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# (12) United States Patent

Ewing et al.

# (54) NETWORK REMOTE POWER MANAGEMENT OUTLET STRIP

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U.S.C. 154(b) by 260 days.

This patent is subject to a terminal dis-

claimer.

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#### Related U.S. Application Data

- (63) Continuation-in-part of application No. 09/930,780, filed on Aug. 15, 2001, now Pat. No. 7,043,543, which is a continuation-in-part of application No. 09/732,557, filed on Dec. 8, 2000, now Pat. No. 7,099,934, which is a continuation-in-part of application No. 09/375,471, filed on Aug. 16, 1999, now Pat. No. 6,711,613, which is a continuation-in-part of application No. 08/685,436, filed on Jul. 23, 1996, now Pat. No. 5,949,974.
- (51) **Int. Cl. G06F 15/173** (2006.01) **G06F 1/26** (2006.01)

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See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

4,051,326 A 9/1977 Badagnani et al.

(Continued)

FOREIGN PATENT DOCUMENTS

WO PCT/US91/08543 5/1993

OTHER PUBLICATIONS

American Power Conversion, "Call-UPSa", 1991, #996-0070, APC, West Kingston, RI 02892 USA.

(Continued)

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(57) ABSTRACT

A vertical-mount network remote power management outlet strip embodiment of the present invention comprises a long, thin outlet strip body with several independently controllable power outlet sockets distributed along its length. A power input cord is provided at one end, and this supplies AC-operating power to relays associated with each of the power outlet sockets. The relays are each addressably controlled by a microprocessor connected to an internal I2C-bus serial communications channel. The power-on status of each relay output to the power outlet sockets is sensed and communicated back on the internal I2C-bus. A devicenetworking communications processor with an embedded operating system translates messages, status, and controls between the internal I2C-bus and an Ethernet port, and other external networks.

#### 21 Claims, 8 Drawing Sheets





#### U.S. PATENT DOCUMENTS

4,101,878	A	7/1978	Shimizu et al.
4,206,444	A	6/1980	Ferlan
4,356,545	A	10/1982	West
4,442,319	A	4/1984	Treidl
4,495,568	$\mathbf{A}$	1/1985	Gilbert et al.
4,611,289	A	9/1986	Coppola
4,647,721	$\mathbf{A}$	3/1987	Busam et al.
4,701,946	A	10/1987	Oliva et al.
4,709,318	A	11/1987	Gephart et al.
4,780,714	A	10/1988	Moustakas et al.
4,937,561	A	6/1990	Sasaki et al.
5,198,806	A	3/1993	Lord
5,319,571	A	6/1994	Langer et al.
5,374,922	A	12/1994	Ebersohl
5,410,713	A	4/1995	White et al.
5,412,645	A	5/1995	Younkin et al.
5,481,730	A	1/1996	Brown et al.
5,485,576	A	1/1996	Fee et al.
5,495,607	A	2/1996	Pisello et al.
5,506,573	$\mathbf{A}$	4/1996	Ewing et al.
5,561,769	A	10/1996	Kumar et al.
5,585,678	A	12/1996	Dijk et al.
5,596,628	A	1/1997	Klein
5,652,893	A	7/1997	Ben-Meir et al.
5,717,934	A	2/1998	Pitt et al.
5,761,084	A	6/1998	Edwards
5,781,434	A	7/1998	Tobita et al.
5,862,391	A	1/1999	Salas et al.
6,445,087	B1 *	9/2002	Wang et al 307/40
6,476,729	B1 *	11/2002	Liu 340/870.11
6,507,273	B1*	1/2003	Chang et al 340/3.1
2002/0052940	A1*	5/2002	Myers et al 709/223
2005/0052814	A1*	3/2005	McNally et al 361/166

### OTHER PUBLICATIONS

American Power Conversion, "Measure-UPSa", Mar. 1993, #996-0127, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Introducing the UPS to build your business on . . . ", Oct. 1993, #996-0207-A, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Application Note #A2", Oct. 1993, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Application Note #A6", Oct. 1993, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Internetworking Power Protection", Jan. 1994, # 996-0295, APC, West Kingston, RI 02892 USA.

American Power Conversion, "PowerNet<sup>a</sup> SNMP Adapter", Jan. 1994, #996-0126, APC, West Kingston, RI 02892 USA

American Power Conversion, "Solutions '94", Feb. 1994, #996-0131, APC, West Kingston, RI 02892 USA

American Power Conversion, "APC NetShelter", 1995, #996-0643-A, APC, West Kingston, RI 02892 USA.

American Power Conversion, "PowerNet", Sep. 1995, #996-0325b, APC, West Kingston, RI 02892 USA.

American Power Conversion, "APC Smart-UPS RM", 1996, #996-0618-B, APC, West Kingston, RI 02892 USA.

American Power Conversion, "APC Smart-UPS XL", 1996, #996-0630-B, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Smart-UPS", 1996, #996-0386-E,

APC, West Kingston, RI 02892 USA. American Power Conversion, "PowerChute plus", 1996, #996-

0041-C, APC, West Kingston, RI 02892 USA. American Power Conversion, "Internetworking Power Protection",

1996, #996-0295-B, APC, West Kingston, RI 02892 USA American Power Conversion, "UPS Accessories", 1996, #996-

0411-C, APC, West Kingston, RI 02892 USA.

American Power Conversion, "Application Notes", Oct. 1996, #996-0495-C, APC, West Kingston, RI 02892 USA.

American Power Conversion, "PowerNet", 1998, #996-0325D,

B. Ewing and J. Mallory, "Power-On/Off-Product Information", 1990, Server Technology, Inc., Reno, Nevada.

Raphael Needleman, "Power-On/Off Lets You Turn on Remote PCs by Phone", Feb. 1991, Info World Impressions, V. 13, Issue 5.

Server Technology, Inc., "Any-To-Any Matrix Communications Switch", 1996, Server Technology, Inc. Reno, Nevada.

Server Technology, Inc., "Sentry Ambassador", 1996, Server Technology, Inc. Reno, Nevada.

Server Technology, Inc., "LAN WAN, Enterprise, Internet Access Equipment", 1996, Server Technology, Inc., Reno, Nevada. Server Technology, Inc., "SENTRYRACK", 1996, Server Technol-

ogy, Inc., Reno, Nevada.

Server Technology, Inc., "SENTRYINTERNATIONAL", 1996, Server Technology, Inc., Reno, Nevada.

Server Technology, Inc. "SENTRY Communications and User Interface", 1996, Server Technology, Inc., Reno, Nevada.

Server Technology, Inc., "SENTRYSHELF", 1996, Server Technology, Inc., Reno, Nevada.

Server Technology, Inc., "SENTRY Power Modules", 1996, Server

Technology, Inc., Reno, Nevada. Server Technology, Inc., "SENTRY ShutDown Remote Power Manager", 1997, Server Technology, Inc., Reno, Nevada.

Server Technology, Inc., "SENTRY Administrator R-450 Remote Power Manager", 1999, Server Technology, Inc., Reno, Nevada. Server Technology, Inc., "How Do You ReBoot Remote Equip-

ment?", 1999, Server Technology, Inc., Reno, Nevada Server Technology, Inc., "SENTRY R-2000 Remote Power Man-

ager", 1999, Server Technology, Inc., Reno, Nevada. Server Technology, Inc., "MasterSwitcha", 1996, Server Technol-

ogy, Inc., Reno, Nevada. W. Richard Stevens. "TCP/IP Illustrated, vol. 1-The Protocols",

pp. 359-361, 1994.

Michael Slater. "Microprocessor-Based Design—A Comprehensive Guide to Hardware Design", pp. 19-24, 1989

Peter Drake. "Using SNMP to Manage Networks", pp. 2/1-2/4,

Novak, T. "Remote Management of Individual Power Supplies", netman.cit.buffalo.edu/CDN-M, p. 1, May 10, 1995.

Uninteruptable Power Source FAQ, v. 1.0, pp. 1-10, Feb. 10, 1994. Davison, M., et al. UPS Management Information Base, Internet Draft, IETF, pp. 1-28, May 13, 1992.

Sentry Ambassador Remote Power Manager © 1996.

Sentry R-2000 Remote Power Manager © 2001.

Sentry 110/230 VAC Product Family © 2000.

Sentry Power Manager—48 VDC Product Family © 2000.

Distributed Power Module Product List, Sep. 23, 2002.

Sentry Power Modules © 1999.

Sentry Power Tower Products © 2001/2002.

Sentry Expanded Function Power Tower (PTEF) © 2001/2002.

Sentry Serial Power Tower (PTSS) © 2001/2002.

Sentry Power Tower Power Distribution © 2001/2002.

Sentry Commander R-400 Remote Power Mgr. © 2001/2002.

Sentry Commander R-400 Remote Pwr. Mgr. Datasheet © 1999.

Sentry Administrator R-450 © 2001/2002.

Sentry Administrator R-450 Remote Pwr. Mgr. © 1998.

Remote Power On/Off, Installation and Operations Manual, © 1991.

Sentry Remote Power Manager brochure © 1991.

Power-On product wrapper © 1991.

Remote Power On/Off product wrapper © 1991.

Intelligent Power Module © 1991.

Local and Remote Power On/Off Alternatives © 1991.

New Box Specification, dated Mar. 6, 1991.

RPM-15 Power Module Specification, Mar. 18, 1991.

Sentry Remote Power Manager, Operational Instructions, Sep. 24,

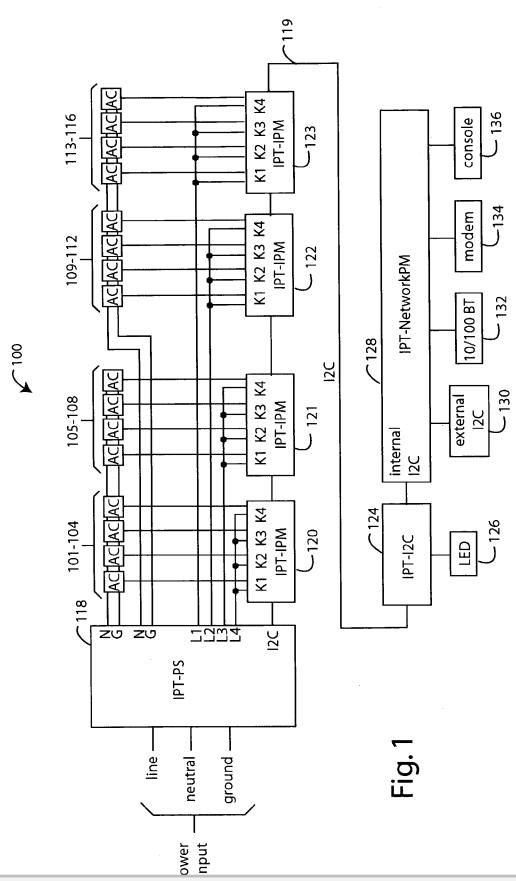
"Keeping Up With . . . ", Internet Telephony, Mar. 2000, pp. 84-87.

"Rebooting Across the Net", PC Magazine, May 5, 1998.

"Server Technology Sentry R-2000", PC Magazine, May 5, 1998.

"APC MasterSwitch", PC Magazine, May 5, 1998.







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