

## MDB interface board - Q3 Pos serial protocol

version	Description	Date	Author
V0.10	New add	2020/12/30	xuyin@wizarpos.com
V0.20	1.Protocol modification 2.Adding log system	2020/10/20	xuyin@wizarpos.com
V0.21	Some modification		
V0.22	Adding Pulse related	2024/3/15	<a href="mailto:xuyin@wizarpos.com">xuyin@wizarpos.com</a>
V0.23	Adding factory Mode	2024/6/28	<a href="mailto:xuyin@wizarpos.com">xuyin@wizarpos.com</a>
V0.24	Adding one shot pulse	2024/12/25	<a href="mailto:xuyin@wizarpos.com">xuyin@wizarpos.com</a>

## 1. Overview

This manual describes the serial communication protocol between Q3 Pos and MDB Interface Board, which will be short as "MIB" in follow content.

The basic baud rate of serial port is set as 115200

As the Q3 Pos could be receive command from MIB as a slave, and also could send command to MIB as a master (e.g., send "begin session" command to inform the MDB VMC it's ready for pay), a mode byte was added in serial frame to show if a command is slave response or a master request.

The request command always anticipates a response command except the checksum is wrong, or the incorrect serial format, in another word, the slave will use silence as a NAK.

## 2. Protocol Packet Definition

### Serial Port parameters

- Baud rate 115200
- 8bit, 1 stop bit, and no parity

### Packet format

Start code	Length	mode	Data	Checksum	End code
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Figure 1 protocol packet format

<b>Start code</b>	size 1 byte, always be 0x09.
<b>Length</b>	size: 1byte, the number bytes of mode, data, and checksum.
<b>Mode</b>	size: 1, 0x00 means a master request packet, 0x01 means a slave response packet, other value is prohibited.
<b>Data</b>	size: n bytes. The data could be raw MDB commands, such as SETUP, VEND. Or the MIB control commands, such as GET VERSION, SET PARAMETER.
<b>Checksum</b>	size: 1byte, using LRC algorithm, input data were "mode, data"
<b>End code</b>	size: 1byte, always be 0x0D.

### 3. Specifics

#### **MDB Forwarding mechanism**

MIB will forward all the MDB cashless device commands (MDB spec section 7), except VMC request Poll.

When the MIB receive the VMC request, it removes the MDB mode bit, fill into serial packet data area, and transmit to serial port. In the opposite direction, the MIB receive the response, it unwraps the packet, and adding mode bit to the tail bytes, sending to the VMC, wait for the acknowledge.

Taking the RESET for example, the transfer data flow can be described as below.

**VMC → MIB:** 0x110 0x10

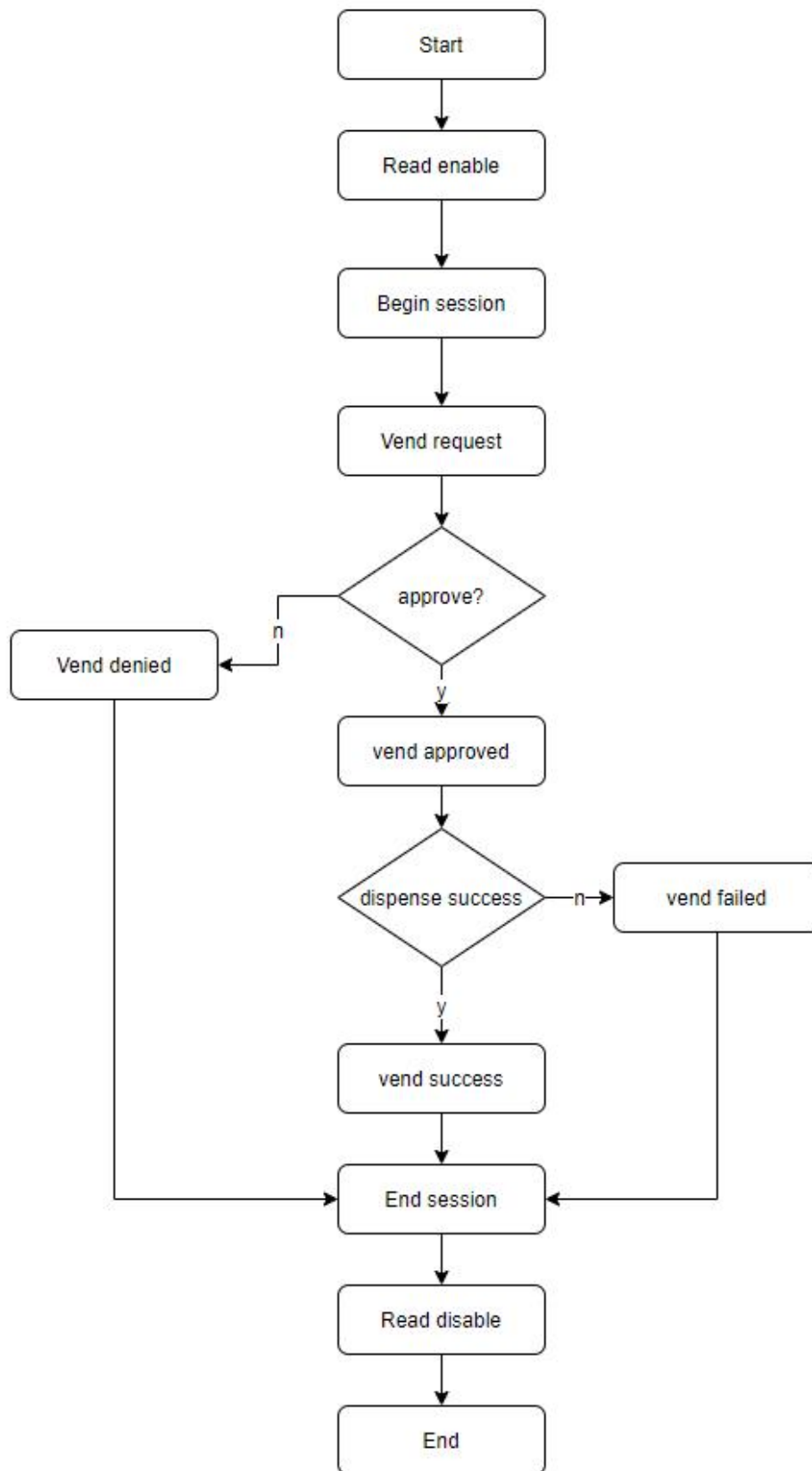
**MIB → Q3V:** 0x09 0x04 0x00 0x10 0x10 0xE0 0x0D

**MIB ← Q3V:** 0x09 0x04 0x01 0x00 0x00 0xFF 0x0D

**VMC ← MIB:** 0x00 0x100

**VMC → MIB:** 0x00

#### 4. Command flow diagram



## 5. Protocol command definition

### **Raw MDB Command Forwarding.**

#### **Description:**

MIB launch this command for forwarding the raw MDB commands (Including the MDB CHK), Note that the MDB mode bit has been removed.

#### **Request packet data**

Mode	Data
Request 00H	VMC Request Command (Reset, Setup, Reader, Expansion, Vend)

#### **Response packet**

Mode	Data
Response 01H	Peripheral Response

#### **Example**

MIB→Q3V 09 04 00 10 10 E0 0D

MIB←Q3V 09 04 01 00 00 FF 0D.

### **Begin session – 0x03.**

#### **Description:**

When Q3v payment reader get ready for transaction, it will issue a begin session command, to inform the VMC master, and waiting a ACK response from MIB.

it is the beginning of one transaction.

Balance amount: 2 Bytes, if balance does not exist, it should be filled with 0xFF.

This command still obeys the MDB spec definition, however it is request by Q3v

#### **Request packet**

Mode	Data
Request 00H	Begin Session (03H) + Funds Available + MDB Checksum

#### **Response packet**

Mode	Data
Response 01H	ACK 00H

#### **Example:**

Q3V→MIB 09 06 00 03 00 64 67 32 0d

Q3V←MIB 09 03 01 00 ff 0d

### **session cancel request -0x04.**

#### **Description:**

Q3 can end the payment session by issue a session cancel request command, pos is in master mode during the command.

### **Request packet**

Mode	Data
Request 00H	Cancel Session Req(04H) + Funds Available + Checksum

### **Response packet**

Mode	Data
Response 01H	ACK 00H

### **Trigger pulse – 0x20.**

#### **Description:**

Trigger Pulse command will trigger a single pulse, if the pulse duration time and voltage are not set, the default low-vol and 50ms pulse wave will be triggered.

#### **Request packet**

Mode	Data
Request 00H	Trigger Pulse 20H

#### **Response packet**

Mode	Data
Response 01H	Trigger Pulse 20H + ACK 00H

### **Trigger pulse One shot – 0x21.**

#### **Description:**

Trigger Pulse command will trigger pulses one time.

#### **Request packet**

Mode	Command	Data
Request 00H	Trigger Pulse one-shot 21H	Pulse Voltage: 0x01/0x00 high voltage/low voltage (4byte hex little endian)
		Pulse Duration: Duration of one pulse, 10-200 Ms. (4byte hex little endian)
		Pulse Interval: The Gap between two pulses. 10-200 Ms. (4byte hex little endian)
		Pulse number: The total number of pulses would be triggered, (4byte hex little endian)

#### **Response packet**

Mode	Data
Response 01H	Trigger Pulse one-shot 21H + ACK 00H

### **Set Parameters**

**Description:**

Q3 pos can update parameters, after receiving the ack response from MIB, the parameter is updated. Q3 Pos in master mode.

For pulse related settings

pulse duration:

pulse duration indicates the lasting time of low-level or high-level pulse wave, the acceptable of the value is 10 -200ms, and should be set as 4bytes little endian hex data. The default value will be 50ms, if not set.

pulse voltage:

pulse voltage indicates the voltage status, only 0 or 1 is acceptable. And filled in 4bytes little endian hex.

Factory mode

Enter factory mode, The MDB board master port will transfer poll command continuously to the slave, when receive the ack from the slave port, the led on the board will flash in a fast frequency, that indicates master port and slave port is working well, Otherwise the led will be off.

**Request packet**

Mode	Command	Sub command	Command data
Request 00H	Set Parameter 90H	00H currency code	Currency code (2 bytes BCD)
		01H scale factor	Factor number (1 byte hex)
		02H decimal place	Decimal place (1 byte hex)
		03H pulse duration	pulse duration (4byte hex little endian)
		04H pulse voltage	Pulse voltage (4bytes hex little endian)
		05H Factory mode	4byte hex little endian, 1 enter Factory mode 0 leave Factory mode

**Response packet**

Mode	Command	Sub command	Command data
Response 01H	Set parameter 90H	00H currency code	ACK 00H
		01H scale factor	ACK 00H
		02H decimal place	ACK 00H
		03H pulse duration	ACK
		04H pulse voltage	ACK
		05H Factory mode	ACK

**Get parameters.****Description:**

Get parameters, in master mode.

**Request packet**



Mode	Command	Sub command	Command data
Request 00H	Get parameter 91H	00H currency code	No data
		01H scale factor	No data
		02H decimal place	No data
		03H pulse duration	No data
		04H pulse voltage	No data

**Response packet**

Mode	Command	Sub command	Command data
Response 01H	Get parameter 91H	00H currency code	ACK 00H+currency code (2 bytes BCD)
		01H scale factor	ACK 00H+ Factor (1 byte hex)
		02H decimal place	ACK 00H + Decimal place (1 byte hex)
		03H pulse duration	ACK 00H + 4 bytes hex
		04H pulse voltage	ACK 00H + 4 bytes hex

**Get Version.**

**Description:**

Get the version of the firmware. Q3 reader in master mode.

**Request packet**

Mode	Command	Sub command	Command data
Request 00H	Get version 92H	No data	No data

**Response packet**

Mode	Command	Sub command	Command data
Response 01H	Get version 92H	No data	ACK 00H+ firmware version (2 bytes HEX)

**Get Hardware Version.**

**Description:**

Get the hardware version of the MIB, data 0,1,2 represent PB7,PB9,PB12, lookup hardware category sheet for specific details.

**Request packet**

Mode	Command	Sub command	Command data
Request 00H	Get version 93H	No data	No data

**Response packet**

Mode	Command	Sub command	Command data
Response 01H	Get version 93H	No data	ACK 00H+ 3bytes data

**MDB Ports communication test.**

**Description:**

To get the MDB ports communication test result

**Request packet**

Mode	Command	Sub command	Command data
Request 00H	Get version 94H	No data	No data

**Response packet**

Mode	Command	Sub command	Command data
Response 01H	Get version 94H	No data	ACK 00H NAK FFH