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(54) **SYSTEM, METHOD AND APPARATUS FOR VENDING MACHINE WIRELESS AUDIT AND CASHLESS TRANSACTION TRANSPORT**

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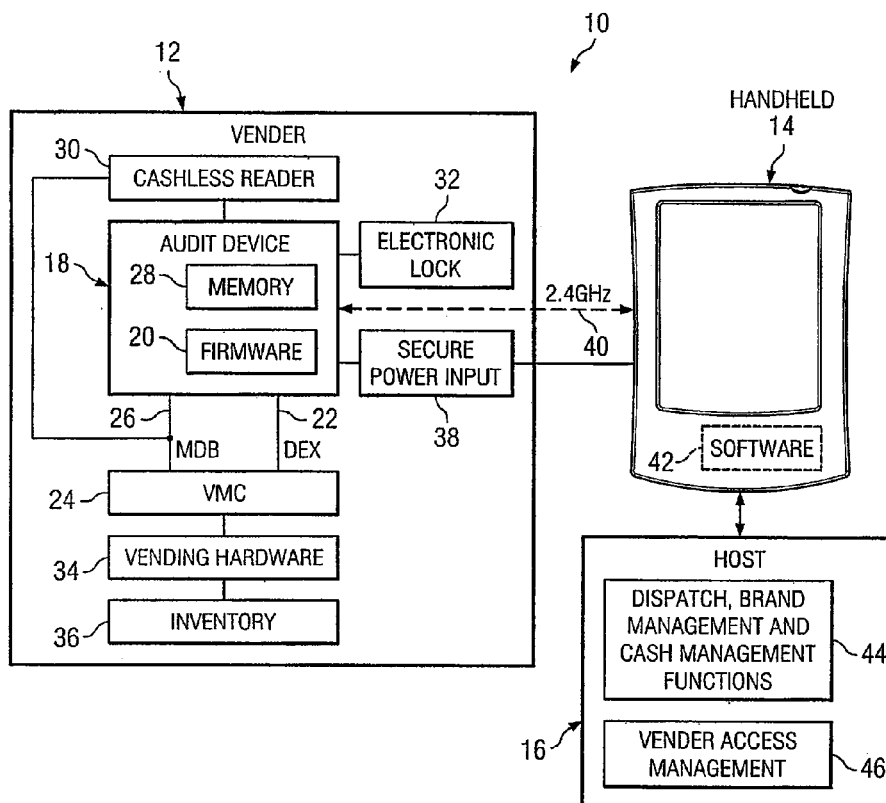   **Bryan W. Godwin**, Round Rock, TX (US)

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(60) Provisional application No. 60/429,756, filed on Nov. 27, 2002. Provisional application No. 60/480,626, filed on Jun. 23, 2003. Provisional application No. 60/078,645, filed on Mar. 19, 1998. Provisional application No. 60/099,434, filed on Sep. 8, 1998.

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(57) **ABSTRACT**

The present invention provides a system, method and apparatus for collecting, storing and communicating vending machine transaction data. The system preferably includes an embedded data collection and storage device that, when placed inside a vending machine, will collect both DEX and MDB data using a combination of ad-hoc scheduling and trigger-based events. In addition, the embedded data collection and storage device may collect transaction data concerning handheld transactions as well as vending machine error transactions, including timestamps. Functionality operable to permit handheld computer communication with the vending machine, as well as at least a cashless media transaction device may also be included. Data transferred to the handheld computer may be subsequently communicated to one or more host applications or credit agencies.
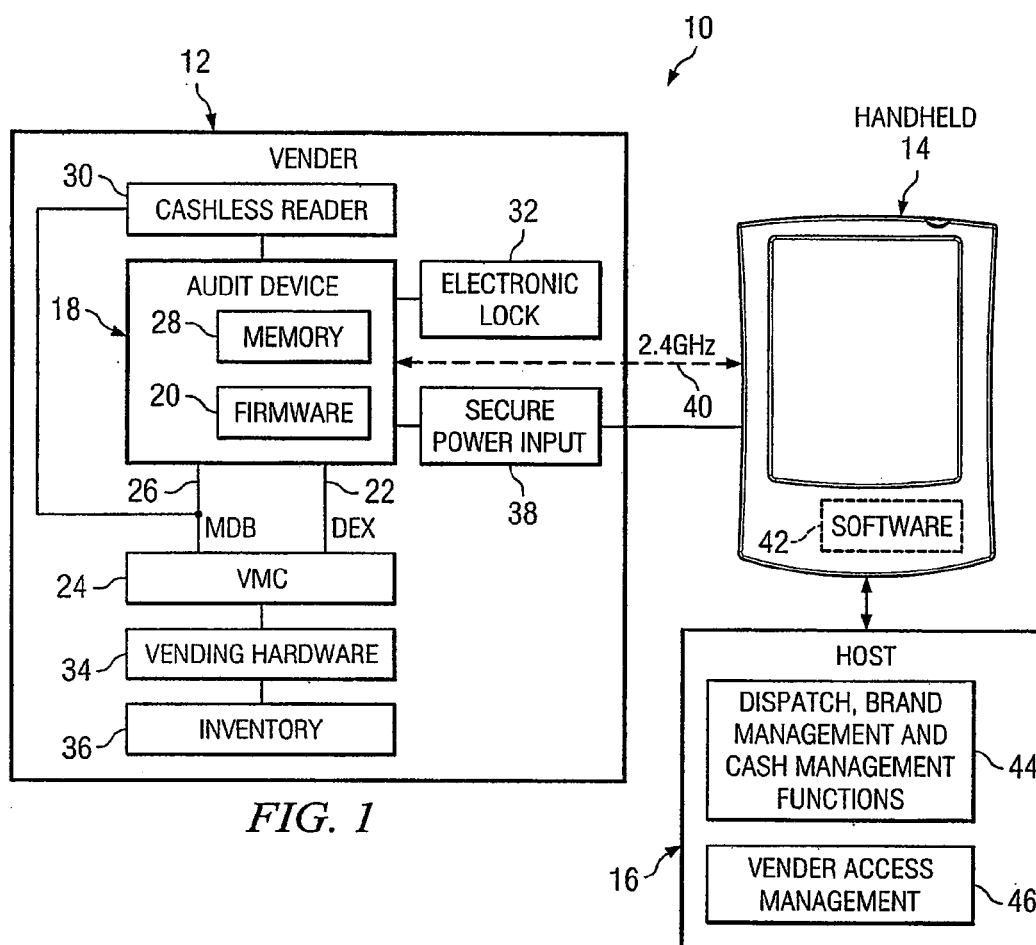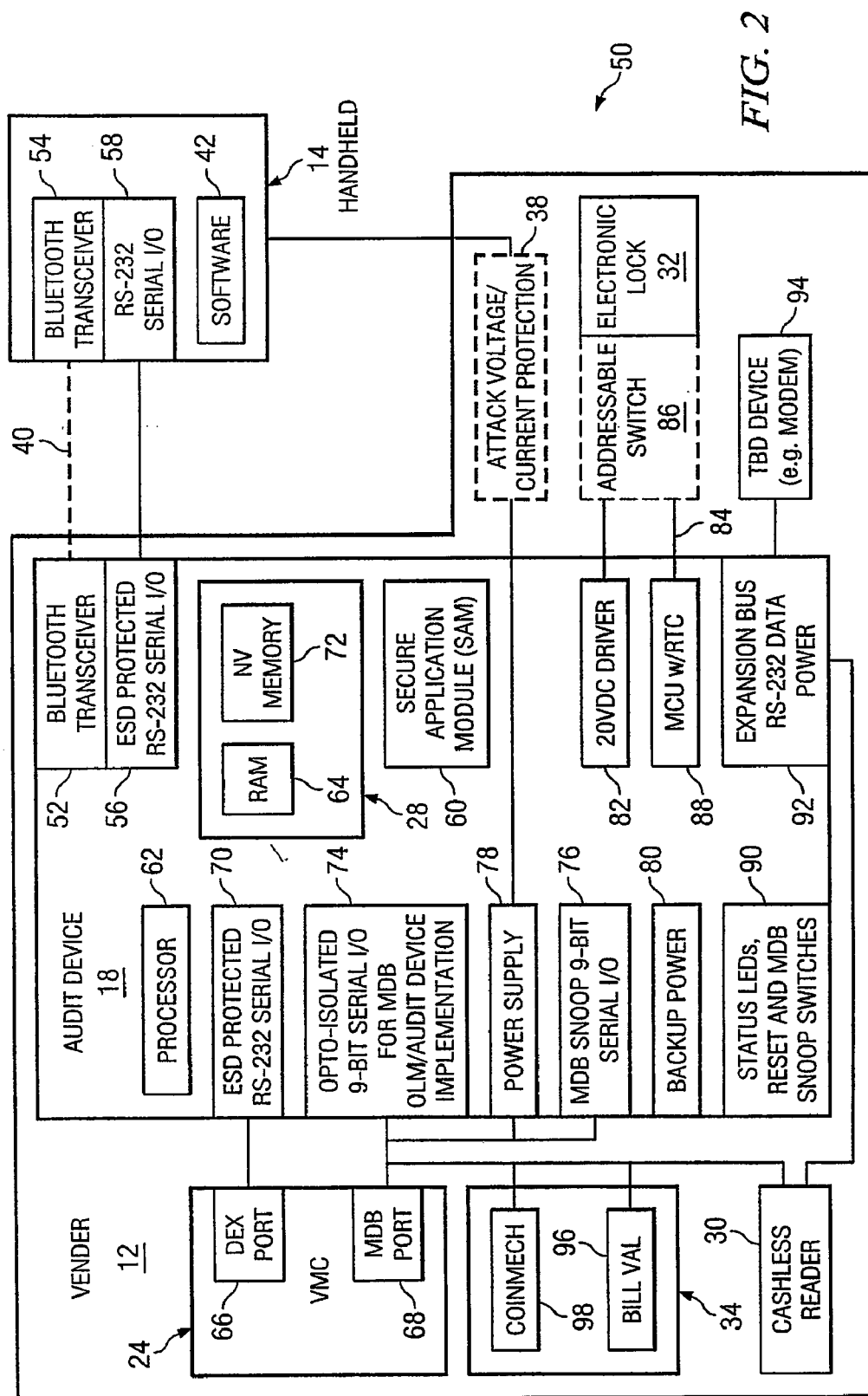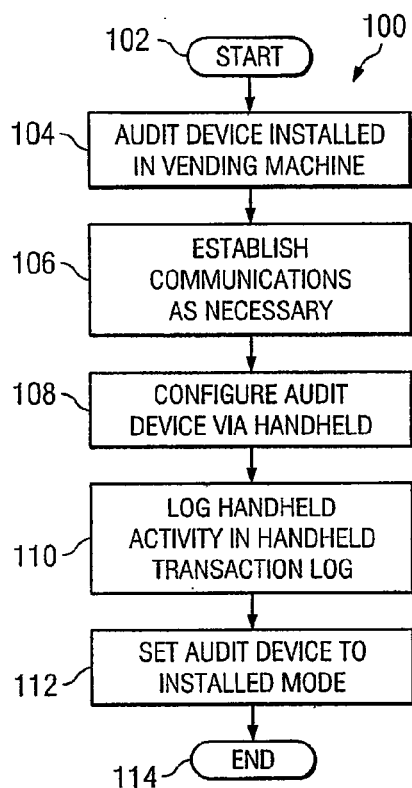
FIG. 1

FIG. 2

102 — START ↙ 100

104 — AUDIT DEVICE INSTALLED IN VENDING MACHINE

106 — ESTABLISH COMMUNICATIONS AS NECESSARY

108 — CONFIGURE AUDIT DEVICE VIA HANDHELD

110 — LOG HANDHELD ACTIVITY IN HANDHELD TRANSACTION LOG

112 — SET AUDIT DEVICE TO INSTALLED MODE

114 — END

FIG. 3

142 — START ↙ 140

144 — INSPECT VENDING MACHINE USER INTERFACE

146 — INTERFACE HANDHELD WITH AUDIT DEVICE

148 — PROBLEM ASSESSMENT AND CORRECTION

150 — OPTIONAL FUNCTIONS

152 — COMMAND ELECTRONIC LOCK AS REQUIRED

154 — LOG HANDHELD ACTIVITY IN HANDHELD TRANSACTION LOG

156 — END

FIG. 5

122 — START ↙ 120

124 — INTERFACE HANDHELD WITH AUDIT DEVICE

126 — PERFORM DATA MANAGEMENT

128 — COMMAND ELECTRONIC LOCK AS REQUIRED

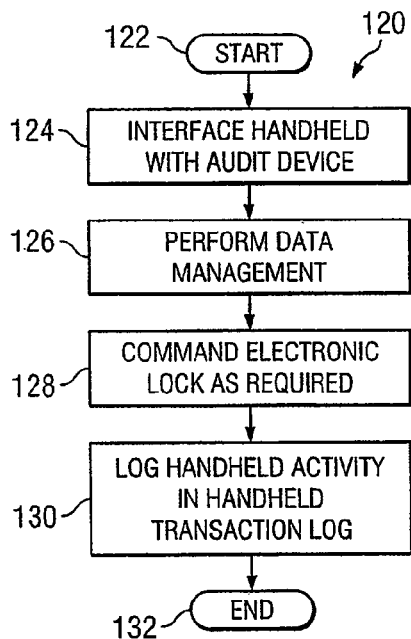130 — LOG HANDHELD ACTIVITY IN HANDHELD TRANSACTION LOG
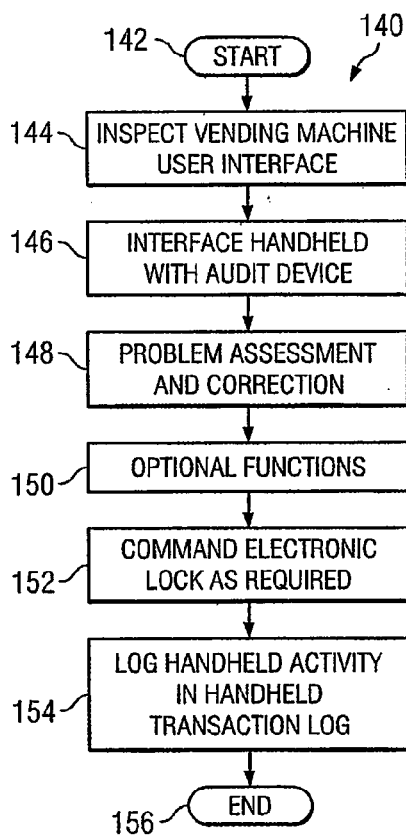
132 — END

FIG. 4

SYSTEM, METHOD AND APPARATUS FOR VENDING MACHINE WIRELESS AUDIT AND CASHLESS TRANSACTION TRANSPORT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a divisional of U.S. patent application Ser. No. 10/722,954 entitled "System, Method and Apparatus for Vending Machine Wireless Audit and Cashless Transaction Transport" filed on Nov. 26, 2003 by Erin M. Defossé et al. and claims the benefit of U.S. provisional application No. 60/429,756 entitled "System and Method for Wireless Audit and Cashless Transaction Transport" filed Nov. 27, 2002 by Erin M. Defosse and claims the benefit of U.S. provisional application No. 60/480,626 entitled "System and Method for Auditing a Vending Machine" filed Jun. 23, 2003 by Erin M. Defossé and is a continuation-in-part of U.S. patent application Ser. No. 09/971,170 filed on Oct. 4, 2001 by Erin M. Defossé and entitled "Remote Data Acquisition, Transmission and Analysis System Including Handheld Wireless Equipment," (Attorney Docket No. 064814.0184) which is a continuation of U.S. patent application Ser. No. 09/267,254 filed on Mar. 12, 1999 by Erin M. Defossé and entitled "Wide Area Network Operation's Center that Sends and Receives Data from Vending Machines," (Attorney Docket No. 064814.0107) now U.S. Pat. No. 6,457,038 that claims priority to U.S. Provisional Patent Application Ser. No. 60/078,645, filed Mar. 19, 1998, and entitled "Remote Data Acquisition and Transmission System for the Monitoring and Control of Vending Machines," and U.S. Provisional Patent Application Ser. No. 60/099,434, filed Sep. 8, 1998, and entitled "Remote Data Acquisition and Transmission System."

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates generally to vending machines and, more particularly, to vending system management and transaction reporting.

BACKGROUND OF THE INVENTION

[0003] The availability of new technologies has given vending machine manufacturers and software developers many tools to address market demands of vending operators. Advances in software and electronics are now enabling the use of computer controls and data acquisition systems directly inside a vending machine. Some of the latest vending machines now make it possible for vending machine operators to download selected aspects of operational information on-site onto portable computers. Although these computerized systems make it easier for operators to gather and analyze some data, they generally ignore many significant aspects of vending operations and commonly provide untimely data. In addition, these computerized systems are typically cumbersome, difficult to connect and fail to leverage advanced functionality likely to enhance vending machine operation efficiency and profitability.

SUMMARY OF THE INVENTION

[0004] In one aspect, the present invention provides a system for auditing a vending machine. In a preferred

a multi-drop-bus (MDB) for communicating with a (MDB) interface of a vending machine controller (VMC) and a DEX interface for communicating with a DEX interface of the vending machine controller. The system preferably also includes a computer interface in the audit device for communicating with a handheld computer. The audit device of the system preferably further includes a clock and clock control logic for automatically synchronizing the clock and the audit device with a clock in the handheld computer. Nonvolatile memory is preferably included in the audit device for storing DEX data and MDB data. Audit control logic is preferably also included and operable to automatically collect DEX data and MDB data from the VMC. The audit control logic preferably further stores timestamps with the DEX and MDB data to record current times for individual events and conditions within the vending machine. The audit device preferably further includes authentication control logic for preventing unauthorized communications over the computer interface and transfer control logic for transferring collected DEX data and MDB data from the audit device to the handheld computer.

[0005] In a further embodiment, a method for auditing a vending machine is provided. The method preferably includes the operations of automatically collecting audit data in an audit device mounted in a vending machine according to predefined collection criteria. In addition, the method preferably provides for storing the audit data with associated timestamps to record occurrence times for individual events and conditions within the vending machine. Continuing, the method preferably includes receiving authentication information from a handheld computer at the audit device and in response to the authentication information, testing the authentication information for validity. In response to receiving valid authentication data, the method preferably provides for synchronizing a clock in the audit device with a clock in the handheld computer and transferring at least a portion of the audit data to the handheld computer. Further, the method preferably provides for transmitting the audit data from the handheld computer to a host application on a central computer for analysis.

[0006] In a further embodiment, teachings of the present invention provide an apparatus for collecting, storing and communicating vending machine data. In a preferred embodiment, the apparatus preferably includes at least one processor, at least one memory operably coupled to the processor and at least one communication port operably coupled to the processor and the memory. In a preferred embodiment, the communication port is preferably operable to communicate vending machine transaction data including cashless transaction data obtained from a cashless media device to a handheld computer.

[0007] In still another embodiment, teachings of the present invention provide a method for communicating with a vending machine. The method preferably includes transmitting information from a handheld computer to a vending machine via a wireless communications interface in the vending machine operating substantially in accordance with at least one unlicensed radio band. The method preferably further includes receiving information at the handheld computer from the vending machine via a wireless communica-

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