PICOVEND EZ SLAVE (MDB slave to RS232/USB interface with age verification support) v2021-06-02

Table of Contents

I. Introduction....4
II. Hardware....5
A. Board overview....5
B. Connectors description....5
C. Communication interfaces....6
III. Communication protocol....7
A. Cashless related commands and answers....7
1. Begin session....7
2. Cancel session....8
3. Vend approved....8
4. Vend denied....9
5. Revalue approved....9
6. Revalue denied....9
7. Revalue limit....9
8. Date/time request....10
9. Display....10
B. System commands and related answers....11
1. Reset....11
2. Reboot....11
3. Status....12
4. Get VMC information....13
5. Set cashless timeout....13
6. Get cashless timeout....13
7. Set cashless address (primary or secondary)....14
8. Get cashless address settings (primary or secondary)....14
9. Set cashless feature level....14
10. Get cashless feature level....14
11. Set cashless country code....15
12. Get cashless country code....15
13. Set cashless scaling factor....15
14. Get cashless scaling factor....15
15. Set cashless decimal places....16
16. Get cashless decimal places....16
17. Set cashless miscellaneous options....16
18. Get cashless miscellaneous options....16
19. Set cashless manufacturer code....17
20. Get cashless manufacturer code....17
21. Set cashless serial number....17
22. Get cashless serial number....17
23. Set cashless model number....17
24. Get cashless model number....18
25. Set cashless expansion identification bits....18
26. Get cashless expansion identification bits....18
27. Set cashless fake credit....19
28. Get cashless fake credit....19
29. Set cashless default session timeout....20
30. Get cashless default session timeout....20
31. Set cashless default approval timeout....20
32. Get cashless default approval timeout....20
33. Set cashless default payment type....21

34. Get cashless default payment type....21
35. Set cashless default payment data....21
36. Get cashless default payment data....21
37. Save settings....21
38. Show settings....22
C. Age verification functions (experimental)....23
1. Age minimum limit request....23
2. Cashless DRAVS (age verification result in cashless mode)....24
3. Age verification DRAVS (age verification result in standalone or mixed mode – cashless + age verification)....24
4. Display....25
5. Date/time request....25
6. Set the device in standalone age verification only or mixed working mode....26
7. Ge the device working mode....26
IV. Unsolicited messages....27
1. File system status....27
2. Hardware serial number fail....27
3. Hardware serial number dump....27
4. CRC fail for last MDB received message from VMC....27
5. Cashless session timeout....27
6. Cashless vend approve timeout....28
7. Cashless reset by VMC....28
8. Cashless not initialized....28
9. ACK on the last message sent to VMC....28
10. NAK on the last message sent to VMC....28
11. Vend request....28
12. Vend cancel....28
13. Vend success....29
14. Vend failure....29
15. Session complete....29
16. Cash sale reporting....29
17. Disabled by VMC....29
18. Enabled by VMC....29
19. Revalue request....30
20. Revalue request....30
21. Expansion options enabled....30
22. Date/time....30
23. Cashless is in session....30
24. Cashless not enabled....30
25. Begin button pressed....30
26. Cashless wait vend....31
27. Cashless wait revalue....31
28. Cashless display time error....31
29. Cashless display message length error....31
30. Display not available....31
Appendix I – cashless stages description....32

I. Introduction

This device was designed for an easy cashless development and integration. Depending on the loaded firmware, if offers the possibility to connect and develop a cashless device by connecting it to:
- a computer over USB or RS232;
- a single board computer (like Raspberry Pi, Orange Pi, etc.) over USB, RS232 or TTL3V3 serial interface;
- a PLC or other device with RS232/TTL3V3 UART.

Also, beside the stock firmware, the device can be directly programmed by ARDUINO IDE with any custom software you want to develop by yourself. If you need this option, we will offer you the microcontroller pinout (microcontroller pins functions) to describe the pins in your ARDUINO sketch. Also, you will receive the information about the needed libraries you have to install in your ARDUINO IDE. To get those information you will be required to sign a Non-Disclosure Agreement and to send us by mail/courier/other method. Support for developing your own firmware will be the subject of a contract and imply some additional support fees.
Support to integrate the device with our stock firmware with your hardware/software is free of charge, of course.
If you need modifications to get a custom behavior of the interface, please send us your specification and we will come back with a quote.
NOTE: Programming with Arduino IDE will erase stock firmware and you will need ESP Flash Download Tool and a firmware that is matching the device hardware serial number. Please be careful when loading a custom firmware by ARDUINO IDE.

Also, please pay attention to the part number while ordering, since there are 2 different firmware versions available (one for USB + TTL 3V3 and one for RS232).

Connecting to a computer or a SBC by RS232 requires a cross DB9 female/DB9 female cable which is not sold by our company and which you can find on almost any hardware store.

The device is using a simple ASCII protocol over USB/RS232/TTL3V3 interfaces. There is no need for you to have deep MDB knowledge, however, some knowledge about MDB cashless messages and parameters will help you faster and better understand the

The device have 2 digital inputs, one being reserved for a push button connection that will trigger a fixed value cashess BEGIN SESSION to the vending machine, in order to allow product selection on Level 2 MDB vending machines or on Level 3 MDB vending machines without Always Idle support.

Device can be used with the future optional GPRS (2G) module in order to connect to a server to send and receive same ASCII protocol messages. This way, the device becomes an online cashless payment system.

Standard package content:
- PICOVEND EZ SLAVE board;
- MDB cable to connect on vending machine MDB bus;

Optional items:
- GPRS (2G) module – under development;
- cables for GPRS module.

II. Hardware

A. Board overview

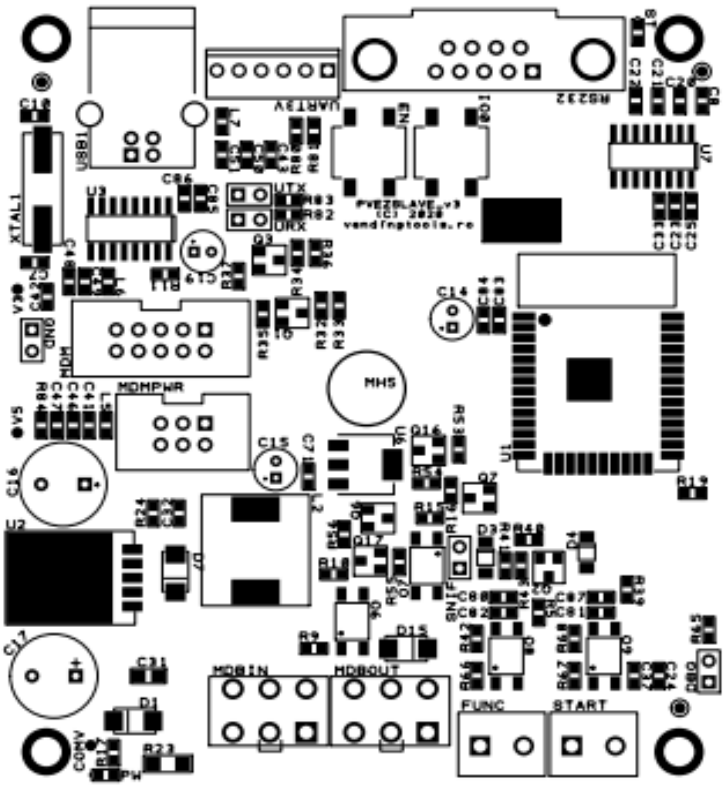

Figure 1: Board overview

B. Connectors description

1. MDBIN – the connector for the MDB cable to connect on the vending machines
2. MDBOUT – the connector for the other MDB payment systems (like coin acceptors/changers, bill validators, other cashless devices, etc). By using this connector, no other “Y” cables are needed.
3. FUNC – this is a digital input, reserved for future use.
4. START – this is a digital input where you can connect a NO button that will be used to begin a session on the Level 2 MDB vending machines or on the Level 3 without Always Idle support vending machines, in order to allow the customer to make his selection.
5. RS232 – this is the connector for RS232 interface (requires a special firmware to work on RS232, that will not support USB or TTL 3V3 interface). This is a mae connector and requires a DB9 female/DB9 female cross cable to connect to a computer (this cable is not shipped by our company, but can be easily found on almost any local hardware store).
6. UART3V – this is the connector for 3V3 UART interface (requires special firmware to work, that will not support TTL 3V3, but will also support USB). The baudrate on this interface will is 115200.
- PIN #1 – N/C;
- PIN #2 – GND;
- PIN #3 – TXD;
- PIN #4 – RXD;
- PIN #5 – 3.3V out (max 100mA);
- PIN #6 – 5V out (max 300mA).

7. USB B connector to use on USB hosts – requires some drivers to install on host, to emulate a virtual serial interface (default baudrate is 115200).

C. Communication interfaces

Both RS232 and TTL 3V3 serial interfaces are using same communication parameters:
- baudrate – 115200bps;
- data bits – 8;
- stop bits – 1;
- parity – none;
- flow control – no flow control (either hardware or software).

USB interface is using a driver for Windows OS. For Raspberry Pi (or compatible) and most of the Linux distributions with new kernels, the OS will automatically load the correct kernel modules.

All commands must end with <CR> and <LF> (0x13, 0x10)
Also, all answers have <CR> and <LF> at the end. If uyou are using non-buffered serial interface reading, make sure your application reads until <LF>.

Sometimes, more than one message will be received (for example, a response to your command and an unsolicited message or an answer with the reason of the command fail). You need to receive the entire message and parse it by checking against all command answers related to your last command and also against all available unsolicited message (see unsolicited messages description below).

III. Communication protocol

A. Cashless related commands and answers

Commands are case-sensitive and you must use all upper case or all lower case for a command. No mixed characters accepted.
For simplicity, we will only use upper case in our documentation.
Answers are always upper case.

1. Begin session

Command	
BEGIN(AAA,BBB,CCC,DDD,EEE,FFF)	This command starts a cashless session when needed - AAA is the credit amount to begin a cashless session. This value is scaled by cashless device scaling factor (default 1, a value of 130 means EUR130, for example) Depending on the vending machine MDB implementation, this value can be a “fake” credit that allows the customer to select a product, can be 0 to display a 0.00 credit, but allows the customer to select a product or can be 65535 to allows the customer to select a product, without displaying any credit on the machine. You need to test different options depending on your application flow and machine supported values. - BBB is the media ID (a 32bit integer, in decimal representation). Here you can specify the card ID, user ID, a random number or even 0 if you don’t need to identify the user. - CCC – reserved, always 0 for this version - DDD – reserved, always 0 for this version - EEE – session timeout. This value is representing a time in seconds. After this time, the device will automatically cancel the session if the customer make no product selection. This way, if you are sending a credit to the machine and the customer is giving-up, the credit will be erased automatically from the machine. - FFF – vend approval timeout. This value is representing a time in seconds. After this time, the device will automatically send a vend denied message to the vending machine if you are not approving or denying the vend request. After automatic deny, the interface will also cancel the session automatically. This way, if you application becomes unresponsive and you are not able to follow the transaction flow, the device will automatically cancel the transaction.
Possible answers	
- BEGINOK	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll.
- BEGINFAIL	- if the command reception failed for some reason.
- CSLSISINSESSION	- BEGIN command comes when the device is already in session (as a result of a previous BEGIN command, for example). This message is sent by the device before BEGINFAIL
- CSLSNOTENABLED	- BEGIN command failed because the cashless device was not initialized and enabled by the VMC

2. Cancel session

Command	
CANCEL	This command cancels the current cashless session and VMC returns to the idle state
Possible answers	
- CANCELOK	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll.
- CANCELFAIL	- if the command reception failed for some reason.
- CSLSWAITVND	- CANCEL is not accepted because a VEND REQUEST was already issued by the machine. You need to issue a VEND APPROVED or a VEND DENIED command and wait for the session close before trying to cancel again. This answer precedes the CANCELFAIL one.
- CSLSWAITREVAL	- CANCEL is not accepted because a REVALUE REQUEST was already issued by the vending machine. You need to issue a REVALUE APPROVED or a REVALUE DENIED command and wait for a positive answer before trying to cancel again. The answer precedes the CANCELFAIL one. So, in this situation you will receive both CSLSWAITREVAL followed by CANCELFAIL

3. Vend approved

Command	
VNDAPP(AAA)	This command approves a vend after the VMC has issued a previous VEND REQUEST command. - AAA is the approved value (scaled by the cashless device scaling factor)
Possible answers	
- VNDAPPOK	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll.
- VNDAPPFAIL	- if the command reception failed for some reason.
- CSLSNOWAITVND	- VEND APPROVED failed because the device is not waiting for a vend approval/denial (the VMC has not issued a previous VEND REQUEST). You should issue this command only after receiving the VEND REQUEST unsolicited message from the device, otherwise you will receive this error message, followed by a VNDAPPFAIL response.

4. Vend denied

Command	
VNDDEN	This command refuses a vend after the VMC has issued a previous VEND REQUEST command.
Possible answers	
- VNDDENOK - VNDDENFAIL - CSLSNOWAITVND	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason. - VEND DENIED failed because the device is not waiting for a vend approval/denial (the VMC has not issued a previous VEND REQUEST). You should issue this command only after receiving the VEND REQUEST unsolicited message from the device, otherwise you will receive this error message, followed by a VNDDENFAIL response.

5. Revalue approved

Command	
REVALAPP	This command approves a revalue after the VMC has issued a previous REVALUE REQUEST command.
Possible answers	
- REVALAPPOK - REVALAPPFAIL	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason.

6. Revalue denied

Command	
REVALDEN	This command refuses a vend after the VMC has issued a previous REVALUE REQUEST command.
Possible answers	
- REVALDENOK - REVALDENFAIL	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason.

7. Revalue limit

Command	
REVALLIMIT(AAA)	This is an answer to VMC REVALUE LIMIT REQUEST command. - AAA is the scaled value for the maximum revalue amount you want to accept for the next REVALUE REQUEST from the vending machine.
Possible answers	
- REVALLIMITOK - REVALLIMITFAIL	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason.

8. Date/time request

Command	
DTREQ	This is requesting the date/time from the VMC. It is useful to get the date/time from the vending machine, to synchronize your application date and time with the VMC NOTE: Not all vending machines are responding with the real date and time. Also, some vending machines have no internal RTC and are not able to supply this information.
Possible answers	
- DTREQOK - DTREQFAIL	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason.

9. Display

Command	
DISPLAY(AAA,BBB)	This command will display a message on vending machine display. Some machines are not able to receive this message. Your application is responsible to format he message according to vending machine display size. You can get the vending machine display size issuing the VMCINFO command, described later in the system commands and answers chapter. - AAA is the time for message display. The value is represented by 0.1seconds. To display the message for 2 seconds, for example, this parameter should have a value of 20. Please note that the VMC can replace or erase your message from it's display before the time expire, if other event that requires a message to the customer occurs. - BBB is the message to display.
Possible answers	
- DISPLAYOK - DISPLAYFAIL - DISPNOTAVAIL - DISPTIMEERR - MSGLENERR	- If the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - If the command reception failed for some reason. - You may receive this message before DISPLAYFAIL answer if the machine has no display or if it is reporting that is not able to receive messages from the cashless device (machine is reporting 0 for the number of columns on display if it does not want to receive this message from the cashless device) - You may receive this message before DISPLAYFAIL answer if the time parameter is not correct (cannot be > 250) - You may receive this message before DISPLAYFAIL answer if your second parameter is longer than 32 characters which is the limit accepted by the MDB protocol.

B. System commands and related answers

Please note that after modifying any device configuration parameter, you need to issue the save settings command in order to make persistent. Also, it is recommended to issue the device reset command or the device reboot command in order to allow the vending machine to reinitialize the cashless device with the new configuration.

1. Reset

Command	
RESET	This command will set the cashless device in a state similar with the one on the power-up. The VMC will reset, initialize and, eventually, enable the cashless device.
Possible answers	
- RESETOK - RESETFAIL	- if the command was successfully received by the interface - if the command reception failed for some reason.

2. Reboot

Command	
REBOOT	This command will perform a device cold reset. This command is mandatory after changing and saving device configuration parameters (see system commands chapter below), it will force the CPU reset and settings reload
Possible answers	
- REBOOTOK	- if the command was successfully received by the interface

3. Status

Command	
STATUS	This command will request the cashless device status information.
Possible answers	
- STATUS(A,B,C,D,E,F,G,H,I)	The status message comes before STATUSOK and have the following parameters: - A – cashless set feature level - B – cashless set scaling factor - C – cashless set decimal places - D – cashless set country code - E – can take one of the following: - REVALON if you set the device to accept revalue command from VMC - REVALOFF if you set the device to not accept revalue command from VMC - F – can take one of the following values - MULTION if you set the device with multivend option enabled - MULTIOFF if you set the device with multivend option disabled - G – can take one of the following values - CASHSALEON if you set the device to accept CASH SALE commands - CASHSALEOFF if you set the device to not accept CASH SALE commands - H – can take one of the following values - CANAI if you set the device to accept Always Idle transactions - CANNOTAI if you set the device to not accept Always Idle transactions - G – can take one of the following values - AION if the Always Idle function was enabled by the vending machine - AIOFF if the Always Idle function was not enabled by the vending machine - H – is the cashless MDB bus read timeout. This parameter value is in milliseconds and is the time the cashless device should wait for an answer from the VMC after sending a message to it. Default value is 3 and you should not modify this value unless you experience a timeout on machine's answers. Wrong value to this parameter may lead to an unresponsive device. - I – is the cashless stage. You may find the stage values and human interpretation later in Appendix I
- STATUSOK - STATUSFAIL	- if the command was successfully received by the interface - if the command reception failed for some reason.

4. Get VMC information

Command	
VMCINFO	This command will request vending machine information. Those information are, most of them, available only after the machine finished to initialize the machine.
Possible answers	
- VMCINFO(A,B,C,D,E,F,G,H,I)	- A – Is the VMC MDB feature level - B – Is the VMC reported maximum price - C – Is the VMC reported minimum price - D – Is the VMC number of columns on display. If the machine is reporting 0 for the number of columns on display, it is not willing to receive DISPLAY messages from the cashless device. - E – Is the VMC number of rows on display. - F – Is the VMC display type. If this value is 0, then the machine can display numbers, upper case letters, blank and decimal point. If this value is 1, then the machine has a full ASCII display. - G – Is the VMC manufacturer code - H – Is the VMC serial number - I – Is the VMC model number
- VMCINFOOK - VMCINFOFAIL	- if the command was successfully received by the interface - if the command reception failed for some reason.

5. Set cashless timeout

Command	
CSLSTIMEOUT(X)	This command will modify the time (milliseconds) the cashless device should wait for an answer from the VMC after sending a message to it. Default value is 3 and you should not modify this value unless you experience a timeout on machine's answers. Wrong value to this parameter may lead to an unresponsive device.
Possible answers	
- CSLSTIMEOUTOK - CSLSTIMEOUTFAIL	- if the command was successfully received - if the command reception failed for some reason.

6. Get cashless timeout

Command	
CSLSTIMEOUT?	This command will read the time (milliseconds) the cashless device should wait for an answer from the VMC after sending a message to it. Default value is 3 and you should not modify this value unless you experience a timeout on machine's answers. Wrong value to this parameter may lead to an unresponsive device.
Possible answers	
- CSLSTIMEOUT(X)	- X is the current set value for cashless timeout oi receiving from the machine after sending a message

7. Set cashless address (primary or secondary)

Command	
SECONDARY(X)	This command will modify the cashless device address. Default it's address is 0x10+, but using this command, it's address can be switched to 0x60+ You will need this if you already have a primary cashless device connected to the vending machine. - X can be 0 (primary address) or 1 (secondary address)
Possible answers	
- SECONDARYOK - SECONDARYFAIL	- if the command was successfully received - if the command reception failed for some reason.

8. Get cashless address settings (primary or secondary)

Command	
SECONDARY?	This command will read the cashless device address.
Possible answers	
- SECONDARY(X)	- X is the current set value for cashless address. If it is 0, then the device is the primary one (address 0x10+). If it is 1, then the device is the secondary one (address 0x60+).

9. Set cashless feature level

Command	
CSLSFTLEVEL(X)	This command will modify the cashless feature level. This information is passed to the machine during initialization phase. However, if the machine has feature level 2, the cashless device will also identify itself as a level 2 cashless device, even if you set this value for level 3. This device is not supporting MDB feature level 1 for this parameter and it will not be able to work with MDB level 1 vending machines. - X can be 2 or 3, other values will return CSLSFTLEVELFAIL
Possible answers	
- CSLSFTLEVELOK - CSLSFTLEVELFAIL	- if the command was successfully received - if the command reception failed for some reason.

10. Get cashless feature level

Command	
CSLSFTLEVEL?	This command will read the cashless feature level you set before.
Possible answers	
- CSLSFTLEVEL(X)	- X is the current set value for cashless feature level

11. Set cashless country code

Command	
CSLSCOUNTRY(X)	This command will modify the cashless country code that the device will report to the VMC. This value is a decimal one, please check the ISO currency codes on MDB manual and convert hex code to decimal. - X is the ISO currency code, decimal format.
Possible answers	
- CSLSCOUNTRYOK - CSLSCOUNTRYFAIL	- if the command was successfully received - if the command reception failed for some reason.

12. Get cashless country code

Command	
CSLSCOUNTRY?	This command will read the cashless country code.
Possible answers	
- CSLSCOUNTRY(X)	- X is the current cashless country code.

13. Set cashless scaling factor

Command	
CSLSSCALE(X)	This command will modify the cashless scaling factor that the device will report to the VMC durint the initialization stage - X is the cashless scaling factor
Possible answers	
- CSLSSCALEOK - CSLSSCALEFAIL	- if the command was successfully received - if the command reception failed for some reason.

14. Get cashless scaling factor

Command	
CSLSSCALE?	This command will read the cashless scaling factor.
Possible answers	
- CSLSSCALE(X)	- X is the current cashless scaling factor.

15. Set cashless decimal places

Command	
CSLSDECIMALS(X)	This command will modify the cashless decimal places that the device will report to VMC during initialization. - X is the cashless decimal places
Possible answers	
- CSLSDECIMALSOK - CSLSDECIMALSFAIL	- if the command was successfully received - if the command reception failed for some reason.

16. Get cashless decimal places

Command	
CSLSDECIMALS?	This command will read the cashless scaling factor.
Possible answers	
- CSLSDECIMALS(X)	- X is the current cashless scaling factor.

17. Set cashless miscellaneous options

Command	
CSLSOPTIONS(X)	This command will modify the cashless option bits - X is the cashless miscellaneous options byte, with the following option bits availabe (according to MDB specifications): - b0 – if set, it will enable restoring funds for the cashless device (VMC will activate revalue limit request and revalue request messages if it is capable to manage this features) - b1 – if set, it will enable cashless multivend option if the VMC is multivend capable; - b2 – always cleared; - b3 – if set, if will inform the VMC that the cashless device is capable to accept and manage cash sale subcommand (for statistic purposes, for example).
Possible answers	
- CSLSOPTIONSOK - CSLSOPTIONSFAIL	- if the command was successfully received - if the command reception failed for some reason.

18. Get cashless miscellaneous options

Command	
CSLSOPTIONS?	This command will read the cashless options byte.
Possible answers	
- CSLSOPTIONS(X)	- X is the current cashless options byte following the cashless option bits description above.

19. Set cashless manufacturer code

Command	
CSLSMFCODE(XXX)	This command will modify the cashless manufacturer code (according to MDB specifications). This code consists of exactly 3 ASCII characters that are reported to the VMC during the initialization phase. You can use your own manufacturer code to identify to the vending machine. Default, this code is “ATM”.
Possible answers	
- CSLSMFCODEOK - CSLSMFCODEFAIL	- if the command was successfully received - if the command reception failed for some reason.

20. Get cashless manufacturer code

Command	
CSLSMFCODE?	This command will read the cashless current manufacturer code.
Possible answers	
- CSLSMFCODE(XXX)	- XXX is the cashless current manufacturer code

21. Set cashless serial number

Command	
CSLSSN(XXXXXXXXXXXX)	This command will modify the cashless device serial number (according with MDB specifications). This consists of a fixed length 12 ASCII characters hat are reported to the VMC during the initialization phase.
Possible answers	
- CSLSSNOK - CSLSSNFAIL	- if the command was successfully received - if the command reception failed for some reason.

22. Get cashless serial number

Command	
CSLSSN?	This command will read the cashless current serial number
Possible answers	
- CSLSSN(XXXXXXXXXXXX)	- XXXXXXXXXXXX is the cashless current serial number

23. Set cashless model number

Command	
CSLSMN(XXXXXXXXXXXX)	This command will modify the cashless device model number (according to MDB specifications). This consists of a fixed length 12 ASCII characters hat are reported to the VMC during the initialization phase.
Possible answers	
- CSLSMNOK - CSLSMNFAIL	- if the command was successfully received - if the command reception failed for some reason.

24. Get cashless model number

Command	
CSLSMN?	This command will read the cashless current model number
Possible answers	
- CSLSMN(XXXXXXXXXXXX)	- XXXXXXXXXXXX is the cashless current model code

25. Set cashless expansion identification bits

Command	
CSLSEXPBITS(X)	This command will modify the cashless expansion identification bits. Possible values for X are 0x00 (always idle mechanism disabled) or 0x20 (always idle mechanism enabled). Any other value may produce unexpected results.
Possible answers	
- CSLSEXPBITSOK - CSLSEXPBITSFAIL	- if the command was successfully received - if the command reception failed for some reason.

26. Get cashless expansion identification bits

Command	
CSLSEXPBITS?	This command will read the cashless expansion identification bits.
Possible answers	
- CSLSEXPBITS(X)	- X is the cashless current model code

27. Set cashless fake credit

Command	
CSLSFAKECREDIT(X)	This command will set the fake credit the cashless device is sending for button triggered transactions. This is useful when the VMC has no Always Idle support (for example, Level 2 vending machines or Level 3 without Always Idle implementation). You need to install a NO SPST button on the machine's front panel and connect it to the "START" connector of the interface. By pressing this button, the customer can trigger a new cashless session (BEGIN SESSION) with the fake credit value. Most of the machines will accept a value of 65535 for "X" and they will invite the customer to select a product, without displaying any credit value. There are also some machines that will display the fake credit even if the value is 65535. In that case, you may set an arbitrary value (even 0 if the machine is supporting product selection with credit = 0 for cashless transactions). You need to test your machine's capability. Start with 65535 for this parameter and check if the machine is accepting a product selection without displaying the credit value. If the machine is displaying the credit, set this parameter to 0. If it does not allow you to select a product, set this parameter on a value equal or bigger than the most expensive product price to allow the customers selecting a product.
Possible answers	
- CSLSFAKECREDITOK - CSLSFAKECREDITFAIL	- if the command was successfully received - if the command reception failed for some reason.

28. Get cashless fake credit

Command	
CSLSFAKECREDIT?	This command will read the cashless fake credit value.
Possible answers	
- CSLSFAKECREDIT(X)	- X is the cashless current fake credit value

29. Set cashless default session timeout

Command	
CSLSDEFSESTIMEOUT(X)	This command will set default session timeout (seconds). If a session is opened by button press and the customer is not making any selection in the “X” seconds interval, the interface will automatically cancel the current session. It is an option to make the machine available for the next customer it somebody is just “playing” with the “START” button. Your application may send the “CANCEL” command anytime if you need to cancel the session before the timeout is reached. Default (factory) value is 40 seconds.
Possible answers	
- CSLSDEFSESTIMEOUTOK - CSLSDEFSESTIMEOUTFAIL	- if the command was successfully received - if the command reception failed for some reason.

30. Get cashless default session timeout

Command	
CSLSDEFSESTIMEOUT?	This command will read the cashless default session timeout.
Possible answers	
- CSLSDEFSESTIMEOUT(X)	- X is the cashless current default session timeout (seconds)

31. Set cashless default approval timeout

Command	
CSLSDEFAPPTIMEOUT(X)	This command will set default approval timeout (seconds). If a product is selected and no approve/deny is coming from your application, then the interface will automatically deny product dispensing after this timeout expires. It is useful if you application stale during approval, to release the machine for another session or for cash sales. The session will be also automatically canceled 3 seconds after the approval timeout, to completely make it available for other transactions. You need to make sure that the default approval timeout is at least 3 seconds shorter than cashless default session timeout otherwise some unexpected events may occur. Default (factory) value is 30 seconds.
Possible answers	
- CSLSDEFAPPTIMEOUTOK - CSLSDEFAPPTIMEOUTFAIL	- if the command was successfully received - if the command reception failed for some reason.

32. Get cashless default approval timeout

Command	
CSLSDEFAPPTIMEOUT?	This command will read the cashless default approval timeout.
Possible answers	
- CSLSDEFAPPTIMEOUT(X)	- X is the cashless current default approval timeout (seconds)

33. Set cashless default payment type

Command	
CSLSDEFPAYTYPE(X)	This command will set default payment type (according to MDB specifications). Usually, the value for X is 0 for standard payment type.
Possible answers	
- CSLSDEFPAYTYPEOK - CSLSDEFPAYTYPEFAIL	- if the command was successfully received - if the command reception failed for some reason.

34. Get cashless default payment type

Command	
CSLSDEFPAYTYPE?	This command will read the cashless default payment type
Possible answers	
- CSLSDEFPAYTYPE(X)	- X is the cashless current default payment type

35. Set cashless default payment data

Command	
CSLSDEFPAYDATA(X)	This command will set default payment data (according to MDB specifications). Usually, the value for X is 0 for standard payment data.
Possible answers	
- CSLSDEFPAYDATAOK - CSLSDEFPAYDATAFAIL	- if the command was successfully received - if the command reception failed for some reason.

36. Get cashless default payment data

Command	
CSLSDEFPAYDATA?	This command will read the cashless default payment data
Possible answers	
- CSLSDEFPAYDATA(X)	- X is the cashless current default payment data

37. Save settings

Command	
SAVESETTINGS	This command will save all modified parameters to the non-volatile memory. After saving settings it is recommended to issue a REBOOT COMMAND
Possible answers	
- SAVESETTINGSOK - SAVESETTINGSFAIL	- if the command was successfully received - if the command reception failed for some reason.

38. Show settings

Command	
SHOWSETTINGS	This command will read the cashless settings
Possible answers	
The device will answer with a list of current set paramenters in the following order:	
- CSLSTIMEOUT(X)	- X is the time (milliseconds) the cashless device should wait for an answer from the VMC after sending a message to it, see III.B.5. for details
- SECONDARY(X)	- X is 0 if the device is the first cashless device and 1 if the device is second cashless device, see III.B.7. and III.B.8. for details
- CSLSFTLEVEL(X)	- X is the current cashless feature level, see III.B.9 and III.B.10 for details
- CSLSCOUNTRY(X)	- X is the hex representation of the current country code, see III.B.11 and III.B.12 for details
- CSLSSCALE(X)	- X is the current scaling factor, see III.B.13 and III.B.14 for details
- CSLSDECIMALS(X)	- X is the current decimal places, see III.B.15 and III.B.16 for details
- CSLSOPTIONS(X)	- X is the value for miscellaneous options, see III.B.17 and III.B.18 for details
- CSLSMFCODE(X)	- X is the value for manufacturer code, see III.B.19 and III.B.20 for details
- CSLSSN(X)	- X is the value for cashless serial number, see III.B.21 and III.B.22 for details
- CSLSMN(X)	- X is the value for cashless model number, see III.B.23 and III.B.24 for details
- CSLSSV(X)	- X is the value for cashless internal software version
- CSLSEXPBITS(X)	- X is the value for cashless expansion identification bits, see III.B.25 and III.B.26 for details
- CSLSFAKECREDIT(X)	- X is the value for cashless fake credit, see III.B.27 and III.B.28 for details
- CSLSDEFSESTIMEOUT(X)	- X is the cashless default session timeout, see III.B.29 and III.B.30 for details
- CSLSDEFAPPTIMEOUT(X)	- X is the cashless default approval timeout, see III.B.31 and III.B.32 for details
- CSLSDEFPAYTYPE(X)	- X is the cashless default payment type, see III.B.33 and III.B.34 for details
- CSLSDEFPAYDATA(X)	- X is the cashless default payment data, see III.B.35 and III.B.36 for details
- SHOWSETTINGSOK	- the list of parameters always ends with SHOWSETTINGSOK

C. Age verification functions (experimental)

Please note that after modifying any device configuration parameter, you need to issue the save settings command in order to make persistent. Also, it is recommended to issue the device reset command or the device reboot command in order to allow the vending machine to reinitialize the cashless device with the new configuration.

This chapter refers to age verification functions, used by some vending machines to dispense age restricted products (such as tobacco products, vaping products or alcoholic drinks). The device is working in 3 scenarios:

1. Standalone age verification device (using age verification MDB dedicated address – 0x68 → 0x6F)

2. Cashless device + standalone age verification device (using cashless addresses 0x10/0x60 + age verification MDB dedicated address – 0x68 → 0x6F)

3. Cashless device with internal age verification support (using cashless address 0x17/0x67)

The device will autodetect the VMC capabilities, it will automatically answer on cashless age verification supported commands (0x17/0x67) and on standalone age verification supported command (0x68 → 0x6F). If you need to connect this interface on a VMC that has also connected other cashless devices, you will need to use AVONLY command and save settings in order to avoid the communication overlap conflict with existing cashless devices. With AVONLY(1), the device will work as a standalone age verification device only (it will only answer on commands 0x68 → 0x6F and will ignore all cashless commands).

1. Age minimum limit request

Command	
AVAGEREQ?	This command will return the minimum age limit requested by the VMC to dispense some products, as a result of the DRAVP message sent by the vending machine on age verification device initialization or on product selection (if there are multiple age targets set on the machine)
Possible answers	
- AVAGEREQ(X)	- if the command was successfully received, “X” is the minimum age value requested by the machine to dispense a product (for example 18 in some countries for tobacco products) This value can be also obtained by monitoring AVDRAVP or CSLSDRAVP unsolicited messages. Those messages may be received while age verification device is initialized or when a product is selected by the customer.

2. Cashless DRAVS (age verification result in cashless mode)

Command	
CSLSDRAVS(X,Y)	This command will send the last age verification medium check result (for example, last national ID card verification). This command is acceptable only if the VMC is supporting cashless device with built-in age verification extensions (0x17/0x67) - X is the DRAVS feature byte 1 (check the MDB protocol manual for details, usually a value of 31 – decimal should work for approval and a value of 15 – decimal should work for denial); - Y is the DRAVS feature byte 2 (check the MDB protocol manual for details, usually a value of 16 should work, meaning “Age verification done by private ident media 1”)
Possible answers	
- CSLSDRAVSOK - CSLSDRAVSFAIL	- if the command was successfully received. - if the command was not successfully received.

3. Age verification DRAVS (age verification result in standalone or mixed mode – cashless + age verification)

Command	
AVDRAVS(X,Y)	This command will send the last age verification medium check result (for example, last national ID card verification). This command is acceptable only if the VMC is supporting standalone age verification devices (0x68 → 0x6F) - X is the DRAVS feature byte 1 (check the MDB protocol manual for details, usually a value of 31 – decimal should work for approval and a value of 15 – decimal should work for denial); - Y is the DRAVS feature byte 2 (check the MDB protocol manual for details, usually a value of 16 should work, meaning “Age verification done by private ident media 1”)
Possible answers	
- AVDRAVSOK - AVDRAVSFAIL	- if the command was successfully received. - if the command was not successfully received.

4. Display

Command	
AVDISPLAY(AAA,BBB)	This command will display a message on vending machine display. Some machines are not able to receive this message. Your application is responsible to format he message according to vending machine display size. You can get the vending machine display size issuing the VMCINFO command, described later in the system commands and answers chapter. - AAA is the time for message display. The value is represented by 0.1seconds. To display the message for 2 seconds, for example, this parameter should have a value of 20. Please note that the VMC can replace or erase your message from it's display before the time expire, if other event that requires a message to the customer occurs. - BBB is the message to display.
Possible answers	
- AVDISPLAYOK	- If the command was successfully received by the interface and placed in pending for sending on the next VMC poll.
- AVDISPLAYFAIL	- If the command reception failed for some reason.
- AVDISPNOTAVAIL	- You may receive this message before AVDISPLAYFAIL answer if the machine has no display or if it is reporting that is not able to receive messages from the cashless device (machine is reporting 0 for the number of columns on display if it does not want to receive this message from the cashless device)
- AVDISPTIMEERR	- You may receive this message before AVDISPLAYFAIL answer if the time parameter is not correct (cannot be > 250)
- AVMSGLENERR	- You may receive this message before AVDISPLAYFAIL answer if your second parameter is longer than 32 characters which is the limit accepted by the MDB protocol.

5. Date/time request

Command	
AVDTREQ	This is requesting the date/time from the VMC. It is useful to get the date/time from the vending machine, to synchronize your application date and time with the VMC NOTE: Not all vending machines are responding with the real date and time. Also, some vending machines have no internal RTC and are not able to supply this information.
Possible answers	
- AVDTREQOK	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll.
- AVDTREQFAIL	- if the command reception failed for some reason.

6. Set the device in standalone age verification only or mixed working mode

Command	
AVONLY(X)	This command sets the device working mode: - if X is 0, it will work as a cashless device and it will accept both cashless age verification commands (0x17 0xFF/0x67 0xFF) and standalone age verification commands (0x68 → 0x6F). Depending on the vending machine capabilities, you can use CSLSDRAVS or AVDRAVS to approve or deny a sale that requires a minimum age to be dispensed. - if X is 1, it will work as a standalone age verification only and will not answer to any cashless related VMC commands, letting other cashless devices to work with the machine. Only AVDRAVS command can be used in this situation. The command needs to be followed by a SAVESETTINGS command if you need the settings made persistent and a REBOOT command to reinitialize it.
Possible answers	
- AVONLYOK - AVONLYFAIL	- if the command was successfully received by the interface and placed in pending for sending on the next VMC poll. - if the command reception failed for some reason.

7. Ge the device working mode

Command	
AVONLY?	This command reads the interface working mode
Possible answers	
- AVONLY(0) - AVONLY(1)	- the interface is working in cashless + age verification mode - the interface is working in standalone age verification mode.

IV. Unsolicited messages

Unsolicited messages are messages that are coming as a result of the VMC activity and not as a result of a command from your application. They may occur at any moment so your application is responsible to constantly listen on the serial or USB interface, parse unsolicited messages and react accordingly.

1. File system status

Command	
- INITFSFAIL	- This this message may come out on power-up or after REBOOT command. This is usually a sign of a defective internal memory and the device will not work
- INITFSOK(1,X,Y)	- This message may come out on power-up or REBOOT command, when the FS was just formatted. X is the number of total used bytes and Y is the number of total memory size
- INITFSOK(2,X,Y)	- This message may come out on power-up or REBOOT if the FS was previously formatted and everything is working fine.

2. Hardware serial number fail

Command	
- SNERR(A,B,C,D,E,F)	- This this message may come out on power-up or after REBOOT command when the current firmware don't match with the device hardware serial number. Please contact us and mention A-F values.

3. Hardware serial number dump

Command	
- SN(A,B,C,D,E,F)	- This this message may come out on power-up or after REBOOT command, showing the hardware serial number.

4. CRC fail for last MDB received message from VMC

Command	
- CRCFAIL(X)	- This this message may come out when there was a communication error (last MDB message received from VMC was an error or was truncated. X is "1" for primary cashless mode and "2" for secondary cashless mode, depending on the device configuration

5. Cashless session timeout

Command	
- CSLSSESSTIMEOUT	- This this message may come out when a timeout occurred for the current session. The device will automatically close the current session if there is no product selection after the session started. See III.A.1, III.B.29 and III.B.30 for details.

6. Cashless vend approve timeout

Command	
- CSLSVNDAPPTIMEOUT	- This this message may come out when a timeout occurred for the current VEND APPROVE status, if your application stalled. See. III.A.1, III.B.31 and III.B.32 for details.

7. Cashless reset by VMC

Command	
- RESETBYVMC	- This this message may come out when the VMC sends a RESET command to the device

8. Cashless not initialized

Command	
- NOTINITED	- This this message may come out when your application sends a command, but the cashless was not initialized by the VMC.

9. ACK on the last message sent to VMC

Command	
- ACK	- This this message may come out after your application sent a message that should be parsed by the VMC, if the VMC correctly received the message.

10. NAK on the last message sent to VMC

Command	
- NAK	- This this message may come out after your application sent a message that should be parsed by the VMC, if the VMC did not correctly received the message.

11. Vend request

Command	
- VNDREQ(A,B)	- This this message may come out during a session (for Level 2 or Level 3 machines without Always Idle mechanism) or anytime for Level 3 machines with Always Idle mechanism, when the customers is making a selection - A is the scaled product price - B is the item (selection) number Your application needs to issue a VEND APPROVED or a VEND DENIED message as a response to this message, after checking customers balance, for example.

12. Vend cancel

Command	
- VENDCANCEL	- This this message may come out during a session (for Level 2 or Level 3 machines without Always Idle mechanism) or anytime for Level 3 machines with Always Idle mechanism, when VMC is waiting for vend approval. Your application

	should take all actions in order to cancel the funds withdrawal,

13. Vend success

Command	
- VENDSUCCESS(A)	- This this message may come out after machine successfully dispensed or prepared the selected product. - A is the item (selection) number successfully dispensed.

14. Vend failure

Command	
- VENDFAILURE	- This this message may come out if the machine failed to dispense or prepare the selected product.

15. Session complete

Command	
- SESSIONCOMPLETE	- This this message may come out when the machine closes the current session.

16. Cash sale reporting

Command	
- CASHSALE(A,B)	- This this message may come out after a success cash sale. It is used for reporting purposes and offers your application the possibility to create real time sales reports. This may depend on the VMC configuration and/or implementation, some older machines may not able to report this information. Also, you need to set bit 3 on cashless miscellaneous options. - A is the scaled product price - B is the item (selection) number

17. Disabled by VMC

Command	
- DISABLEBYVMC	- This this message may come out when the VMC is disabling the device (during dispensing/preparing or because of an internal error). If the cashless is disabled by VMC for a time longer than the longest preparing time for that specific machine, most probably the machine is out of order due to an internal error and you can consider that for reporting an out of order machine. Some machines are also requiring special settings in their menu.

18. Enabled by VMC

Command	
- ENABLEBYVMC	- This this message may come out when the VMC is enabling the cashless device.

19. Revalue request

Command	
- REVALUEREQ(A)	- This this message may come out when the VMC is trying to load some credit into the user account. It may occur only while a cashless session is opened. You may use this function to add cash loaded into the machine to the customer's account. Bit 0 of miscellaneous byte should be set in order to activate this function. Some machines are also requiring special settings in their menu. This message may also occur in the case of vend failure, some machines are trying to load back the credit to customer's account.

20. Revalue request

Command	
- REVALUELIMITREQ	- This this message may come out when the VMC is trying obtain the maximum amount that the cashless device can receive for revalue operations. See III.A.7 for details.

21. Expansion options enabled

Command	
- EXPENABLEOPTIONS	- This this message may come out when the VMC activating some of the expansion identification bits. See III.B.25 and III.B.26 for details

22. Date/time

Command	
- DATETIME(A,B,C,D,E,F,G,H,I)	- This this message may come out when the VMC is reponding to your application date time request message. A-I are values in order mentioned in MDB specification manual.

23. Cashless is in session

Command	
- CSLSISINSESSION	- This this message may come out when your application try to begin a session or when the "START" button is pressed, but a session is currently opened.

24. Cashless not enabled

Command	
- CSLSNOTENABLED	- This this message may come out when your application try to begin a session or when the "START" button is pressed, but the cashless device was not enabled by the VMC

25. Begin button pressed

Command	
- BEGINBUTTON	- This this message may come out when the customer is pushing the cashless "START" button to load a fake credit to the machine, in order to allow a product selection

26. Cashless wait vend

Command	
- CSLSWAITVND	- This this message may come out when a cancel message was sent by your application to the device or a cancel timeout occurred and the cashless device is waiting for a VEND APPROVED or VEND DENIED message.

27. Cashless wait revalue

Command	
- CSLSWAITREVAL	- This this message may come out when a cancel message was sent by your application to the device or a cancel timeout occurred and the cashless device is waiting for a REVALUE APPROVED or REVALUE DENIED message.

28. Cashless display time error

Command	
- DISPTIMERR	- This this message may come out when the time set for a display message command is not correct.

29. Cashless display message length error

Command	
- MSGLENERR	- This this message may come out when the display message length is bigger than 32 bytes (the maximum accepted length, according to MDB specifications).

30. Display not available

Command	
- DISPNOTAVAIL	- This this message may come out when the VMC is reporting that it’s display is not available for the messages coming from the cashless device.

31. Age verification device rest by VMC

Command	
- AVRESETBYVMC	- This this message may come out when the VMC is sending age verification device reset (0x68)

32. Age verification device has sent the setup answer to the VMC

Command	
- AVSETUPOK	- This this message may come out when the interface is answering to the VMC age verification setup command

33. Age verification device no initialized yet

Command	
- AVNOTINITED	- This this message may come out when the interface is receiving a command (DRAVS for example), but not yet initialized by the VMC

34. Age verification device received date/time

Command	
- AVDATETIME(A,B,C,D,E,F,G,H,I)	- This this message may come out when the VMC is responding to your application date time request message. A-I are values in order mentioned in MDB specification manual.

35. Age verification device received minimum requested age from VMC

Command	
- AVDRAVP(X)	- This this message may come out when the VMC is initializing the age verification device or at any moment if there are multiple minimum requested ages set for different products. “X” is the requested value (for example 18 in some countries, where tobacco products are restricted to customers 18yo or higher).

36. Age verification device received age validation request from VMC

Command	
- AVDRAVSREQ	- This this message may come out when the VMC is requesting an update of the age verification. You need to issue AVDRAVS command in response on this command, to inform the VMC if the minimum requested age conditions are met or not.

37. Age verification device received minimum requested age from VMC in cashless age verification mode

Command	
- CSLSDRAVP(X)	- This this message may come out when the VMC is initializing the age verification device or at any moment if there are multiple minimum requested ages set for different products. “X” is the requested value (for example 18 in some countries, where tobacco products are restricted to customers 18yo or higher).

38. Age verification device received age validation request from VMC in cashless age verification mode

Command	
- CSLSDRAVSREQ	- This this message may come out when the VMC is requesting an update of the age verification. You need to issue CSLSDRAVS command in response on this command, to inform the VMC if the minimum requested age conditions are met or not.

Appendix I – cashless stages description

Stage value	Stage description
0	- Power-up or reset by VMC
1	- Received cashless setup config data information from VMC
2	- Received MAX/MIN prices from VMC
3	- Sent JUST reset to VMC
4	- Received VEND REQUEST from VMC
5	- Received VEND CANCEL from VMC
6	- Received VEND SUCCESS from VMC
7	- Received VEND FAILURE from VMC
8	- Received SESSION COMPLETE from VMC
9	- Received DISABLE from VMC
10	- Received ENABLE from VMC
11	- Received CANCEL from VMC
12	- Received DATA ENTRY from VMC
13	- Sent expansion identification to VMC
14	- Received REVALUE REQUEST from VMC
15	- Received REVALUE LIMIT REQUEST from VMC
16	- Sent cashless setup data to VMC
17	- Sent EXPANSION ID to VMC