

Revenue/Customs officials, and the other that is based on the electronic capture of transaction data by static devices at a participating retailer's shop and the use of this data to perform a risk-based selection of transactions for physical checks at the point of departure by Revenue/Customs officials.

- 5 For example, in Singapore the GST paid for purchases at the shops can be refunded via an electronic Tourist Refund Scheme (eTRS). The eTRS scheme starts when a tourist makes a purchase at a participating retailer and shows his passport at the point of purchase to prove his eligibility. Some non-exhaustive examples of the criteria that the tourist must fulfill in order to be
- 10 eligible for the GST tax refund include:
- i. the tourist is not a Singapore citizen or permanent resident of Singapore;
  - ii. the tourist had not spent more than 365 days in Singapore in the past twenty-four (24) months before the date of purchase;
  - iii. the tourist has not been employed in Singapore at any time in the past six
  - 15 (6) months before the date of purchase;
  - iv. the tourist is sixteen (16) years old or above at the time of purchase; and
  - v. the tourist is not a crew member of any aircraft or international cruise departing Singapore.

When paying for the purchases, the tourist would typically utilize a credit/debit

20 card. Information such as the sixteen-digit primary account number (PAN) related the credit/debit card may be used as an identifier or token for tagging the purchases entitled for refund. The participating retailer (merchant) may also issue a paper eTRS Ticket to the tourist. The eTRS Ticket can also be used as a token instead of the credit/debit card.

25 With this token, the tourist can apply for a GST refund at the eTRS self-help kiosk before checking in at an airport or other immigration departure points such as, but not limited to, an airport or a cruise centre. If approved, the eTRS self-help kiosk would generate a Notification Slip indicating "Approved". Depending on the mode of refund selected by the tourist, the tourist can

obtain the refund (minus a service fee) by a direct credit into a designated refund account, such as credit card account, by a bank cheque or in cash at a central refund counter using the approved Notification Slip. If not approved, the eTRS self-help kiosk would generate a Notification Slip indicating that the  
5 refund is "Not Approved". The tourist then brings his purchases to the Customs counter for physical inspection. If the goods pass Customs inspection, a Customs officer would generate a Notification Slip indicating "Approved" to replace the "Not Approved" Notification Slip. During peak hours, these could become bottlenecks in processing the departing tourists as the  
10 customs counter is limited by manpower while the self-help kiosks may be overwhelmed by the number of tourists applying for refunds. Departing tourists typically have to arrive at the immigration departure points earlier to locate these static self-help kiosks in anticipation of a queue.

Further, in order to qualify for the GST refund in Singapore, the tourist must  
15 meet certain criteria. These criteria include spending at least S\$100 (including GST) that can be accumulated in up to three (3) same-day invoices or receipts from retailers bearing the same GST registration number. Also, the tourist has to depart with the goods via the airport or cruise centre within a predetermined period, such as two (2) months from the date of purchase. The  
20 tourist must also depart with the goods within twelve (12) hours after obtaining approval of the GST refund. If the tourist is departing on an international cruise (excluding cruises-to-nowhere, round-trip cruise and regional ferry) from the cruise terminal, he must declare that he is exiting Singapore and will not return via the same voyage on the same ship, using his cruise itinerary as  
25 documentary proof of departure, and commit that he will not be returning to Singapore within forty-eight (48) hours. Further additional criteria may be imposed on student pass holders.

The authorities typically require that the purchases are verified against the invoices or receipts, and the goods are unused, unopened and exported out  
30 of the country and this is done at a counter either before check in (for goods that are to be checked in) or after immigration, to ensure that the goods are exported. However, the authorities at times do a targeted check instead.

With the proliferation of mobile devices, it is common for tourists to travel with at least one personal mobile device that may be used to connect to the internet either via a wireless fidelity (Wi-Fi) networks or mobile telecommunications networks. Hence, it is envisaged that the functions of the mobile device, in particular smartphones, can be better utilized in allowing electronic tax refunds to be facilitated through the use of a dedicated software application residing on this mobile device together with its onboard camera, geo-location module, wireless communication module (Bluetooth and Wi-Fi), alarm notifications, internet connectivity etc.

10 The present invention seeks to provide a system and method that alleviates the above-mentioned drawbacks or meet the above needs at least in part.

#### **SUMMARY OF THE INVENTION**

Throughout the document, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Furthermore, throughout the specification, unless the context requires otherwise, the word "include" or variations such as "includes" or "including", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

The present invention seeks to meet the needs of a tax refund system that does not rely on self-help kiosks, and enables users such as tourists to access their tax refunds efficiently and accurately. The invention proposes a system and method of administration by way of an application software installable on mobile devices to verify user identity, facilitate a completely paperless tourist tax refund experience, and enable more types of transaction data to be captured for a more complete risk-based selection.

A technical problem the invention seeks to solve relates to the bottlenecks faced by customs at peak hour. Another technical problem is associated with

the need to verify identities of tourists and transactions, such as purchases against the invoices and receipts in a more effective and efficient manner to reduce identity and transaction frauds.

The above and other problems are alleviated at least in part and an  
5 improvement in the art is made by a system in accordance with this invention. A first advantage of the system in accordance with this invention is that the tourist refund process is completely electronic, thereby eliminating the need to deal with paper refund tickets and paper receipts. A second advantage of the system in accordance with this invention is that the tourist is able to register in  
10 their own time and convenience on their mobile devices and after logging into the system, the tourist is able to view a consolidated list of all the refund claims they have made via the system, the additional spending required in order to fulfil the minimum spending requirement, as well as the amount of intermediate value accumulated and used. Such intermediate value may be  
15 translated into a form of 'rewards points' or the like. An associated third advantage of the system in accordance with this invention is that by having an intermediate value system (in the form of rewards point or the like) that is currency agnostic, there is no need to convert currencies. This mitigates any fluctuations in the exchange rates. Such an arrangement provides more  
20 certainty to the tourist in terms of the amount of tax refund obtainable, which can be spent even before the refund was actually approved. In accordance with an aspect of the invention there comprises a system for facilitating refund to a user comprising: a mobile device having means to communicate with a central processor for the generation of a refund account and a unique  
25 identifier; the unique identifier associated with the user; a computer device operable to access the unique identifier for verification upon receipt of a refund qualifying transaction associated with the user, the computer device further operable to receive and send information relating to the refund qualifying transaction and generate a refund request upon successful  
30 verification; and the central processor operable to be in data communication with the computer device to receive or send information relating to verification of the unique identification and the refund qualifying transaction and process



the verification or refund request, the central processor further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.

- 5 In some embodiments, the refund may be a tax refund, and be in the form of an intermediate value. The intermediate value may be derived from the actual value of refund based on a conversion rate.

10 In some embodiments, the computer device may be a point-of-sale device, such that the point-of-sale device may be configured to directly send information relating to the refund qualifying transaction to the central processor.

15 In some embodiments, the generated unique identifier may be encoded as a quick response (QR) code and the computer device accesses the unique identifier by scanning the QR code displayed on the mobile device.

20 In some embodiments, the central processor may be operable to send the electronic ticket to a third party server for further verification of the refund qualifying transaction and confirmation of the refund.

25 In some embodiments, the central processor stores the information relating to the refund qualifying transaction in a database before the electronic ticket is generated and sent to the third party server.

In some embodiments, the mobile device may be operable to send an electronic notification related to a requirement being met. The requirement may be a confirmation of departure, or a Declaration of Eligibility.

30 In some embodiments, the mobile device may be operable to receive a notification of refund issued by a third party server once the electronic ticket is processed successfully.

In some embodiments, the central processor is operable to receive a notification of refund issued by a third party server once the at least one electronic ticket is processed successfully and the central processor is operable to send a notification of refund to the mobile device.

5

In some embodiments, the unique identifier associated with the user is generated based on a passport information of the user.

10 In some embodiments, the unique identifier is generated after a registration process.

In some embodiments, the unique identifier is further associated with an image capture of the passport.

15 In some embodiments, the mobile device is integrated with the computing device.

In some embodiments, the central processor is operable to send a notification to the mobile device indicating the success or failure of the refund request.

20

In some embodiments, there comprises another unique identifier associated with a retailer using the computer device.

25 In some embodiments, the another unique identifier is generated after a registration process by the retailer.

In some embodiments, the another unique identifier is further associated with an image capture of one or more account information associated with the retailer.

30

In some embodiments, if the unique identifier is not accessible by the computer device, the computer device is operable to obtain an alternative identifier for verification and send the alternative identifier to the central

processor.

5 In some embodiments, upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

10 In some embodiments, the central processor comprises or is in data communication with a database for storing at least one retailer list of goods and services eligible for tax refund.

15 In some embodiments, the central processor is operable to receive a wish-list of goods and services from the mobile device and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods and services.

20 In some embodiments, when there is a match between the wish-list and the at least one retailer list, the central processor is operable to provide a matched list to the mobile device.

25 In some embodiments, where the electronic ticket is a provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts.

In some embodiments, the provisional electronic ticket is converted to a final electronic ticket at an approved departure point.

30 In some embodiments, the central processor arranged in data communication with at least one third party server to retrieve information related to the identity of the user, and sends the information related to the identity of the user to the computer device.

In some embodiments, if the refund request is not successfully processed, the central processor is arranged in data communication with another computer device provided to an authorized personnel to perform further processing.

- 5 In accordance with another aspect of the invention there is a method for facilitating a refund to a user comprising the steps of: communicating via a mobile device with a central processor for the generation of a refund account and a unique identifier, the unique identifier associated with the user; via a computer device, accessing the unique identifier for verification on receipt of a  
10 refund qualifying transaction associated with the user; generating a refund request upon successful verification; sending information relating to the refund qualifying transaction via a central processor; receiving and processing the refund request; wherein the central processor is further configured to generate an electronic ticket to be sent to the mobile device for the generation of a  
15 refund upon successful process of the refund request.

In some embodiments, the method further includes the step of converting the refund to an intermediate value after the generation of the refund.

- 20 In some embodiments, the intermediate value is derived from the actual value of refund based on a conversion rate.

- In some embodiments, the method further comprises the step of exporting the information relating to the refund qualifying transaction via a point-of-sale  
25 (POS) device in data communication with the computer device, the point-of-sale device is configured to directly send information relating to the refund qualifying transaction to the central processor.

- In some embodiments, the computer device accesses the unique identifier by  
30 scanning an image shown on the mobile device.

In some embodiments, the method further comprises the step of sending the electronic ticket to a government server for further verification of the refund

qualifying transaction and confirmation of the refund.

5 In some embodiments, the mobile device is operable to send an electronic notification related to a requirement being met. The requirement may be a confirmation of departure. The requirement may alternatively, or in conjunction, be a Declaration of Eligibility.

10 In some embodiments, the generation of electronic ticket is based upon one or more requirements being met.

In some embodiments, the method further comprises a step of sending an electronic notification to the mobile device indicating the success or failure of the refund request.

15 In some embodiments, the method further comprises a step of obtaining an alternative identifier for verification and sending the alternative identifier to the central processor if the unique identifier is not accessible by the computer device.

20 In some embodiments, upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

25 In some embodiments, the central processor comprises a database for storing at least one retailer list of goods eligible for tax refund.

30 In some embodiments, the central processor is operable to receive a wish-list of goods from the mobile device and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods or services.

In some embodiments, when there is a match between the wish-list and the at

least one retailer list, the central processor is operable to provide a matched list to the mobile device.

5 In some embodiments, the electronic ticket is a provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts. The provisional electronic ticket may be converted to a final electronic ticket at an approved departure point.

10 In accordance with another aspect of the invention there is a non-transitory computer readable medium containing executable software instructions thereon wherein when executed on a mobile device and/or a computer device performs the method of facilitating a refund to a user comprising the steps of: communicating via the mobile device with a central processor for the generation of a refund account and a unique identifier, the unique identifier  
15 associated with the user; accessing the unique identifier for verification via a computer device on receipt of a refund qualifying transaction associated with the user; sending information relating to the refund qualifying transaction; generating a refund request upon successful verification; and receiving and processing the refund request by a central processor, wherein the central  
20 processor is further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.

The non-transitory computer readable medium may further comprises a software instruction to send an electronic notification to the mobile device  
25 indicating the success or failure of the refund request.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

30 Fig. 1 is the overall architecture of an embodiment of the invention showing how the various parts of the system interact;

Fig. 2 is a flowchart of an embodiment of the invention showing how a user is taken through the system when the application is launched;

Fig. 3 is a state machine diagram of an embodiment of the invention; and

Fig. 4 and Fig. 5 show how a single MDCC device may be used for the deployment of tourist refund in accordance with other embodiments of the invention.

Other arrangements of the invention are possible and, consequently, the accompanying drawing is not to be understood as superseding the generality of the preceding description of the invention.

10

## **PREFERRED EMBODIMENTS OF THE INVENTION**

Particular embodiments of the present invention will now be described with reference to the accompanying drawings. The terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the scope of the present invention. Additionally, unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood by one of ordinary skill in the art to which this invention belongs.

20

In accordance with an embodiment of the present invention and with reference to Fig. 1, there is a system 10 for facilitating refunds. The refund may be in the form of tax refund provided to a tourist and will be described in such a context. It is to be appreciated that the system 10 may be adapted for other types of refunds and not limited to a tax refund. The term 'refunds' include refund in an electronic medium.

The system 10 comprises a central processor 110. Central processor 110 may be in the form of one or more processors and/or servers 110 belonging to an organisation administering the tourist refunds. An example of such an organisation is the Central Refund Agency (CRA). The CRA may be a private organisation, a government organisation, or a quasi-government organisation.

30

The CRA may further be in data communication with a Central Clearing House (CCH) 170 for the purpose of settlement and crediting of refund value.

The one or more servers 110 can include a cloud server or a conventional server with data communications capability. For the ease of discussion, the

5 one or more server will hereinafter be referred to as 'server' or 'servers'.

Server 110 may be connected to one or more databases (not shown). Such database(s) are operable to contain records and information relating to the tourist refunds such as name, addresses and/or pre-generated or generated

unique identifiers associated with the users seeking refunds. Server 110 is

10 also operable to generate and update refund accounts for facilitating, processing and crediting refunds.

In one embodiment, the system 10 comprises a mobile device 120, preferably endowed with communications and computing capabilities and hereinafter

referred to as MDCC 120, and computing device 130 (hereinafter referred to

15 as 'Retailer Device' 130). The Retailer Device 130 can also be an MDCC or other computing device like a desktop/laptop computer. A Point-of-Sale (POS)

device/system may be in data communication with the Retailer Device 130, the data communication in wired or wireless, remotely or otherwise.

Alternatively, the POS device or its associated function may be

20 incorporated/integrated with the Retailer device 130 as a module.

To facilitate the refund process, the mobile device 120 and computing device 130 may be installed with dedicated software applications (colloquially known

as 'apps'). Such dedicated software applications may be operating system (OS) such as iOS<sup>TM</sup> or Android<sup>TM</sup> specific, and/or device specific.

25 The software application installable on mobile device 120 provides a user interface for user registration and for retrieving or providing information for the refund process. Once installed, the software application is operable to perform at least the following functions:-

a. receive registration details entered by the user;

30 b. communicate with the server 110 to send the registration details;

c. receive from the server 110 a unique identifier associated with the user (tourist);

d. receive from the server 110 information related to the refund process;



- e. display notifications/alerts on the MDCC 120 relating to refund process;
- f. provide user interface for user to browse or view account details;
- g. search for necessary communication networks for data communication with the server 110 and the computing device 130 (if necessary); and
- 5 h. store, organise and retrieve information received from various parties.

The MDCC 120 and the Retailer Device 130 can be any mobile electronic device(s) that can connect wirelessly to Wi-Fi networks or conventional telecommunications networks such as 2G, 3G, 4G, or LTE based networks. The mobile electronic devices include, but are not limited to mobile devices  
10 like smartphones, personal digital assistant (PDA) phones and tablets. The devices include mobile devices running on iOS platforms such as the iPhone and the iPad.

The invention will next be described in the context where a user of MDCC 120 (presumably a tourist) downloads a dedicated software application  
15 (hereinafter 'software application') onto the MDCC 120 for registration with the system 10; and usage of the MDCC 120 with the installed software application for facilitating refunds.

During the first usage after downloading the dedicated software application, a registration process is initiated where the tourist is prompted to register by  
20 entering his or her registration details into the application. The tourist may enter the necessary details for registration via manual entry or via imaging the identification documents associated with the tourist, if the MDCC 120 comprises an imaging device or module such as an on-board camera. The identification documents may include passport or other approved identification  
25 papers identifying the user as a tourist. In the case of a passport that comprises a machine readable zone (for example barcode), the MDCC 120 may also be used for reading the readable zone on the passport using the on-board camera or if the MDCC 120 is installed with the necessary hardware and/or software for doing the same.

30 The registration process can further integrate a verification of the authenticity of passports. The registration process can also include a check against records or entries in one or more authorized databases (for example government immigration records) to ascertain the eligibility of the tourist for a

tax refund. Such authorized databases may be public or private databases. With these verifications, the tourist may not need to carry his passport in order for the retailer to verify his tourist status, subject to regulatory acceptance of such method of verifications.

5 Upon receiving the registration information, the MDCC 120 next sends the registration information to the server 110 for the creation of a user account. Once the user account is created, the server 110 then replies to the MDCC 120 with a unique identifier associated with the user account, for the tourist. The unique identifier can be in the form of an assigned account number  
10 and/or encoded into a QR or Quick Response code by the server 110 or software application installed on MDCC 120. The QR code is a type of matrix barcode that is machine readable and can contain information that can quickly be translated into usable data.

Once the unique identifier is generated, the unique identifier can be accessed  
15 on the same MDCC 120 used to register the user or on any other mobile devices 120 that is compatible with the form or physical medium that the unique identifier is encoded. In this regard, the unique identifier is therefore device agnostic. Other types of machine readable codes like barcodes can also be used in place of QR codes, although these may hold less data. This  
20 QR code is tied/tagged to each and every tax refund qualifying transaction made by the tourist.

It is to be appreciated that the unique identifier may include a simple account number, and/or a combination/hybrid of one or more of the above described codes.

25 Once registered and a user account is in place, the tourist user may then make tax refund qualifying transactions such as tax refund qualifying purchases at one or more participating retailers.

After the tax refund qualifying purchase is made at the participating retailer,  
30 the tourist retrieves his or her unique identifier, in the form of a QR code, for display on the MDCC 120. The participating retailer uses the Retailer Device 130 to scan the QR code (s140) for verification on the eligibility for a tax refund by checking against the server 110 to ascertain if the tourist has a

registered account and is eligible for a refund. As an example, the check will include comparing and matching entries with the server 110 and/or its associated processor(s) or database(s) to determine if the passport is a foreign passport and if the tourist is at an age eligible for refund (e.g. 16 years or older). The server 110 can also perform a check against government immigration records via the government server 170 to ascertain the eligibility of the tourist for a tax refund. Alternative ways of unique identifier accessing technology or combinations may be used. Examples of such technologies may include Near Field Communications (NFC), Bluetooth, Wi-Fi, etc. as known to a skilled person. The identification may also be manually entered into the Retailer Device 130. Such a step of verification may include checking the physical passport and the passport information/details submitted, subject to compliance with the necessary regulatory requirements.

Upon scanning of the unique identifier, the participating retailer may enter the purchase/transaction details related to the purchase made by the tourist into the Retailer Device 130. The transaction details may be manually or automatically transmitted. In the latter, the transaction details may be transmitted automatically via a cable or wirelessly from a Point-of-Sale ("POS") system and/or POS device, the POS device configured to send the information relating to the refund qualifying transaction, i.e. purchase/transaction details to the Retailer Device 130 and/or server 110. For example, to facilitate the transmission, a software driver may be installed on the POS system for detecting the Retailer Device 130 as a printer, so that the POS device can print the transaction details to the Retailer Device 130. Alternatively, software may be installed on the POS device or system to capture the transaction details from a payment screen via an Optical Character Recognition (OCR) module. In the case of an Internet-enabled POS system or device, the purchase or transaction details can be directly transmitted to the server 110 via one or more wired or wireless communication means. The transaction details may then be accessible via a web resource locator or link, such as a Uniform Resource Locator (URL).

If a paper receipt is issued for the transaction, the Retailer Device 130 may also be used to image or scan the paper receipt associated with the

transaction for the transaction details to be extracted by an image conversion and/or recognition module, such as, for example the OCR module. Once the retailer has verified the transaction details thus captured, he can transmit the transaction details to the server 110 via the Retailer Device 130. In another  
5 embodiment, the MDCC 120 may be used in place of the Retailer Device 130 to image or scan the paper receipt associated with the transaction. Once the retailer has verified the transaction details thus captured, he can present the tourist with a retailer identifier, which can be another QR code, unique to the retailer, for scanning by the MDCC 120, as a form of retailer  
10 confirmation/receipt.

In another embodiment, if a user is unable to present his unique identifier in the form of a QR code (for example because the user has not yet registered with the server 110), the retailer may scan an alternative identifier, such as but not limited to the Tourist's passport to retrieve his account information. The  
15 scanning device may be the Retailer Device 130 or in the form of a barcode scanner or other imaging device and once the passport has been scanned, the server 110 checks if the tourist has a registered account and eligible for a refund, e.g. if passport is a foreign passport and if tourist is at an age eligible for refund (e.g. 16 years or older). The server 110 can also perform a check  
20 against third party servers or databases, such as government immigration records via the government server 170 to ascertain the eligibility of the tourist for a tax refund. If the tourist is not eligible, the server 110 prompts an authorized personnel (e.g. a cashier) to inform the tourist that he is not eligible for tourist refund. If the tourist is eligible, the server 110 checks for an existing  
25 account by comparing the scanned details with one or more databases of the server 110. If a user account already exists, the app installed on the retailer device 130 is operable to display the user profile or details for validation by the cashier. If the tourist before the cashier matches the user profile, then the cashier confirms the user (customer) identity via a user interface and  
30 proceeds to enter receipt details. If a user account does not exist for the tourist, the server 110 creates a user account and the cashier proceeds to enter receipt details.

The Retailer Device 130 (or the MDCC 120) is operable to send the unique

identifier, as well as the transaction details like the cost, the receipt number, the date and time of the transaction, etc. (see s150) to the server 110. No transaction details can be transmitted without the necessary information associated with the unique identifier (in the form of the QR code) on the MDCC 120 (or on the Retailer Device 130). To minimize fraud, the the Retailer Device 130 can be configured (by the retailer or otherwise) to halt all communications outside of the retailer's opening hours. This would prevent unauthorised tax refunds claims from being entered into the system. The security of the system 10 can be further enhanced by a password management system that requires the cashier to log into the retailer account and may require the password to be changed regularly. Sub-accounts may also be created for individual employees of the retailer who are responsible for collecting payment and their supervisors to create a system of checks-and-balances for approving unusual tax refund claims. Prior to use, the retailer account may undergo a similar registration process as described earlier for the user (tourist) account. In some embodiments, the registration process entails the server 110 assigning or issuing retailers with user identifiers (IDs) and passwords. A manager of the retailer may create sub-accounts. Alternatively the server 110 may assign subaccounts to the retailers, who in turn have administrative rights to manage the sub-accounts. Similar to the registration of the user account, another retailer unique identifier such as a QR code may be generated and assigned to each retailer who registers for an account to participate in the system.

Based on the details sent by the participating retailer, the server 110 sends an electronic ticket for the notification of transaction. Such a notification may be in the form of an eTRS Ticket (containing the details mandated by the Revenue/Customs authorities such as a documentary ID or DOC-ID that uniquely identifies the transaction) directly to the MDCC 120, thus recording the purchase as an eTRS Transaction. The server 110 would also notify the participating retailer via the dedicated software application installed on the Retailer Device 130 of the eTRS Ticket (see s150).

The MDCC 120 is operable to image, store and organise the purchase receipts and invoices issued by the participating retailer, and link these with

the eTRS Transaction for ease of subsequent retrieval by the tourist or by an inspector of the Revenue/Customs authorities. The server 110 will transmit the transaction details as required by the Revenue/Customs authorities to a Central Clearing House (CCH) 170 for lodgement as an eTRS Transaction  
5 180. In another embodiment of the present invention, the server 110 can also request the CCH 170 to perform an instance of risk assessment after each transaction, and communicate 180 the risk assessment results to the server 110. If the result is such that the tourist is selected to present his or her purchases for inspection by an officer of the Revenue/Customs authorities at  
10 the point of departure from the country, the server 110 would then notify the tourist of this requirement via the software application installed on the MDCC 120 either shortly after the transaction itself and/or at the point of departure from the country (s160). This early deterrence would assist to deter potential fraudsters from trying to obtain a tax refund through fraudulent means.

15 With additional tax refund qualifying purchases, multiple eTRS Tickets can be sent to the MDCC 120 in the same direct way (s160).

When the tourist is leaving the country, the MDCC 120 or the dedicated software application installed on the MDCC 120 would request for confirmation of departure from the tourist. Once the tourist confirms his  
20 departure from the country, the tourist can request for a refund together with a Declaration of Eligibility (a requirement by the Singapore Revenue/Customs authorities) or other declarations as required by the Revenue/Customs authorities (s160). The tourist may be guided through the Declaration of Eligibility process by the application on the MDCC 120, which also displays  
25 the passport details of the tourist for his or her confirmation as the person making the Declaration. Purchases recorded as eTRS Transactions are also displayed for the tourist to select those for which he or she would like to submit a claim for tax refund. For those tax refundable purchases made through retailers that do not operate the application, the application on MDCC  
30 120 can scan the paper copy of the eTRS Tickets issued by these retailers so that all the transactions are consolidated. Alternatively, the CCH 170 can also transmit electronically, the details contained in the paper eTRS Tickets, to MDCC 120, upon request by the MDCC 120 or the dedicated software

application installed on the MDCC 120. The tourist would also confirm the preferred refund option – whether in cash or credited back to a credit/debit card or a bank account or even an electronic wallet account – and the application guides the tourist to confirm the relevant details accordingly. The preferred refund option and details may have already been entered at the point of user registration, otherwise the tourist will be prompted to do so. The tourist may also enter the necessary details via manual entry or via imaging the credit card via the on-board camera on MDCC 120, for example.

Once the various fields are completed, the application can allow the tourist to confirm the details one last time before submitting them to the server 110.

In addition to the tourist proactively initiating a request for refund, one way of reminding the tourist to submit the request for refund would be to use a location-based service, such as Global Positioning System (GPS), geofencing, navigation systems etc, to alert the MDCC 120 when the MDCC 120 is detected within range of a departure point installed with a location-based service device, examples of such departure points including an airport or a cruise centre. This would notify and remind the tourist to submit the request for refund. Alternatively, the application on the tourist MDCC 120 can also rely on Wi-Fi networks or cellular base stations at the airport and the cruise centre to remind the tourist when the MDCC 120 accesses these networks. Alternatively, the MDCC 120 can detect transmitters (including but not limited to Bluetooth Low Energy beacons) located at a departure point, such as an airport or a cruise centre, and trigger the application to remind the tourist. This saves the tourist the trouble of having to arrive at the airport early to locate the eTRS self-help kiosk, since the tourist can now submit the request using his or her MDCC 120.

Once the request for refund is submitted (s160) to the server 110, the CCH 170 is notified via s180 and can communicate to the server 110 as to whether the tourist has been selected for inspection by the Revenue/Customs authorities and the server 110 notifies the tourist via the MDCC 120 accordingly (s160).

For tourists who have not been selected for inspection, they would receive a digitised Notification of Approval slip on their MDCC 120. Those who have not received a notification of approval slip and/or have been selected for inspection either at any point of purchase or after the submission of the request for refund would receive a digitised Notification of Inspection slip prompting them to proceed to a counter of the Revenue/Customs authorities for further processing. There, upon presenting the digitised eTRS tickets, invoices/receipts and notification slips stored on the tourists' MDCC 120 together with the goods purchased, passport and plane ticket, as required, an authorized personnel such as the Revenue/Customs officer or inspector updates the record stored at the CCH 170. This may be performed via a separate computing device provided to the customs officer having a dedicated software application installed thereon and arranged in data communication with the server 110 to interact with the server 110. In some embodiments, a 'customs officer' identifier in the form of a QR Code may be provided to the customs inspector to present to the tourist after the customs inspector is satisfied with the eligibility of the tourist and the purchases for a refund. Upon scanning of the QR Code, the server 110 then updates the CCH record as "Approved" and issues a Notification of Approval slip. This Notification of approval may be in paper, or digitised and sent to their MDCC 120.

Cash refunds would be made at a Central Refund Counter (CRC) upon presentation of the Notification of Approval slips, otherwise the monies would be credited to their credit/debit card or bank account as previously indicated, or any payment platforms (e.g. Alipay<sup>TM</sup>, Paypal<sup>TM</sup>) for facilitating the transfer of refund monies to one or more user accounts. The tourists would then proceed to depart Singapore accordingly.

In some embodiments, instead of a cash refund, the refund value may be converted to an intermediate value. Examples of such intermediate value may be coupons, credits, points, or other electronic value etc. One embodiment of



an intermediate value is in the form of 'rewards points'. Such a system of rewards points can also be implemented into the tourist refund process, where the rewards points can be applied towards the purchase of goods and services at participating retailers. Retailers participating in this system of rewards points can be the same ones that are accredited under the tourist refund scheme or retailers that are not accredited but can also be equipped with a Retailer Device 130. Tourists can accumulate rewards points issued by the CRA. In the conversion of tax refund to rewards points, the system may refund the full amount, less than or more than the full amount of tax levied depending on the conversion rate between the tax refund to rewards point, instead of withholding a service fee as in the traditional method, although a service fee can still be offered as an alternative. The system can offer the tourist the option to take the refund in the form of tourist refund (whether as cash or via a credit/debit card) or in the form of rewards points, by way of a prompt either at the point of purchase or at the point of departure from the country. The tourist could even be allowed to convert the tourist refund into rewards points (vice versa) at any point in time, with or without a conversion fee. There may be a point in time where the availability of a tourist refund by way of cash or credit card is reduced or even removed. The rewards points can also be tagged with an expiry date, such that they expire if not used within a certain period of time, or the rewards points may be issued without an expiry date.

With reference to Fig. 2, an embodiment of a process for facilitating a tourist refund, wherein like numerals reference like parts, is described. The process begins when the dedicated software application installed on MDCC 120 is launched (step 210). The process begins with checking whether the tourist is already registered or is a new unregistered user (step 220). If the tourist is not registered, the tourist is walked through with a registration procedure (step 230) where an electronic user account is created with the server 110 and the relevant details are captured by the dedicated software application. Backend, the system 10 performs checks against the details like the passport number, nationality, name and/or other relevant information to ensure duplicate records

are not created. The system can also verify the authenticity of the passports based on their security features or the server 110 may be linked with one or more third party servers. These third party servers may be private, public or government databases for the checking of stolen passports, as well as  
5 checking for other eligibility criteria such as whether the user is in fact a Permanent Resident of a particular jurisdiction and does not fall under the category of 'tourist', therefore ineligible for tourist refund; or whether the user has entered Singapore on a visit pass that may not strictly fall under a 'tourist pass', such as a student pass, etc. whereupon additional criteria have to be  
10 fulfilled. For each user account, a unique identifier like a QR code is created and stored by the application, or created by the server 110 and stored by the application. This process can be integrated with the onboard camera of the mobile device 120 to scan the machine readable zone of the passport to populate the various details or even to scan the passport itself with optical  
15 character recognition, or else manual entry of the details is used. The tourist is also given the option of imaging the passport, guiding him through the process of which page to capture, so that he does not have to carry a physical passport when shopping to claim a refund.

20 At a participating shop, the tourist makes a purchase and the retailer enters or scans the relevant details into the point-of-sale (POS) machine (step 240). After verifying that the purchases qualify for refund and the eligibility of the tourist by checking the tourist's passport, the retailer scans the unique identifier being displayed on the user MDCC 120 by either using the issued  
25 retailer device or the retailer's own mobile device with the application installed (step 250). One method of verifying the status of the tourist would be verification upon scanning the unique identifier or QR code via an onboard camera (where available) if the retailer is using a mobile device as the retailer device 130, whereby upon receipt of the scanned information (which includes  
30 the unique identifier), the server 110 would inform the retailer device whether the user is a tourist or not, which dispenses with the need to check the physical passport. The details of the transaction are then sent to the central server 110 or a processor belonging to the central refund agency (CRA) (step

260), and this may be further sent to CCH 170. Once verified and the records updated, confirmation of the transaction is sent (step 270) together to the retailer and an eTRS Ticket is sent to the tourist either in the application, by email or any other forms of messaging. An electronic image or document of the invoice or receipt issued by the retailer can also be stored in the mobile application for later retrieval.

With some newer POS machines, the purchase details can be transmitted to the retailer device, either wirelessly via Wi-Fi or Bluetooth, or by a cable like a USB or similar, which speeds up the process and reduces the possibility of human error. The purchase details can even be directly transmitted to the server 110 in the form of a central processor. The added security measure of requiring the unique identifier before transmitting means the possibility of non-genuine tourist transactions is reduced. The tourist or the retailer may also use his or her mobile device to image the paper receipt associated with the transaction for the transaction details to be extracted by Optical Character Recognition. The retailer may also be equipped with other devices with imaging or scanning capabilities. Where the details are captured by the tourist's device, once the retailer has verified the transaction details thus captured, he can present the tourist with an identifier, which can be another QR code, unique to the retailer, for scanning by the tourist's device, as a form of retailer confirmation.

The application (and server 110) is also able to track the fulfilment of certain jurisdictional requirements where the purchases made by the tourist are submitted to the server are logged into the system. This feature is available where the tourist images receipts and enters the necessary details relating to the transactions he made. For example, in Singapore in order to qualify for a tax refund, a minimum \$100 must be spent from retailers bearing the same GST registration number and this can be accumulated in up to 3 same-day invoices or receipt, thus the application can immediately alert the user, whether tourist or retailer, if this minimum amount has been reached on the same day. This does away with the current need to check physical receipts

and sum them up.

An additional feature of using a system of intermediate value in the form of rewards points as described in the earlier embodiment can be incorporated into the process. During the purchase (step 240), the tourist informs the retailer that he wishes to use his rewards points, and upon scanning the QR code on the tourist's MDCC (step 250), the rewards points balance is retrieved from the server and displayed to the retailer. Based on this amount and confirmation from the tourist via the tourist's MDCC (step 250) of the number of rewards points to redeem, the retailer would apply the rewards points against the purchase price accordingly and update the server (step 260). In another embodiment, during a purchase (step 240), the tourist who wishes to utilize his intermediate value in the form of rewards points may launch the software application installed on the MDCC 120 to retrieve from the server and display the rewards points balance information. The tourist can inform the retailer of his intention to use his rewards points and scan an identifier, which can be another QR code, unique to the retailer before entering and confirming the number of rewards points he wishes to use, for transmission to the server. The server can then push the number of rewards points to be thus used for display on the issued retailer device or the retailer's own mobile device with the application installed, and the retailer would apply the rewards points against the purchase price accordingly and update the server (step 260). Upon receipt of the eTRS Ticket in the application, the tourist can be prompted to choose whether to convert the amount, with or without a service charge to the CRA, into the rewards points. This raises the possibility of the tourist being able to spend his tourist refund at participating retailers even before leaving the country.

A flowchart shown in Fig. 3 describes an embodiment of how the tax refund is credited/made to the tourist when the tourist is departing the country. At a departing point such as the airport or cruise centre, the installed application on the MDCC 120 is launched by the tourist either on his own volition or reminded by notifications displayed on the mobile device 120. Such

notifications can be triggered by detecting that the tourist is at a departure point such as the airport or cruise centre. The tourist is then prompted to confirm that he is departing the country (step 310), which triggers the system 10 (either via the installed software application or the server 110) to notify the tourist of the purchases made to date, the eTRS Tickets collected, the amount of refund available, as well as the amount of outstanding refunds which may be in the form of an intermediate value as described. The tourist also indicates how the refund is to be made, either in cash or to the credit card account that was used (based on the purchase or transaction details), or to a specified bank account or even to another different credit card account. A further prompt whether to convert the refund available may be triggered to allow the tourist to do so.

Once the list of purchases is confirmed and verified by the tourist, the tourist is guided through the various steps of completing the Declaration of Eligibility and displays the tourist's passport details for confirmation. After confirmation, the declaration of eligibility and refund claims are submitted to the server (step 320) and to the CCH and confirmation is sent to the tourist (step 330), together with either an approval Notification slip or an inspection Notification slip if the tourist has been selected for inspection. If the inspection is verified and cleared, an approval Notification slip is issued to the tourist, and based on the approval Notification slip, a refund can be obtained (step 340) either in cash at the Cash Refund Counter at the airport or cruise centre, or credited back to the specified credit/debit card or bank account. Alternatively, the tourist can also choose to obtain the refund in the form of an intermediate value such as the rewards points, especially if he plans to visit the country again sometime soon. The tourist then departs the country (step 350). The Declaration of Eligibility can be submitted together with the refund claims via the application on the mobile device, which means that process is simplified and the tourist can do so at their own convenience, e.g. while queuing to check in or clearing immigration or even in the transport on the way to the airport.

In another embodiment of the present invention and with reference to Fig. 4

and 5, wherein like numerals reference like parts, the functions associated with the MDCC 120 and retailer device 130 may be integrated into a single MDCC device 420. Such an arrangement is advantageous in the sense that one single MDCC 420 may be utilized for the whole refund process. It is to be

5 appreciated that either:-

the associated functions described for both mobile device 120 and computing device 130 as earlier described would have to be implemented on the MDCC 420, or

10 another dedicated software application incorporating essential functions for mobile device 120 and the computing device 130 would have to be installed on the MDCC 420.

In the single device arrangement, the participating retailer's premises may be equipped with a transmitter and/or receiver (including but not limited to Bluetooth Low Energy 'Bluetooth LE' beacons) 410 operable to transmit  
15 to/receive from a MDCC 420 (used interchangeably with the term 'single device') within range of the transmitter/receiver.

An example of the single device arrangement 400 is shown in Fig. 4. The arrangement 400 comprises one or more Bluetooth LE (BLE) beacons 410 installed within the retailer's shop at a designated location, such as around a  
20 cashier. The BLE beacons 410 can operate in a 'broadcast' or 'advertisement' mode to notify nearby devices of its presence via an address. The address follows a specific format, such as a predefined prefix, followed by a variable UUID, and a major, minor pair. When a user with the MDCC 420, such as a tourist is within the pre-determined range of the designated location, the  
25 MDCC 420 detects the BLE beacons 410 and prompts the user to launch his dedicated software application, or directly launches the software application without prompt once the BLE beacons 410 are detected, which can be programmed to inform the user that he is at a participating retailer based on matching and verifying the broadcast format of the BLE. The retailer specific  
30 information can then be displayed on the MDCC 420.

The user next shops and transacts at the retailer shop. Upon payment for the merchandise, the tourist requests for a tax refund. The cashier then requests

the tourist to send the request for refund from his MDCC 420, together with the refund account number and BLE address to the server 110.

The server 110 opens a session between the user account and the retailer account. The tourist is prompted to scan the transaction receipt using the MDCC 420 via the OCR module as described in previous embodiments, or via  
5 other means including manual or POS system as described. Once scanned, the transaction details are displayed on the MDCC 420.

The tourist presents the transaction details to the cashier or other personnel authorized by the retailer. The cashier verifies the transaction details and  
10 presents a retailer identifier to the tourist. The retailer identifier may be a QR code. The retailer identifier encoded in the form of a QR code may further comprise one or more of the following information:-

- i. Retailer's account number held with the server 110; and
- ii. Sub-accounts created by the retailer for each authorized personnel (e.g.  
15 cashier).

The sub-accounts provide a means for identifying the cashier in case of suspected transaction activity(ies), such as collusion between cashier and tourist.

The tourist scans the retailer QR code and the software application transmits  
20 the same to the server 110 for verification.

Upon receipt of the information related to the retailer identifier, the server 110 matches the QR code with the BLE address to verify that the MDCC 420 is on site. Upon verification, the MDCC 420 transmits the transaction details to the server 110. The server 110 then runs checks on the transaction details. The  
25 checks may include (but not limited to) ensuring that the transaction details are current, i.e. with current date and time, and relate to the correct retailer.

Upon completion of the checks, the server 110 then sends the transaction details to the CCH 170. The CCH 170 then acknowledges the lodgement of the refund claim to the server 110. The server 110 generates the eTRS Ticket,  
30 assigns the DOC-ID and sends the same to MDCC 420.

With reference to Fig. 5, at the point of departure, such as an airport or cruise center, the location of the MDCC 420 is determined by the software application via GPS or other location-based services. Alternatively, the

application on the tourist MDCC 120 can also rely on Wi-Fi networks or cellular base stations at the airport and the cruise centre for detecting the MDCC 420. Once detected, the software application guides the user through the declaration of eligibility as described earlier (see steps 310 to 350). Next  
5 the tourist confirms his departure and eligibility. The MDCC 420 then retrieves the transaction records from the server 110 for the tourist to select for refund. Once the user selects the transaction records, he is prompted to select the refund method (e.g. rewards points, direct credit into specified account etc.). Upon selection, the MDCC 420 sends the declaration of eligibility; selected  
10 refund transaction(s); and refund method to the server 110. The server 110 in turn transmits the information to the CCH 170. The CCH 170 then replies with an approval or non-approval Notification slip to the server 110, which in turn transmit the approval or non-approval Notification to the MDCC 420. If the refund is approved, the CCH 170 further instructs or informs the CRC 430 to  
15 process the refund.

Where the CCH 170 replies with the non-approval notification slip, in some embodiments the tourist may be directed to the customs officer or inspector as described in the earlier embodiment for further inspection. The customs officer may be provided with a separate computer device with a dedicated  
20 software application installed thereon to facilitate inspection by the customs officer. A 'customs officer approval' identifier in the form of a QR Code may be provided to the customs inspector to present to the tourist after the customs inspector is satisfied with the eligibility of the tourist. Upon scanning of the 'customs officer approval' QR Code, the server 110 then updates the CCH  
25 record as "Approved" and issues a Notification of Approval slip. If still not approved, the purchases will not be eligible for tax refunds.

During a purchase (step 240), the tourist who wishes to utilize his intermediate value in the form of rewards points can inform the retailer of his intention to  
30 use his rewards points. He may launch the software application installed on the MDCC 420 to retrieve from the server 110 his rewards points balance and enter and confirm the number of rewards points he wishes to use, before showing to the retailer for verification. Once the retailer has verified the



number of rewards points to be used, he can present the tourist with a retailer identifier, which can be another QR code, unique to the retailer, for scanning by the single device 420 as a form of retailer confirmation, and the server will be updated (step 260). The retailer would apply the rewards points against the purchase price accordingly. Also, upon receipt of the eTRS Ticket in-app, the tourist can be prompted to choose whether to convert the amount, with or without a service charge to the server 110, into the rewards points. This raises the possibility of the tourist being able to spend his tourist refund at participating retailers even before leaving the country.

The single device arrangement is based on the use of a mobile device 420 and eliminates the need for a Retailer Device. Instead of issuing each retailer with a separate device, Bluetooth Low Energy (BLE) beacons (transmitters/receivers) can be placed in each retailer outlet, and each authorized personnel may access the retailer's identifier (which may be in the form of a QR code or otherwise) in a variety of ways. For example an authorized personnel such as a cashier at the retailer shop can be provided with a QR Code Staff Pass, or each retailer outlet can be provided with its own QR Code identifier. The BLE can ensure transactions only take place at participating shops and the QR Code Staff Pass or identifier acts as retailer acknowledgement that the cashier has done her checks. The BLE can also be used to push targeted retailing information to the tourist, e.g. discounts, advertisements, etc. It is to be appreciated that both the QR code and BLE may be utilized in the form of a two-layered check to ensure that the transactions take place within the retailer's shop or premise. Such a two-layered check reduces the risk of any collusion between a member of the retailer's staff and the tourist.

In some embodiments, the server 110 may be operating the system of intermediate value. In such an arrangement, the server 110 may comprise a predictive engine operable to predict which user refund account is likely to be fraudulent so as to be able to take pre-emptive action. Otherwise the system may compromise on account integrity. The predictive engine can be based on at least one criterion of user demographics (e.g. location, countries visited for a past predetermined time frame), transaction profile (e.g. value of

transaction, type of goods, etc.), the type of identifier (e.g. credit card) used to register for a refund account, gender, nationality etc. Based on these criteria, an algorithm can be developed to run in the server 110 to pick out suspicious user accounts. For example, the predictive engine may attribute high risk weights to transactions exceeding certain value arising from certain countries. In some embodiments, in addition to identifying suspicious user accounts, the predictive engine may further be configured to data communicate and send selected details relating to the 'suspicious accounts' to the relevant authorities, which include the customs. The selected details are sent to the authorities for further follow up checks in order to provide a more targeted and focused check. In other embodiments, the system 10 may refuse the registration of any requested refunds accounts deemed not to pass an initial security check based on one or more of the at least one criterion. In yet other embodiments, based on the profile identified by the predictive engine, selected users or tourists may be banned from purchasing certain tax free eligible items. In some embodiments, the predictive engine may be arranged in data communication with one or more database servers, such database servers for maintaining user information.

The above arrangements are advantageous in that more parameters for the selection of tourists for inspection are considered, compared to that considered by the CCH 170 currently. In addition, the selection performed at the servers 110 effectively provide an additional layer of check which is preemptive in nature, as compared to that currently done at the exit point(s) which is 'reactive'. In this regard, it is to be appreciated that the existing system performs selection at the end of a tourist's trip/visit which is deemed less efficient compared to selection performed before the tourist starts his trip. This is because based on the existing structure, the retailers would have already taken the trouble to process the eTRS transactions of a fraudster, only for the transactions to be subsequently found invalid (this is assuming the CCH is able to select the tourist for inspection) when the fraudster attempts to make a claim for a refund as he leaves the country. The above arrangements effectively prevent suspicious transactions from being performed by would-be

fraudsters, saving time and effort for both the retailers as well as the Customs. In another embodiment, the server 110 is configured to link to at least one retailer for the provision of one or more retailer item list(s) available for sale and tax refund. In the app installed on the tourist's MDCC 120, a user interface may then be provided to the tourist which displays the retailer item list of available items for sale and/or tax refund for the tourist to view before the tourist arrives at the country and/or before he/she leaves the country. Once a wish list or checklist of selected items from a tourist is communicated to the server 110 via the app, the server 110 is operable to provide a list of retailer(s) and details of the retailers selling the one or more items, via a data push or pull mechanism that the tourist desire to purchase. The wish list and retailer list may be compared by any compare and match algorithm between the entries on the tourist's wish-list with what the retailers have to offer. The compare and match may be performed at the server 110 side or the app installed on the MDCC 120.

In the creation of the tourist's checklist, the tourist can record a plurality of parameters related to each item. Non-exhaustive examples of these parameters may include the item's name, category, quantity and recipient's name and insert short notes and images (such as pictures) related to each item. Newly created items can be added to a temporary 'pending list' which the tourist can check off to move the items to a completed list whenever a purchase is made. Interfaces for sorting the items in alphabetical or other order may also be provided to the user.

Each time the tourist creates a new item, the app is operable to retrieve a list of retailer(s) selling the item from the server 110, and then provide to the tourist, retailers that sell the item or related items. The tourist can download the names of the recommended retailers to add them to his shopping list (via an interface) or to access the retailer's profile on the app. Through the list and/or a BLE located at the retailer's outlet, the tourist can be notified by the server 110 via the app and/or the retailer that sells the item or related items whenever the tourist is near to the retailer's shop and/or send content e.g. sales voucher from the retailer to the Tourist. This is advantageous to provide

a seamless experience for the tourist and to aid the retailers in selling their products. Further, the arrangement provides an advantageous hybrid between a pure online shopping experience and a real shopping experience where goods can be inspected before it is purchased. Amongst other advantages, the above arrangement reduces the shopping time required for a tourist to look or source for an item and whether that item is eligible for tax refund; provides an alert or other forms of notification when the tourist is nearby a retailer; and provides an informed list on prices and quality before committing to the purchase.

- 5
- 10 In some embodiments, the server 110 is operable to issue one eTRS ticket for each refund claim at each retailer store and charge a service fee for each eTRS Ticket issued. Each eTRS Ticket may comprise more than one sales receipt accumulated at the same store (GSTN), subject to one or more regulations to meet a minimum threshold eligible for refund (e.g. SGD 100).
- 15 For each eTRS ticket issued, the server 110 may also be required to pay a CCH Fee of SGD 1.50.

As an alternative embodiment, instead of issuing an electronic ticket in the form of an eTRS ticket for each transaction, the server 110 is instead operable to issue a provisional eTRS for the first transaction eligible for a refund claim, and add all subsequent transaction receipts to this provisional eTRS ticket. This is akin to a batch mode process and allows multiple retailers' transactions to be combined into a single formal/final eTRS ticket. The formal eTRS ticket will be issued only when the tourist is at an approved departure point. In such a way, both the user and the service provider may save on CCH Fees because only one Refund Ticket per user per trip is issued, instead of one Refund Ticket per user, per store, per trip. This can be performed without compromising on security or authenticity, as the tourist user will have to undergo the verification step at each retailer store.

20

25

30 In some embodiments, users of the system, such as approved retailers, may be provided with a user interface accessible to a portal, the user interface accessible via any computer device such as, but not limited to, a mobile device. The user interface may be used to display business information related to the retailer described as follow. An example of the interface is a

webpage. The server will retrieve and store input received from various sensors such as Bluetooth LE beacons, image capturing devices located around the retailer's shop, for purpose of tracking, monitoring, obtaining, and/or deriving one or more parameters associated with the retailer.

5 Examples of such one or more parameters include number of shoppers in a retailer shop. Such data may be provided on a real-time or near real-time basis displayed on the user interface. The data obtained may be further analyzed to provide business intelligence information useful for the retailer. Such business intelligence information may include shopper traffic in the  
10 retailer shop, busiest period of a weekday or weekend, busiest period over one or more months, etc.

In some embodiments, the system may be linked up with other commercial databases related to cruise ship services for example, to provide users with information such as Qualifying Cruise Ships eligible for tourist refund, as well  
15 as pre-populating travel itinerary to achieve certain level of convenience for the users of the system.

The described embodiments are advantageous as they provide a three-tier checking and verification process. In particular, a first level of  
20 check/verification is performed when a user (tourist) registers with the central processor 110. The second level of check/verification is performed before or during the generation of the eTRS ticket, and the third level of check/verification is performed at the point of departure prior to the generation of an electronic notification indicating the success or failure of the refund  
25 transaction.

Further, it is to be appreciated that the capturing of detailed information at the point of user registration allows a tourist to specify a desired account for refund upfront. Such an arrangement is useful to alleviate any time pressure  
30 that a tourist may face when he is leaving the country, as he needs to complete all form of formalities prior to boarding the aircraft / cruise ship. By shifting the data collection point to prior to the tourist embarking on his trip or

at the point of registration, precious time is saved for the tourist when he faces the most time pressure.

The above is a description of embodiments of systems and methods for facilitating refunds, in particular tax refunds to tourists in accordance with the present invention. It is envisioned that those skilled in the art can design alternative embodiments of this invention that falls within the scope of the invention. In particular, it is to be appreciated that features from various embodiment(s) may be combined to form one or more additional embodiments. Further, the following are non-exhaustive examples of features that may be combined with the described embodiments to form further embodiments that falls within the scope of the invention:-

- In the single device embodiment, the user (tourist) may send both the retailer identifier and the transaction details to the server 110 for further processing upon scanning the retailer QR code. As a pre-requisite, the server 110 will however process the transaction details if and only if the retailer identifier is verified.
- The verification or scanning of the retailer's identifier may be performed either during the refund qualifying transaction is made or after. In the former case, the transaction details are captured before the retailer identifier is scanned before transmission to the server 110. This is particularly relevant for the single device embodiment. In the latter case, the retailer identifier may be verified or scanned for purpose of opening the transaction session before either the user or an authorized representative of the retailer retrieves the transaction details.

**WE CLAIM**

1. A system for facilitating refund to a user comprising:  
5 a mobile device having means to communicate with a central processor for the generation of a refund account and a unique identifier; the unique identifier associated with the user;  
a computer device operable to access the unique identifier for verification upon receipt of a refund qualifying transaction associated with the user, the computer device further operable to receive and send  
10 information relating to the refund qualifying transaction and generate a refund request upon successful verification; and  
the central processor operable to be in data communication with the computer device to receive or send information relating to verification of the unique identification and the refund qualifying transaction and process the  
15 verification or refund request, the central processor further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.
2. The system according to claim 1, wherein the refund is a tax refund  
20 and in the form of an intermediate value.
3. The system according to claim 2, wherein the intermediate value is derived from the actual value of refund based on a conversion rate.
- 25 4. The system according to claim 1, wherein the computer device is a point-of-sale device, the point-of-sale device is configured to directly send information relating to the refund qualifying transaction to the central processor.
- 30 5. The system according to claim 1, wherein the unique identifier is encoded as a quick response (QR) code and the computer device accesses the unique identifier by scanning the QR code displayed on the mobile device.

6. The system according to claim 1, wherein the central processor is operable to send the electronic ticket to a third party server for further verification of the refund qualifying transaction and confirmation of the refund.

5 7. The system according to claim 6, wherein the central processor stores the information relating to the refund qualifying transaction in a database before the electronic ticket is generated and sent to the third party server.

8. The system according to claim 1, wherein the mobile device is operable  
10 to send an electronic notification related to a requirement being met.

9. The system according to claim 8, wherein the requirement is a confirmation of departure.

15 10. The system according to claim 8, wherein the requirement is a Declaration of Eligibility.

11. The system according to claim 10, wherein the mobile device is operable to receive a notification of refund issued by a third party server once  
20 the electronic ticket is processed successfully.

12. The system according to claim 1, wherein the central processor is operable to receive a notification of refund issued by a third party server once the at least one electronic ticket is processed successfully and the central  
25 processor is operable to send a notification of refund to the mobile device.

13. The system according to claim 1, wherein the unique identifier associated with the user is generated based on a passport information of the user.

30

14. The system according to claim 13, wherein the unique identifier is generated after a registration process by the user.



15. The system according to claim 13, wherein the unique identifier is further associated with an image capture of the passport.

5 16. The system according to any one of the preceding claims, wherein the mobile device is integrated with the computing device.

10 17. The system according to any one of the preceding claims, wherein the central processor is operable to send a notification to the mobile device indicating the success or failure of the refund request.

18. The system according to claim 1, wherein there comprises another unique identifier associated with a retailer using the computer device.

15 19. The system according to claim 18, wherein the another unique identifier is generated after a registration process by the retailer.

20 20. The system according to claim 18, wherein the another unique identifier is further associated with an image capture of one or more account information associated with the retailer.

25 21. The system according to claim 1, wherein if the unique identifier is not accessible by the computer device, the computer device is operable to obtain an alternative identifier for verification and send the alternative identifier to the central processor.

30 22. The system according to claim 21, wherein upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

23. The system according to claim 2, wherein the central processor comprises a database for storing at least one retailer list of goods and

services eligible for tax refund.

24. The system according to claim 23, wherein the central processor is operable to receive a wish-list of goods and services from the mobile device  
5 and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods and services.

25. The system according to claim 24, wherein when there is a match  
10 between the wish-list and the at least one retailer list, the central processor is operable to provide a matched list to the mobile device.

26. The system according to claim 1, wherein the electronic ticket is a  
15 provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts.

27. The system according to claim 26, wherein the provisional electronic  
ticket is converted to a final electronic ticket at an approved departure point.

28. The system according to claim 1, the central processor arranged in  
20 data communication with at least one third party server to retrieve information related to the identity of the user, and sends the information related to the identity of the user to the computer device

29. A method for facilitating a refund to a user comprising the steps of:  
25 communicating via a mobile device with a central processor for the generation of a refund account and a unique identifier, the unique identifier associated with the user;

via a computer device,

30 accessing the unique identifier for verification on receipt of a refund qualifying transaction associated with the user;

generating a refund request upon successful verification; and  
sending information relating to the refund qualifying transaction

via a central processor,  
receiving and processing the refund request;

wherein the central processor is further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund  
5 upon successful process of the refund request.

30. The method of claim 29, further including the step of converting the refund to an intermediate value after the generation of the refund.

10 31. The method of claim 30 wherein the intermediate value is derived from the actual value of refund based on a conversion rate.

32. The method of claim 29 further comprising the step of exporting the information relating to the refund qualifying transaction via a point-of-sale  
15 (POS) device in data communication with the computer device, the point-of-sale device is configured to directly send information relating to the refund qualifying transaction to the central processor.

33. The method of claim 29 wherein the computer device accesses the  
20 unique identifier by scanning an image shown on the mobile device.

34. The method according to claim 29, further comprising the step of sending the electronic ticket to a government server for further verification of the refund qualifying transaction and confirmation of the refund.  
25

35. The method according to claim 34, wherein the mobile device is operable to send an electronic notification related to a requirement being met.

36. The method according to claim 35, wherein the requirement is a  
30 confirmation of departure.

37. The method according to claim 35, wherein the requirement is a Declaration of Eligibility.

38. The method of claim 29 wherein the generation of electronic ticket is based upon one or more requirements being met.

5 39. The method of claim 35 further comprising the step of sending an electronic notification to the mobile device indicating the success or failure of the refund request.

10 40. The method according to claim 29, further comprises a step of obtaining an alternative identifier for verification and sending the alternative identifier to the central processor if the unique identifier is not accessible by the computer device.

15 41. The method according to claim 29, wherein upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

20 42. The method according to claim 29, wherein the central processor comprises a database for storing at least one retailer list of goods and services eligible for tax refund.

25 43. The method according to claim 31, wherein the central processor is operable to receive a wish-list of goods and services from the mobile device and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods and services.

30 44. The method according to claim 32, wherein when there is a match between the wish-list and the at least one retailer list, the central processor is operable to provide a matched list to the mobile device.

45. The method according to claim 29, wherein the electronic ticket is a

provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts.

46. The method according to claim 45, wherein the provisional electronic  
5 ticket is converted to a final electronic ticket at an approved departure point.

47. A non-transitory computer readable medium containing executable  
software instructions thereon wherein when executed on a mobile device  
and/or a computer device performs the method of facilitating a refund to a  
10 user comprising the steps of:

communicating via the mobile device with a central processor for the  
generation of a refund account and a unique identifier, the unique identifier  
associated with the user;

15 accessing the unique identifier for verification via a computer device on  
receipt of a refund qualifying transaction associated with the user;

sending information relating to the refund qualifying transaction;

generating a refund request upon successful verification; and

receiving and processing the refund request by a central processor,

20 wherein the central processor is further configured to generate an  
electronic ticket to be sent to the mobile device for the generation of a refund  
upon successful process of the refund request.

48. The non-transitory computer readable medium according to claim 47,  
further comprising a software instruction to send an electronic notification to  
25 the mobile device indicating the success or failure of the refund request.

49. The system of claim 1, wherein if the refund request is not successfully  
processed, the central processor is arranged in data communication with  
another computer device provided to an authorized personnel to perform  
30 further processing.

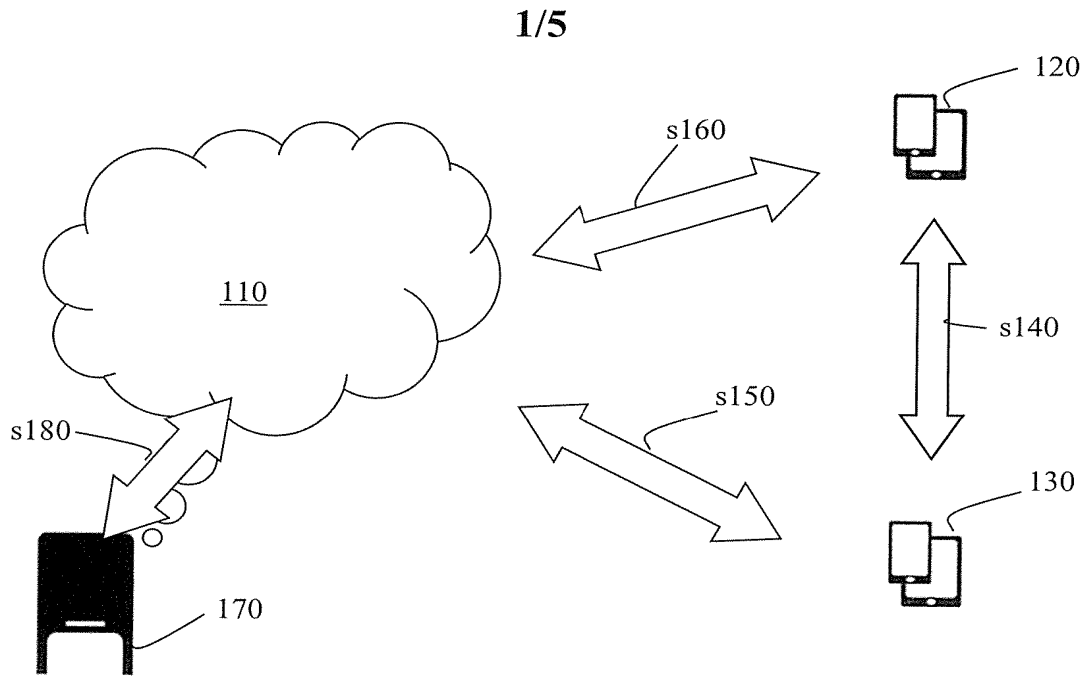


FIG. 1

2/5

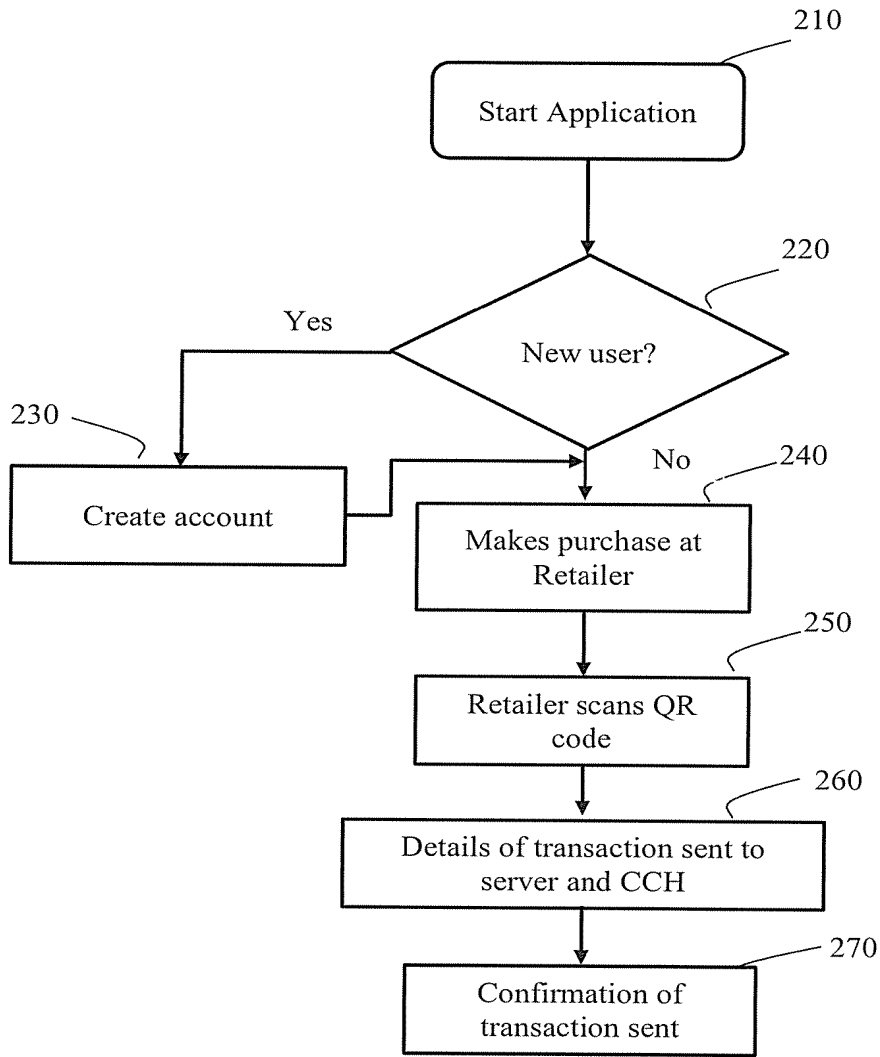


FIG. 2

3/5

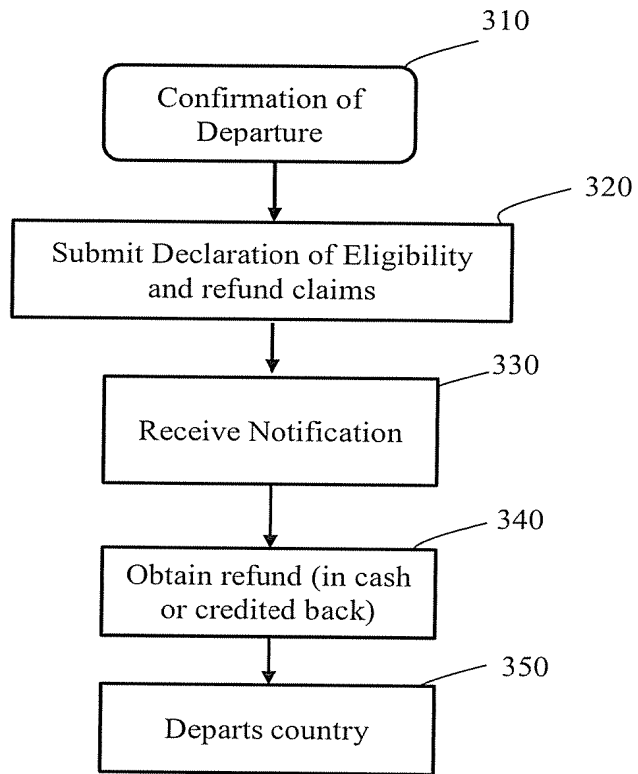


FIG. 3



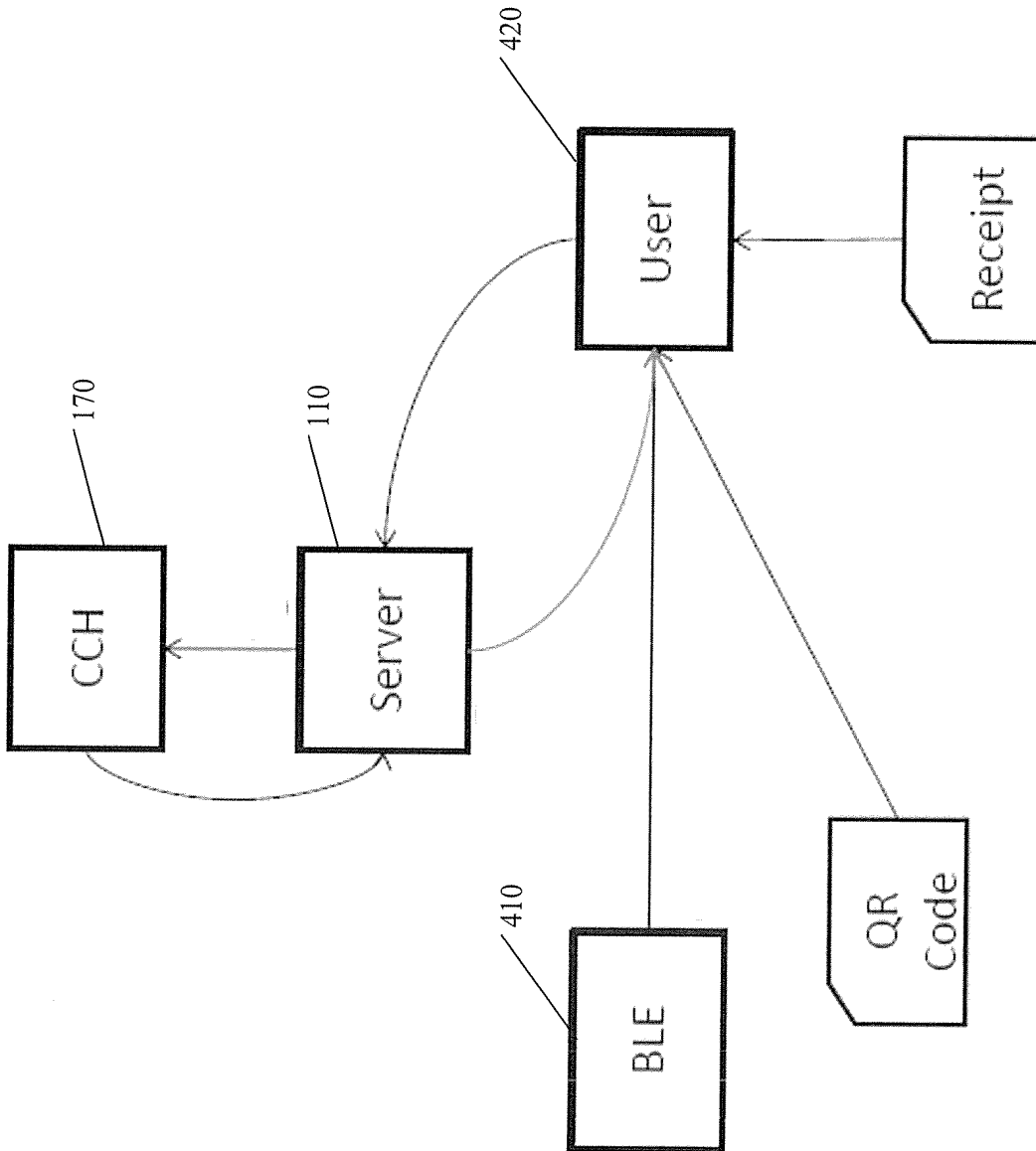


FIG. 4

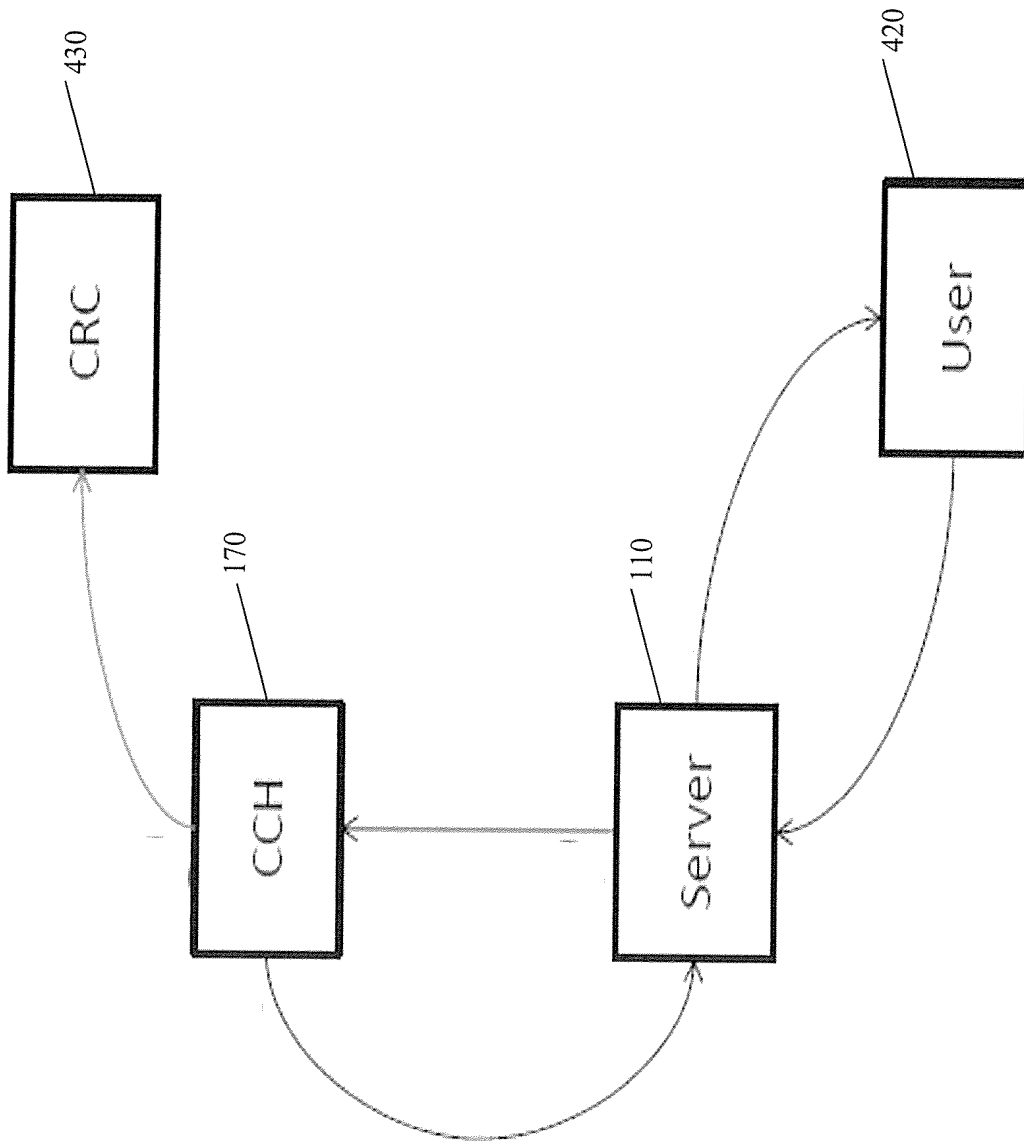


FIG. 5

**INTERNATIONAL SEARCH REPORT**

International application No.

**PCT/SG2016/050297**

**A. CLASSIFICATION OF SUBJECT MATTER**  
**G06Q 20/32 (2012.01) G06Q 40/02 (2012.01)**  
 According to International Patent Classification (IPC)


**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 G06Q  
 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 FAMPAT: mobile device, smartphone, tax, VAT, GST, refund, rebate, reimbursement, electronic ticket, voucher, QR code and other related terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2014-0032089 A (KTIS CORPORATION) 14 March 2014 paragraphs [0001], [0025], [0068]-[0071], [0076], [0077], [0086]-[0088], [0113], [0114], [0124], [0125] of the machine translation	1-49
A	WO 2011/147912 A1 (GLOBAL BLUE HOLDINGS AB) 1 December 2011 paragraphs [0069], [00143], [00153]	-
A	US 2015/0127534 A1 (BHAMBHANI, M. M.) 7 May 2015 paragraph [0035]	-
A L	How VAT refund claim on purchases works. 6 July 2015 [Retrieved on 2016-09-28 from <a href="https://web.archive.org/web/20150706170705/http://www.optimal-tax-free.com/en/vat-refund/">https://web.archive.org/web/20150706170705/http://www.optimal-tax-free.com/en/vat-refund/</a> ; for the purpose of establishing publication date of this citation] the whole document	-

Further documents are listed in the continuation of Box C.  See patent family annex.

\*Special categories of cited documents:

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>
<p>Date of the actual completion of the international search</p> <p>28/09/2016 (day/month/year)</p>	<p>Date of mailing of the international search report</p> <p>30/09/2016 (day/month/year)</p>
<p>Name and mailing address of the ISA/SG</p> <p><b>Intellectual Property Office of Singapore</b>   51 Bras Basah Road                  #01-01 Manulife Centre                  Singapore 189554</p> <p>Email: pct@ipos.gov.sg</p>	<p>Authorized officer</p> <p><u>Lee Yi Chau</u></p> <p>IPOS Customer Service Tel. No.: (+65) 6339 8616</p>

**INTERNATIONAL SEARCH REPORT**

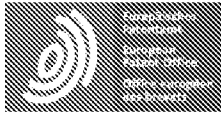
Information on patent family members

International application No.

**PCT/SG2016/050297**

*Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.*

<b>Patent document cited in search report</b>	<b>Publication date</b>	<b>Patent family member(s)</b>	<b>Publication date</b>
KR 10-2014-0032089 A	14/03/2014	WO 2014/038775 A1	13/03/2014
WO 2011/147912 A1	01/12/2011	AU 2011257210 A1	06/12/2012
		AU 2011257210 B2	21/05/2015
		AU 2011257210 B8	11/06/2015
		EP 2577592 A1	10/04/2013
		EP 2577593 A1	10/04/2013
		EP 2577595 A1	10/04/2013
		EP 2577596 A1	20/04/2013
		GB 2480662 A	30/11/2011
		GB 2480664 A	30/11/2011
		JP 2013-527535 A	27/06/2013
		JP 5754751 B2	29/07/2015
		JP 2013-534653 A	05/09/2013
		JP 5791128 B2	07/10/2015
		KR 2013-0052577 A	22/05/2013
		KR 101560868 B1	15/10/2015
		KR 2013-0050943 A	16/05/2013
		KR 2015-0038708 A	08/04/2015
		SG 176401 A1	29/12/2011
		SG 176403 A1	29/12/2011
		SG 176405 A1	29/12/2011
WO 2011/147913 A1	01/12/2011		
WO 2011/147914 A1	01/12/2011		
WO 2011/147918 A1	01/12/2011		
US 2015/0127534 A1	07/05/2015	NONE	



Espacenet

**Bibliographic data: CN207663510 (U) — 2018-07-27**

---

Fruit vending machine and system of selling

**Inventor(s):** NIE HUAIJUN; NIE HUAIDONG; NIE HUAICHUN ± (聂怀军; 聂怀东; 聂怀春)

**Applicant(s):** SHENZHEN ZHUOHEYUN INVEST HOLDING CO LTD ± (深圳卓和云投资控股有限公司)

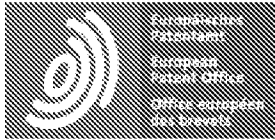
**Classification:** - **international:** G07F11/00; G07F11/16; G07F11/72; G07F9/02; G07F9/10  
- **cooperative:**

**Application number:** CN201721745444U 20171214

**Priority number(s):** CN201721745444U 20171214

**Abstract of CN207663510 (U)**

The utility model relates to a fruit vending machine and system of selling. This fruit vending machine still includes including selling cabinet body; the setting inside selling cabinet body, be used for depositing the fruit accommodate device of fruit, the setting inside selling cabinet body, be used for the electronic scale of weighing for the fruit of selecting, the setting inside selling cabinet body, be used for choosing the sieving mechanism of fruit, fruit that the sieving mechanism was chosen is placed on the electronic scale automatic weighing and is calculated the cost, selling cabinet body and being provided with the take goods open who is used for taking off away fruit, take goods open opens after accomplishing the payment. Through implementing the utility model discloses, do not need artificial the participation, what client can accomplish fruit automatically selects, weighs, pays the bill, gets goods, the machine of should selling can be put to roadside, on-site, the office building in, and occupation space is little, makes things convenient for people to purchase fruit at any time.



## Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

### DESCRIPTION CN207663510U

*10* A fruit vending machine and vending system

[0001]

*14* Technical field

[0002]

*18* The utility model relates to the field of vending machines, and more specifically, to a fruit vending machine and a vending system.

[0003]

*23* Background technique

[0004]

*27* Fruit is an indispensable source of nutrients in people's daily diet.

*28* At present, the main form of fruit sales is still manual sales, including in large supermarkets, fruit shops, temporary roadside sales points, etc. This sales method requires human participation and requires renting a store, which greatly increases the cost of fruit.

*31* In addition, in some office buildings and factories, there are few dedicated shops for selling fruits, causing factory personnel to carry them themselves or go to distant shopping malls to buy them, causing inconvenience to users.

[0005]

*37* Utility model content

[0006]

41 The technical problem to be solved by this utility model is to provide a fruit vending machine and vending system in view of the defects of the prior art that the above-mentioned manual participation leads to high costs and inconvenience for purchasing fruits in some places.

[0007]

47 The technical solution adopted by this utility model to solve the technical problem is to construct a fruit vending machine, which includes a vending machine cabinet and also includes:

[0008]

52 A fruit storage device provided inside the vending machine cabinet for storing fruits;

[0009]

56 An electronic scale installed inside the cabinet of the vending machine for weighing the selected fruits;

[0010]

60 A screening device for selecting fruits is provided inside the cabinet of the vending machine. The fruits selected by the screening device are placed on the electronic scale and automatically weighed and the price is calculated;

[0011]

66 The vending machine cabinet is provided with a pick-up port for taking away fruits, and the pick-up port is opened after payment is completed.

[0012]

71 Preferably, in the fruit vending machine of the present invention, the storage device includes at least two sub-storage devices, and each of the sub-storage devices can respectively place different fruits.

[0013]

76 Preferably, in the fruit vending machine of the present invention, the screening device includes a manual screening device, and the manual screening device includes: a gripper, a mechanical arm, a driving module, and a control module, wherein,

[0014]

82 The gripper is provided on the mechanical arm for grabbing fruits; the drive module is connected to and drives the mechanical arm; the control module is provided outside the vending machine cabinet and connected to the drive module. The control module receives the user's selection operation and generates corresponding control signals to the control module.

[0015]

89 Preferably, in the fruit vending machine of the present invention, the screening device includes an automatic screening device, and the automatic screening device includes a device disposed between the fruit containing device and the electronic scale for removing the fruit from the fruit. The accommodating device moves to the transmission device of the electronic scale;

[0016]

96 A receiving module connected to the transmission device and used to receive purchase information sent by the user, where the purchase information is one of fruit weight, fruit quantity, and purchase amount.

[0017]

101 Preferably, the fruit vending machine of the present invention further includes: a packaging device for packaging the fruits on the electronic scale;

[0018]

106 The packaging device is arranged on the electronic scale, the packaging device places the packaging bag on the electronic scale, and the fruits selected by the screening device are directly placed in the packaging bag; or

[0019]

111 The packaging device is arranged at the pickup port, and after completing the weighing and payment, the fruit in the electronic scale is transferred to the packaging bag at the pickup port.

[0020]

116 Preferably, in the fruit vending machine of the present invention, the vending machine cabinet is provided with a preservation module for fruit preservation; and/or

[0021]

121 The vending machine cabinet is provided with a refrigeration module for fruit refrigeration; and/or



[0022]

125 The vending machine cabinet is provided with a cleaning module for cleaning fruits.

[0023]

129 Preferably, in the fruit vending machine of the present invention, the vending machine cabinet is provided with a display screen for displaying product information, operating procedures, advertising information, reminder information, and payment information; and/or

[0024]

135 Audio playback module for playing audio signals.

[0025]

139 Preferably, the fruit vending machine of the present invention also includes a communication module for sending and receiving information. The communication module includes a wired communication module and/or a wireless communication module. The wireless communication module includes a 3G communication module, 4G communication module, WIFI communication module, Bluetooth communication module, one or more;

[0026]

147 A positioning module connected to the communication module and used to obtain the position information of the vending machine. The position information is sent out through the communication module. The positioning module is a Beidou positioning module, a GPS positioning module, and a base station positioning module. one or more types;

[0027]

154 A power supply module that supplies power to each part of the vending machine. The power supply module includes a mains power supply module and/or a battery power supply module.

[0028]

159 Preferably, the fruit vending machine of the present invention further includes a fruit peeling and cutting module arranged inside the vending machine cabinet for peeling and cutting fruits;

[0029]

164 Some panels of the vending machine cabinet are transparent panels.

[0030]

168 In addition, the utility model also provides an automatic fruit vending system, which includes the above-mentioned fruit automatic vending machine, a mobile terminal and a server, the vending machine is connected to the server, and the mobile terminal is connected to the server;

[0031]

174 The vending machine generates a payment QR code, the mobile terminal scans the payment QR code and makes payment, the payment information is uploaded to the server, and the server issues control instructions to the vending machine. The machine opens the pickup port.

[0032]

180 Implementing a fruit vending machine and vending system of the present invention has the following beneficial effects: the fruit vending machine includes a vending machine cabinet, and also includes: a fruit containing device arranged inside the vending machine cabinet for storing fruits; An electronic scale used to weigh the selected fruits inside the cabinet of the vending machine; a screening device installed inside the cabinet of the vending machine for selecting fruits. The fruits selected by the screening device are placed on the electronic scale to automatically weigh and calculate the price; The vending machine cabinet is provided with a pick-up port for taking away fruits, which is opened after payment is completed.

187 By implementing the utility model, no manual participation is required, and customers can automatically complete the selection, weighing, payment, and pickup of fruits; the vending machine can be placed on the roadside, in a factory, or in an office building, and takes up little space, making it convenient for people to use at any time. Buy fruit.

[0033]

194 Description of the drawings

[0034]

198 The utility model will be further described below in conjunction with the accompanying drawings and examples. In the accompanying drawings:

[0035]

203 Figure 1 is a schematic structural diagram of a first embodiment of a fruit vending machine according to the present invention;

[0036]

208 Figure 2 is a schematic structural diagram of a second embodiment of a fruit vending machine according to the present invention;

[0037]

213 Figure 3 is a schematic structural diagram of an automatic fruit vending system of the present invention.

[0038]

217 Detailed ways

[0039]

221 In order to have a clearer understanding of the technical features, purposes and effects of the present utility model, the specific implementation manner of the present utility model will be described in detail with reference to the accompanying drawings.

[0040]

227 Figure 1 is a schematic structural diagram of a first embodiment of a fruit vending machine according to the present invention.

[0041]

232 Specifically, the fruit vending machine in this embodiment includes a vending machine cabinet. Some panels of the vending machine cabinet are transparent panels, such as tempered glass. Users can observe the fruits in the cabinet through the transparent panels.

235 It also includes: accommodation device, screening device, electronic scale, pick-up port, power supply module, etc., among which,

[0042]

240 The accommodating device is arranged inside the vending machine cabinet and is used to store fruits; in particular, the accommodating device is located at the upper part of the vending machine cabinet, and the lower part of the vending machine cabinet is used to install other equipment of the vending machine.

243 Preferably, the storage device may include at least two sub-storage devices, each sub-storage device is respectively placed with different fruits, for example, an apple storage device, an orange storage device, a banana storage device, etc. are respectively provided.

246 The size and shape of the sub-containing device can be different, and the adaptive setting can be made according to the shape and characteristics of the fruit placed therein to better preserve the fruit.

248 As an option, in order to improve the shelf life and appearance of the fruits, the fruits can be simply pre-packaged, for example, in fresh-keeping bags, in boxes, etc.

[0043]

253 The electronic scale is installed inside the cabinet of the vending machine and is used for weighing the selected fruits. The electronic scale is connected to the containing device.

255 The electronic scale is equipped with a fruit plate. The user can move the selected fruits to the fruit plate through the screening device, and the electronic scale automatically weighs and calculates the price.

257 Furthermore, because different fruits have different prices, when the storage device includes more than two sub-storage devices, multiple corresponding electronic scales need to be set, and each electronic scale is set with a corresponding fruit price.

260 Or, because the prices of different fruits are different, when the holding device includes more than two sub-holding devices, and there is only one electronic scale, the electronic scale sets the corresponding price according to the type of fruit selected by the user, and at the same time, the moving position of the screening device needs to be restricted, that is, After the user selects the fruit, the screening device can only move in the corresponding selection area to select the specified type of fruit.

265 For example, the holding device includes an apple holding device and an orange holding device, each occupying half of the space of the holding device.

267 Then the user chooses to buy apples, and the electronic scale is set to the price of apples. At the same time, the screening device can only move within the area of the apple containing device where the apples are located, and can only select apples.

[0044]

273 The pick-up port is used to take away fruits. The pick-up port can be set at the location of the electronic scale. The pick-up port is equipped with a baffle and a baffle drive module. Before payment, the baffle is closed; after the user completes the online payment Finally, the baffle drive module drives the baffle to move, and the baffle is in the open state.

277 After the user completes the online payment, the pickup port automatically opens, and the user can directly take away the fruit on the electronic scale.

279 By arranging the pick-up port adjacent to the electronic scale, the fruit only needs to be moved once during the entire purchase process, reducing operating time and avoiding damage to the fruit.

281 It is understandable that because the electronic scale is connected to the holding device, it is necessary to set up an enclosure guardrail around the electronic scale to prevent users from taking the fruit directly through the electronic scale after the pick-up port is opened.

284 As an option, an adjustable baffle can be set between the position of the electronic scale and the holding device. During the fruit screening process, the pick-up port is closed and the baffle is opened so that the user can screen the fruits; after payment is completed, the pick-up port When the baffle is opened and the baffle is closed, the user can only take out the fruits that have been purchased, but cannot take away the fruits in the containing device.

[0045]

292 The screening device is installed inside the vending machine cabinet and is used to select fruits. The screening device places the selected fruits on the electronic scale, and the electronic scale automatically weighs and calculates the price.

295 The screening device can complete actions such as grabbing, moving, and releasing fruits, thereby realizing fruit selection.

297 It can be understood that the moving and grabbing parts of the screening device need to be installed inside the vending machine cabinet, and the control module needs to be installed outside the vending machine cabinet for user operation.

300 The screening device will be described below through several embodiments.

301 Screening devices include manual screening devices and automatic screening devices, where,

[0046]

305 As an option, the manual screening device includes: a gripper, a robotic arm, a drive module, and a control module. The gripper is set on the robotic arm for grabbing fruits. In order to prevent the fruit from being scratched or damaged, it is necessary to install the gripper on the gripper. Set with soft cushioning pads.

308 The drive module connects and drives the robotic arm. The drive module can be installed on the track. The drive module drives the robotic arm to move on the track. For example, the drive module is driven by a motor, and the drive motor drives the rollers to move on the track to realize the movement of the robotic arm.

312 The robotic arm has a telescopic structure, which means it can retract up and down.

313 The control module is set outside the vending machine cabinet and is connected to the drive module. The control module receives the user's selection operation and generates corresponding control signals to the control module. The control module includes buttons or operating levers, etc. The control signals include position movement signals and grabbing signals, release signal, etc.

317 For example, the robotic arm has a telescopic structure and can move up and down through telescoping; the drive module drives the robotic arm to move on the track to complete movement in the horizontal direction. In this way, the screening device can move to any position, thereby grabbing fruits and Place on electronic scale.

[0047]

324 As an option, the manual screening device includes: a gripper, a robotic arm, a drive module, and a control module. The gripper is set on the robotic arm for grabbing fruits. In order to prevent the fruit from being scratched or damaged, it is necessary to install the gripper on the gripper. Set with soft cushioning pads.

327 One end of the robotic arm is fixed on the inner wall of the vending machine cabinet, and the other end is provided with a gripper.

329 The robotic arm includes at least two sections, and the connecting nodes between each section can rotate at multiple angles.

331 The drive module drives each robotic arm to move to complete the grabbing, moving and releasing of fruits,

similar to how a person grabs fruits by hand.

[0048]

336 As an option, the manual screening device also includes a gripper, a robotic arm, a driving module, and a short-range wireless communication module that receives wireless control signals, such as Bluetooth, WIFI, etc.

339 The manual screening device is connected to a mobile terminal through a short-range wireless communication module, and an APP for controlling the manual screening device is installed on the mobile terminal.

342 The mobile terminal sends control signals, which include position movement signals, grabbing signals, release signals, etc.; the driving module controls the mechanical arm and gripper to work according to the control signals to grab the fruit.

345 For example, the robotic arm has a retractable structure and can move up and down; the drive module drives the robotic arm to move on the track to complete movement in the horizontal direction. In this way, the screening device can move to any position, and then can grab fruits and place them on the electronic scale.

[0049]

351 The above two manual screening devices can complete fruit screening under the user's operation, allowing users to have more self-service choices; at the same time, operating the mechanical arm movement has a certain degree of fun, which increases the fun of purchasing fruits.

[0050]

357 Alternatively, the automatic screening device includes a transmission device and a receiving module, wherein the transmission device is disposed between the fruit holding device and the electronic scale and is used to move the fruit from the fruit holding device to the electronic scale.

360 The receiving module is connected to the transmission device and is used to receive purchase information sent by the user. The purchase information is one of fruit weight, fruit quantity, and purchase amount. For example, the user can choose to buy 2Kg apples, or 2 apples, or You can choose to buy apples worth 20 yuan.

363 Since the electronic scale can only obtain the weight parameter, if the user inputs the purchase amount, the automatic screening device converts the purchase amount into the corresponding weight based on the fruit price and sends it to the electronic scale.

366 It can be understood that there is feedback regulation between the electronic scale and the transmission device. When the fruit in the electronic scale does not reach the preset weight, the electronic scale sends a signal to continue adding fruit to the transmission device, and the transmission device continues to add fruit; when the fruit in the electronic scale reaches the preset weight, the electronic scale sends a stop adding fruit signal to the transmission device, and the transmission device stops adding fruit.

371 The automatic screening device only requires users to enter purchasing information and does not require users to manually select fruits, which can improve purchasing efficiency.

[0051]

376 The power supply module supplies power to each part of the vending machine. The power supply module includes a mains power supply module and/or a battery pack power supply module.

378 In some places where mains power is not easily accessible, such as squares, parks, roadsides, etc., the battery pack power supply module can be used to provide power, thereby improving the adaptability of the vending machine.

381 Preferably, for vending machines placed outdoors, a solar charging module can also be installed to charge the battery pack, thereby reducing battery maintenance and saving management costs.

[0052]

386 Figure 2 is a schematic structural diagram of a second embodiment of a fruit vending machine according to the present invention.

[0053]

391 Specifically, based on the first embodiment, the fruit vending machine of this embodiment also includes a communication module for sending and receiving information. The communication module includes a wired communication module and/or a wireless communication module. The wireless communication module includes but It is not limited to 3G communication module, 4G communication module, WIFI communication module, etc. The connection and settings of the communication module can refer to the settings of the existing communication module, which will not be described again here.

397 Preferably, in order to provide a better signal to the wireless communication module, the signal antenna can be installed on the top of the vending machine.

[0054]

402 As an option, the vending machine in this embodiment further includes a positioning module connected to the communication module and used to obtain the location information of the vending machine, and the obtained location information is sent to the server through the communication module.

405 Positioning modules include but are not limited to Beidou positioning module, GPS positioning module, Galileo positioning module, base station positioning module, etc.

407 The vending machine uploads location information to the server at preset time intervals so that the location information of the vending machine can be updated in time.

409 In particular, considering that the vending machine will basically not move after being placed, the location information of the vending machine can be uploaded to the server when it is placed for the first time, and the server will save it. Then the vending machine does not need a positioning module. After moving the vending machine, manually Just modify it.

[0055]

416 Alternatively, the vending machine cabinet in this embodiment is provided with a display screen for displaying product information, operating procedures, advertising information, reminder information, payment information and other information. For example, the payment information may be a payment QR code.

419 And an audio playback module for playing audio signals. The audio playback module can play audio signals such as operation prompts, payment prompts, pickup prompts, advertisements, and promotional information.

422 The content displayed on the display screen and the content played by the audio playback module can be obtained through the communication module, that is, remotely issued by the server.

424 For example, the display screen scrolls and plays fruit price information. As the fruit is stored for a longer period of time, the price of the fruit can be appropriately reduced for promotion.

426 In particular, the price information sent by the server can be received through the communication module and displayed on the display screen.

428 Because there are a large number of fruit vending machines and they are widely distributed, the price can be adjusted remotely through the communication module, which greatly improves management efficiency.

430 For another example, the server sends the advertising information to the vending machine through the communication module, and then plays it on the display screen and audio playback module to update the advertising on the vending machine.

[0056]

436 In some embodiments, the fruit vending machine further includes a packaging device for packaging fruits on an electronic scale. The packaging device is arranged on the electronic scale. The packaging device places the packaging bag on the electronic scale, and the fruits selected by the screening device are placed directly. In the packing bag.

440 Alternatively, the packaging device is installed at the pick-up port, and after completing the weighing and payment, the fruit in the electronic scale is transferred to the packing bag at the pick-up port.

442 Alternatively, the packaging device only provides packaging bags to the user, and after the pickup port is opened, the user can package the packaging himself.

[0057]

447 In some embodiments, because fruits are fresh commodities and need to be kept fresh and stored, the fruit vending machine also includes: a fresh-keeping module for keeping fruits fresh is provided in the vending machine cabinet, and the fresh-keeping module is connected with the accommodation device in the vending machine, so that The fruit in the container is kept fresh.

451 It can be understood that since different fruits require different preservation conditions, the preservation module can provide corresponding preservation environments for different sub-containing devices.

453 Preferably, the freshness preservation module includes a temperature adjustment module, a humidity adjustment module, and an oxygen content adjustment module. At the same time, in order to ensure the balance of temperature and humidity in the accommodation device, the freshness preservation module includes a corresponding temperature detection sensor, a humidity detection sensor, and an oxygen content adjustment module. Oxygen sensor enables dynamic adjustment of temperature, humidity, and oxygen



content in the containment device.

[0058]

462 In some embodiments, a refrigeration module for refrigeration of fruits is provided in the vending machine cabinet. The refrigeration module is connected with the storage device to refrigerate the fruits in the storage device.

465 For example, keep watermelons refrigerated in the summer.

466 The refrigeration module is connected to the temperature detection sensor to keep the temperature in the containing device within a preset range.

[0059]

471 In some embodiments, some fruits that are perishable after cleaning can be cleaned after the user purchases them.

473 The fruit vending machine also includes: a cleaning module for cleaning fruits is provided in the cabinet of the vending machine. The cleaning module includes a water storage module, a cleaning tank, and a sewage collection module.

476 After the fruit is weighed and paid online, the fruit is moved to the cleaning tank. The water storage module outputs clean water to the cleaning tank; the automatic cleaning module cleans the fruit. After the cleaning is completed, the fruit is taken out through the shipping port.

479 Afterwards, the sewage in the cleaning tank is discharged to the sewage collection module.

[0060]

483 In some embodiments, the fruit vending machine further includes a fruit peeling and cutting module disposed inside the vending machine cabinet for peeling and cutting fruits. The fruit peeling and cutting module includes a knife for cutting. For example, when cutting a watermelon, it can use the cut melon mold.

486 Furthermore, the vending machine also includes a garbage collection module, which is connected to the fruit peeling and cutting module and is used to collect garbage generated by the fruit peeling and cutting module.

[0061]

491 In some embodiments, the fruit vending machine further includes a lighting lamp for illuminating the vending machine. Preferably, the lighting lamp is installed inside the vending machine cabinet.

[0062]

496 In some embodiments, the fruit vending machine also includes a monitoring device for monitoring the area where the vending machine is located, and the monitoring device sends monitoring information to the server through the communication module.

499 Through monitoring devices, the management efficiency of vending machines can be improved.

[0063]

503 Figure 3 is a schematic structural diagram of an automatic fruit vending system of the present invention.

[0064]

507 Specifically, the fruit automatic vending system includes the above-mentioned fruit vending machine, and also includes mobile terminals and servers. The mobile terminals include but are not limited to smartphones, tablet computers, smart watches, etc.

510 The vending machine is connected to the server, and the mobile terminal is connected to the server.

511 After the user selects and weighs the fruit, the vending machine generates a payment QR code. The mobile terminal scans the payment QR code and makes payment. Payment methods include Alipay, WeChat payment, UnionPay payment, etc.

514 The payment information is uploaded to the server, the server issues control instructions to the vending machine, and the vending machine opens the pickup port.

516 Preferably, the server records the transaction information of each transaction. The transaction information includes vending machine number, type of fruit sold, fruit weight, sales price and other information.

[0065]

521 When the user needs to purchase fruit, he sends a purchase request to the server through the mobile terminal, and the purchase request includes the location information of the mobile terminal.

523 The server searches based on the location information of the mobile terminal, sends the address information of the vending machine within a preset distance from the location information to the mobile terminal, and displays it on the mobile terminal, for example, on an electronic map, or in a list show.

526 Users can know the locations of all fruit vending machines around them and make selections based on their needs.

528 Further, the server generates a route based on the user's location information and the vending machine's address information to guide the user.

[0066]

533 It can be understood that when the merchant stores fruits, the quantity of stored fruits is sent to the server, and the server saves it.

535 During the sales process, the type and quantity of fruits for each transaction are uploaded to the server, and the server can know the number of fruits remaining in the current vending cabinet, thereby achieving remote monitoring, reasonable replenishment, and improving the management efficiency of the vending machine.

[0067]

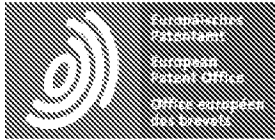
541 By implementing the utility model, no manual participation is required, and customers can automatically

complete the selection, weighing, payment, and pickup of fruits; the vending machine can be placed on the roadside, in a factory, or in an office building, and takes up little space, making it convenient for people to use at any time. Buy fruit.

[0068]

548 The above embodiments are only for illustrating the technical concepts and characteristics of the present invention. Their purpose is to allow those familiar with this technology to understand the contents of the present invention and implement them accordingly, and they cannot limit the scope of protection of the present invention.

552 All equivalent changes and modifications made to the scope of the claims of this utility model shall fall within the scope of the claims of this utility model.



## Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

### CLAIMS CN207663510U

1.

*13* A fruit vending machine, including a vending machine cabinet, is characterized in that it also includes:

*14* A fruit storage device provided inside the vending machine cabinet for storing fruits;

*15* An electronic scale installed inside the cabinet of the vending machine for weighing the selected fruits;

*16* A screening device for selecting fruits is provided inside the cabinet of the vending machine. The fruits selected by the screening device are placed on the electronic scale and automatically weighed and the price is calculated;

*19* The vending machine cabinet is provided with a pick-up port for taking away fruits, and the pick-up port is opened after payment is completed.

2.

*24* The fruit vending machine according to claim 1, wherein the storage device includes at least two sub-storage devices, and each of the sub-storage devices holds different fruits.

3.

*29* The fruit vending machine according to claim 1, wherein the screening device includes a manual screening device, and the manual screening device includes: a gripper, a mechanical arm, a driving module, and a control module, wherein,

*32* The gripper is provided on the mechanical arm for grabbing fruits; the drive module is connected to and drives the mechanical arm; the control module is provided outside the vending machine cabinet and connected to the drive module. The control module receives the user's selection operation and generates corresponding control signals to the control module.

4.

39 The fruit vending machine according to claim 1, characterized in that the screening device includes an automatic screening device, and the automatic screening device includes a device disposed between the fruit containing device and the electronic scale for removing fruits from all locations. The fruit holding device moves to the transmission device of the electronic scale;

43 A receiving module connected to the transmission device and used to receive purchase information sent by the user, where the purchase information is one of fruit weight, fruit quantity, and purchase amount.

5.

48 The fruit vending machine according to claim 1, further comprising: a packaging device for packaging fruits on the electronic scale;

50 The packaging device is arranged on the electronic scale, the packaging device places the packaging bag on the electronic scale, and the fruits selected by the screening device are directly placed in the packaging bag; or

52 The packaging device is arranged at the pickup port, and after completing the weighing and payment, the fruit in the electronic scale is transferred to the packaging bag at the pickup port.

6.

57 The fruit vending machine according to claim 1, wherein a preservation module for fruit preservation is provided in the cabinet of the vending machine; and/or

59 The vending machine cabinet is provided with a refrigeration module for fruit refrigeration; and/or

60 The vending machine cabinet is provided with a cleaning module for cleaning fruits.

7.

64 The fruit vending machine according to claim 1, wherein the vending machine cabinet is provided with a display screen for displaying product information, operating procedures, advertising information, reminder information, and payment information; and/or

67 Audio playback module for playing audio signals.

8.

71 The fruit vending machine according to claim 1, further comprising a communication module for sending and receiving information, the communication module includes a wired communication module and/or a wireless communication module, the wireless communication module includes 3G One or more of communication modules, 4G communication modules, WIFI communication modules, and Bluetooth communication modules;

76 A positioning module connected to the communication module and used to obtain the position information of the vending machine. The position information is sent out through the communication module. The positioning module is a Beidou positioning module, a GPS positioning module, and a base station positioning module. one or more types;

80 A power supply module that supplies power to each part of the vending machine. The power supply module includes a mains power supply module and/or a battery power supply module.

9.

85 The fruit vending machine according to claim 1, further comprising a fruit peeling and cutting module arranged inside the vending machine cabinet for peeling and cutting fruits;

87 Some panels of the vending machine cabinet are transparent panels.

10.

91 A fruit automatic vending system, characterized in that it includes the fruit automatic vending machine according to any one of claims 1 to 9, and also includes a mobile terminal and a server, the vending machine is connected to the server, and the mobile terminal is connected to the server. Described server;

94 The vending machine generates a payment QR code, the mobile terminal scans the payment QR code and makes payment, the payment information is uploaded to the server, and the server issues control instructions to the vending machine. The machine opens the pickup port.



(12)实用新型专利

(10)授权公告号 CN 207663510 U

(45)授权公告日 2018.07.27

(21)申请号 201721745444.3

G07F 9/02(2006.01)

(22)申请日 2017.12.14

(ESM)同样的发明创造已同日申请发明专利

(73)专利权人 深圳卓和云投资控股有限公司  
地址 518000 广东省深圳市前海深港合作  
区前湾一路1号A栋201室(入驻深圳市  
前海商务秘书有限公司)

(72)发明人 聂怀军 聂怀东 聂怀春

(74)专利代理机构 深圳市瑞方达知识产权事务  
所(普通合伙) 44314  
代理人 林俭良 郭方伟

(51)Int.Cl.

G07F 11/00(2006.01)

G07F 11/16(2006.01)

G07F 11/72(2006.01)

G07F 9/10(2006.01)

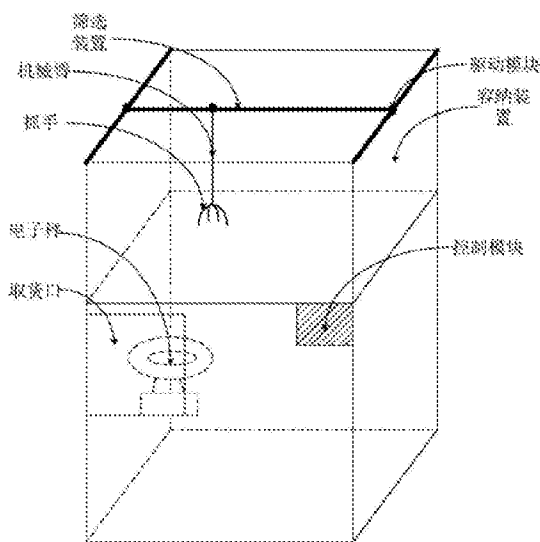
权利要求书2页 说明书6页 附图2页

(54)实用新型名称

一种水果自动售卖机及售卖系统

(57)摘要

本实用新型涉及一种水果自动售卖机及售卖系统。该水果自动售卖机包括售卖机柜体,还包括:设置在售卖机柜体内部、用于存放水果的水果容纳装置;设置在售卖机柜体内部、用于为选取的水果称重的电子秤;设置在售卖机柜体内部、用于选取水果的筛选装置,筛选装置选取的水果放置在电子秤上自动称重并计算价款;售卖机柜体设置有用于取走水果的取货口,取货口在完成付款后打开。通过实施本实用新型,不需要人工参与,顾客可自动完成水果的挑选、称重、付款、取货;该售卖机可摆放至路边、厂区内、写字楼内,占用空间小,方便人们随时购买水果。



CN 207663510 U

1. 一种水果自动售卖机,包括售卖机柜体,其特征在于,还包括:  
设置在所述售卖机柜体内部、用于存放水果的水果容纳装置;  
设置在所述售卖机柜体内部、用于为选取的水果称重的电子秤;  
设置在所述售卖机柜体内部、用于选取水果的筛选装置,所述筛选装置选取的水果放置在所述电子秤上自动称重并计算价款;  
所述售卖机柜体设置有用用于取走水果的取货口,所述取货口在完成付款后打开。
2. 根据权利要求1所述的水果自动售卖机,其特征在于,所述容纳装置包括至少两个子容纳装置,每个所述子容纳装置分别放置不同的水果。
3. 根据权利要求1所述的水果自动售卖机,其特征在于,所述筛选装置包括人工筛选装置,所述人工筛选装置包括:抓手、机械臂、驱动模块、控制模块,其中,  
所述抓手设置在所述机械臂上,用于抓取水果;所述驱动模块连接并驱动所述机械臂;所述控制模块设置在所述售卖机柜体外侧、连接所述驱动模块,所述控制模块接收用户的选择操作,并产生对应的控制信号至所述控制模块。
4. 根据权利要求1所述的水果自动售卖机,其特征在于,所述筛选装置包括自动筛选装置,所述自动筛选装置包括设置在所述水果容纳装置和电子秤之间、用于将水果从所述水果容纳装置移动至所述电子秤的传动装置;  
与所述传动装置连接、用于接收用户发送的购买信息的接收模块,所述购买信息为水果重量、水果数量、购买金额中的一种。
5. 根据权利要求1所述的水果自动售卖机,其特征在于,还包括:用于将所述电子秤上的水果打包的打包装置;  
所述打包装置设置在所述电子秤上,所述打包装置将打包袋放置在所述电子秤上,所述筛选装置选择的水果直接放置在所述打包袋内;或者  
所述打包装置设置在所述取货口,在完成称重付款后,将所述电子秤内的水果转移至所述取货口的打包袋内。
6. 根据权利要求1所述的水果自动售卖机,其特征在于,所述售卖机柜体内设置有用用于水果保鲜的保鲜模块;和/或  
所述售卖机柜体内设置有用用于水果冷藏的冷藏模块;和/或  
所述售卖机柜体内设置有用用于清洗水果的清洗模块。
7. 根据权利要求1所述的水果自动售卖机,其特征在于,所述售卖机柜体上设置有用用于显示商品信息、操作流程、广告信息、提醒信息、付款信息的显示屏;和/或  
用于播放音频信号的音频播放模块。
8. 根据权利要求1所述的水果自动售卖机,其特征在于,还包括用于发送和接收信息的通信模块,所述通信模块包括有线通信模块和/或无线通信模块,所述无线通信模块包括3G通信模块、4G通信模块、WIFI通信模块、蓝牙通信模块中的一种或几种;  
与所述通信模块连接、用于获取所述售卖机的位置信息的定位模块,所述位置信息通过所述通信模块发送出去,所述定位模块为北斗定位模块、GPS定位模块、基站定位模块中的一种或几种;  
为所述售卖机各部分供电的供电模块,所述供电模块包括市电供电模块和/或电池组供电模块。



9. 根据权利要求1所述的水果自动售卖机,其特征在于,还包括设置在所述售卖机柜体内部、用于将水果进行剥切的水果剥切模块;

所述售卖机柜体的部分面板为透明面板。

10. 一种水果自动售卖系统,其特征在于,包括权利要求1-9任一项所述的水果自动售卖机,还包括移动终端和服务器,所述售卖机连接所述服务器,所述移动终端连接所述服务器;

所述售卖机生成付款二维码,所述移动终端扫描所述付款二维码并付款,所述付款信息上传至所述服务器,所述服务器下发控制指令至所述售卖机,所述售卖机打开取货口。

## 一种水果自动售卖机及售卖系统

### 技术领域

[0001] 本实用新型涉及售卖机领域,更具体地说,涉及一种水果自动售卖机及售卖系统。

### 背景技术

[0002] 水果是人们日常饮食中不可缺少的营养来源。目前水果的主要售卖形式依旧是人工贩卖,包括在大型超市、水果店、路边临时售卖点等,这种贩卖方式需要人为参与,并且需要租赁店面,大大提高了水果成本。另外,在一些写字楼和厂区,很少有专门的商铺用于出售水果,导致厂区人员要自己携带或到较远的商场购买,给用户带来不便。

### 实用新型内容

[0003] 本实用新型要解决的技术问题在于,针对现有技术的上述人工参与导致成本过高、一些地方不方便购买水果的缺陷,提供一种水果自动售卖机及售卖系统。

[0004] 本实用新型解决其技术问题所采用的技术方案是:构造一种水果自动售卖机,包括售卖机柜体,还包括:

[0005] 设置在所述售卖机柜体内部、用于存放水果的水果容纳装置;

[0006] 设置在所述售卖机柜体内部、用于为选取的水果称重的电子秤;

[0007] 设置在所述售卖机柜体内部、用于选取水果的筛选装置,所述筛选装置选取的水果放置在所述电子秤上自动称重并计算价款;

[0008] 所述售卖机柜体设置有用于取走水果的取货口,所述取货口在完成付款后打开。

[0009] 优选地,本实用新型所述的水果自动售卖机,所述容纳装置包括至少两个子容纳装置,每个所述子容纳装置分别放置不同的水果。

[0010] 优选地,本实用新型所述的水果自动售卖机,所述筛选装置包括人工筛选装置,所述人工筛选装置包括:抓手、机械臂、驱动模块、控制模块,其中,

[0011] 所述抓手设置在所述机械臂上,用于抓取水果;所述驱动模块连接并驱动所述机械臂;所述控制模块设置在所述售卖机柜体外侧、连接所述驱动模块,所述控制模块接收用户的选择操作,并产生对应的控制信号至所述控制模块。

[0012] 优选地,本实用新型所述的水果自动售卖机,所述筛选装置包括自动筛选装置,所述自动筛选装置包括设置在所述水果容纳装置和电子秤之间、用于将水果从所述水果容纳装置移动至所述电子秤的传动装置;

[0013] 与所述传动装置连接、用于接收用户发送的购买信息的接收模块,所述购买信息为水果重量、水果数量、购买金额中的一种。

[0014] 优选地,本实用新型所述的水果自动售卖机,还包括:用于将所述电子秤上的水果打包的打包装置;

[0015] 所述打包装置设置在所述电子秤上,所述打包装置将打包袋放置在所述电子秤上,所述筛选装置选择的水果直接放置在所述打包袋内;或者

[0016] 所述打包装置设置在所述取货口,在完成称重付款后,将所述电子秤内的水果转

移至所述取货口的打包袋内。

[0017] 优选地,本实用新型所述的水果自动售卖机,所述售卖机柜体内设置有用于水果保鲜的保鲜模块;和/或

[0018] 所述售卖机柜体内设置有用于水果冷藏的冷藏模块;和/或

[0019] 所述售卖机柜体内设置有用于清洗水果的清洗模块。

[0020] 优选地,本实用新型所述的水果自动售卖机,所述售卖机柜体上设置有用于显示商品信息、操作流程、广告信息、提醒信息、付款信息的显示屏;和/或

[0021] 用于播放音频信号的音频播放模块。

[0022] 优选地,本实用新型所述的水果自动售卖机,还包括用于发送和接收信息的通信模块,所述通信模块包括有线通信模块和/或无线通信模块,所述无线通信模块包括3G通信模块、4G通信模块、WIFI通信模块、蓝牙通信模块中的一种或几种;

[0023] 与所述通信模块连接、用于获取所述售卖机的位置信息的定位模块,所述位置信息通过所述通信模块发送出去,所述定位模块为北斗定位模块、GPS定位模块、基站定位模块中的一种或几种;

[0024] 为所述售卖机各部分供电的供电模块,所述供电模块包括市电供电模块和/或电池组供电模块。

[0025] 优选地,本实用新型所述的水果自动售卖机,还包括设置在所述售卖机柜体内部、用于将水果进行剥切的水果剥切模块;

[0026] 所述售卖机柜体的部分面板为透明面板。

[0027] 另,本实用新型还提供一种水果自动售卖系统,包括上述的水果自动售卖机,还包括移动终端和服务器,所述售卖机连接所述服务器,所述移动终端连接所述服务器;

[0028] 所述售卖机生成付款二维码,所述移动终端扫描所述付款二维码并付款,所述付款信息上传至所述服务器,所述服务器下发控制指令至所述售卖机,所述售卖机打开取货口。

[0029] 实施本实用新型的一种水果自动售卖机及售卖系统,具有以下有益效果:该水果自动售卖机包括售卖机柜体,还包括:设置在售卖机柜体内部、用于存放水果的水果容纳装置;设置在售卖机柜体内部、用于为选取的水果称重的电子秤;设置在售卖机柜体内部、用于选取水果的筛选装置,筛选装置选取的水果放置在电子秤上自动称重并计算价款;售卖机柜体设置有用于取走水果的取货口,取货口在完成付款后打开。通过实施本实用新型,不需要人工参与,顾客可自动完成水果的挑选、称重、付款、取货;该售卖机可摆放至路边、厂区内、写字楼内,占用空间小,方便人们随时购买水果。

#### 附图说明

[0030] 下面将结合附图及实施例对本实用新型作进一步说明,附图中:

[0031] 图1是本实用新型一种水果自动售卖机第一实施例的结构示意图;

[0032] 图2是本实用新型一种水果自动售卖机第二实施例的结构示意图;

[0033] 图3是本实用新型一种水果自动售卖系统的结构示意图。

#### 具体实施方式

[0034] 为了对本实用新型的技术特征、目的和效果有更加清楚的理解,现对照附图详细说明本实用新型的具体实施方式。

[0035] 图1是本实用新型一种水果自动售卖机第一实施例的结构示意图。

[0036] 具体的,本实施例的水果自动售卖机包括售卖机柜体,售卖机柜体的部分面板为透明面板,例如钢化玻璃,用户可通过透明面板观察柜体内的水果。还包括:容纳装置、筛选装置、电子秤、取货口、供电模块等,其中,

[0037] 容纳装置设置在售卖机柜体内部、用于存放水果;特别地,容纳装置位于售卖机柜体的上部,售卖机柜体的下部用于安装售卖机的其他设备。优选地,容纳装置可包括至少两个子容纳装置,每个子容纳装置分别放置不同的水果,例如分别设置苹果容纳装置、橘子容纳装置、香蕉容纳装置等。子容纳装置的大小和形状可不同,根据其内放置水果的形状和特性进行适应性设置,以更好的保存水果。作为选择,为提高水果的保质期、外观等,可将水果进行简单预包装,例如,使用保鲜袋包装,使用盒子包装等。

[0038] 电子秤设置在售卖机柜体内部、用于为选取的水果称重,电子秤与容纳装置连通。电子秤上设置有果盘,用户可将选择的水果通过筛选装置移动至果盘上,电子秤自动称重并计算价款。进一步,因不同水果的价格不同,当容纳装置包括两个以上子容纳装置时,需要设置对应多个电子秤,每个电子秤设置对应的水果价格。或者,因不同水果的价格不同,当容纳装置包括两个以上子容纳装置时,电子秤仅有一个,则电子秤根据用户选择的水果类型设置对应价格,同时需要限制筛选装置的移动位置,即用户选定水果后,筛选装置仅能在对应的选择区域运动,选择指定类型的水果。例如,容纳装置包括苹果容纳装置和橘子容纳装置,各占容纳装置的一半空间。则用户选择购买苹果,电子秤设置为苹果的价格,同时,筛选装置仅能在苹果所处的苹果容纳装置的区域内运动,仅能选择苹果。

[0039] 取货口用于取走水果,可将取货口设置在电子秤所在的位置,取货口设置有挡板和挡板驱动模块,在付款之前,挡板处于关闭状态;在用户完成在线付款后,挡板驱动模块带动挡板移动,挡板处于打开状态。用户完成在线付款后,取货口自动打开,则用户可直接取走电子秤上的水果。通过使取货口与电子秤相邻设置,整个购买过程中仅需要移动水果一次,减少操作时间,同时避免水果的磕碰损坏。可以理解,因电子秤与容纳装置连通,需要在电子秤周围设置围闭护栏,防止取货口打开后用户通过电子秤处直接取走水果。作为选择,可在电子秤所处位置和容纳装置之间设置可调节的挡板,在筛选水果过程中,取货口关闭,挡板打开,用户可筛选水果;在付款完成后,取货口打开,挡板关闭,则用户仅可取出已经购买的水果,无法取走容纳装置内的水果。

[0040] 筛选装置设置在售卖机柜体内部、用于选取水果,筛选装置将选取的水果放置在电子秤上,电子秤自动称重并计算价款。筛选装置可完成水果的抓取、移动、释放等动作,从而实现水果的挑选。可以理解,该筛选装置的移动及抓取部分需安装在售卖机柜体内部,控制模块需安装在售卖机柜体外部,以供用户操作。以下分别通过几个实施方式对筛选装置进行说明。筛选装置包括人工筛选装置和自动筛选装置,其中,

[0041] 作为选择,人工筛选装置包括:抓手、机械臂、驱动模块、控制模块,其中,抓手设置在机械臂上,用于抓取水果,为避免水果被抓伤、抓坏,需要在抓手上设置柔软的缓冲垫。驱动模块连接并驱动机械臂,驱动模块可安装在轨道上,驱动模块驱动机械臂在轨道上移动,例如,驱动模块为电机驱动,驱动电机带动滚轮在轨道上移动,实现机械臂的移动。机械臂

为可伸缩结构,即能上下收缩。控制模块设置在售卖机柜体外侧、连接驱动模块,控制模块接收用户的选择操作,并产生对应的控制信号至控制模块,控制模块包括按键或操作杆等,控制信号包括位置移动信号、抓取信号、释放信号等。例如,机械臂为可伸缩结构,通过伸缩完成上下移动;驱动模块驱动机械臂在轨道到移动,完成水平方向上的运动,这样,筛选装置可完成任意位置的移动,进而可抓取水果,并放置在电子秤上。

[0042] 作为选择,人工筛选装置包括:抓手、机械臂、驱动模块、控制模块,其中,抓手设置在机械臂上,用于抓取水果,为避免水果被抓伤、抓坏,需要在抓手上设置柔软的缓冲垫。机械臂的一端固定在售卖机柜体内壁上,另一端设置有抓手。机械臂包括至少两节,每节之间的连接节点可进行多角度转动。驱动模块驱动每节机械臂移动,完成水果的抓取、移动、释放,类似于人用手抓取水果。

[0043] 作为选择,人工筛选装置还包括抓手、机械臂、驱动模块、接收无线控制信号的短距离无线通信模块,例如蓝牙、WIFI等。人工筛选装置通过短距离无线通信模块连接移动终端,移动终端上安装有用于控制人工筛选装置的APP。移动终端发送控制信号,控制信号包括位置移动信号、抓取信号、释放信号等;驱动模块根据控制信号控制机械臂和抓手工作,抓取水果。例如,机械臂为可伸缩结构,完成上下移动;驱动模块驱动机械臂在轨道到移动,完成水平方向上的运动,这样,筛选装置可完成任意位置的移动,进而可抓取水果,并放置在电子秤上。

[0044] 上述两种人工筛选装置在用户的操作下即可完成水果的筛选,使用户具有更多的自助选择权;同时,因操作机械臂移动具有一定的趣味性,增加了购买水果的趣味性。

[0045] 作为选择,自动筛选装置包括传动装置和接收模块,其中,传动装置设置在水果容纳装置和电子秤之间、用于将水果从水果容纳装置移动至电子秤。接收模块与传动装置连接、用于接收用户发送的购买信息,购买信息为水果重量、水果数量、购买金额中的一种,例如,用户可选择买2Kg苹果,也可选择买2个苹果,也可选择买价值20元的苹果。因电子秤仅能获取重量参数,所以,如果用户输入的是购买金额,则自动筛选装置根据水果价格将购买金额转换为对应重量,发送至电子秤。可以理解,电子秤和传动装置之间存在反馈调节,当电子秤内的水果未达到预设重量时,电子秤发送继续添加水果信号至传动装置,传动装置继续添加水果;当电子秤内的水果达到预设重量时,电子秤发送停止添加水果信号至传动装置,传动装置停止添加水果。自动筛选装置仅需要用户输入购买信息,不需要用户手动挑选水果,可提高购买效率。

[0046] 供电模块为售卖机各部分供电,供电模块包括市电供电模块和/或电池组供电模块。在一些市电不易接到的场合,例如广场、公园、路边等,可使用电池组供电模块供电,从而提高售卖机的适应性。优选地,对于放置在室外的售卖机,还可设置太阳能充电模块,为电池组进行充电,从而减少电池的维护,节省管理成本。

[0047] 图2是本实用新型一种水果自动售卖机第二实施例的结构示意图。

[0048] 具体的,在第一实施例的基础上,本实施例的水果自动售卖机还包括用于发送和接收信息的通信模块,通信模块包括有线通信模块和/或无线通信模块,无线通信模块包括但不限于3G通信模块、4G通信模块、WIFI通信模块等,通信模块的连接和设置可参考现有通信模块的设置,在此不再赘述。优选地,为使无线通信模块由较好的信号,可将信号天线安装在售卖机顶端。

[0049] 作为选择,本实施例的售卖机还包括与通信模块连接、用于获取售卖机的位置信息的定位模块,获取的位置信息通过通信模块发送至服务器。定位模块包括但不限于北斗定位模块、GPS定位模块、伽利略定位模块、基站定位模块等。售卖机按照预设时间间隔上传位置信息至服务器,使售卖机的位置信息能及时更新。特别地,考虑到售卖机在放置后基本不会移动,可在首次放置时将售卖机的位置信息上传至服务器,服务器进行保存,则售卖机可不需要定位模块,移动售卖机后,再进行手动修改即可。

[0050] 作为选择,本实施例的售卖机柜体上设置有用于显示商品信息、操作流程、广告信息、提醒信息、付款信息等信息的显示屏,例如付款信息可为付款二维码。以及用于播放音频信号的音频播放模块,音频播放模块可播放操作提示、付款提示、取货提示、广告、促销信息等音频信号。显示屏显示的内容和音频播放模块播放的内容可通过通信模块获取,即由服务器远程下发。例如,显示屏滚动播放水果价格信息,随着水果的存放时间,可适当降低水果的价格进行促销。特别的,可通过通信模块接收服务器下发的价格信息,并在显示屏上显示。因水果自动售卖机的数量较多,且分布广泛,通过通信模块远程调整价格,大大提高管理效率。又例如,服务器将广告信息通过通信模块下发至售卖机,进而在显示屏和音频播放模块上播放,实现售卖机上的广告更新。

[0051] 一些实施例中,水果自动售卖机还包括用于将电子秤上的水果打包的打包装置,打包装置设置在电子秤上,打包装置将打包袋放置在电子秤上,筛选装置选择的水果直接放置在打包袋内。或者,打包装置设置在取货口,在完成称重付款后,将电子秤内的水果转移至取货口的打包袋内。或者,打包装置仅为用户提供包装袋,取货口打开后,用户自己进行打包。

[0052] 一些实施例中,因水果属于生鲜类商品,需要进行保鲜存储,所以水果自动售卖机还包括:售卖机柜体内设置有用于水果保鲜的保鲜模块,保鲜模块与售卖机内的容纳装置连通,使容纳装置内的水果保鲜。可以理解,因不同水果需要的保鲜条件不同,保鲜模块可分别为不同的子容纳装置提供对应的保鲜环境。优选地,保鲜模块包括温度调节模块、湿度调节模块、以及含氧量调节模块,同时,为保证容纳装置内的温度和湿度的平衡,保鲜模块包括对应的温度检测传感器、湿度检测传感器、以及含氧量传感器,实现对容纳装置内温度、湿度、含氧量的动态调节。

[0053] 一些实施例中,售卖机柜体内设置有用于水果冷藏的冷藏模块,冷藏模块与容纳装置连通,将容纳装置内的水果进行冷藏。例如,夏天时将西瓜进行冷藏。冷藏模块与温度检测传感器连接,保持容纳装置内的温度在预设范围内。

[0054] 一些实施例中,对于一些清洗后易坏的水果,可在用户购买后进行清洗。水果自动售卖机还包括:售卖机柜体内设置有用于清洗水果的清洗模块,该清洗模块包括储水模块、清洗池、污水收集模块。水果完成称重和在线付款后,将水果移动至清洗池,储水模块将清水输出至清洗池;自动清洗模块对水果进行清洗,清洗完成后,水果通过出货口取出。之后,将清洗池内的污水排放至污水收集模块。

[0055] 一些实施例中,水果自动售卖机还包括设置在售卖机柜体内部、用于将水果进行剥切的水果剥切模块,水果剥切模块包括用于切割的刀具,例如,在切西瓜时,可使用切瓜模具。进一步,售卖机还包括垃圾回收模块,垃圾回收模块与水果剥切模块连接,用于收集水果剥切模块产生的垃圾。

[0056] 一些实施例中,水果自动售卖机还包括用于为售卖机照明的照明灯,优选地,该照明灯安装在售卖机柜体内部。

[0057] 一些实施例中,水果自动售卖机还包括用于监控售卖机所处区域的监控装置,监控装置通过通信模块将监控信息发送至服务器。通过监控装置,可提高售卖机的管理效率。

[0058] 图3是本实用新型一种水果自动售卖系统的结构示意图。

[0059] 具体的,该水果自动售卖系统包括上述的水果自动售卖机,还包括移动终端和服务器,移动终端包括但不限于智能手机、平板电脑、智能手表等。售卖机连接服务器,移动终端连接服务器。售卖机完成用户挑选水果称重后,生成付款二维码,移动终端扫描付款二维码并付款,付款方式包括支付宝支付、微信支付、银联支付等。付款信息上传至服务器,服务器下发控制指令至售卖机,售卖机打开取货口。优选地,服务器记录每次交易的交易信息,交易信息包括售卖机编号、销售水果种类、水果重量、销售价格等信息。

[0060] 用户需要购买水果时,通过移动终端发送购买请求至服务器,该购买请求包括移动终端的位置信息。服务器根据移动终端的位置信息进行查找,将距离该位置信息在预设距离内的售卖机的地址信息下发至移动终端,并在移动终端显示,例如,在电子地图上显示,或以列表形式显示。用户即可获知自己周围的所有水果售卖机的位置,根据需求进行选择。进一步,服务器根据用户的位置信息和售卖机的地址信息生成路线,为用户进行指引。

[0061] 可以理解,在商家存放水果时,将存放水果的数量发送至服务器,服务器进行保存。在售卖过程中,每笔交易的水果种类和数量上传至服务器,则服务器即可获知当前售卖柜中剩余水果的数量,从而实现远程监控,合理补货,提高了售卖机的管理效率。

[0062] 通过实施本实用新型,不需要人工参与,顾客可自动完成水果的挑选、称重、付款、取货;该售卖机可摆放至路边、厂区内、写字楼内,占用空间小,方便人们随时购买水果。

[0063] 以上实施例只为说明本实用新型的技术构思及特点,其目的在于让熟悉此项技术的人士能够了解本实用新型的内容并据此实施,并不能限制本实用新型的保护范围。凡跟本实用新型权利要求范围所做的均等变化与修饰,均应属于本实用新型权利要求的涵盖范围。

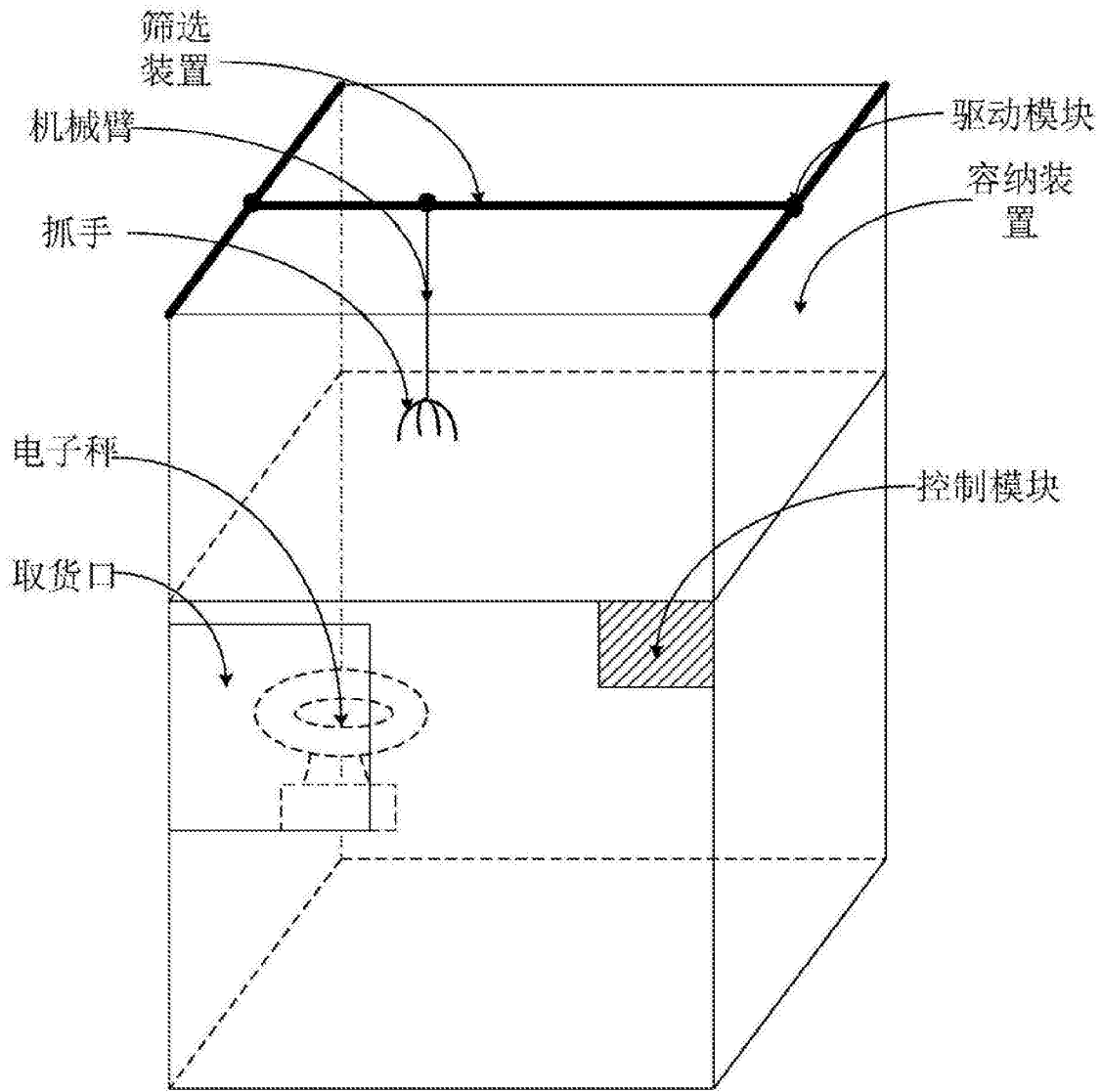


图1





图2

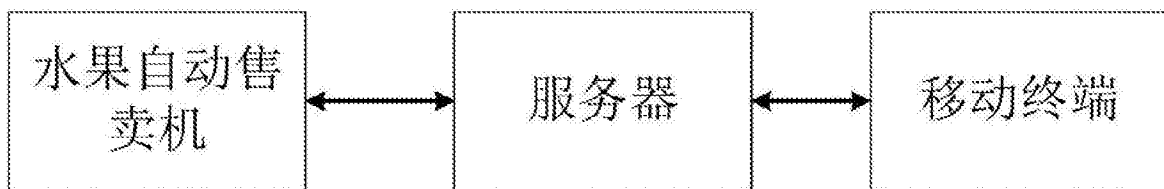
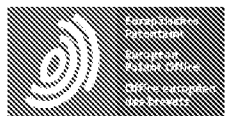


图3



Espacenet

## Bibliographic data: CN108352094 (A) — 2018-07-31

---

Vending machine and method for distance selling regulated goods

**Inventor(s):** PISHCHIK KIRILL EDUARDOVICH ± (K·E·皮希克)

**Applicant(s):** PISHCHIK KIRILL EDUARDOVICH ± (K·E·皮希克)

**Classification:** - **international:** G07F11/00  
 - **cooperative:** G06Q10/0836 (KR); G06Q20/4014 (EP, KR, US);  
G07F11/00 (EP, KR, US); G07F17/0092 (EP, KR);  
G07F9/002 (EP, KR, US); G16H20/10 (EP, KR);  
G16H20/13 (EP, KR); G06Q10/0836 (EP)

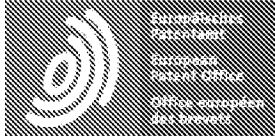
**Application number:** CN20168061694 20160816 Global Dossier

**Priority number(s):** RU20150135449 20150821 ; WO2016RU00552 20160816

**Also published as:** CN108352094 (B); AU2016312856 (A1); AU2016312856 (B2);  
EA038763 (B1); EA201890536 (A1); more

### Abstract of CN108352094 (A)

The present invention relates to vending machines and methods for distance selling regulated goods. The claimed vending machine is equipped with modules for the return and reimbursement of goods, a communication unit for providing a communication link between the vending machine and a specialized operator station, and means which render the vending machine suitable for use by persons with poor vision, said means being graphical marks in the form of raised Braille. A method of distance selling regulated goods is realized using the proposed vending machine for distance selling and envisages monitoring and control, by a specialized operator, of the steps of order placement, verification of consent documents, payment, dispensing and, if necessary, return of the goods. The method provides for communication and the remote control of a vending machine and of a sales process by a specialized operator working at a computerized workstation within a specialized operator station.



# Patent Translate

Powered by EPO and Google

## Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

## DESCRIPTION CN108352094A

*10* Vending machine and method for remote sale of regulated goods

[0001]

*14* technical field

[0002]

*18* The present invention relates to an apparatus and method for automated remote sales, and more particularly to a vending machine for the sale of goods that require authorization or are age-restricted for purchase.

[0003]

*23* Background technique

[0004]

*27* Vending machines have been used extensively for the sale of a variety of single items involving everyday consumer-sized goods and offer advantages over outlets and venues in terms of accessibility, small footprint and low maintenance.

*30* Vending machines are also used for the sale of age-restricted goods, such as tobacco and alcohol, and regulated goods, including pharmaceuticals.

*32* Vending machines for selling prescription drugs have become more widespread, creating a need for vending machines with active sales control methods and sales specialist involvement.

[0005]

*37* As we all know, there are commodity sales machines that require the identity of the buyer. Please refer to the  
Petitioner Exhibit 1002-1076

utility model patent RU73106 published on October 5, 2008 by the Russian Federation, No. U1 [1], which includes a fuselage, a display box with a commodity sample ( order unit), a device for storing and distributing goods (order distribution module), a data display device in the form of a display screen with an active screen (touch screen), a payment instrument in the form of a cash receiving device (cash receiving module), especially Is a cash acceptor with change and receipt printer (module to print receipt and change) function.

43 Vending machines can be equipped with devices for scanning ID scans, as well as video calls with sales specialists, if desired.

#### [0006]

48 Using this vending machine sales method, in order to complete all sales operations through the vending machine itself, the sale of one or several commodities is performed.

50 The method also includes the option of interrupting the sales process, or the sale of the goods requires identification of the buyer, sending the buyer's facial image through a webcam to contact a sales specialist in a call center, and scanning the device for identification, based on the buyer's age The result of the visual inspection of whether the age limit is met determines whether the next step can be performed by the vending machine.

#### [0007]

58 A similar solution was proposed in the application US2009/0276088[2] published on May 11, 2009.

59 The scheme relates to a method of selling age-restricted regulated goods and a vending machine used, and the scheme includes unlocking of the function of the vending machine after a visual inspection of a purchaser's ID by a sales officer.

#### [0008]

65 The above-mentioned automatic vending machines [1, 2] and methods for the sales of regulated goods basically only provide the result of identification based on the age of the purchaser and the further actions taken by the purchaser without the participation of the sales commissioner. Controlled unlocking of cargo aircraft functions,.

69 However, in order to ensure that regulated goods are authorized to be sold as intended, in the case where the sale of goods requires the submission of authorization documents through vending machines, such as medical prescriptions, the entire sales process will be participated through the duty of sales commissioners from the moment the shopping starts until the shopping is completed Rather than being controlled through the vending machine itself.

#### [0009]

77 There is a method of selling pharmaceuticals, including prescription drugs, through a vending machine where the purchaser inserts the prescription into a reading device and then pays for the purchase by means of a credit card using a cash slot (cash acceptor or coin acceptor) or using a card slot: Please refer to the electronic

resources at this URL: [http://www.1000ideas.ru/article/biznes/moda-krasota-zdorove/biznes-ideya-1886-avtomat-dlya-prodazhi-tabletok/\[3\]](http://www.1000ideas.ru/article/biznes/moda-krasota-zdorove/biznes-ideya-1886-avtomat-dlya-prodazhi-tabletok/[3]) as an example.

82 After payment, the purchaser gets a receipt and a printed slip of the medication regimen.

83 During the drug purchase process, buyers can contact merchants, who will check medical prescriptions and provide consultation on medication regimens. The method is implemented in an automatic vending machine, and the automatic vending machine includes a body, a medical prescription interface, a payment module interface, a product delivery tray, a receipt and a medication plan printing module, and a device for audio/video communication with vendors. All operations from the beginning of the shopping process until the end of the shopping are performed by the vending machine without the participation of sales specialists.

#### [0010]

92 In order to solve the problem of sales of regulated goods, considering the lack of a device for checking and controlling the order of goods purchased during the period from product selection to product shipment, the automatic vending machine does not ensure sufficient security for the intended authorized sale of prescription drugs.

96 The function of this type of vending machine is limited to selling goods that do not need to be returned and refunded due to buyer's wrong operation.

#### [0011]

101 In addition, the vending machines in the related art have limited the use of certain categories of disabled people, especially those with poor eyesight, and the vending machines in the related art cannot ensure the identification of the buyer's identity guarantee, which increases the unplanned Risks of selling prescription drugs.

105 In addition, the medicine vending machines in the related art are inconvenient for purchasers to obtain a medicine certificate if necessary, because reading the certificate from a screen is inconvenient to operate, and it is basically impossible for people with poor eyesight to operate.

#### [0012]

111 Contents of the invention

#### [0013]

115 The purpose of the present invention is to develop a comprehensive facility for remote sales of regulated commodities and a sales method for regulated commodities with the participation of sales specialists, the sales of which are regulated by relevant laws and regulations, especially for use in accordance with basic laws and regulations Complexes, vending machines and methods for the sale of prescription drugs controlled by an operating pharmacist or salesperson.

[0014]

*123* The proposed remote-controlled automatic vending machine and method for remote sales of regulated goods can achieve such a technical effect that the sales process can be safely and conveniently delivered to The process by which authorized persons sell regulated goods and the process by which vending machines can be facilitated for persons with disabilities, especially those with low vision.

*127* The use of vending machines can not only reduce the price of medicines by reducing the rent and wages of business premises, but also eliminate geographical barriers through a large network of medicine vending machines, making medicines easier to obtain.

[0015]

*133* The medicine vending machine has strong mobility and a small footprint. It can be installed on tourist routes and gas stations, making it more convenient for motor vehicle users to obtain medicines.

[0016]

*138* Said technical effect is achieved by a remote-controlled vending machine comprising:

[0017]

*142* The automatic vending machine for the remote sale of regulated commodities, which includes a fuselage and the following items installed in the fuselage:

[0018]

*147* A communication unit, a software and hardware unit, a database and a data storage management server, which provide the possibility of establishing communication with a remote sales specialist station, where the sales specialist station includes at least one computerized workstation of a sales specialist for regulated goods, which Software and hardware unit for data collection and control of vending machines for the remote sale of regulated goods.

[0019]

*155* A software and hardware unit for control directing: the acceptance and interpretation of the vending machine, the functional characteristics of the relevant vending machine, and the receipt, payment and dispatch of orders; the software and hardware unit contains audio and A video unit, the audio and video unit includes a display device, a video camera, a speaker and a microphone, and a sales specialist call button, wherein the data display unit is in the form of a touch screen with a buyer interface mounted on the front panel of the body , the video camera is located above the touch screen, the sales specialist call button is equipped with a plate with a graphic pointing point designated in Braille type, which is located on the front panel, and

[0020]

*165* The following are controlled by the Sales Specialist,

[0021]

*169* a commodity unit module which is acted as a container with a door on the front panel with a door surveillance camera,

[0022]

*174* authorization document reading device in the form of a scanner, at least one payment module having a payment receiver located on the front panel of the fuselage,

[0023]

*179* Commodity distribution module, which has a tray on the front panel of the fuselage, the commodity distribution module is equipped with a shipment monitoring camera, and commodity distribution is controlled by a rolling door,

[0024]

*185* a change and receipt cashier module having a tray located on the front panel of the fuselage and equipped with a surveillance camera,

[0025]

*190* A return module and a file storage module, the return module is on the side panel of the fuselage, the file storage module is on the side panel of the fuselage, and has a tray, and the return module and the file storage module are equipped with controlled rolling doors and surveillance cameras for returns and document cashiers, here

[0026]

*197* A plurality of panels with graphic indications of Braille type indications are provided adjacent to the payment acceptor, change and receipt cashier module, goods shipment module and returns module

[0027]

*202* The job site of the sales specialist is the job site of a sales pharmacist or a business vendor.

[0028]

206 The commodity unit modules are preferably equipped with means to maintain the temperature and humidity conditions of the container.

[0029]

211 The method of commodity payment can be carried out in the form of a cash payment module and/or a credit card payment module.

[0030]

216 If desired, the authorization document reading device may be equipped with a container with a surveillance camera for the receipt of authorization documents (eg prescriptions) in the case of the sale of goods requiring authorization documents.

[0031]

222 A method of distance selling regulated goods according to claim 1, which may be carried out using a vending machine for distance selling according to claim 1, the method comprising

[0032]

227 Connecting, by wired or wireless link, one or more vending machines for the remote sale of regulated commodities to a sales specialist station comprising at least one computerized workstation, software and hardware unit of a sales specialist of regulated commodities, Database and data storage management server, software and hardware unit for data collection and control of vending machines for the remote sale of regulated goods.

[0033]

235 Activation of the vending machine is performed from standby mode by the purchaser touching the touch screen displaying the purchaser interface on the screen, or by pressing a call button on the front panel of the vending machine.

[0034]

241 The buyer establishes wired or wireless communication between the vending machine and the sales commissioner station by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,

[0035]

247 Determine the available sales specialist and upload the activated data of the vending machine to the sales  
Petitioner Exhibit 1002-1081



specialist's computer work site, display the operation interface for controlling the functional devices and modules of the vending machine on the monitor of the sales specialist's work site, and the sales specialist starts the automatic Modes of operation of vending machine audio and video units,

[0036]

*254* Display the list of goods requested by the buyer on the touch screen of the vending machine, use the scanner of the vending machine to submit the authorization documents for specific types of goods, and further display the list of selected goods on the screen of the sales specialist station,

[0037]

*260* Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,

[0038]

*265* Confirmation of selected items occurs by touching the selected item confirmation icon on the buyer interface, or by pressing a call button on the front panel of the vending machine.

[0039]

*270* After specifying the customer payment option (cash/credit card), the vending machine payment module is unlocked.

[0040]

*275* The payment for the selected commodity is completed through the payment module receiver, and the sales specialist uses the monitoring camera of the pallet of the commodity shipment module to further unlock the commodity shipment module and the change and receipt cashier module.

[0041]

*281* Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.

[0042]

*286* During commodity selection, the sales specialist can provide commodity documents to the buyer through the tray of the document storage module according to the buyer's requirements, and the sales specialist uses the monitoring camera of the tray to further control the return of the documents.

[0043]

292 The method also offers the possibility of returns through a merchandise return pallet controlled by a sales specialist using a surveillance camera for the merchandise return pallet.

[0044]

297 The proposed vending machine for distance selling also provides a method of selling predetermined regulated goods, the method comprising:

[0045]

302 The purchaser receives information about the address and number of the vending machine, the time when the ordered goods were delivered to the vending machine and the unique password for the purchase,

[0046]

307 Activation of the vending machine is performed from standby mode by the purchaser touching the touch screen with the on-screen purchaser interface, or by pressing a call button on the front panel of the vending machine.

[0047]

313 The communication between the vending machine and the sales commissioner station is established by the buyer through a wired or wireless communication unit by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,

[0048]

319 The unique password is entered through the buyer interface on the vending machine screen, or by the sales representative based on the voice message sent by the buyer through the audio and video unit of the vending machine,

[0049]

325 Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,

[0050]

330 Confirmation of the order is made by touching the order confirmation icon on the buyer interface, or by pressing the call button on the front panel of the vending machine.

[0051]

*335* The sales representative notifies the container number of the module with the commodity unit through the buyer interface or through the voice message.

[0052]

*340* payment for the order by the buyer through the selected payment module receiver, further controlled by the sales specialist using the surveillance camera of the tray of the change and receipt distribution module to unlock the container door of the unit with the merchandise module and the change and receipt distribution module,

[0053]

*347* The acquisition of the medicine in the correct container is controlled by the sales specialist using the surveillance camera 17 of the door 9 of the container,

[0054]

*352* Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.

[0055]

*357* Description of drawings

[0056]

*361* The proposed invention is explained in the accompanying drawings, in which:

[0057]

*365* FIG. 1 shows a general view of a remote-controlled automatic vending machine for remote selling of regulated goods according to the present invention.

[0058]

*370* FIG. 2 shows a flowchart of a vending machine using distance selling, which explains a method of remotely selling regulated goods.

[0059]

375 Detailed ways

[0060]

379 FIG. 1 is a schematic diagram of a general view of a remotely controlled vending machine for remotely selling regulated goods.

[0061]

384 The automatic vending machine includes a body 3, which is provided with equipment and functional modules for placing, storing and selling commodities.

386 The fuselage acts as a supporting frame, which is encapsulated with front and side panels and a rear panel, usually, the rear panel is in the form of a door to facilitate access to the devices and functional modules of the vending machine.

389 The airframe also includes a communication unit for communicating with a sales specialist at a remote station, a hardware and software unit that provides receipts and instructions for control instructions, for example, generated by a sales specialist for regulated commodities.

[0062]

395 The vending machine is equipped with an audio and video system comprising display means in the form of a touch screen 4 , a video camera 5 , speaker means in the form of powered speakers 6 a and 6 b , and a microphone 7 .

398 The camera 5 is arranged to capture images of the buyer's area as well as images of documents and other textual material submitted by persons with low vision.

[0063]

403 The powered loudspeaker is placed where it is convenient to listen to the voice information without noise, for example, above the data display unit.

405 The camera 5 is positioned so as to provide the widest possible capture of the buyer's area, for example it could be located in the middle above the touch screen 4 between the speakers as shown in Figure 2 .

407 Microphone 7 and sales commissioner call button 8 are positioned at the bottom of touch screen 4,

[0064]

411 A plate with a graphic indicator with a Braille type indication mounted on the surface of the call button 8 is used to inform people with poor eyesight of the type of button.

413 The touch screen is at eye level, and its height is determined according to the average height of a person.

[0065]

417 Audio and video systems are used for video conferencing between buyers and sales specialists, consultations during the merchandise purchase process, and consultations during the merchandise application process for shoppers.

420 In addition, a display device and a speaker device are used for familiarizing with commodities sold through the vending machine.

422 For example, in the brochure mode, buyers can browse leaflets for various products.

423 Specifically, during the sale of medicines, buyers can familiarize themselves with product descriptions and usage instructions, for example, with regard to medicines, when the vending machine is in standby mode, buyers can browse and listen to advertisements for various goods that may be demonstrated.

[0066]

429 In order to carry out the processes of ordering, payment and distribution, the automatic vending machine is equipped with a plurality of merchandising modules as containers of commodities (for example, medicines) in the size of daily consumer goods, including authorization document reading means, at least one payment receiving module, in particular Cash receiving module and/or credit card receiving module, change and receipt cashier module and payment goods shipping module.

[0067]

437 The unit modules for the consumer goods sized items to be sold are located inside the fuselage (not visible).

438 A modular unit acts as a container that can hold items within the standard range as well as items outside the standard range.

440 If goods outside the standard range are offered, they are accessed through the door 9 of the container, which is located to the left of the touch screen 4 on the front panel of the vending machine.

442 For the visually impaired, the door 9 is numbered and contains a tray 9a with a container number marking, a pictorial marking in Braille.

[0068]

447 The containers of the vendable merchandise modules are provided with means to maintain temperature and humidity conditions for merchandise storage.

449 For example, the container of the pre-ordered goods module of the medicine vending machine is filled with medicines outside the standard range of the medicine vending machine, which have been ordered earlier by the purchaser, for example through the company's website or through a similar medicine vending machine. Pre-orders for cargo planes, or pharmaceuticals manufactured through remote centralized prescription departments and via pre-orders.

[0069]

457 The work of the payment module is carried out by the receiver 10 of the cash (coin or banknote) receiving

module or the receiver 11 of the credit card module.

[0070]

*462* Beneath the credit card acceptor is the scanner's window 12, which is used to enter and read the purchaser's authorization or identification document.

*464* A container for receiving non-returnable authorization documents (eg, prescription blanks) is provided in a box near the scanner, and is equipped with a surveillance camera (not shown) for authorization documents (eg, medical prescriptions).

*467* Below the scanner is located the tray 13 of the change and receipt cashier module, which is equipped with a camera (not shown) which is used by the salesperson to control the change receipt or refund.

*469* Window 13 is used for refunds in case of wrong shipments (eg medication).

[0071]

*473* The tray 14 of the commodity dispensing module is located in the middle area of the front panel, and is used for distributing goods according to orders.

*475* Item assignment templates are used during purchase.

*476* The pallet 14 of the module is provided with a rolling shutter 14b controlled by a sales specialist and a surveillance video camera (not shown) whose images are sent to the sales specialist's screen during distribution.

*479* Thus, sales specialists control the distribution of those specific commodities, such as pharmaceuticals ordered and paid for by customers.

[0072]

*484* The window 12 and trays 13, 14 are located at a height that facilitates manual handling during document scanning, pickup, receipt and change.

*486* The tray 13 is also used for refunds in the event of misdispensing of goods, such as medicines.

[0073]

*490* Plates of graphic indicators 10a, 11a, 13a and 14a with Braille type identification located near cash/credit card acceptors, merchandise dispensing trays and receipts, and change dispensing windows to facilitate separate payment and receipt of goods by the visually impaired using vending machines As well as getting back change and receipts.

[0074]

*497* On the right side panel of the vending machine body is located the tray 15 of the returns module, which has a lockable roller door 15b, near which is placed the tray 16 of the board and document storage module, which has a graphic indicator in the form of a Braille type 15a, the tray 16 has a lockable roller shutter door 16b.

[0075]

503 The pallets 15 of the returns module and the pallets 16 of the document storage module are controlled by sales specialists.

505 The rolling shutter doors 15b and 16b are remotely controlled by sales specialists.

506 The pallets of the returns module are used in the event that due to mistakes by sales specialists or logistics staff, the misdispensing of goods (such as medicines) to the wrong unit of the storage module occurs.

508 The document storage module is used for storage of certificate copies of commodities (eg, medicines) in the vending machine.

510 According to the buyer's request, the rolling shutter door 16b of the pallet 16 is remotely controlled by a sales specialist and controlled by a camera.

[0076]

515 Lights for night inscriptions, trays and button bars for vending mods can be mounted on the vending machine body.

[0077]

520 In order to prevent service personnel from electric shock, when opening the access door of the device and function module of the vending machine, the lock switch cuts off the circuit.

[0078]

525 Each vending machine is also equipped with a siren which, in case of any intrusion attempt, reports to the service desk of the nearest police department, connects all video cameras of that vending machine and starts recording inside the vending machine and an image of what is happening outside, simultaneously activating an audible alarm (siren).

529 In addition, the vending machine is connected to any available sales specialist, allowing him to make additional decisions while addressing the situation in real time, observing the situation.

531 Afterwards, a decision will be made on whether or not to dispatch the on-call repairer for the vending machine to the vending machine.

[0079]

536 Plus, a salesperson with additional access can connect to any vending machine and check its features, item inventory and test its own functionality.

[0080]

541 If the device used to regulate the temperature and humidity of the unit cabin fails, there will be another  
Petitioner Exhibit 1002-1088

temperature-sensitive alarm and report the failure to the sales commissioner station.

[0081]

*546* The remote sales method proposed using the above-mentioned remote-controlled vending machine according to the present invention is suitable for remote sales of medicines, and the vending machine will be referred to as a medicine vending machine hereinafter.

[0082]

*552* A method for remotely selling a regulated commodity using a vending machine for remote selling a regulated commodity provides control of one or more vending machines.

*554* As illustrated in the flowchart in Fig. 2, one or more automatic vending machines for remote selling of controlled goods are connected to a sales specialist site (2) through a wired or wireless communication unit.

[0083]

*559* Cables based on twisted-pair copper conductors (twisted pairs), coaxial cables with copper conductors, and fiber optic cables can be used as wired communication lines.

*561* Fixed wireless communication, which is based on multipoint wireless communication channels for data transmission in radio frequency bands, can be used as the wireless communication network.

*563* Each vending machine and sales specialist station is equipped with transmitting and receiving antennas and the necessary equipment for data preparation and transmission.

[0084]

*568* The vending machine is equipped with hardware and software units to provide the reception and interpretation of the control commands of the functional characteristics and modules of the vending machine, the preparation of the data on the vending machine for sending to the sales commissioner station, the interpretation of the control signal from the sales commissioner station translate.

[0085]

*575* The sales commissioner's station is equipped with a computer workstation, hardware and software units with a database, and a data storage control server.

*577* The hardware and software units of the sales commissioner's station provide the process of data collection, as well as the preparation and transmission of operational control signals for remote sales of regulated goods by vending machines.

*580* When vending machines are used as medicine vending machines, the sales specialists are pharmacists and vendors.



[0086]

585 When the buyer arrives at the medicine vending machine, the touch screen 4 of the vending machine may be in the advertisement playback mode or the vending machine is in the standby mode, and the vending machine initialization is completed from the advertisement playback mode or the standby mode by touching the touch screen , after the buyer touches the initial touch screen, the Call icon will appear.

589 A person with poor eyesight puts the vending machine into ready mode by pressing the call button 8 on the front panel of the medication vending machine, which is equipped with a graphic indicator in the form of a "call" button in Braille type.

[0087]

595 After pressing the "Call" icon or "Call" button 8 on the touch screen 4 , the medicine vending machine 1 is connected to the sales specialist station 2 .

597 In case of an incoming call, the hardware and software unit of the sales specialist station connects the medication dispenser to the computer workstation of the first serviceable sales specialist.

599 Therefore, the required time to connect to the sales specialist will first be displayed on the touch screen 4 of the medicine vending machine, or if the sales specialist is available, the video image of the sales specialist will appear immediately, and the video captured from the video camera 5 The buyer's image will appear on the screen at the sales specialist's station, so voice communication is also connected, and then a dialogue between the sales specialist and the buyer begins.

604 The dialogue between the sales commissioner and the buyer is recorded in the data storage server of the sales commissioner station, and stored there for a period of time, so that when there is a non-standard or a conflict with the buyer, a possible investigation can be carried out, and a video of the buyer can be generated Record.

[0088]

610 After the sales specialist's computer is connected to the drug vending machine, the operation interface will appear on the screen of the sales specialist station, which has various functional modules and devices of the drug vending machine (scanner, payment module, video camera, All control functions of the locking device for the rolling door of the document storage tray 16 and the rolling door of the return module tray 15).

614 In addition, the software (inventory software) also loads the data on the connected medicine vending machine, namely its geographic location, the quantity and name of the medicines contained in the vending machine, as well as the physical parameters (temperature and humidity of the various parts of the vending machine). ).

618 Afterwards, the sales specialist puts the audio and video unit of the vending machine into operating mode and displays a list of medicines and their prices on the touchscreen.

[0089]

623 During the dialogue with the sales specialist, the buyer speaks out the desired product (for example, medicine) and then the sales specialist selects the medicine requested by the buyer from the warehouse database, and the selection results are listed in the form of the medicine name, quantity and price, and the "total" number. The

form of the instruction list is displayed on the touch screen 4 of the vending machine.

627 If necessary, according to the purchaser's request, the sales specialist gives consultation on the medicine and the ordering procedure using the audio and video unit of the medicine vending machine.

629 In the event that authorization documents need to be submitted, such as a medical prescription, the sales associate unlocks the scanner and the purchaser scans the medical prescription.

631 After the order is completed, the icon "Confirm order" on the drug vending machine purchase interface will be activated.

633 The buyer confirms the order by pressing the icon "confirm order" or by pressing the "call" button 8 of the vending machine, and the order confirmation message will appear on the screen of the salesperson's computer.

636 Afterwards, the salesperson activates the operation of the cash and credit card accepting module, and then the buyer can use one of the receivers 10 or 11.

#### [0090]

641 If the medicine vending machine is used by a person with poor eyesight, a medicine selection process is performed using a voice dialogue mode of dialogue between the purchaser and the sales clerk.

643 The sales specialist informs the purchaser of the information on the medicines available for sale, generates a list of selected medicines, and then informs the purchaser of the selected total amount and total price by voice.

645 Order confirmation is carried out by the buyer pressing the "call" button 8.

646 If a credit card is used for payment, a plate 11a with a graphic indicator in Braille type indication is located near the credit card slot to aid in finding the slot.

648 If the buyer pays in cash, he/she uses a cash acceptor (10), near which he/she can also find a board with a graphic indicator indicated in the Braille type (10a).

650 In both cases, the sales specialist controls all the actions performed by the poor-sighted buyer by means of video communication, helping him find the module.

#### [0091]

655 As soon as the required amount is inserted or the transaction on the credit card account is completed, it will be displayed on the sales specialist's screen, and the settlement with the purchaser is carried out according to the sales specialist's instructions: the goods (such as medicines) are dispensed, and if necessary change.

658 Using the video cameras of the merchandise dispensing tray 14 and the change and receipt dispensing tray 13, the sales specialist initiates and controls the merchandise dispensing and change process.

#### [0092]

663 The visually impaired use a board with graphic indicators 14a and 13a of the pallet designation in Braille to locate the pallet, with the participation of a sales specialist if necessary.

#### [0093]

668 When ordering more than one drug, the drug dispenser dispenses the drugs sequentially, here from larger quantities to smaller quantities, which simplifies the visual control of the drug distribution by the salesperson, because the trays enter from the top Pharmaceutical packaging is unlikely to cover bottom packaging.  
671 Afterwards, change and receipts are dispensed to the change dispensing tray.

[0094]

675 If the buyer needs a prescription drug, the sales specialist will ask the buyer to submit a prescription for the drug.

677 The dispensing of prescription drugs is as follows: the commissioner asks the buyer to insert the prescription slip into the scanner, the scanned image will be displayed on the commissioner's screen, after the commissioner confirms that the prescription is correct and valid and after confirming that the medicine is available, it runs the steps like an over-the-counter drug purchase , and then the commissioner controls the entry of the prescription with the prescription slip into the container through a video camera located inside the container.

688 If the drug is not available in the drug vending machine, and there is no similar drug or the similar drug is not suitable for the purchaser, the prescription slip is returned to the purchaser from the scanner.

[0095]

688 If the buyer wants to browse the documents of the medicine located in the medicine vending machine, the specialist unlocks the rolling door 16b of the tray 16 of the document storage module, the buyer can open the rolling door and take out the folder with the copy of the medicine certificate, which is pressed Alphabetical placement to search by facet.

692 The return of folders is controlled by a video camera located in the tray.

693 After that, the sales specialist locks the door of the tray, or the sales specialist controls the closing and locking of the rolling shutter door to prevent automatic locking.

[0096]

698 In the event that the wrong drug is dispensed to the buyer due to a technical error, the situation is controlled by the sales specialist using the video camera of the merchandise distribution tray 14 who asks the buyer to put the wrong drug into the returns tray 15 .

701 The steps are as follows: the sales specialist unlocks the rolling door 15b of the return pallet, and the buyer opens the rolling door and places commodities there, such as medicine packaging.

703 After the tray's roll-up door is opened, the video camera located in the tray 15 is automatically switched on and the return of the pharmaceutical packages and their integrity are controlled by a specialist.

705 It has been confirmed that the goods are returned, and after closing the roller shutter door 15b of the tray, the sales specialist checks whether the goods are in the return tray 15.

707 Thereafter, the purchaser is either provided with the desired medication or refunded via a receipt and change tray 13 located on the front panel of the medication vending machine.

[0097]

712 After the purchase process is completed, once the automatic vending machine is not used by the buyer for a period of time, the automatic vending machine is set to the standby mode by the sales specialist or is automatically set to the standby mode.

[0098]

718 According to the present invention, the proposed invention also provides for the sale of regulated goods, wherein the regulated goods are ordered through a remote selling vending machine.

720 Carrying out such sales is for distance selling of goods that are not included in the standard list of goods sold by vending machines.

722 For example, it may involve the sale of medicines produced by a central prescription department on a pre-order basis.

[0099]

727 The container of the module with the merchandise unit is used to carry out such sales, in which the intended merchandise is located.

729 After the order has been placed in the container, the number of the container is reported to the buyer, and access to the goods in this container is performed by opening the door 9 of the corresponding container.

731 The door is equipped with an electronic locking device, which is controlled by the sales specialist when the distribution is controlled after payment.

733 Maintain the necessary storage temperature and humidity in containers by means of maintaining temperature and humidity conditions.

[0100]

738 Merchandise sales using containers of the merchandise module are implemented as follows:

[0101]

742 If a shopper needs medicines other than the standard list, he or she can place the order by visiting the company's webpage and then selecting a pickup point (the address of the medicine vending machine), or by communicating with a sales representative through the automated after-sales machine.

745 In the latter case, the buyer calls the sales specialist and informs him of the goods to be ordered.

746 If necessary, the purchaser submits authorization documents, for example, in the form of scanned images of documents.

[0102]

751 After preparing to order, inform the buyer of the unique purchase password and address of the vending  
Petitioner Exhibit 1002-1093

machine by email or text message.

[0103]

756 Afterwards, the buyer who has arrived at the vending machine starts the vending machine by touching the touch screen 6 or pressing the call button 8, and the buyer interface is displayed on the touch screen.

758 Touching the icon "Call" on the buyer's interface, the buyer establishes communication with the sales specialist station through the vending machine communication unit, and enters the purchase password from the buyer's interface.

761 For people with poor eyesight, the communication with the sales commissioner station is established by pressing the call button 8 repeatedly, and the voice information of the buyer is sent through the microphone 7 of the audio and video unit of the vending machine, and the unique purchase password is input by the sales commissioner .

765 The sales specialist makes the screen 4 of the automatic vending machine display the data about the purchased quantity and price, as well as the serial number of the container with the commodity unit, and informs the buyer by voice information.

768 After confirming the purchase via the corresponding confirmation icon on the buyer interface or the buyer's voice message, the sales associate unlocks the payment module to allow use of the payment module's cash or credit card acceptor.

[0104]

774 After payment is made through the receiver available for payment by the buyer, the sales associate unlocks the door 9 of the appropriate number of containers and the receipt and change dispensing module.

776 The buyer opens the door 9 and takes away the merchandise under the control of a sales specialist using a surveillance camera 1 located on the door 9 of the container of the module with the merchandise unit.

778 Issuance of change and receipts is also performed under the control of a sales clerk using a surveillance camera of the tray 13, similar to the steps performed during standard range merchandise purchases.

[0105]

783 During the sale of a predetermined commodity, for example, the commodity uses the drug unit of the commodity module of the vending machine, the purchaser is informed of the limited time that the commodity is stored in the unit.

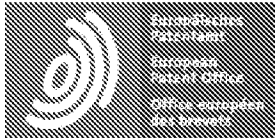
786 If the buyer does not remove the item (eg, medication) from the unit within the allotted time, the item is dispatched to the central office for storage and the buyer is notified by the chosen means of communication (mail/telephone).

789 The buyer will then have to pick up the item from the designated location.

[0106]

793 It should be noted that the vending machine and method for selling goods, especially medicines, specified in

this description, within the framework of the appended claims, do not limit the use of solutions of the related art within the scope and essence of the present invention Subject to deformation and modification.



## Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

## CLAIMS CN108352094A

1.

13 A vending machine for the remote sale of regulated goods, comprising a body (3) and the following items housed in the body:

15 A communication unit, a software and hardware unit, a database and a data storage management server, which provide the possibility of establishing communication with a remote sales specialist station, where the sales specialist station includes at least one computerized workstation of a sales specialist for regulated goods, which Software and hardware units for data collection and operational control of vending machines for the remote sale of regulated goods,

20 Software and hardware units to receive and interpret vending machine control commands and related vending machine functional features and modules for the receipt, payment and distribution of orders, including

22 Audio and video unit, including data display unit, video camera (5), loudspeaker (6a, 6b) and microphone (7) and sales specialist call button (8), wherein the data display unit is a touch screen with buyer interface (4), the touch screen (4) is installed on the front panel of the fuselage, and the video camera (5) is located on the touch screen,

26 a sales specialist call button (8) equipped with a plate on the front panel with a graphic pointing point in Braille type, and

28 Controlled by the Sales Specialist:

29 a commodity unit module configured as a container having a door (9) on the front panel with a surveillance camera (17) corresponding to the door (9),

31 Authorized document reading means in the form of a scanner (12); at least one payment module with payment acceptors (10, 11) on the front panel of the fuselage,

33 a commodity distribution module having a tray (14) on the front panel of the fuselage and equipped with a distribution module equipped with a rolling door (14b) and a corresponding surveillance camera on the rolling door (14b),

36 a change and receipt dispensing module, which has a tray (13) on the front panel of the fuselage, and which is equipped with a surveillance camera,

38 A return module and a file storage module, the return module has a tray (15) on the side panel of the fuselage, and the file storage module has a tray (16) on the side panel of the fuselage, correspondingly, the return module and the file storage module are equipped with There are controlled rolling shutters (15b) and (16b) and surveillance cameras for returns and document distribution, here

42 A plurality of plates (10a, 11a, 13a, 14a, 15a) are placed in said payment acceptors (10, 11), the tray (13) of the change and receipt dispensing module, the tray (14) of the goods dispensing module and the Near the point of location of the tray (15) where the plurality of panels (10a, 11a, 13a, 14a, 15a) has a graphic indicator of the indication in Braille type.

## 2.

49 The vending machine according to claim 1, wherein

50 The commodity unit modules are equipped with means to maintain temperature and humidity conditions.

## 3.

54 A vending machine according to claim 1, wherein the authorization document reader is equipped with a container with a surveillance camera for receipt of prescription slips during sale of prescription drugs.

## 4.

59 The vending machine according to claim 2, wherein

60 The mechanism for commodity payment is configured in the form of a cash payment module and/or a credit card payment module.

## 5.

65 The vending machine according to claim 2, wherein

66 The work site of the sales commissioner station is the work site of a sales pharmacist or a business vendor.

## 6.

70 A method of remotely selling regulated goods using the automatic vending machine for remotely selling regulated goods according to claim 1, the method comprising

72 Activation of the vending machine from standby mode is performed by the purchaser by contacting the touch screen with a purchaser interface displayed on the screen, or by pressing a call button on the front panel of the vending machine,

75 The communication between the vending machine and the sales commissioner station is established by the buyer through a wired or wireless communication unit by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,

78 Determine the available sales specialist and upload the data of the activated vending machine to the sales specialist's computer work site, and display the operation interface for controlling the functional devices and



modules of the vending machine on the screen of the sales specialist's work site, which is started by the sales specialist Modes of operation of audio and video units for vending machines,  
82 A list of products is displayed on the touch screen of the vending machine, and the buyer selects the product to be obtained, and at the same time uses the scanner of the vending machine to submit the authorization document for the specified product type, and further displays the list of selected products on the screen of the sales specialist station,  
86 Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,  
88 Confirmation of selected items by touching the selected item confirmation icon on the buyer interface, or by pressing the call button on the front panel of the vending machine,  
90 Unlock the payment module of the vending machine by the sales specialist,  
91 Pay by selecting the receiver of the payment module, use the monitoring camera of the tray of the product distribution module and the change and receipt distribution module, and the sales specialist will further control the unlocking of the product distribution module and the change and receipt distribution module,  
94 Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.

## 7.

99 The method according to claim 6, wherein during commodity selection, the sales specialist provides buyers with access to the commodity files through the tray of the document storage module, and the sales specialist uses the monitoring camera of the tray to further control the return of the documents.

## 8.

105 The method of claim 6, wherein  
106 Products are returned on a return pallet controlled by a sales representative using a surveillance camera on the product return pallet.

## 9.

111 A method of remotely selling predetermined regulated goods according to claim 1, which uses an automatic vending machine for remote selling, the method comprising  
113 The purchaser receives information about the address and number of the vending machine, the time when the ordered goods were delivered to the vending machine and the unique password for the purchase,  
115 Activation of the vending machine from standby mode is performed by the purchaser by contacting the touch screen with a purchaser interface displayed on the screen, or by pressing a call button on the front panel of the vending machine,  
118 The communication between the vending machine and the sales commissioner station is established by the buyer through a wired or wireless communication unit by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,  
121 The unique code is entered through the buyer interface on the vending machine screen, or by a sales

representative based on a voice message sent by the buyer through the microphone of the vending machine audio and video unit,

124 Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,

126 Order confirmation is made by touching the order confirmation icon on the buyer interface, or by pressing the call button on the front panel of the vending machine,

128 The sales specialist informs the container number of the product module unit through the buyer interface or through voice information,

130 payment for the order by the buyer through the receiver of the selected payment module, using the monitoring camera of the tray of the change and receipt dispensing module, further control of the container door of the module with the merchandise unit and the unlocking of the change and receipt dispensing module by the sales specialist,

134 Using the monitoring camera 17 of the door 9 of the container, the acquisition of the medicine in the appropriate container is controlled by the sales specialist,

136 Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.



(12)发明专利申请

(10)申请公布号 CN 108352094 A

(43)申请公布日 2018.07.31

(21)申请号 201680061694.7

(74)专利代理机构 广州嘉权专利商标事务所有  
限公司 44205

(22)申请日 2016.08.16

代理人 林伟峰

(30)优先权数据

2015135449 2015.08.21 RU

(51)Int.Cl.

G07F 11/00(2006.01)

(85)PCT国际申请进入国家阶段日

2018.04.20

(86)PCT国际申请的申请数据

PCT/RU2016/000552 2016.08.16

(87)PCT国际申请的公布数据

W02017/034441 RU 2017.03.02

(71)申请人 K·E·皮希克

地址 俄罗斯莫斯科

(72)发明人 K·E·皮希克

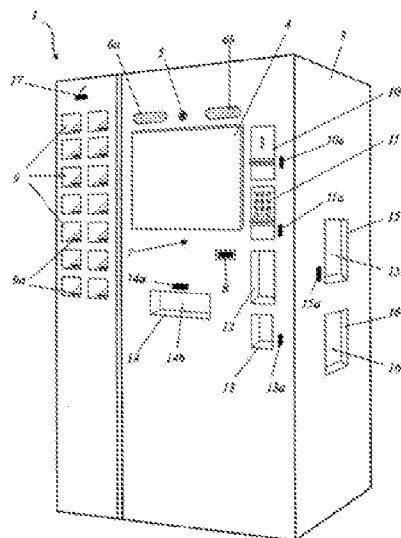
权利要求书3页 说明书9页 附图2页

(54)发明名称

用于远程销售受管制商品的自动售货机及方法

(57)摘要

本发明涉及用于远程销售受管制商品的自动售货机及方法。该自动售货机配备有商品退回和赔偿模块、提供自动售货机和指定营业站点之间通信链接的通信单元,以及使自动售货机适合视力不好的人使用的装置,所述装置是凸起盲文形式的图形标记。一种远程销售受管制商品的方法,使用所提出的用于远程销售的自动售货机来实现,并设想由专门的营业专员来监测和控制下订单、核准同意文件、付款、配货以及必要时退货的步骤。该方法由在专门的营业站点内的电算化工作站工作的专门营业专员,实现自动售货机的通信及其销售过程的远程控制。



CN 108352094 A

1. 一种用于远程销售受管制商品的自动售货机,包括机身(3)和安装在机身中的以下项:

通信单元、软件和硬件单元、数据库以及数据存储管理服务器,该通信单元提供与远程营业专员站建立通信的可能性,此处营业专员站包括至少一个受管制商品的营业专员的电脑工作站点,该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的操作控制,

接收和解译自动售货机控制指令的软件和硬件单元以及用于订单的接收、支付和分配的相关自动售货机功能特征和模块,包括

音频和视频单元,包括数据显示装置、视频摄像机(5)、扬声器(6a、6b)和麦克风(7)以及营业专员呼叫按钮(8),其中数据显示单元为具有购买者界面的触屏(4)的形式,该触屏(4)被安装在机身的前面板上,视频摄像机(5)位于触屏的上面,

营业专员呼叫按钮(8),其配备有位于前面板上的板,该板具有盲文类型形式的图形指示点,以及

由营业专员控制的:

商品单元模块,其配置为容器,该容器在前面板上具有门(9),该前面板具有对应门(9)的监视摄像机(17),

授权文件读取装置,其为扫描仪(12)的形式;至少一个付款模块,其具有在机身前面板上的付款接收器(10、11),

商品分配模块,其在机身前面板上具有托盘(14),且其配备有分配模块,该分配模块配备有卷帘门(14b),以及在该卷帘门(14b)上配备有对应的监视摄像机,

零钱和收据分配模块,其在机身前面板上具有托盘(13),且其配备有监视摄像机,

退货模块和文件存储模块,该退货模块在机身的侧面板上具有托盘(15),该文件存储模块在机身的侧面板上具有托盘(16),相应地,退货模块和文件存储模块配备有受控制的卷帘门(15b)和(16b)以及对应退货和文件分配的监视摄像机,此处

多个板(10a、11a、13a、14a、15a)置于所述付款接收器(10、11)、零钱和收据分配模块的托盘(13)、商品分配模块的托盘(14)以及退货模块的托盘(15)的位置点附近,其中该多个板(10a、11a、13a、14a、15a)具有盲文类型形式的指示的图形指示器。

2. 根据权利要求1所述的自动售货机,其中

商品单元模块配备有保持温度和湿度条件的装置。

3. 根据权利要求1所述的自动售货机,其中授权文件阅读器配备有带监视摄像机的容器,以用于在销售处方药期间的处方单的接收。

4. 根据权利要求2所述的自动售货机,其中

商品付款的机构配置为现金付款模块和/或信用卡付款模块的形式。

5. 根据权利要求2所述的自动售货机,其中

营业专员站的工作站点为营业药剂师或者营业商贩的工作站点。

6. 一种远程销售受管制商品的方法,其使用根据权利要求1的远程销售受管制商品的自动售货机,该方法包括

通过由购买者利用屏幕上显示的购买者界面接触触屏,或者通过按下自动售货机前面板上的呼叫按钮,来从待机模式进行自动售货机的启动,

由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮,经过有线或无线通信单元,来建立自动售货机和营业专员站之间的通信,

确定有空的营业专员且上传已激活的自动售货机的数据至营业专员的电脑工作站点,在营业专员的工作站点的屏幕上显示控制自动售货机功能装置和模块的操作界面,由营业专员启动自动售货机音频和视频单元的操作模式,

在自动售货机触屏上显示商品清单,由购买者选择要获取的商品,同时使用自动售货机扫描仪提交指定商品类型的授权文件,进一步在营业专员站的屏幕上显示选定商品的清单,

在自动售货机触屏上显示购买总量,或者以营业专员语音信息的形式告知商品数量和价格,

通过在购买者界面上接触选定商品确认图标,或者通过按下自动售货机前面板上的呼叫按钮,进行选定商品的确认,

由营业专员解锁自动售货机的付款模块,

通过选定付款模块接收器进行付款,使用商品分配模块及零钱和收据分配模块的托盘的监视摄像机,由营业专员来进一步控制商品分配模块及零钱和收据分配模块的解锁,

一旦自动售货机未被购买者使用一段时间后,由营业专员或者自动地将自动售货机置为待机模式。

7. 根据权利要求6所述的方法,其中在商品选择期间,营业专员通过文件存放模块的托盘向购买者提供商品文件的访问,由营业专员使用所述托盘的监视摄像机进一步控制文件的退回。

8. 根据权利要求6所述的方法,其中

通过退货托盘来进行商品的退回,该退货托盘由营业专员使用商品退货托盘的监视摄像机来控制。

9. 根据权利要求1的一种远程销售预定的受管制商品的方法,其使用用于远程销售的自动售货机,该方法包括

由购买者接收有关自动售货机地址和编号的信息、订购的商品被发送至自动售货机的时间以及唯一的购买密码,

通过由购买者利用屏幕上显示的购买者界面接触触屏,或者通过按下自动售货机前面板上的呼叫按钮,来从待机模式进行自动售货机的启动,

由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮,经过有线或无线通信单元,来建立自动售货机和营业专员站之间的通信,

通过自动售货机屏幕上的购买者界面来输入唯一的密码,或者由营业专员基于购买者通过自动售货机音频和视频单元的麦克风所发送的语音信息来输入唯一的密码,

在自动售货机触屏上显示购买总量,或者以营业专员语音信息的形式告知商品数量和价格,

通过在购买者界面上接触订单确认图标,或者通过按下自动售货机前面板上的呼叫按钮,进行订单的确认,

由营业专员通过购买者界面或者通过语音信息来告知商品模块单元的容器编号,

由购买者通过选定付款模块接收器为订单付款,使用零钱和收据分配模块的托盘的监

视摄像机,由营业专员来进一步控制具有商品单元的模块的容器门以及零钱和收据分配模块的解锁,

使用所述容器的门9的监视摄像机17,由营业专员来控制适当容器中的药品的取得,

一旦自动售货机未被购买者使用一段时间后,由营业专员或者自动地将自动售货机置为待机模式。

## 用于远程销售受管制商品的自动售货机及方法

### 技术领域

[0001] 本发明涉及自动远程销售的设备和方法,尤其涉及用于商品销售的自动售货机,该商品的购买要求授权或受年龄限制。

### 背景技术

[0002] 自动售货机已广泛用于各种单件商品的销售,其涉及日常消费品尺寸的商品,并且就可达性、小占用面积和低维持费来看其比销售网点和场所具有优势。自动售货机也用于受年龄限制的商品,例如烟草和酒精和受管制的商品,包括药品的销售。销售处方药的自动售货机已经变得越来越广泛,产生了具有主动销售控制方法和营业专员参与的自动售货机的需求。

[0003] 众所周知,存在有需要购买者本人身份证明的商品销售机器,请参考俄罗斯联邦2008年10月5日公布的RU73106,U1[1]号实用新型专利,其包括机身、具有商品样品的显示盒(订购单元)、存储和分配商品的装置(订货分配模块)、具有活动屏幕(触屏)的显示屏形式的数据显示装置、支付工具,该支付工具为现金接收装置形式(现金接收模块),尤其是带有找零和收据打印机(打印收据和找零的模块)功能的现金接收器。如果需要,自动售货机可以配备有用于扫描身份证件扫描的装置,以及与营业专员视频电话的装置。

[0004] 使用这种自动售货机的销售方法,为通过自动售货机本身完成所有的销售业务,来执行一种或几种商品的销售。该方法还包括销售过程中断的选项,或者商品的销售要求购买者身份证明,通过网络摄像头发送购买者的面部图像来联系呼叫中心的营业专员,以及通过扫描装置的方式来识别,根据购买者年龄是否符合年龄限制的视觉检测结果,决定是否可以由自动售货机执行下一步操作。

[0005] 类似的方案在2009年5月11日公布的US2009/0276088[2]号申请中提出。该方案涉及销售受年龄限制的管制商品的方法以及所用的自动售货机,且该方案包括在营业专员对购买者证件的目视检查之后,对自动售货机功能的解锁。

[0006] 用于受管制商品销售的上述自动售货机[1,2]和方法,,基本上仅提供根据购买者年龄识别的结果与购买者在没有营业专员参与的情况下采取的进一步行动,对自动售货机功能的受控解锁,。然而,为了确保受管制商品按预期授权销售,在商品销售要求通过自动售货机提交授权文件,例如医学处方的情况下,从购物开始的时刻直到购物完成,整个销售过程将通过营业专员的义务参与而不是通过自动售货机本身得到控制。

[0007] 有一种通过自动售货机销售包括处方药的药品的方法,其中购买者将处方插入读取装置然后使用现金插槽(现金接收器或者硬币接收器)或者使用卡插槽通过信用卡的方式为购物付款;请参考此网址的电子资源:[http://www.1000ideas.ru/article/biznes/moda-krasota-zdorove/biznes-ideya-1886-avtomat-dlya-prodazhi-tabletok/\[3\]](http://www.1000ideas.ru/article/biznes/moda-krasota-zdorove/biznes-ideya-1886-avtomat-dlya-prodazhi-tabletok/)为例。付款之后,购买者获得收据和用药方案打印条。在药品购买过程中,购买者可以联系商贩,商贩将核对医药处方并就用药方案提供咨询。该方法在自动售货机中实施,该自动售货机包括机身、医学处方接口、支付模块接口、商品出货托盘、收据和用药方案打印模块以及

与商贩音频/视频交流的装置。从购物过程开始直到购物终止的所有操作均由自动售货机在无营业专员参与的情况下执行。

[0008] 针对解决受管制商品销售的问题,考虑到从商品选择起到商品出货为止,期间商品购物按序检验和控制的装置的缺乏,该自动售货机没有为预期授权销售处方药确保安全。这种自动售货机的功能仅限于销售不需考虑因购买者错误操作而需要退货以及退款的商品。

[0009] 另外,相关技术中的自动售货机已限制了某些类别的残疾人的使用,尤其是视力差的人,并且相关技术中的自动售货机不能确保购买者身份担保识别,这增加了计划之外销售处方药的风险。另外,如果有需要,相关领域中的药品自动售货机不便于购买者获取药品证书,因为从屏幕上读取证书操作不便,且视力差的人基本上无法操作。

### 发明内容

[0010] 本发明的目的在于开发一种由营业专员参与的受管制商品的远程销售的综合设施和受管制商品的销售方法,其商品的销售受有关法律法规管制,特别是用于依照基本法律法规、由营业药剂师或销售员控制的处方药销售的综合设施、自动售货机和方法。

[0011] 所提出的用于远程销售受管制商品的远程控制自动售货机和和方法能够达到这样的技术效果:通过可直接熟悉药品证书的营业药剂师或营业销售员连续控制销售流程,安全、便捷地向获得授权的人销售管制商品的过程,以及能够为残障人士,特别是视力低下人士使用自动售货机提供便利的流程。使用自动售货机,不仅能够通过降低营业场所租金与工资开销来降低药价,还能够通过大范围的药品自动销售机网络,排除地理障碍,使得药品更加易于获得。

[0012] 药物自动售货机移动性强,占地面积小,可以设置于旅游路线、加油站,使机动车使用者获取药品变得更加便利。

[0013] 所述技术效果通过远程控制的自动售货机达到,该自动售货机包含:

[0014] 用于远程销售受管制商品的该自动售货机,其包括机身以及安装在机身内的以下物件:

[0015] 通信单元、软件和硬件单元、数据库以及数据存储管理服务器,该通信单元提供与远程营业专员站建立通信的可能性,此处营业专员站包括至少一个受管制商品的营业专员的电脑工作站点,该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的控制。

[0016] 用于控制的软件和硬件单元,该软件和硬件单元指挥:自动售货机的接受和解读、相关自动售货机的功能特性,以及订单的接收、支付和出货;该软件和硬件单元包含音频和视频单元,该音频和视频单元包括显示装置、视频摄像机、扬声器和麦克风以及营业专员呼叫按钮,其中数据显示单元为具有购买者界面的触屏的形式,该触屏被安装在机身的前面板上,视频摄像机位于触屏的上方,营业专员呼叫按钮配备有带盲文类型形式指定的图形指示点的板,该板位于前面板上,且

[0017] 以下由营业专员控制,

[0018] 商品单元模块,其由前面板上具有门的容器充当,该前面板具有门监视摄像机,

[0019] 授权文件读取装置,该授权文件读取装置为扫描仪的形式,至少一个付款模块,该



付款模块具有位于机身前面板上的付款接收器，

[0020] 商品分配模块，其在机身前面板上具有托盘，该商品分配模块配备有出货监视摄像机，商品分配由卷帘门控制，

[0021] 零钱和收据出纳模块，该出纳模块具有托盘，托盘位于机身前面板上，并配备有监视摄像机，

[0022] 退货模块和文件存储模块，该退货模块在机身的侧面板上，该文件存储模块在机身的侧面板上，并具有托盘，相应地，退货模块和文件存储模块配备有受控制的卷帘门和以及退货和文件出纳的监视摄像机，此处

[0023] 在所述付款接收器、零钱与收据出纳模块、货物出货模块和退货模块的附近设置有带有盲文类型指示的图形指示的多个板

[0024] 营业专员的工作站点为营业药剂师或者营业商贩的工作站点。

[0025] 商品单元模块优选地配备有保持容器温度和湿度条件的装置。

[0026] 商品付款的方式可以以现金付款模块和/或信用卡付款模块的形式来进行。

[0027] 如果需要，在销售要求授权文件的商品的情况下，授权文件读取装置可以配备有带有监视摄像机的容器，用于授权文件（例如，处方单）的接收。

[0028] 根据权利要求1的远程销售受管制商品的方法，其可以使用根据权利要求1的用于远程销售的自动售货机来实施，该方法包括

[0029] 通过有线或无线链接，连接一个或多个用于远程销售受管制商品的自动售货机至营业专员站，该营业专员站包括至少一个受管制商品的营业专员的电脑工作站、软件和硬件单元、数据库和数据存储管理服务器，该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的控制。

[0030] 通过购买者接触屏幕上显示购买者界面触屏，或者通过按下自动售货机前面板上的呼叫按钮，来从待机模式进行自动售货机的启动。

[0031] 购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮，来建立自动售货机和营业专员站之间的有线或无线通信，

[0032] 确定可用的营业专员且上传已激活的自动售货机的数据至营业专员的电脑工作站，在营业专员的工作站点的显示器上显示控制自动售货机功能装置和模块的操作界面，由营业专员启动自动售货机音频和视频单元的操作模式，

[0033] 在自动售货机触屏上显示购买者要求订购的商品清单，使用自动售货机扫描仪提交特定类型的商品的授权文件，进一步在营业专员站的屏幕上显示选定商品的清单，

[0034] 在自动售货机触屏上显示购买总量，或者以营业专员语音信息的形式告知商品数量和价格，

[0035] 通过在购买者界面上接触选定商品确认图标，或者通过按下自动售货机前面板上的呼叫按钮，进行选定商品的确认。

[0036] 在指定顾客付款选项（现金/信用卡）之后，解锁自动售货机付款模块。

[0037] 对选定商品的支付，是通过支付模块接收器，由营业专员使用商品出货模块的托盘的监控摄像机进一步解锁商品出货模块和零钱与收据出纳模块完成的。

[0038] 一旦自动售货机未被购买者使用一段时间后，由营业专员或者自动地将自动售货机置为待机模式。

[0039] 在商品选择期间, 营业专员按购买者的要求可以通过文件存放模块的托盘给他/她提供商品文件, 由营业专员使用所述托盘的监视摄像机进一步控制文件的退回。

[0040] 该方法还通过商品退货托盘为退货提供可能, 该商品退货托盘由营业专员使用商品退货托盘的监视摄像机来控制。

[0041] 提出的用于远程销售的自动售货机还提供销售预定的受管制商品的方法, 该方法包括:

[0042] 由购买者接收有关自动售货机地址和编号的信息、订购的商品被发送至自动售货机的时间以及唯一的购买密码,

[0043] 通过屏幕上显示购买者界面由购买者接触触屏, 或者通过按下自动售货机前面板上的呼叫按钮, 来从待机模式进行自动售货机的启动。

[0044] 由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮, 经过有线或无线通信单元, 来建立自动售货机和营业专员站之间的通信,

[0045] 通过自动售货机屏幕上的购买者界面来输入唯一的密码, 或者由营业专员基于购买者通过自动售货机音频和视频单元的发送的语音信息来输入唯一的密码,

[0046] 在自动售货机触屏上显示购买总量, 或者以营业专员语音信息的形式告知商品数量和价格,

[0047] 通过在购买者界面上接触订单确认图标, 或者通过按下自动售货机前面板上的呼叫按钮, 进行订单的确认。

[0048] 由营业专员通过购买者界面或者通过语音信息来告知带商品单元的模块的容器编号。

[0049] 由购买者通过选定付款模块接收器为订单付款, 由营业专员使用零钱和收据分配模块的托盘的监视摄像机来进一步控制解锁具有商品模块的单元的容器门以及零钱和收据分配模块,

[0050] 由营业专员使用所述容器的门9的监视摄像机17, 来控制正确容器中药品的取得,

[0051] 一旦自动售货机未被购买者使用一段时间后, 由营业专员或者自动地将自动售货机置为待机模式。

#### 附图说明

[0052] 提出的发明在附图中进行解释, 其中:

[0053] 图1表示了根据本发明远程销售受管制商品的远程受控的自动售货机的总体视图。

[0054] 图2表示了使用远程销售的自动售货机的流程图, 其对远程销售受管制商品的方法进行了解释。

#### 具体实施方式

[0055] 图1为远程销售受管制商品的远程受控的自动售货机的总体视图的示意图。

[0056] 自动售货机包含机身3, 其中设有用于放置, 存储和销售商品的设备和功能模块。机身作为支撑框架, 该支撑框架用前面板和侧面板以及后面板封装起来, 通常, 后面板表现为门的形式以便于触及自动售货机的装置和功能模块。机身还包括通信单元、硬件和软件

单元,通信单元用于与远程站的营业专员通信,硬件和软件单元提供收据和控制指令的说明,例如,该控制指令由受管制商品的营业专员生成。

[0057] 该自动售货机配置有音频和视频系统,该音频和视频系统包括触屏4形式的显示装置、摄像机5、电动扬声器6a和6b形式的扬声器装置,以及麦克风7。摄像机5安装为可以捕捉购买者区域的图像以及由视力差的人提交的文档和其他文本材料的图像。

[0058] 电动扬声器设在便于无噪声收听语音信息的位置,例如,数据显示装置的上方。摄像机5设在便于提供对购买者区域可能的最广泛的捕获的位置,例如,如图2所示,它可以位于扬声器之间的触摸屏4上方的中部。麦克风7和营业专员呼叫按钮8位于触屏4的下方,

[0059] 呼叫按钮8表面上安装有盲文类型指示的带有图形指示器的板,用于告知视力差的人按钮的类型。触屏与眼睛水平,其高度根据人的平均身高数据而决定。

[0060] 音频和视频系统用于购买者和营业专员之间的视频会议、商品购买过程期间的咨询以及购物者商品申购过程期间的咨询。另外,显示装置和扬声器装置用于熟悉通过该自动售货机销售的商品。例如,购买者在小册子模式下可以浏览各种商品的宣传页。具体地,在药品销售期间,购买者可以熟悉商品描述和使用指导,例如,关于药品,当自动售货机处于待机模式时,购买者可以浏览和收听可能被演示的各种商品的广告。

[0061] 为了执行预定、支付和配货的过程,自动售货机配置有作为日常消费品尺寸的商品(例如,药品)容器的多个商品销售模块,包括授权文件读取装置、至少一个付款接收模块,特别是现金接收模块和/或信用卡接收模块,找零和收据出纳模块和付款货物出货模块。

[0062] 用于待售的日常消费品尺寸的商品的单元模块位于机身里面(不可见)。模块单元充当的可以容纳标准范围的商品以及标准范围外的商品的容器。如果提供标准范围外的商品,则通过容器的门9取得商品,该容器位于自动售货机的前面板上触屏4的左侧。针对视力低下者,门9带有编号且包含托盘9a,托盘9a带有容器编号标记、盲文形式的的图形标记。

[0063] 可出售商品模块的容器配置有保持商品存储的温度和湿度条件的装置。例如,药物自动售货机的预定商品模块的容器装满了药品自动售货机的标准范围之外的药品,这些药品已经由购买者早先订购了,例如通过公司的网站订购或通过类似的药品自动售货机的预购订单,或通过远程集中处方部门和通过预订订单制造的药品。

[0064] 通过现金(硬币或钞票)接收模块的接收器10或信用卡模块的接受器11来执行支付模块的工作,该支付模块位于触屏4的右侧,两个接收器一个在上,一个在下。

[0065] 扫描仪的窗口12位于信用卡接收器的下方,该窗口用于输入和读取购买者的授权文件或身份证件。用于接收不可退回的授权文件(例如,处方空白页)的容器提供在扫描仪附近的盒子里,并配置有授权文件(例如,医疗处方)的监视摄像头(未示出)。找零和收据出纳模块的托盘13位于扫描仪下方,该找零和收据分配模块装有摄像机(未示出),该摄像头由营业专员用来控制找零收据或退款。在错误出货(例如,药物)的情况下,窗口13用于退钱。

[0066] 商品分配模块的托盘14位于前面板的中间区域,用于根据订单分配货物。商品分配模板在购买期间使用。模块的托盘14配置有卷帘门14b,该卷帘门14b由营业专员和监视视频摄像机(未示出)控制,在配货期间视频摄像机中的图像被发送至营业专员的屏幕。因此,营业专员控制那些特定商品的分配,例如客户订购和支付的药品。

[0067] 窗口12和托盘13、14位于文件扫描、取货、收据和找零期间便于手动操作的高度。在商品错误分配的情况下,例如药物,托盘13也用于退钱。

[0068] 具有盲文类型标识的图形指示器10a、11a、13a和14a的板位于现金/信用卡接收器、商品分配托盘和收据以及零钱分配窗口附近,以便于视力差的人使用自动售货机分别付款和收货以及取回零钱和收据。

[0069] 退货模块的托盘15位于自动售货机机身的右侧面板上,该托盘15具有可锁定卷帘门15b,在其附近设置有板和文件存储模块的托盘16,该板具有盲文类型形式的图形指示器15a,该托盘16具有可锁定卷帘门16b。

[0070] 退货模块的托盘15和文档存储模块的托盘16由营业专员控制。卷帘门15b和16b由营业专员远程控制。退货模块的托盘用于,由于营业专员或后勤员工失误,导致向存储模块的错误单元错误分配商品(例如药品)的情况。文档存储模块用于自动售货机中的商品(例如,药品)的证书副本的存储。根据购买者的要求,托盘16的卷帘门16b由营业专员远程控制,并由摄像机控制。

[0071] 用于为夜问题字、自动售货机模组的托盘和按钮栏提供照明的照明灯可以安装在自动售货机机身上。

[0072] 为防止服务人员触电,当打开自动售货机的装置和功能模块的检修门时,锁定开关切断电路。

[0073] 每台自动售货机还配备有警报器,万一如果有任何入侵企图,该警报器向最近的警察部门的服务台上报,连接该自动售货机的所有视频摄像机,并且开始记录在自动售货机里面和外面正在发生的事件的图像,同时激活声音警报(警笛声)。另外,自动售货机连接到任何可用的营业专员,让他在实时解决、观察情况的情况下作出额外决定。之后,是否需要派遣自动售货机的值班修理人员前往自动售货机的决定将被做出。

[0074] 另外,具有额外访问权限的营业专员可以连接到任何自动售货机并检查其特性、商品库存并测试其本身的功能。

[0075] 如果用于调节单元舱的温度和湿度的装置发生故障,则会有另一个对温度敏感的警报器,并向营业专员站上报故障。

[0076] 使用根据本发明的上述远程控制自动售货机所提出的远程销售方法适用于远程销售药品,并且下文中的自动售货机将称为药物自动售货机。

[0077] 使用远程销售受管制商品的自动售货机以远程销售受管制商品的方法提供了一台或多台自动售货机的控制。如图2中的流程图所说明的那样,用于远程销售受控商品的一个或多个自动售货机通过有线或无线通信单元连接到营业专员站点(2)。

[0078] 使用基于双绞铜导线(双绞线)的电缆线、具有铜导线的同轴电缆以及光纤电缆可以用作有线通信线路。固定无线通信可以用作无线通信网络,该固定无线通信是基于无线频带中进行数据传输的多点无线通信信道。每个自动贩卖机和营业专员站都配备了发射和接收天线以及用于数据准备和传输的必要设备。

[0079] 自动售货机配备有硬件和软件单元,以提供自动售货机功能特性和模块的控制命令的接收和解译、自动售货机上数据发送到营业专员站的准备、来自营业专员站的控制信号的解译。

[0080] 营业专员站配备有电脑工作站点、带数据库的硬件和软件单元以及数据存储控制

服务器。营业专员站的硬件和软件单元提供数据收集的过程,以及自动售货机远程销售受管制商品的操作控制信号的准备和传输。当自动售货机被用作药物自动售货机时,营业专员为药剂师和商贩。

[0081] 购买者到达药物自动售货机时,自动售货机的触屏4可能正处于广告回放模式或者自动售货机正处于待机模式,并且通过触摸触屏来从广告回放模式或待机模式中完成自动售货机初始化,在购买者接触初触屏之后,将出现“呼叫”图标。视力差的人通过按药物自动售货机前面板上的呼叫按钮8使自动售货机进入准备就绪模式,该药物自动售货机配备有盲文类型形式的“呼叫”按钮指示的图形指示器。

[0082] 在按下触屏4上的“呼叫”图标或“呼叫”按钮8之后,药物自动售货机1连接到营业专员站2。在呼入的情况下,营业专员站的硬件和软件单元将药物自动售货机连接到第一个可服务的的营业专员的电脑工作站点。因此,连接到营业专员的所需时间将首先显示在药物自动售货机的触屏4上,或者如果营业专员可提供服务,则营业专员的视频图像将立即出现,并且从视频摄像机5中获取的购买者图像将出现在营业专员站的屏幕上,因此,语音通信也被连接,然后开始营业专员和购买者之间的对话。营业专员和购买者的对话被记录到营业专员站的数据存储服务器中,并在那里存储一段时间,以便当存在非标准或与购买者发生冲突时进行可能的调查,以及产生购买者的视像记录。

[0083] 在营业专员的计算机连接到药物自动售货机后,操作界面将出现在营业专员站的屏幕上,该操作界面具有药物自动售货机的各种功能模块和装置(扫描仪、支付模块、视频摄像机、文件存储托盘16的卷帘门的锁定装置以及退货模块托盘15的卷帘门)的所有控制功能。另外,软件(库存软件)还会加载已连接的药物自动售货机上的数据,即其地理位置、自动售货机中所含药品的数量和名称以及物理参数(自动售货机各个部分的温度和湿度)。之后,营业专员将自动售货机的音频和视频单元置为操作模式,并在触屏上显示药品列表并说明其价格。

[0084] 在与营业专员对话期间,购买者说出想要的商品(例如,药品)然后营业专员从仓库数据库中选择购买者请求的药品,并且选择结果以药品名称、数量和价格以及“总”数的说明清单的形式显示在自动售货机的触屏4上。如有需要,根据购买者的要求,营业专员使用药物自动售货机的音频和视频单元对药品和订购程序给出咨询。在需要提交授权文件(例如医疗处方)的情况下,营业专员解锁扫描仪且购买者扫描医疗处方。订单完成后,将会激活药物自动售货机购买界面上的图标“确认订单”。购买者通过按下图标“确认订单”或者通过按下自动售货机的“呼叫”按钮8来确认订单,并且订单确认信息将出现在营业专员计算机的屏幕上。之后,营业专员激活现金和信用卡接收模块的操作,然后购买者可以使用接收器10或接收器11中的一个。

[0085] 如果药物自动售货机由视力差的人使用,则使用购买者与营业专员之间对话的语音对话模式来执行药品选择过程。营业专员告知购买者可售药品的信息,并生成选定药品的清单,然后用声音告知购买者选择总量和总价。由购买者按下“呼叫”按钮8进行订单确认。如果使用信用卡进行支付,则带有盲文类型形式指示的图形指示器的板11a位于信用卡插槽附近,以助于找到该插槽。如果购买者支付现金,他/她则使用现金接收器(10),在现金接收器(10)附近他/她也可以找到带有盲文类型(10a)形式指示的图形指示器的板。在这两种情况下,营业专员通过视频通信的方式控制视力差的购买者所执行的所有动作,帮助他

找到模块。

[0086] 只要一插入所需数量的金额或完成了信用卡账户上的交易,其会显示在营业专员的屏幕上,则按照营业专员的指令与购买者进行结算:分配货品(例如药品),并且如果需要的话找零。使用商品分配托盘14和零钱及收据分配托盘13的视频摄像机,营业专员启动和控制商品分配和找零的过程。

[0087] 视力差的人使用带有盲文形式托盘指定的图形指示器14a和13a的板找到托盘,必要时由营业专员参与。

[0088] 当订购多于一种药品时,药物自动售货机依次分配药品,此处是从较大的数量到较小的数量,这简化了由营业专员对药品分配的视觉控制,因为从顶部进入托盘的药品包装不太可能覆盖底部包装。之后,零钱和收据被发放至零钱分配托盘。

[0089] 如果购买者需要处方药,营业专员会要求购买者提交药品处方。处方药的配药如下:专员要求购买者将处方单插入扫描仪,扫描的图像会显示在专员的屏幕上,在专员确认处方是正确和有效的以及在确认有药品之后,就运行像非处方药购买的步骤,然后专员通过位于容器内的视频摄像机控制具有处方单的处方进入容器。如果在药物自动售货机中没有该药品,并且没有类似药品或该类似药品不适合购买者,则将处方单从扫描仪处退回给购买者。

[0090] 如果购买者想要浏览位于药物自动售货机中的药品的文件,则专员解锁文件存储模块的托盘16的卷帘门16b,购买者可以打开卷帘门并拿出具有药品证书副本的文件夹,该药品证书按字母顺序放置以方便搜索。通过位于托盘内的视频摄像机来控制文件夹的退回。之后,营业专员锁定托盘的门,或者营业专员控制卷帘门的关闭和锁定以防自动锁定。

[0091] 在由于技术错误将错误的药品分配给购买者的情况下,该情况由营业专员使用商品分配托盘14的视频摄像机来控制,营业专员要求购买者将错误分配的药品放入退货托盘15。步骤如下:营业专员解锁退货托盘的卷帘门15b,购买者打开卷帘门并在那放置商品,例如药品包装。在托盘的卷帘门被打开后,位于托盘15中的视频摄像机自动开启,并且专员控制药品包装的返回及其完整性。已确认货物被退回,在关闭托盘的卷帘门15b之后,营业专员核对商品是否在退货托盘15中。之后,要么给购买者提供所需的药品,要么通过收据和零钱出纳托盘13来退钱,该收据和零钱出纳托盘13位于药物自动售货机的前面板上。

[0092] 在购买过程完成之后,一旦自动售货机未被购买者使用一段时间后,自动售货机由营业专员置为待机模式或者自动置为待机模式。

[0093] 根据本发明,所提出的发明还提供了销售受管制商品,其中该受管制商品通过远程销售的自动售货机进行了预定。实施这种销售是针对商品的远程销售,且该商品处于自动售货机销售的标准商品清单以外。例如,它可以涉及根据预订单来销售中央处方部门生产的药品。

[0094] 具有商品单元的模块的容器用于执行此类销售,其中预定的商品位于该单元中。在订单被放入容器中之后,向购买者报告容器的编号,通过打开对应的容器的门9来进行这种容器中的商品的获取。该门配备有电子锁合装置,在付款之后控制配货时,该电子锁合装置由营业专员控制。通过保持温度和湿度条件的装置,在容器中保持必要的储存温度和湿度。

[0095] 使用商品模块的容器进行的商品销售以如下方式实施:

[0096] 如果购物者需要标准清单以外的药品,他/她可以通过访问公司的网页随后选择取货点(药物自动售货机的地址)来执行订购,或者通过自动售货机与营业专员通讯来订购商品。在后者的情况下,购买者呼叫营业专员并通知他要订购的商品。如果有必要,购买者提交授权文件,例如,以文件的扫描图像的形式。

[0097] 在准备订购之后,通过电子邮件或短信告知购买者自动售货机的唯一的购买密码、地址。

[0098] 之后,已抵达自动售货机处的购买者通过接触触屏6或者按下呼叫按钮8来启动自动售货机,触屏上即显示购买者界面。接触购买者界面上的图标“呼叫”,购买者就通过自动售货机通信单元建立起与营业专员站的通信,并从购买者界面输入购买密码。对于视力差的人,通过重复按下呼叫按钮8建立起与营业专员站的通信,并通过自动售货机音频和视频单元的麦克风7发送购买者的语音信息,由营业专员来输入唯一的购买密码。营业专员使自动售货机的屏幕4上显示关于购买的数量和价格的数据,以及具有商品单元的容器的编号,并通过语音信息告知购买者。在通过购买者界面上对应的确认图标或购买者的语音消息确认购买之后,营业专员解锁支付模块,以允许使用支付模块的现金或信用卡接收器。

[0099] 在通过可用于购买者付款的接收器付款之后,营业专员解锁合适号码的容器的门9及收据与零钱分配模块。购买者打开门9,在营业专员的控制下取走商品,其中营业专员使用监视摄像机1,该监视摄像机1位于具有商品单元的模块的容器的门9上。在营业专员的控制下也进行零钱和收据的出具,其中营业专员使用托盘13的监视摄像机,类似于标准范围商品购买期间所执行的步骤。

[0100] 在销售预定商品期间,例如,该商品使用自动售货机的商品模块的药品单元,则购买者被告知单元中商品存放的有限时间。如果在指定时间内购买者没有从单元中取走商品(例如,药品),则该商品被派往中心办公室存放,通过选定通信方式(邮件/电话)来告知购买者。随后购买者将必须从指定地点取走商品。

[0101] 应该注意到本说明书中指定的用于销售商品,尤其是药品的自动售货机和方法,在所附权利要求书的框架内,其并不限制在本发明范围和本质内使用相关技术的方案的可能变形和修改。

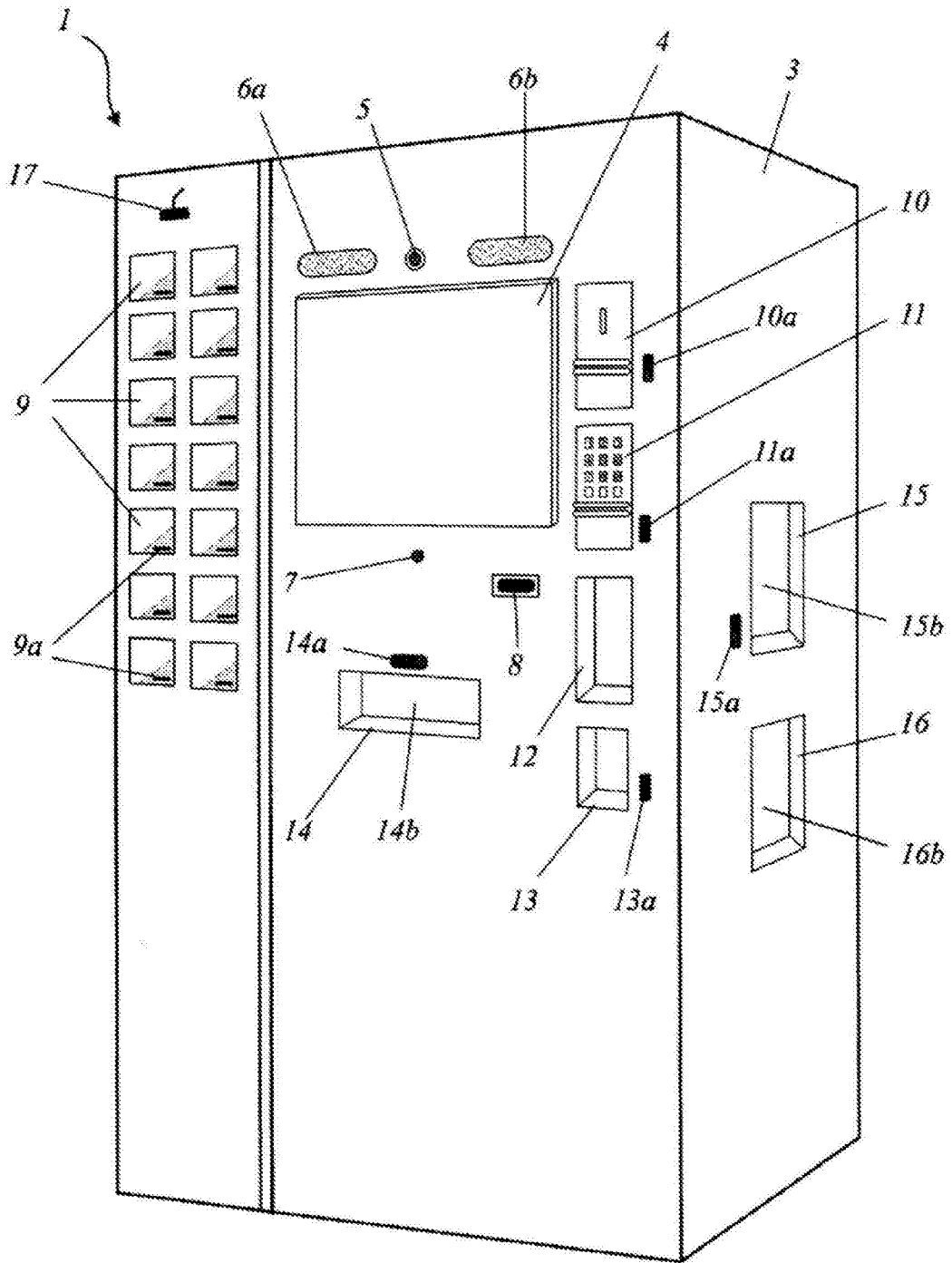


图1



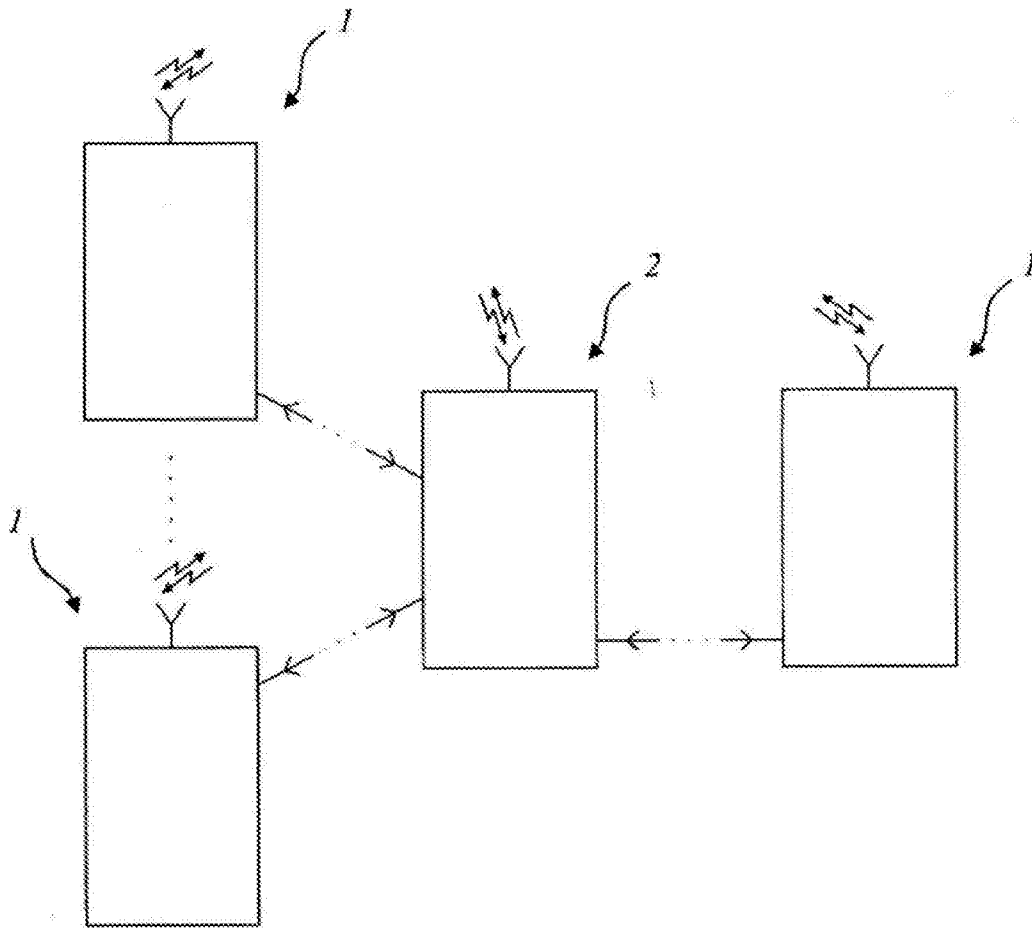


图2



---

**Report Information from Dialog**

July 25 2023 22:46

---

## Table of contents

1. USA Technologies Announces Cashless Solution to Be Offered by Blackboard Inc.....	1
Bibliography.....	4

## USA Technologies Announces Cashless Solution to Be Offered by Blackboard Inc

**Publication info:** Business Wire 18 July 2007: NA.

[ProQuest document link](#)

**Abstract (English):** Students Use ID, Debit and Credit Cards to Purchase from Vending Machines Nationwide MALVERN, Pa. -- USA Technologies (NASDAQ:USAT) announced today that Blackboard Inc. has begun offering its cashless payment technology to customers of the Blackboard Commerce Suite[™] to allow students to make cashless payments at campus vending machines.

The cashless technology is imbedded in Blackboard's FlexVend reader and supports a suite of both wired and wireless applications that enable one-card transactions on-campus, off-campus and online for cashless payment, identification and security.

The new FlexVend readers allow students to pay for products from vending machines with their Blackboard campus card, all major credit cards, as well as contactless 'touch and go' payment systems, such as MasterCard's PayPass.

**Links:** [Check USPTO-STIC for Availability](#)

**Full text:** Students Use ID, Debit and Credit Cards to Purchase from Vending Machines Nationwide MALVERN, Pa. -- USA Technologies (NASDAQ:USAT) announced today that Blackboard Inc. has begun offering its cashless payment technology to customers of the Blackboard Commerce Suite[™] to allow students to make cashless payments at campus vending machines.

The cashless technology is imbedded in Blackboard's FlexVend reader and supports a suite of both wired and wireless applications that enable one-card transactions on-campus, off-campus and online for cashless payment, identification and security.

The new FlexVend readers allow students to pay for products from vending machines with their Blackboard campus card, all major credit cards, as well as contactless 'touch and go' payment systems, such as MasterCard's PayPass.

USA Technologies reported that Blackboard already offers its e-Suds[™] laundry service where students go online to check the availability of college laundry washers and dryers, swipe their Blackboard transaction card to activate and pay for the service, and are notified electronically when the laundry is done.

"Our goal is to provide students with the most efficient, high-tech solutions to meet their every-day needs and wants," said Russ Carlson, President of the Blackboard Commerce Group. "FlexVend provides Blackboard cardholders the ultimate in payment convenience, and the cost is automatically deducted from their Blackboard account."

Blackboard is a leading provider of software and services to the education industry.

"The expanded relationship we now share with Blackboard combines the best leading-edge technology and service from both Blackboard and USA Technologies to bring a quality payment solution to campuses nationwide," said Wendy Jenkins, Vice President, Marketing, USA Technologies. "We are excited that Blackboard has added USA Technologies cashless technology to its portfolio of offerings for students, and we welcome the Federal Reserve Board's recent decision to eliminate the need for receipts for debit card purchases under \$15 which will make cashless from vending machines on campus even more popular," she said.

The online reporting capability of the FlexVend reader also allows for improved auditing of vending machines, resulting in greater efficiency, productivity and security for vending machine operators.

About USA Technologies:

USA Technologies is a leader in the networking of wireless non-cash transactions, associated financial/network  
Petitioner Exhibit 1002-1117

services and energy management. USA Technologies provides networked credit card and other non-cash systems in the vending, commercial laundry, hospitality and digital imaging industries. The Company has marketing agreements with AT&T, Honeywell, Blackboard, MasterCard and others. For further information on USA Technologies, please visit [www.usatech.com](http://www.usatech.com).

**About Blackboard Inc:**

Blackboard Inc. is a leading provider of enterprise software applications and related services to the education industry. Founded in 1997, Blackboard enables educational innovations everywhere by connecting people and technology. Millions of people use Blackboard everyday at academic institutions around the globe, including colleges, universities, K-12 schools and other education providers, as well as textbook publishers and student-focused merchants that serve education providers and their students. Blackboard is headquartered in Washington, D.C., with offices in North America, Europe, Australia and Asia.

**Statement under the Private Securities Litigation Reform Act:**

With the exception of the historical information contained in this release, the matters described herein contain forward-looking statements that involve risk and uncertainties that may individually or mutually impact the matters herein described, including but not limited to, the ability of the Company to increase revenues in the future due to the developing and unpredictable markets for its products, the ability to achieve a positive cash flow, the ability to obtain orders for its energy management products, the ability to obtain new customers and the ability to commercialize its products, which could cause actual results or revenues to differ materially from those contemplated by these statements.

**Subject:** Computer industry;Computer services industry;Information technology services industry; Microcomputer industry

**Location:** United States

**Company / organization:** Blackboard Inc.; USA Technologies Inc.

**Identifier (keyword):** Trade

**SIC classification:** 7370: Computer and Data Processing Services;3571: Electronic computers

**Publication title:** Business Wire

**Pagination:** NA

**Publication date:** Jul 18, 2007

**Publisher:** Business Wire

**Journal subject:** Business, Business, international

**Journal code:** 0EIN

**Source type:** Newswire

**Language of publication:** English

**Document type:** Magazine/Journal

**Source attribution:** Gale PROMT, © Publisher specific

**Accession number:** 166521527

**Document URL:** <https://dialog.proquest.com/professional/docview/673610549?accountid=131444>

**Copyright:** Copyright 2007 Gale, Cengage Learning. All rights reserved. COPYRIGHT 2007 Business Wire

**Date created:** 2010-04-28

**First available:** 2010-07-25

**Database:** Gale Group PROMT® (1972 - current)

## **Bibliography**

Citation style: APA 6th - American Psychological Association, 6th Edition

USA technologies announces cashless solution to be offered by blackboard inc. (2007, Jul 18). Business Wire  
Retrieved from <https://dialog.proquest.com/professional/docview/673610549?accountid=131444>

---

**Contact ProQuest**

Copyright © 2023 ProQuest LLC. All rights reserved. - **Terms and Conditions**



UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

24341 7590 10/04/2023
Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

Table with 2 columns: EXAMINER (HOLLY, JOHN H), ART UNIT (3696), PAPER NUMBER (1703)

DATE MAILED: 10/04/2023

Table with 5 columns: APPLICATION NO. (17/983.311), FILING DATE (11/08/2022), FIRST NAMED INVENTOR (PARESH K. PATEL), ATTORNEY DOCKET NO. (104402-5058-US), CONFIRMATION NO. (1703)

TITLE OF INVENTION: SYSTEMS AND METHODS FOR DETERMINING ELECTRIC PULSES TO PROVIDE TO AN UNATTENDED MACHINE BASED ON REMOTELY-CONFIGURED OPTIONS

Table with 7 columns: APPLN. TYPE (nonprovisional), ENTITY STATUS (SMALL), ISSUE FEE DUE (\$480), PUBLICATION FEE DUE (\$0.00), PREV. PAID ISSUE FEE (\$0.00), TOTAL FEE(S) DUE (\$480), DATE DUE (01/04/2024)

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.



**PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

24341 7590 10/04/2023  
 Morgan, Lewis & Bockius LLP (PA)  
 1400 Page Mill Road  
 Palo Alto, CA 94304-1124

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

_____ (Typed or printed name)
_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

17/983,311 11/08/2022 PARESH K. PATEL 104402-5058-US 1703

TITLE OF INVENTION: SYSTEMS AND METHODS FOR DETERMINING ELECTRIC PULSES TO PROVIDE TO AN UNATTENDED MACHINE BASED ON REMOTELY-CONFIGURED OPTIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	01/04/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
HOLLY, JOHN H	3696	705-020000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).  
 Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list  
 (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
 (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

4a. Fees submitted:  Issue Fee  Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

Electronic Payment via Patent Center or EFS-Web  Enclosed check  Non-electronic payment by credit card (Attach form PTO-2038)

The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

5. Change in Entity Status (from status indicated above)

- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

**Petitioner Exhibit 1002-1122**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for PARESH K. PATEL and EXAMINER HOLLY, JOHN H.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

<b>Notice of Allowability</b>	<b>Application No.</b> 17/983,311	<b>Applicant(s)</b> PATEL, PARESH K.	
	<b>Examiner</b> JOHN H HOLLY	<b>Art Unit</b> 3696	<b>AIA (FITF) Status</b> Yes

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to Amendment filed September 28, 2023.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 2-31. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All      b)  Some\*      c)  None of the:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>September 28, 2023</u> . | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material _____.                        | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date. _____.  |  |

/John H. Holly/  
Primary Examiner, Art Unit 3696

### **Notice of Pre-AIA or AIA Status**

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### **DETAILED ACTION**

This communication is in response to an Amendment filed September 28, 2023.

#### **Continued Examination Under 37 C.F.R. §1.114**

A request for continued examination ("RCE") under 37 C.F.R. §1.114, including the fee set forth in 37 C.F.R. §1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 C.F.R. §1.114, and the fee set forth in 37 C.F.R. §1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 28, 2023 has been entered.

#### **. Information Disclosure Statement**

The Information Disclosure Statement (IDS) submitted on September 28, 2023 was filed in compliance with the provisions of 37 CFR 1.97. Accordingly, this Information Disclosure Statement is being considered by the Examiner.

## **Allowable Subject Matter**

Claims 2 – 31 are allowed over prior art of record.

## **Reasons for Allowance**

The following is an examiner's statement of reasons for allowance:

The prior art of record neither anticipates nor renders obvious the claimed subject matter of the instant application as a whole either taken alone or in combination, in particular, prior art of record does not teach “in response to receiving the first set of remotely-configured options, displaying, in the application, user interface objects that allow for selection of respective options in the first set of remotely-configured options; detecting a selection of a first user interface object that corresponds to a first option in the first set of remotely-configured options; after detecting the selection of the first user interface object, receiving, from the server, pulse information specifying a count, amplitude, shape, or interval of electric pulses to be provided to the control unit of the unattended machine by the pulse-providing device in accordance with the first option; and sending the pulse information to the pulse-providing device; and at the pulse-providing device: receiving the pulse information; determining based on the received pulse information a signal sequence of electrical pulses to output to the control unit of the unattended machine in order to initiate a cashless operation of the unattended machine, wherein the signal sequence of electrical pulses emulates an analog signal generated by a coin receiving switch of the unattended machine, and wherein the signal sequence is characterized by the count, amplitude, shape, or interval of electric pulses specified by the pulse information; and causing the unattended machine to initiate the cashless operation by issuing the signal sequence of electrical pulses to the control unit.”.

Art Unit: 3696

The following prior art references have been deemed most relevant to the allowed claim(s):

The closest prior art Mordechai Teicher (Pub. # US 2010/0312692 A1) teaches a compact payment terminal for operating upon a purchase made by a customer at a retail device is provided. The customer carries a mobile communication device that includes a payment module and a communication module. The compact payment terminal includes a first interface for interfacing with the retail device, a second interface for interfacing with the mobile communication device of the customer and a processing unit connected to the first and second interface. The compact payment terminal is configured to receive, via the first interface, a payment request from the retail device, cooperate, via the second interface, with the payment module of the mobile communication device for initiating a payment transaction respective to the payment request, and selectably conduct, via the second interface and the communication module of the mobile communication device, a communication session between the processing unit and at least one server.

The closest prior art Jonathan L. Lei et al. (Pub. # US 2003/0158891 A1) teaches a wireless network system includes a server system connected to a network. An electronic device is provided having a wireless transceiver adapted to communicate via at least one of light transmission and radio frequency (RF) transmission. A portable wireless device is provided having a wireless connection to the network. The portable wireless device is adapted to communicate wirelessly with the electronic device. The electronic device communicates with the server system over the network through the portable wireless device. The electronic device may conduct real-time and/or non-real-time transactions with the server system by utilizing the portable wireless device as a communication proxy.

The claims allow an unattended machine, which is not connected to any network, to accept remotely- configured options (e.g., multi-credit pricing options) that are configured at a server and sent to a pulse-providing device that is coupled with the

Art Unit: 3696

unattended machine via an exchange of data. For unattended machines that rely on legacy communication protocols, the exchange of data includes instructions that allow a pulse-providing device of the unattended machine to provide electric pulses that are determined in accordance with remotely-configured options that are selected by a user of a mobile device. By providing these electric pulses, the pulse-providing device causes the unattended machine to operate as if it had been paid with coins, even if no coins were physically inserted. The claims recites features of the .mobile device, which, in addition to acting as the communication bridge, also facilitates user selection of a product or service offered by the attended machine, allowing the server to determine how many electric pulses the machine must be provided in accordance with the user's selections. The claimed solution is necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks and recite significantly more than an abstract idea.

### **Conclusion**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Holly whose telephone number is 571.270.3461. The examiner can normally be reached on MON. - FRI 10 AM - 8 PM p.m.



Art Unit: 3696

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Namrata Boveja can be reached on (571)-272-8105. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/John H. Holly/

Primary Examiner, Art Unit 3696

<b>Notice of References Cited</b>	Application/Control No. 17/983,311	Applicant(s)/Patent Under Reexamination PATEL, PARESH K.	
	Examiner JOHN H HOLLY	Art Unit 3696	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A US-20100312692-A1	12-2010	TEICHER; MORDECHAI	G06Q20/3278	455/414.1
*	B US-20030158891-A1	08-2003	Lei, Jonathan L.	G06Q20/327	709/203
C					
D					
E					
F					
G					
H					
I					
J					
K					
L					
M					

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
N					
O					
P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
				Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)	
*	U			ProQuestDialogNPL STIC Search History	
V					
W					
X					

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



NATIONAL  
AUTOMATIC  
MERCHANDISING  
ASSOCIATION

*Serving the Vending / Foodservice management industry*

# Multi-Drop Bus / Internal Communication Protocol

## **MDB / ICP**

Supported by the Technical Members of:

<b>NAMA</b>	National Automatic Merchandising Association
<b>EVA</b>	European Vending Association
<b>EVMMA</b>	European Vending Machine Manufacturers Association

### **Version 4.2**

February, 2011

**National Automatic Merchandising Association**

20 N. Wacker Drive, Suite 3500  
Chicago, Illinois 60606-3120 USA  
312-346-0370 FAX 312-704-4140

[www.vending.org](http://www.vending.org)

Petitioner Exhibit 1002-1132

Petitioners Kiosoft Technologies, LLC, et al.

Exhibit 1006

Page 1

*(this page intentionally left blank)*

# Multi-Drop Bus / Internal Communication Protocol

## Table of Contents

### Revisions

### Introduction

### Section 1

#### General Information

1. Introduction
2. Operational and Application Notes
3. Levels and Options

### Section 2

#### Communication Format

1. Byte Format
2. Block Format
3. Peripheral Addresses
4. Software Operational Rules
5. Typical Session Examples
6. File Transport Layer

### Section 3

#### Bus Timing

1. Timing Definitions
2. Timing Specifications
3. Timing Diagram

### Section 4

#### Hardware Specification

1. Bus Power Supply Definition
2. Bus Transmitter/Receiver Specification
3. Connector Specification
4. Example Schematic

### Section 5

#### Coin Acceptor/Changer

#### VMC/Peripheral Communication Specifications

1. Introductions
2. VMC Commands
3. VMC Command Format
4. Changer Non-Response Time
5. Changer Power Requirements
6. Coin Acceptor/Changer Examples

## **Section 6**

### **Bill Validator**

#### **VMC/Peripheral Communication Specifications**

1. Introductions
2. VMC Commands
3. VMC Command Format
4. Bill Validator Non-Response Time
5. Bill Validator Power Requirements
6. Bill Validator / Recycler Examples

## **Section 7**

### **Cashless Device(s)**

#### **VMC/Peripheral Communication Specifications**

1. Introduction
2. State Definitions
3. Command Protocol
4. Cashless Device Command Response Formats
5. Cashless Device Non-Response Time
6. Cashless Device Power Requirements
7. Example Vend Sessions

## **Section 8**

### **Communications Gateway**

#### **VMC/Peripheral Communication Specifications**

1. Introduction
2. VMC Commands
3. Communications Gateway Command Format
4. Communications Gateway Non-Response Time
5. Communications Gateway Power Requirements
6. Communications Gateway Examples

## **Section 9**

### **Universal Satellite Device**

#### **VMC/Peripheral Communication Specifications**

1. Introduction
2. USD Summary
3. Command Protocol
4. USD Power Requirements
5. Examples - Mode 1 / 2 / 3 Sessions
6. Examples - Data Block Transfers
7. Examples - Communications

**Section 10**  
**Coin Hopper or Tube – Dispenser**  
**VMC/Peripheral Communication Specifications**

1. Introduction
2. VMC Commands
3. VMC Command Format
4. Dispenser Non-Response Time
5. Dispenser Power Requirements

**Appendix 1**  
**Currency Codes**

**Appendix 2**  
**Battery Operated Card Reader**

**Appendix 3**  
**MDB Recommended “Best Practices”**

## *Revisions*

---



## Version 4.2

Version 4.1 of this specification is the sixth release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the continued effort put forth by technical members of NAMA and the EVA. The basis for this specification is the Version 4.1 international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)** released in July, 2010.

There is just one major change within cashless device(s) section, related to cashless devices commonly new in public (credit card) transactions. These devices, especially contactless operated, need an uninterrupted transaction starting with the actual correct vend price and therefore are not able to deliver a begin session in front of the transaction. Previous work arounds have been

- Always starting a begin session by cashless with “unknown credit”, which of course interferes with cash payment (normally a VMC would disable coin/bill acceptance, while a session is active)
- Forcing the customer to hold the payment media twice to the cashless device, once to start the session and second after pressing the selection to do the transaction.

The new modification allows such cashless devices, to identify themselves with an option bit, telling the VMC, that they are capable of accepting vend request, negative vend request and, if possible, revalue request, while in the enabled state as well as in the idle state.

If this option bit is set, a VMC will produce a vend request to the cashless whenever a selection is pressed and not sufficient cash credit is available. The cashless will proceed with this request like in the idle state. If in between, the customer will not present a valid cashless payment media and instead insert cash, the VMC will cancel the vend request with a vend cancel command and after this is accepted, a session complete to return to the enabled state.

### **Section 1 – General Information**

#### **Section 1.3.3**

- Added b5, “always idle session” option

### **Section 7 – Cashless Device(s)**

#### **Section 7.2.3**

- Added the “always idle session” option

#### **Section 7.3**

- Added the “always idle session” option

#### **Section 7.4.4**

- Added b5, "always idle session" option in Ident response

#### Section 7.7

- Added example #11, vend session (always idle session option set)
- Added example #12, vend session cancelled (always idle session option set)
- Added example #13, vend session timeout (always idle session option set)

## Version 4.1

Version 4.1 of this specification is the fifth release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the continued effort put forth by technical members of NAMA and the EVA. The basis for this specification is the Version 4.0 international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)** released in April, 2009.

Of special note are the two major changes that were made to the specification:

- Changed the address of the second Coin Hopper / Tube Dispenser device peripheral in Section 10 from **68H** to **70H**.
- Added the Age Verification Device peripheral (address **68H**) in Section 11.

The following lists the primary revisions to the Version 4.1 of the **MDB / ICP**.

### Section 2 – Communication Format

#### Section 2.3

- Changed the address for the second Coin Hopper or Tube – Dispenser to 01110xxxB (70H).
- Added address 01101xxxB (68H) for the Age Verification Device.

### Section 5 – Coin Changer

- Corrected Page 5.14:  
Expansion command send diagnostic status (0F 05) response data:  
16 bytes: Z1-Z16 changed to 2 bytes: Z1-Z2

## Section 6 – Bill Validator / Recycler

- Corrected Page 6.6:  
Notes: 1. Dispenser setup (3703) command replaced by recycler enabled (3704).
- Corrected Page 6.13:  
Under VMC Data: 19 bytes: Y1- Y19 replaced by Y1- Y18.  
Y3-Y19 replaced by Y3 – Y18 = 16 bytes
- Corrected Page 6.14:  
Y19 replaced by Y18
- Page 6.21, added after Expansion/ID:  
FEATURE ENABLE →  
← ACK

## Section 10 – Coin Hopper or Tube - Dispenser

### Section 10.1, 10.2, 10.3

- Changed second device address to 01110xxxB (70H).

## Section 11 – Age Verification Device

- Added entire section.

## Version 4.0

Version 4.0 of this specification is the fourth release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the continued effort put forth by technical members of NAMA and the EVA. The basis for this specification is the Version 3.0 international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)** released on March 26, 2003.

Of special note are the three major changes that were made to the specification:

- Added the Bill Recycler command set to the Bill Validator / Recycler device peripheral in Section 6.
- Added a second address to the Coin Hopper / Tube Dispenser device peripheral in Section 10.
- Added the MDB Recommended "Best Practices" as **Appendix 3**.

The following lists the primary revisions to the Version 4.0 of the **MDB / ICP**.

### Section 2 – Communication Format

#### Section 2.3

- Added address 01101xxxB (68H) for the second Coin Hopper or Tube – Dispenser.

### Section 5 – Coin Acceptor / Changer

#### Section 5.3

- Added information regarding "Just Reset".
- Corrected typo for POLL command to **08h**.
- Added "Type activity" definitions in POLL Status section.
- Added Section 5.6 **Coin Acceptor/Changer Examples**.

## Section 6 – Bill Validator

### Section 6.3

- Added information regarding “Just Reset”.
- Added “Type activity” definitions in POLL Status section
- Added all new command/responses for the Bill Recycler.

37H - 03H	RECYCLER SETUP
37H - 04H	RECYCLER ENABLE
37H - 05H	BILL DISPENSE STATUS
37H - 06H	DISPENSE BILL
37H - 07H	DISPENSE VALUE
37H - 08H	PAYOUT STATUS
37H - 09H	PAYOUT VALUE POLL
37H - 0AH	PAYOUT CANCEL

- Added Section 5.6 **Bill Validator/Recycler Examples.**

## Section 7 – Cashless

### Section 7.3

- Added information regarding “allows selection without displaying balance” in the Begin Sessions (03H) – Funds Available response.

### Section 7.5

- Added information regarding using the Non-Response time for commands that require data to be returned.

### Section 7.7

- Added Controller “ACKs” to the end of the card reader session examples.

## Section 8 – Communication Gateway

### Section 8.2

- Added 1FH/02H TIME/DATE REQUEST to VMC Command table.

### Section 8.3

- Added option bit b2 : Expansion Time/Date Request command
- Added 1FH/02H TIME/DATE REQUEST command/response.

## Section 9 – Universal Satellite Device (USD)

### Section 9.3

- Corrected errors in 07H - Z3 to Z33 designations.

## **Section 10 – Coin Hopper or Tube - Dispenser**

### **Section 10.1, 10.2, 10.3**

- Added a second devices as address 11001xxxB (68H).
- Expanded on the "Coins Dispensed" section of the DISPENSER STATUS response.

## **Appendix 3 – MDB Recommended “Best Practices”**

- Added entire appendix.

## Version 3.0

Version 3.0 of this specification is the third release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the continued effort put forth by technical members of NAMA and the EVA. The basis for this specification is the Version 2.0 international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)** released on October 4, 2002.

Of special note are the four major changes that were made to the specification:

- Added a second Cashless Device peripheral address in Section 7
- Replaced the Audit Unit with the Communications Gateway in Section 8
- Added the Coin Hopper or Tube – Dispenser in Section 10 (new)
- Assigned 2 addresses to be used for experimental peripherals

The following lists the primary revisions to the Version 3.0 of the **MDB / ICP**.

### Section 1 – General Information

#### Section 1.3

- Changed the Level and Options chart for the Communications Gateway and the Coin Hopper or Tube – Dispenser

### Section 2 – Communication Format

#### Section 2.2

- Added headers for the Response Codes
- Clarified non response processing for Master-to-Peripheral and Peripheral-to-Master communication.

#### Section 2.3

- Updated the Peripheral Address table for the Communications Gateway, Coin Hopper, Cashless Payment 1, and Experimental addresses
- Defined the use of the experimental addresses

#### Section 2.5

- Added new RESET examples F & G.

## **Section 5 – Coin Acceptor / Changer**

### **Section 5.2**

- Renamed the STATUS command to SETUP command
- Added a new Possible Credited Coin Removal status code (0Dh)

## **Section 6 – Bill Validator**

### **Section 6.2**

- Renamed the STATUS command to SETUP command
- Added a new Possible Credited Bill Removal status code (0Ch)

## **Section 7 – Cashless Device(s)**

**(New Cashless Device #2)**

Changed name from Cashless Payment to Cashless Device

### **Section 7.1**

- Added information regarding the dual addresses for two Cashless Device peripherals (10h and 60h)

### **Section 7.3**

- Updated Command & Response table for dual addresses

### **Section 7.4**

- Updated Command/Response Formats for dual addresses

## **Section 8 – Communications Gateway**

**(New Peripheral)**

### **Sections 8.1 through 8.6**

- Replaced former Audit Unit sections with new Communications Gateway Sections

## **Section 9 – Universal Satellite Device (USDC)**

### **Section 9.3**

- Updated POLL table with proper number of bytes (FTL portion)
- Changed “numeric row and column” to “Item Number”

## **Section 10 – Coin Hopper or Tube – Dispenser**

**(New Peripheral)**

### **Sections 10.1 through 10.5**

- Added complete new sections



## Version 2.0

Version 2.0 of this specification is the second release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the culmination of effort put forth by technical members of NAMA, the EVMMA, and the EVA. The basis for this specification is the Version 1.0 international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)** released on October 14, 1998.

The following lists the primary revisions to the Version 2.0 of the **MDB / ICP**

### Introduction

#### Foreword

- Clarified that the Standard is a communication interface

### Section 1 - General Information

#### Section 1.1

- Added 3<sup>rd</sup> paragraph noting interface specification vs. system specification

#### Section 1.3

- Added entire Levels and Options section

### Section 2 - Communication Format

#### Section 2.1

- Changed Mode Bit Master-to-Peripheral text

#### Section 2.2

- Removed "command" from Master-to-Peripheral 4<sup>th</sup> paragraph
- Changed RET description

#### Section 2.3

- Defined address 0000xxxB (00H) for VMC
- Provided address information to show hexadecimal format

#### Section 2.4

- Changed format to 2.4.X sub-sections and added 2.4.4 on Levels

#### Section 2.5

- Changed RET description

#### Section 2.6

- Added complete File Transport Layer Section

### Section 3 - Bus Timing

#### Section 3.1

- Added 2<sup>nd</sup> sentence to  $t_{\text{setup}}$

## Section 4 - Hardware Specification

### Section 4.3

- Modified complete section and added AMP as alternate source to Molex

### Section 4.4

- Added pin numbers to schematic

## Section 5 - Coin Acceptor / Changer

### Section 5.1

- Provided additional address information

### Section 5.3

- Added recommended RESET command sequence
- Modified STATUS response to indicate Country / Currency Codes
- Modified County / Currency Code to include ISO 4217 (Appendix A1)
- Added Note 2 to DISPENSE (ODH) command
- Added FTL POLLED responses
- Added FTL "b3" option bit
- Added FTL expansion commands
- Cosmetic changes to all EXPANSION commands
- Split ALTERNATIVE PAYOUT (0FH-02H) and PAYOUT STATUS (0FH-03H) command into two separate commands (cosmetic change only)
- Added text to ALTERNATIVE PAYOUT (0FH-02H) Y1 description
- Added Note 3 to ALTERNATIVE PAYOUT STATUS (0FH-03H)

### Section 5.5

- Added "See Note 2 ..." text
- Added "If both peripherals supported" to Note

## Section 6 - Bill Validator

### Section 6.1

- Provided additional address information

### Section 6.3

- Added recommended RESET command sequence
- Modified STATUS response to indicate Country / Currency Codes
- Modified County / Currency Code to include ISO 4217 (Appendix A1)
- Added Level 2 information
- Added Level 2 option bytes w/ new EXPANSION COMMANDS:
  - 37H 01H    Level 2 Option Bit Enable
  - 37H 02H    Level 2 Identification
- Added FTL POLLED responses
- Added FTL "b0" option bit
- Added FTL expansion commands
- Modified last sentence in SECURITY command to link to Z9-Z10 STATUS response
- Cosmetic changes to all EXPANSION commands

## Section 6.5

- Added "If both peripherals supported" to Note

## Section 7 - Cashless Payment

### Section 7.2 & 7.2.7

- Added Level 03 Negative Vend Request

### Section 7.2.2

- Changed 1<sup>st</sup> sentence to link Setup to 7.4.1 information

### Section 7.2.4

- Added Negative Vend and Revalue

### Section 7.2.7

- Added Level 03 Negative Vend Request

### Section 7.3

- Added bold text regarding defining currency at the beginning of a session
- Broke uninterruptable table into VMC Command and Reader Response
- Added Level 03 NEGATIVE VEND REQUEST to VMC Command table
- Added Level 03 DATA ENTRY REQUEST to Reader Response table
- Highlighted command out of sequence hard resets from VMC
- Moved Vend Failure Sequence to 7.4.8

### Section 7.3 – Table 1

- Changed name to COMMANDS & RESPONSES
- Changed Comment column to VMC / Reader Level Support
- Linked all commands and responses to Levels
- Added DATA ENTRY REQUEST POLLED responses
- Added FTL POLLED responses
- Added FTL commands
- Added NEGATIVE VEND REQUEST responses
- Defined 14H-1AH and 20H-FEH as "For Future Use"

### Section 7.4.1

- Cosmetically modified RESET command sequence
- Added 32 bit SETUP MAX/MIN PRICE
- Changed text following **Reader response**

### Section 7.4.2

- Clarified Level 01 information (reader has no revalue capability)
- Added Level 03 information
- Modified SETUP response to indicate Country / Currency Codes
- Modified County / Currency Code to include ISO 4217 (Appendix A1)
- Added bold Note in Z3-Z4 County / Currency Code
- Added definition for Miscellaneous Options "b4 – b7"

### Section 7.4.3

- Added Level 03 SETUP if Expanded Currency Mode

### Section 7.4.4

- Added Level 03 BEGIN SESSION response if Expanded Currency Mode
- Added Level 03 VEND APPROVED response if Expanded Currency Mode

- Added Level 03 PERIPHERAL ID response if Expanded Currency Mode
- Clarified COMMAND OUT OF SEQUENCE definition
- Added Level 03 REVALUE LIMIT AMOUNT response if Expanded Currency Mode
- Added Level 03 DATA ENTRY REQUEST response if Data Entry Mode
- Added Level 03 DATA ENTRY CANCEL response if Data Entry Mode
- Added Level 03 FTL REQ TO RCV response if FTL Mode
- Added Level 03 FTL RETRY / DENY response if FTL Mode
- Added Level 03 FTL SEND BLOCK response if FTL Mode
- Added Level 03 FTL OK TO SEND response if FTL Mode
- Added Level 03 FTL REQ TO SEND response if FTL Mode

#### **Section 7.4.5**

- Added Level 03 VEND command if Expanded Currency Mode
- Added Level 03 VEND APPROVED response if Expanded Currency Mode

#### **Section 7.4.8**

- Added Vend Failure (from 7.3)

#### **Section 7.4.10**

- Added Level 03 VEND command if Expanded Currency Mode

#### **Section 7.4.11 (new)**

- Added complete Level 03 NEGATIVE VEND Request section

#### **Section 7.4.15 (new)**

- Added complete Level 03 DATA ENTRY Request section

#### **Section 7.4.16**

- Added Level 03 REVALUE Request command if Expanded Currency Mode

#### **Section 7.4.17**

- Added Level 03 REVALUE Limit Request command if Expanded Currency Mode

#### **Section 7.4.18**

- Added Level 03 EXPANSION REQUEST ID response if Expanded Currency Mode

#### **Section 7.4.22**

- Added Level 03 EXPANSION ENABLE OPTIONS command

#### **Section 7.4.23**

- Added Level 03 FTL REQ TO RCV command & responses if FTL Mode

#### **Section 7.4.24**

- Added Level 03 FTL RETRY / DENY command if FTL Mode

#### **Section 7.4.25**

- Added Level 03 FTL SEND BLOCK command & response if FTL Mode

#### **Section 7.4.26**

- Added Level 03 FTL OK TO SEND command if FTL Mode

#### **Section 7.4.27**

- Added Level 03 FTL REQ TO SEND command & responses if FTL Mode

#### **Section 7.7**

- Added Example Vend Session #10 (Single Negative Vend)

## Section 8 - Audit Device

### Section 8.1

- Provided additional address information

### Section 8.3

- Added FTL POLLED responses
- Added FTL "b3" option bit
- Added FTL expansion commands

## Section 9 - Universal Satellite Device

### Section 9.1

- Provided additional address information

### Section 9.3

- Added FTL POLLED responses
- Added FTL "b2" option bit
- Added FTL expansion commands

### Document Revision History

- Deleted

## Appendix 1 - Currency Codes

- Added entire section (based on ISO 4217)

## Appendix 2 - Battery Operated Card Reader

- Added entire section

---

## Version 1.0

Version 1.0 of this specification is the first release of the international **Multi-Drop Bus / Internal Communication Protocol (MDB / ICP)**. This specification is the culmination of effort put forth by technical members of NAMA, the EVMMA, and the EVA. The basis for this specification is the **International Multi-Drop Bus Interface Standard** published by NAMA and the **Internal Communication Protocol** published by the EVMMA. The NAMA document was originally introduced on October 19, 1993 and later revised on August 19, 1994, June 20, 1997, and October 15, 1997. The EVMMA document was adopted in 1994 and later revised in 1995.

The following lists the primary revisions to the original two documents which were "combined" to create Version 1.0 of the **MDB / ICP**. In actuality, the NAMA **MDB** was the basis of the **MDB / ICP** with the exception of Section 7 which came from the EVMMA **ICP**. Besides typographical corrections and actual feature changes (below), the entire document was edited to provide a more uniform appearance.

The following lists the primary revisions to the Version 1.0 of the **MDB / ICP**.

**Hardware Specification - Section 4.3**

- Added drawings of the MDB male and female connectors.

**Coin Acceptor / Changer - Section 5.3**

- Added Expansion commands:
  - 0F-05 Send Current Diagnostic Status
  - 0F-06 Send Controlled Manual Fill Report
  - 0F-07 Send Controlled Manual Payout Report

**Coin Acceptor / Changer - Section 5.5**

- Added coin acceptance and coin payout power requirements for coin changers using motorized payout mechanisms.
- Added note about simultaneously supplying bill validator transport power.

**Bill Validator - Section 6.5**

- Added note about simultaneously supplying coin mechanism coin acceptance power.

**Cashless Payment - Section 7.2.6**

- Added Level 02 Revalue capability.

**Cashless Payment - Section 7.3**

- Added Level 02 REVALUE REQUEST.
- Removed NAK (NCK) response from uninterruptable state and unexecutable command descriptions.
- Eliminated the BUSY response to vend failure sequences.
- Modified Table 1 per above.

**Cashless Payment - Section 7.4.1**

- Further defined the initializing sequence following a RESET command.

**Cashless Payment - Section 7.4.2**

- Further defined the Z7 Application Maximum Response Time.
- Added Z8 – b3 for supporting the VEND/CASH SALE subcommand.

**Cashless Payment - Section 7.4.4**

- Begin Session (03h) - Added Level 02 Reader Z4-Z10 data.
- Malfunction/Error (0Ah) - Added error code 1100 (refund error).
- Command Out of Sequence (0Bh) - Added Z2 data.
- Eliminated Busy (0Ch) response.
- Added Level 02 Reader Revalue Approved (0Dh) response.
- Added Level 02 Reader Revalue Denied (0Eh) response.
- Added Level 02 Reader Revalue Limit Amount (0Fh) response.

- Added Level 02 Reader User File Data (10h) response.
- Added Level 02 Reader Time/Date Request (11h) response.

**Cashless Payment - Section 7.4.10**

- Added Level 01 Reader CASH SALE (13h/05h) VMC command.

**Cashless Payment - Section 7.4.14**

- Added Level 02 Reader Revalue - Request (15h/00h) VMC command.

**Cashless Payment - Section 7.4.15**

- Added Level 02 Reader Revalue – Limit Request (15h/01h) VMC command.

**Cashless Payment - Section 7.4.17**

- Obsoleted EXPANSION – Read User File (17h/01h) VMC command.

**Cashless Payment - Section 7.4.18**

- Obsoleted EXPANSION – Write User File (17h/02h) VMC command.

**Cashless Payment - Section 7.4.19**

- Added Level 02 Reader Write Time/Date File (17h/03h) VMC command.

**Cashless Payment - Section 7.5**

- Further defined the non-response time with the "Application Maximum Response Time" Z7.

**Cashless Payment - Section 7.6 (original ICP Spec)**

- Moved this section (ICP Payment Media Return Button) to Section 7.3.2.

**Cashless Payment - Section 7.6 (MDB/ICP Spec)**

- Previously was the ICP 7.7 with no modifications.

*(this page intentionally left blank)*



## ***Introduction***

---

### **Foreword**

---

This voluntary Standard contains basic requirements for a vending machine communication interface within the limitations given below and in the General Information section of this Standard. These requirements are based on sound engineering principles, research, field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, and others having specialized experience. These requirements are subject to revision as further experience and investigation may show it necessary or desired.

NAMA, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of NAMA represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the NAMA Standard is processed. NAMA shall not be responsible to anyone for use or reliance upon Standard by anyone. NAMA shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, reliance upon this Standard.

### **Standard Review**

---

A complete review of this standard shall be conducted at least every five years to keep requirements consistent with technology. These reviews shall be conducted by representatives from industry and user groups on the NAMA Vending Technology Standards Committee at that time.

*(this page intentionally left blank)*

# Section 1

## *General Information*

---

### **1.1 Introduction**

---

This document defines a serial bus interface for electronically controlled vending machines. The interface is a 9600 baud Master-Slave arrangement where all peripherals are Slaves to a Master controller.

The intent of this document is to standardize vending machines that employ electronic control (traditionally known as vending mechanism controller - VMC) so that all vending and peripheral equipment communicates identically.

It should be noted that this document is a vending machine interface / protocol specification and **not** a vending machine system specification. Each machine manufacturer should provide a specification on the overall operation of the machine.

### **1.2 Operational and Application Notes**

---

The serial bus, or Multi-Drop Bus (MDB) is configured for Master-Slave operation. There is one Master with capability of communicating with up to thirty-two peripherals. The Master is defined as the Vending Machine Controller (VMC).

Each peripheral is assigned a unique address and command set. The master will "poll" the Bus for peripheral activity. That is, each peripheral is asked for activity, and responds with either an acknowledge, negative acknowledgment, or specific data dependent on its current activity. If a peripheral does not respond within a predefined time, (t-non-response as defined in the peripheral sections) it is assumed that it is not present on the Bus.

Bus interference, or "crashes" are prevented because each peripheral only responds upon being polled. Since there is only one master, and all communication is initiated by the Master, Bus "crashes" are easily precluded.

All peripherals will recognize a disable command, or commands, sent by the Master. This allows for disabling of individual peripherals for various reasons, for example, power management techniques.

Error checking and correction is accomplished by using checksums (CHK) and a retransmit command.

## 1.3 Levels and Options

---

Since the introduction of the earliest Multi-Drop Bus specification, functional levels and operational options have been established for most of the peripherals on the MDB/ICP interface. These have provided the capability for new features to be implemented as new requirements and features were needed for the international vending industry.

### 1.3.1 Levels

Levels of peripheral functionality were established when a major change occurred in the peripheral that added extended commands and responses. Due to potential conflicts between a VMC level and a peripheral level, neither the VMC nor the peripheral should issue a command or reply with a response that is not supported by the other device.

The VMC must initially determine (via the appropriate STATUS or SETUP command) the level of a peripheral before determining which commands it can issue to that device. **A VMC must only send commands that are supported by the peripheral.** For example, a Level 3 command may only be issued to a Level 3 or higher peripheral and must not be issued to a Level 1 or 2 peripheral.

The Cashless Payment and the Universal Satellite Device can also learn the respective level of the VMC for that device. This information is sent via the SETUP command. **It is the responsibility of the peripheral to only send responses that are supported by the VMC.** For example, a Level 3 response may only be sent to a Level 3 or higher VMC and must not be sent to a Level 1 or 2 VMC. Effectively, the VMC and peripheral should support the highest common level.

For total compatibility, VMCs and peripherals should support all lower levels. **For new designs after July 2000, it is strongly recommended that VMCs and peripherals must support all lower levels.** Commercial or regional issues may cause machine or peripheral manufacturers to implement only specific levels; however, this is a decision (and risk) made by the machine or peripheral manufacturer.

### 1.3.2 Options

Options were established in the peripherals to provide various additional operational features that may be required for specific vending applications. As the name implies, these features are "above and beyond" the standard core of required functionality.

**At power on and after a Bus Reset or a RESET command, all options are disabled. During the initialization command sequences, the VMC determines the optional features supported by the peripherals. The VMC will then enable the features it is going to use.** Until the feature is enabled, it is the responsibility of the peripheral to ignore feature specific commands and not respond with feature specific responses.

### 1.3.3 Currently Established Levels and Options

The following table provides a brief description of each of the currently established levels and options of the various MDB/ICP peripherals. Please refer to the specific sections for each device for more detailed information.

Peripherals	Levels	Options	Description
<b>Coin Changer</b>	1	n/a	Never released
	2	none	Supports standard commands
	3	below	Supports Expansion ID command and <u>optionally</u> supports commands for features below
		b0	Alternative Payout Method
		b1	Extended Diagnostics
		b2	Controlled Manual Fill and Payout
	b3	File Transport Layer (FTL)	
<b>Bill Validator</b>	1	none	Supports standard commands and Expansion ID command <u>without</u> options
	2	below	Supports expansion ID command <u>with</u> options and <u>optionally</u> supports commands for features below
		b0	File Transport Layer (FTL)
		b1	Bill Recycling
<b>Cashless Device #1 &amp; #2</b>	1	below	Supports standard commands and Expansion ID command. Readers do not have revaluation capability
		b0*	Reader is capable of restoring funds to card
		b1*	Reader is multivend capable
		b2*	Reader has a display available
		b3*	Reader supports VEND-CASH SALE command
		*bits in the SETUP-Config command	
	2	above	Supports Revalue, Time/Date, Read User File (obsolete), and Write User File (obsolete) commands

Peripherals	Levels	Options	Description
<b>Cashless Device #1 &amp; #2</b> (continued)	3	above & below	Supports expansion ID command <u>with</u> options and <u>optionally</u> supports commands for features below (bits in the Level 3 Expansion ID command)
		b0**	File Transport Layer (FTL)
		b1**	16 or 32 Bit Monetary Format
		b2**	Multi Currency / Multi Lingual
		b3**	Negative Vend
		b4**	Data Entry
		b5**	Always Idle Session
			**bits in the Level 3 Expansion ID command
<b>Communications Gateway</b>	1 2 3	none	Obsolete (former Audit Unit)
		none	Obsolete (former Audit Unit)
		below	Supports Expansion ID command and <u>optionally</u> supports commands for features below
		b0	File Transport Layer (FTL)
		b1	Verbose Mode
		b2	Expansion Time/Date
<b>Universal Satellite Device (USD)</b>	1	below	Supports all basic commands and <u>optionally</u> supports commands for features below
		b0	USD is capable of storing and controlling pricing
		b1	USD is capable of selecting items to vend
		b2	File Transport Layer (FTL)
<b>Coin Hopper or Tube - Dispenser</b>	1	below	Supports Expansion ID command and <u>optionally</u> supports commands for features below
		b0	File Transport Layer (FTL)

## Section 2

### Communication Format

---

#### 2.1 Byte Format

---

Baud Rate:	9600 NRZ
Serial Bit Format:	1 Start Bit 8 Data Bits 1 Mode Bit 1 Stop Bit
	-----
	11 Bits Total

LSB												MSB
Start	0	1	2	3	4	5	6	7	Mode	Stop		

#### Mode Bit: Master-to-Peripheral

The mode bit differentiates between ADDRESS bytes and DATA bytes. ADDRESS bytes must be read by all peripherals, DATA bytes are only read by the peripheral that has been addressed.

The mode bit is set (logic one) to indicate an ADDRESS byte, and not set (logic zero) to indicate a DATA byte.

#### Mode Bit: Peripheral-to-Master

The mode bit must be set on the last byte sent when data is sent from a Slave to the Master.

## 2.2 Block Format

---

### Master-to-Peripheral

A Communication Block for Master-to-Slave transmissions is defined as an Address byte, optional data bytes, and a CHK byte. A block is limited to a maximum of thirty-six (36) bytes.

The upper five bits (MSB) of the Address Byte will be used for addressing. That is, bits 7,6,5,4,3 of the previous byte description will be used for addressing.

The lower three bits (i.e. 2,1,0) of the Address Byte will contain peripheral specific commands. This will allow up to eight instructions to be embedded in the first byte of a block.

The VMC Master will respond to data from a peripheral with an Acknowledgment (ACK), Negative Acknowledgment (NAK), or Retransmit (RET). These are defined later in the document. The 5 mS time-out (t-response) described in the Bus Timing section of this document is the equivalent of a NAK.

If the addressed Slave does not respond within the 5 mS time-out (silence), the Master may repeat the same command, or send a different command, until it receives an answer or until the end of the Non-Response time, as defined in the peripheral sections. See Example in 2.5D. The RESET command should not be used as a recovery method to a 5 mS time-out (t-response) until after exceeding the Non-response time. The VMC may send commands to any other peripheral during this time.

### Peripheral-to-Master

A Communication Block for Slave-to-Master transmissions consists of either a data block and a CHK byte, a acknowledgment (ACK), or a negative acknowledgment (NAK).

The 5 mS time-out (t-response) described in the Bus Timing section of this document is the equivalent of a NAK command. In addition, it is recommended that the peripheral use this time-out as the NAK when a reception error of the ADDRESS byte occurs. This will prevent several peripherals from trying to simultaneously respond with a NAK.

A data block consists of one or more data bytes followed by a CHK byte. The CHK byte is defined later in this document.

The data block and CHK byte are limited to a maximum size of 36 bytes.

A CHK byte is not required when a peripheral responds with NAK or ACK byte. ACK and NAK are defined later in this document.



The peripheral must set the mode bit on the last byte sent to signify end of transmission. This will be either the CHK byte of a block, a NAK byte, or an ACK byte. The mode bit must not be set except for the conditions above.

A peripheral response of ACK or NAK signifies the end of the exchange.

When a peripheral responds with a data block, the VMC must respond with an ACK, NAK or RET. If the Master cannot respond within the 5 mS time-out (t-response) the peripheral must repeat the data block, or append it, at the next possible occasion (i.e. to a later POLL). The same behavior is to apply when the Master responds with NAK.

### CHK Byte

A CHK byte must be sent at the end of each block of data. The CHK byte is a checksum calculated by adding the ADDRESS byte and all DATA bytes. The CHK byte is not included in the summation. The carry bit for CHK additions is ignored since the CHK byte is limited to eight bits.

The following example shows a CHK byte calculation for a possible response to a STATUS command sent to a USA changer slave. See section 5 for details of byte meanings.

02H	Changer feature level
00H	Country code for USA
01H	Country code for USA
05H	Coin scaling factor
02H	Decimal place
00H	Coin type routing
07H	Coin type routing
01H	Coin type 0 has value of 1 scaling factor
02H	Coin type 1 has value of 2 scaling factor
05H	Coin type 2 has value of 5 scaling factor
14H	Coin type 3 has value of 20 scaling factor
<u>FFH</u>	<u>Coin type 4 is a token</u>
12CH	Therefore the CHK byte would be equal to 2CH

A checksum will be performed on all full blocks of communication. A checksum will not be performed on ACK, NAK, or RET bytes.

## Response Codes

The following codes are reserved for the ACK, NAK and RET bytes:

ACK	00H	(acknowledgment/checksum correct)
RET	AAH	(Retransmit the previously sent data. <b>Only the VMC can transmit this byte</b> )
NAK	FFH	(Negative acknowledge)

The VMC and peripheral must also recognize the 5 mS time-out (t-response) as a NAK.

**NOTE:** To improve system reliability it is recommended that when receiving ACK, NAK, or RET the receiving device counts the number of bits set in the byte. This method will require at least two bit errors in the byte before the byte can be mis-interpreted.

## Bus Reset

The VMC may reset all peripherals by pulling the transmit line “active” for a minimum of 100 mS. This informs all peripherals to abort any activity and return to its power-on reset state. Details of this state for each peripheral are provided in later sections of this document. It is recommended that the VMC re-initialize each peripheral after this type of reset.

## 2.3 Peripheral Addresses

---

The addresses below are defined. Note again that the bits shown are the upper five bits (7,6,5,4,3) of the Address Byte and will be used for all addressing including the File Transport Layer described in Section 2.6. The lower three bits (2,1,0) are used for the command.

<u>Address</u>	<u>Definition</u>
00000xxxB (00H)	Reserved for VMC
00001xxxB (08H)	Changer
00010xxxB (10H)	Cashless Device #1
00011xxxB (18H)	Communications Gateway
00100xxxB (20H)	Display
00101xxxB (28H)	Energy Management System
00110xxxB (30H)	Bill Validator
00111xxxB (38H)	Reserved for Future Standard Peripheral
01000xxxB (40H)	Universal Satellite Device #1
01001xxxB (48H)	Universal Satellite Device #2
01010xxxB (50H)	Universal Satellite Device #3
01011xxxB (58H)	Coin Hopper or Tube – Dispenser 1
01100xxxB (60H)	Cashless Device #2
01101xxxB (68H)	Age Verification Device
01101xxxB (70H)	Coin Hopper or Tube – Dispenser 2
01111xxxB (78H)	Reserved for Future Standard Peripherals
.	.
.	.
.	.
11011xxxB (D8H)	Reserved for Future Standard Peripherals
11100xxxB (E0H)	Experimental Peripheral #1
11101xxxB (E8H)	Experimental Peripheral #2
11110xxxB (F0H)	Vending Machine Specific Peripheral #1
11111xxxB (F8H)	Vending Machine Specific Peripheral #2

## Experimental Peripheral Addresses

Experimental Peripheral addresses 11100xxxB (E0H) and 11101xxxB (E8H) are reserved for use by manufacturers when designing and field testing potential new MDB/ICP devices. These addresses are temporary and once the new device is approved by NAMA and the EVA, the device will be assigned a different permanent peripheral address. Use of the Experimental Peripheral addresses shall be limited to "in house" testing and "closed site" field trials. Manufacturers must understand that any devices in the field with Experimental Peripheral addresses must be recalled or updated to the permanent address if the device is approved by NAMA and the EVA. If not approved by NAMA and the EVA, the devices must be recalled or have their addresses changed to the Vending Machine Specific peripheral addresses described below.

## Vending Machine Specific Peripheral Addresses

Vending Machine Specific peripheral addresses (addresses 11110xxxB (F0H) and 11111xxxB (F8H)) are reserved for Non-Standard or proprietary applications. These devices are allowed a unique set of commands.

All other peripherals are defined as Standard devices. These peripherals must follow the specifications to ensure compatibility between manufacturers.

## 2.4 Software Operational Rules

---

### 2.4.1 Power Budget

The VMC must regulate the power budget. That is, peripherals must be enabled and disabled dependent on power availability. The power bus is defined later in this document.

### 2.4.2 Bytes

During multi-byte messages the most significant byte is sent first.

Any bytes within a command or response that are not specifically defined should be left in a 0 state. For Level 03 or lower coin mechanisms, Level 01 bill validators, and Level 01 card readers, this is not a requirement but a suggestion.

### 2.4.3 Polling

The following are recommendations for the methods of VMC to peripheral software operation.

Each peripheral should be polled every 25-200 milliseconds. This can be done by the POLL command or any other appropriate command.

If a peripheral has not responded to a poll for its maximum Non-Response time, the VMC should continue to poll the peripheral at least every ten seconds with a RESET command. (See Example G in Section 2.5).

### 2.4.4 Levels

Due to potential conflicts between a VMC level and a peripheral level, neither the VMC nor the peripheral should issue a command or reply with a response that is not supported by the other device.

The VMC must initially determine (via the appropriate STATUS or SETUP command) the level of a peripheral before determining which commands it can issue to that device. **A VMC must only send commands that are supported by the peripheral.** For example, a Level 3 command may only be issued to a Level 3 or higher peripheral and must not be issued to a Level 1 or 2 peripheral.

The Cashless Payment and the Universal Satellite Device can also learn the respective level of the VMC for that device. This information is sent via the SETUP command. **It is the responsibility of the peripheral to only send responses that are supported**

by the VMC. For example, a Level 3 response may only be sent to a Level 3 or higher VMC and must not be sent to a Level 1 or 2 VMC. Effectively, the VMC and peripheral should support the highest common level.

For total compatibility, VMCs and peripherals should support all lower levels. **For new designs after July 2000, it is strongly recommended that VMCs and peripherals must support all lower levels.** Commercial or regional issues may cause machine or peripheral manufacturers to implement only specific levels; however, this is a decision (and risk) made by the machine or peripheral manufacturer.

## 2.5 Typical Session Examples

A. The diagram below represents a typical transmission when a peripheral is idle.

VMC:

----- ADD\* ----- CHK -----

Peripheral:

----- ACK\* -----

B. The diagram below represents a typical transmission when a peripheral has data to return.

VMC:

----- ADD\* ----- CHK ----- ACK -----

Peripheral:

----- DAT ----- DAT ----- CHK\* -----

C. The diagram below represents a typical transmission when the VMC has data to send.

VMC:

----- ADD\* ----- DAT ----- DAT ----- CHK -----

Peripheral:

----- ACK\* -----

\*Indicates mode bit set

- D. The diagram below represents a typical transmission when the VMC determines a CHK is not correct. The VMC will respond one of two ways:

Send a NAK to the peripheral to indicate that the information was not received correctly then perform other tasks. Note: When the Master answers with NAK (or silence which is treated equally) the slave has to repeat the response, in order to ensure the execution of the response (i.e. coin reception etc.).

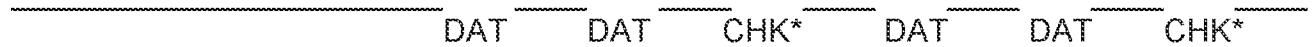
OR

The VMC may send a retransmit (RET) command alerting the peripheral to retransmit the previously sent data.

**VMC:**



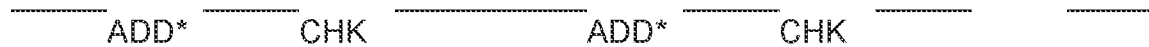
**Peripheral:**



\*Indicates mode bit set.

- E. This diagram represents a situation where the peripheral does not respond within the 5 mS time-out (t-response).

**VMC:**



**Peripheral:**



F. This diagram represents a situation where the peripheral does not respond to a command and after its maximum Non-Response time, is reset by the controller.

Controller	Peripheral	Comment
Command X	→ ← Response	Normal response
Command Y	→ ← [silence...]	No response
Command Y	→ ← [silence...]	No response
Command Y	→ ← [silence...]	No response
		Peripheral does not response within its allocated Non-Response Time.
RESET	→ ← [silence...]	Software Reset Peripheral in initialization routine
RESET	→ ← ACK	Peripheral operational again
POLL	→ ← JUST RESET	Peripheral indicates finished RESET processing
ACK	→	Peripheral initialization sequence is performed as recommended in each peripheral section.



G. This diagram represents a situation where the peripheral is disconnected or goes offline. The controller should send a RESET command every 10 seconds to determine if, and when, the peripheral becomes active again.

Controller	Peripheral	Comment
Command X	→ ← Response	Normal response
Command Y	→ ← [silence...]	No response
Command Y	→ ← [silence...]	No response
Command Y	→ ← [silence...]	No response
		Peripheral does not response within its allocated Non-Response Time.
RESET	→ ← [silence...]	Software Reset Peripheral offline
RESET	→ ← [silence...]	Software Reset Peripheral offline
		Wait 10 seconds
RESET	→ ← [silence...]	Peripheral offline
		Wait 10 seconds
RESET	→ [silence...]	Peripheral offline
		Wait 10 seconds
RESET	→ [silence...]	Peripheral offline

## 2.6 File Transport Layer

---

The File Transport Layer (FTL) provides a method to send and/or receive high level information between peripherals or between a peripheral and the VMC. It is not intended to be used for standard vending credit and control functions. An example would be loading new validation parameters into a coin changer or bill validator.

Since the MDB/ICP interface is "driven" by the VMC, it has to be a network manager for all FTL data transfers. It acts as a temporary mailbox and data switch for FTL blocks; however, the information that is sent via FTL does not have to be interpreted by the VMC. The VMC simply uses the destination and source address information provided in the MDB/ICP command and response structure to forward the data to the proper recipient.

### 2.6.1 FTL Process Overview

If a peripheral needs to transfer data to another peripheral (or the VMC):

- The VMC must poll the peripheral,
- The peripheral must answer with a "REQUEST TO SEND",
- The VMC must get approval to forward data (if necessary),
- The VMC requests the first data block,
- The VMC ACKs the first block and forwards to destination,
- The process repeats until all blocks are sent.

If the VMC needs to transfer data to a peripheral:

- The VMC must send a "REQUEST TO SEND",
- The peripheral approves or denies the transfer request,
- If approved, the VMC sends the first data block,
- The peripheral ACKs the first data block,
- The process repeats until all blocks are sent.

If a peripheral (A) needs to request a transfer of data from another peripheral (B):

- The VMC must poll the peripheral A,
- Peripheral A must send a "REQUEST TO RECEIVE",
- The VMC forwards the request to peripheral B,
- Peripheral B decides to honor the request or not,
- If approved, peripheral B sends the first data block,
- The VMC forwards the data block to peripheral A,
- The process repeats until all blocks are sent.

## 2.6.2 FTL Detailed VMC Operation

The VMC must act as a network manager, it is responsible for checking peripheral status and managing network resources as described below, it must:

- Be aware of which peripherals are active and support the FTL. If a file transfer is requested involving a peripheral that does not support it, the VMC should deny the transfer using RETRY/DENY defined later.
- Poll peripherals to become aware that a data transfer is requested.
- Read data blocks from selected peripherals.
- If VMC receives a NAK, it should attempt to finish current command/response up to 5 times. After that, it should abort file transfer as defined by the protocol.
- Send data blocks to destination device, if not the VMC itself.
- Repeat these steps for all data blocks, as needed.

## 2.6.3 FTL General Operation

- The FTL "session" would transfer a "file" using several "blocks". The "Dest" and "Src" are switched by the VMC directing each block to its destination.
- All responses can be sent immediately after receipt of command or the command can be ACK'ed and the response sent in a delayed fashion (meeting all appropriate time-outs). However, FTL responses must NOT be combined with responses to any other commands, at any time.
- File transfers less than 256 blocks are terminated by sending an empty data file (SEND BLOCK with no data). File transfers of exactly 256 blocks are terminated by block #FE followed by block #FF.
- It is recommended that files larger than one block:
  - 1) Include a CRC in their data. The transport layer is not responsible for checking for correct CRCs.
  - 2) Include a time out mechanism to prevent system dead locks. The transport layer is not responsible for checking for dead locked file transfers.
- To prevent a system dead lock, the VMC must poll other peripherals during all data transfers and service them accordingly.
- Since the VMC is not knowledgeable about the contents of the file transfer it should not disable any peripherals due to a transfer request. This will be the responsibility of the peripherals themselves. They may internally disable and report so to the VMC if possible, or they may just stop responding to the VMC until ready. The latter may cause the VMC to try to reset the peripheral.

## 2.6.4 FTL Command and Response Sets For All Components

The table below defines the VMC commands and peripheral responses that occur during an FTL data transfer. Note that the peripheral responses can either be immediate to the VMC's command or delayed and provided to a subsequent POLL. Definitions are provided on the following page.

Command / Response	VMC Cmd <sup>1</sup>	Resp	Source Data (bytes)	Destination Response
REQ TO SEND	$\alpha 7$ /FE	1F	Dest (1) Src (1) File ID (1) Length (1) Control (1)	OK TO SEND or RETRY/DENY
OK TO SEND	$\alpha 7$ /FD	1E	Dest (1) Src (1)	SEND BLOCK (repeated until whole file is transferred)
SEND BLOCK	$\alpha 7$ /FC	1D	Dest (1) Block # (1) Data (1 to 31)	ACK
RETRY/DENY	$\alpha 7$ /FB	1C	Dest (1) Src (1) Retry delay (1)	ACK
REQ TO RCV	$\alpha 7$ /FA	1B	Dest (1) Src (1) File ID (1) Max Length (1) Control (1)	SEND BLOCK (repeated until whole file is transferred) or RETRY/DENY

Note 1: The  $\alpha 7$  represents the address of the destination device (defined in Section 2.3) logically OR'd with a hexadecimal 0x07.

**Dest** **1 byte**

The destination address of the peripheral where the data block (**not the whole file**) is being sent to. All addresses refer to the standard MDB defined peripheral addresses as defined in Section 2.3. Note that 00000xxx (00H) will be used for the VMC. Examples are a changer (08H), audit system (18H), bill validator (30H), and universal satellite device #2 (48H).

**Src** **1 byte**

The source address of the peripheral where the data block (**not the whole file**) is being sent from. All addresses refer to the standard MDB defined peripheral addresses as defined in Section 2.3. Note that 00000xxx (00H) will be used for the VMC. Examples are the same as in the **Dest** above.

**File ID** **1 byte**

The type of information desired. NAMA will maintain a list of standard file ID's and a definition of what each file type means. Note that if a device responds with a "Retry delay" of FFH it should be interpreted that this device does not support the requested function.

Currently defined file IDs include:

00H: Manufacture ID information. This file must start with the manufactures three character manufactures code, anything after that would be up to the manufacture to define.

01H: DTS defined file. This file must follow the format defined in the EVA-DTS standard. This would include the DXS record as well as all data up to and including the DXE record.

0F0H to 0FFH: This range of files may be used for Manufacturer Specific information. The content and format of these files are left up to the manufacturer to define.

Additional ID proposals must be evaluated by the NAMA MDB/ICP technical standard committee.

**(Max) Length** **1 byte**

The total number of blocks that will (can) be included in the entire file. This byte should be used as a counter to determine the amount of data blocks to be transferred.

**Control** **1 byte**

This byte contains information that can be used by the VMC and peripherals to determine how the data transfer is conducted. Included controls are:

- b0: Reset after transfer. The receiving peripheral should reset itself after the file transfer is complete.
- b1: End of File. The last block of the current FTL session contains the end of this file. If clear (=0), then another FTL session will follow with additional blocks. If set (=1), then this is the last (or only) FTL session to be sent.
- b2 - b7: Not used, must be set to 0

**Block #** **1 byte**

The sequential number of this block, within the total file, that is being requested/sent. All data blocks must be identified by a block number, counting up from 0 (first block) to 255.

**Data Block** **1 to 31 byte(s)**

The actual data portion of the block. All data must fit into a 31 byte, or less, string. The standard MDB CHK byte will signify the end of block. (Peripherals will have to use inter-byte time out when receiving blocks from the VMC.) Knowledge of the contents of this data is only required by the source and destination devices.

**Retry Delay** **1 byte**

A time delay that the sender should wait before trying to re-send the entire data file again. If a device is not capable of receiving a file in its current state, this byte should represent the number of seconds before it will be ready to receive the data. If the device simply refuses to accept the file it must answer with a "Retry Never" signified by a 00H retry delay. If the device is not present, block synchronization is lost, or other failure mode arises a "Retry Never" should be used to abort/deny the current file transfer.

## File Transport Layer Examples

Below are examples of data transfers between the VMC and a peripheral or between two different peripherals via the VMC.

SUCCESSFUL TRANSFER – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← REQ TO SEND ( $\alpha 7/FE$ )		Request to send "n" blocks
OK TO SEND (1E)	→		
	← ACK		
	← SEND BLOCK ( $\alpha 7/FC$ )		Repeated "n" times
ACK	→		

DENIED TRANSFER – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← REQ TO SEND ( $\alpha 7/FE$ )		
RETRY/00 (1C)	→		Denied
	← ACK		

SUCCESSFUL REQUEST – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← POLL (varies)		
REQ TO RCV (1B)	→		Request receive "n" blocks
	← ACK		
	← SEND BLOCK ( $\alpha 7/FC$ )		Repeated "n" times
ACK	→		

DENIED REQUEST – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← POLL (varies)		
REQ TO RCV (1B)	→		Request receive "n" blocks
	← ACK		
	← RETRY/00 ( $\alpha 7/FB$ )		Denied
ACK	→		

VMC ABORTED TRANSFER – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← REQ TO SEND (α7/FE)		Request to send "n" blocks
OK TO SEND (1E)	→		
	← ACK		
	← SEND BLOCK (α7/FC)		Repeated "n" times
ACK	→		
	← RETRY/00 (α7/FB)		Aborted!
ACK	→		

PERIPHERAL ABORT TRANSFER – VMC TO PERIPHERAL A			
Peripheral A	VMC	Peripheral B	Comments
	← REQ TO SEND (α7/FE)		Request to send "n" blocks
OK TO SEND (1E)	→		
	← ACK		
	← SEND BLOCK (α7/FC)		Aborted!
RETRY/00 (1C)	→		
	← ACK		

SUCCESSFUL TRANSFER – PERIPHERAL A TO VMC			
Peripheral A	VMC	Peripheral B	Comments
	← POLL (varies)		
REQ TO SEND (1F)	→		Request to send "n" blocks
	← ACK		
	← OK TO SEND (α7/FD)		
SEND BLOCK (1D)	→		Repeated "n" times
	← ACK		



**DENIED TRANSFER – PERIPHERAL A TO VMC**

Peripheral A	VMC	Peripheral B	Comments
REQ TO SEND (1F)	← POLL (varies) →		Request to send "n" blocks
	← ACK		
	← RETRY/00 (α7/FB)		Denied
ACK	→		

**SUCCESSFUL TRANSFER – PERIPHERAL A TO PERIPHERAL B**

Peripheral A	VMC	Peripheral B	Comments
REQ TO SEND (1F)	← POLL (varies) →		Request to send "n" blocks
	← ACK		
	REQ TO SEND (1F) (α7/FE)	→	
	ACK	← OK TO SEND (1E) →	
SEND BLOCK (1D)	← OK TO SEND (α7/FD) →		Repeated "n" times
	← ACK		
	SEND BLOCK (α7/FC)	→	
		← ACK	

**DENIED TRANSFER – PERIPHERAL A TO PERIPHERAL B**

Peripheral A	VMC	Peripheral B	Comments
REQ TO SEND (1F)	← POLL (varies) →		Request to send "n" blocks
	← ACK		
	REQ TO SEND (1F) (α7/FE)	→	
	ACK	← RETRY/00 (1C) →	Denied
	← RETRY/00 (α7/FB)		
ACK	→		

SUCCESSFUL REQUEST - PERIPHERAL A TO PERIPHERAL B			
Peripheral A	VMC	Peripheral B	Comments
REQ TO RCV (1B)	← POLL (varies)		Request receive "n" blocks
	→		
	← ACK		
	REQ TO RCV (α7/FA)	→	Repeated "n" times
		← SEND BLOCK (1D)	
	ACK	→	
	← SEND BLOCK (α7/FC)		
ACK	→		

DENIED REQUEST – PERIPHERAL A TO PERIPHERAL B			
Peripheral A	VMC	Peripheral B	Comments
REQ TO RCV (1B)	← POLL (varies)		Request receive "n" blocks
	→		
	← ACK		
	REQ TO RCV (α7/FA)	→	Denied
		← RETRY/00 (1C)	
	ACK	→	
	← RETRY/00 (α7/FB)		
ACK	→		

PERIPHERAL A TRANSFER TO PERIPHERAL B – ABORTED BY A			
Peripheral A	VMC	Peripheral B	Comments
REQ TO SEND (1F)	← POLL (varies)		Request to send "n" blocks
	→		
	← ACK		
	REQ TO SEND ( $\alpha 7/FE$ )	→	
		← OK TO SEND (1E)	
	ACK	→	
SEND BLOCK (1D)	← OK TO SEND ( $\alpha 7/FD$ )		
	→		
	← ACK		
	SEND BLOCK ( $\alpha 7/FC$ )	→	
		← ACK	
			Repeated "n" times
RETRY/00 (1C)	← POLL (varies)		Aborted!
	→		
	← ACK		
	RETRY/00 ( $\alpha 7/FB$ )	→	
		← ACK	

PERIPHERAL A TRANSFER TO PERIPHERAL B – ABORTED BY B			
Peripheral A	VMC	Peripheral B	Comments
REQ TO SEND (1F)	← POLL (varies) →		Request to send "n" blocks
	← ACK		
	REQ TO SEND (α7/FE)	→	
		← OK TO SEND (1E)	
	ACK	→	
SEND BLOCK (1D)	← OK TO SEND (α7/FD)		
	→		
	← ACK		
	SEND BLOCK (α7/FC)	→	
		← ACK	
			Repeated "n" times
SEND BLOCK (1D)	← POLL (varies)REQ BLOCK (α7/FD)		
	→		
	← ACK		
	SEND BLOCK (α7/FC)	→	
		← RETRY/00 (1C)	Aborted!
	ACK	→	
ACK	← RETRY/00 (α7/FB)		
	→		

## Section 3

### *Bus Timing*

#### 3.1 Timing Definitions

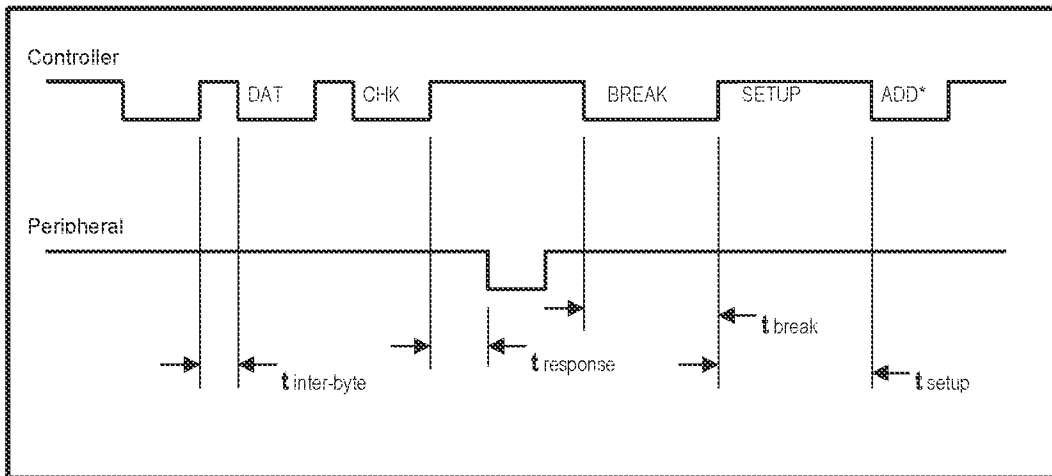
Baud rate	=	The rate of bit transfer per second.
t inter-byte (max.)	=	The maximum time allowed between bytes in a block transmission.
t response (max.)	=	The maximum time any device, master or peripheral, will take to respond to a valid communication.
t break (VMC)	=	The minimum time of the Bus Reset signal sent by the VMC to reset all peripherals.
t setup	=	The minimum set-up time before the VMC attempts to communicate after a reset signal. Peripheral devices may choose to not respond for up to the non-response time defined in each peripheral section.

#### 3.2 Timing Specifications

Baud Rate	=	9600 +1%/-2% NRZ
t inter-byte (max.)	=	1.0 mS
t response (max.)	=	5.0 mS
t break (min.)	=	100 mS
t setup (min.)	=	200 mS

**NOTE:** All peripherals have the option of not responding to the VMC. Non-response timing is defined in the peripheral specification.

### 3.3 Timing Diagram



**NOTE:** \* indicates that the mode bit is set

## Section 4

### *Hardware Specification*

#### 4.1 Bus Power Supply Definition

The information below defines the minimum VMC voltage output. The actual current ratings per peripheral will be defined in their respective sections.

Power supply filtering is optional, therefore if a peripheral requires more power, or tighter regulation, they may elect to supply their own power, or filtering, from available sources elsewhere in the machine.

##### VMC Voltage Output:

Minimum	=	20 VDC rms.(rectified and optionally filtered)
Nominal	=	34 VDC unreg.(rectified and filtered) 24 VDC rms.(rectified only)
Maximum	=	42.5* VDC(ripple voltage upper limit) * High line input may allow 45 VDC peak (max.).

#### 4.2 Bus Transmitter / Receiver Specification

The following section describes the 5V, optically isolated, current loop system between the Master and the Slave.

##### VMC Master:

###### Transmit:

Minimum source current (active):	100 mA @ 4V
Maximum leakage current (inactive):	100 uA

- NOTES:**
- 1) The transmit line must be able to withstand a short while in the active mode.
  - 2) 15 mA should be added for each peripheral over six.

**Receive:**

Minimum input current (active): 15 mA @ 1V  
 Maximum input current (inactive): 1 mA

**Peripheral Slave:****Receive:**

Maximum input current (active): 15 mA @ 4V  
 Maximum input current (inactive): 100 uA

**Transmit:**

Minimum sink current (active): 15 mA @ 1V  
 Maximum leakage current (inactive): 30 uA

**4.3 Connector Specification**

Connector assemblies supplied by the NAMA approved suppliers, noted in Section 4.3.6, are intermateable and meet or exceed the minimum requirements identified in Sections 4.3.1, 4.3.2, 4.3.3, 4.3.4, and 4.3.5 when tested in the mated condition. NAMA must approve any supplier changes to the fit, form, or function. Discrete components, i.e. contacts, are not required to be inter-changeable between supplier products.

**4.3.1. Material**

- 4.3.1.1. Terminal: Phosphor Bronze
- 4.3.1.2. Plating: Tin or Tin/Lead
- 4.3.1.3. Housing: UL 94V-2 nylon

**4.3.2. Ratings**

Section	Item	Requirement
4.3.2.1.	Rated Voltage (Max)	600 Volts AC
4.3.2.2.	Maximum Rated Current (Six Circuit)	7 Amps
4.3.2.3.	Ambient Temperature Range (including terminal T-rise)	-40°C to +105°C



4.3.3. Electrical Performance

Section	Item	Test Condition	Requirement
4.3.3.1.	Contact Resistance	Mate Connectors, measure by dry circuit, 20 mV max., 10 mA. Wire resistance shall be removed from the measured value.	10 mΩ Max.
4.3.3.2.	Insulation Resistance	Mate Connectors, apply 500V DC between adjacent terminal or ground.	1000 MΩ Min.
4.3.3.3.	Dielectric Strength	Mate Connectors, apply 1500V AC for 1 minute between adjacent terminal or ground.	No Breakdown.

4.3.4. Mechanical Performance

Section	Item	Test Condition	Requirement	
4.3.4.1.	Insertion and Withdrawal Force	Insert and withdraw connectors at a speed rate of 25 +/- 3mm / minute.	Noted Below	
		6 Pos Insertion Max.	6 Pos Withdrawal Min.	
		Initial	30 <sup>th</sup> cycle	
		41.2 N	38.2 N	
4.3.4.2.	Crimping Pull Out Force	Mount the crimped terminal, apply axial force on the wire at a rate of 25 +/- 3mm minute.	16 AWG	88 N Min.
			18 AWG	88 N Min.
			20 AWG	59 N Min.
			22 AWG	39 N Min.
			24 AWG	29 N Min.
			26 AWG	20 N Min.
			28 AWG	10 N Min.
4.3.4.3.	Terminal Insertion Force	Insert the crimped terminal into the housing.	15 N Max.	
4.3.4.4.	Terminal/Housing Retention Force	Apply axial pull out force at the speed rate of 25 +/- 3mm / minute.	22 N Min.	
4.3.4.5.	Locking / Unlocking Force	Measure force to lock & unlock connector housings (without contacts) at a rate of 25 +/- 3mm / minute.	Lock: 30 N Max. Unlock: 50 N Min.	

## 4.3.5. Environmental Performance

Section	Item	Test Condition	Requirement	
4.3.5.1.	Repeated Insertion / Withdrawal	When mated up to 30 cycles repeatedly by rate of 10 cycles per minute.	Contact Resistance	20 mΩ Max.
4.3.5.2.	Temperature Rise	Carrying rated current load.	30°C Rise Max.	
4.3.5.3.	Vibration	Amplitude: 1.5mm P-P Sweep Time: 10-55-10 Hz in 1 minute. Duration: 2 hours in each X,Y,Z axis.	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
			Discontinuity	1 μ sec. Max.
4.3.5.4.	Shock	50 G; 3 strokes in each X,Y,Z axis.	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
			Discontinuity	1 μ sec Max.
4.3.5.5.	Heat Resistance	105 +/- 2°C, 96 hours	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
4.3.5.6.	Cold Resistance	-40 +/- 3°C, 96 hours	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
4.3.5.7.	Humidity	Temperature: 60 +/- 2°C Relative Humidity: 90% - 95% Duration: 96 hours	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
			Dielectric Strength	No Breakdown
			Insulation Resistance	1000 MΩ Min.
4.3.5.8.	Temperature Cycling	5 Cycles: a) - 55°C ; 30 Minutes b) 105°C ; 30 Minutes	Appearance	No Damage
			Contact Resistance	20 mΩ Max.
4.3.5.9.	Salt Spray	48 +/- 4 hours exposure to salt spray from 5 +/- 1% solution at 35 +/- 2°C.	Appearance	No Damage
			Contact Res.	20 mΩ Max.
4.3.5.10	SO <sub>2</sub> Gas	24 hour exposure to 50 +/- 5 ppm SO <sub>2</sub> gas at 40 +/- 2°C.	Appearance	No Damage
			Contact Res.	Max.

#### 4.3.6 Approved Suppliers and Part Numbers

##### 4.3.6.1. Suppliers

Molex : Mini-Fit, Jr.™ Product  
AMP: AMP-DUACTM Product

##### 4.3.6.2. Peripherals

Connector: Six (6) Circuit Receptacle Housing  
Molex 39-01-2060  
AMP P/N 106527-6

Terminals: Female Contacts (sockets), Tin  
Molex 39-00-0065  
AMP P/N 106528-2 or 106529-2

Strain Relief: The strain relief shall not exceed a Maximum Form Factor of 0.85 inch wide x 0.75 inch high x 1.90 inch long, excluding integrated hinges and wire ties.

Molex 15-04-0296  
AMP P/N 1375618-1

##### 4.3.6.3. Bus Harness

Connector: Six (6) Circuit Plug Housing  
Molex 39-01-2061  
AMP P/N 794550-6 or 794542-6

Terminals: Male Contacts (pins), Tin  
Molex 39-00-0067  
AMP P/N 794578-1 or 794576-1

##### 4.3.6.4. VMC Connector (Direct PCB Mount)

Vertical Header: Male Contacts (pins), Tin  
Molex 39-28-1063  
AMP P/N 794664-6

Right Angle Header: Male Contacts (pins), Tin  
Molex 39-30-1060  
AMP P/N 794448-1

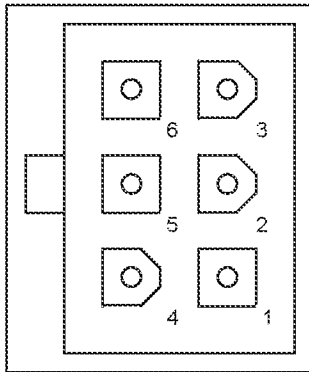
#### 4.3.6.5. Approved Parts – Alternate Form Factors

Select applications may require connector configurations with alternate form factors. Alternate form factor connectors may be used provided they are:

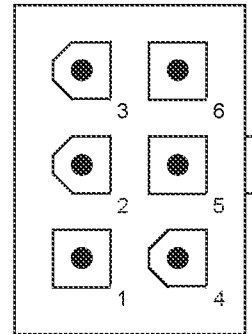
- provided by the Approved Suppliers listed
- part of the Approved Supplier Product Family portfolio
- intermateable with the approved connector part numbers listed
- meet the performance objectives set forth in this specification

**Connector Pin-out:**

- Line 1 - 34 VDC
- Line 2 - DC Power Return
- Line 3 - N/C
- Line 4 - Master Receive
- Line 5 - Master Transmit
- Line 6 - Communications Common

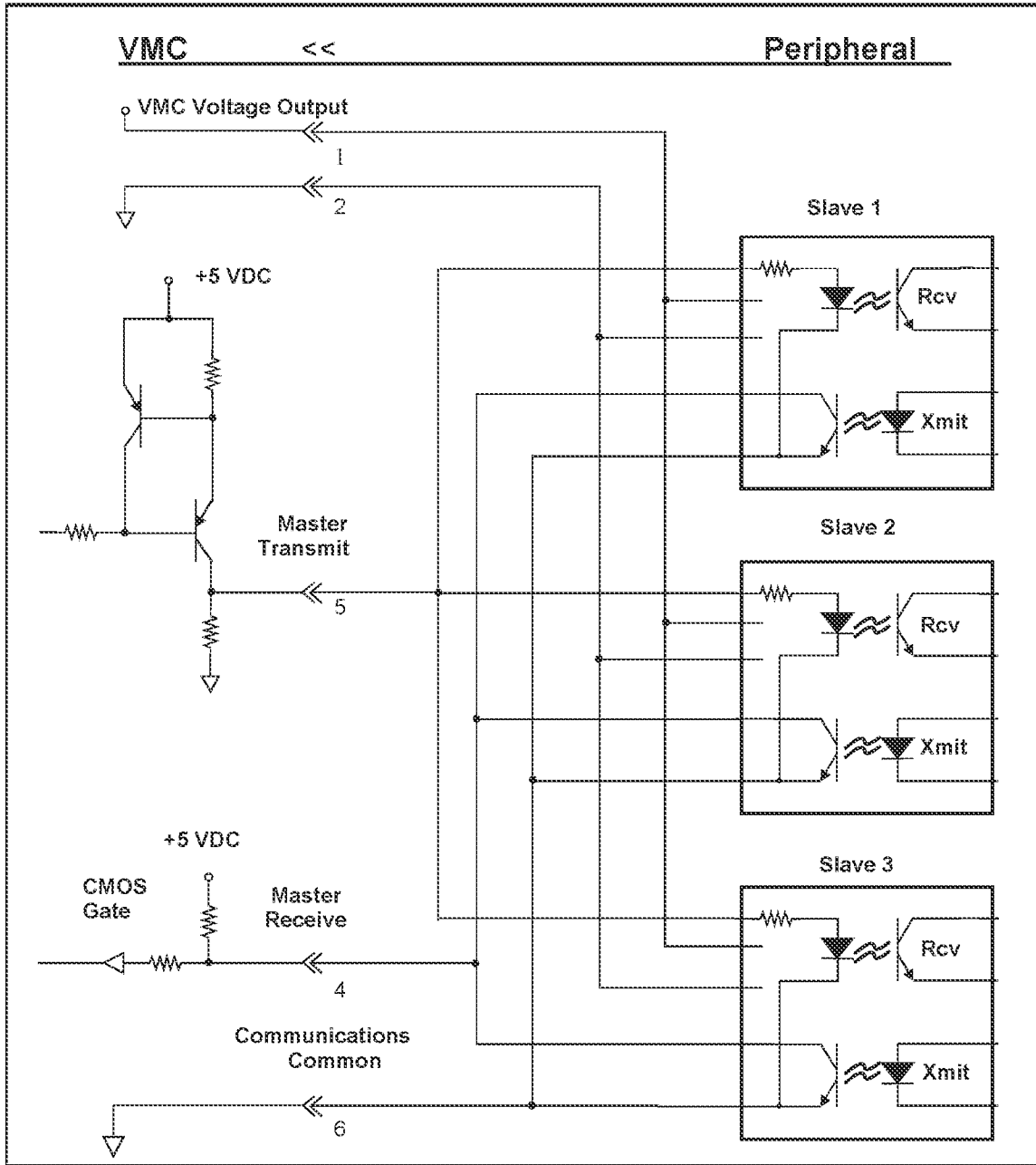


**Peripheral Connector**  
Face View  
Receptacle  
(Sockets)



**VMC / Bus Connector**  
Face View  
Header  
(Pins)

### 4.4 Example Schematic



## **Section 5**

### ***Coin Acceptor/Changer***

### ***VMC/Peripheral Communication Specifications***

#### **5.1 Introduction**

This section defines the communication bytes sent and received by a coin accepting device ("Changer"). As defined in Section 2.3, the changer's address is 00001xxxB (08H).

Unless stated otherwise, all information is assumed to be in a binary format.

There are currently two levels of support defined for the coin mechanism interface, Level 2 and Level 3. The level of coin mechanism operation is sent to the VMC in the response to the STATUS command (defined later in this section). The following paragraphs will define how a VMC should differentiate between each level.

#### **Level 2 Changers**

For level 2 changers, VMC operation consists of monitoring inputs from the coin mechanism, accumulating credit, issuing a coin acceptance disable command when appropriate, and issuing appropriate payout commands based on the VMC resident payout algorithms and escrow rules.

#### **Level 3 Changers**

For level 3 changers, VMC operation is the same as defined above for level 2, with the addition of the EXPANSION command and its implications (defined later in this section). The VMC has the option of sending the EXPANSION command to the coin mechanism to determine the coin mechanism's manufacturer code, serial number, model/tuning revision, software version, and optional features. Based on the optional feature information the VMC will determine the appropriate operating mode (in other words, modes that both the coin mechanism and the VMC can support), enable any appropriate coin mechanism features by sending an appropriate feature enable command back to the coin mechanism, and enter the proper operating mode. This technique allows all VMCs and peripherals to accommodate existing feature capabilities and provides a means for upgrading Level 3 equipment.

## 5.2 VMC Commands

---

<u>Command</u>	<u>Hex Code</u>	<u>Description</u>
RESET	08H	Command for changer to self-reset
SETUP *	09H	Request for changer setup information.
TUBE STATUS	0AH	Request for changer tube status.
POLL	0BH	Request for changer activity status.
COIN TYPE	0CH	Signifies coin types accepted and allowable coin dispensing. This command is followed by setup data. See command format section.
DISPENSE	0DH	Command to dispense a coin type. Followed by coin type to dispense. See command format section.
EXPANSION COMMAND	0FH	Command to allow addition of features and future enhancements. Changers at feature level 2 do not support this command.

**NOTE:** An EXPANSION command is always followed by a “sub-command.” This command allows for feature additions.

\* In Version 1.0 & 2.0, **SETUP** was called **STATUS**.



### 5.3 VMC Command Format

---

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
RESET	08H	No data bytes

This command is the vehicle that the VMC should use to tell the changer that it should return to its default operating mode. With the exception of the ACK response, it should abort all communication and disable all acceptance until otherwise instructed by the VMC.

The following initialization sequence is recommended for all new VMCs designed after July, 2000. It should be used after "power up", after issuing the RESET command, after issuing the Bus Reset (pulling the transmit line "active" for a minimum of 100 mS), or anytime a POLL command results in a "JUST RESET" response (i.e., peripheral self resets).

**POLL – 08h**

To obtain "JUST RESET" response

**SETUP – 09h**

To obtain changer level and configuration information

**EXPANSION IDENTIFICATION – 0F 00h (Level 03+ only)**

To obtain additional changer information and options

**EXPANSION FEATURE ENABLE – 0F 01h (Level 03+ only)**

To enable desired options

**EXPANSION SEND DIAG STATUS – 0F 05h (Level 03+ & option b1 only)**

To request the changer to report its current state of operation

**TUBE STATUS – 0Ah (Note 1)**

To obtain tube status / change information

**COIN TYPE – 0Ch**

To enable desired coin acceptance and disable manual coin payout if desired

Note 1 – A minimum 500 msec delay is required between a reset (regardless of type) and the first **TUBE STATUS** command for certain models of the existing MDB coin changer field base.

<u>VMC Command</u>	<u>Code</u>	<u>Changer Response Data</u>
SETUP	09H	23 bytes: Z1 - Z23

Z1 = Changer Feature Level - 1 byte

Indicates the feature level of the changer. This will distinguish the changers feature level to the VMC. Current defined levels:

Level 2: Supports "core" command set. These are: RESET, STATUS, TUBE STATUS, POLL, COIN TYPE, and DISPENSE. (Z1 = 02h)

Level 3: Supports level two and the EXPANSION command addition changer model number, manufacturer code, turning revision, etc. See the details of EXPANSION command later in this document. (Z1=03h)

Z2 - Z3 = Country / Currency Code - 2 bytes

The packed BCD country / currency code of the changer can be sent in two different forms depending on the value of the left most BCD digit.

If the left most digit is a 0, the International Telephone Code is used to indicate the country that the changer is set-up for. For example, the USA code is 00 01H (Z2 = 00 and Z3 = 01).

If the left most digit is a 1, the latest version of the ISO 4217 numeric currency code is used (see Appendix A1). For example, the code for the US dollar is 18 40H (Z2 = 18 and Z3 = 40) and for the Euro is 19 78 (Z2 = 19 and Z3 = 78).

**All new designs after July, 2000 must use the ISO 4217 numeric currency codes as listed in Appendix A1.**

Z4 = Coin Scaling Factor - 1 byte

All accepted coin values must be evenly divisible by this number. For example, this could be set to 05H for the USA nickel.

Z5 = Decimal Places - 1 byte

Indicates the number of decimal places on a credit display. For example, this could be set to 02H in the USA.

Z6 - Z7 = Coin Type Routing - 2 bytes

Indicates what coin types can be routed to the Changer's tubes.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
Z6 Z7

Bit is set to indicate a coin type can be routed to the tube. Valid coin types are 0 to 15.

Z8 - Z23 = Coin Type Credit - 16 bytes

Indicates the value of coin types 0 to 15. Values must be sent in ascending order. This number is the coin's monetary value divided by the coin scaling factor. Unused coin types are sent as 00H. Unsent coin types are assumed to be zero. It is not necessary to send all coin types. Coin type credits sent as FFH are assumed to be vend tokens. That is, their value is assumed to worth one vend.

The bytes position in the 16 byte string indicates the coin type(s). For example, the first byte sent would indicate the value of coin type 0, the second byte sent would indicate the value of coin type 1, and so on. For example, the USA coin types may be; Coin type 0 = nickel, Coin type 1 = dime, Coin type 2 = quarter, Coin type 3 = dollar.

<u>VMC Command</u>	<u>Code</u>	<u>Changer Response Data</u>
TUBE STATUS	0AH	18 bytes: Z1 - Z18

Z1 - Z2 = Tube Full Status - 2 bytes

Indicates status of coin tube for coin types 0 to 15.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
Z1 Z2

A bit is set to indicate a full tube. For example, bit 7 = set would indicate the tube for coin type 7 is full.

Z3 - Z18 = Tube Status - 16 bytes

Indicates the greatest number of coins that the changer "knows" definitely are present in the coin tubes. A bytes position in the 16 byte string indicates the number of coins in a tube for a

particular coin type. For example, the first byte sent indicates the number of coins in a tube for coin type 0. Unsent bytes are assumed to be zero. For tube counts greater than 255, counts should remain at 255.

**NOTE:** If a changer can detect a tube jam, defective tube sensor, or other malfunction, it will indicate the tube is "bad" by sending a tube full status and a count of zero for the malfunctioning coin type.

<u>VMC Command</u>	<u>Code</u>	<u>Changer Response Data</u>
POLL	0BH	16 bytes: Z1 - Z16

Z1 - Z16 = Changer Activity - 16 bytes

Indicates the changer activity. If there is nothing to report, the changer should send only an ACK. Otherwise, the only valid responses are:

**Coins Dispensed Manually:**

<u>Z1</u>	<u>Z2</u>
(1yyyxxxx)	(zzzzzzzz)

yyy	=	The number of coins dispensed.
xxxx	=	The coin type dispensed (0 to 15)
zzzzzzzz	=	The number of coins in the tube.

**Coins Deposited:**

<u>Z1</u>	<u>Z2</u>
(01yyxxxx)	(zzzzzzzz)

yy	=	Coin routing. 00: CASH BOX 01: TUBES 10: NOT USED 11: REJECT
----	---	---

xxxx	=	Coin type deposited (0 to 15).
------	---	--------------------------------

zzzzzzzz	=	The number of coins in the tube for the coin type accepted.
----------	---	---

**Status:**

(00000001) =	Escrow request <sup>1</sup> - An escrow lever activation has been detected.
--------------	---

(00000010) =	Changer Payout Busy <sup>2</sup> - The changer is busy activating payout devices.
--------------	---

(00000011) =	No Credit <sup>1</sup> - A coin was validated but did not get to the place in the system when credit is given.
(00000100) =	Defective Tube Sensor <sup>1</sup> - The changer has detected one of the tube sensors behaving abnormally.
(00000101) =	Double Arrival <sup>1</sup> - Two coins were detected too close together to validate either one.
(00000110) =	Acceptor Unplugged <sup>2</sup> - The changer has detected that the acceptor has been removed.
(00000111) =	Tube Jam <sup>1</sup> - A tube payout attempt has resulted in jammed condition.
(00001000) =	ROM checksum error <sup>1</sup> - The changers internal checksum does not match the calculated checksum.
(00001001) =	Coin Routing Error <sup>1</sup> - A coin has been validated, but did not follow the intended routing.
(00001010) =	Changer Busy <sup>2</sup> - The changer is busy and can not answer a detailed command right now.
(00001011) =	Changer was Reset <sup>1</sup> - The changer has detected an Reset condition and has returned to its power-on idle condition.
(00001100) =	Coin Jam <sup>1</sup> - A coin(s) has jammed in the acceptance path.
(00001101) =	Possible Credited Coin Removal <sup>1</sup> - There has been an attempt to remove a credited coin.

## Note:

- changers must have a means to disable this code due to potential older VMC issues.
- virtually all VMCs designed prior to this code's introduction (10/16/02) will not support it.
- It is a vending machine system issue as to what is done when this code is received.

**Slug:**

(001xxxx) =	xxxx is the number of slugs since the last activity.
-------------	--

**NOTES:** The Changer may send several of one type activity\*, up to 16 bytes total. This will permit zeroing counters such as slug, inventory, and status.

- 1 Sent once each occurrence
- 2 Sent once each POLL

\* Type activity is defined as Coins Dispensed Manually, Coins Deposited, Status, and Slug. All may be combined in a response to a POLL command providing the total number of bytes does not exceed 16. Note that Coins Dispensed Manually and Coins Deposited are dual byte codes.

**File Transport Layer POLLED responses:**

Note that all FTL responses are defined in Section 2.6. For the coin changer, the source address will always be the changer (08H) as defined in Section 2.3.

Z1

1B	REQ TO RCV	The coin changer is requesting to receive data from a device or VMC.
		Z2 = Destination address of response Z3 = Source address of response (08H) Z4 = File ID Z5 = Maximum length Z6 = Control
1C	RETRY/DENY	The coin changer is requesting a device or VMC to retry or deny the last FTL command.
		Z2 = Destination address of response Z3 = Source address of response (08H) Z4 = Retry delay
1D	SEND BLOCK	The coin changer is sending a block of data (maximum of 31 bytes) to a device or VMC.
		Z2 = Destination address of data Z3 = Block # Z4-Z34 = Data (maximum of 31 bytes)
1E	OK TO SEND	The coin changer is indicating that it is OK for a device or VMC to send it data.
		Z2 = Destination address of response Z3 = Source address of response (08H)
1F	REQ TO SEND	The coin changer is requesting to send data to a device or VMC.
		Z2 = Destination address of response Z3 = Source address of response (08H) Z4 = File ID Z5 = Maximum length Z6 = Control

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
COIN TYPE	0CH	4 bytes: Y1 - Y4

Y1 - Y2 = Coin Enable - 2 bytes

b15	b14	b13	b12	b11	b10	b9	b8		b7	b6	b5	b4	b3	b2	b1	b0
Y1																Y2

A bit is set to indicate a coin type is accepted. For example, bit 6 is set to indicate coin type 6, bit 15 is set to indicate coin type 15, and so on. To disable the changer, disable all coin types by sending a data block containing 0000H. All coins are automatically disabled upon reset.

Y3 - Y4 = Manual Dispense Enable - 2 bytes

b15	b14	b13	b12	b11	b10	b9	b8		b7	b6	b5	b4	b3	b2	b1	b0
Y3																Y4

A bit is set to indicate dispense enable. For example, bit 2 is set to enable dispensing of coin type 2. This command enables/disables manual dispensing using optional inventory switches. All manual dispensing switches are automatically enabled upon reset.

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
DISPENSE	0DH	1 byte: Y1

b7 b6 b5 b4 b3 b2 b1 b0  
 Y1

Bits b3, b2, b1, b0 indicate coin type to be dispensed. Valid codes are 0H to FH to indicate coin types 0 to 15.

Bits b7, b6, b5, b4 indicate the number of coins to be dispensed.

**NOTE 1:** If two coin types have the same value, the highest coin type should be paid out first.

**NOTE 2:** There is no defined limit on how long the actual dispense takes since the command allows for up to 15 coins to be paid out. The payout cycle begins when the changer ACKs the VMC's DISPENSE (0DH) command. This cycle typically lasts a minimum of 100 mS and ends when the changer stops dispensing the desired number of coins. VMCs should monitor the Changer Payout Busy response to the POLL command to determine when the entire payout cycle is completed.

**However,** it must be noted that other than ACKing the DISPENSE (0DH) command, the changer does not have to respond during the payout cycle provided the payout cycle is less than the changer's non-response time and the changer starts responding again prior to the end of the non-response time. Thus, it is acceptable for the changer to never report Changer Payout Busy, but simply start ACKing the POLL commands upon completion of a payout cycle provided the non-response time has not been exceeded.



**LEVEL THREE CAPABILITIES - EXPANSION COMMAND**

The following describes the currently defined expansion commands.

Sub-command 00H is used for a changer that has the capability of reporting model number, serial number, and so on.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Changer Response Data</u>
EXPANSION COMMAND	0FH	00H IDENTIFICATION	33 bytes: Z1 - Z33

Z1 - Z3 = Manufacturer Code - 3 bytes  
Identification code for the equipment supplier. Sent as ASCII characters. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard**" (**EVA-DTS**), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".

Z4 - Z15 = Serial Number - 12 bytes  
  
Factory assigned serial number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.

Z16 - Z27 = Model #/Tuning Revision - 12 bytes  
  
Manufacturer assigned model number and tuning number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable. Each manufacturer should include information concerning the changer tuning revision.

Z28 - Z29 = Software Version - 2 bytes  
  
Current software version. Must be sent in packed BCD.

Z30 - Z33 = Optional Features - 4 bytes  
  
Each of the 32 bits indicate an optional features availability. If the bit is set the feature is available. Bits should be sent in descending order, i.e. bit 31 is sent first and bit 0 is sent last. Currently defined options are:

b0 - Alternative Payout method. This method allows changer designs that determine change payout. That is, the payout algorithm may reside in the changer instead of the VMC.

- b1 - Extended Diagnostic command supported. This command allows the VMC to request diagnostic status of the coin changer.
- b2 - Controlled Manual Fill and Payout commands supported. These commands allows the VMC to request the number of coin inserted or dispensed while the changer was in a controlled manual fill or payback mode.
- b3 - File Transport Layer (FTL) supported as defined in Section 2.6.
- b4 - b31 Available for future use

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION COMMAND	0FH	01H FEATURE ENABLE	4 bytes: Y1 - Y4

This command is used to enable each of the optional features defined in Z30-Z33 above. To enable a feature a bit is set to one. **All optional features are disabled after reset.**

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND (Alternative Payout)	0FH	02H PAYOUT	Y1	None

Y1 = Value of coins to be paid out - 1 byte

This value is expressed as the number of coin scaling factors that would sum to the value. For example, in a USA system using a scaling factor of 05, if the change to be paid out is 75 cents, then Y1 will equal fifteen. That is, the sum of fifteen nickels equal 75 cents. The coin changer will determine which actual denominations of coins will be paid out. In the 75 cent example, the coins may be 3 quarters; or, 7 dimes & 1 nickel; or, 2 quarters & 2 dimes & 1 nickel, etc.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND (Alternative Payout)	0FH	03H PAYOUT STATUS	None	16 bytes: Z1-Z16

Z1 - Z16 = Number of each coin type paid out - 16 bytes

This is the changer's response to the last VMC Alternative PAYOUT command (0FH-02H). Bytes are sent in ascending order of coin types. A bytes position in the string indicates the coin type. That is, byte one is the number of coins for coin type 1, byte two is the number of coins for coin type two, and so on. Unsent bytes are assumed to be zero.

The changer clears payout data after an ACK response from the VMC.

The VMC should compare the value of the coins paid out to the (0FH-02H) Alternative PAYOUT command's Y1.

- NOTES:**
- 1) If the changer's payout is busy it will respond to the Alternative PAYOUT STATUS command with an ACK only.
  - 2) If no coins have been paid out, at least one zero valued data byte must be sent.
  - 3) There is no defined limit on how long the actual payout takes. See Note 2 under the DISPENSE (0DH) command.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>Changer Response Data</u>
EXPANSION COMMAND (Alternative Payout)	0FH	04H PAYOUT VALUE POLL	1 byte: Z1

Z1 = Changer Payout Activity - 1 byte

An interval value (scaled) which indicates the amount of paid out change since the previous PAYOUT VALUE POLL (or between the initial Alternative PAYOUT command (0FH-02H) and the first PAYOUT VALUE POLL).

An 00H response indicates no coins were paid out since the previous PAYOUT VALUE POLL (or the initial Alternative PAYOUT command (0FH-02H)).

An ACK only indicates that the change payout is finished. This should be followed by the PAYOUT STATUS command (0FH-03H) to obtain the complete payout data.

**NOTE:** The initial intent of this command is to determine the amount of change paid out so that the credit display can be decremented as coins are dispensed.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Changer Response Data</u>
EXPANSION COMMAND	0FH	05H SEND DIAGNOSTIC STATUS	2 bytes: Z1-Z2

**Send Current Diagnostic Status** - This command requests the changer to report its current state of operation. The VMC should periodically transmit the command approximately every 1 to 10 seconds.

**Z1-Z2** = Current changer diagnostic information

The changer reports its current state of operation in a 2 byte code. Z1 is the main code and Z2 is the sub-code. The code is reported as long as the condition exists and stops being reported as soon as the condition does not exist. Multiple 2 byte codes may be sent in response to a single command which could result in a maximum of eight 2 byte codes (16 bytes total).

The following tables identify the currently defined extended diagnostic codes:

Z1 / Z2	Status	Cause(s) of Status / Error
01 / 00	Powering up	Changer powering up / initialization
02 / 00	Powering down	Changer powering down
03 / 00	OK	Changer fully operational and ready to accept coins
04 / 00	Keypad shifted	MODE key pressed and held so that LED flashes indicating keypad in shifted state. Reverts to normal mode if no key pressed for 15 seconds
05 / 10	Manual Fill / Payout active	Manual Fill or Manual Payout mode of operation in progress (under control of the changer). This response must be reported at least once to allow the VMC to request a manual fill or manual payout report.
05 / 20	New Inventory Information Available	Changer not in Manual inventory mode, but new inventory information available.
06 / 00	Inhibited by VMC	All coin acceptance inhibited at request of VMC, possibly due to product dispenser jams, completely sold out, etc.
10 / Z2	General changer error	Z2 defined as: <b>00</b> Non specific error. <b>01</b> Check sum error #1. A check sum error over a particular data range of configuration field detected. <b>02</b> Check sum error #2. A check sum error over a secondary data range or configuration field detected. <b>03</b> Low line voltage detected. The changer has disabled acceptance or payout due to a low voltage condition.

Z1 / Z2	Status	Cause(s) of Status / Error
11 / Z2	Discriminator module error	Z2 defined as: 00 Non specific discriminator error. 10 Flight deck open. 11 Escrow Return stuck open. 30 Coin jam in sensor. 41 Discrimination below specified standard. 50 Validation sensor A out of range. The acceptor detects a problem with sensor A. 51 Validation sensor B out of range. The acceptor detects a problem with sensor B. 52 Validation sensor C out of range. The acceptor detects a problem with sensor C. 53 Operating temperature exceeded. The acceptor detects the ambient temperature has exceeded the changer's operating range, thus possibly affecting the acceptance rate. 54 Sizing optics failure. The acceptor detects an error in the sizing optics.
12 / Z2	Accept gate module error	Z2 defined as: 00 Non specific accept gate error. 30 Coins entered gate, but did not exit. 31 Accept gate alarm active. 40 Accept gate open, but no coin detected. 50 Post gate sensor covered before gate opened.
13 / Z2	Separator module error	Z2 defined as: 00 Non specific separator error 10 Sort sensor error. The acceptor detects an error in the sorting sensor.
14 / Z2	Dispenser module error	Z2 defined as: 00 Non specific dispenser error.
15 / Z2	Coin Cassette / tube module error	Z2 defined as: 00 Non specific cassette error. 02 Cassette removed. 03 Cash box sensor error. The changer detects an error in a cash box sensor. 04 Sunlight on tube sensors. The changer detects too much ambient light on one or more of the tube sensors.

## Diagnostic Status EVA-DTS Correlation

The Extended Diagnostic information reported may be used by the vending machine controller as desired (i.e., service mode displays); however, **EVA-DTS** data elements could also be used for reporting to a host system. Examples are:

- o Via a translation of the Z1/Z2 code to one of the **Fault Lists** as described in Section 10 of the **EVA-DTS**.
- o Via the EA201 Event Identification element with the format **EAXxyy** where xx = Z1 and yy = Z2.
- o Via a customer / manufacture specific coding scheme using the **MA5xx** fields.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Changer Response Data</u>
EXPANSION	0FH	06H	16 bytes Z1-Z16
COMMAND		SEND CONTROLLED MANUAL FILL REPORT	

**Send Controlled Manual Fill Report** - This command requests the changer to report the number of coins inserted during a changer controlled manual fill (controlled bulk fill) mode. While in this mode, the changer must not report coins inserted in response to the **POLL** command.

**Z1-Z16** = number of controlled manual mode filled coins (by coin type)

A single byte is reported for each coin type, 0 to 15. For example, Z1 = number of coins of coin type 0 added in a controlled manual fill mode. Any amount above 255 will be reported as 255, i.e. it will reach a maximum limit.

Only coin types *supported* are required to be reported. Counts for unspent coin types will be assumed to be unchanged.

**Notes:** After power on, changer reset, closing of the machine door, or a change in controlled manual fill status in the changer (changer indicated it was in controlled manual fill mode via CM0510 then changed to any other state) the machine should request the controlled manual coin fill data from the changer using the above command.

See EVA-DTS correlation at end of **SEND CONTROLLED MANUAL PAYOUT REPORT (0F-07H)** command.

VMC Command	Code	Sub-Command	Changer Response Data
EXPANSION	0FH	07H	16 bytes Z1-Z16
COMMAND	SEND CONTROLLED MANUAL PAYOUT REPORT		

**Send Controlled Manual Payout Report** - This command requests the changer to report the number of coins dispensed during a changer controlled manual payout (controlled bulk dispense) mode. Note that this does not include the coins dispensed via the individual dispense switches.

If the new Controlled Manual Fill / Payout command is implemented in the coin mech **and** enabled by the VMC (0Fh, 01h, bit 2 of Y1 to Y4), while in a controlled manual payout (dispense) mode, the changer **must not** report the coins paid out in response to the **POLL** command. Conversely, if the changer does not support the new command or the VMC does not enable it, the changer **should** report the coins paid out in response to the **POLL** command.

**Z1-Z16** = number of controlled manual mode dispensed coins (by coin type)

A single byte is reported for each coin type 0 to 15. For example, Z1 = number of coins of coin type 0 dispensed in a controlled manual payout mode. Any amount above 255 will be reported as 255, i.e. it will reach a maximum limit.

Only coin types supported are required to be reported. Counts for unspent coin types will be assumed to be unchanged.

**Note:** After power on, changer reset, closing of the machine door, or a change in controlled manual payout status in the changer (changer indicated it was in controlled manual payout mode via CM0510 then changed to any other state) the machine should request the controlled manual coin payout data from the changer using the above command.

## Controlled Manual Fill / Payout EVA-DTS Correlation

The controlled manual fill and payout coin information may be used by the vending machine controller as desired (i.e., service mode displays); however, **EVA-DTS** data elements could be used for reporting to a host system. Examples are:



	CA3XX	CA4XX	CA1704	CA1705
Controlled Manual Fill	0F06	n/a	0F06	n/a
VMC Tube Fill	VMC	n/a	VMC	n/a
Controlled Manual Payout	n/a	0F07*	n/a	0F07*
VMC Coin Payout	n/a	VMC	n/a	VMC
Manual Dispense Switches	n/a	0B	n/a	0B

\*If extended 0F06 & 0F07 commands are implemented.

If extended 0F06 & 0F07 commands are not implemented in the coin mech or not enabled by the VMC, the coin mech will respond to the POLL command with the controlled manual payout coins.

With the above, the CA3XX & CA4XX fields can continue to be the primary fields for cash audit and the CA1704 & CA1705 fields can be used for indicating controlled manually filled / dispensed coins.

### Coin Tube Audit Fields

As a reference, below are the agreed CA17XX data elements that provide detailed coin tube count information and controlled-manual coin tube insertion / dispense information. These were approved by the EVA - DTS Technical Sub Committee on January 27, 1997.

Block Identifier Reference	Data Contents	Characteristic	Length		Element
			Min	Max	
CA17	Coin Type Number (per MDB coin type)	N	01	03	CA1701
	Value of Coin	N	01	08	CA1702
	Number of Coins in Tube	N	01	08	CA1703
	Number of Coins Inserted during Controlled-Manual Fill	N	01	08	CA1704
	Number of Coins Dispensed during Controlled-Manual Payout	N	01	08	CA1705

**Definitions:**

**CA1701** The coin type number as referred to in the MDB Interface Specification. If not an MDB system, the number represents the coin's position in the coin set starting with the lowest value coin accepted. Note if two or more vintage of the same coin is accepted, the oldest one is first.

For example, the Canadian coin types may be:

0	Old Nickel	3	Quarter
1	New Nickel	4	\$1 Dollar
2	Dime	5	\$2 Dollar

**CA1702** The cash value of the coin (units base).

For example, the Canadian coin types would be:

Nickel	5	\$1 Dollar	100
Dime	10	\$2 Dollar	200
Quarter	25		

**CA1703** The number of coins in the coin tube (or tubes if multiple tubes per coin) that are reported by the coin mech during normal vending operations. Note that this is the "best known tube count" and may be inaccurate if coins were manually added or removed by hand.

**CA1704** The number of coins inserted while the changer was in a Controlled manual fill mode. Controlled manual fill indicates that the coins are being inserted under the control of the coin mech or VMC. Coins are not being loaded by hand through the tops of the tubes.

**CA1705** The number of coins dispensed while the changer was in a controlled manual payout mode. Controlled manual payout indicates that the coins are being dispensed under the control of the coin mech or VMC. Coins are not being removed by hand by "dumping" the tubes.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FAH FTL REQ TO RCV	Y1-Y5	Z1 - Zn (immediate or POLLed)

The VMC is requesting to receive data from the changer whose destination address will always be (08H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 =	Destination address of command (08H)
Y2 =	Source address of command
Y3 =	File ID
Y4 =	Maximum length
Y5 =	Control
Z1 =	1DH which indicates SEND BLOCK
Z2 =	Destination address of data
Z3 =	Block #
Z4 - Z34 =	Data (maximum of 31 bytes)
	or
Z1 =	1CH which indicates RETRY / DENY
Z2 =	Destination address of response
Z3 =	Source address of response (08H)
Z4 =	Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FBH FTL RETRY / DENY	Y1-Y3	None

The VMC is retrying, denying, or aborting a data transfer to/from the changer whose destination address will always be (08H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 =	Destination address of command (08H)
Y2 =	Source address of command
Y3 =	Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FCH FTL SEND BLOCK	Y1-Y33	None

The VMC is sending data to the changer whose destination address will always be (08H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 = Destination address of command & data (08H)  
 Y2 = Block #  
 Y3 - Y33 = Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FDH FTL OK TO SEND	Y1-Y2	Z1-Z34 (immediate or POLLed)

The VMC is indicating that it is OK for the changer to transfer data. The destination address will always be the changer (08H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 = Destination address of command (08H)  
 Y2 = Source address of command  
  
 Z1 = 1DH which indicates SEND BLOCK  
 Z2 = Destination address of data  
 Z3 = Source address of data  
 Z4 - Z34 = Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FEH FTL REQ TO SEND	Y1-Y5	Z1 (immediate or POLLed)

The VMC is requesting to send data to the changer whose destination address will always be (08H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 = Destination address of command (08H)  
 Y2 = Source address of command  
 Y3 = File ID  
 Y4 = Maximum length  
 Y5 = Control

Z1 = 1EH which indicates OK TO SEND  
 Z2 = Destination address of response  
 Z3 = Source address of response (08H)  
 or  
 Z1 = 1CH which indicates RETRY / DENY  
 Z2 = Destination address of response  
 Z3 = Source address of response (08H)  
 Z4 = Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Changer Response</u>
EXPANSION COMMAND	0FH	FFH DIAGNOSTICS	Y1-Yn	Z1-Zn

Y1 - Yn = Device manufacturer specific instruction for implementing various manufacturing or test modes. Y1 - Yn implies that any number of bytes can be used for the VMC data to the peripheral.

Z1 - Zn = Device manufacturer specific responses after receiving manufacturing or test instructions. Z1 - Zn implies that any number of bytes can be used for the changer response data from the peripheral.

## 5.4 Changer Non-Response Time

---

The maximum non-response time for the changer is two seconds.

## 5.5 Changer Power Requirements

---

The current draw for any changer must fall within the following limits. All measurements are at the minimum VMC Voltage Output.

Idle mode	=	200 mA. (max.) continuous
Coin acceptance	=	1.8 A. (max.) for up to 2 seconds (For coin changers using solenoid based payout mechanisms - typical of 3 tube changers sold in the US market. Vending machines sold into the US market are required to supply this power.)
		1.0A. (max.) for up to 2 seconds (For coin changers using motorized payout mechanisms - typical of 4 tube changers.)
Coin payout	=	3.6 A. (max.) for 100 mS. with 400 mS. idle current between pulses during the coin payout cycle. (For coin changers using solenoid based payout mechanisms - typical of 3 tube changers sold in the US market. Vending machines sold into the US market are required to supply this power.)
		1.8 A. (max.) during the coin payout cycle. (For coin changers using motorized payout mechanisms - typical of 4 tube changers.)

**See Note 2 under the DISPENSE (0DH) command for further information on the coin payout cycles.)**

Note: If both peripherals are supported, vending machines should be able to provide sufficient power to simultaneously supply the above power requirements for both the coin changer **Coin Acceptance** and bill validator **Bill Transport** as specified in Section 6.5.

## 5.6 Coin Acceptor/Changer Examples

Event	Exchange
Power up at VMC or JUST RESET received by VMC any other time without reset sequence	Reset sequence Enable sequence
Enter service mode	Disable sequence
Enter sales mode	Enable sequence
Consumer inserts coin	Coin Accept sequence
Credit acceptance is suspended (max. vend price achieved, free vend token accepted, etc.)	Disable sequence
Coins are dispensed	Disable sequence Dispense sequence Enable sequence
Error situation is detected at coin mech.	Error sequence
Manual dispense of coins at coin mech. (only while door is open)	Manual Dispense sequence
Manual filling of coins at coin mech.	Manual Filling sequence

Reset sequence		
VMC	Coin Mechanism	Comments
RESET	→	Reset command
	← ACK	
POLL	→	Allow peripheral to confirm RESET command
	← JUST RESET	
ACK	→	
STATUS	→	Collect operational parameters
	← COIN MECH. CONFIG.	
ACK	→	
EXPANSION/ID	→	Collect asset inf. and options list
	← COIN MECH. ID	
ACK	→	
EXPANSION/ FEATURE ENABLE	→	Enable compatible options
	← ACK	

Error sequence		
VMC	Coin Mechanism	Comments
POLL	→	
	← STATUS/ERROR	Error sent from coin mech.
ACK	→	

Enable sequence		
VMC		Coin Mechanism
TUBE STATUS	→	
	←	TUBE STATUS
ACK	→	
COIN TYPE ENABLE	→	
	←	ACK

Disable sequence		
VMC		Coin Mechanism
COIN TYPE ENABLE	→	
	←	ACK

Coin Accepted sequence		
VMC		Coin Mechanism
POLL	→	
	←	COINS DEPOSITED
ACK	→	

Coin dispense sequence		
VMC		Coin Mechanism
TUBE STATUS	→	
	←	TUBE STATUS
ACK	→	
DISPENSE	→	
	←	ACK
POLL	→	
	←	PAY OUT BUSY
ACK	→	
⋮		
POLL	→	
	←	ACK
TUBE STATUS	→	
	←	TUBE STATUS
ACK	→	
DISPENSE	→	
	←	ACK



Coin dispense sequence	Alternative pay out method	Coin Mechanism	Comments
VMC			
EXPANSION/ ALT. PAY OUT	→		Report value to be paid out
	←	ACK	
EXPANSION/ ALT. PAY OUT VALUE POLL	→		Request paid value
	←	VALUE PAID	"value" paid since last VALUE POLL (may be 00)
ACK	→		
	→		
EXPANSION/ ALT. PAY OUT VALUE POLL	→		Request paid value
	←	ACK	Pay out is complete
EXPANSION/ ALT. PAY OUT STATUS	→		Request pay out status
	←	COINS PAID	Itemization of coins paid
ACK	→		
TUBE STATUS	→		Update current tube status counters
	←	TUBE STATUS	
ACK	→		
	→		
<b>Manual dispense</b>	<b>sequence</b>	<b>Coin Mechanism</b>	<b>Comments</b>
VMC			
POLL	→		
	←	COINS DISPENSED MANUALLY	Number, type, and tube levels for coin just manually dispensed
ACK	→		
TUBE STATUS	→		Update current tube status counters
	←	TUBE STATUS	
ACK	→		

Manual fill VMC	sequence	Coin Mechanism	Comments
EXPANSION COMMAND (Send controlled manual fill report)	→		
	←	NUMBER OF CONTROLLED MANUAL MODE FILLED COINS	Number for coins manually filled, only possible, if the changer supports extended diagnostics and/or controlled manual filled and payout reports (at least b2 set in the options bytes)
ACK	→		
TUBE STATUS	→		Update current tube status counters
	←	TUBE STATUS	
ACK	→		

## Section 6

### *Bill Validator / Recycler*

### *VMC/Peripheral Communication Specifications*

#### 6.1 Introduction

This section defines the communication bytes sent and received between a Bill Validator / Recycler and the VMC. In the text below, all references to "bill validator" includes the optional bill recycler except where expressly noted.

As defined in Section 2.3, the bill validator's address is 00110xxxB (30H).

Unless stated otherwise, all information is assumed to be in a binary format.

There are currently two levels of support defined for the bill validator interface, Level 1 and Level 2. The level of bill validator operation is sent to the VMC in the response to the STATUS command (defined later in this section). The following paragraphs will define how a VMC should differentiate between each level.

##### **Level 1 Bill Validators**

Level 1 bill validators support all standard functions, but do not support any optional features.

##### **Level 2 Bill Validators**

Level 2 bill validators support all standard functions plus various optional features as defined in Section 6.3 under the Expansion command 37-02H. Based on the optional feature information the VMC will determine the appropriate operating mode (in other words, modes that both the bill validator and the VMC can support), enable any appropriate features by sending an appropriate feature enable command back to the bill validator, and enter the proper operating mode. This technique allows all VMCs and peripherals to accommodate existing feature capabilities and provides a means for upgrading Level 2 equipment.

Level 2 bill validator / recyclers will also support all standard functions plus the optional recycling feature as defined in Section 6.3 under the Expansion command 37-02H. Additional commands 37-03H through 37-09H allow control of the bill recycler. **The unit should NOT respond to any Recycler/Dispenser commands or send any Recycler POLL responses unless the Bill Recycler expansion commands are enabled by the VMC (b1=1) and the VMC has request the DISPENSER SETUP (37 03) command.**

## 6.2 VMC Commands

---

<u>Command</u>	<u>Hex Code</u>	<u>Description</u>
RESET	30H	Command for bill validator to self-reset.
SETUP *	31H	Request for bill validator setup information.
SECURITY	32H	Sets Validator Security Mode
POLL	33H	Request for Bill Validator activity Status.
BILL TYPE	34H	Indicates Bill Type enable or disable. Command is followed by set-up data. See command format.
ESCROW	35H	Sent by VMC to indicate action for a bill in escrow.
STACKER	36H	Indicates stacker full and the number of bills.
EXPANSION COMMAND	37H	Command to allow addition of features and future enhancements. Level 1 and above bill validators must support this command.

**NOTE:** The expansion command is always followed by a sub-command.

\* In Version 1.0 & 2.0, **SETUP** was called **STATUS**.

### 6.3 VMC Command Format

---

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
RESET	30H	No data bytes

This command is the vehicle that the VMC should use to tell the validator that it should return to its default operating mode. It should reject any bills in the validation process, return any bills in the escrow position, and disable all other activity until otherwise instructed by the VMC.

The following initialization sequence is recommended for all new VMCs designed after July, 2000. It should be used after "power up", after issuing the RESET command, after issuing the Bus Reset (pulling the transmit line "active" for a minimum of 100 mS), or anytime a POLL command results in a "JUST RESET" response (i.e., peripheral self resets).

**POLL – 33h**

To obtain "JUST RESET" response

**SETUP – 31h**

To obtain bill validator level and configuration information

**EXPANSION IDENTIFICATION – 37 00h (Level 01+)**

To obtain additional bill validator information

**EXPANSION IDENTIFICATION w/ OPTION BITS – 37 02h (Level 02+ only)**

To obtain additional bill validator information and options

**EXPANSION FEATURE ENABLE – 37 01h (Level 02+ only)**

To enable desired options

**STACKER – 36h**

To obtain stacker status and number of bills

**BILL TYPE – 34h**

To enable desired bill acceptance and desired bill escrow capability

<u>VMC Command</u>	<u>Code</u>	<u>Validator Response Data</u>
SETUP	31H	27 bytes: Z1 - Z27

Z1 = Bill Validator Feature Level - 1 byte  
Indicates current feature level of the bill validator. Currently defined levels are:

Level 1 - does not support option bits (Z1 = 01h)

Level 2 - supports option bits (Z1 = 02h)

Z2 - Z3 = Country / Currency Code - 2 bytes  
The packed BCD country / currency code of the bill validator can be sent in two different forms depending on the value of the left most BCD digit.

If the left most digit is a 0, the International Telephone Code is used to indicate the country that the validator is set-up for. For example, the USA code is 00 01H (Z2 = 00 and Z3 = 01).

If the left most digit is a 1, the latest version of the ISO 4217 numeric currency code is used (see Appendix A1). For example, the code for the US dollar is 18 40H (Z2 = 18 and Z3 = 40) and for the Euro is 19 78 (Z2 = 19 and Z3 = 78).

**All new designs after July, 2000 must use the ISO 4217 numeric currency codes as listed in Appendix A1.**

Z4 - Z5 = Bill Scaling Factor - 2 bytes  
All accepted bill values must be evenly divisible by this number. For example, this could be set to 0064H for the USA.

Z6 = Decimal Places - 1 byte  
Indicates the number of decimal places on a credit display. For example, this could be set to 02H for the USA.

Z7 - Z8 = Stacker Capacity - 2 bytes  
Indicates the number of bills that the stacker will hold. For example, 400 bill capacity = 0190H.

Z9 - Z10 = Bill Security Levels - 2 bytes  
Indicates the security level for bill types 0 to 15. Since not all validators support multiple security levels, validators that do not have this feature must report a "high" security level.

Z11 = Escrow/No Escrow - 1 byte  
 Indicates the escrow capability of the bill validator. If Z11 = 00H, the bill validator does not have escrow capability. If Z11 = FFH, the bill validator has escrow capability.

Z12 - Z27 = Bill Type Credit - 16 bytes  
 Indicates the value of the bill types 0 to 15. Values must be sent in ascending order. This number is the bill's monetary value divided by the bill scaling factor. Unused bill types are sent as 00H. Unsent bill types are assumed to be zero. FFH bills are assumed to be vend tokens.

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
SECURITY	32H	2 Bytes: Y1 - Y2

Y1 - Y2 = Bill Type(s) - 2 bytes

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Y1 Y2

A bit is set to indicate the type of bill(s) which are set to a "high" security level. Note that validators that do not support dual security levels should report a "high" security level in the response bytes Z9-Z10 to the STATUS (31H) command.

<u>VMC Command</u>	<u>Code</u>	<u>Validator Response Data</u>
--------------------	-------------	--------------------------------

POLL	33H	16 bytes: Z1 - Z16
------	-----	--------------------

Z1 - Z16 = Bill Validator Activity - 16 bytes

Indicates the validator activity, for example, the type and number of bills accepted, stacker position, recycler actions, or error conditions. If there is nothing to report, the validator should send only an ACK. Otherwise, the only valid responses are:

**Bills Accepted:**

Indicates the type and number of bills accepted, validator stacker status, or recycler status. The first four Bill Routing responses (yyy = 000 to 011) should be used to add or subtract credit. The last four Bill Routing responses (yyy = 100 to 111) are for audit information (EVS-DTS fields).

Z1  
(1yyyxxxx)

yyy	=	Bill Routing;	000: BILL STACKED
			001: ESCROW POSITION <sup>2</sup>
			010: BILL RETURNED
			011: BILL TO RECYCLER <sup>1</sup>
			100: DISABLED BILL REJECTED
			101: BILL TO RECYCLER – MANUAL FILL <sup>1,3</sup>
			110: MANUAL DISPENSE <sup>1</sup>
			111: TRANSFERRED FROM RECYCLER TO CASHBOX <sup>1</sup>

xxxx = Bill Type (0 to 15)

**Notes:**

1. These responses can only be sent if the Bill Recycler expansion commands are enabled by the VMC (b1=1) and the VMC has request the RECYCLER ENABLE (37 04) command.
2. A bill should not be considered secure unless the VMC gets the Bill Stacked or Bill To Recycler response.
3. If during manual fill mode a bill is put into the cashbox the validator/recycler must report a "BILL TO RECYCLER – MANUAL FILL" and "TRANSFERRED FROM RECYCLER TO CASHBOX".

(**Status** codes continued on next two pages)



<b>Status:</b>	<b>Bill Validator (Only)</b>
(00000001) =	Defective Motor <sup>3</sup> - One of the motors has failed to perform its expected assignment.
(00000010) =	Sensor Problem <sup>3</sup> - One of the sensors has failed to provide its response.
(00000011) =	Validator Busy <sup>2</sup> - The validator is busy and can not answer a detailed command right now.
(00000100) =	ROM Checksum Error <sup>3</sup> - The validators internal checksum does not match the calculated checksum.
(00000101) =	Validator Jammed <sup>3</sup> - A bill(s) has jammed in the acceptance path.
(00000110) =	Validator was reset <sup>1</sup> - The validator has been reset since the last POLL.
(00000111) =	Bill Removed <sup>1</sup> - A bill in the escrow position has been removed by an unknown means. A BILL RETURNED message should also be sent.
(00001000) =	Cash Box out of position <sup>3</sup> - The validator has detected the cash box to be open or removed.
(00001001) =	Validator Disabled <sup>2</sup> - The validator has been disabled, by the VMC or because of internal conditions.
(00001010) =	Invalid Escrow request <sup>1</sup> - An ESCROW command was requested for a bill not in the escrow position.
(00001011) =	Bill Rejected <sup>1</sup> - A bill was detected, but rejected because it could not be identified.
(00001100) =	Possible Credited Bill Removal <sup>1</sup> - There has been an attempt to remove a credited (stacked) bill.
	Note:
	- validators must have a means to disable this code due to potential older VMC issues.
	- virtually all VMCs designed prior to this code's introduction (10/16/02) will not support it.
	- It is a vending machine system issue as to what is done when this code is received.
(010xxxxx) =	Number of attempts to input a bill while validator is disabled. <sup>1</sup>

**NOTE:** The validator may send several of one type activity\* up to 16 bytes total.

- 1 Sent once each occurrence.
- 2 Sent once each POLL
- 3 Sent once each occurrence. The validator is then disabled until the condition is removed. Validator will respond with validator disabled until repaired or replaced.

\* Type activity is defined as Bills Accepted and Status. All may be combined in a response to a POLL command providing the total number of bytes does not exceed 16.

<b>Status:</b>	<b>Bill Recycler (Only)</b>
(00100001) =	Escrow request <sup>1</sup> - An escrow lever activation has been detected. If a button is present and activated.
(00100010) =	Dispenser Payout Busy <sup>2</sup> - The dispenser is busy activating payout devices.
(00100011) =	Dispenser Busy <sup>2</sup> - The dispenser is busy and can not answer a detailed command right now.
(00100100) =	Defective Dispenser Sensor <sup>4</sup> - The dispenser has detected one of the dispenser sensors behaving abnormally.
(00100101) =	Not Used
(00100110) =	Dispenser did not start / motor problem <sup>4</sup> .
(00100111) =	Dispenser Jam <sup>4</sup> - A dispenser payout attempt has resulted in jammed condition.
(00101000) =	ROM checksum error <sup>4</sup> - The dispensers internal checksum does not match the calculated checksum. (If separate from validator microprocessor.)
(00101001) =	Dispenser disabled – dispenser disabled because of error or bill in escrow position.
(00101010) =	Bill waiting <sup>2,5</sup> – waiting for customer removal
(00101011) =	Not Used
(00101100) =	Not Used
(00101101) =	Not Used
(00101110) =	Not Used
(00101111) =	Filled key pressed <sup>1</sup> – The VMC should request a new DISPENSER STATUS.

**NOTES:** The dispenser may send several of one type activity, up to 16 bytes total include both bill validator and bill recycler. This will permit zeroing counters such as inventory and status. These responses can only be sent if the Bill Recycler expansion commands are enabled by the VMC (b1=1) and the VMC has request the DISPENSER SETUP (37 03) command.

- 1 Sent once each occurrence.
- 2 Sent once each POLL
- 3 Not used
- 4 Sent once each occurrence. The dispenser is then internally disabled until the condition is removed. If the validator can still be used. Dispenser will respond with dispenser disabled until the condition is removed. If the failure affects both the validator and dispenser it will respond with both validator disabled and dispenser disabled until the condition is removed.
- 5 VMC must monitor this flag along with the PAYOUT VALUE POLL command (alternate Poll (33H) and Payout Status (37H-09H) commands) to determine when the recycler dispense operations are complete, or if a bill is in the inlet waiting for a customer to remove it.

**File Transport Layer POLLED responses:**

Note that all FTL responses are defined in Section 2.6. For the bill validator, the source address will always be the validator (30H) as defined in Section 2.3.

Z1

1B	REQ TO RCV	The bill validator is requesting to receive data from a device or VMC.
		Z2 = Destination address of response Z3 = Source address of response (30H) Z4 = File ID Z5 = Maximum length Z6 = Control
1C	RETRY/DENY	The bill validator is requesting a device or VMC to retry or deny the last FTL command.
		Z2 = Destination address of response Z3 = Source address of response (30H) Z4 = Retry delay
1D	SEND BLOCK	The bill validator is sending a block of data (maximum of 31 bytes) to a device or VMC.
		Z2 = Destination address of data Z3 = Block # Z4-Z34 = Data (maximum of 31 bytes)
1E	OK TO SEND	The bill validator is indicating that it is OK for the device or VMC to send it data.
		Z2 = Destination address of response Z3 = Source address of response (30H)
1F	REQ TO SEND	The bill validator is requesting to send data to a device or VMC.
		Z2 = Destination address of response Z3 = Source address of response (30H) Z4 = File ID Z5 = Maximum length Z6 = Control

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
BILL TYPE	34H	4 bytes: Y1 - Y4

Y1 - Y2 = Bill Enable - 2 bytes

Indicates what type of bills are accepted.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Y1 Y2

Bill types are 0 to 15. A bit is set to indicate acceptance of bill type.

**NOTE:** Sending 0000H disables the bill validator.

Y3 - Y4 = Bill Escrow Enable:

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Y3 Y4

Bill types are 0 to 15. A bit is set to indicate enable of escrow for a bill type.

**NOTE:** On power-up or reset all bill acceptance and escrow are disabled.

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
ESCROW	35H	1 byte: Y1

ESCROW

Y1 = Escrow status - 1 byte

If Y1 = 0;	Return bill in the escrow position.
If Y1 = xxxxxx1;	Stack the bill ("x" indicates don't care)

**NOTE:** After an ESCROW command the bill validator should respond to a POLL command with the BILL STACKED, BILL RETURNED, INVALID ESCROW or BILL TO RECYCLER message within 30 seconds. If a bill becomes jammed in a position where the customer may be able to retrieve it, the bill validator should send a BILL RETURNED message.

It is the responsibility of the VMC to stack or return any bills in escrow PRIOR to issuing the DISPENSE BILL or DISPENSE VALUE message. Leaving a bill in escrow position may lead to failed recycler operations.

<u>VMC Command</u>	<u>Code</u>	<u>Validator Response Data</u>
STACKER	36H	2 bytes: Z1 - Z2

Indicates stacker full condition and the number of bills in the stacker.

Z1            Z2

(Fxxxxxxx) (xxxxxxx)

F = 1 if stacker is full, 0 if not.

xxxxxxxxxxxxxx = The number of bills in the stacker.

### LEVEL ONE and TWO+ CAPABILITIES - EXPANSION COMMAND

In order to allow existing VMCs to operate with original Level 1 or new Level 2 bill validators, a separate identification sub-command has been introduced to handle the additional 4 bytes of Option Bit information.

The original sub-command 00H is used for obtaining Z1 to Z29 identification information from bill validators. This information includes the model number, serial number, software version, etc, but **not the option bits**. Note that if a Level 2+ bill validator is sent the 00H sub-command, it must **not** report the Z30 to Z33 option bytes.

Sub-command 01H is used for Level 2+ bill validators to enable option bits reported in the expansion command 02H sub-command below.

The new sub-command 02H is used for obtaining Z1 to Z33 identification information from Level 2+ bill validators. This information includes the model number, serial number, software version, etc, and the **option bits (Z30-Z33)**.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Validator Response Data</u>
EXPANSION COMMAND	37H	00H	29 bytes: Z1 - Z29
		LEVEL 1 IDENTIFICATION WITHOUT OPTION BITS	

Z1 - Z3 = Manufacturer Code - 3 bytes  
 Identification code for the equipment supplier. Sent as ASCII characters. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard**" (**EVA-DTS**), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".

- Z4 - Z15 = Serial Number - 12 bytes  
Factory assigned serial number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z16 - Z27 = Model #/Tuning Revision - 12 bytes  
Manufacturer assigned model number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z28 - Z29 = Software Version - 2 bytes  
Current software version. Must be sent in packed BCD.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION	37H	01H	4 bytes: Y1 - Y4
COMMAND	LEVEL 2+ FEATURE ENABLE		

This command is used to enable each of the Level 2+ optional features defined in the Level 2+ Identification response bytes Z30-Z33 below. To enable a feature a bit is set to one. **All optional features are disabled after reset.**

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Validator Response Data</u>
EXPANSION	37H	02H	33 bytes: Z1 – Z33
COMMAND	LEVEL 2+ IDENTIFICATION WITH OPTION BITS		

- Z1 - Z3 = Manufacturer Code - 3 bytes  
Identification code for the equipment supplier. Sent as ASCII characters. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard**" (**EVA-DTS**), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".
- Z4 - Z15 = Serial Number - 12 bytes  
Factory assigned serial number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z16 - Z27 = Model #/Tuning Revision - 12 bytes  
Manufacturer assigned model number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z28 - Z29 = Software Version - 2 bytes  
Current software version. Must be sent in packed BCD.
- Z30 - Z33 = Optional Features - 4 bytes

Each of the 32 bits indicate an optional features availability. If the bit is set the feature is available. Bits should be sent in descending order, i.e. bit 31 is sent first and bit 0 is sent last. Currently defined options are:

- b0 - File Transport Layer (FTL) supported as defined in Section 2.6.
- b1 - Bill Recycling supported
- b2 - b31 Available for future use

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Recycler Response Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	03H RECYCLER SETUP	2 bytes: Z1 – Z2

Z1 – Z2 = Bill Type Routing - 2 bytes

Indicates what bill types can be routed to the Recycler dispenser.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
Z1 Z2

Bit is set to indicate a bill type can be routed to the dispenser. Valid bill types are 0 to 15.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	04H RECYCLER ENABLE	19 bytes: Y1 – Y18

Y1 - Y2 = Manual Dispense Enable - 2 bytes

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
Y1 Y2

A bit is set to indicate manual dispense enable. For example, bit 2 is set to enable manual dispensing of bill type 2. This command enables/disables manual dispensing using optional inventory switches. All manual dispensing switches are automatically disabled upon reset.

Y3 – Y18 = Bills Recycler Enabled - 16 bytes

Indicates which bills will be routed to the Recycler:

- 0 = Bill type disable
- 1 = Only High quality bills are used
- 2 = Only High and Medium quality bills are used
- 3 = Use all possible bills (this is the recommended setting – the recycler will use its internal setting to determine what bill are put into the recycler)

Note: Y3 = Bill Type 0 while Y18 = Bill type 15

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Recycler Response Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	05H	34 bytes: Z1 – Z34
		BILL DISPENSE STATUS	

Z1 - Z2 = Dispenser Full Status - 2 bytes

Indicates status of dispenser for bill types 0 to 15.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Z1 Z2

A bit is set to indicate a full dispenser. For example, bit 7 = set would indicate the dispenser for bill type 7 is full.

Z3 – Z34 = Bill Count - 32 bytes

Indicates the greatest number of bills that the dispenser “knows” definitely are present in the dispenser. A word (2 bytes) position in the 32 byte string indicates the number of bills in a dispenser for a particular bill type. For example, the first 2 bytes sent indicate the number of bills in a dispenser for dispenser type 0. Unsent bytes are assumed to be zero. For dispenser counts greater than 65535, counts should remain at 65535.

**NOTE:** If a dispenser can detect a dispenser jam, defective dispenser sensor, or other malfunction, it will indicate the dispenser is "bad" by sending a dispenser full status and a count of zero for the malfunctioning bill type.



<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	06H DISPENSE BILL	3 bytes: Y1 – Y3

Y1 = Bill type to be dispensed

b7 b6 b5 b4 b3 b2 b1 b0

Bits b7, b6, b5, b4 = 0.

Bits b3, b2, b1, b0 indicate bill type to be dispensed.

Valid codes are 0H to FH to indicate bill types 0 to 15.

Y2 - Y3 = Number of bills to be dispensed of bill type defined in Y1

There is no defined limit on how long the actual dispense takes since the command allows for up to 65535 bills to be paid out. The payout cycle begins when the dispenser ACKs the VMC's DISPENSE BILL command. The VMC should wait at least 30 seconds per bill. If the VMC wants to stop the dispensing of bills it can send the CANCEL command.

The VMC must send the PAYOUT VALUE POLL message during the dispense operation to monitor payout, decrement the vendor display, and determine when the operation is complete. The VMC must also send the POLL command to determine if any bills are moved from the recycler to the cashbox or a bill is in the inlet waiting for a customer to remove it. After the dispense operation is complete the PAYOUT STATUS command must be sent to determine what bills were dispensed.

Only one payout operation (DISPENSE BILL or DISPENSE VALUE) may be active at one time. The bill validator is not expected to buffer additional dispense or payout commands while the current command is active. In addition, the VMC should not issue the DISPENSE BILL command if a bill is waiting to for customer removal or if any bills are in the escrow position.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	07H DISPENSE VALUE	2 bytes: Y1, Y2

Y1 – Y2 = Value of bills to be paid out.

Y1 and Y2 are defined as the total value of bills to be paid out. This value is expressed as the actual credit value divided by the bill scaling factor. For example, in a USA system using a scaling factor of 100 (64H), if the change to be paid out is \$15.00, then Y1 will equal 15. The bill dispenser will determine which actual denominations of bills will be paid out. In the

\$15.00 example, the bills may be 3 \$5 bills; or, 1 \$10 bill & 1 \$5 bill; or, 2 \$5 bills & 5 \$1 bills, etc. .

There is no defined limit on how long the actual dispense takes. The payout cycle begins when the dispenser ACKs the VMC's DISPENSE VALUE command. The VMC should wait at least 30 seconds per bill. If the VMC wants to stop the dispensing of bills it can send the CANCEL command.

The VMC must send the PAYOUT VALUE POLL message during the dispense operation to monitor payout, decrement the vendor display, and determine when the operation is complete. The VMC must also send the POLL command to determine if any bills are moved from the recycler to the cashbox or a bill is in the inlet waiting for a customer to remove it. After the dispense operation is complete the PAYOUT STATUS command must be sent to determine what bills were dispensed.

Only one payout operation (DISPENSE BILL or DISPENSE VALUE) may be active at one time. The bill validator is not expected to buffer additional dispense or payout commands while the current command is active. In addition, the VMC should not issue the DISPENSE BILL command if a bill is waiting to for customer removal or if any bills are in the escrow position.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Recycler Response Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	08H PAYOUT STATUS	32 bytes: Z1 – Z32

Z1 – Z32 = Number of each bill type paid out (2 bytes per bill type).

This is the dispenser's response to the last VMC DISPENSE BILL (37-06) or DISPENSE VALUE (37-07) command. Bytes are sent in ascending order of bill types. A byte's position in the string indicates the bill type. That is, bytes one and two are the number of bills for bill type 1, bytes three and four are the number of bills for bill type two, and so on. Unsent bytes above the bill types dispensed are assumed to be zero.

The dispenser clears payout data after an ACK response from the VMC.

The VMC should compare the value of the bills paid out to the VMC DISPENSE BILL (37-06) or DISPENSE VALUE (37-07) command.

**NOTES:** 1) If the dispenser's payout is busy it will respond to the PAYOUT STATUS command with an ACK only.

2) If no bills have been paid out, at least one zero valued data byte must be sent.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Recycler Response Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	09H PAYOUT VALUE POLL	2 bytes: Z1 – Z2

Z1 – Z2 = Dispenser Payout Activity - 2 bytes

An interval value (scaled) which indicates the amount of paid out bills since the previous PAYOUT VALUE POLL (or between the initial DISPENSE VALUE command and the first PAYOUT VALUE POLL).

A 00H response indicates no bills were paid out since the previous PAYOUT VALUE POLL (or the initial DISPENSE VALUE command).

An ACK only indicates that the bill payout is finished. This must be followed by the PAYOUT STATUS command to obtain the complete payout data.

**NOTE:** The initial intent of this command is to determine the amount of bills paid out so that the credit display can be decremented as bills are dispensed.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Recycler Response Data</u>
EXPANSION COMMAND (Bill Recycler)	37H	0AH PAYOUT CANCEL	None

**NOTE:** The Recycler should stop the active payout function within 30 seconds. The VMC must continue to send the PAYOUT VALUE POLL until it receives an ACK indicating the payout is complete. The VMC must then send the PAYOUT STATUS to determine what bill were dispensed.

The VMC MUST issue this command if it implements any type of payout timeout.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Validator Response</u>
EXPANSION COMMAND	37H	FAH FTL REQ TO RCV	Y1-Y5	Z1 (immediate or POLLed)

The VMC is requesting to receive data from the bill validator whose destination address will always be (30H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (30H)
- Y2 = Source address of command
- Y3 = File ID
- Y4 = Maximum length
- Y5 = Control

- Z1 = 1DH which indicates SEND BLOCK
- Z2 = Destination address of data
- Z3 = Block #
- Z4 - Z34 = Data (maximum of 31 bytes)  
or

- Z1 = 1CH which indicates RETRY / DENY
- Z2 = Destination address of response
- Z3 = Source address of response (30H)
- Z4 = Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Validator Response</u>
EXPANSION COMMAND	37H	FBH FTL RETRY / DENY	Y1-Y3	None

The VMC is retrying, denying, or aborting a data transfer to/from the bill validator whose destination address will always be (30H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (30H)
- Y2 = Source address of command
- Y3 = Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Validator Response</u>
EXPANSION COMMAND	37H	FCH FTL SEND BLOCK	Y1-Y33	None

The VMC is sending data to the bill validator whose destination address will always be (30H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command & data (30H)
- Y2 = Block #
- Y3 - Y33 = Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Validator Response</u>
EXPANSION	37H	FDH	Y1-Y2	Z1-Z34 (immediate or
COMMAND		FTL OK TO SEND		POLLed)

The VMC is indicating that it is OK for the bill validator to transfer data. The destination address will always be the validator (30H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (30H)
- Y2 = Source address of command
  
- Z1 = 1DH which indicates SEND BLOCK
- Z2 = Destination address of data
- Z3 = Source address of data
- Z4 - Z34 = Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Validator Response</u>
EXPANSION	37H	FEH	Y1-Y5	Z1 (immediate or
COMMAND		FTL REQ TO SEND		POLLed)

The VMC is requesting to send data to the bill validator whose destination address will always be (30H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (30H)
- Y2 = Source address of command
- Y3 = File ID
- Y4 = Maximum length
- Y5 = Control

- Z1 = 1EH which indicates OK TO SEND
- Z2 = Destination address of response
- Z3 = Source address of response (30H)  
or
- Z1 = 1CH which indicates RETRY / DENY
- Z2 = Destination address of response
- Z3 = Source address of response (30H)
- Z4 = Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>	<u>Val Response</u>
EXPANSION	37H	FFH	Y1-Yn	Z1 - Zn
COMMAND		DIAGNOSTICS		

Y1 - Yn = Device manufacturer specific instruction for implementing various manufacturing or test modes. Y1 - Yn implies that any number of bytes can be used for the VMC data to the peripheral.

Z1 - Zn = Device manufacturer specific responses after receiving manufacturing or test instructions. Z1 - Zn implies that any number of bytes can be used for the bill validator response data from the peripheral.

## 6.4 Bill Validator / Recycler Non-Response Time

The maximum non-response time for the bill validator is five seconds.

## 6.5 Bill Validator / Recycler Power Requirements

The current draw for any bill validator must fall within the following limits. All measurements are at the minimum VMC Voltage Output.

- Idle mode = 200 mA. (avg.) continuous
- Bill transport = 2.5 A. (max.) up to 30 seconds
- Bill dispense = 2.5 A. (max.) up to 30 seconds per bill

Note: If both peripherals are supported, vending machines should be able to provide sufficient power to simultaneously supply the above power requirements for both the bill validator **Bill Transport** and coin mechanism **Coin Acceptance** as specified in Section 5.5.

## 6.6 Bill Validator Examples

Event	Exchange
Power up at VMC or JUST RESET received by VMC any other time without reset sequence	Reset sequence Enable sequence
Mode switch activated, enter service mode	Disable sequence
Mode switch activated, enter sales mode	Enable sequence
Consumer inserts bill	Accept sequence
Bill in escrow position is stacked	Stack sequence
Bill in escrow position is returned	Return sequence
Error situation is detected at validator	Error sequence
Error situation is detected at validator/stacker	Stack control sequence
Bill dispense	Bill Dispense request
Value dispense	Value Payout request
Bill dispense with bill in escrow	Bill Dispense w/ Bill in Escrow
Value dispense with bill in escrow	Value Payout w/ Bill in escrow
Cancel dispense	Value Payout Cancelled
Multiple dispense	Multiple Dispense (or Payout) Requests

Reset sequence			
VMC		Bill Validator	Comments
RESET	→		Reset command
	←	ACK	
POLL	→		Allow peripheral to
	←	JUST RESET	confirm RESET command
ACK	→		
STATUS	→		Collect operational
	←	VALIDATOR CONFIG.	parameters
ACK	→		
SECURITY	→		Update bill security
	←	ACK	Levels (Optional)
EXPANSION/ID	→		Collect asset info.
	←	VALIDATOR ID	
ACK	→		
FEATURE ENABLE	→		
	←	ACK	
RECYCLER SETUP	→		If a recycler is available
	←	BILL ROUTING	
ACK	→		
RECYCLER ENABLE	→		If a recycler is available
	←	ACK	

Enable sequence		
Controller		Bill Validator
STACKER	→	
	←	BILL COUNT
ACK	→	
BILL TYPE ENABLE	→	
	←	ACK
Comments		
		Update stacker count
		Enable appropriate bill types

Disable sequence		
Controller		Bill Validator
BILL TYPE ENABLE	→	
	←	ACK
Comments		
		Disable all bill types

Error sequence		
Controller		Bill Validator
POLL	→	
	←	STATUS/ERROR
ACK	→	
Comments		
		Error sent from Bill validator

Accept sequence		Bill stacked		Comments
Controller		Bill Validator		
POLL	→			
	←	BILL ACCEPTED		Bill type and routing (ESCROW POSITION)
ACK	→			
	·			
	·			
ESCROW	→			Send bill to stacker
	←	ACK		
	·			
	·			
POLL	→			
	←	BILL ACCEPTED		Bill type and routing (BILL STACKED)
ACK	→			

Accept sequence		Bill returned		Comments
Controller		Bill Validator		
POLL	→			
	←	BILL ACCEPTED		Bill type and routing (ESCROW POSITION)
ACK	→			
	·			
	·			



Multi-Drop Bus / Internal Communication Protocol

ESCROW	→		Return bill to consumer
	←	ACK	
	·		
	·		
POLL	→		
	←	BILL ACCEPTED	Bill type and routing
ACK	→		(BILL RETURNED)
<b>Check stacker after</b>			
<b>Accept sequence</b>			
<b>Controller</b>		<b>Bill Validator</b>	
<b>Comments</b>			
POLL	→		
	←	BILL ACCEPTED	Bill type and routing
ACK	→		(BILL STACKED)
	·		
	·		
STACKER	→		Update stacker count
	←	BILL COUNT	
ACK	→		
BILL TYPE ENABLE	←		Disable all bill types, if stacker is full
	→	ACK	

Dispense Sequence			
Controller		Bill Validator	Comments
POLL	→		
	←	BILL WAITING	Inlet blocked, pending customer
ACK	→		
POLL	→		
	←	ACK	Inlet unblocked
DISPENSE BILL	→		Dispense # of bills
	←	ACK	
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		
	←	ACK	Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	·		
	·		
	·		
PAYOUT VALUE POLL	→		
	←	ACK	Payout Complete
PAYOUT STATUS	→		

ACK	←	BILLS PAID	Count of each bill type
BILL DISPENSE STATUS	→		
ACK	←	DISPENSER STATUS	Update Bill counts
ACK	→		

Value Payout Controller		Bill Validator	Comments
POLL	→		
	←	BILL WAITING	Inlet blocked, pending customer
ACK	→		
POLL	→		
	←	ACK	Inlet unblocked
DISPENSE VALUE	→		Dispense Value
	←	ACK	
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		
	←	ACK	Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	•		
	•		
	•		Repeat last 2 commands
PAYOUT VALUE POLL	→		
	←	ACK	Payout Complete
PAYOUT STATUS	→		
	←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→		
	←	DISPENSER STATUS	Update Bill counts
ACK	→		

Dispense Sequence w/ bill in escrow			
Controller		Bill Validator	Comments
POLL	→		
	←	BILL IN ESCROW	
ACK	→		
	•		
	•		
	•		
ESCROW	→		
	←	ACK	Return bill to consumer
	•		
	•		
	•		

Multi-Drop Bus / Internal Communication Protocol

POLL	→		
ACK	←	BILL ACCEPTED	Bill type and routing (BILL RETURNED)
POLL	→		
ACK	←	BILL WAITING	Inlet blocked, pending customer
POLL	→		
ACK	←	ACK	Inlet unblocked
DISPENSE BILL	→		Dispense # of bills
PAYOUT VALUE POLL	←	ACK	
ACK	→		
POLL	←	VALUE PAID	
ACK	→		
POLL	←	ACK	Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	•		
	•		
	•		Repeat last 2 commands
PAYOUT VALUE POLL	→		
ACK	←	ACK	Payout Complete
PAYOUT STATUS	→		
ACK	←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→		
ACK	←	DISPENSER STATUS	Update Bill counts
ACK	→		

Value payout w/ bill in escrow			
Controller		Bill Validator	Comments
POLL	→		
ACK	←	BILL IN ESCROW	
	→		
	•		
	•		
	•		
ESCROW	→		
ACK	←	ACK	Return bill to consumer
	→		
	•		
	•		
	•		
POLL	→		
ACK	←	BILL ACCEPTED	Bill type and routing (BILL RETURNED)
POLL	→		
ACK	←	BILL WAITING	Inlet blocked, pending customer

Multi-Drop Bus / Internal Communication Protocol

ACK	→		
POLL	→		
	←	ACK	Inlet unblocked
DISPENSE VALUE	→		Dispense value
	←	ACK	
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	←	ACK	
	•		Repeat last 2 commands
	•		
	•		
PAYOUT VALUE POLL	→		
	←	ACK	Payout Complete
PAYOUT STATUS	→		
	←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→		
	←	DISPENSER STATUS	Update Bill counts
ACK	→		

Operation Cancelled			
Controller		Bill Validator	Comments
	•		Payout or dispense in progress
	•		
	•		
PAYOUT CANCEL	→		
	←	ACK	Request to abort consumer
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	←	ACK	
	•		Repeat last 2 commands
	•		
	•		
POLL	→		
	←	ACK	Inlet unblocked
PAYOUT STATUS	→		
	←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→		
	←	DISPENSER STATUS	Update Bill counts
ACK	→		

Multiple Operations

Controller		Bill Validator	Comments
POLL	→		
	←	BILL WAITING	Inlet blocked, pending customer
ACK	→		
POLL	→		
	←	ACK	Inlet unblocked
DISPENSE BILL	→		Dispense # of bills
	←	ACK	
	•		
	•		
	•		
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		
	←	ACK	Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	•		
	•		
PAYOUT VALUE POLL	→		
	←	ACK	Payout Complete
PAYOUT STATUS	→		
	←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→		
	←	DISPENSER STATUS	Update Bill counts
ACK	→		
POLL	→		
	←	BILL WAITING	Inlet blocked, pending customer
ACK	→		
POLL	→		
	←	ACK	Inlet unblocked
DISPENSE BILL	→		Dispense # of bills
	←	ACK	
	•		
	•		
	•		
PAYOUT VALUE POLL	→		
	←	VALUE PAID	
ACK	→		
POLL	→		
	←	ACK	Inlet blocked, bill transferred from the recycler to the cashbox, or error code
	•		
	•		
	•		Repeat last 2 commands

PAYOUT VALUE POLL	→ ←	ACK	Payout Complete
PAYOUT STATUS	→ ←	BILLS PAID	Count of each bill type
ACK	→		
BILL DISPENSE STATUS	→ ←	DISPENSER STATUS	Update Bill counts
ACK	→		
POLL	→ ←	BILL WAITING	Inlet blocked, pending customer
ACK	→		
POLL	→ ←	ACK	Inlet unblocked

## Section 7

### Cashless Device(s)

### VMC/Peripheral Communication Specifications

#### 7.1 Introduction

This section defines the communications bytes sent and received between the cashless device(s) and the Vending Machine Controller (VMC). As defined in Section 2.3, there are two cashless device addresses; Cashless #1, 00010xxxB (10H) and Cashless #2, 11000xxxB (60H). The second address has been assigned to allow for two unique forms of cashless devices to be resident in the vending machine simultaneously. An example would be a card based system as Cashless Device #1 (10H) and a mobile phone based system as Cashless Device #2 (60H). **Everything defined in this section will be common to the two cashless devices – only the addresses will be different.**

Unless otherwise stated, all monetary values used by the cashless devices and the VMC will be sixteen bit (Level 01 & 02) or thirty-two bit (Level 03 if 32 bit option enabled), unsigned binary numbers. The numbers will be sent most significant byte first and scaled using the parameters provided by the cashless device's READER CONFIGURATION DATA response.

#### 7.2 State Definitions

MDB cashless devices may be viewed as state machines. These states are as follows:

- 1) Inactive
- 2) Disabled
- 3) Enabled
- 4) Session Idle
- 5) Vend
- 6) Revalue (Level 02/03 cashless devices)
- 7) Negative Vend (Level 03 cashless devices)

##### 7.2.1 Inactive

This is the state of the cashless device at power up or after a reset. While in the Inactive state, cashless devices will NOT be accepted for vending purposes. The cashless device cannot leave this state until all Setup information is received from the VMC.

##### 7.2.2 Disabled

The cashless device automatically enters this state from the Inactive state when it has received the Setup information specified in 7.4.1. It will also enter the Disabled state from the Enabled state when it receives the READER DISABLE command. While in the Disabled state, payment medias will NOT be accepted for vending purposes. The cashless device will remain in this state until either a READER ENABLE command is received (when it will enter the Enabled state) or a RESET is received (when it will enter the Inactive state). For power

management purposes, current consumption will not exceed idle mode specification during disabled state.

### **7.2.3 Enabled**

---

In this state, cashless devices may be used for MDB transactions. The cashless device will remain in this state until a valid payment media is read (when it will enter the Session Idle state), a READER DISABLE command is received (when it will return to the Disabled state) or a RESET is received (when it will enter the Inactive state).

When the device is enabled to operate in an “always idle” state, a request vend will directly enter the vend session, as well as a negative request vend will directly enter the negative vend request session. During enabled “always idle” state, the cashless device may although perform normal sessions starting with a BEGIN SESSION command – the VMC needs to accept both and should after detecting a BEGIN SESSION response act the whole session like “always idle” state disabled” temporarily.

### **7.2.4 Session Idle**

---

In the Enabled state, when a valid payment media is processed, the cashless device will issue a BEGIN SESSION response to a VMC POLL and enter the Session Idle state. This indicates that the cashless device is available for vending activities. The only structured exit from the Session Idle state is through the SESSION COMPLETE message from the VMC. The SESSION COMPLETE command will cause the cashless device to respond with an END SESSION message and enable/disable itself appropriately. Vend / Negative Vend / Revalue commands will cause the cashless device to leave the Session Idle state and enter the Vend / Negative Vend / Revalue state when products are selected and purchased.

### **7.2.5 Always Idle**

---

When the device is able to operate in an “Always Idle” state (enabled with the Optional Feature Bits of the EXPANSION Enable Options command), a VEND REQUEST from the Enabled state will directly enter the Vend state. Additionally, when the device is able to operate in an “Always Idle” state, a NEGATIVE VEND REQUEST will directly enter the Negative Vend Request state.

### **7.2.5 Vend**

---

This state is entered from the Session Idle state upon reception of a VEND REQUEST message from the VMC. The entire Vend state is an uninterruptable command/response sequence. The cashless device will return to the Session Idle state upon completion of this sequence.

### **7.2.6 Revalue (Level 02 / 03 Cashless Devices)**

---

This state is entered from the Session Idle state upon reception of a REVALUE REQUEST message from the VMC. The entire Revalue state is an uninterruptable command/response sequence. The cashless device will return to the Session Idle state upon completion of this sequence.



### 7.2.7 Negative Vend Request (Level 03 Cashless Devices)

This state is entered from the Session Idle state upon reception of a NEGATIVE VEND REQUEST message from the VMC. The entire Negative Vend Request state is an uninterruptable command/response sequence. The cashless device will return to the Session Idle state upon completion of this sequence.

### 7.3 Command Protocol

After the VMC has issued a command, no new commands may be issued until all data generated in response to that command has been received from the cashless device. The complete response may be an ACK only (e.g. the READER ENABLE command). Alternatively, it may consist of an informational response (e.g. READER CONFIGURATION DATA). The cashless device may provide an informational response in two ways. It may respond immediately with the requested data, or the cashless device may ACK the VMC command. If ACKed, the VMC must issue POLLS until the cashless device responds with the requested data, or until the Application Maximum Response Time (defined in READER CONFIGURATION response) has elapsed.

**The cashless device will define the currency type at the beginning of each session. The currency type will be used for all following transactions in that session. If the VMC does not support this currency type, it will end the session.**

Below are the uninterruptable VMC commands which require an informational cashless device response and their associated result:

VMC Command	Cashless Device Response	Result
SETUP/CONFIGURATION DATA =>	READER CONFIGURATION DATA	
EXPANSION/REQUEST ID =>	PERIPHERAL ID	
READER CANCEL =>	CANCELLED	
VEND REQUEST... VEND CANCEL =>	VEND DENIED*	
VEND REQUEST =>	VEND DENIED*	
VEND REQUEST =>	VEND APPROVED =>	VEND SUCCESS*
VEND REQUEST =>	VEND APPROVED =>	VEND FAILURE*
NEGATIVE VEND REQUEST =>	NEGATIVE VEND DENIED*	
NEGATIVE VEND REQUEST =>	NEGATIVE VEND APPROVED =>	NEGATIVE VEND SUCCESS*
NEGATIVE VEND REQUEST =>	NEGATIVE VEND APPROVED =>	NEGATIVE VEND FAILURE*
REVALUE REQUEST=>	REVALUE APPROVED/DENIED*	
SESSION COMPLETE =>	END SESSION	

\*These VEND / NEGATIVE VEND / REVALUE REQUEST response sequences constitute the Vend / Negative Vend / Revalue Request states.

Below are the uninterruptable POLLED cashless device which require an informational response from the VMC:

VMC Command & Data	Cashless Device Response	Result
POLL =>	DATA ENTRY REQUEST + DISPLAY REQUEST (optional)	
POLL =>	DATA ENTRY CANCEL	Cancelled
DATA ENTRY RESPONSE w/ FFs =>		Cancelled

Any command may be issued by the VMC at anytime providing the above command protocol is observed. There are four exceptions to this rule:

- 1) VEND REQUEST, REVALUE REQUEST, and NEGATIVE VEND REQUEST response sequences may only be initiated in the Session Idle state. In other words, the Cashless Device does not allow an "Always Idle" state unless enabled from setting the corresponding enable bit in the enable options command. If this option is enabled, the VEND REQUEST, the NEGATIVE VEND REQUEST, and the REVALUE REQUEST are allowed also during Enabled state.
- 2) The VMC may issue a VEND CANCEL command after issuing a VEND REQUEST, but before receiving a VEND APPROVED/DENIED response. In this case the cashless device will issue a VEND DENIED response to satisfy the original VEND REQUEST response requirement.
- 3) The cashless device may issue DISPLAY REQUESTs in response to POLLS at any time, if the VMC's display is available for use.
- 4) The RESET command is allowed at any time, it is not subject to any restrictions.

If a VMC command is received by the cashless device while it is in one of the preceding uninterruptable states, the following will occur:

The cashless device will ACK the offending command (no data response will be forthcoming). The cashless device will respond to the next poll with the "COMMAND OUT OF SEQUENCE" response (0BH).

**It should be pointed out to cashless device developers that a command out of sequence will always cause the VMC to issue a RESET command to the cashless device.**

### 7.3.1 Multi-Message Response Format

The multi-message response format permits the cashless device to send multiple messages in response to a single command or POLL. Because all messages are of a fixed length, there is no confusion determining where one message ends and the next message begins. (The total message length is subject to the 36 byte limit imposed by Section 2 of this standard.)

For example, if a cashless device fails to correctly write a payment media after a VEND REQUEST, it may need to report:

- 1) VEND DENIED
- 2) MALFUNCTION/ERROR subcode 07h
- 3) SESSION CANCEL REQUEST

The multi-message response (hex) would look like this:

06	0A 07	04	1B*
1	2	3	4

The first byte above (marked 1) is the VEND DENIED message. The next two bytes (marked 2) are the MALFUNCTION/ERROR message. The third and final message is the CANCEL SESSION REQUEST (marked 3). An eight bit checksum with the mode bit set (marked 4) finishes the message.

It is important to note that the controller must service the messages in the order in which they are received. This is necessary to ensure that command protocol is maintained.

### **7.3.2 Coin Mechanism Escrow Return Actions**

If present, the cashless device return button is controlled by the cashless device and it is the responsibility of the cashless device to terminate a vend sequence if the return button is pressed during a vend sequence.

The reaction of the VMC to the coin mechanism escrow return will vary depending upon the state of the system at the time it is pressed. If escrow return is allowed then a coin mechanism escrow return should be interpreted as VEND CANCEL or END OF SESSION.

- 1) In the Enabled state, the VMC should send a READER CANCEL command to the cashless device. This allows the user to abort a pre-approved on-line authorisation request.
- 2) In the Session Idle state, the VMC should send a SESSION COMPLETE command to the cashless device. This will return the cashless device to the Enabled state. The escrow return may cause the system to enter the revalue state prior to the VMC sending the "SESSION COMPLETE" command.
- 3) In the Vend state, before the cashless device has sent a VEND APPROVED or a VEND DENIED, the VMC should send a VEND CANCEL command to the cashless device. This will cancel the vend and cause the cashless device to refund the payment media if necessary.
- 4) In all other cases, no message is sent from the VMC to the cashless device.

TABLE 1: COMMANDS &amp; RESPONSES

Command	Code	Sub-command / Data	Response	VMC / Cashless Level Support
Reset	10H 60H	(none)	No Data *	(Level 01+)
Setup	11H 61H	00H - Config Data	01H - Reader Config Data	(Level 01+)
		01H - Max/Min Prices	No Data *	(Level 01+)
Poll	12H 62H	(none)	00H - Just Reset	(Level 01+)
			01H - Reader Config Data	(Level 01+)
			02H - Display Request	(Level 01+)
			03H - Begin Session	(Level 01+)
			04H - Session Cancel Request	(Level 01+)
			05H - Vend Approved	(Level 01+)
			06H - Vend Denied	(Level 01+)
			07H - End Session	(Level 01+)
			08H - Cancelled	(Level 01+)
			09H - Peripheral ID	(Level 01+)
			0AH - Malfunction / Error	(Level 01+)
			0BH - Cmd Out Of Sequence	(Level 01+)
			0DH - Revalue Approved	(Level 02+) (option)
			0EH - Revalue Denied	(Level 02+) (option)
			0FH - Revalue Limit Amount	(Level 02+) (option)
			10H - User File Data	(Level 02) **
			11H - Time/Date Request	(Level 02+) (option)
			12H - Data Entry Request	(Level 03+) (option)
			13H - Data Entry Cancel	(Level 03+) (option)
			14H - 1AH	(For Future Use)
			1BH - FTL REQ TO RCV	(Level 03+) (option)
			1CH - FTL RETRY / DENY	(Level 03+) (option)
			1DH - FTL SEND BLOCK	(Level 03+) (option)
1EH - FTL OK TO SEND	(Level 03+) (option)			
1FH - FTL REQ TO SEND	(Level 03+) (option)			
20H - FEH	(For Future Use)			
FFH - Diagnostic Response	(Level 01+)			
Vend	13H 63H	00H - Vend Request	05H - Vend Approved	(Level 01+)
			06H - Vend Denied	(Level 01+)

		01H - Vend Cancel	06H - Vend Denied	(Level 01+)
		02H - Vend Success	No Data *	(Level 01+)
		03H - Vend Failure	No Data *	(Level 01+)
		04H - Session Complete	07H - End Session	(Level 01+)
		05H - Cash Sale	No Data *	(Level 01+)
		06H - Negative Vend Request	05H - Vend Approved	(Level 03+) (option)
			06H - Vend Denied	(Level 03+) (option)
Reader	14H 64H	00H - Reader Disable	No Data *	(Level 01+)
		01H - Reader Enable	No Data *	(Level 01+)
		02H - Reader Cancel	08H - Cancelled	(Level 01+)
		03H - Data Entry Response	No Data *	(Level 03+) (option)
Revalue (option)	15H 65H	00H - Revalue Request	0DH - Revalue Approved	(Level 02+) (option)
			0EH - Revalue Denied	(Level 02+) (option)
		01H - Revalue Limit Request	0FH - Revalue Limit Amount	(Level 02+) (option)
			0EH - Revalue Denied	(Level 02+) (option)
Expansion	17H 67H	00H - Request ID	09H - Peripheral ID	(Level 01+)
		01H - Read User File	10H - User File Data	(Level 02) **
		02H - Write User File	No Data *	(Level 02) **
		03H - Write Time/Date (option)	No Data *	(Level 02+) (option)
		04H - Optional Feature Enabled	No Data	(Level 03+)
		FAH - FTL REQ TO RCV (option)	1DH - SEND BLOCK	(Level 03+) (option)
			1CH - RETRY / DENY	(Level 03+) (option)
		FBH - FTL RETRY / DENY (option)	No Data	(Level 03+) (option)
		FCH - FTL SEND BLOCK (option)	No Data	(Level 03+) (option)
		FDH - FTL OK TO SEND (option)	1DH - SEND BLOCK	(Level 03+) (option)
		FEH - FTL REQ TO SEND (option)	1EH - OK TO SEND	(Level 03+) (option)
			1CH - RETRY/DENY	(Level 03+) (option)
		FFH - Diagnostics	FFH - Diagnostic Response	(Level 01+)

\* No Data response = peripheral just responds with ACK or NAK

\*\* **Obsolete Command – Do not use for new designs. Use EXPANSION - Diagnostics.**

The term (option) indicates that the command/response is a feature enabled by option bits.

**NOTE:** Cashless device responses which are part of request / response sequences are listed more than once in the above table since the cashless device may respond either immediately to the request (within 5 milliseconds) or to a later POLL.

## 7.4 VMC/ Cashless Device Command/Response Formats

In the following section, the term "Reader" will indicate either Cashless Device #1 or #2.

### 7.4.1 Reset and Initialising

RESET (10H / 60H)
----------------------

#### Reader response:

No Data response

If this command is received by a cashless device it should terminate any ongoing transaction (with an appropriate credit adjustment, if appropriate), eject the payment media (if applicable), and go to the Inactive state.

All Level 02 and above VMCs must follow the RESET command with the following cashless device initializing sequence: (Any new Level 01 VMCs are recommended to follow the sequence.)

Note that the example shows commands for Cashless Device #1 (10H) only. They would be the same for Cashless Device #2 (address 60H).

#### POLL – 12h

To obtain "JUST RESET" response

#### SETUP CONFIGURATION DATA – 11 00h

To send the VMC's configuration data and obtain the cashless device's data

#### SETUP MAX/MIN PRICE – 11 01h

To send the maximum and minimum prices in the VMC. These prices must be sent as Level 01/02 16 bit credit.

#### EXPANSION REQUEST ID – 17 00h

To obtain additional cashless device information and options (options in Level 03+ only)

#### EXPANSION ENABLE OPTIONS – 17 04h (Level 03+ only)

To enable desired options

#### SETUP MAX/MIN PRICE – 11 01h (Level 03+ and option bits 1 & 2 only)

If 32 bit currency option and/or multi currency – multi lingual is enabled (i.e. bits 1 & 2 of expansion enable options), perform **SETUP MAX/MIN PRICE** again to get 32 bit credit and/or user currency – user language (this conditions will be known as EXPANDED CURRENCY MODE in the rest of the document).

#### READER ENABLE – 14 01h

To enable cashless device (if desired)

## 7.4.2 SETUP - Config Data

SETUP (11H / 61H)	Config Data (00H) Y1	VMC Feature Level Y2	Columns on Display Y3	Rows On Display Y4	Display Info Y5
----------------------	-------------------------------	-------------------------------	--------------------------------	-----------------------------	-----------------------

- Y1 :** Configuration data.  
VMC is sending its configuration data to reader.
- Y2 :** VMC Feature Level.  
Indicates the feature level of the VMC. The available feature levels are:
- 01** - The VMC is not capable or will not perform the advanced features as specified in Table 1: COMMANDS & RESPONSES following Section 7.3.2. The reader will not provide advanced information to the VMC, but can do the advanced features internally (transparently to the VMC). The reader has no reevaluation capability.
- 02** - The VMC is capable and willing to perform the advanced features as specified in Table 1: COMMANDS & RESPONSES following Section 7.3.2. The reader will provide advanced information to the VMC (if possible) and will not do the advanced features internally.
- 03** - The VMC is able to support level 02, but also supports some or all of the optional features listed in the EXPANSION ID command (i.e., file transfer, 32 bit credit, multi-currency / language features, negative vend, and / or data entry).
- Y3 :** Columns on Display. The number of columns on the display. Set to 00H if the display is not available to the reader.
- Y4 :** Rows on Display.  
The number of rows on the display
- Y5 :** Display Information – xxxxyyy  
 xxxxx = Unused  
 yyy = Display type  
 000 : Numbers, upper case letters, blank and decimal point.  
 001 : Full ASCII  
 010-111: Unassigned

### Reader Response:

Reader Config Data (01H) Z1	Reader Feature Level Z2	Country Code High Z3	Country Code Low Z4	Scale Factor Z5	Decimal Places Z6	Application Maximum Response Time Z7	Miscellaneous Options Z8
---	----------------------------------	-------------------------------	------------------------------	-----------------------	-------------------------	--	--------------------------------

- Z1 :** READER - Configuration data.  
Indicates the payment media reader is responding to a SETUP – Configuration data request from the VMC.



**Z2 :** Reader Feature Level.

Indicates the feature level of the reader. Currently feature levels are:

- 01** - The reader is not capable or will not perform the advanced features as specified in Table 1: COMMANDS & RESPONSES following Section 7.3.2. The reader will not provide advanced information to the VMC, but can do the advanced features internally (transparently to the VMC). The reader has no revaluation capability.
- 02** - The reader is capable and willing to perform the advanced features as specified in Table 1: COMMANDS & RESPONSES following Section 7.3.2. The reader will provide advanced information to the VMC (if possible) and will not do the advanced features internally.
- 03** - The reader is able to support level 02, but also supports some or all of the optional features listed in the EXPANSION ID command (i.e., file transfer, 32 bit credit, multi-currency / language features, negative vend, and / or data entry).

**Z3-Z4 :** Country / Currency Code - packed BCD.

The packed BCD country / currency code of the reader can be sent in two different forms depending on the value of the left most BCD digit.

If the left most digit is a 0, the International Telephone Code is used to indicate the country that the reader is set-up for. For example, the USA code is 00 01H (Z3 = 00 and Z4 = 01).

If the left most digit is a 1, the latest version of the ISO 4217 numeric currency code is used (see Appendix A1). For example, the code for the US dollar is 18 40H (Z2 = 18 and Z3 = 40) and for the Euro is 19 78 (Z3 = 19 and Z4 = 78). Use FFFFh if the country code is unknown.

For level 3 cashless devices, it is mandatory to use the ISO 4217 numeric currency code (see Appendix A1).

**Z5 :** Scale Factor.

The multiplier used to scale all monetary values transferred between the VMC and the reader.

**Z6 :** Decimal Places.

The number of decimal places used to communicate monetary values between the VMC and the payment media reader.

All pricing information sent between the VMC and the payment media reader is scaled using the scale factor and decimal places. This corresponds to:

$$\text{ActualPrice} = P \cdot X \cdot 10^{-Y}$$

where P is the scaled value send in the price bytes, and X is the scale factor, and Y is the number of decimal places. For example if there are 2 decimal places and the scale factor is 5, then a scaled price of 7 will mean an actual of 0.35.

- Z7 :** Application Maximum Response Time - seconds.  
 The maximum length of time a reader will require to provide a response to any command from the VMC. The value reported here supercedes the payment reader's default NON-RESPONSE time defined in section 7.5 if the value reported here is greater. (See Section 7.5)
- Z8 :** Miscellaneous Options – xxxxyyyy  
 xxxx: Unused (must be set to 0)  
 yyyy: Option bits  
 b0=0: The payment media reader is NOT capable of restoring funds to the user's payment media or account. Do not request refunds.  
 b0=1: The payment media reader is capable of restoring funds to the user's payment media or account. Refunds may be requested.  
 b1=0: The payment media reader is NOT multivend capable. Terminate session after each vend.  
 b1=1: The payment media reader is multivend capable. Multiple items may be purchased within a single session.  
 b2=0: The payment media reader does NOT have a display.  
 b2=1: The payment media reader does have its own display.  
 b3=0: The payment media reader does NOT support the VEND/CASH SALE subcommand.  
 b3=1: The payment media reader does support the VEND/CASH SALE subcommand.  
 b4-b7=0 **Any future options must be covered by the EXPANSION COMMAND option bits.**

### 7.4.3 SETUP – Max / Min Prices

SETUP (11H / 61H)	Max / Min Prices (01H) Y1	Maximum Price Y2-Y3	Minimum Price Y4-Y5
----------------------	------------------------------------	---------------------------	---------------------------

#### Level 01 / 02 / 03 Readers

- Y1 :** Max / Min prices  
 Indicates the VMC is sending the price range to the reader.
- Y2 - Y3 :** Maximum Price – scaled  
 This information should be sent as soon as the VMC prices have been established and any time there is a change in the maximum price, If the VMC does not know the maximum price, FFFFh should be sent.
- Y4 -Y5 :** Minimum Price – scaled  
 This information should be sent as soon as the VMC prices have been established and any time there is a change in the minimum price. If the VMC does not know the minimum price, 0000h should be sent.

SETUP (11H / 61H)	Max / MinPrices (01H) Y1	Maximum Price Y2-Y5	Minimum Price Y6-Y9	Currency Code Y10-Y11
----------------------	-----------------------------------	---------------------------	---------------------------	-----------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

- Y1 :** Max / Min prices  
Indicates the VMC is sending the price range to the reader.
- Y2 – Y5 :** Maximum Price – scaled  
This information should be sent as soon as the VMC prices have been established and any time there is a change in the maximum price. If the VMC does not know the maximum price, FFFFFFFFh should be sent.
- Y6 – Y9 :** Minimum Price – scaled  
This information should be sent as soon as the VMC prices have been established and any time there is a change in the minimum price. If the VMC does not know the minimum price, 00000000h should be sent.
- Y10-Y11** Currency Code  
The currency code used during this command per ISO 4217 (see Appendix A1). The value is configured as packed BCD with the leading digit a 1 (one). For example, the code for the US dollar would be 1840 (Z10 = 18 and Z11 = 40), and for the Euro is 1978 (Z10 = 19 and Z11 = 78).

**Reader response:**

No Data response

**7.4.4 POLL**

POLL (12H / 62H)
---------------------

The POLL command is used by the VMC to obtain information from the payment media reader. This information may include user actions (CANCEL SESSION REQUEST), hardware malfunctions (MALFUNCTION /ERROR), software malfunctions (COMMAND OUT OF SEQUENCE) or information explicitly requested by the controller (READER CONFIGURATION DATA). An ACK response indicates that no error states exist, and either no information request is pending or pending information is not yet ready for transmission.

In addition to an ACK, the VMC may receive the following POLL responses from the payment media reader.

**Reader responses:**

Just Reset (00H) Z1
------------------------------

**Z1 :** JUST RESET  
 Indicates the payment media reader has been reset.  
*Note:* the difference between ACK and JUST RESET responses is:  
 00H 00H\* =JUST RESET  
 00H\* =ACK  
 \*mode bit=1

Reader Config Info (01H) Z1	Reader Feature Level Z2	Country Code High Z3	Country Code Low Z4	Scale Factor Z5	Decimal Places Z6	Application Maximum Response Time Z7	Miscellaneous Options Z8
---	----------------------------------	-------------------------------	------------------------------	-----------------------	-------------------------	--	--------------------------------

See paragraph 7.4.2 for a detailed explanation of this response.

Display Request (02H) Z1	Display Time Z2	Display Data Z3-Z34
-----------------------------------	-----------------------	---------------------------

**Z1 :** DISPLAY REQUEST  
 The payment media reader is requesting a message to be displayed on the VMC's display.

**Z2 :** Display Time - 0.1 second units  
 The requested display time. Either the VMC or the payment media reader may overwrite the message before the time has expired.

**Z3-Z34 :** Display Data – ASCII  
 The message to be displayed. Formatting (leading and/or trailing blanks) is the responsibility of the payment media reader.

The number of bytes must equal the product of Y3 and Y4 up to a maximum of 32 bytes in the setup/configuration command.

Begin Session (03H)	Funds Available
Z1	Z2-Z3

**Level 01 Readers**

- Z1 :** BEGIN SESSION (level 01 readers)  
Allow a patron to make a selection, but do not dispense product until funds are approved.
- Z2-Z3 :** Funds Available – scaled
  - a. Lesser of the user’s payment media or account balance or FFFEh units.
  - b. Not yet determined - FFFFh. (Allows selection without displaying balance)

Begin Session (03H)	Funds Available	Payment media ID	Payment Type	Payment Data
Z1	Z2-Z3	Z4-Z7	Z8	Z9-Z10

**Level 02 / 03 Readers**

- Z1 :** BEGIN SESSION (level 02/03 readers)  
Allow a patron to make a selection, but do not dispense product until funds are approved.
- Z2-Z3 :** Funds Available – scaled
  - a. Lesser of the user’s payment media or account balance or FFFEh units.
  - b. Not yet determined - FFFFh. (Allows selection without displaying balance)
- Z4-Z7 :** Payment media ID.  
00000000h-FFFFFFFeh=Payment media identification number.  
FFFFFFFh = unknown payment media ID.
- Z8 :** Type of payment:
  - 00xxxxxb = normal vend card (refer EVA-DTS Standard, Appendix A.1.1 Definitions)
  - x1xxxxxb = test media
  - 1xxxxxb = free vend card
  - xx000000b -0 VMC default prices.
  - xx000001b -1 User Group (Z9 = EVA-DTS Element DA701)  
Price list number (Z10 = EVA-DTS Element LA101)\*
  - xx000010b -2 User Group (Z9 = EVA-DTS Element DA701)  
Discount group index (Z10 = EVA-DTS Element MA403)
  - xx000011b -3 Discount percentage factor (Z9=00, Z10 = 0 to 100\*\*, report as positive value in EVA-DTS Element MA404)

xx000100b -4 Surcharge percentage factor (Z9=00, Z10 = 0 to 100\*\*, report as negative value in EVA-DTS Element MA404)

\* User Group is a segmentation of all authorized users. It allows selective cost allocation. A User Group usually has no direct relation to a price list.  
 Price Lists are tables of prices. Each Price List contains an individual price for each product.  
 Discount Group indicates the Price List on which the Percentage Factor will be applied.  
 If the User Group, the Price List or Discount Group is unknown by the VMC, the normal prices are used (Z8 is defaulted to 00h).  
 Minimum value for Z9 and Z10 is 0.

\*\* Percentages are expressed in binary (00 to 64h)

Note:

These functions may NOT be supported by all VMCs.

**Z9-Z10 :** Payment data as defined above.

Begin Session (03H)	Funds Available	Payment media ID	Payment Type	Payment Data	User Language	User Currency Code	Card Options
Z1	Z2-Z5	Z6-Z9	Z10	Z11-Z12	Z13-Z14	Z15-Z16	Z17

**Level 03 (EXPANDED CURRENCY MODE) Readers**

**Z1 :** BEGIN SESSION (level 03 readers / EXPANDED CURRENCY MODE)  
 Allow a patron to make a selection, but do not dispense product until funds are approved.

**Z2-Z5 :** Funds Available – scaled  
 a. Lesser of the user’s payment media or account balance or FFFFFFFEh units.  
 b. Not yet determined - FFFFFFFFh.

**Z6-Z9 :** Payment media ID.  
 00000000h-FFFFFFFEh=Payment media identification number.  
 FFFFFFFFh = unknown payment media ID.

**Z10 :** Type of payment:  
 00xxxxxb = normal vend card (refer EVA-DTS Standard, Appendix A.1.1 Definitions)  
 x1xxxxxb = test media  
 1xxxxxb = free vend card  
 xx000000b -0 VMC default prices.

xx000001b	-1 User Group	(Z11 = EVA-DTS Element DA701)
	Price list number	(Z12 = EVA-DTS Element LA101)*
xx000010b	-2 User Group	(Z11 = EVA-DTS Element DA701)
	Discount group index	(Z12 = EVA-DTS Element MA403)
xx000011b	-3 Discount percentage factor	(Z11=00, Z12 = 0 to 100**, report as positive value in EVA-DTS Element MA404)
xx000100b	-4 Surcharge percentage factor	(Z11=00, Z12 = 0 to 100**, report as negative value in EVA-DTS Element MA404)

\* User Group is a segmentation of all authorized users. It allows selective cost allocation. A User Group usually has no direct relation to a price list.

Price Lists are tables of prices. Each Price List contains an individual price for each product.

Discount Group indicates the Price List on which the Percentage Factor will be applied.

If the User Group, the Price List or Discount Group is unknown by the VMC, the normal prices are used (Z10 is defaulted to 00h).

Minimum value for Z11 and Z12 is 0.

\*\* Percentages are expressed in binary (00 to 64h)

Note:

These functions may NOT be supported by all VMCs.

**Z11-Z12:** Payment data as defined above.

**Z13-Z14** User language to use during this session (2 ASCII characters per ISO 639:latest version). The user language is read from the patrons card and, if supported, should be used instead of the VMC default language (taken according to the setup command International Telephone code) up to the next "session complete". If the VMC is not able to support this language, the default setting should be used.

**Z15-Z16** User currency code to use during this session per ISO 4217 (see Appendix A1). The value is configured as packed BCD with the leading digit a 1 (one). For example, the code for the US dollar would be 1840 (Z15 = 18 and Z16 = 40). and for the Euro is 1978 (Z6 = 19 and Z7 = 78).

**Z17** Card options (overrides any previous default settings for reader)

b0=0: The VMC displays the credit if it is programmed to do so

b0=1: The VMC **must not display** the credit (privacy purpose – user option)

b1=0: The actual inserted patrons card has no refund capability

b1=1: The actual inserted patrons card has refund capability (Note: a reader with refund capability may be used with both type of cards)

b2=0 The actual inserted patrons card has no revalue capability

b2=1 The actual inserted patrons card has revalue & negative vend

capability  
 b3-b7: Reserved for future extensions (unused bits must be set to 0)

Refund means the ability to put money back on the inserted patrons card up to the value of the last transaction. Revalue means the ability to put money back on the inserted patrons card up to any value.

The card reader will define the currency type at the beginning of each card session. **The currency type will be used for all following transactions in that session. If the VMC does not support this currency type, it will end the session.**

Session Cancel Request (04H) Z1
--

**Z1 :** SESSION CANCEL REQUEST  
 The payment media reader is requesting the VMC to cancel the session. The VMC should initiate an eventual SESSION COMPLETE. This response is sent to the VMC whenever the payment media is removed or a request for removal from the reader is made by the user (e.g. if a return button on the reader is pressed).

Vend Approved (05H) Z1	Vend Amount  Z2-Z3
---------------------------------	-----------------------------

**Level 01 / 02 / 03 Readers**

Refer to paragraph 7.4.5 for detailed explanation.

Vend Approved (05H) Z1	Vend Amount  Z2-Z5
---------------------------------	-----------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

Refer to paragraph 7.4.5 for detailed explanation.

Vend Denied (06H) Z1
-------------------------------



Refer to paragraph 7.4.5 for detailed explanation.

End Session (07H) Z1
-------------------------------

Refer to paragraph 7.4.9 for detailed explanation.

Cancelled  (08H) Z1
------------------------------

Refer to paragraph 7.4.14 for detailed explanation.

Peripheral ID (09H)	Manufacturer Code	Serial Number	Model Number	Software Version
Z1	Z2-Z4	Z5-Z16	Z17-Z28	Z29-Z30

**Level 01 / 02 / 03 Readers (If VMC indicates Level 01 or 02)**

- Z1 :** PERIPHERAL ID  
Reader is sending peripheral ID information.
- Z2 - Z4 :** Manufacturer Code - ASCII  
Identification code for the equipment supplier. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard'** (EVA-DTS), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".
- Z5-Z16 :** Serial Number – ASCII  
Factory assigned serial number.
- Z17-Z28 :** Model Number - ASCII  
Manufacturer assigned model number.
- Z29-Z30 :** Software Version - packed BCD  
Current software version.

Peripheral ID (09H)	Manufacturer Code	Serial Number	Model Number	Software Version	Optional Feature bits
Z1	Z2-Z4	Z5-Z16	Z17-Z28	Z29-Z30	Z31 - Z34

**Level 03 Readers (If VMC indicates Level 03)**

- Z1 :** PERIPHERAL ID

Reader is sending peripheral ID information.

- Z2 - Z4 :** Manufacturer Code - ASCII  
Identification code for the equipment supplier. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard'** (EVA-DTS), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".
- Z5-Z16 :** Serial Number – ASCII  
Factory assigned serial number.
- Z17-Z28 :** Model Number - ASCII  
Manufacturer assigned model number.
- Z29-Z30 :** Software Version - packed BCD  
Current software version.
- Z31- Z34** Optional Feature Bits. Each of the 32 bits indicate an optional feature availability. Bits should be sent in descending order, i.e. bit 31 is sent first and bit 0 is sent last. Options **must be enabled by the VMC** using the Expansion Optional Feature Bit Enable (17H-04H) command and **all features are disabled after a reset**. Currently defined options are:

- b0 - File Transport Layer supported
- b1 - 0 = 16 bit monetary format, 1 = 32 bit monetary format
- b2 – support multi currency / multi lingual
- b3 – allow Negative Vend
- b4 – allow data entry
- b5 – allow "Always Idle" state
- b6 to b31 not used (should be set to 0)

Note: If 32 bit monetary format (b1) and or multi currency / multi lingual (b2) options are enabled, this condition will be known as **EXPANDED CURRENCY MODE** in the rest of the document.

Malfunction / Error	Error Code
(OAH) Z1	Z2

- Z1 :** MALFUNCTION/ERROR  
The payment media reader is reporting a malfunction or error.
- Z2 :** Error Code -- xxxxyyyy  
  - xxxx error types
  - 0000: Payment media Error1
  - 0001: Invalid Payment media1
  - 0010: Tamper Error1
  - 0011: Manufacturer Defined Error1

0100:	Communications Error2
0101:	Reader Requires Service2
0110:	Unassigned2
0111:	Manufacturer Defined Error2
1000:	Reader Failure3
1001:	Communications Error3
1010:	Payment media Jammed3
1011:	Manufacturer Defined Error
1100:	Refund error – internal reader credit lost
1101-1111:	Unassigned

- 1 Transient error - Reported once
- 2 Non-transient error - Reported every POLL until cleared. Reader still functional.
- 3 Non-transient error - Reported every POLL until cleared. Reader not presently functional.

yyyy = Manufacturer defined subcode

**Transient Error Handling**

The error will be reported to the VMC until it has been ACKnowledged. The error state will be cleared in the reader, and normal operations will continue.

**Non-transient Error Handling**

The error will be reported to the VMC at each POLL as long as it exists. If the reader is still functional, multi-message responses will allow normal responses in addition to the error report.

**Note:** Refund error is sent from the media reader when it is not able to refund money to the payment media following a failed or cancelled vend. The reader internally cancels the credit and the credit is lost.

Command  
Out of  
Sequence  
(OBH)  
Z1

**Level 01 Readers**

**Z1 :** COMMAND OUT OF SEQUENCE (Level 01 readers)  
The payment media reader has received a command that is not executable in its current state, or that violates one of the uninterruptable sequences. The offending command should be ACKed but not acted upon the reader. The VMC will send the RESET command to the reader upon reception of this response. Note that the reader will continue with

any credit update process prior to resetting.

Command Out of Sequence (OBH) Z1	Status    Z2
--	--------------------------

**Level 02 / 03 Readers**

- Z1 :** COMMAND OUT OF SEQUENCE. (Level 02/03 readers)  
The payment media reader has received a command that is not executable in its current state, or that violates one of the uninterruptable sequences. The offending command should be ACKed but not acted upon the reader. The VMC will send the RESET command to the reader upon reception of this response. Note that the reader will continue with any credit update process prior to resetting.
- Z2 :** Status  
The state of the payment media reader.
  - 01: Inactive state
  - 02: Disabled state
  - 03: Enabled state
  - 04: Session idle state
  - 05: Vend state
  - 06: Revalue state
  - 07: Negative Vend state

Revalue Approved (ODH) Z1
------------------------------------

**Level 02 / 03 Readers**

Refer to paragraph 7.4.16 for detailed explanation.

Revalue Denied (OEH) Z1
----------------------------------

**Level 02 / 03 Readers**

Refer to paragraph 7.4.16 for detailed explanation.

Revalue	Revalue
---------	---------

Limit Amount (OFH)	Limit Amount
Z1	Z2-Z3

**Level 02 / 03 Readers**

Refer to paragraph 7.4.17 for detailed explanation.

Revalue Limit Amount (0FH) Z1	Revalue Limit Amount Z2-Z5
--	----------------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

Refer to paragraph 7.4.17 for detailed explanation.

User File Data (10H) Z1	Number of User File Z2	Length Of User File Z3	User Data Z4-Zn
----------------------------------	------------------------------	------------------------------	-----------------------

**Level 02 Readers**

Obsolete Response – Do not use for new designs!! (Use EXPANSION – Diagnostics)

Refer to paragraph 7.4.19 for detailed explanation.

Time/Date Request (11H) Z1
-------------------------------------

**Level 02 / 03 Readers**

- Z1 :** TIME DATE REQUEST  
In certain circumstances it will be necessary to synchronize the real time clock of the card reader with real time clock of the VMC. The card reader will respond with TIME/DATE REQUEST to a POLL command of the VMC. The VMC will follow with the EXPANSION-WRITE TIME/DATE FILE to the card reader. Refer to paragraph 7.4.19.

Data Entry Request Response (12H) Z1	Data Entry Length and Repeat Bit Z2
---	--

**Level 03 Readers** (if Data Entry option enabled)

- Z1 :** DATA ENTRY REQUEST  
The reader is making a DATA ENTRY REQUEST.
- Z2 :** DATA ENTRY LENGTH and REPEAT BIT  
rnnnnnnnn  
r – Repeat Bit (0 = initial request / 1 = repeated requests  
nnnnnnn – number of requested characters / keys

Depending on the type of data being entered, it is a higher level system decision on whether or not the data is displayed on either the vending machine or card reader. If the data is not displayed (a recommendation for certain types of sensitive data) the vending machine or card reader display can still be optionally used to indicate a prompt and/or representation of the data entered for user feedback (i.e., asterisks \*\*\*\*\*).

If the card reader uses the vending machine’s display for Data Entry information, it must concatenate the DATA ENTRY REQUEST Response (12H) with the DISPLAY REQUEST response (02H). Upon receipt of the response pair, the vending machine controller will give its display to the card reader for the duration of the Data Entry session plus the amount of time specified in the Z2 Display Time following the end of the session (regardless of a normal or cancelled session). In essence, the vending machine controller will not write anything to its display during the Data Entry session plus the Z2 time. The reader will be able to update the Data Entry information on the vending machine’s display by sending additional DISPLAY REQUEST responses during the Data Entry session.

Please see additional DATA ENTRY procedures in Section 7.4.15.

Data Entry Cancel (13H) Z1
-------------------------------

**Level 03 Readers** (if Data Entry option enabled)

- Z1 :** DATA ENTRY CANCEL  
The user has pushed the reader’s RETURN button before completing the DATA ENTRY. The VMC should terminate all DATA ENTRY activity in progress.

FTL  
REQ TO RCV  
(1BH)  
Z1

**Level 03 Readers** (if File Transport Layer option enabled)

- Z1 :**     **FTL REQ TO RCV**  
The reader is requesting to receive data from a device or VMC.
- Z2 :**     **FTL Destination Address**  
The destination address of the response as defined in Section 2.6.
- Z3 :**     **FTL Source Address (Reader = 10H / 60H)**  
The source address of the response as defined in Section 2.6.
- Z4 :**     **FTL File ID**  
The type of information desired as defined in Section 2.6.
- Z5 :**     **FTL Maximum Length**  
The total number of blocks in the file as defined in Section 2.6.
- Z6 :**     **FTL Control**  
Data transfer control information as defined in Section 2.6.

FTL  
RETRY/DENY  
(1CH)  
Z1

**Level 03 Readers** (if File Transport Layer option enabled)

- Z1 :**     **FTL RETRY / DENY**  
The reader is requesting a device or VMC to retry or deny the last FTL command.
- Z2 :**     **FTL Destination Address**  
The destination address of the response as defined in Section 2.6.
- Z3 :**     **FTL Source Address (Reader = 10H / 60H)**  
The source address of the response as defined in Section 2.6.
- Z4 :**     **FTL Retry Delay**  
The retry delay as defined in Section 2.6.



FTL  
SEND  
BLOCK  
(1DH)  
Z1

**Level 03 Readers** (if File Transport Layer option enabled)

- Z1 :**     **FTL SEND BLOCK**  
The reader is sending a block of data (maximum of 31 bytes) to a device or VMC.
- Z2 :**     **FTL Destination Address**  
The destination address of the response as defined in Section 2.6.
- Z3 :**     **FTL Block #**  
The sequential number of the block as defined in Section 2.6.
- Z4- Z34** **FTL Data (maximum of 31 bytes)**  
:           The actual data portion of the block as defined in Section 2.6.

FTL  
OK TO SEND  
(1EH)  
Z1

**Level 03 Readers** (if File Transport Layer option enabled)

- Z1 :**     **FTL OK TO SEND**  
The reader is indicating that it is OK for the device or VMC to send it data.
- Z2 :**     **FTL Destination Address**  
The destination address of the response as defined in Section 2.6.
- Z3 :**     **FTL Source Address (Reader = 10H / 60H)**  
The source address of the response as defined in Section 2.6.

FTL REQ TO SEND (1FH) Z1
--------------------------------------

**Level 03 Readers** (if File Transport Layer option enabled)

- Z1 :**     **FTL REQ TO SEND**  
The reader is requesting to send data to a device or VMC.
- Z2 :**     **FTL Destination Address**  
The destination address of the response as defined in Section 2.6.
- Z3 :**     **FTL Source Address (Reader = 10H / 60H)**  
The source address of the response as defined in Section 2.6.
- Z4 :**     **FTL File ID**  
The type of information desired as defined in Section 2.6.
- Z5 :**     **FTL Maximum Length**  
The total number of blocks in the file as defined in Section 2.6.
- Z6 :**     **FTL Control**  
Data transfer control information as defined in Section 2.6.

Diagnostics Response (FFH) Z1	User Defined Data Z2-Zn
--	----------------------------------

Refer to paragraph 7.4.28 for detailed explanation.

**7.4.5 VEND - Request**

Vend (13H / 63H) Y1	Vend Request (00H) Y2-Y3	Item Price Y4-Y5	Item Number
---------------------------	-----------------------------------	------------------------	----------------

**Level 01 / 02 / 03 Readers**

- Y1 :**     **VEND REQUEST**  
The patron has made a selection. The VMC is requesting vend approval from the payment media reader before dispensing the product.
- Y2-Y3 :** **Item Price - scaled**  
The price of the selected product.

**Y4-Y5 :** Item Number

The item number of the selected product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

**Reader response:**

Vend Approved (05H) Z1	Vend Amount  Z2-Z3
---------------------------------	-----------------------------

**Z1 :** VEND APPROVED

Allow the selected product to be dispensed.

**Z2-Z3 :** Vend Amount - scaled

This is the amount deducted from the user's payment media or account. This may not match the amount specified in the VEND REQUEST command; it may be surcharged or discounted. FFFFh - an electronic token was used.

**NOTE:** The VMC must use Vend Amount to update the credit on the screen. The Reader must fill this field with the used amount for the transaction.

Vend Denied (06H) Z1
-------------------------------

**Z1 :** VEND DENIED

Approval denied for the patron's selection. Do not dispense any products.

Vend (13H / 63H) Y1	Vend Request (00H) Y2	Item Price Y3	Item Number Y4
---------------------------	--------------------------------	---------------------	----------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

**Y1 :** VEND REQUEST

The patron has made a selection. The VMC is requesting vend approval from the payment media reader before dispensing the product.

**Y2-Y5 :** Item Price – scaled

The price of the selected product.

**Y6-Y7 :** Item Number

The item number of the selected product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

**Reader Response:**

Vend Approved (05H) Z1	Vend Amount Z2-Z5
---------------------------------	-------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

- Z1 :** VEND APPROVED  
Allow the selected product to be dispensed.
- Z2-Z5 :** Vend Amount - scaled  
This is the amount deducted from the user's payment media or account.  
This may not match the amount specified in the VEND REQUEST command; it may be surcharged or discounted.  
FFFFFFFFh - an electronic token was used.

**NOTE:** The VMC must use Vend Amount to update the credit on the screen. The Reader must fill this field with the used amount for the transaction.

### 7.4.6 VEND - Cancel

---

Vend (13H / 63H)	Vend Cancel (01H) Y1
---------------------	-------------------------------

**Y1 :** VEND CANCEL

This command can be issued by the VMC to cancel a VEND REQUEST command before a VEND APPROVED/DENIED has been sent by the payment media reader. The payment media reader will respond to VEND CANCEL with a VEND DENIED and return to the Session Idle state.

**Reader response:**

Vend Denied (06H) Z1
-------------------------------

See paragraph 7.4.5 for explanation.

### 7.4.7 VEND - Success

---

Vend (13H / 63H)	Vend Success (02H) Y1	Item Number Y2-Y3
---------------------	--------------------------------	-------------------------

**Y1 :** VEND SUCCESS

The selected product has been successfully dispensed.

**Y2-Y3 :** Item number

The item number of the selected product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

**NOTE** A reset between VEND APPROVED and VEND SUCCESS shall be interpreted as a VEND SUCCESS.

**Reader response:**

No Data response

## 7.4.8 VEND - Failure

Vend (13H / 63H)	Vend Failure (03H) Y1
---------------------	--------------------------------

**Y1 :** VEND FAILURE

A vend has been attempted at the VMC but a problem has been detected and the vend has failed. The product was not dispensed. Funds should be refunded to user's account.

**Reader response:**

No Data response

**Vend failure sequence**

In order to ensure that a reader refunds after a Vend Failure command, the VMC must send at least a single Poll command to obtain the reader possible answers:

ACK	Refund Complete
MALFUNCTION ERROR code 1100yyyy	Refund error-internal reader credit lost
SILENCE	Refund in progress. VMC must repoll reader until ACK or Malfunction error answer for maximum NON Response time.

## 7.4.9 SESSION COMPLETE

Vend (13H / 63H)	Session Complete (04H) Y1
---------------------	------------------------------------

**Y1 :** SESSION COMPLETE

This tells the payment media reader that the session is complete and to return to the Enabled state. SESSION COMPLETE is part of a command/response sequence that requires an END SESSION response from the reader.

**Reader response:**

End  
Session  
(07H)  
Z1

**Z1 :**      **END SESSION**  
This command is issued in response to a **SESSION COMPLETE** command. The **END SESSION** response indicates the reader has returned to the Enabled state. If “**END SESSION**” is not received by the VMC within a the maximum application non-response time, the VMC must issue a “**RESET**” command.

### 7.4.10 CASH SALE

Vend (13H / 63H)	Cash Sale (05H) Y1	Item Price Y2-Y3	Item Number Y4-Y5
---------------------	-----------------------------	------------------------	-------------------------

**Level    01 / 02 / 03 Readers**

- Y1 :**      **CASH SALE**  
A cash sale (cash only or cash and cashless) has been successfully completed by the VMC.
- Y2-Y3 :** Item Price – scaled  
The price of the selected product or cash portion of the price.
- Y4-Y5 :** Item Number  
The item number of the selected product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

Note: This command is issued for cash auditing applications and is sent to the payment media reader if the **SETUP/CONFIGURATION** bit (b3) is enabled anytime a valid cash transaction is completed via a coin mechanism or bill validator.

Reporting of free vends, token vends, etc. should commonly be done, using the following item number conventions:

- Set bit b15 in item number to signal the cash vend as a free vend
- Set bit b14 in item number to signal the cash vend as a test vend
- Set bit b13 in item number to signal the cash vend as a negative vend (an item was returned and cash was payed out)
- Set bit b12 in item number to signal the cash vend as a token vend

**Reader response:**

No Data response

Vend (13H)	Cash Sale (05H) Y1	Item Price Y2-Y5	Item Number Y6-Y7	Item Currency Y8-Y9
---------------	-----------------------------	------------------------	-------------------------	---------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

- Y1 :** CASH SALE  
A cash sale (cash only or cash and cashless) has been successfully completed by the VMC.
- Y2-Y5 :** Item Price – scaled  
The price of the selected product or cash portion of the price.
- Y6-Y7 :** Item Number  
The item number of the selected product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.
- Y8-Y9 :** Item Currency  
The currency for the item price used during the vend. This value may be converted within the reader to the readers balancing currency. The item currency is sent using the numeric code as defined in ISO 4217 (see Appendix A1). The value is configured as packed BCD with the leading digit a 1 (one). For example, the code for the US dollar would be 1840 (Z10 = 18 and Z11 = 40). and for the Euro is 1978 (Z10 = 19 and Z11 = 78).

Note: This command is issued for cash auditing applications and is sent to the payment media reader if the SETUP/CONFIGURATION bit (b3) is enabled anytime a valid cash transaction is completed via a coin mechanism or bill validator.

**Reader response:**

No Data response

**7.4.11 Negative Vend Request**

Vend (13H / 63H)	Neg.Vend Request (06H) Y1	Item Value Y2-Y3	Item Number Y4-Y5
---------------------	------------------------------------	------------------------	-------------------------

**Level 03 Reader**

- Y1 :** NEGATIVE VEND REQUEST



The patron has inserted an item. The VMC is requesting negative vend approval from the payment media reader before accepting the returned product.

**Y2-Y3 :** Item value – scaled  
The value of the inserted product (16 Bit).

**Y4-Y5 :** Item Number  
The item number of the inserted product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

**Reader response:**

Vend Approved (05H) Z1	Vend Amount Z2-Z3
---------------------------	----------------------

**Level 03 (EXPANDED CURRENCY MODE disabled) Readers**

**Z1 :** VEND APPROVED  
Allow the returned product to be accepted, i.e. this means, the reader will be able to credit the value to the patrons card, when a vend success will follow the approved.

**Z2-Z3 :** Vend Amount – scaled  
This is the amount of credit, which will be added to the user's payment media or account. This may not match the amount specified in the NEGATIVE VEND REQUEST command; it may be surcharged or discounted.  
FFFFh - an electronic token will be credited.

Vend (13H / 63H) Y1	Neg. Vend Request (06H) Y1	Item Value Y2-Y5	Item Number Y6-Y7
------------------------	-------------------------------	---------------------	----------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

**Y1 :** NEGATIVE VEND REQUEST  
The patron has inserted an item. The VMC is requesting negative vend approval from the payment media reader before accepting the returned product.

**Y2-Y5 :** Item value – scaled

The value of the inserted product.

**Y6-Y7 :** Item Number

The item number of the inserted product. This number is defined by the manufacturer, and set to FFFFh for undefined or not implemented.

**Reader response:**

Vend Approved (05H) Z1	Vend Amount  Z2-Z5
---------------------------------	-----------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

**Z1 :** VEND APPROVED

Allow the returned product to be accepted, i.e. this means, the reader will be able to credit the value to the patrons card, when a vend success will follow the approved.

**Z2-Z5 :** Vend Amount – scaled

This is the amount of credit, which will be added to the user's payment media or account. This may not match the amount specified in the NEGATIVE VEND REQUEST command; it may be surcharged or discounted.  
FFFFFFFFh - an electronic token will be credited.

Vend Denied (06H) Z1
-------------------------------

**Z1 :** VEND DENIED

Approval denied for the returned product. Do not accept the product or return it if possible.

Note: This command is used in the uninterruptable vend sequence like the normal REQUEST VEND and is followed by the normal responses VEND APPROVED or VEND DENIED, for the reader to confirm the credit update possibility and the final VEND SUCCESS or VEND FAILURE command to update the patron's credit.

Designers of cashless devices must pay special attention in implementing this command, especially for non locking readers. Credit should only be generated on the media upon final reception of VEND SUCCESS to avoid unwanted credit in the system.

Designers of both the VMC and the readers have to deal with fault conditions of such a system carefully. A normal sequence description is added to the example vend sessions with hints to different application features.

### 7.4.12 READER - Disable

---

Reader (14H / 64H)	Disable (00H) Y1
-----------------------	------------------------

**Y1 :** READER DISABLE

This informs the payment media reader that it has been disabled, i.e. it should no longer accept a patron's payment media for the purpose of vending. Vending activities may be re-enabled using the READER ENABLE command. The payment media reader should retain all SETUP information.

**NOTE** Any transaction in progress will not be affected and should continue to its normal completion.

**Reader response:**

No Data response

### 7.4.13 READER - Enable

---

Reader (14H / 64H)	Enable (01H) Y1
-----------------------	-----------------------

**Y1 :** READER ENABLE

This informs the payment media reader that it has been enabled, i.e. it should now accept a patron's payment media for vending purposes. This command must be issued to a reader in the Disabled state to enable vending operations.

**Reader response:**

No Data response

#### 7.4.14 READER - Cancel

---

Reader (14H / 64H) Y1	Cancel (02H) Y1
-----------------------------	-----------------------

- Y1 :** READER CANCEL  
This command is issued to abort payment media reader activities which occur in the Enabled state. It is the first part of a command/response sequence which requires a CANCELLED response from the reader.

##### Reader response:

Cancelled (08H) Z1
--------------------------

- Z1 :** CANCELLED  
This is the reader's response to the READER CANCEL command from the VMC. This command comprises a command/response sequence. Its use is only appropriate in the Enabled state.

#### 7.4.15 DATA ENTRY – Response (Key Entries)

---

The purpose of the overall Data Entry request / response sequence is to allow the machine user to enter data (i.e., a card validation number) using the selection buttons on the vending machine.

**The DATA ENTRY request / response sequence can occur in the Enabled state only. It is the responsibility of the reader to enforce this rule.**

Depending on the type of data being entered, it is a higher level system decision on whether or not the data is displayed on either the vending machine or card reader. If the data is not displayed (a recommendation for certain types of sensitive data) the vending machine or card reader display can still be optionally used to indicate a prompt and/or representation of the data entered for user feedback (i.e., asterisks \*\*\*\*\*). **Please see additional information on the vending machine's display usage for Data Entry in the DATA ENTRY REQUEST Response (12H) description in the 7.4.4 POLL section.**

The DATA ENTRY RESPONSE key entries are sent to the reader as they are pressed. Depending on the user's speed of entry and vending machine controller cycle time, the data may be sent either as a digit at a time, a sub group of digits, or the entire length of digits as specified in the Z2 Data Entry Length byte in the DATA ENTRY REQUEST response. For example, if the Data Entry Length is 6 digits, but only 2 are initially (and quickly) entered, the vending machine controller will send the 2 that are available via the DATA ENTRY

RESPONSE Y2-Y9 command. The balance will be sent via other DATA ENTRY RESPONSE Y2-Y9 commands when available.

It is up to the reader to merge the received DATA ENTRY RESPONSE data and optionally update the display as required. The session is ended after the VMC sends the final DATA ENTRY RESPONSE data (no SESSION COMPLETE command is required). Note that the VMC display will remain available to the reader for the amount of time requested in the previous DISPLAY REQUEST response.

If the data entry process is cancelled by the VMC for any reason, the VMC will send the DATA ENTRY RESPONSE with all data bytes (Y2-Y9) set to FFh. This will terminate the DATA ENTRY REQUEST and return the reader to the Enabled state.

For ease of command message processing, the Data Entry Data has been fixed at 8 characters (Y2-Y9). Unused bytes must be sent as 00h to pad out the entire command to byte Y9.

Reader (14H / 64H)	Data Entry Response (03H) Y1	Data Entry Data Y2-Y9
-----------------------	---------------------------------------	-----------------------------

Level 03 Readers (if option enabled)

**Y1 :** DATA ENTRY RESPONSE  
The VMC is providing a DATA ENTRY RESPONSE to the reader.

**Y2-Y9 :** DATA ENTRY DATA  
Data should be in ASCII, one character per byte. Data should be left justified (first character / key in Y2, second in Y3, etc.). The number of data bytes must equal eight (8) and unused data bytes must be sent as 00h.

If the data entry process is cancelled by the VMC for any reason, the VMC will send this message with all DATA ENTRY data bytes set to FFh.

**Note:** The reader must translate the VMC key information into the appropriate key needed for the application

Reader response:

No Data response

Note: If the reader has additional display information to send to the VMC following the DATA ENTRY RESPONSE, it should send it via a DISPLAY REQUEST response to one of the next POLL commands from the VMC.

**7.4.16 REVALUE - Request (Level 02 / 03 Readers)**

Revalue (15H / 65H)	Revalue Request (00H) Y1	Revalue Amount Y2-Y3
------------------------	-----------------------------------	----------------------------

**Level 02 / 03 Readers**

- Y1 :** REVALUE REQUEST (Level 02 Readers)  
A balance in the VMC account because coins or bills were accepted or some balance is left after a vend. With this command the VMC tries to transfer the balance to the payment media.
- Y2-Y3 :** Revalue amount - scaled.  
The revalue amount should not exceed the revalue limit value given by the command REVALUE LIMIT REQUEST.

Revalue (15H / 65H)	Revalue Request (00H) Y1	Revalue Amount Y2-Y5
------------------------	-----------------------------------	----------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

- Y1 :** REVALUE REQUEST (Level 03 Readers)  
A balance in the VMC account because coins or bills were accepted or some balance is left after a vend. With this command the VMC tries to transfer the balance to the payment media.
- Y2-Y5 :** Revalue Amount - scaled.  
The revalue amount should not exceed the revalue limit value given by the command REVALUE LIMIT REQUEST.

**Reader response:**

Revalue Approved (0DH) Z1
------------------------------------

**Level 02 / 03 Readers**

- Z1 :** REVALUE APPROVED (Level 02 / 03 Readers)  
A balance is in the VMC account because coins or bills were accepted or some balance is left after a vend. The VMC has issued a REVALUE REQUEST to the payment media reader to transfer the balance to the payment media. The payment media reader accepted the request and added its value to the payment media balance. The reader then responds with a REVALUE APPROVED, so the VMC may clear the account.

Revalue Denied (0EH) Z1
----------------------------------

**Level 02 Readers**

**Z1 :** REVALUE DENIED (Level 02 / 03 Readers)  
 A balance is in the VMC account because coins or bills were accepted or some balance is left after a vend. The VMC has issued a REVALUE REQUEST to the payment media reader to transfer the balance to the payment media. The payment media reader does not accept the request and responds with a REVALUE DENIED, so the VMC has to pay out change. It is a quite common situation if there is no payment media inserted at this moment.

**7.4.17 REVALUE - Limit Request (Level 02 / 03 Readers)**

Revalue (15H / 65H) Z1	Revalue Limit Request (01H) Y1
------------------------------	---

**Level 02 / 03 Readers**

Note: If revaluing, follow the BEGIN SESSION with this command.

**Y1 :** REVALUE LIMIT REQUEST (Level 02 Readers)  
 In a configuration with a bill and/or coin acceptor and payment media reader connected to a VMC, the VMC must know the maximum amount the payment media reader eventually will accept by a REVALUE REQUEST. Especially if the bill acceptor accepts a wide range of bills. Otherwise the VMC may be confronted by the situation where it accepted a high value bill and is unable to pay back cash or revalue it to a payment media. (see also below)

**Reader response:**

Revalue Limit Amount (0FH) Z1	Revalue Limit Amount Z2-Z3
---	-------------------------------------

**Level 02 / 03 (EXPANDED CURRENCY MODE disabled) Readers**

**Z1 :** REVALUE LIMIT AMOUNT (Level 02 / 03 Readers)



The patron intends to revalue the payment media with a bill of some value. The VMC must know what kind of bills to accept, so it will issue a REVALUE LIMIT REQUEST to get the amount the payment media reader will accept. The payment media reader will respond with the scaled value, calculated with the maximum allowed payment media balance minus the current balance of the payment media. The payment media reader responds with REVALUE DENIED if there is no payment media available upon this request.

**Z2-Z3** : Revalue limit value - scaled.

**Reader response:**

Revalue Limit Amount (OFH) Z1	Revalue Limit Amount Z2-Z5
----------------------------------	-------------------------------

**Level 03 (EXPANDED CURRENCY MODE) Readers**

**Z1** : REVALUE LIMIT AMOUNT (Level 03 Readers)  
 The patron intends to revalue the payment media with a bill of some value. The VMC must know what kind of bills to accept, so it will issue a REVALUE LIMIT REQUEST to get the amount the payment media reader will accept. The payment media reader will respond with the scaled value, calculated with the maximum allowed payment media balance minus the current balance of the payment media. The payment media reader responds with REVALUE DENIED if there is no payment media available upon this request.

**Z2-Z5** : Revalue Limit Value - scaled.

**7.4.18 EXPANSION - Request ID**

Expansion (17H / 67H)	Request ID (00H)	Manufacturer Code	Serial Number	Model Number	Software Version
	Y1	Y2-Y4	Y5-Y16	Y17-Y28	Y29-Y30

**Y1** : REQUEST ID  
 The VMC is requesting payment media reader identification information. The information included above (Y2-Y30) provides the payment media reader with VMC identification information.

**Y2-Y4** : Manufacturer Code - ASCII  
 Identification code for the equipment supplier. Currently defined

codes are listed in the EVA document entitled "The Data Transfer Standard EVA-DTS" document, the Audit Data Dictionary section, chapter 4, "Manufacturer Codes".

- Y5-Y16 :** Serial Number - ASCII  
Factory assigned serial number.
- Y17-Y28 :** Model Number - ASCII  
Manufacturer assigned model number.
- Y29-Y30 :** Software Version - packed BCD  
Current software version.

**Reader response:**

Peripheral ID (09H)	Manufacture Code	Serial Number	Model Number	Software Version
Z1	Z2-Z4	Z5-Z16	Z17-Z28	Z29-Z30

**Level 01 / 02 / 03 Readers (If VMC indicates Level 01 or 02)**

Peripheral ID (09H)	Manufacture Code	Serial Number	Model Number	Software Version	Optional Feature Bits
Z1	Z2-Z4	Z5-Z16	Z17-Z28	Z29-Z30	Z31-Z34

**Level 03 Readers (If VMC indicates Level 03)**

See paragraph 7.4.4 for a detailed explanation of this response.

**7.4.19 EXPANSION - Read User File (Level 02 Readers)**

**Obsolete Command – Do not use for new designs!! (Use EXPANSION - Diagnostics)**

Expansion (17H / 67H)	Read User File (01H)	Number of User File
	Y1	Y2

**Level 02 Readers**

- Y1=** READ USER FILE  
The VMC request's the user file. The length of the file is variable with a

maximum length of 32 bytes. The contents of the data are defined by the VMC manufacturer. If the payment media reader does support this command it will respond with USER FILE DATA.

**Y2=** Number of User File.  
 The File identification number. The number and size of the data files are defined by the payment media reader manufacturer. The maximum number of user files are FFh.

**Reader response:**

User Data File (10H)	Number of User File	Length of User File	User Data
Z1	Z2	Z3	Z4-Zn

**Z1 :** USER FILE DATA (only level 02 readers)  
 The VMC requires user data and has issued a EXPANSION - READ USER FILE to the payment media reader.

**Z2 :** Number of User File.  
 The File identification number. The number and size of data files are defined by the payment media reader manufacturer. The maximum number of user files are FFh.

**Z3 :** Length of user file  
 The length of the user file. The maximum length of the user file is 32 bytes. If the user file don't exists the length will be set to 00h.

**Z4-Zn :** Data defined by the VMC manufacturer.

**7.4.20 EXPANSION - Write User File (Level 02 Readers)**

**Obsolete Command – Do not use for new designs!! (Use EXPANSION - Diagnostics)**

Expansion (17H / 67H)	Write User File (02H)	Number of User File	Length of User File	User Data
	Y1	Y2	Y3	Y4-Yn

**Y1 :** WRITE USER FILE  
 The VMC request's to write the user file. The length of the file is variable with a maximum length of 32 bytes. The contents of the data are defined by the VMC manufacturer. If the command is supported but the payment media reader is unable to write the payment media (writing problem or data too long) it will respond with MALFUNCTION/ERROR.

- Y2 :** Number of User File.  
The File identification number. The number and size of data files are defined by the payment media reader manufacturer. The maximum number of user files are FFh.
- Y3 :** Length of user file  
The length of the user file. The maximum length of the user file is 32 bytes.
- Y4-Yn :** Data defined by the VMC manufacturer.

**Reader response:**

No Data response

**7.4.21 EXPANSION - Write Time/Date File (Level 02/03 readers)**

Expansion (17H / 67H)	Write Time/ Date File (03H) Y1	Time Date Y2-Y11
--------------------------	---	------------------------

- Y1 :** WRITE TIME/DATE FILE  
The VMC requests to write the Time/Date file.
- Y2- Y11:** Time/Date to synchronize the card reader real time clock. The date bytes are BCD encoded.

- Y2 = Years (Range: 00..99)
- Y3 = Months (Range: 01..12)
- Y4 = Days (Range: 01..31)
- Y5 = Hours (Range: 00..23)
- Y6 = Minutes (Range: 00..59)
- Y7 = Seconds (Range: 00..59)
- Y8 = Day of Week (Range: 01..07, Monday = 1..Sunday = 7)
- Y9 = Week Number (Range: 01..53)
- Y10 = Summertime (Range: 00..01, Summertime = 1)
- Y11 = Holiday (Range: 00..01, Holiday = 1)

If any item of the time/date is not supported use FFH instead.

**7.4.22 EXPANSION – Enable Options (Level 03 readers)**

Expansion (17H / 67H)	Optional Feature Bit Enable (04H) Y1	Optional Feature Bits Y2-Y5
--------------------------	--	--------------------------------

**Level 03 Readers**

- Y1 :**        **OPTIONAL FEATURE BIT ENABLE**  
The VMC can enable which level 3 features it desires.
- Y2 - Y5:** Individual expanded feature bits as sent by reader in response to the 17H-00H EXPANSION REQUEST ID command. To enable a feature, a bit is set to one. Bits should be sent in descending order, i.e. bit 31 is sent first and bit 0 is sent last. **All features are disabled after a reset.**
  - b0 - File Transport Layer supported
  - b1 - 0 = 16 bit monetary format, 1 = 32 bit monetary format
  - b2 – Enable multi currency / multi lingual
  - b3 – Enable negative vend
  - b4 - Enabledata entry
  - b5 – Enable “Always Idle” state
  - b6 to b31 not used (should be set to 0)

Note: If 32 bit monetary format (b1) and or multi currency / multi lingual (b2) options are enabled, this condition will be known as **EXPANDED CURRENCY MODE** in the rest of the document.

**7.4.23 EXPANSION – FTL REQ TO RCV**

Expansion (17H / 67H)	FTL (FAH) Y1	REQ TO RCV  Y2-Y6
--------------------------	--------------------	-------------------------

**Level 03 Readers** (if File Transport Layer option enabled)

The VMC is requesting to receive data from the reader whose destination address will always be 10H or 60H. Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 :**        **FTL REQ TO RCV**  
The VMC is requesting to receive data from the reader.
- Y2 :**        **FTL Destination Address** (Reader = 10H / 60H as defined in Section 2.6.
- Y3 :**        **FTL Source Address**  
The source address of the command as defined in Section 2.6.
- Y4 :**        **FTL File ID**  
The type of information desired as defined in Section 2.6.
- Y5 :**        **FTL Maximum Length**  
The total number of blocks in the file as defined in Section 2.6.
- Y6 :**        **FTL Control**  
Data transfer control information as defined in Section 2.6.

**Reader response:**

Two responses are possible from the reader, either the SEND BLOCK (1DH) which transmits the initial (or only) part of the data or the RETRY / DENY (1CH). Note that the response can either be immediate or delayed.

FTL (1DH)	SEND BLOCK
SEND BLOCK	Information
Z1	Z2-Z34

- Z1 :** 1DH response which indicates SEND BLOCK
- Z2 :** Destination address of data as defined in Section 2.6
- Z3 :** Block # of data as defined in Section 2.6
- Z4-Z34:** Data (maximum of 31 bytes)

or

FTL (1CH)	RETRY / DENY
RETRY / DENY	Information
Z1	Z2-Z4

- Z1 :** 1CH response which indicates RETRY / DENY
- Z2 :** Destination address of response as defined in Section 2.6
- Z3 :** Source address of response (10H / 60H) as defined in Section 2.6
- Z4 :** Retry delay

#### 7.4.24 EXPANSION – FTL RETRY / DENY

Expansion (17H)	FTL (FBH)	RETRY / DENY
	Y1	Y2-Y4

**Level 03 Readers** (if File Transport Layer option enabled)

The VMC is retrying, denying, or aborting a data transfer to/from the reader whose destination address will always be 10H or 60H. Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 :** **FTL RETRY / DENY**  
The VMC is requesting to retry, deny, or abort a data transfer.
- Y2 :** **FTL Destination Address (Reader = 10H / 60H)**  
The destination address of the command as defined in Section 2.6.
- Y3 :** **FTL Source Address**

The source address of the command as defined in Section 2.6.

- Y4 :** **FTL Retry Delay**  
The time delay required of the sender as defined in Section 2.6.

**Reader response:**

None

**7.4.25 EXPANSION – FTL SEND BLOCK**

Expansion (17H / 67H)	FTL (FCH) Y1	SEND BLOCK Y2-Y34
--------------------------	--------------------	----------------------

**Level 03 Readers** (if File Transport Layer option enabled)

The VMC is sending data to the reader whose destination address will always be 10H or 60H. Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 :** **FTL SEND BLOCK**  
The VMC is requesting to send data.
- Y2 :** **FTL Destination Address (Reader = 10H / 60H)**  
The destination address of the command / data as defined in Section 2.6.
- Y3 :** **FTL Block #**  
The block # of data as defined in Section 2.6
- Y4-Y34** **FTL Data (maximum of 31 bytes)**  
The actual data block as defined in Section 2.6.

**Reader response:**

None

**7.4.26 EXPANSION – FTL OK TO SEND**

Expansion (17H / 67H)	FTL (FDH) Y1	OK TO SEND Y2-Y3
--------------------------	--------------------	---------------------

**Level 03 Readers** (if File Transport Layer option enabled)

The VMC is indicating that it is OK for the reader to transfer data. The destination address will always be the reader 10H or 60H. Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 :** **FTL OK TO SEND**  
The VMC is indicating it is OK to send data.

- Y2 :** FTL Destination Address (Reader = 10H / 60H)  
The destination address of the command / data as defined in Section 2.6.
- Y3 :** FTL Source Address  
The source address of the command as defined in Section 2.6.

**Reader response:**

One response is possible from the reader which transmits the initial (or only) part of the data. Note that the response can either be immediate or delayed.

FTL (1DH) SEND BLOCK Z1	SEND BLOCK Information Z2-Z34
----------------------------------	-------------------------------------

- Z1 :** 1DH response which indicates SEND BLOCK
- Z2 :** Destination address of data as defined in Section 2.6
- Z3 :** Block # of data as defined in Section 2.6
- Z4-Z34:** Data (maximum of 31 bytes)

**7.4.27 EXPANSION – FTL REQ TO SEND**

Expansion (17H / 67H)	FTL (FEH) Y1	REQ TO SEND Y2-Y6
--------------------------	--------------------	----------------------

**Level 03 Readers** (if File Transport Layer option enabled)

The VMC is requesting to send data to the reader whose destination address will always be 10H or 60H. Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 :** FTL REQ TO SEND  
The VMC is requesting to send data to the reader.
- Y2 :** FTL Destination Address (Reader = 10H / 60H)  
The destination address of the command as defined in Section 2.6.
- Y3 :** FTL Source Address  
The source address of the command as defined in Section 2.6.
- Y4 :** FTL File ID  
The type of information desired as defined in Section 2.6.
- Y5 :** FTL Maximum Length  
The total number of blocks in the file as defined in Section 2.6.



**Y6 :**     **FTL Control**  
           Data transfer control information as defined in Section 2.6.

**Reader response:**

Two responses are possible from the reader, either the OK TO SEND (1EH) which allows the data transfer to start or the RETRY / DENY (1CH). Note that the response can either be immediate or delayed.

FTL (1EH) OK TO SEND Z1	OK TO SEND Information Z2-Z3
-------------------------------	------------------------------------

- Z1 :**     1EH response which indicates OK TO SEND
- Z2 :**     Destination address of response as defined in Section 2.6
- Z3 :**     Source address of response (10H / 60H) as defined in Section 2.6

or

FTL (1CH) RETRY / DENY Z1	RETRY / DENY Information Z2-Z4
---------------------------------	--------------------------------------

- Z1 :**     1CH response which indicates RETRY / DENY
- Z2 :**     Destination address of response as defined in Section 2.6
- Z3 :**     Source address of response (10H / 60H) as defined in Section 2.6
- Z4 :**     Retry delay

**7.4.28 EXPANSION - Diagnostics**

Expansion (17H / 67H)	Diagnostics (FFH) Y1	User Defined Data Y2-Yn
--------------------------	----------------------------	----------------------------------

**Y1 :**     **DIAGNOSTICS.**  
           Device manufacturer specific instruction for implementing various manufacturing or test modes.

**Y2-Yn :**    User Defined Data.

The data portion of this command is defined by the manufacturer and is not part of this document.

**Reader response:**

Diagnostics Response (FFH) Z1	User Defined Z2-Zn
----------------------------------	-----------------------

**Z1 :** DIAGNOSTICS RESPONSE

**Z2-Zn :** User Defined Data.  
The data portion of this response is defined by the manufacturer and is not part of this document.

**7.5 Cashless Device Non-Response Time**

---

The default maximum non-response time for a cashless device is 5 seconds. This is the maximum time for which a cashless device will not respond to a command or a POLL with ACK, NAK or a message. The “Application Maximum Response Time” reported in byte Z7 of the Reader Configuration Data (7.4.2) supersedes this default value if Z7 is greater.

Unless otherwise specified, a VMC should also use this value as a timeout for a response to commands that require data to be returned. (See Section 7.3.)

**7.6 Cashless Device Power Requirements**

---

The current draw for any cashless device must fall within the following limits. All measurements are at the minimum VMC Voltage Output.

Idle mode = 300 mA. (avg.) continuous

Transport or Read/Write cycle = 1.5 A @ 50% maximum duty cycle up to 5 seconds.

## 7.7 Example Vend Sessions

---

### EXAMPLE VEND SESSION #1 (Valid Single Vend)

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #2**  
**(Valid Multiple Vend)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #3**  
**(Session cancelled by user with reader return button)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
<b>User pushes reader RETURN button</b>			
POLL	→		
	←	SESSION CANCEL	
ACK	→		
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #4a**  
 (Session cancelled by user via coin mechanism  
 escrow return button before product was selected)

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
<b>User pushes coin mech. escrow return</b>			
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #4b**  
**(Session cancelled by user via coin mechanism**  
**escrow return button after product was selected)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
<b>User pushes coin mech. escrow return</b>			
CANCEL VEND	→		
	←	ACK	
POLL	→		
	←	VEND DENIED	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #5**  
**(VMC Failure/product not dispensed**  
**Refund positive)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
<b>Reader deducts purchase price from payment media</b>			
POLL	→		
	←	VEND APPROVED	
<b>VMC fails to dispense product</b>			
VEND FAILURE	→		
	←	ACK	
POLL	→		
	←	Silence during the refund operation	
POLL	→		
	←	ACK	C
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		



**EXAMPLE VEND SESSION #5A  
(VMC Failure/product not dispensed  
Refund fail)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
<b>Reader deducts purchase price from payment media</b>			
POLL	→		
	←	VEND APPROVED	
<b>VMC fails to dispense product</b>			
VEND FAILURE	→		
	←	ACK	
POLL	→		
	←	Silence during the refund operation	
POLL	→		
	←	MALFUNCTION ERROR code 1100yyyy=refund fail ACK	(Level 02 / 03) (Level 01)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #6  
(Vend denied by reader)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
<b>Insufficient funds or payment media/account error</b>			
POLL	→		
	←	VEND DENIED	(Session Idle)
<b>VMC makes no attempt to dispense product</b>			
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #7**  
**(Command Out of Sequence Error)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
EXPANSION ID REQUEST	→		
	←	ACK	
POLL	→		
	←	COMMAND OUT OF SEQUENCE	(Session Idle)
ACK	→		
RESET	→	{Mandatory}	
	←	ACK	(Inactive)

**EXAMPLE VEND SESSION #8a**  
 (Reader busy for longer than max. non response time)

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
		[silence...]	(Reader busy)
POLLs (numerous)	→		
	←	[silence...]	(continued POLLs w/ no response)
POLL	→		
	←	ACK	(restart Non-Response timer)
POLLs (numerous)	→		
	←	[silence...]	(continued POLLs w/ no response)
POLL	→		
	←	[silence...]	(Reader almost finished)
POLL	→		
	←	VEND APPROVED	(Reader ready)
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION #8b**  
**(Reader busy for shorter than max. non response time)**

Controller		Cashless Device	State
POLL	→		
	←	BEGIN SESSION	(Session Idle)
ACK	→		
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	[silence...]	(Reader busy)
POLLs (numerous)	→		
	←	[silence...]	(Continued POLLs w/ no response)
POLL	→		
	←	[silence...]	(Reader almost finished)
POLL	→		
	←	VEND APPROVED	(Reader ready)
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**NOTE**

If the peripheral omits to respond within the maximum non-response time, it is considered to be off-line.

**EXAMPLE VEND SESSION #8c**  
**(No Response, Reader busy at Vend Request.)**

Controller		Cashless Device	State/ Comment
POLL	→		
	←	BEGIN SESSION	
ACK	→		
VEND REQUEST	→		
	←	[silence...]	Reader busy. The reader may not send the response within the t-response(max) timeout or hasn't received the command completely due to line breakdown
VEND REQUEST	→		VMC repeats the command: As the VMC isn't sure, that the slave has received the command free of errors it repeats it. The command itself is not yet performed by the reader as long the ACK hasn't been sent.
	←	[silence...]	Reader busy
VEND REQUEST	→		
	←	ACK	(Vend) The reader will now perform the command. The response isn't available at the moment, thus the VEND REQUEST is only acked
POLL (numerous)	→		VMC polls the reader to obtain the data in VEND APPROVED
	←	ACK	The reader may send a ACK or [silence] to each POLL
POLL	→		
	←	VEND APPROVED	The response to the VEND REQUEST is now available. It must be sent within the time defined by the APPLICATION MAXIMUM RESPONSE TIME. This is measured from the ACK following the VEND REQUEST.
ACK	→		

**EXAMPLE VEND SESSION #9**  
 (Pre-approved authorization aborted by coin  
 mechanism escrow return button before BEGIN SESSION)

Controller	Cashless Device	State
	<b>User swipes payment media</b>	
		(Enabled)
POLL	→	
	←	ACK
READER CANCEL	→	
	←	ACK
	<b>(If applicable, reader aborts HOST communications, ejects payment media, etc...)</b>	
POLL	→	
	←	CANCELLED
ACK	→	

**EXAMPLE VEND SESSION #10**  
**(Single Negative Vend)**

Controller	Cashless Device	State
POLL	→	
	←	BEGIN SESSION (Session Idle)
ACK	→	
		User inserted a payment media, and inserted then a product, which was detected valid, or pressed a selection button to identify the desired product which will be inserted later on
NEGATIVE REQUEST	→	VEND
	←	ACK (Vend)
POLL	→	
	←	VEND APPROVED
		The payment reader is able to add the desired value to the credit
ACK	→	
		The product is now fully accepted from the machine or the user has finally finished insertion of a valid product
VEND SUCCESS	→	
	←	ACK (Session Idle)
		The payment media reader has added the credit
SESSION COMPLETE	→	
	←	ACK
POLL	→	
	←	END SESSION (Enabled)
ACK	→	

Normally, can or bottle return-vendors may check the product first, before the patron inserts his card. It is up to the VMC, to delay the negative vend request, until the session idle state is reached. In many return-vendors, from this state, the product is already fully accepted. Therefore, there is no need for the further sequences, this means, vend accepted, vend success will follow each other immediately.

If the payment media reader is not able to update the credit, there will be two conditions:

- The return vendor is able to escrow the product after the vend denied. In this case the session complete is sent, the product is return and the credit remains unchanged.
- The return vendor is not able to escrow the product after vend denied. In this case, session complete should be sent and there should be an update credit within the system (VMC), which could be returned by other means (i.e. return coins, tokens, etc).

If a return vendor is able to escrow the product again, this vendor normally accepts the product finally only a vend accepted was sent. In this case there may happen some fault condition which allows no final acceptance of the product. The return vendor then closes the session with vend failed instead of vend success, indicating to the reader not to update the system credit, or, if the payment media is no longer present, request re-insertion of the media.





**EXAMPLE VEND SESSION #11**  
**(Always Idle state option set)**

Controller		Cashless Device	State
POLL	→		
	←	ACK	(Enabled)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	ACK	(repeated until User presents cashless media or timeout)
POLL	→		
	←	VEND APPROVED	
ACK	→		
VEND SUCCESS	→		
	←	ACK	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION CANCELLED #12**  
**(Always Idle state option set)**

Controller		Cashless Device	State
POLL	→		
	←	ACK	(Enabled)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	ACK	(repeated until User presents cashless media ), but instead of this, cash is inserted

VEND CANCEL	→		
	←	ACK	(Session Idle)
POLL	→		
	←	VEND DENIED	(Session Idle)
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE VEND SESSION TIMEOUT#13**  
 (Always Idle state option set)

Controller		Cashless Device	State
POLL	→		
	←	ACK	(Enabled)
VEND REQUEST	→		
	←	ACK	(Vend)
POLL	→		
	←	ACK	(repeated until User presents cashless media or timeout), timeout occurs
POLL	→		
	←	VEND DENIED	
ACK	→		
SESSION COMPLETE	→		
	←	ACK	
POLL	→		
	←	END SESSION	(Enabled)
ACK	→		

**EXAMPLE DATA ENTRY SESSION #1**  
**(Three key Data Entry w/ Prompt & Asterisks for Entries)**

Controller	Cashless Device	State
	Previously Enabled	Enabled
POLL	→	
	← DATA ENTRY REQUEST + DISPLAY REQUEST (prompt)	
ACK	→	
	<b>User pushes Selection Key 1</b>	
DATA ENTRY RESPONSE (Key 1)	→	
	← ACK	
POLL	→	
	← DISPLAY REQUEST (prompt + *)	
ACK	→	
	<b>User pushes Selection Key 2</b>	
DATA ENTRY RESPONSE (Key 2)	→	
	← ACK	
POLL	→	
	← DISPLAY REQUEST (prompt + **)	
ACK	→	
	<b>User pushes Selection Key 3</b>	
DATA ENTRY RESPONSE (Key 3)	→	
	← ACK	(Enabled)
POLL	→	
	← DISPLAY REQUEST (prompt + *** or "Entry OK")	
ACK	→	
	<b>Note: After Display Request Time expires, VMC regains control of display</b>	
POLL	→	
	← BEGIN SESSION	(Session Idle)
ACK	→	

**EXAMPLE DATA ENTRY SESSION #2**  
**(Data Entry with Reader Cancel)**

Controller	Cashless Device	State
	<b>Previously Enabled</b>	Enabled
POLL	→	
	←	DATA ENTRY REQUEST + DISPLAY REQUEST (prompt)
ACK	→	
	<b>User pushes (valid) Selection Key</b>	
DATA ENTRY RESPONSE (Key 1)	→	
	←	ACK
POLL	→	
	←	DISPLAY REQUEST (prompt + *)
ACK	→	
	<b>User pushes (invalid) Selection Key</b>	
DATA ENTRY RESPONSE (Key 2)	→	
	←	ACK
POLL	→	
	←	DATA ENTRY CANCEL
ACK	→	(Enabled)
POLL	→	
	←	DISPLAY REQUEST ("Error")
ACK	→	
	<b>After Display Request Time expires, VMC regains control of display</b>	

Note that the above scenario is only an example and it may not be prudent to cancel a session after the first wrong entry. (Someone could fraudulently obtain a password by trying the maximum of selection keys at each position.)

**EXAMPLE DATA ENTRY SESSION #3  
(Data Entry with VMC Cancel)**

Controller	Cashless Device	State
	<b>Previously Enabled</b>	Enabled
POLL	→	
	← DATA ENTRY REQUEST + DISPLAY REQUEST (prompt)	
ACK	→	
	<b>User pushes Selection Key</b>	
DATA ENTRY RESPONSE (Key 1)	→	
	← ACK	
POLL	→	
	← DISPLAY REQUEST (prompt + *)	
ACK	→	
	<b>User walks away &amp; VMC times out</b>	
DATA ENTRY RESPONSE (FF's)	→	
	← ACK	(Enabled)
POLL	→	
	← DISPLAY REQUEST ("Try Again")	
ACK	→	
	<b>After Display Request Time expires, VMC regains control of display</b>	

## **Section 8**

# **Communications Gateway**

# **VMC/Peripheral Communication Specifications**

### **8.1 Introduction**

This section defines the communications bytes sent and received between a Communications Gateway (Comms Gateway) and the VMC. The Comms Gateway address is 00011xxxB (18H).

Unless otherwise stated, all information is assumed to be in a binary format.

After the VMC has issued a command, the Comms Gateway must respond with a reply. The reply may be an ACK or a detailed message response. If the command format expects a response, the Comms Gateway may: 1) respond with an ACK, to acknowledge receiving the command, and send the response later as a response to a POLL, or 2) immediately respond with the expected message.

The Comms Gateway response to a command from the VMC may be an ACK, a single message, or if there is more data to send it may be a multi message reply, up to the MDB maximum of 36 bytes.

The following command / response set has been defined to provide a means to transfer vending information system data from the VMC to the Comms Gateway in one of two ways;

- 1) Entire DTS files (including DXS, ST, SD1, G85, SE, and DXE records) are transferred using the file transport layer (FTL) of MDB.
- 2) Activity "Reports" are sent from the VMC to the Comms Gateway every time something happens in the vending system, it is then the Comms Gateways responsibility to store and assemble the DTS file. (DXS, ST, SD1, G85, SE and DXE data are not sent.) Obviously, a combination of these two methods can be designed to meet specific needs also.

## 8.2 VMC Commands

VMC Cmd	Code	VMC Data	Comm Gateway response
RESET	18H		00H - Just RESET (1)
SETUP	19H	Feature level (1) Scale factor (1) Decimal places (1)	01H - Comms Gateway Config (1) Feature level (1) Max. App. Resp. (2)
POLL	1AH		00H - Just RESET (1) 01H - Comms Gateway Config (1) Feature level (1) Max. App. Resp. (2) 02H - Request transmit (1) 03H - Data transmitted (1) 04H - Error (1) Error code (n) 05H - DTS Event Acknowledge (1) 06H - Peripheral ID: (1) Mfg. code (3) Serial number (12) Model number (12) Software ver. (2) Opt. features (4) 07H - Radio Signal Strength (2) 1BH - FTL REQ to RCV (option) (1) 1CH - FTL RETRY / DENY (option) (1) 1DH - FTL SEND BLOCK (option) (1) 1EH - FTL OK to SEND (option) (1) 1FH - FTL REQ to SEND (option) (1) FFH - Diagnostics (n)
REPORT	1BH	Type = 01, Transaction (1) Transaction Type (1) Selection (Row/Col.) (2) Price (2) Cash in, Coin tubes (2) Cash in, Cashbox (2) Cash in, Bills (2) Value in, Cashless #1 (2) Value in, Cashless #2 (2) Revalue to Cashless #1 (2) Revalue to Cashless #2 (2) Cash out (2) Discount Amount (2) Surcharge Amount (2) User Group # (1) Price List (1) Date (4) Time (2)	



		Type = 02, DTS Event (1) DTS Event Code (10) Date (4) Time (2) Duration (4) Activity (1) Terminal ID (12)	05-DTS Event Acknowledge (1)
		Type = 03, Asset ID (1) Asset Type = 0n (1) Manufacture Code (3) Serial Number (12) Model Number (12) Software Version (2)	
		Type = 03, Asset ID (1) Asset Type = 8n (1) Asset Number (20)	
		Type = 04, Currency ID (1) VMC Currency Code (2) VMC Currency (1) VMC Decimal Point (1)	
		Type = 05, Product ID (1) Product Identification (20) Selection Presence (1)	
CONTROL	1CH	00H - Disable (1)	
		01H - Enable (1)	
		02H - Transmit (1)	
EXPANSION	1FH	00H - Identification	06H - Peripheral ID: (1) Mfg. code (3) Serial number (12) Model number (12) Software ver. (2) Opt. features (4)
		01H - Feature enable (1) Features enabled (4)	
		02H - Time/Date Request (1) Time/Date (1)	07H - CG Time/Date (1) Years (1) Months (1) Days (1) Hours (1) Minutes (1) Seconds (1) Day of Week (1) Summertime (1) Holiday (1)
		FAH - FTL (option) REQ TO RCV	1DH - SEND BLOCK 1CH - RETRY / DENY
		FBH - FTL (option) RETRY / DENY	No Data
		FCH - FTL (option) SEND BLOCK	No Data

	FDH - FTL (option) OK TO SEND	1DH - SEND BLOCK
	FEH - FTL (option) REQ TO SEND	1EH - OK TO SEND 1CH - RETRY/DENY
	FFH - Diagnostics (n)	FFH - Diagnostics (n)

### 8.3 Communications Gateway Command Format

---

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
RESET	18H	No data	None

This command is the vehicle that the VMC should use to tell the Comms Gateway that it should perform its initialization procedure. With the exception of the ACK response, it should abort all communication and revert to the internally stored operational parameters.

The following initialization sequence is recommended. It should be used after "power up", after issuing the RESET command, or after issuing the Bus Reset (pulling the transmit line "active" for a minimum of 100 mS).

**POLL – 18H**

To obtain "JUST RESET" response

**SETUP – 19H**

To obtain Comms Gateway level and configuration information

**EXPANSION IDENTIFICATION – 1F 00H**

To obtain additional identification information and options

**EXPANSION FEATURE ENABLE – 1F 01H**

To enable desired options

**CONTROL / ENABLE – 1CH / 01H**

To enable / alert the Comms Gateway to start collecting data and / or monitoring for REPORT commands situations.

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
SETUP	19H	Y1 - Y3	Z1 - Z4

Y1 = VMC feature level

Indicates the highest Comms Gateway feature level that the VMC supports. Currently the highest feature level is 03, with no requirement to support previous (obsolete) levels 1 and 2.)

Y2 = Scale factor

The multiplier used to scale all monetary values transferred between the VMC and the Comms Gateway.

Y3 = Decimal places

The number of decimal places used to communicate monetary values between the VMC and the Comms Gateway.

Z1 = 01 COMMS GATEWAY CONFIGURATION

The Comms Gateway is responding to a SETUP command. This response includes the following data;

Z2 = Comms Gateway feature level

The feature level of the Comms Gateway. Currently the highest feature level is 03, with no requirement to support previous (obsolete) levels 1 and 2.)

Z3 - Z4 = Application maximum response time

The maximum length of time, in seconds, that an Comms Gateway may be unable to respond to any commands. This includes the time communicating over an external network. The VMC should continue POLLing the Comms Gateway during this time in an attempt to re-synchronize communications earlier. When the Comms Gateway is ready to communicate over the bus again, it should respond to the next POLL with COMPLETE (if communicating externally) or ACK. This time essentially replaces the standard MDB non-response time, as such it's default value is equal to the defined non-response time (5 seconds).

VMC Command    Code/Sub-code    VMC Data    Comms Gateway Response

POLL                    1AH                    No data                Z1 - Zn

The POLL command is used by the VMC to obtain information from the Comms Gateway. This information may include setup information, activity requests, or error conditions. An ACK response indicates that no error states exist and either no information request is pending or pending information is not yet ready for transmission.

In addition to an ACK, the VMC may receive the following POLL responses from the Comms Gateway.

## Z1 = 00 JUST RESET

Indicates the Comms Gateway has been reset internally or on command from the VMC.

## Z1 = 01 COMMS GATEWAY CONFIGURATION

The Comms Gateway is responding to a SETUP command. This response includes the following data;

Z2 = Comms Gateway feature level

The feature level of the Comms Gateway. Currently the highest feature level is 03, with no requirement to support previous (obsolete) levels 1 and 2.)

Z3 - Z4 = Application maximum response time

The maximum length of time, in seconds, that an Comms Gateway may be unable to respond to any commands. This includes the time communicating over an external network. The VMC should continue POLLING the Comms Gateway during this time in an attempt to re-synchronize communications earlier. When the Comms Gateway is ready to communicate over the bus again, it should respond to the next POLL with COMPLETE (if communicating externally) or ACK. This time essentially replaces the standard MDB non-response time, as such it's default value is equal to the defined non-response time (5 seconds).

## Z1 = 02 REQUEST TO TRANSMIT

The Comms Gateway is requesting permission to transmit data to an external collection device. This is done to control the bus power supply. The Comms Gateway should continue sending this response to each POLL until permission to transmit has been granted or the need to transmit goes away.

## Z1 = 03 DATA TRANSMITTED

The Comms Gateway is finished transmitting to an external collect device.

## Z1 = 04 ERROR

The Comms Gateway has developed some type of detectable error. The error codes will be sent continuously, or until the error is resolved.

Z2 – Zn = Error code

The error codes are ASCII strings taken from the EVA DTS Communications fault list.

## Z1 = 05 DTS EVENT ACKNOWLEDGE

The Comms Gateway has recognized that a DTS Event has occurred and must act accordingly. The specific actions will be defined by the Comms Gateway operational specifications.

## Z1 = 06H PERIPHERAL ID

Comms Gateway is sending peripheral ID information. This response includes the following data;

Z2 - Z4 = Manufacturer code

Identification code for the equipment supplier. Sent as ASCII characters. Blanks (20H) are acceptable.

Z5 - Z16 = Serial number

Factory assigned serial number sent as numeric ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Z17 - Z28 = Model number ASCII.

Manufacturer assigned model number sent as ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Z29 - Z30 = Software version

Current software version sent as packed BCD.

Z31 - Z34 = Optional Features

Each of the 32 bits indicate an optional features availability. If the bit is set the feature is available. Currently defined options are:

b0: File transport layer support  
b1: Verbose mode: See REPORT command  
b2: Expansion Time/Date Request command  
b3- b31: Future use, must be set to 0.

## Z1 = 07H RADIO SIGNAL STRENGTH

The Comms Gateway is reporting its signal strength from the network. This response includes the following data;

Z2 = Signal Strength

The level of radio signal strength detected by the Comms Gateway. This is a binary number from 00H to 64H (100%) representing the percentage of expected signal. This can be sent after every POLL, or as needed due to changes in the signal.

Note that all FTL responses below are defined in Section 2.6. For the Comms Gateway, the source address will always be the Comms Gateway (18H) as defined in Section 2.3.

## Z1 = 1BH REQ TO RCV (File Transport Layer)

The Comms Gateway is requesting to receive data from a device or VMC.

Z2 = Destination address of response

Z3 = Source address of response (18H)

Z4 = File ID

Z5 = Maximum length

Z6 = Control

## Z1 = 1CH RETRY/DENY (File Transport Layer)

The Comms Gateway is requesting a device or VMC to retry or deny the last FTL command.

Z2 = Destination address of response

Z3 = Source address of response (18H)

Z4 = Retry delay

## Z1 = 1DH SEND BLOCK (File Transport Layer)

The Comms Gateway is sending a block of data (maximum of 31 bytes) to a device or VMC.

Z2 = Destination address of data

Z3 = Block #

Z4-Z34 = Data (maximum of 31 bytes)

## Z1 = 1EH OK TO SEND (File Transport Layer)

The Comms Gateway is indicating that it is OK for a device or VMC to send it data.

Z2 = Destination address of response

Z3 = Source address of response (18H)

Z1 = 1F      REQ TO SEND      (File Transport Layer)

The Comms Gateway is requesting to send data to a device or VMC.

- Z2 = Destination address of response
- Z3 = Source address of response (18H)
- Z4 = File ID
- Z5 = Maximum length
- Z6 = Control

Z1 = FFH      DIAGNOSTICS

The Comms Gateway is responding to a EXPANSION/DIAGNOSTICS command. This response includes the following data;

Z2 - Zn      User defined data

Device manufacturer specific responses after receiving manufacturing or test instructions. Z1 - Zn implies that any number of bytes may be used for the response data from the Comms Gateway.

**VMC Command      Code/Sub-code      VMC Data      Comms Gateway Response**

REPORT              1BH                      Y1 – Ynn              No data

The REPORT command is used by the VMC to pass activity information to the Comms Gateway. If the "Verbose mode" is enabled via the EXPANSION / FEATURE ENABLE command, this command must be sent immediately following the completion of any activity it is describing. The activities may include; a transaction, a DTS defined event, an asset identification, currency identification, or product identification.

The intent of this command is to provide information so that the Comms Gateway can create a Data Transfer Standard file. All of the following fields show their corresponding DTS fields for reference, for further detail refer to the Data Transfer Standard.

If the "Verbose mode" is disabled, only the "DTS Event" report type records must be sent. This mode uses the FTL to transfer the complete DTS files and the DTS Event report types to alert the VMC of any alarm conditions.

Since reports data may vary, any field that is not relevant, or not known, should be populated with 00H's. All cash values are scaled and decimal adjusted using the data provided in the SETUP command.



Y1 = Type: The type of activity that is being reported, includes one of the following:

01H	Transaction
02H	DTS Event
03H	Asset ID
04H	Currency ID
05H	Product ID

If Y1 = 01H then the following "Transaction" data fields have been identified to be included:

Y2 = Transaction Type

This field defines the type of transaction that the following data describes. The defined transaction types include;

01H	Paid Vend
02H	Token Vend
03H	Free Vend
04H	Test Vend
05H	Revalue
06H	Negative Vend
07H	Vendless*
08H	Manual / Service

\* The end of a "Vendless" transaction is defined by the VMC manufacturer, for example an escrow request, a failed vend, etc.

Y3 – Y4 = Item Number

This is the binary field used to link REPORT type 01 to REPORT type 05. It is an item number, 0000H through FFFFH of the selected product involved in the most recent transaction. This number is defined by the manufacturer.

Y5 – Y6 = Price (PA102)

The established price of the product involved in the most recent transaction. The established price is the price before any adjustments i.e. discounts surcharges, etc.

Y7 – Y8 = Cash in, Coin Tubes (CA303/CA307 or CA1001/CA1002)

The value of cash deposited into the coin tubes since the completion of the previous transaction.

- Y9 – Y10 = Cash in, Cashbox (CA302/CA306)  
 The value of cash deposited into the cashbox since the completion of the previous transaction.
- Y11 – Y12 = Cash in, Bills (CA304/CA308)  
 The value of cash deposited into the bill stacker since the completion of the previous transactions.
- Y13 – Y14 = Value in, Cashless Device #1 (DA201/DA203)  
 The value removed from the media in cashless device #1 since the completion of the previous transaction.
- Y15 – Y16 = Value in, Cashless Device #2 (DB201/DB203)  
 The value removed from the media in cashless device #2 since the completion of the previous transaction.
- Y17 – Y18 = Revalue to Cashless Device #1 (DA401/DA402)  
 The value returned to the media in cashless device #1 since the completion of the previous transaction.
- Y19 – Y20 = Revalue to Cashless Device #2 (DB401/DB402)  
 The value returned to the media in cashless device #2 since the completion of the previous transaction.
- Y21 – Y22 = Cash out (CA401/CA403 or CA402/CA404)  
 The total value of the cash dispensed from the system since the completion of the previous transaction.
- Y23 – Y24 = Discount Amount (CA701/CA702)  
 The value of any discounts awarded since the completion of the previous vend.
- Y25 – Y26 = Surcharge Amount (CA705/CA706)  
 The value of any surcharges collected since the completion of the previous vend.
- Y27 = User Group # (DA701 or DB701)

The user group number that the transaction is associated with.

Y28 = Price List (LA101)

The price list that the transaction is associated with

Y29 – Y32 = Date (PA501)

The date of the transaction. This data is sent as BCD in the following sequence YYYY/MM/DD. For example, 17 March 2002 would be 20H 02H 03H 17H. If the date is not known these bytes are filled with 99Hs.

Y33 – Y34 = Time (PA502)

The time of the transaction. This data is sent as BCD , 24 hour format, in the following sequence HHMM. For example, 6:30 PM would be 18H 30H. If the time is not known these bytes are filled with 99Hs.

If Y1 = 02H then the following "DTS Event" data fields have been identified to be included:

Y2 – Y11 = DTS Event Code (EA101 or EA201 or EA701)

This is an alpha-numeric ASCII code defining the event being reported. The codes are list in the EVA DTS manual. In addition to the standard DTS event codes, an interrogation event is reported as "EA3" and a power outage event is reported as "EA7".

Y12 – Y15 = Date (EA102)

The date of the event. This data is sent as BCD in the following sequence YYYY/MM/DD. For example, 17 March 2002 would be 20H 02H 03H 17H. If the date is not known these bytes are filled with 99Hs.

Y16 – Y17 = Time (EA103)

The time of the event. This data is sent as BCD in the following sequence HH/MM. For example, 6:30 PM would be 18H 30H. If the time is not known these bytes are filled with 99Hs.

Y18 – Y21 = Duration (EA206)

The duration of the event in total minutes. This data is sent as binary. For example, 4 hours and 15 minutes would be 00H 00H 00H FFH.

Y22 = Activity (EA205)

The current status of the events activity. This field is equal to 00H if the event is inactive (or not reset for "EA3") or 01H if the event is active (or reset for "EA3").

Z1 = 05 DTS EVENT ACKNOWLEDGE

The Comms Gateway has recognized that a possible alarm situation has occurred and must act accordingly. The specific actions will be defined by the Comms Gateway operational specifications.

If Y1 = 03H then the following "Asset ID" data fields have been identified to be included:

Y2 = Asset Type

The following code pairs have been defined to represent the type of equipment asset that is being communicated.

Code	Equipment type	DTS header ( $\alpha\alpha$ )
01H / 81H	Audit Module / Data Carrier (DC) Identification	AM1
02H / 82H	Bill Validator Identification	BA1
03H / 83H	Changer Identification	CA1
04H / 84H	Control Board Identification	CB1
05H / 85H	Cashless #1 Identification	DA1
06H / 86H	Cashless #2 Identification	DB1
07H / 87H	Machine Identification	ID1

If Y2 has the MSB = 0 (i.e. Y2 = 01H) then the following asset data fields have been identified to be included:

Y3 – Y5 = Manufacturer code ( $\alpha\alpha 101$ , first 3 characters)

Identification code for the equipment supplier. Sent as ASCII characters. Blanks (20H) are acceptable.

Y6 - Y17 = Serial number ( $\alpha\alpha 101$ , 4<sup>th</sup> through 15<sup>th</sup> characters)

Factory assigned serial number sent as numeric ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Y18 - Y29 = Model number ( $\alpha\alpha 102$ )

Manufacturer assigned model number sent as ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Y30 - Y31 = Software version (or Build Standard) (αα103)

Current software version sent as packed BCD.

If Y2 has the MSB = 1 (i.e. Y2 = 81H) then the following asset data fields have been identified to be included:

Y2 – Y21 = Asset Number (αα105 or αα106)

The asset number of the equipment. This is a reference number used for tracking purposes, separate from the serial number. It is usually programmed by the equipment operator.

If Y1 = 04H then the following "Currency ID" data fields have been identified to be included:

Y2 – Y3 = VMC's Country / Currency Code (ID402)

The packed BCD Country / Currency code of the VMC can be sent in two different forms depending on the value of the left most BCD digit.

If the left most digit is a 0, the International Telephone Code is used to indicate the country that the changer is set-up for. For example, the USA code is 00 01H (Z2 = 00 and Z3 = 01).

If the left most digit is a 1, the latest version of the ISO 4217 numeric currency code is used. For example, the code for the US dollar is 18 40H (Z2 = 18 and Z3 = 40) and for the Euro is 1978 (Z2 = 19 and Z3 = 78).

All new designs after July, 2000 must use the ISO 4217 numeric currency codes.

Y4 = VMC's Coin Scaling Factor / Currency Description (ID403)

The multiplier used to scale all monetary values transferred between the VMC and the vending machines monetary system.

Y5 = VMC's Decimal Point (ID401)

The number of digits to the right of the decimal point. This field is used in countries whose currency requires a number of digits to the right of the decimal point other than 2.

If Y1 = 05H then the following "Product ID" data fields have been identified to be included:

Y2 – Y3 = Item Number

This is the binary field used to link REPORT type 01 to REPORT type 05. This number is defined by the manufacturer.

Y4 – Y9 = Product Number (PA101)

This is the ASCII representation of the Item Number that should be included in the DTS file. All bytes must be sent, leading blanks (20H) are acceptable.

Y10 – Y29 = Product Identification (PA103)

The ASCII product identification that should identify the product itself, as in a name (chips/crisps) or an ID number / bar code. All bytes must be sent, leading blanks (20H) are acceptable.

Y30 = Selection Presence Status (PA107)

This field is set to 00H if a vend mechanism (motor, solenoid, etc.) is present for this selection. This field is set to 01H if a vend mechanism is not present.

An example of a 01H being sent would be if the vend mechanism was present previously, and something occurred so that it is not being currently detected (i.e., removed, broken wire, etc.). It is **not** intended to indicate that a product is not available for vending (i.e., sold out).

**VMC Command    Code/Sub-code    VMC Data    Comms Gateway Response**

CONTROL            1CH                    Y1                    No data

This command is the vehicle that the VMC uses to control the Comms Gateway's use of an external collection device. For example when it should, or should not, transmit through the external collection device. The information is identified by one of the following subcommands;

Y1 = 00            Disabled  
                           No external transmissions will be granted and no REPORT commands will be sent.

Y1 = 01            Enabled  
                           External transmissions may be requested and REPORT commands will be sent.

Y1 = 02            Transmit

Permission to transmit and / or receive data is granted, or a transmission session is requested. A DATA TRANSMITTED response to a POLL must be sent when the transmission session is complete.

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION/ IDENTIFICATION	1FH/00H	Y1	Z1 - Z34

Y1 = 00H IDENTIFICATION subcommand

The VMC is requesting Comms Gateway identification information for asset tracking and optional feature purposes.

Z1 = 06H PERIPHERAL ID

Comms Gateway is sending peripheral ID information. This response includes the following data;

Z2 - Z4 = Manufacturer code

Identification code for the equipment supplier. Sent as ASCII characters. Blanks (20H) are acceptable.

Z5 - Z16 = Serial number

Factory assigned serial number sent as numeric ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Z17 - Z28 = Model number ASCII.

Manufacturer assigned model number sent as ASCII characters. All bytes must be sent. Zeros (30H) and blanks (20H) are acceptable.

Z29 - Z30 = Software version

Current software version sent as packed BCD.

Z31 - Z34 = Optional Features

Each of the 32 bits indicate an optional features availability. If the bit is set the feature is available. Currently defined options include:

b0: File transport layer support.  
 b1: Verbose mode: See REPORT command  
 b2 - b31: Future use, must be set to 0.

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION/ FEATURE ENABLE	1FH/01H	Y1 - Y5	No data

Y1 = 01H FEATURE ENABLE subcommand

This command is used to enable each of the optional features defined in Z32-Z35 of the PERIPHERAL ID response. The VMC should send the EXPANSION /IDENTIFICATION command, receive the PERIPHERAL ID response, perform a logical OR with the optional features it wants to enable, and return the resulting enabled features back to the Comms Gateway by setting a bit to 1 for each respective optional feature enabled. All optional features are disabled after reset.

Y2 - Y5 = Optional features enabled

Each of the 32 bits indicates an optional features state. If the bit is set the feature is enabled.

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION/ TIME/DATE REQUEST	1FH/02H	Y1	Z1-Z11

Y1 = 01H TIME/DATE subcommand

Normally the Comms Gateway is a networked device, and therefore capable of asking the actual time from a server if required. This command is used to synchronize the VMC's real time clock from the Comms Gateway.

To be able to use the command it must be enabled via the EXPANSION / FEATURE ENABLE command.

Z1 = 01H CG Time/Date

The date bytes are BCD encoded

Z2 = Years (Range: 00..99)

Z3 = Months (Range: 01..12)

Z4 = Days (Range: 01..31)

Z5 = Hours (Range: 00..23)

Z6 = Minutes (Range: 00..59)

Z7 = Seconds (Range: 00..59)

Z8 = Day of Week (Range: 01..07, Monday = 1..Sunday = 7)



- Z9 = Week Number (Range: 01..53)
- Z10 = Summertime (Range: 00..01, Summertime = 1)
- Z11 = Holiday (Range: 00..01, Holiday = 1)

If any item of the time/date is not supported use FFH instead

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION COMMAND	0FH FAH FTL REQ TO RCV	Y1-Y5	Z1 - Zn (immediate or POLLed)

The VMC is requesting to receive data from the Comms Gateway whose destination address will always be (18H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (18H)
- Y2 = Source address of command
- Y3 = File ID
- Y4 = Maximum length
- Y5 = Control
  
- Z1 = 1DH which indicates SEND BLOCK
- Z2 = Destination address of data
- Z3 = Block #
- Z4 - Z34 = Data (maximum of 31 bytes)
- or
- Z1 = 1CH which indicates RETRY / DENY
- Z2 = Destination address of response
- Z3 = Source address of response (18H)
- Z4 = Retry delay

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION COMMAND	0FH FBH FTL RETRY / DENY	Y1-Y3	None

The VMC is retrying, denying, or aborting a data transfer to/from the Comms Gateway whose destination address will always be (18H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 =	Destination address of command (18H)
Y2 =	Source address of command
Y3 =	Retry delay

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION COMMAND	0FH FCH FTL SEND BLOCK	Y1-Y33	None

The VMC is sending data to the Comms Gateway whose destination address will always be (18H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 =	Destination address of command & data (18H)
Y2 =	Block #
Y3 - Y33 =	Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION COMMAND	0FH FDH FTL OK TO SEND	Y1-Y2	Z1-Z34 (immediate or POLLed)

The VMC is indicating that it is OK for the Comms Gateway to transfer data. The destination address will always be the Comms Gateway (18H). Note that all FTL Commands / Responses are defined in Section 2.6.

Y1 =	Destination address of command (18H)
Y2 =	Source address of command
Z1 =	1DH which indicates SEND BLOCK
Z2 =	Destination address of data
Z3 =	Source address of data
Z4 - Z34 =	Data (maximum of 31 bytes)

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION COMMAND	0FH FEH FTL REQ TO SEND	Y1-Y5	Z1 - Zn (immediate or POLLed)

The VMC is requesting to send data to the Comms Gateway whose destination address will always be (18H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (18H)
- Y2 = Source address of command
- Y3 = File ID
- Y4 = Maximum length
- Y5 = Control
  
- Z1 = 1EH which indicates OK TO SEND
- Z2 = Destination address of response
- Z3 = Source address of response (18H)  
or
- Z1 = 1CH which indicates RETRY / DENY
- Z2 = Destination address of response
- Z3 = Source address of response (18H)
- Z4 = Retry delay

<u>VMC Command</u>	<u>Code/Sub-code</u>	<u>VMC Data</u>	<u>Comms Gateway Response</u>
EXPANSION/ DIAGNOSTICS	1FH/FFH	Y1 - Yn	Z1 - Zn

- Y1 = FFH    DIAGNOSTICS subcommand  
  
Device manufacturer specific instruction for implementing various manufacturing or test modes.
- Y2 - Yn =    User defined data  
  
The data portion of this command is defined by the manufacturer and is not part of this document.
- Z1 = FFH    DIAGNOSTICS  
  
The Comms Gateway is responding to a EXPANSION/DIAGNOSTICS command. This response includes the following data;  
  
Z2 - Zn =    User defined data

Device manufacturer specific responses after receiving manufacturing or test instructions. Z1 - Zn implies that any number of bytes may be used for the response data from the Comms Gateway.

## **8.4 Communications Gateway Non-Response Time**

The maximum non-response time for a Comms Gateway is 5 seconds. This is the maximum time for which a Comms Gateway will not respond to a command with ACK, NAK, or a data message.

## **8.5 Communications Gateway Power Requirements**

The current draw for any Comms Gateway must fall within the following limits. All measurements are at the minimum VMC Voltage Output.

Idle mode = 300 mA. (avg.) continuous

Active mode = 1.8 A continuous and up to 2.5 A (max) for an accumulated maximum of 10 seconds. The active power mode must be initiated by the REQUEST TO TRANSMIT followed by the CONTROL/TRANSMIT. The active power mode must be closed by sending the DATA TRANSMITTED. During this time the VMC will make its own decisions about which other peripherals will be disabled or not. This may result in the entire machine being disabled for normal vending.

## 8.6 Communications Gateway Examples

Event	Exchange
Power on Reset at VMC or JUST RESET received by VMC any other time	Reset sequence Enable sequence
Communications Gateway is triggered to send a file	Request sequence Transmit sequence
VMC is triggered to send a file	Dump sequence Transmit sequence
DTS Event situation occurs at VMC	DTS Event sequence Request sequence Transmit sequence
Error situation is detected at Comms Gateway	Error sequence
Every vend completion	Vend sequence

Reset sequence		
VMC	Comms Gateway	Comments
RESET (18)	→	Reset command
	← ACK	
POLL (1A)	→	Must be sent once reset, internal or external
	← JUST RESET (00)	
ACK	→	
SETUP (19...)	→	Establish operation configuration
	← CONFIG. (01...)	
ACK	→	
EXPANSION/ID (1F/00...)	→	Send asset information
	← PERIPHERAL ID (06...)	Get asset information
ACK	→	
EXPANSION/FEATURE ENABLE (1F/01...)	→	Enable additional feature if necessary
	← ACK	
Enable sequence		
VMC	Comms Gateway	Comments
CONTROL/ENABLE (1C01)	→	Enable command
	← ACK	
Disable sequence		
VMC	Comms Gateway	Comments
CONTROL/DISABLE (1C00)	→	Disable command
	← ACK	

Request sequence		
VMC	Comms Gateway	Comments
File transfer done	using the MDB	file transport layer
Dump sequence		
VMC	Comms Gateway	Comments
File transfer done	using the MDB	file transport layer
Transmit sequence		
VMC	Comms Gateway	Comments
POLL (1A)	→	
	←	Request to transmit (02)
ACK	→	
CONTROL/ TRANSMIT (1C/02)	→	
	←	ACK
POLL (1A)		
	ACK	
	.	Continue POLLing until ...
	.	
POLL (1A)	→	
	←	Data transmitted (03)
ACK	→	
DTS Event sequence		
VMC	Comms Gateway	Comments
REPORT (1B / 02...)	→	
	←	ACK
	.	Repeat until recognized
	.	
REPORT (1B /02...)	→	
	←	DTS EVENT ACKNOWLEDGE (05)
Error sequence		
VMC	Comms Gateway	Comments
POLL (1A)	→	
	←	ERROR (06)
ACK	→	Sent continuously, or until the error is resolved
Activity sequence		
VMC	Comms Gateway	Comments
REPORT (1B...)	→	Sent every activity
	←	ACK

## Section 9

### *Universal Satellite Device (USD) VMC/Peripheral Communication Specifications*

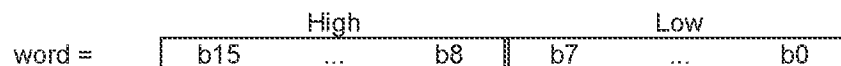
#### 9.1 Introduction

An MDB Universal Satellite Device (USD) is a vending device which lacks customary credit acceptance peripherals. As such, a USD must rely on a host vending machine controller (VMC) to establish credit sufficient to perform a vend. The specification herein describes a protocol by which a USD and a VMC exchange messages and credit via the MDB bus.

##### 9.1.1 Definitions

This section defines the non-response and application response time, base addresses, and the communication bytes sent by the MDB Universal Satellite Device (USD) and a Vending Machine Controller.

- The default maximum non-response time of the USD is 5 seconds.
- The default maximum application response time of the USD is 5 seconds.
- Three consecutive USD base addresses are defined to allow multiple USDs to operate simultaneously from a single VMC
- As defined in Section 2.3, the USD Base addresses are as follows: 01000xxxB (40H), 01001xxxB (48H), and 01010xxxB (50H).
- The specification defined herein assumes a USD base address of 40H in all examples. It should be understood that differing USD base addresses (48H and 50H) will follow the same command format.
- Multi-message responses to a single command are supported. Message length is subject to the 36 byte limit imposed by the MDB standard.
- Unless stated otherwise, all byte information contained herein is assumed to be in a binary format.
- $Y_n$  represents bytes transmitted by the VMC, and  $Z_n$  are bytes transmitted by the USD.
- When words are referenced, they consist of two bytes with the higher order byte first.



## 9.2 USD Summary

This section is a summary of the USD command set and an overview of the modes of operation.

### 9.2.1 Command Summary

Command	Hex Code	Description
RESET	40	Command for USD to self-reset.
SETUP	41	Command to configure USD to VMC requirements.
POLL	42	Command to request for USD activity status.
VEND	43	Command for vend approve / deny.
FUNDS	44	Command to send funds available or to set prices.
CONTROL	45	Command to enable/disable USD.
EXPANSION	47	Command to allow addition of features and enhancements.

### 9.2.2 Overview

The USD Command set described herein allows USDs' to be controlled under the following three modes of operation. The USD's mode of operation is determined by the USD's configuration byte<sup>1</sup> and the sequence of commands the VMC uses.

- Mode One** VMC is used to select items to be vended from the USD and the VMC contains all pricing information. The USD receives vend requests from the VMC and reports vend success or failure.
- Mode Two** The USD or the VMC may select items to be vended. The USD may have special requirements for price and/or selection ID display. In this case, the USD may issue a **FUNDS** request to retrieve this information. The USD must then issue a **VEND** request to gain approval from the VMC before a vend can take place.
- Mode Three** The USD selects items to be vended and has its own pricing information. The USD must issue an vend request to the VMC and gain approval before a vend can take place.

<sup>1</sup> Configuration byte refers to byte Z31 of the sequence Z31 through Z34 of the expansion 07 command. Please refer to page 9.12 for more information on how this byte influences the USD's mode of operation.



## 9.3 Command Protocol

This section contains the complete command set relating to the USD.

### 9.3.1 RESET

Command	Code	VMC Data	USD Response data
RESET	40	No data bytes.	ACK

The **RESET** command is the vehicle that the VMC should use to instruct the USD to return to its default (power on) operating mode. The USD should respond to a reset command with an ACK to acknowledge receipt of the reset command. The USD must not accept any vend requests until the VMC issued setup command sequence has been completed.

The USD must also respond to the VMC issued "master reset" which resets all MDB peripheral devices. The VMC causes a master reset by transmitting a continuous break condition for a minimum of 100 milliseconds.

To ensure proper initialization, the USD should issue a "just reset" (see **POLL** response **00**) whenever it's pricing or configuration has changed.

### 9.3.2 SETUP

Command	Code	VMC Data	USD Response Data
SETUP	41	5 bytes: Y1-Y5	7 bytes: 04 + Z1 - Z6

The **SETUP** command is the vehicle that the VMC should use to configure the USD for feature level, credit scaling factor, display decimal place, and maximum vend approve/deny time. The USD responds to this command by returning it's feature level, highest vend price (divided by the scaling factor), selection configuration, and maximum application response time.

Alternatively, if the USD is not prepared to render a full response to the **SETUP** command, it may reply with an ACK. If this occurs, the USD must transmit it's setup data later, in response to a **POLL** command (see **POLL** command, response **04**). Until the **SETUP** command has been received by the USD, and the USD has correspondingly returned it's own setup data to the VMC, all vend requests will be disallowed.

#### Data sequence transmitted by the VMC to the USD during SETUP

VMC Data	Meaning or interpretation
----------	---------------------------

Y1 =	VMC Feature level, Indicates current feature level of the VMC. Currently defined level is one. <sup>2</sup>
Y2 - Y3 =	Scaling factor 2 bytes (word). All transactions with the USD must be evenly divisible by this number.
Y4 =	Decimal place (02=US). Indicates the position of the decimal place on the USD's optional credit display
Y5 =	VMC maximum approve / deny time in seconds, FF = 255 seconds.

#### Data sequence transmitted by the USD to the VMC during SETUP

USD Response	Meaning or interpretation
04 + Z1 =	USD Feature level, indicates current feature level of the USD. Currently defined level is one. <sup>3</sup>
Z2 - Z3 =	Maximum price on USD in 2 bytes (word). Indicates the highest priced item on the USD. <sup>4</sup> USD should return FF FFh if it does not have internal pricing capability.
Z4 - Z5 =	Item number, defined by the manufacturer configuration (Binary).
Z6 =	USD maximum application response time in seconds, FF = 255 seconds.

<sup>2</sup> Feature level of the VMC is sent to allow the USD to arbitrate command compatibility with the VMC.

<sup>3</sup> Feature level of the USD is sent to allow the VMC to arbitrate command compatibility with the USD. The USD may opt to send this data later in response to a POLL.

<sup>4</sup> The maximum price on the USD is returned to the VMC so this price can be used in the computation of maximum credit acceptance.

## 9.3.3 POLL

Command	Code	USD response Data	USD Response Description
POLL	42	00	USD has just been reset, or wishes to be reset by the VMC.
		01 + 4 bytes Z1- Z4	Vend request, USD requests approval to vend a specified item from VMC.
		02	Vend or home success, requested vend or home was successful.
		03 + 4 bytes Z1 - Z4	Vend or home fail, requested vend or home has failed. Reason for failure is returned.
		04 + 6 bytes Z1 - Z6	USD configuration and setup data.
		05 + 2 bytes Z1 - Z2	USD item price request.
		06 + 2 bytes Z1 - Z2	USD Error codes.
		07 + 34 bytes Z1 - Z34	USD Peripheral ID string.
		08 + 4 bytes Z1 - Z4	USD Status response.
		09 + n bytes Z1 - Zn	USD multiple data block transfer response.
		0A + n bytes Z1 - Zn	USD single data block response
		1B + 5 bytes Z2 - Z6	FTL REQ TO RCV response
		1C + 3 bytes Z2 - Z4	FTL RETRY / DENY response
		1D + n bytes Z2 - Zn	FTL SEND BLOCK response
		1E + 2 bytes Z2 - Z3	FTL OK TO SEND response
		1F + 5 bytes Z2 - Z6	FTL REQ TO SEND response
		FF + Z1 - Zn	USD Diagnostic response.

The **POLL** command is used by the VMC to obtain status information from the USD. The same command is used by the USD to indicate a reset, request a vend, indicate vend success, indicate the reason for a vend failure, request the price of an item, send configuration and/or error data, return the USD's peripheral identification string, control the transmission and reception of data blocks, return a status and/or diagnostic response.

The USD responds to the **POLL** command with either an ACK, or a multi-byte response if there is more information to convey.

**Data sequence transmitted by the USD to the VMC after a *Reset Request***

USD Response	Meaning or interpretation
00	The 00 response indicates that the USD has just been reset or wishes to be reset <sup>5</sup> .

**Data sequence transmitted by the USD to the VMC for a *Vend Request***

USD Response	Meaning or interpretation
01 + Z1- Z2 =	Selection in 2 bytes. Indicates the product to be vended by item number, defined by the manufacturer, as part of a vend request.
Z3 - Z4 =	Scaled product price in 2 bytes (word). Indicates the price of the product to be vended divided by the scaling factor. A price of FFFF is transmitted if the USD does not contain price information.

**Data sequence transmitted by the USD to the VMC after a *Vend or Home success***

USD Response	Meaning or interpretation
02	Indicates that the requested vend or home was successful.

**Data sequence transmitted by the USD to the VMC after a *Vend or Home Fail***

USD Response	Meaning or interpretation
03 + Z1 - Z2 =	USD item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range <sup>6</sup> . b4 = Health safety error. b5 - b15 = Not defined.

<sup>5</sup> The VMC is expected to reconcile whether the USD is transmitting a 00 in confirmation of a VMC issued reset that has just occurred, or as an unsolicited request to be reset. The context of the VMC's prior communication activity should be used in making this assessment.

**Data sequence transmitted by the USD to the VMC if *SETUP* response delayed**

USD Response	Meaning or interpretation
04 + Z1 =	USD Feature level, Indicates current feature level of the USD. The currently defined level is one. <sup>7</sup>
Z2 - Z3 =	Maximum price on USD 2 bytes (word). Indicates the highest priced item on the USD. <sup>8</sup> USD should return FF FFh if it does not have internal pricing capability.
Z4 - Z5 =	Item number, defined by the manufacturer.
Z6 =	USD maximum application response time in seconds, FF = 255 seconds.

**Data sequence transmitted by the USD if the *USD* needs pricing information**

USD Response	Meaning or interpretation
05 + Z1 - Z2 =	Item number, defined by the manufacturer.

**Data sequence transmitted by the USD if the *USD* has a failure to report to VMC**

USD Response	Meaning or Interpretation
06 + Z1 - Z2 =	Bits: b0 = Health Safety violation. b1 = Home or Chute sensor failure b2 = Keypad or Selection switch failure b3 - b15 = Not defined.

**Data sequence transmitted by the USD for peripheral ID**

<sup>6</sup> This error code is included to identify actuators that may not be present within the initially defined row and column configuration. See bytes Z4 and Z5 of the USD's setup response. This is typical in a snack machine implementation where some trays may not be populated with a full complement of motors and/or actuators.

<sup>7</sup> Feature level of the USD is sent to allow the VMC to arbitrate command compatibility with the USD. The USD may have elected to transmit this setup data in fulfillment of an earlier **SETUP** command.

<sup>8</sup> The maximum price on the USD is returned to the VMC so this price can be used in the computation of maximum credit acceptance.

USD Response	Meaning or Interpretation
07 + Z1 - Z3 =	Manufacturer ID Code.
Z4 - Z15 =	USD Serial Number.
Z16 - Z27 =	USD Model Number.
Z28 - Z29 =	USD Software Version.
Z30 - Z33 =	Optional feature bits.

**Data sequence transmitted by the USD to the VMC after a Status request**

USD Response	Meaning or interpretation
08 + Z1 - Z2 =	Item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range. b4 = Health safety error. b5 - b15 = Not defined.

**Data sequence transmitted by the USD to the VMC after a USD data transfer command**

USD Response	Meaning or interpretation
09 + Z1 =	Z1 = 00 USD requests to receive data block Z2 from VMC Z1 = 01 USD requests to send Z2 data block(s) to VMC Z1 = 02 USD data block response where: Z2 = data block number Z3 - Zn = contents of data block
Z2 =	Z2 = Block number USD requests to receive if Z1 = 00 Z2 = Number of blocks the USD requests to send if Z1 = 01 Z2 = Block number the USD is sending if Z1 = 02.
Z3 - Zn =	Contents of data block sent by USD to VMC if Z1 = 02

Data sequence transmitted by the USD to the VMC to send a single block of data

USD Response	Meaning or interpretation
0A + Z1 - Zn =	Z1 - Zn = Arbitrary data to be received by the VMC. The number "n" must be less than 35 per MDB standards

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) REQ TO RCV command

USD Response	Meaning or interpretation
Z1=1B + Z2 - Z6	The USD is requesting to receive data from a device or VMC Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = File ID Z5 = Maximum length Z6 = Control

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) RETRY / DENY command

USD Response	Meaning or interpretation
Z1=1C + Z2 - Z4	The USD is requesting a device or VMC to retry or deny the last FTL command. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = Retry delay

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) SEND BLOCK command

USD Response	Meaning or interpretation
Z1=1D + Z2 - Z34	The USD is sending a block of data (maximum of 31 bytes) to a device or VMC. Z2 = Destination address of response Z3 = Block # Z4 - Z34 = Data (maximum of 31 bytes)

**Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) OK TO SEND command**

USD Response	Meaning or interpretation
Z1=1E + Z2 - Z3	The USD is indicating that it is OK for the device or VMC to send it data. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H)

**Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) REQ TO SEND command**

USD Response	Meaning or interpretation
Z1=1F + Z2 - Z6	The USD is requesting to send data to a device or VMC. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = File ID Z5 = Maximum length Z6 = Control

**Data sequence transmitted by the USD to the VMC after a diagnostic command**

USD Response	Meaning or interpretation
FF + Z1 - Zn =	Diagnostic response.

### 9.3.4 VEND

Command	Code	Sub-Cmd	VMC Data	Response Data
VEND	43	00	none	none
	43	01	none	none
	43	02	2 bytes Y1-Y2	none
	43	03	2 bytes Y1-Y2	none
	43	04	2 bytes Y1-Y2	5 bytes: 08 + Z1 - Z4

The **VEND** command is the vehicle that the VMC uses to signal vend approval or disapproval in response to a USD issued vend request (**POLL** response 01). The



VEND command can also be used by the VMC to initiate a vend, home a selection, or query the status of a selection on the USD.

Sub Cmd:	Meaning or interpretation
00 =	Requested vend approved.
01 =	Requested vend disapproved.
02 =	Vend specified Item number, defined by the manufacturer.
03 =	Home specified Item number, defined by the manufacturer.
04 =	Request status of specified Item number, defined by the manufacturer.

#### Data sequence transmitted by the USD to the VMC after a Status request

USD Response	Meaning or interpretation
08 + Z1 - Z2 =	Item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range. b4 = Health safety error. b5 - b15 = Not defined.

#### 9.3.5 FUNDS

Command	Code	Sub-Cmd	VMC Data	Response Data
FUNDS	44	00	2 bytes: Y1-Y2	none
	44	01	6 bytes: Y1-Y6	none

The **FUNDS** command is the vehicle the VMC should use to specify the funds available for vending. The **FUNDS** 00 command is issued by the VMC whenever the level of credit changes. Typically, the USD would display the credit information returned by a **FUNDS** 00 command on a credit display. The **FUNDS** 01 is issued by the VMC in response to an item price request (**POLL** response 05) by the USD.

Sub-Cmd	Meaning or interpretation
00 + Y1 - Y2 =	Funds available in 2 bytes (word), scaled by the coin scaling factor.

Sub Cmd	Meaning or interpretation
01 + Y1 - Y2 =	Item number, defined by the manufacturer.
Y3 - Y4 =	Selection price in 2 bytes (word) scaled by coin scaling factor.
Y5 - Y6 =	Alphanumeric selection identifier 2 bytes (word), or FFFF if not available. <sup>9</sup>

### 9.3.6 CONTROL

Command	Code	Sub-Cmd	VMC Data	Response Data
CONTROL	45	00	none	none
	45	01	none	none

This command is the vehicle the VMC should use to enable or disable the USD.

Sub-Cmd	Meaning or interpretation
00	Disable USD.
01	Enable USD.

### 9.3.7 EXPANSION

Command	Code	Sub-Cmd	VMC Data	Response Data
EXPANSION	47	00	None	07 + Z1 - Z34 Peripheral ID string and feature bits.
	47	01	Y1 - Y4	none
	47	02	Y1	none
	47	03	Y1 - Y <sub>n</sub>	none
	47	04	Y1	09 + Z1 + Z2 - Z <sub>n</sub>
	47	05	Y1 - Y <sub>n</sub>	none
	47	FA	Y1 - Y5	1D + Z2 - Z34 or 1C + Z2 - Z4
	47	FB	Y1 - Y3	none
	47	FC	Y1 - Y33	none
	47	FD	Y1 - Y2	1D + Z2 - Z34

<sup>9</sup> Alpha-numeric selection identifier is provided to the USD for display purposes only.

	47	FE	Y1 - Y5	1E + Z2 - Z3 or 1C + Z2 - Z4
	47	FF	Diagnostics	Diagnostic response.

**Data sequence transmitted by the USD to the VMC after an expansion 00 sub-command**

USD Response	Meaning or Interpretation
07 + Z1 - Z3 =	Manufacturer ID Code.
Z4 - Z15 =	USD Serial Number.
Z16 - Z27 =	USD Model Number.
Z28 - Z29 =	USD Software Version.
Z30 - Z33 =	Optional feature bits: <ul style="list-style-type: none"> <li>b0 = USD is capable of storing and controlling pricing.</li> <li>b1 = USD is capable of selecting items to vend.</li> <li>b2 = USD is capable of supporting the File Transport Layer. This support is defined in Section 2.6.</li> <li>b3 - b31 = Available for future use.</li> </ul>

**Sub-Command used by the VMC to enable optional feature bits on the USD**

Sub-Cmd	Meaning or interpretation
01 + Y1 - Y4	Enable optional feature bits defined in Z31-Z34 above. Feature is enabled if bit is set to 1, all features are disabled after a reset.

**Sub-Command used by the VMC to identify the number of data blocks it wishes to send to the USD**

Sub-Cmd	Meaning or interpretation
02 + Y1	Number of data blocks the VMC has to send to the USD (Binary)

**Sub-Command used by the VMC to transmit a data block to the USD (Y2-Yn) and to identify the current block number being transmitted (Y1)**

Sub-Cmd	Meaning or interpretation
---------	---------------------------

03 + Y1	Block number the VMC is transmitting to the USD
Y2 - Yn <sup>10</sup>	Data the VMC is transmitting to the USD

**Sub-Command used by the VMC to request that the USD send or re-send data block number (Y1)**

Sub-Cmd	Meaning or interpretation
04 + Y1	VMC requests USD to send block Y1

**Sub-Command used by the VMC to send a single block of data to the USD**

Sub-Cmd	Meaning or interpretation
05 + Y1 - Yn	VMC sends a single block of data consisting of Y1..Yn

**Sub-Command used by the VMC for an FTL REQ TO RCV. The Z1- Zn response can be either immediate or delayed (POLLED).**

Sub-Cmd	Meaning or interpretation
FA + Y1 - Y5	<p>The VMC is requesting to receive data from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6.</p> <p>Y1 = Destination address of command (40H,48H,50H)  Y2 = Source address of command  Y3 = File ID  Y4 = Maximum length  Y5 = Control</p>
<b>USD Response</b>	<b>Meaning or interpretation</b>
Z1 - Z34	<p>Z1 = 1DH which indicates SEND BLOCK  Z2 = Destination address of data  Z3 = Block #  Z4 - Z34 = Data (maximum of 31 bytes)</p>
or	or
Z1 - Z4	<p>Z1 = 1CH which indicates RETRY / DENY  Z2 = Destination address of response  Z3 = Source address of response (40H,48H,50H)  Z4 = Retry delay</p>

<sup>10</sup> The number "n" is limited by the MDB maximum message length of 36 bytes.

**Sub-Command used by the VMC for an FTL RETRY / DENY.**

Sub-Cmd	Meaning or interpretation
FB + Y1 - Y3	<p>The VMC is retrying, denying, or aborting a data transfer to/from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6.</p> <p>Y1 = Destination address of command (40H,48H,50H)  Y2 = Source address of command  Y3 = Retry delay</p>

**Sub-Command used by the VMC for an FTL SEND BLOCK.**

Sub-Cmd	Meaning or interpretation
FC + Y1 - Y33	<p>The VMC is sending data to the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6.</p> <p>Y1 = Destination address of command (40H,48H,50H)  Y2 = Block #  Y3 - Y33 = Data (maximum of 31 bytes)</p>

**Sub-Command used by the VMC for an FTL OK TO SEND. The Z1 to Z33 response can be either immediate or delayed (POLLED).**

Sub-Cmd	Meaning or interpretation
FD + Y1 - Y2	<p>The VMC is requesting to receive data from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6.</p> <p>Y1 = Destination address of command (40H,48H,50H)  Y2 = Source address of command</p>
<b>USD Response</b> Z1 - Z34	<p><b>Meaning or Interpretation</b></p> <p>Z1 = 1DH which indicates SEND BLOCK  Z2 = Destination address of data  Z3 = Source address of data  Z4 - Z34 = Data (maximum of 31 bytes)</p>

**Sub-Command used by the VMC for an FTL REQ TO SEND. The Z1 - Zn response can be either immediate or delayed (POLLED).**

Sub-Cmd	Meaning or interpretation
FE + Y1 - Y5	The VMC is requesting to send data to the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6.  Y1 = Destination address of command (40H,48H,50H) Y2 = Source address of command Y3 = File ID Y4 = Maximum length Y5 = Control
<b>USD Response</b>	<b>Meaning or Interpretation</b>
Z1 - Z34	Z1 = 1EH which indicates OK TO SEND Z2 = Destination address of response Z3 = Source address of response (40H,48H,50H)
or	or
Z1 - Z4	Z1 = 1CH which indicates RETRY / DENY Z2 = Destination address of response Z3 = Source address of response (40H,48H,50H) Z4 = Retry delay

**Data sequence transmitted by the USD to the VMC after a diagnostic command**

USD Response	Meaning or interpretation
FF + Z1 - Zn =	Diagnostic response.

## 9.4 USD Power Requirements

This section defines the maximum power requirements for a USD.

USD peripherals may draw power from the MDB bus or from an integral power supply. In such cases where the USD will require power from the MDB bus, the current draw must remain within the following limits:

USD Mode	Current draw
Idle	200 mA ( maximum continuous)
Vending/Homing	1.75 A (for up to 10 seconds)

## 9.5 Examples – Mode 1 / 2 / 3 Sessions

This section contains three examples of USD sessions in which each of the three modes of USD operation are demonstrated operation respectively.

### 9.5.1 MODE ONE

In this example session the VMC selects the item to vend and knows the vend price. The USD receives the vend command, attempts the vend, and reports if the attempted vend failed or was successful.

VMC	MDB Data	Explanation	USD
⇒	43+02+01+03	VMC requests to vend item from the USD.	
	<ACK>	USD acks vend request.	⇐
⇒	42	VMC polls the USD.	
	<ACK>	USD acks receipt of poll.	⇐
⇒	42	VMC polls the USD again .	
	02	USD responds: vend complete	⇐
⇒	<ACK>	VMC acks vend outcome.	

### 9.5.2 MODE TWO

In this example session the USD or the VMC can select items to vend but the USD may not be aware of the vend price of the item selected. If the USD needs the selected item price, it may request the item price from the VMC. The USD must then issue a **VEND** request, and wait for approval from the VMC before a vend is attempted. The VMC then approves or denies the requested vend and polls the USD for vend success or vend fail.

VMC	MDB Data	Explanation	USD
⇒	42	VMC polls the USD.	
	05+02+06	USD responds with pricing request for item in USD.	⇐
⇒	<ACK>	VMC acks the USD price request.	
⇒	44+01+02+06+00+1 4 +FF+FF	Using the Funds command the VMC sends a price of 20 coin factors for item in USD.	
	<ACK>	USD acks receipt of VMC price data.	⇐
⇒	42	VMC polls the USD.	
	01+02+06+FF+FF	USD responds with a request to vend item in USD at the VMC selected price.	⇐
⇒	<ACK>	VMC acks receipt of vend request.	
⇒	43 + 00 or 01	VMC approves or denies vend request.	
	<ACK>	USD acks receipt of approval or denial.	⇐
⇒	42	VMC polls the USD.	
	03+02+06+00+01	USD responds: vend fail, sold out.	⇐
⇒	<ACK>	VMC acks vend outcome.	

- The **FUNDS** command can be used by USD's which do not have internal prices but need pricing information for display purposes or for other reasons that are not required to complete a transaction.



### 9.5.3 MODE THREE

In this example session the USD selects the item to vend and is aware of the vend price of the item. The USD must issue a vend request and the VMC then approves or denies the requested vend. The VMC then polls the USD for vend success or vend fail.

VMC	MDB Data	Explanation	USD
⇒	42	VMC polls the USD.	
	01+03+02+00+1E	USD requests vend for item at in USD with price of 30 coin factors.	⇐
⇒	<ACK>	VMC acks the USD vend request.	
⇒	43+ 00 or 01	VMC approves or denies vend request.	
	<ACK>	USD acks receipt of approval or denial.	⇐
⇒	42	VMC polls the USD.	
	02	USD responds: vend complete	⇐
⇒	<ACK>	VMC acks vend outcome.	

## 9.6 Examples - Data Block Transfers

This section contains two examples in which data blocks are transferred between the VMC and the USD and vice versa.

### 9.6.1 Data Block Transfer from VMC to USD

In this example the VMC wishes to send two data blocks to the USD. To do this, the VMC uses the expansion 02 command to advise the USD of its request to send data and also to identify the number of data blocks it wishes to send. In response, the USD uses a poll 09 to request the transmission of a data block with the block number enumerated as part of its poll response. The VMC then uses a different expansion command (03) to send the data to the USD.

VMC	MDB Data	Explanation	USD
⇒	47+02+02	VMC issues a request to send two data blocks to the USD	
	<ACK>	USD acks receipt of the request	⇐
⇒	42	VMC polls the USD	
	09+00+01	USD responds with a request to receive data block number 01 from the VMC	⇐
⇒	<ACK>	VMC acks receipt of block number	
⇒	47+03+01+21+22+23	VMC transmits block number 01 containing data: 21, 22, and 23.	
	<ACK>	USD acks receipt of the data block	⇐
⇒	42	VMC polls the USD.	
	09+00+02	USD responds with a request to receive data block number 02 from the VMC.	⇐
⇒	<ACK>	VMC acks receipt of the block number.	
⇒	47+03+02+24+25+26	VMC transmits block number 02 containing data: 24, 25, and 26.	
	<ACK>	USD acks receipt of the data block	⇐

### 9.6.2 Data Block Transfer from USD to VMC

In this example the USD wishes to send two data blocks to the VMC. To do this, the USD makes use of the Poll 09 command to inform the VMC of its request to send data and also to identify the number of data blocks it wishes to send. In response, the VMC uses expansion 04 command to request the transmission of a data block by the individual block number. The USD then uses the poll 09 response to send the data blocks to the VMC.

VMC	MDB Data	Explanation	USD
⇒	42	VMC polls the USD	
	09+01+02	USD responds with a request to send 2 data blocks to the VMC	⇐
⇒	<ACK>	VMC acks request to send data	
⇒	47+04+01	VMC responds with a request to receive data block number 01 from the USD	
	<ACK>	USD acks receipt of block number request	⇐
⇒	42	VMC polls the USD	
	09+02+01+55+56+57	USD responds by transmitting block number 01 containing data 55, 56, and 57.	⇐
⇒	<ACK>	VMC acks receipt of data	
⇒	47+04+02	VMC responds with a request to receive data block number 02 from the USD	
	<ACK>	USD acks receipt of block number request	⇐
⇒	42	VMC polls the USD	
	09+02+02+58+59+60	USD responds by transmitting block number 02 containing data 58, 59, and 60.	⇐
⇒	<ACK>	VMC acks receipt of data	

## 9.7 Universal Satellite Device Examples

Reset Sequence	Controller	USD	Comments
RESET (40)	→		Reset command
	←	ACK	
POLL (42)	→		
	←	JUST RESET (00)	Must be sent once
ACK	→		
SETUP (41)	→		Establish operation configuration
	←	CONFIG. (04...)	
ACK	→		
EXPANSION/ID (47/00...)	→		Send asset information
	←	PERIPHERAL ID (07...)	Get asset information
ACK	→		
EXPANSION/FEATURE ENABLE (47/01...)	→		Enable additional feature if necessary
	←	ACK	
VEND/STATUS REQUEST (43/04 01 01)	→		Check the status of column 1
	←	ACK	
POLL (42)	→		
	←	STATUS (08...)	Status of column 1
ACK	→		
	⋮		
	⋮		
CONTROL/ENABLE (45/01)	→		Enable command
	←	ACK	
VEND/HOME REQUEST (43/03 01 01)	→		Home column 1
	←	ACK	
POLL (42)	→		
	←	VEND COMPLETE (02...)	Homing of column 1 completed
ACK	→		
	⋮		
	⋮		
Enable Sequence	Controller	USD	Comments
CONTROL/ENABLE (45/01)	→		Enable command
	←	ACK	
Disable Sequence	Controller	USD	Comments
CONTROL/DISABLE (45/00)	→		Disable command
	←	ACK	

Multi-Drop Bus / Internal Communication Protocol

Vend Sequence			
Controller		USD	Comments
FUNDS/FUNDS AVAIL (43...)	→		Post funds available to alert device of pending activity
	←	ACK	
POLL	→		Waiting for activity
	←	ACK	
VEND/VEND REQUEST (43/02 01 03)	→		Vend from row 1, col. 3
	←	ACK	
POLL (42)	→		Nothing to report waiting for vend to complete
	←	ACK	
	.		
	.		
POLL (42)	→		VEND COMPLETE (02) or VEND FAIL (03...)
	←	VEND COMPLETE (02)	
ACK	→		
Error Sequence			
Controller		USD	Comments
POLL (42)	→		Sent once for each error
	←	ERROR (06...)	
ACK	→		

*(this page intentionally left blank)*

## Section 10

### *Coin Hopper or Tube - Dispenser VMC/Peripheral Communication Specifications*

#### 10.1 Introduction

This section defines the communication bytes sent and received by a coin dispensing device, which may be in the form of a hopper or tube device. As defined in Section 2.3, there are two dispenser device addresses; Dispenser #1, 01011xxxB (58H) and Dispenser #2, 01110xxxB (70H). The second address has been assigned to allow for two unique forms of dispenser devices to be resident in the vending machine simultaneously. **Everything defined in this section will be common to the two dispenser devices – only the addresses will be different.**

Unless stated otherwise, all information is assumed to be in a binary format

#### 10.2 VMC Commands

<u>Command</u>	<u>Hex Code</u>	<u>Description</u>
RESET	58H / 70H	Command for dispenser to self-reset
SETUP	59H / 71H	Request for dispenser setup.
DISPENSER STATUS	5AH / 72H	Request for dispenser tube / hopper status and coin count.
POLL	5BH / 73H	Request for dispenser activity status.
MANUAL DISPENSE ENABLE	5CH / 74H	Signifies coin types allowable for coin dispensing. This command is followed by setup data. See command format section.
DISPENSE *	5DH / 75H	Command to dispense coins. Followed by coin type or value to dispense. See command format section.
PAYOUT *	5EH / 76H	Command to determine value of coins dispensed. Followed by payout status or value poll. See command format section.
EXPANSION *	5FH / 77H	Command to allow addition of features, File Transport Layer, and future enhancements. See command format section.

\* **NOTE:** DISPENSE, PAYOUT, and EXPANSION commands are always followed by a "sub-command."

## 10.3 VMC Command Format

---

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
RESET	58H / 70H	No data bytes

This command is the vehicle that the VMC should use to tell the dispenser that it should return to its default operating mode and initialize internal hardware systems. With the exception of the ACK response, it should abort all communication until otherwise instructed by the VMC.

The following initialization sequence is recommended. It should be used after "power up" or after issuing the Bus Reset (pulling the transmit line "active" for a minimum of 100 mS).

**RESET – 58h / 70h**

**POLL – 5Bh / 73h**

To obtain "JUST RESET" response

**SETUP – 59h / 71h**

To obtain dispenser level and configuration information

**EXPANSION IDENTIFICATION – 5F 00h / 77 00h**

To obtain additional dispenser information and options

**EXPANSION FEATURE ENABLE – 5F 01h / 77 01h**

To enable desired options

**DISPENSER STATUS – 5Ah / 72h (Note 1)**

To obtain dispenser status / change information

**MANUAL DISPENSE ENABLE – 5Ch / 74h**

To enable and disable manual coin pay-out if desired

No power above idle current can be drawn until after the first POLL following the RESET command. Also, the JUST RESET response to the POLL command must be delayed until any high current usage has been completed.

The dispenser must hold its response of the DISPENSER status until a valid current reading from the sensor system is achieved.



<u>VMC Command</u>	<u>Code</u>	<u>Dispenser Response Data</u>
SETUP	59H / 71H	26 bytes: Z1 - Z26
Z1 =	Dispenser Feature Level - 1 byte	Indicates the feature level of the dispenser. This will distinguish the dispensers feature level to the VMC. Currently only level 1 is supported.
Z2 - Z3 =	Country / Currency Code - 2 bytes	The packed BCD currency code of the dispenser is sent with the left most digit a 1. See Appendix A1 for the latest version of the ISO 4217 numeric currency code. For example, the code for the US dollar is 18 40H (Z2 = 18 and Z3 = 40) and for the Euro is 19 78 (Z2 = 19 and Z3 = 78).
Z4 =	Coin Scaling Factor - 1 byte	All dispensed coin values must be evenly divisible by this number. For example, this could be set to 05H for the USA nickel.
Z5 =	Decimal Places - 1 byte	Indicates the number of decimal places on a credit display. For example, this could be set to 02H in the USA.
Z6 =	Application Maximum Response Time (seconds) -- 1 byte	The maximum length of time a dispenser will require to provide a response to any command from the VMC. The value reported here supercedes the dispenser's default NON-RESPONSE time defined in section 10.4 if the value reported here is greater.
Z7 -- Z8 =	Bit set, if coin disabled by dispenser (i.e. switch).	
Z9 -- Z10 =	Bit set, if coin is self filling.	
Z11 - Z26 =	Coin Type Credit - 16 bytes	Indicates the value of coin types 0 to 15. Values must be sent in ascending order. This number is the coin's monetary value divided by the coin scaling factor. Unused coin types are sent as 00H. Unsent coin types are assumed to be zero. It is not necessary to send all coin types. Coin type credits sent as FFH are assumed to be vend tokens. That is, their value is assumed to be worth one vend.  The byte position in the 16 byte string indicates the coin type(s). For example, the first byte sent would indicate the value of coin type 0, the second byte sent would indicate the value of coin type 1, and so on. For example, the USA coin types may be; Coin type 0 = nickel, Coin type 1 = dime, Coin type 2 = quarter, Coin type 3 = dollar.

<u>VMC Command</u>	<u>Code</u>	<u>Dispenser Response Data</u>
DISPENSER STATUS	5AH / 72H	34 bytes: Z1 – Z34

Z1 - Z2 = Dispenser Full Status - 2 bytes

Indicates status of coin tube / hopper for coin types 0 to 15.

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Z1 Z2

A bit is set to indicate a full dispenser. For example, bit 7 = set would indicate the dispenser for coin type 7 is full.

Z3 – Z34 = Coin Count - 32 bytes

Indicates the greatest number of coins that the dispenser “knows” definitely are present in the coin tube / hopper. A word (2 bytes) position in the 32 byte string indicates the number of coins in a tube / hopper for a particular coin type. For example, the first 2 bytes sent indicate the number of coins in a tube / hopper for coin type 0. Unsent bytes are assumed to be zero. For tube / hopper counts greater than 65535, counts should remain at 65535.

**NOTE:** If a dispenser can detect a tube or hopper jam, defective tube or hopper sensor, or other malfunction, it will indicate the tube / hopper is "bad" by sending a tube / hopper full status and a count of zero for the malfunctioning coin type.

<u>VMC Command</u>	<u>Code</u>	<u>Dispenser Response Data</u>
POLL	5BH / 73H	32 bytes: Z1 – Z32

Z1 - Z32 = Dispenser Activity - 32 bytes

Indicates the dispenser activity. If there is nothing to report, the dispenser should send only an ACK. Otherwise, the only valid responses are:

**Coins Dispensed:**

This response should be sent once at the end of a payout cycle.

Z1 (10yzxxx)

z z =1 for manual dispense  
 z =0 to report a non manual (automatic) dispense

y y =1 for payout completed successfully  
 y =0 for payout completed unsuccessfully (aborted)

xxxx The coin type dispensed (0 to 15)

Z2 - Z3 The number of coins dispensed.

Z4 – Z5 The number of coins in the dispenser.

**Status:**

(00000001) =	Escrow request <sup>1</sup> - An escrow lever activation has been detected. If a button is present and activated.
(00000010) =	Dispenser Payout Busy <sup>2</sup> - The dispenser is busy activating payout devices.
(00000011) =	Not Used
(00000100) =	Defective Dispenser Sensor <sup>1</sup> - The dispenser has detected one of the dispenser sensors behaving abnormally.
(00000101) =	Not Used
(00000110) =	Dispenser did not start <sup>1</sup> .
(00000111) =	Dispenser Jam <sup>1</sup> - A dispenser payout attempt has resulted in jammed condition.
(00001000) =	ROM checksum error <sup>1</sup> - The dispensers internal checksum does not match the calculated checksum.
(00001001) =	Not Used
(00001010) =	Not Used
(00001011) =	Dispenser was "Just Reset" <sup>1</sup> - The dispenser has detected a Reset condition and has returned to its power-on idle condition.
(00001100) =	Not Used
(00001101) =	Not Used
(00001110) =	Not Used
(00001111) =	Filled key pressed <sup>1</sup> - The VMC should request a new DISPENSER STATUS.

**NOTES:**

The dispenser may send several of one type activity, up to 16 bytes total. This will permit zeroing counters such as inventory and status.

1 Sent once each occurrence.

2 Sent once each POLL

**File Transport Layer POLLED responses:**

Note that all FTL responses are defined in Section 2.6. For the coin dispenser, the source address will always be the dispenser (58H/70H) as defined in Section 2.3.

Z1

1B	REQ TO RCV	<p>The coin dispenser is requesting to receive data from a device or VMC.</p> <p>Z2 = Destination address of response  Z3 = Source address of response (58H/70H)  Z4 = File ID  Z5 = Maximum length  Z6 = Control</p>
1C	RETRY/DENY	<p>The coin dispenser is requesting a device or VMC to retry or deny the last FTL command.</p> <p>Z2 = Destination address of response  Z3 = Source address of response (58H/70H)  Z4 = Retry delay</p>
1D	SEND BLOCK	<p>The coin dispenser is sending a block of data (maximum of 31 bytes) to a device or VMC.</p> <p>Z2 = Destination address of data  Z3 = Block #  Z4-Z34 = Data (maximum of 31 bytes)</p>
1E	OK TO SEND	<p>The coin dispenser is indicating that it is OK for a device or VMC to send it data.</p> <p>Z2 = Destination address of response  Z3 = Source address of response (58H/70H)</p>
1F	REQ TO SEND	<p>The coin dispenser is requesting to send data to a device or VMC.</p> <p>Z2 = Destination address of response  Z3 = Source address of response (58H/70H)  Z4 = File ID  Z5 = Maximum length  Z6 = Control</p>

<u>VMC Command</u>	<u>Code</u>	<u>VMC Data</u>
MANUAL DISPENSE ENABLE	5CH / 74H	2 bytes: Y1 – Y2

Y1 - Y2 = Manual Dispense Enable - 2 bytes

b15 b14 b13 b12 b11 b10 b9 b8 | b7 b6 b5 b4 b3 b2 b1 b0  
 Y1 Y2

A bit is set to indicate dispense enable. For example, bit 2 is set to enable dispensing of coin type 2. This command enables/disables manual dispensing using optional inventory switches. All manual dispensing switches are automatically disabled upon reset.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>
DISPENSE COINS	5DH / 75H	00H	3 bytes: Y1 – Y3

b7 b6 b5 b4 b3 b2 b1 b0  
 Y1

Bits b3, b2, b1, b0 indicate coin type to be dispensed. Valid codes are 0H to FH to indicate coin types 0 to 15.

Bits b7, b6, b5, b4 = 0

Y2 - Y3 = Number of coins to be dispensed of coin type defined in Y1

There is no defined limit on how long the actual dispense takes since the command allows for up to 65535 coins to be paid out. The payout cycle begins when the dispenser ACKs the VMC's DISPENSE (5DH/75H) command. This cycle typically lasts a minimum of 100 mS and ends when the dispenser stops dispensing the desired number of coins. VMCs should monitor the Dispenser Payout Busy and Dispenser Activity response to the POLL (5BH/73H) command to determine when the entire payout cycle is completed.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>
DISPENSE VALUE	5DH / 75H	01H	2 bytes: Y1, Y2

Y1 – Y2 = Value of coins to be paid out.

Y1 and Y2 are defined as the value of coins and this value is expressed as the number of coin scaling factors that would sum to the value. For example, in a USA system using a scaling factor of 05, if the change to be paid out is 75 cents, then Y1 will equal fifteen. That is, the sum of fifteen nickels equal 75 cents. The coin dispenser will determine which actual denominations of coins will be paid out. In the 75 cent example, the coins may be 3 quarters; or, 7 dimes & 1 nickel; or, 2 quarters & 2 dimes & 1 nickel, etc. The actual coins dispensed and if the dispense is finished can be acquired via the PAYOUT STATUS (5EH/76H, 00) and PAYOUT VALUE POLL (5EH/76H, 01).

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Dispenser Response</u>
PAYOUT STATUS	5E / 76H	00H	None	32 bytes: Z1-Z32

Z1 – Z32 = Number of each coin type paid out - 32 bytes (2 bytes per coin type).

This is the dispenser's response to the last VMC DISPENSE VALUE command (5DH sub command 01H). Bytes are sent in ascending order of coin types. A bytes position in the string indicates the coin type. That is, bytes one and two are the number of coins for coin type 1, bytes three and four are the number of coins for coin type two, and so on. Unsent bytes above the coin types dispensed are assumed to be zero.

The dispenser clears payout data after an ACK response from the VMC.

The VMC should compare the value of the coins paid out to the (5DH/75H) DISPENSE VALUE command's Y2-Y3.

**NOTES:**

- 1) If the dispenser's payout is busy it will respond to the PAYOUT STATUS command with an ACK only.
- 2) If no coins have been paid out, at least one zero valued data byte must be sent.
- 3) There is no defined limit on how long the actual payout takes. See dispense command (5DH/75H) for further details

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Dispenser Response Data</u>
PAYOUT VALUE POLL	5EH /76H	01H	None	2 bytes: Z1-Z2

Z1 – Z2 = Dispenser Payout Activity - 2 bytes

An interval value (scaled) which indicates the amount of paid out change since the previous PAYOUT VALUE POLL (or between the initial DISPENSE VALUE command (5DH/75H sub command 01H) and the first PAYOUT VALUE POLL).

A 00H response indicates no coins were paid out since the previous PAYOUT VALUE POLL (or the initial DISPENSE VALUE command (5DH/75H sub command 01H)).

An ACK only indicates that the change payout is finished. This should be followed by the PAYOUT STATUS command (5EH/76H-00H) to obtain the complete payout data.

**NOTE:** The initial intent of this command is to determine the amount of change paid out so that the credit display can be decremented as coins are dispensed.

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>Dispenser Response Data</u>
EXPANSION COMMAND	5FH / 77H	00H	33 bytes: Z1 - Z33
	IDENTIFICATION		

- Z1 - Z3 = Manufacturer Code - 3 bytes  
 Identification code for the equipment supplier. Sent as ASCII characters. Currently defined codes are listed in the **EVA** document entitled "**European Vending Association Data Transfer Standard**" (EVA-DTS), the Audit Data Lists section, sub-section 2, "Manufacturer Codes".
- Z4 - Z15 = Serial Number - 12 bytes  
 Factory assigned serial number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z16 - Z27 = Model Number - 12 bytes  
 Manufacturer assigned model number. All bytes must be sent as ASCII characters, zeros (30H) and blanks (20H) are acceptable.
- Z28 - Z29 = Software Version - 2 bytes  
 Current software version. Must be sent in packed BCD.
- Z30 - Z33 = Optional Features - 4 bytes  
 Each of the 32 bits indicate an optional features availability. If the bit is set the feature is available. Bits should be sent in descending order, i.e. bit 31 is sent first and bit 0 is sent last. Currently defined options are:
- b0 - File Transport Layer (FTL) supported as defined in Section 2.6.
  - b1 - b31 Available for future use

<u>VMC Command</u>	<u>Code</u>	<u>Sub-Command</u>	<u>VMC Data</u>
EXPANSION COMMAND	5FH / 77H	01H	4 bytes: Y1 - Y4
	FEATURE ENABLE		

This command is used to enable each of the optional features defined in Z30-Z33 above. To enable a feature a bit is set to one. **All optional features are disabled after reset.**

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Dispenser Response</u>
EXPANSION COMMAND	5FH / 77H FTL REQ TO RCV	FAH	Y1-Y5	Z1 - Zn (immediate or POLLed)

The VMC is requesting to receive data from the dispenser whose destination address will always be (58H/70H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (58H/70H)
- Y2 = Source address of command
- Y3 = File ID
- Y4 = Maximum length
- Y5 = Control

- Z1 = 1DH which indicates SEND BLOCK
  - Z2 = Destination address of data
  - Z3 = Block #
  - Z4 - Z34 = Data (maximum of 31 bytes)
- or

- Z1 = 1CH which indicates RETRY / DENY
- Z2 = Destination address of response
- Z3 = Source address of response (58H/70H)
- Z4 = Retry delay

<u>VMC Command</u>	<u>Code</u>	<u>Sub-command</u>	<u>VMC Data</u>	<u>Dispenser Response</u>
EXPANSION COMMAND	5FH / 77H FTL RETRY / DENY	FBH	Y1-Y3	None

The VMC is retrying, denying, or aborting a data transfer to/from the dispenser whose destination address will always be (58H/70H). Note that all FTL Commands / Responses are defined in Section 2.6.

- Y1 = Destination address of command (58H/70H)
- Y2 = Source address of command
- Y3 = Retry delay