

# **PICOVEND EZ EXECUTIVE TO MDB CONVERTER**

**v2020-08-04  
(fiscal ready)**

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# I. Introduction

This device was designed for an easy conversion of Executive machines to modern MDB payment systems. It can be also used to connect a computer, a PLC or a Raspberry Pi (and compatible SBC) to an Executive vending machine, in order to manage sales and other functions. It is driven by a simple ASCII protocol, that can be easily implemented in any user application.

Standard package content:

- PICOVEND EZ EXECUTIVE TO MDB CONVERTER board
- Executive cable to connect to Executive VMC.

NOTE!!! - this device can handle one MDB bill validator/recycler, one MDB coin acceptor/changer and one MDB cashless device (Level 2 or Level 3 with always idle cashless device). The second cashless address is not implemented and it will be the subject of a future update. **Also, it is not supporting MDB Level 1 cashless devices and there is no plan to add support for Level 1 on this device.**

During its activity, the interface keeps some internal counters (total number of bills validated, total value of validated bills, coin, cashless transactions, product sales in price holding mode, etc.). At any moment, you can read those counters in order to obtain some statistics. Also, the counters may be used as a verification, if some messages are lost by the user application. For example, you may constantly poll for counters to check if you missed some bills or coins.

The converter is able to work with both Executive modes (prices set on the vending machine or "price holding" - with the prices stored on the interface). If you need to collect sales statistics with your external application, "price holding" mode is recommended. The interface is able to store up to 127 product individual counters. The counters can be read over USB interface, by using simple ASCII commands detailed later in this document.

## II. Hardware

### A. Board overview

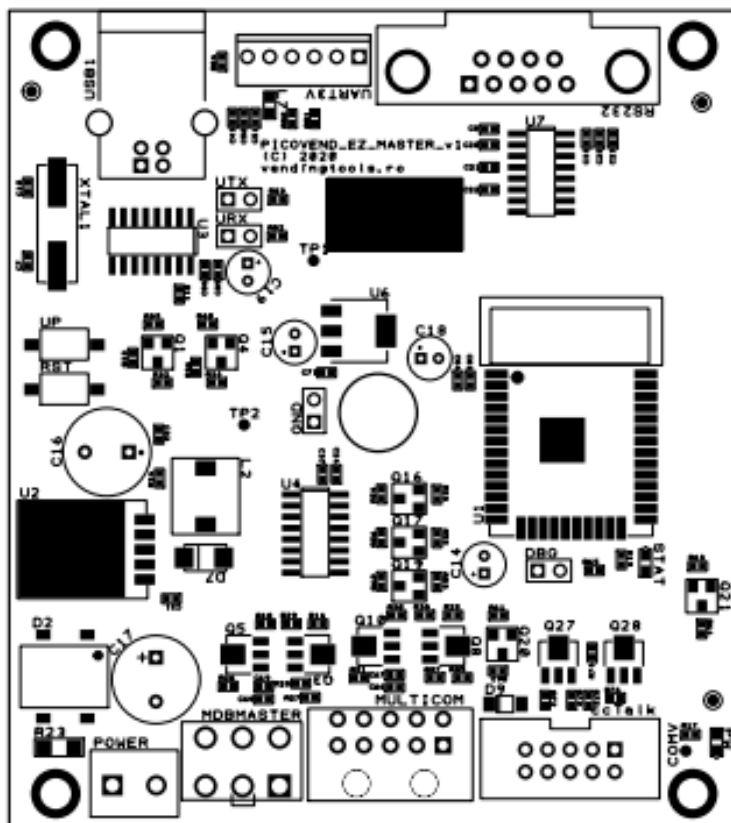


Figure 1 - Board overview

### B. Connectors description

**1. POWER** – connect your external power supply to this connector in order to power the device and, also, the connected peripherals (MDB payment systems, ccTalk payment systems, etc.). You need to make sure your power supply is matching the connected MDB and ccTalk power requirements (voltage and current). The maximum momentary drained current simultaneously drained from MDB and ccTalk should not exceed 4A. AC power can be also applied on this connector, but you need to take care that the transformer can cover all current requirements and not exceed 24V on open terminals.

**2. MDBMASTER** – this connector allows the device interfacing with MDB peripherals (bill validator/recycler, coin acceptor/changer and cashless device);

**3. MULTICOM** – is a multipurpose interface connector, not used with this version. In future software versions it will offer Executive interface and ccTalk for non-standard connector peripherals. On this connector you will need to connect the included Executive cable.

**4. ccTalk** – this is the connector for standard 10pin ccTalk interfaces. It's pinout is the following:

- PIN #1 – ccTalk data;
- PIN #2 – N/C;
- PIN #3 – N/C;
- PIN #4 – GND;
- PIN #5 – N/C;
- PIN #6 – N/C;
- PIN #7 – VCC POWER;
- PIN #8 – GND;
- PIN #9 – N/C;

- PIN #10 – VCC POWER;

ccTalk functions are not implemented in this firmware.

**5. RS232** – this is the connector for RS232 interface – used for Bluetooth activation in this version, by connecting the dedicated “Service mode” optional connector.

**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. USB1** connector to use on USB hosts – requires some drivers to install on host, to emulate a virtual serial interface (default baudrate is 115200). If you are using Windows OS, you will need to install CH340G driver. For Linux (including Raspbian OS), the driver is already included in the latest Kernel and needs no additional driver installation.

## II. Standalone working mode

With this working mode, the device is a standalone converter from Executive vending machine to MDB payment systems. You need to configure the working parameters using the Android application.

Configuration is available by using an Android application only. There are no hidden menus and buttons on this device and the Android application is the easiest way to configure the device

The Android application is connecting over Bluetooth. The controller Bluetooth needs to be activated for configuring and deactivated after configuration finished.

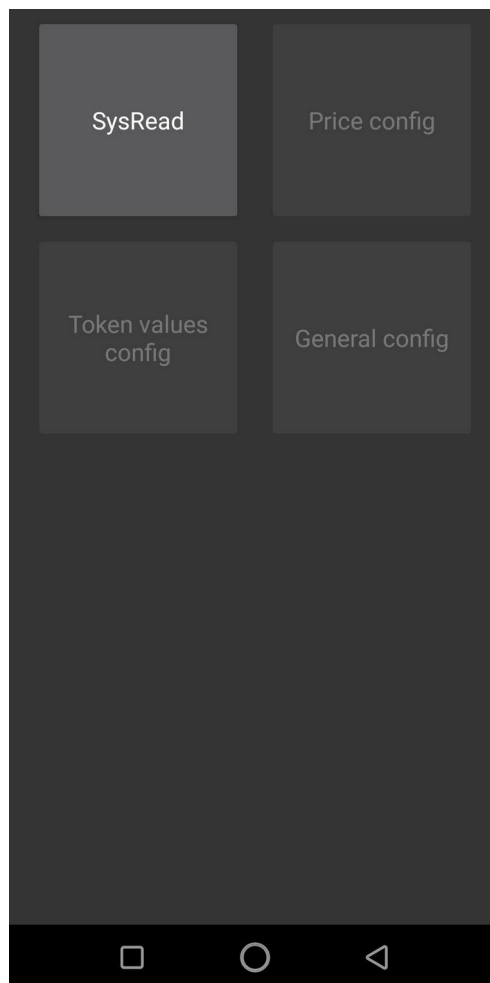
### A. Bluetooth activation

To activate the Bluetooth communication, you need to connect the optional “Bluetooth enable” DB9 connector on the RS232 interface, while the device is not powered.

Power up the device and using your Android device “Bluetooth” menu, pair with the PVEZEXE module in range. You will need to delete and follow the pairing procedure with any different PICOVEND EXECUTIVE TO MDB CONVERTER you may want to configure.

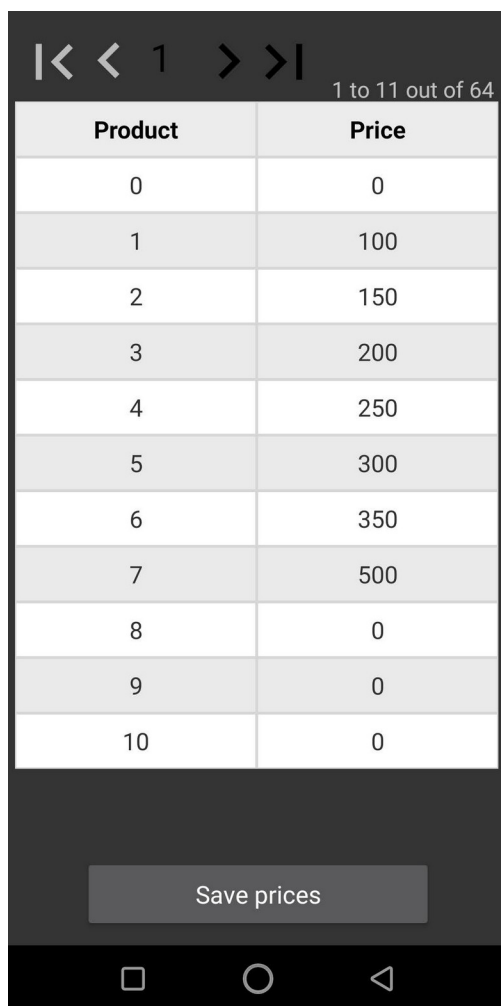
### B. Android application flow

1. Start the application that will automatically try to connect to PVEZEXE device. If successful, you will get a message on your phone and the following screen will be displayed.



Press “SysRead” button, the application will read current controller settings. Some data will be displayed and some short beeps can be hear some short beeps. Please wait patiently while all data are retrieved.

Press “Back” button and go to “Price config” (for Executive price holding mode only).



The screenshot shows a mobile application interface for configuring prices. At the top, there are navigation arrows and a page indicator '1 to 11 out of 64'. Below this is a table with two columns: 'Product' and 'Price'. The table contains 11 rows of data, with Product IDs from 0 to 10 and corresponding prices. A 'Save prices' button is located at the bottom of the screen.

Product	Price
0	0
1	100
2	150
3	200
4	250
5	300
6	350
7	500
8	0
9	0
10	0

In the “Product” column there is the list containing products IDs. For each needed product ID you need to set the correct price (in cents) . For example, if you set the price to 150 for product ID #2, all VMC requests for this product requires a credit of 1.50EUR. This option is only important for “Executive price holding” working mode. It is ignored if the prices are set on the vending machine. You need to make sure that the machine is set in “Executive price holding” mode and the products IDs are matching with the interface settings.

After setting the desired values, press “Save prices” button and wait for data to be saved on the device.

The “Token values” option will set the tokens values, if the controller is connected with an MDB coin acceptor that receives tokens. The configuration depends on your coin acceptor settings and they must match (for example, set on channel #1 150 if your coin acceptor is sending a “token received” message on channel #1 for 1.50EUR tokens. Push “save token values” when you are done setting the token values, then hit “Back button to go back to the main screen.

The “General config” option allows you to set some general controller settings. Please take care on those settings, since they can brick your controller if don't pay attention.

SN	ATM000000001
ESF	10
EDP	4
EMC	1000
EMV	1
EMCH	500
EFV	1
EVT	50
EPH	1

Commit changes

- **SN** is the controller serial number, that will be also periodically show on controller's display. This string should be always 12 characters length, any other length will make the controller acting unpredictable. You can leave this parameter as default, unless you are using an MDB sniffer/telemetry that will send this value to the back-end for machines management.

- **ESF** – is the value for Executive scaling factor. All set credit and product prices are sent between the interface and the Executive vending machine multiplied/divided by this scaling factor. For most of the currencies, you may use a scaling factor of 10, which gives you a credit/price resolution of 10cents. For example, if your last digit will be always 0 (1.50, 2.30, 1.10, etc.), you will use a scaling factor of 10. If your last digit is significant (1.55, 2.34, 1.12, etc.), you will need to use a scaling factor of 1. Please note that the maximum credit you can send to the machine will vary, depending on the scaling factor. The maximum value you can send to the machine is 0xFFFF (65535). That means that for a scaling factor of 1, you will be able to send a maximum credit of 655.35 with 2 decimals settings on the interface and the machine and a



maximum credit of 655.30 in the same conditions, with the scaling factor being 10. Also, the maximum credit amount depends on your decimal point settings on the machine and on the interface. Please note that, if the machine has a scaling factor setting option in its configuration menu, the value set on the machine and the value set on the interface must match. Otherwise, the credit value on the display will be incorrect.

- **EDP** – is the value for Executive decimal point. The value is binary sent and represents the position of the decimal point (for example, to have no decimals, the value should be 0, to have one decimal, the value should be 2 and to have two decimals, the value should be 4). You need to take care that the value set on the interface should match with the value set on the vending machine. Otherwise, you may get wrong values on the VMC display.

- **EMC** – is the value (cents) of the maximum cash credit accepted by the interface for transactions. When the customer has been inserted money corresponding with this set amount, all connected MDB payment systems will be inhibited. After a purchase, if the available credit falls below this value, the payment systems will be automatically enabled by the interface. If the bill is supporting escrow function, this will be automatically activated and the bills that will lead to a higher value will be returned to the customer.

- **EMV** – is the current set for multivend/single vend option. If this value is set to 0, the interface will work in single vend mode (it will automatically return change after each sale). If this value is set to 1, the interface will work in multivend mode, the remaining credit is kept on the machine to allow another selection, after each sale. To get the change, the customer must press the escrow lever on changer (usually the mechanical change button on the machine will push the lever or will activate a small motor that will push the lever).

- **EMCH** – is the value for the maximum change allowed to be returned to the customer after a transaction. If the remaining credit will be higher than this value after a transaction, the interface will not automatically return change (in single vend mode) and will not manually dispense change (in multivend mode). The remaining credit is kept on the machine to allow another selection. This option is usually used to avoid using the machine as a change machine (for example if the customer is inserting bills or coins to the maximum credit value and is selecting a low price product in order to obtain coins).

- **EFV** – is the force vend option for the interface. If this value is set to 1, the machine will not return change if there the machine did not performed a vend. If the value is set to 0, the machine will return change in any situation where a credit is available. This parameter is used to avoid customers using the machine as a change machine (for example, inserting a bill or a bigger value coin, to get coins/smaller coins). If the value is set to 0, the machine will allow the usage as a change machine. There is one exception: when the machine is reporting a vend failed, the customer will be able to get the inserted amount as coins, if does not want to to select other product, due to machine malfunction.

- **EVT** – is the vend timeout (seconds). During a vend stage (product dispensing), if the interface will not receive a “vend success” or a “vend failed” answer from the machine. This may happen due to a machine temporary malfunction, for example. If the timeout interval has passed, the interface will return to the idle mode and the credit will be kept for future product selections. Since this is a backup method to avoid machine going out of order for not normal preparation duration, you need to make sure this time is covering the longest preparation time. For example, if the the hot drink preparation duration is 40 seconds, make sure you set this value to at least 60 seconds, because sometime the preparation duration can be longer (for example if one of the machine pump is out of parameters and cannot fill the tanks in a proper time).

- **EPH** – is the working mode setting. If this value is set to 1, the interface will work in price holding mode and it will use its internal price list. If this value is set to 0, the interface is expecting prices from the machine. Make sure your machine and the interface settings are matching, otherwise, strange behavior is expected (wrong price calculation and credit subtracting).

After modifying any of the above settings, push the label in front of the field to save it to the device. When finishing all modifications, push “Commit changes” to save all settings in the NV flash memory.

Remove the “Bluetooth enable” connector from the DB9 interface and restart the device when all settings are done to allow the controller load and set the new configuration.