

signal onto which data is modulated for recovery within the PDA. Alternate embodiments of the invention however would include recovering data via hot linking the PDA to a personal computer or perhaps coupling the PDA to an information source via a phone line or other type of direct data link, all of which are considered to be equivalent.

[0034] After a data stream has the information recovered there from in step 404, by well-known RF demodulation and data recovery techniques, the information must be formatted for display on a limited size screen area. Because the PDA display screen is relatively small, a scrolling or streaming type display, analogous to a ticker tape information display, readily lends itself to use with a personal digital assistant display unit. Formatting the information recovered from the data stream 406 necessarily requires that the symbols, icons or other characters of an information stream be formatted for display onto a personal digital assistant. In some embodiments, one or more lines of an LCD display on a PDA might scroll continuously. Alternate embodiments might have a signal line of the display momentarily stopped until a user toggles the display of the next line. Alternate (and equivalent) embodiments might pause the information update so that information scrolls across the display area 122 until it is filled, hold the displayed information for a set period of time, then update the displayed information by scrolling new information into the display area 122 (scrolling line display area). The display can of course scroll horizontally, vertically, diagonally, as a design choice.

[0035] After the data is appropriately formatted, it is transferred to (coupled into) the display unit for actual display to the user 408. In the case of embedded advertising, the PDA program control might wait for a response from the user in step 410, allowing an advertiser an opportunity to supplement a displayed ad by a hot link to a web site or the display of more information that might have been sent in the information stream, held in the PDA memory 210 but not displayed on screen 122 unless the PDA user requests it.

[0036] If no response is received in response to a displayed advertisement, such as those shown in FIG. 3, program control would typically return to statement 402 to continue receiving other incoming data streams or processing undisplayed information. If a response to an advertisement, such as those shown in FIG. 3 were received, program control would transfer to step 420 to determine whether more data is locally available in the PDA in which case it would be displayed in step 422. Alternatively, a hyper link to a web site or a request for a download of additional information from the information service provider takes place in step 422 with the subsequent display of that information in step 424 if it is available. At the conclusion of the determination of whether or not information is available, program control would return to the starting point of the process depicted in FIG. 4.

[0037] In FIG. 5, the reception of incoming data streams 500 followed by the detection of embedded messages and advertising text if any, is followed by the determination of whether or not user profile data is locally resident within the PDA 504. As an alternate embodiment, broadcast information by an information service provider 504 might be selectively displayed by the PDA if the PDA is programmed to filter information for display according to user-defined criteria or other data. A user profile might include certain key

words, topics or other recognizable criteria to identify subject matter in an information stream of interest to the PDA user. Upon the determination that broadcast information that was received by the PDA matches a user profile in step 506, a decision is made whether to display received contents that matches the user profile. If no information that was received matches the profile, nothing is displayed in step 507. If content information received by the PDA does match a user profile, which would typically be stored in RAM or ROM 210, a second test in step 508 would include the determination of whether embedded advertising information that was received at the PDA also matches the user profile. A determination that embedded advertisements, such as ads 308 and 310 match a user profile, would be followed by the display of those ads 510 on the display unit of the PDA. If the determination that no ads in the information stream matched the profile the display of advertising could be suppressed in step 512 with program control returning to the top of the program loop as shown.

[0038] By providing either a two way or one way radio link, or a wireless infrared data link or other communications interface to a personal digital assistant, it is possible to provide to the PDA user a virtually real time information stream. By appropriately calling information of interest to the PDA user it is possible to provide ongoing real time information of interest and possible to embed in that information, advertising messages generating revenue to subsidize all or part of the PDA service.

[0039] In addition to sending information such as that collected by the HPID service or its equivalents, other information such as commercial airline flight arrival times, delays, changes and other relevant information can also be sent to the PDA for display. Quotations of publicly traded securities and equities can be continuously broadcast to the PDA and displayed in a limited region of the screen. By using two-way paging, cellular or PCS communications services, two-way communications allow the ability to purchase or sell stocks and equities. Weather forecasts and related climate data could be broadcast to and received by the PDA as well as telephone numbers or e-mail messages, including access to the Internet using any part of the screen 102 as a display and input device. In addition to displaying any sort of data that might be sent to the PDA, local PDA data or information, such as time, date, schedules and appointments, location (regardless of how location might be determined such as GPS, triangulation or Blue-Tooth data network signals) that might already be contained within the PDA or provided thereto, can also be displayed on any part of the screen 102 or the scrolling line display area 122.

[0040] In addition to all of the foregoing, by providing an appropriate interface to the PDA, information that is scrolled or streamed in the display unit of the PDA could be also of course printed on an appropriate device linked to the PDA through any appropriate protocol. A printer interface on the PDA would allow the PDA to drive a printer directly. Alternate embodiments would allow the PDA to upload data to a PC, through a hot link for instance, so that the PC could perform the printing operation.

[0041] From the perspective of information service providers and advertisers, the PDA and the foregoing method by which large amounts of information interleaved with commercial advertising, might provide a significant business