AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Central District of California, Southern Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
	1/30/2015	Central District of California, Southern Division

PLAINTIFF	DEFENDANT
COMARCO WIRELESS TECHNOLOGIES, INC., a Delaware corporation,	APPLE, INC., a California corporation,

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,492,933	7/23/2013	Comarco Wireless Technologies, Inc.
2			
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Central District of California, Southern Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
	1/30/2015	Central District of California, Southern Division

PLAINTIFF	DEFENDANT
COMARCO WIRELESS TECHNOLOGIES, INC., a Delaware corporation,	APPLE, INC., a California corporation,

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,492,933	7/23/2013	Comarco Wireless Technologies, Inc.
2			
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555

CONFIRMATION NO. 3683

POWER OF ATTORNEY NOTICE

27496
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

OC000000065987560

Date Mailed: 01/10/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/02/2014.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/707,119	12/06/2012	THOMAS W. LANNI	6813-62

CONFIRMATION NO. 3683

POA ACCEPTANCE LETTER

112006
Graham Curtin, P.A.
4 Headquarters Plaza
Morristown, NJ 07962

OC000000065987569

Date Mailed: 01/10/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/02/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

6F13-62

PTO/SB/81A (12-08)
Approved for use through 11/30/2011. OMB 0651-0035
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 displays a valid OMB control number.

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	8,492,933
Issue Date	July 23, 2013
First Named Inventor	LANNI
Title	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL...
Attorney Docket Number	6F13-62

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 112006

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-mentioned Customer Number.

OR

☒ The address associated with Customer Number: 112006

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____.

SIGNATURE of Inventor or Patent Owner

Signature		Date	11/26/13
Name	THOMAS W. LANNI	Telephone	949/599.7460
Title and Company	CEO, COMARCO WIRELESS TECHNOLOGIES, INC.		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 2 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: COMARCO WIRELESS TECHNOLOGIES, INC.

Application No./Patent No.: 8492933 Filed/Issue Date: JULY 23, 2013

Titled: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL

COMARCO WIRELESS TECHNOLOGIES, INC. , a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 029420, Frame 0362, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Glen M. Diehl/ January 2, 2014

Signature Date

GLEN M. DIEHL Attorney for Applicant

Printed or Typed Name Title

Electronic Acknowledgement Receipt

EFS ID:	17804799
Application Number:	13707119
International Application Number:	
Confirmation Number:	3683
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Customer Number:	27496
Filer:	Glen M. Diehl/Thea Bachman
Filer Authorized By:	Glen M. Diehl
Attorney Docket Number:	081088-0419555
Receipt Date:	02-JAN-2014
Filing Date:	06-DEC-2012
Time Stamp:	16:44:42
Application Type:	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	Power of Attorney	COMARCO_62_POA.pdf	462061 9c14f0cdbfd518d87ffd3e0c2bec914805eee9b1	no	1

Warnings:	
Information:	

2	Assignee showing of ownership per 37 CFR 3.73.	Comarco_62_373B.pdf	367367 9125e6077570147b716e3fe609141a3ac60358a1	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	829428

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.

To: Docket_IP@pillsburylaw.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 27496

Jul 04, 2013 05:32:53 AM

Dear PAIR Customer:

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 27496 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
13707119	ISSUE.NTF	07/03/2013	081088-0419555

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	07/23/2013	8492933	081088-0419555	3683

27496 7590 07/03/2013

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

THOMAS W. LANNI, Laguna Niguel, CA;
Comarco Wireless Technologies, Inc., Lake Forest, CA

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27496 7590 06/10/2013
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

TITLE OF INVENTION: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	09/10/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
CAVALLARI, DANIEL J	2836	307-151000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Pillsbury Winthrop Shaw Pittman LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

COMARCO WIRELESS TECHNOLOGIES, INC. Lake Forest, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☒ Advance Order - # of Copies 10

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 033975 (enclose an extra copy of this form).

PTOL-85 (Rev. 02/11)

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Roger R. Wise Date June 13, 2013

Typed or printed name Roger R. Wise Registration No. 31,204

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

Electronic Patent Application Fee Transmittal

Application Number:	13707119
Filing Date:	06-Dec-2012
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Filer:	Roger R. Wise/Michael Gutierrez
Attorney Docket Number:	081088-0419555

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	1780	1780
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
Printed Copy of Patent - No Color	8001	10	3	30
		Total in USD ($)		**2110**

Electronic Acknowledgement Receipt

EFS ID:	16032395
Application Number:	13707119
International Application Number:	
Confirmation Number:	3683
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Customer Number:	27496
Filer:	Roger R. Wise/Michael Gutierrez
Filer Authorized By:	Roger R. Wise
Attorney Docket Number:	081088-0419555
Receipt Date:	13-JUN-2013
Filing Date:	06-DEC-2012
Time Stamp:	15:19:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2110
RAM confirmation Number	1969
Deposit Account	033975
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 1.17 (Patent application and reexamination processing fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFee.pdf	110878 892634ac03a8f7f046a01b39c0d22fccbe30d5ea	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	33836 a726537f4ca7c0f70668355bf736fedcdb0847aa	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	144714		

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.

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

27496 7590 06/10/2013

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

EXAMINER
CAVALLARI, DANIEL J

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 06/10/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

TITLE OF INVENTION: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	09/10/2013

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27496 7590 06/10/2013
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

TITLE OF INVENTION: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	09/10/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
CAVALLARI, DANIEL J	2836	307-151000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29	NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
❑ Applicant asserting small entity status. See 37 CFR 1.27	NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
❑ Applicant changing to regular undiscounted fee status.	NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

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.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

27496 7590 06/10/2013

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

EXAMINER	
CAVALLARI, DANIEL J	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 06/10/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

Notice of Allowability	Application No. 13/707,119	Applicant(s) LANNI ET AL.	
	Examiner DANIEL CAVALLARI	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *5/23/2013*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1 and 2*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   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)).

   * Certified copies not received: _____.

   Interim copies:

   a) ☐ All b) ☐ Some c) ☐ None of the: Interim copies of the priority documents have been received.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Daniel Cavallari/
Primary Examiner, Art Unit 2836

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

CPC		
Symbol	**Type**	**Version**

CPC Combination Sets				
Symbol	**Type**	**Set**	**Ranking**	**Version**

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	**SUBCLASS**	**CLAIMED**					**NON-CLAIMED**					
307	151	G	0	5	F	3 / 06 (2006.01.01)						
CROSS REFERENCE(S)												
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**											

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	2	
/DANIEL CAVALLARI/ Primary Examiner.Art Unit 2836	6/2/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	8

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	2	
/DANIEL CAVALLARI/ Primary Examiner.Art Unit 2836	6/2/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	8

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

☒ **Claims renumbered in the same order as presented by applicant** ☐ **CPA** ☐ **T.D.** ☐ **R.1.47**

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1														
	2														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	2	
/DANIEL CAVALLARI/ Primary Examiner.Art Unit 2836	6/2/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	8

PTO/SB/08b (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		"Universal Serial Bus Specification Revision 2.0" Compaq Computer Corporation, et al., April 27, 2000, Cover page, Copyright notice page, Content pages v-xiii, Section 7.2 Power Distribution, pp. 171-178	

Examiner Signature	/Daniel Cavallari/	Date Considered	06/02/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.
This collection of information is required by 37 CFR 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 2 hours 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, 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.

PTO/SB/08a (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-6,903,950 B2	06-07-2005	Ejaz Afzal et al.	
		US-6,528,970 B1	03-04-2003	Sen-Hsiang Liu et al.	
		US-5,969,438	10-19-1999	S. Odaohara	
		US-6,288,522 B1	09-11-2001	S. Odaohara, et al.	
		US-6,795,302 B2	09-21-2004	Michael R. Kluth et al.	
		US-2006/0220465 A1	10-05-2006	T. Kingsmore, Jr. et al.	
		US-2005/0162020 A1	07-28-2005	Thomas W. Lanni	
		US-2006/0164061 A1	07-27-2006	Jose A.V. Formenti et al.	
		US-7,039,821 B1	05-02-2006	Patrick H. Potega	
		US-7,127,623 B2	10-24-2006	Patrick H. Potega	
		US-2002/0171980 A1	11-21-2002	Akira Tsukihashi	
		US-2005/0127758 A1	06-16-2005	Lee W. Atkinson et al.	
		US-6,459,175 B1	10-01-2002	Patrick H. Potega	
		US-5,955,797	09-21-1999	Dong-Hwan Kim	
		US-6,054,846	04-25-2000	Neal J. Castleman	
		US-6,628,535 B1	09-30-2003	Michael Wu	
		US-2004/0075419	04-22-2004	Paul G. Massey et al.	
		US-6,751,109 B2	06-15-2004	Jeffery S. Doss, et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] "Number[4] "Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		WO 2006/116298 A1	11/02/2006	Symbol Technologies, Inc.		
		WO 98/19223	05/07/1998	Castleman		

Examiner Signature	/Daniel Cavallari/	Date Considered	06/02/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08a (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Apt of 1995 no Persons are required to respond to a collection of information unless it contains a valid OMR control number

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 3

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 6,597,565 B1	07-22-2003	Michael R. Kluth et al.	
		US- 7,937,603 B2	05-03-2011	Norbert Haberle, et al.	
		US- 7,145,312 B2	12-05-2006	Thomas W. Lanni	
		US- 7,392,410 B2	06-24-2008	Robert Allen, et al.	
		US- 7,999,412 B2	08-16-2011	Thomas W. Lanni	
		US- 7,868,486 B2	01-11-2011	Thomas W. Lanni	
		US- 7,453,171 B2	11-18-2008	Thomas W. Lanni	
		US- 7,028,202 B2	04-11-2006	Michael D. Long, et al.	
		US- 6,358,096 B1	03-19-2002	Jerry L. Beckman	
		US- 5,369,352	11-29-1994	Craig B. Toepfer, et al.	
		US- 5,570,002	10-29-1996	Neal J. Castleman	
		US- RE39,036 E	03-28-2006	Neal J. Castleman	
		US- 2003/0207603 A1	11-06-2003	Patrick Potega	
		US- 5,350,993	09-27-1994	Shoichi Toya, et al.	
		US- 5,164,652	11-17-1992	Robert M. Johnson, et al	
		US- 5,703,467	12-30-1997	Joseph Patino	
		US- 6,360,177 B1	03-19-2002	Walter M. Curt, et al.	
		US- 5,254,931	10-19-1993	Nils E. Martensson	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] "Number[4] "Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Daniel Cavallari/	Date Considered	06/02/2013

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PTO/SB/08a (07-09)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 3 of 3

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,534,765	07-09-1996	Robert Kreisinger, et al.	
		US- 5,694,024	12-02-1997	Donald R. Dias, et al.	
		US- 5,861,729	01-19-1999	Mitsunori Maeda, et al.	
		US- 5,420,496	05-30-1995	Hiroaki Ishikawa	
		US- 5,939,856	08-17-1999	David M. Demuro, et al.	
		US- 5,506,490	04-09-1996	David M. Demuro	
		US- 5,912,544	06-15-1999	Akihisa Miyakawa, et al.	
		US- 5,333,177	07-26-1994	Michael Braitberg, et al.	
		US- 5,836,783	11-17-1998	Tahei Morisawa, et al.	
		US- 5,573,425	11-12-1996	Tahei Morisawa, et al.	
		US- 5,783,926	07-21-1998	Biily Gayle Moon, et al.	
		US- 6,368,155	04-09-2002	Maxwill P. Bassler, et al.	
		US- 5,593,323	01-14-1997	James U. Dernehl	
		US- 5,615,344	03-25-1997	Rodney J. Corder	
		US- 8,330,303	12-11-2012	Thomas W. Lanni	
		US- 6,999,505	02-14-2006	Kenichi Yokoo, et al.	
		US- 2003/0222503 A1	12-04-2003	Phillip L. Lam, et al.	
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] "Number[4] "Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Daniel Cavallari/	Date Considered	06/02/2013

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	Thomas W. Lanni
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		European Search Report dated September 28, 2006 for EP Patent Application No. EP05250133.5, 3 pages	
		European Search Report dated February 6, 2009 for EP Patent Application No. 07254497.6, 13 pages	
		EUROPEAN PATENT OFFICE, "Examination Report/Communication Pursuant to Article 94(3) EPC" re: Patent Application Serial No. 05 250 133.5, Date: June 14, 2012, 11 pages	
		NATIONAL SEMICONDUCTOR CORPORATION, "Datasheet for LM2601 Adapter Interface Circuit", dated April, 2001, 6 pages	
		Radio Shack 1990 Catalog, cover page and pg. 151, 1990	
		Radio Shack 1994 Catalog, cover page and pg. 142, 1994	
		Radio Shack 1995 Catalog, cover page and pp. 150-151, 1995	
		Minwa Products, "MW182", Minwa Products Catalog 1993, 1 page	
		Power Stream Technology, "High Quality Automobile to Laptop DC/DC Converter" Specification sheet copyright 2000, 2002, 2003, 2004 - 4 pages	
		ACCO Brands USA LLC vs. Comarco Wireless Technologies, Inc., Case No. C11-4378 RS, U. S. District Court for the Northern District of California, Plaintiff and Counterdefendant ACCO's Invalidity Contentions, pp. 1-3 and Exhibit E, pp. 1-6, June 27, 2012.	

/Daniel Cavallari/

Examiner Signature		Date Considered	06/02/2013

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	Thomas W. Lanni
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Declaration of Thomas W. Lanni Regarding Comarco N19 and N24 Tips, May 14, 2013, 2 pages	
		Comarco Wireless Technologies, Inc. Specification Control Drawing No. 1910-0219, "Tip N19", May 14, 2004, 5 pages	
		Comarco Wireless Technologies, Inc. Specification Control Drawing No. 1245-0021-T, "EPROM DS2502, TO-92", June 21, 2005, 1 page	
		Comarco Wireless Technologies, Inc. Specification Control Drawing No. 1910-0224, "Tip N24", October 23, 2004, 5 pages	

Examiner Signature	/Daniel Cavallari/	Date Considered	06/02/2013

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1058	(307/150).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 16:23
L2	943	(307/151).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/02 16:23
S1	15	("20050127758" | "5969438" | "6288522" | "6528970" | "6567565" | "6795302" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/03/14 18:03
S2	1	("6459175").PN.	USPAT; USOCR	OR	OFF	2009/09/13 17:27
S4	21	("20050127758" | "20050162020" | "20060164061" | "20060220465" | "5969438" | "6288522" | "6528970" | "6567565" | "6795302" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 19:33
S5	1	("6751109").PN.	USPAT; USOCR	OR	OFF	2009/09/13 19:34
S8	18	(US-20050127758-$).did. or (US-6903950-$ or US-6795302-$ or US-6567565-$ or US-6528970-$ or US-6288522-$ or US-5969438-$ or US-6459175-$ or US-6751109-$).did. or (US-20050127758-$ or US-20040085793-$ or US-20040008462-$ or US-6567565-$ or US-6528970-$ or JP-2000324713-$ or JP-10301672-$ or BE-729852-$ or EP-1555733-$).did.	US-PGPUB; USPAT; DERWENT	OR	OFF	2009/09/13 20:42
S9	1	S8 and (processor microprocessor controler microcontroler) with compar$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:42
S10	0	(processor microprocessor controler	US-PGPUB;	OR	OFF	2009/09/13

		microcontroler) with compar$4 near3 voltage with refference near2 voltage	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			20:43
S11	851	(processor microprocessor controler microcontroler) with compar$4 near3 voltage with reference near2 voltage	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:43
S12	65	S11 and ("323"/$.ccls. "307"/$.ccls. "363"/$.ccls.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:43
S13	503	307/80.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 21:02
S14	1278	713/322.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 21:02
S15	25	("20040075419" | "20050127758" | "5969438" | "6054846" | "6288522" | "6528970" | "6567565" | "6628535" | "6751109" | "6795302" | "6903850" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/01 15:25
S16	2383	empower	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/01 15:37
S17	327	empower and type near3 (source power supply)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/01 15:37
S18	48	empower and type near3 (source power supply) and AC and DC	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2010/06/01 15:39

			IBM_TDB			
S19	1	("5570002").PN.	USPAT; USOCR	OR	OFF	2010/06/02 13:30
S20	41	("4804916" | "5391976").PN. OR ("5570002").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:21
S21	5	("5111148" | "5160882" | "5283762" | "5387820" | "6665808").PN. OR ("7127623").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:29
S22	122	airplane and Cigarette and (reduc$4 decreas$4 limit$4) near3 power$4 same2 (laptop notebook computer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 20:32
S23	25	("20020083356" | "20030025689" | "20040225902" | "4670837" | "5021679" | "5153535" | "5274827" | "5396635" | "5442794" | "5450003" | "5524249" | "5526253" | "5781768" | "5799198" | "5812860" | "5874851" | "5991883" | "6029249" | "6078319" | "6233691" | "6584571" | "6690652" | "6845456" | "6967522" | "7100062").PN. OR ("7392099").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:41
S24	6	airplane and Cigarette and (reduc$4 decreas$4 limit$4 max maximum) near3 power$4 same2 (laptop notebook computer) not S22	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 20:53
S25	11	("3833821" | "4053788" | "5181858" | "5369352").PN. OR ("6358096").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:59
S26	369	determin$4 with AC with (DC battery) and (reduc$4 decreas$4 limit$4) near3 power$4 same2 (laptop notebook computer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 21:00
S27	10	"7039821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 21:13
S28	3057	715/700.ccls. 715/716.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:29
S29	5512	345/156.ccls.	US-PGPUB; USPAT; USOCR;	OR	OFF	2010/06/03 12:30

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S30	3073	327/100,102,103.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S31	7239	713/300,310,320,346.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S32	1088	307/28,31.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S33	1146	323/313.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S34	60	battery with charg$4 near4 disabl$4 and (airplane aircraft empower)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 14:01
S35	390	307/28.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S36	739	307/31.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S37	1196	320/132.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S38	5347	713/300.ccls.	US-PGPUB;	OR	ON	2010/10/09

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:30
S39	173	comarco with wireless	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:31
S40	6372	((thomas with lanni)(laguna with niguel))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:33
S41	1506	((thomas with lanni)(laguna with niguel)) and controller	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:33
S42	81	S41 and source near3 determin$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:34
S43	614	307/80.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S44	844	307/151.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S45	276	700/22.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S46	300	320/138.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/11/10 14:20

			IBM_TDB			
S48	2	("5570002").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 15:40
S49	57	("4804916" | "5391976").PN. OR ("5570002").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:41
S50	22	empower and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:51
S51	15	("20020171980" | "20050127758" | "20050162020" | "20060164061" | "20060220465" | "5955797" | "5969438" | "6288522" | "6459175" | "6528970" | "6567565" | "6795302" | "6903950" | "7039821" | "7127623").PN. OR ("7868486").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:54
S52	76	(vehicle with airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:57
S53	5	("20060183381" | "5421734" | "6459604" | "6765365" | "7041400").PN. OR ("7701084").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:46
S54	9	("5347211" | "5510691" | "6091611" | "6604177" | "6908334" | "7081010" | "7091421").PN. OR ("7377805").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:49
S55	792	(vehicle automobile cigarette) same (plane airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:53
S56	735	(vehicle automobile cigarette) same (plane airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4) not (S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 16:53
S57	138	(vehicle automobile cigarette) same (airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4) not (S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 16:54
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EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S47	1555	((307/80) or (307/151) or (700/22) or (320/138)).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/11/10 14:20
S75	1785	(713/340).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/11 17:58
S76	7	"Term Removed"	USPAT	OR	OFF	2011/06/11 18:02
S77	210	307/75.ccls.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/11 18:30
S98	481	307/151.ccls.	USPAT; UPAD	OR	ON	2012/07/12 19:49
S105	577	(307/151).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2013/03/10 18:08

6/2/2013 4:24:47 PM
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	Art Unit
	DANIEL CAVALLARI	2836

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	150, 151	3/10/2013	DJC
307	150, 151	6/2/2013	DJC

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search	3/10/2013	DJC
updated East search	6/2/2013	DJC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
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307	151	6/2/2013	DJC

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	1449	06/10/2013	081088-0419555
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Sheet 1 of 1

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		"Universal Serial Bus Specification Revision 2.0" Compaq Computer Corporation, et al., April 27, 2000, Cover page, Copyright notice page, Content pages v-xiii, Section 7.2 Power Distribution, pp. 171-178	

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

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Universal Serial Bus Specification

Compaq

Hewlett-Packard

Intel

Lucent

Microsoft

NEC

Philips

Revision 2.0

April 27, 2000

Scope of this Revision

The 2.0 revision of the specification is intended for product design. Every attempt has been made to ensure a consistent and implementable specification. Implementations should ensure compliance with this revision.

Revision History

Revision	Issue Date	Comments
0.7	November 11, 1994	Supersedes 0.6e.
0.8	December 30, 1994	Revisions to Chapters 3-8, 10, and 11. Added appendixes.
0.9	April 13, 1995	Revisions to all the chapters.
0.99	August 25, 1995	Revisions to all the chapters.
1.0 FDR	November 13, 1995	Revisions to Chapters 1, 2, 5-11.
1.0	January 15, 1996	Edits to Chapters 5, 6, 7, 8, 9, 10, and 11 for consistency.
1.1	September 23, 1998	Updates to all chapters to fix problems identified.
2.0 (draft 0.79)	October 5, 1999	Revisions to chapters 5, 7, 8, 9, 11 to add high speed.
2.0 (draft 0.9)	December 21, 1999	Revisions to all chapters to add high speed.
2.0	April 27, 2000	Revisions for high-speed mode.

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Contents

CHAPTER 8 PROTOCOL LAYER

CHAPTER 9 USB DEVICE FRAMEWORK

CHAPTER 10 USB HOST: HARDWARE AND SOFTWARE

CHAPTER 11 HUB SPECIFICATION

7.2 Power Distribution

This section describes the USB power distribution specification.

7.2.1 Classes of Devices

The power source and sink requirements of different device classes can be simplified with the introduction of the concept of a unit load. A unit load is defined to be 100 mA. The number of unit loads a device can draw is an absolute maximum, not an average over time. A device may be either low-power at one unit load or high-power, consuming up to five unit loads. All devices default to low-power. The transition to high-power is under software control. It is the responsibility of software to ensure adequate power is available before allowing devices to consume high-power.

The USB supports a range of power sourcing and power consuming agents; these include the following:

- **Root port hubs**: Are directly attached to the USB Host Controller. Hub power is derived from the same source as the Host Controller. Systems that obtain operating power externally, either AC or DC, must supply at least five unit loads to each port. Such ports are called high-power ports. Battery-powered systems may supply either one or five unit loads. Ports that can supply only one unit load are termed low-power ports.
- **Bus-powered hubs**: Draw all of their power for any internal functions and downstream facing ports from VBUS on the hub's upstream facing port. Bus-powered hubs may only draw up to one unit load upon power-up and five unit loads after configuration. The configuration power is split between allocations to the hub, any non-removable functions and the external ports. External ports in a bus-powered hub can supply only one unit load per port regardless of the current draw on the other ports of that hub. The hub must be able to supply this port current when the hub is in the Active or Suspend state.
- **Self-powered hubs**: Power for the internal functions and downstream facing ports does not come from VBUS. However, the USB interface of the hub may draw up to one unit load from VBUS on its upstream facing port to allow the interface to function when the remainder of the hub is powered down. Hubs that obtain operating power externally (from the USB) must supply five unit loads to each port. Battery-powered hubs may supply either one or five unit loads per port.
- **Low-power bus-powered functions**: All power to these devices comes from VBUS. They may draw no more than one unit load at any time.
- **High-power bus-powered functions**: All power to these devices comes from VBUS. They must draw no more than one unit load upon power-up and may draw up to five unit loads after being configured.
- **Self-powered functions**: May draw up to one unit load from VBUS to allow the USB interface to function when the remainder of the function is powered down. All other power comes from an external (to the USB) source.

No device shall supply (source) current on VBUS at its upstream facing port at any time. From VBUS on its upstream facing port, a device may only draw (sink) current. They may not provide power to the pull-up resistor on D+/D- unless VBUS is present (see Section 7.1.5). When VBUS is removed, the device must remove power from the D+/D- pull-up resistor within 10 seconds. On power-up, a device needs to ensure that its upstream facing port is not driving the bus, so that the device is able to receive the reset signaling. Devices must also ensure that the maximum operating current drawn by a device is one unit load, until configured. Any device that draws power from the bus must be able to detect lack of activity on the bus, enter the Suspend state, and reduce its current consumption from VBUS (refer to Section 7.2.3 and Section 9.2.5.1).

7.2.1.1 Bus-powered Hubs

Bus-powered hub power requirements can be met with a power control circuit such as the one shown in Figure 7-42. Bus-powered hubs often contain at least one non-removable function. Power is always available to the hub's controller, which permits host access to power management and other configuration registers during the enumeration process. A non-removable function(s) may require that its power be switched, so that upon power-up, the entire device (hub and non-removable functions) draws no more than one unit load. Power switching on any non-removable function may be implemented either by removing its power or by shutting off the clock. Switching on the non-removable function is not required if the aggregate power drawn by it and the Hub Controller is less than one unit load. However, as long as the hub port associated with the function is in the Power-off state, the function must be logically reset and the device must appear to be not connected. The total current drawn by a bus-powered device is the sum of the current to the Hub Controller, any non-removable function(s), and the downstream facing ports.

Figure 7-42 shows the partitioning of power based upon the maximum current draw (from upstream) of five unit loads: one unit load for the Hub Controller and the non-removable function and one unit load for each of the external downstream facing ports. If more than four external ports are required, then the hub will need to be self-powered. If the non-removable function(s) and Hub Controller draw more than one unit load, then the number of external ports must be appropriately reduced. Power control to a bus-powered hub may require a regulator. If present, the regulator is always enabled to supply the Hub Controller. The regulator can also power the non-removable functions(s). Inrush current limiting must also be incorporated into the regulator subsystem.

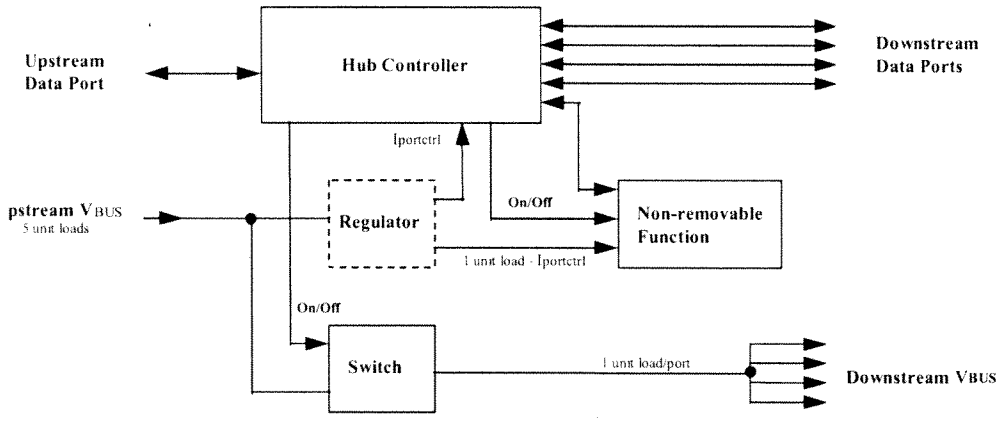

Figure 7-42. Compound Bus-powered Hub

Power to external downstream facing ports of a bus-powered hub must be switched. The Hub Controller supplies a software controlled on/off signal from the host, which is in the "off" state when the device is powered up or after reset signaling. When switched to the "on" state, the switch implements a soft turn-on function that prevents excessive transient current from being drawn from upstream. The voltage drop across the upstream cable, connectors, and switch in a bus-powered hub must not exceed 350 mV at maximum rated current.

7.2.1.2 Self-powered Hubs

Self-powered hubs have a local power supply that furnishes power to any non-removable functions and to all downstream facing ports, as shown in Figure 7-43. Power for the Hub Controller, however, may be supplied from the upstream VBUS (a "hybrid" powered hub) or the local power supply. The advantage of supplying the Hub Controller from the upstream supply is that communication from the host is possible even if the device's power supply remains off. This makes it possible to differentiate between a disconnected and an unpowered device. If the hub draws power for its upstream facing port from VBUS, it may not draw more than one unit load.

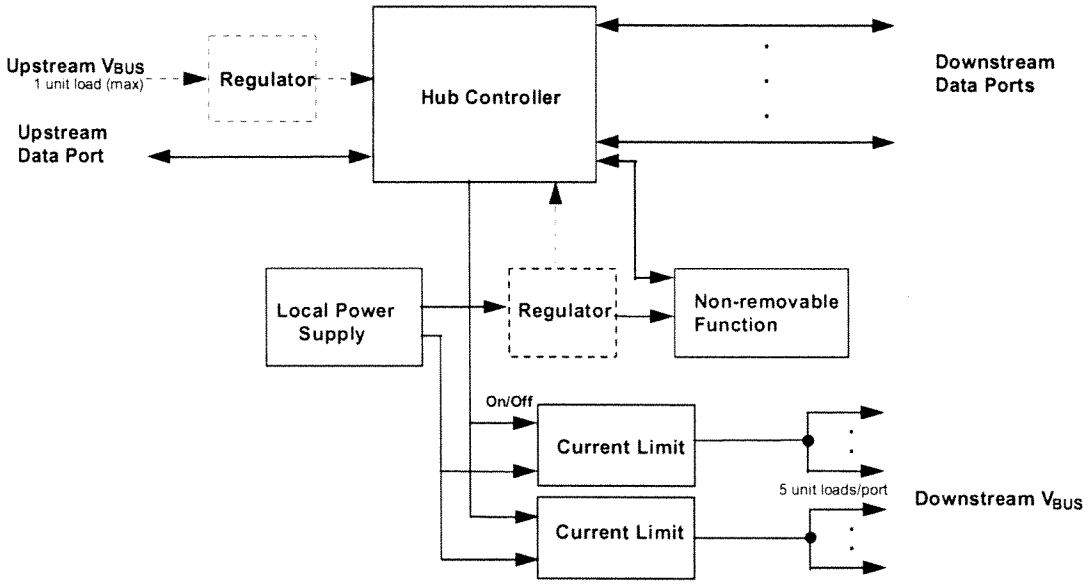

Figure 7-43. Compound Self-powered Hub

The number of ports that can be supported is limited only by the address capability of the hub and the local supply.

Self-powered hubs may experience loss of power. This may be the result of disconnecting the power cord or exhausting the battery. Under these conditions, the hub may force a re-enumeration of itself as a bus-powered hub. This requires the hub to implement port power switching on all external ports. When power is lost, the hub must ensure that upstream current does not exceed low-power. All the rules of a bus-powered hub then apply.

7.2.1.2.1 Over-current Protection

The host and all self-powered hubs must implement over-current protection for safety reasons, and the hub must have a way to detect the over-current condition and report it to the USB software. Should the aggregate current drawn by a gang of downstream facing ports exceed a preset value, the over-current protection circuit removes or reduces power from all affected downstream facing ports. The over-current condition is reported through the hub to Host Controller, as described in Section 11.12.5. The preset value cannot exceed 5.0 A and must be sufficiently above the maximum allowable port current such that transient currents (e.g., during power up or dynamic attach or reconfiguration) do not trip the over-current protector. If an over-current condition occurs on any port, subsequent operation of the USB is not guaranteed, and once the condition is removed, it may be necessary to reinitialize the bus as would be done upon power-up. The over-current limiting mechanism must be resettable without user mechanical intervention. Polymeric PTCs and solid-state switches are examples of methods, which can be used for over-current limiting.

7.2.1.3 Low-power Bus-powered Functions

A low-power function is one that draws up to one unit load from the USB cable when operational. Figure 7-44 shows a typical bus-powered, low-power function, such as a mouse. Low-power regulation can be integrated into the function silicon. Low-power functions must be capable of operating with input VBUS voltages as low as 4.40 V, measured at the plug end of the cable.

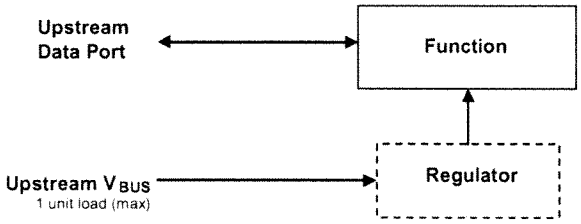

Figure 7-44. Low-power Bus-powered Function

7.2.1.4 High-power Bus-powered Functions

A function is defined as being high-power if, when fully powered, it draws over one but no more than five unit loads from the USB cable. A high-power function requires staged switching of power. It must first come up in a reduced power state of less than one unit load. At bus enumeration time, its total power requirements are obtained and compared against the available power budget. If sufficient power exists, the remainder of the function may be powered on. A typical high-power function is shown in Figure 7-45. The function's electronics have been partitioned into two sections. The function controller contains the minimum amount of circuitry necessary to permit enumeration and power budgeting. The remainder of the function resides in the function block. High-power functions must be capable of operating in their low-power (one unit load) mode with an input voltage as low as 4.40 V, so that it may be detected and enumerated even when plugged into a bus-powered hub. They must also be capable of operating at full power (up to five unit loads) with a VBUS voltage of 4.75 V, measured at the upstream plug end of the cable.

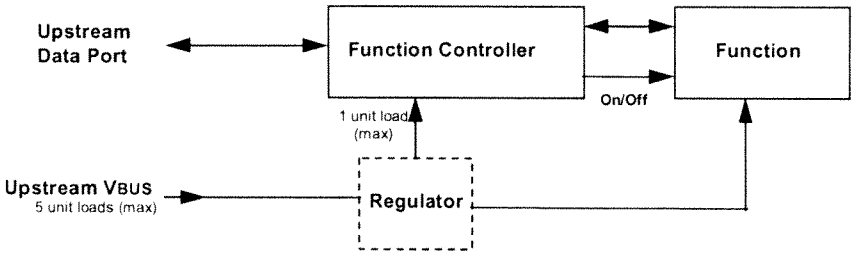

Figure 7-45. High-power Bus-powered Function

7.2.1.5 Self-powered Functions

Figure 7-46 shows a typical self-powered function. The function controller is powered either from the upstream bus via a low-power regulator or from the local power supply. The advantage of the former scheme is that it permits detection and enumeration of a self-powered function whose local power supply is turned off. The maximum upstream power that the function controller can draw is one unit load, and the regulator block must implement inrush current limiting. The amount of power that the function block may draw is limited only by the local power supply. Because the local power supply is not required to power any downstream bus ports, it does not need to implement current limiting, soft start, or power switching.

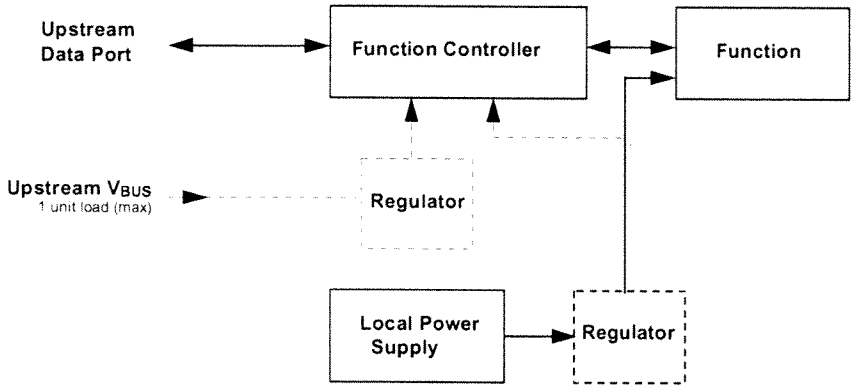

Figure 7-46. Self-powered Function

7.2.2 Voltage Drop Budget

The voltage drop budget is determined from the following:

- The voltage supplied by high-powered hub ports is 4.75 V to 5.25 V.
- The voltage supplied by low-powered hub ports is 4.4 V to 5.25 V.
- Bus-powered hubs can have a maximum drop of 350 mV from their cable plug (where they attach to a source of power) to their output port connectors (where they supply power).
- The maximum voltage drop (for detachable cables) between the A-series plug and B-series plug on VBUS is 125 mV (VBUSD).
- The maximum voltage drop for all cables between upstream and downstream on GND is 125 mV (VGNDD).
- All hubs and functions must be able to provide configuration information with as little as 4.40 V at the connector end of their upstream cables. Only low-power functions need to be operational with this minimum voltage.
- Functions drawing more than one unit load must operate with a 4.75 V minimum input voltage at the connector end of their upstream cables.

Figure 7-47 shows the minimum allowable voltages in a worst-case topology consisting of a bus-powered hub driving a bus-powered function.

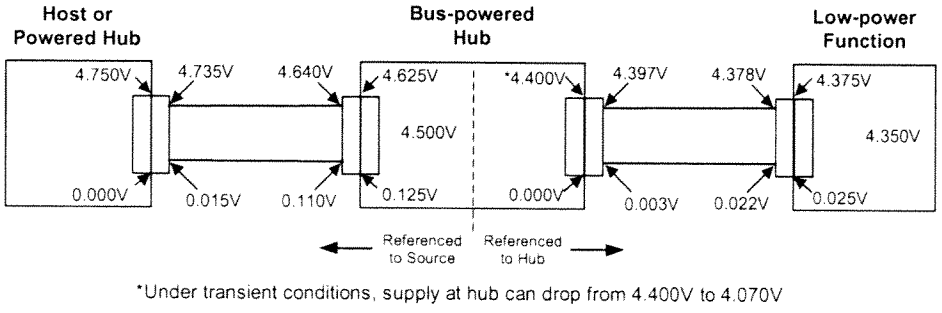

Figure 7-47. Worst-case Voltage Drop Topology (Steady State)

7.2.3 Power Control During Suspend/Resume

Suspend current is a function of unit load allocation. All USB devices initially default to low-power. Low-power devices or high-power devices operating at low-power are limited to 500 µA of suspend current. If the device is configured for high-power and enabled as a remote wakeup source, it may draw up to 2.5 mA during suspend. When computing suspend current, the current from VBUS through the bus pull-up and pull-down resistors must be included. Configured bus-powered hubs may also consume a maximum of 2.5 mA, with 500 µA allocated to each available external port and the remainder available to the hub and its internal functions. If a hub is not configured, it is operating as a low-power device and must limit its suspend current to 500 µA.

While in the Suspend state, a device may briefly draw more than the average current. The amplitude of the current spike cannot exceed the device power allocation 100 mA (or 500 mA). A maximum of 1.0 second is allowed for an averaging interval. The average current cannot exceed the average suspend current limit (ICCSH or ICCSL, see Table 7-7) during any 1.0-second interval (TSUSAVG1). The profile of the current spike is restricted so the transient response of the power supply (which may be an efficient, low-capacity, trickle power supply) is not overwhelmed. The rising edge of the current spike must be no more than 100 mA/µs. Downstream facing ports must be able to absorb the 500 mA peak current spike and meet the voltage droop requirements defined for inrush current during dynamic attach (see Section 7.2.4.1). Figure 7-48 illustrates a typical example profile for an averaging interval. If the supply to the pull-up resistor on D+/D- is derived from VBUS, then the suspend current will never go to zero because the pull-up and pull-down resistors will always draw power.

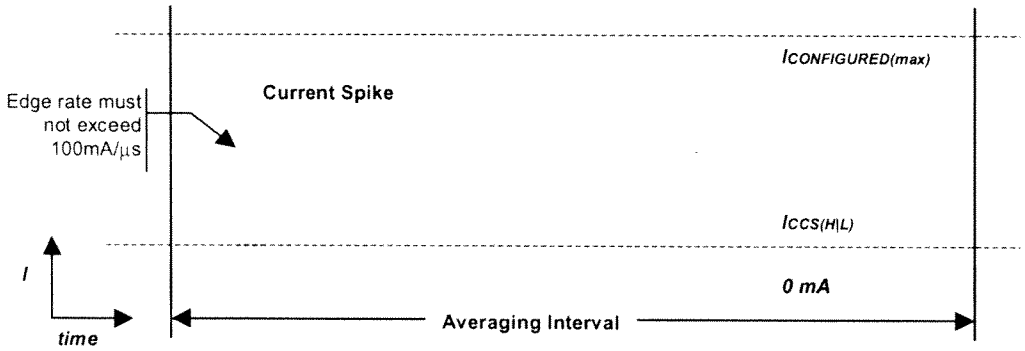

Figure 7-48. Typical Suspend Current Averaging Profile

Devices are responsible for handling the bus voltage reduction due to the inductive and resistive effects of the cable. When a hub is in the Suspend state, it must still be able to provide the maximum current per port (one unit load of current per port for bus-powered hubs and five unit loads per port for self-powered hubs). This is necessary to support remote wakeup-capable devices that will power-up while the remainder of the system is still suspended. Such devices, when enabled to do remote wakeup, must drive resume signaling upstream within 10 ms of starting to draw the higher, non-suspend current. Devices not capable of remote wakeup must draw the higher current only when not suspended.

When devices wakeup, either by themselves (remote wakeup) or by seeing resume signaling, they must limit the inrush current on VBUS. The target maximum droop in the hub VBUS is 330 mV. The device must have sufficient on-board bypass capacitance or a controlled power-on sequence such that the current drawn from the hub does not exceed the maximum current capability of the port at any time while the device is waking up.

7.2.4 Dynamic Attach and Detach

The act of plugging or unplugging a hub or function must not affect the functionality of another device on other segments of the network. Unplugging a function will stop the transaction between that function and the host. However, the hub to which this function was attached will recover from this condition and will alert the host that the port has been disconnected.

7.2.4.1 Inrush Current Limiting

When a function or hub is plugged into the network, it has a certain amount of on-board capacitance between VBUS and ground. In addition, the regulator on the device may supply current to its output bypass capacitance and to the function as soon as power is applied. Consequently, if no measures are taken to prevent it, there could be a surge of current into the device which might pull the VBUS on the hub below its minimum operating level. Inrush currents can also occur when a high-power function is switched into its high-power mode. This problem must be solved by limiting the inrush current and by providing sufficient capacitance in each hub to prevent the power supplied to the other ports from going out of tolerance. An additional motivation for limiting inrush current is to minimize contact arcing, thereby prolonging connector contact life.

The maximum droop in the hub VBUS is 330 mV, or about 10% of the nominal signal swing from the function. In order to meet this requirement, the following conditions must be met:

- The maximum load (CRPB) that can be placed at the downstream end of a cable is 10 µF in parallel with 44 Ω. The 10 µF capacitance represents any bypass capacitor directly connected across the VBUS lines in the function plus any capacitive effects visible through the regulator in the device. The 44 Ω resistance represents one unit load of current drawn by the device during connect.
- If more bypass capacitance is required in the device, then the device must incorporate some form of VBUS surge current limiting, such that it matches the characteristics of the above load.
- The hub downstream facing port VBUS power lines must be bypassed (CHPB) with no less than 120 µF of low-ESR capacitance per hub. Standard bypass methods should be used to minimize inductance and resistance between the bypass capacitors and the connectors to reduce droop. The bypass capacitors themselves should have a low dissipation factor to allow decoupling at higher frequencies.

The upstream facing port of a hub is also required to meet the above requirements. Furthermore, a bus-powered hub must provide additional surge limiting in the form of a soft-start circuit when it enables power to its downstream facing ports.

A high-power bus-powered device that is switching from a lower power configuration to a higher power configuration must not cause droop > 330 mV on the VBUS at its upstream hub. The device can meet this by ensuring that changes in the capacitive load it presents do not exceed 10 µF.

Signal pins are protected from excessive currents during dynamic attach by being recessed in the connector such that the power pins make contact first. This guarantees that the power rails to the downstream device are referenced before the signal pins make contact. In addition, the signal lines are in a high-impedance state during connect, so that no current flows for standard signal levels.

7.2.4.2 Dynamic Detach

When a device is detached from the network with power flowing in the cable, the inductance of the cable will cause a large flyback voltage to occur on the open end of the device cable. This flyback voltage is not destructive. Proper bypass measures on the hub ports will suppress any coupled noise. The frequency range of this noise is inversely dependent on the length of the cable, to a maximum of 60 MHz for a one-meter cable. This will require some low capacitance, very low inductance bypass capacitors on each hub port connector. The flyback voltage and the noise it creates is also moderated by the bypass capacitance on the device end of the cable. Also, there must be some minimum capacitance on the device end of the cable to ensure that the

inductive flyback on the open end of the cable does not cause the voltage on the device end to reverse polarity. A minimum of 1.0 µF is recommended for bypass across VBUS.

7.3 Physical Layer

The physical layer specifications are described in the following subsections.

7.3.1 Regulatory Requirements

All USB devices should be designed to meet the applicable regulatory requirements.

7.3.2 Bus Timing/Electrical Characteristics

Table 7-7. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	µA
Input Levels for Low-/full-speed:					
High (driven)	VIH	Note 4, Section 7.1.4	2.0		V
High (floating)	VIHZ	Note 4, Section 7.1.4	2.7	3.6	V
Low	VIL	Note 4, Section 7.1.4		0.8	V
Differential Input Sensitivity	VDI	|(D+)-(D-)|; Figure 7-19; Note 4	0.2		V
Differential Common Mode Range	VCM	Includes VDI range; Figure 7-19; Note 4	0.8	2.5	V
Input Levels for High-speed:					
High-speed squelch detection threshold (differential signal amplitude)	VHSSQ	Section 7.1.7.2 (specification refers to differential signal amplitude)	100	150	mV

Electronic Acknowledgement Receipt

EFS ID:	15860472
Application Number:	13707119
International Application Number:	
Confirmation Number:	3683
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Customer Number:	27496
Filer:	Roger R. Wise/Michael Gutierrez
Filer Authorized By:	Roger R. Wise
Attorney Docket Number:	081088-0419555
Receipt Date:	23-MAY-2013
Filing Date:	06-DEC-2012
Time Stamp:	19:43:08
Application Type:	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		IDS.pdf	83283 86bd3c3d02ff77d00ccd623e0406bc436a269f0a	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3
Warnings:			
Information:			

2	Non Patent Literature	NPL.pdf	755752 dfcae98457111bab9ff61bf75d40e445210df592	no	19
Warnings:					
Information:					
		Total Files Size (in bytes):	839035		

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.

Docket Number: 081088-0419555 PATENT APPLICATION

Client Reference: N/A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of

THOMAS W. LANNI Group Art Unit: 2836

Application No.: 13/707,119 Examiner: DANIEL J. CAVALLARI

Filed: December 6, 2012 Confirmation No.: 3683

For: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Pursuant to 37 CFR 1.56, the attention of the Patent and Trademark Office is hereby directed to the reference listed on the attached Form PTO/SB/08b. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference be made of record therein and appear among the "References Cited" on any patent to issue therefrom. Applicant respectfully requests the Examiner to return an initialed copy of the enclosed Form PTO/SB/08b to Applicant with the next Office communication to indicate that the reference has been considered, per MPEP § 609.

This Information Disclosure Statement is being filed after filing a Request for Continued Examination but before the issuance of an office action.

No certification or fee is required.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

Date: May 23, 2013

By: /Roger R. Wise/
Roger R. Wise
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PTO/SB/30 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	Cavallari, Daniel J.
Attorney Docket Number	081088-0419555

This is a Request for Continued Examination (RCE) under 37 CFR 1 .114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☒ Enclosed

      i. ☒ Amendment and Remarks

      ii. ☐ Affidavit(s)/ Declaration(s)

      ☒ Information Disclosure Statement (IDS)

      iv. ☐ Other _____

2. Miscellaneous

   Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a

   a. ☐ period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
   The Director is hereby authorized to charge the following fees any underpayment of fees or credit any overpayments to

   a. ☒ Deposit Account No. 033975 .

      i. ☒ RCE fee required under 37 CFR 1.17(e)

      ii ☐ Extension of time fee (37 CFR 1.136 and 1.17)

      iii ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Roger R. Wise/	Date	May 14, 2013
Name (Print/Type)	Roger R. Wise	Registration No.	31204

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature			
Name (Print/Type)		Date	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **THOMAS W. LANNI** Serial No.: 13/707,119 Filed: December 6, 2012 For: *POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE*	Group Art Unit: 2836 Examiner: Cavallari, Daniel J. Confirmation No.: 3683

RCE and REMARKS

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

Dear Sir:

For the reason explained in the accompanying remarks, applicant requests continued examination in lieu of paying the issue fee.

A Listing of the Claims begins on page 2 of this paper.

Remarks begin on page 3 of this paper.

IN THE CLAIMS:

The claims are not being amended herein, but are set forth below for reference.

1. (Original) Power supply equipment comprising:

an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device, the adapter including circuitry for producing an analog data signal for use by the electronic device to control an amount of power drawn by the electronic device; and

a cable having proximal and distal ends, the proximal end being electrically coupled to the adapter and the distal end terminating in an output connector, the output connector including:

a plurality of conductors to transfer the DC power and the analog data signal to the electronic device; and

circuitry to receive a data request from the electronic device and in response transmit a data output to the electronic device to identify the power supply equipment to the electronic device.

2. (Original) The power supply equipment of claim 1 wherein the output connector can be detached from the cable.

REMARKS

This application was allowed by Notices of Allowance and Allowability dated March 18, 2013. The issue fee has not been paid.

In lieu of paying the issue fee, applicant is filing this Request for Continued Examination to re-open prosecution on the merits so that the Examiner may consider the accompanying Information Disclosure Statement and the information submitted therewith. This RCE is being filed pursuant to 37 CFR §1.114(a)(1). The "submission" required by that rule is the accompanying IDS.

Consideration of the IDS and the information identified therein is respectfully requested.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

Date: May 14, 2013

By: /Roger R. Wise/
Roger R. Wise
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Facsimile: (213) 629-1033

Docket Number: 081088-0419555 PATENT APPLICATION

Client Reference: N/A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of

THOMAS W. LANNI Group Art Unit: 2836

Application No.: 13/707,119 Examiner: DANIEL J. CAVALLARI

Filed: December 6, 2012 Confirmation No.: 3683

For: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Pursuant to 37 CFR 1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached Forms PTO/SB/08a and PTO/SB/08b. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom. Applicant respectfully requests the Examiner to return an initialed copy of the enclosed Forms PTO/SB/08a and PTO/SB/08b to Applicant with the next Office communication to indicate that the references have been considered, per MPEP § 609.

This Information Disclosure Statement is being filed concurrently with a Request for Continued Examination. No certification or fee is required.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

Date: May 14, 2013

By: /Roger R. Wise/
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PTO/SB/08a (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if Known	
Application Number	13/707,119
Filing Date	December 6, 2012
First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-6,903,950 B2	06-07-2005	Ejaz Afzal et al.	
		US-6,528,970 B1	03-04-2003	Sen-Hsiang Liu et al.	
		US-5,969,438	10-19-1999	S. Odaohara	
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		US-2005/0162020 A1	07-28-2005	Thomas W. Lanni	
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Sheet 2 of 3

Complete if Known	
Application Number	13/707,119
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First Named Inventor	THOMAS W. LANNI
Art Unit	2836
Examiner Name	DANIEL J. CAVALLARI
Attorney Docket Number	081088-0419555

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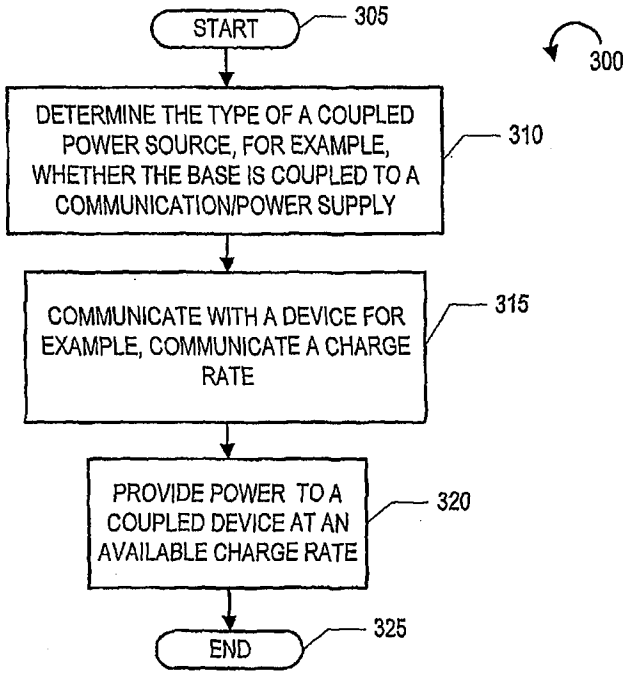
(54) Title: METHODS AND APPARATUS FOR CHARGING A POWER SOURCE



(57) Abstract: Methods and apparatus for charging a power source comprising determining a type of power supply used by a base, communicating a charge rate to a power source charging module and providing power to the power source at a charge rate. In one embodiment, a scanner can recharge from a cradle that receives power from either a dedicated external power source or through USB by adjusting its charge rate based on a communication from the base.

WO 2006/116298 A1

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— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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METHODS AND APPARATUS FOR CHARGING A POWER SOURCE

FIELD OF THE INVENTION

[001] The invention is directed to the powering of electronic devices and, more particularly to methods and apparatus for charging a power source, such as, for example, a rechargeable battery.

BACKGROUND OF THE INVENTION

[002] Wireless electronic devices such as cell phones, handheld scanners, mobile computers, electronic pets, etc. normally comprise a rechargeable power source, such as, for example, a battery. The electronic device can be recharged by coupling the device to an accompanying base. The base can draw power from another battery, a communicant/power supply interface and/or an electrical outlet.

[003] Some communication interfaces, such as, for example, the Universal Serial Bus (USB) interface, an IEEE 1394 interface, etc. can provide power to coupled devices as well as communicate data. These combination communication/power supply interfaces can have a maximum allowable current draw. For example in USB, the maximum allowable current draw from a USB host is 500mA. This limit may not be as high as an electronic device could draw if the base was powered by another type of external power supply. If an electronic device attempts to draw a current amount over the limit, the USB host shuts off power to the base due to excessive current draw and the electronic device would not be recharged.

[004] Accordingly, there is a desire for methods and apparatus for charging a power source from a base that can draw power from a plurality of different sources that may have a plurality of different current draw limits.

SUMMARY OF THE INVENTION

[005] The invention as described and claimed herein satisfies this and other needs, which will be apparent from the teachings herein. An embodiment of the invention includes methods and apparatus for charging a power source, such as, for example, a rechargeable battery.

[006] An exemplary method of charging a power source comprises determining a type of power supply used by a base, communicating a charge rate to a power source charging module, and providing power to the power source at a charge rate. In an exemplary embodiment, the electronic device can be a scanner and the base can be a cradle.

[007] The cradle can be coupled to a plurality of different power supplies, such as, for example, a dedicated power supply from an outlet and/or a communication/power supply interface. The communication/power supply interface can be, for example, a USB interface or an IEEE 1394 interface. The power source for the scanner charges at a rate that depends on the type of power supply used by the cradle. If the cradle uses a power supply that can handle higher current draws, then the scanner draws more current, and if the cradle uses a power supply that has a lower current draw limit, then the scanner limits its charge rate in accordance with the lower current draw limit.

[008] In an embodiment of the invention, the scanner comprises a power source charging module, which charges the scanner's battery. In alternate embodiments, the power source module can be implemented as part of the cradle. Before or after the scanner is coupled to the cradle, the cradle sends a message to the scanner, telling it what at what rate it should charge its power source. The message can be as simple as a

waveform signal and/or it can be a message that is part of a communication protocol between the cradle and the scanner.

[009] After the scanner learns a charge rate, the scanner sends a control signal to the power source charging module, which prepares to charge the scanner's battery at an appropriate charge rate. In an embodiment, a power source charging module comprises at least two current sources. The charge rate can be controlled by the number of current sources that are used.

[010] Other objects and features of the invention will become apparent from the following detailed description, considering in conjunction with the accompanying drawing figures. It is understood however, that the drawings are designed solely for the purpose of illustration and not as a definition of the limits of the invention.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[011] The drawing figures are not to scale, are merely illustrative, and like reference numerals depict like elements throughout the several views.

[012] Fig. 1 illustrates and exemplary device implemented according to an embodiment of the invention.

[013] Fig. 2 illustrates an exemplary base implemented according to an embodiment of the invention.

[014] Fig. 3A illustrates an exemplary base side power source charging method implemented according to an embodiment of the invention.

[015] Fig. 3B illustrates an exemplary power source charging implemented according to an embodiment of the invention.

[016] Fig. 4 illustrates an exemplary scanner implemented according to an embodiment of the invention.

[017] Fig. 5 illustrates an exemplary cradle implemented according to an embodiment of the invention.

[018] Fig. 6 illustrates the scanner of Fig. 4 coupled to the cradle of Fig. 5.

[019] Fig. 7 illustrates a block diagram illustrating exemplary modules of the scanner and cradle of Figs. 4 and 5.

[020] Fig. 8 illustrates an exemplary power source charging module implemented according to an embodiment of the invention.

[021] Fig. 9 illustrates an alternate power source charging module implemented according to an embodiment of the invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[022] There will now be shown and described in connection with the attached drawing figures several exemplary embodiments of methods and apparatus for charging a power source.

[023] Electronic devices often comprise rechargeable batteries as power supplies. Some of those devices can be coupled to a base to recharge their batteries. The base can be supplied with power through a number of different ways. For example, the base can be plugged into an outlet, it can draw power from another battery, or can be powered through a communication / power supply line, such as, for example, USB. The base can be configured to receive power from one method or through a plurality of different methods. Unfortunately, different power supplies may have different specifications, such as for example, maximum allowable current draws. Thus, if a device

expects a first power supply and draws current at an acceptable level for that first power supply, but the base is being supplied by a second power supply with a lower maximum current draw, the base will stop charging the device.

[024] This is not a desirable situation because the base has some power to recharge the device's battery, but it cannot because the device is drawing too much current. Thus, in an exemplary embodiment of the invention, a base determines the type or types of power supplies that it is using, and determines an appropriate charge rate for a coupled device. The charge rate is then communicated to a power source charging module. Using the power supply information, the power source charging module can then prepare to charge a device at an appropriate level. In alternate embodiments, the power source charging module can be located in the device or the base.

[025] Fig. 1 illustrates an exemplary device 100 implemented in accordance with the invention. The device 100 can be, in exemplary embodiments, a handheld scanner, a mobile computer, a cell phone etc. The device 100 comprises a processing unit 105, a power source 130, power source charging module 127, contacts 140 and memory 120 coupled together by bus 125. The modules of device 100 can be implemented as any combination of software, hardware, hardware emulating software, and reprogrammable hardware. The bus 125 is an exemplary bus showing the interoperability of the different modules of the invention. As a matter of design choice there may be more than one bus, and in some embodiments certain modules may be directly coupled instead of coupled to a bus 125. Additionally, some modules may be combined with others.

[026] When the device 100 is used in a mobile mode, the device 100 can receive power from power source 130, which can be a rechargeable battery or another source of electrical power. In addition, power source 130 can be a plurality of different power modules that work in conjunction or in a back up configuration. The device 100 can recharge its power source 130 through contacts 140. Contacts 140 can be, for example, exposed metal strips that align with contacts on a base, contacts in a slot for a wire that connects to a base, an electrical plug, etc. In addition to contacts 140 for recharging, device 100 can have additional contacts 140 that can be used for other purposes, such as, for example, communicating with the base.

[027] Processing unit 105 can be implemented as, in exemplary embodiments, one or more Central Processing Units (CPU), Field-Programmable Gate Arrays (FPGA), etc. In an embodiment, the processing unit 105 can comprise a general purpose CPU that processes software and raw image data stored in memory 120. In other embodiments, modules of the processing unit 105 may be preprogrammed or hardwired in the processing unit's 105 memory to perform functions, such as, for example, signal processing, etc. In alternate embodiments, one or more modules of processing unit 105 can be implemented as an FPGA that can be loaded with different processes, for example, from memory 120, and perform a plurality of functions. Processing unit 105 can comprise any combination of the processors described above.

[028] Memory 120 can be implemented as volatile memory, non-volatile memory and rewriteable memory, such as, for example, Random Access Memory (RAM), Read Only Memory (ROM) and/or flash memory. The memory 120 stores methods and processes used to operate the device 100. Different devices perform

different functions, thus different devices store different methods in memory. An exemplary device, such as, for example, a handheld scanner, can comprise a signal processing method 150, a power source charging method 160 and a power management method 155. The memory 120 can also be used to store data, and as mentioned above, memory 120 can be part of processing unit 105.

[029] In a scanner, when a decoding operation is initiated, for example, a trigger is pressed, the scanner 100 reads a target dataform, for example, a barcode, and analyzes the dataform. Signal processing method 150 is used by the scanner to decode dataforms. The scanner can be a laser scanner, imaging scanner, etc.

[030] Power management method 155 manages the power used by a device 100. In some embodiments, the device 100 can switch to a power save mode, when no activity is detected for a given amount of time. The power save mode can completely shut down the device 100 or alternatively, it can slow down device operations, or initiate other power saving techniques.

[031] In accordance with an embodiment of the invention, device 100 comprises power source charging method 160. In an embodiment of the invention, device 100 receives information from a base before the device 100 begins to charge. The information can comprise a charge rate the device uses to appropriately recharge its battery.

[032] For example, an exemplary power source charging module 127 can comprise a current source and a battery charger. The current source can comprise two or more current sources, and the level of current drawn by the device 100 can be controlled by the number of current sources that are used. Thus, in an exemplary embodiment,

when a base is supplied by a 110-volt outlet, the power source charging module127 uses all its current sources and draws current at a high rate. When the base is supplied by a USB interface, the power source charging module 127 uses less than all its current sources and draws current at a lower rate.

[033] In alternate embodiments, a power source charging module 127 can comprise a battery charger. The battery charger can charge a power source at different current levels based on a reference signal across one or more resistors. The reference signal can be controlled by switching off current to some of the resistors.

[034] The exemplary embodiment of Fig. 1 illustrates signal processing method 150, power source charging method 160 and power management method 155 as separate components, but these methods are not limited to this configuration. Each method described herein in whole or in part can be separate components or can interoperate and share operations. Additionally, although the methods are depicted in the memory 120, in alternate embodiments the methods can be incorporated permanently or dynamically in the memory of processing unit 105.

[035] Memory 120 is illustrated as a single module in Fig. 1, but in some embodiments device 100 can comprise more than one memory module. For example, the methods described above can be stored in separate memory modules.

[036] Fig. 2 illustrates an exemplary base 200 implemented in accordance with an embodiment of the invention. The base 200 comprises a processing unit 205, recharging module 230, communication interface 210, contacts 240 and memory 220 coupled together by bus 245. As with the device 100, the bus 245 of the base 200 illustrates the interoperability of the modules of base 200. In other embodiments, some

modules of the base may be directly coupled together and/or incorporated within one another.

[037] The processing unit 205 and the contacts 240 can be similar to the processing unit and contacts of the device 100. The level of "intelligence" of the base 200 is variable, and the number of modules that are in the base 200 can correspond to the intelligence of the base 200, or in other embodiments an exemplary base with a plurality of features can be made to emulate a base with less features. For example, in some embodiments, the base 200 can perform only a recharging function through recharging module 230. In other embodiments, the base 200 can additionally provide a communication link to a managing computer through communication interface 210.

[038] In some embodiments of the invention, the recharging module 230 can also comprises the power source charging module 127 described in Fig. 1. Such a base can recharge devices that do not have a power source charging module 127 and/or it can recharge devices with a power source charging module by bypassing the module 127 or telling the device 100 to turn the module 127 off.

[039] The memory 220 of base 200 can have stored thereon, a number of methods for operating the base 200. For example, the base 200 can be modified to perform device management through device management method 265. Device management can include, for example, address pairing between a base 200 and a device 100.

[040] In addition, in an exemplary embodiment of the invention, base-side power source charging method 260 can be used to charge the power source of a device. For example, when power is supplied to the base 200, side power source charging method

260 determines the types of power supplies coupled to the base 200, and chooses one or more to use for power and to recharge the power supply of a device. In an embodiment of the invention, the method 260 has a preference for a higher capacity power supply. Device management method 265 and base side power source charging method 260 can be stored in memory 220, in an embodiment. Memory 220 can be similar to the memory 120 of device 100.

[041] Fig. 3A illustrates an exemplary base side power source charging method 300 implemented in accordance with an embodiment of the invention. In embodiments of the invention, the method 300 can be implemented as the base side power source method 260 of base 200.

[042] Method 300 starts in step 305, for example, when a base 200 receives power and/or is turned on. Processing proceeds to step 310, where the base 200 determines the type of a coupled power source, for example, the base 200 can be coupled to a 110-volt outlet and/or the base can be coupled to a communication/power supply interface such as a USB interface. In an embodiment, the base can have a preference to use the higher capacity power supply. In alternate embodiments, the plurality of different powers source can be combined.

[043] Following step 310, processing proceeds to step 315, where the base 200 communicates with a device 100, for example the base 200 communicates a charge rate to the device 100. The communication can be an electrical signal representing a charge rate and/or in alternate embodiments, the communication can be part of a messaging protocol between the base 200 and the device 100. The communication can occur through an electrical connection between the base 200 and the device 100, and/or in

alternate embodiments, the base 200 and the device 100 can communicate wirelessly before the device 100 is couple to the base 200.

[044] In an alternate embodiment of the invention, the base 200 further comprises a power source charging module 127. In this embodiment, the communication step 315, can comprise an instruction to the device 100 to turn off its power source charging module 127. Additionally, the base 200, through processing unit 205, can communicate with its power source charging module 127 to prepare the module to charge at an available charge rate.

[045] Returning to step 315 of Fig. 3A, the base 200, in one exemplary embodiment, communicates to a device 100 to charge at a normal rate or a reduced rate. In alternate embodiments, the base 200 can choose from a plurality of different rates. Fig. 3B illustrates an exemplary power source charging method 330 that can be implemented as power source charging method 160 of device 100. Method 330 starts in step 430, for example when a device 100 is coupled to a base 200.

[046] Processing proceeds to step 345, where the device communicates with a base 200. The communication can comprise a charge rate at which the device 100 can charge its power source. Following step 345, processing proceeds to step 350 where the device 100 determines whether to charge at a first rate or a second rate. If the communication from the base 200 indicates to the device 100 to charge at a first rate, processing proceeds to step 355. In step 355, the device 100 prepares to charge at a first rate. In one exemplary embodiment, the first rate can be a reduced rate. In the embodiment where the device 100 comprises two or more current sources, a reduced

charge rate can be achieved by using one current source. Following step 355, processing of method 330 ends in step 365.

[047] Returning to step 350, if the communication from the base 200 indicates that the device 100 can charge at a second rate, processing proceeds from step 350, to step 360. In step 360, the device 100 prepares to charge its power source at a second rate. In an exemplary embodiment, the second rate can be a normal/full charge rate. In the embodiment where the device 100 comprises two or more current sources, a normal/full charge rate can be achieved by activating all the available current sources. In an embodiment, the power source charging module 127 of a device 100 can comprise two current sources. One current source is always on, and the other current source is turn on, under control of the processing unit 105, when a full charge rate is available. Following step 360, processing of method 330 ends in step 365.

[048] Returning to step 315 of Fig. 3A, processing proceeds from step 315 to step 320, where the base 320 provides power to a coupled device 100 at an available charge rate. Since, in an embodiment of the invention, the base 200 communicates the appropriate charge rate to the coupled device 100, and the device prepares to charge at that appropriate rate, the device 100 can charge at any rate that is available to the base. Therefore, the device will automatically charge whether the base 200 is powered by a high capacity supply or a low capacity supply. Processing of method 300 ends in step 325, for example, when the device's power source is charged.

[049] Figs. 4-7 illustrate an exemplary scanner 400 and cradle 500 implemented in accordance with an embodiment of the invention. Fig. 4 illustrates a wire frame diagram of an exemplary scanner 400. The scanner 400 comprises four contacts 440 on

the bottom of it handle. Two of the contacts are used to recharge the scanner's 400 power source and the other two contacts are used to transfer data between the scanner 400 and the cradle 500.

[050] Fig. 5 illustrates an exemplary cradle 500 implemented in accordance with an embodiment of the invention. The cradle 500 comprises a first receiving structure positioned on the top of the cradle 500 for receiving the head of the scanner 400 and a second receiving structure positioned at the bottom of the cradle 500 for receiving the handle of the scanner. The second receiving structure comprises four contacts (not shown) that correspond to the contacts 440 on the bottom of the scanner 400. When the scanner 400 is place in the cradle 500 as illustrated in Fig. 6, the contacts 440 of the scanner 100 and the contacts of the cradle 500 are aligned to form a connection. As mentioned above the connection can be used to transfer data to and from the scanner 400 and to charge the power source of the scanner 400.

[051] As illustrated in Fig. 6, the base can be coupled to a terminal 675, such as for example a POS terminal. The connection can be through a USB interface which the cradle 500 can use for communications with the POS terminal 675. The POS terminal 675 can be coupled to another computer from which it receives product information, updates, etc. The POS terminal 675 can also act as a USB host and provide power to the cradle 500. The cradle 500 can also be coupled to another external power supply, such as, for example, a 110-volt outlet.

[052] Fig. 7 illustrates an exemplary block diagram of scanner 400 and cradle 500. Cradle 500 comprises a 6.5Vstep-up module 710, a supply mux 715, a 5 volt buck 720, a 3.3V LDO (low dropout) regulator 725, a processing unit 705, a radio 730 and an

antenna 735. The scanner 400 comprises a 5V LDO 740, a current source 755, a battery charger 770, a charge FET 760, a dead switch 765, a battery 785, a 3.3V LDO 745, a 5V step-up 750, a processing unit 775, a scan engine 790, a radio 780 and an antenna 795.

[053] The cradle can obtain power from a plurality of different sources. For example, power can be supplied from a 5V cable, such as, for example, a USB cable, coming from the terminal, or power can be supplied by an external power source, such as for example from an electrical outlet or from another battery. The supply mux 715 detects which line is providing the cradle with power and sends the power to 5V buck regulator 720, which maintains a 5V voltage.

[054] The 5V buck 720 is coupled to the 6.5V step-up 710 and the 3.3V LDO 725. The 6.5 V step-up is coupled to the cradle's 500 contacts which are coupled to the contacts of the scanner 400. One contact can be a supply line while the other contact can be a ground. The 3.3V LDO is coupled to the processing unit 705. The processing unit 705 is coupled to the radio 730, and the radio 730 is coupled to an antenna 735. The cradle 500 can use the radio 730 and antenna 735 to communicate with the scanner 400 when the scanner is operating in a mobile mode. The exemplary cradle 500 of Fig. 7 also comprises a processing unit 705 that has a connection to a host interface. The host interface can be a USB interface coupled to a POS terminal host.

[055] In an exemplary embodiment, the cradle 500 can determine whether it is coupled to a USB host by sending pulses on unused USB pins that are shorted. If the cradle 500 receives the same pulses as it outputs, then it is coupled to a USB host.

[056] In alternate embodiments the cradle 500 can communicate with a terminal using the radio 730 and antenna 735 instead of a USB connection.

[057] The processing unit 705 can also be coupled to the contacts of cradle 500. When a scanner 400 is placed in the cradle 500 the contacts of the cradle 500 make a connection with the contacts of the scanner 400. The contacts of the scanner are coupled to a processing unit 775 in the scanner 400. Thus, the cradle 500 and the scanner 400 can communicate information, including a charge rate, between each other through this connection.

[058] As mentioned above, the scanner 400 also has two contacts for receiving power from the cradle 500. The supply line is coupled to the 5V LDO 740, the current source 755 and an analog to digital converter in the processing unit 775. The current source 755 is coupled to one prong of the charge FET 760, the 5V LDO 740 is coupled to a second prong of the charge FET 760 and the battery charger 770 is coupled to a third prong of the charge FET 760. The current source is also coupled to the processing unit 775. The second prong of the charge FET 760 is also coupled to a bus coupling the 3.3V LDO 745, the 5V step-up 750 and the dead switch 765. The other end of the dead switch 765 is coupled to the scanner's 400 power source 785.

[059] The connections between the modules in the scanner 400 are exemplary and may not be complete. Additional communications channels, which are not shown, can exist between the various modules of the scanner 400. In addition, the communication channels between the modules of the cradle 500 are also exemplary and may not be complete. Additional communications channels, which are not shown, can exist between the various modules of the cradle 500.

[060] The 3.3V LDO 745 provides a consistent 3.3 volts to the processing unit 775 and the radio 780, while the 5V step-up 750 provides power to the scan engine 790.

The scanner 400 can use the radio 780 and the antenna 795 to communicate with the base 500 when the scanner 400 is in a mobile mode.

[061] In an exemplary recharging operation, the supply mux 715 chooses an available power source. When both power sources types are available, the supply mux 715 chooses the external voltage because it has a higher current capacity. Then, the cradle 500 determines which power source the supply mux 715 has chosen and stores that information. The cradle 500 then uses that selection information to choose an appropriate charge rate for a scanner 400.

[062] When a scanner 400 is coupled to the cradle 500, the cradle 500 and the scanner 400 communicate with each other. In one embodiment, the cradle 500 sends a message to the scanner 400, informing it to charge at a particular rate. Using the charge rate information received from the cradle 500, the scanner 400, through processing unit 775, adjusts a power source charging module 127 to charge at the received rate. The battery charger 770 turns on the charge FET 760, and the battery begins to charge. Thus, the scanner 400 automatically charges from either the 5V cable or the external voltage.

[063] The power source charging module 127, comprises current source 755, battery charger 770 and charge FET 760. Figs. 8 and 9 illustrate two different power source charging modules 800, 900 that maybe used in different embodiments of the invention. In alternate embodiments of the invention, any module that can control current levels may be used as a power source charging module 127.

[064] Exemplary scanner 400 comprises a nickel metal hydride power source 785 and the current source 755 can be implemented with a module similar to the power source charging module 800 illustrated in Fig. 8. Power source charging module 800

comprises a power supply line 805 that is coupled to two current sources 810, 815. The current sources 810, 185 are also coupled to a power source 820. One of the current sources 810, is coupled to and controlled by processing module 825.

[065] In this exemplary embodiment, when the scanner 400 charges at a reduced rate, the processing module 825 does not activate current source 810, and the power source 820 only draws power from current source 815. In one exemplary embodiment, the maximum current draw of the current source 815 can be set to correlate with the lower capacity power supply available to the cradle 500. The maximum current draw from a USB host is 500 mA. When the scanner 400 charges at a full charge rate, the processing module 825 activates the other current source 810, and the power supply 820 draws power from both current sources 810, 815. Thus, the scanner 400 draws the proper amount of current from the cradle 500, and a USB host coupled to the cradle 500 will not shut off power to the cradle 500 for drawing too much current.

[066] In an alternate embodiment, an electronic device may have a lithium ion battery as a power supply. In this embodiment, a current source may not be needed and a power source charging module 127 similar to the module 900 illustrated in Fig. 9 may be implemented.

[067] The power source charging module 900 illustrated in Fig. 9 comprises a battery charger 910, a power source 915, a processing module 935, two resistors and a switch 920. The battery charger 910 draws current from a power supply line 905, and charges a coupled power source 915. The level of current that the battery charger 910 draws from the line 905 can be controlled, through the processing module 935, by the switch 920 and the two resistors 925, 930.

[068] In an exemplary embodiment, when the switch 902 can be turned off and on to control the charge rate of the battery charger 910. When the switch is off the battery charger 910 reads resistor 925, and charges the battery 915 at a reduced rate. When the switch is on, the battery charger 910 read both resistors 925, 930 and charges the battery 915 at a maximum rate. The battery charge 910 can be scaled to charge at a plurality of different rates by adding additional resistors.

[069] While there have been shown and described and pointed out fundamental novel features of the invention as applied to preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and detail of the disclosed invention may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

CLAIMS

What is claimed:

1. A method of charging a power source comprising:

determining a type of power supply used by a base;

communicating a charge rate to a power source charging module; and

providing power to said power source at said charge rate.

2. The method of claim 1, wherein the step of communicating a charge rate to a power source charging module is performed before a device is coupled to said base for charging.

3. The method of claim 1, wherein said power source charging module is located in a device, said device comprising a rechargeable power source.

4. The method of claim 1, wherein the step of communicating a charge rate to a power source charging module is communicated as part of a communication protocol between said base and a device.

5. The method of claim 1, further comprising preparing to charge said power source based on said type of power supply.

6. The method of claim 5, wherein the step of preparing to charge said power source based on said type of power supply comprises sending a signal to a current control module to charge said power source at a charge rate based on the type of power supply used by said base.

7. The method of claim 6, wherein said current control module comprises at least one of a current source and a power source charger.

8. The method of claim 1, wherein the step of determining a type of a power supply used by a base comprises:

determining whether said base is coupled to a dedicated power supply; and

determining whether said base is coupled to a hybrid communication and power supply when a negative determination is made on the dedicated power supply.

9. The method of claim 8, wherein said hybrid communication and power supply is at least one of a universal serial bus system and an IEEE 1394 system.

10. A charging base comprising:

a multiplexing module for selecting an available power supply;

a processing unit; and

memory having stored thereon at least one process for,

determining a type of power supply used by said base,

communicating a charge rate to a power source charging module, and

providing power to a power source at said charge rate.

11. The charging base of claim 10, wherein said multiplexing module selects one of a dedicated power supply and a hybrid communication and power supply.

12. The charging base of claim 10, further comprising a communication module and an antenna for wireless communication with a device.

13. The charging base of claim 10, wherein said charging base is coupled to a point of sale terminal.

14. The charging base of claim 10, wherein said at least one process further comprises preparing to charge a power source based on said type of power supply.

15. The charging base of claim 14, further comprising a current control module, and wherein the step of preparing to charge a power source based on said type of power supply comprises sending a signal to said current control module to charge said power source at a charge rate based on the type of power supply used by said base.

16. A computing device comprising:

a power source;

a processing unit; and

memory having stored thereon at least one process for,

communicating with a base to determine a charge rate, and

receiving power from said base at said charge rate.

17. The computing device of claim 16, further comprising a communication module and an antenna for wireless communication with a base.

18. The computing device of claim 16, wherein said power source is one of a nickel metal hydride battery and a lithium ion battery.

19. The computing device of claim 16, wherein said computing device is a dataform scanner.

20. The computing device of claim 16, wherein said at least one process further comprises preparing to charge said power source based on said type of power supply used by said base.

21. The computing device of claim 20, further comprising a current control module, and wherein the step of preparing to charge said power source based on said type

of power supply comprises sending a signal to said current control module to charge said power source at a charge rate based on the type of power supply used by said base.

22. The computing device of claim 21, wherein said current control module comprises at least one of a current source and a power source charger.

23. The computing device of claim 22, wherein said current control device comprises at least two current sources, and said charge rate is adjusted by the number of current sources that are used.

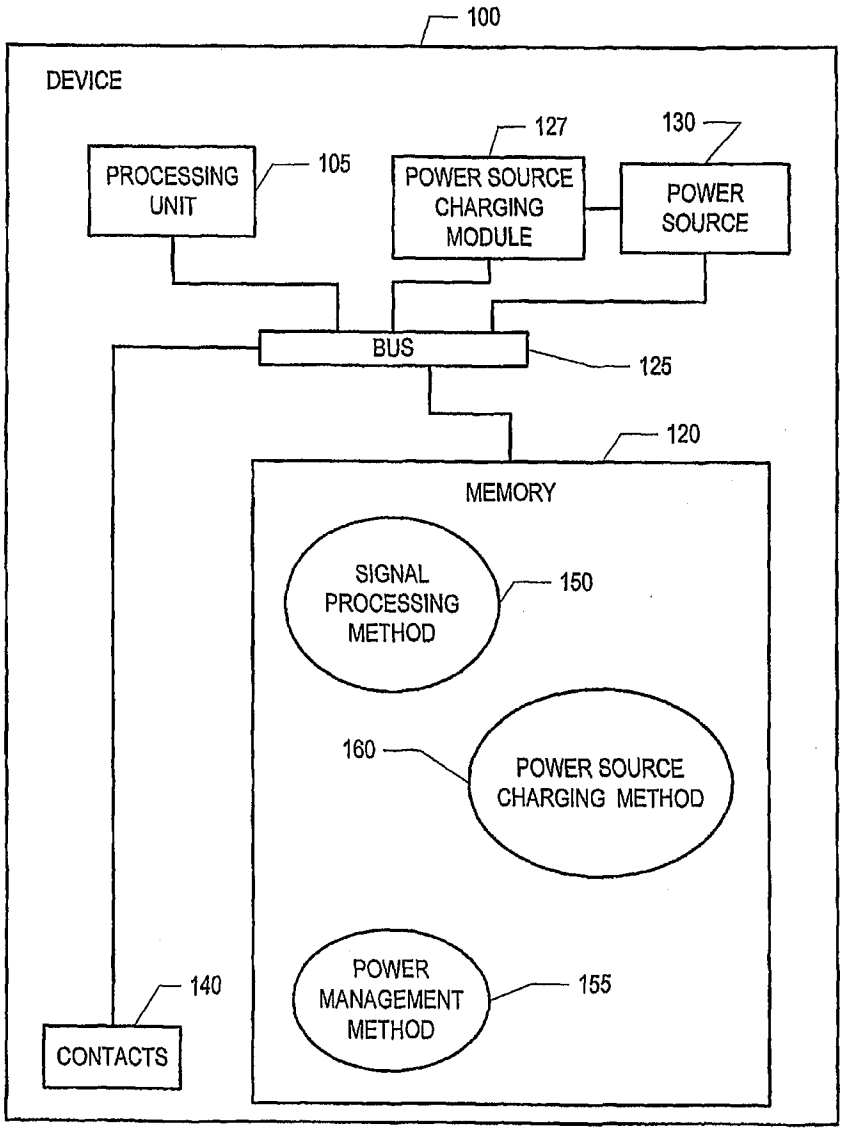
100
DEVICE
PROCESSING UNIT
105
127
POWER SOURCE CHARGING MODULE
130
POWER SOURCE
BUS
125
120
MEMORY
SIGNAL PROCESSING METHOD
150
160
POWER SOURCE CHARGING METHOD
POWER MANAGEMENT METHOD
155
140
CONTACTS

FIG. 1

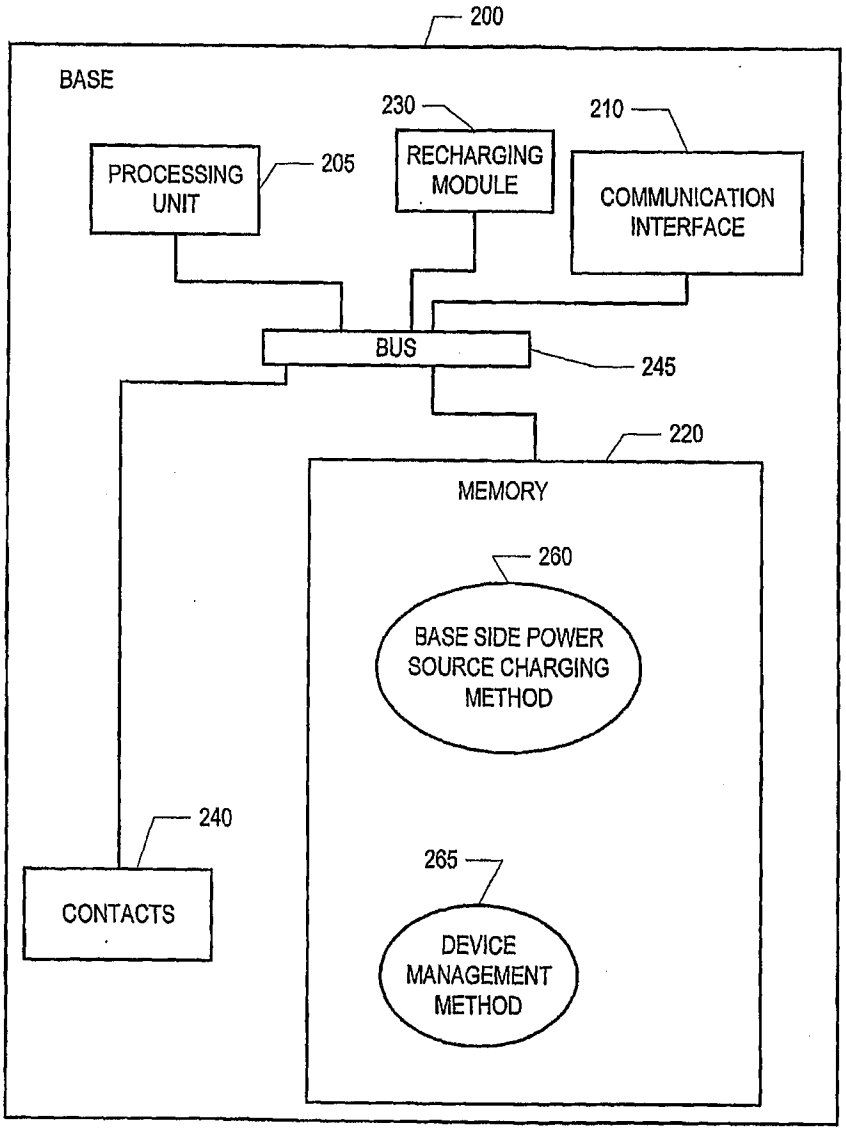
200
BASE
230
RECHARGING MODULE
210
COMMUNICATION INTERFACE
PROCESSING UNIT
205
BUS
245
220
MEMORY
260
BASE SIDE POWER SOURCE CHARGING METHOD
240
CONTACTS
265
DEVICE MANAGEMENT METHOD

FIG. 2

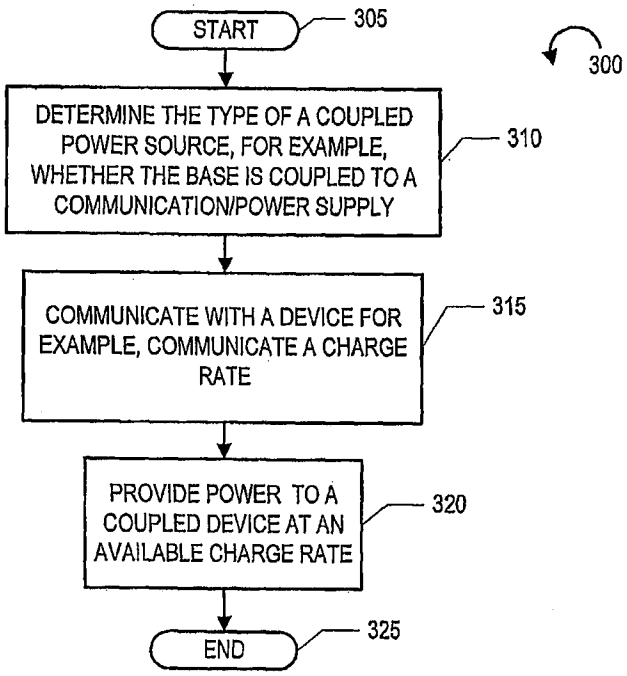
START
305
300
DETERMINE THE TYPE OF A COUPLED POWER SOURCE, FOR EXAMPLE, WHETHER THE BASE IS COUPLED TO A COMMUNICATION/POWER SUPPLY
310
COMMUNICATE WITH A DEVICE FOR EXAMPLE, COMMUNICATE A CHARGE RATE
315
PROVIDE POWER TO A COUPLED DEVICE AT AN AVAILABLE CHARGE RATE
320
END
325

FIG. 3A

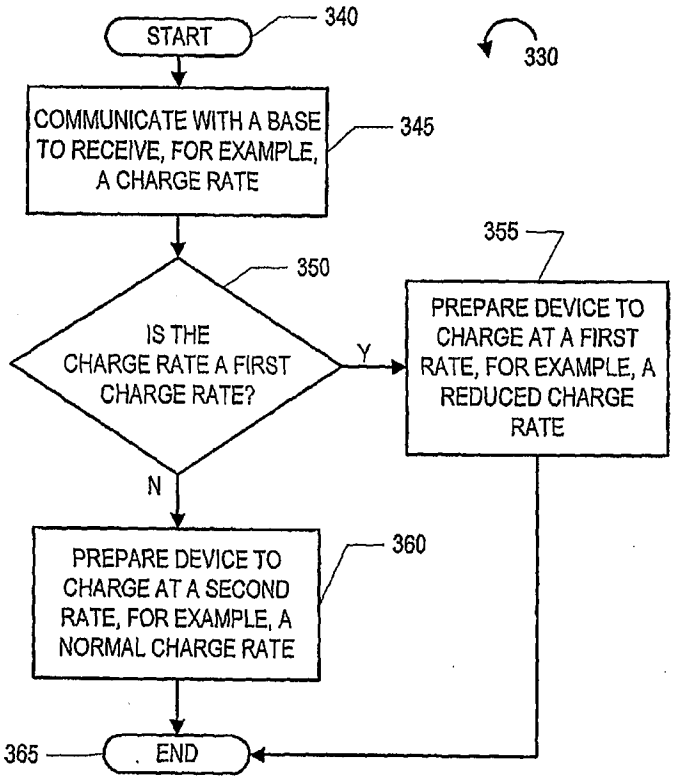
START
340
330
COMMUNICATE WITH A BASE TO RECEIVE, FOR EXAMPLE, A CHARGE RATE
345
355
350
IS THE CHARGE RATE A FIRST CHARGE RATE?
Y
PREPARE DEVICE TO CHARGE AT A FIRST RATE, FOR EXAMPLE, A REDUCED CHARGE RATE
N
PREPARE DEVICE TO CHARGE AT A SECOND RATE, FOR EXAMPLE, A NORMAL CHARGE RATE
360
365
END

FIG. 3B

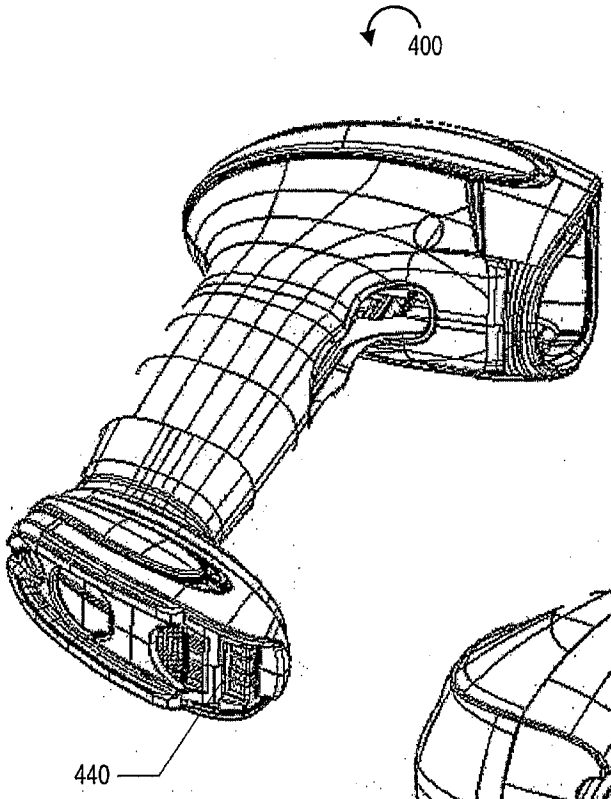

FIG. 4

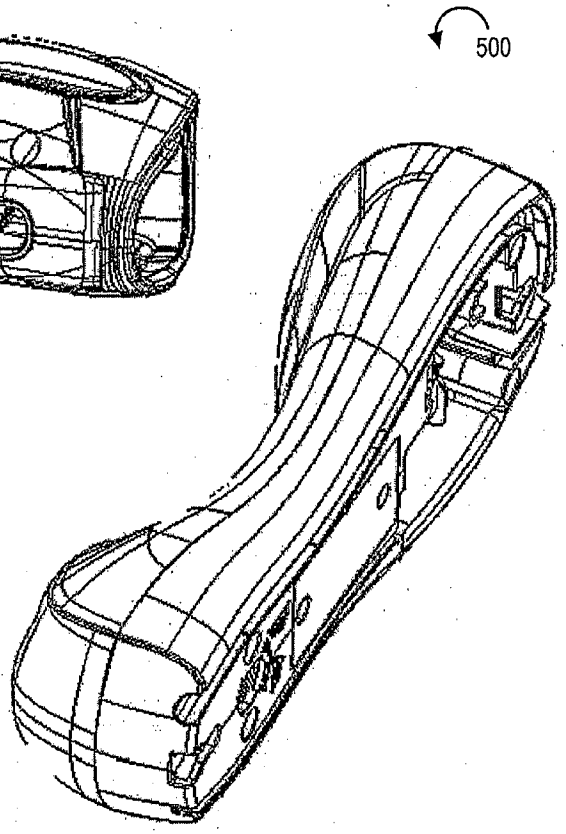

FIG. 5

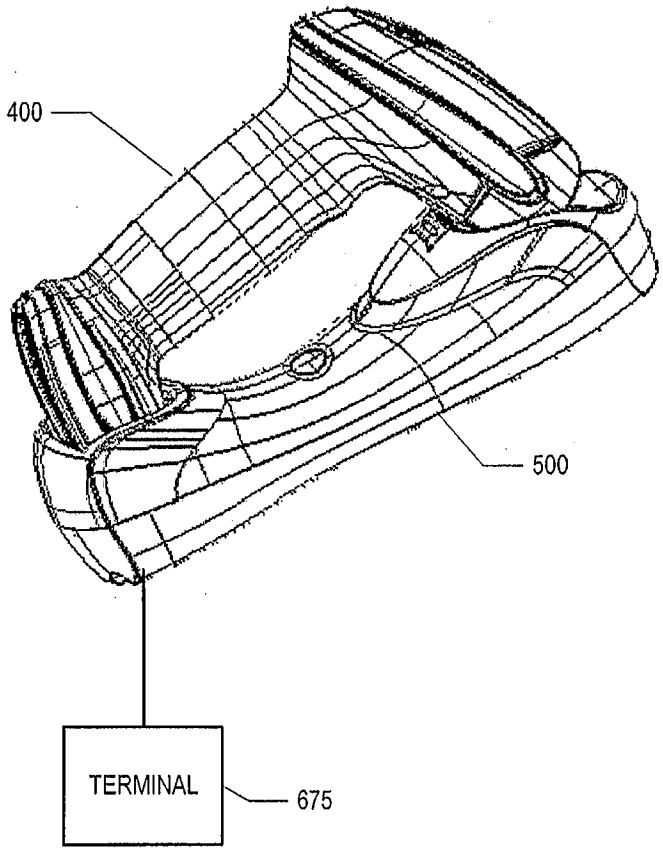

FIG. 6

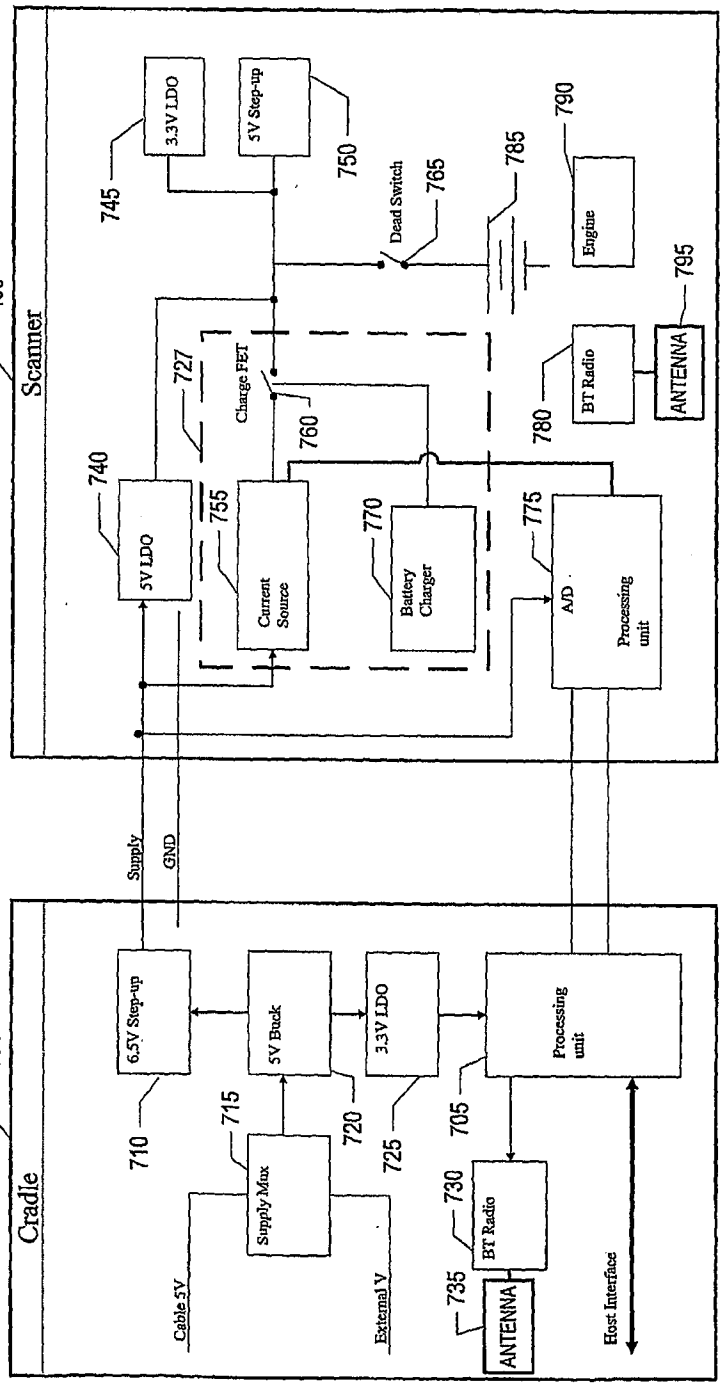
400
Scanner
745
3.3V LDO
750
5V Step-up
Dead Switch
765
785
790
Engine
795
ANTENNA
BT Radio
780
727
Charge FET
760
740
5V LDO
755
Current Source
770
Battery Charger
775
A/D
Processing unit
Supply
GND
500
Cradle
6.5V Step-up
5V Buck
3.3V LDO
Processing unit
710
715
720
725
705
Supply Mux
730
BT Radio
735
ANTENNA
Cable 5V
External V
Host Interface

FIG. 7

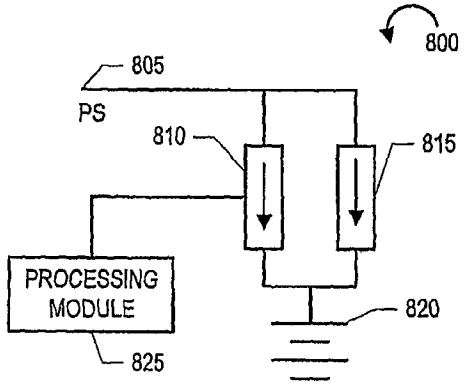
800
805
PS
810
815
PROCESSING MODULE
820
825

FIG. 8

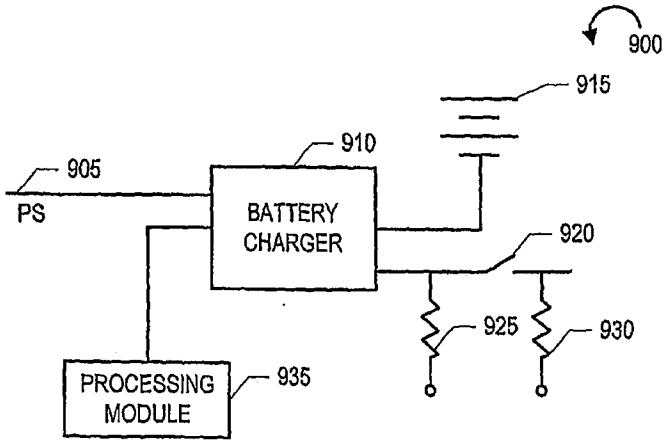
900
915
910
905
PS
BATTERY CHARGER
920
925
930
PROCESSING MODULE
935

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/015452

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F1/16 H02J7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06F H02J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 487 081 A (RESEARCH IN MOTION LIMITED) 15 December 2004 (2004-12-15) abstract paragraphs [0001], [0003], [0005] - [0011], [0015] - [0030]; figures 1,3-6	1,3-5,9, 10, 16-18,20
Y		6,7,15, 19,21,22
Y	US 2003/054703 A1 (FISCHER DANIEL M ET AL) 20 March 2003 (2003-03-20) abstract paragraphs [0043] - [0082], [0089]; figures 1-5,9-12b	6,7,15, 21,22
Y	US 6 886 104 B1 (MCCLURG GEORGE WILLIAM ET AL) 26 April 2005 (2005-04-26) the whole document	19

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2006	28/07/2006

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Lorenzo Feijoo, S

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/015452

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/052547 A1 (FISCHER DANIEL M ET AL) 20 March 2003 (2003-03-20) the whole document	
A	US 2003/030412 A1 (MATSUDA KUNIAKI ET AL) 13 February 2003 (2003-02-13) abstract paragraphs [0044], [0079] - [0090], [0106] - [0118], [0137], [0138], [0144], [0145]; figures 4,8,10	
A	WO 2005/013456 A (PN TELECOM CO., LTD; PARK, YOON) 10 February 2005 (2005-02-10) abstract the whole document	
A	US 6 288 522 B1 (ODAOHHARA SHIGEFUMI ET AL) 11 September 2001 (2001-09-11) abstract; claims 1-13	
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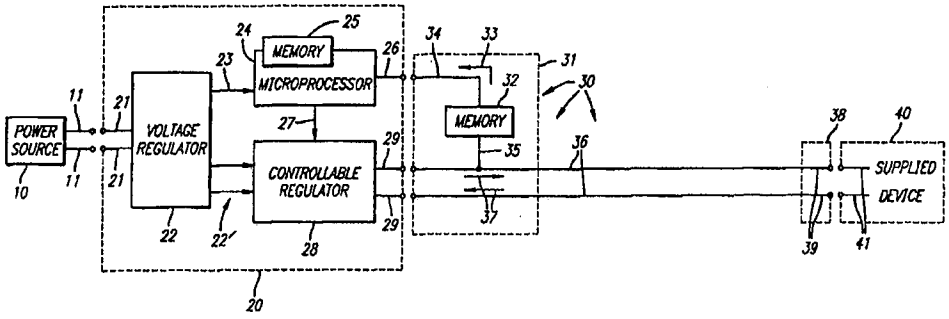

(57) Abstract

The system provides electricity to operate any of a multiplicity of devices (40) and most typically receives power from a source (10) and passes power to any of the devices (40). The system also accepts electronic-device identification information for any particular one of such devices (40). The system also has one or more programmed digital electronic microprocessors (24) that use the identification information to select power parameters for passage of power from the source (10) to the powered device (40). The system activates its own power passing capability to apply power to each device (40) according to the power parameters selected by the microprocessor (24). A cable (36), which for some purposes may be regarded as a part of the system and for some purposes is a separate invention, connects the microprocessor (24) and power passing parts of the system to the powered device (40); the identification information is held either in the cable, typically in a ROM, PROM, EPROM or other memory chip (32) in one of the end connectors of the cable (36) or in a device (40) to be powered, or in a power adapter which is at either end of the cable or within the device (40) to be powered, and is read by the system microprocessor (24) before power is supplied. In some forms of the invention, a power adapter receives a.c. power from the system and derives, from the a.c. power (10), power in a modified form for operation of the device.

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IMPROVED UNIVERSAL POWER-SUPPLY CONNECTION SYSTEM FOR MULTIPLE ELECTRONIC DEVICES, AND DEVICES FOR USE THEREWITH

BACKGROUND OF THE INVENTION

This invention relates generally to supplying electrical power to electronic and other electrical devices; and more particularly to systems and apparatus for providing electrical power to operate any of a multiplicity of such devices.

Although a general introduction appears below, it will be helpful to readers who are already familiar with my U. S. Patent 5,570,002 on this subject to know at the outset that this present document deals not only with the invention as set forth and/or claimed in that patent, but also with certain special cases of the invention. In these special cases: (1) a power adapter is used as part of, or instead of, the special power cable of my earlier invention — and the adapter per se may be at either end of the cable; (2) identifying information for an electronic device is passed from, or through, a power adapter to a power-supply system, rather than through a cable as such; (3) identifying information is held in a memory unit within a power adapter, rather than in a cable; and (4) some forms of the invention as claimed are, or include, an electronic device (rather than a cable) that holds a memory unit for identifying the device to a power-supply system. To an extent these several special cases may arise either independently or in various combinations.

In many situations it is desirable to make general provision for supplying electrical power to a device that will be provided later, as for instance by a customer or other user of a multiuser facility. By "multiuser facility" I mean to encompass a facility used by just a small number of people at a time, or even one person at a time — but in which the people or person using the facility at any time are typically different from the people or person using it at other times — and in any event the individual device cannot be specified or identified in advance.

Mobile facilities, which is to say vehicles — such as ships, airplanes, trains, buses and automobiles are examples of such multiuser facilities. Continuing in the same vein, stationary facilities of interest for present purposes include transportation terminals such as airport lounges.

Other pertinent types of multiuser facilities include hotels, restaurants, convention and exhibit halls, schools, laboratories and offices. Problems related to supply of electrical power in all such multiuser facilities will now be discussed.

As will shortly appear, however, it is possible to analyze and generalize the problems under discussion. Such generalization will lead to realization that related problems, such as economic inefficiencies, are present even in single-user circumstances.

In a mobile facility and elsewhere far from the user's own home or office it can be particularly important to supply electrical power exclusively in correct form for the device which will use that power, and furthermore exclusively to devices which are suitable for operation in the particular facility. For instance, supplying power in an incorrect form (for instance incorrect voltage) may damage the device to which the power is supplied, and such damage may be especially problematic for a user who is in transit — when repair or replacement may be unfeasible.

In a mobile facility, supplying power in an incorrect form may also cause problems more intimately related to the power-supplying equipment — by damaging that equipment, or taking it temporarily out of service. Such equipment may be particularly limited in current-carrying capacity or in ability to accept loads or signals reflected from the electrical device back into the supply.

Here too, repair or replacement of a mobile power supply en route may be unfeasible on account of the limitations inherent in travel. Similarly some candidate solutions such as fuses and circuit breakers within vehicles pose their own inherent undesirable costs and inconveniences.

Even more importantly, some electrical and particularly electronic devices interfere with safe operation of nearby equipment such as a vehicle in which such devices are used.

A classical and well-known example of this problem is computer-generated interference with air navigation.

Thus for some situations it may be desirable to entirely deny, rather than supply, power for particular individual devices. To put it another way, it may be desirable to entirely deny power for any device that is not approved for use.

To facilitate generality of expression in this document, however, denying power will be encompassed within the concept of selecting power parameters for the particular combination of electrical device and facility — and then applying power "according to the power parameters". In other words, for purposes of this document it is to be understood that selected parameters in some cases may be "no voltage and no current".

Two modern developments make the problems outlined above particularly important. First is a proliferation of portable electronic devices which are nominally internal-battery operated, but which can operate from external power, and whose batteries require replacement or recharging at intervals considerably shorter than the uninterrupted duration of modern travel (as for transcontinental air flights) — and whose direct-external-power and charger-external-power requirements are extremely variegated.

Even for short-range travel, use of external power when available is usually preferable to conserve batteries for environments lacking external power. Such portable electrical devices range from ordinary audio cassette players and handheld electronic games, through portable television sets and video cameras, to full-capability personal computers, FAX machines and even computer printers.

Nominal power requirements of all these devices are extremely diverse as to current drain, voltage, direct vs. alternating waveform, and in the latter case frequency. Furthermore whereas some devices tolerate large departures from nominal values, others accommodate only rather tight tolerances in power characteristics.

Accompanying a great many of these devices, moreover, are rechargers for the internal batteries. In most cases

the input-power specifications for the chargers are entirely different from the direct-use external power specifications.

A second pertinent modern development is that some airplane-manufacturer interest has arisen in providing at each passenger seat, or for instance at each business or first-class passenger seat, an equipment pod that includes certain special amenities. Such amenities may for example include a separately deployable video monitor, and in particular a courtesy electrical-connector receptacle for supplying electrical power to laptop computers, dictating machines and the like.

Analogously in vehicles (such as ordinary buses) where navigational interference is not a problem, power receptacles for cellular telephones will be appropriate. More generally it may be desirable, in aircraft as well as other facilities, to power through such receptacles any of the great range of portable electronics mentioned above.

In order to make use of such a power-supply receptacle, each electronic device (computer, telephone, tape recorder etc.) must have a cable terminated compatibly with the receptacle. Such a compatible termination or adaptor is readily provided, but — by giving all devices in common an equal access to the facility power supply — only makes more severe the more-fundamental device-compatibility problems discussed earlier.

As will be understood, provision of such amenities at each seat in each aircraft in an entire new aircraft-model line aggravates in a time-immediate way the problems discussed above. This particularly focused need, however, is magnified by the general desirability of solving these problems for other types of vehicles and facilities.

Once attention is directed to the special problems of providing power in multiuser facilities, it can be appreciated that the broad diversity of electronic-device power requirements has itself created a very uneconomic variegation in commercially available separate power-supply modules. This diversity of power-supply units in turn has been fed by various factors, probably including for small-portable-device manufacturers the desirability of --

(a) supplying a single model for use in various countries with divergent house-voltage specifications, and

(b) avoiding submission of their products to the expensive and demanding sort of safety tests generally required for house-voltage apparatus.

A large number of different power-supply modules on the market introduces a significant element of added costs. Such costs are embedded throughout manufacturing, warehousing, inventorying, shipping, and related paperwork for all the related products.

Some manufacturers have attempted to reduce the maze of power-supply modules which travelers need, by providing custom battery-charger/power-supply input units that operate on any voltage from about 100 through 250 Vac, and at 50 or 60 Hz. Some such units may automatically test the voltage and frequency available, and modify their own power-input characteristics accordingly.

Devices so equipped accordingly require only a socket adapter when transported abroad, and thus solve a major problem of diversity as between countries. As will be understood, however, this type of enhancement does nothing to reduce the uneconomic diversity of power-supply specifications or modules within any country, as between different electronic devices.

In a hitherto unrelated field, it is known to provide and employ an integrated-circuit memory unit, such as a ROM, RAM, PROM or EPROM chip, for identification purposes. Modern semiconductor technology makes possible the provision of electronic "keys" or identification units that can each carry one of an essentially unlimited number of electronic key codes.

If desired, each code can be made unique, or substantially so. On the other hand, if preferred a large number of chips can be made with the same code — for use in distinguishing associated people or items from one another by categories.

For example, the DS 2400, 2401 and 2502 circuit devices manufactured by Dallas Semiconductors, Inc., of Dallas Texas, each have a numerical capacity equal to the fourteenth power of ten, or one hundred trillion, and can be manufactured in such a way that no two of them hold the same number. Thus the numerical range of ROMs and PROMs now on the market exceeds the earth's population by several orders of magnitude.

The above-mentioned Dallas Semiconductors devices are called by the firm its "Touch Memory" chips, as the devices are able to read or write with momentary contact. The firm houses each chip in a stainless steel container which the firm calls a "MicroCan". This coin-shaped container is 16.3 mm in diameter and 3.2/5.8 mm in height.

It is mounted it with one flat circular face of the can secured to the flat surface of a generally rectangular thin flat ID card or a thin flat generally oblong-shaped key fob. A user holds and manipulates the card or fob so as to insert the "MicroCan" into — for example — a generally forwardly facing electronic-lock receptacle, through which data in the chip are read into electronic circuitry within the lock.

The Dallas chips, housed as just described, are advertised for use in identifying a great variety of different things and entities such as people, livestock, or warehoused merchandise; for instance it is now advertised as useful for identifying different kinds of batteries in an inventory. As mentioned earlier, it has not been suggested heretofore that such ROM, PROM etc. chips might have any application to solving the multiple-power-supply problems discussed previously.

As can now be seen, the prior art has failed to provide solutions to important problems in the portable-electronics field.

SUMMARY OF THE DISCLOSURE

The invention corrects the failings of the prior art. Before offering a relatively rigorous discussion of the invention, some informal orientation will be provided here.

It is to be understood that these first comments are not intended as a statement of the invention. They are simply in the nature of insights that will be helpful in recognizing the underlying character of the prior-art problems discussed above (such insights are considered to be a part of the inventive contribution associated with the invention) — or in comprehending the underlying principles upon which the invention is based.

Through modern electronics it is possible to provide a single electronic apparatus capable of supply electrical power at any of a great number of different power specifications — that is to say, voltage, impedance, current range, and waveform. It is also possible to control that apparatus to provide power selectively at some particular power specification.

Furthermore the control can be made automatic — based upon information about the device which is to use the supplied power. Such information, in general principle, can take either of two broad forms: (1) a statement of the power specifications and (2) identification of the device to be powered, from which identification the power specifications can be found by reference to a suitable tabulation linking the identification and specifications for a great many different devices.

Still further the information about each device can be encoded in a memory chip and provided to the power-supply apparatus whenever that device respectively is connected to receive power from the supply apparatus. In other words each device can be caused to have an associated respective memory chip which provides the needed identification.

The part of such a power-supply apparatus that accepts and analyzes information from the individual-device memory chips, and controls the power supplied to the powered device, can nowadays be made very small and inexpensive. Similarly the identifying memory chip associated with each powered device can be very small and inexpensive.

The physical arrangements for association of a memory chip with each powered device are subject to considerable variation. For new devices, preferably the chip may be built into the device; for already-existing devices the chip may be

built into a new power cable (preferably into one of the connectors at the two ends of the cable) for each device.

As will be seen, such a cable may be completely passive, except of course for the readable information-carrying chip. This may be a maximally economical approach, as to the cable itself; however, as will be seen later a cable that includes or is associated with a power adapter may turn out — at least in certain environments — to be maximally economical overall.

Of course the costs of these elements cannot be zero, but through their use a single power supply — what might be called a "universal" power supply — can be used for virtually any portable apparatus, thereby introducing a major economy in terms of manufacturing and distribution for power supplies, as suggested previously. A more important economy, however, is that a single power-supply apparatus, provided in and preferably built into a multiuser facility, can be used to supply the portable-electronics needs of essentially any user who appears in the multiuser facility.

This latter economy can be enjoyed particularly in mobile facilities such as airplanes where space and weight allowances for such functions are stringently limited — and where power misapplication can bear severe consequences as pointed out in the preceding section of this document. Not only can each approved device be supplied with electrical power according to its own proper power specifications, but in addition each device can be screened to determine whether it is in fact an approved device for use in the environment of each facility respectively — and, if not, the power specifications for that combination of device and facility can be established, as suggested earlier, to be "no power".

It will be understood that from time to time there may be introduced new portable devices whose power specifications are not adequately compatible with categories previously held in the evaluative circuitry or tabulation that is embedded in the power-supply apparatus. Updating of the evaluative tabulation or circuitry may then become necessary or desirable, and may be facilitated by making that part of the apparatus either (1) a plug-in or otherwise easily replace-

able module, or (2) reprogrammable, as for example through the power port.

If desired such versatility can be limited to only more-expensive models actually intended for use in multiuser facilities. Some multiuser versions of the apparatus, those intended for plural and especially multiple concurrent use of power by plural or multiple devices, may also be made to take advantage of economies possibly available through sharing of a central or common evaluation/tabulation module for the facility; in addition to manufacturing economy it will be understood that economy can be realized in the updating procedure by replacing or reprogramming only the central module.

The present document focuses in part on power adapters, rather than completely passive cables as in my above-mentioned patent and in the foregoing paragraphs, because analysis indicates that, in many environments which are extremely important commercially, a system using adapters (most typically carried by the end-user, with the electronic device to be powered) can be far more economical than a system which supplies power directly in a form that can be used in most portable electronic devices. This is particularly true, for instance, in commercial passenger aircraft, where it is very adverse to add weight and other complications required for provision of d. c. power.

To the extent that a system actually calls for wiring of d. c. power over any significant distance within an aircraft, a significant adverse factor is the wiring weight needed to avoid undesirable voltage drops and heat dissipation. Further such power must be supplied in various voltages, for use in passengers' telephones, laptop computers, dictating equipment and the like; the requirement of providing voltage in so many different forms is thus undertaken by the common system, even though each single user only uses just one voltage at any given time — and even though many voltages may be used only very occasionally.

In short, although it has been stated above that multivoltage systems are possible, and in a sense even practical — and are within the scope of certain aspects of my

invention and corresponding ones of the appended claims — in at least certain environments such systems are not economically optimum. Systems according to the now-introduced aspects of my invention, to the contrary, are economically optimum in such environments; these systems provide power to operate devices at least one of which has an associated power adapter.

The adapter can receive a standard a. c. voltage from a system receptacle and perform the necessary transformation. Thus the requirement to provide the particular needed voltage can be absorbed by the end user (i. e., the party which wishes to use some particular obscure voltage requirement), and the system need merely check the adapter to determine whether it and its associated electronic device are compatible with the supply system.

Here "compatible" may only mean, for example, acceptable in terms of (1) total power required and (2) electromagnetic emissions. It should be recognized that the adapter, too, has some weight; however, the individual carrying a portable electronic device ordinarily carries an adapter with the device anyway. Therefore with the power-adapter systems according to my invention there is little or no net added weight.

Now with these preliminary observations in mind this discussion will proceed to a perhaps more-formal summary. The invention has several independent main aspects or facets, independently usable although for optimum enjoyment of their benefits they are best practiced together.

Of these main facets of my invention, the first three were presented in my above-mentioned patent, and are repeated below.

In preferred embodiments of a first one of these major aspects, the invention is a power-supply connection system for providing electrical power, from a source of electrical power, to operate any of a multiplicity of electronic devices. The system includes some means for receiving electrical power from such a source; for purposes of generality and

breadth in expression of the invention these means will be called simply the "power-receiving means".

In addition the system includes some means for passing electrical power to any of such electronic devices. Again for breadth and generality these will be called the "power-passing means".

The system also includes some means for accepting electronic-device identification information from any particular one of such electronic devices. These means, which will herein be designated the "information-accepting means", are associated with the power-passing means.

Further the system includes some means for using the identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to the particular one device. These means include a programmed digital electronic microprocessor, and will be called the "programmed digital electronic microprocessor means" or more simply "microprocessor means".

Still further the system includes some means for activating the power-passing means to apply power therethrough to the particular one device according to the power parameters. In other words, these activating means both (1) activate the power-passing means and (2) apply power through the power-passing means to the particular one device, in accordance with the parameters selected by the microprocessor means.

The foregoing may be a description or definition of the first main facet of the invention in its broadest or most general form. Even in this broad form, however, this first aspect of the invention can be seen to resolve the problems described in the preceding section of this document.

More specifically, this first broad form of the invention provides a single, universal power supply that can be used to supply power to virtually any portable electronic device of suitable power demand, whether in a multiuser facility or in some private context — such as a home or personal car. This universal supply thereby introduces important economies of manufacture, inventory and distribution, together with some provision for safety against power misapplication.

Although this first major aspect of the invention even in this broad form thus resolves prior-art problems, nevertheless this aspect of the invention is preferably practiced with certain additional features or characteristics that enhance enjoyment of the advantages of the invention. For example, preferably the system further includes at least one electrical cable, with termination that is standard for connection to any of such devices of the multiplicity.

This at least one cable includes conductors that serve as part of the power-passing and information-accepting means. In this preferred form, the electronic device provides the identification information into the information-accepting means of the cable.

In one such preferred arrangement, it is still further preferable that the conductors include:

- at least one conductor that serves as part of the power-passing means but not the information-accepting means; and

- at least one other conductor that serves as part of the information-accepting means but not the power-passing means.

In an alternative such preferred arrangement, however, it is preferable that the conductors serving as part of the information-accepting means are the identical conductors that serve as part of the power-passing means.

Reverting to the first major aspect of the invention, another preferable feature — particularly in a case where the system is for use in conjunction with any of a multiplicity of cables that are respectively associated with such electronic devices of the multiplicity — is provision of at least one electrical connector receptacle, with terminal configuration that is standard for connection to any of such multiple cables. In this arrangement the at least one receptacle includes terminals that serve as part of the power-passing and information-accepting means; and the associated cable and electronic device in conjunction provide the

identification information into the information-accepting means of the connector receptacle.

Another preferable feature for inclusion in the system is a tabulation of identification information with corresponding power parameters, for each of a multiplicity of electronic devices, held in association with the microprocessor means. For a class of electronic devices that are not acceptable for use with — or whose identification information is not recognized by — the system, the tabulation preferably comprises corresponding power parameters that encompass passing no power to any device of the class of electronic devices.

Preferably the power-passing and information-accepting means are connected by a detachable connector to at least one of (1) the microprocessor means and (2) one of such electronic devices. For some purposes the system of the first main facet of the invention also preferably includes the source of electrical power.

It is also preferable, as to the first major aspect of the invention, that the power-passing and information-accepting means include an electrical cable having a termination that is standard for connection to any of such electronic devices of the multiplicity. It is also preferable that the parameters for each of such devices comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current. In regard to a system according to the latter preference, it is particularly desirable that the parameters for each of such devices include at least supply voltage and supplied current.

It is also preferred that the identification information include at least one of the power parameters. (In one form of this feature, the identification may include a device code or device-category code for use in a lookup table that has all the power parameters, and the at least one power parameter is used as redundant cross-checking information to validate that the information coming from the device-associated memory chip is valid. In another form of this feature, the identification information simply includes the power parameters as such, so that no lookup function is needed.)

In preferred embodiments of a second of its principal facets or aspects, the invention is a power-supply connection system for providing electrical power from a source of electrical power in a facility, to operate a plurality of electronic devices. Each such device is one of a multiplicity of electronic devices that are compatible with the facility.

Here the system includes power-receiving means as before. This system also has some means, including plural connection ports, for passing electrical power to a plurality of any of such compatible electronic devices, substantially concurrently; as will be understood these "power-passing means" are related to the power-passing means of the first aspect of the invention but with a difference of being configured for plural operation.

A preferred embodiment of this second main facet of the invention also includes some means, associated with the power-passing means, for accepting, at any of the plurality of ports, electronic-device identification information from any particular one of such electronic devices. These information-accepting means as will be understood are, analogously, related to the like-named means of the first main facet of the invention.

Also included in preferred embodiments of this second main aspect of the invention are programmed digital electronic microprocessor means for using the identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to each particular one device. In addition such embodiments also include some means for activating the power-passing means to apply power therethrough to any of such compatible electronic devices, substantially concurrently, according to their power parameters respectively.

The foregoing may represent a definition or description of the second principal aspect or facet of the invention in its most broad or general form; however, as before the second main facet of the invention even in this very broad form may be seen to resolve difficult problems of the prior art. Specifically this general form of the second primary aspect of the invention solves the particularly difficult problems of

supplying electrical power expeditiously and safely to plural or multiple users' devices concurrently.

Nevertheless as before some additional features or characteristics are preferable. For example it is preferred that the system include some means, controlled by the processor means, for alerting personnel of such facility in event identification information from an incompatible electronic device is received.

In preferred embodiments of a third main aspect or facet, the invention is a power cable for use in connecting a particular electronic device to an electrical power-supply system in a facility — for passage of electricity from the system to the device. The cable includes a first electrical connector, at one end of the cable, for connection to the electronic device; and a second electrical connector, at another end of the cable, having terminals for connection to the power-supply system.

In addition the cable includes a memory device in one of the connectors. The device is interconnected with at least one of the terminals, for connection to the power-supply system — for identifying the electronic device to the power-supply system through the terminals.

The preceding two paragraphs may constitute a description or definition of the third facet of the invention in its broadest or most general form, but again can be seen to resolve important prior-art problems. In particular this facet of the invention provides a component whose use facilitates and enhances application of the insights or principles of the invention to the task of interconnecting electrical devices to power-supplying systems according to either or both of the first two aspects of the invention.

As will be understood, millions of such electrical devices already have been manufactured and exist, without any associated memory chip as taught by the invention. Some of these preexisting devices are relatively very expensive — so much so that it would be uneconomic to discard them in favor of newly manufactured devices having such an associated chip.

The cable of this third aspect of the invention makes the desired interconnection possible at only relatively minor

expense. That expense is, namely, the cost of a cable that may be standard in every way except for (1) inclusion of a chip whose contained identification information matches the power requirements of the device for which it is purchased, and optionally also (2) some label, color-coding, cable imprinting or the like that identifies the electrical device or devices with which it should be used.

In addition if desired the device-end connector of the cable may be configured for the particular device or category of devices, so as to preclude or deter misconnection of a cable for one electrical device, or device category, to some other device. At any rate, as with the first two main aspects of the invention preferably this third facet is practiced in conjunction with further features to optimize its benefits.

For example it is preferred that the memory device identify the electronic device for validation of compatibility of the electronic device with the facility. It is also preferred that the memory device be in the second electrical connector, as this arrangement in some cases may avoid including an additional conductor along the length of the cable. For now the memory device is best a Dallas® DS 2400, 2401 or 2502; any later refinements — or substantial equivalents — may be equally or more desirable. As another example it is preferred that the memory device be a ROM chip, and a two-pin device.

Now I shall turn to the special cases mentioned earlier. As discussed below, they provide five additional main aspects of the invention, here identified as the fourth through eighth major facets or aspects of the invention.

The fourth aspect of the invention is somewhat related to the first, but here involves use of a power adapter rather than a cable that might be completely passive. More specifically, in preferred embodiments of this fourth facet, the invention is a power-supply connection system for providing electrical power, from a source of electrical power, to operate any of a multiplicity of electronic devices, at least one of which electronic devices has an associated power adapter.

This system includes means for receiving electrical power from such a source, and means for passing electrical power to such a power adapter that is associated with any of such electronic devices. The system also includes automatic means for automatically accepting electronic-device identification information for a particular device which is associated with that particular one power adapter.

These automatic accepting means are associated with the power-passing means. The accepting means accept the identification information from or through any particular one of such power adapters respectively.

Furthermore the system includes programmed digital electronic microprocessor means for using the identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to the particular one device-associated power adapter.

Additionally included are some means for activating the power-passing means to apply power therethrough to the particular one power adapter according to the power parameters.

This aspect of the invention provides benefits related to those described earlier for the first aspect. Those benefits are enhanced, however, by the added advantages of a power-adapter-based system — discussed earlier in the informal introduction. Of course I also prefer to use this fourth aspect of the invention in conjunction with certain added features or characteristics which will be clear from the further discussion that follows.

The fifth primary facet of the invention is related to the above-discussed second aspect, but once again focuses on use of a power adapter, rather than use of a cable that might be entirely passive. A preferred embodiment of the invention in its fifth main facet is a power-supply connection system for providing electrical power from a source of electrical power in a facility, to operate a plurality of electronic devices.

Each such device is one of a multiplicity of electronic devices that have associated power adapters which are compatible with the facility — "compatible" being defined as

discussed earlier. This system includes some means for receiving electrical power from such a source.

The system also includes automatic means, including a plurality of connection ports, for automatically passing electrical power to a plurality of any of such compatible power adapters respectively, substantially concurrently. In addition the system includes some means, associated with the power-passing means, for accepting, from any particular one of such power adapters at any of the plurality of ports, electronic-device identification information for a particular one device associated with that particular one power adapter.

Further included are programmed digital electronic microprocessor means for using said identification information. These means use the identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to each particular one power adapter for its associated device.

A preferred system according to the fifth main aspect also includes some means for activating the power-passing means to apply power therethrough. The power thereby passes to any of such compatible power adapters for the associated electronic devices, substantially concurrently, according to their power parameters respectively. This aspect of the invention too has associated preferences which will optimize the enjoyment of its benefits; these preferences will become clear shortly.

A sixth major independent facet of the invention is related to the third, but here again particularly focuses upon use of a power adapter. In a preferred embodiment according to this sixth facet, the invention itself is a power adapter.

This power adapter is for use in connecting a particular electronic device to an electrical power-supply system in a facility — for passage of electrical power from the system to the device through the adapter. The power adapter includes a first electrical connector for connection to the electronic device, and a second electrical connector having terminals for connection to the power-supply system.

The power adapter also includes some means for receiving electrical power at the second electrical connector and deriving therefrom electrical power in a different form. This reformed power is for provision to the electronic device at the first electrical connector.

Finally the power adapter of this sixth major independent facet of the invention includes a memory unit interconnected with at least one of the terminals, for connection to the power-supply system. This memory unit is for identifying the electronic device to the power-supply system through the at least one terminal.

This power adapter of the sixth aspect of my invention is advantageous in that it enables enjoyment of the benefits described above for the fourth and fifth aspects of the invention. Several preferred details of features and characteristics for this sixth aspect of the invention will appear from the remainder of this document.

A seventh major independent facet of the invention is disclosed in my previously mentioned patent. This aspect of the invention addresses placement of a memory unit in the electronic device itself, rather than in a power adapter or cable.

In preferred embodiments of its seventh aspect, the invention is an electronic device, for use with an electrical power-supply system. More specifically it is for use with an electrical power-supply system which supplies power to any of a multiplicity of electronic devices, in response to received identification information for each of the supplied devices.

The identification information is for use in determining power parameters for each of the devices respectively. The electronic device includes at least one main chassis.

This electronic device also includes identifying means for providing identification information to the system, for identifying the device to the system. In addition the device has connection means for receiving power from the system and transmitting identification information from the identifying means to the system.

The identification information identifies the device to the system, through the connection means. Numerous preferences will be seen in the following discussion.

An eighth major facet of the invention is closely related to the seventh aspect discussed above, but includes several of the associated preferences. Thus preferably the identifying means include a memory unit substantially at or within the main chassis for providing identification information to the system.

Also preferably the identification information identifies the device to the system for validation of compatibility of the device with the system, and for establishing necessary power parameters for the device. These parameters include supply voltage, supply impedance, and supplied current — or combinations of these.

Furthermore it is preferred that the memory unit be a programmed ROM chip. More specifically I prefer that it be a memory chip in the Dallas® line, ideally model DS 2400, 2401 or 2402, or later refinements if any, and substantial equivalents if any.

The device itself is preferably for use in performing a useful function such as, but not limited to, computing, communicating, illuminating, calculating, displaying, examining, recording, reproducing, printing, fastening or controlling. It preferably includes one or more operating electronic memory modules used directly in and as part of such a useful function.

The identifying means, however, preferably include a memory unit that is distinct from every operating electronic memory module of the device. Those skilled in the art will appreciate that this is a more practical, simple and economical method than attempting to read the main memory modules of the device. Such attempts in general would require powering up the entire unit — for the purpose of determining whether power can be supplied to the unit! — which appears somewhat impractical.

In purest principle it is true that the interrogating power from the power-supply system might be used to power up a ROM that is also used in operation of the device for its

useful function, if the electronic device were specifically designed to operate thus. Such a special design, however, would have the drawback of tending to expose the contents of that ROM at the power connections, which in general is a relatively undesirable operating characteristic for a functional ROM used in an electronic device. Further specific design features in turn would have to be included to overcome this drawback, and the only perceptible motivation for doing so would be to circumvent the foregoing statement of preference for a "distinct" memory unit — and corresponding provisions in certain of the appended claims. Hence this type of roundabout design may be regarded as the equivalent of employing a memory unit that is distinct from every operating memory module used in the useful function of the device.

All of the foregoing operational principles and advantages of the present invention will be more fully appreciated upon consideration of the following detailed description, with reference to the appended drawings, of which:

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of one preferred embodiment of a power-supply system according to the first or second main facet or aspect of the invention, together with a preferred embodiment of one form of cable according to the third main aspect or facet;

Fig. 2 is a like diagram of a system that is one preferred embodiment particularly according to the second main facet of the invention, together with several forms of cable that are preferred embodiments according to the third main aspect;

Fig. 3 is an isometric or perspective drawing of a cable according to the third main aspect of the invention, very schematically shown ready for use in a representative multi-user facility;

Fig. 4 is a logic-flow diagram representing operation of firmware in the Fig. 1 or Fig. 2 power-supply system to accept information from a device or device-associated memory

chip and in response supply electricity to the device, if eligible;

Fig. 5 is a diagram like Fig. 1 but relating to a power adapter rather than a passive cable;

Fig. 6 is a diagram like certain portions of Fig. 2 but relating to power adapters; and

Fig. 7 is an isometric or perspective drawing like Fig. 3, but for a system that uses power adapters.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Fig. 1, electrical power from a source 10 is provided through a power-supply system 20 of the invention, and through a cable 30 of the invention, to an electrical device 40. The supplied device 40 is most typically but not necessarily a portable electronic device.

The supply system 20 receives power from the source 10 through receiving means that generally include a pair of leads/terminals 11 of the source and 21 of the supply system. In the arrangement shown, terminals may be needed because the source 10 and supply system 20 are separate or separately packaged; if instead the source 10 were encompassed and packaged within the system 20, then naturally the terminals could be omitted and the leads 11, 21 consolidated.

Within the supply system 20 a first voltage regulator 22 takes power from the input leads 21 and produces at its outputs 22', 23 stabilized voltage. Voltage at one of those outputs 23 is applied to power a digital electronic microprocessor 23 that includes or is associated with a preferably reprogrammable memory 25.

Through information-accepting means that include terminals/leads 26 of the supply system and 34 of the attached cable, the microprocessor 24 also receives identification information 33 about the device 40. The microprocessor responds by developing and applying a signal 27 to activate and control another, controllable regulator 28 within the supply system 20. (Any suitable single-line, multiline, digital or analog signal 27 may be used.)

The microprocessor is programmed to develop the signal 27 based upon use of the externally supplied information 33 in conjunction with information stored in the microprocessor-associated memory 25. More specifically, the microprocessor performs these tasks in such a way that the controllable regulator 28 supplies power at a voltage, current, etc. which are appropriate to the combination of (1) the supplied device 40 and (2) the source 10, as well as (3) a facility or other environment for which the system 20 has been prepared.

Output power from the controllable regulator is impressed upon power-passing means that include output leads/terminals 29 of the supply system. The power-passing means also include components of the cable 30, when connected to those output terminals 29, for carrying power 37 to the supplied device 40.

The cable 30 includes — at its end proximate to the supply system 20 — a connector 31 whose three leads/terminals 34, 36 are respectively configured to mate with the previously mentioned three information and power leads/terminals 26, 29 of the supply system. The external configuration of this near-end connector 31 accordingly should be standard for all types of cable 30, except that — as will be seen shortly — some types of cable 30 require only two connections, in which case no separate information terminal need be included.

For the particular type of cable 30 illustrated in Fig. 1, the near-end connector 31 houses a memory 32, one of whose terminals is connected to the independent information terminal/lead 34 of the connector 31. The other terminal 35 of the memory 32 is connected to one of the power terminals/leads 36, and thereby to the mating terminal/lead 29 in the supply system 20. One mating set of terminals/leads 36, 29 thus serves as a common connection for both the information-accepting and power-supplying functions of the system and cable.

Through these means the memory 32 in the near-end cable connector 31 supplies the previously mentioned external information 33. The information is transmitted by passage of electrical signals via the information terminals/leads 34, 26

(and one set of power terminals/leads 36, 29) to the microprocessor 24.

Within the near-end connector 31 typically there is an internal housing that contains the memory 32. The gross physical form of this internal housing — and thus of the interior as well as the exterior of the near-end connector — may be substantially standard.

The information held within the memory, however, is specific to the device 40 to which power is to be supplied, or at least to a category of such devices. The memory 32 may be a ROM, PROM (one-time-writable ROM), EPROM, EEPROM, RAM etc. — whichever may be best suited for the logistics of preparing a number of memory units 32 to represent some class or category of electronic devices 40 to supply systems 20.

In the marketplace, as will be understood, some devices 40 are vastly more numerous than others. Hence some types of memories 32 — depending on relative economy of scale etc. — may be preferable for some devices 40, and other very different types may be preferable for other devices 40.

Issuing from the near-end connector 31 is the cable 30 proper, which is to say two elongated power-carrying leads 36 terminating in a far-end connector 30 with two power-carrying terminals 39. This far-end connector 30 and its terminals — like the information held in the memory 32, generally speaking — are specific to devices 40 of a particular type (or category of types), to which power is to be supplied; accordingly the connector 38 and terminal 39 can be configured or shape-encoded to permit connection only with devices 40 of the intended mating type or category.

As evaluated from the perspective of the supplied device 40, the entire power-supply system 20 and cable 30 engage and function as if they were a completely dedicated or specific supply arrangement for the particular device 40. Accordingly the operating components (not shown) of the device 40 are simply connected — or remain connected — in conventional fashion, without need for any special provisions on account of the power-supply system 20 and cable 30, to power-input leads 41 within the device 40.

The Fig. 1 embodiment is advantageous for (1) its relative economy, in that placement of the memory 32 in the near-

end connector 31 obviates need for running the third lead 34 the length of the cable; (2) its relative simplicity in that the memory 32 has its own terminal/lead 34 separate from the power terminals/leads 36 and so requires no added measures for protecting the memory 32 against or extracting its information signal 33 from the power 37; and (3) the absence of any requirement for retrofitting the supplied device 40 with internal memory to supply the needed identification information 33.

On the other hand, this embodiment has cost drawbacks in that (1) the third terminal 34 introduces some added cost, (2) elements in both — rather than only one — of the connectors 31, 38 must be specific to the supplied device 40, and (3) for a new supplied device 40, building the cable 30 with provision for a memory unit 32, and associating the correct memory unit 32 with each cable 30, is more expensive than building the memory-unit 32 function directly into the new device 40 as part of its manufacture. People skilled in this field will understand that these recited advantages and drawbacks are simply tradeoffs to be managed in the usual engineering fashion for each subgrouping of supply systems 20, cables 30 and devices 40 in the marketplace.

The Fig. 2 system is capable of serving only a single device as in Fig. 1 — and also is capable of supplying power to numerous devices 140a-140z, when present, concurrently. As symbolized in Fig. 2 by absence of cables and supplied devices at some representative ports b, c, k, the system can operate properly with cables and devices attached at all, any, or none of its ports a-z.

The source 110, first regulator 122 and microprocessor-associated memory 125, and each of numerous three-terminal ports a-z are generally similar to the corresponding elements 10, 22, 25 and 26/29 of Fig. 1. A controllable multiport regulator 128 for use in the Fig. 2 system might also be simply an aggregation of individual regulators 28 (Fig. 1), each with its own separate control path (I. e. lead, wire pair, bus etc.) 27 from the microprocessor.

In the interest of economy, however, the regulator 128 instead may preferably be constructed to use as many as

possible of its components in common for the ports a-z. For example the microprocessor may have a single identification-information-accepting path 126 from the regulator 128, and a single control path 127 to the regulator 128.

In this latter case an electrical bus system within the regulator 128 may route identification information from the individual ports a-z (for instance, from any of the individual information terminals 126a-126z) to the microprocessor's single information path 126. Such a bus system also may route activation and power-specification signals from the microprocessor's single control path 127 to individual modules (not illustrated), within the regulator 128, feeding the individual power terminals 129a-129z.

As those skilled in the art of electronic design will understand, such a bus-controllable arrangement requires a conventional addressing subsystem, guided by the microprocessor 124 to direct the passage of information and control signals (and if desired even power) along common bus elements in an orderly, mutually noninterfering way. Accordingly the microprocessor 124 programming in the Fig. 2 system, while encompassing the basic functions of the processor 24 in the elemental Fig. 1 system, also includes timesharing and addressing provisions necessary to such orderly interfacing with the controllable regulator.

Each of the Fig. 2 ports a-z is a three-terminal set, to accommodate three-terminal cable types including the cable 30 (Fig. 1). For reference purposes this is illustrated at port y of Fig. 2, where the cable 130y and supplied device 140y are identical to the cable 30 and device 40 in Fig. 1.

Some manufacturers of cables and/or devices, however, may prefer to practice forms of my invention in which only two connections are made between the cable and supply system. In such forms of the invention, identification information from a memory 143a, 132j within the supplied device 140a or cable 130j is read into the microprocessor 124 via the power leads 129a, 129j — using various provisions that will be discussed later in this document.

As will be understood such information is accepted by the processor 124 while no power is standing on the power leads 129a, 129j; and after supply of power along those leads

129a, 129j is initiated, no further information transfer is needed. Therefore no special provision is needed for concurrent sharing of those power leads by information and power.

What is needed in some systems, however, is protection of the memory 143a, 132j against the voltage at which power is provided to the supplied device 140a, 140j. Whether any given system requires such protection may depend on the magnitude and polarity, and possibly waveform, of the voltage.

Thus typical memory devices 143a, 132j are intrinsically capable of standing off — and in some commercial packages may be provided with internal guarding against — relatively modest supplied voltage, as for example ±3 Vdc. Such devices may be damaged upon application of typical battery-recharger input voltages such as for example 110 to 240 Vac.

In this family of cables and supplied devices according to the invention, each memory 143a, 132j is specifically associated — by definition, for present purposes — with a known voltage specification. It is therefore straightforward to determine for each manufacturing project whether a discrete guard element 149a, 136j' need be interposed to protect the respective memory chip 143a, 132j.

The supplied device 140a illustrated at the first port a of the Fig. 2 supply system is taken to be a device of new manufacture with a built-in memory 143a, according to the invention. In such situations, incorporating provision for the memory 143a into initial manufacture of the device 140a is especially inexpensive; and likewise incorporating provision for a voltage-guarding component 149a, if needed, is also inexpensive.

Incorporating such manufacturing provisions is cost effective; in particular they enable use of the most-economical and simplest possible cable 130a — completely passive and with only two conductors 136a. Incorporation of such provisions is even more attractive for a low-voltage device in which the guard element 149a may be omitted.

On the other hand, as illustrated at the last port z in Fig. 2, also within the scope of my invention is building of a memory unit 143z into a newly manufactured device 140z, and

interconnection of the device 140z with the supply system 120 through a three-wire connector 144z-139z and cable 130z. This configuration may be reasonably economical, particularly e. g. for a device 140z which operates on relatively high voltage and for which a relatively short cable 130z is adequate.

The supplied device 140j illustrated at the second occupied port j, by contrast, is taken to be an already-existing device — lacking a built-in identification-information memory according to the invention. To obtain economies associated with having to make only one connector 138j specific to the supplied device 140j, the memory 132j with its device-specific contents is housed within the far-end connector 138j — that is to say, the connector which must be mechanically configured to mate with the device connector 141j anyway.

To obtain further economies associated with a two-conductor cable 130j, the memory 132j is connected across the power leads/terminals 136j/139j. This connection point is just across the supplied-device power-input connector 139j/141j from the port-a position (within the supplied device 140j) just discussed, and so is electrically equivalent — but confers the major economy of avoiding a retrofit of the supplied device 140j.

As in the port-a system, within the general port-j configuration the memory 132j should be protected 136j' against the power applied to the power terminals/leads 136j/139j for relatively high-voltage devices 140j. For economy's sake such protection may be better omitted for relatively low-voltage devices.

In event the two-conductor configurations illustrated at ports a and j are regarded as sufficiently attractive (for their particular simplicities and economies) to become standard, then all the ports a-z may be made two-terminal ports by elimination of the terminals 126a-126z — as may the analogous port in the Fig. 1 system by omission of the separate information terminal 26. In that event the necessary information-signal connections may be made, before application of power, through the power ports 129a-129z, 129 as will be described shortly.

The cable 130j shown at the second occupied port j in Fig. 2 is also represented mechanically in Fig. 3, but with somewhat schematic representations of a facility, some supply-system elements, the supplied device 140j, and interconnections. This drawing includes conventional passenger-accommodating provisions 90 of an aircraft, a conventional or other electricity-using device 140j such as a so-called "notebook" computer ready for use within such a mobile facility, and two representative conveniently located ports 126j/129j, 126k/129k of a supply system.

Other Fig. 2 elements such as the power source 110, first regulator 122, processor 124 and associated memory 125, and most internal parts of the multiport regulator 128 may be centrally located with respect to the aircraft or other facility, and are not shown in Fig. 3. Wiring connections from the centrally disposed multiport regulator 128 to the individual user sites and corresponding ports 126j/129j, 126k/129k etc. are distributed throughout the passenger accommodations, but most typically — for reasons of esthetics, safety, and equipment protection — along paths that are concealed, and also not shown in Fig. 3.

In Fig. 3 as in Fig. 2 the near-end connector 131j is shown as a two-terminal unit, but ready for engagement 95 with the three-terminal port 126j/129j of the supply system. The near-end connector housing 131j nevertheless is advantageously configured for mating 95 of its two terminals 136j with exclusively the two power terminals 129j of the supply-system port.

As will be explained later, the two-terminal connector 131j may be engaged in either of two opposite orientations with the port terminals 129j. The far-end connector 138j and particularly its terminals 139j are mechanically configured — as symbolized by a triangular-section element (Fig. 3) — for engagement 96 with, exclusively, power-input terminals 141j of a device 140j whose power specifications are represented by the memory inside the housing 138j.

Since the memory 132j (Fig. 2) is not actually visible within the far-end connector 138j as drawn in Fig. 3, the physical elements which do appear in this drawing may be taken equally well as representing the port-a (Fig. 2) two-

conductor configuration — with memory 143a built into the supplied device 140a. By visualizing the connector 131j as having one additional terminal or pin, the reader will also find Fig. 3 to be generally representative of the three-terminal configurations illustrated at ports r, y and z, and in Fig. 1.

One configuration, at the last port z in Fig. 2, has already been introduced that represents a three-wire form of a device with built-in memory 143z, conceptually related to a corresponding two-wire form at the first port a. Analogously illustrated at the third occupied port r is a three-wire form of a cable configuration for a device without built-in memory.

In this port-r configuration, identification information is supplied from a memory 132r housed in the far-end connector 138r. This port-r three-wire cable configuration is conceptually related to the corresponding two-wire form, just discussed, at the second occupied port j.

The three-wire configuration shown at the third occupied port r is advantageous in that no voltage-guard element is needed, and may be especially desirable for some high-voltage devices — particularly devices needing only relatively short cables. Thus these advantages are analogous, in relation to the related two-wire configuration at the second occupied port j, to those offered by the three-wire built-in configuration at port z in relation to the two-wire built-in configuration at port a.

Still another form (not illustrated) of my invention is a configuration with the memory housed in the near-end cable connector — as at port y, and as in Fig. 1 — but connected across the power leads as at the first two occupied ports a, j of Fig. 2. For relatively high-voltage systems, that configuration may require guarding as 15 149a, 136j' in Fig. 2.

Although that configuration is within the scope of my invention, I regard it as relatively undesirable because it incurs the added costs of making both connectors device-specific, but without greatly redeeming itself by saving the cost of a third wire along the full cable length — since there is no third wire beyond the near-end connector. None-

theless the configuration under discussion does have some benefit in that the near-end connector need have only two terminals rather than three (as at port y in Fig. 2).

Now in operation with respect to each generalized port "n" of the multiple ports a-z of a multiport form of my invention, the microprocessor 124 initially is quiescent 50 (Fig. 4) with respect to power application at power terminals of that port n — waiting for a connection at that port n. This initial condition of quiescence, however, is relatively active in terms of logical functions of the microprocessor, as that unit is programmed to circulate continuously through a connection-monitoring loop 50-54.

More specifically, the processor may check at intervals in the range of, for example, once each five seconds to several times each second for each of several possible connections to a memory 32, 132, 143. Thus in sequence the processor 24, 124 may:

- attempt 51 to find a memory connected to its data line 26, 126; then failing that

- attempt 52 to find a memory connected with one arbitrary selected ("forward") polarity across the power terminals 29, 129; and then failing that

- attempt 53 to find a memory connected with an opposite ("reverse") polarity — but across the same power terminals 29, 129.

Still failing this last possibility, with respect to port n the system returns 54 to begin the process again. The system may be programmed, however, to digress (not shown) — at any point in the process — from servicing of any particular port n to monitoring or other steps with respect to the other ports.

In event any of the tests 51-53 is positive, the system proceeds to read 55-57 the presented memory 32, 132, 143 in its respective orientation. People skilled in this field will understand that as a practical matter, depending upon

the protocol established for the memory units by their manufacturer(s), there may be no physical distinction between the steps of testing 51-53 for a connection and the steps 55-57 of reading signals from the memory unit; hence in this particular regard the diagram in some practical cases may be regarded as partially conceptual.

In any event the system proceeds 58 to the next firmware module 60-68, in which acceptability of the presented device 40, 140 is determined. To this end the processor first receives 60 the identification information into a suitable intermediate storage point within the processor 24, 124 and then advances 61 to the step of seeking 62 some matching entry in a lookup table that is held in the processor-associated memory 25, 125.

If the processor fails to find 64 any such matching entry, then its sequence branches 65 to return 67 to the quiescent state. Along the way — if the system designers have chosen the option indicated in the drawing — the processor sounds and/or displays 66, to the local user and/or to centralized operators of the facility 90, an indication that an unacceptable connection has been presented to the supply system.

Such an unacceptable connection may represent a device 40, 140 which has been disqualified from use in the particular facility, or has not been submitted for preapproval, for use in the particular facility 90, or which is simply a foreign memory unit not carrying any valid device-identifying code. Alternatively such a connection may represent a paperclip or like metal object such as might be inserted by a small child — or even a deliberate bogus connection such as a jumper wire or screwdriver, as may be presented to the system from time to time by a prankster or vandal.

For a multiuser facility the optional design feature of a central alarm may be particularly appropriate to enable aircraft cabin attendants, for example, to deter any misuse of the system. In a private context, on the other hand, no alarm may be needed as each user will understand if power is withheld that the system has detected some incompatibility.

It will be understood that merely for definiteness and simplicity has Fig. 4 been drawn as representing a system in

which disqualified devices 40, 140 are simply not included in the lookup table. For at least some practical commercial systems it may be preferred to include disqualified devices 40, 140 — but flagged as disqualified, so that the system alarm 66 can indicate, for the information of the prospective user or system operators, a distinction between presentation of a device that is disqualified and one that is unrecognized. In some instances the user or operators may wish to take suitable remedial action, based upon such information.

On the other hand, if the processor is able to find 64 in the lookup table 25, 125 a matching entry, then the system instead proceeds 68 to another procedural module 70-73: supplying suitable power to the presented device 40, 140. This process includes first selecting 70 suitable power specifications.

Again as a practical matter this selection step may be physically unitary with finding 64, 68 the submitted identification in the lookup table. In particular, as mentioned earlier the identification information 33 may itself include or consist of all necessary power specifications, so that the need for a lookup table may be obviated or reduced and the "selection" step 70 may simply consist of reading — and perhaps reformatting — the information from the external memory 32, 132, 143.

In any case, once the specifications are selected the system goes on 71 to apply 72 them to activate the controllable regulator 28, 128 through the pertinent port n, and then go on to module 80-86 relating to eventual disconnection of the supplied device 40, 140. In the latter module the system repetitively cycles 80-83 through testing 82 for disconnection, and failing that test then repeating the same test at frequent intervals such as, for instance, once or twice per second — but when the test 82 is met, the system branches 84 to deactivate 85 the regulator 28, 128 with respect to port n (which is to say, disconnect the power at that port) and then reset 86 to the initial quiescent state 50 for that port n.

Where a power-adapter-based system is substituted for a passive-cable-based system, with reference to a single user station, the Fig. 1 schematic may instead appear generally as

shown in Fig. 4. Fig. 1 elements that are different from those in Fig. 1 but serve very generally analogous functions are shown with callouts that differ only by the insertion of a prefix "2".

As to identification of the device 240 (by way of its power adapter 231) to the system 220, the operation is closely analogous. As explained earlier, however, the overall system now has the benefits of operating with a standard voltage at the terminals 226, 229 regardless of the type of device 240 that is present — and also, because a. c. voltage is in use, with more-economical power transmission to the user station.

Analogously, the Fig. 2 schematic for multiple user stations may instead, for a power-adapter-based system, appear generally as shown in Fig. 5. Here the prefix is "3" instead of "2". Once again, the identification procedure is generally as before, but the overall multiple-user system now has the benefits of a single common, standard a. c. voltage for all users.

The system is advantageously programmed to monitor current drawn at each port in use, and compare the current drawn with the current-specifications portion of power specifications found earlier. The system is also advantageously programmed to deactivate the controlled regulator 28, 128 with respect to any port at which a power overload arises when or after power supply is initiated at that port. Of course an overload may be defined with respect to criteria for a facility 90, in addition to criteria selected as part of power specifications for a device 40, 140.

Some system designers may prefer to structure the supply system 20, 120 so that in use of two-terminal cables 30, 130 the contents of the memory 32, 132, 143 remain accessible to the processor 24, 124 even after power is supplied to the device 40, 140. Such operation is readily possible, though more costly, through conventional multiplexing of the identification data onto the power lines 29/36, 129/136.

The invention is readily implemented in firmware of a dedicated microprocessor within a supply-system apparatus housing 20, 120. Alternatively, however, and particularly

for relatively large facilities such as a laboratory complex, hotel, convention center, ship, or large aircraft, the necessary programming and some of the connections according to my invention may instead be provided as software and controlled ports of a general-purpose computer — and thus integrated into the overall operational systems of the facility, thereby expediting any desired updating of the identification-information database 125, as well as customization of the power-supplying system to protocols, organization, security, hierarchies etc. of the facility.

Thus in some types of multiuser facilities the microprocessor 124 may be provided additional information about relevant facility status. In aircraft, for instance, which provide a passenger-amenities pod at each seat the availability of power through supply systems according to my invention may be conditioned upon use or nonuse of other elements of the pod. For example the system may, to promote safety, refuse power to a port 129/126 until some deployment of the pod itself is detected; or, to limit power at each seat, refuse power if a video display associated with the pod is also or already in use.

Some systems according to my invention, for marketing or other purposes, may be made facility-specific in different ways. For example, the device-specific memory unit 32, 132, 143 may be usable only in aircraft of a particular airline — e. g., perhaps one which mails a cable 30, 130 without charge to each preferred passenger or prospect.

As to types of memory unit 32, 132, 143 for use in the cable 30, adapter 230, 330 or device 140a, 140z, 340, as suggested earlier I prefer a ROM such as the Dallas® DS 2400 or 2401 (chips in two different voltage options respectively) for supplied devices 40 etc. whose power specifications are very common. I prefer to use ROMs for such supplied devices 40 etc. because ROMs are the least expensive memory units for high-volume applications.

For devices 40 etc. whose power specifications are much less common, I prefer to use a PROM. One suitable commercially available unit is the Dallas® DS 2502, which actually is a hybrid — having one kilobyte of one-time-writable

memory space or PROM in addition to the same ROM used in the DS 2401.

Use of such a programmable memory unit carries the benefit of reducing inventory, as the unit — and even an otherwise-finished cable 30 — can be programmed at a warehouse or even retail store, after preliminary distribution, to accommodate a considerable variety of supplied devices 40 etc.

An alternative for special applications is a more-powerful electronic device such as a RAM, or even a microprocessor programmed to represent or simulate a simpler memory chip (and note the earlier comment about equivalence to a distinct memory unit). For example a central or other processor (not shown) in a portable computer or other supplied device 140a, 140z may be programmed (and if need be provided with a small continuous power supply) to serve the functions of the memory unit 143a, 143z.

All such variations are within the scope of my invention.

As will be understood the foregoing disclosure is intended to be merely exemplary, not to limit the scope of the invention — which is to be determined from the appended claims.

I CLAIM:

1. A power-supply connection system for providing electrical power, from a source of electrical power, to operate any of a multiplicity of electronic devices, at least one of which electronic devices has an associated power adapter; and said system comprising:

means for receiving electrical power from such a source;

means for passing electrical power to such a power adapter that is associated with any of such electronic devices;

automatic means, associated with said power-passing means, for automatically accepting, from or through any particular one of such power adapters respectively, electronic-device identification information for a particular device which is associated with that particular one power adapter;

programmed digital electronic microprocessor means for using said identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to said particular one device-associated power adapter; and

means for activating the power-passing means to apply power therethrough to said particular one power adapter according to the power parameters.

2. The system of claim 1, for use with at least one electronic device whose associated power adapter holds a memory unit for identifying the device to the system; and wherein:

the information-accepting means receive the identification information from such memory unit held by such power adapter.

3. The system of claim 2, wherein:

said power-passing means pass a. c. power to such power adapter.

4. The system of claim 1, for use in conjunction with any of a multiplicity of power adapters that are respectively associated with such electronic devices of the multiplicity:

further comprising at least one electrical power-adapter receptacle, with terminal configuration that is standard for connection to any of such multiplicity of power adapters, the at least one power-adapter receptacle comprising terminals that serve as part of the power-passing and information-accepting means; and

wherein the information-accepting means of the power-adapter receptacle receive the identification information from such power adapter and associated electronic device.

5. The system of claim 4, wherein:

the terminals serving as part of the information-accepting means are the identical terminals that serve as part of the power-passing means.

6. The system of claim 1, further comprising:

a tabulation of identification information with corresponding power parameters, for each of a multiplicity of electronic devices, held in association with the microprocessor means.

7. The system of claim 6, wherein:

for a class of electronic devices that are not acceptable for use with or whose identification information is not recognized by the system, the tabulation comprises corresponding power parameters that encompass passing no power to any device of said class of electronic devices.

8. The system of claim 7, particularly for use in environments sensitive to inadequately controlled electromagnetic-radiation emissions; and wherein:

said class of electronic devices that are not acceptable for use with, or whose identification information is not recognized by, the system comprise electronic devices that produce electromagnetic-radiation emissions that are inadequately controlled.

9. The system of claim 1, further comprising:

said source of electrical power.

10. The system of claim 1, for use in conjunction with at least one of such electronic devices, of the multiplicity, which substantially contains its associated power adapter, and wherein:

the power-passing and information-accepting means comprise an electrical cable having a termination that is standard for connection to any of such power adapters of the multiplicity.

11. The system of claim 1, wherein:

the parameters for each of such devices comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current.

12. The system of claim 1, wherein:

the parameters for each of such devices comprise at least supply voltage and supplied current.

13. The system of claim 1, wherein:

the identification information itself comprises at least one of the power parameters.

14. The system of claim 1, wherein:

the identification information itself comprises the power parameters.

15. A power-supply connection system for providing electrical power from a source of electrical power in a facility, to operate a plurality of electronic devices, each such device being one of a multiplicity of electronic devices that have associated power adapters which are compatible with the facility; said system comprising:

means for receiving electrical power from such a source;

automatic means, including a plurality of connection ports, for automatically passing electrical power to a plurality of any of such compatible power adapters respectively, substantially concurrently;

means, associated with said power-passing means, for accepting, from any particular one of such power adapters at any of the plurality of ports, electronic-device identification information for a particular one device associated with that particular one power adapter;

programmed digital electronic microprocessor means for using said identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to each particular one power adapter for its associated device; and

means for activating the power-passing means to apply power therethrough to any of such compatible power adapters for the associated electronic devices, substantially concurrently, according to their power parameters respectively.

16. The system of claim 17, for use with at least one such electronic device whose associated power adapter holds an electronic memory unit; and wherein:

the information-accepting means receive the identification information from such electronic memory unit held by such associated power adapter.

17. A power adapter for use in connecting a particular electronic device to an electrical power-supply system in a facility, for passage of electrical power from the system to the device through the adapter; said power adapter comprising:

a first electrical connector for connection to the electronic device;

a second electrical connector having terminals for connection to the power-supply system;

means for receiving electrical power at the second electrical connector and deriving therefrom electrical power in a different form for provision to the electronic device at the first electrical connector; and

a memory unit interconnected with at least one of the terminals for connection to the power-supply system, for identifying the electronic device to the power-supply system through said at least one terminal.

18. The power adapter of claim 17, wherein:

the memory unit identifies the electronic device for validation of compatibility of the electronic device with the facility.

19. The power adapter of claim 17, wherein:

the memory unit is in the second electrical connector.

20. The power adapter of claim 17, wherein:

the memory unit is a memory chip selected from the group consisting of the Dallas® memory chips model DS 2400, 2401 and 2502 and later refinements if any, and substantial equivalents thereof if any.

21. The power adapter of claim 17, wherein:

the memory unit is a programmed ROM chip.

22. An electronic device for use with an electrical power-supply system which supplies power to any of a multiplicity of electronic devices, in response to received identification information for each of the supplied devices, said identification information being for use in determining power parameters for each of the devices respectively; said electronic device comprising:

at least one main chassis;

identifying means for providing identification information to the system, for identifying the device to the system; and

connection means for receiving power from the system and transmitting identification information from the identifying means to the system;

wherein the identification information identifies the device to the system, through the connection means.

23. The electronic device of claim 22, wherein:

the identifying means identify the electronic device for validation of compatibility of the electronic device with the system.

24. The electronic device of claim 22, wherein:

the identifying means comprise a memory unit held substantially at or within the main chassis.

25. The electronic device of claim 24, wherein:

the identifying means comprise a memory unit held adjacent to the main chassis.

26. The electronic device of claim 25, wherein:

the memory unit is held in a power adapter adjacent to the main chassis.

27. The electronic device of claim 26, wherein:
the power adapter receives a. c. electrical power from the system and derives, from said a. c. power, electrical power in a modified form for operating the device.

28. The electronic device of claim 22, wherein:
said identification information identifies the device to the system adequately for establishing necessary power parameters for the device.

29. The electronic device of claim 28, wherein:
said parameters comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current.

30. The electronic device of claim 28, wherein:
the parameters comprise at least supply voltage and supplied current.

31. The electronic device of claim 28, wherein:
the identification information itself comprises at least one of the power parameters.

32. The electronic device of claim 28, wherein:
the identification information itself comprises the power parameters.

33. The electronic device of claim 32, wherein:
the parameters comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current.

34. The electronic device of claim 32, wherein:

the parameters comprise at least supply voltage and supplied current.

35. The electronic device of claim 22, wherein:

the identifying means comprise a memory unit that is a memory chip selected from the group consisting of the Dallas® memory chips model DS 2400, 2401 and 2502 and later refinements if any, and substantial equivalents thereof if any.

36. The electronic device of claim 22, wherein:

the identifying means comprise a memory unit that is a programmed ROM chip.

37. The electronic device of claim 22, for use in performing a useful function such as but not limited to computing, communicating, illuminating, calculating, displaying, examining, recording, reproducing, printing, fastening, or controlling:

further comprising one or more operating electronic memory modules used directly in and as part of such a useful function; and

wherein the identifying means comprise a memory unit that is distinct from every operating electronic memory module of the device.

38. An electronic device for use with an electrical power-supply system which supplies any of a multiplicity of electronic devices, in response to received identification information for each of the supplied devices, said identification information being for use in determining power parameters for each of the devices respectively; said electronic device comprising:

at least one main chassis;

identifying means, comprising a memory unit held substantially at or within the main chassis, for providing identification information to the system, for identifying the device to the system; and

connection means for receiving power from the system and transmitting identification information from the identifying means to the system; and wherein:

the identification information identifies the device to the system, through the connection means, for validation of compatibility of the electronic device with the system and for establishing necessary power parameters for the device;

said parameters comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current;

the identification information itself comprises at least one of the power parameters.

39. The device of claim 38, wherein:

the memory unit is a memory chip selected from the group consisting of the Dallas® memory chips model DS 2400, 2401 and 2502 and later refinements if any, and substantial equivalents thereof if any.

40. The device of claim 38, wherein:

the identifying means comprise a memory unit that is a programmed ROM chip.

41. The device of claim 38, for use in performing a useful function such as but not limited to computing, communicating,

illuminating, calculating, displaying, examining, recording, reproducing, printing, fastening, or controlling:

further comprising one or more operating electronic memory modules used directly in and as part of such a useful function; and

wherein the identifying means comprise a memory unit that is distinct from every operating electronic memory module of the device.

42. A power-supply connection system for providing electrical power, from a source of electrical power, to operate any of a multiplicity of electronic devices, said system comprising:

means for receiving electrical power from such a source;

means for passing electrical power to any of such electronic devices;

automatic means, associated with said power-passing means, for automatically accepting, from any particular one of such electronic devices respectively, electronic-device identification information for that particular one device;

programmed digital electronic microprocessor means for using said identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to said particular one device; and

means for activating the power-passing means to apply power therethrough to said particular one device according to the power parameters.

43. The system of claim 42, for use with at least one electronic device that includes a cable or connector holding a memory unit for identifying the device to the system; and wherein:

the information-accepting means receive the identification information from such memory unit held by such connector or cable.

44. The system of claim 42, for use with at least one such electronic device that has at least one main chassis and that holds directly within the main chassis, not within a cable or connector, a memory unit for identifying the device to the system:

further comprising at least one electrical cable, with termination that is standard for connection to any of such electronic devices of the multiplicity, the at least one cable comprising conductors that serve as part of the power-passing and information-accepting means; and

wherein the information-accepting means receive the identification information through the cable from such memory unit within such main chassis of such electronic device.

45. The system of claim 44, wherein said conductors comprise:

at least one conductor that serves as part of the power-passing means but not the information-accepting means; and

at least one other conductor that serves as part of the information-accepting means but not the power-passing means.

46. The system of claim 44, wherein:

the conductors serving as part of the information-accepting means are the identical conductors that serve as part of the power-passing means.

47. The system of claim 42, for use in conjunction with any of a multiplicity of cables that are respectively associated with such electronic devices of the multiplicity:

further comprising at least one electrical connector receptacle, with terminal configuration that is standard for connection to any of such multiplicity of cables, the at least one connector receptacle comprising terminals that serve as part of the power-passing and information-accepting means; and

wherein such associated cable and electronic device in conjunction provide the identification information into the information-accepting means of the connector receptacle.

48. (revised 2/96) The system of claim 47 wherein:

the terminals serving as part of the information-accepting means are the identical terminals that serve as part of the power-passing means.

49. The system of claim 42, further comprising:

a tabulation of identification information with corresponding power parameters, for each of a multiplicity of electronic devices, held in association with the microprocessor means.

50. The system of claim 49wherein:

for a class of electronic devices that are not acceptable for use with or whose identification information is not recognized by the system, the tabulation comprises corresponding power parameters that encompass passing no power to any device of said class of electronic devices.

51. The system of claim 50, particularly for use in environments sensitive to inadequately controlled electromagnetic-radiation emissions; and wherein:

said class of electronic devices that are not acceptable for use with, or whose identification information is not recognized by, the system comprise electronic devices that produce electromagnetic-radiation emissions that are inadequately controlled.

52. The system of claim 42, further comprising:

said source of electrical power.

53. The system of claim 42, wherein:

the power-passing and information-accepting means comprise an electrical cable having a termination that is standard for connection to any of such electronic devices of the multiplicity.

54. The system of claim 42, wherein:

the parameters for each of such devices comprise at least one parameter selected from the group consisting of supply voltage, supply impedance, and supplied current.

55. The system of claim 42, wherein:

the parameters for each of such devices comprise at least supply voltage and supplied current.

56. The system of claim 42, wherein:

the identification information comprises at least one of the power parameters.

57. The system of claim 42, wherein:

the identification information comprises the power parameters.

58. (amended 2/96 and 5/96) A power-supply connection system for providing electrical power from a source of electrical power in a facility, to operate a plurality of electronic devices, each such device being one of a multiplicity of electronic devices that are compatible with the facility; said system comprising:

means for receiving electrical power from such a source;

automatic means, including a plurality of connection ports, for automatically passing electrical power to a plurality of any of such compatible electronic devices respectively, substantially concurrently;

means, associated with said power-passing means, for accepting, from any particular one of such electronic devices at any of the plurality of ports, electronic-device identification information for that particular one device;

programmed digital electronic microprocessor means for using said identification information to select power parameters, for passage of power from the power-receiving means and through the power-passing means to each particular one device; and

means for activating the power-passing means to apply power therethrough to any of such compatible electronic devices, substantially concurrently, according to their power parameters respectively.

59. The system of claim 58, for use with at least one such electronic device that includes a cable or connector holding a memory unit; and wherein:

the information-accepting means receive the identification information from such electronic memory unit held by such connector or cable.

60. The system of claim 58, further comprising:

means, controlled by the microprocessor means, for alerting personnel of such facility in event identification information from an incompatible electronic device is received.

61. A power cable for use in connecting a particular electronic device to an electrical power-supply system in a facility, for passage of electrical power from the system to the device; said cable comprising:

a first electrical connector included as part of the cable, at one end of the cable, for connection to the electronic device;

a second electrical connector included as part of the cable, at another end of the cable, having terminals for connection to the power-supply system; and

a memory unit in one of the connectors, and interconnected with at least one of the terminals for connection to the power-supply system, for identifying the electronic device to the power-supply system through said terminals.

62. The cable of claim 61, wherein:

the memory unit identifies the electronic device for validation of compatibility of the electronic device with the facility.

63. The cable of claim 61, wherein:

the memory unit is in the second electrical connector.

64. The cable of claim 61, wherein:

the memory unit is a memory chip selected from the group consisting of the Dallas® memory chips model DS 2400, 2401 and 2502 and later refinements if any, and substantial equivalents thereof if any.

65. The cable of claim 61, wherein:

the memory unit is a programmed ROM chip.

FIG. 1

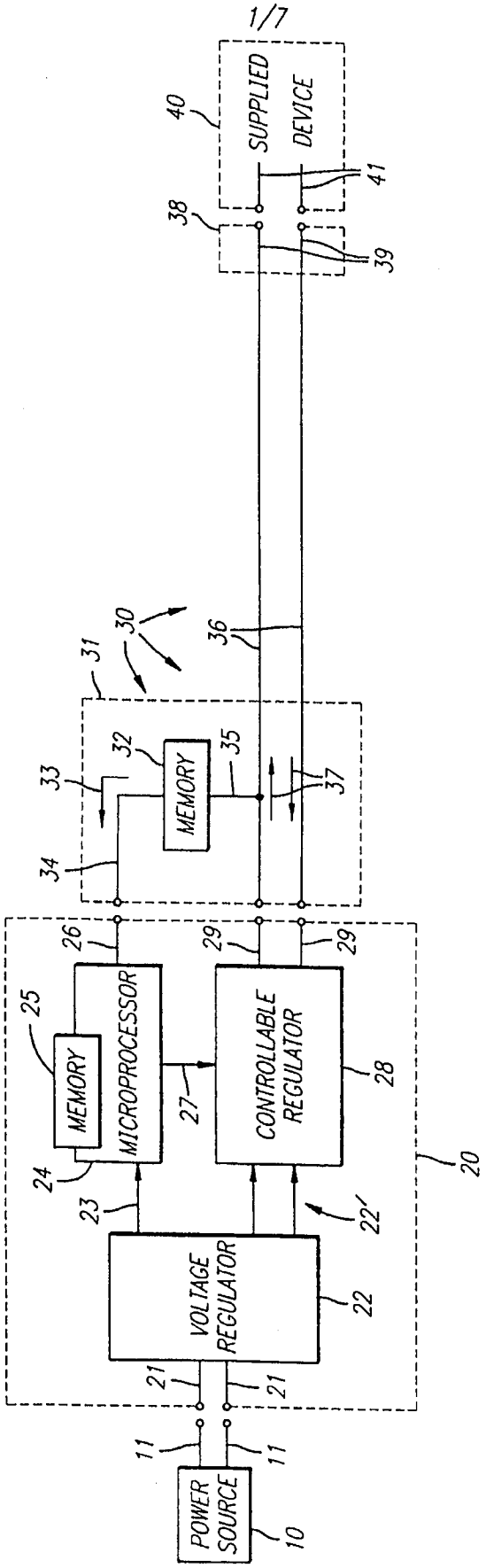
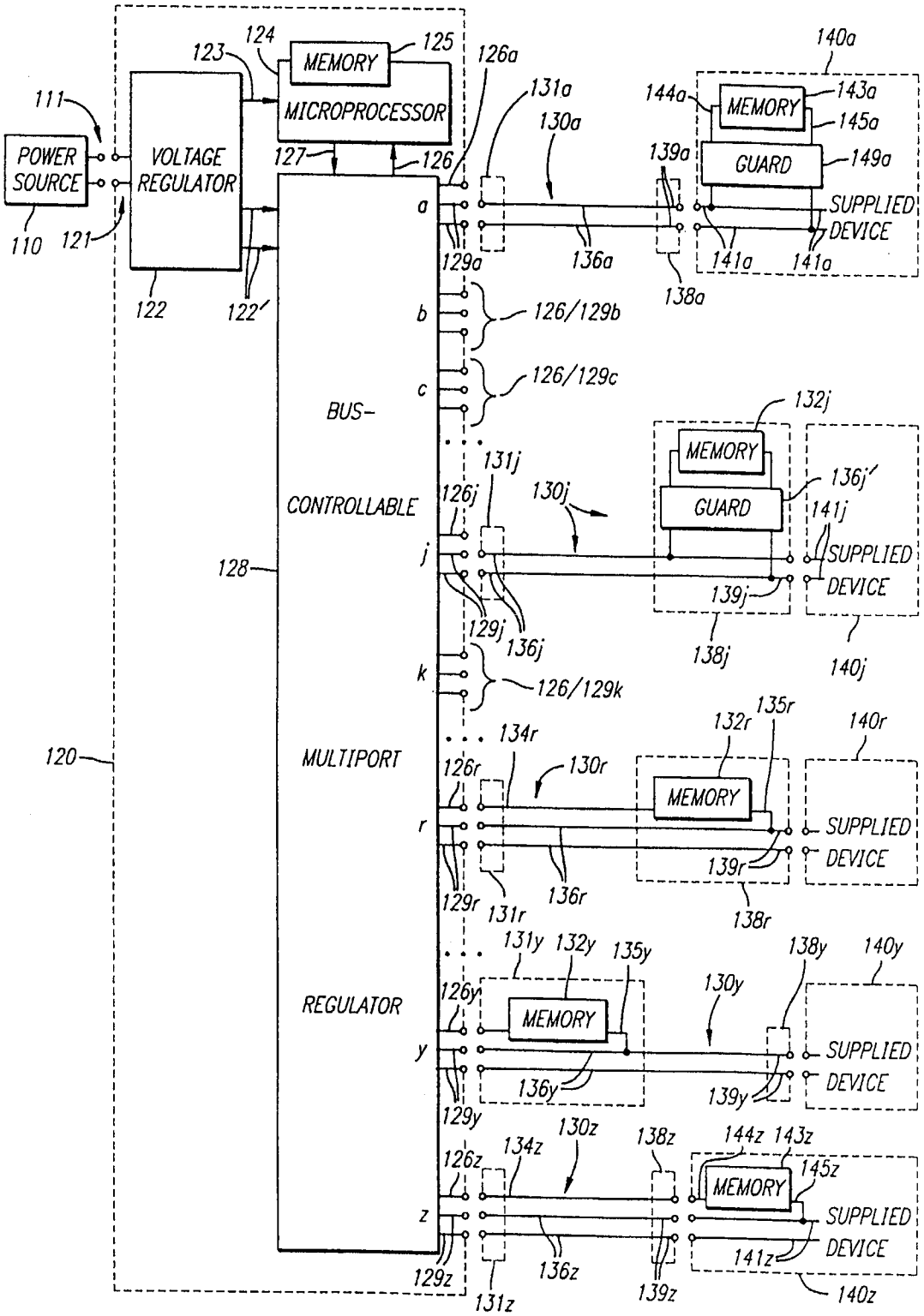


FIG. 2



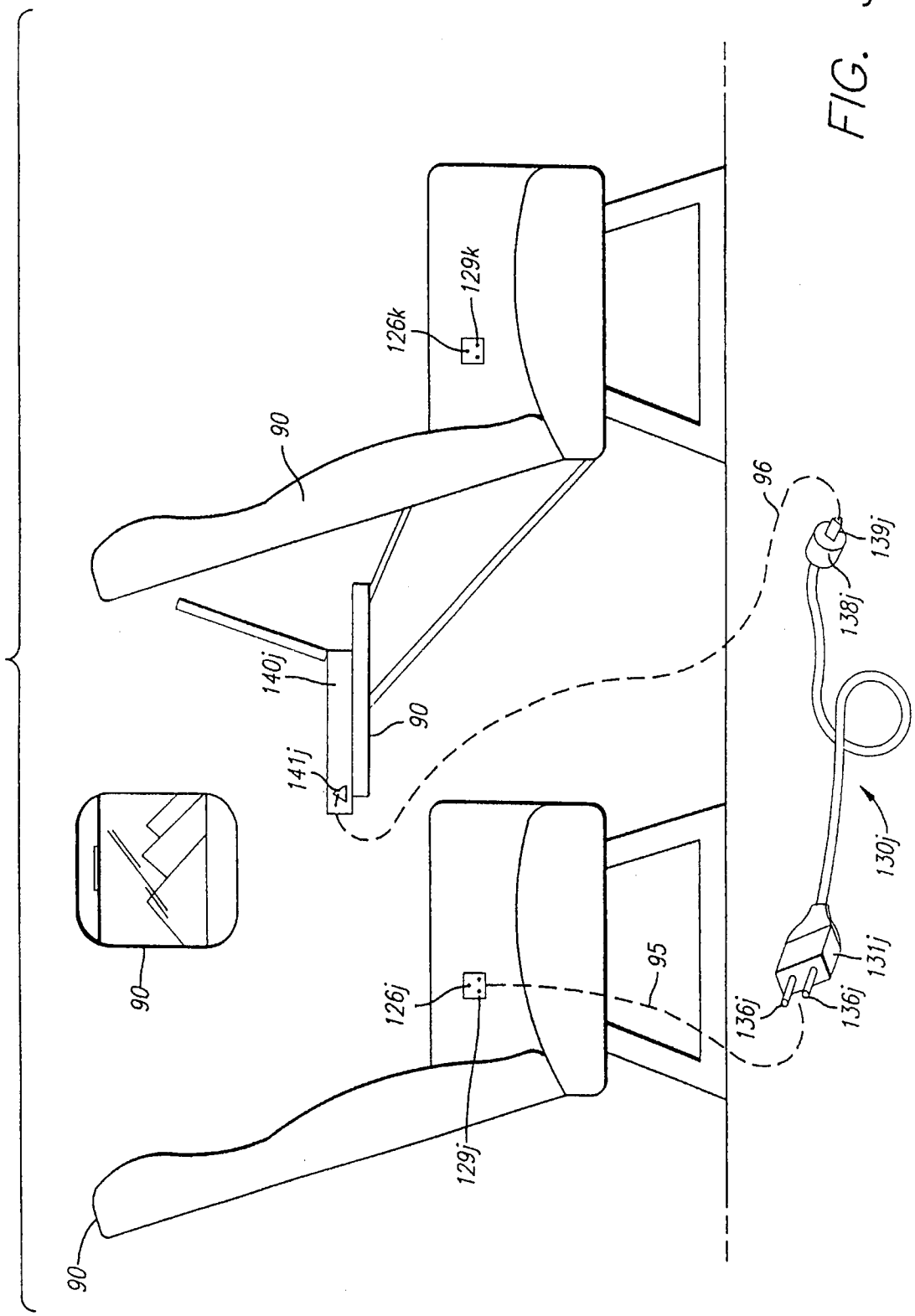


FIG. 3

FIG. 4

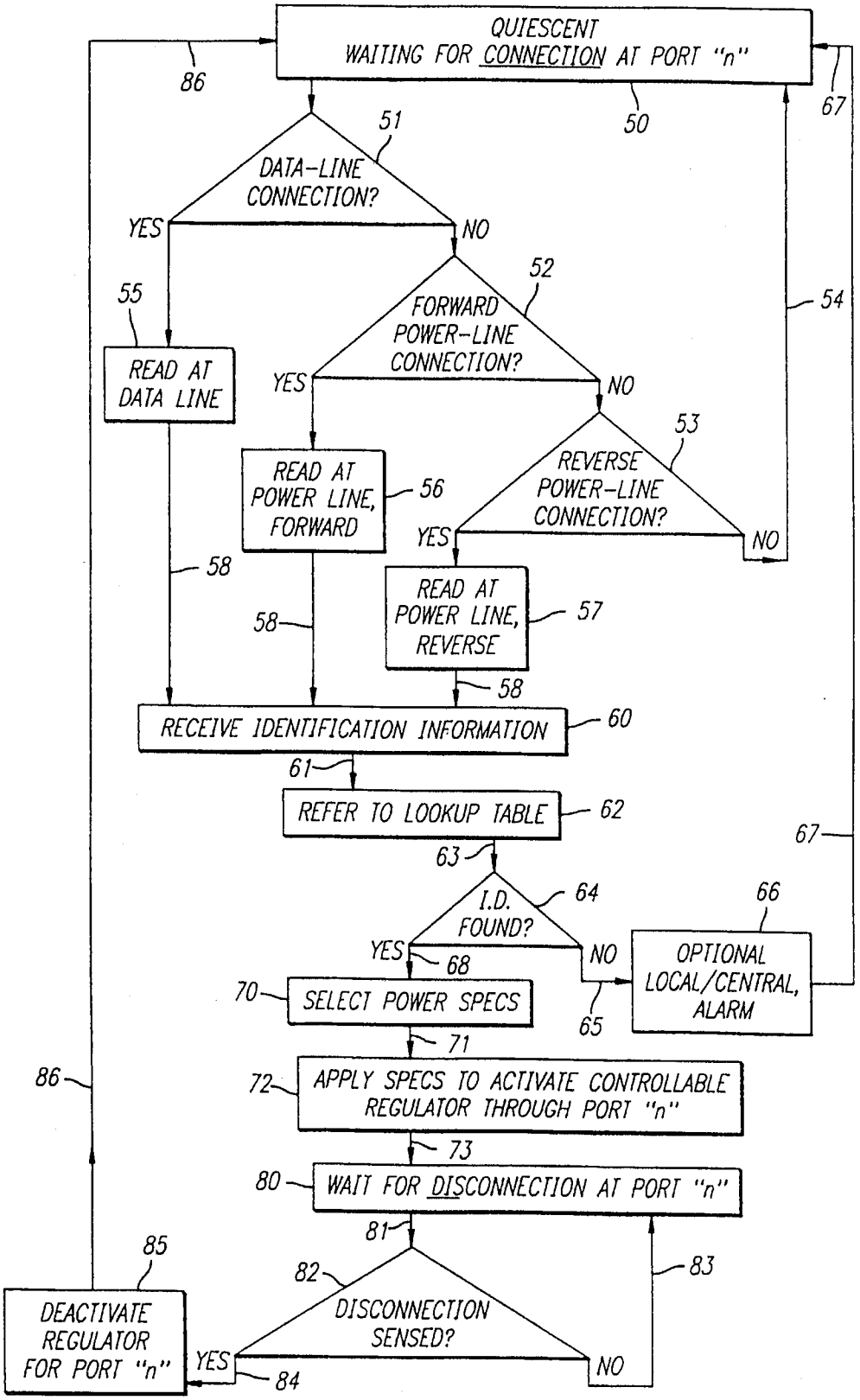
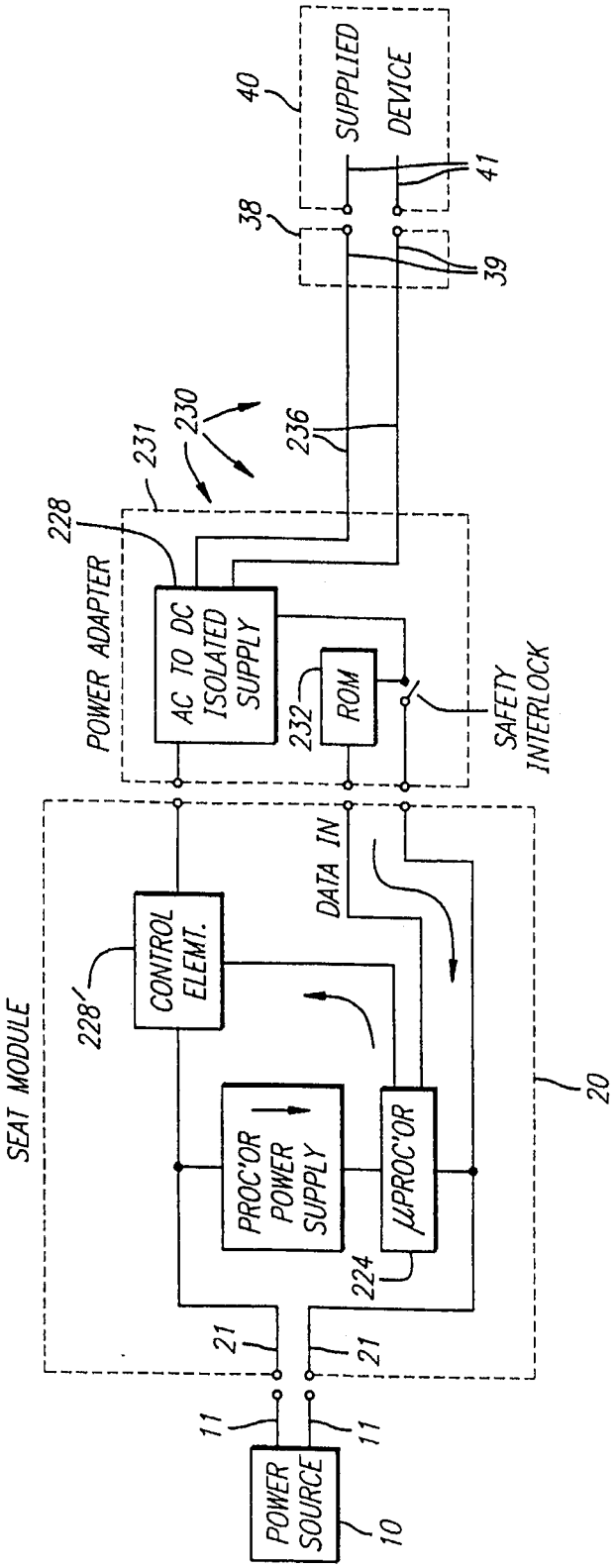


FIG. 5


40
SUPPLIED DEVICE
41
38
39
230
231
236
228
POWER ADAPTER
AC TO DC ISOLATED SUPPLY
232
ROM
SAFETY INTERLOCK
DATA IN
SEAT MODULE
228'
CONTROL ELEMT.
PROC'OR POWER SUPPLY
µPROC'OR
224
20
21
21
11
11
POWER SOURCE
10

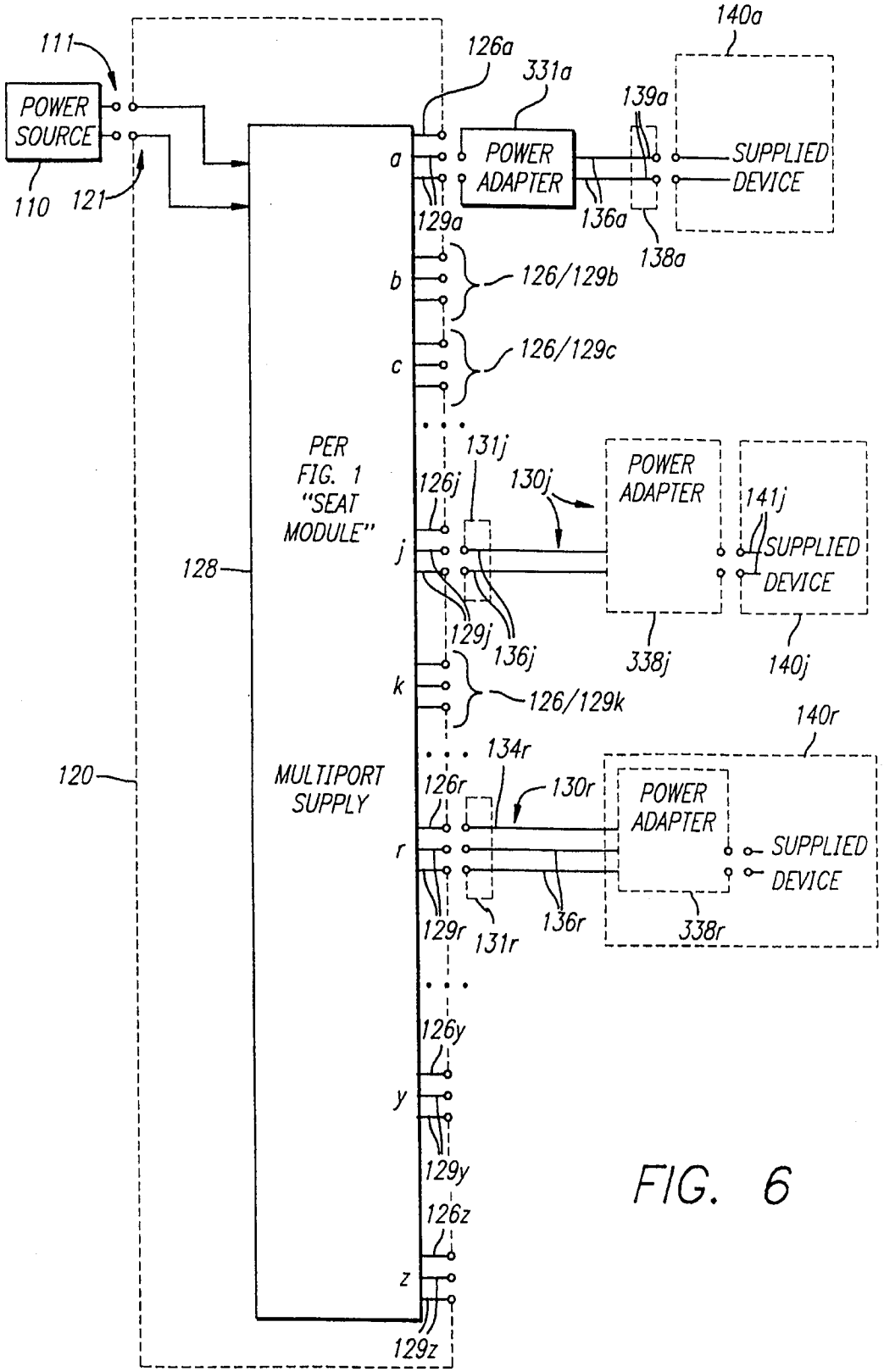
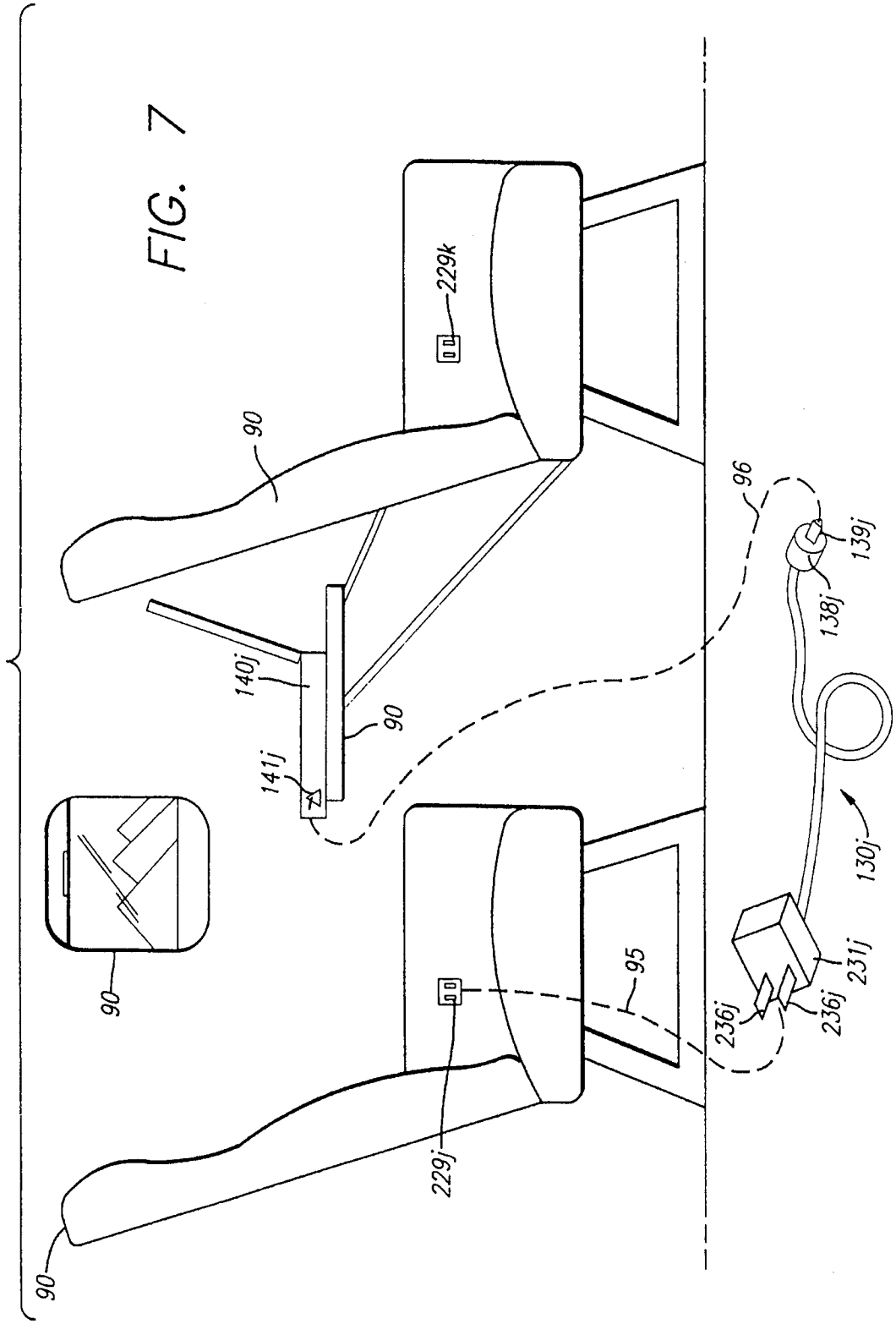


FIG. 6

FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/17662

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G05F 1/56
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 307/11,31; 323/283,285,322; 364/273,273.1,273.2,273.4,273.5,492,707

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS / search terms: power supply connection, power supply interconnection, microprocessor, power control, power adapter, device identification.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,204,249 A (DYE et al.) 20 MAY 1980	NONE
A	US 4,813,072 A (MOSES et al.) 14 March 1989	
A	US 4,804,916 A (FRANK) 14 FEBRUARY 1989	
A	US 5,568,370 A (GOLDSTEIN et al.) 22 OCTOBER 1996	
A	US 5,532,524 A (TOWNSLEY et al.) 02 JULY 1996	

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 JANUARY 1997	25 FEB 1997
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-7721	Authorized officer ALBERT PALADINI Telephone No. (703) 308-2005

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/17662

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

307/11,31; 323/283,285,322; 364/273,273.1,273.2,273.4,273.5,492,707

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Date
28.09.06

Reference	Application No./Patent No.
N57 [illegible]/P04968PEP	05250133.5 - 1242

Applicant/Proprietor
Comarco Wireless Technologies, Inc.

COMMUNICATION

The European Patent Office herewith transmits as an enclosure the European search report (under R. 44 or R. 45 EPC) for the above-mentioned European patent application.

If applicable, copies of the documents cited in the European search report are attached.

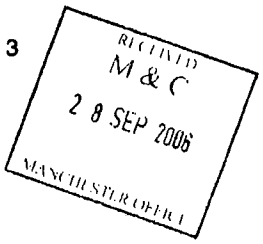
☑ Additional set(s) of copies of the documents cited in the European search report is (are) enclosed as well.

The following specifications given by the applicant have been approved by the Search Division :

☑ Abstract ☑ Title

☐ The abstract was modified by the Search Division and the definitive text is attached to this communication.

The following figure will be published together with the abstract : 3



Refund of search fee

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 25 0133

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 6 528 970 B1 (LIU SEN-HSIANG ET AL) 4 March 2003 (2003-03-04) * column 3, paragraph 53 - column 5, paragraph 5; figures 1-3 *	1,11,21, 31	INV. H02J7/00 H02M1/10
A	US 5 969 438 A (ODAOHARA ET AL) 19 October 1999 (1999-10-19) * column 1, paragraph 8 - column 3, paragraph 51; figure 1 *	1,11,21, 31	
A	US 6 288 522 B1 (ODAOHHARA SHIGEFUMI ET AL) 11 September 2001 (2001-09-11) * the whole document *	1,11,21, 31	

TECHNICAL FIELDS SEARCHED (IPC)

H02M
H02J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 September 2006	Thisse, Sophie

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, 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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 25 0133

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-09-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6528970 B1	04-03-2003	NONE	
US 5969438 A	19-10-1999	JP 3224756 B2	05-11-2001
		JP 10301672 A	13-11-1998
US 6288522 B1	11-09-2001	JP 3365745 B2	14-01-2003
		JP 2000324713 A	24-11-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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For any questions about this communication:
Tel :+31 (0)70 340 45 00

Date: 06.02.09

Reference	Application No./Patent No.
MK/P05972PEP	07254497.6 - 2207 / 1928063

Applicant/Proprietor: Comarco Wireless Technologies, Inc.

Communication

The extended European search report is enclosed.

The extended European search report includes, pursuant to Rule 62 EPC, the European search report (R. 61 EPC) or the partial European search report/ declaration of no search (R. 63 EPC) and the European search opinion.

Copies of documents cited in the European search report are attached.

☑ 2 additional set(s) of copies of such documents is (are) enclosed as well.

The following have been approved:

☑ Abstract ☑ Title

☐ The Abstract was modified and the definitive text is attached to this communication.

The following figure(s) will be published together with the abstract: 3

Refund of the search fee

If applicable under Article 9 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.

Europäisches Patentamt • European Patent Office • Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 07 25 4497

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 98/19223 A (CASTLEMAN NEAL J [US]) 7 May 1998 (1998-05-07) * sentences 3,4,11,12; claim 1 * * sentence 2; claim 2 * * sentence 3; claim 18 * * sentences 3,12,13; claim 22 * * sentence 4; claim 59 *	1-22	INV. H01R29/00
A	US 2006/164061 A1 (FORMENTI JOSE A V [US] ET AL) 27 July 2006 (2006-07-27) * page 4, line 408; figure 4 *		
A,D	US 2005/162020 A1 (LANNI THOMAS W [US]) 28 July 2005 (2005-07-28) * abstract *		
Y	US 2006/220465 A1 (KINGSMORE TERRY A JR [US] ET AL KINGSMORE JR TERRY A [US] ET AL) 5 October 2006 (2006-10-05) * page 1, column 2, lines 1-3, paragraph 7 * * page 1, column 2, lines 11-20, paragraph 9 *	1-22	TECHNICAL FIELDS SEARCHED (IPC) H02J H01R G06F
A	WO 2006/116298 A (SYMBOL TECHNOLOGIES INC [US]; DIGIOVANNA ROBERT W [US]; GONZALEZ DANIE) 2 November 2006 (2006-11-02) * abstract *	1-22	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 November 2008	Fiat, Cyrille

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

T : theory or principle underlying the invention
E : earlier patent document, but published on, 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

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 25 4497

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-11-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9819223 A	07-05-1998	AU 7668496 A	22-05-1998
US 2006164061 A1	27-07-2006	NONE	
US 2005162020 A1	28-07-2005	CA 2493048 A1	15-07-2005
		EP 1555733 A2	20-07-2005
		US 2007073420 A1	29-03-2007
US 2006220465 A1	05-10-2006	NONE	
WO 2006116298 A	02-11-2006	CN 101189564 A	28-05-2008
		EP 1875326 A1	09-01-2008
		US 2006244422 A1	02-11-2006

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

The examination is being carried out on the **following application documents**:

Description, Pages

1-13 as originally filed

Claims, Numbers

1-22 as originally filed

Drawings, Figures

1-11 as originally filed

1 PREAMBLE

1.1 Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure:

D1: WO 98/19223 A (CASTLEMAN NEAL J [US]) 7 May 1998 (1998-05-07)
D2: US 2006/164061 A1 (FORMENTI JOSE A V [US] ET AL) 27 July 2006 (2006-07-27)
D3: US 2005/162020 A1 (LANNI THOMAS W [US]) 28 July 2005 (2005-07-28)
D4: US 2006/220465 A1 (KINGSMORE TERRY A JR [US] ET AL KINGSMORE JR TERRY A [US] ET AL) 5 October 2006 (2006-10-05)
D5: WO 2006/116298 A (SYMBOL TECHNOLOGIES INC [US]; DIGIOVANNA ROBERT W [US]; GONZALEZ DANIE) 2 November 2006 (2006-11-02)

1.2 The application does not meet the requirements of Article 84 EPC, because its sets of claim lacks conciseness contrarily to the requirements of Rule 43(2) EPC, and because it is not clear as requested by Article 84 EPC.

2 LACK OF CONCISENESS (Article 84 EPC, Rule 43(2) EPC)

2.1 Claims 1, 5, 8, 12,16 and 20 have been drafted as separate independent apparatus claims. Under Article 84 in combination with Rule 43(2) EPC an application may contain more than one independent claim in a particular category only if the subject matter claimed falls within one or more of the exceptional situations set out in paragraphs (a), (b) or (c) of Rule 43(2) EPC.

2.2 These exceptional cases are:

a) a plurality of inter-related products, for example, plug and socket or transmitter and receiver, i.e. different objects that complement each other or work together, what is not the case of the present application;

b) different uses of a product or apparatus, for instance further medical uses, also no the case of this application; and

c) alternative (unitary) solutions to a particular problem, where it is not appropriate to cover these alternatives by a single claim, and bearing in mind that alternative means different or mutually exclusive possibilities.

2.3 The last possibility is not the case either of the present application. The possibilities in the different independent claims cannot be considered substantially different or mutually exclusive. The similarities in the wording and technicalities are a clear indication that it is possible to replace such claims with a single independent claim, e.g. by selecting a common wording for the essential features.

2.4 The examiner would like to stress that there is no clear distinction between the independent claims because of overlapping scope and it is particularly burdensome for a skilled person to establish the subject-matter for which protection is sought. Therefore, in the present case, one independent claim is considered appropriate.

2.5 In the further prosecution of the application, failure to file an amended set of claims which complies with Rule 43(2) EPC, or to submit convincing arguments as to why the current set of claims does in fact comply with these provisions, may lead to refusal of the application under Article 97(1) EPC.

3 **OTHER CLARITY MATTERS** (Article 84 EPC)

3.1 In general, all the independent claims lack a very important essential feature. The problem to be solved is to avoid a possible overcurrent that could compromise the security during flight operation because of overheating or fire following a malfunction of the charging circuit of a battery in the electronic device. The "detachable tips" disclosed in the independent claims act as a kind of interface between power supply and electronic device transmitting relevant information in

order to avoid that possibility. However the mere transit of the informations does not suffice to avoid the overheating or the fire. The Applicant has not defined (at least) in the claims which are the means that, in fact, having regard to the relevant informations will avoid the overheating. These means appears to be *"controller 360"*.

3.2 On the other hand, the independent claims do also lack other essential features: With more detail, and without prejudice of the other features that could prompt as essential during the examination procedure of this application, a list would include:

3.3 - **Independent claim 1**:
It is clear from the description on page 13: "*Under certain operating conditions, the character string represents that a* ***rechargeable battery*** *within the electronic device can be charged by the power adapter 940 and tip 900 combination.*" (page 13, lines18-19) that the following feature is essential to the definition of the invention: ***"rechargeable battery"***. If this feature is not included in independent claim 1, then, the role of the character string in the resolution of the problem is not definded and the resolution of the problem is hindered;

3.4 - **Independent claim 5**:
It is clear that this claim does not resolves the problem of this invention without the following feature which is essential to the definition of the invention: **control circuit for providing a control signal to the power adapter**;

3.5 - **Independent claim 8**:
This claim describes only a simple connector. All the features in claim 5, together with the essential feature (then same as about claim 5) **control circuit**, are lacking in claim 8. With the feature in claim 8 it is not possible to solve the problem solved by the invention;

3.6 - **Independent claim 12**:
Same as about claim 8 applies "mutatis mutandis" to independent **claim 12**;

3.7 - **Independent claim 16**:
The feature "**receiver**" is essential for the definition of the invention: if not the management of the data as described in the description would not operate in

order to solve the problem underlying the invention;

3.8 - About **claim 20**:
This same said for claim 5 applies "mutatis mutandis" to independent **claim 20** with the lack of essential feature **control circuit**.

3.9 Since independent claims do not contain these feature they do not meet the requirement following from **Article 84 EPC**, taken in combination with **Rule 43(1) and (3) EPC**, that any independent claim must contain all the technical features essential to the definition of the invention.

3.10 The term "tip" used in **claims 1 to 22**, have no well-recognized or acknowledged meaning for the person skilled in the art of power supplies and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claims **unclear** (Article 84 EPC).

3.11 In claim 1 the applicant tries to characterise the memory, the receiver, the transmitter, and by extension, the detachable tip, by reference to the power adapter and the electronic device to which it is connected. Where a claim in respect of a physical entity (product, apparatus) seeks to define the invention by reference to features relating to the entities use, a lack of clarity results (Guidelines, C-III, 4.14). This is particularly the case where the claim not only defines the entity itself but also specifies its relationship to a second entity (in this case, even a third entity) which is not part of the claimed entity.

3.12 Before considering a restriction to the combination of the entities, it should always be remembered that the applicant is normally entitled to independent protection of the first entity "per se", even if it was initially defined by its relationship to the second entity. Since the first entity can often be produced and marketed independently of the second entity, it will usually be possible to obtain independent protection by wording the claims appropriately. This is the case of the characterisation of receiver and transmitter in claim 1: the problem can be overcome by defining them as "receiver adapted to" and "transmitter adapted to". However it does not appear to be the case of the characterisation of the memory via the function associated to the character string, as it has no influence on the memory, i.e. it is not possible to give a clear definition of the first entity per se, in this case, because of the memory. Then the solution appears to be drafting the claim directed to a combination of the entities.

3.13 This last objection can be extended "mutatis mutandis" to the other independent claims (5, 8, 12,16 and 20).

3.14 To conclude this clarity chapter, claim 20 appears to have all the technical features in claim 5: then this claim depends on claim 5.
Accordingly, the claim should be drafted with a reference to claim 5 at the begining of the claim and afterwards adding the other features in the subject-matter of the claim.

4 PRELIMINARY OPINION ON INVENTIVE STEP

4.1 The application presents severe clarity problems. The unjustified number of independent apparatus claims and the lack of essential features severely hinders the possibility of understanding which is, in fact, the subject-matter for which the applicant seeks protection. Moreover the protection of the detachable tip "per se" appears to be complicated, due to the strong interrelations with the other two parts of the system (power supply and electronic devices).

4.2 For the sake of efficiency the examiner will perform a rough analysis of the inventive activity of the set of claims. This analysis should not be understood as a binding opinion and is done without prejudice of other possible opinions or arguments that may arise during the procedure.

4.3 Document D1 is considered to be the closest prior art to the subject matter of claim 1.

4.4 This document shows the following features thereof (the references in parentheses applying to this document):
- a **detachable** cable (figure 1) to be utilized with a **power adapter** (claim 1, line 4), comprising a **memory** (claim 2, line 2) for storing an **identification** information (claim 1, line 12).
- a **electronic device** (claim 1, line 3) which can be coupled to the detachable cable.
- a **receiver** (claim 59, line 4) to receive an identification request and a **transmitter** (claim 22, line 12-13) to transmit the identification information in response to an **identification request** (claim 22, line 3).

4.5 The subject-matter of claim 1 therefore differs from this known D1 in that:
(a) Claim 1 discloses a **detachable tip** instead of a detachable cable.
(b) Claim 1 discloses the identification information as a **character string**.
(c) Claim 1 discloses the identification string **identifying whether a power adapter is an approved adapter**.

4.6 Therefore, the present application does meet the requirements of Article 52(1) EP. Thus the subject-matter of **claim 1 appears to be novel** within the meaning of Article 54(1) and (2) EPC.

4.7 Concerning feature (a), the examiner wonders whether a "tip" can be considered as a technical feature in the electrical context of the application. It recalls more a shape

or a size rather than a technical feature bringing a technical limitation to the claim. Then, according to the Guidelines C-IV.11.7.2 (second paragraph) the feature should not be relevant for assessing inventive step. Moreover, a person skilled in the art would have no difficulties to think of a "*tip*" that is "*detachable*" after having knowledge of the detachable cable (see figure 1) in D1.

4.8 Concerning feature (b), the storing of information under the form of a character-string is a known solution for the person skilled in the art of identification and communication handling when faced to the problem of reflecting representative parameters of a system.

4.9 Concerning feature (c), it could be the ground for an inventive step.

4.10 The feature (c) has the effect of preventing a power supply or a load from being damaged by a dangerous overcurrent.

4.11 The objective problem is then "how to prevent a power supply or a load from being damaged by a dangerous overcurrent".

4.12 The feature (c) is described in document D4 as providing the same advantage as in the present application. The person skilled in the art would therefore regard it as a normal option to include this feature in the electrical power distribution system described in document D1 in order to solve the problem posed.
Indeed, the problem of preventing an electronic device from being connected to a power adapter not being a dedicated accessory to such an electronic device is recognize in D4, paragraph [0007], lines 1 to 3.
A solution is given by access to "*A power adapter communication module of the power adapter sends the identification information (...). A power enablement module of the power supply authorizes output of a high DC power if the identification information confirms a proper connection between the information handling and the adapter*" (see paragraph [0009], lines 11 to 20).

4.13 The person skilled in the art when faced to this problem would modify the system in the sense of protecting or adapting the working mode of the electronic device according to the type of adapter type it is connected to.

4.14 In addition to target the same problem, the skilled person in the art of power distribution would combine D1 and D2 because the two documents target the domain of an electrical device being powered by a power adapter (D1, title and D4, title).
Therefore the person skilled in the art would bring the teaching of D4 in D1 aiming to the subject matter of claim 1, without the use of any inventive skill.

4.15 Then the subject-matter of **claim 1 does not involve an inventive step** within the meaning of Article 56 EPC.

4.16 Concerning claim 2 the use of a microcontroller integrating receiver, memory and

transmitter is a normal design option. Most of the modern microcontroller integrate in the same unit all these functions. After having knowledge of the cable in D1 (with a transmitter, receiver and memory), the person skilled in the art would use a microcontroller in order to solve the problem of how to provide the detachable tip with the possibility of a easy configuration of the operational parameters.

4.17 Same could be said for dependent claim 3. The use of a one-wire interface protocol is far from of being inventive and is to be considered part of the common knowledge of the skilled person.

4.18 The subject-matter of claim 4 is to be identified in the abstract of document D1 (line 4).

4.19 Thus **claims 1-4** do not meet the requirements of Article 52(1) EPC because their subject-matter **do not involve an inventive step** within the meaning of Article 56 EPC.

4.20 With regard to **independent claim 5**, the argument against claim 1 also applies, "mutatis mutandis". The subject-matter of dependent claims 6 and 7 is found to be non-inventive following the same argumentation made for claims 4 and 2 respectively.

4.21 Thus **claims 5-7** do not meet the requirements of Article 52(1) EPC because their subject-matter **do not involve an inventive step** within the meaning of Article 56 EPC.

4.22 In the particular case of independent claim 8, the reasoning for claim 1 also applies, considering on top that the connectors referred in claim 8 can be identified in D1. The subject-matter of dependent claim 9 is to be identified in D1, and the subject-matter of claims 10 and 11 cannot be the ground of an inventive step, being normal design options for a person skilled in the art when face to the problem of reporting a representative operational magnitude of an electronic unit.

4.23 Thus **claims 8-11** do not meet the requirements of Article 52(1) EPC because their subject-matter **do not involve an inventive step** within the meaning of Article 56 EPC.

4.24 The subject-matter of independent claim 12, is also rendered non-inventive, according to the reasoning made for independent claim 8. Claim 13 is not inventive for the same reason as claim 5. To conclude with this group of claims, dependent claims 14 and 15 refer to habitual DC source from which an electronic device might be powered and cannot be the ground of an inventive step. Moreover, they appear to define the detachable tip in claim 12 by reference to the DC source selected, and

fall then also in the clarity problem defined in the Guidelines C-III 4.14, already discussed in combination with the independent claims.

4.25 Thus **claims 12-15** do not meet the requirements of Article 52(1) EPC because their subject-matter **do not involve an inventive step** within the meaning of Article 56 EPC.

4.26 Finally, the subject-matter of independent claim 20 and dependent claims 21 and 22 does make any inventive contribution over the prior art because of the same reason given concerning claims 1, 5 and 14. Thus **claims 20-22** do not meet the requirements of Article 52(1) EPC because their subject-matter **do not involve an inventive step** within the meaning of Article 56 EPC.

4.27 The combination of the features of independent claim 16 does not appear to be known from the available prior art.

5 CONCLUDING REMARKS

5.1 It has been already discussed the severity of the clarity problems of this application. The number of independent claims make the examiner think in an attempt of the applicant to hide the subject-matter for which protection is sought. The applicant is firmly requested to counteract this lack of conciseness and to file a new set of claims with just one independent claim per category, upon which the further prosecution of the application is to be based.

5.2 The applicant is invited to file amendments aiming to solve this objection aiming to fast and efficient examination procedure. While doing so, the applicant is asked to consider the following matter.

5.3 For the sake of efficiency, and in order to facilitate the examination of the conformity of the amended claims with the requirements of Article 123(2) EPC, the applicant is requested to clearly identify the amendments carried out, **irrespective of whether they concern amendments by addition, replacement or deletion**, and to indicate, starting from the independent claim as filed, the passages of the application as filed on which these amendments of the new independent claims are based (see Guidelines E, II, 1). These indica-tions should be submitted in handwritten form on a copy of the relevant parts of the application as filed.

5.4 The case law of the Board of Appeal for Art. 123(2) EPC, rules that any amendment must be **directly and unambiguously** derivable from and consistent with the application as originally filed (see e.g. decision of the Board of Appeal T441/92). The examiner proposes to reproduce (when adding, replacing or deleting a feature) **in a word-by-word basis the wording of the passage of the description endorsing**

the amendment. Concerning figures, the examiner reminds the applicant that **the solely use of figures as endorsement for an amendment is complicated** for the following reasons. A drawing as filed discloses a multiplicity of features. This is the disclosure as filed. If, however, isolated features are taken from a drawing, always the question arises whether **there is a direct and unambiguous hint in the specification as filed for this particular selection of features from the drawing** (see decision T191/93).

5.5 In a similar decision (**T1067/97**) the board confirmed that, if a claim was to be restricted to a preferred embodiment, it was normally not admissible under Article 123(2) EPC to extract isolated features from a set of features which had originally been disclosed in combination for that embodiment. An amendment of this nature would only be justified in the absence of any clearly recognisable functional or structural relationship among said features. A mix of features from different embodiments to obtain new subject matter, is also not acceptable (see e.g. T284/94).

5.6 Independent claims 1, 5, 8, 12, 16 and 20 are not in the **two-part form** in accordance with Rule 43(1) EPC, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 43(1)(a) EPC) and with the remaining features being included in the characterising part (Rule 43(1)(b) EPC). If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefore should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of claims 1, 5, 8, 12, 16 and 20 are already known in combination from the document D1 (see the Guidelines, C-III, 2.3.2).

5.7 The applicant should also give convincing arguments in favour of inventive step, i.e., why starting from the features of the preamble of claim 1 (the features known from D1, in case of a two-part form claim) it is not obvious, in his opinion, to add the features of the characterising part of claim 1, even if a skilled person additionally takes into account the teachings of any of the other prior art documents (D2, D4). The argumentation in favour of inventive step should only be based on the features defined in claim 1. Any facultative features cannot support the inventive step of the subject-matter of claim 1.

5.8 Any information the applicant may wish to submit concerning the subject-matter of the invention, for example **further details of its advantages or of the problem it solves**, and for which there is no basis in the application as filed, should be confined to the letter of reply and not be incorporated into the application (Article 123(2) EPC and the Guidelines, C-VI, 5.7 et seq.).

5.9 When filing amended claims the applicant should at the same time bring the **description into conformity with the amended claims**. Care should be taken during revision, especially of the introductory portion and any statements of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed (Article 123(2) EPC).

5.10 Summary of the invention in the description, should be replaced by a **new definition of the invention, according to the new set of claims** to avoid different definitions of the invention in the description and the claims, which could lead to unclarity, if the claims are read together with the description (Art. 84 EPC). It can be replaced by "the invention is defined by the features of the independent claims. Preferred embodiments are defined in the dependent claims". Alternatively, the wording of the claims can be repeated in the description 1:1.

5.11 To meet the requirements of Rule 42(1)(b) EPC, the document D1 should be identified in the description and its relevant contents should be indicated. The applicant should ensure that it is clear from the description which features of the subject-matter of independent claims are known from the document. The examiner suggests the use of the expression "document WO 98/19223 discloses a device comprising the features of the preamble of claim 'A'", where 'A' is an independent claim, correctly drafted in the two-part form.

5.12 The features of the claims should be provided with reference signs placed in parentheses to increase the intelligibility of the claims (Rule 43(7) EPC). This applies to both the preamble and characterising portion (see the Guidelines, C-III, 4.19).

5.13 It is the applicant's responsibility to ensure that registered trademarks are acknowledged as such in the description (see Guidelines C-II, 4.18).
The description is making reference to "*EmPower*". **EMPOWER®** is a trademark of Astronics Advanced Electronic Systems.
Claim 3 and the description, it is made reference of "*One-Wire*". **1-Wire®** is a trademark of Maxim Integrated Products, Inc.

5.14 The "spirit" (page 18, line 8) and "***Spirit of the invention***" (page 18, line 10) statements in the description imply that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in a lack of clarity of the claims (Article 84 EPC) when the description is used to interpret the claims (see Guidelines C-III, 4.4). This statement should therefore be amended to remove this inconsistency.

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PM318636EP

Application No.	Ref.	Date
05 250 133.5 - 1233	MH/P04968PEP	14.06.2012
Applicant: Comarco Wireless Technologies, Inc.		

Communication pursuant to Article 94(3) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(2) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 126(2) and 131(2) and (4) EPC. One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (R. 50(1) EPC).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the Examining Division requesting that you correct this deficiency (R. 137(4) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Art. 94(4) EPC).

The notification of this communication starts the 24-month period according to Rule 36(1)(a) EPC for filing a voluntary divisional application divided from this application or from any sequential application. For further information see Guidelines for Examination, A-IV, 1.1.1.2 and 1.1.1.4.

Rocha, Daniel
Primary Examiner
For the Examining Division

Enclosure(s): 9 page/s reasons (Form 2906)
US-6358096-B1, US-20030207603-A1

The examination is being carried out on the **following application documents**

Description, Pages

1-11 as originally filed

Claims, Numbers

1-40 as originally filed

Claims, Pages

1-6 as originally filed

Drawings, Sheets

1/10-10/10 as originally filed

Drawings, Figures

1, 2A, 2B, 3, 4A, 4B, 5A, 5B, 6, 7A, 7B, 8 as originally filed

Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure.

D1 US 6 528 970 B1 (LIU SEN-HSIANG ET AL) 4 March 2003 (2003-03-04)

D2 US 5 969 438 A (ODAOHARA ET AL) 19 October 1999 (1999-10-19)

D3 US 6 288 522 B1 (ODAOHHARA SHIGEFUMI ET AL) 11 September 2001 (2001-09-11)

The following documents are cited by the Examiner. A copy of the documents is annexed to the communication and the numbering will be adhered to in the rest of the procedure.

D4 "LM2601 - Adapter Interface Circuit",
National Semiconductor
, April 2001 (2001-04),
Retrieved from the Internet:

URL:http://www.datasheetcatalog.org/datasheet/nationalsemiconductor/LM2601.pdf
[retrieved on 2012-06-08]

D5 US 6 358 096 B1 (BECKMAN JERRY L [US]) 19 March 2002 (2002-03-19)

D6 US 2003/207603 A1 (POTEGA PATRICK [US]) 6 November 2003 (2003-11-06)

1 Article 84 EPC

1.1 The application does not meet the requirements of Article 84 EPC, because claims 1, 11, 21 and 31 are not clear.

1.2 Essential feature missing

1.2.1 It is clear from the description on p. 4, l. 19 - p. 5, l. 6 and on p. 6, l. 16 - l. 22 that the feature "from one among two different DC power sources having different DC voltage magnitudes" is essential to the definition of the invention *("An embodiment of the present invention is directed to a power supply system to determine a DC power source... The DC power source may be determined by voltage comparison circuitry, such as a comparator, or by a voltage comparison device including a processor", cf. p. 4, l. 19 - p. 5, l. 6 of the description of the present application; "The adapter... to determine whether the DC power source 305 is an automobile cigarette lighter outlet or an emPower airplane outlet. As stated above, automobile cigarette lighter outlets typically provide a DC voltage having a magnitude within the range of 11.0 Volts and 14.1 Volts. An emPower airplane outlet typically provides a DC voltage having a magnitude within the range of 14.5 and 15.5 Volts.", cf. p. 6, l. 16-22 of the description of the present application).*

1.2.2 Since independent claims 1, 11, 21 and 31 do not contain this feature ("from one among two different DC power sources having different DC voltage magnitudes") they do does not meet the requirement following from Article 84 EPC, taken in combination with Rule 43(1) and (3) EPC, that any independent claim must contain all the technical features essential to the definition of the invention.

1.2.3 Furthermore, claims 1, 11, 21 and 31 also do neither contain the feature "comprising a battery", which is also essential to the definition of the invention.

1.3 Conciseness

1.3.1 Claims 1, 11, 21 and 31 have been drafted as separate independent claims

1.3.2 Under Article 84 in combination with Rule 43(2) EPC, an application may contain more than one independent claim in a particular category only if the subject-matter claimed falls within one or more of the exceptional situations set out in paragraph (a), (b) or (c) of Rule 43(2) EPC. This is not the case in the present application, however, for the following reason(s):

- Claim 21 includes all the features of claim 1. Hence, claim 21 should be reformulated as a claim dependent on claim 1 (see Rule 43(4) EPC and Guidelines C-III, 3.4).

- Claims 1 and 31 are two different formulations of the same embodiment. Thus, claim 31 should not be drafted as an additional independent apparatus claim.

2 Article 52(1), 54(1)(2) and 56 EPC

2.1 Independent claims 1, 11, 21 and 31

2.1.1 According to the requirements of Rule 49(11) EPC, the terminology and the signs must be consistent throughout the application. This requirement is not met in view of the use of the expressions "a data signal (Vdata)" and "the Vdata signal" for the same feature (see claims 1, 9, 11, 19 and 21).

2.1.2 Furthermore, notwithstanding the above-mentioned lack of clarity, the subject-matter of claim 1 is not new within the meaning of Article 54(1) and (2) EPC, and the requirements of Article 52(1) EPC are therefore not met.

2.1.3 Document D4 discloses:

An adapter device *("adapter", "adapter interface circuit (AIC)", "portable computer", cf. D4: p. 1, "General Description")*, comprising:

a DC/DC adapter *("airplane... power line adapter", cf. D4: p. 1, "Features")* to receive DC power from a DC power source *(NB as the skilled person would know, most aircrafts are equipped with a 14V or 28V DC bus)*, and output a regulated DC voltage *(NB the fact that the airplane power line adapter outputs a regulated DC voltage is well-known to the skilled person, see. e.g. D5: "airlines are equipping their passenger airplanes with power sockets for charging and powering portable electronic devices. Primex Aerospace of St. Petersburg, Florida has developed what has become the standard in airline power sources, a system it calls the Empower™ system... For airline power sources, a standard has been established that mandates a 5-amp circuit breaker for*

a 15-volt power socket, resulting in a maximum power delivery of 75 watts before the airline circuit breaker is tripped.", cf: D5: col. 1, l. 44-48); and

source determination circuitry *("LM2601 - Adapter Interface Circuit", cf. D4: Title)* to receive the DC power *("$V_{ADAPTER}$", cf. D4: p. 1, "Block diagram"; "$V_{ADAPTER}$ ... -0.3V to 28V, cf. D4: p. 3, "Absolute Maximum Ratings")* from the DC power source *(the aircraft's DC system bus)* and compare a magnitude of a voltage *($V_{ADAPTER}$)* of the DC power with a reference magnitude *("$V_{CHARGER}$... Adapter Voltage for V_{CP} [CHARGER PRESENT] Low-to-High Transition... Min: 16.5V, Typ: 17.0V, Max: 17.4V", cf. D4: p. 3, "Electrical Characteristics")* of a reference voltage *($V_{CHARGER}$)(NB in practice the input voltage $V_{ADAPTER}$ appears to be being divided by a resistive voltage divider and compared to voltage reference of 2.5V, cf. D4: p. 1: "Block Diagram")*,

wherein when the magnitude of the voltage *($V_{ADAPTER}$)* of the DC power is greater than the reference magnitude *($V_{CHARGER}$)("$V_{ADAPTER}$ > 17 volts", cf. D4: p. 2, "Pin Description")*, a data signal *("5... CHARGER PRESENT", cf. D4: p. 2, "Pin Description"; "VCP... Logic Output Voltage... Charge present", cf. D4: p. 3, "Electrical Characteristics")* having a first value *(Low... Typ: 0.25V, Max: 0.6V", cf. D4: p. 3, "Electrical Characteristics")* is output, and when the magnitude of the voltage of the DC power is less than the reference magnitude *($V_{CHARGER}$)* , the data signal having a second value *("High when $V_{ADAPTER}$ > 17 voltage", cf. D4: p. 2, "Pin Description"; "High... Min:.2.9V, Typ: 3.1V", cf. D4: p. 3, "Electrical Characteristics")* is output *(NB when the input voltage $V_{ADAPTER}$ after resistive division is greater than the reference voltage of 2.5V, the output CHARGER PRESENT is asserted high; otherwise it is asserted low, cf. D4: p. 1, "Block diagram", it is therewith implicitly disclosed that the CHARGER PRESENT pin is low when $V_{ADAPTER}$ < 17V)*, the data signal *(CHARGER PRESENT, V_{CP})* being received by control circuitry *("System Management Controller", cf. D4: p. 4, "Typical Application - Notes; "notebook system management microcontroller (or 'embedded controller')", cf. D4: p. 5, "Application Information")* of an electronic device *("notebook computer system of a portable device", cf. D4: p. 5, "Application Information")("Pin Master Power Source (MPS) should be connected to System Management Controller's (SMC) and battery backs' GPIOs. When SMC detects a*

powered AC adapter via active signals at Charger Present or Adapter Present outputs, it asserts Adapter Enable signal and isolates the battery pack(s).", cf. D4: p. 4, "Typical Application - Notes") wherein

when the data signal *(CHARGER PRESENT, V_{CP})* has the first value *(Low)*, the electronic device *(notebook computer system of portable device)* operates in a first mode *("Detects... an airplane or car power line adapter that should not be used for battery charging", cf. D4: p. 1, "Features"; NB evidently when the pin CHARGER PRESENT is low, the detection of a power source having a voltage magnitude equal or smaller than the airplane power line voltage is being asserted, cf. D4: p. 2, "Pin Description")* where battery charging circuitry is disabled *("The computer should be able to automatically refuse to charge a battery when powered from an airplane power line.", cf. D4: p. 5, "Application Information")*, and when the data signal has the second value *(High)*, the battery charging circuitry is enabled *("When a notebook computer is being powered from a battery and the adapter is plugged in, the computer should start drawing power from the adapter, not from the battery. The most time efficient charging scenario is when a computer draws the full rated current from a constant voltage adapter. The computers uses what it needs to run, and passes all remaining power on to the battery for charging. The computers should be able to automatically refure to charge a battery when powered from an airplane power line", cf. D4: p. 5, "Application Information")*.

2.1.4 The subject-matter of claim 1 is therefore not new (Article 54(1) and (2) EPC).

2.1.5 The subject matter of corresponding method claim 11 is for similar reasons, mutatis mutandis, not new in view of document D4.

2.1.6 Claim 21 is dependent on claim 1, the subject matter including the additional feature "a power supply system". Since document D4 describes a power supply system comprising an adapter device according to claim 1 ("The adapter interface circuit (AIC) IC provides the control functions necessary for use in mating a constant voltage output AC-DC adapter or airline adapter to a notebook computer system or a portable device.", cf. D4: p. 5, "Application information" and p. 4, Fig.), the subject matter of claim 21 is also not new in view of document D4.

2.1.7 Claim 31 essentially comprises the same subject matter as claim 1 and is therefore also not new in view of document D4.

2.2 **Dependent claims 2-10, 12-20, 22- 30 and 32-40**

2.2.1 Dependent claims 2-10, 12-20, 22- 30 and 32-40 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the EPC with respect to novelty and/or inventive step. A short reasoning is given below:

2.2.2 **Claims 2, 12, 22 and 32: Lack of novelty**

2.2.2.1 Document D4 discloses an adapter device according to claim 1 (see above), wherein when the DC power source is an automobile cigarette lighter outlet *("car power line adapter", cf. D4: p. 1, "Features")*, the magnitude of the voltage of the DC power is less than the reference magnitude *("$V_{CHARGER}$··· Adapter Voltage for V_{CP} [CHARGER PRESENT] Low-to-High Transition... Min: 16.5V, Typ: 17.0V, Max: 17.4V", cf. D4: p. 3, "Electrical Characteristics")(NB a car battery typically delivers a standard 12V voltage to the car's DC system voltage as the skilled person would readily acknowledge; the DC system voltage is thus less than the minimum voltage of the reference magnitude, i.e. 12V < 16.5V)*.

2.2.2.2 The subject matter of corresponding method claim 12 and of device claims 22 and 32 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.3 **Claims 3, 13, 23 and 33: Lack of novelty**

2.2.3.1 Document D4 discloses an adapter device according to claim 2 (see above), the magnitude of the DC power being in a range between about 11.0 Volts and about 14.1 Volts *(typically 12V, see comments above)*.

2.2.3.2 The subject matter of corresponding method claim 13 and of device claims 23 and 33 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.4 **Claims 4, 14, 24 and 34: Lack of inventive step**

2.2.4.1 The subject matter of claim 4 is directed towards solving the problem of distinguishing between the presence of car and airplane line adapters in order to disable battery charging only when the latter is detected.

2.2.4.2 Although document D4 is silent about making this distinction, the power adapter described therein inhibiting battery charging when connected to either airplane or car line adapters, it clearly concentrates on blocking the charging operation when powered from airplane power lines *("The computer should be able to automatically refuse to charge a battery when powered from an airplane power line", cf. D4: p. 5, "Application Information")*.

2.2.4.3 Document D5 on the other hand, describes an adapter device, which specifically detects that whether it is being powered by an airplane of car line adapter and changes its power output level accordingly.

2.2.4.4 Detecting the presence of either an airplane or a car line adapter and regulting the power output of the adapter accordingly is described in document D5 as providing the same advantages as in the present application. The skilled person would therefore regard it as a normal design option to include this feature in the adapter device described in document D4 in order to solve the problem posed.

2.2.4.5 The subject matter of corresponding method claim 14 and of device claims 24 and 34 is for similar reasons, mutatis mutandis, also not considered to be inventive in view of document D4 in combination with D5.

2.2.5 **Claims 5, 15, 25 and 35: Lack of inventive step**

2.2.5.1 Document D4 discloses an adapter device, the magnitude of the DC power being in a range between about 14.5 Volts and about 15.5 Volts *(NB as discussed in document D5, col. 1, l. 29-48, the EmPowerTM system has become a de facto standard in the aviation industry and delivers a nominal voltage of 15.0 V).*

2.2.5.2 For the same reasons already discussed above (cf. §2.2.4 above), the subject matter of claim 5 is therefore not considered to involve an inventive step in view of document D4 in combination with D5.

2.2.5.3 The subject matter of corresponding method claim 15 and of device claims 25 and 35 is for similar reasons, mutatis mutandis, also not considered to be inventive in view of document D4 in combination with D5.

2.2.6 **Claims 6, 16, 26 and 37: Lack of novelty**

2.2.6.1 Document D4 discloses an adapter device according to claim 1 (see above), further including an AC/DC adapter *("Detects an AC-DC adapter suitable for charging or an airplane or car power line adpater that should not be used for battery charging", cf. D4: p. 1, "Features"; "a constant voltage output AC-DC adapter", cf. D4: p. 5, "Application Information").*

2.2.6.2 The subject matter of corresponding method claim 16 and of device claims 26 and 37 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.7 **Claims 7, 17, 27 and 38: Lack of novelty**

2.2.7.1 Document D4 discloses an adapter device according to claim 1 (see above), wherein the electronic device is a notebook computer *("notebook computer system", cf. D4: "Application Information")*.

2.2.7.2 The subject matter of corresponding method claim 17 and of device claims 27 and 38 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.8 **Claims 8, 18, 28 and 39: Lack of clarity and novelty**

2.2.8.1 The application does not meet the requirements of Article 84 EPC, because claims 8 and 18 are not clear. In particular, reference is made to "the component", which supposedly should have been defined in claims 1 resp. 11. No such reference however is found in the subject matter of claims 1 resp. 11.

2.2.8.2 Furthermore, notwithstanding the above-mentioned lack of clarity, the subject-matter of claim 8 is not new.

2.2.8.3 Document D4 discloses an adapter device according to claim 1 (see above), wherein one component is a battery of the electronic device *("the battery", cf. D4: p. 5, "Application Information")*.

2.2.8.4 The subject matter of corresponding method claim 18 and of device claims 28 and 39 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.9 **Claims 9, 19 and 29: Lack of clarity and novelty**

2.2.9.1 Parentheses surrounding symbols in claims should be used exclusively in combination with reference signs to increase the intelligibility of the claims (Rule 43(7) EPC). The terms "(a)", "(b)" and "(c)" should therefore be reformulated as e.g. "a)", "b)" and "c)"

2.2.9.2 Document D4 discloses an adapter device according to claim 1 (see above), the data signal being selected from the group consisting of: a) a transmission of a discrete bit *("Charger present", cf. D4: p. 1, Fig.)*, b) a transmission of a data signal having multiple bits *("Charger present", "Adapter present", cf. D4: p. 1, Fig.)*, c) an analog signal, and d) an analog voltage.

2.2.9.3 The subject matter of corresponding method claim 19 and of device claim 29 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.10 **Claims 10, 20, 30 and 40: Lack of novelty**

2.2.10.1 Document D4 discloses an adapter device according to claim 1 (see above), the comparison circuitry including a comparator *(the lower comparator in D4: p. 1, Fig.)*.

2.2.10.2 The subject matter of corresponding method claim 20 and of device claims 30 and 40 is for similar reasons, mutatis mutandis, also not new in view of document D4.

2.2.11 **Claim 36: Lack of novelty**

2.2.11.1 Document D4 discloses an electronic device according to claim 31 (see above), wherein the adapter includes a DCIDC adapter *("airplane... power line adapter", cf. D4: p. 1, "Features").*

3 **Further procedure**

3.1 It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the applicant nevertheless regard some particular matter as patentable, an independent claim should be filed taking account of Rule 43(1) EPC. The applicant should also indicate how the subject-matter of the new claim differs from the state of the art and the significance thereof.

3.2 The attention of the applicant is drawn to the fact that the application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC).

D. W. M. Rocha

National Semiconductor

April 2001

LM2601
Adapter Interface Circuit

General Description

The Adapter Interface Circuit (AIC) is used to sense the presence of an external power source for a portable computer. It notifies the computer if a source is present and indicates if the source is appropriate for charging battery packs inside the computer. The AIC also senses an adapter current and its direction. AIC isolates the adapter and signals the computer when peak current threshold is exceeded.

LM2601 drives P-channel FETs. No high current rated Schottky diode is required to implement an adapter switchover circuit. This significantly decreases additional heat dissipation during simultaneous fast battery charging while running a computer, particularly in Maximum Performance mode of operation

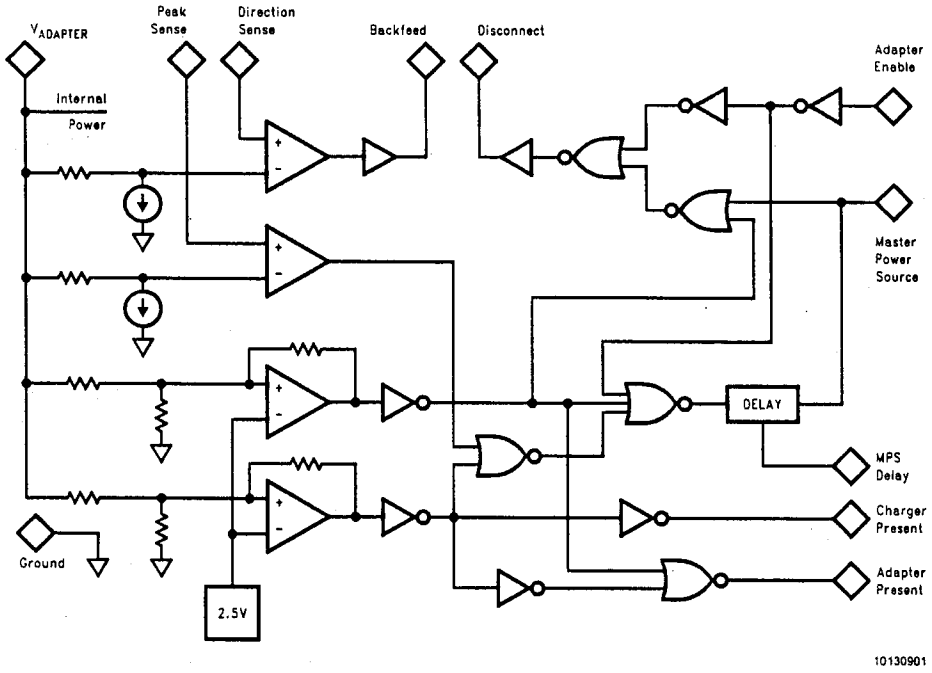
Features

- Detects an AC-DC adapter suitable for battery charging or an airplane or car power line adapter that should not be used for battery charging
- Allows the implementation of intelligent switchover circuits for portable systems
- LM2601 shuts down automatically when adapter is removed
- Low leakage current from battery when not powered
- Drives P-channel FETs, no Schottky diodes are required
- No reverse inrush current from battery into the adapter output capacitance
- Allows for battery capacity gas-gauge calibration under system software/firmware control
- Adapter over current threshold programmable with external resistors
- Wide input range: 5V - 24V
- Available in TSSOP-14 package

Applications

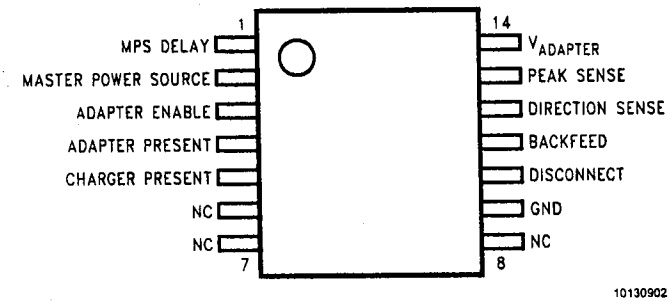
- Portable Computers
- Portable IAs (Internet Appliances, Information Appliances)
- Other Battery Powered Devices

Block Diagram



Pin Configuration

TSSOP-14



10130902

Ordering Information

Order Number	Package Number	Package Type	Supplied As*
LM2601MTC	MTC14	TSSOP-14	Rail (94 Units/Rail)
LM2601MTCX	MTC14	TSSOP-14	Tape and Reel (2500 Units/Reel)

* Partial Rails are available, there is no minimum order quantity. Tape and Reel is supplied as full reels only.

Pin Description

Pin No.	Name	Function
1	MPS DELAY	A capacitor between this pin and ground sets the delay of the MPS risetime. See MPS DELAY description in Typical Application section.
2	MASTER POWER SOURCE	Bi-directional logic pin. If driven high by an external source, indicates that a battery is powering the power bus. If driven high by the AIC, indicates the adapter is powering the bus. AIC cannot drive MPS low. If there is no valid adapter voltage present, the pin is not an output but a high impedance logic input. The input is pulled-down via an internal 40k resistor.
3	ADAPTER ENABLE	Logic input pin. Active high. Grants permission to the adapter to drive both the power bus and the MPS signal.
4	ADAPTER PRESENT	Logic output pin. High when 12 volts < $V_{ADAPTER}$ < 17 volts. The output typically has 40k pull-down resistor. The source current is not internally limited and the part can be damaged if the output is shorted to ground when driven HIGH.
5	CHARGER PRESENT	Logic output pin. High when $V_{ADAPTER}$ > 17 volts. The output typically has 40k pull-down resistor. The source current is not internally limited and the part can be damaged if the output is shorted to ground when driven HIGH.
9	GND	IC ground pin.
10	DISCONNECT	Drives the gate of the disconnect P-ch FET.
11	BACKFEED	Drives the gate of the backfeed P-ch FET.
12	DIRECTION SENSE	Connection for current sense resistor to control BACKFEED.
13	PEAK SENSE	Connection for current sense resistor to control DISCONNECT.
14	$V_{ADAPTER}$	Power input pin. Output of AC adapter, auto adapter or airline adapter.

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/ Distributors for availability and specifications.

$V_{ADAPTER}$	−0.3V to 28V
$V_{PEAK\ SENSE}$, $V_{DIRECTION\ SENSE}$, $V_{BACKFEED}$, $V_{DISCONNECT}$	−0.3V to $V_{ADAPTER}$
$V_{ADAPTER\ ENABLE}$, $V_{MASTER\ POWER\ SOURCE}$	−0.3V to 5.5V
$V_{MPS\ DELAY}$	−0.3V to 2V
Storage Temperature	−40°C to 125°C
ESD Ratings	
Human Body Model (Note 2)	2kV
Machine Model (Note 3)	200V

Operating Ratings (Note 1)

Supply Voltage ($V_{ADAPTER}$)	5V to 24V
Ambient Temp. Range	−20°C to 70°C
Junction Temp. Range	−20°C to 85°C

Electrical Characteristics

Limits with standard typeface apply for T_J = 25°C, and limits in **boldface type** apply over the full temperature range (Note 4)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{AE}	Adapter Enable - 3V- or 5V-CMOS or TTL Logic Input	High Low	**2.0**		**0.8**	V
$V_{AP,\ CP}$	Logic Output Voltage Adapter present, Charger present	High Low, I_{SINK} = 5µA	**2.9**	3.1 0.25	**0.6**	V
V_{MPS_I}	Master Power Source 5V-CMOS Logic Input	High Low	**4.0**		**0.8**	V
V_{MPS_O}	Logic Output Voltage Master Power Source	$V_{ADAPTER}$ > 5.8V High Low	**4.5**	4.75 0.05	**0.5**	V
$V_{ADAPTER}$	Adapter Voltage for V_{AP} Low-to-High Transition		**11.7**	12.0	**12.3**	V
	Hysteresis		**1.8**	2.0	**2.2**	
$V_{CHARGER}$	Adapter Voltage for V_{CP} Low-to-High Transition		**16.5**	17.0	**17.4**	V
	Hysteresis		**0.08**	0.10	**0.12**	
$\Delta V_{BACKFEED}$	Current Sense Differential Voltage Threshold for Driving Backfeed FET	Vadapter − Direction sense, $V_{ADAPTER}$ = 5V	4 **3**	9	17 **18**	mV
$\Delta V_{DISCONNECT}$	Current Sense Differential Voltage Threshold for Driving Disconnect FET	Vadapter − Peak sense, $V_{ADAPTER}$ = 24V	127 **125**	135	143 **145**	mV
$V_{BACKFEED}$, $V_{DISCONNECT}$	FET Control Voltage	$V_{ADAPTER}$ > 11V High		$V_{ADAPTER}$ - 0.5V		V
		$V_{ADAPTER}$ > 11V Low		$V_{ADAPTER}$ - 10V or GND+0.5V, whichever is greater		
t_{DRIVE}	Rise/Fall Time of FET Drive (Note 5)	$V_{ADAPTER}$ = 10V C_{Load} = 3000pF		3	**6**	µS
I_Q	Quiescent Current	$V_{ADAPTER}$ = 24V		2	**10**	mA
$I_{L,B}$, $I_{L,D}$	Leakage Current into Backfeed or Disconnect	$V_{ADAPTER}$ = 0V $V_{BACKFEED}$, $V_{DISCONNECT}$ = 18V		1	**15**	µA
$I_{L,AE}$	Input Current into Adapter Enable Input	V_{AE} = 3.3V, Backfeed/Disconnect = 18V		50		µA
$I_{L,\ MPS}$	Input Current into MPS Input	V_{MPS} = 5.5V		175		µA
TC_{DELAY}	Delay Time Temperature Coefficient			4000		ppm/°C

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics.

Note 2: The human body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

Note 3: The machine model is a 200pF capacitor discharged directly into each pin. All pins are rated for 200V except pins 4 and 5 which are rated for 100V.

Note 4: Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.

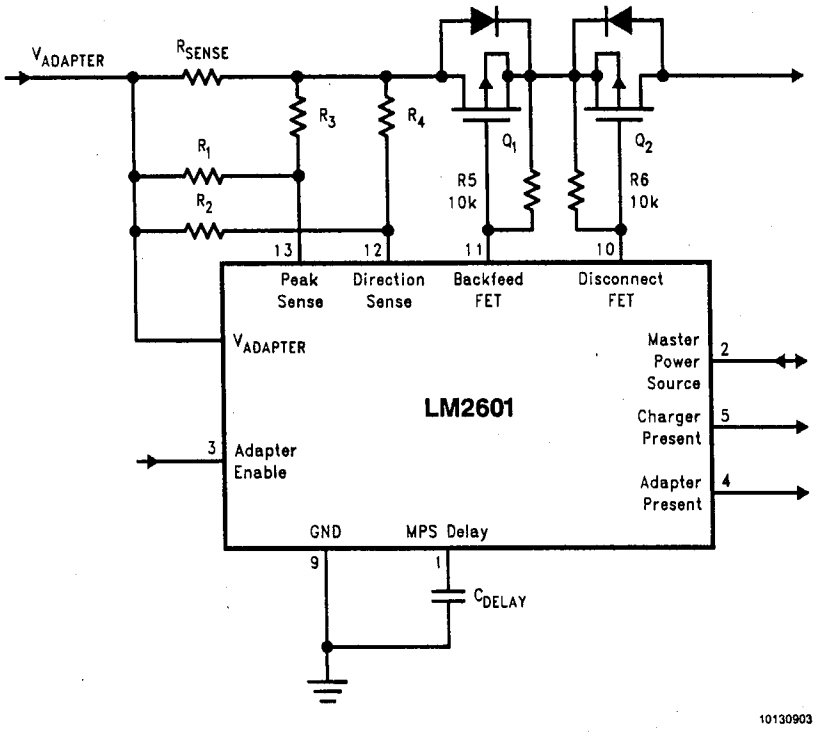
Electrical Characteristics (Continued)

Note 5: Adapter Enable input is used to change the state of Disconnect, Direction Sense input is used to change the state of Backfeed.

a. Fall time is measured as the time it takes Backfeed or Disconnect voltage to go from a high level (approx. $V_{ADAPTER}$ − 0.5V) to ($V_{ADAPTER}$ − 4V) after the signal is initiated at Adapter Enable or Direction Sense.

b. Rise time is measured as the time it takes Backfeed or Disconnect voltage to go from a low level (approx. 0.5V) to ($V_{ADAPTER}$ − 2V) after the signal is initiated at Adapter Enable or Direction Sense.

Typical Application

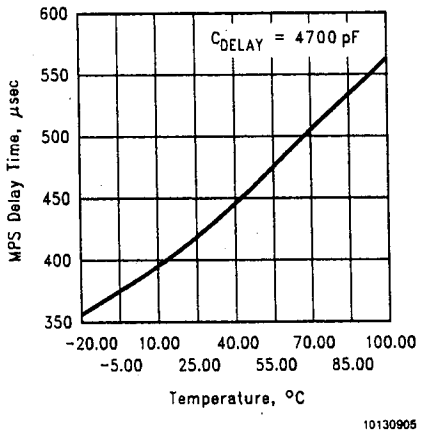


Notes

1. R_{SENSE} value should be selected to guarantee that a programmed over current will cause a voltage drop across R_{SENSE} of approx. 135mV. If a higher value of R_{SENSE} has to be selected then R1/R3 resistor divider should be used to scale the voltage drop down.
2. Internal and external circuits associated with Direction Sense and Backfeed FET pins allow to emulate a Schottky diode functionality with much lower forward voltage drop and, therefore, with much lower power dissipation. R2/R4 resistor divider programs the backfeed current protection threshold. The backfeed FET Q1 turns off when the backfeed current pulse level causes more than 9 mV (typical value) voltage drop between $V_{adapter}$ pin and Direction Sense pin.
3. Voltage difference ($V_{DIRECTION\ SENSE}$ - $V_{ADAPTER}$) must be higher than 20mV to reliably isolate the adapter in case of leakage.
4. R5 and R6 prevent the FETs from turning on unless driven by LM2601.
5. C_{DELAY} value can be calculated from the following formula:

   $C_{DELAY}(nF) = T_{DELAY}(\mu s)/90$ at 25˚C
6. T_{DELAY} temperature coefficient equals 4000ppm/˚C. See also the Typical Delay Time vs. Temperature graph.
7. Pin Master Power Source (MPS) should be connected to System Management Controller's (SMC) and battery packs' GPIOs. When SMC detects a powered AC adapter via active signals at Charger Present or Adapter Present outputs, it asserts Adapter Enable signal and isolates the battery pack(s). Adapter Enable signal turns the Disconnect FET on. When the AC adapter is unplugged or powered off, SMC enables one of the system battery packs. The battery packs' embedded controller starts driving the logic MPS signal high that turns the Disconnect FET off.

Typical Delay Time vs. Temperature



10130905

Application Information

The adapter interface circuit (AIC) IC provides the control functions necessary for use in mating a constant voltage output AC-DC adapter or airline adapter to a notebook computer system or a portable device. It allows optimal battery charging during computer operation, and allows battery discharge for battery gas gauge calibration. It receives control signals from the notebook computer, monitors input current from the adapter, provides adapter voltage status to the notebook system management microcontroller (or "embedded controller"), and appropriately drives MOSFET switches to electrically connect the adapter to the computer.

AIC will allow a system designer to solve various power management tasks typical for an adapter powered systems containing a rechargeable battery.

When a notebook computer is being powered from a battery and the adapter is plugged in, the computer should start drawing power from the adapter, not from the battery. The most time efficient charging scenario is when a computer draws the full rated current from a constant voltage adapter. The computer uses what it needs to run, and passes all remaining power on to the battery for charging. The computer should be able to automatically refuse to charge a battery when powered from an airplane power line. It may be necessary sometimes to have a computer fully discharging the battery and then fully recharging it (for battery gas gauge calibration purposes) while being powered by an AC adapter.

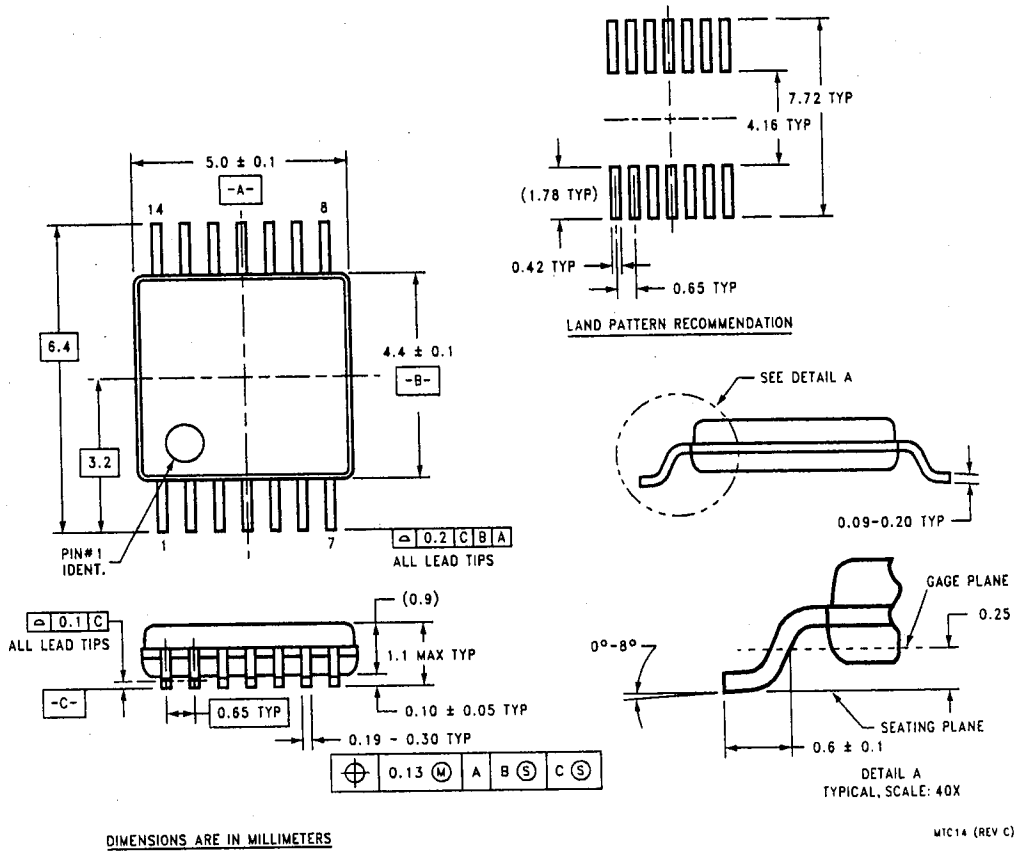
AIC will also allow a computer to prevent backfeeding current into an adapter if the adapter is not powered while being plugged into the computer (some of existing adapters can draw current from the computer under this conditions for charging the AC adapter output bulk capacitance from the computer battery).

While the lowest usable adapter voltage is about 9.5V, that is $V_{ADAPTER}$ = 11.7V minus 2.2V hysteresis, AIC is operational down to $V_{ADAPTER}$ = 5V. This means that AIC will not generate false readings down to $V_{ADAPTER}$ = 5V. Such false readings would be MPS = HIGH, ADAPTER PRESENT = HIGH, CHARGER PRESENT = HIGH.

AIC determines usable voltage ranges by comparing $V_{ADAPTER}$ with an internal 2.5V voltage reference (see also Electrical Characteristics). AIC detects operating current limit and leakage current limit into the adapter jack by differential sensing across current sense resistor R_{SENSE} either directly or scaled down by resistor dividers R1/R3 and R2/R4.

When designing the LM2601 into a system it may be necessary to consider ESD protection requirements for the adapter jack according to your system design spec.

Physical Dimensions inches (millimeters)
unless otherwise noted



TSSOP-14 Package
14-Lead Thin Shrink Small-Outline Package
For Ordering, Refer to Ordering Information Table
NS Package Number MTC14

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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1990 Catalog No. 446 Index Page 92

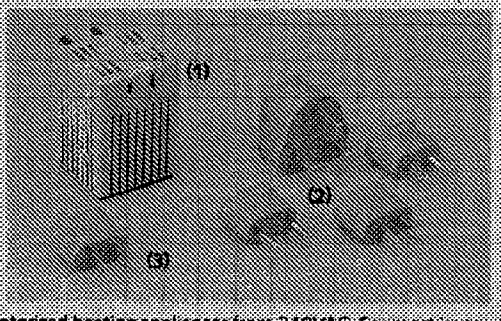
Foreign Travel Converters and AC/DC Adapters

Foreign AC Power Converters and Plug Adapters

Use 120VAC Personal Appliances In Countries With 240VAC Power

- **Compact Size**
- **Overload Protected**
- **Your Best Travel Companion**

Converters Low As 14.95



(1) 50-Watt Converter/Transformer for Electronic Equipment. Converts 240VAC to 120VAC to operate most cassette recorders, radios, photoflash units, battery rechargers, calculators, razors, lens sterilizers and appliances up to 50 watts. 9½ oz. 1⅝ × 2⅝ × 1¼". **273-1401** **14.95**

1000-Watt Converter. Allows use of 120VAC nonmotorized heating appliances from 240VAC. For most irons, curlers, curling irons, heating pads, electric blankets, steamers, manicure sets, immersion heaters, incandescent lamps and food/bottle warmers. 3 oz. 3½ × 1½ × 1½" **273-1402** **15.95**

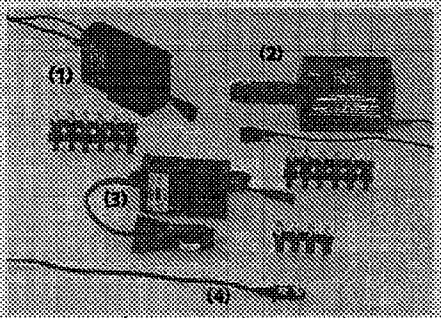
1600-Watt Converter. Allows use of 120VAC heating appliances from 240VAC. For hand-held hair dryers with universal (AC/DC) motors, most irons, electric blankets, steamers, manicure sets, immersion heaters, incandescent lamps and food/bottle warmers. 3 oz. 3½ × 1⅞ × 1⅞". **273-1404** **19.95**

(2) Plug Adapters. Let you connect power converters above, to almost any wall outlet in the world. *Must be used with one of the converters above.* **273-1405** ..... **Set of 4/7.95**

(3) U.S.-Outlet Plug Adapter. Lets you connect dual-voltage appliances with European plugs to U.S.-type 120VAC power outlet. **273-1406** **1.95**

IMPORTANT NOTE! These converters can NOT be used with clocks, TV sets, high-fidelity equipment, typewriters, computers, hooded hair dryers, slide projectors or permanently installed equipment. NOT for continuous use. Will NOT work with DC (direct current). 1600-watt and 1000-watt converters should NOT be used with transformer-operated equipment.

Universal AC-to-DC And Car DC Adapters



(1) Universal AC-to-DC Adapter. Switch selects 3, 4.5, 6, 7.5 or 9VDC. Six-foot cord. Includes six Adaptaplugs. UL listed. **273-1650** **12.95**

Six-Piece Adaptaplug Set. 274-1501 ..... **7.29**

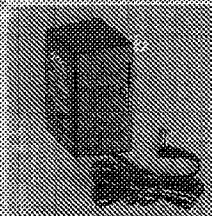
(2) Universal DC Adapter. Selectable 3, 4.5, 6, 7.5 or 9VDC. Six Adaptaplugs. **270-1560** **11.95**

(3) High-Current DC Adapter. Provides 6, 9 or 12VDC. With four plug sizes. **270-1562** **13.95**

NEW! Right-Angle 6-Plug Set. (Not shown.) Coaxial. Fits #270-1562. **270-1563** **6.99**

(4) 9V Battery Eliminator. Connector is snap-type as used on 9-volt batteries. UL listed. **273-1552** **5.95**

Hard-to-Find AC-to-AC Adapters



NEW 1988

UL Listed

For Phone Answerers. Exact replacement in many name brands. Input: 120VAC. Output: 13VAC, 800 mA. **273-1610** **8.95**

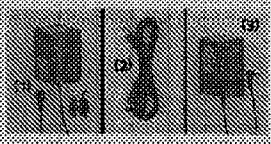
For Nintendo® Video Game. Input: 120VAC. Output: 9VAC, 1.3A. **273-1611** **15.95**

Registered trademark, Nintendo Co., Ltd.

AC-to-DC Adapters

NEW 1988

UL Listed



For devices requiring more current than small adapters provide. Input: 120VAC.

(1) 6/7.5 DC, 700 mA Output. For LCD portable TVS, portable CD players, hand-held computers. **273-1655** **15.95**

(2) Y-Cable. Use with above adapter and amplified speakers. **273-1649** **4.99**

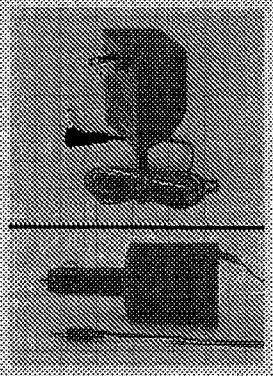
(3) 9VDC, 800 mA Output. For keyboards, portable CD players and video games. **273-1656** **14.95**

Adapters for Radio Shack Equipment (And Many Other Brands)

All have a body similar to photo at right, plug into 120VAC. UL listed.

Output VDC	Output mA	Connector	Cat. No.	Each
9	300	Coax Plug	273-1455	7.95
6	150	Coax Plug	273-1454	7.95
9	25	3/32" Plug	273-1431	6.95
3*	200	Coax Plug	273-1466	6.95
3	200	3/32" Plug	273-1435	8.95

*NEW! For STEREO-MATE portables



Car/Boat Adapter

Plugs into lighter socket. 6V or 9V DC output. 12VDC neg. gnd. **14-844** **6.95**

Special-Purpose AC-to-DC Adapters

Versatile Adaptaplugs Fit Most Portables

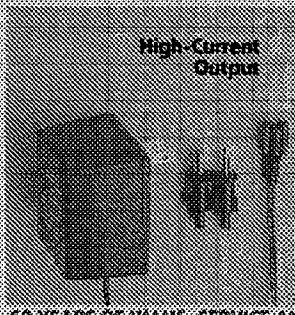
Adapts battery-powered portables with DC jack to AC. All have 120VAC input and are UL listed.

9VDC Adapter (Shown). 500 mA output. With two Adaptaplugs. **273-1651** **10.95**

12VDC Adapter. 500 mA output. Includes four Adaptaplugs. **273-1652** **10.95**

12VDC Adapter. Delivers up to one amp. With three Adaptaplugs. **273-1653** **19.95**

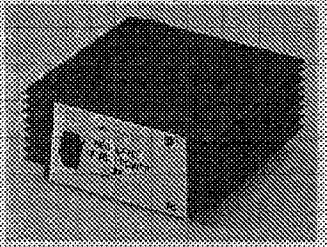
Personal Portable Adapter. Hum-free circuit designed especially for personal stereos. Switch selects 1.5 or 3VDC output. 300 mA. Includes two Adaptaplugs. **273-1654** **13.95**



120VAC-to-12VDC Power Supplies

Regulated 12VDC Supply. Operates most devices requiring 12 to 14 volts DC. Features push-to-reset circuit breaker, on/off switch, LED "on" indicator, finned heat sink for cool operation. Rated 2.5 amps continuous. 2¼ × 6¾ × 6¼". UL listed. **22-120** **39.95**

12VDC Supply. Same function as above but non-regulated and rated 1.75 amps continuous. UL listed. **22-127** **26.95**



Operate Autosound, CBs and Ham Transceivers at Home

$2.95

Radio Shack®

1994 CATALOG

QUALITY VALUE SELECTION

QUICK INDEX PAGE 3

We Have America's Largest Selection In Power Adapters

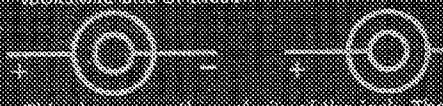
Only Radio Shack has everything in AC and DC power adapters. These devices let you use portable equipment, such as CD players, radios, tape recorders, TVs and walkie-talkies, on home AC power or car DC power. An adapter pays for itself fast with the money that you save on batteries.

Choosing the Right Power Adapter Is As Easy As One... Two... Three

NOTE: To be able to use a power adapter, your portable must have a DC input jack. The plug from the adapter should fit snugly into this jack.

ONE... THE ADAPTER'S PLUG MUST MATCH THE POLARITY OF YOUR PORTABLE'S DC INPUT JACK.

Most DC input jacks have a symbol nearby that looks like one of these:



This shows you the *polarity* of the jack. The left symbol means that the outside of the jack is positive (+) and the inside is negative (–). The symbol on the right means the reverse.

TWO... THE VOLTAGE FROM THE POWER ADAPTER MUST BE EXACTLY THE SAME NUMBER AS THE VOLTAGE REQUIRED BY YOUR PORTABLE.

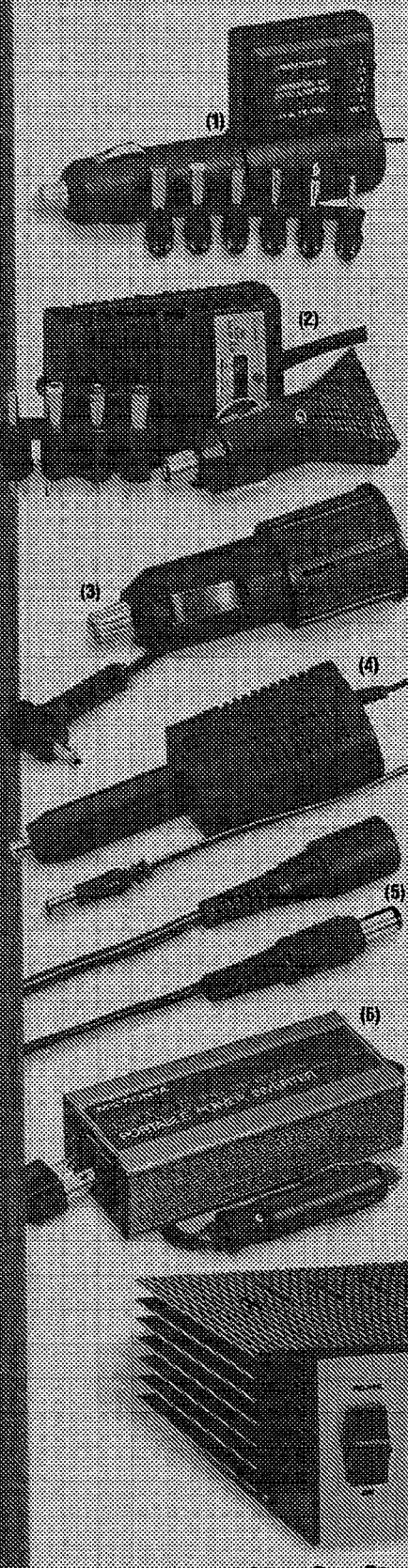
Most DC input jacks are labeled with the voltage required, such as 9VDC or 12VDC. VDC means volts DC. Another way to find the voltage is to count the number of batteries in your portable and multiply by 1.5. For a portable with two batteries, the voltage is 1.5 times 2, or 3 volts.

THREE... THE POWER ADAPTER'S CURRENT (mA) MUST BE EQUAL TO OR MORE THAN THE CURRENT REQUIRED BY YOUR PORTABLE.

The power adapter also must provide enough current to power the portable. This current is usually given in mA, short for milliamps. You can usually find the amount of current a portable requires listed in the back of its owner's manual. If a portable requires 100 mA of current, an adapter rated at least 100 mA is fine. An adapter that provides more current, such as 500 mA, is OK to use, too. Using an adapter that provides less current can damage the adapter and the portable.

Convenient Adaptaplugs and Selectable-Voltage Adapters

Many Radio Shack adapters include a set of plugs so the adapter will fit different types of DC input jacks. We also have adapters with selectable output voltages. If you plan to use an adapter on more than one portable, one of these AC or DC adapters is your best value.



Universal DC-to-DC Adapter

(1) Plugs into vehicle lighter socket. Selectable 3, 4.5, 6, 7.5 or 9VDC output voltages and six included Adaptaplugs allow use with a wide variety of equipment. Up to 300 mA of current. 6-foot cord. **270-1560** . . . **12.99**

High-Current DC Adapter

(2) Selectable voltage output of 3, 6 or 9VDC at up to 900 mA and 12VDC at up to 3 amps. This adapter is ideal for high-current equipment such as portable TVs. Includes four Adaptaplugs. **270-1562** **16.99**

6-Piece Right-Angle Plug Set for Above. 270-1563 . . . . . **7.49**

Video Game DC Adapters

(3) Universal Video Game DC Adapter. Powers these games from car lighter socket: Nintendo™, Super Nintendo™, Nintendo Game Boy™, Sega™ Genesis™, NEC Turbografx-16™, NEC Turbo Express™, Sega Game Gear™ and Atari™ Lynx™. **270-1504** . . **19.99**

DC Adapter for Game Boy. 270-1506 . . **9.99**

DC Adapter for Nintendo and Super Nintendo. 270-1505 . . . . . **15.99**

(See page 158 for more video game accessories)

Light-Duty DC-to-DC Adapter

(4) Provides 6 or 9VDC output, up to 500 mA. Coaxial-type output plug fits many small portable cassette recorders. **14-844** . . **6.99**

5-Foot DC Extension Cable

(5) Fits most AC and DC adapters. Ideal for use with video games and portables at home and in car's back seat. Has coax jack at one end, coax plug at the other in popular 5.5mm O.D., 2.1mm I.D. size. **273-1648** **3.99**

DC Power Y Cable. Lets you power two DC devices from one adapter. **273-1649** . . . **4.99**

Get 115VAC Power From Your Car Lighter Socket

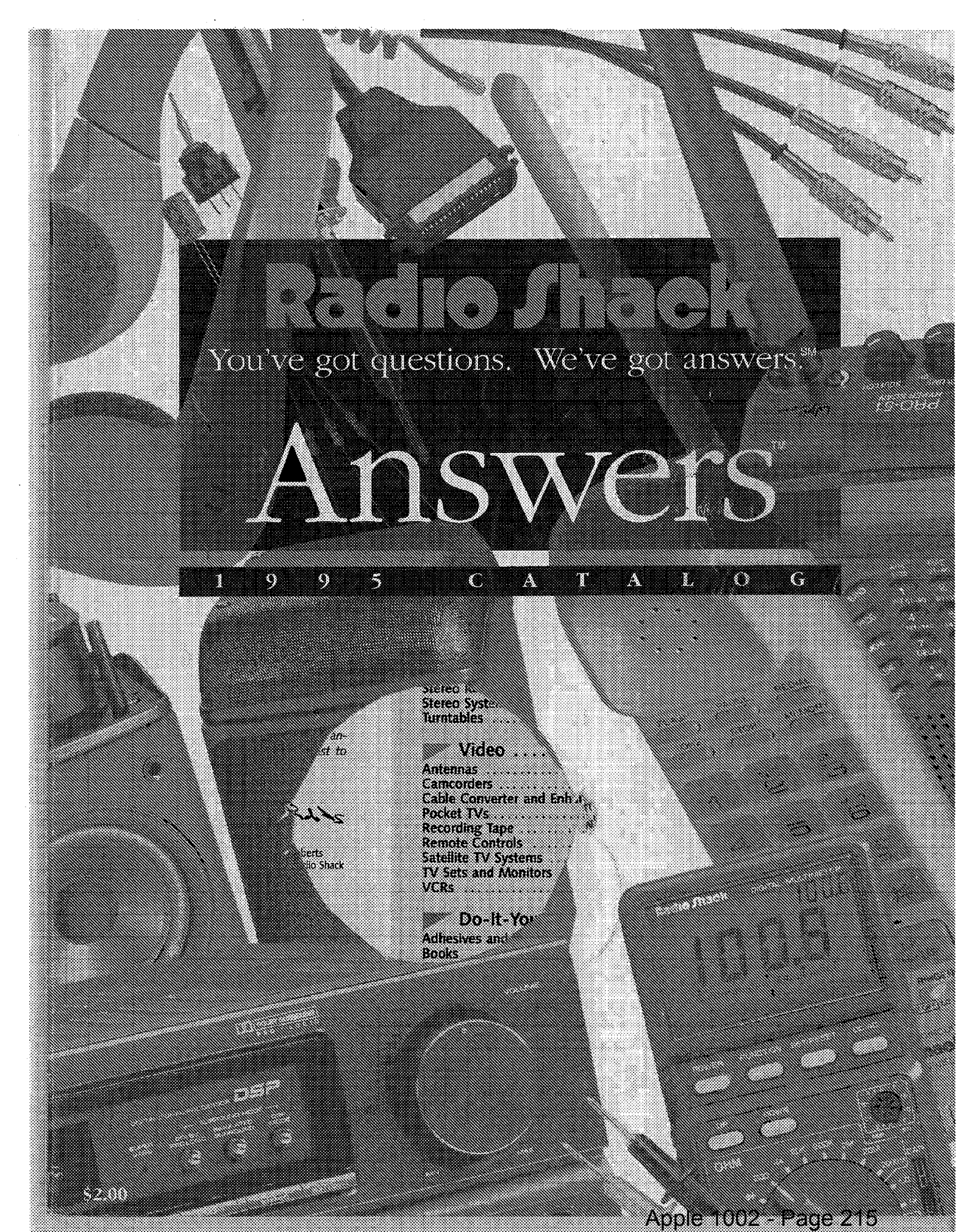
(6) Just the thing for camping, tailgate parties and emergencies. This 12VDC to 115VAC inverter plugs into car's lighter socket. Operates small AC appliances including shavers, electric blankets, TVs, VCRs, battery chargers, camcorders and more. Rated 140 watts continuous output. **22-132** **99.99**

Power Mobile CBs, Car Stereos and Radios From House AC

120VAC-to-12VDC Regulated Power Supply. (Shown.) Ideal for powering most mobile CBs, car stereos, radios and other 12VDC devices from AC. Useful in troubleshooting as well as powering car electronics for home use. Features push-to-reset circuit breaker, LED "on" light, heat sink for cool operation. Rated 2.5 amps continuous. UL listed. **22-120** **39.99**

120VAC-to-12VDC Unregulated Power Supply. Same function as above, but has a nonregulated output and is rated 1.75 amps continuous. UL listed. **22-127** **27.99**

ALL AC-CONNECTED PRODUCTS ON THESE TWO PAGES ARE UL LISTED / SEE PAGE 103 FOR MORE DC POWER ACCESSORIES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You've got questions. We've got answers.SM
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Antennas
Camcorders
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Recording Tape
Remote Controls
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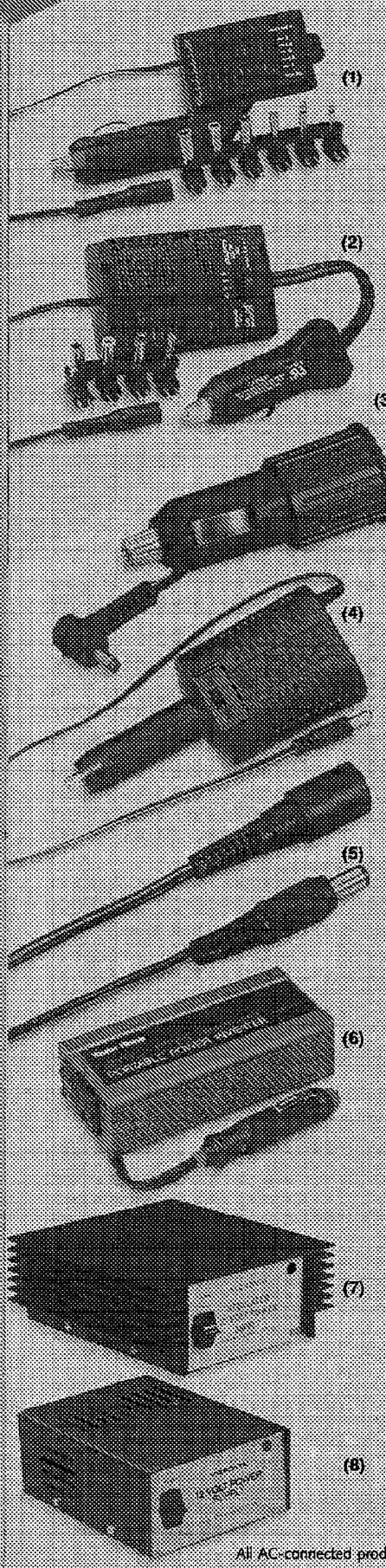


Universal DC-to-DC adapter

(1) Plugs into vehicle lighter socket. Selectable 3, 4.5, 6, 7.5 or 9VDC output voltages. Six included Adaptaplugs allow use with a wide variety of equipment. Up to 300 mA of current. 6-foot cord. **270-1560** **12.99**

NEW! **Adaptaplug for Sony®.** Type-2 style. 4.0mm O.D., 1.7mm I.D. (CMC) **270-1575** **2.49**

NEW! **Adaptaplug for radar detectors.** 3.0mm O.D., 1.0mm I.D. (CMC) **270-1576** **2.49**

High-current DC adapter

(2) Selectable voltage output of 3VDC up to 400mA, 6VDC up to 600mA, 9VDC up to 900mA and 12VDC at up to 3 amps. Ideal for portable TVs. Includes four Adaptaplugs. **270-1562** **16.99**

6-piece right-angle plug set for above.
(3) 270-1563 ..... **7.49**

Video game DC adapters

(3) Universal Video Game DC Adapter. Powers these games from car lighter socket: Nintendo™, Super Nintendo™, Nintendo Game Boy™, Sega™ Genesis™, NEC Turbografx-16™, Sega Game Gear™ and Atari™ Lynx™. **270-1504** **19.99**

DC adapter for Game Boy. 270-1506 ..... **9.99**

DC adapter for Nintendo and Super Nintendo. 270-1505 ..... **15.99**

(See page 169 for more video game accessories)

Light-duty DC-to-DC adapter

(4) Provides 6 or 9VDC output, up to 500 mA. Coaxial-type output plug fits many small portable cassette recorders. **14-844** **6.99**

5-foot DC extension cable

(5) Fits most AC and DC adapters. Ideal for use with video games and portables at home and in car's back seat. Has coax jack at one end, coax plug at the other in popular 5.5mm O.D., 2.1mm I.D. size. **273-1648** **3.99**

DC power Y cable. Lets you power two DC devices from one adapter. **273-1649** **4.99**

12VDC-to-115VAC portable inverter

(6) Just the thing for camping, tailgate parties and emergencies. Plugs into car's lighter socket. Operates small AC appliances, including shavers, electric blankets, TVs, VCRs, battery chargers, camcorders and more. Rated 140 watts continuous output. (TSP) **22-132** **99.99**

50-watt DC-to-AC inverter. (CMC) **22-133, 69.99**

225-watt DC-to-AC inverter. (CMC) **22-134, 169.99**

800-watt DC-to-AC inverter. (CMC) **22-135, 499.99**

1500-watt DC-to-AC inverter. (CMC) **22-136, 849.99**

120VAC-to-12VDC power supplies

(7) Regulated power supply. Ideal for powering most mobile CBs, car stereos, radios and other 12VDC devices from AC. Useful in troubleshooting, as well as powering car electronics for home use. Features push-to-reset circuit breaker, LED "on" light, heat sink for cool operation. Rated 2.5 amps continuous. UL listed. **22-120** **39.99**

(8) Unregulated power supply. Same function as above, but has a non-regulated output and is rated 1.75 amps continuous. UL listed. **22-127** ... **27.99**

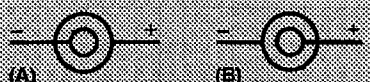
Which Adapter?

Picking the right adapter is easy as 1-2-3

NOTE: To be able to use a power adapter, your portable must have a DC input jack. The plug from the adapter should fit snugly into this jack.

1 . . . THE ADAPTER'S PLUG MUST MATCH THE POLARITY OF YOUR PORTABLE'S DC INPUT JACK

Most DC input jacks have a symbol nearby that looks like one of these:



This shows you the polarity of the jack. Symbol A means that the outside of the jack is positive (+) and the inside is negative (–). Symbol B means the reverse.

2 . . . THE VOLTAGE FROM THE POWER ADAPTER MUST BE EXACTLY THE SAME NUMBER AS THE VOLTAGE REQUIRED BY YOUR PORTABLE

Most DC input jacks are labeled with the voltage required, such as 3VDC or 12VDC. VDC means volts DC. Another way to find the voltage on many products is to count the number of batteries in your portable and multiply by 1.5. For a portable with two batteries, the voltage is 1.5 times 2, or 3 volts.

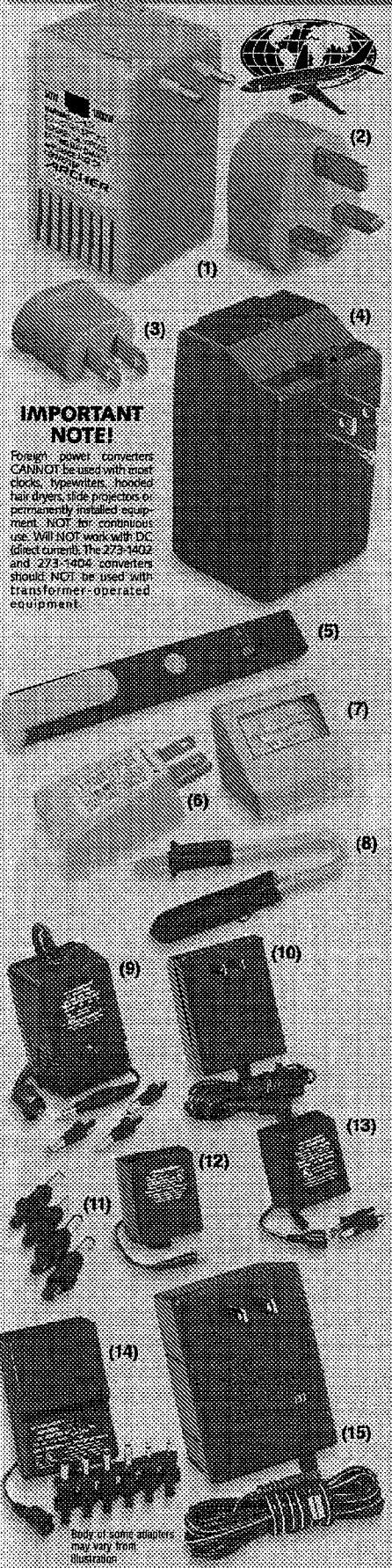
3 . . . THE POWER ADAPTER'S CURRENT (mA) MUST BE EQUAL TO OR MORE THAN THE CURRENT NEEDED BY YOUR PORTABLE

The power adapter also must provide enough current to power the portable. The current is usually given in mA, short for milliamps. You can usually find the amount of current a portable requires listed in the back of its owner's manual. If a portable requires 100 mA of current, an adapter rated at least 100 mA is fine. An adapter that provides more current, such as 500 mA, is often OK to use, too. Using an adapter that provides less current can damage the adapter and the portable.

CONVENIENT ADAPTAPLUGS AND SELECTABLE-VOLTAGE ADAPTERS

Many Radio Shack adapters include a set of plugs so the adapter will fit different types of DC input jacks. We also have adapters with selectable output voltages. If you plan to use an adapter on more than one portable, one of these AC or DC adapters is your best value.

All AC-connected products on these two pages are UL Listed. See page 163 for more DC power accessories. Sony is a registered trademark of Sony Corp.



Body of some adapters may vary from illustration

IMPORTANT NOTE!

Foreign power converters CANNOT be used with most clocks, typewriters, hooded hair dryers, slide projectors or permanently installed equipment. NOT for continuous use. Will NOT work with DC (direct current). The 273-1402 and 273-1404 converters should NOT be used with transformer-operated equipment.

AC adapters for overseas travel

(1) Dual-Power Foreign-Travel AC Converter. Lets you use 120VAC (USA) equipment on 240VAC foreign power. For electronic/motorized devices rated up to 50 watts, such as radios or calculators. Also for heating devices up to 1600W, such as irons or handheld hair dryers.
273-1410 ..... **34.99**

1600-Watt Foreign Travel AC Converter. Operates most 120VAC heating appliances from 240VAC. For irons, incandescent lamps and most hand-held hair dryers.
273-1404 ..... **19.99**

1000-Watt Foreign Travel AC Converter. Same function as above, but rated 1000 watts max. **273-1402** **17.99**

50-Watt Foreign AC Converter/Transformer for Electronic Equipment. Converts 240VAC to operate most recorders, radios, photoflashes, chargers, calcs. **273-1401** **16.99**

(2) Plug Adapters. Connect foreign AC converters to almost any outlet, including recessed. Must be used with a converter. **273-1405** ..... **Set of 4/7.99**

(3) Foreign Plug to USA-Outlet Adapter. Lets you connect a dual-voltage appliance with a European AC plug to a USA-type 120VAC power outlet. **273-1406** **1.99**

(4) 40-Watt Foreign Reverse Converter. Converts USA power (110/120VAC) to foreign standard 220/240VAC. Operates many foreign appliances rated up to 40 watts on USA power. **273-1411** **31.99**

Home AC testing devices

(5) AC Voltage Sensor. Indicates 70 to 440 volts AC without direct electrical hookups. Easy and safe way to check cords, switches, fuses and more. **22-103** **12.99**

(6) AC Outlet Analyzer. Just plug into any 3-wire (grounded) 120VAC wall outlet to check for a variety of dangerous faults. **22-101** **5.99**

(7) AC Line Voltage Monitor. Plug-in meter has a color-coded scale. Indicates safe zone at a glance. 96-130VAC. UL listed. **22-104** **12.99**

(8) Neon Circuit Tester. Neon lamp glows to indicate voltages from 90 to 300, AC or DC. Use to check AC outlets, cables, circuits in equipment and more. **22-102** **1.99**

AC-to-DC and AC-to-AC Adapters

(9) 12VDC High-Current Adapter. Heavy duty. Delivers up to one amp. Includes four Adaptaplugs. **273-1653, 21.99**

(10) NEW! Power Adapter for Super Nintendo™.
273-1613 ..... **15.99**

(11) NEW! 4-Piece Adaptaplug Set. Available Oct. 30, 1994.
273-1647 ..... **3.99**

(12) AC-to-DC Adapter for Nintendo Gameboy™.
273-1660 ..... **7.99**

AC-to-AC Adapter for Many Phone Answerers. 13VAC, 800 mA output. **273-1610** **8.99**

(13) 9 VDC Adapter. 500 mA. Two Adaptaplugs.
273-1651 ..... **10.99**

12VDC Adapter. 500 mA. Four Adaptaplugs.
273-1652 ..... **10.99**

1.5 or 3VDC Selectable Output. Up to 300 mA. Personal portable stereo AC adapter with special hum-free circuit. Includes two Adaptaplugs. **273-1654** **13.99**

6-7.5VDC, 700 mA Output. For many LCD TVs and portable CD players. Two Adaptaplugs. **273-1655** **17.99**

(14) Universal AC-to-DC Adapter. Selectable 3, 4.5, 6, 7.5, 9VDC output. 300 mA. Includes six Adaptaplugs.
273-1650 ..... **12.99**

11-Piece Adaptaplug Set. 274-1501 ..... **7.29**

3VDC, 600 mA CD Player Adapter. For most portable CD players. Regulated output. (CMC) **273-1659** **17.99**

Adapter for Nintendo™ Video Game. 273-1611 ..... **15.99**

AC-to-DC Adapter for SEGA Genesis®. 273-1612. 15.99

(15) General-Purpose AC-to-DC Adapters. All are UL listed.

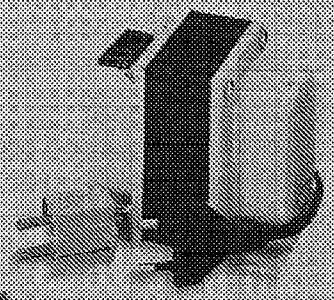
Output		Connector	Cat. No.	Each
VDC	mA			
9	300	5.5/2.1mm Coax, Center Neg.	273-1455	7.99
9	800	5.5/2.1mm Coax, Center Neg.	273-1656	12.99
9	9	9V Snap	273-1562	6.99
7.5	100	1/8" Plug, Tip Pos.	273-1451	6.99
6	150	5.5/2.1mm Coax, Center Neg.	273-1454	7.99
3*	200	3.4/1.3mm Coax, Center Neg.	273-1456	6.99
3	200	1/8" Plug, Tip Pos.	273-1435	8.99

*For use with most Radio Shack STEREO-MATE® portables

Take it along

Going overseas? Our converters and transformers let you adapt to foreign power

When you travel abroad, you don't have to leave your electric razor, lens sterilizer or other important personal items. Our Foreign Travel AC Converters let you use most small appliances on foreign power, and our new heavy-duty transformers (below) will let you operate your U.S.-made computers, cooking appliances, TVs, stereos and more. Our Plug Adapters (Fig. 3, top left) let you plug them into almost any AC outlet, anywhere, anytime, anyplace.



Voltage transformers for larger appliances

200-Watt Step Down Transformer. Can be used with answering machines, computer monitors, dot-matrix printers, fans, small fax machines, hand blenders, hand mixers, juicers, keyboards, pasta makers, small stereo systems, televisions and VCRs (for playing tapes recorded in the U.S.), video games and word processors. (CMC) **273-1415** **39.99**

500-Watt Step Down Transformer. Can be used with blenders, food processors, computer systems, small copiers, large fax machines, small hand drills, meat slicers, stand-type mixers, sewing machines, large stereo systems and small vacuums. (CMC) **273-1416** **64.99**

1000-Watt Step Down Transformer. Can be used with bread machines, coffee/espresso makers, large copiers, large food processors, irons, laser printers, plain-paper faxes, popcorn poppers, power tools, toasters, large vacuums and waffle/sandwich makers. (CMC)
273-1417 ..... **99.99**

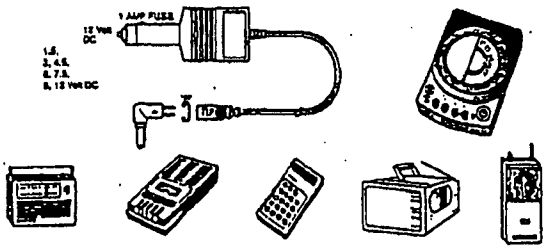
1500-Watt Step Down Transformer. Can be used with large espresso machines, frying pans, grills, kettles, microwave ovens and toaster ovens. (CMC)
273-1418 ..... **149.99**

MINWA

0 80558 18276 1

MW182

The MW182 is a high quality 800mA regulated DC Adapter. With the ability to convert the power from your car cigarette lighter to any one o the following outputs 1.5, 3, 4.5, 6, 7.5, 9, or 12 Volts, this unit is truly universal. You may also choose from a full range of universal plugs enabling usage with most portable cassette players, radios, CD player, mini TV and many other battery run appliances. This unit also has reversable polarity to allow you usage with units which have either positive or negative centre pin.



INSTRUCTIONS:

1. Determine proper output voltage setting, check the electronic product rating plate or number of batteries. e.g. 2 batteries (3V), 4 batteries (6V)
2. Choose correct adapter plug for your appliance
3. Before attaching adapter plug to power cord, check instruction or rate plate of set to determine tip polarity. Reversed polarity may result in permanent damage to set. Common symbols for tip polarity:

Line up work "TIP" on adapter plug with appropriate polarity mark (either "-NEG" or "+POS") on sleeve, then force home.

4. Plug MW182 into cigarette lighter
5. When it is not in use, remove the adapter from lighter socket

FEATURES:

- Input: 12 Volts DC.
- Output: DC 1.5, 3, 4.5, 6, 7.5, 9, 12 Volts Switchable. All voltage regulated except for 12 Volts.
- Cord: Length 1.8 meter.
- Fused for Portection (1 AMP).
- Power Output: 800mA Maximum.

2.1 x 5.0 mm female plug	2.5 mm male plug
2.1 x 5.5 mm female plug	3.5 mm male plug
1.4 x 3.5 mm female plug	1 x 3 mm female plug

WARNING!

To ensure no damage will occur please check voltage and polarity before usage. ALWAYS SWITCH OFF APPLIANCES PRIOR TO INSERTION OF PLUGS. REMOVE FROM LIGHTER SOCKET WHEN NOT IN USE.

MADE IN CHIN

m

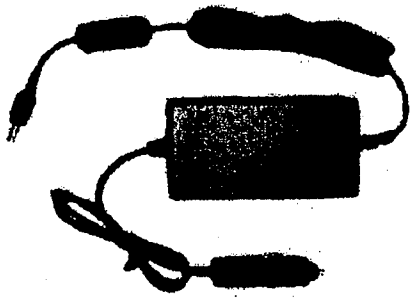
PowerStream

High Quality Automobile to Laptop DC/DC Converter.

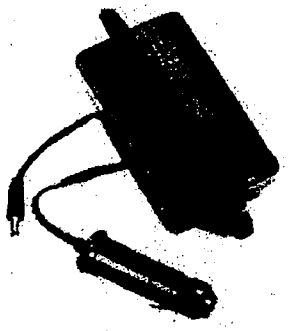
PowerStream

For more DC/DC converters for auto, truck, and solar use click here.

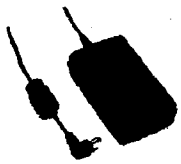
For Retail see link below.



For OEM Car to Notebook and Laptop converters this page



For retail sales of Laptop converters click here



For AC Adapters for any laptop click here

For more DC DC converters click here

This product is a voltage-boosting DC/DC converter designed to power or charge a laptop from an automobile power point or cigarette lighter. The 1060 series power supply is in current production, and is available for retail or commercial sales in any quantity.

For retail sales and computer compatibility click here.

60 Watt 1075 Series: For retail sales click here.

Parameter	PST-ED1075-	-18	PST-ED1075-	PST-ED1075-20	-24

Input	11.5 – 15.5 Volts				
Output Vout	16 Volts	18 Volts	19 Volts	20 Volts	24 V
Output Iout	3.5 Amps	3.3	3.0 Amps	3.0 Amps	2.5 Amps
Ripple/Noise	1.5 % Max				
Line Regulation	± 5 %				
Load Regulation	± 5 %				
Efficiency	85%	85%	88%		
Operating Temperature	-20 to +85 °C				
EMI :	Compliant to FCC/VDE level B				
Mechanical:	100 x 58 x 27 mm (3.9 x 2.25 x 1 inches)				
Weight	198 grams				
Connector	Per Customer Requirements				
Data Sheets	For the full range of voltages and connectors click here				

**Although PDF data sheets have not been created for these voltages, the basic parameters are the same as for the 16, 19, and 20 volt converters.

120 Watt 1010 Series Auto-Laptop Adapter (In Stock)For retail sales click here.

Parameter	PST-ED10100-16	-18	PST-ED1010-19	PST-ED1010-20	-24
Input	11 – 16 Volts				
Output Vout	16 Volts	18 Volts	19 Volts	20 Volts	24 V
Output Iout	7 Amps	6.6	6.3 Amps	6.0 Amps	5 Amps
Ripple/Noise	300 mV Max				
Line Regulation	± 0.5 %				
Load Regulation	± 5 %				
Efficiency	85%	85%	88%		
Operating Temperature	0 to +45 °C				
EMI :	Compliant to FCC/VDE level B, CE el				
Mechanical:	100 x 58 x 27 mm (3.9 x 2.25 x 1 inches)				
Weight	250 grams				

Data Sheets	ED1010 PDF Data Sheet

Low Cost P006 Series, 90 Watt user selected output (In Stock):

Parameter	PST-P006-Universal	
Input	11 – 15 Volts	
Output Vout	15, 16, 18, 19, 20, 21 Volts slide switch selectable	
Output Iout	6 Amps to 4.3 Amps depending on voltage selection	Click here to buy
Ripple/Noise	not rated	
Line Regulation	not rated	
Load Regulation	not rated	
Efficiency	not rated	
Operating Temperature	not reated	
EMI :	CE, FCC compliant	
Approvals	CE Mark	
Mechanical:	92 x 58 x 40 mm (3 7/8 x 2 1/4 x 1 1/2 inches)	
Weight	255 grams (0.56 pounds)	
Connector	Multiple connector kit for laptops	6.3 (O.D) X 3.0 (ID) mm 5.5 (O.D) X 2.5 (I.D) mm 5.0 (O.D) X 2.1 (I.D)mm 4.75 (O.D) X 1.7 (I.D) mm EIAJ 6 . 5 (O.D) X 4 . 3 (I.D) X 1.4 (PIN) mm Accessory Connector Kit Also Available

- Universal input 10.5VDC to 15VDC
- Meets FCC/CISPR/VCCI class B EMI
- Low profile and low cost
- High efficiency
- 100% HI-POT tested
- 100% cyclic Burn-In

PowerStream Technology: 140 South Mountainway Drive, Orem Utah 84058
Phone: 801-764-9060, 9062, 9063 or 9064 ◆Fax: 801-764-9061

PowerStream Technology
140 South Mountainway Dr.
Orem, UT 84058
Phone: 801-764-9060, 9062, 9063 or 9064
Fax: 801-764-9061
Map & Directions

Adapter car computer laptop power supply
Power supply to charge laptop from car.
DC-DC power supplies
DC-DC power supply
Marine to laptop power supply.

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Attorneys for Plaintiff
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UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

ACCO BRANDS USA LLC,

Plaintiff,

v.

COMARCO WIRELESS TECHNOLOGIES, INC.,

Defendant.

Case No. C11-4378 RS

PLAINTIFF AND COUNTERDEFENDANT ACCO'S PATENT LOCAL RULE 3-3 INVALIDITY CONTENTIONS

In accordance with Patent Local Rules 3-3 and 3-4, ACCO Brands USA LLC ("ACCO") hereby provides Comarco Wireless Technologies, Inc. ("Comarco") with its invalidity contentions, which pertain to the claims that Comarco has alleged are infringed in its infringement contentions served on May 14, 2012. ACCO alleges that the following claims of the following patents are invalid:

- U.S. Patent No. 6,831,848 ("the '848 Patent")

- U.S. Patent No. 7,863,770 ("the '770 Patent")- Claims 11, 12, 13, 28 29, 30, 31, 36 and 37
- U.S. Patent No. 7,495,941 ("the '941 Patent")- Claims 21, 22, 27 and 28
- U.S. Patent No. 7,999,412 ("the '412 Patent")- Claim 21
- U.S. Patent No. 7,613,021 ("the '021 Patent")- claim 28

Each of the above claims is invalid for anticipation under 35 U.S.C. § 102 (a) and (b), and obviousness under 35 U.S.C. § 103.

ACCO reserves the right to amend its invalidity contentions in the event Comarco amends its infringement contentions.

Patent Local Rule 3-3(a) Identification of Prior Art

Prior Art Patents

Patent Number	Country of Origin	Date of Issue
3,967,133	US	June 29, 1976
4,914,561	US	April 3, 1990
5,027,255	US	June 25, 1991
5,297,015	US	Mar 22, 1994
5,342,356	US	Aug 30, 1994
5,369,352	US	Nov 29, 1994
5,570,002	US	Oct 29, 1996
5,861,729	US	Jan 19, 1999
6,459,175	US	Oct 1, 2002
6,597,565	US	July 22, 2003
6,836,101	US	Dec 28, 2004
7,028,202	US	April 11, 2006

Other Prior Art

Vicor VI-200 Power Converter, as described in the following documents:

"Noise May Keep Your Product on the Bench," EDN (Cahners Pub.), May 28, 1987 ("EDN Ad");

Vinciarelli (US 4,415,959);

Electronic Design article, Sept. 2, 1997, 3 pages ("Elec. Design"); and

Electronic Products article, Nov. 1997, 2 pages ("Elec. Prods.")

Patent Local Rule 3-3(b) Anticipation and Obviousness Contentions

Attached to these invalidity contentions as Exhibits A through E are claim charts in accordance with Patent Local Rule 3-3(b) & (c).

Patent Local Rule 3-3(d) Invalidity Contentions Under 35 U.S.C. § 112

The term "low profile" in claim 28 of the '021 patent is vague and renders that claim indefinite and invalid. Low profile describes the core in the transformer. The cores in the transformers of the patent are substantially wider or longer than they are high, justifying being the label "low profile." In the Kensington products against which Comarco has asserted this claim, the ratio of the height of the core to the width is an order of magnitude greater. If that too is "low profile," then the boundary of this claim cannot be determined.

The term "connector" is used ambiguously in claim 21 of the '412 patent. The term appears to refer to three different structures but the claim fails to identify how it is being used in each instance. This renders the claim so vague and indefinite as to be invalid.

At this time, ACCO has obtained no discovery of the inventor and is unable, therefore, to assess whether the inventor complied with the best mode requirement. ACCO therefore reserves its right to assert failure to comply with the best mode requirement in the future.

Respectfully submitted,

DATED: June 27, 2012

KILPATRICK TOWNSEND & STOCKTON LLP

By: */s/ A. James Isbester*
A. James Isbester
Attorneys for Plaintiff
ACCO BRANDS USA LLC

63775957 v1

Exhibit E

Invalidity of the Asserted Claim of U.S. Patent No. 7,999,412

1. **Long Reference**

U.S. Patent No. 7,028,202 ("Long") is prior art to the '412 patent under 35 USC §102(b).

Claim 21	Long 7,028,202
Power supply equipment comprising:	Long FIG. 1 shows power supply adaptor 200.
an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device;	Power supply adaptor 200 converts power from wall outlet 204 to DC power (Long FIG. 1; col. 2, lines 53-56). Wall outlet 204 constitutes a 'power source, external to the adapter' as required by this element.
a cable having proximal and distal ends, the proximal end being electrically coupled to the DC power from the adapter and the distal end terminating in a connector; and	Long FIG. 1 shows a cable (unlabeled in figure) running from adaptor 200 and terminating in connector 210. See also Long FIG. 16, which shows cable 506 that connects from an adaptor and runs to device-side power plug 504.
a tip which includes:	Long FIG. 15 shows power dongle 408, which can be considered a 'tip' as required by this element.
an input connector which is detachably mateable to the connector to receive the DC power;	In Long FIG. 15, adaptor-side power receptacle 422 of power dongle 408 detachably mates with adaptor plug 210' (Long col. 9, lines 27-31) to receive power from the adaptor. Adapter-side power receptacle 422 constitutes an 'input connect' as required by this element. Note: It is unclear to what "the connector" in this limitation refers. There is "a connector" introduced in the above "a cable" element, and there is also "[a]n input connector" introduced here.
an output connector which is detachably mateable to the electronic device;	In Long FIG. 15, device-side power plug 426 of power dongle 408 detachably mates with notebook power receptacle 126' (Long col 9, lines 31-35). Device-side power plug 426 constitutes an 'output connector which is detachably mateable to the electronic device' as required by this element.

Claim 21	Long 7,028,202
a plurality of conductors to transfer the DC power from the input connector to the output connector to provide the DC power to the electronic device; and	Positive contacts 410a/410b and ground contacts 412a/412b of power dongle 408 are connected as illustrated in Long FIG. 14 (Long col. 9, lines 36-40). The lines between positive contacts 410a/410b and ground contacts 412a/412b constitute 'a plurality of conductors' as required by this element.
a power indication circuitry to transmit to the electronic device via the output connector a power output indication signal representative of an amount of power available to be supplied to the electronic device by the adapter.	Power running through peripheral ID resistor 414, whose resistance represents its power rating (Long col. 8, lines 58-61), by way of ID contact 416b of device-side power plug 426 indicates to notebook computer 100 the amount of power it can draw without exceeding the adapter's rated level of power (Long col. 9, lines 2-20). Resistor 414 and its associated wiring constitute 'power indication circuitry' as required by this element. The resistance read (e.g., the amount of current that flows or the voltage drop across the resistor) constitutes a 'power output indication signal' as required by this element.

2. **Kluth Reference**

U.S. Patent No. 6,597,565 ("Kluth") is prior art to the '412 patent under 35 USC §102(b).

Claim 21	Kluth 6,597,565
Power supply equipment comprising:	Kluth FIG. 1 shows power supply equipment, including plug 14, AC/DC converter 12, and connectors 18, etc.
an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device;	External power system 12 includes an AC/DC converter that accepts AC and converts it to DC (Kluth col. 3, lines 60-63). External power system 12 constitutes an 'adaptor' as required by this element.
a cable having proximal and distal ends, the proximal end being electrically coupled to the DC power from the adapter and the distal end terminating in a connector; and	In Kluth FIG. 1, DC lines 16 go from the AC/DC converter to a connector (unlabeled in the figure) that connects with external power connector 24. DC lines 16 constitutes a 'cable' as required by this element.

Claim 21	Kluth 6,597,565
a tip which includes:	External power system 24 its mate (unlabeled in the figure) may be analogous to a "tip." If a connector is different than a tip, then the use of a "tip" instead of a connector would have been obvious, as this change is merely a change in form without a change in function.
an input connector which is detachably mateable to the connector to receive the DC power;	External power connector 24 mates with a connector at the end of DC lines 16 to receive DC power from external power system 12. External power connector 24 constitutes an 'input connector' as required by this element. Note: It is unclear to what "the connector" in this limitation refers. There is "a connector" introduced in the above "a cable" element, and there is also "[a]n input connector" introduced here.
an output connector which is detachably mateable to the electronic device;	A connector (unlabeled in figure) at the end of DC lines 16 mates with external power connector 24 of information handling system 10 (e.g., a computer). The unlabeled connector constitutes an 'output connector' as required by this element. Note that the 'input connector' is on the right and the 'output connector' is on the left in Kluth FIG. 1. Power flows into the input connector from the output connector.
a plurality of conductors to transfer the DC power from the input connector to the output connector to provide the DC power to the electronic device; and	External power connector pins carry DC power through external power connector 24 and its mate (Kluth col. 3, lines 63-66). The pins constitute a 'plurality of conductors' as required by this element.
a power indication circuitry to transmit to the electronic device via the output connector a power output indication signal representative of an amount of power available to be supplied to the electronic device by the adapter.	External power source identification signal line 20 carries an external power source identification signal to information handling system 10 (Kluth col. 3, line 66 – col. 4, line 4). The external power source identification signal indicates whether power is available (Kluth col. 4, lines 40-45) from the adapter. External power source identification signal line 20 constitutes 'power indication circuitry,' and the external power source identification signal constitutes a 'power output indication signal' as required by this element.

3. **Castleman Reference**

U.S. Patent No. 5,570,002 ("Castleman") is prior art to the '412 patent under 35 USC §102(b).

Claim 21	Castleman 5,570,002
Power supply equipment comprising:	Power supply systems 20/120 are shown in Castleman FIGS. 1-2.
an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device;	FIGS. 1-2 of Castleman show voltage regulators 22/122 taking power from external power source 10/110 and producing stabilized voltage at their outputs (Castleman col. 9, lines 44-46) and controllable regulators 28/128 supplying power at a voltage, current, etc. that are appropriate to the supplied device (Castleman col. 9, lines 61-67). The voltage can be a direct current (DC) waveform (Castleman col. 2, lines 26-31). Voltage regulators 22/122 and controllable regulators 28/128 constitute an 'adaptor' as required by this element. The elements of Castleman FIG. 2 are generally similar to those in Castleman FIG. 1 (Castleman col. 11, lines 35-39).
a cable having proximal and distal ends, the proximal end being electrically coupled to the DC power from the adapter and the distal end terminating in a connector; and	Wiring connections from the centrally disposed multiport regulator 128 to individual port connectors 126 are distributed throughout the passenger accommodations (Castleman col. 13, lines 48-54) of an aircraft. The wiring connections constitute a 'cable' as required by this element.
a tip which includes:	Castleman FIGS. 1 and 2 show cables 30/130 having connectors 31/131 and 38/138 at both ends. A cable is analogous to a "tip." If cables 30/130 are different than a tip, then the use of the word "tip" instead of a cable would have been obvious, as this change is merely a change in form without a change in function.
an input connector which is detachably mateable to the connector to receive the DC power;	Connectors 31/131 detachably mate with terminals 26/126 and power leads 29/129 to receive power from the supply system ports (Castleman col. 10, lines 7-11; col. 13, lines 58-61). Connectors 31/131 constitutes an 'input connector' as required by this element. Note: It is unclear to what "the connector" in this limitation refers. There is "a connector" introduced in the above "a cable" element, and there is also "[a]n input connector" introduced here.

Claim 21	Castleman 5,570,002
an output connector which is detachably mateable to the electronic device;	Output connectors 38/138 detachably mate to supplied devices 140 (Castleman col. 10, lines 55-61).
a plurality of conductors to transfer the DC power from the input connector to the output connector to provide the DC power to the electronic device; and	Elongated power-carrying leads 36/136 supply power to power-carrying terminals 39 (Castleman col. 10, lines 52-55; col. 13, lines 9-11) for device 40 (FIG. 1). Elongated power-carrying leads 36/136 constitute a 'plurality of conductors' as required by this element.
a power indication circuitry to transmit to the electronic device via the output connector a power output indication signal representative of an amount of power available to be supplied to the electronic device by the adapter.	Device identification information 33, which includes power specifications (Castleman col. 16, lines 3-9) including supply voltage, supply impedance, supplied current, is stored in memories 143a/143z. The identification information is transmitted from memories 143a/143z, which are in electronic devices 140a/140z (Castleman FIG. 2), through connectors 138a/138z. Based on the power specifications, appropriate power is supplied or denied to the device across connectors 138a/138z (Castleman col. 16, lines 10-13). Memories 143a/143z constitute 'power indication circuitry,' and device identification information 33 constitutes a 'power output indication signal' as required by this element.

4. **Toepfer Reference**

U.S. Patent No. 5,369,352 ("Toepfer") reference is prior art to the '412 patent under 35 USC §102(b).

Claim 21	Toepfer 5,369,352
Power supply equipment comprising:	Equipment for supplying power to an electric vehicle battery charger is shown in FIG. 1, including outlet receptacles 8 and adaptor 10.
an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device;	Adapter 10 converts power provided by outlet receptacle 8, which is external to adapter 10, to that suitable for a battery charger 16 for an electric vehicle. Batteries are typically charged using direct current (DC). In addition, adapter 10 includes power supply 20, which converts input power lines 21 to a predetermined D.C. voltage (Toepfer col. 2, lines 61-64).

Claim 21	Toepfer 5,369,352
a cable having proximal and distal ends, the proximal end being electrically coupled to the DC power from the adapter and the distal end terminating in a connector; and	Power line 21 has ends, one end terminating in connector 19. Adapter 10 supplies power line voltage 10 to connector 24, which supplies the power voltage from adapter 10 into electric vehicle 14. Power line 21 constitutes a 'cable' as required by this element.
a tip which includes:	Adaptor 10 includes plug 19 and connector 24 at each tip (Toepfer FIG. 1).
an input connector which is detachably mateable to the connector to receive the DC power;	Plug 19 mates with receptacle 8 (Toepfer FIG. 1; col. 2, lines 28-32). Outlet receptacle 8 can supply DC power (Toepfer col. 2, line 64, col. 3, line 1); therefore, plug 19 can receive DC power. Plug 19 constitutes an 'input connector' as required by this element. Note: It is unclear to what "the connector" in this limitation refers. There is "a connector" introduced in the "a cable" element above, and there is also "[a]n input connector" introduced here.
an output connector which is detachably mateable to the electronic device;	Output connector 24 connects with inlet receptacle 18 of an electric vehicle battery charger.
a plurality of conductors to transfer the DC power from the input connector to the output connector to provide the DC power to the electronic device; and	Multiples conductors of power line 21 (see Toepfer FIG. 2) transfer power from plug 19 to connector 24 (Toepfer FIG. 1), including DC power (see Toepfer col. 2, line 64, col. 3, line 1).
a power indication circuitry to transmit to the electronic device via the output connector a power output indication signal representative of an amount of power available to be supplied to the electronic device by the adapter.	Identification circuit 28 identifies the electrical capabilities of the power outlet (e.g., voltage level, current level) (Toepfer col. 2, line 61, - col. 3, line 4), including the maximum ratings of the outlet (Toepfer col. 3, lines 2-4), in an identifier (FIG. 4; see data 54). Data 54 can include a voltage rating and current rating. Identification circuit 28 constitutes 'power indication circuitry,' and data 54 constitutes a 'power output indication signal' as required by this element.

In addition, each of the foregoing references could properly be combined with any other of the foregoing references to render the claim obvious under 35 U.S.C. §103. Each of the references discloses a power supply that provides power to an electrical device in which the electrical device receives information from the connection to that supply.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **THOMAS W. LANNI** Serial No.: 13/707,119 Filed: December 6, 2012 For: *POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE*	Group Art Unit: 2836 Examiner: CAVALLARI, DANIEL J. Confirmation No.: 3683

DECLARATION OF THOMAS W. LANNI REGARDING COMARCO N19 AND N24 TIPS

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

Dear Sir:

I, Thomas W. Lanni, declare as follows:

1. I am the sole inventor of the above-identified patent application.

2. I have assigned the above-identified patent application to Comarco Wireless Technologies, Inc. ("Comarco").

3. I have been continuously employed by Comarco from 1994 to the present and am currently Comarco's President and Chief Executive Officer.

4. Upon information and belief, on or about May 14, 2004, Comarco finalized the design of Tip N19 as described in Comarco Specification Control Drawing Nos.

1910-0219 and 1245-0021-T, copies of which are being concurrently submitted with this Declaration.

5. Upon information and belief, on or about October 23, 2004, Comarco finalized the design of Tip N24 as described in Comarco Specification Control Drawing Nos. 1910-0024 a copy of which is being concurrently submitted with this Declaration.

6. Upon information and belief, on or about December 31, 2004, Comarco entered into, in the United States, a Supply Agreement with Battery-Biz, Inc. ("Battery-Biz") concerning Comarco's manufacture and Battery-Biz's purchase of power adapter products and SmartTips® therefor, including Tips N19 and N24.

7. All statements made of my own knowledge are true and all statements made upon information and belief are believed to be true.

I acknowledge that pursuant to 18 U.S.C. §1001, willful false statements and the like are punishable by fine or imprisonment, or both, and may jeopardize the validity of the above-identified application and/or any patent issuing therefrom.

Date: May 14, 2013

Thomas W. Lanni

REVISIONS

REV		DATE	APPR.
B	INITIAL RELEASE, ECO 11036	5/14/04	DP
C	REVISED PER ECO NO. 12317	6/21/05	MJO
D	REVISED PER ECO NO. 12537	8/24/05	CG

DRAWING NO. 1910-0219

SPECIFICATIONS:

UNLESS OTHERWISE SPECIFIED

1) PARTS AND ASSEMBLY SHALL BE CLEAN AND FREE OF FLASHING, OIL AND FOREIGN DEBRIS.

2) PART SHALL MEET PHYSICAL REQUIREMENTS FOR MATING CONNECTORS, KEYING AND MARKING PER SHEET 4.

3) PART SHALL MEET ELECTRICAL REQUIREMENTS PER SCHEMATIC ON SHEET 3.

4) OPERATING TEMPERATURE RANGE: 0°C – +40°C

5) STORAGE TEMPERATURE RANGE: –40°C – +70°C

6) ELECTRIC STRENGTH: NOT REQUIRED

7) INSULATION RESISTANCE: APPLY 50 VDC BETWEEN OUTPUT AND OUTPUT RTN. RESISTANCE SHALL BE GREATER THAN 100 MEG OHMS.

8) DC RESISTANCE:

P1–3 TO P2–1	0.015 OHMS MAX.
P1–4 TO P2–2	0.015 OHMS MAX
P1–1 TO P1–2	2.29K – 2.34K OHMS
P1–1 TO P1–5	172.09 – 175.91 OHMS
P1–4 TO P1–5	741.75 – 758.25 OHMS

SPECIFICATION CONTROL DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
DECIMALS
.X ± .03 .XXX ±.005
.XX± .01
ANGLES ±1°

MATERIAL

FINISH

APPROVALS		DATE
DRAWN	T.NGUYEN	5/5/04
CHECKED	D. PEAVLER	5/20/04
ENGINEERING	G. VUDUC	5/20/04
MANUFACTURING	B.PRABHAKAR	5/20/04

Comarco Wireless Technologies
2 Cromwell, Irvine, Ca 92618

TITLE: TIP N19

SIZE: A | DRAWING NO.: 1910-0219 | REV.: D

SCALE: 1/1 | DO NOT SCALE DWG. | SHEET 1 OF 5

SPECIFICATIONS CONT:

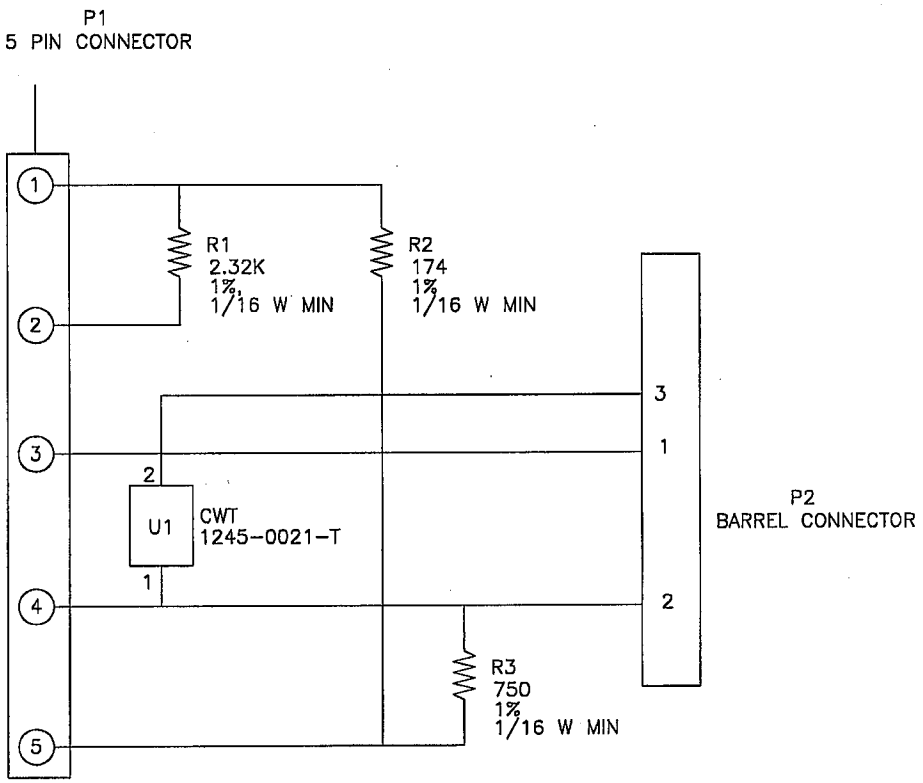
9) CONTACT INSERTION AND WITHDRAWAL FORCE:	NOT APPLICABLE
10) DURABILITY:	MINIMUM 10 SAMPLES, EACH TO MATE 5,000 TIMES AND STILL MEETS ELECTRICAL AND MECHANICAL REQUIREMENT. REPEAT TESTS 6, 7, AND 8.
11) MOISTURE RESISTANCE:	HUMIDITY TREATMENT AT 40°C ± 2°C. 90–95% RH (NON– CONDENSING) FOR 48 HOURS. REPEAT TESTS 6 AND 7.
12) SALT FOG:	NO CORROSION SHALL APPEAR AFTER THE CONNECTOR IS PLACED IN A MIST OF 5% NaCL SOLUTION FOR 24 HOURS. REPEAT TESTS 6 AND 7.
13) INSULATOR RING:	MATERIAL: NYLON 46, UL94 V–0, TEMP RATING:MIN 249°C, COLOR BLACK
14) STRENGTH:	TEST PER COMARCO MPS–0002, METHOD 1.

15) INDENTIFY EACH MOLD CAVITY NUMBER. DO NOT LOCATE INDENTIFICATION ON EXTERIOR SURFACES WHEN TIP ASSEMBLED.

16) ENVIRONMENTAL COMPLIANCE PER COMARCO SPECIFICATION MPS–0001, REVISION LEVEL AS STATED IN PURCHASE ORDER.

DRAWING NO. 1910–0219

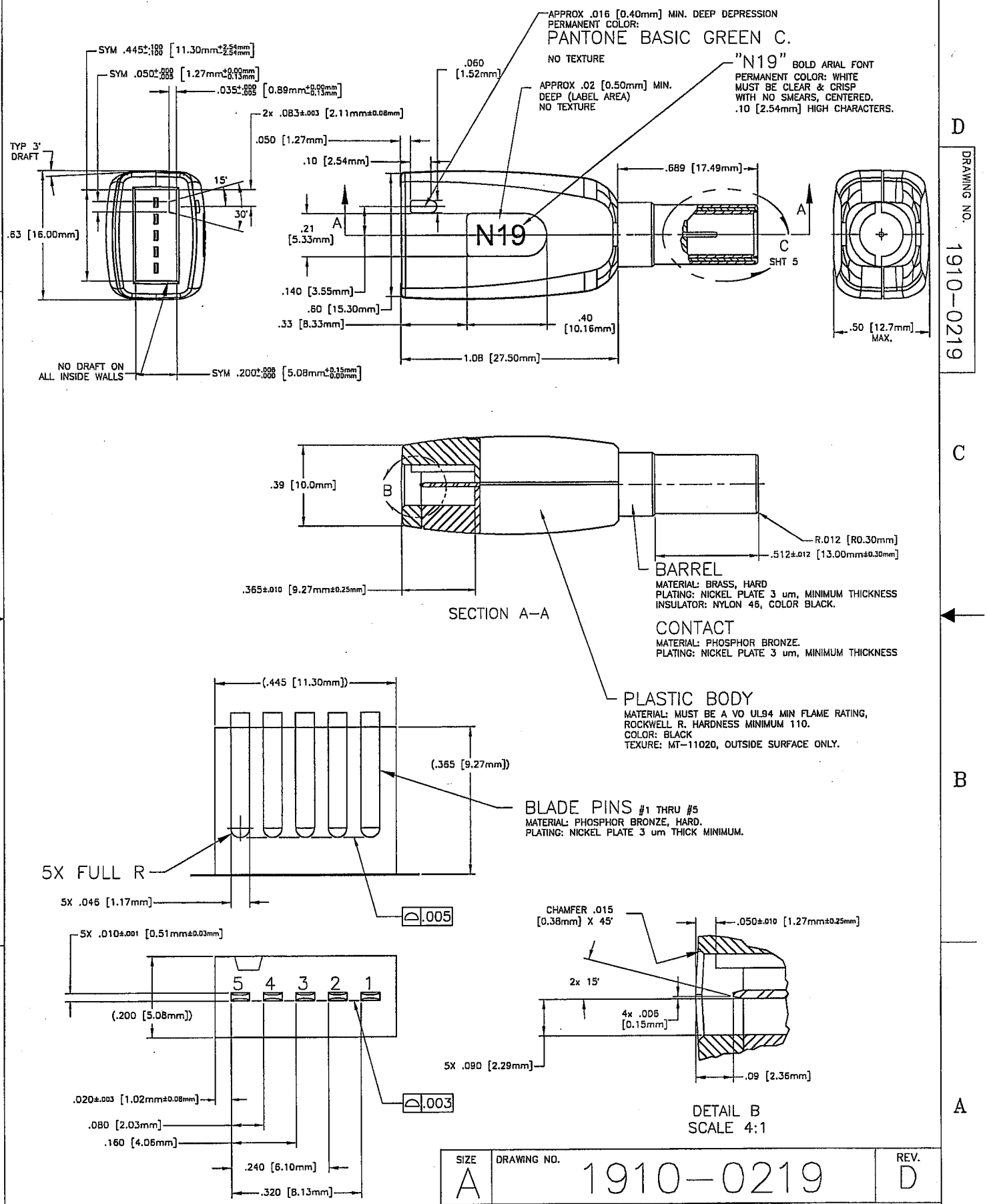
SIZE	DRAWING NO.	REV.
A	1910–0219	D
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 2 OF 5



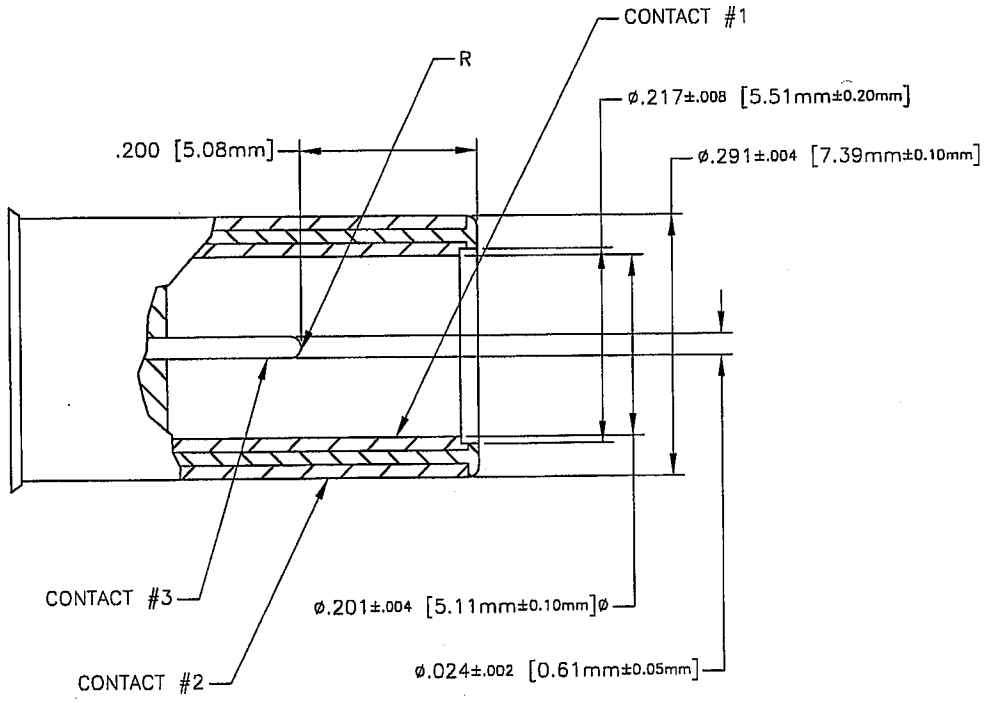
SCHEMATIC

U1 IS AN EPROM AS DESCRIBED IN CWT 1245-0021-T.

SIZE	DRAWING NO.	REV.
A	1910-0219	D
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 3 OF 5



SIZE	DRAWING NO.	REV.
A	1910-0219	D
SCALE: 2/1	DO NOT SCALE DWG.	SHEET 4 OF 5



DETAIL C

SCALE: 5/1

SIZE	DRAWING NO.	REV.
A	1910-0219	D
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 5 OF 5

DRAWING NO. 1245-0021-T

REVISIONS			
REV		DATE	APPR.
B	RELEASED PER ECN NO. 12317	6/21/05	CS
C	REVISED PER ECO NO. 12397	7/15/05	CS
D	REVISED PER ECO NO. 12678	10/7/05	CS

NOTES: UNLESS OTHERWISE SPECIFIED

1. THIS IS A SOURCE CONTROL DOCUMENT. ONLY ELECTRICAL R.E.A. TO AUTHORIZE ANY DEVIATION FROM THIS DOCUMENT.
2. ALL PARTS PURCHASED PER THIS SCD MUST BE RoHS COMPLIANT. ALL PURCHASE ORDERS WRITTEN TO PURCHASE PARTS PER THIS SCD MUST CONTAIN THE FOLLOWING IN THE BODY OF THE PURCHASE ORDER : "ALL PARTS SUPPLIED PER THIS PURCHASE ORDER MUST BE RoHS COMPLIANT."

EPROM, DS2502, TO-92		
MANUFACTURER	PART # BULK	PART # TAPE & REEL
DALLAS SEMICONDUCTOR	DS2502+	DS2502+T&R

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
DECIMALS
.x ± .03 .xxx ±.005
.xx± .01
ANGLES ±.5°
MATERIAL
FINISH

APPROVALS	DATE
DRAWN D. PEAVLER	6/21/05
CHECKED C. STRICKLER	6/21/05
ENGINEERING C. STRICKLER	6/21/05

Comarco Wireless Technologies
2 Cromwell, Irvine, Ca 92618

TITLE
EPROM, DS2502, TO-92

SIZE	DRAWING NO.	REV.
A	1245-0021-T	D

SCALE: N/A | DO NOT SCALE DWG. | SHEET 1 OF 1

REVISIONS

REV		DATE	APPR.
A1	INITIAL RELEASE, PCO 0187	10/23/04	

PROTOTYPE MASTER

DRAWING NO. 1910-0224

SPECIFICATIONS:
UNLESS OTHERWISE SPECIFIED

1) PARTS AND ASSEMBLY SHALL BE CLEAN AND FREE OF FLASHING, OIL AND FOREIGN DEBRIS.

2) PART SHALL MEET PHYSICAL REQUIREMENTS FOR MATING CONNECTORS, KEYING AND MARKING PER SHEET 4.

3) PART SHALL MEET ELECTRICAL REQUIREMENTS PER SCHEMATIC ON SHEET 3.

4) OPERATING TEMPERATURE: ASSEMBLY SHALL OPERATURE WITHIN SPECIFICATION PER MPS-03-0001, WITH INPUT = TBD VOLTS AND OUTPUT = TBD VOLTS AT TBD AMP.

5) STORAGE TEMPERATURE: ASSEMBLY SHALL BE SUBJECTED TO TEMPERATURE STORAGE PER MPS-03-0001. RETEST DIELECTRIC STRENGTH, INSULATION RESISTANCE, AND DC RESISTANCE.

6) DIELECTRIC STRENGTH: LEAKAGE CURRENT BETWEEN ANY TWO CONDUCTORS < 2 MA, WHEN 500 VDC OR 353 VAC IS APPLIED FOR 1 MINUTE, PER MPS-04-0001.

7) INSULATION RESISTANCE: IMPEDANCE BETWEEN OUTPUT (P1-3) AND OUTPUT RETURN (P1-4)CONDUCTORS SHALL BE 100 MEG OHMS MINIMUM, WHEN 100 VDC IS APPLIED FOR 1 MINUTE, PER MPS-04-0002.

8) DC RESISTANCE: THE FOLLOWING RESISTANCE VALUES SHALL BE VERIFIED PER APPLICABLE SPECIFICATION, MPS-04-0003 AND MPS-04-0004

TEST POINTS TBD

SPECIFICATION CONTROL DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
DECIMALS
.X ± .03 .XXX ±.005
.XX± .01
ANGLES ±1°
MATERIAL
FINISH

APPROVALS		DATE
DRAWN	T.NGUYEN	10/23/04
CHECKED		
ENGINEERING		
MANUFACTURING		

Comarco Wireless Technologies
2 Cromwell, Irvine, Ca 92618

TITLE: TIP N24

SIZE	DRAWING NO.	REV.
A	1910-0224	A1

SCALE: 1/1 | DO NOT SCALE DWG. | SHEET 1 OF 5

SPECIFICATIONS CONT:

PROTOTYPE MASTER

9) CONTACT INSERTION AND WITHDRAWAL FORCE:	NOT APPLICABLE.
10) DURABILITY:	NOT APPLICABLE
11) HUMIDITY EXPOSURE:	ASSEMBLY SHALL BE SUBJECTED TO 48 HOURS HUMIDITY EXPOSURE PER MPS-03-0002. RETEST DIELECTRIC STRENGTH AND INSULATION RESISTANCE.
12) SALT FOG:	ASSEMBLY SHALL BE SUBJECTED TO 24 HOURS OF SALT FOG EXPOSURE PER MPS-03-0003.
13) NOT USED	
14) STRENGTH:	ASSEMBLY SHALL WITHSTAND STRUCTURAL LOAD PER MPS-0002, METHOD 1.

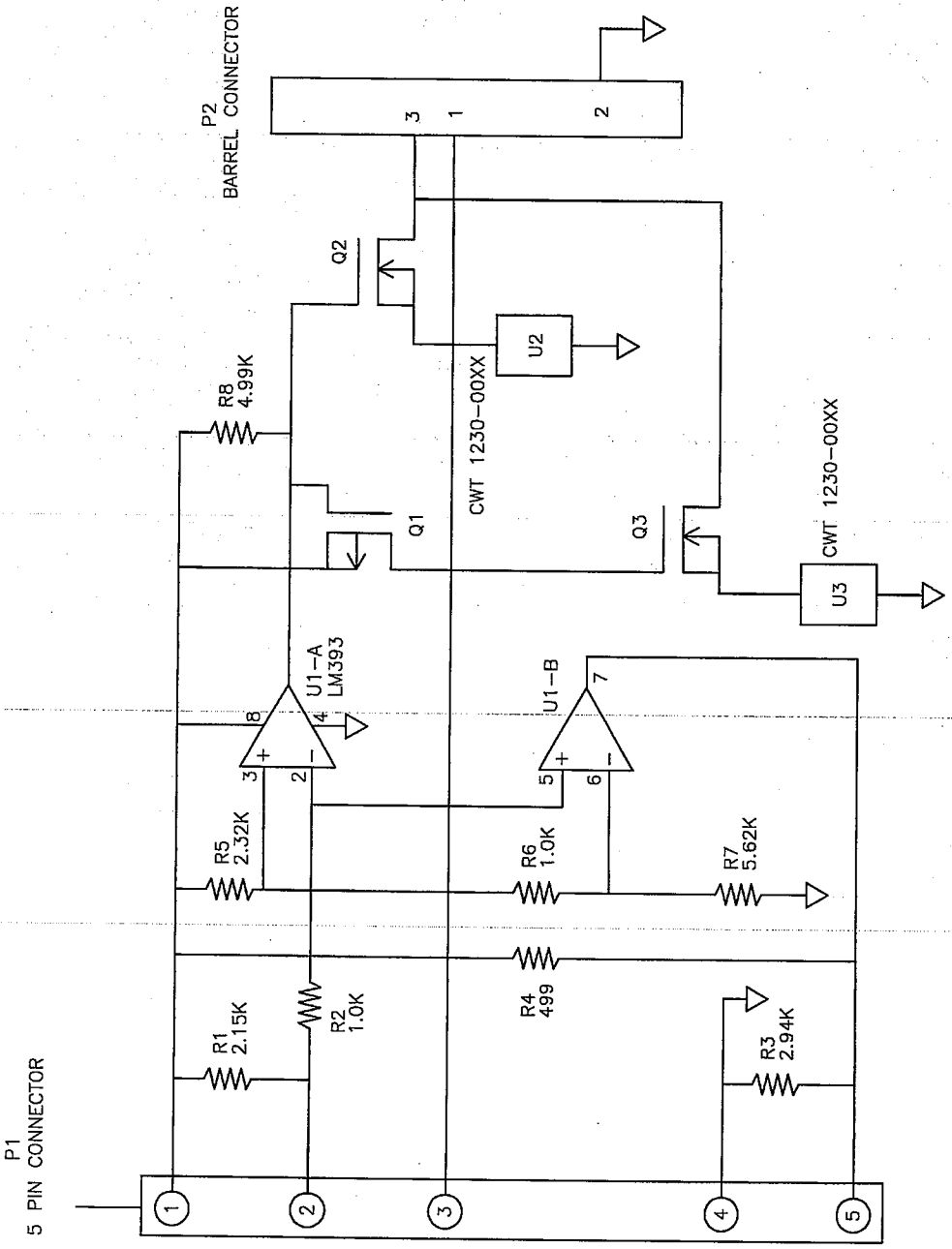
15) ALL EXTERNALLY EXPOSED POLYMER COMPONENTS SHALL COMPLY TO MPS-0001.

16) IDENTIFY EACH MOLD CAVITY NUMBER. DO NOT LOCATE ON EXTERIOR SURFACES WHEN TIP ASSEMBLED.

DRAWING NO. 1910-0224

SIZE	DRAWING NO.	REV.
A	1910-0224	A1
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 2 OF 5

PROTOTYPE MASTER



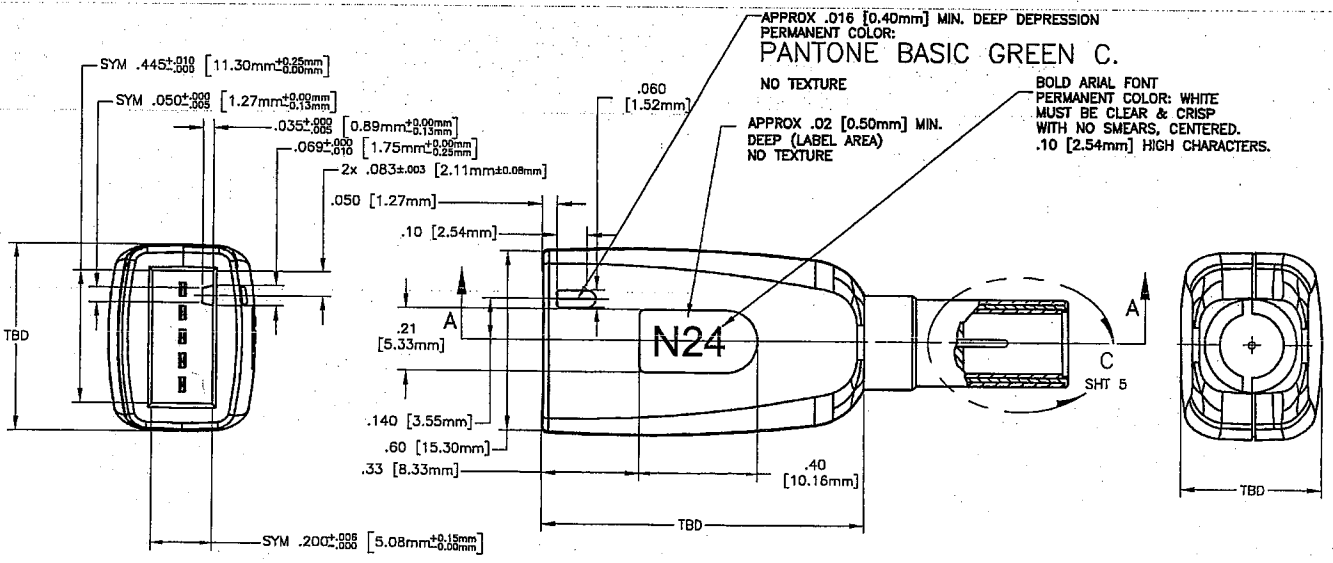
ALL RESISTORS ARE 1%, 1/16 W MIN.
U2 AND U3 ARE EPROM

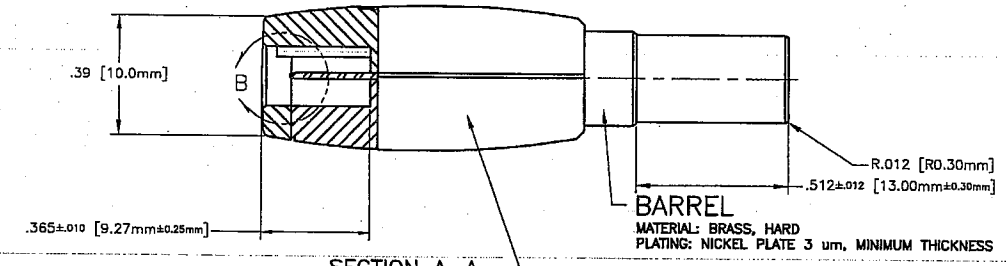
SCHEMATIC

DRAWING NO. 1910-0224

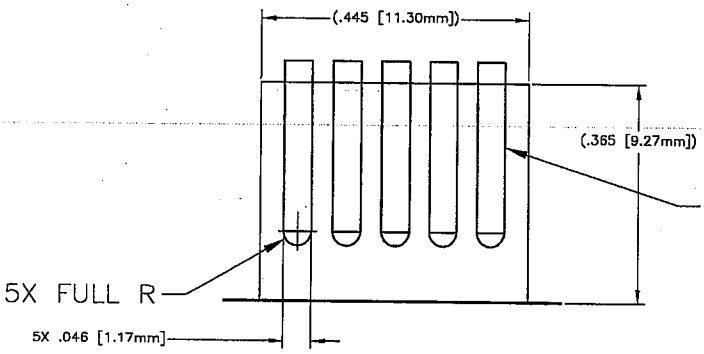
SIZE	DRAWING NO.	REV.
A	1910-0224	A1
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 3 OF 5

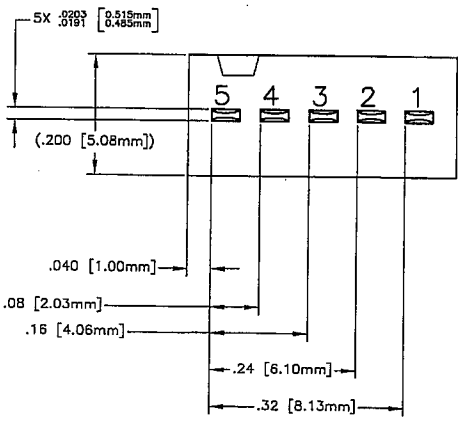
PROTOTYPE MASTER

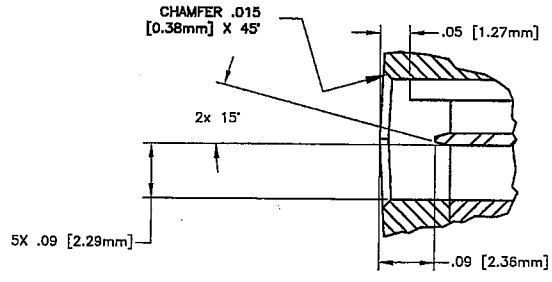




SECTION A–A





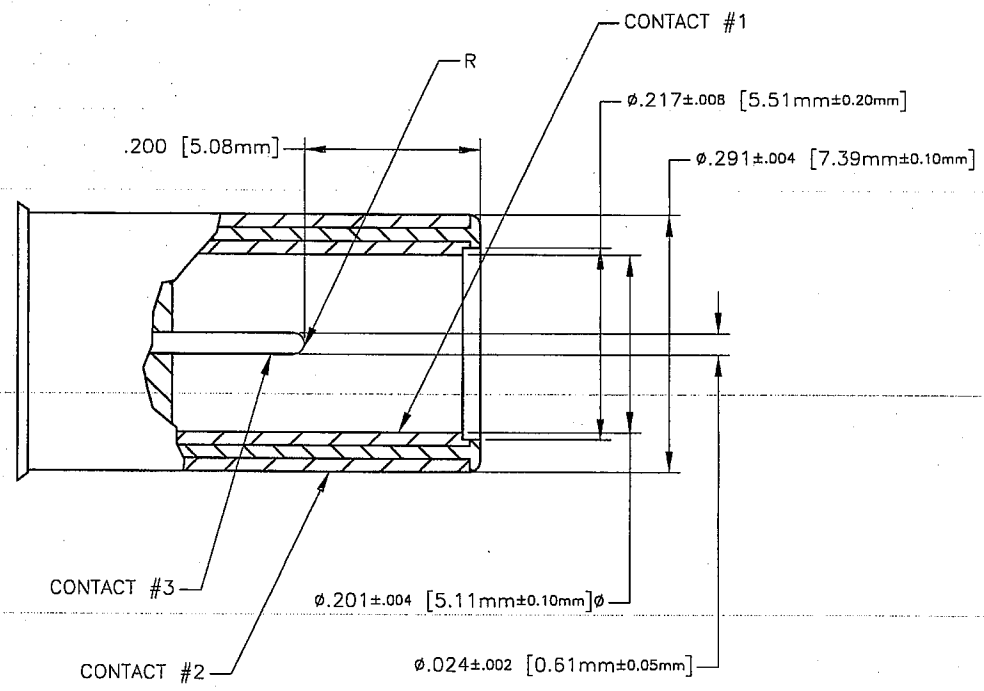


DETAIL B
SCALE 4:1

SIZE	DRAWING NO.	REV.
A	1910-0224	A1
SCALE: 2/1	DO NOT SCALE DWG.	SHEET 4 OF 5

PROTOTYPE MASTER

DRAWING NO. 1910-0224



DETAIL C

SCALE: 5/1

SIZE	DRAWING NO.	REV.
A	1910-0224	A1
SCALE: 1/1	DO NOT SCALE DWG.	SHEET 5 OF 5

Electronic Patent Application Fee Transmittal

Application Number:	13707119
Filing Date:	06-Dec-2012
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Filer:	Roger R. Wise/Margaret Garcia
Attorney Docket Number:	081088-0419555

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt

EFS ID:	15775195
Application Number:	13707119
International Application Number:	
Confirmation Number:	3683
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Customer Number:	27496
Filer:	Roger R. Wise/Margaret Garcia
Filer Authorized By:	Roger R. Wise
Attorney Docket Number:	081088-0419555
Receipt Date:	14-MAY-2013
Filing Date:	06-DEC-2012
Time Stamp:	16:49:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1200
RAM confirmation Number	4011
Deposit Account	033975
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 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCETransmittal.pdf	80647 81a376b7f1553e329d26ab4ac2f49b7f1997e2ba	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		RCEandRemarks.pdf	74806 ba25dccdba487e7d7cd0fa79e895d0518165f5aa	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
	Claims		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	3	
Warnings:					
Information:					
3		IDSw1449.pdf	407380 0006c154567fa0944a2cc566345caae6dd23aa19	yes	7
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Form (SB08)		3	7	
Warnings:					
Information:					
4	Foreign Reference	WO2006116298A1.pdf	1071400 76da50270c31d435d4693823f9d506d1ca9f02d3	no	35
Warnings:					
Information:					
5	Foreign Reference	WO9819223.pdf	2561146 6e4fe1282fe20a39146c33c407e9a16d29b1d07b	no	62
Warnings:					
Information:					

6	Non Patent Literature	NPL01.pdf	92067 77c04562b91217542ca72373432f17620e33768a	no	3
Warnings:					
Information:					
7	Non Patent Literature	NPL02.pdf	693212 512dcf7837f13e865b47de62ec175cb53f4b50b4	no	13
Warnings:					
Information:					
8	Non Patent Literature	NPL03.pdf	520923 4a6872eac5574baa822b59e9202d1e23c4e38a31	no	11
Warnings:					
Information:					
9	Non Patent Literature	NPL04.pdf	282387 7c0a1e5d7dc25ef29f44bf90f4719a463846b7a7	no	6
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Information:					
10	Non Patent Literature	NPL05.pdf	1301058 ee4ef938fae4ad3700b88ae5d35b71517380e17a	no	2
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11	Non Patent Literature	NPL06.pdf	1424021 233c578f04939b83ab1db7dd359aec9ed85ff16e	no	2
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Information:					
12	Non Patent Literature	NPL07.pdf	2066885 4d7a192c20c932be797673d92651ed05def6721c	no	3
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Information:					
13	Non Patent Literature	NPL08.pdf	41311 5e7d645de219f8eec7b1e3c5c86a522dc07b4bcc	no	1
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14	Non Patent Literature	NPL09.pdf	164985 346d70c96ae023dfc03f8a8d35692ca7ecd5d54c	no	4
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Information:					

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Information:					
16	Non Patent Literature	NPL11.pdf	53536 2432c74a94c5b72f7d993b9ce7884755e8810d11	no	2
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Information:					
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Warnings:					
Information:					
18	Non Patent Literature	NPL13.pdf	48659 7fb78c5ce4a7f5276e937f079d5bd0037b2183e6	no	1
Warnings:					
Information:					
19	Non Patent Literature	NPL14.pdf	178755 2d71e2d953e247f49db92e083396675b9d6f4346	no	5
Warnings:					
Information:					
20	Fee Worksheet (SB06)	fee-info.pdf	30613 973d522643d573103e1d90540bc463e451d54945	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	11701679		

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/707,119	Filing Date 12/06/2012	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 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).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT

05/14/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 2	Minus	** 20	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					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.

LIE
/DEBORAH SCOTT/

To: Docket_IP@pillsburylaw.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 27496

Apr 19, 2013 05:23:48 AM

Dear PAIR Customer:

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 27496 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
13707119	NTC.PUB	04/18/2013	081088-0419555

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555

CONFIRMATION NO. 3683

27496
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

PUBLICATION NOTICE

OC000000060542872

Title:POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

Publication No.US-2013-0093263-A1
Publication Date:04/18/2013

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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NOTICE OF ALLOWANCE AND FEE(S) DUE

27496 7590 03/18/2013

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

EXAMINER
CAVALLARI, DANIEL J

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 03/18/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

TITLE OF INVENTION: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1770	$300	$0	$2070	06/18/2013

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27496 7590 03/18/2013
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

TITLE OF INVENTION: POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1770	$300	$0	$2070	06/18/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
CAVALLARI, DANIEL J	2836	307-151000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555	3683

27496 7590 03/18/2013

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

EXAMINER	
CAVALLARI, DANIEL J	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 03/18/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

Notice of Allowability	Application No. 13/707,119	Applicant(s) LANNI ET AL.	
	Examiner DANIEL CAVALLARI	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/6/2012*.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are *1 and 2*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .

4. ☐ 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 the:
      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)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/Daniel Cavallari/
Primary Examiner, Art Unit 2836

DETAILED ACTION

Allowable Subject Matter

Claims 1-2 are allowed.

The following is an examiner's statement of reasons for allowance:

The claims in the application are deemed to be directed to an nonobvious improvement over the prior art of record, particularly Potega US 7,039,821 teaches power supply equipment that sends a signal from the powered device to the adapter to configure the voltage supplied by the adapter (See column 7, line 46 to column 8, line 8); Lanni US 2005/0024030 teaches power supply equipment that receives a signal from a device (ie active tip) that control the adapter; and Atkinson et al. US 7,392,099 teaches a system which controls a device based on the supplied power source voltage.

The primary reason for allowance of the claims is the inclusion of the particular power supply equipment circuitry including the particular adapter, cable, plurality of conductors, and circuitry to receive **and** (*emphasis added*) transmit a data output to the electronic device to identify the power supply equipment to the electronic device.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Cavallari whose telephone number is 571-272-8541. The examiner can normally be reached on Monday-Friday 10:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached at (571)272-2391. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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.

/Daniel Cavallari/

3/10/2013

PRIMARY PATENT EXAMINER
ART UNIT 2836

Notice of References Cited	Application/Control No. 13/707,119	Applicant(s)/Patent Under Reexamination LANNI ET AL.	
	Examiner DANIEL CAVALLARI	Art Unit 2836	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,039,821	05-2006	Potega, Patrick H.	713/340
*	B	US-2005/0024030	02-2005	Lanni, Thomas W.	323/274
*	C	US-7,392,099	06-2008	Atkinson et al.	700/22
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	("7392099").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/03/10 16:48
L2	25	("20020083356" | "20030025689" | "20040225902" | "4670837" | "5021679" | "5153535" | "5274827" | "5396635" | "5442794" | "5450003" | "5524249" | "5526253" | "5781768" | "5799198" | "5812860" | "5874851" | "5991883" | "6029249" | "6078319" | "6233691" | "6584571" | "6690652" | "6845456" | "6967522" | "7100062").PN. OR ("7392099").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/03/10 16:48
L3	413	("empower" em$power) and (aircraft airplane air$craft air$plane)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/03/10 16:50
L4	2	("8330303").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/03/10 17:45
L5	1051	(307/150).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/03/10 17:47
L6	933	(307/151).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/03/10 17:47
S1	15	("20050127758" | "5969438" | "6288522" | "6528970" | "6567565" | "6795302" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2009/03/14 18:03

			IBM_TDB			
S2	1	("6459175").PN.	USPAT; USOCR	OR	OFF	2009/09/13 17:27
S4	21	("20050127758" | "20050162020" | "20060164061" | "20060220465" | "5969438" | "6288522" | "6528970" | "6567565" | "6795302" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 19:33
S5	1	("6751109").PN.	USPAT; USOCR	OR	OFF	2009/09/13 19:34
S8	18	(US-20050127758-$).did. or (US-6903950-$ or US-6795302-$ or US-6567565-$ or US-6528970-$ or US-6288522-$ or US-5969438-$ or US-6459175-$ or US-6751109-$).did. or (US-20050127758-$ or US-20040085793-$ or US-20040008462-$ or US-6567565-$ or US-6528970-$ or JP-2000324713-$ or JP-10301672-$ or BE-729852-$ or EP-1555733-$).did.	US-PGPUB; USPAT; DERWENT	OR	OFF	2009/09/13 20:42
S9	1	S8 and (processor microprocessor controler microcontroler) with compar$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:42
S10	0	(processor microprocessor controler microcontroler) with compar$4 near3 voltage with refference near2 voltage	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:43
S11	851	(processor microprocessor controler microcontroler) with compar$4 near3 voltage with reference near2 voltage	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:43
S12	65	S11 and ("323"/$.ccls. "307"/$.ccls. "363"/$.ccls.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 20:43
S13	503	307/80.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/09/13 21:02
S14	1278	713/322.ccls.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2009/09/13 21:02

			EPO; JPO; DERWENT; IBM_TDB			
S15	25	("20040075419" | "20050127758" | "5969438" | "6054846" | "6288522" | "6528970" | "6567565" | "6628535" | "6751109" | "6795302" | "6903850" | "6903950").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/01 15:25
S16	2383	empower	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/01 15:37
S17	327	empower and type near3 (source power supply)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/01 15:37
S18	48	empower and type near3 (source power supply) and AC and DC	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/01 15:39
S19	1	("5570002").PN.	USPAT; USOCR	OR	OFF	2010/06/02 13:30
S20	41	("4804916" | "5391976").PN. OR ("5570002").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:21
S21	5	("5111148" | "5160882" | "5283762" | "5387820" | "6665808").PN. OR ("7127623").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:29
S22	122	airplane and Cigarette and (reduc$4 decreas$4 limit$4) near3 power$4 same2 (laptop notebook computer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 20:32
S23	25	("20020083356" | "20030025689" | "20040225902" | "4670837" | "5021679" | "5153535" | "5274827" | "5396635" | "5442794" | "5450003" | "5524249" | "5526253" | "5781768" | "5799198" | "5812860" | "5874851" | "5991883" | "6029249" | "6078319" | "6233691" | "6584571" | "6690652" | "6845456" | "6967522" | "7100062").PN. OR ("7392099").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:41
S24	6	airplane and Cigarette and (reduc$4 decreas$4 limit$4 max maximum) near3 power$4 same2 (laptop notebook computer) not S22	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2010/06/02 20:53

			EPO; JPO; DERWENT; IBM_TDB			
S25	11	("3833821" | "4053788" | "5181858" | "5369352").PN. OR ("6358096").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/06/02 20:59
S26	369	determin$4 with AC with (DC battery) and (reduc$4 decreas$4 limit$4) near3 power$4 same2 (laptop notebook computer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 21:00
S27	10	"7039821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/06/02 21:13
S28	3057	715/700.ccls. 715/716.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:29
S29	5512	345/156.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S30	3073	327/100,102,103.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S31	7239	713/300,310,320,346.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S32	1088	307/28,31.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/06/03 12:30
S33	1146	323/313.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2010/06/03 12:30

			IBM_TDB			
S34	60	battery with charg$4 near4 disabl$4 and (airplane aircraft empower)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 14:01
S35	390	307/28.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S36	739	307/31.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S37	1196	320/132.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S38	5347	713/300.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:30
S39	173	comarco with wireless	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:31
S40	6372	((thomas with lanni)(laguna with niguel))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:33
S41	1506	((thomas with lanni)(laguna with niguel)) and controller	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/10/09 15:33
S42	81	S41 and source near3 determin$4	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2010/10/09 15:34

			EPO; JPO; DERWENT; IBM_TDB			
S43	614	307/80.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S44	844	307/151.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S45	276	700/22.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S46	300	320/138.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/11/10 14:20
S48	2	("5570002").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 15:40
S49	57	("4804916" | "5391976").PN. OR ("5570002").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:41
S50	22	empower and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:51
S51	15	("20020171980" | "20050127758" | "20050162020" | "20060164061" | "20060220465" | "5955797" | "5969438" | "6288522" | "6459175" | "6528970" | "6567565" | "6795302" | "6903950" | "7039821" | "7127623").PN. OR ("7868486").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:54
S52	76	(vehicle with airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 15:57
S53	5	("20060183381" | "5421734" | "6459604" | "6765365" | "7041400").PN. OR ("7701084").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:46
S54	9	("5347211" | "5510691" | "6091611" | "6604177" | "6908334" | "7081010" | "7091421").PN. OR ("7377805").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:49

S55	792	(vehicle automobile cigarette) same (plane airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4)	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:53
S56	735	(vehicle automobile cigarette) same (plane airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4) not (S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 16:53
S57	138	(vehicle automobile cigarette) same (airplane) and (tip adapter adaptor connector connecter) with (chang$4 interchang$4) not (S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 16:54
S58	56	("2914704" | "3048805" | "3049687" | "3111641" | "3978465" | "4257089" | "4307441" | "4442382" | "4622627" | "4734839" | "4747034" | "4885674" | "4890214" | "4912392" | "5019954" | "5146394" | "5177431" | "5177675" | "5184291" | "5295058" | "5309348" | "5345592" | "5347211" | "5479331" | "5510691" | "5559422" | "5589762" | "5636110" | "5672951" | "5717318" | "5739672" | "5739673" | "5770895" | "5773961" | "5838554" | "5861732" | "5886422" | "5949213" | "6064177" | "6091611" | "6172884" | "6194875" | "6201376" | "6670797" | "6678178" | "6703815" | "6836101" | "D339103" | "D359474" | "D375936" | "D391227").PN. OR ("7365524").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 16:58
S59	23	("20030085621" | "5200685" | "5510691" | "5532524" | "5570002" | "5602455" | "5606242" | "5721481" | "5783927" | "5977747" | "6005773" | "6054846" | "6191552" | "6198250" | "6268711" | "6459175" | "6667599" | "6693413" | "6765368" | "6831848" | "6836101").PN. OR ("7145312").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:01
S60	54	("0339103" | "0359474" | "0375936" | "0391227" | "3048805" | "3049687" | "3111641" | "4257089" | "4307441" | "4442382" | "4622627" | "4734839" | "4747034" | "4885674" | "4890214" | "4912392" | "5019954" | "5146394" | "5177675" | "5184291" | "5295058" | "5309348" | "5347211" | "5479331" | "5510691" | "5636110" | "5672951" | "5739672" | "5739673" | "5770895" | "5773961" | "5838554" | "5861732" | "5886422" | "5949213" | "6064177" | "6091611" | "6172884" | "6194875" | "6670797" | "6678178").PN. OR ("6836101").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:07
S61	1776	713/340.ccls.	US-PGPUB; USPAT; USOCR;	OR	OFF	2011/06/11 17:14

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S62	672	S61 and dc	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 17:15
S63	6	("20070138971" | "20080192513" | "5278771" | "5446647" | "6404348" | "7561388").PN. OR ("7937603").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:23
S64	6	("20070138971" | "20080192513" | "5278771" | "5446647" | "6404348" | "7561388").PN. OR ("7937603").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:24
S65	13	("20020171398" | "20030126474" | "20040017884" | "20040018774" | "5162721" | "5182546" | "5530879" | "5818669" | "6075340" | "6483204" | "6498460" | "6681336").PN. OR ("7581130").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:28
S66	9	("20030135769" | "20040005818" | "20040164721" | "6765543" | "6839853" | "7039821" | "7117377").PN. OR ("7392410").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/06/11 17:35
S67	2	("5279771").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 17:57
S68	2	("5278771").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 17:57
S69	5976	(713/300).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 17:58
S70	3587	(713/320).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 17:58
S71	41	(US-20050127758-$ or US-20070073420-$ or US-20060005055-$ or US-20020171980-$ or US-20060098358-$ or US-20060080051-$ or US-20050162020-$ or US-20100283330-$ or US-	US-PGPUB; USPAT; DERWENT	OR	OFF	2011/06/11 18:02

		20050024030-$).did. or (US-6903950-$ or US-6795302-$ or US-6567565-$ or US-6528970-$ or US-6288522-$ or US-5969438-$ or US-6459175-$ or US-6751109-$ or US-5955797-$ or US-7453171-$ or US-7127623-$ or US-5570002-$ or US-6835068-$ or US-7058484-$ or US-6358096-$ or US-7868486-$ or US-7365524-$ or US-7193398-$ or US-7145312-$ or US-7646107-$ or US-6836101-$ or US-6054846-$ or US-6707284-$).did. or (US-20050127758-$ or US-20040085793-$ or US-20040008462-$ or US-6567565-$ or US-6528970-$ or JP-2000324713-$ or JP-10301672-$ or BE-729852-$ or EP-1555733-$).did.				
S72	15	S71 and tip	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 18:02
S73	253	307/75.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 18:30
S74	777	307/130.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/06/11 18:30
S78	6	(("7999412") or ("7868486") or ("7453171")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/12 15:48
S79	15	("5111148" | "5160882" | "5283762" | "5387820" | "6665808").PN. OR ("7127623").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 16:22
S80	51	("7453171" | "6903950" | "20020171980" | "5969438" | "6054846" | "6751109" | "7145312" | "7392410" | "20050127758" | "6288522" | "6528970" | "7039821" | "7028202" | "6459175" | "6795302" | "6597565" | "20040075419" | "20060164061" | "20060220465" | "6628535" | "7937603" | "7999412" | "20050162020" | "5955797" | "7127623" | "7868486").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/12 16:39
S81	1	detach$3 near3 tip same power same data	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2012/07/12 17:12

			EPO; JPO; DERWENT; IBM_TDB			
S82	6	detach$4 near3 tip same power same data	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/12 17:13
S83	22	("5204991" | "5347211" | "5653906" | "5903117" | "6061261" | "6128602" | "6157139").PN. OR ("6628535").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 17:22
S84	12	("5347211" | "5901056" | "6628535" | "6903950" | "6937490" | "6972975").PN. OR ("7245515").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 17:24
S85	12	("5347211" | "5901056" | "6628535" | "6903950" | "6937490" | "6972975").PN. OR ("7245515").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 17:27
S86	253	363/146.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 17:28
S87	26	("20020001007" | "20020171694" | "20040001346" | "20040085030" | "20060087872" | "20060267411" | "20070047270" | "20070155191" | "20070216353" | "20070220286" | "20070300089" | "20080130340" | "4611289" | "5019767" | "5565714" | "5886428" | "5898569" | "5907197" | "6003139" | "6445086" | "6522032" | "6573621" | "6754092" | "7258572" | "7315097" | "7426126").PN. OR ("8198757").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 17:32
S88	134	interchang$4 same cable same (data with power)	US-PGPUB; USPAT; USOCR	OR	ON	2012/07/12 18:06
S89	429	detach$4 same cable same (data with power) not S88	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 18:15
S90	4817	detach$4 same (connector tip cable) and (charger adapter brick) and (lap$2top computer empower note$2book) not S88	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 18:18
S91	5416	(detach$4 interchang$4) same (connector tip cable) and (charger adapter brick) and (lap$2top computer empower note$2book) not S88	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 18:21
S92	468	S91 and ("713"/$.ccls. "307"/$.ccls. "700"/$.ccls. "363"/$.ccls.)	US-PGPUB; USPAT;	OR	ON	2012/07/12 18:21

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S93	903	307/151.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 19:49
S94	100	thomas with ianni	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 19:50
S95	88	S94 and adapter	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 19:50
S96	2	("0758933").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/12 19:53
S97	51	("7453171" | "6903950" | "20020171980" | "5969438" | "6054846" | "6751109" | "7145312" | "7392410" | "20050127758" | "6288522" | "6528970" | "7039821" | "7028202" | "6459175" | "6795302" | "6597565" | "20040075419" | "20060164061" | "20060220465" | "6628535" | "7937603" | "7999412" | "20050162020" | "5955797" | "7127623" | "7868486").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/12 20:09

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	577	(307/151).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2013/03/10 18:08
S47	1555	((307/80) or (307/151) or (700/22) or (320/138)).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/11/10 14:20
S75	1785	(713/340).CCLS.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/11 17:58
S76	7	"Term Removed"	USPAT	OR	OFF	2011/06/11 18:02
S77	210	307/75.ccls.	US-PGPUB; USPAT; UPAD	OR	OFF	2011/06/11 18:30
S98	481	307/151.ccls.	USPAT; UPAD	OR	ON	2012/07/12 19:49

3/ 10/ 2013 6:09:12 PM
H:\ East\ Workspaces\ 13707119.wsp

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

CPC		
Symbol	**Type**	**Version**

CPC Combination Sets				
Symbol	**Type**	**Set**	**Ranking**	**Version**

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	**SUBCLASS**	**CLAIMED**					**NON-CLAIMED**					
307	151	G	0	5	F	3 / 06 (2006.01.01)						
CROSS REFERENCE(S)												
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**											

NONE	**Total Claims Allowed:**	
(Assistant Examiner) (Date)	2	
/DANIEL CAVALLARI/ Primary Examiner.Art Unit 2836	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner) (Date)	1	8

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 2	
/DANIEL CAVALLARI/ Primary Examiner.Art Unit 2836 (Primary Examiner) (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 8

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	**Art Unit**
	DANIEL CAVALLARI	2836

☒ **Claims renumbered in the same order as presented by applicant** ☐ **CPA** ☐ **T.D.** ☐ **R.1.47**

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1														
	2														

NONE

(Assistant Examiner) (Date)

Total Claims Allowed:

2

/DANIEL CAVALLARI/
Primary Examiner.Art Unit 2836

(Primary Examiner) (Date)

O.G. Print Claim(s)	O.G. Print Figure
1	8

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13707119	LANNI ET AL.
	Examiner	Art Unit
	DANIEL CAVALLARI	2836

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	150, 151	3/10/2013	DJC

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search	3/10/2013	DJC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
307	151	3/10/2013	DJC

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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 3683

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/707,119	12/06/2012	307	2836	081088-0419555

APPLICANTS

THOMAS W. LANNI, Laguna Niguel, CA;
Comarco Wireless Technologies, Inc., Lake Forest, CA

**** CONTINUING DATA ***************************

This application is a CON of 13/209,636 08/15/2011 PAT 8,330,303 *
which is a CON of 12/840,952 07/21/2010 PAT 7,999,412
which is a CON of 11/604,950 11/28/2006 PAT 7,868,486
which is a CIP of 10/758,933 01/15/2004 PAT 7,453,171
(*)Data provided by applicant is not consistent with PTO records.

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

01/04/2013

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /DANIEL J CAVALLARI/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	14	2	1

ADDRESS

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102
UNITED STATES

TITLE

POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

FILING FEE RECEIVED		
1260	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

To: Docket_IP@pillsburylaw.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 27496

Mar 18, 2013 05:35:22 AM

Dear PAIR Customer:

PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 27496 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
13707119	NOA	03/18/2013	081088-0419555
	892	03/18/2013	081088-0419555

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/707,119	12/06/2012	THOMAS W. LANNI	081088-0419555

CONFIRMATION NO. 3683

27496
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

POA ACCEPTANCE LETTER

Date Mailed: 01/10/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/06/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/llvuong/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/707,119	12/06/2012	2838	1260	081088-0419555	2	1

CONFIRMATION NO. 3683

27496
PILLSBURY WINTHROP SHAW PITTMAN LLP (LA)
P.O BOX 10500
McLean, VA 22102

FILING RECEIPT

OC000000058478781

Date Mailed: 01/10/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

THOMAS W. LANNI, Laguna Niguel, CA;

Applicant(s)

Comarco Wireless Technologies, Inc., Lake Forest, CA

Assignment For Published Patent Application

COMARCO WIRELESS TECHNOLOGIES, INC., Lake Forest, CA

Power of Attorney: The patent practitioners associated with Customer Number 27496

Domestic Priority data as claimed by applicant

This application is a CON of 13/209,636 08/15/2011 PAT 8330303 *
which is a CON of 12/840,952 07/21/2010 PAT 7999412
which is a CON of 11/604,950 11/28/2006 PAT 7868486
which is a CIP of 10/758,933 01/15/2004 PAT 7453171
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 01/04/2013
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/707,119**
Projected Publication Date: 04/18/2013
Non-Publication Request: No

Early Publication Request: No
Title

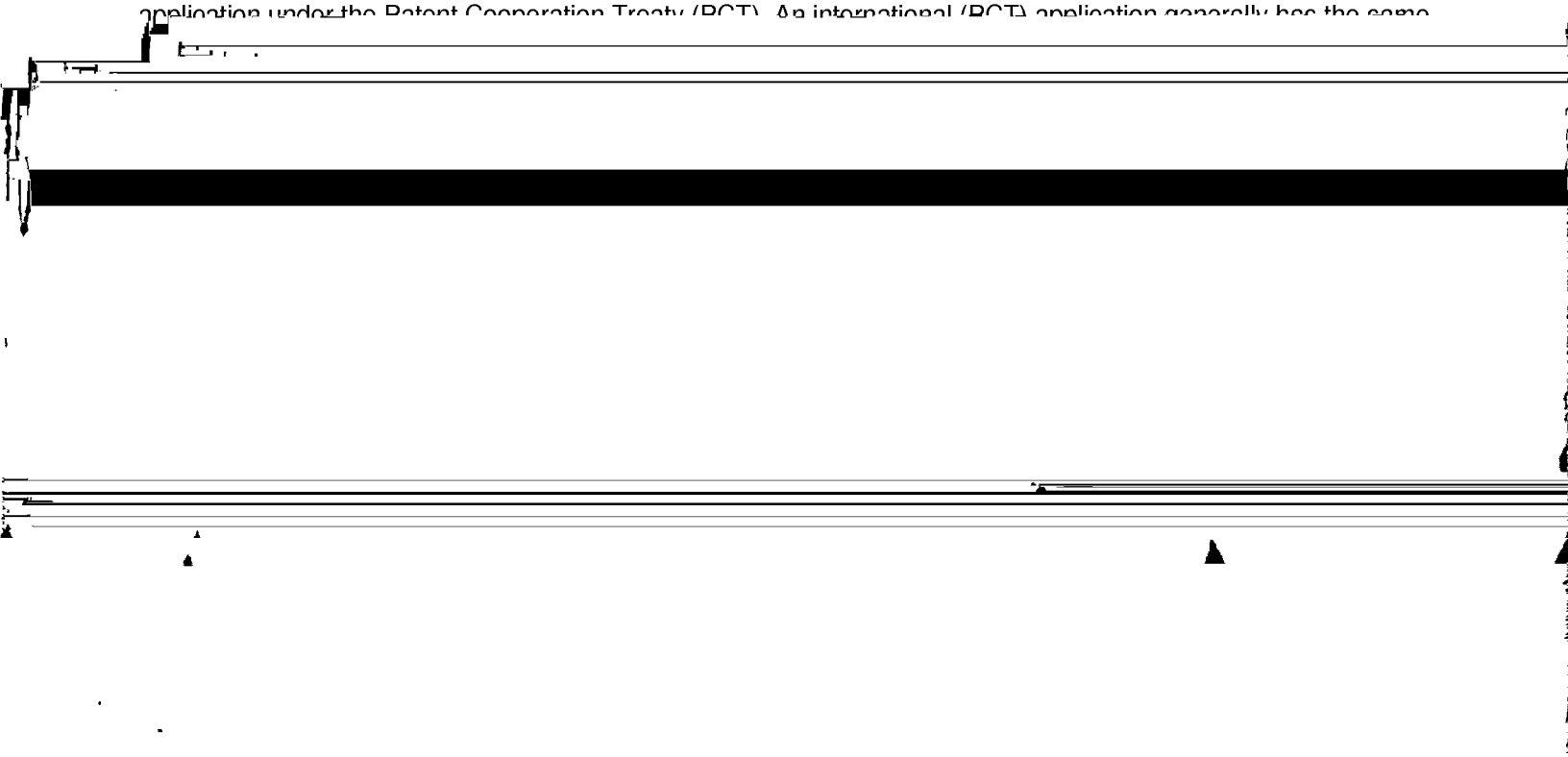
POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

Preliminary Class

363

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same



effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/707,119

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	390
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	620
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	250
TOTAL CLAIMS (37 CFR 1.16(i))	2 minus 20 =	*			OR	x 62 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 250 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1260

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		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 found in the appropriate box in column 1.

To: Docket_IP@pillsburylaw.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 27496

Jan 10, 2013 05:21:26 AM

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McLean, VA 22102
UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
13707119	N570	01/10/2013	081088-0419555
	APP.FILE.REC	01/10/2013	081088-0419555

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____

filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: THOMAS W. LANNI Date (Optional): December 6, 2012

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 27496

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☐ The address associated with Customer Number:

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: COMARCO WIRELESS TECHNOLOGIES, INC.
25541 Commercentre Drive
Lake Forest, CA 92630-8870

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	T.L.L	Date	December 6, 2012
Name	Thomas W. Lanni	Telephone	949-599-7460
Title	President and CEO, Comarco Wireless Technologies, Inc.		

For: U.S. Rights and Foreign Rights
For: U.S. Application
By: Inventor

ASSIGNMENT OF INVENTION

In consideration of the payment by ASSIGNEE to ASSIGNOR of the sum of Ten Dollars ($10.00), the receipt of which is hereby acknowledged, and for other good and valuable consideration,

ASSIGNOR:

THOMAS W. LANNI
24071 Pinehurst Lane
Laguna Niguel, CA 92677-2475

Nationality: United States

hereby sells, assigns and transfers to

ASSIGNEE:

COMARCO WIRELESS TECHNOLOGIES, INC.
25541 Commercentre Drive
Lake Forest, CA 92630-8870

Nationality: Delaware

and the successors, assigns and legal representatives of the ASSIGNEE the entire right, title and interest for the United States and its territorial possessions and in all foreign countries, including all rights to claim priority, in and to any and all improvements which are disclosed in the invention entitled:

POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

and which is found in (37 C.F.R. § 3.21) U.S. patent application executed on even date herewith naming the above inventors for the above-entitled invention and any legal equivalent thereof in a foreign country, including the right to claim priority and, in and to, all Letters Patent to be obtained for said invention by the above application or any continuation, division, renewal, or substitute thereof, and as to letters patent any reissue or re-examination thereof.

ASSIGNOR hereby covenants that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

ASSIGNOR further covenants that ASSIGNEE will, upon request, be provided promptly with all pertinent facts and documents relating to said invention and said Letters Patent and legal equivalents as may be known and accessible to ASSIGNORS and will testify as to the same in any interference, litigation or proceeding related thereto and will promptly execute and deliver to ASSIGNEE or legal representatives any and all papers, instruments or affidavits required to apply for, obtain, maintain, issue and enforce said application, said invention and said Letters Patent and said equivalents thereof which may be necessary or desirable to carry out the purposes thereof.

Date: December 6, 2012

Signature of THOMAS W. LANNI

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Filer:	Roger R. Wise/Margaret Garcia
Attorney Docket Number:	081088-0419555

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	390	390
Utility Search Fee	1111	1	620	620
Utility Examination Fee	1311	1	250	250
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1260**

Electronic Acknowledgement Receipt

EFS ID:	14404170
Application Number:	13707119
International Application Number:	
Confirmation Number:	3683
Title of Invention:	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE
First Named Inventor/Applicant Name:	THOMAS W. LANNI
Customer Number:	27496
Filer:	Roger R. Wise/Margaret Garcia
Filer Authorized By:	Roger R. Wise
Attorney Docket Number:	081088-0419555
Receipt Date:	06-DEC-2012
Filing Date:	
Time Stamp:	16:42:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1260
RAM confirmation Number	3900
Deposit Account	033975
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 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ApplicationDataSheet.pdf	212671 afc0b4657c85c1a656ad7e3457b7af5899b8ee31	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
2		Specification.pdf	352176 a5d4fd66d15b8a67e38887dc95d814867427c0f8	yes	21

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Specification	1	19
Claims	20	20
Abstract	21	21

Warnings:					
Information:					
3	Drawings-only black and white line drawings	Drawings.pdf	151164 d7787352168ea770e714704a1b212b6592554d39	no	14
Warnings:					
Information:					
4	Oath or Declaration filed	Declaration.pdf	69235 1a712e27138a5b6baa23911aa6012d21d8abe75d	no	1
Warnings:					
Information:					
5	Power of Attorney	PowerOfAttorney.pdf	128810 8d7a1995bf2b9d478da70d6af039f03890fd552d	no	3
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	33391 0fd71e7eea8084376d87d7cc5dfb2f1f70e9ebe3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	947467		

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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.

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PTO/AIA/14 (08-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	081088-0419555
	Application Number	
Title of Invention	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

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Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
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Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

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Application Information:

Title of the Invention	POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE		
Attorney Docket Number	081088-0419555	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	14	Suggested Figure for Publication (if any)	

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Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	27496		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13209636	2011-08-15

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13209636	Continuation of	12840952	2010-07-21	7999412	2011-08-16

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12840952	Continuation of	11604950	2006-11-28	7868486	2011-01-11

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
11604950	Continuation in part of	10758933	2004-01-15	7453171	2008-11-18

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	081088-0419555
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Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

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Application Number	Country[1]	Filing Date (YYYY-MM-DD)	Priority Claimed
			○ Yes ◉ No

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Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

○ Assignee	○ Legal Representative under 35 U.S.C. 117
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :	
If the Assignee is an Organization check here. ☒	
Organization Name	COMARCO WIRELESS TECHNOLOGIES, INC.

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Additional Applicant Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	Roger R. Wise			Date (YYYY-MM-DD)	2012-12-06
First Name	Roger R.	Last Name	Wise	Registration Number	31204

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PTO/AIA/14 (08-12)
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This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

APPLICATION FOR
UNITED STATES PATENT
IN THE NAME OF

THOMAS W. LANNI

FOR

POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

Prepared By:

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Attorney Docket No.: 081088-0419555

TITLE OF THE INVENTION

POWER SUPPLY EQUIPMENT PROVIDING A DATA SIGNAL, IDENTIFICATION INFORMATION AND POWER TO AN ELECTRONIC DEVICE

RELATED APPLICATIONS

This application is a continuation of application serial no 13/209,636, filed on August 15, 2011, now U.S. Patent No. 8,330,303 issued on December 11, 2012, which is a continuation of application serial no. 12/840,952, filed on July 21, 2010, now U.S. Patent No. 7,999,412 issued on August 16, 2011, which is a continuation of application serial no. 11/604,950, filed on November 28, 2006, now U.S. Patent No. 7,868,486 issued on January 11, 2011, which is a continuation-in-part of application serial no. 10/758,933, filed on January 15, 2004, now U.S. Patent No. 7,453,171 issued on November 18, 2008.

BACKGROUND OF THE INVENTION

1. Technical Field

This invention relates to power supply equipment which includes an adapter and interchangeable tips. Via the tips, the power adapter is able to provide a data signal, as well as power, to various electronic devices.

2. Description of the Related Arts

There are power systems in the art which allow a user to hook up a DC/DC adapter to an automobile outlet, to supply regulated DC power to power an electronic device, such as a notebook computer. Automobile outlets typically provide a DC voltage in a range between 11.0 and 14.1 Volts. Some power systems also allow the user to hook up the DC/DC adapter to an

airplane output such as the EMPOWER system. EMPOWER typically provides a DC voltage in a range between 14.5 and 15.5 Volts.

Accordingly, some DC/DC adapters can be used with both an automobile outlet and the EMPOWER system to provide a regulated DC power to the electronic device such as the notebook computer. Notebook computers often contain lithium ion batteries. Such batteries can be recharged when the notebook computer is hooked up to the DC/DC adapter. For example, if the user is in a car, the user can couple a DC/DC adapter to the notebook computer and to the cigarette lighter outlet to power the notebook computer. The batteries in the notebook computer will draw some of the DC power supplied to recharge the batteries of the notebook computer if they are low in power. Accordingly, the user can simultaneously use the notebook computer and recharge the batteries therein.

The user can also use the DC/DC adapter while on an airplane, by plugging the DC/DC adapter into the EMPOWER outlet. The EMPOWER outlet and the automobile outlets have different sizes and shapes. Accordingly, the user can directly plug the DC/DC adapter into the EMPOWER outlet, and can place a connector over the EMPOWER plug of the DC/DC adapter and then plug the connector into the automobile cigarette lighter outlet. When the user hooks the DC/DC adapter up to the EMPOWER outlet and then to the electronic device, the electronic device receives the regulated DC power. However, if the charging circuitry in the battery malfunctions, the battery can overheat or even catch on fire when recharging from an EMPOWER DC source. If the battery were to catch on fire while an airplane in which the emPlower outlet is located is flying, the fire would have the potential to cause the airplane to crash or cause substantial damage.

To address this problem, one system in the art provides a connector to connect between the DC/DC adapter and the notebook computer to inform the notebook computer not to recharge the batteries. FIG. 1 illustrates a power supply system according to the prior art. As shown, a DC power source 100 is coupled to a DC/DC adapter 105 via a cable 102. The DC/DC adapter 105 receives power from the DC power source 100 and outputs regulated DC power to an electronic device 120, via a cable 110 and a connector 115 coupled to the end of the cable 110.

The DC/DC adapter 105 can provide three output pins to the electronic device 120, as shown in FIGS. 2A and 2B of the prior art. The first pin can provide the output voltage (i.e., V_{out}), the second pin can provide a ground reference (i.e., GND), and the third pin can provide a data line (i.e., V_{data}) to instruct the notebook as to whether the batteries should be recharged or not. For example, as shown in FIG. 2A, V_{data} could be tied to GND to indicate that the DC power source 100 is the EMPOWER system and therefore the battery should not be recharged. Alternatively, as shown in FIG. 2B, V_{data} could also be left open (i.e., to provide a non-grounded floating voltage) when the DC power source 100 in a cigarette lighter outlet of an automobile. Accordingly, when using the DC/DC adapter 105 while in an automobile, the user would use a connector 115 having the V_{data} line floating, and when using the DC/DC adapter 105 with the EMPOWER system of an airplane, the user would use a connector 115 having the V_{data} line tied to GND.

However, problems arise when the user forgets to change the connector 115 for use with the automobile when the user is in an airplane. Accordingly, if the user has the wrong connector 115 attached when using with the EMPOWER system, a battery of an electronic device 120 such as a notebook computer can charge the battery even when used with the EMPOWER system, and if the charging circuitry of the battery malfunctions, overheating or even a fire can occur,

resulting in damage to the notebook computer. Also, if the connector 115 is damaged or flawed, then it may not provide the correct V_{data} signal to the notebook computer, allowing the notebook computer to recharge the batteries in an airplane when they shouldn't be allowed to do so.

Accordingly, current DC/DC power adapter systems are deficient because they are incapable of automatically and intelligently informing an electronic device 120 coupled thereto of the DC power source (i.e., the EMPOWER system or an automobile cigarette lighter outlet).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a power supply system according to the prior art;

FIG. 2A illustrates a first connector to coupled a power supply system to an electronic device according to the prior art;

FIG. 2B illustrates a second connector to coupled a power supply system to an electronic device according to the prior art;

FIG. 3 illustrates a power supply system according to an embodiment of the invention;

FIG. 4A illustrates a tip having digital control circuitry according to an embodiment of the invention;

FIG. 4B illustrates a tip having analog control circuitry according to an embodiment of the invention;

FIG. 5A illustrates comparison circuitry according to an embodiment of the invention;

FIG. 5B illustrates comparison circuitry according to an additional embodiment of the invention;

FIG. 6 illustrates an electronic device according to an embodiment of the invention;

FIG. 7A illustrates a method of determining and outputting V_{data} according to an embodiment of the invention;

FIG. 7B illustrates a method of receiving V_{data} and allowing power to flow to devices within the electronic device based on V_{data} according to an embodiment of the invention;

FIG. 8 illustrates a power supply system according to an embodiment of the invention;

FIGS. 9A and 9B illustrate a tip including control circuitry according to embodiments of the invention;

FIG. 10 illustrates a tip including control circuitry and a measurement circuit according to an embodiment of the invention; and

FIG. 11 illustrates a power supply system including a tip according to an embodiment of the invention.

DETAILED DESCRIPTION

An embodiment of the present invention is directed to a power supply system to determine a DC power source (e.g., an automobile cigarette lighter outlet or an EMPOWER airplane outlet) coupled thereto and send a signal indicative of the power source to an electronic device coupled thereto. The electronic device may be a notebook computer or other portable consumer electronic device, for example. Based on the signal sent to the electronic device, the electronic device may control the amount of power drawn to prevent overheating. For example, when a notebook computer is hooked up and the power source is the EMPOWER system, the electronic device may disable charging of the internal batteries of the notebook computer, in order to prevent damage or overheating of the batteries due to malfunction or failure. The DC power source may be determined by voltage comparison circuitry, such as a comparator, or by a voltage comparison device including a processor.

FIG. 3 illustrates a power supply system 301 according to an embodiment of the invention. As shown, the adapter 340 may be used with an AC power source 300 or a DC power source 305. In other embodiments, only a DC power source 305 may be utilized to supply power. The AC power source 300 may be coupled to an AC/DC adapter 310 via a cable 342. The DC power source 305 may be coupled to both a DC/DC adapter 315 and comparison circuitry 320 via a cable 345. The DC power source 305 may be an automobile's cigarette lighter outlet or an airplane's EMPOWER system outlet, for example. AC/DC adapter 310 may convert AC power from the AC power source 300 into regulated DC power, which is supplied to post-regulation circuitry 325. The post-regulation circuitry 325 may provide an output voltage (V_{out}) and a ground reference (GND) to a tip 330 coupled to the adapter 340 via a cable 350, as further explained below with respect to FIGS. 4A and 4B. The tip 330 may be coupled to an electronic device 335 to provide the power thereto from the power supply system 301. The tip 330 may be removable from the cable 350 and may be inserted into a power input opening of the electronic device. Tips 330 may have different shapes and sizes, depending up the shape and sizes of the power input openings of the respective electronic devices 335 being powered. The tip 330 may also include control circuitry 365 to provide a signal to control circuitry 370 of the adapter 340. The signal may be sent to the control circuitry 370 via the cable 350. In one embodiment, the control circuitry 365 of the tip 330 may include digital components to provide a digital signal to the control circuitry 370 of the adapter 340. The digital signal may be utilized to set the magnitude of V_{out} and limit the amount of current which may be drawn from the adapter 340. The post-regulation circuitry 325 regulates the voltage to what the tip 330 tells it to provide.

Alternatively, the tip 330 may include analog components and may provide voltage programming and current programming voltages ($V_{Vprogram}$ and $V_{Iprogram}$, respectively) to the adapter 340. $V_{Vprogram}$ may be utilized to set the magnitude of V_{out}. For example, there may be a linear relationship between $V_{Vprogram}$ and V_{out} where V_{out} is 3 times as large as $V_{Vprogram}$. Accordingly, if $V_{Vprogram}$ had a magnitude of 3.0 Volts, V_{out} would have a magnitude of 9.0 Volts, and if $V_{Vprogram}$ had a magnitude of 2.0 Volts, V_{out} would have a magnitude of 6.0 Volts. The analog circuitry may contain passive or active components.

Accordingly, regardless of whether the tip 330 has analog or digital control circuitry, a single adapter 340 may be used to supply power to a plurality of different electronic devices 335 having different power requirements.

The adapter 340 may also include comparison circuitry 320. The comparison circuitry 320 may compare a magnitude of a voltage received from the DC power source 305 with a reference voltage to determine whether the DC power source 305 is an automobile cigarette lighter outlet or an EMPOWER airplane outlet. As stated above, automobile cigarette lighter outlets typically provide a DC voltage having a magnitude within the range of 11.0 Volts and 14.1 Volts. An EMPOWER airplane outlet typically provides a DC voltage having a magnitude within the range of 14.5 and 15.5 Volts. Accordingly, the reference voltage may be set at a level between the high end of the automobile cigarette light outlet voltage (i.e., 14.1 Volts) and the low end of the EMPOWER airplane outlet voltage (i.e., 14.5 Volts). For example, the reference voltage may be set at 14.3 Volts. Accordingly, if the magnitude of the DC power source is greater than 14.3 Volts, then the comparison voltage may determine that the received DC voltage has a greater magnitude than the reference voltage and the DC power source 305 is therefore the EMPOWER airplane outlet. However, if the magnitude of the DC power source is less than 14.3

Volts, then the comparison voltage may determine that the received DC voltage has a smaller magnitude than the reference voltage and the DC power source 305 is therefore the automobile cigarette lighter outlet.

The comparison circuitry 320 may output a signal V_{data} based upon whether the DC power source is determined to be the automobile cigarette lighter outlet or the EMPOWER airplane outlet. For example, the comparison may output 5 Volts if the automobile cigarette lighter outlet is detected, and 0.0 Volts if the EMPOWER airplane outlet is detected. In alternative embodiments, different voltages for V_{data} may be used. In additional embodiments, the comparison circuitry 320 may output a digital signal, such as a stream of bits, indicative of the DC power source 305. V_{data} may be sent via cable 350 to the tip 330, and straight over to the electronic device 335. The electronic device 335 may include a controller 360 which is responsive to V_{data}. For example, if the electronic device 335 is a notebook computer and V_{data} is indicative of the EMPOWER airplane outlet system, the controller 360 may disable battery charging circuitry 600, thereby preventing recharging of the batteries. And if the V_{data} is indicative of the automobile cigarette lighter outlet as the DC power source 305, the controller 360 may enable battery charging circuitry to allow the batteries to be recharged.

Although FIG. 3 illustrates an adapter 340 which includes both a AC/DC adapter and a DC/DC adapter, other embodiments may include only a DC/DC adapter, and no AC/DC adapter.

FIG. 4A illustrates a tip 400 having digital control circuitry 402 according to an embodiment of the invention. As shown, the tip 400 receives V_{data}, V_{out} and GND from the adapter 340 and allows them to all flow to the electronic device 335. The digital control circuitry 402 may receive the V_{out} and GND signals and may output a control signal to the adapter 340 to

set the magnitude of V_{out} and limit the current provided. The control signal may be sent to the adapter 340 via the cable 350 between the tip 400 and the adapter 340. The digital control circuitry 402 may include a processor and a memory device, for example. In some embodiments, the tip 400 may be separable from cable 350, and in other embodiments, the tip 400 may be physically part of the cable 350.

FIG. 4B illustrates a tip 405 having analog control circuitry 410 according to an embodiment of the invention. As shown, the tip 405 receives V_{data}, V_{out} and GND from the adapter 340 and allows them to all flow to the electronic device 335. The analog control circuitry 410 may receive the V_{out} and GND signals and may output $V_{Vprogram}$ and $V_{Iprogram}$ to the adapter 340. $V_{Vprogram}$ and $V_{Iprogram}$ may be sent to the adapter 340 via the cable 350 between the tip 405 and the adapter 340. The analog control circuitry 400 may include passive or active components, for example. In some embodiments, the tip 400 may be separable from cable 350, and in other embodiments, the tip 400 may be physically part of the cable 350.

FIG. 5A illustrates comparison circuitry 320 according to an embodiment of the invention. As shown, the comparison circuitry 320 includes a comparator 500. The comparator 500 receives (a) the DC power signal from the DC power source 305, and (b) a reference voltage, V_{ref}. The comparator outputs V_{data} based on whether the magnitude of the DC power from the DC power source exceeds V_{ref}, as described above with respect to FIG. 3.

FIG. 5B illustrates comparison circuitry 320 according to an additional embodiment of the invention. As shown, the comparison circuitry 320 includes a processor 505. The processor 505 receives (a) the DC power signal from the DC power source 305, and (b) value of a reference voltage stored in memory. The processor 505 then outputs V_{data} based on whether the

magnitude of the DC power from the DC power source exceeds V_{ref}, as described above with respect to FIG. 3. The processor 505 may output a single high or low voltage (e.g., 5.0 Volts or 0.0 Volts) based on the detected DC power source. Alternatively, the processor 505 may output a stream of bits to indicate the DC power source.

FIG. 6 illustrates an electronic device 335 according to an embodiment of the invention. As shown, the electronic device 335 may receive GND, V_{out} and V_{data} from the tip 330. V_{data} may be received by a controller 360. The controller 360 may disable battery charging circuitry 600 of the electronic device 335 from charging batteries when V_{data} is indicative of the EMPOWER outlet. Alternatively, the controller 360 enables battery charging circuitry 600 so that the batteries of the electronic device may be charged based on the value of V_{data}.

FIG. 7A illustrates a method of determining and outputting V_{data} according to an embodiment of the invention. The processing shown in FIG. 7A may be implemented by the adapter 340. First, DC power is received 700 from the DC power source 305. Next, the comparison circuitry determines 705 whether the magnitude of the voltage of the DC power received is greater than V_{ref}. If "no," the comparison circuitry determines the DC power source 305 to be an automobile cigarette lighter outlet, and processing proceeds to operation 710, where V_{data} is output with a signal/voltage magnitude indicating that the DC power source 305 is the automobile cigarette lighter outlet. Processing then returns to operation 700. If "yes," at operation 705, processing proceeds to operation 715, where V_{data} is output with a signal/voltage magnitude indicating that the DC power source 305 is the EMPOWER airplane outlet.

FIG. 7B illustrates a method of receiving V_{data} and allowing power to flow to devices within the electronic device 335 based on V_{data} according to an embodiment of the invention.

First, the electronic device 335 receives 720 the V_{data} signal. As discussed above, the V_{data} signal is sent from the adapter 340 through the tip 330 and over to the control circuitry 365 of the electronic device 335. Next, based on the V_{data} signal, a first set of predetermined devices may be prevented 725 from receiving power. For example, if the electronic device 335 is a notebook computer, the control circuitry 365 may prevent batteries from recharging if V_{data} indicates that the DC power source is the EMPOWER airplane outlet. Other devices/components in the electronic device 335 may also be prevented from receiving power or from functioning in a certain way.

At operation 730, a second set of predetermined devices may be allowed to receive power based on the Vdata signal. For example, if V_{data} indicates that the DC power source is an automobile cigarette lighter outlet, then power may be available to batteries of the electronic device 335 to allow recharging. Other devices/components in the electronic device 335 may also be allowed to receive power or function in a particular way.

In embodiments described above, the V_{data} signal may be used to send a signal to the control circuitry 365 indicating the DC power source. This signaling may be done via a discrete bit, an analog signal, a data signal line, an analog voltage, or via any other suitable manner. The V_{data} signal may be transmitted from the adapter 340 to the tip 330 and electronic device 335 via a single signaling line or multiple signaling lines.

FIG. 8 illustrates a power supply system 800 according to an embodiment of the invention. The power supply system 800 is similar to the power supply system 301 shown in FIG. 3. However, unlike the power supply system 301, in which the adapter 340 itself contains comparison circuitry 370, the adapter 340 of power supply system 800 does not contain the

comparison circuitry 805. Instead, a regular adapter 340 may be used and the electronic device 335 itself includes the comparison circuitry 805 for determining the DC power source. The electronic device 335 may be a notebook computer and may implement the methods shown in FIGS. 7A and 7B.

Fig. 9A illustrates a tip according to an embodiment of the present invention. The tip 900 includes control circuitry 902 and a controller 950. The tip 900 is coupled to an adapter 940 and may have a cable disposed between the adapter 940 and the tip 900. The adapter 940 transmits V_{out} and GND to the tip 900. In an embodiment of the invention, digital or analog control circuitry 902 transmits a programming signal or a control signal to the adapter 940. In an embodiment of the invention, digital or analog control circuitry 902 may transmit a plurality of programming signals to the adapter. Illustratively, digital or analog control circuitry 902 may transmit a voltage control signal to regulate the voltage output (Vout) from the adapter 940. The digital or analog control circuitry 902 may also transmit a current control signal to limit the current output from the adapter 940. The V_{out} and GND signals are passed through the adapter 940 to the electronic device 935, such as a laptop, PDA, or cellular phone, to provide power to the electronic device.

In an embodiment of the invention, the tip 900 may also receive a value, which is illustrated by reference numeral 980 in Fig. 9A. The value may be representative of whether or not the power adapter is an approved adapter which can be connected to an electronic device 935. For example, for safety reasons, certain digital music player or laptop manufactures only desire to have certain manufacturers' power adapter connected to their system. Accordingly, the power adapter may transmit a value that indicates that the power adapter 940 is approved for powering the electronic device. Alternatively, the value may be representative of a maximum

power output that is available at the time from the power adapter. For example, the value may represent that only 70 watts of power are available from the power adapter because the power adapter has been limited to that output power. Instead of receiving a value from the power adapter, the tip 900 may receive a character string. The character string may identify whether or not the power adapter is an approved adapter for powering the electronic device 935. The value or the character string may be received at input connector 985 of the tip 900. The input connector 985 may receive the value or character string and may pass through this signal or information to the output connector 990. Under certain operating conditions, there may be no modification of the value or character string in the tip 900. The output connector 990 is coupled to the electronic device 935 and passes the value or character string to the electronic device. A conductor 995 may couple the input connector 985 to the output connector 990.

Fig. 9B illustrates an alternative embodiment of a tip according to an embodiment of the invention. In an embodiment of the invention, the tip 900 may include a controller 950, wherein the controller 950 includes a receiver 952, a memory 954, and a transmitter 956. In an alternative embodiment of the invention, a programmable Dallas Semiconductor programmable memory (i.e., DS2502) may be substituted for a controller and may include the receiver 952, memory 954, and transmitter 956. The receiver 952 may receive a signal from the electronic device 935. The signal may be a request from the electronic device 935 to interrogate the tip 900 and identify whether or not an approved power adapter 940 is coupled to the tip 900 and thus the electronic device 935. Once the controller 950 receivers the request from the electronic device 935, the controller 950 extracts a character string from the memory 954 and utilizes the transmitter 956 to transmit the character string to the electronic device 935. The character string is representative of the power adapter to which the tip 900 is coupled. In an embodiment of the

invention, a microcontroller may be programmed and could be utilized in place of the transmitter 956, a receiver 952 , and a memory 954. The character string may represent that the power adapter 940 and/or tip 900 is approved to be connected to the electronic device, e.g.. a laptop or a cellular phone. Under certain operating conditions, the character string represents that a rechargeable battery within the electronic device can be charged by the power adapter 940 and tip 900 combination. Under certain operating conditions, the character string is indicative of a maximum power available from the power adapter. Under certain operating conditions, a value can be stored in the memory 954 where the value is indicative for the maximum power available from the power adapter. Illustratively, the value may be a power (or wattage) value or a current value.

The transmitter 956 may communicate with the electronic device 935 via a one-wire interface. The transmitter 956 may communicate with the electronic device 935 via other communication protocols, including serial communication protocols.

Fig. 10 illustrates a second embodiment of a tip according to an embodiment of the invention. The tip 900 may include an analog or digital control circuitry 910, a controller 950, and measurement circuit 960 (e.g., a voltage sense circuit or a current sense circuit). The measurement circuit 960 may measure a magnitude level of a programming or control signal e.g., ($V_{Iprogram}$), that is being transmitted to the power adapter 940. In an embodiment of the invention, the programming or control signal has a value representative of a maximum current available to be output by the adapter 940. For example, a voltage magnitude of the programming or control signal identifies a value of current (e.g., in amperes) that the power adapter is available to output. Illustratively, each 0.5 volts in the programming or control signal may represent one amp of current that the power adapter can output. A programming or control signal having a

magnitude of 2.5 volts represents that the power adapter is limited to output 5 amperes and the power output is limited to 100 watts (if the fixed voltage output is 20 volts). The measurement circuit 960 may be implemented using a comparator or a number of comparators that compare a voltage level of the control signal to a reference voltage level or a number of reference voltages.

In an alternative embodiment of the invention, the measurement circuit 960 may be implemented by an analog-to-digital converter. The analog-to-digital converter may measure a value of the control signal or the programming signal and identify the value which is representative of the power available to be output from the power adapter. In an embodiment of the invention, the analog-to-digital converter may be used in conjunction with a microcontroller. The analog-to-digital converter may be separate from the microcontroller or the analog-to-digital converter may be incorporated into the microcontroller.

The measurement circuit 960 takes the measured magnitude level of the programming or control signal and sends the information to the controller 950. A memory 954 may store a plurality of character strings. Alternatively, the memory 954 may store a plurality of values. Each of the plurality of character strings or values may represent a potential power output level of the power adapter 940. For example, one character string may be represent that the power adapter can output 90 watts while another character string represents that the power adapter can output 140 watts. The controller 950 receives the magnitude level of the programming / control signal from the measurement circuit 960 and selects the corresponding character string stored in the memory 954. Alternatively, the controller receives the magnitude level of the programming or control signal and selects the corresponding value stored in the memory 954.

After the corresponding character string or value is selected, the corresponding character string is transmitted to the electronic device 935 through the transmitter 956. The electronic device receives the character string and acts in response to the received character string or value. For example, the character string may indicate that the power adapter coupled to the tip (which is connected to the electronic device) can output 75 watts. Based on this information, a controller in an electronic device 935 (e.g., a laptop) may prevent the power adapter from charging the rechargeable battery within the electronic device 935 because the electronic device 935 may require all of the 75 watts of power.

The controller 950 may be a microcontroller. The controller 950 including the receiver 952, transmitter 956, and memory 954 may be a semiconductor memory chip such as a Dallas Semiconductor DS2502 programmable memory. The receiver 952 and transmitter 956 may communicate with the electronic device via a number of protocols, e.g., the one-wire interface communication protocols, a serial interface communication protocol, etc.

Fig. 11 illustrates an alternative embodiment of a power supply system utilizing DC power source comparison circuitry according to an embodiment of the present invention. Fig. 11 is similar to the power supply system illustrated in Fig. 3 and also includes a microcontroller 950 in the tip 330. In Fig. 11, the microcontroller 950 receives a signal from the power adapter 340 in addition to the V_{out} signal and ground signal. The power source determination signal may be referred to as a V_{data} signal and may be generated by the comparison circuitry 320 in the adapter. The power source determination signal may identify a power capability of the external power source is an external automobile DC power source, an external AC power source, or an external airplane DC power source. For example, the power source determination signal may identify that the power adapter is connected to an external airplane DC power source and is limited to a

number of watts of output, e.g., 50 or 60 watts of power. Alternatively, the power source determination signal may identify that the power adapter is connected to an external automobile power source, e.g., 90 watts or 100 watts.

The microcontroller 950 may receive the power source determination signal. Based on the received power source determination signal, the microcontroller 950 may extract a character string corresponding to the received power source determination signal from a memory. The memory 954 (see Figs. 9A, 9B, and 10) , as noted before, may store a number of character strings. Alternatively, the memory 954 may store a number of values and the microcontroller 950 may select one of the number of values. Although Fig. 11 does not illustrate that the microcontroller includes the memory 954, receiver 952, and transmitter 956, the microcontroller 950 may incorporate these components. Alternatively, the memory 954, receiver 952, and transmitter 956 may be located in devices outside of the controller 950 (e.g., not incorporated therein). The number of character strings or values may each represent a different power capability of the power adapters which can be coupled to the tip via a cable. Illustratively, one character string or value may represent a 90 watt power adapter, one character string may represent a 130 watt power adapter, one character string may represent a 70 watt power adapter, and one character string may represent that the power adapter has a limited power supply capability, e.g., less than 70 watts.

In an embodiment of the invention, no character string or value may be transmitted if the power adapter cannot generate a certain wattage of power. This may represent that the power adapter and tip cannot be utilized to charge the battery of the electronic device. The microcontroller 950 may transmit the selected character string to the electronic device. A controller 360 in the electronic device may receive the selected character string and may perform

a plurality of actions based on the selected character string. For example, if the selected character string identifies that the power adapter has a limited power capability, e.g., less than 50 watts or 70 watts, the controller 360 may place the electronic device in a mode of low power consumptions, e.g., turning off display earlier or not allowing charging of the battery in the electronic device. Under other operating conditions, the character string or value may identify that an AC adapter is the external power source and can provide 130 Watts, and the controller 360 may allow the battery in the electronic device to be charged by the power adapter and place the electronic device in a high power consumption mode, e.g., brightness of screen and hard drive.

Under certain operating conditions, rather than a character string, the microcontroller 950 may have a number of current levels that represent different power capabilities of adapters. Illustratively, in other words, a first current level may represent that the power adapter 340 can supply 130 watts, a second current level may represent that the power adapter 340 can supply 90 watts, a third current level represents that the power adapter 340 can supply 70 watts, and a fourth current level may represent the power adapter 340 supplies less that 70 watts.

While the description above refers to particular embodiments of the present invention, it will be understood that many modifications may be made without departing from the spirit thereof. The accompanying claims are intended to cover such modifications as would fall within the true scope and spirit of the present invention. The presently disclosed 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 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.

WHAT IS CLAIMED IS:

1. Power supply equipment comprising:

an adapter to convert power from a power source, external to the adapter, to DC power for powering an electronic device, the adapter including circuitry for producing an analog data signal for use by the electronic device to control an amount of power drawn by the electronic device; and

a cable having proximal and distal ends, the proximal end being electrically coupled to the adapter and the distal end terminating in an output connector, the output connector including:

a plurality of conductors to transfer the DC power and the analog data signal to the electronic device; and

circuitry to receive a data request from the electronic device and in response transmit a data output to the electronic device to identify the power supply equipment to the electronic device.

2. The power supply equipment of claim 1 wherein the output connector can be detached from the cable.

ABSTRACT OF THE DISCLOSURE

Power supply equipment includes an adapter to convert power from a power source to a DC power for powering an electronic device. The adapter includes circuitry for producing an analog data signal for use by the electronic device to control an amount of power drawn by the device. A cable has an output connector with a plurality of conductors to transfer the DC power and the analog data signal to the electronic device. The connector further includes circuitry to receive a data request from the electronic device and in response transmit a data output which identifies the power supply equipment to the electronic device.

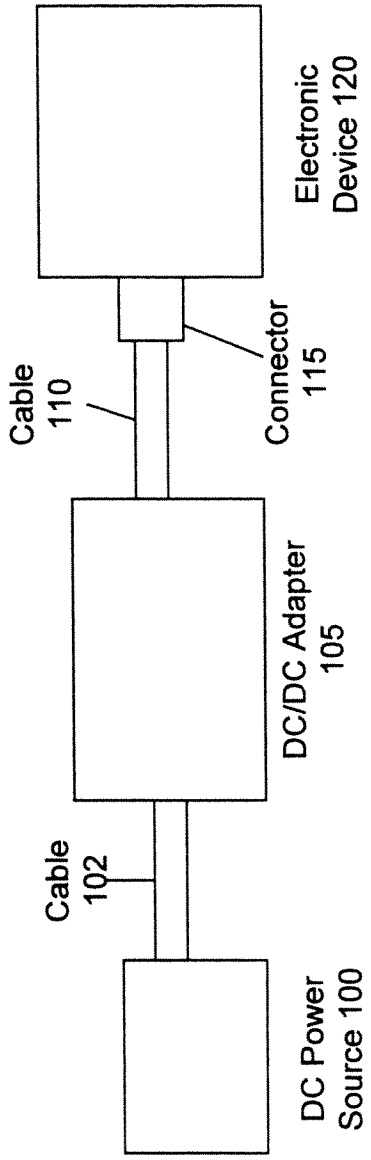

Fig. 1 (Prior Art)

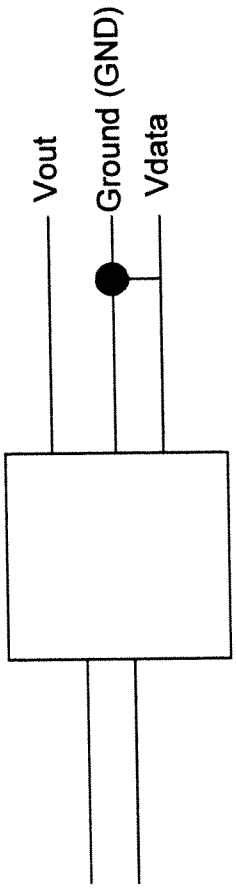

Fig. 2A

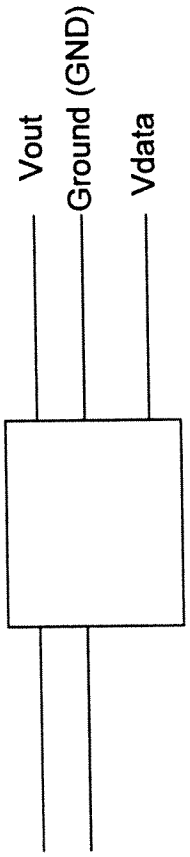

Fig. 2B

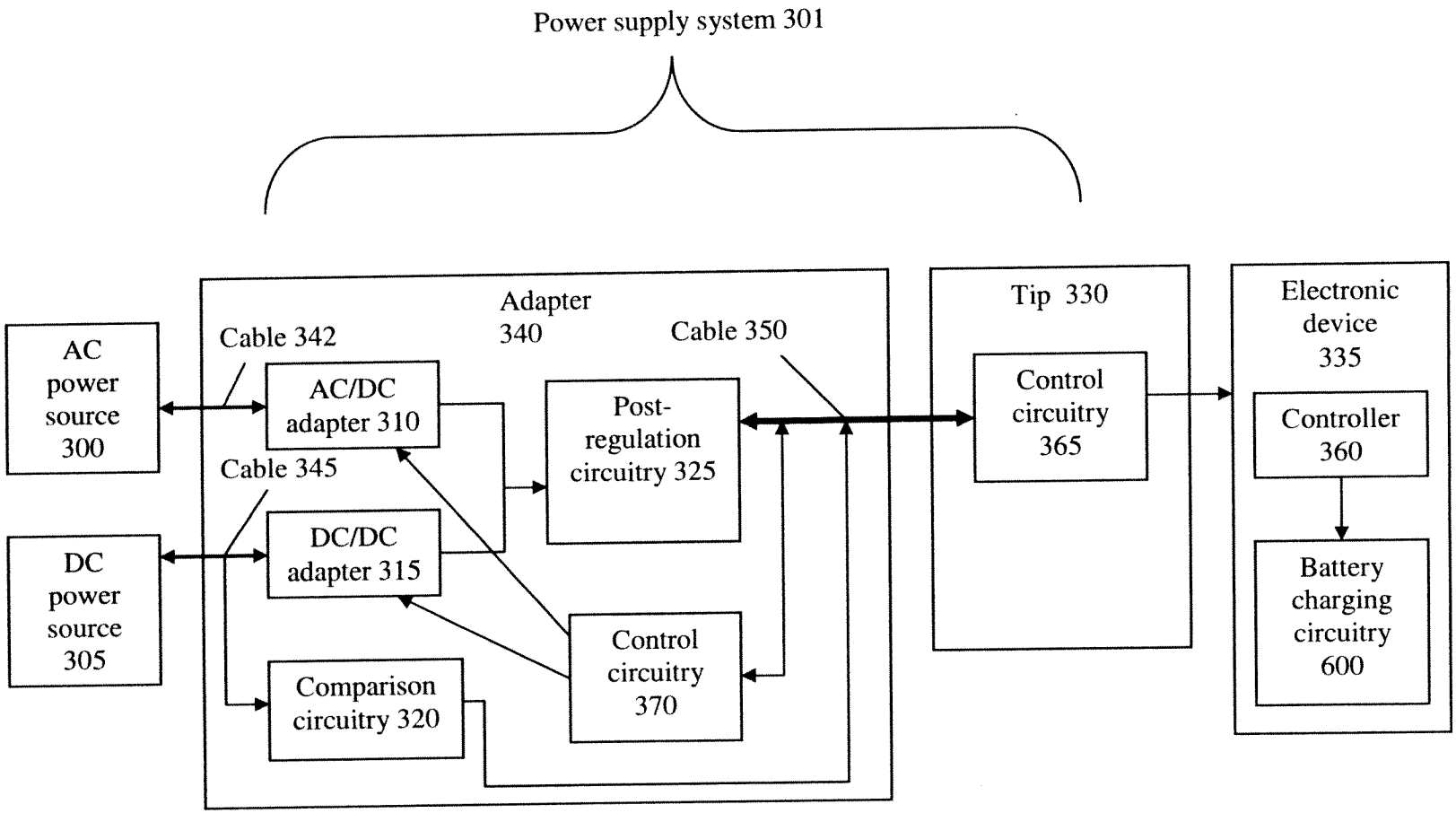

FIG. 3

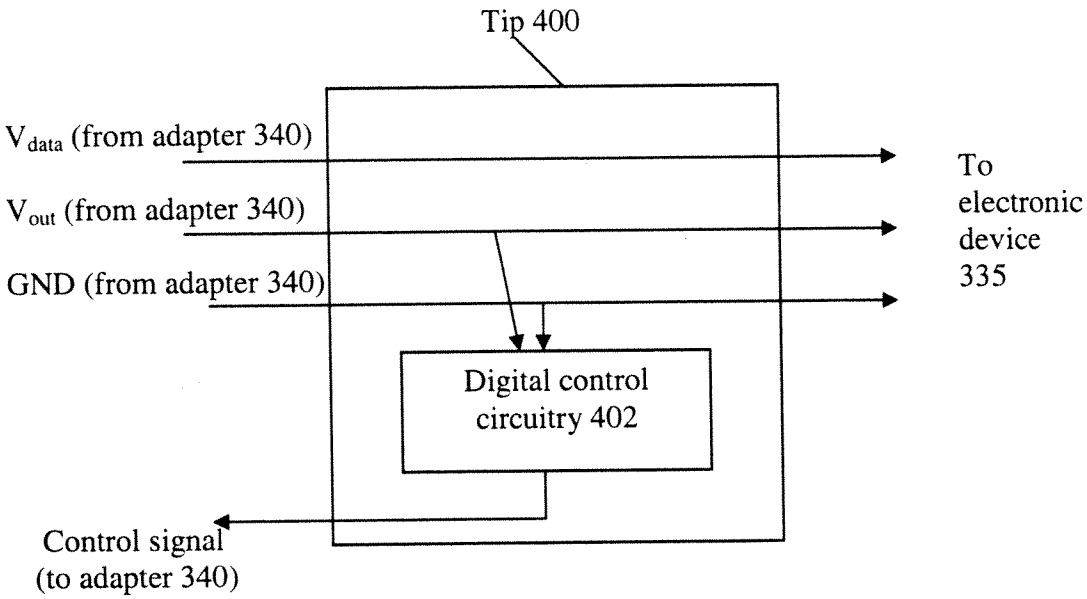
Tip 400
V_{data} (from adapter 340)
V_{out} (from adapter 340)
GND (from adapter 340)
To electronic device 335
Digital control circuitry 402
Control signal (to adapter 340)

FIG. 4A

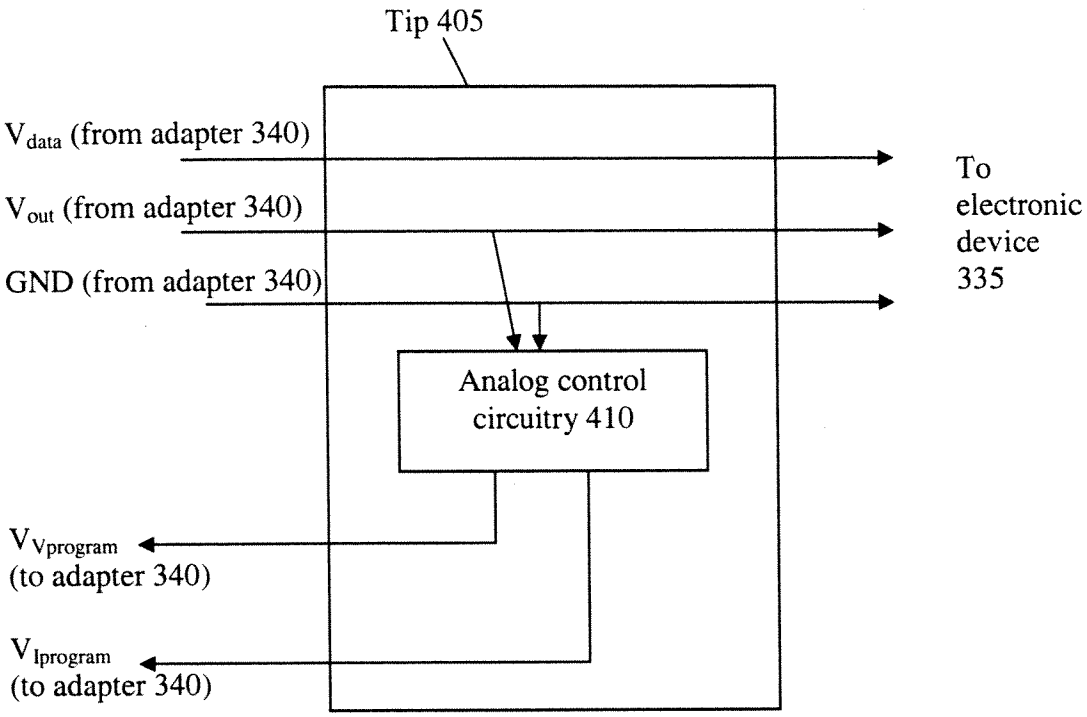
Tip 405
V_{data} (from adapter 340)
V_{out} (from adapter 340)
GND (from adapter 340)
To electronic device 335
Analog control circuitry 410
$V_{Vprogram}$ (to adapter 340)
$V_{Iprogram}$ (to adapter 340)

FIG. 4B

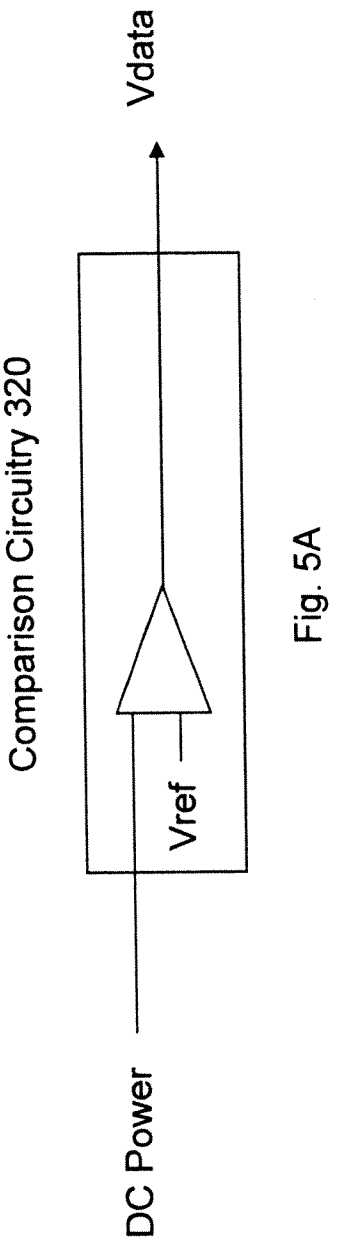
Vdata
Comparison Circuitry 320
Vref
DC Power

Fig. 5A

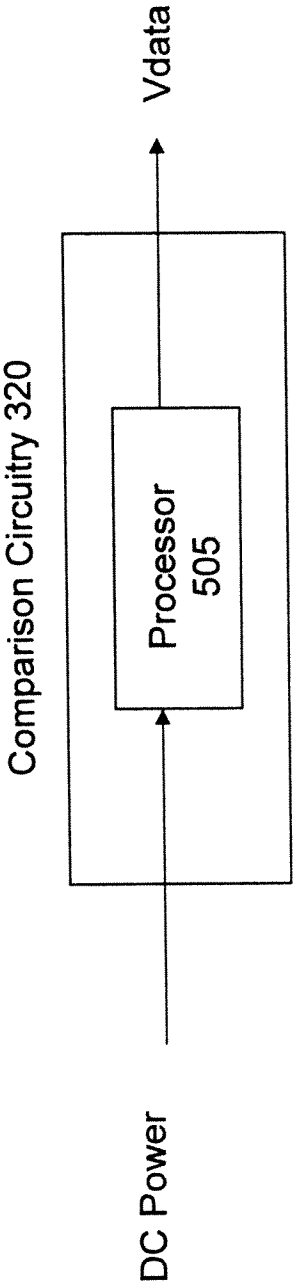
Vdata
Comparison Circuitry 320
Processor
505
DC Power

Fig. 5B

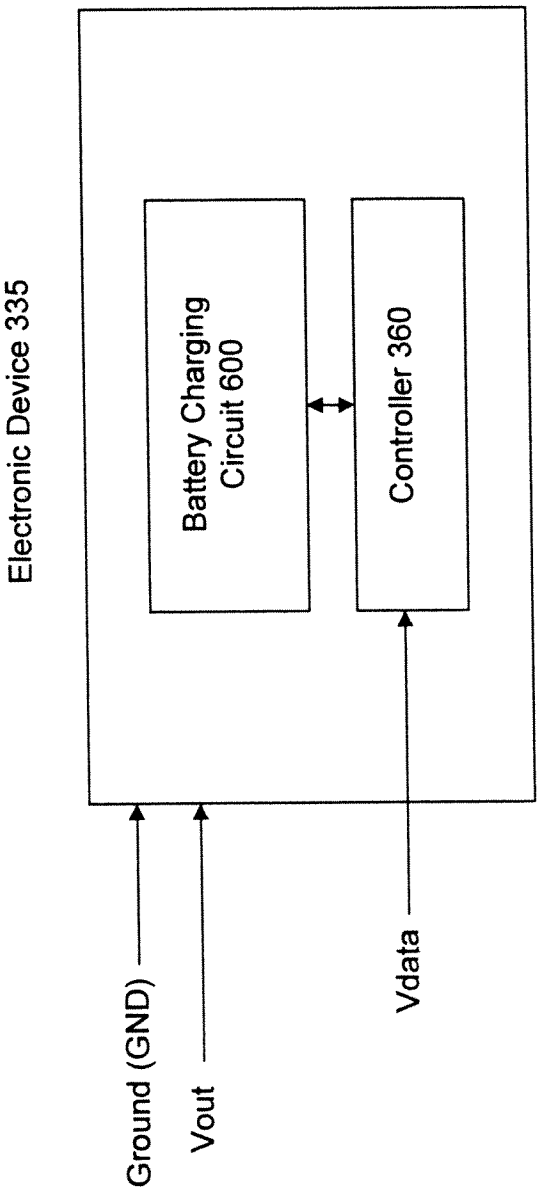
Electronic Device 335
Battery Charging Circuit 600
Controller 360
Ground (GND)
Vout
Vdata

Fig. 6

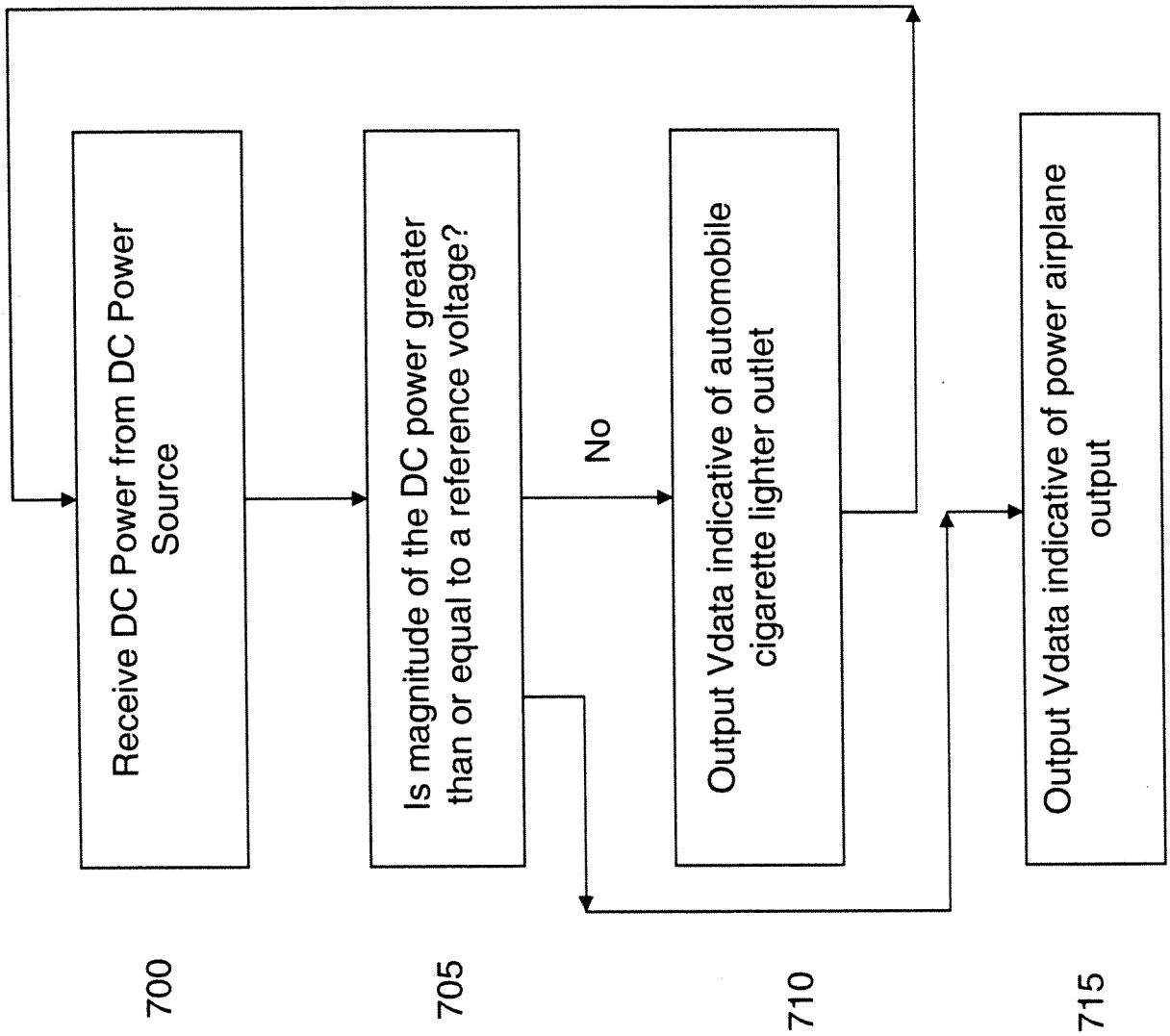
Receive DC Power from DC Power Source
Is magnitude of the DC power greater than or equal to a reference voltage?
No
Output Vdata indicative of automobile cigarette lighter outlet
Output Vdata indicative of power airplane output
700
705
710
715

Fig. 7A

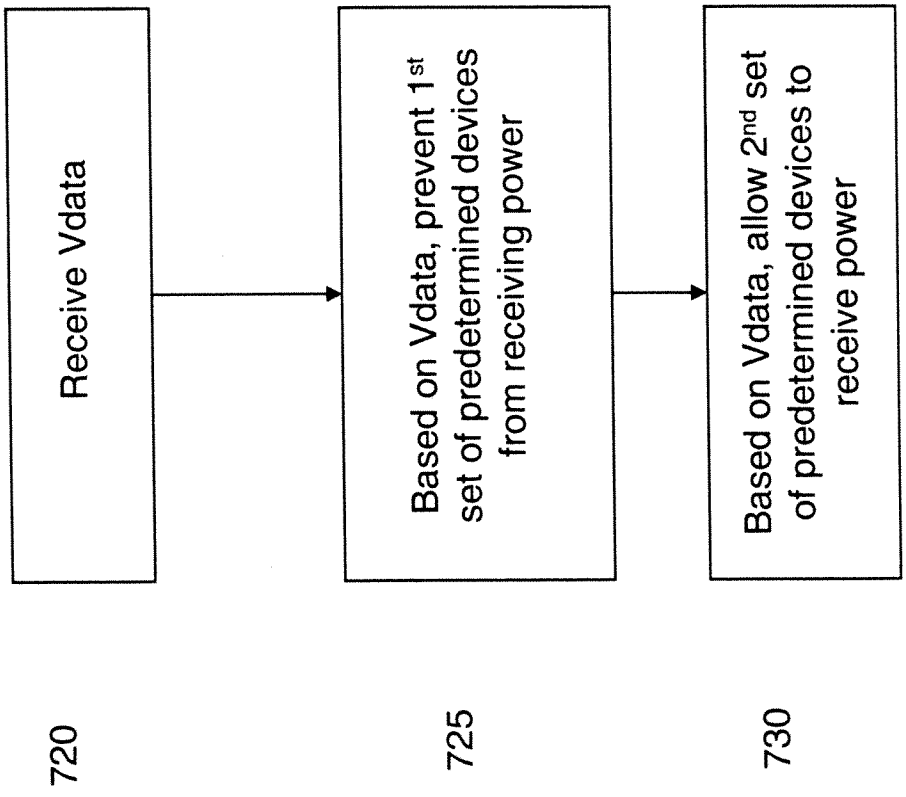
Receive Vdata
Based on Vdata, prevent 1st set of predetermined devices from receiving power
Based on Vdata, allow 2nd set of predetermined devices to receive power
720
725
730

Fig. 7B

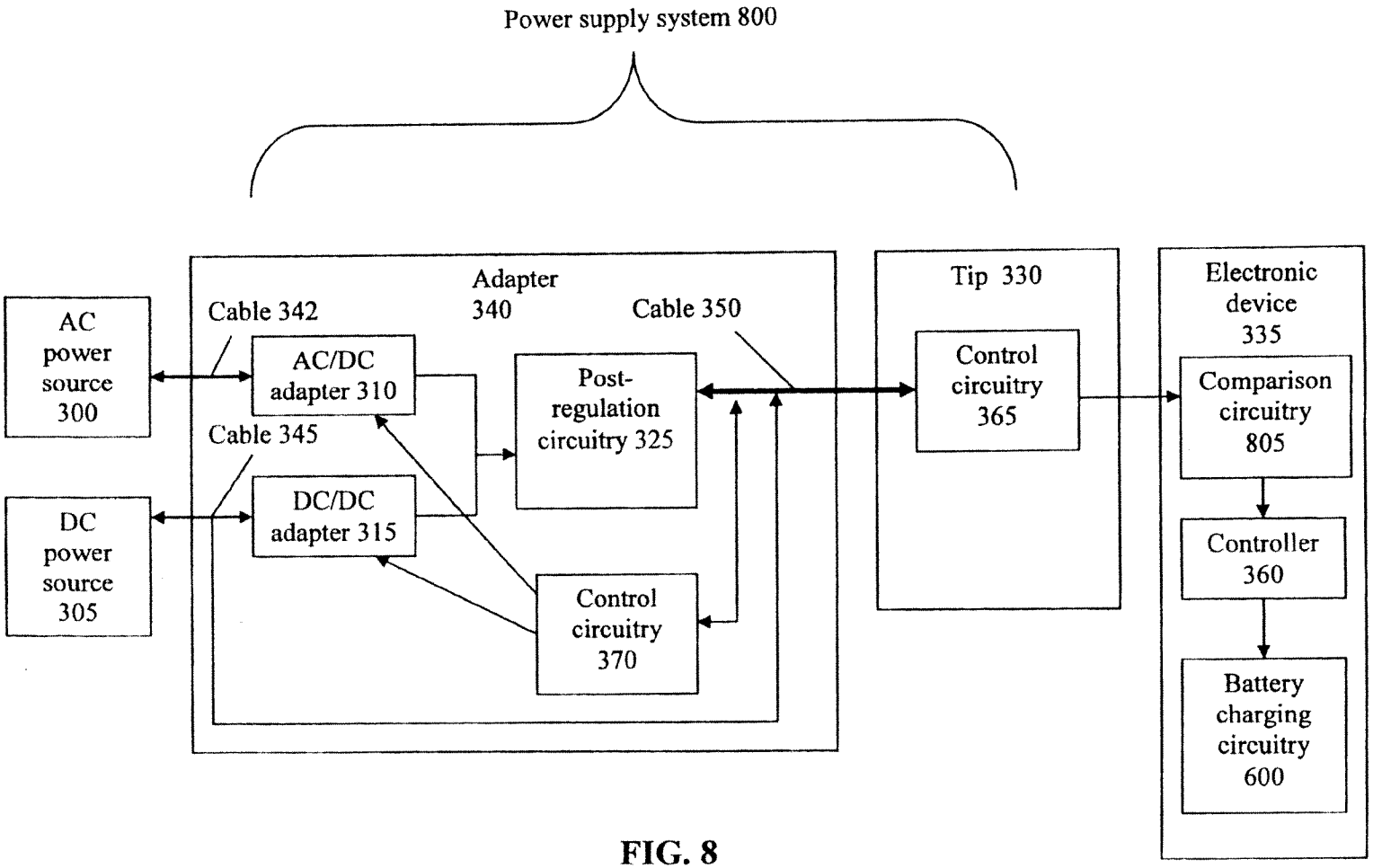

FIG. 8

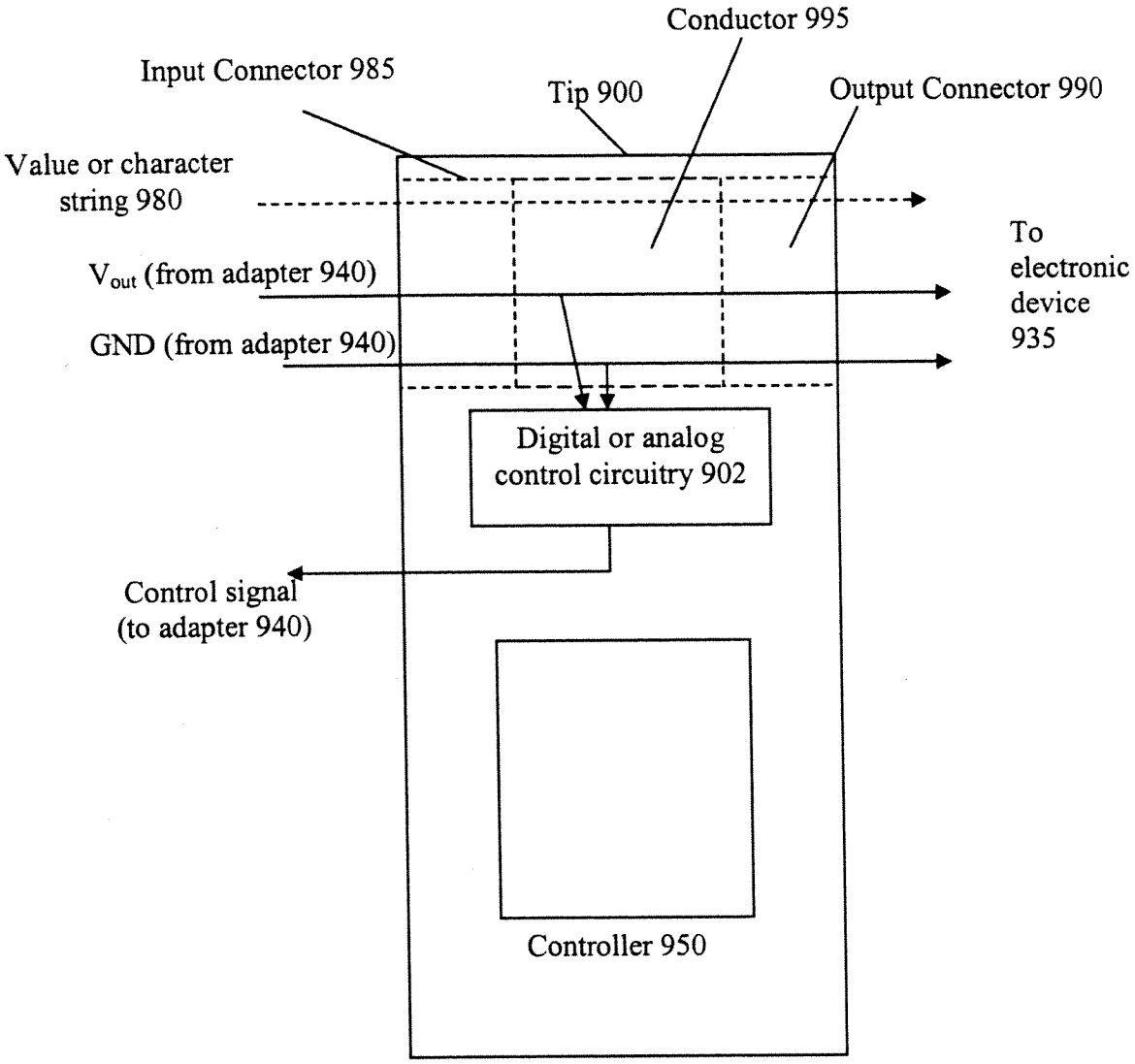
Conductor 995
Input Connector 985
Tip 900
Output Connector 990
Value or character string 980
To electronic device 935
V_{out} (from adapter 940)
GND (from adapter 940)
Digital or analog control circuitry 902
Control signal (to adapter 940)
Controller 950

FIG. 9A

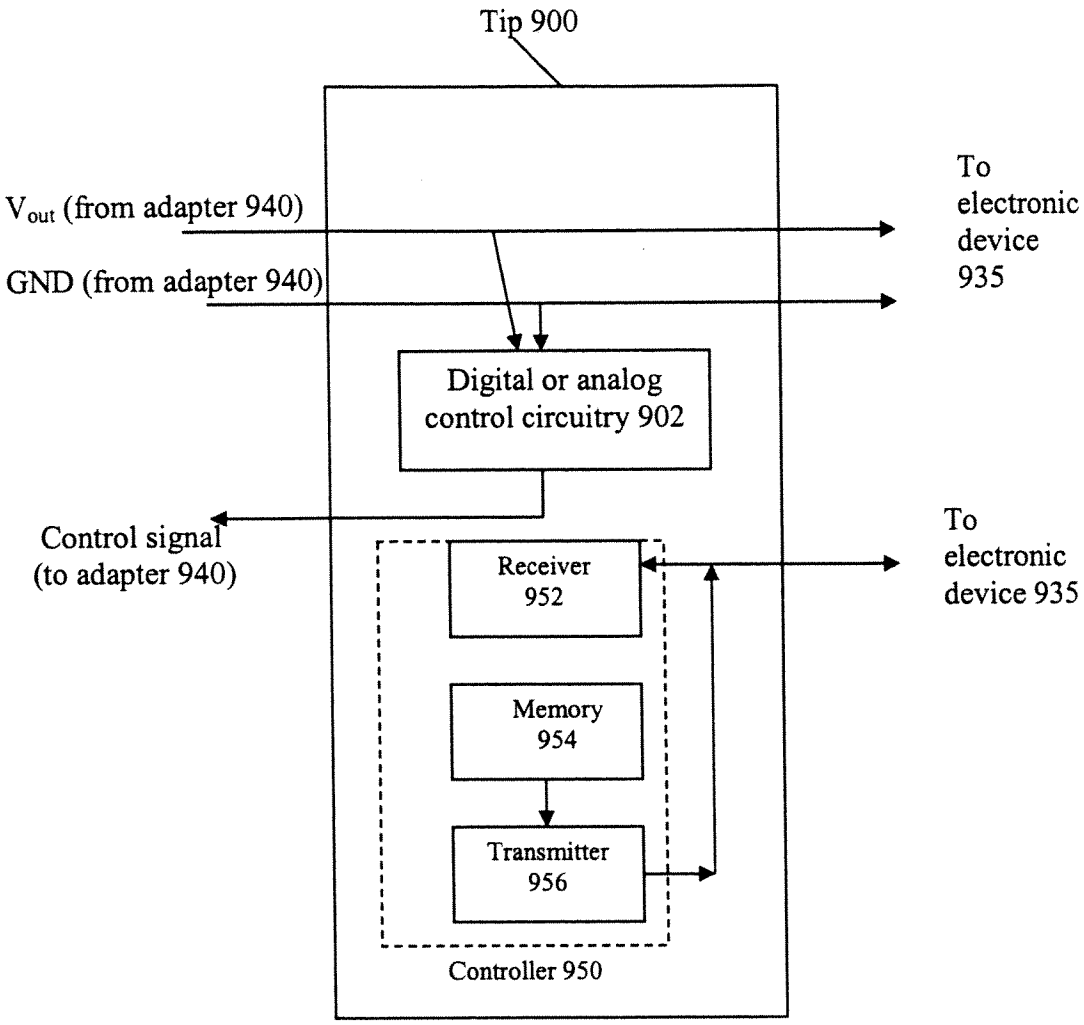
Tip 900
V_{out} (from adapter 940)
GND (from adapter 940)
To electronic device 935
Digital or analog control circuitry 902
Control signal (to adapter 940)
To electronic device 935
Receiver 952
Memory 954
Transmitter 956
Controller 950

FIG. 9B

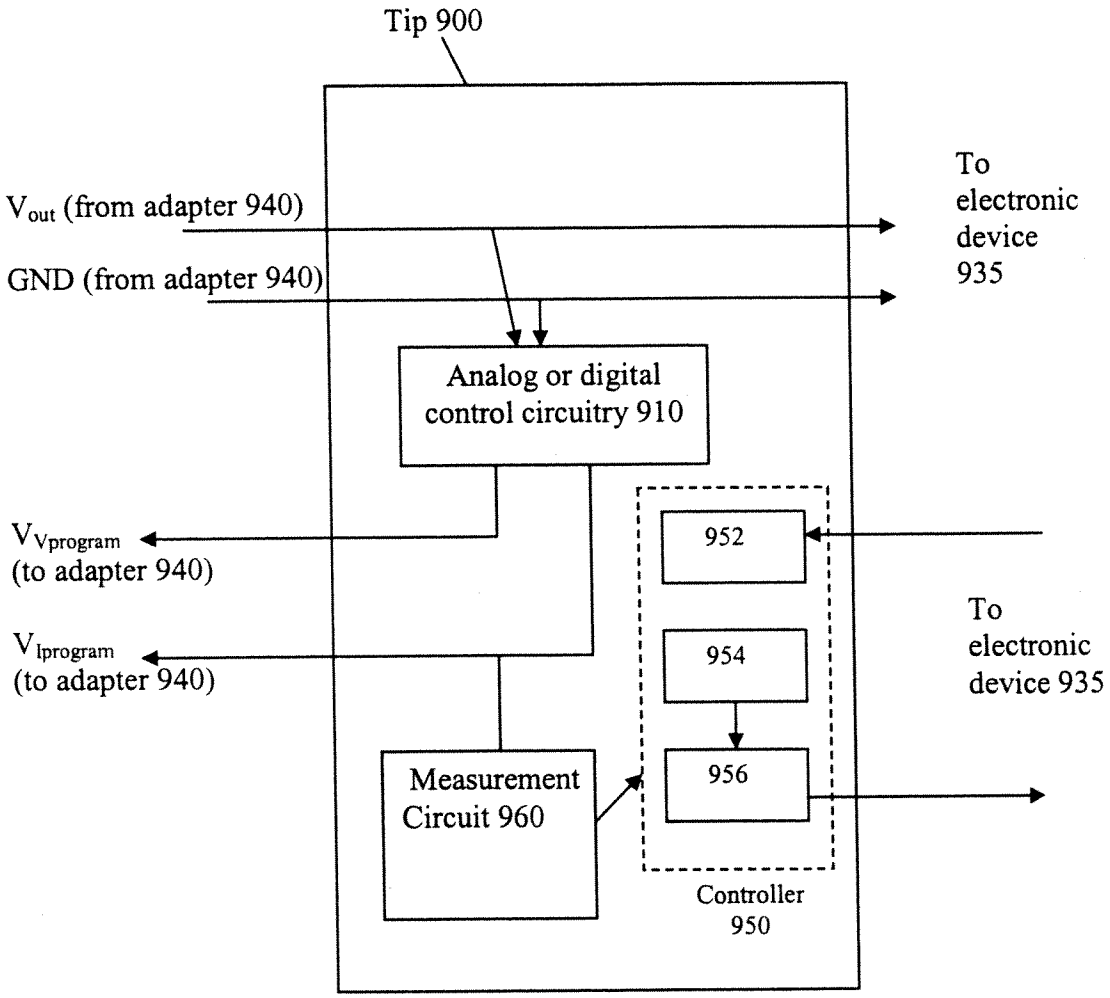
Tip 900
V_{out} (from adapter 940)
GND (from adapter 940)
To electronic device 935
Analog or digital control circuitry 910
$V_{Vprogram}$ (to adapter 940)
$V_{Iprogram}$ (to adapter 940)
952
954
956
To electronic device 935
Measurement Circuit 960
Controller 950

FIG. 10

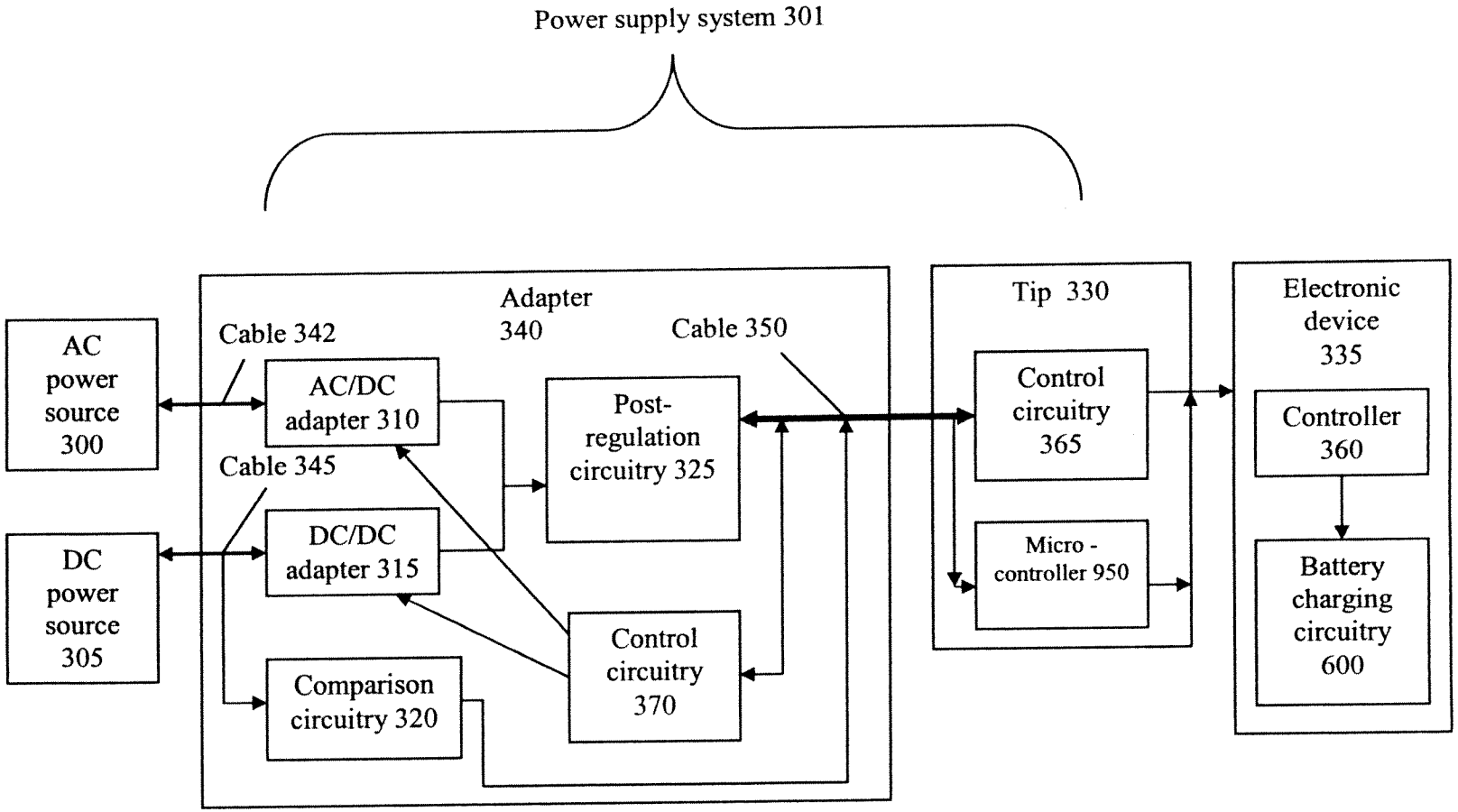
Power supply system 301
Adapter
340
Cable 342
Cable 345
Cable 350
AC
power
source
300
DC
power
source
305
AC/DC
adapter 310
DC/DC
adapter 315
Post-
regulation
circuitry 325
Comparison
circuitry 320
Control
circuitry
370
Tip 330
Control
circuitry
365
Micro -
controller 950
Electronic
device
335
Controller
360
Battery
charging
circuitry
600

FIG. 11