

(54) **ARRANGEMENT FOR DYNAMIC ALLOCATION OF SPACE ON A SMALL DISPLAY OF A TELEPHONE TERMINAL**

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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.: **09/271,036**

(22) Filed: **Mar. 17, 1999**

Related U.S. Application Data

(63) Continuation of application No. 08/775,316, filed on Dec. 31, 1996.

(51) Int. Cl.⁷ **H04B 1/38**; H04B 1/18; H04M 1/00

(52) U.S. Cl. **455/566**; 455/158.4; 379/387.01; 379/93.17

(58) Field of Search 379/355, 457, 379/387.01, 354, 93.17; 455/575, 145, 158.4, 566, 564, 550, 412, 414, 90; 345/146, 173, 333, 353, 352, 356, 357, 661, 810, 848

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(57) **ABSTRACT**

An arrangement for dynamically varying how space on a small display is allocated for presentation of various types of user information is provided. The arrangement optimizes utilization of space on small displays by dynamically allocating lines on the display for presentation of status or header-type information as well as menu item-type information. The arrangement configures the display such that lines therein are dedicatable in any combination to displaying these two types of information.

21 Claims, 3 Drawing Sheets

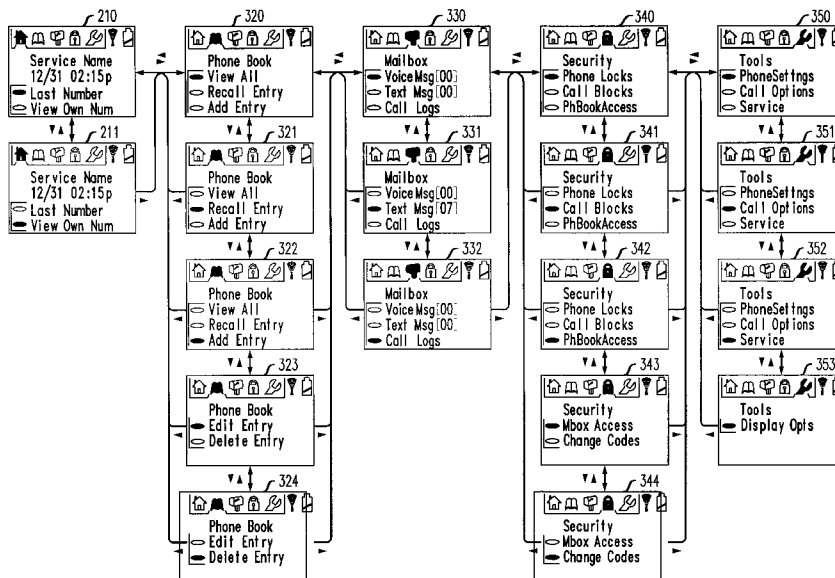


FIG. 1

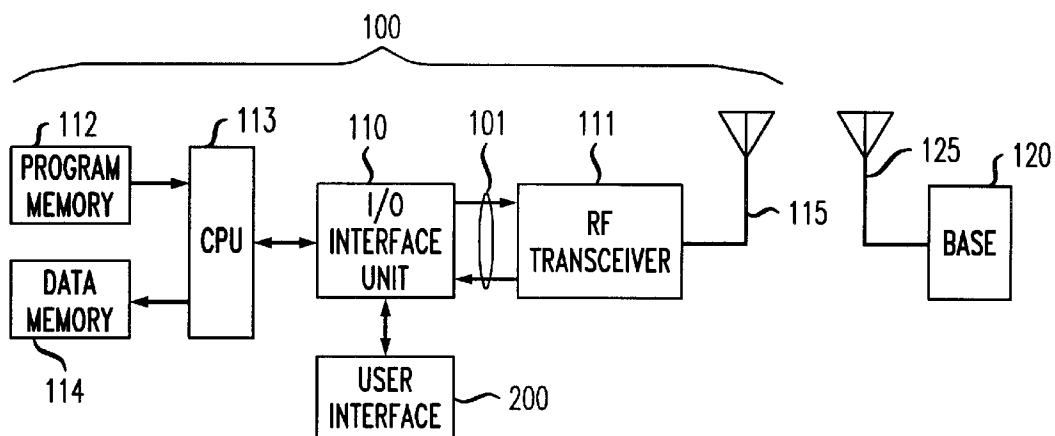
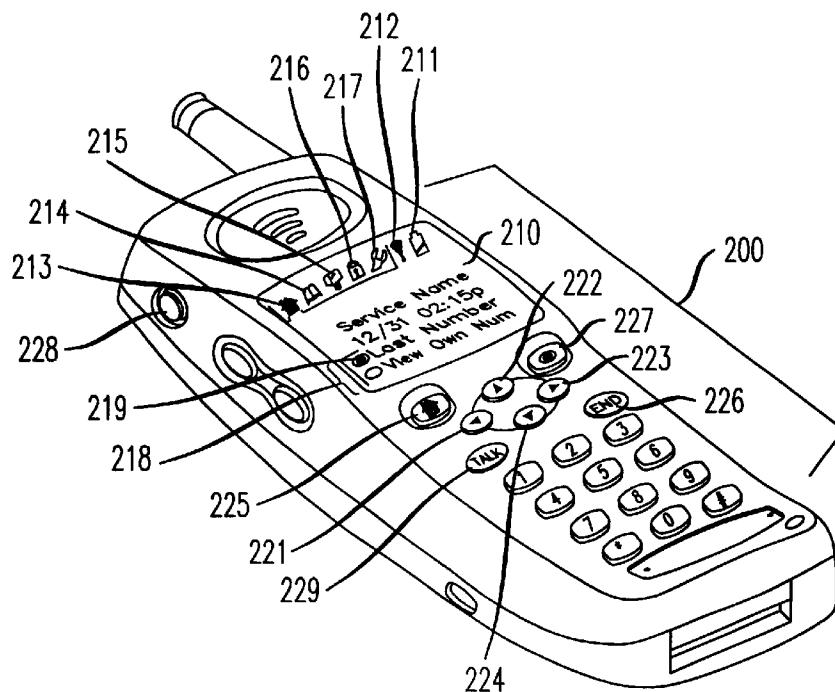


FIG. 2



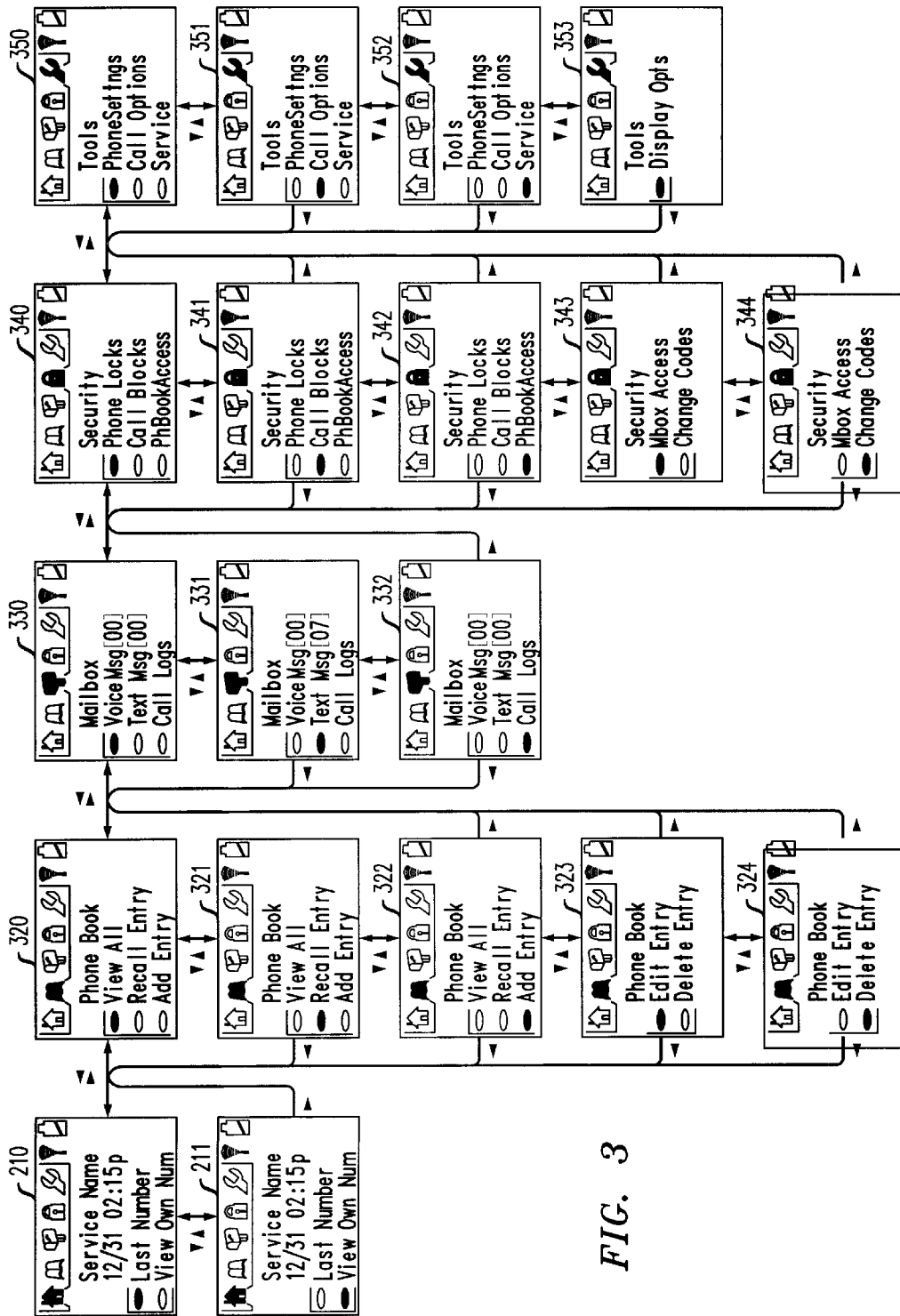
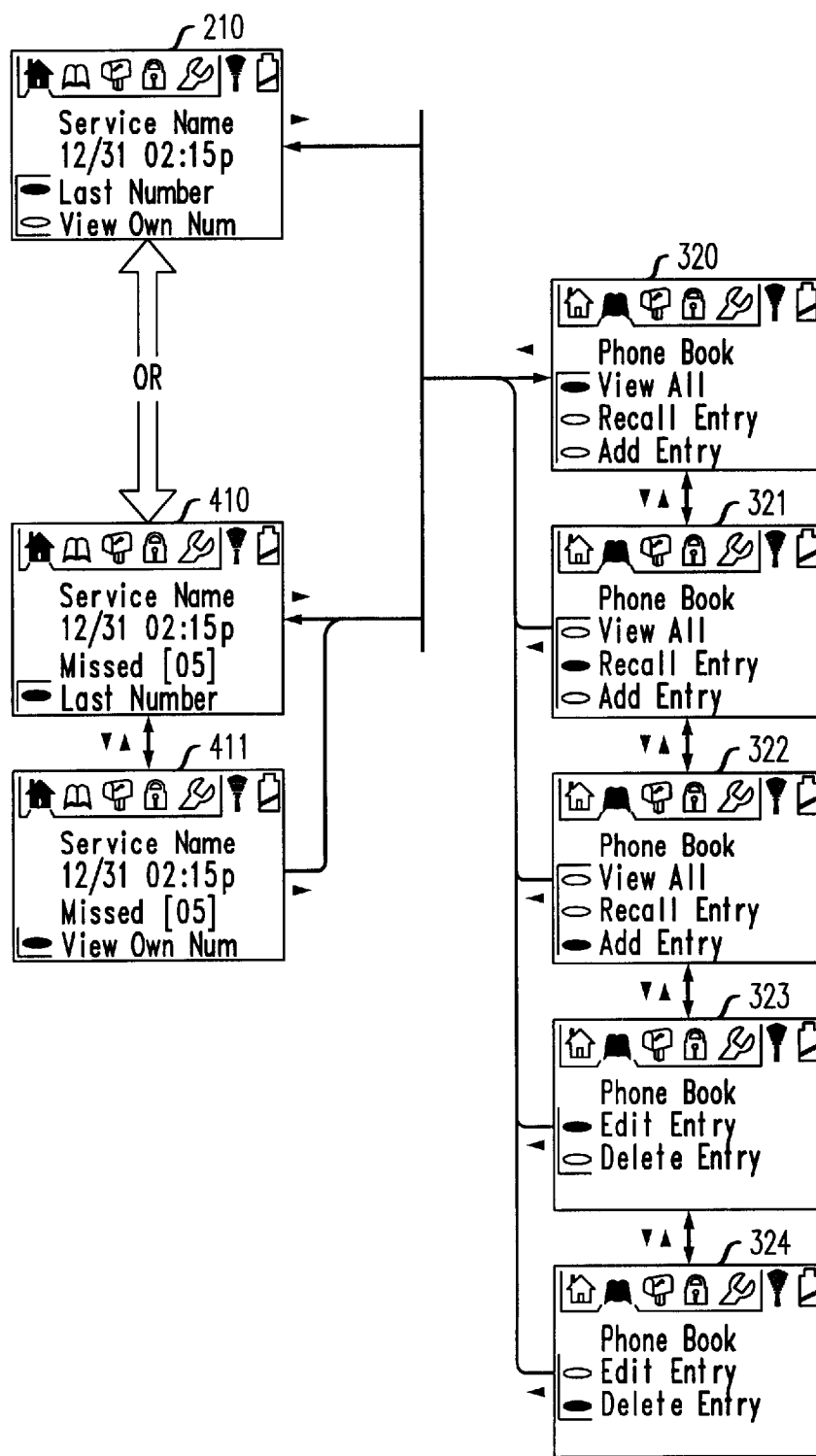


FIG. 3

FIG. 4



ARRANGEMENT FOR DYNAMIC ALLOCATION OF SPACE ON A SMALL DISPLAY OF A TELEPHONE TERMINAL

This application is a continuation of application Ser. No. 08/775,316, filed Dec. 31, 1996.

BACKGROUND OF THE INVENTION

1. Technical Field

This invention is directed to telephone terminals and, more particularly, a telephone terminal configurable for accessing features available on the terminal through an interactive display arrangement.

2. Description of the Prior Art

With the advent of numerous features now available at many telephone terminals, displays having selectable menu options are being commonly employed to aid users in accessing the features associated with these options. The display technology employed in most telephone displays today is character-based liquid crystal device (LCD) displays. These displays are configured in various array sizes such as, for example, a 2-line by 10-character LCD display, a 3-line by 12-character LCD display and a 4-line by 12-character LCD display. In order to be aesthetically pleasing when incorporated into a telephone housing, these displays tend to be small, typically on the order of one inch in height. Also, in order to provide a reasonable number of characters for information such as caller-ID information and directory access information, a small font size for the characters is generally used. Thus, the numerous available features unfortunately require large amounts of information to be presented on very small displays.

For optimizing the utilization of space on small displays, some telephone terminals use soft key user interfaces. While soft key approaches can increase the flexibility of managing access to numerous features, they require that a portion of the display be dedicated exclusively to this purpose. For example, many telephone terminals dedicate the bottom row of the display for presentation of label screen prompts which correspond to a set of hard keys. Although these screen prompts do improve somewhat the ease with which one uses the display, such a design constrains the amount of space available for presentation of non-menu items, and also constrains the number of soft key choices which may be shown at any given time. Further, existing terminal screen designs typically constrain the maximum number of characters available for menu labels.

SUMMARY OF THE INVENTION

The prior art problems are solved in accordance with the present invention which provides an arrangement for dynamically varying how space on a small display is allocated for presentation of various types of user information. This arrangement is more flexible in organizing and presenting information than existing arrangements.

In accordance with an aspect of the invention, the arrangement optimizes utilization of space on small displays by dynamically allocating lines on the display for presentation of status or header-type information as well as menu item-type information. The arrangement configures the display such that lines therein are dedicatable in any combination to displaying these two types of information. By way of example, on a terminal with a 4-line display, one line may be dedicated to status information, and three lines to menu items; or alternatively, two lines may be dedicated to status

information and two lines also to menu items. Thus, enhanced flexibility and efficiency are provided through use of this arrangement.

This invention and its mode of operation will be more clearly understood from the following detailed description when read with the appended drawings:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a wireless telephone terminal and a base unit, the telephone terminal being usable for incorporating the present invention;

FIG. 2 illustrates the telephone terminal of FIG. 1 including a user interactive display displaying a first menu screen accessible in accordance with the present invention; and

FIGS. 3 and 4 are flow charts illustrating some of the display screens provided by the circuitry shown in FIG. 1 and produced in an interactive display shown in FIG. 2 in accordance with the invention.

Throughout the drawing, the same elements when shown in more than one figure are designated by the same reference numerals.

DETAILED DESCRIPTION

Referring now to FIG. 1, there is shown an illustrative block diagram of a wireless telephone terminal 100 useful for describing the operation of the present invention. The terminal includes an input/output (I/O) interface unit 110 which connects to a radio frequency (RF) transceiver 111 containing a transmitter and receiver for providing communications in, by way of illustrative example, a cellular radio system.

Various types of cellular radio systems are known in the art and have been otherwise described. Once such system is described in *The Bell System Technical Journal*, Volume 58, January 1979, Number 1, particularly in papers entitled "Advanced Mobile Phone Service: Introduction, Background and Objectives" by W. R. Young and "The Cellular Concept" by V. H. MacDonald.

The RF transceiver 111 may also provide communications suitable for operating in a cordless telephone system. Such a cordless telephone system is described in U.S. Pat. Nos. 4,706,274 and 5,044,010, for example.

This I/O interface unit 110 contains switching and control circuits required by the terminal 100 for establishing, maintaining and terminating RF communications connections between terminal 100 and base unit 120. Through these circuits and via antennas 115 and 125, the terminal 100 thus sends to and receives the appropriate signals from the base unit via the RF transceiver 111.

The terminal 100 also includes a program memory 112 which provides instructions to a central processor unit (CPU) 113 for controlling the various operating features and functions originating at the terminal. This program memory 112 contains data for interpreting a plurality of codes representative of various control signals received from the base unit 120 and for generating codes to be transmitted to the base unit 120. A data memory 114 is utilized by the CPU 113 for storing and accessing data associated with performing the various functions and features programmed in the program memory 112. In the described embodiment, CPU 113 is a microprocessor, program memory 112 is read-only-memory (ROM) and data memory 114 is a random-access-memory (RAM). These components are readily available from a number of semiconductor manufacturers such as Intel, Motorola, AMD and NEC. Connected to the interface

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