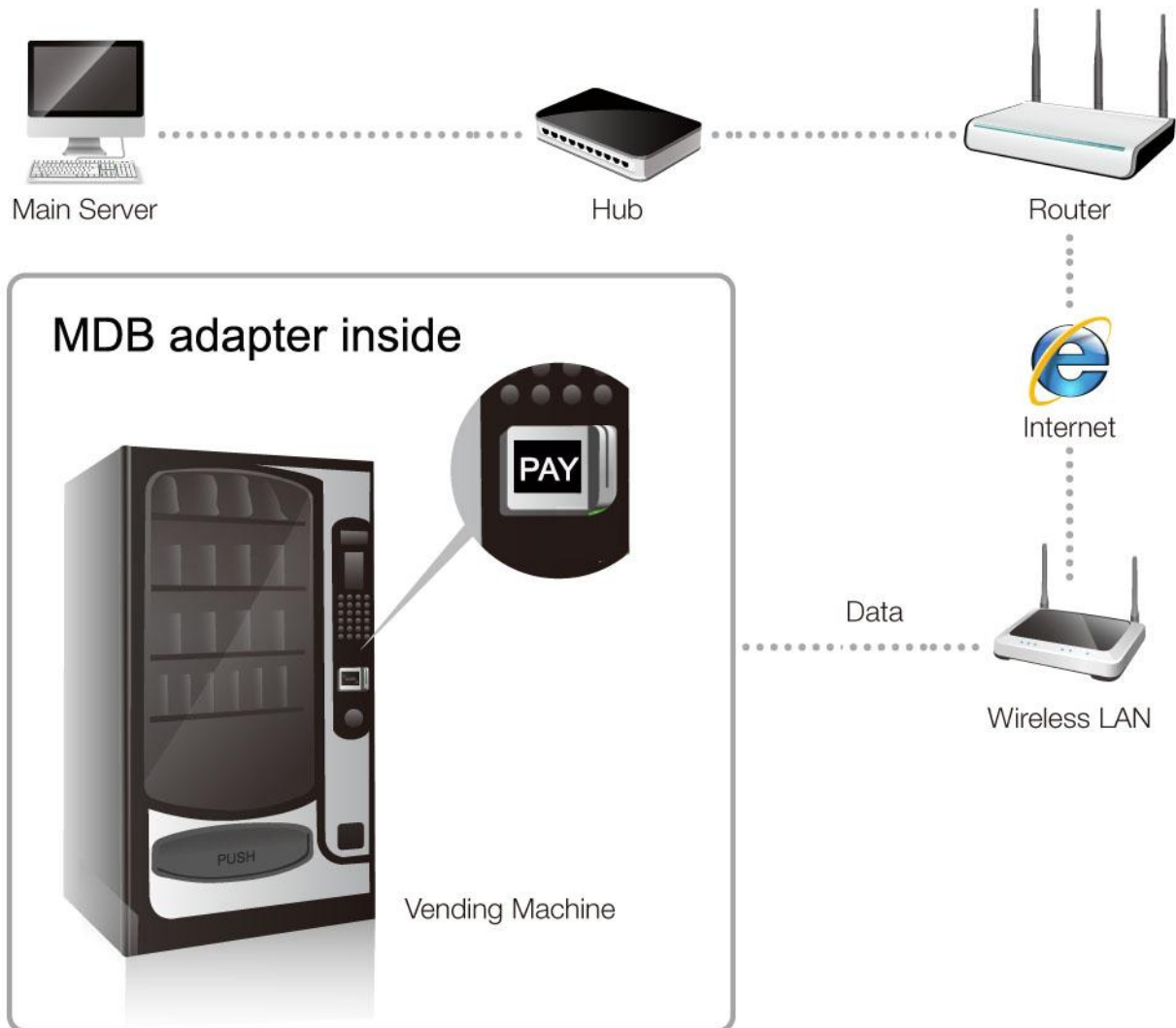


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WAFER provide full solution for Vending machine payment solution / welcome



RS232-MDB , MDB-USB and Pi2MDB Converter Manual

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Company: Shanghai Wafer Microelectronics Co.,Ltd.

Updates will not be communicated actively.

Introduction:

RS232-MDB (PC2MDB) and MDB-USB both are used to connect the PC or any other RS232 device to and MDB interface vending machine. Pi2MDB is used to connect the Raspberry pi board to vending machine. And makes it easy to integrate with MDB interface vending machines by the RS232, USB device or Raspberry pi. These adapters will reply the VMC Poll command automatically, So for user doesn't need to consider the Poll command. Any data from VMC except the poll command will be redirected to RS232 port.

Also these MDB adapter will treat all power on or reset data communication with VMC.

Any data if you want to send the HEX data to VMC, just send to adapter box together with checksum, then the adapter box will send to VMC during the VMC poll request.

So for user only need to be familiar with the Vending session with VMC during PC software development. And user should read the MDB protocol carefully to finish the test and development.

How to select these adapter for user's project?

1. If you want to connect a simple RS232 device to existing vending machine, then select the standard RS232-MDB box. **For example, PC or Android main board or PLC**
2. If your device has a USB port and also want to get a DC5V power supply from MDB box, then MDB-USB would be the best selection. **For example some POS device, some android main board.**
3. If you want to connect a popular **Raspberry pi board to vending machine**, then Pi2MDB should be the good selection. because that can be plugged directly onto the Raspberry Pi GPIO bus connector. And also power on the Raspberry pi board from the GPIO power line. Also we have the plastic case to mount the board with PI together.

For technical details or any technical questions and the protocol specification, please refer to <http://www.waferlife.com>

Any other questions, you can also add wafer online service skype: wafer-service

MDB Adapters and interfaces description:



What is the difference between RS232-MDB and MDB-USB ?

1. MDB-USB has the extra DC5V/2A output, that can be used to provide the power for POS or RaspberryPi or other connected device
2. MDB-USB is the USB port and RS232-MDB is the standard RS232 COM port

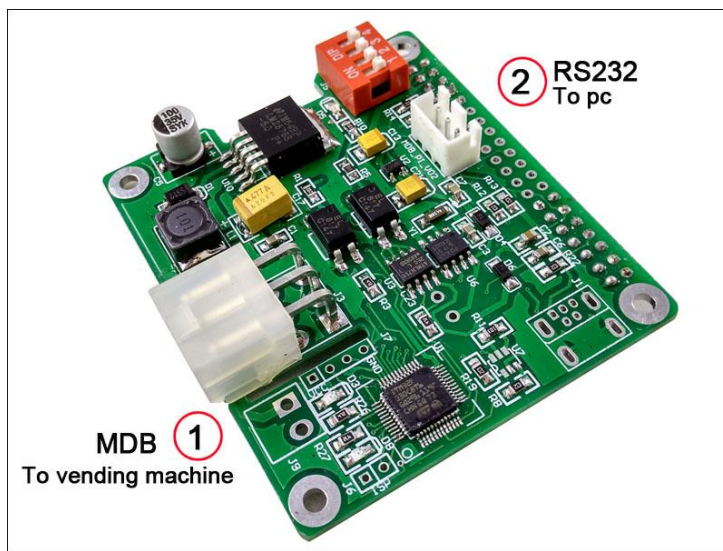


What is the USB port on MDB-USB ?

The USB On the MDB-USB is a Virtual COM-Port VCP Interface using a FTDI FT-232RL USB to Serial Interface driver. This VCP chipset is supported by all major Operating Systems.

What is the COM port on RS232-MDB

Standard box is DB9 female connector, customer can select the optional DB9 male type connector or USB connector.



What is the MDB board for Raspberry pi ?

Wafer provide the housing for this board and can mount the Raspberry pi GPIO header and MDB board together.

User can communicate with the vending machine cashless interface through the Raspberry pi Com port on the 40pin GPIO.

Wafer also provide a three pin connector on board for firmware update and also for PC com port test. Then before test with Raspberry pi,user can first test with windows PC easily.

Now we start the MDB adapter Test:

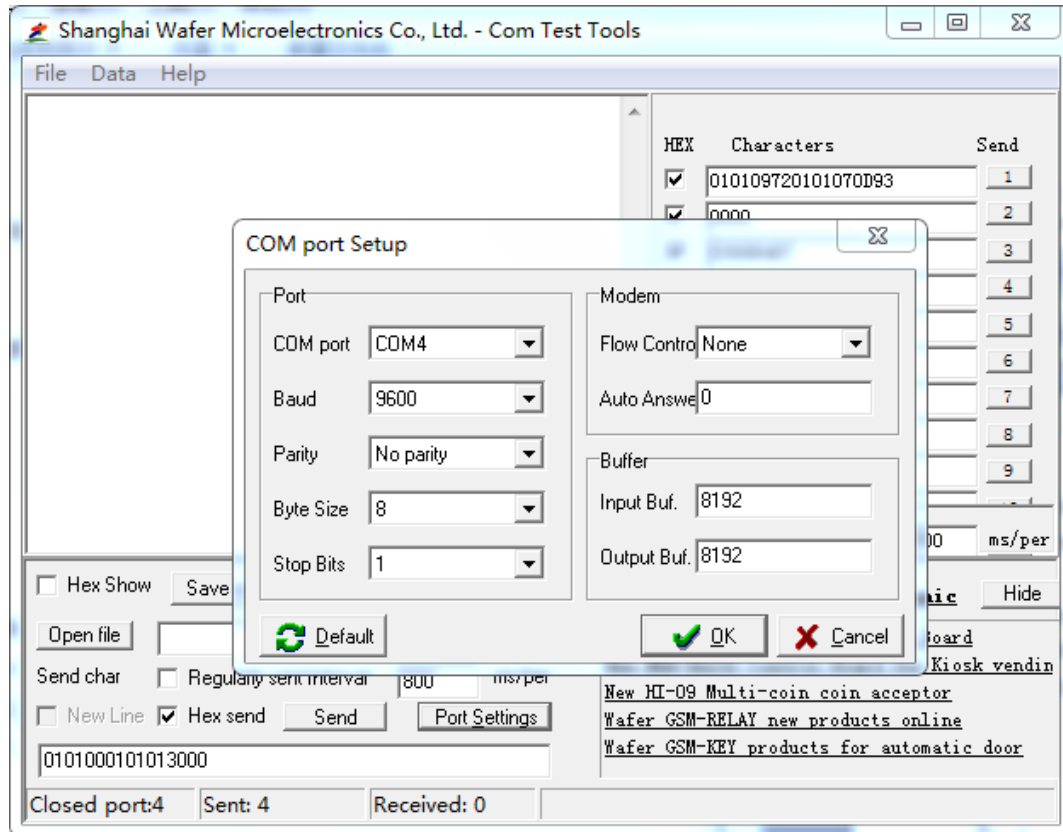
1. Know your Vending machine
 - a) Vending machine must support the cashless payment device
(If your vending machine doesn't support the MDB cashless payment interface, then consult wafer service person for other solutions)
 - b) Vending machine has the MDB connector for MDB cashless devices
 - c) Disconnect other MDB payment devices before test the MDB adapter box
2. Connect the Adapter box to VMC and PC
Simply plug the RS232-MDB to VMC (Vending machine controller) and the PC RS232 port. For MDB-USB adapter USB connector, need to install the USB driver firstly according to your system.

Check the suitable USB driver from the following web link:

<http://www.ftdichip.com/Drivers/VCP.htm>

3. Open the PC-MDB Test tool (SerialTool.exe)

Firstly check in the **PC Windows Device Manager** or make clear which is the right com port that can be used. And then Select the right Com port in the SerialTool and select the “Hex Send” as the following picture



4. Power on the VMC (RS232-MDB adapter box will be powered on at the same time through the MDB bus)

After powered on,keep to look at the RS232-MDB adapter box status LEDs, when the adapter box can be connected to the VMC,the MDB Master LED will flash some times during Power on data exchange

If No “MDB Master LED” flashing happen,then Please check:

- (1) Confirmed again,that vending machine support the cashless device interface
- (2) If the MDB address is switched at the 10H (Normally VMC will Priority support 10H)
- (3) Power off and Power on the VMC again to try
- (4) Switch the MDB address to 60H to Power off and power on the VMC again to try
- (5) Contact your VMC manufacture,if that VMC can support the MDB cashless device

5. If MDB Master LED flash some times and that means VMC has found this PC2MDB cashless devices

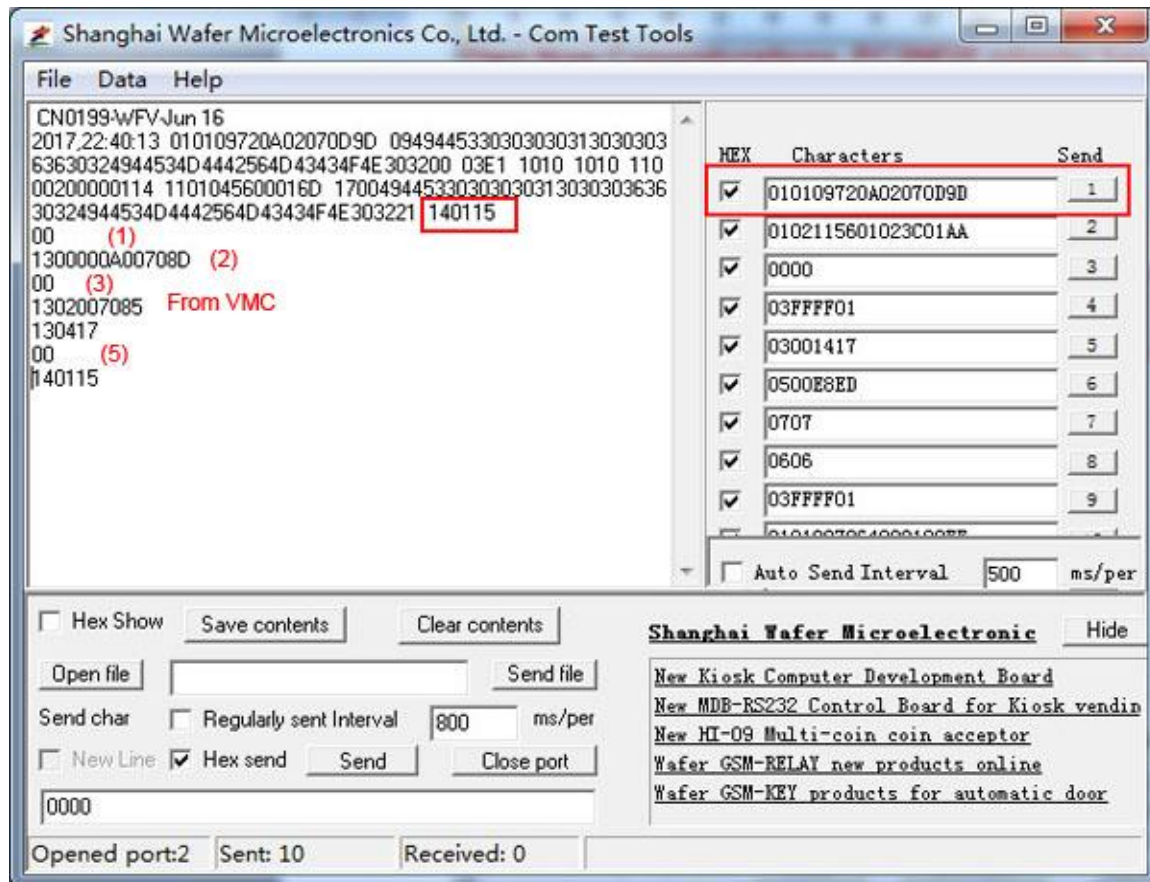
After power on the PC2MDB, Serial tool will get a self ID data:” Firmware version and the config data Report”

If serial tool can’t get this data, you need to check the serial port is properly selected

If adapter box is connected successfully to the VMC ,then you can get other more data from VMC,for example 11..... or 14..... (Start with 11, 12 , 14 or other)

You don't need to do anythings, our adapter box is already enabled to do the communication with the VMC with the config data after Vending machine powered on.

If you can get the data 140115,Then Now Congratulations, PC2MDB adapter has successfully connected to VMC



Following is the Prototype VMC test data brief explanation:

- | | | |
|--------------------|----------------------------|-----------------|
| (1) 11000200010114 | VMC Setup – Config data | (Page. 126/313) |
| (2) 1101045600016D | VMC Setup – Max /Min Price | (Page. 128/313) |
| (3) 1700..... | VMC Setup | (Page. 159/313) |
| (4) 140115 | VMC Reader enable | (Page. 154/313) |

----- After powered on,if you want to change the config data -----

- (5) 010109720A02070D9D

This is the config data for VMC, if you change it with your data according to MDB protocol, then press the Line 1 to send to PC2MDB Adapter box and press the Line 2 to ask the VMC to read the data again

Note: The first 8 bytes is the config data and the last data 9D is Checksum

When you compile your data during test and not sure the Checksum,then just send the first 8 bytes,the adapter box will reply you the checksum data,the you put the Checksum data at the end of the data group,then the adapter will reply you “ 00 “

6. Now you need to read the “ Mdb_version_4-2.pdf “ file carefully, especially about the MDB cashless device (From 7.1 ,page 117/313)

7. What adapter box has done by itself ?
- (1) Adapter box will reply the poll command from VMC automatically.
 - (2) When power on, Adapter box will reply the Config data and some ID data those are saved in the memory to VMC
 - (3) You can change the config data by yourself, and next time VMC power on again will read the new config data
8. Now we start test to add the credit value to VMC (Start a session with vending machine)
Press the test Line 3 button to send the data : `03FFFF01` (Page: 131/313)
This command is to start the **Begin Session** to tell the VMC, that card funds available for vending
After user select the goods, then:
VMC VEND send the Vend Request data: `1300000A00708D` (Page: 144/313)
(VMC send the information of the item price and number to card reader to confirm the credit)
Then Card reader should reply with Vend approved or Vend denied
For example : `05000A0F` to Approve the vend or `0606` to Deny the vend
VMC Reply after vending success: `1302007085` and `130417`
Then card reader need to send the command `0707` to **end the session**

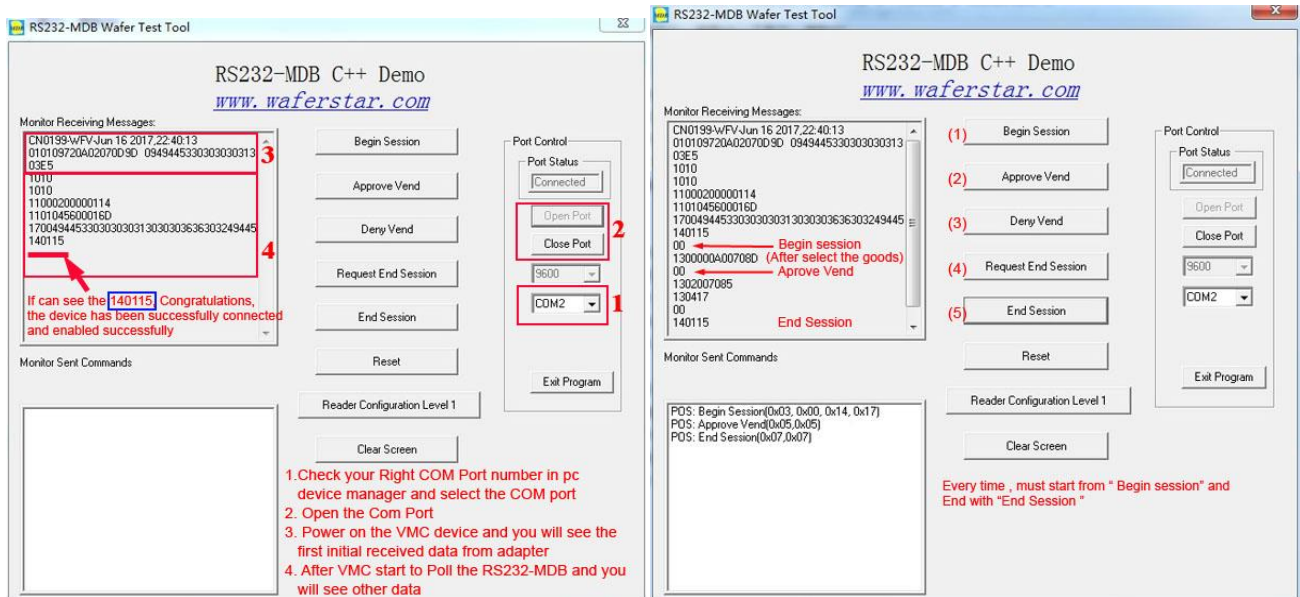
When user develop his own project code. Must be noted: Start every session with 03FFFF01 and End with 0707

9. Use the cashless interface to work for the mobile payment
Actually cashless interface is originally designed for card reader, so every time when user want to buy something in the vending machine, they will swipe the card on the Card reader and then card reader will start the session with the Vending machine. And then user can select the goods on the keypad .
So for cashless interface, We also must do the “swipe card” action to start the session, and then select the good in the keypad later. But When we start to design the system of mobile payment, there is no real card to swipe, and we also don't know when the user will start to select the goods. **So when you design the software, we should do the “swipe card” action every time after the last session completed.** Then later user can select the goods directly to continue the session.
10. More technical features and questions during mobile payment, please contact wafer
Wafer will provide full technical support and professional solution for customer's project design.
11. Test with Wafer MDB Test tools:



If you have order the SDK sets, then please contact waferstar to get the source code for This MDB test tools

How to Quick Start to use WAFER MDB adapter Box



12. What is waferstar SDK included:

- (1) Two sets RS232-MDB adapter box
- (2) MDB Test Tools
- Following service don't included in the normal order
- (3) Two sets Good quality USB to RS232 adapter cable (For MDB-USB box sets don't include this. Because MDB-USB is already USB interface)
- (4) Source code of WAFER MDB Test Tools
- (5) Wafer MDB protocol technical support and Easy understanding help
- (6) Ultimately technical supported until the project succeeds
- (7) MDB adapter simulate MDB coin acceptor or MDB bill acceptor supported**
(This is very important when some vending machine don't support MDB cashless device interface)

About the important configuration data:

When we are new to cashless payment equipment development, we must study the MDB protocol carefully, especially about the configuration data: SETUP - Config Data (1100.....) and EXPANSION - Request ID (1700).

About configuration data:

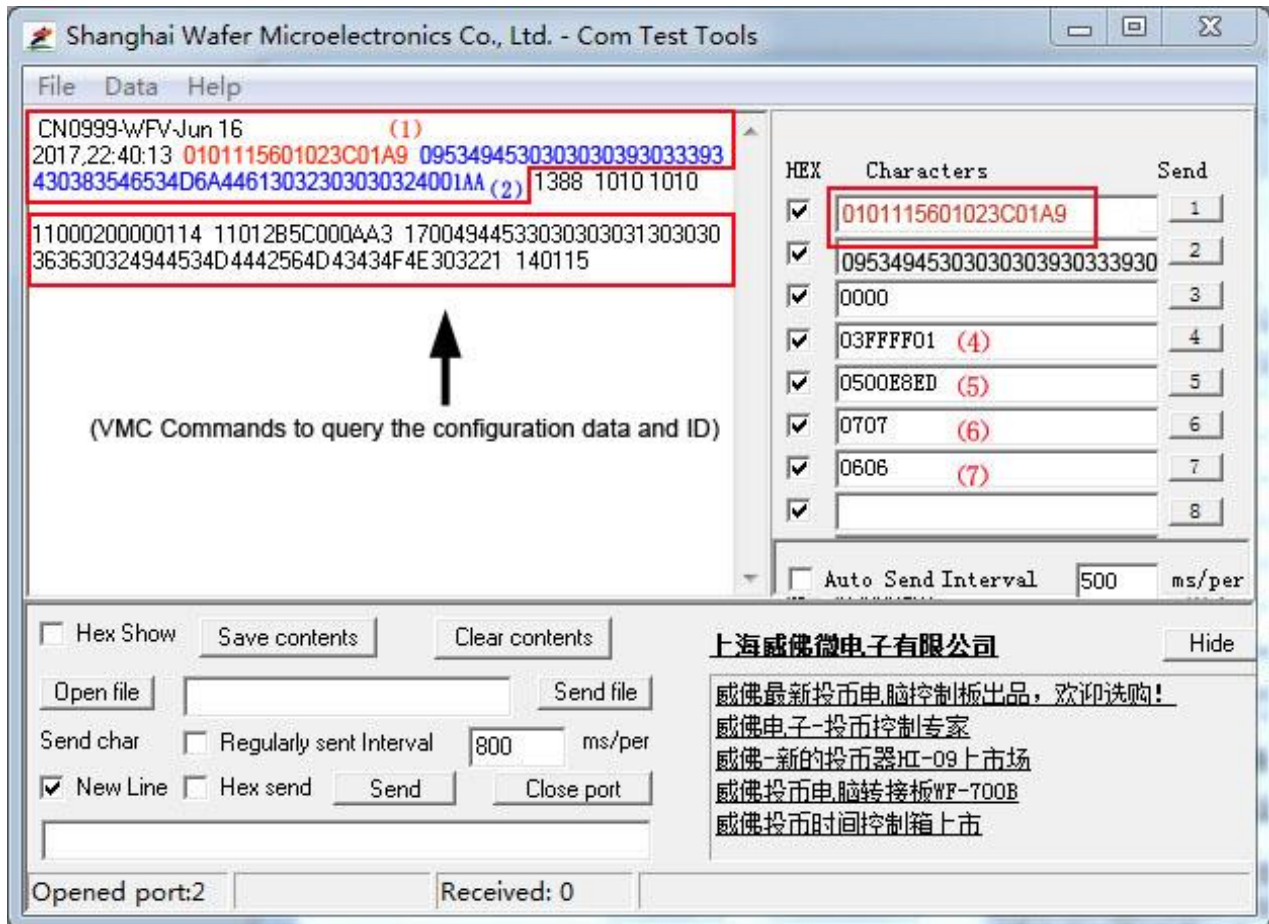
Each time the device is powered on, the device will report a string of configuration data that is pre-stored in the device to the PC, including software firmware version, date, and two strings of configuration data beginning with 01 and 09. Corresponding to CONFIG DATA and REQUEST ID respectively. These configuration data can be changed.

These two configuration parameters will involve some special functions. For example, always idle, support CASH SALE and revalue. Of course, user firstly should confirm that vending machine must support these functions.

After the vending machine starts running, the VMC will send commands to query these

configuration commands.

After the host of the vending machine starts running, the host will send commands to query these configuration commands. This allows you to know which features the device supports. Of course, it is not that we have done the configuration, the host must support it. This ultimately depends on whether the host itself supports it



Users can send new configuration data through the serial port tool. After the adapter receives the correct configuration data, it will reply 00 and store the new configuration data. When the host is queried, it will reply with the new configuration data. This data will be stored even if the MDB adapter is powered off.

Tip: The last byte of the configuration data is the checksum byte, if you are not sure what the check byte is. You can remove this byte when sending configuration data. The adapter will then reply with a non-zero byte, which is the correct checksum byte. We add this byte to the end of the configuration data and send it. The device will reply 00.

For example: **0101115601023C01A9** is the right configuration data

If we only send 0101115601023C01 to the MDB box, it will reply with A9



For example, Customer select and buy a product from the vending machine and Vending machine dispense the product

1. PC Send the Credit Funds Available (Scaled) to VMC (For example 03FFFF01)
Just use the maximum credit value would be okay
2. User Select the product (For example NO.11 product was selected)
(No data send to PC)
3. VMC then send the Vend Request to PC
13000064000B82
Note the PC, NO.11 product was selected and also the price is 1.00 (64H Scaled to 1.00)
4. If PC reply with 05006469
Just tell the VMC, that Vend Approved and Confirmed the last credit would be deducted from the buyer's account.
This may not match the amount specified in the VEND REQUEST command; it may be surcharged or discounted.
5. VMC will dispense the product and send the VEND SUCCESS to reader
1302000B20
6. VMC will also send the command 130417 to inform the Session Complete
7. PC must reply with 0707 to end the Session

For example, Customer select and buy a product from the vending machine, but The PC denied the select vend

1. PC Send the Credit Funds Available (Scaled) to VMC (For example 03FFFF01)
2. User Select the product (For example NO.11 product was selected)
(No data send to PC)
Just use the maximum credit value would be okay
3. VMC then send the Vend Request to PC
13000064000B82
Note the PC, NO.11 product was selected and also the price is 1.00 (64H Scaled to 1.00)
4. At this step, PC can deny the Vend and Reply with 0606
Just tell the VMC, that Vend was denied
5. VMC will not dispense the product and send the command 130417 to inform the Session Complete
6. PC must reply with 0707 to end the Session

WAFER PRODUCT SERIES FOR MDB SYSTEM

- If your machine is an old machine, doesn't support the mdb cashless interface. Wafer has the solution to simulate a coin validator or bill acceptor to connect your RS232 device or mobile payment device to vending machine



- Wafer also support the wireless payment mdb interface, We have LAN version or 3G version to connect MDB and remote payment server directly



- Wafer also provide Virtual VMC for your easy system development and test. Then during system development, don't need to put a big and heavy vending machine near your office desk

Vending machine Simulator

MDB main board
For payment interface development
Support bill acceptor, coin acceptor
cashless payment interface



- Wafer provide USD-MDB box for you to extend your vending machine

An MDB Universal Satellite Device (USD) is a vending device which lacks customary credit acceptance peripherals. As such, a USD must rely on a host vending machine controller (VMC) to establish credit sufficient to perform a vend. The specification herein describes a protocol by which a USD and a VMC exchange messages and credit via the MDB bus.

(If user want to use this adapter box, your Host VMC must support the USD interface, if you are not sure if support the USD, before order, please contact your manufacture or contact wafer for service)



- Wafer provide useful MDB data debug box (MDB-SPY) for your development
- If you want to connect a Pulse interface payment device to MDB interface, Wafer also have the solutions



Check how to use at youtube:

<https://www.youtube.com/watch?v=afq4uCf59Ac>

Where can download the USB driver ?

<http://www.ftdichip.com/Drivers/VCP.htm>

How can I get the fast technical service ?

Online service skype: wafer-service

Where can we download the newest manual or files

<http://www.mdb-rs232.com>

<http://www.waferlife.com>

<http://www.waferstar.com>

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