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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/580,227	10/15/2009	Arndt MUELLER	29268US02

CONFIRMATION NO. 9919

POA ACCEPTANCE LETTER



23446
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

Date Mailed: 07/20/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/13/2021.

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

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

/yterferra/

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒

Practitioners associated with Customer Number:

23,446

OR

☐

Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒

The address associated with Customer Number:

23,446

OR

☐

Firm or individual name

Address

City

State

Zip

Country

Telephone

Email

Assignee name and address: ENTROPIC COMMUNICATIONS, LLC
1345 AVENUE OF THE AMERICAS, 46TH FLOOR
NEW YORK, NY 10105

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature /Andrea L. Gothing/

Date 2021-05-04

Name Andrea L. Gothing

Telephone 415-830-0613

Title Licensing Officer and Authorized Signatory, Entropic Communications, LLC

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.
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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.
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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 Acknowledgement Receipt

EFS ID:	43235151
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	23446
Filer:	Ronald H. Spuhler/Deborah Wilson
Filer Authorized By:	Ronald H. Spuhler
Attorney Docket Number:	29268US02
Receipt Date:	13-JUL-2021
Filing Date:	15-OCT-2009
Time Stamp:	13:48:26
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	Assignee showing of ownership per 37 CFR 3.73	29268US02_373c_Statement_A IA-96.pdf	124798	no	3
			e561c98b06e9346137b784da5d7dd4bdd6 a62b56		
Warnings:					

Information:					
2	Power of Attorney	Entropic- POA_General_Assignee_Entrop icCommunications_ALG.pdf	487892	no	2
			51444e06ae84b241bfc127dc47c5d6c646944dd7		
Warnings:					
Information:					
Total Files Size (in bytes):				612690	
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.					

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: ENTROPIC COMMUNICATIONS, LLC

Application No./Patent No.: 12/580,227 Filed/Issue Date: 2009-10-15

Titled: METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK
ENTROPIC COMMUNICATIONS, LLC, a limited liability company

(Name of Assignee)

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

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Arndt MUELLER To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 023381, Frame 0020, or for which a copy thereof is attached.

2. From: EXCALIBUR ACQUISITION CORPORATION, ENTROPIC COMMUNICATIONS, INC. To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 035706, Frame 0267, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

STATEMENT UNDER 37 CFR 3.73(c)

3. From: ENTROPIC COMMUNICATIONS, INC., EXCALIBUR SUBSIDIARY, LLC To: ENTROPIC COMMUNICATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 035717, Frame 0628, or for which a copy thereof is attached.

4. From: ENTROPIC COMMUNICATIONS, LLC To: MAXLINEAR COMMUNICATIONS LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 055776, Frame 0482, or for which a copy thereof is attached.

5. From: MAXLINEAR COMMUNICATIONS LLC To: ENTROPIC COMMUNICATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 055899, Frame 0291, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

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

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

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

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

/Ronald H. Spuhler/

Signature

Ronald H. Spuhler

Printed or Typed Name

2021-07-13

Date

52245

Title or Registration Number

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.

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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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2

CONFIRMATION NO. 9919

POA ACCEPTANCE LETTER



23446
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

Date Mailed: 08/05/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/27/2015.

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

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

/zabrah/



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
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2

77330
ENTROPIC COMMUNICATIONS, INC.
6350 SEQUENCE DRIVE
SAN DIEGO, CA 92121

CONFIRMATION NO. 9919
POWER OF ATTORNEY NOTICE



Date Mailed: 08/05/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/27/2015.

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

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

/zabaha/

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.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

23446

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

23446

OR

Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

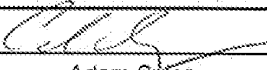
Assignee Name and Address:

Entropic Communications, LLC.
2051 Palomar Airport Road, Suite 100
Carlsbad, CA 92011

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	6/5/15
Name	Adam Spice	Telephone	
Title	Chief Financial Officer		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. This information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Electronic Acknowledgement Receipt

EFS ID:	23030465
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Christopher C. Winslade/Deb Wilson
Filer Authorized By:	Christopher C. Winslade
Attorney Docket Number:	E080048USU2
Receipt Date:	27-JUL-2015
Filing Date:	15-OCT-2009
Time Stamp:	14:43:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	29268US02_373b_Statement_sb96.pdf	431187 604f8e3409ad16bce2aa15caa21351fefcb2af9f	no	2

Warnings:

Information:

2	Power of Attorney	Entropic_POA_PreAIA.pdf	340881	no	2
			8107f4c6d5473b527f97e45769199b81a37aad1b		
Warnings:					
Information:					
Total Files Size (in bytes):				772068	
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.					

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Arndt MUELLER

Application No./Patent No.: 12580227

Filed/Issue Date: 10/15/2009

Titled: **METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK**

Entropic Communications, LLC, a corporation

(Name of Assignee)

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

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

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

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

OR

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

1. From: Arndt MUELLER To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 023381, Frame 0020, or for which a copy thereof is attached.

2. From: EXCALIBUR ACQUISITION CORPORATION To: ENTROPIC COMMUNICATIONS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 035706, Frame 0267, or for which a copy thereof is attached.

3. From: ENTROPIC COMMUNICATIONS, INC. and EX To: ENTROPIC COMMUNICATIONS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 035717, Frame 0628, or for which a copy thereof is attached.

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

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

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

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

/Christopher C. Winslade/

07/27/2015

Signature

Date

Christopher C. Winslade, Reg. No. 36308

Attorney for Applicant

Printed or Typed Name

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.



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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	11/27/2012	8320566	E080048USU2	9919
77330	7590	11/07/2012		
ENTROPIC COMMUNICATIONS, INC. 6290 SEQUENCE DRIVE SAN DIEGO, CA 92121				

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 372 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):

Arndt MUELLER, San Diego, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
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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)

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.

77330 7590 07/24/2012
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

Certificate of Mailing or Transmission Via EFS-Web
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.

Tara Sallee	(Depositor's name)
/Tara Sallee/	(Signature)
October 23, 2012	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

TITLE OF INVENTION: METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	10/24/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEMMA, SAMSON B	2432	380-268000

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 Bruce Greenhaus
2 Sheppard, Mullin, Richter & Hampton LLP
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)

Entropic Communications, Inc.

San Diego, CA

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

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

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- ☐ A check is enclosed.
☒ Payment by Deposit A
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 504613 (enclose an extra copy of this form).

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

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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

Authorized Signature /Richard A. Bachand, Reg. #25,107/

Date October 23, 2012

Typed or printed name Richard A. Bachand

Registration No. 25,107

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

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Electronic Patent Application Fee Transmittal				
Application Number:	12580227			
Filing Date:	15-Oct-2009			
Title of Invention:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK			
First Named Inventor/Applicant Name:	Arndt MUELLER			
Filer:	Richard A. Bachand			
Attorney Docket Number:	E080048USU2			
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:				
Publ. Fee- early, voluntary, or normal	1504	1	300	300
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1770	1770

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2070

Electronic Acknowledgement Receipt

EFS ID:	14059113
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Richard A. Bachand
Filer Authorized By:	
Attorney Docket Number:	E080048USU2
Receipt Date:	23-OCT-2012
Filing Date:	15-OCT-2009
Time Stamp:	20:40:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 2070
RAM confirmation Number	9007
Deposit Account	504613
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Issue Fee Payment (PTO-85B)	2012_10_23_Fee_Transmittal_ E080048USU2.pdf	593932 dce160fe6075b6014ae8dbc3da04f05e64b8d0000	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32142 641694281e7915175830d6556a6c934dd32d0094	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			626074		
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Receipt date: 07/16/2012

12580227 - GAU: 2432

Doc code: IDS

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0851-0031

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227	
	Filing Date		2009-10-15	
	First Named Inventor	Mueller, Arndt		
	Art Unit	2432		
	Examiner Name	Lemma, Samson		
	Attorney Docket Number	05JM-169426 (E080048USU2)		

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
	1	7054296	B1	2006-05-30	Sorrells et al.	

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

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20070133386	A1	2007-06-14	Kim et al.	

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FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	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	2008/039951	WO	A1	2008-04-03	Qualcomm		☐

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

Receipt date: 07/16/2012 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227	12580227 - GAU: 2432
	Filing Date		2009-10-15	
	First Named Inventor	Mueller, Arndt		
	Art Unit	2432		
	Examiner Name	Lemma, Samson		
	Attorney Docket Number	05JM-169426 (E080048USU2)		

1	Examination Report for App No. GB1104519.2, completed 23 May 2012, Examiner Dr. Mark Lewney	☐
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EXAMINER SIGNATURE

Examiner Signature	/Samson Lemma/	Date Considered	09/22/2012
--------------------	----------------	-----------------	------------

*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.



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NOTICE OF ALLOWANCE AND FEE(S) DUE

77330 7590 07/24/2012
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

EXAMINER

LEMMMA, SAMSON B

ART UNIT

PAPER NUMBER

2432

DATE MAILED: 07/24/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

TITLE OF INVENTION: METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	10/24/2012

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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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.

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

77330 7590 07/24/2012
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

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.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

TITLE OF INVENTION: METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	10/24/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEMMA, SAMSON B	2432	380-268000

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

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

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

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

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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

Authorized Signature _____ Date _____
Typed or printed name _____ Registration No. _____

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

77330 7590 07/24/2012
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

EXAMINER

LEMMA, SAMSON B

ART UNIT	PAPER NUMBER
----------	--------------

2432

DATE MAILED: 07/24/2012

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 329 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 329 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.	Applicant(s)	
	12/580,227	MUELLER, ARNDT	
	Examiner	Art Unit	
	SAMSON LEMMA	2432	

-- 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 06/20/2012.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-18.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

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

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

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ 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. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____ 4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	5. ☐ Notice of Informal Patent Application 6. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____. 7. ☐ Examiner's Amendment/Comment 8. ☐ Examiner's Statement of Reasons for Allowance 9. ☐ Other ____.
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/SAMSON LEMMA/ Primary Examiner, Art Unit 2432	
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<i>Index of Claims</i> 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

✓	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	10/20/2011	04/20/2012	07/06/2012					
	1	✓	=	=					
	2	✓	=	=					
	3	✓	=	=					
	4	✓	=	=					
	5	✓	=	=					
	6	✓	=	=					
	7	✓	=	=					
	8	✓	=	=					
	9	✓	=	=					
	10	✓	=	=					
	11	✓	=	=					
	12	✓	=	=					
	13	✓	=	=					
	14	✓	=	=					
	15	✓	=	=					
	16	✓	✓	=					
	17	✓	✓	=					
	18	✓	✓	=					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application	:	12/580,227	Confirmation No. 9919
Applicant	:	Arndt Mueller	
Filed	:	October 15, 2009	
TC/A.U.	:	2432	
Examiner	:	Samson Lemma	
For	:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK	
Docket No.	:	05JM-169426	

Mailstop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INTRODUCTORY COMMENTS

This is in response to the final office action, dated April 26, 2012, and filed within the two month period for an Advisory Action. After careful consideration of the grounds for rejection, Applicant respectfully requests that the Examiner reconsider the rejections in view of the amendments and discussion submitted.

please enter.
07/06/2012

/S.L./

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

Search Notes 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

SEARCHED			
Class	Subclass	Date	Examiner
380	268, 287	07/06/2012	SL
370	480	07/06/2012	SL

SEARCH NOTES		
Search Notes	Date	Examiner
380/\$. 370/\$ (Search is Updated)	07/06/2012	SL
EAST and Interference Search (Search is Updated)	07/06/2012	SL
NPL (IEEE, ACM DIGITAL LIBRARY, GOOGLE, GOOGLE PATENT, GOOGLE SCHOLAR, CITESEER, ...)	07/06/2012	SL
INVENTOR NAME SEARCH	07/06/2012	SL

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
Interference Search History Printout	Interference Search History Printout	07/06/2012	SL

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"20100098257"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:37
L2	446	(380/268).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:43
L3	207	(380/287).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:43
L4	1482	(370/480).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:44
L5	333	(orthogonal with frequency with division with multiple with access\$ with network\$).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:45
L8	5	(pseudorandom with noise with sequence with subcarrier\$).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:47
L9	1	(orthogonal with frequency with division with multiple with access\$) and (network\$ with pseudorandom with noise with sequence with subcarrier\$)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:48
L10	1	(mapp\$3 with packet with plurality with quadrature with amplitude with modulated with symbol\$)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:50
L11	1	(mapp\$3 with packet with plurality with quadrature with amplitude with	US-PGPUB; USPAT; USOCR;	OR	OFF	2012/07/10 23:50

		modulated with symbol\$).clm.	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L12	1	(predetermined with transformation with quadrature with amplitude with modulated with symbol\$).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:51
L13	10	(quadrature with amplitude with modulated with symbol with pseudorandom noise with sequence with subcarrier).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:52
L14	10	(transformation with quadrature with amplitude with modulated with symbol with pseudorandom noise with sequence with subcarrier).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:53
L15	10	(predetermined with transformation with quadrature with amplitude with modulated with symbol with pseudorandom noise with sequence with subcarrier).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:53
L16	2	(predetermined with transformation with quadrature with amplitude with modulated with symbol with pseudorandom noise with sequence with subcarrier) and 8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:54
L17	1	(predetermined WITH transformation WITH quadrature WITH amplitude WITH modulated WITH symbol WITH pseudorandom WITH noise WITH sequence WITH subcarrier)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:55
L18	1	(predetermined WITH transformation WITH quadrature WITH amplitude WITH modulated WITH symbol WITH pseudorandom WITH noise WITH sequence WITH subcarrier).CLM.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/10 23:55

7/10/2012 11:56:05 PM

Issue Classification 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
380		268				H	O	4	L	9 / 00 (2006.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
380	287																	
370	480																	

☒ 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	1	17	17												
2	2	18	18												
3	3														
4	4														
5	5														
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9	9														
10	10														
11	11														
12	12														
13	13														
14	14														
15	15														
16	16														

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 18	
/SAMSON LEMMA/ Primary Examiner. Art Unit 2432 (Primary Examiner) _____ (Date) _____		07/06/2012 (Date) _____	O.G. Print Claim(s) 1 O.G. Print Figure 4

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0851-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227	
	Filing Date		2009-10-15	
	First Named Inventor	Mueller, Arndt		
	Art Unit	2432		
	Examiner Name	Lemma, Samson		
	Attorney Docket Number	05JM-169426 (E080048USU2)		

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
	1	7054296	B1	2006-05-30	Sorrells et al.	

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

U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20070133386	A1	2007-06-14	Kim et al.	

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

FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	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	2008/039951	WO	A1	2008-04-03	Qualcomm		☐

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227
	Filing Date		2009-10-15
	First Named Inventor	Mueller, Arndt	
	Art Unit	2432	
	Examiner Name	Lemma, Samson	
	Attorney Docket Number	05JM-169426 (E080048USU2)	

1	Examination Report for App No. GB1104519.2, completed 23 May 2012, Examiner Dr. Mark Lewney	☐
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If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

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

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

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.

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
3 April 2008 (03.04.2008)

PCT

(10) International Publication Number
WO 2008/039951 A1(51) International Patent Classification:
H04L 27/26 (2006.01)(21) International Application Number:
PCT/US2007/079785(22) International Filing Date:
27 September 2007 (27.09.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/535,947 27 September 2006 (27.09.2006) US(71) Applicant (for all designated States except US): **QUALCOMM Incorporated** [US/US]; International IP Administration, 5775 Morehouse Drive, San Diego, California 92121 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **WANG, Michael Mao** [US/US]; 5775 Morehouse Drive, San Diego, California 92121 (US).(74) Agents: **BACHAND, Richard A.** et al.; International IP Administration, 5775 Morehouse Drive, San Diego, California 92121 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

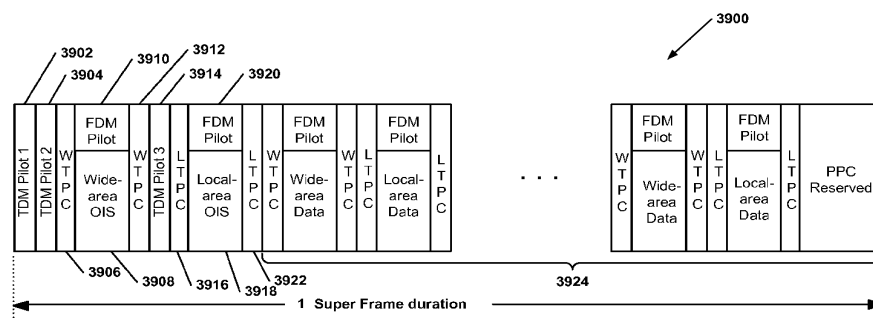
Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(54) Title: METHODS AND APPARATUS FOR TRANSMITTING A FRAME STRUCTURE IN A WIRELESS COMMUNICATION SYSTEM



Electronic Acknowledgement Receipt

EFS ID:	13265107
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Daniel N. Yannuzzi/Linda Spirra
Filer Authorized By:	Daniel N. Yannuzzi
Attorney Docket Number:	E080048USU2
Receipt Date:	16-JUL-2012
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Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		169426-IDS.pdf	237820	yes	5
			332b3e6a0cea4a91018514ec6b29d42e612da73f		

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	3	
Information Disclosure Statement (IDS) Form (SB08)			4	5	
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Information Disclosure Statement Transmittal

Docket Number

05JM-169426

Address To
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

In Re Application Of:

Mueller, Arndt

Application No.	12/580,227
Filing Date	October 15, 2009
Examiner	Lemma, Samson
Art Unit	2432

Title of Invention

METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK

BASIS FOR FILING (Select 1, 2 or 3 below.)

37 CFR 1.97(b)

- 1) ☐ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53 (d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

37 CFR 1.97(c)

- 2) ☒ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of:

- a) ☒ the statement specified in 37 CFR 1.97(e);

OR

- b) ☐ the fee set forth in 37 CFR 1.17(p).

37 CFR 1.97(d)

- 3) ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(c), and on or before payment of the issue fee, and is accompanied by the Statement as specified in 37 CFR 1.97(e) and the fee set forth in 37 CFR 1.17(p).

Information Disclosure Statement Transmittal

Docket Number

05JM-169426

STATEMENT UNDER 37 CFR 1.97(e) ACCOMPANYING INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement submitted herewith is submitted under one of the following conditions, which satisfies the requirement under 37 CFR 1.97(e). (Select 4 or 5 below if applicable.)

- 4) ☒ 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; or
- 5) ☐ 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.

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Fee set forth in 37 CFR 1.17(p):

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- ☐ Charge the amount of _____
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Information Disclosure Statement Transmittal

Docket Number

05JM-169426

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Signatory Drop-Down Box

Daniel N. Yannuzzi

Name	Daniel N. Yannuzzi	Registration Number	36,727
Signatory Capacity	Attorney for Applicant(s)	E-mail Address	
eSign		Date Signed	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application	:	12/580,227	Confirmation No. 9919
Applicant	:	Arndt Mueller	
Filed	:	October 15, 2009	
TC/A.U.	:	2432	
Examiner	:	Samson Lemma	
For	:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK	
Docket No.	:	05JM-169426	

Mailstop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INTRODUCTORY COMMENTS

This is in response to the final office action, dated April 26, 2012, and filed within the two month period for an Advisory Action. After careful consideration of the grounds for rejection, Applicant respectfully requests that the Examiner reconsider the rejections in view of the amendments and discussion submitted.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Original) A method for communications transmission using orthogonal frequency division multiple access on a network comprising:
 - a) providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access;
 - b) providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers;
 - c) allocating a subset of the set of available subcarriers to each of the transmitting network devices;
 - d) a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers;
 - e) the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier;
 - f) the transmitting network device transmitting the transformed symbol to a receiving network device.
2. (Original) The method of claim 1, wherein the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation comprise:
 - a) the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier; and

- b) the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier.
3. (Previously Presented) The method of claim 2, wherein the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed.
4. (Original) The method of claim 1, wherein the pseudorandom noise sequence comprises a PN-15 sequence.
5. (Original) The method of claim 4, wherein the step of performing the predetermined transformation comprises rotating the quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
6. (Original) The method of claim 4, wherein the receiving network device comprises a network coordinator and wherein the packet comprises a resource reservation request packet.
7. (Original) A method for communications reception using orthogonal frequency division multiple access on a network comprising:

- a) receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device;
- b) receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device;
- c) wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence; and
- d) descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

8. (Original) The method of claim 7, wherein:

- a) the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier; and
- b) advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and

descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier.

9. (Original) The method of claim 8, wherein the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled.
10. (Original) The method of claim 7, wherein the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence.
11. (Original) The method of claim 10, wherein the step of descrambling the scrambled quadrature amplitude modulated symbol comprises rotating the scrambled quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the scrambled quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
12. (Original) The method of claim 4, wherein the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet.
13. (Original) A communications network system, comprising:
 - a) a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access;

- b) wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
- c) initializing a sequence generator with a predetermined seed; and,
- d) while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

14. (Original) The system of claim 13, further comprising:

- a) a second network device configured to transmit a second quadrature amplitude modulated symbol on a second subcarrier of the set of available subcarriers;
- b) wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol, the second constellation scrambling operation comprising:
 - initializing a second sequence generator with the predetermined seed; and,
 - while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol.

15. (Original) The system of claim 14, further comprising:

- a) a receiving network device configured to receive the first and second scrambled quadrature amplitude modulated symbols;
- b) wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled quadrature amplitude modulated symbols, comprising:
 - initializing a third sequence generator with the predetermined seed; and,

while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first quadrature amplitude modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second quadrature amplitude modulated symbol.

16. (Currently Amended) A network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a non-transitory computer readable medium having a computer executable program code embodied on the non-transitory computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of:

- a) performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
 - initializing a sequence generator with a predetermined seed; and,
 - while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

17. (Original) The network device of claim 16, wherein the computer executable program code is further configured to cause the device to transmit the scrambled quadrature amplitude modulated symbol to a receiving network

18. (Original) The network device of claim 17, wherein the receiving network device comprises a network coordinator, the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request.

REMARKS

Claims 1-18 are pending in this application and claim 16 is amended. In view of the above amendments and following remarks, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Allowable Subject Matter

Claims 1-15 are allowed and claims 16-18 are indicated as allowable if amended to overcome the rejection under 35 U.S.C. § 101.

Claim Rejection – 35 U.S.C. § 101

Claim 16-18 are rejected under 35 U.S.C. § 101 for allegedly being directed to non-statutory subject matter.

Applicant has followed the Examiner's suggestion and amended claim 16 to recite, in part, "a non-transitory computer readable medium." In light of the amendment, all outstanding rejections to claims 16-18 are moot. Accordingly, Applicant respectfully requests the Examiner to withdraw all outstanding rejections and to allow claim 16 and its dependents.

CONCLUSION

The foregoing amendments are believed to place this application in condition for allowance. Timely issuance is respectfully requested. If any matters remain outstanding after consideration of this Amendment that the Examiner believes might be expedited by a telephone conference with Applicant's representative, the Examiner is respectfully requested to call the undersigned attorney at the number indicated below.

Any fees due in connection with the filing of this Amendment should be charged to Deposit Account No. 50-4562 referencing docket 05JM-169426. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Dated: June 20, 2012

Respectfully submitted,

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP

By: _____

Michael A. Febbo
Registration No. 59,205

SHEPPARD MULLIN RICHTER & HAMPTON LLP
12275 El Camino Real, Suite 200
San Diego, California 92130
Telephone: (858) 720-8900
Facsimile: (858) 509-3691

Electronic Acknowledgement Receipt

EFS ID:	13066161
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Daniel N. Yannuzzi/Linda Spirra
Filer Authorized By:	Daniel N. Yannuzzi
Attorney Docket Number:	E080048USU2
Receipt Date:	20-JUN-2012
Filing Date:	15-OCT-2009
Time Stamp:	18:56:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		169426-Amendmnt.pdf	427998 ff40826849fe5bcb7cd637014c4568a1535a4cbf	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Miscellaneous Incoming Letter	1	2
	Amendment After Final	3	12
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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:			
Total Files Size (in bytes):		427998	
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Amendment Transmittal Letter

Docket Number

05JM-169426

Address To
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Title of Invention

METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK

First Named Inventor Arndt Mueller

Application No. 12/580,227

Filing Date October 15, 2009

Examiner Samson Lemma

Art Unit 2432

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

The fee has been calculated and is transmitted as shown below.

☒ Applicant claims Small Entity Status. See 37 CFR 1.27.

Fee Calculation

Claims as Amended

For	#Filed	#Previously Paid For	#Extra	Rate	Fee
Total Claims	18	- 20 =		x 30 =	
Total Indep. Claims	4	- 4 =		x 125 =	
Multiple Dependent Claims (check if applicable) ☐					
TOTAL					\$0

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Amendment Transmittal Letter

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Signatory Drop-Down Box

Michael A. Febbo

Name	Michael A. Febbo	Registration Number	59,285
Signatory Capacity	Attorney for Applicant(s)	E-mail Address	
eSign			Date Signed 06/20/2012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application	:	12/580,227	Confirmation No. 9919
Applicant	:	Arndt Mueller	
Filed	:	October 15, 2009	
TC/A.U.	:	2432	
Examiner	:	Samson Lemma	
For	:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK	
Docket No.	:	05JM-169426	

Mailstop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INTRODUCTORY COMMENTS

This is in response to the final office action, dated April 26, 2012, and filed within the two month period for an Advisory Action. After careful consideration of the grounds for rejection, Applicant respectfully requests that the Examiner reconsider the rejections in view of the amendments and discussion submitted.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Original) A method for communications transmission using orthogonal frequency division multiple access on a network comprising:
 - a) providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access;
 - b) providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers;
 - c) allocating a subset of the set of available subcarriers to each of the transmitting network devices;
 - d) a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers;
 - e) the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier;
 - f) the transmitting network device transmitting the transformed symbol to a receiving network device.

2. (Original) The method of claim 1, wherein the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation comprise:
 - a) the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier; and

- b) the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier.
3. (Previously Presented) The method of claim 2, wherein the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed.
4. (Original) The method of claim 1, wherein the pseudorandom noise sequence comprises a PN-15 sequence.
5. (Original) The method of claim 4, wherein the step of performing the predetermined transformation comprises rotating the quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
6. (Original) The method of claim 4, wherein the receiving network device comprises a network coordinator and wherein the packet comprises a resource reservation request packet.
7. (Original) A method for communications reception using orthogonal frequency division multiple access on a network comprising:

- a) receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device;
- b) receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device;
- c) wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence; and
- d) descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

8. (Original) The method of claim 7, wherein:

- a) the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier; and
- b) advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and

descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier.

9. (Original) The method of claim 8, wherein the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled.
10. (Original) The method of claim 7, wherein the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence.
11. (Original) The method of claim 10, wherein the step of descrambling the scrambled quadrature amplitude modulated symbol comprises rotating the scrambled quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the scrambled quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
12. (Original) The method of claim 4, wherein the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet.
13. (Original) A communications network system, comprising:
 - a) a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access;

- b) wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
- c) initializing a sequence generator with a predetermined seed; and,
- d) while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

14. (Original) The system of claim 13, further comprising:

- a) a second network device configured to transmit a second quadrature amplitude modulated symbol on a second subcarrier of the set of available subcarriers;
- b) wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol, the second constellation scrambling operation comprising:
 - initializing a second sequence generator with the predetermined seed; and,
 - while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol.

15. (Original) The system of claim 14, further comprising:

- a) a receiving network device configured to receive the first and second scrambled quadrature amplitude modulated symbols;
- b) wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled quadrature amplitude modulated symbols, comprising:
 - initializing a third sequence generator with the predetermined seed; and,

while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first quadrature amplitude modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second quadrature amplitude modulated symbol.

16. (Currently Amended) A network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a non-transitory computer readable medium having a computer executable program code embodied on the non-transitory computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of:

- a) performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
 - initializing a sequence generator with a predetermined seed; and,
 - while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

17. (Original) The network device of claim 16, wherein the computer executable program code is further configured to cause the device to transmit the scrambled quadrature amplitude modulated symbol to a receiving network

18. (Original) The network device of claim 17, wherein the receiving network device comprises a network coordinator, the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request.

REMARKS

Claims 1-18 are pending in this application and claim 16 is amended. In view of the above amendments and following remarks, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Allowable Subject Matter

Claims 1-15 are allowed and claims 16-18 are indicated as allowable if amended to overcome the rejection under 35 U.S.C. § 101.

Claim Rejection – 35 U.S.C. § 101

Claim 16-18 are rejected under 35 U.S.C. § 101 for allegedly being directed to non-statutory subject matter.

Applicant has followed the Examiner's suggestion and amended claim 16 to recite, in part, "a non-transitory computer readable medium." In light of the amendment, all outstanding rejections to claims 16-18 are moot. Accordingly, Applicant respectfully requests the Examiner to withdraw all outstanding rejections and to allow claim 16 and its dependents.

CONCLUSION

The foregoing amendments are believed to place this application in condition for allowance. Timely issuance is respectfully requested. If any matters remain outstanding after consideration of this Amendment that the Examiner believes might be expedited by a telephone conference with Applicant's representative, the Examiner is respectfully requested to call the undersigned attorney at the number indicated below.

Any fees due in connection with the filing of this Amendment should be charged to Deposit Account No. 50-4562 referencing docket 05JM-169426. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Dated: June 20, 2012

Respectfully submitted,

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP

By: _____

Michael A. Febbo
Registration No. 59,205

SHEPPARD MULLIN RICHTER & HAMPTON LLP
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application	:	12/580,227	Confirmation No. 9919
Applicant	:	Arndt Mueller	
Filed	:	October 15, 2009	
TC/A.U.	:	2432	
Examiner	:	Samson Lemma	
For	:	METHOD AND APPARATUS FOR PERFORMING CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME NETWORK	
Docket No.	:	05JM-169426	

Mailstop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

INTRODUCTORY COMMENTS

This is in response to the final office action, dated April 26, 2012, and filed within the two month period for an Advisory Action. After careful consideration of the grounds for rejection, Applicant respectfully requests that the Examiner reconsider the rejections in view of the amendments and discussion submitted.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Original) A method for communications transmission using orthogonal frequency division multiple access on a network comprising:
 - a) providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access;
 - b) providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers;
 - c) allocating a subset of the set of available subcarriers to each of the transmitting network devices;
 - d) a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers;
 - e) the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier;
 - f) the transmitting network device transmitting the transformed symbol to a receiving network device.
2. (Original) The method of claim 1, wherein the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation comprise:
 - a) the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier; and

- b) the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier.
3. (Previously Presented) The method of claim 2, wherein the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed.
4. (Original) The method of claim 1, wherein the pseudorandom noise sequence comprises a PN-15 sequence.
5. (Original) The method of claim 4, wherein the step of performing the predetermined transformation comprises rotating the quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
6. (Original) The method of claim 4, wherein the receiving network device comprises a network coordinator and wherein the packet comprises a resource reservation request packet.
7. (Original) A method for communications reception using orthogonal frequency division multiple access on a network comprising:

- a) receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device;
- b) receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device;
- c) wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence; and
- d) descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

8. (Original) The method of claim 7, wherein:

- a) the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier; and
- b) advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and

descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier.

9. (Original) The method of claim 8, wherein the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled.
10. (Original) The method of claim 7, wherein the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence.
11. (Original) The method of claim 10, wherein the step of descrambling the scrambled quadrature amplitude modulated symbol comprises rotating the scrambled quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the scrambled quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
12. (Original) The method of claim 4, wherein the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet.
13. (Original) A communications network system, comprising:
 - a) a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access;

- b) wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
- c) initializing a sequence generator with a predetermined seed; and,
- d) while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

14. (Original) The system of claim 13, further comprising:

- a) a second network device configured to transmit a second quadrature amplitude modulated symbol on a second subcarrier of the set of available subcarriers;
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 - initializing a second sequence generator with the predetermined seed; and,
 - while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol.

15. (Original) The system of claim 14, further comprising:

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- b) wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled quadrature amplitude modulated symbols, comprising:
 - initializing a third sequence generator with the predetermined seed; and,

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16. (Currently Amended) A network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a non-transitory computer readable medium having a computer executable program code embodied on the non-transitory computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of:

- a) performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
 - initializing a sequence generator with a predetermined seed; and,
 - while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

17. (Original) The network device of claim 16, wherein the computer executable program code is further configured to cause the device to transmit the scrambled quadrature amplitude modulated symbol to a receiving network

18. (Original) The network device of claim 17, wherein the receiving network device comprises a network coordinator, the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request.

REMARKS

Claims 1-18 are pending in this application and claim 16 is amended. In view of the above amendments and following remarks, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Allowable Subject Matter

Claims 1-15 are allowed and claims 16-18 are indicated as allowable if amended to overcome the rejection under 35 U.S.C. § 101.

Claim Rejection – 35 U.S.C. § 101

Claim 16-18 are rejected under 35 U.S.C. § 101 for allegedly being directed to non-statutory subject matter.

Applicant has followed the Examiner's suggestion and amended claim 16 to recite, in part, "a non-transitory computer readable medium." In light of the amendment, all outstanding rejections to claims 16-18 are moot. Accordingly, Applicant respectfully requests the Examiner to withdraw all outstanding rejections and to allow claim 16 and its dependents.

CONCLUSION

The foregoing amendments are believed to place this application in condition for allowance. Timely issuance is respectfully requested. If any matters remain outstanding after consideration of this Amendment that the Examiner believes might be expedited by a telephone conference with Applicant's representative, the Examiner is respectfully requested to call the undersigned attorney at the number indicated below.

Any fees due in connection with the filing of this Amendment should be charged to Deposit Account No. 50-4562 referencing docket 05JM-169426. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Dated: June 20, 2012

Respectfully submitted,

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP

By: _____

Michael A. Febbo
Registration No. 59,205

SHEPPARD MULLIN RICHTER & HAMPTON LLP
12275 El Camino Real, Suite 200
San Diego, California 92130
Telephone: (858) 720-8900
Facsimile: (858) 509-3691

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 12/580,227		Filing Date 10/15/2009		☐ To be Mailed		
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	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), (l), 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(j))	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										
(Column 1)			(Column 2)			(Column 3)		SMALL ENTITY OR OTHER THAN SMALL ENTITY		
AMENDMENT	06/20/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	X \$ =		OR	X \$60=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 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	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:
/DIANIECE JACOBS/

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

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



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

77330 7590 04/26/2012
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

EXAMINER	
LEMMA, SAMSON B	

ART UNIT	PAPER NUMBER
2432	

MAIL DATE	DELIVERY MODE
04/26/2012	PAPER

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

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

Office Action Summary	Application No. 12/580,227	Applicant(s) MUELLER, ARNDT	
	Examiner SAMSON LEMMA	Art Unit 2432	
	-- 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 08 February 2012.

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) 1-18 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☒ Claim(s) 1-15 is/are allowed.

7) ☒ Claim(s) 16-18 is/are rejected.

8) ☐ Claim(s) ____ 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: _____.
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DETAILED ACTION

1. This office action is in response to an amendment filed on 02/08/2012.
2. The amendment made to dependent claim 3 overcomes the objection set forth in the previous office action. Thus, this particular objection is withdrawn.

Response to Arguments

3. Applicant's argument filed on February 08, 2012 with respect to claims 1-18 (103 (a), rejection) have been fully considered and are found to be persuasive. Thus the prior art rejection set forth in the previous office action is withdrawn.

However, applicant's argument regarding the 101 rejection set forth in the previous office action is not persuasive.

Examiner would like to point out that independent claim 16, claims the program stored in the computer readable medium. In other words, the claim is directed to computer readable medium having computer executable program code, wherein the computer executable code is configured to cause the network device to perform the steps recited in the body of the claim. Thus, the claim is not directed to the network device but to the program stored in medium. Unlike applicant's representative argument, the claim is not directed to the "network device" recited in the claim rather it is directed to the set of instructions stored in the medium.

Thus, to make the claim statutory, the program/the set of instructions recited in the claim, has to be stored in appropriate non-transitory computer readable medium.

In view of this understanding the 101 rejection is maintained.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

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

5. **Claims 16-18** are rejected under 35 U.S.C. 101 because the subject matter is directed to non-statutory subject matter.

6. **Claims 16-18** recites a limitation/term, "computer readable medium", however it raises a questions whether or not this term implies a statutory "non-transitory computer readable storage medium" or medium that may be non-statutory such as "transmission medium". In the absence of a clear and concise definition, the limitation/term could be broadly interpreted to include, non-statutory subject matter such as signal or carrier waves. Thus in order to the overcome that possibility, examiner would suggest to replace the "computer readable medium" recited in claims 16-18 with "non-transitory computer readable medium". For this reason, the above claims do not clearly establish a statutory category of

Art Unit: 2432

the invention since the recited program/code is not stored or encoded in appropriate "non-transitory computer readable medium". Therefore the claims are program per se and do not fall within the statutory classes listed in 35 USC 101.

Conclusion

7. **THIS ACTION IS MADE FINAL.** 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 mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samson B Lemma whose telephone number is 571-272-3806. The examiner can normally be reached on Monday-Friday (8:00 am---4: 30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BARRON JR GILBERTO can be reached on 571-272-3799. 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.

/SAMSON LEMMA/
Primary Examiner, Art Unit 2432

Application/Control Number: 12/580,227
Art Unit: 2432

Page 5

Search Notes 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

SEARCHED			
Class	Subclass	Date	Examiner
380	268, 287	04/20/2012	SL
370	480	04/20/2012	SL

SEARCH NOTES		
Search Notes	Date	Examiner
380/\$. 370/\$ (Search is Updated)	04/20/2012	SL
EAST (Search is Updated)	04/20/2012	SL
NPL (IEEE, ACM DIGITAL LIBRARY, GOOGLE, GOOGLE PATENT, GOOGLE SCHOLAR, CITESEER, ...)	04/20/2012	SL
INVENTOR NAME SEARCH	04/20/2012	SL

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

✓	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	10/20/2011	04/20/2012							
	1	✓	=							
	2	✓	=							
	3	✓	=							
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	12	✓	=							
	13	✓	=							
	14	✓	=							
	15	✓	=							
	16	✓	✓							
	17	✓	✓							
	18	✓	✓							

PATENT

Entropic Ref. No.: E080048USU2

Serial No. 12/580,227

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:
Arndt Mueller

**For: METHOD AND APPARATUS FOR
PERFORMING CONSTELLATION
SCRAMBLING IN A MULTIMEDIA
HOME NETWORK**

Serial No.: 12/580,227

Group Art Unit: 2432

Filed: 15-Oct-2009

Confirmation No. 9919

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

Attention: LEMMA, SAMSON B
Examiner

Dear Sir:

In response to the Non-Final Office Action dated November 9, 2011, please note the following remarks and comments:

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

Remarks/Comments begin on page 8 of this paper.

I hereby certify that this
correspondence is being electronically deposited
with the Commissioner for Patents through the
USPTO electronic filing system, on:

February 8, 2012

(Date of Deposit)

Tim Ellis

(Name of Person Making Deposit)

/Tim Ellis/

(Signature)

Amendments to the Claims:

1. (Original) A method for communications transmission using orthogonal frequency division multiple access on a network comprising:
 - a) providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access;
 - b) providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers;
 - c) allocating a subset of the set of available subcarriers to each of the transmitting network devices;
 - d) a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers;
 - e) the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier;
 - f) the transmitting network device transmitting the transformed symbol to a receiving network device.
2. (Original) The method of claim 1, wherein the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation comprise:
 - a) the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier; and
 - b) the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a

- next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier.
3. (Currently Amended) The method of claim ~~3~~ 2, wherein the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed.
 4. (Original) The method of claim 1, wherein the pseudorandom noise sequence comprises a PN-15 sequence.
 5. (Original) The method of claim 4, wherein the step of performing the predetermined transformation comprises rotating the quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.
 6. (Original) The method of claim 4, wherein the receiving network device comprises a network coordinator and wherein the packet comprises a resource reservation request packet.
 7. (Original) A method for communications reception using orthogonal frequency division multiple access on a network comprising:
 - a) receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device;
 - b) receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding

- second plurality of used subcarriers assigned to the second transmitting network device;
- c) wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence; and
 - d) descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.
8. (Original) The method of claim 7, wherein:
- a) the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier; and
 - b) advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier.
9. (Original) The method of claim 8, wherein the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled.
10. (Original) The method of claim 7, wherein the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence.
11. (Original) The method of claim 10, wherein the step of descrambling the scrambled quadrature amplitude modulated symbol comprises rotating the scrambled quadrature

amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the scrambled quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.

12. (Original) The method of claim 4, wherein the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet.
13. (Original) A communications network system, comprising:
 - a) a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access;
 - b) wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
 - c) initializing a sequence generator with a predetermined seed; and,
 - d) while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.
14. (Original) The system of claim 13, further comprising:
 - a) a second network device configured to transmit a second quadrature amplitude modulated symbol on a second subcarrier of the set of available subcarriers;
 - b) wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol, the second constellation scrambling operation comprising:
 - i) initializing a second sequence generator with the predetermined seed; and,
 - ii) while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of

- a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol.
15. (Original) The system of claim 14, further comprising:
- a) a receiving network device configured to receive the first and second scrambled quadrature amplitude modulated symbols;
 - b) wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled quadrature amplitude modulated symbols, comprising:
 - i) initializing a third sequence generator with the predetermined seed; and,
 - ii) while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first quadrature amplitude modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second quadrature amplitude modulated symbol.
16. (Original) A network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a computer readable medium having a computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of:
- a) performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising:
 - i) initializing a sequence generator with a predetermined seed; and,

- ii) while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

17. (Original) The network device of claim 16, wherein the computer executable program code is further configured to cause the device to transmit the scrambled quadrature amplitude modulated symbol to a receiving network device.

18. (Original) The network device of claim 17, wherein the receiving network device comprises a network coordinator, the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request.

REMARKS/ARGUMENTS

Claims 1-18 were pending in the application.

Claims 1-18 were rejected.

No Claims have been canceled.

Claim 3 has been amended.

Applicants believe that all claims are now in condition for allowance.

Discussion of Objections

The Examiner rejected Claim 3 as being dependent upon itself. Applicants have amended Claim 3 to depend from Claim 2. Accordingly, Applicants respectfully traverse the Examiner's objection to Claim 3 as amended.

Discussion of Rejections Under 35 U.S.C. §101

The Examiner rejected Claims 16-18 under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The Examiner contends that Claim 16-18 are directed to a computer executable program embodied on a computer readable medium. However, Applicants respectfully point to the fact that Claims 16-18 are, in fact, directed to a **network device**. The particular network device recited in Claims 16-18 perform the steps recited in the respective claims. Clearly a network device is within the scope of patentable subject matter. Accordingly, Applicants respectfully traverse the Examiner's rejection of Claims 16-18 under 35 U.S.C. §101.

Discussion of Rejections Under 35 U.S.C. §103

The Examiner rejected Claims 1-3, 7-9 and 13-17 under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereafter "Kim") in view of Sorrells et al (hereafter "Sorrells"). Applicants point out the typographical error in the office action which indicates that Sorrells is US Patent No. 7,054,596 rather than 7,054,296.

Applicants traverse the Examiner's rejection of these claims for at least the following reasons.

As per Claim 1, the Examiner contends that providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers. The Examiner points to paragraph [0065] of Kim as support for this assertion. However, upon a careful reading of paragraph [0065] of Kim, it can be seen that this paragraph deals with how to place particular pilot subcarriers within a set of subcarriers, where each cell within a cellular communications network will be identified by the particular set of pilot subcarriers that it is transmitting. This has nothing to do with a “transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier”. The only thing that the description of Kim’s paragraph [0065] has in common with the limitation cited in Claim 1 is that they both use a pseudorandom sequence and they both have subcarriers of an OFDM system. However, the allocation of pilots within a set of subcarriers that is disclosed by Kim has nothing at all to do with the modulation of particular subcarriers with a particular pseudorandom sequence in order to scramble the symbols to be transmitted.

More particularly, paragraph [0065] of Kim refers to selecting the particular subcarriers on which pilot signals will be transmitted by particular cells within a cellular communications system, while Claim 1 recites using a pseudorandom sequence generator to assist in scrambling symbols to be transmitted on subcarriers of an OFDMA network.

The Examiner also relies upon Sorrells in the rejection of Claim 1. However, Sorrells also lacks the limitation of “the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier”, as recited in Claim 1.

Accordingly, Applicants respectfully traverse the Examiner’s rejection of Claim 1. Furthermore, since a similar limitation is present in each of the Claims presented in the current application, Applicants respectfully traverse the Examiner’s rejection of Claims 1, 3, 7, 8, and 13-17.

The Examiner has rejected Claims 4, 5, 10 and 11 under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Sorrells and further in view of Tanaka, et al (US Publication No. 2005/0287964, hereafter “Tanaka”). Applicants contend that Tanaka neither

teaches nor suggests the limitation that is lacking from Kim and Sorrells. Accordingly, Applicants respectfully traverse the Examiner's rejection of Claims 4, 5, 10 and 11.

The Examiner has rejected Claims 6, 12, and 18 under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Sorrells and further in view of Tanaka and further in view of Senarath, et al. (US Pub. 2008/10076432, hereinafter "Senarath"). Applicants contend that Senarath neither teaches nor suggests the limitation that is lacking from Kim, Sorrells and Tanaka. Accordingly, Applicants respectfully traverse the Examiner's rejection of Claims 4, 6, 12, and 18.

CONCLUSION

Applicants believe that all claims pending in the application are allowable. Applicants therefore respectfully request that a timely Notice of Allowance be issued in this case.

This is a response to the Office Action mailed on November 9, 2011, and as such, is submitted timely.

If there are any other fees due in connection with the filing of the response, please charge the fees to our Deposit Account No. 50-4613. If a fee is required for an additional extension of time under 37 CFR 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned.

Respectfully submitted,

Dated: February 8, 2012

By: /Bruce W. Greenhaus/
Bruce W. Greenhaus
Attorney for Applicants
Registration No. 37,339

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San Diego, California 92121
Telephone: (619) 980-2612
e-mail address: PatentTeam@entropic.com

Electronic Acknowledgement Receipt

EFS ID:	12025870
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Bruce Wayne Greenhaus/Tim Ellis
Filer Authorized By:	Bruce Wayne Greenhaus
Attorney Docket Number:	E080048USU2
Receipt Date:	08-FEB-2012
Filing Date:	15-OCT-2009
Time Stamp:	11:50:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		E080048USU2_Amendment-to_Non-Final_2-8-2012.pdf	124122 0b9508cd2ba480974b5059ef18b104b9cc060c09	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	10
	Amendment/Req. Reconsideration-After Non-Final Reject	11	11
Warnings:			
Information:			
Total Files Size (in bytes):		124122	
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.			

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 12/580,227		Filing Date 10/15/2009		☐ To be Mailed		
APPLICATION AS FILED – PART I											
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	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), (l), 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 \$	=		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											
(Column 1)			(Column 2)			(Column 3)		SMALL ENTITY OR		OTHER THAN SMALL ENTITY	
AMENDMENT	02/08/2012	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	X \$	=		OR	X \$60=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0	X \$	=		OR	X \$250=	0
	☐ Application Size Fee (37 CFR 1.16(s))								OR		
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR		
						TOTAL ADD'L FEE		TOTAL ADD'L FEE		0	
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		OR	X \$	=
	☐ Application Size Fee (37 CFR 1.16(s))								OR		
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR		
						TOTAL ADD'L FEE		TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

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

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



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2	9919

77330 7590 11/09/2011
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

EXAMINER	
LEMMA, SAMSON B	

ART UNIT	PAPER NUMBER
2432	

MAIL DATE	DELIVERY MODE
11/09/2011	PAPER

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

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

Office Action Summary	Application No. 12/580,227		Applicant(s) MUELLER, ARNDT	
	Examiner SAMSON LEMMA		Art Unit 2432	

-- 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 15 October 2009.

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) 1-18 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) 1-18 is/are rejected.

8) ☐ Claim(s) ____ 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 15 October 2009 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: _____.
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DETAILED ACTION

1. This office action is in response to an application filed on 10/15/2009. Claims 1-18 are pending of which claims 1, 7, 13 and 16 are independent.

Priority

2. This application claims priority from Provisional Application No. 61105942 filed on 10/16/2008 and claims priority from a provisional application No. 61144061 filed on 01/12/2009. Therefore, the effective filing date for the subject matter defined in the pending claims of this application is **10/16/2008**.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted on 02/18/2010 has been considered. The submission is in compliance with the provisions of 37 CFR 1.97. Form PTO-1449 is signed and attached hereto.

Oath/Declaration

4. The oath filed on 10/15/2009 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Specification

5. The specification filed on October 15, 2009 is also accepted.

Drawings

6. The drawings filed on October 15, 2009 are also accepted.

Claim Objections

Claim 3 is objected to because of the following informalities: Dependent claim 3 depends on itself. Appropriate correction is required.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

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

8. Claims 16-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.
9. Independent claim 16 is also directed to a computer readable medium having a computer executable program embodied on the computer readable medium ...” Examiner asserts that this particular limitation such as “computer readable medium” can be broadly or reasonably interpreted as being just a signal. In view of this interpretation and understanding, the office asserts that the claim does not fall within the statutory classes listed in 35 USC 101. See MPEP § 2106 IV. B. 1(a). Note: Replacing the limitation "computer readable medium" with "non-transitory computer readable storage medium" would overcome this particular ground of rejection.

10. Dependent claims 17-18 are dependent on the above independent claim 16 and are rejected likewise because they are also directed to a computer readable medium having a computer executable program embodied on the computer readable medium ...” Examiner asserts that this particular limitation such as “computer readable medium” can be broadly or reasonably interpreted as being just a signal. In view of this interpretation and understanding, the office asserts that these claims do not fall within the statutory classes listed in 35 USC 101. See MPEP § 2106 IV. B. 1(a).

Note: Replacing the limitation "computer readable medium" with "non-transitory computer readable storage medium" would overcome this particular ground of rejection.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
12. **Claims 1-3, 7-9 and 13-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter referred to as **Kim**) (US Pub

lication No. 2007/0133386 A1) (Pub. Date June 14, 2007) (Submitted with IDS) in view of Sorrells et al (hereinafter refereed as **Sorrells**) (U.S. Patent No. 7, 054,596) (Date of Patent: May 30, 2006) (All of these references are submitted with IDS)

Examiner Note: A review of the office action made to PCT/US2009/060995 reveals that, it is still applicable to the current claims.

13. **As per independent claims 1 Kim discloses a method for communications transmission using orthogonal frequency division multiple access on a network** (*para [0009] wherein the mobile communication system is usually in the form of a network*) **comprising: providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access** (*para [0009], [0014] wherein the cells are the network devices*); *providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers (para [0065]);* **allocating a subset of the set of available subcarriers to each of the transmitting network devices** (*para [0065] wherein different carder is assigned to different cells*); **a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet**

comprises mapping the packet onto a plurality of modulated symbols to be transmitted on the used subcarriers (*para [0065]*); *the transmitting network device performing a predetermined transformation on a modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier* (*para [0072]*); **the transmitting network device transmitting the transformed symbol to a receiving i network device** (*para [0065]*).

Kim does not specifically teach the limitation recited as a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers; the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

However, Sorrells teaches a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of modulated symbols to be transmitted on the used subcarriers (*col 103, In 2-22*), **and mapping the packet onto a plurality**

of quadrature amplitude modulated symbols (*col 75, In 50-col 76, In 7 wherein quadrature amplitude modulation is adopted*).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system.

14. **As per independent claims 7 Kim discloses a method for communications reception using orthogonal frequency division multiple access on a network** (*para [0009]*) **comprising:**
- receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device** (*para [0065] wherein the modulation contains periodically recurrent noise and can thus be regarded as scrambled modulation*);
- receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device** (*para [0065]*);

wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence (para [0065]); and
descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier (para [0065] wherein the pilot signal contains the pseudorandom noise info; para [0070]-[0071] wherein the pilot signal is used for frequency synchronization during descrambling).

Kim does not specifically teach receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device; receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers

assigned to the second transmitting network device; and descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

However, Sorrells teaches **the orthogonal frequency division modulation symbol comprising a plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding plurality of used subcarriers assigned to the transmitting network device** (*col 103, In 2-22; col 75, In 50-col 76, In 7*).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system.

15. **As per independent claims 13 Kim discloses a method a communications network system** (*para [0009]*), **comprising: a network device configured to transmit a modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access** (*para [0009]*); **wherein the network device is configured to perform a constellation scrambling operation on the modulated symbol** (*para [0063]-[0065]; Fig. 3C wherein constellation structure is shown*), **the constellation**

scrambling operation comprising: a sequence generator (*para [0065]*);
and, while proceeding through the set of available subcarriers in a
predetermined order, advancing the sequence generator for each
subcarrier preceding the subcarrier, and using an element of a
sequence generated by the sequence generator to scramble the
modulated symbol (*para [0065], [0070]-[0071]*).

Kim does not specifically teach a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access; wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising: initializing a sequence generator with a predetermined seed; and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

However, Sorrells **teaches a network device configured to transmit a quadrature amplitude modulated symbol** (col 75, In 50-col 76, In 7) **and initializing a sequence generator with a predetermined seed** (col 119, In 49-57).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude

modulation in an OFDMA network would have simplified the modulation and demodulation system, and using a predetermined seed would have enabled the generation of pseudorandom noise.

16. **As per independent claims 16 Kim discloses a network device configured to transmit a modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access (para [0009], [0065]),**
the network device comprising the steps of:
performing a constellation scrambling operation on the modulated symbol to form a scrambled modulated symbol (para [0065], [0070]-[0071]),
the constellation scrambling operation comprising: a sequence generator (para [0065]); and,
while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the modulated symbol (para [0065], [0070]-[0071]).

Kim does not specifically teach a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a computer readable medium having a

computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of: performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising: initializing a sequence generator with a predetermined seed; and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

However, Sorrells teaches a network device configured to transmit a quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7), **the network device comprising a computer readable medium having a computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps** (col 53, In 39-50), **and initializing a sequence generator with a predetermined seed** (col 119, In 49-57).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system, adopting computer executable program would

have enabled the automatic control of the system, and using a predetermined seed would have enabled the generation of pseudorandom noise.

17. **As per dependent claims 2 Kim** further teaches the steps of providing a corresponding element of a pseudorandom noise sequence and performing a ~redetermined transformation (para [0065], [0072]) comprise: the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarder if the first available subcarrier is a used subcarrier (para [0065] wherein $v(k)$ is the generated random sequence and thus there must be a random noise generator inside the system. Each value of k represents a recurrently-used subcarrier, and when $k=0$, $v(k)$ gives the initial random element and the corresponding subcarrier is assigned to the transmitter); and the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarder if the next available subcarrier is a used subcarrier (para [0065] wherein when k

increases, the next random element is used and the corresponding symbol is transmitted).

18. **As per dependent claims 3 Kim** further teaches the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed (para [0065] wherein $v(k)$ is a pseudorandom sequence and it was well known in the art at the time of the invention that such sequence will repeat after its end, thus, the $v(k)$ -related subcarrier will repeat after the end also).
19. **As per dependent claims 8 Kim** further teaches the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols (para [0065] wherein first and second scrambled orthogonal frequency division modulation symbols are taught when k equals 0 and 1, respectively; para [0070]-[0071] wherein descrambling is taught) comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier (para [0065]) and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier (para [0070]-[0071]); and advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and descrambling the

symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier (para [0065], [0070]-[0071]).

20. As per dependent claims 9 Kim further teaches the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled (para [0065], [0070]-[0071]).

21. As per dependent claims 14 Kim further teaches a second network device configured to transmit a second modulated symbol on a second subcarrier of the set of available subcarriers (para [0065]); wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol (para [0063]-[0065]; Fig. 3C), the second constellation scrambling operation comprising: a second sequence generator (para [0065] wherein multiple cell groups are taught, each group corresponds to a random sequence and must have a sequence generator); and, while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol (para [0065], [0070]-[0071]). Sorrells further teaches a network device configured to transmit a quadrature amplitude modulated symbol (col 75, ln 50-col 76, ln 7), initializing a sequence generator with the predetermined seed (col 119, ln 49-57).

22. As per dependent claims 15 Kim further teaches a receiving network device configured to receive the first and second scrambled modulated symbols (para [0063]-[0065], [0070]-[0071]; Fig. 3C); wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled modulated symbols (para [0063]-[0065], [0070]-[0071]; Fig. 3C), comprising: a third sequence generator (para [0065]); and, while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second modulated symbol (para [0065], [0070]-[0071] wherein synchronized descrambling is taught). Sorrells further teaches the quadrature amplitude modulated symbols (col 75, In 50-col 76, In 7), and initializing a sequence generator with the predetermined seed (col 119, In 49-57), initializing a sequence generator with the predetermined seed (col 119, In 49-57).

23. As per dependent claim 17 Kim further teaches a system configured to cause the device to transmit the scrambled modulated symbol to a receiving network device (para [0065]). Sorrells further teaches quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7) and the computer executable program code is further configured to cause the

device to transmit the symbol to a receiving network device (col 53, In 39-50).

24. **Claims 4, 5 and 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter referred to as **Kim**) (US Publication No. 2007/0133386 A1) (Pub. Date June 14, 2007) (Submitted with IDS) in view of Sorrells et al (hereinafter referred to as **Sorrells**) (U.S. Patent No. 7, 054,596) (Date of Patent: May 30, 2006) and further in view of Tanaka et al ((hereinafter referred to as **Tanaka**) (US Publication No. 2005/0287964 A1) (Pub. Date Dec 29, 2005) (All of these references are submitted with IDS)
25. **As per dependent claims 4 Kim and Sorrells** teach the method of claim 1. Kim teaches the pseudorandom noise sequence (para [0065]) but does not specifically teaches the pseudorandom noise sequence comprises a PN-15 sequence. However, Tanaka teaches the pseudorandom noise sequence comprises a PN-15 sequence (para [0083]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells and Tanaka since adopting PN-15 sequence would have simplified the generation of random noise.
26. **As per dependent claims 5 Kim** further teaches the element of the pseudorandom noise sequence is a '1' and the element of the pseudorandom noise sequence is a '0' (para [0065] wherein the random sequence $v(k)$ may be 0 or 1). Sorrells further teaches the quadrature

amplitude modulated symbol (col 75, In 50-col 76, In 7), the step of performing the predetermined transformation comprises rotating the symbol by 180 deg if the element of the sequence is a certain value and not modifying the symbol if the element of the sequence is another value (col 121, In 43-48 wherein 4th and 7th terms are rotated by 180 deg and other terms keep unchanged).

27. As per dependent claims 10 Kim and Sorrells teach the method of claim 7. Kim teaches the pseudorandom noise sequence (para [0065]) but does not specifically teaches the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence. However, Tanaka teaches the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence (para [0083] wherein the PN15 sequence is a 15th order random sequence). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells and Tanaka since adopting 15th order sequence would have simplified the generation of random noise.

28. As per dependent claims 11 Kim further teaches the step of descrambling the scrambled modulated symbol (para [0070]-[0071]), the element of the pseudorandom noise sequence is a '1' and the element of the pseudorandom noise sequence is a '0' (para [0065]). Sorrells further teaches the quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7), rotating the symbol by 180 deg if the element of the sequence is

a certain value and not modifying the symbol if the element of the sequence is another value (col 121, In 43-48).

29. **Claims 6, 12 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (hereinafter referred to as **Kim**) (US Publication No. 2007/0133386 A1) (Pub. Date June 14, 2007) (Submitted with IDS) in view of Sorrells et al (hereinafter refereed as **Sorrells**) (U.S. Patent No. 7, 054,596) (Date of Patent: May 30, 2006) and further in view of Tanaka et al ((hereinafter referred to as **Tanaka**) (US Publication No. 2005/0287964 A1) (Pub. Date Dec 29, 2005) and further in view of 200810076432 A1 to Senarath et al. (hereinafter 'Senarath') (All of these references are submitted with IDS)
30. **As per dependent claim 6** Kim, Sorrells and Tanaka teach the method of claim 4. Sorrells further teaches the receiving network device comprises a network coordinator (col 70, In 4-11) but does not specifically teach the packet comprises a resource reservation request packet.
- However, Senarath teaches the packet comprises a resource reservation request packet (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells, Tanaka and Senarath since using resource reservation coding would have ensured the communication quality.

- 31. As per dependent claim 12**, Kim, Sorrells and Tanaka teach the method of claim 4. Kim further teaches first and second scrambled orthogonal frequency division modulation symbols (para [0065]). Sorrells further teaches the method is performed by a network coordinator (col 70, In 4-11). Kim, Sorrells and Tanaka do not specifically teach the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet. However, Senarath teaches the symbols are contained in a resource reservation request packet (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells, Tanaka and Senarath since using resource reservation coding would have ensured the communication quality.
- 32. As per dependent claim 18**, Kim and Sorrells teach the network device of claim 17. Kim further teaches the sequence comprises a pseudorandom sequence (para [0065]). Sorrells further teaches the receiving network device comprises a network coordinator (col 70, In 4-11), and the quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7). Kim and Sorrells do not specifically teach the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request. However, Tanaka teaches the sequence comprises a 15th order pseudorandom sequence (para [0083]). Senarath teaches an encoded symbol of a resource reservation request (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the

teachings of Kim, Sorreils, Tanaka and Senarath since adopting 15th order sequence would have simplified the generation of random noise, and using resource reservation coding would have ensured the communication quality.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.(See PTO-Form 892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samson B Lemma whose telephone number is 571-272-3806. The examiner can normally be reached on Monday-Friday (8:00 am---4: 30 pm). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BARRON JR GILBERTO can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/SAMSON LEMMA/

Primary Examiner, Art Unit 2432

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Art Unit: 2432

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Notice of References Cited	Application/Control No. 12/580,227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT	
	Examiner SAMSON LEMMA	Art Unit 2432	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,333,449	02-2008	Zimmermann et al.	370/321
*	B	US-2009/0106810	04-2009	Stoye et al.	725/131
*	C	US-2009/0129317	05-2009	Che et al.	370/328
*	D	US-2004/0037214	02-2004	Blasco Claret et al.	370/203
*	E	US-7,310,522	12-2007	Geile, Michael J.	455/424
	F	US-			
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"20100098257"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:11
L2	131	(orthogonal with frequency with division with multiple with access with network) and scrambling	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:12
L3	5	(orthogonal with frequency with division with multiple with access with network) and constellation with scrambling	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:12
L4	8	(orthogonal with frequency with division with multiple with access with network) and constellation with scrambl\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:15
L5	423	(380/268).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:16
L6	197	(380/287).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:16
L7	1403	(370/480).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:16

L8	7	constellation adj scrambl\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:17
L9	2	constellation adj scrambl\$ and OFDMA	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/11/06 23:17

11/6/2011 11:18:23 PM

<i>Index of Claims</i> 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

✓	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	10/20/2011									
	1	✓									
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Search Notes 	Application/Control No. 12580227	Applicant(s)/Patent Under Reexamination MUELLER, ARNDT
	Examiner SAMSON LEMMA	Art Unit 2432

SEARCHED			
Class	Subclass	Date	Examiner
380	268, 287	10/20/2011	SL
370	480	10/20/2007	SL

SEARCH NOTES		
Search Notes	Date	Examiner
380/\$. 370/\$ (With text Search)	10/20/2011	SL
EAST (See attachment)	10/20/2011	SL
NPL (IEEE, ACM DIGITAL LIBRARY, GOOGLE, GOOGLE PATENT, GOOGLE SCHOLAR, CITESEER, ...)	10/20/2011	SL
INVENTOR NAME SEARCH	10/20/2011	SL

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227	
	Filing Date		2009-10-15	
	First Named Inventor	Arndt MUELLER		
	Art Unit	~~2431~~ 2432		
	Examiner Name	~~Unknown~~ Samson Lemma		
	Attorney Docket Number	E080048USU2		

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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	6956865	B1	2005-10-18	KHAUNTE et al.		
	2	5349582	A	1994-09-20	BISDIKIAN et al.		
	3	7054296	B1	2005-10-18	SORRELLS et al.		
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	1	20080013473	A1	2008-01-17	PROCTOR, JR et al.		
	2	20070133386	A1	2007-06-14	KIM et al.		
	3	20050287964	A1	2005-12-29	TANAKA et al.		

Receipt date: 02/18/2010 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227	12580227 - GAU: 2432
	Filing Date		2009-10-15	
	First Named Inventor	Arndt MUELLER		
	Art Unit	2431		
	Examiner Name	UnKnown		
	Attorney Docket Number	E080048USU2		

	4	20080076432	A1	2008-03-27	SENARATH et al.	
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SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/580,227	10/15/2009	380	2432	E080048USU2		
APPLICANTS Arndt MUELLER, San Diego, CA; ** CONTINUING DATA ***** This appln claims benefit of 61/105,942 10/16/2008 and claims benefit of 61/144,061 01/12/2009 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 10/26/2009						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/SAMSON B LEMMA/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 12	TOTAL CLAIMS 18	INDEPENDENT CLAIMS 4
ADDRESS ENTROPIC COMMUNICATIONS, INC. 6290 SEQUENCE DRIVE SAN DIEGO, CA 92121 UNITED STATES						
TITLE Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network						
FILING FEE RECEIVED 1310	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		



UNITED STATES PATENT AND TRADEMARK OFFICE

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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
12/580,227	10/15/2009	Arndt MUELLER	E080048USU2

CONFIRMATION NO. 9919

77330
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

PUBLICATION NOTICE



OC000000041235711

Title:Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network

Publication No.US-2010-0098257-A1

Publication Date:04/22/2010

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12580227
	Filing Date		2009-10-15
	First Named Inventor	Arndt MUELLER	
	Art Unit	2431	
	Examiner Name	UnKnown	
	Attorney Docket Number	E080048USU2	

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	6956865	B1	2005-10-18	KHAUNTE et al.		
	2	5349582	A	1994-09-20	BISDIKIAN et al.		
	3	7054296	B1	2005-10-18	SORRELLS et al.		
If you wish to add additional U.S. Patent citation information please click the Add button.							Add
U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	20080013473	A1	2008-01-17	PROCTOR, JR et al.		
	2	20070133386	A1	2007-06-14	KIM et al.		
	3	20050287964	A1	2005-12-29	TANAKA et al.		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12580227
	Filing Date	2009-10-15
	First Named Inventor	Arndt MUELLER
	Art Unit	2431
	Examiner Name	UnKnown
	Attorney Docket Number	E080048USU2

	4	20080076432	A1	2008-03-27	SENARATH et al.	
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If you wish to add additional U.S. Published Application citation information please click the Add button

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number 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

NON-PATENT LITERATURE DOCUMENTS

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

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

EXAMINER SIGNATURE

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

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

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	12580227
	Filing Date	2009-10-15
	First Named Inventor	Arndt MUELLER
	Art Unit	2431
	Examiner Name	UnKnown
	Attorney Docket Number	E080048USU2

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	/Bruce W. Greenhaus/	Date (YYYY-MM-DD)	2010-02-18
Name/Print	Bruce W. Greenhaus	Registration Number	37,339

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

Privacy Act Statement

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

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

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

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

BRUCE GREENHAUS
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing (day/month/year) 10 DEC 2009
Applicant's or agent's file reference E080048WOP1	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US2009/060952	International filing date (day/month/year) 16 October 2009
Applicant ENTROPIC COMMUNICATIONS, INC.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest against payment of (an) additional fee(s) under Rule 40.2,** the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver Telephone No. 571-272-7774
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Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference E080048WOP1	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2009/060952	International filing date (<i>day/month/year</i>) 16 October 2009	(Earliest) Priority Date (<i>day/month/year</i>) 16 October 2008
Applicant ENTROPIC COMMUNICATIONS, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 5
☒ as suggested by the applicant.
☐ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/060952

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - H04J 3/06 (2009.01) USPC - 370/503 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) IPC(8) - H04J 3/06 (2009.01) USPC - 370/503 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) MicroPatent and Google Patents		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,956,865 B1 (KHAUNTE et al) 18 October 2005 (18.10.2005) entire document	1-40
Y	US 2008/0013473 A1 (PROCTOR, JR. et al) 17 January 2008 (17.01.2008) entire document	1-40
Y	US 5,349,582 A (BISDIKIAN et al) 20 September 1994 (20.09.1994) entire document	4-5, 14-15, 24-25, and 34-35
☐ Further documents are listed in the continuation of Box C. ☐		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 21 November 2009		Date of mailing of the international search report 10 DEC 2009
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

BRUCE GREENHAUS
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

Date of mailing
(day/month/year)

10 DEC 2009

Applicant's or agent's file reference
E080048WOP1

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US2009/060952

International filing date (day/month/year)

16 October 2009

Priority date (day/month/year)

16 October 2008

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

IPC(8) - H04J 3/06 (2009.01)

USPC - 370/503

Applicant **ENTROPIC COMMUNICATIONS, INC.**

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/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion

21 November 2009

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2009/060952

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, this opinion has been established on the basis of a sequence listing filed or furnished:
- a. (means)
- ☐ on paper
- ☐ in electronic form
- b. (time)
- ☐ in the international application as filed
- ☐ together with the international application in electronic form
- ☐ 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 has been filed or furnished, the required statements that the information in the subsequent or additional 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/US2009/060952

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	1-40	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-40	NO
Industrial applicability (IA)	Claims	1-40	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-3, 6-13, 16-23, 26-33, and 36-40 lack an inventive step under PCT Article 33(3) as being obvious over Khaunte et al, hereinafter Khaunte in view of Proctor, Jr. et al, hereinafter Proctor.

Regarding Claim 1, Khaunte teaches a method for synchronizing a plurality of nodes on a communication network (col 3, lines 35-40 for sharing channels in a network with a plurality of nodes), comprising: exchanging a local clock time between a first node and a second node over the communication network (col 3, lines 40-50 for head node communicating with other nodes with a start time to determine propagation delay between nodes; and col 3, lines 30-45 for current and start time of messages [a local clock time]); performing a ranging method between the first and second nodes based on the local clock time exchanged (col 3, lines 50-55 for determining range for nodes using delays based on clock times in the lookahead time value), wherein the ranging method results in an estimated propagation delay between the first and second node (col 3, lines 50-60 for using minimum propagation delay between nodes); and adjusting the local clock time either the first or second node based on the estimated propagation delay (col 3, lines 50-55 for dynamically adjusting lookahead time value based on propagation delay or adjusting local clock). Khaunte does not explicitly teach synchronizing clock time between the first and second node. In the same field of endeavor, Proctor teaches synchronizing clock time between the first and second node (paragraph 10 for synchronizing nodes based on timing offsets). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte's network method with Proctor's synchronizing because the combination would allow Khaunte's network method to improve communication timing between nodes on the uplink and downlink by using range calculations (Proctor, paragraph 10).

Regarding Claim 11, Khaunte discloses network device, comprising: a controller (col 3, lines 38-42 for access control system or controller); a device module (col 3, lines 30-40 for head end nodes or devices); memory coupled to the controller (col 3, lines 30-35 for computer program there for a computer with memory); computer executable program code on a computer readable medium (col 3, lines 30-35 for computer program) configured to cause the controller to perform the functions of: exchanging local clock times between a first node and a second node over a communication network (col 3, lines 40-50 for head node communicating with other nodes with a start time to determine propagation delay between nodes on a network and col 3, lines 30-45 for current and start time of messages or a local clock time); performing a ranging method between the first and second nodes based on the local clock times exchanged between the first and second nodes (col 3, lines 50-55 for determining range for nodes using delays based on clock times in the lookahead time values), wherein the ranging method results in an estimated propagation delay between the first and second nodes (col 3, lines 50-60 for using minimum propagation delay between nodes); and adjusting the local clock times of the first and second nodes based on the estimated propagation delay (col 3, lines 50-55 for dynamically adjusting lookahead time values based on propagation delay or adjusting local clock). Khaunte does not explicitly disclose synchronizing local clock time between the first and second node. In the same field of endeavor, Proctor discloses synchronizing local clock time between the first and second node (paragraph 10 for synchronizing nodes based on timing offsets). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte's network with Proctor's synchronizing because the combination would allow Khaunte's network to improve communication timing between nodes on the uplink and downlink by using range calculations (Proctor, paragraph 10).

Regarding Claim 21, Khaunte discloses computer program product comprising a computer usable medium having computer readable program code embodied therein for synchronizing a plurality of nodes on a communication network (col 3, lines 35-40 for sharing channels in a network with a plurality of nodes), the computer program product comprising computer readable program code configured to cause a device to: exchange local clock times between a first node and a second node over a communication network (col 3, lines 40-50 for head node communicating with other nodes with a start time to determine propagation delay between nodes and col 3, lines 30-45 for current and start time of messages or a local clock time); perform a ranging method between the first and second nodes based on the local clock times exchanged between the first and second nodes (col 3, lines 50-55 for determining range for nodes using delays based on clock times in the lookahead time values), wherein the ranging method results in an estimated propagation delay between the first and second nodes (col 3, lines 50-60 for using minimum propagation delay between nodes); and adjust the local clock times of the first and second nodes based on the estimated propagation delay (col 3, lines 50-55 for dynamically adjusting lookahead time values based on propagation delay or adjusting local clock). Khaunte does not explicitly disclose synchronizing local clock time between the first and second node. In the same field of endeavor, Proctor discloses synchronizing local clock time between the first and second node (paragraph 10 for synchronizing nodes based on timing offsets). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte's network with Proctor's synchronizing because the combination would allow Khaunte's network to improve communication timing between nodes on the uplink and downlink by using range calculations (Proctor, paragraph 10).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2009/060952

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Regarding Claim 31, Khaunte discloses a network interface module, comprising: a controller (col 3, lines 38-42 for access control system or controller); memory coupled to the controller (col 3, lines 30-35 for computer program there for a computer with memory); computer executable program code on a computer readable medium configured to cause the controller to perform the functions of: exchanging local clock times between a first node and a second node over a network (col 3, lines 40-50 for head node communicating with other nodes with a start time to determine propagation delay between nodes and col 3, lines 30-45 for current and start time of messages or a local clock time); performing a ranging method between the first and second nodes based on the local clock times exchanged between the first and second nodes (col 3, lines 50-55 for determining range for nodes using delays based on clock times in the lookahead time values), wherein the ranging method results in an estimated propagation delay between the first and second nodes (col 3, lines 50-60 for using minimum propagation delay between nodes); and adjusting the local clock times of the first and second nodes based on the estimated propagation delay (col 3, lines 50-55 for dynamically adjusting lookahead time values based on propagation delay or adjusting local clock). Khaunte does not explicitly disclose synchronizing local clock time between the first and second node. In the same field of endeavor, Proctor discloses synchronizing local clock time between the first and second node (paragraph 10 for synchronizing nodes based on timing offsets). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte's network with Proctor's synchronizing because the combination would allow Khaunte's network to improve communication timing between nodes on the uplink and downlink by using range calculations (Proctor, paragraph 10).

Regarding Claim 2, 12, 22, and 32, Khaunte teaches using the synchronized local clock time in subsequent packet transmissions between the first and second nodes (col 4, lines 35-40 for using minimum lookahead time for subsequent MAP messages).

Regarding Claim 3, 13, 23, and 33, Khaunte teaches wherein exchanging local clock times, performing the ranging method (col 9, line 65 to col 10, line 5 for ranging on cable modem networks), and adjusting the local clock times comprises: transmitting from the first node and receiving at the second node a first packet (col 9, lines 47-63 for transmitting a test signal and receiving test signal or packet), wherein the first packet comprises a first packet clock time comprising the local clock time of the first node at transmission time, and a scheduled arrival clock time (col 9, lines 50-60 for determining distance and timing propagation delay and determining offset or scheduled arrival time for packet); setting the local clock time of the second node to the first packet clock time (col 9, lines 50-63 for storing timing offset value of second node or setting clock time for transmitting to second node); transmitting from the second node and receiving at the first node a second packet at the first scheduled arrival clock time (col 9, lines 50-60 for transmitting message back upstream to adjust upstream link), wherein the second packet is received by the first node at an actual arrival clock time (col 10, lines 25-32 for checking propagation delay with theoretical delay or estimated arrival time with actual propagation time and col 15, lines 50-67 for scheduler to generate precise time of ranging slot or actual arrival time and generating a lookahead time taking into account propagation of MAP message); calculating and storing the estimated propagation delay at the first node, wherein calculating the estimated propagation delay is based on the first scheduled arrival clock time and the first actual time (col 9, lines 50-60 for calculating propagation delay between two nodes); transmitting from the first node and receiving at the second node a third packet, wherein the third packet comprises the estimated propagation delay (figure 5 element SAT3 for third packet transmitted to determine network timing); and storing the estimated propagation delay at the second node (col 9, lines 60-64 for storing offset information).

Regarding Claim 6, 16, 26, and 36 Khaunte teaches wherein the first node is a network coordinator (col 5, lines 30-40 for network scheduler or coordinator).

Regarding Claim 7, 17, 27, and 37 Khaunte teaches wherein the second node is a new node and the method is performed as part of admission of the second node to the communication network (col 12, lines 12-20 for performing ranging methods for new modems on the network).

Regarding Claim 8, 18, 28, and 38 Khaunte teaches wherein the method is performed periodically to maintain synchronization between the first and second nodes (col 10, lines 1-8 for periodic ranging for network nodes).

Regarding Claim 9, 19, 29, and 39 Khaunte teaches wherein the communication network is a mesh network (col 22, lines 1-12 for a network with a host of nodes or a mesh network).

Regarding Claim 10, 20, 30, and 40 Khaunte teaches the method as shown above. Khaunte does not explicitly teach wherein the communication network operates in accordance with a Multimedia over Coax Alliance (MoCA) standard. In the same field of endeavor, Proctor teaches wherein the communication network operates in accordance with a Multimedia over Coax Alliance (MoCA) standard (paragraph 9 for using the MoCA standard). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte's network with Proctor's standard because the combination would allow Khaunte's network to improve communication by using existing wiring for the network (Proctor, paragraph 9).

Claims 4-5, 14-15, 24-25, and 34-35 lack an inventive step under PCT Article 33(3) as being obvious over Khaunte in view of Proctor, and further in view of Bisdikian et al, hereinafter Bisdikian.

Regarding Claim 4, 14, 24, and 34 Khaunte teaches wherein a transmission time of a transmitted packet is measured at 90% of peak amplitude of a transmission signal, 90% of peak power of a transmission signal, 90% of total power of a transmission signal, or delay of a transmission signal (col 7, lines 45-60 for using propagation, interleaver, and processing delays to calculate the delay of the transmitted signal as shown in figure 4C). Khaunte and Proctor do not explicitly teach a mean delay. In the same field of endeavor, Bisdikian teaches a mean delay (col 6, lines 47-55 for mean delay of the message in the network). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte and Proctor's network with Bisdikian's delay because the combination would allow Khaunte and Proctor's network to improve delay calculations for accessing buses and releasing slots in the network (Bisdikian, col 6, lines 47-55).

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US2009/060952

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Regarding Claim 5, 15, 25, and 35 Khaunte teaches wherein an arrival time of a received packet is measured at 90% of peak amplitude of a received signal, 90% of peak power of a received signal, 90% of total power of a received signal, or delay of a received signal (col 7, lines 45-60 for using propagation, interleaver, and processing delays to calculate the delay of the transmitted signal as shown in figure 4C and using round trip signal or both transmit and receive). Khaunte and Proctor do not explicitly teach a mean delay. In the same field of endeavor, Bisdikian teaches a mean delay (col 6, lines 47-55 for mean delay of the message in the network). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Khaunte and Proctor's network with Bisdikian's delay because the combination would allow Khaunte and Proctor's network to improve delay calculations for accessing buses and releasing slots in the network (Bisdikian, col 6, lines 47-55).

Claims 1-40 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To: BRUCE W. GREENHAUS 6290 SEQUENCE DRIVE SAN DIEGO, CA 92121		Date of mailing (day/month/year) 09 DEC 2009
Applicant's or agent's file reference E080048WOP2	FOR FURTHER ACTION See paragraphs 1 and 4 below	
International application No. PCT/US 09/60995	International filing date (day/month/year) 16 October 2009 (16.10.2009)	
Applicant ENTROPIC COMMUNICATIONS, INC.		

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 8270

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference E080048WOP2	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US 09/60995	International filing date (<i>day/month/year</i>) 16 October 2009 (16.10.2009)	(Earliest) Priority Date (<i>day/month/year</i>) 16 October 2008 (16.10.2008)
Applicant ENTROPIC COMMUNICATIONS, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 4
☒ as suggested by the applicant.
☐ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 09/60995

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - H04J 11/00 (2009.01) USPC - 370/206 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) USPC: 370/206 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 370/206, 208 (keyword limited - see terms below) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST(USPT,PGPB,EPAB,JPAB); Google Scholar Search Terms Used: orthogonal, frequency, divisional, multiple, access, communication, pseudorandom, subcarrier, PN-15, rotate, 180, amplitude, computer, program, quadrature, sequence, resource, reservation, network, coordinator																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 2007/0133386 A1 (Kim et al.) 14 June 2007 (14.06.2007), para [0009], [0014], [0063]-[0065], [0070]-[0072]</td> <td>1 - 18</td> </tr> <tr> <td>Y</td> <td>US 7,054,296 B1 (Sorrells et al.) 30 May 2006 (30.05.2006), col 53, ln 39-50; col 75, ln 50-col 76, ln 7; col 103, ln 2-22; col 119, ln 49-57; col 121, ln 43-48</td> <td>1 - 18</td> </tr> <tr> <td>Y</td> <td>US 2005/0287964 A1 (Tanaka et al.) 29 December 2005 (29.12.2005), para [0083]</td> <td>4-6, 10-12, 18</td> </tr> <tr> <td>Y</td> <td>US 2008/0076432 A1 (Senarath et al.) 27 March 2008 (27.03.2008), para [0034]</td> <td>6, 12, 18</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 2007/0133386 A1 (Kim et al.) 14 June 2007 (14.06.2007), para [0009], [0014], [0063]-[0065], [0070]-[0072]	1 - 18	Y	US 7,054,296 B1 (Sorrells et al.) 30 May 2006 (30.05.2006), col 53, ln 39-50; col 75, ln 50-col 76, ln 7; col 103, ln 2-22; col 119, ln 49-57; col 121, ln 43-48	1 - 18	Y	US 2005/0287964 A1 (Tanaka et al.) 29 December 2005 (29.12.2005), para [0083]	4-6, 10-12, 18	Y	US 2008/0076432 A1 (Senarath et al.) 27 March 2008 (27.03.2008), para [0034]	6, 12, 18
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
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Y	US 7,054,296 B1 (Sorrells et al.) 30 May 2006 (30.05.2006), col 53, ln 39-50; col 75, ln 50-col 76, ln 7; col 103, ln 2-22; col 119, ln 49-57; col 121, ln 43-48	1 - 18															
Y	US 2005/0287964 A1 (Tanaka et al.) 29 December 2005 (29.12.2005), para [0083]	4-6, 10-12, 18															
Y	US 2008/0076432 A1 (Senarath et al.) 27 March 2008 (27.03.2008), para [0034]	6, 12, 18															
☐ Further documents are listed in the continuation of Box C. ☐																	
<table border="0"> <tr> <td> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family													
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family																
Date of the actual completion of the international search 25 November 2009 (25.11.2009)		Date of mailing of the international search report 09 DEC 2009															
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774															

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: BRUCE W. GREENHAUS
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) **09 DEC 2009**

Applicant's or agent's file reference
E080048WOP2

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US 09/60995

International filing date (day/month/year)

16 October 2009 (16.10.2009)

Priority date (day/month/year)

16 October 2008 (16.10.2008)

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

IPC(8) - H04J 11/00 (2009.01)

USPC - 370/206

Applicant **ENTROPIC COMMUNICATIONS, INC.**

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/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion

25 November 2009 (25.11.2009)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITYInternational application No.
PCT/US 09/60995

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, this opinion has been established on the basis of a sequence listing filed or furnished:
- a. (means)
- ☐ on paper
- ☐ in electronic form
- b. (time)
- ☐ in the international application as filed
- ☐ together with the international application in electronic form
- ☐ 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 has been filed or furnished, the required statements that the information in the subsequent or additional 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/US 09/60995

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 - 18	YES
	Claims	None.	NO
Inventive step (IS)	Claims	None.	YES
	Claims	1 - 18	NO
Industrial applicability (IA)	Claims	1 - 18	YES
	Claims	None.	NO

2. Citations and explanations:

Claims 1-3, 7-9 and 13-17 lack an inventive step under PCT Article 33(3) as being obvious over US 2007/0133386 A1 to Kim et al. (hereinafter 'Kim'), in view of US 7,054,296 B1 to Sorrells et al. (hereinafter 'Sorrells').

As per claim 1, Kim teaches a method for communications transmission using orthogonal frequency division multiple access on a network (para [0009] wherein the mobile communication system is usually in the form of a network) comprising: providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access (para [0009], [0014] wherein the cells are the network devices); providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers (para [0065]); allocating a subset of the set of available subcarriers to each of the transmitting network devices (para [0065] wherein different carrier is assigned to different cells); a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of modulated symbols to be transmitted on the used subcarriers (para [0065]); the transmitting network device performing a predetermined transformation on a modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier (para [0072]); the transmitting network device transmitting the transformed symbol to a receiving network device (para [0065]). Kim does not specifically teach a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers; the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier. However, Sorrells teaches a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of modulated symbols to be transmitted on the used subcarriers (col 103, ln 2-22), and mapping the packet onto a plurality of quadrature amplitude modulated symbols (col 75, ln 50-col 76, ln 7 wherein quadrature amplitude modulation is adopted). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system.

As per claim 2, Kim further teaches the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation (para [0065], [0072]) comprise: the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier (para [0065] wherein $v(k)$ is the generated random sequence and thus there must be a random noise generator inside the system. Each value of k represents a recurrently-used subcarrier, and when $k=0$, $v(k)$ gives the initial random element and the corresponding subcarrier is assigned to the transmitter); and the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier (para [0065] wherein when k increases, the next random element is used and the corresponding symbol is transmitted).

As per claim 3, Kim further teaches the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed (para [0065] wherein $v(k)$ is a pseudorandom sequence and it was well known in the art at the time of the invention that such sequence will repeat after its end, thus, the $v(k)$ -related subcarrier will repeat after the end also).

--Please See Supplemental Boxes--

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 09/60995

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claim 3 is written as depending on itself. For the purposes of this search and opinion, claim 3 will be treated as depending on the preceding claim 2.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 09/60995

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V. 2. Citations and explanations:

As per claim 7, Kim teaches a method for communications reception using orthogonal frequency division multiple access on a network (para [0009]) comprising: receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device (para [0065] wherein the modulation contains periodically recurrent noise and can thus be regarded as scrambled modulation); receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device (para [0065]); wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence (para [0065]); and descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier (para [0065] wherein the pilot signal contains the pseudorandom noise info; para [0070]-[0071] wherein the pilot signal is used for frequency synchronization during descrambling). Kim does not specifically teach receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device; receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device; and descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier. However, Sorrells teaches the orthogonal frequency division modulation symbol comprising a plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding plurality of used subcarriers assigned to the transmitting network device (col 103, in 2-22; col 75, in 50-col 76, in 7). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system.

As per claim 8, Kim further teaches the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols (para [0065] wherein first and second scrambled orthogonal frequency division modulation symbols are taught when k equals 0 and 1, respectively; para [0070]-[0071] wherein descrambling is taught) comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first available subcarrier (para [0065]) and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier (para [0070]-[0071]); and advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier (para [0065], [0070]-[0071]).

As per claim 9, Kim further teaches the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled (para [0065], [0070]-[0071]).

As per claim 13, Kim teaches a communications network system (para [0009]), comprising: a network device configured to transmit a modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access (para [0009]); wherein the network device is configured to perform a constellation scrambling operation on the modulated symbol (para [0063]-[0065]; Fig. 3C wherein constellation structure is shown), the constellation scrambling operation comprising: a sequence generator (para [0065]); and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the modulated symbol (para [0065], [0070]-[0071]). Kim does not specifically teach a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access; wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising: initializing a sequence generator with a predetermined seed; and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol. However, Sorrells teaches a network device configured to transmit a quadrature amplitude modulated symbol (col 75, in 50-col 76, in 7) and initializing a sequence generator with a predetermined seed (col 119, in 49-57). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system, and using a predetermined seed would have enabled the generation of pseudorandom noise.

--Please See Continuation Sheet--

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 09/60995

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V. 2. Citations and explanations:

As per claim 14, Kim further teaches a second network device configured to transmit a second modulated symbol on a second subcarrier of the set of available subcarriers (para [0065]); wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol (para [0063]-[0065]; Fig. 3C), the second constellation scrambling operation comprising: a second sequence generator (para [0065]) wherein multiple cell groups are taught, each group corresponds to a random sequence and must have a sequence generator; and, while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol (para [0065], [0070]-[0071]). Sorrells further teaches a network device configured to transmit a quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7), initializing a sequence generator with the predetermined seed (col 119, In 49-57).

As per claim 15, Kim further teaches a receiving network device configured to receive the first and second scrambled modulated symbols (para [0063]-[0065], [0070]-[0071]; Fig. 3C); wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled modulated symbols (para [0063]-[0065], [0070]-[0071]; Fig. 3C), comprising: a third sequence generator (para [0065]); and, while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second modulated symbol (para [0065], [0070]-[0071] wherein synchronized descrambling is taught). Sorrells further teaches the quadrature amplitude modulated symbols (col 75, In 50-col 76, In 7), and initializing a sequence generator with the predetermined seed (col 119, In 49-57), initializing a sequence generator with the predetermined seed (col 119, In 49-57).

As per claim 16, Kim teaches a network device configured to transmit a modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access (para [0009], [0065]), the network device comprising the steps of: performing a constellation scrambling operation on the modulated symbol to form a scrambled modulated symbol (para [0065], [0070]-[0071]), the constellation scrambling operation comprising: a sequence generator (para [0065]); and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the modulated symbol (para [0065], [0070]-[0071]). Kim does not specifically teach a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a computer readable medium having a computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of: performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising: initializing a sequence generator with a predetermined seed; and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol. However, Sorrells teaches a network device configured to transmit a quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7), the network device comprising a computer readable medium having a computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps (col 53, In 39-50), and initializing a sequence generator with a predetermined seed (col 119, In 49-57). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim and Sorrells since adopting quadrature amplitude modulation in an OFDMA network would have simplified the modulation and demodulation system, adopting computer executable program would have enabled the automatic control of the system, and using a predetermined seed would have enabled the generation of pseudorandom noise.

As per claim 17, Kim further teaches a system configured to cause the device to transmit the scrambled modulated symbol to a receiving network device (para [0065]). Sorrells further teaches quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7) and the computer executable program code is further configured to cause the device to transmit the symbol to a receiving network device (col 53, In 39-50).

Claims 4, 5, 10 and 11 lack an inventive step under PCT Article 33(3) as being obvious over Kim in view of Sorrells, and further in view of US 2005/0287964 A1 to Tanaka et al. (hereinafter 'Tanaka').

As per claim 4, Kim and Sorrells teach the method of claim 1. Kim teaches the pseudorandom noise sequence (para [0065]) but does not specifically teaches the pseudorandom noise sequence comprises a PN-15 sequence. However, Tanaka teaches the pseudorandom noise sequence comprises a PN-15 sequence (para [0083]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells and Tanaka since adopting PN-15 sequence would have simplified the generation of random noise.

As per claim 5, Kim further teaches the element of the pseudorandom noise sequence is a '1' and the element of the pseudorandom noise sequence is a '0' (para [0065]) wherein the random sequence $v(k)$ may be 0 or 1). Sorrells further teaches the quadrature amplitude modulated symbol (col 75, In 50-col 76, In 7), the step of performing the predetermined transformation comprises rotating the symbol by 180 deg if the element of the sequence is a certain value and not modifying the symbol if the element of the sequence is another value (col 121, In 43-48 wherein 4th and 7th terms are rotated by 180 deg and other terms keep unchanged).

As per claim 10, Kim and Sorrells teach the method of claim 7. Kim teaches the pseudorandom noise sequence (para [0065]) but does not specifically teaches the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence. However, Tanaka teaches the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence (para [0083]) wherein the PN15 sequence is a 15th order random sequence). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells and Tanaka since adopting 15th order sequence would have simplified the generation of random noise.

--Please See Continuation Sheet--

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US 09/60995

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V. 2. Citations and explanations:

As per claim 11, Kim further teaches the step of descrambling the scrambled modulated symbol (para [0070]-[0071]), the element of the pseudorandom noise sequence is a '1' and the element of the pseudorandom noise sequence is a '0' (para [0065]). Sorrells further teaches the quadrature amplitude modulated symbol (col 75, in 50-col 76, in 7), rotating the symbol by 180 deg if the element of the sequence is a certain value and not modifying the symbol if the element of the sequence is another value (col 121, in 43-48).

Claims 6, 12 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Kim in view of Sorrells and Tanaka, and further in view of US 2008/0076432 A1 to Senarath et al. (hereinafter 'Senarath').

As per claim 6, Kim, Sorrells and Tanaka teach the method of claim 4. Sorrells further teaches the receiving network device comprises a network coordinator (col 70, in 4-11) but does not specifically teach the packet comprises a resource reservation request packet. However, Senarath teaches the packet comprises a resource reservation request packet (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells, Tanaka and Senarath since using resource reservation coding would have ensured the communication quality.

As per claim 12, Kim, Sorrells and Tanaka teach the method of claim 4. Kim further teaches first and second scrambled orthogonal frequency division modulation symbols (para [0065]). Sorrells further teaches the method is performed by a network coordinator (col 70, in 4-11). Kim, Sorrells and Tanaka do not specifically teach the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet. However, Senarath teaches the symbols are contained in a resource reservation request packet (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells, Tanaka and Senarath since using resource reservation coding would have ensured the communication quality.

As per claim 18, Kim and Sorrells teach the network device of claim 17. Kim further teaches the sequence comprises a pseudorandom sequence (para [0065]). Sorrells further teaches the receiving network device comprises a network coordinator (col 70, in 4-11), and the quadrature amplitude modulated symbol (col 75, in 50-col 76, in 7). Kim and Sorrells do not specifically teach the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request. However, Tanaka teaches the sequence comprises a 15th order pseudorandom sequence (para [0083]). Senarath teaches an encoded symbol of a resource reservation request (para [0034]). It would have been obvious to one of ordinary skill in the art to combine the teachings of Kim, Sorrells, Tanaka and Senarath since adopting 15th order sequence would have simplified the generation of random noise, and using resource reservation coding would have ensured the communication quality.

Claims 1 - 18 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Electronic Acknowledgement Receipt

EFS ID:	7041371
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Bruce Wayne Greenhaus/Tim Ellis
Filer Authorized By:	Bruce Wayne Greenhaus
Attorney Docket Number:	E080048USU2
Receipt Date:	18-FEB-2010
Filing Date:	15-OCT-2009
Time Stamp:	17:28:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	E080048USU2_IDS_Response_2-18-2010.pdf	95217 555a8d05ba68d422b6f9e78d2c8898c33cb2bdd9	no	2

Warnings:

Information:

2	Information Disclosure Statement (IDS) Filed (SB/08)	E080048USU2_IDS_Form8a_2-18-2010.pdf	1180210 7d5b86bb5ed3ec3ce6da99bfc69b7009af8bec5a	no	4
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	E080048WOP1_ISR_12-10-09.pdf	465467 a183d964ce92950dc8d56a5576cc6821c04ee9eb	no	8
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	E080048WOP2_ISR_12-9-09.pdf	611907 60d0515eef9ad3f34bf05a70d14c9f653a5b5eeb	no	10
Warnings:					
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Total Files Size (in bytes):			2352801		
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February 18, 2010

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Tim L. Ellis

(Name of Person Making Deposit)

/Tim L. Ellis/

(Signature)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**In Re Application of:
Arndt MUELLER**

**For: Method and Apparatus for
Performing Constellation Scrambling in a
Multimedia Home Network.**

Serial No.: 12/580,227

Group Art Unit: 2431

Filed: 15-Oct-2009

Information Disclosure Statement Under 37 CFR § 1.97 and § 1.98

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

Attention: **Unknown**
Examiner

Dear Sir:

The references cited on attached form, PTO/SB/08a, are being provided for consideration during examination of the above-identified patent application. It is respectfully requested that all cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue from this application

Enclosed is a copy of the following International Search Reports: (1) ISR dated December 9, 2009, which was issued in corresponding PCT application serial number PCT/US2009/060995 filed October 16, 2009, and (2) ISR dated December 10, 2009, which was issued in corresponding PCT application serial number PCT/US2009/060952 filed October 16, 2009, and in which these references were cited.

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February 18, 2010

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Tim L. Ellis

(Name of Person Making Deposit)

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(Signature)

As provided for by 37 CFR § 1.97 (g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted, or that this statement encompasses all the possible relevant information.

The Applicants provide this Information Disclosure Statement before the issuance of an Office Action on the merits, therefore, Applicants believe that no fee is required for submission of this statement; however, if a fee is required the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account Number 50-4613. Please deduct any additional fees from, or credit any overpayment to the above-noted Deposit Account as well.

Should any questions arise, a telephone call to the Applicants' representative is invited.

Respectfully submitted,

Dated: February 18, 2010

By: /Bruce W. Greenhaus/
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/580,227	10/15/2009	2611	1310	E080048USU2	18	4

CONFIRMATION NO. 9919

77330
ENTROPIC COMMUNICATIONS, INC.
6290 SEQUENCE DRIVE
SAN DIEGO, CA 92121

FILING RECEIPT



OC000000038475760*

Date Mailed: 11/02/2009

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)

Arndt MUELLER, San Diego, CA;

Assignment For Published Patent Application

ENTROPIC COMMUNICATIONS, INC., San Diego, CA

Power of Attorney: The patent practitioners associated with Customer Number 77330

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/105,942 10/16/2008
and claims benefit of 61/144,061 01/12/2009

Foreign Applications

If Required, Foreign Filing License Granted: 10/26/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/580,227**

Projected Publication Date: 04/22/2010

Non-Publication Request: No

Early Publication Request: No

Title

Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network

Preliminary Class

375

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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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.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E080048USU2
		Application Number	
Title of Invention	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network		
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.			

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Title of the Invention	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network		
Attorney Docket Number	E080048USU2	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)	12	Suggested Figure for Publication (if any)	4

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E080048USU2
		Application Number	
Title of Invention	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network		

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Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
		61105942	2008-10-16
Prior Application Status	Pending	Remove	
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	E080048USU2
		Application Number	
Title of Invention	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network		

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Signature	/Bruce W. Greenhaus/			Date (YYYY-MM-DD)	2009-10-15
First Name	Bruce W.	Last Name	Greenhaus	Registration Number	37339

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PATENT APPLICATION

Title:

METHOD AND APPARATUS FOR PERFORMING CONSTELLATION

SCRAMBLING IN A MULTIMEDIA HOME NETWORK

Inventor:

ARNDT MUELLER

Entropic Docket No.: E080048USU2

Sheets of Drawings: 12

**METHOD AND APPARATUS FOR PERFORMING
CONSTELLATION SCRAMBLING IN A MULTIMEDIA HOME
NETWORK**

Cross-Reference to Related Applications

[0001] This application claims priority from Provisional Application Serial Number 61/105,942, filed on October 16, 2008 and this application claims priority from Provisional Application Serial Number 61/144,061, filed on January 12, 2009, each which is hereby incorporated herein by reference in its entirety.

Technical Field

[0002] The disclosed method and apparatus relates generally to communication networks, and more particularly, some embodiments relate to constellation scrambling in orthogonal frequency division multiple access networks.

Description of the Related Art

[0003] With the many continued advancements in communications and data transfer technology, more and more devices are being introduced in both the consumer and commercial sectors with advanced, high bandwidth communications capabilities. Additionally, advances in processing power and low-power consumption technologies have led to the proliferation of communications capabilities in various products on a widespread basis.

[0004] For example, communication networks are now commonplace in many home and office environments. Such networks allow various previously independent

devices to share data and other information to enhance productivity or simply to improve their convenience to the user. Against this backdrop, there is a growing demand for the ability to connect content devices (e.g., televisions, DVD players and recorders, digital cameras, speakers, video cameras, etc.), computing devices, I/O devices, home appliances and modems.

[0005] Home entertainment networks are typically provided in one of two topologies. The first is an Access topology, which can be best analogized to a tree structure wherein a base node communicates with nodes in its branches, but branch nodes do not typically communicate directly with other branches. The second is a Mesh topology in which any node can communicate directly with any other node in the network. Access topologies are typically found in apartment or office settings where a master node at the 'source' is used to distribute data to a plurality of downstream nodes (e.g., to the various apartments in an apartment building) and the downstream nodes (e.g., apartments) do not need to share content with one another. Mesh topologies, on the other hand, might be more typically found in a home environment where, although there may be a common source of broadband data (e.g., the main cable feed into the home), the homeowners may wish to share content originating from a device in one room with other devices in other rooms in their home.

[0006] To address the growing demand for a digital home networking market, a consortium of industry leading companies formed the Multimedia over Coax Alliance (MoCA™). MoCA has provided a technical standard (referred to as "MoCA") which defines a protocol for distributing digital entertainment over the available bandwidth on

coaxial cable previously installed in households for cable or satellite TV service. The initial MoCA standard was approved in February 2006, and routers with built-in MoCA capabilities (i.e., that conform to the MoCA standard), MoCA set-top boxes and MoCA adapters followed shortly thereafter. Accordingly, one Mesh topology is defined by the MoCA standard.

[0007] Architects of these and other networks, and indeed communications channels in general, have long struggled with the challenge of managing multiple communications from various devices across a limited channel. Accordingly, network architects have come up with various solutions to arbitrate disputes or otherwise allocate bandwidth among the various communicating devices, or clients, on the network. Schemes used in well known network configurations such as token rings, Ethernet, and other configurations have been developed to allow sharing of the available bandwidth.

Brief Summary

[0008] According to various embodiments of the disclosed method and apparatus, systems and methods are provided that allow multiple transmitting network devices to transmit under a orthogonal frequency divisional multiple access (OFDMA) mode to a receiving network device. The multiple transmitting network devices may be configured to perform constellation scrambling on the symbols they will be transmitting using a predetermined scrambling sequence. They may be further configured to synchronize their use of the sequence, for example, by advancing the sequence for each available subcarrier, such that the receiving device may view the payload as if it were sent by a

single transmitter. Accordingly, these multiple transmissions may be descrambled using only one instance of a sequence generator.

[0009] In one embodiment of the disclosed method and apparatus, a network is configured to operate in an OFDMA mode that aggregates Reservation Requests from multiple (up to 16) nodes which simultaneously transmit their payload symbols destined for a network coordinator (NC). Each transmitter utilizes only a subset of subcarriers, which have been pre-allocated to it on a mutually exclusive basis. By having synchronized carrier frequencies and causing the signals to arrival at the NC at the same time, the orthogonality of the union of all transmitted subcarriers is maintained. That is, the NC receives an apparently normal payload, whose demodulated subcarriers can then be re-partitioned to recover each individual Reservation Request.

[0010] According to an embodiment of the disclosed method and apparatus, a communications network system comprises a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access; wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising: initializing a sequence generator with a predetermined seed; and, while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

[0011] Other features and aspects of the disclosed method and apparatus will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the features in accordance with embodiments of the disclosed method and apparatus. The summary is not intended to limit the scope of the claimed invention, which is defined solely by the claims attached hereto.

Brief Description of the Drawings

[0012] The disclosed method and apparatus, in accordance with one or more various embodiments, is described in detail with reference to the following figures. The drawings are provided for purposes of illustration only and merely depict typical embodiments or examples of possible embodiments of the disclosed method and apparatus. These drawings are provided to facilitate the reader's understanding of the disclosed method and apparatus and shall not be considered limiting of the breadth, scope, or applicability of the claimed invention. It should be noted that for clarity and ease of illustration these drawings are not necessarily made to scale.

[0013] Figure 1 illustrates an example home network in which embodiments of the disclosed method and apparatus may be implemented.

[0014] Figure 2 illustrates a constellation diagram showing a coding scheme for 16-QAM.

[0015] Figure 3 illustrates a frequency band that may be used for OFDMA in accordance with an embodiment of the disclosed method and apparatus.

[0016] Figure 4 illustrates an OFDM coding module that may be used in accordance with an embodiment of the disclosed method and apparatus.

[0017] Figure 5 illustrates a scrambling operation according to an embodiment of the disclosed method and apparatus.

[0018] Figure 6 illustrates a plurality of orthogonal frequency subcarriers having associated elements of a pseudorandom noise sequence.

[0019] Figure 7 illustrates a descrambling operation according to an embodiment of the disclosed method and apparatus.

[0020] Figure 8 illustrates a descrambling and decoding module for a network device receiving signals during an OFDMA communications period in accordance with an embodiment of the disclosed method and apparatus.

[0021] Figure 9 illustrates a general constellation scrambling procedure that may be implemented in an embodiment of the disclosed method and apparatus.

[0022] Figure 10 illustrates a more specific scrambling procedure that may be implemented in an embodiment of the disclosed method and apparatus.

[0023] Figure 11 illustrates a pseudorandom sequence generator that may be implemented in an embodiment of the disclosed method and apparatus.

[0024] Figure 12 illustrates an example computing module that may be used in implementing various features of embodiments of the disclosed method and apparatus.

[0025] The figures are not intended to be exhaustive or to limit the disclosed method and apparatus to the precise form disclosed. It should be understood that the disclosed method and apparatus can be practiced with modification and alteration, and that the claimed invention should be limited only by the claims and the equivalents thereof.

Detailed Description

[0026] Before describing the disclosed method and apparatus in detail, it is useful to describe a few example environments in which the disclosed method and apparatus can be implemented. FIG. 1 is a diagram illustrating one such example environment comprising a home cable network. The example of a home environment illustrated in FIG. 1 also includes examples of equipment and other electronic devices or nodes that might be found in a typical home-networking environment, such as a network defined by MoCA. The network of FIG. 1 includes set-top boxes 111 and televisions (TVs) 110 found in the master bedroom 115, the bedroom 114, and the family room 113. Also, a typical home network might include computing systems such as a desktop computing system 117 and peripherals as illustrated in the den 113, and a laptop computer 118 such as that illustrated in the kitchen 112. Other content devices or network devices might also be provided.

[0027] In many communications networks, physical layer (PHY) packets are transmitted using orthogonal frequency division multiplexing (OFDM). In OFDM, data is modulated onto a plurality of frequency subcarriers. Each subcarrier is modulated using quadrature amplitude modulation (QAM). In QAM, the phases of two carrier

waves at the same frequency are modulated. The two subcarriers are termed the quadrature (Q) component and the in phase (I) component. For example, Figure 2 illustrates a coding scheme for 16-QAM. As the Figure illustrates, both the quadrature and the in phase components may assume any one of four different phases, for a total of sixteen different symbols. By representing such a coding scheme with Q and I as axes of a graph, a constellation diagram may be obtained. Operations on QAM symbols may then be described in terms of what the operations do to their respective constellation point. For example, rotating point 150 by 180° would map it onto point 151, which is equivalent to multiplying the quadrature component by -1 and the in phase component by -1. As the figure illustrates, a constellation diagram comprising 2 points would be equivalent to binary phase shift keying (BPSK). Although BPSK requires only one carrier wave, references to quadrature amplitude modulation herein will be understood to encompass BPSK unless otherwise stated.

[0028] A MoCA network includes a plurality of client nodes, such as TVs 110, set top boxes 111 and computers 117, 118. It should be noted that TVs, 110, set top boxes 111 and computers 117, 118 are configured with a communication device that allows these devices to operate as a client node on the MoCA network. Initially, upon setting up a MoCA network, one of the client nodes is automatically selected to be a network coordinator (NC). For the purpose of establishing a system to allocate network bandwidth, the NC schedules times during which communication occurs over the network. The NC communicates the schedule to each client node in "Media Access Packets" (MAPs). Each MAP is a packet of information. One MAP is sent by the NC during each "MAP cycle". To enable the NC to perform these scheduling duties, the NC

provides an opportunity for network devices to transmit a “Reservation Request” (RR) that comprises a request for a certain amount of bandwidth at a certain time. The required time to receive these RRs grows with the size of the network. For example, if a MAP cycle were 1000 μ s, and each RR required 17 μ s, then to separately receive RRs from the 15 non-controlling nodes in a 16 node network would require 255 μ s or about 25% of the channel time.

[0029] From time-to-time, the disclosed method and apparatus refers to this example environment. The description in terms of this environment is provided to allow the various features and embodiments of the disclosed method and apparatus to be portrayed in the context of an particular application as one example. After reading this description, it will become apparent to one of ordinary skill in the art how the disclosed method and apparatus can be implemented in different and alternative environments.

[0030] Figure 3 illustrates a frequency band that may be used for OFDMA in accordance with an embodiment of the disclosed method and apparatus. In this frequency band, a plurality of frequency subcarriers 201 or “tones” (represented by upwards-pointing arrows) are provided for use in OFDM communications. In some embodiments, a portion of the tones 202 (represented with an ‘X’ above the tone) may be determined to be unavailable for OFDM communications, for example because the signal falls outside of the system’s defined available bandwidth or reservation of the subcarrier for other uses. Accordingly, a subset of subcarriers within the frequency band may be available subcarriers for OFDM (the subcarriers not marked with an ‘X’). In an OFDMA communications environment, further subsets of the available subcarriers are assigned to

network nodes for use in OFDMA communications. These network nodes may then communicate simultaneously on their assigned subcarriers. For example, a portion of the subcarriers assigned to node 'A' 203 are labeled with an 'A' and the portion of the subcarriers assigned to node 'B' 204 are labeled with a 'B', while subcarriers that remain available for another node 205 are unlabeled. In some embodiment, the partitioning of the available subcarriers into node-specific portions may be undertaken by a network coordinator or controller, for example during a node admission process. In other embodiments, for example those lacking a network controller, the allotment of the available subcarriers to the network nodes may be mutually negotiated.

[0031] In some communications networks, OFDMA may be used for all transmission types, for example to allow a large number of network devices to share a common communications medium, such as in a sensor network. In other communications networks, OFDMA may be used for particular transmission types. For example, OFDMA may be used for network transmissions that are required from participating network nodes for scheduling and house keeping purposes. Using MoCA networks as an example, OFDMA may be used to transmit RRs during an RR period of a MAP cycle, thereby reducing the duration of the RR period and freeing time for other network communications.

[0032] In some communications networks, the different modulation schemes may be assigned to the different available subcarriers. For example, different schemes may be used because communications on the different subcarriers may have varying propagation or signal characteristics. For example, a first subcarrier 206 may provide a signal-to-

noise ratio (SNR) that can support 1024-QAM, while a second subcarrier may have a large degree of noise, or a reduced allowed signal strength, such that it can maintain only 2-QAM, (i.e., BPSK). Accordingly, in some embodiments, rather than requiring each subcarrier to have the same modulation scheme, different subcarriers may be allocated different modulation schemes. For example, the network medium may be periodically profiled and the available subcarriers may be assigned different QAM modulation schemes according to these profiles.

[0033] In such an embodiment, even if OFDMA is reserved for house-keeping or maintenance data exchanges, such as the transmission of RRs, where packet length will be relative constant between different nodes, different nodes may still require different numbers of subcarriers. For example, if the subcarriers assigned to B 204 for OFDMA support a higher QAM modulation rate, such as 512-QAM, while the subcarriers assigned to A 203 do not support such high rates, then A may be assigned a greater number of subcarriers, as illustrated.

[0034] Figure 4 illustrates an OFDM coding module that may be used in accordance with an embodiment of the disclosed method and apparatus. In this implementation, a coding module 249 receives an input bit stream 250. Input bit stream 250 may represent a PHY packet, for example. The coding module 249 transforms the serial bit stream to a parallel stream using serial-to-parallel module 251. This parallel stream is then presented to a QAM module 252, which may comprise a plurality of QAM coding modules 257. In some embodiments, a QAM coding module 275 may be present for each available subcarrier. Accordingly, in these embodiments, when the network

node communicates using OFDMA, it may not use all available QAM modules. Instead, the network node may use only the QAM modules that correspond to its assigned subset of the available subcarriers. In other embodiments, the serial to parallel module 251 and the multiple QAM modules 257 are replaced with a single QAM coding module that sequentially performs QAM coding of the bit stream 250 onto the used subcarriers.

[0035] After QAM coding, an output symbol stream 253 comprising a plurality of QAM symbols, and together comprising an OFDM symbol, is provided to a scrambler module 254. The scrambler module 254 uses the output 256 of a sequence generator 255 to perform a constellation scrambling operation on the received QAM symbols, as described below with respect to Figure 5. In some embodiments, sequence generator module 255 comprises a pseudorandom noise sequence generator and the output 256 comprises a pseudorandom noise sequence. The scrambled symbol stream 257 is then provided for further use by the transmitter.

[0036] Figure 5 illustrates a scrambling operation according to an embodiment of the disclosed method and apparatus. In one embodiment, a shared pseudorandom sequence that is used for constellation scrambling is provided to each network device that will be simultaneously transmitting during an OFDMA communications period. In one such embodiment, the pseudorandom sequence is initialized with a common seed, such that each network device generates the same sequence. Furthermore, in accordance with one embodiment, the available subcarriers for OFDMA communications are indexed according to an indexing scheme that is shared among the network nodes. In this embodiment, when the constellation scrambling process begins (STEP 280), beginning

with the first OFDM symbol and first subcarrier in the frequency range, a transmitting network device inspects the current subcarrier to determine if the subcarrier is available for OFDMA communications (STEP 286). If the subcarrier is available, then the device determines whether the current subcarrier is being used by the device for OFDMA communications (STEP 281) (i.e., the subcarrier will be transmitting a QAM symbol on the current subcarrier). If so, then the node obtains the latest element of the pseudorandom sequence (STEP 282) and scrambles the QAM symbol on the used subcarrier (STEP 283) using the obtained element of the pseudorandom sequence. After STEP 283, or after STEP 281 if the subcarrier is not used, the device clocks the noise generator to advance the pseudorandom sequence to the next element (STEP 284). In STEP 287, the device determines if the current subcarrier is the last subcarrier of the current symbol. In the illustrated embodiment, this step is performed after STEP 284 if it is determined in STEP 286 that the current subcarrier is not available. If STEP 287 determines that the current subcarrier is not the last subcarrier of the current symbol, then the network device advances to the next subcarrier (STEP 288) and the method repeats from STEP 286. On the other hand, if the subcarrier is the last subcarrier, then the device determines if current symbol is the last symbol (STEP 285). If not, the device advances to the first subcarrier of the next symbol and the method again repeats from STEP 286. If the current symbol is the last symbol, then all symbols in the message have been scrambled, and the method ends.

[0037] Accordingly, if this method is followed by the network devices that are transmitting using OFDMA, then no two network devices will scramble a symbol using the same pseudorandom sequence element. For example, a network device transmitting

on the first subcarrier will be the only device to use the first element of the pseudorandom noise sequence, a network device transmitting on the second subcarrier will be the only device to use the second element of the pseudorandom noise sequence, and so on. This situation is illustrated in Figure 6, where each available subcarrier effectively has a unique sequence element $S(n)$. This occurs because each network device advances the sequence generator for each available subcarrier, even those that it does not use. In other embodiments, such as illustrated with respect to Figure 6, each available subcarrier may be assigned

[0038] Accordingly, the receiving network device sees the transmitted payload as if it were sent by a single transmitter, and it can use a single sequence generator to descramble the received symbols. In some embodiments, the receiving network proceeds in a manner analogous to Figure 5. This is illustrated in Figure 7. When this method begins, the receiving network device seeds its sequence generator with the same initial seed as the transmitting network device. Then the decoding method begins (STEP 290), starting with the first received OFDM symbol and the first subcarrier in the frequency band. As described herein, the OFDM symbol on the receiver's side in this embodiment comprises an OFDM symbol that is a combination of a plurality of OFDM symbols that were sent by multiple transmitting devices using OFDMA. Analogously to the scrambling process, the descrambling process inspects the current subcarrier (STEP 296) to determine if it is available for OFDMA, and if so, determines if the subcarrier was used (i.e., carried a QAM symbol) (STEP 291). If the subcarrier is used, then the receiving device obtains the latest bit from the scrambling sequence (STEP 292) and descrambles the QAM symbol on that used subcarrier (STEP 293). If the subcarrier was

available but not used in STEP 291, or after descrambling the subcarrier in STEP 293, then the receiving device clocks the noise generator (STEP 294). Continuing the descrambling process, the receiving device proceeds through the subcarriers of the frequency band (STEP 298 and 297), and for each of the OFDM symbols (STEP 299 and 295) in a manner analogous to the process implemented by the transmitting devices. After the method has ended, the receiving network device has descrambled all the received symbols from the plurality of transmitting devices that participated in the OFDMA transmission period. In some embodiments this avoids the requirement that the receiving network device maintain multiple sequence generators, because the receiving network device does not need to maintain a separate sequence generator for each transmitting device in order to descramble each transmitting device's communications. In a particular embodiment, the receiving network device may comprise a network controller, and the QAM symbols received during the OFDMA period may comprise the transmitting devices' RRs. Accordingly, the network controller may then use the requests to schedule an allocation of the bandwidth during an upcoming MAP and transmit responses to the various network devices with their assigned schedules.

[0039] Figure 8 illustrates a descrambling and decoding module for a network device receiving signals during an OFDMA communications period in accordance with an embodiment of the disclosed method and apparatus. In this embodiment, the receiving module 300 obtains a scrambled symbol stream 307. Scrambled symbol stream 307 will typically comprise a plurality of QAM symbols transmitted on a corresponding plurality of used subcarriers. These used subcarriers represent the sum of the subcarriers used by the individual transmitting network devices during the OFDMA communications period.

This scrambled symbol stream 307 is provided to a descrambling module 304 for constellation descrambling. As described herein, because the transmitting network devices were able to synchronize their use of a sequence generator, the receiving network device can descramble the received stream 307 using a single sequence generator 305 and output sequence 306. The descrambled symbol stream 303 may then be provided to a plurality of QAM decoders 307, making up a QAM decoding module 302 for decoding. Once the symbols have been decoded, they may be allocated according to their respective transmitting network devices by allocating module 301 and output as a plurality of bit streams 308, with one bit stream per transmitting network device.

[0040] Figure 9 illustrates a general constellation scrambling procedure that may be implemented in an embodiment of the disclosed method and apparatus. In this scrambling procedure, a QAM symbol 320 $C(n)$ may be represented by a pair comprising an in phase component and a quadrature component, $C(n) = \{I(n), Q(n)\}$. In one scrambling process, the in phase component 321, $I(n)$, and the quadrature component 322, $Q(n)$, of the symbol undergo transformations 324 and 325, respectively. In these transformations, a known element of a sequence, such as a pseudo-random sequence 323 may be used such that de-scrambling the symbol comprises an inverse operation using the same sequence element. After transformation, the scrambled symbol $C(n)'$ 328 comprises a scrambled in phase component 326, $I(n)'$, and a scrambled quadrature component 327, $Q(n)'$.

[0041] Figure 10 is a block diagram of the components used to perform a procedure in accordance with one embodiment of the disclosed method and apparatus. In

this procedure, a predetermined sequence 340 is provided to a mapping function module 342. In one embodiment, the bit stream 340 comprises a pseudorandom sequence of 1's and 0's. The mapping function module 342 maps 1's to -1's and 0's to 1's, thereby forming a pseudorandom sequence of 1's and -1's. An input symbol stream 341 is coupled to a symbol module 343 to obtain a QAM symbol. A multiplier 344 multiplies the in phase and quadrature components of the symbols by the result of the mapping function 342. If the current element of the pseudorandom sequence is a 1, then the mapping function module 342 returns a -1, and both the in phase and quadrature components are negated, which is equivalent to a 180° rotation (as viewed on a constellation diagram). Moreover, if the current element of the pseudorandom sequence is a 0, then the mapping function module 342 returns 1, resulting in an identity function that leaves the in phase and quadrature components unchanged. The output of the multiplier 344 is a scrambled symbol stream 345. In this particular scrambling process, and other scrambling processes, the scrambling function is its own inverse. In other words, providing the scrambled symbol stream 345 to the symbol module 343 in place of the input symbol stream 341 will result in the original unscrambled stream 341 being output from the multiplier 344, assuming that the pseudorandom sequence 340 is restarted at the original initial value.

[0042] Figure 11 illustrates a pseudorandom sequence generator that may be implemented in an embodiment of the disclosed method and apparatus. This figure illustrates a sequence generator for generating a 15th order pseudorandom noise sequence (PN-15(n)), with a generator polynomial $X^{15} + X + 1$. In particular embodiments, each network device in a communications network has such a sequence generator. At the

beginning of an OFDMA transmissions period, each transmitter initializes the shift register 370 with a predetermined seed. For example, in a particular embodiment the shift register 370 is initialized with the fifteen least significant bits of 0x3EA9. In some embodiments, the current element of the pseudorandom sequence comprises the bit currently occupying A_0 , for example, the first element of the pseudorandom sequence will comprise the least significant bit of the seed. When the sequence generator is clocked, the shift register generates a new A_{14} as $A_0 + A_1$, discards the bit in A_0 , moves each bit from A_n to A_{n-1} . Accordingly, the sequence is generated in a deterministic manner, but can be shown to generate all 2^{15} possible 15-bit combinations with an even distribution. Accordingly, the sequence appears to be noise-like as it proceeds.

[0043] As described herein, because each transmitting network device participating in the OFDMA period initializes their generator using the same seed, and clocks their generator for each available subcarrier, not merely for their used subcarriers, the various transmitting network devices are able to synchronize their use of the pseudorandom sequence for QAM symbol scrambling. Accordingly, the receiving network device is able to use one sequence generator and descrambling module to descramble all the received QAM symbols during the OFDMA period, rather than needing to maintaining separate descrambling modules for each transmitting network device.

[0044] As used herein, the term module might describe a given unit of functionality that can be performed in accordance with one or more embodiments of the disclosed method and apparatus. As used herein, a module might be implemented

utilizing any form of hardware, software, or a combination thereof. For example, one or more processors, controllers, ASICs, PLAs, PALs, CPLDs, FPGAs, logical components, software routines or other mechanisms might be implemented to make up a module. In implementation, the various modules described herein might be implemented as discrete modules or the functions and features described can be shared in part or in total among one or more modules. In other words, as would be apparent to one of ordinary skill in the art after reading this description, the various features and functionality described herein may be implemented in any given application and can be implemented in one or more separate or shared modules in various combinations and permutations. Even though various features or elements of functionality may be individually described or claimed as separate modules, one of ordinary skill in the art will understand that these features and functionality can be shared among one or more common software and hardware elements, and such description shall not require or imply that separate hardware or software components are used to implement such features or functionality.

[0045] Where components or modules of the disclosed method and apparatus are implemented in whole or in part using software, in one embodiment, these software elements can be implemented to operate with a computing or processing module capable of carrying out the functionality described with respect thereto. One such example computing module is shown in Figure 12. Various embodiments are described in terms of this example-computing module 400. After reading this description, it will become apparent to a person skilled in the relevant art how to implement the disclosed method and apparatus using other computing modules or architectures.

[0046] Referring now to Figure 12, computing module 400 may represent, one or more processors, controllers, control modules, or other processing devices, such as a processor 404 or for example, desktop, laptop and notebook computers; hand-held computing devices (PDA's, smart phones, cell phones, palmtops, etc.); mainframes, supercomputers, workstations or servers; or any other type of special-purpose or general-purpose computing devices as may be desirable or appropriate for a given application or environment. In one embodiment, a computing module might be found in other electronic devices such as, for example, digital cameras, navigation systems, cellular telephones, portable computing devices, modems, routers, WAPs, terminals and other electronic devices that might include some form of processing capability.

[0047] Processor 404 might be implemented using a general-purpose or special-purpose processing engine such as, for example, a microprocessor, controller, or other control logic. In the illustrated example, processor 404 is connected to a bus 402, although any communication medium can be used to facilitate interaction with other components of computing module 400 or to communicate externally.

[0048] Computing module 400 might also include one or more memory modules, simply referred to herein as main memory 408. For example, preferably random access memory (RAM) or other dynamic memory, might be used for storing information and instructions to be executed by processor 404. Main memory 408 might also be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor 404. Computing module 400 might likewise

include a read only memory (“ROM”) or other static storage device coupled to bus 402 for storing static information and instructions for processor 404.

[0049] The computing module 400 might also include one or more various forms of information storage mechanism 410, which might include, for example, a media drive 412 and a storage unit interface 420. The media drive 412 might include a drive or other mechanism to support fixed or removable storage media 414. For example, a hard disk drive, a floppy disk drive, a magnetic tape drive, an optical disk drive, a CD or DVD drive (R or RW), or other removable or fixed media drive might be provided. Accordingly, storage media 414 might include, for example, a hard disk, a floppy disk, magnetic tape, cartridge, optical disk, a CD or DVD, or other fixed or removable medium that is read by, written to or accessed by media drive 412. As these examples illustrate, the storage media 414 can include a computer usable storage medium having stored therein computer software or data.

[0050] In alternative embodiments, information storage mechanism 410 might include other similar instrumentalities for allowing computer programs or other instructions or data to be loaded into computing module 400. Such instrumentalities might include, for example, a fixed or removable storage unit 422 and an interface 420. Examples of such storage units 422 and interfaces 420 can include a program cartridge and cartridge interface, a removable memory (for example, a flash memory or other removable memory module) and memory slot, a PCMCIA slot and card, and other fixed or removable storage units 422 and interfaces 420 that allow software and data to be transferred from the storage unit 422 to computing module 400.

[0051] Computing module 400 might also include a communications interface 424. Communications interface 424 might be used to allow software and data to be transferred between computing module 400 and external devices. Examples of communications interface 424 might include a modem or softmodem, a network interface (such as an Ethernet, network interface card, WiMedia, IEEE 802.XX or other interface), a communications port (such as for example, a USB port, IR port, RS232 port Bluetooth® interface, or other port), or other communications interface. Software and data transferred via communications interface 424 might typically be carried on signals, which can be electronic, electromagnetic (which includes optical) or other signals capable of being exchanged by a given communications interface 424. These signals might be provided to communications interface 424 via a channel 428. This channel 428 might carry signals and might be implemented using a wired or wireless communication medium. Some examples of a channel might include a phone line, a cellular link, an RF link, an optical link, a network interface, a local or wide area network, and other wired or wireless communications channels.

[0052] In this document, the terms "computer program medium" and "computer usable medium" are used to generally refer to media such as, for example, memory 408, storage unit 420, media 414, and channel 428. Additionally, the various embodiments set forth herein are described in terms of block diagrams, flow charts and other illustrations. As will become apparent to one of ordinary skill in the art after reading this document, the illustrated embodiments and their various alternatives can be implemented without confinement to the illustrated examples. For example, block diagrams and their accompanying description should not be construed as mandating a particular architecture or configuration. Accordingly, the particular embodiments disclosed herein should not be used to limit the scope of the claimed invention, but rather the scope of the claimed invention should be determined by the appended claims in light of the specification and without limitation to particular examples provided therein.

Claims

1. A method for communications transmission using orthogonal frequency division multiple access on a network comprising:

providing a plurality of transmitting network devices with a set of available subcarriers for orthogonal frequency division multiple access;

providing a corresponding element of a pseudorandom noise sequence for each subcarrier of the set of available subcarriers;

allocating a subset of the set of available subcarriers to each of the transmitting network devices;

a transmitting network device of the plurality of devices mapping a packet onto a plurality of used subcarriers of its allocated subset of available subcarriers, wherein the step of mapping the packet comprises mapping the packet onto a plurality of quadrature amplitude modulated symbols to be transmitted on the used subcarriers;

the transmitting network device performing a predetermined transformation on a quadrature amplitude modulated symbol using the element of the pseudorandom noise sequence corresponding to the used subcarrier;

the transmitting network device transmitting the transformed symbol to a receiving network device.

2. The method of claim 1, wherein the steps of providing a corresponding element of a pseudorandom noise sequence and performing a predetermined transformation comprise:

the transmitting network device receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise

sequence element corresponding to a first available subcarrier and transforming the symbol to be transmitted on the first available subcarrier if the first available subcarrier is a used subcarrier; and

the transmitting network device advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and transforming the symbol to be transmitted on the next available subcarrier if the next available subcarrier is a used subcarrier.

3. The method of claim 3, wherein the step of the transmitting network device advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is transformed.

4. The method of claim 1, wherein the pseudorandom noise sequence comprises a PN-15 sequence.

5. The method of claim 4, wherein the step of performing the predetermined transformation comprises rotating the quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.

6. The method of claim 4, wherein the receiving network device comprises a network coordinator and wherein the packet comprises a resource reservation request packet.

7. A method for communications reception using orthogonal frequency division multiple access on a network comprising:

receiving a first scrambled orthogonal frequency division modulation symbol from a first transmitting network device, the first orthogonal frequency division modulation symbol comprising a first plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding first plurality of used subcarriers assigned to the first transmitting network device;

receiving a second scrambled orthogonal frequency division modulation symbol from a second transmitting network device, the second orthogonal frequency division modulation symbol comprising a second plurality of scrambled quadrature amplitude modulation symbols transmitted on a corresponding second plurality of used subcarriers assigned to the second transmitting network device;

wherein the first plurality of subcarriers and the second plurality of subcarriers are subsets of a set of available subcarriers, and wherein the subcarriers of the set of available subcarriers have corresponding elements of a pseudorandom noise sequence; and

descrambling the first and second scrambled orthogonal frequency division modulation symbols, the step of descrambling comprising descrambling a scrambled quadrature amplitude modulation symbol transmitted on a used subcarrier using the element of the pseudorandom noise sequence corresponding to the used subcarrier.

8. The method of claim 7, wherein the step of descrambling the first and second scrambled orthogonal frequency division modulation symbols comprises receiving an initial pseudorandom noise sequence element from a pseudorandom noise sequence generator, the initial pseudorandom noise sequence element corresponding to a first

available subcarrier and descrambling the symbol received on the first available subcarrier if the first available subcarrier is a used subcarrier; and

advancing the pseudorandom noise generator to receive a next element of the pseudorandom noise sequence corresponding to a next available subcarrier and descrambling the symbol received on the next available subcarrier if the next available subcarrier is a used subcarrier.

9. The method of claim 8, wherein the step of advancing the pseudorandom noise generator is repeated until a symbol to be transmitted on a last used subcarrier is descrambled.

10. The method of claim 7, wherein the pseudorandom noise sequence comprises a 15th order pseudorandom noise sequence.

11. The method of claim 10, wherein the step of descrambling the scrambled quadrature amplitude modulated symbol comprises rotating the scrambled quadrature amplitude modulated symbol by 180° if the element of the pseudorandom noise sequence is a '1' and not modifying the scrambled quadrature amplitude modulated symbol if the element of the pseudorandom noise sequence is a '0'.

12. The method of claim 4, wherein the method is performed by a network coordinator and wherein first and second scrambled orthogonal frequency division modulation symbols are contained in a resource reservation request packet.

13. A communications network system, comprising:

a network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access;

wherein the network device is configured to perform a constellation scrambling operation on the quadrature amplitude modulated symbol, the constellation scrambling operation comprising:

initializing a sequence generator with a predetermined seed; and,

while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

14. The system of claim 13, further comprising:

a second network device configured to transmit a second quadrature amplitude modulated symbol on a second subcarrier of the set of available subcarriers;

wherein the second network device is configured to perform a second constellation scrambling operation on the second quadrature amplitude modulated symbol, the second constellation scrambling operation comprising:

initializing a second sequence generator with the predetermined seed; and,

while proceeding through the set of available subcarriers in the predetermined order, advancing the second sequence generator for each subcarrier preceding the second subcarrier, and using a second element of a second sequence generated by the second sequence generator to scramble the second quadrature amplitude modulated symbol.

15. The system of claim 14, further comprising:

a receiving network device configured to receive the first and second scrambled quadrature amplitude modulated symbols;

wherein the receiving network device is configured to perform a constellation descrambling operation on the first and second scrambled quadrature amplitude modulated symbols, comprising:

initializing a third sequence generator with the predetermined seed; and,

while proceeding through the set of available subcarriers in the predetermined order, advancing the third sequence generator for each subcarrier preceding the first subcarrier, and using the first element to descramble the first quadrature amplitude modulated symbol, advancing the third sequence generator for each subcarrier preceding the second subcarrier, and the using the second element to descramble the second quadrature amplitude modulated symbol.

16. A network device configured to transmit a quadrature amplitude modulated symbol on a subcarrier of a set of subcarriers available for orthogonal frequency division multiple access, the network device comprising a computer readable medium having a computer executable program code embodied on the computer readable medium, wherein the computer executable code is configured to cause the network device to perform the steps of:

performing a constellation scrambling operation on the quadrature amplitude modulated symbol to form a scrambled quadrature amplitude modulated symbol, the constellation scrambling operation comprising:

initializing a sequence generator with a predetermined seed; and,

while proceeding through the set of available subcarriers in a predetermined order, advancing the sequence generator for each subcarrier preceding the subcarrier, and using an element of a sequence generated by the sequence generator to scramble the quadrature amplitude modulated symbol.

17. The network device of claim 16, wherein the computer executable program code is further configured to cause the device to transmit the scrambled quadrature amplitude modulated symbol to a receiving network device.

18. The network device of claim 17, wherein the receiving network device comprises a network coordinator, the sequence comprises a 15th order pseudorandom sequence, and the quadrature amplitude modulated symbol comprises an encoded symbol of a resource reservation request.

ABSTRACT

Systems and methods are provided that allow multiple transmitting network devices to transmit under an orthogonal frequency divisional multiple access (OFDMA) mode to a receiving network device. The multiple transmitting network devices may be configured to perform constellation scrambling on the symbols they will be transmitting using a predetermined scrambling sequence. They may be further configured to synchronize their use of the sequence, for example, by advancing the sequence for each available subcarrier, such that the receiving device may view the payload as if it were sent by a single transmitter. Accordingly, these multiple transmissions may be descrambled using only one instance of a sequence generator.

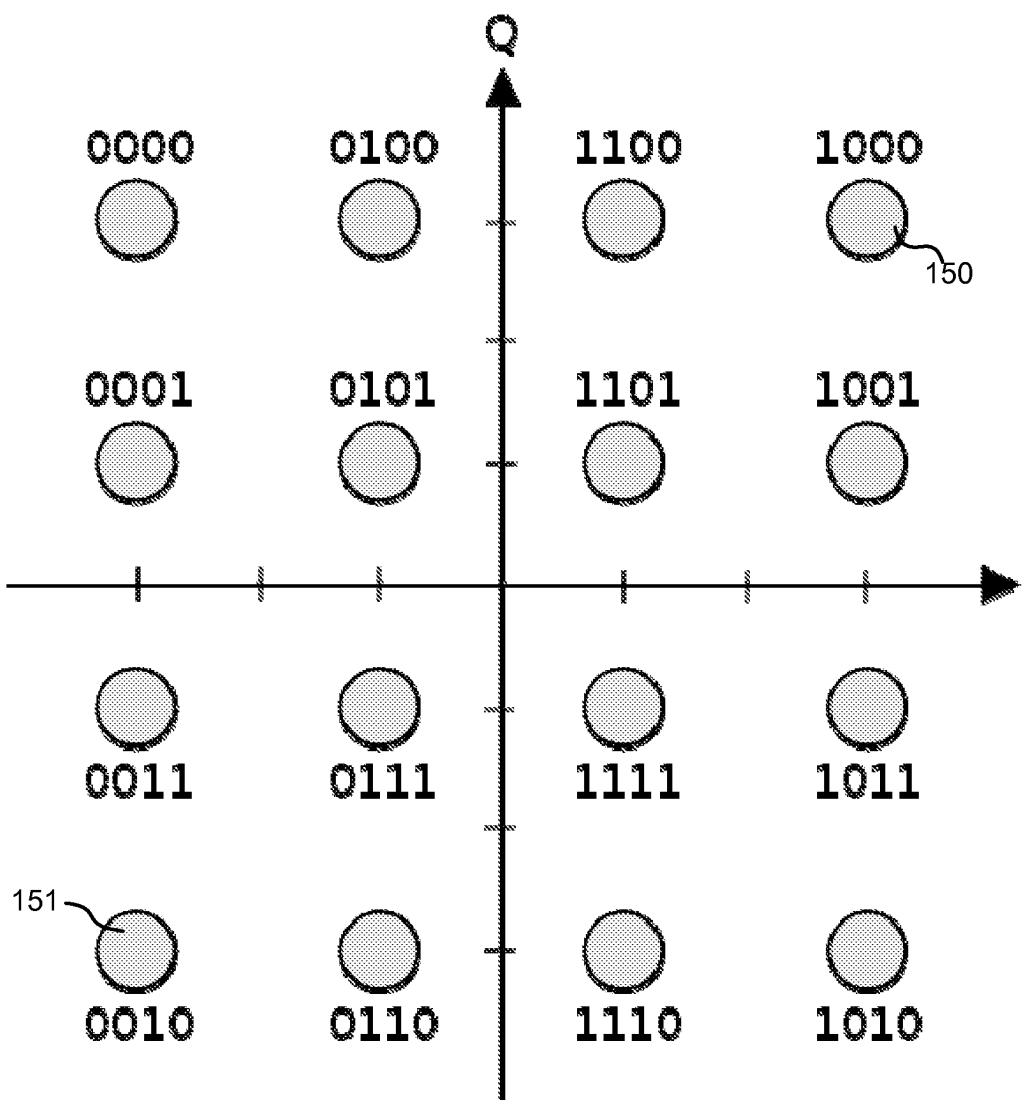
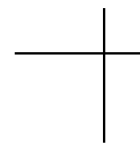
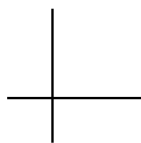


Fig. 2



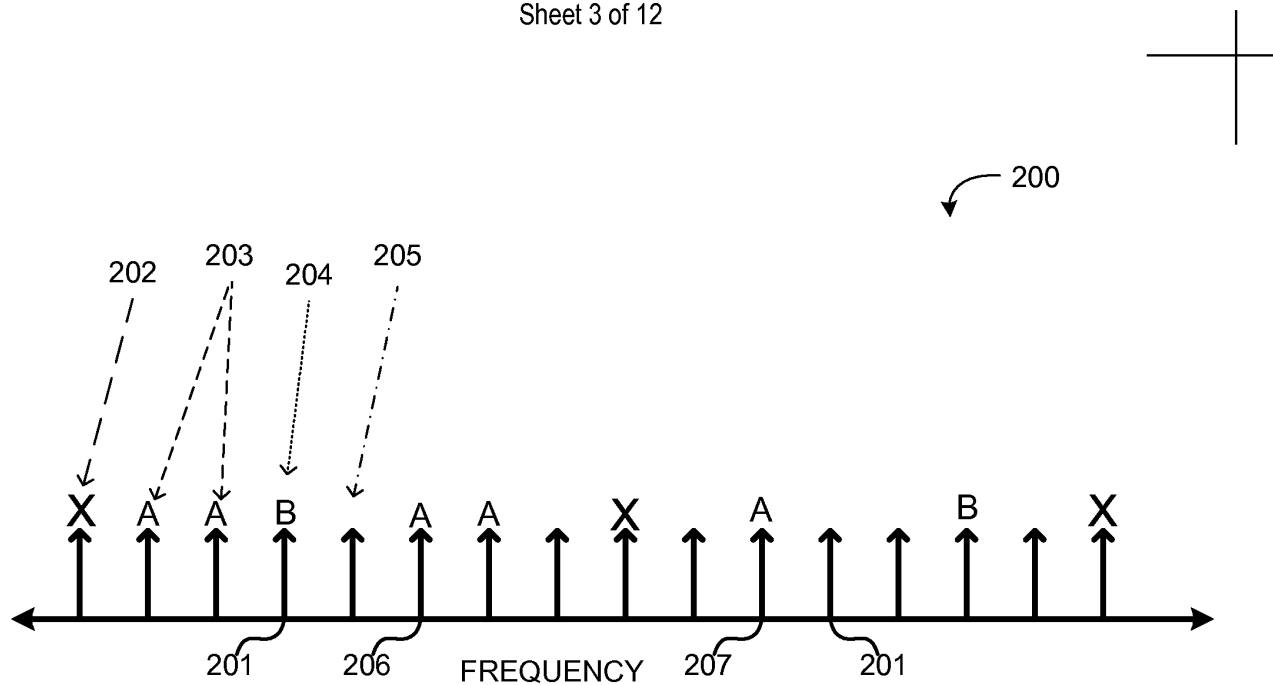


Fig. 3

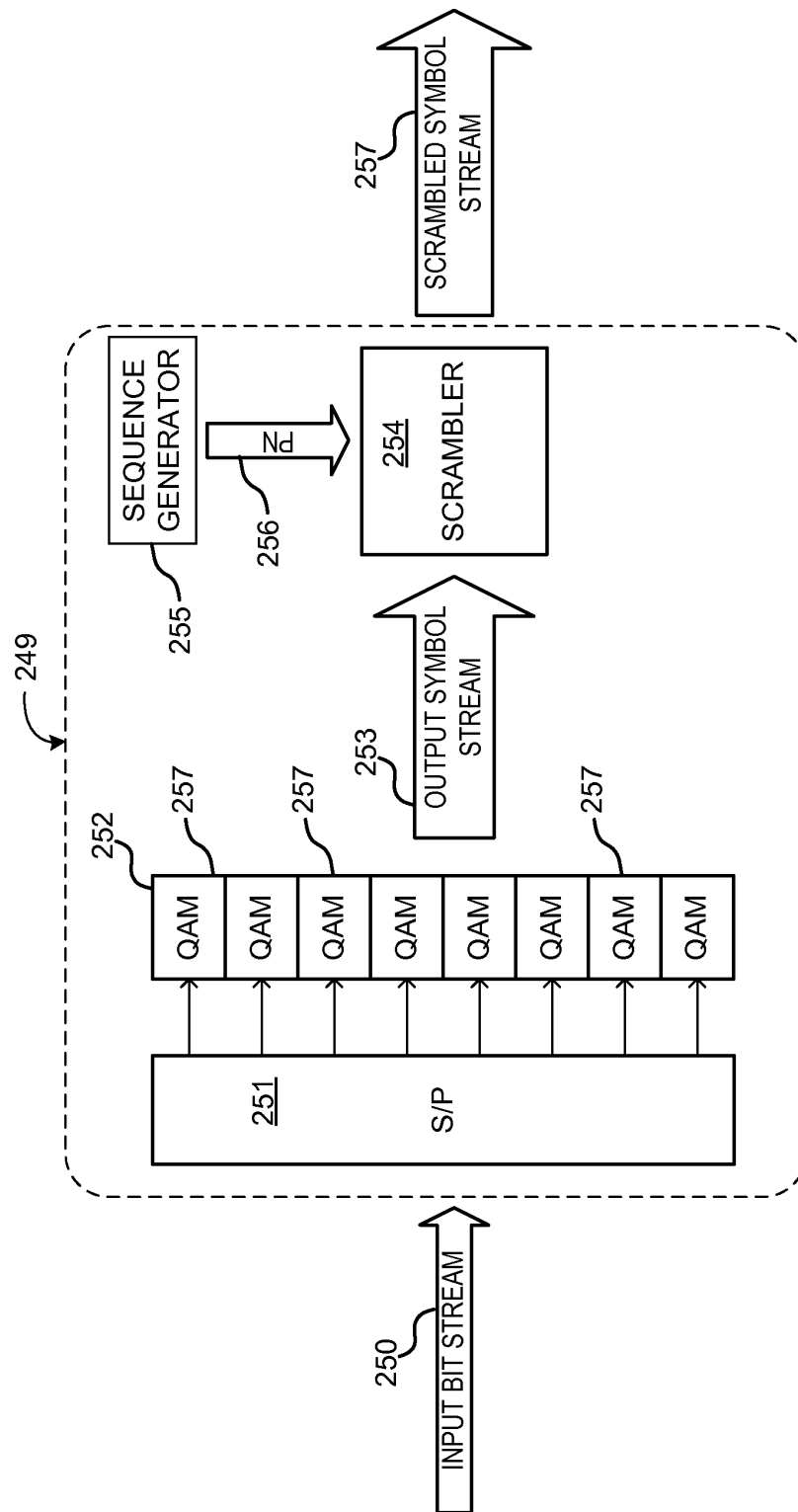


Fig. 4

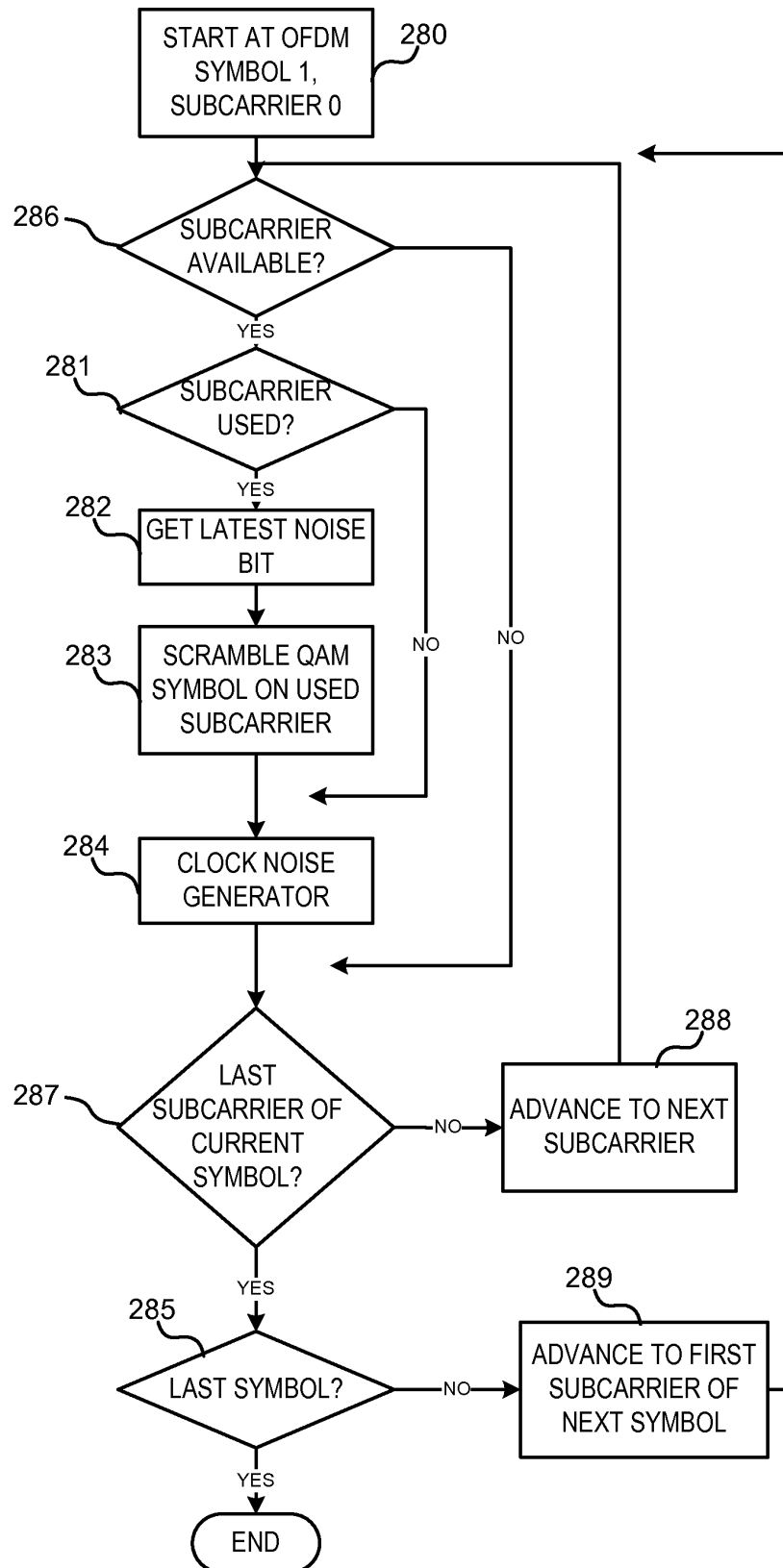


Fig. 5

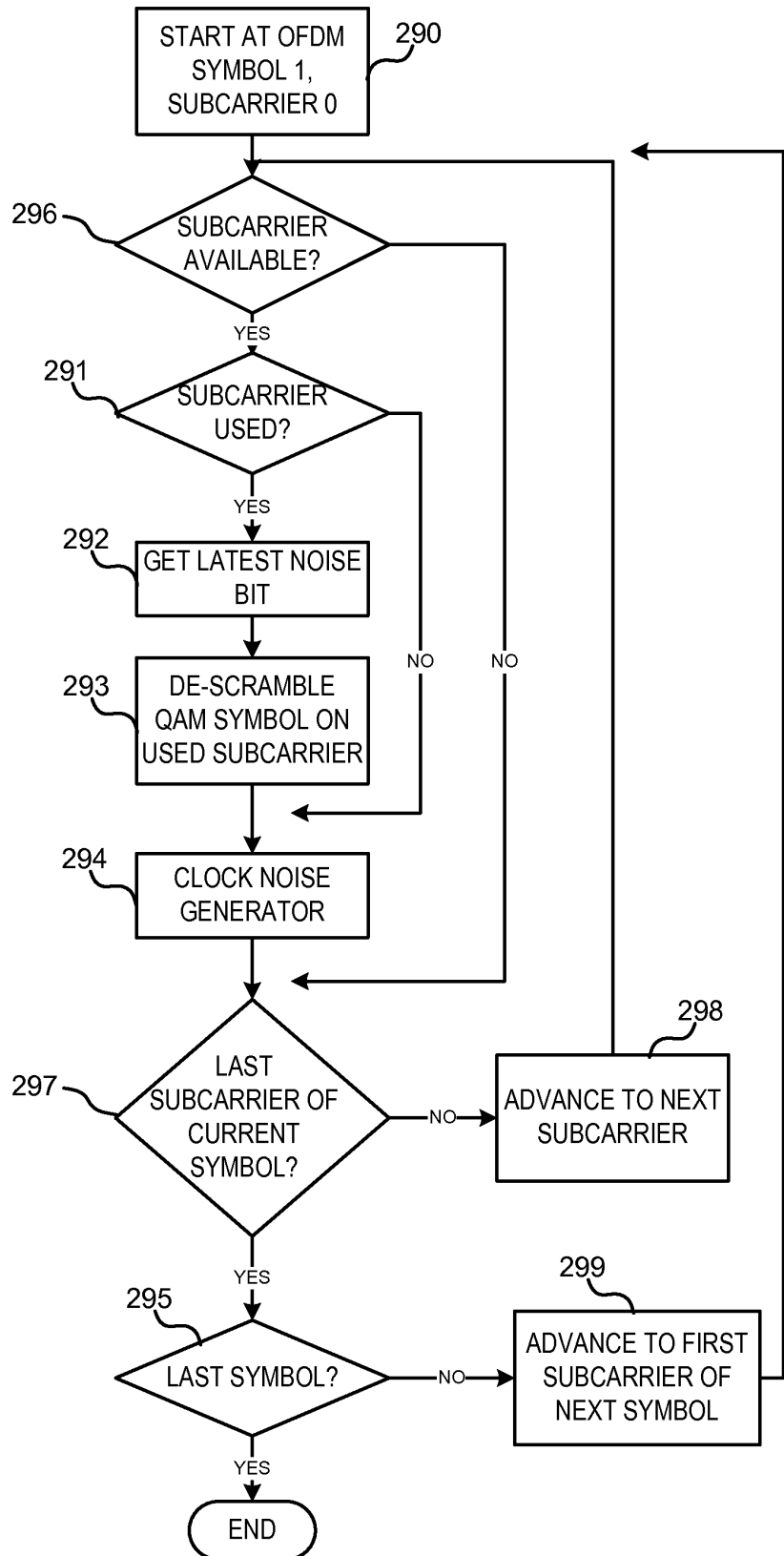


Fig. 7

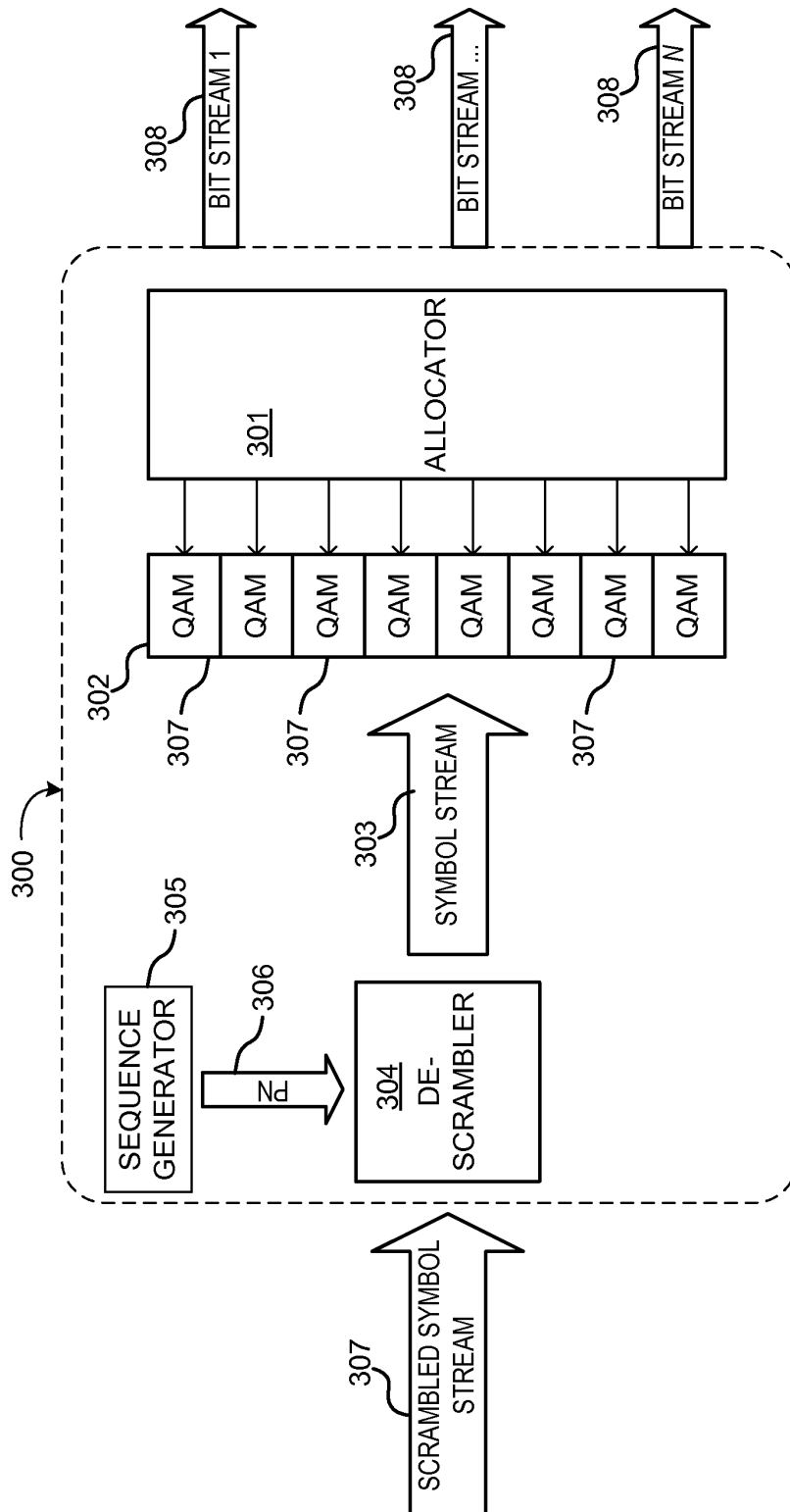


Fig. 8

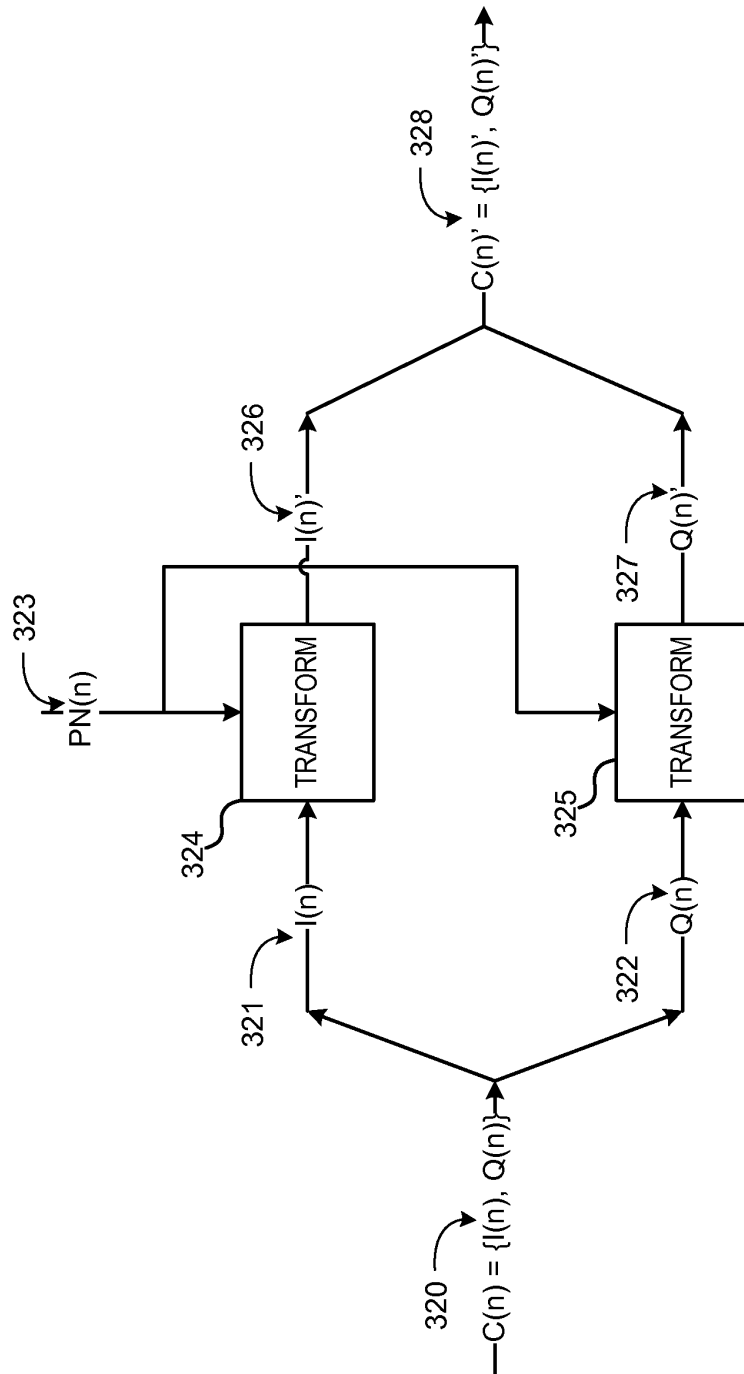


Fig. 9

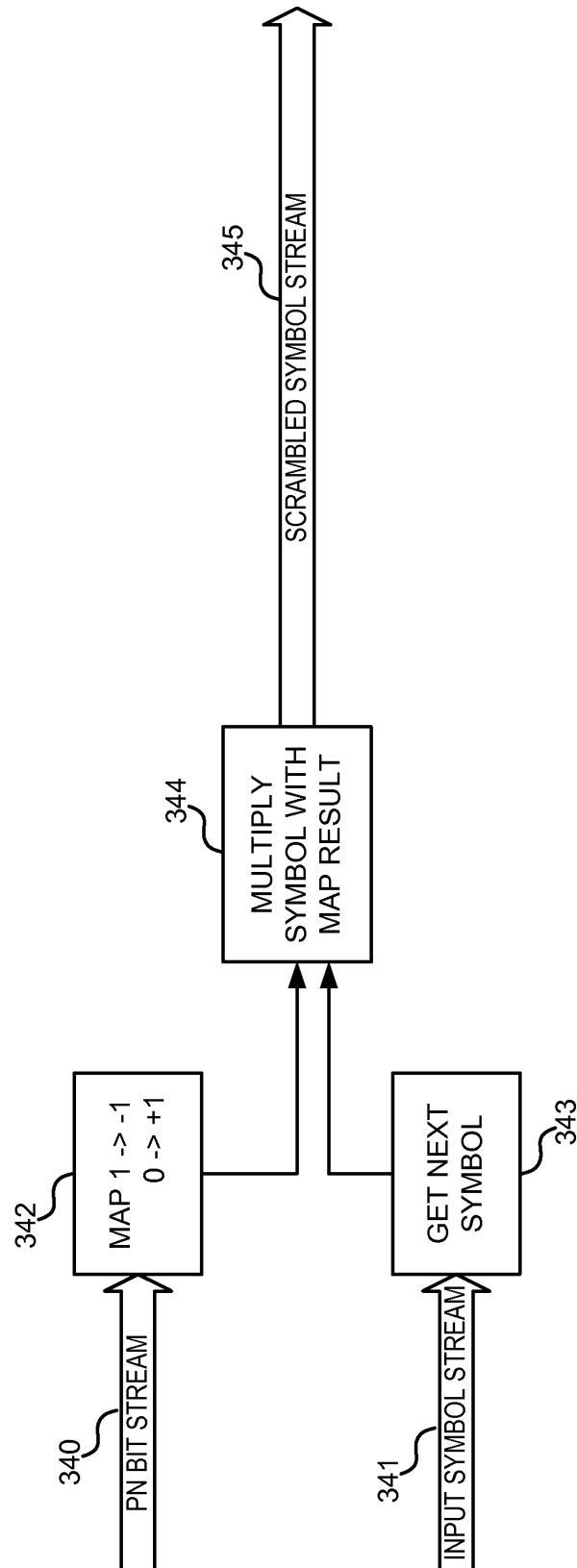


Fig. 10

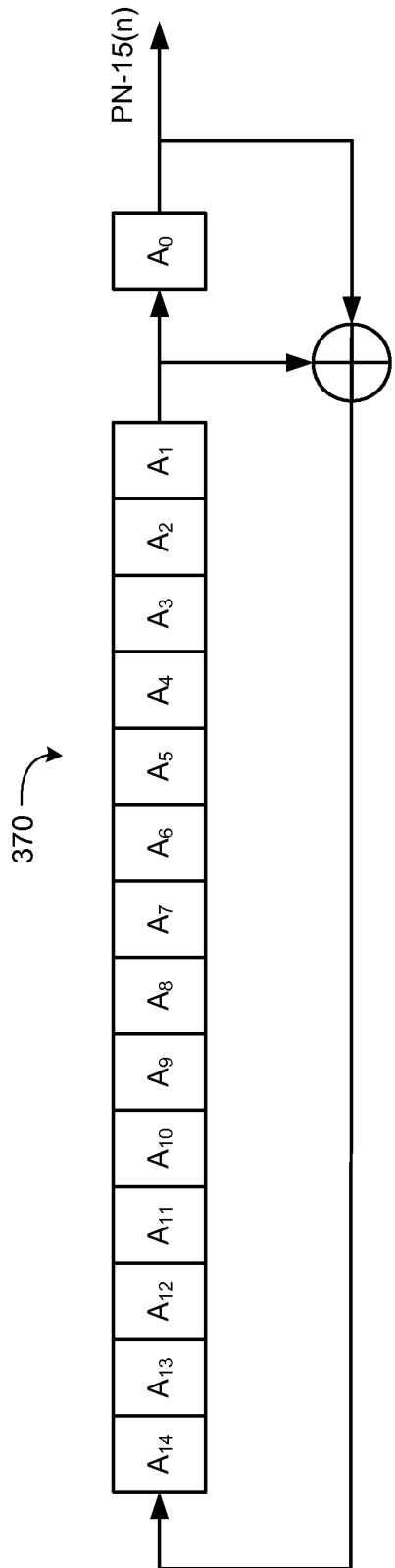
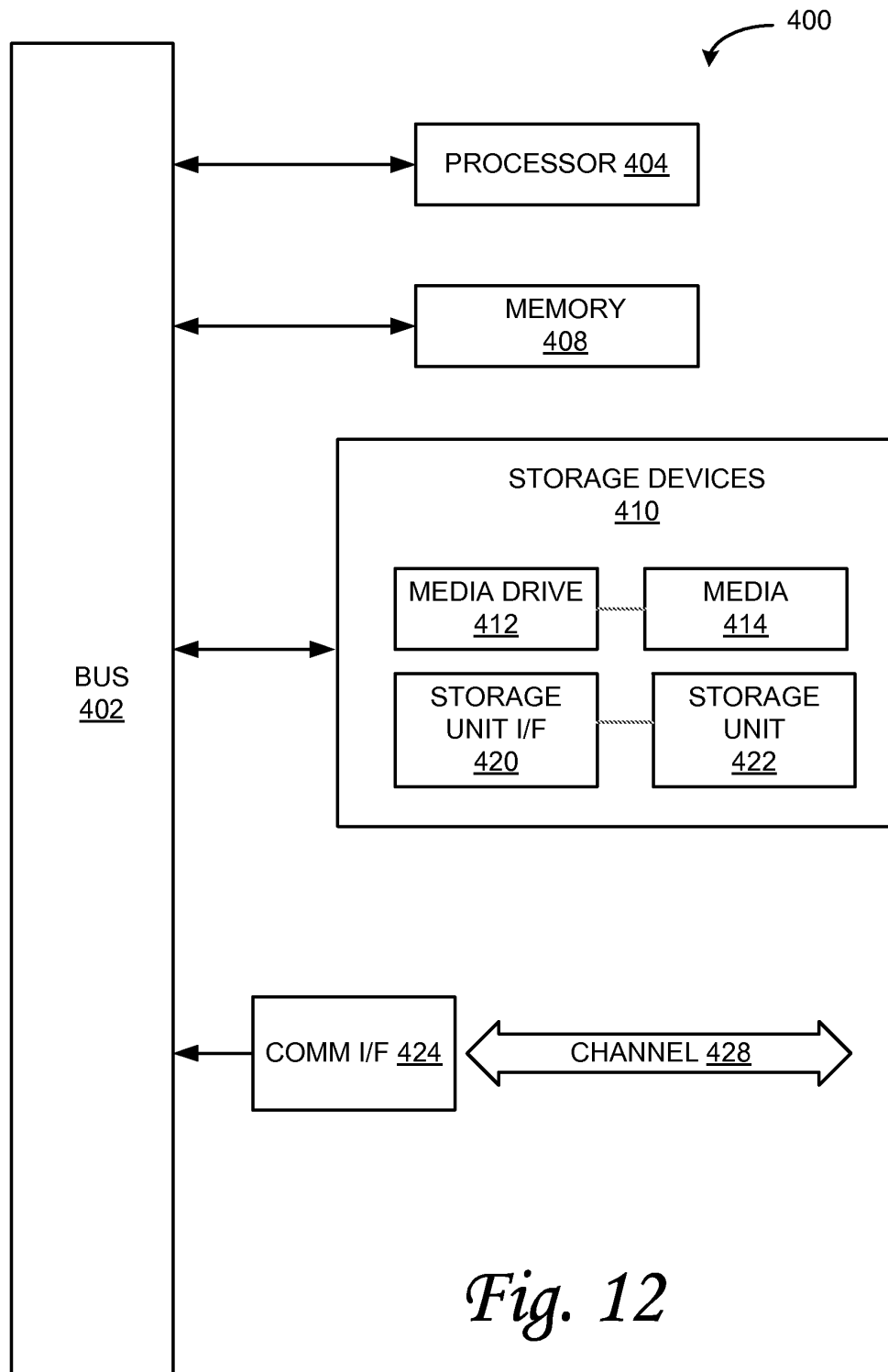


Fig. 11



COMBINED DECLARATION / POWER OF ATTORNEY

AS BELOW NAMED INVENTOR, I HEREBY DECLARE THAT: This Declaration is of the following type:

☒ Original ☐ Supplemental ☐ Continuation-In-Part ☐ Divisional
☐ Continuation ☐ National Stage of PCT

My residence, post office address and citizenship are as stated below next to my name: I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention **Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network**. The specification of which:

☐ is attached hereto.
☒ was filed on October 15, 2009 as Serial No. _____
☐ was amended on _____ (if applicable).
☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Sec. 1.56(a).

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

Priority Claimed				
(Country)	(Application No.)	(Day/Month/Year/Filed)	(Yes)	(No)

I hereby claim the benefit under Title 35 USC 119(e) of any United States provisional application(s) listed below:

<u>61/105,942</u> (Serial No.)	<u>October 16, 2008</u> (Filing Date)
<u>61/144,061</u> (Serial No.)	<u>January 12, 2009</u> (Filing Date)

I hereby claim the benefit under Title 35 USC 120 of the United States application(s) listed below, and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 USC 112, I acknowledge the duty to disclose material information as defined in Title 37 CFR 1.56(a) which occurred between the filing date of the prior application and the national or PCT International filing date of this application:

(Serial No.)	(Filing Date)	(Status)
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I, the undersigned, hereby appoint the attorneys and/or agents associated with Customer No. 77330 to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith. Please direct all telephone calls to Tim Ellis at (858) 768-3835 and address all correspondence to: Entropic Communications, Inc., C/O Tim Ellis, 6290 Sequence Drive, San Diego, California 92121.

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

Full Name of First or Joint Inventor Arndt MUELLER	Inventor Signature 	Date 10/15/2009
Residence 12631 La Tortola, San Diego, California 92129	Citizenship CA	
Post Office Address		

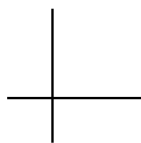


Fig. 1

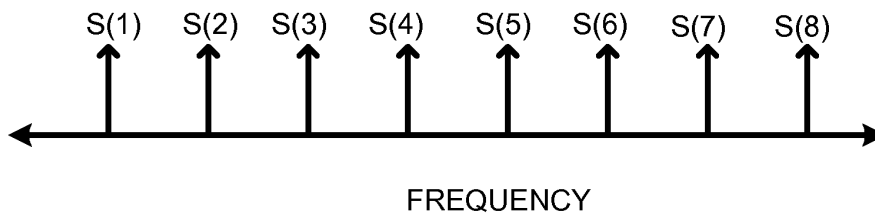
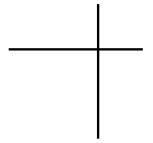
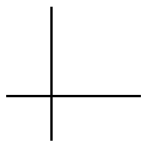


Fig. 6



Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network		
First Named Inventor/Applicant Name:		Arndt MUELLER		
Filer:		Bruce Wayne Greenhaus/Tim Ellis		
Attorney Docket Number:		E080048USU2		
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:				
Independent claims in excess of 3	1201	1	220	220
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1310

Electronic Acknowledgement Receipt	
EFS ID:	6273321
Application Number:	12580227
International Application Number:	
Confirmation Number:	9919
Title of Invention:	Method and Apparatus for Performing Constellation Scrambling in a Multimedia Home Network
First Named Inventor/Applicant Name:	Arndt MUELLER
Customer Number:	77330
Filer:	Bruce Wayne Greenhaus/Tim Ellis
Filer Authorized By:	Bruce Wayne Greenhaus
Attorney Docket Number:	E080048USU2
Receipt Date:	15-OCT-2009
Filing Date:	
Time Stamp:	21:39:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1310
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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 1.21 (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	E080048USU2_App-Data-Sheet_10-15-09.pdf	1541919	no	4
			319903076e8514b2431782d23e1365494ae473a0		
Warnings:					
Information:					
2		E080048USU2_App-as-Filed_10-15-09.pdf	178423	yes	32
			3b44bc5ee37c2cc0e5ce04a8569c75e31aa9329c		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	24	
	Claims		25	31	
	Abstract		32	32	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	E080048USU2_Fig-2-as-Filed_10-15-09.pdf	76331	no	1
			f1c0cbe42920239eecd5c0664c87692f6a01e1		
Warnings:					
Information:					
4	Drawings-only black and white line drawings	E080048USU2_Fig-3-as-Filed_10-15-09.pdf	53298	no	1
			f32dff90a4dbeat5565f97a066a2cd2ab2ad31a4		
Warnings:					
Information:					
5	Drawings-only black and white line drawings	E080048USU2_Fig-4-as-Filed_10-15-09.pdf	58502	no	1
			9e32f26c9cf9ef6eedb78b54bb9bf972435b8081		
Warnings:					
Information:					
6	Drawings-only black and white line drawings	E080048USU2_Fig-5-as-Filed_10-15-09.pdf	53755	no	1
			747ca7148739c47c8581ec90e38ed7feab24b7eb		
Warnings:					
Information:					

7	Drawings-only black and white line drawings	E080048USU2_Fig-7-as-Filed_10-15-09.pdf	53518	no	1
			0e3648778356b89e398eff4d42b0441b282703b9		
Warnings:					
Information:					
8	Drawings-only black and white line drawings	E080048USU2_Fig-8-as-Filed_10-15-09.pdf	76050	no	1
			c862bd097e6f5ede44d312b59a0690d1f616d7df		
Warnings:					
Information:					
9	Drawings-only black and white line drawings	E080048USU2_Fig-9-as-Filed_10-15-09.pdf	51559	no	1
			b534148bed2628bfd581ff0f3a41ce6e7e9b6c2		
Warnings:					
Information:					
10	Drawings-only black and white line drawings	E080048USU2_Fig-10-as-Filed_10-15-09.pdf	53580	no	1
			1967a565ac490c1c2a428a50d3ae977bc34917a1		
Warnings:					
Information:					
11	Drawings-only black and white line drawings	E080048USU2_Fig-11-as-Filed_10-15-09.pdf	49110	no	1
			ffb94ace74c0a2fe4c2cfbda432acdb505df121		
Warnings:					
Information:					
12	Drawings-only black and white line drawings	E080048USU2_Fig-12-as-Filed_10-15-09.pdf	51823	no	1
			769b356cf0abb86bd141dbcb8386090ee44a070		
Warnings:					
Information:					
13	Oath or Declaration filed	E080048USU2_Combined-Decl-PoA_10-15-09.pdf	483009	no	1
			840af75df2ac38d28eca4df4d5d91a1ff10aa381		
Warnings:					
Information:					
14	Drawings-only black and white line drawings	E080048USU2_Fig-1-as-Filed_10-15-09.pdf	137152	no	1
			b42e751ba28ab87b6a5eaf5765d5258241922ebc		
Warnings:					
Information:					
15	Drawings-only black and white line drawings	E080048USU2_Fig-6-as-Filed_10-15-09.pdf	49424	no	1
			106fbaf8517d5aacb53e5d9aa883f675aaee5621		
Warnings:					
Information:					

16	Fee Worksheet (PTO-875)	fee-info.pdf	36435	no	2
			58720e0cac9f70e31b280ffe8b5112f20880e a60		
Warnings:					
Information:					
Total Files Size (in bytes):				3003888	
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Application Number: 12580227 Document Date: 10/15/2009

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- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

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10/15/00

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number

12/580,227**APPLICATION AS FILED – PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(i))	18 minus 20 =	*
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1
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	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

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

SMALL ENTITY

RATE (\$)	FEE (\$)
N/A	
N/A	
N/A	
X 26=	
X 110=	
N/A	
TOTAL	

OR OTHER THAN SMALL ENTITY

RATE (\$)	FEE (\$)
N/A	330
N/A	540
N/A	220
X 52=	
X 220=	220
N/A	
TOTAL	1310

APPLICATION AS AMENDED – PART II

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

AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total (37 CFR 1.16(j))	*	Minus **	=
Independent (37 CFR 1.16(h))	*	Minus ***	=
Application Size Fee (37 CFR 1.16(s))			
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

SMALL ENTITY

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL	
ADD'T FEE	

OR OTHER THAN SMALL ENTITY

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL	
ADD'T FEE	

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

AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total (37 CFR 1.16(j))	*	Minus **	=
Independent (37 CFR 1.16(h))	*	Minus ***	=
Application Size Fee (37 CFR 1.16(s))			
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL	
ADD'T FEE	

OR

RATE (\$)	ADDITIONAL FEE (\$)
X =	
X =	
N/A	
TOTAL	
ADD'T FEE	

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

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

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

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

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

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09/29/09

Approved for use through 7/31/2006. OMB 0651-0032

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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/580,227	
APPLICATION AS FILED – PART I						
(Column 1)		(Column 2)		SMALL ENTITY		OR
OTHER THAN SMALL ENTITY						
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	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), (l), 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))	8	minus 20 = *	X 26=		X 52=	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *	X 110=		X 220=	
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					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A		N/A	
			TOTAL		TOTAL	1090
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		
SMALL ENTITY		OR		OTHER THAN SMALL ENTITY		
RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
X =		X =				
X =		X =				
N/A		N/A				
TOTAL ADD'T FEE		TOTAL ADD'T FEE				
(Column 1)		(Column 2)		(Column 3)		
SMALL ENTITY		OR		OTHER THAN SMALL ENTITY		
RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
X =		X =				
X =		X =				
N/A		N/A				
TOTAL ADD'T FEE		TOTAL ADD'T FEE				

AMENDMENT A

	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
Total (37 CFR 1.16(i))	*	Minus	**	=	
Independent (37 CFR 1.16(h))	*	Minus	***	=	
Application Size Fee (37 CFR 1.16(s))					
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

AMENDMENT B

	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
Total (37 CFR 1.16(i))	*	Minus	**	=	
Independent (37 CFR 1.16(h))	*	Minus	***	=	
Application Size Fee (37 CFR 1.16(s))					
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

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

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

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

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

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

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