



US008432956B2

(12) **United States Patent**  
**Krinsky et al.**

(10) **Patent No.:** **US 8,432,956 B2**  
(45) **Date of Patent:** **\*Apr. 30, 2013**

(54) **MULTICARRIER MODULATION MESSAGING FOR POWER LEVEL PER SUBCHANNEL INFORMATION**

(75) Inventors: **David M. Krinsky**, Acton, MA (US);  
**Robert Edmund Pizzano, Jr.**, Stoneham, MA (US)

(73) Assignee: **TQ Delta, LLC**, Austin, TX (US)

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

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/476,310**

(22) Filed: **May 21, 2012**

(65) **Prior Publication Data**  
US 2012/0230476 A1 Sep. 13, 2012

**Related U.S. Application Data**

(63) Continuation of application No. 12/779,660, filed on May 13, 2010, now Pat. No. 8,238,412, which is a continuation of application No. 12/477,742, filed on Jun. 3, 2009, now Pat. No. 7,835,430, which is a continuation of application No. 10/619,691, filed on Jul. 16, 2003, now Pat. No. 7,570,686, which is a continuation of application No. 09/755,173, filed on Jan. 8, 2001, now Pat. No. 6,658,052.

(60) Provisional application No. 60/224,308, filed on Aug. 10, 2000, provisional application No. 60/174,865, filed on Jan. 7, 2000.

(51) **Int. Cl.**  
**H04B 1/38** (2006.01)  
**H04L 12/26** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **375/222; 370/252**

(58) **Field of Classification Search** ..... None  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,836,726 A 9/1974 Wells et al.  
4,385,384 A 5/1983 Rosbury et al.

(Continued)

**FOREIGN PATENT DOCUMENTS**

EP 0889615 1/2009  
GB 2303032 2/1997

(Continued)

**OTHER PUBLICATIONS**

Boets et al., "Modeling Aspect of Transmission Line Networks," Proceedings of the Instrumentation and Measurement Technology Conference, US, New York, IEEE, May 12, 1992, pp. 137-141, XP000343913 ISBN: 0-7803-0640-6.

(Continued)

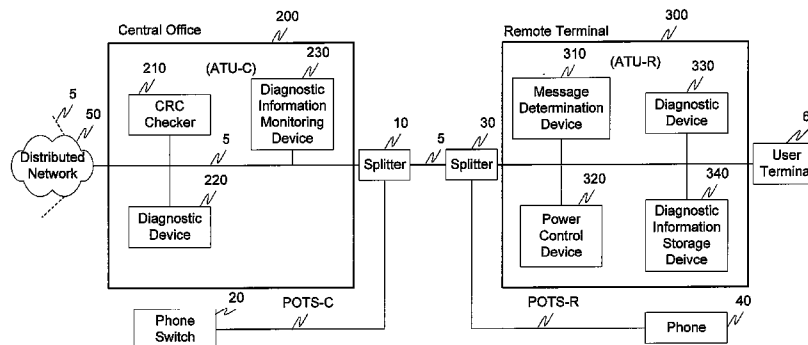
*Primary Examiner* — Khanh C Tran

(74) *Attorney, Agent, or Firm* — Jason H. Vick; Sheridan Ross, PC

(57) **ABSTRACT**

Upon detection of a trigger, such as the exceeding of an error threshold or the direction of a user, a diagnostic link system enters a diagnostic information transmission mode. This diagnostic information transmission mode allows for two modems to exchange diagnostic and/or test information that may not otherwise be exchangeable during normal communication. The diagnostic information transmission mode is initiated by transmitting an initiate diagnostic link mode message to a receiving modem accompanied by a cyclic redundancy check (CRC). The receiving modem determines, based on the CRC, if a robust communications channel is present. If a robust communications channel is present, the two modems can initiate exchange of the diagnostic and/or test information. Otherwise, the transmission power of the transmitting modem is increased and the initiate diagnostic link mode message re-transmitted to the receiving modem until the CRC is determined to be correct.

**10 Claims, 2 Drawing Sheets**



## U.S. PATENT DOCUMENTS

4,566,100	A	1/1986	Mizuno et al.
5,023,873	A	6/1991	Stevens et al.
5,128,619	A	7/1992	Bjork et al.
5,313,197	A	5/1994	Barr et al.
5,361,293	A	11/1994	Czerwiec
5,388,252	A	2/1995	Dreste et al.
5,608,643	A	3/1997	Wichter et al.
5,612,960	A	3/1997	Stevens et al.
5,864,602	A	1/1999	Needle
5,964,891	A	10/1999	Caswell et al.
6,073,179	A	6/2000	Liu et al.
6,075,821	A	6/2000	Kao et al.
6,175,934	B1	1/2001	Hershey et al.
6,188,717	B1	2/2001	Kaiser et al.
6,219,378	B1	4/2001	Wu
6,249,543	B1	6/2001	Chow
6,404,774	B1	6/2002	Jenness
6,411,678	B1	6/2002	Tomlinson, Jr. et al.
6,445,773	B1	9/2002	Liang et al.
6,449,307	B1	9/2002	Ishikawa et al.
6,512,789	B1	1/2003	Mirfakhraei
6,631,120	B1	10/2003	Milbrandt
6,633,545	B1	10/2003	Milbrandt
6,636,603	B1	10/2003	Milbrandt
6,658,052	B2	12/2003	Krinsky et al.
6,725,176	B1	4/2004	Long et al.
6,781,513	B1	8/2004	Korkosz et al.
7,570,686	B2	8/2009	Krinsky et al.
7,835,430	B2	11/2010	Krinsky et al.
7,889,784	B2	2/2011	Krinsky et al.
2010/0226418	A1	9/2010	Krinsky et al.
2011/0103443	A1	5/2011	Krinsky et al.

## FOREIGN PATENT DOCUMENTS

JP	60-206346	10/1985
JP	Hei6-003956	1/1994
JP	A-Hei10-513622	12/1998
JP	A-Hei11-508417	7/1999
JP	A-Hei11-261665	9/1999
JP	A-Hei11-317723	11/1999
WO	WO 86/07223	12/1986
WO	WO 96/24995	8/1996
WO	WO 97/01256	1/1997
WO	WO 97/01900	1/1997
WO	WO 99/18701	4/1999
WO	WO 99/20027	4/1999
WO	WO 99/26375	5/1999
WO	WO 99/63427	12/1999
WO	WO 99/67890	12/1999
WO	WO 00/64130	10/2000

## OTHER PUBLICATIONS

Cioffi, John M., ADSL Maintenance with DMT, T1E1.4 ADSL Project, Amati Communications Corporation, Dec. 1, 1992, pp. 1-14.

Lewis et al., "Extending Trouble Ticket System to Fault Diagnostics," IEEE Network, IEEE Inc. New York, US, Nov. 1, 1993, pp. 44-51, XP 000575228.

"Asymmetric Digital Subscriber Line (ADSL) Transceivers," ITU-T G.992.1, Jun. 1999, pp. 91-117, 125, 126, 131, 132.

ITU-T Recommendation G.992.2, "Splitterless asymmetric digital subscriber line (ADSL) transceivers," International Telecommunication Union, Jun. 1999, 179 pages.

ITU-T Recommendation G.994.1, "Handshake procedures for digital subscriber line (DSL) transceivers," International Telecommunication Union, Jun. 1999, 56 pages.

International Search Report for PCT/US01/00418 dated Jul. 16, 2001, 4 pages.

Written Opinion for International (PCT) Patent Application No. PCT/US01/00418, mailed Jan. 18, 2002, 2 pages.

International Preliminary Examination Report for International (PCT) Patent Application No. PCT/US01/00418, completed Mar. 9, 2002, 2 pages.

Examiner's First Report for Australian Patent Application No. 27669/01, dated Apr. 2, 2004.

Notice of Acceptance for Australian Patent Application No. 27669/01, dated Aug. 6, 2004.

Examiner's First Report for Australian Patent Application No. 2004203321, dated Nov. 16, 2006.

Notice of Acceptance for Australian Patent Application No. 2004203321, dated Aug. 7, 2008.

Examiner's First Report for Australian Patent Application No. 2008203520, mailed Mar. 9, 2009.

Notice of Acceptance for Australian Patent Application No. 2008203520, mailed Jul. 9, 2009.

Examination Report for Australian Patent Application No. 2009222537, dated Mar. 21, 2011.

Examination Report for Australian Patent Application No. 2009222537, dated May 27, 2011.

Notice of Acceptance for Australian Patent Application No. 2009222537, dated Aug. 25, 2011.

Official Action for Canadian Patent Application No. 2,394,491, mailed Nov. 24, 2009.

Notice of Allowance for Canadian Patent Application No. 2,394,491, dated Jul. 16, 2010.

Official Action for Canadian Patent Application No. 2,726,826, dated Jun. 30, 2011.

Notice of Allowance for Canadian Patent Application No. 2,726,826, dated Mar. 1, 2012.

Official Action for European Patent Application No. 01901808.4, mailed Dec. 1, 2004.

Official Action for European Patent Application No. 01901808.4, mailed Sep. 14, 2005.

Communication about intention to grant a European patent for European Patent Application No. 01901808.4, mailed May 15, 2006.

European Search Report for European Patent Application No. EP 06022008 completed Jan. 8, 2007.

Official Action for European Patent Application No. EP 06022008.4, mailed Sep. 20, 2007.

Official Action for European Patent Application No. EP 06022008, dated Apr. 23, 2010.

Official Action for European Patent Application No. EP 06022008, mailed Jul. 7, 2010.

Communication Under Rule 71(3) EPC for European Patent Application No. EP 06022008, dated Apr. 4, 2011.

Notification of Reasons (including translation) for Refusal for Japanese Patent Application No. 2001-552611, Dispatched Date: Dec. 7, 2009.

Official Action (including translation) for Japanese Patent Application No. 2001-552611, mailed Aug. 2, 2010.

Official Action (including translation) for Japanese Patent Application No. 2001-552611, mailed Mar. 28, 2011.

Official Action (including translation) for Japanese Patent Application No. 2008-191051, mailed Jul. 26, 2010.

Notice of Allowance for Japanese Patent Application No. 2008-190051, mailed Mar. 14, 2011.

Decision to Grant Patent (including translation) for Korean Patent Application No. 10-2002-7008794, dated Dec. 1, 2006.

Official Action for U.S. Appl. No. 09/755,173, mailed Jun. 20, 2002.

Official Action for U.S. Appl. No. 09/755,173, mailed Sep. 24, 2002.

Official Action for U.S. Appl. No. 09/755,173, mailed Mar. 14, 2003.

Notice of Allowance for U.S. Appl. No. 09/755,173, mailed Jul. 1, 2003.

Official Action for U.S. Appl. No. 10/619,691, mailed Oct. 31, 2006, 14 pages.

Official Action for U.S. Appl. No. 10/619,691, mailed Mar. 30, 2007, 11 pages.

Official Action for U.S. Appl. No. 10/619,691, mailed Jun. 13, 2008, 7 pages.

Official Action for U.S. Appl. No. 10/619,691, mailed Oct. 20, 2008, 11 pages.

## US 8,432,956 B2

Page 3

---

Supplemental Notice of Allowability for U.S. Appl. No. 10/619,691, mailed Jul. 6, 2009, 5 pages.

Official Action for U.S. Appl. No. 12/477,742, mailed Jun. 8, 2010, 10 pages.

Official Action for U.S. Appl. No. 12/477,742, mailed Aug. 16, 2010, 9 pages.

Notice of Allowance for U.S. Appl. No. 12/477,742, mailed Sep. 7, 2010, 6 pages.

Office Action for U.S. Appl. No. 12/779,660, mailed Mar. 19, 2012.

Notice of Allowance for U.S. Appl. No. 12/779,660, mailed Apr. 26, 2012.

Official Action for U.S. Appl. No. 12/779,708, mailed Sep. 29, 2010, 6 pages.

Official Action for U.S. Appl. No. 12/779,708, mailed Dec. 15, 2010, 6 pages.

Notice of Allowance for U.S. Appl. No. 12/779,708, mailed Jan. 3, 2011, 6 pages.

Official Action (including translation) for Japanese Patent Application No. 2011-012155 mailed Jun. 4, 2012.

Official Action for U.S. Appl. No. 13/004,254, mailed Dec. 4, 2012.

Decision of Refusal (including translation) for Japanese Patent Application No. 2011-012155, mailed Feb. 25, 2013.

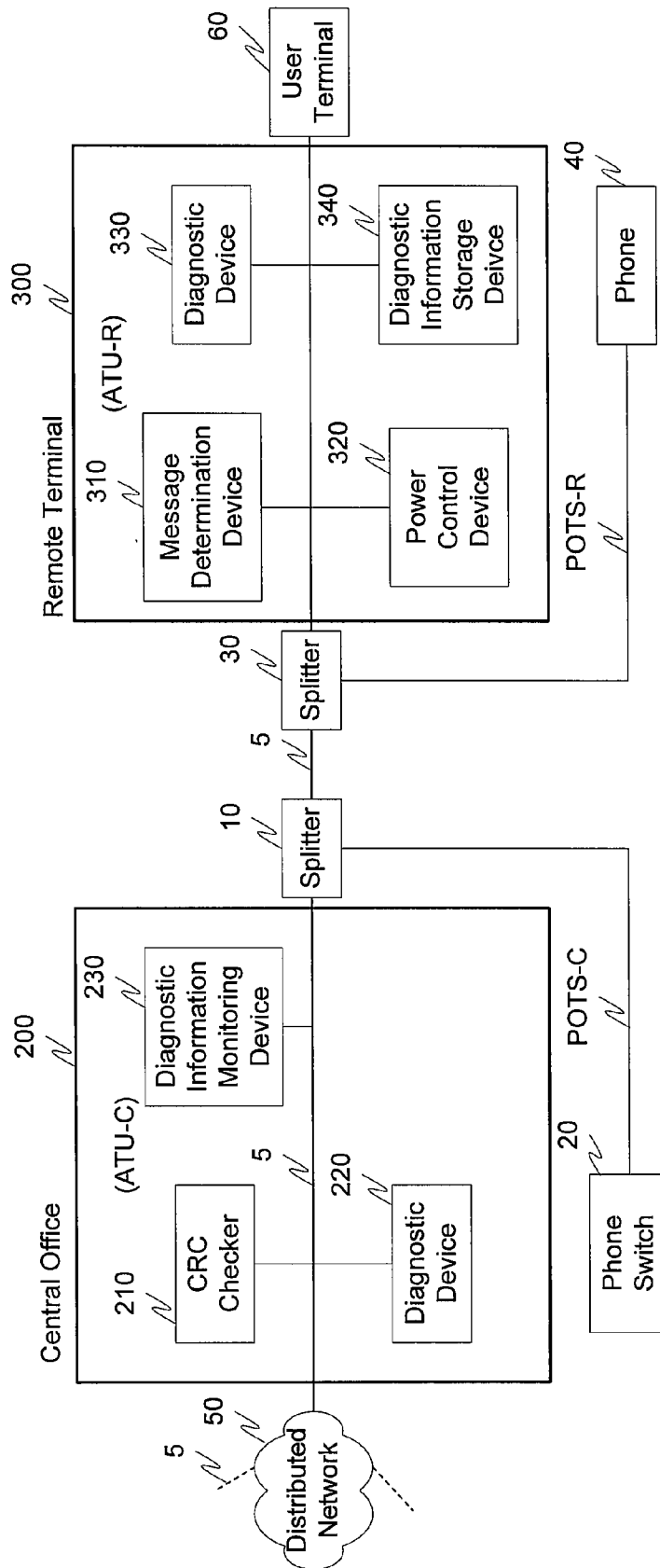


Fig. 1

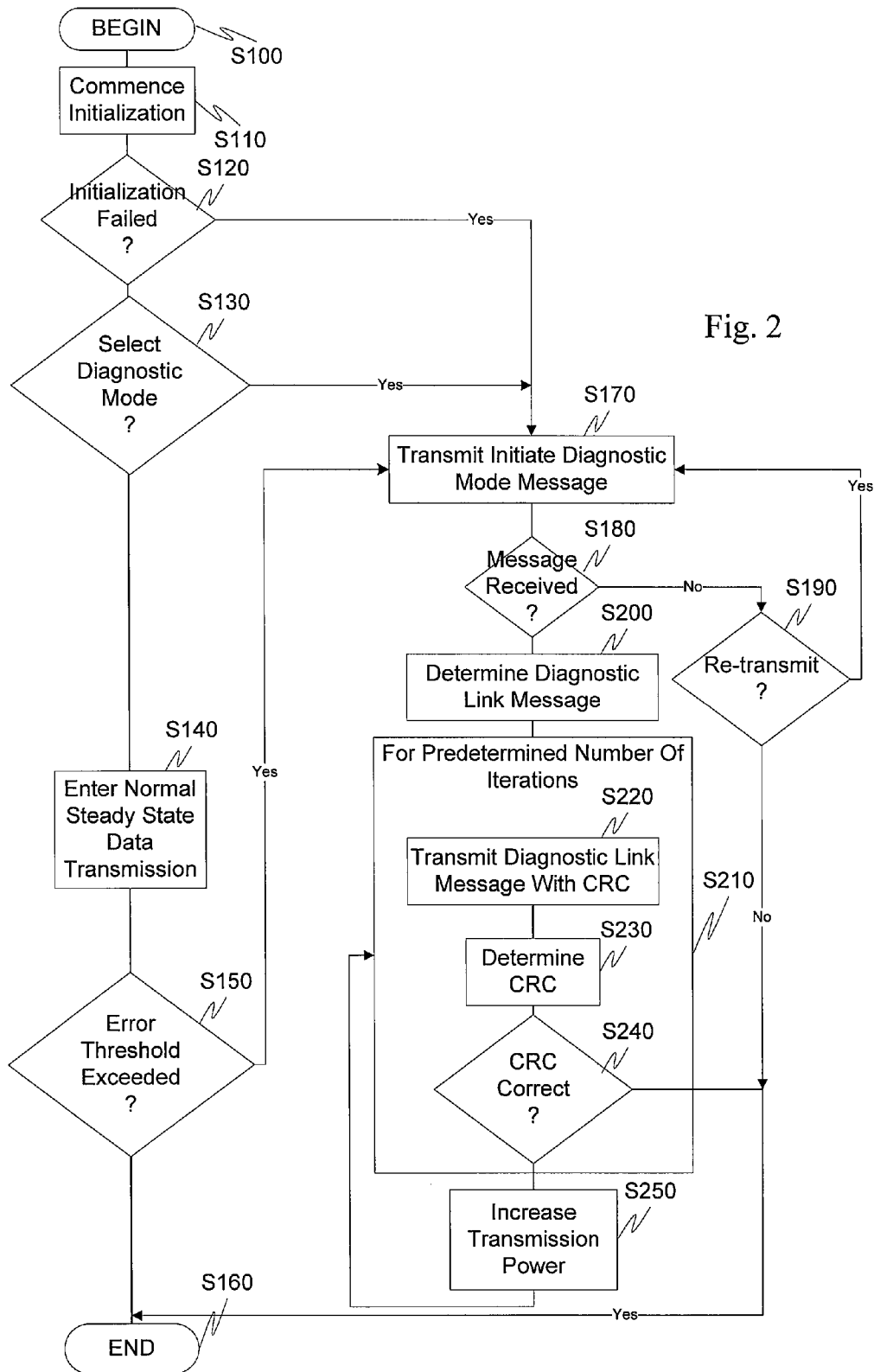


Fig. 2

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.