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Austerman, III et al.

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(54) **SYSTEM FOR COMMUNICATING WITH ELECTRONIC EQUIPMENT**

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Related U.S. Application Data

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(51) **Int. Cl.**[7] **H04L 12/12**; G08B 13/14
(52) **U.S. Cl.** **370/241**; 340/568.1
(58) **Field of Search** 370/527, 252, 370/241, 242, 445, 446, 419, 420, 421, 463, 426; 340/568.2, 568.4, 568.1, 571, 572.1, 687, 573.4, 573.1, 505, 506; 375/222

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,359,379	A	12/1967	Pullum et al.	
3,407,400	A	10/1968	Lurie	340/517
3,408,643	A	10/1968	Sliman	340/568.1
3,537,095	A	10/1970	Cones	340/517
3,696,378	A	10/1972	Daniel	340/568.2
3,794,989	A	2/1974	Manley et al.	340/517
3,863,036	A	1/1975	McCrudden	
3,932,857	A	1/1976	Way et al.	340/568.2
4,121,201	A	10/1978	Weathers	
4,156,799	A	5/1979	Cave	
4,230,912	A	10/1980	Lee et al.	
4,273,955	A	6/1981	Armstrong	178/69 G
4,340,788	A	7/1982	Sbuelz	370/250
4,495,494	A	1/1985	McCune	

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

SE	WO 96/29638	9/1996
SE	WO 97/09667	3/1997
WO	PCT/IB96/00223	1/1996

OTHER PUBLICATIONS

"Integrated Services Digital Network (ISDN)", International Telecommunication Union, vol. III, Fascicle III.8, pp. 175–176 and 204–209 (Nov. 14–25, 1988).
Track–It for Windows, 3 pages.
Visual Audit Pro, 2 pages.

(List continued on next page.)

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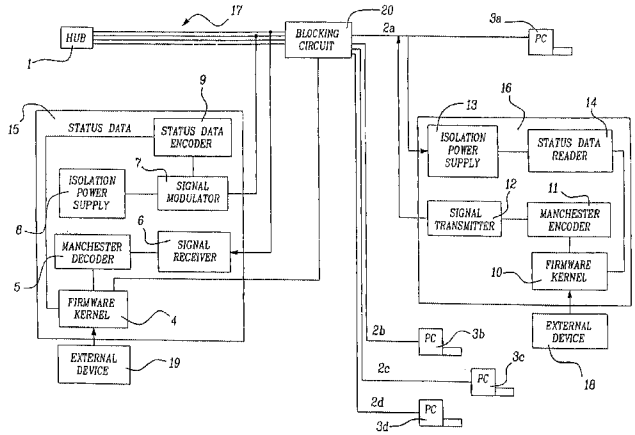
(57) **ABSTRACT**

In accordance with the teachings of the present invention, a communication system **(17)** is provided for generating and monitoring data over pre-existing conductors **(2A–2D)** between associated pieces of networked computer equipment **(3A–3D)**. The system includes a communication device **(12)** attached to the electronic equipment that transmits information to a central module **(15)** by impressing a low frequency signal on the pre-existing data lines of the remotely located equipment. A receiver **(6)** in the central module **(15)** monitors the low frequency data on the data lines to determine the transmitted information of the electronic equipment. The communication device may also be powered by a low current power signal from the central module **(15)**. The power signal to the communication device may also be fluctuated to provide useful information, such as status information, to the communication device. Relocation of the electronic equipment with attached communication device to another location on the network is detected immediately and may be used to update a database. This invention is particularly adapted to be used with an existing Ethernet communications link or equivalents thereof.

20 Claims, 13 Drawing Sheets



U.S. PATENT DOCUMENTS

4,617,656	A	*	10/1986	Kobayashi et al.	370/445
4,631,367	A		12/1986	Coviello et al.	
4,636,771	A		1/1987	Ochs	
4,654,640	A	*	3/1987	Carll et al.	340/568.2
4,670,902	A		6/1987	Naiwirt	
4,674,084	A		6/1987	Suzuki et al.	370/509
4,719,616	A		1/1988	Akano	370/527
4,731,829	A		3/1988	Bonnet et al.	
4,733,223	A		3/1988	Gilbert	340/505
4,733,389	A		3/1988	Puvogel	
4,736,195	A		4/1988	McMurtry et al.	
4,760,382	A		7/1988	Faulkner	340/568.2
4,782,322	A		11/1988	Lechner et al.	340/310.02
4,813,066	A		3/1989	Holtz et al.	
4,896,315	A		1/1990	Felker et al.	370/252
4,935,959	A		6/1990	Markovic et al.	
5,034,723	A		7/1991	Maman	340/568.2
5,034,978	A		7/1991	Nguyen et al.	
5,136,580	A		8/1992	Videlock et al.	
5,142,269	A		8/1992	Mueller	
5,144,544	A		9/1992	Jenneve et al.	
5,231,375	A		7/1993	Sanders et al.	340/568.2
5,243,328	A		9/1993	Lee et al.	
5,301,246	A	*	4/1994	Archibald et al.	375/222
5,365,515	A		11/1994	Graham	
5,406,260	A		4/1995	Cummings et al.	340/568.2
5,578,991	A		11/1996	Scholder	
5,675,321	A		10/1997	McBride	340/568.2
5,692,917	A		12/1997	Rieb et al.	439/225
5,715,174	A		2/1998	Cotichini et al.	
5,821,868	A		10/1998	Kuhling	
5,929,778	A	*	7/1999	Asama et al.	340/10.51
5,963,557	A	*	10/1999	Eng	370/432
6,021,493	A	*	2/2000	Cromer et al.	713/200
6,064,305	A		5/2000	Lockyer	
6,130,894	A	*	10/2000	Ojard et al.	370/421
6,147,603	A		11/2000	Rand	340/568.2
6,172,606	B1		1/2001	Lockyer	340/568.2
6,344,794	B1	*	2/2002	Ulrich et al.	340/573.1

OTHER PUBLICATIONS

Lavoisard, J.L. et al, Les Installations Terminales D'Abonnes, Commutation & Transmission No. 3, 1987, pp. 35–50.

An Interoperable Solution for FDDI Signaling Over Shielded Twisted Pair, Advanced Micro Devices, Inc., May 21, 1991, 9 pgs.

FDDI on Copper with AMD PHY, Advanced Micro Devices, 1991, 8 pgs.

Information Processing Systems—Fibre Distributed Data Interface (FDDI) Part 1: Token Ring Physical Layer Protocol (PHY), Global Engineering Documents, 1989, 38 pgs.

Information Processing Systems—Fibre Distributed Data Interface (FDDI) Part 3: Physical Layer Medium Dependent, Global Engineering Documents, 1989, 55 pgs.

Information Processing Systems—Fibre Distributed Data Interface (FDDI) Part 2: Token Ring Media Access Control (MAC), Global Engineering Documents, 1989, 75 pgs.

"Attachment Module Guide for the IBM Token–Ring Network", IBM, Apr. 1992.

"Token Ring Access Method", The Institute of Electrical and Electronics Engineers, Inc., 1985, 80 pages.

LattisNet System 3000 Ethernet Connectivity Guide, SynOptics Communications, Inc., Sep. 1991, 19 pages.

Stallings, William, Local Networks (Second Edition), 435 pages.

FDDI Metallic Media—Shielded Twisted Pair Physical Layer Medium Dependent, British Telecom, Oct. 15, 1991.

Letter of Assurance Process Flowchart, IEEE, 2 pages.

IEEE–SA Standards Board Bylaws, 3 pages.

Keller, R. et al, "Performance Bottlenecks in Digital Movie Systems", Proceedings of the 4th International Workshop on Network and Operating System Support for Digital Audio and Video, Lancaster, U.K., Nov. 1993, 13 pages.

LattisNet System 3000 Ethernet Connectivity Guide, SynOptics Communications, Inc., Sep. 1991, 12 pages.

Chapter I LattisNet Operation, Ethernet Connectivity Guide, 145 pages.

LattisNet System 3000 Ethernet Connectivity Guide, Sep. 1991, 19 pages.

Technical Response Center, Technical Tip, Bay Networks, 2 pages.

LattisNet System 3000 Ethernet Connectivity Guide, Sep. 1991, 7 pages.

Local Area Networks, Managing the Physical Layer, International Data Corporation, Mar. 1990, 36 pages.

Levine, Judity, FDDI Spec Consortium, 21 pages.

Stallings, William, Local Networks, An Introduction.

An Interoperable Solution for FDDI Signaling Over Shielded Twisted Pair, Advanced Micro Devices, May 21, 1991, 25 pages.

Token Ring Network Architecture Reference, IBM, 15 pages.

Reference Data for Engineers: Radio, Electronics, Computer and Communications, 1989, 17 pages.

IEEE Network Magazine, vol. 1, No. 1, Jan. 1987, 30 pages.

System Consideration for Multisegment 10 Mb/s Baseband Networks, (Section 13) and Twisted Pair Medium Attachment Unit (MAU) and Baseband Medium, Type 10BASE–T (Section 14), 33 pages.

* cited by examiner

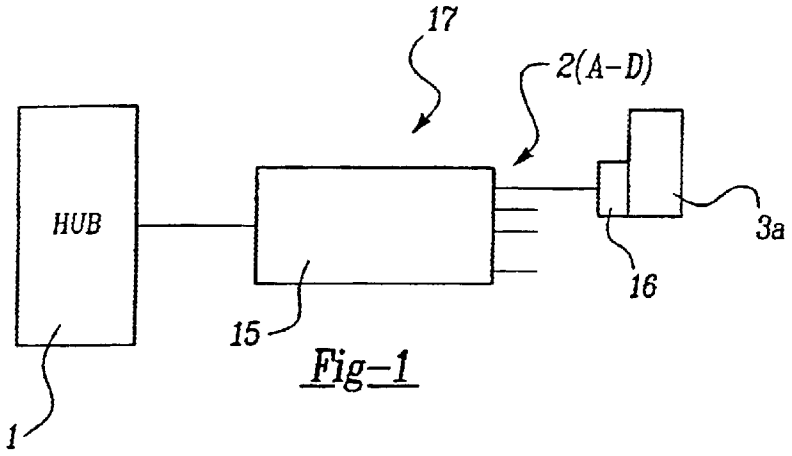


Fig-1

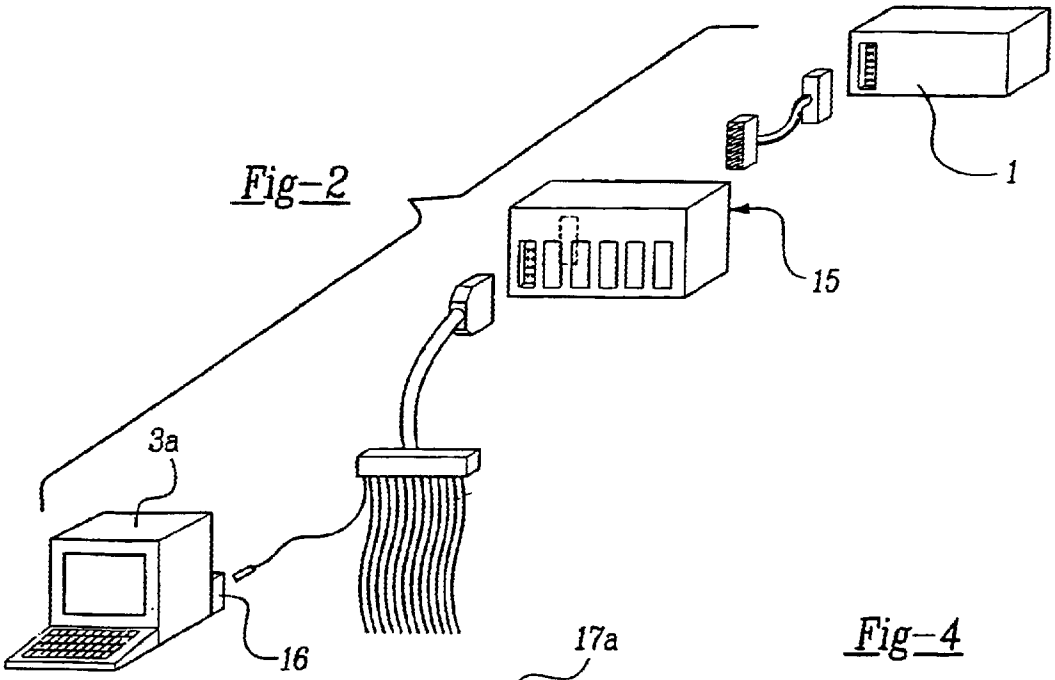
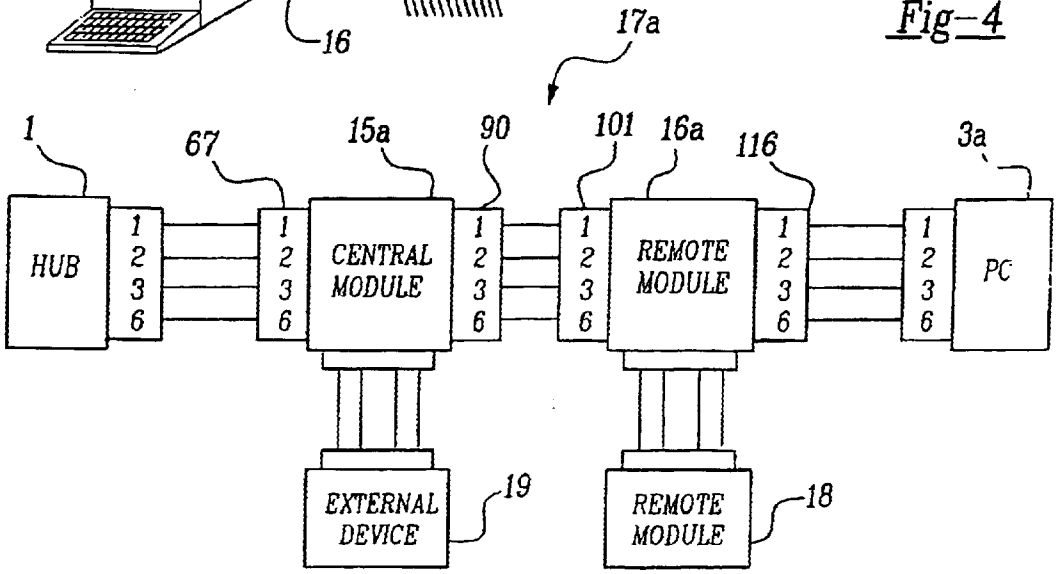


Fig-2

Fig-4



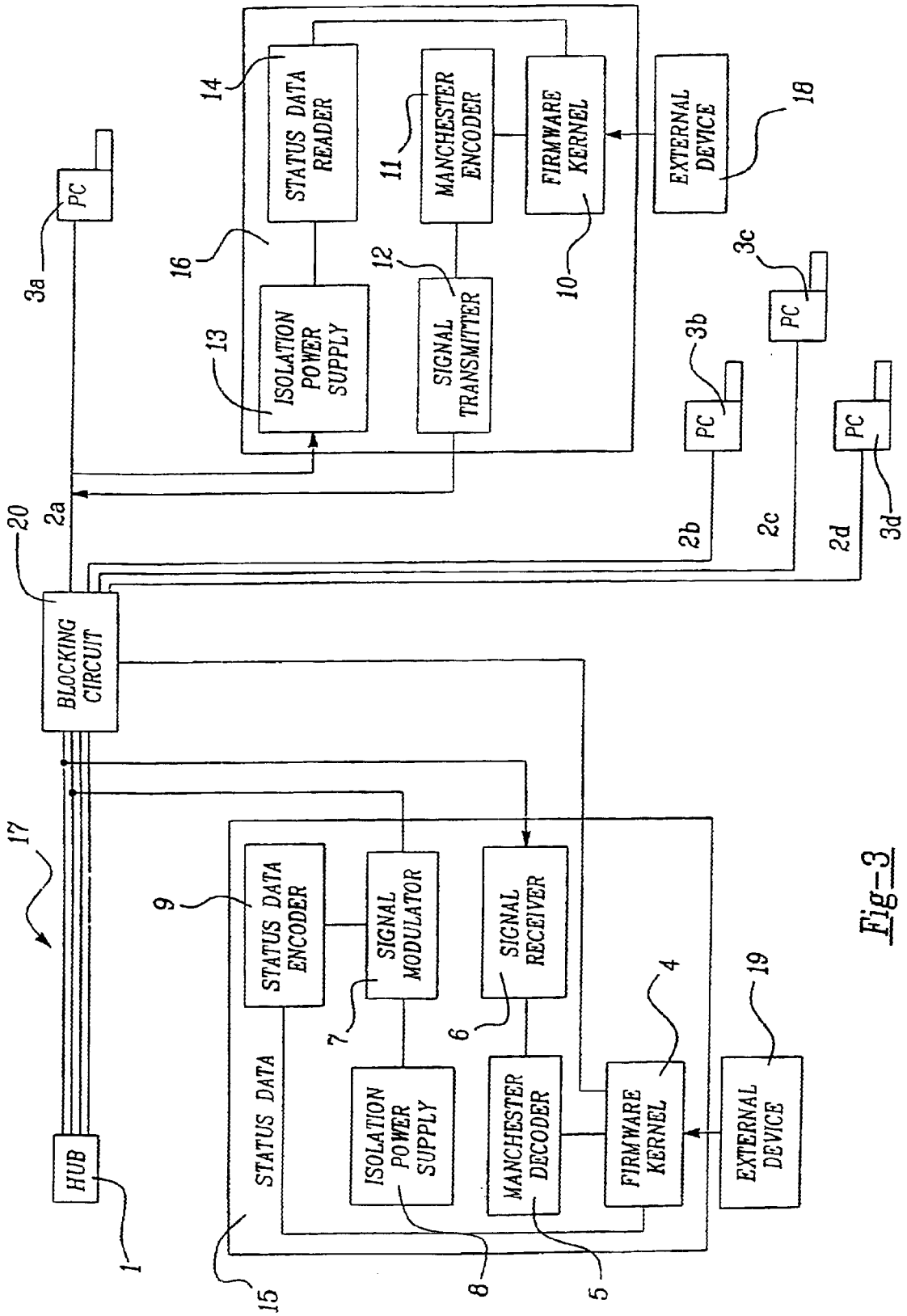


Fig-3

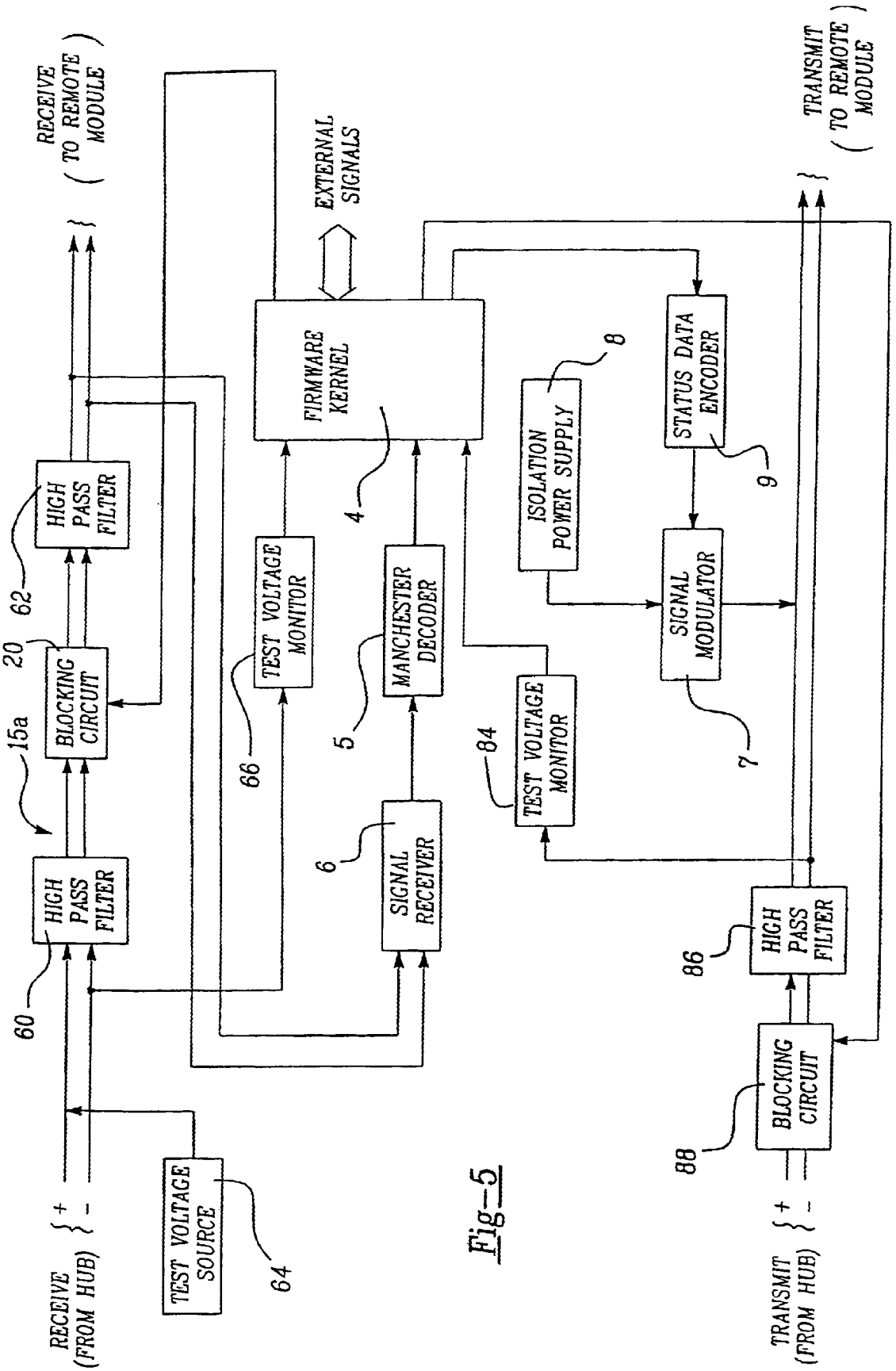


Fig-5

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