

AO 120 (Rev. 08/10)

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

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

DOCKET NO.	DATE FILED 11/24/2021	U.S. DISTRICT COURT District of Delaware
PLAINTIFF MZ Audio Sciences, LLC		DEPENDANT Sony Group Corporation (Japan), Sony Corporation of America, Sony Interactive Entertainment LLC, Sony Pictures Entertainment Inc., Sony Electronics Inc., Sony DADC US Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 US 7,289,961 B2	10/30/2007	MZ Audio Sciences, LLC
2		
3		
4		
5		

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

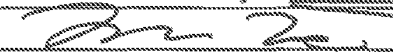
DATE INCLUDED	INCLUDED BY	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

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

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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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

CERTIFICATION OF MICRO ENTITY STATUS (INSTITUTION OF HIGHER EDUCATION BASIS)			
Application Number or Control Number (if applicable): 10/870,685		Patent Number (if applicable): 7,289,961	
First Named Inventor: Mark F. Bocko		Title of Invention: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS	
CERTIFICATION ON THE BASIS OF EMPLOYMENT BY AN INSTITUTION OF HIGHER EDUCATION			
The applicant hereby certifies the following—			
The applicant qualifies as a small entity as defined in 37 CFR 1.27.			
The applicant's employer, from which the applicant obtains the majority of the applicant's income, is an institution of higher education as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).			
SIGNATURE by an authorized party set forth in 37 CFR 1.33(b)			
Signature			
Name	Zeljko Igrijatovic		
Date	10/24/2019	Telephone	(585) 381-0483 Registration No.
<input checked="" type="checkbox"/>	There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.		
CERTIFICATION ON THE BASIS OF ASSIGNMENT OR OBLIGATION TO ASSIGN TO AN INSTITUTION OF HIGHER EDUCATION			
The applicant hereby certifies the following—			
The applicant qualifies as a small entity as defined in 37 CFR 1.27.			
The applicant has assigned, granted, conveyed, or is under an obligation by contract or law, to assign, grant, or convey, a license or other ownership interest in the particular application to an institution of higher education as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).			
SIGNATURE by an authorized party set forth in 37 CFR 1.33(b)			
Signature			
Name			
Date		Telephone	
			Registration No.
<input type="checkbox"/>	There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.		

NOTE: A signed copy of this "institution of higher education basis" micro entity certification form (PTO/SB/15B) filed together with a signed copy of the "gross income basis" micro entity certification form (PTO/SB/15A) will be taken to be a representation that any inventor or person applying for a patent as provided in 37 CFR 1.46 not qualifying on the "gross income basis" qualifies on the "institution of higher education basis."

CERTIFICATION OF MICRO ENTITY STATUS (INSTITUTION OF HIGHER EDUCATION BASIS)			
Application Number or Control Number (if applicable): 10/870,685		Patent Number (if applicable): 7,289,961	
First Named Inventor: Mark F. Bocko		Title of Invention: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS	
CERTIFICATION ON THE BASIS OF EMPLOYMENT BY AN INSTITUTION OF HIGHER EDUCATION			
The applicant hereby certifies the following—			
The applicant qualifies as a small entity as defined in 37 CFR 1.27.			
The applicant's employer, from which the applicant obtains the majority of the applicant's income, is an institution of higher education as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).			
SIGNATURE by an authorized party set forth in 37 CFR 1.33(b)			
Signature	<i>Mark F. Bocko</i>		
Name	Mark F. Bocko		
Date	10/24/2019	Telephone	585 294 5046
		Registration No.	
<input checked="" type="checkbox"/>	There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.		
CERTIFICATION ON THE BASIS OF ASSIGNMENT OR OBLIGATION TO ASSIGN TO AN INSTITUTION OF HIGHER EDUCATION			
The applicant hereby certifies the following—			
The applicant qualifies as a small entity as defined in 37 CFR 1.27.			
The applicant has assigned, granted, conveyed, or is under an obligation by contract or law, to assign, grant, or convey, a license or other ownership interest in the particular application to an institution of higher education as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).			
SIGNATURE by an authorized party set forth in 37 CFR 1.33(b)			
Signature			
Name			
Date		Telephone	
		Registration No.	
<input type="checkbox"/>	There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.		

NOTE: A signed copy of this "institution of higher education basis" micro entity certification form (PTO/SB/15B) filed together with a signed copy of the "gross income basis" micro entity certification form (PTO/SB/15A) will be taken to be a representation that any inventor or person applying for a patent as provided in 37 CFR 1.46 not qualifying on the "gross income basis" qualifies on the "institution of higher education basis."

Electronic Acknowledgement Receipt

EFS ID:	37583073
Application Number:	10870685
International Application Number:	
Confirmation Number:	7203
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
First Named Inventor/Applicant Name:	Mark F. Bocko
Customer Number:	109973
Filer:	Michael C. Greenbaum/Regina Fields
Filer Authorized By:	Michael C. Greenbaum
Attorney Docket Number:	01338-0001
Receipt Date:	28-OCT-2019
Filing Date:	18-JUN-2004
Time Stamp:	17:45:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Certification of Micro Entity (Education Basis)	executedIgnjatovic_MES.pdf	58970 <small>a4dde224299b28aee628599058222e515ffa0084</small>	no	1

Warnings:

Information:					
2	Certification of Micro Entity (Education Basis)	Bocko_MES.pdf	108770	no	1
			6850d6d076767c72f62184fd82584847bad7a7d7		
Warnings:					
Information:					
Total Files Size (in bytes):			167740		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					



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.
10/870,685	06/18/2004	Mark F. Bocko	01338-0001	7203
109973	7590	09/19/2019	EXAMINER	
Bejin Bieneman PLC 2000 Town Center Suite 800 Southfield, MI 48075			HAN, QI	
			ART UNIT	PAPER NUMBER
			2626	
			NOTIFICATION DATE	DELIVERY MODE
			09/19/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

doCKET@b2iplaw.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,289,961 :
Issue Date: October 30, 2007 :
Application No. 10/870,685 : **DECISION ON PETITION**
Filed: June 18, 2004 :
Attorney Docket No. 01338-0001 :

This is a decision on the renewed petition under 37 CFR 1.378(b), filed August 20, 2019, to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent.

The petition is **GRANTED**.

This patent expired on October 30, 2015, for failure to pay the 7½ maintenance fee.

The maintenance fee is hereby accepted and the above-identified patent is reinstated as of the mail date of this decision.

It is not apparent whether the person signing the statement of unintentional delay was in a position to have firsthand or direct knowledge of the facts and circumstances of the delay at issue. Nevertheless, such statement is being treated as having been made as the result of a reasonable inquiry into the facts and circumstances of such delay. In the event that such an inquiry has not been made, petitioner must make such an inquiry. If such inquiry results in the discovery that the delay in paying the maintenance fee under 37 CFR 1.378(b) was intentional, petitioner must notify the Office. *See* 37 CFR 11.18.

Telephone inquiries concerning this decision should be directed to JoAnne Burke at (571) 272-4584.

/JOANNE L BURKE/
Lead Paralegal Specialist, OPET



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
10/870,685	06/18/2004	Mark F. Bocko	01338-0001

109973
Bejin Bieneman PLC
2000 Town Center
Suite 800
Southfield, MI 48075

CONFIRMATION NO. 7203
POA ACCEPTANCE LETTER



Date Mailed: 08/23/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/20/2019.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tmwilliams/



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
10/870,685	06/18/2004	Mark F. Bocko	17892-000001-US

27572
Harness Dickey (Troy)
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

**CONFIRMATION NO. 7203
POWER OF ATTORNEY NOTICE**



Date Mailed: 08/23/2019

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/20/2019.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tmwilliams/

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	7,289,961
	Issue Date	October 30, 2007
	First Named Inventor	Mark F. Bocko
	Title	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
	Attorney Docket No.	01338-0001

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 Customer Number identified in the box at right 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:

109973

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-identified Customer Number.OR
 The address associated with the Customer Number identified in the box at right: Firm or
Individual Name

Address

City

Country

Telephone

State

Zip

I am the:

 Applicant.OR
 Patent owner.

Statement under 37 CFR 3.73(c) [Form PTO/AIA/96] submitted herewith or filed on January 24, 2019

SIGNATURE of Applicant or Patent Owner

Signature

Mark F. Bocko

Date

8/20/2019

Name

Mark F. Bocko

Telephone

588 294 5946

Title and Company

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below. A 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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 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.

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	7,289,861
	Issue Date	October 30, 2007
	First Named Inventor	Mark F. Booko
	Title	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
Attorney Docket No.		01338-0001

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 Customer Number identified in the box at right 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: 109973

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-identified Customer Number.

OR

The address associated with the Customer Number identified in the box at right:

Firm or Individual Name

Address

City State Zip

Country

Telephone Email

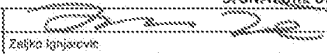
I am the:

Applicant.

OR

Patent owner.
 Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on January 24, 2019

SIGNATURE of Applicant or Patent Owner

Signature		Date	09/20/2019
Name	Zeljko Ignjatovic	Telephone	(855) 381-0400
Title and Company			

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

A 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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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 1458, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	36922841
Application Number:	10870685
International Application Number:	
Confirmation Number:	7203
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
First Named Inventor/Applicant Name:	Mark F. Bocko
Customer Number:	27572
Filer:	Tyson B. Benson/Sarah Goodwin
Filer Authorized By:	Tyson B. Benson
Attorney Docket Number:	17892-000001-US
Receipt Date:	20-AUG-2019
Filing Date:	18-JUN-2004
Time Stamp:	12:16:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	01338_0001_POA_FILE.pdf	1101255 0a4f62b1bb0f7192b2012d744c2062f9aab4877b	no	2

Warnings:

Information:	
Total Files Size (in bytes):	1101255
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>	

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.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b)) Page 1 of 3	Docket Number (Optional) 01338-0001
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Mail to: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7,289,961 Application Number 10/970,685
Issue Date October 30, 2007 Filing Date June 18, 2004

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

is a reissue of original Patent No. _____ original issue date _____
original application number _____
original filing date _____.

resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____
filed on _____.

CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, 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.

Date Signature

Typed or Printed Name of Person Signing Certificate

[page 1 of 3]

This collection of information is required by 37 CFR 1.378(b). 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, 1.14 and 41.6. This collection is estimated to take 1 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Petition, 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.

**PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT
OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))**

Page 2 of 3

1. SMALL ENTITY

Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29 Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted			Small Entity			Micro Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)	Amount	Fee	(Code)
<input type="checkbox"/> \$ _____	3½ yr fee	(1551)	<input type="checkbox"/> \$ _____	3½ yr fee	(2551)	<input type="checkbox"/> \$ _____	3½ yr fee	(3551)
<input type="checkbox"/> \$ _____	7½ yr fee	(1552)	<input checked="" type="checkbox"/> \$ <u>1,800.00</u>	7½ yr fee	(2552)	<input type="checkbox"/> \$ _____	7½ yr fee	(3552)
<input type="checkbox"/> \$ _____	11½ yr fee	(1553)	<input type="checkbox"/> \$ _____	11½ yr fee	(2553)	<input type="checkbox"/> \$ _____	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED \$ 1,800.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

\$ _____ Undiscounted (Fee Code 1558); or

\$ 1,000.00 Small Entity (Fee Code 2558); or

\$ _____ Micro Entity (Fee Code 3558)

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee.

PETITION FEE BEING SUBMITTED \$ 1,000.00

7. MANNER OF PAYMENT

Enclosed is a check for the sum of \$ _____

Please charge Deposit Account No. _____ the sum of \$ _____

Payment by credit card. Form PTO-2038 is attached.

Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

The Director is hereby authorized to charge any maintenance fee or petition deficiency to Deposit Account No. 50-5967

**PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT
OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))**

Page 3 of 3

9. OVERPAYMENT

As to any overpayment made, please

Credit to Deposit Account No. 50-5967

OR

Send refund check

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.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

11. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED.

August 20, 2019

Date

/Tyson B. Benson/

Signature(s) of Petitioner(s)

64,468

Registration Number, if applicable

Tyson B. Benson

Typed or Printed Name(s)

313-528-6948

Telephone Number

2000 Town Center, Suite 800, Southfield, MI 48075

Address

Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- Maintenance Fee Payment
- Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
- _____
- _____

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.

Electronic Patent Application Fee Transmittal

Application Number:	10870685				
Filing Date:	18-Jun-2004				
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS				
First Named Inventor/Applicant Name:	Mark F. Bocko				
Filer:	Tyson B. Benson/Sarah Goodwin				
Attorney Docket Number:	17892-000001-US				
Filed as Small Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)	
Basic Filing:					
Pages:					
Claims:					
Miscellaneous-Filing:					
Petition:					
PET. REVIVE ABANDON APP, DELAY PYMT-RESP	2453	1	1000	1000	
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt

EFS ID:	36923815
Application Number:	10870685
International Application Number:	
Confirmation Number:	7203
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
First Named Inventor/Applicant Name:	Mark F. Bocko
Customer Number:	27572
Filer:	Tyson B. Benson/Sarah Goodwin
Filer Authorized By:	Tyson B. Benson
Attorney Docket Number:	17892-000001-US
Receipt Date:	20-AUG-2019
Filing Date:	18-JUN-2004
Time Stamp:	14:02:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1000
RAM confirmation Number	E20198JE02575341
Deposit Account	505967
Authorized User	Sarah Goodwin

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

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)
 37 CFR 1.20 (Post Issuance fees)
 37 CFR 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	Transmittal Letter	01338-0001_Response_to_Decision_on_Petition_USP_7289961.pdf	28279 caa3025fc188f0160a4fcc50a529c5afa6b94d3	no	2

Warnings:

Information:

2	Petition for review by the Office of Petitions	01338_0001_Petition_sb0066.pdf	306382 0673efecb2fd5f3fb98e190bb97e4cc22ba8ce88	no	4
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Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	30512 5537388ceb2de93e39bd90a0db76524c77c1c77	no	2
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Warnings:

Information:

Total Files Size (in bytes): 365173

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/E0/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Mark F. Bocko et al.	Group Art Unit:	2626
Assignee:	Mark F. Bocko and Ignjatovic Zeljko	Examiner:	Han, Qi
Patent No.:	7,289,961	Confirmation No.:	7203
Issued:	October 30, 2007	Docket No.:	01338-0001
App. No.:	10/870,685		
Filed:	June 18, 2004		
Title:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS		

RESPONSE TO DECISION ON PETITION

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

This paper is filed in response to the Decision on Petition dated July 26, 2019 dismissing the Petition to Accept Unintentionally Delayed Payment of Maintenance Fee in An Expired Patent (37 CFR 1.378(b)) filed November 29, 2018.

The U.S. Patent and Trademark Office was unable to collect the required petition fee since Tyson B. Benson had transferred to a new law firm and was no longer an authorized user on the deposit account listed in the petition. Tyson B. Benson is now associated with Customer Number 109973 and is an authorized user on Deposit Account No. 50-5967, and a new Power of Attorney has been filed for U.S. Patent No. 7,289,961.

Therefore, Petitioner files concurrently a new Petition to Accept Unintentionally Delayed Payment of Maintenance Fee in An Expired Patent (37 CFR 1.378(b)) with payment via EFS-Web and authorization to charge any maintenance fee or petition deficiency to Deposit Account No. 50-5967.

Respectfully submitted,

Electronic signature: /Tyson B. Benson/
Tyson B. Benson
Reg. No. 64,468
Ph: 313-528-6948
Attorneys for Patent Owner

Response Submitted August 20, 2019
Patent No. 7,289,961/App. No.: 10/870,685

Docket No. 01338-0001

Bejin Bieneman PLC
2000 Town Center, Suite 800
Southfield, MI 48075
United States of America
Telephone: 313-528-4882
Customer No. 109973

Date: August 20, 2019



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.
10/870,685	06/18/2004	Mark F. Bocko	17892-000001-US	7203
27572	7590	07/26/2019	EXAMINER	
Harness Dickey (Troy) P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			HAN, QI	
			ART UNIT	PAPER NUMBER
			2626	
			NOTIFICATION DATE	DELIVERY MODE
			07/26/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sto-ptomail@hdp.com
troy@mailroom@hdp.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,289,961 :
Issue Date: October 30, 2007 :
Application No. 10/870,685 : ON PETITION
Filed: June 18, 2004 :
Attorney Docket No. 17892-000001-US :

This is a decision on the petition under 37 CFR 1.378(b), filed November 29, 2018, to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent.

There is no indication that the petition is signed by a registered patent attorney or patent agent of record. However, in accordance with 37 CFR 1.34, the signature of Tyson B. Benson appearing on the correspondence shall constitute a representation to the United States Patent and Trademark Office that he or she is authorized to represent the particular party in whose behalf he or she acts.

The petition is **DISMISSED**.

The rules and statutory provisions governing the operations of the U.S. Patent and Trademark Office require payment of a fee on filing each petition to accept delayed payment of a maintenance fee. In this instance, the fee required by law is \$1,000.

Petitioner has given the Office authorization to the charge the required petition fee set forth in 37 CFR 1.17(m) in the \$1,000 to deposit account number 08-0750. However, the Office is unable to collect the required fees due to the reason that Tyson B. Benson is not an authorize user on the deposit account. As a result, the petition in the above identified patent application is considered of not being accompanied by payment of the required petition fee. Accordingly, no consideration on the merits can be given to the petition until the required fee is received.

Telephone inquiries concerning this decision should be directed to JoAnne Burke at (571) 272-4584.

/s/ JoAnne L Burke /

JoAnne L Burke
Lead Paralegal Specialist
Office of Petitions



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
10/870,685	06/18/2004	Mark F. Bocko	17892-000001-US

27572
Harness Dickey (Troy)
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

CONFIRMATION NO. 7203
POA ACCEPTANCE LETTER



Date Mailed: 02/15/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/24/2019.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/deelliott/



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
10/870,685	06/18/2004	Mark F. Bocko	17892-000001-US

27557
BLANK ROME LLP
1825 Eye Street NW
WASHINGTON, DC 20006-5403

**CONFIRMATION NO. 7203
POWER OF ATTORNEY NOTICE**



Date Mailed: 02/15/2019

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/24/2019.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/deelliott/



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
10/870,685	06/18/2004	Mark F. Bocko	17892-000001-US

27557
BLANK ROME LLP
1825 Eye Street NW
WASHINGTON, DC 20006-5403

CONFIRMATION NO. 7203
POA ACCEPTANCE LETTER



Date Mailed: 01/31/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

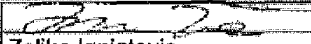
This is in response to the Power of Attorney filed 01/24/2019.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/

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	7,289,961		
	Issue Date	October 30, 2007		
	First Named Inventor	Mark F. BOCKO		
	Title	Data Hiding Via Phase Manipulation Of Audio Signals		
	Attorney Docket No.	17892-000001-US		
I hereby revoke all previous powers of attorney given in the above-identified patent.				
<input type="checkbox"/> A Power of Attorney is submitted herewith. OR <input checked="" type="checkbox"/> I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right 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: 27572				
OR <input type="checkbox"/> 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	Practitioner(s) Name	Registration Number
Please recognize or change the correspondence address for the above-identified patent to:				
<input checked="" type="checkbox"/> The address associated with the above-identified Customer Number. OR <input type="checkbox"/> The address associated with the Customer Number identified in the box at right: 				
OR				
<input type="checkbox"/> Firm or Individual Name				
Address				
City		State	Zip	
Country				
Telephone		Email		
I am the:				
<input type="checkbox"/> Inventor, having ownership of the patent. OR <input checked="" type="checkbox"/> 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	01/23/2019
Name	Zeljko Ignjatovic		Telephone	(575) 381-0489
Title and Company				
NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.				
<input checked="" type="checkbox"/> A total of <u>2</u> forms are submitted.				

23297038 1

M.E/cb

PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Patent Number	7,289,961		
	Issue Date	October 30, 2007		
	First Named Inventor	Mark F. BOCKO		
	Title	Data Hiding Via Phase Manipulation Of Audio Signals		
	Attorney Docket No.	17892-000001-US		
I hereby revoke all previous powers of attorney given in the above-identified patent.				
<input type="checkbox"/> A Power of Attorney is submitted herewith. OR <input checked="" type="checkbox"/> I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right 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: <div style="float: right; border: 1px solid black; padding: 2px; margin-top: 5px;">27572</div>				
OR <input type="checkbox"/> 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	Practitioner(s) Name	Registration Number
Please recognize or change the correspondence address for the above-identified patent to:				
<input checked="" type="checkbox"/> The address associated with the above-identified Customer Number. OR <input type="checkbox"/> The address associated with the Customer Number identified in the box at right: <div style="float: right; border: 1px solid black; width: 80px; height: 20px; margin-top: 5px;"></div>				
OR <input type="checkbox"/> Firm or Individual Name				
Address				
City		State	Zip	
Country				
Telephone		Email		
I am the:				
<input type="checkbox"/> Inventor, having ownership of the patent. OR <input checked="" type="checkbox"/> 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	<i>Mark F. Bocko</i>		Date	01/23/2019
Name	Mark F. Bocko		Telephone	(585) 294 5046
Title and Company				
NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.				
<input checked="" type="checkbox"/> A total of <u>2</u> forms are submitted.				

23297033.1

MLF/cb

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.

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: Mark F. Bocko and Zeljko IgnjatovicApplication No./Patent No.: 7,289,961 Filed/Issue Date: October 30, 2007Titled: Data Hiding Via Phase Manipulation Of Audio SignalsZeljko Ignjatovic, a Individual
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. 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 50 %); 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. 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 _____, Frame _____, or a copy* 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: Mark F. BOCKO To: University of Rochester
The document was recorded in the United States Patent and Trademark Office at
Reel 015902 , Frame 0238 , or a copy* is attached.
2. From: Zeljko IGNJATOVIC To: University of Rochester
The document was recorded in the United States Patent and Trademark Office at
Reel 015902 , Frame 0238 , or a copy* is attached.
3. From: University of Rochester To: Air Force Research Laboratory/IFOJ
The document was recorded in the United States Patent and Trademark Office at
Reel 015852 , Frame 0341 , or a copy* thereof is attached.

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

*As required by 37 CFR 3.73(b)(1)(i), if a copy/copies is/are attached, 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.]

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

[Signature]
Signature

01/23/2019
Date

Zeljko Ignjatovic
Printed or Typed Name

Title or Registration Number

STATEMENT UNDER 37 CFR 3.73(b) - Supplemental Sheet

Continuation of the chain of title from the inventor(s) to the current assignee.

4. From: Air Force Research Laboratory//FOJ To: Dr. Mark F. Bocko
 The document was recorded in the United States Patent and Trademark Office at
 Reel 047155, Frame 0913, or a copy* is attached.
5. From: Air Force Research Laboratory//FOJ To: Dr. Zeljko Ignjatovic
 The document was recorded in the United States Patent and Trademark Office at
 Reel 047155, Frame 0913, or a copy* is attached.
6. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
7. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
8. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
9. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
10. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
11. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
12. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
13. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
14. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
15. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.

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.

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: Mark F. Bocko and Zeljko IgnjatovicApplication No./Patent No.: 7,289,961 Filed/Issue Date: October 30, 2007Titled: Data Hiding Via Phase Manipulation Of Audio SignalsMark F. Bocko, a Individual
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. 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 50 %); 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. 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 _____, Frame _____, or a copy* 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: Mark F. BOCKO To: University of Rochester
The document was recorded in the United States Patent and Trademark Office at
Reel 015902, Frame 0238, or a copy* is attached.
2. From: Zeljko IGNJATOVIC To: University of Rochester
The document was recorded in the United States Patent and Trademark Office at
Reel 015902, Frame 0238, or a copy* is attached.
3. From: University of Rochester To: Air Force Research Laboratory/IFOJ
The document was recorded in the United States Patent and Trademark Office at
Reel 015852, Frame 0341, or a copy* thereof is attached.

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

- *As required by 37 CFR 3.73(b)(1)(i), if a copy/copies is/are attached, 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.]

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

Mark F. Bocko 01/23/2019
Signature Date

Mark F. Bocko
Printed or Typed Name Title or Registration Number

STATEMENT UNDER 37 CFR 3.73(b) - Supplemental Sheet

Continuation of the chain of title from the inventor(s) to the current assignee.

4. From: Air Force Research Laboratory/IFOJ To: Dr. Mark F. Bocko
 The document was recorded in the United States Patent and Trademark Office at
 Reel 047155, Frame 0913, or a copy* is attached.
5. From: Air Force Research Laboratory/IFOJ To: Dr. Zeljko Ignjatovic
 The document was recorded in the United States Patent and Trademark Office at
 Reel 047155, Frame 0913, or a copy* is attached.
6. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
7. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
8. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
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9. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
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10. From: _____ To: _____
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11. From: _____ To: _____
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 Reel _____, Frame _____, or a copy* is attached.
12. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
13. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
14. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.
15. From: _____ To: _____
 The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or a copy* is attached.

23297111.1

Electronic Acknowledgement Receipt

EFS ID:	34948235
Application Number:	10870685
International Application Number:	
Confirmation Number:	7203
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
First Named Inventor/Applicant Name:	Mark F. Bocko
Customer Number:	27557
Filer:	Tyson B. Benson/Lisa Johannsen
Filer Authorized By:	Tyson B. Benson
Attorney Docket Number:	000687-00339
Receipt Date:	24-JAN-2019
Filing Date:	18-JUN-2004
Time Stamp:	13:34:45
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	Ignjatovic_POA.pdf	73509 58fe9b8e526d94da119d29ac6d2e1bf0b72ba4bb	no	1

Warnings:

Information:					
2	Power of Attorney	Bocko_POA.pdf	73485 2dd63e6d8bae4479807127473feed4813c6b06a7	no	1
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	lgnjatovic_373_statement.pdf	122177 d344972122a6114f1542569cd0118e2766216e11	no	2
Warnings:					
Information:					
4	Assignee showing of ownership per 37 CFR 3.73	Bocko_373_statement.pdf	121873 922ddba6ee6e805862a4872bc77bd7f223c54bc6	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			391044		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>					

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.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b)) Page 1 of 3	Docket Number (Optional) 17892-000001-US (000687-00339)
--	--

Mail to: Mail Stop Petition
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450
 Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7,289,961 Application Number 10/870,685
 Issue Date October 30, 2007 Filing Date June 18, 2004

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

is a reissue of original Patent No. _____ original issue date _____
 original application number _____
 original filing date _____.

resulted from the entry into the U.S. under 35 U.S.C. 371 of the international application _____
 filed on _____.

CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, 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.

_____ Date _____ Signature _____

Typed or Printed Name of Person Signing Certificate

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.

**PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT
OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))**

Page 2 of 3

1. SMALL ENTITY

 Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

 Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

 Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

 Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted				Small Entity			Micro Entity		
Amount	Fee	(Code)		Amount	Fee	(Code)	Amount	Fee	(Code)
<input type="checkbox"/> \$ _____	3½ yr fee	(1551)		<input type="checkbox"/> \$ _____	3½ yr fee	(2551)	<input type="checkbox"/> \$ _____	3½ yr fee	(3551)
<input type="checkbox"/> \$ _____	7½ yr fee	(1552)		<input checked="" type="checkbox"/> \$ <u>1,800.00</u>	7½ yr fee	(2552)	<input type="checkbox"/> \$ _____	7½ yr fee	(3552)
<input type="checkbox"/> \$ _____	11½ yr fee	(1553)		<input type="checkbox"/> \$ _____	11½ yr fee	(2553)	<input type="checkbox"/> \$ _____	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED \$ 1,800.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

\$ _____ Undiscounted (Fee Code 1558); or

\$ 1,000.00 Small Entity (Fee Code 2558); or

\$ _____ Micro Entity (Fee Code 3558)

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee. (Note: There is currently no micro entity amount for the petition fee.)

PETITION FEE BEING SUBMITTED \$ 1,000.00

7. MANNER OF PAYMENT

 Enclosed is a check for the sum of \$ _____ Please charge Deposit Account No. 08-0750 the sum of \$ 2,800.00 Payment by credit card. Form PTO-2038 is attached. Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

 The Director is hereby authorized to charge any maintenance fee or petition deficiency to
Deposit Account No. 08-0750

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.

**PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT
OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))**

Page 3 of 3

9. OVERPAYMENT

As to any overpayment made, please

Credit to Deposit Account No. 08-0750

OR

Send refund check

WARNING:

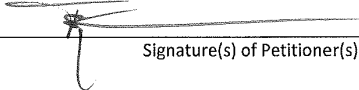
Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information, such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization 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.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

11. PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED.

11/29/2018
Date


Signature(s) of Petitioner(s)

64,468
Registration Number, if applicable

Tyson B. Benson
Typed or Printed Name(s)

(248) 641-1213
Telephone Number

HARNESS, DICKEY & PIERCE, P.L.C.

P.O. Box 828
Bloomfield Hills, Michigan 48303

Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- Maintenance Fee Payment
- Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
-

23187637.1

Electronic Acknowledgement Receipt

EFS ID:	34438580
Application Number:	10870685
International Application Number:	
Confirmation Number:	7203
Title of Invention:	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS
First Named Inventor/Applicant Name:	Mark F. Bocko
Customer Number:	27557
Filer:	Tyson B. Benson/Carla Burns
Filer Authorized By:	Tyson B. Benson
Attorney Docket Number:	000687-00339
Receipt Date:	29-NOV-2018
Filing Date:	18-JUN-2004
Time Stamp:	16:09:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	Petition_to_Revive_-_11-29-18.PDF	134012 8ddf74a09b39b438a2c3107d1139727537e590de	no	3

Warnings:

Information:	
Total Files Size (in bytes):	134012
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> 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.</p>	

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT5187109

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
AIR FORCE RESEARCH LABORATORY	03/16/2015
RECEIVING PARTY DATA	
Name:	DR MARK F BOCKO
Street Address:	3045 IDAS LANE
City:	CALEDONIA
State/Country:	NEW YORK
Postal Code:	14423
Name:	DR ZELJKO IGNJATOVIC
Street Address:	76 HARWOOD CIR
City:	ROCHESTER
State/Country:	NEW YORK
Postal Code:	14625
PROPERTY NUMBERS Total: 1	
Property Type	Number
Patent Number:	7289961
CORRESPONDENCE DATA	
Fax Number:	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Phone:	5855204561
Email:	MBOCKO@ROCHESTER.RR.COM
Correspondent Name:	MARK F. BOCKO
Address Line 1:	3045 IDAS LANE
Address Line 4:	CALEDONIA, NEW YORK 14423
NAME OF SUBMITTER:	MARK F BOCKO
SIGNATURE:	/mark f bocko/
DATE SIGNED:	10/13/2018
This document serves as an Oath/Declaration (37 CFR 1.63).	
Total Attachments: 4	

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source=Slide4#page1.tif

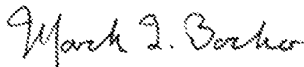
October 13, 2018

To Whom it may concern:

We are requesting a change of Assignee for Patent US 7289961 to the inventors, Mark F. Bocko and Zeljko Ignjatovic. This patent was assigned originally to the University of Rochester, our employer, on September 8, 2004, with confirmatory license assigned to the Air Force Research Lab, the government research sponsor, on January 12, 2005. On 2/20/2015 the University waived its invention rights, including rights to patent 7289961, to the government. Please see Appendix A for the relevant iEdison Invention Report. On 3/16/15 the government waived the patent rights to the inventors, Mark F. Bocko and Zeljko Ignjatovic, see Appendix B for the relevant iEdison patent report. There was no additional assignment between the UR and the inventors in 2015, because the AFRL did not take further actions to request a separate assignment form between the contractor and the employee/inventors pursuant to 35 USC Section 202(d) and 37 CFR § 401.9. In the intervening period we have not been requested to relinquish our rights, nor has the government asserted "march in rights" in the patent, and therefore we believe that at present we hold the rights to this patent and thus request this change of Assignee.

In a separate action we will be petitioning the USPTO to reinstate this expired patent due to our unintentional failure to pay the eight-year patent maintenance fee by October 30, 2015. We make this petition on the grounds that in 2015 the AFRL did not notify us that the patent rights had been assigned to the inventors (ourselves) thereby making us responsible for paying the maintenance fee. We learned only recently (June 2018) that we were assigned the patent rights to patent US7289961 on 3/16/15.

Thank you.
Sincerely,



Mark F. Bocko

Invention Report

The report you requested is displayed below.
Click on the Invention Report Number to go directly to the selected invention report record.

Invention Report Number:	7847181-02-0062
Grantee/Contractor Organization:	UNIVERSITY OF ROCHESTER
Grantee/Contractor Organization Code:	7847181
DOI # Number:	
Invention Disclosure Accepted Date:	08/17/2011
Invention Disclosure Rejected Date:	
Research Tools Guidelines Agreement Accepted:	
Research Tools Guidelines Agreement Accepted Date:	
Invention Docket Number:	2-11144-03024

Invention Title: Data Hiding Methods in Audio Signals

Invention Keywords:

Inventors:

- Mark F Bocko
- Seljko Ignjatovic

Invention Report Date:	01/04/2003
Primary Agency:	AFRL/RI

Funding Agencies & Supporting Grant/Contract Numbers:

Agency Designation	Grant/Contract Number
AFRL/RI	F30602-02-1-0129

Date of 1st publication on sale or public use:	
Title Election Date:	06/19/2003
Invention Status:	Not Elect Title - Waived
Waive To Requested:	GOVERNMENT
Not Elect Title Reason:	Low Commercial Potential
Not Elect Title - Other Text:	
Waive Date:	02/20/2015
Parent Invention Report Number:	
Organizations to View Invention:	

Subcontracts:

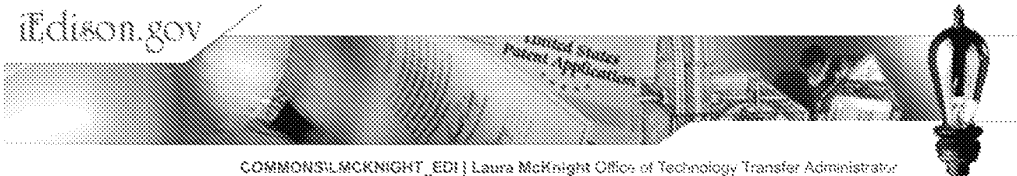
Invention Creation Date:	01/07/2003 01:21 AM
Last Updated Date:	02/20/2015 11:06 AM

[Go Back to Generate Invention Report](#)

Appendix B - 03/16/2015 iEdison Patent Record indicating patent status, "WAIVE TO GOVERNMENT" and Final Patent Rights Determination. "WAIVE TO INVENTOR(S)"

4/20/2018

Patent Record



COMMONSILMCKNIGHT_ED1 | Laura McKnight Office of Technology Transfer Administrator

[Main Menu](#) [Search Inventions](#) [Search Patents](#) [Search Utilization](#) [Search Documents](#) [Search iEdison Account](#)

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View Patent Record

View Invention/Patent Tree: [Vertical](#) [Horizontal](#)

[Edit Patent](#)

Invention Report Number 7047101-03-0002
DOE "S" Number
Grantee/Contractor Organization UNIVERSITY OF ROCHESTER (7047101)
Patent Docket Number 03-0002-20
^ Type of Patent Application ORD
^ U.S. Patent Title Data Hiding via Phase Manipulation of Audio Signals
Keyword(s)
^ Inventor(s) Mark F Bocko
Zeljko Ignjatovic
Provisional Patent Application Number
Filing Date of Provisional Patent Application required if Provisional Application number supplied
Non-Provisional Patent Application Number 10/970,665
Filing Date of Non-Provisional Patent Application required if Non-Provisional Application number supplied 06/18/2004
PCT Patent Application Number
Filing Date of PCT Patent Application required if PCT number supplied
Patent Number 7289661
Patent Issue Date required if Patent number supplied 10/30/2007
Patent Expiration Date 10/30/2027
Explanatory Notes
Government Notes
Foreign Filings
^ Patent Status WAIVE TO GOVERNMENT
Parent Patent Docket Number
Parent Patent Organization Code 7047101
Other Related Inventions
Organization Code for Other Organizations to View This Patent
Current Government Support Clause [View Current Document](#)
Government Support Clause Accepted Date 08/17/2011
Government Support Clause Reject Date

4/20/2018

Patent Record

Government Support Clause
Reject Comment

Current Confirmatory License [View Content Document](#)

Confirmatory License
Accepted Date 01/13/2008

Confirmatory License Reject
Date

Confirmatory License Reject
Comment

[Final Patent Rights
Determination](#) [WAVE TO INVESTORS](#)

[Final Patent Rights
Determination Date](#) 03/16/2008

Domestic Waiver Decision No

Domestic Waiver Decision
Date

Other Documents

Document Name	File	File Type	Document Category	Created By	Last Updated By

Exit Patent

SEASON- 2587

<https://public.wva.nih.gov/licenses/patent/record.asp?method=edit&patentid=53336>

2/2



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/870,685	10/30/2007	7289961	000687-00339	7203

27557 7590 10/10/2007
BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037

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 107 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

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

Mark F. Bocko, Caledonia, NY;
Zeljko Ignjatovic, Rochester, NY;

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)

27557 7590 06/22/2007

BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037

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.
10/870,685	06/18/2004	Mark F. Bocko	000687-00339	7203

TITLE OF INVENTION: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$0	\$1000	09/24/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAN, QI	2626	380-253000

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, 1 Blank Rome LLP
 (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. 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 University of Rochester (B) RESIDENCE: (CITY and STATE OR COUNTRY) Rochester, NY

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 three (3)

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 23-2185 (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 [Signature] Date 02 FC:1504 September 20, 2007
 Typed or printed name Michael C. Greenbaum Registration No. 28,419

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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NOTICE OF ALLOWANCE AND FEE(S) DUE

27557 7590 06/22/2007

BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037

EXAMINER

HAN, QI

ART UNIT PAPER NUMBER

2626

DATE MAILED: 06/22/2007

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

10/870,685 06/18/2004 Mark F. Bocko 000687-00339 7203

TITLE OF INVENTION: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional YES \$700 \$300 \$0 \$1000 09/24/2007

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)

27557 7590 06/22/2007

BLANK ROME LLP
 600 NEW HAMPSHIRE AVENUE, N.W.
 WASHINGTON, DC 20037

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.
10/870,685	06/18/2004	Mark F. Bocko	000687-00339	7203

TITLE OF INVENTION: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$0	\$1000	09/24/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
HAN, QI	2626	380-253000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "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.</p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1</p> <p>(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. _____ 2</p> <p>_____ 3</p>
---	---

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

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> 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).</p>
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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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Table with columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
10/870,685 06/18/2004 Mark F. Bocko 000687-00339 7203
27557 7590 06/22/2007
BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037
EXAMINER HAN, QI
ART UNIT 2626 PAPER NUMBER
DATE MAILED: 06/22/2007

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 107 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 107 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.

Notice of Allowability	Application No.	Applicant(s)	
	10/870,685	BOCKO ET AL.	
	Examiner	Art Unit	
	Qi Han	2626	

-- 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 04/23/2007.
2. The allowed claim(s) is/are 3-5, 12, 13, 16-18, 25 and 26.
3. 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.**

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____.
 - (b) 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)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
|--|---|


RICHMOND DORVIL
SUPERVISORY PATENT EXAMINER



Used in Lieu of PTO/SB/08A/B
(Based on PTO 04-07 version)

Substitute for form 1449/PTO		<i>Complete if Known</i>	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Application Number	10/870,685
		Filing Date	June 18, 2004
		First Named Inventor	Mark F. BOCKO
		Art Unit	2626
		Examiner Name	Q. Han
Sheet	1	of	1
		Attorney Docket Number	000687.0339

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ²	(if known)			

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. ¹	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ³
		Country Code ⁴	Number-Kind Code ⁵				

*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.18 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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
24		H. J. Kim, et al. "Audio watermarking techniques", in <i>Intelligent Watermarking Techniques</i> , H. C. Huang, H. M. Hang, and J. S. Pan, (Editor), World Scientific Publishing Co., May 2004.	

*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.

Examiner Signature		Date Considered	6/18/07
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000687.00339/35796964v.1



Approved for use through 07/31/2008. OMB C651-C031
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Substitute for form 1448A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>	Complete if Known <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Application Number</td><td>10/870,685</td></tr> <tr><td>Filing Date</td><td>June 18, 2004</td></tr> <tr><td>First Named Inventor</td><td>Mark F. Bocko, et al.</td></tr> <tr><td>Art Unit</td><td>2841</td></tr> <tr><td>Examiner Name</td><td>Unassigned</td></tr> <tr><td>Attorney Docket Number</td><td>000687-00339</td></tr> </table>	Application Number	10/870,685	Filing Date	June 18, 2004	First Named Inventor	Mark F. Bocko, et al.	Art Unit	2841	Examiner Name	Unassigned	Attorney Docket Number	000687-00339
Application Number	10/870,685												
Filing Date	June 18, 2004												
First Named Inventor	Mark F. Bocko, et al.												
Art Unit	2841												
Examiner Name	Unassigned												
Attorney Docket Number	000687-00339												
Sheet 1 of 2													

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US-6,737,957	May 18, 2004	Petrovic, et al.	
		US-6,792,542	September 14, 2004	Lee, et al.	
		US-6,430,301	August 6, 2002	Petrovic, et al.	
		US-6,427,012	July 30, 2002	Petrovic, et al.	
		US-6,175,627	January 16, 2001	Petrovic, et al.	
		US-6,675,146	January 6, 2004	Rhoads	
		US-6,674,876	January 6, 2004	Hannigan, et al.	
		US-6,654,480	November 25, 2003	Rhoads	
		US-6,647,129	November 11, 2003	Rhoads	
		US-6,647,128	November 11, 2003	Rhoads	
		US-6,633,654	October 14, 2003	Hannigan, et al.	
		US-6,567,780	May 20, 2003	Rhoads	
		US-6,560,350	May 6, 2003	Rhoads	
		US-6,560,349	May 6, 2003	Rhoads	
		US-6,442,283	August 27, 2002	Tewfik, et al.	
		US-6,404,898	June 11, 2002	Rhoads	
		US-6,363,159	March 26, 2002	Rhoads	
		US-6,266,430	July 24, 2001	Rhoads	


FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	†
		Country Code ² Number ³ Kind Code ⁴ (if known)				

Examiner Signature		Date Considered	4/3/06
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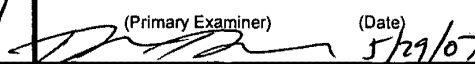
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kind 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.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/870,685	BOCKO ET AL.	
	Examiner	Art Unit	
	Qi Han	2626	

ISSUE CLASSIFICATION										
ORIGINAL					CROSS REFERENCE(S)					
CLASS	SUBCLASS				CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
704	273				704	270	253			
INTERNATIONAL CLASSIFICATION										
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QI HAN 5/21/07 (Assistant Examiner) (Date)	RICHEMOND DORVIL SUPERVISORY PATENT EXAMINER (Primary Examiner) (Date)	Total Claims Allowed: 10				
<i>MDS</i> 5/29/07 (Legal Instruments Examiner) (Date)	 5/29/07	<table border="1" style="width: 100%;"> <tr> <td>O.G. Print Claim(s)</td> <td>O.G. Print Fig.</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> </table>	O.G. Print Claim(s)	O.G. Print Fig.	3	3
O.G. Print Claim(s)	O.G. Print Fig.					
3	3					

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original
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	2		32		62		92
1	3		33		63		93
2	4		34		64		94
3	5		35		65		95
	6		36		66		96
	7		37		67		97
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Index of Claims



Application/Control No.

10/870,685

Examiner

Qi Han

Applicant(s)/Patent under Reexamination

BOCKO ET AL.

Art Unit

2626

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date			
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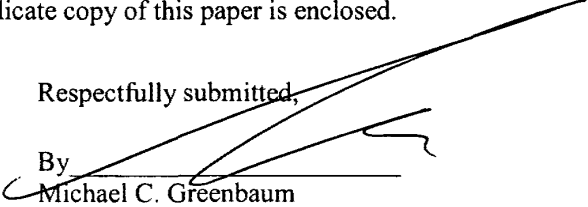
Claim		Date			
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It is not believed that a fee is required in this matter, since Applicants previously submitted the attached prior art on March 8, 2005 and are merely re-submitting the prior art. However, if such a fee is required, the Commissioner is authorized to charge Deposit Account No. 23-2185 (000687-00339) in the amount of \$180.00 covering the fee set forth in 37 CFR 1.17(p) or any other fee as required. A duplicate copy of this paper is enclosed.

Dated: June 7, 2007

Respectfully submitted,

By


Michael C. Greenbaum

Registration No.: 28,419

BLANK ROME LLP

Correspondence Customer Number: 27557

Attorney for Applicant



Used in Lieu of PTO/SB/08A/B
(Based on PTO 04-07 version)

Substitute for form 1449/PTO			Complete if Known		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>			Application Number	10/870,685	
			Filing Date	June 18, 2004	
			First Named Inventor	Mark F. BOCKO	
			Art Unit	2626	
			Examiner Name	Q. Han	
Sheet	1	of	1	Attorney Docket Number	000687.0339

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)				

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. ¹	Foreign Patent Document		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
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)					

*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.

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
		H. J. Kim, et al. "Audio watermarking techniques", in <i>Intelligent Watermarking Techniques</i> , H. C. Huang, H. M. Hang, and J. S. Pan, (Editor), World Scientific Publishing Co., May 2004.	

*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.

Examiner Signature		Date Considered	
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000687.00339/35796964v.1



Approved for use through 07/31/2009. OMB 0551-0031
 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
 Under the Paperwork Reduction Project of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1448A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>	Complete if Known												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Application Number</td> <td>10/870,685</td> </tr> <tr> <td>Filing Date</td> <td>June 18, 2004</td> </tr> <tr> <td>First Named Inventor</td> <td>Mark F. Bocko, et al.</td> </tr> <tr> <td>Art Unit</td> <td>2841</td> </tr> <tr> <td>Examiner Name</td> <td>Unassigned</td> </tr> <tr> <td>Attorney Docket Number</td> <td>000687-00339</td> </tr> </table>	Application Number	10/870,685	Filing Date	June 18, 2004	First Named Inventor	Mark F. Bocko, et al.	Art Unit	2841	Examiner Name	Unassigned	Attorney Docket Number	000687-00339
Application Number	10/870,685												
Filing Date	June 18, 2004												
First Named Inventor	Mark F. Bocko, et al.												
Art Unit	2841												
Examiner Name	Unassigned												
Attorney Docket Number	000687-00339												
Sheet 1 of 2													

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US-6,737,957	May 18, 2004	Petrovic, et al.	
		US-6,792,542	September 14, 2004	Lee, et al.	
		US-6,430,301	August 6, 2002	Petrovic, et al.	
		US-6,427,012	July 30, 2002	Petrovic, et al.	
		US-6,175,627	January 16, 2001	Petrovic, et al.	
		US-6,675,148	January 6, 2004	Rhoads	
		US-6,674,876	January 6, 2004	Hannigan, et al.	
		US-6,654,480	November 25, 2003	Rhoads	
		US-6,647,129	November 11, 2003	Rhoads	
		US-6,647,128	November 11, 2003	Rhoads	
		US-6,633,654	October 14, 2003	Hannigan, et al.	
		US-6,667,780	May 20, 2003	Rhoads	
		US-6,560,350	May 6, 2003	Rhoads	
		US-6,560,349	May 6, 2003	Rhoads	
		US-6,442,283	August 27, 2002	Tewfik, et al.	
		US-6,404,898	June 11, 2002	Rhoads	
		US-6,363,159	March 26, 2002	Rhoads	
		US-6,266,430	July 24, 2001	Rhoads	

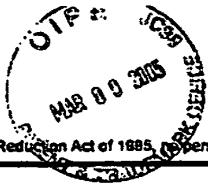
FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. ¹	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³	Number ⁴ Kind Code ⁵ (if known)				

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.



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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 <i>(Use as many sheets as necessary)</i>			Complete if Known		
			Application Number	10/870,685	
			Filing Date	June 18, 2004	
			First Named Inventor	Mark F. Bocko, et al.	
			Art Unit	2841	
			Examiner Name	Unassigned	
			Attorney Docket Number	000687-00339	
Sheet	2	of	2		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.†	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T‡
		"Audio Watermarking Techniques", H. Kim, Kangwon National University, Korea, pp. 1-17	
		"Audio Signal Watermarking Based on Replica Modulation", Rade Petrovic, Telsika 2001, Yugoslavia, September 19-21, 2001, pp. 227-234	
		"Data Hiding Within Audio Signals", Rade Petrovic, et al., Telsika 1999, October 13-15, 1999, pp. 88-95	

no date so that
 it cannot be considered
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 5/1/07

Examiner Signature		Date Considered	5/1/07
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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.

† Applicant's unique citation designation number (optional). ‡ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.

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EAST Search History

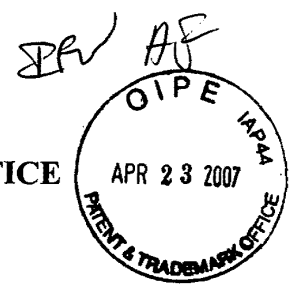
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L3	0	704/270.ccls. and @ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) same (phase with difference)	US-PGPUB; USPAT	OR	ON	2007/05/21 19:19
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EAST Search History

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Docket No. 000687-00339



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: Mark Bocko et al.

GAU: 2626

Serial No: 10/870,685

Examiner: Qi Han

Filed: June 18, 2004

For: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

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

Sir:

Transmitted herewith is an amendment in the above-identified application.

- No additional fee is required
- This application qualifies for small entity status. 37 C.F.R. §1.27.
- Additional documents filed herewith:

Claims	Claims Remaining	Highest Number Prev. Paid		Number of Extra Claims	Rate	Fee
Total	10	28	-20	0	\$50	\$0.00
Independent	3	6	-3	0	\$200	\$0.00
		<input type="checkbox"/> Multiple Dependent Claims			\$360	\$0.00
TOTAL OF ABOVE CALCULATIONS						\$0.00
		<input type="checkbox"/> Reduction by 50% for filing by Small Entity				\$0.00
		<input type="checkbox"/> Recordation of Assignment			\$40.00	\$0.00
TOTAL						\$0.00

A check in the amount of _____ is attached.

Please charge any additional Fees for the papers being filed herewith and for which no check is enclosed herewith, or credit any overpayment to deposit Account No. 23-2185. A duplicate copy of this sheet is enclosed.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time may be charged to Deposit Account No. 23-2185. A duplicate copy of this sheet is enclosed.

BLANK ROME LLP
600 New Hampshire Avenue, N.W.
Washington, DC 20037
TEL (202) 944-3000
FAX (202) 572-8398

BLANK ROME LLP

David J. Edmondson
Registration No. 35,126

Customer No. 27557

Date: April 23, 2007



Patent Application No. 10/870,685
Attorney Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)	
	)	Examiner: Qi Han
Mark Bocko et al)	
	)	Art Unit: 2626
Application No.: 10/870,685)	
	)	Confirmation No.: 7203
Filed: June 18, 2004)	
	)	Atty. Dkt. No.: 000687-00339
For:: Data Hiding Via Phase Manipulation of)	
Audio Signals	)	Date: April 23, 2007
	)	(April 22 was a Sunday)

AMENDMENT AFTER FINAL REJECTION

Mail Stop AF

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

Sir:

The present Amendment is filed in response to an Office Action mailed January 22, 2007. Please amend the above-captioned application as follows.

Amendments to the claims begin on page 2 of the present Amendment

Remarks begin on page 6 of the present Amendment.

In the claims:

Please amend the claims as follows:

Claims 1 and 2 (Cancelled).

3. (Currently Amended) ~~The method of claim 1~~ A method for embedding data in an audio signal, the method comprising:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and

(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded, wherein:

step (b) comprises selecting a fundamental tone and at least one overtone; and

step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

4. (Original) The method of claim 3, wherein:

step (b) comprises selecting a plurality of said overtones; and

step (c) comprises quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.

5. (Original) The method of claim 4, wherein step (c) further comprises inverse transforming the plurality of frequency components with the quantized phase differences.

Claims 6-11 (Cancelled).

12. (Currently Amended) ~~The method of claim 10,~~ A method for extracting embedded data from an audio signal, the method comprising:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

(c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

(d) from the phase shift determined in step (c), extracting the embedded data, wherein step (b) comprises selecting a fundamental tone and at least one overtone.

13. (Original) The method of claim 12, wherein step (b) comprises selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining the phase shift in each of the plurality of overtones.

Claims 14 and 15 (Cancelled).

16. (Currently Amended) ~~The device of claim 14,~~ A device for embedding data in an audio signal, the device comprising:

an input for receiving the audio signal and the data to be embedded;

a processor, in communication with the input, for:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and

(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded; and

an output, in communication with the processor, for outputting a result of step (c) as the audio signal with the embedded data, wherein:

the processor performs step (b) by selecting a fundamental tone and at least one overtone; and

the processor performs step (c) by quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

17. (Original) The device of claim 16, wherein:

the processor performs step (b) by selecting a plurality of said overtones; and

the processor performs step (c) by quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.

18. (Original) The device of claim 17, wherein the processor performs step (c) further by inverse transforming the plurality of frequency components with the quantized phase differences.

Claims 19-24 (Cancelled).

25. (Currently Amended) ~~The device of claim 23~~ A device for extracting embedded data from an audio signal, the device comprising:

an input for receiving the audio signal;

a processor, in communication with the input, for:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

(c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

(d) from the phase shift determined in step (c), extracting the embedded data; and

an output for outputting the embedded data, wherein the processor performs step (b) by selecting a fundamental tone and at least one overtone.

26. (Original) The device of claim 25, wherein the processor performs step (b) by selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining the phase shift in each of the plurality of overtones.

Claims 27-32 (Cancelled).

REMARKS

The Office Action mailed January 22, 2007, has been carefully considered. In response thereto, the present application has been amended in a manner which is believed to place it into condition for allowance. Accordingly, reconsideration and withdrawal of the outstanding Office Action and issuance of a Notice of Allowance are respectfully solicited in view of the foregoing amendments and the following remarks.

Allowable subject matter

At the outset, the Applicants acknowledge with appreciation the indication of allowable subject matter in claims 3-5, 12-13, 16-18 and 25-26. As those claims have been rewritten in independent form, the Applicants respectfully submit that the objection to those claims as being dependent on a rejected base claim has been overcome and that those claims are now clearly in condition for allowance.

Rejected claims

As the rejected claims have been canceled, the Applicants respectfully submit that all grounds of rejection under 35 U.S.C. §§ 101, 102 and 103 are moot.

Conclusion

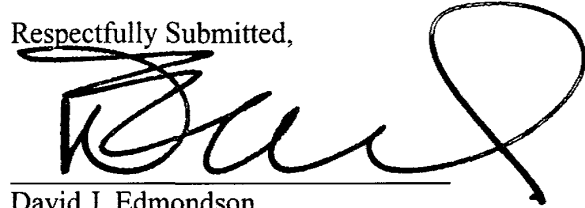
For the reasons set forth above, the Applicants respectfully submit that entry of the present Amendment is appropriate and that the application as amended is in condition for allowance. Notice of such allowance is respectfully solicited.

In the event there are any questions relating to this Amendment or to the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

Please charge any deficiency in fees, or credit any overpayment thereof, to the account of Blank Rome, LLP, Deposit Account No. 23-2185 (000687-00339). In the event that a Petition for Extension of Time is required to render the present Amendment timely and either does not

accompany the present Amendment or does not suffice to render the present Amendment timely, the Applicants respectfully petition under 37 C.F.R. § 1.136(a) for an extension of time for as many months as are required to render the present Amendment timely. Any fee due is authorized above.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'David J. Edmondson', written over a horizontal line.

David J. Edmondson
Reg. No. 35,126

Blank Rome LLP
600 New Hampshire Ave., N.W.
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/870,685	Filing Date 06/18/2004	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED - PART I			SMALL ENTITY <input checked="" type="checkbox"/> OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		OR	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		OR	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		OR	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				OR		
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					OR		
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		OR	TOTAL	

APPLICATION AS AMENDED - PART II					SMALL ENTITY OR OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	10/24/2006	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR				OR		
	Total (37 CFR 1.16(i))	* 32	Minus ** 28	= 4	X \$25 =	100	OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 6	Minus *** 6	= 0	X \$100 =	0	OR	X \$ =	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR		
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE	100	OR	TOTAL ADD'L FEE	

APPLICATION AS AMENDED - PART II					SMALL ENTITY OR OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	12/3/07	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR				OR		
	Total (37 CFR 1.16(i))	* 10	Minus ** 28	= 4	X \$ =		OR	X \$ =	
	Independent (37 CFR 1.16(h))	* 6	Minus *** 6	= 0	X \$ =		OR	X \$ =	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR		
<input type="checkbox"/> 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 number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Legal Instrument Examiner:
 Vikki Short

ak



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/870,685	06/18/2004	Mark F. Bocko	000687-00339	7203
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27557 7590 01/22/2007
 BLANK ROME LLP
 600 NEW HAMPSHIRE AVENUE, N.W.
 WASHINGTON, DC 20037

EXAMINER

HAN, QI

ART UNIT	PAPER NUMBER
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2626

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS	01/22/2007	PAPER
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/870,685	Applicant(s) BOCKO ET AL.	
	Examiner Qi Han	Art Unit 2626	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 10/24/2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-32 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-2, 6-11, 14-15, 19-24, 27-32 is/are rejected.
- 7) Claim(s) 3-5, 12, 13, 16-18, 25 and 26 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 24 October 2006 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Amendment

2. This communication is responsive to the applicant's amendment dated 10/24/2006. The applicant(s) added claims 29-32 (see the amendment: page 7).

The examiner withdraws the disclosure objection, because the applicant made amendment (see the amendment: page 2).

Response to Arguments

3. Applicant's arguments filed on 10/24/2006 with respect to the corresponding claim rejection under 35 USC 101 and 102/103, have been fully considered but they are not persuasive.

In response to applicant's arguments with respect to rejection of claim 27 under 35 USC 101 that "the machine-readable storage medium and the audio signal are analogous to the memory and the data structure of Lowry, and there is nothing to distinguish the present claimed invention either legally or factually from the invention claimed in Lowry" (the amendment: page 8, paragraph 5), the examiner respectfully disagrees with applicant's argument and has a different view of understanding the rejection under 35 USC 101 and the claim interpretation. Firstly, it is noted that the claimed "an article of manufacture" in the preamble appears, in the

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surface, to fall within the statutory classes (manufacture). However, the limitation in the body recites nothing more than claiming an audio signal recorded on a machine-readable storage medium, which can be interpreted as claiming a type of energy (signal) that falls within 35 USC 101 Judicial Exceptions, i.e. a physical phenomena. Since the claim, as whole, only involve storing audio signal and the result is still a type of energy (signal) in nature, the claimed invention would not produce a useful, tangible, and concrete result in a practical application. Therefore, the claim, as whole, is directed to non-statutory subject matter. Secondly, it is noted that data structure is not audio signal and the claimed limitation does not include any "data structure" at all, so that, the argued analogousness is not proper and lacks comparison in term of patent subject matter eligibility. Thirdly, the claim may also be interpreted as merely claiming nonfunctional descriptive material (audio signal), i.e. abstract idea, stored in a machine-readable storage medium, which does not make the claim statutory either, because no requisite functionality is present to satisfy the practical application requirement.

In response to applicant's arguments with respect to rejection of claim 28 under 35 USC 101 that "in one of the patents cited by the Office..., claims ...are directed to a data signal embodied in a carrier wave" (the amendment: pages 8-9, bridge paragraph), it should be understood that at this point the examiner cannot comment a patent subject matter eligibility of another patent, based on the office policy. It is also noted that the examiner follows latest "Interim Guidelines for Examination of patent applications for patent subject matter Eligibility", which is published in 1300 Off. Gazette Patent Office 142 (November 22, 2005). Finally, for the instant claim, it recites "a signal structure embodied in a carrier wave, which, as whole, substantially claims a type of energy (signal), which does not fall within any of statutory

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categories under 35 USC 101. Therefore, the claim, as whole, is directed to nonstatutory subject matter.

In response to applicant's arguments with respect to claim rejection under 35 USC 102/103 that the reference (Iliev, et al.) does not teach "step (b) of claim 1" since "the portion of Iliev, et al. cited for such teaching actually does not mention selecting frequency components..." (the amendment: page 9, paragraph 3), the examiner has a different view of the prior art teachings and the claim interpretations. It is noted the limitation "(b)...selecting **at least two** of the plurality of frequency components" is broad, so that, as stated in the rejection, the Iliev's disclosure 'the resulting frequency components located at about each 21.5Hz apart were considered (selected) as stimuli' is properly read on the claimed limitation, based on broadest reasonable interpretation of the claim.

For above reasons, the applicant's arguments are not persuasive and the rejection is sustained.

Further, regarding the newly added claims 29-32, the response to applicant's arguments (the amendment: page 9, paragraph 5 to page 10 paragraph 2), is directed to the claim rejection (see below). It is note that even though the newly added claims introduce new issue and change the scope of the claims, the previous cited references are still applicable to the prior art rejection (see below).

Claim Rejections - 35 USC § 101

4. Claims 27-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

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Regarding claim 27, it recites “an article of manufacture comprising: a machine-readable storage medium; and an audio signal recorded on the machine-readable storage medium, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase shifted to embed data in the audio signal”. It is noted that even though the claimed “an article of manufacture” in the preamble appears, in the surface, to fall within the statutory classes (manufacture), the limitation in the body recites nothing more than claiming an audio signal recorded on a machine-readable storage medium, which can be interpreted as claiming a type of energy (signal) that falls within 35 USC 101 Judicial Exceptions, i.e. a physical phenomena. Since the claim, as whole, only involve storing audio signal and the result is still a type of energy (signal) in nature, the claimed invention would not produce a useful, tangible, and concrete result in a practical application. Therefore, the claim, as whole, is directed to non-statutory subject matter. Further, the claim may also be interpreted as merely claiming nonfunctional descriptive material (audio signal), i.e. abstract idea, stored in a machine-readable storage medium, which does not make the claim statutory either, because no requisite functionality is present to satisfy the practical application requirement. Therefore the claim, in either interpretation, is nonstatutory.

Regarding claim 28, it recites “a signal structure embodied in a carrier wave, the signal structure comprising an audio signal, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase-shifted to embed data in the audio signal”. It is noted that the claimed signal structure (a type of energy), as whole, claims a type of energy (signal), which does not fall within any of statutory categories under 35 USC 101. Therefore, the claim, as whole, is directed to nonstatutory subject matter.

5. To expedite a complete examination of the instant application the claims rejection under 35 U.S.C 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 102

6. Claims 1, 10, 14, 23 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by ILIEV et al. (US 6,996,521 B2) hereinafter referenced as ILIEV.

As per **claim 1**, ILIEV discloses auxiliary channel masking in an audio signal (title) to ‘embedding data into an audio signal and detecting data embedded in to an audio signal’ (col. 1, lines 13-14), comprising:

“(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components” (col. 5, lines 33-39, ‘short-time Fourier analysis’, ‘FFT was applied on 1024-point rectangular windows (time frame)’, ‘the resulting frequency components located at about each 21.5 Hz apart’);

“(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components” (col. 5, lines 33-39, ‘the resulting frequency components located at about each 21.5 Hz apart were considered (selected) as independent stimuli (inherently including multiple frequency components in a frame)’); and

“(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded” (col. 5, lines 33-39, ‘FFT algorithm provided the

phase value of each component'; col. 6, lines 48-64, 'encoding a single-bit-per-frequency-component' and 'to alter the phase of the left channel').

As per **claim 10**, it recites a method for extracting embedded data from an audio data. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) that is simply inversed operation of method claim 1, wherein 'decoder of an auxiliary channel' (ILIEV: Fig. 7 and col. 7, line 46 to col. 8, line 30) is read on the claimed "(d) from the phase shift determined in step (c), extracting the embedded data".

As per **claim 14**, it recites a device. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

As per **claim 23**, it recites a device. The rejection is based on the same reason described for claim 10, because the claim recites the same or similar limitation(s) as claim 10.

As per **claim 27**, the rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

As per **claim 28**, the rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

Claim Rejections - 35 USC § 103

7. Claims 2, 8-9, 11, 15, 21-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over ILIEV in view of KOBAYASHI et al. (US 6,526,385 B1) hereinafter referenced as KOBAYASHI.

As per **claim 2** (depending on claim 1), even though ILIEV discloses "altering a relative phase of the two frequency components in accordance with the data to be embedded" (col. 7,

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lines 1-5, 'collects all the frequency components of the left channel, constructs the new frequency representation of the left channel which contains the masked (embedded) data'), ILIEV does not expressly disclose "selecting two of the plurality of frequency components in accordance with a **pseudo-random sequence**". However, this feature is well known in the art as evidenced by KOBAYASHI who discloses system for embedding additional information in audio data' (title), comprising using 'pseudo-random numbers (sequence) with the phase direction' and 'the phase of an embedded signal' (col. 20, lines 55-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify ILIEV by providing using pseudo-random numbers (sequence) with the phase of an embedded signal, as taught by KOBAYASHI, for the purpose of maintaining a high sonic quality and high robustness for the embedded information in audio data (KOBAYASHI: col. 3, lines 27-28).

As per **claims 8-9** (depending on claim 1), ILIEV does not expressly disclose "wherein the audio signal undergoes lossy compression **before** steps (a)-(c)" (for claim 8) and "after steps (a)-(c)" (for claim 9). However, this feature is well known in the art as evidenced by KOBAYASHI who further discloses 'a method and a system, for embedding additional information in audio data...is robust against destruction during the data processing, such as the compression/decompression of data and the addition of random noise to individual frequency components' (col. 3, lines 35-39), which suggests the system has capability of implementing the functionality as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify ILIEV by providing a robust method/system against destruction during the data processing, such as the compression/decompression of data,

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as taught by KOBAYASHI, for the purpose of maintaining a high sonic quality and high robustness for the embedded information in audio data (KOBAYASHI: col. 3, lines 27-28).

As per **claim 11** (depending on claim 10), the rejection is based on the same reason described for claim 2, because the claim recites the same or similar limitation(s) as claim 2.

As per **claim 15** (depending on claim 14), the rejection is based on the same reason described for claim 2, because the claim recites the same or similar limitation(s) as claim 2.

As per **claims 21-22** (depending on claim 14), the rejection is based on the same reason described for claims 8-9 respectively, because the claims recite the same or similar limitation(s) as claims 8-9 respectively.

As per **claim 24** (depending on claim 23), the rejection is based on the same reason described for claim 11, because the claim recites the same or similar limitation(s) as claim 11.

8. Claims 6-7 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over ILIEV in view of GANG et al. ("MP3 resistant oblivious steganography", Acoustics, Speech, and Signal Processing, 2001, Proceedings. (ICASSP '01). IEEE, international conference, 7-11 May 2001, page 1365-1368 vol. 3) hereinafter referenced as GANG.

As per **claim 6** (depending on claim 1), ILIEV does not expressly disclose "(d) reducing a phase discontinuity at boundaries of the time frames caused by step (c)". However, this feature is well known in the art as evidenced by GANG who discloses 'MP3 resistant oblivious steganography' (title), comprising 'a phase hiding scheme' to 'modify the initial phase while keeping the relative phase between adjacent frames (including boundaries of the time frames) unchanged (reducing a phase discontinuity)' (page 1367, left col., section 3.2). Therefore, it

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would have been obvious to one of ordinary skill in the art at the time the invention was made to modify ILIEV by providing a phase hiding scheme with keeping the relative phase between adjacent frames, as taught by GANG, for the purpose (motivation) of reducing ‘abrupt phase change (discontinuity)’ for the ‘data hiding’ since ‘human beings are sensitive to phase continuity between frames’ (GANG: page 1367, left col., section 3.2).

As per **claim 7** (depending on claim 6), the rejection is based on the same reason described for claim 6, because the rationale for claim 6 covers the same or similar limitations as claim 7, wherein ‘modify the initial phase while keeping the relative phase between adjacent frames unchanged’ (GANG: page 1367, left col., section 3.2) is read on the claimed “controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames”.

As per **claims 19-20** (depending on claim 14), the rejection is based on the same reason described for claims 6-7 respectively, because the claims recite the same or similar limitation(s) as claims 19-20 respectively.

9. Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over ILIEV.

As per **claim 29** (depending on claim 1), ILIEV does not expressly disclose “wherein the auto signal is a monaural signal”. However, ILIEV teaches that “the term audio signal encompasses any type of signal comprising audio’ (col. 3, lines 16-17), and ‘the method 600 (similar for decoding method 700) may be applied to just one channel’ (col. 7, lines 43-44 and col. 8, lines 28-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that one channel signal is equivalent to a monaural signal and the phase comparison in a frame of one channel signal can only be made between the

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phases of different frequencies in the frame, and to modify ILIEV by providing using the encoding/decoding method for just one channel signal, as taught by ILIEV himself, because to 'those skilled in that art' would know that 'a variant of the method(s) 'may be applied to just one channel or extended to more channels than just left and right channels' (obviousness or motivation) (ILIEV: col. 7, lines 39-45 and col. 8, lines 23-30).

As per **claim 30** (depending on claim 10), the rejection is based on the same reason described for claim 29, because the claim recites the same or similar limitation(s) as claim 29.

As per **claim 31** (depending on claim 13), the rejection is based on the same reason described for claim 29, because the claim recites the same or similar limitation(s) as claim 29.

As per **claim 32** (depending on claim 23), the rejection is based on the same reason described for claim 29, because the claim recites the same or similar limitation(s) as claim 29.

Allowable Subject Matter

10. Claims 3-5, 12-13, 16-18 and 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowable subject matter:

Regarding dependent **claims 3 and 16**, the instant application is directed to a method and apparatus (device) for embedding data in an audio signal. Each of the dependent claim, combining some well-known features in the art recited the corresponding parent claim(s), identifies the uniquely distinct features of:

step (b) (referring to the step(s) in the independent claim 1 or 14) comprises selecting a fundamental tone (fundamental frequency) and at least one overtone (harmonic frequencies); and step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

Regarding **claims 12 and 25**, the statement is based on the same reason described for claims 3 and 16 respectively, because the claims recite the same or similar limitation(s) that is simply inversed operation of claims 3 and 16 respectively.

Regarding **claims 4-5, 13, 17-18 and 26**, the statement is based on the same reason described for claims 1, 10, 14 and 23 respectively, because these dependent claims inherit all limitations of their parent claim(s).

11. The prior art of record, ILIEV et al. (US 6,996,521 B2), KOBAYASHI et al. (US 6,526,385 B1) and GANG et al. ("MP3 resistant oblivious steganography", ICASSP '01. IEEE), provided numerous teachings and approaches of embedding data into an audio signal and determining (extracting) data embedded into an audio signal, including modifying phase component to embed data, using pseudo-random numbers (sequence) with phase direction to embed additional information, and keeping the relative phase between adjacent frames unchanged for phase continuity propose. However, the combined features stated above, are not anticipated by, nor made obvious over the prior art of the record.

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Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened-statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Please address mail to be delivered by the United States Postal Service (USPS) as follows:

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (571) 272-7604. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (571) 272-7602.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see <http://pair-direct.uspto.gov>.

QH/qh
January 16, 2007



RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER

Index of Claims



Application/Control No.

10/870,685

Examiner

Qi Han

Applicant(s)/Patent under Reexamination

BOCKO ET AL.

Art Unit

2626

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date			
Final	Original	1/16/07			
	1	√			
	2	√			
	3	O			
	4	O			
	5	O			
	6	√			
	7	√			
	8	√			
	9	√			
	10	√			
	11	√			
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Patent Application No. 10/870,685
Attorney Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)	
	)	Examiner: Qi Han
Mark Bocko et al)	
	)	Art Unit: 2626
Application No.: 10/870,685)	
	)	Confirmation No.: 7203
Filed: June 18, 2004)	
	)	Atty. Dkt. No.: 000687-00339
For:: Data Hiding Via Phase Manipulation of)	
Audio Signals	)	Date: October 24, 2006

AMENDMENT

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

Sir:

The present Amendment is filed in response to an Office Action mailed April 24, 2006. Please amend the above-captioned application as follows.

Amendments to the specification begin on page 2 of the present Amendment.

Amendments to the claims begin on page 3 of the present Amendment

Remarks begin on page 8 of the present Amendment.

In the specification:

Please amend the paragraphs of the specification on page 8, lines 21-24, to read as follows:

Figure 11 is a schematic diagram showing a sigma-delta modulator for reducing phase discontinuities; ~~and~~

Figure 12 is a schematic diagram showing a system on which either of the preferred embodiments can be implemented; and

Figure 13 is a flow chart summarizing the preferred embodiments.

Please amend page 15 of the specification by inserting the following new paragraph at line 9:

The preferred embodiments will now be summarized with reference to the flow chart of Figure 13. In step 1302, the audio signal is divided into time frames and frequency components. In step 1304, at least two frequency components are selected. In step 1306, the phases are altered in accordance with the data.

In the claims:

Please amend the claims as follows:

1. (Original) A method for embedding data in an audio signal, the method comprising:
 - (a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;
 - (b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and
 - (c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded.
2. (Original) The method of claim 1, wherein:
 - step (b) comprises selecting two of the plurality of frequency components in accordance with a pseudo-random sequence; and
 - step (c) comprises altering a relative phase of the two frequency components in accordance with the data to be embedded.
3. (Original) The method of claim 1, wherein:
 - step (b) comprises selecting a fundamental tone and at least one overtone; and
 - step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.
4. (Original) The method of claim 3, wherein:
 - step (b) comprises selecting a plurality of said overtones; and
 - step (c) comprises quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.
5. (Original) The method of claim 4, wherein step (c) further comprises inverse transforming the plurality of frequency components with the quantized phase differences.

6. (Original) The method of claim 1, further comprising (d) reducing a phase discontinuity at boundaries of the time frames caused by step (c).

7. (Original) The method of claim 6, wherein step (d) comprises controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames.

8. (Original) The method of claim 1, wherein the audio signal undergoes lossy compression before steps (a)-(c).

9. (Original) The method of claim 1, wherein the audio signal undergoes lossy compression after steps (a)-(c).

10. (Original) A method for extracting embedded data from an audio signal, the method comprising:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

(c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

(d) from the phase shift determined in step (c), extracting the embedded data.

11. (Original) The method of claim 10, wherein step (c) comprises determining which of the plurality of frequency components has the phase shift in accordance with a pseudo-random sequence.

12. (Original) The method of claim 10, wherein step (b) comprises selecting a fundamental tone and at least one overtone.

13. (Original) The method of claim 12, wherein step (b) comprises selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining the phase shift in each of the plurality of overtones.

14. (Original) A device for embedding data in an audio signal, the device comprising:
an input for receiving the audio signal and the data to be embedded;
a processor, in communication with the input, for:
(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;
(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and
(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded; and
an output, in communication with the processor, for outputting a result of step (c) as the audio signal with the embedded data.

15. (Original) The device of claim 14, wherein:
the processor performs step (b) by selecting two of the plurality of frequency components in accordance with a pseudo-random sequence; and
the processor performs step (c) by altering a relative phase of the two frequency components in accordance with the data to be embedded.

16. (Original) The device of claim 14, wherein:
the processor performs step (b) by selecting a fundamental tone and at least one overtone; and
the processor performs step (c) by quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

17. (Original) The device of claim 16, wherein:
the processor performs step (b) by selecting a plurality of said overtones; and

the processor performs step (c) by quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.

18. (Original) The device of claim 17, wherein the processor performs step (c) further by inverse transforming the plurality of frequency components with the quantized phase differences.

19. (Original) The device of claim 14, wherein the processor further performs (d) reducing a phase discontinuity at boundaries of the time frames caused by step (c).

20. (Original) The device of claim 19, wherein the processor performs step (d) by controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames.

21. (Original) The device of claim 14, wherein the processor performs lossy compression on the audio signal before the processor performs steps (a)-(c).

22. (Original) The device of claim 14, wherein the processor performs lossy compression on the audio signal after the processor performs steps (a)-(c).

23. (Original) A device for extracting embedded data from an audio signal, the device comprising:

an input for receiving the audio signal;

a processor, in communication with the input, for:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

(c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

(d) from the phase shift determined in step (c), extracting the embedded data; and

an output for outputting the embedded data.

24. (Original) The device of claim 23, wherein the processor performs step (c) by determining which of the plurality of frequency components has the phase shift in accordance with a pseudo-random sequence.

25. (Original) The device of claim 23, wherein the processor performs step (b) by selecting a fundamental tone and at least one overtone.

26. (Original) The device of claim 25, wherein the processor performs step (b) by selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining the phase shift in each of the plurality of overtones.

27. (Original) An article of manufacture comprising:

a machine-readable storage medium; and

an audio signal recorded on the machine-readable storage medium, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase-shifted to embed data in the audio signal.

28. (Original) A signal structure embodied in a carrier wave, the signal structure comprising an audio signal, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase-shifted to embed data in the audio signal.

29. (New). The method of claim 1, wherein the audio signal is a monaural signal.

30. (New) The method of claim 10, wherein the audio signal is a monaural signal.

31. (New) The device of claim 14, wherein the audio signal is a monaural signal.

32. (New) The device of claim 23, wherein the audio signal is a monaural signal.

REMARKS

The Office Action mailed April 24, 2006, has been carefully considered. In response thereto, the present application has been amended in a manner which is believed to place it into condition for allowance. Accordingly, reconsideration and withdrawal of the outstanding Office Action and issuance of a Notice of Allowance are respectfully solicited in view of the foregoing amendments and the following remarks.

Allowable subject matter

At the outset, the Applicants acknowledge with appreciation the indication of allowable subject matter in claims 3-5, 12-13, 16-18 and 25-26.

Drawings

The Applicants respectfully submit that the present Amendment and the new Fig. 13 filed concurrently herewith overcome the objection to the drawings.

Rejection under 35 U.S.C. § 101

The Applicants respectfully traverse the rejection of claims 27-28 under 35 U.S.C. § 101.

With regard to the article of manufacture of claim 27, the Federal Circuit held in *In re Lowry*, 32 F.3d 1579, 32 U.S.P.Q.2d 1031, 1034-5 (Fed. Cir. 1994), that a claim directed to a memory storing thereon a data structure was directed to patentable subject matter. In the present claimed invention, the machine-readable storage medium and the audio signal are analogous to the memory and the data structure of *Lowry*, and there is nothing to distinguish the present claimed invention either legally or factually from the invention claimed in *Lowry*. Therefore, the Applicants respectfully submit that the subject matter of claim 27 is patentable under 35 U.S.C. § 101.

With regard to the signal structure of claim 28, that is also subject matter which is recognized to be patentable under 35 U.S.C. § 101. In fact, in one of the patents cited by the

Office, namely, U.S. Patent No. 5,937,000 to *Lee et al*, claims 67-69 are directed to a data signal embodied in a carrier wave. Thus, the argument set forth in the Office Action regarding claim 28 calls into question the validity of a granted U.S. patent, which the Office may not do in the present proceeding, MPEP § 1701. Therefore, the Applicants respectfully submit that the subject matter of claim 28 is patentable under 35 U.S.C. § 101.

Rejections over the prior art

Claims 1, 10, 14, 23, 27, and 28 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,996,521 (*Iliev, et al.*). Claims 2, 8, 9, 11, 15, 21, 22, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the patent to *Iliev, et al.* in view of U.S. Patent No. 6,526,385 (*Kobayashi, et al.*). Claims 6, 7, 19, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the patent to *Iliev, et al.* in view of the article to *Gang, et al.* For the reasons set forth below, the Applicants respectfully traverse.

The Applicants respectfully disagree with the contention that *Iliev, et al.* teaches step (b) of claim 1. The portion of *Iliev, et al.* cited for such teaching actually does not mention selecting frequency components; instead, it appears that all of the resulting frequency components are used. Therefore, the Applicants respectfully submit that the applied reference does not anticipate the claimed subject matter.

Since the secondary references do not overcome the above-noted deficiency of *Iliev et al*, the Applicants respectfully submit that neither of the proposed combinations would have rendered obvious the subject matter of any of the claims.

Iliev et al is concerned with the MAA (minimum audible angle) which is intrinsic to stereo or multi-channel audio signals that enable audio imaging. MAA does not apply to monaural signals, which are recited in new claims 29-32. This is the “appearance” that the sound source is at a particular location which is achieved by the phase relationship between the right and left channels of a stereo audio signal (or some appropriate combination of

channel phases in multi-channel extensions of stereo). This concept does not apply to monaural audio signals; therefore, their invention does not apply to monaural signals.

Moreover, the *Iliev et al* method is "content blind". They are simply making phase changes in multi-channel audio that slightly modify the aural imaging properties of the reconstructed sound. They move the apparent location of the sound by less than the MAA. The present claimed invention, by contrast, is based upon the harmonic structure of common audio signals such as speech and music. The present claimed invention selects at least two of the plurality of frequency components of the audio signal and alters a phase of at least one of them. Thus, the present claimed invention applies to monaural or multi-channel audio data files equally well and thereby offers an advantage over *Iliev et al*. Moreover, the present claimed invention allows a greater density of information than does that of *Iliev et al*.

Therefore, the Applicants respectfully submit that the present claimed invention is not anticipated by any of the applied references and would not have been obvious over any of the applied references, whether alone or in combination.

Conclusion

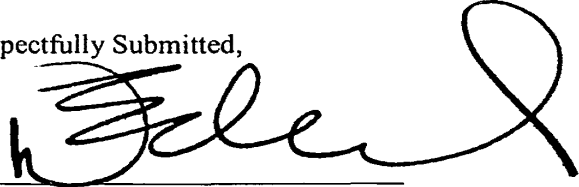
For the reasons set forth above, the Applicants respectfully submit that the application as amended is in condition for allowance. Notice of such allowance is respectfully solicited.

In the event there are any questions relating to this Amendment or to the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

Please charge any deficiency in fees, or credit any overpayment thereof, to the account of Blank Rome, LLP, Deposit Account No. 23-2185 (000687-00339). In the event that a Petition for Extension of Time is required to render the present Amendment timely and either does not accompany the present Amendment or does not suffice to render the present Amendment timely, the Applicants respectfully petition under 37 C.F.R. § 1.136(a) for an extension of time for as

many months as are required to render the present Amendment timely. Any fee due is authorized above.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "D. Edmondson", written over a horizontal line.

David J. Edmondson
Reg. No. 35,126

Blank Rome LLP
600 New Hampshire Ave., N.W.
Washington, D.C. 20037-2485
Telephone 202-772-5838
Facsimile 202-572-1438
MCG/DJE/smj



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Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: Mark Bocko et al. GAU: 2626
Serial No: 10/870,685 Examiner: Qi Han
Filed: June 18, 2004
For: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

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

Sir: Transmitted herewith is an amendment in the above-identified application.

- Checked boxes for: No additional fee is required; This application qualifies for small entity status; Additional documents filed herewith: Petition for Extension of Time and Submission of Formal Drawing and 1 sheet of formal drawing

Table with 7 columns: Claims, Claims Remaining, Highest Number Prev. Paid, Number of Extra Claims, Rate, Fee. Rows include Total, Independent, Multiple Dependent Claims, Reduction by 50%, Recordation of Assignment, and TOTAL.

- Checked boxes for: A check in the amount of 510 is attached; Please charge any additional Fees for the papers being filed herewith; If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136...

BLANK ROME LLP
600 New Hampshire Avenue, N.W.
Washington, DC 20037
TEL (202) 944-3000
FAX (202) 572-8398

Signature of David J. Edmondson
BLANK ROME LLP
David J. Edmondson
Registration No. 35,126

Customer No. 27557
Date: October 24, 2006

The PTO did not receive the following listed item(s) A check \$510.00



Patent Application No. 10/870,685
Attorney Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

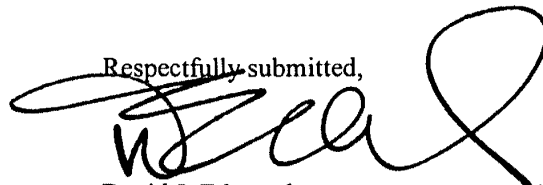
In re Application of)	
	)	Examiner: Qi Han
Mark Bocko et al)	
	)	Art Unit: 2626
Application No.: 10/870,685)	
	)	Confirmation No.: 7203
Filed: June 18, 2004)	
	)	Atty. Dkt. No.: 000687-00339
For:: Data Hiding Via Phase Manipulation of)	
Audio Signals	)	Date: October 24, 2006

SUBMISSION OF FORMAL DRAWING

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

Sir:

Applicants submit herewith one sheet of a new formal drawing containing Figure 13 of the drawings in the above-identified application.

Respectfully submitted,

 David J. Edmondson
 Reg. No. 35,126

BLANK ROME LLP
600 New Hampshire Ave., N.W.
Washington, D.C. 20037-2485
202-772-5838 (Phone)
202-572-1438 (Facsimile)

REPLACEMENT SHEET

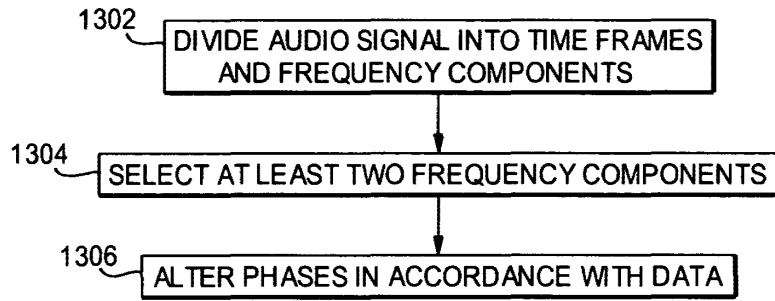


FIG. 13



PTO/SB/22 (08-03)

Approved for use through 7/31/2006. OMB 0651-0031

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

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

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number: 000687-00339
Serial Number: 10/870,685	Confirmation Number: 7203	Filed: June 18, 2004
Inventor(s): Mark Bocko et al.		
For: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS		
Art Unit: 2626	Examiner: Qi Han	
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.		
The requested extension and fees are as follows (check time period desired and enter the appropriate fee below):		
	<u>Fee</u>	<u>Small Entity Fee</u>
<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$120	\$60
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$450	\$225
<input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1020	\$510
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1590	\$795
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2160	\$1080
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. <input checked="" type="checkbox"/> A check in the amount of the fee is enclosed. <input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached. <input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account. <input checked="" type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>23-2185</u>		
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.		
I am the <input type="checkbox"/> applicant/inventor.		
<input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96)		
<input checked="" type="checkbox"/> attorney or agent of record. Registration Number <u>35,126</u>		
<input type="checkbox"/> attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____		
Blank Rome LLP 600 New Hampshire Avenue, N.W. Washington, DC 20037 Tel: (202) 772-5800 Fax: (202) 572-8398 Customer No.: 27557		Respectfully submitted, _____ David J. Edmondson
Date: October 24, 2006		
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.		
<input checked="" type="checkbox"/> Total <u>2</u> forms are submitted.		

This collection of information is required by 37 CFR 1.136(a). 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 6 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.

10/25/2006 JADD01 00000016 232105 10070665 01 FC:2253 510.00 DA

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 10/870,685		Filing Date 06/18/2004		<input type="checkbox"/> To be Mailed					
APPLICATION AS FILED – PART I														
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FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR		RATE (\$)	FEE (\$)				
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>		N/A	N/A		N/A				N/A					
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>		N/A	N/A		N/A		N/A							
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>		N/A	N/A		N/A		N/A							
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>		minus 20 =	*		X \$ =		OR		X \$ =					
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>		minus 3 =	*		X \$ =		OR		X \$ =					
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).												
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>														
* If the difference in column 1 is less than zero, enter "0" in column 2.														
APPLICATION AS AMENDED – PART II														
(Column 1)			(Column 2)			(Column 3)			SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
AMENDMENT	10/24/2006	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)				
	Total <small>(37 CFR 1.16(i))</small>	* 28	Minus	** 28	= 0	X \$25 =	0	OR	X \$ =					
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	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>													
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>													
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AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)				
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* 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".														
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The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.														

Legal Instrument Examiner:
Vikki Short

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/870,685		Filing Date 06/18/2004		<input type="checkbox"/> To be Mailed		
APPLICATION AS FILED – PART I											
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY			
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)	OR		RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>		N/A	N/A		N/A		OR		N/A		
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>		N/A	N/A		N/A		OR		N/A		
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>		N/A	N/A		N/A		OR		N/A		
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>		minus 20 =	*		X \$ =		OR		X \$ =		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>		minus 3 =	*		X \$ =		OR		X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>											
					TOTAL		OR		TOTAL		
* If the difference in column 1 is less than zero, enter "0" in column 2.											
APPLICATION AS AMENDED – PART II											
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	10/24/2006	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR		RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 32	Minus	** 28	= 4	X \$25 =	100	OR		X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus	***6	= 0	X \$100 =	0	OR		X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>										
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>										
					TOTAL ADD'L FEE	100	OR		TOTAL ADD'L FEE		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR		RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =		OR		X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =		OR		X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>										
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>										
					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 number found in the appropriate box in column 1.											

Legal Instrument Examiner:
Vikki Short

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/870,685	06/18/2004	Mark F. Bocko	000687-00339	7203
27557	7590	04/24/2006	EXAMINER	
BLANK ROME LLP 600 NEW HAMPSHIRE AVENUE, N.W. WASHINGTON, DC 20037			HAN, QI	
			ART UNIT	PAPER NUMBER
			2626	

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/870,685	BOCKO ET AL.	
	Examiner	Art Unit	
	Qi Han	2626	

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

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-28 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-28 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/18/05 & 3/9/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement submitted on 02/18/2005 and 03/09/2005 have been considered by the examiner (see attached PTO-1449).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed steps (a) and (c) (such as in clam 1) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 27-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 27, it recites “an article of manufacture comprising: a machine-readable storage medium; and an audio signal recorded on the machine-readable storage medium, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase shifted to embed data in the audio signal”. It is noted that even though the claim recites “an article of manufacture”, the claim as whole is nothing but merely an audio signal recorded on a machine-readable storage medium, wherein the signal (a type of energy) is substantially categorized as a physical phenomena, so as being non-statutory subject matter. Further, in another view of the claim, as best understood, it can be interpreted as a nonfunctional descriptive material stored on a medium or mere arrangements or complication of facts or data, which is also nonstatutory.

Regarding claim 28, it recites “a signal structure embodied in a carrier wave, the signal structure comprising an audio signal, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase-shifted to embed data in the audio signal”. It is noted that the claimed signal structure (a type of energy), as whole, is substantially

categorized as a physical phenomena, so as being non-statutory subject matter. Further, in another view of the claim, as best understood, the claimed signal structure can be interpreted as a descriptive material embodied in a carrier or mere arrangements or complication of facts or data, which is also nonstatutory.

4. To expedite a complete examination of the instant application the claims rejection under 35 U.S.C 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 10, 14, 23 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by ILIEV et al. (US 6,996,521 B2) hereinafter referenced as ILIEV.

As per **claim 1**, ILIEV discloses auxiliary channel masking in an audio signal (title) to 'embedding data into an audio signal and detecting data embedded in to an audio signal' (col. 1, lines 13-14), comprising:

“(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components” (col. 5, lines 33-39, 'short-time Fourier analysis', 'FFT was

applied on 1024-point rectangular windows (time frame)', 'the resulting frequency components located at about each 21.5 Hz apart');

“(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components” (col. 5, lines 33-39, 'the resulting frequency components located at about each 21.5 Hz apart were considered as independent stimuli (inherently including multiple frequency components in a frame)'); and

“(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded” (col. 5, lines 33-39, 'FFT algorithm provided the phase value of each component'; col. 6, lines 48-64, 'encoding a single-bit-per-frequency-component' and 'to alter the phase of the left channel').

As per **claim 10**, it recites a method for extracting embedded data from an audio data. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) that is simply inversed operation of method claim 1, wherein 'decoder of an auxiliary channel' (ILIEV: Fig. 7 and col. 7, line 46 to col. 8, line 30) is read on the claimed "(d) from the phase shift determined in step (c), extracting the embedded data".

As per **claim 14**, it recites a device. The rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

As per **claim 23**, it recites a device. The rejection is based on the same reason described for claim 10, because the claim recites the same or similar limitation(s) as claim 10.

As per **claim 27**, the rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

As per **claim 28**, the rejection is based on the same reason described for claim 1, because the claim recites the same or similar limitation(s) as claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 8-9, 11, 15, 21-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over ILIEV in view of KOBAYASHI et al. (US 6,526,385 B1) hereinafter referenced as KOBAYASHI.

As per **claim 2** (depending on claim 1), even though ILIEV discloses “altering a relative phase of the two frequency components in accordance with the data to be embedded” (col. 7, lines 1-5, ‘collects all the frequency components of the left channel, constructs the new frequency representation of the left channel which contains the masked (embedded) data’), ILIEV does not expressly disclose “selecting two of the plurality of frequency components in accordance with a **pseudo-random sequence**”. However, this feature is well known in the art as evidenced by KOBAYASHI who discloses system for embedding additional information in audio data’ (title), comprising using ‘pseudo-random numbers (sequence) with the phase direction’ and ‘the phase of an embedded signal’ (col. 20, lines 55-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify

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ILIEV by providing using pseudo-random numbers (sequence) with the phase of an embedded signal, as taught by KOBAYASHI, for the purpose of maintaining a high sonic quality and high robustness for the embedded information in audio data (KOBAYASHI: col. 3, lines 27-28).

As per **claims 8-9** (depending on claim 1), ILIEV does not expressly disclose “wherein the audio signal undergoes lossy compression **before** steps (a)-(c)” (for claim 8) and “after steps (a)-(c)” (for claim 9). However, this feature is well known in the art as evidenced by KOBAYASHI who further discloses ‘a method and a system, for embedding additional information in audio data...is robust against destruction during the data processing, such as the compression/decompression of data and the addition of random noise to individual frequency components’ (col. 3, lines 35-39), which suggests the system has capability of implementing the functionality as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify ILIEV by providing a robust method/system against destruction during the data processing, such as the compression/decompression of data, as taught by KOBAYASHI, for the purpose of maintaining a high sonic quality and high robustness for the embedded information in audio data (KOBAYASHI: col. 3, lines 27-28).

As per **claim 11** (depending on claim 10), the rejection is based on the same reason described for claim 2, because the claim recites the same or similar limitation(s) as claim 2.

As per **claim 15** (depending on claim 14), the rejection is based on the same reason described for claim 2, because the claim recites the same or similar limitation(s) as claim 2.

As per **claims 21-22** (depending on claim 14), the rejection is based on the same reason described for claims 8-9 respectively, because the claims recite the same or similar limitation(s) as claims 8-9 respectively.

As per **claim 24** (depending on claim 23), the rejection is based on the same reason described for claim 11, because the claim recites the same or similar limitation(s) as claim 11.

7. Claims 6-7 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over ILIEV in view of GANG et al. ("MP3 resistant oblivious steganography", Acoustics, Speech, and Signal Processing, 2001, Proceedings. (ICASSP '01). IEEE, international conference, 7-11 May 2001, page 1365-1368 vol. 3) hereinafter referenced as GANG.

As per **claim 6** (depending on claim 1), ILIEV does not expressly disclose "(d) reducing a phase discontinuity at boundaries of the time frames caused by step (c)". However, this feature is well known in the art as evidenced by GANG who discloses 'MP3 resistant oblivious steganography' (title), comprising 'a phase hiding scheme' to 'modify the initial phase while keeping the relative phase between adjacent frames (including boundaries of the time frames) unchanged (reducing a phase discontinuity)'(page 1367, left col., section 3.2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify ILIEV by providing a phase hiding scheme with keeping the relative phase between adjacent frames, as taught by GANG, for the purpose (motivation) of reducing 'abrupt phase change (discontinuity)' for the 'data hiding' since 'human beings are sensitive to phase continuity between frames' (GANG: page 1367, left col., section 3.2).

As per **claim 7** (depending on claim 6), the rejection is based on the same reason described for claim 6, because the rationale for claim 6 covers the same or similar limitations as claim 7, wherein 'modify the initial phase while keeping the relative phase between adjacent

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frames unchanged' (GANG: page 1367, left col., section 3.2) is read on the claimed "controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames".

As per **claims 19-20** (depending on claim 14), the rejection is based on the same reason described for claims 6-7 respectively, because the claims recite the same or similar limitation(s) as claims 19-20 respectively.

Allowable Subject Matter

8. Claims 3-5, 12-13, 16-18 and 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowable subject matter:

Regarding dependent **claims 3 and 16**, the instant application is directed to a method and apparatus (device) for embedding data in an audio signal. Each of the dependent claim, combining some well-known features in the art recited the corresponding parent claim(s), identifies the uniquely distinct features of: step (b) (refer to the step(s) in the independent claim 1 or 14) comprises selecting a fundamental tone (fundamental frequency) and at least one overtone (harmonic frequencies); and step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

Regarding **claims 12 and 24**, the statement is based on the same reason described for claims 3 and 16 respectively, because the claims recite the same or similar limitation(s) that is simply inversed operation of claims 3 and 16 respectively.

Regarding **claims 4-5, 13, 17-18 and 26**, the statement is based on the same reason described for claims 1, 10, 14 and 23 respectively, because these dependent claims inherit all limitations of their parent claim(s).

The prior art of record, ILIEV et al. (US 6,996,521 B2), KOBAYASHI et al. (US 6,526,385 B1) and GANG et al. ("MP3 resistant oblivious steganography", ICASSP '01. IEEE), provided numerous teachings and approaches of embedding data into an audio signal and determining (extracting) data embedded into an audio signal, including modifying phase component to embed data, using pseudo-random numbers (sequence) with phase direction to embed additional information, and keeping the relative phase between adjacent frames unchanged for phase continuity propose. However, the combined features stated above, are not anticipated by, nor made obvious over the prior art of the record.

9. 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

10. Please address mail to be delivered by the United States Postal Service (USPS) as follows:

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Art Unit: 2626

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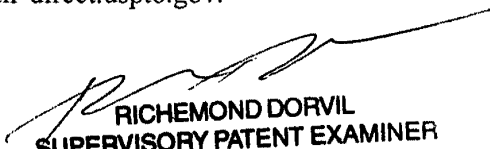
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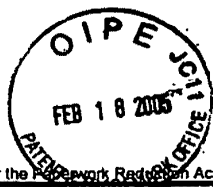
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (571) 272-7604. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (571) 272-7602.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see <http://pair-direct.uspto.gov>.

QH/qh
April 4, 2006


RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER



Approved for use through 07/31/2006. OMB 0651-0031
 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1448A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known

Application Number	10/670,685
Filing Date	June 18, 2004
First Named Inventor	Mark F. Bocko, et al.
Art Unit	2641
Examiner Name	Unassigned
Attorney Docket Number	000687-00339

Sheet 1 of 1

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US-6,539,475	03-25-03	Cox, et al.	
		US-6,684,199	01-27-04	Stebbins	
		US-6,707,409	03-16-04	Ignjatovic, et al.	
		US-			
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FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	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
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				

Examiner Signature	Date Considered
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Substitute for form 1449A/PTO <h2 style="text-align: center;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center;"><i>(Use as many sheets as necessary)</i></p>	<h3 style="text-align: center;">Complete if Known</h3> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Application Number</td><td>10/870,685</td></tr> <tr><td>Filing Date</td><td>June 18, 2004</td></tr> <tr><td>First Named Inventor</td><td>Mark F. Bocko, et al.</td></tr> <tr><td>Art Unit</td><td>2641</td></tr> <tr><td>Examiner Name</td><td>Unassigned</td></tr> <tr><td>Attorney Docket Number</td><td>000687-00339</td></tr> </table>	Application Number	10/870,685	Filing Date	June 18, 2004	First Named Inventor	Mark F. Bocko, et al.	Art Unit	2641	Examiner Name	Unassigned	Attorney Docket Number	000687-00339
Application Number	10/870,685												
Filing Date	June 18, 2004												
First Named Inventor	Mark F. Bocko, et al.												
Art Unit	2641												
Examiner Name	Unassigned												
Attorney Docket Number	000687-00339												
Sheet 1 of 2													

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US-6,737,957	May 18, 2004	Petrovic, et al.	
		US-6,792,542	September 14, 2004	Lee, et al.	
		US-6,430,301	August 6, 2002	Petrovic, et al.	
		US-6,427,012	July 30, 2002	Petrovic, et al.	
		US-6,175,627	January 16, 2001	Petrovic, et al.	
214	4	US-6,675,146	January 6, 2004	Rhoads	
		US-6,674,876	January 6, 2004	Hannigan, et al.	
		US-6,654,480	November 25, 2003	Rhoads	
		US-6,647,129	November 11, 2003	Rhoads	
		US-6,647,128	November 11, 2003	Rhoads	
		US-6,633,654	October 14, 2003	Hannigan, et al.	
		US-6,567,780	May 20, 2003	Rhoads	
		US-6,560,350	May 6, 2003	Rhoads	
		US-6,560,349	May 6, 2003	Rhoads	
		US-6,442,283	August 27, 2002	Tewfik, et al.	
		US-6,404,898	June 11, 2002	Rhoads	
		US-6,363,159	March 26, 2002	Rhoads	
		US-6,266,430	July 24, 2001	Rhoads	

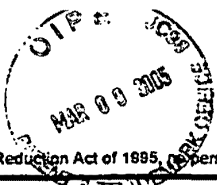
FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				

Examiner Signature	Date Considered	4/3/06
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Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	10/870,685
		Filing Date	June 18, 2004
		First Named Inventor	Mark F. Bocko, et al.
		Art Unit	2641
		Examiner Name	Unassigned
		Attorney Docket Number	000687-00339
Sheet	2	of	2

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
		"Audio Watermaking Techniques", H. Kim, Kangwon National University, Korea, pp. 1-17	
2H	S	"Audio Signal Watermaking Based on Replica Modulation", Rade Petrovic, Telsiks 2001, Yugoslavia, September 19-21, 2001, pp. 227-234	
		"Data Hiding Within Audio Signals", Rade Petrovic, et al., Telsiks 1999, October 13-15, 1999, pp. 88-95	

Examiner Signature		Date Considered	4/3/06
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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 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.

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000687.00339/35667403v1

BR 06/04

Notice of References Cited	Application/Control No. 10/870,685	Applicant(s)/Patent Under Reexamination BOCKO ET AL.	
	Examiner Qi Han	Art Unit 2626	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-6,996,521 B2	02-2006	Iliev et al.	704/200
*	B US-6,526,385 B1	02-2003	Kobayashi et al.	704/504
*	C US-2002/0107691 A1	08-2002	Kirovski et al.	704/270
*	D US-6,650,762 B2	11-2003	Gibson et al.	382/100
*	E US-5,937,000 A	08-1999	Lee et al.	375/141
*	F US-2002/0034224	03-2002	Srinivasan, Venugopal	375/240
*	G US-2003/0095685 A1	05-2003	Tewfik et al.	382/100
	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				
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	S				
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NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)			
U	GANG et al. ("MP3 resistant oblivious steganography", Acoustics, Speech, and Signal Processing, 2001, Proceedings. (ICASSP '01). IEEE, international conference, 7-11 May 2001, page 1365-1368 vol. 3)			
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.

Index of Claims



Application/Control No.

10/870,685

Examiner

Qi Han

Applicant(s)/Patent under Reexamination

BOCKO ET AL.

Art Unit

2626

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date			
Final	Original	4/4/06			
	1	√			
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Bib Data Sheet

CONFIRMATION NO. 7203

SERIAL NUMBER 10/870,685	FILING DATE 06/18/2004 RULE	CLASS 380	GROUP ART UNIT 2626	ATTORNEY DOCKET NO. 000687-00339
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APPLICANTS

Mark F. Bocko, Caledonia, NY;
 Zeljko Ignjatovic, Rochester, NY;

Handwritten: } 24 4/13/06

** CONTINUING DATA *****

This appln claims benefit of 60/479,438 06/19/2003

** FOREIGN APPLICATIONS *****

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** 08/12/2004

Foreign Priority claimed <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Met after Allowance	NY	7	28	6
Verified and Acknowledged Examiner's Signature: <i>[Signature]</i> Initials: <i>dy</i>				

ADDRESS

27557
 BLANK ROME LLP
 600 NEW HAMPSHIRE AVENUE, N.W.
 WASHINGTON , DC
 20037

TITLE

Data hiding via phase manipulation of audio signals

FILING FEE RECEIVED 664	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue)
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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S8	5	704/273.ccls. and @ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) and audio and phase with (chang\$4 shift\$4 alter\$4)	USPAT	OR	OFF	2006/04/03 17:16
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S22	0	"704"/\$.ccls. and @ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with audio and phase with (chang\$4 shift\$4 alter\$4) and phase and (hiding hide hidden) and (harmonic overtone)	US-PGPUB; USPAT	OR	ON	2006/04/03 18:46
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S25	34	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with audio and phase with (chang\$4 shift\$4 alter\$4) and phase and (hiding hide hidden) and pseudo\$8 and (pitch fundamental) and (harmonic overtone) and (transform\$4 FFT DFT)	US-PGPUB; USPAT	OR	ON	2006/04/03 18:50
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EAST Search History

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S34	0	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with audio and phase and (hiding hide hidden) and (phase near1 difference) with quantiz\$8	US-PGPUB; USPAT	OR	ON	2006/04/03 19:59
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EAST Search History

S42	48	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (pich fundamental) adj1 frequency	US-PGPUB; USPAT	OR	ON	2006/04/04 16:18
S43	29	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (pich fundamental) adj1 frequency and (overtone harmonic)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:56
S44	4	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (pich fundamental) adj1 frequency with (overtone harmonic)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:19
S45	2	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (pich fundamental) adj1 frequency with (overtone harmonic) and phase	US-PGPUB; USPAT	OR	ON	2006/04/04 16:22
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S47	66	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic) and phase	US-PGPUB; USPAT	OR	ON	2006/04/04 18:24
S48	9	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic) with phase	US-PGPUB; USPAT	OR	ON	2006/04/04 16:28
S49	4	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic) with phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:48

EAST Search History

S50	4	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4)same(speech music voice audio) and (overtone harmonic) with phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:50
S51	5	@ad<"20030619" and frame and frequency and (speech music voice audio) and (overtone harmonic) with phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:50
S52	29	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and ((pich) (fundamental adj1 frequency)) and (overtone harmonic)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:57
S53	3	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and ((pich) (fundamental adj1 frequency)) and (overtone harmonic) same phase	US-PGPUB; USPAT	OR	ON	2006/04/04 16:58
S54	0	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and ((pich) (fundamental adj1 frequency)) and (overtone harmonic) same phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:59
S55	0	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) same (speech music voice audio) and ((pich) (fundamental adj1 frequency)) and (overtone harmonic) same phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 16:59
S56	1	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) and (speech music voice audio) and ((pich) (fundamental adj1 frequency)) and (overtone harmonic) same phase and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:00

EAST Search History

S57	0	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) and ((pich)(fundamental adj1 frequency)) and (overtone harmonic) same phase and (watermark\$4 steganogra\$4) with (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:01
S58	0	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) and ((pich)(fundamental adj1 frequency)) and (overtone harmonic) and phase and (watermark\$4 steganogra\$4) with (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:02
S59	1	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) and ((pich)(fundamental adj1 frequency)) and (overtone harmonic) and phase and (watermark\$4 steganogra\$4) same (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:02
S60	1	@ad<"20030619" and frame and frequency and ((pich)(fundamental adj1 frequency)) and (overtone harmonic) and phase and (watermark\$4 steganogra\$4) with (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:02
S61	2	@ad<"20030619" and ((pich)(fundamental adj1 frequency)) and (overtone harmonic) and phase and (watermark\$4 steganogra\$4) with (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:07
S62	1	@ad<"20030619" and ((pich)(fundamental adj1 frequency)) with (overtone harmonic) and phase and (watermark\$4 steganogra\$4) with (speech music voice audio)	US-PGPUB; USPAT	OR	ON	2006/04/04 17:07
S63	1	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic) and (phase with discontinuity)	US-PGPUB; USPAT	OR	ON	2006/04/05 15:20

EAST Search History

S64	1	@ad<"20030619" and frame and frequency and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity)	US-PGPUB; USPAT	OR	ON	2006/04/05 15:20
S65	13	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity)	US-PGPUB; USPAT	OR	ON	2006/04/05 15:22
S66	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity) and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/05 15:22
S67	6	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity) with boundar\$4 and (watermark\$4 steganogra\$4)	US-PGPUB; USPAT	OR	ON	2006/04/05 15:35
S68	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity) with boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:38
S69	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (phase with discontinuity) with boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:38
S70	110	@ad<"20030619" and (phase with discontinuity) with boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:36
S71	10	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) same (speech music voice audio) and (phase with discontinuity) with boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:37
S72	9	@ad<"20030619" and (hid\$4 embed\$4) with (speech music voice audio) and (phase with discontinuity) with boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:38

EAST Search History

S73	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with discontinuity) same boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:39
S74	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with (continuity discontinuity)) same boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:39
S75	0	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with (contin\$6 discontin\$4)) same boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 15:40
S76	9	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with (contin\$6 discontin\$6)) same boundar\$4	US-PGPUB; USPAT	OR	ON	2006/04/05 16:44
S77	1	"06707409"	US-PGPUB; USPAT	OR	ON	2006/04/05 16:34
S78	0	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with (contin\$6 discontin\$6)) same delta	US-PGPUB; USPAT	OR	ON	2006/04/05 16:45
S79	2	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with delta)	US-PGPUB; USPAT	OR	ON	2006/04/05 16:52
S80	31	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with difference)	US-PGPUB; USPAT	OR	ON	2006/04/05 16:56
S81	1	@ad<"20030619" and (data infomation) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) and (phase with difference) same (contin\$6 discontin\$6 boundar\$4)	US-PGPUB; USPAT	OR	ON	2006/04/05 16:53

EAST Search History

S82	3	@ad<"20030619" and (data information) with (hid\$4 embed\$4) with (speech music voice audio) and (overtone harmonic (frequency with tone)) same (phase with difference)	US-PGPUB; USPAT	OR	ON	2006/04/05 16:56
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ITW

Attorney Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)	
Mark Bocko	)	Examiner: Unassigned
	)	Art Unit: Unassigned
Application No.: 10/870,685	)	Confirmation No.: 7203
Filed: June 18, 2004	)	Atty. Dkt. No.: 000687-00339
For:: Data Hiding Via Phase Manipulation of	)	Date: June 20, 2005
Audio Signals)	

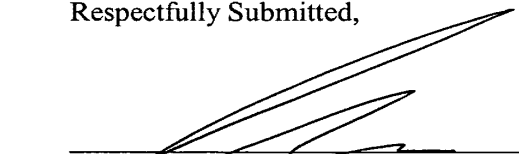
STATUS INQUIRY

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

Sir:

It is respectfully requested that Applicant's attorney be advised of the current status of the above-identified application as well as the anticipated date of action by the U.S. Patent and Trademark Office.

Respectfully Submitted,



Michael C. Greenbaum
Reg. No. 28,419

Blank Rome LLP
600 New Hampshire Ave., N.W.
Washington, D.C. 20037-2485
Telephone 202-772-5836
Facsimile 202-572-1436
MCG/DJE/smj

Docket No. 000687-00339



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Mark F. Bocko, et al.
Serial No: 10/070,685
Filed: June 18, 2004
For: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

GAU: 2641
Confirmation No. 7203
Examiner: UNASSIGNED

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

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

Sir:
Applicant(s) wish to disclose the following information.

REFERENCES

- The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- A check is attached in the amount required under 37 CFR §1.17(p).

RELATED CASES

- Attached is a copy of applicant's pending application(s) or issued patent(s) which may be related to the present application. These documents are listed on form PTO-1449, also attached.
- A check is attached in the amount required under 37 CFR §1.17(p).

CERTIFICATION

- Each item of information contained in this information disclosure statement was cited for the first time in any communication from a foreign patent office in any counterpart foreign application not more than three months prior to the filing of this statement.
- No item of information contained in this information disclosure statement was cited for the first time in any communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.
- This Information Disclosure Statement is being filed within three months of the filing date of the subject patent application.
- This Information Disclosure Statement is being filed before the mailing date of a first Office Action on the merits.

PETITION

- Applicant(s) hereby request consideration of the attached information. A check is attached in the amount of the Petition fee required under 37 CFR §1.17(i)(1).

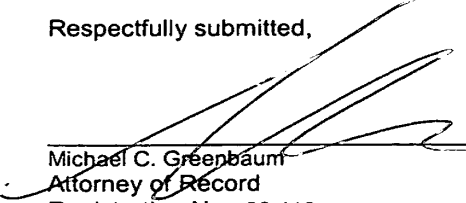
DEPOSIT ACCOUNT

- Please charge any additional fees for the papers being filed herewith and for which no check is enclosed herewith, or credit any overpayment to deposit account number 23-2185. A duplicate copy of this sheet is enclosed.

Blank Rome LLP
600 New Hampshire Avenue, N.W.
Washington, DC 20037
Tel: (202) 772-5800
Fax (202) 572-8398
Customer No.: 27557

Date: March 8, 2005

Respectfully submitted,


Michael C. Greenbaum
Attorney of Record
Registration No. 28,419



Approved for use through 07/31/2006. OMB 0651-0031
 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Project (PTO-01) 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO <h2 style="text-align: center;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center;"><i>(Use as many sheets as necessary)</i></p>	<h3 style="text-align: center;">Complete if Known</h3> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Application Number</td><td>10/870,685</td></tr> <tr><td>Filing Date</td><td>June 18, 2004</td></tr> <tr><td>First Named Inventor</td><td>Mark F. Bocko, et al.</td></tr> <tr><td>Art Unit</td><td>2641</td></tr> <tr><td>Examiner Name</td><td>Unassigned</td></tr> <tr><td>Attorney Docket Number</td><td>000687-00339</td></tr> </table>	Application Number	10/870,685	Filing Date	June 18, 2004	First Named Inventor	Mark F. Bocko, et al.	Art Unit	2641	Examiner Name	Unassigned	Attorney Docket Number	000687-00339
Application Number	10/870,685												
Filing Date	June 18, 2004												
First Named Inventor	Mark F. Bocko, et al.												
Art Unit	2641												
Examiner Name	Unassigned												
Attorney Docket Number	000687-00339												
Sheet <u>1</u> of <u>2</u>													

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
		US-6,737,957	May 18, 2004	Petrovic, et al.	
		US-6,792,542	September 14, 2004	Lee, et al.	
		US-6,430,301	August 6, 2002	Petrovic, et al.	
		US-6,427,012	July 30, 2002	Petrovic, et al.	
		US-6,175,627	January 16, 2001	Petrovic, et al.	
		US-6,675,146	January 6, 2004	Rhoads	
		US-6,674,876	January 6, 2004	Hannigan, et al.	
		US-6,654,480	November 25, 2003	Rhoads	
		US-6,647,129	November 11, 2003	Rhoads	
		US-6,647,128	November 11, 2003	Rhoads	
		US-6,633,654	October 14, 2003	Hannigan, et al.	
		US-6,567,780	May 20, 2003	Rhoads	
		US-6,560,350	May 6, 2003	Rhoads	
		US-6,560,349	May 6, 2003	Rhoads	
		US-6,442,283	August 27, 2002	Tewfik, et al.	
		US-6,404,898	June 11, 2002	Rhoads	
		US-6,363,159	March 26, 2002	Rhoads	
		US-6,266,430	July 24, 2001	Rhoads	

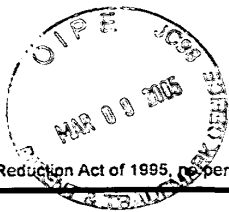
FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. ¹	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³	Number ⁴ Kind Code ⁵ (if known)				

Examiner Signature	Date Considered
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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. 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.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.



Approved for use through 06/30/2006. OMB 0651-0031
 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	10/870,685
		Filing Date	June 18, 2004
		First Named Inventor	Mark F. Bocko, et al.
		Art Unit	2641
		Examiner Name	Unassigned
		Attorney Docket Number	000687-00339
Sheet	2	of	2

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
		"Audio Watermaking Techniques", H. Kim, Kangwon National University, Korea, pp. 1-17	
		"Audio Signal Watermaking Based on Replica Modulation", Rade Petrovic, Telsiks 2001, Yugoslavia, September 19-21, 2001, pp. 227-234	
		"Data Hiding Within Audio Signals", Rade Petrovic, et al., Telsiks 1999, October 13-15, 1999, pp. 88-95	

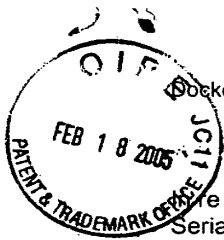
Examiner Signature	Date Considered
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication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

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 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 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, 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.

17W



Serial No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re application of: Mark F. Bocko, et al.
Serial No: 10/670,685
Filed: June 18, 2004
For: DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

GAU: 2641
Confirmation No. 7203
Examiner: UNASSIGNED

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

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

Sir:
Applicant(s) wish to disclose the following information.

REFERENCES

- The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- A check is attached in the amount required under 37 CFR §1.17(p).

RELATED CASES

- Attached is a copy of applicant's pending application(s) or issued patent(s) which may be related to the present application. These documents are listed on form PTO-1449, also attached.
- A check is attached in the amount required under 37 CFR §1.17(p).

CERTIFICATION

- Each item of information contained in this information disclosure statement was cited for the first time in any communication from a foreign patent office in any counterpart foreign application not more than three months prior to the filing of this statement.
- No item of information contained in this information disclosure statement was cited for the first time in any communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.
- This Information Disclosure Statement is being filed within three months of the filing date of the subject patent application.
- This Information Disclosure Statement is being filed before the mailing date of a first Office Action on the merits.

PETITION

- Applicant(s) hereby request consideration of the attached information. A check is attached in the amount of the Petition fee required under 37 CFR §1.17(i)(1).

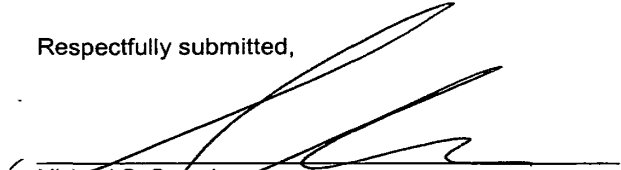
DEPOSIT ACCOUNT

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Blank Rome LLP
600 New Hampshire Avenue, N.W.
Washington, DC 20037
Tel: (202) 772-5800
Fax (202) 572-8398
Customer No.: 27557

Date: February 18, 2005

Respectfully submitted,


Michael C. Greenbaum
Attorney of Record
Registration No. 28,419



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	ATTORNEY DOCKET NUMBER
10/870,685	06/18/2004	Mark Bocko	000687-00339

27557
BLANK ROME LLP
600 NEW HAMPSHIRE AVENUE, N.W.
WASHINGTON, DC 20037

CONFIRMATION NO. 7203

FORMALITIES LETTER



OC00000013539669

Date Mailed: 08/16/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 385 to complete the basic filing fee for a small entity.
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of \$201 as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is \$651 for a Small Entity

- ³⁹⁵\$385 Statutory basic filing fee.
 - \$65 Late oath or declaration Surcharge.
 - Total additional claim fee(s) for this application is \$201
- | | | | |
|------------|----------|----------|-----------|
| 10/19/2004 | HVUJONG1 | 00000013 | 10870685 |
| 01 | FC:2001 | | 395.00 OP |
| 02 | FC:2051 | | 65.00 OP |
| 03 | FC:2202 | | 72.00 OP |
| 04 | FC:2201 | | 132.00 OP |

- 172
- ~~\$129~~ for 3 independent claims over 3.
 - \$72 for 8 total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450



*A copy of this notice **MUST** be returned with the reply.*

Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

in re Application of)	
Mark Bocko	)	ATTN: Mail Stop Missing Parts
Serial No.: 10/870,685	)	Confirmation No.: 7203
Filed: June 18, 2004	)	Atty. Dkt. No.: 000687-00339
For:: Data Hiding Via Phase Manipulation of Audio Signals)	

RESPONSE TO NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

Commissioner for Patents
October 15, 2004
P.O. Box 1450
Arlington, VA 22313-1450

Date: October 18, 2004

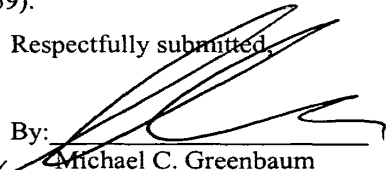
Sir:

Responsive to the Notice to File Missing Parts of Application mailed August 17, 2004, enclosed are the following documents to complete the formal filing requirements in the above-identified application:

- Response to Notice to File Missing Parts of Application (herewith).
- Original Notice to File Missing Parts
- Fee Transmittal.
- Filing of Declaration Under 37 CFR 1.53(f)
- Executed Declaration for Patent Application and Power of Attorney.
- Oath/Declaration Surcharge and basic filing fee in the amount of \$704.00.
- Assignment Recordation Cover Sheet with Executed Assignment.

The Commissioner is hereby authorized to charge any additional fees or credit any payment to Deposit Account No. 23-2185 (000687-00339).

Respectfully submitted,

By: 

Michael C. Greenbaum
Registration No. 28,419
Attorney for Applicants

Customer No. 27557
BLANK ROME LLP
The Watergate
600 New Hampshire Avenue, NW
Washington, D.C. 20037
(202) 772-5800 (Phone)
(202) 572-1436 (Facsimile)

000687.00339/90047205v1

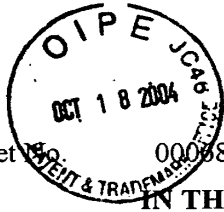


Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FREE TRANSMITTAL for FY 2005	Complete if Known
Effective 1010112003. Patent fees are subject to annual revision.	Application Number: 10/870,685
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27	Filing Date: June 18, 2004
	First Named Inventor: Mark Bocko
	Examiner Name: TBD
	Art Unit: TBD
TOTAL AMOUNT OF PAYMENT: (\$) 704	Attorney Docket No.: 000687-00337

<p>METHOD OF PAYMENT (check all that apply)</p> <p><input checked="" type="checkbox"/> Check <input type="checkbox"/> Credit card <input type="checkbox"/> Money <input type="checkbox"/> other <input type="checkbox"/> None</p> <p><input type="checkbox"/> Deposit Account: Deposit Account Number: 23-2185 Deposit Account Name: Blank Rome LLP</p> <p>The Director is authorized to: (check all that apply)</p> <p><input type="checkbox"/> Charge fee(s) indicated below <input checked="" type="checkbox"/> Credit any overpayments</p> <p><input checked="" type="checkbox"/> Charge any additional fee(s) or any underpayment of fee(s)</p> <p><input type="checkbox"/> Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.</p>	<p>FEE CALCULATION (continued)</p> <p>3. ADDITIONAL FEES</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Large Entity</th> <th colspan="2">Small Entity</th> <th rowspan="2">Fee Description</th> <th rowspan="2">Fee Paid</th> </tr> <tr> <th>Fee Code</th> <th>Fee (\$)</th> <th>Fee Code</th> <th>Fee (\$)</th> </tr> </thead> <tbody> <tr><td>1051</td><td>130</td><td>2051</td><td>65</td><td>Surcharge - late filing fee or oath</td><td>65</td></tr> <tr><td>1052</td><td>50</td><td>2052</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet</td><td></td></tr> <tr><td>1053</td><td>130</td><td>1053</td><td>130</td><td>Non-English specification</td><td></td></tr> <tr><td>1812</td><td>2,520</td><td>1812</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td><td></td></tr> <tr><td>1804</td><td>920*</td><td>1804</td><td>920*</td><td>Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>1805</td><td>1,840*</td><td>1805</td><td>1,840*</td><td>Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>1251</td><td>110</td><td>2251</td><td>55</td><td>Extension for reply within first month</td><td></td></tr> <tr><td>1252</td><td>430</td><td>2252</td><td>215</td><td>Extension for reply within second month</td><td></td></tr> <tr><td>1253</td><td>980</td><td>2253</td><td>490</td><td>Extension for reply within third month</td><td></td></tr> <tr><td>1254</td><td>1,530</td><td>2254</td><td>765</td><td>Extension for reply within fourth month</td><td></td></tr> <tr><td>1255</td><td>2,080</td><td>2255</td><td>1,040</td><td>Extension for reply within fifth month</td><td></td></tr> <tr><td>1401</td><td>340</td><td>2401</td><td>170</td><td>Notice of Appeal</td><td></td></tr> <tr><td>1402</td><td>340</td><td>2402</td><td>170</td><td>Filing a brief in support of an appeal</td><td></td></tr> <tr><td>1403</td><td>340</td><td>2403</td><td>170</td><td>Request for oral hearing</td><td></td></tr> <tr><td>1501</td><td>1,510</td><td>1501</td><td>1,510</td><td>Petition to institute a public use proceeding</td><td></td></tr> <tr><td>1502</td><td>110</td><td>2452</td><td>55</td><td>Petition to revive - unavoidable</td><td></td></tr> <tr><td>1503</td><td>1,370</td><td>2453</td><td>685</td><td>Petition to revive - unintentional</td><td></td></tr> <tr><td>1501</td><td>1,370</td><td>2501</td><td>685</td><td>Utility issue fee (or reissue)</td><td></td></tr> <tr><td>1502</td><td>490</td><td>2502</td><td>245</td><td>Design issue fee</td><td></td></tr> <tr><td>1503</td><td>660</td><td>2503</td><td>330</td><td>Plant issue fee</td><td></td></tr> <tr><td>1460</td><td>130</td><td>1460</td><td>130</td><td>Petitions to the Commissioner</td><td></td></tr> <tr><td>1807</td><td>50</td><td>1807</td><td>50</td><td>Processing fee under 37 CFR 1.17(q)</td><td></td></tr> <tr><td>1806</td><td>180</td><td>1806</td><td>180</td><td>Submission of Information Disclosure Stmt</td><td></td></tr> <tr><td>8021</td><td>40</td><td>8021</td><td>40</td><td>Recording each patent assignment per property (times number of properties)</td><td>40</td></tr> <tr><td>1809</td><td>790</td><td>2809</td><td>395</td><td>Filing a submission after final rejection (37 CFR 1.129(a))</td><td></td></tr> <tr><td>1810</td><td>790</td><td>2810</td><td>395</td><td>For each additional invention to be examined (37 CFR 1.129(b))</td><td></td></tr> <tr><td>1801</td><td>790</td><td>2810</td><td>395</td><td>Request for Continued Examination (RCE)</td><td></td></tr> <tr><td>1802</td><td>90</td><td>1802</td><td>900</td><td>Request for expedited examination of a design application</td><td></td></tr> </tbody> </table> <p>Other fee (Specify) _____</p> <p>*Reduced by Basic Filing Fee Paid</p>	Large Entity		Small Entity		Fee Description	Fee Paid	Fee Code	Fee (\$)	Fee Code	Fee (\$)	1051	130	2051	65	Surcharge - late filing fee or oath	65	1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet		1053	130	1053	130	Non-English specification		1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination		1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action		1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action		1251	110	2251	55	Extension for reply within first month		1252	430	2252	215	Extension for reply within second month		1253	980	2253	490	Extension for reply within third month		1254	1,530	2254	765	Extension for reply within fourth month		1255	2,080	2255	1,040	Extension for reply within fifth month		1401	340	2401	170	Notice of Appeal		1402	340	2402	170	Filing a brief in support of an appeal		1403	340	2403	170	Request for oral hearing		1501	1,510	1501	1,510	Petition to institute a public use proceeding		1502	110	2452	55	Petition to revive - unavoidable		1503	1,370	2453	685	Petition to revive - unintentional		1501	1,370	2501	685	Utility issue fee (or reissue)		1502	490	2502	245	Design issue fee		1503	660	2503	330	Plant issue fee		1460	130	1460	130	Petitions to the Commissioner		1807	50	1807	50	Processing fee under 37 CFR 1.17(q)		1806	180	1806	180	Submission of Information Disclosure Stmt		8021	40	8021	40	Recording each patent assignment per property (times number of properties)	40	1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))		1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))		1801	790	2810	395	Request for Continued Examination (RCE)		1802	90	1802	900	Request for expedited examination of a design application	
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SUBMITTED BY		(Complete if applicable)			
Name (Print/Type)	Michael C. Greenbaum	Registration No. (Attorney/Agent)	28,419	Telephone	202-772-5800
Signature				Date	October 18, 2004
Correspondence Address:	Blank Rome LLP 600 New Hampshire Avenue, N.W. Washington, D.C. 20037 Fax: 202-572-8398 Customer No.: 27557				



Docket No. 000687-00339

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Mark Bocko CONFIRMATION NO: 7203
SERIAL NO: 10/870,685 GAU: TBD
FILED: June 18, 2004 EXAMINER: TBD
FOR: Data Hiding Via Phase Manipulation of Audio Signals

FILING OF DECLARATION UNDER 37 CFR 1.53(f)

MAIL STOP: MISSING PARTS
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ARLINGTON, VA 22313-1450

ATTN: APPLICATION BRANCH

SIR:

Responsive to the notification dated August 16, 2004, and in accordance with the provisions of 37 CFR 1.53(f), Applicants submit herewith a Declaration in accordance with 37 C.F.R. 1.63.

- The required fee was paid at the time of filing the application.
A check in the amount of \$704.00 is attached to cover the required fee for the late filing of the executed declaration and the basic filing fee and Assignment Recordation Fee.
A copy of the notification is also submitted herewith.

The Declaration enclosed herewith adequately identifies the above-identified application in accordance with 37 CFR 1.63, as set forth in MPEP Section 601.01.

In light of the foregoing, this application is deemed to be in proper condition for examination and such favorable action is earnestly solicited.

Please charge any underpayment of fees or credit any overpayment of fees to Deposit Account No. 23-2185. A duplicate copy of this paper is attached.

BLANK ROME LLP

THE WATERGATE BUILDING
SUITE 1100
600 NEW HAMPSHIRE AVENUE
WASHINGTON, DC 20037
TEL (202) 772-5838
FAX (202) 572-1438

Handwritten signature of Michael C. Greenbaum
Registration No. 28,419

Date: October 18, 2004



Attorney Docket: 000687-00339

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS** the specification of which

is attached hereto

was filed on June 18, 2004 as United States Application Number or PCT International

Application Number 10/870,685 and (if applicable) was amended on _____

I hereby authorize our attorneys to insert the serial number assigned to this application.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 USC §119			
APPLICATION NO.	COUNTRY	DAY/MONTH/YEAR FILED	PRIORITY CLAIMED

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below.

PROVISIONAL APPLICATION(S) UNDER 35 U.S.C. §119(e)	
APPLICATION NUMBER	FILING DATE
60/479,438	June 19, 2003

I hereby claim the benefit under 35 U.S.C. §120 of any United States application, or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

PRIOR U.S./PCT INTERNATIONAL APPLICATION(S) DESIGNATED FOR BENEFIT UNDER 35 U.S.C. §120		
APPLICATION NO.	FILING DATE	STATUS — PATENTED, PENDING, ABANDONED

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith: Victor M. Wigman, Reg. No. 25,201; George C. Myers, Jr., Reg. No. 27,040; Donald R. Greene, Reg. No. 22,470; Michael C. Greenbaum, Reg. No. 28,419; Charles R. Wolfe, Jr., Reg. No. 28,680; Michael D. White, Reg. No. 32,795; Brian C. Jones, Reg. No. 37,857; David J. Edmondson, Reg. No. 35,126; Denise C. Lane, Reg. No. 42,780; Peter Weissman, Reg. No. 40,220; Brian WM. Higgins, Reg. No. 48,443; Minh-Quan K. Pham, Reg. No. 50,594; Thomas L. Willis, Jr., Reg. No. 53,778 and Tara L. Hoffman, Reg. No. 46,510.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Commission Expires *May 22, 2007*

Barbara A. Dick



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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/870,685	06/18/2004	Mark Bocko	000687-00339

CONFIRMATION NO: 7203

27557
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FORMALITIES LETTER



OC00000013539669

Date Mailed: 08/16/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 385 to complete the basic filing fee for a small entity.
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of \$201 as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$651** for a Small Entity

- \$385 Statutory basic filing fee.
- \$65 Late oath or declaration Surcharge.
- Total additional claim fee(s) for this application is **\$201**

- \$129 for 3 independent claims over 3.
- \$72 for 8 total claims over 20.

Replies should be mailed to: Mail Stop Missing Parts
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PART 3 - OFFICE COPY

13281 U.S. PTO
061804

**UTILITY
PATENT APPLICATION
TRANSMITTAL**
(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	000687-00339
First Inventor or Application Identifier	Mark Bocko
Title	DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

22386 U.S. PTO
10/870685

061804

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Commissioner for Patents
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1. Fee Transmittal Form (e.g. PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. Applicant claims small entity status.
See 37 CFR 1.27
3. Specification Total Pages 21
4. Drawing(s) (35 U.S.C. 113) Total Sheets 7
5. Oath or Declaration Total Pages
 - a. Newly executed (original or copy)
 - b. Copy from a prior application (37 C.F.R. §1.63(d))
(for continuation / divisional w/ box 18 completed)
 - i. DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §1.63(d)(2) and 1.33(b).
6. CD-ROM or CD-R in duplicate, large table or Computer Program (*Appendix*)
7. Application Data Sheet. See 37 CFR 1.76
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
 - a. Computer Readable Form (CRF)
 - b. Specification or Sequence Listing on:
 - i. CD-ROM or CD-R (2 copies); or
 - ii. Paper
 - c. Statements verifying identity of above copies


- ACCOMPANYING APPLICATION PARTS**
9. Assignment Papers (cover sheet & document(s))
 10. 37 C.F.R. §3.73(b) Statement Power of Attorney
(when there is an assignee)
 11. English Translation Document (if applicable)
 12. Information Disclosure Statement (IDS)/PTO-1449 Copies of IDS Citations
 13. Preliminary Amendment
 14. White Advance Serial No. Postcard
 15. Certified Copy of Priority Document(s)
(if foreign priority is claimed)
 16. Request and Certification under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
 17. Other:

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below:
 Continuation Divisional Continuation-in-part (CIP) of prior application no.:
 Prior application information: Examiner: Group Art Unit:

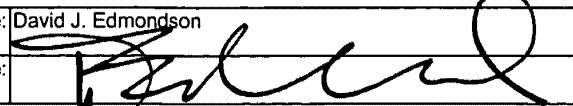
For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b is considered a part of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. Amend the specification by inserting before the first line the sentence:
 This application is a Continuation Division Continuation-in-part (CIP) of application Serial No. Filed on
 This application claims priority of provisional application Serial No. 60/479,438 Filed June 19, 2003

20. CORRESPONDENCE ADDRESS

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The PTO did not receive the following listed item(s) The Transmittal

Name: David J. Edmondson	Registration No.: 35,126
Signature: 	Date: June 18, 2004

DATA HIDING VIA PHASE MANIPULATION OF AUDIO SIGNALS

Reference to Related Application

The present application claims the benefit of U.S. Provisional Patent Application No. 60/479,438, filed June 19, 2003, whose disclosure is hereby incorporated by reference in its entirety into the present disclosure.

Statement of Government Interest

The work leading to the present invention was supported by the Air Force Research Laboratory/IFEC under grant number F30602-02-1-0129. The government has certain rights in the invention.

Field of the Invention

The present invention is directed to a system and method for insertion of hidden data into audio signals and retrieval of such data from audio signals and is more particularly directed to such a system and method using a phase encoding scheme.

Description of Related Art

Digital watermarking currently is receiving a great amount of attention due to commercial interests that seek to control the distribution of digital media as well as other types of digital data. A watermark is data that is embedded in a media or document file that serves to identify the integrity, the origin or the intended recipient of the host data file. One attribute of watermarks is that they may be visible or invisible. A watermark also may be robust, fragile or semi-fragile. The data capacity of a watermark is a further attribute. Trade-offs among these three properties are possible and each type of watermark has its specific use. For example, robust watermarks are useful for establishing ownership of data, whereas fragile watermarks are useful for verifying the authenticity of data.

Steganography literally means "covered writing" and is closely related to watermarking, sharing many of the attributes and techniques of watermarking.

Steganography works by embedding messages within other, seemingly harmless messages, so that seemingly harmless messages will not arouse the suspicion of those wishing to intercept the embedded messages.

As a basic example, a message can be embedded in a bitmap image in the following
5 manner. In each byte of the bitmap image, the least significant bit is discarded and replaced by a bit of the message to be hidden. While the colors of the bitmap image will be altered, the alteration of colors will typically be subtle enough that most observers will not notice. An intended recipient can reconstruct the hidden message by extracting the least significant bit of each byte in the transmitted image. If the bitmap image has eight-bit color depth (256
10 colors), and the message to be hidden is a text message with eight-bit text encoding, then each letter of the text message can be encoded in and extracted from eight pixels of the bitmap image. While more sophisticated examples exist, the above example will serve to illustrate the basic concept.

The field of steganography is receiving a good deal of attention due to interest in
15 covert communication via the Internet, as well as via other channels, and data hiding in information systems security applications. The single most important requirement of a steganographic method is that it be invisible to all but the intended recipient of the message.

Figure 1 illustrates the attributes and uses of various categories of watermarking and steganographic techniques. Two dimensions that characterize watermarking and
20 steganographic techniques are visibility and robustness. In Figure 1, the "visibility" axis extends from visible to undetectable, and the "robustness" axis extends from fragile to robust. In this "attribute" space we show the regions occupied by various watermarking and steganographic techniques. Ideally, steganography should always be undetectable. A third dimension, data capacity, also may be included. In general, enhancement of any of the three
25 attributes -- visibility, robustness, and capacity -- compromises the other two attributes.

Steganography in digital audio signals is especially challenging due to the acuity and complexity of the human auditory system (HAS). Besides having a wide dynamic range and a fairly small differential range, the HAS is unable to perceive absolute monaural phase, except in certain contrived situations.

5 Figure 2 shows the magnitude and phase spectrogram of a few seconds of speech, specifically, a male voice saying, "This is a sample of speech." The upper plot shows the magnitude of the spectrum as a function of time. The bands of horizontal lines represent the overtone spectrum of the pitched portions of the signal. In addition to the usual display of the magnitude of the spectral density (in the upper plot), the phase of the spectrum is also
10 displayed (in the lower plot). The phase of the spectrum is apparently random. This was verified by computing the autocorrelation in frequency of each spectral "slice"; it was found to be highly peaked at zero delay, indicating no correlation.

Two companies, Verance and Digimarc, have introduced schemes for watermarking of audio signals. Those two schemes will be described.

15 Verance was formed in 1999 from the merger of ARIS Technologies Inc. and Solana Technology Development Corporation. Verance provides software packages to companies interested in controlling the use of their copyrighted digital audio content, but the major application seems to be in broadcast monitoring and verification. For that application, hidden tags are inserted into digital files for TV and radio commercials, programs and music,
20 and a service is provided which monitors all airplay in all major US media markets so that reports can be provided to the advertisers and copyright owners.

In 1999, Verance was selected to provide a worldwide industry standard for copy protected DVD audio and in the Secure Digital Music Initiative (SDMI) and was adopted by the 4C Entity, a consortium of technology companies committed to "protecting entertainment
25 content when recorded to physical media." Verance's audio watermarking technology was

intended to embed inaudible yet identifiable digital codes into an audio waveform. The audio watermarks are expected to carry detailed information associated with the audio and audiovisual content for such purposes as monitoring and tracking its distribution and use as well as controlling access to and usage of the content. Embedded watermarks travel with the audio and audiovisual content wherever it goes and are highly resistant to even the most sophisticated attempts to remove them.

The problem with Verance's technology for copyright protection, however, is that it can be hacked. It has been demonstrated that the watermark data can be detected and removed by hackers who were able to discover the key by applying general signal process analysis. This weakness was uncovered in a "hackers challenge" test, set up by the SDMI. The technology has not been accepted by the industry since its announcement in 1999.

Digimarc was founded in 1995 with a focus on deterring counterfeiting and piracy of media content through "digital watermarking," primarily for images and video. It had revenue in 2002 of \$80M. Its earliest success came from working with a consortium of leading central banks on the development of a system to deter PC counterfeiting of banknotes. The company provides products and services that enable production of millions of personal identification products such as driver's licenses in more than 33 US states and 20 countries.

Digimarc does not have a significant business in audio watermarking, but about six years ago, Digimarc competed in an open, competitive bid process by the DVD-CCA (DVD Copy Control Association), to protect movies from piracy. The DVD-CCA includes the leading companies from the motion picture, computer and consumer electronics industries. The DVD-CCA decided on August 1, 2002, that the offered technologies from Digimarc and its competitors were inadequate. An interim solution was announced by the DVD-CCA on September 15, 2003. It appears that that the interim DVD-CCA solution is no longer supported.

Other technologies will now be described.

An alternative data protection technique from NEC, as described in US Patent 6,539,475 (Method for protecting digital data through unauthorized copying), has a trigger signal embedded in the data. If the embedded trigger mark is present, the data is considered to
5 be a scrambled copy. The device then descrambles the input data if it detects a trigger signal. In the case of an unauthorized copy that contains a trigger signal with unscrambled data, the descrambler would render the data useless.

The principal weakness of this technology lies in the requirement to remove the protection before the data can be used. If an authorized person is able to insert the recording
10 device after the descrambling, an unprotected and descrambled copy of the data can be made.

In another patent, US 6,684,199, assigned to the Recording Industry Association of America, the system authenticates data by introducing an authentication key in the form of a predetermined error. The purpose is to prevent piracy through unauthorized access and unauthorized copying of the data stored on the media disc. It is one of the few techniques
15 that can survive analog conversion, but it is open to signal processing analysis by hackers.

Examination of various music and speech spectrograms indicates an apparent randomness of phase, which is not surprising since the analysis frequencies of the spectral analysis are not phase coherent with the frequencies present in the signal. So far, however, that apparent randomness of phase has not been exploited for data-hiding purposes.

20

Summary of the Invention

It is therefore an object of the present invention to overcome the above-noted deficiencies of the prior art.

It is another object of the invention to realize a technique which resists blind signal-
5 processing attacks.

It is still another object of the invention to realize a technique which can survive digital-to-analog conversion.

It is yet another object of the invention to realize a technique which can survive lossy audio compression, such as MPEG I layer III (MP3) compression, and which can even be
10 applied directly to compressed audio files such as MP3 files.

To achieve the above and other objects, the present invention is directed to a technique in which the phase of chosen components of the host audio signal is manipulated. In a preferred embodiment, the phase manipulation, and thus the hidden message, may be detected by a receiver with the proper "key." Without the key, the hidden data is
15 undetectable, both aurally and via blind digital signal processing attacks. The method described is both aurally transparent and robust and can be applied to both analog and digital audio signals, the latter including uncompressed as well as compressed audio file formats such as MP3. The present invention allows up to 20 kbits of data to be embedded in compressed or uncompressed audio files.

20 Naturally occurring audio signals such as music or voice contain a fundamental frequency and a spectrum of overtones with well-defined relative phases. When the phases of the overtones are modulated to create a composite waveform different from the original, the difference will not be easily detected. Thus, the manipulation of the phases of the harmonics in an overtone spectrum of voice or music may be exploited as a channel for the transmission
25 of hidden data.

The fact that the phases are random presents an opportunity to replace the random phase in the original sound file with any pseudo-random sequence in which one may embed hidden data. In such an approach, the embedded data is encoded in the larger features of the cover file, which enhances the robustness of the method. To extract the embedded data, one
5 uses the “key” to distinguish the phase modulation encoding from the inherent phase randomness of the audio signal.

The present invention has the advantage over existing Verance algorithms of being undetectable and robust to blind signal processing attacks and of being uniquely robust to digital to analog conversion processing.

10 The present invention can be used to watermark movies by applying the watermark to the audio channel in such a way as to resist detection or tampering.

The present invention would allow copies of the data to be distributed as unscrambled information, but would contain the capability to identify the source of any copy. For example, a digital rights management system implementing the present invention would inform users
15 as they download music that unauthorized copies are traceable to them and they are responsible for preventing further illegal distribution of the downloaded file.

Brief Description of the Drawings

Preferred embodiments of the present invention and variations thereon will be set forth in detail with reference to the drawings, in which:

Figure 1 is a conceptual diagram illustrating the attributes of various data embedding
5 techniques;

Figure 2 is a spectrogram showing characteristics of human speech;

Figure 3 is a phase diagram illustrating a first preferred embodiment of the present invention;

Figure 4 is a phase diagram illustrating a second preferred embodiment of the present
10 invention;

Figure 5 is a spectrogram of a musical excerpt used to test the present invention;

Figure 6 is a spectrogram of the same musical excerpt with data embedded therein;

Figure 7 is a graph of the decoding error rate as a function of signal-to-noise ratio (SNR) for three levels of quantization;

Figure 8 is a graph of the decoding error rate as a function of MP3 encoder bit rate for
15 three levels of quantization;

Figure 9 is a graph of bit error rate as a function of sample density for different frame lengths;

Figure 10 is a graph of decoding error rate as a function of a rate of usage of
20 synchronization frames;

Figure 11 is a schematic diagram showing a sigma-delta modulator for reducing phase discontinuities; and

Figure 12 is a schematic diagram showing a system on which either of the preferred
embodiments can be implemented.

25

Detailed Description of the Preferred Embodiments

Two preferred embodiments and variations thereon will be set forth in detail with reference to the drawings.

A first method of phase encoding is indicated in Figure 3. In the illustrated method, during each time frame one selects a pair (or more) of frequency components of the spectrum and re-assigns their relative phases. The choice of spectral components and the selected phase shift can be chosen according to a pseudo-random sequence known only to the sender and receiver. To decode, one must compute the phase of the spectrum and correlate it with the known pseudo-random carrier sequence.

More specifically, a phase encoding scheme is indicated in which information is inserted as the relative phase of a pair of partials ϕ_0, ϕ_1 in the sound spectrum. In each time frame a new pair of partials may be chosen according to a pseudo-random sequence known only to the sender and receiver. The relative phase between the two chosen spectral components is then modified according to a pseudo-random sequence onto which the hidden message is encoded.

A second preferred embodiment, called the Relative Phase Quantization Encoding Scheme or the Quantization Index Modulation (QIM) scheme, will now be disclosed with reference to Figure 4. In that phase encoding method the following steps are employed. One first computes the spectrum of a frame of audio data, then selects an apparent fundamental tone and its series of overtones as shown in the left plot of Figure 4; it is convenient to select the strongest frequency component in the spectrum. Then, two of the overtones in the selected series are “relative phase quantized” according to one of two quantization scales, as shown on the right. The choice of quantization levels indicates a “1” or “0” datum. The relative phase-quantized spectrum is then inversely transformed to convert back to the time

domain. The second preferred embodiment uses a variable set of phase quantization steps as explained below.

Step 1:

Segment the time representation of the audio signal $S[i]$, ($0 \leq i \leq I-1$) into series of
5 frames of L points $S_n[i]$ where ($0 \leq i \leq L-1$). At this stage, a threshold check may be applied
and the frame skipped if insufficient audio power was present in the frame.

Step 2:

Compute the spectrum of each frame of audio data and calculate the phase of each
frequency component within the frame, $\Phi_n(\omega_i)$ ($0 \leq i \leq L-1$). An idealization of a typical
10 spectrum with a fundamental and accompanying overtone series is shown.

Step 3:

Quantize the relative phases of two of the overtones in the selected frame according to
one of two quantization scales, as shown on the right of Figure 4.

$$\Delta\Phi = \pi / 2^n$$

15 If '1' is to be embedded,

$$\Phi_n(\omega_i) = \Delta\Phi \times \text{round}(\Phi_n(\omega_i) / \Delta\Phi)$$

If '0' is to be embedded,

$$\Phi_n(\omega_i) = \Delta\Phi \times \text{round}(\Phi_n(\omega_i) / \Delta\Phi - 0.5) + \Delta\Phi / 2$$

The number of quantization levels 'n' is variable. The greater the number of levels,
20 the less audible the effect of phase quantization. However, when a greater number of
quantization levels is employed, the probability of data recovery error increases.

Step 4:

Inverse transform the phase-quantized spectrum to convert back to the time
representation of the signal by applying an L -point IFFT (inverse fast Fourier transform).

Recovery of the embedded data requires the receiver to compute the spectrum of the signal and to know which two spectral components were phase quantized. In the tests described later, the relative phase between the fundamental and the second harmonic was employed as the communication channel.

5 Figure 5 shows the spectrum (magnitude is in the upper plot and the phase in the lower plot) of a musical excerpt ("Nite-Flite" by the Sammy Nestico Big Band). Figure 6 shows the spectrum, (magnitude and phase) of the same music file with 1 kbit of hidden data. The data is encoded in the phase quantization of the second harmonic of the strongest spectral component of each frame; four quantization levels are used. There is no apparent spectral
10 evidence of the embedded data. In this method any one or several of the spectral components may be so manipulated.

The method described above was also applied to a 23-second-long classical guitar solo. Gaussian noise was introduced prior to decoding. The relative phase between the 2 strongest harmonics of the music file was quantized and embedded with 1 kbit of binary data
15 then followed with the decoding process in the presence of Gaussian noise. The above was done for 3 different quantization scales (2^n equally spaced quantization levels), with $n = 1, 2$ and 3 respectively. The decoding error rate at 3 different quantization levels with increasing signal to noise ratio (SNR) is shown in Figure 7.

Applying the method described here to 512 points frames of 44,100 samples/sec audio
20 one may encode 86 bits per second per chosen spectral line. This is slightly over 5 kbits/minute. We have also employed the method on up to 4 harmonics of the overtone spectrum with satisfactory results, raising the data capacity to approximately 20 kbits/minute.

The robustness of data against lossy compression will now be described. MP3 is a common form of lossy audio compression that employs human auditory system features,

specifically frequency and temporal masking, to compress audio by a factor of approximately 1:10.

The robustness of the steganographic technique described above was evaluated by hiding data in an uncompressed (.wav) audio file followed by conversion to MP3 format and then back to .wav format. The spectrograms of the final wav files were indistinguishable from the originals, and the audio quality was typical of MP3 compressed audio. In the example presented here, we embedded 1 kbit of data in the phase of the 2nd harmonic of the strongest spectral feature in each frame. The file was then converted to MP3 using the Lame MP3 encoder, converted back to .wav format and then examined for the presence of the hidden data. In Figure 8, the decoding error rate is illustrated as a function of the MP3 encoder output bitrate - ranging from 32 kbit/sec to 224 kbit/sec. We explored data survivability as a function of the number of quantization steps, 2^n , for $n = 1,2,3$. The frame length employed was 576 points and the sampling frequency was 44,100 Hz.

It was found that the data recovery error rate could be reduced to near zero by employing an amplitude threshold in the selection of the segments of audio data that were encoded. A weak form of error correction could be employed to guard against such infrequent errors. One also may implement the techniques described above directly in compressed audio files, which would eliminate recovery errors.

To test the robustness of the stego message under D-A-D conversion, the audio file with the embedded binary stego message was recorded to cassette tape employing a common tape deck and then re-digitized using the same deck for play-back. The tape deck introduced amplitude modulation, nonlinear time shifts (wow and flutter) and broad-band noise.

The encoding method performs best when the decoder and the encoder are synchronized. As shown in Figure 9, de-synchronization leads to an increased bit-recovery error rate. Therefore, a synchronization method is needed to compensate for the time shifts

introduced by the D-A-D conversion process. One such method that we found to be effective is as follows. First, at the encoder we chose frames distributed periodically throughout the file to encode a stego message that is known to the decoder. At the decoder these frames serve as “synchronization frames”. For example, if we encode every fourth frame in the audio file with the binary stego message ‘1’, during decoding we may check every fourth frame to assess the instantaneous time-shift and then resynchronize the remaining data frames before decoding.

Another factor is the ratio of power between the selected harmonics. In some frames, the power ratio is too low to allow robust encoding and those frames will be skipped. We found that for a power ratio of 1:5, the robustness of the method was maintained.

Figure 10 shows the decoding error rate as a function of the percentage of frames employed for synchronization. As we can see from the figure the decoding error rate decreases as the number of synchronization frames increases. For example, when 45% of the frames are employed as synchronization frames, the decoding error rate approaches 10%.

An artifact of the phase manipulation method described above is a small discontinuity at the frame boundaries caused by reassignment of the phase of one of the spectral components. Depending upon the magnitude of the discontinuity, there may be a broad spectral component, appearing as white noise, in the background of the host file spectrum. In order to reduce the magnitude of the discontinuity, three techniques have been employed. In the first, rather than reassigning the phase of a single spectral component we do so for a band of frequencies in the neighborhood of the spectral component of interest. We typically use a band of frequencies of width equal to a few percent of the signal bandwidth.

A second method is to employ an error diffusion technique using a sigma delta modulator. Background information on sigma-delta modulation is found in our U.S. Patent No. 6,707,409, issued March 16, 2004.

Fig. 11 shows a schematic diagram of a device for error diffusion employed in conjunction with the phase-manipulation data-hiding method. Fig. 11 represents the most general case for N -th order sigma-delta modulation as used to diffuse an error resulting from embedding data into the host signal. In the device 1100 of Fig. 11, a host signal supplied to an input 1102 is integrated through a series of integrators 1104-1, 1104-2, ... 1104- N . The integrated signal is received in an embedding module, where a watermark or other signal received at a watermark input 1106 is embedded. The resulting signal is output through an output 1110 and is also fed back to the integrators 1104-1, 1104-2, ... 1104- N through subtracting circuits 1112. Although the device of Fig. 11 has been applied to frame sizes of 1,024 samples, the frame size is variable, and the resulting audio quality is clearly affected by the choice of the frame size.

Although both of these methods proved to be acceptable, a third method proved to be the simplest and most effective. The third method for reducing the phase discontinuities at the frame boundaries is simply to force the phase shifts to go to zero at the frame boundaries. In our implementation we employed a raised cosine function $(1+\cos)^n$ with $n = 10$. At the frame boundaries the phase of the chosen harmonic is not shifted and in the central region of the frame the phase is shifted by an amount equal to the difference of the original phase of the chosen harmonic and the nearest phase quantization step. The audible artifacts are eliminated in this method.

Figure 12 shows a system on which the present invention, including either of the two preferred embodiments disclosed above, can be implemented. The system 1200 is shown as including an encoder 1202 and a decoder 1214, although, of course, either of the devices 1202, 1214 could have both encoding and decoding capabilities.

In the encoder 1202, the audio signal and the data to be embedded are received in an input 1204. A processor 1206 embeds the data in the audio signal and outputs the encoded

file through an output 1208. From the output 1208, the encoded file can be transmitted in any suitable fashion, e.g., by being placed on a persistent storage medium 1210 (DVD, CD, tape, or the like) or by being transmitted over a live transmission system 1212.

5 In the decoder 1214, the encoded file is received at an input 1216. A processor 1218 extracts the embedded data from the signal and outputs the data through an output 1220. If required, the audio signal can also be output through the output 1220. For example, if the embedded data are used for watermarking purposes, the data and the audio signal can be supplied to a player which will not play the audio signal unless the required watermarking data are present.

10 While two preferred embodiments and variations thereon have been set forth above in detail, those skilled in the art who have reviewed the present disclosure will readily appreciate that other embodiments can be realized within the scope of the invention. For example, numerical values are illustrative rather than limiting, as are recitations of specific file formats. Moreover, in addition to steganography and watermarking, any suitable use for
15 hidden data falls within the present invention. Furthermore, the present invention can be implemented on any suitable hardware through any suitable software, firmware, or the like. Also, audio signals or files are not limited to portions of data recognized as discrete files by an operating system, but instead may be continuously recorded signals or portions thereof. Therefore, the present invention should be construed as limited only by the appended claims.

20

We claim:

1. A method for embedding data in an audio signal, the method comprising:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

5 (b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and

(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded.

2. The method of claim 1, wherein:

10 step (b) comprises selecting two of the plurality of frequency components in accordance with a pseudo-random sequence; and

step (c) comprises altering a relative phase of the two frequency components in accordance with the data to be embedded.

3. The method of claim 1, wherein:

15 step (b) comprises selecting a fundamental tone and at least one overtone; and

step (c) comprises quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

4. The method of claim 3, wherein:

step (b) comprises selecting a plurality of said overtones; and

20 step (c) comprises quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.

5. The method of claim 4, wherein step (c) further comprises inverse transforming the plurality of frequency components with the quantized phase differences.

25 6. The method of claim 1, further comprising (d) reducing a phase discontinuity at boundaries of the time frames caused by step (c).

7. The method of claim 6, wherein step (d) comprises controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames.

8. The method of claim 1, wherein the audio signal undergoes lossy compression before steps (a)-(c).

5 9. The method of claim 1, wherein the audio signal undergoes lossy compression after steps (a)-(c).

10. A method for extracting embedded data from an audio signal, the method comprising:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a
10 plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

(c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

15 (d) from the phase shift determined in step (c), extracting the embedded data.

11. The method of claim 10, wherein step (c) comprises determining which of the plurality of frequency components has the phase shift in accordance with a pseudo-random sequence.

12. The method of claim 10, wherein step (b) comprises selecting a fundamental tone
20 and at least one overtone.

13. The method of claim 12, wherein step (b) comprises selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining the phase shift in each of the plurality of overtones.

14. A device for embedding data in an audio signal, the device comprising:
25 an input for receiving the audio signal and the data to be embedded;

a processor, in communication with the input, for:

(a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components; and

(c) altering a phase of at least one of the plurality of frequency components in accordance with the data to be embedded; and

an output, in communication with the processor, for outputting a result of step (c) as the audio signal with the embedded data.

10 15. The device of claim 14, wherein:

the processor performs step (b) by selecting two of the plurality of frequency components in accordance with a pseudo-random sequence; and

the processor performs step (c) by altering a relative phase of the two frequency components in accordance with the data to be embedded.

15 16. The device of claim 14, wherein:

the processor performs step (b) by selecting a fundamental tone and at least one overtone; and

the processor performs step (c) by quantizing a phase difference of the at least one overtone relative to the fundamental tone to embed at least one bit of the data to be embedded.

17. The device of claim 16, wherein:

the processor performs step (b) by selecting a plurality of said overtones; and

the processor performs step (c) by quantizing the phase differences of the plurality of overtones selected in step (b) to embed a plurality of bits of the data to be embedded.

18. The device of claim 17, wherein the processor performs step (c) further by inverse transforming the plurality of frequency components with the quantized phase differences.

19. The device of claim 14, wherein the processor further performs (d) reducing a phase discontinuity at boundaries of the time frames caused by step (c).

5 20. The device of claim 19, wherein the processor performs step (d) by controlling phase shifts introduced in step (c) to go to zero at the boundaries of the time frames.

21. The device of claim 14, wherein the processor performs lossy compression on the audio signal before the processor performs steps (a)-(c).

10 22. The device of claim 14, wherein the processor performs lossy compression on the audio signal after the processor performs steps (a)-(c).

23. A device for extracting embedded data from an audio signal, the device comprising:

an input for receiving the audio signal;

a processor, in communication with the input, for:

15 (a) dividing the audio signal into a plurality of time frames and, in each time frame, a plurality of frequency components;

(b) in each of at least some of the plurality of time frames, selecting at least two of the plurality of frequency components;

20 (c) determining a phase shift which has been applied to at least one of the plurality of frequency components in accordance with the embedded data; and

(d) from the phase shift determined in step (c), extracting the embedded data; and

an output for outputting the embedded data.

25 24. The device of claim 23, wherein the processor performs step (c) by determining which of the plurality of frequency components has the phase shift in accordance with a pseudo-random sequence.

25. The device of claim 23, wherein the processor performs step (b) by selecting a fundamental tone and at least one overtone.

26. The device of claim 25, wherein the processor performs step (b) by selecting the fundamental tone and a plurality of overtones, and wherein step (c) comprises determining
5 the phase shift in each of the plurality of overtones.

27. An article of manufacture comprising:
a machine-readable storage medium; and
an audio signal recorded on the machine-readable storage medium, wherein the audio
signal comprises a plurality of time frames in which frequency components have been phase-
10 shifted to embed data in the audio signal.

28. A signal structure embodied in a carrier wave, the signal structure comprising an audio signal, wherein the audio signal comprises a plurality of time frames in which frequency components have been phase-shifted to embed data in the audio signal.

Abstract of the Disclosure

Data are embedded in an audio signal for watermarking, steganography, or other purposes. The audio signal is divided into time frames. In each time frame, the relative phases of one or more frequency bands are shifted to represent the data to be embedded. In
5 one embodiment, two frequency bands are selected according to a pseudo-random sequence, and their relative phase is shifted. In another embodiment, the phases of one or more overtones relative to the fundamental tone are quantized.

Figure 1

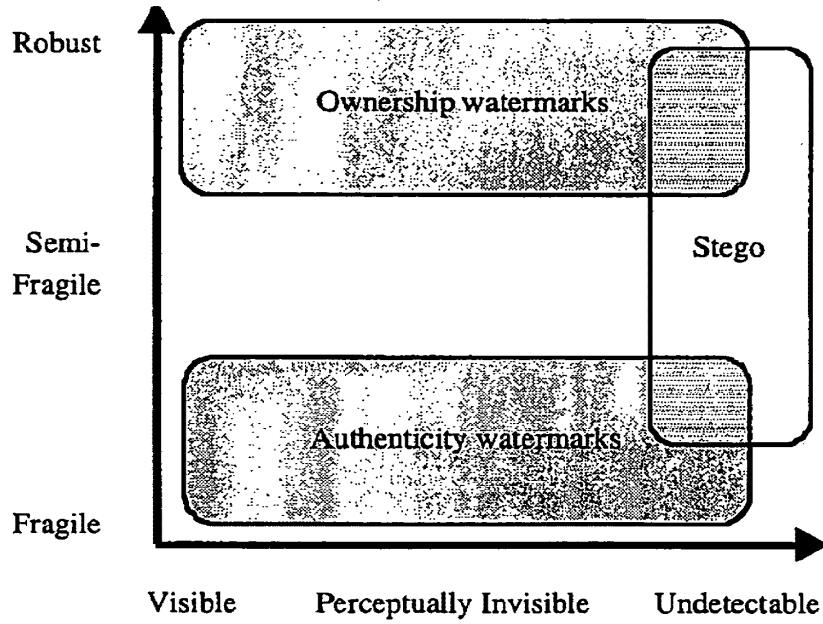
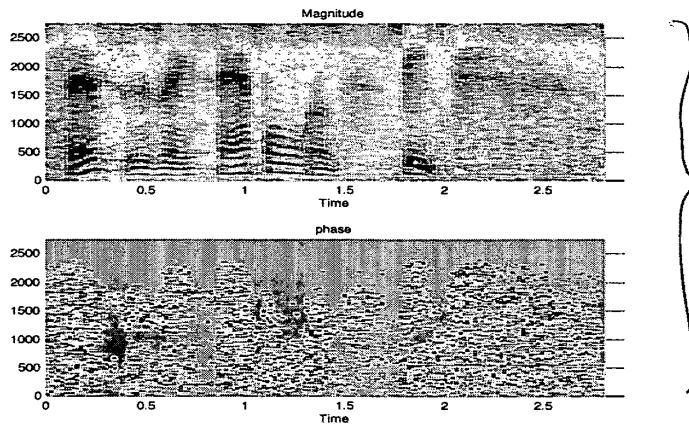


Figure 2



BEST AVAILABLE COPY

Figure 3

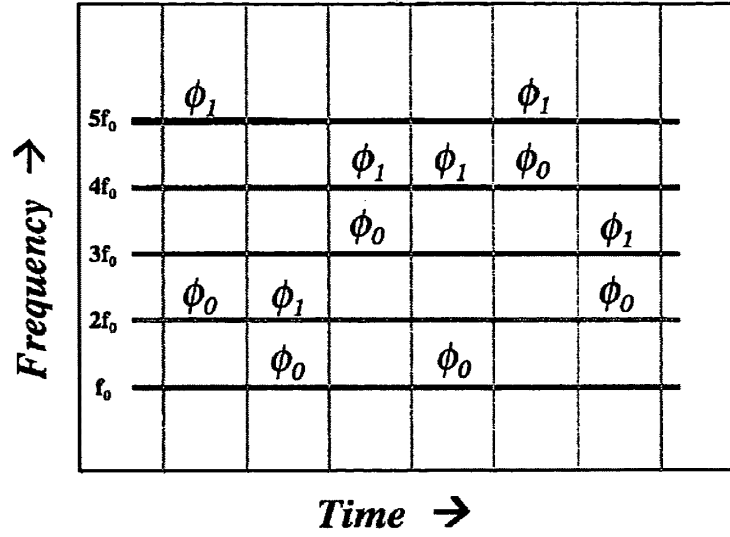


Figure 4

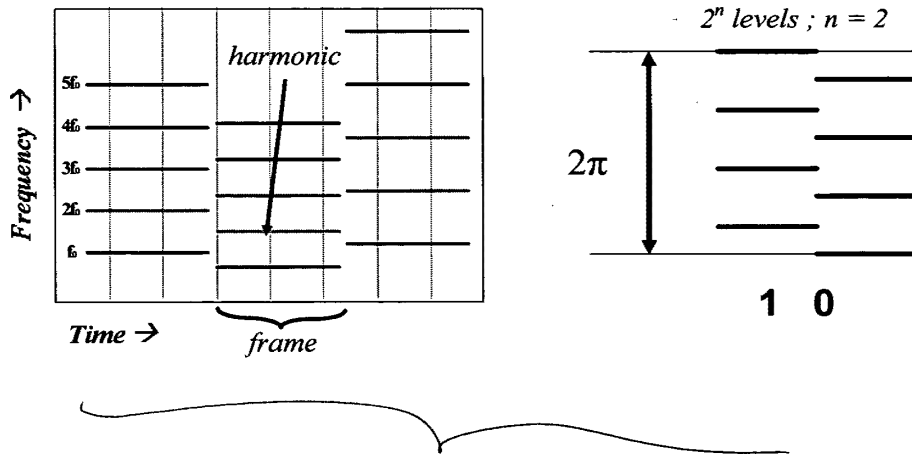


Figure 5

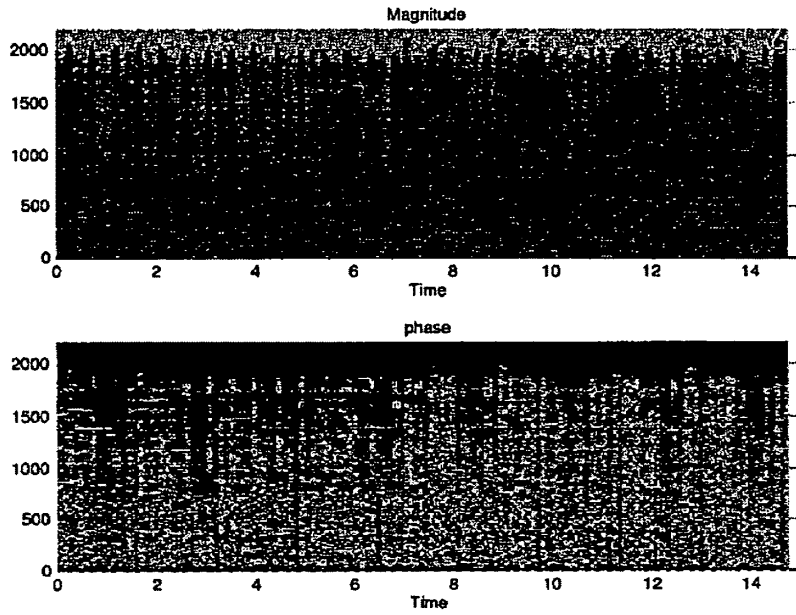
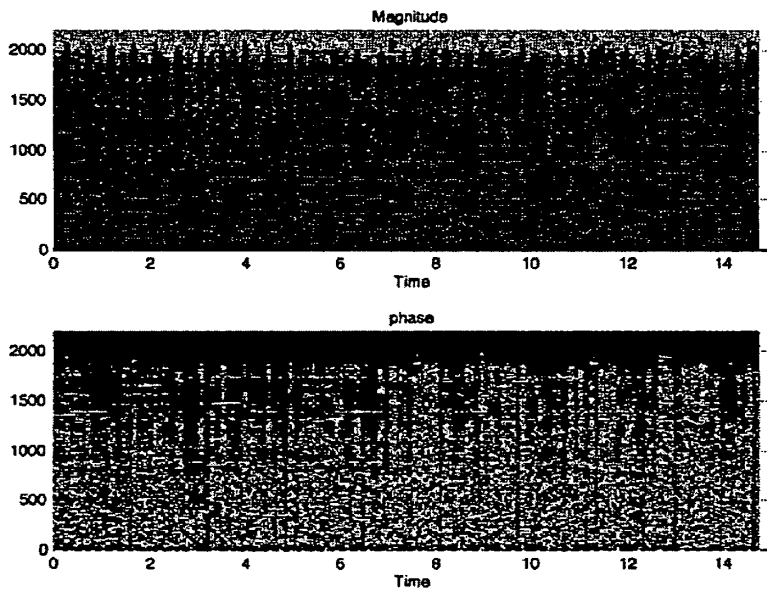


Figure 6



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Figure 7

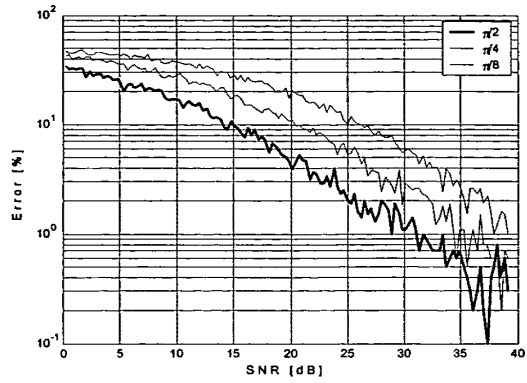


Figure 8

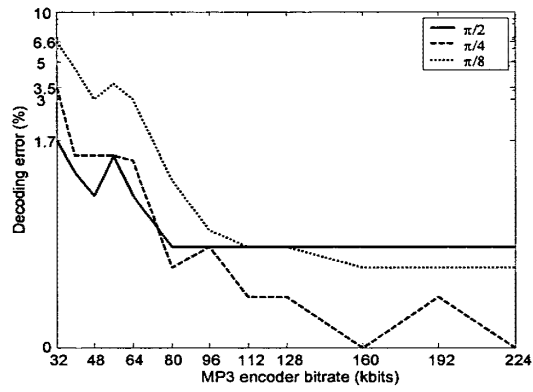


Figure 9

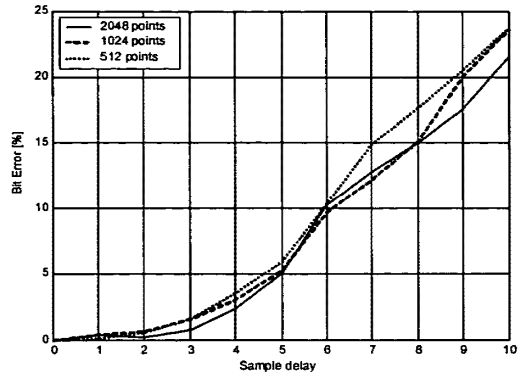


Figure 10

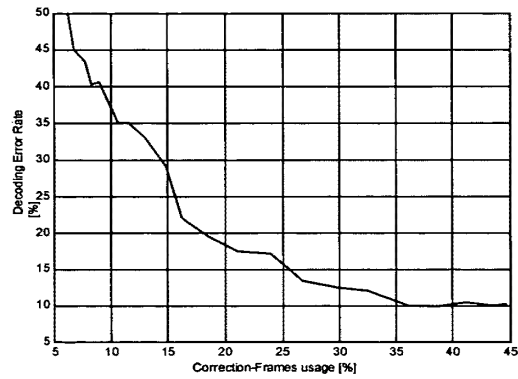
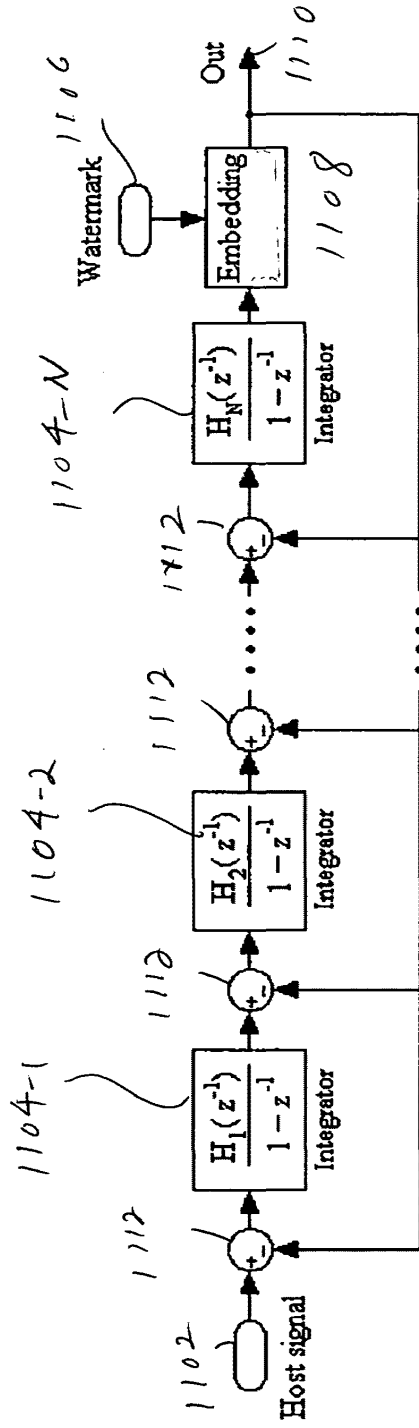


Figure 11

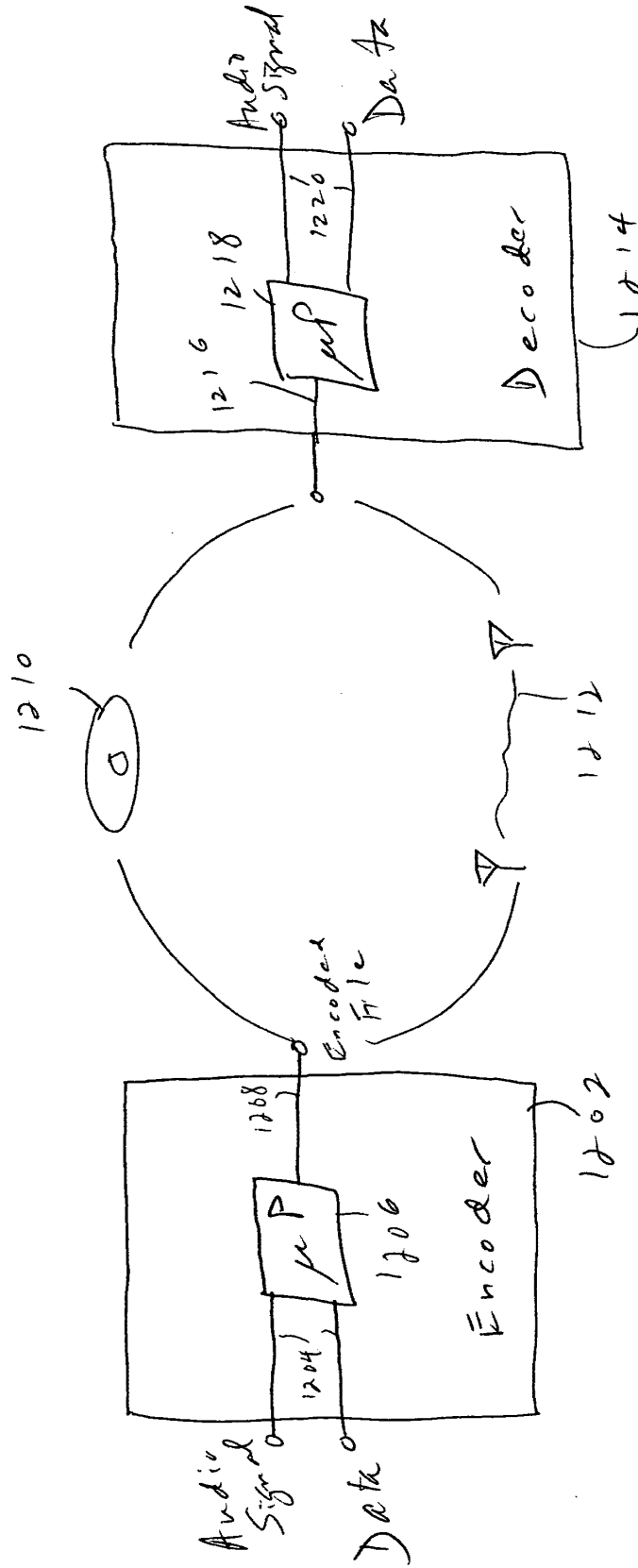


$$H_{M,i}(z^{-1}) = \frac{H_i(z^{-1})}{1-z^{-1}} \quad , \quad H_i(z^{-1}) = A_i \left(B_{i,0} + B_{i,1}z^{-\frac{1}{2}} + B_{i,2}z^{-1} \right) \quad , \quad i = 1, 2, 3, \dots, N$$

1100 →

Figure 12

1200 →



PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number

10870685

CLAIMS AS FILED - PART I

(Column 1) (Column 2)

TOTAL CLAIMS	28	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	28 minus 20=	* 8
INDEPENDENT CLAIMS	6 minus 3 =	* 3
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE

OR OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	385.00
X\$ 9=	72
X43=	129
+145=	0
TOTAL	586

RATE	FEE
BASIC FEE	770.00
X\$18=	
X86=	
+290=	
TOTAL	

CLAIMS AS AMENDED - PART II

(Column 1) (Column 2) (Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT C		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
TOTAL ADDIT. 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.