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Chase, Jr.

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- [54] **AUTOMATIC DATA SYNCHRONIZATION BETWEEN A HANDHELD AND A HOST COMPUTER USING PSEUDO CACHE INCLUDING TAGS AND LOGICAL DATA ELEMENTS**
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- [73] Assignee: **Compaq Computer Corporation**, Houston, Tex.
- [21] Appl. No.: **08/689,304**
- [22] Filed: **Aug. 7, 1996**
- [51] **Int. Cl.⁶** **G06F 1/00**; G06F 15/00; G06F 17/30; G06F 15/62
- [52] **U.S. Cl.** **395/200.78**; 395/200.76; 395/821; 395/892; 395/893; 707/200; 707/203; 707/204
- [58] **Field of Search** 395/200.78, 200.76, 395/821, 892, 893; 707/200, 203, 204

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,897,781	1/1990	Chang et al.	364/200
5,337,044	8/1994	Folger et al.	340/825.44
5,392,390	2/1995	Crozier	395/161

OTHER PUBLICATIONS

Personal Air Communications Technology Brochure No. 32956.
 PSCI (Pacific Communication Sciences, Inc.) Brochure entitled pACT: An Advanced Two-Way Messaging and Paging Protocol.
 PCSI News Release dated Jun. 5, 1996, announcing Chip Set for pACT Two-Way Paging and Messaging Services.
 Vendetti, Don, Wireless Tutorial—Narrowband PCS: Two-Way Messaging, Wireless for the Corporate User (1996).
 PSCI, Product Brochure for PC18101F-01 Control Processor for AT&T pACT NPC System, Dec. 1, 1995.
 PSCI, Product Brochure for PC11503T Modem IC for AT&T pACT NPC System, Dec. 1, 1995.

PSCI, Product Brochure for PC11504T Modem Processor for AT&T pACT NPC System, Dec. 8, 1995.
 PSCI, Product Brochure for PC11605M Radio Transceiver for AT&T pACT NPC System, Dec. 1, 1995.
 Thryft, Ann R., pACT Adds Sophistication to Two Way Paging Services, EBN, Jun. 17, 1996, 1996, p. 22.
 Moore, Mark, "Pegasus to lack key functions", PC Week, Jun. 24, 1996, p.8.
 Matzkin, Jonathan, "The New PDA Hand-held devices head online", PC Magazine, Jun. 25, 1996, p. 31.
 Yoshida, Junko, "WebTV pulls Sony, Philips into the Net," Electronic Engineering Times, Jul. 15, 1996, p. 16.
 Wirbel, Loring, "Alliance to spin a wireless Web", Electronic Engineering Times, Jul. 15, 1996, pp. 1,8.
 Moore, Mark, "Users of Pegasus will get choice of wireless carriers", PC Week, Jul. 22, 1996, pp. 9,40.

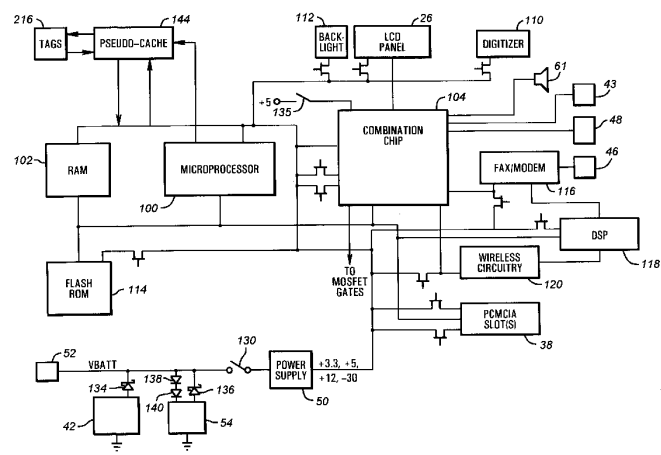
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Attorney, Agent, or Firm—Akin, Gump, Strauss, Hauer & Feld, LLP

[57] **ABSTRACT**

An apparatus is disclosed for performing dynamic synchronization between data stored in a handheld computer and a host computer, each having a plurality of data sets including at least one common data set, each computer having a copy of the common data set. The handheld computer has a processor, a communication port, and a data synchronization engine. The data synchronization engine has a pseudo-cache and one or more tags connected to the pseudo cache. Data is synchronized whenever data is written to main memory and/or when the associated pseudo-cache tag is invalidated. By strict adherence to a set of protocols, data coherency is achieved because the system always knows who owns the data, who has a copy of the data, and who has modified the data. The data synchronization engine resolves any differences in the copies and allows the storage of identical copies of the common data set in the host computer and in the handheld computer.

25 Claims, 25 Drawing Sheets



OTHER PUBLICATIONS

Wolfe, Alexander, "Microsoft poses PC specs", Electronic Engineering Times, Aug. 8, 1996, Issue 909, pp. 1, 8.

Gardner, W. David, "Microsoft eyes one-way paging to jump-start handhelds", Electronic Engineering Times, Aug. 8, 1996, Issue 909, pp. 10, 16.

Grace, Elden, "RF Filter Technology for Wireless Communications", Wireless Design & Development, p. 8.

Sharp Model ZR-5700/ZR-5800 Keyboard Enhanced Personal Digital Assistant-Zaurus Operational Manual, pp. 1-61.

FIG. 1A

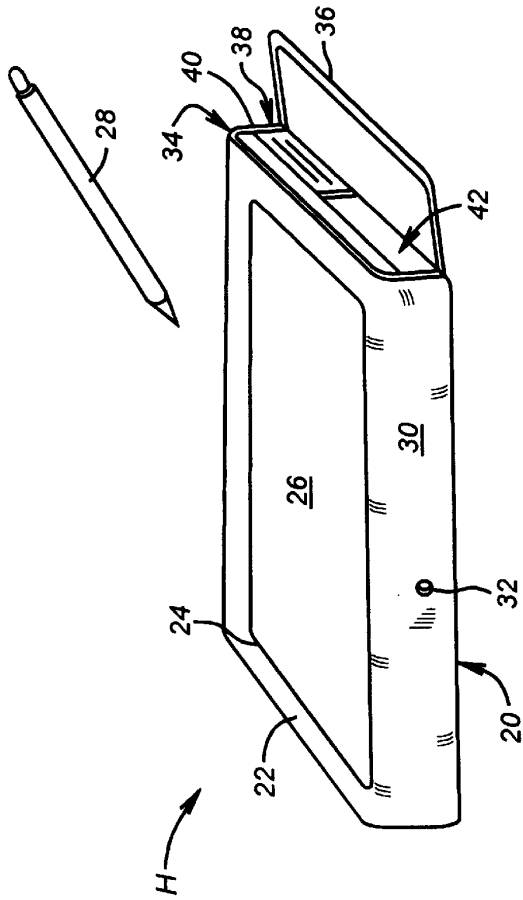
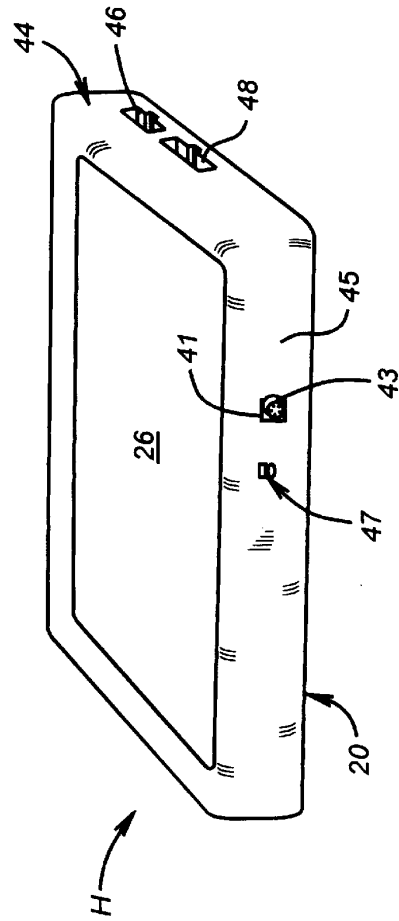


FIG. 1B



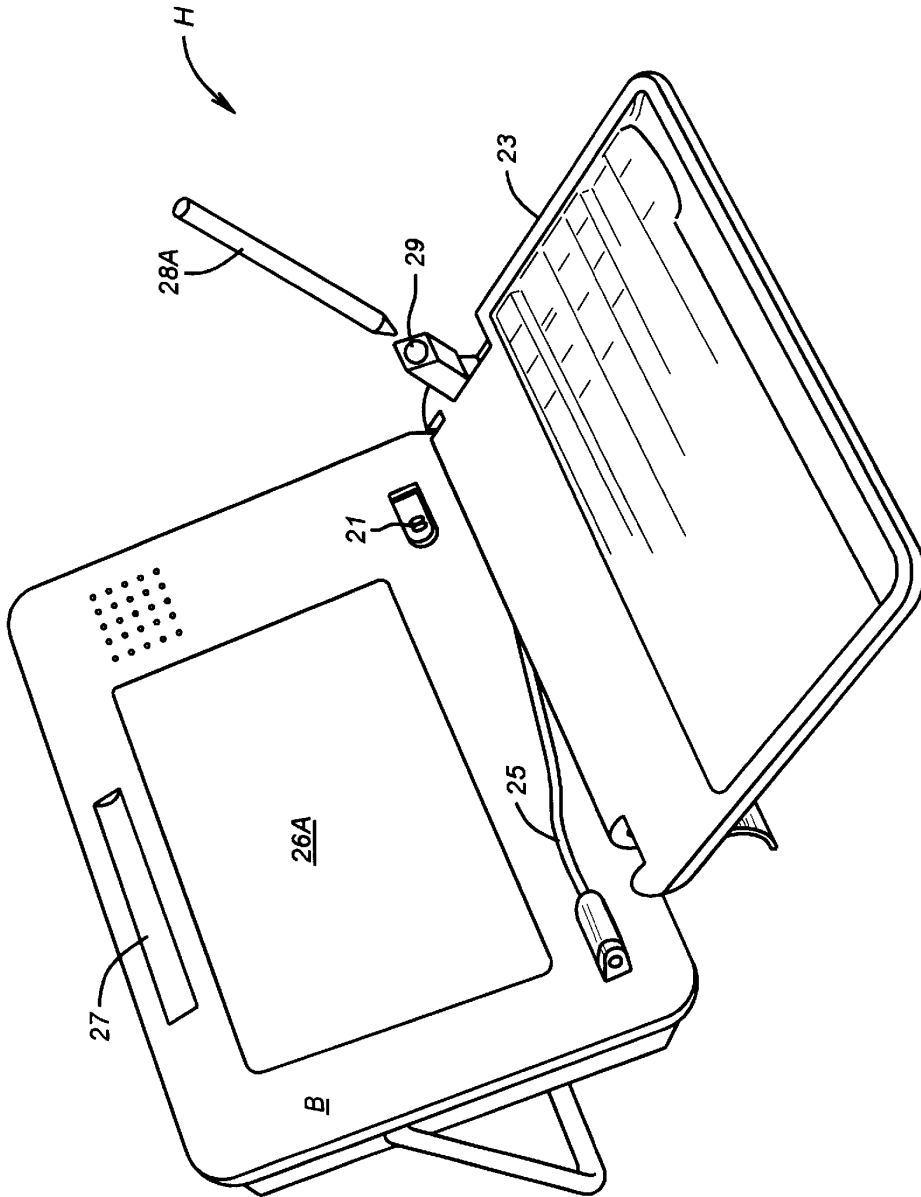


FIG. 1C

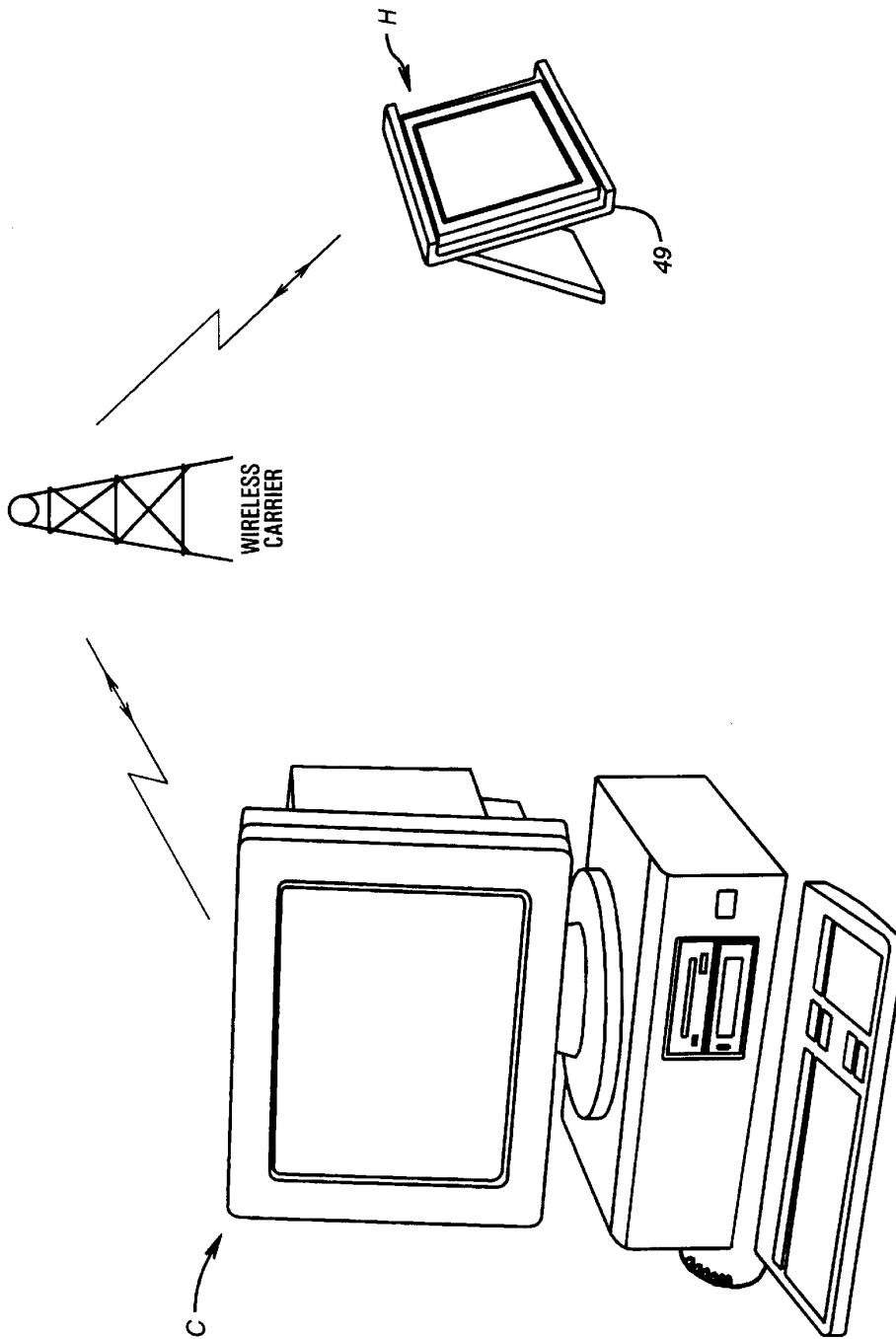


FIG. 1D

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