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Fresh approach to vending telemetry

HARDWARE SIDE

Vending Machines

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Vending machine types by product

Hot drinks
(Free standing)

Hot drinks
(Table Top
and OCS)

Cold snack and
food
(Free standing)

Cold drinks
(Free standing)

Fresh juice
(Free standing)

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vBox2 Compatible VMs

- ACN
- ATS
- Azkoyen
- Bianchi
- Coffetek
- Crane
- Damian
- De Jong Duke
- DixieNarco
- Ducale
- FAS
- Gerhardt
- GPE
- HGZ Maschinenbau
- Manea
- Necta
- Royal Vendors
- Rhea
- Saeco
- Vendo
- Sielaff
- Spengler
- Wittenborg
- Wurlitzer
- etc.

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HARDWARE SIDE

Inside VM: a system of devices

Inside VM

- VM CPU board - the brain of the VM
- Peripheral devices:
  - Coin Changer
  - Cashless (e.g. Card reader Closed-loop payments)
  - Bill Validator
- Additional functionality:
  - Comms Gateway
  - Age verification
  - Mobile payments

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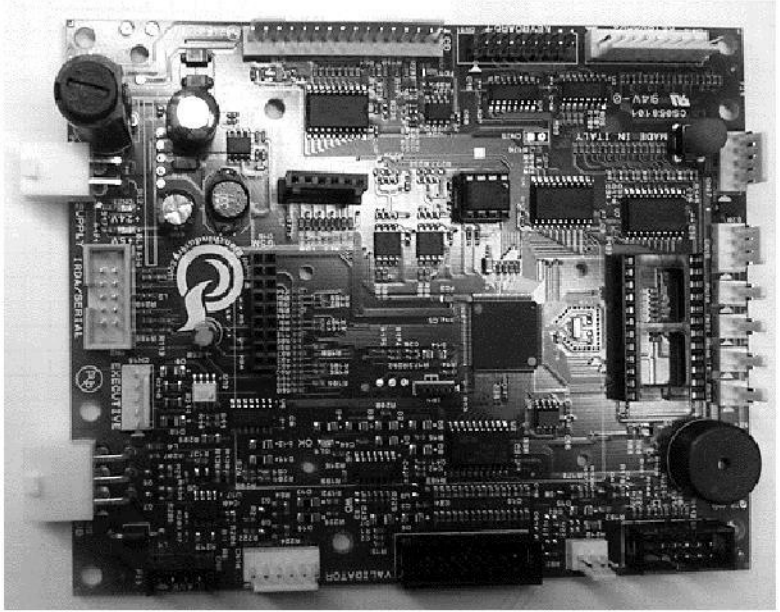
VM CPU board

- VM CPU board – the brain of the Vending Machine
- Here VM Firmware is run
- Different VM Firmwares → Different VM configurations and functionalities (incl. support of telemetry, real-time data)



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Payment systems

- Coin Changer
- Bill Validator
- Cashless
  - Card readers
  - Closed-group payments
  - NFC-supported payments

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Additional functionality

- Comms Gateway
  - Is a ‘black box’ in the VM as it collects all sales and technical information
  - Good for real-time transaction and event transmission
  - Though only a few VMs have it (Sielaff, Spengler), it should be always activated if provided
- Age verification
  - In some cases is included in the cashless device
  - Is turned off by default and activated and can report only during the time of a vend
- Mobile / contact-less payments
  - SMS payments
  - E-Wallet solutions

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Sensors – to enhance VM functionality

- Door sensor
  - Generates door open / close event
  - Useful for analysis and optimization of VM servicing time
- Temperature sensor
  - Provides information about the temperature inside the VM (cold food and drinks)
  - Useful for notifying when temperature limits are exceeded
- Tilt sensor
  - Provides information about when the VM has been shifted or moved
  - Useful for analysis of product deficits and against thefts of VMs
- Proximity sensor
  - Used to attract persons attention when they are nearby
  - Could be used for the analysis of visits to the VM and its location

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MDB vs. EXE

- MDB (MultiDrop Bus)
  - For interconnecting with VMC, Coin Changer and other VM modules
  - US standard now used also in many European countries

- EXE (Protocol-A)
  - For interconnecting with Vending Machine Controller (VMC), Audit Storage Unit, Cashless Payment Peripheral
  - Western-European standard still used in 'Old Europe' – France, Italy, Spain

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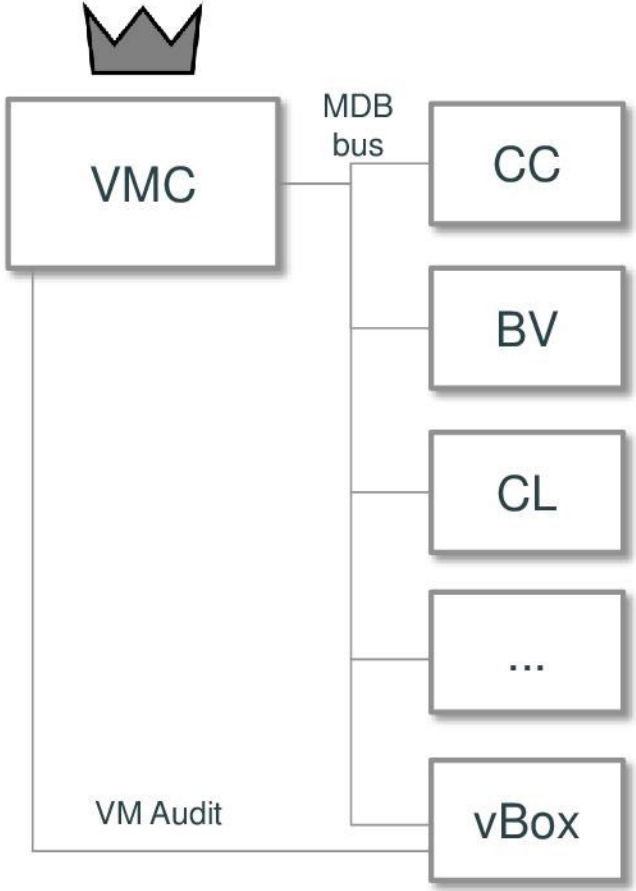
MDB schema (default sniffer mode)



- VMC is the Master device
- VMC requests status and sales info from each device. Each device responds
- vBox listens to this communication
- Several other peripheral devices can be attached (e.g. AV, CGW, CL#2)
- VMC gathers all audit data

- MDB bus provides both data and power

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3 vBox MDB modes

- vBox in MDB Sniffer mode
  - vBox monitors if any of devices are operational and if the VM can sell the products
  - supports real-time Cashless purchases
- vBox in MDB Communications Gateway
  - vBox reports real-time transactions and events to server
- vBox in MDB Cashless mode
  - used to register vends from VM for free (sniffer real-time sales)
  - used to accept / decline vend transaction as CL device (remote CL feature) - sms payments, e-wallet, other API / server solution

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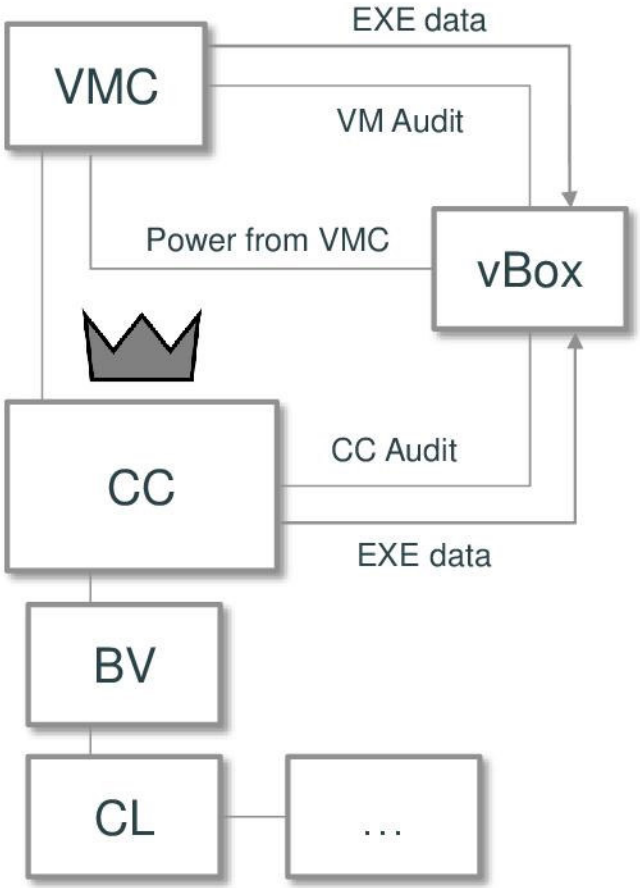
EXE schema



- CC is the Master device
- CC requests status info from VMC. VMC responds. CC provides display info
- vBox is a transparent intermediary between VMC and CC
- CC requests status and sales info from other devices
- Several other peripheral devices can be attached (e.g. AV, CGW, CL2)
- CC gathers sales audit data
- VM keeps it's own technical audit
- Power and data lines are separated

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2 vBox EXE modes

- EXE Sniffer mode
  - vBox reads data from CC – prices and price class
  - Supports real-time Cashless purchases
  - If VM audit is enabled, can also obtain VM technical errors and product data

- EXE Free (Cashless) mode
  - vBox acts as CC to command the VM to allow Freevend

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MDB or EXE – crucial for audit data

MDB

Under MDB standard the VM Controller (VMC) is the main device

Audit data is always read from VMC

EXE

Under EXE standard the Coin Changer (CC) is the main device

Audit data is always read from CC

CL can also act as system Master.

Additionally, audit can be read from VMC

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Audit data standards

- The audit data is stored in EVA DTS (European Vending Association Data Transfer Standard) format

- EVA DTS files are transmitted using one of the three common audit data protocols:
  - DEX: hardwired direct data transfer protocol
  - DDCMP: data transfer protocol over hardware link
  - MDB FTL: high level data exchange protocol between VMC and other modules

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Audit data protocols

- DDCMP
  - Western-European (Italian) standard, used in many European countries
  - Proactive – pushes the data
  - Preferred for vBox
  - Additional functionality:
    - DDCMP enhanced enables real-time technical evend reporting
    - DDCMP speed negotiation – used for faster audit transmission than default (when it exceeds 9600 bps)
    - Read-only (list 2) – not to reset the counters once audit is read

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Audit data protocols

- DEX
  - US standard, default in US market, but now used also in many European countries
  - Reactive – responds to data requests
  - Additional vBox functionality:
    - HW connect – can simulate physical plug to get the data (only for VM Audit)

- MDB FTL
  - Audit is transmitted over MDB cable
  - Additional functionality:
    - Read-only (file id: 2) – not to reset the counters once audit is read

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Telemetry data: summary

- Vendon solution can provide information on:
  - technical data:
    - power state
    - technical errors of VM / peripheral devices
    - status of VM door, temperature, movements etc.
    - ID numbers of all devices
  - product data:
    - IDs, prices, sales and remaining amounts
  - payment data:
    - amounts of coins and cash in the CC

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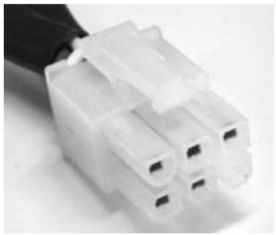
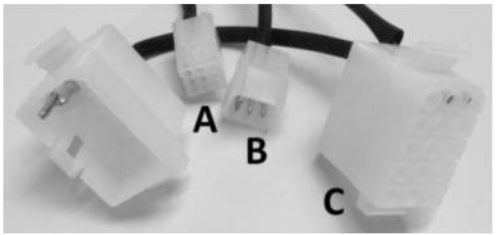
Data cables – for data transmission & power supply

MDB

EXE





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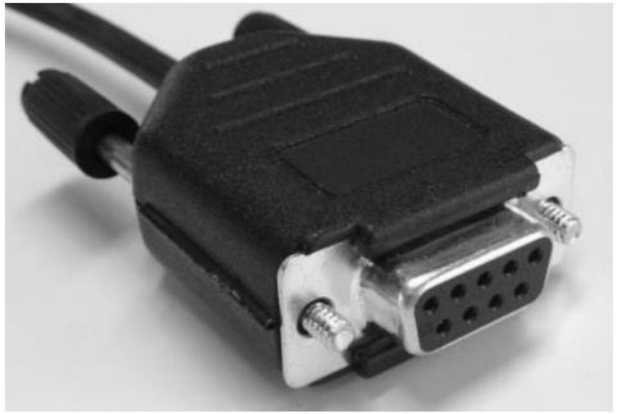
Audit cables – VM specific

DB9 Female (standard / Inverted)



DB9 Male (standard / Inverted)

DB15 Male for MEI CC

AudioJack

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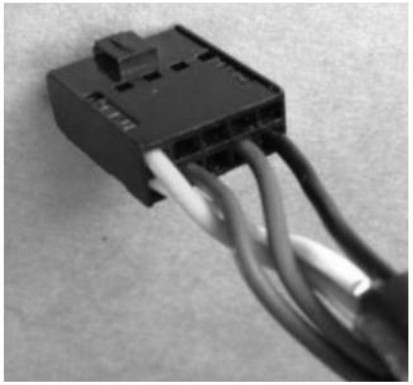
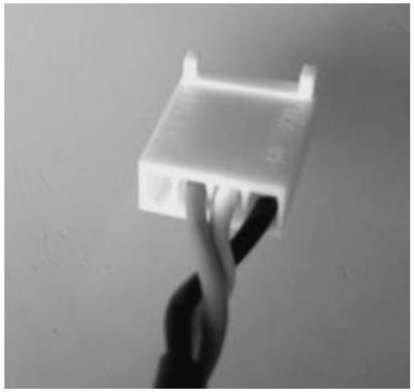
Audit cables – VM specific (cont'd)

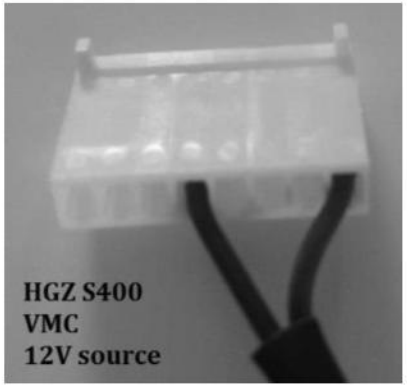
HGZ Rex
Royal
S200

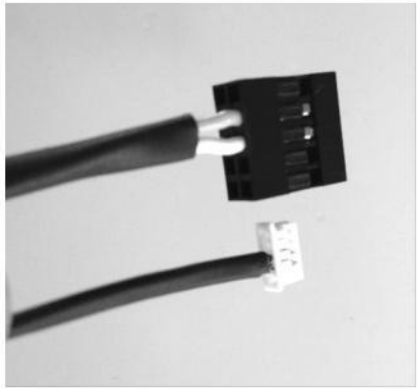




Crane
Infinity

HGZ Rex
Royal
S400





De Jong
Duke

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HARDWARE SIDE

vBox device

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vBox device

- microprocessor driven telemetry device

- Transmits data over GPRS network (2G)

- Is equipped with:
  - In-built SIM card
  - Pre-loaded firmware
  - Function button
  - LED and sound indicators
  - Internal memory

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vBox device

Reset button

Function button

LED indicators:

Power

GSM

Data

Connector C1

Connector C2

USB

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Reset button

- 1 x Press - the vBox2 device starts operation in *normal* regime.
- Switches off vBox from being powered by the battery. If there is no external power supply the device is switched off.

  ! For the use by authorized Vendon representatives only.

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Function button

- The physical function button can be used by the operator in the following way:
  - 1 x Press (3 beeps) – to register refillment, includes EVADTS readout
  - 2 x Press (2 beeps) – to register encashment, includes EVADTS readout
  - 3 x Press (1 beep) – to request EVADTS audit - suggested to perform during installation to set the zero level of counters

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LED indicators

- The **green LED indicator** shows the status of **external power supply**
- The **red LED indicator** shows the status of **GSM** connection
- The **orange LED indicator** shows the status of **data** transmission

- If they are:
  - **ON =** the function is **working fine**
  - **BLINKING FAST**
    - **POWER / STATUS =** there is a **problem**
    - **GSM =** is **working**
  - **BLINKING SLOWLY =** there is a **problem, almost not working**
  - **OFF =** the function is **NOT working**

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LED indicators (cont'd)

The **green LED indicator** shows the status of **external power supply**

- ON – external power supply and GSM is connected.
- Blinking (0,03 sec) – direct-current is above 36V.
- Blinking (0,2 sec) – direct-current is below 8V or external power supply is switched off but GSM operation is powered by battery.
- OFF – the vBox2 device is not working, GSM cannot be switched on.

The **red LED indicator** shows the status of **GSM** connection

- ON – GSM is connected and has communicated with the server (is online, idle state).
- Blinking (0,03 sec) – GSM is ON, and is exchanging data with the server (is online, processing).
- Blinking (0,2 sec) – is trying to register in network (is offline).
- OFF – the vBox2 device cannot transmit the stored data to the server (is offline).

The **orange LED indicator** shows the status of **data** transmission

- ON – at least one peripheral device is connected to C1 connector and the vBox2 device is working / communicating.
- Blinking - at least one peripheral device is connected to C1 connector but the vBox2 device is not working / not communicating. It is inhibited.
- OFF – none of the peripheral devices is connected to C1 connector. Communication is not possible.

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Connectors C1, C2, and USB socket

- **C1 connector** – for the connection of data and power cable.
  - Possible cable types: EXECUTIVE, MDB
- **C2 connector** – for the connection of audit cable (incl. Sensors)
  - Examples of possible cable types:
    - AudioJack (CC or VM Audit)
    - DB9Male (CC or VM Audit), DB9Female (CC or VM Audit)
    - DB15Male (CC or VM Audit), DB15Female (CC or VM Audit)
    - VM-specific audit cables
- **USB connector** – for manual upload of **new firmware**
  - For the use by authorized Vendon representatives only

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