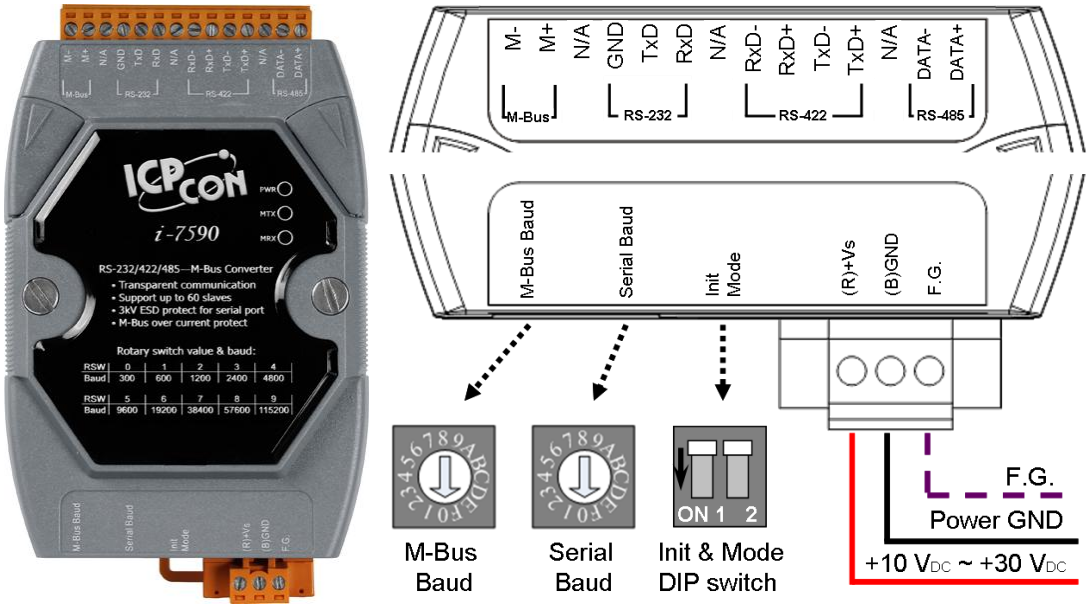
I-7590 Quick Start

RS-232/422/485 to M-Bus Convertor

1. Hardware Structure



2. Specifications & Features

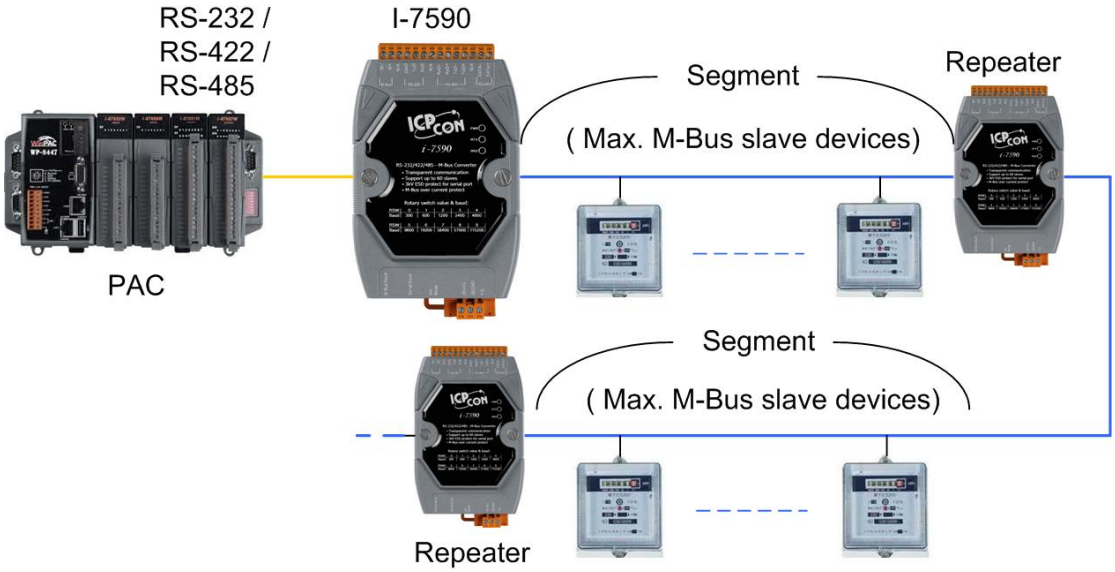
- M-Bus Port: 1
- Serial Port: 1 (RS-232 / RS-422 / RS-485)
- Serial Baud and M-Bus Baud can be configured separately.
- Provides 10 kinds of Baud for default, 6 kinds of Baud for user-defined.
- Supports up to 100 M-Bus slaves.
- Provides transparent communication.
- Watchdog inside.
- Allows updating firmware by the RS-232 port.
- Overcurrent and short-circuit protection on the M-Bus port.
- 3750 Vrms photocouple isolation on the M-Bus port.
- ±4 kV ESD to contact.
- Reverse polarity protection on power.
- Provide 3 LED indicators, PWR LED, MTX LED and MRX LED.
- Power requirement +10 V_{DC} ~ +30 V_{DC}.
- Power consumption 1.8 W @ 24 V_{DC} (with 1 slave device).
  10 W @ 24 V_{DC} (with 100 slave devices).
- Operating Temperature: -25℃ ~ +75℃.
- Storage Temperature: -30℃ ~ +80℃.
- Humidity: 10 to 90% RH, Non-condensing.
- Dimensions: 72mm x 122mm x 33mm (W x L x H).

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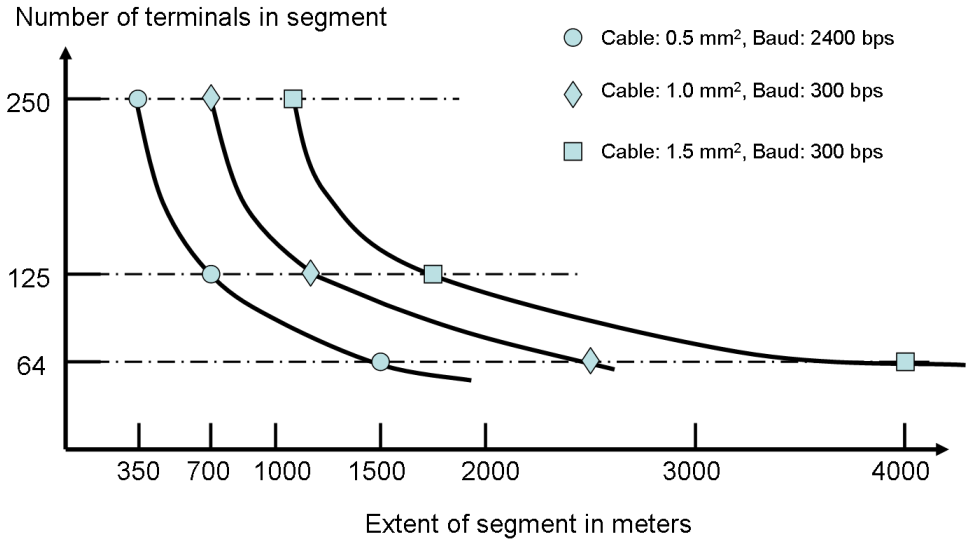
3. Wire Connection

M-Bus:

A two-wire standard telephone cable (JYStY N*2*0.8 mm) is used as the transmission medium for the M-Bus. The maximum distance between a slave and the repeater is 350m; this length corresponds to a cable resistance of up 29Ω. This distance applies for the standard configuration having Baud rates between 300 and 9600 Baud, and a maximum of 250 slaves (I-7590 supports max 100 slaves). The maximum distance can be increased by limiting the Baud rate and using fewer slaves. In the standard configuration the total cable length should not exceed 1000m, in order to meet the requirement of a maximum cable capacitance of 180nF.



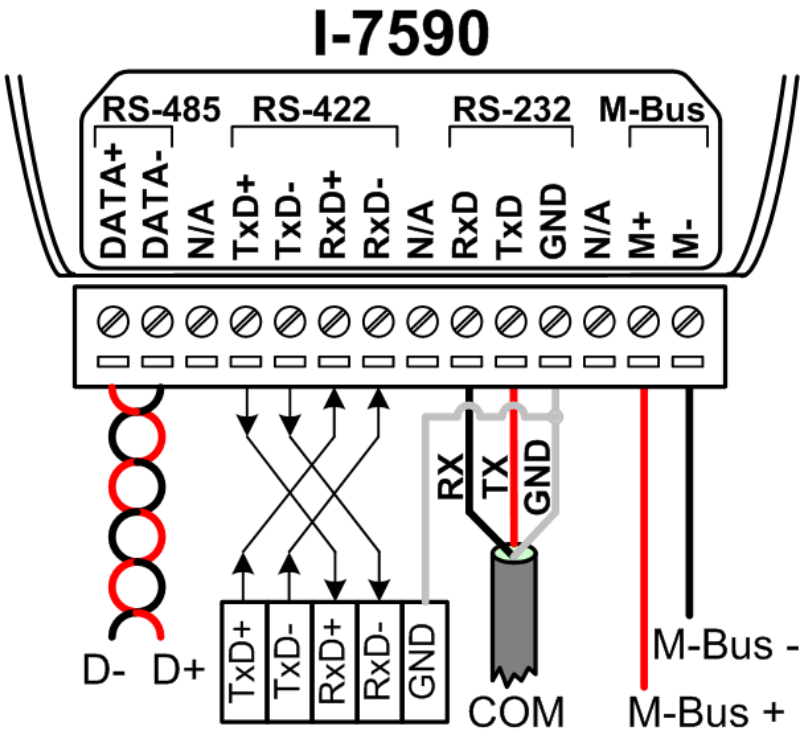
The number of terminals that can be connected to a repeater and the structure of the segments within an extended M-Bus system are determined by the type of cable and the Baud rate.



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Wring:

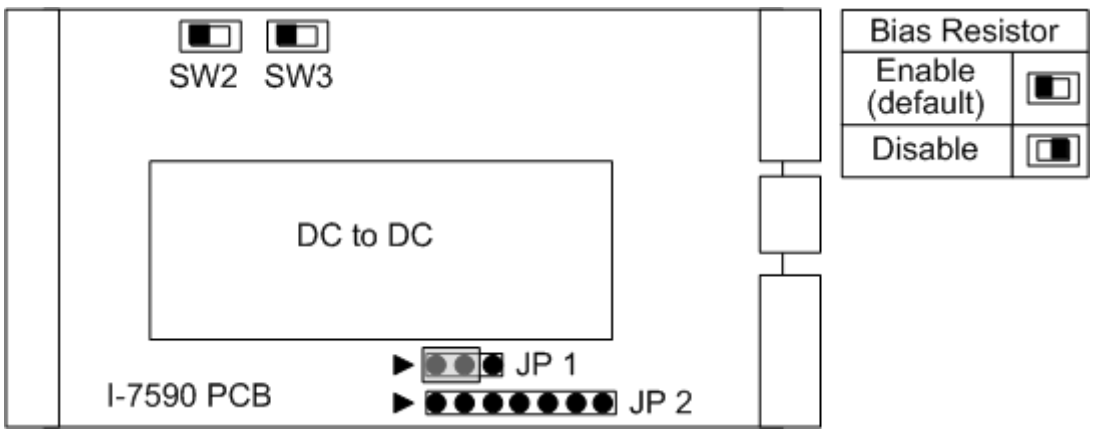
The following figure shows the wire connections of the M-Bus, RS-232, RS-422 and RS-485. The GND pins of RS-232 and RS-422 are the same pin.



Note: Only one port of the RS-232, RS-422 and RS-485 can work at the same time.

Bias Resistor:

In order to stable the signals of the RS-485 and RS-422 network, the bias resistor must be applied. The factory default of the I-7590 is to enable the bias resistor. If there is any other RS-485 (or RS-422) device which has enabled the bias resistor, the bias resistor of the I-7590 must be disabled. Users can open the cover of the I-7590, and adjust the SW2 for RS-485 (or SW2 and SW3 for RS-422) to configure the bias resistor. It would be as the following figure.



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4. LED Indicators

Description	PWR	MTX	MRX
Power On (+10 ~ +30 V_{DC})	**ON**	**--**	**--**
M-Bus message is transmitted success	**ON**	**ON**	**OFF**
M-Bus message is received success	**ON**	**OFF**	**ON**
Update firmware mode	**ON**	**ON**	**ON**

5. Rotary Switch

The I-7590 has two rotary switches for the configuration of the M-Bus Baud rate and serial port Baud rate. The following table describes the mapping table between the rotary switches and Baud rate. After changing the configuration of the rotary switches, the I-7590 needs to reboot to enable the new setting.

Switch	Baud rate (bps)	Format
0	300	M-Bus Port: 8, e, 1 Serial Port: 8, n, 1
1	600	
2	1200	
3	2400	
4	4800	
5	9600	
6	19200	
7	38400	
8	57600	
9	115200	
A ~ F	User-defined	User-defined

6. DIP Switch

The DIP switch described in the section 1 is used to update firmware and configure user-defined Baud rate. The configuration would be as follows. After changing the configuration of the DIP switch, the I-7590 needs to reboot to enable the new setting.

Init Pin	Mode Pin	Description
OFF	**OFF**	Operation Mode
OFF	**ON**	Configure Mode (refer to section 7)
ON	**--**	Update Firmware Mode(refer to section 9)

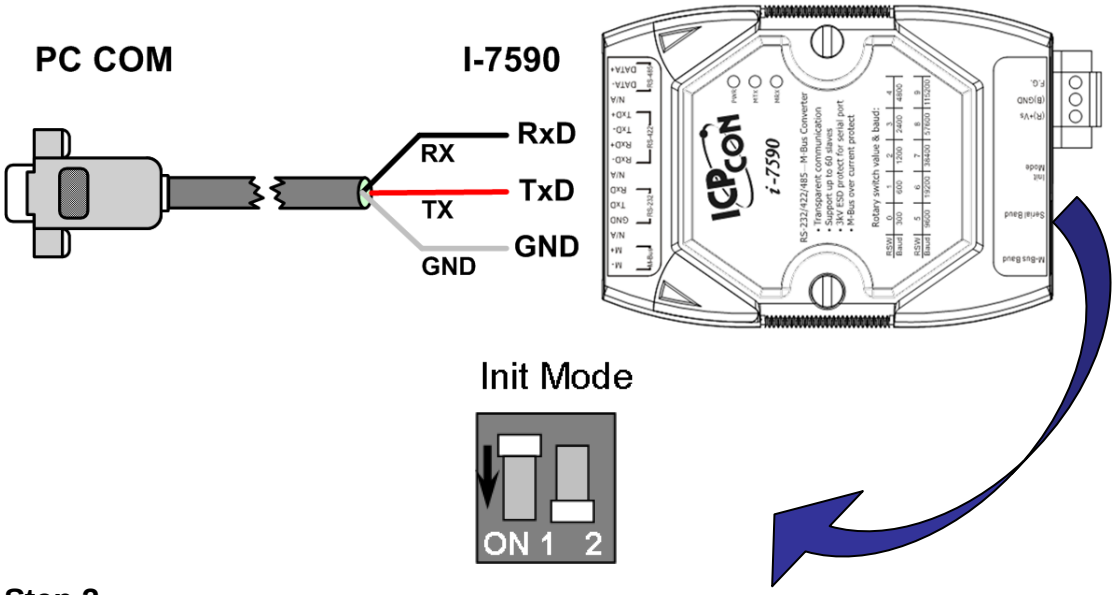
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7. Configuration of User-defined Baud Rate

In addition to 10 kinds of default Baud rate, the I-7590 provides 6 user-defined Baud rate for the serial port and the M-Bus port. Users can use the I-7590 utility to configure the user-defined Baud rate and enable it by setting the rotary switches. The I-7590 utility can be downloaded from the following website:
http://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/mbus/converter/i-7590/software/

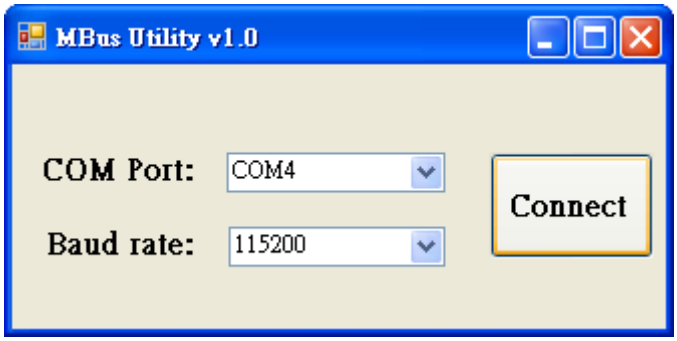
Step 1:

Connect the PC COM port to the RS-232 port of the I-7590. Set the DIP switch to the configuration mode (refer to the section 6) and then power it on.



Step 2:

Execute the I-7590 utility, and select the correct port number and the Baud rate. Then, click the connect button.

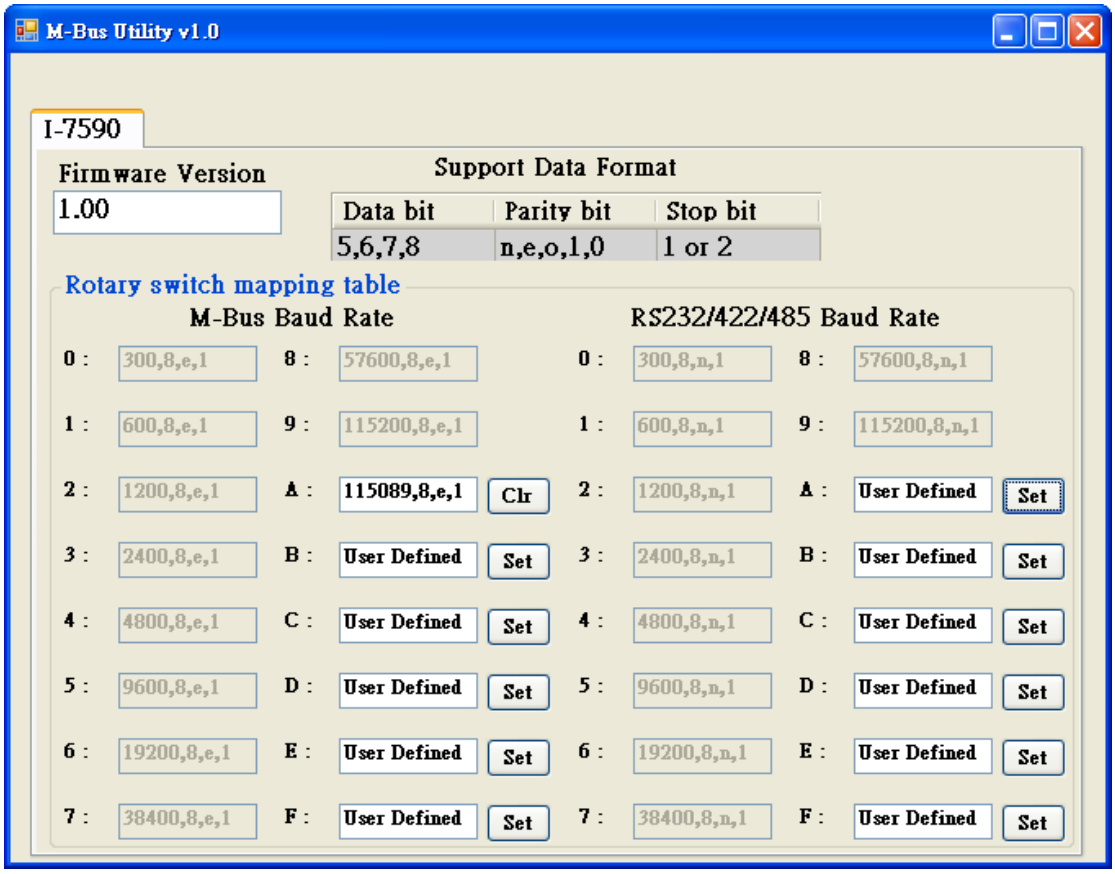


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Step 3:

Afterwards, the I-7590 utility shows all settings stored in the I-7590 if it had been configured before, or shows “User Defined” if there is no configuration. If users want to clear the setting before, click the “Clr” button behind the item to clear the corresponding configuration. If users want to configure a new Baud rate and data format, select an empty item, key in the Baud rate and data format, and click the “Set” button to finish the configuration.

The I-7590 supports Data Bit: 5, 6, 7, 8.
Parity: n, e, o, 1, 0.
Stop Bit: 1, 2.

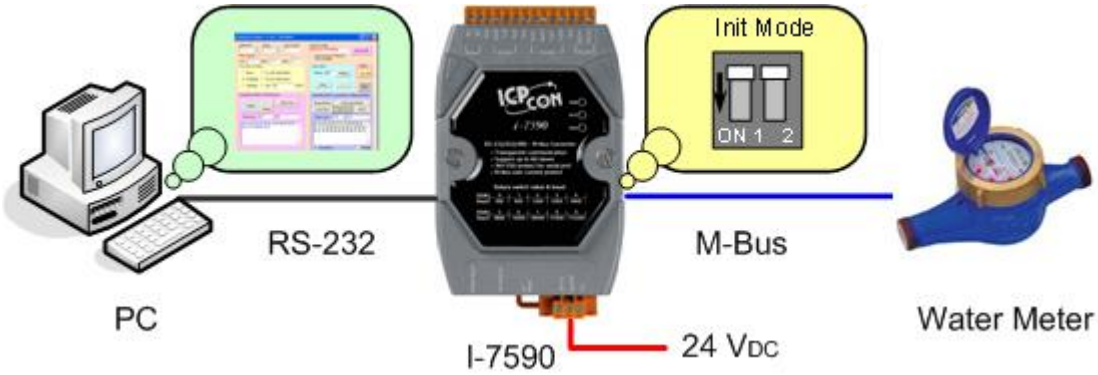


Note: Some Baud rate can’t been exactly calculated as the same with the users’ configuration. The utility would choose a closest Baud rate instead (the tolerance is depend on the value of the Baud rate, and would not exceed 3%). For example, if the 115200 bps is configured, the 115089 bps will be used.

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8. Test Example

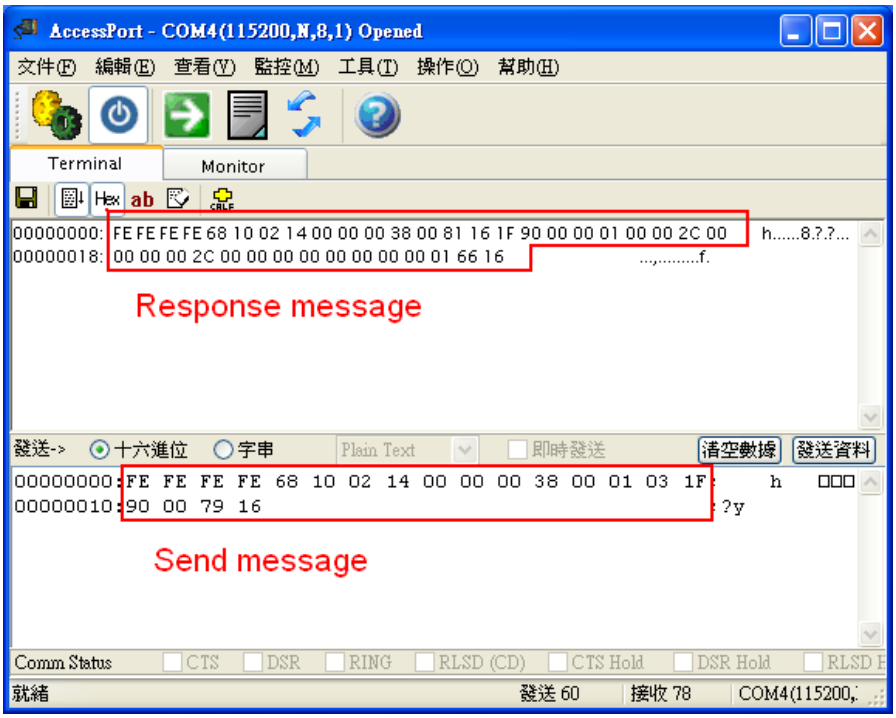
Structure:



RS-232 Baud rate: 115200 bps (Rotary Switch 9).
M-Bus Baud rate: 2400 bps (Rotary Switch 3).

* About the wire connection, please refer to the section 3.

Communication:

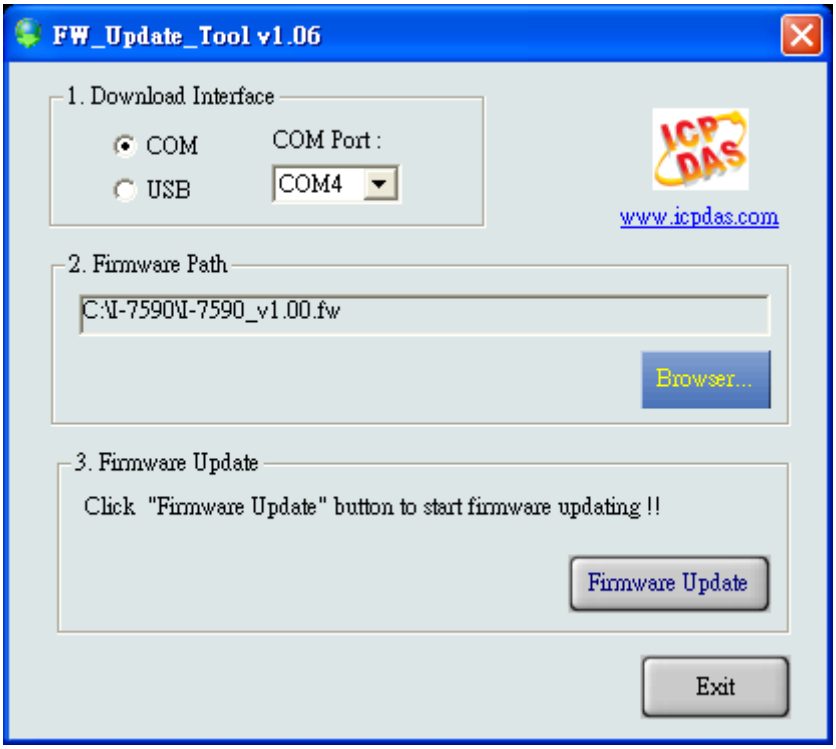


Prepare a software tool which can send and receive binary commands with COM ports, for example SUDT AccessPort as the following website http://www.sudt.com/en/ap/. Send a standard M-Bus command from the PC through RS-232, and I-7590 will pass the command to the M-Bus network and the M-Bus meter will reply the command to the PC.

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9. Update Firmware

Users can set the DIP switch to Update Firmware mode (refer to the section 6) and reboot the I-7590 for updating the firmware of the I-7590. In this case, the three LED, PWR, MTX, MRX are all always turn on. Users need to connect the PC COM port with the RS-232 port of the I-7590 and use the “FW_Update_Tool” tool to update the firmware. The “FW_Update_Tool” tool can be downloaded from the ICP DAS web site:
http://ftp.icpdas.com.tw/pub/cd/fieldbus_cd/mbus/converter/i-7590/software/



Please follow the steps to accomplish the firmware update of the I-7590.

(1) Choose the correct COM port on PC that connects to the I-7590.

(2) Click the “Browser…” button to choose the I-7590 firmware file such as I7590_vx.xx.fw.

(3) Click “Firmware Update” button to start the firmware update process.

(4) After firmware update successes, switch the DIP to normal run mode and reboot the I-7590. The I-7590 will execute with new firmware.

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