MD-309 User Manual

Wireless Data Terminal

Etung Technology Co., Ltd
RM305 Geng Fang Plaza,jia 13 Huayuan Road Haidian Dist. Beijing,china
TEL:4008-909-611 FAX:010-64857815

Table of Contents

1. Product Introduction 3
1.1 Brief Introduction 3
1.2 Product Outlook 4
1.3 Standard Accessories 5
1.4 Working Mechanism 6
1.5 Specifications 6
1.5.1 Technical Parameters 6
1.5.2 Indicator Light Description 7
1.5.3 Serial Port Definition 8
1.6 Technical Advantages 8
1.7 Typical Usecases 9
2. Device Configurations 10
2.1 Configurations 10
2.1.1 Preparation 10
2.1.2 Configuring MD-309 10
2.2 Configuration Parameters 13
2.3 Restore to Default 18
2.4 Firmware Update 18
Appendix：Switching RS-485 to RS-232 21

1. Product Introduction

This chapter mainly introduces the outlook, accessories, specifications and mechanism of MD-309.

1. Brief Introduction
2. Product Outlook
3. Accessories
4. Dimension
5. Working Mechanism
6. Specifications
7. Technical Advantages
8. Typical Usecases

1.1 Brief Introduction

MD-309 is a GPRS DTU produced by Etung in 2010. It can greatly reduce customer's DTU procurement and integration cost, and has industrial-grade stability and reliability as well. MD-309 has more reasonable cost control, with lower price; it can be regarded by customers as an easy-to-use and useful GPRS DTU product.

MD-309 can connect quickly with RTU, PLC, or IPC, and implement remote and transparent data transfer. It can be used widely in various industries related to "Internet of things":

- ✧ In electric power industry, MD-309 can be used in data transfer areas such as reactive compensation, distribution monitoring, electric meter reading and lamp monitoring;
- ✧ In water application industry, MD-309 can play in wireless communication areas such as water meter reading, water resource remote monitoring, and water transportation network monitoring;
- ✧ In environment protection area, MD-309 can fully deserve GPRS soldier in pollution online monitoring system such as Continuous Emission Monitoring System(CEMS), water quality monitoring system;
- ✧ In device maintenance area, such as elevator monitoring and air-conditioner monitoring, MD-309 can be embedded quickly into customer's appliance and implement GPRS wireless data transfer;
- ✧ In heating industry, MD-309 can connect with MODBUS concentrator to implement heating meter reading, implement remote data transfer for household heating measurement; it can also connect with PLC or collector to implement remote monitoring of heat exchange station.

1.2 Product Outlook

Figure 1-1: MD-309 side view 1

Figure 1-2: MD-309 side view 2

1.3 Standard Accessories

Figure 1-3: GSM sucking antenna

1.4 Working Mechanism

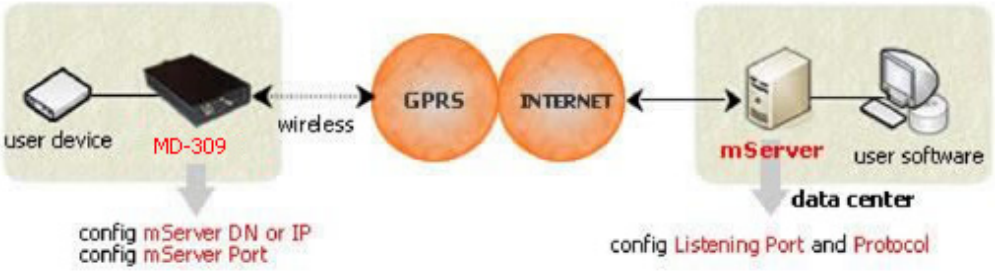

Figure 1-7: MD-309 working mechanism

After configuring IP address (or domain name) and port of the data center in MD-309, it dials in GPRS wireless network to access the internet; then it establishes connection to the preconfigured IP address and port(i.e. mServer's listening port). On the other hand, the user software system connects to the mServer via virtual serial port, thus implements the wireless and bi-directional data communication between user device and user software system.

1.5 Specifications

1.5.1 Technical Parameters

- Basic Parameters
  - Power Supply: 12 V DC
  - Data interface: RS232/485/422/TTL
  - Network: GSM/GPRS
  - Frequency: 850/900/1800/1900MHz
  - Humidity: 95%@+40ºC
  - Dimensions: 103x64x24mm (excluding antenna and handle)

- Communication
  - Adjustable baud rate on data interface
  - Support hard flow control on serial interface

- ✧ Support standard TCP/IP protocol with both TCP and UDP
- ✧ Support always online
- ✧ Support SMS and ringing tone wakeup(wakeup online)

◆ Stability
- ✧ Host CPU: 32-bit ARM processor
- ✧ Built-in soft/hard watch dog
- ✧ Built-in TCP/IP protocol stack

◆ Data Center
- ✧ Support domain name
- ✧ Compatible with various data center software

◆ Configuration
- ✧ Configurable via serial port
- ✧ Configurable via hyper terminal with menus

1.5.2 Indicator Light Description

LED Indicator Light	Color	Status	Description
Online	Green	Always light	Connected to data center
		Extinguished	No connection to data center
		Flash quickly	Connecting to data center
		Flash slowly	Dialing
Sending	Red	Flash	Transferring data/Standby
		Turn off	No data transfer

Table 1-1 MD-309 indicator light description

1.5.3 Serial Port Definition

Type	RS-232					RS-485		
Pin	2	3	5	7	8	2	3	5
Definition	**RXD**(out)	**TXD**(in)	**GND**	**RTS**(in)	**CTS**(out)	**A**	**B**	**GND**

Table 1-2: MD-309 serial port pin definition

1.6 Technical Advantages

Etung DTU products are advanced not only from hardware industrialization, design rationality, software convenience, and usage flexibility, but also from working stability. Its technical advantages are easy to see:

- ✧ Support sending SMS
- ✧ Support GPRS and SMS as backup
- ✧ Support modifying DTU configurations via SMS
- ✧ Support modifying DTU configurations remotely at server side
- ✧ Support querying SIM card number remotely, checking SIM card balance and traffic within DTU
- ✧ Support device remote re-boot
- ✧ Support eYun platform, server building not needed and plug-and-play
- ✧ Support chuankoutong, virtual serial port programming not needed

1.7 Typical Usecases

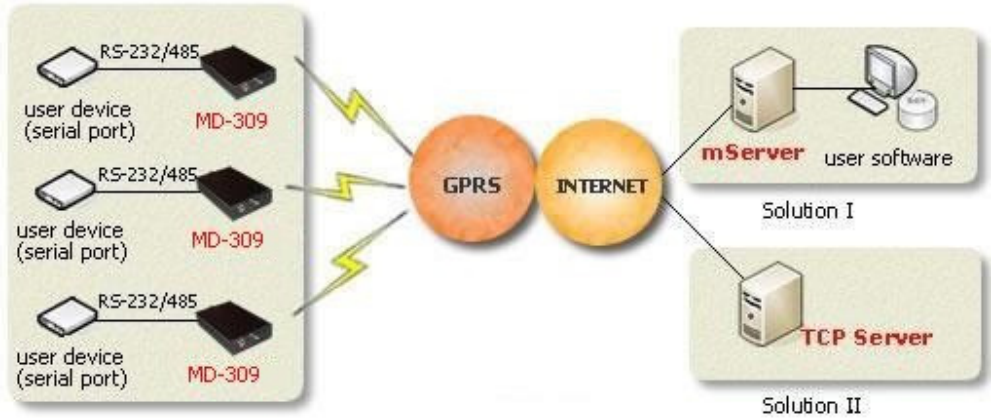

Figure 1-8: MD-309 multiple points to data center

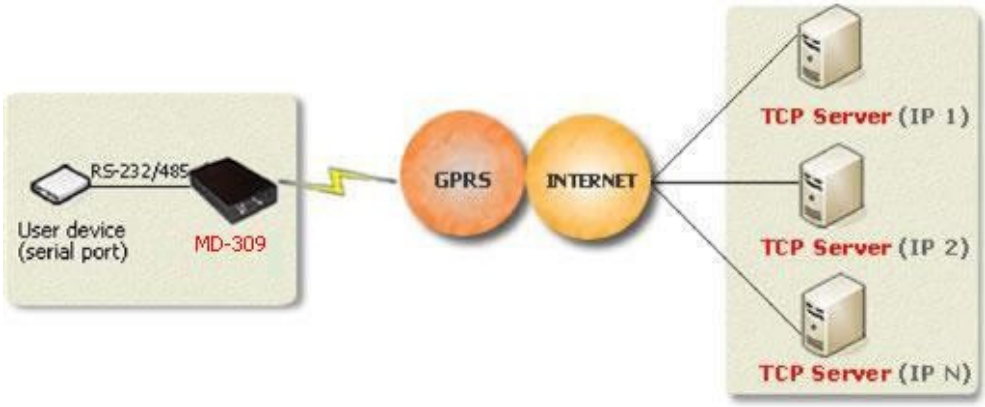

Figure 1-9: MD-309 one point to multiple data centers

2. Device Configurations

This chapter introduces how to use MD-309 and related parameters.

1. Configurations
2. Parameters
3. Restore to default
4. Firmware Update
5. Remote Configurations

2.1 Configurations

2.1.1 Preparation

- ✧ Serial line used to connect MD-309 with PC or user devices
- ✧ GSM Antenna
- ✧ Power Adapter
- ✧ one SIM card, either from China Mobile or China Unicom, that applies GPRS and can access internet directly via NET

2.1.2 Configuring MD-309

- ✧ Connect MD-309 with PC using 9-pin 9-hole serial line (if MD-309 is with RS485 interface, we need an adapter from RS485 to RS232, switch RS485 to RS232 and then connect with PC. For details please see Appendix Switching RS-485 to RS-232)
- ✧ Find and run MD-309 dedicated configuration executable DTUcfg.exe either from the CD
- ✧ Click button "Settings" in the upper side of the user interface, and in the popup dialog with title "Settings", select the serial port that is used to configure MD-309, then click OK:

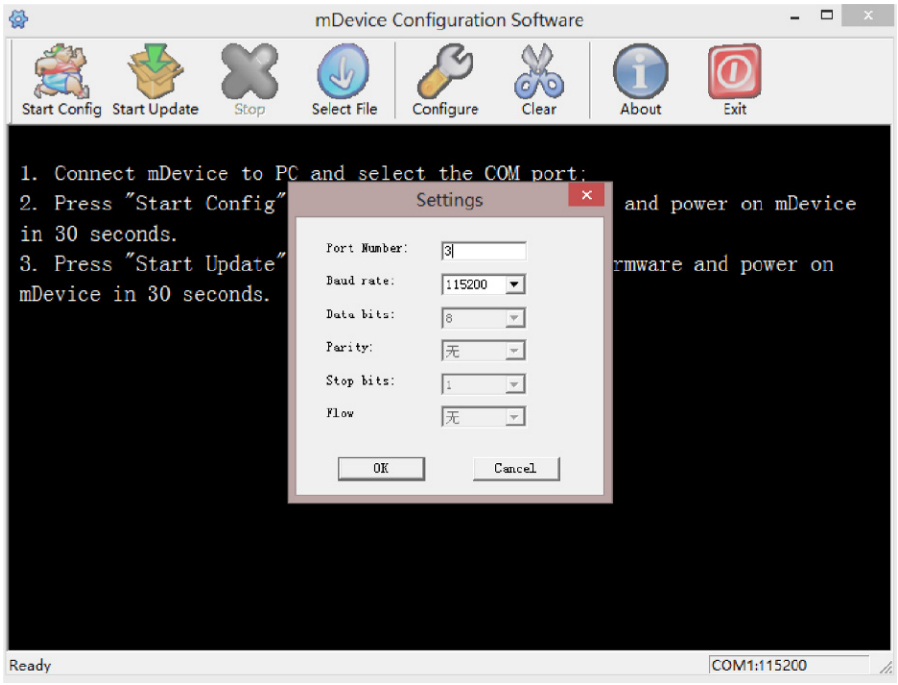

Figure 2-1: Setting serial port

- Click "Start configuration" based on the prompt, and power on MD-309 quickly within 30 seconds; when the information about MD-309 model appears, press Enter, then the first item of the configuration menu appears: "1) Data center domain or IP ()", then input domain of the data center: eyun.Etungtech.com (or press Enter to use the default value in the bracket. The default value is Etung server domain, please input your own domain or IP address if you have built your own server).

- Press Enter, then the second configuration item appears:

  "Data center port (8080)", input mServer's listening port "8080" (or press Enter directly to use the default value in the bracket. This port is the public port of Etung server, input your own port if you have built your own server or leased a dedicated port).

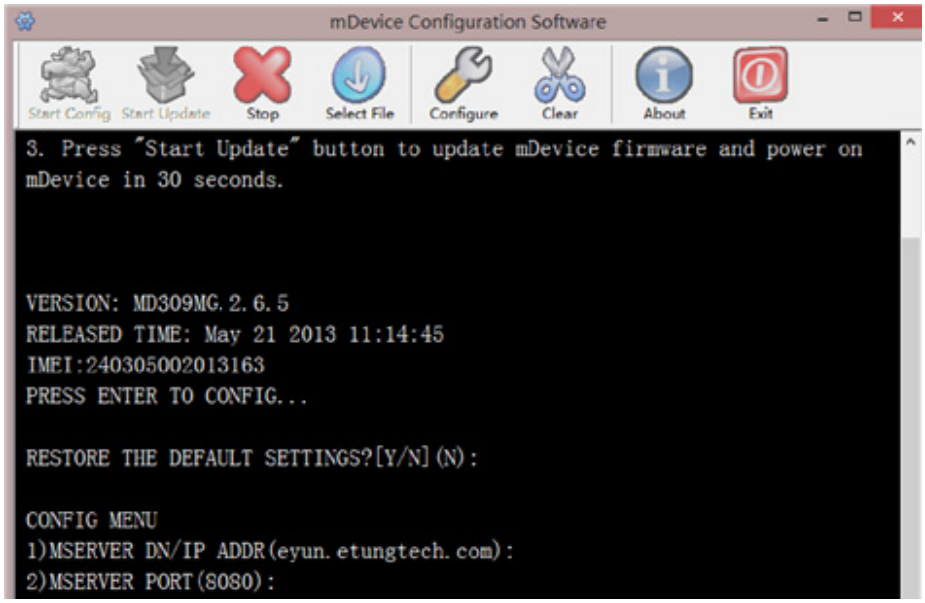

Figure 2-2: Setting domain(or IP) and port of data center

- If Etung chuankoutong eYun version is used, configure the applied username in MD-309. If you have built your own server, or you do not use Etung chuankoutong eYun version, you do not need to configure this item.

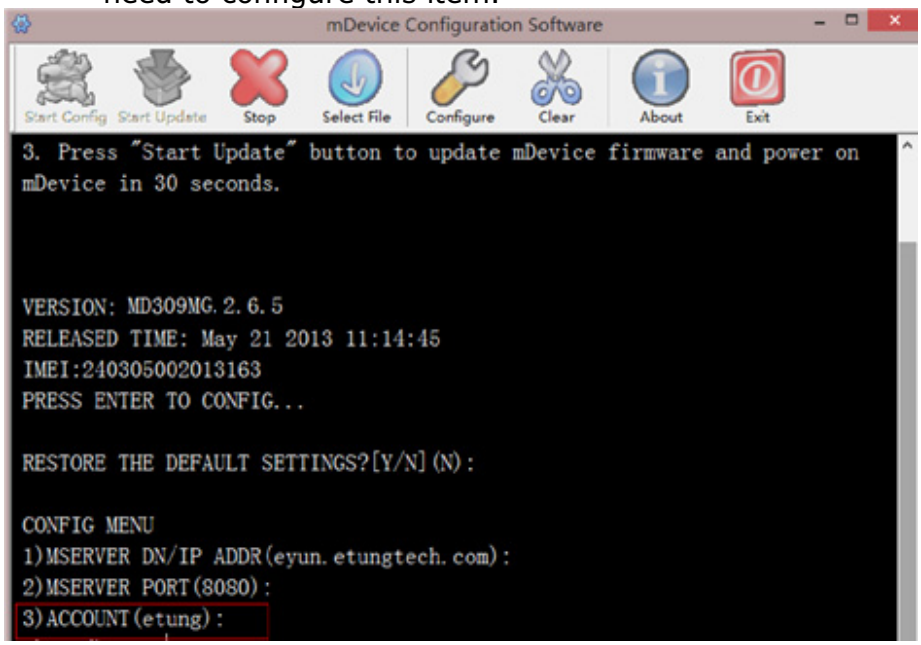

Figure 2-3: Configuring username

- Click Enter repeatedly until the prompt "Configuration complete" appears, then the configuration of MD-309 is complete:

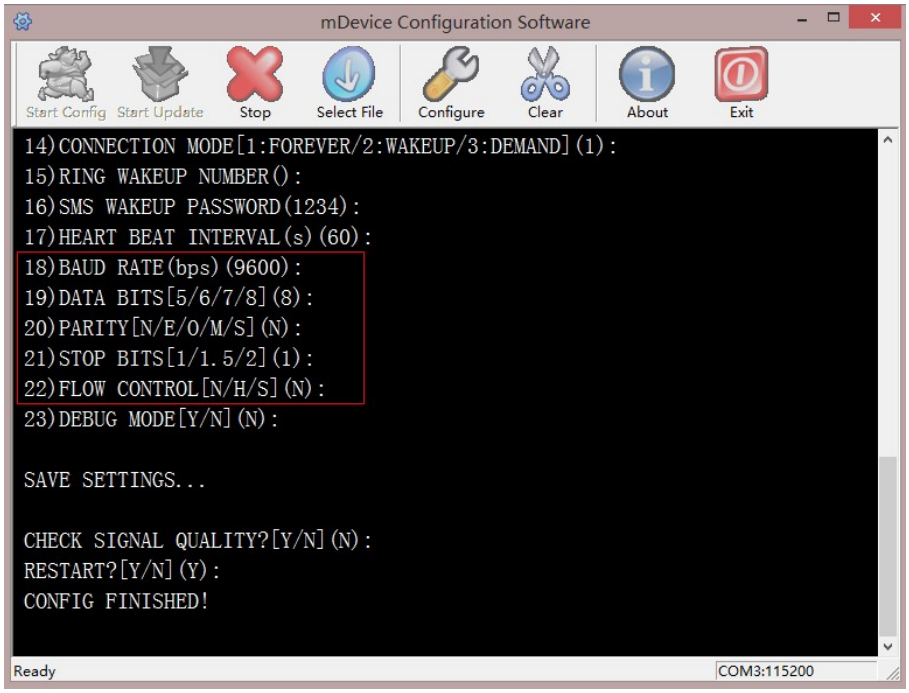

Figure 2-4: Configuration complete

Attention:
In reality, MD-309 connects user devices via serial port, so serial port attributes need to be configured in order to match user device serial port.

2.2 Configuration Parameters

Each configuration menu item of MD-309 includes the following items (those with * are mandatory), details are in the following:

*__Order number__: includes digit and right bracket, for example "10)"
*__Name and unit__: name of the configuration item (some items have unit)
__Optional values__: the contents within "[]" are the values that are allowed in this configuration item, multiple optional values are separated with "/"
*__Default value__: i.e. the content within "()", If you press Enter to skip this item configuration, the default value will be used.

For example:

15) **digit bit** [5/6/7/8] **(8)**
Order number **Name and unit** Optional values **Default value**

Below are the configuration items with MD-309 V2.8.5. Different versions may have different configuration items.

Configuration Menu Item	Description
RESTORE THE DEFAULT SETTINGS?[Y/N](N)	Configure to restore to default or not
1) MSERVER DN/ IP ADDR (eyun.Etungtech.com)	Configure data center IP address or domain
2) MSERVER PORT (8080)	Configure data center port
3) ACCOUNT (Etung)	Configure applied eYun username, it is only required to configure if chuankoutong eYun version is used.
4) APN name ()	Configure wireless APN name, normally it is not needed, and default value is used, but users with dedicated network adapter need to configure this item.
5) Network Protocol[UDP/TCP](TCP)	Configure data transport protocol, either UDP or TCP.
6) Connect mServer[Y/N](Y)	Configure whether to connect mServer, Y by default to connect mServer.
7) Self-define registration package when no mServer connection ()	When the device does not connect mServer, self-define registration package.
8) Self-define heart-beat package when no mServer connection ()	When the device does not connect mServer, self-define heart-beat package.
9) Serial port output connection information[Y/N](N)	Configure whether to output connection information from serial port, N by default, i.e. do not output

	information. If Y, DTU will output from serial port "+STATUS:1\r\n" after connection and "+STATUS:0\r\n" after disconnection.
10) DNS Server()	Configure DNS server, blank by default and DTU will automatically acquire DNS server from the operator network. If DNS server need to be specified manually, at most two DNS server IPs can be specified with colon as separator, for example: 8.8.8.8,9.9.9.9.
11) Dialing account (gprs)	Configure username, normally it is not changed.
12) Dialing password (****)	Configure password, normally it is not changed.
13) Phone number (113901234567)	Configure device's phone number, normally it is not needed.

14) Connection mode[1:always online/2:wakeup online/3:online upon request]	Configure connection mode. Always online means after power on it keeps connected with data center, and auto connects after disconnection; Wakeup online means it does not connects after power on, and dials and connect when receiving wakeup SMS or wakeup call(wakeup phone number and wakeup password need to configure), and after wakeup online if there is no data transfer in continuous 5 minutes it will disconnect; Online upon request means it does not connects after power on, and when data need to be sent from serial port it will be triggered to dial and connects data center, and after online upon request if there is no data transfer in continuous 5 minutes it will disconnect. Online upon request includes wakeup online functions, that is, when no data need to be sent from serial
	port and it does not connect after power on, it can be triggered to dial and connect by wakeup SMS or wakeup call.
15) Ringing tone wakeup phone number ()	Configure ringing tone wakeup phone number when connection mode is wakeup online. NULL or "ALL" means it does not check calling number, and there can be multiple numbers separated by ",".

16) SMS wakeup password (1234)	Configure password used for SMS wakeup when connection mode is wakeup online. If SMS wakeup is required, the SMS used to wakeup must use this password. At the same time, this password is also the password used to configure the SMS.
17) Heart-beat interval in seconds (60)	Configure heart-beat interval in seconds. Heart-beat timeout is 3 times of heart-beat interval.
18) Baud rate bps(9600)	Configure baud rate on serial port when transferring data.
19) Data bits [5/6/7/8] (8)	Configure data bits on serial port when transferring data.
20) Parity checking[N/E/O/M/S] (N)	Configure parity checking bit on serial port when transferring data. N: No checking, E: Even checking, O: Odd checking, M: Mark checking, S: Space checking.
21) Stopping bit[1/1.5/2] (1)	Configure stopping bit on serial port when transferring data
22) Flow control[N/H/S] (N)	Configure flow control on serial port when transferring data. N: No flow control, H: Hard flow control, S: Soft flow control.
23) Debugging mode[Y/N] (N)	Configure whether DTU is running in debugging mode. It will output debugging information under debugging mode, but DTU cannot transfer data in debugging mode.
Check signal quality[Y/N] (N)	Configure whether to check signal quality where DTU is located. It can only work properly with good or better signal quality.

Table 2-1: Details of configuration parameters

2.3 Restore to Default

According to the description of "Configuring MD-309", after entering MD-309 configuration interface, the first item is "Restore to default" option, input "Y" and press Enter, then the configuration will be restored to default.

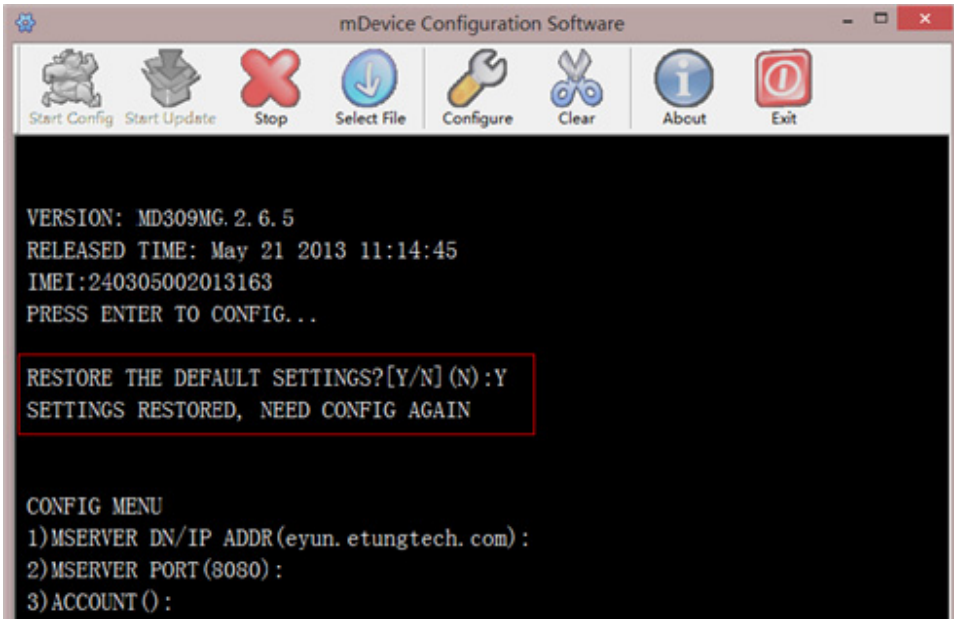

Figure 2-5: Restore to default

2.4 Firmware Update

✧ Ask Etung for firmware software
✧ According to the description of "Configuring MD-309", connect MD-309 with PC via 9-pin 9-hole serial line, run MD-309 configuration executable, and set the serial port used to update MD-309.
✧ Click "Select file", then select the file (.bin) to update, and click "Open".

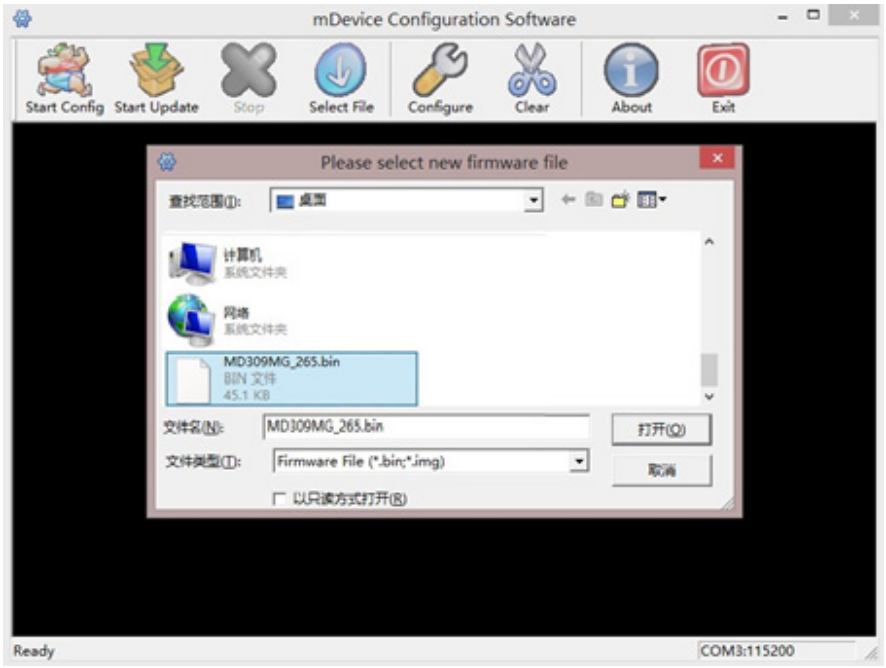

Figure 2-6: Select file to update

✧ Click "Start to update", then power on the device quickly within 30 seconds.

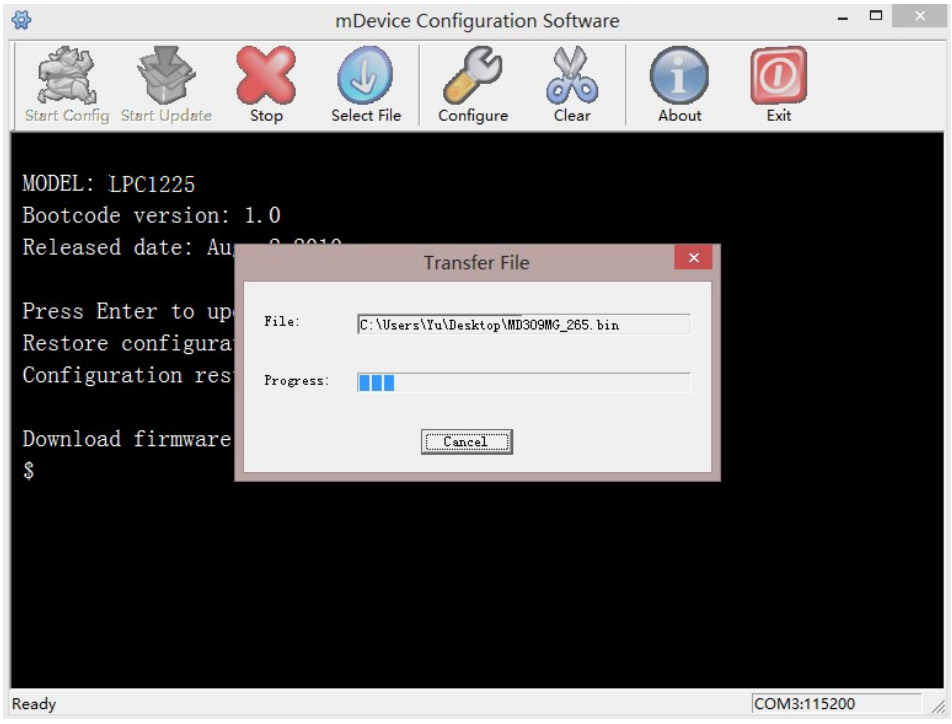

Figure 2-7: Firmware Update

✧ After update is complete the device will reboot automatically, then in the user interface a prompt "Update finished" will appear.

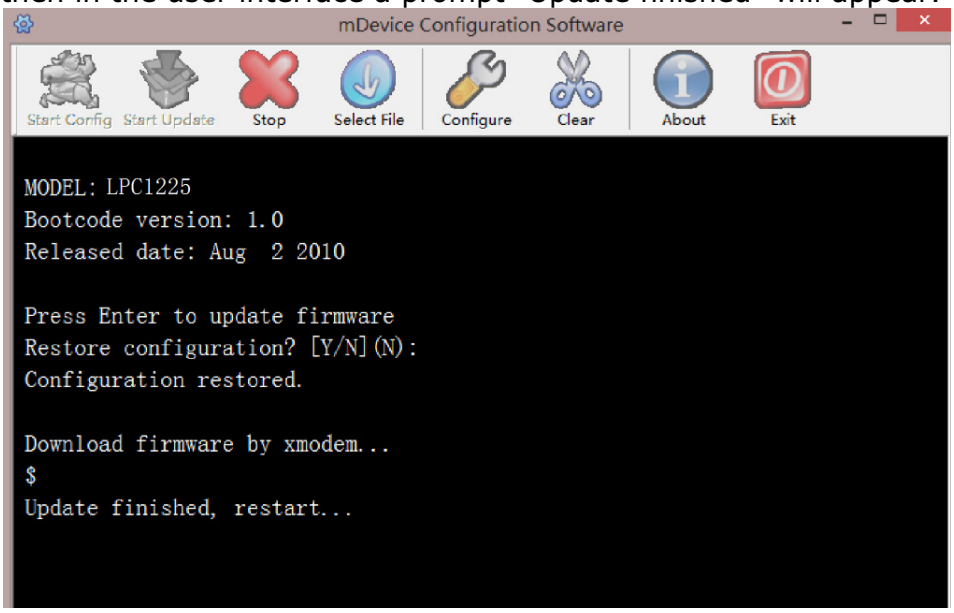

Figure 2-8: Update complete

Appendix : Switching RS-485 to RS-232

When configuring Etung device with RS-485 interface, in order to connect the device to PC, it is required to switch RS-485 interface to RS-232 interface. Etung provides two kinds of switching methods: via RS-485 to RS-232 convertor, and via 9-pin adapter serial line. Details are described below.

1) RS-485 to RS-232 Convertor

This method requires a RS-485 to RS-232 convertor (as shown in Figure Appendix 3-1), as well as an adapter line from RS-485 to RS232 (as shown in Figure Appendix 3-2), this line is delivered for free by Etung when

customer buys devices the first time.

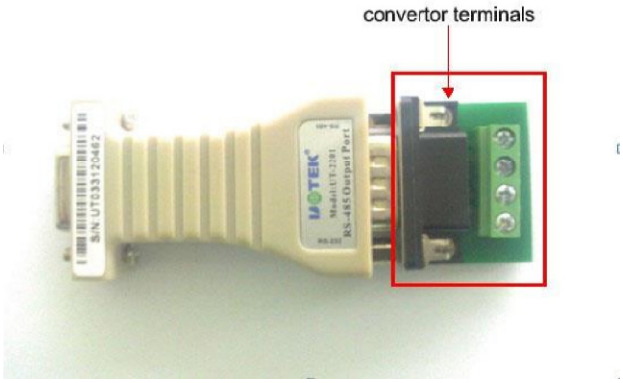

Figure Appendix 3 -1: RS-485 to RS-232 Convertor

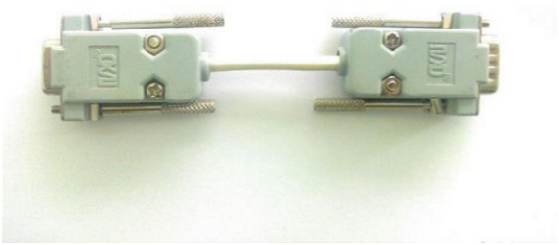

Figure Appendix 3 -2: Adapter line from RS -485 to RS-232

Connect the 9-pin end of the adapter line to the 9-hole serial port of the device, connect the other end of the adapter line to the 9-pin end of the convertor (not including convertor terminal) as shown in Figure Appendix 3-3, and then connect the 9-hole end of the convertor to PC.

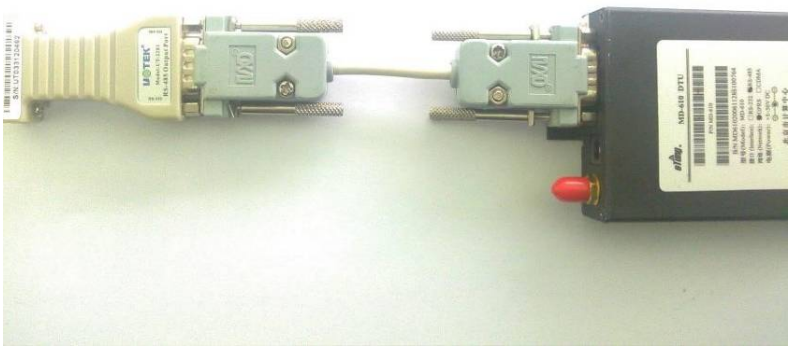

Figure Appendix 3-3: connection diagram

2) 9-pin adapter serial line(RS-485 serial line)

This method requires RS-485 to RS-232 convertor, and 9-pin adapter serial line (as shown in Figure Appendix 3-4).

Figure Appendix 3-4: 9-pin adapter serial line

First, connect the red and yellow line of the line end on 9-pin adapter serial line to the convertor terminal of the convertor, the order is: plug the red line into T/R+ port of the terminal, and yellow line into T/R- port of the terminal, and other lines are not required to connect, as shown in Figure Appendix 3-5.

Figure Appendix 3-5: Line connection order

Then, connect the 9-pin end of the 9-pin adapter serial line to the interface of RS-485 device, and connect 9-hole end of the RS-485 to RS-232 convertor to PC, as shown in Figure Appendix 3-6.

Figure Appendix 3-6: 9-pin adapter connection diagram

FCC Certification Requirements

Caution: Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user’s authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.