



# United States Patent [19]

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Beasley et al.

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[54] **SYSTEM AND METHOD FOR REMOTE PATCHING OF OPERATING CODE LOCATED IN A MOBILE UNIT**

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[21] Appl. No.: **422,075**

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[22] Filed: **Apr. 12, 1995**

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[51] Int. Cl.<sup>6</sup> ..... **G06F 13/00**

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[52] U.S. Cl. .... **364/514 R**

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[58] Field of Search ..... 364/514 R; 395/600, 395/700, 200.09; 379/56, 58, 59, 95; 455/31.1, 33.1, 54.1

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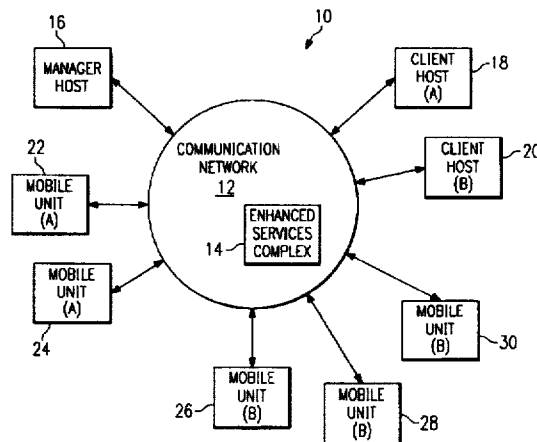
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### [57] ABSTRACT

A system (10) for remote patching or updating of operating code located in a mobile unit (22, 24, 26, 28, or 30) is provided. The system (10) includes a manager host (16) and a mobile unit (22, 24, 26, 28, or 30). The manager host (16) is operable to initiate transmission through a communication network (12) of at least one discrete patch message defining at least one patch. The mobile unit (22, 24, 26, 28, or 30) is operable to receive the at least one patch message. The mobile unit (22, 24, 26, 28, or 30) is also operable to create patched operating code by merging the patch with current operating code located in the mobile unit (22, 24, 26, 28, or 30) and to switch execution to the patched operating code. The mobile unit (22, 24, 26, 28, or 30) can also receive at least one download message defining new operating code to replace the current operating code.

**42 Claims, 5 Drawing Sheets**



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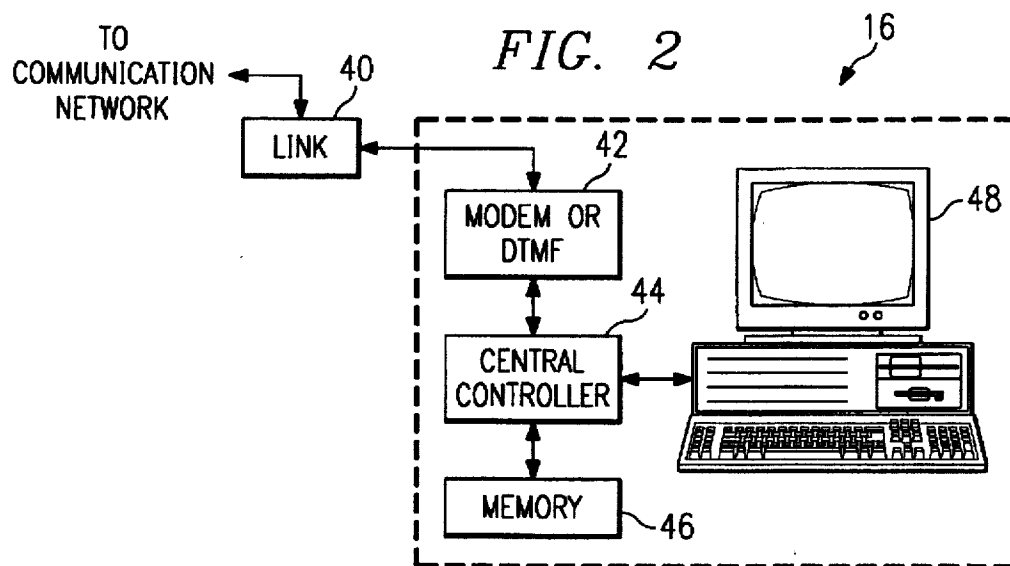
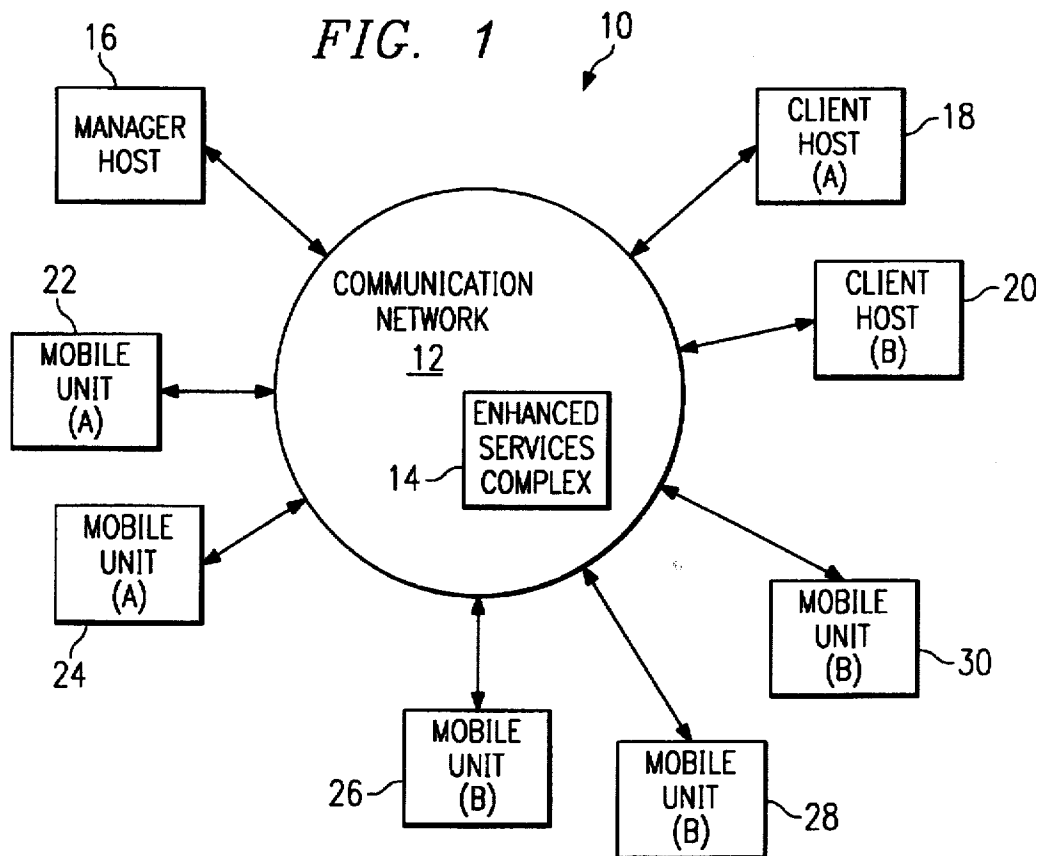


FIG. 3

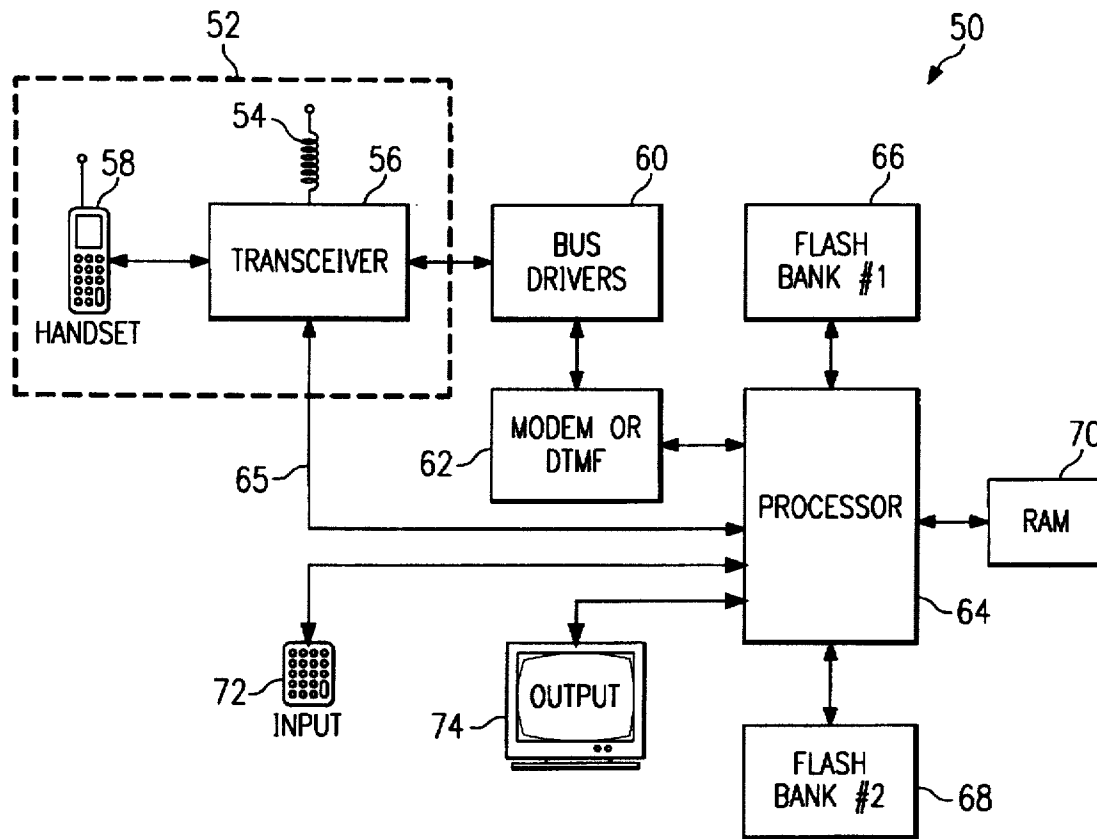


FIG. 4

		MESSAGE FORMAT									
MESSAGE	TYPE	MESSAGE TYPE (1 BYTE)	PATCH FILE ID (1 BYTE)	SOFTWARE VERSION (8 BYTES)	NUMBER OF PATCHES (1 BYTE)	MEMORY ADDRESS TO BE MODIFIED BY PATCH (4 BYTES)	STARTING ADDRESS IN PATCH MEMORY SPACE (4 BYTES)	NUMBER OF BYTES OF DATA (1 BYTE)	NUMBER OF BYTES OF DATA (1 BYTE)	PATCH DATA (1-232 BYTES)	
NEW PATCH FILE MESSAGE	0										
APPEND PATCH MESSAGE	1	MESSAGE TYPE (1 BYTE)	PATCH FILE ID (1 BYTES)	MEMORY ADDRESS TO BE MODIFIED BY PATCH (4 BYTES)	STARTING ADDRESS IN PATCH MEMORY SPACE (4 BYTES)	NUMBER OF BYTES OF DATA (1 BYTE)	PATCH DATA (1-241 BYTES)				
APPEND DATA MESSAGE	2	MESSAGE TYPE (1 BYTE)	PATCH FILE ID (1 BYTE)	PATCH EXTENSION DATA (1-250 BYTES)							
DELETE UNINCORPORATED PATCHES MESSAGE	3	MESSAGE TYPE (1 BYTE)									
PREPARE FOR DOWNLOAD MESSAGE	4	MESSAGE TYPE (1 BYTE)									
DOWNLOAD MESSAGE	5	MESSAGE TYPE (1 BYTE)	RECORD TYPE (2 BYTES)	RECORD LENGTH (1 BYTE)	STARTING ADDRESS (2-4 BYTES)	PROGRAM DATA (1-100 BYTES)				RECORD CHECKSUM (1 BYTE)	
PROGRAM CHECKSUM MESSAGE	6	MESSAGE TYPE (1 BYTE)	PROGRAM CHECKSUM (2 BYTES)								

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