EXHIBIT D

United States Patent [19]

Jednacz et al.

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[54] **LIGHTING CONTROL SYSTEM WITH PACKET HOPPING COMMUNICATION**

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[21] Appl. No.: **498,715**

[22] Filed: **Jun. 30, 1995**

[51] Int. Cl.^{6} **H04Q 7/00**

[52] U.S. Cl. **340/825.52**; 340/825.06; 315/294

[58] Field of Search 340/825.064, 825.37, 340/825.52, 825.57, 825.58; 315/294, 295, 323; 307/29, 39

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,755,792	7/1988	Pezzolo et al.	340/825.06
4,847,281	7/1989	Brown, III et al.	340/825.06
5,046,066	9/1991	Messenger	340/825.06
5,066,896	11/1991	Bertenshaw et al.	315/294
5,086,385	2/1992	Launey et al.	340/825.37
5,090,024	2/1992	Vander Mey et al.	375/1
5,263,046	11/1993	Vander Mey	375/1
5,278,862	1/1994	Vander May	375/1
5,359,625	10/1994	Vander Mey et al.	375/1
5,385,297	1/1995	Rein et al.	340/825.06
5,471,119	11/1995	Ranganath	315/294
5,530,322	6/1996	Ference et al.	315/294
5,537,104	7/1996	Van Dort et al.	340/825.52
5,565,855	10/1996	Knibbe	340/825.06
5,572,438	11/1996	Ehlers et al.	307/39

OTHER PUBLICATIONS

F. William Gutzwiller, Control Networks for the Home, Oct. 1983, Machine Design Magazine, vol. 55, No. 24, pp. 109–112.

V.R. Hohman, "900–MHZ Radio Provides Two–Way Path Control & Return", Transmission & Distribution (Jun. 1984) pp. 33–36.

G.W. Kelly, "Sona/ECS a Decentralized Environmental Control System", Proc. IEEE Comp. Soc. Workshop on Computing Aid to the Handicapped, Nov. 4–5, 1982, p. 103.

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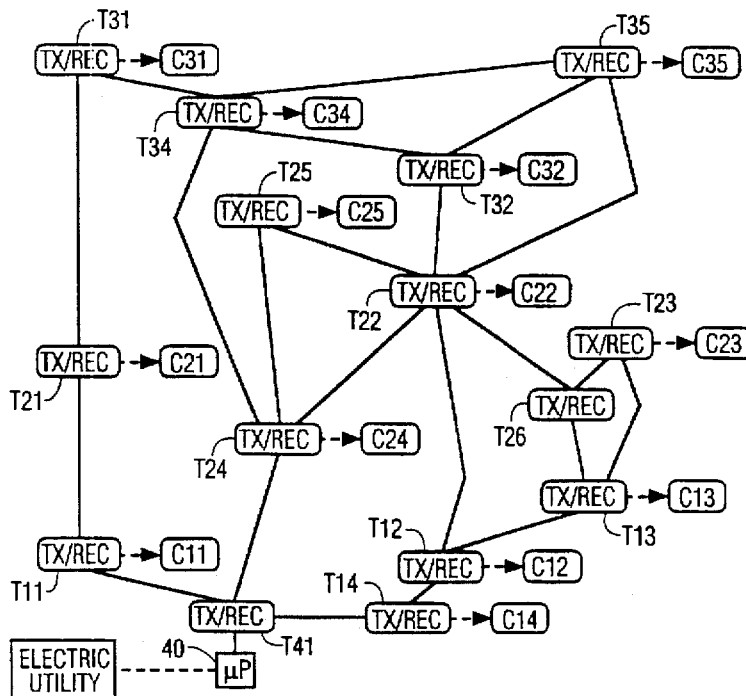
[57] **ABSTRACT**

Building lights are master controlled to reduce power consumption under building master control, or in response to electric utility commands to the building computer. Each lighting wall control unit includes a transceiver which can communicate to at least one neighbor transceiver, thereby forming a distributed communication network extending back to the building computer. The transceivers operate asynchronously with low data rate FSK signals, using carrier frequencies between 900 and 950 MHz. Different communications protocols control packet forwarding and acknowledgement so that messages reach their destination but are not forwarded in endless circles, and so that collisions are minimized.
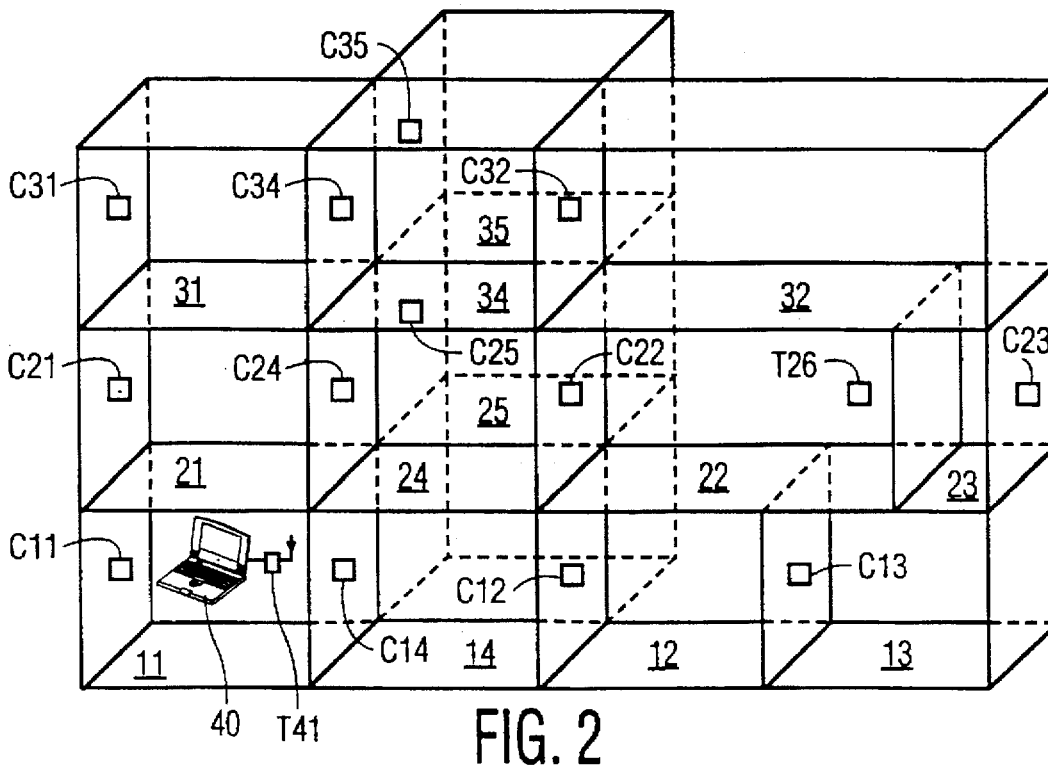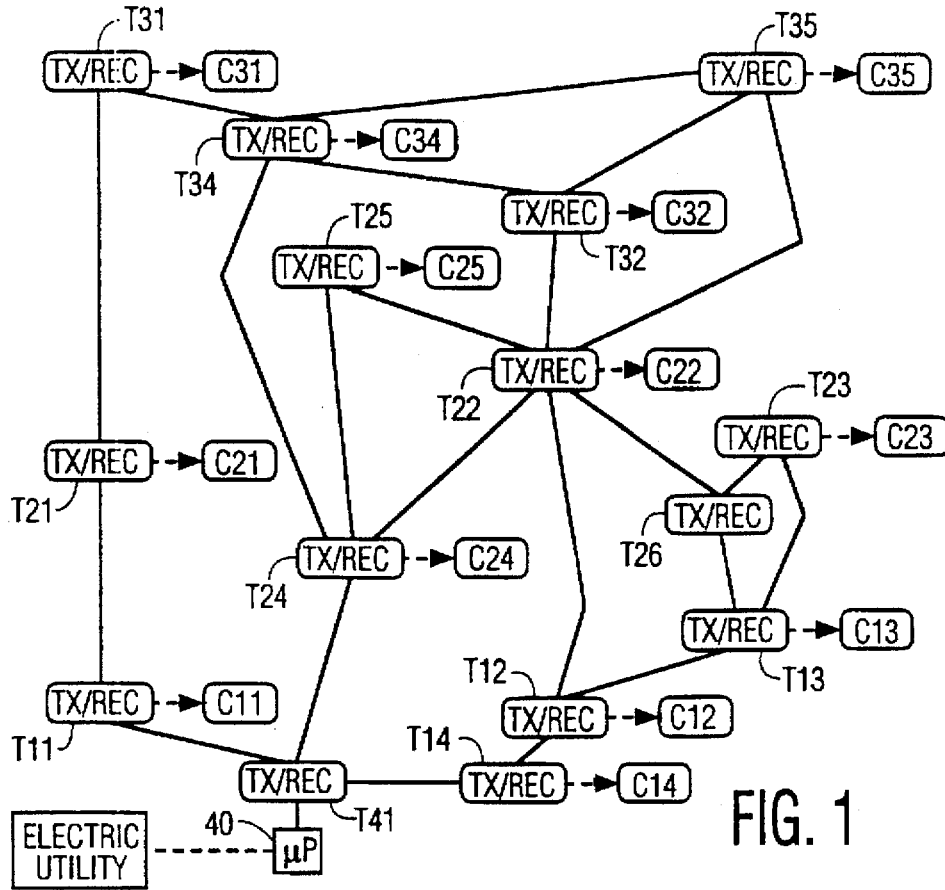
24 Claims, 8 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

FIG. 4

DOCKET ALARM
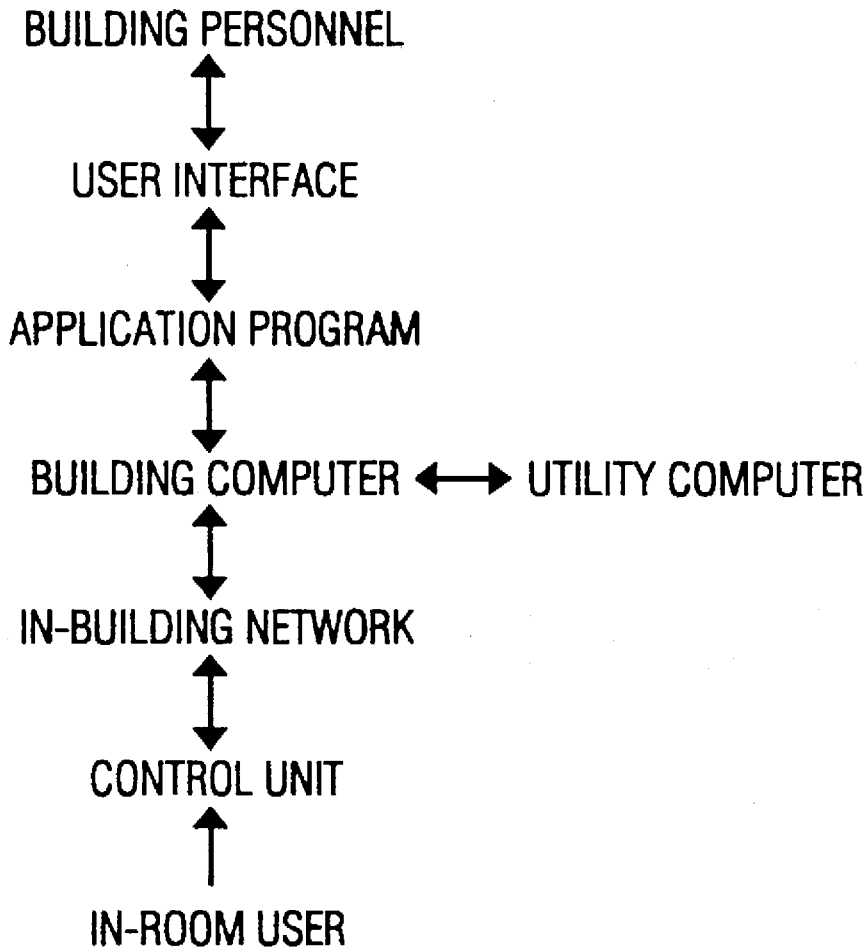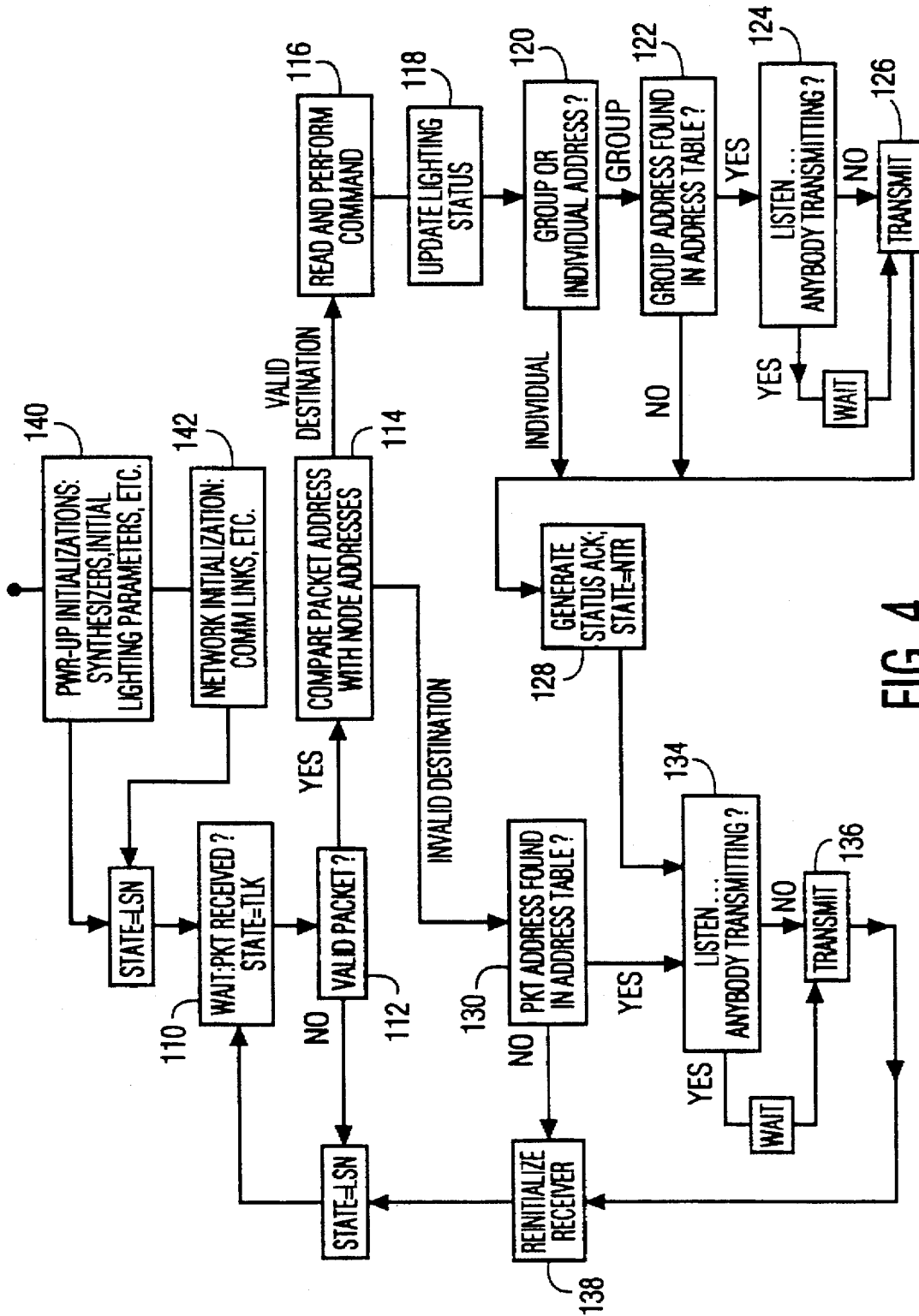
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