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(54) **COMMUNICATIONS WEBS WITH PERSONAL COMMUNICATIONS LINKS FOR PSTN SUBSCRIBERS**

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(*) 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.

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Related U.S. Application Data

(63) Continuation-in-part of application No. 08/843,200, filed on Apr. 16, 1997, now Pat. No. 6,058,104, which is a continuation of application No. 08/709,597, filed on Sep. 9, 1996, now Pat. No. 5,805,582, which is a continuation of application No. 08/262,214, filed on Jun. 17, 1994, now Pat. No. 5,555,258.

(51) **Int. Cl.**⁷ **H04J 15/00**

(52) **U.S. Cl.** **370/352; 370/338**

(58) **Field of Search** 455/422, 557, 455/558, 517, 419, 420, 421; 370/328, 338, 493, 536, 537, 535, 542, 352, 401, 419; 375/220, 222, 257

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,949,172 A 4/1976 Brown et al.

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

CA	2053776	4/1993
EP	1 049 342 A2	3/1998
EP	0 918 423	5/1999

(List continued on next page.)

OTHER PUBLICATIONS

European Search Report in related Application EP 00 11 7222.

(List continued on next page.)

Primary Examiner—Ajit Patel

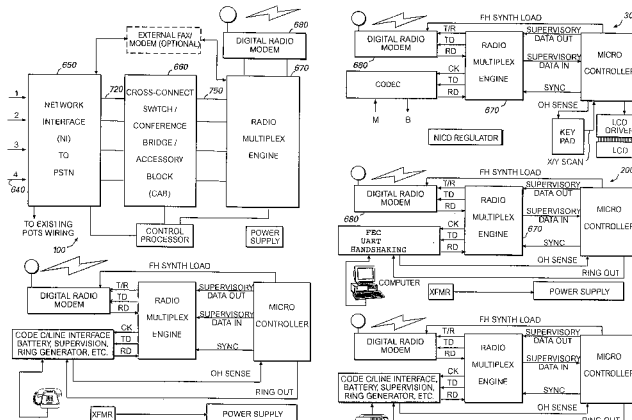
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(57) **ABSTRACT**

Systems for connecting telecommunications infrastructure lines to telephones, handsets, computers, teletype machines and other end user interfaces or consumer electronics devices in a residence or business. Systems according to the present invention include Network Control Units which form the center of a star topology and which communicate via RF link with Wireless Access Units and handsets. Wireless Access Units feature an interface, such as, for example, a standard telephone jack, for accommodating a telephone, a fax machine, a compute modem or other device. Computers or other devices may also be accommodated by Wireless Access Units having other physical and virtual interfaces, including, for instance, serial ports or network interfaces. The Wireless Access Units may also be digital to accommodate ISDN or any other digital standard. Wireless control/monitoring accessories may also be employed to communicate with the Network Control Unit and provide additional functionality such as entrance monitoring, baby monitoring, HVAC control and other services. Personal Communication Links provide wireless handset and speakerphone services. The Personal Communication Links include independent talk/listen paths from the unit to the Network Control Unit. In addition, each Personal Communication Link includes circuitry for automatically adjusting from high-volume/high-microphone sensitivity for speakerphone operation to low-volume/low-microphone sensitivity for conventional handset operation.

29 Claims, 20 Drawing Sheets



U.S. PATENT DOCUMENTS

4,058,678	A	11/1977	Dunn et al.	
4,456,793	A	6/1984	Baker et al.	
4,475,193	A	10/1984	Brown	
4,479,033	A	10/1984	Brown et al.	
4,514,594	A	4/1985	Brown et al.	
4,523,307	A	6/1985	Brown et al.	
4,658,096	A	4/1987	West, Jr. et al.	
4,675,863	A	6/1987	Paneth et al.	
4,737,975	A	4/1988	Shafer	
4,775,997	A	10/1988	West, Jr. et al.	
4,776,001	A	10/1988	Murata et al.	
4,779,262	A	10/1988	Avis et al.	
4,785,450	A	11/1988	Bolgiano et al.	
4,792,946	A	12/1988	Mayo	
4,817,089	A	3/1989	Paneth et al.	
4,825,448	A	4/1989	Critchlow et al.	
4,893,317	A	1/1990	Critchlow et al.	
4,912,705	A	3/1990	Paneth et al.	
4,922,517	A	5/1990	West, Jr. et al.	
4,994,802	A	2/1991	Critchlow et al.	
5,008,900	A	4/1991	Critchlow et al.	
5,022,024	A	6/1991	Paneth et al.	
5,072,308	A	12/1991	Lin et al.	
5,101,418	A	3/1992	Critchlow et al.	
5,119,375	A	6/1992	Paneth et al.	
5,121,391	A	6/1992	Paneth et al.	
5,146,473	A	9/1992	Critchlow et al.	
5,159,705	A	10/1992	Critchlow et al.	
5,168,507	A	12/1992	Critchlow et al.	
5,177,741	A	1/1993	Critchlow et al.	
5,212,830	A	5/1993	Miller	
5,224,120	A	6/1993	Schilling	
5,228,053	A	7/1993	Miller et al.	
5,228,056	A	7/1993	Schilling	
5,260,941	A	11/1993	Wilder et al.	
5,260,967	A	11/1993	Schilling	
5,263,045	A	11/1993	Schilling	
5,274,665	A	12/1993	Schilling	
5,276,703	A	1/1994	Budin et al.	
5,289,497	A	2/1994	Jacobson et al.	
5,299,226	A	3/1994	Schilling	
5,307,399	A	4/1994	Dai et al.	
5,327,478	A	7/1994	Lebowitz	379/40
5,361,294	A	11/1994	Lee et al.	
5,381,446	A	1/1995	McIntosh	
5,384,826	A	1/1995	Amitay	
5,416,778	A	5/1995	Chan et al.	
5,497,373	A	3/1996	Hulen et al.	
5,533,027	A	7/1996	Akerberg et al.	
5,555,258	A *	9/1996	Snelling	370/29
5,610,912	A	3/1997	Johnstown	
5,805,582	A	9/1998	Snelling et al.	
6,052,365	A *	4/2000	Bhagalla	370/336
6,058,104	A *	5/2000	Snelling	370/277
6,097,733	A *	8/2000	Basu	370/468

FOREIGN PATENT DOCUMENTS

GB	2 040 643	8/1980
GB	2 174 571	11/1986
JP	1-16051	1/1989
JP	1-57860	3/1989
JP	1-309530	12/1989
JP	1-309531	12/1989
JP	2-34046	2/1990
JP	2-34047	2/1990
JP	2-63352	3/1990
JP	3-179957	8/1991

WO	WO 95/16330	6/1995
WO	WO 96/12264	4/1996
WO	WO 98/10577	3/1998

OTHER PUBLICATIONS

International Search Report in related PCT/US00/00623.

International Search Report in related PCT/US99/11078.

Anon, "The Cordless Office," *Telecom World (U.K.)* Dec. 1991, pp. 36-37.

Bud, Andrew, "Technologies for Personal Networking in Europe," presented at International Mobile Communications 90: Blenheim Online Ltd., Pinner, Middx, U.K. Jun. 12-14, 1990, pp. 79-88.

Costello, J., "Look—No Wires", *Office Equipment News*, Nov. 1992, pp. 46-47.

Douligeris, C., "Intelligent Home Systems", *IEEE Communications Magazine*, Oct. 1993, pp. 52-61.

Duet, D.A., "An Investigation into the Economic Impact of Low-Powered, Digital Radio in the Telephone Distribution Plant", *Globecom '89*, Nov. 27-30, 1989, pp. 38.7.1-38.7.5.

Duet, D.A., "Portable Phone Service for an Upscale Subdivision—An Economic Assessment", *ICC '90, IEEE GA*, Apr. 16-19, 1990, pp. 206.1.1-206.1.4.

Elliott, P.W., and T.M. Kanaropoulos, "Supporting Diverse Services in a Microcellular TDMA System", *Tenth UK Teletraffic Symposium: Performance Engineering in Telecommunications Networks*, Martlesham Heath, U.K., Apr. 14-16, 1993, pp. 28/1-9.

Habuka, T., and H. Sekiguchi, "Standardization of Personal Handy Phone (PHP)", *NTT Review*, vol. 5, No. 5, Sep. 1993, pp. 101-105.

Kobb, B.Z., "Personal Wireless", *IEEE Spectrum*, Jun. 1993, pp. 20-25.

Madrid, J.S. Sheldon, and G. Cheadle, "A New Galaxy on the Horizon: Wireless Telephony", *TE&M* Jul. 15, 1990, pp. 49-52.

Mulder, R.J., "Radio Access in Corporate Technology Networks", *2nd International conference on Private Switching Systems and Networks*. London, Jun. 23-25, 1992, pp. 110-116.

Polimene, F., "Use your Telephones as a Home Intercom System", *Radio-Electronics*, May 1991, pp. 44-48.

Shannon and Weaver, *The Mathematical Theory of Communication*, The University of Illinois Press: Urbana (1949), pp. 1-117*.

Spicer, J.J., G.A. Halls, and G. Crisp, "Wireless Office Data Communications using CT2 and DECT" *IEE Colloquium on 'Personal Communications, Circuits, Systems and Technology'* Digest No. 12, London, Jan. 22, 1993, pp. 9/1-4.

van der Hoek, H., "From cordless PABX to PCN", *Telecommunications (International Edition)*, Mar. 1991, pp. 49-52.

Werbus, V., A. Veloso, and A. Villanueva, "DECT—Cordless Functionality in New Generation Alcatel PABXs", *Electrical Communication*, 2nd Quarter 1993, pp. 172-180.

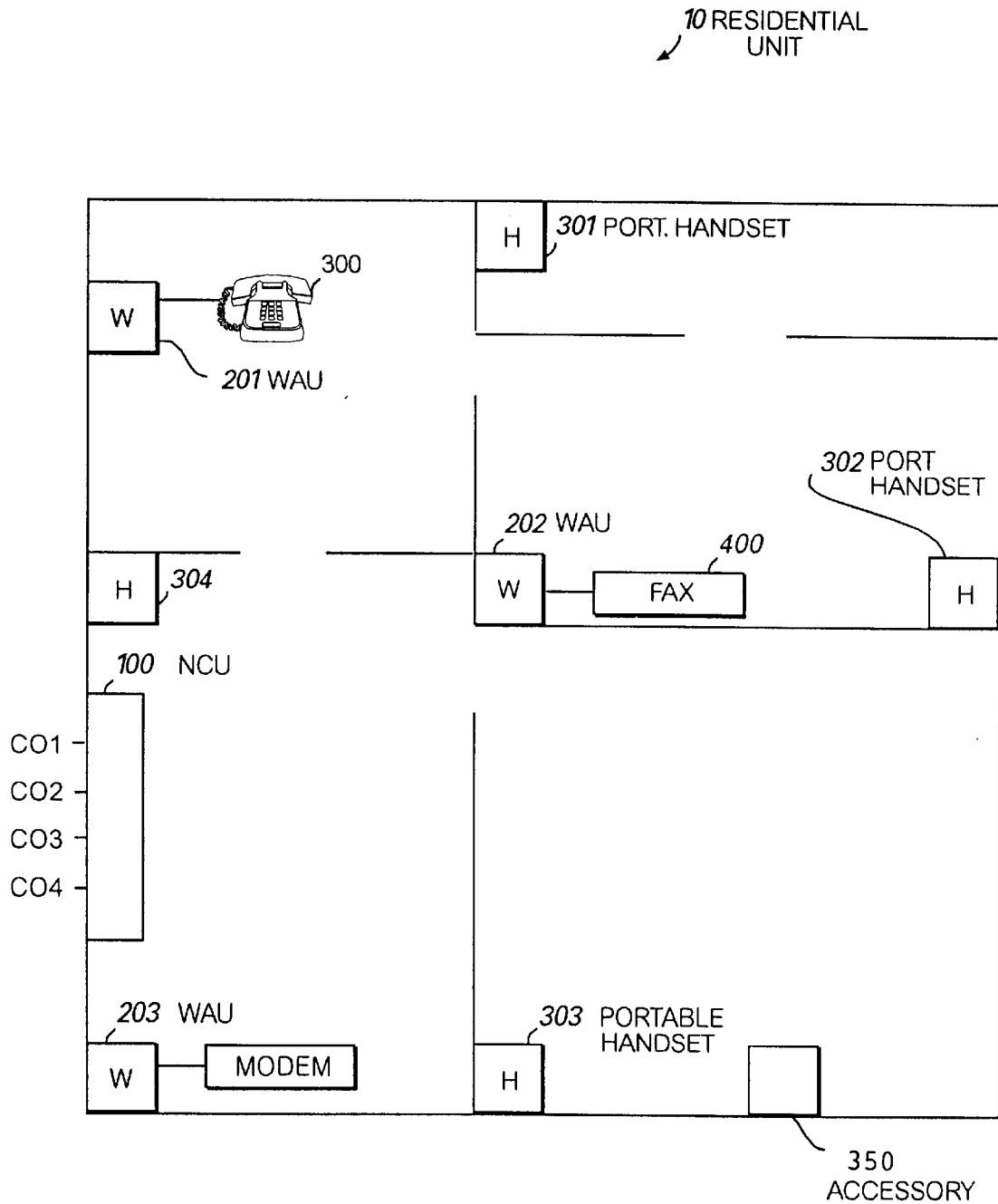


FIG.1

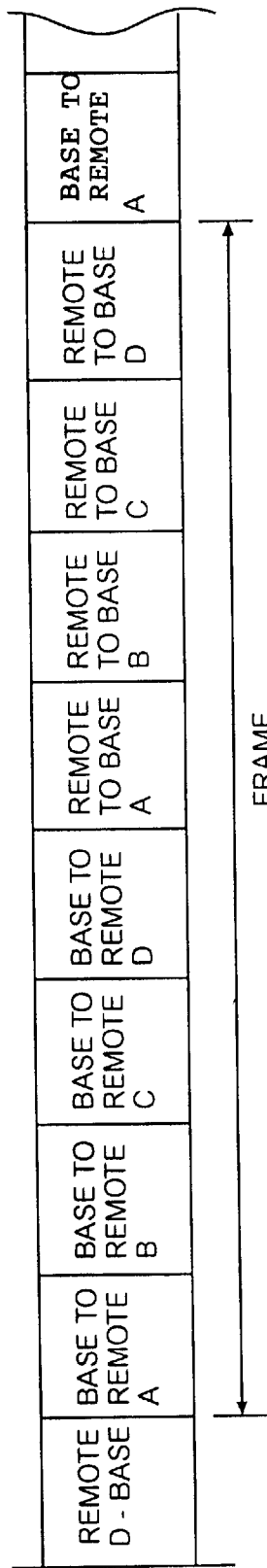


FIG.2

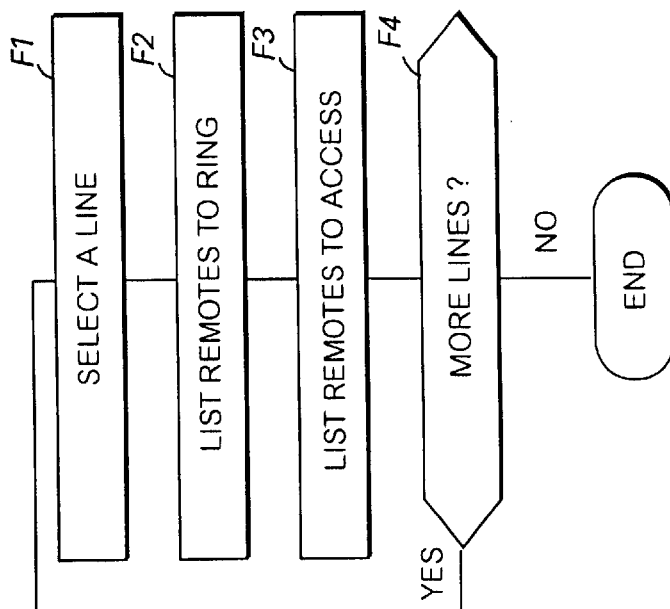


FIG.11A

LINE	RING	ACCESS
1	201, 203 301 - 304	201, 203 301 - 304
2	201, 203 301 - 304	201, 203 301 - 304
3	301	301
4	202	202

FIG.11B

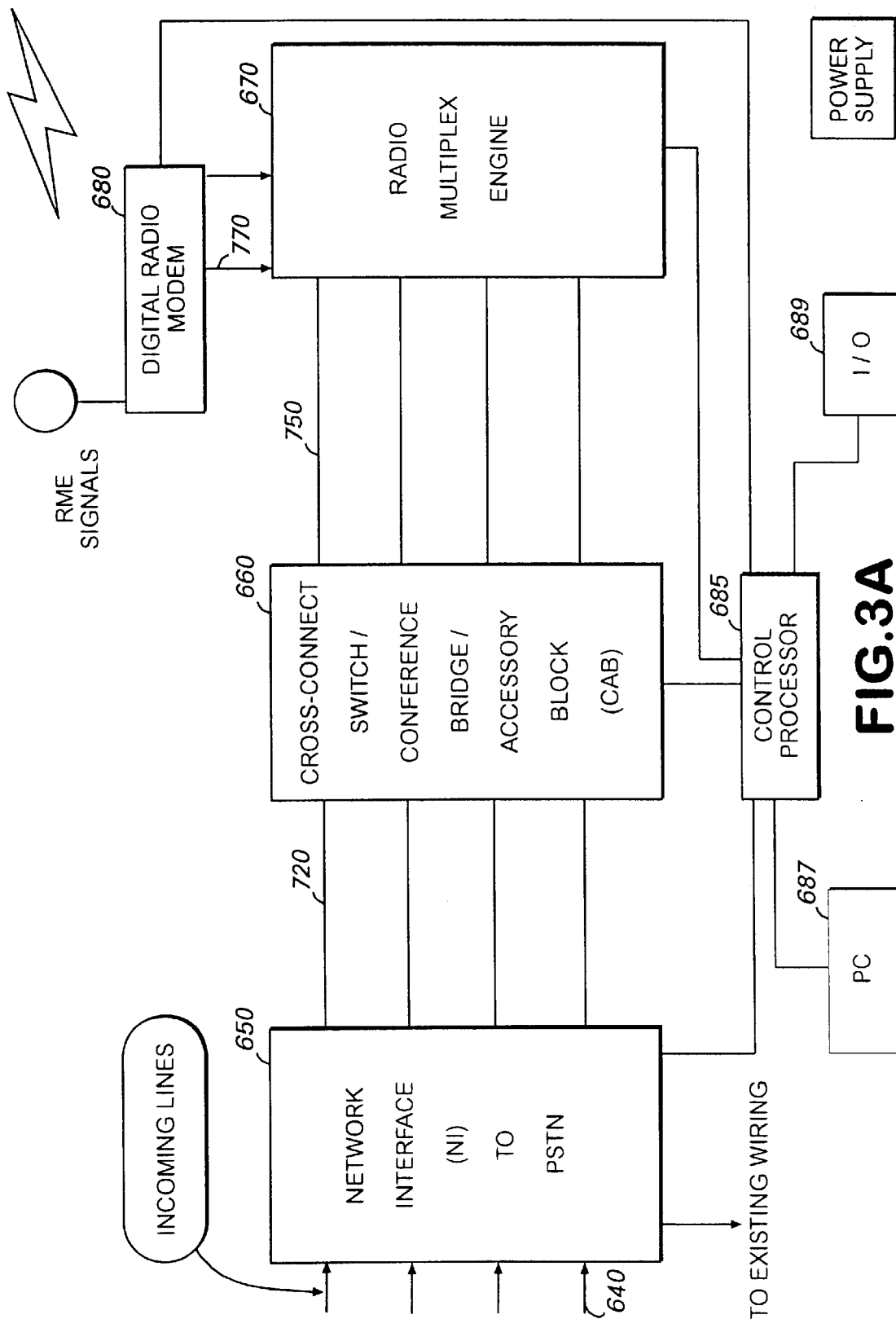


FIG. 3A

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