

(12) **United States Patent**
Nelson et al.

(10) **Patent No.:** **US 6,341,143 B1**
 (45) **Date of Patent:** **Jan. 22, 2002**

- (54) **MODEM WITH FIRMWARE UPGRADE FEATURE**
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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.
- (21) Appl. No.: **08/368,291**
- (22) Filed: **Jan. 3, 1995**

Related U.S. Application Data

- (63) Continuation-in-part of application No. 08/087,164, filed on
 Jul. 2, 1993.
- (51) **Int. Cl.⁷** **H04B 1/38; H04M 11/00**
- (52) **U.S. Cl.** **375/222; 379/93.05**
- (58) **Field of Search** **375/222, 219;**
395/200, 200.01, 200.02, 200.09, 200.18,
200.64, 200.51, 750.05; 379/93.01, 93.05,
100.01

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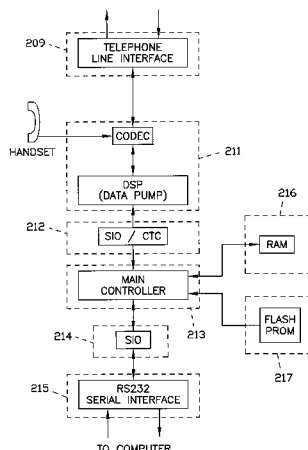
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(57) **ABSTRACT**

Updated operating code and parameters can be reprogrammed into a modem system with no disassembly of the modem hardware. The modem system includes a memory chip in which operating code and parameters are stored. Two control programs control the reprogramming of updated operating code. One of the control programs is designed for manufacturing and testing purposes. The other control program allows remote reprogramming of updated operating code or parameters from a remote location such as a customer site. A user can thus remotely upgrade system firmware with updates, bug fixes, enhancements or other new releases of system operating code by downloading the update over a phone line to a host PC and reprogramming the memory chip of the modem over the serial port from the host PC. The user can also remotely upgrade the modem system firmware by directly programming the memory chip of the modem without the assistance of the host PC. The modem system is portable, obtaining power from a standard 9 volt battery. Therefore, various power saving features are also incorporated into the modem system

8 Claims, 28 Drawing Sheets



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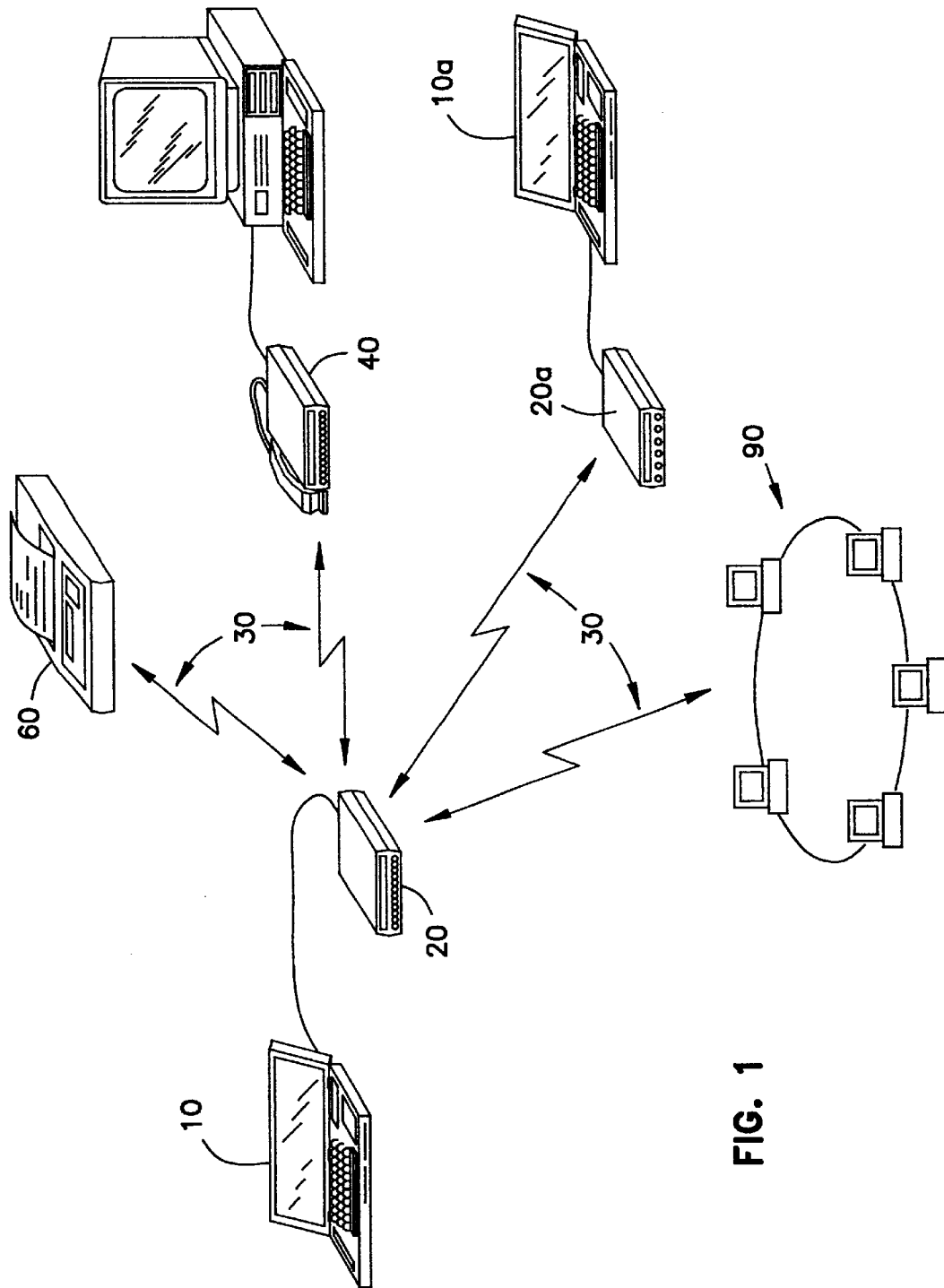


FIG. 1

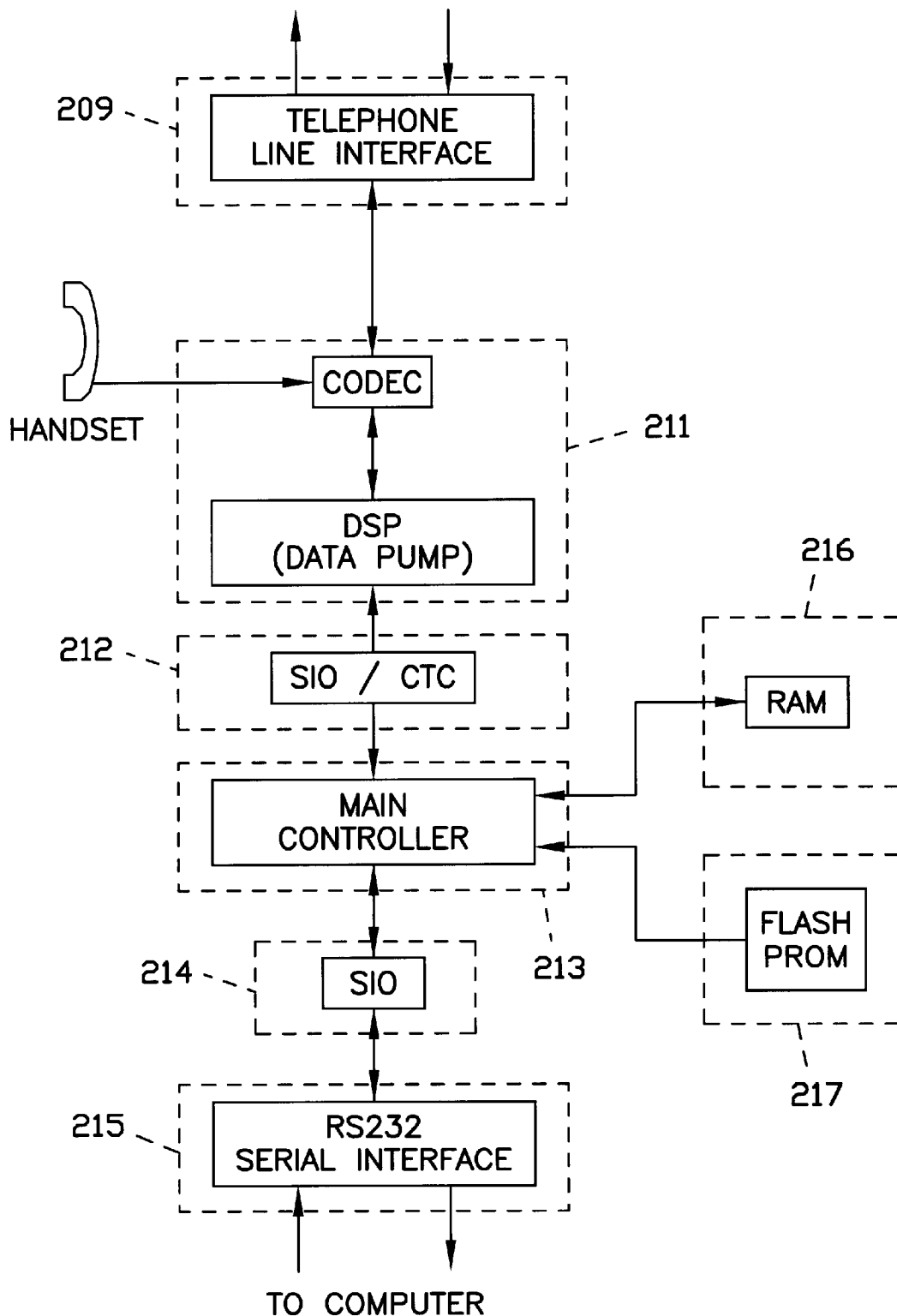


FIG. 2

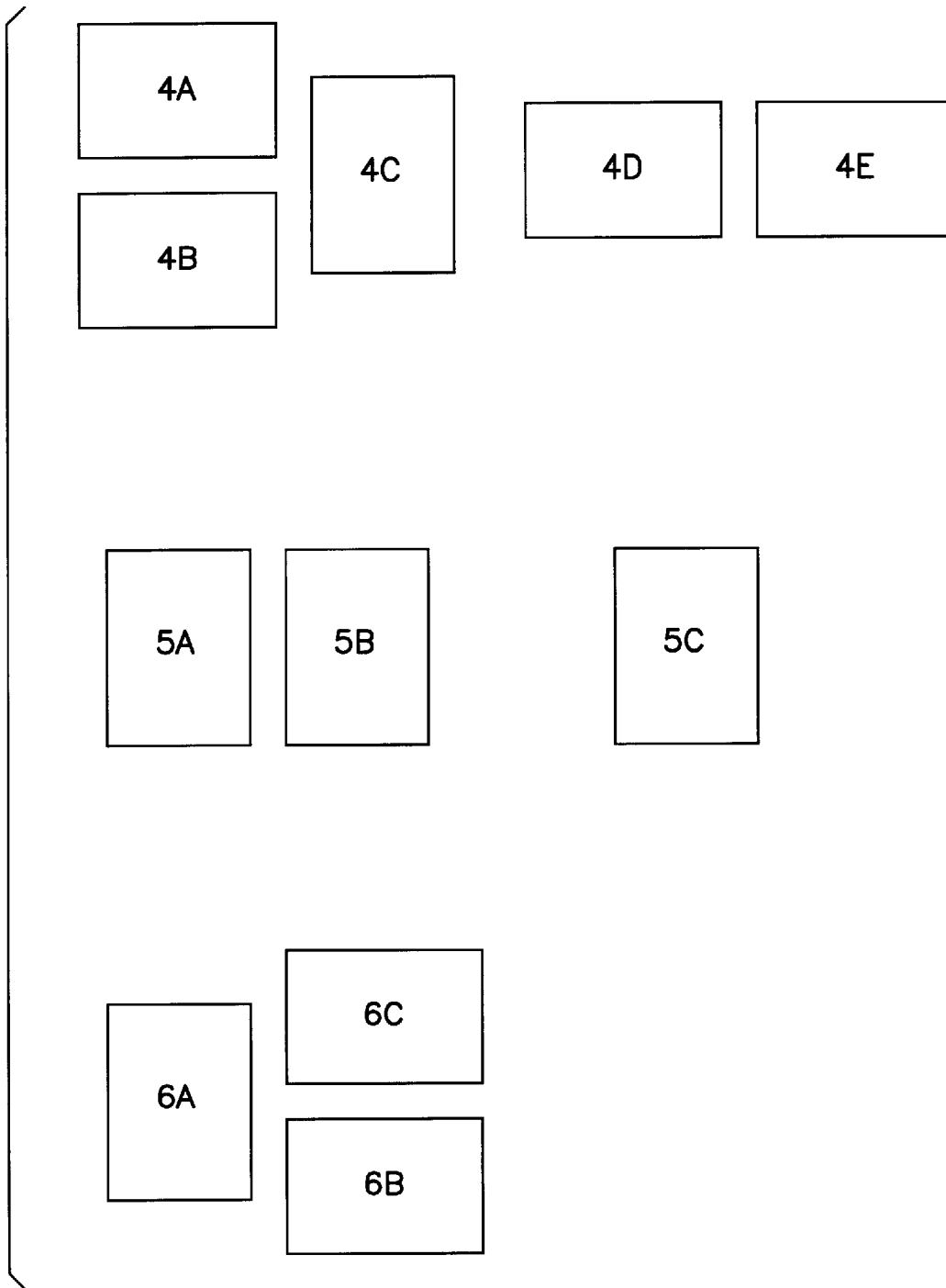


FIG. 3

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