

<b>Receipt date: 05/27/2009</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

1						
---	--	--	--	--	--	--

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button.

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1		<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button.

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Receipt date: 03/13/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-09)

Approved for use through 02/28/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2618		
	Examiner Name			
	Attorney Docket Number	AFF.004C5US		

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	5835732		1998-11-10	Kikinis, et al.		
	2	6396164		2002-05-28	Barnea, et al.		
	3	6407750		2002-06-18	Gioscia, et al.		
	4	6421305		2002-07-16	Gioscia, et al.		

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	20030215102		2003-11-20	Marlowe		

If you wish to add additional U.S. Published Application citation information please click the Add button.

Add

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> i	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>

<b>Receipt date: 03/13/2009</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2618		
	Examiner Name			
	Attorney Docket Number	AFF.004C5US		

	1	EP0982732 A1	EP		2000-01-03	Saeahan Information Systems, Inc.	<input checked="" type="checkbox"/>
--	---	--------------	----	--	------------	-----------------------------------	-------------------------------------

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Yamaha Corporation, "QY Data Filer - Owner's Manual," pages 1-250, 1997.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Receipt date: 02/17/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-09)

Approved for use through 02/28/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2618
	Examiner Name	Unknown
	Attorney Docket Number	AFF.004C5US

**U.S. PATENTS**

Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

**U.S. PATENT APPLICATION PUBLICATIONS**

Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

<b>Receipt date: 02/17/2009</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		12015320
	Filing Date		2008-01-16
	First Named Inventor	Russell W. White, et al.	
	Art Unit		2618
	Examiner Name	Unknown	
	Attorney Docket Number		AFF.004C5US

1	Affinity Labs of Texas, LLC, Plaintiff, v. BMW North America, LLC, et al., Defendants, C.A. No. 9:08-cv-00164-RC, Affinity's Infringement Contentions, with Infringement Chart Exhibits A-G.	<input type="checkbox"/>
2	Affinity Labs of Texas, LLC, Plaintiff, v. Alpine Electronics of America, Inc., et al., Defendants, C.A. No. 9:08-cv-00171-RC, Affinity's Infringement Contentions, with Infringement Chart Exhibits A-1 to G.	<input type="checkbox"/>
3	Affinity Labs of Texas, LLC, Plaintiff, v. Dice Electronics, LLC, et al., Defendants, C.A. No. 9:08-cv-00171-RC, Affinity's Infringement Contentions, with Infringement Chart Exhibits A-C.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	6	((("6622083") or ("6396164") or ("6255961") or ("6282464") or ("6148261") or ("6526355")).PN.	USPAT	OR	OFF	2009/11/07 17:48
L2	3	((("20040117442") or ("20010028717") or ("20030215102")).PN.	US-PGPUB; USPAT	OR	OFF	2009/11/07 18:00
L3	3	((("7321783") or ("6681120") or ("6278884")).PN.	US-PGPUB; USPAT	OR	OFF	2009/11/07 18:08
L4	1	pudsey.in. and information adj distribution.ti.	USPAT; EPO	OR	ON	2009/11/07 18:45
L5	12	1 or 2 or 3 or 4	US-PGPUB; USPAT	OR	ON	2009/11/07 18:53
L6	6	5 and (charg\$3 or recharge)	US-PGPUB; USPAT	OR	ON	2009/11/07 18:53
L7	3	((("4807292") or ("6232539") or ("6230322")).PN.	USPAT	OR	OFF	2009/11/07 19:09
L8	2	7 and (charg\$3 or recharge)	US-PGPUB; USPAT	OR	ON	2009/11/07 19:13
L9	0	7 and soft adj button	US-PGPUB; USPAT	OR	ON	2009/11/07 19:16
L10	0	5 and soft adj button	US-PGPUB; USPAT	OR	ON	2009/11/07 19:16
L11	4	5 and (gui or graphical adj2 interface)	US-PGPUB; USPAT	OR	ON	2009/11/07 19:17
L12	5	5 and (gui or graphical adj2 interface or icon or soft adj button or soft adj key)	US-PGPUB; USPAT	OR	ON	2009/11/07 19:17

L13	4	12 and (vehicle or automobile)	US-PGPUB; USPAT	OR	ON	2009/11/07 19:18
L14	1	("6202060").PN.	USPAT	OR	OFF	2009/11/07 19:25

**EAST Search History (Interference)**

< This search history is empty >

**11 / 7 / 09 7:27:31 PM**

**C:\ Documents and Settings\ egary\ My Documents\ EAST\ Workspaces\ 12015320.wsp**

Receipt date: 04/28/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-09)

Approved for use through 04/30/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2618
	Examiner Name	
	Attorney Docket Number	AFF.004C5US

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6192340		2001-02-20	Abecassis	
	2	6230322		2001-05-08	Saib, et al.	
	3	6694200		2004-02-17	Naim	
	4	6526335		2003-02-25	Treyz, et al.	
	5	6990334		2006-01-24	Ito	
	6	5307326		1994-04-26	Osawa	
	7	4905272		1990-02-27	Van de Mortel, et al.	
	8	6629000		2003-09-30	Moon, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.



Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2618
Examiner Name	
Attorney Docket Number	AFF.004C5US

**U.S.PATENT APPLICATION PUBLICATIONS**

Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20040151327		2004-08-05	Marlow	
	2	20050049002		2005-03-03	White, et al.	
	3	20050054379		2005-03-10	Cao, et al.	
	4	20050096018		2005-03-05	White, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	CN 1218258 A	CN		1999-06-02			<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Affinity Labs of Texas, LLC, Plaintiff, v. BMW North America, LLC. et al, Defendants, Case No. 9:08-cv-00164-RC, Defendant Volkswagen Group of America, Inc's Invalidity Contentions, Pages 1-346.	<input type="checkbox"/>

Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2618
Examiner Name	
Attorney Docket Number	AFF.004C5US

2	Affinity Labs of Texas, LLC, Plaintiff, v. Dice Electronics, LLC., Defendants, Case No. 9:08-cv-00163-RC; Affinity Labs of Texas, LLC, Plaintiff, v. Hyundai Motor America, et al., Defendants, Case No. 9:08-cv-00164-RC; Affinity Labs of Texas, LLC, Plaintiff, v. JVC Americas Corp., Kenwood USA Corporation, Defendants, Case No. 9:08-cv-00171-RC, Defendant's Joint Invalidation Contentions and Production of Documents Pursuant To Patent Rules 3-3 and 3-4(b), Pages 1-23 and Exhibits A, B1-B34, C and D.	<input type="checkbox"/>
3	U.S. Patent And Trademark Office, Issue Notification in patent application serial no. 10/947,754, 1 page.	<input type="checkbox"/>
4	R. LIND, et al. "The Network Vehicle - A Glimpse into the Future of Mobile Multi-Media," September 1999, Pages 27-32.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Receipt date: 04/28/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-09)

Approved for use through 04/30/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2618
	Examiner Name	
	Attorney Docket Number	AFF.004C5US

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6192340		2001-02-20	Abecassis	
	2	6230322		2001-05-08	Saib, et al.	
	3	6694200		2004-02-17	Naim	
	4	6526335		2003-02-25	Treyz, et al.	
	5	6990334		2006-01-24	Ito	
	6	5307326		1994-04-26	Osawa	
	7	4905272		1990-02-27	Van de Mortel, et al.	
	8	6629000		2003-09-30	Moon, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2618
Examiner Name	
Attorney Docket Number	AFF.004C5US

**U.S.PATENT APPLICATION PUBLICATIONS**

Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20040151327		2004-08-05	Marlow	
	2	20050049002		2005-03-03	White, et al.	
	3	20050054379		2005-03-10	Cao, et al.	
	4	20050096018		2005-03-05	White, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	CN 1218258 A	CN		1999-06-02			<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Affinity Labs of Texas, LLC, Plaintiff, v. BMW North America, LLC, et al, Defendants, Case No. 9:08-cv-00164-RC, Defendant Volkswagen Group of America, Inc's Invalidity Contentions, Pages 1-346.	<input type="checkbox"/>

Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2618
Examiner Name	
Attorney Docket Number	AFF.004C5US

2	Affinity Labs of Texas, LLC, Plaintiff, v. Dice Electronics, LLC., Defendants, Case No. 9:08-cv-00163-RC; Affinity Labs of Texas, LLC, Plaintiff, v. Hyundai Motor America, et al., Defendants, Case No. 9:08-cv-00164-RC; Affinity Labs of Texas, LLC, Plaintiff, v. JVC Americas Corp., Kenwood USA Corporation, Defendants, Case No. 9:08-cv-00171-RC, Defendant's Joint Invalidation Contentions and Production of Documents Pursuant To Patent Rules 3-3 and 3-4(b), Pages 1-23 and Exhibits A, B1-B34, C and D.	<input type="checkbox"/>
3	U.S. Patent And Trademark Office, Issue Notification in patent application serial no. 10/947,754, 1 page.	<input type="checkbox"/>
4	R. LIND, et al. "The Network Vehicle - A Glimpse into the Future of Mobile Multi-Media," September 1999, Pages 27-32.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Receipt date: 04/28/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-09)

Approved for use through 04/30/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2618
	Examiner Name	
	Attorney Docket Number	AFF.004C5US

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6192340		2001-02-20	Abecassis	
	2	6230322		2001-05-08	Saib, et al.	
	3	6694200		2004-02-17	Naim	
	4	6526335		2003-02-25	Treyz, et al.	
	5	6990334		2006-01-24	Ito	
	6	5307326		1994-04-26	Osawa	
	7	4905272		1990-02-27	Van de Mortel, et al.	
	8	6629000		2003-09-30	Moon, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2618
Examiner Name	
Attorney Docket Number	AFF.004C5US

**U.S. PATENT APPLICATION PUBLICATIONS**

Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20040151327		2004-08-05	Marlow	
	2	20050049002		2005-03-03	White, et al.	
	3	20050054379		2005-03-10	Cao, et al.	
	4	20050096018		2005-03-05	White, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	CN 1218258 A	CN		1999-06-02			<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Affinity Labs of Texas, LLC, Plaintiff, v. BMW North America, LLC. et al, Defendants, Case No. 9:08-cv-00164-RC, Defendant Volkswagen Group of America, Inc's Invalidity Contentions, Pages 1-346.	<input type="checkbox"/>

Receipt date: 04/28/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2618	
Examiner Name		
Attorney Docket Number	AFF.004C5US	

2	Affinity Labs of Texas, LLC, Plaintiff, v. Dice Electronics, LLC., Defendants, Case No. 9:08-cv-00163-RC; Affinity Labs of Texas, LLC, Plaintiff, v. Hyundai Motor America, et al., Defendants, Case No. 9:08-cv-00164-RC; Affinity Labs of Texas, LLC, Plaintiff, v. JVC Americas Corp., Kenwood USA Corporation, Defendants, Case No. 9:08-cv-00171-RC, Defendant's Joint Invalidity Contentions and Production of Documents Pursuant To Patent Rules 3-3 and 3-4(b), Pages 1-23 and Exhibits A, B1-B34, C and D.	<input type="checkbox"/>
3	U.S. Patent And Trademark Office, Issue Notification in patent application serial no. 10/947,754, 1 page.	<input type="checkbox"/>
4	R. LIND, et al. "The Network Vehicle - A Glimpse into the Future of Mobile Multi-Media," September 1999, Pages 27-32.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button


**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



<b>Search Notes</b>  	<b>Application/Control No.</b>  12015320	<b>Applicant(s)/Patent Under Reexamination</b>  WHITE ET AL.
	<b>Examiner</b>  Erika A Gary	<b>Art Unit</b>  2617

<b>SEARCHED</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>
	see EAST search attached	1/30/09	EAG
	see EAST search attached	11/7/09	EAG

<b>SEARCH NOTES</b>		
<b>Search Notes</b>	<b>Date</b>	<b>Examiner</b>
searched parent case for current claim terms - see EAST search attached	1/30/09	EAG
see EAST search attached	11/7/09	EAG

<b>INTERFERENCE SEARCH</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

--	--

Receipt date: 06/12/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (05-09)

Approved for use through 06/30/2009. OMB 0681-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

Receipt date: 06/12/2009

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

1	Affinity Labs of Texas, LLC, Plaintiff, v. Apple, Inc., Defendant, C.A. No. 9:09-cv-00047-RC (Eastern District of Texas), Complaint (pages 1-7), with Exhibits A, B and C, Filed March 24, 2009, 76 pages in total.	<input type="checkbox"/>
---	---	--------------------------

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Receipt date: 06/04/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (04-09)

Approved for use through 05/31/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit		2617	
	Examiner Name	Erika A. Gary		
	Attorney Docket Number		AFF.004C5US	

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2000-66974	JP		2000-03-03			<input type="checkbox"/>
	2	11-68685	JP		1999-03-09			<input type="checkbox"/>
	3	CN 1218258A	CN		1999-06-02			<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

4	H11-242686	JP		1999-09-07	Sony Corporation	<input type="checkbox"/>
5	DE 44 31 070 B4	DE		2004-07-22	DaimlerChrysler AG	<input type="checkbox"/>
6	0 569 343 A1	EP		1993-10-11	Pioneer Electronic Corporation	<input type="checkbox"/>
7	0 675 341 A1	EP		1995-04-10	Honda Giken Kogyo	<input type="checkbox"/>
8	0 771 686 A2	EP		1997-07-05	Toyota Jidosha Kabushiki Kaisha Toyota-shi, Aichi-	<input type="checkbox"/>
9	H4-261576	JP		1992-09-17	Mitsubishi Electric Corporation	<input type="checkbox"/>
10	2-301330	JP		1990-12-13		<input type="checkbox"/>
11	5-294250	JP		1993-11-09		<input type="checkbox"/>
12	6-187597	JP		1994-07-08		<input type="checkbox"/>
13	JP6289118	JP		1994-10-18	Sega Enterprises KK	<input type="checkbox"/>
14	JP6294659	JP		1994-10-21	Dainippon Printing Co. LTD.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

15	07-129895	JP		1995-05-19	Honda Motor Co Ltd	<input type="checkbox"/>
16	07-146155	JP		1995-06-06	Honda Motor Co Ltd	<input type="checkbox"/>
17	7-262493	JP		1995-10-13	CSK Corporation	<input type="checkbox"/>
18	7-262493	JP		1995-10-13		<input type="checkbox"/>
19	JP7270171	JP		1995-10-20	Sumitomo Electronic Industries	<input type="checkbox"/>
20	JP7036382	JP		1995-02-07	Mitsubishi Electric Corp.	<input type="checkbox"/>
21	8-110231	JP		1996-04-30		<input type="checkbox"/>
22	9-61514	JP		1997-03-07		<input type="checkbox"/>
23	10-103966	JP		1998-04-24		<input type="checkbox"/>
24	10-143349	JP		1998-05-29	Compaq Computer Corporation	<input type="checkbox"/>
25	JP1018712	JP		1989-01-23	Mazda Motor	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

26	JP5077679	JP		1993-03-30	Nissan Motor	<input type="checkbox"/>
27	JP59085599	JP		1984-05-17	Nissan Motor	<input type="checkbox"/>
28	JP63136828	JP		1988-06-09	Pioneer Electronic Corp.	<input type="checkbox"/>
29	63-136828	JP		1988-06-09		<input type="checkbox"/>
30	WO 96/04724	WO		1996-02-15	Emerson, Harry	<input type="checkbox"/>
31	WO 96/07110	WO		1996-03-07	British Telecommunications Public Limited Company	<input type="checkbox"/>
32	WO 97/13657	WO		1997-04-17	United Technologies Automotive, Inc.	<input type="checkbox"/>
33	H11-317061	JP		1999-11-16	Victor Company of Japan, LTD.	<input checked="" type="checkbox"/>
34	2901445	JP		1999-03-19	Kenwood Corporation	<input checked="" type="checkbox"/>
35	WO 99/35009	WO		1999-07-15	Microsoft Corporation	<input type="checkbox"/>
36	11-219580	JP		1999-08-10		<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

37	11219580 A	JP		1999-10-08	Sony Corp	<input type="checkbox"/>
38	1168685	JP		1999-03-09		<input type="checkbox"/>
39	11-068685	JP		1999-09-03	Sony Corp	<input type="checkbox"/>
40	1998-052033	JP		1998-09-25		<input type="checkbox"/>
41	1999-0042565	JP		1999-06-15		<input type="checkbox"/>
42	1999-0073234	KR		1999-10-05	Young-Man Lee	<input type="checkbox"/>
43	1999-0048723	KR		1999-07-05		<input type="checkbox"/>
44	KR2019990022030U	KR		1999-06-25	Young-Shik Cheon	<input type="checkbox"/>
45	2000-0001465	KR		2000-01-25	Samsung Motors	<input type="checkbox"/>
46	0142256	KR		1998-03-30		<input type="checkbox"/>
47	WO 98/21672	WO		1998-05-22	Inergy Online, Inc.	<input type="checkbox"/>



Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

48	WO 98/47252	WO		1998-10-22	Stern, Geoffrey	<input type="checkbox"/>
49	WO 00/54187	WO		2000-09-14	Rock.Com, Inc.	<input type="checkbox"/>
50	WO 00/60450	WO		2000-10-12	Khyber Technologies Corporation	<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	MARK MOELLER, Computing Unplugged Magazine, "Product Preview, A Survey of Auto PC 2.0 for software developers," 1999-2009, Zatz Publishing, pages 1-7.	<input type="checkbox"/>
	2	MARK MOELLER, Computing Unplugged Magazine, "AutoPC Update, Auto PC/Windows CE for Automotive news bites," 1999-2009, Zatz Publishing, pages 1-4.	<input type="checkbox"/>
	3	Claim Chart for KR19990033393, Claim 17 of U.S. Patent No. 7,324,833, pages 1-3.	<input type="checkbox"/>
	4	RIO500, Getting Started Guide for Windows 98 and Macintosh OS 8.6, pages 1-2.	<input type="checkbox"/>
	5	NORBERT A. STREITZ, et al., "DOLPHIN: Integrated Meeting Support Across Local And Remote Desktop Environments And LiveBoards," Integrated Publication and Information Systems Institute, 1994, pages 345-358.	<input type="checkbox"/>
	6	LEO DEGEN, et al., "Working with Audio: Integrating Personal Tape Recorders and Desktop Computers," May 3-7, 1992, pages 413-418.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

7	H.S. JUN GIBEE, "A Virtual Information Desk On The Internet," University of Ulsan, September 1999, pages 265-268.	<input type="checkbox"/>
8	STEVE WHITTAKER, et al., "TeleNotes: Managing Lightweight Interactions in the Desktop," Lotus Development Corporation, June 1997, pages 137-168.	<input type="checkbox"/>
9	R.M. CROWDER, et al., "Integration of Manufacturing Information Using Open Hypermedia," Computer in Industry, 1999, pages 31-42.	<input type="checkbox"/>
10	TOMAS BOSTROM, et al., "Mobile Audio Distribution," Royal Institute of Technology, 1999, pages 166-172.	<input type="checkbox"/>
11	ALEX POON, et al., Xerox Disclosure Journal, Vol. 19, No. 2, "Gestural User Interface Technique for Controlling the Playback of Sequential Media," March/April 1994, pages 187-190.	<input type="checkbox"/>
12	DEB KUMAR ROY, "NewsComm: A Hand-Held Device For Interactive Access to Structured Audio," Massachusetts Institute of Technology, June 1995, pages 1-12.	<input type="checkbox"/>
13	VICTORIA BELLOTTI, et al., "Walking Away from the Desktop Computer: Distributed Collaboration and Mobility in a Product Design Team," 1996, pages 209-218.	<input type="checkbox"/>
14	UPUL OBEYSEKARE, et al., "The Visual Interactive Desktop Laboratory," January-March 1997, pages 63-71.	<input type="checkbox"/>
15	ASIM SMAILAGIC, et al., "MoCCA: A Mobile Communication and Computing Architecture," Institute for Complex Engineered Systems, pages 1-8.	<input type="checkbox"/>
16	SUI-MENG POON, et al., "Integration of Value-Added Audio Playback Capacity Into Computer Network," Nanyang Technological University, 1995, pages 632-636.	<input type="checkbox"/>
17	ERDAL PAKSOY, et al., "A variable-rate celp coder for fast remote voicemail retrieval using a notebook computer," DSPS R&D Center, Texas Instruments, 1997, pages 119-124.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

18	JEFFREY A. DAVIS, "Use of Personal Computers in Satellite Command and Control Systems," Raytheon Systems Company, October 24, 1999, pages 283-291.	<input type="checkbox"/>
19	NIKI DAVIS, "Remote Teaching Via ISDN2 And Desktop Conferencing," Exeter University School of Education, pages 1-3.	<input type="checkbox"/>
20	A CHAN, et al., "The PEP-II Project-Wide Database," Stanford University, 1996, pages 840-842.	<input type="checkbox"/>
21	KRISHNA BHARAT, et al., "Migratory Applications," Springer Berlin, Vol. 1222, 1997, pages 1-21.	<input type="checkbox"/>
22	EMPEG CAR, "MP3 in your dash," Digital Audio Player User Guide, pages 1-50.	<input type="checkbox"/>
23	MICROSOFT, "Getting Started Microsoft. Windows. 98" Second Edition, 1998, pages 1-138.	<input type="checkbox"/>
24	SAUL GREENBERG, "PDAs and Shared Public Displays: Making Personal Information Public, and Public Information Personal," University of Calgary, March 1999, pages 1-11.	<input type="checkbox"/>
25	NAOHIKO KOHTAKE, et al., "InfoStick: an interaction device for Inter-Appliance Computing," Keio University, pages 1-15.	<input type="checkbox"/>
26	HEWLETT PACKARD, User's Guide, HP Jornada 420, Palm-Size PC, pages 1-75	<input type="checkbox"/>
27	MICROSOFT, "Introducing Microsoft Windows 95 - Certificate of Authenticity," 1995, pages 1-117.	<input type="checkbox"/>
28	SONY, "New Technical Theory For Servicing, MZ-R5ST Operation Manual," pages 1-44.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

29	RICHARD C. DAVIS, et al., "A Framework for Sharing Handwritten Notes," 1998, pages 119-120.	<input type="checkbox"/>
30	KRISHNA A. BHARAT, et al., "Migratory Applications," UIST '95, November 14-17, 1995, pages 133-142.	<input type="checkbox"/>
31	BRAD A. MYERS, "Collaboration Using Multiple PDAs Connected To A PC," Carnegie Mellon University, 1998, pages 385-294.	<input type="checkbox"/>
32	RICHARD C. DAVIS, et al., "NotePals: Lightweight Note Sharing by the Group, for the Group," May 15-20, 1999, pages 338-345.	<input type="checkbox"/>
33	JUN REKIMOTO, et al., "Augmented Surfaces: A Spatially Continuous Work Space for Hybrid Computing Environments," May 15-20, 1999, pages 378-385.	<input type="checkbox"/>
34	DAN R. OLSEN, JR., "Interacting with Chaos," September and October 1999, pages 42-54.	<input type="checkbox"/>
35	SCOTT ROBERTSON, et al., "Dual Device User Interface Design: PDAs and Interactive Television," April 13-18, 1996, pages 79-86.	<input type="checkbox"/>
36	SYMANTEC CORPORATION, "pcANYWHERE32 User's Guide," 1993-1997, pages 1-216.	<input type="checkbox"/>
37	KRISHNA BHARAT, et al., Migratory Applications, "Mobile Object Systems Towards the Programmable Internet," Springer Berlin/Heidelberg, Volume 1222/11997, 1997, pages 1-134.	<input type="checkbox"/>
38	DIAMOND MULTIMEDIA SYSTEMS, INC., "Rio PMP300, User's Guide," 1998, pages 1-27.	<input type="checkbox"/>
39	SONY, "Portable MiniDisc Recorder, Operating Instructions, MZ-R55," 1998, pages 1-42.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

40	NORBERT A. STREITZ, et al., "i-Land: An Interactive Landscape for Creativity and Innovation," Proceedings of the ACM Conference on Human Factors in Computing Systems, May 15-20, 1999, pages 120-127.	<input type="checkbox"/>
41	NORBERT A. STREITZ, et al., "Roomware for Cooperative Buildings: Integrated Design of Architectural Spaces and Information Spaces," pages 1-20	<input type="checkbox"/>
42	Direct Cable Connection screen shot, "B1U6U4," 10 pages total.	<input type="checkbox"/>
43	Direct Cable Connection screen shot, 10 pages total.	<input type="checkbox"/>
44	IBM, "WordPad z50 Cradle Option - User's Guide," 1990, pages 1-18.	<input type="checkbox"/>
45	IBM MOBILE SYSTEMS, "WorkPad z50 Mobile Companion (2608-1Ax), Hardware Maintenance Manual," March 1999, pages 1-77.	<input type="checkbox"/>
46	KEVIN JOST, Automotive Engineering International, "The car as a mobile-media platform," May 1998, pages 49-53.	<input type="checkbox"/>
47	MICROSOFT CORPORATION, "Windows CE 2.1 Technical Articles, Developing Applications for an Auto PC," June 1999, pages 1-13.	<input type="checkbox"/>
48	INFOGATION CORPORATION, "InfoGation Corp. Introduces Software Applications for Next-Generation Smart Car Systems," January 8, 1998, pages 1-2.	<input type="checkbox"/>
49	BUSINESS WIRE, "ORA Electronics Announces USB-Compatible TelCar Mark VII Begins Shipping First Quarter of 1999," January 6, 1999, pages 1-2.	<input type="checkbox"/>
50	ORA USA, "ORA Electronics Patents Telcar Cellular Telephone Interface," July 6, 1998, pages 1-2.	<input type="checkbox"/>

Receipt date: 06/04/2009

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	/Erika Gary/ (11/07/2009)	Date Considered	11/07/2009
--------------------	---------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit		2617	
	Examiner Name	Erika A. Gary		
	Attorney Docket Number		AFF.004C5US	

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	6622083		2003-09-16	Knockheart, et al.		

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1						

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS				Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.		T <sup>5</sup>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

1	The United States Patent And Trademark Office, Office Action Mailed August 5, 2009, in a related application.	<input type="checkbox"/>
---	---	--------------------------

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-09-11
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	12015320			
<b>Filing Date:</b>	16-Jan-2008			
<b>Title of Invention:</b>	Method for Managing Media			
<b>First Named Inventor/Applicant Name:</b>	Russell W. White			
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas			
<b>Attorney Docket Number:</b>	AFF.0004C5US			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	6056043
<b>Application Number:</b>	12015320
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	2156
<b>Title of Invention:</b>	Method for Managing Media
<b>First Named Inventor/Applicant Name:</b>	Russell W. White
<b>Customer Number:</b>	21906
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas
<b>Filer Authorized By:</b>	Mark J. Rozman
<b>Attorney Docket Number:</b>	AFF.0004C5US
<b>Receipt Date:</b>	11-SEP-2009
<b>Filing Date:</b>	16-JAN-2008
<b>Time Stamp:</b>	14:37:35
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$180
RAM confirmation Number	791
Deposit Account	201504
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

<b>File Listing:</b>					
<b>Document Number</b>	<b>Document Description</b>	<b>File Name</b>	<b>File Size(Bytes)/ Message Digest</b>	<b>Multi Part /.zip</b>	<b>Pages (if appl.)</b>
1	Information Disclosure Statement (IDS) Filed (SB/08)	AFF004C5USIDSforB1OA.pdf	608472 6ef7d383b0477f2fdca8e6fa5c8e14cf581d3de	no	4
<b>Warnings:</b>					
<b>Information:</b>					
2	NPL Documents	AFF004NPLDocumentB1OA.pdf	758526 edd6a46b75219c42d0b7ed41f6cee4929e76b5a7	no	28
<b>Warnings:</b>					
<b>Information:</b>					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30163 9d55c7fab8b0ac9842af5c0233645d2ae1f302af	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			1397161		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit		2617	
	Examiner Name	Erika A. Gary		
	Attorney Docket Number		AFF.004C5US	

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	7065342		2006-06-20	Rolf		
	2	6845398		2005-01-18	Galensky, et al.		
	3	6185491		2001-02-06	Gray, et al.		
	4	6178514		2001-01-23	Wood		
	5	6006115		1999-12-21	Wingate		

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

**U.S.PATENT APPLICATION PUBLICATIONS**

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1						

If you wish to add additional U.S. Published Application citation information please click the Add button.

Add

**FOREIGN PATENT DOCUMENTS**

Remove

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit		2617	
	Examiner Name	Erika A. Gary		
	Attorney Docket Number		AFF.004C5US	

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> i	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	EP 1 146 674 A2	EP		2001-10-17	Mazda Motor Corporation		<input type="checkbox"/>
	2	DE 102 05 641 A 1	DE		2002-02-12	Volkswagen AG		<input checked="" type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	"Request for Inter Partes Reexamination Of U.S. Patent No. 7,324,833 Pursuant To 37 CFR 1.915," Requestor: Volkswagen Group of America, Inc., Filed on August 21, 2009, Pages 1-61 with Certificate of Mailing, and Claim Charts A - HH.	<input type="checkbox"/>
	2	YAMAHA CORPORATION, "Yamaha Music Sequencer, QY70, Owner's Manual," Chapters 1-11, 1997.	<input type="checkbox"/>
	3	MULTI TECHNOLOGY EQUIPMENT, "Neo Car Jukebox, Installation and Instruction Manual," Pages 1-30.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-09-03
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**17.10.2001 Bulletin 2001/42**

(51) Int Cl.7: **H04H 1/00**

(21) Application number: **01108630.3**

(22) Date of filing: **05.04.2001**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
 MC NL PT SE TR**  
 Designated Extension States:  
**AL LT LV MK RO SI**

- Ushio, Masao, c/o Mazda Motor Corporation  
 Aki-gun, Hiroshima 730-8670 (JP)
- Hosoda, Kouji, c/o Mazda Motor Corporation  
 Aki-gun, Hiroshima 730-8670 (JP)
- Hirabayashi, Shigefumi,  
 c/o Mazda Motor Corporation  
 Aki-gun, Hiroshima 730-8670 (JP)

(30) Priority: **07.04.2000 JP 2000106892**  
**11.04.2000 JP 2000108853**

(71) Applicant: **Mazda Motor Corporation**  
**Aki-gun, Hiroshima 730-8670 (JP)**

(74) Representative: **Müller-Boré & Partner**  
**Patentanwälte**  
**Graflinger Strasse 2**  
**81671 München (DE)**

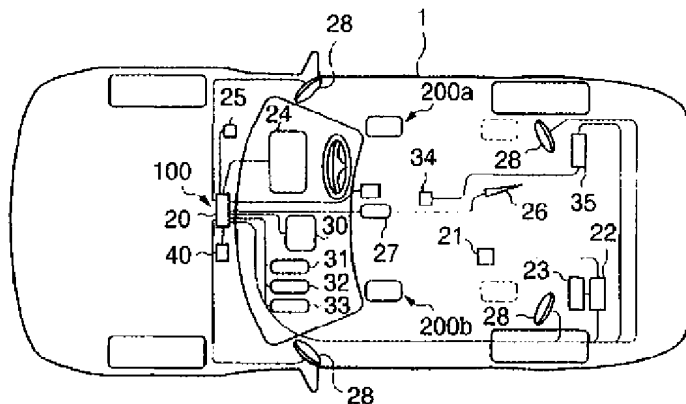
(72) Inventors:  
 • **Ohmura, Hiroshi, c/o Mazda Motor Corporation**  
**Aki-gun, Hiroshima 730-8670 (JP)**

(54) **System and method for reproducing audio data, method and apparatus for reproducing audio data to be used in a vehicle and computer readable storage medium for storing a computer program**

(57) An audio apparatus for a vehicle made up of a carmounted audio apparatus 100 and portable audio apparatuses 200a and 200b transmits/receives contents data such as music via radio communication. As a communication system for this in-car radio communi-

cation, a short-distance data communication system is used, which allows the apparatuses to recognize and authenticate one another and perform data communication with one another in the vehicle. Received music data is reproduced/output in real time.

**FIG. 1**



## Description

### FIELD OF THE INVENTION

[0001] The present invention relates to the field of an audio apparatus that provides contents such as music in a vehicle such as an automobile.

### BACKGROUND OF THE INVENTION

[0002] In the field of an automobile, a typical example of vehicle, an audio apparatus has come into widespread use in recent years allowing passengers to enjoy various contents such as music in a vehicle.

[0003] In such a conventional audio apparatus, a passenger inserts a portable music storage medium such as a CD (compact disk), MD (mini-disk), cassette tape into the audio apparatus and enjoys music of his/her choice by replaying/outputting it from data stored in the music storage medium.

[0004] However, an audio apparatus using such a music storage medium is burdensome because the passenger needs to take the storage medium storing music to be replayed in the vehicle into the vehicle every time the passenger gets on the vehicle.

[0005] Thus, the Japanese Patent Laid-Open No. 11-30986, etc. proposes a technology for directly receiving digitized music data from the outside through an audio apparatus using a music distribution service and enjoying the music data in the vehicle without using a music recording medium.

[0006] Here, the technology described in the Japanese Patent Laid-Open No. 11-30986 will be summarized below.

[0007] The vehicle music data acquisition system described in this Publication consists of an information center that distributes music to vehicles and a vehicle capable of wirelessly communicating with the information center (see FIG. 2 of the relevant Publication) and the music distribution procedure in such a system configuration is explained with reference to FIG. 2 of the relevant Publication.

[0008] That is, the vehicle sends data about a music replaying condition in the own vehicle (including information to identify music of a distribution request) to the information center.

[0009] Upon reception of the data about the music replaying condition, the information center determines whether the requested music data exists in the information center or not and if the music data does not exist, the information center acquires the data on the Internet from the outside. Then, the information center creates music data with the amount of data reduced (compressed) based on the data about the music replaying condition and sends the music data created to the vehicle. The vehicle replays the music based on the received music data.

[0010] According to the audio apparatus using this

music distribution service, the passenger can enjoy any music at any time without the need to prepare any music storage medium. This allows the passenger to easily enjoy music of his/her choice in the vehicle, providing an effect of allowing the passenger to spend his/her time comfortably in the vehicle.

[0011] Furthermore, the technology described in the Japanese Patent Laid-Open No. 10-240207 will be summarized below.

[0012] This Publication describes a touch-screen type audio-visual replay digital system and a plurality of windows appearing on a display shows information on audio-visual contents that can be replayed.

[0013] The user can select a desired window from among a plurality of windows displayed to easily replay the audio-visual contents requested to be replayed.

[0014] On the other hand, recently, with the development of the Internet, music distribution services indirectly using the Internet are provided as described below, which allows the user to download digitized contents data such as music to an information storage medium such as a memory card and enjoy music of his/her choice easily.

[0015] Furthermore, recently, individuals often carry with them portable audio apparatuses and these portable audio apparatuses are also making it easier to enjoy music using music data stored in an information storage medium.

[0016] By the way, people go for a long-distance drive on a trip, etc., a plurality of passengers often gets on the vehicle, in which case, because preference of music varies from one person to another, it is preferred that these passengers be able to enjoy music of their respective choices and spend their time during the long-distance drive comfortably.

[0017] In a vehicle equipped with an audio apparatus using a conventional music storage medium, satisfying such as demand requires each passenger to record music of his/her choice to a music storage medium corresponding to the audio apparatus or purchase one and take the music storage medium into the vehicle.

[0018] As in the case of the Japanese Patent Laid-Open No. 11-30986, the audio apparatus using the music distribution service provided from the information center can freely obtain a variety of music data at any time by a required amount. This allows the passengers to freely enjoy music of their choice without the need to take the music storage medium into the vehicle.

[0019] The audio apparatus using the music distribution service provides such convenience, but on the other hand, because this audio apparatus receives music data from the outside by radio (wireless telephone line, etc.), it takes some time of communication to download music data of one piece of music for example. Therefore, if, for example, electromagnetic interference occurs while the music data is being downloaded during a drive, the audio apparatus is unable to reliably receive the music data of the relevant piece of music.

[0020] And in the case where the music data cannot be received reliably, it is necessary to receive the music data again. Thus, even the audio apparatus using the music distribution service is still not sufficient in respect of user friendliness.

[0021] Moreover, downloading music data from the music distribution service in the current communication environment entails a high communication cost, and so it is problematic in respect of cost, too.

[0022] Therefore, one possible method of enjoying music of one's choice reliably and at low cost without using such a music distribution service is to use music data included in a portable audio apparatus. This is because the portable audio apparatus that each passenger carries includes music data of his/her choice beforehand and using this music data allows the passenger to reliably enjoy music data of his/her choice in the vehicle.

[0023] However, the shape and mode of a portable audio apparatus varies from one model to another, and the wired connection port and the shape of its information storage medium also vary. For this reason, using this portable audio apparatus in the vehicle requires the passenger to set the audio apparatus in a mount preinstalled in the vehicle, connect it to an in-car audio apparatus via a cable or insert or remove the information storage medium to take the music data of portable audio apparatuses of all models into the in-car audio apparatus, which is difficult in practice.

[0024] Moreover, even if wired connection ports of portable audio apparatuses of all models and information storage media are standardized having a common shape and mode, there remains a possibility that the passenger will still need to set the audio apparatus in the mount and insert or remove the information storage media, which is a problem of requiring time and trouble.

[0025] Moreover, the conventional audio system above generally comprises a main unit that controls reproduction of musical pieces (contents) connected to a plurality of speakers via cables. Therefore, when an audio system is also mounted when the vehicle is purchased or when a desired audio system is mounted later, it is troublesome to lay cables for the audio system in a limited space of the vehicle.

[0026] Furthermore, also in the car cabin design stage, the degree of freedom in design may be reduced because it is necessary to consider locations of cables for the audio system and operability for cabling, etc.

[0027] Furthermore, in a conventional audio system, once a determined system configuration has been incorporated in the vehicle, subsequent changes to the system configuration are not easy. Thus, when the user wants to replay a CD (compact disk) in the main unit that is provided with only functions of a radio tuner and cassette tape recorder, a widespread method for meeting such a demand is to carry into the vehicle a portable CD player, a transmitter that FM-modulates an output signal and allows a radio tuner on the audio system side to receive the output signal or an adapter that reads the

output signal of the CD player through the head of the cassette tape recorder and thereby indirectly reproduces the output signal of the CD player through the audio system.

5 [0028] However, the above indirect reproduction method requires that a portable CD player and FM transmitter, etc. be carried into the vehicle and their locations be secured in a narrow car cabin, and restricts the original seating space for passengers, provides not good  
10 looking and also has a problem with the quality of musical pieces.

#### SUMMARY OF THE INVENTION

15 [0029] The present invention has been proposed to solve the conventional problems, and has as its main object to provide, even when a plurality of passengers gets on an automobile, for example, an audio system and its contents reproduction method, audio apparatus  
20 for a vehicle and its contents reproduction method, portable audio apparatus, computer program product and computer-readable storage medium capable of easily and reliably reproducing contents data in a portable audio apparatus carried by passengers inside the vehicle  
25 and outputting the contents data as sound so that passengers can enjoy music of their respective choices in the vehicle without the need to download contents data such as music and conversation from the Internet.

[0030] To solve the above problems, the present invention is constituted as follows.

[0031] That is, the present invention provides an audio system that reproduces contents information as sound in a vehicle, composed of portable audio apparatuses (200, 200a, 200b) carried by passengers of the  
30 vehicle and an audio apparatus (100) mounted in the vehicle, characterized in that the portable audio apparatuses include contents information retaining means (204) for retaining contents information and transmitting  
35 means (205) for transmitting the contents information to the audio apparatus at least by means of radio communication, and the audio apparatus includes receiving means (110) for receiving the contents information from the portable audio apparatuses at least by means of radio communication, and controlling means (101, 103)  
40 for reproducing the contents information received by the receiving means and at the same time outputting the reproduced information as sound from speakers (28) mounted in the vehicle.

[0032] In a preferred embodiment, it is preferred that the audio apparatus be provided with operation switches (24, 106-109) that allow entries by the passengers of the vehicle, operation signal transmitting means (110) for transmitting operation signals according to the operations of the operation switches to the portable audio  
45 apparatuses at least by means of radio communication, and the portable audio apparatuses be further provided with controlling means (203) for performing own operation control according to the operation signals received

from the audio apparatus at least by means of radio communication.

[0033] Furthermore, for example, the audio apparatus (100) mounted in the vehicle constructs a radio subsystem made up of audio controlling means (100A) equipped with a first radio communication apparatus (116) and speaker units (2A to 2D) equipped with a second radio communication apparatus (222), and the first and second radio communication apparatuses can perform radio communications based on a predetermined radio communication protocol, and it is preferred that the plurality of speaker units receive radio signals transmitted from the first radio communication apparatus of the audio controlling means by the second radio communication apparatus and reproduce the contents information contained in the received radio signals according to characteristic information individually set in each speaker unit.

[0034] To attain the same object, the present invention provides a contents reproduction method for an audio system that reproduces contents information as sound in the vehicle, comprising a system constructing step of constructing a communication system that carries out at least a radio communication, composed of portable audio apparatuses (200, 200a, 200b) carried by passengers of the vehicle and an audio apparatus (100) mounted in the vehicle, a contents information sending step of sending contents information retained beforehand in the portable audio apparatuses to the audio apparatus at least by means of radio communication, and a sound reproducing step of receiving and reproducing the contents information sent in the contents information sending step at least by means of radio communication and outputting the reproduced information as sound from speakers (28) mounted in the vehicle.

[0035] Furthermore, for example, the system constructing step includes a subsystem constructing step of constructing a radio subsystem made up of an audio control unit (100A) equipped with a radio communication apparatus that can perform radio communication based on a predetermined radio communication protocol and a plurality of speaker units (2A to 2D), and it is preferred that the audio reproducing step includes a first step of sending a radio signal containing contents information from the audio control unit and the plurality of speaker units include a second step of receiving the radio signals and reproducing the contents information included in the received radio signal as sound according to characteristic information individually set in each speaker unit.

[0036] To attain the same object, the present invention provides an audio apparatus for a vehicle (100) mounted in a vehicle to reproduce contents information as sound in the vehicle, comprising system constructing means (101, 110) for constructing a radio communication system composed of portable audio apparatuses (200, 200a, 200b) carried by passengers of the vehicle and the audio apparatus, receiving means (110) for re-

ceiving the contents information from the portable audio apparatuses at least by means of radio communication and controlling means (101, 103) for reproducing the contents information received by the receiving means and outputting the reproduced information as sound from speakers (28) mounted in the vehicle.

[0037] In a preferred embodiment, it is preferred that the system constructing means, when the plurality of portable audio apparatuses is identified, construct a radio communication system including the plurality of portable audio apparatuses and the controlling means control so that between the plurality of portable audio apparatuses, the contents information retained beforehand by the first portable audio apparatus is transferred to the second portable audio apparatus by radio communication and the contents information is reproduced as sound by the second portable audio apparatus.

[0038] Another method to attain the same object is a contents reproduction method for an audio apparatus for a vehicle (100) mounted in a vehicle that reproduces contents information as sound in the vehicle, comprising a system constructing step of constructing a radio communication system composed of portable audio apparatuses (200, 200a, 200b) carried by passengers of the vehicle and the audio apparatus, a receiving step of receiving the contents information from the portable audio apparatuses at least by means of radio communication and a sound reproducing step of reproducing the contents information received in the receiving step and outputting the reproduced information as sound from speakers (28) mounted in the vehicle.

[0039] The same object above can also be attained by an audio apparatus mounted in a vehicle (audio apparatus for a vehicle), program codes that instruct so that the operation of the audio apparatus is implemented and a computer-readable storage medium that stores these program codes, which make up the audio system in the above configuration.

[0040] The same object above can also be attained by a contents reproduction method of the audio apparatus (audio apparatus for a vehicle) corresponding to the contents reproduction method of the audio system in the configuration above, program codes that instruct so that the contents reproduction method is implemented in the audio apparatus for a vehicle and a computer-readable storage medium that stores these program codes.

[0041] Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0042] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together with

the description, serve to explain the principles of the invention.

Fig. 1 is an outlined plan view of an automobile using an audio apparatus of the present invention;  
Fig. 2 is a system block diagram of an audio apparatus control system and radio communication system according to a first embodiment of the present invention;

Fig. 3 is a front view of an operation panel of an audio apparatus 100 in the first embodiment;

Fig. 4 is a flow chart of operation control of the audio apparatus 100 in the first embodiment;

Fig. 5 is an "AUDIO TOP MENU" screen shown on a display in the first embodiment;

Fig. 6 is a "reception MENU" screen shown on a display in the first embodiment;

Fig. 7 is an "AUDIO MENU" screen shown on a display in the first embodiment;

Fig. 8 is a flow chart of operation control of a portable audio apparatus 200 in the first embodiment;

Fig. 9 is an "erasure MENU" screen shown on a display in the first embodiment;

Fig. 10 is an "Internet MENU" screen shown on a display in the first embodiment;

Fig. 11 is a "Transfer MENU" screen shown on a display in the first embodiment;

Fig. 12 is a display screen in a first modification of the first embodiment;

Fig. 13 is an outlined plan view of an automobile using radio communication signals directed to seat positions in a second modification of the first embodiment;

Fig. 14 is an outlined plan view of an automobile using radio communication signals directed to mount positions in a third modification of the first embodiment;

Fig. 15 illustrates a configuration example with an audio apparatus according to a second embodiment mounted in the car cabin;

Fig. 16 illustrates a block configuration of components making up the audio apparatus according to the second embodiment and flows of radio signals between the components;

Fig. 17 is a flow chart of musical piece reproduction processing in an audio unit 100A in the second embodiment;

Fig. 18 is a flow chart of musical piece reproduction processing in speaker units 2A to 2D in the second embodiment;

Fig. 19A and Fig. 19B are flow charts of musical piece reproduction processing in a portable audio terminal 3 in the second embodiment;

Fig. 20 is a flow chart of musical piece reproduction processing in an audio unit 100A in a third embodiment;

Fig. 21 is a flow chart of musical piece reproduction processing in speaker units 2A to 2D in the third em-

bodiment;

Fig. 22A and Fig. 22B are flow charts of musical piece reproduction processing in a portable audio terminal 3 in the third embodiment; and

Fig. 23 illustrates a display example of a display 113 of the audio unit 100A.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0043] Preferred embodiments of the present invention will now be described in detail in accordance with the accompanying drawings.

[First embodiment]

[0044] Embodiments of the present invention applied to an automobile, a typical example of vehicle, will now be described in detail in accordance with the accompanying drawings.

[0045] FIG. 1 is an outlined plan view of an automobile using an audio apparatus (audio system) of the present invention. As shown in FIG. 1, the automobile audio apparatus of this embodiment is generally constituted by a car-mounted audio apparatus 100 (hereinafter referred to as "audio apparatus 100") mounted in a vehicle 1 and portable audio apparatuses 200a and 200b carried into the vehicle by passengers.

[0046] In the following explanations, the portable audio apparatuses 200a and 200b will sometimes be collectively called a "portable audio apparatus 200".

[0047] The audio apparatus 100 is constructed of not only an audio function but also a navigation function and Internet communication function, etc. so as to perform a variety of information processing.

[0048] A concentrated control unit 20 for controlling the entire system of the audio apparatus of this embodiment is installed close to an instrument panel in the center of the vehicle 1. This concentrated control unit 20 is connected with various apparatuses mounted in the vehicle 1 in order to perform the functions, which will be described below.

(Navigation function)

[0049] The navigation function is intended to realize navigation functions such as route guidance to a preset desired destination and is constructed by a GPS (Global Positioning System) antenna 21 to detect the current position of the own vehicle installed in the vehicle 1, a navigation controller 22 to perform navigation control, a DVD-ROM changer 23 to read road map information, etc. stored in DVD-ROM, a display 24 that displays navigation information and allows input operations by passengers and a voice guide speaker 25 that outputs navigation information in voice, and these apparatuses are each connected to the concentrated control unit 20.

[0050] The navigation function in this embodiment is

provided with functions similar to those of a conventional navigation apparatus such as detecting the current position of the own vehicle, giving the passengers road information and traffic information and providing a route guide for the automobile.

(Internet communication function)

[0051] The Internet communication function is constructed by a telephone antenna 26 connected to the Internet over a radio telephone network, a cellular telephone 27 to transmit/receive Internet information, the display 24 that allows input operations by the passenger, car-mounted speakers 28 that output the information received on the Internet as voice information (hereinafter referred to as "speakers 28"), etc. and these apparatuses are also each connected to the concentrated control unit 20.

[0052] This embodiment transmits/receives Internet information using the cellular telephone 27, but it is also possible to provide a dedicated Internet transmission/reception section for the main unit of the audio apparatus 100 aside from the cellular telephone 27.

[0053] The Internet communication function of this embodiment is provided with functions such as receiving various kinds of information requested by the passengers by the audio apparatus 100 over the Internet and transmitting information from the vehicle to the outside by e-mail, etc.

(Audio function)

[0054] The audio function is constructed by an audio control unit 30 that controls the entire system of the relevant audio function, a CD drive 31 that reads CD music data, an MD drive 32 that reads MD music data, a memory drive 33 that reads music data of a memory card, speakers 28 that output music as sound in the vehicle, a car-mounted radio antenna 34 placed in the center of the vehicle to carry out radio communication with a plurality of cellular audio apparatuses 200a and 200b in the vehicle and a radio transmitter/receiver 35 that transmits/receives music data to/from the portable audio apparatuses 200a and 200b, and these apparatuses are each connected to the concentrated control unit 20.

[0055] As in the case of a conventional audio apparatus, this audio function is provided with functions such as reading contents data such as music, converted to digital data, stored in a CD, MD or memory card (hereinafter referred to as "music data"), generating reproduction signals according to the read music data and outputting the music data from the speakers 28 as music (hereinafter referred to as "reproduced output"), and also provided with a function of receiving AM/FM waves by an AM/FM tuner (not shown) and outputting AM/FM broadcasting signals from the speakers 28.

[0056] This audio function is also provided with a function of receiving digital music data using a music distri-

bution service of the Internet and reproducing and outputting as music from the speakers 28.

[0057] The audio function of the audio apparatus 100 is further capable of communicating with a plurality of the portable audio apparatuses 200a and 200b carried into the vehicle through in-car radio communications based on a predetermined communication system and provided with a function of receiving music data retained in the portable audio apparatuses 200a and 200b and reproducing and outputting as music from the speakers 28 in the vehicle.

[0058] Note, that the concentrated control unit 20 to which these apparatuses are connected is connected to a car-mounted LAN (local area network) unit 40 as shown in FIG. 1 and is constructed so as to perform information communication with other vehicle control apparatuses.

[0059] Next, the control system and radio communication system of the audio apparatus according to this embodiment will be explained with reference to the system block diagram in FIG. 2.

[0060] In FIG. 2, a system block of the audio apparatus 100 is shown on the Left side and a system block of the portable audio apparatus 200a is shown on the right side. FIG. 2 shows details of only the system block of one portable audio apparatus for convenience, but the system of the other portable audio apparatus is also constructed in the same way.

[0061] The audio apparatus 100 is provided with a CPU 101 and this CPU 101 controls the system of the audio apparatus 100. A music source 102 is connected to the CPU 101. The music source 102 is constructed of an information storage unit (e.g., storage medium such as semiconductor memory) that stores music data received from the outside and retains music data of the audio apparatus 100.

[0062] Furthermore, an amplifier 103 is connected to the CPU 101 and the amplifier 103 amplifies and converts music information signals which are music data stored in a storage medium reproduced and generated by the CD drive 32, etc. and reproduces and outputs as music from the speakers 28.

[0063] Furthermore, the display 24 is connected to the CPU 101 of the audio apparatus 100 and the display 24 displays the control content of the audio apparatus 100 and music source music title data, etc. Furthermore, a car external music source reception circuit 104 is connected to the CPU 101 and the car external music source reception circuit 104 receives information from the Internet and AM or FM waves through a car-external antenna 105 (telephone antenna 26, etc.).

[0064] Furthermore, audio operation switches 107 such as a volume, a select switch, a replay button, a stop button, a fast-forward button, a rewind button and a selecting/determining switch 108 to select a cross cursor button or select button and an output changeover button 109 are connected to the CPU 101 via an operation system interface 106.



[0065] Furthermore, a transmission/reception module 110 is connected to the CPU 101 and the transmission/reception module 110 carries out in-car radio communication with the portable audio apparatuses 200a and 200b carried into the vehicle via an in-car radio antenna 34.

[0066] The portable audio apparatus 200a is constructed of an apparatus main unit 201a and a headphone 202b.

[0067] This apparatus main unit 201a is provided with a CPU 203 that controls the system of the portable audio apparatus 200a, and a music source 204, a transmission/reception module 205, a display 206, operation switches 208 such as a volume, a select switch, a replay button, a stop button, a fast-forward button and a rewind button, etc. and internal/external changeover switch 209 are further connected to this CPU 203 via an operation system interface 207.

[0068] The headphone 202a of the portable audio apparatus 201a is also provided with a transmission/reception module 210 for radio communications, which receives music data sent from the apparatus main unit 200a of the portable audio apparatus through radio communication to allow the passengers to enjoy music individually.

[0069] Note, that the number of portable audio apparatuses in this embodiment is only set to 2. but it is also possible to additionally set the number according to the number of passengers as shown with virtual lines in FIG. 2.

[0070] Moreover, it is also possible to construct the apparatus main unit 201a and headphone 202a as a single apparatus.

[0071] These audio apparatus 100 and portable audio apparatuses 200a and 200b transmit/receive music data, etc. to/from each other through in-car radio communication.

[0072] As an in-car radio communication system, this embodiment adopts a short-distance data communication system that slows the apparatuses to recognize and authenticate one another in the vehicle and perform data communication among one another. More specifically, as an example of a short-distance data communication system used within a short-distance of several tens of m, this embodiment carries out a so-called Bluetooth-based radio communication.

[0073] The short-distance communication system includes radio wave communication using a spread spectrum technology, optical communication and infrared communication, etc. This embodiment adopts a radio wave communication with less directivity. However, if it is possible to construct a network in which the music apparatus 100 functions as a master and the portable music apparatuses function as slaves during a communication, other communication systems can also be adopted.

[0074] Furthermore, music data transmitted/received is preferred to be compatible to all kinds of model and

transmitted/received in a short time, and therefore this music data is preferred to be transmitted/received, after being compressed as a data file based on a predetermined system and converted to compressed data.

[0075] Data compression systems available to this embodiment include MP3, Solid Audio, Liquid Audio, etc. Therefore, the audio apparatus 100 and portable audio apparatuses 200 are provided with general software or hardware capable of compressing to music data based on such a data compression system or decoding to a decoded signal at the time of reproduction.

[0076] Connecting the audio apparatus 100 and portable audio apparatus 200 through in-car radio communication and constructing a communication network (hereinafter referred to as "network") will allow each apparatus to transmit/receive music data and allow the audio apparatus 100 to control the portable audio apparatuses 200, etc.

[0077] FIG. 3 is a front view of an operation panel 50 of the audio apparatus 100 installed in the center of the instrument panel. The upper section is an operation panel 51 of the audio apparatus and the lower section is an air-conditioning-related operation panel 52. Here, the audio-apparatus-related operation panel 51 will be explained.

[0078] First, selection switches 53 for selecting a music source such as AM/FM and CD, etc. are provided in the upper section of the operation panel 50 and the music source output from the speakers 28 is determined according to the selection of these selection switches 53.

[0079] Below the selection switches 53 is a liquid crystal display panel 54. The liquid crystal display 54 displays a set temperature and in-car temperature or music information of the audio apparatus 100, etc.

[0080] Below the liquid crystal display 54 are slot openings 55, 56 and 57. Inserting various storage media such as a CD, MD or memory card into these slot openings 55, 56 and 57 allows the audio apparatus 100 to incorporate music data of music sources.

[0081] To the left of the slot openings 55 and 56 are screen changeover switches 58 to switch the display screen of the liquid crystal display 54. At the top is a navigation switch 58a to switch the display screen to a navigation screen, in the center is an audio switch 58b to switch the display screen to an audio screen and at the bottom is an audio top switch 58c to switch the display screen to an audio top menu screen of in-car radio communication.

[0082] The display 24 of the audio apparatus 100 is set on an instrument panel (not shown) close to a driver seat easily recognizable by the passengers and constructed to display an audio screen such as various kinds of information of the audio apparatus. Note, that the above-described liquid crystal display panel 54 can also be used as the display 24 of the audio apparatus 100.

[0083] To the right of the slot openings is a cross cur-

sor/determination button 108 to move the cursor on a display screen and determine a predetermined item.

[0084] Below the slot openings are audio operation switches 107 whereby the passengers can input audio operation signals such as replay, stop or volume. These audio operation switches 107 are a power volume switch, skip switch, etc. from the left. At the right end are output changeover switches 109 that allow the passenger to switch the output destination of the audio operation signal which is output by the passenger manipulating the audio operation switches 107 between the audio apparatus 100 and portable audio apparatuses 200.

[0085] Then, the action and method of operation of the audio apparatus according to this embodiment will be explained using FIG. 4 to FIG. 11.

[0086] First, the action of the audio apparatus 100 will be explained using the flow chart of operation control of the audio apparatus 100 shown in FIG. 4. This flow chart indicates the procedure of a software program executed by the CPU 101 and the control processing by the CPU 101 is started by an ignition ON of the vehicle 1, for example.

[0087] Initially, it is judged whether a power switch of the audio apparatus 100 (not shown) is ON or not (S10) and when the judgment result is NO, the process goes to Return and when the judgment result is YES, it is judged whether an external music source (each of the portable audio apparatuses 200) is replayed or not (S11).

[0088] If the result of the judgment (S11) as to whether the external music sources 200a and 200b are replayed or not is NO, music data of the music source 102 (CD, MD, memory card, etc.) of the audio apparatus 100 is directly reproduced and output from the speakers 28 as in the case of a normal audio apparatus (S12). On the other hand, if the judgment result is YES, the existence of any external music source (apparatus main units 201a and 201b of the portable audio apparatuses) and external speakers (headphones 202a and 202b of the portable audio apparatuses) carried into the vehicle is searched, and the external music source whose existence has been confirmed is connected to the audio apparatus 100 through an in-car radio communication (S13).

[0089] The search connection operation in S13 is started by the passenger operating the audio top switch 58c on the operation panel 51 of the audio apparatus 100. More specifically, the passenger makes an "AUDIO TOP MENU" shown in FIG. 5 appear on the display screen and selects and determines "External music source/external speaker search and reception" D1 with a cross cursor/determination button 108.

[0090] In this case, if the passenger selects/determines "External music source/external speaker search and reception" D1, the display screen is switched to the "Reception MENU" screen shown in FIG. 6 and a search radio wave is emitted from the in-car radio antenna 34 of the audio apparatus 100. This allows the audio appa-

ratus 100 to connect the apparatuses 201a and 201b of the portable audio apparatuses in the vehicle to the headphones 202a and 202b for a search.

[0091] At this time, installed in the center of the vehicle, the in-car radio antenna 34 can emit the search radio wave uniformly in the vehicle and detect the portable audio apparatuses 200 in the vehicle uniformly. Furthermore, even if portable audio apparatuses 200 owned by persons other than the passengers happen to exist outside near the vehicle, this reduces the probability of an erroneous search.

[0092] When the portable audio apparatuses 200a and 200b are detected and connected within a predetermined search time, the audio apparatus 100 and the plurality of portable audio apparatuses 200a and 200b send an identification address to each other and form a network through an in-car radio communication. Once the network is constructed, the "Reception MENU" screen looks as shown in FIG. 6.

[0093] For example, when the audio apparatus 100 finds and recognizes two portable audio apparatuses 200a and 200b in the vehicle, these apparatuses construct a communication system with the audio apparatus 100 as a master and the portable audio apparatuses 200a and 200b as slaves and recognize one portable audio apparatus 200a as an external player A and the other portable audio apparatus 200b as an external player B. Then, the "Reception MENU" screen shows the connection states in simplified expressions indicating the audio apparatus 100 as M and the portable audio apparatuses as PA and PB (D21). Note, that the "Reception MENU" screen also shows a list of music title data, etc. associated (correspondence established) with music data (contents data) of each apparatus connected (D22).

[0094] When the apparatuses have constructed the network by means of in-car radio communication, the passenger operates the cross cursor/determination button 108 to select/determine "Confirm" D23 on the "Reception MENU" screen and terminates the search connection operation.

[0095] However, if it is judged that the search/connection is insufficient, the passenger operates the cross cursor/determination button 108 to select/determine "Search" D24 to continue the search/connection. This ensures that the apparatuses are connected to construct the network.

[0096] Note, if the number of the portable audio apparatuses 200 in the vehicle changes, it is necessary to perform search/connection every time, but if the passenger selects/determines "Update" D25 on the "Reception MENU" screen, it is possible to set the audio apparatus 100 so as to automatically repeat search/connection at predetermined intervals.

[0097] After external music sources (apparatus main units of the portable audio apparatuses), external speakers (headphones) have been searched/connected (S13), a music source and output port are determined

on the "AUDIO MENU" screen (S14).

[0098] The music source/output port determination operation in S14 is carried out by the passenger operating the cross cursor/determination button 108 on the "AUDIO TOP MENU" screen to select/determine "Determine music replay/output destination" D1 and making the display screen show the "AUDIO MENU" screen shown in FIG. 7.

[0099] Here, the music source/output port determination operation in S14 will be explained more specifically. For example, if the passenger wants to replay the second music of the portable audio apparatus 200a identified as the external player A from the speakers 28, the passenger selects/determines "External player A" D11a in the "Source" selection area D11 on the "AUDIO MENU" screen. Then, a music data list D12 of the portable audio apparatus 200a of the external player A is displayed on the left. This music data list D12 shows music titles, artist names and data volumes, etc. and shows the content of the music data retained in the portable audio apparatus 200a.

[0100] The passenger operates the cross cursor/determination button 108 in this music data list D12 displayed to select/determine the "Second music" D12a. Then, the passenger selects/determines "Car-mounted SP" D13a in the "Output destination" selection area D13 (selection/determination content in FIG. 7).

[0101] When the passenger who carries the portable audio apparatus 200a of the external player A personally wants to replay all music pieces of the music data of the portable audio apparatus 200b of the external player B carried by another passenger through the own headphone, the passenger selects/determines "External player B" D11b in the "Source" selection area D11 on the "AUDIO MENU" screen and makes the music data list (not shown) of the portable audio apparatus 200b of the external player B appear and selects/determines the "External player B" D11b in the "Source" selection area D11 again. Thus, the passenger selects all music pieces of the portable audio apparatus 200b of the external player B and then selects/determines the "External player A" D13b in the "Output destination" selection area D13.

[0102] Thus, the passenger further performs operation of determining a music source, output port according to the request of a passenger and terminates the music source/output port determination operation.

[0103] The music source/output port determination operation according to the request of each passenger is performed in this way.

[0104] Note, when the passenger performs no music source determination operation in the above music source/output port determination operation, all music data pieces of the portable audio apparatuses are selected one after another starting from the external player A and all music data pieces of the portable audio apparatuses are reproduced/output from the speakers 28 or those portable audio apparatuses one after another.

Thus, if the passenger does not want to listen to any particular music but simply wants to listen to music as BGM, then the passenger need not perform any music source determination operation.

5 [0105] After the passenger determines the music source/output port on the "AUDIO MENU" screen, it is judged whether the selected music source is only a car-mounted source (music source of the audio apparatus 100) or not (S15).

10 [0106] If the judgment result in S15 is YES, it is judged whether the output destination is only the speakers 28 or not (S16).

[0107] On the other hand, if the judgment result in S15 is NO, the music data of the music selected from external music sources (portable audio apparatuses 200a and 200b) is received and the received music data is stored in an information storage unit (not shown) such as a semiconductor memory of the audio apparatus (S17). Then, it is judged whether the output destination set in S14 is the speakers 28 only or not (S16).

[0108] That is, if the external music sources (portable audio apparatuses 200a and 200b) are selected in the "Source" selection area D11, the music data sent from the portable audio apparatuses 200a and 200b are received by the audio apparatus 100 in real time and the received music data is immediately subjected to predetermined processing such as decoding and then reproduced and output.

[0109] Note, even if the external music sources (portable audio apparatuses 200a and 200b) are selected consecutively, control is performed such that the music data is transmitted/received in real time and reproduced/output.

[0110] Then, if the result of judgment in S16 as to whether the selected output destination is only the speakers 28 or not is YES, the selected music is reproduced and output from the speakers 28 in real time (S18). On the other hand, if the judgment result is NO, it is further judged whether the output destination is the speakers 28 and external speakers (headphones 202a, 202b) or not (S19).

[0111] If the judgment result in S19 is YES, the selected music (music previously selected by the passenger to be replayed) to be output from the speakers 28 is reproduced and output from the speakers 28 and the selected music to be output from the external speakers is sent to the selected external speakers (headphones 202a, 202b) (S20).

[0112] Thus, if the two output destinations of the music data, the speakers 28 and external player A, are selected/determined, the speakers 28 reproduce and output the music data of the portable audio apparatus 200a, which is the external player A, in real time and the headphone 202a of the external player A reproduces and outputs the music data of the portable audio apparatus 200b, which is the external player B, in real time.

[0113] In this case, the music data of the portable audio apparatus 200b, which is the external player B, can

also be sent directly from the portable audio apparatus 200b, which is the external player B, to the headphone 202a of the external player A in real time bypassing the car-mounted audio apparatus 100.

[0114] If the judgment result in S19 is NO, that is, if the output destination is only the external speakers, the music data of the selected music is sent to the selected external speakers (headphones 202a and 202b of the portable audio apparatuses) (S21).

[0115] Thus, if, for example, the above selection is made in "AUDIO MENU", the second music data is sent in real time from the portable audio apparatus 200a, external player A, to the audio apparatus 100, reproduced/output from the car-mounted speakers 28 and all music data pieces of the portable audio apparatus 200b, external player B, are sent in real time to the portable audio apparatus 200a, external player A, and reproduced/output in real time from the headphone 202b of the external player A.

[0116] Then, in the above control state, it is judged whether the passenger has operated the audio operation switch 107 or not (S22). If the audio operation switch 107 has been operated, an audio operation signal corresponding to the operation is output from the relevant switch.

[0117] If the judgment result in S22 is YES, an audio operation signal is output to the corresponding apparatuses according to the output changeover switch 109 that switches the output destination of the audio operation signal (S23).

[0118] Thus, when the passenger operates the fast-forward switch, if the audio apparatus 100 has been selected by the output changeover switch 109, the music reproduced and output from the speakers 28 is fast-forwarded. On the other hand, if the portable audio apparatus 200a of the external player A has been selected by the output changeover switch 109, the music reproduced and output from the headphone 202a of the portable audio apparatus is fast-forwarded.

[0119] If the judgment result in S22 is NO, that is, if the passenger has not operated the audio operation switches 107, the process directly shifts to Return.

[0120] Communication control and audio control of the audio apparatus 100 are carried out in this way.

[0121] Then, the operation of the portable audio apparatus 200 will be explained using the flow chart of operation control of the portable audio apparatus 200 shown in FIG. 8. This flow chart indicates the procedure of a software program executed by the CPU 203.

[0122] Here, the portable audio apparatus 200a, which is the external player A, will be explained, but the other portable audio apparatus will be operated in the same way.

[0123] First, it is judged whether the power of the portable audio apparatus 200a is ON or not (Q10) and if the judgment result is NO, the process shifts to Return and if the judgment result is YES, it is judged whether the internal/external changeover switch 209 of the portable

audio apparatus 200a is in an external output state or not (Q11).

[0124] If the result of the judgment about the external output state is NO, the music data (hereinafter referred to as "internal music data") of the music sources 204 (CD, MD, memory card, etc.) of the portable audio apparatus is output/reproduced from the headphone 202a as in the case of a normal portable audio apparatus (Q12).

[0125] On the other hand, the judgment result in Q11 is YES, the relevant portable audio apparatus 200 is connected and registered in the audio apparatus 100 in accordance with the aforementioned search/connection operation of the audio apparatus 100 (Q13). Thus, the portable audio apparatus 200a constitutes a network together with other apparatuses (audio apparatus 100, portable audio apparatus 200b) via in-car radio communication.

[0126] When the relevant portable audio apparatus 200 is connected to and registered in the audio apparatus 100, then it is judged whether the own portable audio apparatus 200a is selected by the passenger as the output destination through the selection signal received by the audio apparatus 100 (Q14).

[0127] Then, whether the judgment result in Q14 is YES or NO, it is judged whether there is any request for sending internal music data to the external apparatuses (audio apparatus 100 or other portable audio apparatus 200b) (Q15, Q16).

[0128] When it is judged that the own portable audio apparatus 200a is the output destination and there is a request for sending internal music data to the audio apparatus 100 or other portable audio apparatus 200b (hereinafter referred to as "external apparatuses"), the internal music data is sent to the external apparatuses in real time and at the same time, the music data of the external apparatuses (hereinafter referred to as "external music data") is received and reproduced/output from the headphone 202a of the portable audio apparatus in real time (Q17).

[0129] Thus, if, for example, the music source/output port is selected/determined on the "AUDIO MENU" screen as shown above, the music data retained in the portable audio apparatus 200a of the external player A is sent to the audio apparatus 100 and the passenger can replay the music data in the vehicle in real time and at the same time, the headphone 202a of the external player A receives in real time the music data retained in the portable audio apparatus 202b of the external player B and the passenger can personally replay the music data.

[0130] On the other hand, if it is judged in Q14 and Q15 that the own portable audio apparatus 200a is the output destination and there is no request for sending internal music data to the external apparatuses, the external music data is received and the headphone 202a reproduces and outputs the music data in real time (Q18).

[0131] Thus, in this case, the passenger can receive the music data of the audio apparatus 100 or music data of the other portable audio apparatus 200b in real time and personally enjoy the music data by the headphone 202a without sending the music data from the own portable audio apparatus 200a to the external apparatuses.

[0132] On the other hand, if it is judged in Q14 and Q16 that the own portable audio apparatus 200a is not the output destination and there is a request for sending internal music data to the external apparatuses, the internal music data is sent to the external apparatuses in real time (Q19).

[0133] Thus, in this case, no music is reproduced/output from the headphone 202a and it is not possible to personally enjoy music but it is possible to send the music data to the audio apparatus 100 or other portable audio apparatus 200b and enjoy in real time the music data retained in the own portable audio apparatus 200a using the speakers 28 or the headphones 202b of the other portable audio apparatuses.

[0134] Furthermore, if it is judged in Q14 and Q16 that the own portable audio apparatus 200a is not the output destination and there is no request for sending internal music data to the external apparatuses, either, then the internal music data and external music data are not transmitted/received and the portable audio apparatus 200a is held in a standby state (Q20).

[0135] In this case, the portable audio apparatus 200a neither reproduces/outputs from the headphone 202a nor sends the music data to the external apparatuses.

[0136] Then, in the above control state, it is judged whether the passenger has operated the audio operation switch 208 of the portable audio apparatus 200a or not (Q21).

[0137] If the judgment result in Q21 is YES, an audio operation signal according to the operation of the audio operation switches 208 is output to the corresponding audio apparatus (Q22).

[0138] For example, if the music data reproduced/output from the headphone 202a is the music data retained in the audio apparatus 100, an audio operation signal is sent to the audio apparatus 100. Furthermore, if the music data reproduced/output from the headphone 202a is the music data retained in the other portable audio apparatus, the audio operation signal is sent to the other portable audio apparatus 200b. In the case of the own music source 204, the own portable audio apparatus 200a is controlled as is.

[0139] On the other hand, if the judgment result in Q21 is NO, the portable audio apparatus 200a maintains its control state without sending the audio operation signal.

[0140] Then, it is judged whether the audio operation signal has been received from the external apparatuses or not (Q23).

[0141] If the judgment result in Q23 is YES, the audio operation of the internal music data is executed according to the received audio operation signal (Q24), and if the judgment result is NO, the control state is maintained

as is and the process shifts to Return.

[0142] Thus, if the audio operation signal is received from an external apparatus, the music data of the own portable audio apparatus 200a is subjected to audio-operations by the external apparatus (audio apparatus 100 or other portable audio apparatus 200b).

[0143] For example, it is possible to audio-operate the music data of the portable audio apparatus 200a by operating the audio operation switch 107 of the audio apparatus 100 or audio-operate the music data of the audio operation switches 208 of the portable audio apparatus 200b of the external player B by operating the audio operation switches 208 of the portable audio apparatus 200a of the external player A. Thus, operating the own portable audio apparatus without causing trouble to other passengers can freely and easily perform audio operations of the music that one enjoys.

[0144] Communication control and audio control of the portable audio apparatuses are carried out in this way.

[0145] Then, the operation of erasing music data retained in the audio apparatus 100, etc. will be explained.

[0146] This music data erasure operation erases the music data selected by the passenger from the information storage unit of the audio apparatus 100 and thereby can arrange music data of the information storage unit at the request of the passenger.

[0147] This erasure operation is carried out by the passenger operating the audio top switch 58c on the operation panel 51 of the audio apparatus 100, displaying the "AUDIO TOP MENU" screen shown in FIG. 9 on the display screen and selecting/determining "Erase received music" D4 with the cross cursor/determination button 108.

[0148] If the passenger selects/determines "Erase received music" D4, the display screen is switched to the "Erasure MENU" screen shown in FIG. 9, which displays the storage content of the music data and target apparatuses and erasure method.

[0149] From this "Erasure MENU" screen, if the passenger selects/determines the apparatus storing the music data to be erased in the "Target apparatus" selection area D41, the storage content of the corresponding apparatus is displayed in the "Memory data" display area D42.

[0150] The music data (contents data) is associated with the corresponding music title data (title data) and the audio apparatus 100 displays characters that represent the corresponding music titles in the "memory data" display area D42 according to the music title data. When the passenger selects/determines the music title of the music data to be erased with the storage content displayed in the "memory data" display area D42 and selects/determines the "Erase" D43, the music data that the passenger wants to erase is erased from the information storage unit of the corresponding apparatus.

[0151] For example, if the passenger wants to erase the first music of the information storage unit of the audio

apparatus 100, the processing of erasing music data is performed by selecting/determining the selection content shown in the "Erasure MENU" screen in FIG. 9.

**[0152]** Note, this embodiment also sets external players (external player A, external player B, etc.) in the "Target apparatus" selection area D41 so as to erase the storage content of the portable audio apparatuses 200a and 200b, too.

**[0153]** As the erasure method, "Erase all received music pieces" D44 and "Erase all" D45 are set in addition to "Erase" D43. Here, "Erase all received music pieces" means a method of erasing all music data received from other apparatuses and stored and "Erase all" means a method of erasing all music data stored in the information storage unit of a desired apparatus together with music data stored independently.

**[0154]** After erasing the music data to be erased, selecting/determining "End" D46 terminates the erasure operation.

**[0155]** Then, the Internet operation will be explained, which receives digital music data from outside the vehicle and reproduces/outputs the music data as music from the speakers 28.

**[0156]** The Internet operation is carried out by the passenger operating the audio top switch 58c on the operation panel 51 of the audio apparatus 100, displaying the "AUDIO TOP MENU" screen shown in FIG. 5 on the display screen and selecting/determining "Receive music from Internet" D3 with a cross cursor/determination button.

**[0157]** When the passenger selects/determines "Receive music from Internet" D3, the display screen is switched to the "Internet MENU" screen shown in FIG. 10 and the apparatus is connected to the Internet.

**[0158]** The "Internet MENU" screen displays the music distribution service site screen and shows "Best hits in this week" D31, "Traditional Japanese music select" D32, etc. allowing the passenger to select music data from a variety of genre.

**[0159]** The passenger selects/determines the item of genre of his/her choice from this "Internet MENU" screen, selects/determines the music data of the music to be distributed and receives the music. Then, the audio apparatus 100 temporarily stores the received music data in the information storage unit and reproduces/outputs the music data as music from the speakers 28 according to the operation of the passenger.

**[0160]** In this way, using music distribution of the Internet makes it possible to replay a large amount of new music in the vehicle.

**[0161]** Then, a data transfer will be explained, which transfers music data stored in each apparatus to another apparatus and sends/receives music data between different apparatuses.

**[0162]** The data transfer operation is carried out by the passenger operating the audio top switch on the operation panel 51 of the audio apparatus 100, displaying the "AUDIO TOP MENU" screen shown in FIG. 5 on the

display screen and selecting/determining "Transfer received music" D5 with a cross cursor/determination button.

**[0163]** When the passenger selects/determines "Transfer received music" D5, the display screen is switched to the "Transfer MENU" screen shown in FIG. 11 and the transmitting apparatus, storage content of the music data, receiving apparatus and transfer method are shown.

**[0164]** Music data is transferred between different apparatuses by the passenger selecting/determining a desired item with the cross cursor/determination button 108 on the "Transfer MENU" screen.

**[0165]** For example, when the passenger wants to transfer the music data of the first music from the information storage unit of the audio apparatus 100 to a portable audio apparatus 200a of the external player A, the passenger selects/determines the "Car-mounted memory" D51a in the "Transmitting apparatus" selection area D51 as the selection content of the "Transfer MENU" screen, displays the car-mounted memory data D52, which is the storage content of the information storage unit of the audio apparatus 100 and selects/determines the music data D52a of the first music in the car-mounted memory data D52. Then, the passenger selects/determines the external player AD53a in the "Receiving apparatus" selection area D53.

**[0166]** After selecting/determining music data in this way, selecting/determining the "Transfer" D54 allows the music data of the first music to be transferred from the information storage unit of the audio apparatus 100 to the portable audio apparatus 200a of the external player A.

**[0167]** If the passenger wants to transfer all music data, the passenger selects/determines "Transfer all" D55 in the car-mounted memory data D52 instead of selecting/determining specific music, then all music data is transferred at a time.

**[0168]** After transferring music data, selecting/determining "End" D56 terminates the data transfer operation.

**[0169]** In this data transfer, selecting/determining external players in the "Transmitting apparatus" selection area D51 and the "Receiving apparatus" selection area D53 also allows a data transfer of music data between the selected plurality of portable audio apparatuses 200.

**[0170]** A data transfer being enabled between apparatuses, it is possible to easily exchange music data not only between the audio apparatus 100 and portable audio apparatuses 200 but also between the portable audio apparatuses. Thus, it is possible to freely exchange music data of preference between passengers or freely transfer music data of the audio apparatus 100 to a portable audio apparatus.

<First modification of first embodiment>

**[0171]** Then, Fig. 12 shows a display screen of this

modification.

[0172] In this modification, display screen D60 shows a screen changeover switch D61 (NAVI switch D61a, AUDIO switch D61b, AUDIO TOP switch D61c) that switches between the display screens, a cross cursor/determination button D62 that determines a predetermined item, an audio operation switch D63 to enter an audio operation signal and an output changeover switch D64 that switches the output destination of the audio operation signal and allows the passenger to perform audio operations from the display screen D60.

[0173] That is, this modification constructs the display screen D60 with a touch panel allowing the passenger to enter audio operations to the audio apparatus 100 by directly touching the screen.

[0174] In this modification, the method of input operations by the audio apparatus 100 and control content are mostly the same as those in the embodiment above.

[0175] That is, when the passenger selects the audio switch D61a with the screen changeover switch D61, the "AUDIO MENU" screen D65 appears in the center and for example, the passenger selects/determines the external player A in the "Source" selection area D66 on the "AUDIO MENU" screen, the 4th music in the "Music title list" selection area D67 and the speakers 28 in the "Output destination" selection area D67 with the cross cursor/determination button D62, and thereby the audio apparatus 100 determines the reproduction/output destination of the music (see FIG. 15).

[0176] Then, when an audio operation signal of reproduction and stop, etc. of the music data according to the input operation of the passenger is output from the audio operation switch D63, the audio apparatus 100 outputs the audio operation signal to the corresponding apparatus according to the setting condition of the output changeover switch D64.

[0177] Note, when the AUDIO TOP switch D61c is selected, various selection processing screens are displayed on the display screen D60 as in the case of the embodiment above allowing selection operation.

[0178] As described above, this modification is constructed so that the passenger can perform audio operations by directly touching the display screen, thus making it possible to eliminate audio operation switches, etc. from the operation panel 51 of the audio apparatus 100 set in the instrument panel. This makes the configuration of the operation panel 51 compact and allows the passenger to directly operate the audio apparatus while watching the display screen, thus improving operability.

<Second modification of first embodiment>

[0179] Then, a different modification of the identification method of the portable audio apparatuses will be explained based on Fig. 13 and Fig. 14.

[0180] As shown in Fig. 13, this modification adopts a communication method capable of providing directivity for a radio signal sent from the in-car radio antenna

34, thereby identifying portable audio apparatuses that exist in the vehicle.

[0181] Fig. 13 is a drawing to explain that the audio apparatus 100 in this modification sends a plurality of radio communication signals with directivity from the in-car radio antenna 34 in accordance with each seating position of the vehicle 1, thereby mutually carries out radio communication with the portable audio apparatuses that exist in the vehicle and identifies those portable audio apparatuses.

[0182] In this modification, the in-car radio antenna 34 installed almost in the center of the vehicle emits radio communication signals with directivity L1, L2, L3 and L4 around in four directions corresponding to the seating positions 2, 3 and 4 and carries out radio communication with the portable audio apparatuses.

[0183] As shown by the hatching areas in Fig. 13, these radio communication signals L1, L2, L3 and L4 are sent from the in-car radio antenna 34 so as to irradiate the total areas of the seats 2, 3 and 4 at their respective predetermined irradiation angles. Adopting such a configuration, this modification is constructed to allow the passengers to be seated to reliably search the portable audio apparatuses 200a and 200b no matter where the passengers put the portable audio apparatuses 200a and 200b and carry out radio communication.

[0184] As these radio communication signals L1, L2, L3 and L4 are sent, the audio apparatus 100 detects the portable audio apparatuses 200a and 200b at their respective irradiated seating positions, automatically identifies the detected portable audio apparatuses as apparatuses forming a radio communication network in the vehicle and at the same time sets the identified portable audio apparatuses as the apparatuses to/from which music data can be transmitted/received.

[0185] For example, when the portable audio apparatus 200a is searched and connected, through the radio communication signal L1 corresponding to the driver seat 2, the portable audio apparatus 200a can be identified as "External player A", and when the portable audio apparatus 200b is searched and connected through the radio communication signal L2 corresponding to the assistant seat 3, the portable audio apparatus 200b can be identified as "External player B".

[0186] Thus, this modification allows portable audio apparatuses to be identified through radio communication signals with directivity.

<Third modification of first embodiment>

[0187] Fig. 14 is a drawing to explain that the audio apparatus 100 in this modification sends a radio communication signal with directivity from the in-car radio antenna 34 in accordance with the positions of mounts provided in the vehicle for the portable audio apparatuses, thereby mutually carries out radio communication with the portable audio apparatuses which exist in the

vehicle and identifies those portable audio apparatuses.

**[0188]** In this modification, the in-car radio antenna 34 installed almost in the center of the vehicle emits radio communication signals L11, L12, L13 and L14 with directivity in directions corresponding to the positions of mounts 5a, 5b, 5c and 5d of the portable audio apparatuses set in the vehicle and carries out radio communication with the portable audio apparatuses.

**[0189]** As shown in Fig. 14, the positions of the mounts 5a, 5b, 5c and 5d are predetermined in the vehicle. For this reason, the in-car radio antenna 34 in this modification focuses the irradiation angles of the radio communication signals L11, L12, L13 and L14 as shown in the hatching areas in the same figure and pinpoints the irradiation thereof on the mounts 5a, 5b, 5c and 5d. Moreover, the audio apparatus 100 in this modification is constructed to carry out radio communication only when the portable audio apparatuses 200a and 200b are set on the mounts.

**[0190]** Also, in this modification, when these radio communication signals L1, L2, L3 and L4 are transmitted, the audio apparatus 100 detects the portable audio apparatuses 200a and 200b at the seating positions irradiated, automatically identifies the detected portable audio apparatuses as apparatuses making up a radio communication network in the vehicle and at the same time sets the identified portable audio apparatuses as the apparatuses to/from which music data can be transmitted/received.

**[0191]** For example, when the portable audio apparatus 200a is searched and connected through the radio communication signal L11 that irradiates the mount 5a near the driver seat, the portable audio apparatus 200a is identified as "External player A", and when the portable audio apparatus 200b is searched and connected through the radio communication signal L12 that irradiates the mount 5b near the assistant seat, the portable audio apparatus 200b is identified as "External player B".

**[0192]** Thus, this modification allows portable audio apparatuses to be identified through radio communication signals with directivity.

**[0193]** As in the case of the above embodiment, it is possible to perform audio control on transmission/reception of music data, etc. by identifying the portable audio apparatuses 200 as shown in the second and third modifications explained above.

**[0194]** Thus, the identification method of these portable audio apparatuses makes it possible to visually check the position of a portable audio apparatus that has been connected to the car-mounted audio apparatus, thus improving operability.

**[0195]** As described above, the first embodiment and its modification have the following effects.

**[0196]** This embodiment first sends music data retained in the portable audio apparatuses 200a and 200b to the audio apparatus 100 via radio communication and reproduces/outputs the music data in real time through

the speakers 28 in the vehicle. This allows the music data retained in the relevant portable audio apparatuses to be reliably and easily reproduced/output from the speakers 28 via radio communication without the passengers bothering to set the portable audio apparatuses on the mounts.

**[0197]** This makes it possible to replay preferred music using music data in the portable audio apparatus that the passenger carries without downloading the music data from the Internet, thus improving operability and convenience and furthermore attaining cost reduction.

**[0198]** Especially, since the music data of the portable audio apparatuses 200 is reproduced/output in real time, it is not necessary to store a large volume of music data in the audio apparatus 100 and it is possible to reduce the volume of the information storage unit such as semiconductor memory necessary for the audio apparatus 100.

**[0199]** Furthermore, audio operations of the portable audio apparatuses 200a and 200b are possible by the passenger carrying out operations from the audio operation switches 107 of the audio apparatus 100. Thus, even if music data is retained in the portable audio apparatuses 200a and 200b, the passenger can carry out operations of the portable audio apparatuses 200a and 200b directly from the audio apparatus 100. Also when the driver carries out audio operations during driving, audio operations through the audio operation switches 107 of the audio apparatus 100 with high operability can also secure the safety.

**[0200]** Furthermore, this embodiment allows the passenger to freely select the mode of use of the portable audio apparatuses 200a and 200b in the vehicle by switching between a communication state in which music data is transmitted/received between the apparatuses 100, 200a and 200b, and a non-communication state without performing transmission/reception of music data between apparatuses using the internal/external changeover switch 209 of the portable audio apparatuses 200a and 200b.

**[0201]** Furthermore, this embodiment allows the passenger to visually check the physically invisible connection state of radio communication by visibly displaying the communication connection state of the audio apparatus 100 and portable audio apparatuses 200a and 200b through the connection situation D21 of the "Reception MENU" screen and reliably judge the connection state of the audio apparatus 100 and portable audio apparatuses 200a and 200b.

**[0202]** Furthermore, in this embodiment, if the passenger does not determine music source through the music source determination operation, all music data pieces of each portable audio apparatus are selected one by one and reproduced/output as music from the speakers 28 one by one, allowing the passenger to enjoy music data of all the portable audio apparatuses in the vehicle without selecting the music data every time.

**[0203]** Furthermore, this embodiment constructs a ra-



dio communication network made up of respective apparatuses by assigning identification addresses to a plurality of portable audio apparatuses 200a and 200b that exist within the radio communication range of the audio apparatus 100 and thereby identifying the apparatuses. This allows the audio apparatus 100 to reliably recognize which of the portable audio apparatuses 200a and 200b in such a radio communication network has sent the music data and control reproduction of the music.

**[0204]** Furthermore, in the second modification above, the portable audio apparatuses that exist at the seat positions are searched/connected by a plurality of radio communication signals with directivity in accordance with the seat positions in the vehicle, thus reliably identifying the portable audio apparatuses.

**[0205]** Especially, the passenger can visually check which portable audio apparatus at which passenger seat music data is transmitted/received to/from, thus improving operability.

**[0206]** Furthermore, in the third modification above, the portable audio apparatuses are identified through a plurality of radio communication signals with directivity in accordance with the positions of the mounts of the portable audio apparatuses provided in the vehicle, making it possible to identify the portable audio apparatuses when the portable audio apparatuses are set on the mount. Thus, the passenger can easily judge which portable audio apparatus on which mount music data is transmitted/received to/from and the audio apparatus 100 does not search/connect portable audio apparatuses other than those that exist on the mounts, preventing erroneous detection.

**[0207]** Furthermore, in this embodiment and its modification, the in-car radio antenna 34 is installed almost in the center of the vehicle, which can emit detection wave uniformly in the vehicle and can search/connect the portable audio apparatuses in the vehicle uniformly. Moreover, even if there are any portable audio apparatuses other than those of the passengers near and outside the vehicle, this embodiment and its modification can reduce the possibility of erroneous detection.

**[0208]** Furthermore, in this embodiment, the audio apparatus 100 receives a plurality of music data pieces sent from a plurality of portable audio apparatuses 200a and 200b, reproduces/outputs one music data piece as music from the speakers 28 and reproduces/outputs other music data pieces as music from the headphones of the portable audio apparatuses 200a and 200b. When a plurality of portable audio apparatuses 200a and 200b is connected by means of radio communication in the vehicle, different music data pieces are reproduced simultaneously from the speakers 28 and portable audio apparatuses 200a and 200b, and thereby passengers of the vehicle 1 can replay desired music individually.

**[0209]** Furthermore, in this embodiment, a plurality of portable audio apparatuses 200a and 200b are connected to the audio apparatus 100 with communication capability by means of radio communication, music data

retained in one portable audio apparatus 200b is sent to the other portable audio apparatus 200a and the relevant music data can be reproduced/output as music from the other portable audio apparatus 200a. This allows the passenger to replay the music data retained in the portable audio apparatus 200b of another passenger as music using the own portable audio apparatus 200a.

**[0210]** Furthermore, in this embodiment, when the passenger selects/determines "Search" D24 from the "Reception MENU" screen and performs connection operation only at the initial audio control, it is possible to eliminate the possibility of erroneous connection even if other portable audio apparatuses enter into the communication range of the audio apparatus 100 during music control such as when the vehicle is traveling, thereby preventing disturbance of control.

**[0211]** On the other hand, while "Update" D25 is selected/determined on the "Reception MENU" screen during audio control, the audio apparatus 100 in this embodiment automatically performs connection operation at predetermined time intervals and can thereby eliminate the need for the passenger to perform connection operation every time a new portable audio apparatus is connected.

**[0212]** The method of controlling the audio apparatus in the above embodiments and their modifications is implemented by the CPUs inside these apparatuses executing the control program stored in the concentrated control unit 20 that performs system control of the audio apparatus 100 and portable audio apparatus 200, etc. Furthermore, providing such a control program stored in a program storage medium separately will also allow the control unit of another audio apparatus, etc. to execute the above-described control processing.

**[0213]** The first embodiment has been explained so far. The present invention is not limited to this embodiment, but includes any cases where portable audio apparatuses are carried into the vehicle, music data retained in those portable audio apparatuses is sent to the audio apparatus mounted in the vehicle via in-house radio communication and replayed in real time from speakers mounted in the vehicle. Its detailed configuration can be changed as appropriate without departing from the spirit and scope thereof.

[Second embodiment]

**[0214]** Then, a second embodiment, which is based on the system configuration of the audio apparatus (audio system) according to the first embodiment above, will be explained. In the following explanations, overlapping explanations about the same configurations as those in the first embodiment will be omitted and explanations will be focused on characteristic sections of this embodiment

**[0215]** This embodiment is a modification of the first embodiment above and characterized by the configura-

tion of the apparatus mounted on the vehicle. This feature is summarized as follows: Instead of the subsystem made up of the audio apparatus 100 and speakers 28, etc. in the first embodiment, the second embodiment constructs a subsystem in the vehicle with an audio unit 100A and speaker units 2A to 2D, which will be described below, making it possible to carry out radio communication between components which make up the subsystem itself.

[0216] Fig. 15 illustrates a configuration example of an audio apparatus for a vehicle according to the second embodiment mounted in a car cabin.

[0217] In the same figure, a basic configuration of the audio apparatus for a vehicle according to this embodiment includes, in the car cabin of a vehicle 300, an audio unit 100A embedded in a center console, speaker units 2A to 2D embedded in accordance with the seats in the car cabin and can also include a portable audio terminal (portable audio apparatus) 3 according to the need of the passenger in addition to this basic configuration.

[0218] In this embodiment, a general configuration is used as an example in which the speaker units 2A and 2B are placed near the driver seat and assistant seat of the vehicle 300 and the speaker units 2C and 2D are placed behind the right and left rear seats, but the number and locations of the speaker units are not limited to the configuration example shown in Fig. 15 and can be determined as appropriate according to the layout and size, etc. of the seats in the car cabin.

[0219] Fig. 16 shows a block configuration of components making up the audio apparatus for a vehicle in the second embodiment and flows of radio signals between those components.

<Audio unit 100A>

[0220] First, the apparatus configuration of the audio unit 100A will be explained.

[0221] Reference numeral 112 denotes a plurality of operation switches 112 that allow the passenger to select contents such as music and voice to be replayed in the audio apparatus for a vehicle, set sound quality, sound volume, replay balance or select the replay unit such as CD and MD. Reference numeral 113 denotes a display that displays the setting state set by the operation switches 112 and the replay state set by the replay unit, etc. and can also be of a type provided with a touch panel so that the display also assumes part of the function of the operation switches 112 (a display example of the display 113 in this embodiment will be described later with reference to Fig. 23).

[0222] Reference numeral 114 denotes an external communication unit to acquire contents to be replayed by the audio apparatus for a vehicle from a communication apparatus outside the vehicle and it is possible to use a communication module capable of receiving data via a cable or by radio using infrared rays, etc. from

a radio communication apparatus connectable to a mobile communication network in the city or information apparatus such as a personal digital assistant (PDA) mobile computer.

[0223] Reference numeral 115 denotes an audio storage medium (memory) that stores contents acquired from the outside via the external communication unit 114 and can also be configured as detachable. This audio storage medium 115 stores contents information such as music compressed beforehand according to a system like MP3, Solid Audio, Liquid Audio.

[0224] Reference numeral 116 denotes a radio communication apparatus that carries out radio communication with the speaker units 2A to 2D and the portable audio terminal 3 according to a predetermined communication protocol and this embodiment performs radio communication based on a Bluetooth system, which is an example of a short-distance radio communication system used within a range of distance of several tens of m.

[0225] Reference numeral 117 is a replay unit that reads contents information such as music stored beforehand in a storage medium such as CD, MD or cassette tape. Reference numeral 111 denotes a microcomputer that controls each block of the audio unit 100A above and thereby provides contents reproduction by the speaker units 2A to 2D and portable audio terminal 3, which will be described later, and operates according to a control program stored in memory.

[0226] Here, when contents information is sent to the speaker units 2A to 2D, the audio unit 100A sends the contents information compressed according to a predetermined system. That is, the microcomputer 111 sends compressed contents information stored in the audio storage medium 115 in the same data format from the radio communication apparatus 116, but in the case of contents information read from the replay unit 117, the microcomputer 111 compresses the contents information in a predetermined format such as MP3, Solid Audio and Liquid Audio above (in the case of MD, the same data compression format stored in MD can be used) prior to transmission thereof.

[0227] Note, that the audio unit 100A is driven by a power supply supplied from a battery (not shown) of the vehicle 300. Moreover, the individual structure and basic function itself of each block of the audio unit 100A above are presently generally known, and therefore their details will be omitted in this embodiment.

<Portable audio terminal 3>

[0228] Then, an apparatus configuration of the portable audio terminal 3 will be explained.

[0229] Reference numeral 132 denotes a plurality of operation switches that allows the user to select contents music (musical piece) or contents such as voice to be replayed in the portable audio apparatus, set the replay state such as replay start, stop and fast-forward

of the selected contents, set sound quality, sound volume and replay balance. Reference numeral 133 denotes a display that displays the setting state and the replay state, etc. set by the operation switches 132.

**[0230]** Reference numeral 134 denotes an external communication unit to acquire contents to be replayed by the portable audio apparatus from a communication apparatus outside the vehicle and it is possible to use a communication module capable of receiving data via a cable or by radio using infrared rays, etc. from a radio communication apparatus connectable to a mobile communication network in the city or information apparatus such as a personal digital assistant (PDA) mobile computer.

**[0231]** Reference numeral 135 denotes a radio communication apparatus that carries out radio communication with the audio unit 100A and the speaker units 2A to 2D, according to the same predetermined communication protocol (Bluetooth system) as that of the audio unit 100A.

**[0232]** Reference numeral 136 denotes an audio storage medium (memory) that stores contents acquired from the outside via the external communication unit 134 and can also be configured as detachable. This audio storage medium 136 stores contents information such as music compressed beforehand according to a predetermined system like MP3, Solid Audio, Liquid Audio.

**[0233]** Reference numeral 137 denotes a speaker and/or headphone that outputs sound.

**[0234]** Reference numeral 131 denotes a microcomputer that controls each block of the portable audio terminal 3 above and thereby provides the replay function by the terminal as a single unit of replaying contents information stored in the audio storage medium 136 and provides contents replay by the speaker units 2A to 2D, which will be described later, and operates according to a control program stored in memory.

**[0235]** Here, when contents information is sent to the speaker units 2A to 2D, the portable audio terminal 3 sends the contents information compressed according to a predetermined system.

**[0236]** That is, the microcomputer 131 sends compressed contents information stored in the audio storage medium 136 in the same data format from the radio communication apparatus 135. When compressed contents information stored in the audio storage medium 136 is output as sound from the speakers (or headphones) 137, the microcomputer 131 decodes the compressed contents information according to the compression format and reproduces according to the decoded data.

**[0237]** Note, that the portable audio terminal 3 is driven by a power supply supplied from a battery (not shown) in the terminal. Moreover, the individual structure and basic function itself of each block of the portable audio terminal 3 above are presently generally known, and therefore their details will be omitted in this embod-

iment. Furthermore, the portable audio terminal 3 can also include a replay unit that reads contents information such as music pre-stored in a storage medium such as CD, MD or cassette tape.

<Speaker units 2A to 2D>

**[0238]** Then, an apparatus configuration of the speaker units 2A to 2D will be explained.

**[0239]** Reference numeral 222 denotes a radio communication apparatus that receives a radio signal, etc. including contents (e.g. musical piece) from the audio unit 100A or portable audio terminal 3 according to the same predetermined communication protocol (Bluetooth system) as that of the audio unit 100A and portable audio terminal 3 and sends the radio signal received from the own speaker unit to the other speaker units at the request of other speaker units as will be described later.

**[0240]** Reference numeral 223 denotes a speaker that outputs contents such as musical piece reproduced from the radio signal received by the radio communication apparatus 222. Reference numeral 221 denotes a microcomputer that controls the radio communication apparatus 222 and speakers 223 above and thereby provides the function of communication with other speaker units and contents reproduction as will be described later and operates according to a control program stored in memory.

**[0241]** When the contents information compressed in a predetermined format is received from the audio unit 100A or portable audio terminal 3, the microcomputer 221 of the speaker units 2A to 2D decodes the contents information according to the protocol corresponding to the compression format and reproduces sound from the speaker 223 according to the decoded data.

**[0242]** Note, that the speaker units 2A to 2D are driven by a power supply supplied from a battery (not shown) of the vehicle 300. Moreover, the individual structure and basic function itself of each block of each speaker unit are presently generally known, and therefore their details will be omitted in this embodiment.

**[0243]** The arrowed lines in Fig. 16 conceptually show flows of radio signals transmitted/received between components such as the audio unit 100A, portable audio terminal 3 and speaker units 2A to 2D above.

**[0244]** The radio signals at least transmitted/received to implement this embodiment include signals (hereinafter referred to as "music signals") including information of contents (e.g., music) commonly sent to the speaker units (including the portable audio terminal 3), signals including individual audio replay characteristic information (hereinafter referred to as "audio replay characteristic signals") of each speaker unit corresponding to desired sound quality, sound volume, replay balance, etc. set by the passengers using the audio unit 100A and signals including sync information (hereinafter referred to as "synch signals") of individual sound out-

put timing by the speaker units 2A to 2D.

**[0246]** These radio signals include not only the information content above to be sent but also identification information to identify the transmission source and transmission destination and predetermined transmission error determination codes, etc.

**[0246]** Note, that the radio communication system used in each component is not limited to Bluetooth, but any system can also be used if it allows high-speed and large volume data transfer in such a way that there will be no delay in transmission of contents information to be reproduced in a space of the vehicle room in which the audio apparatus for a vehicle is mounted.

**[0247]** In this embodiment, contents information is transmitted/received to/from the speaker units 2A to 2D compressed in the predetermined format above. However, if the radio communication system used allows high-speed and large volume data transfer, by sending music signals including decoded contents information from the audio unit 100A or portable audio terminal 3, a hardware or software module for implementing decoding processing can be omitted from the speaker units 2A to 2D.

<Contents reproduction>

**[0248]** Then, the contents reproduction operation implemented when the above components each act will be explained with reference to Fig. 17 to Fig. 19A and Fig. 19B and Fig. 23.

**[0249]** Note, that the audio apparatus for a vehicle according to this embodiment can reproduce various kinds of contents (conversation, sports replay, news, etc.), but in the following explanations, most general musical pieces (music) will be taken as an example of typical contents.

**[0250]** First, a basic music reproduction operation in this embodiment will be outlined.

**[0251]** Fig. 23 shows a display example of the display 113 of the audio unit 100A. When the passenger wants reproduction of musical pieces using the audio apparatus for a vehicle, the passenger operates the power switch and thereby makes the audio unit 100A display the setting screen in Fig. 23.

**[0252]** In this display screen, the passenger selects some desired music source from among a plurality of types of music sources to be replayed and registers the external player as required. Here, the music source denotes the source of information to replay musical pieces.

**[0253]** In the example shown in Fig. 23, CD is selected and the external player 1 is selected. Furthermore, in this embodiment, the portable audio terminal 3 is selected to be identifiable with an identification number, etc. as the external player 1 through the setting operation by the passenger from a screen (not shown) and when music signals are sent from the relevant terminal and audio unit 100A, the priority order in which the music signals should be replayed is set.

**[0254]** Then, according to the music source selection operation above, a list of CD musical pieces inserted in the replay unit 117 (CD player, in this case) beforehand is automatically displayed in the left area of the display and the passenger selects musical pieces to be replayed using the cursor key, etc. near the right end of the audio unit 100A.

**[0255]** Furthermore, the passenger can set audio replay characteristics such as sound quality, sound volume and replay balance (including the setting of a pseudo-silenced state, which will be described later) during voice output from the speaker units 2A to 2D individually for each speaker unit using the operation switches 112, which are not shown in Fig. 23 (Note, if no setting is performed, predetermined default settings are used).

**[0256]** Then, when the passenger performs operations such as "Replay", "Fast-forward" and "Stop" as required, the audio unit 100A sends music signals including information on the selected musical pieces and control signals including control information such as stop and fast-forward to the speaker units 2A to 2D and sends audio replay characteristic signals including audio replay characteristic information set by the passenger (or default) to each speaker unit individually.

**[0257]** Then, the speaker units 2A to 2D reproduce the music signals received from the audio unit 100A according to the audio replay characteristic signals and control signals received in the same way and outputs a replay signal created by reproduction as sound from the speakers 223.

**[0258]** At this time, in this embodiment, since the portable audio terminal 3 is registered as the external player 1 as shown above, if the relevant terminal is inside or near the car cabin of the vehicle 300, the headphone 137 can also reproduce the musical pieces of the same contents as those of the relevant speaker unit.

**[0259]** Moreover, in the order of reproduction of musical pieces previously set by the passenger from the audio unit 100A, for example, if the audio unit 100A is higher than the portable audio terminal 3, it is possible to output the musical pieces included in the music signals from the speaker units 2A to 2D by sending the music signals from the relevant terminal when the music signals are not sent from the relevant unit yet. In this case, the portable audio terminal 3 also sends an audio replay characteristic signal according to the setting regarding the replay characteristics set by the user from the relevant terminal. The music replay priority information set by this passenger can be sent from the audio unit 100A to each speaker unit at predetermined or undetermined intervals as a control signal including the priority information.

**[0260]** If the contents to be reproduced is a musical piece, for example, a delimitation (unit) of the amount of information when the music signal is sent from the audio unit 100A (or portable audio terminal 3) can be a unit of one musical piece or a plurality of musical pieces or a unit of a predetermined time of a few seconds or so to

divide one musical piece into a plurality of portions. In the case of radio broadcasting, the unit is preferred to be a shorter time unit to secure real-time broadcasting. Any way, design can be conducted in such a way as to arrange the amount of information to be sent in predetermined units according to factors such as over what extent of time the frequency band used in the adopted radio communication system can be occupied by the audio apparatus for a vehicle according to this embodiment.

**[0261]** Fig. 17 is a flow chart of musical piece reproduction processing in the audio unit 100A in the second embodiment and shows the control procedure executed by the microcomputer 111 according to a control program pre-stored in memory.

**[0262]** In the same figure, in step 3201: it is judged whether any of operation switches 112 is operated and if the judgment result is YES (operated), the process goes to step S205 and if the judgment result is NO (not operated), the process goes to S202.

**[0263]** Step S202 to step S204: Since none of the operation switches 112 is operated, the setting state of an internal flag F that indicates whether the audio unit 100A sends a radio signal or not is judged (step S202), and if this judgment results in F=1 (the radio signal is sent), it is judged whether a stop signal to stop the transmission of the radio signal from the relevant unit has been received from the portable audio terminal 3 or not (step S203), and if F=0 (transmission of the radio signal is stopped), the process returns to step S201.

**[0264]** Then, if the judgment in step S203 is NO (when no stop signal has been received), the process goes to step S208 to continue the transmission of the radio signal and if the judgment in step S203 is YES (the stop signal has been received), the internal flag is set to F=0 (step S204) and the process returns to step S201.

**[0265]** Step S205: The type of the operation switch whose operation has been detected in the judgment in step S201 from among the operation switches 112 is judged and if the operated switch is a switch related to audio replay ("Replay" switch illustrated in Fig. 23), the process goes to step S206 and if the operated switch is a switch related to replay stop ("Stop" or "Pause" switch illustrated in Fig. 23), the process goes to step S206, and if the operated switch is a switch related to the audio characteristic setting (switch not shown which allows the audio replay characteristic above), the process goes to step S211.

**[0266]** Step S206 and step S207: Since the audio unit 100A has instructed reproduction, a stop signal is sent to the relevant terminal (step S206) to prohibit a radio signal from being sent from the portable audio terminal 3 and the internal flag is set to F=1 (radio signal is sent) (step S207).

**[0267]** Step S208 to step S210: Before the switch about audio replay ("Replay" switch) is operated, the above selected musical pieces on the display in Fig. 23 are read from the audio storage medium 115 (or storage

medium inserted into the replay unit 117), music signals including information on the musical piece (information of compressed data format) are created (step S208), the created music signals are sent in a predetermined unit together from the radio communication apparatus 116 according to a predetermined communication protocol (step S209) and the process returns to step S201.

**[0268]** Then, when the operation of the switch about replay stop ("Stop" switch) is detected in step S205, the internal flag is set to F=0 (transmission of the radio signal is stopped) (step S210) and the process returns to step S201.

**[0269]** That is, when the transmission of the music signal is started according to the operation of the "Replay" switch, the transmission of the music signals each containing a predetermined unit amount of information of the musical pieces continues until all selected musical pieces are sent until the operation of the switch about replay stop is detected.

**[0270]** Note, when the "Pause" switch is operated, the internal flag is held to F=1 (radio signal is sent), the transmission of the music signals can be temporarily stopped.

**[0271]** Step S211: When the operation of the switch about the setting of the audio characteristics is detected in step S205, the internal flag F setting state is judged (step S211), and if this judgment is F=1 (radio signal is sent), the process goes to step S212 to send the audio replay characteristic signal according to the relevant setting and if F=0 (transmission of the radio signal is stopped), the process returns to step S201.

**[0272]** Step S212 to step S214: In order to realize a desired sound field according to the operation of the switch about the operated audio characteristic setting, the setting information on the replay characteristic such as sound quality, sound volume and replay balance of the speaker units 2A to 2D of memory (not shown) in the microcomputer 111 is updated (step S212, step S213), the audio replay characteristic signal according to the updated setting information is individually sent to each speaker unit (step S214) and the process returns to step S201.

**[0273]** Here, the memory, which is not shown, of the microcomputer 111, stores location information of all the speaker units 2A to 2D and setting information on the audio replay characteristics to realize a general sound field at those locations (for example, when the relevant audio apparatus for a vehicle is mounted in the vehicle 300).

**[0274]** The setting information above is pre-stored as a default setting and the relevant setting information in step S212 and step S213 can be updated for the setting items such as sound quality, sound volume and replay balance except the location information of the relevant speaker units. Thus, no matter what characteristic is set, musical pieces are replayed with an optimal sound field according to the installation location of the speaker units 2A to 2D.

**[0275]** Moreover, the setting of the audio replay characteristic (sound field setting) using the operation switches 112 in the audio unit 100A includes choices like setting of sound volume to zero, setting for generating a pseudo-silenced state or setting for generating sound stripped of a specific frequency component, etc. for a desired speaker unit of the four speaker units.

**[0276]** The reason why these settings are possible in this embodiment is that as described above, the setting information about the audio replay characteristic includes location information of all the speaker units 2A to 2D, and so it is possible to realize replay characteristics taking into account the other speaker units when one speaker unit tries to replay sound with a desired sound field.

**[0277]** That is, in order to generate a pseudo-silenced state at a seat corresponding to a specific speaker unit, it is possible to change the phase of the sound output from the speaker unit opposite to the phase of the sound output from another speaker unit within the range in which the voice reaches the seat corresponding to the speaker unit and set the volume level based on the relevant location information. Furthermore, in order to generate sound stripped of a specific frequency component, it is possible to apply filtering before the speaker unit outputs the replay signal from the speaker 223.

**[0278]** Therefore, the setting information that can realize such a replay signal is sent to each speaker unit through the audio replay characteristic signal according to the setting of the audio replay characteristics in the audio unit 100A.

**[0279]** Fig. 18 is a flow chart of musical piece replay processing in the speaker units 2A to 2D in the second embodiment and shows the control procedure executed by the microcomputer 221 of each speaker unit according to a control program pre-stored in memory.

**[0280]** In the same figure, in step S221 and step S222: it is judged whether an audio replay characteristic signal directed to the own speaker unit has been received from the audio unit 100A (step S221) and if the judgment result is NO (the relevant signal is not received), the process goes to step S223 and if the judgment result is YES (the relevant signal has been received), the audio replay characteristics of the own speaker unit are updated according to the setting information included in the received audio replay characteristics signal (step S222) and the process goes to S223.

**[0281]** Step S223, step S224: It is judged whether a musical signal is received from the audio unit 100A or portable audio terminal 3 or not (step S223), and if the judgment result is NO (the relevant signal is not received), the process returns to step S221. When the judgment result in step S223 is YES (the relevant signal has been received), it is judged whether the received musical signal is not sent from either one component of the audio unit 100A or portable audio terminal 3 or both are a plurality of types of musical signals including the musical signals sent from an external player, which is

not set on the display screen in Fig. 23 or not (step S224).

**[0282]** Step S225: As the audio unit 100A sets priority, each speaker unit at least receives a transmitted control signal and thereby priority in replaying musical signals is set, and therefore if the judgment result in step S224 is YES (musical signals are received from a plurality of types of sources), any one of the plurality of types of received musical signals is selected according to the preset priority in this step (step S225) and the process goes to step S228.

**[0283]** Step S226, step S227: When the judgment result in step S224 is NO (a plurality of types of musical signals has not been received), it is judged whether no musical signal has been received (step S226) and if this judgment result is NO (one musical signal has been received within a predetermined time), the process goes to step S228. On the other hand, if the judgment result in step S226 is YES (when no musical signal has been received beyond the predetermined time), a control signal requesting a transfer of the musical signal is sent to the other speaker units (three speaker units other than the own speaker unit because in this embodiment, the musical information itself of a predetermined unit included in the musical signal has a content common to all the speaker units) and when the musical signals are transferred from the other speaker units to the own speaker unit in response to the control signal, the musical signals are received (step S227) and the process goes to step S228.

**[0284]** Step S228: It is judged whether special processing should be applied during sound output, for example, whether a child seat is attached to the seat corresponding to the own speaker unit, or whether a pseudo-silenced state is set.

**[0285]** More specifically, it is possible to judge whether a child seat is attached to the seat corresponding to the own speaker unit, for example, using a general system such as a detection system based on the output signal of an ultrasonic sensor provided in the car cabin or a detection system that detects a signal transmitted from an oscillator provided at the child seat from an antenna embedded in each seat and detects the child seat based on the size of the detected signal, and it is possible to receive a control signal including information expressing the detection state from the audio unit 100A at predetermined or undetermined intervals.

**[0286]** Furthermore, it is possible to judge whether a pseudo-silenced state is set or not by referencing the audio replay characteristic updated in step S222.

**[0287]** Step S229: Since it is judged in step S228 that special processing is required, in this step, a musical signal including an amount of information of a predetermined unit whose reception is detected in step S223 (or acquired from another speaker unit) is decoded according to a decoding protocol that conforms to the protocol at the time of compression and converted to a replay signal (that is, a signal of opposite phase realizing a

pseudo-silenced state, signal of sound level 0 or signal with a predetermined frequency component filtered out, etc.) with reference to the audio replay characteristic updated in step S222 according to a desired sound field set by the audio unit 100A. This allows the passenger seated on a specific seat to drive the speaker unit corresponding to the seat in a condition according to his/her preference, for example, to set the speaker unit in a pseudo-silenced state in the case of a seat to which a child seat is attached or set the speaker unit to only output sound that will not adversely affect the child.

[0288] Step 230: Since it is judged in step S228 that special processing is not required, in this step, a musical signal including an amount of information of a predetermined unit whose reception is detected in step S223 (or acquired from another speaker unit) is decoded according to a decoding protocol that conforms to the protocol at the time of compression and converted to a replay signal with reference to the audio replay characteristic updated in step S222 according to a desired sound field set by the audio unit 100A.

[0289] Step S231 and step S232: At the time of reception of the musical signal received this time or based on a sync signal common to the speaker units sent by a predetermined speaker unit, the timing of outputting the replay signal created in step S229 or step S230 from the speaker 223 of the own speaker unit is adjusted (step S231) and the relevant replay signal is output as sound from the speaker 223 (step S232) at the adjusted output timing and the process returns to step S221.

[0290] Fig. 19A and Fig. 19B are flow charts of the music replay processing in the portable audio terminal 3 according to the second embodiment and show the control procedure carried out by the microcomputer 131 according to a control program pre-stored in memory.

[0291] In the same figure, in step S241: It is judged whether any of the operation switches 132 has been operated, and if the judgment result is YES (operated), the process goes to step S250 and if the judgment result is NO (not operated), the process goes to step S242.

[0292] Step S242, step S243: It is judged whether a musical signal has been received from the audio unit 100A, and if the judgment result is NO (the relevant signal has not been received), the process goes to step S247 and if the judgment result is YES (the relevant signal has been received), the setting state of an internal flag F2 that indicates whether reception of the musical signal from the outside (audio unit 100A) is possible or not (step S243) is judged, and if the judgment result is F2=0 (reception of the relevant signal is prohibited), the process goes to step S247 and if F2=1 (reception of the relevant signal is allowed), the process goes to step S244.

[0293] Step S244 to step S246: Since the setting state of the internal flag F2 is F2=1, the received musical signal is converted to a replay signal (step S244) according to the replay characteristic preset by the user of the portable audio terminal 3, the replay signal is output as

sound to the speaker (headphone) 137 (step S245), the setting state of an internal flag F1 that indicates whether the musical signal including the musical piece information read from the audio storage medium 136 by the relevant terminal should be sent independently or not is set to F1=0 (transmission of the relevant signal is prohibited) (step S246) and the process goes to step S247.

[0294] Step S247 to step S249: The setting state of an internal flag F0 that indicates whether a radio signal is sent from the portable audio terminal 3 or not is judged (step S247) and if the judgment result is F0=1 (the radio signal is sent), it is judged whether a stop signal instructing that the transmission of the radio signal from the relevant terminal should be stopped has been received from the audio unit 100A or not (step S248) and if F0=0 (transmission of the radio signal is stopped), the process returns to step S241.

[0295] If the judgment result in step S248 is NO (the stop signal has not been received), the process goes to step S254 to continue the transmission of the radio signal and if the judgment result is YES (when the stop signal has been received), the internal flag F0 is set to F0=0 (step S249) and the process returns to step S241.

[0296] Step S250: The type of the operation switch of the operation switches 132, which is detected to have been operated in the judgment in step S241, is judged and if the operated switch is the switch about audio replay ("Replay" switch), the process goes to step S251, and if it is the switch about replay stop ("Stop" or "Pause" switch), the process goes to step S258, and if it is the switch about mode setting, the process goes to step S259, and if it is the switch about audio characteristic setting, the process goes to step S265.

[0297] Step S251 and step S252: Since the operation switch of the portable audio terminal 3 has instructed a replay, the setting state of the internal flag F1 is judged and if this judgment result is F1=0 (transmission of the musical signal from the relevant terminal is prohibited), the process goes to step S253, and if F1=1 (transmission of the musical signal from the relevant terminal is allowed), a stop signal is sent to the relevant unit to prohibit the radio signal from being sent from the audio unit 100A (step S252) and the process goes to step S253.

[0298] Step S253: The internal flag F0 is set to F0=1 (radio signal is sent) and the process goes to step S208.

[0299] Step S254: Before the switch about audio replay ("Replay" switch) is operated, the musical piece selected by the user is read from the audio storage medium 136 and a musical signal including the information on the musical piece is created.

[0300] Step S255 to step S258: The setting state of the internal flag F1 is judged (step S255), and if the judgment result is F1=0 (transmission of the musical signal from the relevant terminal is prohibited), the musical signal created in step S254 is output as sound to the speaker (headphone) 137 of the relevant terminal (step S256) and if F1=1 (transmission of the musical signal from the relevant terminal is allowed), the musical signals creat-

ed in step S254 are arranged in a predetermined unit and sent from the radio communication apparatus 135 according to a predetermined communication protocol (step S257) and the process returns to step S241.

[0301] Then, when an operation of the switch about replay stop ("Stop" switch) is detected in step S250, the internal flag F0 is set to F0=0 (transmission of the radio signal is stopped) (step S258) and the process returns to step S241.

[0302] That is, when the internal flag F0=0 (transmission of the radio signal is stopped) if the internal flag F1=1, once the transmission of the musical signals is started according to the operation of the "Replay" switch until an operation of the switch about replay stop is detected, musical signals each including a predetermined unit amount of musical piece information are sent until all the selected musical pieces are sent. Furthermore, if the "Pause" switch is operated while the musical signals are being sent, it is possible to temporarily stop the transmission of the musical signals while holding the internal flag F0=1 (radio signal is sent). Then, when the internal flag F1=0, the musical pieces independently replayed by the portable audio terminal 3 are output from the speaker (headphone) 137.

[0303] Step S259 to step S261: Since an operation of the switch about mode setting is detected in step S250, it is judged whether the operation has set the transmission switch to ON (step S259), and the state of the internal flag F1 that indicates whether transmission of the musical signals from the relevant terminal is possible or not is set according to the judgment (F1=1 when the relevant switch is ON: step S260, F1=0 when the relevant switch is OFF: step S261).

[0304] Step S262 to step S264: Since an operation of the switch about mode setting is detected in step S250, it is judged whether the operation has set the reception switch to ON (step S262), and the state of the internal flag F2 that indicates whether reception of the musical signals from the audio unit 100A is possible or not is set according to the judgment (F2=1 when the relevant switch is ON: step S263, F2=0 when the relevant switch is OFF: step S264).

[0305] Step S265, step S266: When an operation of the switch about audio characteristic setting is detected in step S250, the setting states of the internal flags F0 and F1 are judged and if F0=F1=1, the process goes to step S268 and if F0=0, or F0=1 and F1=0, the process returns to step S241.

[0306] Step S267 to step S269: In order to realize a desired sound field according to the operation of the operated switch about the audio characteristic setting and in order to realize a desired sound field according to the setting information on the replay characteristics such as sound quality, sound volume and replay balance of the speaker units 2A to 2D of memory (not shown) in the microcomputer 131, the setting information on the replay characteristics such as sound quality, sound volume and replay balance of the speaker units 2A to 2D

of memory (not shown) in the microcomputer 131 is updated (step S267, step S268), and the audio replay characteristic signal according to the updated setting information is sent to each speaker unit individually (step S269) and the process returns to step S241.

[0307] According to this embodiment described above, it is possible to discard cables connecting the audio unit 100A and speaker units 2A to 2D and make mounting of each component in the car cabin easier. This eliminates the need for the designer of the vehicle to consider the cabling locations or operability of cabling, thus improving the degree of freedom of design.

[Third embodiment]

[0308] Then, a third embodiment, which is based on the audio apparatus for a vehicle according to the second embodiment above, will be explained. In the following explanations, overlapping explanations about the same configurations as those in the second embodiment will be omitted and explanations will be focused on characteristic sections of this embodiment.

[0309] In the speaker units shown in Fig. 15, this embodiment groups, for example, the speaker units 2A and 2B corresponding to the driver seat and assistant seat and the speaker units 2C and 2D corresponding to the right and left rear seats, and replays musical pieces differing from one group to another. When such grouping is set, it is possible to allow the passengers to arbitrarily set a group including at least one speaker unit from the operation switches 112 of the audio unit 100A and from a predetermined display screen (not shown) using the display 113.

[0310] Furthermore, this embodiment allows the passenger to select a musical piece source or a musical piece to be replayed for every group set by the passenger by displaying the display screen illustrated in Fig. 23 for every group.

[0311] Fig. 20 is a flow chart of music replay processing in the audio unit 100A in the third embodiment, and since the basic processing configuration is almost the same as the flow chart in Fig. 17 described in the second embodiment, the characteristic processing in this embodiment will be explained.

[0312] In this embodiment, the audio unit 100A needs to send musical signals differing from one preset group to another. Therefore, in this embodiment, when an operation of the switch about audio replay is detected in step S106 before a stop signal is sent to the portable audio terminal 3 in step S108, a selected musical piece is set for every preset group in step S107 prior to setting the internal flag F to 1.

[0313] Then, in step S110 and step S111, musical piece information for every group is read from the audio storage medium 115, etc., their respective musical signals are created and those musical signals are sent to each speaker unit that makes up each group by a predetermined unit amount. At this time, the audio unit



100A includes the identification information of the group to which each speaker unit belongs in the musical signal to be sent.

[0314] Furthermore, when the audio replay characteristic is allowed to be set for every group, it is possible to send an audio replay characteristic signal according to the setting in step S115 and step S116.

[0315] Fig. 21 is a flow chart of music replay processing in the speaker units 2A to 2D in the third embodiment, and since the basic processing configuration is almost the same as the flow chart in Fig. 18 described in the second embodiment, the characteristic processing in this embodiment will be explained.

[0316] When a plurality of types of musical signals is received in step S124, in step S125, the speaker units 2A to 2D perform processing of selecting musical signals according to preset replay priority in the same way as in the second embodiment and at the same time selects a musical signal from among the received musical signals, including the identification information of the group to which the own unit belongs.

[0317] Then, when it is not possible to receive musical signals in step S126, it is necessary to select the musical signal including the identification information of the group to which the own speaker unit belongs from among the musical signals received as a result of requesting other speaker units for musical signals in step S127. Or when another speaker unit of the group to which the own speaker unit belongs can be recognized by a plurality of musical signals received so far, it is possible to directly request another speaker unit that belongs to the same group to transfer the musical signal.

[0318] Fig. 22A and Fig. 22B are flow charts of music replay processing in the portable audio terminal 3 in the third embodiment, and since the basic processing configuration is almost the same as the flow charts in Fig. 19A and Fig. 19B described in the second embodiment, the characteristic processing in this embodiment will be explained.

[0319] As in the case of the above-described audio unit 100A, the portable audio terminal 3 needs to send musical signals differing from one preset group to another in this embodiment. Therefore, when an operation of the switch about audio replay is detected in step S151 and the judgment result in step S152 is the internal flag F1=1 (transmission of musical signals from the relevant terminal is allowed), this embodiment sets musical pieces selected for every preset group in step S153 before a stop signal is sent to the audio unit 100A in step S154.

[0320] Then, in step S156 and step S159, musical piece information for every group is read from the audio storage medium 136, etc., their respective musical signals are created and those musical signals are sent to each speaker unit that makes up each group by a predetermined unit amount. At this time, the portable audio terminal 3 includes the identification information of the group to which each speaker unit belongs in the musical signal to be sent.

[0321] Furthermore, when the audio replay characteristic is allowed to be set for every group, as in the case of the above-described audio unit 100A, it is possible to send an audio replay characteristic signal according to the setting in step S170 and step S171.

[0322] This embodiment allows individual passengers to listen to contents according to their preference in set group units and is ideally applicable to a vehicle with a large room such as a wagon car and bus.

[0323] The second and third embodiments above describe the audio unit 100A as a stationary type as shown in Fig. 15, but the present invention is not limited to such a system configuration. If the audio unit 100A is implemented as a terminal that the passenger can carry with him/her, that terminal can be carried into the vehicle by the passenger, making it possible to transfer musical signals to be replayed to a plurality of speaker units via radio communication as described above, eliminating a troublesome operation required in the above stationary type audio unit 100A to secure (transfer) musical piece information to the audio unit 100A before musical pieces are replayed, etc., thus improving operability.

[0324] The second and third embodiments above provide an easy-to-mount audio apparatus for a vehicle, its contents reproduction method and sound reproduction apparatus.

[0325] That is, the second and third embodiments above can discard cables connecting the audio unit 100A and a plurality of speaker units 2A to 2D and simplify mounting in the vehicle. This eliminates the need for the designer of the vehicle to consider cabling locations, thus increasing the degree of freedom of design.

[0326] Furthermore, according to the third embodiment above, the speaker units 2A to 2D are located in accordance with the seats of the vehicle 300 and by sending a radio signal including contents different from those for the other speaker units to the speaker unit corresponding to a specific seat, it is possible to allow individual passengers to listen to contents according to their preference.

[0327] Furthermore, the second and third embodiments above can reproduce contents with an optimal sound field according to the locations of the speaker units 2A to 2D.

[0328] Furthermore, the second and third embodiments above can generate a pseudo-silenced state or output sound stripped of a specific frequency component.

[0329] Furthermore, the second and third embodiments above allow the passenger seated on a specific seat to drive the speaker unit corresponding to the seat in a condition according to his/her preference, for example, set the speaker unit to only output sound that will not adversely affect the child in the case of a seat to which a child seat is attached.

[0330] Furthermore, in the second and third embodiments above, the audio unit 100A is made portable and can be carried into the vehicle, making it possible to

transfer contents to be replayed to a plurality of speaker units via radio communication, eliminating a troublesome operation to transfer contents to the apparatus on the vehicle side, etc.

[0331] Furthermore, when a radio signal is sent, the second and third embodiments above send contents to be sent through the radio signal by dividing the contents by a predetermined unit amount of information to a plurality of speaker units. This makes it possible to efficiently send contents according to the time during which the frequency band available to radio communications can be occupied.

[0332] Furthermore, according to the second and third embodiments above, even if radio signals are sent from, for example, a stationary unit in the car cabin and a portable unit as the radio signals from the audio unit 100A, the same contents received from any one unit can be reproduced by a plurality of speaker units.

[0333] As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the claims.

#### Claims

1. An audio system that reproduces contents information as sound in a vehicle, comprising:

a portable audio apparatus (200, 200a, 200b) carried by a passenger of said vehicle; and  
an audio apparatus (100) mounted in said vehicle,

**characterized in that** said portable audio apparatus comprises:

contents information retaining means (204) for retaining contents information; and  
transmitting means (205) for transmitting said contents information to said audio apparatus at least by means of radio communication, and  
said audio apparatus comprises:

receiving means (110) for receiving said contents information from said portable audio apparatus at least by means of radio communication; and  
controlling means (101, 103) for reproducing said contents information received by said receiving means and outputting the reproduced information as sound from a speaker (28) mounted in said vehicle.

2. The audio system according to claim 1, **characterized in that** said audio apparatus further comprises:

an operation switch (24, 106 to 109) that allows the passenger of said vehicle to input an operation of said audio system; and  
operation signal transmitting means (110) for transmitting an operation signal corresponding to the operation of said operation switch to said portable audio apparatus at least by means of radio communication, and  
said portable audio apparatus further comprises controlling means (203) for controlling the own operation according to said operation signal received from said audio apparatus at least by means of radio communication.

3. The audio system according to claim 1 or 2, **characterized in that** at least any one of said audio apparatus and said portable audio apparatus further comprises selecting means capable of selecting a communication execution state in which contents information is transmitted between both apparatuses or a non-communication execution state in which contents information is not transmitted.

4. The audio system according to one of the preceding claims, **characterized in that** at least said audio apparatus further comprises displaying means (24) for visibly displaying the state of communication between said audio apparatus and said portable audio apparatus.

5. The audio system according to one of the preceding claims, **characterized in that** said audio apparatus identifies said portable audio apparatus that exists in a predetermined radio communication area of said audio apparatus and further comprises system constructing means (101, 110) for constructing a radio communication system made up of the identified portable audio apparatus and said audio apparatus, and  
said audio apparatus acquires said contents information from the portable audio apparatus identified by said system constructing means.

6. The audio system according to claim 5, **characterized in that** said audio apparatus further comprises instructing means capable of, when a plurality of contents information pieces is received from a plurality of portable audio apparatuses identified by said system constructing means, instructing simultaneous reproduction of the plurality of contents information pieces, and  
said controlling means, when simultaneous reproduction is instructed by said instructing means, outputs at least any one contents information piece from among the plurality of contents information pieces whose simultaneous reproduction is instructed from said speaker and at the same time remotely controls said plurality of portable audio ap-

paratuses so that the other contents information pieces are reproduced by at least any one of the plurality of portable audio apparatuses identified by said system constructing means.

7. The audio system according to claim 5 or 6, **characterized in that** said receiving means can receive contents information from the plurality of portable audio apparatuses identified by said system constructing means,

said audio apparatus further comprises setting means capable of, when a plurality of contents information pieces is received from the plurality of portable audio apparatuses identified by said system constructing means, setting priority of the plurality of portable audio apparatuses in order to set the order of reproducing those contents information pieces, and

said controlling means, when the priority is set by said setting means, sequentially performs control that contents information received from one portable audio apparatus is output as sound from the speaker mounted in said vehicle on said identified plurality of portable audio apparatuses according to said priority.

8. The audio system according to claim 5, 6 or 7, **characterized in that** said system constructing means, for the purpose of identifying said portable audio apparatuses detected in said vehicle, which is said predetermined radio communication area, assigns individual identification addresses and constructs said radio communication system with all portable audio apparatuses, which have been assigned identification addresses, and said audio apparatus.

9. The audio system according to claim 5, 6, 7 or 8, **characterized in that** said system constructing means transmits a first radio signal with directivity in said vehicle and identifies said portable audio apparatus that exists in said predetermined radio communication area (L1 to L4, L11 to L14) based on a second radio signal received from said portable audio apparatus according to the transmission of the radio signal.

10. The audio system according to claim 9, **characterized in that** said predetermined radio communication area (L1 to L4) corresponds to a seat position (2, 3, 4) placed in said vehicle.

11. The audio system according to claim 9 or claim 10, **characterized in that** said predetermined radio communication area (L11 to L14) corresponds to a position (5a to 5d) of the mount of said portable audio apparatus placed in said vehicle.

12. The audio system according to any one of claims 9

to 11, **characterized in that** said system constructing means sends a first radio signal from a radio antenna (34) installed almost in the center of said vehicle.

13. A contents reproduction method of an audio system that reproduces contents information as sound in a vehicle, **characterized by** comprising:

a system constructing step of constructing a communication system constructed of a portable audio apparatus (200, 200a, 200b) carried by a passenger of said vehicle and an audio apparatus (100) mounted in said vehicle that performs at least radio communication;

a contents information transmitting step of transmitting contents information pre-stored in said portable audio apparatus to said audio apparatus at least by means of radio communication; and

a sound reproducing step of receiving and reproducing said contents information sent in said contents information transmitting step by said audio apparatus at least by means of radio communication and outputting the reproduced information as sound from a speaker (28) mounted in said vehicle.

14. The contents reproduction method according to claim 13, **characterized by** further comprising:

an operation inputting step allowing the passenger of said vehicle to input an operation of said audio system;

an operation signal transmitting step of transmitting an operation signal according to the operation input in said operation inputting step to said portable audio apparatus at least by means of radio communication; and

a reproducing step in which said portable audio apparatus reproduces contents information retained in the portable audio apparatus in response to said operation signal received from said audio apparatus at least by means of radio communication.

15. The contents reproduction method according to claim 13 or 14, **characterized in that** said radio communication system is constructed in said system constructing step only at the beginning of audio control.

16. The contents reproduction method according to claim 13, 14 or 15, **characterized in that** said radio communication system is constructed in said system constructing step at a predetermined time interval.

17. The contents reproduction method according to any one of claim 13, claim 15 and claim 16, **characterized in that** in order to identify said portable audio apparatus detected in said vehicle as a predetermined radio communication area, said system constructing step assigns individual identification addresses and constructs said radio communication system with all portable audio apparatuses with the identification addresses assigned and said audio apparatus.

18. An audio apparatus for a vehicle (100) mounted in a vehicle that reproduces contents information as sound in said vehicle, **characterized by** comprising:

system constructing means (101, 110) for constructing a radio communication system constructed of a portable audio apparatus (200, 200a, 200b) carried by a passenger of the vehicle and said audio apparatus;

receiving means (110) for receiving said contents information from said portable audio apparatus at least by means of radio communication; and

controlling means (101, 103) for reproducing said contents information received by said receiving means and outputting the reproduced information as sound from a speaker (28) mounted in said vehicle.

19. The audio apparatus for a vehicle according to claim 18, **characterized in that** said system constructing means constructs, when a plurality of said portable audio apparatuses is identified, a radio communication system including the plurality of portable audio apparatuses, and

said controlling means, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via radio communication and controls so that the contents information is reproduced as sound in said second portable audio apparatus.

20. A contents reproduction method of an audio apparatus for a vehicle (100) mounted in said vehicle to reproduce contents information as sound in said vehicle, **characterized by** comprising:

a system constructing step of constructing a radio communication system constructed of a portable audio apparatus (200, 200a, 200b) carried by a passenger of said vehicle and said audio apparatus;

a receiving step of receiving said contents information from said portable audio apparatus at least by means of radio communication; and

a sound reproducing step of reproducing said contents information received in said receiving step and outputting the reproduced information as sound from a speaker (28) mounted in said vehicle.

21. The contents reproduction method according to claim 20, **characterized in that**, when a plurality of said portable audio apparatuses is identified in said system constructing step, a radio communication system including the plurality of portable audio apparatuses is constructed, and

said sound reproducing step, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via radio communication and controls so that the contents information is reproduced as sound in said second portable audio apparatus.

22. The audio system according to one of claims 1 to 12, **characterized in that** the audio apparatus (100) mounted in said vehicle constructs a radio subsystem in said vehicle made up of audio controlling means (100A) equipped with a first radio communication apparatus (116) and a plurality of speaker units (2A to 2D) equipped with a second radio communication apparatus (222).

said first and second radio communication apparatuses can carry out radio communications based on a predetermined radio communication protocol, and

said plurality of speaker units receives a radio signal sent from the first radio communication apparatus of said audio controlling means by said second radio communication apparatus and reproduces contents information included in the received radio signal according to characteristic information individually set for each speaker unit.

23. The audio system according to claim 22, **characterized in that** said audio controlling means can perform a setting by which said plurality of speaker units is divided into a plurality of groups made up of at least one speaker unit and sends a radio signal including contents information differing among the set plurality of groups.

24. The audio system according to claim 22 or 23, **characterized in that** said plurality of speaker units is provided in accordance with seats in the vehicle, and

said audio controlling means sends to a speaker unit corresponding to a specific seat, a radio signal including contents information different from the contents information for the other speaker units.

25. The audio system according to claim 22, 23 or 24 **characterized in that** said audio controlling means sends a first radio signal including the same contents information to said plurality of speaker units and sends a second radio signal including said characteristic information to each speaker unit individually, and  
said plurality of speaker units applies sound field processing based on individual characteristic information included in said second radio signal to the contents information included in said first radio signal and then outputs the contents information as sound.
26. The audio system according to claim 25, **characterized in that** said characteristic information includes information on the locations of all said plurality of speaker units and sound field processing at those locations, and  
said plurality of speaker units performs sound field processing taking into account the other units based on said characteristic information prior to outputting sound from the own unit.
27. The audio system according to any one of claims 22 to 25, **characterized in that** said plurality of speaker units is provided in accordance with the seats in said vehicle, and  
said audio controlling means controls a speaker unit from among said plurality of speaker units that corresponds to a specific seat so as to be able to reproduce sound with sound volume, sound quality or sound field different from the other speaker units.
28. The audio system according to claim 27, **characterized in that** a seat in said vehicle is provided with detecting means for detecting whether any child seat is attached, and  
said audio controlling means designates a seat where said detecting means has detected the presence of a child seat as said specific seat and controls the speaker unit corresponding to the seat so as to be able to reproduce sound with sound volume, sound quality or sound field different from the other speaker units.
29. The audio system according to one of the claims 22 to 28 **characterized in that** said audio controlling means is a portable terminal (3).
30. The audio system according to one of the claims 22 to 29 **characterized in that** when said radio signal is sent, said audio controlling means sends contents information to be sent through the radio signal, by dividing the contents information by a predetermined unit amount of information to said plurality of speaker units.
31. The audio system according to claim 30, **characterized in that** said plurality of speaker units comprises synchronization means for, when the contents information divided into said predetermined unit amounts of information received through said radio signal is reproduced, mutually synchronizing the output timing among the speaker units.
32. The audio system according to one of claims 22 to 31 **characterized in that** when a plurality of types of radio signals sent from different sources is received, said plurality of speaker units reproduces contents information included in any one of the radio signals based on preset priority.
33. A portable audio apparatus (3) in the audio system according to claim 22 that comprises a third radio communication apparatus (135) that receives a radio signal sent from the first radio communication apparatus of said audio controlling means and can reproduce sound at least through a headphone based on the radio signal received by the radio communication apparatus.
34. The contents reproduction method according to one of claims 13 to 17, **characterized in that** said system constructing step includes, as an audio apparatus (100) mounted in said vehicle, a subsystem constructing step of constructing a radio subsystem made up of an audio control unit (100A) and a plurality of speaker units (2A to 2D) each equipped with a radio communication apparatus that can carry out radio communication based on a predetermined radio communication protocol, and  
said audio reproducing step includes:  
a first step of sending a radio signal including contents information from said audio control unit; and  
a second step of receiving said radio signal from said plurality of speaker units and reproducing the contents information included in the received radio signal as sound according to the characteristic information individually set for each speaker unit.
35. The contents reproduction method according to claim 34. **characterized in that** said first step divides said plurality of speaker units into a plurality of groups made up of at least one speaker unit and sends a radio signal including contents information differing among those groups from said audio control unit.
36. The contents reproduction method according to claim 34 or 35, **characterized in that** in said first step, said audio control unit sends a first radio signal including the same contents information to said plu-

rality of speaker units and sends a second radio signal including said characteristic information to the speaker units, and

in said second step, said plurality of speaker units applies sound field processing based on the individual characteristic information included in said second radio signal to the contents information included in said first radio signal individually and then outputs the contents information as sound.

37. The contents reproduction method according to any one of claims 34 to 36, **characterized in that** said plurality of speaker units is preset in accordance with the seats in the vehicle, and said sound reproducing step controls a speaker unit from among said plurality of speaker units that corresponds to a specific seat by said audio control unit so as to be able to reproduce sound with sound volume, sound quality or sound field different from the other speaker units.
38. The contents reproduction method according to one of claims 34 to 37, **characterized in that** when said radio signal is sent from said audio control unit in said first step, the contents information to be sent through the radio signal is divided by a predetermined unit amount of information and sent to said plurality of speaker units.
39. The contents reproduction method according to one of claims 34 to 38, **characterized in that** when said plurality of speaker units receives a plurality of types of radio signals sent from different sources in said second step, contents information included in any one of the radio signals is reproduced based on preset priority.
40. A computer program product that provides instructions that implement the operation of the audio apparatus for a vehicle according to claim 18 or claim 19.
41. A computer program product that provides instructions that implement the contents reproduction method according to claim 20 or claim 21 with an audio apparatus for a vehicle.
42. A computer-readable storage medium that stores a program code that implements the operation of the audio apparatus for a vehicle according to claim 18 or claim 19.
43. A computer-readable storage medium that stores a program code that implements the contents reproduction method according to claim 20 or claim 21 with an audio apparatus for a vehicle.

FIG. 1

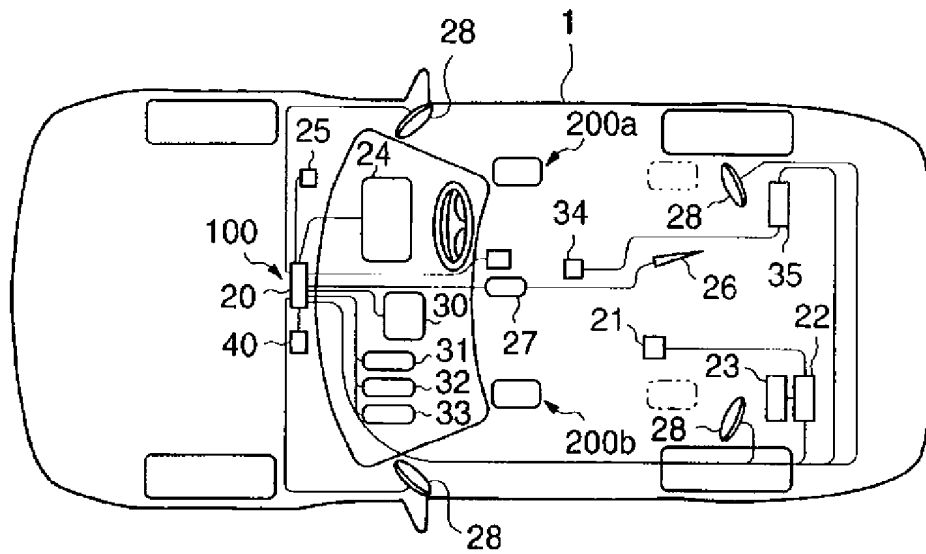


FIG. 2

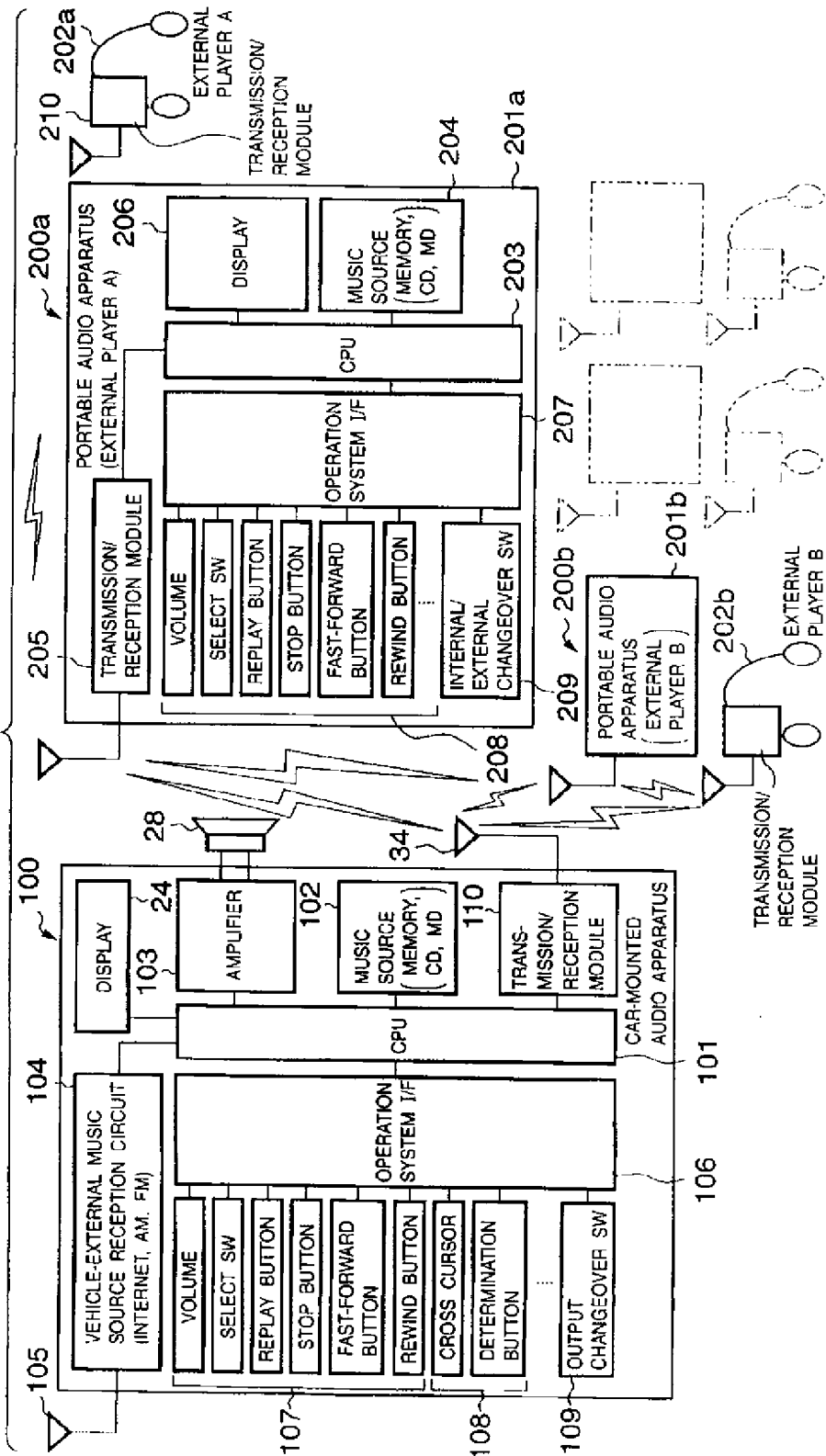




FIG. 3

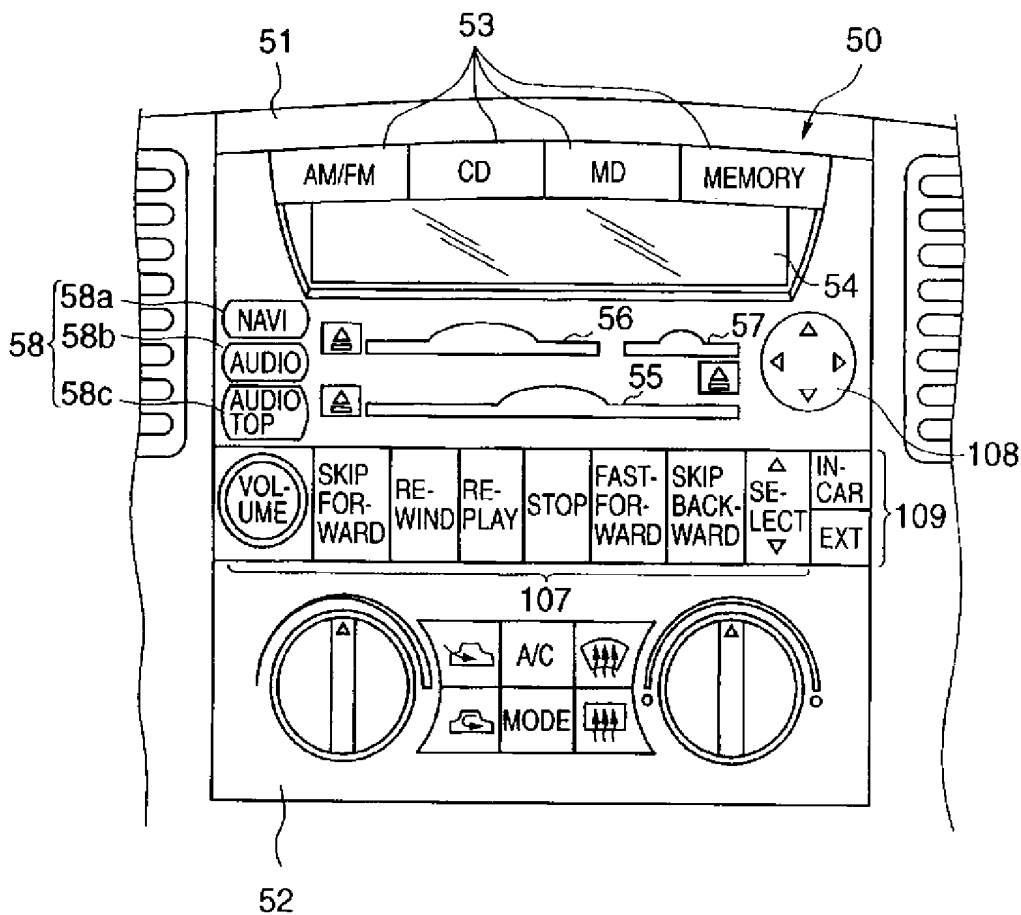
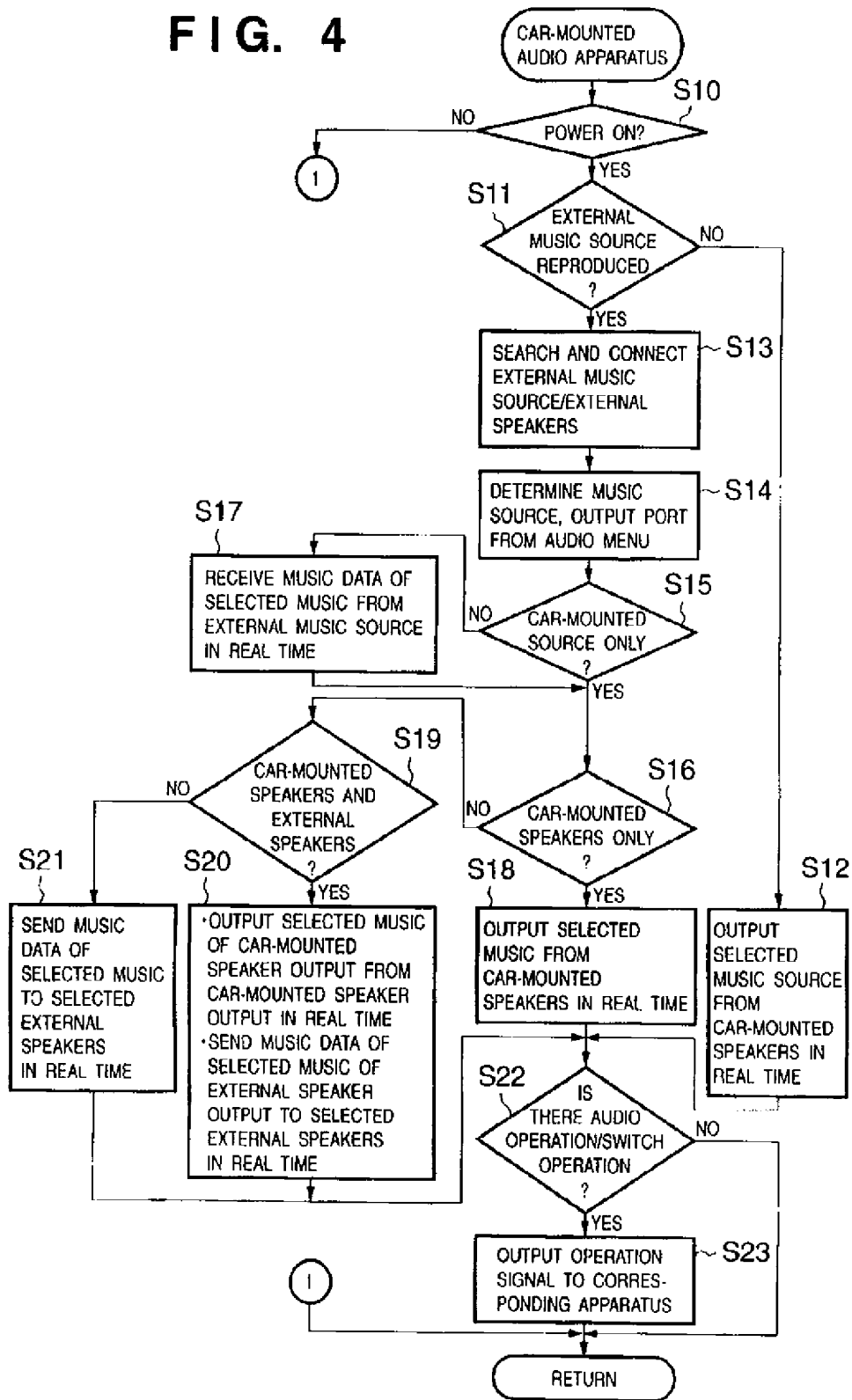


FIG. 4



**FIG. 5**

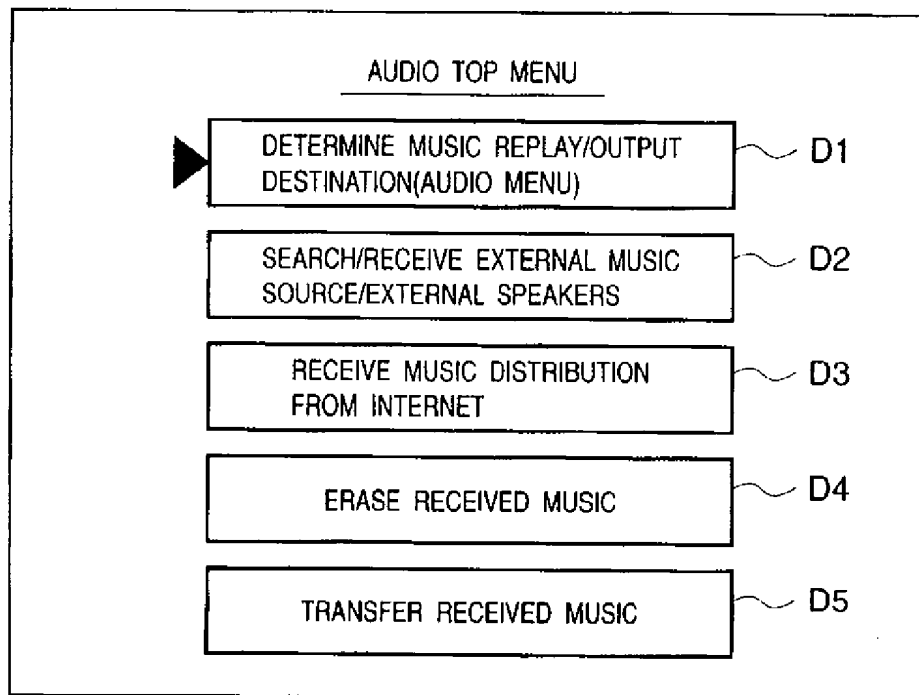


FIG. 6

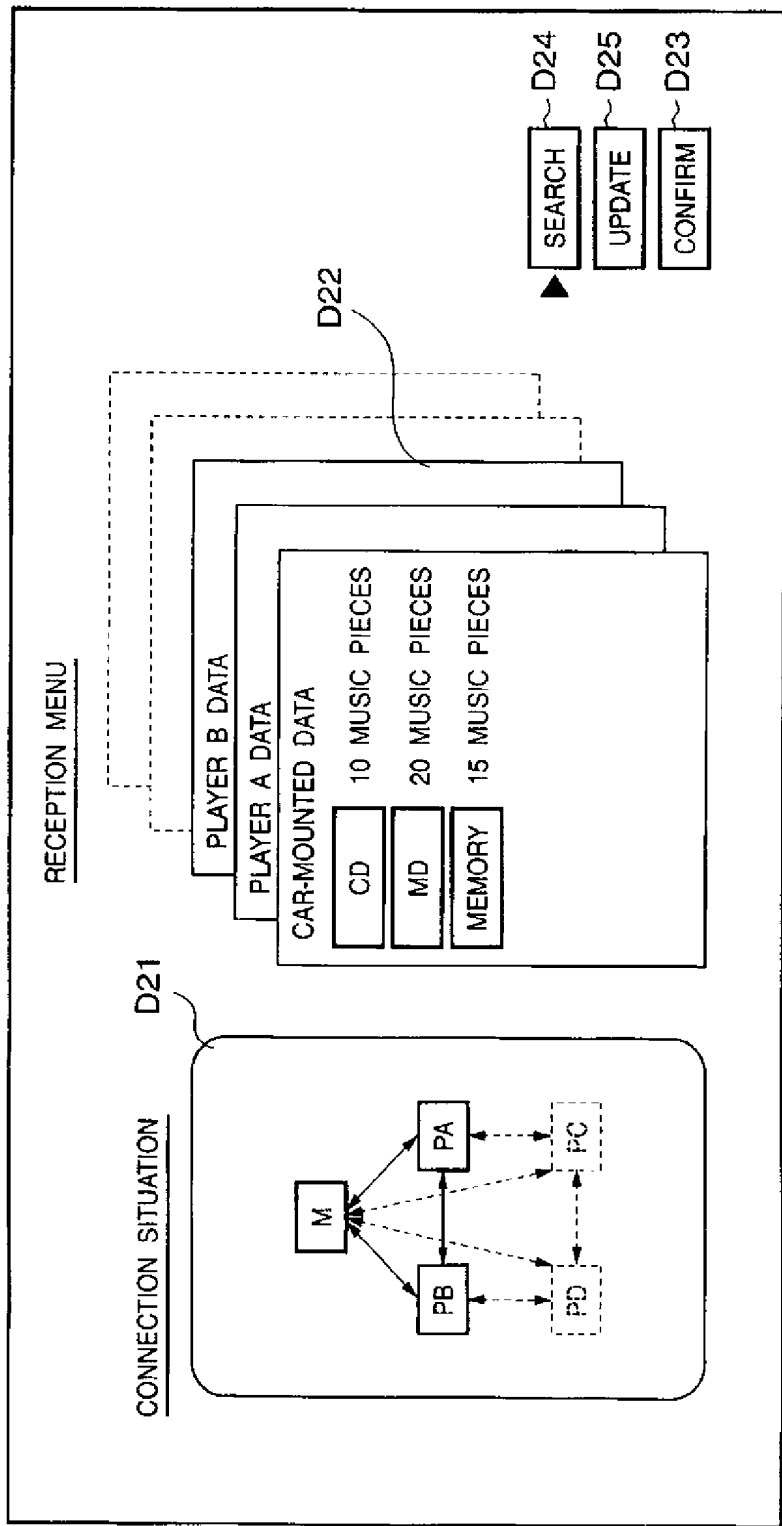


FIG. 7

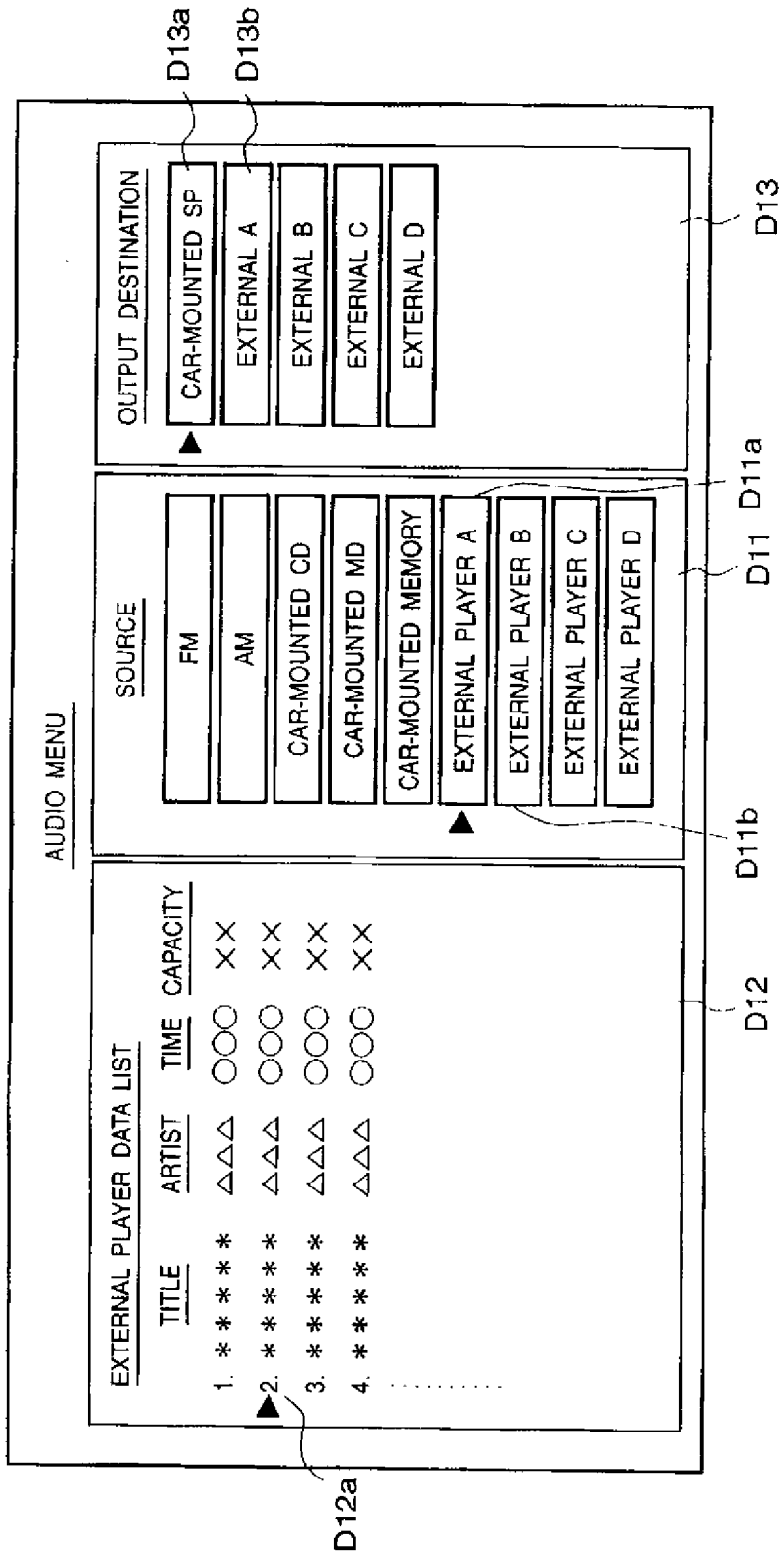
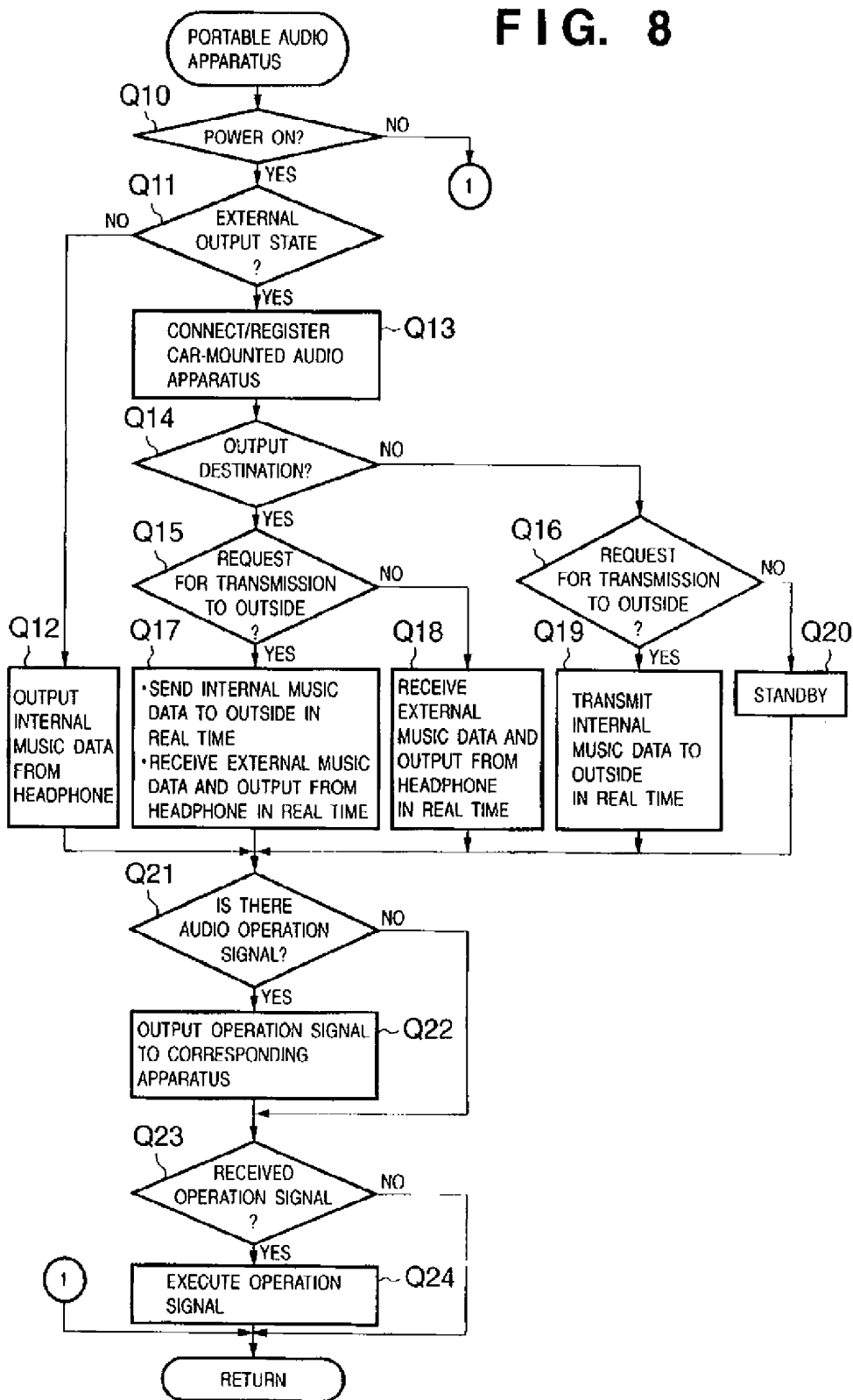
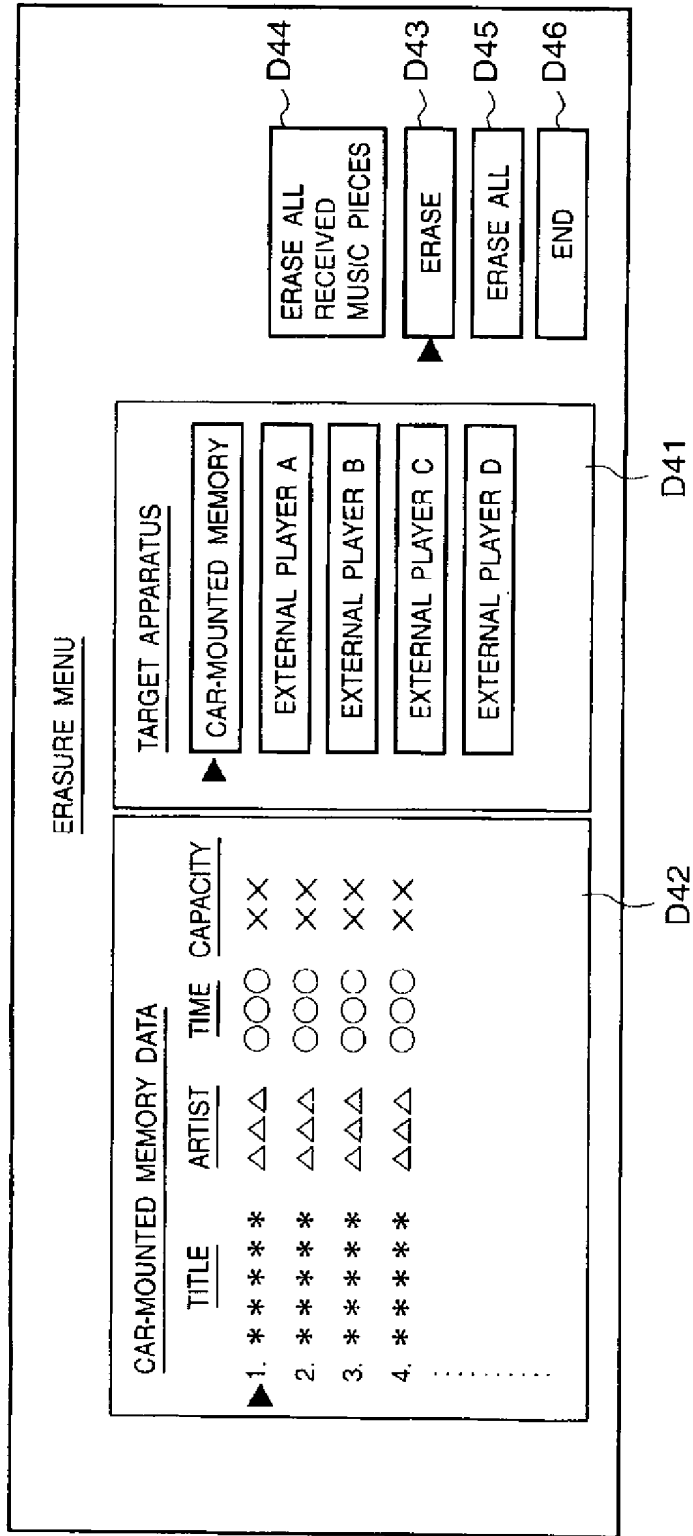


FIG. 8



**FIG. 9**



**FIG. 10**

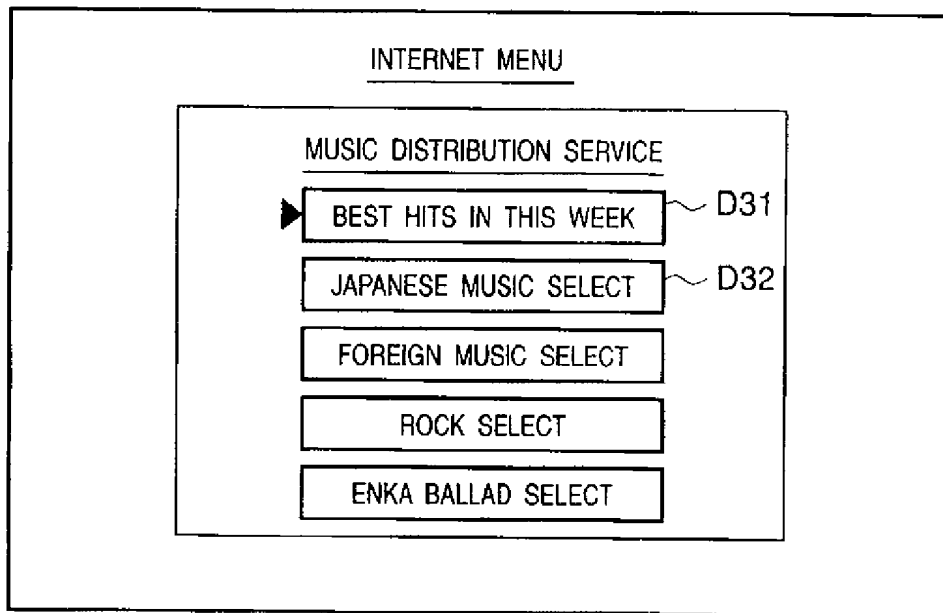




FIG. 11

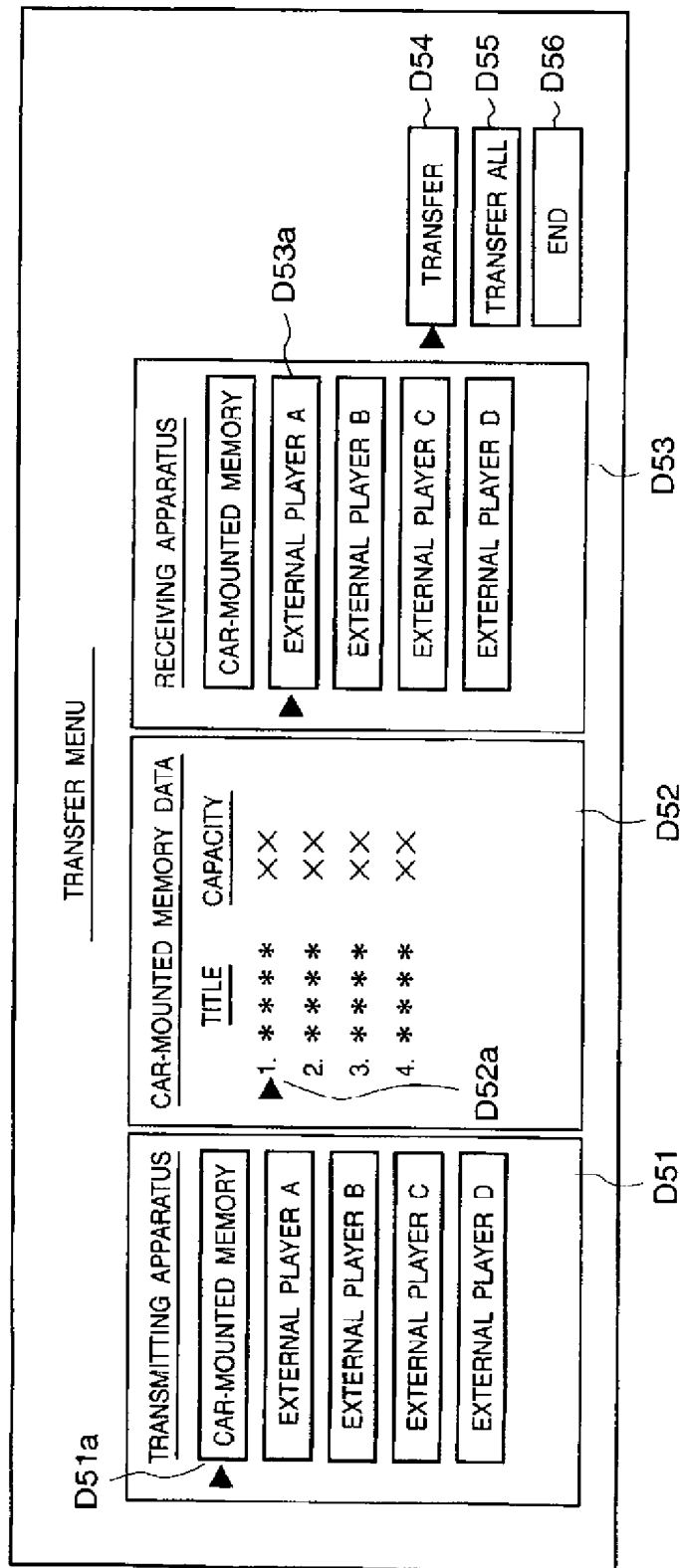


FIG. 12

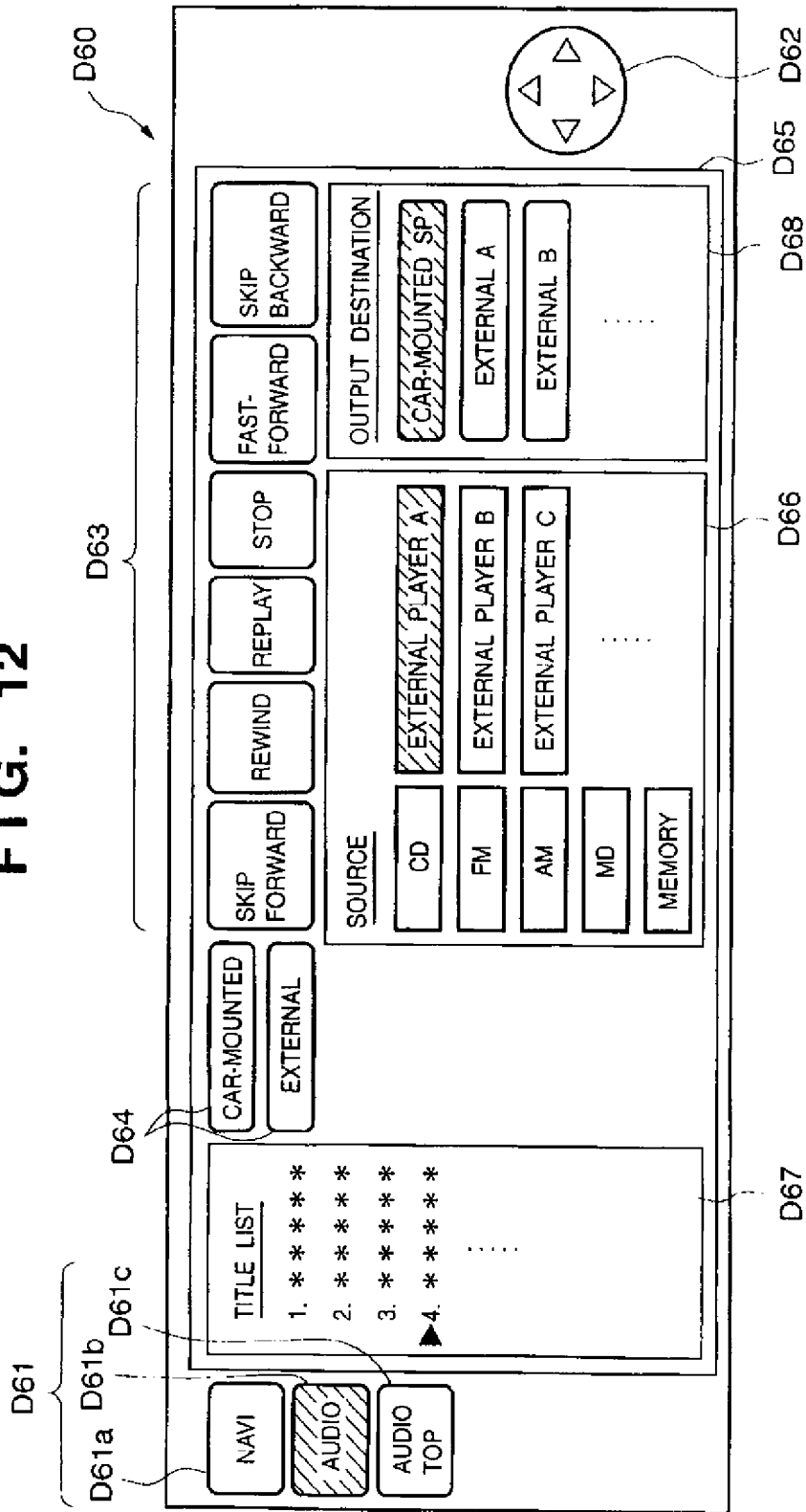


FIG. 13

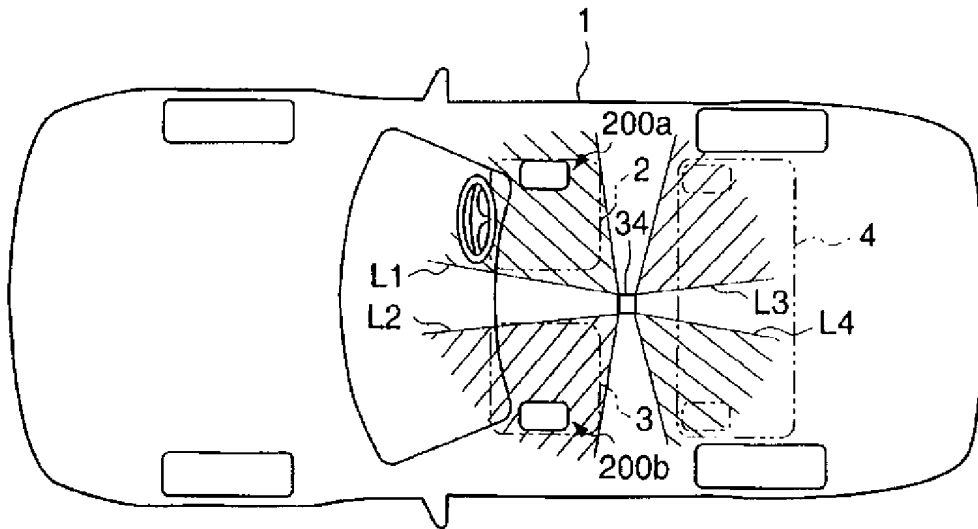


FIG. 14

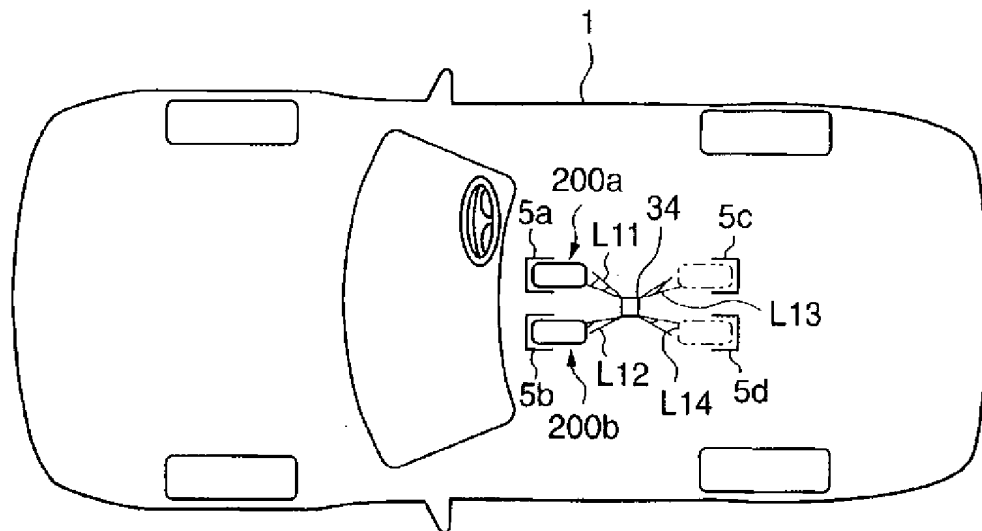


FIG. 15

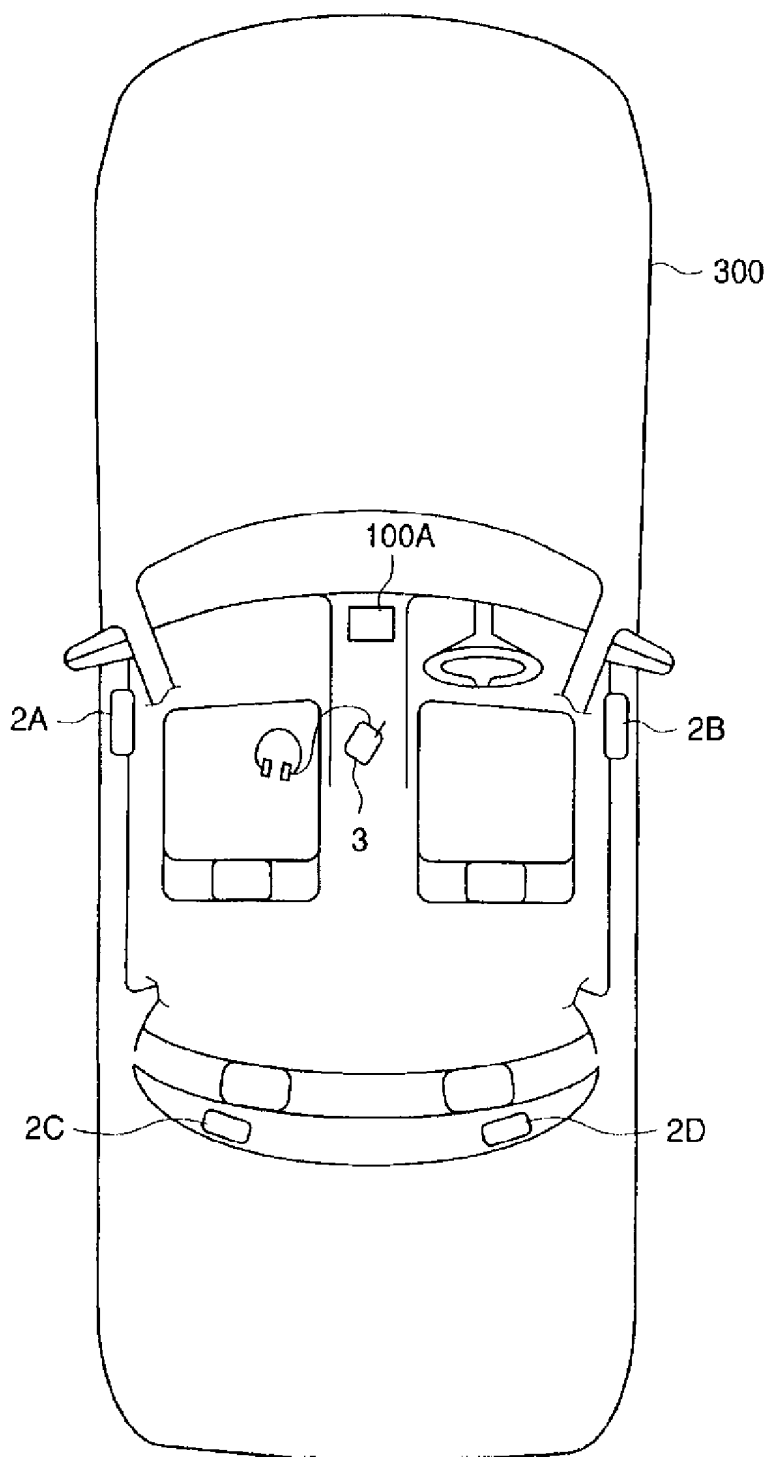


FIG. 16

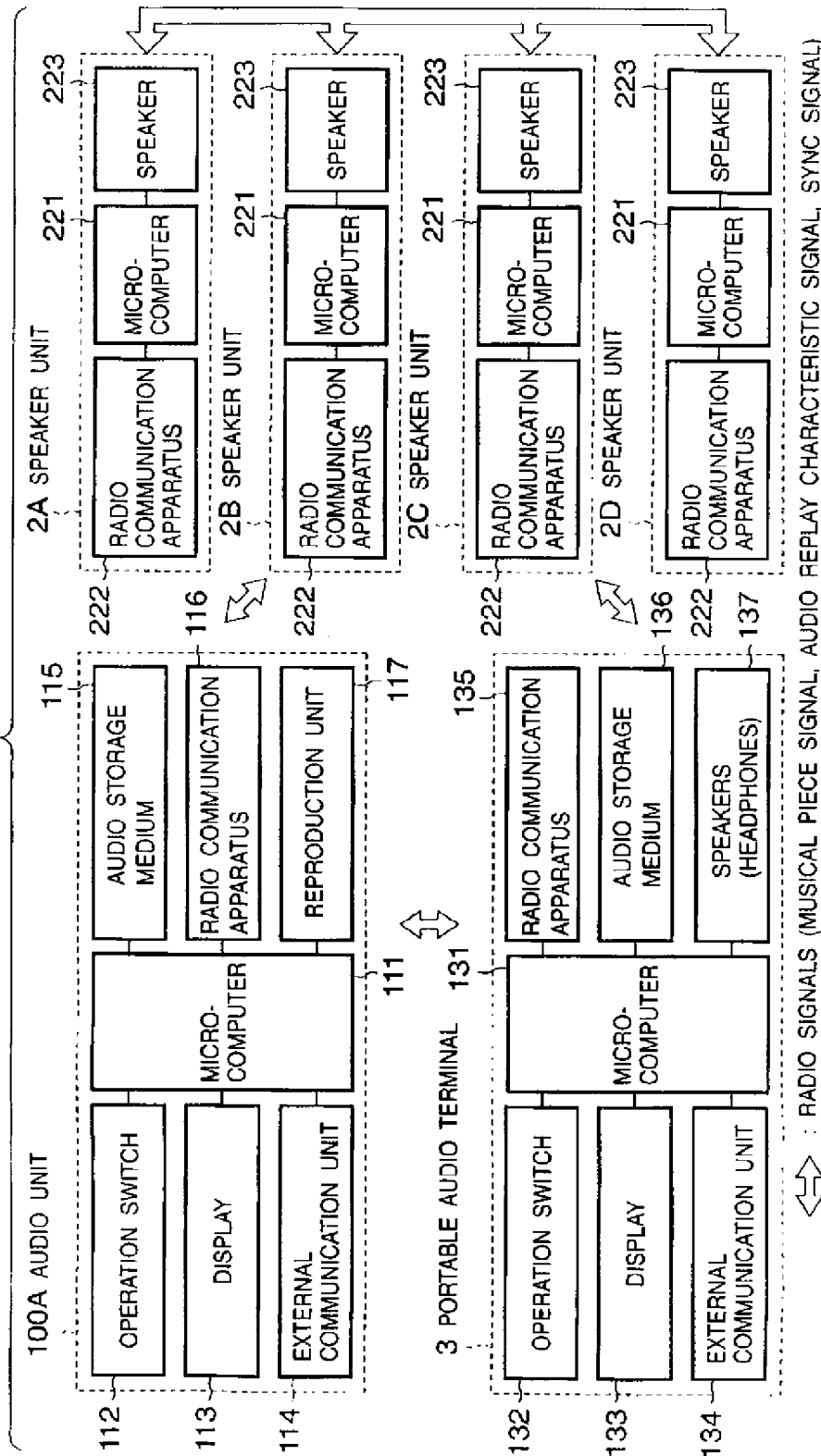


FIG. 17

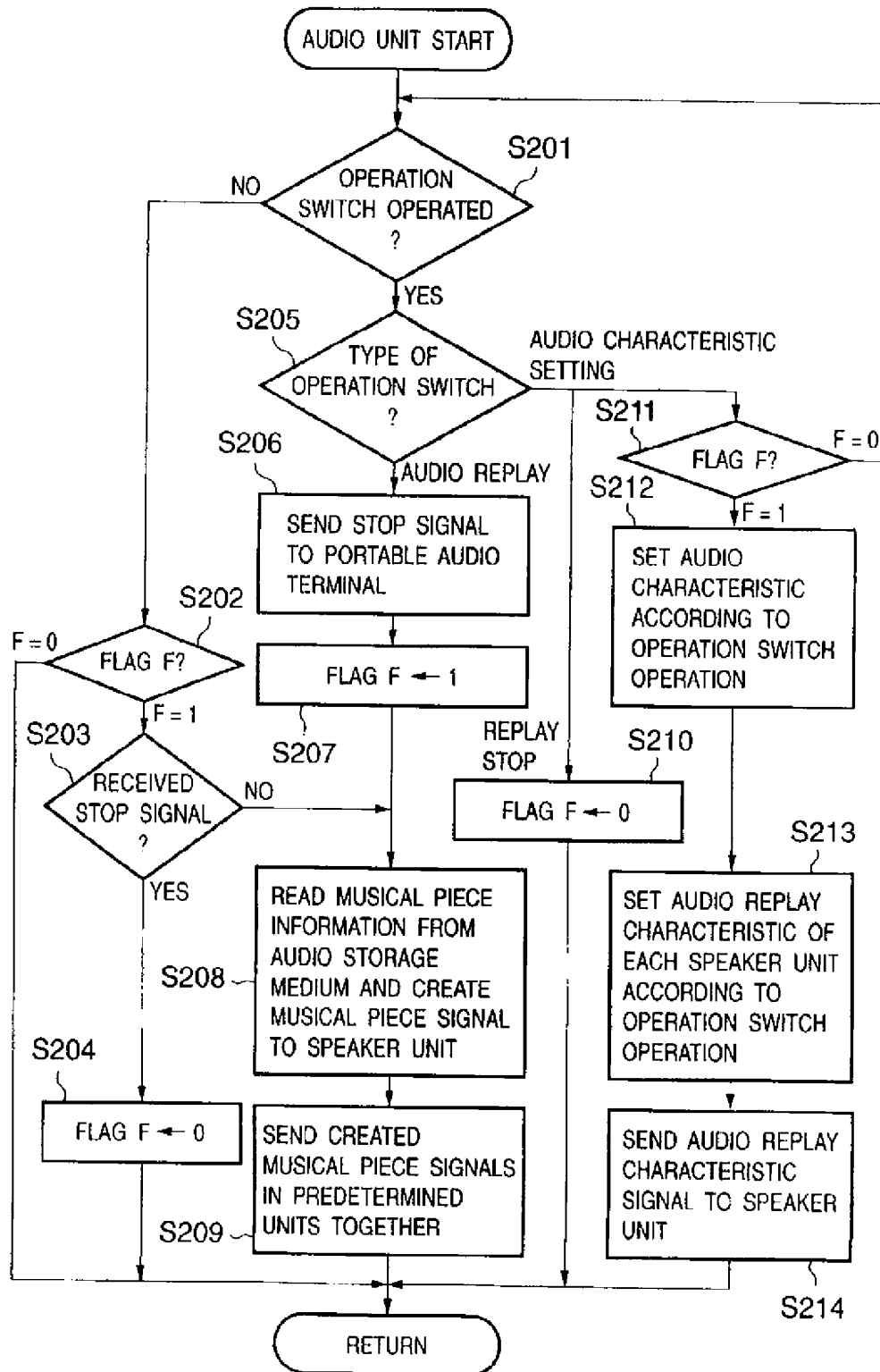


FIG. 18

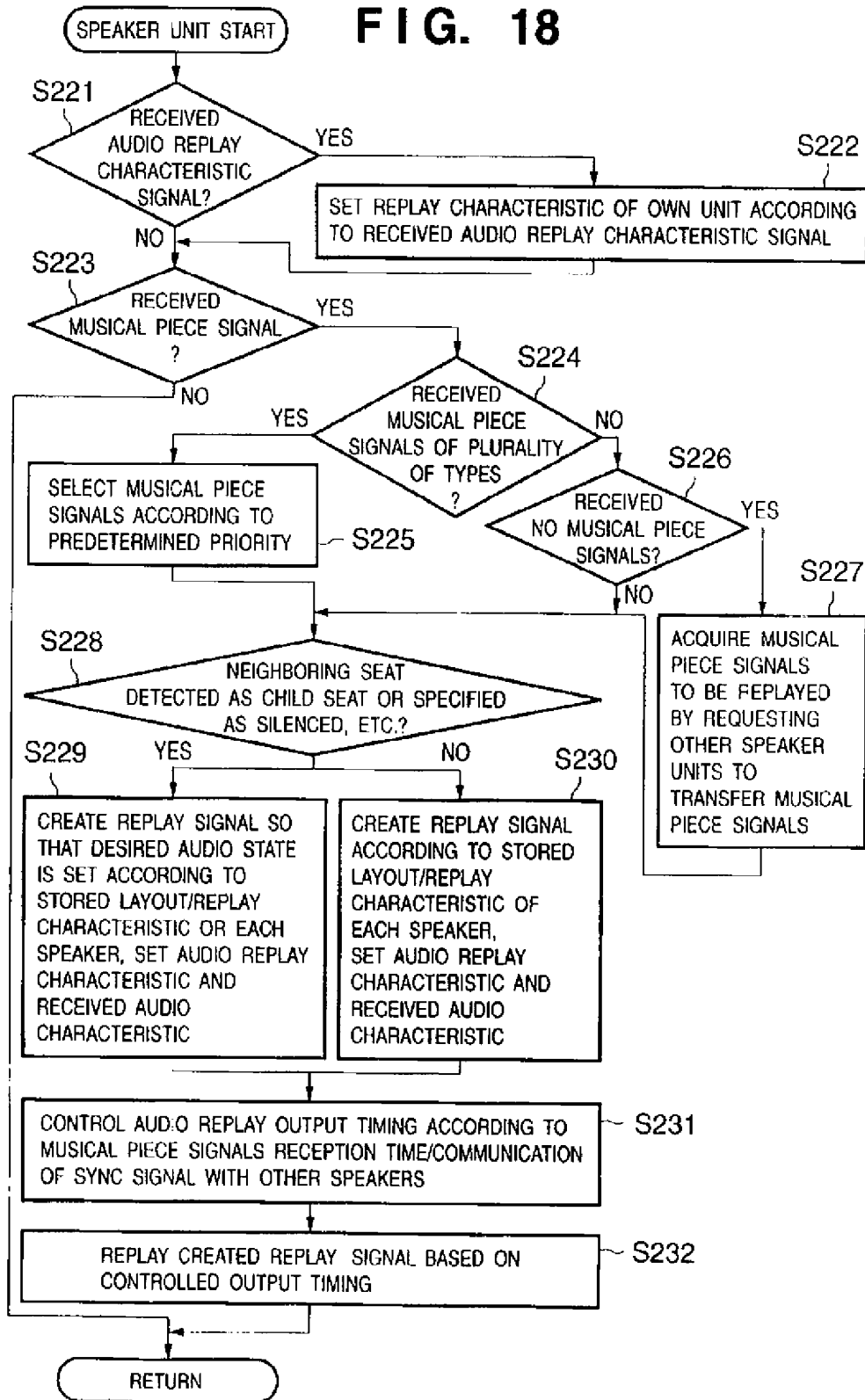




FIG. 19A

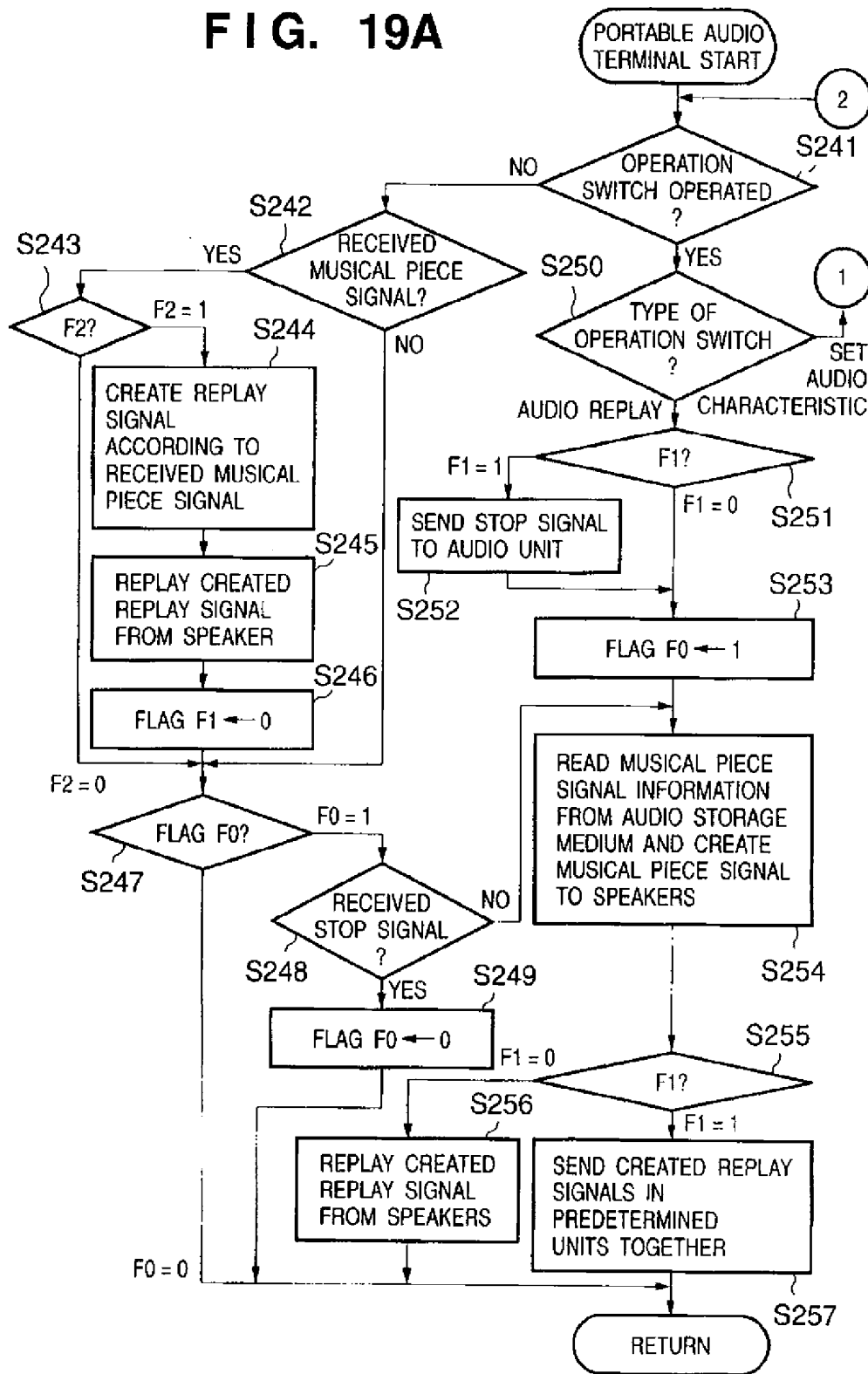


FIG. 19B

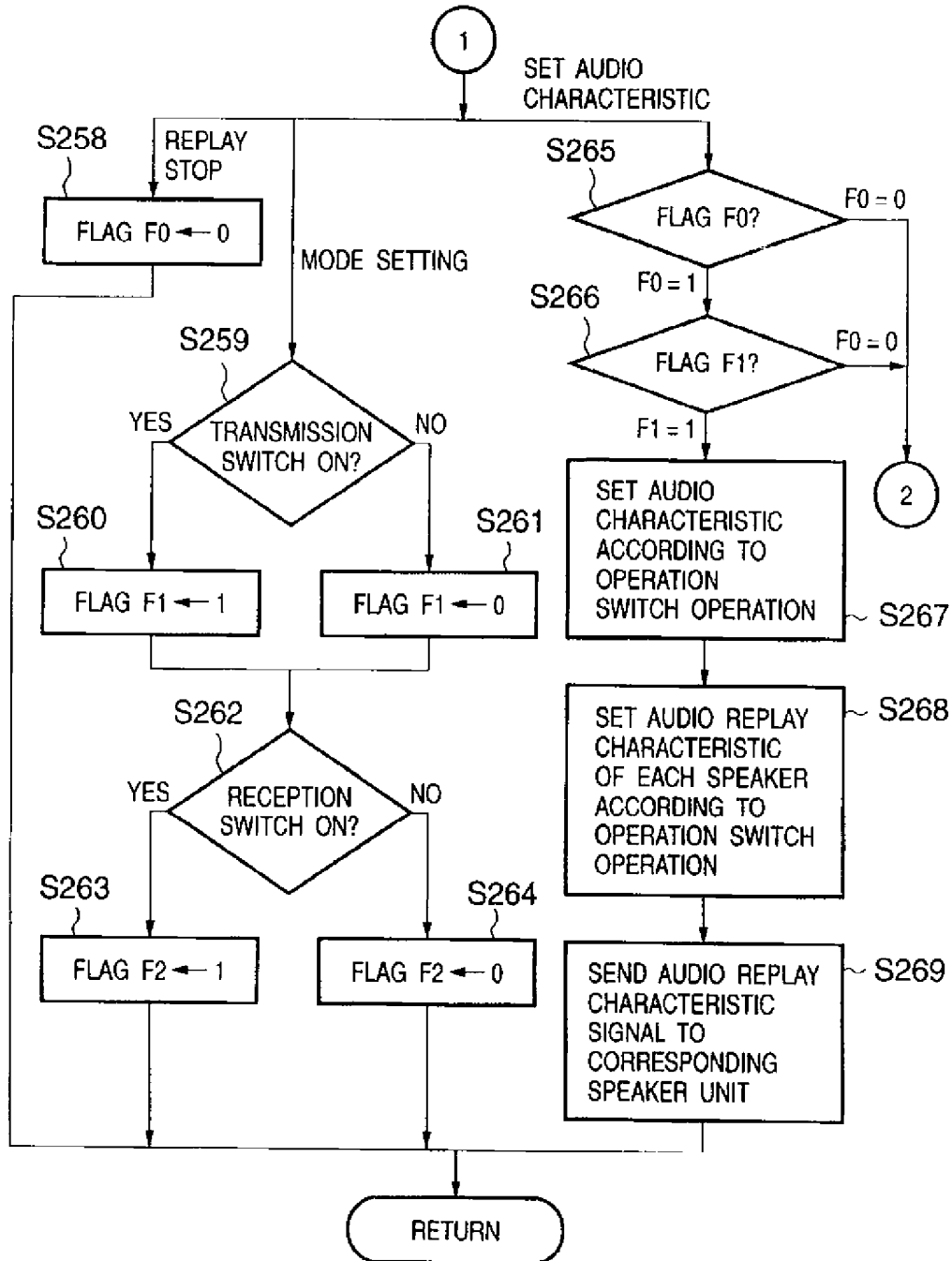


FIG. 20

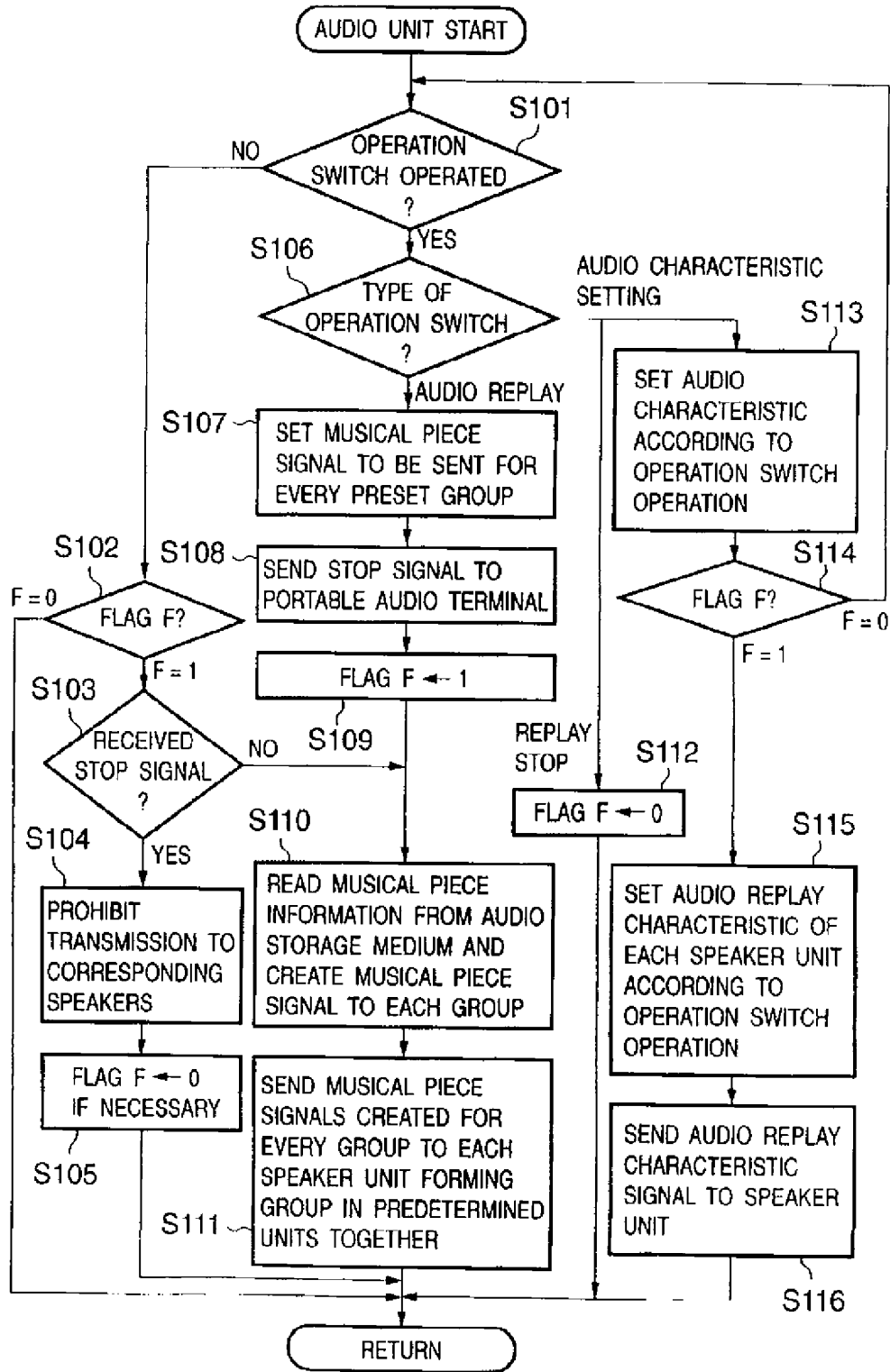


FIG. 21

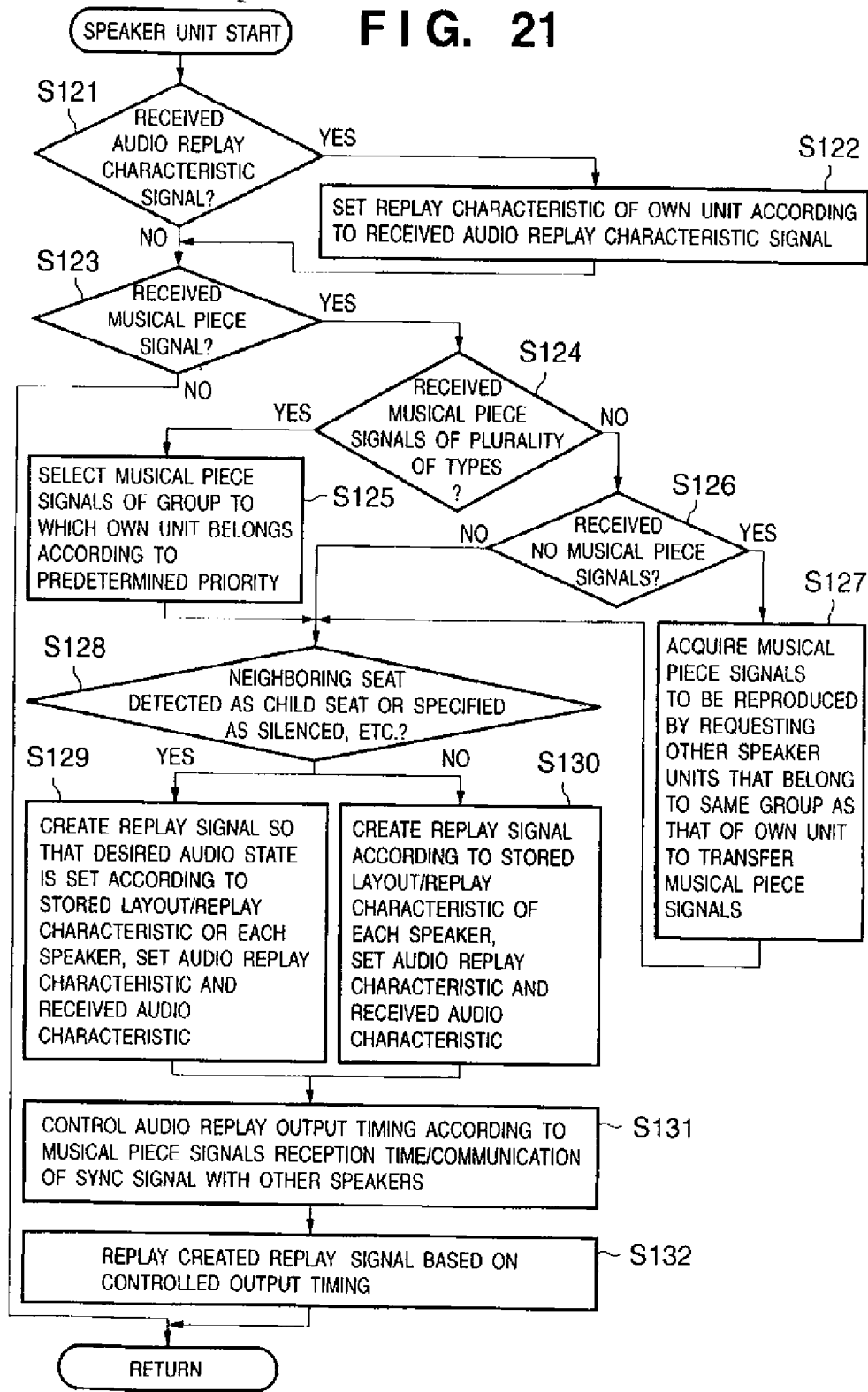


FIG. 22A

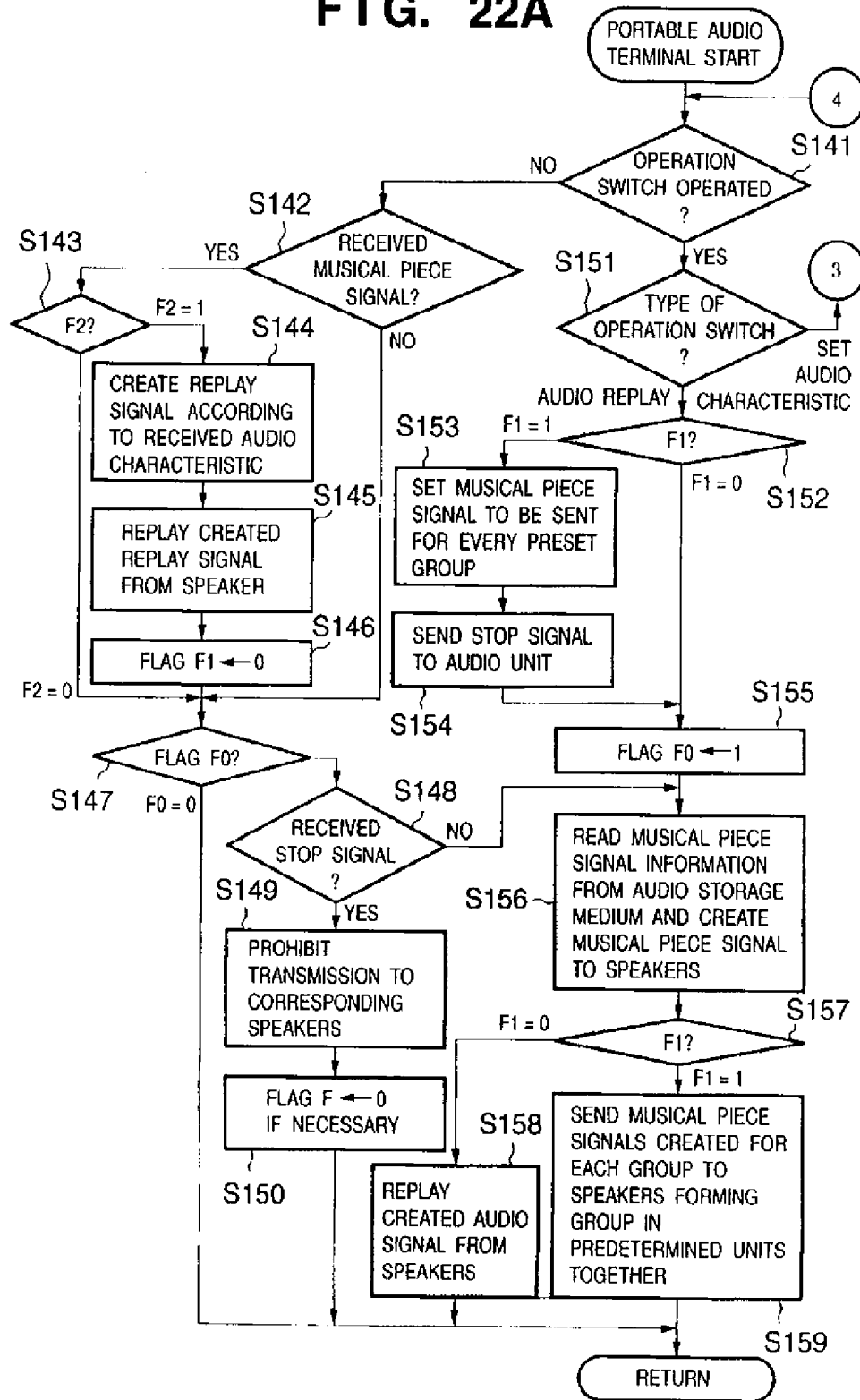
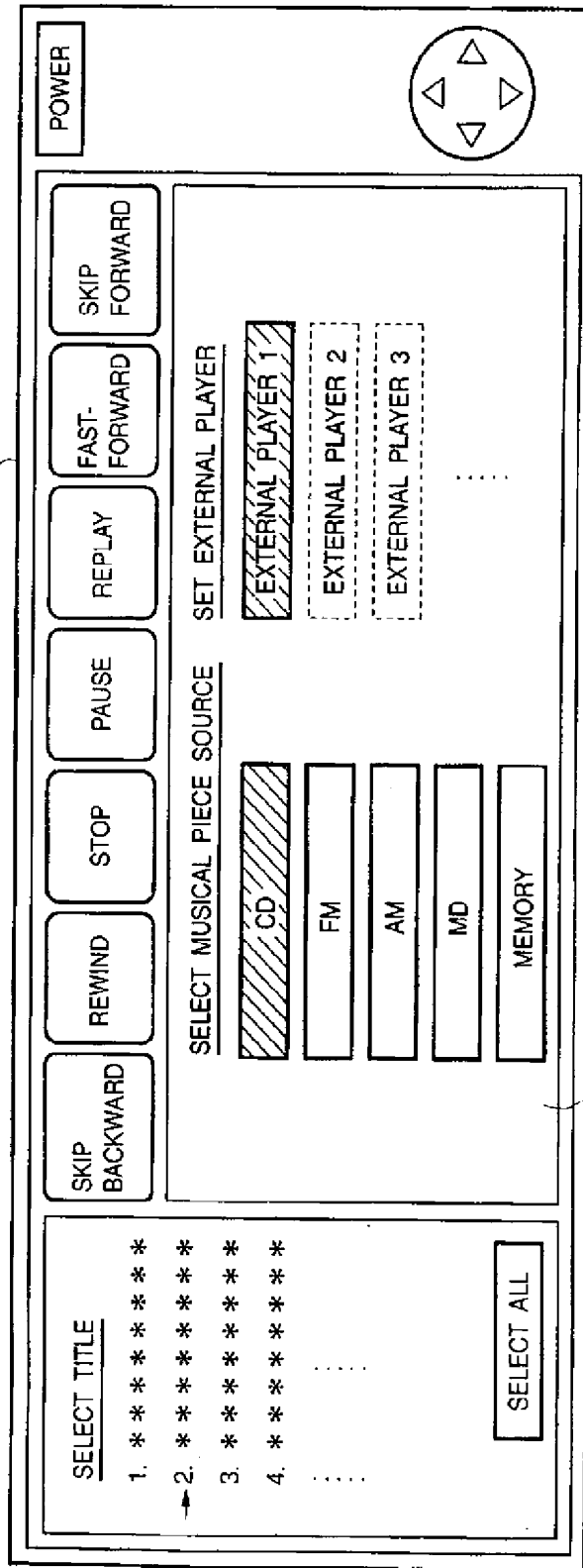


FIG. 23



13



19 BUNDESREPUBLIK  
DEUTSCHLAND



DEUTSCHES  
PATENT- UND  
MARKENAMT

12 **Offenlegungsschrift**  
10 **DE 102 05 641 A 1**

51 Int. Cl. 7:  
**G 06 F 3/02**

21 Aktenzeichen: 102 05 641.2  
22 Anmeldetag: 12. 2. 2002  
43 Offenlegungstag: 14. 8. 2003

DE 102 05 641 A 1

71 Anmelder:  
Volkswagen AG, 38440 Wolfsburg, DE

72 Erfinder:  
Wengelnik, Heino, Dr., 38442 Wolfsburg, DE;  
Riemann, Axel, 38440 Wolfsburg, DE; Krüger, Jens,  
38524 Sassenburg, DE

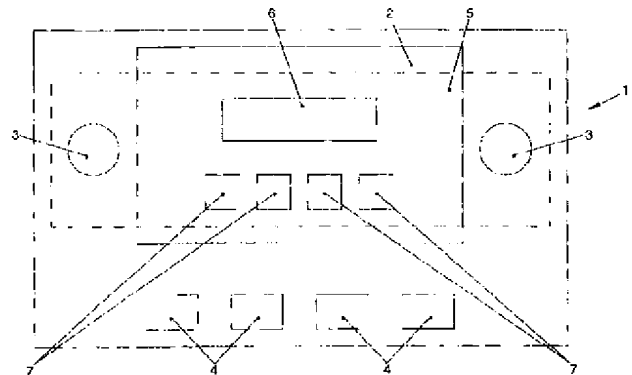
50 Für die Beurteilung der Patentfähigkeit in Betracht  
zu ziehende Druckschriften:

- DE 199 39 631 A1
- DE 196 46 875 A1
- DE 195 21 717 A1
- DE 100 23 783 A1
- DE 40 33 832 A1

**Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen**

54 Multifunktions-Bedieneinrichtung

57 Die Erfindung betrifft eine Multifunktions-Bedieneinrichtung (1), umfassend ein Display (2), ein zentrales Steuergerät, mindestens ein Funktionsauswahlelement (4) zur Auswahl eines zu bedienenden Endgerätes und mindestens ein Eingabeelement (3), wobei das zentrale Steuergerät über das Eingabeelement (3) eingegebene Steuerbefehle an das über mindestens ein Funktionsauswahlelement (4) ausgewählte Endgerät überträgt, wodurch über das zentrale Steuergerät auf dem Display (2) die Bedienoberfläche (5) mindestens eines Endgerätes derart darstellbar ist, dass diese visuell der Bedienoberfläche (5) eines realen Endgerätes nachempfunden ist.



DE 102 05 641 A 1

## Beschreibung

[0001] Die Erfindung betrifft eine Multifunktions-Bedien- einrichtung und ein Verfahren zu dessen Ansteuerung, ins- besondere für Kraftfahrzeuge.

[0002] Multifunktionselemente für Kraftfahrzeuge sind in vielfältiger Art bekannt. Sie fassen in ihrer Funktion die Bedienebenen verschiedener Geräte im Kraftfahrzeug zusam- men.

[0003] Hierzu gehören Radio, CD-Spieler, Navigations- system, Bordcomputer, Telefonanlage, und dergleichen mehr. Durch das Zusammenfassen mehrerer Geräte-Bedienzuwei- sungen sind solche Bedienelemente insbesondere für den Einsatz in Kraftfahrzeugen einigen technischen Anforder- ungen unterworfen. Zum einen muss das Multifunktions- bedienelement sicher und leicht, und zur Verhinderung einer Ablenkung des Fahrzeugführers auch selbsterklärend bzw. intuitiv sein. Eine sichere Bedienbarkeit im Kraftfahrzeug bedeutet insbesondere, dass keine weitergehende Ablen- kung vom übrigen Verkehrsgeschehen hervorgerufen wer- den darf. Dazu müssen die einzelnen Bedientasten gut er- reichbar positioniert sein und der Bildschirm des Multifun- ktionsbedienelementes muss zudem leicht einschbar sein. Die generierbaren Funktionen müssen logisch selbsterklärend eingestellt bzw. abgerufen werden können.

[0004] Aus der EP 0 701 926 A2 ist ein Multifunktions- bedienelement insbesondere für Kraftfahrzeuge bekannt, bei welchem ein Bildschirm sowie ein oder mehrere Tastenfel- der Verwendung finden. So ist hieraus auch bekannt, Bedi- en- und Schaltelemente bzw. -tasten logisch zuzuweisen. Die Zuweisung erfolgt dabei derart, dass eine übergeordnete Funktionsgruppe zunächst die ansprechende Einheit aus- wählt, und darüber hinaus den untergeordneten Funktions- gruppen oder Bedienelementen sozusagen die Geräte zu- weist, die nunmehr bedient werden sollen. Die Bedienele- mente, d. h. die Tasten zur Bedienung sind randseitig neben oder unter dem Bildschirm verteilt angeordnet. Der Bild- schirm selbst hat eine fest vorgegebene Abmessung, so dass die Position der randseitigen Tasten auch nachhaltig ortsfest gegeben ist. Nachteilig ist hierbei zum einen die festgelegte Bildschirmgeometrie, die damit auch die Funktionen ein- schränkt, und darüber hinaus entsteht ein durch die mit zum Teil mit erheblichem Abstand vom Bildschirmrand angeord- neten Tasten eine effektive Gesamtoberfläche, die beim Ein- bau ins Kraftfahrzeug ungünstig ist.

[0005] Aus der DE 199 41 963 A1 ist ein Multifunktions- bedienelement für Kraftfahrzeuge bekannt, mit einem Bild- schirm sowie randseitig am Bildschirm angeordnete Bedien- tasten, wobei die Bedientasten ausschließlich randseitig am Bildschirm angeordnet sind und die randseitig angeordneten Bedientasten optisch auf dem Bildschirm, als in demselben optisch hineinversetzt fortgesetzt dargestellt werden, wobei die Bedientasten als Softkeytasten ausgebildet sind, denen auf dem Bildschirm die jeweils zugeordneten Funktionen als in Tastennähe generierte Funktionssymbole anzeigbar sind.

[0006] Nachteilig an den bekannten Multifunktions-Bedi- eneinrichtungen ist, dass diese dem Nutzer ein gewisses Abstraktionsvermögen abverlangen, da eine computerähnli- che Menüführung für viele Nutzer gewöhnungsbedürftig ist.

[0007] Der Erfindung liegt daher das technische Problem zugrunde, eine Multifunktions-Bedieneinheit, insbesondere für Kraftfahrzeuge zu schaffen, die von einem Nutzer ein geringeres Abstraktionsvermögen erfordert sowie ein dazu- gehöriges Verfahren zur Ansteuerung zur Verfügung zu stel- len.

[0008] Die Lösung des technischen Problems ergibt sich durch die Gegenstände mit den Merkmalen der Patentan-

sprüche 1 und 9. Weitere vorteilhafte Ausgestaltungen der Erfindung ergeben sich aus den Unteransprüchen.

[0009] Hierzu wird über das zentrale Steuergerät auf dem Display der Multifunktions-Bedieneinrichtung die Bedien- oberfläche mindestens eines Endgerätes derart dargestellt, dass diese visuell der Bedienoberfläche eines realen Endge- rätes nachempfunden ist. Dabei wird ausgenutzt, dass der Nutzer einer Multifunktions-Bedieneinrichtung sich häufig an die Bedienoberflächen der vorher realen und separaten Endgeräte, wie beispielsweise Radio oder CD-Player, ge- wöhnt hat. Um nun den Umgewöhnungsprozess auf das not-wendigste zu reduzieren, simuliert nun die Multifunktions- Bedieneinrichtung die Bedienoberfläche eines solchen rea- len separaten Endgerätes, sodass der Nutzer optisch eine vertraute Bedienoberfläche sieht. Als Endgerät, dessen Bedi- enoberfläche derart simuliert wird, bieten sich alle Endge- räte an, die ein Nutzer zuvor als separate Endgeräte mit ei- gener Bedienoberfläche kennengelernt hat. Hierzu gehören neben Radio und CD-Player insbesondere Navigations- systeme, TV, Klimaanlage, Lichtschalter, Wamblinkschalter, Heckscheibenheizung, Kassettenspieler, DVD-Player, Or- ganizer und Handy/Telefon. Die Bedienoberfläche kann da- bei vorzugsweise im Maßstab 1 : 1 zur realen Bedienober- fläche simuliert werden oder aber, wenn zweckmäßig, ver- größert oder verkleinert werden. Ein weiterer Vorteil ist, dass auch gegebenenfalls in der Hardware geänderte Endge- räte soweit als möglich mit der gleichen Bedienoberfläche dargestellt werden können, wenn sich die Änderungen nicht auf die Bedienoberfläche auswirken müssen, was aufgrund des Wiedererkennungseffektes Berührungängste zu neuen Geräten überwinden hilft.

[0010] In einer weiteren bevorzugten Ausführungsform erfolgt die Darstellung der Bedienoberfläche perspektivisch, sodass sich für den Nutzer der Eindruck verstärkt, dieser hätte das reale, separate Endgerät vor sich.

[0011] In einer weiteren bevorzugten Ausführungsform ist mindestens ein separates Eingabeelement, vorzugsweise ein Dreh-Drück-Knopf außerhalb des Displays angeordnet, der in den optischen Gesamteindruck der simulierten Bedien- oberfläche eingepasst ist, sodass dieser zur Bedienoberflä- che zugehörig erfasst wird. Hierdurch können auch anson- sten schwer zu simulierende Drehknöpfe integriert werden, denen je nach Endgerät unterschiedliche Funktionalitäten zugeordnet werden.

[0012] In einer weiteren bevorzugten Ausführungsform ist das Display als Touch-Screen ausgebildet, wodurch ins- besondere Taster und Schalter gut simuliert werden können.

[0013] In einer alternativen Ausführungsform umfasst die Multifunktions-Bedieneinrichtung mindestens ein Eingab- element, mittels dessen ein Cursor auf dem Display be- wegt werden kann, wobei die auf dem Display dargestellten Eingabeoptionen durch den Cursor ausgelöst werden kön- nen.

[0014] In einer weiteren bevorzugten Ausführungsform sind die Funktionsauswahlelemente für die einzelnen End- geräte als separate Taster oder Schalter unterhalb des Dis- plays angeordnet, sodass diese sehr übersichtlich angeord- net sind.

[0015] In einer weiteren bevorzugten Ausführungsform sind das zentrale Steuergerät und die Endgeräte über einen Datenbus und/oder eine drahtlose Kommunikationseinrich- tung miteinander verbunden.

[0016] Die Erfindung wird nachfolgend anhand eines be- vorzugten Ausführungsbeispiels näher erläutert. Die ein- zige Figur zeigt eine schematische Darstellung einer Multi- funktions-Bedieneinrichtung.

[0017] Die Multifunktions-Bedieneinrichtung 1 umfasst ein Display 2, das als Touch-Screen ausgebildet ist, zwei



links und rechts vom Display 2 angeordnete Dreh-Drück-Knöpfe 3 und vier Funktionsauswahlelemente 4, die als Taster ausgebildet sind. Des weiteren umfasst die Multifunktions-Bedieneinrichtung 1 ein nicht dargestelltes zentrales Steuergerät, das über ein Bussystem mit verschiedenen Endgeräten verbunden ist. Über die Funktionsauswahlelemente 4 kann dabei ein bestimmtes Endgerät ausgewählt werden, wobei jedem Funktionsauswahlelement 4 ein Endgerät fest zugeordnet ist.

[0018] Beispielsweise sind den vier Funktionsauswahlelementen 4 ein Navigationssystem, ein Radio, ein Telefon und ein TV-Gerät zugeordnet. Bei Betätigung eines Funktionsauswahlelementes 4 wird auf dem Display 2 eine dem jeweils ausgewählten Endgerät zugeordnete Bedienoberfläche 5 dargestellt, die der Bedienoberfläche eines realen Endgerätes nachempfunden ist. Visuell stellt sich die Bedienoberfläche 5 der Multifunktions-Bedieneinrichtung 1 wie die Bedienoberfläche eines realen, separaten Endgerätes dar. Ist das ausgewählte Endgerät beispielsweise ein Radio, so wird die Bedienoberfläche 5 entsprechend einem bestimmten Radio-Typ nachempfunden. Dabei kann vorgesehen sein, dass der Nutzer zwischen verschiedenen Radio-Typen wählen kann.

[0019] In der Fig. 1 ist schematisch die Bedienoberfläche 5 eines Radios dargestellt, umfassend eine Kanalanzeige 6 und diverse programmierbare Stationstasten 7, die durch die Touch-Screen-Funktion des Displays 2 simuliert werden. Des weiteren ist die Bedienoberfläche 5 derart gestaltet, dass visuell die beiden Dreh-Drück-Knöpfe 3 in die Bedienoberfläche 5 eingebunden sind, so dass der gestrichelte Bereich als Bedienoberfläche wirkt, wobei beispielsweise der eine Dreh-Drück-Knopf als Lautstärkereglер und der andere als Tuner-Regler arbeitet.

[0020] Wird hingegen beispielsweise das Funktionsauswahlelement 4 des Navigationssystems betätigt, so simuliert das zentrale Steuergerät entsprechend eine Bedienoberfläche eines realen, separaten Navigationssystems.

[0021] Hierdurch wird erreicht, dass ein Nutzer stets die ihnen vertrauten Bedienoberflächen angeboten bekommt, unabhängig von der real verbauten Hardware des Endgerätes.

[0022] Dies erleichtert die Bedienung durch den Nutzer, da dieser sich nicht umzustellen hat, auch wenn beispielsweise die real verbaute Hardware der Endgeräte sich ändert.

#### Patentansprüche

1. Multifunktions-Bedieneinrichtung, umfassend ein Display, ein zentrales Steuergerät, mindestens ein Funktionsauswahlelement zur Auswahl eines zu bedienenden Endgerätes und mindestens ein Eingabeelement, wobei das zentrale Steuergerät über das Eingabeelement eingegebene Steuerbefehle an das über mindestens ein Funktionsauswahlelement ausgewählte Endgerät überträgt, **dadurch gekennzeichnet**, dass über das zentrale Steuergerät auf dem Display (2) die Bedienoberfläche (5) mindestens eines Endgerätes derart darstellbar ist, dass diese Bedienoberfläche (5) visuell der Bedienoberfläche eines realen Endgerätes nachempfunden ist.

2. Multifunktions-Bedieneinrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Darstellung der Bedienoberfläche (5) perspektivisch ist.

3. Multifunktions-Bedieneinrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass mindestens ein separates Eingabeelement (3) außerhalb des Displays (2) angeordnet ist und in den optischen Gesamteindruck der dargestellten Bedienoberfläche (5) einge-

passt ist.

4. Multifunktions-Bedieneinrichtung nach Anspruch 3, dadurch gekennzeichnet, dass das separate Eingabeelement als Dreh-Drück-Knopf (3) ausgebildet ist.

5. Multifunktions-Bedieneinrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, dass mittels mindestens eines Eingabeelementes ein Cursor auf dem Display bewegbar und auf dem Display (2) dargestellte Eingabeoptionen aktivierbar sind.

6. Multifunktions-Bedieneinrichtung nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, dass das Display (2) als Touch-Screen ausgebildet ist.

7. Multifunktions-Bedieneinrichtung nach einem der vorangegangenen Ansprüche; dadurch gekennzeichnet, dass die Funktionsauswahlelemente (4) für die einzelnen Endgeräte als separate Taster oder Schalter unterhalb des Displays (2) angeordnet sind.

8. Multifunktions-Bedieneinrichtung nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, dass das zentrale Steuergerät und die Endgeräte über einen Datenbus oder eine drahtlose Kommunikationsstrecke miteinander verbunden sind.

9. Verfahren zur Ansteuerung eines Displays einer Multifunktions-Bedieneinrichtung, mittels mindestens eines Funktionsauswahlelementes, eines zentralen Steuergerätes und eines Eingabeelementes, wobei das zentrale Steuergerät über das Eingabeelement eingegebene Steuerbefehle an ein über das Funktionsauswahlelement ausgewähltes Endgerät überträgt, dadurch gekennzeichnet, dass über das zentrale Steuergerät auf dem Display (2) die Bedienoberfläche mindestens eines Endgerätes derart dargestellt wird, dass die dargestellte Bedienoberfläche (5) der Bedienoberfläche eines realen Endgerätes nachempfunden ist.

Hierzu 1 Seite(n) Zeichnungen

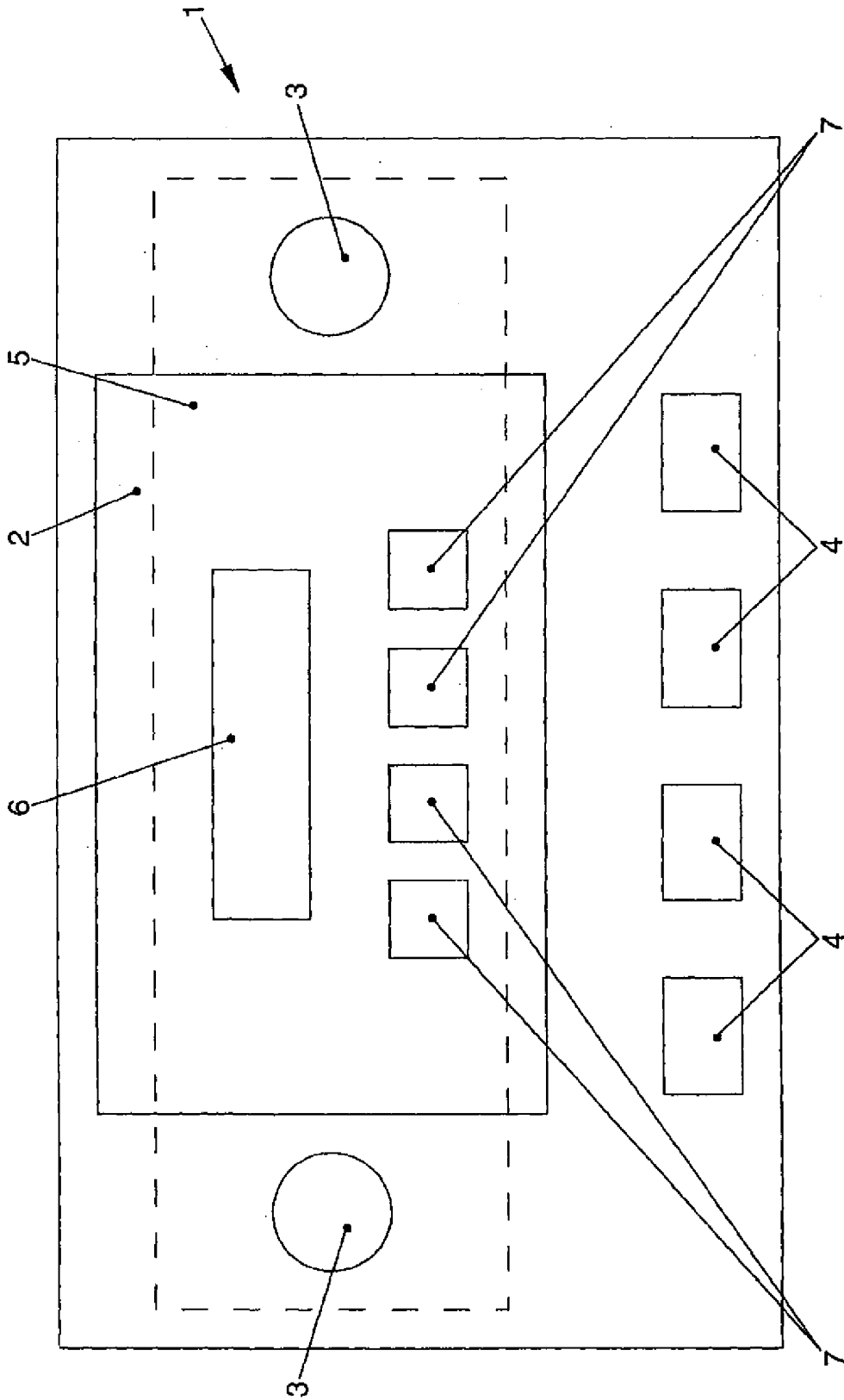


FIG. 1

IN THE UNITED STATES DISTRICT COURT FOR THE  
EASTERN DISTRICT OF TEXAS

AFFINITY LABS OF TEXAS, LLC,

Plaintiff,

V.

BMW NORTH AMERICA, LLC ET AL.,

Defendants.

Civil Action No. 9:08-cv-00164-RC

**CERTIFICATION OF JUDITH E. TADDEO**

I, Judith E. Taddeo, hereby certify that:

1. I am employed as a certified translator for Kenyon & Kenyon, LLP.
2. I have carefully reviewed the attached English language translation of the document Offenlegungsschrift DE 102 05 641 A1 [Laid-Open Document DE 102 05 641 A1] from the original German-language document.
3. To the best of my knowledge and belief, the attached translation is a true and correct English version of the original.

I certify under penalty of perjury that the foregoing is true and correct.

Executed on May 8, 2009

  
\_\_\_\_\_



18 FEDERAL REPUBLIC OF GERMANY



GERMAN PATENT AND MARK OFFICE

12 Laid-open document  
10 DE 102 05 641 A 1

51 Int. Cl. 7: G 06 F 3/02

21 File no.: 102 05 641.2  
22 Application date: 12. 2. 2002  
40 Laid-open date: 14. 8. 2003

DE 102 05 641 A 1

71 Applicant:  
Volkswagen AG, 38440 Wolfsburg, DE

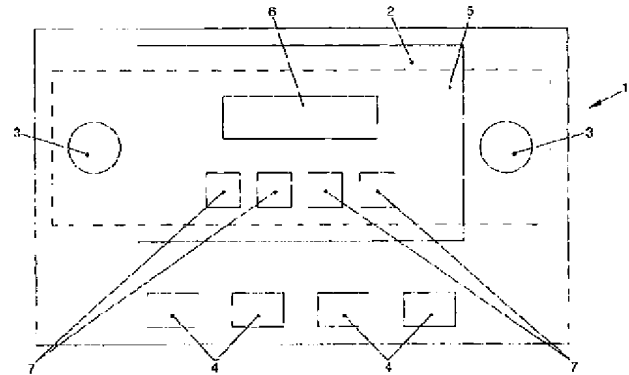
72 Inventors:  
Wengelnik, Heino, Dr., 38442 Wolfsburg, DE;  
Riemann, Axel, 38440 Wolfsburg, DE; Krüger, Jens,  
38524 Sassenburg, DE

56 Printed Publications to be considered for evaluating the allowability

- DE 199 39 631 A1
- DE 196 46 875 A1
- DE 195 21 717 A1
- DE 100 23 783 A1
- DE 40 33 832 A1

The following information has been taken from the documents submitted by the applicant

- 54 Multi-Function Operating Device
- 57 The invention relates to a multi-function operating device (1), including a display (2), a central control device, at least one function selection element (4) for selecting a user terminal to be operated, and at least one input element (3), the central control device transmitting control commands input via the input element (3), to the user terminal selected via the at least one function selection element (4), whereby, via the central control device, the user interface (5) of at least one user terminal is able to be displayed on the display (2) in such a way that it visually resembles the user interface (5) of a real user terminal.



DE 102 05 641 A 1

MULTI-FUNCTION OPERATING DEVICE

Description

[0001] The invention relates to a multi-function operating device and a method for its control, in particular for motor vehicles.

[0002] Multi-function elements for vehicles are known in many forms. They combine the operating levels of different devices in the motor vehicle in their function.

[0003] Among these are radios, CD players, navigation systems, on-board computers, telephone systems and the like. Because the operating assignments of multiple devices are combined, such operating elements, especially when used in motor vehicles, have to satisfy a number of technical specifications. For one, the multi-function operating element must be reliable and uncomplicated and it must also be self-explanatory or intuitive in order not to distract the vehicle driver. A reliable operability in the motor vehicle means, in particular, that no further distraction from other traffic situations takes place. To this end, the individual operating keys must be easy to reach, and the screen of the multi-function operating element must also be easy to view. The functions able to be generated should be able to be set and called up in a logically self-explanatory manner.

[0004] From EP 0 701 926 A2, a multi-function operating element is known, especially for motor vehicles, which utilizes a screen as well as one or more keyboard fields. It is also known from there, for instance, to assign operating and switching elements or keys in a logical manner. The assignment is made such that a superposed function group initially selects the responding unit;

furthermore, it assigns, so to speak, to the subordinate function groups or operating elements the devices that are subsequently to be operated. The operating elements, i.e., the operating keys, are distributed along the edge next to or  
5 underneath the screen. The screen itself has fixed dimensions so that the position of the edge keys is also permanently defined. Disadvantageous in this context is, for one, the fixed screen geometry, which thus also restricts the functions; furthermore, because of the keys, some of which are disposed at a  
10 considerable distance from the screen edge, an effective overall surface results that is disadvantageous for the installation in the motor vehicle.

[0005] From DE 199 41 963 A1, a multi-function operating element for motor vehicles is known, which has a screen as well as  
15 operating keys disposed at the edge of the screen, the operating keys being situated exclusively at the edge of the screen, and the operating keys disposed at the edge are optically displayed on the screen in continued fashion such that they are optically placed thereon, the operating keys being implemented as software  
20 key buttons to which the individually assigned functions are displayable on the screen as function symbols generated in the vicinity of the keys.

[0006] One disadvantage of the known multi-function operating devices is that they demand a certain capacity for abstraction  
25 on the part of the user since a menu mode that resembles a computer takes getting used to for many users.

[0007] Therefore, the invention is based on the technical problem of providing a multi-function operating unit, in particular for motor vehicles, which requires a lower capacity

for abstraction by the user, and of providing a related method for the control.

[0008] The solution of the technical problem follows from the subject matters having the features of Claims 1 and 9.

5 Additional advantageous embodiments of the present invention follow from the dependent claims.

[0009] To this end, the operator interface of at least one user terminal is displayed on the display of the multi-function operating device via the central control device in such a way  
10 that it visually resembles a real user terminal. The fact that the user of a multi-function operating device often has become familiar with the previously real and separate user terminals, e.g., radio or CD player, is utilized in this context. In order to then reduce the necessary adjustment process to a minimum,  
15 the multi-function operating device simulates the operator interface of such a real, separate user terminal, so that the user optically sees a familiar user interface. All user terminals previously encountered by a user as separate user terminals with their own user interface lend themselves to user  
20 terminals whose user interface is simulated in this manner. Among them are not only radios and CD players, but especially also navigation systems, TVs, air conditioning systems, light switches, warning light switches, rear window defrosters, cassette players, DVD players, organizers and cellular phones.  
25 The user interface may preferably be simulated at a 1 : 1 scale with regard to the real user interface or else, if useful, in enlarged or reduced size. Another advantage is also that user terminals that possibly have been modified in their hardware are able to be shown with the same user interface to the greatest  
30 extent possible, provided the modifications do not affect the

user interface, which, by the recognition effect, helps in overcoming the fear of new devices.

[0010] In one additional preferred embodiment, the representation of the user interface is implemented in perspective manner, so that the user's perception of seeing the real, separate user terminal is reinforced.

[0011] In one additional preferred embodiment, at least one separate input element, preferably a rotary/push button, is disposed outside the display, which is integrated into the visual overall appearance of the simulated user interface, so that it is seen as part of this user interface. This makes it possible to also integrate rotary buttons, which are otherwise difficult to simulate, to which different functionalities are assigned depending on the user terminal.

[0012] In one further preferred embodiment, the display is implemented as touch screen, by which push button switches and switches, in particular, are able to be simulated in satisfactory manner.

[0013] In one alternative development, the multi-function operating device includes at least one input element by which a cursor is able to be moved on the display, and the input options displayed on the display are able to be triggered by the cursor.

[0014] In one further preferred embodiment, the function selection elements for the individual user terminals are situated underneath the display as separate push-button keys or switches, so that they are arranged in an easily comprehensible manner.



[0015] In one further preferred development, the central control device and the user terminals are interconnected via a data bus and/or a wireless communication device.

[0016] The present invention is elucidated in the following on the basis of a preferred exemplary embodiment. The sole figure shows a schematic representation of a multi-function operating device.

[0017] Multi-function operating device 1 includes a display 2, which is implemented as touch screen, two rotary/push buttons 3 situated to the left and right of display 2, and four function selection elements 4, which are implemented as push button switches. Furthermore, multi-function operating device 1 includes a central control device (not shown), which is connected to various user terminals via a bus system. A specific user terminal is selectable via function selection elements 4, each function selection element 4 being permanently assigned to one user terminal.

[0018] For example, a navigation system, a radio, a telephone, and a TV device are assigned to the four function selection elements 4. When a function selection element 4 is operated, a user interface 5 assigned to the selected user terminal is displayed on display 2, which user interface resembles that of a real user terminal. Visually, user interface 5 of multi-function operating device 1 looks like the user interface of a real, separate user terminal. If the selected user terminal is a radio, for example, then user interface 5 is correspondingly based on a certain type of radio. It may be provided that the user is able to select from among different types of radios.

[0019] Fig. 1 schematically shows user interface 5 of a radio, which includes a channel indicator 6 and various programmable station buttons 7, which are simulated by the touch screen function of display 2. Moreover, user interface 5 is designed such that both rotary/push buttons 3 are visually incorporated in user interface 5, so that the dashed area acts as user interface, and the one rotary/push button operates as volume control and the other as tuner/control, for example.

[0020] In contrast, if function selection element 4 of the navigation system is operated, for instance, then the central control device correspondingly simulates a user interface of a real, separate navigation system.

[0021] This makes it possible for the user to always be offered a familiar user interface, regardless of the actually installed hardware of the user terminal.

[0022] This facilitates the operation by the user since there is no need for the user to adjust, even if the actually installed hardware of the user terminals changes, for instance.

What Is Claimed Is:

1. A multi-function operating device, including a display, a central control device, at least one function selection element for selecting a user terminal to be operated, and at least one input element, the central control device transmitting control commands, input via the input element, to the user terminal selected via the at least one function selection element, wherein, via the central control device, the user interface (5) of at least one user terminal is able to be displayed on the display (2) in such a way that this user interface (5) visually resembles the user interface of a real user terminal.
2. The multi-function operating device as recited in Claim 1, wherein the display of the user interface (5) is a perspective display.
3. The multi-function operating device as recited in Claim 1 or 2, wherein at least one separate input element (3) is disposed outside of the display (2), and is fitted into the optical overall appearance of the displayed user interface (5).
4. The multi-function operating device as recited in Claim 3, wherein the separate input element is implemented as rotary/push button (3).

5. The multi-function operating device as recited in one of the Claims 1 through 4, wherein a cursor is able to be moved on the display with the aid of at least one input element, and input options represented on the display (2) are able to be activated.
6. The multi-function operating device as recited in one of the preceding claims, wherein the display (2) is implemented as touch screen.
7. The multi-function operating device as recited in one of the preceding claims, wherein the function selection elements (4) for the individual user terminals are situated underneath the display (2) as separate pushbutton switches or switches.
8. The multi-function operating device as recited in one of the preceding claims, wherein the central control device and the user terminals are interconnected via a data bus or a wireless communication path.
9. A method for controlling a display of a multi-function operating device, using at least one function selection element, a central control device and an input element, the central control device transmitting control commands, input via the input element, to a user terminal selected via the function selection element, wherein the user interface of at least one user

terminal is displayed on the display (2) via the central control device, in such a way that the displayed user interface (5) resembles the user interface of a real user terminal.

1 Page of Drawings

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	6013143
<b>Application Number:</b>	12015320
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	2156
<b>Title of Invention:</b>	Method for Managing Media
<b>First Named Inventor/Applicant Name:</b>	Russell W. White
<b>Customer Number:</b>	21906
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas
<b>Filer Authorized By:</b>	Mark J. Rozman
<b>Attorney Docket Number:</b>	AFF.0004C5US
<b>Receipt Date:</b>	03-SEP-2009
<b>Filing Date:</b>	16-JAN-2008
<b>Time Stamp:</b>	17:13:05
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	AFF004C5USIDSforReexam.pdf	609211 <small>022cc7b99da9cc9c93956ac51c70acc901ac503f</small>	no	4

### Warnings:

### Information:

2	Foreign Reference	AFF004EP1146674.pdf	1982001	no	52
			042ce1283d14e7f5d46df2145b0099c640c38fc7		
<b>Warnings:</b>					
<b>Information:</b>					
3	Foreign Reference	AFF004DE10205641WithTranslation.pdf	411736	no	15
			a1a197007a7ea7a9dc64d455fa29c9051a7262f8		
<b>Warnings:</b>					
<b>Information:</b>					
4	NPL Documents	AFF004RequestForReexamination.pdf	2030535	no	68
			130754ee6c07fa25c3a3fe163419ffd9b3241f4c		
<b>Warnings:</b>					
<b>Information:</b>					
5	NPL Documents	AFF004ClaimChartsA-E.pdf	1681580	no	59
			76add49377a541616cc4b11421499bd627c499d7		
<b>Warnings:</b>					
<b>Information:</b>					
6	NPL Documents	AFF004ClaimChartsF-J.pdf	2218454	no	78
			ca5f118561aa3be1a71be27089f5bbb7c5010020		
<b>Warnings:</b>					
<b>Information:</b>					
7	NPL Documents	AFF004ClaimChartsK-Z.pdf	1300216	no	56
			ba13eca7daa1b99ba12eeb6f27d4734594b4bb40e		
<b>Warnings:</b>					
<b>Information:</b>					
8	NPL Documents	AFF004ClaimChartsAA-BB.pdf	1575044	no	74
			53326b661a301df9e2e262fe644245da6bbe72e7		
<b>Warnings:</b>					
<b>Information:</b>					
9	NPL Documents	AFF004ClaimChartsCC-HH.pdf	1881174	no	80
			54afe55dc09ad036ca1f31cfb3e2d59c2701e97b		
<b>Warnings:</b>					
<b>Information:</b>					
10	NPL Documents	AFF004YamahaMusicSequenceChapters1-6.pdf	2506659	no	75
			c49aae343e7132aafe0a44f8f361037fe00a02ed		
<b>Warnings:</b>					
<b>Information:</b>					

11	NPL Documents	AFF004YamahaMusicSequence Chapters7-10.pdf	2557524	no	82
			2fafc56b6f6751d0cb7d1cd8e5de7ca5c2b94fd5		
<b>Warnings:</b>					
<b>Information:</b>					
12	NPL Documents	AFF004YamahaMusicSequence Chapter11-END.pdf	2661330	no	94
			996a45d9616027620d4c4d1a1e823cc7cf696793		
<b>Warnings:</b>					
<b>Information:</b>					
13	NPL Documents	AFF004NeoCarManual.pdf	795910	no	33
			c64b53b3074220df1336c24c059509ba0ad5fc92		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				22211374	

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Russell W. White, et al. § Group Art Unit: 2617  
§  
Serial No.: 12/015,320 §  
§ Examiner: Erika A. Gary  
Filed: January 16, 2008 §  
§  
For: Method For Managing Media § Atty. Dkt. No.: AFF.004C5US

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO RESTRICTION REQUIREMENT**

Madam:

In response to the restriction requirement mailed July 24, 2009, please amend the above-referenced patent application as follows:

**Amendments to the Claims** begin on page 2 of this paper.

**Remarks/Arguments** begin on page 7 of this paper.

Date of Deposit: <u>August 24, 2009</u> I hereby certify under 37 CFR § 1.8 this correspondence is being deposited <b>via EFS</b> on the date indicated above.  /Stephanie Petreas/ <p style="text-align: right;">Stephanie Petreas</p>
---

## **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

Claims 1 – 20 (canceled)

Claims 21 - 30 (canceled)

Claims 31 - 38 (canceled)

Claim 39 (previously presented): An audio system comprising:  
a portable device having a physical interface configured to releasably engage a contacting portion of an interconnection system to form at least a portion of a communication path between the portable device and a separate electronic device, wherein the physical interface has a generally rectangular shape and is configured to couple a first conductive element of the interconnection system with a component of the portable device that outputs data and couple a second conductive element of the interconnection system with a recharging circuit of the portable device;

a wireless communication module operable to receive an incoming telephone call; and  
an audio output engine configured to output information representing a played audio file to the separate electronic device via the physical interface and to alter an outputting of the played audio file in connection with a receipt of the incoming telephone call.

Claim 40 (previously presented): The system of claim 39, further comprising an engine configured to communicate data from the portable device to the separate electronic device to allow the separate electronic device to present an icon on a display of the separate electronic device such that the icon: (a) is a soft button that is linked to a particular audio file saved at the portable device; (b) is selectable by a user via the separate electronic device; and (c) is configured to respond to a user selection by causing the separate electronic device to request the portable device to begin playing the particular audio file.

Claim 41 (previously presented): The system of claim 39, further comprising the interconnection system, wherein the interconnection system is operable to couple the portable device to a power supply of an automobile.

Claim 42 (previously presented): The system of claim 39, wherein the interconnection system further comprises an FM modulator.

Claim 43 (currently amended): The system of claim 39, further comprising the separate electronic device, wherein the separate electronic device includes a wireless receiver.

Claim 44 (previously presented): The system of claim 43, further comprising a housing component of the portable device that at least partially defines an enclosure, wherein the wireless communication module and the audio output engine are secured within the enclosure.

Claim 45 (previously presented): The system of claim 39, wherein the portable device is configured to accept an over the air download of an application that allows the portable device to request an audio stream representing a local broadcast signal for a channel located remote from a then current location of the portable device and a different over the air download of a media, further wherein the media is selected from a group consisting of an audio file, a video file, a piece of software, a book, and a message.

Claim 46 (canceled)

Claim 47 (canceled)

Claim 48 (new): The system of claim 39, further comprising a housing component of the portable device including a front surface comprising a display, wherein the display represents more than half of a total width of the front surface and more than half of a total length of the front surface.

Claim 49 (new)        The system of claim 39, the portable device comprising a front surface having a length and a width, wherein the length is longer than the width, and further wherein the physical interface is located on a lengthwise side of the portable device.

Claim 50 (new):        A wireless device comprising:  
a physical interface configured to releasably engage a contacting portion of an interconnection system to form at least a portion of a communication path between the wireless device and a separate electronic device, wherein the physical interface has a generally rectangular shape and is configured to couple a first conductive element of the interconnection system with a component of the wireless device that communicates data and couple a second conductive element of the interconnection system with a recharging circuit of the wireless device;  
a wireless communication module operable to receive an incoming telephone call; and  
an audio output engine configured to output information representing a played audio file to the separate electronic device via the physical interface and to alter an outputting of the played audio file in connection with a receipt of the incoming telephone call.

Claim 51 (new):        The wireless device of claim 50, further comprising an engine configured to communicate data from the wireless device to the separate electronic device to allow the separate electronic device to present an icon on a display of the separate electronic device such that the icon: (a) is a soft button that is linked to a particular audio file saved at the wireless device; (b) is selectable by a user via the separate electronic device; and (c) is configured to respond to a user selection by causing the separate electronic device to request the wireless device to begin playing the particular audio file.

Claim 52 (new):        The wireless device of claim 50, further comprising the interconnection system, wherein the interconnection system is operable to couple the wireless device to a power supply of another device.

Claim 53 (new):        The wireless device of claim 51, wherein the interconnection

system further comprises an FM modulator.

Claim 54 (new)        The wireless device of claim 50, wherein the wireless device is configured in a housing having a front surface having a length and a width, wherein the length is longer than the width, and further wherein the physical interface is located on a lengthwise side of the housing.

Claim 55 (new):        The wireless device of claim 50, further comprising:  
a housing component of the wireless device that at least partially defines an enclosure, wherein the wireless communication module and the audio output engine are secured within the enclosure;

a front surface of the wireless device that comprises a display, wherein the display represents more than half of a total width of the front surface and more than half of a total length of the front surface; and

an interface programming engine located within the enclosure and configured to allow a user to alter a displayed selectable icon.

Claim 56 (new):        The wireless device of claim 50, wherein the wireless device is configured to accept an over the air download of an application that allows the wireless device to request an audio stream representing a local broadcast signal for a channel located remote from a then current location of the wireless device and a different over the air download of a media, further wherein the media is selected from a group consisting of an audio file, a video file, a piece of software, a book, and a message.

Claim 57 (new):        The wireless device of claim 50, wherein the wireless device comprises a generally rectangular housing having a display that substantially predominates a face of the housing.

Claim 58 (new):        A method comprising:  
communicating information representing a played audio file from a portable wireless

device to a separate electronic device coupled to the portable wireless device via a physical interface of the portable wireless device configured to releasably engage a contacting portion of an interconnection system to form at least a portion of a communication path between the portable wireless device and the separate electronic device, the physical interface having a generally rectangular shape and to couple a first conductive element of the interconnection system with a component of the portable wireless device that communicates data and to couple a second conductive element of the interconnection system with a recharging circuit of the portable wireless device;

receiving an incoming telephone call in the portable wireless device; and

altering the communication representing the played audio file in connection with receipt of the incoming telephone call.

Claim 59 (new): The method of claim 58, further comprising communicating data from the portable wireless device to the separate electronic device to allow the separate electronic device to present an icon on a display thereof such that the icon: (a) is a soft button that is linked to a particular audio file saved at the portable wireless device; (b) is selectable by a user via the separate electronic device; and (c) is configured to respond to a user selection by causing the separate electronic device to request the portable wireless device to begin playing the particular audio file.

Claim 60 (new): The method of claim 58, further comprising receiving an over the air download of an application that allows the portable wireless device to request an audio stream representing a local broadcast signal for a channel located remote from a then current location of the portable wireless device.

**REMARKS/ARGUMENTS**

Applicants hereby elect without traverse to prosecute the claims directed to Group III. Such claims include claims 39-45 and new claims 48-60. Claims 21-38, 46 and 47 are hereby canceled.

In view of these remarks, the application is now in condition for allowance and the Examiner's prompt action in accordance therewith is respectfully requested. The Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 20-1504.

Respectfully submitted,

Date: August 24, 2009

/Mark J. Rozman/  
Mark J. Rozman  
Registration No. 42,117  
TROP, PRUNER & HU, P.C.  
1616 S. Voss Road, Suite 750  
Houston, Texas 77057-2631  
(512) 418-9944 [Phone]  
(713) 468-8883 [Fax]  
Customer No: 21906

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5939964
<b>Application Number:</b>	12015320
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	2156
<b>Title of Invention:</b>	Method for Managing Media
<b>First Named Inventor/Applicant Name:</b>	Russell W. White
<b>Customer Number:</b>	21906
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas
<b>Filer Authorized By:</b>	Mark J. Rozman
<b>Attorney Docket Number:</b>	AFF.0004C5US
<b>Receipt Date:</b>	24-AUG-2009
<b>Filing Date:</b>	16-JAN-2008
<b>Time Stamp:</b>	14:49:10
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	AFF004C5USReplytoRestriction Requirement.pdf	52250 <small>9e361a0969369bfd06ae5472abc03f770fb8a14c</small>	no	7

### Warnings:

### Information:



This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>12/015,320</b>	Filing Date <b>01/16/2008</b>	<input type="checkbox"/> To be Mailed
---	---	----------------------------------	---------------------------------------

APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	SMALL ENTITY <input checked="" type="checkbox"/>	OR			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =		OR	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		OR	TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR			
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =		OR	X \$ =	
Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =		OR	X \$ =	
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>									
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR			
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
<b>08/24/2009</b>									
Total <small>(37 CFR 1.16(i))</small>	* 20	Minus	** 27	= 0	X \$26 =	0	OR	X \$ =	
Independent <small>(37 CFR 1.16(h))</small>	* 3	Minus	*** 3	= 0	X \$110 =	0	OR	X \$ =	
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>									
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>							OR		
					TOTAL ADD'L FEE	<b>0</b>	OR	TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
 /THERESA LINDSAY/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/015,320	01/16/2008	Russell W. White	AFF.0004C5US	2156
21906	7590	07/24/2009	EXAMINER	
TROP, PRUNER & HU, P.C. 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			GARY, ERIKA A	
			ART UNIT	PAPER NUMBER
			2617	
			MAIL DATE	DELIVERY MODE
			07/24/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 12/015,320	<b>Applicant(s)</b> WHITE ET AL.	
	<b>Examiner</b> Erika A. Gary	<b>Art Unit</b> 2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 4/30/09.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 21-47 is/are pending in the application.  
    4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) \_\_\_\_\_ is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) 21-47 are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
    a)  All    b)  Some \*    c)  None of:
1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 21-30 and 46, drawn to an audio system comprising a physical connector operable to conductively couple a recharging circuit of an electronic device to a power source associated with a sound system, classified in class 455, subclass 573.
  - II. Claims 31-38 and 47, drawn to a method for providing audio content, classified in class 455, subclass 3.06.
  - III. Claims 39-45, drawn to an audio system comprising a wireless communication module operable to receive an incoming telephone call and alter an outputting of a played audio file in connection with receipt of the incoming call, classified in class 455, subclass 412.2.
  
2. The inventions are distinct, each from the other because of the following reasons:

The invention in group one is drawn to an audio system comprising a physical connector operable to conductively couple a recharging circuit of an electronic device to a power source associated with a sound system. The invention in group 2 is drawn a method for providing audio content. The invention in group 3 is drawn to an audio system comprising a wireless communication module operable to receive an incoming

Art Unit: 2617

telephone call and alter an outputting of a played audio file in connection with receipt of the incoming call. The inventions have separate utility and require separate searches.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

### ***Conclusion***

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erika A. Gary whose telephone number is 571-272-7841. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne Bost can be reached on 571-272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2617

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EAG/  
July 20, 2009

/Erika A. Gary/  
Primary Examiner, Art Unit 2617

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor		Russell W. White, et al.	
	Art Unit		2617	
	Examiner Name		Erika A. Gary	
	Attorney Docket Number		AFF.004C5US	

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

1	Affinity Labs of Texas, LLC, Plaintiff, v. Apple, Inc., Defendant, C.A. No. 9:09-cv-00047-RC (Eastern District of Texas), Complaint (pages 1-7), with Exhibits A, B and C, Filed March 24, 2009, 76 pages in total.	<input type="checkbox"/>
---	---	--------------------------

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-06-12
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5508571
<b>Application Number:</b>	12015320
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	2156
<b>Title of Invention:</b>	Method for Managing Media
<b>First Named Inventor/Applicant Name:</b>	Russell W. White
<b>Customer Number:</b>	21906
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas
<b>Filer Authorized By:</b>	Mark J. Rozman
<b>Attorney Docket Number:</b>	AFF.0004C5US
<b>Receipt Date:</b>	12-JUN-2009
<b>Filing Date:</b>	16-JAN-2008
<b>Time Stamp:</b>	16:08:16
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	AFF004C5USIDS6-12-09.pdf	1010476 <small>61634582cc3eed324980b56b6442c3ce3f543905</small>	no	3

### Warnings:

### Information:

This is not an USPTO supplied IDS fillable form

2	NPL Documents	AFF004SeriesIDS6-12-09NPLDoc ument-Complaint.pdf	2539029 <small>ea291846cef6db6926892f673e5a71a83814 eb45</small>	no	76
---	---------------	---	---	----	----

**Warnings:**

**Information:**

**Total Files Size (in bytes):** 3549505

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (04-09)

Approved for use through 05/31/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2000-66974	JP		2000-03-03			<input type="checkbox"/>
	2	11-68685	JP		1999-03-09			<input type="checkbox"/>
	3	CN 1218258A	CN		1999-06-02			<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

4	H11-242686	JP		1999-09-07	Sony Corporation	<input type="checkbox"/>
5	DE 44 31 070 B4	DE		2004-07-22	DaimlerChrysler AG	<input type="checkbox"/>
6	0 569 343 A1	EP		1993-10-11	Pioneer Electronic Corporation	<input type="checkbox"/>
7	0 675 341 A1	EP		1995-04-10	Honda Giken-Kogyo	<input type="checkbox"/>
8	0 771 686 A2	EP		1997-07-05	Toyota Jidosha Kabushiki Kaisha Toyota-shi, Aichi-	<input type="checkbox"/>
9	H4-261576	JP		1992-09-17	Mitsubishi Electric Corporation	<input type="checkbox"/>
10	2-301330	JP		1990-12-13		<input type="checkbox"/>
11	5-294250	JP		1993-11-09		<input type="checkbox"/>
12	6-187597	JP		1994-07-08		<input type="checkbox"/>
13	JP6289118	JP		1994-10-18	Sega Enterprises KK	<input type="checkbox"/>
14	JP6294659	JP		1994-10-21	Dainippon Printing Co. LTD.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

	15	07-129895	JP		1995-05-19	Honda Motor Co Ltd		<input type="checkbox"/>
	16	07-146155	JP		1995-06-06	Honda Motor Co Ltd		<input type="checkbox"/>
	17	7-262493	JP		1995-10-13	CSK Corporation		<input type="checkbox"/>
	18	7-262493	JP		1995-10-13			<input type="checkbox"/>
	19	JP7270171	JP		1995-10-20	Sumitomo Electronic Industries		<input type="checkbox"/>
	20	JP7036382	JP		1995-02-07	Mitsubishi Electric Corp.		<input type="checkbox"/>
	21	8-110231	JP		1996-04-30			<input type="checkbox"/>
	22	9-61514	JP		1997-03-07			<input type="checkbox"/>
	23	10-103966	JP		1998-04-24			<input type="checkbox"/>
	24	10-143349	JP		1998-05-29	Compaq Computer Corporation		<input type="checkbox"/>
	25	JP1018712	JP		1989-01-23	Mazda Motor		<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

	26	JP5077679	JP		1993-03-30	Nissan Motor		<input type="checkbox"/>
	27	JP59085599	JP		1984-05-17	Nissan Motor		<input type="checkbox"/>
	28	JP63136828	JP		1988-06-09	Pioneer Electronic Corp.		<input type="checkbox"/>
	29	63-136828	JP		1988-06-09			<input type="checkbox"/>
	30	WO 96/04724	WO		1996-02-15	Emerson, Harry		<input type="checkbox"/>
	31	WO 96/07110	WO		1996-03-07	British Telecommunications Public Limited Company		<input type="checkbox"/>
	32	WO 97/13657	WO		1997-04-17	United Technologies Automotive, Inc.		<input type="checkbox"/>
	33	H11-317061	JP		1999-11-16	Victor Company of Japan, LTD.		<input checked="" type="checkbox"/>
	34	2901445	JP		1999-03-19	Kenwood Corporation		<input checked="" type="checkbox"/>
	35	WO 99/35009	WO		1999-07-15	Microsoft Corporation		<input type="checkbox"/>
	36	11-219580	JP		1999-08-10			<input type="checkbox"/>



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

	37	11219580 A	JP		1999-10-08	Sony Corp		<input type="checkbox"/>
	38	1168685	JP		1999-03-09			<input type="checkbox"/>
	39	11-068685	JP		1999-09-03	Sony Corp		<input type="checkbox"/>
	40	1998-052033	JP		1998-09-25			<input type="checkbox"/>
	41	1999-0042565	JP		1999-06-15			<input type="checkbox"/>
	42	1999-0073234	KR		1999-10-05	Young-Man Lee		<input type="checkbox"/>
	43	1999-0048723	KR		1999-07-05			<input type="checkbox"/>
	44	KR2019990022030U	KR		1999-06-25	Young-Shik Cheon		<input type="checkbox"/>
	45	2000-0001465	KR		2000-01-25	Samsung Motors		<input type="checkbox"/>
	46	0142256	KR		1998-03-30			<input type="checkbox"/>
	47	WO 98/21672	WO		1998-05-22	Inergy Online, Inc.		<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

	48	WO 98/47252	WO		1998-10-22	Stern, Geoffrey		<input type="checkbox"/>
	49	WO 00/54187	WO		2000-09-14	Rock.Com, Inc.		<input type="checkbox"/>
	50	WO 00/60450	WO		2000-10-12	Khyber Technologies Corporation		<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	MARK MOELLER, Computing Unplugged Magazine, "Product Preview, A Survey of Auto PC 2.0 for software developers," 1999-2009, Zatz Publishing, pages 1-7.	<input type="checkbox"/>
	2	MARK MOELLER, Computing Unplugged Magazine, "AutoPC Update, Auto PC/Windows CE for Automotive news bites," 1999-2009, Zatz Publishing, pages 1-4.	<input type="checkbox"/>
	3	Claim Chart for KR19990033393, Claim 17 of U.S. Patent No. 7,324,833, pages 1-3.	<input type="checkbox"/>
	4	RIO500, Getting Started Guide for Windows 98 and Macintosh OS 8.6, pages 1-2.	<input type="checkbox"/>
	5	NORBERT A. STREITZ, et al., "DOLPHIN: Integrated Meeting Support Across Local And Remote Desktop Environments And LiveBoards," Integrated Publication and Information Systems Institute, 1994, pages 345-358.	<input type="checkbox"/>
	6	LEO DEGEN, et al., "Working with Audio: Integrating Personal Tape Recorders and Desktop Computers," May 3-7, 1992, pages 413-418.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

7	H.S. JUN GIBEE, "A Virtual Information Desk On The Internet," University of Ulsan, September 1999, pages 265-268.	<input type="checkbox"/>
8	STEVE WHITTAKER, et al., "TeleNotes: Managing Lightweight Interactions in the Desktop," Lotus Development Corporation, June 1997, pages 137-168.	<input type="checkbox"/>
9	R.M. CROWDER, et al., "Integration of Manufacturing Information Using Open Hypermedia," Computer in Industry, 1999, pages 31-42.	<input type="checkbox"/>
10	TOMAS BOSTROM, et al., "Mobile Audio Distribution," Royal Institute of Technology, 1999, pages 166-172.	<input type="checkbox"/>
11	ALEX POON, et al., Xerox Disclosure Journal, Vol. 19, No. 2, "Gestural User Interface Technique for Controlling the Playback of Sequential Media," March/April 1994, pages 187-190.	<input type="checkbox"/>
12	DEB KUMAR ROY, "NewsComm: A Hand-Held Device For Interactive Access to Structured Audio," Massachusetts Institute of Technology, June 1995, pages 1-12.	<input type="checkbox"/>
13	VICTORIA BELLOTTI, et al., "Walking Away from the Desktop Computer: Distributed Collaboration and Mobility in a Product Design Team," 1996, pages 209-218.	<input type="checkbox"/>
14	UPUL OBEYSEKARE, et al., "The Visual Interactive Desktop Laboratory," January-March 1997, pages 63-71.	<input type="checkbox"/>
15	ASIM SMILAGIC, et al., "MoCCA: A Mobile Communication and Computing Architecture," Institute for Complex Engineered Systems, pages 1-8.	<input type="checkbox"/>
16	SUI-MENG POON, et al., "Integration of Value-Added Audio Playback Capacity Into Computer Network," Nanyang Technological University, 1995, pages 632-636.	<input type="checkbox"/>
17	ERDAL PAKSOY, et al., "A variable-rate celp coder for fast remote voicemail retrieval using a notebook computer," DSPS R&D Center, Texas Instruments, 1997, pages 119-124.	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

18	JEFFREY A. DAVIS, "Use of Personal Computers in Satellite Command and Control Systems," Raytheon Systems Company, October 24, 1999, pages 283-291.	<input type="checkbox"/>
19	NIKI DAVIS, "Remote Teaching Via ISDN2 And Desktop Conferencing," Exeter University School of Education, pages 1-3.	<input type="checkbox"/>
20	A CHAN, et al., "The PEP-II Project-Wide Database," Stanford University, 1996, pages 840-842.	<input type="checkbox"/>
21	KRISHNA BHARAT, et al., "Migratory Applications," Springer Berlin, Vol. 1222, 1997, pages 1-21.	<input type="checkbox"/>
22	EMPEG CAR, "MP3 in your dash," Digital Audio Player User Guide, pages 1-50.	<input type="checkbox"/>
23	MICROSOFT, "Getting Started Microsoft. Windows. 98" Second Edition, 1998, pages 1-138.	<input type="checkbox"/>
24	SAUL GREENBERG, "PDAs and Shared Public Displays: Making Personal Information Public, and Public Information Personal," University of Calgary, March 1999, pages 1-11.	<input type="checkbox"/>
25	NAOHIKO KOHTAKE, et al., "InfoStick: an interaction device for Inter-Appliance Computing," Keio University, pages 1-15.	<input type="checkbox"/>
26	HEWLETT PACKARD, User's Guide, HP Jornada 420, Palm-Size PC, pages 1-75	<input type="checkbox"/>
27	MICROSOFT, "Introducing Microsoft Windows 95 - Certificate of Authenticity," 1995, pages 1-117.	<input type="checkbox"/>
28	SONY, "New Technical Theory For Servicing, MZ-R5ST Operation Manual," pages 1-44.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

29	RICHARD C. DAVIS, et al., "A Framework for Sharing Handwritten Notes," 1998, pages 119-120.	<input type="checkbox"/>
30	KRISHNA A. BHARAT, et al., "Migratory Applications," UIST '95, November 14-17, 1995, pages 133-142.	<input type="checkbox"/>
31	BRAD A. MYERS, "Collaboration Using Multiple PDAs Connected To A PC," Carnegie Mellon University, 1998, pages 385-294.	<input type="checkbox"/>
32	RICHARD C. DAVIS, et al., "NotePals: Lightweight Note Sharing by the Group, for the Group," May 15-20, 1999, pages 338-345.	<input type="checkbox"/>
33	JUN REKIMOTO, et al., "Augmented Surfaces: A Spatially Continuous Work Space for Hybrid Computing Environments," May 15-20, 1999, pages 378-385.	<input type="checkbox"/>
34	DAN R. OLSEN, JR., "Interacting with Chaos," September and October 1999, pages 42-54.	<input type="checkbox"/>
35	SCOTT ROBERTSON, et al., "Dual Device User Interface Design: PDAs and Interactive Television," April 13-18, 1996, pages 79-86.	<input type="checkbox"/>
36	SYMANTEC CORPORATION, "pcANYWHERE32 User's Guide," 1993-1997, pages 1-216.	<input type="checkbox"/>
37	KRISHNA BHARAT, et al., Migratory Applications, "Mobile Object Systems Towards the Programmable Internet," Springer Berlin/Heidelberg, Volume 1222/11997, 1997, pages 1-134.	<input type="checkbox"/>
38	DIAMOND MULTIMEDIA SYSTEMS, INC., "Rio PMP300, User's Guide," 1998, pages 1-27.	<input type="checkbox"/>
39	SONY, "Portable MiniDisc Recorder, Operating Instructions, MZ-R55," 1998, pages 1-42.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

40	NORBERT A. STREITZ, et al., "i-Land: An Interactive Landscape for Creativity and Innovation," Proceedings of the ACM Conference on Human Factors in Computing Systems, May 15-20, 1999, pages 120-127.	<input type="checkbox"/>
41	NORBERT A. STREITZ, et al., "Roomware for Cooperative Buildings: Integrated Design of Architectural Spaces and Information Spaces," pages 1-20	<input type="checkbox"/>
42	Direct Cable Connection screen shot, "B1U6U4," 10 pages total.	<input type="checkbox"/>
43	Direct Cable Connection screen shot, 10 pages total.	<input type="checkbox"/>
44	IBM, "WordPad z50 Cradle Option - User's Guide," 1990, pages 1-18.	<input type="checkbox"/>
45	IBM MOBILE SYSTEMS, "WorkPad z50 Mobile Companion (2608-1Ax), Hardware Maintenance Manual," March 1999, pages 1-77.	<input type="checkbox"/>
46	KEVIN JOST, Automotive Engineering International, "The car as a mobile-media platform," May 1998, pages 49-53.	<input type="checkbox"/>
47	MICROSOFT CORPORATION, "Windows CE 2.1 Technical Articles, Developing Applications for an Auto PC," June 1999, pages 1-13.	<input type="checkbox"/>
48	INFOGATION CORPORATION, "InfoGation Corp. Introduces Software Applications for Next-Generation Smart Car Systems," January 8, 1998, pages 1-2.	<input type="checkbox"/>
49	BUSINESS WIRE, "ORA Electronics Announces USB-Compatible TelCar Mark VII Begins Shipping First Quarter of 1999," January 6, 1999, pages 1-2.	<input type="checkbox"/>
50	ORA USA, "ORA Electronics Patents Telcar Cellular Telephone Interface," July 6, 1998, pages 1-2.	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

If you wish to add additional non-patent literature document citation information please click the Add button			
<b>EXAMINER SIGNATURE</b>			
Examiner Signature		Date Considered	
<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>			
<p><sup>1</sup> See Kind Codes of USPTO Patent Documents at <a href="http://www.USPTO.GOV">www.USPTO.GOV</a> or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.</p>			

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-06-08
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	WO 00/79372 A1	WO		2000-12-28	Colvin, David S.		<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

1	HEWLETT PACKARD, "HP Jornada 430/430se Palm-Size PC, User's Guide," Edition 1, 1999, pages 1-151.	<input type="checkbox"/>
2	NEC, "NEC MobilePro 750C, User's Guide," 1998, pages 1-83.	<input type="checkbox"/>
3	MICROSOFT, "Palm PC User's Guide," Microsoft Windows CE, pages 1-39.	<input type="checkbox"/>
4	PALM PC USER'S GUIDE, "Chapter 6, Information Backup and Exchange," pages 69-148	<input type="checkbox"/>
5	MPMan, "User's Guide, The Portable MP 3player using the flash memory and SmartMedia card," 1997, pages 1-35.	<input type="checkbox"/>
6	Cover Sheet, www.mpman.com, 1 page.	<input type="checkbox"/>
7	Smart Media Card Slot Diagram, 1 page.	<input type="checkbox"/>
8	MP Man F20 Logo, 1 page.	<input type="checkbox"/>
9	MPMan, "User's Guide, The portable MP3 player using the flash memory with variety features including the voice recording, phone/memo browsing, etc.," 1997, pages 1-47.	<input type="checkbox"/>
10	Smart Media card diagram and install instructions, pages 1-4.	<input type="checkbox"/>
11	ANAND LAL SHIMPI, Empeg, Ltd., "MP3 meets Car Audio: Empeg Mark II in-dash Car MP3 Player," September 18, 2000, pages 1-17.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

12	PETER CLARKE, EE Times, "Engineers drive craze for MP3 audio players," February 5, 1999, pages 1-4.	<input type="checkbox"/>
13	RIO CAR DOT ORG GEEK GUIDE, "empeg car Mk. 1," February 21, pages 1-4.	<input type="checkbox"/>
14	HUGO FIENNES, RIO CAR DOT ORG GEEK GUIDE, "MP3 Mobile," February 21, pages 1-4.	<input type="checkbox"/>
15	RIO CAR DOT ORG, "Frequently Asked Questions," pages 1-16.	<input type="checkbox"/>
16	DIAMOND MULTIMEDIA SYSTEMS, INC., "Rio PMP300 User's Guide," 1998, pages 1-27.	<input type="checkbox"/>
17	STEPHEN J. BUCKLEY, et al., "The Car as a Peripheral, Adapting a Portable Computer to a Vehicle Intranet," SAE Technical Paper Series, 98C030, October 19-21, 1998, pages 1-14.	<input type="checkbox"/>
18	"The MP3 Mobile," April 8, 1998, pages 1-13.	<input type="checkbox"/>
19	12-Volt Business & Technology Solutions, AutoMedia, "How the Intelligent Data Bus will impact the way you do business," November 1998, pages 1-2.	<input type="checkbox"/>
20	Press Release, "Creative Labs Launches Nomad Portable MP3 Players," April 15, 1999, pages 1-5.	<input type="checkbox"/>
21	BMW, "Betriebsanleitung Bordmonitor mit Navigation und TV," 1995, pages 1-82.	<input type="checkbox"/>
22	BMW, "Owner's Manual, On-board monitor with navigation system," 1996, pages 1-81.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

23	TRANSPERFECT/TRANSLATIONS, "True and accurate translation of the 1995 BMW Manual, from German into English," August 16, 2005, pages 1-80.	<input type="checkbox"/>
24	HEINZ SODEIKAT, "EURO-SCOUT is facing the German 1994 Market," 1994, pages 551-556.	<input type="checkbox"/>
25	Pictures of car navigation systems in a car dashboard, pages 1-11.	<input type="checkbox"/>
26	BMW, "The BMW On-Board Navigation System - Technology Takes a Remarkable Turn," 2005, pages 1-9.	<input type="checkbox"/>
27	OLDSMOBILE, "1991 Toronado/Trofeo User's Guide," 1991, pages 1-41.	<input type="checkbox"/>
28	YEPP, "Digital Sounds - yepp - YP-E32/E64102-291," October 23, 1999, pages 1-46	<input type="checkbox"/>
29		<input type="checkbox"/>
30	U.S. Provisional Application No. 60/167179, entitled "System, Method, And Device for Playing Recorded Music on a Wireless Communications Device," by Devon A. Rolf, filed November 23, 1999, pages 1-48.	<input type="checkbox"/>
31	MICROSOFT, "Getting Started, Microsoft Windows 98, For distribution with a new PC only," 1998, pages 1-145.	<input type="checkbox"/>
32	PR NEWSWIRE, "Alpine Announces Fall Release of Interface Adapter That Enables iPod Control and Playback from In-Vehicle Sound Systems," July 7, 2004, pages 1-2..	<input type="checkbox"/>
33	HA-YOUNG PARK, The Customer Times, "Portable Computer Music, MP3 File and MP3 Player rise as the Next Generation Audio Format," May 1999, pages 1-2.	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320
	Filing Date		2008-01-16
	First Named Inventor	Russell W. White, et al.	
	Art Unit		2617
	Examiner Name	Erika A. Gary	
	Attorney Docket Number		AFF.004C5US

	34	"MP3 Players Introduced in the Korean IT Magazines," 1998-1999, pages 1-15.	<input type="checkbox"/>
	35	MPMan, "MP-F20, User's Guide, Portable MP3 player using the flash memory and a Memory card," [ages 1-16.	<input type="checkbox"/>
	36	PR NEWSWIRE ASSOCIATION, INC., "Delphi's Communiport(R) Technology for Tomorrow, Today Demonstrated at Frankfurt Auto Show," September 15, 1999, pages 1-8.	<input type="checkbox"/>
	37	CRAIN COMMUNIATIONS, INC., "Products," Agilent Technologies Press Release, February 21, 2000, pages 1-6.	<input type="checkbox"/>
	38	THE WASHINGTON TIMES, LLC, John Hanan, Dallas Morning News, "Cars add computer, audiovisual gear," January 14, 2000, pages 1-3.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	Date Considered
--------------------	-----------------

**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-06-08
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

(09) 日本国特許庁 (J.P.)

(10) 公開特許公報 (A)

(11) 特許出願公開番号

特開平11-68685

(43) 公開日 平成11年(1999)3月9日

(51) Int.Cl. <sup>6</sup>	識別記号	F1	
H04H 1/00		H04H 1/00	C
H04E 7/00		H04E 7/00	
// H04B 7/26		7/26	M

審査請求 未請求 請求項の数73 O.L. (全 26 頁)

(12) 出願番号 特願平9-225435  
 (22) 出願日 平成9年(1997)8月21日

(71) 出願人 000002185  
 ソニー株式会社  
 東京都品川区北品川6丁目7番35号  
 (72) 発明者 伊藤 誠吾  
 東京都品川区北品川6丁目7番35号ソニー株式会社内  
 (74) 代理人 弁護士 田辺 恵基

(54) 【発明の名称】 無線情報送信方法及びその装置

(57) 【要約】

【課題】本発明は無線音響受信装置に関し、利便性の良い音響提供サービスを実現する。

【解決手段】所望の音響信号を要求するサービス要求信号を送信する無線送信手段(5)と、サービス要求信号に対応して送信される音響信号が含まれる送信信号を受信する無線受信手段(5)と、無線受信手段から出力される受信信号に復調及び又は復号処理を施して音響信号を復元する復調復号手段(5及び6)と、復調復号手段によって復元された音響信号を音波に変換して出力する電気音響変換手段(6)とを設けるようにした。これにより音響信号が記録された記録媒体を持たずとも、所望の音響信号を容易に得ることができ、利便性が良い音響提供サービスを実現し得る。

4

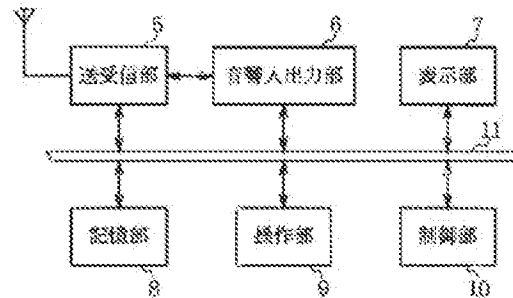


図2 音響受信装置の全体構成

## 【特許請求の範囲】

【請求項1】 所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

上記復調復号手段によって復元された上記音響信号を音波に変換して出力する電気音響変換手段とを具えることを特徴とする無線音響受信装置、

【請求項2】 上記電気音響変換手段は少なくとも2つ以上の電気音響変換素子からなり、上記音響信号をステレオ音響で出力することを特徴とする請求項1に記載の無線音響受信装置、

【請求項3】 上記復調復号手段は、上記受信信号から主情報と副情報を分離する復号手段と、上記副情報から特徴情報を復元する特徴情報復元手段と、

上記特徴情報復元手段によって復元した上記特徴情報を利用して上記主情報の復元処理を行う情報復元手段と、上記情報復元手段の出力信号に復号化を行うて上記音響信号を復元する情報復元化手段とを具えることを特徴とする請求項1に記載の無線音響受信装置、

【請求項4】 上記復調復号手段は、さらに、上記主情報のデータ並び順を元に戻すデインターリーブ手段を具えることを特徴とする請求項3に記載の無線音響受信装置、

【請求項5】 上記情報復元化手段は、上記出力信号に離散コサイン変換処理を行うことにより上記音響信号を復元することを特徴とする請求項3に記載の無線音響受信装置、

【請求項6】 上記情報復元化手段は、上記出力信号に逆高速フーリエ変換処理を行うことにより上記音響信号を復元することを特徴とする請求項3に記載の無線音響受信装置、

【請求項7】 所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

少なくとも2つ以上の電気音響変換素子を有し、上記復調復号手段によって復元された上記音響信号を音波に変換してステレオ音響で出力する電気音響変換手段とを具えることを特徴とする車載音響装置、

【請求項8】 さらに表示手段を具え、受信する上記音響信号に関連する情報を当該表示手段に表示することを特

徴とする請求項7に記載の車載音響装置、

【請求項9】 さらに遠隔操作手段を具え、当該遠隔操作手段を介して動作制御のための制御データが入力されることを特徴とする請求項8に記載の車載音響装置、

【請求項10】 上記遠隔操作手段は、上記制御データを赤外光で送信することを特徴とする請求項9に記載の車載音響装置、

【請求項11】 さらにテレビ放送受信手段を具え、上記受信する音響信号に関連する情報と、上記テレビ放送受信手段で受信したテレビ放送の画像とを同時又は切り換えて上記表示手段に表示することを特徴とする請求項8に記載の車載音響装置、

【請求項12】 さらに現在位置測定手段を具え、上記受信する音響信号に関連する情報と、上記現在位置測定手段に関連する情報とを同時又は切り換えて上記表示手段に表示することを特徴とする請求項8に記載の車載音響装置、

【請求項13】 上記無線送信手段、上記無線受信手段及び上記復調復号手段は取り外し可能な構成を有し、取り外した後も通信機として使用可能であることを特徴とする請求項7に記載の車載音響装置、

【請求項14】 所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

少なくとも2つ以上の電気音響変換素子を有し、上記復調復号手段によって復元された上記音響信号を音波に変換してステレオ音響で出力する電気音響変換手段と、駆動用の電池とを具えることを特徴とする携帯型音響出力装置、

【請求項15】 上記電気音響変換手段が有する上記電気音響変換素子は、人体装着式の素子であることを特徴とする請求項14に記載の携帯型音響出力装置、

【請求項16】 さらに、上記音響信号を受信する際の制御データを入力するための操作手段を具えることを特徴とする請求項15に記載の携帯型音響出力装置、

【請求項17】 上記操作手段は、通話に関する制御データを入力するための操作キーであることを特徴とする請求項16に記載の携帯型音響出力装置、

【請求項18】 上記操作手段は、曲動押圧式の操作子からなることを特徴とする請求項16に記載の携帯型音響出力装置、

【請求項19】 上記操作手段は、曲動押圧式の操作子からなることを特徴とする請求項16に記載の携帯型音響出力装置、

【請求項20】 上記操作手段は、複数の押圧スイッチからなることを特徴とする請求項16に記載の携帯型音響



出力装置。

【請求項21】上記電気音響変換手段を、上記無線送信手段、上記無線受信手段及び上記復調復号手段を取納した本体ケースに対してケーブル接続し、当該ケーブル上に上記操作手段を配置することを特徴とする請求項16に記載の携帯型音響出力装置。

【請求項22】さらに表示手段を具え、受信する上記音響信号に関連する情報を当該表示手段に表示することを特徴とする請求項16に記載の携帯型音響出力装置。

【請求項23】上記表示手段は、通話に関する情報も表示することを特徴とする請求項22に記載の携帯型音響出力装置。

【請求項24】上記電気音響変換手段を、上記無線送信手段、上記無線受信手段及び上記復調復号手段を取納した本体ケースに対してケーブル接続し、当該ケーブル上に上記表示手段を配置することを特徴とする請求項23に記載の携帯型音響出力装置。

【請求項25】上記表示手段と上記操作手段は一体形成されることを特徴とする請求項24に記載の携帯型音響出力装置。

【請求項26】上記復調復号手段によって復元した上記音響信号を送信する微弱情報送信手段と、

上記微弱情報送信手段によって送信された上記音響信号を受信して上記電気音響変換手段に供給する微弱情報受信手段とを具え、上記音響信号を非ケーブル接続により上記電気音響変換手段に供給することを特徴とする請求項14に記載の携帯型音響出力装置。

【請求項27】上記微弱情報送信手段は、電磁波を使用して上記音響信号を送信することを特徴とする請求項26に記載の携帯型音響出力装置。

【請求項28】上記電磁波は、10〔MHz〕以上、かつ1〔GHz〕以下の周波数帯域であることを特徴とする請求項27に記載の携帯型音響出力装置。

【請求項29】上記微弱情報受信手段は所定の操作手段から入力された制御データを電磁波を使用して送信し、上記微弱情報送信手段は当該微弱情報受信手段から送信された制御データを受信して所定の制御手段に出力することを特徴とする請求項27に記載の携帯型音響出力装置。

【請求項30】所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

上記復調復号手段から出力される上記音響信号を再変調して出力する再変調手段と、

上記再変調手段の出力信号を再送信する再送信手段とを具えることを特徴とする無線情報再送信装置。

【請求項31】上記再変調手段は、上記音響信号に対して周波数変調を行うことを特徴とする請求項30に記載の無線情報再送信装置。

【請求項32】上記再送信手段は、10〔MHz〕以上、かつ1〔GHz〕以下の周波数帯域の電磁波を使用して上記出力信号を送信することを特徴とする請求項30に記載の無線情報再送信装置。

【請求項33】所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

少なくとも2つ以上の人体装着式の電気音響変換素子を有し、上記復調復号手段によって復元された上記音響信号を音波に変換してステレオ音響で出力する電気音響変換手段と、

駆動用の電池とを具え、通話時には上記電気音響変換手段の上記電気音響変換素子によって声帯の振動を検出して音声信号を生成し、当該音声信号を上記無線送信手段を介して送信すると共に、上記無線受信手段によって通信相手からの音声信号を受信して上記電気音響変換手段の上記電気音響変換素子から出力することにより、音響受信と通話の両方を成し得るようになされたことを特徴とする携帯用音響出力通信装置。

【請求項34】通話時、上記電気音響変換素子に供給する上記音声信号と、上記電気音響変換素子から上記無線送信手段に供給する上記音声信号とを時分割伝送することを特徴とする請求項33に記載の携帯用音響出力通信装置。

【請求項35】所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施して上記音響信号を復元する復調復号手段と、

少なくとも2つ以上の電気音響変換素子を有し、上記復調復号手段によって復元された上記音響信号を音波に変換してステレオ音響で出力する電気音響変換手段とを具えることを特徴とする自動車。

【請求項36】さらに表示手段と現在位置測定手段とを具え、上記受信する音響信号に関連する情報と、上記現在位置測定手段に関連する情報とを同時又は切り替えて上記表示手段に表示することを特徴とする請求項35に記載の自動車。

【請求項37】入力信号を情報源符号化する情報源符号化手段と、

上記入力信号の特徴情報を抽出する特徴抽出手段と、

上記情報源符号化手段の出力データを上記特徴抽出手段によって抽出した上記特徴情報を利用してベクトル量子化する量子化手段と、

上記量子化手段の出力信号を変調する変調手段と、  
上記変調手段の出力信号を端末装置に送信する無線送信手段と、

上記端末装置からの送信信号を受信する無線受信手段と、

上記無線受信手段から出力される受信信号に復調及び又は復号処理を施す復調復号手段とを具え、上記復調復号手段の出力信号の内容に基づいて上記入力信号の内容を変更することを特徴とする情報送信装置。

【請求項38】上記情報源符号化手段から出力される上記出力データを並び換えるインクローブ手段と、  
上記特徴情報抽出手段によって抽出した特徴情報から重み関数を生成する重み関数生成手段とを具えることを特徴とする請求項37に記載の情報送信装置。

【請求項39】上記情報源符号化手段は、上記入力信号に離散コサイン変換処理を行うことを特徴とする請求項37に記載の情報送信装置。

【請求項40】上記情報源符号化手段は、上記入力信号に高速フーリエ変換処理を行うことを特徴とする請求項37に記載の情報送信装置。

【請求項41】所望の音響信号を要求するサービス要求信号を送信し、

上記サービス要求信号に対応して送信される上記所望の音響信号が含まれる送信信号を受信し、

受信した受信信号に復調及び又は復号処理を施して上記音響信号を復元し、

復元した上記音響信号を音波に変換して出力することを特徴とする無線音響受信方法。

【請求項42】受信する上記音響信号に関連する情報を表示することを特徴とする請求項41に記載の無線音響受信方法。

【請求項43】上記受信信号から主情報と副情報を分離し、

上記副情報から特徴情報を復元し、  
復元した上記特徴情報を利用して上記主情報を復元し、  
当該復元結果を情報源復号化することにより、上記受信信号から上記音響信号を復元することを特徴とする無線音響受信方法。

【請求項44】上記情報源復号化として離散コサイン逆変換処理を行うことを特徴とする請求項43に記載の無線音響受信方法。

【請求項45】上記情報源復号化として逆高速フーリエ変換処理を行うことを特徴とする請求項43に記載の無線音響受信方法。

【請求項46】所望の音響信号を要求するサービス要求信号を送信し、

上記サービス要求信号に対応して送信される上記音響信

号が含まれる送信信号を受信し、  
受信した受信信号に復調及び又は復号処理を施して上記音響信号を復元し、

復元した上記音響信号を再変調して再送信し、  
再送信された上記音響信号を受信して復調し、当該音響信号を音波に変換して出力することを特徴とする無線音響受信方法。

【請求項47】上記再変調として上記音響信号に周波数変調を行うことを特徴とする請求項46に記載の無線音響受信方法。

【請求項48】所望の音響信号を要求するサービス要求信号を送信し、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信し、

受信した受信信号に復調及び又は復号処理を施して上記音響信号を復元し、

復元した上記音響信号を再変調して再送信することを特徴とする無線音響再送信方法。

【請求項49】上記再変調として上記音響信号に周波数変調を行うことを特徴とする請求項48に記載の無線音響再送信方法。

【請求項50】所望の音響信号を要求するサービス要求信号を送信し、

上記サービス要求信号に対応して送信される上記音響信号が含まれる送信信号を受信し、

受信した受信信号に復調及び又は復号処理を施して上記音響信号を復元し、

復元された上記音響信号を所定の電気音響変換素子を使用して音波に変換して出力し、

通話時には声帯の振動を上記電気音響変換素子によって検出して音声信号を生成して送信すると共に、通信相手からの音声信号を受信して上記電気音響変換素子から出力することを特徴とする携帯式音響出力通信方法。

【請求項51】上記電気音響素子による上記音声信号の出力と上記音声信号の生成とを時分割で行うことを特徴とする請求項50に記載の携帯式音響出力通信方法。

【請求項52】入力信号を情報源符号化すると共に、上記入力信号の特徴情報を抽出し、

上記情報源符号化による出力データを上記特徴情報を利用してベクトル量子化し、

上記ベクトル量子化による出力信号を変調して端末装置に送信し、

上記端末装置からの送信信号を受信し、  
受信した受信信号に復調及び又は復号処理を施して上記端末装置から送信されたデータを復元し、当該データの内容に基づいて上記入力信号の内容を変更することを特徴とする情報送信方法。

【請求項53】上記情報源符号化として上記入力信号に離散コサイン変換処理を行うことを特徴とする請求項52に記載の情報送信方法。

【請求項54】上記情報源符号化として上記入力信号に高速フーリエ変換処理を行うことを特徴とする請求項52に記載の情報送信方法。

【請求項55】端末装置からの要求信号を受信し、上記要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、上記要求信号が第2の種類の信号であつたときには所定の曲群の中から任意の楽曲を選択して送信することを特徴とする楽曲送信方法。

【請求項56】上記要求信号が第3の種類の信号であつたときには端末装置側で定められた楽曲を送信することを特徴とする請求項55に記載の楽曲送信方法。

【請求項57】上記曲群は、過去に送信した楽曲を除いた楽曲群からなることを特徴とする請求項55に記載の楽曲送信方法。

【請求項58】上記曲群は、過去所定時間内に送信した楽曲を除いた楽曲群からなることを特徴とする請求項55に記載の楽曲送信方法。

【請求項59】端末装置からの要求信号を受信し、上記要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、上記要求信号が第2の種類の信号であつたときには端末装置側で定められた楽曲を送信することを特徴とする楽曲送信方法。

【請求項60】端末装置からの要求信号を受信する受信手段と、上記要求信号が第1の種類の信号であつたときには予め定められた所定の順番で楽曲を送信し、上記要求信号が第2の種類の信号であつたときには所定の曲群の中から任意の楽曲を選択して送信する音楽情報送信手段とを具備することを特徴とする楽曲送信装置。

【請求項61】上記曲群は、過去に送信した楽曲を除いた楽曲群からなることを特徴とする請求項60に記載の楽曲送信装置。

【請求項62】上記曲群は、過去所定時間内に送信した楽曲を除いた楽曲群からなることを特徴とする請求項60に記載の楽曲送信装置。

【請求項63】端末装置からの要求信号を受信する受信手段と、上記要求信号が第1の種類の信号であつたときには予め定められた所定の順番で楽曲を送信し、上記要求信号が第2の種類の信号であつたときには端末装置側で定められた楽曲を送信する音楽情報送信手段とを具備することを特徴とする楽曲送信装置。

【請求項64】楽曲を指定せずに楽曲送信を要求する第1の要求信号又は楽曲を指定して楽曲送信を要求する第2の要求信号を送信する送信手段と、上記第1又は第2の要求信号に対応して送信された音楽信号を受信する受信手段とを具備することを特徴とする楽曲受信装置。

【請求項65】楽曲送信を要求する要求信号を送信する送信手段と、上記要求信号に対応した音楽信号を受信する受信手段と、

上記受信手段の出力信号から上記音楽信号と共に送信された付加情報を抽出する抽出手段と、

上記付加情報のうち第1の種類の付加情報と第2の種類の付加情報とを選択的に表示する表示手段とを具備することを特徴とする楽曲受信装置。

【請求項66】上記第1の種類の付加情報は楽曲の題名であり、上記第2の種類の付加情報は楽曲の歌詞であることを特徴とする請求項65に記載の楽曲受信装置。

【請求項67】上記表示手段は、上記第1又は第2の種類の付加情報を表示する際、当該付加情報の種類に応じた異なる記号又は文字を表示することを特徴とする請求項65に記載の楽曲受信装置。

【請求項68】操作入力に応じて仮想カーソルが2次元の仮想情報テーブル上を移動することにより当該仮想カーソルが位置するところの情報を表示し、確定指示が入力されると、上記仮想カーソルが位置するところの情報を選択することを特徴とする情報選択方法。

【請求項69】操作入力に応じて仮想カーソルが2次元の文字表上を移動することにより当該仮想カーソルが位置するところの文字を表示し、確定指示が入力されると、上記仮想カーソルが位置するところの文字を選択して入力することを特徴とする文字入力方法。

【請求項70】上記文字は日本語の仮名文字であり、上記文字表は50音表であることを特徴とする請求項69に記載の文字入力方法。

【請求項71】楽曲名と、楽曲に付与された楽曲コードとを対とした単位データを少なくとも1つ以上有し、上記単位データを所望の順番で並べて、当該順番によって上記楽曲の時系列的順番を規定することを特徴とする楽曲データ指定用データ構造。

【請求項72】楽曲指定のための選択情報を所定の通信回線を介して送信し、上記選択情報に該当する楽曲リストを上記通信回線を介して受信し、

上記楽曲リストの中から所望の楽曲を指定し、当該指定された楽曲を示す情報を上記通信回線を介して送信することを特徴とする通信回線を利用した楽曲指定方法。

【請求項73】上記指定された楽曲を示す情報を所定の記憶手段に記憶しておき、所望の時刻になると、上記指定された楽曲を示す情報を送信することを特徴とする請求項72に記載の通信回線を利用した楽曲指定方法。

【発明の詳細な説明】

【0001】

【目次】以下の順序で本発明を説明する。

【0002】発明の属する技術分野

従来の技術

発明が解決しようとする課題

課題を解決するための手段

発明の実施の形態

(1) 第1の実施の形態

(1-1) 音楽提供サービスシステムの構成(図1)

(1-2) 音響受信装置の全体構成(図2及び図3)

(1-3) 送受信部の構成(図4)

(1-4) 音響入出力部の構成(図5)

(1-5) PHS基地局の構成(図6)

(1-6) 音響受信装置のデータ処理回路の構成(図7)

(1-7) 音楽提供サービスを受ける際の操作及び表示

(図8～図13)

(1-8) 音楽提供サービスに係る制御部の制御手順

(図14及び図15)

(1-9) 音響受信装置の本体に設けられた操作部(図16及び図17)

(1-10) 動作及び効果

(2) 第2の実施の形態(図18及び図19)

(3) 第3の実施の形態(図20～図22)

(4) 他の実施の形態(図23)

発明の効果

【0003】

【発明の属する技術分野】本発明は無線情報通信方法及びその装置に関し、例えば無線回線を介して音楽データを受信する音響受信装置に適用して好適なものである。

【0004】

【従来の技術】近年、移動中において音楽やその他の情報を聞くといったことが頻繁に行われている。例えば小型ラジオ装置や、カセットテープ、ミニディスク又はコンパクトディスク等の記録媒体を装備したヘッドホンステレオ装置等を携帯し、これらの装置を使用して通勤電車の中でラジオ放送や音楽等を聞くといったことが広く行われている。また自動車で移動している最中においても、カーラジオ装置を使用してラジオ放送を聞いたり、或いはカーオーディオ装置を使用してカセットテープ、ミニディスク又はコンパクトディスク等の記録媒体に記録されている音楽を再生して聞くといったことが行われている。

【0005】

【発明が解決しようとする課題】ところでかかる従来の移動しながらの情報入手方法においては、ユーザにとって使い勝手が未だ不十分のところがある。例えばラジオ放送の場合には、一般公衆向けの放送であるが故に、個人の情報や音楽の嗜好を反映させることができず、聞きたくも無い話や曲を聞かなければならないといった不都合がある。また記録媒体から音楽を再生する方法では、音楽等、聴取内容については個人の嗜好を反映させることができるが、記録媒体を購入したり或いは編集したりする必要があり、時間や経費或いは労力や保管場所等が

必要になるといった不都合があると共に、せっかく記録媒体を作成又は購入してもすぐに時代に取り残されてしまい、同じものを何度も聞いて聞き飽きてしまうといった不都合がある。

【0006】このような問題を解決する方法として、本出願人は特開平8-207433号においてPHS(パーソナル・ハンディホン・システム)いわゆる簡易型携帯電話システム等の無線電話を用いて情報・音楽サービスを提供する方法を提案しており、この方法によれば上述した欠点を全て解消することができ、個人の嗜好を反映した情報提供サービスを記録媒体が無くても実現することができる。

【0007】しかしながらPHS等の無線電話回線は、通常のコンパクトディスクやミニディスク等の記録媒体を使用した音楽再生方法に比較して再生周波数帯域が狭い上、さらに常に通信状態が良いとは限らないといった問題がある。このため無線電話回線を使用した音楽提供方法は、記録媒体からの再生による方法に比べて音質的に劣ると共に、フージング等の種々の擾乱により高速度伝送レートを安定して得ることができない問題がある。上述した特開平8-207433号においては、この点について、回線状態に応じて周波数特性を切り換えたり或いは信号出力方式をステレオからモノラルに切り換えたりすることにより対処しているが、回線状態に応じて音質やサービス内容が変わることに他ならず、ユーザから見れば利便性の点において未だ不十分ところがある。

【0008】本発明は以上の点を考慮してなされたもので、一般に利便性が向上した無線情報通信方法及びその装置を提案しようとするものである。

【0009】

【課題を解決するための手段】かかる課題を解決するための本発明においては、所望の音響信号を要求するサービス要求信号を送信し、サービス要求信号に対応して送信される音響信号が含まれる送信信号を受信し、受信した送信信号に復調及び又は復号処理を施して音響信号を復元し、復元した音響信号を音波に変換して出力するようにした。

【0010】このようにしてサービス要求信号を送信し、それに対応して送信された音響信号を受信して出力するようにしたことにより、音響信号が記録された記録媒体を持たなくても、ユーザが希望する音響信号を容易に得ることができる。また送信側で音響信号に所定の変調及び又は符号化処理を施してあり、これを受信側で復調及び又は復号処理するようにしたことにより、回線状態が変化しても、高音質の音響信号を安定に得ることができる。

【0011】また本発明においては、所望の音響信号を要求するサービス要求信号を送信し、サービス要求信号に対応して送信される音響信号が含まれる送信信号を受信し、受信した送信信号に復調及び又は復号処理を施し、

で音響信号を復元し、復元した音響信号を再変調して再送信するようにした。

【0012】このようにして受信した音響信号に再変調を施して再送信するようにしたことにより、音響信号を出力するための素子と音響信号を受信するための装置とをケーブルで接続しなくても良くなり、使い勝手を向上し得る。

【0013】また本発明においては、所望の音響信号を要求するサービス要求信号を送信し、サービス要求信号に対応して送信される音響信号が含まれる送信信号を受信し、受信した受信信号に復調及び又は復号処理を施して音響信号を復元し、復元された音響信号を所定の電気音響変換素子を用いて音波に変換して出力し、通話時には声帯の振動を電気音響変換素子によって検出して音声信号を生成して送信すると共に、通信相手からの音声信号を受信して電気音響変換素子から出力するようにした。

【0014】このように受信した音響信号を出力するための電気音響変換素子を、通話時には音声を集音するマイクロホンとして使用することにより、1つの素子を兼用し得、使い勝手を向上し得る。

【0015】また本発明においては、入力信号を情報源符号化すると共に、入力信号の特徴情報を抽出し、情報源符号化による出力データを特徴情報を利用してベクトル量子化し、ベクトル量子化による出力信号を変調して端末装置に送信し、端末装置からの送信信号を受信し、受信した受信信号に復調及び又は復号処理を施して端末装置から送信されたデータを復元し、当該データの内容に基づいて入力信号の内容を変更するようにした。

【0016】このように端末装置から送信されたデータの内容に基づいて、入力信号の内容を変更するようにしたことにより、端末装置が所望する入力信号を容易に送信することができる。

【0017】また本発明においては、端末装置からの要求信号を受信し、要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であつたときには所定の曲群の中から任意の楽曲を選択して送信するようにした。

【0018】このように要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であつたときには所定の曲群の中から任意の楽曲を選択して送信するようにしたことにより、要求信号の種類に応じて所望の楽曲を提供することができる。

【0019】また本発明においては、端末装置からの要求信号を受信し、要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であつたときには端末装置側で定めた楽曲を送信するようにした。

【0020】このように要求信号が第1の種類の信号であつたときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であつたときには端末装置側で定めた楽曲を送信するようにしたことにより、要求信号の種類に応じて所望の楽曲を提供することができる。

【0021】また本発明においては、要求信号に対応した音楽信号を受信し、受信した受信信号から音楽信号と共に送信された付加情報を抽出し、付加情報のうち第1の種類の付加情報と第2の種類の付加情報とを選択的に表示するようにした。

【0022】このように要求信号に対応した音楽信号を受信し、受信した受信信号から音楽信号と共に送信された付加情報を抽出し、付加情報のうち第1の種類の付加情報と第3の種類の付加情報とを選択的に表示するようにしたことにより、音楽信号と共に送信された付加情報を選択的に確認することができ、使い勝手を向上し得る。

【0023】また本発明においては、操作入力に応じて仮想カーソルが2次元の仮想情報テーブル上を移動することにより当該仮想カーソルが位置するところの情報を表示し、確定指示が入力されると、仮想カーソルが位置するところの情報を選択するようにした。

【0024】このように操作入力に応じて仮想カーソルが2次元の仮想情報テーブル上を移動することにより当該仮想カーソルが位置するところの情報を表示し、確定指示が入力されると、仮想カーソルが位置するところの情報を選択するようにしたことにより、容易に所望の情報を選択することができる。

【0025】また本発明においては、操作入力に応じて仮想カーソルが2次元の文字表上を移動することにより当該仮想カーソルが位置するところの文字を表示し、確定指示が入力されると、仮想カーソルが位置するところの文字を選択して入力するようにした。

【0026】このように操作入力に応じて仮想カーソルが2次元の文字表上を移動することにより当該仮想カーソルが位置するところの文字を表示し、確定指示が入力されると、仮想カーソルが位置するところの文字を選択して入力するようにしたことにより、容易に所望の文字を入力することができる。

【0027】また本発明においては、楽曲データ指定用データ構造において、楽曲名と、楽曲に付与された楽曲コードとを対とした単位データを少なくとも1つ以上有し、その単位データを所望の順番で並べて、当該順番によって楽曲の時系列的順番を規定するようにした。

【0028】このように楽曲名と、楽曲に付与された楽曲コードとを対とした単位データを所望の順番で並び、その順番によって楽曲の時系列的順番を規定するようにしたことにより、楽曲名と楽曲コードとを容易に把握し得ると共に、楽曲順序までも容易に把握し得る。

【0029】また本発明においては、通信回線を利用した楽曲指定方法において、楽曲指定のための租情報も所定の通信回線を介して送信し、租情報に該当する楽曲リストを通信回線を介して受信し、楽曲リストの中から所望の楽曲を指定し、当該指定された楽曲を示す情報を通信回線を介して送信するようにした。

【0030】このように楽曲指定のための租情報を所定の通信回線を介して送信し、租情報に該当する楽曲リストを通信回線を介して受信し、楽曲リストの中から所望の楽曲を指定し、当該指定された楽曲を示す情報を通信回線を介して送信するようにしたことにより、通信相手側にある楽曲を通信回線を介して容易に指定することができる。

【0031】

【発明の実施の形態】以下図面について、本発明の実施の形態を詳述する。

【0032】(1) 第1の実施の形態

(1-1) 音楽提供サービスシステムの構成

図1において、1は全体として本発明を適用した音楽提供サービスシステムを示し、大きく分けてサービスセンタ2、PHS基地局3及び音響受信装置4によって構成される。サービスセンタ2は提供する音楽信号の発信元であり、音響受信装置4を有したユーザが希望する楽曲の音楽信号をPHS基地局3に送信する。PHS基地局3はPHS(パーソナル・ハンディホン・システム)いわゆる簡易型携帯電話システム)の基地局装置であり、サービスセンタ2から供給される音楽信号をPHSの無線回線を介して送信する。

【0033】音響受信装置4はPHSの電話端末装置に音楽提供サービスを受けるための構成を付加した装置であり、PHS基地局3から送信される音楽信号を受信してこれを電気音響変換手段を介して出力する。これにより音響受信装置4を有するユーザは、サービスセンタ2が提供する音楽信号を受信して聴取することができ、ミニディスクやコンパクトディスク等といった記録媒体を持たずに所望の音楽を聞くことができる。

【0034】図1に、音楽提供サービスを受ける際には、始めに音響受信装置4から楽曲の種類等を示すサービス要求信号をPHSの無線回線を介してPHS基地局3に送信する。これを受けたPHS基地局3はそのサービス要求信号をサービスセンタ2に転送する。これによりサービスセンタ2では、そのサービス要求信号を基にユーザが希望する楽曲を把握し得、その楽曲の音楽信号を再生して発信することができる。

【0035】(1-2) 音響受信装置の全体構成

図2において、4は全体として本発明による音響受信装置を示し、大きく分けて送受信部5、音響入出力部6、表示部7、記憶部8、操作部9及び制御部10によって構成される。

【0036】送受信部5はPHSの規格に準拠した無線

送受信部であり、通話のための音声信号をPHSの無線回線を介してPHS基地局3と送受信したり、或いは音楽提供サービスとしてPHSの無線回線を介してPHS基地局3から送信される音楽信号を受信したりする回路ブロックである。

【0037】音響入出力部6は送受信部5に対する音声信号及び音楽信号の入出力インターフェイスであり、マイクロホンによって通話のための音声信号を録音したり、スピーカによって通話相手からの音声信号を出力したりすると共に、音楽提供サービスとして受信した音楽信号をステレオ対応のスピーカやイヤホン等を介して出力するようになされている。

【0038】表示部7は例えば液晶ディスプレイからなり、音響受信装置4を電話端末として使用しているときには通話相手や自局の電話番号、相手先名、或いは電波受信状態や電池状態等といった各種データを表示すると共に、音楽提供サービスを受けているときには楽曲の題名や歌詞等といったデータ(このデータは音楽信号と共にサービスセンタ2から送信される)を表示するようになされている。

【0039】また記憶部8は例えばメモリからなり、短縮ダイヤルとして登録された電話番号や電話帳リストとして登録された相手先名及び電話番号、或いは自局の電話番号等といった電話端末として必要な各種データと、音楽提供サービスを受けるのに当たって必要な楽曲コードや曲順等の各種データを記憶するようになされている。また操作部9は例えばテンキーやその他の操作子によって構成され、当該テンキーやその他の操作子を介してこの音響受信装置4に対するユーザからの動作指令(具体的には、電話をかけた受けたりするときの動作指令や音楽提供サービスを受けるときの動作指令)を入力し得るようになされている。

【0040】制御部10はこの音響受信装置4の全体動作を制御するための制御ブロックであり、データバス11を介して各部に制御データを供給して各部の動作を制御するようになされている。また制御部10はデータバス11を介して記憶部8に各種データを記憶又は当該記憶部8から各種データを読み出ししたり、或いはデータバス11を介して操作部9から入力された動作指令を示す制御データを受け、それに基づいた動作制御を行うようになされている。

【0041】ここでこのような構成を有する音響受信装置4の実例の使用形態例を図3に示す。この図3に示す例では、音響受信装置4を電池によって駆動するようにしたことにより、音響受信装置4を携帯して使用することができるようになっている。この場合、ユーザ12は音響受信装置4を携帯用ケース等を使用してベルト等に固定した上で、上述した音楽信号送受信の電気音響変換手段としてステレオ対応のイヤホン13を使用することにより受信した音楽信号を聴取する。これによりユーザ

12は、屋外を移動しながらでも、耳は手ぶら感覚で所望の音楽を聞くことができる。

【0042】なお、この例では、上述した操作部9を音響受信装置4の本体だけに設けるのではなく、当該操作部9をリモート操作子14としてイヤホン13のケーブル上（すなわち電気音響変換手段と音響受信装置4を接続するケーブル上）にも配置しており、これによりユーザ12は音楽提供サービスを受ける際の操作を平元で行うことができ、わざわざ音響受信装置4の本体に配された操作部9を操作しなくても音楽提供サービスを受けることができるようになされている。因みに、リモート操作子14には、操作部9だけでなく、本体に設けられた表示部7と同様の表示部7が一体形成されており、これにより後述するような受信する音響信号に関連する情報を本体の表示部7を見なくても、リモート操作子14を操作しながら見ることができるようになっている。

#### 【0043】(1-3) 送受信部の構成

続いてこの項では上述した送受信部5について具体的に説明する。図4に示すように、送受信部5は無線送信部5A及び無線受信部5Bを有しており、この無線送信部5A及び無線受信部5BによつてPHSの無線回線を介してデータの送受信を行うようになされている。

【0044】この送受信部5においては、例えば通話時、音響入出力部6のマイクロホン20によつて入力された音声信号S1を音声信号処理回路21を介して受けるようになされている。この場合、マイクロホン20は音響電気変換素子からなり、集音したユーザ12の音声を音響電気変換処理により電気的な音声信号S1に変換する。また音声信号処理回路21は入力される音声信号S1に対してADPCM(Adaptive Differential Pulse Code Modulation:適応差分型パルスコード変調)の符号化方式に基づいた所定の符号化処理を行い、その結果得られる符号化音声データS2を送受信部5に出力する。

【0045】送受信部5ではこの符号化音声データS2を時分割多重回路22に入力する。PHSの無線回線はTDMA/TDD方式(Time Division Multiple Access/Time Division Duplex:時分割多元検波/時分割二重通信方式)を採用しており、予め自局に割り当てられたタイムスロットのタイミングで送信と受信を交互に行うようになされている。このためこの送受信部5では、時分割多重回路22が設けられており、この時分割多重回路22によつて自局に割り当てられた送信スロットに送信データを格納すると共に、自局に割り当てられた受信スロットから受信データを取り出すようになされている。

【0046】時分割多重回路22は音声信号処理回路21から供給される符号化音声データS2を自局に割り当てられた送信スロットに格納することにより送信バーストデータS3を生成し、これを変調回路23に出力す

る。変調回路23は入力される送信バーストデータS3に例えばQPSK変調(Quadrature Phase Shift Keying:4相位相変調)による変調処理を施してベースバンド帯域の送信信号S4を生成し、これをミキサ回路24に出力する。因みに、送信バーストデータS3がバースト的な信号であることからこの送信信号S4も同じくバースト的な信号である。

【0047】ミキサ回路24は周波数シンセサイザ25から供給されるローカル信号S5を送信信号S4に乗算することにより当該送信信号S4を1.9[GHz]帯の送信信号S6に周波数変換し、その送信信号S6をRFフィルタ26に出力する。因みに、周波数シンセサイザ25は温度補償型水晶発振器(TCXO)27から出力される発振出力S7に基づいて所望周波数のローカル信号S5を生成するようになされている。これによりミキサ回路24では、その所望周波数のローカル信号S5を使用して所望周波数の送信信号S6を生成することができる。

【0048】ミキサ回路24から出力される送信信号S6は、RFフィルタ26によつて当該送信信号S6に含まれる不要成分が除去された後、RF増幅器28によつて所定電力に増幅され、アンテナ共用器29を介してアンテナ30に供給される。これによりアンテナ30から音声信号S1に宛じた送信信号S6が送信される。

【0049】一方、アンテナ30によつて受信された1.9[GHz]帯の受信信号S8はアンテナ共用器29によつて送信信号S6から分離された後、RF増幅器31によつて増幅され、RFフィルタ32に入力される。因みに、ここまでの説明から分かるように、アンテナ共用器30は送信信号S6と受信信号S8とを分離する回路であり、このアンテナ共用器30を設けることにより1つのアンテナ30を送信と受信で共用して使用し得るようになされている。

【0050】RFフィルタ32は受信信号S8に含まれる不要成分を除去して該段のミキサ回路33に出力する。ミキサ回路33は周波数シンセサイザ25から供給されるローカル信号S9を受信信号S8に乗算することにより当該受信信号S8を例えば243.975248.45[MHz]の第1中間周波信号S10に周波数変換し、その第1中間周波信号S10を第1IFフィルタ34に出力する。因みに、この場合、RFフィルタ32によつて受信信号S8に含まれる不要成分を除去していることによりミキサ回路33で周波数変換処理を行ったときに混交変調歪みの発生を未然に防止し得る。

【0051】第1IFフィルタ34は第1中間周波信号S10に含まれる不要成分を除去して増幅器35に出力する。増幅器35は第1中間周波信号S10を所定電力に増幅した後、これをミキサ回路36に出力する。ミキサ回路36はローカル発振器37から供給される所望周波数のローカル信号S11を第1中間周波信号S10に

乗算することにより当該第1中間周波信号S10を例えば16.7[MHz]の第2中間周波信号S12に周波数変換し、これを第2IFフィルタ38に出力する。

【0052】このようにして生成された第2中間周波信号S12は第2IFフィルタ38によつて不要成分が除去された後、増幅器39によつて所定電力に増幅され、復調回路40に供給される。復調回路40は第2中間周波信号S12に対して送信側に対応する復調処理（例えばQPSK復調処理）を施すことにより当該第2中間周波信号S12から受信バーストデータS13を復元し、これを時分割多重回路22に出力する。

【0053】時分割多重回路22は受信スロットに対応してバースト状に形成された受信バーストデータS13から符号化音声データS14を取り出し、これを音声信号処理回路21に出力する。音声信号処理回路21は入力される符号化音声データS14に対してADPCMの符号化方式に対応した復号化処理を施すことにより当該符号化音声データS14から音声信号S15を復元し、これをスピーカ41に出力する。

【0054】スピーカ41は電気音響変換素子からなり、入力される音声信号S15に電気音響変換処理を施すことにより当該音声信号S15を音波に変換して出力する。これにより通話相手の音声をスピーカ41を介して聞くことができる。

【0055】これに対して音声以外のデータ（例えば制御データ等）を送信する場合には、音響入出力部6のデータ入力端子42に入力されるデータをデータ処理回路43に入力してここで所定の符号化処理を施し、その結果得られる符号化データS17を送受信部5の時分割多重回路22に入力する。時分割多重回路22は、上述した符号化音声データS2と同様に、符号化データS17を自局に割り当てられた送信スロットに格納することにより送信バーストデータS3を生成し、これを変調回路23に出力する。これにより音声データ以外のデータも同様にして送信することができる。

【0056】また音声以外のデータ（例えば音楽提供サービスによる音楽データ等）を受信した場合には、時分割多重回路22は、上述の場合と同様に、受信バーストデータS13から符号化データS18を取り出し、その符号化データS18をデータ処理回路43に出力する。データ処理回路43はこの符号化データS18に送信側に対応した所定の復号化処理を施すことにより受信データを復元し、これをデータ出力端子44を介して出力する。これにより音声以外のデータも受信して出力することができる。

#### 【0057】(1-4) 音響入出力部の構成

続いてこの項では音響入出力部6の具体的な構成を説明する。図5に示すように、音響入出力部6においては、制御部10から出力されるサービス要求信号S20をデータ入力端子42を介してデータ処理回路43に入力し得

るようになされている。このサービス要求信号S20は上述したように符号化処理された後、送受信部5を介してPHS基地局3に送信される。これにより音楽提供サービスを受けたいことをPHS基地局3を介して音楽発信元であるサービスセンタ2に送ることができる。

【0058】このサービス要求信号S20に応じてサービスセンタ2が送出した音楽信号（この音楽信号は当該音楽信号に付随する付加情報も含む）は、上述した送受信部5を介して受信され、符号化データS18としてデータ処理回路43に入力される。データ処理回路43はこの符号化データS18に所定の復号化処理を施すことにより音楽データ等によつて構成される受信パケットデータS21を復元し、これをデータ出力端子44を介して受信パケット処理部45に出力する。

【0059】受信パケット処理部45は受信パケットデータS21から楽曲の題名や歌詞等の付加情報を分離し、これを画像データS22として上述したデータバス11を介して表示部7に送出する。これによりこの音響受信装置4では、音楽信号に付随する付加情報を表示部7に表示することができる。また受信パケット処理部45は、受信パケットデータS21から音楽データS23を分離してこれを音響出力部46に出力する。

【0060】音響出力部46は音声データS23からステレオ方式の右側音楽信号S24R及び左側音楽信号S24Lを取り出し、これをそれぞれ出力端子48に接続されたイヤホン13の右側電気音響変換素子47R及び左側電気音響変換素子47Lに出力する。これによりユーザ12は、イヤホン13を介してステレオ音響の音楽を聴取することができる。困みに、出力端子48に接続されるイヤホン13としては、いわゆるハイファイ仕様のものであつて周波数特性の良いものが使用されており、これにより音質の良い音楽を聴取し得、音楽の鑑賞価値を高めることになされている。

#### 【0061】(1-5) PHS基地局の構成

ここで音楽信号を送信するPHS基地局3の構成を説明する。但し、ここでは音楽信号を送信するための回路ブロックについてのみ説明する。PHS基地局3は、図6に示すように、送信データ処理部50、送受信部51、アンテナ52及び受信データ処理部53を有している。困みに、送信データ処理部50及び受信データ処理部53は必ずしもPHS基地局3に搭載される必要はなく、場合によつては音楽信号の発信元であるサービスセンタ2に搭載されることもある。なお、サービスセンタ2に搭載される場合には、送信データ処理部50及び受信データ処理部53は有線回線を介してPHS基地局3に接続される。

【0062】サービスセンタ2から出力される音楽信号は所定のアナログデジタル変換回路（図示せず）を介してデジタル化された後、音楽データS30としてデータ入力端子54を介して送信データ処理部50に入力



される。因みに、この音楽データS30は音楽そのものだけでなく、その音楽に付随する付加情報（例えば楽曲の題名や歌詞等）も含んでいる。送信データ処理部50においては、この音楽データS30を離散コサイン変換回路（DCT）55及び特徴情報抽出回路56に入力するようになされている。

【0063】離散コサイン変換回路55は情報源符号化のための回路であり、入力される音声データS30に離散コサイン変換を施し、その結果得られる変換音声データS31をインターリーブ回路57及び特徴情報抽出回路56に出力する。因みに、離散コサイン変換とは、入力データを予め用意された周波数成分の異なる複数の基底ベクトルと係数（一般にはDCT係数と呼ばれる）との乗算によって表し、その係数を変換データとして出力する処理であり、これにより入力データのデータ量を減らすような処理である。

【0064】特徴情報抽出回路56は、音声データS30及び変換音声データS31の両方、或いは音声データS30又は変換音声データS31のいずれか一方から信号が有する特徴を抽出し、その特徴情報S32を重み関数生成回路58に出力する。因みに、ここで言う特徴とは、周波数成分や信号波形パケーン等、その信号が独自に持つ特徴である。

【0065】重み関数生成回路58は入力される特徴情報S32を基に重み関数S33を生成し、これを後述するベクトル量子化回路59に出力する。因みに、重み関数S33は送信対象のデータそのものではなく、そのデータの特徴を表すデータであるので副情報と呼ばれる。

【0066】一方、インターリーブ回路57は入力される変換音声データS31のデータ順序を所定の順序で並び換え、その結果得られる変換音声データS34をベクトル量子化回路59に出力する。因みに、このようにデータ順序を並び換えることにより、伝送路の劣化によってバーストエラーが発生したとき、これを分散してエラー訂正し得、伝送路が劣化した場合でも良好にデータ伝送を行うことができる。またインターリーブ回路57から出力される変換音声データS34は、送信対象のデータそのものであるため、副情報としての重み関数S33に対して主情報と呼ばれる。

【0067】ベクトル量子化回路59は、内部に予め用意されたコードブックを使って、入力される重み関数S33及び変換音声データS34にベクトル量子化を施し、その結果得られる量子化データS35を符号化回路60に出力する。因みに、ベクトル量子化とは、コードブックとして用意された代表ベクトルの中から入力データを表す最適な代表ベクトルを検出し、その代表ベクトルを表すコードを量子化するものであり、入力データのデータ量を大幅に低減し得るものである。

【0068】符号化回路60は入力される量子化データS35に対して誤り訂正のための符号化処理を施し、そ

の結果得られる送信データS36を送受信部51に出力する。なお、ベクトル量子化回路59においては、変換音声データS34を量子化する際に重み関数S33が示す特徴情報を利用して量子化処理を行うので、変換音声データS34を良好に量子化する上では重み関数S33が重要な役割を果たすことになる。このため重み関数S33は忠実に入力データの特徴を表していなければならず、また重み関数S33は確実に伝送されなければならぬ。そのため符号化回路60では、重み関数S33（副情報）のデータ部分に対しては変換音声データS34（主情報）のデータ部分よりも強力な誤り訂正処理を施すようになされている。

【0069】送受信部51は上述した音響受信装置4の送受信部5とほぼ同様の構成を有しており、入力される送信データS36に例えばQPSK変調による所定の変調処理を施した後、周波数変換処理を施して送信信号S37を生成し、これをアンテナ52を介して送信する。これによりサービスセンタ2から出力された音楽信号がPHSの無線回線を介して送信されることになる。

【0070】一方、音響受信装置4から送信されたサービス要求信号S20が重畳された送信信号S6はアンテナ52によって受信され、受信信号S38として送受信部51に入力される。送受信部51はこの受信信号S38に周波数変換を施して中間周波信号を取り出した後、その中間周波信号に復調処理を施して受信データS39を復元し、これを受信データ処理部53に出力する。

【0071】受信データ処理部53は、受信データS39に所定の復号化処理を施すことにより上述したサービス要求信号S20を復元し、これを制御信号S40としてサービスセンタ2に送出する。これにより音響受信装置4が音楽提供サービスを要求していることをサービスセンタ2に通知することができる。なお、受信データ処理部53で行う復号化処理としては、音響受信装置4のデータ処理回路43で行った符号化処理に対応した復号化処理である。

【0072】(1-6)音響受信装置のデータ処理回路の構成

続いてこの項では上述した音響受信装置4のデータ処理回路43について説明する。上述したデータ処理回路43は、図7に示すようなデータ復号ブロック62を有しており、このデータ復号ブロック62によってPHS基地局3から送られる音楽データを復号化処理するようになされている。

【0073】このデータ復号ブロック62においては、送受信部5の時分多量回路22から出力される符号化データS18をまず復号化回路63に入力する。この復号化回路63は入力される符号化データS18に誤り訂正処理を施して当該データに含まれる誤りを訂正した後、主情報のデータS50と副情報のデータS51とをそれぞれ分離抽出し、抽出した主情報のデータS50、

副情報のデータS51をそれぞれデインターリーブ回路64、特徴情報復元回路65に出力する。

【0074】デインターリーブ回路64は送信側のインターリーブ回路57で行ったデータ順序の並び換えを元に戻し、その結果得られる主情報のデータS52を情報復元回路66に出力する。一方、特徴情報復元回路65は入力される副情報のデータS51から特徴情報S53を復元してこれを情報復元回路66に出力する。

【0075】情報復元回路66は入力される特徴情報S53を利用して主情報のデータS52の復元処理を行うことにより当該主情報のデータS52から送信側の変換データS31（すなわちDC T変換されたデータ）に対応する復元データS54を復元し、これを雑音コサイン逆変換回路（IDCT）67に出力する。雑音コサイン逆変換回路67は情報源復号化のための回路であり、入力される復元データS54に対して雑音コサイン逆変換処理を施すことにより送信側の音楽データS30に対応する音楽データS21を復元し、これを上述したように受信バケット処理部45に出力する。

【0076】このようにしてこの音楽提供サービスシステム1においては、送信側で音楽データS30に雑音コサイン変換処理やベクトル量子化処理を施し、受信側ではその逆処理を行って送信された音楽データS21を復元するようにしたことにより、回線状態が変化した場合でも、送信された音楽データS21を良好かつ確実に復元し得る。また送信時、音楽データS30に対して雑音コサイン変換処理やベクトル量子化処理を施すようにしたことにより、送信するデータ量を減らして効率良くデータ伝送することができる。

【0077】（1-7）音楽提供サービスを受ける際の操作及び表示

続いてこの項では音楽受信装置4を使用して音楽提供サービスを受ける際の操作及びそのときの表示部7の表示例について説明する。まず音楽受信装置4の操作部9を使用して所定の操作を行うと、図8に示すように、音楽提供サービスのメニュー画面が表示部7に表示される。なお、このメニュー画面のデータは予め記憶部8に記憶されており、そのデータを読出して表示部7に供給することにより図8に示すようなメニュー画面が表示される。

【0078】このメニュー画面においては、全部で10個のモードが用意されており、それらのモードを示す項目名と項目番号がそれぞれ表示される。1番目から3番目のモード、すなわち「最新ベストテン（J-POP）」、「最新ベストテン（ロック）」、「最新ベストテン（演歌）」は各ジャンルのうち最新のヒット曲として定められた10曲を下位又は上位から順に聞くことができるモードである。

【0079】また4番目から6番目のモード、すなわち「ランダムピックアップ（90年代）」、「ランダムピッ

クアップ（80年代）」、「ランダムピックアップ（60～70年代）」は各年代の曲の中からランダムに選ばれた曲を聞くことができるモードである。また7番目から9番目のモード、すなわち「ジャズランダム」、「クラシックランダム」、「レゲエランダム」は各ジャンルの曲の中からランダムに選ばれた曲を聞くことができるモードである。

【0080】因みに、4～6番目及び7～9番目のモードにおいては、ユーザ側が曲を選定するのではなく、サービスセンタ2が曲を選定するようになされている。具体的には、サービスセンタ2は各分秒毎に分類された楽曲群の中から乱数等を用いて任意の曲を選定し、その曲を提供する。その際、サービスセンタ2は過去所定時間（例えばその当日の朝から現在まで或いは前日の朝から現在まで）の間にユーザが聞いた曲を記憶しておき、その曲を除いた楽曲群の中から任意の曲を選ぶようになされている。これにより一度聞いた楽曲と同じ曲がすぐさま選択されることを防止し得ると共に、所定時間経過すればその楽曲を再び選択することができる。このようにした理由は、同じ曲を立て続けに聞きたくないというユーザ心理に合わせたサービスを提供するためである。

【0081】最後に、10番目のモードすなわち「プログラムモード」はユーザが選定した楽曲をサービスセンタ2に通知してその楽曲を聞くことができるモードである。このモードの場合には、1曲だけを指定して聞くこともできるし、また複数曲を順番に指定して聞くこともできる。

【0082】このようなメニュー画面の中から所望のモードを指定して音楽提供サービスを開始するときには、ユーザは希望するモードの項目番号を操作部9のテンキーを使用して入力する。この操作により、その希望したモードに対応したサービス要求信号S20がサービスセンタ2に向けて送信される。これによりサービスセンタ2ではユーザが希望するモードを把握し得る。ユーザが希望するモードの音楽提供サービスを開始し得る。なお、「プログラムモード」の場合には、楽曲の選定が必要になるので項目番号を入力しただけではサービス要求信号S20は送信されず、後述する曲選定処理が終了した後に当該サービス要求信号S20が9送信される。

【0083】また上述したように音楽提供サービスのモードとしては、大きく分けて予めサービスセンタ側で決められる楽曲を順に送出するモード（第1から第3番目のモード）と、サービスセンタ側で予め用意されている楽曲群の中からランダムに選んで送出するモード（第4から第9のモード）と、ユーザ側から指定された楽曲をサービスセンタ側が送出するモード（第10番目のモード）とに分けられることから、サービス要求信号S20としても大きく分けて3種類に分けられる。

【0084】ここで実際に音楽提供サービスが開始されると、音楽受信装置4の表示部7には図9に示すような

表示画面が表示される。すなわち図9に示すように、通常モードとして曲名表示画面が表示される。この場合、表示部7の上段に表示されている「ハイウエイCD×M」は現在聴取している楽曲の題名を示しており、その下段に表示されている「ダイブム×□」はその楽曲の歌手名又は演奏者名を示している。なお、楽曲がクラシック音楽の場合には、演奏者名と共に作曲者名が表示される。これは、クラシック音楽の場合には、演奏者が知りたいというよりもその作曲者が知りたいという要望が強いためである。

【0085】また楽曲名の前後に表示される音符記号「♪」は、現在表示されている画面が曲名表示画面であることを示すマークである。このような音符記号を表示するようにしたことにより、ユーザは現在表示されている画面が曲名表示画面であることを容易に知り得る。

【0086】表示部7の中央にある「next」の下段に表示されている「17××」は次に演奏される予定の楽曲の題名を示し、その隣の「轟高○○」は次の楽曲の歌手名又は演奏者名を示している。困みに、この次曲名表示は設定により表示を解除し得るようになされている。これは、特にランダムモード（上述した第1から第9番目のモード）の場合には、次に何が演奏されるか分からないことが楽しみのもつでもあるので、このようなユーザ心理を反映させた運用形態を実現するためである。

【0087】また表示部7の最下段にはサブメニューが表示される。このサブメニュー内において表示される「0→メニュー」は、テンキーから「0」を入力すると図8に示したようなモード設定のためのメニュー画面が表示が切り換わることを示している。また「1→次曲」は、テンキーから「1」を入力すると現在演奏している楽曲を停止して次の楽曲の演奏を開始することを示している。また「2→歌詞」は、テンキーから「2」を入力すると曲名表示画面から次に説明するような歌詞表示画面に切り換わることを示している。

【0088】困みに、この曲名表示画面において表示される楽曲の題名や歌手名、或いは次の楽曲の題名や歌手名のデータは、サービスセンタ2から音楽データと共に送信された付加情報から抽出したものである。またサブメニューに示すように「1」を入力した場合には、次曲演奏の開始を要求するサービス要求信号S20が送信される。これによりサービスセンタ2では現在流している音楽データの送出手を停止して次曲の音楽データの送出手を開始する。なお、サブメニューには表示されていないが、音楽提供サービスを受けている最中に通話終了キーを押すと、PHSの無線回線が切られるので、音楽提供サービスが自動的に停止する。

【0089】ここでサブメニューに示されるように、テンキーから「2」を入力すると、表示部7には、図10に示すような歌詞表示画面が表示される。この場合、画面の上段に表示される本マーク記号は現在表示されてい

る画面が歌詞表示画面であることを示している。このような本マーク記号を表示するようにしたことにより、ユーザは現在表示されている画面が歌詞表示画面であることを容易に知り得る。

【0090】またこの本マーク記号の横又は下段には、現在演奏されている楽曲の歌詞が表示される。この歌詞表示は、曲進行に合わせて表示形態（例えば色、ハッチング又は点滅等）が変わるようになされており、これにより現在どの部分まで曲が進んでいるかを容易に知り得るようになされている。

【0091】さらにこの歌詞表示の下段には、曲名表示画面と同様に、サブメニューが表示される。サブメニューにおける「0→曲名表示」はテンキーから「0」を入力すると図9に示した曲名表示画面に戻ることを示しており、「1→次曲」はテンキーから「1」を入力すると現在演奏中の曲を停止して次の曲を開始することを示している。

【0092】一方、図8に示したメニュー画面において「プログラムモード」を示す項目番号「0」を入力すると、図11(A)に示すようなプログラムモードの画面が表示部7に表示される。この画面の右側に表示されている矢印記号及び数字は、テンキーから「5」を入力すると、仮想文字テーブル上において仮想カーソルが上方方向に移動することを示しており、同様に「0」を入力すると仮想カーソルが下方に、「7」を入力すると仮想カーソルが左方向に、「9」を入力すると仮想カーソルが右方向に移動することを示している。

【0093】具体的には、図11(B)に示すように、仮想文字テーブルTBは50音の仮名文字をあいいうえお順に2次元的に並べた、いわゆる50音表によって構成されており、「5」を入力すると「お」段から「あ」段の方向に向かつて仮想カーソルKが移動し、「0」を入力すると逆に「あ」段から「お」段の方向に向かつて仮想カーソルKが移動し、「7」を入力すると「あ」行から「ん」行の方向に向かつて仮想カーソルKが移動し、「9」を入力すると逆に「ん」行から「あ」行の方向に向かつて仮想カーソルKが移動するようになされている。

【0094】その際、仮想カーソルKが位置するところの仮名文字が表示画面の下段に表示されるようになってくる。例えば仮想カーソルKが仮名文字「か」のところに位置していれば、当該仮名文字「か」が選択され、図11(A)に示すように、表示画面の下段に仮名文字「か」が表示される。このようにして「5」、「0」、「7」又は「9」のテンキーを操作すれば、音響受信装置4に所望の仮名文字を表示させることができるようになされている。

【0095】またこのプログラムモードの表示画面においては、画面下方に「press ーせ」が表示されている。この表示は、テンキーから「\*」を入力すれば確定指示

が入力され、現在表示されている仮名文字を確定して入力することができることを意味している。

【0096】このようなプログラムモードの表示画面において、ユーザが希望する楽曲を指定する場合には、まずこのようなテンキーを操作して希望する楽曲の題名頭文字を入力する。例えば図11に示すように、「か」で始まる楽曲を希望するのであれば、仮名文字「か」を入力する。頭文字が入力できたら続いて「#」を入力すると、その仮名文字が確定され、題名の頭文字が「か」で始まる曲名リストを要求するサービス要求信号S20が音響受信装置4から送信される。これによりサービスセンタ2はこのサービス要求信号S20に応じて題名の頭文字が「か」である曲名リストを音響受信装置4に向けて送信する。

【0097】この曲名リストを受信すると、表示部7には、図12に示すような曲名リストが表示される。この図12に示すように、曲名リストを受信すると、その曲名リストとして受信した各楽曲名が上から順に表示される。この場合、画面の右側には先程と変わって矢印記号と「上」及び「下」の数字だけが表示されている。これは、題名の前に表示されるカーソル「\*」を「上」又は「下」のテンキーを使用して上下方向に移動し得ることを意味している。なお、「下」キーを使用してカーソル「\*」を画面の一番下に移動したとき、曲名リストがまだ下に続く場合には、曲名リストが速に上にシフトしてスクロール表示し、またこれとは逆に「上」キーを使用してカーソル「\*」を画面の一番上に移動したとき、曲名リストがまだ上に続く場合には、曲名リストが速に下にシフトしてスクロール表示するようになされており、これにより表示画面に対してリスト数が多く場合でも全てのリストを表示することができるようになされている。困みに、この状態では、受信した曲名リストを表示しているだけなので、カーソル「\*」は点滅状態にあり、曲指定が未だなされていないことを示している。

【0098】ここでユーザが希望する楽曲を指定する場合には、上述したような「上」又は「下」のテンキーを操作してユーザが希望する楽曲の題名のところにカーソル「\*」を表示させる。続いて「#」キーを押圧操作して当該「#」を入力してカーソル「\*」が位置している楽曲を確定する。これによりカーソル「\*」が点滅表示から連続表示に変更され、その楽曲が確定されたことが示される。

【0099】楽曲が確定されると、その楽曲が確定されたことを示すサービス要求信号S20がPHS無線回線を介してサービスセンタ2に送信される。サービスセンタ2はこのサービス要求信号S20によりユーザが希望している楽曲を把握し、その楽曲を特定する楽曲コードをPHS無線回線を介して音響受信装置4に送信する。困みに、この楽曲コードは、予めサービスセンタ2が保有している全曲に対して楽曲毎に異なるように付されて

いるコードである。

【0100】プログラムモードの場合には、このような操作を順に繰り返して行くことにより、ユーザが聞きたい楽曲を1曲ずつ指定し、その楽曲を特定する楽曲コードを1つずつ入手する。そしてその入手した楽曲コードを、図13に示すように、1つのファイルとして記憶部8に記憶する。この場合、1行目の「File 1」はファイルネームであり、ユーザが任意に指定するか又は音響受信装置4において以前に作成されたファイルネームと異なるように自動的に付与される。また2行目の「Title of 1="ハイウエイ〇×△"」は1曲目として指定した楽曲の題名が「ハイウエイ〇×△」であることを示し、3行目の「Code of 1="225920"」は1曲目の楽曲コードが「225920」であることを示している。このように楽曲名と楽曲コードを対にし、これを指定された演奏順序に合わせて並べて記憶する。これによりこの曲名ファイルを参照すれば、ユーザにより指定された楽曲名及び楽曲コードを把握し得ると共に、演奏順序も把握することができる。

【0101】なお、このようにして楽曲コードを入手することにより生成された曲名ファイルは、操作部9より所定の操作を行うと、実際に表示部7に表示されるようになされており、これにより指定した楽曲が合っているかどうかユーザ自身が目で見て確認することができる。

【0102】かくしてプログラムモードで音楽提供を受ける場合には、このようにして曲名ファイルを作成した後、所定操作を行って、その曲名ファイルから曲順に沿って楽曲コードを順に読み出し、その楽曲コードを付加したサービス要求信号S20を送信する。これによりユーザが指定した音楽信号がサービスセンタ2から送信され、プログラムモードの音楽提供サービスが開始される。

【0103】(1-8)音楽提供サービスに係る制御部の制御手順

ここで以上説明した音楽提供サービスの制御は全て制御部10の動作制御によって行われるが、この項では、その動作制御をフローチャートを使用して順に説明する。

【0104】まず曲指定を行う際には、図14に示す動作手順によって曲指定がなされる。すなわちステップSP1から入ったステップSP2において、制御部10はメニュー画面表示中にプログラムモードを選択操作がなされたか否かを判断する。その結果、プログラムモード以外の操作がなされた場合には、制御部10はそのモードを示すサービス要求信号S20を送信した後、ステップSP3に移って処理を終了する。

【0105】一方、プログラムモードが指定された場合には、制御部10はステップSP4に移って曲指定のための頭文字入力を受け付ける。ステップSP4において、曲指定のための頭文字入力が行なされると、制御部10は、題名の頭文字が入力された文字からなる楽曲の曲

名リストをサービスセンタ2に要求することにより、当該サービスセンタ2から曲名リストを入手し、その曲名リストを表示部7に表示する。

【0106】そしてステップSP5において、制御部10はその曲名リスト内の任意の楽曲に対して確定操作がなされたか否かを判断し、曲確定の操作がなされた場合には、ステップSP6に移ってここで曲確定を示すサービス要求信号S20をサービスセンタ2に送信し、続くステップSP7においてサービスセンタ2から送られてくる楽曲コードを受信する。一方、曲確定の操作がなされなかつた場合には、制御部10はステップSP4に戻って曲指定の頭文字入力を再度受け付ける。

【0107】制御部10は、楽曲コードを入手すると、ステップSP8に移り、ここで引き続き曲指定の操作がなされるか否かを判断することによりユーザが希望する楽曲が全て指定し終わつたか否かを判断する。その結果、引き続き曲指定の操作がなされた場合には、制御部10は、ステップSP4に戻って処理を繰り返す、曲指定が終わつた場合にはステップSP9に移る。

【0108】ステップSP9において、制御部10は今までの処理により指定された全曲の楽曲名及び楽曲コードを曲名ファイルに指定された順番で格納し、当該曲名ファイルを記憶部8に記憶する。この処理を終えると、制御部10はステップSP3に移って曲指定のための処理を終了する。

【0109】これに対して音楽提供サービスを受ける際の手順としては、図15に示すようになる。すなわちステップSP10から入つたステップSP11において、制御部10は、メニュー画面表示中にモード選択のためのテンキー入力を受け付ける。そして次のステップSP12において、制御部10は入力されたテンキーの種類を判断することによりプログラムモードが指定されたかランダムモードが指定されたかを判断する。その結果、プログラムモードが指定された場合には、制御部10はステップSP13に進み、ランダムモードが指定された場合にはステップSP18に進む。

【0110】ステップSP13において、制御部10は先の曲確定により記憶部8に格納した曲名ファイルから楽曲の題名を読み出し、これを表示部7に表示する。次にステップSP14において、制御部10は、表示した楽曲の楽曲コードを曲名ファイルから読み出し、これをサービスセンタ2に向けて送信する。次のステップSP15では、その楽曲コード送信に応じてサービスセンタ2から送られてくる音楽データを受信し、これをイヤホン13を介して出力する。これによりユーザは指定した音楽を当該イヤホン13を介して聴取することができる。

【0111】1曲分の音楽データが受信し終わると、制御部10は次のステップSP16に移り、ここで曲名ファイル内に次の曲があるか否かを判断し、次の曲があ

ればステップSP13に戻って処理を繰り返す、次の曲がなければステップSP17に移って処理を終了する。

【0112】一方、ランダムモードが指定されたためステップSP18に移つた場合には、制御部10は指定されたランダムモード（ランダムモードとしては図8に示した第1から第9番目のモードがある）に対応するサービス要求信号S20をサービスセンタ2に向けて送信する。次のステップSP19では、そのサービス要求信号S20に応じてサービスセンタ2から送られてくる音楽データを受信し、これをイヤホン13を介して出力する。これによりユーザは指定した音楽提供モードに対応する音楽を当該イヤホン13を介して聴取することができる。

【0113】次のステップSP20では、制御部10は通話終了キーが押されたか否かを判断することにより音楽提供サービスの停止が指示されたか否かを判断する。その結果、音楽提供サービスの停止が指示されなかつた場合には、制御部10はステップSP19に戻って処理を繰り返す、停止が指示された場合にはステップSP21に進んで音楽提供サービスの受信を停止して処理を終える。

【0114】(1-9) 音響受信装置の本体に設けられた操作部

最後にこの項では、音響受信装置4の本体に設けられた操作部9について説明する。音響受信装置4の各電気回路を収納した本体ケース4Aの上面にはPHS基地局3と無線通信するためのアンテナ30が配置されている。また本体ケース4Aの正面には表示部7と音響入出力部6のスピーカ41とが設けられている。さらに表示部7の下方には操作部9を構成する通話キー9A、通話終了キー9B及びテンキー9Cが配置されている。図みに、テンキー9Cは、図から明らかのように、実際には「0」～「9」の10個の数字キーと「\*」キー及び「#」キーの2つの特殊キーからなっている。

【0115】また本体ケース4Aの下部には当該本体ケース4Aに対して回動自在にフリツパ4Bが取り付けられている。このフリツパ4Bは閉じたときに丁度通話キー9A、通話終了キー9B及びテンキー9Cを覆うようになされており、これにより音響受信装置4を靴やポケット等に入れておいたときに誤ってこれらの操作キーが押されることを未然に防止し得るようになされている。またこのフリツパ4Bの先端には音響入出力部6のマイクロホン20が設けられており、このフリツパ4Bを開くことにより当該マイクロホン20が通話時に丁度ユーザの口元にきてユーザの音声拾い易くなっている。

【0116】また本体ケース4Aの側面には操作部9を構成する回転押注式の操作子いわゆるジョグダイヤル9Dが設けられている。このジョグダイヤル9Dは、図17に示すように、矢印a又はbに示す方向に回転し得るよう本体4Aに取り付けられている。このジョグダイヤル9Dを回転させたときには「カチカチ」といったク

リック感が得られるようになっており、これによりユーザはいずれの方向にどれだけ回転させたかを容易に把握し得るようになされている。

【0117】このジョグダイヤル9Dを回転操作すると、当該ジョグダイヤル9Dはその回転角に応じたパルスが発生する（このパルスは回転角に応じていることにより回転方向及び回転量を示している）。制御部10はこのジョグダイヤル9Dが発生するパルスを検出することにより当該ジョグダイヤル9Dがいずれの方向にどれだけ回転操作されたかを検出し得るようになされている。そして制御部10はその検出した回転方向及び回転量に応じた量だけ表示部7に表示されるカーソルを上方向又は下方向に移動するようになされている。これによりこの音響受信装置4では、上述したように「5」又は「0」キーを押さなくても、カーソルを容易に移動し得るようになされている。

【0118】またこのジョグダイヤル9Dは矢印cに示す方向（すなわち本体4Aにほぼ垂直な方向）に押圧操作し得るようになされている。このジョグダイヤル9Dは押圧操作がなされると、押圧操作がなされたことを示すスイッチ信号が発生する。制御部10はこのスイッチ信号を検出することによりジョグダイヤル9Dの押圧操作を検出し得るようになされており、当該押圧操作を検出したときにはカーソルが表示されている項目を確定するようになされている。これによりこの音響受信装置4では、上述したように「5」キーを押さなくても、カーソルが位置している項目を確定することができる。かくしてこのようなジョグダイヤル9Dを設けることにより、部品点数は増えるものの、音響受信装置4の操作性及び商品性を向上することができる。

【0119】図みに、イヤホン13のケーブル上に配されたリモート操作子14にも、ここで示した表示部7、通話キー9A、通話終了キー9B、テンキー9C及びジョグダイヤル9Dが設けられており、当該リモート操作子14を使用しても同様の操作を行うことができる。

#### 【0120】(1-10) 動作及び効果

以上の構成において、この音楽提供サービスシステム1で音楽提供サービスを受ける場合には、まず音響受信装置4からサービスセンタ2に対してPHSの無線回線を介してサービス要求信号S20を送信する。この場合、提供される音楽サービスとしては大きく分けてサービスセンタ2側で楽曲を決めるランダムモードとユーザ側で楽曲を決めるプログラムモードとに分けられる。ユーザがランダムモードを希望した場合には、その旨を示すサービス要求信号S20がサービスセンタ2に送信される。サービスセンタ2はこのサービス要求信号S20に応じて所定の曲群の中からランダムに楽曲を選んでその音楽データを送信するか、もしくは最新ベストテンとして登録されている曲群の中から順番に楽曲を選んでその音楽データを送信する。音響受信装置4はこのようにし

てPHSの無線回線を介して送信される音楽データを受信し、これをイヤホン13に出力する。これによりユーザは当該イヤホン13を介して希望した音楽を聞くことができる。

【0121】一方、ユーザがプログラムモードを希望した場合には、まず希望する楽曲名の頭文字を入力して曲名リストをサービスセンタ2に要求する。サービスセンタ2はその指定された文字が題名の頭に付く曲名リストを音響受信装置4に送信する。音響受信装置4では、その曲名リストを表示部7に表示してユーザにその中から希望する楽曲を選択させる。そしてユーザが希望する楽曲を確定すると、曲確定を示すサービス要求信号S30を送信してサービスセンタ2から楽曲コードを入手する。以降のこの動作を繰り返して、ユーザが希望している楽曲名及び楽曲コードからなる曲名ファイルを作成する。そして音響受信装置4では、この曲名ファイルから順に楽曲コードを読み出してサービスセンタ2に送信することによりユーザが希望している音楽データをサービスセンタ2に順に送信させる。かくしてこの音楽データを受信して、イヤホン13から出力することにより、ユーザは希望する音楽を聞くことができる。

【0122】このようにしてこの音楽提供サービスシステム1では、ユーザが希望する音楽データをPHSの無線回線を介して送信し、これを音響受信装置4で受けて出力することにより、カセットテープやコンパクトディスク等の記録媒体を持たなくともユーザが希望する音楽を移動しながら聞くことができ、いわゆるミュージック・オン・デマンド・サービスを移動体通信で実現することができ、ユーザに大いなる利便性を提供することができる。

【0123】またこの音楽提供サービスシステム1においては、音楽データを送信する際、当該音楽データに離散コサイン変換処理やベクトル量子化処理を施して送信する。このようにして離散コサイン変換処理やベクトル量子化処理を施して音楽データを送信すると、回線状態が変化した場合でも、受信側で当該音楽データを正確に受信し得る。従って回線状態に応じて周波数特性を切り換えたり或いは信号出力方式をステレオからモノラルに切り換えたりする必要がなくなり、安定に音楽提供サービスを提供することができる。

【0124】以上の構成によれば、サービス要求信号S20に応じてユーザが希望する音楽データに所定の変調符号化処理を施して送信し、受信側ではその音楽データを受信して所定の復調復号化処理を施した後、所定の出力手段を介して出力するようにしたことにより、記録媒体を持たずユーザが希望する音楽を移動しながら聞くことができ、一段と利便性が向上した音楽提供サービスを実現することができる。

#### 【0125】(2) 第2の実施の形態

上述の第1の実施の形態においては、ユーザが音響受信

装置4を携帯して音楽提供サービスを受けた場合について述べたが、この第2の実施の形態においては、音響受信装置と自動車の車載音響機器と組み合わせて音楽提供サービスを受ける場合について説明する。

【0126】図18において、70は全体として第2の実施の形態による音響受信装置を示し、この実施の形態の場合も、PHS基地局3から送信される音楽データを当該音響受信装置70で受信するようになされている。但し、この音響受信装置70は受信した音楽データを第1の実施の形態のようにイヤホン13から送出するのではなく、自動車の車内に設置された車載音響機器を介して送出するようになされている。

【0127】近年の車載音響機器としては、昔のように単にラジオ放送だけを受信するのではなく、ナビゲーション装置やテレビ受信機等と組み合わせたものが提案されている。このような車載音響機器は、図18に示すように、大きく分けて、ナビゲーションのための地図や経路、或いは受信したテレビ放送の画像や各種メニュー等を表示する表示部71と、現在位置測定手段及び地図データベース手段を有するナビゲーション装置やテレビ受信機の受信部、或いはミニディスクやコンパクトディスク等の記録媒体から音楽を再生する音楽再生部やAM/FMラジオ放送のラジオ受信機等が収納された音響機器本体72と、受信したラジオ放送の音声や再生した音楽を送出するステレオ対応のスピーカ73R、73Lとによって構成される。

【0128】この第2の実施の形態による音響受信装置70は、PHSの無線回線を介して受信した音楽データにFM変調(Frequency Modulation:いわゆる周波数変調)を施し、これをFMラジオ放送の周波数帯域(通常76~90(MHz))の微弱電波(以下、単に微弱電波と呼ぶ)で送信する。車載音響機器のラジオ受信機はこの微弱電波で送信されるFM信号を受信し、受信したFM信号から音楽データを復元してこれをスピーカ73R、73Lを介して出力する。これによりユーザは、自動車に既に搭載されている車載音響機器のスピーカ73R、73Lを介して希望する音楽をステレオ音響で聞くことができる。

【0129】このようにしてこの第2の実施の形態による音響受信装置70では、PHSの無線回線を介して受信した音楽データを微弱電波のFM信号に変換し直して送信し、これを車載音響機器のラジオ受信機に受信させて音楽を出力させる。これにより既存の車載音響機器を利用して高音質及び高出力で音楽を出力することができる。

【0130】因みに、この第2の実施の形態においては、リモートコントローラ74から赤外線によって送信される制御データを音響受信装置70で受信し得るようになされており、これによりリモートコントローラ74を用いて音響受信装置70や車載音響機器の動作を制御し得る

ようになされている。

【0131】またこの第2の実施の形態においては、受信したテレビ放送の画像を表示しているときに、当該テレビ放送の画像と、第1の実施の形態で説明したような楽曲名や音楽提供サービスを受ける際のメニュー画面等、受信する音楽データに関連する情報とを表示部71に同時又は切り換えて表示し得るようになされている。同様に、ナビゲーションのための経路画面を表示しているときに、当該経路画面と、受信する音楽データに関連する情報とを表示部71に同時又は切り換えて表示し得るようになされている。これによりこの第2の実施の形態においては、車載音響機器として既に設置されている表示部71を音楽提供サービスでも使用し得るようになされている。

【0132】なお、この第2の実施の形態による音響受信装置74も、第1の実施の形態と同様に、送受信部等の各種電気回路を電池で駆動し得るようになされており、ダッシュボードから取り外せば通常のPHSの通信端末装置として使用し得るようになされている。

【0133】ここでこの第2の実施の形態による音響受信装置70の構成を図19に示す。図2との対応部分に同一番号を付して示す図19において、70は全体として第2の実施の形態による音響受信装置を示し、第1の実施の形態による音響受信装置4に対して新たに微弱電波発生・変調部75、微弱電波用のアンテナ76、赤外線受光部77及び赤外線受信処理部78が設けられている。

【0134】赤外線受光部77はリモートコントローラ74から送信される赤外線を受信し、当該赤外線の光量に応じた電気信号S60を発生する。赤外線受信処理部78はこの電気信号S60を解析することによりリモートコントローラ74から送信された制御データS61を検出し、これをデータバス11を介して制御部10に送出する。

【0135】制御部10はこの制御データS61に応じて音響受信装置70の各部の動作を制御するようになされており、これによりリモートコントローラ74を使用して音響受信装置74の動作を制御し得るようになされている。例えばリモートコントローラ74から所定のモードで音楽提供サービスを開始するような制御データが送信された場合には、制御部10はその制御データに応じて送受信部5の動作を制御し、当該送受信部5を介してサービス要求信号S20を送信する。これによりサービスセンタ2はこのサービス要求信号S20に応じてユーザが希望するモードで音楽データを送信する。音響受信装置74においては、PHSの無線回線を介して送信される信号を送受信部5によって受信し、その受信した音楽データを音響入出力部6で復号化処理することにより、サービスセンタ2から送信された音楽データ(S24R、S24L)を復元し、これを微弱電波発生・変調

部75に出力する。

【0136】微弱電波発生・変調部75は、供給される音楽データ(S24R、S24L)にFM変調を施して送信信号を生成した後、当該送信信号をFMラジオ放送の周波数帯域に周波数変換し、これを微弱電波でアンテナ76から送信する。これにより車載音響機器のラジオ受信機でこの微弱電波を受信すれば、音響受信装置70で受信した音楽データを車載音響機器を介して出力することができる。

【0137】なお、制御部10は、音楽データと共に送信された楽曲名や歌詞名等といった付加情報S62や、表示部7に表示するメニュー画面のデータS63も微弱電波発生・変調部75を介して送信するようになされており、これにより車載音響機器でこれを受信すれば、当該車載音響機器の表示部71に楽曲名や歌詞名はメニュー画面等、音楽提供サービスに関するデータを表示することができる。

【0138】また、制御部10は、赤外線受光部77及び赤外線受信処理部78を介して受けた車載音響機器に関する制御データS64も、微弱電波発生・変調部75を介して送信するようになされており、これによりリモートコントローラ74を使用して車載音響機器の動作をも制御することができる。

【0139】以上の構成によれば、受信した音楽データに再度FM変調を施してこれを微弱電波で送信するようになったことにより、音響受信装置70で受信した音楽データを既存の車載音響機器を介して高音質及び高出力で送出し得、音楽提供サービスを受ける際の利便性をさらに向上することができる。

【0140】(3)第3の実施の形態

上述の第1の実施の形態においては、音響受信装置4で受信した音楽データを有線接続されたイヤホン13を介して送出した場合について述べたが、この第3の実施の形態においては、ワイヤレスタイプのイヤホンを使用して音楽データを聴取し得るようになった場合について説明する。

【0141】図20に示すように、この第3の実施の形態においては、音響受信装置80で受信した音楽データを再変調して微弱電波で送信し、これをワイヤレスタイプのイヤホン81の通信部81Aで受信することにより当該音楽データをイヤホン81の電気音響変換素子を介して出力するようになされている。これによりこの第3の実施の形態では、音響受信装置80とイヤホン81とを分離して使用することができ、第1の実施の形態のように音響受信装置4を身につけずとも靴の中等に入れておけば容易に音楽データを聞くことができる。

【0142】なお、第1の実施の形態であっても、音響受信装置4を靴の中等に入れることは可能であるが、ケーブル接続されている関係上、少なくともイヤホン13のケーブル長分しか引き出すことができない。また第1

の実施の形態の場合には、音響受信装置4を身につけて歩くと、イヤホン13のケーブルが手などに引つねられて邪魔になるおそれがある。しかしながらこの第3の実施の形態のように音響受信装置80とイヤホン81とを無線接続すれば、電波の届く範囲内であれば自由に引き出すことができると共に、第1の実施の形態のようにイヤホン13のケーブルが邪魔になることもないので、一段と大きな自由度が得られる。

【0143】またこの第3の実施の形態においても、イヤホン81のケーブル途中にはリモート操作子81Bが設けられており、このリモート操作子81Bから入力された制御データを通信部81Aを介して送信し得るようになされている。これにより音響受信装置80の本体に設けられた操作部9をおおむね操作しなくても、音楽提供サービスを受ける際の制御データをユーザの手元で入力することができる。図みに、このリモート操作子81Bは、第1の実施の形態で説明したリモート操作子14とはほぼ同様のものであり、表示機能と操作入力機能を有している。

【0144】ここでこの第3の実施の形態による音響受信装置80の構成を図21に示す。図2との対応部分に同一番号を付して示す図21において、80は全体として第3の実施の形態による音響受信装置を示し、第1の実施の形態による音響受信装置4に対して新たに微弱電波送受信部82及び微弱電波用のアンテナ83が設けられている。

【0145】この音響受信装置80においては、ワイヤレスタイプのイヤホン81の通信部81Aから送信された送信信号をアンテナ83によって受信し、その結果得られる受信信号S70を微弱電波送受信部82に入力するようになされている。微弱電波送受信部82はこの受信信号S70に所定の復調処理を施すことにより当該受信信号S70からリモート操作子81Bが発した制御データS71を復元し、これをデータバス11を介して制御部10に出力する。

【0146】制御部10は、この制御データS71が音楽提供サービスを受けるための制御データであれば、当該制御データS71に応じて音楽提供サービスを受けるためのサービス要求信号S20を送受信部5を使ってPHSの無線回線を介してサービスセンタ2に送信する。これを受けたサービスセンタ2は、サービス要求信号S20に応じた所望の音楽データをPHSの無線回線を介して送信する。

【0147】音響受信装置80においては、PHSの無線回線を介して送信される信号を送受信部5によって受信し、その受信した音楽データを音響入出力部6で復号化処理することにより、サービスセンタ2から送信された音楽データ(S24R、S24L)を復元し、これを微弱電波送受信部82に出力する。

【0148】微弱電波送受信部82は、供給される音楽



データ(S24R、S24L)に所定の変調処理を施して送信信号を生成した後、当該送信信号を例えば数100 (MHz)程度の信号に変換し、これを微弱電波でアンテナ83から送信する。かくしてこの微弱電波をイヤホン81の通信部81Aで受信して音楽データを復調し、当該音楽データをイヤホン81の電気音響変換素子を介して出力すれば、音響受信装置80で受信した音楽データをワイヤレスタイプのイヤホン81で容易に聞くことができる。

【0149】なお、微弱電波送受信部82は、楽曲名や歌詞或いはメニュー画面のデータ等、受信する音楽データに関連するデータも、微弱電波を使用して送信する。これによりワイヤレスタイプのイヤホン81でこれを受信してリモート操作子81Bに表示すれば、楽曲名や歌詞等を音響受信装置80の本体に設けられた表示部7を見ずとも容易に確認し得る。

【0150】ここでワイヤレスタイプのイヤホン81の構成を図22に示す。この図22に示すように、ワイヤレスタイプのイヤホン81は大きく分けて通信部81A、リモート操作子81B、アンテナ81C及び電気音響変換素子81R、81Lによって構成される。このワイヤレスタイプのイヤホン81においては、音響受信装置80の微弱電波送受信部82から送信された微弱電波をアンテナ81Cによって受信し、その結果得られる受信信号S72を通信部81Aに入力するようになされている。通信部81Aは受信信号S72に所定の復調処理を施すことにより当該受信信号S72からステレオ方式の左右の音楽信号S73R及びS73Lを復元し、これを電気音響変換素子81R、81Lに出力する。これによりユーザは電気音響変換素子81R、81Lを耳に当てれば、当該電気音響変換素子81R、81Lを介して音楽を聞くことができる。

【0151】一方、ユーザがリモート操作子81Bを操作することにより入力された制御データS74は通信部81Aに入力される。通信部81Aはこの制御データS74に所定の変調処理を施して送信信号を生成した後、当該送信信号を例えば数100 (MHz)程度の信号に変換し、これを微弱電波でアンテナ81Cから送信する。これにより音響受信装置80では、この微弱電波を受信して制御データS74を復元すれば、その制御データS74に基づいてユーザの指示に応じた動作を行うことができる。

【0152】以上の構成によれば、受信した音楽データを再変調して微弱電波で送信するようにしたことにより、音響受信装置80で受信した音楽データをワイヤレスタイプのイヤホン81で聞くことができ、音楽提供サービスを受ける際の利便性を一段と向上することができる。

【0153】(4)他の実施の形態

なお上述の第1及び第3の実施の形態においては、受信

した音楽データを出力する音響出力手段としてイヤホンを用いた場合について述べたが、本発明はこれに限らず、耳を覆うようにして音響出力手段を装着する、いわゆるヘッドホンを用いるようにしても上述の場合と同様の効果を得ることができる。

【0154】また上述の第2の実施の形態においては、音楽データが重畳された微弱電波の周波数を70~90 (MHz)程度に設定した場合について述べたが、本発明はこれに限らず、車載音響機器として搭載されているラジオ受信機で受信し得る範囲の周波数であればその他の周波数であっても良い。

【0155】また上述の第3の実施の形態においては、音楽データが重畳された微弱電波の周波数を数100 (MHz)程度に設定した場合について述べたが、本発明はこれに限らず、数10 (MHz)以上、かつ1 (GHz)以下の範囲であればその周波数はいずれであっても良い。少なくともこの範囲に設定しさえすれば、微弱電波による通信を容易に行うことができる。

【0156】また上述の第1及び第3の実施の形態においては、受信した音声データを単にイヤホン13又は81で送出するようにした場合について述べたが、本発明はこれに限らず、電気音響変換素子であるイヤホンをマイクロホンとして使用し、通話のための音声信号を当該イヤホンを介して入力するようにしても良い。一般にイヤホンを構成する電気音響変換素子は、音波の振動を速に拾って電気信号に変換することができる。すなわち人間の声帯で発生した音声波は、通常、管等を伝わって耳の中まで到達するが、この音声波の振動をイヤホンによって受ければ、当該イヤホンによって音声信号を生成することができる。この音声信号を第1又は第3の実施の形態のようにケーブル又は無線無線を介して音響受信装置4又は80の音響入出力部らに入力すれば、イヤホンをマイクとして使用することができるので、音響受信装置4又は80を電話端末として使用するとき、両手に何も持たずに手ぶら感覚で通話を行うことができ、大きな自由度が得られる。この場合、イヤホンに出力する音声信号とイヤホンから入力された音声信号の伝送を半二重通信によって行っても良いが、時分額伝送による全二重通信によって伝送する方が通話の応答性が良くなるのでより効果的である。

【0157】また上述の第1の実施の形態においては、音楽データをPHS基地局3から送信するとき、送信データ処理部50において当該音楽データに離散コサイン変換を施した場合について述べたが、本発明はこれに限らず、高速フーリエ変換(FFT)等、その他の処理を施すようにしても良い。因みに、送信側で高速フーリエ変換処理を行った場合には、受信側のデータ復号ブロック62で離散コサイン変換の代わりに逆高速フーリエ変換(IFFT)を行うようにすれば良い。

【0158】また上述の第1の実施の形態においては、

メニュー画面のデータを記憶部8に記憶しておく場合について述べたが、本発明はこれに限らず、PHSの無線回線を介してサービスセンタ2側からこのメニュー画面のデータを送るようにしても上述の場合と同様の効果を得ることができる。

【0159】また上述の第1の実施の形態においては、ランダムモードで提供する音楽の分類を、図10に示すように、「最新ベストテン（J-POP）」、「最新ベストテン（ロック）」、「最新ベストテン（演歌）」、「ランダムヒットアップ（90年代）」、「ランダムヒットアップ（80年代）」、「ランダムヒットアップ（60〜70年代）」、「ジャズランダム」、「クラシックランダム」及び「レゲエランダム」の9個に分けた場合について述べたが、本発明はこれに限らず、年代及びジャンルを更に細かく分けても良い。類は、楽曲部の分類としては、図10に示した分類以外のものであっても良い。

【0160】また上述の第1の実施の形態においては、仮想文字テーブルTBを日本語の50音表によって形成することにより日本語の仮名文字を入力し得るようにした場合について述べたが、本発明はこれに限らず、その他の文字からなる仮想文字テーブルを形成してその他の文字を入力し得るようにしても良い。

【0161】また上述の第1の実施の形態においては、2次元方向に広がる仮想文字テーブルTBを使用したため、「5」、「0」、「7」及び「9」キーを使用して上下左右方向に仮想カーソルKを移動し得るようにした場合について述べたが、本発明はこれに限らず、アルファベットのように1次元方向に文字が並ぶ仮想文字テーブルを使用した場合には、「5」及び「0」キー又は「7」及び「9」キーを使用して上下又は左右方向のみに仮想カーソルを移動し得るようにして、「A」から「Z」方向又は「Z」から「A」方向のみに仮想カーソルを移動するようにしても良い。

【0162】また上述の第1の実施の形態においては、プログラムモードで楽曲を指定するとき、ユーザーが曲名リストから所望の楽曲を選んで楽曲を確定した後、その曲確定を示すサービス要求信号S20を送出して楽曲コードを入手した場合について述べたが、本発明はこれに限らず、曲名リストをサービスセンタ2から送信するとき、楽曲名と共に楽曲コードも送信するようにしても良い。このようにすれば、図14に示したフローチャートのステップSP6及びSP7の処理を省略することができる。

【0163】また上述の第1の実施の形態においては、音符記号を表示することにより曲名表示画面であることを示すと共に、本マーク記号を表示することにより歌詞表示画面であることを示すようにした場合について述べたが、本発明はこれに限らず、「曲名」といった文字や「歌詞」といった文字を表示することにより曲名表示画面であることを歌詞表示画面であることを示すようにし

ても良い。

【0164】また上述の第1の実施の形態においては、プログラムモードで指定した楽曲を示す曲名ファイルを記憶部8に記憶し、音楽提供サービスを受ける際にはこの曲名ファイルからユーザーが指定した楽曲を示す楽曲コードを読み出してサービスセンタ2に連通することによりユーザーが指定した楽曲の音楽信号を得るようにした場合について述べたが、本発明はこれに限らず、予め記憶しておいた曲名ファイルから楽曲コードを読み出す時刻を指定するタイマを設け、このタイマに登録された時刻になつたら楽曲コードを読み出してサービスセンタ2に連通するようにしても良い。このようにすれば、予めユーザーがタイマに所望の時刻を登録しておけば、その時刻になつたときに自動的に音楽信号を受信して所望の音楽を聞くことができる。

【0165】また上述の第1の実施の形態においては、ランダムモードで音楽提供サービスを受けているとき、通話終了キーを使用して音楽提供サービスの停止を指示した場合について述べたが、本発明はこれに限らず、音楽提供サービスの停止をテンキー等に割り当てるようにしても良い。

【0166】また上述の第1の実施の形態においては、回転押圧式の操作子すなわちジョグダイヤル90を設けてカーソル移動を行つた場合について述べたが、本発明はこれに限らず、その他の操作子を設けてカーソル移動を行うようにしても良い。例えば図23(A)に示すように、所定の角度だけ回動すると共に、本体4Aにはほぼ垂直な方向に押圧操作が可能な回動押圧式の操作子90を設け、当該操作子90によってカーソル移動を行うようにしても良い。この場合、操作子90は、上下方向に±αの角度だけ回動し得るようになされていると共に、回動した状態から手を離せばバネ等の付勢力によって元の位置に戻るようになされている。この操作子90はユーザーにより+α又は−αの角度だけ回動させられると、2つのスイッチのうち回動方向に対応するスイッチをオン状態にするようになされている。制御部10はこのスイッチの状態を検出することにより操作子90の回動方向を検出すると共に、スイッチがオン状態になつている時間を計測するようになされており、その検出した回動方向及び時間に応じた量だけ表示部7に表示されるカーソルを上方向又は下方向に移動するようになされている。これにより上述した実施の形態のように所定のテンキーを押さなくても、カーソルを容易に移動することができる。またこの操作子90は矢印κに示す方向に押圧操作し得るようになされている。この操作子90は押圧操作がなされると、押圧操作がなされたことを示すスイッチ信号を発生する。制御部10はこのスイッチ信号を検出することにより操作子90の押圧操作を検出し得るようになされており、当該押圧操作を検出したときにはカーソルが表示されている項目を確定するようになら

ている。これにより上述した実施の形態のように「キ」キーを押さなくても、カーソルが位置している項目を容易に確定することができる。

【0167】またこれに限らず、図23(B)に示すように、3点スイッチ式の操作子91を設けてカーソル移動を行うようにしても良い。この場合、操作子91は縦に並んだ3つのスイッチ91A~91Cによって構成される。制御部10はこの3つのスイッチ91A~91Cのスイッチ状態を検出し得るようになされており、検出結果に応じてカーソルを移動すると共に、カーソルの位置している項目の確定を行うようになされている。具体的には、第1のスイッチ91Aが押圧操作された場合には、制御部10は当該第1のスイッチ91Aが押されている時間を計測し、その時間に応じた量だけカーソルを上方向に移動する。また第3のスイッチ91Cが押圧操作された場合には、制御部10は第3のスイッチ91Cが押されている時間を計測し、その時間に応じた量だけカーソルを下方向に移動する。これにより上述した実施の形態のように所定のテンキーを押さなくても、カーソルを容易に移動することができる。また第2のスイッチ91Bが押圧操作された場合には、制御部10は当該第2のスイッチ91Bの押圧状態を検出してカーソルが位置している項目を確定する。これにより上述した実施の形態のように「キ」キーを押さなくても、カーソルが位置している項目を容易に確定することができる。かくしてこのような自動押圧式の操作子90又は3点スイッチ式の操作子91を設けるようにしても、同様に音響受信装置の操作性及び商品性を向上することができる。

【0168】また上述の実施の形態においては、サービスセンタ2から音楽信号を送信することによりユーザに音楽提供サービスを行った場合について述べたが、本発明はこれに限らず、サービスセンタ2からニュースや株式情報、或いは天気予報等、その他の情報を送信するようにしても良い。要は、音楽や音声等、情報提供のための音響信号をサービスセンタから送信するようになれば、上述の場合と同様の効果を得ることができる。

【0169】また上述の実施の形態においては、PHSの無線回線を介して音響信号を伝送した場合について述べたが、本発明はこれに限らず、携帯電話システムや自動車電話システム等、その他の無線通信システムの無線回線を介して音楽信号を伝送するようにしても上述の場合と同様の効果を得ることができる。

【0170】また上述の実施の形態においては、受信した音響信号を出力する電気音響変換素子を2つ設け、ステレオ音響を出力するようにした場合について述べたが、本発明はこれに限らず、少なくとも2つ以上の電気音響変換素子を設けて、受信した音響信号をステレオ音響で出力するようになれば上述の場合と同様の効果を得ることができる。

【0171】また上述の実施の形態においては、無線送

信部5Aを介してサービス要求信号を送信し、これにตอบสนองして送られてくる音楽信号を無線受信部5Bで受信し、その受信信号を復調回路40で復調処理した後、データ処理回路43で復号化処理を行って音楽信号を復元し、これをイヤホン13を介して出力した場合について述べたが、本発明はこれに限らず、少なくとも、所望の音響信号を要求するサービス要求信号を送信する無線送信手段と、サービス要求信号に対応して送信される音響信号が含まれる送信信号を受信する無線受信手段と、無線受信手段から出力される受信信号に復調及び又は復号処理を施して音響信号を復元する復調復号手段と、復調復号手段によって復元された音響信号を音波に変換して出力する電気音響変換手段とを設けるようにすれば、上述の実施の形態と同様に、音響信号が記録された記録媒体を持たずに、ユーザが希望する音響信号を容易に得ることができる。

【0172】

【発明の効果】上述のように本発明によれば、サービス要求信号を送信し、それに対応して送信された音響信号を受信して出力するようにしたことにより、音響信号が記録された記録媒体を持たなくても、ユーザが希望する音響信号を容易に得ることができる。また送信側で音響信号に所定の復調及び又は符号化処理を施しておいて、これを受信側で復調及び又は復号処理するようにしたことにより、回線状態が変化しても、高音質の音響信号を安定に得ることができる。かくして一段と利便性を向上した上で音響信号を提供することができる。

【0173】また受信した音響信号に再度調を施して再送信するようにしたことにより、音響信号を出力するための素子と音響信号を受信するための装置とをケーブルで接続しなくても良くなり、使い勝手を向上し得る。

【0174】また受信した音響信号を出力するための電気音響変換素子を、通話時には音声信号を生成する素子として使用することにより、1つの素子を兼用し得、使い勝手を向上し得る。

【0175】また端末装置から送信されたデータの内容に基づいて、送信する入力信号の内容を変更するようにしたことにより、端末装置が所望する入力信号を容易に送信することができる。

【0176】また要求信号が第1の種類の信号であったときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であったときには所定の曲群の中から任意の楽曲を選択して送信するようにしたことにより、要求信号の種類に応じて所望の楽曲を提供することができる。

【0177】また要求信号が第1の種類の信号であったときには送信側で予め定められた所定の順番で楽曲を送信し、要求信号が第2の種類の信号であったときには端末装置側で定められた楽曲を送信するようにしたことにより、要求信号の種類に応じて所望の楽曲を提供すること

ができる。

【0178】また要求信号に対応した音楽信号を受信し、受信した受信信号から音楽信号と共に送信された付加情報を抽出し、付加情報のうち第1の種類の付加情報と第2の種類の付加情報とを選択的に表示するようにしたことにより、音楽信号と共に送信された付加情報を選択的に確認することができ、使い勝手を向上し得る。

【0179】また操作入力に応じて仮想カーソルが2次元の仮想情報テーブル上を移動することにより当該仮想カーソルが位置するところの情報を表示し、確定指示が入力されると、仮想カーソルが位置するところの情報を選択するようにしたことにより、容易に所望の情報を選択することができる。

【0180】また操作入力に応じて仮想カーソルが2次元の文字表上を移動することにより当該仮想カーソルが位置するところの文字を表示し、確定指示が入力されると、仮想カーソルが位置するところの文字を選択して入力するようにしたことにより、容易に所望の文字を入力することができる。

【0181】また楽曲名と、楽曲に付与された楽曲コードとを対とした単位データを所望の順番で並べ、その順番によって楽曲の時系列的順番を規定するようにしたことにより、楽曲名と楽曲コードとを容易に把握し得ると共に、楽曲順序までも容易に把握し得る。

【0182】また楽曲指定のための粗情報を所定の通信回線を介して送信し、粗情報に該当する楽曲リストを通信回線を介して受信し、楽曲リストの中から所望の楽曲を指定し、当該指定された楽曲を示す情報を通信回線を介して送信するようにしたことにより、通信相手側にある楽曲を通信回線を介して容易に指定することができる。

【図面の簡単な説明】

【図1】本発明による音楽提供サービスシステムの構成を示すブロック図である。

【図2】音響受信装置の構成を示すブロック図である。

【図3】音響受信装置の使用形態の説明に供する略線図である。

【図4】音響受信装置の送受信部の構成を示すブロック図である。

【図5】音響受信装置の音響入出力部の構成を示すブロック図である。

【図6】PHS基地局の構成を示すブロック図である。

【図7】データ処理回路のデータ復号ブロックの構成を示すブロック図である。

【図8】音楽提供サービスのためのメニュー画面を示す略線図である。

【図9】音楽提供サービスを受けているときの曲名表示画面を示す略線図である。

【図10】音楽提供サービスを受けているときの歌詞表示画面を示す略線図である。

【図11】プログラムモードのときの表示画面及び仮想文字テーブルを示す略線図である。

【図12】プログラムモードにおいて曲名リストを表示したときの表示画面を示す略線図である。

【図13】プログラムモードで指定した曲の曲名ファイルを示す略線図である。

【図14】プログラムモードで曲を指定するときの手順を示すフローチャートである。

【図15】音楽提供サービスを受ける際の手順を示すフローチャートである。

【図16】音響受信装置の外観構成を示す斜視図である。

【図17】回転押圧式の操作子の動作の説明に供する略線図である。

【図18】第2の実施の形態による受信側のシステム構成を示す略線図である。

【図19】第2の実施の形態による音響受信装置の構成を示すブロック図である。

【図20】第3の実施の形態による音響受信装置の使用形態を示す略線図である。

【図21】第3の実施の形態による音響受信装置の構成を示すブロック図である。

【図22】第3の実施の形態におけるワイヤレスタイプのイヤホンの構成を示すブロック図である。

【図23】他の実施の形態による操作子を示す略線図である。

【符号の説明】

- 1……音楽提供サービスシステム、2……サービスセンタ、3……PHS基地局、4、70、80……音響受信装置、4A……本体ケース、5、51……送受信部、5A……無線送信部、5B……無線受信部、6……音響入出力部、7、71……表示部、8……記憶部、9……操作部、9A……通話キー、9B……通話終了キー、9C……テンキー、9D……ジョグダイヤル、10……制御部、11……データバス、12……ユーザ、13、81……イヤホン、14、81B……リモート操作子、21……音声信号処理回路、22……時分割多重回路、23……変調回路、30、52、76、81C、83……アンテナ、40……復調回路、43……データ処理回路、45……受信パケット処理部、46……音響出力部、50……送信データ処理部、53……受信データ処理部、55……離散コサイン変換回路、56……特徴情報抽出回路、57……インターリーブ回路、58……重み乗数生成回路、59……ベクトル量子化回路、60……符号化回路、62……データ復号ブロック、63……復号化回路、64……デインターリーブ回路、65……特徴情報復元回路、66……情報復元回路、67……離散コサイン逆変換回路、72……音響機器本体、74……リモートコントローラ、75……振動電波発生・変調部、77……赤外線受光部、78……赤外線受信処理部、81

A...通信部、S2...微弱電波送受信部、90、91...操作子。

【図1】



図1 音楽提供サービスシステムの全体構成

【図2】

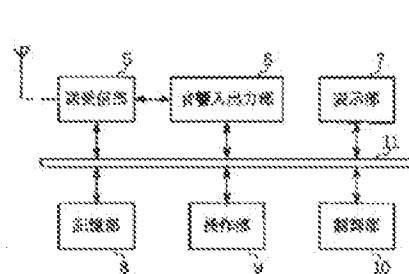


図2 音楽受信装置の全体構成

【図9】

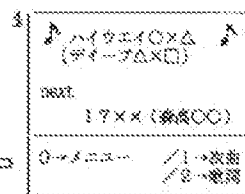


図9 曲名表示画面

【図3】

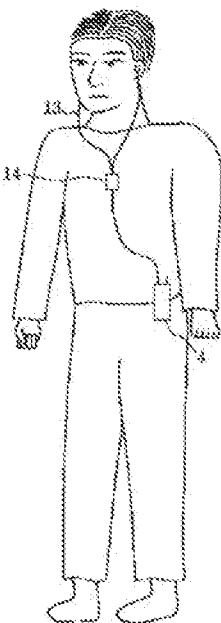


図3 音楽受信装置の使用形態

【図4】

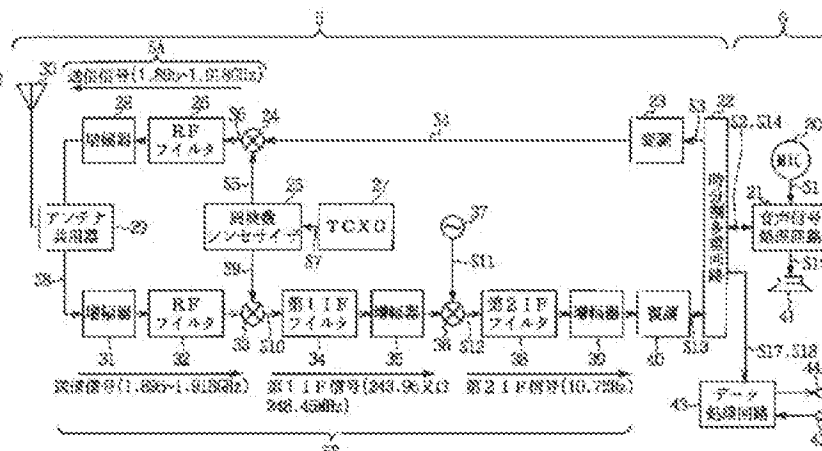


図4 送受信部の構成

【図5】

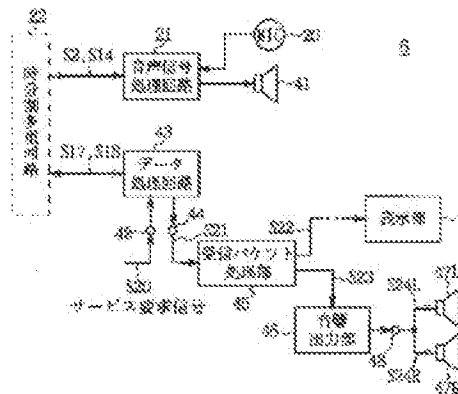


図5 音響入力部の構成

【図10】

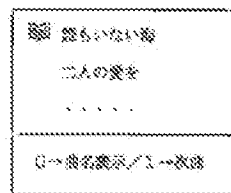


図10 歌詞表示画面

【図7】

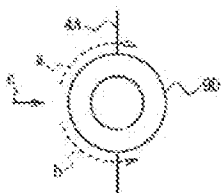


図7 回転操作子の構成

【図6】

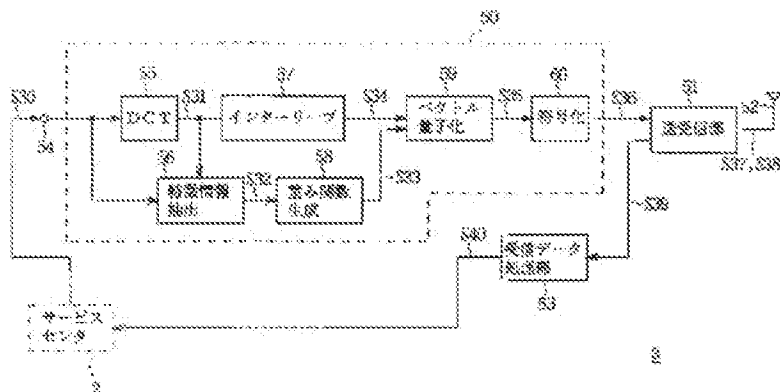


図6 PHS基地局の構成

【図7】

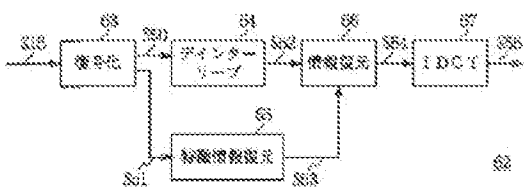


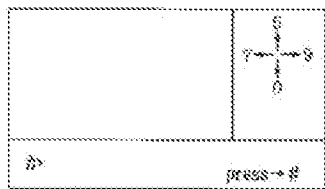
図7 データ処理回路のデータ変換ブロック

【図8】

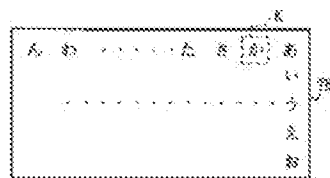
- 1 最新ベストテン (J-POP)
- 2 最新ベストテン (ロック)
- 3 最新ベストテン (演歌)
- 4 ランダムピクアップ (90年代)
- 5 ランダムピクアップ (80年代)
- 6 ランダムピクアップ (60~70年代)
- 7 ジャズランダム
- 8 クラシックランダム
- 9 レグナムランダム
- 0 プログラムオフ

図8 ノメニュー画面

【図11】



(A) プログラムモードの表示画面



(B) 仮想文字テーブル

図11 プログラムモードの表示画面及び仮想文字テーブル

【図12】

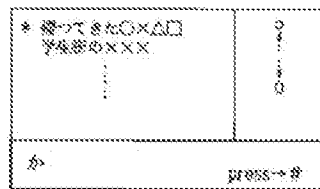


図12 プログラムモードにおける曲名リストの表示

【図13】

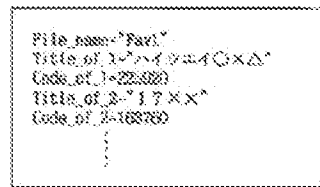


図13 プログラムモードで指定した曲名ファイル

【図14】

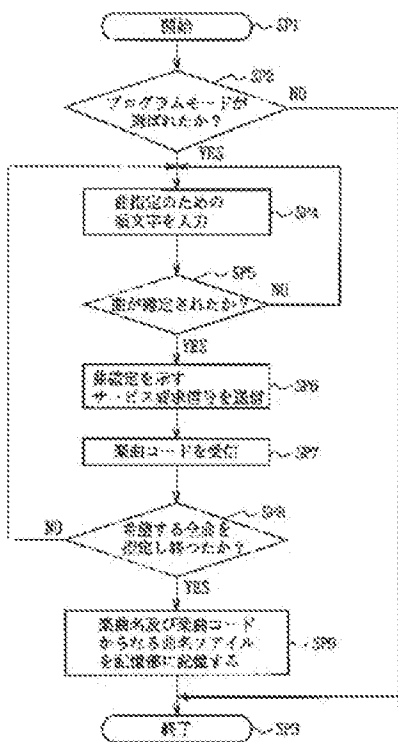


図14 音設定手順

【図15】

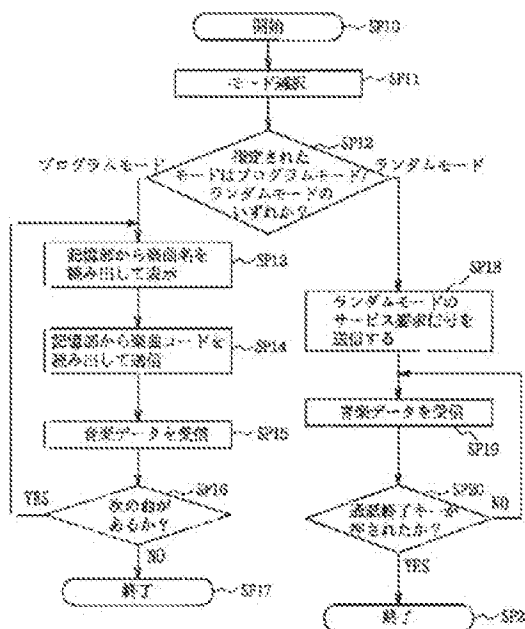


図15 音声提供サービスを受ける際の手順

【図16】

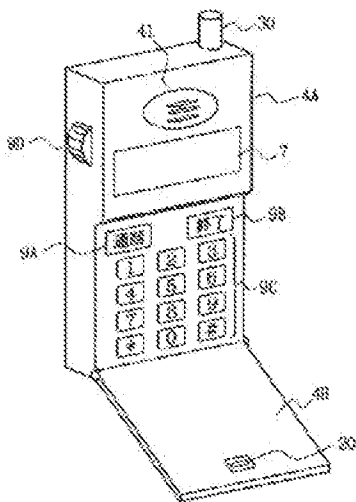


図16 音響受信装置の外観構成

【図19】

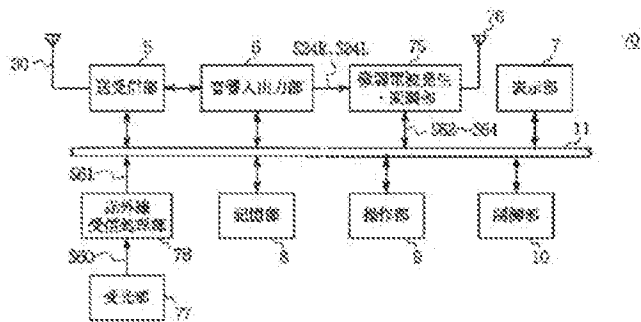


図19 第2の実施の形態による音響受信装置の構成

【図18】

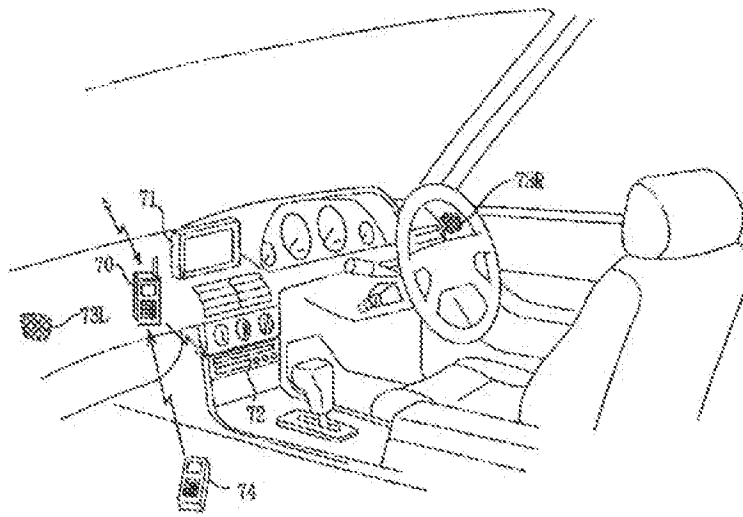


図18 第2の実施の形態による受信側のシステム構成

【図20】

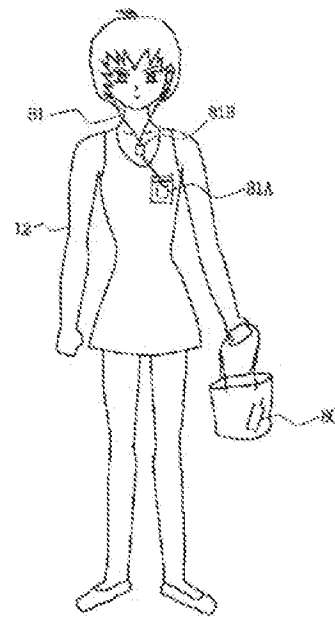


図20 第3の実施の形態による使用形態

【図21】

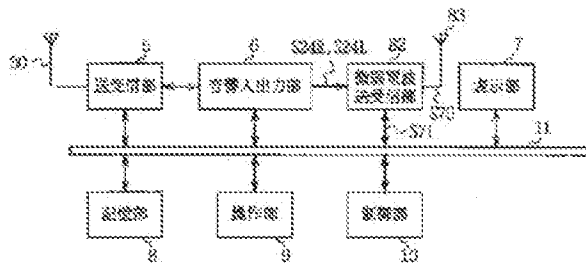


図21 第3の実施の形態による音響受信装置の構成

【図22】

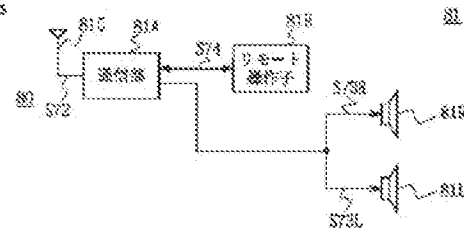


図22 ワイヤレスタイプのイェイコン

【図23】

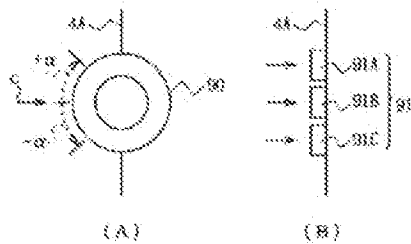


図23 他の実施の形態による操作子



[19]中华人民共和国国家知识产权局

[51]Int. Cl<sup>6</sup>

G11B 20/10

G11B 27/10

# [12]发明专利申请公开说明书

[21] 申请号 98114958.8

[43]公开日 1999年6月2日

[11]公开号 CN 1218258A

[22]申请日 98.4.20 [21]申请号 98114958.8

[30]优先权

[32]97.11.24 [33]KR [31]62315/97

[71]申请人 世韩情报系统株式会社

地址 韩国汉城

共同申请人 数字网株式会社

[72]发明人 文光珠 黄鼎夏

[74]专利代理机构 柳沈知识产权律师事务所

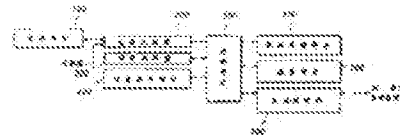
代理人 马莹

权利要求书4页 说明书9页 附图页数6页

[54]发明名称 运动图像专家组便携式收音系统及其再现方法

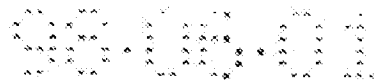
[57]摘要

一种 MPEG 便携式收音系统及其再现方法。该系统包括:电源装置,提供工作电源;电源处理装置,对电源整流以稳定电压和电流;信息显示装置,显示与系统相关的数和字母组合;控制装置,控制声音数据的转换和再现;数据存储装置,把压缩的声音数据存储到指定的地址;信息选择装置,再现、下载和提供存储的选择的声音数据;收音装置,把声音数据转换成用户可听格式;和发送/接收装置,发送和接收来自外部装置的声音和节目数据。



1 9 9 8 - 4 2 7

专利文献出版社出版



## 权 利 要 求 书

1. 一种 MPEG 便携式收音系统, 包括:
  - 电源装置, 用于给该系统提供工作电源, 该电源装置由蓄电池来构成;
  - 5 电源处理装置, 用于对由电源装置提供的电源进行整流以便稳定电压和电流;
  - 信息显示装置, 用于显示与该系统的操作状态相关的数和字母组合;
  - 控制装置, 用于控制利用 MPEG 方法压缩的声音数据的转换和再现的所有操作;
  - 10 数据存储装置, 用于根据由控制装置输出的信号把利用 MPEG 方法压缩的声音数据存储于指定的地址;
  - 信息选择装置, 用于选择一般的操作以便再现、下载和提供在数据存储装置中存储的选择的声音数据;
  - 收音装置, 用于根据由控制装置输出的信号将在数据存储装置中存储的
  - 15 声音数据转换成对用户可听的格式; 和
  - 发送/接收装置, 用于发送和接收由外部装置来的声音数据和节目数据,
2. 根据权利要求 1 所述的收音系统, 其中当电源处理装置通过适配器接收外部电源时, 该电源处理装置给电源装置的蓄电池提供充电电流。
3. 根据权利要求 1 所述的收音系统, 其中该信息选择装置包括:
  - 20 正向开关, 用于当按下该开关小于一秒时进入到下一个选择, 并且当连续按下该开关大于一秒时它快速播放当前的选择;
  - 反向开关, 用于当按下该开关小于一秒时, 如果选择是在中间播放位置, 那么它返回到目前选择的开始位置, 或如果选择是在两个选择之间, 那么它返回到前一个选择, 并且当连续按下该开关大于一秒的预定时间时它快
  - 25 速地反向播放数据;
  - 播放/停止开关, 用于当按下该开关一次时再现数据, 并且在播放模式中, 当按下时停止播放模式, 然后关断电源;
  - 重复开关, 用于当按下该开关一次时重新播放目前选择的节目, 当按下两次时重复所有的选择; 并当连续按下该开关时它取消所有的重复命令; 和
  - 30 随机开关, 用于当按下该开关时以随机顺序随机地再现节目选择,
4. 根据权利要求 1 所述的收音系统, 其中该控制装置包括:



CPU，用于控制有关把利用 MPEG 方法存储的数字数据转换成可听格式的操作；

中断控制器，用于当输入/输出操作结束或在其中产生故障时输出控制信号以便控制 CPU；

5 电源控制器，用于输出控制信号，以便稳定由电源处理装置提供的电源以作为 CPU 的工作电源，并且当存在故障时关断电源；

键盘接口，用于连接由信息选择装置提供的键选择信号；

LCD 控制器，用于控制提供给信息显示装置的矩阵电路的电流，以便在本发明的收音系统的操作期间控制显示；

10 扩展 ROM 接口，用于与扩展 ROM 连接，该扩展 ROM 被附加以扩展节目或存储器的容量；

计时器，用于对为数据下载和再现下载的数据所需要的时间信息和操作该系统所需要的数据中断所需要的时间信息进行计数；

总线桥接控制器，用于输出控制总线的控制信号，该总线传送数据；

15 控制器，用于控制数据发送和接收的输入/输出；

闪存 ROM 控制器，用于根据由 CPU 提供的中断器控制信号来驱动闪存 ROM；

DSP 接口，用于输出控制信号，该控制信号控制利用 MPEG 方法压缩的数字声音数据的输入/输出；和

20 时钟驱动器，用于把发生器的发生器时钟处理到预定的状态并且驱动该时钟作为 CPU 的时钟信号。

5. 根据权利要求 1 所述的收音系统，其中该数据存储装置包括：

25 RAM，该 RAM 是当切断电源时丢失数据的易失性存储元件，用于在给该系统提供电源之后正在进行再现操作的同时装入应用软件和瞬时存储该软件；和

闪存 ROM，该闪存 ROM 是当切断电源时不丢失数据的非易失性存储元件，用于存储和删除声音数据和与应用软件相关的数据以及其它数字数据。

6. 根据权利要求 1 所述的收音系统，其中该收音装置包括：

30 DSP 部分，用于把利用 MPEG 方法压缩的数字声音数据处理到预定状态；和



音频部分，用于把由 DSP 部分输入的声音信号转换成可听的格式。

7. 一种用于 MPEG 便携式收音系统的再现方法，包括下列步骤：

在把电源提供给信息选择装置时启动该系统；

装入主程序和完成所需软件的引导；和

5 根据由信息选择装置输出的信号、工作电源的状态、是否与外部电源连接和与外部电信系统连接等，如果操作环境的设置被完成，那么下载和再现存储的声音数据。

8. 根据权利要求 7 的再现方法，其中该方法还包括下列步骤：

在 CPU 和所有电路已经被启动之后，检测在主程序中是否存在误差；

10 和

如果检测到主程序处于正常状态，那么运行主程序和完成所需软件的引导，如果在主程序中检测到误差，那么输出误差信号并且停止进一步的运行。

9. 根据权利要求 7 所述的再现方法，其中该方法还包括下列步骤：

当检测到键信号是由信息选择装置输入时，确定键信号是否是电源关断

15 信号；

如果键信号不是电源关断信号，那么确定该键信号是否是声音数据再现信号；

如果键信号不是声音数据再现信号，那么确定该键信号是否是正向信号；

20 如果键信号不是正向信号，那么确定该键信号是否是反向信号；

如果该键信号不是反向信号，那么确定该键信号是否是停止信号；

如果该键信号不是停止信号，那么确定该键信号是否是重复信号；

如果该键信号不是重复信号，那么确定该键信号是否是随机信号；和

进行与检测信号对应的操作。

25 10. 根据权利要求 7 所述的再现方法，其中该方法还包括下列步骤：

如果确定电源装置的工作电源是在低电源状态，那么把检测到的电源与预定标准值相比较；

如果确定检测到的电源太低以致不能进行该系统的操作，那么显示警告消息、存储当前数据、并且关断电源；和

30 如果确定检测到的电源足以使该系统继续操作，那么显示指示该系统充电的消息。



11. 根据权利要求 7 所述的再现方法, 该方法还包括下列步骤:  
当确定正在由外部电源提供电源时, 利用由该外部电源提供的电源进行声音数据的再现操作; 和  
确定电源装置的电源状态并且进行充电操作。
- 5 12. 根据权利要求 7 所述的再现方法, 该方法还包括下列步骤:  
当检测到再现信号是来自信息选择装置时, 显示已选择的语音数据选择的信息和当前正在播放的节目选择的信息。
13. 根据权利要求 7 所述的再现方法, 该方法还包括下列步骤:  
检索从外部电信系统接收的数据并且确定在该数据中是否存在误差;  
10 如果检测到在该数据中存在误差, 那么请求重新发送数据; 和  
如果检测到在该数据中没有误差, 那么在该数据的接收被完成之后在指定的地址中存储接收的数据。



# 说明书

## 运动图像专家组便携式 收音系统及其再现方法

5

本发明涉及一种便携式收音系统和方法，尤其涉及一种便携式收音系统及其再现方法，其中利用运动图像专家组(MPEG)方法压缩的并且在存储装置中存储的声音数据被转换成一种可听格式并且通过耳机、扬声器等输出。

通常，处理成待听和待看的数据被存储在存储介质中，然后通过再现装置输出。最普通的例子包括在磁带上存储的模拟数据，该磁带通过盒式播放机来播放，和在光盘上存储的数字数据，该光盘通过光盘播放机来播放。

近来在数字技术领域的发展已经使在个人计算机中使用的存储介质得到了很大改进。也就是说，用在 PC 中的存储介质明显地变轻和变小，为用户提供了更大的存储容量。

15 然而，随着为了运行操作系统和应用软件所需要的存储容量的增加，怎样能够更有效地利用存储介质受到了限制。为了补救这个问题，设计了各种方法以便能够更有效地利用数字数据。MPEG 标准是这些方法中的一个方法，它通过压缩存储在存储介质中的数据来增加存储介质的存储容量。

也就是说，利用压缩数据的 MPEG 方法把数据大约压缩到其原始规模的十二分之一而不损害声音或图像质量。在为了该目的利用软件或硬件压缩数据之后，把该数据存储在存储介质中，然后利用 MPEG 方法把该数据转换到它的原始状态，以致于该数据以由用户能够听到或看到的格式被再现。因此，MPEG 方法大大地增加了数据存储容量。

25 虽然所有传统的再现系统，例如磁带播放机，光盘播放机和 PC 等，具有再现 MPEG 压缩的数据的能力，但是用户遇到了许多麻烦。

具体地讲，在利用能够再现存储在磁带上的数据的盒式播放机时，由于存储(记录)数据所需要的时间与再现该数据的时间是相同的，所以存储过程是费时间的，并且在存储过程期间产生的热起损害记录质量的作用，以致于收音质量被降低。此外，由于磁带容易被损坏，所以在盒式带上存储的数据的重复播放也起着降低声音质量的作用。

30 光盘播放机和其中使用的光盘也具有许多问题，即，在光盘上不能记



录。此外，由于 CD 机的机械易坏性，所以当 CD 机即使受到轻微的外部振动时也能够产生再现故障。最后，由于在该装置中的机械部件经常超过一定的时间就损坏，所以 CD 机具有有限的使用寿命。

5 在盒式带中和 CD 机使用的存储介质也具有占据很大空间的缺陷。同样，用户必须特别小心地把存储介质放置在不受热，不受阳光直照等的区域内。

在现有技术的装置方面，例如用于再现利用 MPEG 方法存储的数据的 PC，由于这些装置不是便携式的，所以用户能够接收声音和图像所在的位置被限制到该装置所在的位置。此外，当利用 PC 来再现利用 MPEG 方法压缩  
10 的数据时，使 PC 配置能够进行这种功能的软件或硬件的费用较高。同样，由于各种类型的声音数据被存储在许多存储介质中，所以用户必须购买许多类型的存储介质并且经过复杂的处理来再现在其中存储的数据。

最后，在上述所有的情况下，用户必须亲自去零售店来购买存储介质，这对用户产生了不方便。

15 本发明已经做了努力来解决上述的问题。本发明的一个目的是提供一种 MPEG 便携式放音系统及其再现方法，其把利用 MPEG 方法压缩和存储在存储芯上的声音数据再现成可听的格式。

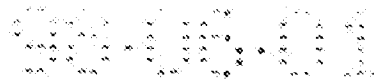
本发明的另一个目的是提供一种 MPEG 便携式放音系统，通过把数据存储  
20 在半导体存储介质中。在记录期间该系统能够防止像在现有的盒式带播放机中那样产生的热，并且能够避免象传统的盒式带、光盘和其它存储介质那样由于暴露在热中而被损坏。

本发明的又一个目的是提供一种 MPEG 便携式放音系统，该系统能够与电信网和数据自动售货机连接，以致于各种数据能够被下载，由此，能够使用户享受到这些系统的快速、方便、多样等好处。

25 本发明的又一个目的是提供一种 MPEG 便携式放音系统，在该系统中借助于如上所述的电信网和数据自动售货机下载的数据能够由个人计算机来访问和保留。

30 本发明的又一个目的是提供一种 MPEG 便携式放音系统，该系统不需要像磁带播放机和光盘播放机那样的单独的存储介质，以致于能够使该装置变轻和变薄，并且不需要存储介质的物理存储空间。

为了实现上述目的，本发明提供一种用于再现利用 MPEG 方法压缩的声



音数据的 MPEG 便携式收音系统和方法。本发明的系统包括：电源装置，用于给该系统提供工作电源，该电源装置由蓄电池来构成；电源处理装置，用于对由电源装置提供的电源进行整流以便稳定电压和电流；信息显示装置，用于显示与该系统相关的数和字母组合；控制装置，用于控制利用 MPEG 方法压缩的声音数据的转换和再现的所有操作；数据存储装置，用于根据由控制装置输出的信号把利用 MPEG 方法压缩的声音数据存储 5 在指定的址；信息选择装置，用于选择一般的操作以便再现、下载和提供在数据存储装置中存储的选择声音数据；收音装置，用于根据由控制装置输出的信号把在数据存储装置中存储的声音数据转换成用户可听的格式；和发送/接收装置，用于发送和接收由外部装置来的声音数据和节目数据。

10 本发明的再现方法包括下列步骤：在把电源提供给信息选择装置时启动该系统和检测闪速 ROM 的状态；如果检测到闪速 ROM 的状态是正常的，由闪速 ROM 装入主程序和完成所需软件的引导；和如果操作环境的安装被完成，那么根据由信息选择装置输出的信号、工作电源的状态、是否与外部电源连接和与外部电信系统连接，下载和再现存储的声音数据。

15 作为说明书一部分的附图解释了本发明的实施例，并且与说明书一起来解释本发明的原理，附图中：

图 1 是根据本发明的优选实施例的 MPEG 便携式收音系统的方框图。

图 2 是图 1 的 MPEG 便携式收音系统的详细方框图；和

20 图 3a - 3f 是用于根据本发明的优选实施例的 MPEG 便携式收音系统的再现方法的流程图。

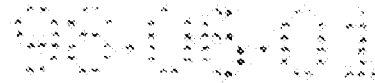
下面参照附图来描述本发明的优选实施例。

首先参照图 1，本发明的 MPEG 便携式收音系统包括：电源部分 100，电源处理器 200，信息选择器 300，信息显示部分 400，控制部分 500，数据存储部分 600，收音部分 700 和发送/接收机 800。

25 利用镍-镉(Ni - CD)、镍-金属氢化物(Ni - MH)、锂离子，或锂聚合物蓄电池来实现电源部分 100，并且该电源部分 100 把化学能量变换成电能并把该电能提供给便携式收音系统。此外，利用通过适配器接收的电能对电源部分 100 进行再次充电。

30 电源处理器 200 从电源部分 100 或直接地通过适配器接收电力，并且把该电力整流成稳压电流，然后把该稳压电流作为驱动电源提供给控制部分





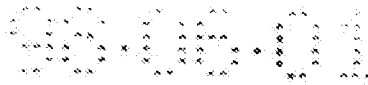
500。当电源处理器 200 通过适配器接收电力时，电源处理器 200 把接收到的电力提供给电源部分 100，用于对电源部分 100 进行充电。

利用由用户操作的各种预定键来执行信息选择器 300，并且信息选择器 300 根据用户的选择来输出电信号以便控制电源，分离用于再现的数据、控制与数据再现相关的各种功能，并且发送和接收数据。

具体的说，信息选择器 300 包括：正向开关，用于当按下该开关最好小于一秒的预定时间时它进入到下一个节目选择，并且当连续按下最好大于一秒的预定时间时它快速播放数据；反向开关，用于当按下该开关最好小于一秒的预定时间时，如果选择是在中间播放位置，那么它返回到目前节目选择的开始位置，或如果选择是在两个选择之间，那么它返回到前一个节目选择位置，并且当连续按下该开关最好大于一秒的预定时间时它快速地反向播放数据；播放/停止开关，用于当按下该开关一次时再现数据，并且在再现数据的情况下，当再按下一次时停止目前的播放模式，然后关断电源；重复开关，用于当按下该开关一次时它重新播放目前选择的节目，当按下两次时它重复所有的选择，当按下最好大于三秒的预定时间时它取消所有的重复命令；随机开关，用于当按下该开关时以随机顺序随机地再现节目选择。

利用 LCD(液晶显示器)来实现信息显示部分 400，并且该信息显示部分 400 显示与通过上述开关实现的各种模式相关的各种数字和字母。

控制部分 500 控制用于存储和再现利用 MPEG 方法压缩的声音信号的所有各种操作。如在图 2 中所示的，控制部分 500 包括：CPU(中心处理单元)501，用于控制与把利用 MPEG 方法存储的数字数据变换成可听格式相关的操作；中断控制器 503，用于输出控制信号，以便当输入/输出操作结束或在其中产生故障时控制 CPU 501；电源控制器 505，用于输出控制信号，以便稳定由电源处理器 200 提供的电源来作为 CPU 501 的工作电源，并且当故障存在时关断电源；键盘接口 507，用于连接由信息选择器 300 提供的键选择信号；LCD 控制器 509，用于控制提供给信息显示部分 400 的矩阵电路的电流，以便在本发明的收音系统的操作期间控制显示；扩展 ROM 接口 511，用于与扩展 ROM 连接，增加该扩展 ROM 是用于扩展节目或存储器，并且与闪存 ROM 连接；计时器 513，用于对为数据下载和再现下载的数据所需要的信息和操作该系统所需要的数据中断所需要的时间信息进行计数；总线桥接控制器 519，用于输出控制总线的控制信号，该总线传送数据；控制器



523, 用于控制发送和接收的数据的输入/输出; 闪存 ROM 控制器 527, 用于根据由 CPU 501 提供的中断器控制信号来驱动闪存 ROM 603; DSP(数字信号处理器)接口 529, 用于输出控制信号, 该控制信号控制利用 MPEG 方法压缩的数字声音数据的输入/输出; 和时钟驱动器 531, 用于把发生器 1000 5 的发生器时钟处理到预定的状态并且驱动该时钟作为 CPU 501 的时钟信号。

利用中断线与 I/O 总线的结合, 把上述控制部分 500 的所有元件连接起来。

数据存储部分 600 根据从控制部分 500 来的信号存储通过发送/接收机 800 下载的并且利用 MPEG 方法压缩的声音数据。此外, 如在图 2 中所示的, 10 利用闪存 ROM 603 来实现数据存储部分 600, 用于存储和删除声音数据和与应用软件相关的数据以及其它的数字数据。该闪存 ROM 603 是非易失性存储元件, 即当切断电源时它不丢失数据。

收音部分 700 根据由控制部分 500 提供的信号把存储在数据存储部分 600 中的声音数据转换成一种可听的格式。如在图 2 中所示的, 收音部分 700 15 包括: DSP 部分 701, 用于把利用 MPEG 方法压缩的数字声音数据还原成它的原始状态; 音频部分 703, 用于把由 DSP 部分 701 输入的声音信号转换成一种可听的格式; 和耳机/扬声器 705, 用于把由音频部分 703 输入的电声音信号转换成能够由用户可听的声音。

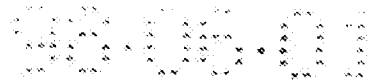
发送/接收机 800 与 PC, 数据自动售货机, 或其它这样的外部装置连接, 20 并且它既可以给这些外部装置发送声音或节目数据, 也可以从这些装置接收声音或节目数据。

下面参照图 3a - 3f 来描述一种利用 MPEG 方法压缩数据的优选再现方法, 该方法用于上述结构的便携式收音系统。

首先, 如果用户按下信息选择器 300 的 ON(接通)开关以便再现和听在利用 MPEG 方法压缩的并且存储在数据存储部分 600 中的所有数字数据之中特 25 殊的声音数据, 那么控制部分 500 的 CPU 501 通过借助于电源处理器 200 接收从电源部分 100 或适配器来的电源而进入到操作模式(S1000)。

接着, CPU 501 运行主程序和完成所需软件的引导(S1300), 然后确定通过键盘接口 507 和 MEM/IO 总线输入的信息选择器 300 的键信号是否被检 30 测(S1400)。

如果在步骤 S1400 中检测到键信号, 那么在步骤 S1410 中它确定是否具



有电源关断选择信号，该选择信号是由用户选择以切断由电源处理器 200 提供的电源来选择的。如果检测到电源关断信号，那么在步骤 S1415 中关断由电源处理器 200 提供的工作电源并且该系统进入到预备模式。

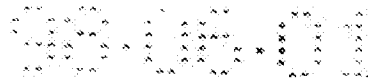
如果在步骤 S1410 中没有检测到电源关断信号，那么在步骤 S1420 中检测是否输入收音信号，该收音信号用于恢复和再现利用 MPEG 方法压缩的和在数据存储部分 600 的闪存 ROM 603 中存储的数据选择。

如果在步骤 S1420 中确定键信号是用于再现在数据存储部分 600 中存储的声音数据的再现键信号，那么在步骤 S1425 中 CPU 501 把选择的收音信号借助于控制部分 500 的 DSP 接口 529 加载到收音部分 700 的 DSP 部分 701 上，然后利用操作系统软件把利用 MPEG 方法压缩的数字声音数据恢复到它的原始状态，通过收音部分 700 的音频部分 703 把该数据转换成电声音信号，和通过耳机/扬声器 705 把该电信号转换成用户可听的声音信号并且输出该信号。

在步骤 S1420 中，如果检测到的键信号不是用于再现声音信号的信号或如果该系统目前正在再现数据，那么在步骤 S1430 中检测是否已经输入正向信号，如果在步骤 S1430 中检测到正向键信号，那么 CPU 501 确定是否该正向选择信号是在小于一秒的预定时间之内被发送，如果这个判断被满足，那么进入到下一个选择并且执行再现操作，同时还确定是否该正向选择信号是在大于一秒的预定时间之内被发送，如果是，那么目前的选择被快速地再现 (S1435)。

在步骤 S1430 中，如果没有检测到正向键信号，那么在步骤 S1440 上确定反向键信号是否已被输入，如果该反向键信号已被输入，那么正在再现的目前节目选择被返回到开始，或如果是在两个选择之间，那么如果反向信号是最好在小于一秒的预定时间之内被发送，那么进入到前一首歌的选择，如果反向信号是在最好大于一秒的预定时间之内被发送，那么当前播放的节目选择被快速地反向(S1445)。

如果在步骤 S1440 中没有检测到反向信号，那么在步骤 S1450 中检测停止信号是否已经被输入，在步骤 S1450 中，如果检测到停止信号，那么利用安装程序进一步确定预定次数最好为一次的信号是否已经被输入并且当前的模式是否是播放模式，在这种情况下当前的再现操作被中断，以及在停止模式中是否再现被起动。此外，在播放模式已经被中断的情况下，如果检测到



在最好大于三秒的预定时间内发送了停止信号，那么预备电源被控制到关断(S1455)。

在步骤 S1450 中，如果没有检测到停止信号，或如果检测到该系统是在播放模式，那么在步骤 S1460 中确定重复信号是否已经被输入。如果检测到重复信号，那么利用安装程序来确定输入的次数，从而当检测到信号已经被输入最好为一次的预定次数时重复当前的选择，当检测到两个信号被输入时，重复在闪存 ROM 603 的存储器中存储的所有声音信号，和当在重复操作期间检测到信号被输入时，取消任何重复的命令(S1465)。

此外，如果在步骤 S1460 中没有检测到重复信号，那么在步骤 S1470 中确定随机信号是否已经被输入。如果在这个步骤中检测到随机信号，那么在步骤 S1475 中以随机的顺序再现选择的节目，如果没有检测到随机信号，那么重复进行再现利用 MPEG 方法压缩的声音数据的操作。

在上述根据由信息选择器 300 输入的键信号正在再现由用户选择的声音信号的情况下，工作电源在电源处理器 200 中被分析，以便确定在电源部分 100 中是否存在低电源状态，该低电源状态不能使再现操作被进行(S1500)。如果在步骤 S1500 中检测到电源部分 100 是在低电源状态中，那么在步骤 S1510 中确定检测的当前电压是否低于预定的基准值，该基准值将阻止声音信号的正常再现。

如上所述，如果确定电源部分 100 的电压小于预定的标准值，那么控制部分 500 借助于 MEM/IO 总线输出预定的控制信号给 LCD 控制器 509 以使显示警告。在此，LCD 控制器 509 调节提供给信息显示部分 400 的矩阵电路的电源，从而在信息显示部分 400 上显示“电源关断”的消息(S1520)。

在显示“电源关断”消息的同时，控制部分 500 的 CPU 501 给数据存储器部分 600 的闪存 ROM 603 输入数据存储器信号，以致于当前的状态被保留(S1530)，并且借助于 MEM/IO 总线来控制电源控制器 505 以使切断提供给电源处理器 200 的电源(S1540)。

在步骤 S1510 中，如果确定电源部分 100 的电压大于预定的标准值，该电压能够使该系统正常操作，那么控制部分 500 借助于 LCD 控制器 509 来控制信息显示部分 400，以致于“低电源”信息被显示(S1550)。

在步骤 S1500 中检查电源状态之后，控制部分 500 的 CPU 501 确定电源处理器 200 是否通过适配器与外部电源连接(S1600)，如果在步骤 S1600 中检



检测到电源处理器 200 与外部电源连接,那么在步骤 S1610 中确定电源部分 100 是否被充满电。

如上所述,如果检测到电源部分 100 已被充满电,那么中断充电操作,以便防止电源部分 100 由过充电而被损坏,如果检测到电源部分 100 没有被充满电,那么确定由外部电源来的电力是否通过适配器正在供电(S1620)。此时,如果在电源部分 100 没有被充满电的状态下外部电源正在供电,那么由外部电源给电源部分 100 提供电源以便对电源部分 100 进行充电(S1630)。

在步骤 S1600 之后,即在确定是否与外部电源连接之后,在步骤 S1700 中确定声音数据是否根据用户的选择正在被再现。在这个步骤中,如果声音数据正在被再现,那么控制部分 500 的 CPU 501 分析声音数据,检查例如:数据再现时间、选择的题目、音乐的类型、用于该选择的保留播放时间等等,并且通过控制 LCD 控制器 509 由信息显示部分 400 来显示该信息(S1710)。

此外,控制部分 500 的 CPU 501 在数据存储部分 600 的闪存 ROM 603 中存取利用 MPEG 方法压缩的声音数据,并且通过 DSP 接口 529 把这个声音数据发送给放音部分 700 的 DSP 部分 701。从而, DSP 部分 701 把利用 MPEG 方法压缩的数字声音数据处理到预定的状态,并且借助于音频部分 703 把它转换成声音信号,然后通过耳机/扬声器 705 再现该声音数据,从而用户能够听到该声音(S1720)。

接着,在步骤 S1730 中确定选择的的声音数据是否已经被完全再现了,如果已经被再现完了,那么在步骤 S1740 中从闪存 ROM 603 中检索下一个选择的的声音数据,然后,在步骤 S1750 中从闪存 ROM 603 装入待再现的声音数据和做好再现该声音数据的准备。

在步骤 S1700 之后,即确定声音数据是否正在被再现之后,控制部分 500 的 CPU 501 分析由控制器 523 来的信号,以便确定发送/接收机 800 是否与外部电信系统连接,该外部电信装置是指例如计算机,该计算机具有调制解调器或安装在其中的其它电信装置,或数据自动售货机,该自动售货机出售各种数据和各种音乐节目、电视游戏等(S1800)。

如果在步骤 S1810 中确定发送/接收机 800 与外部电信系统连接,那么本发明的系统被变成下载负载,在步骤 S1810 中该数据被下载,并且在步骤 S1820 中确定在下载的数据中是否存在误差。

如上所述,如果确定在下载的数据中存在误差,那么控制部分 500 的

CPU 501 控制重新发送数据，如果在该数据中不存在误差，那么存储该数据 (S1830)。此外，如果在步骤 S1820 中确定在发送的数据中不存在误差，那么在步骤 S1840 中 CPU 501 确定该数据的发送是否被完成，指明在数据存储部分 600 中的地址区域，然后在步骤 S1850 中下载和存储该数据。

- 5       在如上所述构成和再现压缩数据的 MPEG 便携式收音系统，由于利用 MPEG 方法压缩声音数据并且把该数据存储到半导体芯片中或其它存储元件中，然后以一种用户可听的格式被再现，因此，通过消除了对唱片、磁带、CD 和其它类似的存储介质的需要而提供了方便，并且能够克服在现有再现装置中利用存储介质的许多缺陷：即在记录或重复播放之后音质的下降、存储介质的易碎性迫使在存储数据时需要特别小心等缺陷。
- 10

此外，因为能够把本发明的系统与电信系统和数据自动售货机连接起来以便下载各种数据，所以能够提供给用户快速、方便和低费用的好处。

- 考虑到在此公开的对本发明的描述和特殊的实施例，本发明的其它实施例对于本领域里的技术人员来说是显而易见的，这些说明和实施例仅作为例子来考虑，它们都属于由所附权利要求所指示的本发明的保护范围和精神之内。
- 15

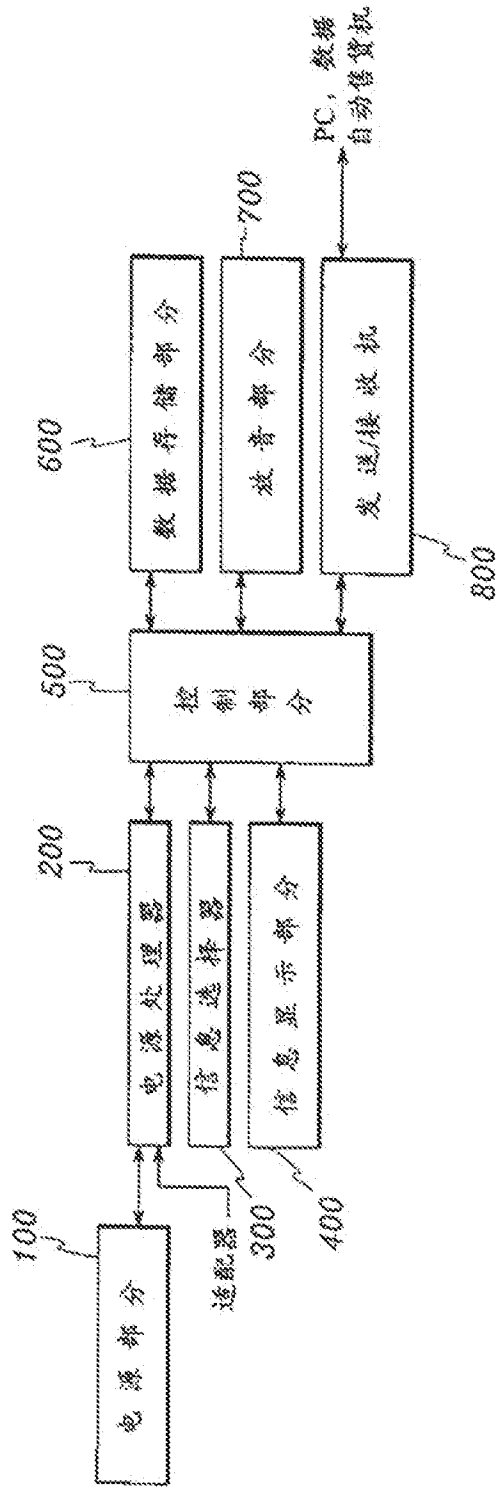


图 1

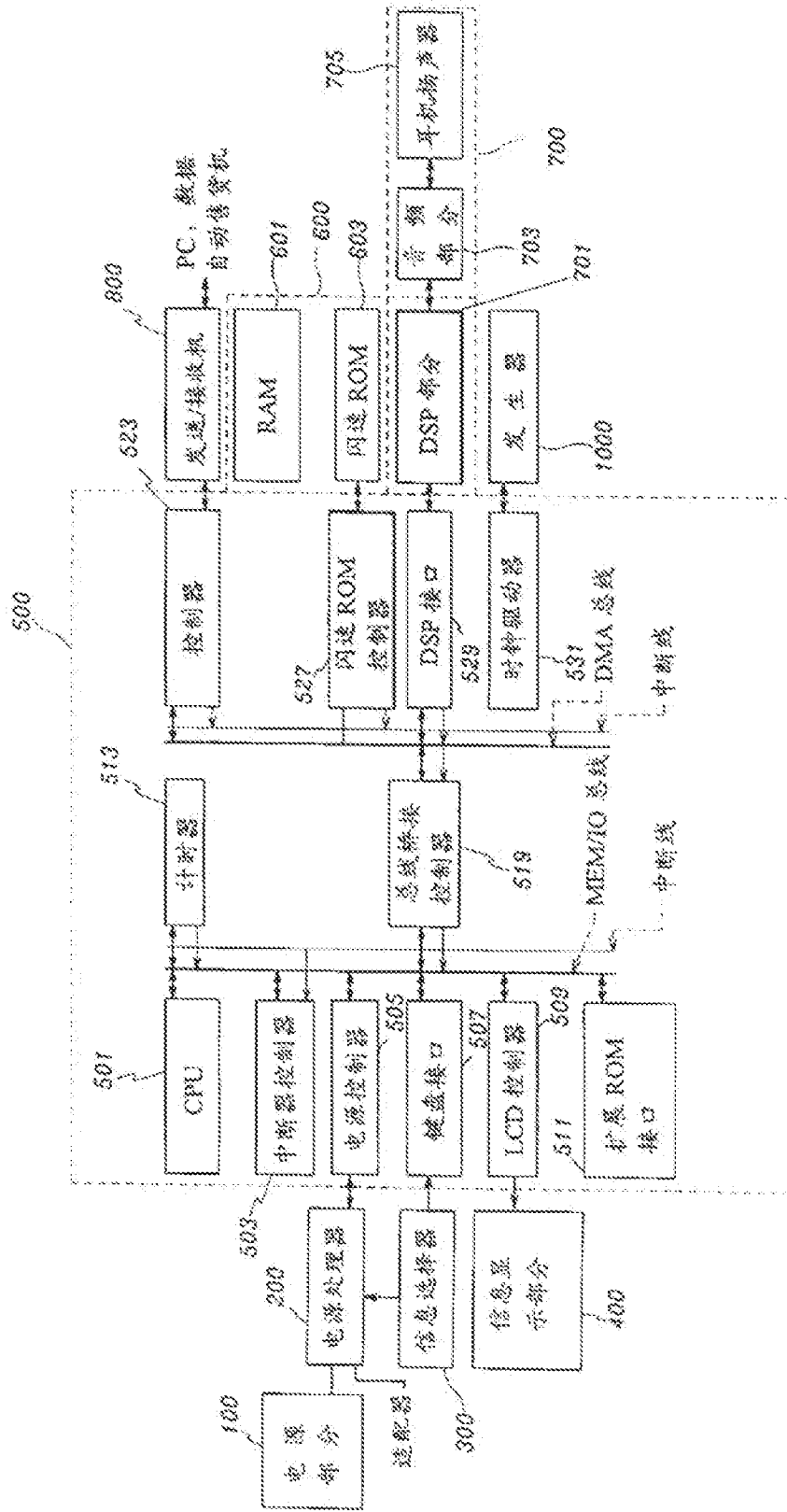


图 2



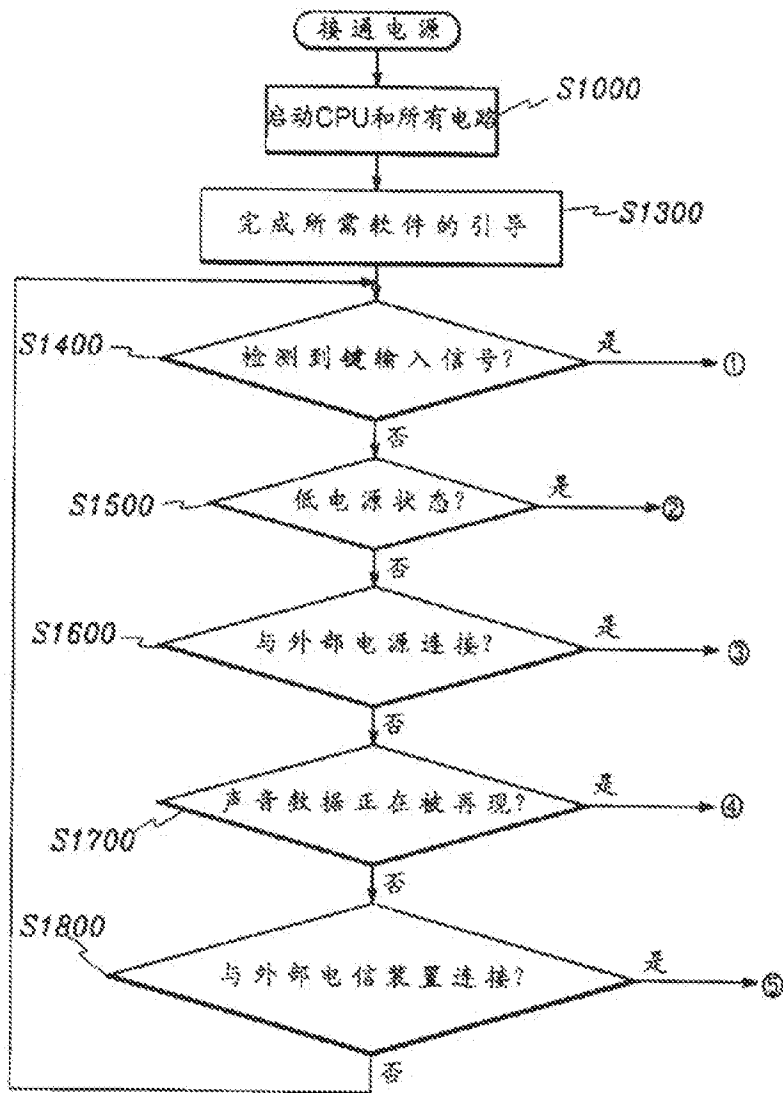


图 3a

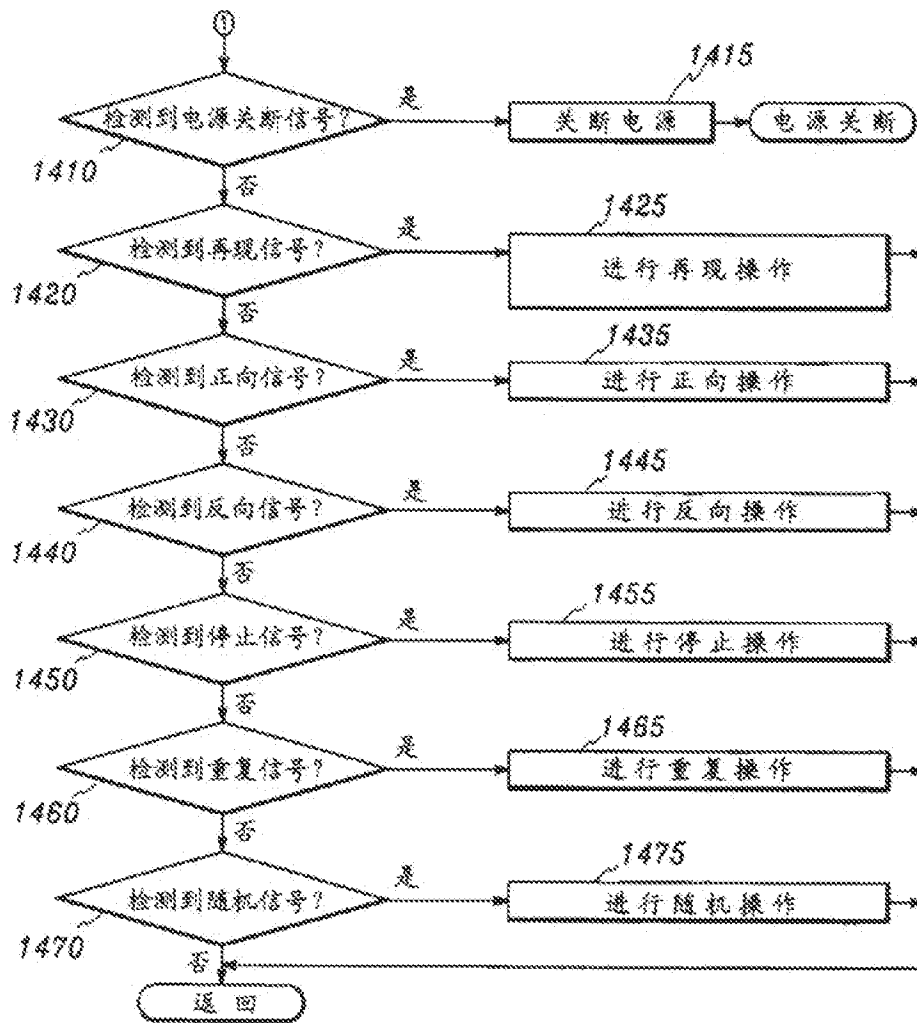


图 3b

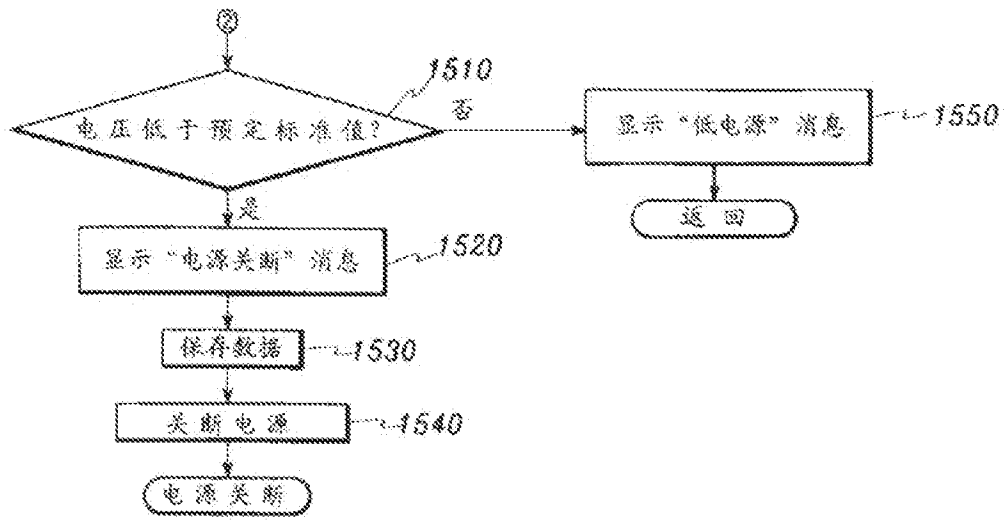


图 3c

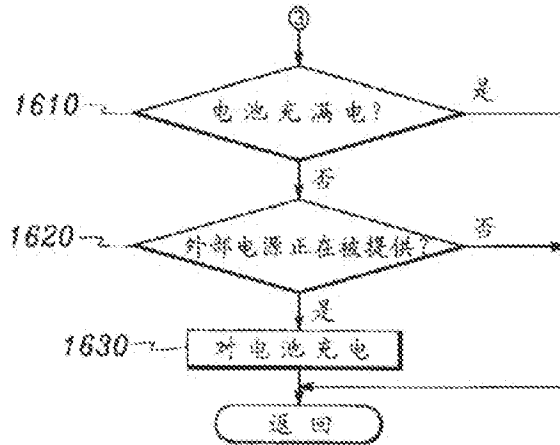


图 3d

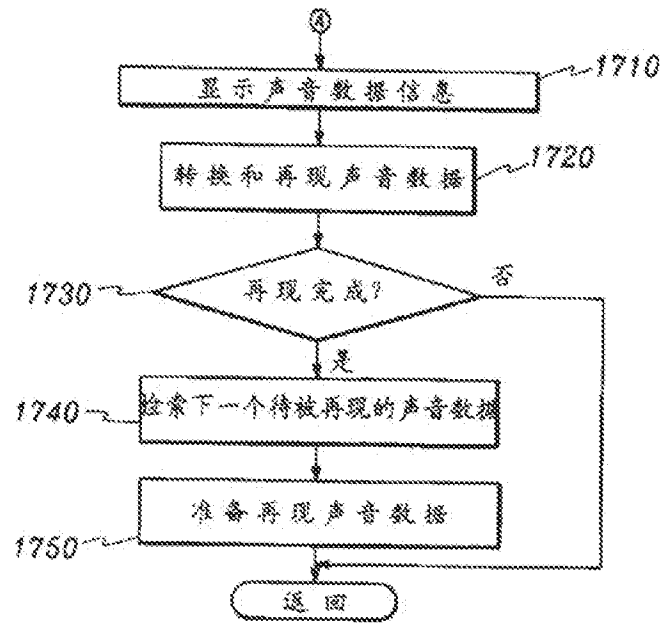


图 3e

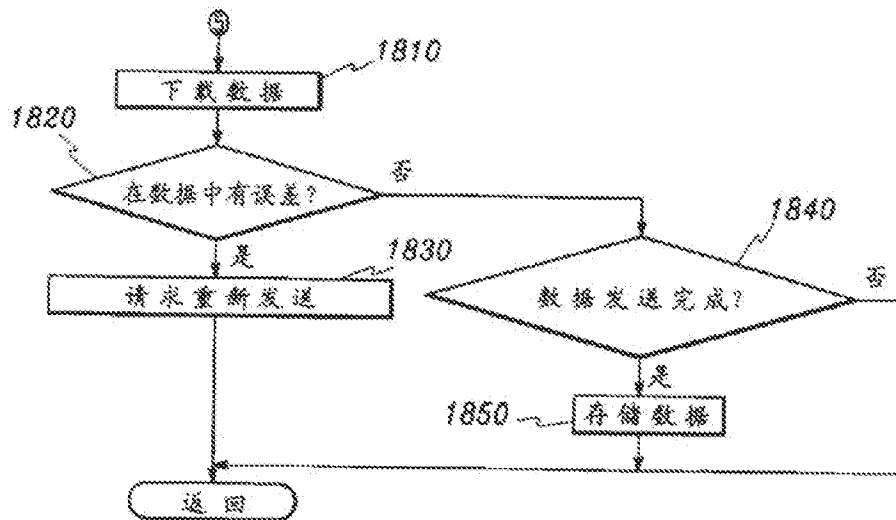


图 3f

(51) Int. Cl. <sup>6</sup>	Domestic classification symbol	F1			
G06F 17/30	351	G06F 15/40	310F		
13/00		13/00	351E		
		15/40	310G		
			370E		
		15/401	310D		

Request of examination: Not requested yet

Number of claims 20

OL (total 27 pages)

continuing to the last page

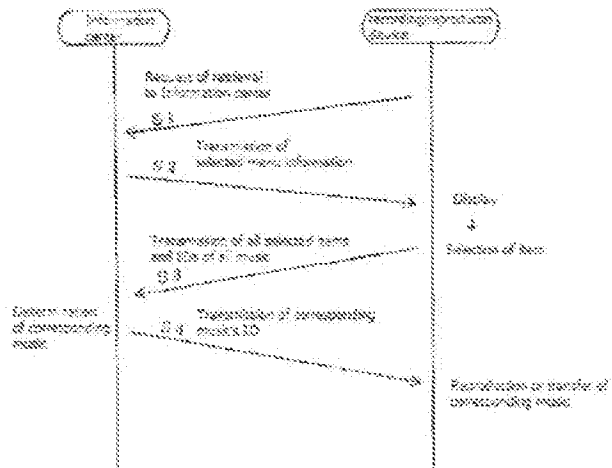
(21) Patent application	H10-45115	(71) Patent Applicant	00002185
(22) Filing date	February 26, 1998 (Heisei 10)		
		SONY Corporation	
		6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo	
		(72) Inventor Takashi Kumagai	
		C/O SONY Corporation	
		6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo	
		(72) Inventor Toshiyuki Arai	
		C/O SONY Corporation	
		6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo	
		(74) Agent Atsuo Waki, Patent attorney	
		and one other	

(54) [Title of the invention] INFORMATION DELIVERY SYSTEM, TERMINAL APPARATUS AND FILE PROCESSING METHOD

(57) Abstract

[PROBLEM TO BE SOLVED] To provide a user with an easy and diversified selection method of a stored file from a database incorporated in a terminal apparatus.

[SOLUTION] A classification database means, wherein a large number of data files (for example, musical compositions) are classified according to diversified categories, is provided to an information center so that information retrievals can be executed using retrieval object information transmitted from a terminal side and the classification database means in the information center. Also, in exchange of transmitting the retrieval object information from a user-side terminal to the information center, it is enabled that the user can obtain the result of retrieval, which matches the user's retrieval object information within the user's data files. For example, the data files in the classification database means are classified according to a variety of phenomena such as a season, time, event, mood, conditions and the like so that the user can process the data files (reproduction, transfer etc.) selected in accordance with the user's mood or condition by only designating the item of classification corresponding the user's mood or condition.



[Claims]

[Claim 1] An information delivery system comprising an information center and a terminal apparatus capable of communicating with the information center, wherein the information center comprises:

a classification database means storing classification information according to classification items on a plurality of data files;

a receiving means at the center side capable of receiving retrieval object information from the terminal apparatus;

an information retrieving means capable of executing data file retrieval by using the retrieval object information received at the center and the classification database means; and a transmitting means at the center side capable of transmitting the result of retrieval from the information retrieval means; and

the terminal apparatus comprises:

a storing means to store a plurality of data files;

a transmitting means at the terminal side capable of transmitting the retrieval object information to the information center;

a receiving means at the terminal side capable of receiving the result of retrieval from the information center; and

a file processing means capable of executing predetermined processing of data files corresponding to the result of retrieval received by the receiving means at the terminal side.

[Claim 2] The information delivery system according to Claim 1, wherein the terminal apparatus is provided with a selecting means capable of selecting classification item to be the target of the retrieval within the classification items stored in the classification database means; the retrieval object information transmitted by the transmitting means at the terminal side comprises the selected classification item selected by the selecting means and identification information of each data file stored in the storing means; the information retrieving means retrieves the classification database means to find classified data files corresponding to the data files identified from the identification information transmitted from the transmitting means at the terminal apparatus side within the classification items matching those transmitted from the transmitting means at the terminal side and;

the transmitting means at the center side transmits the identification information of data files retrieved by the information retrieving means as the result of information retrieval.

[Claim 3] The information delivery system according to Claim 1, wherein the file processing means reads out data files corresponding to the result of retrieval received by the receiving means at the terminal side to reproduce and output them.

[Claim 4] The information delivery system according to Claim 1 comprising: a connecting means capable of connecting the terminal apparatus to enable the terminal apparatus to communicate information; and a data-file-storage device capable of storing data files, wherein the file processing means reads out data files corresponding to the result of retrieval

received by the receiving means at the terminal side to supply to the data-file-storage device so that the data files are stored in the storing means in the data-file-storage device.

[Claim 5] The information delivery system according to Claim 4, wherein a reproducing means capable of executing reproduction and outputting of data files stored in the storing means in the data-file-storage device is provided to the data-file-storage device.

[Claim 6] An information delivery system comprising an information center and a terminal apparatus capable of communicating with the information center, wherein the information center comprises: a classification database means storing classification information according to classification items on a plurality of data files;

a receiving means at the center side capable of receiving retrieval object information from the terminal apparatus;

an information retrieving means capable of executing data file retrieval by using the retrieval object information received at the center and the classification database means; and a transmitting means at the center side capable of transmitting the result of retrieval from the information retrieval means; and

the terminal apparatus comprises:

a storing means to store a plurality of data files;

a transmitting means at the terminal side capable of transmitting the retrieval object information to the information center;

a receiving means at the terminal side capable of receiving the result of retrieval from the information center;

a classified-item-storing/processing means to store classification items received by the receiving means at the terminal side so as to correspond to respective data files stored in the storing means; and

a file processing means capable of executing predetermined processing of data files by using stored classification items corresponding to the respective data files.

[Claim 7] The information delivery system according to Claim 6, wherein the retrieval object information transmitted by the transmitting means at the terminal side is identification information of the respective data files stored in the storing means; the information retrieving means retrieves respective classification items corresponding to the respective data files identified from the identification information transmitted from the transmitting means at the terminal side; and

the transmitting means at the center side transmits the respective classification items for the respective data files retrieved by the information retrieving means.

[Claim 8] The information delivery system according to Claim 6, wherein a selecting means is provided to the terminal apparatus; and

the file processing means reads out data files corresponding to the result of retrieval received by the receiving means at the terminal side to reproduce and output them.

[Claim 9] The information delivery system according to Claim 6, wherein a selecting means is provided to the terminal apparatus; a connecting means capable of connecting the terminal apparatus to enable the terminal apparatus to communicate information is provided;

a data-file-storage device comprising a storing means capable of storing data files is provided; and the file processing means reads out data files stored so as to correspond to classification items selected by the selecting means from the storing means in the data-file-storage device.

[Claim 10] The information delivery system according to Claim 9, wherein a reproducing means capable of executing reproducing and outputting processing of data files stored in the storing means in the data-file-storage device is provided to the data-file-storage device.

[Claim 11] A terminal apparatus comprising:  
a storing means capable of storing a plurality of data files;

a transmitting means capable of transmitting retrieval object information to the outside information center;

a receiving means capable of receiving a result of retrieval transmitted from the information center; and  
a file processing means capable of executing predetermined processing of data files corresponding to the result of retrieval received by the receiving means at the terminal side.

[Claim 12] The terminal apparatus according to Claim 11, wherein a selecting means capable of selecting classification items to be the retrieval object information is provided; and  
the retrieval object information transmitted by the transmitting means at the terminal side comprises the classification items selected by the selecting means and identification information of the respective data files stored in the storing means.

[Claim 13] The terminal apparatus according to Claim 11, wherein the file processing means reads out data files corresponding to the result of retrieval received by the receiving means from data files stored in the storing means to reproduce and output them.

[Claim 14] The terminal apparatus according to Claim 11, wherein the file processing means reads out data files corresponding to the result of retrieval received by the receiving means from data files stored in the storing means and supplies them to outside data-file-storage device for the storage thereof.

[Claim 15] A terminal apparatus comprising:  
a storing means capable of storing a plurality of data files;

a transmitting means capable of transmitting retrieval object information to the outside information center;

a receiving means capable of receiving a result of retrieval transmitted from the information center;

a file processing means capable of executing predetermined processing of data files

corresponding to the result of retrieval received by the receiving means at the terminal side; and  
a file processing means capable of executing predetermined processing by using classification items stored so as to correspond to the respective data files.

[Claim 16] The terminal apparatus according to Claim 15, wherein the retrieval object information transmitted by the transmitting means is identification information of the respective data files stored in the storing means.

[Claim 17] The terminal apparatus according to Claim 15, wherein a selecting means to select classification items is provided; and the file processing means reads out data files stored in the storing means so as to correspond to the respective classification items selected by the selecting means to reproduce and output them.

[Claim 18] The terminal apparatus according to Claim 15, wherein a selecting means to select classification items is provided; and the file processing means reads out data files stored in the storing means so as to correspond to the respective classification items selected by the selecting means and supplies them to outside data-file-storage device for the storage thereof.

[Claim 19] A file processing method for a system, in which a mutual information communication between a terminal apparatus storing a plurality of data files and an information center comprising a classification database storing classification information according to classification items of a plurality of data files is enabled, wherein the following operation procedures are performed: a selecting operation procedure at the terminal apparatus side to select classification items to be the retrieval object information in the classification database means;

a first transmitting operation procedure to transmit the classification items selected by the selecting operation procedure and identification information of stored respective data files from the terminal apparatus side;

a first receiving means at the information center side to receive the classification items and the identification information transmitted by the first transmitting operation procedure;

a retrieving operation procedure at the information center side to execute the retrieval of data files by using the classification items and identification information received by the first receiving operation procedure and the classification database means;

a second transmitting operation procedure to transmit the identification information of data files as the result of retrieval by the retrieval operation procedure from the information center;

a second receiving operation procedure at the terminal side equipment to receive the identification information transmitted by the second transmitting operation procedure; and

a file processing operation procedure at the terminal apparatus side to execute predetermined processing of data files corresponding to the identification information received by the second receiving operation procedure.

[Claim 20] A file processing method for a system, in which a mutual information communication between a terminal apparatus storing a plurality of data files and an information center comprising a classification database storing classification information according to classification items of a plurality of data files is enabled, wherein the following operation procedures are performed: a first transmitting operation procedure to transmit the classification items selected by the selecting operation procedure and identification information of stored respective data files from the terminal apparatus side; a first receiving means at the information center side to receive the classification items and the identification information transmitted by the first transmitting operation procedure; a retrieving operation procedure at the information center side to execute the retrieval of classification items of data files by using the identification information received by the first receiving operation procedure and the classification database means; a second transmitting operation procedure to transmit the classification items of data files as the result of retrieval by the retrieval operation procedure from the information center; a second receiving operation procedure at the terminal apparatus side to receive the classification items transmitted by the second transmitting operation procedure; a classified-item-storing operation procedure at the terminal apparatus side to store the classification items received by the second receiving operation procedure so as to correspond to stored respective data files; a selecting operation procedure at the terminal apparatus side to select classification items; and a file processing operation procedure at the terminal apparatus side to execute predetermined processing of data files stored so as to correspond to classification items selected by the selecting operation procedure.

[Detailed description of the invention]

[0001]

[Field of the invention] The present invention relates to an information center, an information delivery system comprising the information center and a terminal apparatus capable of communicating with the information center, the terminal apparatus, and a file processing method using the information delivery system.

[0002]

[Description of the related art] A variety of devices are spreading as audiovisual apparatuses owned by users and it has becoming popular to individually enjoy music software or visual software. For example, users can own audio systems using disk recording media such as CDs (compact discs) or MD (minidisks) to reproduce their favorite CDs or MDs after purchasing them or they can produce original disks by copying favorite music compositions on MDs which are recordable media.

[0003]

[Problems to be solved by the invention] Development of a recording/reproducing apparatus as a novel audiovisual device capable of accumulating audio data files or video data files, for example using high-capacity media such as a hard disk, has been advanced. For example, a user can dub musical compositions recorded on his package media such as CDs on a hard disk in the novel audiovisual device to be developed. By using high-capacity recording media such as hard disks, for example, all musical compositions recorded on a

large number of CDs owned by the user can be stored in the recording/reproducing apparatus.

[0004] Thus, the user does not need to find a CD recording the music, which he wants to reproduce and load it in the recording/reproducing apparatus for the reproduction but he can simply designate the music so that the music can be read out from a hard disk for the reproduction. Therefore, this system would be particularly convenient for a user having a large number of CDs. Furthermore, since changing of CDs would not be necessary, it can be easily achieved that a user can enjoy musical compositions by simply selecting them for example in accordance with his mood and condition of the day.

[0005] Additionally, if a portable recording/reproducing device capable of transferring or copying musical components from the hard disk of the recording/reproducing apparatus is provided, it is enabled to select and copy only desired musical components from a large number of musical components onto the portable device for their reproduction. Particularly, if a hard disk or flash memory is used as the recording medium for the portable recording/reproducing device, the transfer or copying of musical components can be achieved instantaneously; therefore for example such a usage style that a user can select musical components in accordance with his mood and condition and transfer them to or copy them onto the portable recording/reproducing device to enjoy the reproduction thereof by the portable recording/reproducing device on a daily basis. For example, in cases in which desired musical components for a user are recorded on a plurality of CDs or MDs, the user has to carry all CDs or MDs with him for the reproduction of desired musical components using a conventional portable reproducing device (CD player or MD player); however the realization of above-described portable recording/reproducing device would eliminate the trouble.

[0006] Thus, users may be able to easily enjoy musical components by using above-described recording/reproducing apparatus and portable recording/reproducing device; however, following problems may occur with the usage thereof. For example, in cases in which considerably large number of musical components is stored in a hard disk of the above-described recording/reproducing apparatus, the selection of desired musical components or selecting operation of musical components which the user wants to transfer or copy may become troublesome. Meanwhile, in order to eliminate the troublesome selecting operation, it may be effective to classify each musical component according to the genre or artist; however, actually such classifications may not be necessarily effective for the user to select musical components in accordance with his personal fancy, mood, schedule, condition and the like. Furthermore, the addition of the advanced retrieval function for the selecting operation of musical components to the recording/reproducing apparatus may result in the higher production cost and enlargement thereof; therefore such apparatus may not be relevant as the apparatus used by an average user.

[0007] In consideration of above-described problems, the objective of the present invention is to provide a method which enables a user to appropriately and easily select musical components from a large number of data files such as music data stored in a hard disk and the like in accordance with his mood, condition, etc.



[0008] To achieve the objective, an information delivery system comprising an information center and a terminal apparatus capable of communicating with the information center is constructed in the present invention. The information center is provided with a classification database means storing classification information according to classification items on a plurality of data files, a receiving means at the center side capable of receiving retrieval object information from the terminal apparatus, an information retrieving means capable of executing data file retrieval by using the classification database means and a transmitting means at the center side capable of transmitting the result of retrieval from the information retrieval means. Additionally, the terminal apparatus is provided with a storing means to store a plurality of data files, a transmitting means at the terminal side capable of transmitting the retrieval object information to the information center, a receiving means at the terminal side capable of receiving the result of retrieval from the information center and a file processing means capable of executing predetermined processing of data files corresponding to the result of retrieval received by the receiving means at the terminal side.

[0009] That is, the information center is provided with the classification database in which respective data files of music components recorded on commercially available CDs are classified according to diversified classification items so that the user side can select and designate certain classification items in the classification database by using the terminal apparatus. Then the information center retrieves data files which are included in the selected classification items and also owned by the user in his terminal apparatus (i.e., data files stored in the storing means) and transmits the result to the terminal apparatus. Thus, by providing the information center with the classification database for retrieval, a very advanced retrieval is realized and the terminal apparatus can simply request retrieval by transmitting classification items and identification information on stored data files to the information center. And once receiving the result of retrieval from the information center, the processing of data files such as reproduction or transfer to other device according to a desired condition for the user is enabled based on the result. Therefore, the necessary selection operation for the user is to simply select the classification items in accordance with his mood or condition.

[0010] Additionally, an information delivery system comprising an information center and a terminal apparatus capable of communicating with the information center is constructed in the present invention. The information center is provided with a classification database means storing classification information according to classification items on a plurality of data files, a receiving means at the center side capable of receiving retrieval object information from the terminal apparatus, an information retrieving means capable of executing data file retrieval by using the classification database means and a transmitting means at the center side capable of transmitting the result of retrieval from the information retrieval means. Additionally, the terminal apparatus is provided with a storing means

to store a plurality of data files, a transmitting means at the terminal side capable of transmitting the retrieval object information to the information center, a receiving means at the terminal side capable of receiving the result of retrieval from the information center, a classified-item-storing means capable of storing classification items received by the receiving means at the terminal apparatus side so as to correspond to respective data files stored in the storing means and a file processing means capable of executing predetermined processing of data files corresponding to the result of retrieval received by the receiving means at the terminal side.

[0011] That is, the information center is provided with the classification database in which respective data files of music components recorded on commercially available CDs are classified according to diversified classification items so that the information center can retrieve data files owned by the user in his terminal apparatus (i.e., data files stored in the storing means) for their classification items and transmit the respective classification items of data files to the terminal apparatus. Then, classification items corresponding to respective data files transmitted from the information center in the terminal apparatus side. Therefore, at the time the user uses the terminal apparatus, by only selecting certain classification items, the terminal apparatus can extract data files corresponding to the selected classification items from all data files stored in the storing means so the predetermined processing of files can be executed. In this case, by providing the classification database for retrieval to the information center, information retrieval according to diversified classification items can be achieved (i.e., it is enabled to provide the terminal apparatus with diversified classification items for retrieval.) Therefore, the necessary selection operation for the user is to simply select the classification items in accordance with his mood or condition and thereby the processing of data files such as reproduction or transfer to other device according to a desired condition for the user is enabled.

[0012]

[Embodiments of the invention] Hereafter, the information delivery system, the information center 1 and recording/reproducing apparatus 10 which are configuring the information delivery system and furthermore a portable device 50 which is connectable with the recording/reproducing apparatus 10 shall be explained. The explanation shall be performed according to the following sequence.

1. Summary of the information delivery system
2. Example of appearances of the recording/reproducing device and the portable device
3. Internal constitution of the recording/reproducing device
4. Internal constitution of the portable device
5. Processing of the file migration
6. Storing mode of files in the recording/reproducing device
7. First example of the operation for file selection
8. Second example of the operation for file selection

[0013] Summary of the information delivery system  
Figure 1 shows the summary of the information delivery system according to the embodiment of the present invention. The information delivery system is constituted by the recording/reproducing apparatus 10 used at a house 2 of an average user and the information center as an information service organization concerning the usage of recording/reproducing device 10. It is enabled that the information center 1 and recording/reproducing apparatus 10 can mutually communicate various information through a communication line 3. The communication line may be a public network such as an ISDN network or a leased line network for the system and the mode of network is not particularly limited. Additionally, the information delivery system may be configured by a satellite communication line comprising a communication satellite 4 and parabola antennas 5 installed to each house 2 so as to enable information communication between the information center 1 and each recording/reproducing apparatus 10.

[0014] The recording/reproducing apparatus 10 used by an average user shall be explained in detail below, but is provided with a large capacity data storing unit (e.g., a hard disk drive 15 shown in Figure 3) therein as well as with a drive function of package media such as CDs or MDs, inputting function of data from other devices, inputting function of data through a communication line and the like. Therefore, it can store audio data, visual data and other various data reproduced from CDs, CD-ROM, MDs purchased by the user and other various data inputted from other devices or through the communication line as files.

[0015] Thereby, the user can freely reproduce any stored file (e.g., for music component, one song is stored as one file.) Therefore, if the user once stores all music components recorded in a large number of CDs that he owns as files, he can reproduce any desired music component without selecting and loading the CD wherein the desired music component is recorded.

[0016] The information center can provide various information to the recording/reproducing apparatus 10 as described above with or without charging fee. For example, the information center can provide information on files of musical components stored in the recording/reproducing apparatus 10 including text data such as song titles, artist names, lyrics and the like, image data such as images accompanied with songs, images of artists and the like and data on copyrights such as names of concerned parties such as lyric writers, composers, creators and the like. For example, the recording/reproducing apparatus 10 can store the information provided from the information center so as to correspond to files of musical components in order to utilize the information for various operations such as display. Additionally, it is also possible for the information center 1 to transmit audio data itself, i.e., musical components to the recording/reproducing apparatus 10 to make the recording/reproducing apparatus 10 store them as files; thus it is enabled to establish another sales system for musical components which is different from a conventional sales of CDs as package media.

[0017] The details shall be described below, but in this embodiment, the information center 1 comprises a database wherein musical components recorded on commercially available CDs are classified according to predetermined classification items so that the user of the recording/reproducing apparatus 10 can utilize the retrieval service using the classification database at the information center 1 for example through a communication line 3. That is, the retrieval of own musical components (files stored in the recording/reproducing apparatus 10) can be implemented by using the information center 1.

[0018] Additionally, in this embodiment, a portable recording/reproducing device (hereafter, portable device) 50, which is connectable to the recording/reproducing apparatus 10 is provided to a user. The details on the portable device 50 shall be described below, but it comprises data file storing unit (for example, a hard disk drive (or a flash memory) in Figure 4) 54 capable of storing files such as audio data therein. When connected to the recording/reproducing apparatus 10, files (musical components and the like) stored in the recording/reproducing apparatus 10 can be transferred to or copied onto the data file storing unit in the portable device 50. Needless to say but files stored in the data file storing unit in the portable device 50 can also be transferred to or copied onto the data file storing unit in the recording/reproducing apparatus 10.

[0019] Any files stored in the recording/reproducing apparatus 10 can be transferred to or copied onto the portable device 50 by the user to utilize them in the portable device 50. For example, user can listen to musical components outside of home after transferring the files of the musical components to the portable device 50.

[0020] Example of appearances of the recording/reproducing device and the portable device

Figure 2 shows one example of the appearances of the recording/reproducing apparatus 10 and the portable device 50. Meanwhile, what is explained here is only one example, and other modifications may be possible for the appearance of each device, configurations of the user interface (configurations for operations and displays), connecting mode between the recording/reproducing apparatus 10 and the portable device 50 and the like.

[0021] As shown in Figure 2, in this embodiment the recording/reproducing apparatus 10 is so-called a radio-cassette recorder so as to suit to the use at home. Of course, a component type is also usable. Operational keys, operational knobs, rotating keys referred to as jog dials are provided as a variety of operators Ka to the front panel and the like of the recording/reproducing apparatus. Speakers 35 to output reproduced sounds and a display part 24 to display various information are provided as outputting parts for a user. For example, the display part is formed by a liquid crystal panel.

[0022] A CD inserting part 17 is provided to insert CD system disks for the reproduction of CD system disks (audio CD, CD-ROMs, CD texts etc.) by the recording/reproducing apparatus 10 or dubbing of data onto the internal hard disk which shall be described below.

in a similar manner, an MD inserting part 18 is provided to insert MD system disks for the reproduction/reproduction [note by the translator: as per original] of MD system disks (audio MD, MD data etc.) by the recording/reproducing apparatus 10 or dubbing of data onto the internal hard disk.

[0023] Additionally, a variety of terminals 1a to be connected to other devices are provided. These terminals can serve as portions to be used for the connection with a microphone or headphone, as connecting terminals, optical digital terminals or interface connectors with other audiovisual device, personal computer and the like.

[0024] As means of inputting operations, a keyboard 90 or a remote commander 91 are provided in addition to the operators Ka. The keyboard 90 can be connected to the recording/reproducing apparatus 10 through a keyboard connector as a terminal 1a, or in cases in which an infrared ray transmitting part is installed in the keyboard 90, the operational information from the keyboard 90 can be outputted as infrared rays to be inputted in the recording/reproducing apparatus 10 through a light-receiving portion 21. The remote commander 91 can output the operational information for example in an infrared ray system. The operational information in terms of infrared rays can be inputted in the recording/reproducing apparatus 10 through the light-receiving portion 21. Meanwhile, when a wireless system is applied to the keyboard 90 or for the output of operational information from the remote commander 91, radio waves can be used instead of infrared rays.

[0025] Additionally, a PCMCIA slot 39 is formed on the recording/reproducing apparatus 10 so that data transactions by using the installed PCMCIA card are enabled.

[0026] The portable device is made small and light to suit to the portable use by the user. Operational keys and the like are provided to the portable device 50 as operators Kb for various operations by the user. Even though they are not illustrated, jog dials and the like may be also provided. Speakers 68 to output reproduced sounds and a display part 57 to display various information are provided as outputting parts for the user. For example, the display part 57 is formed by a liquid crystal panel.

[0027] Additionally, a variety of terminals 1b to be connected to other devices are provided. These terminals can serve as portions to be used for the connection with a microphone or headphone, as connecting terminals, optical digital terminals or interface connectors with other audiovisual device, personal computer and the like. For example, when the user carries the portable device, the user can listen to the reproduced music from the speaker 68 as well as from a headphone 92 connected to a headphone terminal among terminals 1b.

[0028] By connecting the recording/reproducing apparatus 10 with the portable device 50, it is enabled to perform a variety of data communications (real file data such as audio data etc. and control data for the processing thereof at the time of communication) between the recording/reproducing apparatus 10 and the portable device 50. In this embodiment, the recording/reproducing apparatus 10 is provided with an attaching part MT having a connector so that the portable device 50 is

connected to the recording/reproducing apparatus 10 by loading it in the attachment part MT. When the portable device 50 is loaded in the recording/reproducing device 10, a connector 60 arranged on the bottom of the portable device 50 and the connector 27 in the attaching part MT can be mutually connected and the data communications between two devices are performed through the connectors 60, 27. Meanwhile, the connection between recording/reproducing apparatus 10 and the portable device 50 may be achieved by a line connection system using a communication cable or a wireless system.

[0029] Internal constitution of the recording/reproducing apparatus 10

Subsequently, the internal constitution of the recording/reproducing apparatus 10 shall be explained by referring to Figure 3. Touch-tons or rotating operators are provided to the recording/reproducing apparatus 10 as a panel operating part 20. The operators herein are equivalent to various operators Ka in Figure 2. That is, they are various operators disposed on the device chassis. Meanwhile, it was not explained in Figure 2, but in addition to the display of operational keys on the display part 24, a touch-panel operators may be formed by providing a touch detecting mechanism on the display part 24, and these touch-panel operators are also included in the panel operating part 20 in Figure 3. By the operation of the panel operating part 20, operation signals to execute various operations of the recording/reproducing apparatus 10 are transmitted and the recording/reproducing apparatus 10 is operated according to the operation signals.

[0030] For example, to make the input operation of names of musical components corresponding to the recorded audio information or name of artists easy, the keyboard 90 or the remote commander 91 can be used; also by connecting the keyboard 90 to a USB (universal serial bus) terminal 1a5, the inputting by the keyboard 90 is enabled. That is, by supplying the input signal (operation signal) from the keyboard 90 through the USB terminal 1a6 to the USB driver, the signals can be inputted in the recording/reproducing device 10. Meanwhile, each of various terminals 1a1 to 1a7 corresponds to one of terminals 1a shown in Figure 2, respectively.

[0031] Additionally, it is configured that the operation signals in terms of infrared rays transmitted from the remote commander 91 (and operation signal transmitted from the keyboard 90 when set to output infrared rays) are converted from light to electricity at the light-receiving part 21 to be supplied to an infrared ray interface driver 22 so that they can be taken in the recording/reproducing device 10.

[0032] Meanwhile, it also may be configured so that the data output and transfer is performed through the infrared ray interface driver 22 or a USB driver 23.

[0033] The recording/reproducing apparatus 10 is provided with a RAM 13, ROM 12 and a flash memory 14 which configure a regular personal computer, and the entire operation control is performed by a CPU 11. The communication of file data or control data between each block is performed through a bus B1.

[0034] The ROM 1 stores a program and the like to control the operations of the recording/reproducing apparatus 10 according to input signals inputted by the operation of the panel operating part 20 (or input signals from the keyboard 90 or the remote commander 91.) Data area and task area for the execution of the program can be temporarily set on the RAM 13 and flush memory 14. Or, the ROM 12 stores a program loader and thereby the program itself can be loaded in the flush memory 14.

[0035] Once an optical disk of CD system (audio CD, CD-ROM, CD text etc.) is loaded in the CD-ROM drive 17 through the above-mentioned CD inserting part 17, the information recorded on the optical disc is read out by an optical pickup with a single speed or higher than a single speed for example such as 16X or 32X speed. Additionally, once an optical disk of MD system (audio MD, MD data etc.) is loaded in the MD drive 17 through the above-mentioned MD inserting part 18, the information recorded on the optical disc is read out by an optical pickup. Or, information can be recorded on the disk loaded therein. Meanwhile, in this embodiment, the CD-ROM drive 17 and MD drive 18 are provided; however it is also allowed to provide either one of them or to provide other drive corresponding to other information storing media (e.g. magnet-optical disks referred to as MOs, optical disks of other systems, magnelic disks, memory cards etc.)

[0036] As a high-capacity storing means in the recording/reproducing apparatus 10, a hard disk drive (hereafter, HDD) 15 to record and reproduce information on a hard disk is provided. For example, audio information and the like read out from the CD-ROM drive 17 or MD drive 18 can be stored in HDD 15 as files (e.g. one music component is stored as one file.)

[0037] Additionally, an encoder 28 to perform the encoding of audio data according to ATRAC2 (Adaptive Transform Acoustic Coding 2) and a decoder 29 to decode the encoded audio data according to ATRAC2 (Adaptive Transform Acoustic Coding 2) are provided. The encoder 28 and decoder 29 perform the encoding and decoding of supplied audio data corresponding to the control by the CPU 11. Additionally, a buffer memory 16 is provided to temporarily store the audio data which is the subject of processing. The buffer memory 16 performs the writing/reading-out of data based on the control by the CPU.

[0038] For example, in cases in which the data read out from the disk by the CD-ROM drive 17 is stored in the HDD 15, as the preprocessing for the storage of the audio data in the HDD 15, the audio data read out from the disk is temporarily stored in the buffer memory 16 as well as the same audio data is supplied to the encoder 28 for the encoding thereof

according to the ATRAC2. Furthermore, the data encoded by the encoder 28 is again stored in the buffer memory 16 temporarily, and finally the encoded audio data is accumulated in the HDD 15.

[0039] In this embodiment, it is configured that the audio data encoded according to the ATRAC2 by the encoder 28 is accumulated in the HDD 15; however, for example, it is allowed that the data read out from the CD-ROM drive 17 is directly accumulated in the HDD 15.

[0040] The encoder 28 not only encodes data read out from a medium loaded in the CD-ROM drive 17, but also it is configured so that audio signals inputted from a microphone terminal 1a3 connected to a microphone or other audio signals inputted from a line input terminal 1a2 connected to other device such as a CD player can be inputted therein through an A/D converter 31; these inputted audio data can be encoded by the encoder 28. Furthermore, it is configured that the data inputted from an external device (e.g. a CD player) can be inputted in the encoder 28 through an IEC958 (International Electrotechnical Commission 958) encoder; thus data inputted according to an optical digital system can be also encoded by the encoder 28.

[0041] Then, after encoding the data inputted from an external device, the encoded data can be stored in the HDD 15 in files.

[0042] Meanwhile in the above description, the ATRAC2 (trademark) is used as an encoding algorithm of the encoder 28; however, the algorithm may be any one which can compress the information and it also may be the ATRAC (trademark), MPEG (moving picture coding experts group), PASC (precision adaptive sub-band coding), TwinVQ (trademark), RealAudio (trademark), LiquidAudio or the like.

[0043] Additionally, the recording/reproducing apparatus 10 is provided with a modem 19 which is an interface connectable with an external network including the internet, TEL network, cable TV, wireless network and the like. Request signals, information stored in medium loaded in the CD-ROM drive 17, user ID, user information, user billing information and the like are transmitted to a remote server through the modem 19.

[0044] At the server (a server which is communicable through the communication line 3) side of the external network, operations including a verification by a user ID, processing of billing, retrieval of additional information on musical components from disk information such as titles, name of artists, composers, lyric writers, image of jackets, etc. are performed. All operations are controlled so that predetermined information, which the user requested can be returned to the recording/reproducing apparatus 10 side.

In this embodiment, the example wherein the additive information on musical components is returned; however, it is also possible to configure the system so that musical components requested by the user can be directly downloaded from the external network. Additionally, it is further possible to configure the system so that the information on musical components corresponding to the media information is returned and bonus tracks of predetermined media can be obtained by delivery.

[0045] The audio information accumulated in the HDD 15 is decoded by the decoder 29, and the decoded data can be reproduced and outputted by the speaker 35 through the D/A converter 33 and the amplifier 34. Or it can be reproduced and outputted by a headphone connected to the headphone terminal ta1. In this embodiment, the decoder 29 decodes data according to the ATRAC2; however the decoding algorithm may be any one which can match the encoding algorithm of the encoder 28. Additionally, it is possible that the encoding and decoding are performed by the CPU instead of being performed by the hardware.

[0046] The display unit 24 shown in Figure 2 is provided as an interface for the user to administrate and control files such as audio data accumulated in the HDD 15. The display part 24 is displayed and driven by a display driver 25. Required characters, symbols, icons and the like are displayed on the display part 24 based on the control by the CPU 11. Additionally, folders or jacket images corresponding to audio files (hereinafter, for the convenience of explanation, files, wherein audio data on musical components are recorded, are referred to as "audio files") and operations by a pointing device such as a mouse, pen, fingers and the like are enabled. The pointing device is included in the panel operating part 20. For example, such an operation that an audio file designated by the user on the display is reproduced is enabled.

[0047] Additionally, it is possible that selected files are deleted, transferred to or copied onto an external device (e.g. portable device 50) by using the display on the display part 24. Or, it is also possible to configure the display part 24 so as to graphically display an html (hyper text mark up language) document searched and downloaded from the WWW (World Wide Web) site on the internet as the related information based on a TOC (table of contents) information in a medium loaded in the CD-ROM drive 17. Furthermore, the display part 24 can also serve as a usual internet browser.

[0048] The recording/reproducing apparatus 10 is configured so as to take in audio information from a variety of devices or systems, connected to the terminal ta7, such as an IRD for satellite communication, MD player, DVD player, DV player and the like through an IEEE1394 interface 37 and IEEE1394 driver 36. As a further additive function, a PCMCIA (Personal Computer Memory Card International Association) slot 38 is provided through

a PCMCIA driver so as to enable the attachment of PCMCIA card thereto; therefore, peripheral devices such as an external memory unit, other media drive, modem, terminal adapter, capture board etc. can be easily connected thereto.

[0049] As described in Figure 2, the recording/reproducing apparatus 10 is provided with the connector 27 for the connection with the portable device 50. By connecting the connector 27 with the connector 60 of the portable device 50, the CPU 11 is enabled to exchange various information communications with the portable device 50 through the interface driver 26. For example, audio files accumulated in the HDD 15 can be transferred.

[0050] 4. Internal constitution of the portable device:  
An example of the internal constitution of the portable device is shown in Figure 4. The recording/reproducing apparatus 10 with the portable device 50 can be electrically connected by connecting the connector 27 and the connector 60. In this state, the interface driver 26 of the recording/reproducing apparatus 10 and the interface driver 59 of the portable device 50 are mutually connected so that the data communication between both devices is enabled.

[0051] The portable device 50 is provided with touch-tone and rotating keys and the like as a panel operating unit 56. That is, a variety of operators Kb shown in Figure 2 correspond to the panel operating part 56. By operating operators Kb as the panel operating part 56, operation signals to command the operations of the portable device 50 are transmitted to a control bus 52 so that the portable device 50 is operated according to the operation signals.

[0052] Additionally, similarly to the case of recording/reproducing apparatus 10, the portable device 50 is also provided with a RAM 53 and ROM 52 which configure a regular personal computer, and the entire operation control is performed by a CPU 51. The communication of file data or control data between each block is performed through a bus 52.

[0053] The ROM 52 stores a program and the like to control the operations of the portable device 50 according to the operation signals inputted by the operation of the panel operating part 56. Data area and task area for the execution of the program can be temporarily set on the RAM 53 and flush memory 54. Meanwhile, a flush memory may also be installed therein similarly to the case of recording/reproducing apparatus 10 and the configuration of bus shall not be limited.

[0054] As a storing means in the portable device 50, a hard disk drive (HDD) 54 to record and reproduce information on a hard disk is provided. For example, audio information and the like transferred from the recording/reproducing apparatus 10 can be stored in HDD 54 as files (e.g. one music component is stored as one file.) Meanwhile, a flush memory and the like may be used instead of a HDD as a storing means.

[0055] Additionally, similarly to the case of recording/reproducing apparatus 10, an encoder 61 to perform the encoding of audio data according to ATRAC2 and a decoder 62 to decode the encoded audio data according to ATRAC2 are provided. The encoder 61 and decoder 62 perform the encoding and decoding of supplied audio data corresponding to the control by the CPU 51. Additionally, a buffer memory 55 is provided to temporarily store the audio data, which is the subject of processing. The buffer memory 55 performs the writing/reading-out of data based on the control by the CPU 51.

[0056] For example, in cases in which the audio data not encoded according to ATRAC2 is supplied from the recording/reproducing apparatus 10 through the interface driver 59 to be stored in the HDD 54, as the preprocessing for the storage of the audio data in the HDD 54, the audio data is temporarily stored in the buffer memory 55 as well as the same audio data is supplied to the encoder 61 for the encoding thereof according to the ATRAC2. Furthermore, the data encoded by the encoder 61 is again stored in the buffer memory 55 temporarily, and finally the encoded audio data is accumulated in the HDD 54.

[0057] In this embodiment, it is configured that the audio data encoded according to the ATRAC2 is accumulated in the HDD 54; therefore in cases in which the audio files stored in the HDD 15 are supplied through the interface driver 59 to be stored in the HDD 54 (i.e. transfer or copy of musical components) the processing by the encoder 61 is not necessary. However, it is allowed that the audio data (uncompressed data) read out from a medium loaded in the CD-ROM drive 17 and the like in the recording/reproducing apparatus 10 is directly inputted through the interface driver 59, and in these cases, as processing to record the audio data on the HDD 54, it is necessary to encode the data by the encoder 61 as described above.

[0058] In this embodiment, it is configured so that the audio data encoded according to the ATRAC2 by the encoder 61 is accumulated in the HDD 54; however, for example, it is allowed to directly accumulate the uncompressed data in the HDD 54.

[0059] As the parts to supply the audio data to be compressed to the encoder 61, in addition to the above-described interface driver 59, a microphone terminal tb3, line input terminal tb2, optical digital terminal tb4 and the like are provided. Meanwhile, a variety of terminals tb1 to tb4 in Figure 4 respectively correspond to one of terminals tb in Figure 2.

[0060] The encoder 61 is configured so that audio signals inputted from a microphone terminal tb3 through an amplifier 55 or other audio signals inputted from a line input terminal tb2 connected to other device such as a CD player can be inputted therein through an A/D converter 64; these inputted audio data can also be encoded by the encoder 61 [note by the translator: as per original]. Furthermore, it is configured that the data inputted from an

external device (e.g. a CD player) can be inputted in the encoder 61 through an IEC958 (International Electrotechnical Commission 958) encoder 63; thus data inputted according to an optical digital system can be also encoded by the encoder 61.

[0061] Then, after encoding the data inputted from an external device, the encoded data can be stored in the HDD 54 in files.

[0062] Meanwhile in the above description, the ATRAC2 is used as an encoding algorithm of the encoder 61; however, the algorithm may be any one which can compress the information and it also may be the ATRAC, MPEG, PASC, TwinVQ, RealAudio, LiquidAudio or the like.

[0063] The audio information accumulated in the HDD 54 can be decoded by the decoder 62 and can be reproduced by a speaker 67 through a D/A converter 66 and an amplifier 67. Or it can be reproduced and outputted by a headphone connected to the headphone terminal tb1. In this embodiment, the decoder 62 decodes data according to the ATRAC2; however the decoding algorithm may be any one, which can match the encoding algorithm of the encoder 61. Additionally, it is possible that the encoding and decoding are performed by the software in the CPU 51 instead of being performed by the hardware.

[0064] The display unit 57 shown in Figure 2 is provided as an interface for the user to administrate and control files such as audio data accumulated in the HDD 54. The display part 57 is displayed and driven by a display driver 58. Required characters, symbols, icons and the like are displayed on the display part 57 based on the control by the CPU 51. Additionally, folders or jacket images corresponding to audio files and operations by a pointing device such as a mouse, pen, fingers and the like are enabled. The pointing device is included in the panel operating part 20. For example, such an operation that an audio file designated by the user on the display is read out from the HDD 54 and reproduced by the speaker 35 and the like is enabled. Additionally, it is possible that selected files are deleted, transferred to or copied onto an external device (e.g. recording/reproducing apparatus 10) by using the display on the display part 57.

[0065] Meanwhile, as explained in Figure 2, the portable device 50 is enabled to exchange data between the recording/reproducing apparatus 10 when loaded in the attaching part MT of recording/reproducing apparatus 10; however the interface may also be contactless, for example, an IrDA and the like may be used. Additionally, even though it is not illustrated but a charging current supplying part is provided to the recording/reproducing apparatus 10, so it may be configured in such a manner that electricity is charged in a chargeable battery of the portable device 50, which is the power supply unit for the operation, when the portable device 50 is attached to the recording/reproducing apparatus 10.

[0065] 5. Processing of the file migration in the recording/reproducing apparatus 10 and portable device configured as mentioned above, respectively stored files (audio data on musical components) can be copied or transferred (moved) between each other. That is, files stored in the HDD 15 of the recording/reproducing apparatus 10 can be transferred to or copied onto the HDD 54 of the portable device 50, or adversely, files stored in the HDD 54 of the portable device 50 can be transferred to or copied onto the HDD 15 of the recording/reproducing apparatus 10.

[0067] Meanwhile, herein, the word "copy" means the processing which results in a condition in which a certain file exists in both of the HDD to be copied and the HDD to copy after completing the operation, i.e., the same certain file can be reproduced in both the recording/reproducing apparatus 10 and portable device 50. By contrast, the word "transfer" (move) means the processing which results in a condition in which the reproduction of a certain file is disabled in the HDD to be copied after completing the operation. In this embodiment, it is enabled to transfer (move) any audio files between the HDD 15 and HDD 54.

[0068] The processing to transfer a designated file among files stored in the HDD 15 of the recording/reproducing apparatus 10 to the HDD 54 of the portable device 50 shall be explained by referring to Figure 5. This processing is executed by the CPU 11.

[0069] In Step F101, the CPU 11 detects whether the portable device 50 is loaded in the attaching part MT of the recording/reproducing apparatus 10 or not. The detecting methods at this time include a detection of loading condition by a mechanical switch system, a detection of connection by transacting signals through connectors 27, 60 and the like.

[0070] If it is judged that the recording/reproducing apparatus 10 and portable device 50 are connected each other, the processing proceeds to Step F102 and whether a request to transfer musical components, i.e., audio files to portable device 50 is requested by a user (or as an execution request by operation program) or not is judged. For example, more particularly, the audio file selected among folders indicating audio files displayed in the display part 24 by the user by using the predetermined pointing device will be transferred to the portable device 50 upon further receipt of the direction to transfer to the portable device 50 by the user.

[0071] If it is judged that there is a request of transfer of musical components based on above-mentioned operations, the volume of selected audio file is detected in the following Step F 103. Next, in Step F104, the free area in the HDD 54 of the portable

device 50 is detected and the result is compared with the volume of audio file requested to transfer to the portable device 50. The free area in the HDD 54 can be found by a communication with the CPU 51. For example, it is possible to configure the system so that the CPU 11 can directly access the HDD 54; in that case, by enabling the operation control of the HDD 54 or file control by the CPU 11, it is enabled that the CPU 11 directly checks the free area in HDD 54 and the like.

[0072] In cases in which it is judged that the free area in HDD 54 is insufficient compared to the volume of the audio file to be transferred, processing to delete audio files stored in HDD 54 will be executed. This processing may be executed by the CPU 11 through the CPU 51 or the directly executed by the CPU 11. As methods to delete audio files from HDD 54 (how to select files to be deleted), a method to delete files according to the ascending order of number of reproduction, a method to delete files according to the ascending order of date, and the like may be adopted. Additionally, since there is a fear that important files may be deleted automatically without the user's permission, it is preferred to provide a warning display on the display parts 24, 57 to obtain a confirmation by the user.

[0073] If it is judged that the transfer is possible in Step F104, and in cases in which the transfer is judged to be impossible and following processing of Step F105 is executed, the processing proceeds to Step F106 and the file migration is executed. That is, predetermined audio files are transferred from the HDD 15 to HDD 54 through the interface drivers 26, 59 and the transfer is recorded.

[0074] Since the above-mentioned operation is file transfer processing, a flag to prohibit a reproduction is set for the audio file which is transferred in the HDD 15 so that the audio file is treated as a file which is recorded but can not be reproduced. Meanwhile, it is also possible to delete the audio file which is transferred from the HDD 15 in Step F107.

[0075] Since the audio file is virtually transferred to the portable device 50 from the recording/reproducing apparatus 10 by setting a flag to prohibit a reproduction in Step F107, it is controlled that only one certain audio file can exist; therefore the flag can also serve to prevent an illegal copy of files. Additionally, since the transfer is performed between the HDD 15 and HDD 54 both of which are high-speed accessing media and an encoding/decoding processing such as ATRAC2 is not necessary, the transfer is completed instantaneously and even a plurality of files can be transferred in a short time.

[0076] Thus, the file transfer is achieved by the execution of processing described in Figure 5.

These processing enables, the user for example, to select desired musical components from those owned by the user (i.e. files stored in the HDD 15) and to transfer them to the portable device to enjoy them out of home.

[0077] Meanwhile, in cases in which a copy of files is performed, only the processing in Step F107 is not executed. Additionally, in cases in which a file is transferred to (or copied onto) HDD 15 from HDD 54, the similar processing as described above needs to be executed by the CPU 51; however, the processing can also be mainly executed by the CPU 11.

[0078] 6. Storing mode of files in the recording/reproducing apparatus

Figure 6 shows an example of storing mode of files in the HDD 15 of the recording/reproducing apparatus 10. By way of example, the user can load his CD in the CD-ROM drive 17 and record (i.e. copy) musical components stored in the CD as respective files in the HDD 15. If the storage is implemented on a basis of a medium such as a CD, an administrative file corresponding to each medium in the CD, which is copied is formed, and each musical component is stored as one audio file.

[0079] Figure 6 shows a condition in which "n" pieces of CDs are copied on the HDD 15; an administrative file AL (AL1 to AL(n)) corresponding to each CD is formed. Each musical component recorded on each CD is stored as an audio file so as to correspond to each administrative file. In Figure 6, files in each row mean files copied from one CD; for example, copied data from a certain CD (respective musical components) are stored as AL1-M1, AL1-M2, AL1-M3, and so on, in such a manner that respective files correspond to the administrative file, AL1. Copied data from other CD (respective musical components) are stored as AL2-M1, AL2-M2, AL2-M3, and so on, in such a manner that respective files correspond to the administrative file, AL2. That is, these are actual music data. Thus, when one CD is copied, one administrative file and audio files of same number as that of musical components in the CD are formed.

[0080] Additionally, at the time of copying a certain CD, the user may be able to input data, or the user may be able to receive related information to the CD from the information center 1 with or without charge, and those information is stored as related information files. By way of example, a related information file AL1ad is formed corresponding to the administrative file AL1. The data stored as the related information file AL (\*) ad are, as described above, files, name of artists, text data such as lyrics, images on musical components and image of artists, address of artist's internet homepage (URL), information on copyrights, name of related persons (composers, lyric writers, creator and the like) etc.

[0081] The administrative file comprises a variety of information on corresponding one or more than two audio files and related information files and is used

at the time of reproduction, transfer, copy or edition of each audio file of related information file. For example, the administrative file AL1 stores entire administrative information, administrative information on each audio file, AL1-M1, AL1-M2, AL1-M3, and so on, of a group of files which are copied and stored from a medium such as a CD and furthermore administrative information on the related information file AL1ad.

[0082] Figure 7 shows an example of data of administrative information recorded on an administrative file. For example, as the album information, which is entire administrative information, copied and stored from a medium such as CD, file types, number of files, title of the album, data sizes, date and time of copy, name of related persons (composers, lyric writers, player and the like), information on copyrights, album ID and other information are recorded. The album ID is an identification code unique to the album recorded on a medium such as CD.

[0083] As the administrative information individually corresponding to each audio file, file information (#1) to file information (#m) are recorded on the administrative file, and the file information includes a file type of the corresponding file, address pointer indicating recording position of the corresponding file on the HDD 15, data size of the file, title (name of the music component etc), time and date of copy, name of related persons (composers, lyric writers, player and the like), information on copyright, musical component ID, flag to prohibit the reproduction, classification item code, and other various administrative information. The musical component code is an identification code unique to the musical component in case of musical component file. The flag to prohibit the reproduction is the flag to prohibit the reproduction explained for the transfer operation in Figure 5. The classification item code is information on classification items recorded so as to correspond to a musical component in the second example of operation for file selection to be described below.

[0084] Furthermore, related file information is recorded in the administrative file as the administrative information to administrate the related file. The related file information includes a file type and number of files of corresponding related information files, address pointer indicating recording position of related information file on the HDD 15, data size of the related information file, time and date of recording, name of related persons, information on copyright, related information file ID, and other various administrative information.

[0085] By recording above-mentioned administrative information in the administrative file, the recording/reproducing apparatus 10 is enabled to execute processing of reproduction, transfer, copy, edition of certain musical component and output images or texts as related information while the music component is reproduced and the like.



[0086] Meanwhile, the contents of administrative information numerated in the explanation of Figure 7 is only one example and the file storing mode shown in Figure 6 is also only an example. In practice, preferred file storing mode and administrative mode for a variety of processing of the audio data, which is the actual data, may be adopted. Additionally, in this embodiment, the file is explained as being the audio data on musical component; however, it is also considered to store the moving image data, still image data, text data, program as a game software as actual files (i.e., not as related files but as independent files.)

[0087] First example of the operation for file selection

Subsequently, the first example of the operation for the file selection, which is a unique operation in this embodiment shall be explained. As described above, the user is able to reproduce or transfer audio files stored in the HDD 15 of the recording/reproducing apparatus 10. That is, by storing audio files copied from own CD and the like in the HDD 15 of the recording/reproducing apparatus 10, the user can select and reproduce desired musical components among a large number of musical components he owns, or transfer the same to the portable device for the reproduction thereof outside the house. Additionally, in cases in which audio files are transferred to the portable device 50, since the data transfer between HDDs (or between the HDD and flash memory) can be completed instantaneously, for example, the user can easily select musical components in accordance with his mood or condition every day without having any temporal burden.

[0088] However, in cases in which a considerably large number of musical components are stored in the HDD 15, the operation to select desired musical components or musical components to be transferred to the portable device 50 becomes troublesome. Especially in cases in which the user wants to select musical components in accordance with his mood or condition (time, schedule or place to visit etc), the user has to think about musical components suitable for his mood and condition and perform an operation to designate them among a large number of musical components. Therefore, this embodiment achieves the simplification of file selecting operation and an operation, which does not put a burden on the user as described below.

[0089] In the first example of operation, for the file selection, first the information center provides a selection menu to the user, i.e., the recording/reproducing apparatus 10 through the communication line 3. Then, the user can simply perform a selecting operation toward the selection menu displayed on the display part 24 of the recording/reproducing apparatus 10, and thereby one or more than two musical components he desires are selected and the reproduction or transfer to the portable device 50 thereof can be automatically performed without specifically designating name of musical components etc.

[0090] Herein, the classification items in the selection menu provided by the information center 1 are not items according to music genres or artists (of course, these classification items may be included therein), for example, they are classification items by which the user can select musical components in accordance with his mood, condition, date, schedule etc at the time. For example, classification items

according to the seasons such as "spring music", "summer music", "autumn music" and "winter music" or classification items according to the time such as "morning music", "daytime music" and "nighttime music" or as classification items according to conditions or schedules such as "music for driving", "music for party" and "music for date" and the like may be provided. More diversified examples for classification items such as "recent recommended music", "hit numbers", "love songs", "farewell songs", "vernal songs", "journey songs", "mountain songs", "ocean songs" and the like may also be provided.

[0091] The information center 1 comprises a classification database in which numerous commercially available music components are classified according to diversified classification items as described above. By way of example, Figure 8 exemplifies part of contents stored in the classification database. That is, as shown in Figure 8, the database comprises lists of musical components in such a manner that they correspond to each classification item which matches them. Needless to say, but depending on how to set the classification items, there may be cases in which a certain musical component is included in a plurality of classification items.

[0092] Meanwhile, the user using the recording/reproducing apparatus 10 has a large number of musical components stored in the HDD of the recording/reproducing apparatus 10. For example, herein it is assumed that a variety of musical components as shown in Figure 9 (a) are stored in the HDD 15 as files. The user select one or more than two musical components among those owned by the user and reproduce or transfer them to the portable device 50; at that time the user can utilize the classification database of the information center 1 as shown in Figure 8. For example in the case in which the user selects the "spring music" from a variety of classification items provided by the information center 1; the information center 1 retrieves musical components included in the classification item of "spring music" among the musical components owned by the user as shown in Figure 9(a) from the database; and transmits the corresponding musical components to the user as the result. Then, the recording/reproducing apparatus 10 reproduces or transfers the corresponding musical components. For example, in this example, there are two musical components, which match the classification item, "spring music among musical components shown in Figure 9(a); therefore these two musical components shown in Figure 9(b) are reproduced or transferred.

[0093] Communication operations between the information center 1 and the recording/reproducing apparatus 10 at the time of execution of the first example of operation shall be explained by referring to Figures 10 and 11. Figure 10 shows basic communication operations. When the user wants to use the file selection as the first example of operation provided by the information center 1, the user operates the recording/reproducing apparatus 10 to transmit the request of retrieval. Then, the recording/reproducing apparatus 10 transmit a request for retrieval as Communication S1 to the information center 1. When the request is received by the information center 1, the information center 1 transmits information of selection menu as Communication S2 in return.

That is, the information center 1 transmits information on selection items stored in the classification database so that the classification items on the database can be displayed as selection menus in the recording/reproducing apparatus 10.

[0094] After receiving the selection menu information, the recording/reproducing apparatus 10 makes the display part 24 display selection items supplied as one of selection menu information so as to present it to the user. For example, the selection menu as shown in Figure 14 (a) is displayed. The user selects desired classification items in accordance with his mood or condition from classification items such as "spring music", "summer music", "autumn music", and so on, displayed in the selection menu.

[0095] Once certain classification items are selected by the user, the recording/reproducing apparatus 10 transmits the information on selected classification items as Communication S3, and concurrently, transmits all IDs of musical components owned by the user (i.e., stored in the HDD 15). As described above, the administrative information on each audio file in the HDD 15 is stored in the corresponding administrative file, and also musical component ID as an identification code of the musical component is added (of course, other file structure such as the musical component ID is added in the header area of each audio file is possible.) Figure 9 (a) shows musical component IDs (id1 to id (x)) to identify the stored musical component; thus, musical components for all musical components owned by the user is transmitted from the recording/reproducing apparatus 10 to the information center.

[0096] After receiving the selected items and all musical component IDs as Communication S3, the information center 1 executes a retrieval by using the classification database as shown in Figure 6. That is, musical components contained in the selected classification items registered in the database are compared with musical components owned by the user by using each ID of musical component to retrieve musical components owned by the user which match those in the database (hereafter, referred to as "corresponding musical components"). For example, when ID of each musical component as shown in Figure 9 (a) and the classification item, "spring music" are transmitted, the retrieval is performed in such a manner that a list of musical components which is classified as "spring music in the database shown in Figure 8" is compared with musical components owned by the user to retrieve corresponding musical components. In this example, as easily understood by comparing Figure 8 and Figure 9 (a), 2 musical components in Figure 9 (a) are corresponding musical components.

[0097] After completing the retrieval of corresponding musical components, the information center 1 transmits IDs of corresponding musical components to the recording/reproducing apparatus 10 as the result in Communication S4. By receiving IDs of corresponding musical components, the recording/reproducing apparatus 10 is enabled to determine files (musical components) corresponding to the classification item selected by the user among files stored in the HDD 15 so that the recording/reproducing apparatus 10 can reproduce or transfer them to the portable device 50. For example, musical components in Figure 9 (b) are reproduced or transferred.

[0098] Meanwhile, corresponding musical components are selected from corresponding musical components owned by the user; therefore, there may be a case in which no musical components corresponding to the selected classification item are found (the user does not own them.) The communication operations for such a case are shown in Figure 11. Meanwhile, Communications S1, S2 and S3 are similar to those shown Figure 10, so the explanation shall be omitted.

[0099] After receiving the selected items and all musical component IDs as Communication S3, the information center 1 executes retrieval by using the classification database as described above; in cases in which no corresponding musical components are found, information for selectable menu is transmitted as Communication S5. The selectable menu is the information in which classification items, which can be selected by the user within the extent of musical components owned by the user are listed. That is, the selection menu information as Communication S2 is a list of classification items provided in the classification database of the information center; however, the selectable menu information as Communication S5 is the information as the result of retrieving all classification items on the classification database in accordance with all musical components owned by the user and at the recording/reproducing apparatus 10 side, for example, the selectable menu is displayed as shown in Figure 14 (b).

[0100] The user selects desired classification items from those listed up in the selectable menu, and once certain classification items are selected, the recording/reproducing apparatus 10 transmits information on selected classification items as Communication S6. Meanwhile, IDs of all musical components are already transmitted so it is not necessary to send them again.

[0101] After receiving the information on selected classification items as Communication S6, the information center 1 executes the retrieval by using the classification database again and determines the corresponding musical components among those owned by the user. By definition, some corresponding musical components are determined at this time. Then, after completing the retrieval of corresponding musical components, the information center 1 transmits IDs of corresponding musical components to the recording/reproducing apparatus 10 as the result in Communication S7. By receiving IDs of corresponding musical components, the recording/reproducing apparatus 10 is enabled to determine files (musical components) corresponding to the classification item selected by the user among files stored in the HDD 15 so that the recording/reproducing apparatus 10 can reproduce or transfer them to the portable device 50.

[0102] Meanwhile, as a modification of this example of operation, it is possible to transmit IDs of all musical components owned by the user with the request for retrieval at the stage of Communication S1. Thereby, the information center is enabled to transmit the selectable menu information at the stage of Communication S2; therefore at the first display of menu for the user, only selectable menu is presented to the user and the condition, which no corresponding musical components for selected classification items are found, is prevented from occurring.

[0103] The processing in the recording/reproducing apparatus 10 (processing by the CPU 11) to achieve the above-mentioned first example of operation is shown in Figure 12 and the processing in the information center 1 is shown in Figure 13. First, the processing at the recording/reproducing apparatus 10 side shall be explained by referring to Figure 11. After the execution of the operation for the request for retrieval by the user, the processing by the CPU proceeds from Step F201 to Step F202 to transmit the request for retrieval to the information center 1. That is, above-mentioned Communication S2 is executed. Then, in Step 203, the CPU 11 waits for the selection menu information (Communication S2) from the information center 1. After receiving the selection menu information, the processing proceeds to Step F203 wherein a selection menu corresponding to the selection menu information as shown in Figure 14 (a) is displayed in the display part 24. Then, the CPU 11 waits for the operation by the user. After confirming the selection menu, the user selects desired classification items or cancels the processing. Meanwhile, it is omitted in a flowchart in Figure 12, the user may have to operate the page flipping or cursor movement on the display of menu to select classification items; therefore, the CPU 11 has to control of display corresponding to those operations.

[0104] If the user cancels the operation, the processing is terminated at Step F206. If the user executes the operation to select certain classification items, the processing proceeds from Step F205 to Step F207 wherein selected classification items and IDs of all musical components (all audio files) stored in the HDD 15 are transmitted. That is, the above-mentioned Communication S3 is executed. Then the processing waits for the transmission of IDs of corresponding musical components (Communication S4) or selectable menu information (Communication S5) from the information center 1.

[0105] If the IDs of corresponding musical components are transmitted; that is such a case as shown in Figure 10, therefore the processing proceeds from Step F208 to Step F210. Then, it is determined that the operation requested by the user is either reproduction or transfer to the portable device 50. In case of reproduction, the processing proceeds to Step F212 wherein one or more than two corresponding musical components indicated by received IDs of corresponding musical components are read out from the HDD 15 and processing to reproduce and output them from the speaker 35 and the like is executed. By contrast, when the operation requested by the user is transfer, the processing proceeds to Step F211 wherein one or more than two corresponding musical components indicated by received IDs of corresponding musical components are read out from the HDD 15 and processing to transfer them to the HDD 54 of the portable device 50 is executed. That is, the file transfer explained in Figure 5 is executed (the files to be transferred in Figure 5 is one or more than two files indicated by IDs of corresponding musical components.)

[0106] Meanwhile, the determination of user's direction in Step F210 may be executed to prompt the user to execute the operation to direct when the processing proceeds to this stage, or it may be possible to prompt the user to direct the processing in Steps F201 or F205.

[0107] After transmitting the selected classification items and IDs of all musical components in Step F207, there may be a case that the selectable menu is transmitted from the information center 1. That is, this is such a case as explained in Figure 11; in this case the processing proceeds from Step F209 to Step F213. Then according to the received selectable menu information, a

selectable menu as shown in Figure 14 (b) is displayed in the display part 24. Thereafter, the processing waits for the operation by the user. After confirming the selection menu, the user selects desired classification items or cancels the processing. Meanwhile, in this Step the user may also have to operate the page flipping or cursor movement on the display of menu to select classification items; therefore, the CPU 11 has to control of display corresponding to those operations.

[0108] If the user cancels the operation, the processing is terminated at Step F215. If the user executes the operation to select certain classification items, the processing proceeds from Step F214 to Step F216 wherein selected classification items are transmitted. That is, the above-mentioned Communication S6 is executed. Then the processing waits for the transmission of IDs of corresponding musical components in Step F208. After receiving IDs of corresponding musical components from the information center 1 as Communication S7, the processing proceeds to Step F 210 wherein the user's direction is determined. Then, if user directs the reproduction, the processing proceeds to Step F212 wherein one or more than two corresponding musical components indicated by received IDs of corresponding musical components are read out from the HDD 15 and processing to reproduce and output them from the speaker 35 and the like is executed. By contrast, when the operation requested by the user is transfer, the processing proceeds to Step F211 wherein one or more than two corresponding musical components indicated by received IDs of corresponding musical components are read out from the HDD 15 and processing to transfer them to the HDD 54 of the portable device 50 is executed.

[0109] Next, the processing at the information center 1 side shall be explained by referring to Figure 13. In the information center, when receiving a request for retrieval from a certain recording/reproducing apparatus 10 as Communication S1, the processing proceeds from Step F301 to Step F302 wherein selection menu information is created. That is, the selection menu information is created by listing up classification items prepared as the classification database. In this case, it may be possible to select classification items by taking the date, season, current events and the like at that time into consideration. Meanwhile, the selection menu can be previously created and updated whenever new classification items are added to the database and the like.

[0110] Next, in Step F303, the selection menu information is transmitted to recording/reproducing apparatus 30 (note by the translator; as per original) which transmits the request for retrieval as the aforementioned Communication S2. Then, in Step F304 the processing waits for the Communication S3, i.e., the transmission of selected classification items and IDs of all musical components from the recording/reproducing apparatus 10. After receiving the selected classification items and IDs of all musical components, the retrieval is executed in Step F305. That is, as described above, musical components contained in the selected classification items registered in the database are compared with musical components owned by the user by using each ID of musical component to retrieve corresponding musical components. Herein, if corresponding musical components are found, the processing proceeds to Step F307 wherein IDs of corresponding musical components are transmitted to the recording/reproducing apparatus 10 (aforementioned Communication S4) and the processing is completed.

[0111] However, in cases in which no corresponding musical components are found as the result of retrieval in Step F305, the processing proceeds from Step F306 to Step F308 wherein a selectable menu is created by listing up selectable items for the user of the recording/reproducing apparatus 10 from classification items in the classification database. Then, the selectable menu information is transmitted to the recording/reproducing apparatus 10 in Step F309. That is, the aforementioned Communication S5 is executed. After transmitting the selectable menu information, the process waits for the Communication S6 from the recording/reproducing apparatus 10, i.e., the receipt of selected classification items, and after receiving thereof, the processing proceeds from Step F310 to Step F311 wherein the retrieval is executed. That is, musical components contained in the selected classification items registered in the database are compared with musical components owned by the user by using each ID of musical component to retrieve musical components owned by the user which match those in the database. In this case the corresponding musical components must definitely exist; therefore after the completion of the retrieval, the processing proceeds to Step F307 wherein IDs of corresponding musical components are transmitted to the recording/reproducing apparatus 10 (aforementioned Communication S7) and the processing is completed.

[0112] By executing above-mentioned processing as shown in Figures 12 and 13, the operations as the first example of the operation in this embodiment is actualized and thereby the user only needs to select arbitrary classification items in accordance with his mood or condition on that day; accordingly musical components which meet his mood or condition are selected and their reproduction or transfer to the portable device can be performed. Thus, the selecting operation for the user can be significantly simplified. For example, by selecting "driving music" from the selection menu before going to drive a car, the user can obtain a condition in which musical components suitable for driving are transferred to the portable device side. Additionally, since the contents of the data in communications executed in this example of operation as shown in Figures 10 and 11 are request commands, IDs of musical components, classification items and the like and are smaller, with respect to the data volume, than audio data or video data, the communications can be swiftly completed without constructing a high-speed communication line. Therefore, there will not be cases in which the user has to wait long.

[0113] As described above, according to this embodiment of the present invention, the user's daily operation to select desired musical components can be simplified, the operation can be completed in a shorter time and the usability of the recording/reproducing apparatus 10 and portable device 50 can be significantly improved.

[0114] B. Second example of the operation for file selection

Next, the second example of the operation for file selection different from the above-mentioned first example of the operation shall be explained as the example of operation for file selection in this embodiment. The second example is also to significantly simplify the selecting operation by the user and to achieve the operation, which will not put a burden on the user.

[0115] In the first example of the operation as described above, the retrieval for file selection is executed in the information center 1; however, in this second example of the operation, the retrieval of files is executed by the

recording/reproducing apparatus 10 side. That is, in this example of operation, the information center 1 is provided with the classification database as shown in Figure 6, and retrieves classification items in the classification database based on the each musical component owned by the user and transmits thereof to the recording/reproducing apparatus 10. The recording/reproducing apparatus 10 stores the transmitted classification items from the information center 1 so that they can correspond to respective musical components (audio files) stored in the HDD 15. Then, in the processing process of the retrieval after the actual retrieval is executed, the communication with the information center is not particularly performed, that is, a selection menu is created from the stored classification items so that the user can select musical components.

[0116] The user using the recording/reproducing apparatus 10 is storing a large number of files as musical components copied from own CDs and the like in the HDD. For example, now it is assumed that a variety of musical components as shown in Figure 15 (a) are stored in the HDD 15 as files. The classification items for respective files stored as described above are submitted to the information center 1 for the determination thereby, and then the recording/reproducing apparatus 10 receives the information on classification items determined for respective musical components. The recording/reproducing apparatus 10 stores the classification items for musical components so that they can correspond to respective musical components. Herein, the classification items are expressed as "Kwa", "Ksp" and so on; these correspond to classification items set in the database as shown in Figure 6. These classification items may be stored in the administrative files to administrate respective audio files (refer to Figures 6 and 7.) Or, they may be stored in the respective header regions of audio files. Meanwhile, of course there may be cases wherein a plurality of classification items correspond to a single musical component (audio file.)

[0117] A selection of actual musical components for the reproduction or transfer to the portable device 50 thereof is performed by the user from own musical components; at the time of the selection, the recording/reproducing apparatus 10 (CPU 11) checks classification items of respective musical components stored in the HDD 15 to create a selection menu to make user perform the selection. After the selection, audio files (corresponding musical components) corresponding to the selected classification items are retrieved and the reproduction or transfer thereof is executed according to the selection operation. For example, when "spring music" is selected from a variety of classification items presented in the selection menu by the user, musical components corresponding to the classification item "Ksp" of "spring music" are retrieved in the HDD 15; as the result, for example, 2 musical components are extracted as shown in Figure 15 (c); 2 musical components as shown in Figure 15 (c) are reproduced or transferred.

[0118] Communication operations between the information center 1 and the recording/reproducing apparatus 10 at the time of execution of the second example of operation shall be explained by referring to Figure 16. This communication operation is executed in one stage previous to that the user actually executes the file selection operation. First, at a predetermined time point based on the user's selection or judgment by the CPU 11, the recording/reproducing apparatus 10 transmits a request for classification and IDs of all musical components stored in the HDD 15 as Communication S10 to the information center 1.

[0119] After receiving the request for classification and all musical component IDs as Communication S10, the information center 1 executes a retrieval by using the classification database as shown in Figure 8. That is, each musical component owned by the user which is identified by the received musical component ID is subjected to the retrieval in the classification database to determine one or more than two classification items including the each musical component.

[0120] After determining all classification items for all musical components owned by the user, the information center 1 transmits information on classification items for respective musical components to the recording/reproducing apparatus 10 as the result of retrieval. After receiving the classification items for respective musical components, the recording/reproducing apparatus 10 stores them on the HDD so that they can correspond to stored respective musical components (audio files).

[0121] Additionally, when new audio files are added on the HDD 15 by further copy of CD and the like by the user afterward, the recording/reproducing apparatus 10 executes an operation to transmit a request for classification and musical component IDs corresponding to newly added audio files to the information center as Communication S12.

[0122] After receiving the request for classification and musical component IDs corresponding to newly added audio files as Communication S12, the information center 1 executes a retrieval by using the classification database as shown in Figure 8 to determine classification items corresponding to added musical components. After determining all classification items, the information center 1 transmits information on classification items for respective musical components to the recording/reproducing apparatus 10 as the result of retrieval in Communication S13. After receiving the classification items, the recording/reproducing apparatus 10 stores them on the HDD so that they can correspond to stored newly added musical components (audio files).

[0123] The processing by the CPU 11 in the recording/reproducing apparatus 10 and the processing in the information center 1 to achieve the above-mentioned communications are shown in Figure 17. When the request for classification is executed by the user or judgment of the CPU 11, first, the processing proceeds from Step F401 to Step F402 wherein whether audio files to which classification items are added exist among audio files stored in the HDD 15 or not is judged. If it is judged that there are no classified audio files, the processing proceeds to Step F403 wherein the operation to transmit IDs of all musical components stored in the HDD 15 with a request for classification, i.e., the above-mentioned Communication S10 is executed. By contrast, if it is judged that there are classified audio files, the processing proceeds to Step F404 wherein audio files to which classification items are not added yet are listed up, and the operation to transmit musical component IDs corresponding to unclassified musical components with a request for classification, i.e., Communication S12 is executed.

[0124] After receiving the request for classification transmitted from the recording/reproducing apparatus 10 by processing in Step F403 or Step F404, in the information center 1, the processing proceeds from Step F501 to Step F502 wherein a retrieval of classification items corresponding to IDs of

transmitted respective musical components is executed by using the classification database. Then in Step F503, the classification items corresponding to respective musical components are transmitted as the result of retrieval. That is, the above-mentioned Communication S11 or S13 is executed.

[0125] In the recording/reproducing apparatus 10, after executing the processing of Step F403 or Step F404, the processing is waiting for the receipt of classification items as the result of retrieval in Step F405. After receiving the result, the processing proceeds to Step F406 wherein the classification items are stored in the HDD 15 so as to correspond to respective musical components (audio files) which are targets of classification.

[0126] By executing the addition of classification items to musical components owned by the user through above mentioned communication operations, a condition as shown in Figure 15(b) can be obtained; hereafter, selecting operation of musical components according to the user's mood or condition is enabled at the recording/reproducing apparatus 10 side. The processing executed by the CPU 11 at the time of file selection for the reproduction or transfer thereof shall be explained by referring to Figure 18.

[0127] After the operation to direct the execution of retrieval is performed by the user, the processing by the CPU 11 proceeds from Step F601 to Step F602 wherein for example a selection menu as shown in Figure 14 (a) is displayed in the display part 24. The classification items presented in the selection menu may be all kinds of classification items as classification items stored in the HDD 15. That is, selectable classification items in all musical components owned by the user are listed. After displaying the selection menu, the processing waits for the user's operation.

[0128] After confirming the selection menu, the user selects desired classification items or cancels the processing. Meanwhile, it is omitted in Figure 18, but in this Step the user may also have to operate the page flipping or cursor movement on the display of menu to select classification items; therefore, the CPU 11 has to control of display corresponding to those operations.

[0129] If the user cancels the operation, the processing is terminated at Step F604. If the user executes the operation to select certain classification items, the processing proceeds from Step F603 to Step F604 wherein audio files to which selected classification items are added are retrieved and extracted. Then, the processing proceeds to Step F605 wherein the user's direction is either reproduction or transfer to the portable device 50 is determined. Then, if user directs the reproduction, the processing proceeds to Step F606 wherein one or more than two corresponding musical components are read out from the HDD 15 and processing to reproduce and output them from the speaker 35 and the like is executed. By contrast, when the operation requested by the user is transfer, the processing proceeds to Step F607 wherein one or more than two corresponding musical components are read out from the HDD 15 and processing to transfer them to the HDD 54 of the portable device 50 is executed. That is, the file transfer processing explained in Figure 5 is executed (Files to be transferred in Figure 5 correspond to one or more than two files extracted as corresponding musical components.)

[0130] Meanwhile, the determination operation of user's direction in Step F006 may be performed at the time the processing proceeds to this stage to prompt the user to execute the operation.

[0131] By executing above-mentioned processing as shown in Figures 18, the operations as the second example of the operation in this embodiment is actualized and thereby the user only needs to select arbitrary classification items in accordance with his mood or condition on that day; accordingly musical components which meet his mood or condition are selected and their reproduction or transfer to the portable device can be performed. Thus, the selecting operation for the user can be significantly simplified. Therefore, similarly to the first example, according to this embodiment of the present invention, the user's daily operation to select desired musical components can be simplified, the operation can be completed in a shorter time and the usability of the recording/reproducing apparatus 10 and portable device 50 can be significantly improved.

[0132] Thus, the system configurations and example of operations are explained as embodiments of the present invention; however, the present invention shall not be limited by above embodiments and a large number of modifications for the configuration of devices and procedure of processing and the like may be possible.

[0133]

[Effect of the invention] As comprehended by the explanation described above, the following effects can be achieved by the present invention. In the present invention, the information center is provided with the classification database means in which a large number of data files (musical components etc.) are classified according to diversified classification items so that the retrieval operation by using the retrieval object information transmitted from the terminal apparatus side and classification database means can be executed. From the user's point of view, by transmitting the retrieval object information from the terminal apparatus to the information center, the user can obtain the information on files matching the retrieval object information among data files owned by the user, i.e., data files stored in the storing means of the terminal apparatus as the result of retrieval. That is, the user can obtain diversified results of retrieval by using the advanced retrieval system at the information center side. Therefore the user can execute a diversified and simple retrieval regarding the selection of data files owned by the user (i.e., the user can use the advanced retrieval system at the information center side); therefore the user can obtain a condition, in which desired data files are selected, without executing an operation to specifically designate data files.

[0134] Particularly, the user side is enabled to select certain classification items in the classification database from the terminal apparatus; once selected classification items and each identification information on each file stored in the storing means are transmitted as retrieval object information, the information center side can retrieve data files contained in the selected classification items from data

files owned by the user in the terminal apparatus (i.e., data files stored in the storing means) and transmit the result of retrieval to the terminal apparatus. For example, if data files are classified not only according to the genre of musical component or artist but also according to diversified events such as the season, time, events, mood, various situations and the like in the classification database, the user only needs to designate classified items in accordance with his mood or condition on that day and the processing of selected files in accordance with his mood or condition on that day can be executed; thus this system can provide a great convenience to the user.

[0135] Additionally, since the information communicated between the information center and the user are aforementioned classification items, ID of musical components, result of retrieval and the like and their data volumes are smaller than those of audio data or video data, there is no necessity to construct a specific line (high-speed transmission line) as a communication line. Additionally, since the volume of the data communicated has a small volume, the communications can be completed quite swiftly. As described above, in the present invention, a round-trip communication is needed from the stage that the terminal apparatus side selects the classification items and transmits the retrieval request to the stage that the terminal apparatus side receives the result; however, the time for round-trip communication is quite short and therefore the time interval from the user executes the operation to select classification items to the execution of processing of retrieved data files can be quite short. That is, a system, which does not put a burden with respect to time (particularly, latency) on the user can be achieved.

[0136] Additionally, provided that the terminal apparatus side is configured so that the data files corresponding to received retrieval result are read out from the storing means to be reproduced and outputted, from the user's point of view, the reproduction of appropriate data files (musical components etc.) can be achieved by only designating and inputting retrieval object information such as classification items. Thus, a preferred reproducing operation for the user can be achieved in return of quite simple operation by the user. For example, the user can enjoy musical components in accordance with his mood or condition of the day.

[0137] Additionally by executing operations to read out data files corresponding to received retrieval result from the data file storing means and transferring or copying them to the data file storing device connected with the terminal apparatus at the terminal apparatus side, the user can obtain a condition, in which appropriate data files (musical components etc.) are stored in the data file storing means by only designating and inputting retrieval object information such as classification items. Therefore, the user can enjoy musical components in accordance with his mood or condition by using the data file-storing device. If the data file storing means is a portable device, the user can enjoy musical components in accordance with his mood or condition outside the home.

[0138] Additionally, in the present invention, the information center is provided with the classification database in which a large number of data files are classified according to diversified classification items so that the information center can retrieve data files owned by the user for their classification items by using the retrieval object information transmitted from the terminal apparatus side and the classification database means. From the user's point of view, by only transmitting retrieval object information to the information center, the user can obtain classification items of data files owned by the user, i.e., data files stored in the storing means of the terminal apparatus. That is, the user can obtain classification items according to diversified classification systems by using the advanced retrieval system at the information center side and they can be stored so that they can correspond to data files. Therefore, the user is enabled to make the terminal apparatus execute a diversified and simple retrieval for the selection of data files owned by the user. For example, provided that the data files are classified according to classification items corresponding to diversified events such as the season, time, event, mood, a variety of situations and the like; the terminal apparatus side is enabled to store classification items according to the diversified events obtained by using the advanced retrieval system at the information center side so that they can correspond to each data file. Accordingly, the terminal apparatus can execute retrieval by using the stored classification items; therefore the user can select desired data files and execute the predetermined operations thereof by only designating classification items in accordance with the user's mood or condition without specifically selecting data files.

[0139] Additionally, provided that the retrieval object information is the identification information of respective data files stored in the storing means; the retrieval means in the information center is enabled to appropriately retrieve classification items of the database means for the respective files owned by the user; therefore, preferred retrieval result (classification items) for the user can be transmitted.

[0140] Additionally, since also in this case, the information communicated between the information center and the terminal apparatus are aforementioned identification information and classification items as the result of retrieval and their data volumes are smaller than those of audio data or video data, there is no necessity to construct a specific line (high-speed transmission line) as a communication line or to fix a new infrastructure. Additionally, since the volume of the data being communicated has a small volume, the communications can be completed quite swiftly and the time interval from the user executes the operation to select classification items to the execution of processing of retrieved data files can be quite short.

[0141] Additionally, in cases in which classification items corresponding to data files stored in the storing means are already stored at the terminal apparatus side, it is enabled to read out data files stored so as to correspond to classification items selected by the user from the storing means and execute processing for the reproduction and output; therefore, from the user's point of view, reproduction of appropriate data files (musical components etc.) is achieved by only selecting the classification items. Thus, the preferred reproducing operation for the user can be achieved by a quite simple operation. For example, the user can enjoy musical components and the like in accordance with his mood or condition of the day.

[0142] Additionally, in cases in which classification items corresponding to data files stored in the storing means are already stored at the terminal apparatus side, it is enabled to read out data files stored so as to correspond

to classification items selected by the user from the storing means and execute processing for the copy or transfer thereof to the data file storing device connected with the terminal apparatus; therefore, the user can obtain a condition, in which appropriate data files (musical components etc.) are stored at the data file storing device side by only selecting classification items from the terminal apparatus. Consequently, the user can enjoy musical components in accordance with his mood or condition by using the data file-storing device. If the data file storing device is the portable device, the user can enjoy musical components in accordance with his mood or condition outside the home.

[Brief description of drawings]

[Figure 1] This is an explanatory drawing of the information delivery system in the embodiment in accordance with the present invention.

[Figure 2] This is a block diagram of the recording/reproducing apparatus as a terminal apparatus in the embodiment in accordance with the present invention.

[Figure 3] This is a block diagram of the recording/reproducing apparatus in the embodiment in accordance with the present invention.

[Figure 4] This is a block diagram of the portable device in the embodiment in accordance with the present invention.

[Figure 5] This is a flowchart of file transfer from the recording/reproducing apparatus to portable device in the embodiment in accordance with the present invention.

[Figure 6] This is an explanatory drawing of the file storing system in the hard disk of the recording/reproducing apparatus in the embodiment in accordance with the present invention.

[Figure 7] This is an explanatory drawing of the contents of the administrative file in the hard disk of the recording/reproducing apparatus in the embodiment in accordance with the present invention.

[Figure 8] This is an explanatory drawing of the classification database provided to the information center in the embodiment in accordance with the present invention.

[Figure 9] This is an explanatory drawing of the file selected in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 10] This is an explanatory drawing of the communication operation in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 11] This is an explanatory drawing of the communication operation in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 12] This is a flowchart of the processing executed in the recording/reproducing apparatus in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 13] This is a flowchart of the processing executed in the information center in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 14] This is an explanatory drawing of the selection menu display in the first example of the operation in the embodiment in accordance with the present invention.

[Figure 15] This is an explanatory drawing of the file selected in the second example of the operation in the embodiment in accordance with the present invention.

[Figure 16] This is an explanatory drawing of the communication operation in the second example of the operation in the embodiment in accordance with the present invention.

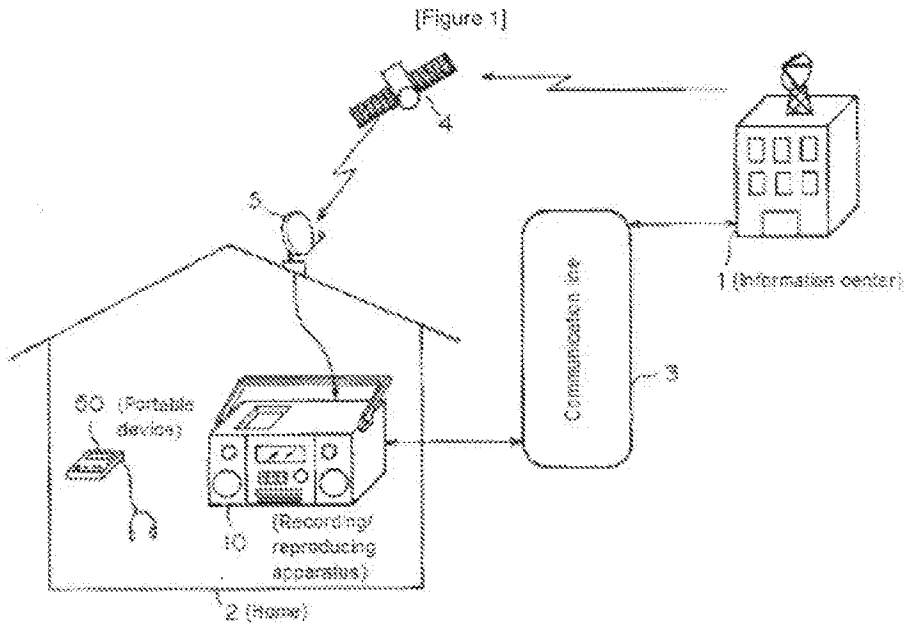
[Figure 17] This is a flowchart of processing executed in the recording/reproducing apparatus and the information center at the time of communication operation in the second example of the operation in the embodiment in accordance with the present invention.

[Figure 18] This is a flowchart of processing of the data file reproduction/transfer in recording/reproducing apparatus in the second example of the operation in the embodiment in accordance with the present invention.

[Description of symbols]

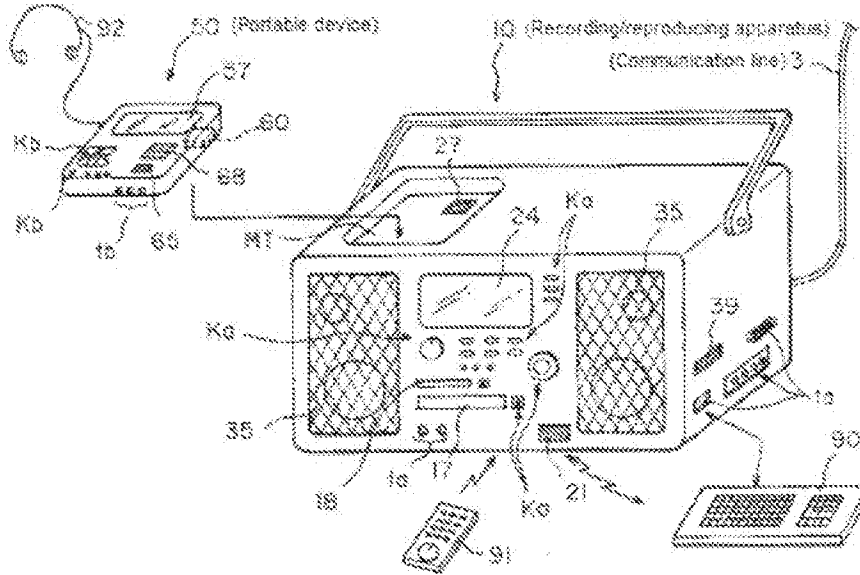
1 information center, 3 communication line, 10 recording/reproducing apparatus, 11 CPU, 12 ROM, 13 RAM, 14 flash memory, 15 HDD, 16 buffer

memory, 17-CD-ROM drive, 18 MD drive, 19 modem, 20 panel operating part, 22 infrared ray interface driver, 23 USB driver, 24 display part, 25 display driver, 26 interface driver, 27 connector, 28 encoder, 29 decoder, 30 IEC958 encoder, 31 A/D converter, 32 microphone amplifier, 33 D/A converter, 34 amplifier, 35 speaker, 36 IEEE1394 driver, 37 IEEE1394 interface, 38 PCMCIA driver, 39 PCMCIA slot, 51 CPU, 52 ROM, 53 RAM, 54 HDD, 55 buffer memory, 56 panel operating part, 57 display part, 58 display driver, 59 interface driver, 60 connector, 61 encoder, 62 decoder, 63 IEC958 encoder, 64 A/D converter, 65 microphone amplifier, 66 D/A converter, 67 amplifier, 68 speaker

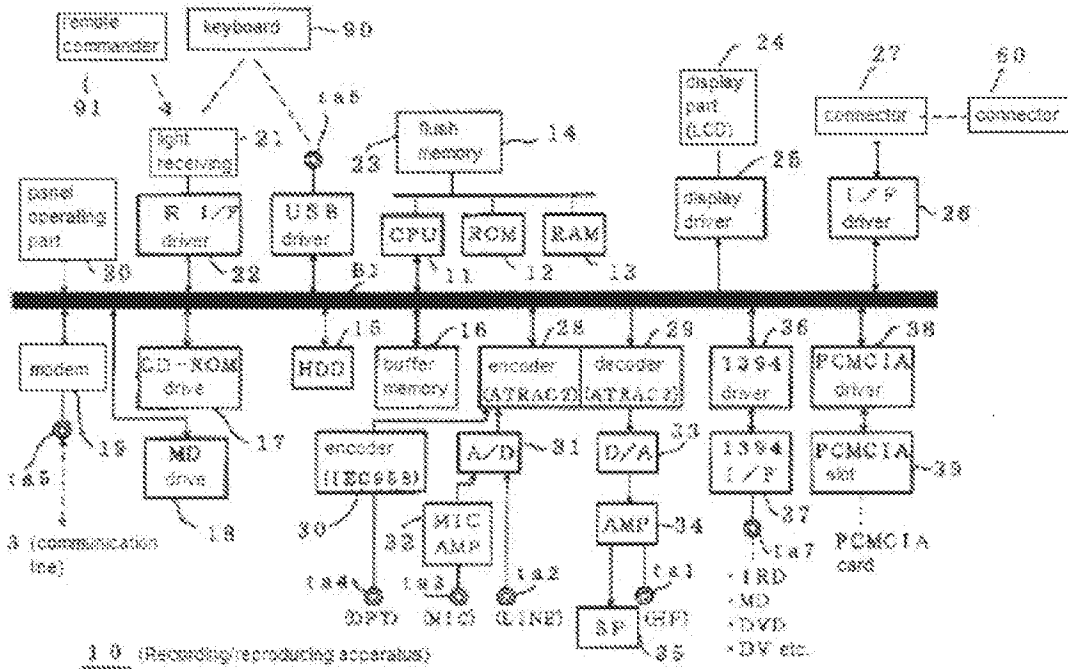




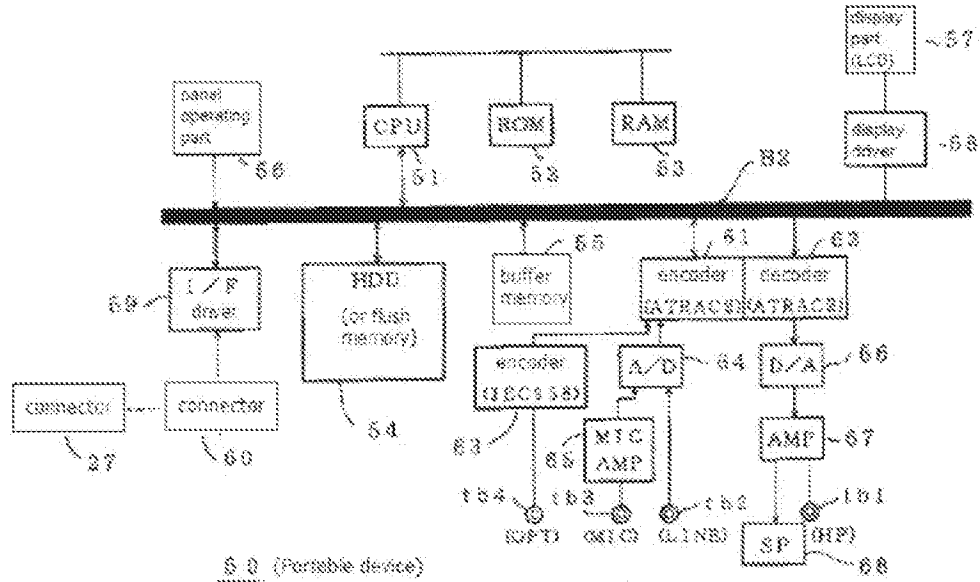
[Figure 2]



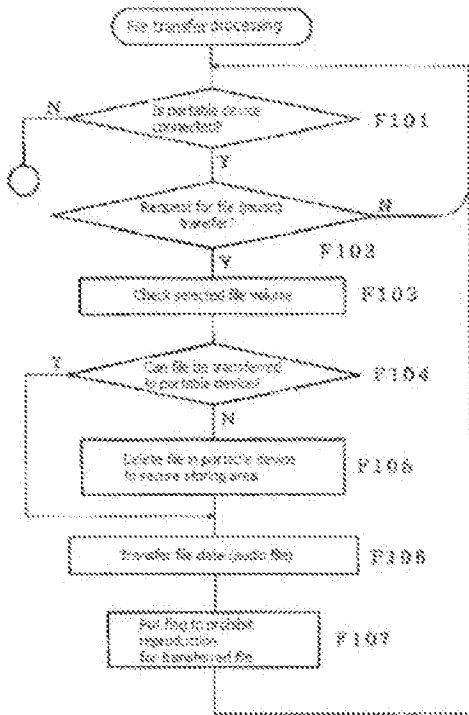
[Figure 3]



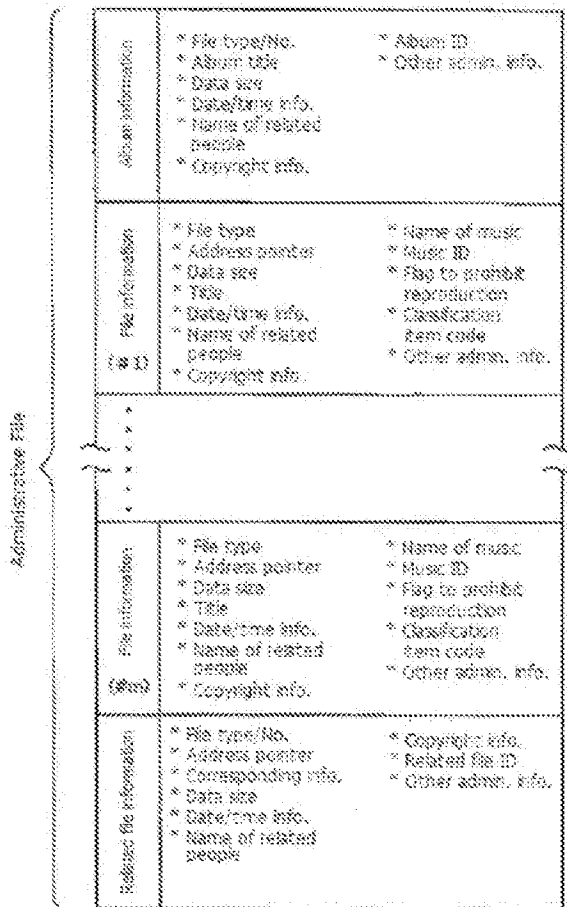
[Figure 4]



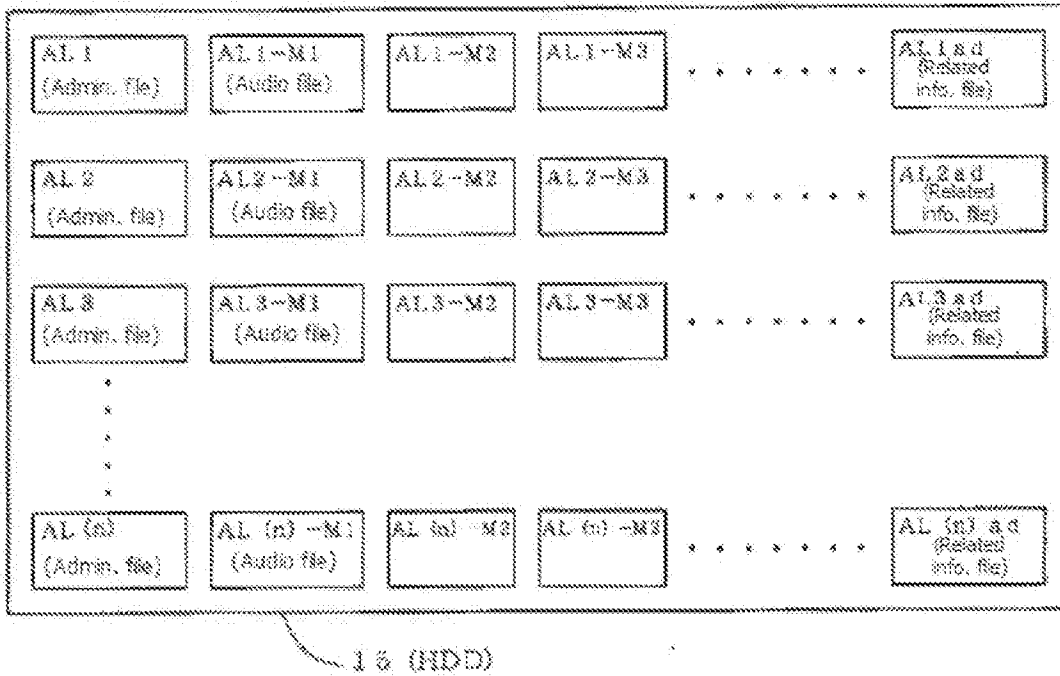
[Figure 5]



[Figure 7]



[Figure 6]



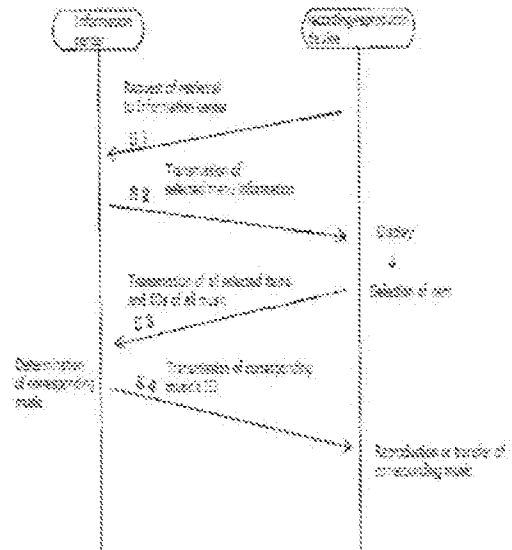
[Figure 8]

Classification database in information center

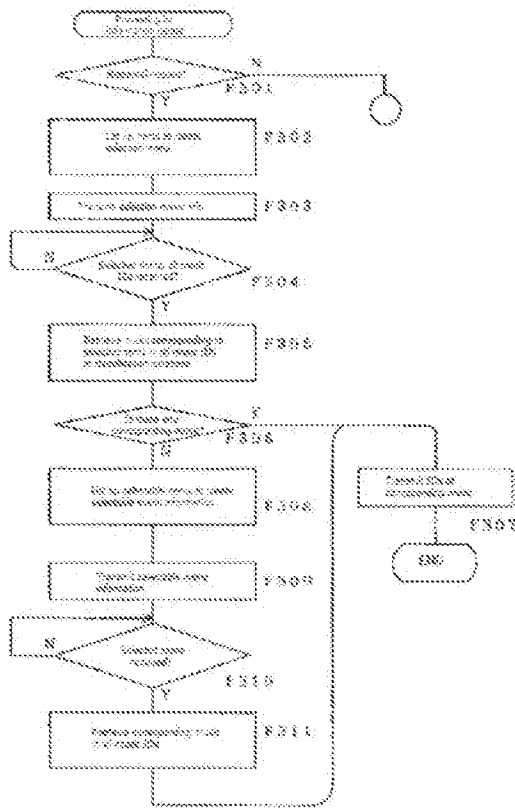
Item	List (10)	Item	List (10)
Spring music	Swallow River	Winter music	Winter Promenade
	Cherry		Fireworks
	Trip		Jingle Bell
	Spring Dance		12 Holy Nights
	...		...
Summer music	Summer Girl, Belle	Country music	Highway Star
	Summer Breath		Freedom
	Lone Land		Trucker's Straight Road
	Disarm Gun		Smells Like Teen Spirit
	...		...
Autumn music	Small Autumn	Morning music	My Morning
	Red Dragonfly		Music for Rubber Gymnastics
	September Love		Morning Light
	Music Light		Track in Fall Morning
	...		...

[Figure 9]

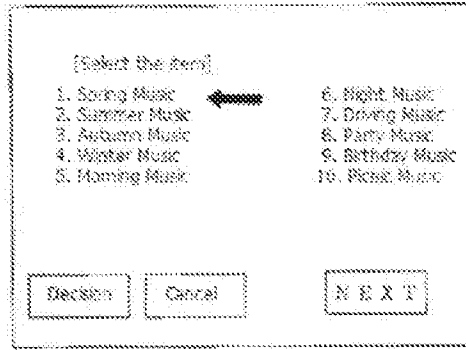
[Figure 10]





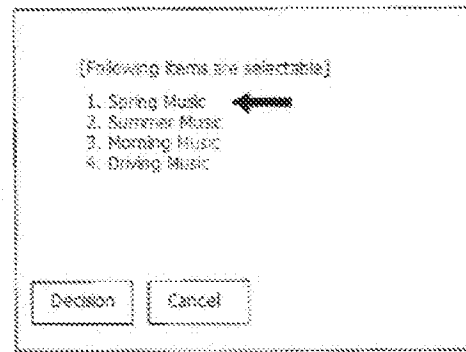


Selection Menu Display



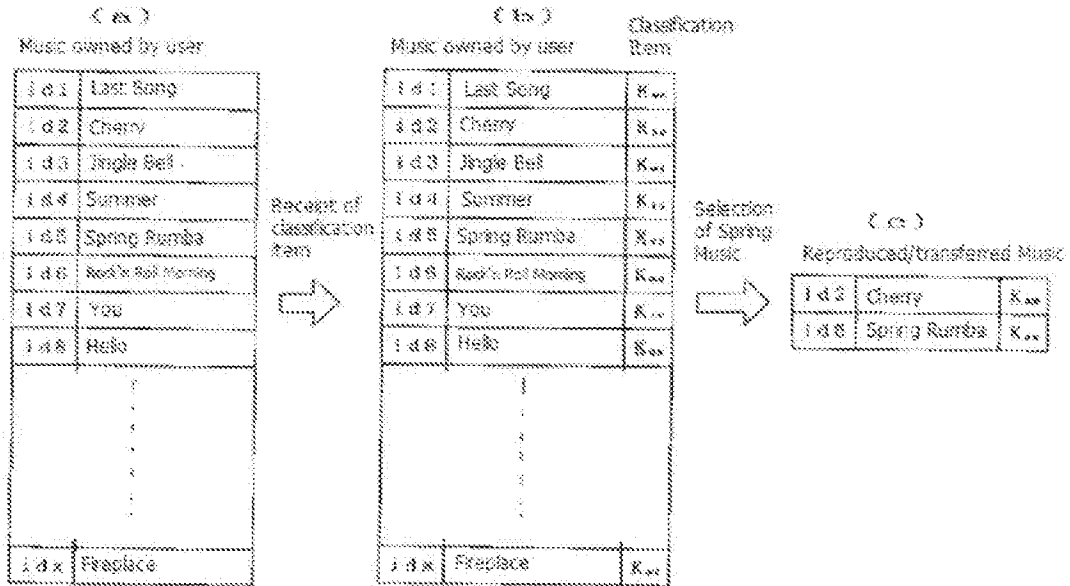
(a)

Selectable Menu Display

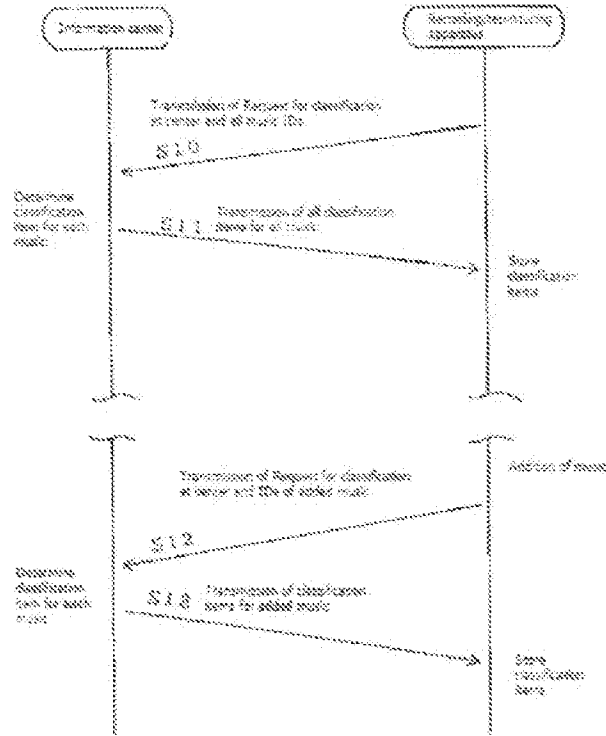


(b)

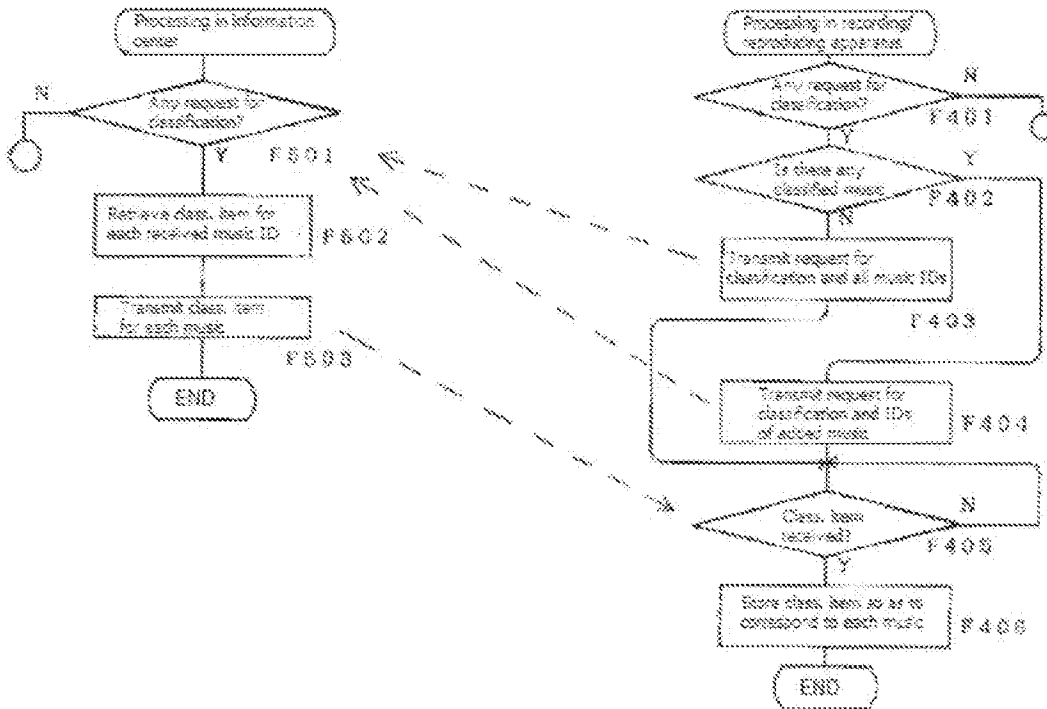
[Figure 15]



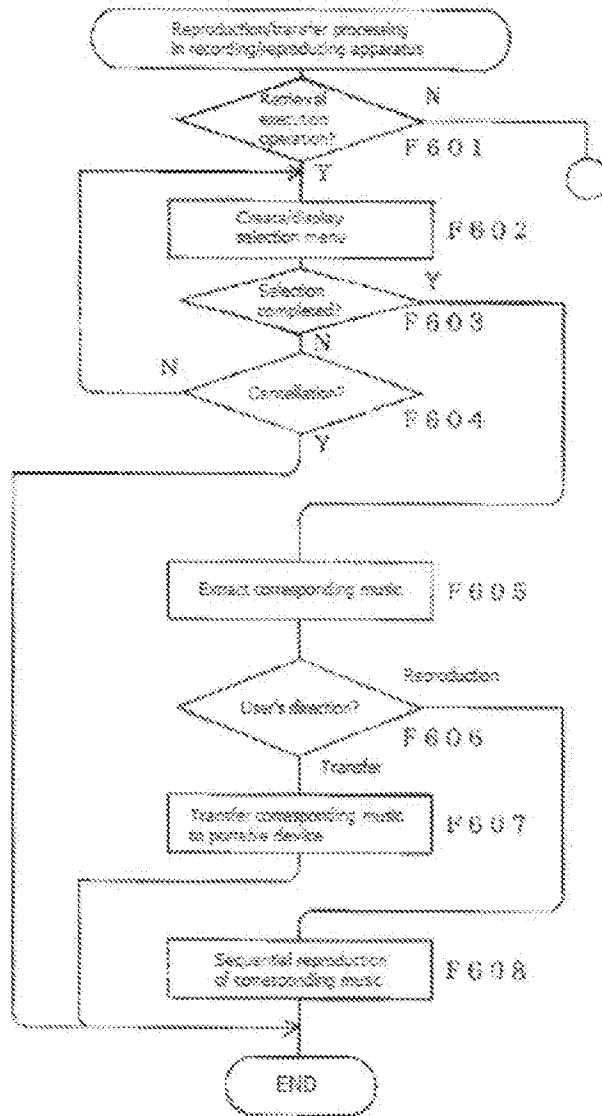
[Figure 16]



[Figure 17]



[Figure 18]



Continuing from the front page

(51) Int. Cl.<sup>7</sup>

Domestic classification symbol

F1

G06F

15/403

310B

[EOF]



# EXPERT TRANSLATION BUREAU, INC.

Telephone: (312) 759-9999 Facsimile: (800) 803-0676  
1450 Sandpebble Drive, Suite 112, Wheeling, IL 60090

[www.Expert-Translation.com](http://www.Expert-Translation.com)

## CERTIFICATE OF TRANSLATION

March 9, 2009

*I, Kagari Fujita, hereby certify that I am competent in both English and Japanese languages.*

*I further certify under penalty of perjury that translation of the aforementioned patent document:*

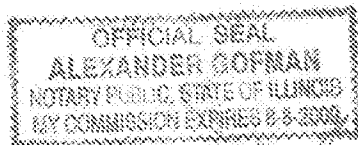
**[JP1999242686(A)\_English.pdf]**

*from the Japanese language into the English language is accurate and correct to the best of my knowledge and proficiency.*



Kagari Fujita

Professional Translator



03.09.2009





(19)  
Bundesrepublik Deutschland  
Deutsches Patent- und Markenamt

(10) DE 44 31 070 B4 2004.07.22

(12)

**Patentschrift**

(21) Aktenzeichen: P 44 31 070.6  
(22) Anmeldetag: 01.08.1994  
(43) Offenlegungstag: 07.03.1996  
(45) Veröffentlichungstag  
der Patenterteilung: 22.07.2004

(51) Int Cl<sup>7</sup>: **B60R 25/00**  
B60K 31/00

Innerhalb von 3 Monaten nach Veröffentlichung der Erteilung kann Einspruch erhoben werden.

(71) Patentinhaber:  
DaimlerChrysler AG, 70567 Stuttgart, DE

(74) Vertreter:  
Amersbach, W., Dipl.-Ing., 89250 Senden

(72) Erfinder:  
Regel-Brietzmann, Peter, Dr., 89073 Ulm, DE;  
Class, Fritz, Dr., 72587 Römerstein, DE;  
Heisterkamp, Paul, 69610 Oberdisingen, DE

(56) Für die Beurteilung der Patentfähigkeit in Betracht  
gezogene Druckschriften:  
DE 42 32 435 C1  
DE 42 27 969 C2  
DE 34 38 385 C2  
DE 42 39 271 A1

DE 42 24 536 A1  
DE 42 01 142 A1  
DE 38 05 819 A1  
DE 32 20 983 A1  
DE 92 16 352 U1  
US 38 78 915  
EP 06 24 488 A1  
N.N.: Die elektronischen Belfahrer. In: Funkschau  
5/1988, S.46-48;  
HANKEL, Rainer; URBANSKI, Wilfried: OKE - ein  
autar-  
kes Ortungssystem für Einsatzfahrzeuge. In:  
Bosch  
Techn. Berichte 6, 1988, 1/2, S.57-66;

(54) Bezeichnung: Anordnung zur zugangscodesteuerten Benutzungseinschränkung eines Kraftfahrzeugs

(57) Hauptanspruch: Anordnung zur zugangscodesteuerten Benutzungseinschränkung eines Kraftfahrzeuges mit elektronisch steuerbaren Komponenten, bei welcher in einem Zuordnungsspeicher eine benutzungseinschränkende Zuordnungsvorschrift von Steuerungsparametern der elektronisch steuerbaren Komponenten zu jedem zulässigen Zugangscod gespeichert ist und eine Steuereinheit die Komponenten nach Maßgabe der gespeicherten Zuordnungsvorschrift und des eingegebenen Zugangscodes steuert, dadurch gekennzeichnet, dass die Steuereinheit geeignet ist, die benutzungseinschränkende Zuordnungsvorschrift für den aktuellen Benutzer des Kraftfahrzeuges anhand mindestens eines zusätzlichen Passwortes dahingehend zu ändern, dass in Abhängigkeit des Passwortes vorab gespeicherte Steuerparameter aktiviert werden.

## Beschreibung

[0001] Die Erfindung betrifft eine Anordnung zur zugangscodesteuerten Benutzungseinschränkung eines Kraftfahrzeugs.

[0002] Zur Verringerung der Mißbrauchs- oder Diebstahlsgefahr ist insbesondere die mechanische Sicherung in Form des Lenkradschlusses bekannt. Darüberhinaus gibt es bereits codebetätigte elektronische Wegfahrsperrn. Beide Sicherungsmaßnahmen sind aber erfahrungsgemäß zu überwinden. Insbesondere existiert aber auch kein wirksamer Schutz gegen die mißbräuchliche Benutzung eines eingeschränkt befugten Benutzers oder den kriminellen Zugriff auf ein von einem Berechtigten gestartetes Fahrzeug.

## Stand der Technik

[0003] Im deutschen Gebrauchsmuster DE 92 16 352 U1 ist eine Kilometerkarte für Fahrerlänger offenbart, die eine PIN-Nummer und ein Kilometergut haben enthält. Die Karte wird dazu verwendet, bei der Benutzung eines Fahrzeuges durch einen Fahrerlänger zu gewährleisten, dass der Fahrer eine vorab eingestellte Höchstgeschwindigkeit nicht überschreitet und das Fahrzeug nur für eine fest eingestellte Anzahl von Kilometern von dem Fahrerlänger verwendet werden kann. Darüber hinausgehende Modifikationen von Fahrzeugfunktionen sind in der genannten Schrift nicht offenbart. In der deutschen Offenlegungsschrift DE 42 39 271 A1 ist ein Diebstahlschutz für Fahrzeuge offenbart, bei dem ein Fahrzeug durch die Fernabfrage eines eingebauten Senderempfängers beispielsweise im Fall eines Diebstahls lokalisiert werden kann. Die dort beschriebene Funktionalität wird lediglich zur Ortung eines abhanden gekommenen Fahrzeuges verwendet.

[0004] In der deutschen Offenlegungsschrift DE 42 24 538 A1 ist eine Anlage beschrieben, anhand der Bewegungsraum von Fahrzeugen geografisch definiert begrenzt werden kann. Hierbei werden, sobald das entsprechend ausgestattete Fahrzeug ein vorab definiertes geografisches Gebiet verläßt, wesentliche Fahrzeugfunktionen wie beispielsweise die Motorsteuerung vollständig deaktiviert. Die deutsche Offenlegungsschrift DE 42 01 142 A1 beschreibt ein System, mit dem die Geschwindigkeit eines Fahrzeuges anhand eines Fahrzeugnavigationssystems und Sensoren insbesondere zum Fahrbahnzustand ortsabhängig geregelt werden kann. In dem US-Patent US 3,878,915 B1 wird eine programmierbare Geschwindigkeitskontrollvorrichtung beschrieben, die die Vorabauswahl einer Maximalgeschwindigkeit eines Fahrzeuges anhand von einem Benutzer angegebener Codes ermöglicht. Die europäische Patentanmeldung EP 0 624 488 A1 sowie die deutsche Patentschrift DE 34 38 285 C2 offenbaren ähnliche Einrichtungen zur Begrenzung bzw. Kontrolle einer maximalen Fahrzeuggeschwindigkeit oder anderer Pa-

rameter für Fahrzeugfunktionen anhand vom Fahrer direkt eingegebenen oder anderweitig zur Verfügung gestellten Daten.

## Aufgabenstellung

[0005] Der vorliegenden Erfindung liegt daher die Aufgabe zugrunde eine Anordnung zur zugangscodesteuerten Benutzungseinschränkung eines Kraftfahrzeugs anzugeben, welche eine solche mißbräuchliche Benutzung verhindert oder zumindest erschwert.

[0006] Die Erfindung ist im Patentanspruch 1 beschrieben. Die Unteransprüche enthalten vorteilhafte Ausgestaltungen und Weiterbildungen der Erfindung. [0007] Die Erfindung ermöglicht es, daß ein eingeschränkt berechtigter Benutzer ein Fahrzeug unter Einhaltung von Beschränkungen z.B. räumlicher, zeitlicher oder funktioneller Art ein Kraftfahrzeug wie gewöhnlich nutzen kann und erst bei Überschreiten der Beschränkungen oder bei dem Versuch dazu Sicherungsmaßnahmen ausgelöst werden.

[0008] Der Umfang der Beschränkungen ist vorzugsweise veränderlich programmierbar und als Zuordnungsvorschrift in einem programmierbaren Speicher spezifisch für einen oder mehrere Zugangscodes gespeichert.

[0009] Die Sicherungsmaßnahmen werden durch Einfluß einer Steuereinheit auf elektronische Komponenten des Fahrzeuges bewerkstelligt. Dabei können bevorzugt ohnehin vorhandene elektronische Komponenten wie z.B. die elektronisch gesteuerte Zündung oder die elektronisch gesteuerte Kraftstoffzufuhr oder evtl. vorhandene Zusatzsysteme genutzt werden.

[0010] Die Eingabe eines Zugangscodes kann auf verschiedene an sich bekannte Arten erfolgen, beispielsweise über eine Tastatur, durch Spracheingabe, mittels einer Karte usw.. Vorzugsweise werden zur Codeeingabe Einrichtungen mitbenutzt, die auch für andere Funktionen vorgesehen sind, z.B. Mikrofon und Spracherkennung einer Freisprecheinrichtung mitbenutzt zur Spracheingabe eines Zugangscodes.

[0011] Die technische Ausführung kann mit gebräuchlichen Mitteln und damit kostengünstig und aufwandsarm erfolgen. Die elektronische Steuerung des Kraftfahrzeuges wird mit einem programmierbaren Speicher verbunden, in welchem als Zuordnungsvorschrift zu einem oder mehreren zulässigen Zugangscodes Steuerparameter für elektronisch steuerbare Komponenten des Kraftfahrzeuges gespeichert sind. Nach Maßgabe dieser gespeicherten Parameter steuert eine Steuereinrichtung in Verbindung mit der Fahrzeugelektronik einzelne oder mehrere Funktionen des Kraftfahrzeuges, wie etwa Freigabe der Benzinpumpe, der Zündung, die mögliche Höchstgeschwindigkeit, das Öffnen des Kofferraums und ähnliches. Die Parameter können in Gruppen zusammengefaßt sein. Der eingegebene Zugangscod legt nach der codespezifisch gespeicherten Zuord-

nungsvorschrift anhand der gespeicherten Parameter fest, welche elektronisch steuerbaren Funktionen im Fahrzeug aktiviert oder gesperrt sind und bestimmt somit den Umfang der Benutzungseinschränkung.

[0012] Die Aufhebung einer Benutzungseinschränkung ist an die vorherige Eingabe eines freigebenden Zugangscodes gebunden, z. B. vor Antritt einer Fahrt, während einer bestimmten Zeitpause zu Beginn der Fahrt, in einem bestimmten Zeitintervall vor der gewünschten Benutzungsart oder auf Aufforderung des Systems.

[0013] Die Steuerungsparameter können als bedingte Parameter oder Funktionen programmiert sein, welche erst in Verbindung mit über spezielle oder für andere Funktionen bereits vorhandene Sensoren bestimmte Zustandswerte, z.B. nach Vergleich in einer Vergleichseinrichtung zu konkreten Steuerungsparametern führen.

[0014] So kann z.B. ein Wert für die Höchstgeschwindigkeit programmiert sein, der fortlaufend mit dem aktuellen Geschwindigkeitswert verglichen wird. Bei Unterschreiten der programmierten Höchstgeschwindigkeit erfolgt keine Beeinflussung des elektronischen Systems. Erst beim Überschreiten dieser Höchstgeschwindigkeit steuert die Steuereinrichtung das Fahrzeugsystem nach einem hierfür vorgesehenen Ablauf, z.B. Drosselung der Kraftstoffzufuhr, Auslösen eines Warnhinweises und/oder einer Aufforderung zur Eingabe eines die Beschränkung aufhebenden Zugangscodes usw.

[0015] Nach einem anderen Beispiel kann eine Gebietsbeschränkung einprogrammiert sein, die unter Benutzung eines Ortssensors in einem Navigationssystem (Global Positioning System o.ä.) fortlaufend mit dem aktuellen Ort des Fahrzeugs verglichen wird und z.B. bei Annäherung an die Gebietsgrenze einen Warnhinweis an den Fahrer, nach Überschreiten der programmierten Gebietsgrenze einen Funk-Alarmruf auslöst und/oder eine allmähliche Stilllegung des Fahrzeugs bewirkt.

[0016] Die Programmierung des Systems kann z.B. über eine numerische oder alphanumerische Tastatur erfolgen. Dazu läßt sich das System mittels eines zusätzlichen besonderen mechanischen oder elektronischen Schlüssels in einen Programmierzustand versetzen. In diesem Zustand ist die Eingabe oder Freigabe von neuen Zugangscodes möglich, die Löschung von alten Zugangscodes, sowie die Setzungen, Änderung und Löschung von mit bestimmten Zugangscodes gekoppelten Nutzungseinschränkungen. Ebenfalls läßt sich die Beschränkung der Gültigkeitsdauer von Zugangscodes setzen, ändern oder löschen. Ferner können die von der Steuereinheit ausgelösten Abläufe neu vergeben werden.

[0017] Zugangscodes können in Gruppen zusammengefaßt sein und so jeweils die gleiche Nutzungsbeschränkung in Kraft setzen. Zugangscodes oder Codegruppen können bestimmten Personen zugeordnet werden. Dadurch erfolgt bei der Eingabe des

Codes eine Identifizierung des Eingebenden.

#### Ausführungsbeispiel

[0018] Nachfolgend sind zur Veranschaulichung der Erfindung noch einige spezielle bevorzugte Funktionen und vorteilhaft mit der erfindungsgemäßen Anordnung verbindbare Zusatzfunktionen beschrieben, ohne daß die Erfindung auf diese beschränkt sein soll.

#### A. Diebstahlsicherung

[0019] Das System wird eingestellt auf eine allgemeine Benutzungseinschränkung. Alle Untersysteme des Fahrzeugs werden abgeschaltet, wenn keine korrekte Fahreridentifizierung erfolgt. Die Anzahl der möglichen Fehlversuche zur Eingabe ist im Programmiermodus bestimmbar. Wird diese erreicht oder überschritten, blockiert die Systemsteuerung sämtliche Systeme und Eingaben bis zur Wiederherstellung des Programmiermodus.

[0020] Bei Benutzung eines lastaturbasierten Zugangscodesystems muß sich der Fahrer vor Antritt der Fahrt identifizieren. Bei Benutzung eines Spracherkennungssystem muß sich der Fahrer innerhalb eines im Programmiermodus eingestellten Zeitraums oder einer zurückgelegten Strecke identifizieren. Geschieht diese Identifizierung nicht, oder wird die Anzahl der erlaubten Fehlversuche überschritten, blockiert die Fahrzeugelektronik wie bei herkömmlichen Systemen, bzw. sorgt nach einer oder mehreren Warnungen an den Fahrer für ein allmähliches Anhalten des Fahrzeugs. Das Fahrzeugsystem blockiert anschließend. Die Blockade ist nur in einem besonders geschützten Modus (etwa dem Programmiermodus) aufhebbar.

#### B. Nutzungseinschränkungen für spezielle Fälle bzw. Personen und Personengruppen

– Eingabe eines oder mehrerer gleichwertiger Paßwörter (für den Fall, daß einmal eines vergessen wird) für einen oder mehrere berechtigte Benutzer mit der vollen Nutzungsberechtigung. Diese Paßwörter werden sprecherabhängig gehalten.

– Eingabe eines oder mehrerer Paßwörter für Benutzer mit eingeschränkter Nutzungsberechtigung und die zugehörige Nutzungseinschränkung. Diese Nutzungseinschränkung kann zeit- oder streckenabhängig (etwa für den Parkservice, die Werkstatt, die Tankstelle etc.) gestaltet werden, aber auch andere Fahrzeugfunktionen (etwa Höchstgeschwindigkeit, Öffnung des Kofferraums etc.) können eingeschränkt werden. Bei diesen Paßwörtern kann auch Sprecherunabhängigkeit eingestellt werden.

– Eingabe eines oder mehrerer sprecherunabhängiger Notruf-Paßwörter. Diese Paßwörter bewir-

ken Notrufmaßnahmen seitens der Fahrzeugelektronik (s.u. "Zusätzliche Funktionalität"), schränken aber zunächst die Benutzung des Fahrzeugs nicht ein.

- Eingabe von sprecherabhängigen Stornierungs-Passwörtern, die innerhalb des Sicherheitsintervalls der Notrufpasswörter die Aufhebung der Notruf-Funktionalität bewirken.

### C. Zusätzliche Funktionen

[0021] Notruf Verschiedene Notrufwörter bewirken verschiedene Notrufe und Notrufarten. Es gibt allgemeine Notrufe, die sofort einen entsprechenden Notruf offen absetzen, und Notrufe, die nach einem Intervall einen verdeckten Notruf absetzen. Die verdeckte Notrufart dient als Schutzmaßnahme bei Fahrzeugentführungen (car-jacking).

[0022] Die offenen Notrufwörter erledigen automatisch etwa die Anforderung eines Polizei-Einsatzwagens oder eines Rettungswagens. Wenn das Fahrzeug mit einem Navigationssystem ausgestattet ist, wird gleichzeitig die Position übermittelt, ansonsten wird der Notruf dem Fahrer über das Telefon weitergegeben, damit dieser die Position angeben kann.

[0023] Die verdeckten Notrufwörter bewirken, daß sich das Fahrzeug als gestohlen bzw. entführt meldet. Ist ein Navigationssystem vorhanden, wird auch die Position angegeben.

[0024] Dies geschieht verdeckt und nach einem Intervall, um eine Gefährdung einer eventuelle mitentführten Person zu vermeiden.

[0025] Für beide Arten von Notrufwörtern gibt es Stornierungswörter, die die Absetzung des Notrufs verhindern bzw. abbrechen oder eine Stornierungsmeldung absetzen. Für die verdeckten Notrufwörter gibt es Pseudo-Stornierungswörter, die nur die Quit-terungsmeldung des Systems auslösen, den Notruf aber aufrechterhalten.

### Fahrtenbuch bzw. Fahrprotokoll

[0026] Da durch den Passwortmechanismus der jeweilige Fahrer identifiziert ist, kann das Fahrzeugsystem für jede Fahrt und jeden Fahrer ein Nutzungsprotokoll erstellen, das über die Ansprüche an ein Fahrtenbuch hinaus auch einen Fahrtenstreiber-Mechanismus sowie in Verbindung mit einem Navigationssystem ein vollständiges Fahrtenprotokoll beinhalten kann.

### Nutzung durch Verleihsfirmen

[0027] Bei der Übergabe des Fahrzeugs gibt der Mieter ein Hauptnutzungspasswort ein. Damit verbunden kann die Verleihfirma eventuelle vertragliche Nutzungseinschränkungen wie etwa maximale Nutzungsdauer, maximale Entfernungsleistung sowie in Verbindung mit einem Navigationssystem geographische Nutzungseinschränkungen in die Fahrzeuge-

lektronik eingeben. Das Fahrzeug meldet es, wenn diese Nutzungseinschränkungen nicht eingehalten werden bzw. sorgt für ein allmähliches Anhalten des Fahrzeugs. Die Sicherung der Eingabemöglichkeit erfolgt in diesem Falle elektronisch, damit ein Point-to-Point-Verleih möglich wird.

### Patentansprüche

1. Anordnung zur zugangscodesteuerten Benutzungseinschränkung eines Kraftfahrzeuges mit elektronisch steuerbaren Komponenten, bei welcher in einem Zuordnungsspeicher eine benutzungseinschränkende Zuordnungsvorschrift von Steuerungsparametern der elektronisch steuerbaren Komponenten zu jedem zulässigen Zugangscode gespeichert ist und eine Steuereinheit die Komponenten nach Maßgabe der gespeicherten Zuordnungsvorschrift und des eingegebenen Zugangscode steuert, dadurch gekennzeichnet, dass die Steuereinheit geeignet ist, die benutzungseinschränkende Zuordnungsvorschrift für den aktuellen Benutzer des Kraftfahrzeuges anhand mindestens eines zusätzlichen Passwortes dahingehend zu ändern, dass in Abhängigkeit des Passwortes vorab gespeicherte Steuerparameter aktiviert werden.

2. Anordnung nach Anspruch 1, dadurch gekennzeichnet, dass das zusätzliche Passwort eindeutig einem Benutzer zugeordnet ist.

3. Anordnung nach Anspruch 1, dadurch gekennzeichnet, dass das zusätzliche Passwort benutzerunabhängig ist.

4. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Zuordnungsvorschrift zusätzlich veränderlich programmierbar ist.

5. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Steuerparameter als Funktion von variablen Zustandswerten gespeichert sind, dass Sensoren diese Zustandswerte ermitteln und eine Vergleichseinrichtung aus der gespeicherten Funktion und anhand der ermittelten Zustandswerte konkrete Steuerparameter ableitet.

6. Anordnung nach Anspruch 4, dadurch gekennzeichnet, dass ein Ortssensor mittels eines Ortungssystems den momentanen Ort des Fahrzeugs bestimmt, dass die Zuordnungsvorschrift eine Gebietsbeschränkung enthält und die Vergleichseinrichtung den bestimmten Ort mit der Gebietsbeschränkung vergleicht.

7. Anordnung nach Anspruch 4, dadurch gekennzeichnet, dass ein Geschwindigkeitssensor die Momentangeschwindigkeit ermittelt.

8. Anordnung nach Anspruch 7, dadurch gekennzeichnet, dass die Zuordnungsvorschrift eine Beschränkung der Geschwindigkeit enthält.

9. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Steuereinheit die Betätigung elektronischer Komponenten sperrt oder freigibt.

10. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Steuereinheit einen vorprogrammierten Ablauf auslöst.

11. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass die Steuereinheit beim Versuch der Betätigung einer gesperrten Komponente die Ausgabe eines Hinweises auf die Sperrung und/oder die Aufforderung zur Eingabe eines freigebenden Zugangscode auslöst.

12. Anordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, dass sie eine zusätzliche Komponente aufweist, die geeignet ist, einen Notruf zu generieren, und die durch die Eingabe eines bestimmten Passwortes aktivierbar ist.

Es folgt kein Blatt Zeichnungen



Europäisches Patentamt

European Patent Office

Office européen des brevets



Publication number: 0 569 243 A1

EUROPEAN PATENT APPLICATION

Application number: 93303536.2

Int. Cl.<sup>8</sup>: G06F 3/033, B60R 16/02

Date of filing: 07.05.93

Priority: 08.05.92 JP 116447/92

Date of publication of application: 10.11.93 Bulletin 93/45

Designated Contracting States: DE FR GB

Applicant: PIONEER ELECTRONIC CORPORATION  
No. 4-1, Meguro 1-chome  
Meguro-ku Tokyo-to (JP)

Inventor: Nishida, Junichi, c/o Pioneer Electronic Corp.  
Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Ishida, Tassho, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Sakaguchi, Masahiko, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Shinohara, Jun, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Araki, Morio, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Ayukai, Yasuhiro, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Nabe, Kenichi, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Arakawa, Takeharu, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Baba, Toshiharu, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Inventor: Kaneko, Michihiro, c/o Pioneer Electronic Corp.

Kawagoe Works, No. 25-1 Aza-Nishicho  
Oaza-Yamada, Kawagoe-shi, Saitama-ken (JP)

Representative: Brunner, Michael John et al  
GILL JENNINGS & EVERY Broadgate House 7  
Eldon Street  
London EC2M 7LH (GB)

Control system for devices mounted on vehicle.

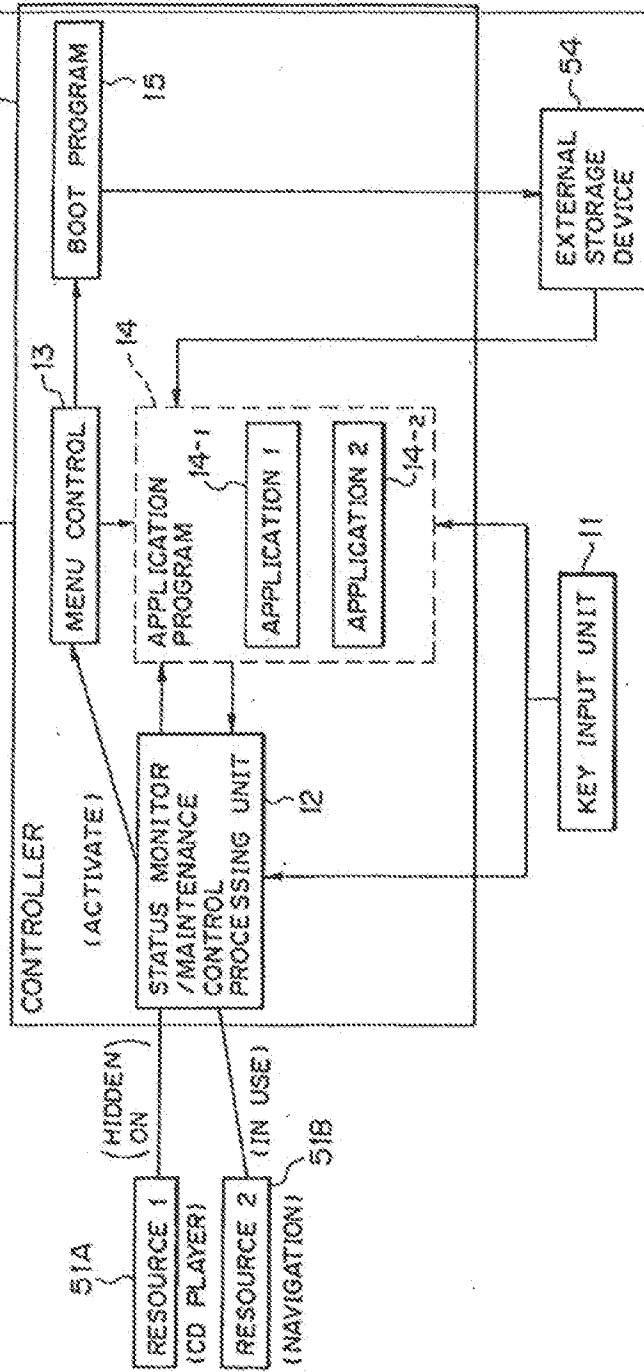
A control system (10) for devices mounted on vehicle includes a plurality of controlled devices (51), storage unit (54) for storing a plurality of control programs for controlling each of the plurality of the controlled devices, input unit (11) for selecting controlled devices to be operated from the plurality of controlled devices, and operation control unit (16) for reading application programs respectively associated with controlled devices selected by the input unit from the storage unit and monitoring status of operations of the controlled devices selected by the input unit on the basis of the application programs read from the storage unit so as to simultaneously operate the controlled devices.

EP 0 569 243 A1

Jouve, 18, rue Saint-Denis, 75001 PARIS

FIG. 3

10



## Field of the Invention:

The present invention relates to a control system for devices mounted on vehicle (hereinafter referred to as "on-vehicle device"), and more particularly to a control system for on-vehicle devices which integrally controls, by means of a single control unit, a plurality of devices, such as a navigation device, a compact disk (CD) player, a tuner and a cassette player.

## Description of the Prior Art:

Recently, various electronic devices have been used as on-vehicle devices. Examples of these on-vehicle devices are audio devices such as CD (Compact Disk) players, DAT (Digital Audio Tape) players and FM/AM tuners, visual devices such as television sets, navigation devices using a GPS (Global Positioning System) or the like. It is possible to operate these devices independently. However, it is desirable to integrally control the devices by means of a single control unit in order to systematically operate the overall system. Further, it is required that on-vehicle devices can be provided in a limited space and can be operated by the driver who is driving the car. From the above point of view, it is desirable to employ a centralized control system using a single control device.

FIG. 1 is a block diagram illustrating an overview of a control system for on-vehicle devices. Referring to FIG. 1, a control system 50 includes devices 51A and 51B to be controlled, a key input unit 52, a controller 53, an external storage device 54 and a display unit 58. The controlled devices 51A and 51B are, for example, audio devices such as CD players, DAT players and FM/AM tuners, visual devices such as television sets, navigation devices using a GPS or the like. Hereinafter, the controlled devices 51A and 51B are referred to as "resources". The key input unit 52 is used to input various kinds of data to the system. The controller 53 selects one of the resources on the basis of input data from the input key unit 52, and performs various controls on the basis of an application program (application software) used to control the selected resource. The external storage device 54 stores application programs associated with the respective resources. The display unit 58 displays various kinds of data and the operation status.

The controller 53 includes a menu controller 55, an application operation controller 56, and a boot controller 57. The menu controller 55 activates the system and the operation of the overall system. The application operation controller 56 operates the application program. The boot controller 57 transfers the application program read from the external storage device 54 in an initial state to the application operation controller 56, and activates the application program.

A description will now be given of the operation of the control system. In the following description, the

resources 51A and 51B are a CD player (resource 1) and a navigation device (resource 2), respectively.

First of all, a power supply to the on-vehicle control system 50 is turned ON. The menu controller 55 of the controller 53 activates the overall controller 53, and makes the display 58 represent a menu screen MENU for selecting one of the resources. It will now be assumed that the user looks at the menu screen MENU and selects the CD player 51A by the key input unit 52. The menu controller 55 sends the boot controller 57 an instruction to activate the application program associated with the CD player 51A.

In response to receipt of the instruction, the boot controller 57 transfers the application program associated with the CD player 51A to the application operation controller 56, and activates the application program. The display unit 58 displays an application screen APP associated with the selected application program (see FIG. 2). The application screen APP for use in the CD player represents the number of programs, information indicating how to operate the key input unit 52 for the CD player (for example, information indicating the functions of key switches), and so on. Hence, the system operates as if the controller 53 is used exclusively for the CD player, and the CD player 51A performs a play specified by the user.

When the user wishes to operate the navigation device 51B while the CD player 51A is playing, a menu screen display key (menu key; not shown) mounted on the key input unit 52 is pushed down, and then the menu screen MENU is displayed again. Hence, the display on the display unit 58 is switched from the application screen APP to the menu screen MENU. At the same time as the above switching, the application operation controller 56 terminates the operation of the application program associated with the CD player 51A. As a result, the play of the CD player 51A is interrupted.

Thereafter, the user looks at the menu screen MENU and selects the navigation device 51B by the key input unit 52. The menu controller 55 makes the boot controller 57 activate the application program associated with the navigation device 51B.

The boot controller 57 transfers the application program associated with the navigation device 51B to the application operation controller 56, and activates the selected application program. Hence, the display unit 58 represents an application screen APP related to the application program (see FIG. 2). The application screen APP for use in the navigation device indicates a map, information indicating how to operate the key input unit 52 for the navigation device (for example, information indicating the functions of key switches), and so on. Hence, the system operates as if the controller 53 is used exclusively for the navigation device, and the navigation device 51B performs an operation specified by the user, for example, displays a map desired by the user.



As described above, the display operation on the menu screen MENU corresponds to switching of resources performed when the desired resource is specified. In order to terminate displaying of the application screen APP and display the menu screen MENU, it is necessary to terminate execution of the application program currently selected. In other words, it is impossible to simultaneously use the resources usable independently, such as the CD player and the navigation device. Hence, the resources cannot be efficiently utilized.

It is an object of the present invention to provide a control system for on-vehicle devices, which is capable of simultaneously using resources usable independently.

According to one aspect of the present invention, there is provided a control system for devices mounted on vehicle includes a plurality of controlled devices, storage unit for storing a plurality of control programs for controlling each of the plurality of the controlled devices, input unit for selecting controlled devices to be operated from the plurality of controlled devices, and operation control unit for reading application programs respectively associated with controlled devices selected by the input unit from the storage unit and monitoring status of operations of the controlled devices selected by the input unit on the basis of the application programs read from the storage unit so as to simultaneously operate the controlled devices.

The nature, utility, and further features of this invention will be more clearly apparent from the following detailed description with respect to a preferred embodiment of the invention when read in conjunction with the accompanying drawings briefly described below.

FIG. 1 is a block diagram illustrating an overview of a control system for on-vehicle devices;

FIG. 2 is a diagram showing switching between screens in the control system shown in FIG. 1;

FIG. 3 is a block diagram of an overview of the structure of an embodiment of the present invention;

FIG. 4 is a diagram illustrating a state transition of a menu screen in the embodiment of the present invention;

FIG. 5 is a diagram illustrating an example of display of the menu screen;

FIG. 6 is a block diagram illustrating an overview of the structure of a state monitor/maintenance control processing unit;

FIG. 7 is a flowchart of the operation of a first-resource status maintenance processing unit; and

FIG. 8 is a flowchart of the operation of a second-resource status maintenance processing unit.

A description will now be given, with reference to FIGS. 3 through 8, of an embodiment of the present

invention. In these figures, parts that are the same as those shown in FIG. 1 are given the same reference numbers.

A control system 10 for on-vehicle devices according to the embodiment of the present invention includes a plurality of resources 51A and 51B, a key input unit 11, a controller 18, the external storage device 54 and the display unit 58. The resources 51A and 51B are, for example, audio devices such as CD players, DAT players and FM/AM tuners, visual devices such as television sets, navigation devices using a GPS or the like. The key input unit 11 is used to input various kinds of data to the system. The controller 18 selects two or more resources from among the plurality of resources on the basis of the input data from the input key unit 11, and performs various controls on the basis of an application program or programs (application software) used to control the selected resource or resources. The external storage device 54 stores application programs associated with the respective resources. The display unit 58 displays various pieces of data and the operation status.

The controller 18 includes a status monitor/maintenance control processing unit 12, a menu controller 13, an application operation controller 14, and a boot controller 15. The status monitor/maintenance control processing unit 12 activates the system, and monitors the status of the operation of the plurality of resources. Further, the processing unit 12 simultaneously operates one or more resources. The menu controller 13 performs an operation on the menu screen MENU (see FIG. 2) under the control of the status monitor/maintenance control processing unit 12. The application operation controller 14 operates a plurality of application programs 14<sub>1</sub> and 14<sub>2</sub>. The boot controller 15 transfers one or more application programs read from the external storage device 54 to the application operation controller 14 in an initial mode, and activates the application programs.

A description will now be given, with reference to FIGS. 6 through 8, of the structure and operation of the status monitor/maintenance control processing unit 12. For the sake of simplicity, the following description relates to a case where two resources are simultaneously operated.

FIG. 6 is a block diagram of the structure of the status monitor/maintenance control processing unit 12. The status monitor/maintenance control processing unit 12 includes a first-resource status maintenance processing unit 20, a second-resource status maintenance processing unit 21 and an application interface 22. The first-resource status maintenance processing unit 20 controls the operation of the first resource 51A. The second-resource status maintenance processing unit 21 controls the operation of the second resource 51B. The application interface 22 performs an interfacing operation between the first-

resource status maintenance processing unit 20 or the second-resource status maintenance processing unit 21 and the application operation controller 14.

The operation of the status monitor/maintenance control processing unit 12 will now be described with reference to FIGS. 7 and 8. It will be assumed that the status monitor/maintenance control processing unit 12 simultaneously operates the two application programs by executing an interruption process.

FIG. 7 is a flowchart of the operation of the first-resource status maintenance processing unit 20, and FIG. 8 is a flowchart of the operation of the second-resource status maintenance processing unit 21.

The first-resource status maintenance processing unit 20 determines whether or not a command from the application operation controller 14 to the first resource 51A has been inputted via the application interface 22 by the interruption process in step S10.

When it is determined that the command to the first resource 51A has not been inputted, the first-resource status maintenance processing unit 20 sends the first resource 51A an operation confirmation command for confirming the status of the operation of the first resource 51A in step S11. In response to receipt of the operation confirmation command, the first resource 51A sends the first-resource status maintenance processing unit 20 information concerning the operation of the first resource 51A requested by the received command.

Then, the first-resource status maintenance processing unit 20 determines whether or not an error has occurred on the basis of the received information concerning the operation of the first resource 51A in step S13, and performs an error process when an error has occurred in step S14. Then, the process returns to step S10. When it is determined that an error has not occurred in the first resource 51A, the first-resource status maintenance processing unit 20 performs nothing and returns to step S10.

When it is determined, in step S10, that the command to the first resource 51A has been inputted, the first-resource status maintenance processing unit 20 sends the above command to the first resource 51A in step S15. In response to receipt of the above command, the first resource 51A performs the operation related to the command, and sends the first-resource status maintenance processing unit 20 information concerning the result of the operation in step S12.

The first-resource status maintenance processing unit 20 determines, on the basis of the received information concerning the operation, whether or not an error with respect to the command has occurred in step S13. When it is determined that an error has occurred, the first-resource status maintenance processing unit 20 performs an error process in step S14, and returns to step S10 again. When it is determined, in step S13, that no error has occurred, the first-resource status maintenance processing unit 20 does

not perform anything, and returns to step S10.

In parallel with the above operation of the first-resource status maintenance processing unit 20, the second status maintenance processing unit 21 determines whether or not a command from the application operation controller 14 to the second resource 51B has been inputted via the application interface 22 by the interruption process in step S20.

When it is determined, in step S20, that no command to the second resource 51B has been inputted, the second-resource status maintenance processing unit 21 sends the second resource 51B an operation confirmation command for confirming the status of the operation of the second resource 51B in step S21. In response to receipt of the operation confirmation command, the second resource 51B sends the second-resource status maintenance processing unit 21 information concerning the operation of the second resource 51B requested by the received command.

The second-resource status maintenance processing unit 21 determines whether or not an error has occurred on the basis of the received information concerning the operation of the second resource 51B in step S23, and performs an error process when an error has occurred in step S24. Then, the process returns to step S20. When it is determined that an error has not occurred in the second resource 51B, the second-resource status maintenance processing unit 21 performs nothing and returns to step S20.

When it is determined, in step S20, that the command input to the second resource 51B has been inputted, the second-resource status maintenance processing unit 21 sends the above command to the second resource 51B in step S25. In response to receipt of the above command, the second resource 51B performs the operation related to the command, and sends the second-resource status maintenance processing unit 21 information concerning the result of the operation in step S22.

Then, the second resource status maintenance processing unit 21 determines, on the basis of the received information concerning the operation, whether or not an error with respect to the command has occurred in step S23. When it is determined that an error has occurred, the second-resource status maintenance processing unit 21 performs an error process in step S24, and executes step S20 again. When it is determined, in step S23, that no error has occurred, the second-resource status maintenance processing unit 21 does not perform anything, and returns to step S20.

As described above, according to the embodiment of the present invention, it is possible to simultaneously operate the two resources in parallel with each other by the interruption process and to efficiently utilize the resources.

A description will now be given of the concrete operation of the on-vehicle control system. In the follow-

ing description, the first resource 51A is a CD player (serving as "resource 1"), and the second resource 51B is a navigation device (serving as "resource 2").

First, a power supply to the on-vehicle control system 50 is turned ON. The status monitor/maintenance control processing unit 12 of the controller 18 activates the overall controller 53, and makes the display unit 56 represent a menu screen MENU<sub>ORG</sub> for selecting one or more resources. It will now be assumed that the user looks at the menu screen MENU<sub>ORG</sub> and selects the CD player 51A by the key input unit 52. The menu controller 55 sends the boot controller 15 an instruction to activate the application program corresponding to the CD player 51A.

In response to receipt of the instruction, the boot controller 15 transfers the application program 14<sub>1</sub> associated with the CD player 51A to a predetermined area of a memory (not shown) in the application operation controller 14, and activates the application program 14<sub>1</sub>. The display unit 56 displays an application screen APP<sub>1</sub> associated with the selected application program 14<sub>1</sub> (see FIG. 2). The application screen APP for use in the CD player indicates the number of programs, information indicating how to operate the key input unit 52 for the CD player (for example, information indicating the functions of key switches), and so on. Hence, the system operates as if the controller 53 is used exclusively for the CD player, and the CD player 51A performs a play specified by the user.

When the user wishes to operate the navigation device 51B while the CD player 51A is playing, a menu screen display key (menu key; not shown) mounted on the key input unit 52. Hence, the status monitor/maintenance control processing unit 12 sends the menu controller 13 the command for displaying the menu screen on the display unit 56. Hence, the display on the display unit 56 is switched from the application screen APP<sub>1</sub> to a menu screen MENU<sub>NEW</sub>. As shown in FIG. 5, the menu screen MENU<sub>NEW</sub> indicates the resources so that the resources which are operating are visually distinguishable from the resources which are not operating. For example, the resources (the CD player: CD AUDIO) which are operating are indicated with a display color different from a display color with which the resources which are not operating are indicated. In the example shown in FIG. 5, the indication of the CD player which is operating is shown so that it is surrounded by a block. A state in which one or more resources previously selected are simultaneously operating is referred to as a "hidden ON state".

The user refers to the menu screen MENU<sub>NEW</sub>, and operates a cursor key (not shown) of the key input unit 11 so that the cursor moves to the indication of the navigation device 51B (a reverse indication in FIG. 5). Hence, the menu controller 55 sends the boot

controller 15 a command to activate an application program 14<sub>2</sub> associated with the navigation device 51B. In response to receipt of the command, the boot controller 15 transfers the application program 14<sub>2</sub> associated with the navigation device 51B to a memory area in the application operation controller 14 different from that for the application program 14<sub>1</sub>, and activates the application program 14<sub>2</sub>. Hence, an application screen APP<sub>2</sub> for the application program 14<sub>2</sub> for the navigation device 51B is displayed on the display unit 56 (see FIG. 2). The application screen APP<sub>2</sub> for use in the navigation device indicates a map, information indicating how to operate the key input unit 11 for the navigation device (for example, information indicating the functions of key switches), and so on. Hence, the system operates as if the controller 18 is used exclusively for the navigation device, and the navigation device 51B performs an operation specified by the user, for example, displays a map desired by the user.

The status monitor/maintenance control processing unit 12 controls the application operation controller 14 so that the application program 14<sub>1</sub> for the CD player 51A is simultaneously running. Hence, reproduced sounds are being output via a speaker (not shown) in the hidden ON state.

According to the embodiment of the present invention, the status monitor/maintenance control processing unit is provided between the application software and the resources, and is capable of maintaining the operating status of the previously selected one or more resource. As a result, a plurality of resources operable independently can be simultaneously operated and can be efficiently utilized. In this case, it is possible to directly switch the display from the application screen APP<sub>1</sub> to the application screen APP<sub>2</sub>, and directly switch the display from the menu screen MENU<sub>ORG</sub> to the menu screen MENU<sub>NEW</sub>.

In the above-mentioned embodiment, two resources are simultaneously operated. Further, more than two resources can be simultaneously operated in the same manner as described above.

According to the present invention, it is possible to independently operate a plurality of controlled devices (resources) by means of an operation control means and hence to efficiently utilize the resources in the on-vehicle control system.

The invention may be embodied in other specific forms without departing from the spirit of essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

Claims

1. A control system (10) for devices mounted on vehicle comprising:
  - a plurality of controlled devices (51),
  - storage means (54) for storing a plurality of control programs for controlling each of the plurality of the controlled devices;
  - input means (11) for selecting controlled devices to be operated from the plurality of controlled devices; and
  - operation control means (16) for reading application programs respectively associated with controlled devices selected by said input means from the storage means and monitoring status of operations of the controlled devices selected by said input means on the basis of the application programs read from said storage means so as to simultaneously operate the controlled devices.
  
2. A control system according to claim 1, wherein said operation control means monitors a selection of controlled devices by interruption process when at least one controlled device is being operated.
  
3. A control system according to claim 1, wherein said operation control means comprising a plurality of sub-control means (14, 20, 21) for respectively monitoring and operating each one of said controlled devices and interface means (22) for interfacing said sub-control means with each other.
  
4. A control system according to claim 1, further comprising display means (56) for indicating the controlled devices currently operated.
  
5. A control system according to claim 4, wherein said display means indicates the newly selected controlled devices in a manner being distinguished from the controlled device which has been operated prior to the selection of the new controlled device.

5

10

15

20

25

30

35

40

45

50

55

7

FIG. 1

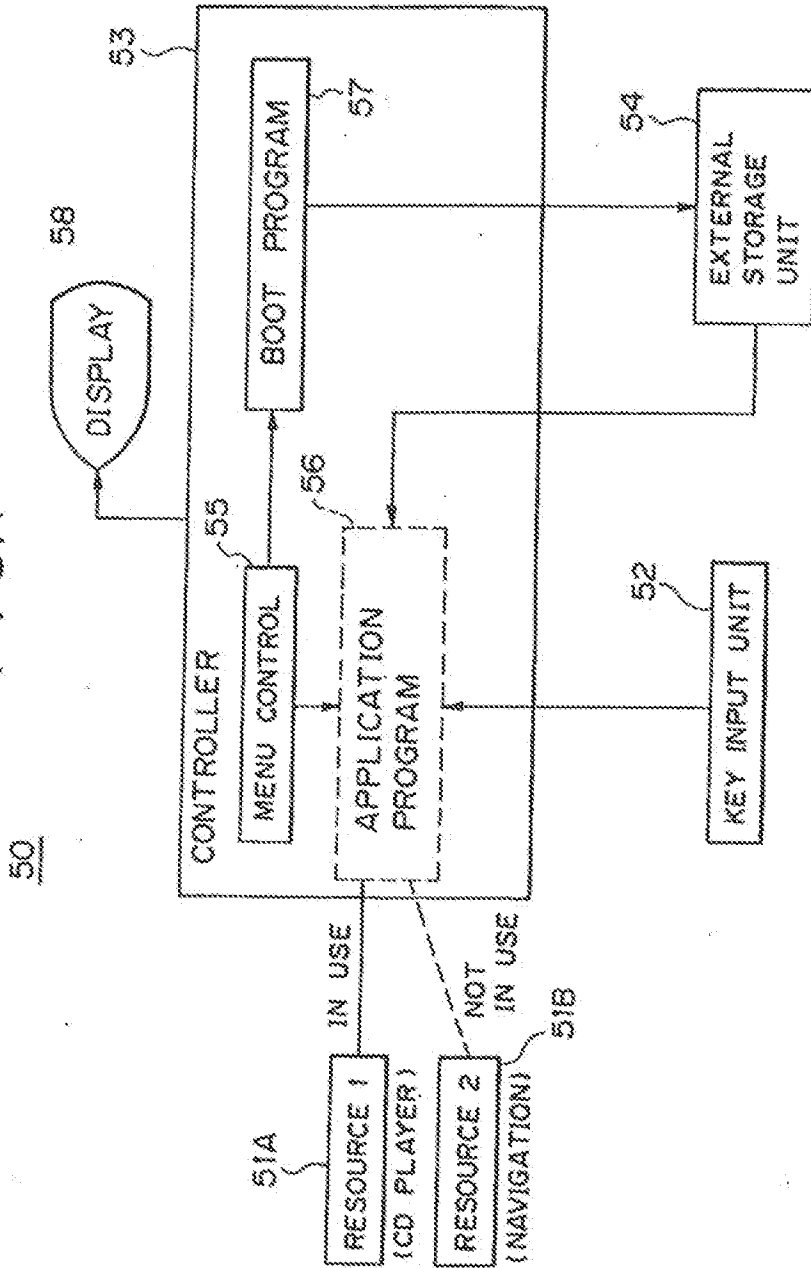


FIG. 2

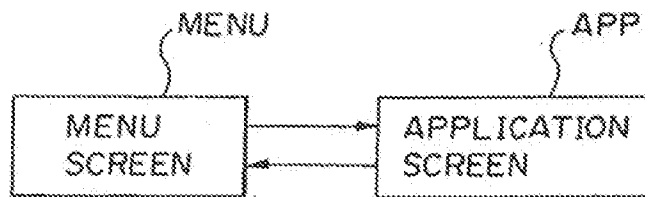


FIG. 3

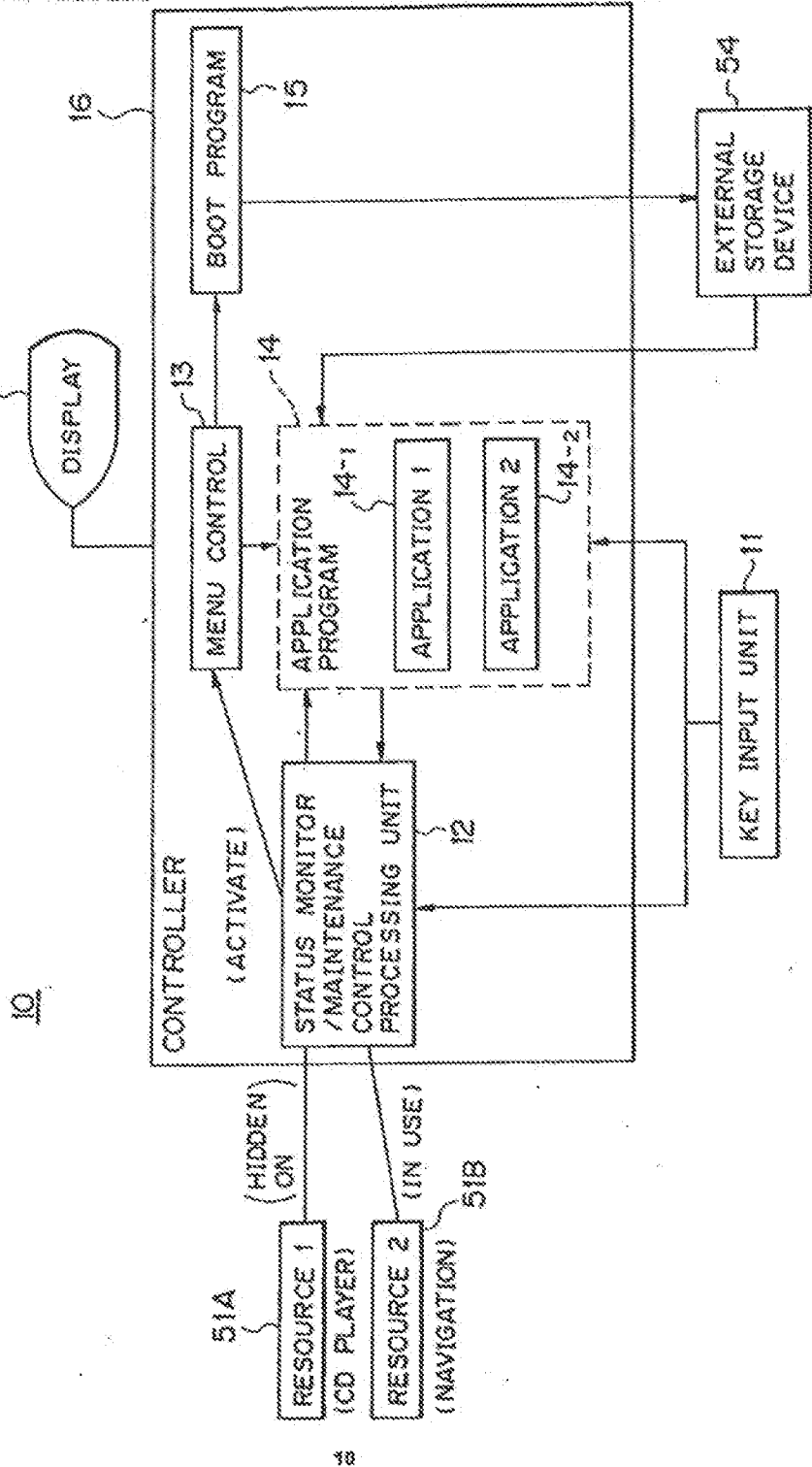


FIG. 4

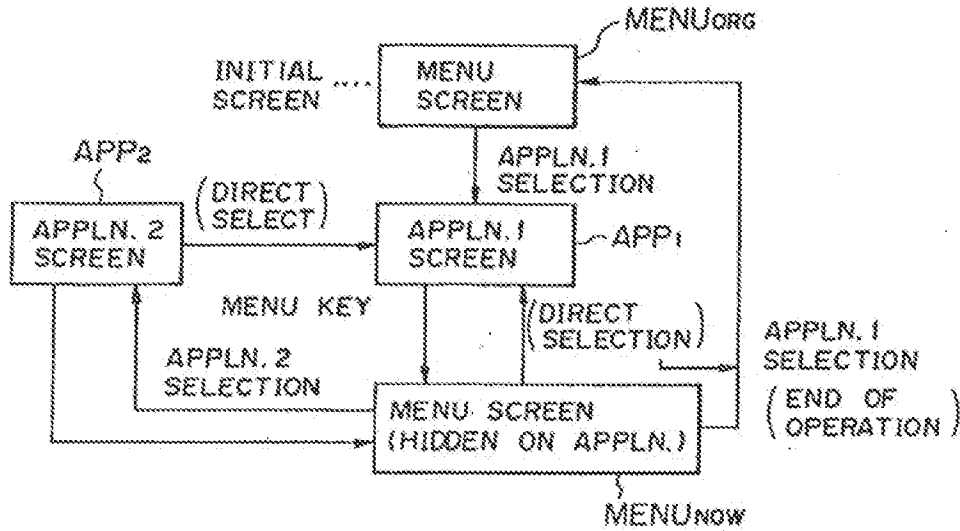


FIG. 5

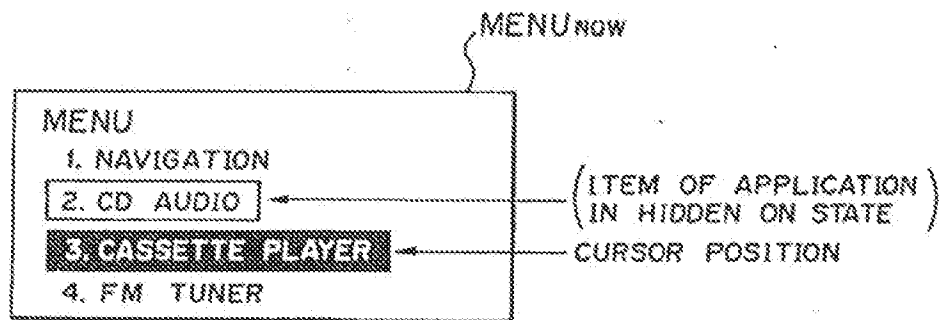




FIG. 6

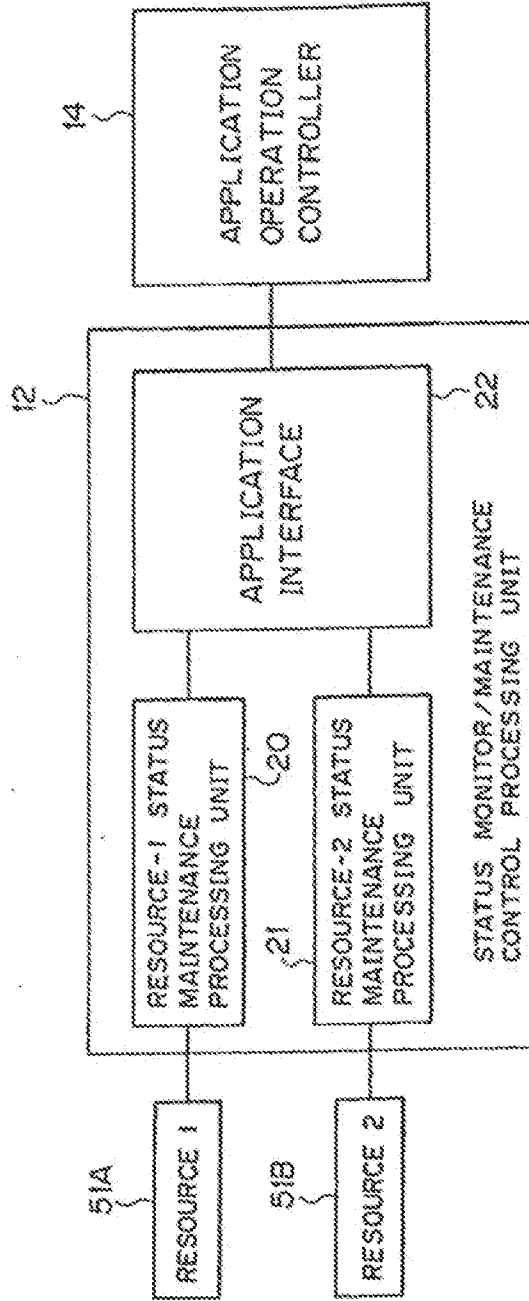


FIG. 7

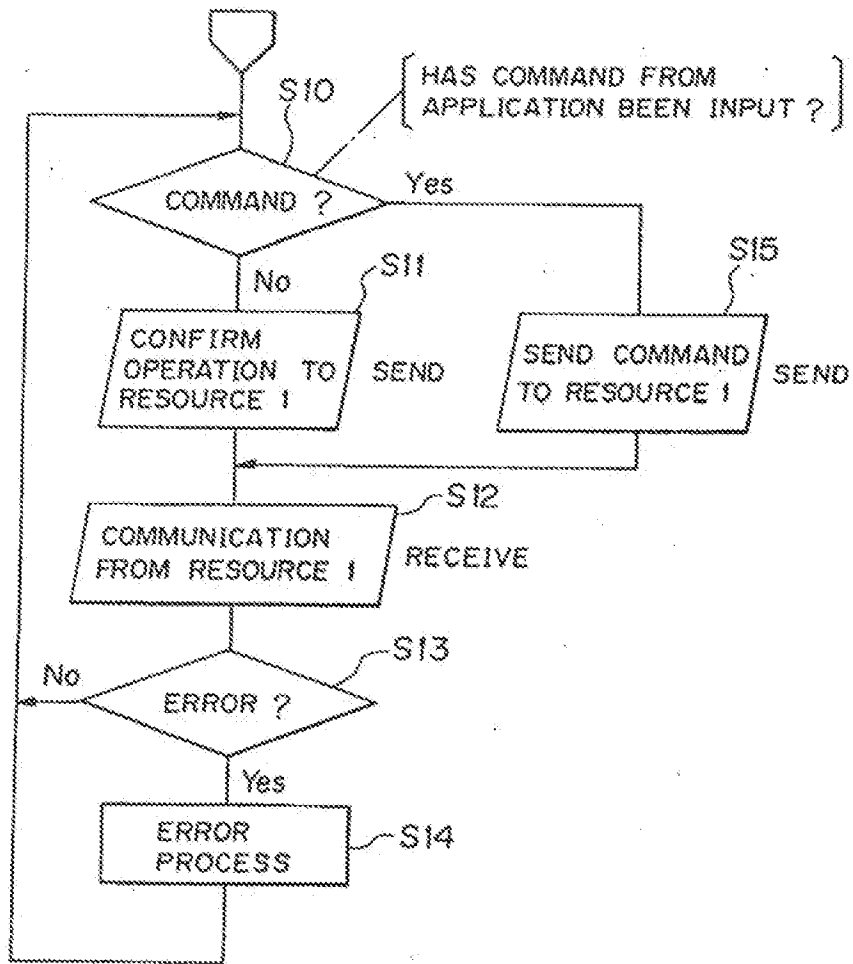
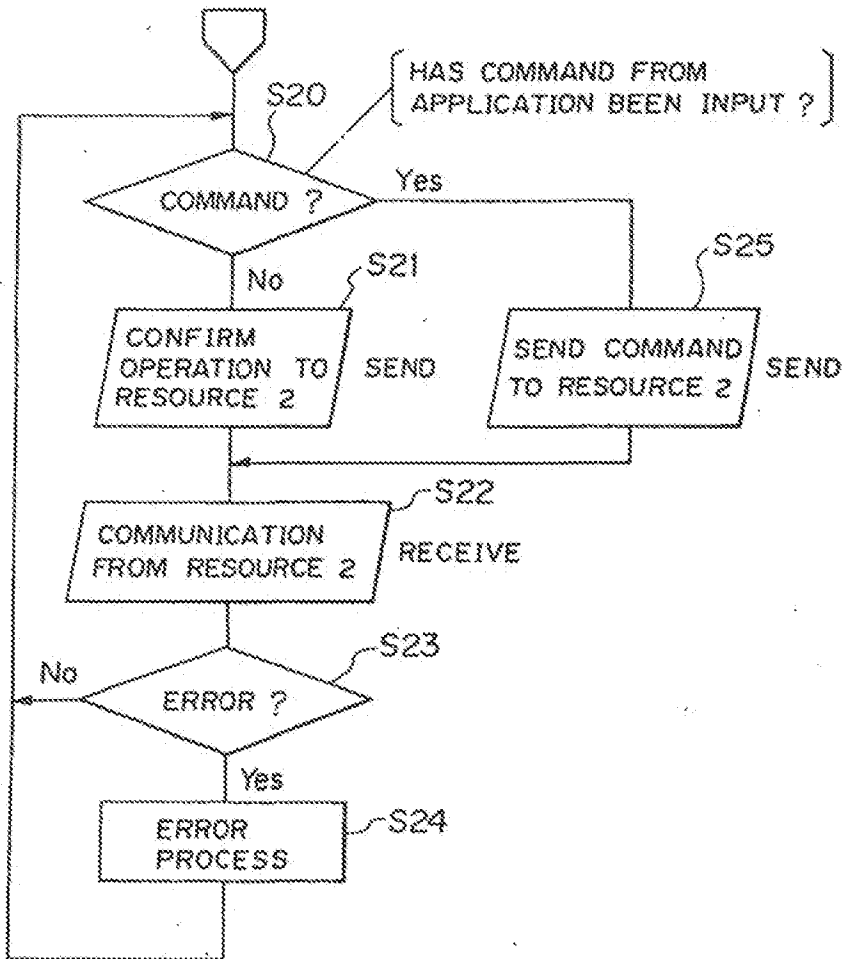


FIG. 8





European Patent  
Office

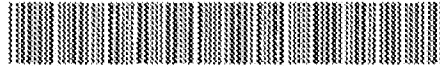
EUROPEAN SEARCH REPORT

Application Number

EP 93 30 3536

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 8)
X	EP-A-0 383 094 (ROBERT BOSCH GMBH) * the whole document *	1-4	G06F3/033 B60R16/02
X	US-A-4 809 177 (WINDLE W. E.) * column 2, line 64 - column 3, line 19 * * column 4, line 61 - column 5, line 10 * * column 8, line 50 - column 15, line 38 *	1,3-5	
X	PATENT ABSTRACTS OF JAPAN vol. 15, no. 116 (P-1182)20 March 1991 & JP-A-30 06 773 ( ALPINE ELECTRON INC ) 14 January 1991 * abstract *	1,4	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		23 AUGUST 1993	BAILAS A.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		I : theory or principle underlying the invention E : earlier patent document, but published so, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EP 0 509 243 A1 (2)



EUROPEAN PATENT APPLICATION

Application number: 95302088.8

Int. Cl.<sup>6</sup>: G01C 21/20, B60R 16/02, G06F 3/16, G09B 29/10

Date of filing: 29.03.95

Priority: 29.03.94 JP 59250/94

Inventor: Sawada, Yasuhiro  
c/o Honda R&D Co., Ltd.,  
4-1, Chuo 1-chome  
Wako-shi, Saitama-kan, 351-01 (JP)

Date of publication of application:  
04.10.95 Bulletin 95/40

Designated Contracting States:  
DE FR GB

Representative: Tomlinson, Kerry John et al  
Frank E. Dahn & Co.  
European Patent Attorneys  
Imperial House  
15-19 Kingsway  
London WC2B 6UZ (GB)

Applicant: HONDA GIKEN KOGYO  
KABUSHIKI KAISHA  
1-1, Minami-Aoyama 2-chome  
Minato-ku Tokyo 107 (JP)

Car navigation system.

A car navigation system (1) includes a route judgement means (6) for judging whether the driver should head for an input place name (5a) in order to reach a destination (4a), and judgement result means (8) for outputting a judgement result, so that a car can be guided and navigated along a suitable route to the destination by inputting place names written on road signs or the like. The judgement result is output with a voice message or image display (9). When plural place names are input, the judgement is made on each of the place names, and the most suitable place name is selected and output.

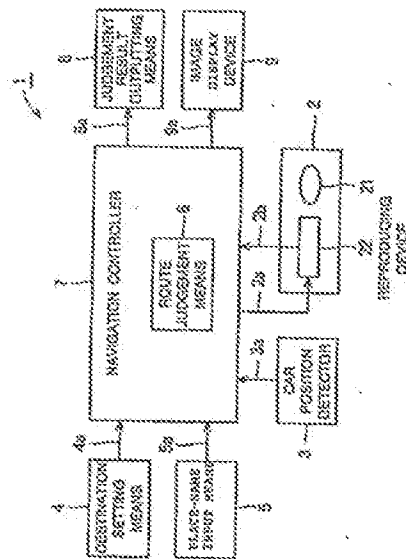


FIG. 1

EP 0 675 341 A1

This invention relates to a car navigation system for obtaining information on a route which is suitable to guide or navigate a car (vehicle) to a destination by beforehand registering the destination.

There has been known a car navigation system in which a route extending to a destination is preset, and a course to be selected, such as "turning to the left or right", "keeping straight on" or the like, is guided using voice synthesis or the like when a car arrives at the front side of a crossing or the like. In such a system, the course guide is made with synthesized voice or the like at all times irrespective of driver's need every time the car arrives at this side of a crossing or the like, and thus the voice may sound offensive to the driver's ear. In order to overcome such a disadvantage, a car navigation system for outputting road guide information with voice immediately when a request (navigation request) is made from a driver is proposed in Japanese Laid-open Patent Application No. Hei-5-99678.

In addition, a map display device for a car in which a destination and a current position can be set by inputting the names of places, etc., displayed on a map with voice is also proposed in Japanese Laid-open Patent Application No. Hei-3-257485.

Furthermore, for a solid road as shown in Fig. 12 which has been recently developed in cities, the car position is indicated at the same position on a map which is displayed on a display unit or the like of a car navigation system when a car runs on any road of a high level road 121, a ground road 122 and an underground road (tunnel) 123. In order to avoid such a problem, Japanese Laid-open Patent Application No. Hei-4-219872 proposes a voice guide device in which a road environment is specified in accordance with a view from a car window, for example, (1) only a distance view can be taken because of high level road, (2) only a close-range view can be taken because of a general road, or (3) no view can be taken because of a covered road, and a guide sentence (message) is prepared in accordance with the specified road environment to perform the road guide with synthesized voice.

In the car having the navigation system, a driver drives his car while checking the position of the car or the course (direction) of the car by seeing a road sign as shown in Fig. 13. When the same place name as the final destination is indicated on a road sign, the driver identifies the course without losing his way. However, the same place name as the destination is not necessarily indicated on a road sign. In this case, the driver must decide a suitable course on the basis of one or plural place names which are indicated on a road sign. Here, if the driver knows his way around an area in which he drives currently, he can decide the course on the basis of the names of places which will be passed until the car reaches the final destination (hereinafter these places are referred to as "via-

places"). However, if he does not know well his way around the area, he cannot decide the suitable course. Therefore, there has been required a device in which by inputting the names of via-places displayed on road signs or the like, the car can be guided and navigated along a course which is suitable to lead the car to the final destination, on the basis of judgment as to whether it is suitable to lead the car to a course extending to the name of a via-place. In the car navigation system as disclosed in Japanese Laid-open Patent Application No. Hei-5-99678, a travel route must be preset, and this is a cumbersome work. A navigation system having an advance indication function as disclosed in Japanese Laid-open Patent Application No. Sho-60-202307 is designed to indicate a course to a car at every crossing by inputting a travel start point and a destination point. However, in the navigation systems of the Japanese Laid-open Patent Application Nos. Hei-5-99678 and Sho-60-202307 as described above, the judgment on "turning to the left or right", "keeping straight on", etc., is made on the basis of a road map to indicate a suitable course to a driver.

Therefore, for example, in a case where a crossing at which the car is to change its course is a solid crossing as shown in Fig. 14, a voice guide indicating "turn to the right 100meters ahead" would be merely made insofar as a map data base is provided with no information indicating a solid crossing structure when the car is instructed at the solid crossing to change its course from a course in the north direction on a road A to another course in the east direction on a road B. However, various structures may be designed for solid crossings, and thus even when the course change (turning to the right) is beforehand indicated, it is unclear whether it is suitable to keep a right lane in accordance with the indication.

Accordingly, in order to enable making a guide indicating "pass from a left lane through a bypass and enter a road B" in accordance with the structure of the solid crossing a map data base is required having road environment data containing the detailed structures of solid crossings as disclosed in the Japanese Laid-open Patent Application No. 4-219872. However, such a map data base needs a large amount of data, and thus a larger capacity storing medium (for example, plural CD-ROMs) and a storing medium reading device for accessing the storing medium at high speed (for example, CD-ROM automatic changer or the like) are required, so that the system becomes complicated and high in price. In addition, a larger number of steps for renewal and maintenance of road environment data are required.

The present invention has been implemented to overcome the above problem, and has a first object to provide a car navigation system for guiding and navigating a car along a suitable route extending to a destination on the basis of place names which are in-

indicated on road signs even when a general data base having no road environment data on the structures of solid crossings, etc., is used, and, in other words, a car navigation system for assisting a driver to surely judge his route on the basis of the road signs even in a geographically unfamiliar area around which the driver does not know his way.

Furthermore, the present invention has a second object to provide a car navigation system which can surely guide and navigate the car in a suitable course even in such a case where the driver does not know an accurate place name (Japanese rendering or pronunciation) because in some cases the driver does not accurately know the pronunciations (the Japanese rendering) of some place names written in Kanji on road signs in a geographically unfamiliar area, and in which place names can be hand-written with characters such as Hiragana, Katakana or the like which are relatively easily input and easily recognizable even under a vibrational running condition.

In order to attain the above objects, a car navigation system according to claim 1 includes route judgment means for judging whether an input place name is suitable for a route extending to a destination, and judgment result outputting means for outputting a judgment result of the route judgment means. Accordingly, by inputting a place name written on a road sign or the like, it can be suitably indicated which course should be selected. Therefore, even when the driver or the like does not recognize the geographical relationship between a destination and a place name written on a road sign or the like in a geographically unfamiliar area, he can take the suitable course on the basis of the place name written in the road sign or the like.

In a car navigation system according to claim 2, place names indicated on a map which is reproduced and displayed on a screen by an image display device and data on pronunciations of the place names (written in Kanji) are provided to a road map data base. Therefore, place names such as via-places, etc., can be specified by inputting the place names with voice using a voice recognition device (in the following description, a via-place is defined as a place through which the car passes to the destination). Furthermore, when a hand-writing input device is used, the place names such as via-places can be also specified by inputting the place names in Hiragana or Katakana with a pen or the like. Accordingly, a hand-write character recognizing unit of this system can be more facilitated in construction than a hand-write input device which needs recognition of Kanji. In addition, it is difficult to accurately input complicated Kanji characters during running because of car vibration. On the other hand, the Hiragana or Katakana character input of the place names makes the hand-writing input operation more easy.

In a car navigation system according to claim 3,

in addition to an accurate (formal) pronunciation for each place name, data on other ways of pronunciation (hereinafter referred to merely as "pronunciations") for each place name are also provided. Accordingly, even when the driver or the like does not know the formal place names because of a geographically unfamiliar area, the place names written on road signs, etc., can be input by voicing or hand-writing an adequate (informal) pronunciation for each place name.

For example, in the car navigation system having the place name input means using a voice recognition device and the judgment result output means using a voice synthesizer, when the driver or the like voices one or plural place names which are written on a road sign, the place name input means analyzes the voice and supplies the input one or plural place names to the route judgment means.

On the basis of the datum on the current position of the car which is supplied from a car position detection device, the route judgment means recognizes the position at which the car is currently located, and judges whether a route containing a place whose name is input from the place name input means as a via-place name is suitable, thereby allowing the car to arrive at a destination (final destination) which is preset by destination setting means. If plural place names are input, the above judgment may be made on each place name, and the most suitable one (place name, route) selected and output.

Through the judgement as described above, the route may be judged to be suitable when an angle at which a line connecting the car current position and the destination intersects to a line connecting the car current position and an input place-name point is below a predetermined threshold value. If there are plural input place-name points which satisfy the above angle condition (below the predetermined threshold angle value), a route containing a place name providing the smallest angle in these plural place names may be selected.

Furthermore, the suitability judgment may be made on the basis of the distance of a common portion between a route extending from the current position to the destination and a route extending from the current position to an input place name. Besides, the suitability judgment may be made on the basis of the distance of a route extending from the current position through an input place name (via-place) to the destination. In a case where a route extending to an input place name contains a route (road) such as a superhighway on which the car can run at a higher speed than on a general road, the distance of the road (superhighway) may be converted (reduced) to a shorter value than its actual distance (conversion of the distance on the basis of a preset reduction rate) to calculate the distance to the destination, and a route through which the car arrives at the destination

most early may be selected/identified on the basis of the converted distances (calculated in consideration of an arrival time).

When a judgment result on the suitable route is given, the judgment result output means may allow the suitable route to be audibly supplied by voice synthesis, whereby the driver can take the suitable route.

In the above system, the place name input means may be constructed by the hand-write character input device and the hand-write character recognition device, and the judgment result output means may be designed to display a route which is judged to be suitable on a map which is reproduced and displayed on a screen of a display unit, and a line connecting the car current position and a vis-place which is judged to be suitable.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram showing a car navigation system according to a first embodiment of the present invention;

Fig. 2 is a block diagram showing a car position detector;

Fig. 3 is a block diagram showing a voice recognition device;

Fig. 4 is a block diagram showing a destination setting means and a place name input means;

Fig. 5 is a block diagram showing a navigation controller;

Fig. 6 is a block diagram showing a judgment result output means;

Fig. 7 is a schematic diagram showing a first embodiment of a suitability judgment on a route extending to a destination (judgment based on a course direction);

Fig. 8 is a schematic diagram showing a second embodiment of the suitability judgment on the route extending to the destination (judgment based on route);

Fig. 9 is a schematic diagram showing a third embodiment of the suitability judgment on the route extending to the destination (judgment based on set area);

Fig. 10 is a block diagram showing another embodiment of the navigation controller;

Fig. 11 is a schematic diagram showing an example of a course guide image;

Fig. 12 is a schematic diagram showing an example of a solid road;

Fig. 13 is a schematic diagram showing an example of a road sign; and

Fig. 14 is a schematic diagram showing an example of the structure of a solid crossing.

Fig. 1 is a block diagram showing the overall construction of a car navigation system 1 of an embodiment of the present invention. The car navigation system 1 includes a road map data base 2, a car position

detector 3, a destination setting means 4, a place-name input means 5, a navigation controller 7 having a route judgment means 8, a judgment result output means 9 and an image display device 9.

Reference numeral 2a represents an access request signal for accessing the road map data base 2, reference numeral 2b represents a data output signal to be output in response to the access request signal 2a, reference numeral 3a represents car position data, reference numeral 4a represents input information on the destination setting, reference numeral 5a represents input information on a place name which is a target for a route judgment, reference numeral 6a represents information on the judgment result, and reference numeral 9a represents a display unit driving signal such as a video signal or the like.

The road map data base 2 comprises a CD-ROM (compact disc ROM) 21 on which road map information is recorded, and a reproducing device 22 for the CD-ROM 21. In the road map data base 2 are beforehand stored map data for generating maps on various reduced scales such as a broad area map, a middle area map, a detailed area map, etc., various kinds of display matters to be indicated on a map which is displayed on the image display device 9, such as names of superhighways, national roads, local roads, etc., attributes and display data (character data containing Kanji, etc.) of main buildings, railways, rivers, lakes, etc., and at least pronunciation data (character data of Hiragana or Katakana) for place names in accordance with a predetermined data base format (structure).

With respect to the pronunciation data, the data base format is designed so that plural ways of pronunciation (hereinafter referred to merely as "pronunciations") (i.e., not only one pronunciation) may be registered for each place name. Accordingly, with respect to place names which are hard to pronounce or liable to be mispronounced because these names are written in Kanji, plural pronunciations are beforehand registered for these place names so that the place name concerned can be specified with any one of the registered pronunciations for the place name. For example, plural pronunciations "Tokorozawa", "Tokorozawa", "Shozawa", "Shosawa", etc., are registered for the place name of Kanji character " ". These plural pronunciations are managed so that the formal pronunciation and the informal pronunciations for the place name are discriminable from each other. Accordingly, when the current position of the car is requested to be audibly output to the driver or the like using the voice synthesis (i.e., so that the driver or the like can hear a synthesized voice representing the current position), the car navigation system 1 of this embodiment can voice to the driver the place name of the car current position with the formal pronunciation.

The road map data base 2 may comprise a re-



conding medium such as a magnetic recording medium, a magneto-optical recording medium or a semiconductor memory in place of the CD-ROM, and a read-out device therefor.

Fig. 2 is a block diagram showing an embodiment of the car position detector shown in Fig. 1. The car position detector 3 is designed so as to use jointly a dead reckoning navigation device 33 which successively calculates the position of the car on the basis of a direction signal 31a from a direction sensor 31 such as a gyro, a geomagnetic sensor or the like and a distance signal such as a pulse signal or the like which is output every predetermined unit travel distance from a travel distance sensor 32 such as a wheel rotation sensor or the like, and a GPS position measuring device 35 for detecting the position of the car on the basis of signals which are received from plural GPS satellites using a GPS reception antenna 34. Accordingly, even when it is impossible to receive waves from the GPS satellites, the current position of the car can be guessed by the dead reckoning navigation device 33.

The car position detector 3 is further provided with a travel locus calculation means 36 for obtaining a travel locus on the basis of car position data 33a which are successively output from the dead reckoning navigation device 33, and a map matching means 37 for comparing travel locus data 36a output from the travel locus calculation means 36 with road data 2a read out from the road map data base 2 to correct the current position of the car so that the car is located on a road in consideration of features of the travel locus such as crossings, bending points, etc.

When no setting operation is carried out for the current position of the car (initial position), the car position detection control means 38 in the car position detector 3 supplies the dead reckoning navigation device 33 with position data 35a output from the GPS position measuring device 35 as an initial position or temporary position data 38a, and also outputs it as car position data 3a. The car position detection control means 38 supplies the dead reckoning navigation device 33 with position correction data 37a which are output from the map matching means 37 to correct the current position data of the car, and supplies the navigation control unit 7 with the newest car position data 33a which are successively output from the dead reckoning navigation device 33 as the car position data 3a.

Fig. 3 is a block diagram showing a destination setting means and a place name input means.

The destination setting means 4 and the place name input means 5 are designed to input a destination and a place name serving as a target for the course judgment with a voice using a voice recognition device 40. The voice recognition device 40 can recognize the voice of any speaker, and its recognition rate can be improved by beforehand registering

the voice of a specific speaker (for example, a driver).

Therefore, the voice recognition device 40 includes a level adjustment circuit 42 having an AGC function for adjusting the output signal 41e of a microphone 41 to a predetermined signal level, a noise removing circuit 43 for removing noise components and emphasizing a specific frequency band component and removing undesired frequency components so that a voice signal is suitable for voice analysis, a voice analyzing circuit 44 for analyzing the features of a voice signal 43a for analysis from which the noise components are removed and which has frequency components suitable for the voice analysis to code the voice signal 43a, a collate circuit 45 for comparing and collating the analysis data (voice input) 44a output from the voice analysis circuit 44 and the analysis data (comparison reference) 45a supplied from an analysis data storing circuit 45 to output analysis result data 46a representing coincidence or similarity degree for these analysis data, a recognition result output means 47 for outputting a destination input command 47a and place-name input data 4b on the basis of the analysis result data 46a, monosyllable data and vocabulary data 45b, a register control means 48 for registering the voice of a specific speaker, a key input interface (I/F) circuit 49 and an operation unit 50 having various operation keys.

The analysis data storing circuit 45 is designed so that analysis data for the voice of an unspecified speaker and analysis data for the voice of a specific speaker are stored in discrete storage areas. The register control means 48 is designed so that when the destination key 51 is pushed down in a state where a voice register switch 48a is set to a register mode and then "Destination" is voiced, the vocabulary analysis data for "Destination" is stored in the analysis data storing circuit 45 while making a correspondence between the pushed key and data representing the function of the key.

The operation unit 50 includes the destination key 51 for registering a command voice (command words) when the destination is input with voice, a road guide key 52 for registering a command voice (command words) for starting a road guide operation, cursor shift keys 53a to 53d for scrolling a map displayed on the screen of the image display device 9 and registering a command voice (command words) to shift a position indicating cursor displayed on the map, an enter (set) key 54 for registering a command voice (command words) to determine and input the position of the shifted cursor, and a voice register key 55 which has plural keys and serves to register the voiceless sounds of the Japanese syllabary, the voiced sounds, the syllabic nasal in Japanese, numerals, words such as alphabetic letters, etc., in accordance with the pushing frequency of each key and the combination of pushed keys (multi-pushing).

The unspecified speaker can start the destination

set mode and a mode for inputting a place name for course guide by voicing a predetermined key word. For example, the voice of "destination" starts the destination set mode and the voice of "course guide" starts the course guide mode, and then the next voice of "Tokorozawa" (place name) allows input of a place name corresponding to the destination, a via-place name or the like.

On the other hand, the specific speaker such as a driver or the like can register his favorite words in accordance with the operation of the keys 51 to 55. Any words such as "the end of travel" and "which course" may be used and registered for the destination setting and the start of the course guide, respectively. The words of "up", "shita", "hidari", "migi", "up", "down", "left", "right", etc., may be used and registered as command words (key words) for the shift of the cursor and the scroll of the map, and further the word of "OK" may be used and registered as a command word (key word) to determine the cursor position and the map.

The destination setting means 4 and the place-name input means 5 are designed so that the input operation can be performed by using the various keys 51 to 55 of the operation unit 50 and by jointly using the operation of the keys 51 to 55 and the voice. For example, the following actions may be performed. That is, the destination key 51 is pushed to shift the mode to the destination register mode, and then a destination name is input with voice. Furthermore, the road guide key 52 is pushed to shift the mode to the course guide mode, and then the via-place name is input with voice. Accordingly, the recognition result output means 47 monitors the key input information 49a output from the key input interface circuit 49 at all times, and it is designed to generate and output not only the commands corresponding to the voice input, but also the commands corresponding to the key input and data 47a to 47c. Reference numeral 47c represents a cursor shift command for scrolling the cursor position and the map or determining them, and reference numeral 47d represents a voice unrecognizability output signal representing that the voice recognition cannot be performed.

The operation unit 50 is provided with map type selection keys 56a to 56c for selecting the map type such as a broad area map, a middle area map, a detailed area map or the like. When the map type selection keys 56a to 56c are operated, the corresponding map selection command 47e is output from the recognition result output means 47. The selection of the map type may be performed by voicing a key word such as "broad area map", "middle area map", "detailed area map" or the like.

The voice analysis circuit 44 is provided with a continuous word judgment circuit for judging a series of voice periods (phrases) on the basis of an envelope waveform of an analysis voice signal and time varia-

tion of a power spectrum, and supplies the judgment result 44b to the collate circuit 45, the recognition result output means 47, the register control means 48, etc., to identify the punctuation of the voice input command. Accordingly, even when plural place names of "Tokorozawa", "Kawagoe" and "Omiya" are input for the course guide, these voices are identified as three kinds of place names, and the place-name input data 47b of the three place names are supplied to the navigation control unit 7.

Fig. 4 is a block diagram showing another embodiment of the destination setting means and the place-name input means.

The destination setting means 4 and the place-name input means 5 shown in Fig. 4 are designed so that the destination and the place names serving as targets for the route judgment can be input with a pen using a hand-write character recognition device 56.

A pen input operation which is conducted on a hand-write input tablet 56a of pressure-sensitive type or electromagnetic induction type is detected by a pen input detector 56b, and the hand-write character recognition means 56d makes an analysis of writer's handwriting, an analysis of the order of making strokes in writing a character, etc., on the basis of the detection output 56c of the pen input detector 56b. The character code data 56e corresponding to the identified characters are supplied to the recognition result output control means 57a in the recognition result check/output control unit 57.

The recognition result output control means 57a temporarily stores into a temporary storage means such as a RAM or the like (not shown) the character code data 56e which are successively supplied from the hand-write character recognition means 56d while considering the supply order (the handwriting order).

The display control means 57b obtains through a character generator (not shown) character font data corresponding to the temporarily stored character code data of a character or a character array, and displays a recognized character or character array on an input character check display area 57d of an operation unit display 57c comprising a liquid crystal display or the like.

An operation input unit 58 comprising a transparent touch panel switch or the like is provided on the display screen of the operation unit display 57c, whereby the operation input areas 58a to 58e corresponding to functional displays such as destination setting, course guide (via-place input), input mode switching, cancel (one-character delete for hand-written characters), OK (input character check), etc., are operated with a pen tip or a finger to perform the input of various kinds of functions. The input operation of the operation input unit 58 is detected by the operation input detector 57a, and when the input operation of the destination setting is carried out, the

destination input command 47a is supplied to the navigation controller 7.

An input mode switching means 57g switches alternately the character input mode and the cursor shift mode with each other every time the detection output 57f corresponding to the input mode switching operation is supplied from the operation input detector 57e, and outputs an input mode indication signal 57h indicating the corresponding input mode. On the basis of the input mode indication signal 57h, the display control means 57b visibly displays the current input mode by turning on or turning off any one of "character input" mode and "cursor shift" mode on the operation unit display 57c. Upon reception of the detection output indicating the execution of the input operation of the destination setting or course guide (via-plate input) from the operation input detector 57e, the display control means 57b turns on the character display of "destination setting" or "course guide (via-plate input)" of the operation unit display 57c to visibly display the setting of the current mode.

When supplied with the input mode indication signal 57h representing the cursor shift mode, the handwriting character recognition means 58d outputs a cursor shift command 47c corresponding to the pen input direction (the shift direction of the pen) and the shift distance (or shift speed and shift distance) thereof. Through this operation, the scroll of the map and the shift of the cursor displayed on the map can be performed with the same operation performance as a pointing device (image position indicating device) such as a mouse or the like.

When the detection output of the cancel operation is output from the operation input detector 57d, the recognition result output control means 57a cancels the character code data which are supplied just before the supply of the detection output. Accordingly, the characters which are displayed on the input character check display area 57d are deleted from the rear side one by one every time the cancel operation is carried out. Through this operation, correction can be performed for an erroneous handwriting input or an erroneous recognition of a character. On the other hand, when supplied with the detection output of the OK (input character check) operation, the recognition result output control means 57a successively outputs the character code data corresponding to the character array, etc., which are temporarily stored in the temporary storage means as the place-name input data 47b. Through this operation, the place name of the destination or the place name which is a target for the course guide is supplied to the navigation controller 7.

The hand-writes input operation unit 59 having the handwriting input tablet 56a is provided with a pen receiver 58b on which a pen 59a is mounted and fixed for an emergent use, and is also provided with a palm rest portion 58c (a hatched area) for mounting hands

or wrists thereon below and at the side of handwriting input table 56a. Therefore, the handwriting input operation can be more stably performed even when running vibration occurs.

The handwriting character recognition unit 58d is designed to recognize only characters of Hiragana or Katakana, numerals and some symbols so that the data amount required for the analysis of the writer's handwriting and the order of making strokes in writing a character is reduced to reduce the storage area of these data, and a time required for recognition is shortened.

The handwriting input tablet 56a may be formed of transparent or excellently light-permeable material and disposed on the display screen of the operation unit display 57c.

Fig. 5 is a block diagram showing an embodiment of the navigation controller.

The navigation controller 7 includes a data base access means 71 for controlling a read-out (access) operation of data from the road map data base 2, a signal processor 72 for processing the read-out data 2b, a pronunciation-position managing means 73 for managing the relationship between the pronunciations of place names and the positions thereof on a map, a map image generator 74 for generating map image data 74a, a character symbol generator 75 for generating display image data 75a such as characters, symbols, etc., to be displayed on the map, a route judgment means 76, a guide information generating means 77 for generating guide image data 77a displayed on the display screen of the image display device 9, an image synthesizer 78 for combining the respective image data 74a, 75a and 77a to output the synthesized image data 78a, and a display device interface (I/F) unit 79. The navigation controller 7 may be formed of a microcomputer system.

The data base access means 71 has a function of indicating the map type such as the broad area map, the middle area map, the detailed area map or the like on the basis of the map selection command 47a, and a function of generating and outputting an access request signal 2a for accessing the corresponding data on the basis of the car position data 3a successively output from the car position detection means 3, the position data 73a output from the pronunciation-position management means 73, and a search request 73b.

The signal processor 72 analyzes the read-out data 2b on the basis of the preset data base format to decompose these data into the map data 72a, the character symbol data 72b, the pronunciation-position data 72c on the relationship between the pronunciation of a place name and its position on the map and then outputs these decomposed data. When the road map data base 2 comprises a CD-ROM and a reproducing device therefor, the signal processor 72 carries out various signal processing such as an error

check, signal format conversion and serial-to-parallel signal conversion for the data 2b on the basis of reproduced signals.

The pronunciation-position management means 73 corresponds to a so-called dictionary for place names in which the position data 73a are output on the basis of the place-name input data 47b. On the basis of the presence or absence of the destination input command 47a, it judges whether the place-name input data 47b supplied from the voice recognition device 46 or the handwrite character recognition device 56 corresponds to the place name of the destination or the place name of a via-place or the like, and outputs the position data 73a containing information on the destination/via-place, etc.

When the pronunciation-position managing means 73 is designed to manage the place names of the map displayed currently on the image display device 9 and the pronunciation data thereof (containing plural pronunciation data other than the format pronunciation data) and there is no input place name on the map, a map which is nearest to the currently displayed map in the direction extending to the destination is first indicated and the search request 73b is output. If the corresponding pronunciation is not detected in the data output signal 2b of the map which is preferentially indicated, those maps (excluding the preferentially-indicated map) which are nearest to the currently-displayed map are successively searched. However, if no corresponding pronunciation is still detected, those maps which are at the outside of and adjacent to the nearest maps are successively searched while preferentially searching a map in the direction extending to the destination. The preferential search of the map in the direction extending to the destination enables the search time to be effectively shortened.

Therefore, for generation of the search request 73b, the pronunciation-position managing means 73 supplies a search preferential direction guide request 73c to the route judgment means 76 which temporarily stores the position data of the beforehand-registered destination, and obtains preferential search map information 73d on the map to be preferentially searched from the route judgment means 76 to successively generate and output the search request 73b on the basis of the preferential search map information 73d.

This construction brings such an advantage that the storage capacity of the storage device for the pronunciation-position data, which is provided in the pronunciation-position managing means 73, can be reduced.

In order to set the destination itself, the adjacent maps are successively searched on the basis of the current position as a reference position to shorten the search time. However, even by this manner, the search time may be long when the destination is far

away from the current position.

Accordingly, all the pronunciation-position data which are stored in the CD-ROM 21 mounted on the reproducing device 22 of the road map data base 2 may be beforehand read into the pronunciation-position managing means 73, and stored in a storage device (for example, non-volatile memory or the like) provided in the pronunciation-position management means 73.

With this construction, the position data corresponding to any input place name in Japan can be obtained for a short time.

Furthermore, the pronunciation-position data may be provided in the pronunciation-position managing means 73 in place of the storage of the pronunciation-position data in the road map data base 2. With this construction, an existing road map data base having no pronunciation data, etc., is directly usable.

Still furthermore, the pronunciation-position data may be stored in a detachably-mounted storage medium such as an IC card type non-volatile memory or the like, whereby the destination setting and the course suitability judgment based on the via-place names through the place-name inputting operation are allowed by mounting the storage medium on the mount portion. In this case, the pronunciation-position data which are provided with only the pronunciations of place names displayed on a reproducing screen to meet the type of a CD-ROM 21 (map data storage medium) mounted on the reproducing device 22 may be supplied by the mountable storage medium. In this case, the pronunciation-position data for place names which are not displayed on the reproducing screen may be provided to perform a finer position setting. Furthermore, various pronunciation-position storage media for various purposes such as a leisure storage medium having pronunciation-position data on the names of golf places, hotels, sight-seeing places, etc., a business storage medium having the pronunciation-position data on the names of public offices, companies, etc., may be prepared to enable the destination setting and the course suitability judgment in accordance with the use purpose.

The map image generator 74 is designed to generate and output the map image data on the basis of the map data 72a supplied from the signal processor 72.

On the basis of the character symbol data 72b supplied from the signal processor 72, the character/symbol generator 76 generates and outputs display image data 75a for character information such as place names, road names, names of means of transportation, station names, the names of main buildings, etc., and symbols such as public offices, police offices, fire stations, post offices, hospitals, schools, shrines, temples, etc., so that these characters and symbols are displayed at prescribed positions on the

map, and it is provided with a character generator (character/symbol generator) for generating fonts of characters, symbols, etc.

The route judgment means 76 includes a temporary storage device (for example, RAM) for temporarily storing the position data of the destination (MD), the car position data (JD) 3a and judgment target position data (KD1, KD2, KD3, ...) corresponding to the via-places input for the course suitability judgment. The route judgment means 76 judges, on the basis of each position data (MD, JD, KDn), the map data 72a and a route judgment method as described later, whether a route extending to the destination is suitable, and outputs the judgment result 8a.

When the position data 73a supplied from the pronunciation-position management means 73 contains information representing that it is the destination, the route judgment means 76 judges the position data 73a to be the position data (MD) of the destination, and stores it into a prescribed storage address. When the position data 73a is judged to be the judgment target position data (KD1, KD2, KD3, ...) corresponding to the via-place or the like, the route judgment means 76 stores it into a prescribed address, and counts the even number of the supplied position data to recognize the number of routes to be estimated.

When supplied with the search preferential direction guide request 73c from the pronunciation-position management means 73, the route judgment means 76 outputs data on a direction extending from the car position (J) to the destination (M) as preferential search map information 73d. When the route judgment means 76 can recognize the numbers or the like for the road maps, the number data or the like for a sectional map which is adjacent to the currently-displayed map in the direction extending to the destination may be output as the preferential search map information 73d. Furthermore, a relative direction of a map to be preferentially searched with respect to the currently-displayed map, such as a north side, an east side or the like, may be merely output.

When the route judgment means 76 receives a signal 47d representing that a place name or the like input by voice or handwrite cannot be recognized, from the destination setting means 4 and the place name input means 5 constructed by the voice recognition device 40 or the handwrite character recognition device 56, or receives a signal 73e representing that there is no place name concerned, from the pronunciation-position management means 73, the route judgment means 76 supplies the judgment result output means 8 with a judgment result 8a representing that the input is requested to be carried out again, or that the judgment cannot be performed. In this case, through the voice output means 80 in the judgment result output means 8, a voice guide message such as "please input once more", "the name of AA is

not registered" or the like is output, and through the image output means 90 in the judgment result output means 8, message image data 90a such as "please input again", "the place name is unrecognizable" or the like is generated to display the guide image message on the screen of the image display device 9 through the image synthesizer 78 and a display device interface unit 79.

On the basis of the car position data 3a, the position data 73a for the place names containing classification information of destination/via-place, etc., and the map 72a, the guide information generator 77 generates and outputs a mark indicating an advance direction, a mark indicating the destination position, a mark indicating the position of a place name input for route judgment, and guide image data 77a on various guide information such as a line connecting the car position and the destination, a line connecting the car position and the position of a place name input for the route judgment (the respective lines are different in line type or display color), etc.

The guide information generating means 77 controls the shift of the position of the cursor displayed on the screen of the display device 9 on the basis of the cursor shift command 47c, and supplies the destination position register data 77b to the route judgment means 76 when the destination is registered by the determination input of the cursor position while it supplies the current position register data 77c to the car position detector 3 when the current position is registered.

The image synthesizer 78 combines the map image data 74a supplied from the map image generator 74, the display image data 75a such as the symbols/characters supplied from the character symbol generator 75, the guide image data 77a supplied from the guide information generating means 77 and the message image data 90a (when the judgment result is imaged and displayed) with one another to output synthesized image data 78a.

The display device interface (I/F) unit 79 converts the synthesized image data 78a to a display device driving signal 8a which is suitable for an input specification of the image display device 9, and outputs it. For example, it is equipped with a CRT interface circuit for generating and outputting an analog video signal when a CRT monitor display is used as the image display device 9, or with an LCD driving circuit or the like for converting the synthesized image data to a signal for driving each dot when an LCD (liquid crystal) display is used.

Fig. 6 is a block diagram showing the judgment result output means.

The judgment result output means serves to audibly output the judgment result with voice and also to display a message sentence corresponding to the judgment result on the screen of the image display device 9, and thus it is equipped with the voice output

means 80 and the image output means 80.

A guide message generating means 81 analyzes the judgment result 8a which is output on the basis of a preset rule to select a suitable one from plural messages which are beforehand stored in a message storage unit 82, and inserts a place name or the like into the message if necessary, whereby guide message data 81a are generated and output.

A voice editor 83 successively takes out desired voice information data from a voice information storage unit 84 on the basis of the guide message data 81a, and successively outputs the voice information data to a voice synthesizer 85. A voice signal 85a output from the voice synthesizer 85 is amplified by an amplifier 86 to drive an electro-acoustic transducer 87 of a speaker or the like. Through this operation, a voice message such as "AA direction" or "please go to OO direction" is output. When one place name is input and it is suitable to go toward the place name, a voice message of "OK" (if it is not preferably, a voice message of "NO") or the like is merely output.

A guide message image synthesizer 81 successively takes out character font data from a character generator 92 on the basis of the guide message data 81a to generate and output message image data 80a.

In place of independently providing the image output means 90, the message image data corresponding to the judgment result may be generated using the guide information generating means 77 in the navigation controller 7 shown in Fig. 5. Furthermore, the judgment result may be output with only voice or only an image.

Fig. 7 is a diagram showing a suitability judgment method for a route extending to a destination.

In the suitability judgment method shown in (a) of Fig. 7, a route is judged to be suitable if an intersectional angle  $\theta$  between a line J-M connecting the current position (car position) J and a destination M and a line J-K connecting the current position (car position) J and the position K of an input place name is smaller than a predetermined threshold angle  $\theta_{th}$  (for example, 60 degrees). If an angle between the destination direction and the direction of a place name serving as a judgment target is above 120 degrees, for example, a judgment result 8a representing that the direction should be inverted is output, and a message "the advance direction is opposite" or the like is given to the driver or the like.

When plural place names are input as judgment targets, intersectional angles  $\theta 1$  between a line J-K1 connecting the current position (car position) J and the position K1 of a judgment target and a line J-M connecting the current position J and the destination M,  $\theta 2$  between a line J-K2 connecting the current position J and the position K2 of another judgment target and the line J-M, and  $\theta 3$  between a line J-K3 connecting the current position J and the position K3 of the other judgment target and the line J-M, are calculated

as shown in (b) of Fig. 7, and the place name which provides the smallest intersectional angle below the threshold value  $\theta_{th}$  is judged to be the most suitable place name for the route.

As described above, the course suitability method based on the positional relationship of the via-place K<sub>n</sub> with the current position J and the destination M requires no road data 72a. The route judgment means 76 can judge the course suitability on the basis of only the position data 73a supplied from the pronunciation-position management means 73, so that the judgment can be performed for a short time. In addition, the route judgment means 76 is merely provided with the position relationship judgment means for judging the positions of plural places and the relationship thereamong, so that the hard structure can be made compact or the number of the program processing steps can be reduced.

When two or more via-places are input and the angles  $\theta 1$  and  $\theta 2$  shown in (b) of Fig. 7 are substantially equal to each other, the route judgment means 76 may output a judgment result 8a representing "any one of "OO" and "AA" is OK".

A more detailed route judgement can be performed by designing the route judgment means 76 so that a course suitability judgment is made in consideration of the map data 72a.

For example, when two or more via-places are input and the angles  $\theta 1$  and  $\theta 2$  shown in (b) of Fig. 7 are substantially equal to each other, the route judgment means 76 calculates the road distance of each route extending from the current position (car position) J through each input via-place name to the destination M on the basis of the map data 72a, and one of the via-place names which provides the shorter travel distance is judged as being suitable.

In this case, the road distance of the route extending through the input via-place name to the destination M is calculated when it is satisfied that the input place name is located at the car position side with respect to the destination M (nearer to the car position than the destination M). On the other hand, the road distance from the current position (car position) to the destination M is calculated when the input place name is farther away from the current position than the destination M.

The route judgment means 76 supplies the judgment result output means 8 with the pronunciation data of the place name and the judgment result 8a representing that the route containing the place name is the optimum route, whereby a voice message "OO is optimum" or the like is voiced from the judgment result output means 8, and a guide sentence having the same means is displayed on the screen of the image display device 8.

When the map data 72a contains information to discriminate superhighways, etc. and general roads from one another, the route judgment means 76 may

calculate the value corresponding to an estimation time which is estimated to be taken until the car arrives at the destination, thereby performing a more detailed judgment containing the route information.

In a case where a route passing through a superhighway or the like to the destination can be set by selecting a route containing an input via-place or the like (the direction of the place name for which the course guide is requested), the route judgment means 76 calculates the road distance of the route containing the superhighway or the like so that the distance of an area in which a superhighway is usable is converted to a half of the actual distance, for example, and the course suitability judgment is made on the basis of the calculated road distance. Thereafter, it outputs the judgment result 8a containing the type information of used roads and outputs from the judgment result output means 8 a guide message of "A superhighway is usable if you go to XX direction. If you use a general road, please go to OO direction" or the like.

Fig. 6 shows another embodiment of a suitability judgment method for the route extending to the destination.

The course suitability judgment method shown in Fig. 8 is effective for the case where a route extending to the destination M is set manually or for the case where a function of automatically setting a route extending to the destination is provided. Furthermore, the accurate course guide can be performed even when the position of an input place name for the course guide is farther away from the current position than the destination.

As shown in (a) of Fig. 8, the route judgment means 76 compares a route (PJM) extending from the car position (current position) J to the destination M with a route (PK) extending from the car position (current position) J to the position K of an input place name to judge whether there is a common portion between the routes (PJM) and (PK). If there is a common portion PJC, the route judgment means 76 outputs the judgment result 8a representing that selection of the route extending to the input place name is suitable, and supplies audibly or visibly a message of "OO", "Please go to O direction" or the like through the judgment result output means 8.

When plural place names are input and respective routes extending to the respective input place names have a common portion with a route extending to the destination as shown in (b) of Fig. 8, the route judgment means 76 calculates the distance of the common portion (PJC1, PJC2) for every route, or calculates the ratio of the common portion to the route extending to the destination (PJC1/PJCM), (PJC2/PJCM) every route, and judges the route (the input place name) having the common portion of larger distance or larger ratio as a more suitable route.

Furthermore, the route judgment means 76 may calculate the distance of the common portion and out-

put the judgment result 8a containing the calculation result to output a guide message of "Please go to ΔΔ direction. It is necessary to change the course about XX kilometers ahead" or the like through the judgment result output means 8. With this message, it is understood by or suggested to the driver or the like that it is suitable at this time to go to the direction of the place name ΔΔ although it is not coincident with the direction to the destination.

Fig. 9 shows a third embodiment of a suitability judgment method for the route extending to the destination.

In this method, a rhombic ((a) of Fig. 9) or egg-shaped ((b) of Fig. 9) area A which has a width (distance) W corresponding to the length (distance) LJM of a line L connecting the current position J and the destination M is set at both sides of the line L. If a place name input for the course guide exists in the area A, a route extending to the input place name is judged as "suitable". A portion having the largest width in the area A is set so as to be nearer to the destination M, so that a course guide (navigation) in a direction which is deviated from a direction toward the destination can be prevented. In the case of (a) of Fig. 9, the widest portion in the area A is set away from the destination at a distance of one-third of the length (distance) LJM of the line L.

In this manner, the course suitability judgment is performed with no map data 72a, and thus the judgment and response can be performed for a short time. In addition, a permissible range of via-places, etc., is limited in accordance with the distance to the destination M, so that it is avoided to take a long roundabout way.

In (c) of Fig. 9, it is assumed that the place names of big cities or important positions of transportation exist around (far away from or in the neighborhood of) the destination, and a place name which is located within an area B having a radius of R from the destination M is judged as "suitable". In the methods of (a) and (b) of Fig. 9, as the car approaches to the destination, the area permitting the "suitable" judgment is narrower. Therefore, there occurs a case where "NO" message is more frequently output even when a place name is input. However, by setting the area B having the destination M at the center thereof, the car can be navigated into the area having the predetermined radius R from the destination M.

In (d) of Fig. 9, an area B having the destination M at the center thereof and an egg-shaped area A whose wider portion is set at the car position J side (near to the car position J) are combined with each other to set a gourd-shaped area as a whole. Accordingly, even when the car is located at the current position and approaches to the destination M, the frequency of the message "NO" is reduced.

Fig. 10 is a block diagram showing another embodiment of the navigation controller.

When a place name is input for the course guide, the navigation controller 107 of this embodiment displays the position of the input place name on the screen of the image display device 9 so that the relationship between the position of the place name and the destination can be recognized, whereby the driver and passengers such as a passenger at the assistant driver's seat or the like can check the route by seeing the displayed map.

When the position data 73a of a place name such as a via-place or the like is supplied from the pronunciation-position managing means 73, the route judgment means 101 supplies a course guide map automatic selection means 102 with the position data 101a (JD, MD, KD) of the car position J, the destination M and the via-place or the like K.

The road guide map automatic selection means 102 has range data of each sectional map every reduced scale such as a detailed area, a middle area, a broad area, etc., and it first searches such a map as contains all of the car position J, one or plural via-places, etc., K and the destination M. If there is the map concerned, it supplies the map indication data 102a indicating the map to the data base access means 71 to read out the data of the corresponding sectional map from the road map data base 2.

If there is no sectional map containing all the car position J, the destination M and the via-places, etc., K, the road guide map automatic selection means 102 searches a sectional map containing the current position J and at least one via-place K, or a sectional map containing the current position J and the destination M. If the selected map does not contain the destination M, the road guide map automatic selection means 102 outputs information representing the fact to the route judgment means 101, and if there is a via-place which is not contained in the selected map, the road guide map automatic selection means 102 outputs information 102b on the via-place to the route judgment means 101.

If there is a sectional map containing the car position J, the destination M and all the input via-places, etc., K, the route judgment means 101 supplies the position data 101b thereof (MD, KD) to the guide information generating means 103. On the basis of each position data 101b (MD, KD), the guide information generating means 103 generates image data for displaying a mark MM indicating the destination position and a mark MK indicating the position of each of the input via-places, etc., at the corresponding positions, and generates image data of lines LM and LK which connect the car position mark MJ based on the car position data 3a and the respective marks MM, MD. Thereafter, it supplies the generated image data 103a for the road guide to the image synthesizer 78. Through this operation, the road guide information is displayed on the screen of the image display device 9 while superposed on the road map.

Fig. 11 shows an example of a road guide image.

A case where the destination and all the input via-places are displayed at the same time is shown in (a) of Fig. 11. MM represents a mark indicating the position of the destination M, MK1 to MK3 (MKn) represent marks indicating the positions of the respective input via-places K1 to K3 (Kn). MJ represents a mark indicating the vehicle position, LM represents a line connecting the vehicle position and the destination, and LK1 to LK3 (LKn) represent lines connecting the respective via-places, etc., to the vehicle position, respectively.

The route judgment means 101 judges a suitable route on the basis of the judgment methods shown in Figs. 7 to 9 and outputs the judgment result 6a to the judgment result output means 108 to output the judgment result in the form of a voice message while also outputting to the guide information generating means the position data 101b of the via-place or the like which is judged to be suitable.

Thereafter, the guide information generating means 103 displays the line LM extending from the vehicle position to the destination, the line extending from the vehicle position to the via-place or the like which is judged to be suitable (in this embodiment, line LK2), and the lines extending from the vehicle position to the other via-places (in this embodiment, lines LK1, LK3) with different line types (thickness of line, the kind of line such as a solid line, a chain line, etc.) or different display colors so that these lines are discriminable from one another.

Therefore, when the driver or the passenger inputs one or plural place names written on a road sign or the like into the car navigation system 1, a suitable route is indicated with a voice message, and a road map containing the destination and the input place name(s) is reproduced and displayed on the screen 9a of the image display device 9. In this case, the positions of the destination and the input via-place names, the vehicle position and the lines connecting the vehicle position to these positions are displayed on a map in such a way as to be easily visible, so that the route can be checked using the map display in combination.

When any map which contains the positions of all place names serving as targets for the route judgment cannot be selected, the route judgment means 101 supplies the guide information generating means 103 with place-name data on the positions of the place names which cannot be displayed on a selected map, and data 101b on the direction extending from the vehicle position to each of the positions of these place names and the distance in a straight line extending from the vehicle position to each of the positions.

Upon reception of these data 101b, the guide information generating means 103 displays an arrow extending from the vehicle position to the destination



and an arrow extending from the vehicle position to a via-place or the like, and generates image data for guide information JM on the destination which indicates the place name of the destination and the distance to the destination at the arrow side, and for guide information FJK on the place names of the via-places and the distance of the straight line.

When the route judgment means 101 judges the course suitability on the basis of the route to the destination as shown in Fig. 8, the guide information generating means 103 may generate image data on a route extending from the destination and the input via-place or the like to display the route on the map.

Furthermore, in Fig. 10, the judgment result output means for imaging and displaying the route judgment result is constructed by the guide information generating means 103, the image synthesizer 78, the display device I/F unit 79 and the image display device 7 in the navigation controller 100. However, the image for the navigation guide may be generated by the image output means 90 shown in Fig. 5.

In the above embodiment, the judgment result 8a is output in the form of a voice message and an image display. However, it may be output in the form of either the voice or the image display. Besides, a selection switch may be provided for the judgment result so that the judgment result can be switched between the voice and the image display by an user's operation.

A car navigation system according to claim 1 includes route judgment means for judging whether an input place name is suitable for a route extending to a destination, and judgment result outputting means for outputting a judgment result of the route judgment means. Accordingly, by inputting a place name written on a road sign or the like, it can be suitably guided which course should be selected. Therefore, even when a driver or the like does not recognize the geographical relationship between a destination and a place name written on a road sign or the like in a geographically unfamiliar area, he can take the suitable course on the basis of the place name written in the road sign or the like.

In a car navigation system according to claim 2, place names indicated on a map which is reproduced and displayed on a screen by an image display device and data on pronunciations of the place names (written in Kanji) are provided to a road map data base. Therefore, place names such as via-places, etc., can be specified by inputting the place names with voice using a voice recognition device. Furthermore, when a hand-writing input device is used, the place names such as via-places can be also specified by inputting the place names in Hiragana or Katakana with a pen or the like. Accordingly, a hand-writing character recognizing unit of this system can be more facilitated in construction than a hand-writing input device which needs recognition of Kanji. In addition, it is difficult to accurately input complicated Kanji characters during

running because of car vibration. On the other hand, the Hiragana or Katakana input of the place names makes the hand-writing input operation more easy.

In a car navigation system according to claim 3, in addition to accurate (formal) pronunciations for place names, data on other pronunciations for the place names are provided. Accordingly, even when the driver or the like does not know the formal place names because of a geographically unfamiliar area, the place names written on road signs, etc., can be input by voicing or hand-writing an adequate pronunciation for each place name.

Furthermore, the destination setting means and the place-name input means are constructed by using the voice recognition device or the handwrite character recognition device, the destination and the via-places can be easily input.

Whether the input place name is suitable as a via-place is output with voice using the voice synthesizer. On the screen of the image display device are displayed a map containing the current position of the car, and the lines connecting the current position to the destination and to the input place name (via-place).

#### Claims

1. A car navigation system comprising:
  - a road map data base;
  - a car position detecting device for detecting the current position of a car;
  - place-name input means for inputting a place name;
  - route judgement means for judging whether the input name is suitable for a route extending to a destination; and
  - judgement result output means for outputting a judgement result.
2. The car navigation system as claimed in claim 1, wherein said road map data base is provided with place-name display data for place names to be displayed on a map which is reproduced on a screen of an image display device, and pronunciation data for the place means.
3. The car navigation system as claimed in claim 1 or 2, wherein said road map data base is provided with place-name display data of the place names to be displayed on the map, data on formal pronunciations for the place names and data on the other pronunciations for the place names.
4. The car navigation system as claimed in claim 1, 2 or 3, wherein said destination setting means and said place-name input means are constructed by a voice recognition device.

6. The car navigation system as claimed in claim 1, 2 or 3, wherein said destination setting means and said place-name input means are constructed by a handwrite character input device and a handwrite character recognition device. 5
7. The car navigation system as claimed in any of claims 1 to 5, wherein said route judgement means judges whether the input place name is suitable on the basis of an intersection angle between a line connecting the current position of the car and the destination and a line connecting the current position of the car and the position of an input place name. 10
8. The car navigation system as claimed in any of claims 1 to 5, wherein said route judgement means compares a route extending from the current position of the car to the destination with a route extending from the current position of the car to the position of an input place name, and judges whether the input place name is suitable on the basis of the distance or ratio of a common portion between the routes. 15
9. The car navigation system as claimed in any of claims 1 to 5, wherein said route judgement means sets a prescribed area at both sides of a line connecting the current position of the car and the destination, and judges the input place name to be suitable as a via-place if the input place name is within the set area. 20
10. The car navigation system as claimed in any of claims 1 to 5, wherein when the destination is far away from the current position of the car, said route judgement means judges the input place name to be suitable as a via-place if the input place name is located at a prescribed distance or less from the destination. 25
11. The car navigation system as claimed in any preceding claim, wherein when the input place name contains a route such as a superhighway on which the car can run at a higher speed than on a general road, said route judgement means converts the distance of the route to a shorter value than the actual distance thereof (on the basis of a preset reduction rate) to calculate the distance to the destination, and a route through which the car arrives at the destination most early is selected/ identified on the basis of the converted distance (calculated in consideration of an arrival time). 30
12. The car navigation system as claimed in any preceding claim, wherein said judgement result output means comprises an image display device, and displays a map containing the current position of the car on a screen of said image display device and further displays a line extending from the current position of the car to the destination and a line extending from the current position of the car to the position of the input place name on the screen. 35
13. The car navigation system as claimed in any preceding claim, wherein said judgement result output means comprises a voice synthesizer. 40

FIG. 1

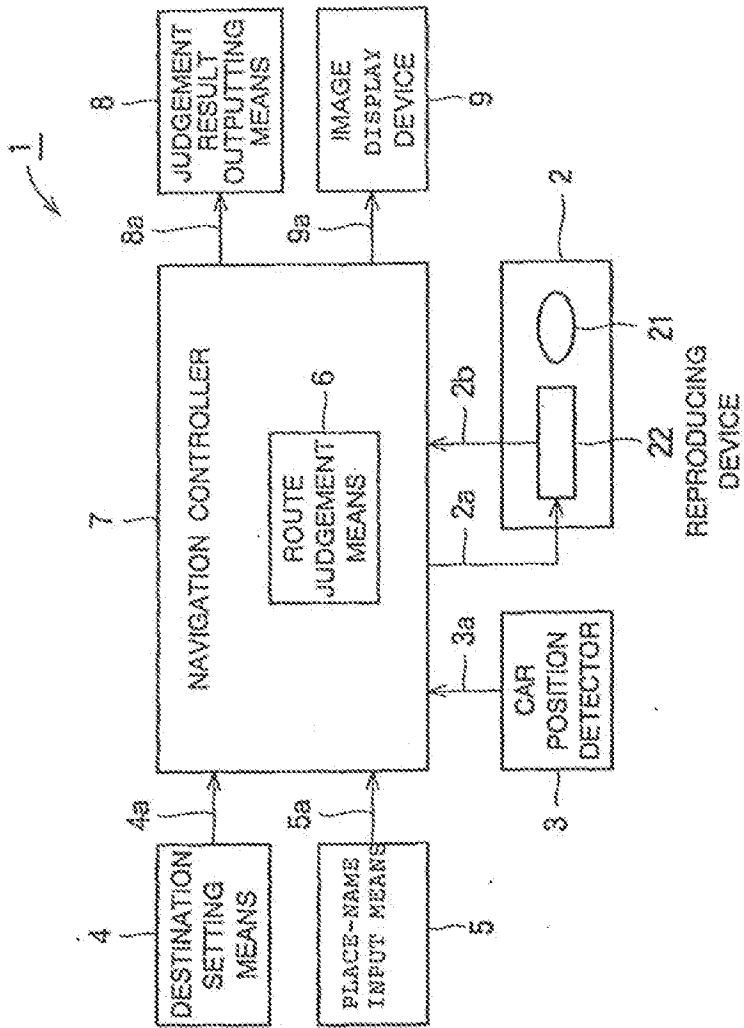


FIG. 2.

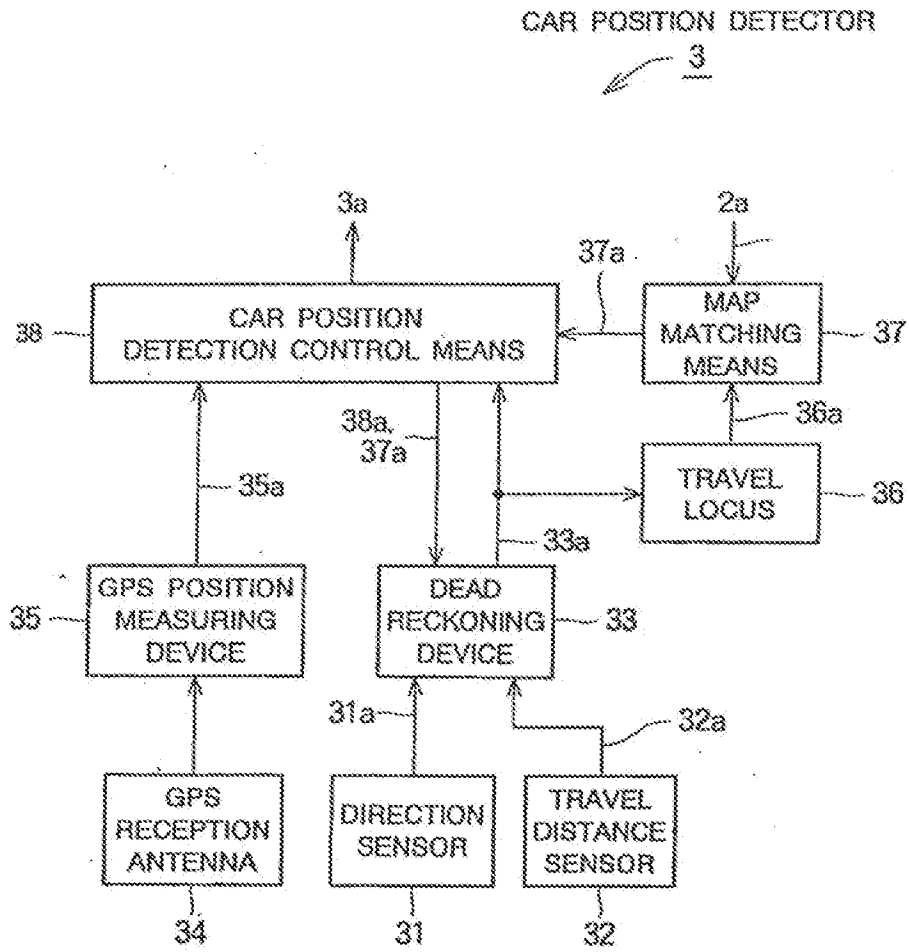
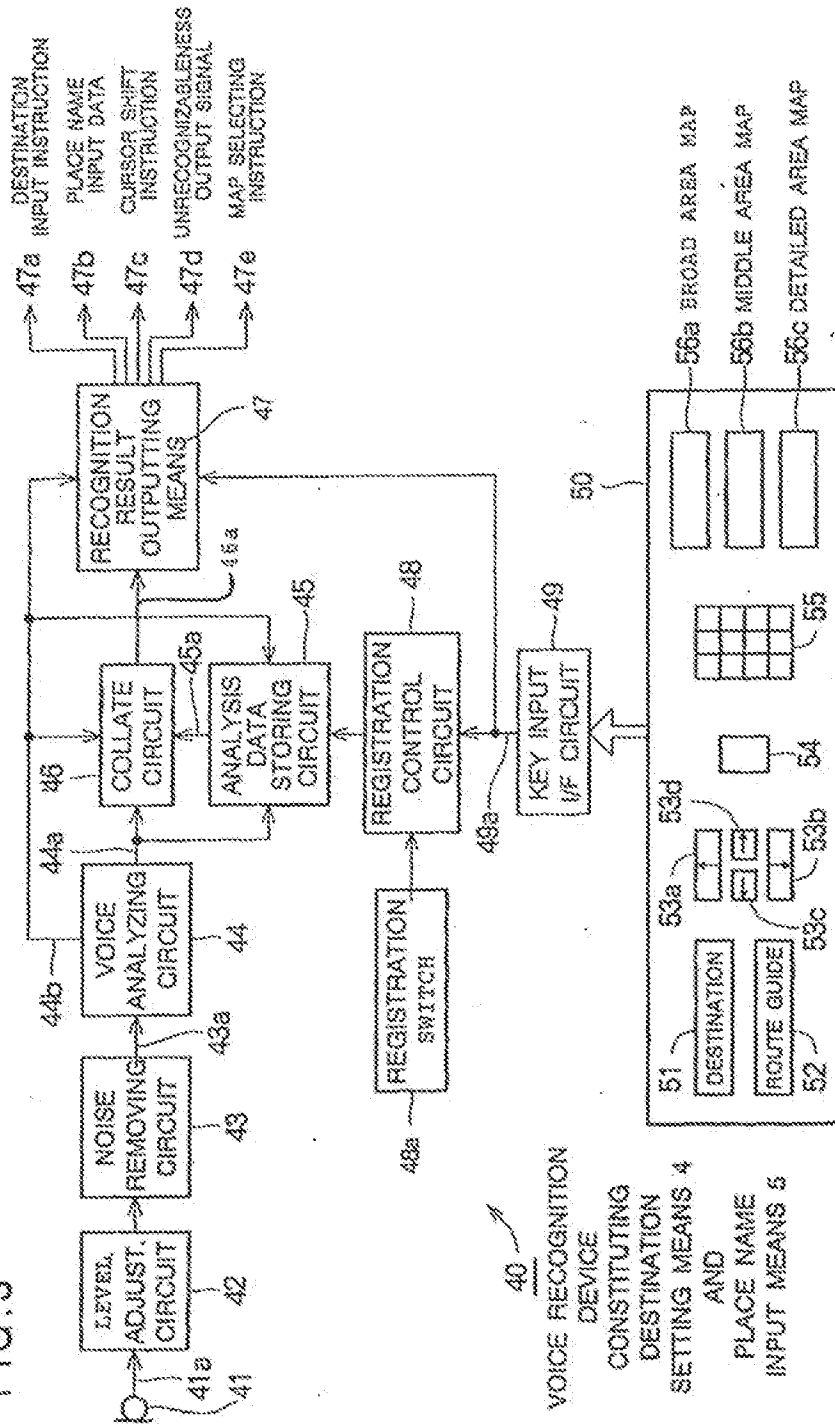


FIG. 3



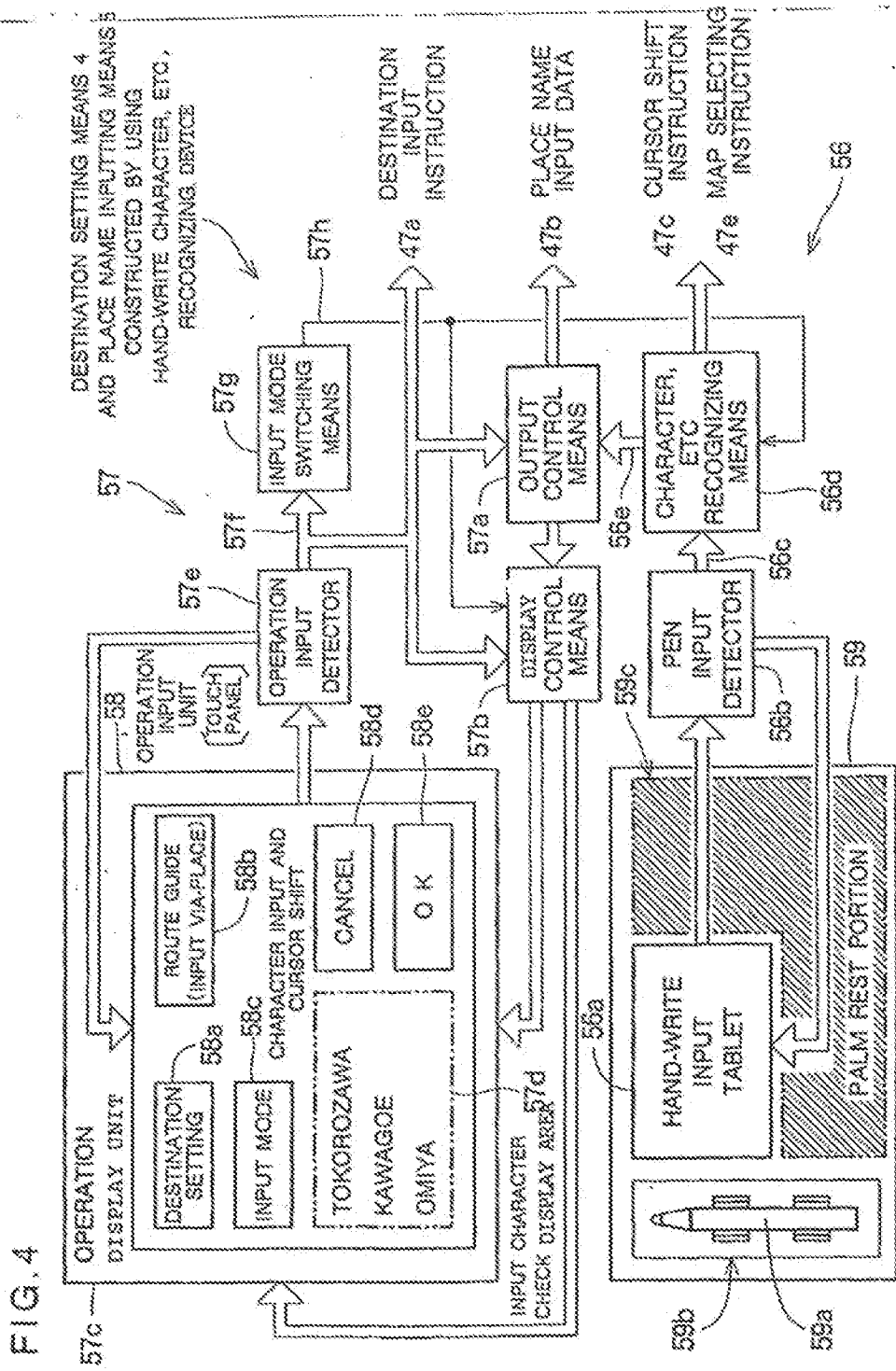




FIG. 6

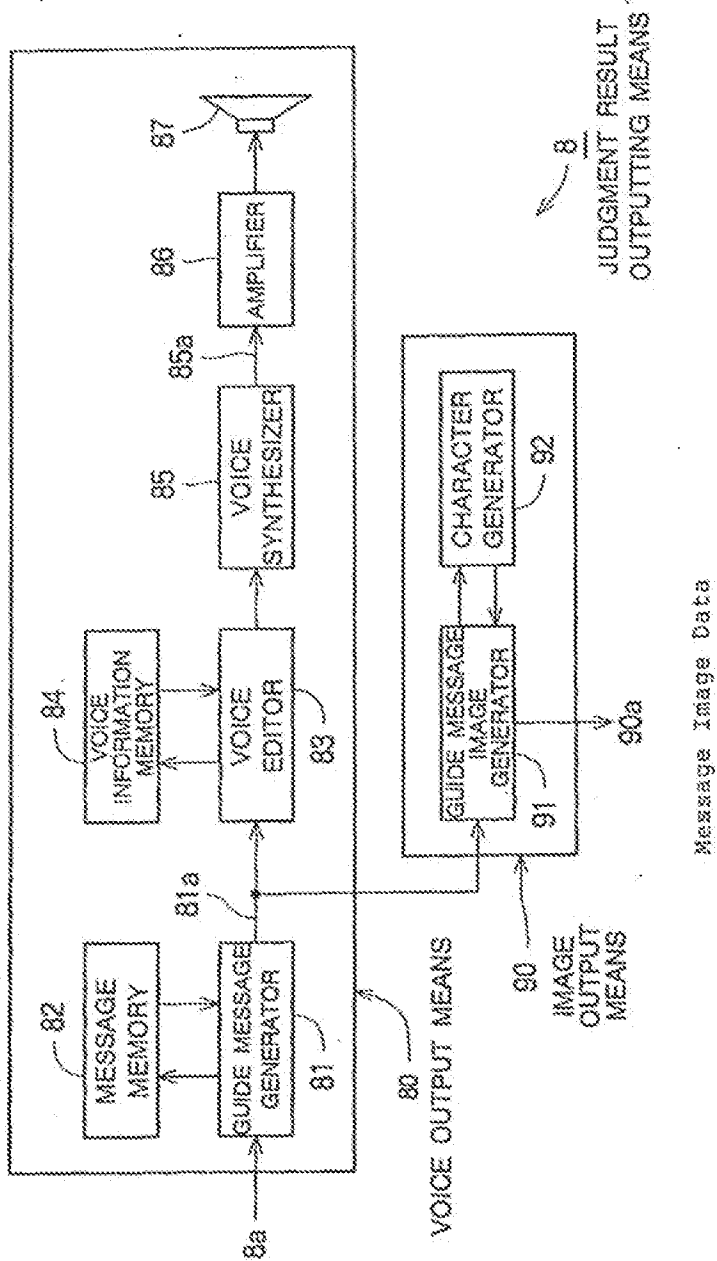
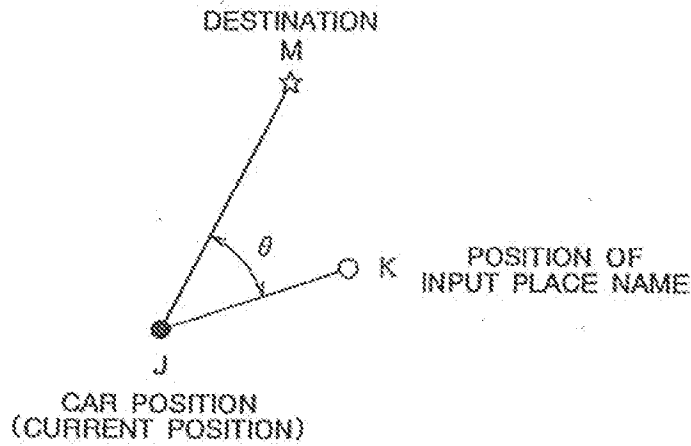




FIG.7

JUDGMENT ON SUITABILITY OF ROUTE ON THE BASIS OF DIRECTIONS OF DESTINATION AND INPUT VIA-PLACE

(a) WHEN INPUT PLACE NAME IS ONE



(b) WHEN INPUT PLACE IS PLURAL

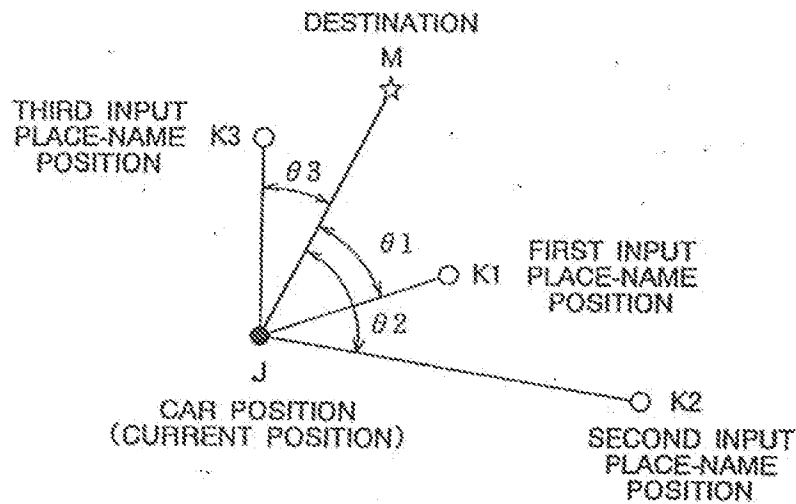
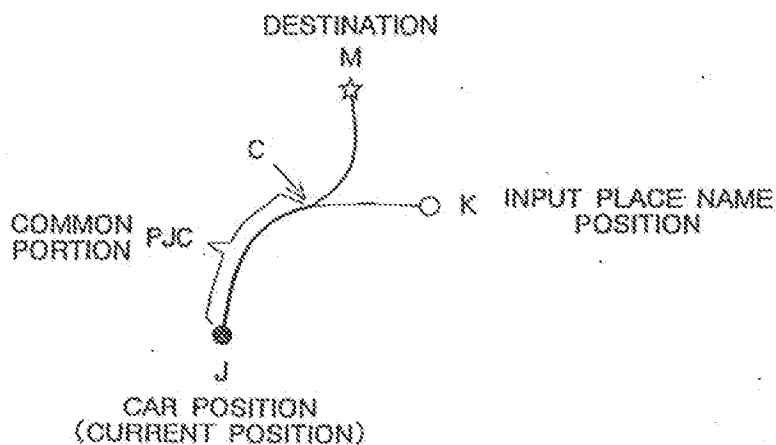


FIG. 8

COURSE SUITABILITY JUDGMENT BASED ON COMMON PORTION  
 BETWEEN ROUTE TO DESTINATION  
 AND ROUTE TO INPUT PLACE NAME

(a) WHEN INPUT PLACE NAME IS ONE



(b) WHEN INPUT PLACE IS PLURAL

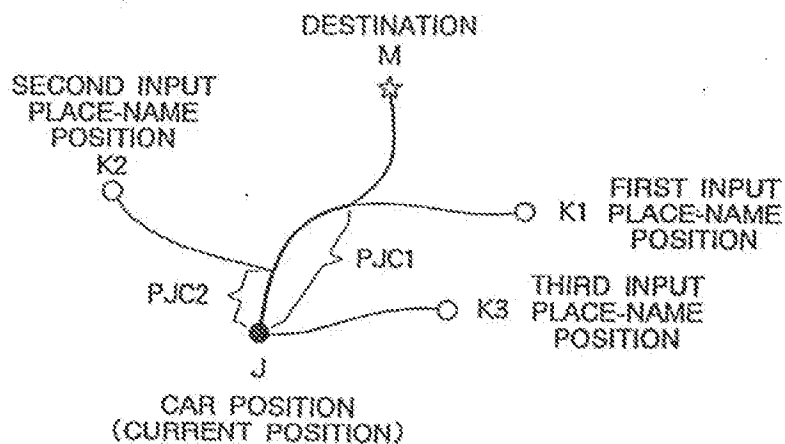


FIG. 9

COURSE SUITABILITY JUDGMENT BASED ON PERMISSIBLE RANGE SET IN ACCORDANCE WITH DISTANCE BETWEEN DESTINATION AND CURRENT POSITION

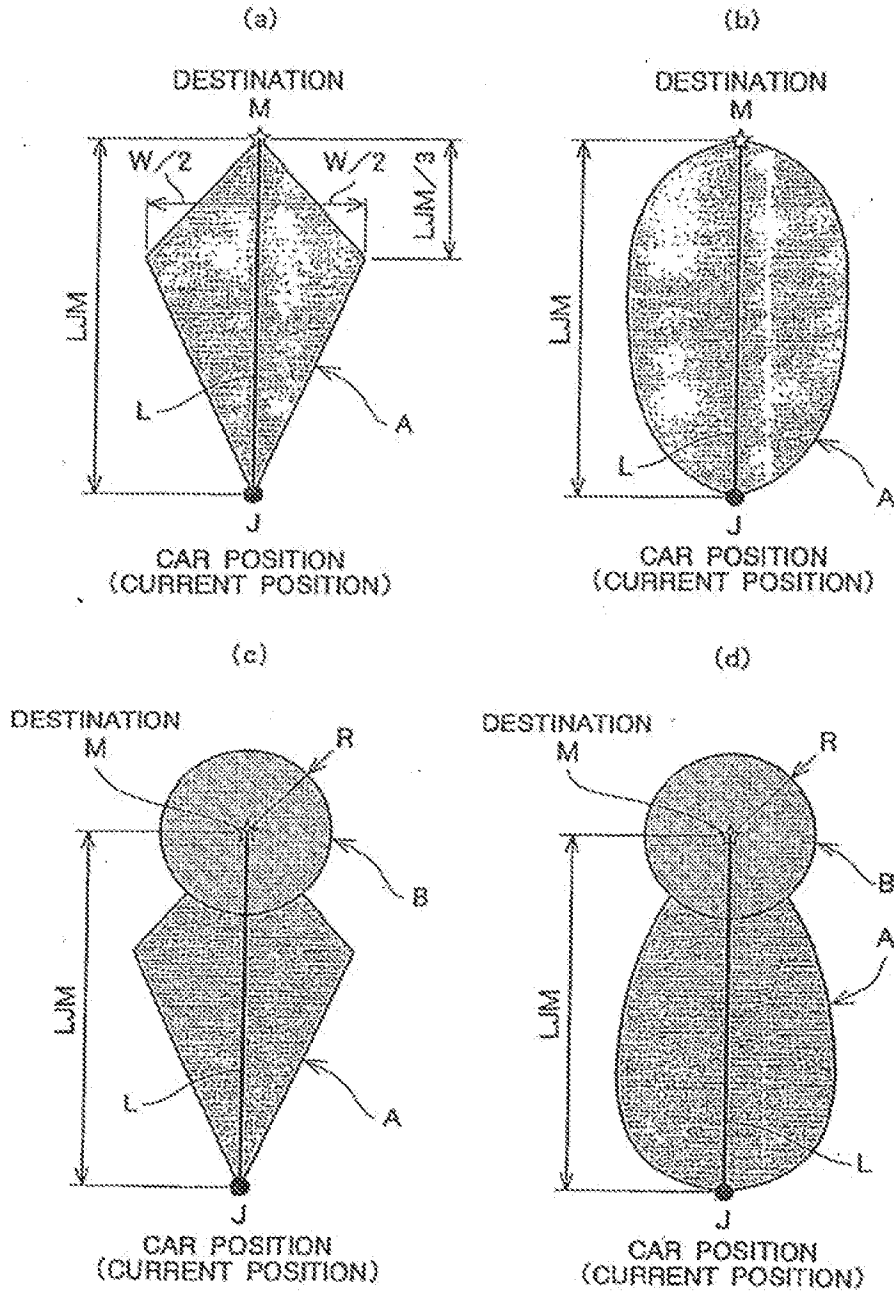
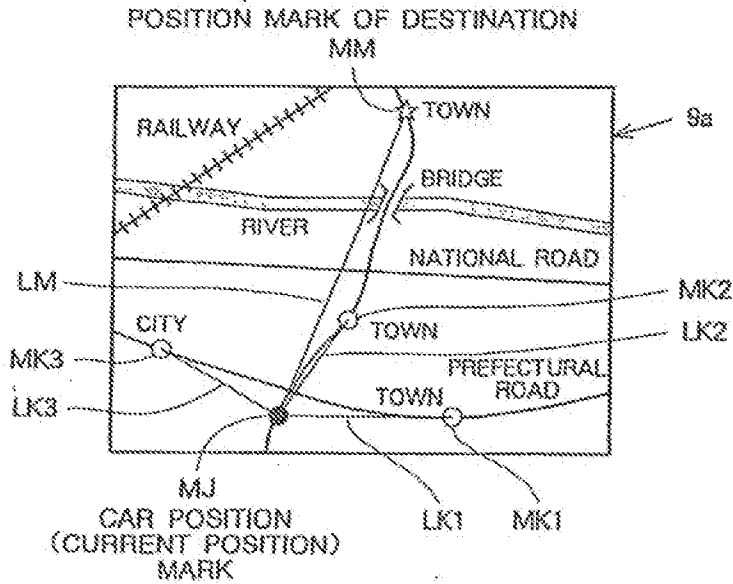




FIG.11

EXAMPLE OF ROUTE GUIDE IMAGE

(a) DISPLAY OF CAR POSITION, DESTINATION AND POSITION OF ALL INPUT PLACE NAMES



(b) WHEN DESTINATION AND POSITIONS OF SOME INPUT PLACE NAMES CANNOT BE DISPLAYED

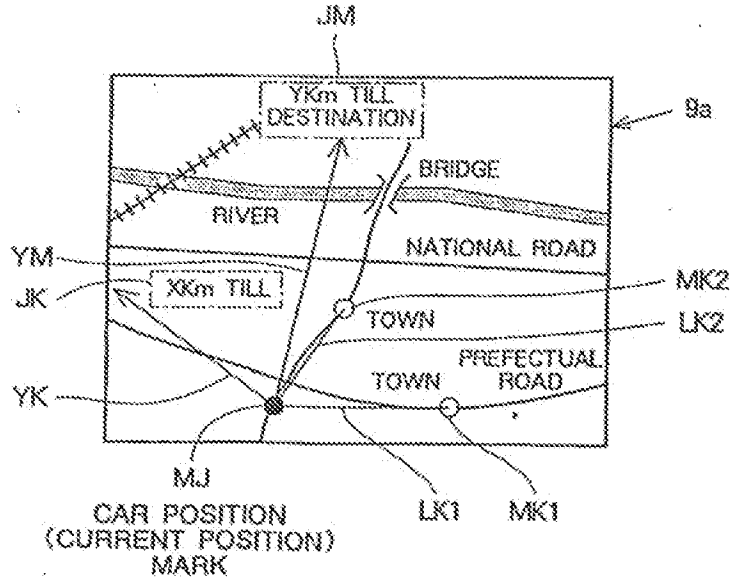


FIG.12

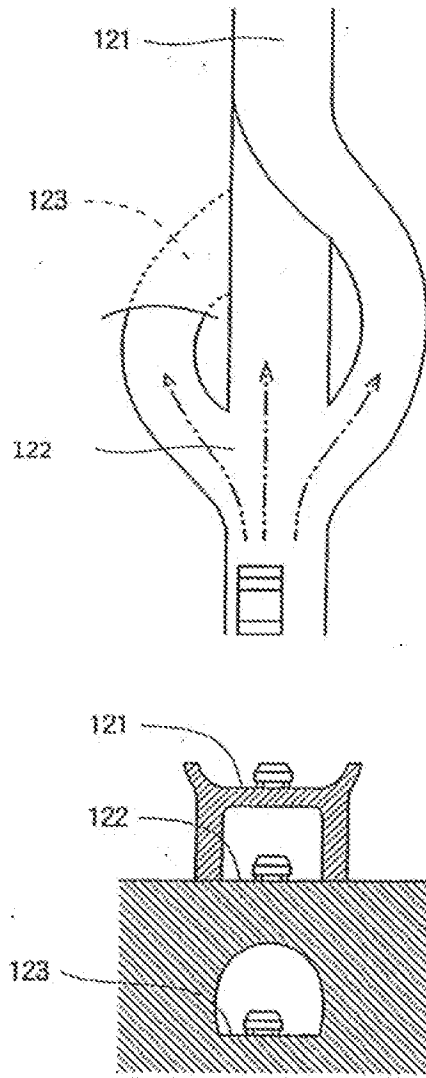


FIG.13

EXAMPLE OF SIGNPOST

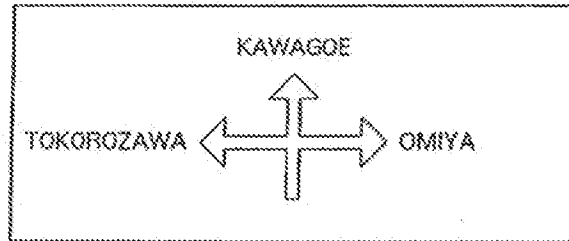
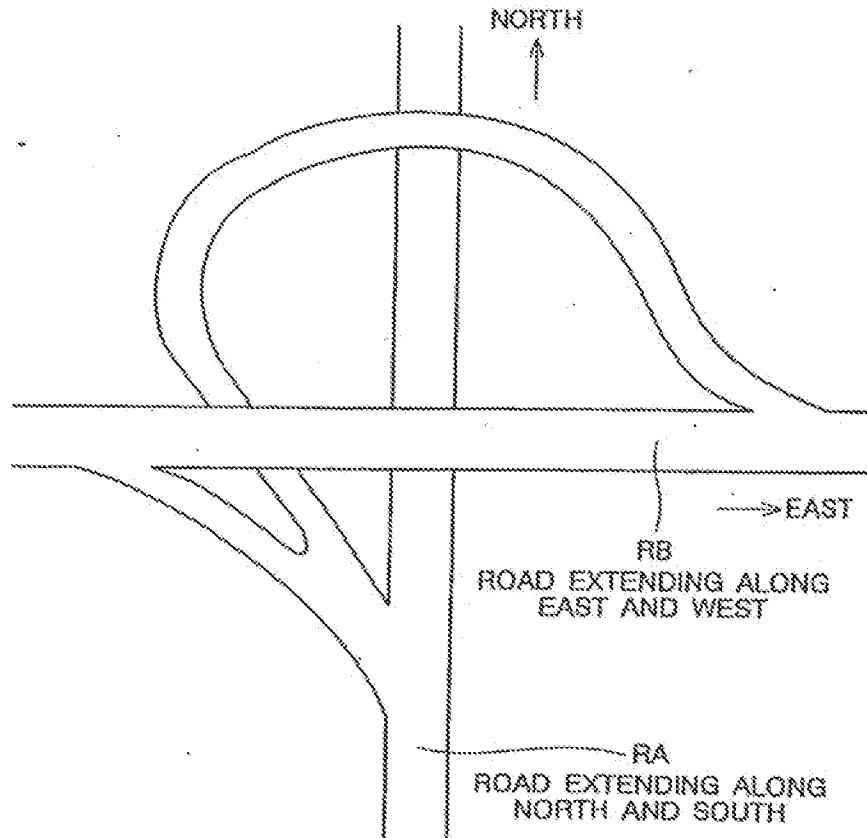


FIG.14

EXAMPLE OF SOLID CROSSING



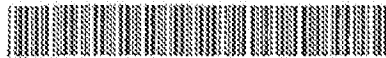
European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 2088

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.4)
Y	GB-A-2 079 453 (WOOTTON) * abstract; page 2, line 1 - page 3, line 29; page 3, lines 39-56; page 4, line 42 - page 7, line 13; page 8, lines 26-36; figure 2 *	1-4, 11, 12	G01C21/20 B60R16/02 G06F3/16 G09B29/10
Y	US-A-5 177 685 (DAVIS ET AL.) * abstract; column 23, line 64 - column 24, line 60 *	1-4, 11, 12	
D, Y	PATENT ABSTRACTS OF JAPAN vol. 16, no. 60 (P-1312) 14 February 1992 & JP-A-03 257 485 (MITSUBISHI ELECTRIC CORP) 15 November 1991 * abstract *	1-4, 11, 12	
A	WD-A-92 09866 (AUDIO NAVIGATION SYSTEMS, INC.) * abstract; page 11, line 15 - page 12, line 30; page 20, lines 17-26; page 21, line 32 - page 22, line 16 *	1-4, 11, 12	
A	GE-A-35 15 471 (MITSUBISHI DENKI K.K.) * abstract; page 9, line 23 - page 10, line 35; page 17, line 12 - page 22, line 11; page 24, line 13 - page 27, line 37; figures 4-9 *	1, 2, 12	TECHNICAL FIELDS SEARCHED (Int.Cl.4) G01C B60R G06F G09B G09B
A	PATENT ABSTRACTS OF JAPAN vol. 14, no. 230 (P-1048) 16 May 1990 & JP-A-02 056 590 (DAIHATSU MOTOR CO LTD) 26 February 1990 * abstract *	5	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Searcher
BERLIN		20 July 1995	Seitner, H
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if cited above Y : particularly relevant if combined with another document of the same category A : technological background G : non-written disclosure F : literature document		T : theory or principle underlying the invention B : earlier patent document, not published or, after the filing date D : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document	





(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:  
07.05.1997 Bulletin 1997/19

(51) Int. Cl.<sup>5</sup>: B60K 35/00

(21) Application number: 96307400.0

(22) Date of filing: 18.10.1996

(84) Designated Contracting States:  
DE FR GB

(72) Inventors:  
• Nojima, Akihiko  
Toyota-shi, Aichi-ken, 471-71 (JP)  
• Yanagisawa, Takashi  
Toyota-shi, Aichi-ken, 471-71 (JP)

(30) Priority: 06.11.1995 JP 286915/95

(71) Applicant: Toyota Jidoshu Kabushiki Kaisha  
Toyota-shi, Aichi-ken 471-71 (JP)

(74) Representative: Wood, Anthony Charles et al  
Urquhart-Dykes & Lord  
91 Wimpole Street  
London W1M 8AH (GB)

(54) Information display apparatus for vehicles

(57) An information display apparatus for vehicles for securely providing the driver with only information necessary corresponding to the running condition, the information display apparatus comprising an information processor (16) for receiving information detected by various sensors (28) and monitors (26) and detecting the running condition of the vehicle, a memory (14) containing information on respective running conditions for display and weight of information importance, the memory being used to read information corresponding to the detected running condition and the degree of information importance, and a display unit (10) for displaying information in a display area or in an amount according to the degree of importance, wherein the display area of speed information is increased when the vehicle is running straight and the display area of information about conditions behind the vehicle is increased when the vehicle is traveling in reverse.

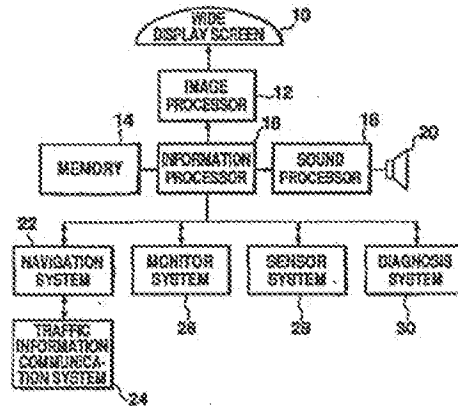


Fig. 1

EP 0 771 686 A2

## Description

### BACKGROUND OF THE INVENTION

#### TECHNICAL FIELD

The present invention relates to an information display apparatus for vehicles, and more particularly to a flexible display apparatus for displaying desired information in a desired form.

#### PRIOR ART

With the increasing functional sophistication of vehicles in recent years, it is becoming important from a viewpoint of human interface or safety to display information necessary for running of a vehicle in a manner that the driver can see easily.

As for such a technology, for example, a display console is disclosed in Japanese Patent Laid-Open Publication No. Hai 7-5817, in which information about various states is selectively shown in a three-partition display area on a flat image-receiving screen.

However, the above prior art has a problem that although various items of information are selectively shown, forms of display of different items of information are uniform because the display area is limited.

If consideration is started with display of information while a vehicle is running, the kind of information the driver requires naturally differs with the condition in which the vehicle is running, and even with the same kind of information, the degree of information importance varies with the condition in which the vehicle is running. More specifically, while the vehicle is running on a straight road, speed information is relatively important, but as the vehicle is approaching an intersection, information concerning whether the vehicle should turn left or right or information about the ambient condition assumes an increasing importance over speed information. As described, since the importance of information that the driver requires changes continuously (perhaps abruptly), it has been impossible under the uniform pattern of display to aptly and securely provide the driver with information whose importance changes with the vehicle running conditions.

### SUMMARY OF THE INVENTION

An object of the present invention is to provide a display apparatus which can aptly display information according to the running condition of a vehicle to securely and readily supply information truly necessary to the driver or the crew.

To achieve the above object, in one form of the invention, the information display apparatus for vehicles comprises detection means for detecting the running condition, memory means for storing information to display corresponding to respective running conditions and different degrees of importance of information, display

means for displaying information, and control means for reading display information corresponding to the detected running condition as well as the degree of importance of the display information and displaying the display information in a display area according to its weighted degree of importance. The running conditions to be detected include, for example, a straight running condition, a backward running condition, a running condition just before an intersection, etc. In a backward running condition, information about the condition behind the vehicle has a relatively high importance, while in a straight running condition, speed information has a relatively high importance and just before an intersection information about turning left or right becomes relatively important. As described, since the importance of information differs with the running conditions, necessary information can be securely supplied to the driver if important information is displayed prominently.

In another form of the invention, the information display apparatus for vehicles comprises detection means for detecting the running condition, memory means for storing items of information to display corresponding to respective running conditions and different in degrees of importance of these items, display means for displaying information, and control means for reading the item of display information corresponding to the detected running condition and the degree of importance of the item of display information from the memory means and displaying the item of display information in the display means giving prominence according to the degree of importance. Only necessary information would be supplied to the driver in order to make effective use of the limited display by displaying a large amount of information related to the running condition and a small amount of information with a relatively low importance. The amount of information is set as follows. When the car is running straight, a larger amount of speed information is supplied. When the car is running in reverse, a larger amount of information about conditions behind the car is supplied. When the car is approaching an intersection, a larger amount of information about the intersection condition is supplied.

In yet another form of the invention, the information display apparatus for vehicles comprises detection means for detecting the running condition; memory means for storing items of information to display corresponding to respective running conditions, different degrees of importance of the items of information and an allowable total amount of information, display means for displaying information, and control means for reading the item of display information corresponding to the detected running condition, the degree of importance of the item of display information, and the allowable amount of information from the memory means and displaying the display information item in a display area according to its degree of importance within the allowable amount of information in the display means. In a running condition in which the driver must pay attention to the environment around the vehicle, a large amount of

information should not be shown on the display. Therefore, by setting an allowable amount of information according to the running condition, the driver can be provided with only necessary information. A case where a large allowable amount of information can be set is, for example, when the vehicle is at a standstill. A case where a small allowable amount of information must be set is when the vehicle is going backward, for example.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of the display apparatus according to an embodiment of the present invention;

Fig. 2 is a table of data stored in the memory of the display apparatus shown in Fig. 1;

Fig. 3 is an operation flowchart of the display apparatus shown in Fig. 1;

Fig. 4 is a screen image on the display when the driver enters a vehicle;

Fig. 5 is a screen image on the display when a destination is set;

Fig. 6 is a screen image on the display when the shift position is set in reverse (R);

Fig. 7 is a screen image on the display after the shift position is set in R;

Fig. 8 is a screen image on the display after the shift position is set in D (drive);

Fig. 9 is a screen image on the display when the vehicle is running on a general automobile road (without route guide);

Fig. 10A is a screen image on the display when running straight while following a route guide;

Fig. 10B is a screen image on the display when running at a point 700 m before an intersection while following a route guide;

Fig. 10C is a screen image on the display when running at a point 300 m before an intersection while following a route guide;

Fig. 11 is a screen image on the display at an intersection where the driver cannot get a clear view ahead;

Fig. 12 is a screen image on the display when a warning message is received from a traffic information communication system;

Fig. 13 is a screen image on the display when running straight on a highway;

Fig. 14 is a screen image on the display when operating the radio tuner while traveling on a highway;

Fig. 15 is a screen image on the display when traffic information is received from a traffic information communication system;

Fig. 16 is a screen image on the display when changing a lanes while traveling on a highway;

Fig. 17 is a screen image on the display while running in a dense fog;

Fig. 18 is a screen image on the display when the ACC switch is turned on while the vehicle is at a standstill; and

Fig. 19 is a screen image on the display when the ignition key is removed.

#### PREFERRED EMBODIMENTS OF THE PRESENT INVENTION

An embodiment of the present invention will be described with reference to the accompanying drawings.

Fig. 1 is a block diagram of this embodiment. The instrument panel of the vehicle is formed by a wide display screen 10 (128 mm x 700 mm), which is not conventional fixed indicators. This display may be a liquid-crystal display or a CRT. The wide display 10 is connected through an image processor 12, probably including VRAMs, to an information processor 16 for editing information for display. The image processor 16 includes a CPU for specified arithmetic operations, a ROM containing a processing program to be described later, an I/O interface. The image processor 16 accesses a memory 14 containing information to display according to the running condition and degree of importance of information and decides which information to display, the size of display area, and the amount of information to display. The information processor 16 receives various information items from a navigation system 22, a traffic information communication system 24, a monitor system 26, a sensor system 28, and a diagnosis system 30; decides the running condition; and picks out and outputs necessary information to the image processor 12. Since some information should preferably be given in sound (an alarm, for example), the information processor 16 outputs such audio information from a speaker 20 through a sound processor 18.

The navigation system 22 includes a position detecting system such as a GPS device, a map data memory such as a CD-ROM, and a route search system. When the route guide is used, the position of the vehicle and a recommended route, along with map data are supplied, to the information processor 16. The traffic information communication system 24 includes communication means for radio-wave or optical two-way communications with information centers through beacons installed along the road, and obtains and supplies the road conditions including information about congestion or accidents to the information processor 16. The monitor system 26 includes monitors such as a back monitor for viewing the scene behind the vehicle, corner monitors for viewing the left and right sides, and an infrared monitor for picking up the scene in front of the vehicle. This monitor system supplies images to the information processor 16. The sensor system 28 detects the running speed or the engine rotating speed of the vehicle, fuel level, water temperature, shift position, rain, fog, etc. and supplies data to the information processor 16. The diagnosis system 30 makes decides the battery voltage, oil level, etc. are adequate and supplies this information to the information processor 16.

Under the above arrangement, the information processor 16 decides information to display according to the running conditions, and displays information in a display area or in an amount of information according to the degree of information importance. The following processes will now be described, showing example running conditions.

Fig. 2 shows items of information for respective running conditions and degrees of their importance which are stored in the memory 14. The running conditions include:

- (1) "The driver enters a vehicle and the key is inserted into the ignition switch."
- (2) "The shift lever is fixed in R."
- (3) "The car is running straight while the route guide is in operation."
- (4) "The car is running at a point 700 m before an intersection."
- (5) "The car is running at a point 300 m before an intersection."
- (6) "The car is at an intersection where the driver cannot get a clear view ahead."
- (7) "There is a possibility that a pedestrian will enter the road while the car is running straight."
- (8) "The car is running straight on a highway."

In the case of (1), the items of information to display are diagnosis, warning, shift position, fuel level, and temperature. The allowable amount of information that can be displayed is as follows. If the display capability of the display 10 is set at 100, the amount of information can be shown to the driver or the crew is considered to be 100%. This is because while the vehicle is at a standstill, the driver can concentrate his attention upon the display 10 and therefore full display is possible. The order of priority of information is diagnosis, warning, shift, fuel and temperature. The ratio of display area is 20% for each item of information. In the case of (2), the items of information to display are back monitor, shift, fuel and temperature. The allowable amount of information is 20%. Information is limited to 20% because when traveling in reverse, the driver must confirm conditions to the rear of the vehicle and cannot watch the display closely so it is necessary to reduce the amount of information displayed. The order of priority is back monitor, shift, fuel and temperature and the ratio of display area is 50%, 20%, 10% and 10%, in that order. This ratio is based on the fact that while traveling in reverse, information about the condition at the rear of the vehicle is most important. In the case of (3), the items of information to display are route guide with the arrow mark, speed, fuel and temperature, and as the vehicle is running, the allowable amount of information is limited to 40%. The order of priority of information is route guide with arrow mark, speed, fuel and temperature and the ratio of display area is 30%, 50%, 10% and 10%, in that order. Although route guide with arrow mark has been given the highest priority, the ratio of display area for

speed is largest because route guide can be given to the driver with a simple arrow mark which occupies a very small area. In the case of (4), the items of information to display, the allowable amount of information and the order of priority are the same as in (3), but the ratio of display area is different with 40%, 40%, 10% and 10%. More specifically, the display area for route guide with arrow mark is increased while the display area for speed is reduced because, as the vehicle approaches an intersection, the importance of information about the intersection increases and more information about the intersection is displayed with a greater display area. In a similar manner as described, regarding the cases of (5), (6), (7) and (8), the items of information, the allowable amount of information, the order of priority and the ratio of display area are decided and stored in memory. The information processor 16 accesses the memory 14 containing such a table as this to read the items of information corresponding to the current running condition, and displays information with a specified ratio of display area.

Fig. 3 is a process flowchart of the information processor 16. The information processor 16 recognizes the current running condition using information from the navigation system 22 and the sensor system 28, and accesses the memory 14. The information processor 16 decides the amount of information to display, that is, the allowable amount of information according to the running condition (S101), and also decides the priority (the degree of importance) of the respective items of information (S102). The priority is, to be more specific, the order of priority and the ratio of display area. A decision is made whether the item of information with the highest priority has a display area ratio of greater than 50% (S103). In the case of (2), for example, since the ratio of the back monitor with the first priority is 60%, the result of the above decision is YES. In the case of (4), the ratio of the intersection guide with the first priority is 40%, the result of the decision is NO. If the ratio of an item of information with the first priority is larger than 50%, a decision is made if the ratio of the item of information with the second priority is larger than 25% (S104). If the ratio of the second-priority item is less than 25%, in other words, if the first-priority item is far more important than the other items, the first-priority item of information is displayed in a large area at the center of the display 10, and consequently the other items of information are displayed according to their ratios around the first-priority item (S105). If the second-priority item of information has an area ratio of larger than 25%, the first- and second-priority items are displayed according to their ratios on the left and the right sides of the display 10 (S106). The first-priority item should preferably be displayed on the side closer to the driver's seat.

On the other hand, if the first-priority item has an area ratio of less than 50%, a decision is made whether the area ratio of this first-priority item is larger than 25% (S107). If so, a decision is made if the second-priority item also has an area ratio of larger than 25% (S108). If

the first and second priority items both have an area ratio of larger than 25%, they are displayed in a large area on the left and the right sides of the display 10 (S105). If the first and second priority items both have an area ratio of less than 25%, they are displayed according to their ratios in an ordinary picture composition (S110). Though not illustrated, when operation or accident information is supplied singly from any of the systems, the information processor 16 displays the information superimposed on the screen image.

By the process as described, the information processor 16 displays various items of information by suitably changing their display areas. Examples are shown in the following.

Fig. 4 shows an example of screen image of (1), that is, when the driver gets into a vehicle and puts the engine key in the starter switch. The first-priority item of diagnosis and the second-priority item of warning both have a display area of less than 25%, they are shown in almost equal display areas in an ordinary picture composition. In Fig. 4, reference numeral 100 denotes warning about the seat belt and the open/close condition of doors, 102 denotes diagnosis, 104 denotes shift position, 106 denotes fuel and 108 denotes temperature.

Fig. 5 shows a case where the driver stops the car and sets a destination. The screen shows a destination setting map 110 and a speedometer 112 in place of warning 102. The destination setting map 110 is supplied from the navigation system 22. The display area ratios of the destination setting map and the speedometer are respectively set to be more than 25%, and are displayed on the left and the right sides on the display 10.

Fig. 6 shows a case where the shift lever is shifted from the P (parking) position to the R (reverse) position. In this case, when receiving information from the sensor system 26 that the shift lever has been moved from P to R, the information processor 16 displays the shift position information 104 superimposed at the center of the display 10. From this, the driver can easily recognize that the shift lever has been shifted to the R position.

Fig. 7 shows the condition that the shift lever has been set at the R position, namely, case (2). The back monitor image 114 as the first-priority information, that is, the image of the scene to the rear of the vehicle supplied from the monitor system 26 is displayed in a large area at the center of the display 10. Therefore, from this image, the driver can easily grasp the condition to the rear of the vehicle, making it possible for him to smoothly back up.

Fig. 8 shows a case where the driver puts the shift lever in the D (drive) position and is preparing to drive. The speedometer 112 is shown in a large area at the center of the display 10. Note that the speed scale is graduated in 20 km/h intervals up to 180 km/h.

Fig. 9 shows a case where the car has begun motion with the shift lever put in the D position. As the accelerator pedal is depressed, the engine rotating speed increases, so that the tachometer 116 is shown

in almost the same display area as the speedometer 112. If a decision is made from information from the navigation system that the vehicle is running on a general automobile road, the speedometer scale is changed to a maximum of 100 km/h and the region up to the speed limit of 50 km/h appears in blue.

Fig. 10 shows an example of display when the vehicle is running while following the route guide. Fig. 10A shows a display screen while running straight, in which the arrow mark 118 is shown on the left and the speedometer is shown on the right side of the display screen 10. The display area ratio of the arrow mark to the speedometer is 50% to 50%. Route guide information "straight line 5 km" from the navigation system 22 is shown above the arrow mark. Fig. 10B shows a display screen when the vehicle is 700 m before an intersection, in which the arrow guide and the speedometer are shown like in Fig. 10A, but the area ratio is 40% to 40%. More specifically, the area of the arrow guide is increased, while the area of the speedometer is decreased. The broken lines show the changes of the display areas. Above the arrow guide, there is a guide message "700 m to Yamashita-cho". In addition, there is a turn-right arrow guide to indicate that the vehicle should turn to the right at the intersection. Fig. 10C shows a display screen when the vehicle is 300 m before an intersection, in which the items of information are the arrow guide and the speedometer as in the above two display images, but the display area ratio is 50% to 30%. In other words, the area of the arrow guide is further increased, while the area of the speedometer is further decreased. (The broken lines show how the areas change.) As the display area of the speedometer decreases, the amount of information is changed to show only the current speed (40 km/h). On the other hand, the arrow guide changes to a three-dimensional image display to give a stereoscopic representation of the condition near the intersection. Note that three-dimensional image data is supplied from the navigation system. As described, while the same items of information are displayed, the display areas and the amounts of information are varied sequentially according to running conditions, in other words, the display screen changes according to running conditions to enable the driver to easily see and understand the display screen and obtain needed information. In Fig. 10, the mode of supply of information was changed at 700 m and 300 m before the intersection, but it is also possible to successively change the display areas at every 100 m, for example.

Fig. 11 shows a display screen when the vehicle is passing an intersection where it is difficult to see far ahead. The information processor 16, which detects through navigation system data that the vehicle has come to such an intersection, displays the left and right images 120 from the corner monitors of the monitor system 26 on the display screen 10. Since the display area ratio of corner monitor is 60%, the corner monitor information is shown in a large proportion on the display

- (a) detection means for detecting a running condition;
- (b) memory means for storing information to display corresponding to respective running conditions and degrees of importance of information;
- (c) display means for displaying information;
- (d) control means for reading display information corresponding to a detected running condition and a degree of importance of said display information from said memory means and displaying said display information in a display area according to the degree of importance of said information in said display means.
2. An information display apparatus according to Claim 1, wherein said detection means includes a navigation system for guiding a vehicle by detecting its current position.
3. An information display apparatus according to Claim 1, wherein said detection means includes a monitor for monitoring the environment around the vehicle.
4. An information display apparatus according to Claim 1, wherein said detection means includes a diagnosis system for deciding whether devices necessary for operation of said vehicle are normal or not.
5. An information display apparatus according to Claim 1, wherein said detection means detect at least said vehicle's straight running condition, reverse running condition and running condition before an intersection.
6. An information display apparatus according to Claim 1, wherein said degree of information importance is decided by order of priority and display area ratios.
7. An information display apparatus according to Claim 5, wherein said control means displays speed information in a larger proportion than other items of information when said vehicle is running straight, information about the condition behind said vehicle in a larger proportion than other items of information when said vehicle is going in reverse, and information for intersection guide in a larger proportion than other items of information when said vehicle is approaching an intersection.
8. An information display apparatus for vehicles comprising:
- (a) detection means for detecting a running condition;
- (b) memory means for storing items of informa-

tion to display corresponding to respective running conditions and degrees of importance of the items of information;

(c) display means for displaying information

(d) control means for reading an item of display information corresponding to the detected running condition and a degree of importance of the item of display information from said memory means and displaying said item of display information in an amount of display information according to the degree of importance in said display means.

9. An information display apparatus according to Claim 8, wherein said control means displays a larger amount of speed information than other information when the vehicle is running straight, a larger amount of information about conditions behind the vehicle than other information when the vehicle is going in reverse, and a larger amount of intersection guide than other information when the vehicle is approaching an intersection.
10. An information display apparatus for vehicles comprising:

(a) detection means for detecting a running condition;

(b) memory means for storing items of information to display corresponding to respective running conditions, degrees of importance of the items of information and an allowable total amount of information;

(c) display means for displaying information;

(d) control means for reading an item of display information corresponding to the detected running condition, a degree of importance of the item of display information and the allowable amount of information from said memory means and displaying the item of display information in a display area according to the degree of importance within the allowable amount of information in said display means.

11. An information display apparatus according to Claim 10, wherein said allowable amount of information is set at a smaller amount when the vehicle is running than when the vehicle is not in motion.

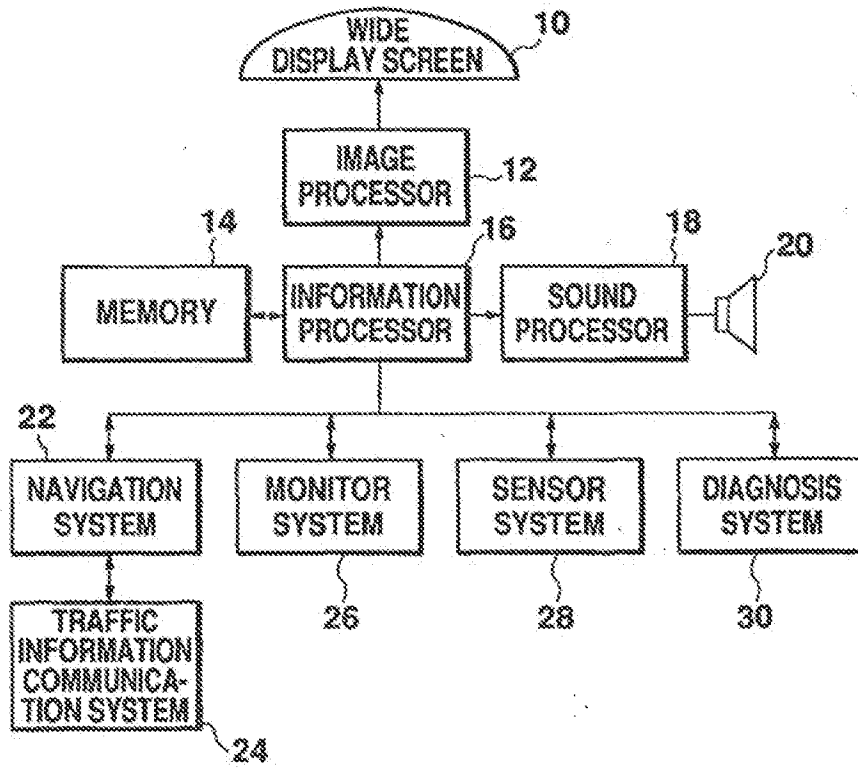


Fig. 1

RUNNING CONDITION	ITEM OF INFORMATION	ALLOWABLE AMOUNT OF INFORMATION	ORDER OF PRIORITY	RATIO
GET IN AND INSERT KEY INTO IGNITION	DIAGNOSIS WARNING SHIFT FUEL TEMP	100%	1	20%
			2	20%
			3	20%
			4	20%
			5	20%
SHIFT LEVER IN R	BACK MONITOR SHIFT FUEL TEMP	20%	1	60%
			2	20%
			3	10%
			4	10%
WHEN ROUTE GUIDE IS DISPLAYED, CAR GOES STRAIGHT.	ARROW GUIDE SPEED FUEL TEMP	40%	1	30%
			2	50%
			3	10%
			4	10%
WHEN ROUTE GUIDE IS DISPLAYED, CAR IS 700M BEFORE INTERSECTION.	CROSSING GUIDE SPEED FUEL TEMP	40%	1	40%
			2	40%
			3	10%
			4	10%
WHEN ROUTE GUIDE IS DISPLAYED, CAR IS 300M BEFORE INTERSECTION.	CROSSING GUIDE SPEED FUEL TEMP	40%	1	50%
			2	30%
			3	10%
			4	10%
AT INTERSECTION WHERE DRIVER CANNOT GET A CLEAR VIEW	CORNER MONITOR ARROW GUIDE FUEL TEMP	40%	1	60%
			2	20%
			3	10%
			4	10%
WHILE GOING STRAIGHT, PRECAUTION IS GIVEN ON A PEDESTRIAN ABOUT TO CROSS	PRECAUTION SPEED FUEL TEMP	20%	1	50%
			2	30%
			3	10%
			4	10%
CAR GOES STRAIGHT ON A HIGHWAY	SPEED AMBIENT CONDITION FUEL TEMP	40%	1	40%
			2	40%
			3	10%
			4	10%

Fig. 2



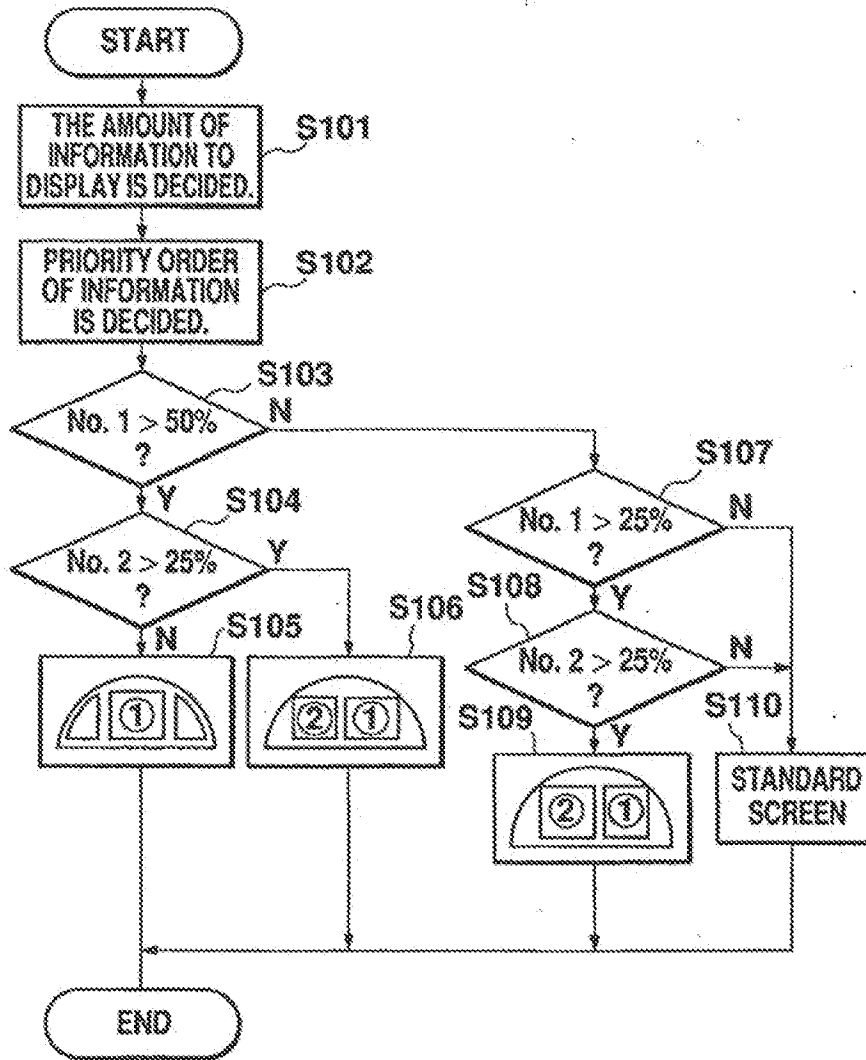


Fig. 3

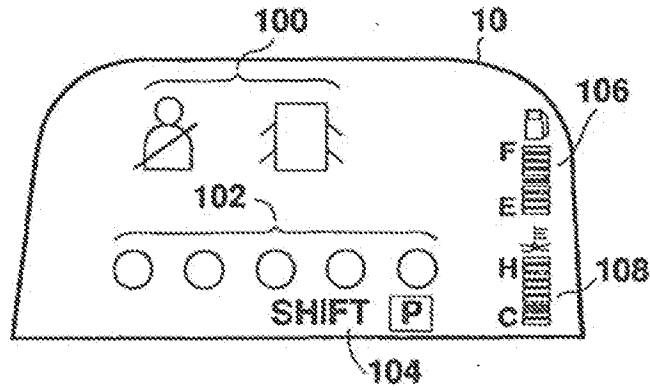


Fig. 4

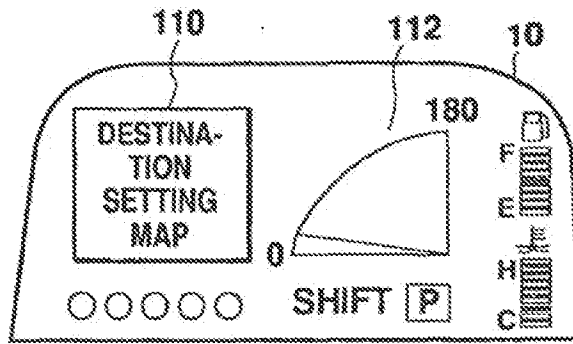


Fig. 5

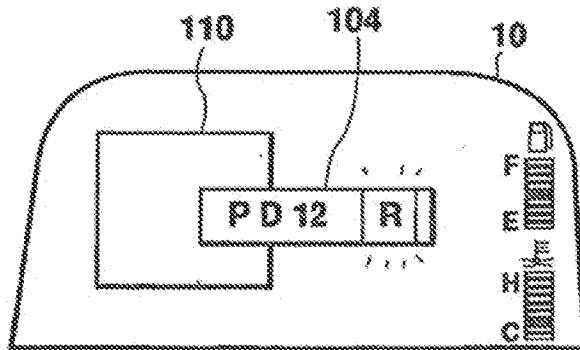


Fig. 6

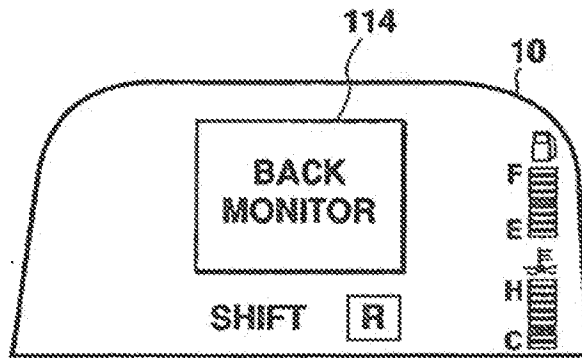


Fig. 7

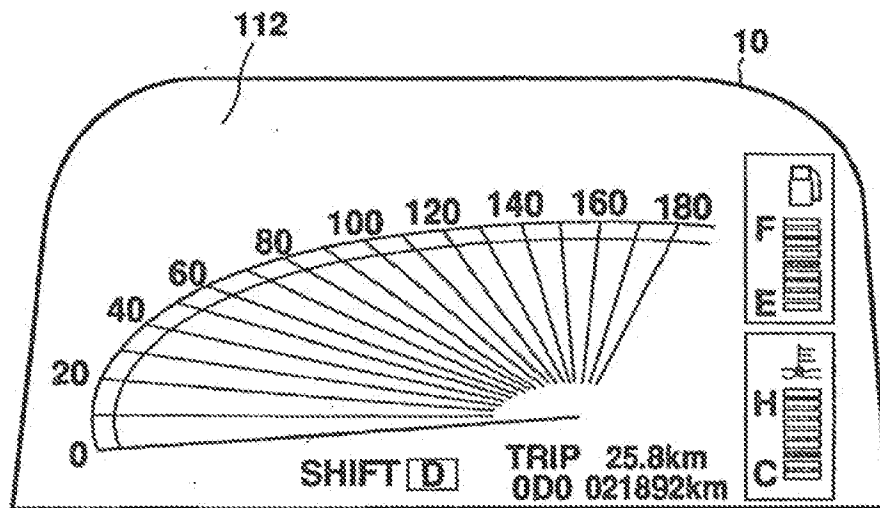


Fig. 8

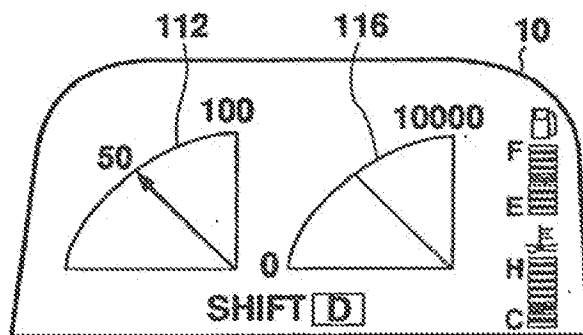


Fig. 9

Fig. 10A

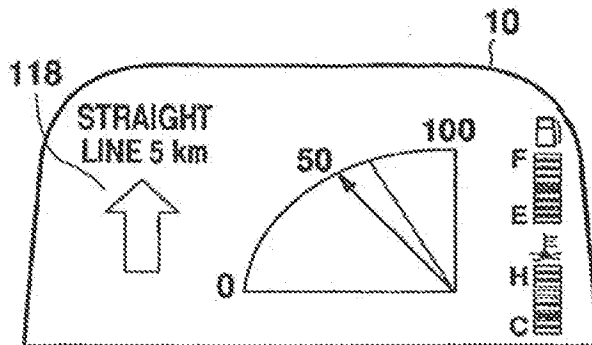


Fig. 10B

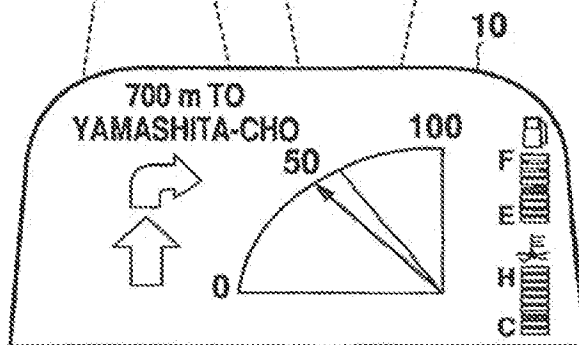
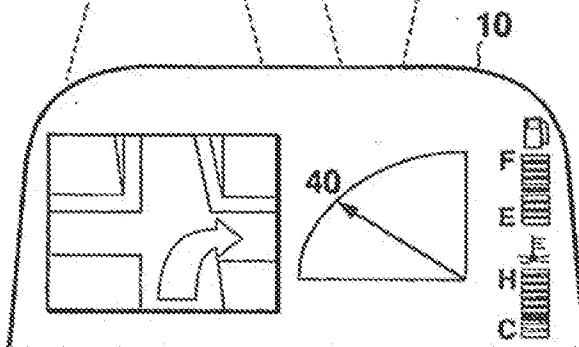


Fig. 10C



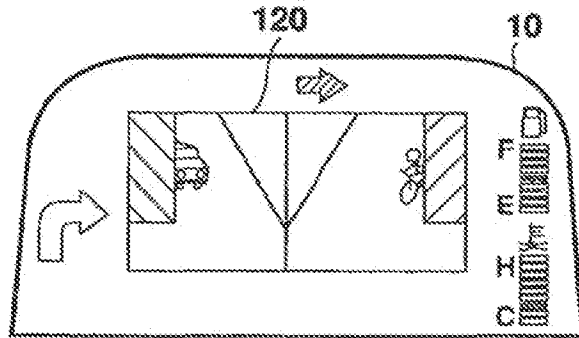


Fig. 11

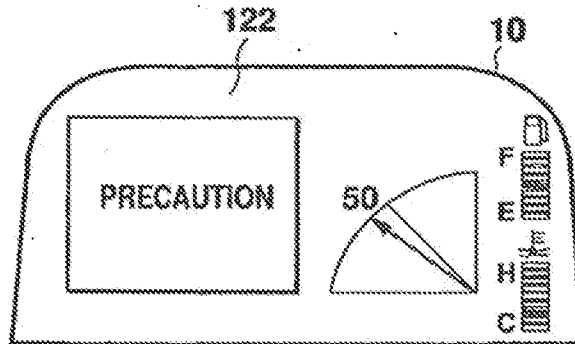


Fig. 12

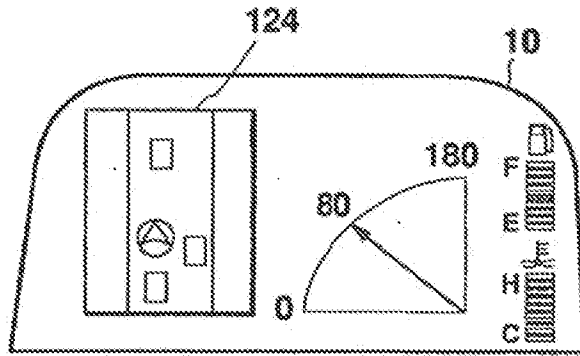


Fig. 13

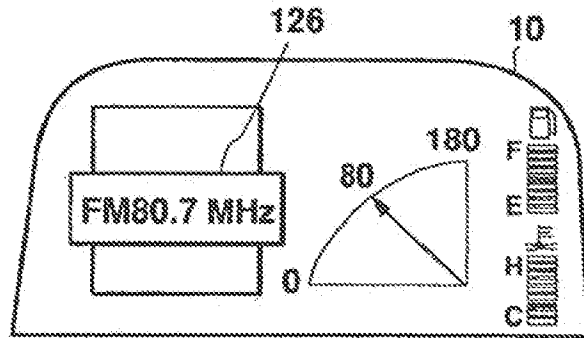


Fig. 14

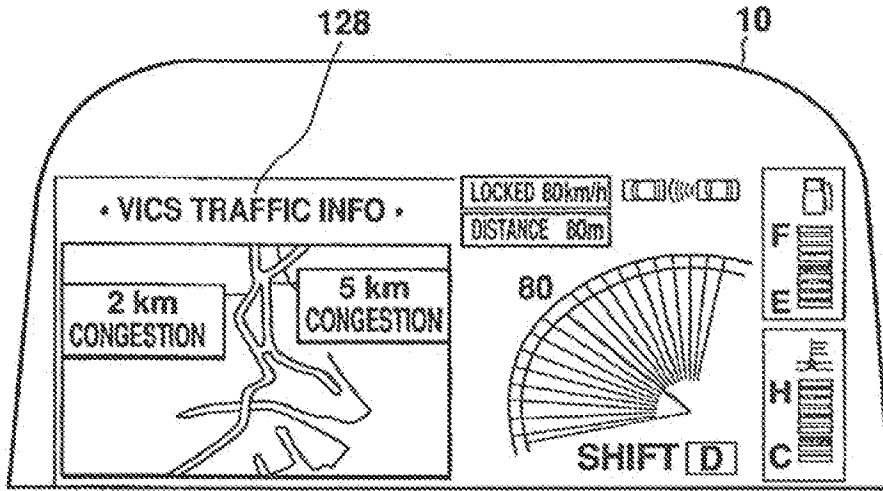


Fig. 15

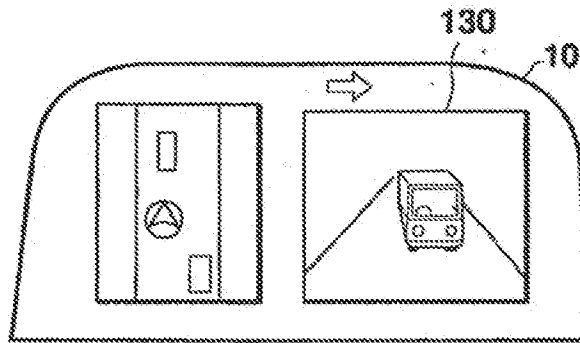


Fig. 16



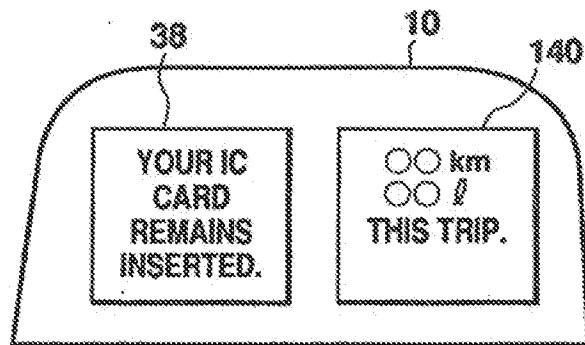


Fig. 19

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5470092
<b>Application Number:</b>	12015320
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	2156
<b>Title of Invention:</b>	Method for Managing Media
<b>First Named Inventor/Applicant Name:</b>	Russell W. White
<b>Customer Number:</b>	21906
<b>Filer:</b>	Mark J. Rozman/Stephanie Petreas
<b>Filer Authorized By:</b>	Mark J. Rozman
<b>Attorney Docket Number:</b>	AFF.0004C5US
<b>Receipt Date:</b>	08-JUN-2009
<b>Filing Date:</b>	16-JAN-2008
<b>Time Stamp:</b>	11:50:50
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	AFF004C5IDS1449Form2.pdf	405157 <small>6750040845808ef4436c969b8111e0fc3e3f422c</small>	no	12

### Warnings:

### Information:

This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Filed (SB/08)	AFF004C5IDS1449Form3.pdf	229983 f6c02e80ac71e5ffc3525c4e2f685b04f3af88e6	no	6
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied IDS fillable form					
3	NPL Documents	DEF00006036.pdf	645752 5383ec8066ad2abb3748e7b9b3e814885cbeec56	no	4
<b>Warnings:</b>					
<b>Information:</b>					
4	NPL Documents	DEF00006040.pdf	3337025 e8eec982a73f7b18fa47030166d8b3d606dbff12	no	16
<b>Warnings:</b>					
<b>Information:</b>					
5	Foreign Reference	DEF00006552.pdf	6623494 eb00653f3e77c3f2b74fec7f6ddab8bbdd644c12	no	26
<b>Warnings:</b>					
<b>Information:</b>					
6	NPL Documents	DEF00006578.pdf	2563814 f33b8877805f96fb229e1958eb78f7a536700225	no	27
<b>Warnings:</b>					
<b>Information:</b>					
7	NPL Documents	DEF00006605.pdf	2313558 89b3f2fc79366a5b1c4b6ab93cee22c19ab48416	no	9
<b>Warnings:</b>					
<b>Information:</b>					
8	NPL Documents	DEF00006686.pdf	2690712 7e4241cad60f6b7b25fe9fdd6c512d1c488457e1	no	13
<b>Warnings:</b>					
<b>Information:</b>					
9	NPL Documents	DEF00006699.pdf	452958 c22f5ff8941c8fb7e117d1f6c299652584605442	no	2
<b>Warnings:</b>					
<b>Information:</b>					

10	NPL Documents	DEF00006709.pdf	1287236	no	5
			eecl1e90599c164ea5e2ea28dbc2bc5c74e9feac		
<b>Warnings:</b>					
<b>Information:</b>					
11	Foreign Reference	DEF00007989.pdf	3091952	no	20
			32f5e57543903806c3dfc7d5c0eec8b6c653c22a		
<b>Warnings:</b>					
<b>Information:</b>					
12	Foreign Reference	DEF00008095.pdf	7211061	no	28
			76dd4a27f10ca371f9d0ee3d26b7107aa4a05ebb		
<b>Warnings:</b>					
<b>Information:</b>					
13	NPL Documents	DEF00011275.pdf	13986791	no	82
			773afe63cab9b3e05f114b703cb0031a7ab9dd58		
<b>Warnings:</b>					
<b>Information:</b>					
14	NPL Documents	DEF00011395.pdf	11050910	no	81
			5ac22443bae3f7449669636fe71b68d4ed967cde		
<b>Warnings:</b>					
<b>Information:</b>					
15	NPL Documents	DEF00011557.pdf	9372135	no	80
			f4199dc9074ec990b181ffcc452d24ee83e937		
<b>Warnings:</b>					
<b>Information:</b>					
16	Foreign Reference	DEF00011637.pdf	1128345	no	5
			2d8584ded06ce14dedba7e7c9593645a0a7d3e50		
<b>Warnings:</b>					
<b>Information:</b>					
17	Foreign Reference	DEF00011642.pdf	2114782	no	15
			f327d0b6dbf54d841f4bc099472ea30feaed761b		
<b>Warnings:</b>					
<b>Information:</b>					
18	Foreign Reference	DEF00011657.pdf	5101766	no	28
			ae8a7db43e8615863f548a93754b3c2f54f2c213		
<b>Warnings:</b>					
<b>Information:</b>					

19	Foreign Reference	DEF00011685.pdf	2322896	no	17
			6d3b48768fb227f92c372caa772ce304e250b737		

**Warnings:**

**Information:**

20	NPL Documents	DEF00011702.pdf	985776	no	6
			85flea21b1100a5869192794fa112a167b57e065		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			76916103		
-------------------------------------	--	--	----------	--	--

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (04-09)

Approved for use through 05/31/2009. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2000-66974	JP		2000-03-03			<input type="checkbox"/>
	2	11-68685	JP		1999-03-09			<input type="checkbox"/>
	3	CN 1218258A	CN		1999-06-02			<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

4	H11-242686	JP		1999-09-07	Sony Corporation	<input type="checkbox"/>
5	DE 44 31 070 B4	DE		2004-07-22	DaimlerChrysler AG	<input type="checkbox"/>
6	0 569 343 A1	EP		1993-10-11	Pioneer Electronic Corporation	<input type="checkbox"/>
7	0 675 341 A1	EP		1995-04-10	Honda Giken-Kogyo	<input type="checkbox"/>
8	0 771 686 A2	EP		1997-07-05	Toyota Jidosha Kabushiki Kaisha Toyota-shi, Aichi-	<input type="checkbox"/>
9	H4-261576	JP		1992-09-17	Mitsubishi Electric Corporation	<input type="checkbox"/>
10	2-301330	JP		1990-12-13		<input type="checkbox"/>
11	5-294250	JP		1993-11-09		<input type="checkbox"/>
12	6-187597	JP		1994-07-08		<input type="checkbox"/>
13	JP6289118	JP		1994-10-18	Sega Enterprises KK	<input type="checkbox"/>
14	JP6294659	JP		1994-10-21	Dainippon Printing Co. LTD.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

15	07-129895	JP		1995-05-19	Honda Motor Co Ltd	<input type="checkbox"/>
16	07-146155	JP		1995-06-06	Honda Motor Co Ltd	<input type="checkbox"/>
17	7-262493	JP		1995-10-13	CSK Corporation	<input type="checkbox"/>
18	7-262493	JP		1995-10-13		<input type="checkbox"/>
19	JP7270171	JP		1995-10-20	Sumitomo Electronic Industries	<input type="checkbox"/>
20	JP7036382	JP		1995-02-07	Mitsubishi Electric Corp.	<input type="checkbox"/>
21	8-110231	JP		1996-04-30		<input type="checkbox"/>
22	9-61514	JP		1997-03-07		<input type="checkbox"/>
23	10-103966	JP		1998-04-24		<input type="checkbox"/>
24	10-143349	JP		1998-05-29	Compaq Computer Corporation	<input type="checkbox"/>
25	JP1018712	JP		1989-01-23	Mazda Motor	<input type="checkbox"/>



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

	26	JP5077679	JP		1993-03-30	Nissan Motor		<input type="checkbox"/>
	27	JP59085599	JP		1984-05-17	Nissan Motor		<input type="checkbox"/>
	28	JP63136828	JP		1988-06-09	Pioneer Electronic Corp.		<input type="checkbox"/>
	29	63-136828	JP		1988-06-09			<input type="checkbox"/>
	30	WO 96/04724	WO		1996-02-15	Emerson, Harry		<input type="checkbox"/>
	31	WO 96/07110	WO		1996-03-07	British Telecommunications Public Limited Company		<input type="checkbox"/>
	32	WO 97/13657	WO		1997-04-17	United Technologies Automotive, Inc.		<input type="checkbox"/>
	33	H11-317061	JP		1999-11-16	Victor Company of Japan, LTD.		<input checked="" type="checkbox"/>
	34	2901445	JP		1999-03-19	Kenwood Corporation		<input checked="" type="checkbox"/>
	35	WO 99/35009	WO		1999-07-15	Microsoft Corporation		<input type="checkbox"/>
	36	11-219580	JP		1999-08-10			<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

	37	11219580 A	JP		1999-10-08	Sony Corp		<input type="checkbox"/>
	38	1168685	JP		1999-03-09			<input type="checkbox"/>
	39	11-068685	JP		1999-09-03	Sony Corp		<input type="checkbox"/>
	40	1998-052033	JP		1998-09-25			<input type="checkbox"/>
	41	1999-0042565	JP		1999-06-15			<input type="checkbox"/>
	42	1999-0073234	KR		1999-10-05	Young-Man Lee		<input type="checkbox"/>
	43	1999-0048723	KR		1999-07-05			<input type="checkbox"/>
	44	KR2019990022030U	KR		1999-06-25	Young-Shik Cheon		<input type="checkbox"/>
	45	2000-0001465	KR		2000-01-25	Samsung Motors		<input type="checkbox"/>
	46	0142256	KR		1998-03-30			<input type="checkbox"/>
	47	WO 98/21672	WO		1998-05-22	Inergy Online, Inc.		<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

	48	WO 98/47252	WO		1998-10-22	Stern, Geoffrey		<input type="checkbox"/>
	49	WO 00/54187	WO		2000-09-14	Rock.Com, Inc.		<input type="checkbox"/>
	50	WO 00/60450	WO		2000-10-12	Khyber Technologies Corporation		<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	MARK MOELLER, Computing Unplugged Magazine, "Product Preview, A Survey of Auto PC 2.0 for software developers," 1999-2009, Zatz Publishing, pages 1-7.	<input type="checkbox"/>
	2	MARK MOELLER, Computing Unplugged Magazine, "AutoPC Update, Auto PC/Windows CE for Automotive news bites," 1999-2009, Zatz Publishing, pages 1-4.	<input type="checkbox"/>
	3	Claim Chart for KR19990033393, Claim 17 of U.S. Patent No. 7,324,833, pages 1-3.	<input type="checkbox"/>
	4	RIO500, Getting Started Guide for Windows 98 and Macintosh OS 8.6, pages 1-2.	<input type="checkbox"/>
	5	NORBERT A. STREITZ, et al., "DOLPHIN: Integrated Meeting Support Across Local And Remote Desktop Environments And LiveBoards," Integrated Publication and Information Systems Institute, 1994, pages 345-358.	<input type="checkbox"/>
	6	LEO DEGEN, et al., "Working with Audio: Integrating Personal Tape Recorders and Desktop Computers," May 3-7, 1992, pages 413-418.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

7	H.S. JUN GIBEE, "A Virtual Information Desk On The Internet," University of Ulsan, September 1999, pages 265-268.	<input type="checkbox"/>
8	STEVE WHITTAKER, et al., "TeleNotes: Managing Lightweight Interactions in the Desktop," Lotus Development Corporation, June 1997, pages 137-168.	<input type="checkbox"/>
9	R.M. CROWDER, et al., "Integration of Manufacturing Information Using Open Hypermedia," Computer in Industry, 1999, pages 31-42.	<input type="checkbox"/>
10	TOMAS BOSTROM, et al., "Mobile Audio Distribution," Royal Institute of Technology, 1999, pages 166-172.	<input type="checkbox"/>
11	ALEX POON, et al., Xerox Disclosure Journal, Vol. 19, No. 2, "Gestural User Interface Technique for Controlling the Playback of Sequential Media," March/April 1994, pages 187-190.	<input type="checkbox"/>
12	DEB KUMAR ROY, "NewsComm: A Hand-Held Device For Interactive Access to Structured Audio," Massachusetts Institute of Technology, June 1995, pages 1-12.	<input type="checkbox"/>
13	VICTORIA BELLOTTI, et al., "Walking Away from the Desktop Computer: Distributed Collaboration and Mobility in a Product Design Team," 1996, pages 209-218.	<input type="checkbox"/>
14	UPUL OBEYSEKARE, et al., "The Visual Interactive Desktop Laboratory," January-March 1997, pages 63-71.	<input type="checkbox"/>
15	ASIM SMILAGIC, et al., "MoCCA: A Mobile Communication and Computing Architecture," Institute for Complex Engineered Systems, pages 1-8.	<input type="checkbox"/>
16	SUI-MENG POON, et al., "Integration of Value-Added Audio Playback Capacity Into Computer Network," Nanyang Technological University, 1995, pages 632-636.	<input type="checkbox"/>
17	ERDAL PAKSOY, et al., "A variable-rate celp coder for fast remote voicemail retrieval using a notebook computer," DSPS R&D Center, Texas Instruments, 1997, pages 119-124.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

18	JEFFREY A. DAVIS, "Use of Personal Computers in Satellite Command and Control Systems," Raytheon Systems Company, October 24, 1999, pages 283-291.	<input type="checkbox"/>
19	NIKI DAVIS, "Remote Teaching Via ISDN2 And Desktop Conferencing," Exeter University School of Education, pages 1-3.	<input type="checkbox"/>
20	A CHAN, et al., "The PEP-II Project-Wide Database," Stanford University, 1996, pages 840-842.	<input type="checkbox"/>
21	KRISHNA BHARAT, et al., "Migratory Applications," Springer Berlin, Vol. 1222, 1997, pages 1-21.	<input type="checkbox"/>
22	EMPEG CAR, "MP3 in your dash," Digital Audio Player User Guide, pages 1-50.	<input type="checkbox"/>
23	MICROSOFT, "Getting Started Microsoft. Windows. 98" Second Edition, 1998, pages 1-138.	<input type="checkbox"/>
24	SAUL GREENBERG, "PDAs and Shared Public Displays: Making Personal Information Public, and Public Information Personal," University of Calgary, March 1999, pages 1-11.	<input type="checkbox"/>
25	NAOHIKO KOHTAKE, et al., "InfoStick: an interaction device for Inter-Appliance Computing," Keio University, pages 1-15.	<input type="checkbox"/>
26	HEWLETT PACKARD, User's Guide, HP Jornada 420, Palm-Size PC, pages 1-75	<input type="checkbox"/>
27	MICROSOFT, "Introducing Microsoft Windows 95 - Certificate of Authenticity," 1995, pages 1-117.	<input type="checkbox"/>
28	SONY, "New Technical Theory For Servicing, MZ-R5ST Operation Manual," pages 1-44.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

29	RICHARD C. DAVIS, et al., "A Framework for Sharing Handwritten Notes," 1998, pages 119-120.	<input type="checkbox"/>
30	KRISHNA A. BHARAT, et al., "Migratory Applications," UIST '95, November 14-17, 1995, pages 133-142.	<input type="checkbox"/>
31	BRAD A. MYERS, "Collaboration Using Multiple PDAs Connected To A PC," Carnegie Mellon University, 1998, pages 385-294.	<input type="checkbox"/>
32	RICHARD C. DAVIS, et al., "NotePals: Lightweight Note Sharing by the Group, for the Group," May 15-20, 1999, pages 338-345.	<input type="checkbox"/>
33	JUN REKIMOTO, et al., "Augmented Surfaces: A Spatially Continuous Work Space for Hybrid Computing Environments," May 15-20, 1999, pages 378-385.	<input type="checkbox"/>
34	DAN R. OLSEN, JR., "Interacting with Chaos," September and October 1999, pages 42-54.	<input type="checkbox"/>
35	SCOTT ROBERTSON, et al., "Dual Device User Interface Design: PDAs and Interactive Television," April 13-18, 1996, pages 79-86.	<input type="checkbox"/>
36	SYMANTEC CORPORATION, "pcANYWHERE32 User's Guide," 1993-1997, pages 1-216.	<input type="checkbox"/>
37	KRISHNA BHARAT, et al., Migratory Applications, "Mobile Object Systems Towards the Programmable Internet," Springer Berlin/Heidelberg, Volume 1222/11997, 1997, pages 1-134.	<input type="checkbox"/>
38	DIAMOND MULTIMEDIA SYSTEMS, INC., "Rio PMP300, User's Guide," 1998, pages 1-27.	<input type="checkbox"/>
39	SONY, "Portable MiniDisc Recorder, Operating Instructions, MZ-R55," 1998, pages 1-42.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

40	NORBERT A. STREITZ, et al., "i-Land: An Interactive Landscape for Creativity and Innovation," Proceedings of the ACM Conference on Human Factors in Computing Systems, May 15-20, 1999, pages 120-127.	<input type="checkbox"/>
41	NORBERT A. STREITZ, et al., "Roomware for Cooperative Buildings: Integrated Design of Architectural Spaces and Information Spaces," pages 1-20	<input type="checkbox"/>
42	Direct Cable Connection screen shot, "B1U6U4," 10 pages total.	<input type="checkbox"/>
43	Direct Cable Connection screen shot, 10 pages total.	<input type="checkbox"/>
44	IBM, "WordPad z50 Cradle Option - User's Guide," 1990, pages 1-18.	<input type="checkbox"/>
45	IBM MOBILE SYSTEMS, "WorkPad z50 Mobile Companion (2608-1Ax), Hardware Maintenance Manual," March 1999, pages 1-77.	<input type="checkbox"/>
46	KEVIN JOST, Automotive Engineering International, "The car as a mobile-media platform," May 1998, pages 49-53.	<input type="checkbox"/>
47	MICROSOFT CORPORATION, "Windows CE 2.1 Technical Articles, Developing Applications for an Auto PC," June 1999, pages 1-13.	<input type="checkbox"/>
48	INFOGATION CORPORATION, "InfoGation Corp. Introduces Software Applications for Next-Generation Smart Car Systems," January 8, 1998, pages 1-2.	<input type="checkbox"/>
49	BUSINESS WIRE, "ORA Electronics Announces USB-Compatible TelCar Mark VII Begins Shipping First Quarter of 1999," January 6, 1999, pages 1-2.	<input type="checkbox"/>
50	ORA USA, "ORA Electronics Patents Telcar Cellular Telephone Interface," July 6, 1998, pages 1-2.	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

If you wish to add additional non-patent literature document citation information please click the Add button			
<b>EXAMINER SIGNATURE</b>			
Examiner Signature		Date Considered	
<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>			
<p><sup>1</sup> See Kind Codes of USPTO Patent Documents at <a href="http://www.USPTO.GOV">www.USPTO.GOV</a> or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.</p>			



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-06-08
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320	
	Filing Date		2008-01-16	
	First Named Inventor	Russell W. White, et al.		
	Art Unit	2617		
	Examiner Name	Erika A. Gary		
	Attorney Docket Number	AFF.004C5US		

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	WO 00/79372 A1	WO		2000-12-28	Colvin, David S.		<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		12015320
Filing Date		2008-01-16
First Named Inventor	Russell W. White, et al.	
Art Unit	2617	
Examiner Name	Erika A. Gary	
Attorney Docket Number	AFF.004C5US	

1	HEWLETT PACKARD, "HP Jornada 430/430se Palm-Size PC, User's Guide," Edition 1, 1999, pages 1-151.	<input type="checkbox"/>
2	NEC, "NEC MobilePro 750C, User's Guide," 1998, pages 1-83.	<input type="checkbox"/>
3	MICROSOFT, "Palm PC User's Guide," Microsoft Windows CE, pages 1-39.	<input type="checkbox"/>
4	PALM PC USER'S GUIDE, "Chapter 6, Information Backup and Exchange," pages 69-148	<input type="checkbox"/>
5	MPMan, "User's Guide, The Portable MP 3player using the flash memory and SmartMedia card," 1997, pages 1-35.	<input type="checkbox"/>
6	Cover Sheet, www.mpman.com, 1 page.	<input type="checkbox"/>
7	Smart Media Card Slot Diagram, 1 page.	<input type="checkbox"/>
8	MP Man F20 Logo, 1 page.	<input type="checkbox"/>
9	MPMan, "User's Guide, The portable MP3 player using the flash memory with variety features including the voice recording, phone/memo browsing, etc.," 1997, pages 1-47.	<input type="checkbox"/>
10	Smart Media card diagram and install instructions, pages 1-4.	<input type="checkbox"/>
11	ANAND LAL SHIMPI, Empeg, Ltd., "MP3 meets Car Audio: Empeg Mark II in-dash Car MP3 Player," September 18, 2000, pages 1-17.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

12	PETER CLARKE, EE Times, "Engineers drive craze for MP3 audio players," February 5, 1999, pages 1-4.	<input type="checkbox"/>
13	RIO CAR DOT ORG GEEK GUIDE, "empeg car Mk. 1," February 21, pages 1-4.	<input type="checkbox"/>
14	HUGO FIENNES, RIO CAR DOT ORG GEEK GUIDE, "MP3 Mobile," February 21, pages 1-4.	<input type="checkbox"/>
15	RIO CAR DOT ORG, "Frequently Asked Questions," pages 1-16.	<input type="checkbox"/>
16	DIAMOND MULTIMEDIA SYSTEMS, INC., "Rio PMP300 User's Guide," 1998, pages 1-27.	<input type="checkbox"/>
17	STEPHEN J. BUCKLEY, et al., "The Car as a Peripheral, Adapting a Portable Computer to a Vehicle Intranet," SAE Technical Paper Series, 98C030, October 19-21, 1998, pages 1-14.	<input type="checkbox"/>
18	"The MP3 Mobile," April 8, 1998, pages 1-13.	<input type="checkbox"/>
19	12-Volt Business & Technology Solutions, AutoMedia, "How the Intelligent Data Bus will impact the way you do business," November 1998, pages 1-2.	<input type="checkbox"/>
20	Press Release, "Creative Labs Launches Nomad Portable MP3 Players," April 15, 1999, pages 1-5.	<input type="checkbox"/>
21	BMW, "Betriebsanleitung Bordmonitor mit Navigation und TV," 1995, pages 1-82.	<input type="checkbox"/>
22	BMW, "Owner's Manual, On-board monitor with navigation system," 1996, pages 1-81.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	12015320
Filing Date	2008-01-16
First Named Inventor	Russell W. White, et al.
Art Unit	2617
Examiner Name	Erika A. Gary
Attorney Docket Number	AFF.004C5US

23	TRANSPERFECT/TRANSLATIONS, "True and accurate translation of the 1995 BMW Manual, from German into English," August 16, 2005, pages 1-80.	<input type="checkbox"/>
24	HEINZ SODEIKAT, "EURO-SCOUT is facing the German 1994 Market," 1994, pages 551-556.	<input type="checkbox"/>
25	Pictures of car navigation systems in a car dashboard, pages 1-11.	<input type="checkbox"/>
26	BMW, "The BMW On-Board Navigation System - Technology Takes a Remarkable Turn," 2005, pages 1-9.	<input type="checkbox"/>
27	OLDSMOBILE, "1991 Toronado/Trofeo User's Guide," 1991, pages 1-41.	<input type="checkbox"/>
28	YEPP, "Digital Sounds - yepp - YP-E32/E64102-291," October 23, 1999, pages 1-46	<input type="checkbox"/>
29		<input type="checkbox"/>
30	U.S. Provisional Application No. 60/167179, entitled "System, Method, And Device for Playing Recorded Music on a Wireless Communications Device," by Devon A. Rolf, filed November 23, 1999, pages 1-48.	<input type="checkbox"/>
31	MICROSOFT, "Getting Started, Microsoft Windows 98, For distribution with a new PC only," 1998, pages 1-145.	<input type="checkbox"/>
32	PR NEWSWIRE, "Alpine Announces Fall Release of Interface Adapter That Enables iPod Control and Playback from In-Vehicle Sound Systems," July 7, 2004, pages 1-2..	<input type="checkbox"/>
33	HA-YOUNG PARK, The Customer Times, "Portable Computer Music, MP3 File and MP3 Player rise as the Next Generation Audio Format," May 1999, pages 1-2.	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		12015320
	Filing Date		2008-01-16
	First Named Inventor	Russell W. White, et al.	
	Art Unit		2617
	Examiner Name	Erika A. Gary	
	Attorney Docket Number		AFF.004C5US

	34	"MP3 Players Introduced in the Korean IT Magazines," 1998-1999, pages 1-15.	<input type="checkbox"/>
	35	MPMan, "MP-F20, User's Guide, Portable MP3 player using the flash memory and a Memory card," [ages 1-16.	<input type="checkbox"/>
	36	PR NEWSWIRE ASSOCIATION, INC., "Delphi's Communiport(R) Technology for Tomorrow, Today Demonstrated at Frankfurt Auto Show," September 15, 1999, pages 1-8.	<input type="checkbox"/>
	37	CRAIN COMMUNIATIONS, INC., "Products," Agilent Technologies Press Release, February 21, 2000, pages 1-6.	<input type="checkbox"/>
	38	THE WASHINGTON TIMES, LLC, John Hanan, Dallas Morning News, "Cars add computer, audiovisual gear," January 14, 2000, pages 1-3.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

Examiner Signature	Date Considered
--------------------	-----------------

**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	12015320
	Filing Date	2008-01-16
	First Named Inventor	Russell W. White, et al.
	Art Unit	2617
	Examiner Name	Erika A. Gary
	Attorney Docket Number	AFF.004C5US

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. Rozman/	Date (YYYY-MM-DD)	2009-06-08
Name/Print	Mark J. Rozman	Registration Number	42117

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平10-103966

(43) 公開日 平成10年(1998) 4月24日

(51) Int.Cl.*	識別記号	F I	
G 0 1 C 21/00		G 0 1 C 21/00	A
B 6 0 R 21/00	6 3 0	B 6 0 R 21/00	6 3 0
// B 6 0 R 19/48		19/48	L
C 0 8 C 1/16		C 0 8 C 1/16	C

審査請求 未請求 請求項の数 3 O L (全 7 頁)

(21) 出願番号 特願平8-253840  
 (22) 出願日 平成8年(1996) 9月30日

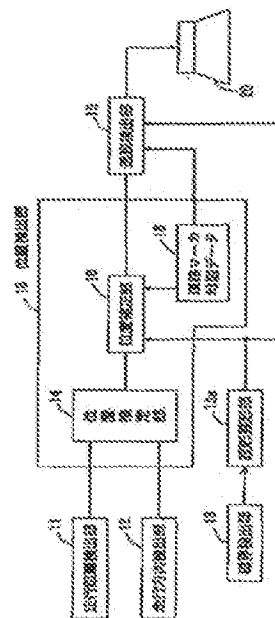
(71) 出願人 000002130  
 住友電気工業株式会社  
 大阪府大阪市中央区北浜四丁目5番33号  
 (72) 発明者 畑中 健一  
 大阪市此花区島屋一丁目1番9号 住友電  
 気工業株式会社大阪製作所内  
 (74) 代理人 弁護士 亀井 弘壽 (外1名)

(54) 【発明の名称】 車線逸脱警告装置

(57) 【要約】

【課題】 道路マーカの座標データ列を記憶するとともに、自律航法を併用することにより、車線の逸脱を的確に判断し警告する。

【解決手段】 自律航法により車両の位置を推定する車両位置推定部14と、道路マーカの座標データ列を記憶した道路マーカ地図メモリ15と、車両の位置を道路マーカの並ぶライン上に投影することにより、車両のラインからのずれdを求め、このずれdを閾値d<sub>0</sub>と比較することによって、車線逸脱を検出する逸脱検出部19と、逸脱警告部20とを備える。





【特許請求の範囲】

【請求項1】 道路に道路マーカを布設し、この道路マーカを検出することにより、車両の道路マーカからのずれを検出して車線からの逸脱を警告する装置であって、自律航法により車両の位置を推定する車両位置推定手段と、道路マーカの座標データ列を記憶した道路マーカ地図メモリと、

車両の位置を道路マーカの並ぶライン上に投影することにより、車両のラインからのずれdを求め、このずれdを閾値d<sub>0</sub>と比較することによって、車線逸脱を検出する逸脱検出手段と、逸脱警告手段とを備えることを特徴とする車線逸脱警告装置。

【請求項2】 道路マーカを検出するマーカ検出手段と、マーカ検出手段により検出された道路マーカと、座標データメモリに記憶されている道路マーカとの対応付けをし、車両位置推定手段により推定された車両の位置に基づいて、前記マーカ検出手段により検出された道路マーカの推定位置を算出し、この道路マーカの推定位置と、座標データメモリに記憶されている道路マーカの座標データとを比較することにより、自律航法により推定された車両の位置を補正する位置補正手段とをさらに備えることを特徴とする請求項1記載の車線逸脱警告装置。

【請求項3】 前記閾値d<sub>0</sub>は、次の(a)～(d)のいずれか又はこれらの組合せの基準に従って設定されるものであることを特徴とする請求項1記載の車線逸脱警告装置。

- (a) 車両の幅が広いと閾値d<sub>0</sub>を小さくする。
- (b) 車線幅が狭いと閾値d<sub>0</sub>を小さくする。
- (c) 車両の走行方向と磁気ネイルの並んでいるラインの方向との差であるヨー角φが大きいと閾値d<sub>0</sub>を小さくする。
- (d) 車線を規定する白線からガードレール又は側壁までの距離が短いと閾値d<sub>0</sub>を小さくする。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、道路に道路マーカを布設し、この道路マーカを検出することにより車両の道路マーカからのずれを検出して車線からの逸脱を警告する車線逸脱警告装置に関するものである。

【0002】

【従来の技術】 道路と車両との通信又は車両と車両との通信により、車両の車線位置、走行距離、速度、加速度、他車両との車間距離等を情報として採り入れ、この情報に基づいてドライバに警告したり、車両のブレーキ操作、アクセル操作、ステアリング操作等の指令を発生し運転装置に伝えたりする自動運転システムが知られている。

【0003】 このような自動運転システムにおいては、車両の走行距離（所定の基準点からの相対的な走行距

離）、車両が道路のどの車線を走行しているか、車線を外れていないか、あるいは車線のどの部分（車線の中央、左寄り又は右寄り）を走行しているか、車線に沿って真っ直ぐに走っているか若しくは斜めに横切っているか等を正確に認識することが重要である。

【0004】 従来では、車載カメラを通して道路の状態を撮影し画像認識することにより、走行位置を判定する技術は提案されているが（例えば特開平7-77431号公報参照）、カメラや画像処理装置が必要になり、判定アルゴリズムが複雑になるため、より簡易に走行位置を認識することのできる装置が望まれていた。そこで、道路面に道路の方向に沿って磁気ネイルを埋め込み、車体に設けた磁気センサによってこの磁気ネイルを検出することにより、車両の走行距離や車体の横方向の変位を検出するシステムが提案されている（1994年9月13日米国特許第5,347,456号、1992年5月14日PCT国際公報WO 92/08176号参照）。

【0005】 さらに、磁気テープを道路に貼り付け、磁気テープから生ずる磁界を利用して車両の位置を検出するシステムも提案されている。これらの磁気ネイル、磁気テープ等、車両の走行位置を検出するため道路に設けられた設備を「道路マーカ」と総称することとする。自動運転システムを搭載した車両は、前記のように道路マーカを検出することによって、車両の走行位置を知ることができる。

【0006】

【発明が解決しようとする課題】 ところで、車線を外れていないか、あるいは車線のどの部分を走行しているか、車線に沿って真っ直ぐに走っているか若しくは斜めに横切っているか等を正確に認識するためには、車両の道路マーカからのずれを認識する必要がある。最も普通に考えられる方法は、道路マーカを検出する検出素子を複数個、車両のバンパーの底部等に並べ、いずれの検出素子が道路マーカを検出しているかにより、道路マーカからのずれを算出する方法である。

【0007】 例えば、バンパーの底部の左右と真中に検出素子を取付け、真中に検出素子が道路マーカを検出しているときは車線の中央を走行しているとし、左の検出素子が道路マーカを検出しているときは車線の右寄りを走行しているとし、右の検出素子が道路マーカを検出しているときは車線の左寄りを走行しているとする。しかし、前記の検出方法では、検出素子の取付け長さを超えて車線を逸脱したときは、道路マーカからのずれが分からなくなる。しかも、検出素子の取付け長さは車体の幅に限定される。

【0008】 一方、車両の走行距離検出信号、走行方向検出信号に基づいて車両の推定位置を算出する自律航法が知られている。そこで、本発明は、道路マーカの座標データ列を記憶するとともに、自律航法を併用することにより、車線の逸脱を的確に判断し警告することができ

る車線逸脱警告装置を実現することを目的とする。

【0009】

【課題を解決するための手段】本発明の車線逸脱警告装置は、自律航法により車両の位置を推定する車両位置推定手段と、道路マーカの座標データ列を記憶した道路マ

ーカ地図メモリと、車両の位置を道路マーカの並ぶライン上に投影することにより、車両のラインからのずれdを求め、このずれdを閾値d<sub>1</sub>と比較することによって、車線逸脱を検出する逸脱検出手段と、逸脱警告手段とを備えるものである(請求項1)。  
【0010】この構成によれば、自律航法により求められた車両の位置を道路マーカの並ぶライン上に投影することにより、車両のラインからのずれdを求めることができる。このずれdが、閾値d<sub>1</sub>以上であれば、車線逸脱を検出し警告することができる。本発明の車線逸脱警告装置は、前記請求項1記載の要素に加えて、道路マーカを検出するマーカ検出手段と、マーカ検出手段により検出された道路マーカと、座標データメモリに記憶されている道路マーカとの対応付けをし、車両位置推定手段により推定された車両の位置に基づいて、前記マーカ検出手段により検出された道路マーカの推定位置を算出し、この道路マーカの推定位置と、座標データメモリに記憶されている道路マーカの座標データとを比較することにより、自律航法により推定された車両の位置を補正する位置補正手段とをさらに備えるものである(請求項2)。

【0011】この構成によれば、自律航法により求められた車両の位置を、道路マーカ地図メモリに記憶された道路マーカの座標データ列に基づいて、正確に補正することができる。したがって、車両のラインからのずれdを正確に求めることができる。前記閾値d<sub>1</sub>は、請求項3記載の(a)~(d)のいずれか又はこれらの組合せの基準に基づいて設定することができる(請求項3)。

【0012】(a)~(d)の基準を採用する理由は次のとおりである。

- (a) : 車両の幅が広いと車線を逸脱しやすいので、閾値d<sub>1</sub>を小さくする。
- (b) : 車線幅が狭いと車線を逸脱しやすいので、閾値d<sub>1</sub>を小さくする。
- (c) : ヨー角φが大きいときは、ラインから離れるスピードが速いことを意味するので、早めに警告を出さないと走行上危険であるから、閾値を小さく設定する。ヨー角φが小さいときは、ハンドルの切り返しも容易なので警告が遅くともよいと考え閾値を大きめに設定する。
- (d) : 車線を規定する白線からガードレール又は側壁までの距離が短いと、早めに警告を出さないと衝突の危険性があるので、閾値d<sub>1</sub>を小さめにする。この距離が比較的長いときは閾値d<sub>1</sub>を大きめにする。

【0013】

【発明の実施の形態】以下、本発明の実施の形態を、添付図面を参照しながら詳細に説明する。図1は、道路マ

ーカとして車線の真中に磁気ネイルを埋め込んだ道路を低空から見た図である。磁気ネイルは、直径3cm、長さ10cm程度の強磁性体の釘からなるものである。  
【0014】磁気ネイルは、N極とS極とが、所定ピッチL(例えば1~2m)を周期として所定のコード(例えば1をN極、-1をS極とすれば-1, 1, -1, 1, ...)に従って配列される。なお極性は、地表面に向いている磁界の極性を意味する。図2は、車線逸脱警告装置を含む車載装置を示すブロック図である。車載装置は、走行距離検出部11と、走行方向検出部12と、両検出部11, 12から出力される走行距離検出信号、走行方向検出信号に基づいて自律航法により推定位置を算出する位置推定部14と、道路に埋め込まれた磁気ネイルの磁界を検出するための磁界検出部13及び波形整形部13aと、磁気ネイルにより構成されるコードや座標データ列を格納した道路マーカ地図メモリ15と、磁気ネイルのコードを検出し、これと道路マーカ地図メモリ15に記憶されている座標データ等とを比較して、位置推定部14で検出された推定位置を補正する位置補正部16と、逸脱検出部19と、逸脱警告部20とを備えている。

【0015】これら位置推定部14、道路マーカ地図メモリ15、位置補正部16により位置検出部18を構成する。さらに詳細に説明すると、前記走行距離検出部11として、例えば車輪速センサが使用可能である。この車輪速センサは、車輪の回転を検出する磁気センサを有し、磁気センサからの出力正弦波信号の波数をカウンタによりカウントすることにより車輪の回転数を、カウンタから出力されるカウントデータに対して、乗算器により車輪の外周を示す所定の定数を乗算することにより検出周期Δt(周期番号をnで表す。)当りの走行距離を検出するものである。なお、それ以外に、ドップラシフト等に基づいて車両の走行速度を検出し、積分することにより走行距離を検出する構成の車速センサ等、従来公知の構成のものも使用可能である。

【0016】前記走行方向検出部12には、例えば、単位時間当りの回転角度データを出力するジャイロが使用可能である。このジャイロの例として、振動ジャイロ、光ファイバジャイロ、差動型車輪速センサがあげられる。また、地磁気の水平分力を検出する地磁気センサを使用することもでき、地磁気センサと前記ジャイロとの組合せを採用することも可能である。

【0017】前記磁界検出部13は、例えばバンパーの底部に設けられ、図3に示すように、磁気抵抗素子1を細長いゴム状の永久磁石3の上に複数個並べ、それぞれから出力電圧を取り出す回路構成としている。磁気抵抗素子1は、磁界を加えることによって電気抵抗が変化する素子であり、InSb, GaAs, InAs等の半導

体材料がよく用いられる。本実施の形態では、基板の上に真空蒸着法によりInSb薄膜を形成した素子を用いるが（例えばトヨコム東洋通信機株式会社製の「磁気抵抗素子TMS-Dシリーズ」が使用可能である）、これ以外に、バルク（単結晶）型の磁気抵抗素子を使用してもよい。

【0018】道路に沿って埋め込まれた磁気ネイルの境界を、磁気検出部12のいずれかの磁気抵抗素子が検出すれば、その変化により磁気ネイルのコードを読み取ることができる。また、磁気検出部13のいずれの磁気抵抗素子が検出しているのを知ることによって、車両の中心線と磁気テープとの横方向の相対距離（以下「L」と書く）を検出することもできる。

【0019】道路マーカ地図メモリ15は、磁気ネイルにより構成されるコードや位置情報が格納されているものである。ここで、前記道路マーカ地図メモリ15の記憶構造は、表1のようになる。

【0020】

【表1】

路線名、区間名

地点番号	磁気ネイル符号	相対座標
0	S	(0, 0)
1	N	(x <sub>1</sub> , y <sub>1</sub> )
2	S	(x <sub>2</sub> , y <sub>2</sub> )
3	N	(x <sub>3</sub> , y <sub>3</sub> )
⋮	⋮	⋮
⋮	⋮	⋮

【0021】道路マーカ地図メモリ15は、高速道路の路線、区間ごとに対応して、地点の番号、埋め込まれた磁気ネイルのその地点の極の区別（「磁気ネイルの符号」という）、東向きをx方向とし北向きをy方向とした相対座標を記憶している。例えば、出発点となる地点の番号は0、その地点に埋め込まれた磁気ネイルの符号はS、地点の相対座標は(0, 0)となっている。

【0022】位置推定部14は、走行距離検出部11から出力される距離データΔD、を取り込むとともに、走行方向検出部12から出力される角速度データω、を取り込み、前回の角速度ω<sub>n-1</sub>と今回の角速度ω、との平均Ω、

$$\Omega = (\omega_{n-1} + \omega) / 2$$

を求め、これに周期Δtをかけ、前回の方位θ<sub>n-1</sub>に加算することにより今回の方位θ、を求め、

$$\theta = \Omega \cdot \Delta t + \theta_{n-1}$$

さらに、前回の方位θ<sub>n-1</sub>と、今回の方位θ、との平均\*

$$x_n = x_{n-1} + (x_n - x_{n-1}) (T_n - T_{n-1}) / \Delta t$$

\*方位θ、を求め、

$$\theta_n = (\theta_n + \theta_{n-1}) / 2$$

そしてこの平均方位θ、に基づいて、前記距離ΔD、の東西方向成分Δx、(=ΔD、×cosθ、)、および南北方向成分Δy、(=ΔD、×sinθ、)を検出し、前回の推定位置データ(x<sub>n-1</sub>, y<sub>n-1</sub>)に対して前記各成分Δx、, Δy、を加算することにより、現在の推定位置(x<sub>n</sub>, y<sub>n</sub>)を検出する。

$$[0024] x_n = x_{n-1} + \Delta x,$$

$$10 \quad y_n = y_{n-1} + \Delta y,$$

なお、推定位置の初期位置(x<sub>0</sub>, y<sub>0</sub>)を決める必要があるが、この初期位置(x<sub>0</sub>, y<sub>0</sub>)は、出発点となる磁気ネイルを検出した時点の車両位置を、例えば(0, 0)に設定してそれを採用すればよい。

【0025】位置補正部16は、磁気抵抗素子の取付け長さを超えて車線を逸脱していないことを前提として、この推定位置(x<sub>n</sub>, y<sub>n</sub>)を、道路マーカ地図メモリ15に格納された相対座標に基づいて補正する。この補正方法を説明すると、まず、コース出発点を特定する。ここで、コース出発点の特定は、次のようにして行う。車両は、高速道路に入る前に選信手段、例えばビーコンから、当該高速道路の路線名、区間名の情報を受ける。ナビゲーション装置を搭載していれば、ナビゲーション装置から路線名、区間名の情報を受けてもよい。この情報により、道路マーカ地図メモリ15に記憶されているデータ群の記憶場所を特定することができる。

【0026】高速道路の入口と出口との間に磁気ネイルが埋め込まれており、車両が当該入口から高速道路に入ると、最初は特定の符号（例えばS極）が現れ、その後両符号が所定のコードに従って現れる。この最初の特定の符号を初めて検出した地点を出発点とする。その後、磁気ネイルにより構成されるコードを読み取ることにより、相対座標を知ることができる。

【0027】また、例えばコードが-1, 1, -1, 1, …といった単純なものであれば、検出した符号をカウントするだけで、何番目の地点であるかが分かるので、表1を参照して相対座標を知ることができる。位置補正部16は前記コードの読み取り結果に基づき、道路マーカ地図メモリ15を参照して相対座標（以下「(x<sub>n</sub>, y<sub>n</sub>)」と書く）を読み出す。

【0028】次に、当該時点の車両推定位置(x<sub>n</sub>, y<sub>n</sub>)を求め、一般に、当該車両推定位置(x<sub>n</sub>, y<sub>n</sub>)は、図4に示すようにいずれかの検出周期Δtの始めの車両推定位置(x<sub>n-1</sub>, y<sub>n-1</sub>)と終わりの車両推定位置(x<sub>n</sub>, y<sub>n</sub>)との間に存在するので、車両推定位置(x<sub>n</sub>, y<sub>n</sub>)は、検出周期Δtの始めの時刻T<sub>n-1</sub>と、終わりの時刻T<sub>n</sub>と、符号が検出された時刻T<sub>n</sub>とを使えば、

$$y_s = y_{s0} + (y_s - y_{s0}) (T_s - T_{s0}) / \Delta t$$

で求められる。

【0029】そして、当該車両推定位置  $(x_s, y_s)$  及び前記相対距離  $L$  に基づいて推定される相対座標  $(x', y')$  と、道路マーカ地図メモリ15に記憶されている相対座標  $(x_s, y_s)$  との関係を求める。図5は、車両推定位置  $(x_s, y_s)$  と推定位置

$$\begin{aligned} x' &= x_s - L \sin \theta, \\ y' &= y_s + L \cos \theta. \end{aligned}$$

で表される。

【0030】ここで、前記(1)式及び(2)式で示された推定位置  $(x', y')$  と、道路マーカ地図メモリ15から読みだした磁気ネイルの座標  $(x_s, y_s)$  とを比較し、その差を求める。

$$\begin{aligned} \Delta x &= x_s - x', \\ \Delta y &= y_s - y'. \end{aligned}$$

この差  $\Delta x, \Delta y$  が車両推定位置  $(x_s, y_s)$  の補正量となる(以下、添字  $n$  を省略して、推定位置  $(x, y)$  と書く)。すなわち、車両推定位置  $(x, y)$  を、  
 $x = x + \Delta x$   
 $y = y + \Delta y$

として補正することができる。補正された推定位置  $(x, y)$  は、GPS(Global Positioning System)等と比べて極めて精度が高い。

【0031】前述した位置補正部16の処理は、磁気抵抗素子の取付け長さを超えて車線を逸脱していないことを前提としていた。もし、磁気抵抗素子の取付け長さを超えて車線を逸脱すれば、車両の中心線と磁気テープとの横方向の相対距離  $L$  が求まらないので、前述した処理を行うことはできない。この場合は、位置推定部14から出力される車両の推定位置  $(x_s, y_s)$  をそのまま車両の推定位置  $(x, y)$  として採用することになる。

【0032】次に、車線からの逸脱を警告する方法について説明する。この警告の判断は、車両が、磁気抵抗素子の取付け長さを超えて車線を逸脱しても、逸脱していても行うことができる(逸脱していないのに警告するのは無用という気もするが、警告しきい値は任意に設定することができる)。まず、逸脱検出部19は、車両推定位置  $(x, y)$  を磁気ネイルの並んでいるライン上の位置へ投影する。

【0033】図6は、最近検出された磁気ネイルの座標  $(x_{s0}, y_{s0})$ 、次の番号に対応する磁気ネイルの座標  $(x_{s1}, y_{s1})$  及び推定位置  $(x, y)$  を示す図である。ライン上の補正すべき位置を  $(x', y')$  と書くことにすると、 $(x', y')$  は、推定位置  $(x, y)$  からラインに垂線を引くことにより求められる。

$$\begin{aligned} x' &= x_{s0} + (x_{s1} - x_{s0}) R \\ y' &= y_{s0} + (y_{s1} - y_{s0}) R \end{aligned}$$

ここで、 $R$ は、

$(x', y')$  との位置関係を表した図であり、車両の走行方向は  $\theta$  で表されている。方向  $\theta$  の符号は反時計回りを正とし、相対距離  $L$  の符号は車両の左側に磁気テープ又は誘導線を検出したときを正とする。同図に示した関係より、推定位置  $(x', y')$  は、 $L$  と  $\theta$  とを用いて

$$(1)$$

$$(2)$$

$$R = \frac{(x_s - x_{s0})(x - x_{s0}) + (y_s - y_{s0})(y - y_{s0})}{(x_s - x_{s0})^2 + (y_s - y_{s0})^2}$$

で定義される。

【0034】このライン上への投影位置  $(x', y')$  と、車両推定位置  $(x, y)$  との距離  $d$

$$d = \text{SQRT} \{ (x - x')^2 + (y - y')^2 \}$$

が車両のラインからのずれになる。逸脱検出部19は、このずれ  $d$  が閾値  $d_0$  よりも大きいと判断すれば、逸脱警告部20から音声により警告を出す。勿論、音声で警告を出すのに代えて、ディスプレイ(図示せず)に警告を表示させてもよい。また、警告を出すのと同時に、ブレーキ操作、アクセル操作、ステアリング操作等を行うアクチュエータに指令信号を与えてもよい。

【0035】警告の解除は、ウィンカー操作があったとき、ステアリング操作があったときとする。また、ウィンカー操作、ステアリング操作に伴ってラインからのずれ  $d$  が閾値  $d_0$  を越えたときは、初めから警告をしないようにしてもよい。なお、前記閾値  $d_0$  は、例えば、車両の幅、車線幅を考慮して選ぶことができる。この場合、車両の幅は、当該車両に固有の値として保有しておけばよく、車線幅は、高速道路の路線、区間ごとに対応して、データとして道路マーカ地図メモリ15に格納しておけばよい。

【0036】例えば、車線幅3.5m、車両の幅1.8mのときは、閾値  $d_0$  を0.85mに設定する。閾値  $d_0$  の設定をすると、図7に示すように、車両の走行方向と磁気ネイルの並んでいるラインとのヨ一角度  $\phi$  を考慮してもよい。ここで、ヨ一角度  $\phi$  は、道路マーカからのずれ  $d$  の時間変化に基づいて算出することができる。ヨ一角度  $\phi$  が大きいときは、ラインから離れるスピードが速いことを意味するので、閾値を小さく設定する。ヨ一角度  $\phi$  が小さいときは、ハンドルの切り返しも容易なので警告が遅くなってもよいと考え閾値を大きめに設定する。

【0037】具体的にいうと、一般に車両が直線維持走行を行っているときは、ヨ一角度  $\phi$  は  $\pm 1.5^\circ$  以内、車線変更を行うときはヨ一角度  $\phi$  は  $3^\circ \sim 5^\circ$  程度になる。したがって、ヨ一角度  $\phi$  が  $1.5^\circ$  未満のときは車線の境界を示す白線ぎりぎりまで警告を与え、ヨ一角度  $\phi$  が  $1.5^\circ$  以上  $3^\circ$  未満のときは白線の30cm内側で警告を与え、ヨ一角度  $\phi$  が  $3^\circ$  以上のときは白線の50cm内側で

警告を与えるようにする。

【0038】また、閾値d、を車両の幅、車線幅だけでなく、ガードレール又は側壁までの距離を考慮して決定することもできる。この場合、白線とガードレール又は側壁までの距離を道路マーカ地図メモリ15に格納しておき、この距離が比較的短いときは閾値d、を小さめにし、この距離が比較的長いときは閾値d、を大きめにする。

【0039】さらに、ドライバの運転の癖によって、閾値を変えることもできる。ドライバによっては、左寄りを走行する人、右寄りを走行する人がいる。この場合は、過去の走行内容を学習しておき、右側と左側とで閾値を変える。また、車両の性能等により、左右のぶれが大きい場合があるので、この場合も、過去の走行内容を学習しておき、左右のぶれが大きいときは閾値を小さめに設定する。

【0040】

【発明の効果】以上のように本発明の車線逸脱警告装置によれば、自律航法により求められた車両の位置を道路マーカの並ぶライン上に投影することにより、車両のラインからのずれdを求めることができる。このずれdに基づいて車線の逸脱を的確に判断し警告することができる。

【0041】特に、請求項2記載の発明であれば、自律航法により求められた車両の位置を、道路マーカ地図メモリに記憶された道路マーカの座標データ列に基づいて、正確に補正することができ、車両のラインからのずれdを正確に求めることができる。

【図面の簡単な説明】

【図1】道路マーカとして、車線の真中に磁気ネイルを埋め込んだ道路を低空から見た図である。

【図2】車線逸脱警告装置を含む車載装置を示すブロック図である。

\*【図3】磁気抵抗素子を細長いゴム状の永久磁石の上に複数個並べ、それぞれから出力電圧を取り出す回路構成を示す図である。

【図4】いずれかの検出周期Δtの始めの車両推定位置(x<sub>0</sub>, y<sub>0</sub>)と終わりの車両推定位置(x<sub>1</sub>, y<sub>1</sub>)との間の車両推定位置(x, y)の算出方法を説明する図である。

【図5】車両推定位置(x, y)と磁気ネイルの座標(x<sub>0</sub>, y<sub>0</sub>)との位置関係を説明する図である。

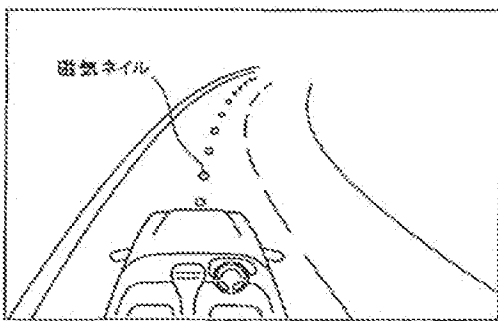
【図6】車両推定位置(x, y)を磁気ネイルの並んでいるライン上の位置へ投影する方法を説明する図である。

【図7】車両推定位置(x, y)を磁気ネイルの並んでいるライン上の位置へ投影する場合にヨー角θを考慮して投影する方法を説明する図である。

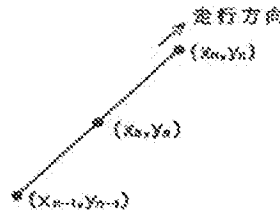
【符号の説明】

- 1 磁気抵抗素子
- 2 抵抗素子
- 3 永久磁石
- 11 走行距離検出部
- 12 走行方向検出部
- 13 磁界検出部
- 13a 波形整形部
- 14 位置推定部
- 15 道路マーカ地図メモリ
- 16 位置補正部
- 17 アンテナ
- 17a 受信復調部
- 17b ループコイル
- 17c ループコイル
- 17d 90° 移相器
- 17e ハイブリッド

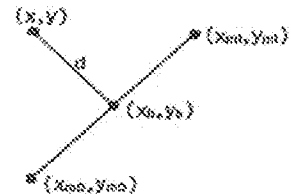
【図1】



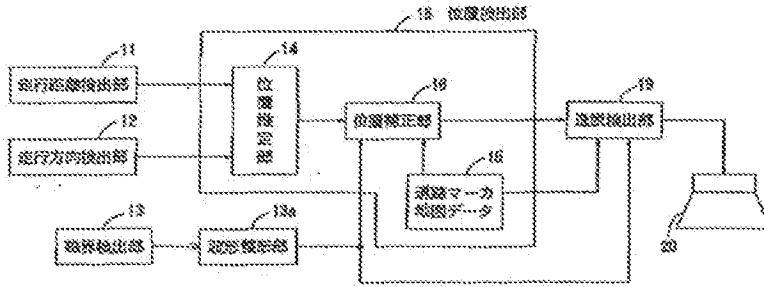
【図4】



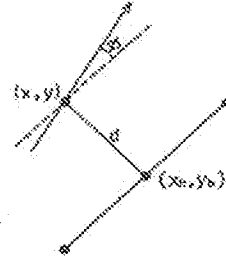
【図6】



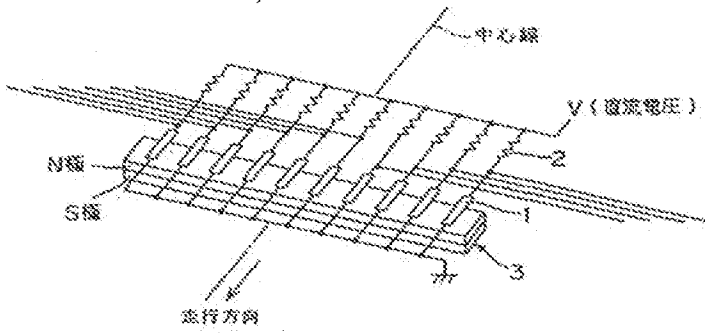
【圖2】



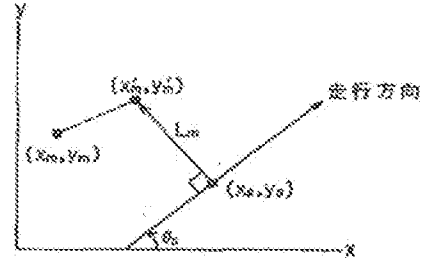
【圖7】



【圖3】



【圖5】



# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-103966

(43)Date of publication of application : 24.04.1998

(51)Int.Cl.

G01C 21/00  
 B60R 21/00  
 // B60R 19/48  
 G08G 1/16

(21)Application number : 08-258940

(71)Applicant : SUMITOMO ELECTRIC IND LTD

(22)Date of filing : 30.09.1996

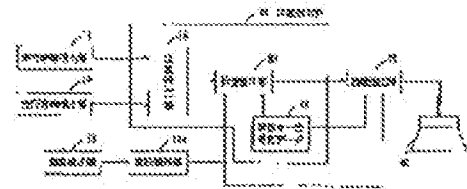
(72)Inventor : HATANAKA KENICHI

## (54) DEVICE FOR WARNING DEVIATION FROM LANE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a device for warning deviation from a lane which accurately discriminates the deviation of a vehicle from the lane and warn the driver of the vehicle of the deviation by storing the coordinate data train of road markers and, at the same time, using self-contained navigation.

SOLUTION: A device for warning deviation from a lane is provided with a vehicle position estimating section 14 which estimates the location of a vehicle by self-contained navigation, a road marker map memory 15 which stores the coordinate data train of road markers, a deviation detecting section 19 which detects the deviation of the vehicle from the lane by finding the deviation (d) of the vehicle from a road marker arranging line by projecting the location of the vehicle upon the arranging line and comparing the deviation (d) with a threshold d0, and a deviation warning section 20.



JAPANESE

[JP,10-103966,A]

---

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS



---

CLAIMS

---

[Claim(s)]

[Claim 1] By laying a road marker on a road and detecting this road marker A car location presumption means to detect the gap from the road marker of a car and to warn of deviation from a lane and to be equipment and to presume the location of a car with autonomous navigation, By projecting the road marker map memory which memorized a road marker's coordinate data train, and the location of a car on Rhine where a road marker stands in a line It asks for the gap  $d$  from Rhine of a car, and is a threshold  $d_0$  about this gap  $d$ . Lane deviation warning device characterized by having a deviation detection means to detect lane deviation by comparing, and a deviation warning means.

[Claim 2] With a marker appearance means to detect a road marker, and the road marker detected by the marker appearance means Carry out matching with the road marker memorized by coordinate data memory, and it is based on the location of the car presumed by the car location presumption means. By computing a road marker's estimated position detected by said marker appearance means, and comparing this road marker's estimated position with a road marker's coordinate data memorized by coordinate data memory The lane deviation warning device according to claim 1 characterized by having further a location amendment means to amend the location of the car presumed by autonomous navigation.

[Claim 3] Said threshold  $d_0$  The following (a) - (d) Lane deviation warning device according to claim 1 characterized by being what set up in accordance with the criteria of either or these combination.

- (a) When the width of face of a car is wide, it is a threshold  $d_0$ . It is made small.
- (b) When lane width is narrow, it is a threshold  $d_0$ . It is made small.
- (c) When the yaw angle  $\phi$  which is a difference with the direction of Rhine where the transit direction of a car and the magnetic nail are located in a line is large, it is a threshold  $d_0$ . It is made small.
- (d) If the distance from the white line which specifies a lane to a guard rail or a side attachment wall is short, a threshold  $d_0$  will be made small.

---

[Translation done.]

---

## DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention lays a road marker on a road, and relates to the lane deviation warning device which detects the gap from the road marker of a car and warns of deviation from a lane by detecting this road marker.

[0002]

[Description of the Prior Art] The unattended operation system which adopts the distance between two cars with the lane location of a car, mileage, a rate, acceleration, and the other car etc. as information, it warns a driver, or generates the command of the brakes operation of a car, accelerator actuation, steering actuation, etc., and tells a driving device based on this information by the communication link with a road and a car or the communication link with a car and a car is known.

[0003] In such an unattended operation system, it is important to recognize correctly which part (the center, the left, or rightist inclinations of a lane) of a lane the mileage (relative mileage from a predetermined reference point) of a car and a car are running which lane of a road, or it has not separated from the lane or is running, whether it is running straightly along the lane, or it is crossing aslant.

[0004] Although the technique of judging a transit location by photoing and carrying out the image recognition of the condition of a road through a mounted camera was proposed in the former (for example, refer to JP,7-77431,A), since a camera and an image processing system were needed and a judgment algorithm became complicated, equipment which can recognize a transit location more simply was desired. Then, the system which detects the mileage of a car and the variation rate of the longitudinal direction of a car body is proposed by embedding a magnetic nail along the direction of a road on a path road surface, and detecting this magnetic nail with the magnetometric sensor formed in the car body (September 13, 1994 U.S. Pat. No. 5,347,456 and May 14, 1992 PCT international public presentation WO 92/08176 refer to number).

[0005] Furthermore, a magnetic tape is stuck on a road and the system which detects the location of a car using the field produced from a magnetic tape is also proposed. These magnetic nails, a magnetic tape, etc. presuppose that the facility formed in the road is named a "road marker" generically, in order to detect the transit location of a car. The car carrying an unattended operation system can know the transit location of a car by detecting a road marker as mentioned above.

[0006]

[Problem(s) to be Solved by the Invention] By the way, in order to recognize correctly which part of a lane it has not separated from the lane or is running, whether it is running straightly along the lane, or it is crossing aslant, it is necessary to recognize the gap from the road marker of a car. The approach considered most ordinarily is the approach of computing the gap from a road marker by whether which sensing element has detected the road marker by arranging in the pars basilaris ossis occipitalis of the bumper of a car etc. two or more sensing elements which detect a road marker.

[0007] For example, a sensing element is attached in right and left and the middle of the pars basilaris ossis occipitalis of a bumper, when the sensing element has detected the road marker right in the middle, it supposes that it is running the center of a lane, when the left sensing element has detected the road marker, it supposes that it is running the rightist inclinations of a lane, and when the right sensing element has detected the road marker, suppose that it is running the left of a lane. However, by the aforementioned detection approach, when it deviates from a lane exceeding the anchoring die length of a sensing element, the gap from a road marker is not clear anymore. And the anchoring die length of a sensing element is limited to the width of face of a car body.

[0008] On the other hand, the autonomous navigation which computes the estimated position of a car based on the mileage detecting signal of a car and the transit direction detecting signal is known. Then, this invention aims at realizing the lane deviation warning device which can judge deviation of a lane exactly and can warn of it by using autonomous navigation together while it memorizes a road marker's coordinate data train.

[0009]

[Means for Solving the Problem] The lane deviation warning device of this invention by projecting a car location presumption means to presume the location of a car with autonomous navigation, the road marker map memory which memorized a road marker's coordinate data train, and the location of a car on Rhine where a road marker stands in a line It asks for the gap  $d$  from Rhine of a car, and is a threshold  $d_0$  about this gap  $d$ . By comparing, it has a deviation detection means to detect lane deviation, and a deviation warning means (claim 1).

[0010] According to this configuration, it can ask for the gap  $d$  from Rhine of a car by projecting the location of the car called for by autonomous navigation on Rhine where a road marker stands in a line. This gap is a threshold  $d_0$ . If it is above, it can detect and warn of lane deviation. The lane deviation warning device of this invention to said

element according to claim 1 In addition, a marker appearance means to detect a road marker, Matching with the road marker detected by the marker appearance means and the road marker memorized by coordinate data memory is carried out. Based on the location of the car presumed by the car location presumption means, a road marker's estimated position detected by said marker appearance means is computed. This road marker's estimated position, By comparing a road marker's coordinate data memorized by coordinate data memory, it has further a location amendment means to amend the location of the car presumed by autonomous navigation (claim 2).

[0011] According to this configuration, the location of the car called for by autonomous navigation can be correctly amended based on a road marker's coordinate data train memorized by road marker map memory. Therefore, it can ask for the gap  $d$  from Rhine of a car correctly. Said threshold  $d_0$  (a) according to claim 3 - (d) It can set up based on the criteria of either or these combination (claim 3).

[0012] (a) - (d) The reason for adopting criteria is as follows.

(a) : since it will be easy to deviate from a lane if the width of face of a car is wide, it is a threshold  $d_0$ . It is made small.

(b) : since it will be easy to deviate from a lane if lane width is narrow, it is a threshold  $d_0$ . It is made small.

(c) : since it means that the speed from which the yaw angle  $\phi$  separates from Rhine when large is quick and is transit top risk if warning is not taken out a little early, set up a threshold small. When small, since the cut of a handle is also easy, the yaw angle  $\phi$  thinks that warning may become slow, and sets up a threshold more greatly.

(d) : since there is danger of a collision if warning is not taken out a little early when the distance from the white line which specifies a lane to a guard rail or a side attachment wall is short, it is a threshold  $d_0$ . It is made more smallish. When this distance is comparatively long, it is a threshold  $d_0$ . It enlarges slightly.

[0013]

[Embodiment of the invention] Hereafter, the gestalt of operation of this invention is explained to a detail, referring to an accompanying drawing. Drawing 1 is drawing which looked at the road which embedded the magnetic nail in the middle of a lane as a road marker from the low altitude. A magnetic nail consists of a nail of the diameter of 3cm, and an about [ die-length 10cm ] ferromagnetic.

[0014] N pole and the south pole make a period the predetermined pitch  $L$  (for example, 1-2m), and a magnetic nail is arranged according to a predetermined code (for example, 1 N pole and -1 the south pole then -1, 1, -1, 1, ...). In addition, a polarity means the polarity of the field suitable for earth surface. Drawing 2 is the

block diagram showing the mounted equipment containing a lane deviation warning device. The location presumption section 14 in which mounted equipment computes an estimated position with autonomous navigation based on the mileage detecting signal and the transit direction detecting signal to which it is outputted from the mileage detecting element 11, the transit direction detecting element 12, and both the detecting elements 11 and 12. The field detecting element 13 and waveform-shaping section 13a for detecting the field of the magnetic nail embedded by the road. The road marker map memory 15 which stored the code Sagitta label data stream constituted by the magnetic nail. The code of a magnetic nail is detected, the coordinate data memorized by this and the road marker map memory 15 is compared, and it has the location amendment section 16 which amends the estimated position detected in the location presumption section 14, the deviation detecting element 19, and the deviation warning section 20.

[0015] These locations presumption section 14, the road marker map memory 15, and the location amendment section 16 constitute the location detecting element 18. If it furthermore explains to a detail, for example, a wheel speed sensor is usable as said mileage detecting element 11. This wheel speed sensor has the magnetometric sensor which detects rotation of a wheel, obtains the number of rotations of a wheel by counting the wave number of the output sine wave signal from a magnetometric sensor with a counter, and detects the mileage of per detection period  $\Delta t$  (a periodic number is expressed with  $n$ .) by carrying out the multiplication of the predetermined constant which shows the periphery of a wheel with a multiplier to the count data outputted from a counter. In addition, the thing of conventionally well-known configurations, such as a speed sensor of a configuration of detecting mileage, is also usable by detecting and integrating with the travel speed of a car based on a doppler shift etc. in addition to it.

[0016] The gyroscope which outputs the angle-of-rotation data per unit time amount to said transit direction detecting element 12 is usable. As an example of this gyroscope, an oscillating gyroscope, an optical fiber gyroscope, and a differential mold wheel speed sensor are raised. Moreover, the earth magnetism sensor which detects the horizontal component of earth magnetism can also be used, and it is also possible to adopt the combination of an earth magnetism sensor and said gyroscope.

[0017] As it is prepared in the pars basilaris ossis occipitalis of a bumper and shown in drawing 3, said field detecting element 13 arranges two or more magnetic resistance elements 1 in on the permanent magnet 3 of the shape of long and slender rubber, and makes them the circuitry which takes out output voltage from each. A magnetic

resistance element 1 is a component from which electric resistance changes by adding a field, and semiconductor materials, such as InSb, GaAs, and InAs, are used well. Although the component which formed the InSb thin film with the vacuum deposition method on the substrate is used with the gestalt of this operation (for example, the "magnetic-resistance-element TMS-D series" by TOYOKOMU Toyo Communication Equipment Co., Ltd. is usable), the magnetic resistance element of a bulk (single crystal) mold may be used in addition to this.

[0018] If one magnetic resistance element of the field detecting elements 13 detects the field of the magnetic nail embedded along the road, the code of a magnetic nail can be read by the change. Moreover, the relative distance (it is written as "Lm" below) of the longitudinal direction of the center line of a car and a magnetic tape is also detectable by getting to know whether which magnetic resistance element of the field detecting element 13 has detected.

[0019] The code and positional information from which the road marker map memory 15 is constituted by the magnetic nail are stored. Here, the storage structure of said road marker map memory 15 becomes as it is shown in Table 1.

[0020]

[Table 1]

路線名、区間名

地点番号	磁気 ネイル符号	相 对 座 標
0	S	( 0, 0 )
1	N	( x <sub>1</sub> , y <sub>1</sub> )
2	S	( x <sub>2</sub> , y <sub>2</sub> )
3	N	( x <sub>3</sub> , y <sub>3</sub> )
⋮	⋮	⋮
⋮	⋮	⋮

[0021] The road marker map memory 15 corresponded for every route of a highway, and section, and the relative coordinate which made x directions distinction (it is called "the sign of a magnetic nail") of the pole of the number of a point and its point of the embedded magnetic nail and the east sense, and made the north sense the direction of y is memorized. For example, in the sign of the magnetic nail by which the number of the point used as a starting point was embedded at 0 and its point, the relative coordinate of S and a point is (0, 0).

[0022] The location presumption section 14 is distance data  $\Delta D_n$  outputted from the mileage detecting element 11. While incorporating Angular-velocity data  $\omega_n$  outputted from the transit direction detecting element 12 it incorporates.

Angular-velocity  $\omega_{n-1}$  [ last ] This angular-velocity  $\omega_n$  Average  $\omega_{n-1} + \omega_n$  are calculated, periodic  $\Delta t$  is applied to this, and it is bearing  $\theta_{n-1}$  [ last ]. It is this bearing  $\theta_n$  by adding. It asks.

[0023]  $\theta_n = \omega_n \Delta t + \theta_{n-1}$  --- bearing  $\theta_{n-1}$  [ further last ] This bearing  $\theta_n$  Average bearing  $\theta_n$  it asks.  $\theta_n = (\theta_n + \theta_{n-1})/2$  and this average bearing  $\theta_n$  it is based. Said distance  $\Delta D_n$  Direction component of east and west  $\Delta x_n (= \Delta D_n \times \cos \theta_n)$ . And direction component of north and south  $\Delta y_n (= \Delta D_n \times \sin \theta_n)$  is detected, and they are said each component  $\Delta x_n$  and  $\Delta y_n$  to the last estimated position data ( $x_{n-1}$  and  $y_{n-1}$ ). A current estimated position ( $x_n$  and  $y_n$ ) is detected by adding.

[0024]  $x_n = x_{n-1} + \Delta x_n$   $y_n = y_{n-1} + \Delta y_n$  --- the car location at the time of in addition, this initial valve position ( $x_0$  and  $y_0$ ) detecting the magnetic nail used as a starting point, although the initial valve position ( $x_0$  and  $y_0$ ) of an estimated position needed to be decided --- for example, (0 0), what is necessary is to set up and just to adopt it

[0025] The location amendment section 16 amends this estimated position ( $x_n$  and  $y_n$ ) based on the relative coordinate in which it was stored by the road marker map memory 15 on the assumption that it has not deviated from the lane more than the anchoring die length of a magnetic resistance element. Explanation of this amendment approach pinpoints a course starting point first. Here, pinpointing of a course starting point is performed as follows. A car receives the information on the route name of the highway concerned, and a section name from means of communications, for example, a beacon, before going into a highway. As long as it carries navigation equipment, the information on a route name and a section name may be received from navigation equipment. Using this information, the memory location of the data constellation memorized by the road marker map memory 15 can be pinpointed.

[0026] The magnetic nail is embedded between the inlet port of a highway, and the outlet, if a car goes into a highway from the inlet part concerned, at first, a specific sign (for example, south pole) will appear, and both signs will appear according to a predetermined code after that. Let the point which detected this first specific sign for the first time be a starting point. Then, a relative coordinate can be known by reading the code constituted by the magnetic nail.

[0027] moreover, a code - 1, 1, and - if it is simple things, such as 1, 1, and ..., since it

turns out the point of what position it is, with reference to Table 1, a relative coordinate can be known only by counting the detected sign. The location amendment section 16 reads a relative coordinate (it is written as "" (xm and ym) below) with reference to the road marker map memory 15 based on the reading result of said code. [0028] Next, it asks for the car estimated position at the time concerned (xs and ys). Generally the car estimated position (xs and ys) concerned Since it exists between the car estimated position (xn-1 and yn-1) which one of detection period deltat begins, and the last car estimated position (xm and ym) as shown in drawing 4 A car estimated position (xs and ys) is time-of-day Tn-1 which detection period deltat begins. Time of day Tn of an end Time of day Tm when the sign was detected If it uses  $x_s = x_{n-1} + (x_n - x_{n-1}) (T_m - T_{n-1}) / \text{deltat}$  It asks by  $y_s = y_{n-1} + (y_n - y_{n-1}) (T_m - T_{n-1}) / \text{deltat}$ .

[0029] And a car estimated position (xs and ys) and said relative distance Lm concerned it asks for the relation between the relative coordinate (x'm and y'm) presumed by being based, and the relative coordinate (xm and ym) memorized by the road marker map memory 15. Drawing 5 is drawing showing the physical relationship of a car estimated position (xs and ys) and an estimated position (x'm and y'm), and the transit direction of a car is thetan. It is expressed. Direction thetan A sign makes a counterclockwise rotation forward and is a relative distance Lm. A sign makes forward the time of detecting a magnetic tape or a guide wire on the left-hand side of a car. From the relation shown in this drawing, an estimated position (x'm and y'm) is Lm. thetan It uses.  $x'm = x_s - L_m \sin \text{thetan}$  (1)  $y'm = y_s + L_m \cos \text{thetan}$  (2) It is expressed. [0030] Here, it is the above (1), A formula and (2) The estimated position (x'm and y'm) shown by the formula is compared with the coordinate (xm and ym) of the magnetic nail read from the road marker map memory 15, and the difference is searched for.  $\text{deltax} = x_m - x_s$   $\text{deltay} = y_m - y_s$  — these differences deltax and delta y serve as the amount of amendments of a car estimated position (xn and yn) (hereafter, Subscript n is omitted and it is written as an estimated position (x y)). That is, a car estimated position (x y) can be amended as  $x = x + \text{deltax}$   $y = y + \text{deltay}$ . the amended estimated position (x y) — GPS (Global Positioning System) etc. — it compares and precision is very high.

[0031] The processing of the location amendment section 16 mentioned above was premised on having not deviated from the lane more than the anchoring die length of a magnetic resistance element. If it deviates from a lane exceeding the anchoring die length of a magnetic resistance element, it will be the relative distance Lm of the longitudinal direction of the center line of a car, and a magnetic tape. Since it cannot



be found, processing mentioned above cannot be performed. In this case, the estimated position (xn and yn) of the car outputted from the location presumption section 14 will be adopted as an estimated position (x y) of a car as it is.

[0032] Next, how to warn of deviation from a lane is explained. A car can make a judgment of this warning, even if it deviates from a lane exceeding the anchoring die length of a magnetic resistance element, and it has not deviated (although felt like saying that warning having not deviated is unnecessary, a warning threshold can be set as arbitration). First, the deviation detecting element 19 projects a car estimated position (x y) to the location on Rhine where the magnetic nail is located in a line.

[0033] Drawing 6 is drawing showing the coordinate (xm0, ym0) of the magnetic nail detected recently, the coordinate (xm1, ym1) of the magnetic nail corresponding to the following number, and an estimated position (x y). If the locations which should amend on Rhine will be written to be (xb and yb), (xb and yb) will be calculated by drawing a perpendicular from an estimated position (x y) to Rhine.

$$x_b = x_m0 + (x_m1 - x_m0) R$$
$$y_b = y_m0 + (y_m1 - y_m0) R$$
 here  $R = \frac{(x_m1 - x_m0)(y - y_m0) + (y_m1 - y_m0)(x - x_m0)}{\sqrt{(x_m1 - x_m0)^2 + (y_m1 - y_m0)^2}}$

It comes out and defines.

[0034] Distance dd=SQRT of the projection location (xb and yb) to this Rhine top, and a car estimated position (x y)  $\{(x-x_b)^2 + (y-y_b)^2\}$

It becomes a gap from Rhine of \*\*\*\*\*. For the deviation detecting element 19, this gap d is a threshold d0. If it judges that it is large, warning will be taken out from the deviation warning section 20 with voice. Of course, it may replace with taking out warning with voice, and warning may be displayed on a display (not shown). Moreover, a command signal may be given to the actuator which performs brakes operation, accelerator actuation, steering actuation, etc. to taking out warning and coincidence.

[0035] Discharge of warning is considered as the time of there being steering actuation, when there is winker actuation. Moreover, it follows on winker actuation and steering actuation, and the gap d from Rhine is a threshold d0. When it exceeds, warning is bent from the start, and it is good even if like. In addition, said threshold d0 For example, it can choose in consideration of the width of face of a car, and lane width. In this case, what is necessary is for lane width to correspond for every route of a highway, and section, and just to store it in the road marker map memory 15 as data that what is necessary is just to hold the width of face of a car as a value of a proper on the car concerned.

[0036] For example, it is a threshold d0 at the time of the lane width of 3.5m, and width of face of 1.8m of a car. It is set as 0.85m. Threshold d0 When setting up, as shown in

drawing 7, the yaw angle  $\phi$  with Rhine where the transit direction of a car and the magnetic nail are located in a line may be taken into consideration. Here, the yaw angle  $\phi$  is computable based on time amount change of the gap  $d$  from a road marker. Since it means that the speed from which the yaw angle  $\phi$  separates from Rhine when large is quick, a threshold is set up small. When small, since the cut of a handle is also easy, the yaw angle  $\phi$  thinks that warning may become slow, and sets up a threshold more greatly.

[0037] While the car's performing straight-line maintenance transit generally, speaking concretely, when performing less than  $\phi \times 1.5$  degrees of yaw angles and making a lane change, the yaw angle  $\phi$  becomes 3 degrees -- about 5 degrees. Therefore, when the yaw angle  $\phi$  is less than 1.5 degrees, warning is given just before the white line which shows the boundary of a lane, when the yaw angle  $\phi$  is 1.5 degrees or more less than 3 degrees, warning is given by 30cm inside of a white line, and when the yaw angle  $\phi$  is 3 degrees or more, warning is given by 50cm inside of a white line.

[0038] Moreover, threshold  $d_0$  It can also determine not only in consideration of the width of face of a car, and lane width but in consideration of the distance to a guard rail or a side attachment wall. In this case, the distance to a white line, a guard rail, or a side attachment wall is stored in the road marker map memory 15, and when this distance is comparatively short, it is a threshold  $d_0$ . It is made more smallish, and when this distance is comparatively long, it is a threshold  $d_0$ . It enlarges slightly.

[0039] Furthermore, a threshold is also changeable with the peculiarity of operation of a driver. There are those who run the left depending on a driver, and those who run rightist inclinations. In this case, the past contents of transit are learned and a threshold is changed on right-hand side and left-hand side. Moreover, with the engine performance of a car etc., since blurring on either side may be oversized, the past contents of transit are learned also in this case, and when blurring on either side is large, a threshold is set up more smallish.

[0040]

[Effect of the invention] According to the lane deviation warning device of this invention, it can ask for the gap  $d$  from Rhine of a car as mentioned above by projecting the location of the car called for by autonomous navigation on Rhine where a road marker stands in a line. Based on this gap  $d$ , deviation of a lane can be judged exactly and it can warn of it.

[0041] Especially, if it is invention according to claim 2, the location of the car called for by autonomous navigation can be correctly amended based on a road marker's coordinate data train memorized by road marker map memory, and it can ask for the