EXHIBIT D

US005726644A

United States Patent [19]

Jednacz et al.

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[45] **Date of Patent:** Mar. 10, 1998

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

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[73] Assignee: **Philips Electronics North America Corporation**, New York, N.Y.

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[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

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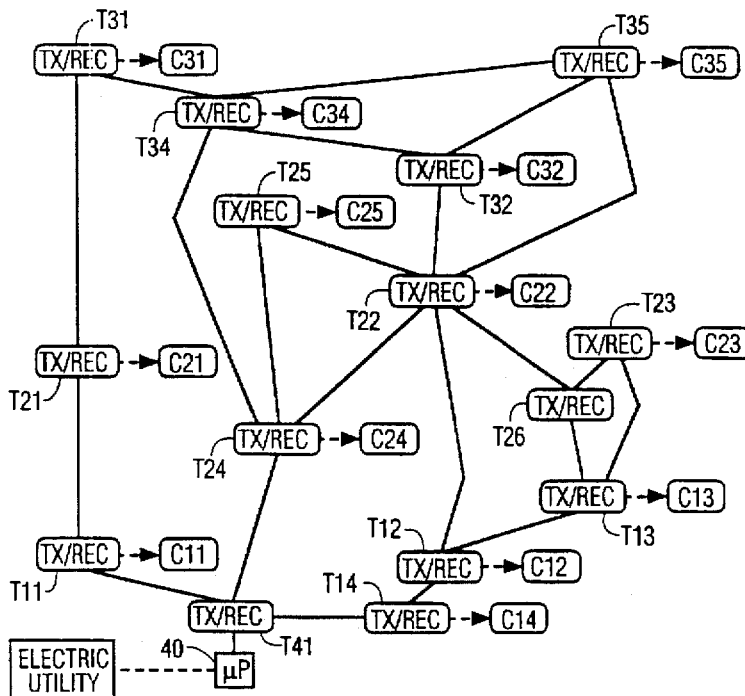
[57] **ABSTRACT**

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

BUILDING PERSONNEL

↕

USER INTERFACE

↕

APPLICATION PROGRAM

↕

BUILDING COMPUTER ⟷ UTILITY COMPUTER

↕

IN-BUILDING NETWORK
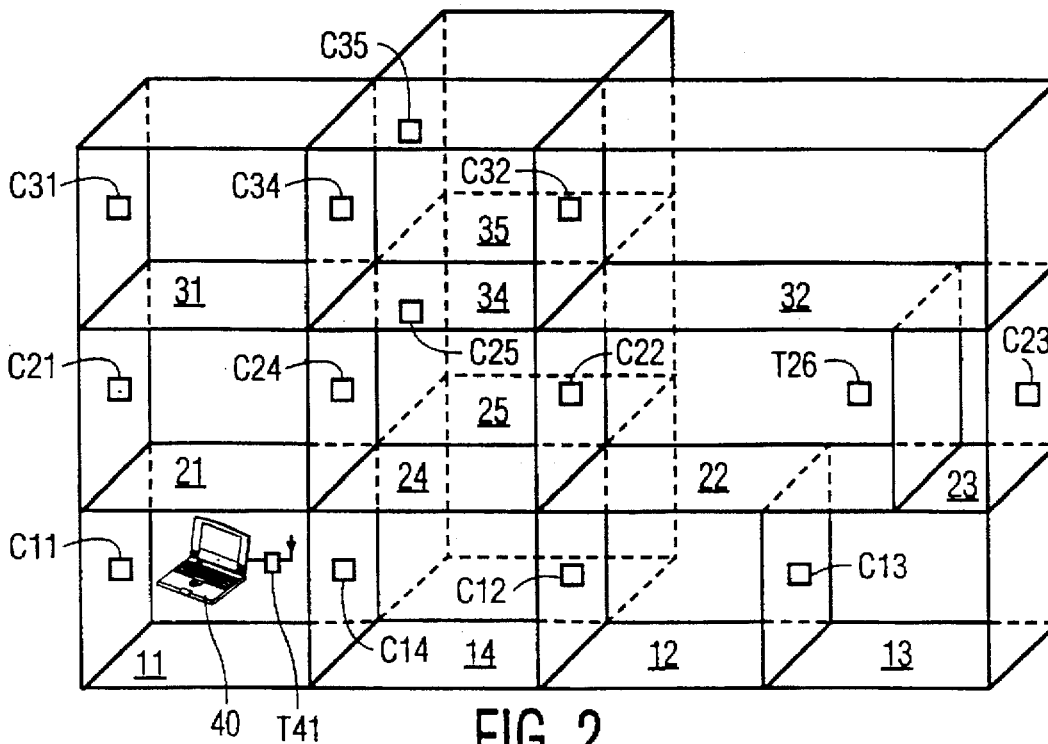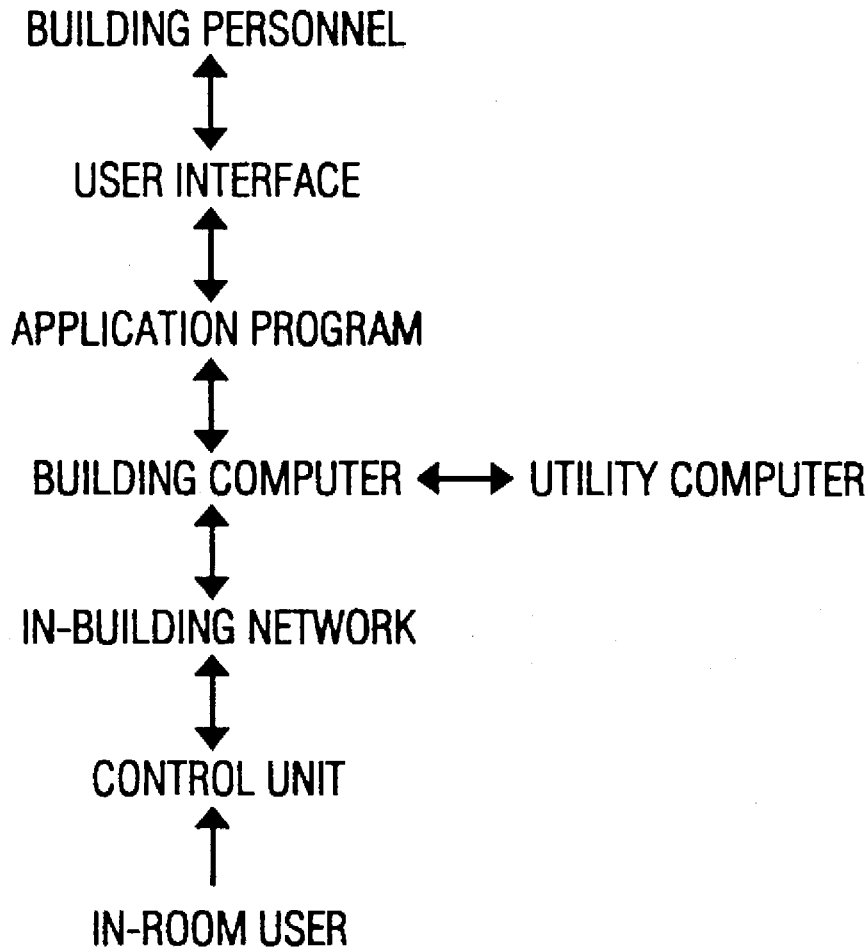
↕

CONTROL UNIT

↑

IN-ROOM USER
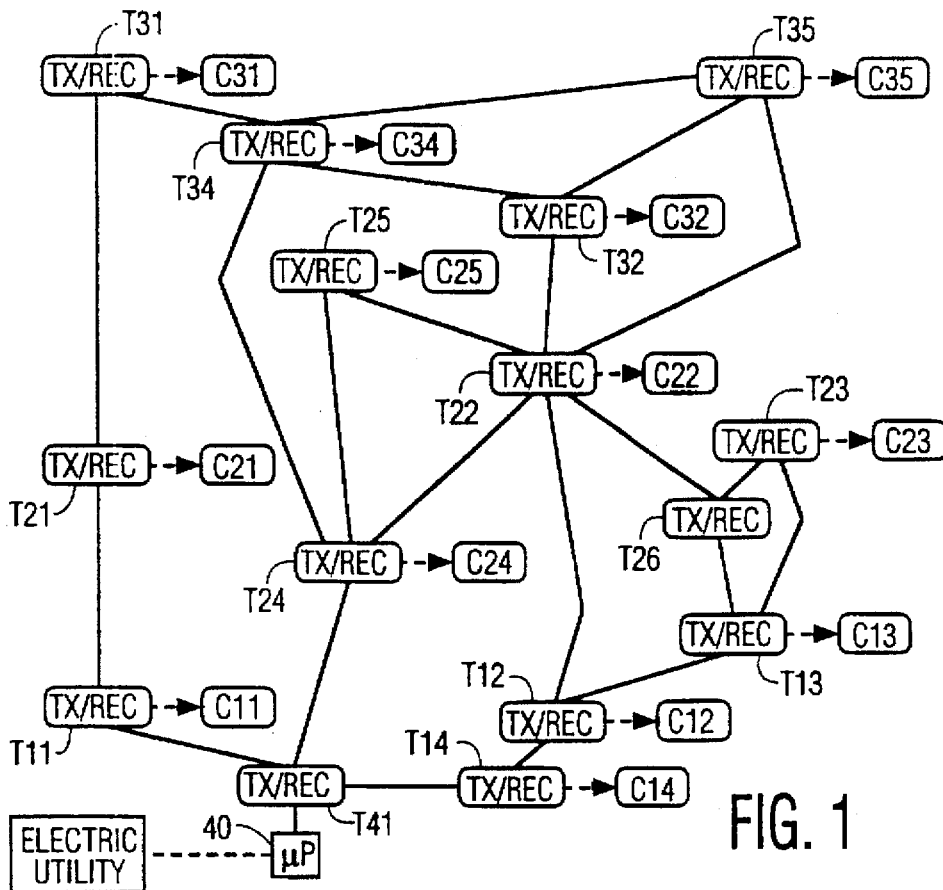
FIG. 3

FIG. 4

DOCKET ALARM
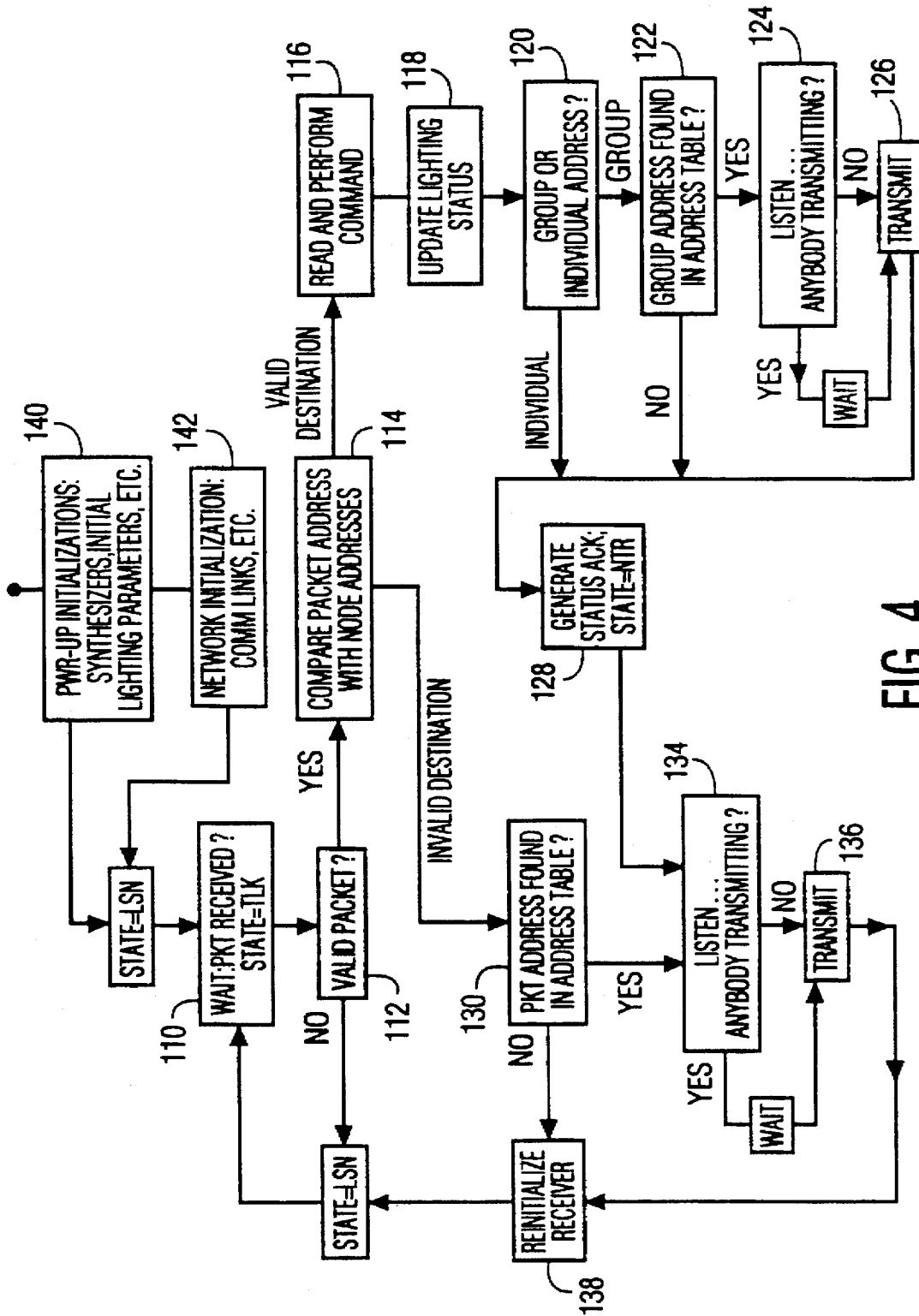
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