

J1050 U.S. PTO
10/027391



12/21/01

PATENT NUMBER and
ISSUE DATE

U.S. UTILITY Patent Application

APPL NUM 10027391	FILING DATE 12/21/2001	CLASS 700 375	SUBCLASS 94 74	GAU 2604	EXAMINER McCreaney
**APPLICANTS: Woolfork C.; 2644					
**CONTINUING DATA VERIFIED:					
** FOREIGN APPLICATIONS VERIFIED:					
PG-PUB	DO NOT PUBLISH <input type="checkbox"/>	RESCIND <input type="checkbox"/>			
Foreign priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no			ATTORNEY DOCKET NO		
35 USC 119 conditions met <input type="checkbox"/> yes <input type="checkbox"/> no					
Verified and Acknowledged Examiners's initials					
TITLE : Wireless digital audio system					
U.S. DEPT. OF COMM./PAT. & TM-PTO-436L (Rev. 12-94)					

NOTICE OF ALLOWANCE MAILED		Assistant Examiner	CLAIMS ALLOWED		
			Total Claims	Print Claim for O.G.	
ISSUE FEE		Primary Examiner	DRAWING		
Amount Due	Date Paid		Sheets Drwg.	Figs. Drwg.	Print Fig.
<input type="checkbox"/> TERMINAL DISCLAIMER		PREPARED FOR ISSUE	Application Examiner		
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PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

12/31/2001 WABDELRI 00000018 10027391

01 FC:201

370.00 DP

PTO-1556
(5/87)

*U.S. GPO: 2000-468-987/39595



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
 UNITED STATES PATENT AND TRADEMARK OFFICE
 WASHINGTON, D.C. 20231
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Bib Data Sheet

CONFIRMATION NO. 1123

SERIAL NUMBER 10/027,391	FILING DATE 12/21/2001	CLASS 375	GROUP ART UNIT 2631	ATTORNEY DOCKET NO.	
APPLICANTS C. Earl Woolfork, Altadena, CA;					
** CONTINUING DATA *****					
** FOREIGN APPLICATIONS *****					
IF REQUIRED, FOREIGN FILING LICENSE GRANTED** SMALL ENTITY ** ** 01/28/2002					
Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no	35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance	STATE OR COUNTRY CA	SHEETS DRAWING 2	TOTAL CLAIMS 7	INDEPENDENT CLAIMS 3
Verified and Acknowledged Examiner's Signature _____ Initials _____					
ADDRESS Dennis W. Beech LAW OFFICES OF DENNIS W. BEECH Suite C-2 19900 Beach Blvd. Huntington Beach , CA 92648					
TITLE Wireless digital audio system					
FILING FEE RECEIVED 370	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) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

12-28-01

A



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RESPOND TO: HUNTINGTON BEACH

December 20, 2001

EL870683042US

BOX: PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

Dear Commissioner:

Enclosed is a patent application for:

Applicant: C, EARL WOOLFORK
Application: WIRELESS DIGITAL AUDIO SYSTEM

- This application comprises of:
 - 10 pages of specifications
 - 2 pages of drawings
 - Combination Declaration & Power of Attorney
 - Small Entity Declaration
 - Proof of Mailing
 - Self addressed postcard
 - A check in the amount of \$370.00

This amount is based on:

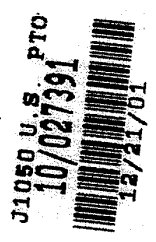
7 claims and 3 independent claims	\$370.00
0 claims in excess of twenty (\$9.00)	0.00
0 independent claims in excess of three (\$42.00)	0.00
TOTAL FILING FEE	\$370.00

If you have any questions, please do not hesitate to contact me.

Sincerely,

DENNIS W. BEECH
Reg. No.: 35443

DWB/ab
Enclosures



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In regards to application of:

Applicant: C, EARL WOOLFORK
Application: WIRELESS DIGITAL AUDIO SYSTEM

BOX: PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

EXPRESS MAIL CERTIFICATE MAILING UNDER 37 CFR § 1.10

"Express Mail" label number: EL 870683042

Date of Deposit: December 20, 2001

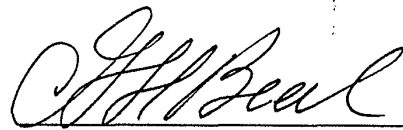
I hereby certify that the following attached correspondence comprising:

10 pages of specifications
2 pages of drawings
Combination Declaration & Power of Attorney
Small Entity Declaration
Self addressed postcard
A check in the amount of \$370.00

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR § 1.10 on the date indicated above and is addressed to:

BOX: PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

Dated: 12-20-01


ANNEROSE BEECH



WIRELESS DIGITAL AUDIO SYSTEM

BACKGROUND OF THE INVENTION

5 [0001] This invention relates to audio player devices and more particularly to systems that include headphone listening devices. The new audio system uses existing audio player device headphone jacks to connect a transmitter for wireless transmission of a signal to a receiving headphone.

[0002] Use of audio headphones with audio player devices such as radio, 10 tape players, CD players, computers, television audio and the like have been in use for many years. Such use includes the portable player systems such as cassette tape players that may be used during exercising as for example running. These systems usually incorporate an audio source having a headphone jack to which a headphone is connected by wire and connector.

15 [0003] There are also known wireless headphones that may receive radio transmissions. Also, audio player devices have been modified to allow wireless communication with a headphone receiver. However, these systems do not allow use of a simple plug in transmitter for connection to the audio player device jack for wireless transmission between space separated devices.

20 [0004] As can be seen, there is a need for a simple connection system for existing audio player devices to allow wireless transmission to a headphone receiver.

SUMMARY OF THE INVENTION

25 [0005] The present invention is directed to wireless digital audio systems for transmission of a signal from an audio player device to a headphone. An audio transmitter may include a headphone plug in communication with an analog low pass filter wherein the headphone plug may be connectable to a 30 headphone jack of an audio source. The low pass filter output signal may be in

communication with an A/D converter whose output may be in communication with a digital low pass filter that outputs a signal to an encoder. The encoder output may be in communication with a channel encoder the output of which may be in communication with a block interleaver. The block interleaver output
5 may be in communication with a modulator the output of which may be summed with a transmitter code generator output in a summing element. The modulator may be a 64 Ary modulator. The summing element output may be in communication with a differential phase shift key transmitter the output of which may be in communication with a transmit antenna for wireless
10 transmission of a signal. The transmitted signal may be transmitted to an audio receiver for processing to power a headphone speaker.

[0006] These and other features, aspects and advantages of the present invention will become better understood with reference to the following drawings, description and claims.

15

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 illustrates a schematic diagram representation of the wireless digital audio system;

20 [0008] Figure 2 illustrates a functional block diagram of the audio transmitter according to an embodiment of the invention;

[0009] Figure 3 illustrates a functional block diagram of the audio receiver according to an embodiment of the invention.

25

DETAILED DESCRIPTION

[0010] The following detailed description is the best currently contemplated modes for carrying out the invention. The description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general
30 principles of the invention.

[0011] Referring to Figure 1, a wireless digital audio system 10 may include an audio transmitter 20 connected to an audio player or audio source 80. The audio transmitter 20 may be connected to the audio source 80 headphone jack 82 using a headphone plug 22. The audio transmitter 20 may have a transmitting antenna 24 that may be omni-directional for transmitting an electromagnetic signal to a receiving antenna 52 of an audio receiver 50 that may be a headphone receiver. The audio receiver 50 may have headphone speakers 54 in headphones 55 for listening to the audio signal. The audio system 10 may digitize the audio signal and may transmit an electromagnetic signal at 2.4 GHz using approximately 100 milliwatts or less of power.

[0012] Referring to Figure 2, an audio transmitter 20 may receive an audio signal from an audio source 80. The audio transmitter 20 may be a compact device that may be connected to the audio source 80 to remain therewith for transmitting a signal to an audio receiver. An audio source 80 normally provides an analog output signal in the approximate range of 20 Hz to 20 kHz. This signal may then be processed through an analog low pass filter 30 to then be digitized by a 4 bit analog-to-digital (A/D) converter 32. After digital conversion of the analog audio signal, the digital signal may be processed by a digital low pass filter 34 to reduce unwanted out of band noise that may have been produced by the A/D converter 32.

[0013] An encoder 36 may be used to reduce intersymbol interference (ISI) by using a transform code to encode the digital signal. The reduction of ISI may lower the probability of a signal detection error in the audio receiver. The digital signal may next be processed by a channel encoder 38 and a block interleaver 40 to produce encoded redundancies in the transmitted signal to reduce errors that may occur during transmission.

[0014] Modulation of the digital signal may be performed using direct sequence spread spectrum communication technology. A 64-Ary modulator 42 may be used for summation at summation element 46 with a transmitter code generator 44 signal to produce a high symbol rate, and a unique codeword that

spreads the signal spectrum. The output of the summation element 46 may then be communicated to a differential phase shift key (DPSK) transmitter 48 that modulates the digital signal to be transmitted by an omni-directional transmitting antenna 24 at approximately 2.4 GHz. The transmit power may be limited to 100 milliwatts.

[0015] The transmitted signal from transmit antenna 24 may be received by receiving antenna 52 and communicated to a wideband band pass filter (BPF) 54. The received spread spectrum signal may then be communicated to a 2.4 GHz direct conversion receiver 56. The direct conversion receiver 56 may provide a method for down converting the received signal while utilizing timing and synchronization to capture the correct bit sequence embedded in the received spread spectrum signal. The audio receiver 50 may utilize fuzzy logic (or continuous logic) to optimize performance of the audio receiver 50.

[0016] The down converted output signal of the direct conversion receiver 56 may be summed in receiver summing element 58 with a receiver code generator 60 signal. The receiver code generator 60 may contain the same unique code word that was transmitted by the audio transmitter 20 specific to a particular a user. Other code words from wireless digital audio systems 10 may appear as noise to a particular audio receiver 50. This may also be true for other device transmitted signals operating in the wireless digital audio system 10 spectrum. This code division multiple access (CDMA) may be used to provide each user independent operation.

[0017] The resulting summed digital signal from receiving summary element 58 may be processed by a 64-Ary demodulator 62 to demodulate the signal elements modulated in the audio transmitter 20. A block de-interleaver 64 may then decode the bits of the digital signal encoded in the block interleaver 40. Following such, a Viterbi decoder 66 may be used to decode the bits encoded by the channel encoder 38 in the audio transmitter 20. A source decoder 68 may further decode the coding applied by the encoder 36. The resultant processed digital signal may thereby be condition to represent the

original signal processed and transmitted by the audio transmitter 20.

[0018] The next step may process the digital signal to return the signal to analog or base band format for use in powering a speaker 54. A digital-to-analog converter 70 (DAC) may be used to transform the digital signal to an analog audio signal. An analog low pass filter 72 may be used to filter the analog audio signal to pass a signal in the approximate 20 Hz to 20kHz frequency range and filter other frequencies. The analog audio signal may then be processed by a power amplifier 74 that may be optimized for powering a headphone speaker 54 to optimize a high quality, low distortion signal for hearing by a user wearing the headphones 55.

[0019] While the invention has been particularly shown and described with respect to the illustrated and preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

CLAIMS

I claim:

1. An audio transmitter for wireless transmission of a signal from an audio source to a headphone comprising:
 - a headphone plug in communication with an analog low pass filter and connectable to a headphone jack of an audio source;
 - said low pass filter output in communication with an A/D converter;
 - said A/D converter in communication with a digital low pass filter, the output of which is in communication with an encoder;
 - said encoder output in communication with a channel encoder the output of which is in communication with a block interleaver;
 - said block interleaver output in communication with a modulator the output of which is summed with a transmitter code generator output in a summing element; and
 - said summing element output in communication with a differential phase shift key transmitter the output of which is in communication with a transmit antenna for wireless transmission of a signal.

2. The audio transmitter as in claim 1 wherein said signal is transmitted to an audio receiver of said headphone comprising:
 - a receiving antenna in communication with a wideband band pass filter;
 - said wideband band pass filter in communication with a direct conversion receiver the output of which is summed with a receiver code generator in a receiver summing element;
 - said receiver summing element in communication with a demodulator the output of which is in communication with a block de-

interleaver;

said block de-interleaver output in communication with a Viterbi decoder the output of which is in communication with a source decoder;

said source decoder output in communication with a D/A converter the output of which is in communication with an analog low pass filter; and

said analog low pass filter output in communication with a power amplifier the output of which is in communication with a headphone speaker.

3. The audio transmitter as in claim 1 wherein said modulator is a 64-Ary modulator.

4. The audio transmitter as in claim 2 wherein said demodulator is a 64 Ary demodulator.

5. An audio receiver for packaging in a headphone comprising:
a receiving antenna in communication with a wideband band pass filter;

said wideband band pass filter in communication with a direct conversion receiver the output of which is summed with a receiver code generator in a receiver summing element;

said receiver summing element in communication with a demodulator the output of which is in communication with a block de-interleaver;

said block de-interleaver output in communication with a Viterbi decoder the output of which is in communication with a source decoder;

said source decoder output in communication with a D/A converter the output of which is in communication with an analog low pass filter; and

said analog low pass filter output in communication with a power

amplifier the output of which is in communication with a headphone speaker.

6. The audio receiver as in claim 5 wherein said demodulator is a 64 Ary demodulator.

7. A wireless digital audio system for wireless transmission of a signal from an audio source to a headphone comprising:

a headphone plug in communication with an analog low pass filter and connectable to a headphone jack of an audio source;

said low pass filter output in communication with an A/D converter;

said A/D converter in communication with a digital low pass filter, the output of which is in communication with an encoder;

said encoder output in communication with a channel encoder the output of which is in communication with a block interleaver;

said block interleaver output in communication with a modulator the output of which is summed with a transmitter code generator output in a summing element;

said summing element output in communication with a differential phase shift key transmitter the output of which is in communication with a transmit antenna for wireless transmission of a signal to a receiving antenna;

said receiving antenna in communication with a wideband band pass filter;

said wideband band pass filter in communication with a direct conversion receiver the output of which is summed with a receiver code generator in a receiver summing element;

said receiver summing element in communication with a demodulator the output of which is in communication with a block de-interleaver;

said block de-interleaver output in communication with a Viterbi

WIRELESS DIGITAL AUDIO SYSTEM

ABSTRACT OF THE DISCLOSURE

5 [0020] The present invention is directed to wireless digital audio systems
for transmission of a signal from an audio player device to a headphone. An
audio transmitter may include a headphone plug in communication with an
analog low pass filter wherein the headphone plug may be connectable to a
headphone jack of an audio source. The low pass filter output signal may be in
10 communication with an A/D converter whose output may be in communication
with a digital low pass filter that outputs a signal to an encoder. The encoder
output may be in communication with a channel encoder the output of which
may be in communication with a block interleaver. The block interleaver output
may be in communication with a modulator the output of which may be summed
15 with a transmitter code generator output in a summing element. The
modulator may be a 64 Ary modulator. The summing element output may be
in communication with a differential phase shift key transmitter the output of
which may be in communication with a transmit antenna for wireless
transmission of a signal. The transmitted signal may be transmitted to an audio
20 receiver for processing to power a headphone speaker. It is emphasized that
this abstract is provided to comply with the rules requiring an abstract that will
allow a searcher or other reader to quickly ascertain the subject matter of the
technical disclosure. It is submitted with the understanding that it will not be
used to interpret or limit the scope or meaning of the claims.

COMBINATION DECLARATION AND POWER OF ATTORNEY

As the below named inventor, I hereby declare that this declaration is an original.

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: WIRELESS DIGITAL AUDIO SYSTEM.

SPECIFICATION IDENTIFICATION

The specification is attached hereto.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

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 the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

No such applications have been filed.

Dated: 12/20/01


C. EARL WOOLFORK

POWER OF ATTORNEY

As the named inventor, I hereby appoint the following attorney to prosecute this application and transact all business in the Patent and Trademark Office and as agent or common representative to act on behalf of the applicant before the competent International authorities.

Dennis W. Beech, Reg. No. 35,443
LAW OFFICES OF DENNIS W. BEECH
19900 Beach Blvd., Suite C-2
Huntington Beach, CA 92648
(714) 378-0212

DECLARATION


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 statement may jeopardize the validity of the application or any patent issue thereon.

Country of Citizenship: United States of America

Residence: 2670 No. Lincoln Ave., Altadena, CA 91001

Post Office address: Same as above

Full name of sole or first inventor: C. Earl Woolfork

Inventor's signature: 

Date: 12/20/01

Applicant or Patentee: C. Earl Woolfork
Serial or Patent No. : _____
Filed or Issued : _____
For: WIRELESS DIGITL AUDIO SYSTEM

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9 (f) AND 1.27 (b))--INDEPENDENT INVENTOR**

As the below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, to Patent and Trademark Office with regard to the invention entitled WIRELESS DIGITAL AUDIO SYSTEM described in the specification filed herewith.

I have not assigned, granted, conveyed or licensed and I am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or license or are under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

No such person.

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

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, and patent issuing thereon, or any patent to which this verified statement is directed.

Date 12/20/01


C. EARL WOOLFORK

TOP SECRET

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN	700	94

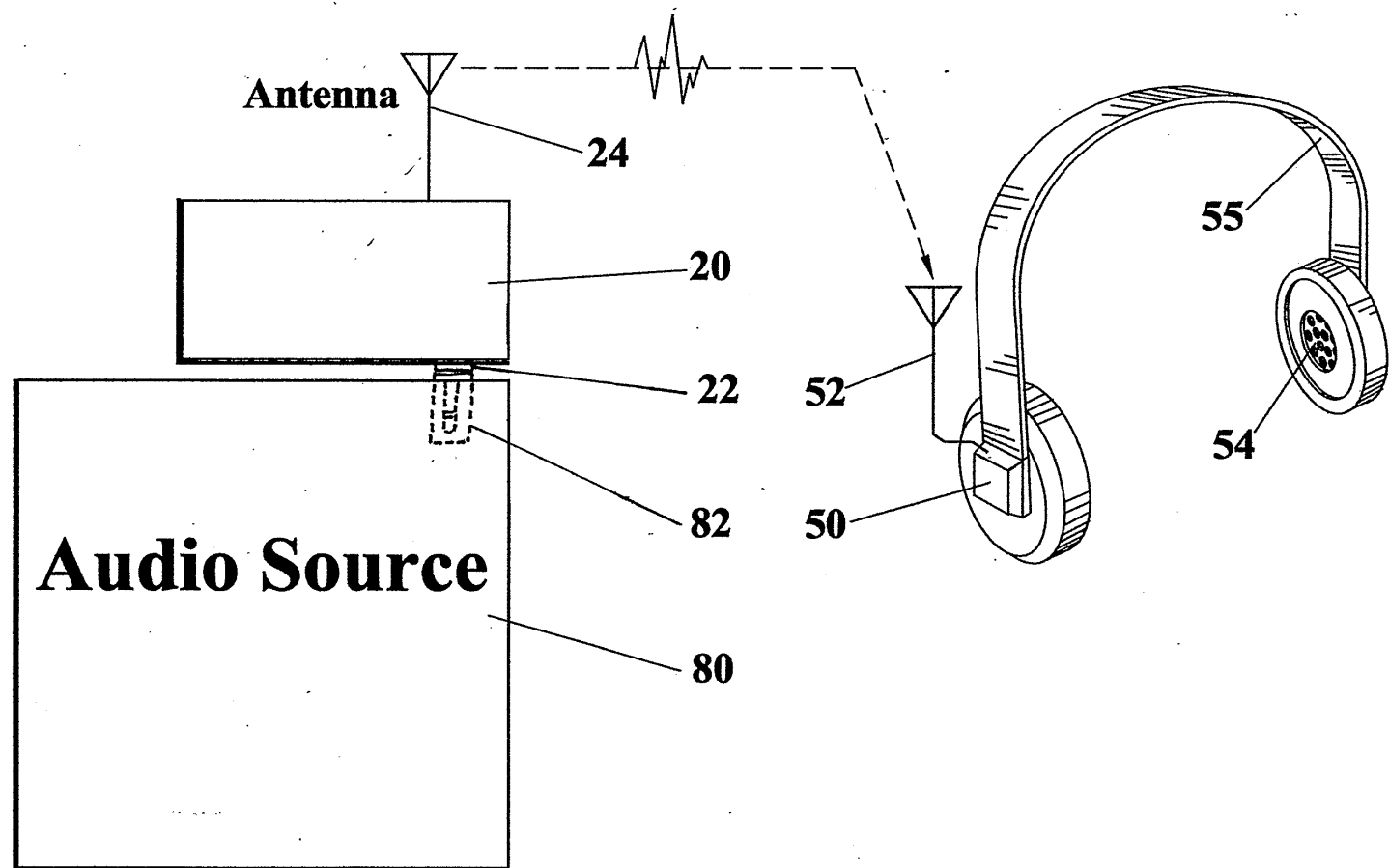


FIG.1

FIG. 2

APPROVED	O. G. FIG.
BY	CLASS
DRAFTSMAN	700
	SUBCLASS
	94

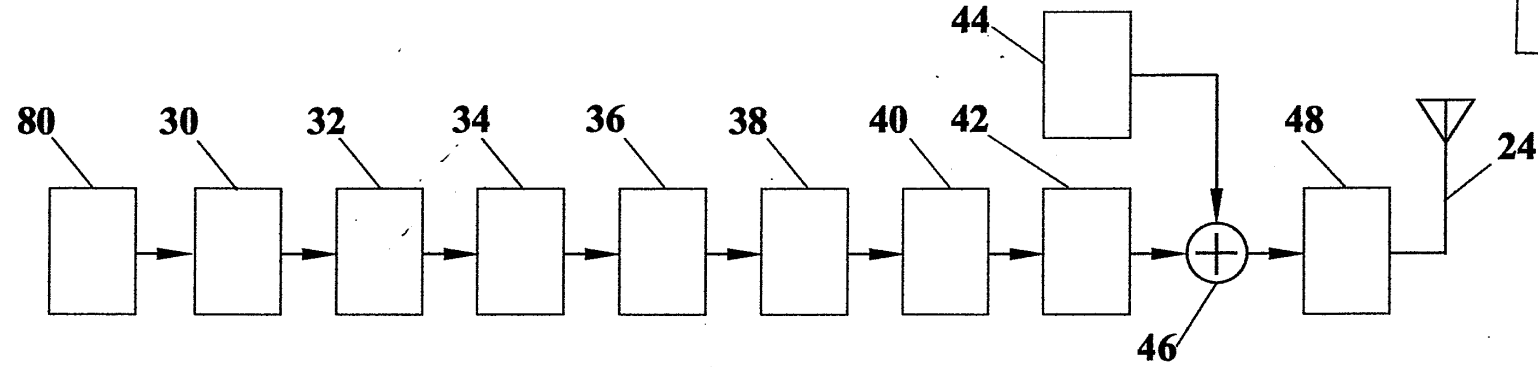


FIG. 2

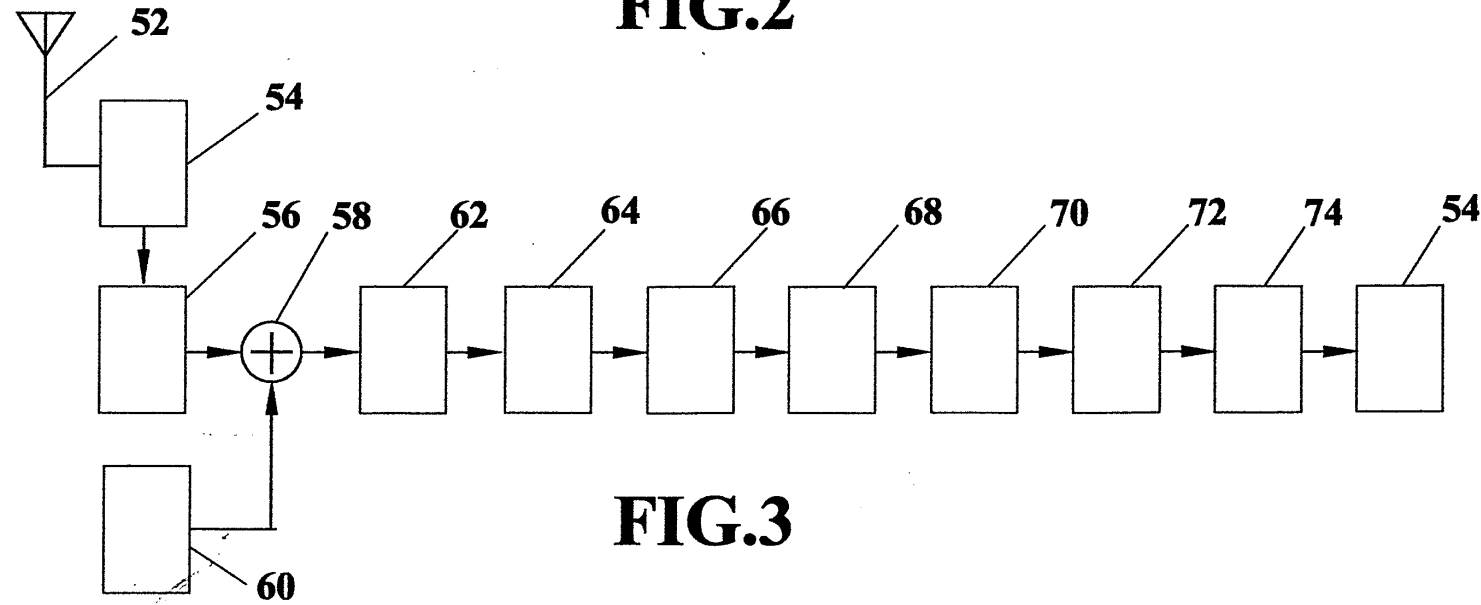
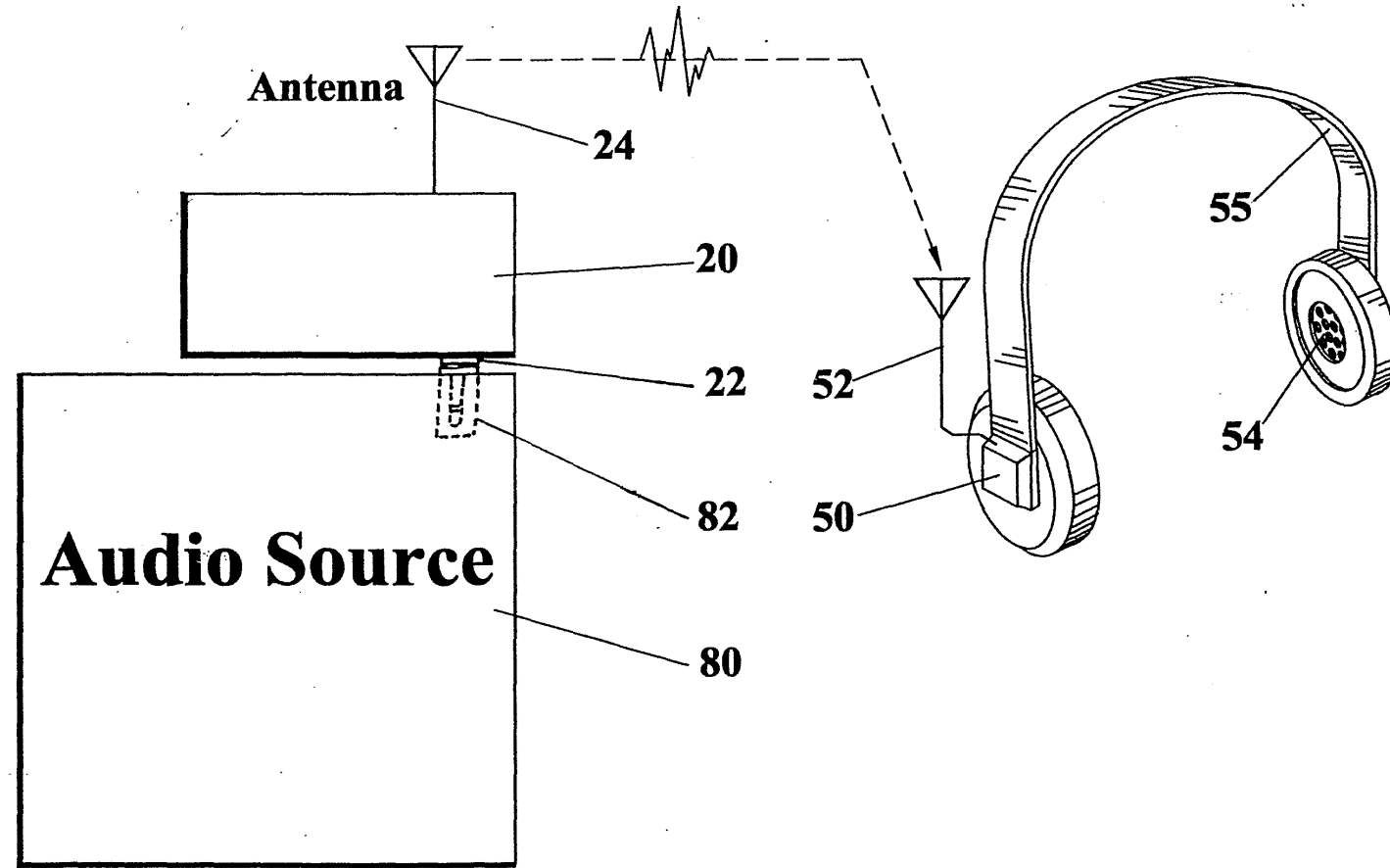


FIG. 3

100227 762300F



PRINT OF DRAWINGS
AS ORIGINALLY FILED

FIG.1

FOR REFERENCE

PRINT OF DRAWINGS
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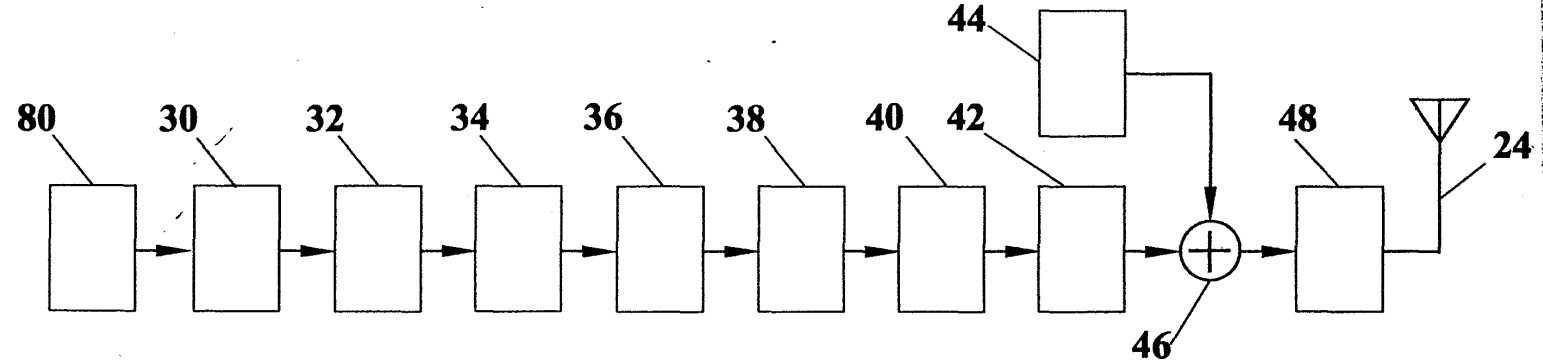


FIG. 2

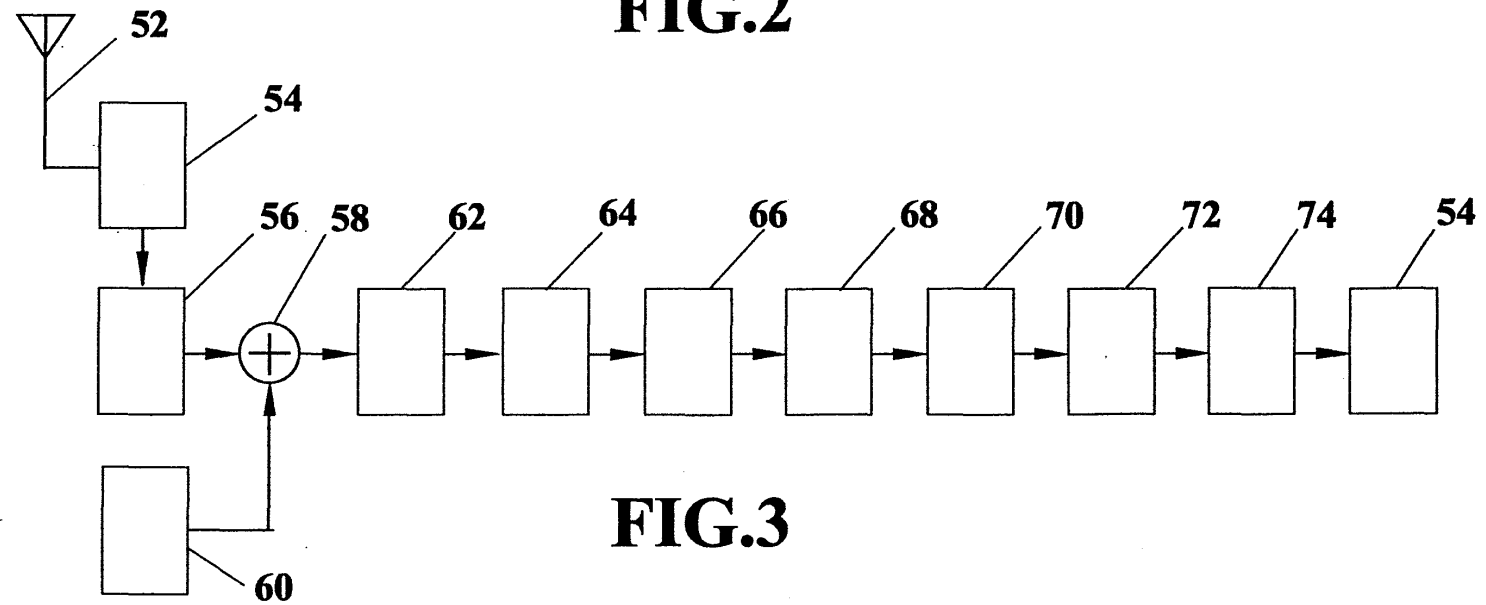
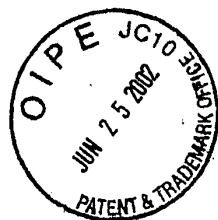


FIG. 3

OP 2631 # 13
7-8-02



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	C. Earl Woodfork)	
)	Art Unit: 2631
Serial No.:	10/027,391)	
)	Examiner: Unknown
Filed:	12-21-2001)	
)	
For:	Wireless Digital Audio System)	

RECEIVED

JUL 01 2002

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR SECTION 1.56

Technology Center 2600

Assistant Commissioner for Patents
Washington, DC 20231

Dear Commissioner:

Pursuant to 37 CFR Section 1.56, Applicant hereby advises that during the evaluation of the subject matter of the above-identified patent application, the references listed below were brought to the attention of Applicant's attorney. No representation is made that the references listed below legally constitute prior art, or that more relevant references are not available. Copies of the references, and copies of information for Form PTO 1449 are attached herewith.

The accompanying references disclose various wireless digital audio systems.

U.S. Patent No. 6,212,282 U.S. Patent No. 5,946,343
U.S. Patent No. 6,118,882 U.S. Patent No. 5,832,024
U.S. Patent No. 6,045,224 U.S. Patent No. 5,887,006
U.S. Patent No. 4,845,751

The relevance of these patents is that they are related to wireless digital audio systems. Notification from the Examiner regarding consideration of these references is respectfully requested.

Dated: 6-22-02

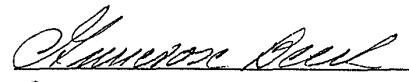
Respectfully submitted,

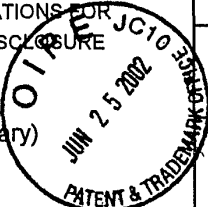


DENNIS W. BEECH
Reg. No.: 35443

CERTIFICATE OF MAILING

I hereby certify that this notice and the required additional fee are being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231 on the date indicated below.

Print Name: ANNEROSE BEECH Signature: 
Date: 6-22-02

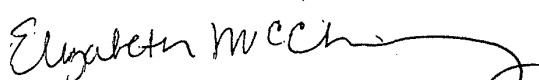
FORM PTO-1449 (Modified) LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)	ATTY. DOCKET NO. None	SERIAL NO. 10/027,391
	APPLICANT: C. Earl Woolfork	
	FILING DATE 12-21-2001	GROUP 2631
		

REFERENCE DESIGNATION										U.S. PATENT DOCUMENTS			
EXAMINER INITIAL		DOCUMENT NUMBER							DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
EM	AA	6	2	1	2	2	8	2	2001	MERSON	381	77	
EM	AB	6	1	1	8	8	8	2	2000	HAYNES	381	374	
EM	AC	6	0	4	5	2	2	4	2000	KALLENBACH	351	158	
EM	AD	4	8	4	5	7	5	1	1989	SCHWAB	381	25	
EM	AE	5	9	4	6	3	4	3	1999	SCHOTZ	375	200	
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	AH												
	AI												
	AJ												
	AK												

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 JUL 01 2002
 Technology Center 2600

FOREIGN PATENT DOCUMENTS														
		DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
													YES	NO
	AL													
	AM													
	AN													
	AO													
	AP													

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)														
	AR													
	AS													
	AT													

EXAMINER 	DATE CONSIDERED 8/12/02
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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.

(Information Disclosure Statement - Section 9 PTO-1449 (Modified [6-1] - Page 1 of 1)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,391	12/21/2001	C. Earl Woolfork		1123

7590 09/06/2002

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EXAMINER

MCCHESENEY, ELIZABETH A

ART UNIT PAPER NUMBER

2644

DATE MAILED: 09/06/2002

3

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

Office Action Summary	Application No.	Applicant(s)	
	10/027,391	WOOLFORK, C. EARL	
	Examiner	Art Unit	
	Elizabeth A McChesney	2644	

-- 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) 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 the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- 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) 1-7 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) 1-7 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 December 21, 2001 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).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) 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.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____
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) Paper No(s) <u>2</u>	6) <input type="checkbox"/> Other:

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: The wireless digital system 10 is mentioned in the specification page 3, line 1 in relation to figure 1 however the number is not labeled in the figure 1 drawing. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because Figure 2 fails to provide written labels of the block diagram to provide a sufficient description of the drawing. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. 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.

4. **Claims 1 and 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) in view of Schilling (US Patent No. 6,327,297) and in further view of Schwab (US Patent No. 4,845,751).

Regarding **claim 1** Schotz et al. (hereinafter, "Schotz"), discloses a wireless speaker system wherein the transmitter 22 transmits a wireless signal from an audio source 26 (see figure 1). The transmitter comprises of an anti-aliasing filter 50A, which reads on a low pass filter, which is in communication with an A/D converter digital filter 52 in communication with a correction encoder 98 in communication with an interleaver 100 which is in communication with a modulator 103 wherein a code generator 308 is also incorporated and at a juncture that is in communication with a quadrature phase shift keying (QPSK) scheme 104 which is used and further output for wireless transmission through antenna 38 (see figures 4A and 4B). Schotz discloses that a binary-phase keying scheme could also be used however it is well known in the art that many modulation types are equivalent and could be substituted for the QPSK (col. 10-lines 8-11). Schilling also discloses that there are suitable equivalent modulation types, which include PSK, BSPK, QPSK, DPSK and M-ary phase shift keying (col. 5-lines 10-18). Therefore it would have been obvious to one of ordinary skill in the art to use an equivalent form of modulation such as differential phase shift key in order to modulate the signal and be transmitted in the 2.4 GHz band.

Schotz discloses wireless transmission between two speakers. However, it is well known to have wireless speakers as well as wireless headphones. Schwab discloses wireless stereo headphones wherein the wireless headphone that uses an

accessory plug-in transmitter that can be easily installed to a conventional receiver/amplifier by simply plugging it into the receiver's headphone jack (col. 1-lines 47-51). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide wireless transmission of signals as taught by Schotz to wireless headphones via a plug-in transmitter as discloses in Schwab for the purpose of providing privacy to the listener without the constraints of wires.

Regarding **claim 3**, Schotz in view of Schilling and in further view of Schwab discloses everything claimed as applied above (see claim 1). Schilling discloses an equivalent modulator maybe a M-ary phase shift keying modulation where M is larger than, four and would therefore read on a 64-ary modulator.

Claim Rejections - 35 USC § 103

5. **Claims 2 and 4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) in view of Schilling (US Patent No. 6,327,297), Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 2**, Schotz in view of Schilling and in further view of Schwab discloses everything claimed as applied above (see claim 1). Schotz further discloses the incoming signal fed from the receiver antenna 40 to a bandpass filter 138 which is in communication with the receiver front end 140 and into circuitry 146 which performs the down conversion at the juncture 158 in combination with the receiver code generator 144 which is in combination with the demodulator 148 in communication with the de-

interleaver 200 in combination with the decoder 198 in communication with the D/A converter in communication with the analog filter in communication with a power amplifier wherein it is well known in the art to include a power amplifier and therefore would have been obvious to provide one in order to strengthen the audio signal which is driven to the speaker. Schotz discloses an error correction decoder 198 but does not specifically disclose or fairly suggest a Viterbi decoder. However, the examiner maintains that Viterbi decoders are well known in the art. Uramoto discloses a receiver for broadcasting data. Uramoto further discloses demodulated data supplied to Viterbi decoder circuit 16 in which it is deinterleaved and subjected to error correction and supplied to audio decoder circuit 17. It would have been obvious to one of ordinary skill in the art at the time the invention to use a Viterbi decoder and decoder circuit in the system disclosed by Schotz for an equivalent decoder for deinterleaving and error correction of desired data transmission.

Regarding **claim 4**, it would have been obvious to use a 64-ary demodulator in order to demodulate the signal from the modulator discussed in claim 3.

Claim Rejections - 35 USC § 103

6. **Claims 5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) and Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 5**, Schotz discloses the incoming signal fed from the receiver antenna 40 to a bandpass filter 138 which is in communication with the receiver front

end 140 and into circuitry 146 which performs the down conversion at the juncture 158 in combination with the receiver code generator 144 which is in combination with the demodulator 148 in communication with the de-interleaver 200 in combination with the decoder 198 in communication with the D/A converter in communication with the analog filter in communication with a power amplifier wherein it is well known in the art to include a power amplifier and therefore would have been obvious to provide one in order to strengthen the audio signal which is driven to the speaker. Schotz discloses an error correction decoder 198 but does not specifically disclose or fairly suggest a Viterbi decoder. However, the examiner maintains that Viterbi decoders are well known in the art. Uramoto discloses a receiver for broadcasting data. Uramoto further discloses demodulated data supplied to Viterbi decoder circuit 16 in which it is deinterleaved and subjected to error correction and supplied to audio decoder circuit 17. It would have been obvious to one of ordinary skill in the art at the time the invention to use a Viterbi decoder and decoder circuit in the system disclosed by Schotz for an equivalent decoder for deinterleaving and error correction of desired data transmission.

Schotz discloses wireless transmission between two speakers. However, it is well known to have wireless speakers as well as wireless headphones. Schwab discloses wireless stereo headphones wherein it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide wireless transmission of signals as taught by Schotz to a receiver in the wireless headphones for the purpose of providing privacy to the listener without the constraints of wires.

Regarding **claim 6**, see Examiner's comments regarding claim 3.

Claim Rejections - 35 USC § 103

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) in view of Schilling (US Patent No. 6,327,297), Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 7**, Schotz discloses a wireless speaker system wherein the transmitter 22 transmits a wireless signal from an audio source 26 (see figure 1). Schotz discloses wireless transmission between two speakers. However, it is well known to have wireless speakers as well as wireless headphones. Schwab discloses wireless stereo headphones wherein the wireless headphone that uses an accessory plug-in transmitter that can be easily installed to a conventional receiver/amplifier by simply plugging it into the receiver's headphone jack (col. 1-lines 47-51). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide wireless transmission of signals as taught by Schotz to wireless headphones via a plug-in transmitter as discloses in Schwab for the purpose of providing privacy to the listener without the constrains of wires.

The transmitter comprises of an anti-aliasing filter 50A, which reads on a low pass filter, which is in communication with an A/D converter digital filter 52 in communication with a correction encoder 98 in communication with an interleaver 100 which is in communication with a modulator 103 wherein a code generator 308 is also incorporated and at a juncture that is in communication with a quadrature phase shift keying (QPSK) scheme 104 which is used and further output for wireless transmission

through antenna 38 (see figures 4A and 4B). Schotz discloses that a binary-phase keying scheme could also be used however it is well known in the art that many modulation types are equivalent and could be substituted for the QPSK (col. 10-lines 8-11). Schilling also discloses that there are suitable equivalent modulation types, which include PSK, BSPK, QPSK, DPSK and M-ary phase shift keying (col. 5-lines 10-18). Therefore it would have been obvious to one of ordinary skill in the art to use an equivalent form of modulation such as differential phase shift key in order to modulate the signal and be transmitted in the 2.4 GHz band.

Schotz further discloses the incoming signal fed from the receiver antenna 40 to a bandpass filter 138 which is in communication with the receiver front end 140 and into circuitry 146 which performs the down conversion at the juncture 158 in combination with the receiver code generator 144 which is in combination with the demodulator 148 in communication with the de-interleaver 200 in combination with the decoder 198 in communication with the D/A converter in communication with the analog filter in communication with a power amplifier wherein it is well known in the art to include a power amplifier and therefore would have been obvious to provide one in order to strengthen the audio signal which is driven to the speaker. Schotz discloses an error correction decoder 198 but does not specifically disclose or fairly suggest a Viterbi decoder. However, the examiner maintains that Viterbi decoders are well known in the art. Uramoto discloses a receiver for broadcasting data. Uramoto further discloses demodulated data supplied to Viterbi decoder circuit 16 in which it is deinterleaved and subjected to error correction and supplied to audio decoder circuit 17. It would have

been obvious to one of ordinary skill in the art at the time the invention to use a Viterbi decoder and decoder circuit in the system disclosed by Schotz for an equivalent decoder for deinterleaving and error correction of desired data transmission.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wang et al. (US Patent No. 5,671,255) discloses a method and apparatus for determining coding rate in a wireless communication system.

Cai et al. (US Patent No. 5,960,040) discloses communication signal processors and methods.

Gevargiz et al. (US Patent No. 6,301,313) discloses mobile digital radio system with spatial and time diversity capability.

Takagi (US Patent No. 6,11,473) discloses a receiving apparatus for digital broadcasting.

Schuchman et al. (US Patent No. 5,283,780) discloses a digital audio broadcasting system.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth A. McChesney whose telephone number is (703) 308-4563. The examiner can normally be reached Monday – Friday, 8:00 am – 4:30 pm.

Application/Control Number: 10/027,391
Art Unit: 2644

Page 10

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386.

Any response to this action should be mailed to:


Commissioner of Patents and Trademarks
Washington, D.C. 20231


Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

EAM 
August 20, 2002


FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited	Application/Control No. 10/027,391	Applicant(s)/Patent Under Reexamination WOOLFORK, C. EARL	
	Examiner Elizabeth A McChesney	Art Unit 2644	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-5,946,343	08-1999	Schotz et al.	375/141
B	US-6,327,297	12-2001	Schilling, Donald L.	375/134
C	US-4,845,751	07-1989	Schwab, Brian H.	381/105
D	US-6,278,751	08-2001	Uramoto, Yoichi	375/345
E	US-5,671,255	09-1997	Wang et al.	375/341
F	US-5,960,040	09-1999	Cai et al.	329/304
G	US-6,301,313	10-2001	Gevargiz et al.	370/321
H	US-611,473	09-1898	Takagi	48/216
I	US-5,283,780	02-1994	Schuchman et al.	370/312
J	US-			
K	US-			
L	US-			
M	US-			

FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
O					
P					
Q					
R					
S					
T					

NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
U	
V	
W	
X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In regards to application of:

Serial Number: 10/027,391
Applicant: C. EARL WOOLFORK
Filing Date: 12-21-01
Group Art Unit: 2644
Examiner: MC CHESNEY, ELIZABETH A.
For: WIRELESS DIGITAL AUDIO SYSTEM

Box: Non-Fee Amendment
Assistant Commissioner for Patents
Washington, DC 20231

CERTIFICATE OF MAILING UNDER 37 CFR § 1.10

Express Mail label number: EL 870683609 US
Date of Deposit: November 26, 2002


I hereby certify that the following attached correspondence comprising:

8 page specifications
1 page drawing
Version with Markings to Show Changes Made

is being deposited with the United States Postal Service as Express Mail to Addressee" service under 37 CFR § 1.10 on the date indicated below and is addressed to:

BOX: Non-Fee Amendment
Assistant Commissioner for Patents
Washington, DC 20231

Date: 11-26-02


Annerose Beech



11-29-02

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#4A
fd
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RESPOND TO: HUNTINGTON BEACH

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Technology Center 2600

EL870683609US

November 26, 2002

Box: NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, D.C. 20231

Serial Number: 10/027,391
Applicant: C. EARL WOOLFORK
Filing Date: 12-21-01
Group Art Unit: 2644
Examiner: MC CHESNEY, ELIZABETH A.
For: WIRELESS DIGITAL AUDIO SYSTEM

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

The following is submitted in response to Examiner's Action, Paper No. 03, dated September 6, 2002.

Applicant respectfully submits the following amendments to the application in order to clarify the specification, drawings and claims. Proposed drawing corrections are submitted herewith.

AMENDMENTS

In the Drawings:

A proposed corrected drawing sheet is submitted herewith.

In the Claims:

Please cancel claims 1 and 2 without prejudice or disclaimer of the subject matter contained therein.

Please amend the claims as follows:

3. (Amended) The wireless digital audio system 7 wherein said modulator is a 64-
Ary modulator.

a1

4. (Amended) The wireless digital audio system 7 wherein said demodulator is a
64 Ary demodulator.

REMARKS

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

Reexamination and reconsideration of this application as amended is requested. By this amendment, corrections have been made in the drawings and claims 1 and 2 have been cancelled. Figure 1 has been amended to add reference designator 10.

The drawings have been objected to as failing to comply with 37 CFR 1.84 (P)(5) because they not include the reference number 10 that is referred to in the specification on page 3, line 1. A proposed drawing amendment is enclosed.

The drawings have also been objected to because Figure 2 fails to provide written labels of the block diagram to provide a sufficient description of the drawing. It is believed that Figure 2 and Figure 3 are illustrated with all of the proper reference numbers that were used due to the size of the blocks in the block diagram. Do both Figures 2 and 3 have to be increased in size to allow entry of written word labels?

Claims 1 and 3 have been rejected under 35 USC 103(a) as being unpatentable over Schotz (U.S. Patent No. 5,946,343) in view of Schilling (U.S. Patent No. 6,327,297) and in further view of Schwab (U.S. Patent No. 4,845,751). Claim 1 has been cancelled. Claim 3 has been amended to be dependent on claim 7. Response regarding claim 3 is included with claim 7.

Claims 2 and 4 have been rejected under 35 USC 103(a) as being unpatentable over Schotz et al. ('343) in view of Schilling ('297), Schwab ('751) and further in view of Uramoto ('751). Claim 2 has been cancelled. Claim 4 has been amended to be dependent on claim 7.

Response regarding claim 4 is included with claims 5 and 7.

Claims 5 and 6 have been rejected under 35 USC 103(a) as being unpatentable over Schotz ('343) and Schwab ('751) and in further view of Uramoto ('751). The examiner states that Schotz discloses the incoming signal fed from a receiver antenna 40 to be processed by a bandpass filter 138 into circuitry 146 that performs down conversion at juncture 158 in combination with code generator 144. There is a demodulator 148, de-interleaver 200 and a decoder 198 that is in communication with a D/A converter and an analog filter. The examiner remarks that use of a power amplifier would be obvious. The examiner further comments that the Schotz error correcting decoder 198 is not specifically a Viterbi decoder, but that Uramoto discloses such a decoder with demodulated data supplied by circuit 16 in which deinterleaving is performed. The examiner states it would have been obvious to use such circuitry in the Schotz art. Schotz does not disclose transmission to a wireless headphone; however, the examiner states Schwab discloses wireless headphones and use of such with the Schotz art would be obvious.

The examiner references the comments regarding claim 3 as applying to the rejection of claim 6.

The wireless system disclosed by Schotz is a speaker based system and therefore does not anticipate the problems in obtaining good sound quality in a wireless headphone system. The Schwab system does not disclose or anticipate solving this issue either. The system disclosed is a basic wireless communication system emphasizing a structure to control a transmitter.

The instant invention discloses the uniqueness between wireless speaker design and wireless headphone design. The wireless speaker, designed by Schotz is stationary (with respect to the transmitter) receiving components. The wireless headphones, used in the instant application, are non-stationary (with respect to the transmitter). As a result, the relative motion between a transmitter and a mobile receiver (the headphones) produces different small-scale multipath (i.e., fading) than a transmitter that communicates with a non-mobile receiver (wireless

speaker). Small-scale multipath (fading) occurs when two or more versions of a transmitted signal arrive at the receiver (in this case, the wireless headphones) at slightly different times. This deteriorates communication between a transmitter and receiver. Since the instant invention user is often in motion, a more sophisticated digital communication design is required because an increased presence of small-scale multipath (fading) exists when a digital receiver (the headphones) is in motion. Design provisions for this degree of small-scale multipath (fading) are included in the instant invention (e.g., Diversity and Equalization techniques). In addition, the radio frequency (RF) power design constraints are different for a wireless speaker system and a wireless headphone system. This is because the headphones are mounted directly on the users head (unlike wireless speakers), so the RF power received at the headphones must be considerably lower than the RF power received by wireless speakers (such as those in Schotz design). Schotz basic design does not include the elements necessary for compensation of a mobile receiver as claimed in the instant invention.

Regarding the wireless headphone device design by Schwab. It is not a portable communication system that may be used with a computer, laptop, portable CD player, etc. to provide personal listening pleasure that accommodate multiple users. Schwab describes a device that is used in conjunction with a "conventional stereo receiver/amplifier" (i.e., a home stereo system). The patent does not address mobile receiver issues to support the Schotz design. Additional differences between Schwab's device and the instant invention include the following. Schwab's device requires "minor modifications to the receiver amplifier" to remotely activate a "SCAN" and "SEEK" feature that allows the user to select program material. The instant invention requires no modifications to existing audio devices. Clearly the two devices are different in function and design. Combining the two references is not obvious to produce the claimed design of applicant.

Claim 7 has been rejected under 35 USC 103(a) as being unpatentable over Schotz ('343) in view of Schilling ('297), Schwab ('751) and in further view of Uramoto ('751). The examiner

states Schotz discloses a wireless speaker system with transmitter 22 transmitting a wireless signal from an audio source 26. Further comments about wireless speakers are similar to the comments regarding claim 5. It is further stated that Schwab discloses wireless stereo headphones that use an accessory plug-in transmitter for use with a conventional receiver/amplifier by plug in to a headphone jack. The examiner states that it would have been obvious to combine these two disclosures.

It is further stated by the examiner that the Schotz transmitter includes an anti-aliasing filter 50A that reads on a low pass filter that communicates with an A/D converter digital filter 52 that communicates to correction encoder 98, an interleaver 100, a modulator 103 and an included code generator 308, and at a juncture with a quadrature phase shift keying scheme 104 to output a wireless transmission through antenna 38. The examiner further comments that Schilling discloses equivalent modulation types that include M-ary and therefore it would be obvious to modulate the signal in Schotz as in the instant invention and to transmit in the 2.4 GHz band.

The remainder of the examiner's comments relate to the receiver element and are similar to those for claim 5.

The remarks to the examiner's comments regarding claim 7 are the same as those presented regarding claim 5. Systems with headsets for use by individuals while moving that are in wireless communication with a transmitter have not addressed the issue of degradation of signal quality and sound quality as presented in the instant application invention. Headsets have existed for a long time and no one has invented a quality system for such use as evidenced by the remarks herein. To encompass the applied for inventive elements at a minimum three patents must be cited and, in the case of the use of a headset, the wireless headset is a simplistic receiver that is oriented toward control of the transmitter. It is believed that none of the cited art anticipates solving the signal degradation problem caused by user motion and the system element combinations are not obvious.

The combination of elements as claimed in the instant invention use functions that may be found individually or in combination other than as presented in the instant application. This includes the use of a Viterbi decoder as cited from the Uramoto patent for a receiver for broadcast data. In spite of the existence of such elements for a long time, there has been no unique combination of the elements as in the instant invention associated with a headset involving a moving receiver as claimed by applicant. There has been a long felt need for an improved signal quality wireless headset system.

Regarding the examiners rejection of claims 3, 4 and 6, the Schotz art does not anticipate the use with a wireless headset nor do any of the cited patents address the signal degradation based on headset receiver motion. Specifically, the Schilling patent is related to PCS devices, i.e., cell phones that require different design parameters than a digital audio device. For example, the bit rate requirement for a quality audio device such as a cell phone is 32 kilobits per second, while high fidelity sound such as music must operate at a minimum bit rate of 1.4 megabits per second.

It is believed with the clarifying amendments that the uniqueness of the instant invention is not disclosed in the cited art. While headphones have been known for some time, wireless versions have not addressed the issue of high quality transmission for good sound reproduction. There has been a long felt need for a solution to this problem. Applicant believes that a solution to wireless headphone use with the signal quality was not obvious to those involved in the art of wireless headphone design.

Accordingly it is believed that the rejections under 35 USC Section 103(a) have been overcome by canceling and amending of the claims and the remarks, and withdrawal thereof is respectfully requested.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration of the cause for rejections and objections is requested. Allowance of claims 1 through 4 is earnestly solicited.

No additional fee for claims is seen to be required.

If you have any questions do not hesitate to contact me.

Very truly yours,



DENNIS W. BEECH
Reg. No.: 35,443

DWB/ab

Attachments: Version with Markings to Show Changes Made
 1 Drawing Sheet with Red Line Changes

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1 and 2 have been canceled.

The claims have been amended as follows:

3. (Amended) The [audio transmitter] wireless digital audio system [1] 7 wherein said modulator is a 64-Ary modulator.

4. (Amended) The [audio transmitter] wireless digital audio system [2] 7 wherein said demodulator is a 64 Ary demodulator.

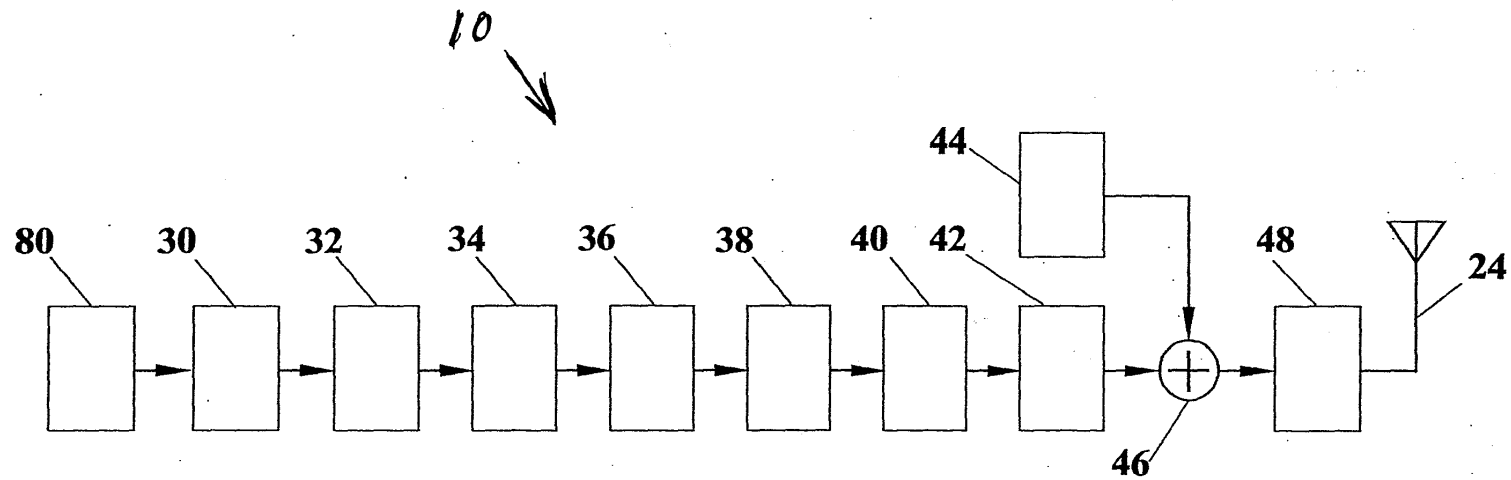


FIG. 2

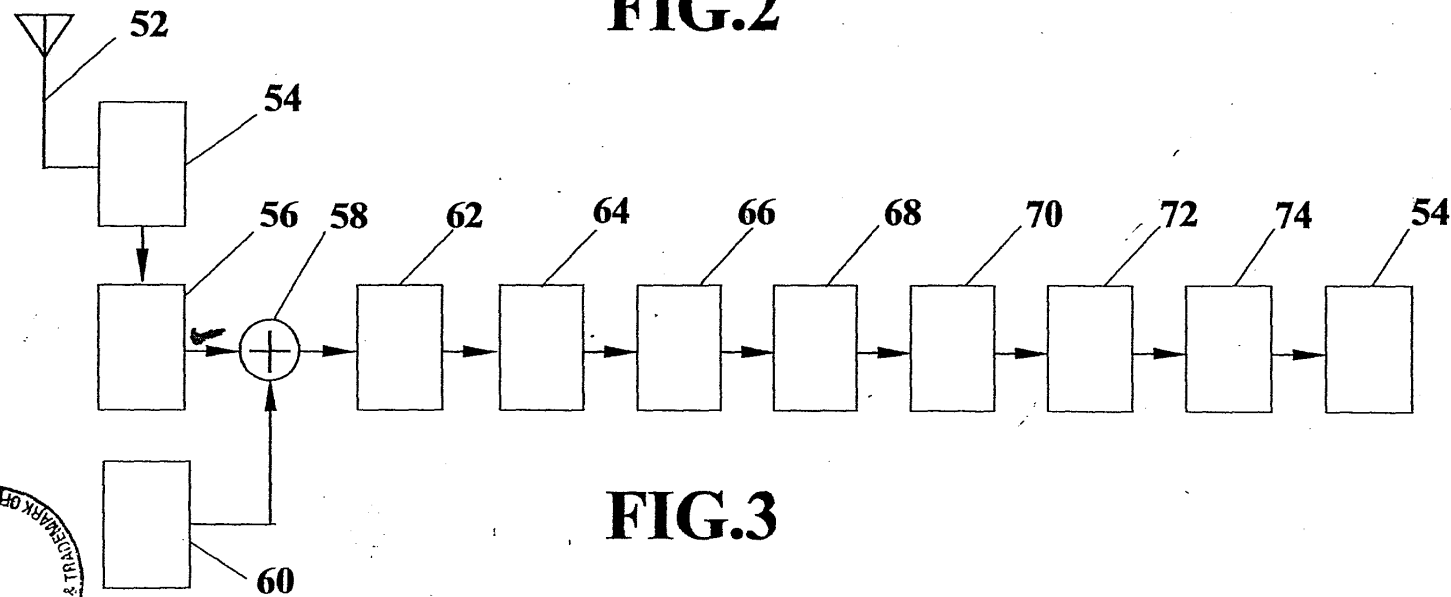


FIG. 3



PLG



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/027,391	12/21/2001	C. Earl Woolfork		1123
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7590 02/26/2003
Dennis W. Beech
LAW OFFICES OF DENNIS W. BEECH
Suite C-2
19900 Beach Blvd.
Huntington Beach, CA 92648

EXAMINER

MCCHESNEY, ELIZABETH A

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 02/26/2003

5

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

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)	
	10/027,391	WOOLFORK, C. EARL	
	Examiner	Art Unit	
	Elizabeth A McChesney	2644	

-- 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 ____ MONTH(S) 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 the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- 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) 3-7 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) 3-7 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).
- 11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) 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.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) Interview Summary (PTO-413) Paper No(s) ____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other:

DETAILED ACTION

1. This action is in response to applicant's response filed on November 26, 2002. Claims 3-7 are now pending in the present application. This action is made final.

Claim Rejections - 35 USC § 103

2. 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.

3. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) and Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 5**, Schotz discloses the incoming signal fed from the receiver antenna 40 to a bandpass filter 138 which is in communication with the receiver front end 140 and into circuitry 146 which performs the down conversion at the juncture 158 in combination with the receiver code generator 144 which is in combination with the demodulator 148 in communication with the de-interleaver 200 in combination with the decoder 198 in communication with the D/A converter in communication with the analog filter in communication with a power amplifier wherein it is well known in the art to include a power amplifier and therefore would have been obvious to provide one in order to strengthen the audio signal which is driven to the speaker. Schotz discloses an

error correction decoder 198 but does not specifically disclose or fairly suggest a Viterbi decoder. However, the examiner maintains that Viterbi decoders are well known in the art. Uramoto discloses a receiver for broadcasting data. Uramoto further discloses demodulated data supplied to Viterbi decoder circuit 16 in which it is deinterleaved and subjected to error correction and supplied to audio decoder circuit 17. It would have been obvious to one of ordinary skill in the art at the time the invention to use a Viterbi decoder and decoder circuit in the system disclosed by Schotz for an equivalent decoder for deinterleaving and error correction of desired data transmission.

Schotz discloses wireless transmission between two speakers. However, it is well known to have wireless speakers as well as wireless headphones. Schwab discloses wireless stereo headphones wherein it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide wireless transmission of signals as taught by Schotz to a receiver in the wireless headphones for the purpose of providing privacy to the listener without the constraints of wires.

4. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) in view of Schilling (US Patent No. 6,327,297), Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 6**, Schotz in view of Schilling discloses everything claimed as applied above (see claim 5). Schotz discloses that a binary-phase keying scheme could also be used however it is well known in the art that many modulation types are equivalent and could be substituted for the QPSK (col. 10-lines 8-11). Schilling also

discloses that there are suitable equivalent modulation types, which include PSK, BSPK, QPSK, DPSK and M-ary phase shift keying (col. 5-lines 10-18). Therefore it would have been obvious to one of ordinary skill in the art to use an equivalent form of modulation such as differential phase shift key in order to modulate the signal and be transmitted in the 2.4 GHz band.

Claim Rejections - 35 USC § 103

5. **Claims 3-4 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schotz et al. (US Patent No. 5,946,343) in view of Schilling (US Patent No. 6,327,297), Schwab (US Patent No. 4,845,751) and in further view of Uramoto (US Patent No. 6,278,751).

Regarding **claim 7**, Schotz discloses a wireless speaker system wherein the transmitter 22 transmits a wireless signal from an audio source 26 (see figure 1). Schotz discloses wireless transmission between two speakers. However, it is well known to have wireless speakers as well as wireless headphones. Schwab discloses wireless stereo headphones wherein the wireless headphone that uses an accessory plug-in transmitter that can be easily installed to a conventional receiver/amplifier by simply plugging it into the receiver's headphone jack (col. 1-lines 47-51). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide wireless transmission of signals as taught by Schotz to wireless headphones via a plug-in transmitter as discloses in Schwab for the purpose of providing privacy to the listener without the constrains of wires.

The transmitter comprises of an anti-aliasing filter 50A, which reads on a low pass filter, which is in communication with an A/D converter digital filter 52 in communication with a correction encoder 98 in communication with an interleaver 100 which is in communication with a modulator 103 wherein a code generator 308 is also incorporated and at a juncture that is in communication with a quadrature phase shift keying (QPSK) scheme 104 which is used and further output for wireless transmission through antenna 38 (see figures 4A and 4B). Schotz discloses that a binary-phase keying scheme could also be used however it is well known in the art that many modulation types are equivalent and could be substituted for the QPSK (col. 10-lines 8-11). Schilling also discloses that there are suitable equivalent modulation types, which include PSK, BSPK, QPSK, DPSK and M-ary phase shift keying (col. 5-lines 10-18). Therefore it would have been obvious to one of ordinary skill in the art to use an equivalent form of modulation such as differential phase shift key in order to modulate the signal and be transmitted in the 2.4 GHz band.

Schotz further discloses the incoming signal fed from the receiver antenna 40 to a bandpass filter 138 which is in communication with the receiver front end 140 and into circuitry 146 which performs the down conversion at the juncture 158 in combination with the receiver code generator 144 which is in combination with the demodulator 148 in communication with the de-interleaver 200 in combination with the decoder 198 in communication with the D/A converter in communication with the analog filter in communication with a power amplifier wherein it is well known in the art to include a power amplifier and therefore would have been obvious to provide one in order to

strengthen the audio signal which is driven to the speaker. Schotz discloses an error correction decoder 198 but does not specifically disclose or fairly suggest a Viterbi decoder. However, the examiner maintains that Viterbi decoders are well known in the art. Uramoto discloses a receiver for broadcasting data. Uramoto further discloses demodulated data supplied to Viterbi decoder circuit 16 in which it is deinterleaved and subjected to error correction and supplied to audio decoder circuit 17. It would have been obvious to one of ordinary skill in the art at the time the invention to use a Viterbi decoder and decoder circuit in the system disclosed by Schotz for an equivalent decoder for deinterleaving and error correction of desired data transmission.

Regarding **claim 3**, the references listed above disclose everything claimed as applied above (see claim 7). Schotz discloses that a binary-phase keying scheme could also be used however it is well known in the art that many modulation types are equivalent and could be substituted for the QPSK (col. 10-lines 8-11). Schilling also discloses that there are suitable equivalent modulation types, which include PSK, BSPK, QPSK, DPSK and M-ary phase shift keying (col. 5-lines 10-18). Therefore it would have been obvious to one of ordinary skill in the art to use an equivalent form of modulation such as differential phase shift key in order to modulate the signal and be transmitted in the 2.4 GHz band.

Regarding **claim 4**, the references listed above disclose everything claimed as applied above (see claim 7). It would have been obvious to use a 64-ary demodulator in order to demodulate the signal from the modulator discussed in claim 3.

Response to Arguments

6. Applicant's arguments filed 11/26/02 have been fully considered but they are not persuasive.

According to the MPEP, 37 CFR 1.111, general arguments in filing a response, for example, "the uniqueness of the instant invention is not disclosed in the cited art" does not constitute patentability. A 103 rejection can only be overcome when the combination of references does not teach or imply a limitation in the claims or it would not have been obvious to one of ordinary skill in the art to recognize the well-known teaching for combination.

In this case, the application is dealing with known technology, which is to achieve receiving reliable data transmission in a high mobile environment and is presently achieved through cell phone technology. The components are well known and are used for purposes that are also well known. Therefore it would have been obvious to one of ordinary skill in the art to combine obvious technology in an obvious manner to solve a common problem of wireless audio. The references teach the known components and wireless transmission via headphones is well known and even admitted by the applicant. The problem already exists for unreliable analog transmission and can be overcome by teachings of digital wireless audio transmission as shown by the references previously cited. Therefore the rejection is maintained for the pending claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth A. McChesney whose telephone number is (703) 308-4563. The examiner can normally be reached Monday – Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

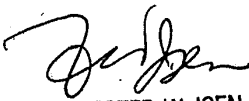
Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

EAM *EAM*
February 24, 2003


FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600



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.
10/027,391	12/21/2001	C. Earl Woolfork		1123

7590 09/09/2003

Dennis W. Beech
LAW OFFICES OF DENNIS W. BEECH
Suite C-2
19900 Beach Blvd.
Huntington Beach, CA 92648

EXAMINER

MCCHESENEY, ELIZABETH A

ART UNIT PAPER NUMBER

2644

DATE MAILED: 09/09/2003

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

PTO-90C (Rev. 07-01)



UNITED STATES DEPARTMENT OF COMMERCE

U.S. Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER
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6

DATE MAILED:

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

Commissioner for Patents

PTO-90C (Rev.04-03)

Notice of Abandonment	Application No.	Applicant(s)	
	10/027,391	WOOLFORK, C. EARL	
	Examiner	Art Unit	
	Elizabeth A McChesney	2644	

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

This application is abandoned in view of:

1. Applicant's failure to timely file a proper reply to the Office letter mailed on _____.
 - (a) A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
 - (c) A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
 - (d) No reply has been received.

2. Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) The submitted fee of \$_____ is insufficient. A balance of \$_____ is due.
The issue fee required by 37 CFR 1.18 is \$_____. The publication fee, if required by 37 CFR 1.18(d), is \$_____.
 - (c) The issue fee and publication fee, if applicable, has not been received.

3. Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) No corrected drawings have been received.


4. The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.

5. The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.

6. The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. The reason(s) below:

Verification was made via telephone with the applicant's attorney on August 27, 2003. Attorney stated that a Continuation was mailed as well as a verification of abandonment on August 25, 2003.


 FORESTER W. ISEN
 SUPERVISORY PATENT EXAMINER
 TECHNOLOGY CENTER 2600

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

CLAIMS ONLY

SERIAL NO.

100 27.391

FILING DATE

APPLICANT(S)

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
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* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number

N/A

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	7	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	7 minus 20 = *	0
INDEPENDENT CLAIMS	3 minus 3 = *	0
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		RATE	FEE
BASIC FEE	370.00	OR	BASIC FEE	740.00
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	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"/>					

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OR OTHER THAN SMALL ENTITY

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X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	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	ADDI-TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

	(Column 1)		(Column 2)		(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
	Total	*	Minus	**	=
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FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>					

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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."
 *** 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.

SEARCH

Class	Sub.	Date	Exmr.
381	7A	8/4	EM
381	311	8/4	EM
381	-	8/4	EM

INTERFERENCE SEARCHED			
Class	Sub.	Date	Exmr.

SEARCH NOTES

(List databases searched. Attach search strategy inside.)

	Date	Exmr.
(Digital near 3 Stereo near 6 audio) and (interleaved or interleave or interleaveing) -Bill Isen	8/6	EM
Discussed w/ Bill Luther 375/ 140, 261, 262 268, 269, 271 279-281, 283 295, 298, 316 328-332, 346-348	8/15	EM

ISSUE SLIP STAPLE AREA (for additional cross-references)

ISSUING CLASSIFICATION									
ORIGINAL		CROSS REFERENCE(S)							
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
INTERNATIONAL CLASSIFICATION									
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^ Continued on Issue Slip Inside File Jacket

INDEX OF CLAIMS

✓ Rejected - (Through numeral) ... Canceled N Non-elected A Appeal
 = Allowed + Restricted I Interference O Objected

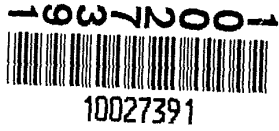
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If more than 150 claims or 9 actions staple additional sheet here

832



J1050 U.S. PTO
10/027391
12/21/01

INITIALS

CONTENTS

	Date Received (Incl. C. of M.) or Date Mailed	Date Received (Incl. C. of M.) or Date Mailed
1. Application <u>J</u> papers.		31.
2. <u>IDS</u>	<u>06-25-02</u>	32.
2-26 3. <u>Obj 3 MS</u>	<u>9/6/02</u>	33.
4. <u>Amend A</u>	<u>11-26/02</u>	34.
2-4 5. <u>FINAL REJ. 3 MS</u>	<u>2-26-03</u>	35.
6. <u>ABN</u>	<u>9-9-03</u>	36.
7. _____		37.
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