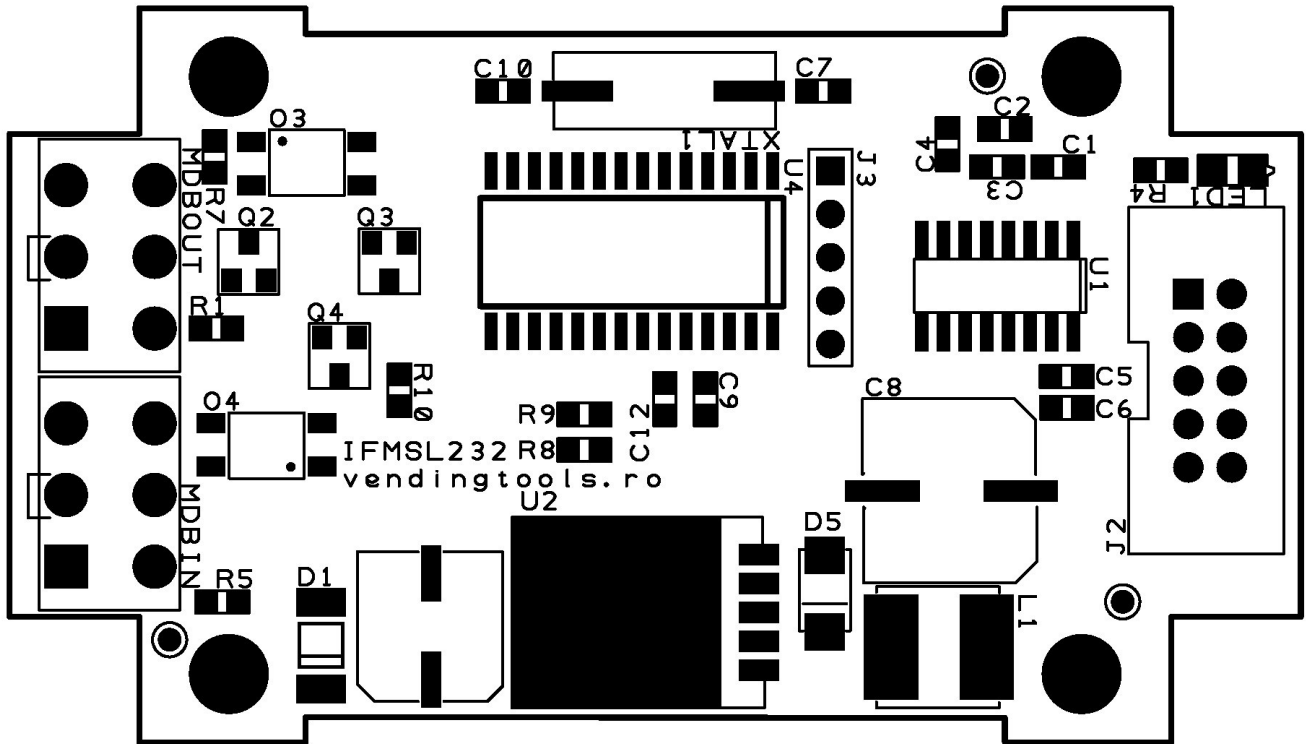


Interface MDB SLAVE to RS232
v.01.12.2016
Quick reference

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I. Hardware overview



Picture 1: Board overview

1. Power supply requirements

The INTERFACE is powered directly from the MDB bus, with a power consumption of 80mA at a maximum 37VDC.

2. Connector description

- **<MDBIN>** – MDB input connector. It requires a pin to pin straight MDB cable.
- **<J2>** - RS232 connector. For this port, the package includes a flat cable with all necessary connectors.
- **<MDBOUT>** - Used to connect the MDB PERIPHERALS. This port was added to eliminate the need of an “Y” cable.

3. General description

You do not need to perform any settings on the INTERFACE, neither hardware or software.

This interface can be only used to act as a cashless device (card payments, SMS payments, etc.). If you need to act as a bill validator or coin acceptor or other MDB slave device, please contact us for software development.

Also, the interface is actively sniffing the MDB bus to catch the entire communication between VMC and the cash payment systems (bills and coins). There are some internal counters that are accumulating the cash inserted (coins and bills) and the change returned (coins). Those counters are accessible for read by the MDBCashlessGetStat command (see reference below) and can be used for some sort of telemetry systems (there is also a reporting system that sends out on the serial port every selection on cash transactions – if the machine has the software implementation for MDB cashless cash vend messages). The interface is managing the 9th bit and the time critical answers for the VMC and you only need to send some simple command. At this time, the cashless cannot support revalue commands (you cannot add credit on your cashless device using cash, directly on a vending machine). If you need this feature, please contact us for software development.

This interface is using a fixed scaling factor of 10.

II. RS232 communication protocol

The interface has a low level protocol and we are also offering a small daemon application (written with Python 3 and tested on Linux for the moment). You can use this daemon to connect your application simply by using a socket or as an example for your low level development, if you need to directly send commands to the RS232 port. You can see a small video about using this daemon with telnet to manage some cash/cashless transactions at [this link](#)

You must set the RS232 interface with the following parameters:

- baudrate – 230400bps;
- data bits – 8;
- stop bits – 1;
- parity – NONE;
- flow control – RTS/CTS.

III. Low level communication protocol using direct RS232 connection

1. Cashless begin session

<COMMAND>	<PARAMETERS>
0x03	<ul style="list-style-type: none"> - Byte 1 – scaled value of available funds (hi) - Byte 2 – scaled value of available funds (lo) - Byte 3 → Byte 6 – media ID - Byte 7 – Payment type (according to MDB specifications) - Byte 8 → Byte 9 - Payment data (according to MDB specifications) - Byte 10 – MDB CRC
INTERFACE answer	
<ul style="list-style-type: none"> - 0xFC 0xFC 0xFC 0xFC 0xFC 0xFC - ACK – command success - 0xFD 0xFD 0xFD 0xFD 0xFD 0xFD – NACK – command failed 	

2. Cashless cancel session

<COMMAND>	<PARAMETERS>
0x04	- Byte 1 – MDB CRC – always 0x04 for this command
INTERFACE answer	
- 0xFC 0xFC 0xFC 0xFC 0xFC 0xFC - ACK – command success	
- 0xFD 0xFD 0xFD 0xFD 0xFD 0xFD – NACK – command failed	

3. Vend denied

<COMMAND>	<PARAMETERS>
0x06	- Byte 1 – MDB CRC – always 0x06 for this command
INTERFACE answer	
- 0xFC 0xFC 0xFC 0xFC 0xFC 0xFC - ACK – command success	
- 0xFD 0xFD 0xFD 0xFD 0xFD 0xFD – NACK – command failed	

4. Vend approved

<COMMAND>	<PARAMETERS>
0x05	- Byte 1 – scaled value of the product price (hi) - Byte 2 – scaled value of the product price (lo)
INTERFACE answer	
- 0xFC 0xFC 0xFC 0xFC 0xFC 0xFC - ACK – command success	
- 0xFD 0xFD 0xFD 0xFD 0xFD 0xFD – NACK – command failed	

5. Get status

<COMMAND>	<PARAMETERS>
0xFB	Byte 1 – MDB CRC – always 0xFB for this command
INTERFACE answer	
<ul style="list-style-type: none"> - Byte 1 → Byte 4 – cash counter (non-volatile lifetime accumulated cash) - Byte 5 → Byte 8 – change counter (non-volatile lifetime accumulated change) - Byte 9 – cashless stage with one of the following values: <ul style="list-style-type: none"> - 0x00 – beginning - 0x01 – setup config data - 0x02 – max/min prices - 0x03 – just reset - 0x04 – vend request - 0x05 – vend cancel - 0x06 – vend success - 0x07 – vend failure - 0x08 – session complete - 0x09 – disabled - 0x0A – enabled - 0x0B – cancel from VMC - 0x0C – entry request - 0x0D – expansion request ID - 0x0E – revalue request - 0x0F – revalue limit request - Byte 10 – MDB CRC 	

6. Interface reset

<COMMAND>	<PARAMETERS>
0xFE	- Byte 1 – MDB CRC – always 0xFE for this command – will reset the interface and force the VMC to initialize it again.
INTERFACE answer	
No answer	

7. Unsolicited message – cash received

<COMMAND>	<PARAMETERS>
None	None – this message comes anytime the VMC is receiving some cash
INTERFACE answer	
<ul style="list-style-type: none"> - Byte 0 – 0xFA - Byte 1 → Byte 4 – scaled value of received cash - Byte 5 – interface CRC (bytes XOR from B0 to B4) 	

8. Unsolicited message – cashless status

<COMMAND>	<PARAMETERS>
None	None – this message comes anytime the VMC is receiving some cash
INTERFACE answer	
<ul style="list-style-type: none">- Byte 0 – 0x14- Byte 1 – cashless status, with the following values:<ul style="list-style-type: none">- 0x00 – cashless disabled- 0x01 – cashless enabled- 0x02 – cashless cancel- Byte 2 – interface CRC (bytes XOR from B0 to B1)	

9. Unsolicited message – vend

<COMMAND>	<PARAMETERS>
None	None – this message comes anytime the VMC is receiving some cash
INTERFACE answer	
<ul style="list-style-type: none">- Byte 0 – 0x13 - always<ul style="list-style-type: none">- if Byte 1 == 0x00<ul style="list-style-type: none">- Byte 2 → Byte 3 – scaled value of received cashless- Byte 4 → Byte 5 – item number (selection/line number)- Byte 6 – interface CRC (bytes XOR from B0 to B5)- if Byte 1 == 0x01 – vend cancel<ul style="list-style-type: none">- Byte 2 – interface CRC (bytes XOR from B0 to B1)- if Byte 1 == 0x02 – vend success<ul style="list-style-type: none">- Byte 2 – Byte 3 – Item ID- Byte 3 – interface CRC (bytes XOR from B- to B3)- if Byte 1 == 0x03 – vend failure (the VMC could not deliver the product)<ul style="list-style-type: none">- Byte 2 – interface CRC (bytes XOR from B0 to B1)- if Byte 1 == 0x04 – session complete<ul style="list-style-type: none">- Byte 2 – interface CRC (bytes XOR from B0 to B1)- if Byte 1 == 0x05 – cash sale reported to cashless device<ul style="list-style-type: none">- Byte 2 → Byte 3 – scaled value of received cashless- Byte 4 → Byte 5 – item number (selection/line number)- Byte 6 – interface CRC (bytes XOR from B0 to B5)	

IV. High level protocol, using Python 3 daemon

1. MDBCashlessBeginSession(NNNN)

The command, sent on the socket, has the following syntax:

- **MDBCashlessBeginSession(NNNN)**, where NNNN is the value of the credit you need to send to MDB machine, scaled by 100. For example, if you need to send 1EUR, the NNNN should be 100 and if you want to send 3.20EUR, you must set NNNN to 320. This command is corresponding to the MDB low level message “Begin session”.

The daemon will respond with:

{"MDBCashlessBeginSession": "XXXX"} where XXXX should match NNNN value you have sent to the interface. If XXXX has a value of -1 (negative one), then there was an error in the communication between the interface end the vending machine. You must issue a cancel session command and retry.

2. MDBCashlessCancelSession

The command, sent on the socket, has the following syntax:

- **MDBCashlessCancelSession**. This command will reset the cashless session and the cashless interface will come back to idle mode. This command is corresponding to the MDB low level message "Session cancel request".

The daemon will respond with:

{"MDBCashlessCancelSession": "0"} – for succes or

{"MDBCashlessCancelSession": "-1"} – for failure

3. MDBCashlessVendDenied

The command, sent on the socket, has the following syntax:

- **MDBCashlessVendDenied**. This command will deny cashless vend request that comes from the VMC. This command is corresponding to the MDB low level message "Vend denied".

The daemon will respond with:

{"MDBCashlessVendDenied": "0"} – for success or

{"MDBCashlessVendDenied": "-1"} – for failure

4. MDBCashlessVendApproved(NNNN)

The command, sent on the socket, has the following syntax:

- **MDBCashlessVendApproved(NNNN)**. This command will approve the vend for the previous vend request command issued by the VMC. The NNNN value has statistical functions, for VMC controller and you have to issue the right amount in response to VMC request. It is also scaled like on MDBCashlessBeginSession command. This command is corresponding to the MDB low level message "Vend approved".

The daemon can respond with one or more messages:

{"VMCResponse" : "VendSuccess", "ProductID" : "10"} – this answer means that VMC successfully sold the product and you can subtract the value in the vend request message from your customer's account.

{"VMCResponse" : "SessionComplete"} – this answer is not solicited and can be sent by VMC or not, depending on its settings and/or software implementation.

5. MDBCashlessGetStat

The command, sent on the socket, has the following syntax:

- **MDBCashlessGetStat**. This command will return some internal informations from the MDB-RS232 interface and has no corresponding low level MDB command.

Daemon response example:

{"MDBCashlessStatus" : "10" , "MDBCashlessHuman" : "Enabled by VMC" , "MDBCashSniff" : "1100" , "MDBChangeSniff" : "200"}

Where:

- **MDBCashlessStatus** is a numeric value corresponding to the interface status;
- **MDBCashlessHuman** is a human readable information about the interface current status;
- **MDBCashSniff** is the total value of accumulated cash inserted into the payment systems, obtained by sniffing the MDB communication. This is non-resettable, it is the value since the first power-up of the interface and is available only for read, scaled by 100 (for this example, total cash from the first power-up is 11.00);
- **MDBChangeSniff** is the total value of the change returned by the vending machine to the customers, also read-only and non-resettable, scaled by 100 (for this example, the total change from the first power-up is 2.00).

6. MDBCashlessReset

The command, sent on the socket, has the following syntax:

- **MDBCashlessReset**. This command will put the cashless interface in a stage available on the power-up. The VMC will initialize the cashless again.

The daemon will respond with:

{"MDBCashlessReset" : "0"} – for success or

{"MDBCashlessReset" : "-1"} – for failure.

7. Shutdown

The command, sent on the socket, has the following syntax:

- **Shutdown** – This command will stop the daemon, and this will terminate with exitcode 0.
There is no daemon answer for this command, the socket will be closed and the daemon will end it's execution.

8. Unsolicited messages

The daemon can send one or more of this messages, depending on machine's configuration and/or software implementation:

{"CashInput" : "900"} – the value of the general cash counter. It is incremented and it will be sent on each cash input (coin and bill)

{"CashSale" : "Success", "ProductID" : "10", "ProductPrice" : "100"} – this message will be received if the machine can report cash sales to a cashless device. This message will be sent on each cash sale, with the ID and the value of the selected product. The value is also scaled by 100.

NOTES: