AO 120 (Rev. 08/10)

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

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

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

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
14-1000 DWF/TNL	4/8/2014	of Minnesota

PLAINTIFF	DEFENDANT
3M Company, 3M Innovative Properties Company	HM Electronics, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,694,040	4/8/2014	3M Company
2			
3			
4			
5			

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

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

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

DECISION/JUDGEMENT
Complaint filed 4/8/2014

CLERK	(BY) DEPUTY CLERK	DATE
RICHARD D. SLETTEN	A. Linner	4/18/2014

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	04/08/2014	8694040	61312US015 (102.0105USC2)	1908

32692 7590 03/19/2014

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

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

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

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

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

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

Steven T. Awiszus, St. Paul, MN;

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)

32692 7590 12/13/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

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.

Rebecca C. Bode	(Depositor's name)
/Rebecca C. Bode/	(Signature)
February 13, 2014	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	03/13/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, DAVID Q	2643	455-517000

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

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

1 David B. Patchett
2
3

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

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

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

3M Innovative Properties Company St. Paul, Minnesota 55133-3427

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

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

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 13-3723 (enclose an extra copy of this form).

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

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

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

Authorized Signature /David B. Patchett/ Date February 13, 2014

Typed or printed name David B. Patchett Registration No. 39326

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	David Burke Patchett/Rebecca Bode
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**960**

Electronic Acknowledgement Receipt

EFS ID:	18198907
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	David Burke Patchett/Rebecca Bode
Filer Authorized By:	David Burke Patchett
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	13-FEB-2014
Filing Date:	22-AUG-2011
Time Stamp:	15:43:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$960
RAM confirmation Number	1438
Deposit Account	133723
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFee_61312US015.PDF	128716 323061306f3c3b10f2c1669f00aad07e9adcd0bd	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30851 d8d2b10228f9fe2af998165ff8fb86e34c947f52	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	159567		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

32692 7590 12/13/2013

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER
NGUYEN, DAVID Q

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 12/13/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	03/13/2014

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

32692 7590 12/13/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	03/13/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, DAVID Q	2643	455-517000

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

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

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

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

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

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

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

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

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

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

32692 7590 12/13/2013

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
NGUYEN, DAVID Q	

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 12/13/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

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

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

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

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

Privacy Act Statement

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

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

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

Notices of Allowance and Fee(s) Due mailed between October 1, 2013 and December 31, 2013

(Addendum to PTOL-85)

If the "Notice of Allowance and Fee(s) Due" has a mailing date on or after October 1, 2013 and before January 1, 2014, the following information is applicable to this application.

If the issue fee is being timely paid on or after January 1, 2014, the amount due is the issue fee and publication fee in effect January 1, 2014. On January 1, 2014, the issue fees set forth in 37 CFR 1.18 decrease significantly and the publication fee set forth in 37 CFR 1.18(d)(1) decreases to $0.

If an issue fee or publication fee has been previously paid in this application, applicant is not entitled to a refund of the difference between the amount paid and the amount in effect on January 1, 2014.

Notice of Allowability	Application No. 13/214,746	Applicant(s) AWISZUS, STEVEN T.	
	Examiner DAVID Q. NGUYEN	Art Unit 2643	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to *11/26/2013*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *46-77 (renumbered as 1-32 respectively)*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

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

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

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

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 11/26/2013
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

1. The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 11/26/2013 was filed after the mailing date of the Notice of Allowance on 09/04/2013. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Allowable Subject Matter

3. Claims 46-77 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 46-75 are allowable as indicated in the previous office action.

Claim 76 depends on claim 46. Therefore, it is allowable.

Claim 77 depends on claim 62. Therefore, it is allowable.

5. 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

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID Q. NGUYEN whose telephone number is (571)272-7844. The examiner can normally be reached on 8:30AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinsong Hu can be reached on (571)272-3965. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	517	08/27/2012	DN
455	3.05	08/27/2012	DN
455	73	08/27/2012	DN
455	403	08/27/2012	DN
455	569.1	08/27/2012	DN
Updated search		03/05/2013	DN
Updated search		05/15/2013	DN
updated search		08/22/2013	DN
Updated search		12/05/2013	DN

SEARCH NOTES		
Search Notes	Date	Examiner
Text	08/27/2012	DN
Updated search	03/05/2013	DN
Updated search	05/15/2013	DN
Updated search	08/22/2013	DN
Updated search	12/05/2013	

	/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
Text		05/15/2013	DN
Updated search		08/22/2013	DN
Updated search		12/05/2013	DN

	/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

CPC

Symbol				Type	Version
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			
		/			

CPC Combination Sets

Symbol				Type	Set	Ranking	Version
		/					
		/					

		Total Claims Allowed:	
NONE (Assistant Examiner)	(Date)	32	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 (Primary Examiner)	12/05/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
455	517	H 0 4 B 7 / 00 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
455	403	73	569.1	63	

NONE	Total Claims Allowed:	
(Assistant Examiner) (Date)	32	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 12/05/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner) (Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33	4	49	21	65						
	2		18		34	5	50	22	66						
	3		19		35	6	51	23	67						
	4		20		36	7	52	24	68						
	5		21		37	8	53	25	69						
	6		22		38	9	54	26	70						
	7		23		39	10	55	27	71						
	8		24		40	11	56	28	72						
	9		25		41	12	57	29	73						
	10		26		42	13	58	30	74						
	11		27		43	14	59	31	75						
	12		28		44	15	60	17	76						
	13		29		45	16	61	32	77						
	14		30	1	46	18	62								
	15		31	2	47	19	63								
	16		32	3	48	20	64								

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 32	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 (Primary Examiner)	12/05/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Substitute for form 1449A/PTO (modified)	Application Number	13/214746
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	22-AUG-2011
(Use as many sheets as necessary)	First Named Inventor	Awiszus, Steven T
	Confirmation Number	1908
Page 1 of 1	Attorney Case Number	61312US015

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1				
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	 Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1						
	B2						
	B3						
	B4						
	B5						
	B6						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1	"Third Party Comments After Patent Owner's Response to the Action Closing Prosecution Pursuant to 37 C.F. R. § 1.947", for U.S. Application No. 95/002,239 (3M file 61312USRX2), mailed October 21, 2013 (24 pages).	
	C2		
	C3		

*Examiner: /David Nguyen/	Date Considered: 12/05/2013
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	12/05/2013					
	1	✓	-	-	-					
	2	✓	-	-	-					
	3	✓	-	-	-					
	4	✓	-	-	-					
	5	✓	-	-	-					
	6	✓	-	-	-					
	7	✓	-	-	-					
	8	✓	-	-	-					
	9	✓	-	-	-					
	10	✓	-	-	-					
	11	✓	-	-	-					
	12	✓	-	-	-					
	13	✓	-	-	-					
	14	✓	-	-	-					
	15	✓	-	-	-					
	16	✓	-	-	-					
	17	✓	-	-	-					
	18	✓	-	-	-					
	19	✓	-	-	-					
	20	✓	-	-	-					
	21	✓	-	-	-					
	22	✓	-	-	-					
	23	✓	-	-	-					
	24	✓	-	-	-					
	25	✓	-	-	-					
	26	✓	-	-	-					
	27	✓	-	-	-					
	28	✓	-	-	-					
	29	✓	-	-	-					
	30	✓	-	-	-					
	31	✓	-	-	-					
	32	✓	-	-	-					
	33	✓	-	-	-					
	34	✓	-	-	-					
	35	✓	-	-	-					
	36	✓	-	-	-					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	12/05/2013					
	37	✓	-	-	-					
	38	✓	-	-	-					
	39	✓	-	-	-					
	40	✓	-	-	-					
	41	✓	-	-	-					
	42	✓	-	-	-					
	43	✓	-	-	-					
	44	✓	-	-	-					
	45	✓	-	-	-					
1	46		✓	=	=					
2	47		✓	=	=					
3	48		✓	=	=					
4	49		✓	=	=					
5	50		✓	=	=					
6	51		✓	=	=					
7	52		✓	=	=					
8	53		✓	=	=					
9	54		✓	=	=					
10	55		✓	=	=					
11	56		✓	=	=					
12	57		✓	=	=					
13	58		✓	=	=					
14	59		✓	=	=					
15	60		✓	=	=					
16	61		✓	=	=					
18	62		✓	=	=					
19	63		✓	=	=					
20	64		✓	=	=					
21	65		✓	=	=					
22	66		✓	=	=					
23	67		✓	=	=					
24	68		✓	=	=					
25	69		✓	=	=					
26	70		✓	=	=					
27	71		✓	=	=					
28	72		✓	=	=					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	12/05/2013					
29	73		✓	=	=					
30	74		✓	=	=					
31	75		✓	=	=					
17	76				=					
32	77				=					

32692
Customer Number

Request for Continued Examination (RCE) Transmittal

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

November 26, 2013 /Rebecca C. Bode/
Date Signed by: Rebecca C. Bode

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

First Named Inventor:	Awiszus, Steven T		
Application No. :	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title:	Remotely Configurable Wireless Intercom System for an Establishment		

This is a Request for Continued Examination (RCE) under 37 CFR § 1.114 of the above-identified application.

1. Submission required under 37 CFR § 1.114

a. ☐ Response previously submitted dated _____.
   i. Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____.
   ii. ☐ Other:

b. ☒ Enclosed:
   i. ☐ Amendment/Reply
   ii. ☐ Affidavit(s)/Declaration(s)
   iii. ☒ Information Disclosure Statement (IDS)/Supplemental IDS
   iv. ☐ Other:

2. Miscellaneous

a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months.
   i. ☐ Applicant requests entry of non-entered claims
   ii. ☐ Applicant requests non-entry of non-entered claims

b. ☐ Other _____

3. Fees: The RCE fee under 37 CFR § 1.17(e) is required by 37 CFR § 1.114 when the RCE is filed.

☒ The RCE fee required under 37 CFR § 1.17(e) will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☐ The Director is authorized to charge the RCE fee required by 37 CFR § 1.17(e) to Deposit Account No. 13-3723.

☒ Please charge any additional fees associated with the prosecution of this application to Deposit Account No. 13-3723. This authorization includes the fee for any necessary extension of time under 37 CFR § 1.136(a). To the extent any such extension should become necessary, it is hereby requested.

☒ Please credit any overpayment to the same deposit account.

4. ☐ A Request for Extension of Time is being filed concurrently.

Under the provisions of 37 CFR § 1.136(a), Applicant petitions to extend the period for filing a reply in the above-identified application. The requested extension and appropriate fee are as follows:

☐ 37 CFR § 1.17(a)(1) - Extension within first month
☐ 37 CFR § 1.17(a)(2) - Extension within second month
☐ 37 CFR § 1.17(a)(3) - Extension within third month
☐ 37 CFR § 1.17(a)(4) - Extension within fourth month
☐ 37 CFR § 1.17(a)(5) - Extension within fifth month

Respectfully submitted,

November 26, 2013
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: (651) 736-3833

32692
Customer Number

Patent
Case No.: 61312US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	AWISZUS, STEVEN T		
Application No.:	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

SUPPLEMENTARY INFORMATION DISCLOSURE STATEMENT

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

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

November 26, 2013 /Rebecca C. Bode/
Date Signed by: Rebecca C. Bode

Dear Sir:

Pursuant to 37 CFR §§ 1.56, 1.97, and 1.98, enclosed is a completed Form PTO-1449, citing references submitted for consideration by the Examiner. It is respectfully requested that the Examiner initial and return the enclosed Form PTO-1449 to indicate that each reference has been considered.

A Request for Continued Examination under 37 CFR § 1.114 is being filed concurrently, thus it is believed that no fee is due for this Information Disclosure Statement.

Fees

☒ It is believed that no fee is due; however, in the event a fee is required, please charge the fee to Deposit Account No. 13-3723.

☐ The fee required under 37 CFR § 1.17(p) will be paid at the time of EFS-Web submission. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☐ Please charge the fee provided in 37 CFR § 1.17(p) to Deposit Account No. 13-3723.

Copies of Documents

Copies of any cited foreign patents, foreign publications, non-patent literature documents, and any pending U.S. applications filed before June 30, 2003, are enclosed. Copies of any pending U.S. applications filed after June 30, 2003 that can be accessed on the USPTO's IFW system are not enclosed as per USPTO Waiver dated September 21, 2004. Copies of any U.S. patents and published U.S. patent applications are not enclosed.

Respectfully submitted,

November 26, 2013
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833

Substitute for form 1449A/PTO (modified)		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	**Application Number**	**13/214746**
	Filing Date	**22-AUG-2011**
	First Named Inventor	**Awiszus, Steven T**
(Use as many sheets as necessary)	**Confirmation Number**	**1908**
Page 1 of 1	**Attorney Case Number**	**61312US015**

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1				
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	 Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1						
	B2						
	B3						
	B4						
	B5						
	B6						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1	"Third Party Comments After Patent Owner's Response to the Action Closing Prosecution Pursuant to 37 C.F. R. § 1.947", for U.S. Application No. 95/002,239 (3M file 61312USRX2), mailed October 21, 2013 (24 pages).	
	C2		
	C3		

*Examiner:	Date Considered:
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.	

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	David Burke Patchett/Rebecca Bode
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt

EFS ID:	17514379
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	David Burke Patchett/Rebecca Bode
Filer Authorized By:	David Burke Patchett
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	26-NOV-2013
Filing Date:	22-AUG-2011
Time Stamp:	17:53:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1200
RAM confirmation Number	6292
Deposit Account	133723
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCE_with_IDS_61312US015.PDF	72705 8075ba17676d0855fb4bc6c9520af6b08deaf625	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Transmittal Letter	IDS5_with_RCE_61312US015.PDF	76846 74ef1c5fb8f18d4bfec0e0f5fbdb48013ca4b68a	no	2
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	IDS5_1449_61312US015.PDF	78397 471f70b4984717d46f323879e0f602ec7429561e	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
4	Non Patent Literature	Third_Party_Comments_to_Pat_Owner_Resp_to_Action_Closing_Prosecution_dated_10-21-13.PDF	6098398 fe01f8c29e34cc44dfd6ffcfc78307e68f36d0cd	no	24
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30964 a0741df859d813c31341ef3de2753587c6700a01	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	6357310		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

32692 7590 09/04/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER
NGUYEN, DAVID Q

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 09/04/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	12/04/2013

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

32692 7590 09/04/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	12/04/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, DAVID Q	2643	455-517000

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

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

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

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

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

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

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

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

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

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

32692 7590 09/04/2013

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
NGUYEN, DAVID Q	

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 09/04/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 13/214,746	Applicant(s) AWISZUS, STEVEN T.	
	Examiner DAVID Q. NGUYEN	Art Unit 2643	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to *08/20/2013*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *46-77 (renumbered as 1-32 respectively)*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

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

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

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

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 08/20/2013
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

1. The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 08/20/2013 was filed after the mailing date of the Notice of Allowance on 05/20/2013. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Allowable Subject Matter

3. Claims 46-77 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 46-75 are allowable as indicated in the previous office action.

New claim 76 depends on claim 46. Therefore, it is allowable.

New claim 77 depends on claim 62. Therefore, it is allowable.

5. 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

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID Q. NGUYEN whose telephone number is (571)272-7844. The examiner can normally be reached on 8:30AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinsong Hu can be reached on (571)272-3965. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

CPC- SEARCHED

Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner
455	517	08/27/2012	DN
455	3.05	08/27/2012	DN
455	73	08/27/2012	DN
455	403	08/27/2012	DN
455	569.1	08/27/2012	DN
Updated search		03/05/2013	DN
Updated search		05/15/2013	DN
updated search		08/22/2013	DN

SEARCH NOTES

Search Notes	Date	Examiner
Text	08/27/2012	DN
Updated search	03/05/2013	DN
Updated search	05/15/2013	DN
Updated search	08/22/2013	DN

INTERFERENCE SEARCH

	/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
Text		05/15/2013	DN
Updated search		08/22/2013	DN

	/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
13214746	AWISZUS, STEVEN T.
Examiner	**Art Unit**
DAVID Q NGUYEN	2643

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

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

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 32	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 (Primary Examiner)	08/22/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
455	517	H 0 4 B 7 / 00 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
455	403	73	569.1	63	

NONE	Total Claims Allowed: 32	
(Assistant Examiner) (Date)		
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 (Primary Examiner)	08/22/2013 (Date)	O.G. Print Claim(s): 1 / O.G. Print Figure: 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33	4	49	21	65						
	2		18		34	5	50	22	66						
	3		19		35	6	51	23	67						
	4		20		36	7	52	24	68						
	5		21		37	8	53	25	69						
	6		22		38	9	54	26	70						
	7		23		39	10	55	27	71						
	8		24		40	11	56	28	72						
	9		25		41	12	57	29	73						
	10		26		42	13	58	30	74						
	11		27		43	14	59	31	75						
	12		28		44	15	60	17	76						
	13		29		45	16	61	32	77						
	14		30	1	46	18	62								
	15		31	2	47	19	63								
	16		32	3	48	20	64								

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 32	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643 (Primary Examiner)	08/22/2013 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	08/22/2013					
	1	✓	-	-	-					
	2	✓	-	-	-					
	3	✓	-	-	-					
	4	✓	-	-	-					
	5	✓	-	-	-					
	6	✓	-	-	-					
	7	✓	-	-	-					
	8	✓	-	-	-					
	9	✓	-	-	-					
	10	✓	-	-	-					
	11	✓	-	-	-					
	12	✓	-	-	-					
	13	✓	-	-	-					
	14	✓	-	-	-					
	15	✓	-	-	-					
	16	✓	-	-	-					
	17	✓	-	-	-					
	18	✓	-	-	-					
	19	✓	-	-	-					
	20	✓	-	-	-					
	21	✓	-	-	-					
	22	✓	-	-	-					
	23	✓	-	-	-					
	24	✓	-	-	-					
	25	✓	-	-	-					
	26	✓	-	-	-					
	27	✓	-	-	-					
	28	✓	-	-	-					
	29	✓	-	-	-					
	30	✓	-	-	-					
	31	✓	-	-	-					
	32	✓	-	-	-					
	33	✓	-	-	-					
	34	✓	-	-	-					
	35	✓	-	-	-					
	36	✓	-	-	-					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	08/22/2013					
	37	✓	-	-	-					
	38	✓	-	-	-					
	39	✓	-	-	-					
	40	✓	-	-	-					
	41	✓	-	-	-					
	42	✓	-	-	-					
	43	✓	-	-	-					
	44	✓	-	-	-					
	45	✓	-	-	-					
1	46		✓	=	=					
2	47		✓	=	=					
3	48		✓	=	=					
4	49		✓	=	=					
5	50		✓	=	=					
6	51		✓	=	=					
7	52		✓	=	=					
8	53		✓	=	=					
9	54		✓	=	=					
10	55		✓	=	=					
11	56		✓	=	=					
12	57		✓	=	=					
13	58		✓	=	=					
14	59		✓	=	=					
15	60		✓	=	=					
16	61		✓	=	=					
18	62		✓	=	=					
19	63		✓	=	=					
20	64		✓	=	=					
21	65		✓	=	=					
22	66		✓	=	=					
23	67		✓	=	=					
24	68		✓	=	=					
25	69		✓	=	=					
26	70		✓	=	=					
27	71		✓	=	=					
28	72		✓	=	=					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013	08/22/2013					
29	73		✓	=	=					
30	74		✓	=	=					
31	75		✓	=	=					
17	76				=					
32	77				=					

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

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[5]
		"ANSWER TO DEFENDANT HM ELECTRONICS'S COUNTERCLAIMS", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed June 14, 2012	
		"COMPLAINT", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed March 2, 2012	

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"DEFENDANT'S ANSWER, AFFIRMATIVE DEFENSES AND COUNTERCLAIMS TO PLAINTIFFS' COMPLAINT FOR PATENT INFRINGEMENT", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed May 25, 2012	
		"ORDER STAYING CASE PENDING REEXAMINATION", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed September 21, 2012	
		"THIRD PARTY COMMENTS AFTER PATENT OWNER'S RESPONSE PURSUANT TO 37 cfr 1.947", Filed in Inter Partes Reexamination Application No. 95/002,238 on February 14, 2013.	
		"THIRD PARTY COMMENTS AFTER PATENT OWNER'S RESPONSE PURSUANT TO 37 cfr 1.947", Filed in Inter Partes Reexamination Application No. 95/002,239 on March 8, 2013.	

EXAMINER SIGNATURE

Examiner Signature	/David Nguyen/	Date Considered	08/22/2013

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

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

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

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Field

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☒ None

SIGNATURE

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

Signature	/Katherine M. DeVries Smith/	Date (YYYY-MM-DD)	2013-08-20
Name/Print	Katherine M. DeVries Smith	Registration Number	42,157

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

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

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13/214,746	Filing Date	2011-08-22	Docket Number (if applicable)	61312US015(1020105USC2)	Art Unit	2647
First Named Inventor	Steven T. Awiszus			Examiner Name	David Q. Nguyen		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

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

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

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 503688

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

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

Signature of Registered U.S. Patent Practitioner			
Signature	/Katherine M. DeVries Smith/	Date (YYYY-MM-DD)	2013-08-20
Name	Katherine M. DeVries Smith	Registration Number	42157

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 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.

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

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

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[5]
		"ANSWER TO DEFENDANT HM ELECTRONICS'S COUNTERCLAIMS", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed June 14, 2012	
		"COMPLAINT", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed March 2, 2012	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"DEFENDANT'S ANSWER, AFFIRMATIVE DEFENSES AND COUNTERCLAIMS TO PLAINTIFFS' COMPLAINT FOR PATENT INFRINGEMENT", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed May 25, 2012	
		"ORDER STAYING CASE PENDING REEXAMINATION", 3M Company and 3M Innovative Properties Company v. HM Electronics, Inc., Civil Action No. 12-cv-553 SRN/JSM, Filed September 21, 2012	
		"THIRD PARTY COMMENTS AFTER PATENT OWNER'S RESPONSE PURSUANT TO 37 cfr 1.947", Filed in Inter Partes Reexamination Application No. 95/002,238 on February 14, 2013.	
		"THIRD PARTY COMMENTS AFTER PATENT OWNER'S RESPONSE PURSUANT TO 37 cfr 1.947", Filed in Inter Partes Reexamination Application No. 95/002,239 on March 8, 2013.	

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☒ None

SIGNATURE

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

Signature	/Katherine M. DeVries Smith/	Date (YYYY-MM-DD)	2013-08-20
Name/Print	Katherine M. DeVries Smith	Registration Number	42,157

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Awiszus	Examiner:	Nguyen
Serial No.:	13/214,746	Group Art Unit:	2617
Filed:	August 22, 2011	Docket No.:	61312US015 (102.0105USC2)
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

AMENDMENT & REQUEST FOR CONTINUED EXAMINATION

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

Sir:

The following amendment is respectfully submitted.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

Amendments to the Claims

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

1-45. (Cancelled)

46. (Currently Amended) An intercom system, said intercom system being configurable for a drive-through, quick service restaurant establishment having a staff, comprising:
a base station **having the ability to connect** ~~**connectable**~~ to a wide area communication network;
at least one headset ~~**capable of**~~ **configured for** two-way wireless communication with said base station;
said wireless communication between the at least one headset and said base station being configurable with at least one parameter that adjusts a volume level of communications wirelessly received or wirelessly transmitted by the headset;
said at least one parameter being **locally** adjustable ~~**by the staff**~~ at the establishment;
said base station being configured to permit remote review and remote adjustment of said at least one parameter **from a facility remote from the location of the establishment** when said base station is connected to said wide area communication network; and
wherein said at least one parameter can be saved into a template of parameters for later use.

47. (Previously Presented) The system of claim 46, wherein said at least one parameter is a plurality of parameters that adjust volume levels of communications wirelessly received or wirelessly transmitted by said headset, said plurality of parameters being adjustable by the staff at the establishment and being remotely reviewable and remotely adjustable when said base station is connected to said wide area communication network, and wherein said plurality of parameters can be grouped and saved into said template of parameters for later use.

48. (Previously Presented) The system of claim 47, wherein one of said plurality of parameters is a vehicle alert.

49. (Previously Presented) The system of claim 46, wherein said template of parameters can be saved locally at the establishment.

50. (Previously Presented) The system of claim 46, wherein said template of parameters can be saved to a location remote from the establishment.

51. (Previously Presented) The system of claim 46, wherein said template of parameters is a default.

52. (Previously Presented) The system of claim 46, wherein said template of parameters is a factory default.

53. (Previously Presented) The system of claim 46, wherein said template of parameters is configured for recall to reset the system.

54. (Previously Presented) The system of claim 47, wherein said plurality of parameters comprises a first parameter and a second parameter, wherein said first parameter adjusts a volume level of communications emitted by a speaker in the headset that were captured by a microphone in a drive-through lane, and wherein said second parameter adjusts a volume level of communications emitted by a speaker in the drive-through lane that were captured by a microphone in the headset.

55. (Previously Presented) The system of claim 46, wherein said at least one headset is a plurality of headsets.

56. (Previously Presented) The system of claim 47, wherein at least one of said plurality of parameters adjusts volume levels of communications between the headset and an ordering point in a drive-through lane.

57. (Previously Presented) The system of claim 46, further comprising an ordering point having a speaker and a microphone, wherein said ordering point is positioned near a menu board and is capable of communication with said base station.

58. (Previously Presented) The system of claim 57, wherein said ordering point is configured to be hard-wired to said base station.

59. (Previously Presented) The system of claim 46, further comprising software configured to determine if a fault condition exists in the system.

60. (Previously Presented) The system of claim 47, wherein one of said plurality of parameters is master volume.

61. (Previously Presented) The system of claim 56, wherein one of said plurality of parameters is master volume.

62. (Currently Amended) An intercom system, said intercom system being configurable for a drive-through, quick service establishment having a staff, comprising:
a base station **having the ability to connect** ~~connectable~~ to a wide area communication network;
a plurality of headsets **configured for** ~~**capable of**~~ two-way wireless communication with said base station;
said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter that adjusts at least one volume level of communication between each of the headsets and at least one ordering point in a drive-through lane;
said at least one parameter being **locally** adjustable **at** ~~**by the staff of**~~ the establishment;
said base station being configured to permit remote review and remote adjustment of said at least one parameter **from a facility remote from the location of the establishment** when said base station is connected to said wide area communication network; and

wherein said at least one parameter for each of said plurality of headsets is grouped into a template of parameters that can be saved for later use.

63. (Currently Amended) The system of claim 62, ~~**further comprising an**~~ **said at least one** ordering point having a speaker and a microphone, wherein said ordering point is positioned near a menu board and is capable of communication with said base station.

64. (Previously Presented) The system of claim 62, wherein said template of parameters can be saved locally at the establishment.

65. (Previously Presented) The system of claim 62, wherein said template of parameters can be saved to a location remote from the establishment.

66. (Previously Presented) The system of claim 62, wherein said template of parameters is a default.

67. (Previously Presented) The system of claim 62, wherein said template of parameters is a factory default.

68. (Previously Presented) The system of claim 62, wherein said template of parameters is configured for recall to reset the system.

69. (Previously Presented) The system of claim 62, wherein said at least one parameter is a plurality of parameters.

70. (Previously Presented) The system of claim 69, wherein said plurality of parameters comprises a first parameter and a second parameter, wherein said first parameter adjusts a volume level of communications emitted by a speaker in one of said plurality of headsets captured by a microphone of the ordering point, and wherein said second parameter adjusts a

volume level of communications emitted by a speaker of the ordering point captured by a microphone of said one headset of said plurality of headsets.

71. (Previously Presented) The system of claim 69, wherein said plurality of parameters further comprises a vehicle alert parameter.

72. (Previously Presented) The system of claim 63, wherein said ordering point is configured to be hard-wired to said base station.

73. (Previously Presented) The system of claim 62, further comprising software configured to determine if a fault condition exists in the system.

74. (Previously Presented) The system of claim 69, wherein one parameter of said plurality of parameters is master volume.

75. (Previously Presented) The system of claim 71, wherein one parameter of said plurality of parameters is master volume.

76. (New) The system of claim 46, wherein the remote adjustment of the at least one parameter need not be locally activated.

77. (New) The system of claim 62, wherein the remote adjustment of the at least one parameter need not be locally activated.

REMARKS

Applicants respectfully request reconsideration of the present case in view of the above amendments and the following remarks. Claims 1-45 were previously canceled. Claims 76 and 77 have been added. Claims 46, 62 and 63 are amended. Claims 46-77 are currently pending. No new matter is added.

Claims 46 and 62 have been amended to reflect that the base station has "the ability to connect to a wide area network," which is supported in the specification as-filed at least at ¶¶ 11-12, 30, 31, 40, Fig. 1. Applicants' intent is not to change the claim scope with this amendment. Applicants assert that the word "connectable," by itself, refers to the ability to connect. But this addition is made to further make clear that this is what the Applicant intends the claim to require. Applicants note that claims 46 and 62 do not require that the base station is actually connected to a wide area network, but that the base station has the ability to connect, in other words is connectable, to a wide area network.

Claims 46 and 62 have also been amended to reflect that the plurality of headsets are "configured for" two-way wireless communication. Applicants' intent is not to change the claim scope with this amendment. The intent is to clarify the meaning of the claim.

Claims 46 and 62 have also been amended to reflect that the at least one parameter is "locally adjustable at the establishment". This language is supported in the specification as-filed at least at Fig. 1, the original claims, and ¶ 11, 17, 34, 41 and 62. As such, no new matter has been inserted. Applicants' intent is not to change the claim scope with this amendment. The intent is to clarify the meaning of the claim.

Claims 46 and 62 have also been amended to reflect that "remote review and remote adjustment of said at least one parameter" is "from a facility remote from the location of the establishment," which is supported in the specification as-filed at least at Fig. 1, and ¶ 62. As such, no new matter has been inserted. Applicants contend that the word "remote," by itself, refers to a location remote from the establishment in which the system is located. However, this addition is made to further make clear that this is what the Applicants intend the claim to require.

Claim 63 has been amended to reflect antecedent basis of the term "ordering point." As such, no new matter has been inserted.

Dependent claims 76 and 77 have been added, which specify that "the remote adjustment of the at least one parameter need not be locally activated," which is supported at least at ¶62 of the application as filed.

Summary

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Please charge any additional fees or credit any overpayments to Deposit Account No. 50-3688 which may have been overlooked with regard to this filing.

Respectfully submitted,

August 20, 2013
Date

/Katherine M. DeVries Smith/
Katherine M. DeVries Smith
Reg. No. 42,157
Pauly, DeVries Smith & Deffner, L.L.C.
Customer Number: 32692
Phone No: 612-746-4794

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Katherine Marie DeVries Smith/Elizabeth DeVries
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt

EFS ID:	16631884
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Katherine Marie DeVries Smith/Elizabeth DeVries
Filer Authorized By:	Katherine Marie DeVries Smith
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	20-AUG-2013
Filing Date:	22-AUG-2011
Time Stamp:	17:42:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1200
RAM confirmation Number	5041
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	2013_08_20_102_0105USC2_RCE.pdf	797939 7495d432e9902d1763fa15a1145e1ecfcc8b0450	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	2013_08_20_102_0105USC2_1449_SIDS.pdf	114325 6795e5cda58f0d962a034c7d11ddf33d3f254d44	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	2013_02_14_Third_Party_Comments_95002238.pdf	1558118 578c5ff25fd9e6d3743901de7697982eded517c9	no	23
Warnings:					
Information:					
4	Non Patent Literature	2013_03_08_Third_Party_Comments_95002239.pdf	1924184 bfabf10dfdbbefd4987e86ba1a2e4e556bfea8cf	no	31
Warnings:					
Information:					
5	Non Patent Literature	ANSWER_TO_DEFENDANT_HM_.pdf	103027 f01dc652e3915e496fb1e69f6d2aae3bb8985127	no	4
Warnings:					
Information:					
6	Non Patent Literature	Complaint_.pdf	4785992 ac3e6aaff507925d3f2f534de0ae3f0b0d1b62c8	no	24
Warnings:					
Information:					
7	Non Patent Literature	DEFENDANTS_ANSWER_.pdf	120805 51a060ade31df859be4ff32112a7f3cade819d64	no	8
Warnings:					
Information:					

8	Non Patent Literature	ORDER_STAYING_CASE_REEXAMINATION_.pdf	79513 ef3842c9affd6c07c6b7b56897d5f1c0908ee4a4	no	2
Warnings:					
Information:					
9		2013_08_20_102_0105USC2_Response_RCE.pdf	86752 6b6b6234f75240decde1291972e9150ae9ad1f94	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment after Notice of Allowance (Rule 312)	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	8

Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	30854 a5a4079705ddfb5714976b93b312e67540f26044	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	9601509		

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/214,746	Filing Date 08/22/2011	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT

08/20/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 32	Minus	** 45	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***6	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/WANDA BARNES/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Awiszus	Examiner:	Nguyen
Serial No.:	13/214,746	Group Art Unit:	2617
Filed:	August 22, 2011	Docket No.:	61312US015 (102.0105USC2)
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

NOTIFICATION OF LITIGATION AND *INTER PARTES* REEXAMINATION IN RELATED PATENTS UNDER 37 CFR1.56 AND MPEP 2001.06(c)

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

Sir:

The Patent Owner hereby informs the Office that Patent No. 8,005,455 and Patent No. 7,599,679 are the subject of a patent infringement lawsuit, 3M Co. et al. v. HM Electronics, Inc. ("HME"), Civil Action No. 12-CV-553 SRN/JSM (D. Minn.). The above captioned application claims priority to these two patents. The litigation was filed in the United States District Court for the District of Minnesota. A stay was granted in this litigation case on September 21, 2012.

A Request for *Inter Partes* Reexamination was filed by HME for U.S. Patent No. 7,599,679. The Request was granted and a Non-Final Office Action was mailed on November 15, 2012. A Response was filed by the Patent Owner on January 15, 2013. Third Party Comments were filed on February 14, 2013. The reexam for Patent No. 7,599,679 has control no. 95/002,238.

A Request for *Inter Partes* Reexamination was also filed by HME for U.S. Patent No. 8,005,455. The Request was granted and a Non-Final Office Action was mailed on December 6, 2012. A Response was filed by the Patent Owner on February 8, 2013. Third Party Comments were filed on March 8, 2013. An Action Closing Prosecution was mailed July 19, 2013. The reexam for Patent No. 8,005,455 has control no. 95/002,239.

Pleadings from this litigation are submitted herewith, including the Complaint, Defendant's Answer, Affirmative Defenses and Counterclaims to Plaintiffs' Complaint for Patent Infringement and Order Staying Case Pending Reexamination.

Respectfully submitted,

August 14, 2013
Date

/Katherine M. DeVries Smith/
Katherine M. DeVries Smith
Reg. No. 42,157
Pauly, DeVries Smith & Deffner, L.L.C.
Customer Number:
Phone No: 612-746-4784

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MINNESOTA

3M COMPANY and 3M INNOVATIVE PROPERTIES COMPANY, Plaintiffs, vs. HM ELECTRONICS, INC., Defendant.	Civil Action No. 12-553 SRN/JSM JURY TRIAL DEMANDED

COMPLAINT

This is a complaint for patent infringement arising under the patent laws of the United States. Plaintiffs 3M Company and 3M Innovative Properties Company state and allege the following as their complaint:

THE PARTIES

1. Plaintiff 3M Company is incorporated under the laws of Delaware and has a principal place of business at 3M Center, Saint Paul, Minnesota 55133-3427.

2. 3M Company is in the business of manufacturing and selling many different types of products, including wireless intercom systems such as those used in drive-thru ordering locations of quick service restaurants.

3. Plaintiff 3M Innovative Properties Company ("3M IPC") is incorporated under the laws of Delaware and has a principal place of business at 3M Center, Saint Paul, Minnesota 55133-3427.

4. 3M IPC is engaged in, among other things, obtaining, managing and licensing intellectual property rights, including patents, for the benefit of 3M Company.

5. Upon information and belief, Defendant HM Electronics, Inc. ("HME"), is incorporated under the laws of California and has a principal place of business at 14110 Stowe Drive, Poway, California 92064.

6. HME manufactures, offers for sale, and sells wireless intercom systems in competition with 3M.

JURISDICTION

7. This is an action for patent infringement arising under the Acts of Congress relating to patents, 35 U.S.C. §§ 271, 281-285.

8. This Court has jurisdiction under 28 U.S.C. §§ 1331, 1332, and 1338(a).

9. This Court has personal jurisdiction over HME by virtue of its continuous and systematic contacts with the State of Minnesota, and its knowing and purposeful distribution, offers to sell, and sales of wireless intercom systems and associated products that infringe the 3M IPC patents at issue in the State of Minnesota. For example, HME has knowingly and purposefully distributed the products at issue to restaurants located in Minnesota.

10. Venue in this District is proper under 28 U.S.C. § 1400(b) and 28 U.S.C. § 1391.

Count I: Patent Infringement

11. On October 6, 2009, United States Patent No. 7,599,679 ("the '679 patent") entitled "Remotely Configurable Wireless Intercom System for an Establishment" was duly and legally issued to Plaintiff 3M IPC as assignee of the inventor, Steven T. Awiszus. A copy of the '679 patent is attached to this Complaint as EXHIBIT A.

12. The '679 patent relates to wireless intercom systems.

13. 3M IPC is the owner of the entire right, title, and interest in the '679 patent.

14. 3M Company is the exclusive licensee of the '679 patent.

15. Defendant HME has infringed the '679 patent by manufacturing, offering for sale, selling, and/or importing products, such as its ion/IQ™ Drive-Thru Headset Systems, covered by one or more claims of the '679 patent.

16. Plaintiffs have suffered irreparable harm due to Defendant HME's infringement of the '679 patent, and will continue to suffer irreparable harm in the future, unless Defendant HME is enjoined from further infringement of the '679 patent.

Count II: Patent Infringement

17. On August 23, 2011, United States Patent No. 8,005,455 ("the '455 patent") entitled "Remotely Configurable Wireless Intercom System for an

Establishment" was duly and legally issued to Plaintiff 3M IPC as assignee of the inventor, Steven T. Awiszus. A copy of the '455 patent is attached to this Complaint as EXHIBIT B.

18. The '455 patent relates to wireless intercom systems.

19. 3M IPC is the owner of the entire right, title, and interest in the '455 patent.

20. 3M Company is the exclusive licensee of the '455 patent.

21. Defendant HME has infringed the '455 patent by manufacturing, offering for sale, and/or selling products, such as its ion/IQ™ Drive-Thru Headset Systems, covered by one or more claims of the '455 patent.

22. Plaintiffs have suffered irreparable harm due to Defendant HME's infringement of the '455 patent, and will continue to suffer irreparable harm in the future, unless Defendant HME is enjoined from further infringement of the '455 patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for the following relief:

a. A judgment that Defendant HME has infringed U.S. Patent Nos. 7,599,679 and 8,005,455;

b. A preliminary injunction enjoining and restraining Defendant HME, its officers, directors, agents, servants, employees, attorneys and all others acting under or through it, directly or indirectly, from infringing U.S. Patent Nos. 7,599,679 and 8,005,455;

c. A permanent injunction enjoining and restraining Defendant HME, its officers, directors, agents, servants, employees, attorneys and all others acting under or through it, directly or indirectly, from infringing U.S. Patent Nos. 7,599,679 and 8,005,455;

d. A judgment and order requiring Defendant HME to pay all appropriate damages under 35 U.S.C. § 284, including treble damages if any of the infringement is determined to be willful, with prejudgment interest;

e. A judgment and order requiring Defendant HME to pay the costs of this action, including all disbursements, and attorney fees if this case is exceptional as provided by 35 U.S.C. § 285, with prejudgment interest; and

f. Such other and further relief that this Court may deem just and equitable.

DEMAND FOR JURY TRIAL

Plaintiffs hereby demand a trial by jury of all issues triable by jury.

Plaintiffs 3M COMPANY and
3M INNOVATIVE PROPERTIES COMPANY

By their attorneys,

s/Timothy A. Lindquist

Alan G. Carlson (MN Reg. No. 14,801)
Timothy A. Lindquist (MN Reg. No. 245,318)
Todd S. Werner (MN Reg. No. 033019X)
Peter M. Kohlhepp (MN Reg. No. 390,454)
CARLSON, CASPERS, VANDENBURGH & LINDQUIST
225 South Sixth Street, Suite 3200
Minneapolis, MN 55402

Telephone: (612) 436.9600
Facsimile: (612) 436.9605
acarlson@ccvl.com
tlindquist@ccvl.com
twerner@ccvl.com
pkohlhepp@ccvl.com

US007599679B2

(12) **United States Patent**
Awiszus

(10) **Patent No.: US 7,599,679 B2**
(45) **Date of Patent: Oct. 6, 2009**

(54) **REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT**

(75) Inventor: **Steven T. Awiszus**, Woodbury, MN (US)

(73) Assignee: **3M Innovative Properties Company**, St. Paul, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 566 days.

(21) Appl. No.: **11/276,048**

(22) Filed: **Feb. 10, 2006**

(65) **Prior Publication Data**

US 2007/0190966 A1 Aug. 16, 2007

(51) **Int. Cl.**
H04Q 7/20 (2006.01)

(52) **U.S. Cl.** **455/403**; 455/73; 455/569.1; 455/63

(58) **Field of Classification Search** 455/419, 455/63.1, 575.2, 569.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,321,848	A	6/1994	Miyahira et al.	
5,721,783	A *	2/1998	Anderson	381/328
6,435,406	B1	8/2002	Pentel	
6,574,603	B1	6/2003	Dickson et al.	
6,856,817	B2 *	2/2005	Tischler	455/569.1
6,993,292	B2	1/2006	Sabongi et al.	
2003/0134666	A1	7/2003	Fletcher et al.	
2003/0162504	A1	8/2003	Sabongi et al.	
2003/0200147	A1	10/2003	Sabongi et al.	
2003/0225622	A1	12/2003	Doan	
2004/0116071	A1	6/2004	Hall	
2004/0158499	A1	8/2004	Dev et al.	
2005/0004843	A1	1/2005	Heflin	
2005/0059414	A1	3/2005	Mahmoodi et al.	
2005/0135458	A1 *	6/2005	Graves et al.	375/130
2005/0277410	A1	12/2005	Ismail et al.	
2006/0030269	A1 *	2/2006	Sabongi et al.	455/63.1
2006/0041482	A1	2/2006	Awiszus et al.	
2006/0045063	A1	3/2006	Stanford et al.	

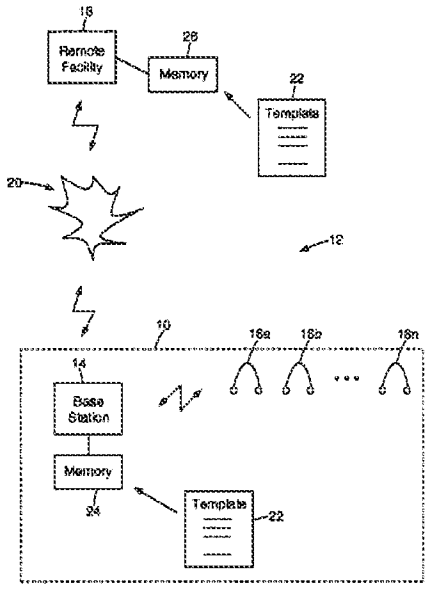
* cited by examiner

Primary Examiner—David Q Nguyen
(74) *Attorney, Agent, or Firm*—David B. Patchett

(57) **ABSTRACT**

A remotely configurable wireless intercom system and method for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewable and being remotely adjustable via the wide area communication network. Also disclosed is a method of providing a remotely configurable wireless intercom system. Wireless communication is configured between each of the plurality of headsets and the base station with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewed and adjusted via the wide area communication network. A parameter is reviewable and may be remotely reset via the wide area communication network, particularly if a fault condition exists.

30 Claims, 3 Drawing Sheets



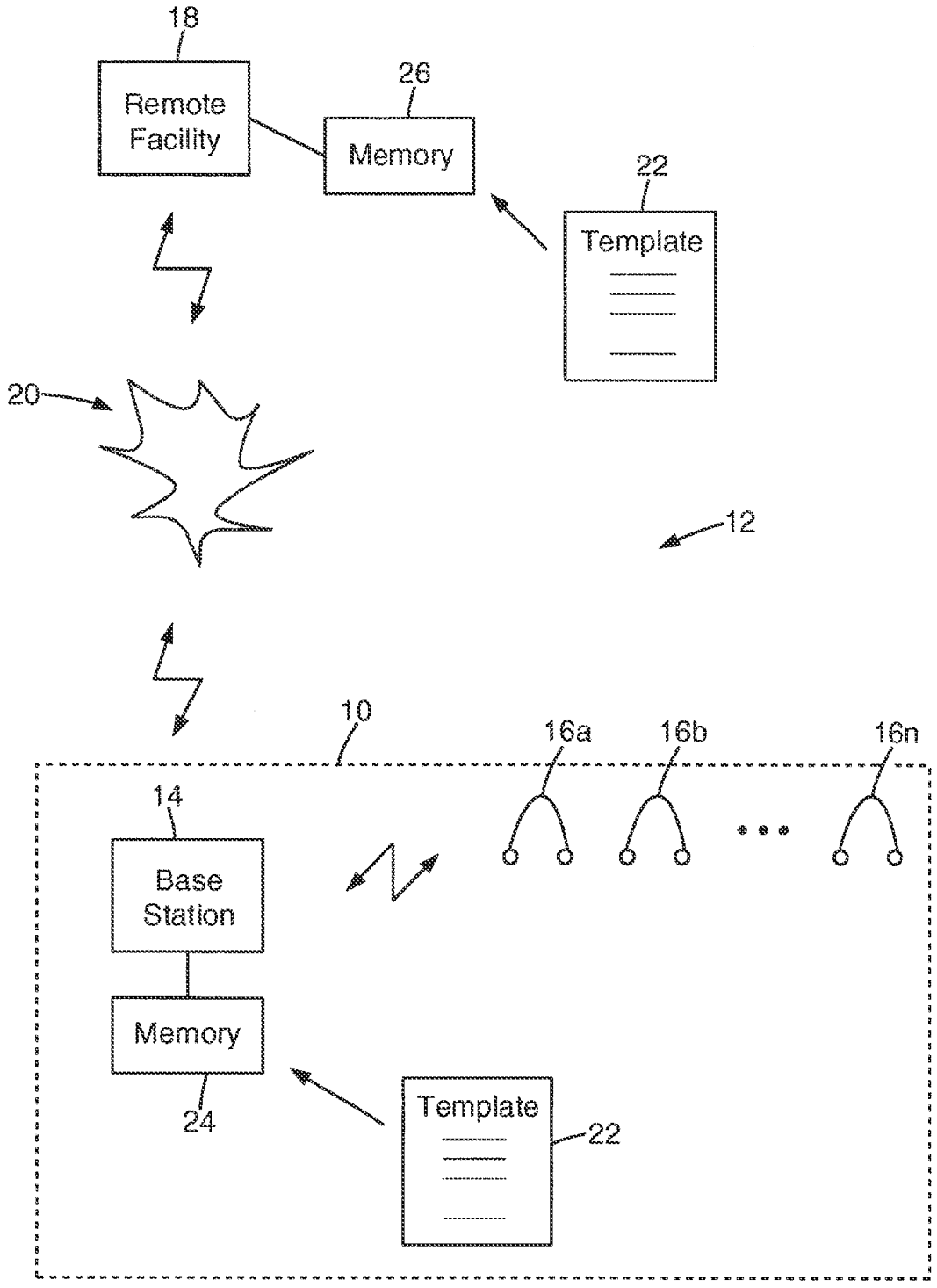

18
Remote Facility
26
Memory
22
Template
20
12
10
16a
16b
16n
14
Base Station
Memory
24
Template
22

Fig. 1

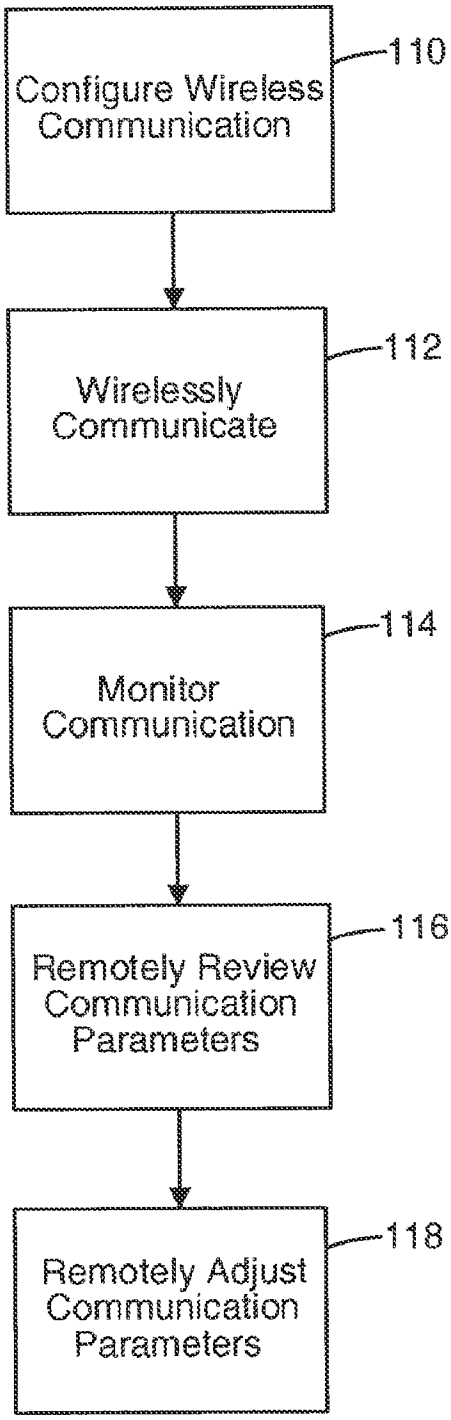

Configure Wireless Communication
110
Wirelessly Communicate
112
Monitor Communication
114
Remotely Review Communication Parameters
116
Remotely Adjust Communication Parameters
118

Fig. 2

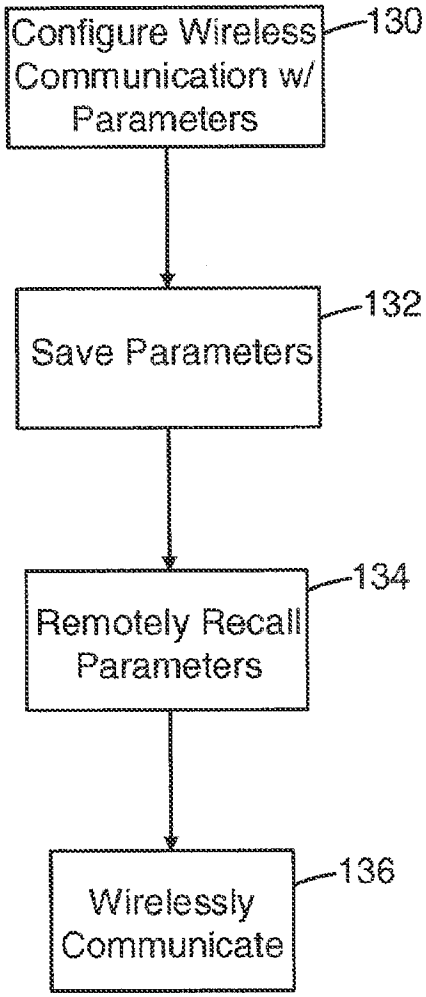

Configure Wireless Communication w/ Parameters
130
Save Parameters
132
Remotely Recall Parameters
134
Wirelessly Communicate
136

Fig. 3

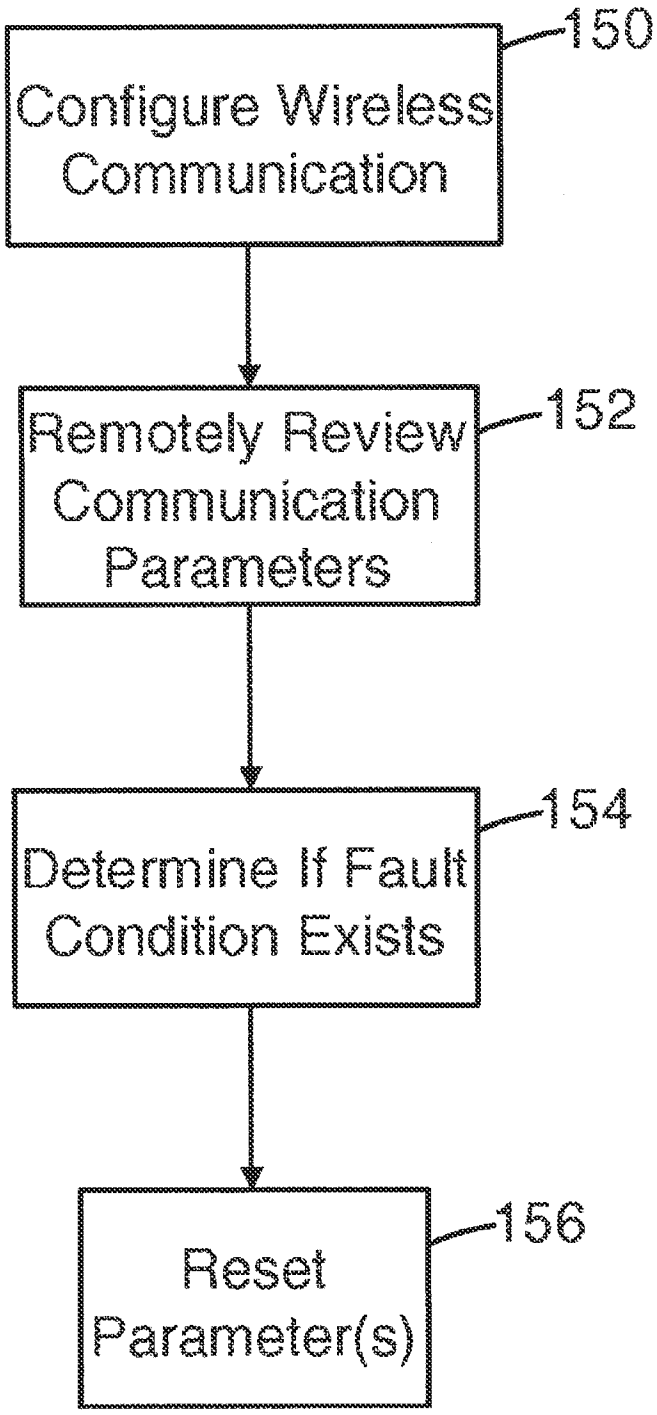

150
Configure Wireless Communication
152
Remotely Review Communication Parameters
154
Determine If Fault Condition Exists
156
Reset Parameter(s)

Fig. 4

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

FIELD OF THE INVENTION

The present invention is generally related to wireless intercom systems and, more particularly, to wireless intercom systems for commercial establishments.

BACKGROUND OF THE INVENTION

It is common for establishments, such as retail establishments, and particularly restaurants, to facilitate drive-up customers with drive-up lanes and windows to service the customer. A customer will typically drive up to a menu/order board and communicate the customer's wishes from the vehicle to staff, including an order taker, inside the retail establishment. The customer, still in the vehicle, will then proceed to one or more windows in order to pay for the purchase, if required, and pick up the merchandise.

An intercom system can facilitate communication within and around the establishment, particularly between the occupant of the vehicle, the customer, and the staff inside the establishment. In a "quick service" restaurant situation, a post mounted speaker and microphone, located near a menu board, is hard wired to an intercom base station located inside the restaurant. The base station can wirelessly communicate with a portable device worn by an order taker. The portable device is typically a transceiver worn as a belt pack and an accompanied wired headset. Alternatively, in some instances, the portable device is self-contained on a wearable headset eliminating the need for a belt pack. The order taker typically listens continually to the post mounted microphone and presses a button in order to speak to the vehicle occupant as needed.

In many systems and methods of ordering items from an establishment from a drive-up or drive-thru facility, the order is orally communicated directly from the post-mounted speaker and microphone to an order taking facility, typically a drive-thru order specialist wearing a headset, in the establishment. The order specialist, or others, then collect the ordered item or items and handle the transaction with the customer at a drive-up window, taking money for the ordered item, making change and handing the order to the customer.

The drive-through ordering system is vitally important for a quick service restaurant. In some quick service restaurants, the drive-through is sixty percent (60%) or more of the revenue of the establishment. Thus, there is a great need for a reliable intercom system for use, for example, in obtaining orders from the drive-through facility. If the intercom system develops a fault, becomes mal-adjusted or otherwise malfunctions, the establishment may be unable to process orders from the drive-through facility not only preventing the establishment from booking the revenue which otherwise would have been obtained but also potentially alienating customers.

While systems and methods have been developed in which the order taking process is moved off-site from the establishment, for example, U.S. Patent Application Publication No. US2003/0225622, Doan, entitled "Metbod and System For Entering Orders of Customers," such systems may not prevent a problem locally associated with the intercom system of the establishment from disrupting communication.

Furthermore, many intercom systems utilize wireless techniques to facilitate communication among staff of the establishment. Such wireless intercom systems can have parameters, such as volume or gain, which affect the ability of the intercom system to function well and reliably. Such intercom systems can, over time, either through changing conditions, personnel, inappropriate adjustment, for example, become unreliable and/or inoperable.

Adding to the difficulty in establishing and maintaining a reliable and effective intercom system, is that establishment utilizing such intercom systems have become ubiquitous in many geographic areas, including communities in which highly-skilled personnel trained in the maintenance and repair of such intercoms are non-existent. Such personnel can often be located a considerable distance away from the site of the establishment, often a number of hours apart. Any failure or other inoperability of the intercom system in such a geographic location could result in a significant downtime for the intercom system and for the establishment to obtain a significant portion of their revenue until the such time as a maintenance and/or repair person can travel to the establishment. Even if the establishment is not distant from the location of service personnel, sending service personnel on a service call results in a significant expense, both in terms of money but also in the time expended to perform any required repair.

BRIEF SUMMARY OF THE INVENTION

Aspects of the present invention allow the intercom system of an establishment to be remotely adjusted by a technician or other user without the need for such technician or other user to be dispatched to the establishment itself, saving both a considerable amount of both time and money.

A technician, or other user, may access the intercom system, for example, via the internet, from great distances and may be able to immediately remedy any of a number of adjustment-based issues. Further, the intercom system itself may be able to self-report fault conditions, such as errors in hardware, errors in software and errors in adjustment, for example, or warn of possible service needs at the time of or prior to system failure.

This is of great value to the establishment as it may prevent costly downtime to the establishment.

In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewable and being remotely adjustable via the wide area communication network.

In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless communication is configured between each of the plurality of headsets and the base station with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewed and adjusted via the wide area communication network.

In an embodiment, the system also includes a plurality of parameters, at least one of the plurality of parameters being adjustable by the staff of the establishment. The plurality of parameters are remotely adjustable via the wide area communication network.

In an embodiment, the plurality of parameters are grouped into a template of parameters.

In an embodiment, the template is saved for future recall.

In an embodiment, the template is saved locally at the establishment.

In an embodiment, the template is saved to a location remote from the establishment.

In an embodiment, the plurality of parameters may be restored from the template previously stored.

In an embodiment, the plurality of parameters may be remotely restored from the template previously stored remotely from the establishment.

In an embodiment, the template is derived from another establishment.

In an embodiment, the template of the plurality of parameters is established in conjunction with installation of the wireless intercom system and is saved.

In an embodiment, the template of the plurality of parameters established in conjunction with installation is recalled at a point in time following the installation.

In an embodiment, the template of the plurality of parameters is established as a factory default.

In an embodiment, the template of the plurality of parameters established as default is recalled at a point in time following establishment.

In an embodiment, wireless communication is established between an ordering point and at least one of the plurality of headsets.

In an embodiment, a remote facility monitors communication on the wireless intercom system.

In an embodiment, the parameter is adjusted by the remote facility in response to monitoring of communication of the wireless intercom system.

In an embodiment, the establishment comprises a quick service restaurant.

In an embodiment, the parameter is an audio level.

In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station is configurable with at least one parameter being remotely reviewable via the wide area communication network. The parameter is remotely re-settable via the wide area communication network.

In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless communication is configured between each of the plurality of headsets and the base station. At least one parameter is remotely reviewed via the wide area communication network. It is remotely determined if a fault condition exists with the plurality of parameters. If a fault condition exists, the parameter is reset to a predetermined value via the wide area communication network.

In an embodiment, the parameter is reset upon the detection of a fault condition via the wide area communication network.

In an embodiment, the parameter is adjustable by the staff of the establishment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of the functional components of an intercom system;

FIG. **2** is flow chart illustrating monitoring of intercom communications and remote adjustment of intercom system parameters;

FIG. **3** is a flow chart illustrating storage of and subsequent recall of intercom system parameters; and

FIG. **4** is a flow chart illustrating remote review of intercom system fault conditions and remote resetting of such parameters.

DETAILED DESCRIPTION OF THE INVENTION

Intercom systems, e.g., wireless intercom systems, used at establishments, e.g., quick service restaurants, typically can have several parameters which govern the operation of the intercom system.

As shown in FIG. **1**, establishment **10** is served by intercom system **12**. Base station **14** communicates wirelessly with a plurality of headsets **16***a*, **16**, . . . **16***n*. Headsets **16***a*, **16**, . . . **16***n* are worn by personnel, or staff of establishment **10** and, in a preferred embodiment can be used by such personnel to receive orders taken from a drive-through facility (not shown). At least one of the staff members communicates with a customer in the drive-through facility to obtain an order from the customer. This staff members may be wearing, and communicating through, one of headsets **16***a*, **16**, . . . **16***n* or may be in wired communication with base station **14**. Other staff members will wear headsets **16***a*, **16**, . . . **16***n* or the remaining ones of headsets **16***a*, **16**, . . . **16***n*, primarily to listen, or monitor communication between the customer and staff member taking the order.

Intercom system **12** at establishment **10**, e.g., a quick service restaurant, has several parameters which govern the operation of the system. For example, each of headsets **16***a*, **16**, . . . **16***n* can be in full duplex communication with base station **14** and each of headsets **16***a*, **16**, . . . **16***n* may have a receive audio level, or volume, and/or a transmit audio level associated with it. Separate volume, or gain, controls, may be available to each of headsets **16***a*, **16**, . . . **16***n* for each direction of communication. Many other parameters are also possible, such as lane assignment, receive volume, transmit volume, master volume for a speaker associated with the drive-through facility, individual volume for each channel received by the drive-through facility, base station receive volume, base station transmit volume, page, greeter, vehicle detection alert, vehicle approaching alert, for examples. Many, if not all, of these parameters may be available to one or more staff members for individual adjustment.

It is recognized, however, that an intercom system **12** involving a drive-through facility, drive-through lane, a base station **14** and, potentially, several headsets **16***a*, **16**, . . . **16***n* with each unit located in a potentially unique environment and unique conditions can be complex to set up and adjust properly. Failure to perform proper set-up and balance could result in unsatisfactory operation, e.g., resulting in annoying feedback and/or instability perhaps making communication difficult, if not impossible. Providing a staff member or staff members with adjustment control of at least one parameter, e.g., volume of their headset **16**, is desirable to take into account individual speaking patterns and hearing capabilities. However, it is possible for individual adjustments to throw the balance of intercom system **12** and, possibly, to render it unstable and/or unusable.

Since the location of the establishment **10** may be a significant distance geographically from the location of a qualified service technician, it may take a considerable amount of time for such service technician, once summoned, to arrive at the location of establishment **10** in order to begin repairs. In

some cases establishment **10** may be located hours away from a service technician. Even if establishment **10** is not located a significant distance from a qualified service technician, sending a service technician on-site to perform a repair can still be a significant expense in terms of both time and money.

However, intercom system **12** allows personnel from establishment **10** to call a technical service facility **18** located remotely from the location of establishment **10**.

However, a technical service facility **18** located remotely from the location of establishment **10** may be alerted, by personnel of establishment **10**, automatically or by other means, to access the parameters controlling intercom system **12** remotely via a wide area network **20**, such as by way of the internet. The service technician may be able to access the parameters associated with intercom system **12**, review the parameters of intercom system **12**, and potentially make adjustments to the parameters to place intercom system **12** back in operation or to improve the operation of intercom system **12**.

The service technician may be able to resolve the issue with intercom system **12** quickly without a need to dispense a service technician to the site of establishment **10**. If the site of establishment **10** is remote, many hours of establishment down time may be saved, perhaps even a day if it is necessary to fly or otherwise transport a service technician to a very remote site. Even if the site of establishment is not remote, a service technician may be able to service many more establishments and solve many more issues more efficiently by making remote adjustments than by incurring site visits. Remote adjustment of parameters of intercom system **12** may minimize, or eliminate altogether, service interruption by establishment **10**.

It is to be recognized and understood that one or more than one parameter of intercom system **12** may be accessed, reviewed and, potentially, modified or adjusted. One parameter, e.g., the master volume of intercom system **12**, may be the only parameter reviewed and/or adjusted. On the other hand, it is also contemplated that multiple parameters may be reviewed, and one or more of the parameters reviewed may be adjusted. For example, the volume levels of all of headsets **16***a*, **16**, . . . **16***n* may be reviewed. Following review, it may be necessary to adjust the volume level of a single headset **16**, say headset **16***a*, or it may be desirable to adjust the volume of more than one or all of headsets **16***a*, **16**, . . . **16***n*.

Since multiple parameters may be involved in the setting up, adjusting and balancing of intercom system **12** and because one parameter may have an effect on other aspects of the intercom system, it may be desirable to form multiple parameters into parameter sets. A given set of parameters for intercom system **12** may form a template **22**, i.e., a set of parameters for intercom system **12** that, when implemented, will give rise to a particular operational characteristic for intercom system **12**. For example, known settings for parameters which provide for a particular response or performance of intercom system **12** or which may typically eliminate common issues associated with maladjustment of parameters may be formed as a template. Such a template of parameters may be utilized, for example, either in a later point in time in the same establishment or another establishment having a similar intercom system **12** or a similar facility, structure and/or layout.

Individual parameters or a template **22** or templates of parameters may be saved or stored for later recall. Template **22** may be saved to memory **24** located locally with respect to establishment **10**. Once saved in memory **24**, template **22**, or one of a plurality of templates **22**, may be recalled later to reset intercom system **12** or to bring about a desired change of operational parameters. If intercom system **12** parameters are adversely adjusted, then a previously stored template may be recalled from memory **24** and utilized to provide a new operational guidebook for intercom system **12**. In particular, a service technician, located remote from the location of establishment **10**, may access memory **24** and recall a template **22** previously stored and make the parameters associated with that template **22** active. Additionally, a remotely located service technician may recall a previously stored template **22** from memory **24** and then, perhaps, make further adjustments or modifications to one or more individual parameters in order to improve or optimize the performance characteristics of intercom system **12**.

It is also contemplated that parameters for establishment **10** may be stored remotely from establishment **10**. For example, the same wideband communication network allowing a service technician at remote facility **18** to access parameters of intercom system **12** may also or alternatively used to transmit parameters, preferably in a template **22**, to remote facility to be saved or stored in memory **26**. Such parameters or templates **22** may be subsequently recalled as discussed to bring about an operational scheme for intercom system **12** as discussed above with respect to locally stored parameters and/or templates **22**. Further, memory **26** associated with remote facility **18** may be used to store a template or templates **22** which may apply to more than one of establishments such as establishment **10**. For example, a particular brand or chain of establishment may store a template **22** that may be pertinent for a "standard" quick service restaurant of which many may be constructed in different locations. Thus stored, it would be relatively easy for a service technician to recall the template **22** in order to initially setup and make intercom system **12** operational in a new location or a new establishment meeting that brand's or chain's "standard" layout. As above, of course, the service technician may fine tune the operational parameters for intercom system **12**. However, the standard template **22** may have provided the service technician with a substantial head start and made the entire process easier and faster. It is to be recognized and understood that while memory **26** is illustrated connected directly to remote facility **18**, that memory **26** may also be remote, not only from establishment **10**, but also from remote facility **18**.

Memory **26** may be physically located in remote facility **18** or may be located elsewhere and accessed by remote facility **18** remotely.

Communication occurring on intercom system **12** may be monitored by other personnel in or associated with establishment **12**, either by listening through base station **14** or one or more of headsets **16***a*, **16**, . . . **16***n*. In the alternative or in addition, personnel associated with remote facility **18** may monitor communication occurring on intercom system **12**, particularly communication used in receiving orders from customers. Such personnel associated with remote facility **18**, in addition to performing normal quality control of ordering functions, may also analyze the quality of the communications and may preemptively access parameters associated with intercom system **12** and adjust or modify such parameters, if desired, to maintain or improve the operational characteristics of intercom system **12**. In this case, personnel associated with establishment **10** do not need to request assistance from a service technician and may not even know that a service technician from remote facility **18** performed service on intercom system **12**.

Further, intercom system **12** may contain hardware and/or software used for the purpose of determining if a fault condition exists, i.e., that it is desired that a service technician inspect intercom system **12**. If so, intercom system **12** may

notify a service technician at remote facility **18** of the existence of a fault condition as determined by commonly available hardware and/or software and a service technician at remote facility **18** may review parameters and/or other aspects of intercom system **12** remotely. The service technician may be able to adjust and/or repair intercom system **12**, again preemptively, by reviewing and/or adjusting or modifying parameters associated with intercom system **12**.

FIG. **2** is a flow chart illustrating a method of remotely configuring a wireless communication system, such as that used in intercom system **12** of establishment **10**. The wireless intercom system is configured (**110**), in part by setting the parameters associated with the system. Such configuration can be done locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way. Once configured, the wireless intercom system is then ready to perform communications (**112**) for establishment **10**. Optionally, communications occurring on the wireless intercom system may be monitored (**114**), either locally or remotely as, for example, by remote facility **18**. In response to a request from establishment **10**, in response to an indication of a fault condition or preemptively, remote facility **18** remotely reviews (**116**) communication parameters associated with the wireless intercom system by way of wideband communications network **20**. A service technician, or automated equipment, associated with remote facility **18** may then analyze the setting of such parameters and the operation of the wireless intercom system and, if necessary, may remotely adjust or modifying (**118**) one or more of the communication parameters. Typically such adjustment is performed in order to improve the operation of the wireless intercom system or in order to make the wireless intercom system operational.

FIG. **3** is a flow chart illustrating a method of configuring a wireless intercom system with saved and subsequently recalled parameters. The wireless intercom system is configured (**130**), in part by setting communication parameters associated with the system. Again, such configuration can be locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way. Once configured, the wireless intercom system is then ready to perform communications for establishment **10**. Communication parameters associated with the wireless intercom system are saved (**132**), either in local memory or memory located remote from establishment **10**. Such parameters are preferably saved as a set of parameters in a template **22**. Subsequent to saving such parameters, one or more of such parameters are recalled (**134**) from memory and utilized to establish, at least in part, the operational characteristics of the wireless intercom system. Once established, the wireless intercom system may then be utilized to communicate (**136**) in the operational environment of the establishment.

FIG. **4** is a flow chart illustrating a method of remotely configuring a wireless intercom system responsive to a fault condition. The wireless intercom system is configured (**150**), in part by setting communication parameters associated with the system. Again, such configuration can be done locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way.

Remote facility **18** remotely reviews (**152**) communication parameters associated with the wireless intercom system by way of wideband communications network **20**. A service technician, or automated equipment, associated with remote facility **18** may then analyze the setting of such parameters and the operation of the wireless intercom system to determine (**154**) if a fault condition exists. A fault condition could be the result of one or more inappropriate settings of communication parameters or another hardware and/or software fault condition. Upon determination of a fault, remote facility may then reset (**156**) the communication parameters associated with the wireless communication system in order to attempt to eliminate the fault condition.

Thus, embodiments of the remotely configurable wireless intercom system for an establishment are disclosed. One skilled in the art will appreciate that the present invention can be practiced with embodiments other than those disclosed. The disclosed embodiments are presented for purposes of illustration and not limitation, and the present invention is limited only by the claims that follow.

What is claimed is:

1. A remotely configurable wireless intercom system for an establishment having a staff, comprising:

a base station connectable to a wide area communication network;

a plurality of headsets in two-way wireless communication with said base station;

said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter;

said at least one parameter being adjustable by said staff of said establishment;

said at least one parameter being remotely reviewable and being remotely adjustable via said wide area communication network;

and wherein the remotely configurable wireless intercom system comprises a plurality of parameters, at least one of said plurality of parameters being adjustable by said staff of said establishment, and wherein said plurality of parameters are remotely adjustable via said wide area communication network, and wherein said plurality of parameters are grouped into a template of parameters.

2. A remotely configurable wireless intercom system as in claim **1** wherein said template is saved for future recall.

3. A remotely configurable wireless intercom system as in claim **2** wherein said template is saved locally at said establishment.

4. A remotely configurable wireless intercom system as in claim **2** wherein said template is saved to a location remote from said establishment.

5. A remotely configurable wireless intercom system as in claim **2** wherein said plurality of parameters may be restored from said template previously stored.

6. A remotely configurable wireless intercom system as in claim **5** wherein said plurality of parameters may be remotely restored from said template previously stored remotely from said establishment.

7. A remotely configurable wireless intercom system as in claim **1** wherein said template is derived from another establishment.

8. A remotely configurable wireless intercom system as in claim **2** wherein said template of said plurality of parameters is established in conjunction with installation of said wireless intercom system and is saved.

9. A remotely configurable wireless intercom system as in claim **8** wherein said template of said plurality of parameters established in conjunction with installation is recalled at a point in time following said installation.

10. A remotely configurable wireless intercom system as in claim **2** wherein said template of said plurality of parameters is established as a factory default.

11. A remotely configurable wireless intercom system as in claim 10 wherein said template of said plurality of parameters established as default is recalled at a point in time following establishment.

12. A remotely configurable wireless intercom system as in claim 1 further comprising an ordering point and wherein wireless communication occurs between said ordering point and at least one of said plurality of headsets.

13. A remotely configurable wireless intercom system as in claim 12 further comprising a communication between said establishment and a remote facility allowing said remote facility to monitor communication on said wireless intercom system.

14. A remotely configurable wireless intercom system as in claim 13 wherein said at least one parameter is adjusted by said remote facility in response to monitoring of communication of said wireless intercom system.

15. A remotely configurable wireless intercom system as in claim 1 wherein said establishment comprises a quick service restaurant.

16. A method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with said base station, comprising the steps of:

configuring wireless communication between each of said plurality of headsets and said base station with at least one parameter being adjustable by said staff of said establishment; and

remotely reviewing and adjusting said at least one parameter via said wide area communication network;

wherein said at least one parameter comprises a plurality of parameters, and further comprising the step of grouping said plurality of parameters into a template of parameters.

17. A method as in claim 16 further comprising the step of saving said template for future recall.

18. A method as in claim 17 wherein said template is saved locally at said establishment.

19. A method as in claim 17 wherein said template is saved to a location remote from said establishment.

20. A method as in claim 17 further comprising the step of restoring said plurality of parameters from said template previously stored.

21. A method as in claim 20 wherein said step of restoring said plurality of parameters is accomplished from said template previously stored remotely from said establishment.

22. A method as in claim 17 further comprising the step of deriving said template from another establishment.

23. A method as in claim 17 further comprising the step of establishing said template of said plurality of parameters in conjunction with installation of said wireless intercom system.

24. A method as in claim 23 further comprising the step of recalling said template of said plurality of parameters established in conjunction with installation at a point in time following said installation.

25. A method as in claim 17 further comprising the step of establishing said template of said plurality of parameters as a factory default.

26. A method as in claim 25 further comprising the step of recalling said template of said plurality of parameters established as default at a point in time following establishment.

27. A method as in claim 16 further comprising the step of wirelessly communicating between an ordering point and at least one of said plurality of headsets.

28. A method as in claim 27 further comprising the step of monitoring communication on said wireless intercom system by a remote facility.

29. A method as in claim 28 further comprising the step of adjusting said at least one parameter by said remote facility in response to monitoring of communication of said wireless intercom system.

30. A method as in claim 16 wherein said establishment comprises a quick service restaurant.

* * * * *

US008005455B2

(12) **United States Patent**
Awiszus

(10) **Patent No.: US 8,005,455 B2**
(45) **Date of Patent: Aug. 23, 2011**

(54) **REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT**

(75) Inventor: **Steven T. Awiszus**, Woodbury, MN (US)

(73) Assignee: **3M Innovative Properties Company**, St. Paul, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/548,596**

(22) Filed: **Aug. 27, 2009**

(65) **Prior Publication Data**

US 2009/0318076 A1 Dec. 24, 2009

Related U.S. Application Data

(63) Continuation of application No. 11/276,048, filed on Feb. 10, 2006, now Pat. No. 7,599,679.

(51) **Int. Cl.**
H04M 11/00 (2006.01)

(52) **U.S. Cl.** **455/403**; 455/73; 455/569.1; 455/63; 455/3.05

(58) **Field of Classification Search** 455/403, 455/73, 569.1, 422.1

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,321,848	A	6/1994	Miyahira et al.	
6,435,406	B1	8/2002	Pentel	
6,816,205	B2 *	11/2004	Dudkowski	348/705
2003/0225622	A1	12/2003	Doan	
2004/0158499	A1	8/2004	Dev et al.	
2004/0204168	A1 *	10/2004	Laurila	455/569.1
2005/0004843	A1	1/2005	Heflin	
2006/0030269	A1 *	2/2006	Sabongi et al.	455/63.1

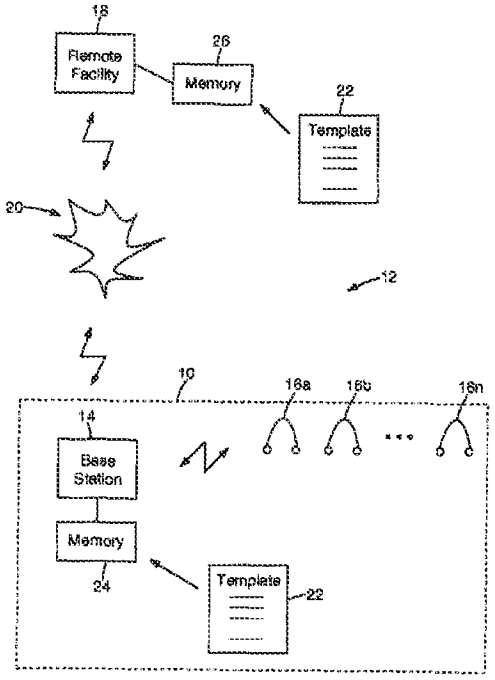
* cited by examiner

Primary Examiner — David Q Nguyen
(74) *Attorney, Agent, or Firm* — David B. Patchett

(57) **ABSTRACT**

A remotely configurable wireless intercom system and method for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewable and being remotely adjustable via the wide area communication network. Also disclosed is a method of providing a remotely configurable wireless intercom system. Wireless communication is configured between each of the plurality of headsets and the base station with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewed and adjusted via the wide area communication network. A parameter is reviewable and may be remotely reset via the wide area communication network, particularly if a fault condition exists.

20 Claims, 3 Drawing Sheets



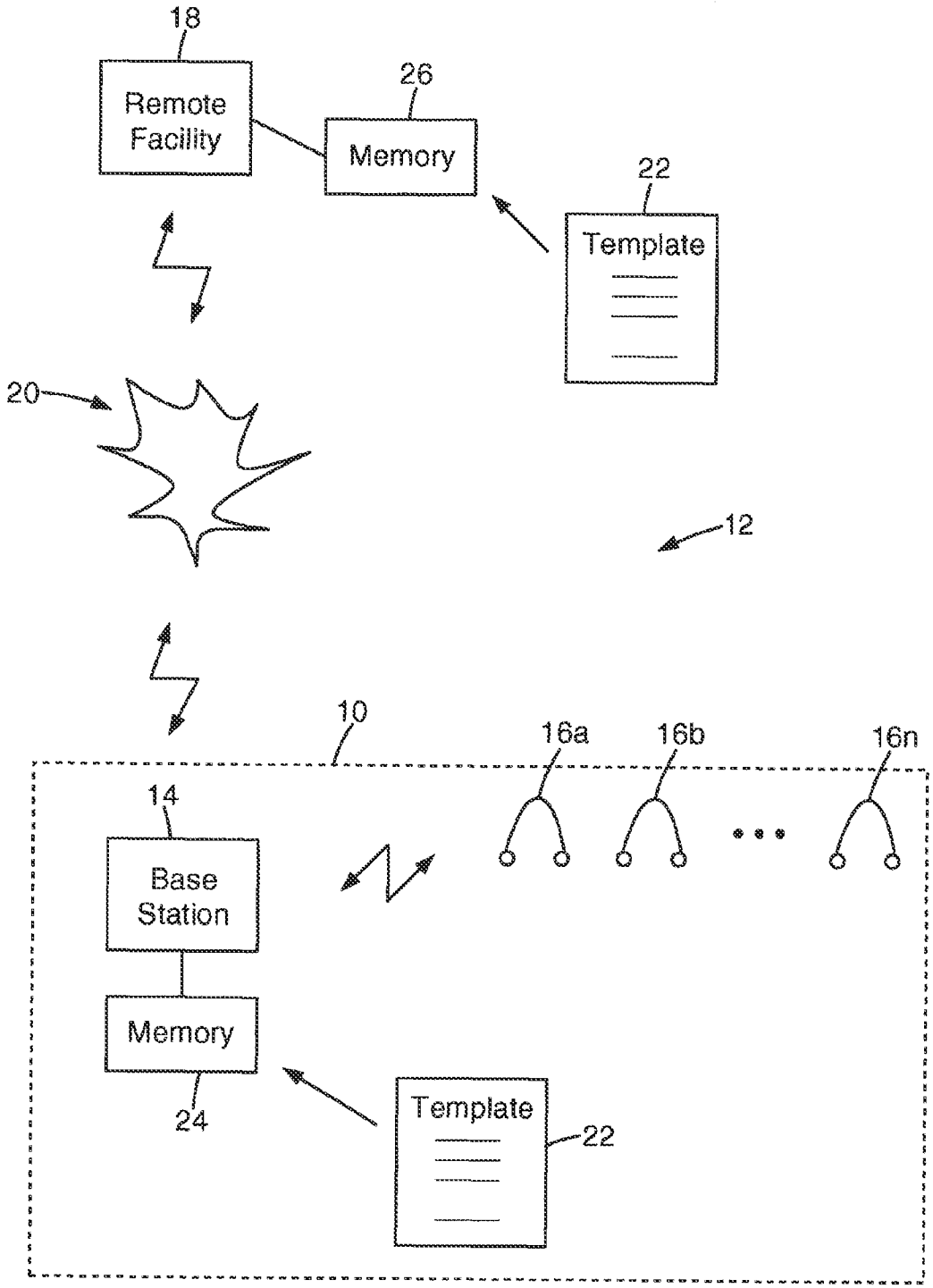

18
Remote Facility
26
Memory
22
Template
20
12
10
16a
16b
16n
14
Base Station
Memory
24
Template
22

Fig. 1

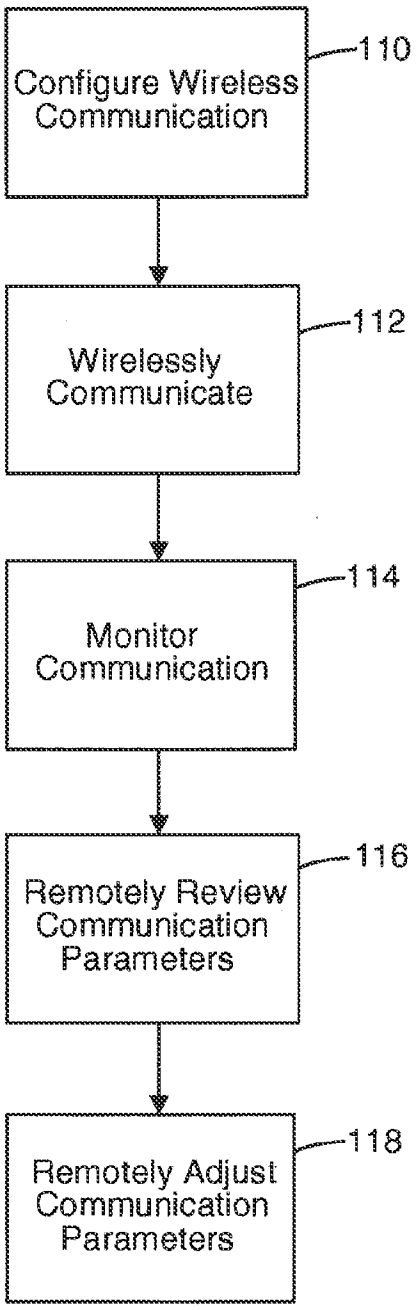

Configure Wireless Communication
110
Wirelessly Communicate
112
Monitor Communication
114
Remotely Review Communication Parameters
116
Remotely Adjust Communication Parameters
118

Fig. 2

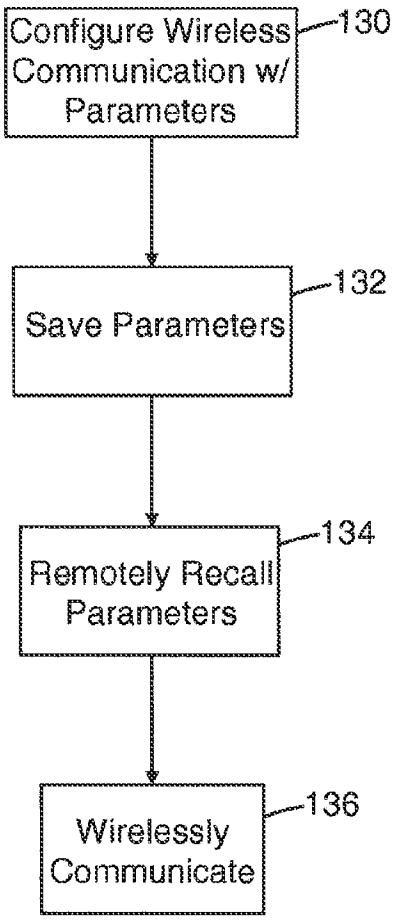

Configure Wireless Communication w/ Parameters
130
Save Parameters
132
Remotely Recall Parameters
134
Wirelessly Communicate
136

Fig. 3

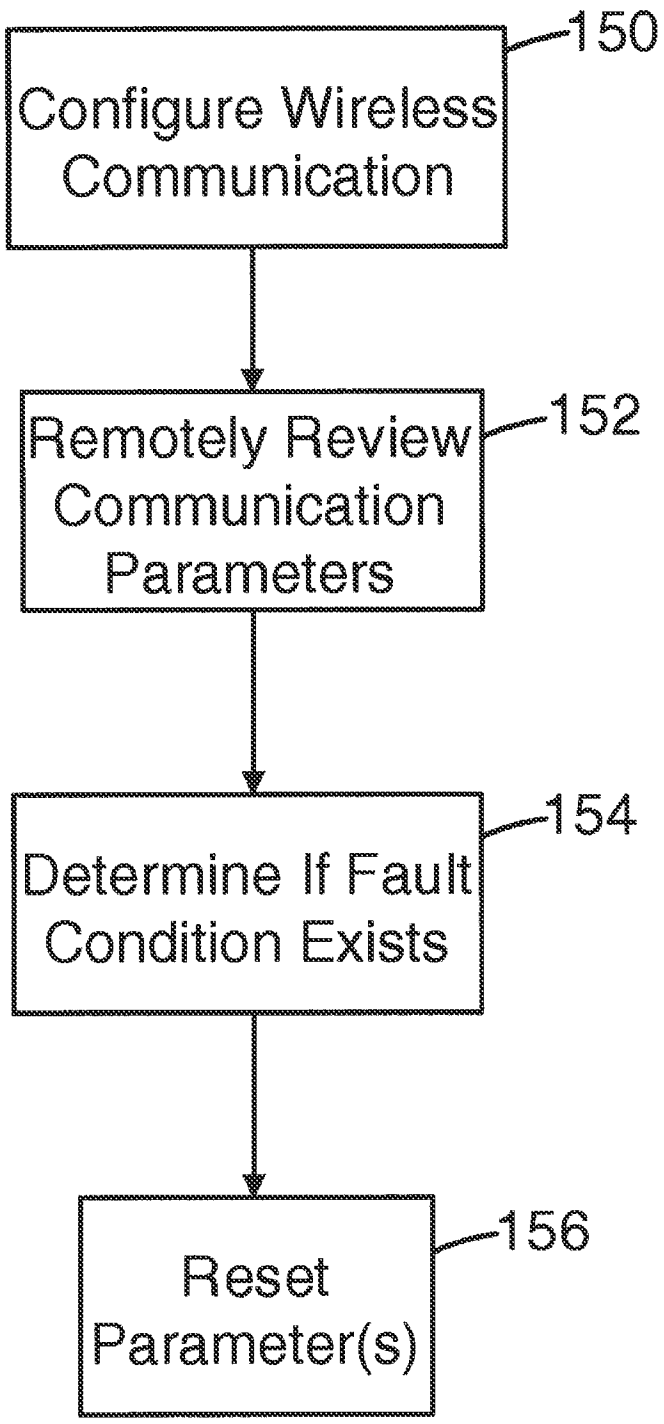

150
Configure Wireless Communication
152
Remotely Review Communication Parameters
154
Determine If Fault Condition Exists
156
Reset Parameter(s)

Fig. 4

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Ser. No. 11/276,048, filed Feb. 10, 2006 now U.S. Pat. No. 7,599,679, now allowed, the disclosure of which is incorporated by reference in its entirety herein.

FIELD OF THE INVENTION

The present invention is generally related to wireless intercom systems and, more particularly, to wireless intercom systems for commercial establishments.

BACKGROUND OF THE INVENTION

It is common for establishments, such as retail establishments, and particularly restaurants, to facilitate drive-up customers with drive-up lanes and windows to service the customer. A customer will typically drive up to a menu/order board and communicate the customer's wishes from the vehicle to staff, including an order taker, inside the retail establishment. The customer, still in the vehicle, will then proceed to one or more windows in order to pay for the purchase, if required, and pick up the merchandise.

An intercom system can facilitate communication within and around the establishment, particularly between the occupant of the vehicle, the customer, and the staff inside the establishment. In a "quick service" restaurant situation, a post mounted speaker and microphone, located near a menu board, is hard wired to an intercom base station located inside the restaurant. The base station can wirelessly communicate with a portable device worn by an order taker. The portable device is typically a transceiver worn as a belt pack and an accompanied wired headset. Alternatively, in some instances, the portable device is self-contained on a wearable headset eliminating the need for a belt pack. The order taker typically listens continually to the post mounted microphone and presses a button in order to speak to the vehicle occupant as needed.

In many systems and methods of ordering items from an establishment from a drive-up or drive-thru facility, the order is orally communicated directly from the post-mounted speaker and microphone to an order taking facility, typically a drive-thru order specialist wearing a headset, in the establishment. The order specialist, or others, then collect the ordered item or items and handle the transaction with the customer at a drive-up window, taking money for the ordered item, making change and handing the order to the customer.

The drive-through ordering system is vitally important for a quick service restaurant. In some quick service restaurants, the drive-through is sixty percent (60%) or more of the revenue of the establishment. Thus, there is a great need for a reliable intercom system for use, for example, in obtaining orders from the drive-through facility. If the intercom system develops a fault, becomes mal-adjusted or otherwise malfunctions, the establishment may be unable to process orders from the drive-through facility not only preventing the establishment from booking the revenue which otherwise would have been obtained but also potentially alienating customers.

While systems and methods have been developed in which the order taking process is moved off-site from the establishment, for example, U.S. Patent Application Publication No. US2003/0225622, Doan, entitled "Method and System For Entering Orders of Customers," such systems may not prevent a problem locally associated with the intercom system of the establishment from disrupting communication.

Furthermore, many intercom systems utilize wireless techniques to facilitate communication among staff of the establishment. Such wireless intercom systems can have parameters, such as volume or gain, which affect the ability of the intercom system to function well and reliably. Such intercom systems can, over time, either through changing conditions, personnel, inappropriate adjustment, for example, become unreliable and/or inoperable.

Adding to the difficulty in establishing and maintaining a reliable and effective intercom system, is that establishment utilizing such intercom systems have become ubiquitous in many geographic areas, including communities in which highly-skilled personnel trained in the maintenance and repair of such intercoms are non-existent. Such personnel can often be located a considerable distance away from the site of the establishment, often a number of hours apart. Any failure or other inoperability of the intercom system in such a geographic location could result in a significant downtime for the intercom system and for the establishment to obtain a significant portion of their revenue until the such time as a maintenance and/or repair person can travel to the establishment. Even if the establishment is not distant from the location of service personnel, sending service personnel on a service call results in a significant expense, both in terms of money but also in the time expended to perform any required repair.

BRIEF SUMMARY OF THE INVENTION

Aspects of the present invention allow the intercom system of an establishment to be remotely adjusted by a technician or other user without the need for such technician or other user to be dispatched to the establishment itself, saving both a considerable amount of both time and money.

A technician, or other user, may access the intercom system, for example, via the internet, from great distances and may be able to immediately remedy any of a number of adjustment-based issues. Further, the intercom system itself may be able to self-report fault conditions, such as errors in hardware, errors in software and errors in adjustment, for example, or warn of possible service needs at the time of or prior to system failure. This is of great value to the establishment as it may prevent costly downtime to the establishment.

In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewable and being remotely adjustable via the wide area communication network.

In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless communication is configured between each of the plurality of headsets and the base station with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewed and adjusted via the wide area communication network.

In an embodiment, the system also includes a plurality of parameters, at least one of the plurality of parameters being adjustable by the staff of the establishment. The plurality of parameters are remotely adjustable via the wide area communication network.

In an embodiment, the plurality of parameters are grouped into a template of parameters.

In an embodiment, the template is saved for future recall.

In an embodiment, the template is saved locally at the establishment.

In an embodiment, the template is saved to a location remote from the establishment.

In an embodiment, the plurality of parameters may be restored from the template previously stored.

In an embodiment, the plurality of parameters may be remotely restored from the template previously stored remotely from the establishment.

In an embodiment, the template is derived from another establishment.

In an embodiment, the template of the plurality of parameters is established in conjunction with installation of the wireless intercom system and is saved.

In an embodiment, the template of the plurality of parameters established in conjunction with installation is recalled at a point in time following the installation.

In an embodiment, the template of the plurality of parameters is established as a factory default.

In an embodiment, the template of the plurality of parameters established as default is recalled at a point in time following establishment.

In an embodiment, wireless communication is established between an ordering point and at least one of the plurality of headsets.

In an embodiment, a remote facility monitors communication on the wireless intercom system.

In an embodiment, the parameter is adjusted by the remote facility in response to monitoring of communication of the wireless intercom system.

In an embodiment, the establishment comprises a quick service restaurant.

In an embodiment, the parameter is an audio level.

In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station is configurable with at least one parameter being remotely reviewable via the wide area communication network. The parameter is remotely re-settable via the wide area communication network.

In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless communication is configured between each of the plurality of headsets and the base station. At least one parameter is remotely reviewed via the wide area communication network. It is remotely determined if a fault condition exists with the plurality of parameters. If a fault condition exists, the parameter is reset to a predetermined value via the wide area communication network.

In an embodiment, the parameter is reset upon the detection of a fault condition via the wide area communication network.

In an embodiment, the parameter is adjustable by the staff of the establishment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of the functional components of an intercom system;

FIG. **2** is flow chart illustrating monitoring of intercom communications and remote adjustment of intercom system parameters;

FIG. **3** is a flow chart illustrating storage of and subsequent recall of intercom system parameters; and

FIG. **4** is a flow chart illustrating remote review of intercom system fault conditions and remote resetting of such parameters.

DETAILED DESCRIPTION OF THE INVENTION

Intercom systems, e.g., wireless intercom systems, used at establishments, e.g., quick service restaurants, typically can have several parameters which govern the operation of the intercom system.

As shown in FIG. **1**, establishment **10** is served by intercom system **12**. Base station **14** communicates wirelessly with a plurality of headsets **16***a*, **16**, . . . **16***n*. Headsets **16***a*, **16**, . . . **16***n* are worn by personnel, or staff of establishment **10** and, in a preferred embodiment can be used by such personnel to receive orders taken from a drive-through facility (not shown). At least one of the staff members communicates with a customer in the drive-through facility to obtain an order from the customer. This staff members may be wearing, and communicating through, one of headsets **16***a*, **16**, . . . **16***n* or may be in wired communication with base station **14**. Other staff members will wear headsets **16***a*, **16**, . . . **16***n* or the remaining ones of headsets **16***a*, **16**, . . . **16***n*, primarily to listen, or monitor communication between the customer and staff member taking the order.

Intercom system **12** at establishment **10**, e.g., a quick service restaurant, has several parameters which govern the operation of the system. For example, each of headsets **16***a*, **16**, . . . **16***n* can be in full duplex communication with base station **14** and each of headsets **16***a*, **16**, . . . **16***n* may have a receive audio level, or volume, and/or a transmit audio level associated with it. Separate volume, or gain, controls, may be available to each of headsets **16***a*, **16**, . . . **16***n* for each direction of communication. Many other parameters are also possible, such as lane assignment, receive volume, transmit volume, master volume for a speaker associated with the drive-through facility, individual volume for each channel received by the drive-through facility, base station receive volume, base station transmit volume, page, greeter, vehicle detection alert, vehicle approaching alert, for examples. Many, if not all, of these parameters may be available to one or more staff members for individual adjustment.

It is recognized, however, that an intercom system **12** involving a drive-through facility, drive-through lane, a base station **14** and, potentially, several headsets **16***a*, **16**, . . . **16***n* with each unit located in a potentially unique environment and unique conditions can be complex to set up and adjust properly. Failure to perform proper set-up and balance could result in unsatisfactory operation, e.g., resulting in annoying feedback and/or instability perhaps making communication difficult, if not impossible. Providing a staff member or staff members with adjustment control of at least one parameter, e.g., volume of their headset **16**, is desirable to take into account individual speaking patterns and hearing capabilities. However, it is possible for individual adjustments to

throw the balance of intercom system **12** and, possibly, to render it unstable and/or unusable.

Since the location of the establishment **10** may be a significant distance geographically from the location of a qualified service technician, it may take a considerable amount of time for such service technician, once summoned, to arrive at the location of establishment **10** in order to begin repairs. In some cases establishment **10** may be located hours away from a service technician. Even if establishment **10** is not located a significant distance from a qualified service technician, sending a service technician on-site to perform a repair can still be a significant expense in terms of both time and money.

However, intercom system **12** allows personnel from establishment **10** to call a technical service facility **18** located remotely from the location of establishment **10**.

However, a technical service facility **18** located remotely from the location of establishment **10** may be alerted, by personnel of establishment **10**, automatically or by other means, to access the parameters controlling intercom system **12** remotely via a wide area network **20**, such as by way of the internet. The service technician may be able to access the parameters associated with intercom system **12**, review the parameters of intercom system **12**, and potentially make adjustments to the parameters to place intercom system **12** back in operation or to improve the operation of intercom system **12**.

The service technician may be able to resolve the issue with intercom system **12** quickly without a need to dispense a service technician to the site of establishment **10**. If the site of establishment **10** is remote, many hours of establishment down time may be saved, perhaps even a day if it is necessary to fly or otherwise transport a service technician to a very remote site. Even if the site of establishment is not remote, a service technician may be able to service many more establishments and solve many more issues more efficiently by making remote adjustments than by incurring site visits. Remote adjustment of parameters of intercom system **12** may minimize, or eliminate altogether, service interruption by establishment **10**.

It is to be recognized and understood that one or more than one parameter of intercom system **12** may be accessed, reviewed and, potentially, modified or adjusted. One parameter, e.g., the master volume of intercom system **12**, may be the only parameter reviewed and/or adjusted. On the other hand, it is also contemplated that multiple parameters may be reviewed, and one or more of the parameters reviewed may be adjusted. For example, the volume levels of all of headsets **16***a*, **16**, . . . **16***n* may be reviewed. Following review, it may be necessary to adjust the volume level of a single headset **16**, say headset **16***a*, or it may be desirable to adjust the volume of more than one or all of headsets **16***a*, **16**, . . . **16***n*.

Since multiple parameters may be involved in the setting up, adjusting and balancing of intercom system **12** and because one parameter may have an effect on other aspects of the intercom system, it may be desirable to form multiple parameters into parameter sets. A given set of parameters for intercom system **12** may form a template **22**, i.e., a set of parameters for intercom system **12** that, when implemented, will give rise to a particular operational characteristic for intercom system **12**. For example, known settings for parameters which provide for a particular response or performance of intercom system **12** or which may typically eliminate common issues associated with maladjustment of parameters may be formed as a template. Such a template of parameters may be utilized, for example, either in a later point in time in the same establishment or another establishment having a similar intercom system **12** or a similar facility, structure and/or layout.

Individual parameters or a template **22** or templates of parameters may be saved or stored for later recall. Template **22** may be saved to memory **24** located locally with respect to establishment **10**. Once saved in memory **24**, template **22**, or one of a plurality of templates **22**, may be recalled later to reset intercom system **12** or to bring about a desired change of operational parameters. If intercom system **12** parameters are adversely adjusted, then a previously stored template may be recalled from memory **24** and utilized to provide a new operational guidebook for intercom system **12**. In particular, a service technician, located remote from the location of establishment **10**, may access memory **24** and recall a template **22** previously stored and make the parameters associated with that template **22** active. Additionally, a remotely located service technician may recall a previously stored template **22** from memory **24** and then, perhaps, make further adjustments or modifications to one or more individual parameters in order to improve or optimize the performance characteristics of intercom system **12**.

It is also contemplated that parameters for establishment **10** may be stored remotely from establishment **10**. For example, the same wideband communication network allowing a service technician at remote facility **18** to access parameters of intercom system **12** may also or alternatively used to transmit parameters, preferably in a template **22**, to remote facility to be saved or stored in memory **26**. Such parameters or templates **22** may be subsequently recalled as discussed to bring about an operational scheme for intercom system **12** as discussed above with respect to locally stored parameters and/or templates **22**. Further, memory **26** associated with remote facility **18** may be used to store a template or templates **22** which may apply to more than one of establishments such as establishment **10**. For example, a particular brand or chain of establishment may store a template **22** that may be pertinent for a "standard" quick service restaurant of which many may be constructed in different locations. Thus stored, it would be relatively easy for a service technician to recall the template **22** in order to initially setup and make intercom system **12** operational in a new location or a new establishment meeting that brand's or chain's "standard" layout. As above, of course, the service technician may fine tune the operational parameters for intercom system **12**. However, the standard template **22** may have provided the service technician with a substantial head start and made the entire process easier and faster. It is to be recognized and understood that while memory **26** is illustrated connected directly to remote facility **18**, that memory **26** may also be remote, not only from establishment **10**, but also from remote facility **18**. Memory **26** may be physically located in remote facility **18** or may be located elsewhere and accessed by remote facility **18** remotely.

Communication occurring on intercom system **12** may be monitored by other personnel in or associated with establishment **12**, either by listening through base station **14** or one or more of headsets **16***a*, **16**, . . . **16***n*. In the alternative or in addition, personnel associated with remote facility **18** may monitor communication occurring on intercom system **12**, particularly communication used in receiving orders from customers. Such personnel associated with remote facility **18**, in addition to performing normal quality control of ordering functions, may also analyze the quality of the communications and may preemptively access parameters associated with intercom system **12** and adjust or modify such parameters, if desired, to maintain or improve the operational char-

acteristics of intercom system **12**. In this case, personnel associated with establishment **10** do not need to request assistance from a service technician and may not even know that a service technician from remote facility **18** performed service on intercom system **12**.

Further, intercom system **12** may contain hardware and/or software used for the purpose of determining if a fault condition exists, i.e., that it is desired that a service technician inspect intercom system **12**. If so, intercom system **12** may notify a service technician at remote facility **18** of the existence of a fault condition as determined by commonly available hardware and/or software and a service technician at remote facility **18** may review parameters and/or other aspects of intercom system **12** remotely. The service technician may be able to adjust and/or repair intercom system **12**, again preemptively, by reviewing and/or adjusting or modifying parameters associated with intercom system **12**.

FIG. **2** is a flow chart illustrating a method of remotely configuring a wireless communication system, such as that used in intercom system **12** of establishment **10**. The wireless intercom system is configured (**110**), in part by setting the parameters associated with the system. Such configuration can be done locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way. Once configured, the wireless intercom system is then ready to perform communications (**112**) for establishment **10**. Optionally, communications occurring on the wireless intercom system may be monitored (**114**), either locally or remotely as, for example, by remote facility **18**. In response to a request from establishment **10**, in response to an indication of a fault condition or preemptively, remote facility **18** remotely reviews (**116**) communication parameters associated with the wireless intercom system by way of wideband communications network **20**. A service technician, or automated equipment, associated with remote facility **18** may then analyze the setting of such parameters and the operation of the wireless intercom system and, if necessary, may remotely adjust or modifying (**118**) one or more of the communication parameters. Typically such adjustment is performed in order to improve the operation of the wireless intercom system or in order to make the wireless intercom system operational.

FIG. **3** is a flow chart illustrating a method of configuring a wireless intercom system with saved and subsequently recalled parameters. The wireless intercom system is configured (**130**), in part by setting communication parameters associated with the system. Again, such configuration can be locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way. Once configured, the wireless intercom system is then ready to perform communications for establishment **10**. Communication parameters associated with the wireless intercom system are saved (**132**), either in local memory or memory located remote from establishment **10**. Such parameters are preferably saved as a set of parameters in a template **22**. Subsequent to saving such parameters, one or more of such parameters are recalled (**134**) from memory and utilized to establish, at least in part, the operational characteristics of the wireless intercom system. Once established, the wireless intercom system may then be utilized to communicate (**136**) in the operational environment of the establishment.

FIG. **4** is a flow chart illustrating a method of remotely configuring a wireless intercom system responsive to a fault condition. The wireless intercom system is configured (**150**), in part by setting communication parameters associated with the system. Again, such configuration can be done locally through conventional techniques or by recalling or installing a template **22**, may be done remotely, e.g., using remote facility **18**, or in any other way.

Remote facility **18** remotely reviews (**152**) communication parameters associated with the wireless intercom system by way of wideband communications network **20**. A service technician, or automated equipment, associated with remote facility **18** may then analyze the setting of such parameters and the operation of the wireless intercom system to determine (**154**) if a fault condition exists. A fault condition could be the result of one or more inappropriate settings of communication parameters or another hardware and/or software fault condition. Upon determination of a fault, remote facility may then reset (**156**) the communication parameters associated with the wireless communication system in order to attempt to eliminate the fault condition.

Thus, embodiments of the remotely configurable wireless intercom system for an establishment are disclosed. One skilled in the art will appreciate that the present invention can be practiced with embodiments other than those disclosed. The disclosed embodiments are presented for purposes of illustration and not limitation, and the present invention is limited only by the claims that follow.

What is claimed is:

1. A remotely configurable wireless intercom system for an establishment having a staff, comprising:

a base station connectable to a wide area communication network;

a plurality of headsets in two-way wireless communication with said base station; said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter; said at least one parameter being adjustable by said staff of said establishment;

said at least one parameter being remotely reviewable and being remotely adjustable via said wide area communication network, wherein said at least one parameter comprises an audio level.

2. The remotely configurable wireless intercom system of claim **1** further comprising a plurality of parameters, at least one of said plurality of parameters being adjustable by said staff of said establishment and wherein said plurality of parameters are remotely adjustable via said wide area communication network.

3. The remotely configurable wireless intercom system of claim **2** wherein said plurality of parameters form a template of parameters.

4. The remotely configurable wireless intercom system of claim **3** wherein said template of parameters is configured for future recall.

5. The remotely configurable wireless intercom system of claim **4** wherein said template of parameters is established in conjunction with installation of said wireless intercom system.

6. The remotely configurable wireless intercom system of claim **4** wherein said template of said plurality of parameters is a factory default.

7. The remotely configurable wireless intercom system of claim **1** further comprising an ordering point, wherein wireless communication occurs between said ordering point and at least one of said plurality of headsets.

8. The remotely configurable wireless intercom system of claim **1** further comprising a communication between said establishment and a remote facility allowing said remote facility to monitor said two-way wireless communication.

9. The remotely configurable wireless intercom system of claim 1 wherein said establishment comprises a quick service restaurant.

10. A method of providing a remotely configurable wireless intercom system for an establishment comprising:

configuring wireless communication between each of a plurality of headsets and a base station with at least one parameter being adjustable by one or more staff members of an establishment; and

remotely reviewing and adjusting said at least one parameter via a wide area communication network, wherein said at least one parameter comprises an audio level.

11. The method of claim 10 wherein said at least one parameter comprises a plurality of parameters.

12. The method of claim 11 further comprising grouping said plurality of parameters into a template of parameters.

13. The method of claim 12 further comprising saving said template for future recall.

14. The method of claim 13 further comprising restoring said plurality of parameters from said template.

15. The method of claim 14 wherein restoring said plurality of parameters from said template is done remotely from said establishment.

16. The method of claim 12 further comprising establishing said template of said plurality of parameters as a factory default.

17. The method of claim 12 further comprising establishing said template of said plurality of parameters in conjunction with installation of said wireless intercom system.

18. The method of claim 17 further comprising recalling said template following said installation.

19. The method of claim 10 further comprising monitoring communication on said wireless intercom system by a remote facility.

20. The method of claim 19 further comprising adjusting said at least one parameter by said remote facility in response to monitoring of communication of said wireless intercom system.

* * * * *

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

3M COMPANY and
3M INNOVATIVE PROPERTIES COMPANY,

Plaintiffs,

v.

HM ELECTRONICS, INC.,

Defendant.

Civil Action 12-cv-0553 SRN/JSM

JURY TRIAL DEMANDED

DEFENDANT'S ANSWER, AFFIRMATIVE DEFENSES AND COUNTERCLAIMS TO PLAINTIFFS' COMPLAINT FOR PATENT INFRINGEMENT

ANSWER

Defendant HM Electronics, Inc. ("HME" or "Defendant") answers the Complaint of plaintiffs 3M Company and 3M Innovative Properties Company (collectively "3M" or "Plaintiffs") and counterclaims as follows. All averments and allegations not expressly admitted herein are denied. The paragraph numbers correspond to those in 3M's Complaint.

THE PARTIES

1. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 1 of the Complaint and on that basis denies those allegations.

2. Admitted.

3. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 3 of the Complaint and on that basis denies those allegations.

4. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 4 of the Complaint and on that basis denies those allegations.

5. Admitted.

6. Admitted.

JURISDICTION

7. HME admits that the Complaint purports to assert claims for patent infringement. HME asserts that the claims have no merit.

8. HME admits that this Court has subject matter jurisdiction.

9. HME admits it is subject to personal jurisdiction in the State of Minnesota but otherwise denies the allegations in paragraph 9.

10. HME admits that venue is proper in this district.

Count I: Alleged Patent Infringement

11. HME admits that United States Patent No. 7,599,679 ("the '679 patent") is entitled "Remotely Configurable Wireless Intercom System for an Establishment," that it was issued to Plaintiff 3M IPC as assignee of the inventor, Steven T. Awiszus, and that a copy of the '679 patent was attached to the Complaint as Exhibit A. HME otherwise denies the allegations of this paragraph.

12. HME admits that the '679 patent relates to wireless intercom systems.

13. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 13 of the Complaint and on that basis denies those allegations.

14. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 14 of the Complaint and on that basis denies those allegations.

15. Denied.

16. Denied.

Count II: Alleged Patent Infringement

17. HME admits that United States Patent No. 8,005,455 ("the '455 patent") is entitled "Remotely Configurable Wireless Intercom System for an Establishment," that it was issued to Plaintiff 3M IPC as assignee of the inventor, Steven T. Awiszus, and that a copy of the '455 patent was attached to the Complaint as Exhibit B. HME otherwise denies the allegations of this paragraph.

18. HME admits that the '455 patent relates to wireless intercom systems.

19. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 19 of the Complaint and on that basis denies those allegations.

20. HME lacks knowledge or information sufficient to form a belief as to the truth of any allegations in paragraph 20 of the Complaint and on that basis denies those allegations.

21. Denied.

22. Denied.

PRAYER FOR RELIEF

HME denies that Plaintiffs are entitled to judgment or relief as set forth on pages 4 through 5 of the Complaint.

AFFIRMATIVE DEFENSES

Without assuming the burden of proof which would otherwise reside with Plaintiffs, HME asserts the following defenses.

23. HME has not infringed and is not infringing any valid claim of the '679 or '455 patent.

24. On information and belief, the '679 and '455 patents and their claims are invalid for failure to satisfy one or more conditions of patentability set forth in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. § 101, 102, 103 and 112.

25. On information and belief, the damages sought by Plaintiffs are barred in whole or in part because of Plaintiffs' failure to comply with 35 U.S.C. § 287(a).

RIGHT TO AMEND DEFENSES

HME reserves the right to amend its answer to assert further defenses based on future discovery during the lawsuit.

COUNTERCLAIMS

Pursuant to Rule 13 of the Federal Rules of Civil Procedure, Defendant HM Electronics, Inc. ("Defendant" or "HME") for its counterclaims against 3M Company and 3M Innovative Properties Company (collectively "Plaintiffs" or "3M"), alleges as follows:

PARTIES

1. HME is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business located at 14110 Stowe Drive, Poway, California 92604.

2. Upon information and belief, plaintiff 3M Company is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business located at 3M Center, St. Paul, Minnesota 55133.

3. Upon information and belief, plaintiff 3M Innovative Properties Company is a wholly-owned subsidiary of 3M Company with its principal place of business at 3M Center, St. Paul, Minnesota 55133.

JURISDICTION AND VENUE

4. This is an action for declaratory judgment of non-infringement and invalidity of United States Patent Nos. 7,599,679 and 8,005,455 arising under the patent laws of the United States, 35 U.S.C. § 1 et seq, and the Declaratory Judgment Act, 28 U.S.C. §§ 2201-2202.

5. This court has subject matter jurisdiction over HME's Counterclaims under 28 U.S.C. §§ 1331, 1338(a), 2201, and 2202.

6. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b) and 1391(c). Plaintiffs have consented to jurisdiction in this district by filing suit against HME in this Court.

GENERAL ALLEGATIONS

7. The '679 patent was issued by the United States Patent and Trademark Office on October 6, 2009.

8. The '455 patent was issued by the United States Patent and Trademark Office on August 23, 2011.

9. Plaintiffs claim to be the owners, by assignment, of all right, title and interest in the '679 and '455 patents.

10. On March 2, 2012, Plaintiffs filed suit against HME claiming infringement of the '679 and '455 patents.

11. An actual controversy exists between HME and Plaintiffs regarding the infringement and validity of the '679 and '455 patents.

FIRST CAUSE OF ACTION: DECLARATORY JUDGMENT OF NON-INFRINGEMENT

12. HME incorporates the allegations of the previous paragraphs.

13. HME has not infringed and is not infringing the '679 patent.

14. HME has not infringed and is not infringing the '455 patent.

15. HME is entitled to a declaratory judgment of non-infringement of the patents.

SECOND CAUSE OF ACTION: DECLARATORY JUDGMENT OF INVALIDITY

16. HME incorporates the allegations of the previous paragraphs.

17. The '679 and '455 patents are invalid for failure to satisfy one or more of the conditions of patentability set forth in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 101, 102, 103 and 112.

18. HME is entitled to a declaratory judgment of invalidity.

DEMAND FOR JURY TRIAL

In accordance with Rule 38(b) of the Federal Rules of Civil Procedure, HME demands a trial by jury on all issues so triable.

RELIEF REQUESTED

WHEREFORE, HME respectfully requests the following relief:

1. Judgment in favor of HME denying all relief requested by Plaintiffs in this action and dismissing Plaintiffs' Complaint for patent infringement with prejudice;

2. Judgment declaring that HME has not infringed and is not infringing any valid claim of the '679 or '455 patents, and that HME has not contributed to or induced and is not contributing to or inducing infringement of any valid claim of the patents;

3. Judgment declaring that each claim of the '679 and '455 patents is invalid;

4. Judgment declaring this to be an exceptional case under U.S.C. § 285 and awarding HME its costs, expenses, and reasonable attorneys' fees; and

5. Such other and further relief as the court deems just and proper.

Dated: May 25, 2012

FREDRIKSON & BYRON, P.A.

By: s/ Lora M. Friedemann

Lora M. Friedemann (#259615)
Kurt J. Niederluecke (#271597)
Timothy M. O'Shea (#386437)
200 South Sixth Street, Ste. 4000
Minneapolis, MN 55402-1425
Telephone: (612) 492-7000
Facsimile: (612) 492-7077
lfriedemann@fredlaw.com
kniederluecke@fredlaw.com
toshea@fredlaw.com

Attorneys for HM Electronics, Inc.

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

3M COMPANY and
3M INNOVATIVE PROPERTIES COMPANY,

Civil File No. 12-cv-00553 SRN/JSM

Plaintiff,

v.

HM ELECTRONICS, INC.,

Defendant.

ORDER STAYING CASE PENDING REEXAMINATION

This matter is before the Court on the parties' stipulation to stay pending reexamination, Docket No. 28.

In this lawsuit, Plaintiffs 3M Company and 3M Innovative Properties Company (collectively "3M") accuse Defendant HM Electronics, Inc. ("HME") of infringing U.S. Patent No. 7,599,679 and U.S. Patent No. 8,005,455 (collectively, "3M Patents").

On September 13, 2012, HME sought reexamination of the 3M Patents. The following day, HME moved to stay this lawsuit until the reexamination proceedings are concluded. The parties have agreed that an immediate stay is appropriate.

Based on the stipulation of the parties, the arguments of counsel, and on all the files, records and proceedings herein,

IT IS HEREBY ORDERED that this lawsuit is stayed pending reexamination in the United States Patent and Trademark Office of the 3M Patents that are the subject of this action.

Dated: September 21, 2012

s/Susan Richard Nelson
SUSAN RICHARD NELSON
United States District Judge

Electronic Acknowledgement Receipt

EFS ID:	16583343
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Katherine Marie DeVries Smith/Elizabeth DeVries
Filer Authorized By:	Katherine Marie DeVries Smith
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	14-AUG-2013
Filing Date:	22-AUG-2011
Time Stamp:	17:18:19
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	Notice of concurrent proceedings / decisions	2013_08_14_102_0105USC2_Notification_Litigation_.pdf	4982037 6619db224ab5ed04ea0e37d1fe245735680c3ce8	no	36

Warnings:	
Information:	

Total Files Size (in bytes):	4982037

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-2005079885		Apr 14, 2005	Patino, Joseph et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
		WO-9610878			Apr 11, 1996	STROHALLEN, GENE et al.		
		EP-1372299			Dec 17, 2003	Franks, Roland A.		

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[5]
		"Action Closing Prosecution", for U.S Application No. 95/002,239 (our file 102.0105USR2), mailed July 19, 2013 (65 pages)	

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Extended European Search Report", for PCT/US2007/002961, mailed May 7, 2013 (6 pages)	

EXAMINER SIGNATURE

Examiner Signature	/David Nguyen/	Date Considered	08/05/2013

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

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☒ See attached certification statement.

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

☐ None

SIGNATURE

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

Signature	/Katherine M. DeVries Smith/	Date (YYYY-MM-DD)	2013-08-01
Name/Print	Katherine M. DeVries Smith	Registration Number	42,157

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-2005079885		Apr 14, 2005	Patino, Joseph et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
		WO-9610878			Apr 11, 1996	STROHALLEN, GENE et al.		
		EP-1372299			Dec 17, 2003	Franks, Roland A.		

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[5]
		"Action Closing Prosecution", for U.S Application No. 95/002,239 (our file 102.0105USR2), mailed July 19, 2013 (65 pages)	

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Extended European Search Report", for PCT/US2007/002961, mailed May 7, 2013 (6 pages)	

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☒ See attached certification statement.

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

☐ None

SIGNATURE

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

Signature	/Katherine M. DeVries Smith/	Date (YYYY-MM-DD)	2013-08-01
Name/Print	Katherine M. DeVries Smith	Registration Number	42,157

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Steven T. Awiszus	Examiner:	David Q. Nquyen
Serial No.:	13/214,746	Group Art Unit:	2617
Filed:	August 22, 2011	Docket:	61312US015 (102.0105USC2)
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

INFORMATION DISCLOSURE STATEMENT & CERTIFICATIONS UNDER 37 cfr 1.97(e)

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

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Each item of information contained in the Information Disclosure Statement was either first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement (See 37 CFR 1.97(e) (1)), or was not cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement. See 37 CFR 1.97(e) (2).

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

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications are no longer required to be provided to the Office. Notification of this change was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004. Thus, Applicant has not included copies of any US Patents or Published Applications cited with this submission. Should the Office require copies to be provided, Applicant respectfully requests that notice of such requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

Date August 1, 2013 By /Katherine M. DeVries Smith/

Katherine M. DeVries Smith
Reg. No. 42,157
Pauly, DeVries Smith & Deffner, L.L.C.
Customer Number: 32692
Phone No: 612-746-4784

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Katherine Marie DeVries Smith/Elizabeth DeVries
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	16475438
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Katherine Marie DeVries Smith/Elizabeth DeVries
Filer Authorized By:	Katherine Marie DeVries Smith
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	01-AUG-2013
Filing Date:	22-AUG-2011
Time Stamp:	17:14:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	4443
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	EP1372299.PDF	542071 85537c041df3be039ac35985bff7e8ecd0521e34	no	11
Warnings:					
Information:					
2	Other Reference-Patent/App/Search documents	PCTUS2007002961_Search_Report_61312EP004.PDF	210603 ee251f8ccb6ec34a88150eae52ef99d65331d0c5	no	6
Warnings:					
Information:					
3	Foreign Reference	WO9610878.PDF	3391151 20d40a2443dac0fe3b6d5f44e88e68b8b763556e	no	89
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	2013_07_19_102_0105USR2_Action_Closing_Prosecution__.pdf	3933240 4ce4aac8d677aeaaf66ae15acc28b7bd4fd355bf	no	65
Warnings:					
Information:					
5	Information Disclosure Statement (IDS) Form (SB08)	2013_08_01_102_0105USC2_IDS_1449.pdf	114186 b295e7b4592b62717c0493fca7672d84a8768663	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
6	Transmittal Letter	2013_08_01_102_0105USC2_IDS_Statement.pdf	87648 8d59ac0c98fbae3ac763dca21ce5e1c0c3985add	no	2
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	30815 eefae8a18e6ed36ba97aa47928bd35bf9839f273	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	8309714		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 372 299 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.12.2003 Bulletin 2003/51

(51) Int Cl.[7]: **H04L 12/56**

(21) Application number: **02254137.9**

(22) Date of filing: **13.06.2002**

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

(71) Applicant: **Red-M (Communications) Limited**
Wooburn Green,
Buckinghamshire HP10 0HH (GB)

(72) Inventor: **Franks, Roland Alexander**
Hazlemere, Bucks HP15 7QX (GB)

(74) Representative: **Finnie, Peter John**
Gill Jennings & Every,
Broadgate House,
7 Eldon Street
London EC2M 7LH (GB)

(54) A system for improving wireless communications devices

(57) The present invention uses a wireless device (2) without audio capabilities as an intermediary between a wireless headset (1) and an audio gateway (3). The wireless device (2) supports a software application which allows the transfer of voice data to and from the headset (1) using a first protocol and transfer of voice data to and from the audio gateway (3) using a second protocol. It is also possible to use the same protocol for each connection, allowing the wireless device to act as a relay. The system is preferably a Bluetooth communications system.

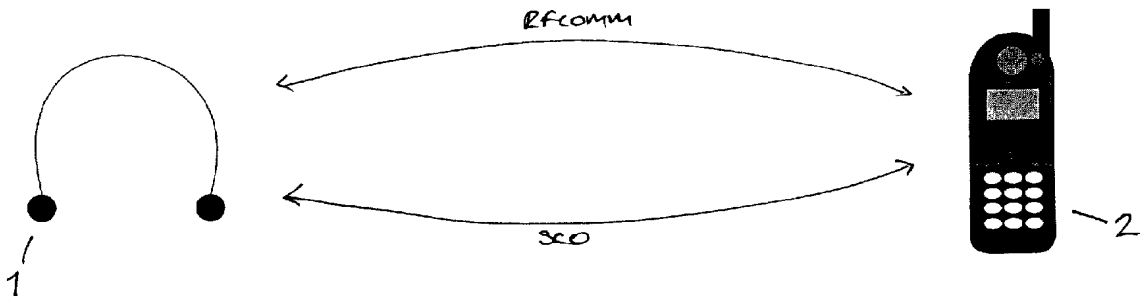


Figure 1

EP 1 372 299 A1

Description

Field of the Invention

[0001] The present invention relates to communication between wireless devices, in particular Bluetooth devices.

Background to the Invention

[0002] Wireless types of devices and networks are becoming more widespread. Wireless communication can be broken down into one of three main categories, radio, cellular and local. Radio communications are used for mainly long distance work, and cellular communications are used for mobile phones and the like.

[0003] In addition to this, local communication standards are also provided for short-range radio communication. One such short-range radio communication radio system is Bluetooth which can be used to provide customer premises wireless links for voice, data and multi-media applications.

[0004] A Bluetooth Radio Frequency (RF) system is a Fast Frequency Hopping Spread Spectrum (FFHSS) system in which packets are transmitted in regular time slots on frequencies defined by a pseudo random sequence. A Frequency Hopping system provides Bluetooth with resilience against interference. Interference may come from a variety of sources including microwave ovens and other communication systems operating in this unlicensed radio band which can be used freely around the world. The system uses 1MHz frequency hopping steps to switch among 79 frequencies in the 2.4GHz Industrial, Scientific and Medical (ISM) band at 1600 hops per second with each channel using a different hopping sequence.

[0005] The Bluetooth baseband architecture includes a Radio Frequency transceiver (RF), a Link Controller (LC) and a Link Manager (LM) implementing the Link Manager Protocol (LMP).

[0006] Bluetooth version 1.1 supports asymmetric data rates of up to 721 Kbits per second and 57.6Kbits per second and symmetric data rates of up to 432.5Kbits per second. Data transfers may be over synchronous connections, Bluetooth supports up to three pairs of symmetric synchronous voice channels of 64Kbits per second each.

[0007] Bluetooth connections operate in something called a piconet in which several nodes accessing the same channel via a common hopping sequence are connected in a point to multi-point network. The central node of a piconet is called a master that has up to seven active slaves connected to it in a star topology. The bandwidth available within a single piconet is limited by the master, which schedules time to communicate with its various slaves. In addition to the active slaves, devices can be connected to the master in a low power state known as park mode, these parked slaves cannot be active on the channel but remain synchronised to the master and addressable. Having some devices connected in park mode allows more than seven slaves be attached to a master concurrently. The parked slaves access the channel by becoming active slaves, this is regulated by the master.

[0008] Multiple piconets with overlapping coverage may co-operate to form a scatternet in which some devices participate in more than one piconet on a time division multiplex basis. These and any other piconets are not time or frequency synchronised, each piconet maintains its own independent master clock and hopping sequence.

[0009] The Bluetooth specification has therefore been designed for the primary purpose of allowing electronic devices to wirelessly communicate with each other in a local environment. The system is typically utilized in an environment in which one-to-one communication is achieved between two Bluetooth enabled devices.

[0010] Almost any electronic device can be Bluetooth enabled. Common electronic devices such as mobile telephones, PDAs, laptops, PCs and printers are increasingly being manufactured so as to be Bluetooth enabled. It is also possible to adapt existing devices to be Bluetooth enabled.

[0011] Bluetooth enabled devices can have different levels of Bluetooth functionality. Bluetooth headsets and pagers are typical of Bluetooth devices with limited functionality and in particular limited control functionality. Bluetooth headsets receive audio data from an telephony gateway device, such as a mobile telephone, and allow a user to listen and talk without holding the telephone to their ear. Audio data is transmitted in a Bluetooth system using a synchronous connectionless oriented (SCO) link. Bluetooth headsets necessarily have a limited range owing to restrictions on what is considered to be a desirable size and weight for a headset. Furthermore, headsets are typically only interoperable with devices using a particular protocol, such as RFCOMM, and only with one device at a time.

[0012] A PDA is an example of a device which can have greater Bluetooth functionality, including a greater level of control functionality. A Bluetooth enabled PDA typically has a higher power Bluetooth radio than a device like a headset. A PDA may be able to form multiple Bluetooth connections simultaneously, be able to use a number of different protocols, may include a memory and may be able to support security features, such as the use of Personal Identification Number (PIN) codes.

Summary of the Invention

[0013] According to a first aspect of the present invention, a wireless communications system comprises:

an first wireless device;
a mobile intermediate wireless communications device; and,

a second wireless device,

wherein the mobile intermediate wireless communications device is adapted to communicate data with the first wireless device over a wireless channel using a first protocol and to communicate audio data with the second wireless device over a wireless channel using a second protocol.

[0014] The present invention allows the combination of a first wireless device, such as a headset, with another wireless device, such as a Personal Digital Assistant (PDA) or a laptop computer, to enhance the functionality of both devices. In this example, the combination of an audio headset with a non-audio PDA can provide the functionality of a mobile telephone. Typically, the first device has limited functionality and in particular limited control functionality. The intermediate device has different functionality to the first device and may advantageously have greater functionality than the first device. This greater functionality may include a higher power radio, greater sensitivity to incoming radio signals, the ability to form multiple connections simultaneously, a better user interface and enhanced security features.

[0015] Preferably, the first device and the intermediate device are Bluetooth enabled and communicate with each other using a Bluetooth connection. Preferably, the first device is an audio device and the second device is a telephony gateway. Preferably, the telephony gateway is Bluetooth enabled and communicates with the intermediate device using a Bluetooth connection. The telephony gateway may be a cordless telephony protocol telephony gateway such that the combination of the audio device and the intermediate device acts like a Bluetooth telephone. Preferably, the first wireless device is a headset. Preferably, the intermediate device is a PDA or a laptop computer.

[0016] According to a second aspect of the present invention, a mobile intermediate wireless communications device comprises:

a storage medium encoding computer executable instructions that support a first wireless communications protocol and a second wireless communications protocol and allow conversion between the first wireless communications protocol and the second wireless communications protocol;
at least one transceiver for sending and receiving data over a first communications channel using the first protocol and for sending and receiving data over a second communications channel using the second protocol.

[0017] Preferably, the mobile intermediate wireless communications device further includes means to establish a communications link with a remote transceiver. Preferably, the transceiver is a Bluetooth radio transceiver. Preferably, the data is audio data. The mobile intermediate wireless communications device may be a laptop computer or a PDA.

[0018] According to a third aspect of the present invention, a method of transferring audio data between a first wireless communications device and a second wireless communications device by providing a mobile intermediate wireless communications device comprises the steps of:

receiving data at the intermediate device using a first wireless communications protocol;
converting the data so that it is suitable for transmission using a second wireless communications protocol; and,
transmitting the audio data from the intermediate device using the second wireless communications protocol.

[0019] Preferably, the method further comprises the step of establishing a link between the intermediate device and the second communications device. Preferably, the data is audio data. Preferably, the wireless communications protocols are Bluetooth communications protocols.

[0020] According to a fourth aspect of the present invention, a computer program product comprises computer program code means adapted to perform the method according to the third aspect of the present invention. The computer program product may be software embodied on a computer readable medium.

[0021] According to a fifth aspect of the present invention, a mobile intermediate wireless communications device is adapted to relay data between a first wireless communications device and a second wireless communications device, wherein the intermediate device receives data in the form of a first signal from the first device and outputs the data as a second signal which can be received by the remote communications device.

[0022] In this aspect the intermediate device acts purely as a relay without performing data processing. The intermediate communications device provides a mobile relay for a first communications device having a relatively short range. Preferably, the first device is also a mobile device.

[0023] Preferably, the intermediate device is adapted to receive signals from a remote source and relay them to the first communications device. Preferably, the transmit power of the second signal is greater than the received power of the first signal. More preferably, the transmit power of the second signal is greater than the transmit power of the first signal. Preferably, the receive signal strength sensitivity of the intermediate device is greater than the receive signal strength sensitivity of the first mobile communications device.

[0024] The intermediate device may have another function as its primary function, for example it may be a PDA, a laptop or a mobile telephone equipped with a radio transceiver.

[0025] The intermediate device preferably includes a

Bluetooth radio. The intermediate device is preferably adapted for use with a headset as the first mobile radio communications device, and more preferably a Bluetooth headset.

[0026] The intermediate device may provide greater connectivity than the first mobile radio communications device and may support security features.

[0027] The invention accordingly allows an "off the shelf" radio device having a short range to be used in situations in which it would not previously have functioned. The intermediate device of the present invention relays and preferably amplifies signals from the short range device and relays signals to the short range device from remote radio transceivers.

Brief Description of the Drawings

[0028] Examples of the present invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a schematic representation of a conventional Bluetooth implemented headset and telephony gateway communications set-up;
Figure 2 is a schematic representation of a headset and telephony gateway communications set-up according to one aspect of the present invention; and,
Figure 3 is a schematic representation of a PDA acting as a relay for a Bluetooth headset in accordance with another aspect of the present invention.

Detailed Description

[0029] Figure 1 shows a headset 1 having a Bluetooth radio which is in radio communication with a Bluetooth enabled mobile telephone 2. The Bluetooth radio (not shown) on the headset is a low power, light weight radio which accordingly has a limited range. The distance that a typical Bluetooth headset can be from a telephony gateway before audio quality degrades to an unusable level is only a few metres. The headset allows a hands free operation of the telephone without the encumbrance of wires. The telephone can be kept in a user's pocket or bag and be operated from the headset. However, as stated above, the radio on the headset has a limited range and the quality of the audio signal deteriorates rapidly with distance from the telephone, especially if there are other objects positioned between the headset and the telephone.

[0030] Figure 2 shows a Bluetooth communications system comprising a headset 11, a PDA 12 and a telephony gateway 13. Typically PDAs do not have any intrinsic audio capabilities. Notwithstanding this, in the present invention the PDA 12 is provided with a software application that allows the PDA to support a headset profile and a cordless telephony profile. The software application running on the PDA provides telephone like functions such as dialling and answering incoming calls. The application communicates with the telephony gateway 13 using the telephony control protocol specification (TCS).

[0031] In the control plane, an L2CAP session exists between the PDA 12 and the gateway 13, which is always initiated by the PDA 12. The PDA may be master or slave depending on whether role reversal is supported.

[0032] Correspondingly, an RFCOMM session exists between the PDA 12 and the headset 11. The RFCOMM session may be initiated by either device. The RFCOMM session is transient i.e. it is only in existence during a call.

[0033] In the present invention, there is no Bluetooth connection between the headset and the telephony gateway 13. The PDA 12 may be part of a piconet or a scatternet depending on the dynamics of the call. It is also possible a Bluetooth connection between a headset and a telephony gateway can be controlled by a third Bluetooth device, such as a PDA which is also connected to the telephony gateway. However, in such systems the third Bluetooth device is not connected to the headset and so is not an intermediate device. The complexity of such systems makes them undesirable.

[0034] When an audio path is required SCO links are established in the data plane between the gateway 13 and the PDA 12, and the PDA 12 and the associated headset 11. The PDA 12 switches voice data between the SCO channel to the gateway 13 and the SCO channel to the headset 11.

[0035] In operation the PDA 12 acts as a telephone even though it has no inherent audio capability. The headset 11 is controllable from the PDA 12 to allow incoming and outgoing calls.

[0036] The example described with reference to Figure 2 has a PDA 12 as the intermediate device. However, any Bluetooth device capable of running the software application could be used, although it is preferable to have a Graphical User Interface (GUI).

[0037] Figure 3 shows another aspect of the present invention. A headset 21 in radio communication with a mobile telephone 22 or other network access point (not shown) via an intermediate mobile radio communications device 23 according to the present invention. In this example, the intermediate device is a PDA 23 which is Bluetooth enabled. The Bluetooth radio fitted to the PDA 23 typically has a higher power, and hence greater range than the radio on the headset 21. The PDA acts as a relay between the headset 21 and the mobile telephone 22. The PDA 23 receives a relatively weak signal from the headset 21 and transmits a repeat of this with a higher signal strength than the original. Accordingly, the higher power radio on the PDA 23 allows the telephone 12 to be further away from the PDA 23 than from the headset 21 alone. The PDA 23 can easily be fitted with a higher power Bluetooth radio since there is less restriction on the size and weight of the radio used in the PDA than in the headset. The headset 21 could be

any other low power radio device.

[0038] An example of the system of Figure 3 in operation will now be described. A call is initiated by the telephone 22 and an RFCOMM session is established with the PDA 23 acting as a slave. The PDA 23, acting as a master, then establishes an RFCOMM session with the headset 21 and relays commands between the mobile telephone 22 and the headset 21. When the telephone 22 establishes a SCO link with the PDA 23, the PDA establishes a SCO link with the headset 21 and switches data between them.

[0039] The PDA 23 appears to the telephone 22 as a headset and to the headset 21 as a mobile telephone. There are RFCOMM sessions, and underlying ACL channels, between the telephone 22 and the PDA 23, and between the PDA 23 and the headset 21.

[0040] Pairing and link key exchange occurs between the PDA 23 and the telephone 22 and between the headset 21 and the PDA 23. The combination of Bluetooth connections results in the PDA 23 being part of a scatternet. Alternatively , the PDA 23 may be a master of a piconet. The PDA 23 and telephone 22 can undergo a role change such that the PDA 23 becomes master and the telephone becomes a slave.

[0041] Other mobile devices are possible as the intermediate device since almost any electronic device can be Bluetooth enabled. For example a laptop computer or a mobile telephone could be used.

[0042] Similarly, the remote radio device can be something other than a mobile telephone, for example, it could be a Bluetooth network Access Point, such as the Red-M Access Point, available from Red-M (Communications) Limited, UK. The user of a headset could then communicate over the network so long as the intermediate mobile device remained in range of an Access Point and the headset and intermediate device remain in range of each other. This allows a user of a headset to roam throughout an area of network coverage and continue to communicate over the network via the headset. Handoff between Access Points can be achieved using known techniques. The range of access points in a Bluetooth network area is typically greater than the range of Bluetooth headsets. The invention allows existing headsets to be used in a manner compatible with areas covered by Bluetooth networks, such as airport lounges and offices.

[0043] The intermediate device, in this example a PDA, whilst acting as a relay, may also provide greater connectivity than the headset. The PDA may be connected to multiple remote devices simultaneously as master of a piconet or as part of a scatternet. The PDA may also support security features, such as the use of a PIN number, which is not supported by the headset alone.

Claims

1. A wireless communications system comprising:

   an first wireless communications device;
   an mobile intermediate wireless communications device; and,
   a second communications device,

   wherein the mobile intermediate wireless communications device is adapted to communicate audio data with the first device over a wireless channel using a first protocol and to communicate data with the second device over a wireless channel using a second protocol.

2. A system according to claim 1, wherein the first device and the intermediate device are Bluetooth enabled and communicate with each other using a Bluetooth connection.

3. A system according to claim 1 or 2, wherein the second device is Bluetooth enabled and communicates with the intermediate device using a Bluetooth connection.

4. A system according to claim 1, 2 or 3, wherein the first device is an audio device and the second device is a telephony gateway.

5. A system according to claim 4, wherein the telephony gateway is a cordless telephony protocol telephony gateway, such that the combination of the audio device and the intermediate device acts like a Bluetooth telephone.

6. A system according to any preceding claim wherein the first device is a headset.

7. A system according to any preceding claim wherein the intermediate device is a Personal Digital Assistant (PDA) or a laptop.

8. A mobile intermediate wireless communications device suitable for use in the system of any preceding claim.

9. A mobile intermediate wireless communications device comprising:

   a storage medium encoding computer executable instructions that support a first wireless communications protocol and a second wireless communications protocol and allow conversion between the first wireless communications protocol and the second wireless communications protocol;
   at least one transceiver for sending and receiv-

ing data using the first protocol and for sending and receiving data using the second protocol.

10. A mobile intermediate wireless communications device according to claim 9, further including means to establish a communications link with a remote transceiver.

11. A mobile intermediate wireless communications device according to claim 9 or 10, wherein the transceiver is a Bluetooth radio transceiver.

12. A mobile intermediate wireless communications device according to claim 9, 10 or 11, wherein the data is audio data.

13. A mobile intermediate wireless communications device according to any one of claims 9 to 12, wherein the mobile intermediate wireless communications device is a laptop computer or a PDA.

14. A method of transferring audio data between a first wireless communications device and a second wireless communications device by providing a mobile intermediate wireless communications device comprising the steps of:

receiving data at the intermediate device using a first communications protocol;
converting the data so that it is suitable for transmission using a second communications protocol; and
transmitting the data from the intermediate device using the second communications protocol.

15. A method of transferring data according to claim 14, further comprising the step of establishing a link between the intermediate device and the second communications device.

16. A method of transferring data according to claim 14 or 15, wherein the data is audio data.

17. A method of transferring data according to claim 14, 15 or 16, wherein the communications protocols are Bluetooth protocols.

18. A computer program product comprising computer program code means adapted to perform the method of any one of claims 14 to 17.

19. A computer program product according to claim 18, comprising software embodied on a computer readable medium.

20. A mobile intermediate wireless communications device adapted to relay data between a firstwireless communications device and a remote communications device, wherein the intermediate device receives data in the form of a first signal from the first communications device and outputs the data as a second signal which can be received by the remote communications device.

21. A mobile intermediate device according to claim 20, wherein the intermediate device is adapted to receive signals from the remote communications device and relay them to the first mobile communications device.

22. A mobile intermediate device according to claim 20 or 21, wherein the transmit power of the second signal is greater than the received power of the first signal.

23. A mobile intermediate device according to any one of claims 20 to 22, wherein the transmit power of the second signal is greater than the transmit power of the first signal.

24. A mobile intermediate device according to any one of claims 20 to 23, wherein the receive signal strength sensitivity of the intermediate device is greater than the receive signal strength sensitivity of the first mobile communications device.

25. A mobile intermediate device according to any one of claims 20 to 24, having a function other than relaying data as its primary function.

26. A mobile intermediate device according to claim 25, wherein the mobile intermediate device is a PDA equipped with a radio transceiver.

27. A mobile intermediate device according to any one of claims 20 to 26, wherein the intermediate device is adapted for use with a headset as the first mobile communications device.

28. A mobile intermediate device according to any one of claims 20 to 28, including a Bluetooth radio.

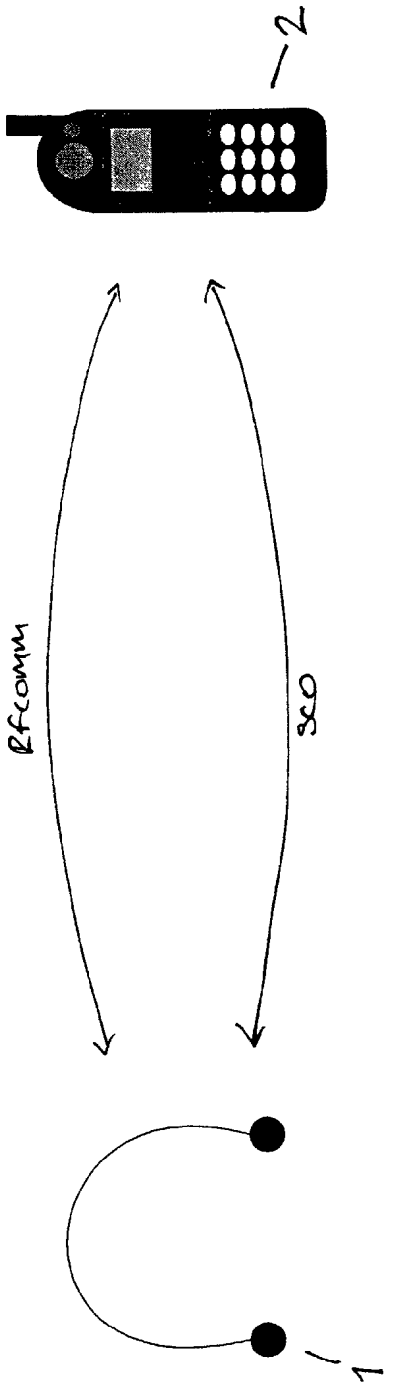


Figure 1

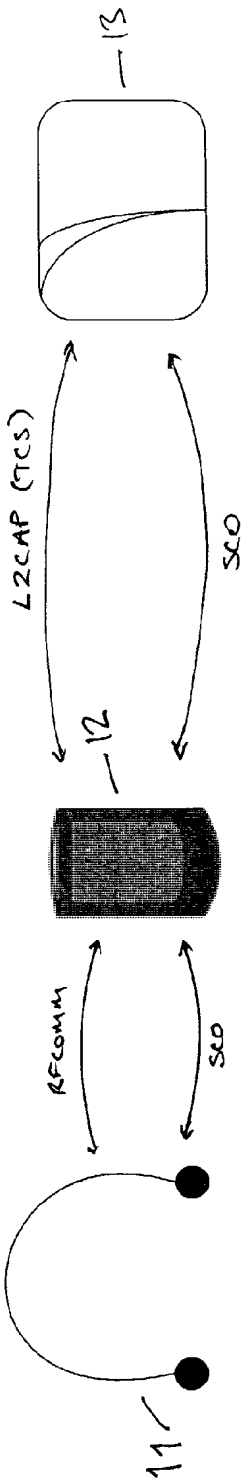


Figure 2

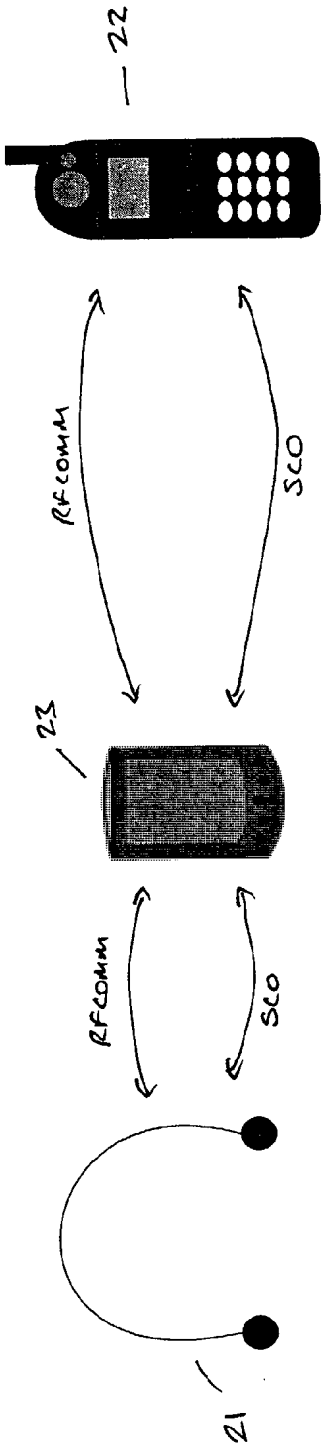


Figure 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 4137

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y	US 2001/051530 A1 (KAZAMA SATOSHI ET AL) 13 December 2001 (2001-12-13) * paragraph [0048] - paragraph [0052] * * figure 3 * ---	1,2,4,5, 7-28 3,6	H04L12/56
X	WO 01 17210 A (XIRCOM INC) 8 March 2001 (2001-03-08) * abstract * * page 5, line 16 - page 7, line 23 * * figures 1,2 * ---	1,9,14, 20	
Y	HAARTSEN J: "BLUETOOTH - THE UNIVERSAL RADIO INTERFACE FOR AD HOC, WIRELESS CONNECTIVITY" ON - ERICSSON REVIEW, ERICSSON. STOCKHOLM, SE, no. 3, 1998, pages 110-117, XP000783249 ISSN: 0014-0171 * the whole document * * figure 1 * ---	3,6	
A	WO 01 37497 A (ISAAC CHRISTOPHER A ;PRESCIENT NETWORKS PTY LTD (AU); SHYY DONG JY) 25 May 2001 (2001-05-25) * abstract * * page 1, line 10 - line 13 * * page 3, line 9 - line 22 * * page 4, line 3 - line 6 * * page 7, line 18 - page 9, line 14 * * figure 1 * ---	1-28	TECHNICAL FIELDS SEARCHED (Int.Cl.7) H04L
A	EP 0 821 507 A (LUCENT TECHNOLOGIES INC) 28 January 1998 (1998-01-28) * abstract * * column 1, line 45 - line 55 * * column 3, line 1 - column 4, line 5 * * column 5, line 3 - line 13 * * figure 1 * -----	1,9,14, 20	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	28 February 2003	Rabe, M

CATEGORY OF CITED DOCUMENTS

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

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 25 4137

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

28-02-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001051530 A1	13-12-2001	JP 2001345756 A	14-12-2001
WO 0117210 A	08-03-2001	AU 6638900 A	26-03-2001
		CN 1373961 T	09-10-2002
		GB 2369510 A	29-05-2002
		WO 0117210 A1	08-03-2001
WO 0137497 A	25-05-2001	WO 0137497 A1	25-05-2001
		AU 1373301 A	30-05-2001
EP 0821507 A	28-01-1998	US 5894478 A	13-04-1999
		CA 2206988 A1	24-01-1998
		EP 0821507 A2	28-01-1998
		JP 10091551 A	10-04-1998
		KR 274295 B1	15-12-2000

EPO FORM P0459

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

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
H04L 27/00, H04B 5/00

A1

(11) International Publication Number: **WO 96/10878**

(43) International Publication Date: 11 April 1996 (11.04.96)

(21) International Application Number: PCT/US95/12536

(22) International Filing Date: 2 October 1995 (02.10.95)

(30) Priority Data:
08/316,920 3 October 1994 (03.10.94) US

(60) Parent Application or Grant
(63) Related by Continuation
US 08/316,920 (CIP)
Filed on 3 October 1994 (03.10.94)

(71) Applicant *(for all designated States except US)*: PHONIC EAR INCORPORATED [US/US]; 3880 Cypress Drive, Petaluma, CA 94954-7600 (US).

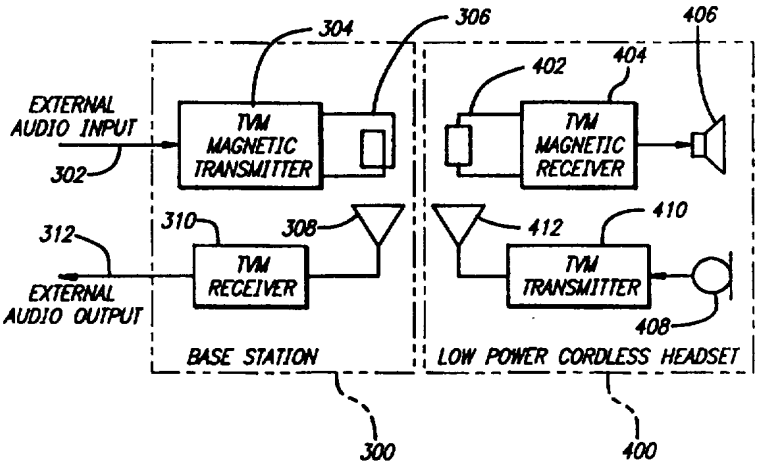
(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: STROHALLEN, Gene, M. [US/US]; 931 Goldridge Road, Sebastopol, CA 94572 (US). YOUNG, Robert, F. [US/US]; 910 N. Plymouth Street, Santa Cruz, CA 95060 (US).

(74) Agents: HENTY, David, L. et al.; Graham & James, 14th floor, 801 S. Figueroa Street, Los Angeles, CA 90017-5554 (US).

(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: VERY LOW POWER CORDLESS HEADSET SYSTEM



(57) Abstract

A cordless headset (400), requiring very low power using Time Variant Modulation (TVM) for reception of a magnetic signal and TVM of RF or infraded as the transmitter. The headset (400) area or zone of operations is defined by the magnetic field that the headset (400) operates within and uses a handshake protocol that takes advantage of the TVM fixed clock period. The headset (400) communicates with a base station (300) that includes a TVM transmitter (304) and loop for transmitting a TVM signal to the cordless headset (400), and an RF or infrared receiver (310) capable of receiving TVM signals from the headset (400). The base station (300) also contains the headset protocol logic for controlling the headset (400) transmission. The headset (400) and base station (300) receiver can both be fixed, mobile or portable and vary with respect to orientation and distance from each other. The receiver circuits (310, 404) in both base station (300) and headset (400) automatically adjust to the variance in signal strength.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	**GB**	United Kingdom	**MR**	Mauritania
AU	Australia	**GE**	Georgia	**MW**	Malawi
BB	Barbados	**GN**	Guinea	**NE**	Niger
BE	Belgium	**GR**	Greece	**NL**	Netherlands
BF	Burkina Faso	**HU**	Hungary	**NO**	Norway
BG	Bulgaria	**IE**	Ireland	**NZ**	New Zealand
BJ	Benin	**IT**	Italy	**PL**	Poland
BR	Brazil	**JP**	Japan	**PT**	Portugal
BY	Belarus	**KE**	Kenya	**RO**	Romania
CA	Canada	**KG**	Kyrgystan	**RU**	Russian Federation
CF	Central African Republic	**KP**	Democratic People's Republic of Korea	**SD**	Sudan
CG	Congo			**SE**	Sweden
CH	Switzerland	**KR**	Republic of Korea	**SI**	Slovenia
CI	Côte d'Ivoire	**KZ**	Kazakhstan	**SK**	Slovakia
CM	Cameroon	**LI**	Liechtenstein	**SN**	Senegal
CN	China	**LK**	Sri Lanka	**TD**	Chad
CS	Czechoslovakia	**LU**	Luxembourg	**TG**	Togo
CZ	Czech Republic	**LV**	Latvia	**TJ**	Tajikistan
DE	Germany	**MC**	Monaco	**TT**	Trinidad and Tobago
DK	Denmark	**MD**	Republic of Moldova	**UA**	Ukraine
ES	Spain	**MG**	Madagascar	**US**	United States of America
FI	Finland	**ML**	Mali	**UZ**	Uzbekistan
FR	France	**MN**	Mongolia	**VN**	Viet Nam
GA	Gabon				

VERY LOW POWER CORDLESS HEADSET SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to short range wireless communication systems. More particularly, the present invention relates to short range inductively coupled communication systems having an expanded channel capability.

2. Description of Prior Art

Short range wireless communication systems are of significant importance for a variety of applications. Although many applications are quite common, such as cordless telephones, "walkie talkies" and cordless microphones, a large number of other potential applications also exist. Such potential applications, which could include virtually any system employing audio cord coupling, have generally not been exploited due to limitations in existing short range communication systems.

There are four basic wireless communication systems in use today: acoustic, radio frequency, infrared and inductive. Each of these has performance characteristics, and attendant advantages and limitations, well known to those skilled in the art. For example, acoustic communication is short range, can cover large groups of people and is subject to interference. Radio frequency (or RF) communication in turn is long range and can use many forms of modulation including amplitude modulation (AM) and frequency modulation (FM) for transmitting signals on an RF carrier. Infrared communication is generally limited to short range, line of sight communication and is immune to forms of interference other than light. The cost vs. range vs. fidelity of each method is well known to those skilled in the art.

The last noted approach to short range wireless communication employs inductively coupled, or magnetically coupled, wireless transmission. In particular, this approach

has been employed in hearing assistive devices for communication between a belt worn radio and a small hearing aid of the type worn behind the ear (BTE) or in the ear (ITE). Cordless coupling between the belt worn device and the ITE or BTE hearing aid is important both for aesthetic reasons, in view of the fact that hearing aid wearers usually desire to avoid calling attention to their hearing disability, as well as for practical reasons relating to awkwardness relative to a cord directly attached to a BTE or ITE hearing aid.

In such a hearing assistive application, the belt worn receiver or microphone is coupled via a cord or cable to a loop which is worn under the clothing of the hearing aid user and encircles the user's neck. The ITE or BTE hearing aid in turn has an inductive pick up loop therein, for example, the inductive loop employed for picking up telephone audio (so called teleloop, T-loop or T-coil), to pick up the audio signal from the neck worn transmission loop. The audio signals from the belt worn audio source directly amplitude modulate the current through the neck worn loop to produce an amplitude modulated signal in the audio frequency band. This is commonly referred to as a base band amplitude modulation system, since no carrier frequency is employed (as in the case of RF transmission). The use of an inductive loop allows connecting cords to be omitted from the ITE or BTE hearing aid thus providing the advantages of aesthetics, i.e., removing visible cords from the hearing impaired user, as well as convenience due to the lack of cords which may become tangled or interfere with the actions of the user.

One advantage of an inductively coupled system relative to an RF transmission system is that since that such an inductively coupled system operates in the audio frequency range, FCC regulation is not applicable and problems related to FCC licensing are avoided. Another advantage of inductive coupling for short-range communication systems of this type is that low power consumption is associated with the system. Due

to the desired small size of the hearing aid, low power consumption is a key requirement since any batteries employed must be of small size and hence limited in power supply capabilities. Also, the transmitter portion of the system, in the noted example a belt worn device, may be battery operated and hence sensitive to power consumption.

A significant disadvantage of an inductively coupled base band amplitude modulated system is the tendency to experience signal variations due to changes in the relative orientation of the receiving coil and the transmission loop as well as sensitivity to distance between the receiving coil and transmission loop. This not only causes fading in and out of the signal as the user moves about, but also creates serious signal to noise problems where lower magnitude audio signals are being transmitted.

In addition, the electrical inductance of either the transmitting or receiving coil is inversely related to the bandwidth of the system. Increasing the electrical inductance reduces the bandwidth, providing a "Catch-22" where wide bandwidth low power transmission is desired.

Another problem of base band inductively coupled systems is the high background noise typically present due to the magnetic fields of common electrical devices. A base band magnetic element (pick up coil) typically has its resonance in the audio range, and a typical system has a sensitivity around 2 milliGauss (mG). Electrical appliances, motors, fluorescent lights produce a magnetic field in the 60-120 Hz range, which overlaps the audio range and can be detected in base band operation. The following are typical magnetic field strength of a variety of electrical devices, measured at a distance of 3 feet.

Fluorescent Lights	3 mG
Electric Toaster	3 mG
Electric Motor	2 mG
House Wiring	2 mG

Electric Blanket 100 mG

When compared to an inductive coupled base band system sensitivity of about 2 mG, it is clear these items have enough of a magnetic electric field to cause significant interference in base band systems.

There are thus several serious limitations associated with base band systems: signal fading with varying distance and orientation of the receiver with respect to the loop; signal to noise ratio deterioration with distance; restrictions on the signal bandwidth by parameters of the circuit elements; and presence of high background noise due to common electrical devices. Therefore, the quality of audio communication provided by base band systems has been less than desired.

As a practical application of a short range communication system, the replacement of corded headsets with cordless headsets for communications between the headset and a base station has known practical advantages.

Traditional corded headsets for use in two-way communication provide the user with noise reduction from the surrounding environment as well as privacy. Corded headsets suffer, however, from numerous disadvantages including excessive weight and size which leads to wearing discomfort after several hours of use. Additionally, cords present another problem for headset users. Cords tend to tangle, break, and limit the area of operation of the headset. Also, corded headsets often require electrical isolation from the main panel or console as a preventative measure against electrical shock.

Advantages afforded by cordless headsets are many and include the capability of providing the wearer with flexibility as to physical movement, in addition to acceptable levels of signal to noise performance. The ability to conduct two-way communications while still having the freedom of using

both hands is a primary benefit of the cordless headset. Air traffic controllers, stock brokers, secretaries, busy executives, telemarketers, operators, receptionists, and others often use headsets in everyday applications. A cordless headset would enable such persons to enjoy much more flexibility in terms of movement. Existing cordless headsets, however, often can cause the wearer discomfort due to their large size and weight. Current power requirements for cordless headsets contributes to the uncomfortably large size of the currently available headsets. While the cost of the available cordless headsets tends to vary, the circuitry associated with the needed transmitter and receiver components, and power requirements, have kept cordless headsets uniformly more expensive than corded headsets. In addition, privacy considerations often limit the use of cordless headsets since it is possible for third parties with a receiver tuned to the proper frequency to listen in on communications between a base station and the headset.

The typical cordless headset provides for two-way communications between a headset and a base unit. The two-way communications typically use only one mode of transmission: radio frequency, infrared or magnetic coupling.

RF headsets are the most commonly used for two way communications. In an RF headset, both the receiver and transmitter are RF. Two accomplish full duplex communications, a separate transmit and receive channel are required. Because of the difficulty in controlling RF radiation patterns, additional channels are often required. However, due to the limited number of available channels in the radio frequency spectrum, users are required to share the available channels. In addition to causing interference, this places restrictions on the number of users in a given area.

Designers of RF headsets often try to make greater use out of the limited number of RF channels. Spread spectrum and frequency synthesis are two popular methods that make greater

use of the available channels. Such techniques have shown promise in making optimum use out of the available number of RF channels, however, both techniques require complex circuitry which consumes space and power, thus adding to the size and weight problems discussed above. In addition, such circuitry adds to the cost of the system.

Further, in RF headsets, Frequency Modulation, or "FM," is the preferred method for modulating the RF carrier. As those skilled in the art will appreciate, FM modulation delivers a higher quality signal than Amplitude Modulation or "AM." Of course, the detection scheme for FM modulation is more complex than that for AM, and thus requires more circuitry. The FM modulated carrier typically operates at a duty cycle greater than 50% and therefore requires more power for transmission than a signal that would be modulated at a lesser duty cycle. Further, unless expensive coding techniques are used, the transmission of RF signals between the base station and the headset enables third parties to intercept the transmitted signals, thus creating additional concerns regarding the security of the communications.

Infrared headsets are not susceptible to interference problems associated with limited channel availability as are RF headsets, but are restricted to line of sight communication. While line of sight communications provide for a relatively secure communication link, thus relieving some privacy concerns, infrared communications can require a considerable power supply. For example, the amount of power required by an infrared headset is proportional to the ambient light conditions in the user area and the range or distance from the base station. Thus, as the ambient light level increases, the power that is needed to overcome the ambient light noise floor to complete the transmission from the headset to the base station also increases. Similarly, as the distance from the headset to the base station increases, the power required to transmit a signal from the headset to the

base station also increases.

While allowing significantly more freedom of movement than is possible with corded headsets, infrared systems suffer some mobility limitations due to the line of sight requirement associated with using infrared beams. If the infrared beam between the base station and the headset is blocked, the user will be unable to maintain a communication link. In situations where communication integrity is essential, for example, air traffic control, the possibility of a base station/headset communication link interruption may prevent the use of infrared cordless headsets.

Magnetically coupled headsets offer limited performance within a given area but are highly susceptible to the magnetic interference from fluorescent lights, motors, computer/CRT monitors, video monitors and any large power generator producing a magnetic field. Magnetically coupled headsets are also susceptible to large changes in signal strength if the distance or orientation with respect to the base station is varied. In addition to susceptibility to signal level variations, a large amount of power is required to transmit a magnetically coupled signal over a given distance. Such power requirements can limit the operating life of the headset battery or require larger and heavier batteries to maintain a reasonable operating period between battery recharge or replacement.

A common denominator among the above-discussed three primary methods of signal transmission between two-way cordless headsets and a base station is concern over the power requirements for the headset. As one skilled in the art will appreciate, battery power for a cordless headset will generally be the determining factor as to the size, weight, operating life and range or distance over which the headset may be used. Further, the size and weight of the headset will directly impact the ergonomics of such a device, and thus the comfort level of the user wearing the headset.

Accordingly, it will be appreciated that a need presently exists for a short range wireless communication system which consumes relatively little power and which can be implemented without complex circuitry. It will be further appreciated that a need presently exists for a short range wireless communication system which provides good audio quality reception and which is not subject to the above-noted problems. It will be further appreciated that a need presently exists for a short range wireless communication system which is not subject to federal regulations involving long range communication systems.

Further, as the above discussion illustrates, a need currently exists for a very low power consumption cordless headset that includes expanded channel capability in communicating with a base station. Such a headset must be comfortable enough for extended wear, yet also provide longer battery life, and provide equivalent or improved signal to noise ratios and interference resistance than that currently available with the above-discussed transmission modes.

SUMMARY OF THE INVENTION

The present invention provides a short range wireless communication system which consumes very little power and which employs relatively simple and inexpensive circuitry for both the transmission and reception portions of the system. The present invention further provides a short range wireless communication system which is not subject to amplitude variation and noise problems related to orientation and distance of the transmission and reception portions of the system.

The short range wireless communication system of the present invention employs Time Variant Modulation (TVM) along with inductive (or magnetic) coupling of a transmission element and a receiving element to achieve the above-noted results. More specifically, the present invention employs

transmission of a relatively high repetition rate train of relatively constant amplitude pulses which are modulated by the audio frequency signal desired to be transmitted. The characteristics of the pulse train which are modulated by the audio frequency input signal relate to the time domain. For example, the duration of each pulse in the pulse train may be modulated so that it corresponds to the instantaneous magnitude of the audio frequency input signal.

The modulated high repetition rate pulse train is provided to the transmission element which is magnetically coupled to a receiving element. The receiving element is configured in a receiver and at least one of the elements is freely movable relative to the other. For example, the receiver may be configured in a head worn device such as a headset or in-ear receiver, or in a hand held or other portable receiver. The magnetically induced current in the receiving element, which may be a simple loop, drives a pulse detector and demodulator circuit which decodes the time variant modulated pulses and reproduces the original audio frequency signal. This reproduced audio frequency signal is then provided to a speaker for reproduction of the audio signal.

In a preferred embodiment, the transmission or modulating circuitry may employ a relatively straightforward sawtooth wave generator, triangle wave generator or other substantially linear waveform generator. The linear waveform is compared to the audio frequency input signal to generate a time variant modulated pulse train. This pulse train preferably has a pulse frequency (i.e., repetition rate) at least 2.6 times that of the highest frequency in the audio frequency signal to be transmitted, typically 30 kHz for normal audio signals falling below 12 kHz. The high repetition rate modulated pulse train is provided, via an magnetic element driving circuit, to an magnetic transmission element which is of dimensions and configuration adapted for the specific

application. For example, a neck worn or belt worn loop may be employed for transmission from a portable transmitter/audio source to a head worn device such as a headset or an ITE or BTE hearing aid. Much larger fixed loops or other elements may be employed where transmission is desired to multiple receivers in an enclosed space, such as a room, instead of an individual head worn device.

The receiving or demodulating circuitry may also be relatively simple. For example, in the case of modulation of the pulse train duty cycle, referred to herein as symmetry modulation, a simple RC (resistor and capacitor) circuit may be employed to integrate the pulses to demodulate the time domain modulated pulse train and reproduce the audio signal at the receiver. For application in a head worn device, a very low power amplifier is all that is required to drive a speaker worn in the ear or adjacent the ear of the user. The receiver may thus provide both low cost and lightweight construction with very little power consumption.

It will be appreciated by those skilled in the art that the present invention, employing modulation in the time domain as opposed to the amplitude domain, avoids the problems associated with amplitude modulated base band magnetic coupled systems related to amplitude sensitivity to orientation and distance between the transmitting and receiving loops. In particular, since all the pulses in the pulse train are of the same magnitude, with only their duration or other time characteristics being modulated in response to the input, variations in coupling efficiency between the transmitting and receiving magnetic elements will not affect the demodulated output signal. Furthermore, the pulse magnitude and/or receiver sensitivity may be chosen so as to provide a desired signal to noise ratio.

Further, a cordless headset using Time Variant Modulation (TVM) for reception of a magnetic signal and TVM of RF or infrared, or other communication modes, as the transmitter

offers advantages over prior art cordless headsets which use only infrared or RF for both transmission and reception. The headset area or zone of operations is defined by the magnetic field that the headset operates within and uses a handshake protocol that takes advantage of the TVM fixed clock period. The headset and base station receiver can both be fixed, mobile or portable and vary with respect to orientation and distance from each other. The receiver circuits in both base station and headset automatically adjust to the variance in signal strength. Such a system provides for cordless headset communications which overcome the problems associated with prior art cordless headsets discussed above.

Accordingly, it will be appreciated by those skilled in the art that the present invention provides a short range magnetically coupled wireless communication system which overcomes the above-noted problems in the prior art. Further features and advantages of the system of the present invention will be appreciated by review of the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an electrical schematic drawing in block diagram form of the short range magnetically coupled wireless communication system of the present invention.

FIGURE 2A is a timing diagram illustrating the unmodulated pulse train provided by the transmission circuitry of the short range magnetically coupled wireless communication system of the present invention.

FIGURE 2B is a timing diagram illustrating the pulse train of FIGURE 2A after being modulated by an input audio frequency signal.

FIGURE 3 is a schematic drawing of the loop geometry and field strength for the data of Table 1.

FIGURE 4 is a graph illustrating the relationship between signal to noise ratio, bandwidth and modulation index for the

wireless communication system of the present invention.

FIGURE 5 is a block diagram of the time variant modulation (TVM) pulse generator of the system of FIGURE 1 in accordance with a preferred embodiment employing symmetry modulation.

FIGURE 6A is a timing diagram illustrating a sine wave input signal and a sawtooth waveform which are combined to provide a square wave variable duration output pulse train as illustrated in FIGURE 6B.

FIGURE 7 is a block diagram of a demodulator circuit employed in the receiver portion of the short range wireless communication system of FIGURE 1.

FIGURE 8 is an electrical schematic diagram illustrating the modulator circuit of FIGURE 5 in more detail.

FIGURE 9 is an electrical schematic drawing illustrating a preferred embodiment of the demodulator circuit of FIGURE 7.

FIGURE 10A is an electrical schematic drawing of a threshold detector employed in the circuit of FIGURE 9.

FIGURE 10B is a waveform diagram illustrating the operation of the circuit of FIGURE 10A.

FIGURE 11A is a block diagram of a TVM pulse generator circuit in accordance with an alternate embodiment employing pulse width modulation in the transmitter portion of the short range communication system of FIGURE 1.

FIGURE 11B is a block diagram of the detector/demodulator circuit of the system of FIGURE 1 in an embodiment employing pulse width modulation.

FIGURE 12A is a timing diagram illustrating the modulation of a triangular waveform by a sine wave signal and the resultant pulse width modulated square wave pulse train is illustrated in FIGURE 12B.

FIGURE 13 is a block diagram of a TVM pulse generator circuit in accordance with an alternate embodiment employing pulse position modulation in the transmitter portion of the short range communication system of FIGURE 1.

FIGURES 14A, 14B and 14C are timing diagrams illustrating the input audio signal and a triangular waveform, the square wave output pulse train, and a constant width pulse output, respectively, provided by the circuit of FIGURE 13.

FIGURE 15 is a block schematic diagram of a detector/demodulator circuit in the alternate embodiment of the present invention employing pulse position modulation transmission.

FIGURE 16 is block diagram of a TVM pulse generator circuit in accordance with yet another embodiment of the present invention employing pulse interval modulation in the transmitter portion of the short range communication system of FIGURE 1.

FIGURES 17A, 17B and 17C are timing diagrams illustrating an input signal modulating a sawtooth waveform, the pulse transitions, and a resulting pulse train with constant width and variable interval, respectively, provided by the circuit of FIGURE 16.

FIGURE 18 is a block schematic diagram of a detector/demodulator circuit in accordance with the embodiment of the present invention employing pulse interval modulation.

FIGURE 19 is a perspective drawing of a preferred implementation of the transmitter portion of the wireless transmission system of the present invention employing a monolithic integrated circuit and thick film transmission loop mounted on a circuit board.

FIGURE 20 is a perspective view of a preferred implementation of a receiver portion of the transmission system of the present invention employing a monolithic integrated circuit and receiving loop mounted on a circuit board.

FIGURE 21 is a drawing illustrating an implementation of the present invention employing a neck worn transmission loop and a head worn receiver.

FIGURE 22 is a drawing of an alternate implementation of

the present invention employing a head worn receiving unit and a transmission loop integrated into a large area such as the ceiling or walls of a room.

FIGURE 23 is a graph of signal to noise ratio versus distance for both a base band inductively coupled transmission system and for the system of the present invention.

FIGURES 24A and 24B are drawings illustrating signal dynamic range and coupling loss for base band inductive coupling and the system of the present invention, respectively.

FIGURE 25 is a graph illustrating amplitude versus frequency for transmission with the system of the present invention.

FIGURE 26 is a graph of amplitude versus frequency comparatively illustrating the bandwidth characteristics of base band inductive coupling and the transmission system of the present invention.

FIGURE 27 is a block diagram of the preferred embodiment of a low power cordless headset system in accordance with the present invention.

FIGURE 28 is a block diagram of a preferred embodiment of a base station for use in the cordless headset system shown in FIGURE 27.

FIGURE 29 is a block diagram of a preferred embodiment of a headset for use in the cordless headset system shown in FIGURE 27.

FIGURE 30 is a timing diagram illustrating a reconstructed TVM carrier signal and pilot tone used in the headset shown in FIGURE 29.

FIGURE 31 is a logic diagram illustrating control of the headset shown in FIGURE 29 in accordance with the carrier signal and pilot tone illustrated in FIGURE 30.

PREFERRED EMBODIMENTS OF THE INVENTION

Referring to FIGURE 1, the short range wireless communication system of the present invention is illustrated in block schematic form. As shown, the system includes a transmitter portion 10 and a receiver portion 12 which are separated by variable transmission distance D. At least one of transmitter portion 10 and receiver portion 12 is thus freely movable to provide such variable transmission distance D. The transmitter portion 10 includes a transmitting magnetic element 14 and the receiver portion 12 includes a receiving magnetic element 16.

As indicated schematically in FIGURE 1 by the dashed line, the transmission system of the present invention employs magnetic coupling between the two magnetic elements 14, 16; that is, signals in the transmitting element 14 induce signals in the receiving element 16 by the mutual magnetic coupling of the two circuits formed by these two elements. The strength of the magnetic field provided by the transmitting magnetic element 14 as well as the voltage induced in the receiving element 16 may be determined empirically or estimated from basic magnetic theory. The basic parameters affecting magnetic field and induced current may be illustrated by considering the following basic magnetic equations and terms applicable for simple transmitting elements and receiving elements:

(1) "B" is Magnetic Field (Tesla)

1 TESLA = 1 Newton/Amp. Meter = 1 Weber/(Meter)^2

= 10^4 Gauss

(2) ϕ is magnetic flux

(3) $\phi = BA$ = (Magnetic Field) • (Area)

(4) $B = \frac{\mu}{2}\frac{(I)}{(S)}$ = field generated with a straight conductor

(5) $B = \frac{(\mu)}{2}\frac{(I)}{R}$ = field generated in a current loop

$B = \mu \frac{N}{L} I$ = field generated in a coil

Where μ is permeability, I = current, S = distance, R = loop Radius, N = number of turns, L = length of coil.

Thus, from equations (4) and (5), in general more current yields a higher magnetic field (more Gauss). Additionally, the magnetic field falls with distance, in a manner depending on the geometry of the transmitting element.

The induced voltage in a receiver coil depends upon the following equations:

(6) $v = N \frac{d\phi}{dt}$

(7) $v = \frac{dB}{dt} \bullet$ (interacting area)

where v = induced voltage, N = number of turns, and $\frac{d\phi}{dt}$ = rate of change in magnetic flux.

Thus, increasing the number of turns yields a higher received voltage. Also, from equation (6) it will be appreciated that a higher rate of change of flux, usually associated with frequency of operation, yields more output voltage. The rate of change of flux ($\frac{d\phi}{dt}$) is related to the bandwidth of operation. Equation (7) in turn reflects the direct relation of size of the receiving coil to induced voltage. This means a larger area of interaction with the flux yields more output from the receiving element. Further increases in the voltage induced in the receiver loop 16 can be accomplished by inserting a flux concentrating material such as a magnetic alloy or ferrite material.

From the foregoing, it will be appreciated that the magnetic coupling of the transmitting loop 14 and receiving loop 16 may be increased by increasing one or more of the following system parameters:

1. Current in the transmitting loop.
2. Number of turns in the receive coil.

3. Size of receive coil.

4. Flux concentrating inserts to interact with more magnetic flux.

5. Transmitting loop geometry and construction.

6. Increased sensitivity in the receiver circuit.

Also, it will be appreciated that:

7. Bandwidth requirements dictate the magnitude of $\frac{d\phi}{dt}$, which also affects the magnitude of the magnetic coupling.

It will further be appreciated that the magnetic coupling between the transmitting loop 14 and receiving loop 16 is restricted or impeded by the following factors:

8. Distance

9. Inductance in the transmitting loop (i.e. since inductance restricts bandwidth, the magnitude $\frac{d\phi}{dt}$ is restricted).

Accordingly, it will be appreciated that the foregoing parameters of the system may be selected to provide the desired coupling, transmission distance, and bandwidth for the specific application.

The communication system of the present invention is specifically designed for short range communication, i.e., less than 100 meters. The transmission distance D may be on the order of less than 1 to more than 5 the times the dimensions of the transmitting magnetic element 14 so as to advantageously exploit the efficient magnetic coupling between the transmission magnetic element 14 and the receiving magnetic element 16. In some applications, however, it may be advantageous to modify one or more of the above noted parameters, e.g. by increasing the current output to the transmitting magnetic element 14, to allow the communication distance D to be a greater multiple of the magnetic element diameter. Even in such applications the transmission distance D will be much less than that of RF communication systems which provide communication over distances many thousands of

times the size of the transmitting antenna.

It should further be appreciated that the relative dimensions of the transmitting magnetic element 14 and receiving magnetic element 16, are not to scale in FIGURE 1. In some applications the transmitting magnetic element will be substantially larger than the receiving element. As will be discussed in more detail below, the receiver portion of the communication system 12 may typically be adapted to be configured in a portable unit, such as a head worn device, and may be even of a sufficiently small size to fit behind the ear or in the ear of a user. The transmitting magnetic element 14 in turn may range from a very small size, such as adapted to be used in a microphone portion of a headset, to a magnetic element which is large enough to encircle a room, or even an auditorium, to provide transmission to a large number of receivers 12. Also, the single loop illustrated for transmitting magnetic element 14 may be replaced by multiple magnetic elements in parallel or in a coil configuration. A variety of other magnetic elements may also be employed. Receiving magnetic element 16, in turn, which is illustrated as a coil, may be replaced with a single turn magnetic element or multiple, magnetic elements configured in different geometries. Also, it should be appreciated that the orientation of the magnetic elements as illustrated in FIGURE 1 is purely for ease of illustration. Typically, the best magnetic coupling between the transmitting magnetic element 14 and receiving magnetic element 16 will be achieved by placing the receiving magnetic element in a direction generally along the line of the axis perpendicular to the plane of the transmitting loop. Nonetheless, in most applications, the receiving magnetic element and the receiving unit 12 will be freely movable relative to the transmitting unit 10 and transmitting magnetic element 14, thus changing both the distance and orientation relative thereto.

Still referring to FIGURE 1, the transmitter portion 10

receives an external input which is provided by an audio signal such as a receiver or microphone 18. The external input contains the signal desired to be transmitted to the receiver portion 12. The external input provided to receiver/transducer 18 may be an acoustic audio signal in which case the receiver/transducer 18 may simply be a microphone, amplifier, compressor or other well known device for transducing acoustic signals to audio frequency electrical signals. Alternatively, the external input may be provided by means of a remotely transmitted signal, such as an RF signal containing audio information, in which case the receiver/transducer 18 includes appropriate RF receiver circuitry to pick up and convert the RF signal to an audio frequency electrical signal. Alternatively, the external input may be provided from other sources either connected through wires or part of the same overall equipment as the receiver/transducer 18. For example, an audio reproduction system providing prerecorded audio frequency signals, such as from a tape recorder, cassette, CD or other well known audio recording medium may provide the input signal. Also, while audio frequency input signals are discussed in detail herein, it should be appreciated that other types of signals, including other frequency ranges and digital data pulses instead of continuous audio signals, may also be transmitted by the system of the present invention.

The input signal, after being converted to audio frequency electrical signals by receiver/transducer 18, is provided to Time Variant Modulation (TVM) pulse generator 20. TVM pulse generator 20 receives the audio frequency input signal provided by receiver/transducer 18, and employs it to modulate a repetitive pulse stream in the time domain. That is, the input signal does not alter the magnitude of the pulses or the frequency composition of a given pulse but rather alters the pulse characteristics in the time domain. As will be discussed in more detail below, such time variant

modulation provides significant advantages over base band amplitude modulation such as employed in prior art systems.

The repetition rate of the pulse train provided by the TVM pulse generator 20 may vary over a wide range but is preferably at least 2.6 times the frequency of the highest frequency component in the audio signal to be transmitted. Higher pulse repetition rates may be employed up to, for example, one MHz or greater. The pulses provided by TVM pulse generator 20 are preferably of substantially equal amplitude with such amplitude chosen to enhance the signal to noise ratio in the receiver portion 12, as will be discussed in more detail below.

Referring to FIGURES 2A and 2B, the time variant modulation provided by TVM pulse generator 20 may be best appreciated by reference to a specific example of such modulation technique. In FIGURE 2A, an unmodulated pulse train is illustrated in the form of a square wave signal with a 50% duty cycle and fixed clock or repetition rate. Either the consecutive up transitions or consecutive down transitions of the square wave pulses may be taken as defining the clock period of the pulse train. This signal illustrated in FIGURE 2A would correspond to the output of TVM pulse generator 20 in response to a 0 DC voltage signal input thereto. FIGURE 2B in turn represents the pulse train of FIGURE 2A after being modulated with a varying audio frequency signal input having a general sinusoidal shape.

The modulation technique illustrated by the modulated signal of FIGURE 2B corresponds to symmetry modulation in the time domain. More specifically, each upward transition of the pulse train in FIGURE 2B occurs at exactly the same point as the up transition in the unmodulated signal of 2A. Thus the consecutive up transitions in both the unmodulated and modulated pulse trains represents the fixed repetition rate or clock rate of the pulse train. As may be appreciated by review of FIGURE 2B, however, the down transition of each

pulse, which defines the duration of the pulse, varies in response to the magnitude of the modulating signal. As will also be appreciated from inspection of FIGURES 2A and 2B the presence of the modulating signal alters the 50% duty cycle and thus alters the symmetry of the pulse train (thus giving rise to the name of symmetry modulation for the modulation technique illustrated).

Considering the specific pulses in FIGURE 2B, the respective consecutive pulses correspond to a 0 voltage modulating signal, followed by an increasing magnitude modulating signal as represented by a longer duration pulse, followed by a 0 voltage modulation of signal, followed by a shorter duration pulse corresponding to a modulating signal below the 0 reference, followed by another 0 voltage pulse. The pulse train of FIGURE 2B thus corresponds to a single period of a sine wave modulating signal.

The symmetry modulation approach in FIGURE 2B is purely illustrative. As will be discussed in more detail below, other time variant modulation techniques may equally be employed. For example, pulse width modulation, pulse position modulation and pulse interval modulation may also be employed.

Referring again to FIGURE 1, the repetitive pulse train produced by the TVM pulse generator provides a signal to the magnetic element driver circuit 22 which drives the magnetic transmitting element 14 with the pulse train. Magnetic element driver 22 provides the gain necessary to drive the transmitting magnetic element 14 for the specific application and magnetic element size and also preferably decouples the pulse generation unit circuitry from the transmitting element. For most short range applications, due to the effective coupling provided by the shared magnetic flux of the transmission magnetic element 14 and receiving magnetic element 16, a very low power driving signal will be adequate to provide the desired signal to noise level in the receiver 12. For example, for transmission over very short ranges such

as less than one meter the power necessary to drive the transmitting magnetic element may typically be measured in milliwatts while at the same time providing a high signal to noise ratio. Also, for certain TVM approaches, such as pulse interval modulation discussed below, the dynamic range of the transmitted signal does not impact on the power consumption of the transmitter portion 10.

As further illustrated in FIGURE 1, the receiver/transducer 18, TVM pulse generator 20 and magnetic element driver 22 are all powered by a power supply 24. Power supply 24 may be a battery in the case of a movable transmitter portion 10, and the low power consumption of the transmitter may provide a long battery life. Alternatively, in applications where the transmitter portion 10 is stationary, or configured in a room or auditorium, power supply 24 may be a transformer coupled to conventional AC mains.

Still referring to FIGURE 1, the receiver portion 12 includes TVM pulse detector/demodulator 26 which receives the TVM pulse train induced in receiving magnetic element 16. Detector/demodulator 26 will vary with the specific TVM modulation technique employed but may typically be a circuit of relatively simple construction, low power consumption and low cost. Alternatively, the function of the demodulator can be accomplished by the transducer or speaker itself, thus requiring no other integrating or demodulating components. For example, as will be discussed in more detail below, in the case of pulse symmetry modulation as described above in relation to FIGURES 2A and 2B, a simple RC (resistor and capacitor) circuit, may serve to adequately demodulate the audio signal from the high repetition rate pulse train, by integrating the receiver signals to derive a signal related to the pulse duty cycle. In general, a low pass filter in combination with threshold detection and preamplification circuitry will be adequate for the detector/demodulator 26.

The output of the detector/demodulator 26, i.e., the transmitted audio frequency signal, is provided to audio driver 28 which may be a conventional audio amplifier circuit, which in turn drives speaker 30. Typically a low power speaker 30 will be employed for head worn receiver applications. Each of these components of receiver 12 in turn are powered by power supply 32 which will be a small battery in most applications. Due to the magnetic coupling of the receiving magnetic element 16 to the transmitting magnetic element 14, and the simple circuitry employed by the receiver a very low power consumption will be required by the receiver 12.

As noted above in Equation 5, for a simple loop transmission element geometry, there exists a direct relationship between diameter of the loop, the current, and the magnetic field, with the highest magnetic flux in the center of the loop. Furthermore, the magnetic field has an inverse relationship with distance. Typically the magnetic field falls to about 1-40% of the maximum value, at 1 loop diameter. These relations define an operational range for the magnetic coupling of the transmitting element and receiving element which is related to the loop current and loop size.

The relationship between loop current and magnetic field at various distances is illustrated in the following Table 1. Table 2 illustrates the relationship between loop size and magnetic field at various distances. The geometry for the measured values in the tables is shown in FIGURE 3.

More specifically, FIGURE 3 shows a circular magnetic element or loop, which lies in the X-Z plane (the Z axis extends out of the page). A graphical illustration of the measured field data of Table 1 versus distance and position relative to the center of the loop, is also provided in FIGURE 3. The shape of the magnetic field is in general an elliptic paraboloid which extends along the +Y and -Y (not shown) axis.

The magnetic field shown in FIGURE 3 illustrates the

field strength as more uniform where the field is weakest (far field) compared to where the field is strongest (near field). The far field region may thus be advantageously exploited for communication in some applications.

Table 1 gives magnetic field strength in milliGauss (mG) for a 9 inch diameter single loop, driven by 4.6 mA at 10 V, using symmetry modulation with a repetition rate of 30 kHz.

Table 2 in turn illustrates measured magnetic field for different loop diameters as a function of distance from the plane of the loop along the axis of the loop (X=Z=0). The current was maintained substantially constant for loop diameters of 3½ inches, 7 inches, and 9 inches and was allowed to drop for the larger loop diameters to avoid circuit modifications for the larger loops. (That is, increasing loop size increases loop resistance, eventually requiring circuit modification to maintain current constant.) As in the case of the data of Table 1, the modulation technique was symmetry modulation and the TVM pulse repetition rate was 30 kHz.

In obtaining the measurements of Tables 1 and 2, the field strength meter pickup coil was oriented so its axis was at all times perpendicular to the plane of the loop to be measured. If the pickup coil is rotated 90 degrees, such that the axis of the pickup coil is parallel to the plane of the loop to be measured, the field strength in the center of the loop would be zero, as measured by the field strength meter. Moving the pickup coil radially outward in turn results in an increase in field strength, reaching a maximum at the perimeter of the loop, then a decrease with further distance radially outward.

For some applications, having high field strength or output at the center of the loop may not be desirable. Reorienting the demodulating magnetic element can therefore provide greater sensitivity at or near the perimeter of the loop.

Table 1

Magnetic Field (in MilliGauss)

	X=0	X=1	X=2	X=3	X=4	X=4½	X=5	X=6	X=7	X=8	X=9	X=10	X=11	X=12	X=13	X=14	X=15	X=18	X=21
Y=0	37.2	40.2	44.8	50.8	42.4	6.1	12.1	10.6	5.7	3.0	1.4	0.6	0.4	0.3	0.2	0.2	0.2	0.2	0.1
Y=1	30.0	29.7	29.0	25.7	15.7	12.4	4.1	3.0	2.8	1.7	0.9	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Y=2	25.7	23.6	21.5	17.6	11.8	8.2	4.8	2.4	0.8	0.6	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Y=3	18.2	16.3	13.9	11.2	7.0	5.4	3.6	1.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Y=4	12.7	12.1	10.6	7.9	5.4	4.5	3.3	2.1	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Y=5	8.5	7.9	6.7	5.4	3.9	3.0	2.1	1.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Y=6	5.7	5.4	4.5	3.8	2.9	2.5	2.0	1.0	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Y=7	4.1	3.8	3.3	2.7	1.8	1.6	1.4	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Y=8	2.9	2.7	2.2	2.4	1.4	1.2	1.1	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Y=9	1.6	1.5	1.3	1.1	1.0	0.7	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Y=10	0.9	0.8	0.6	2.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Y=11	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Y=12	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2

Table 2

Y	LOOP DIAMETER 3½" LOOP CURRENT = 558 mA	LOOP DIAMETER 7" LOOP CURRENT = 582 mA	LOOP DIAMETER 9" LOOP CURRENT = 520 mA	LOOP DIAMETER 13" LOOP CURRENT = 455 mA	LOOP DIAMETER 18" LOOP CURRENT = 362 mA	LOOP DIAMETER 36" LOOP CURRENT = 234 mA
0	X=Z=0	X=Z=0	X=Z=0	X=Z=0	X=Z=0	X=Z=0
	102.9 mG	48.7 mG	37.2 mG	18.2 mG	11.8 mG	1.7 mG
Y=1	52.0	37.5	30.0	16.0	11.5	1.65
Y=2	23.6	26.0	25.7	13.6	10.1	1.6
Y=3	10.9	16.6	18.2	10.9	8.9	1.5
Y=4	5.1	10.0	12.7	8.4	7.6	1.4
Y=5	2.4	6.4	8.5	6.4	6.4	1.3
Y=6	1.0	3.9	5.7	4.7	5.2	1.2
Y=7	0.6	2.2	4.1	3.4	4.2	1.0
Y=8	0.5	1.2	2.9	2.3	3.3	0.9
Y=9	0.5	0.7	1.6	1.6	2.5	0.8
Y=10	0.5	0.5	0.9	1.1	1.9	0.7
Y=11	0.5	0.5	0.5	0.6	1.3	0.6
Y=12	0.5	0.5	0.4	0.5	1.0	0.5
Y=15	0.3	0.3	0.3	0.3	0.3	0.4

From the data in Table 2, it can be seen that as the loop diameter increases, the ratio of flux density in the plane of the loop to above the plane of the loop decreases. In other words, in a small diameter loop, the flux is concentrated mainly in the plane of the loop. As the diameter of the loop increases, more of the flux is above the plane of the loop.

Within allowable measurement error, Tables 1 and 2 show that the magnetic field strength (mG) drops to 1-10% of maximum at one loop diameter above or away from the center plane of the loop. More generally, at one loop diameter the field strength will be within 1-40% of the maximum value for most configurations.

Preferably, using the circuits illustrated, 0.3-0.5 mG (milliGauss) is desired for sufficient magnetic coupling of the receiving magnetic element to the transmitting magnetic element. The signal becomes noisy at 0.5 mG and becomes unusable at 0.3 mG. However, it should be appreciated that other transmission and receiving magnetic element configurations and dimensions, as well as other transmission modulating schemes, may provide greater sensitivity. Therefore loop drive current and loop size may be adjusted, along with the other parameters noted above, to provide a desired field strength at a desired operational distance for the specific application.

FIGURE 4 shows the effect of the modulation index on the signal to noise ratio, as constrained by the system bandwidth. Modulation index is the ratio of the narrowest and widest pulse generated by the TVM pulse generator. The highest modulation index generally provides the best results for signal to noise ratio, linearity and distortion. For example, one practical circuit suitable for certain applications provides an 80% modulation index. The modulation index is limited by the receiver bandwidth. The system bandwidth is preferably optimized for best signal to noise ratio rather than to optimize the modulation index.

Referring to FIGURE 5, a specific example of the TVM pulse generator 20 of FIGURE 1 is illustrated where symmetry modulation of the pulse train is provided in response to the audio frequency modulating signal. In FIGURES 6A and 6B exemplary pulse trains are illustrated. In the symmetry modulation approach as illustrated, a repetitive substantially linear waveform of fixed repetition rate is modulated by the audio frequency input signal to generate a modulated pulse stream. The modulated pulses have a variable length duration, the variable length duration representing the encoded audio frequency signal, but a fixed repetition rate corresponding to that of the linear input waveform. Since the pulse repetition rate is constant but the pulse duration changes, the duty cycle must vary with the instantaneous magnitude of the modulating signal. For example, a sawtooth waveform, may be modulated by a slowly varying sine wave as shown in FIGURE 6A, to generate a square wave pulse stream with changing duty cycle as shown in FIGURE 6B.

As will be appreciated from inspection of FIGURE 6B in comparison to the sine wave modulating the pulse stream of FIGURE 6A, the 6B pulse train has a sequence of pulses of duration corresponding to the magnitude of the sine wave at that point with each pulse having a trailing edge defined by the clock rate of the sawtooth wave (the clock signals are denoted by C_1-C_N in FIGURE 6B). This clock rate defines the sampling rate of the audio input signal. As will further be appreciated from inspection of FIGURE 6B, the pulses in FIGURE 6B are of constant height, which height may be adjusted to provide the desired degree of noise immunity at the receiver portion.

Referring to FIGURE 5, a TVM pulse generator circuit providing a symmetry modulated pulse train of the type illustrated in FIGURE 6B, is shown. The TVM pulse generator employs a sawtooth waveform generator circuit 40 which generates a linear sawtooth waveform at the desired frequency,

e.g., 10-100 kHz. Sawtooth waveform generator 40 may preferably employ a pulse generator 42 for providing repetitive pulse spikes of short duration, e.g., 3-5 microseconds, at the desired frequency. The pulses are provided to linear ramp generator 44 which generates the linear ramp portion of each sawtooth pulse at a repetition rate determined by pulse generator 42. The output of linear ramp generator 44 is a sawtooth waveform having the desired repetition rate which is provided along line 46 to voltage comparator 48. Voltage comparator 48 also receives the audio frequency signal provided from audio receiver/transducer 18 (shown in FIGURE 1) along line 50. Comparator 48 compares the two inputs provided along line 46 and line 50 respectively and provides a two level output pulse stream along line 52 corresponding to the comparison result.

For example, considering the signals illustrated in FIGURE 6A as the inputs to the comparator 48, as the linear portion of the sawtooth ramp begins to rise, e.g., from zero volts DC, the comparator 48 will output a zero DC value as represented by the initial zero value of pulse train 6B. As the linear ramp portion of the sawtooth waveform increases above the sine wave, however, the comparator output will go high providing a DC output voltage V_H as further illustrated in FIGURE 6B. When the sawtooth waveform reaches the end of its linearly increasing ramp portion and drops suddenly to zero volts DC once again, as illustrated in FIGURE 6A, it transitions below the magnitude of the sine wave modulating input causing the output of the comparator 48 to transition low as illustrated in FIGURE 6B. Since the time which the linearly increasing sawtooth waveform is above (or below) the modulating signal corresponds to the time during which the comparator 48 output is high (or low) it will be appreciated that the comparator output pulse train provides a modulated pulse train corresponding in the time domain to the magnitude of the input modulating signal.

It will be appreciated by those skilled in the art that the threshold at which the comparator 48 transitions between low and high may be set as desired for the specific application. Alternatively, the transition level may be modified by altering the magnitude of the sawtooth output provided from sawtooth waveform generator 40. Also, it will be appreciated that while the sawtooth waveform illustrated in FIGURE 6A provides well defined clock signals C_1-C_N on the downward portion of the pulse train, a sawtooth waveform having a linearly decreasing ramp portion and a sharply increasing leading portion may equally be employed, which would provide a well defined clock transition at the beginning of each square wave pulse train. Further, it will be appreciated by those skilled in the art that while idealized waveforms are illustrated in FIGURES 6A and 6B, corresponding to idealized sawtooth waveforms and idealized square waves, in practice they will be rounded or otherwise vary from the idealized shape, while still providing the advantages of the present invention.

Furthermore, various other modifications may be made while remaining within the scope of the present invention. For example, the ramp rate of the sawtooth waveform illustrated in FIGURE 6A may be widely varied, while retaining the linear nature of the ramp portion thereof, as desired for the specific application while maintaining the advantages of the present invention. Furthermore, the values of the low and high comparator output voltages V_0 and V_H may be varied as desired for the specific application. Preferably, however a relatively low value of V_H, e.g., 1 volt is provided by the comparator, and the pulse height is adjusted for transmission by the subsequent magnetic element driver circuitry 22 shown in FIGURE 1, to provide the pulse magnitude suitable for a desired signal to noise ratio in the receiver portion of the system. Also, the output of comparator 48, may be inverted relative to that illustrated so that the positive portion of

the pulse train duty cycle corresponds to the magnitude of the modulating signal, as opposed to the negative portion as illustrated.

Referring to FIGURE 7, the TVM pulse detector/demodulator 26 employed in the receiver portion 12 of the communication system of the present invention is illustrated in a block schematic diagram. As will be appreciated from review of FIGURE 7, the detector/demodulator is a relatively simple analog circuit and such simplicity is a significant advantage of the short range communication system of the present invention.

As shown, the detector/demodulator 26 includes a preamplification circuit 60 which is directly coupled to the receiving magnetic element 16. Preamplifier 60 may be a commercially available component which is tuned for the specific receiving magnetic element 16, to provide the desired degree of preamplification to the input signal provided by the receiving loop. Preamplifier 60 provides the amplified output from the receiving magnetic element 16 to pulse detector 62. Pulse detector 62 discriminates transmitted pulses in the modulated pulse train provided from the preamplifier 60 from background noise. The output of detector 62 thus corresponds to the transmitted high repetition rate modulated pulse train with transmission noise substantially eliminated.

The pulse train is provided by detector 62 to demodulator circuit 64 which discriminates the audio frequency modulating signal from the high repetition rate pulse train. Since, in the case of symmetry modulation, the duty cycle of the pulse train corresponds to the encoded audio signal; it may be recovered by integrating the pulse train. A simple integration circuit may thus suffice for demodulator 64. More generally, demodulator 64 may operate as a band pass filter to discriminate the audio frequency modulating signal from the high repetition rate pulse train. While such band pass filters are commercially available, a suitable analog

filtering system may be readily constructed using discrete components as will be discussed in more detail below.

The output of demodulator 64 is thus the reconstructed audio frequency modulating signal initially provided from the audio input receiver/transducer 18, of FIGURE 1. This demodulated signal is then provided to the audio output driver 28 for amplification, which circuit may be of any suitable design constructed in a manner well known to those skilled in the art.

Referring to FIGURE 8, a preferred embodiment of the TVM pulse generator circuit 20 is illustrated in a detailed schematic drawing. As discussed previously in relation to FIGURE 5, the TVM pulse generator employed for a symmetry modulation implementation includes a high repetition rate pulse generator 42 which provides a sequence of pulses at a fixed frequency. As illustrated, in one embodiment the pulse generator 42 may comprise a coupled free running multivibrator and monostable, employing first and second inverters 70, 72 respectively, to generate a repetitive pulse sequence. The repetition rate of the pulses provided by the multivibrator/monostable circuit may be adjusted by use of first and second resistors 74, 76 and first and second capacitors 78, 80. These resistors and capacitors, in conjunction with delay times of inverters 70, 72, may be used to adjust the repetition rate of the pulse generator 42 between 10 kHz and 1 MHz or even higher if desired. Preferably, however, the range will be chosen to lie between 10 kHz and 100 kHz. Alternatively, the free running multivibrator/monostable circuit illustrated in FIGURE 6 may be replaced with other well known sources of high repetition rate pulses, for example crystal oscillators, phase locked loops, etc. The entire timing circuit may also be self contained in a monolithic I.C. It is also possible to derive a clock signal from an external source.

Still referring to FIGURE 8, the output of the pulse

generator 42 is provided to the linear ramp generator circuit 44. As illustrated, the ramp generator 44 employs a timing capacitor 86 and a reset or discharge transistor 82. Reset transistor 82 receives the output of invertor 72 at the base thereof. Each pulse from the pulse generator circuit 42 applied to reset transistor 82 turns it on and resets the ramp circuit voltage to 0 volts DC by discharging capacitor 86 to ground. The slope of the linearly increasing ramp signal is determined by constant current generator 84 and timing capacitor 86. After each reset pulse, current generator 84 in combination with capacitor 86 will cause the voltage at node 88, and hence the voltage applied to voltage comparator 48, to increase linearly as the capacitor is charged by the current generator to a maximum, e.g., 1 volt. The next consecutive pulse then pulls the voltage at node 88 back down to ground causing the sharp down transition of the sawtooth waveform. It will thus be appreciated that the sawtooth ramp generation circuit of FIGURE 8 provides a readily implemented and low cost circuit.

Voltage comparator 48 in turn may be a commercially available comparator circuit which is manufactured by a wide variety of manufacturers. Comparator 48 compares the instantaneous voltages from the ramp generator and the input signal. The output of comparator 48 is either high (e.g., 1 volt) or low (e.g., 0 volts), depending on the comparison result.

Also shown in FIGURE 8, is a preferred embodiment of the magnetic element driver circuit 22. This circuit employs a current amplifier which may be an amplifying transistor 90, which responds to the state of the comparator 48 output. When the comparator output is high transistor 90 causes current to flow through isolation transformer 92. When the comparator output is low, no current flows through transformer 92. The output of transformer 92 is in turn provided to the transmitting magnetic element 14. Transformer 92 isolates the

transmission magnetic element 14 from the rest of the transmitter circuitry. The power required to drive the transmitting magnetic element 14 while in general will be quite low for short range applications, e.g., to a head worn receiver, but certain applications may require more power, for example where a room or other enclosed area is encircled by the transmitting magnetic element to allow transmission to a large number of receiving units within the closed area.

The foregoing schematic drawing illustrated in FIGURE 8 provides a simple and relatively low cost implementation of a TVM pulse generator circuit, which may be implemented as a single IC, as will be discussed in more detail below. It will be appreciated however, that alternate approaches may be employed. For example, the circuitry of FIGURE 8 may be replaced with a microprocessor programmed to provide the desired pulse train in response to an audio frequency input signal. Also, while the circuitry of FIGURE 8 may be implemented in a embodiment employing discrete components, it will be appreciated by those skilled in the art that all or a portion of the circuitry may be embodied in an integrated circuit chip providing a more compact embodiment of the illustrated circuitry.

Referring to FIGURE 9, a schematic drawing of a preferred embodiment of the detector/demodulator circuit 26 is illustrated in an embodiment adapted for use with a symmetry modulation based system. The components illustrated in FIGURE 9 generally correspond to those discussed above in relation to FIGURE 7 and like numerals are employed.

More specifically, as shown in FIGURE 9, the preamplification circuitry may employ a combination of a commercially available pre-amp circuit 100 in conjunction with a load resistor 102 and a DC blocking capacitor 104. The load resistor 102 matches the electrical parameters of the receiving magnetic element 16 and the preamplification system. The blocking capacitor 104 provides DC isolation between the

magnetic element 16 and preamplification circuit 60. The output of the preamplification circuit 60 is provided to the pulse detector circuit 62 which includes a threshold detector 106 which receives the amplified modulated pulse train signal at the input thereof along line 108. Threshold detector 106 discriminates pulses in the pulse train from background noise.

The output of threshold detector 106 is a constant value output when the input signal exceeds the detection level and zero otherwise. This output pulse train is then provided to demodulator circuit 64 which separates the audio frequency modulating signal from the pulse train. As illustrated, a simple resistor-capacitor circuit may suitably discriminate the audio frequency signal from the pulse train in the case of a symmetry modulated pulse train by integrating the pulse train signal and providing an output signal corresponding to the instantaneous duty cycle of the pulse train. The specific values of resistor 110 and capacitor 112 are chosen to provide the desired time constant to filter only the high frequencies.

It will thus be appreciated that the detector/demodulator circuit illustrated in FIGURE 9 is an extremely simple analog circuit which can be readily implemented in an inexpensive and compact manner readily adapted for a portable receiver. Thus, the symmetry modulation approach for which the illustrated detector/demodulator is adapted has the advantages of a low cost and compact receiver unit suitable for headset or hearing aid receivers or other small receiver applications. Also symmetry modulation provides superior dynamic range, a recoverable clock, good linearity, frequency independence, DC coupled transmitter and receiver, and up to 80% modulation level.

Referring to FIGURE 10A, a preferred embodiment of the threshold detector 106 employed in the detector/demodulator circuit of FIGURE 9 is illustrated in a schematic drawing. As will be appreciated from inspection of FIGURE 10A, the threshold detector is a relatively simple circuit. Further,

the illustrated circuit has advantages over more conventional threshold detector circuits, typically employing a reference voltage and comparator, in that it is not susceptible to DC drift and does not require a reference voltage setting circuit. This thus provides a threshold detector circuit which is well suited for eliminating noise from transmitted pulses and which avoids problems such as limited dynamic range associated DC drift and pulse asymmetry associated with a reference voltage and comparator approach.

As shown in FIGURE 10A, the threshold detector circuit employs first, second and third bipolar transistors 180, 182 and 184, respectively. These transistors are coupled in parallel between the positive voltage supply (+V) and ground thereby defining three current legs. The first bipolar transistor 180 acts as an input and receives the input signal provided from the pre-amp circuit 60 at the base thereof, via first resistor 186 and bias capacitor 188. As will be discussed in more detail below, bias capacitor 188 acts in conjunction with bias resistor 189 as a threshold setting element for the turn on of transistor 180. As further illustrated in FIGURE 10A, each of the current legs corresponding respectively to first, second and third transistors, 180, 182 and 184, includes a resistor; resistors 190, 196, and 198 respectively. The bottom portion of the current legs in turn are coupled to ground via resistors 192 and 194. Thus, these resistors, 190, 192, 194, 196, and 198 balance the circuits to provide the desired output from node 200, with feedback to bias capacitor 188 through transistor 180.

In operation it will be appreciated that the input transistor 180 and the middle transistor 182 are complementary; i.e., either transistor 180 or transistor 182 may be conducting at any time but not both since when transistor 180 is turned it will short the base/emitter junction of transistor 182. During the static condition,

i.e., where no signal is being input to the threshold detector circuit, bias resistor 189 allows capacitor 188 to become charged to a threshold voltage which turns on input transistor 180. Transistor 182 is then turned off by transistor 180, as noted above. Transistor 184 is then turned on, pulling output node 200 to ground and providing a low output as desired.

In the operational mode, the modulated pulse train is provided to the input of the threshold detector circuit, and to bias capacitor 188. This supplies a voltage to transistor 180 which moves up and down with the input signal as adjusted by the bias capacitor 188. This causes the transistors 180 and 182 to alternately conduct and drive output transistor 184 to provide a bi-level output at node 200. The biasing of transistor 180 by biasing capacitor 188 and biasing resistor 189 maintains a constant voltage across of the base to emitter junction of transmitter 180. Since the base to emitter voltage is constant, the voltage developed across resistor 194 by the output leg charges up the capacitor 188 such that the pulse generated across resistor 194 is symmetrized. Since the current across resistor 194 represents the output signal at the collector of output transistor 184, the output signal at node 200 is also symmetrized. This feedback action which is provided via resistor 194 and the base/emitter junction of input transistor 180 to the bias capacitor 188, compensates for DC drift which would otherwise occur in a typical threshold detection circuit.

Referring to FIGURE 10B, an illustrative waveform provided by the detector circuit of FIGURE 10A is shown. As shown, there are two threshold levels provided, one for positive transitions and the other for negative transitions. The feedback provided by resistor 194 restores the bias of the bias capacitor 188 such that the output of the circuit is always symmetrized between the positive and negative transitions. This bias restoration has a time constant which may be set as desired for the specific application by setting

the values of resistor 194 and bias capacitor 188. For example, a time constant of about 500 milliseconds is suitable for a pulse train time domain modulated by an audio frequency signal since any signal frequencies higher than 2 Hz will be passed through the detector circuit to the output.

Although the threshold detector circuit described in FIGURES 10A and 10B is presently preferred, it will be appreciated by those skilled in the art that more conventional threshold detectors may also be employed. Such detectors typically would employ a reference voltage setting circuit and a comparator, the comparator receiving one input from the reference voltage circuit and the other from the input modulated pulse train. Those pulses exceeding the reference voltage would then be detected as a pulse and noise would be discriminated. While this has the added complexity of a reference voltage setting circuit and the problems noted above of DC drift and asymmetry between positive and negative pulses, commercially available circuits are available providing such threshold detection for higher voltage applications (e.g. 3-5 volts) and may be advantageous for certain applications for this reason.

Referring to FIGURES 11A and 11B, the TVM pulse generator 20 and the TVM pulse detector/demodulator 26 of the system of FIGURE 1 are illustrated in block schematic form for an alternate embodiment employing pulse width modulation. In FIGURES 12A and 12B examples of encoding waveforms and transmitted pulse trains are illustrated. In pulse width modulation, the pulse width of the pulse train is proportional to the instantaneous value of the input signal and the repetition rate is equal to the sampling rate.

More specifically, referring to FIGURES 11A and 12A and B, the TVM pulse generator 20 includes a triangular waveform generator 120 which generates a waveform such as illustrated in FIGURE 12A. This triangular waveform is provided to one input of comparator 122 which receives the audio frequency

input signal at the other input thereof. As in the case of the pulse symmetry modulation embodiment described above, the comparator 122 compares the linear waveform, i.e, the triangular wave in this embodiment, with the audio input signal and generates a substantially square wave output pulse train with transitions at the crossings of the audio and triangular wave values as indicated in FIGURE 12B. As in the case of pulse symmetry modulation described previously, the duration or pulse width of the square wave pulse train of FIGURE 12B corresponds to the (inverse) magnitude of the audio frequency signal. The square wave pulse train of FIGURE 12B differs from that of pulse symmetry modulation, however, in that the square wave pulse width extends on both sides of the clock pulses C_1-C_N which are represented by the transitions of the linear portions of the triangle waveform.

The presence of the audio information in the pulse of FIGURE 12B on both sides of the clock signal can provide advantages due to noise cancellation where the signal levels are relatively small and require a small percentage of the modulation index. However, due to the lack of a well defined transition in the transmitted pulse train to define a clock signal, the demodulator circuitry must be somewhat more complex than that in the pulse symmetry modulation embodiment described previously. A further practical potential advantage of the pulse width modulation scheme illustrated in FIGURES 11A and 11B is that commercially available components are available which generate a pulse width modulated signal. For example, the commercially available LM555 chip manufactured by National Semiconductor and many others may be employed for a portion of the circuitry illustrated in FIGURE 11A. Alternatively, however, a suitable pulse width modulation circuit can be constructed along the lines of the sawtooth waveform generator and comparator illustrated in FIGURE 8 for the case of symmetry modulation.

Referring to FIGURE 11B, a block diagram of the

detector/demodulator circuit 26 is illustrated for the pulse width modulation implementation. As illustrated the detector/demodulator 26 includes a preamplification circuit 60 and pulse detector 62 which may correspond to the matching circuits described in relation to FIGURES 7 and 9 discussed previously and like numerals are employed. The demodulator circuit 124, however differs, from that described previously in that a simple integration scheme using an RC circuit will not provide optimal dynamic range due to the absence of well defined clock pulses in the transmitted pulse train. Accordingly, a source of clock signals 126 is preferably provided, which clock signals are synchronized with those of the triangular waveform generator 120. That is, if the original triangular waveform generator provides a 30 kHz pulse, the clock signal generator 126 will provide 30 kHz reference clock signals. This allows DC voltage coordination of the transmitting portion and receiving portion of the communication system to prevent DC drift of the receiver and potential reduction in audio quality.

Referring to FIGURE 13 and FIGURES 14A, 14B and 14C, an alternate embodiment of the TVM pulse generator 20 of the transmission system of FIGURE 1 is illustrated in block schematic and timing diagrams, respectively. In the embodiment illustrated in FIGURES 13 and 14A-C, pulse position modulation is employed to encode the audio frequency signal to be transmitted.

In pulse position modulation, a square wave pulse train such as provided in pulse symmetry modulation or pulse width modulation, is converted to a series of very short duration pulses which define the beginning and ends of the square wave pulses. These short duration pulses are then transmitted between the inductively coupled transmitting and receiving magnetic elements and then converted back to a square wave pulse train at the receiver. This has the advantage of providing a low duty cycle, high peak but low average power

pulse train which can significantly reduce battery drain. For more noisy environments, the relatively high short duration pulses can be used to provide efficient detection despite transmission loss or otherwise noise problems. Also, since the pulses which are transmitted are all preferably of equal width, a narrow bandwidth detector may be employed in the receiver circuitry.

More specifically, referring to FIGURES 14A and 14B, the initial linear pulse train is shown as a triangular waveform which is used to compare a input audio frequency signal, indicated as a sine wave in FIGURE 14A, to provide a square wave output pulse train. This corresponds to the case of pulse width modulation transmission. Alternatively, a pulse symmetry modulation approach may be employed and the linear waveform illustrated in FIGURE 14A may be replaced with a sawtooth waveform with a concomitant modification of the square wave pulse train of FIGURE 14B. In FIGURE 14C, the square wave pulses of FIGURE 14B have been replaced with short duration pulses corresponding to the leading and trailing edges of the square wave pulses of FIGURE 14B. It will be appreciated that since the audio signal information encoded in the waveform of FIGURE 14B is contained in the width of the pulses shown therein, the short pulses of FIGURE 14C which define the beginning and ends of the pulses of FIGURE 14B, contain the same information encoded therein. Thus, the short duration pulses of FIGURE 14C may be transmitted in place of the wider pulses of FIGURE 14B without any loss of information but with a reduction in the duty cycle and power consumption of the transmission circuit.

Referring to FIGURE 13, the TVM pulse generator 20 employed in the pulse position modulation approach may employ a linear waveform generator 130 which provides an output waveform to comparator 132 which receives the audio frequency signal at the other input thereof. As noted above, the linear waveform generated by linear waveform generator 130 may be a

sawtooth waveform in the case of a pulse symmetry modulation approach to generation of the square wave or may be a triangular waveform if pulse width modulation encoding is desired. The corresponding square waveform output from comparator 132 is then provided to differentiator circuit 134 which discriminates the leading and trailing edges of the square wave pulses in the pulse train. A relatively simple circuit may be employed for the differentiator 134, for example a resistor and capacitor network may suitably discriminate the edges of the pulses. The output of differentiator 134 is provided to a pulse forming circuit 136 which creates the very short duration pulses such as illustrated in FIGURE 14C. For example, 3-5 microsecond pulses may be provided by pulse forming circuit 136. Pulse forming circuit 136 may for example be a one shot monostable, commercially available, device. The output of pulse forming circuit 136 is in turn provided to the transmitting magnetic element 14 via magnetic element driver 22 in a manner as illustrated in FIGURE 1 as described above.

Referring to FIGURE 15, a detector/demodulator circuit 26, suitable for use with a pulse position modulation implementation of the present invention, is illustrated. As noted above, since the short duration pulses transmitted in a pulse position modulation approach may be of higher peak magnitude, while still drawing less power than a symmetry modulation or pulse width modulation approach, the noise discrimination may be increased by setting a higher threshold in the pulse detector circuit 138. This circuit receives the transmitted pulse position modulated signals from a pre-amp circuit 60 which may function in a manner as described previously for other detector/demodulator implementations. The output of the pulse detector 138 substantially corresponds to the transmitted pulse sequence as illustrated in FIGURE 14C. This pulse train is provided to flip flop 140, which may for example be a commercially available RS flip flop, which

converts the pulse train back to a form such as illustrated in FIGURE 14B. This converted pulse train is in turn provided to a demodulator circuit 142 which may correspond to the demodulator circuit 64 discussed previously in relation to FIGURE 9 if a symmetry modulation transmission is employed or may correspond to the demodulator circuit 124 if pulse width modulation is employed, as discussed in relation to FIGURE 11B. The output of demodulator 142 will thus be the restored audio frequency signal originally applied to the input of comparator 132 (referring to FIGURE 13).

Referring to FIGURES 16, 17A-C, and 18, an alternate embodiment of the TVM transmission system is illustrated employing pulse interval or pulse distance modulation. In the illustrated approach, as in the case of pulse position modulation described previously, very short duration pulses are transmitted, to obtain the benefit of low power consumption, good noise discrimination capabilities, and wide dynamic range.

As in the case of pulse position modulation, the TVM pulse generator circuit 20 illustrated in FIGURE 16 employs a linear waveform generator 150 which may generate any of a sawtooth, triangular, or other linear repetitive waveform, the output of which is provided to one input of comparator 152 which receives the audio frequency signal to be transmitted at the other input thereof. Also, as in the case of the pulse position modulation approach described previously, the output of the comparator 152 is provided to a differentiator circuit 154, the output of which is then provided to a pulse forming circuit 156, which may similarly be a one shot monostable circuit. Unlike the pulse position modulation approach described previously, however, the output of the pulse forming circuit 156 is fed back as an input to the linear waveform generator circuit 150 to alter the repetition rate of the linear waveform generated thereby.

For example, in the case of a linear sawtooth waveform

generated by linear waveform generator 150, a variable repetition rate output sawtooth pulse train such as illustrated in FIGURE 17A would be generated. Output pulse trains of short duration pulses as illustrated in FIGURE 17B and 17C then in turn would be generated by comparator 152 and pulse forming circuit 156. As will be appreciated from inspection of FIGURE 17C, the pulse train employs very short duration pulses for magnetic element transmission, thereby providing high peak, but low average power consumption. Also, a very wide dynamic range may be readily transmitted since the interval between consecutive pulses only varies as the dynamic range is increased while the total power consumption remains the same.

Referring to FIGURE 18, the detector/demodulator circuitry employed for the system employing pulse interval modulation is illustrated. As shown, the received pulse train signal is amplified by preamplification circuit 60 which may operate in a manner as previously described. The output of preamplification circuit 60 is provided to a pulse detector 158 which discriminates the transmitted pulses from background noise which in turn provides the output to ramp generator 160 and peak and hold detector 162. These operate in combination to reproduce the original audio frequency input signal.

Referring to FIGURE 19, a preferred implementation of the transmitter portion 10 of the transmission system of the present invention is illustrated. As shown schematically in FIGURE 19, the TVM pulse generator circuit 20 and a portion of the loop driver circuitry 22 are preferably implemented in a single monolithic integrated circuit ("IC") chip 210. (The portion of the loop driver circuit 22 forming isolation transformer 92, which is optionally employed where the drive current to the loop is sufficiently high to require isolation from the IC 210, will normally be incompatible with IC fabrication.)

As illustrated schematically in FIGURE 19, the monolithic

IC 210 employs an audio input contact 212 which receives the audio input signal from an external audio signal source. IC 210 also has positive and negative (ground) voltage contacts 214 and 216, respectively, and output contacts 218 and 220 for coupling to the isolation transformer 92. As further illustrated in FIGURE 19, for smaller transmission loop 14 sizes, the monolithic IC 210 and loop 14 may be mounted together on a printed circuit board 222. For example, the transmission loop 14 may be a thick film conductive loop found on the circuit board and connected to the output portion of the isolation transformer 92. This thus provides a very compact and readily manufactured transmission portion 10.

The provision of the major electrical components of the transmission portion 10 in a single monolithic IC 210, in particular, has significant cost advantages over prior wireless communication systems. These prior systems have been incompatible with a single monolithic IC transmission circuit due to various components which cannot really be implemented in such a circuit. This thus provides the transmission system of the present invention with a significant cost and space advantage over prior systems.

Referring to FIGURE 20, a preferred implementation of the receiver portion of the transmission system of the present invention is illustrated also employing a single monolithic IC 224 for the receiver portion 12. As illustrated schematically in FIGURE 20, the monolithic IC 224 preferably includes the detector/demodulator circuitry 26, and optionally the audio driver circuit 28, in a single compact chip configuration. The chip 224 has first and second contacts 226, 228 for coupling to the receiving loop 16 and positive voltage (+V) and negative voltage (ground) contacts 230, 232, respectively. The connection of the monolithic IC 224 to the receiving loop 16 may preferably be achieved through DC blocking capacitors 234 and 236 configured as "hanging" components to the IC 224. Additionally, a contact 238 is provided for coupling to an

external speaker or other audio signal output device. For applications where a suitably compact receiving loop or coil 16 is employed, the monolithic IC 224 and receiving loop 16 may be mounted together on a circuit board 240 providing a very compact and easily manufactured implementation of the receiver portion 12.

The monolithic modulator and demodulator ICs, 210 and 224, respectively, will preferably have a minimum amount of external or "hanging" components. The magnetic elements 14, 16 and audio transducers such as microphones, earspeakers, and loudspeakers must be hanging components. Other such hanging components may include large value DC blocking capacitors, and external resistors and capacitors for setting parametric levels.

Referring to FIGURES 21 and 22, two illustrative implementations of the short range magnetically coupled wireless transmission system of the present invention are shown.

More specifically, in FIGURE 21 the system of the present invention is illustrated in an implementation employing a neck worn transmission magnetic element 14, in the form of a simple loop, which receives the TVM transmission pulses from a pocket or belt worn transmitter unit 170. The compact transmitter unit 170 includes the transmission portion 10 of the wireless short range communication system illustrated in FIGURE 1, including a portable battery power supply and a receiver/transducer adapted for the specific application. For example, in the case of a hearing assist application, the transmitter unit 170 may include an RF receiver for receiving audio signals from an instructor held microphone broadcast through a conventional RF transmission system. Alternatively, the transmitter unit 170 may include a transducer, such as a conventional microphone, for picking up external sounds and amplifying them for transmission via the neck loop.

The receiver portion 12 of the communication system in

turn is configured in a compact receiver unit 172. As illustrated in FIGURE 21, the receiver unit 172 may be configured as a behind the ear (BTE) hearing aid or it may equally be configured as an in the ear (ITE) hearing aid or as a headset adapted to be worn by the user. Due to the aforementioned low power and good noise resolution capabilities of the present invention, the receiver unit 172 is readily adapted to a small battery power supply while at the same time providing good audio quality for the user.

Referring to FIGURE 22, an alternate embodiment is illustrated where the transmission magnetic element 14 is configured in an area, such as a portion of an enclosure such as a room or auditorium, where one or several users wearing receiving units may pick up the transmitted audio frequency signal. As illustrated, the transmission magnetic element 14 may be a large diameter loop encircling the area, such as a room or portion thereof, such that a good magnetic coupling between the transmission magnetic element and the receiving magnetic element is provided. As further illustrated the receiving unit may take the form of a headset 174. Alternatively, the receiving unit may be one of the ITE or BTE types of hearing aids described previously in relation to FIGURE 21. The transmission magnetic element 14 may also be configured in an electronic enclosure or in a portion of the floor, walls or even in a table or like item of furniture configured in the room, with the specific configuration of the magnetic element being adapted for the specific application. For example, in the case of a system desired for broadcast to multiple users around a conference room table, the transmission magnetic element 14 could be a loop configured under or within the table surface resulting in good magnetic coupling between the transmission magnetic element and a plurality of receiving units.

While a magnetic element 14 is illustrated in FIGURE 22 as a single loop, it will be appreciated that multiple loops

may be employed. Also, a magnetic element with a more complicated geometry may be employed. For example, a single magnetic element configured in a "FIGURE 8" type geometry may provide added directionality to the magnetic element coupling field. Alternatively, an array of independently driven magnetic elements may be provided for ensuring good coupling to all portions of a large enclosed area, such as an auditorium.

It will therefore be appreciated that a wide range of transmission magnetic element geometries and dimensions may be employed ranging from a fraction of an inch to 100 or more meters in diameter.

In view of the foregoing, it will be appreciated that the short range wireless communication system of the present invention provides significant advantages over presently available alternative approaches. In particular, relative to a base band inductively coupled system, the time variant modulated pulse transmission system of the present invention eliminates the strong dependence of the received signal on orientation or distance of the receiving magnetic element from the transmitting loop. Also, the signal to noise ratio is substantially unaffected by the distance and orientation between the two loops. In contrast, in a base band system, for example in the case of a head worn system, merely turning the user's head could cause a significant shift in noise level and audio signal volume. Increasing the distance between the receiver and transmitter also reduces the audio signal volume.

This advantage of the communication system of the present invention over a base band system is illustrated in FIGURE 23 which shows the effects of distance on the signal to noise ratio for a TVM transmission system in accordance with the present invention and for a typical base band system. It will be appreciated from FIGURE 23 that the system of the present invention maintains a relatively constant signal to noise ratio over distance. A base band system in contrast has a

signal to noise ratio which deteriorates immediately over distance.

As mentioned previously, a number of common electrical devices generate interference in the area of 3 mG. In order to have a usable signal to noise ratio, a base band system must operate above the electrical noise field, in this case above 3 mG, since operating below 3 mG would cause an increase in noise. It is possible, with TVM, to take advantage of signal levels at or below the 3 mG electrical interference level by building a more sensitive TVM receiver.

This may be further appreciated by a specific quantitative comparison of signal to noise ratios (S/N) at different distances as set out in Tables 3 and 4. The measurements were done with a loop current of 4.6mA at 10 volts. The modulating technique used was symmetry modulation. The geometry is the same as illustrated in FIGURE 3. In Table 4 a quantitative comparison of bandwidth is also provided.

TABLE 3

	Base Band No Filter	Base Band Filter	T.V.M.
Y=	S/N (dB)	S/N (dB)	S/N (dB)
3	49	34	58
6	39	21	58
9	32	17	55
12	25	10	45
15	21	6	34
18	18	4	32

TABLE 4

	Y=	3"	7"	10"	20"	10 feet
Base Band	Low	150 Hz	300 Hz	300 Hz	300 Hz	450 Hz
	High	6 kHz	5 kHz	5 kHz	5 kHz	3.5 kHz
	S/N (dB)	45	40	40	40	40
TVM	Low	DC	DC	DC	DC	DC
	High	8 kHz	8 kHz	8 kHz	8 kHz	8 kHz
	S/N (dB)	56	56	58	48	48

Further, in the system of the present invention, a wide dynamic range signal may be transmitted with low power and good noise immunity. For example, in contrast to that shown in FIGURE 24A, in FIGURE 24B, a fixed 20 dB pulse train signal is sufficient to allow a 60 dB or greater dynamic range audio signal to be transmitted. In this case, a transmission loss varying from 0 dB to 60 dB neither affects the output level nor the signal to noise ratio.

In addition, the communication system of the present invention enjoys significant frequency response advantages over base band, as shown in FIGURES 25-26.

More specifically, as shown in FIGURE 25, the system of the present invention delivers wide bandwidth. This wide bandwidth provides much more intelligibility - a factor much needed for hearing assistive applications.

As shown in FIGURE 26, base band has a relatively narrow bandwidth. More specifically base band systems have a low frequency limitation (1) due to $d\phi/dt$ decreasing with decreasing frequency. A second limitation (2) is high frequency roll-off due to inductance in the magnetic coupling elements. A further limitation (3) is present since equalization is needed to flatten the response for acceptable operation.

As shown in FIGURE 26, on the other hand, the TVM system of the present invention does not have a low frequency limitation and (4) has a frequency response down to DC. A high frequency roll-off (5) is present due to the filtering response of the integrator circuit (in a symmetry modulation embodiment) but does not substantially impact performance.

Also, relative to RF systems, the magnetic coupled system of the present invention provides both lower power and less cost in addition to avoiding the requirements for FCC certification in practical applications.

A block diagram of the preferred embodiment of a cordless headset system is shown in FIGURE 27. The system includes a

base station 300 and a cordless headset 400. TVM pulses are created by modulating an external audio input signal 302 with a clock source provided by a TVM magnetic transmitter 304 which may be of the same form as transmitter 10 shown in FIGURE 1. A power amplifier in the transmitter 304 drives a coil or loop 306 with the TVM pulses, thus producing a pulsed magnetic field. A coil 402 in the headset 400 detects the pulsed magnetic field. The pulses are amplified by the TVM magnetic receiver 404, which may be of the same form as receiver 12 in FIGURE 1, and a signal corresponding to the external audio input 302 is recovered from the sensed magnetic field and supplied to an audio speaker 406 in the headset 400.

A TVM transmitter 410 in the headset TVM modulates and transmits, via the antenna or light source 412, an audio signal derived from the headset microphone 408 back to the base station 300. The transmitter may incorporate an RF, infrared, or other suitable transmitter. Presently, an RF transmitter is the preferred transmitter for use in headset 400. Of course, those skilled in the art will appreciate that when an RF transmitter is used, element 412 would be an antennas, but when an infrared transmitter is used, element 412 would be an infrared light source. At the base station, if an RF transmitter is used, element 308 would be an RF antenna that receives the RF signal and supplies it to a TVM receiver 310 which would incorporate an RF receiver therein. Of course, if infrared is used to transmit from the headset, then element 308 would comprise an infrared sensor and the TVM receiver 310 would incorporate an infrared receiver therein. The TVM receiver 310 demodulates the TVM modulated signal into a signal corresponding to the audio signal derived from the headset microphone 408, and the resulting signal is provided as the base station audio output signal 312.

The base station 300 is shown in more detail in FIGURE 28. The base station 300 contains a complete magnetic transmitter 304 and a selected receiver 310. As discussed

above, such a receiver can be based on any suitable transmission mode, but is preferably an RF receiver. The magnetic transmitter circuit accepts an external audio input 302, and processes the signal through the pre amplifier 318. The headset gain or volume is controlled from the base unit by the audio gain control 326. A summing amplifier 328, sums the output 320 of the pre-amplifier 318 with a pilot tone 324 that is synchronous with the TVM clock.

The pilot tone 324, is a square wave signal outside of the audio range that is obtained from the divide-by-n counter 322 and mixed with the output 320 of the pre-amplifier 318. The divide-by-n counter 322 receives as an input the TVM clock signal and outputs the pilot tone which is synchronous with the TVM clock but which has a different frequency. The pilot tone 324 and TVM clock signal are detected by the headset 400 and are used to control the headset transmitter and headset speaker muting.

Specifically, the TVM clock and pilot tone signals are synchronous with each other. The TVM clock signal is also a square wave signal having a 50% duty cycle. As will be discussed in more detail below, the headset 400 conducts a test to determine if both signals are present, synchronous and in the proper sequence. If the signals are not present, synchronous, or received in the proper sequence, the headset is prevented from locking on to the received signal. If it is determined that the signals are present, synchronous, and have been received in the proper sequence, the headset locks on to the received signal. This virtually eliminates the possibility of the headset locking on to an erroneous signal or other base station signal source. The TVM modulator 330, modulates the combined audio and pilot tone signals with the TVM clock signal which is first shaped using waveshape generator 316 that shapes the square wave TVM signal to form a triangle or ramp signal suitable for use in the TVM modulator 330 as discussed above with respect to FIGURES 1-26.

The TVM modulated signal is then supplied to the loop driver circuit 332. A magnetic loop antenna 334 receives the signal from the driver circuit 332 and produces a corresponding magnetic field including the TVM signal.

The base station receiver includes an RF antenna or infrared sensor 336 that receives the TVM modulated signal from the headset transmitter 410. The TVM modulated signal is detected and amplified by the RF or infrared receiver 338. The TVM signal is detected using a TVM carrier detector 340. Low pass filter 344, filters out the TVM carrier and processes the audio signal obtained from the headset microphone 408. The filtered TVM carrier is recovered and compared with the TVM clock in the TVM clock/pilot tone comparator 348 to determine if the signals are synchronous. If comparator 348, which may be a phase-locked-loop, determines that both signals are synchronous, an enable signal is provided to gate 350 and to an enable input of the audio amplifier 346. The operation of gate 350, which may be any suitable gate such as a logic gate or controllable switch, allows the pilot tone to be supplied to the summing amplifier, and ultimately to be transmitted to the headset 400. The audio amplifier 346 amplifies and matches the audio output signal to the connected audio system.

The low battery detect circuit 342 may comprise a phase locked loop that detects the use of a headset modulating clock signal of a specified frequency for modulating transmissions from the headset to the base station. As will be discussed in more detail below, when a specified frequency is used to modulate the transmissions from the headset to the base station, the base station determines that the low battery detect circuit 422 in the headset has detected a low battery situation. The low battery detect circuit 342 in the base station then alerts the user by providing light or sound alarm at the base station to signify that the headset needs to have the batteries recharged or replaced.

A block diagram of the preferred embodiment of the headset is shown in FIGURE 29. A magnetic coil 402 detects the magnetic field produced by the loop 334 including the TVM signal. The TVM magnetic receiver 404 in the headset includes a pre-amplifier 414 that processes the TVM signal from coil 402 and detects the rise and fall times of the TVM pulses. The receiver 404 also reconstructs the base station TVM clock from the TVM modulated signal and uses it as the clock to modulate the RF or infrared transmitter 436.

The headset 400 detects the TVM clock signal through the use of a TVM clock recovery circuit 424. As one skilled in the art will appreciate, in the TVM modulated signal, it is possible to detect positive and negative transitions signal. The detected transitions can be used to trigger a series of flip-flops. The triggering of the flip-flops is synchronous with the positive to negative transitions of the TVM modulated signal, thus recovering the square wave clock signal that is synchronous with the original TVM clock in the base station. The recovered square wave signal preferably has a frequency which is one-half that of the TVM clock signal in the base station. This square wave signal is shaped in the waveshape circuit 428 to produce a triangle or ramp signal as is known in the art. The output of the waveshape circuit 428 is then used to modulate the output of the preamplifier 432. Although the frequency of the recovered signal is preferably one-half that of the original TVM clock signal, it is still capable of meeting the modulation needs of the headset.

The TVM clock recovery circuit 424 includes as an input the output of the low battery detect circuit 422. As one skilled in the art will appreciate, the low battery detect circuit may comprise a latch circuit which transitions from low to high or high to low when the battery voltage falls below a predetermined level. The battery 420 may comprise an alkaline, lithium, nickel cadmium, nickel metal hydride, or other suitable battery, preferably having an operating voltage

between 1 and 9 volts. The TVM clock recovery circuit 424 responds to the low battery level signal by dividing the frequency of the recovered clock signal by a predetermined value which is preferably two. Such division can be readily accomplished by employing a series of latches that are enabled in response to the low battery level signal. The frequency change is detected by the low battery detect and indicator circuit 342. Although the frequency of the clock signal will have been divided again in half (i.e., such that it is known one-fourth of the original frequency), the typical TVM clock signal is on the order of 150 kHz. One-fourth the original TVM clock frequency, or 37.5 kHz is still more than sufficient to handle the modulation needs of the headset 400.

The audio processor 416 recovers the base station audio input signal 302 and drives the headset speaker 406. The headset wearer's audible sounds are detected by microphone 430 and a corresponding audio signal is supplied to pre-amplifier 432, which may comprise an audio or microphone compressor. The TVM modulator 434 receives the output of the pre-amplifier 432 and uses the recovered TVM clock signal to Time Variant Modulate the pre-amplified audio signal. The RF or infrared transmitter 436, then receives the TVM modulated audio signal from the modulator 434.

Prior to enabling the transmitter 436 to transmit the TVM modulated audio signal, a pilot tone detect/latch circuit 426, which may include a band pass filter tuned to the frequency of the pilot tone as well as some logic control circuitry, compares the recovered TVM clock with the pilot tone signal to determine that the signals are present, synchronous, and were received in the proper sequence. Once transmitter 436 is enabled by the pilot tone detect/latch circuit 426, the transmitter 436 is driven in accordance with a TVM modulated received from TVM modulator 434. The pilot tone detect/latch circuit 426 also controls the squelch gate 418 as will be discussed in more detail below. The RF antenna or infrared

light source 412 transmits the TVM modulated signal to the base station FIGURE 27.

The recovery of the TVM clock signal originally used to modulate the TVM modulated signal transmitted from the base station to the headset eliminates the need for an additional clock circuit in the headset. In addition, since the TVM clock signal recovered in the headset is synchronous with the TVM clock signal in the base station, the present invention is able to provide the user with an added level of privacy over the communication channel between the headset and the base. That is, the comparison of the TVM clock signal used to modulate transmissions from the headset with the TVM clock in the base station can be used to ensure the integrity of the signals being transmitted between the headset and the base station.

In normal operation, the TVM magnetic transmitter 304 in base station 300 produces a magnetic field having a size determined by the transmit power of the transmitter 304 and the construction of loop 306. The generation of such a magnetic field is discussed above in conjunction with FIGURE 3. The headset 400, which includes a TVM magnetic receiver 404 and coil 402, will have a range of operation which is defined by the sensitivity of receiver 404 and coil 402, as well as the size of the magnetic field generated by the base station 300. The magnetic field is modulated by the TVM clock signal. The loop 402 and receiver 404 in the headset 400 sense the modulation of the magnetic field and produce a corresponding received signal that can be subjected to demodulation in order to obtain the recovered clock signal discussed above as well as any information, such as audio information, that was modulated by the TVM clock signal in base station 300.

The timing diagram of FIGURE 30 illustrates the TVM carrier or clock signal reconstructed in the headset in relation to the detected pilot tone. As can be clearly seen

in the FIGURE, the two signals are synchronous. The latching logic chart shown in FIGURE 31 illustrates the handshake operation that occurs between the headset pilot tone detect/latch circuit 426 and the base station 300. Rather than reflecting a truth table commonly found in Boolean logic schemes, the chart in FIGURE 31 more adequately expresses the state transitions of the pilot tone detect/latch circuit 426 as the handshaking sequence with the base commences.

To understand the chart in FIGURE 31, it must be understood that prior to entry into the range of operation of a base station, a headset 400 is in a steady state standby condition with no TVM clock or pilot tone detection occurring (i.e., a "0, 0" state). If, upon the initial entry of a headset 400 into the range of operation of a base station 300, the headset detects both the TVM clock and the pilot tone, i.e., a "1, 1" condition, the pilot tone detect/latch circuit 426 determines that another headset may be in use within the magnetic field. The latch circuit 426 will not allow the headset to move from a "0, 0" condition to a "1, 1" condition. Thus, in this instance where a "1, 1" condition is immediately detected, the latch circuit 426 will not enable the speaker 406 or RF transmitter 436 and the headset will stay in a standby condition.

If the first condition sensed by the headset 400 is a TVM clock and no pilot tone (i.e., a "1, 0" condition), the latch circuit 426 allows the headset to move from the "0, 0" state to the "1, 0" state and the headset "latches on" or "locks on" to the TVM clock signal. That is, the latch circuit 426 enables the transmitter 436 and the speaker 406. The transmitter immediately begins transmissions using the TVM signal (even without an audio signal).

Once the pilot tone detect/latch circuit 426 enters the "1, 0" state, it will remain in this state for a predetermined period of time as determined by either a count circuit in the pilot tone detect/latch circuit 426 or an separate disable

circuit 438. The disable logic circuit 438 which may simply comprise a counter that is enabled when the TVM clock is present and the pilot tone is not, and is disabled when both are present. The system waits a predetermined period of time for the pilot tone and, if the tone is not received, it is determined that a problem has occurred and the headset goes to a standby condition.

As described above, the pilot tone transmission from the base station 300 will only be enabled if the detected TVM signal received from the headset 400 (after the transmitter is enabled upon entering the "1, 0" state) is synchronous with the base station TVM clock. If a positive comparison is made, the base station 300 transmits the pilot tone to the headset 400.

The pilot tone detect/latch circuit 426 will only make a transition to the "1, 1" state without shutting down the headset transmission where the prior state was "1, 0." Thus, the latch circuit senses the TVM clock with no pilot tone, the transmitter transmits to the base, and the latch circuit 426 waits a period of time for the base station to acknowledge the headset's presence in the area by supplying a pilot tone. If the pilot tone is sent from the base as discussed above, the latch circuit now enters the "1, 1" state. At this point, the latch circuit permanently latches to the TVM signal and the headset is in constant communication with the base until either the TVM signal is lost or the pilot tone is lost.

If the headset does not detect the TVM clock signal in a received signal, or if the TVM clock signal is dropped at any time during communications, the headset is "locked out", i.e., the speaker 406 is not enabled and the transmitter 436 is disabled. This corresponds to the "0, X" condition of FIGURE 31. Such a condition would occur if, for example, the headset wearer passed out of range of the base station. In this situation, since the transmitter 436 and speaker 406 are automatically disabled, the headset of the present invention

automatically enters an energy conserving standby mode, thus prolonging the useful life of the headset batteries. This same condition happens when the headset enters the range of a base station but immediately detects the presence of both the TVM clock and the pilot tone.

At the base station, the reconstructed TVM clock used to modulate the RF transmitter is detected by the base station and compared with the TVM clock generated by the TVM clock generator 314. If the two clocks are synchronous, the pilot tone/TVM clock comparator circuit 348 enables the generation of the base station pilot tone and transmits it back to the headset 400. A headset timeout circuit 438 will disable the transmitter 436 if this signal is not sent within a reasonable period of time. The transmitter 436 is latched in the enable mode if the pilot tone is received, and will remain latched as long as the recovered TVM clock and pilot tone are present. This condition restricts another user from interfering with or latching on to a base station signal that is in use.

The above-discussed cordless headset system offers significant advantages over prior art cordless headset systems. The present invention has significantly lower power requirements than prior art cordless headset systems due to the ability to combine the TVM magnetic receiver in the headset with a return transmission link to the base station of another transmission mode such as RF or infrared. For example, the following comparison of power requirements of the TVM (RF) cordless headset system of the present invention with prior art cordless headset systems assumes normal headset usage:

Headset Transmit Power for 6' range with S/N of 50 db:

	power (mA)	volts
RF(FM):	5 mA	3.3V
Infrared:	30 mA	2.5V
Magnetic:	150 mA	15V

TVM(magnetic/RF) 1.5 mA 3.3V

Headset Receiver Power for 6' range with S/N of 50 dB (including speaker output):

	power (mA)	voltage
RF(FM):	6 mA.	3.3V
Infrared:	1.5 mA	3.3V
Magnetic:	1.5 mA	3.3V
TVM(magnetic/RF)	1.5 mA	3.3V

Total Headset Power for 6' range with S/N of 50 dB:

	power (mA)
RF(FM):	11 mA
Infrared:	31.5 mA
Magnetic:	151.5 mA
TVM(magnetic/RF)	3.0 mA

As can be seen from the above comparison of power requirements, a headset using a TVM magnetic receiver with a RF transmitter requires less than one-third of the power of the nearest prior art headset system (two-way RF) which utilizes a single mode (RF) for transmitting and receiving.

In addition to the above power statistics, the automatic standby mode of the headset when no TVM clock is detected, or when both the TVM clock and the pilot tone are initially detected upon entering the range of a base station, enables the present invention to extend the useful life of the battery power supply. Coupled with the already low power consumption of the headset, the battery life of the cordless headset of the present invention is far superior to conventional cordless headsets.

For example, a standard two-way RF cordless headset operating at a standard power output level of 35 mA has an estimated battery life of 2 hours. The present invention operating as shown in the drawings with an RF transmitter has a standard power output level of 5mA and operates for an

estimated 18 hours.

The present invention offers numerous advantages over prior art cordless headsets. With respect to two-way RF cordless headsets, the cordless headset of the present invention: i) can be provided at a lower cost, ii) consumes less power, iii) does not require channelization, iv) is less susceptible to interference, v) can be controlled to operate only in a specifically defined zone, and vi) is more pleasing ergonomically due to the ability to reduce the size of the headset unit by using smaller batteries. Further, the TVM transmitter and receiver components of the cordless headset of the present invention have a circuit density lower than prior art cordless headsets. This allows for miniaturization using integrated circuit implementations for most circuit components.

With respect to two-way infrared headsets, the cordless headset of the present invention: i) can perform in all work environments, ii) is not sensitive to changes in direction between the headset and the base station, iii) is not limited to line of sight communications, iv) consumes less power, v) can be controlled to operate only in a specifically defined zone, and vi) provides a more ergonomic package for the reasons discussed above with respect to RF.

With respect to headsets employing two-way magnetic coupling, the cordless headset of the present invention: i) is not susceptible to CRT or low frequency interference, ii) has a wider bandwidth and better signal to noise performance, iii) is not susceptible to changes in field strength, iv) is not susceptible to headset orientation and movement, and v) can be controlled to operate only in a specifically defined zone.

In addition to the advantages described above, those skilled in the art will appreciate that numerous modifications and or additions can be made to the present invention without departing from the spirit and scope of the present invention. It is intended that all such modifications and/or additions be

covered by the claims appended hereto.

For example, while the present invention has been described as a communication system between a headset and a base station, those skilled in the art will recognize that the present invention is not limited to use with cordless headsets, but could be used in a cordless handset for a telephone, microphone or other communication device.

Accordingly, it will be appreciated that the system of the present invention provides a highly effective short range wireless communication system readily adapted to a variety of applications including both applications presently employing wireless communication techniques as well as applications where cord coupling of the transmitter and receiver have typically been employed.

WHAT IS CLAIMED IS:

1. A two-way wireless communication system for transmitting audio signals between a first location and a second location, the system comprising:

first transmission means, disposed at said first location, for receiving a first audio signal and for time variant modulating said first audio signal, said first transmission means including a magnetic transmission element for transmitting said first audio signal;

first receiver means, disposed at said second location and including a magnetic receiving element magnetically coupled to said magnetic transmission element, for receiving and demodulating said modulated first audio signal;

second transmission means, disposed at said second location, for receiving a second audio signal and for time variant modulating said second audio signal, said transmission means including at least one of a RF transmitter and an infrared transmitter for transmitting said second audio signal; and

second receiver means, disposed at said first location and including at least one of a RF receiver and an infrared receiver, for receiving and demodulating said modulated second audio signal, wherein at least one of said first and second locations comprises a portable communication device.

2. The two-way wireless communication system according to claim 1, wherein the first location comprises a base station and the second location comprises a cordless headset.

3. The two-way wireless communication system according to claim 1, wherein the first location comprises a base station and the second location comprises a cordless handset.

4. The two-way wireless communication system according to claim 2, wherein the first transmission means includes:

a time variant modulation clock generator for generating a time variant clock signal, and modulation means, responsive to the time variant clock signal for time variant modulating said first audio signal to produce a time variant modulated first audio signal, said magnetic transmission element receiving and transmitting the time variant modulated first audio signal.

5. The two-way wireless communication system according to claim 4, wherein the first receiver means includes:

time variant modulation clock recovery means, responsive to said received modulated first audio signal, for producing a second time variant clock signal, said second time variant clock signal being synchronous with said first time variant clock signal.

6. The two-way wireless communication system according to claim 5, wherein the first transmission means further includes a pilot tone generator for generating and transmitting a pilot tone to said first receiver means.

7. The two-way wireless communication system according to claim 6, wherein the first receiver means further includes a pilot tone detector for detecting said pilot tone transmitted by said transmission means.

8. The two-way wireless communication system according to claim 7, wherein said pilot tone detector includes means for comparing said detected pilot tone with said second time variant clock signal to determine if said detected pilot tone and said second time variant clock signal are synchronous.

9. The two-way wireless communication system according to claim 8, wherein said pilot tone detector includes means, responsive to at least one of said detected pilot tone, for disabling said second transmission means.

10. A two-way communication system for transmitting a first audio signal from a first location to a second location and for transmitting a second audio signal from the second location to the first location, the system comprising:

first transmission means, disposed at said first location, for receiving said input signal and for providing a first pulse sequence modulated in the time domain by said first audio signal, said transmission means including a magnetic transmission element for transmitting said pulse sequence;

first receiver means, disposed at said second location and including a magnetic receiving element magnetically coupled to said magnetic transmission element, for receiving said pulse sequence and for demodulating said pulse sequence to reproduce said first audio signal;

second transmission means, disposed at said second location, for receiving said second audio signal and for providing a second pulse sequence modulated in the time domain by said second audio input signal, said transmission means including at least one of a RF transmission element and an infrared transmission element for transmitting said pulse sequence; and

second receiver means, disposed at said first location and including a second receiving element corresponding to said at least one of a RF transmission element and an infrared transmission element, for receiving said pulse sequence and for demodulating said pulse sequence to reproduce said second audio signal, wherein at least one of said first and second locations comprises a portable communication device.

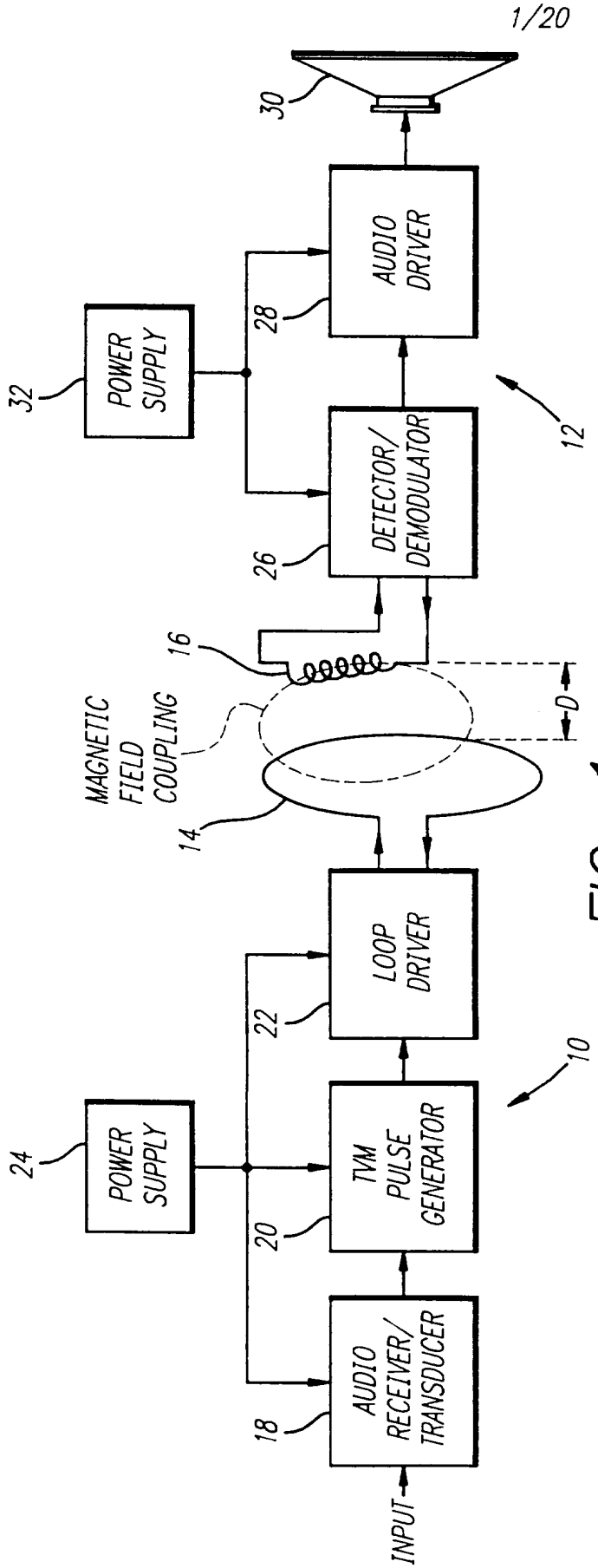


FIG. 1

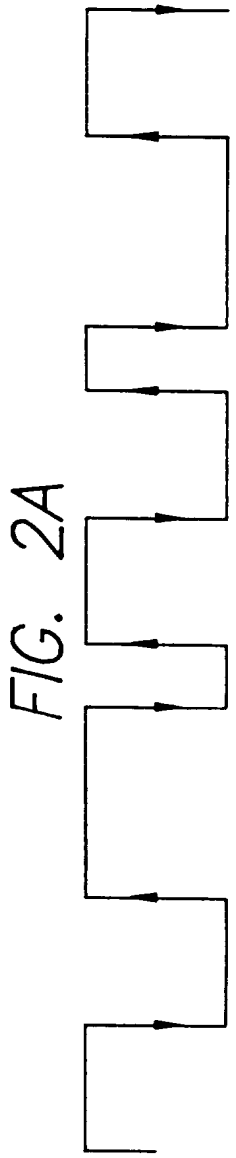
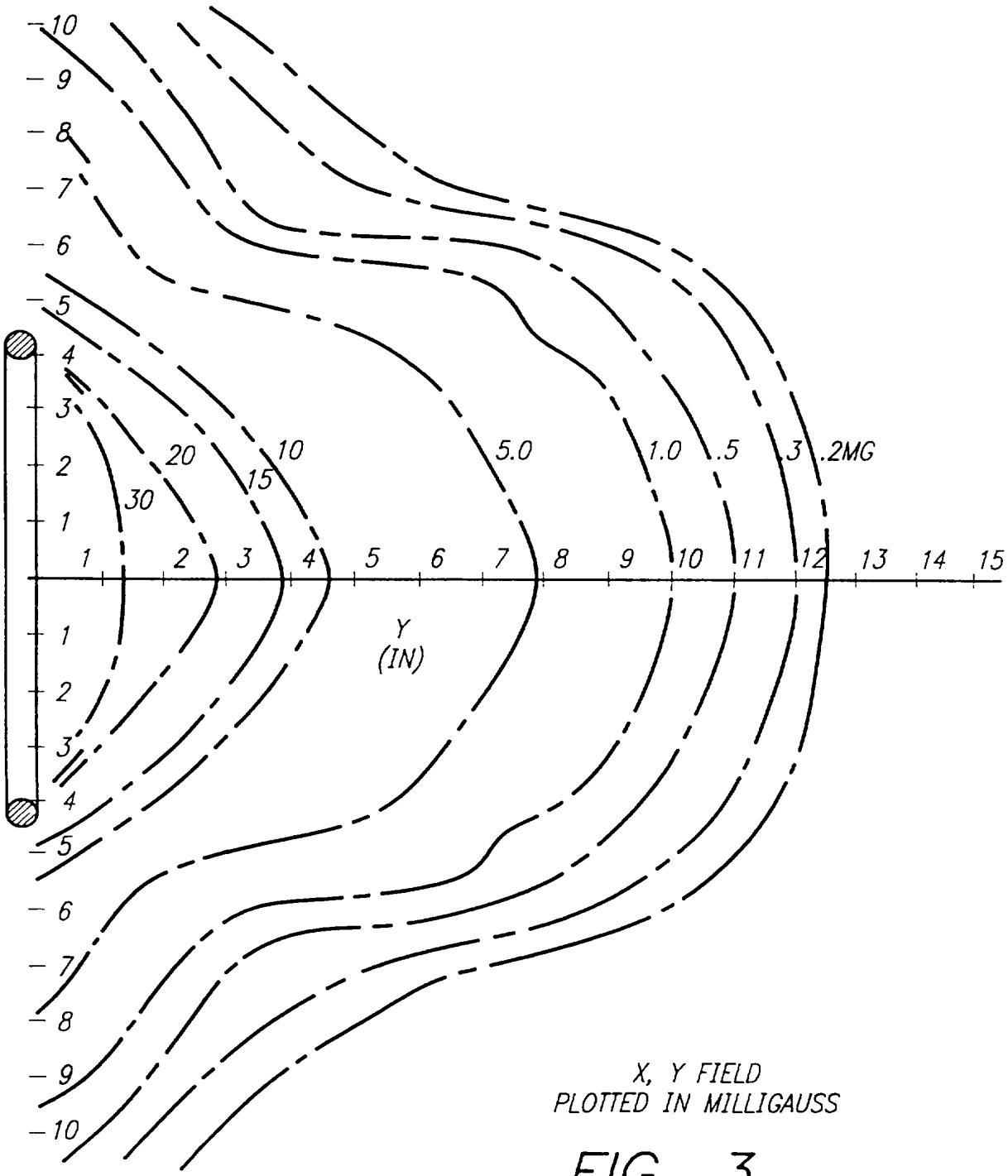


FIG. 2A

FIG. 2B



X, Y FIELD
PLOTTED IN MILLIGAUSS

FIG. 3

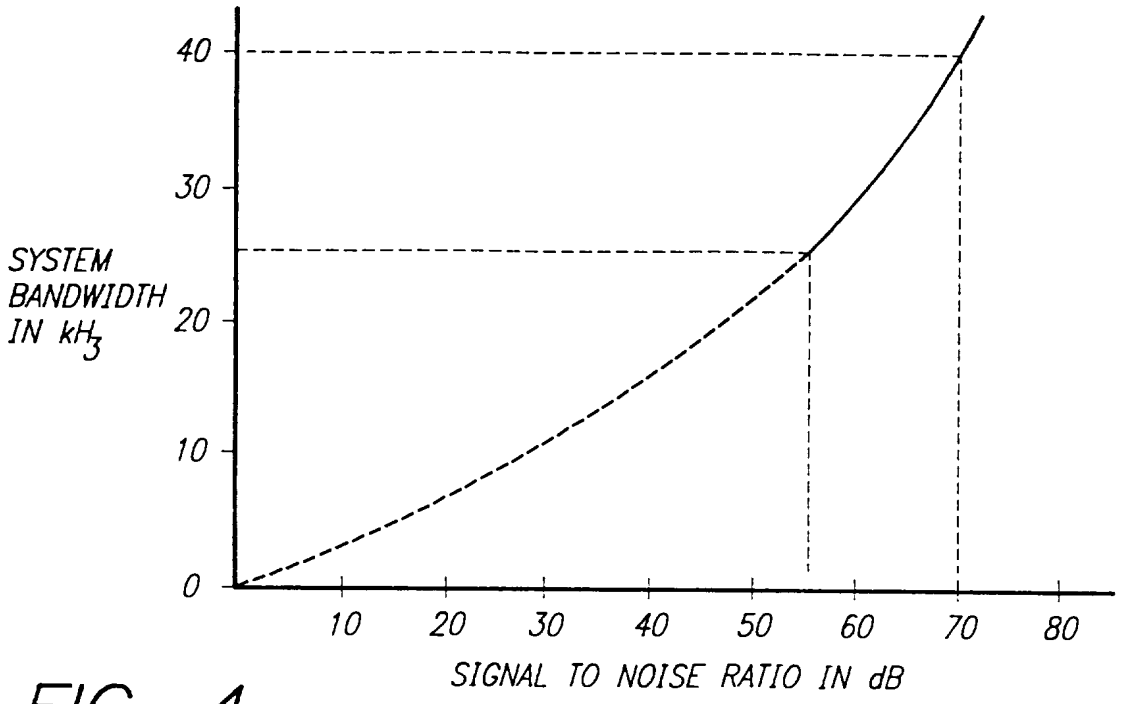

40
30
20
10
0
SYSTEM BANDWIDTH IN kH_3
10
20
30
40
50
60
70
80
SIGNAL TO NOISE RATIO IN dB

FIG. 4

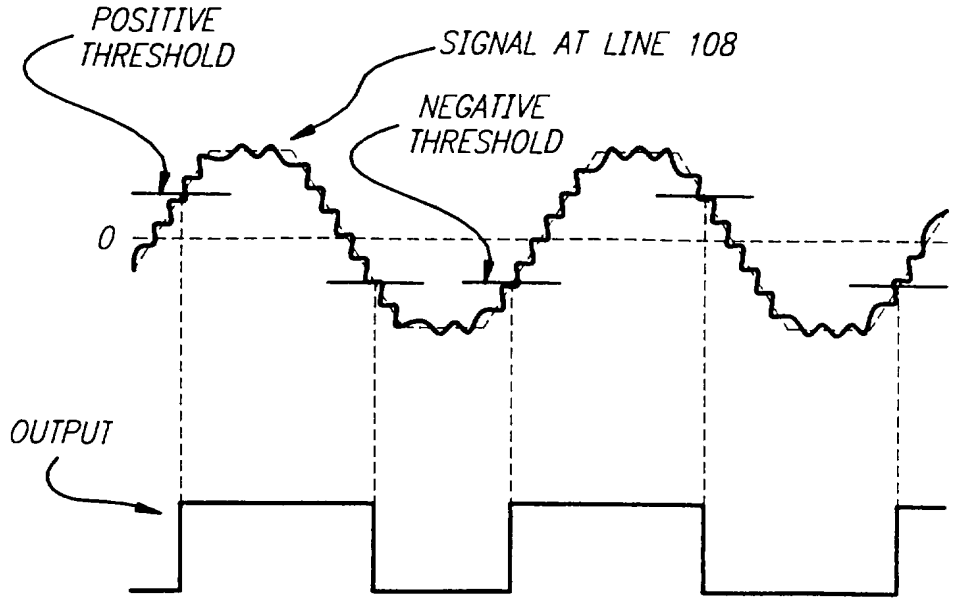

POSITIVE THRESHOLD
SIGNAL AT LINE 108
NEGATIVE THRESHOLD
0
OUTPUT

FIG. 10B

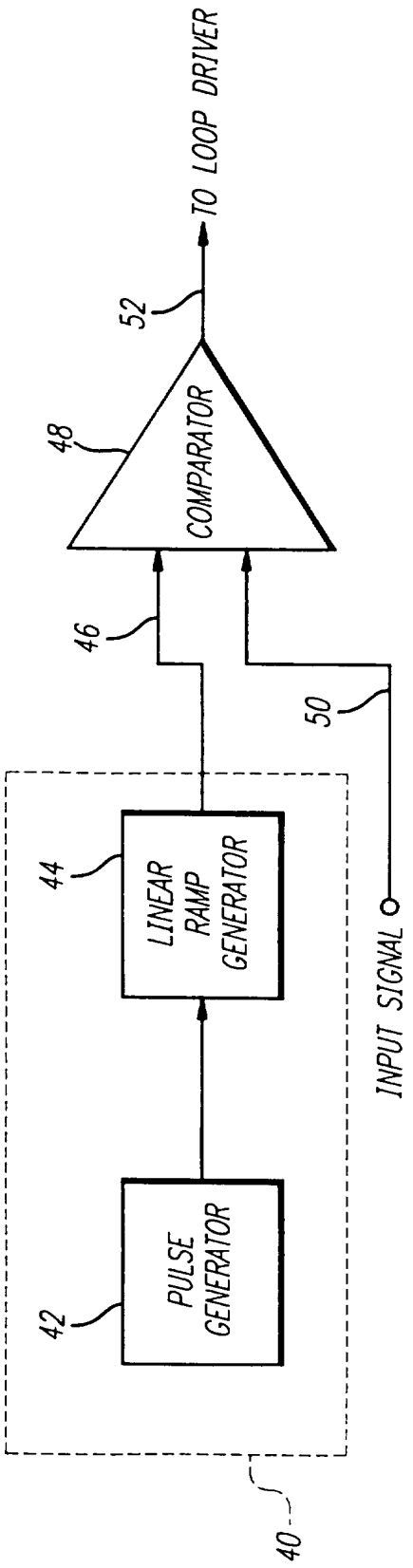


FIG. 5

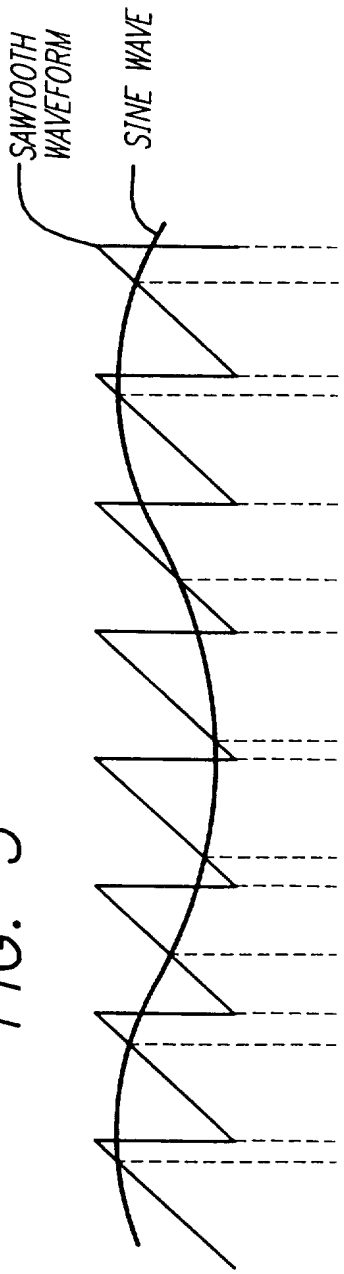


FIG. 6A

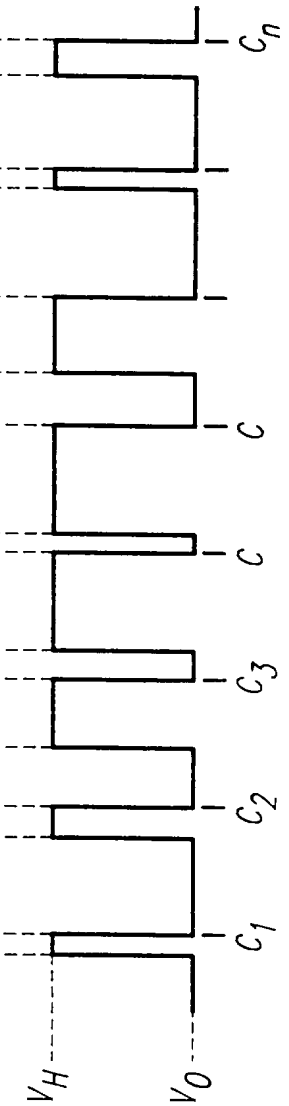


FIG. 6B

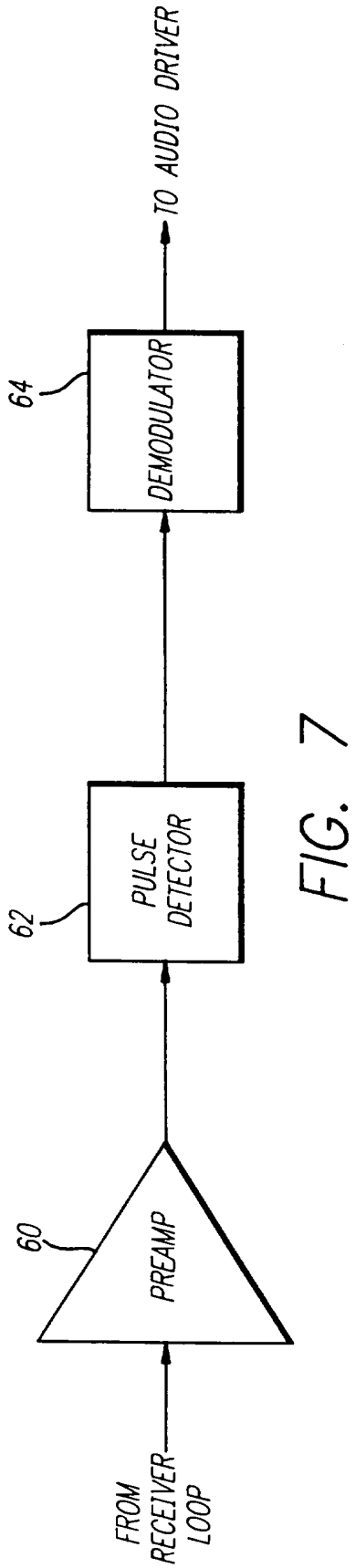

TO AUDIO DRIVER
64
DEMODULATOR
62
PULSE DETECTOR
60
PREAMP
FROM RECEIVER LOOP

FIG. 7

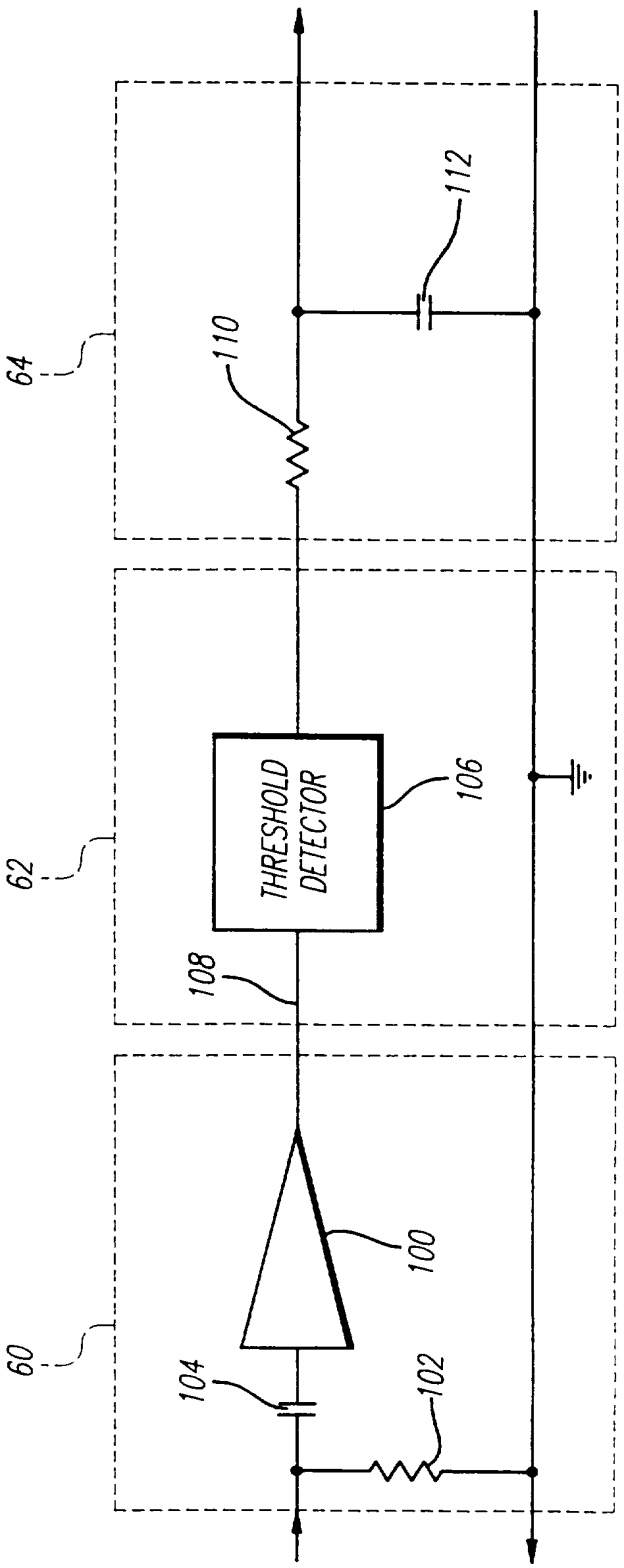

64
110
112
62
THRESHOLD DETECTOR
106
108
60
100
104
102

FIG. 9

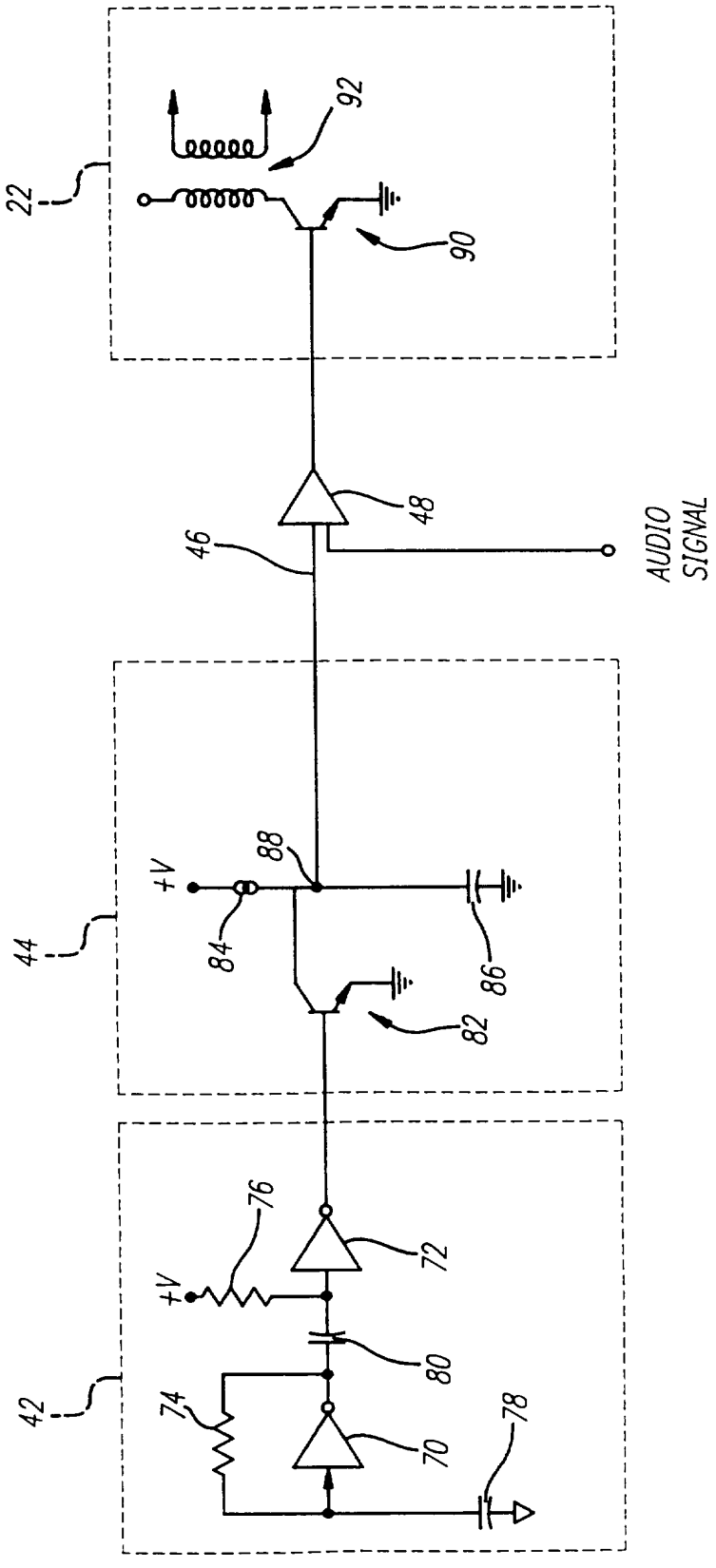


FIG. 8

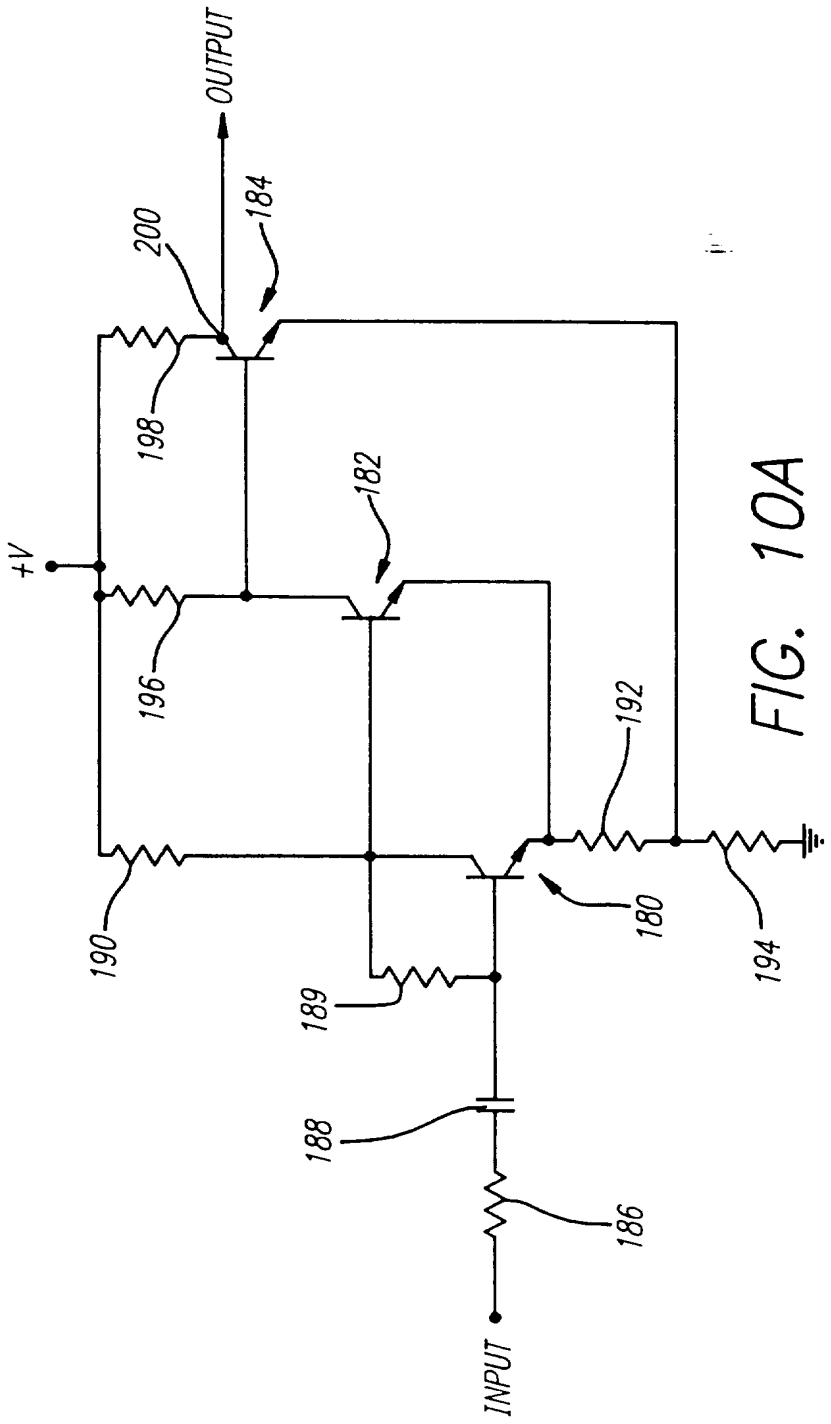


FIG. 10A

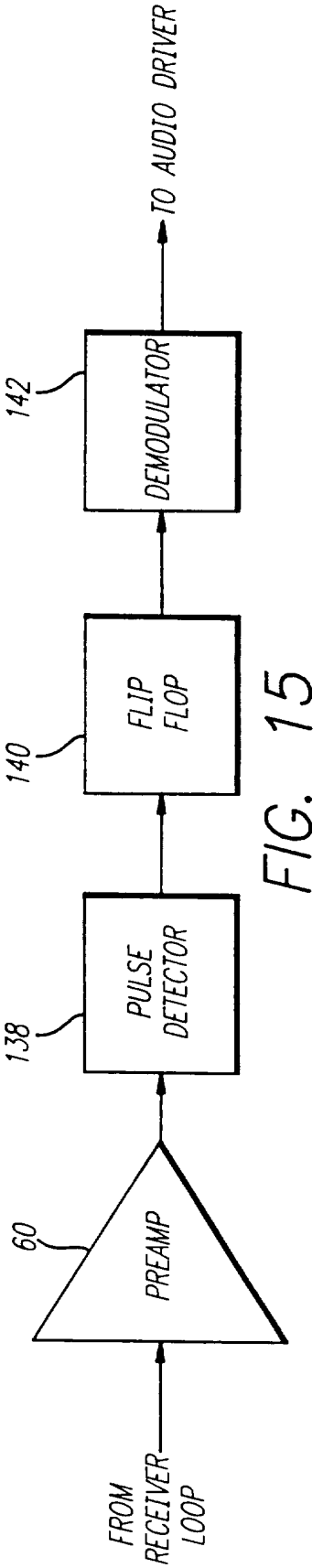


FIG. 15

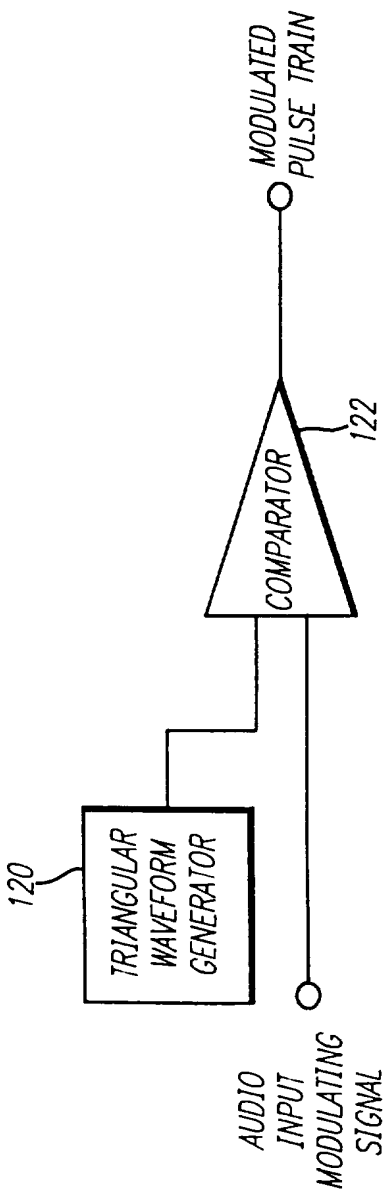


FIG. 11A

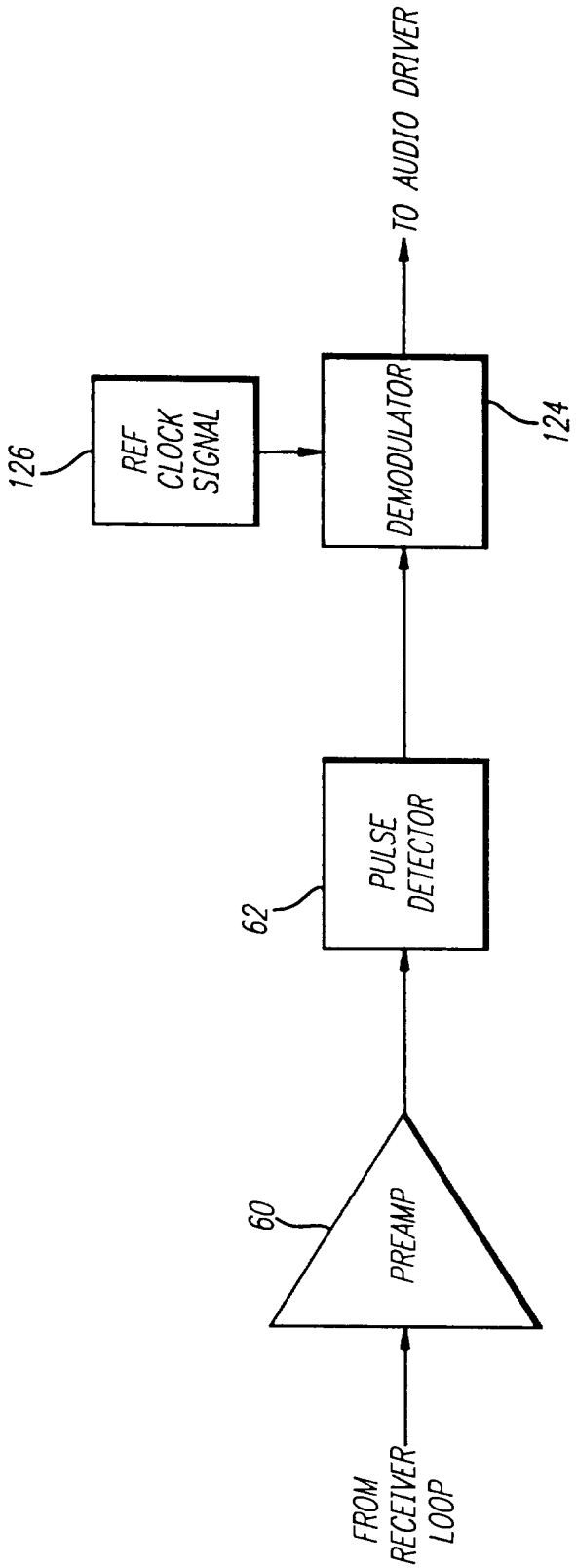


FIG. 11B

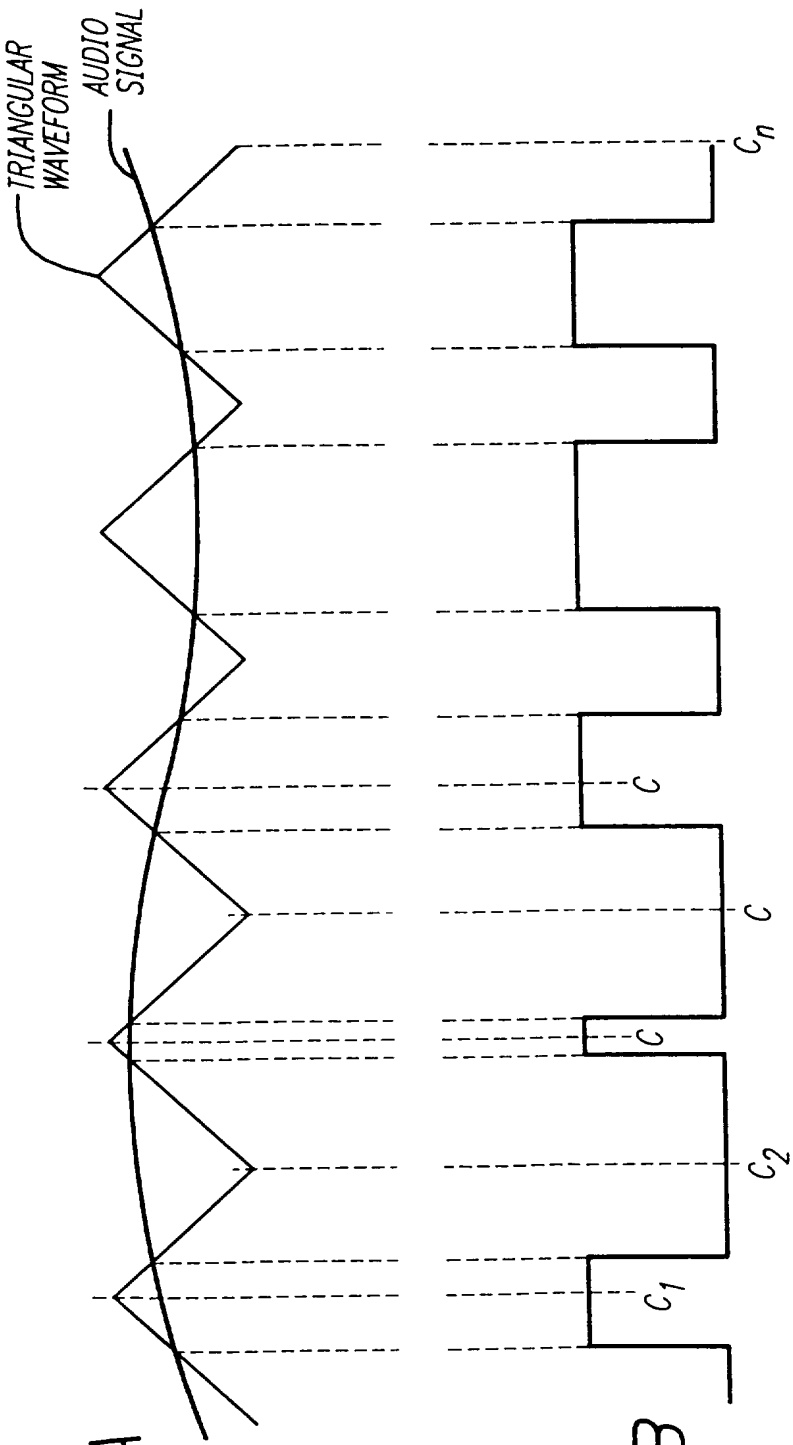


FIG. 12A

FIG. 12B

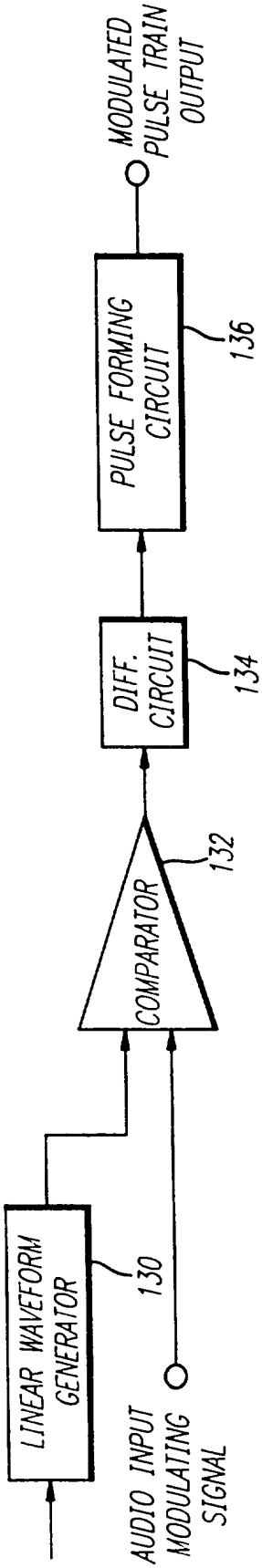


FIG. 13

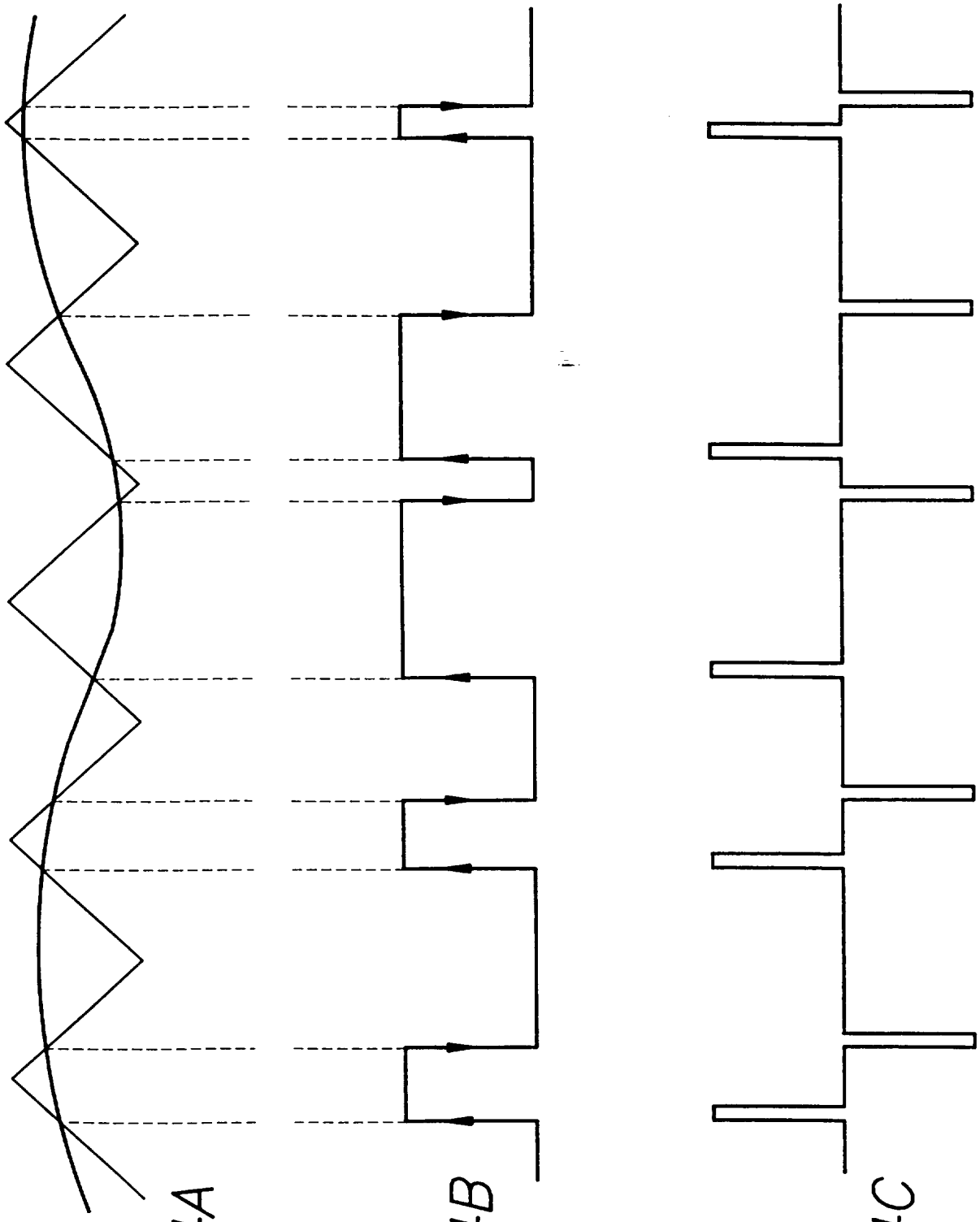


FIG. 14A

FIG. 14B

FIG. 14C

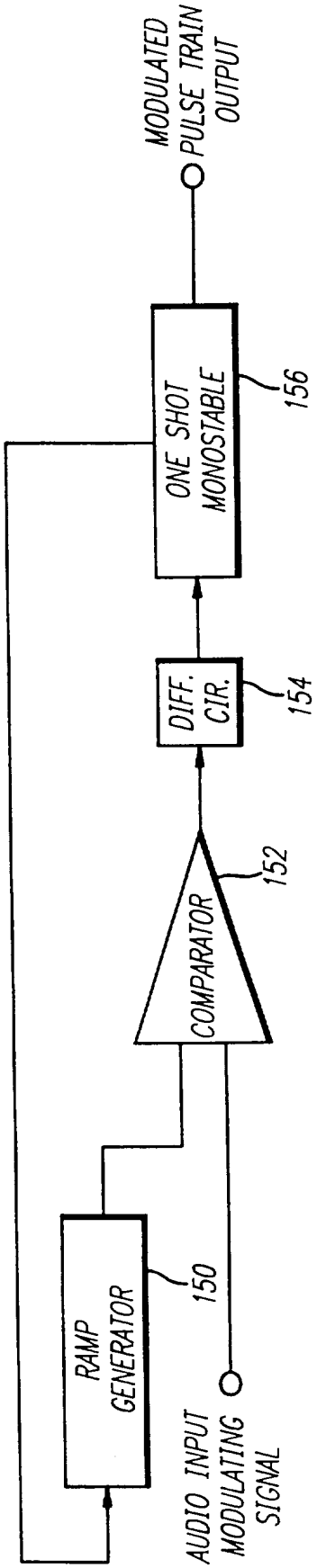

MODULATED PULSE TRAIN OUTPUT
ONE SHOT MONOSTABLE
156
DIFF. CIR.
154
COMPARATOR
152
RAMP GENERATOR
150
AUDIO INPUT MODULATING SIGNAL

FIG. 16

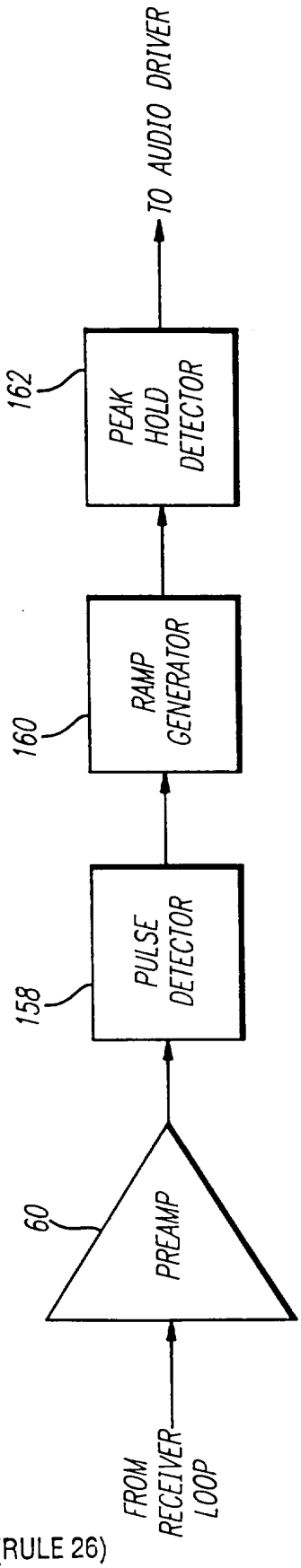

TO AUDIO DRIVER
162
PEAK HOLD DETECTOR
160
RAMP GENERATOR
158
PULSE DETECTOR
60
PREAMP
FROM RECEIVER LOOP

FIG. 18

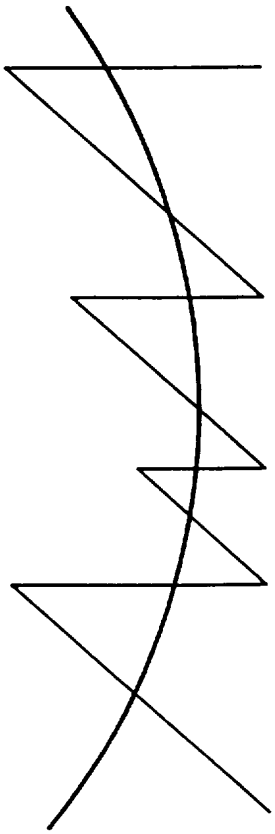


FIG. 17A

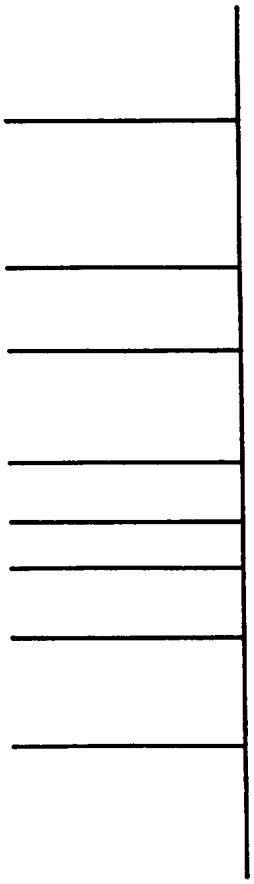


FIG. 17B

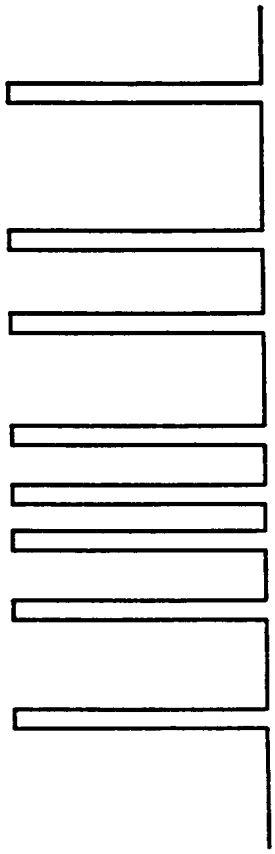


FIG. 17C

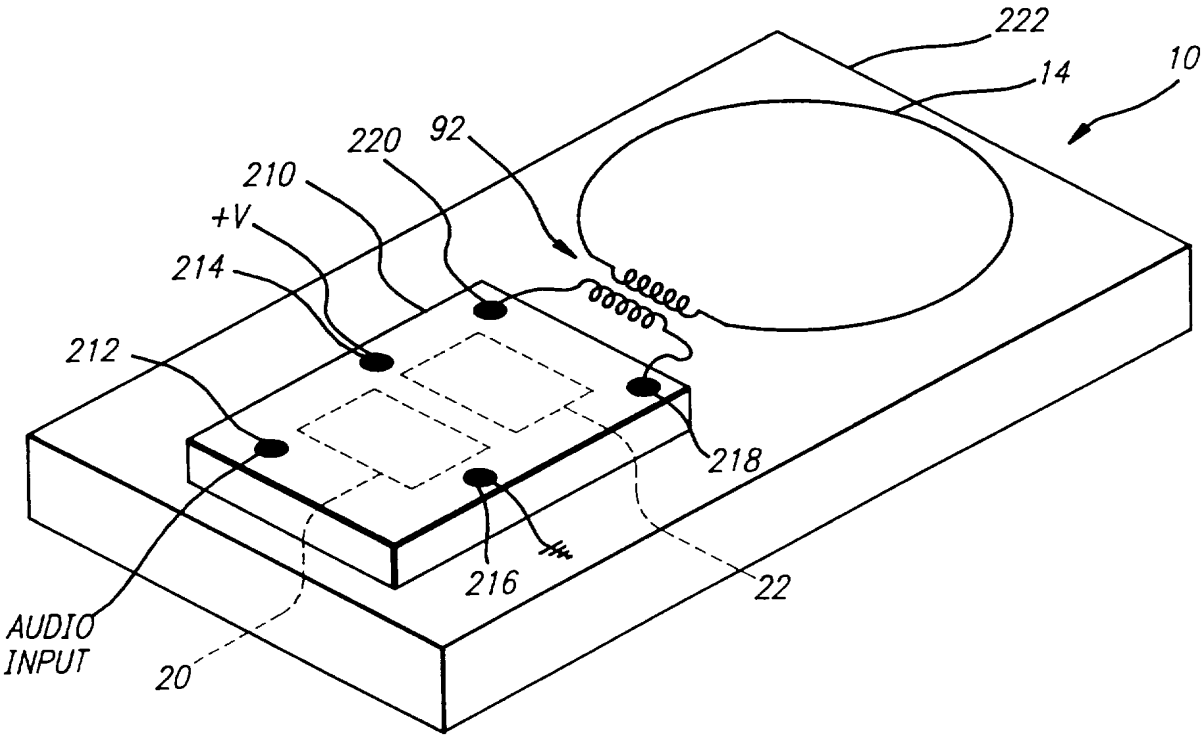

222
14
10
220
92
210
+V
214
212
218
216
22
AUDIO
INPUT
20

FIG. 19

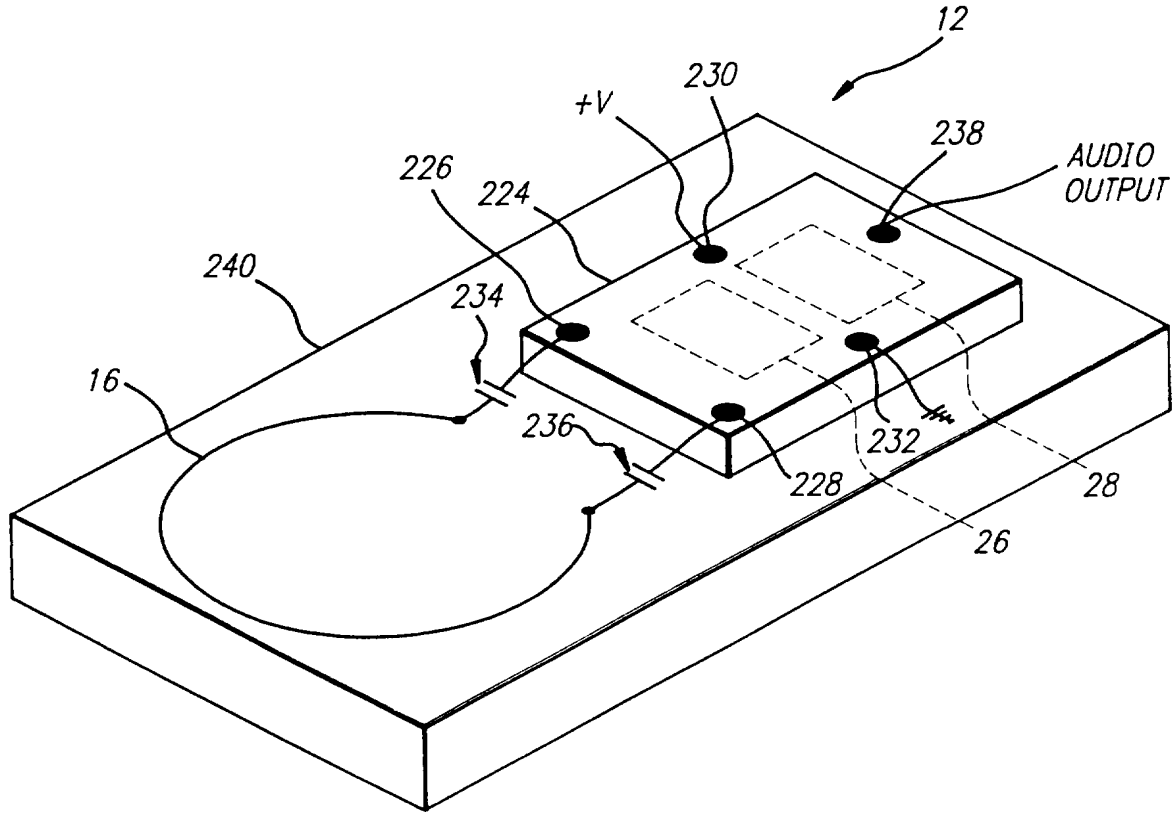
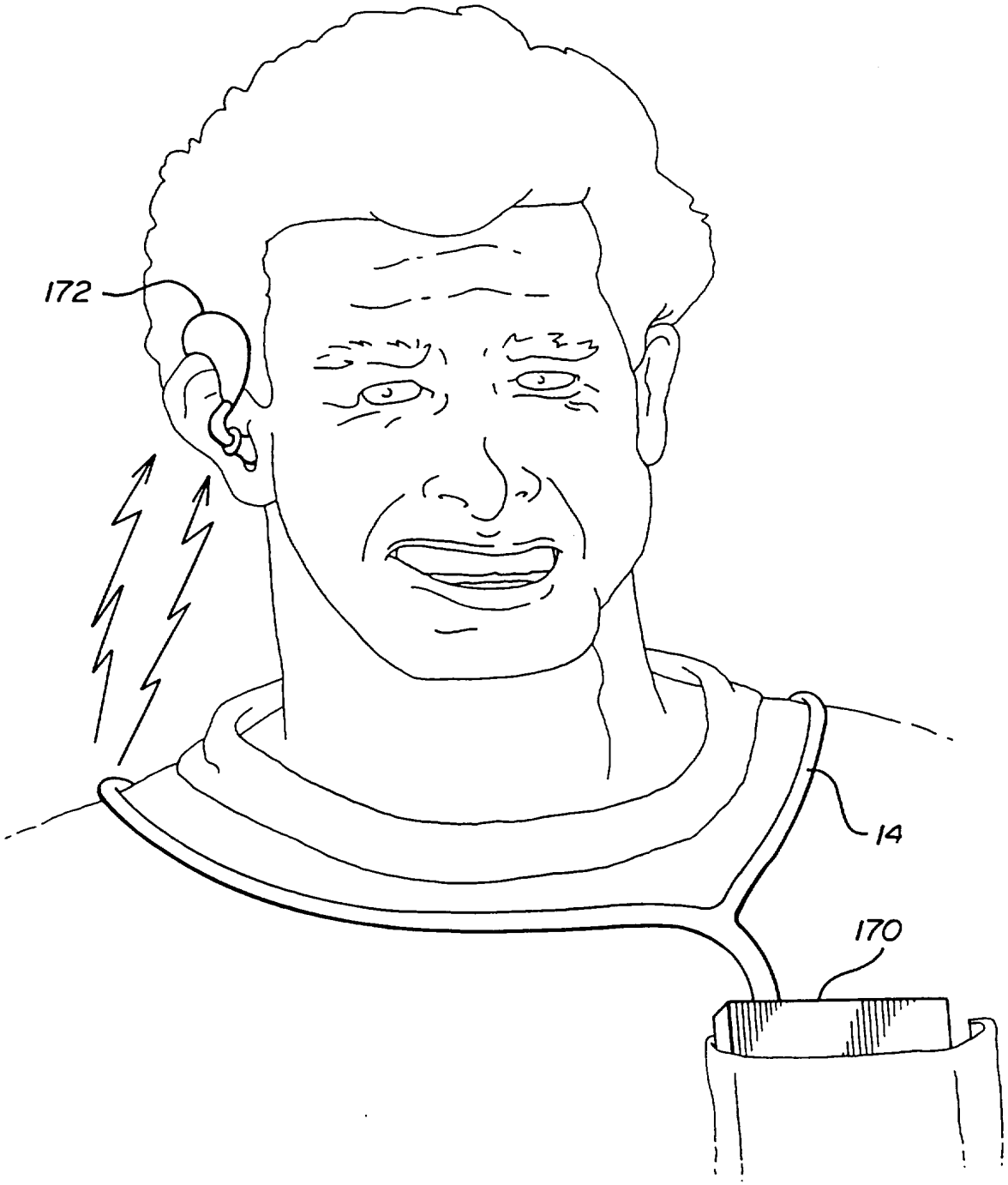

12
230
+V
238
AUDIO
OUTPUT
226
224
240
234
16
236
232
228
28
26

FIG. 20

FIG. 21



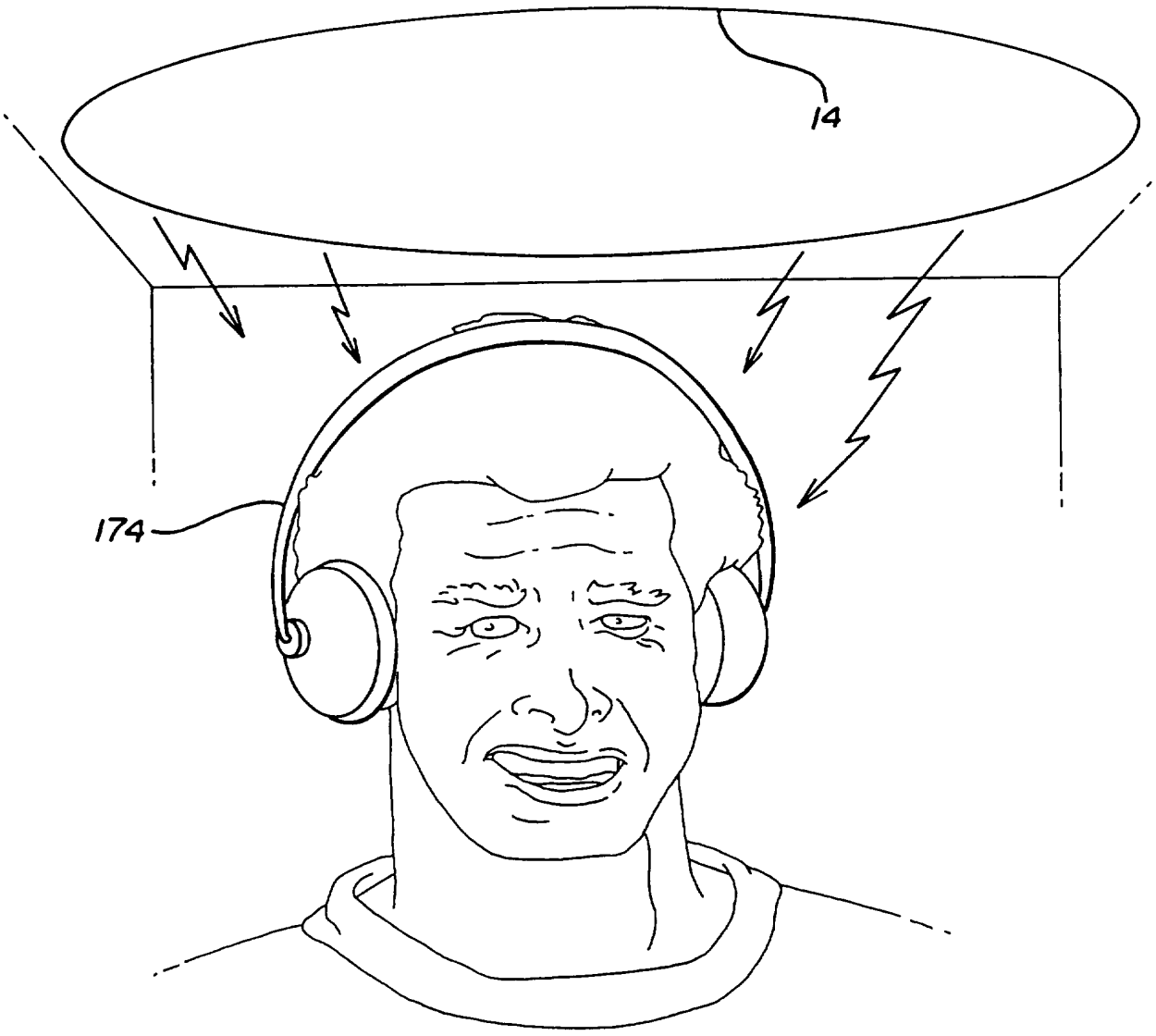


FIG. 22

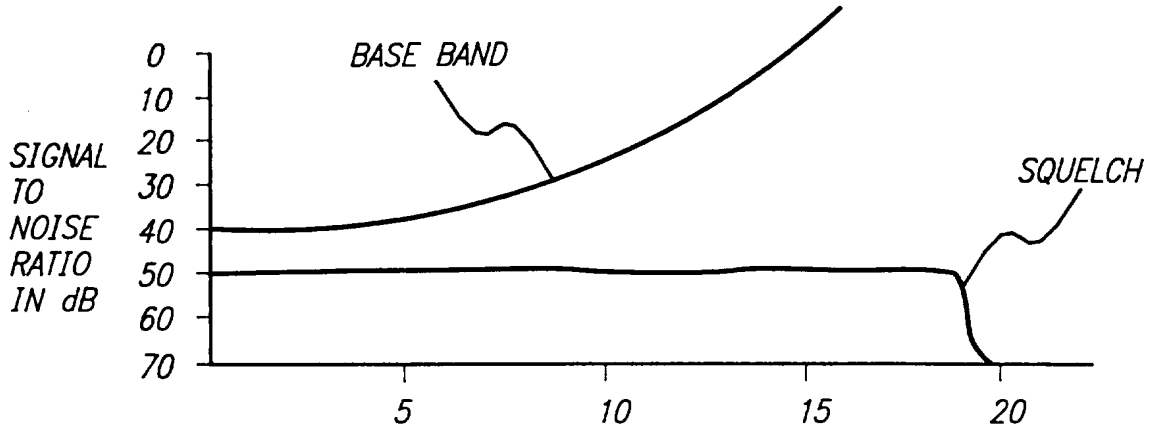
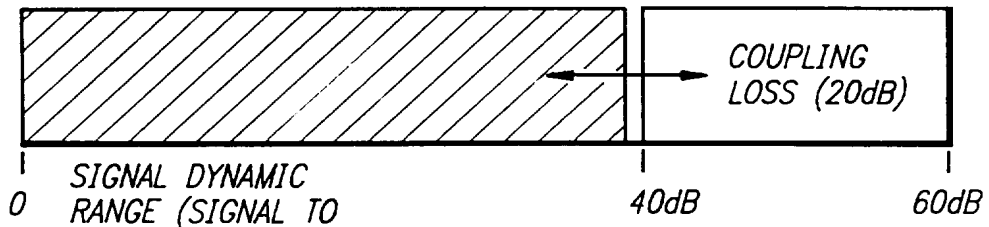
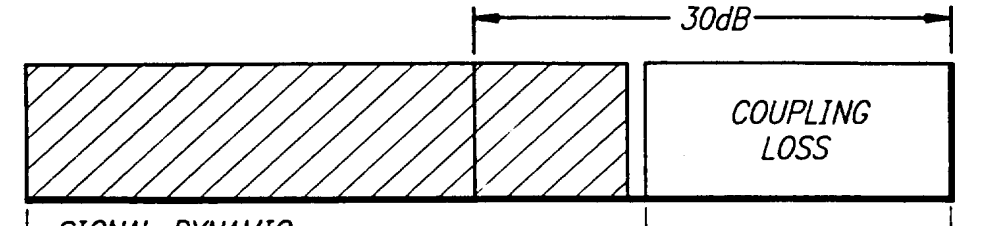


FIG. 23



DISTRIBUTION OF SIGNAL DYNAMIC RANGE AND THE COUPLING LOSS FOR BASE BAND

FIG. 24A



DISTRIBUTION OF SIGNAL DYNAMIC RANGE AND COUPLING LOSS IN T. V. M.

FIG. 24B

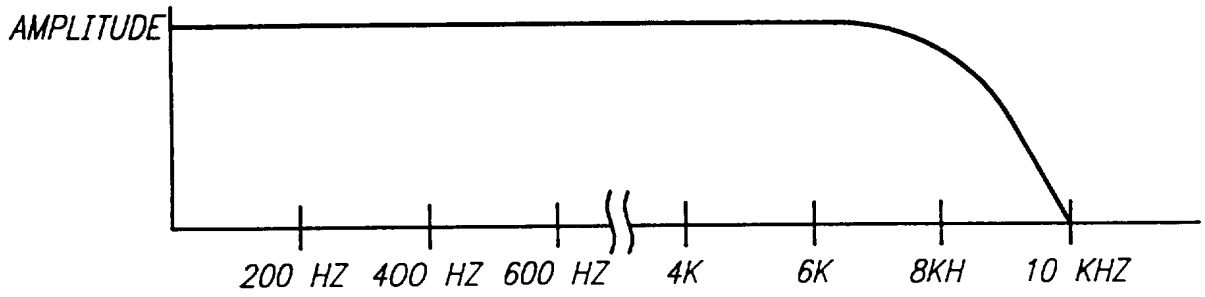

AMPLITUDE
200 HZ
400 HZ
600 HZ
4K
6K
8KH
10 KHZ

FIG. 25

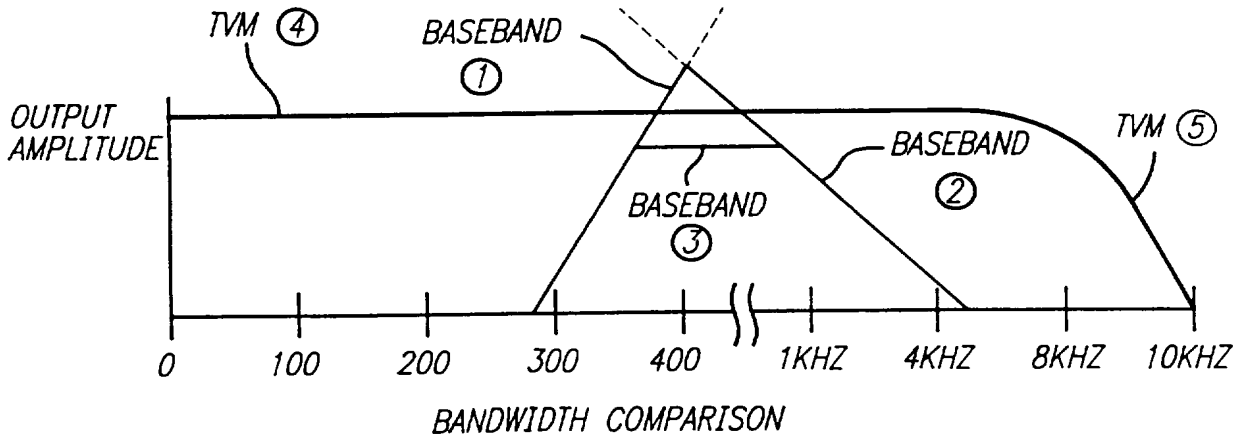
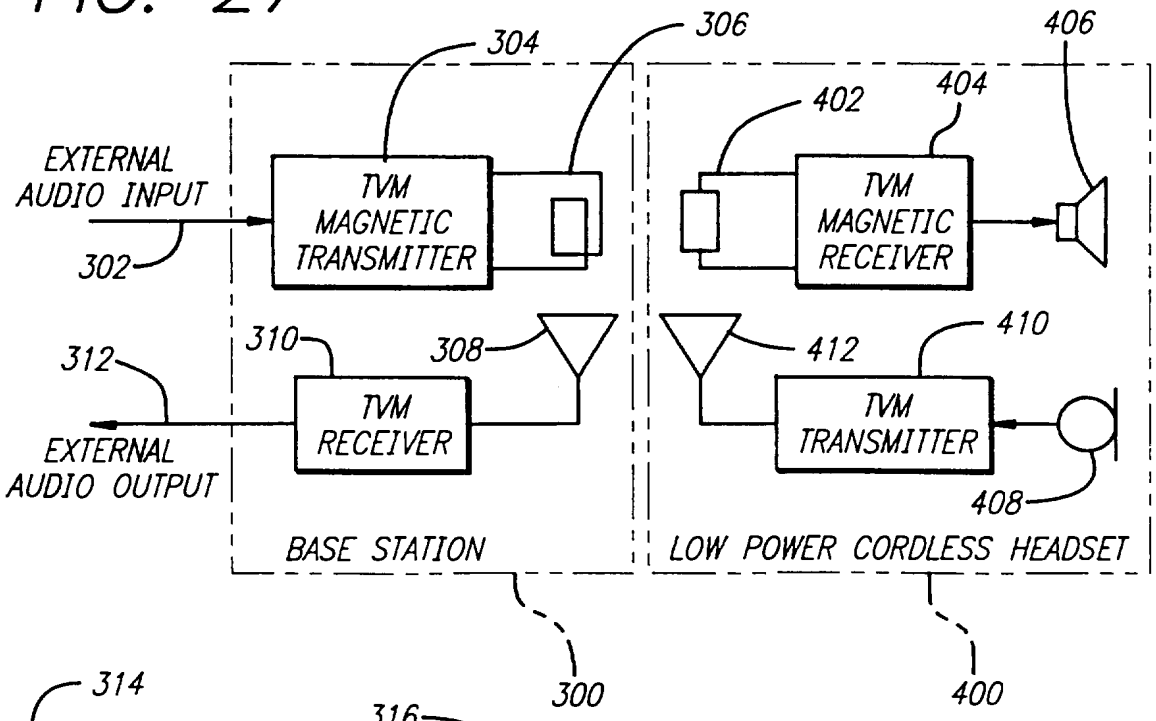

TVM ④
BASEBAND ①
OUTPUT AMPLITUDE
TVM ⑤
BASEBAND ②
BASEBAND ③
0
100
200
300
400
1KHZ
4KHZ
8KHZ
10KHZ
BANDWIDTH COMPARISON

FIG. 26

FIG. 27


304
306
406
402
404
EXTERNAL AUDIO INPUT
TVM MAGNETIC TRANSMITTER
TVM MAGNETIC RECEIVER
302
310
308
410
412
312
TVM RECEIVER
TVM TRANSMITTER
EXTERNAL AUDIO OUTPUT
408
BASE STATION
LOW POWER CORDLESS HEADSET
300
400

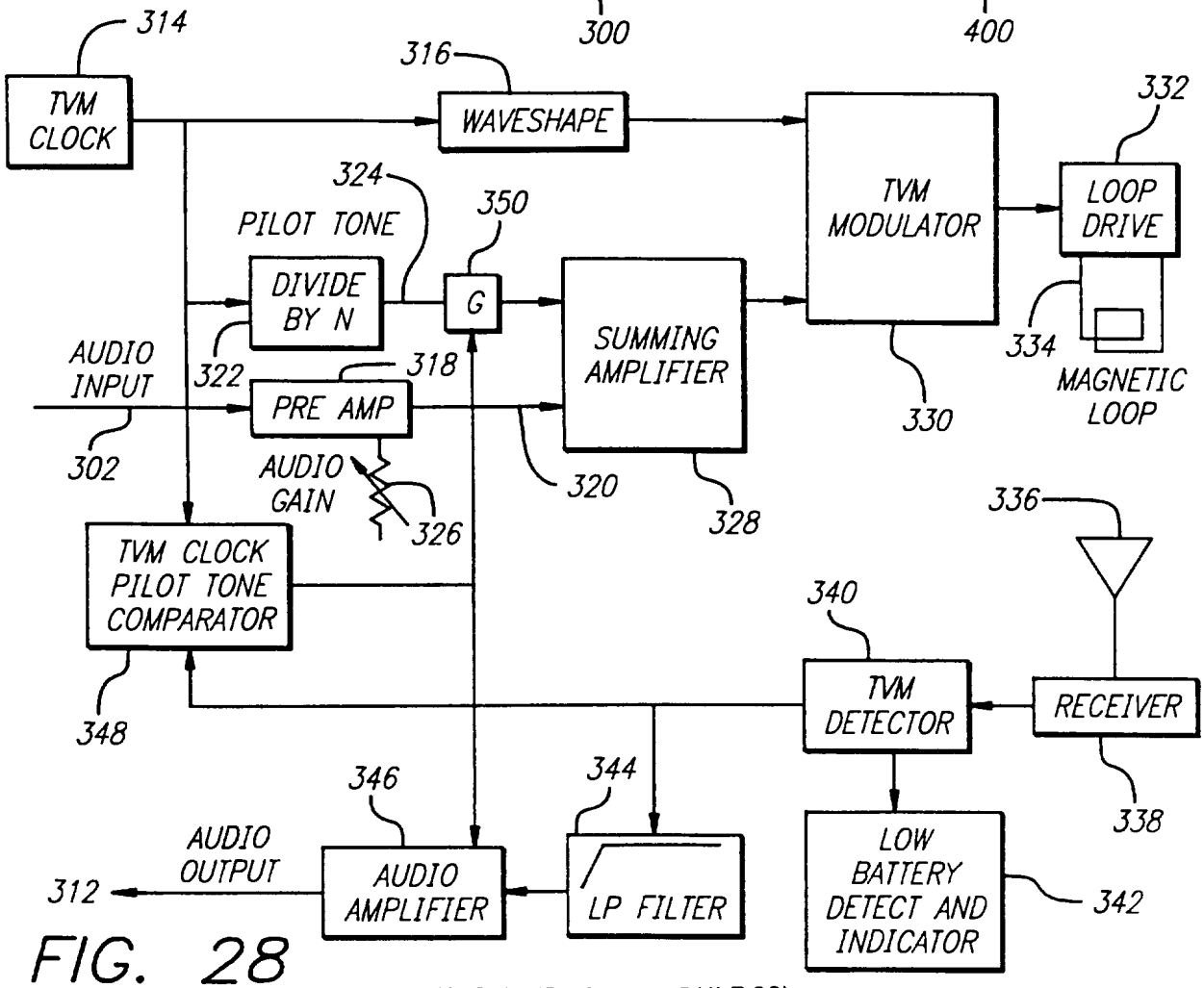

314
316
TVM CLOCK
WAVESHAPE
332
324
350
PILOT TONE
TVM MODULATOR
LOOP DRIVE
DIVIDE BY N
G
SUMMING AMPLIFIER
AUDIO INPUT
322
318
334
PRE AMP
MAGNETIC LOOP
330
302
AUDIO GAIN
320
328
326
336
TVM CLOCK PILOT TONE COMPARATOR
340
TVM DETECTOR
RECEIVER
348
338
346
344
AUDIO OUTPUT
AUDIO AMPLIFIER
LP FILTER
LOW BATTERY DETECT AND INDICATOR
312
342

FIG. 28

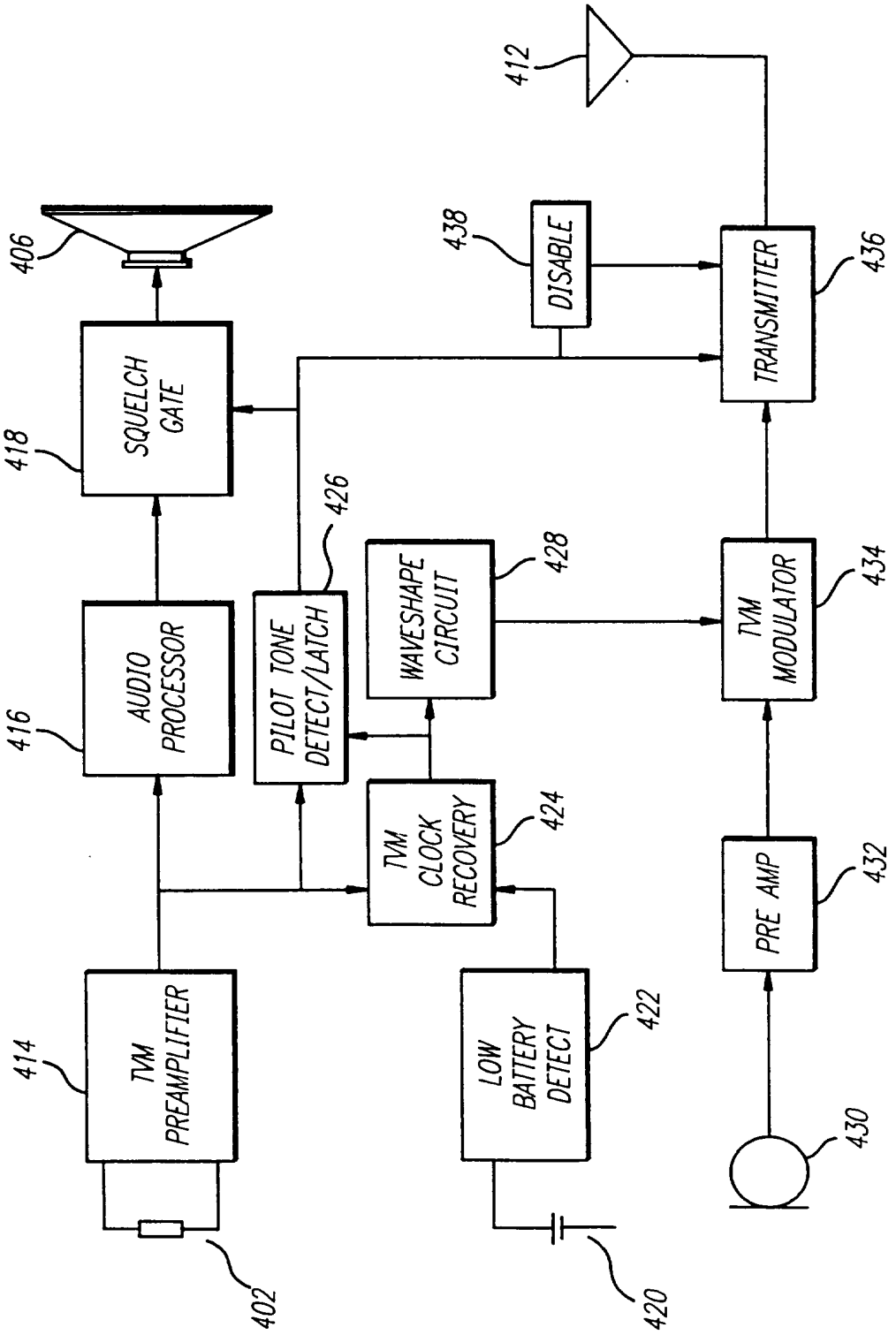

412
406
438
DISABLE
TRANSMITTER
436
SQUELCH GATE
418
426
428
WAVESHAPE CIRCUIT
TVM MODULATOR
434
AUDIO PROCESSOR
416
PILOT TONE DETECT/LATCH
TVM CLOCK RECOVERY
424
PRE AMP
432
TVM PREAMPLIFIER
414
LOW BATTERY DETECT
422
430
402
420

FIG. 29

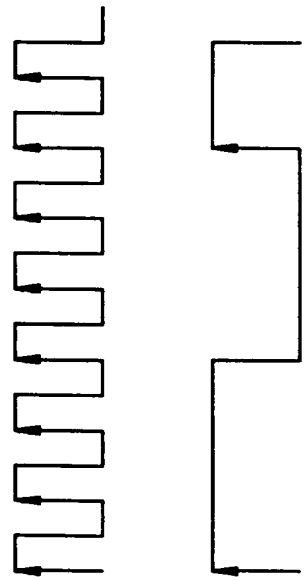


FIG. 30

TVM CLOCK DETECT	0	1	1
PILOT TONE DETECT	X	0	1
HEADSET CONDITION	LOCK OUT	LOCK ON	LOCK OUT

LOGIC LEVEL

FIG. 31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/12536

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04L 27/00; H04B 5/00
US CL : 375/259,257; 455/41
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 375/259,257; 455/41

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

NONE

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

STN
TVM or time variant modulation, magnetic transmitter and receiver, wireless communication

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 5,054,112 (IKE) 01 October 1991,col. 2, lines 17-66, abstract and figs.1-4.	1-3 ,10
A	US, A, 5,276,910 (BUCHELE) 04 January 1994, col.2 line 61 to col.3, line 59.	1-3,10
A	US, A, 4,462,113(IWATA) 24 July 1984, col. 2, line 65 to col. 3, line 68.	1-3,10
A	US, A, 5,293,400(MONOD ET AL) 08 March 1994, abstract.	1-3,10
A	US, A, 4,584,707(GOLDBERG ET AL) 22 April 1986, col.1, line 56 to col. 2, line 53.	1-3,10

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

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
22 DECEMBER 1995

Date of mailing of the international search report
26 FEB 1996

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer
TEMESGHEN GHEBERTINSAE
Telephone No. (703) 305-4777

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

APP0238

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

32692 7590 05/20/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER
NGUYEN, DAVID Q

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 05/20/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	08/20/2013

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

32692 7590 05/20/2013
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

TITLE OF INVENTION: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	08/20/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, DAVID Q	2643	455-517000

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

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

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

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

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

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

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

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

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

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

32692 7590 05/20/2013

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
NGUYEN, DAVID Q	

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 05/20/2013

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

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 13/214,746	Applicant(s) AWISZUS, STEVEN T.	
	Examiner DAVID Q. NGUYEN	Art Unit 2643	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to *5/10/2013*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *46-75 (renumbered as 1-30 respectively)*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

   Interim copies:

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

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

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

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

Attachment(s)

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

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

DETAILED ACTION

Allowable Subject Matter

1. Claims 46-75 are allowed.

2. The following is an examiner's statement of reasons for allowance:

Applicant filed terminal disclaimer to overcome the rejection. Therefore, claims 46-57 are allowable as indicated in the previous office action.

3. 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

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID Q. NGUYEN whose telephone number is (571)272-7844. The examiner can normally be reached on 8:30AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinsong Hu can be reached on (571)272-3965. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
13214746	AWISZUS, STEVEN T.
Examiner	**Art Unit**
DAVID Q NGUYEN	2643

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

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

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION									
CLASS	**SUBCLASS**	**CLAIMED**					**NON-CLAIMED**				
455	517	H	0	4	B	7 / 00 (2006.01.01)					
CROSS REFERENCE(S)											
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**										
455	403	73	569.1	63							

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	30	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643	05/15/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	30	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643	05/15/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2643

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33	4	49	20	65						
	2		18		34	5	50	21	66						
	3		19		35	6	51	22	67						
	4		20		36	7	52	23	68						
	5		21		37	8	53	24	69						
	6		22		38	9	54	25	70						
	7		23		39	10	55	26	71						
	8		24		40	11	56	27	72						
	9		25		41	12	57	28	73						
	10		26		42	13	58	29	74						
	11		27		43	14	59	30	75						
	12		28		44	15	60								
	13		29		45	16	61								
	14		30	1	46	17	62								
	15		31	2	47	18	63								
	16		32	3	48	19	64								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	30	
/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643	05/15/2013	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	517	08/27/2012	DN
455	3.05	08/27/2012	DN
455	73	08/27/2012	DN
455	403	08/27/2012	DN
455	569.1	08/27/2012	DN
Updated search		03/05/2013	DN
Updated search		05/15/2013	DN

SEARCH NOTES		
Search Notes	Date	Examiner
Text	08/27/2012	DN
Updated search	03/05/2013	DN
Updated search	05/15/2013	DN

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
Text		05/15/2013	DN

	/DAVID Q NGUYEN/ Primary Examiner.Art Unit 2643

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013						
	1	✓	-	-						
	2	✓	-	-						
	3	✓	-	-						
	4	✓	-	-						
	5	✓	-	-						
	6	✓	-	-						
	7	✓	-	-						
	8	✓	-	-						
	9	✓	-	-						
	10	✓	-	-						
	11	✓	-	-						
	12	✓	-	-						
	13	✓	-	-						
	14	✓	-	-						
	15	✓	-	-						
	16	✓	-	-						
	17	✓	-	-						
	18	✓	-	-						
	19	✓	-	-						
	20	✓	-	-						
	21	✓	-	-						
	22	✓	-	-						
	23	✓	-	-						
	24	✓	-	-						
	25	✓	-	-						
	26	✓	-	-						
	27	✓	-	-						
	28	✓	-	-						
	29	✓	-	-						
	30	✓	-	-						
	31	✓	-	-						
	32	✓	-	-						
	33	✓	-	-						
	34	✓	-	-						
	35	✓	-	-						
	36	✓	-	-						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013						
	37	✓	-	-						
	38	✓	-	-						
	39	✓	-	-						
	40	✓	-	-						
	41	✓	-	-						
	42	✓	-	-						
	43	✓	-	-						
	44	✓	-	-						
	45	✓	-	-						
1	46		✓	=						
2	47		✓	=						
3	48		✓	=						
4	49		✓	=						
5	50		✓	=						
6	51		✓	=						
7	52		✓	=						
8	53		✓	=						
9	54		✓	=						
10	55		✓	=						
11	56		✓	=						
12	57		✓	=						
13	58		✓	=						
14	59		✓	=						
15	60		✓	=						
16	61		✓	=						
17	62		✓	=						
18	63		✓	=						
19	64		✓	=						
20	65		✓	=						
21	66		✓	=						
22	67		✓	=						
23	68		✓	=						
24	69		✓	=						
25	70		✓	=						
26	71		✓	=						
27	72		✓	=						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013	05/15/2013						
28	73		✓	=						
29	74		✓	=						
30	75		✓	=						

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

BIB DATA SHEET

CONFIRMATION NO. 1908

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/214,746	08/22/2011	455	2643	61312US015 (102.0105USC2)

APPLICANTS

Steven T. Awiszus, St. Paul, MN;

**** CONTINUING DATA ***************************

This application is a CON of 12/548,596 08/27/2009 PAT 8005455 *
which is a CON of 11/276,048 02/10/2006 PAT 7599679
(*)Data provided by applicant is not consistent with PTO records.

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

08/31/2011

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /DAVID Q NGUYEN/ Examiner's Signature	☑ Met after Allowance DN Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		MN	3	45	6

ADDRESS

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427
UNITED STATES

TITLE

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

FILING FEE RECEIVED		
3050	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/214,746	AWISZUS, STEVEN T.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 10 MAY 2013	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

JAB

U.S. Patent and Trademark Office

RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP: 2643

32692
Customer Number

Patent
Case No.: 61312US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	AWISZUS, STEVEN T		
Application No.:	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.116

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

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

MAY 10, 2013 /Hylis H. Froelke/
Date Signed by: Hylis H. Froelke

Dear Sir:

This is in response to the outstanding Office Action, dated March 12, 2013, in the above-identified application.

Fees

☐ Any required fee will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☐ Please charge any fees under 37 CFR §§ 1.16 and 1.17 which may be required to Deposit Account No. 13-3723.

☒ Please charge any additional fees associated with the prosecution of this application to Deposit Account No. 13-3723. This authorization includes the fee for any necessary extension of time under 37 CFR § 1.136(a). To the extent any such extension should become necessary, it is hereby requested.

☒ Please credit any overpayment to the same deposit account.

REMARKS

Claims 46-75 are pending, and stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 7,599,679.

With this response a terminal disclaimer has been filed disclaiming any additional patent term this application may acquire beyond the term of U.S. Patent No. 7,599,679. It is therefore respectfully requested that the Office Action's non-statutory double patenting rejection of claims 46-75 be withdrawn.

In view of the above, it is submitted that the application is in condition for allowance.

Respectfully submitted,

May 10, 2013
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833

32692
Customer Number

Patent
Case No.: 61312US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	AWISZUS, STEVEN T		
Application No.:	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

TERMINAL DISCLAIMER UNDER 37 CFR § 1.321

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

MAY 10, 2013 /Hylis H. Froelke/
Date Signed by: Rebecca C. Bode

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

Dear Sir:

Petitioner, 3M Innovative Properties Company, a corporation of the State of Delaware having a place of business at 3M Center, St. Paul, MN, represents that it is the exclusive owner of the entire interest in the above-identified application (referred to as the "Subject Application") by virtue of an assignment recorded at Reel 017378, Frame 0359, on March 24, 2006. Petitioner further represents that it is the exclusive owner of the entire interest in U.S. Patent No. 7,599,679 (referred to as the "Prior Patent"), by virtue of an assignment recorded at Reel 017378, Frame 0359, on March 24, 2006.

Petitioner disclaims the terminal part of the statutory term of any patent granted on the Subject Application that would extend beyond the expiration date of the full statutory term, as defined in 35 USC §§ 154 and 173 and as presently shortened by any terminal disclaimer, of the Prior Patent. Petitioner hereby agrees that any patent granted on the Subject Application shall be enforceable only for and during such period that any patent granted on the Subject Application and the Prior Patent are commonly owned. This agreement is to run with any patent granted on the Subject Application and to be binding upon the grantee, its successors, or assigns.

In making the above disclaimer, Petitioner does not disclaim any terminal part of any patent granted on the Subject Application that would extend to the expiration date of the full statutory term as defined in 35 USC §§ 154 and 173 of the Prior Patent, as presently shortened by any terminal disclaimer, in the event such Prior Patent later: (1) expires for failure to pay a maintenance fee; (2) is held unenforceable or is found invalid by a court of competent jurisdiction; (3) is statutorily disclaimed in whole or terminally disclaimed under 37 CFR § 1.321; (4) has all claims canceled by a reexamination certificate; (5) is reissued; or (6) is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

I declare that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under 18 USC § 1001 and that such willful false statements may jeopardize the validity of the above-identified application or any patent issuing thereon.

Fees

☒ Any required fee under 37 CFR § 1.20(d) will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.20(d) which may be required to Deposit Account No. 13-3723.

☐ Please charge any fees under 37 CFR §§ 1.20(d) which may be required to Deposit Account No. 13-3723.

☒ Please charge any additional fees associated with the prosecution of this application to Deposit Account No. 13-3723. This authorization includes the fee for any necessary extension of time under 37 CFR § 1.136(a). To the extent any such extension should become necessary, it is hereby requested.

☒ Please credit any overpayment to the same deposit account.

Respectfully submitted,

May 10, 2013
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Irina Hass/Hylis Froelke
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Statutory or Terminal Disclaimer	1814	1	160	160
		Total in USD ($)		**160**

Electronic Acknowledgement Receipt

EFS ID:	15745767
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Irina Hass/Hylis Froelke
Filer Authorized By:	Irina Hass
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	10-MAY-2013
Filing Date:	22-AUG-2011
Time Stamp:	14:49:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$160
RAM confirmation Number	1135
Deposit Account	133723
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		RespToFOA_61312US015.PDF	72232 c22516bad6bd1d9d3d7e760f44f348cf5a8231fd	yes	2
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment After Final		1	1	
	Applicant Arguments/Remarks Made in an Amendment		2	2	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	TerminalDisclaimer_61312US015.PDF	72546 ba94c337be0b10d0100787d5792ca1946c201cbe	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30494 ce87ea771ecb44d1c5cae7896f1b2b7ffad4480a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	175272		

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.

<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.

<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.

<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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

32692 7590 03/12/2013

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
NGUYEN, DAVID Q	
ART UNIT	PAPER NUMBER
2643	
NOTIFICATION DATE	DELIVERY MODE
03/12/2013	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):

LegalUSDocketing@mmm.com

Office Action Summary	Application No.	Applicant(s)	
	13/214,746	AWISZUS, STEVEN T.	
	Examiner	Art Unit	
	DAVID Q. NGUYEN	2643	

-- 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 *04 February 2013*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *46-75* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *46-75* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ 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).

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) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 46-75 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 7,599,679. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the reference US 7,599,679. The reference and instant application are claiming common subject matter, as follows:

An intercom system, said intercom system being configurable for a drive-through, quick service restaurant establishment having a staff, comprising: a base station connectable to a wide area communication network; at least one headset capable of two-way wireless communication with said base station; said wireless communication between the at least one headset and said base station being configurable with at least one parameter that adjusts a volume level of communications wirelessly received or wirelessly transmitted by the headset; said at least one parameter being adjustable by the staff at the establishment; said base station being configured to permit remote review and remote adjustment of said at least one parameter when said base station is connected to said wide area communication network; and wherein said at least one parameter can be saved into a template of parameters for later use.

Allowable Subject Matter

3. Claim 46-57 would be allowable if amended to overcome the double patenting rejection, set forth in this Office action.

The following is an examiner's statement of reasons for allowance:

New claims 46-57 would be allowable because the prior art of record does not teach said wireless communication between the at least one headset and said base station being configurable with at least one parameter that adjusts a volume level of communications wirelessly received or wirelessly transmitted by the headset and wherein said at least one parameter can be saved into a template of parameters for later use, as specified in the claims.

4. 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

5. 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.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID Q. NGUYEN whose telephone number is (571)272-7844. The examiner can normally be reached on 8:30AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinsong Hu can be reached on (571)272-3965. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2643

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	517	08/27/2012	DN
455	3.05	08/27/2012	DN
455	73	08/27/2012	DN
455	403	08/27/2012	DN
455	569.1	08/27/2012	DN
Updated search		03/05/2013	DN

SEARCH NOTES		
Search Notes	Date	Examiner
Text	08/27/2012	DN
Updated search	03/05/2013	DN

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code [1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-5721783		Feb 24, 1998	ANDERSON, JAMES	
		US-6574603		Jun 3, 2003	Dickson, Timothy E., et al.	
		US-6856817		Feb 15, 2005	Tischler, Ralph	
		US-6993292		Jan 31, 2006	Sabongi, Gebran J., et al.	
		US-7177824		Feb 13, 2007	Sabongi, Gebran J., et al.	
		US-7231233		Jun 12, 2007	Gosieski, George J. Jr.	
		US-7761063		Jul 20, 2010	Tsuda, Shinichiro et al.	
		US-7920539		Apr 5, 2011	Stanford, Thomas et al.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code [1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-20050059414		Mar 17, 2005	Mahmoodi, Abolghassem B., et al.	

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		US-20050135458		Jun 23, 2005	Graves, David W., et al.	
		US-20050277410		Dec 15, 2005	Ismail, Samir et al.	
		US-20060041482		Feb 23, 2006	Awiszus, Steven T., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
		WO-2007094981			Aug 23, 2007	AWISZUS, Steven T.		

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[5]
		"3M Wireless Intercom System Service Information", Copyright March 2003, pp 1-18	
		"EtherPath User's Guide", Copyright 1998…2004, Revised June 3, 2004, pp 1-92	

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Examination Report", dated September 22, 2011, from NZ Application No. 595259, corresponding to U.S. Patent Application No. 11/276,048, (pp. 2).	
		"Examination Report", NZ Application No. 595104 (our file 102.0105NZD1), mailed September 15, 2011 (pp. 1-3)	
		"Examination Response", dated November 3, 2011, from NZ Application No. 570370, corresponding to U.S. Patent Application No. 11/276,048, (pp. 2).	
		"Handbook of Intercom Systems Engineering", Copyright 2000, Revised March 2002, pp 1-168	
		"HM Electronics PRO850 Wireless Intercom Operating Instructions", Copyright September 2003, Revised September 11, 2003, pp 1-45	
		VU, TUYET, "HME's New PRO850 Wireless Intercom System Offers More Flexibility and Operation Power to Pro-Audio Professionals", PRO3-10, September 2, 2003 (1 page)	
		WHITE, RON, "How Computer's Work", Indianapolis, IN: Que, 2006. Print. (6 pages)	
		"Japanese Office Action", from JP Application No. 2008-544285 (our file 102.0105JPWO), mailed May 29, 2012, (4 pages) English translation	
		"Lantronix Secure Com Port Redirector User Guide", Copyright 2004, Revision B December 2004, pp 1-24	
		"Non-Final Office Action", mailed December 6, 2012 in co-pending Application Serial No. 95/002,239(our file 102.0105USR2), "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT," (35 pages).	

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Office Action", mailed November 15, 2012 in co-pending Application Serial No. 95/002,238(our file 102.0105USRX), "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT," (45 pages).	
		"PC30 Software Version 2.1, for HME System 30, Installation and Operating Instructions", HM Electronics, Inc., November 2003, 104 pages.	
		"PCT International Preliminary Report on Patentability", from International Application No. PCT/US2007/002961, corresponding to U.S. Patent Application No. 11/276,048, dated June 28, 2007, pp 1-6	
		"Response to First Examiner's Report", dated May 10, 2010 from AU Application No. 2007215462, corresponding to U.S. Patent Application No. 11/276,048, mailed June 1, 2011, (pp. 10)	
		"Response to First Examiner's Report", dated September 15, 2011, from NZ Application No. 595104, corresponding to U.S. Patent Application No. 11/276,048, mailed December 6, 2012 (3 pgs)	
		"Response to Non-Final Office Action mailed December 6, 2012", filed with USPTO February 6, 2013 in co-pending Application Serial No. 95/002,239(our file 102.0105USR2), (78 pages).	
		"Response to Office Action mailed November 15, 2012", filed with USPTO January 15, 2013 in co-pending Application Serial No. 95/002,238(our file 102.0105USRX), (75 pages).	
		"Symantec pcAnywhere User's Guide", Copyright 2003, pp 1-212	
		"System 30, Drive-Thru Timer System, Operating Instructions", HM Electronics, Inc., November 2002, 99 pages.	
		"Telex Operating Instructions RadioCom BTR-800, TR-800 Professional Wireless Intercom System", June 2002, pp 1-73	

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Wireless 6000 Wireless Drive-Thru Audio System Installation Instructions, by HM Electronics", Copyright August 2003, pp 1-50	
		"Request For *Inter Partes* Reexamination (37 CFR 1.913)" filed with USPTO September 13, 2012 in US Patent No. 8,005,455, Attorney docket no. 64895.1.10 (102.0105USR2), (123 pages).	
		"Request For *Inter Partes* Reexamination (37 CFR 1.913)" filed with USPTO September 13, 2012 in US Patent No. 7,599,679, Attorney docket no. 64895.1.9 (102.0105USRX), (147 pages).	

EXAMINER SIGNATURE

Examiner Signature	/David Nguyen/	Date Considered	03/05/2013

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

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☐ None

SIGNATURE

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

Signature	/Rakhi Nikhanj/	Date (YYYY-MM-DD)	2013-02-26
Name/Print	Rakhi Nikhanj	Registration Number	66,654

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

Substitute for form 1449A/PTO (modified)		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	**Application Number**	**13/214746**
	Filing Date	**22-AUG-2011**
	First Named Inventor	**Awiszus, Steven T**
(Use as many sheets as necessary)	**Confirmation Number**	**1908**
Page 1 of 1	**Attorney Case Number**	**61312US015**

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	2003/0134666	07-17-2003	Fletcher	
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1						
	B2						
	B3						
	B4						
	B5						
	B6						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1		
	C2		
	C3		

*Examiner:	/David Nguyen/	Date Considered:	03/05/2013

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

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013							
	1	✓	-							
	2	✓	-							
	3	✓	-							
	4	✓	-							
	5	✓	-							
	6	✓	-							
	7	✓	-							
	8	✓	-							
	9	✓	-							
	10	✓	-							
	11	✓	-							
	12	✓	-							
	13	✓	-							
	14	✓	-							
	15	✓	-							
	16	✓	-							
	17	✓	-							
	18	✓	-							
	19	✓	-							
	20	✓	-							
	21	✓	-							
	22	✓	-							
	23	✓	-							
	24	✓	-							
	25	✓	-							
	26	✓	-							
	27	✓	-							
	28	✓	-							
	29	✓	-							
	30	✓	-							
	31	✓	-							
	32	✓	-							
	33	✓	-							
	34	✓	-							
	35	✓	-							
	36	✓	-							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013							
	37	✓	-							
	38	✓	-							
	39	✓	-							
	40	✓	-							
	41	✓	-							
	42	✓	-							
	43	✓	-							
	44	✓	-							
	45	✓	-							
	46		✓							
	47		✓							
	48		✓							
	49		✓							
	50		✓							
	51		✓							
	52		✓							
	53		✓							
	54		✓							
	55		✓							
	56		✓							
	57		✓							
	58		✓							
	59		✓							
	60		✓							
	61		✓							
	62		✓							
	63		✓							
	64		✓							
	65		✓							
	66		✓							
	67		✓							
	68		✓							
	69		✓							
	70		✓							
	71		✓							
	72		✓							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012	03/05/2013							
	73		✓							
	74		✓							
	75		✓							

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code [1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-5721783		Feb 24, 1998	ANDERSON, JAMES	
		US-6574603		Jun 3, 2003	Dickson, Timothy E., et al.	
		US-6856817		Feb 15, 2005	Tischler, Ralph	
		US-6993292		Jan 31, 2006	Sabongi, Gebran J., et al.	
		US-7177824		Feb 13, 2007	Sabongi, Gebran J., et al.	
		US-7231233		Jun 12, 2007	Gosieski, George J. Jr.	
		US-7761063		Jul 20, 2010	Tsuda, Shinichiro et al.	
		US-7920539		Apr 5, 2011	Stanford, Thomas et al.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code [1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-20050059414		Mar 17, 2005	Mahmoodi, Abolghassem B., et al.	

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		US-20050135458		Jun 23, 2005	Graves, David W., et al.	
		US-20050277410		Dec 15, 2005	Ismail, Samir et al.	
		US-20060041482		Feb 23, 2006	Awiszus, Steven T., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
		WO-2007094981			Aug 23, 2007	AWISZUS, Steven T.		

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[5]
		"3M Wireless Intercom System Service Information", Copyright March 2003, pp 1-18	
		"EtherPath User's Guide", Copyright 1998…2004, Revised June 3, 2004, pp 1-92	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Examination Report", dated September 22, 2011, from NZ Application No. 595259, corresponding to U.S. Patent Application No. 11/276,048, (pp. 2).	
		"Examination Report", NZ Application No. 595104 (our file 102.0105NZD1), mailed September 15, 2011 (pp. 1-3)	
		"Examination Response", dated November 3, 2011, from NZ Application No. 570370, corresponding to U.S. Patent Application No. 11/276,048, (pp. 2).	
		"Handbook of Intercom Systems Engineering", Copyright 2000, Revised March 2002, pp 1-168	
		"HM Electronics PRO850 Wireless Intercom Operating Instructions", Copyright September 2003, Revised September 11, 2003, pp 1-45	
		VU, TUYET, "HME's New PRO850 Wireless Intercom System Offers More Flexibility and Operation Power to Pro-Audio Professionals", PRO3-10, September 2, 2003 (1 page)	
		WHITE, RON, "How Computer's Work", Indianapolis, IN: Que, 2006. Print. (6 pages)	
		"Japanese Office Action", from JP Application No. 2008-544285 (our file 102.0105JPWO), mailed May 29, 2012, (4 pages) English translation	
		"Lantronix Secure Com Port Redirector User Guide", Copyright 2004, Revision B December 2004, pp 1-24	
		"Non-Final Office Action", mailed December 6, 2012 in co-pending Application Serial No. 95/002,239(our file 102.0105USR2), "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT," (35 pages).	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Office Action", mailed November 15, 2012 in co-pending Application Serial No. 95/002,238(our file 102.0105USRX), "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT," (45 pages).	
		"PC30 Software Version 2.1, for HME System 30, Installation and Operating Instructions", HM Electronics, Inc., November 2003, 104 pages.	
		"PCT International Preliminary Report on Patentability", from International Application No. PCT/US2007/002961, corresponding to U.S. Patent Application No. 11/276,048, dated June 28, 2007, pp 1-6	
		"Response to First Examiner's Report", dated May 10, 2010 from AU Application No. 2007215462, corresponding to U.S. Patent Application No. 11/276,048, mailed June 1, 2011, (pp. 10)	
		"Response to First Examiner's Report", dated September 15, 2011, from NZ Application No. 595104, corresponding to U.S. Patent Application No. 11/276,048, mailed December 6, 2012 (3 pgs)	
		"Response to Non-Final Office Action mailed December 6, 2012", filed with USPTO February 6, 2013 in co-pending Application Serial No. 95/002,239(our file 102.0105USR2), (78 pages).	
		"Response to Office Action mailed November 15, 2012", filed with USPTO January 15, 2013 in co-pending Application Serial No. 95/002,238(our file 102.0105USRX), (75 pages).	
		"Symantec pcAnywhere User's Guide", Copyright 2003, pp 1-212	
		"System 30, Drive-Thru Timer System, Operating Instructions", HM Electronics, Inc., November 2002, 99 pages.	
		"Telex Operating Instructions RadioCom BTR-800, TR-800 Professional Wireless Intercom System", June 2002, pp 1-73	

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

		"Wireless 6000 Wireless Drive-Thru Audio System Installation Instructions, by HM Electronics", Copyright August 2003, pp 1-50	
		"Request For *Inter Partes* Reexamination (37 CFR 1.913)" filed with USPTO September 13, 2012 in US Patent No. 8,005,455, Attorney docket no. 64895.1.10 (102.0105USR2), (123 pages).	
		"Request For *Inter Partes* Reexamination (37 CFR 1.913)" filed with USPTO September 13, 2012 in US Patent No. 7,599,679, Attorney docket no. 64895.1.9 (102.0105USRX), (147 pages).	

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13/214,746
	Filing Date	Aug 22, 2011
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	102.0105USC2

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

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

☐ None

SIGNATURE

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

Signature	/Rakhi Nikhanj/	Date (YYYY-MM-DD)	2013-02-26
Name/Print	Rakhi Nikhanj	Registration Number	66,654

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

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Rakhi Devi Nikhanj/Elizabeth DeVries
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	15040835
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Rakhi Devi Nikhanj/Elizabeth DeVries
Filer Authorized By:	Rakhi Devi Nikhanj
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	26-FEB-2013
Filing Date:	22-AUG-2011
Time Stamp:	18:11:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7621
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Other Reference-Patent/App/Search documents	2011_06_01_102_0105AUWO_Response_to_OA.PDF	88219 8b271ba44d6976fcc9f35bb5c0b947a465dc2008	no	10
Warnings:					
Information:					
2	Other Reference-Patent/App/Search documents	2011_09_15_102_0105NZD1_OA.PDF	566490 9cf382464c034f5941edd8c80ff1e6dce8353cd5	no	3
Warnings:					
Information:					
3	Other Reference-Patent/App/Search documents	2011_09_22_Exam_Report_NZ595259.pdf	509591 c0c71ffe41cd1df741d5efbecdc211ef19f88f78	no	2
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	2011_11_03_NZ570370_Response.pdf	146964 4e5eddb3811263dad08d63350b4b6897c6cedcd8	no	2
Warnings:					
Information:					
5	Other Reference-Patent/App/Search documents	2012_05_29_102_0105JPWO_NFOA.pdf	183455 8c546184aae1504c486491f360455a5eeedffb2e	no	4
Warnings:					
Information:					
6	Other Reference-Patent/App/Search documents	2012_12_06_102_0105NZD1_ResponsetoOA__.pdf	172089 b970d50618227e9e5b88503f371d343803db9811	no	3
Warnings:					
Information:					
7	Non Patent Literature	HME_PC30A_Software_User_Manual_2003_.pdf	10796708 d553774d64c091621c023304466aa26fbc0cbc21	no	104
Warnings:					
Information:					
8	Non Patent Literature	HME_Timer_System_30_OperatingManual_2002_.pdf	19920683 dd8e21464d2f2b96641a318cd7436958d635da03	no	99

Warnings:					
Information:					
9	Non Patent Literature	Vu_PRO850PressRelease_.pdf	40683 b9acde97ffa126e39d512a673c86d4f85e15f4d9	no	1
Warnings:					
Information:					
10	Non Patent Literature	White_HowComputersWork_.pdf	5387702 12e991f65e96da54ab7b29cb92404b241867de99	no	6
Warnings:					
Information:					
11	Other Reference-Patent/App/Search documents	WO2007094981_Preliminary_Report_Patentability.pdf	274223 c9ec961d09d789a48cbf163c564a534c95f9b573	no	6
Warnings:					
Information:					
12	Other Reference-Patent/App/Search documents	2012_11_15_102_0105USRX_OfficeAction.pdf	1579126 b797d761371872198 51b5930e937880bc0c88151	no	45
Warnings:					
Information:					
13	Other Reference-Patent/App/Search documents	2012_12_06_102_0105USR2_OfficeAction.pdf	1294514 fc09c68c32fbf46fdb76ee607b7a96490a50c803	no	35
Warnings:					
Information:					
14	Other Reference-Patent/App/Search documents	2013_01_15_102_0105USRX_Response_OA.pdf	3823364 3a8850a562803b580f6837e1db1fe361968ba340	no	75
Warnings:					
Information:					
15	Other Reference-Patent/App/Search documents	2013_02_06_105_0105USR2_Response_OA.pdf	4170188 9640e9817d6bc70d9e2d82fce182f1f963f9d1a2	no	78
Warnings:					
Information:					
16	Non Patent Literature	_ETHERPATH_USERS_GUIDE.pdf	1900888 b021f56da70cc342dc46b1901719794342a8452b	no	92
Warnings:					
Information:					
17	Non Patent Literature	3M_WIRELESS_INTERCOM_SYSTEM_SERVICE_INFO.pdf	719772 434af6d33f3d7fbabb0267be194daa9e90d5af04	no	18

Warnings:					
Information:					
18	Non Patent Literature	HANDBOOK_INTERCOM_SYSEMS_ENGINEERING.pdf	8835523 1b63b99d4a6d0e493495efbdf03331b63cb1bb50	no	168
Warnings:					
Information:					
19	Non Patent Literature	HM_PRO850_INSTRUCTIONS.pdf	2116452 aa843467383d10a74c675d9286fb130c7fe367b7	no	45
Warnings:					
Information:					
20	Non Patent Literature	LANTRONIX_SECURE_COM_PORT_REDIRECTOR_GUIDE.pdf	1183758 75ec7a5b4c5f141b9438871fa5f72ebab8444f21	no	24
Warnings:					
Information:					
21	Non Patent Literature	SYMANTEC_PCANYWHERE_USERS_GUIDE.pdf	7288406 c0181f7ed8e02bed1868276e2a03e5e31b286217	no	212
Warnings:					
Information:					
22	Non Patent Literature	TELEX_OPERATING_INSTRUCTIONS_RADIOCOM_BTR800.pdf	2230316 2aeb8b18886d01745ac07a511a90e1fcfdeff61c	no	73
Warnings:					
Information:					
23	Non Patent Literature	WIRELESS_6000_WIRELESS_AUDIO_INSTRUCTIONS.pdf	2807914 32bf11d74e863ff3c99b5e872bff71f4888d513f	no	50
Warnings:					
Information:					
24	Other Reference-Patent/App/Search documents	2012_09_13_102_0105USRX_Request_InterPartes_Reexamination_7599679_.pdf	25644603 807a66c9a56a2b423a875034f4a5a73c1150949b	no	147
Warnings:					
Information:					
25	Other Reference-Patent/App/Search documents	2012_09_13_102_0105USR2_Request_InterPartes_Reexamination_8005455_.pdf	8314008 c0cc84ceb4494878906a242a0fc848305b7f72db	no	123
Warnings:					
Information:					
26	Information Disclosure Statement (IDS) Form (SB08)	2013_02_26_102_0105USC2_1449.pdf	153131 12d57c691dbf87cd60e1fa4b7cb24822d32dd726	no	6

Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
27	Fee Worksheet (SB06)	fee-info.pdf	30889 03d9c44cda261e1907d06735e998242915657bcc	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	110179659	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 61312WO003	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2007/002961	International filing date *(day/month/year)* 01 February 2007 (01.02.2007)	Priority date *(day/month/year)* 10 February 2006 (10.02.2006)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant 3M INNOVATIVE PROPERTIES COMPANY		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☒	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 12 August 2008 (12.08.2008)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Simin Baharlou e-mail: pt09.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
BUCKINGHAM, Stephen W.

3M Center Office of Intellectual Property Counsel Post Office Box 33427 Saint Paul Minnesota 55133-3427 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**28 JUNE 2007 (28.06.2007)**
Applicant's or agent's file reference 61312WO003	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2007/002961	**01 FEBRUARY 2007 (01.02.2007)**	10 FEBRUARY 2006 (10.02.2006)

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

H04L 12/28(2006.01)i, H04L 12/46(2006.01)i, H04L 12/66(2006.01)i

Applicant

3M INNOVATIVE PROPERTIES COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	27 JUNE 2007 (27.06.2007)	JEON, Yong Hai Telephone No.82-42-481-565

Form PCT/ISA/237 (cover sheet) (April 2007)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2007/002961

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

   ☐ a sequence listing
   ☐ table(s) related to the sequence listing

   b. format of material

   ☐ on paper
   ☐ in electronic form

   c. time of filing/furnishing

   ☐ contained in the international application as filed.
   ☐ filed together with the international application in electronic form.
   ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2007/002961

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date(Rules 43bis.1 and 64.1) is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if neccessary:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2007/002961

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-41	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-41	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-41	YES
	Claims	None	NO

2. Citations and explanations :

Reference is made to the following documents:
D1: US 2003/0134666 A1 (FLETCHER et al.) 17 Jun. 2003
D2: US 5321848 A (MIYAHIRA et al.) 14 Jun. 1994

Claim 1 of the present invention relates to a remotely configurable wireless intercom system for an establishment having a staff. The system comprises: a base station connectable to a wide area communication network; a plurality of headsets in two-way wireless communication with said base station; said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter; said at least one parameter being adjustable by said staff of said establishment; said at least one parameter being remotely reviewable and being remotely adjustable via wide area communication network.

Claim 19 of the present invention relates to a remotely configurable wireless intercom system for an establishment having a staff. The system comprises: a base station connectable to a wide area communication network; a plurality of headsets in two-way wireless communication with said base station; said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter; at least one parameter being remotely reviewable via said wide area communication network; and said at least one parameter being remotely re-settable via said wide area communication network.

Claim 21 of the present invention relates to a method of providing a remotely configurable wireless intercom system for an establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with said base station. The method comprises the steps of: configuring wireless communication between each of said plurality of headsets and said base station with at least one parameter being adjustable by said staff of said establishment; and remotely reviewing and adjusting said at least one parameter via said wide area communication network.

Claim 39 of the present invention relates to a method of providing a remotely configurable wireless intercom system for an establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with said base station. The method comprises the steps of: configuring wireless communication between each of said plurality of headsets and said base station; remotely reviewing at least one parameter via said wide area communication network; remotely determining if a fault condition exists with said plurality of parameters; and resetting said at least one parameter to a predetermined value via said wide area communication network

(continued on the supplemental box)

International application No.
PCT/US2007/002961

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

(Box No. V item 2)

D1 discloses a. wireless intercom system comprising: a base that communicates with headsets via radio waves; and headsets that communicates with the base station via radio waves.

D2 discloses a drive-up station full duplex communication system for communications between an employee within a building and a customer seated within a vehicle in a drive-up lane at a drive-up customer speaker post, outside of the building. The system comprises: employee transceiving means for transmitting a first audio signal and for receiving a second audio signal; a base station transceiving means to receive said first audio signal and a third audio signal and to transmit said second audio signal and a fourth audio signal; audio gain reduction means to decrease said second audio signal; fixed remote communication means mounted to the drive-up customer speaker post to transmit said third audio signal and receive said fourth audio signal said fixed remote communication means including a microphone compartment having a microphone disposed therein for enabling the customer to communicate to the employee within the building, a speaker compartment having a speaker disposed therein for enabling the customer to receive communications from the employee within the building, and isolation means to separate acoustically said microphone compartment and said speaker compartment; said speaker compartment having a front opening for helping to direct sounds from the speaker towards the customer; said isolation means including a front wall having a baffle mounted thereto extending downwardly to partially obstructed said frontal opening for helping to direct sounds from the speaker downwardly and away from the microphone; said speaker compartment having a bottom wall recessed from said frontal opening for enabling sounds from the speaker to be directed downwardly towards the drive-up lane;
means for mounting said speaker inclined downwardly at an angle .theta. relative to the vertical for directing sounds from the speaker downwardly towards the drive-up lane; and electrically connective means to connect said fixed remote communication means to said base station transceiving means.

However, D1 and D2 do not disclose the technical feature of claims 1, 19, 21 and 39 that wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment

And the said technical feature is not anticipated by the prior art and not obvious to a person skilled in the art. Thus claims 1, 19, 21 and 39 involve novelty and an inventive step under the criteria of PCT Article 33(2) and (3). Also, claims 2-18, 20, 22-38, 40 and 41 comply with PCT Article 33(2) and (3) as they are dependent claims.

Claims 1-41 of the present invention relate to wireless intercom systems for commercial establishments.
Therefore, the claims 1-41 are industrially applicable under the criteria PCT Article 33(4).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Awiszus	Examiner:	Nguyen
Serial No.:	13/214,746	Group Art Unit:	2617
Filed:	August 22, 2011	Docket No.:	61312US015 (102.0105USC2)
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

AMENDMENT

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

Sir:

In response to the Office Action dated September 4, 2012, the following amendment is respectfully submitted.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

Amendments to the Claims

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

1-45. (Cancelled)

46. (New) An intercom system, said intercom system being configurable for a drive-through, quick service restaurant establishment having a staff, comprising:
a base station connectable to a wide area communication network;
at least one headset capable of two-way wireless communication with said base station;
said wireless communication between the at least one headset and said base station being configurable with at least one parameter that adjusts a volume level of communications wirelessly received or wirelessly transmitted by the headset;
said at least one parameter being adjustable by the staff at the establishment;
said base station being configured to permit remote review and remote adjustment of said at least one parameter when said base station is connected to said wide area communication network; and
wherein said at least one parameter can be saved into a template of parameters for later use.

47. (New) The system of claim 46, wherein said at least one parameter is a plurality of parameters that adjust volume levels of communications wirelessly received or wirelessly transmitted by said headset, said plurality of parameters being adjustable by the staff at the establishment and being remotely reviewable and remotely adjustable when said base station is connected to said wide area communication network, and wherein said plurality of parameters can be grouped and saved into said template of parameters for later use.

48. (New) The system of claim 47, wherein one of said plurality of parameters is a vehicle alert.

49. (New) The system of claim 46, wherein said template of parameters can be saved locally at the establishment.

50. (New) The system of claim 46, wherein said template of parameters can be saved to a location remote from the establishment.

51. (New) The system of claim 46, wherein said template of parameters is a default.

52. (New) The system of claim 46, wherein said template of parameters is a factory default.

53. (New) The system of claim 46, wherein said template of parameters is configured for recall to reset the system.

54. (New) The system of claim 47, wherein said plurality of parameters comprises a first parameter and a second parameter, wherein said first parameter adjusts a volume level of communications emitted by a speaker in the headset that were captured by a microphone in a drive-through lane, and wherein said second parameter adjusts a volume level of communications emitted by a speaker in the drive-through lane that were captured by a microphone in the headset.

55. (New) The system of claim 46, wherein said at least one headset is a plurality of headsets.

56. (New) The system of claim 47, wherein at least one of said plurality of parameters adjusts volume levels of communications between the headset and an ordering point in a drive-through lane.

57. (New) The system of claim 46, further comprising an ordering point having a speaker and a microphone, wherein said ordering point is positioned near a menu board and is capable of communication with said base station.

58. (New) The system of claim 57, wherein said ordering point is configured to be hard-wired to said base station.

59. (New) The system of claim 46, further comprising software configured to determine if a fault condition exists in the system.

60. (New) The system of claim 47, wherein one of said plurality of parameters is master volume.

61. (New) The system of claim 56, wherein one of said plurality of parameters is master volume.

62. (New) An intercom system, said intercom system being configurable for a drive-through, quick service establishment having a staff, comprising:
a base station connectable to a wide area communication network;
a plurality of headsets capable of two-way wireless communication with said base station;
said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter that adjusts at least one volume level of communication between each of the headsets and at least one ordering point in a drive-through lane;
said at least one parameter being adjustable by the staff of the establishment;
said base station being configured to permit remote review and remote adjustment of said at least one parameter when said base station is connected to said wide area communication network; and
wherein said at least one parameter for each of said plurality of headsets is grouped into a template of parameters that can be saved for later use.

63. (New) The system of claim 62, further comprising an ordering point having a speaker and a microphone, wherein said ordering point is positioned near a menu board and is capable of communication with said base station.

64. (New) The system of claim 62, wherein said template of parameters can be saved locally at the establishment.

65. (New) The system of claim 62, wherein said template of parameters can be saved to a location remote from the establishment.

66. (New) The system of claim 62, wherein said template of parameters is a default.

67. (New) The system of claim 62, wherein said template of parameters is a factory default.

68. (New) The system of claim 62, wherein said template of parameters is configured for recall to reset the system.

69. (New) The system of claim 62, wherein said at least one parameter is a plurality of parameters.

70. (New) The system of claim 69, wherein said plurality of parameters comprises a first parameter and a second parameter, wherein said first parameter adjusts a volume level of communications emitted by a speaker in one of said plurality of headsets captured by a microphone of the ordering point, and wherein said second parameter adjusts a volume level of communications emitted by a speaker of the ordering point captured by a microphone of said one headset of said plurality of headsets.

71. (New) The system of claim 69, wherein said plurality of parameters further comprises a vehicle alert parameter.

72. (New) The system of claim 63, wherein said ordering point is configured to be hard-wired to said base station.

73. (New) The system of claim 62, further comprising software configured to determine if a fault condition exists in the system.

74. (New) The system of claim 69, wherein one parameter of said plurality of parameters is master volume.

75. (New) The system of claim 71, wherein one parameter of said plurality of parameters is master volume.

REMARKS

Applicants respectfully request reconsideration of the present case in view of the above amendments and the following remarks. Claims 1-45 have been canceled. Claims 46-75 have been added. Claims 46-75 are currently pending. No new matter has been inserted. The new claims are supported throughout the application as-filed, and many of the new claims are supported by the originally-filed claims, but specific examples are provided herein.

With regard to new independent claim 46, "a base station connectable to a wide area network" is claimed, which is supported in the application as-filed at least at ¶¶ 40, 53-54, 58, and the originally-filed claims. "[A]t least one headset capable of two-way wireless communication with said base station" is supported at least by the originally-filed claims and at ¶¶ 53-54. "[S]aid wireless communication between the at least one headset and said base station being configurable with at least one parameter that adjusts a volume level of communications wirelessly received or wirelessly transmitted by the headset" is supported at least by the originally-filed claims and at ¶¶ 54, 60. "[S]aid at least one parameter being adjustable by the staff at the establishment" is supported at least by the originally-filed claims and at ¶55. "[S]aid base station being configured to permit remote review and remote adjustment of said at least one parameter when said base station is connected to said wide area communication network" is supported at least by the originally-filed claims and at ¶¶ 11, 13, 58. "[S]aid at least one parameter can be saved into a template of parameters for later use" is supported at least by the originally-filed claims and at ¶¶ 61-62.

With regard to new independent claim 62, "a base station connectable to a wide area communication network" is claimed, which is supported in the application as-filed at least at ¶¶ 40, 53-54, 58, and the originally-filed claims. "[A] plurality of headsets capable of two-way wireless communication with said base station" is supported at least by the originally-filed claims and at ¶¶ 53-54. "[S]aid wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter that adjusts at least one volume level of communication between each of the headsets and at least one ordering point in a drive-through lane" is supported at least by the originally-filed claims and at ¶¶ 54, 60. "[S]aid at least one parameter being adjustable by the staff of the establishment" is supported at least by the originally-filed claims and at ¶55. "[S]aid base station being configured to permit

remote review and remote adjustment of said at least one parameter when said base station is connected to said wide area communication network" is supported at least by the originally-filed claims and at ¶¶ 11, 13, 58. "[S]aid at least one parameter for each of said plurality of headsets is grouped into a template of parameters that can be saved for later use" is supported at least by the originally-filed claims and at ¶¶ 61-62.

Dependent claim 47 claims "a plurality of parameters that adjust volume levels of communications…" which is supported at least at ¶¶ 54, 58, 60-61, "parameters being adjustable by the staff…and remotely reviewable and remotely adjustable…" which is supported at least at ¶¶ 54, 59, 63, 66 and a "template of parameters" that is supported at least at ¶¶ 61-63. The content of claims 48 and 71 are supported at least at ¶ 54. Dependent claims 49 and 64 are supported at least at ¶ 62. Dependent claims 50 and 65 are supported at least at ¶ 63. Dependent claims 51-53 and 66-68 are supported at least at ¶ 47. Dependent claims 54 and 70 are supported at least at ¶ 54. Dependent claim 55 is supported at least at ¶ 53. Dependent claim 56 is supported at least at ¶ 54. Dependent claims 57 and 63 are supported at least at ¶¶ 3, 40. Dependent claims 58 and 72 are supported at least at ¶ 3. Dependent claims 59 and 73 are supported at least at ¶¶ 65-66. Dependent claims 60, 61, 74, and 75 are supported at least at ¶¶ 54, 60. Dependent claim 69 is supported at ¶¶ 58, 60-61.

Double Patenting

Claims 17-45 were rejected on the ground of nonstatutory obviousness-type double patenting over U.S. Pat. No. 7,599,679. Applicant respectfully requests that this rejection be held in abeyance until there is an indication of allowable subject matter, at which time Applicant will file a terminal disclaimer if still appropriate.

35 U.S.C. § 103

Claims 1-5, 10-12, 17-20 and 25-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hall (US 7,120,388) in view of Laurila (US 2004/0204168). These claims have been cancelled. As such, Applicant respectfully requests that this rejection be withdrawn.

Summary

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Please charge any additional fees or credit any overpayments to Deposit Account No. 50-3688 which may have been overlooked with regard to this filing.

Respectfully submitted,

February 4, 2013
Date

/Rakhi D. Nikhanj/
Rakhi D. Nikhanj
Reg. No. 66,654
Pauly, DeVries Smith & Deffner, L.L.C.
Customer Number: 32692
Phone No: 612-746-4790

Electronic Patent Application Fee Transmittal

Application Number:	13214746
Filing Date:	22-Aug-2011
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Rakhi Devi Nikhanj/Elizabeth DeVries
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with $0 paid	1252	1	570	570

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**570**

Electronic Acknowledgement Receipt

EFS ID:	14869346
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Rakhi Devi Nikhanj/Elizabeth DeVries
Filer Authorized By:	Rakhi Devi Nikhanj
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	04-FEB-2013
Filing Date:	22-AUG-2011
Time Stamp:	17:29:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$570
RAM confirmation Number	5301
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2013_02_04_102_0105USC2_NFOAResponse.pdf	83414 b543f4ae437bb319527ad3dad415b230125c39b5	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30831 b625709483d5b1f0cd8b6783f53605f10660cd4b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	114245		

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
13/214,746	08/22/2011	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $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).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/04/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 45	= 0	X $ =		OR	X $62=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***6	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DOROTHY BELL/

Substitute for form 1449A/PTO (modified)		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	**Application Number**	**13/214746**
	Filing Date	**22-AUG-2011**
	First Named Inventor	**Awiszus, Steven T**
(Use as many sheets as necessary)	**Confirmation Number**	**1908**
Page 1 of 1	**Attorney Case Number**	**61312US015**

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	2003/0134666	07-17-2003	Fletcher	
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1						
	B2						
	B3						
	B4						
	B5						
	B6						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1		
	C2		
	C3		

*Examiner:	Date Considered:
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.	

Electronic Acknowledgement Receipt

EFS ID:	14550949
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	David Burke Patchett/Rebecca Bode
Filer Authorized By:	David Burke Patchett
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	21-DEC-2012
Filing Date:	22-AUG-2011
Time Stamp:	18:43:06
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	Transmittal Letter	IDS3_61312US015.PDF	74639 4f6f056c25fce9533417eaa3985bb3f3f93944ac	no	2

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	IDS3_1449_61312US015.PDF	77585 c7e55304f6966594d91dd1e108880874505acbea	no	1

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	152224

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

32692
Customer Number

Patent
Case No.: 61312US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	AWISZUS, STEVEN T		
Application No.:	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

INFORMATION DISCLOSURE STATEMENT

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

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

December 21, 2012 /Rebecca C. Bode/
Date Signed by: Rebecca C. Bode

Dear Sir:

Pursuant to 37 CFR §§ 1.56, 1.97, and 1.98, enclosed is a completed Form PTO-1449, citing references submitted for consideration by the Examiner. It is respectfully requested that the Examiner initial and return the enclosed Form PTO-1449 to indicate that each reference has been considered.

Fees

☒ It is believed that no fee is due; however, in the event a fee is required, please charge the fee to Deposit Account No. 13-3723.

☐ The fee required under 37 CFR § 1.17(p) will be paid at the time of EFS-Web submission. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☐ Please charge the fee provided in 37 CFR § 1.17(p) to Deposit Account No. 13-3723.

Certification Under 37 § CFR 1.97(e)(1)

Under 37 CFR § 1.97(e)(1), I hereby certify that each item of information contained in this Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three (3) months prior to the filing of this Information Disclosure Statement.

Copies of Documents

Copies of any cited foreign patents, foreign publications, non-patent literature documents, and any pending U.S. applications filed before June 30, 2003, are enclosed. Copies of any pending U.S. applications filed after June 30, 2003 that can be accessed on the USPTO's IFW system are not enclosed as per USPTO Waiver dated September 21, 2004. Copies of any U.S. patents and published U.S. patent applications are not enclosed.

Respectfully submitted,

December 21, 2012
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)	1908

32692 7590 09/04/2012

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER	
NGUYEN, DAVID Q	

ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
09/04/2012	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):

LegalUSDocketing@mmm.com

Office Action Summary	Application No.	Applicant(s)	
	13/214,746	AWISZUS, STEVEN T.	
	Examiner	Art Unit	
	DAVID Q. NGUYEN	2617	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *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 *22 August 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ 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

5)☒ Claim(s) *1-45* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-5,10-12 and 17-45* is/are rejected.

8)☒ Claim(s) *6-9 and 13-16* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ 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).

12)☐ 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

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.

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/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 17-45 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 7,599,679. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the reference US 7,599,679. The reference and instant application are claiming common subject matter, as follows:

A remotely configurable wireless intercom system for an establishment having a staff, comprising: a base station; a plurality of headsets in two-way wireless communication with said base station; said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter; said at least one parameter being locally adjustable; and said at least one parameter being remotely adjustable via a wide area communication network, wherein said at least one parameter comprises an audio level.

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 negatived by the manner in which the invention was made.

4. Claims 1-5, 10-12, 17-20 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall (US 7,120,388 B2) in view of Laurila (US 2004/0204168 A1).

Regarding claim 1, Hall teaches an intercom system for a drive-through, quick service restaurant facility (see abstract, col. 6, lines 39-61 and fig. 1) comprising: a plurality of headsets (see fig. 7 and col. 8, lines 22-45; wearers of ear sets 44); a base station configured for communication with the plurality of headsets (see fig. 7 and col. 6, line 39 to line 61; base station 18); a speaker associated with a drive-through facility and configured to be located near a menu board (see col. 6, lines 39 to 45; fig. 7 and fig. 11; speaker 12), wherein the speaker is configured for communication with the base station (see col. 6, lines 39 to 45; fig. 7 and fig. 11; speaker 12); and a microphone configured to be located near the menu board and configured for communication with the base station (see col. 6, lines 39 to 45; fig. 7 and fig. 11; microphone 14); the system further comprising a plurality of parameters controlling a configuration of the intercom system (see fig. 11 and col. 10, lines 21-38; frequency f_1 and frequency f_2); wherein the base station is connectable to a wide area communication network (see fig. 7 and fig. 11). Hall does not disclose wherein the base station is connectable to a wide area communication network in order to enable remote adjustment of the plurality of parameters. However, Laurila teaches enabling remote adjustment of the plurality of parameters (see par. 0045 and fig. 1; where a change of volume (preferably discrete volume levels such as 0 to 15) is selected at the AG UI 56, the AG PAN circuitry 82 signals the request to the headset PAN circuitry 50. The adjusted volume is displayed at the headset UI 58 if present, and the headset PAN circuitry 50 acknowledges the request back to the AG PAN circuitry 82. Where the (FM) volume adjust is initiated at the headset UI 58, the flow of data is reversed). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Laurila to Hall in order to reduce overall ambient noise in the system.

Regarding claim 10, Hall teaches a method comprising: configuring wireless communication between each of a plurality of headsets (see fig. 7, fig. 11 and col. 8, lines 22-45; wearers of ear sets 44), a base station with a plurality of parameters, a speaker configured to be located near a menu board, and a microphone configured to be located near a menu board (see fig. 7 and col. 6, line 39 to line 61; base station 18, speaker 12 and micro[hone 14), wherein at least one of the plurality of parameters is configured for local adjustment (see fig. 11 and col. 10, lines 21-38; frequency f_1 and frequency f_2); connecting the base station to a wide area network (see fig. 7, fig. 11 and col. 6, line 39 to line 61). Hall does not disclose remotely adjusting at least one of the plurality of parameters via the wide area network. However, Laurila teaches remotely adjusting at least one of the plurality of parameters via the wide area network (see par. 0045 and fig. 1; where a change of volume (preferably discrete volume levels such as 0 to 15) is selected at the AG UI 56, the AG PAN circuitry 82 signals the request to the headset PAN circuitry 50. The adjusted volume is displayed at the headset UI 58 if present, and the headset PAN circuitry 50 acknowledges the request back to the AG PAN circuitry 82. Where the (FM) volume adjust is initiated at the headset UI 58, the flow of data is reversed). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Laurila to Hall in order to reduce overall ambient noise in the system.

Regarding claim 17, Hall teaches a remotely configurable wireless intercom system for an establishment having a staff (see abstract, col. 6, lines 39-61 and fig. 1), comprising: a base station (see fig. 7 and col. 6, line 39 to line 61; base station 18); a plurality of headsets in two-way wireless communication with said base station (see fig. 7 and col. 8, lines 22-45; wearers of ear sets 44); said wireless communication between each of said plurality of headsets and said

base station being configurable with at least one parameter (see fig. 11 and col. 10, lines 21-38; frequency f_1 and frequency f_2); Hall does not disclose said at least one parameter being locally adjustable; and said at least one parameter being remotely adjustable via a wide area communication network, wherein said at least one parameter comprises an audio level. However, Laurila teaches at least one parameter being locally adjustable; and said at least one parameter being remotely adjustable via a wide area communication network, wherein said at least one parameter comprises an audio level (see par. 0045 and fig. 1; where a change of volume (preferably discrete volume levels such as 0 to 15) is selected at the AG UI 56, the AG PAN circuitry 82 signals the request to the headset PAN circuitry 50. The adjusted volume is displayed at the headset UI 58 if present, and the headset PAN circuitry 50 acknowledges the request back to the AG PAN circuitry 82. Where the (FM) volume adjust is initiated at the headset UI 58, the flow of data is reversed). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Laurila to Hall in order to reduce overall ambient noise in the system.

Regarding claim 25, Hall teaches a method comprising: configuring wireless communication between each of a plurality of headsets and a base station with at least one parameter, wherein the at least one parameter is configured for local adjustment (see fig. 7; col. 6, line 39 to line 61; base station 18 and col. 8, lines 22-45; wearers of ear sets 44; fig. 11 and col. 10, lines 21-38; frequency f_1 and frequency f_2). Hall does not teach remotely reviewing and adjusting said at least one parameter via a wide area communication network, wherein said at least one parameter comprises an audio level. However, Laurila teaches remotely reviewing and adjusting said at least one parameter via a wide area communication network, wherein said at

least one parameter comprises an audio level (see par. 0045 and fig. 1; where a change of volume (preferably discrete volume levels such as 0 to 15) is selected at the AG UI 56, the AG PAN circuitry 82 signals the request to the headset PAN circuitry 50. The adjusted volume is displayed at the headset UI 58 if present, and the headset PAN circuitry 50 acknowledges the request back to the AG PAN circuitry 82. Where the (FM) volume adjust is initiated at the headset UI 58, the flow of data is reversed). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Laurila to Hall in order to reduce overall ambient noise in the system.

Regarding claims 2, 11, 18, 26, Hall also discloses the system comprising software configured to determine if a fault condition exists in the system (see col. 8, lines 22-45).

Regarding claims 3, 12, 19, 27, Hall also teaches wherein at least one parameter of the plurality of parameters is relevant to a vehicle detection alert (see col. 8, lines 22-45).

Regarding claim 5, Hall also teaches wherein at least one parameter comprises a drive-through lane assignment (see col. 8, lines 22-45).

Regarding claim 4, Laurila teaches wherein at least one parameter of the plurality of parameters is relevant to volume of the speaker (see par. 0045 and fig. 1).

Regarding claim 20, Laurila teaches the intercom system further comprising a speaker volume parameter (see par. 0045 and fig. 1).

Allowable Subject Matter

5. Claims 6-9, 13-16 and 21-24, 28-31 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.

Regarding claims 6-9, 13-16 and 21-24, 28-31, the prior art of record does not teach the plurality of parameters are grouped into a template as specified in the claims.

6. Claims 32-45 would be allowable if rewritten to overcome the rejection(s) under Double Patenting, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID Q. NGUYEN whose telephone number is (571)272-7844. The examiner can normally be reached on 8:30AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jinsong Hu can be reached on (571)272-3965. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID Q NGUYEN/
Primary Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 13/214,746	Applicant(s)/Patent Under Reexamination AWISZUS, STEVEN T.	
	Examiner DAVID Q. NGUYEN	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,120,388	10-2006	Hall, Ronald W.	455/3.05
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	Art Unit
	DAVID Q NGUYEN	2617

SEARCHED

Class	Subclass	Date	Examiner
455	517	08/27/2012	DN
455	3.05	08/27/2012	DN
455	73	08/27/2012	DN
455	403	08/27/2012	DN
455	569.1	08/27/2012	DN

SEARCH NOTES

Search Notes	Date	Examiner
Text	08/27/2012	DN

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2011-08-22
First Named Inventor	Steven T. Awiszus
Art Unit	2617
Examiner Name	David Q. Nguyen
Attorney Docket Number	61312US015 (102.0105USC2)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5321848		1994-06-14	Miyahira et al.	
	2	6435406		2002-08-20	Pentel	
	3	6816205		2004-11-09	Dudkowski	
	4	7599679		2009-10-06	Awiszus	

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

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030225622		2003-12-04	Doan	
	2	20040158499		2004-08-12	Dev et al.	

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13214746 - GAU: 2617
	Filing Date	2011-08-22
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	61312US015 (102.0105USC2)

	3	20040204168		2004-10-14	Laurila	
	4	20050004843		2005-01-06	Heflin	
	5	20060030269		2006-02-09	Sanbogi et al.	
	6	20090318076		2009-12-24	Awiszus	

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

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	File history for co-pending U.S. Patent Application Serial No. 12/548,596, filed August 27, 2009, Atty. Docket No. 61312US014, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (108 pgs.)	☐
	2	First Examination Report dated January 18, 2010 for co-pending New Zealand Patent Application No. 570370, filed August 27, 2009, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (2 pgs.)	☐

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13214746 - GAU: 2617
	Filing Date	2011-08-22
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	61312US015 (102.0105USC2)

	3	Office Action dated May 10, 2010 for co-pending Australian Patent Application No. 2007215462, filed August 27, 2009, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (2 pgs.)	☐

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

EXAMINER SIGNATURE

Examiner Signature	/David Nguyen/	Date Considered	08/27/2012

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

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13214746 - GAU: 2617
Filing Date	2011-08-22
First Named Inventor	Steven T. Awiszus
Art Unit	2617
Examiner Name	David Q. Nguyen
Attorney Docket Number	61312US015 (102.0105USC2)

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Rakhi D. Nikhanj/	Date (YYYY-MM-DD)	2011-08-22
Name/Print	Rakhi D. Nikhanj	Registration Number	66654

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

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

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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

Substitute for form 1449A/PTO (modified)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Page 1 of 1

Application Number	**13/214746** 13214746 - GAU: 2617
Filing Date	**22-AUG-2011**
First Named Inventor	**Awiszus, Steven T**
Confirmation Number	**1908**
Attorney Case Number	**61312US015**

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1				
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1	GB	1291743	10-04-1972			
	B2						
	B3						
	B4						
	B5						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1		
	C2		
	C3		

***Examiner:** /David Nguyen/	**Date Considered:** 08/27/2012

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.

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								
	23	✓								
	24	✓								
	25	✓								
	26	✓								
	27	✓								
	28	✓								
	29	✓								
	30	✓								
	31	✓								
	32	✓								
	33	✓								
	34	✓								
	35	✓								
	36	✓								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13214746	AWISZUS, STEVEN T.
	Examiner	**Art Unit**
	DAVID Q NGUYEN	2617

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	08/27/2012								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								
	43	✓								
	44	✓								
	45	✓								

Substitute for form 1449A/PTO (modified)		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	**Application Number**	**13/214746**
	Filing Date	**22-AUG-2011**
	First Named Inventor	**Awiszus, Steven T**
(Use as many sheets as necessary)	**Confirmation Number**	**1908**
Page 1 of 1	**Attorney Case Number**	**61312US015**

United States Patent Documents

Exam. Init.*	Cite No.	Document Number Doc. Number-(Kind Code if Known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1				
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12				

Foreign Patent Documents

Exam. Init.*	Cite No.	Foreign Patent Document Ctry. Code	 Number-Kind Code (If known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Translation (Check if yes)
	B1	GB	1291743	10-04-1972			
	B2						
	B3						
	B4						
	B5						

OTHER DOCUMENTS

Exam. Init.*	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	Translation (Check if yes)
	C1		
	C2		
	C3		

*Examiner:	Date Considered:
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.	

PATENT SPECIFICATION (11) 1291743

1291743

DRAWINGS ATTACHED

(21) Application No. 49292/70 (22) Filed 16 Oct. 1970

(31) Convention Application No. 873869 (32) Filed 4 Nov. 1969 in

(33) United States of America (US)

(45) Complete Specification published 4 Oct. 1972

(51) International Classification H04B 7/00

(52) Index at acceptance

H4L 23 26E7X 26E8 26F6 26G2B

(54) SINGLE CHANNEL DUPLEX SPACE LINKED PULSE COMMUNICATIONS SYSTEM

(71) We, THE BENDIX CORPORATION, a corporation organised and existing under the laws of the State of Delaware, United States of America, of Bendix Center, Southfield, Michigan 48075, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a single channel, polystation duplex space linked pulse communication system.

There are many activities in which small groups of men working together require ready communication in the face of high ambient noise levels, spatial separation or a water surround, unimpeded by the "push to talk" switch of conventional transceivers. Early work in this field was reported by Lewis and Milner in the periodical "Wireless Engineer" of September 1936 on Pages 475 to 482. Improvements have been made in these pulse systems, but they are basically limited to two-station operation by the fact that each receives while the other transmits. The present invention extends the desirable qualities of such systems to more than two stations by using a continuously operative receiver having essentially only two output states to provide pulse to pulse control of the pulse period of its associated transmitter modulator in such sense that the pulse generator therein is brought into synchronism with the mean of the pulses received from other stations except for a phase difference. A further desirable quality is then achieved simultaneously, in that any one station needs only to communicate with one other station to communicate with all. In the ultimate, this permits stations separated by natural barriers to communicate by way of other properly located, perhaps untended, stations used as repeaters. Dual channel duplex stations have been used to provide similar functions, but two classes of stations are then present which must communicate in alternate order, thus restricting freedom of motion.

A primary object of the invention is to provide a means for mutual communication over a common space channel without manual mode switching.

More particularly, it provides means for establishing trains of pulses at a plurality of stations linked by a common space channel and means at said stations for maintaining a common repetition rate for said trains of pulses, while the repetition rate of the pulses is subject to intelligent control at each of two or more of the stations.

Additionally, it provides means for using semiconductor devices in their most reliable mode, namely as switching devices, to maintain synchronism among members of a group of synchronous pulse communication stations. The switching devices are used to directly alter the time constant of the clock oscillator in each station during reception of a pulse to attain the object of causing convergence of transmitted and received pulses.

The preferred embodiments of the invention will now be described by way of example with reference to the accompanying drawings.

A block diagram of a preferred embodiment of the invention appears in Fig. 1. The dashed line is indicative of a simpler version.

A composite diagram appears in Fig. 2, parallel to the full-line diagram of Fig. 1. The significant components of the invention are here shown in exemplary schematic form, as an aid to a functional description.

The waveforms at significant points in the circuit of Fig. 2 are illustrated to a common time scale in Fig. 3. The waveforms shown are idealized; in a physical realization, the corners of square waves will be visibly rounded, slopes will be finite, brief spikes may appear and so forth without significant influence on the functions of the circuits.

The simpler variant indicated by the dashed line of Fig. 1 is detailed in the partial schema-

[*Price 25p*]

tic of Fig. 4 which otherwise conforms to Fig. 2.

Waveforms peculiar to the circuit of Fig. 4 are shown in Fig. 5.

The circuit of Fig. 6 may be viewed as an improvement of Fig. 4, essentially equal to Fig. 2 in performance.

In the diagram of Fig. 1 a signal input at the terminal 1, here attributed to a microphone is applied by way of the amplifier 2 to a relaxation oscillator as a free-running pulse generator 3 so as to modulate the pulse period, or viewed inversely, the pulse repetition rate. The repetition rate, at its lowest value, should be greater than twice the highest signal frequency. The output pulses from the generator 3 are conveyed to a delay circuit 4, conveniently a monostable relaxation oscillator. By using its recovery to trigger the pulse generator 5, a fixed time delay is introduced between the transition pulse of the astable pulse generator 3 and the triggering of the monostable oscillator 5. The constant duration output pulse of the monostable oscillator 5 is then used to turn on the transmitter 6, which may be simply an amplifier as in induction paging systems, a high frequency radio transmitter, a controllable optical source, etc. linked to space by an appropriate coupling such as a loop, an open antenna, a lens or the like. A receiver 7 adapted to the mode of communication is coupled to space by the same or parallel means so that it responds to the transmitter 6 associated with it and to similar transmitters in other like transceivers. The receiver 7 drives a limiting amplifier 8 so that received pulses are presented to a switched discriminator 9 as a train of square waves having abrupt transitions between two fixed values of voltage or current. In the switched discriminator the received pulses are compared to a pulse from the delay monostable oscillator 4 and the transmitted pulse monostable oscillator 5, arranged so that coincidence of the received pulse with the transmitted pulse will not vary the normal free-running output of the discriminator 9, but a received pulse starting before the transmitted pulse will change the output in a first sense in proportion to the departure from coincidence, and a received pulse occurring later than the transmitted pulse will change the output similarly in the opposite sense. A received pulse beginning before and ending after the transmitted pulse will produce a net change proportional to the departure from coincidence of the median points of the transmitted and received pulses. The output of discriminator 9 is applied to the pulse generating astable oscillator 3 to control its pulse to pulse period so that an output from the discriminator 9 in the first sense will hasten the occurrence of the next pulse and an output in the opposite sense will retard the occurrence. Thus, when two or more transceivers are in mutual communication they will transmit in pulse synchronism, with phase differences dependent on path delays and departure of each from its natural period. The mutual pulse period thus established will be approximately a median of the shortest and longest natural periods represented in the group. When the pulse period of one or more members of the group is subjected to modulation by speech or other intelligence, all members of the group respond alike. A bandpass filter 10 may then be connected to the astable oscillator 3 or either of the monostable oscillators 4 or 5 or the transmitter input at a point where unidirectional pulses are found, to recover the modulation of all members of the group, since the average value of the pulses is directly proportional to their repetition rate. The variations in this average value are small, so an amplifier 11 is generally required to provide an adequate output at the terminal 12 for a headphone.

In an alternate version indicated by the dashed connection A the switched discriminator is omitted and the output of the limiting amplifier 8 is applied directly to the pulse generating astable oscillator 3 to modify its period. The duration of the pulses from the limiting amplifier 8 will be a minimum when all received pulses are coincident with the pulses from the transmitter 6. Pulses from other transceivers arriving either earlier or later than the pulses from the transmitter 6 will increase the duration of the pulses from the limiting amplifier 8. Hence, the pulse to pulse period of the pulse generating astable oscillator 3 can be influenced in only one sense by a lack of coincidence. If, for example, the sense of control is elected to increase the pulse to pulse period of the generator 3 as the control pulses from the limiting amplifier increase in duration, the pulse to pulse period of a transceiver will be increased from its natural free running value when it receives pulses from another transciever. Members of a group of transceivers will have different natural pulse to pulse periods and consequently require different control potentials, so they fall into synchronism with a variety of phase relations between transmitted and received pulses. Similarly, changing the sense of control of the generator 3 by the pulse output of the limiting amplifier 8 would cause all members of a group to operate with pulse to pulse periods shorter than their natural periods.

The partial schematic of Fig. 2 contains block designations of conventional elements, identified by the numbers used in Fig. 1, and an exemplary but non-exclusive schematic of the novel combination of functions. Here the active element of the astable pulse generator 3 of Fig. 1 is the unijunction transistor 13, which periodically discharges the capacitor 14. The unijunction transistor used in this circuit is a 2N2646, an annular silicon PN

type and all other transistors shown are 2N2222, an annular star silicon NPN useful as a high speed switch and general purpose amplifier through the VHF region. The active elements of the delay monostable oscillator 4 of Fig. 1 are the transistors 15, 16 and 17; in the quiescent state transistor 17 is non-conductive and transistors 15 and 16 are saturated. When the capacitor 14 discharges, a brief negative pulse to the base of transistor 15 turns it off, thus turning off transistor 16 and saturating transistor 17 for a period determined by the time constants of the circuit, in this instance 6 μs. Upon recovery, a negative pulse conveyed to the base of transistor 18 turns it off and produces an identical action for a period of 8 μs in the monostable oscillator comprising transistors 18, 19 and 20; this is the monostable oscillator 5 of Fig. 1. Output from the collectors of transistors 19 and 20 is used to turn on the transmitter 6 during the astable state of the oscillator 5; only one of these may be necessary, depending on the nature of the space link and the method of keying the transmitter.

In Fig. 2 the switched phase discriminator 9 of Fig. 1 comprises the transistors 21, 22 and 23 and their associated components; recharging of the capacitor 14 is controlled by this system. Immediately upon discharge of capacitor 14 through the unijunction transistor 13, the collector of the transistor 16 rises from about 0.4V. to the 9V. of the supply; current may then flow through the isolation diode 24 and the current limiting device 25 to the capacitor 14, but current flowing through the current limiting device 26 is diverted to ground through the normally saturated transistor 23. At the conclusion of the delay period of 6 μs the collector of transistor 16 will revert to 0.4V. The monostable oscillator 5 of Fig. 1 will then be triggered causing transistor 21 to cut off as transistor 20 saturates, thus providing a charging path through the isolation diode 27 and the same current limiting device 25, which persists for 8 μs. At the end of this period the potential at the collector of transistor 21 falls to 0.2V. but charging now continues through isolation diode 28 and the same current limiting device 25 until the capacitor reaches the trigger potential of the unijunction transistor 13. During the first period of 6 μs current could flow through the diode 28 as well as the diode 24, but this is inconsequential because both paths lead to the same current limiting device 25. These are the conditions existing when the only output from the receiver 7 is that derived from its associated transmitter 6.

When a signal from another transceiver is present, the equilibrium conditions may be illustrated by Fig. 3, based on the assumption that the other transceiver has a somewhat shorter natural pulse to pulse period; hence, it will transmit slightly earlier. The potential across the capacitor 14 is represented on a common temporal base by Fig. 3A, the potential scale being expanded relative to the remainder of the figure for clarity. Fig. 3E represents the nearly constant charging current, with short intervals of enhanced current, as at J, during which the capacitor potential increases at a corresponding rate (inset K) and periods of current cut off, as at L, during which the capacitor potential does not increase (inset M). Thus, immediately after the capacitor discharge, the potential of the collector of transistor 16 will rise as indicated in Fig. 3B, charging through diode 24 and current limiting device 25. However, the receiver 7 responds to a signal received before its associated transmitter 6 is keyed on, and the output of the limiting amplifier 8, indicated at Fig. 3D, becomes positive while the collector of transistor 16 is still positive. When the transistor 22 saturates and transistor 23 cuts off in response to the receiver, the current flowing through the current limiting device 26 is utilized to increase the charging current of capacitor 14 through the isolation diode 29, hastening the rise of potential across capacitor 14, as shown in inset K. When the transmission period begins, transistor 16 saturates and transistor 21 cuts off, as previously discussed, so the charging current reverts to the median value, but an incremental charge has been added which will shorten the pulse to pulse period. However, if a third transceiver having a slightly longer natural pulse to pulse period is on the scene, the output of the amplifier 8 will remain at its positive level for a short time after its associated transmitter 6 has ceased to transmit. The potential at the collector of transistor 21, indicated in Fig. 3C, will fall and current through diode 27 will cease, but transistor 22 remains saturated while the last signal continues. During this interval charging current drops to zero (wave form L, Fig. 3E) because transistor 16 is also conductive, effectively grounding the potential source for the current limiting device 26. The potential of capacitor 14 ceases to rise, thus lengthening the pulse to pulse period. In this example of a transceiver having a median pulse to pulse period, the effect of the presence of one or the other of the postulated transceivers would be to accommodate its pulse to pulse period to that of its mate, which would also accommodate its period. However, when both of the postulated transceivers are present, they influence one another to the median period and their influence on the median transceiver is but a small residue, as here shown.

Provision has been made to superimpose a signal, nominally speech, as an auxiliary charging source for the capacitor 14, as shown by the coupling of the amplifier 2 by way of the capacitor 30 and resistor 31. The effect

is to hasten charging on positive excursions of the signal, shortening the period, and reduce charging on the negative excursions, lengthening the period. Consequently, when a transceiver is modulated to transmit intelligence, it may have at one instant the shortest pulse to pulse period of any member of its group and a moment later the longest. Changes in period caused by modulation are restrained by the compensation induced by other transceivers, when they are responding. The transitions from leading to lagging phase or the reverse are accomplished rapidly because compensation ceases for an instant; hence, crossover distortion is small if the transceivers are reasonably near to being alike. As a corollary, if a transceiver should lose contact with its group, its user will observe a rise in sidetone as a result of the greater modulation changes, enabling him to find a position which will establish contact. Of the several design factors, the transmission period is most significant so it is desirable that it should be adjustable by incremental adjustment of one of the elements of the monostable oscillator 5.

Recovery of the speech or other intelligence transmitted by other members of a group may be had by integrating the pulse output at any point in the chain of pulse generators. In the example of Fig. 2, the pulses at the collector of transistor 19 have been elected.

Variants of the system of Fig. 1 can be had by using a known double time constant multivibrator to combine the functions of the astable oscillator 3 and the monostable oscillator 4 or to combine the functions of the monostable oscillators 4 and 5. Other arrangements may be used to combine the pulses to obtain the controlled charging current for the capacitor 14 of Fig. 2, using, for example, established digital logic integrated circuit units. Also, the timing circuit of the oscillator 3 may be periodically charged and the discharge controlled, since either produces a change in the average value of the resistance element of a resistance-capacitance product; other equivalents are already known. The essence is that the pulse to pulse period should respond to reception occurring immediately before or after transmission.

An alternative embodiment is provided by omitting the switched phase discriminator, as indicated by the dashed line A of Fig. 1. A reduction to practice is shown in Fig. 4, where only the portions differing from Fig. 2 are detailed, with enough peripheral circuitry from Fig. 2 to permit ready orientation. The rise in potential across the capacitor 14 is basically exponential in form, as illustrated in Fig. 5A, with an extended discontinuity, generally also exponential if any change in potential occurs. Pulses from the monostable oscillators 4 and 5 play no direct part in charging the capacitor 14, but are included as time markers where Fig. 5B is the delay period and Fig. 5C is the transmission period.

As in Fig. 2, the output of the limiting amplifier 8 is positive during reception from the associated transmitter 6 and any other transmitter in the group, as illustrated in Fig. 5E, where the dashed lines indicate functions in an individual free running system and full lines are typical of operation as a synchronized member of a group. The positive output of the limiting amplifier 8 saturates the otherwise non-conductive transistor 22 (which may be the final stage of amplifier 8), reducing the potential at the point 32 of the resistive network to about a third of its nominal value, as shown in Fig. 5D.

The dashed lines of Fig. 5 show the full cycle of events for an isolated station, the full lines the sequence for one synchronized to another station having a longer pulse to pulse period. This other station would, of course, receive a signal before transmitting, so the charging rate of its timing capacitor, which we may identify as 14', would be reduced in advance of its transmission, and would remain reduced until the output of its limiting amplifier 8' fell to near zero shortly after cessation of its transmission. The net effect in either case is to increase the pulse to pulse period. In practice it is found that the difference in control of the periods required to bring about equality is manifest only as a modest phase difference in a system. The change in period of all stations in a group may be used to provide an indication in each of any loss of contact.

As an alternative, a diode isolated charging path directly from the output of the limiting amplifier 8 in parallel with an unswitched resistive charging path may be used to increase the charging rate. With this relatively simple charging connection, the pulse to pulse period of a transceiver is reduced from its natural period when it is synchronized to another, if the receiver output is positive during reception, or increased if the receiver output is near ground during reception.

The station shown in Fig. 6 uses a different switched phase discriminator from that shown in Fig. 2. It has the attribute of interrupting the charging of the timing condenser 14 during reception of its own pulses or those arriving later in time, due to saturation of the transistor 22, thus interrupting the main charging path through the isolation or holding diode 28. The potential appearing across the condenser 14 thus resembles that of Fig. 5A. However, an auxiliary charging path providing about twice the main charging current has been provided through the diode 33, regulated by the resistor 34. This path becomes effective to shorten the pulse to pulse interval when the transistor 35 is turned off by a received pulse and the PNP transistor

36 is turned on by the delay monostable oscillator, corresponding to reception of a pulse before transmission begins. Despite the hiatus in the charging of the condenser 14 during the transmission period, the overall operation of transponding units is essentially identical to that discussed in connection with Fig. 2.

It is generally undesirable to isolate the receiver from the transmitter, so a radio link may use a common antenna and tuned circuits for both, and an acoustic link may use a common transducer; even an inductive link may best use a common coupling member. Optical transducers generally are not reversible, so cross coupling in the space path or, as earlier described, in the electrical circuit is necessary.

A timing circuit must include two or all of the three kinds of electrical impedance devices known as resistors, inductors and capacitors. For the present purpose, one of these must be switched rapidly from one value to another for brief periods. In the present state of the art, resistors may be most readily switched, and are most often combined with capacitors to produce timing circuits. It is generally recognized that the resistor controls charging or discharging the current in a tuning circuit deriving its energy from a constant potential source and hence, that a change in the potential of the source is equivalent to a change in the value of the resistor. Thus, it should be evident that many equivalents to the circuits proposed herein may be devised.

WHAT WE CLAIM IS:—

1. A common channel, duplex pulse communication system having at least a pair of stations, in which each of said stations includes: a receiver and a transmitter, said receiver being continuously operative to receive its transmissions as well as the transmissions of the other station of said pair; modulating means providing a pulse output in which the interval between pulses varies in accordance with intelligence to be transmitted from the station; synchronizing means exerting cyclic control upon said modulating means of the station in response to the pulses received from the transmitter of the other of said stations for adjusting the timing of pulses generated at the station for substantial coincidence with said received pulses; and demodulating means for each receiver providing an output intelligence signal which is a composite of the input intelligence signals of all stations in the system.

2. A communication system as claimed in claim 1, in which said modulating means includes a timing network of the relaxation type having its time constant continuously altered in response to the intelligence to be transmitted and cyclically altered in response to output from said synchronizing means.

3. A communication system as claimed in claim 1, in which said synchronizing means is additionally responsive to pulses received from the transmitter of the station.

4. A communication system as claimed in claim 1, in which said synchronizing means includes a comparator for determining the difference between the times of occurrence at the station receiver of a locally transmitted pulse and a remotely transmitted pulse.

5. A communication system as claimed in claim 4, in which said synchronizing means develops a control signal of one sense when a pulse from a remote transmitter is received prior to the occurrence of a pulse from the local transmitter and of the opposite sense when a pulse from the local transmitter terminates prior to the termination of a pulse received from a remote transmitter.

6. A communication system as claimed in claim 1, in which said modulating means includes an oscillator, a delay circuit for delaying the output of said oscillator, and a keying circuit responsive to said oscillator delayed output to key said local transmitter to transmit a pulse of fixed duration once in each cycle of said oscillator.

7. A communication system as claimed in claim 6, in which said oscillator includes a network formed of a capacitive element and of a resistive element connected to establish the period of said oscillator, and an active device connected to said network and responsive to a first electrical energy condition therein to switch it to a second electrical energy condition to maintain electrical oscillations therein, said delay circuit delaying transmission of a pulse by a fixed delay interval after said second electrical energy condition has een established.

8. A communication system as claimed in claims 1 and 7, in which said synchronizing means couples the pulse output of said local receiver to said oscillator to control during said pulse output the return of said network from said second electrical energy condition to said first electrical energy condition.

9. A communication system as claimed in claim 8, in which said synchronizing means comprises a switch responsive to said pulse output, said switch having one condition of conductivity during the occurrence of a pulse in said pulse output and another condition of conductivity during the absence of a pulse.

10. A communication system as claimed in claim 9, in which said switch alters a reference potential applied to an element of said network.

11. A communication system as claimed in claim 9, in which said synchronizing means includes means responsive to said keying circuit to inhibit control of said oscillator by said switch during transmission of a pulse by said local transmitter.

12. A communication system as claimed in claim 9, in which said delay circuit includes

means to condition said switch to control said oscillator during the said fixed delay interval.

13. A communication system as claimed in claim 9, in which said synchronizing means includes means responsive to said one condition of conductivity of said switch and connected to said network to reduce the period of said oscillator, and said delay circuit includes means to condition said switch for the reduction of said oscillator period only during said delay interval.

14. A communication system as claimed in claim 9, in which said synchronizing means includes means responsive to said one condition of conductivity of said switch and connected to said network to increase the period of said oscillator, and said delay circuit includes means to condition said switch for increasing said oscillator period during intervals other than said delay interval.

15. A common channel, duplex pulse communication system having at least a pair of stations constructed and adapted to operate substantially as herein described with reference to and as illustrated in the accompanying drawings.

For the Applicants:
F. J. CLEVELAND & COMPANY,
Chartered Patent Agents,
Lincoln's Inn Chambers,
40—43 Chancery Lane,
London, W.C.2.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1972.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1291743 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

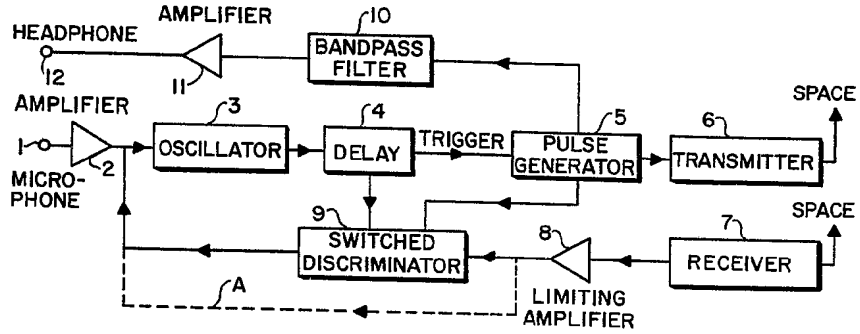


FIG. 1

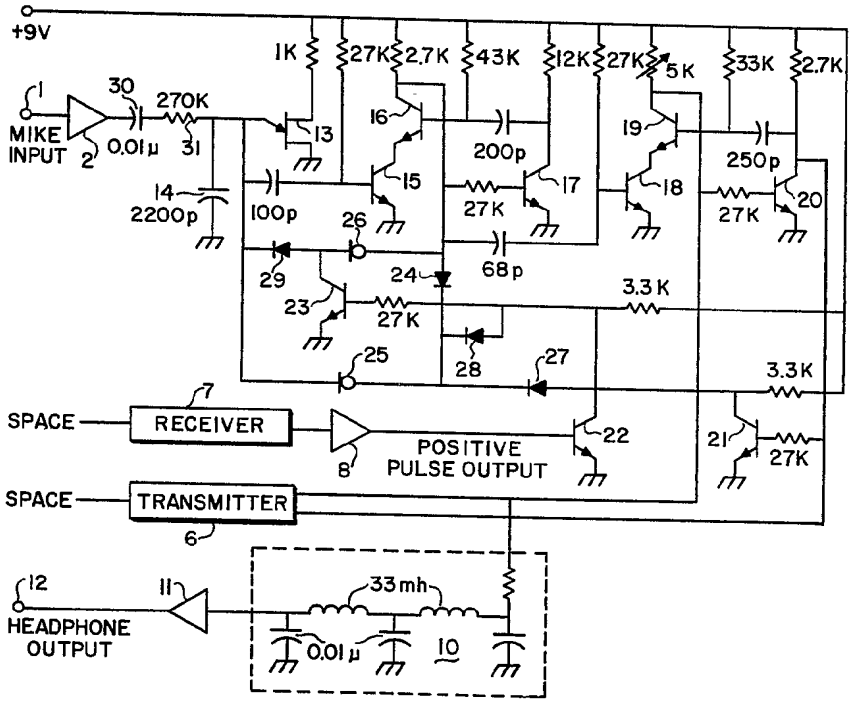


FIG. 2

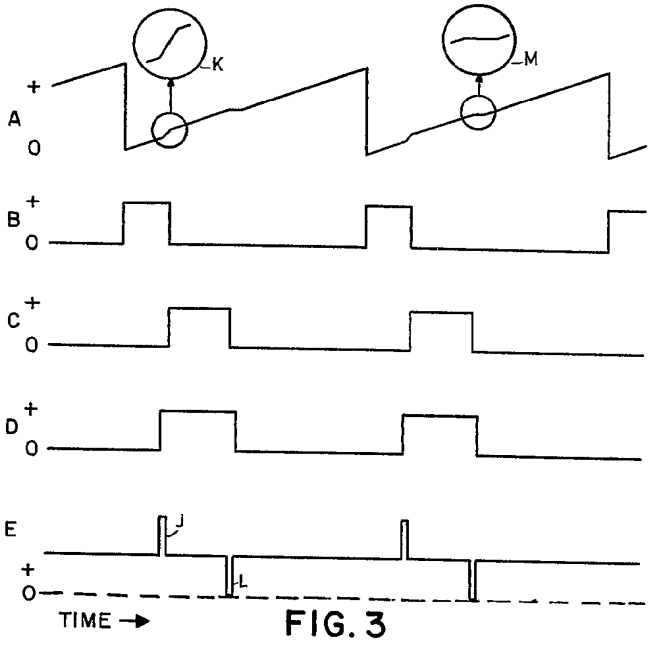

K
M
A
B
C
D
E
+
0
J
L
TIME

FIG. 3

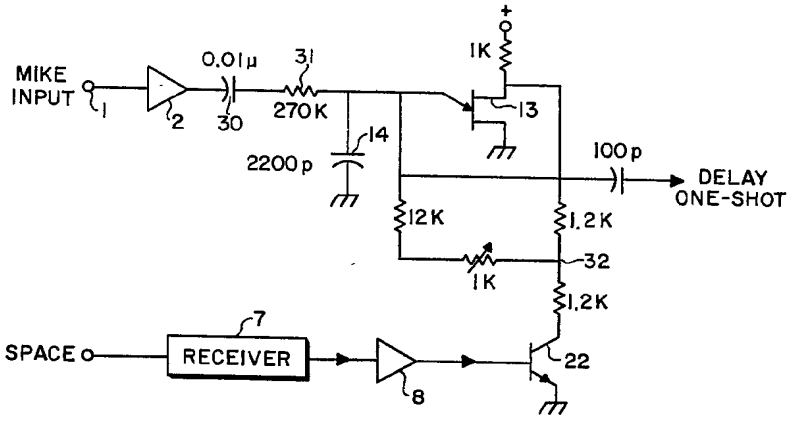

MIKE INPUT
1
2
30
0.01μ
31
270K
2200p
14
1K
13
100p
DELAY ONE-SHOT
12K
1.2K
32
1K
1.2K
SPACE
7
RECEIVER
8
22

FIG. 4

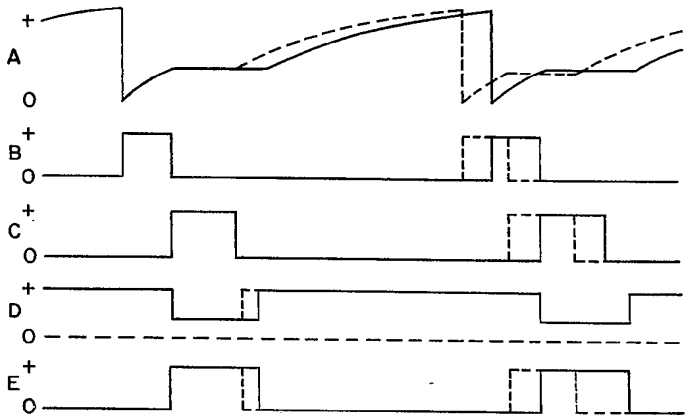

A
B
C
D
E
+
0

FIG. 5

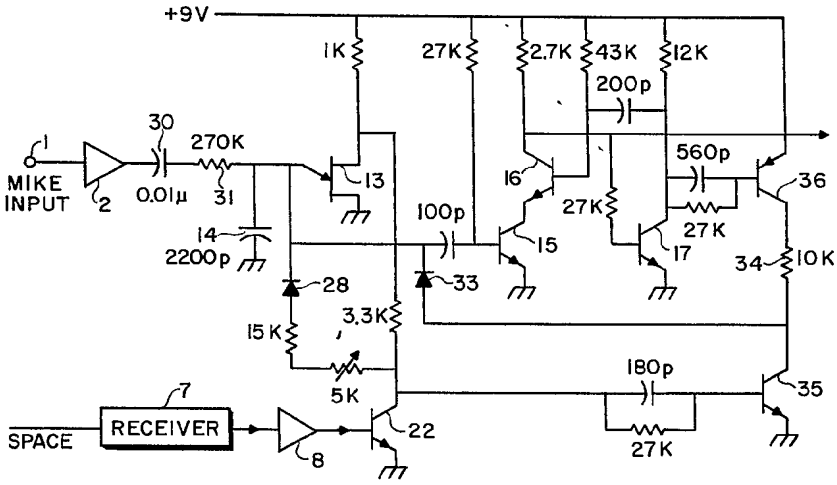

+9V
1K
27K
2.7K
43K
12K
200p
30
270K
1
MIKE INPUT
2
0.01μ
31
13
14
2200p
100p
16
15
27K
560p
36
27K
17
34
10K
28
33
3.3K
15K
5K
180p
35
7
RECEIVER
SPACE
8
22
27K

FIG. 6

Electronic Acknowledgement Receipt

EFS ID:	12993054
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	David Burke Patchett/Rebecca Bode
Filer Authorized By:	David Burke Patchett
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	12-JUN-2012
Filing Date:	22-AUG-2011
Time Stamp:	15:10:21
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	Transmittal Letter	IDS2_61312US015.PDF	76341 0364b679f826bf80a85392f1170229e65cb53f84	no	2

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	IDS2_1449_61312US015.PDF	77811 1417b53ba89098b50ed4e2de7399cc76f714ad7d	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	GB1291743.PDF	635384 c02e2709845af8906b43668dfe7dd34a4715249d	no	9
Warnings:					
Information:					
			Total Files Size (in bytes):	789536	

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

32692
Customer Number

Patent
Case No.: 61312US015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	AWISZUS, STEVEN T		
Application No.:	13/214746	Confirmation No.:	1908
Filed:	22-AUG-2011		
Title	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		

INFORMATION DISCLOSURE STATEMENT

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

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]

I hereby certify that this correspondence is being:

☒ transmitted to United States Patent and Trademark Office on the date shown below via the Office electronic filing system.

June 12, 2012 /Rebecca C. Bode/
Date Signed by: Rebecca C. Bode

Dear Sir:

Pursuant to 37 CFR §§ 1.56, 1.97, and 1.98, enclosed is a completed Form PTO-1449, citing references submitted for consideration by the Examiner. It is respectfully requested that the Examiner initial and return the enclosed Form PTO-1449 to indicate that each reference has been considered.

This Information Disclosure Statement is being filed within three months of the filing date of the application, or within three months of entry into the national stage, or before the mailing of a first Office Action on the merits.

Fees

☒ It is believed that no fee is due; however, in the event a fee is required, please charge the fee to Deposit Account No. 13-3723.

☐ The fee required under 37 CFR § 1.17(p) will be paid at the time of EFS-Web submission. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☐ Please charge the fee provided in 37 CFR § 1.17(p) to Deposit Account No. 13-3723.

Copies of Documents

Copies of any cited foreign patents, foreign publications, non-patent literature documents, and any pending U.S. applications filed before June 30, 2003, are enclosed. Copies of any pending U.S. applications filed after June 30, 2003 that can be accessed on the USPTO's IFW system are not enclosed as per USPTO Waiver dated September 21, 2004. Copies of any U.S. patents and published U.S. patent applications are not enclosed.

Respectfully submitted,

June 12, 2012
Date

By: /David B. Patchett/
David B. Patchett, Reg. No.: 39,326
Telephone No.: 651-736-4713

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/214,746	08/22/2011	Steven T. Awiszus	61312US015 (102.0105USC2)

CONFIRMATION NO. 1908

32692
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

PUBLICATION NOTICE

OC000000051494965

Title:REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

Publication No.US-2011-0306379-A1
Publication Date:12/15/2011

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/214,746

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	45 minus 20 =	* 25			OR	x 52 =	1300
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6 minus 3 =	* 3				x 220 =	660
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3050

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/214,746	08/22/2011	2614	3050	61312US015 (102.0105USC2)	45	6

CONFIRMATION NO. 1908

32692
3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

FILING RECEIPT

Date Mailed: 09/06/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Steven T. Awiszus, St. Paul, MN;

Assignment For Published Patent Application

3M INNOVATIVE PROPERTIES COMPANY, St. Paul, MN

Power of Attorney: The patent practitioners associated with Customer Number 32692

Domestic Priority data as claimed by applicant

This application is a CON of 12/548,596 08/27/2009 PAT 8,005,455 *
which is a CON of 11/276,048 02/10/2006 PAT 7,599,679
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 08/31/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/214,746**

Projected Publication Date: 12/15/2011

Non-Publication Request: No

Early Publication Request: No

Title

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

Preliminary Class

379

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2011-08-22
First Named Inventor	Steven T. Awiszus
Art Unit	2617
Examiner Name	David Q. Nguyen
Attorney Docket Number	61312US015 (102.0105USC2)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5321848		1994-06-14	Miyahira et al.	
	2	6435406		2002-08-20	Pentel	
	3	6816205		2004-11-09	Dudkowski	
	4	7599679		2009-10-06	Awiszus	

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

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030225622		2003-12-04	Doan	
	2	20040158499		2004-08-12	Dev et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2011-08-22
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	61312US015 (102.0105USC2)

	3	20040204168		2004-10-14	Laurila	
	4	20050004843		2005-01-06	Heflin	
	5	20060030269		2006-02-09	Sanbogi et al.	
	6	20090318076		2009-12-24	Awiszus	

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

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	File history for co-pending U.S. Patent Application Serial No. 12/548,596, filed August 27, 2009, Atty. Docket No. 61312US014, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (108 pgs.)	☐
	2	First Examination Report dated January 18, 2010 for co-pending New Zealand Patent Application No. 570370, filed August 27, 2009, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (2 pgs.)	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2011-08-22
	First Named Inventor	Steven T. Awiszus
	Art Unit	2617
	Examiner Name	David Q. Nguyen
	Attorney Docket Number	61312US015 (102.0105USC2)

	3	Office Action dated May 10, 2010 for co-pending Australian Patent Application No. 2007215462, filed August 27, 2009, entitled "REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT" (2 pgs.)	☐

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

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2011-08-22
First Named Inventor	Steven T. Awiszus
Art Unit	2617
Examiner Name	David Q. Nguyen
Attorney Docket Number	61312US015 (102.0105USC2)

CERTIFICATION STATEMENT

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

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

OR

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

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Rakhi D. Nikhanj/	Date (YYYY-MM-DD)	2011-08-22
Name/Print	Rakhi D. Nikhanj	Registration Number	66654

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

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Filer:	Rakhi Devi Nikhanj/Sheryl Boerboom
Attorney Docket Number:	61312US015 (102.0105USC2)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	25	52	1300
Independent claims in excess of 3	1201	3	220	660
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**3050**

Electronic Acknowledgement Receipt

EFS ID:	10785625
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Rakhi Devi Nikhanj/Sheryl Boerboom
Filer Authorized By:	Rakhi Devi Nikhanj
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	22-AUG-2011
Filing Date:	
Time Stamp:	16:18:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3050
RAM confirmation Number	2842
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	2011_08_22_102_0105USC2_Application_Data_Sheet.pdf	1031621 c6b7ee9abfc2705df0521cef1c5186c738fc5663	no	4
Warnings:					
Information:					
2	Oath or Declaration filed	2011_08_22_102_0105USC2_Declaration_and_POA.pdf	148799 278325b35e73f11b8a48f702b73bb99860c3c503	no	2
Warnings:					
Information:					
3	Non Patent Literature	FH_for_US12548596.pdf	4334546 78d285bca3984bca70e17c8babdf5bfa9015c2da	no	108
Warnings:					
Information:					
4		2011_08_22_102_0105USC2_Patent_Application_as_filed.pdf	136706 f5d6d50610bbd1ea79ffad010c91faf0382a7480	yes	21

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	14
Claims	15	20
Abstract	21	21

Warnings:					
Information:					
5	Drawings-only black and white line drawings	2011_08_22_102_0105USC2_Drawings.pdf	646162 041ceabca515b0eaf368337813c6551274f45623	no	3
Warnings:					
Information:					
6	Transmittal Letter	2011_08_22_102_0105USC2_IDS.pdf	85056 0dc7c2342df5e7b826cb8b78fa2e345a848e017c	no	2
Warnings:					

Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	2011_08_22_102_0105USC2_Form_1449.pdf	612987 f1860039689769eeba6f07712ad640445f1ca90d	no	5
Warnings:					
Information:					
8	Non Patent Literature	102_0105AU_OA_dated_05_10_10.pdf	81256 d626ca342a8f6e7d180e2b61a930dc1f778b7d38	no	2
Warnings:					
Information:					
9	Non Patent Literature	NZ_OA_dated_01_18_2010.pdf	55693 69301e136d7cfed3979804e7d576f7fb7420c583	no	2
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	38227 b3441760ad4ee247de1a6604b5e27f08d785de77	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	7171053	

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.

<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.

<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.

<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.

Electronic Acknowledgement Receipt

EFS ID:	10785625
Application Number:	13214746
International Application Number:	
Confirmation Number:	1908
Title of Invention:	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT
First Named Inventor/Applicant Name:	Steven T. Awiszus
Customer Number:	32692
Filer:	Rakhi Devi Nikhanj/Sheryl Boerboom
Filer Authorized By:	Rakhi Devi Nikhanj
Attorney Docket Number:	61312US015 (102.0105USC2)
Receipt Date:	22-AUG-2011
Filing Date:	
Time Stamp:	16:18:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3050
RAM confirmation Number	2842
Deposit Account	503688
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	2011_08_22_102_0105USC2_Application_Data_Sheet.pdf	1031621 c6b7ee9abfc2705df0521cef1c5186c738fc5663	no	4
Warnings:					
Information:					
2	Oath or Declaration filed	2011_08_22_102_0105USC2_Declaration_and_POA.pdf	148799 278325b35e73f11b8a48f702b73bb99860c3c503	no	2
Warnings:					
Information:					
3	Non Patent Literature	FH_for_US12548596.pdf	4334546 78d285bca3984bca70e17c8babdf5bfa9015c2da	no	108
Warnings:					
Information:					
4		2011_08_22_102_0105USC2_Patent_Application_as_filed.pdf	136706 f5d6d50610bbd1ea79ffad010c91faf0382a7480	yes	21

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	14
Claims	15	20
Abstract	21	21

Warnings:					
Information:					
5	Drawings-only black and white line drawings	2011_08_22_102_0105USC2_Drawings.pdf	646162 041ceabca515b0eaf368337813c6551274f45623	no	3
Warnings:					
Information:					
6	Transmittal Letter	2011_08_22_102_0105USC2_IDS.pdf	85056 0dc7c2342df5e7b826cb8b78fa2e345a848e017c	no	2
Warnings:					

Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	2011_08_22_102_0105USC2_Form_1449.pdf	612987 f1860039689769eeba6f07712ad640445f1ca90d	no	5
Warnings:					
Information:					
8	Non Patent Literature	102_0105AU_OA_dated_05_10_10.pdf	81256 d626ca342a8f6e7d180e2b61a930dc1f778b7d38	no	2
Warnings:					
Information:					
9	Non Patent Literature	NZ_OA_dated_01_18_2010.pdf	55693 69301e136d7cfed3979804e7d576f7fb7420c583	no	2
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	38227 b3441760ad4ee247de1a6604b5e27f08d785de77	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	7171053	

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.

<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.

<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.

<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.

PTO/SB/14 (11-08)
Approved for use through 09/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	61312US015 (102.0105USC2)
	Application Number	
Title of Invention	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Steven	T.	Awiszus	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	St. Paul	State/Province	MN	Country of Residence i	US

Citizenship under 37 CFR 1.41(b) i: US

Mailing Address of Applicant:

Address 1	871 Lexington Parkway South		
Address 2			
City	St. Paul	State/Province	MN
Postal Code	55116	Country i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	32692		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT		
Attorney Docket Number	61312US015 (102.0105USC2)	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

PTO/SB/14 (11-08)
Approved for use through 09/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	61312US015 (102.0105USC2)
	Application Number	
Title of Invention	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	32692		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	12/548596	2009-08-27

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/548596	Continuation of	11/276048	2006-02-10	7599679	2009-10-06

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			○ Yes ◉ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

PTO/SB/14 (11-08)
Approved for use through 09/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	61312US015 (102.0105USC2)
	Application Number	
Title of Invention	REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT	

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1 Remove

If the Assignee is an Organization check here. ☒			
Organization Name	3M Innovative Properties Company		
Mailing Address Information:			
Address 1	P.O. Box 33427		
Address 2			
City	St. Paul	**State/Province**	MN
Country [i] US		Postal Code	55133-3427
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Rakhi D. Nikhanj/			Date (YYYY-MM-DD)	2011-08-22
First Name	Rakhi D.	Last Name	Nikhanj	Registration Number	66654

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

DECLARATION AND POWER OF ATTORNEY, FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR § 1.63)		
	Case No:	61312US002
	First Named Inventor:	Steven T. Awiszus
	COMPLETE IF KNOWN	
	Application No.:	11/276048
☐ Declaration Submitted with Initial Filing ☒ Declaration Submitted after Initial Filing (surcharge 37 CFR § 1.16(e) required)	Filing Date:	February 10, 2006
	Art Unit:	
	Examiner Name:	

As a below named inventor, I hereby declare that my residence, mailing address, and citizenship are as stated below next to my name, and that I believe I am an 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:

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

The specification of which

☐ is attached hereto;

☒ was filed on **February 10, 2006**
As United States Application No. **11/276048**

☐ is identified as PCT International Application No.
filed on

and was amended on (if applicable).

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

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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

Prior Foreign Application No.	Country	Foreign Filing Date (MM/DD/YYYY)	Priority NOT Claimed	Certified Copy Attached	
				YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

I hereby appoint Practitioners at Customer Number 32692 as my attorneys and/or agents with full powers (including the powers of appointment, substitution, and revocation) to prosecute this application and any division, continuation, continuation-in-part, reexamination, or reissue thereof, and to transact all business in the U.S. Patent and Trademark Office connected therewith.

Customer Number for Practitioner of Record: **32692**

I also appoint the following Practitioners as my attorneys and/or agents with full powers (including the powers of appointment, substitution, and revocation) to prosecute this application and any division, continuation, continuation-in-part, reexamination, or reissue thereof, and to transact all business in the U.S. Patent and Trademark Office connected therewith: William D. Bauer, Reg. Number 28,052

The mailing address and the telephone number of the above-identified attorneys and/or agents are that of Customer No. 32692.

Inquiries regarding this application can be made to:

Attention: Stephen W. Buckingham
Office of Intellectual Property Counsel
3M Innovative Properties Company
Telephone No.: 651-733-3379

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 18 USC § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR:	☐ A petition has been filed for this unsigned inventor.	
Given Name (first and middle [if any]): Steven T.	Family Name or Surname: Awiszus	
Inventor's Signature: Steven T. Awiszus		Date: 3-21-2016
Residence: Woodbury, Minnesota	Country: USA	Citizenship: United States of America
Mailing Address: P.O. Box 33427, St. Paul, Minnesota 55133-3427, USA		

Dkt: 61312US015
(102.0105USC2)

REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Application No. 12/548,596 filed 08/27/2009, and U.S. Patent No. 7,599,679, filed 02/10/2006, the disclosures of which are incorporated by reference in its entirety herein.

FIELD OF THE INVENTION

[1] The present invention is generally related to wireless intercom systems and, more particularly, to wireless intercom systems for commercial establishments.

BACKGROUND OF THE INVENTION

[2] It is common for establishments, such as retail establishments, and particularly restaurants, to facilitate drive-up customers with drive-up lanes and windows to service the customer. A customer will typically drive up to a menu/order board and communicate the customer's wishes from the vehicle to staff, including an order taker, inside the retail establishment. The customer, still in the vehicle, will then proceed to one or more windows in order to pay for the purchase, if required, and pick up the merchandise.

[3] An intercom system can facilitate communication within and around the establishment, particularly between the occupant of the vehicle, the customer, and the staff inside the establishment. In a "quick service" restaurant situation, a post mounted speaker and microphone, located near a menu board, is hard wired to an intercom base station located inside the restaurant. The base station can wirelessly communicate with a portable device worn by an order taker. The portable device is typically a transceiver worn as a belt pack and an accompanied wired headset. Alternatively, in some instances, the portable device is self-contained on a wearable headset eliminating the need for a belt pack. The order taker typically listens continually to the post mounted microphone and presses a button in order to speak to the vehicle occupant as needed.

[4] In many systems and methods of ordering items from an establishment from a drive-up or drive-thru facility, the order is orally communicated directly from the post-mounted

speaker and microphone to an order taking facility, typically a drive-thru order specialist wearing a headset, in the establishment. The order specialist, or others, then collect the ordered item or items and handle the transaction with the customer at a drive-up window, taking money for the ordered item, making change and handing the order to the customer.

[5] The drive-through ordering system is vitally important for a quick service restaurant. In some quick service restaurants, the drive-through is sixty percent (60%) or more of the revenue of the establishment. Thus, there is a great need for a reliable intercom system for use, for example, in obtaining orders from the drive-through facility. If the intercom system develops a fault, becomes mal-adjusted or otherwise malfunctions, the establishment may be unable to process orders from the drive-through facility not only preventing the establishment from booking the revenue which otherwise would have been obtained but also potentially alienating customers.

[6] While systems and methods have been developed in which the order taking process is moved off-site from the establishment, for example, U.S. Patent Application Publication No. US2003/0225622, Doan, entitled "Method and System For Entering Orders of Customers," such systems may not prevent a problem locally associated with the intercom system of the establishment from disrupting communication.

[7] Furthermore, many intercom systems utilize wireless techniques to facilitate communication among staff of the establishment. Such wireless intercom systems can have parameters, such as volume or gain, which affect the ability of the intercom system to function well and reliably. Such intercom systems can, over time, either through changing conditions, personnel, inappropriate adjustment, for example, become unreliable and/or inoperable.

[8] Adding to the difficulty in establishing and maintaining a reliable and effective intercom system, is that establishment utilizing such intercom systems have become ubiquitous in many geographic areas, including communities in which highly-skilled personnel trained in the maintenance and repair of such intercoms are non-existent. Such personnel can often be located a considerable distance away from the site of the establishment, often a number of hours apart. Any failure or other inoperability of the intercom system in such a

geographic location could result in a significant downtime for the intercom system and for the establishment to obtain a significant portion of their revenue until the such time as a maintenance and/or repair person can travel to the establishment. Even if the establishment is not distant from the location of service personnel, sending service personnel on a service call results in a significant expense, both in terms of money but also in the time expended to perform any required repair.

BRIEF SUMMARY OF THE INVENTION

[9] Aspects of the present invention allow the intercom system of an establishment to be remotely adjusted by a technician or other user without the need for such technician or other user to be dispatched to the establishment itself, saving both a considerable amount of both time and money.

[10] A technician, or other user, may access the intercom system, for example, via the internet, from great distances and may be able to immediately remedy any of a number of adjustment-based issues. Further, the intercom system itself may be able to self-report fault conditions, such as errors in hardware, errors in software and errors in adjustment, for example, or warn of possible service needs at the time of or prior to system failure. This is of great value to the establishment as it may prevent costly downtime to the establishment.

[11] In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets are in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station are configurable with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewable and being remotely adjustable via the wide area communication network.

[12] In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless

communication is configured between each of the plurality of headsets and the base station with at least one parameter being adjustable by the staff of the establishment. The parameter is remotely reviewed and adjusted via the wide area communication network.

[13] In an embodiment, the system also includes a plurality of parameters, at least one of the plurality of parameters being adjustable by the staff of the establishment. The plurality of parameters are remotely adjustable via the wide area communication network.

[14] In an embodiment, the plurality of parameters are grouped into a template of parameters.

[15] In an embodiment, the template is saved for future recall.

[16] In an embodiment, the template is saved locally at the establishment.

[17] In an embodiment, the template is saved to a location remote from the establishment.

[18] In an embodiment, the plurality of parameters may be restored from the template previously stored.

[19] In an embodiment, the plurality of parameters may be remotely restored from the template previously stored remotely from the establishment.

[20] In an embodiment, the template is derived from another establishment.

[21] In an embodiment, the template of the plurality of parameters is established in conjunction with installation of the wireless intercom system and is saved.

[22] In an embodiment, the template of the plurality of parameters established in conjunction with installation is recalled at a point in time following the installation.

[23] In an embodiment, the template of the plurality of parameters is established as a factory default.

[24] In an embodiment, the template of the plurality of parameters established as default is recalled at a point in time following establishment.

[25] In an embodiment, wireless communication is established between an ordering point and at least one of the plurality of headsets.

[26] In an embodiment, a remote facility monitors communication on the wireless intercom system.

[27] In an embodiment, the parameter is adjusted by the remote facility in response to monitoring of communication of the wireless intercom system.

[28] In an embodiment, the establishment comprises a quick service restaurant.

[29] In an embodiment, the parameter is an audio level.

[30] In an embodiment, the present invention provides a remotely configurable wireless intercom system for an establishment having a staff. A base station is connectable to a wide area communication network. A plurality of headsets is in two-way wireless communication with the base station. Wireless communication between each of the plurality of headsets and the base station is configurable with at least one parameter being remotely reviewable via the wide area communication network. The parameter is remotely re-settable via the wide area communication network.

[31] In an embodiment, the present invention provides a method of providing a remotely configurable wireless intercom system for a establishment having a staff, having a base station connectable to a wide area communication network and having a plurality of headsets in two-way wireless communication with the base station. Wireless communication is configured between each of the plurality of headsets and the base station. At least one parameter is remotely reviewed via the wide area communication network. It is remotely determined if a fault condition exists with the plurality of parameters. If a fault condition exists, the parameter is reset to a predetermined value via the wide area communication network.

[32] In an embodiment, the parameter is reset upon the detection of a fault condition via the wide area communication network.

[33] In an embodiment, the parameter is adjustable by the staff of the establishment.

[34] In an embodiment, wireless communication between each of a plurality of headsets, a base station with a plurality of parameters, a speaker configured to be located near a menu board, and a microphone configured to be located near a menu board is configured. At

least one of the plurality of parameters is configured for local adjustment. The base station is connected to a wide area network, and at least one of the plurality of parameters is adjusted via the wide area network.

[35] In another method embodiment, wireless communication between each of a plurality of headsets and a base station is configured with at least one parameter such as an audio level. Such parameter can be configured for local adjustment. The at least one parameter can be remotely reviewed and adjusted via a wide area communication network.

[36] In yet another method embodiment, wireless communication is configured between each of a plurality of headsets and a base station. A plurality of parameters can be adjustable by staff of an establishment. The plurality of parameters are remotely reviewed and adjusted via a wide area communication network, and are grouped into a template of parameters.

[37] In an embodiment a method can also have the step of determining if a fault condition exists.

[38] In an embodiment a method can also have the step of remotely reviewing and adjusting a parameter relevant to a vehicle detection alert.

[39] In an embodiment a method can also have the step of recalling the template to reset the wireless communication.

[40] In a system embodiment, a drive-though, quick service restaurant facility has a plurality of headsets and a base station that configured for communication with the plurality of headsets. A speaker can be associated with the drive-through facility, be located near a menu board, and is configured for communication with the base station. A microphone is also configured to be located near the menu board and for communication with the base station. A plurality of parameters controls configuration of the intercom system. The base station is connectable to a wide area communication network in order to enable remote adjustment of the plurality of parameters.

[41] In another system embodiment, a base station is in two-way wireless communication with a plurality of headsets. The wireless communication is configurable with at least one

parameter that is locally adjustable. The parameter is also remotely adjustable via a wide area communication network. The parameter can be an audio level.

[42] In yet another system embodiment, a base station is configured for two-way wireless communication with a plurality of headsets, where such communication is configurable with a plurality of parameters that are remotely adjustable via a wide area communication network and grouped into a template of parameters. At least one of the parameters are adjustable by staff of an establishment.

[43] In an embodiment, the system has software that is configured to determine if a fault condition exists in the system.

[44] In an embodiment, at least one parameter of the plurality of parameters is relevant to a vehicle detection alert.

[45] In an embodiment, at least one parameter of the plurality of parameters is relevant to volume of the speaker.

[46] In an embodiment, at least one parameter comprises a drive-through lane assignment.

[47] In an embodiment, the plurality of parameters is grouped into a template. The template can be a default. The template can be a factory default. The template can be configured for recall to reset the system.

BRIEF DESCRIPTION OF THE DRAWINGS

[48] **Figure 1** is a block diagram of the functional components of an intercom system;

[49] **Figure 2** is flow chart illustrating monitoring of intercom communications and remote adjustment of intercom system parameters;

[50] **Figure 3** is a flow chart illustrating storage of and subsequent recall of intercom system parameters; and

[51] **Figure 4** is a flow chart illustrating remote review of intercom system fault conditions and remote resetting of such parameters.

DETAILED DESCRIPTION OF THE INVENTION

[52] Intercom systems, e.g., wireless intercom systems, used at establishments, e.g., quick service restaurants, typically can have several parameters which govern the operation of the intercom system.

[53] As shown in **Figure 1**, establishment 10 is served by intercom system 12. Base station 14 communicates wirelessly with a plurality of headsets 16a, 16, … 16n. Headsets 16a, 16, … 16n are worn by personnel, or staff of establishment 10 and, in a preferred embodiment can be used by such personnel to receive orders taken from a drive-through facility (not shown). At least one of the staff members communicates with a customer in the drive-through facility to obtain an order from the customer. This staff members may be wearing, and communicating through, one of headsets 16a, 16, … 16n or may be in wired communication with base station 14. Other staff members will wear headsets 16a, 16, … 16n or the remaining ones of headsets 16a, 16, … 16n, primarily to listen, or monitor communication between the customer and staff member taking the order.

[54] Intercom system 12 at establishment 10, e.g., a quick service restaurant, has several parameters which govern the operation of the system. For example, each of headsets 16a, 16, … 16n can be in full duplex communication with base station 14 and each of headsets 16a, 16, … 16n may have a receive audio level, or volume, and/or a transmit audio level associated with it. Separate volume, or gain, controls, may be available to each of headsets 16a, 16, … 16n for each direction of communication. Many other parameters are also possible, such as lane assignment, receive volume, transmit volume, master volume for a speaker associated with the drive-through facility, individual volume for each channel received by the drive-through facility, base station receive volume, base station transmit volume, page, greeter, vehicle detection alert, vehicle approaching alert, for examples. Many, if not all, of these parameters may be available to one or more staff members for individual adjustment.

[55] It is recognized, however, that an intercom system 12 involving a drive-through facility, drive-through lane, a base station 14 and, potentially, several headsets 16a, 16, … 16n with each unit located in a potentially unique environment and unique conditions can be

complex to set up and adjust properly. Failure to perform proper set-up and balance could result in unsatisfactory operation, e.g., resulting in annoying feedback and/or instability perhaps making communication difficult, if not impossible. Providing a staff member or staff members with adjustment control of at least one parameter, e.g., volume of their headset 16, is desirable to take into account individual speaking patterns and hearing capabilities. However, it is possible for individual adjustments to throw the balance of intercom system 12 and, possibly, to render it unstable and/or unusable.

[56] Since the location of the establishment 10 may be a significant distance geographically from the location of a qualified service technician, it may take a considerable amount of time for such service technician, once summoned, to arrive at the location of establishment 10 in order to begin repairs. In some cases establishment 10 may be located hours away from a service technician. Even if establishment 10 is not located a significant distance from a qualified service technician, sending a service technician on-site to perform a repair can still be a significant expense in terms of both time and money.

[57] However, intercom system 12 allows personnel from establishment 10 to call a technical service facility 18 located remotely from the location of establishment 10.

[58] However, a technical service facility 18 located remotely from the location of establishment 10 may be alerted, by personnel of establishment 10, automatically or by other means, to access the parameters controlling intercom system 12 remotely via a wide area network 20, such as by way of the internet. The service technician may be able to access the parameters associated with intercom system 12, review the parameters of intercom system 12, and potentially make adjustments to the parameters to place intercom system 12 back in operation or to improve the operation of intercom system 12.

[59] The service technician may be able to resolve the issue with intercom system 12 quickly without a need to dispense a service technician to the site of establishment 10. If the site of establishment 10 is remote, many hours of establishment down time may be saved, perhaps even a day if it is necessary to fly or otherwise transport a service technician to a very remote site. Even if the site of establishment is not remote, a service technician may be able to service many more establishments and solve many more issues more efficiently

by making remote adjustments than by incurring site visits. Remote adjustment of parameters of intercom system 12 may minimize, or eliminate altogether, service interruption by establishment 10.

[60] It is to be recognized and understood that one or more than one parameter of intercom system 12 may be accessed, reviewed and, potentially, modified or adjusted. One parameter, e.g., the master volume of intercom system 12, may be the only parameter reviewed and/or adjusted. On the other hand, it is also contemplated that multiple parameters may be reviewed, and one or more of the parameters reviewed may be adjusted. For example, the volume levels of all of headsets 16a, 16, … 16n may be reviewed. Following review, it may be necessary to adjust the volume level of a single headset 16, say headset 16a, or it may be desirable to adjust the volume of more than one or all of headsets 16a, 16, … 16n.

[61] Since multiple parameters may be involved in the setting up, adjusting and balancing of intercom system 12 and because one parameter may have an effect on other aspects of the intercom system, it may be desirable to form multiple parameters into parameter sets. A given set of parameters for intercom system 12 may form a template 22, i.e., a set of parameters for intercom system 12 that, when implemented, will give rise to a particular operational characteristic for intercom system 12. For example, known settings for parameters which provide for a particular response or performance of intercom system 12 or which may typically eliminate common issues associated with maladjustment of parameters may be formed as a template. Such a template of parameters may be utilized, for example, either in a later point in time in the same establishment or another establishment having a similar intercom system 12 or a similar facility, structure and/or layout.

[62] Individual parameters or a template 22 or templates of parameters may be saved or stored for later recall. Template 22 may be saved to memory 24 located locally with respect to establishment 10. Once saved in memory 24, template 22, or one of a plurality of templates 22, may be recalled later to reset intercom system 12 or to bring about a desired change of operational parameters. If intercom system 12 parameters are adversely

adjusted, then a previously stored template may be recalled from memory 24 and utilized to provide a new operational guidebook for intercom system 12. In particular, a service technician, located remote from the location of establishment 10, may access memory 24 and recall a template 22 previously stored and make the parameters associated with that template 22 active. Additionally, a remotely located service technician may recall a previously stored template 22 from memory 24 and then, perhaps, make further adjustments or modifications to one or more individual parameters in order to improve or optimize the performance characteristics of intercom system 12.

[63] It is also contemplated that parameters for establishment 10 may be stored remotely from establishment 10. For example, the same wideband communication network allowing a service technician at remote facility 18 to access parameters of intercom system 12 may also or alternatively used to transmit parameters, preferably in a template 22, to remote facility to be saved or stored in memory 26. Such parameters or templates 22 may be subsequently recalled as discussed to bring about an operational scheme for intercom system 12 as discussed above with respect to locally stored parameters and/or templates 22. Further, memory 26 associated with remote facility 18 may be used to store a template or templates 22 which may apply to more than one of establishments such as establishment 10. For example, a particular brand or chain of establishment may store a template 22 that may be pertinent for a "standard" quick service restaurant of which many may be constructed in different locations. Thus stored, it would be relatively easy for a service technician to recall the template 22 in order to initially setup and make intercom system 12 operational in a new location or a new establishment meeting that brand's or chain's "standard" layout. As above, of course, the service technician may fine tune the operational parameters for intercom system 12. However, the standard template 22 may have provided the service technician with a substantial head start and made the entire process easier and faster. It is to be recognized and understood that while memory 26 is illustrated connected directly to remote facility 18, that memory 26 may also be remote, not only from establishment 10, but also from remote facility 18. Memory 26 may be physically located in remote facility 18 or may be located elsewhere and accessed by remote facility 18 remotely.

[64] Communication occurring on intercom system 12 may be monitored by other personnel in or associated with establishment 12, either by listening through base station 14 or one or more of headsets 16a, 16, … 16n. In the alternative or in addition, personnel associated with remote facility 18 may monitor communication occurring on intercom system 12, particularly communication used in receiving orders from customers. Such personnel associated with remote facility 18, in addition to performing normal quality control of ordering functions, may also analyze the quality of the communications and may preemptively access parameters associated with intercom system 12 and adjust or modify such parameters, if desired, to maintain or improve the operational characteristics of intercom system 12. In this case, personnel associated with establishment 10 do not need to request assistance from a service technician and may not even know that a service technician from remote facility 18 performed service on intercom system 12.

[65] Further, intercom system 12 may contain hardware and/or software used for the purpose of determining if a fault condition exists, i.e., that it is desired that a service technician inspect intercom system 12. If so, intercom system 12 may notify a service technician at remote facility 18 of the existence of a fault condition as determined by commonly available hardware and/or software and a service technician at remote facility 18 may review parameters and/or other aspects of intercom system 12 remotely. The service technician may be able to adjust and/or repair intercom system 12, again preemptively, by reviewing and/or adjusting or modifying parameters associated with intercom system 12.

[66] **Figure 2** is a flow chart illustrating a method of remotely configuring a wireless communication system, such as that used in intercom system 12 of establishment 10. The wireless intercom system is configured (110), in part by setting the parameters associated with the system. Such configuration can be done locally through conventional techniques or by recalling or installing a template 22, may be done remotely, e.g., using remote facility 18, or in any other way. Once configured, the wireless intercom system is then ready to perform communications (112) for establishment 10. Optionally, communications occurring on the wireless intercom system may be monitored (114), either locally or remotely as, for example, by remote facility 18. In response to a request from establishment 10, in response to an indication of a fault condition or preemptively,

remote facility 18 remotely reviews (116) communication parameters associated with the wireless intercom system by way of wideband communications network 20. A service technician, or automated equipment, associated with remote facility 18 may then analyze the setting of such parameters and the operation of the wireless intercom system and, if necessary, may remotely adjust or modifying (118) one or more of the communication parameters. Typically such adjustment is performed in order to improve the operation of the wireless intercom system or in order to make the wireless intercom system operational.

[67] **Figure 3** is a flow chart illustrating a method of configuring a wireless intercom system with saved and subsequently recalled parameters. The wireless intercom system is configured (130), in part by setting communication parameters associated with the system. Again, such configuration can be locally through conventional techniques or by recalling or installing a template 22, may be done remotely, e.g., using remote facility 18, or in any other way. Once configured, the wireless intercom system is then ready to perform communications for establishment 10. Communication parameters associated with the wireless intercom system are saved (132), either in local memory or memory located remote from establishment 10. Such parameters are preferably saved as a set of parameters in a template 22. Subsequent to saving such parameters, one or more of such parameters are recalled (134) from memory and utilized to establish, at least in part, the operational characteristics of the wireless intercom system. Once established, the wireless intercom system may then be utilized to communicate (136) in the operational environment of the establishment.

[68] **Figure 4** is a flow chart illustrating a method of remotely configuring a wireless intercom system responsive to a fault condition. The wireless intercom system is configured (150), in part by setting communication parameters associated with the system. Again, such configuration can be done locally through conventional techniques or by recalling or installing a template 22, may be done remotely, e.g., using remote facility 18, or in any other way.

[69] Remote facility 18 remotely reviews (152) communication parameters associated with the wireless intercom system by way of wideband communications network 20. A service

technician, or automated equipment, associated with remote facility 18 may then analyze the setting of such parameters and the operation of the wireless intercom system to determine (154) if a fault condition exists. A fault condition could be the result of one or more inappropriate settings of communication parameters or another hardware and/or software fault condition. Upon determination of a fault, remote facility may then reset (156) the communication parameters associated with the wireless communication system in order to attempt to eliminate the fault condition.

[70] Thus, embodiments of the remotely configurable wireless intercom system for an establishment are disclosed. One skilled in the art will appreciate that the present invention can be practiced with embodiments other than those disclosed. The disclosed embodiments are presented for purposes of illustration and not limitation, and the present invention is limited only by the claims that follow.

What is claimed is:

1. An intercom system for a drive-through, quick service restaurant facility comprising:
a plurality of headsets;
a base station configured for communication with the plurality of headsets;
a speaker associated with a drive-through facility and configured to be located near a menu board, wherein the speaker is configured for communication with the base station; and
a microphone configured to be located near the menu board and configured for communication with the base station;
the system further comprising a plurality of parameters controlling a configuration of the intercom system; and
wherein the base station is connectable to a wide area communication network in order to enable remote adjustment of the plurality of parameters.

2. The intercom system of claim 1, further comprising software configured to determine if a fault condition exists in the system.

3. The intercom system of claim 1, wherein at least one parameter of the plurality of parameters is relevant to a vehicle detection alert.

4. The intercom system of claim 1, wherein at least one parameter of the plurality of parameters is relevant to volume of the speaker.

5. The intercom system of claim 1 wherein at least one parameter comprises a drive-through lane assignment.

6. The intercom system of claim 1, wherein the plurality of parameters are grouped into a template.

7. The intercom system of claim 6, wherein the template is a default.

8. The intercom system of claim 7, wherein the template is a factory default.

9. The intercom system of claim 6, wherein the template is configured for recall to reset the system.

10. A method comprising:
configuring wireless communication between each of a plurality of headsets, a base station with a plurality of parameters, a speaker configured to be located near a menu board, and a microphone configured to be located near a menu board, wherein at least one of the plurality of parameters is configured for local adjustment;
connecting the base station to a wide area network; and
remotely adjusting at least one of the plurality of parameters via the wide area network.

11. The method of claim 10, further comprising determining if a fault condition exists.

12. The method of claim 10, further comprising remotely reviewing and adjusting a parameter relevant to a vehicle detection alert.

13. The method of claim 10, further comprising grouping the plurality of parameters into a template.

14. The method of claim 13, wherein the template is a default.

15. The method of claim 14, wherein the template is a factory default.

16. The method of claim 13, further comprising recalling the template to reset the wireless communication.

17. A remotely configurable wireless intercom system for an establishment having a staff, comprising:
a base station;
a plurality of headsets in two-way wireless communication with said base station;
said wireless communication between each of said plurality of headsets and said base station being configurable with at least one parameter;
said at least one parameter being locally adjustable; and
said at least one parameter being remotely adjustable via a wide area communication network, wherein said at least one parameter comprises an audio level.

18. The intercom system of claim 17, further comprising software configured to determine if a fault condition exists in the system.

19. The intercom system of claim 17, further comprising a vehicle detection alert parameter.

20. The intercom system of claim 17, further comprising a speaker volume parameter.

21. The intercom system of claim 17, further comprising a plurality of parameters grouped into a template.

22. The intercom system of claim 21, wherein the template is a default.

23. The intercom system of claim 22, wherein the template is a factory default.

24. The intercom system of claim 21, wherein the template is configured for recall to reset the intercom system.

25. A method comprising:

configuring wireless communication between each of a plurality of headsets and a base station with at least one parameter, wherein the at least one parameter is configured for local adjustment; and

remotely reviewing and adjusting said at least one parameter via a wide area communication network, wherein said at least one parameter comprises an audio level.

26. The method of claim 25, further comprising determining if a fault condition exists.

27. The method of claim 25, further comprising remotely reviewing and adjusting a parameter relevant to a vehicle detection alert.

28. The method of claim 25, further comprising grouping a plurality of parameters into a template.

29. The method of claim 28, wherein the template is a default.

30. The method of claim 29, wherein the template is a factory default.

31. The method of claim 28, further comprising recalling the template to reset the wireless communication.

32. A remotely configurable wireless intercom system comprising:

a base station;

a plurality of headsets configured for two-way wireless communication with said base station, the wireless communication between each of the plurality of headsets and the base station being configurable with a plurality of parameters, wherein at least one of the plurality of parameters are adjustable by staff of an establishment and the plurality of parameters are remotely adjustable via a wide area communication network; and

a template of parameters grouping the plurality of parameters.

33. The intercom system of claim 32, further comprising software configured to determine if a fault condition exists in the system.

34. The intercom system of claim 32, wherein at least one parameter of the plurality of parameters is relevant to a vehicle detection alert.

35. The intercom system of claim 32, wherein at least one parameter of the plurality of parameters is relevant to volume of a speaker.

36. The intercom system of claim 35, wherein the template of parameters is a default.

37. The intercom system of claim 36, wherein the template of parameters is a factory default.

38. The intercom system of claim 35, wherein the template of parameters is configured for recall to reset the system.

39. A method comprising the steps of:
configuring wireless communication between each of a plurality of headsets and a base station with a plurality of parameters adjustable by staff of an establishment;
remotely reviewing and adjusting the plurality of parameters via a wide area communication network; and
grouping said plurality of parameters into a template of parameters.

40. The method of claim 39, further comprising determining if a fault condition exists.

41. The method of claim 39, further comprising remotely reviewing and adjusting a parameter relevant to a vehicle detection alert.

42. The method of claim 39, further comprising remotely reviewing and adjusting a parameter relevant to volume of a speaker.

43. The method of claim 39, wherein the template of parameters comprises default settings.

44. The method of claim 43, wherein the template of parameters comprises factory default settings.

45. The method of claim 43, further comprising recalling the template of parameters to reset the wireless communication.

ABSTRACT

Systems and methods associated with an intercom system for a drive-through, quick service restaurant facility is disclosed. Generally, a plurality of headsets is configured for communication with a base station. A speaker is associated with the drive-through facility is configured to be located near a menu board, and is configured for communication with the base station. A microphone is also configured to be located near the menu board and configured for communication with the base station. A plurality of parameters control the configuration of the intercom system, and the base station is connectable to a wide area communication network to enable remote adjustment of the plurality of parameters.

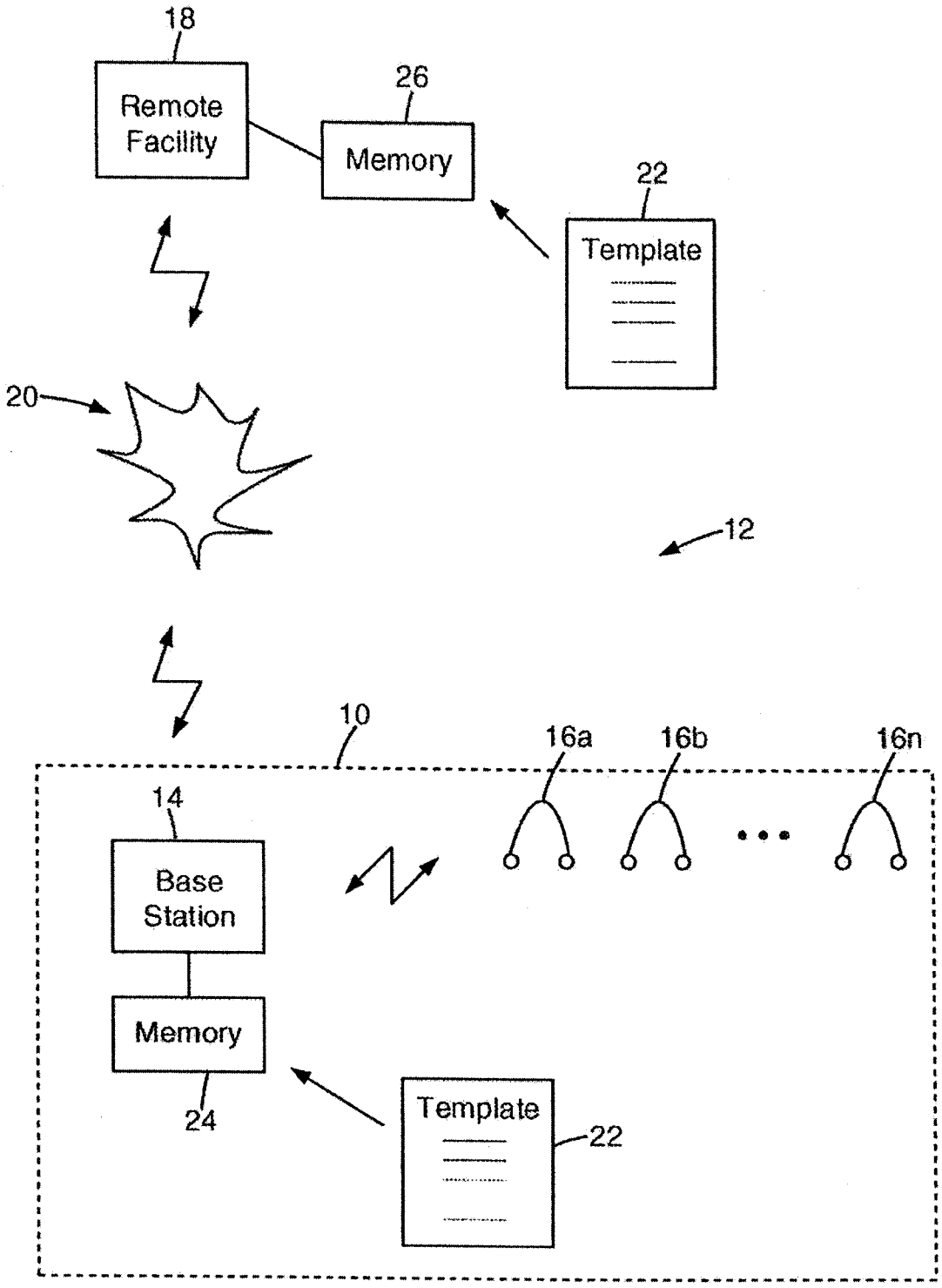

18
Remote Facility
26
Memory
22
Template
20
12
10
16a
16b
16n
14
Base Station
Memory
24
Template
22

Fig. 1

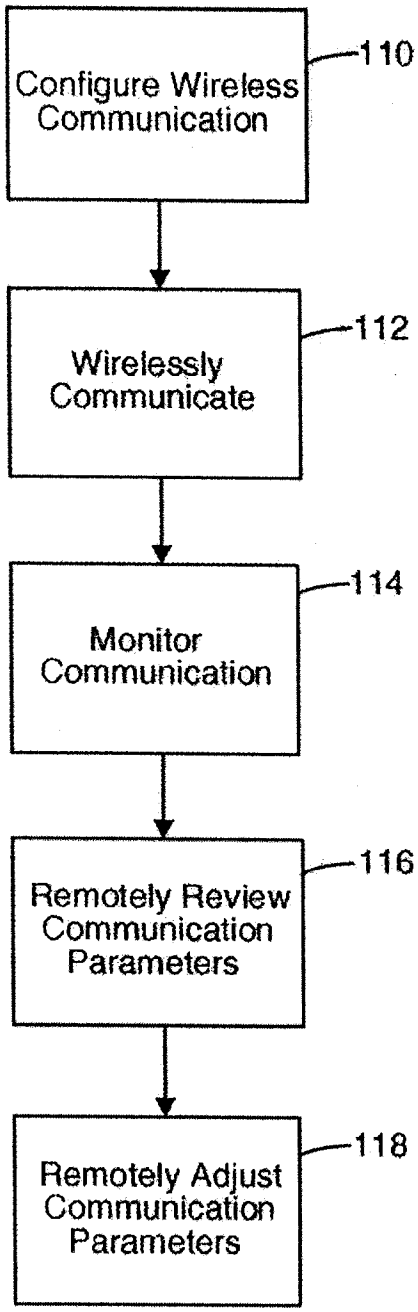

Configure Wireless Communication
110
Wirelessly Communicate
112
Monitor Communication
114
Remotely Review Communication Parameters
116
Remotely Adjust Communication Parameters
118

Fig. 2

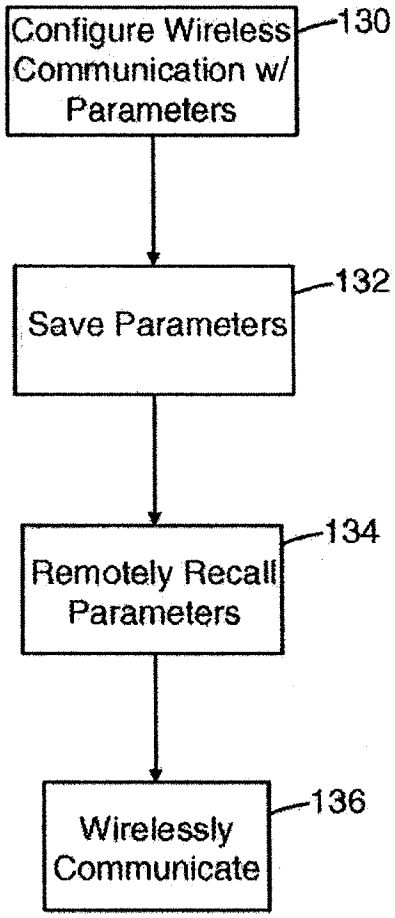

Configure Wireless Communication w/ Parameters
130
Save Parameters
132
Remotely Recall Parameters
134
Wirelessly Communicate
136

Fig. 3

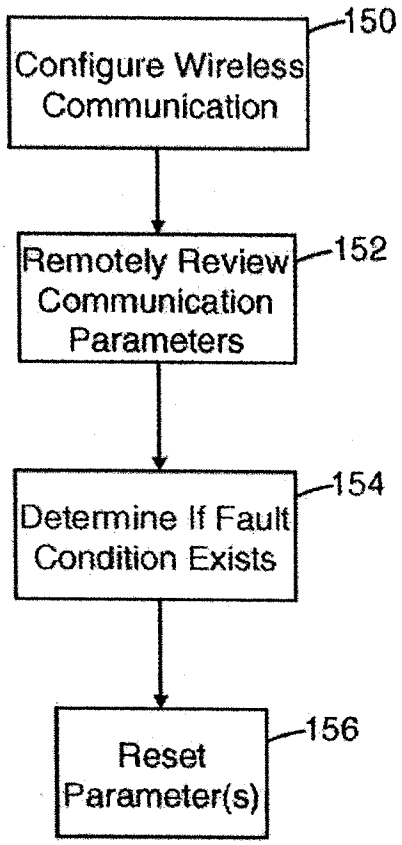

Configure Wireless Communication
150
Remotely Review Communication Parameters
152
Determine If Fault Condition Exists
154
Reset Parameter(s)
156

Fig. 4

S/N NEW FILING **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Steven T. Awiszus	Examiner:	David Q. Nguyen
Serial No.:	New Filing	Group Art Unit:	2617
Filed:	Filed Herewith	Docket:	61312US015 (102.0105USC2)

Title: REMOTELY CONFIGURABLE WIRELESS INTERCOM SYSTEM FOR AN ESTABLISHMENT

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir,

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement. However, if an Office Action on the merits has been mailed, the Commissioner is hereby authorized to charge the required fees to Deposit Account No. 50-3688 in order to have this Information Disclosure Statement considered.

The Examiner is invited to contact the Applicant's Representative at the below-listed telephone number if there are any questions regarding this communication.

Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications are no longer required to be provided to the Office. Notification of this change was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004. Thus, Applicant has not included copies of any US Patents or Published Applications cited with this submission. Should the Office require copies to be provided,

Applicant respectfully requests that notice of such requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

Date August 22, 2011 By /Rakhi D. Nikhanj/

Rakhi D. Nikhanj
Reg. No. 66,654
Customer Number: 32692
612-746-4790