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# United States Patent [19]

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Billström et al.

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[54] **APPARATUSES AND MOBILE STATIONS FOR PROVIDING PACKET DATA COMMUNICATION IN DIGITAL TDMA CELLULAR SYSTEMS**

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[21] Appl. No.: **354,874**

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### [30] Foreign Application Priority Data

Dec. 10, 1993 [SE] Sweden ..... 9304119

[51] Int. Cl.<sup>6</sup> ..... **H04T 3/26**; H04Q 7/38

[52] U.S. Cl. .... **370/349**; 379/60; 455/332; 370/332; 370/337; 370/338; 370/403

[58] Field of Search ..... 370/94.1, 95.1, 370/95.3, 60, 110.1, 79; 379/58, 59-63; 455/331, 54.1, 56.1; 340/825.44

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*Primary Examiner*—Benedict V. Safourek

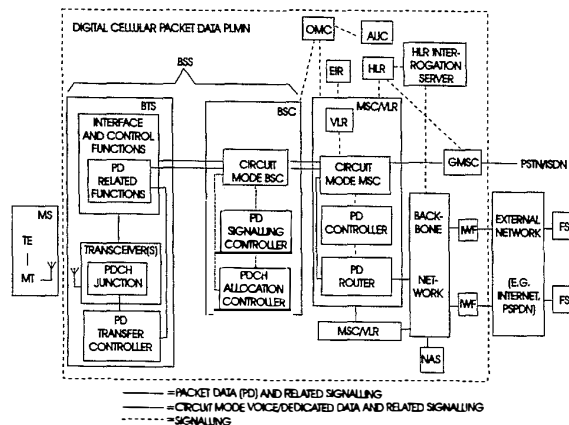
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### [57] ABSTRACT

Apparatuses and mobile stations are described which provide packet data services in TDMA (Time Division Multiple Access) cellular systems, based on providing shared packet data channels optimized for packet data. A first "integrated" embodiment utilizes the current cellular infrastructure to the extent possible consistent with functional and performance requirements. Shared packet data channels in base stations may be provided dynamically determined by demand. A packet data controller in each Mobile services Switching Center controls access to the packet data services. A packet data router in each MSC routes packets to and from the MSC service area. A backbone network interconnects packet data routers and Interworking Functions providing internetworking with external network(s). A second "separate" embodiment, in order to minimize the impact on the current cellular system, primarily utilizes the base station portion of the cellular system, relying for the remaining network parts on a separate mobile packet data infrastructure.

**57 Claims, 20 Drawing Sheets**



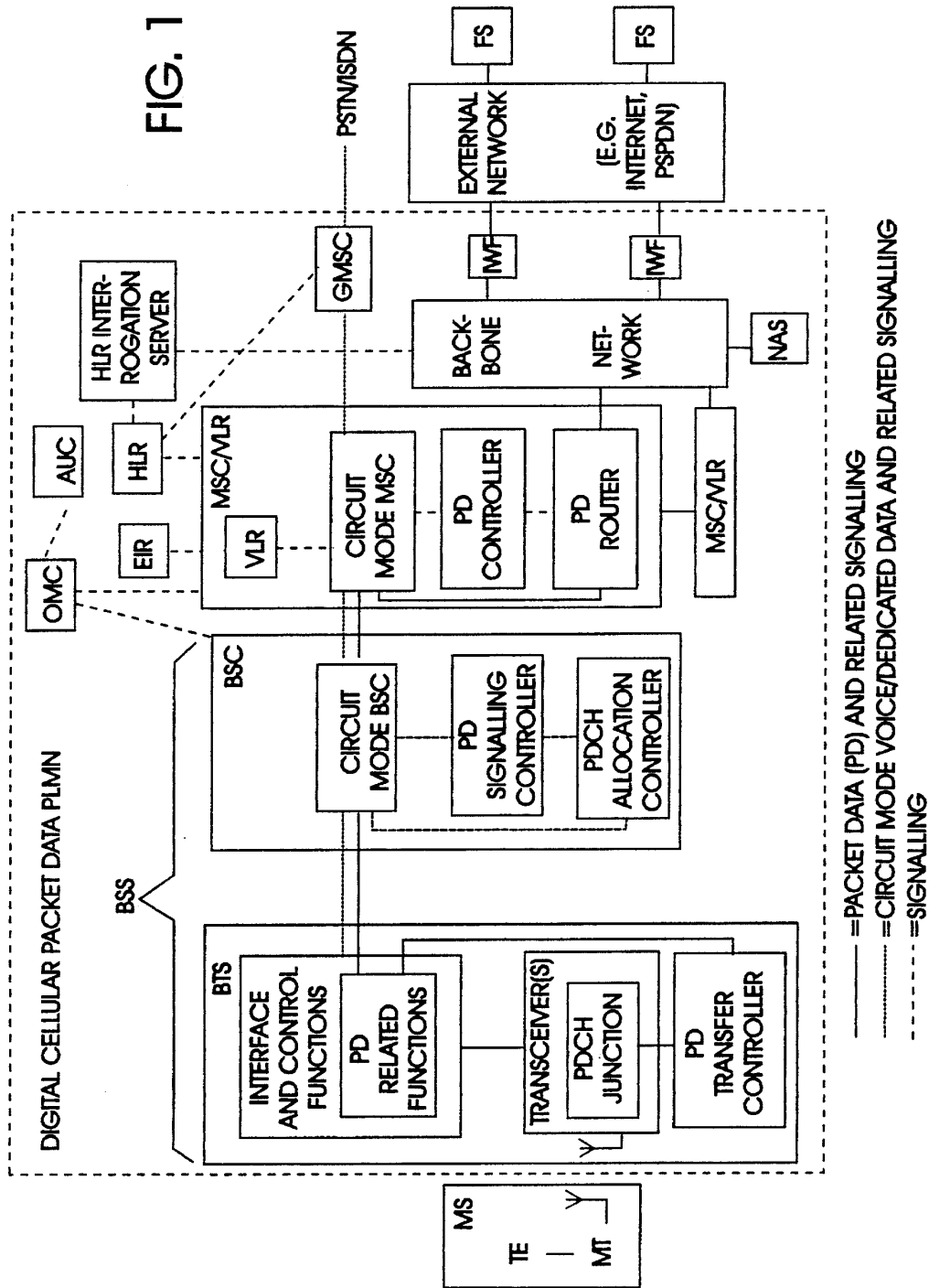


FIG. 2

INTRANETWORK PROTOCOL AND INTERWORKING EXAMPLE (IP)

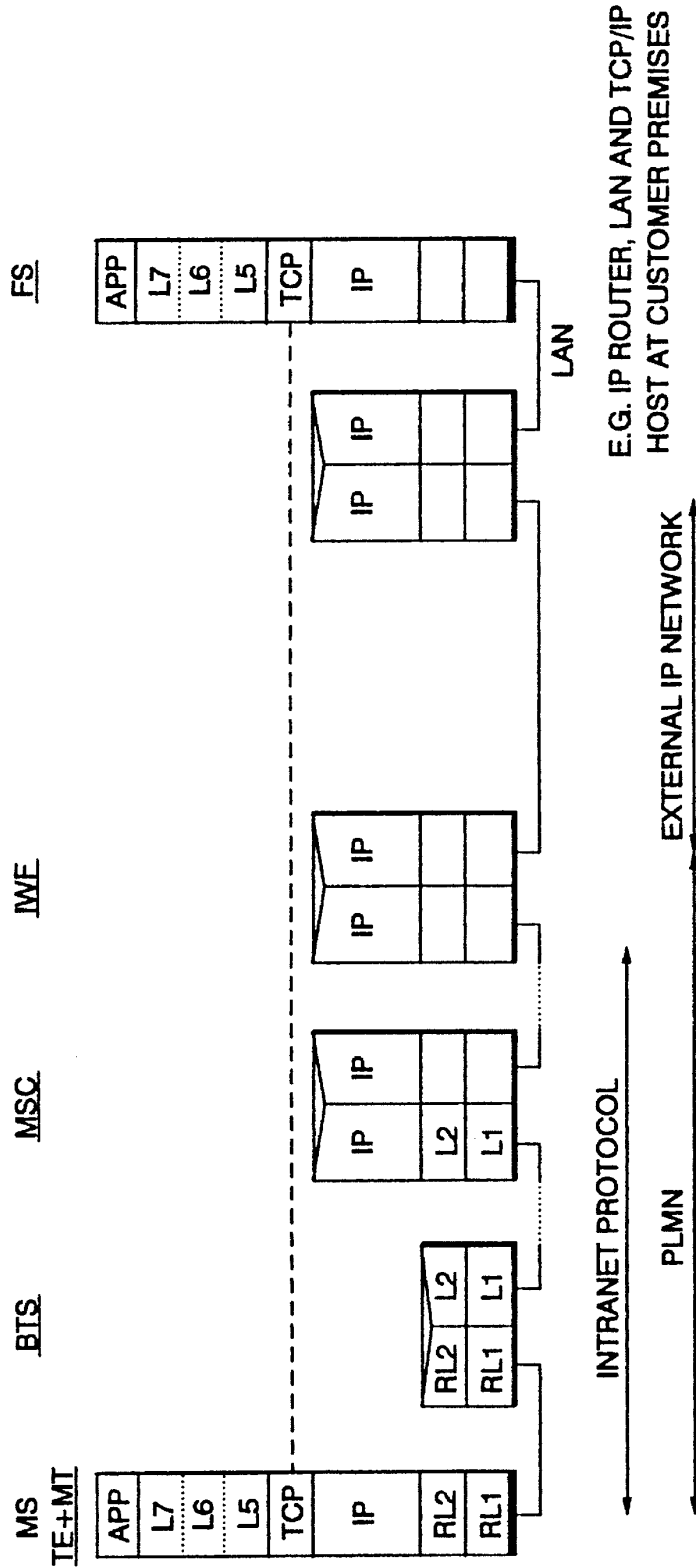


FIG. 3

INTRANETWORK PROTOCOL AND INTERWORKING EXAMPLE (X.25)

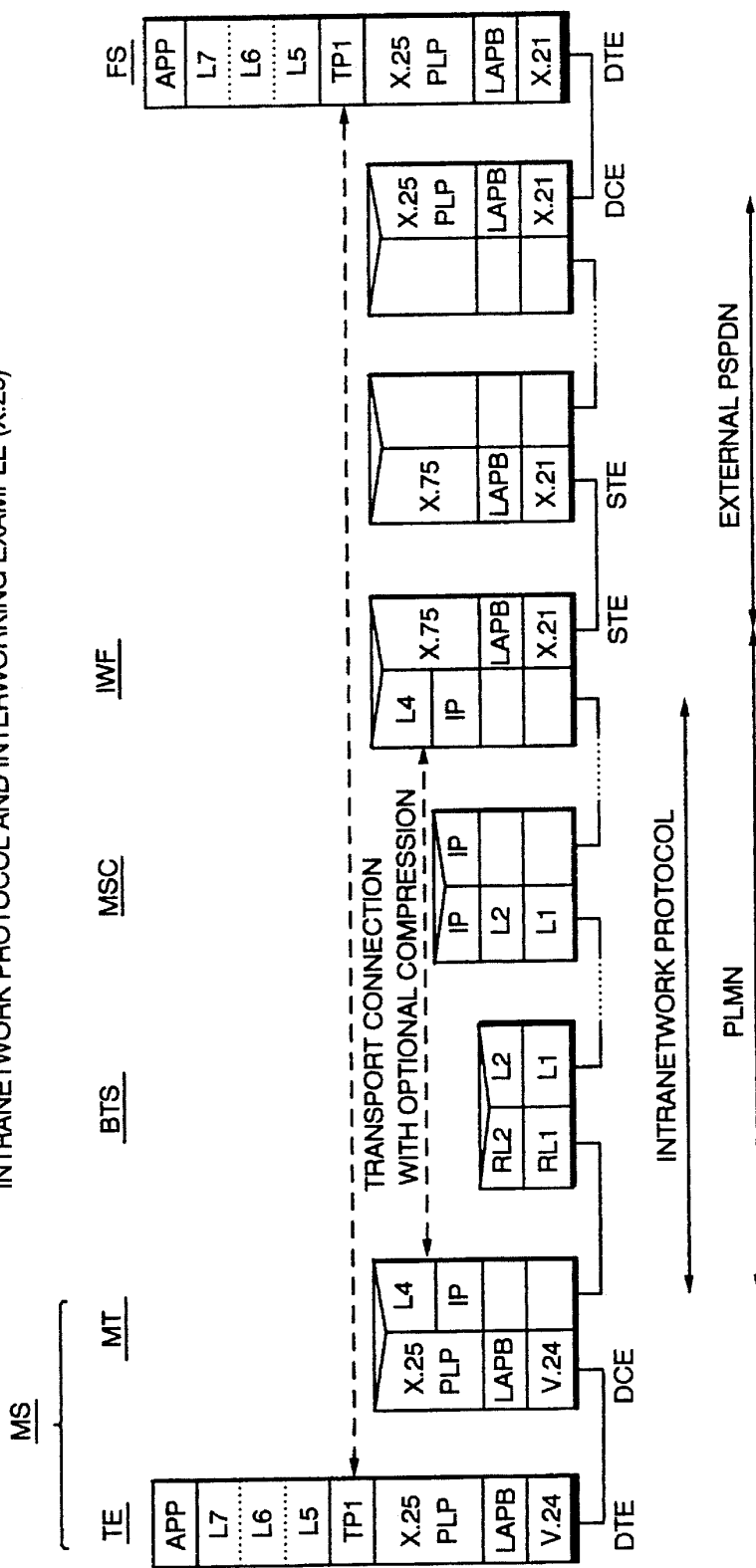
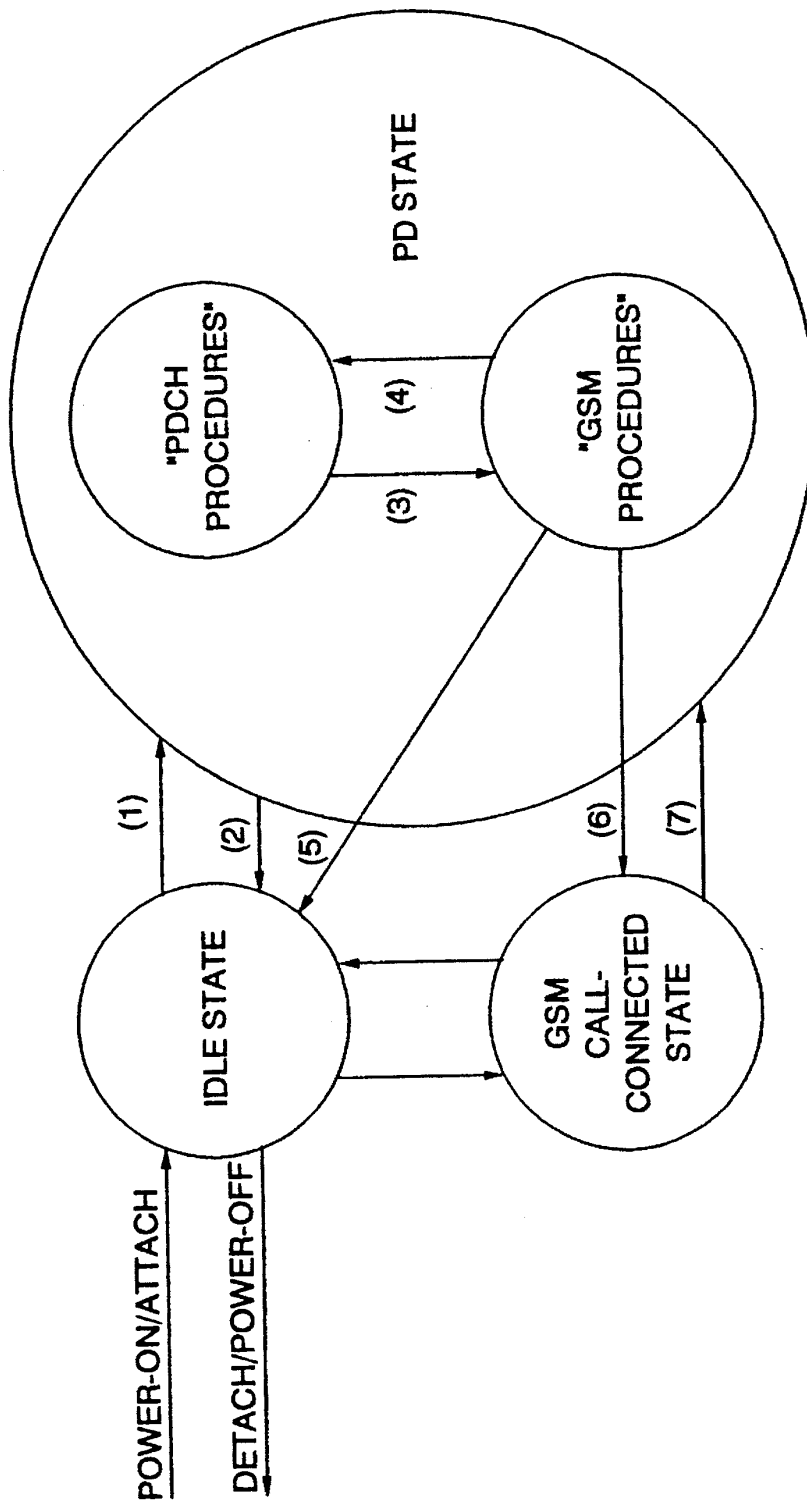


FIG. 4



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