Atop Technologies, Inc.

1-port Modbus Gateway MB5001C/MB5001C-Sis

User's Manual

Version 1.1

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Important Announcement

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This document is intended to provide customers with brief descriptions on the product and to assist customers to get started. For detail information and operations of the product, please refer to the manual in the CD attached.

FCC WARNING
Class A for 1-port Modbus Gateway(MB5001C/MB5001C-Sis)

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expenses.

A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord can be used.

Use only shielded cables to connect other devices to this equipment by RS-232 or RS-485 ports.

Be cautioned that changes or modifications not expressly approved by the party responsible for compliance could void ones authority to operate the equipment.

Contents

1. Introduction

Modbus is an industry adopted communication protocol based on RTU, ASCII, and TCP protocols for various applications; these three protocols are commonly used by hardware equipments in the industry, such as DCS, PLC, HMI, power load measurement, various sensor and measuring instruments. The Modbus Gateway is capable of implementing the Modbus environment between different hardware interfaces, thereby streamlining the process of management and application.

Diverse Hardware Infrastructure

Modbus Gateway supports the four most commonly used hardware communication interfaces, RS232, RS485, RS422, and Ethernet. The simple-to-use configuration software provided with Modbus Gateway can quickly modify the hardware interface to use, and easily switch to the existing hardware communication infrastructure.

Switching between Modbus Protocols

Modbus Gateway supports the standard Modbus protocol and is capable of converting any Modbus protocols between Modbus TCP and Modbus RTU or Modbus ASCII for all supported hardware interfaces.

1.1 Packaging

Please check ones package contains the following items:

- Atop MB5001C or MB5001C-Sis Modbus Gateway x 1
- 5 pins Terminal Block for Serial Connector x 1 (only for MB5001C-Sis)
- 3 pins Terminal Block for Power Connector x 1 (only for MB5001C-Sis)
- Product CD containing configuration utility x 1
- Wall-mounting screws x 2
- Atop Modbus gateway quick start guide x 1

Optional Accessories：

1. DK-25 DIN-Rail Kit f
2. Power Adapter with DC jack- PIN 1.3φ output 5.0V 1A
   (1) AD5V1A(US) Switching adapter
   (2) AD5V1A(EU) Switching adapter
3. Power Adapter with Terminal block output 12V 1.25A
   (1) US315-12(US) Switching adapter
   (2) US315-12(EU Switching adapter

2. Hardware Setup

NOTE:

1. **MB5001C** (for RS-232), **MB5001C-Sis** (for RS422/485). Panel layout in Appendix A.3.1
2. One can press the reset button of MB5001C to reset the settings to the default value

Figure 2.1 shows the interfaces.

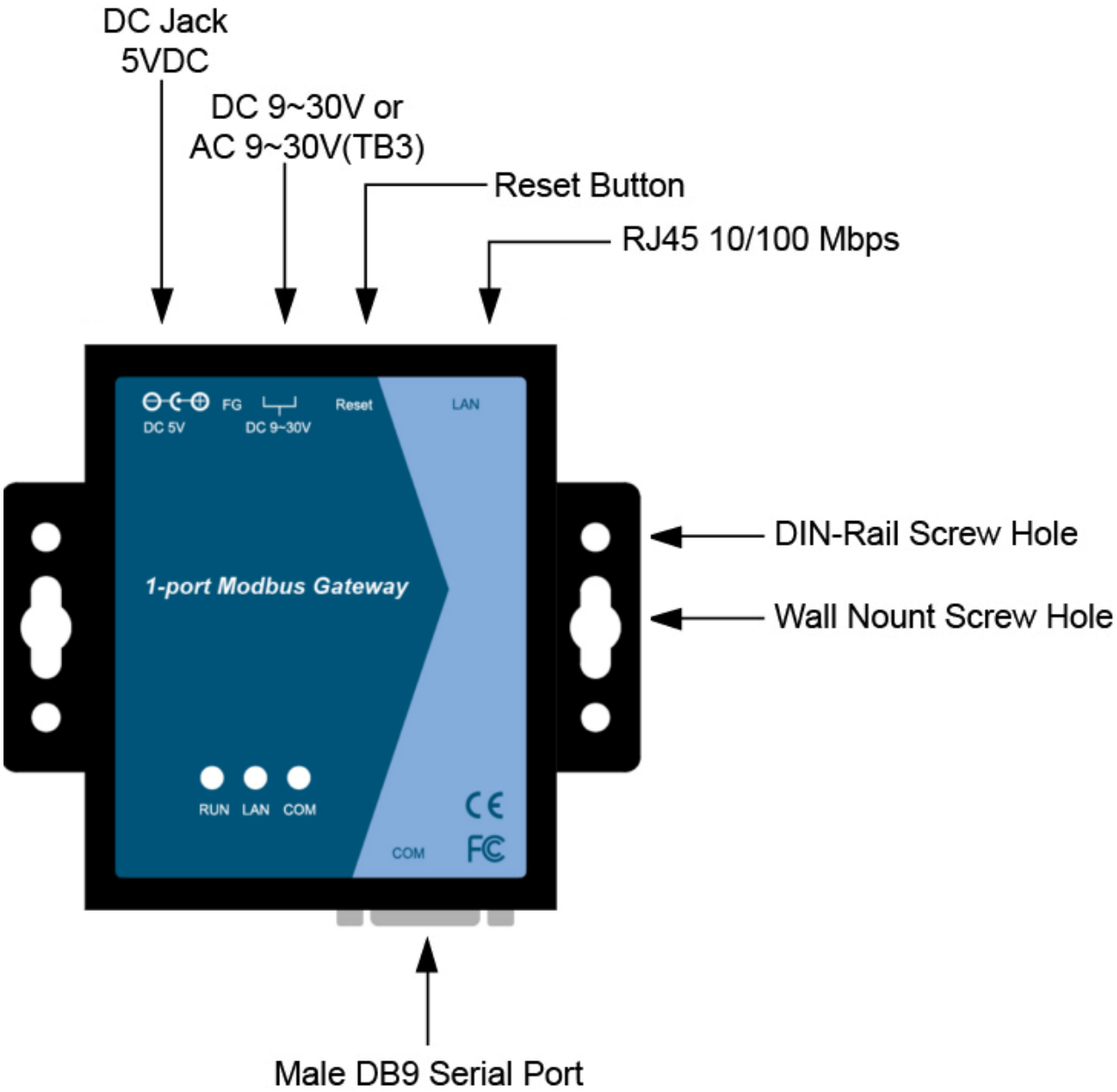


Figure 2.1 MB5001C interfaces.

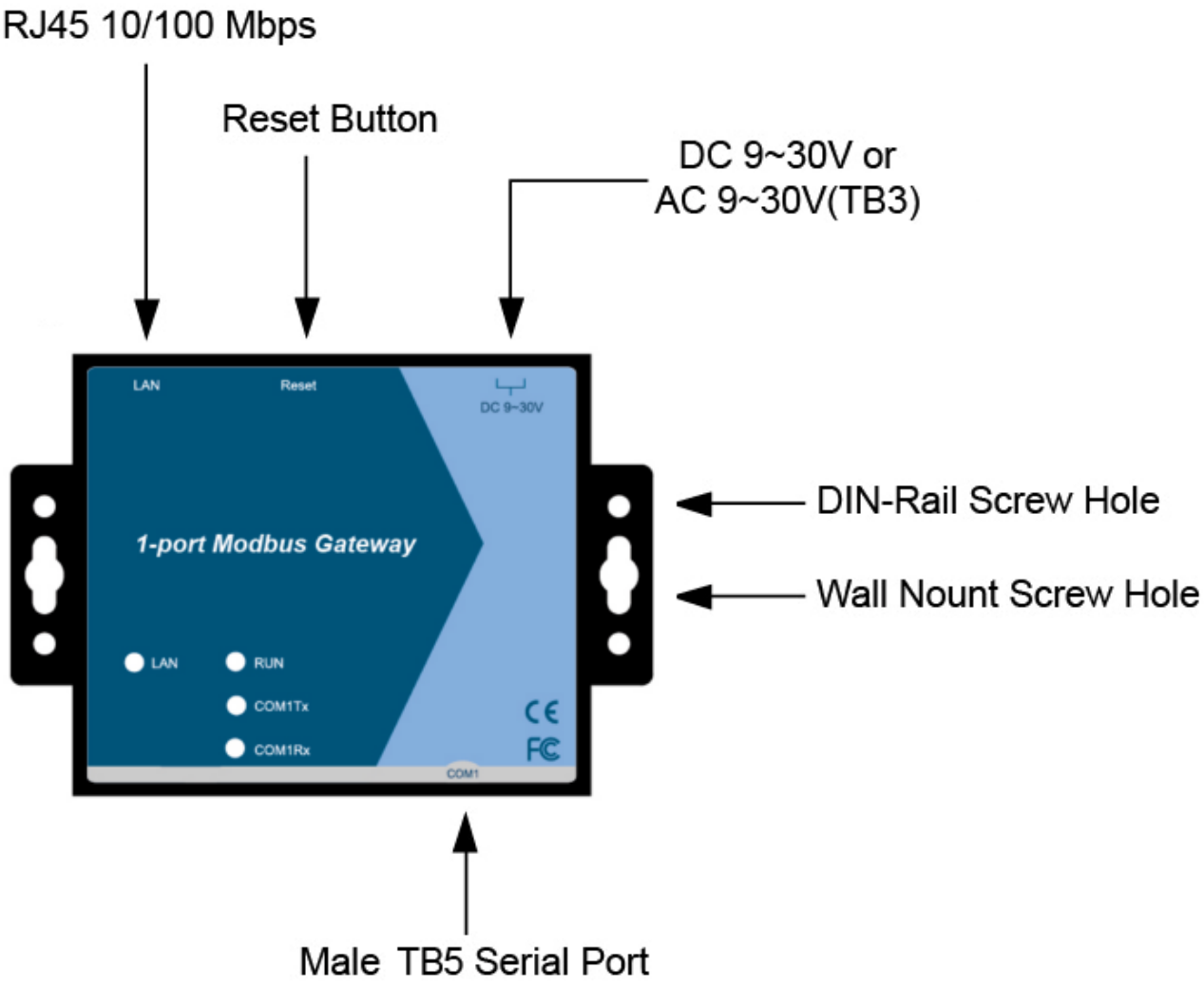


Figure 2.2 MB5001C-Sis interfaces

2.1 LED Indicators

2.1.1 LAN LED

Message	Description
Off	Ethernet Disconnected
Blinking with Green	Data is transmitting on Ethernet for 100Mbps
Blinking with Orange	Data is transmitting on Ethernet for 10Mbps
Table 1. LAN LED Message	

2.1.2 COM Port LED

Message	Description
Off	No data is transmitting on COM port
Blinking	Data is transmitting on COM port
Table 2. COM Port LED Message	

2.1.3 RUN LED

Message	Description
On	Jumper JP1 Pin1 and Pin2 are shorted to disable AP firmware running
Blinking (rate: 0.5 Sec)	AP firmware is running normally
Table 3. RUN LED Message	

2.2 Installation Procedures

Step 1: Connect MB5001C to power source using 5V DC Jack(Note that DC Jack is 5V only, and only use it with a power adaptor), or 9~30V DC Terminal Block power source.

Note : **MB5001C provide two power inputs can be connected simultaneously to live DC power sources. Anyone of the power inputs fails, the other live source acts as a backup to support power needs automatically. The redundant dual DC power inputs give one extra assurance of non-stop operation.**

MB5001C : 5V DC Jack or DC 9-30V 3-pin Terminal Block power input

MB5001C-Sis: DC 9-30V 3-pin Terminal Block power input

Step 2: Connect MB5001C to Ethernet network. Use a standard straight-through Ethernet cable when one connect it to a hub/switch, one also can connect it to ones PC's Ethernet port via a cross-over Ethernet cable for easy set up. However, in this case one need to make sure ones PC is in the same network sub-net as MB5001C.

Step 3: Connect MB5001C's serial port to a serial device.

Step 4: Placement options. One can mount MB5001C to a wall/panel (Mounting screws included) or Din-Rail rack (Require optional item model: Din-Rail-Kit DK-25).

3. Software Setup

MB5001C Modbus Gateway is shipped with default settings shown in the following table:

Property	Default Value
IP Address	**10.0.50.100**
Gateway	**10.0.0.254**
Subnet Mask	**255.255.0.0**
User Name	**admin**
Password	**default**
COM 1	9600,None, 8, 1, No flow control, buffer disabled, packet delimiter timer 2ms
Link 1	Type: TCP Server, Listen port 4660, Filter=0.0.0.0
SysName of SNMP	name
SysLocation of SNMP	location
SysContact of SNMP	contact

3.1 Configuration by Device Management Utility

3.1.1 Static IP

Use Device Management Utility that comes with product CD to configure the network parameters of MB5001C. Please click "**Configuration**" button(ref Figure 3.1) then give it a static IP information.(Figure 3.2)

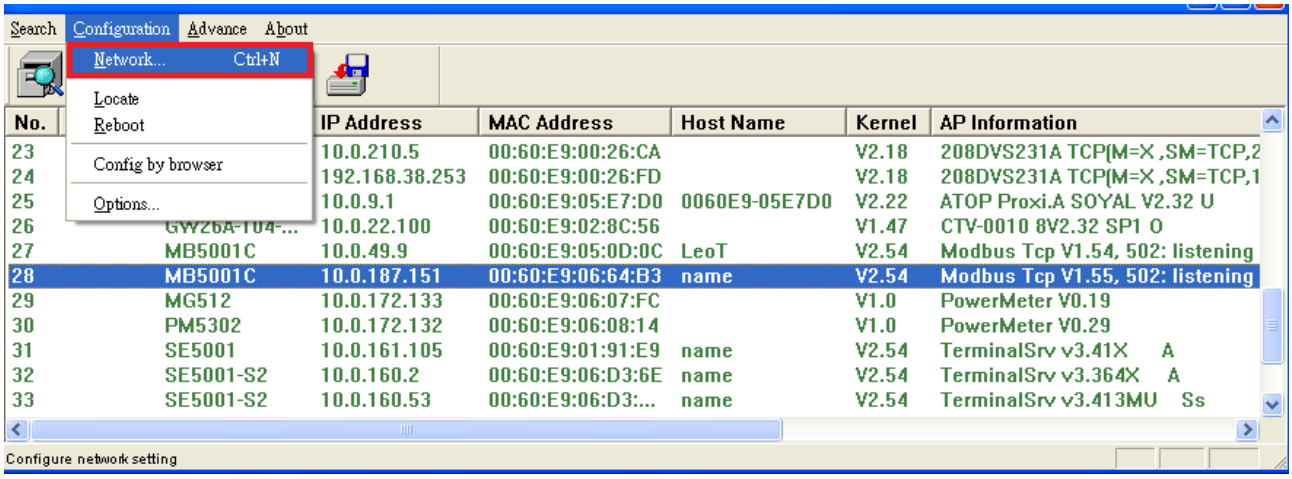


Figure 3.1 Configure by Device Management Utility

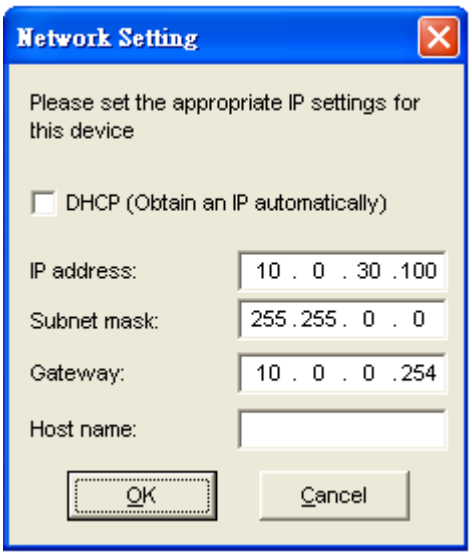


Figure 3.2 Static IP setup dialog window

3.1.2 Auto IP (Dynamic IP)

A DHCP server can automatically assign the IP address and network settings. MB5001C supports the DHCP function. By default, the DHCP function on MB5001C is disabled; one can use Device Management Utility software to search network information automatically by following steps：

->Execute Device Management Utility (Figure 3.1)

->Click on the IP address of MB5001C in Device Management Utility

->Click “**Config**” button(It will pop-up Dialog Window)

->Check ”**Auto IP**” (Figure 3.3)

->Click “ **Config Now**” button(The MB5001C will restart and get IP from DHCP server automatically)

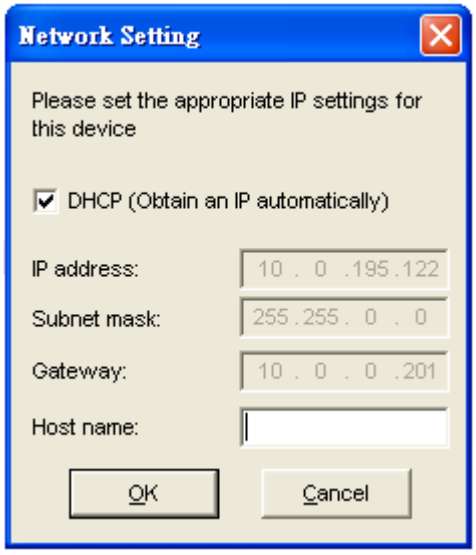


Figure 3.3 Device Management Utility Auto IP Dialog Window

3.2 Configuration by Telnet Utility

One can use Telnet utility to change configuration settings of MB5001C by following steps：

3.2.1 Login to the System

->Open Ms-DOS command prompt window

->Telnet to MB5001C using command "**Telnet IP_address**".(For example：Input **Telnet 10.0.50.100** in Ms-DOS command prompt window).After telnet to MB5001C, system prompts for a password, the default password is "**default**". (Figure 3.4)

Figure 3.4 Login to the system

Note: One can press the default button of MB5001C to reset the password to the default value.

1. After verifying the password, the following terminal screen appears.(Figure 3.5)

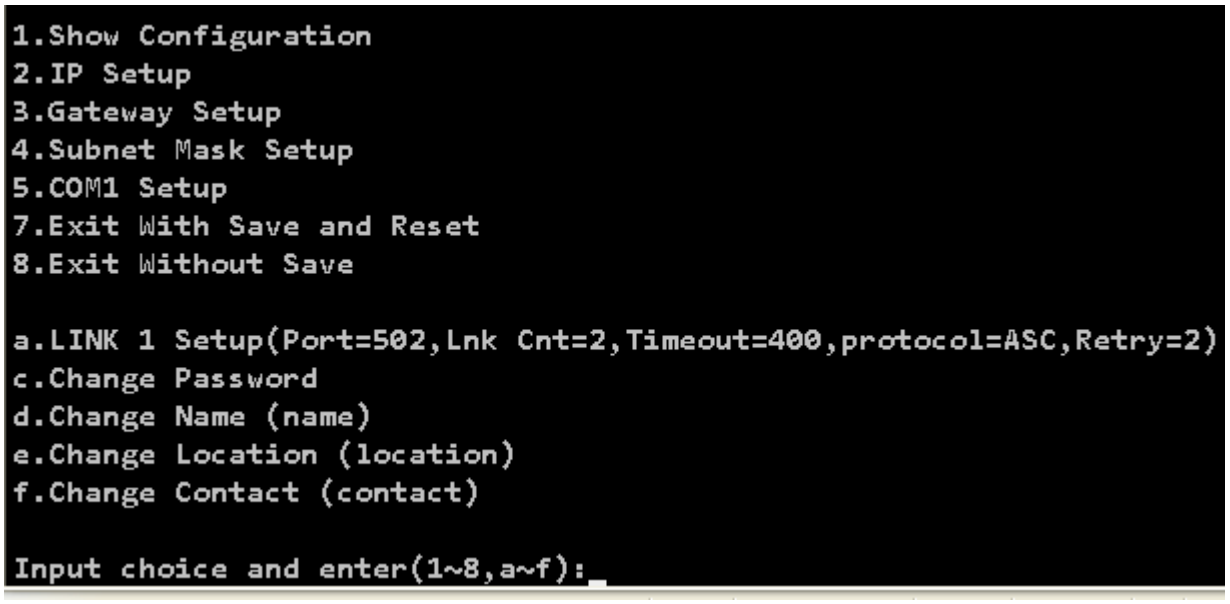


Figure 3.5 Main menu

Note: Changes to networking parameters will take effect only when one exit and restart MB5001C.

->Select "**1**" from "**Input choice and enter (1~8,a~f):**" to enter show configuration page as following:(Figure 3.6)

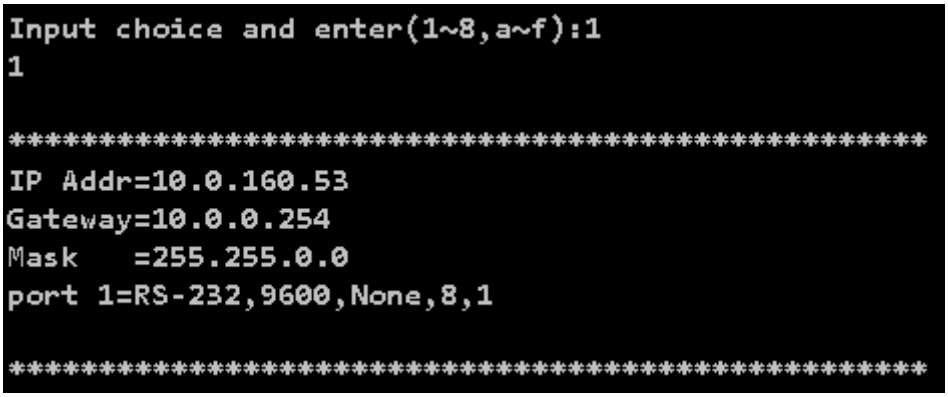


Figure 3.6 Show Configuration

This page gives one the general information of MB5001C including IP address, Gateway, subnet mask, and serial information of the device.

3.2.2 IP Setup

Select "**2**" from "**Input choice and enter (1~8,a~f)**:" to Setup IP:(Figure 3.7)

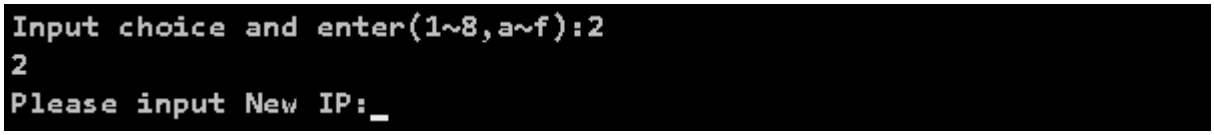


Figure 3.7 IP Setup

3.2.3 Gateway Setup

Select "**3**" from "**Input choice and enter (1~8,a~f)**:" to Setup Gateway:(Figure 3.8)

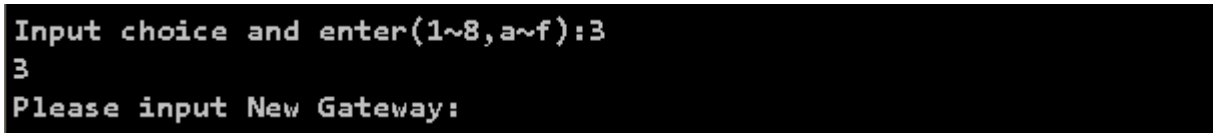


Figure 3.8 Gateway Setup

3.2.4 Subnet Mask Setup

Select "**4**" from "**Input choice and enter (1~8,a~f)**:" to Setup Subnet Mask:(Figure 3.9)

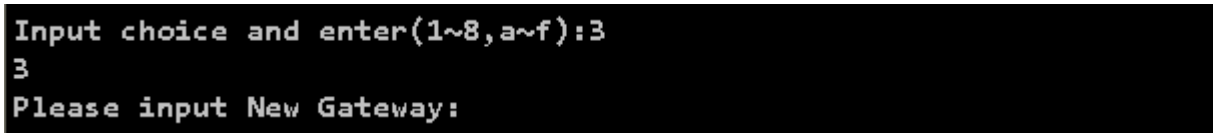


Figure 3.9 Gateway Setup

3.2.5 COM1 Setup

Select "**5**" from "**Input choice and enter (1~8,a~f)**:" to Setup COM1. One can then give the COM port alias name, set the baud rate and parity, determine number of data bit and stop bit, and decide if one want to use flow control and the type of flow control one want to use. The following screen (Figure 3.10) illustrates how to setup 9600 baudrate, none parity, 8 data bits, and 1 stop bit.

```
Input choice and enter(1~8,a~f):5
5
(1)1200 (2)2400 (3)4800 (4)9600 (5)19200 (6)38400 (7)56000(8)115200(9)other
Please select baudrate(8):4
4
(1)None (2)Odd (3)Even (4)Mark (5)Space
Please select Parity(1):1
1
(1)7 bits (2)8 bits
Please select length(2):2
2
(1)1 bits (2)2 bits
Please select stop bit(1):1
1
```

Figure 3.10 COM1 Setup

3.2.6 Exit with Save and Reset

Select "**7**" from "**Input choice and enter (1~8,a~f)**:" to Exit with Save. Please choose this option to save all the previous changes to EEPROM, the device will restart automatically.

3.2.7 Exit with Save and Reset

Select "**8**" from "**Input choice and enter (1~8,a~f)**:" to Exit with Save. Please choose this option to discard all the previous changes the device will close telnet connection automatically.

3.2.8 Link 1 Setup

Select "**a**" from "**Input choice and enter (1~8,a~f)**:" to Exit with Save. The following screen (Figure 3.11) illustrates how to set port to 502, connection to 2, input timeout to 400, protocol to ASCII, and retry to 2 times.

```
a.LINK 1 Setup(Port=502,Lnk Cnt=1,Timeout=200,protocol=ASC,Retry=1)
c.Change Password
d.Change Name (name)
e.Change Location (location)
f.Change Contact (contact)

Input choice and enter(1~8,a~f):a
a
Please input Modbus TCP_LISTEN_PORT(502):502
502
Please input Connect Count(1):2
2
Please input Timeout(200):400
400
(1)ASC (2)RTU
Please select Protocol(1):1
1
Please Input Retry Count(1):2
2
```

Figure 3.11 Link1 Setup

3.2.9 Change Password

1. Select "***c***" from "**Input choice and enter (1~8,a~f):**". The following screen (Figure 3.12) illustrates how to change an empty password to "1111".

```
Input choice and enter(1~8,a~f):c
c
Please input old password:

Please input new password:1111
****
Please verify new password:1111
****
add:1Password changed!
```

Figure 3.12 change the password

2. If one want to change the password, please type the old password in the "**Please input old password**" field, type the new password in the "**Please input new password**" and the "**Please verify new password**" fields.

   Note: One can press the default key of product to reset password to the default value.

3.2.10 SNMP Settings

a. Select "**d**" from "**Input choice and enter (1~8,a~f)**:" to change SNMP Name field.

Note that if you press enter, MB5001C will fill in a default name equal to its MAC.

b. Select "**e**" from "**Input choice and enter (1~8,a~f)**:" to change SNMP Location field.

c. Select "**f**" from "**Input choice and enter (1~8,a~f)**:" to change SNMP Contact field.

3.3 Configuration Using Web Browser

1. Make sure one PC is located on the same network sub-net as MB5001C
2. Open a web browser, then type in the IP address of MB5001C to be configured. Default user name is **admin** and default password is **default**.
3. MB5001C's network, link mode and COM ports settings can be configured in different web pages.
4. Click "**Save Configuration**" to save settings.
5. Click "**Restart**" button to make the change effective if necessary.

It is also possible to modify various settings through the web server interface. To do so, please follow the steps below.

3.3.1 Log in to the System

1. From web browser, type in the IP address of MB5001C in the URL.

   Example: http://10.0.50.100

2. The following authentication screen appears. (Figure 3.16) Please type in user name and password then click on OK. The user name is admin and password is "default".

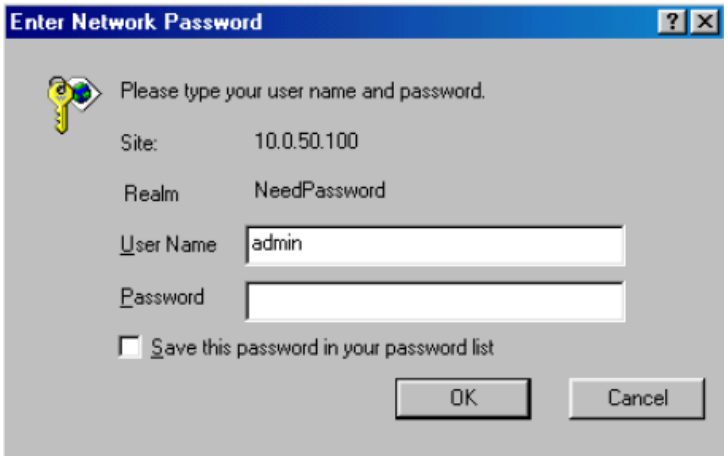


Figure 3.16 login the system via Web

3. The following overview page appears.(Figure 3.17)

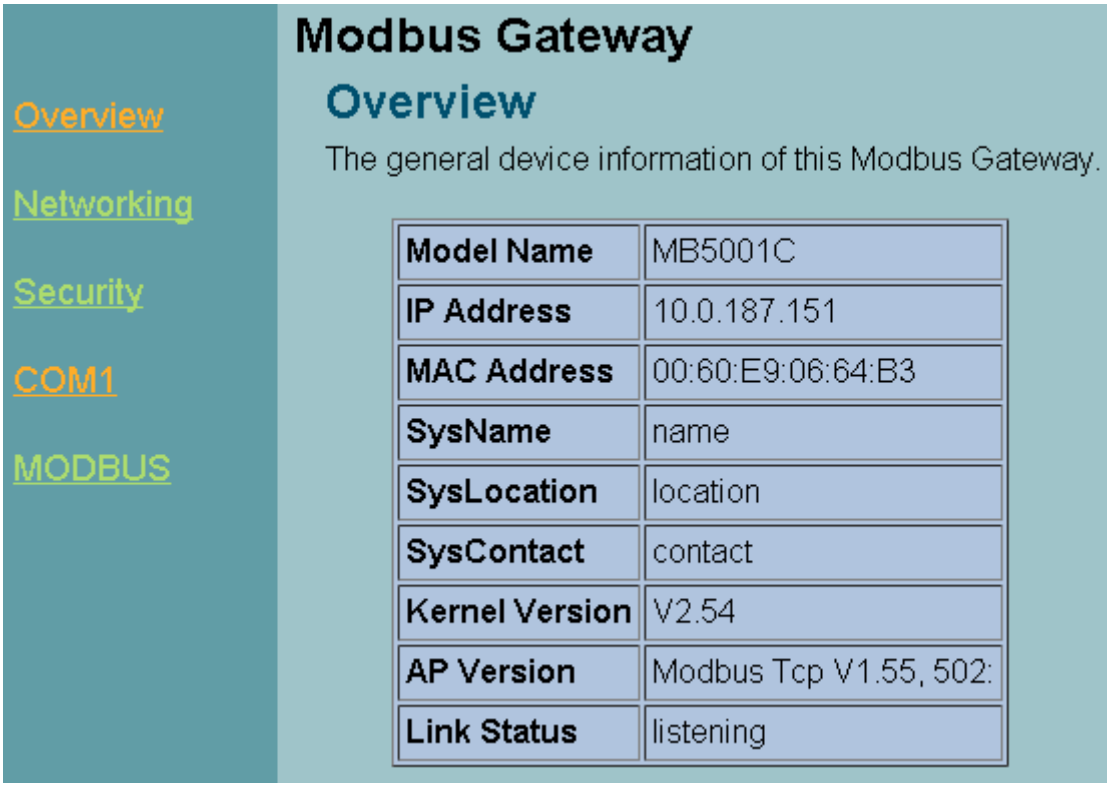


Figure 3.17 Overview

3.3.2 Change Password

1. Click on the "**Security**" link and the following screen appears.(Figure 3.18)

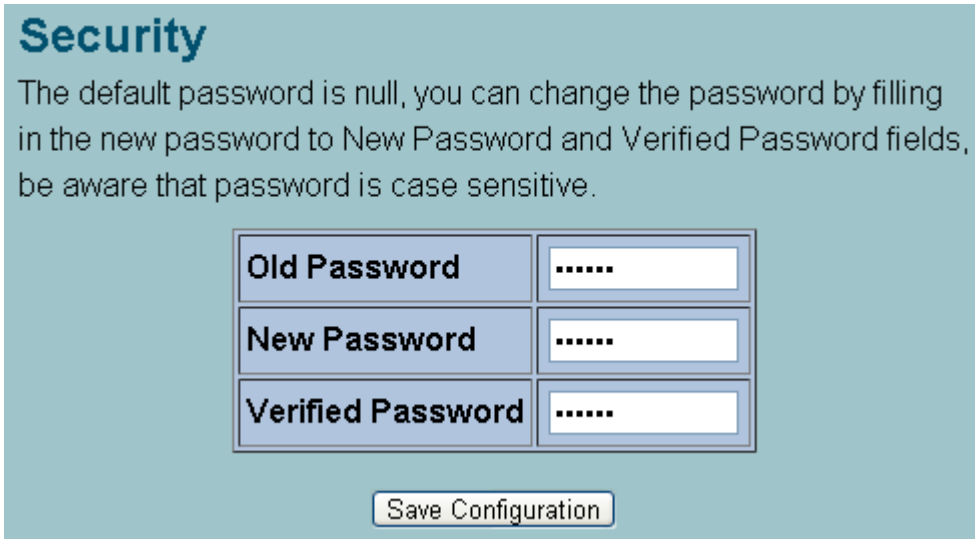


Figure 3.18 Change the password

2. Please input the old password in the "**Old Password**" field, input the new password in the "**New Password**" and the "**Verified Password**" fields, and then click on "**Save Configuration**" to update

the password.

Note: One can press the default key of product to reset password to the default value.

3.3.3 Network Setup

Click on the ***"*Networking*"*** link and the following screen appears. Fill in IP information under TCP/IP field. Alternatively, one can do the configuration by clicking on DHCP to obtain auto IP address, gateway and subnet mask information.

Enable SNMP by checking "**Enable**", fill in network identification information under SNMP field and click on the "Save Configuration" button to save the changes, please notice that the setting will not become effective until one restart MB5001C.(Figure 3.20)

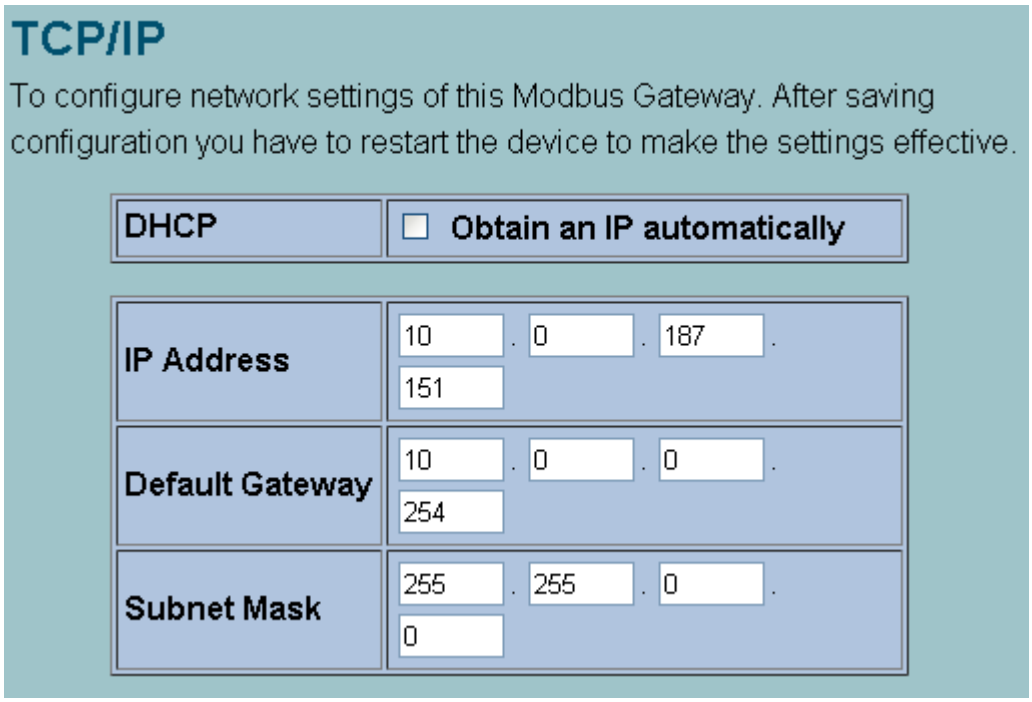


Figure 3.19 TCP/IP setup

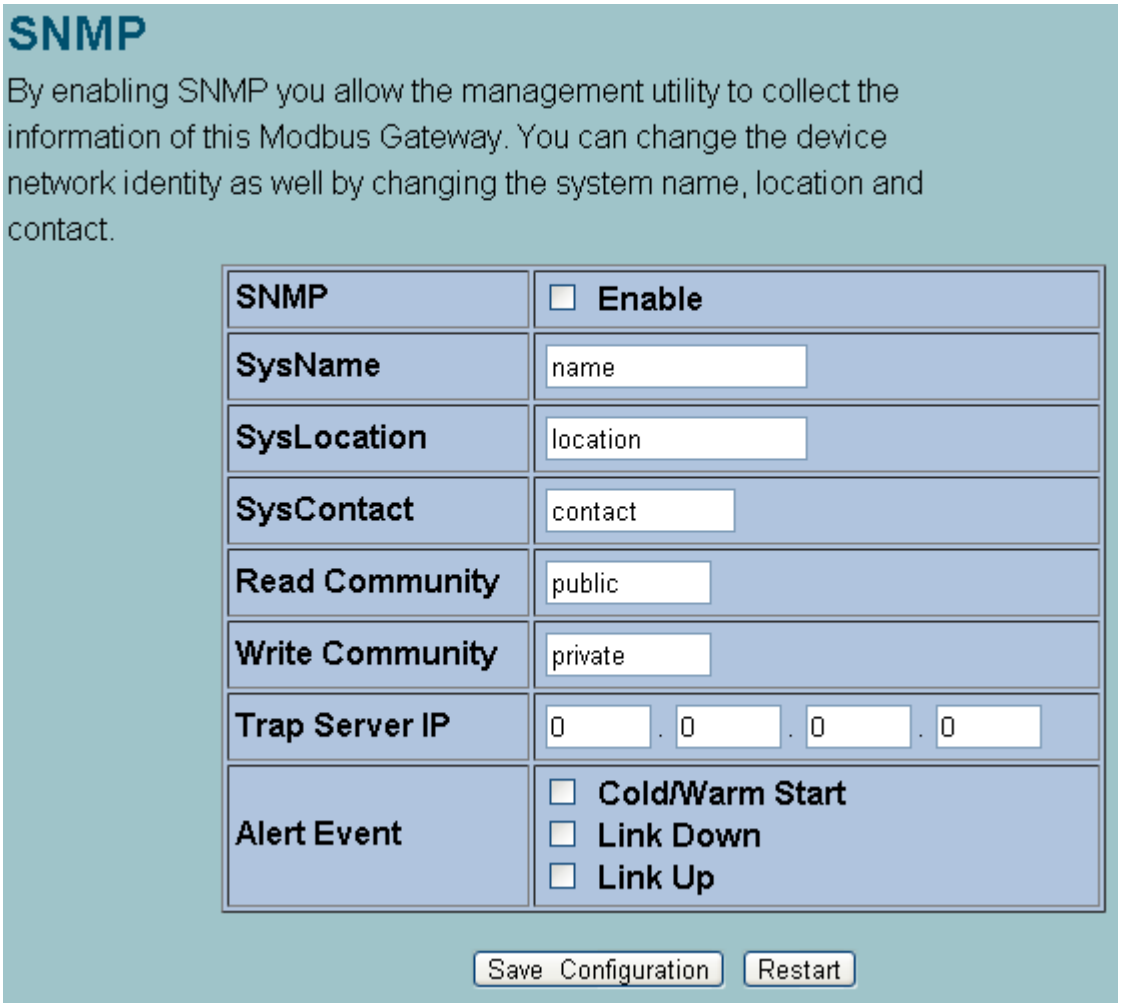


Figure 3.20 SNMP setup

3.3.4 Configure COM1 Settings

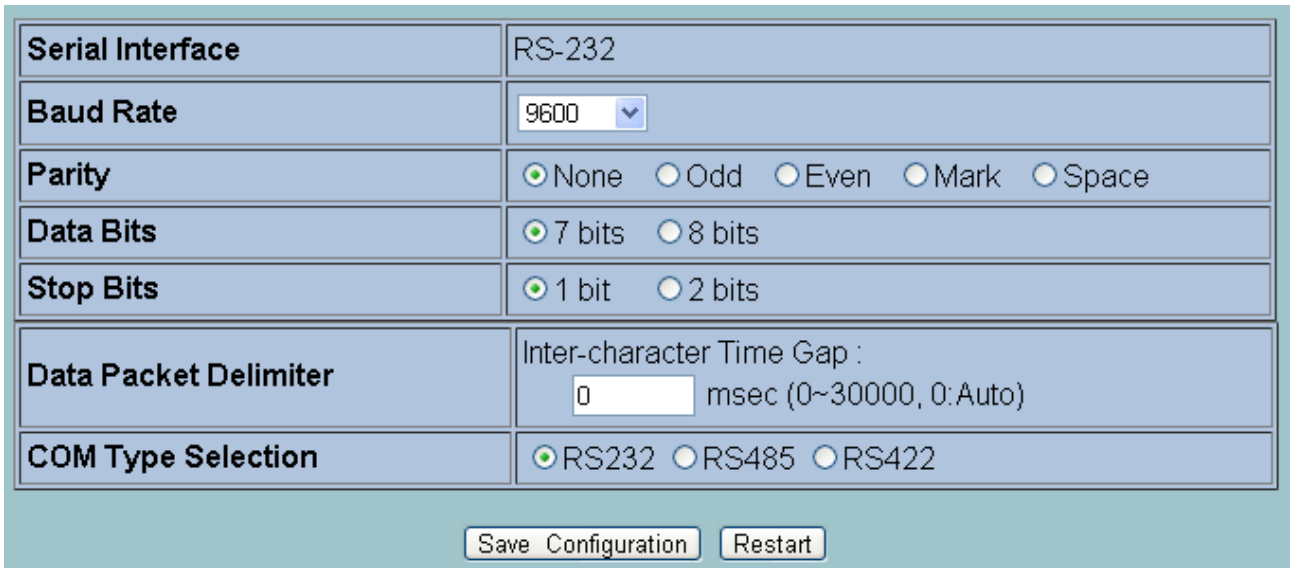


Figure 3.21 Com1 Setup

Note :

1. The default Baud Rate of MB5001C is 9600 and it is associated with serial port COM respectively.
2. The default value for data packet delimiter is 0. When the delimiter is set to 0 (Auto), MB5001C will automatically chooses the optimal delimiter according to the baud rate.
3. The “COM Type Selection” will show different port interface according to its selected port type.
4. After configuring the parameters, click on the “Save Configuration” button to save the changes, please notice that the setting will not become effective until click “restart”.

3.3.5 Modbus Settings

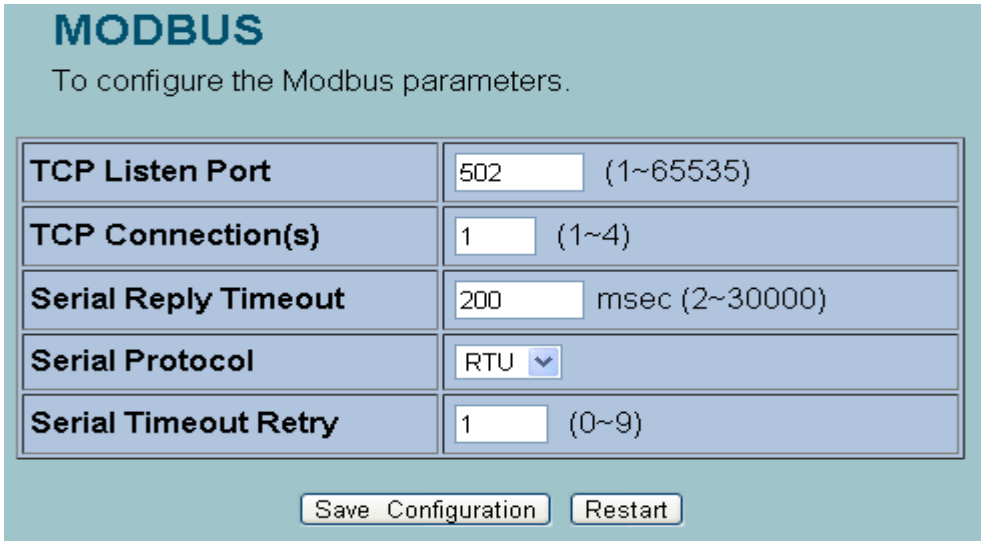


Figure 3.22 Modbus Setup

TCP Listen Port: Modbus/TCP Listen port. Default is 502.

Please note that Ethernet interface only support Modbus Slave.

TCP Connections(s): Maximum of four simultaneous Modbus/TCP connections is allowed.

Serial Reply Timeout: If the serial side does not respond with the specified time, data would be dropped and not transmitted over TCP even if the gateway receives it later.

Serial Protocol: Select between Modbus/ASCII and Modbus/RTU.

Please note that Serial interface only support Modbus Master.

Serial Timeout Retry: If “0” is set, the gateway would not store TCP packets in the buffer. If the number is greater than “0”, the gateway would store the TCP packets in the buffer and retries the specified times when the Modbus device on the serial side does not respond.

Note: After configuring the parameters, click on the “Save Configuration” button to save the changes, please note that the setting will not become effective until “restart” is clicked.

3.4 Assign a New IP Address by ARP Command

Use ARP command to assign a static IP address of MB5001C using its hardware MAC address. The MAC address is printed on the rear side of device in the format of "0060E9-xxxxxx". The following example shows how it works within MS-DOS command prompt window.

(For example change IP from 10.0.50.100 to 10.0.50.101,and the MAC address of MB5001C is 00-60-e9-11-11-01)

Step1: Add the new host IP to ARP table

->Open Ms-DOS command prompt window

->Input **arp -s 10.0.50.101 00-60-E9-11-11-01** (Figure 3.26)

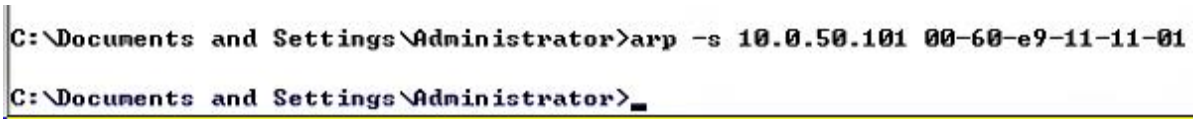


Figure 3.26. Ms-DOS command prompt window

Step2: Change to new IP via telnet port 1 (Figure 3.27)

->Input **telnet 10.0.50.101 1**

Note: The telnet will be fail and MB5001C will be restarted automatically, after restart the IP address should be change to 10.0.50.101

Step3: Using new IP to configure MB5001C via telnet

->Input **telnet 10.0.50.101**

Note 1: When using this method to change IP address, PC's IP address and MB5001C 's IP address must belong to the same subnet.

Note 2: The changed IP address must be legal, otherwise it will be changed back to the default value (10.0.50.100) after restart.

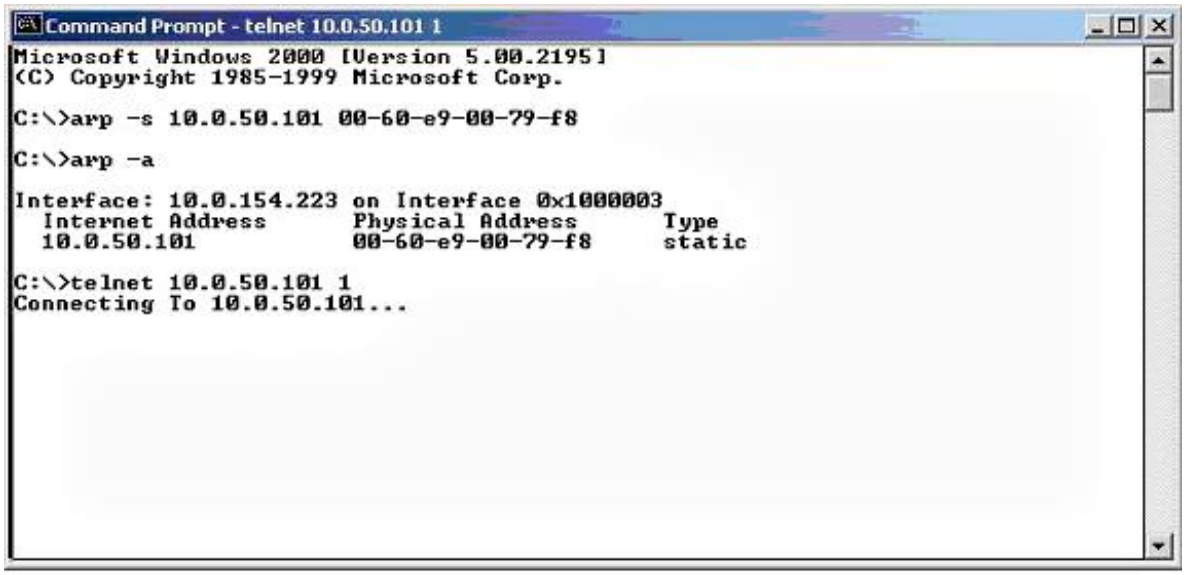


Figure 3.27. Assigning a new IP address by ARP command

5. SNMP Setup

5.1 SNMP Network Management Platform

MB5001C is an SNMP device that allows many popular SNMP Network management platforms such as HP Open View.

Depending on the network management tools one are using, device MB5001C information can be collected from running the management tools including IP address, DNS name, system descriptions and NIC information etc.

5.2 Using NetworkView as an Example

NetworkView is a compact network management tool from NetworkView Software, Inc. (www.networkview.com). It discovers all TCP/IP nodes in a network using DNS, SNMP and ports information and documents with printed maps and reports for future use.

First, download and install the tool on ones PC (**Windows 2000 and Windows XP**), then start NetworkView.

1. Click on the  button to open a new file. The following screen shall appear, in the Addresses field, Enter in the IP address range to search (Figure 5.1).

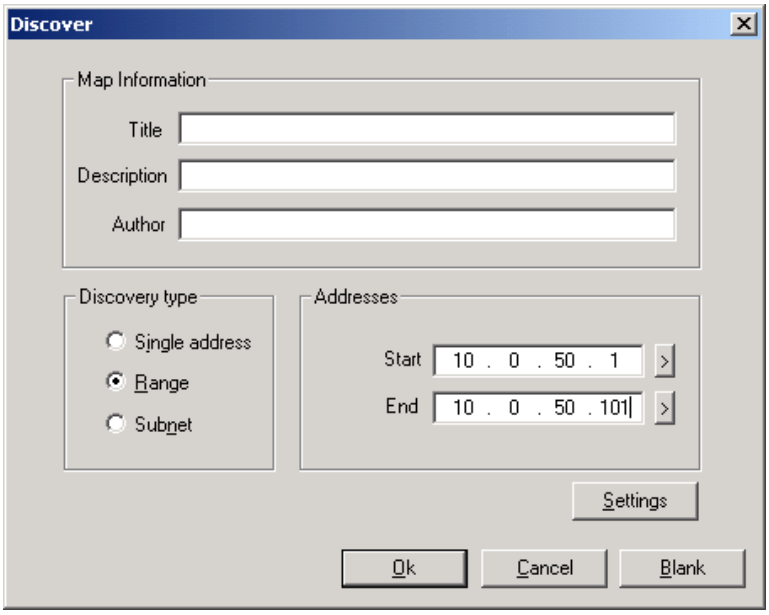


Figure 5.1 IP address searching

2. Click on “OK” and the following dialog box shall display the searching progress (Figure 5.2).

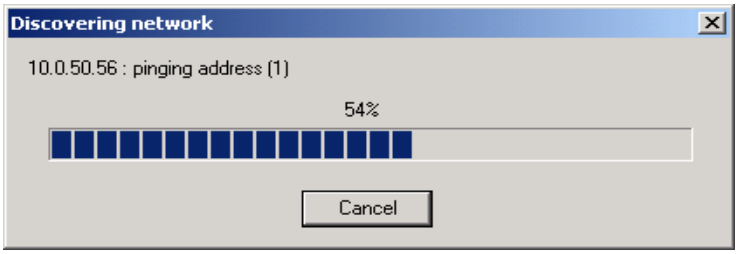


Figure 5.2 Searching progress

3. After the search is completed, NetworkView will display the devices found in the main window, as shown below (Figure 5.3).

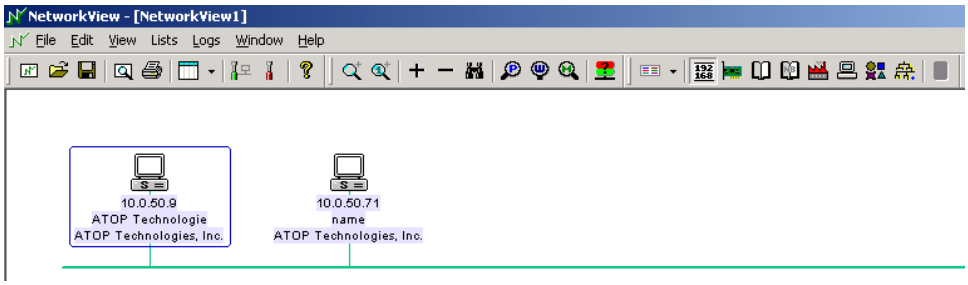


Figure 5.3 NetworkView display the devices found

4. Double-click on the device icon to display information about the device, including IP Address, Company, SysLocation (Max 15 characters), SysName (Max 9 characters) and types etc (Figure 5.4).

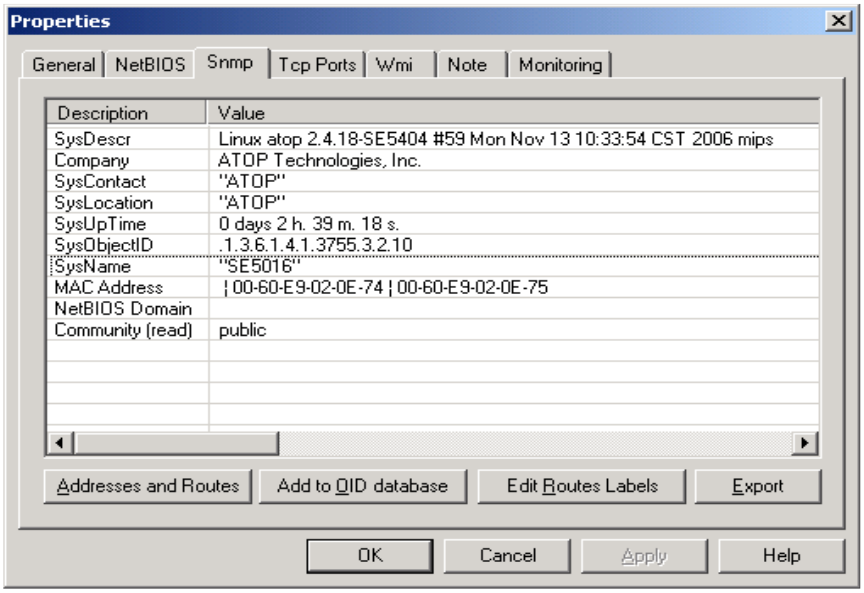


Figure 5.4 NetworkView display device information

Note:

1. The NetworkView tool is limited to information extracting and viewing only.
2. To modify the configurations please use the web server, Telnet or Device Management Utility.

6. Diagnostics

There are several ways one can check on the status and availability of MB5001C.

6.1 Use Standard TCP/IP Utility Ping Command

From Windows **Start** menu, select **Run** and type in "**ping <TCP Server IP address>**".

If the connection is established, the Reply messages are displayed, otherwise it will indicate Request timed out (Figure 6.1).

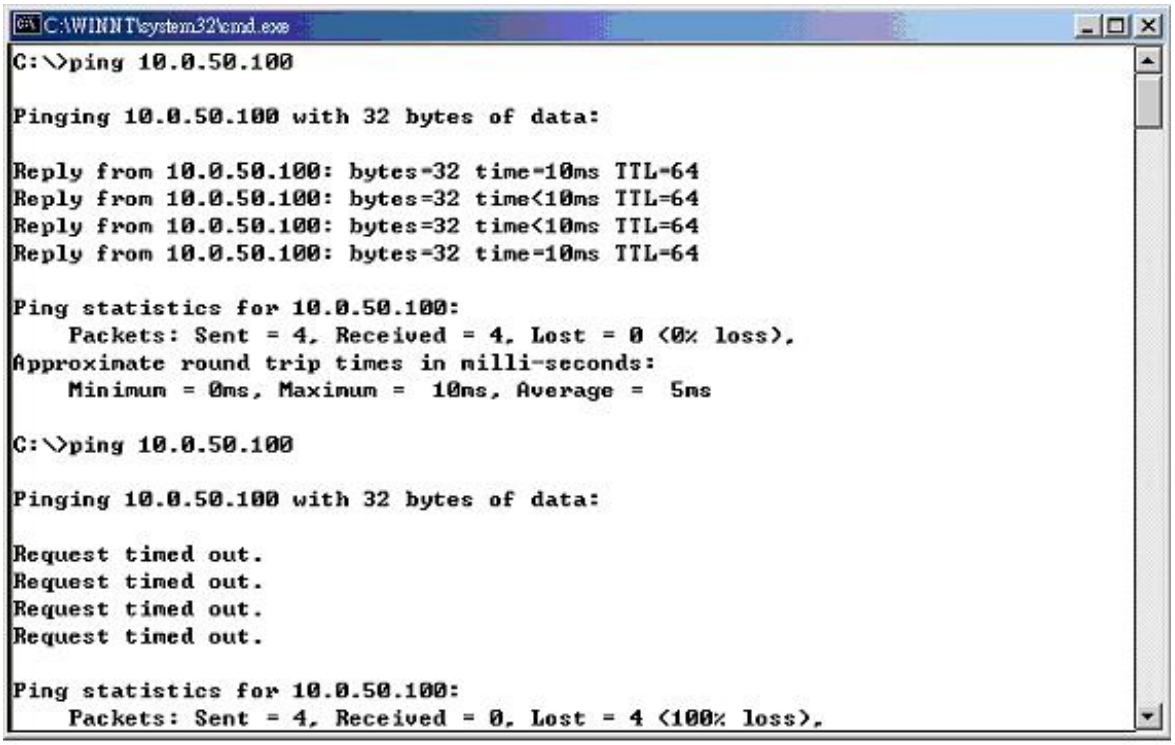


Figure 6.1 Standard TCP/IP utility ping command

6.2 Use Device Management Utility

Use **Device Management Utility** that comes with the product CD or diskette to check on the status of MB5001C. The status and version can be read from the tool.

For example, **'listening'** means that COM1 is still waiting for TCP connection (Figure 6.2).

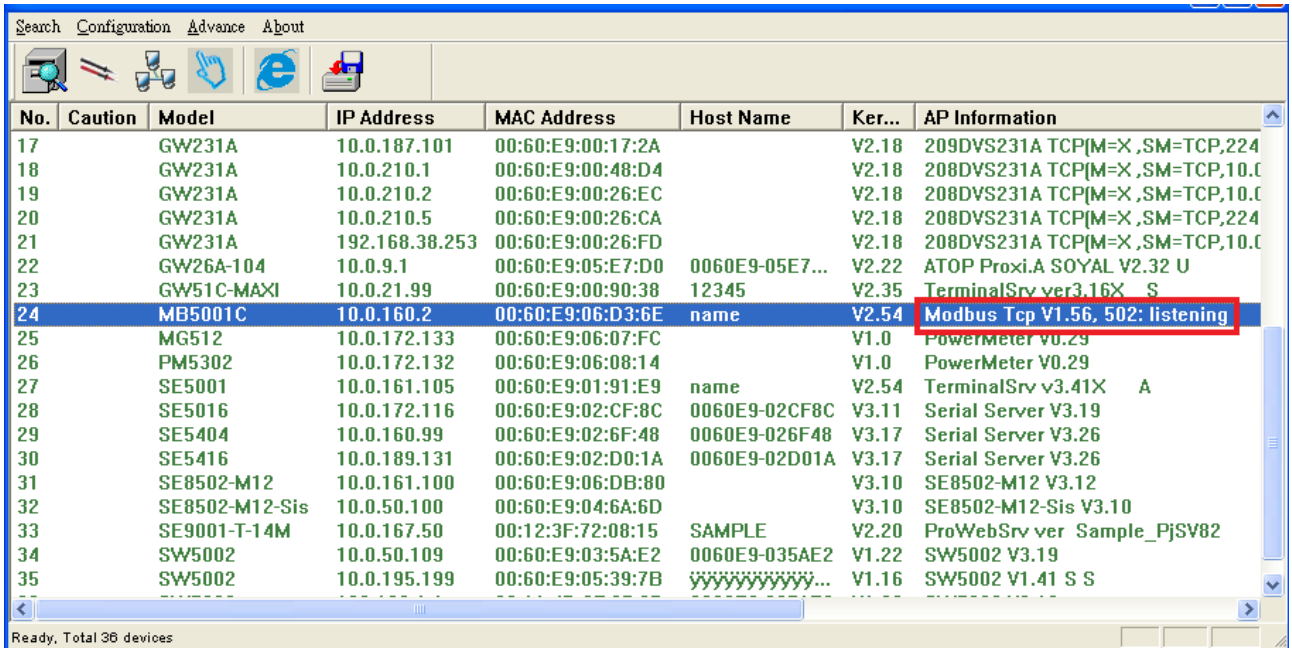


Figure 6.2 Device Management Utility

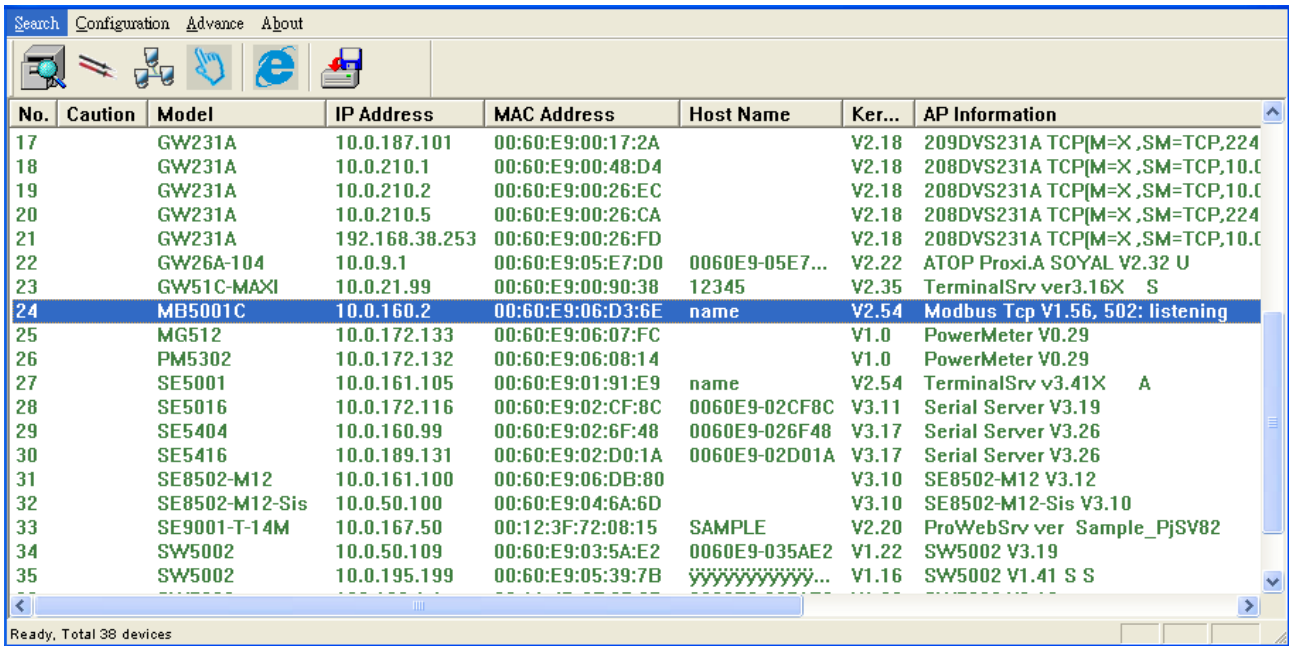
Appendix A: Management Utility

A.1. Device Management utility Introduction

Device Management Utility, developed by ATOP, is a special tool for device management and configuration. It can realize the daily management on various ATOP network devices for address search, device positioning, parameter configuring, and firmware downloading.

A.2. Interface

The operating interface of the **Device Management Utility** is shown below:

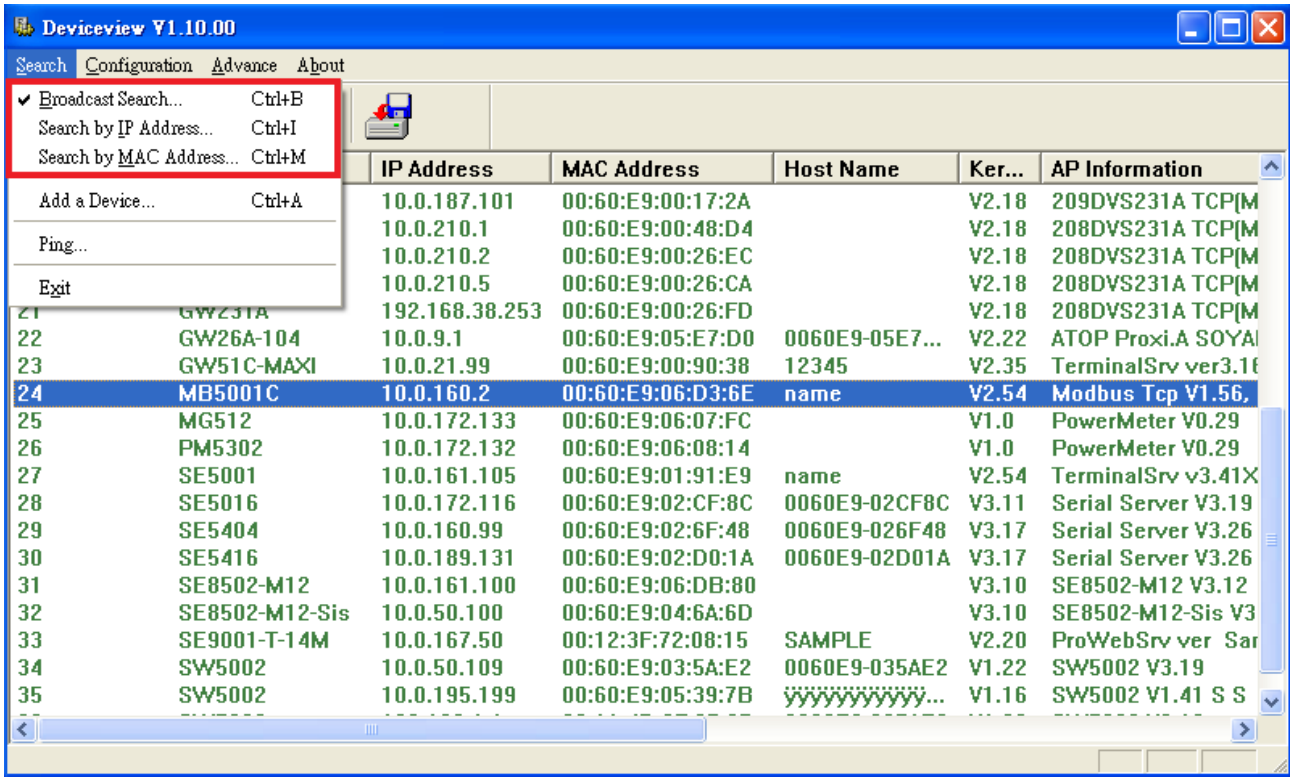


Caution Field	Description
!	IP conflict. There are two devices with the same IP address in the network.
@	The device is using DHCP.
<	The device is being located.
+	You have logged into the device.
?	MAC conflict. There are two devices with the same MAC address in the network.

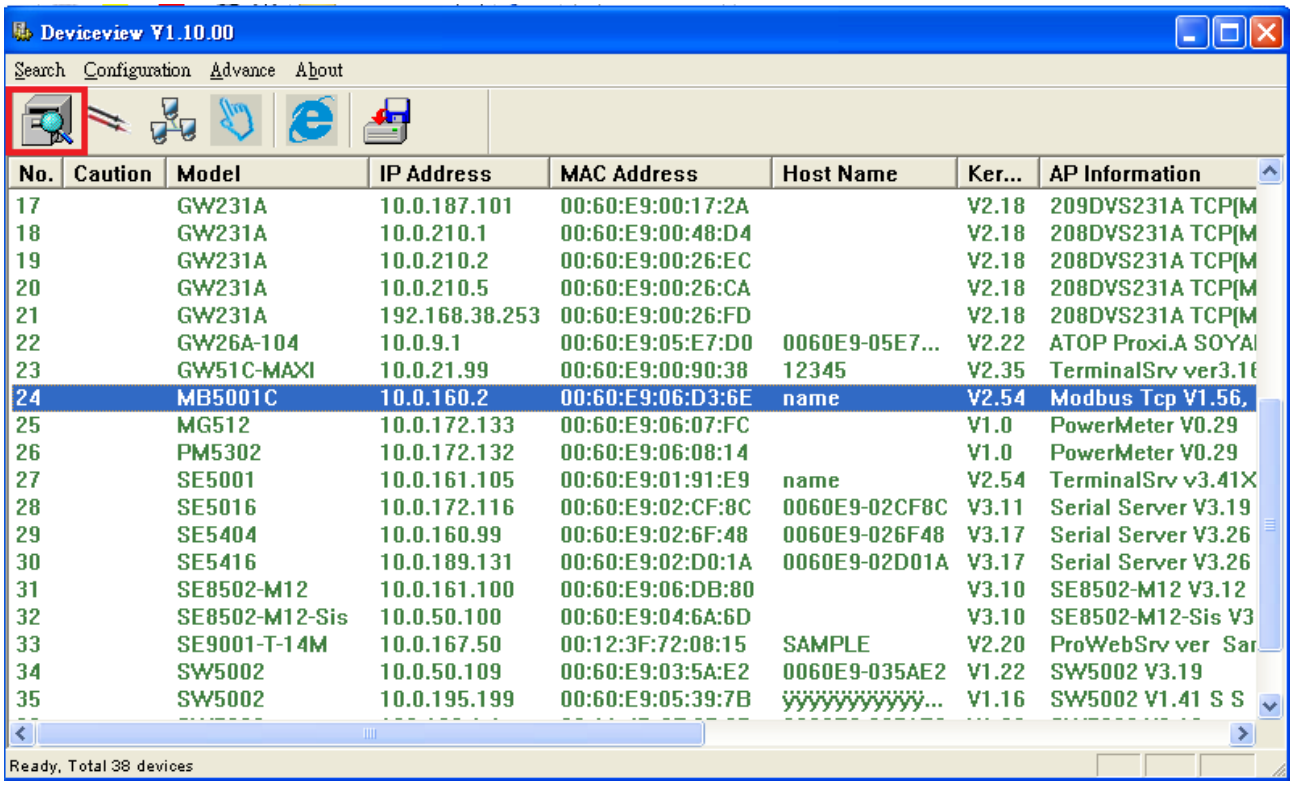
A.3. Functions

A.3.1. Device Search

This function is applied to search devices in the network. There are four methods to search devices, Search by Broadcast, Search by IP addresses, Search by MAC addresses and Rescanning devices by using the current search method. To select the search methods, users click the “Search” on the main menu which is shown below.



Alternatively, users can select by clicking the button on the toolbar as below.

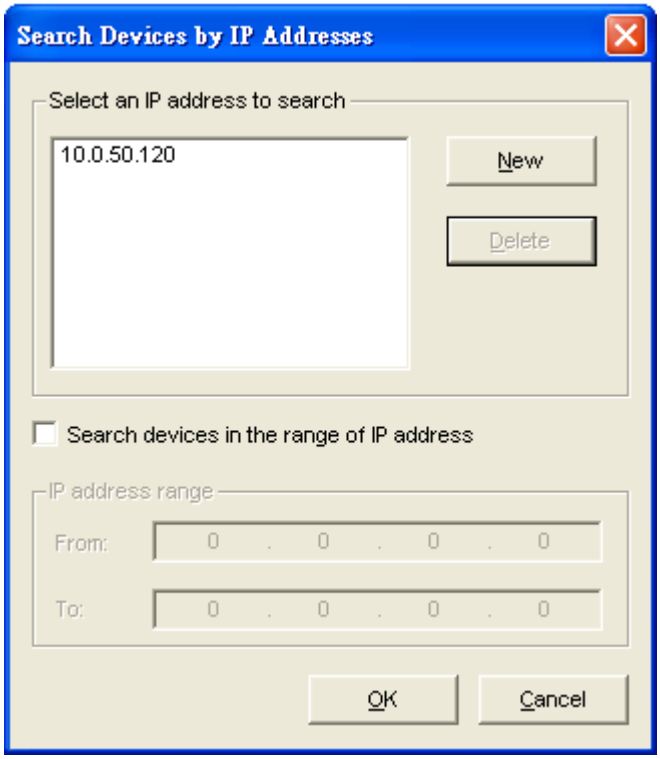


Broadcast Search

Once “Broadcast Search” is selected, a box will pop up as below. The user may type in or select different broadcast address based on his own requirement.

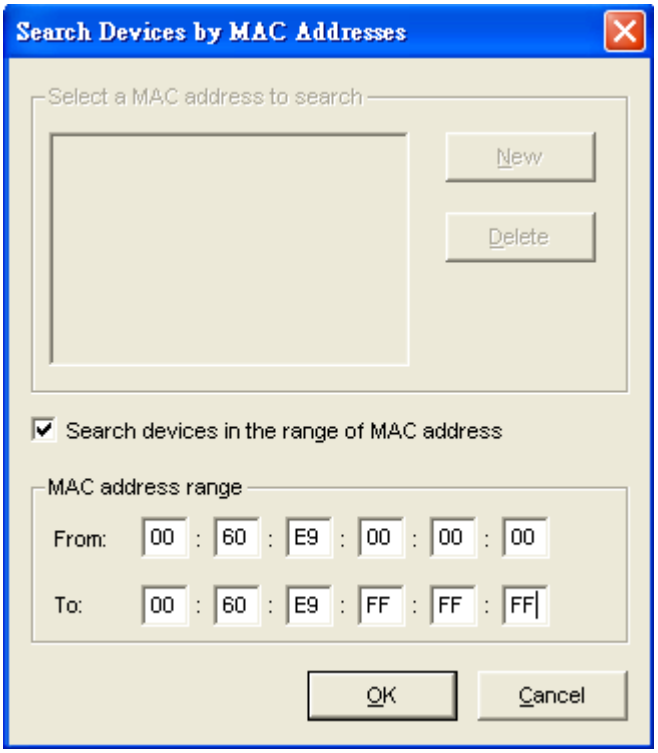
Search by IP address

Once “Search by IP Address” is selected, an interface will pop up as below. Here user may have two options: Select an IP address to search or Search device in the range of IP address.



Search by MAC Address

If “Search by MAC Address” is selected, another box will pop up as below. Here the user may search in two ways: “Search a MAC address to search” or “Search devices in the range of MAC address”

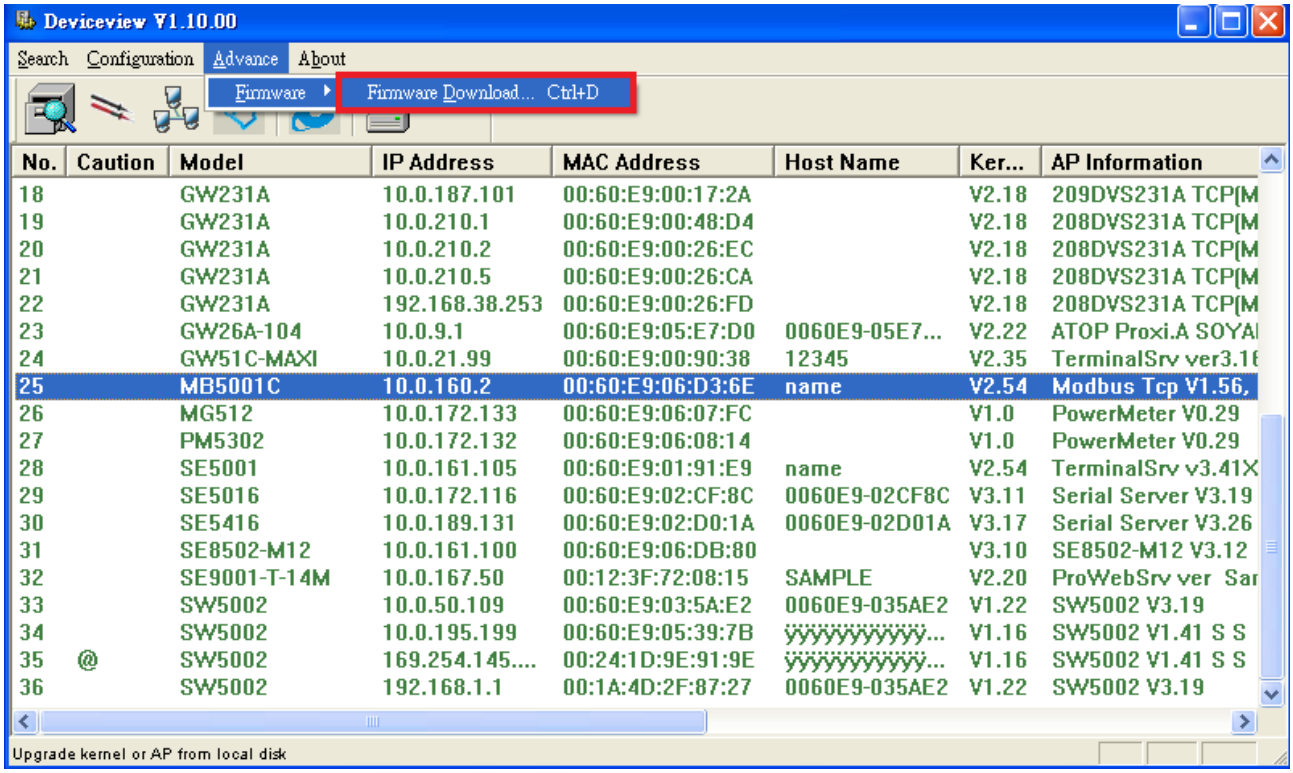


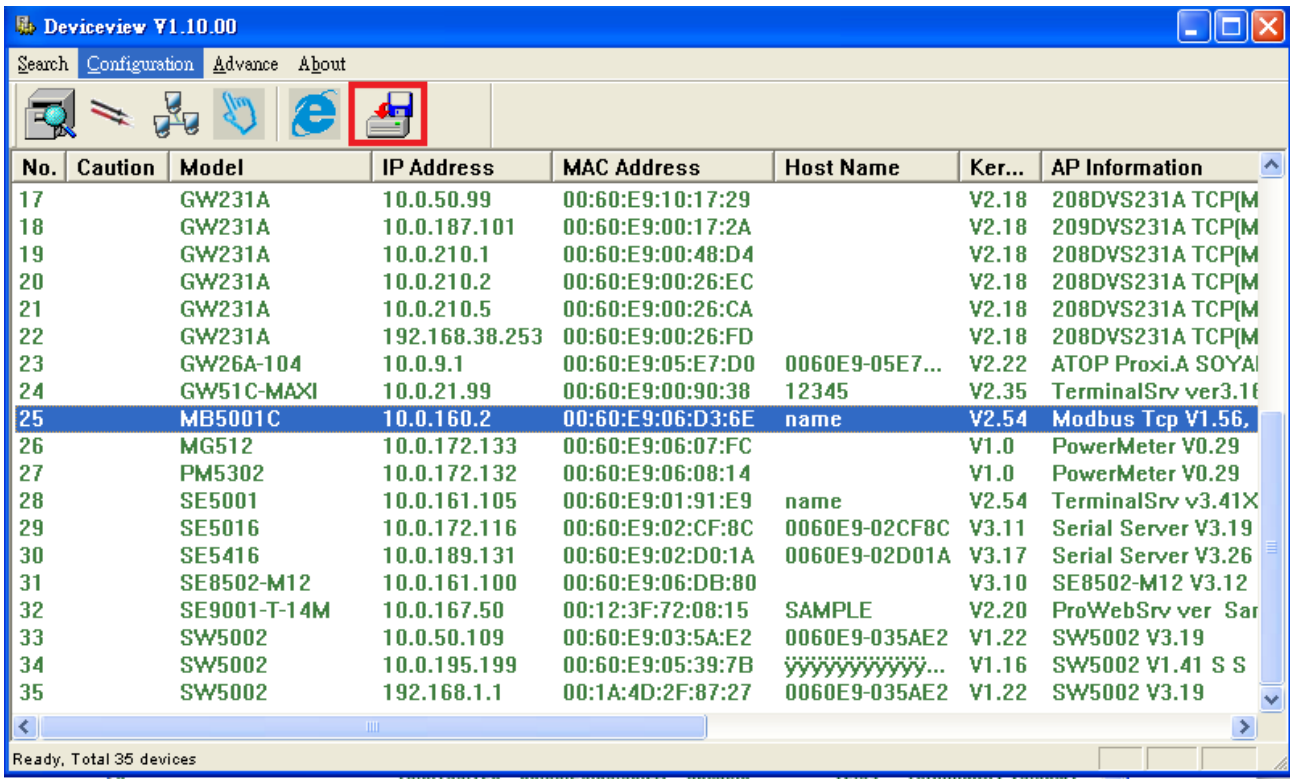
Rescan

Once the user click the “Rescan” button on the toolbar, the Device Management Utility shall re-search devices by using the current search way.

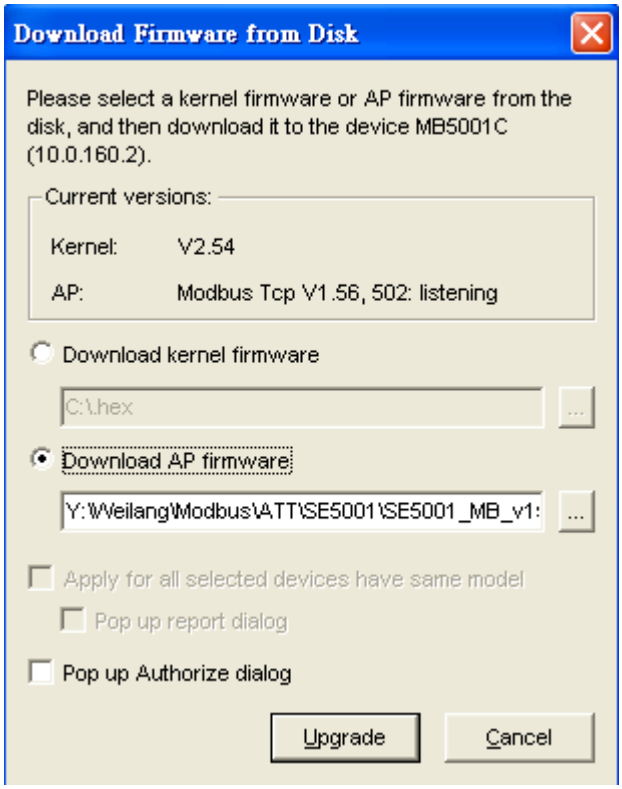
A.3.2. Firmware

This function is applied to downloading a firmware into the selected device. The user can enter the window for downloading by firstly clicking a designated network device, and then selecting the submenu option “Firmware Download” in the main menu option “Firmware”, or directly clicking the button **Upgrade from disk**.



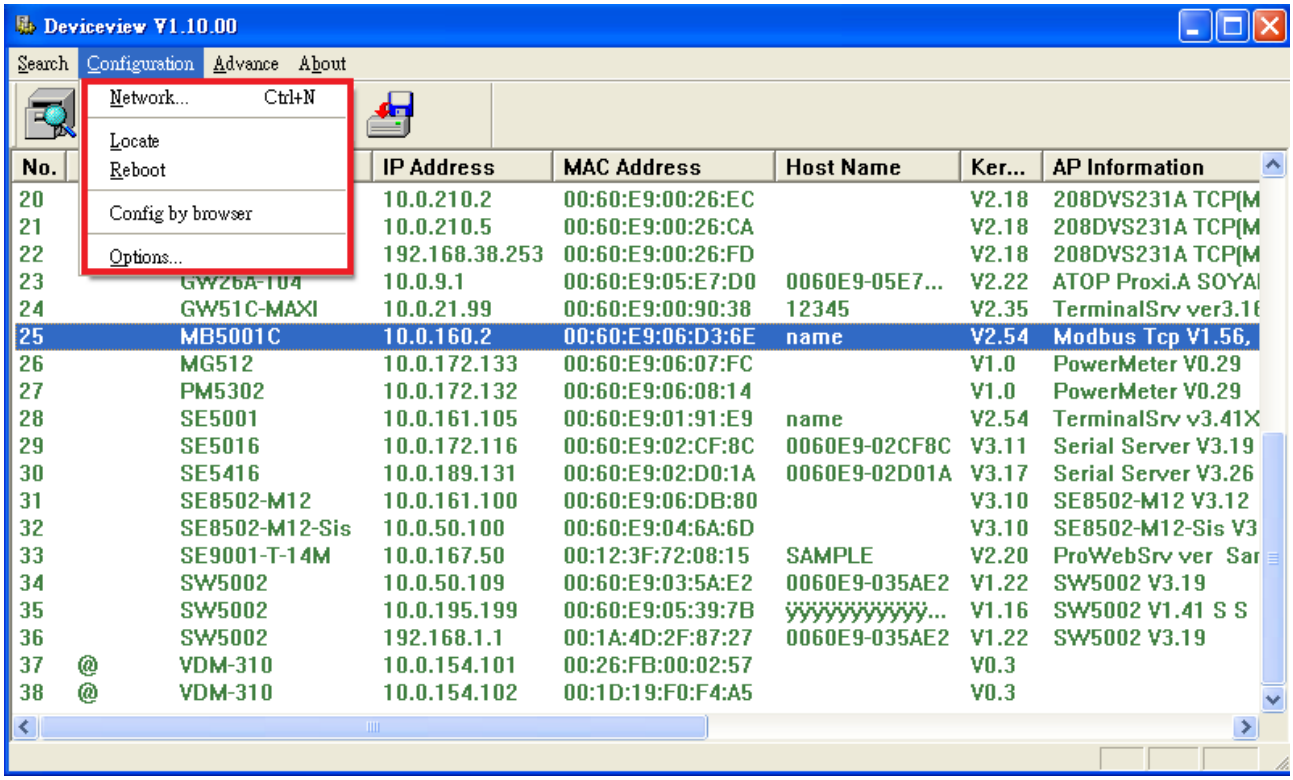


And then the user can select and download the required firmware from the disk, as shown in the figure below. The user can also select several same devices at one time, and realize the firmware updating for them by selecting **Apply for all selected devices have same model**.



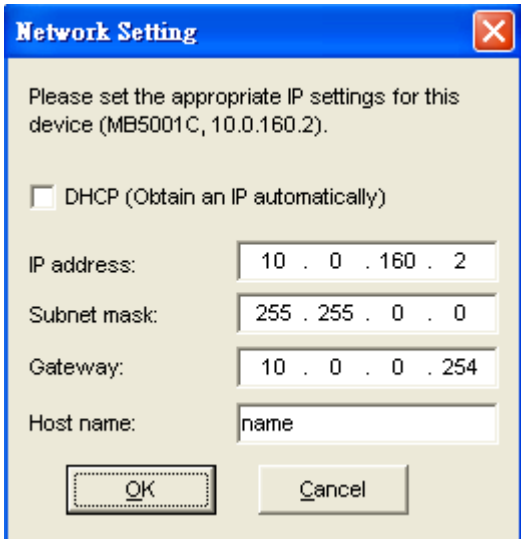
A.3.3. Configuration

This function is for device configuration to set up parameters, to import and to export the parameters, and to set up some options. Here is the list of configurations: “Network”, “SNMP”, “COM Port”, “Locate”, “Reset”, “Import Setting”, “Export Setting”, “Virtual COM”, “Config by browser” and “Options.” Users can carry out a configuration operating through menu or by clicking the corresponded button on the toolbar, shown as the figure below:



Network

The user can modify the IP address of any selected device, shown as the figure below. You can statically assign IP address, Subnet mask, and Gateway. Optionally, you can set up the device with a host name. You can select DHCP option to obtain an IP address automatically.



Locate

The user can apply this function to locate a device when its IP address is known, but its position is unknown. If a device is selected, the device will appear to sing. Users can locate the device by selecting the Configuration submenu **Locate** or clicking the **Locate** button on the toolbar.

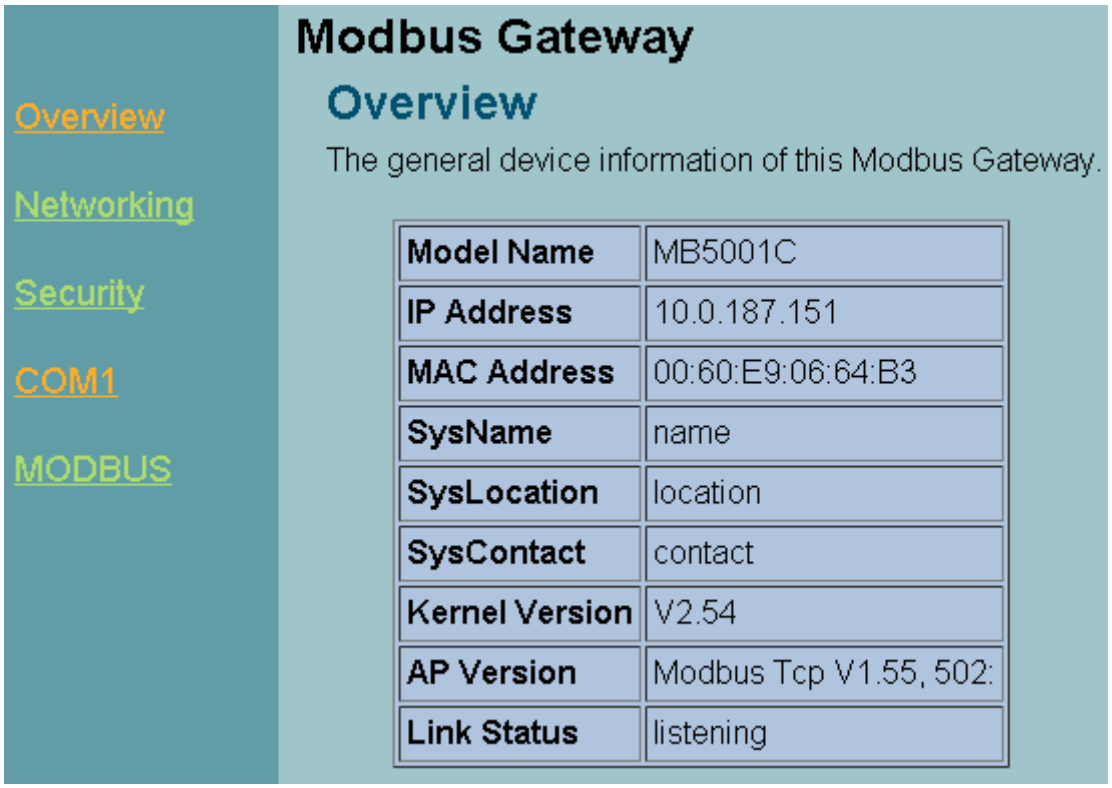
Reboot

The device should be restarted after a successful modification of parameter configuration. Users can also carry out a restart through the submenu option **Reset**.

The user can also select several devices at one time, and save the parameter information of these selected devices into a designated parameter file by selecting "Save all the selected devices".

Configure by Browser

Some devices are supplied with build-in Web servers, which will be used to configure similar to Device Management Utility software. Users can carry out any parameter setting directly through the submenu option “Config by Browser”, and a Web browser is shown in the figure below.



Options

The option is mainly applied to setting some common working rules of Device Management Utility, such as the device search time interval or whether to display any device information tip. The dialog is shown in the figure below.

Appendix B: Specifications

B.1 Hardware Specifications

	Specifications
CPU	▪ 16-bit Embedded CPU ▪ 100MHz
Flash Memory	▪ 512K Bytes
SDRAM	▪ 512K Bytes
EEPROM	▪ 512 Bytes
Host Communication	▪ IEEE802.3 base band ▪ TCP/IP, UDP, SNMP, HTTP, Telnet, ARP, BOOTP, DHCP, ICMP
Reset	▪ Built-in default key to restore factory default settings
Watch Dog Timer	▪ 1.34 second hardware auto reset ▪ Power failure threshold: 4.75V
SerialPort Communication	▪ One RS-232 or RS-485/RS-422 selectable ▪ RS-232: EIA-RS-232C standard, Full Duplex, DB9 ▪ RS-485: 2/4 wires, Half/Full duplex, Terminal Block ▪ RS-422: 4 wires, Half/Full duplex, Terminal Block ▪ Parameters 1) Baud-rate: 1200 bps ~ 230Kbps 2) Parity: None, Even, Odd, Mark, Space 3) Data bits: 7,8 4) Stop bits: 1,2 5) Packet Delimiter: by inter-character timeout, by characters delimiter 6) Flow Control: None, Hardware CTS/RTS, Software Xon/Xoff
LED indication	▪ RUN x 1 ▪ LAN x 1 ▪ COM port1
Power Requirement	▪ 5VDC Jack with Power Adaptor or DC +9~30V Terminal Block, 2.8 Watt Max
Temperature	▪ Operation: 0℃to 60℃ ▪ Storage: -20℃to 70℃
Humidity	▪ 20%~90% non-condensing
Housing	▪ 65mm(L) x 78mm(W) x 28mm(H)

B.2 Software Specifications

Item	Specifications
Protocol	▪ TCP/IP, UDP, HTTP, SNMP, ARP, Telnet, ICMP, BOOTP, DHCP
Configuration	▪ Configuration information for both TCP/IP and serial ports is kept in the EEPROM. ▪ Configuration utilities of Windows 95/98/2000/NT/XP/2003 are provided for configuring settings.
Internal Buffer Size	▪ TCP receiving buffer size = 8K bytes ▪ TCP transmitting buffer size = 16K bytes ▪ RS-232 or RS-485/RS-422 receiving buffer size = 4K bytes ▪ RS-232 or RS-485/RS-422 transmitting buffer size = 4K bytes

B.3 Panel Layout and Connector Pin Assignments

B.3.1 Pin Assignments

DB9 Pin Assignments

The pin assignments of DB9 connector on MB5001C are shown in the following table:

Pin#	RS-232 **Full Duplex** for MB5001C Model	RS422/4-Wire RS-485 **Full Duplex** for MB5001C Model	2-Wire RS-485 **Half Duplex** for MB5001C Model
1	DCD	N/A	N/A
2	RXD	**TXD+**	N/A (reserved)
3	TXD	**RXD**+	**DATA+**
4	DTR	N/A	N/A
5	SG (Signal Ground)	SG (Signal Ground)	SG (Signal Ground)
6	DSR	N/A	N/A
7	RTS	**RXD-**	**DATA-**
8	CTS	**TXD-**	N/A (reserved)
9	N/A	N/A	N/A

Terminal Block Pin Assignments

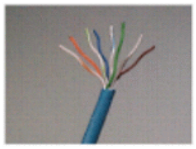
The pin assignments of Terminal Block connector on MB5001C-Sis are shown in the following table:

Pin#	RS422/4-Wire RS-485 **Full Duplex** **For MB5001C-Sis**	2-Wire RS-485 **Half Duplex** **For MB5001C-Sis**
1	T+	NC
2	T-	NC

3	R+	Data+
4	R-	Data-
5	SG (Signal Ground)	SG (Signal Ground)

B.3.2 Ethernet Port (RJ-45)

1. Category 5 UTP cable, 8 core wire.



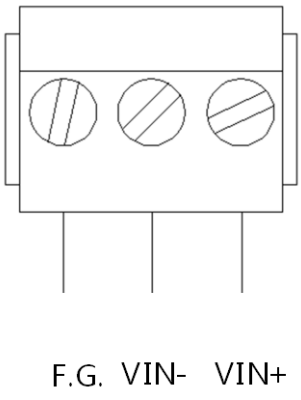
2. RJ45 Connector.

3. RJ45 Pin Assignment

Pin Assignment	**568A** Definition	**568B** Definition
Pin1	Green-White	Orange-White
Pin2	Green	Orange
Pin3	Orange-White	Green-White
Pin4	Blue	Blue
Pin5	Blue-White	Blue-White
Pin6	Orange	Green
Pin7	Brown-White	Brown-White
Pin8	Brown	Brown

One can choose either 568A or 568B definition. If one want to make a crossover cable, one should use 568A and 568B definition respectively in each terminal of a UTP cable.

B.3.3 Power Terminal Block Connector



Note**: It could be reversed for the pin of VIN- and VIN+.**

B.4 Buzzer/LED Message

B.4.1 Buzzer

“ ^ “: Beep twice

“ = “: Beep off

Message	Description
^===^===^===^===^===^===^... (1sec)	Watchdog problem, return service is required
^^^^^^^^^^^^^^^^^^^^^^^^...	Memory problem, return service is required
^==^========^^ (5sec)	Startup OK but AP firmware is disabled
^==^========^^^ (5sec)	Startup OK and AP firmware is enabled
Table 1. Buzzer Message	

B.4.2 LAN LED

Message	Description
LED Off	Ethernet Disconnected
LED blinking with Green	Data is transmitting on Ethernet for 100Mbps
LED blinking with Orange	Data is transmitting on Ethernet for 10Mbps
Table 2. LAN LED Message	

B.4.3 COM Port LED

Message	Description
LED off	No data is transmitting on COM port
LED on blinking state	Data is transmitting on COM port
Table 3. COM Port LED Message	

B.4.4 RUN LED

Message	Description
LED on	Jumper JP1 pin1 and pin2 are short to disable AP firmware in the flash memory.
LED blinking (rate: 0.5Sec)	AP firmware is running
Table 4. RUN LED Message	

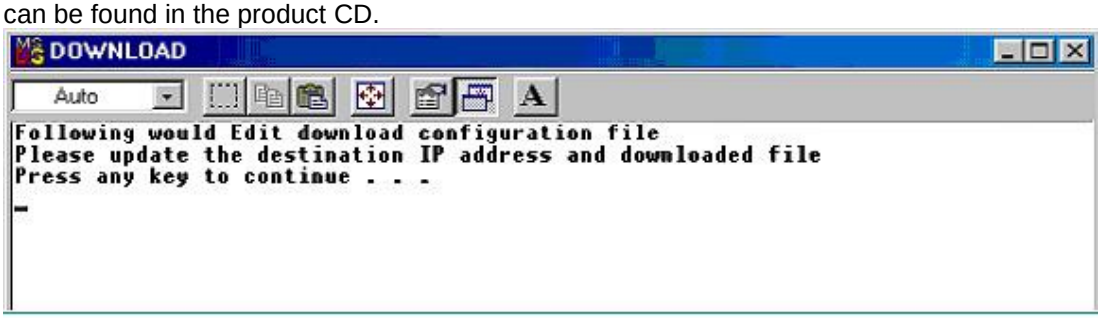
Appendix C: Upgrade System Firmware

After the new version of firmware is released, customers can download it from www.Atop.com.tw After one download the firmware, please follow these instructions listed below.

C.1 Upgrade Procedures

When one get a new software version, please follow the sequences below to upgrade ones MB5001C.

1. Connect a PC (Windows 95/98/NT/2000/XP) and MB5001C one wish to upgrade the firmware in the same TCP/IP network. Use command **ping** or Device Management Utility program to verify their availability.
2. Prepare the download tool and press any key to edit its configuration file **dapdl.cfg**. dapdl.cfg file can be found in the product CD.



3 Edit the **"dapdl.cfg"** file to fit ones system need, the content of the file looks like as the following. Be sure to save ones modifications after the change is made.

Remote_IP 10.0.50.100

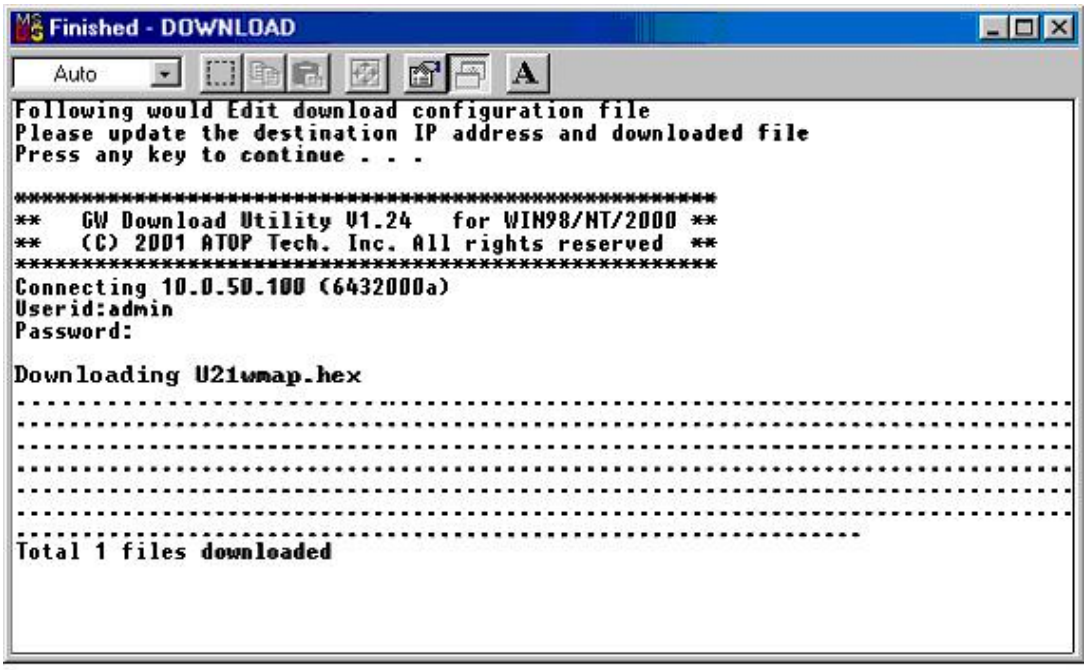
Load U5001ap.hex

The first line identifies the IP address of MB5001C, the second line identifies the firmware (.Hex file) name to be downloaded.

4 Execute the utility program **download.bat,** it can be found in the product CD.

5 Input the user name and password credential, the new firmware will be downloaded.

6 MB5001C will automatically restart each time the firmware is successfully downloaded.



C.2 Critical Issues of Upgrading

1 One can always abort the upgrading process by pressing the **<Esc>** key from host PC during the upgrading process. MB5001C will restart automatically and the system remains intact.

2 If MB5001C does not receive any upgrading data within **30 seconds**, MB5001C will restart automatically and the system remains intact.

3 After the upgrading process finishes, MB5001C will program the flash memory and buzzer beeps 6 times then restarts. Normally, it takes around 10 seconds to complete the programming process. If an error occurs during the programming process, MB5001C will clear the corresponding memory and the system remains intact of what it was.

C.3 Error Messages

Firmware upgrade may not be successful if errors occur during the process.

Error Cause	Message	Comments
Illegal Hex file format	Hex File Text Error Hex File Check-Sum Error Hex File Format Error Hex File End of Record Error	
MB5001C handshaking problem	MB5001C ACK Start Address Error MB5001C ACK Length Error MB5001C Response Command Error	
Configuration file	Remote IP not found Open configuration file failure	

Appendix D: Disable System Firmware

The AP (application program) firmware of MB5001C can be disabled. This function is used in the situation that one downloaded a wrong version of firmware that caused the system crashed.

To disable the current version of firmware and prevent it from executing, please do the followings:

1. Turn the power off, open MB5001C case.
2. Short pin1 and pin2 of jumper JP1 on the right-top corner from the main board to disable AP firmware.
3. Power on MB5001C.
4. Download the correct AP firmware to MB5001C.
5. Remove the pin 1 and pin2 of jumper JP1 to enable AP firmware.
6. Close the case and continue ones operations.

Appendix E: Specification

Specifications	
System	
CPU	16-bit x86 Embedded CPU
Flash	512K Bytes
DRAM	512K Bytes
EEPROM	512 Bytes
Watchdog	Hardware built-in
Ethernet	
Compliance	IEEE802.3
Port	1-port
Transmission Rate	10/100Mbps Auto-detection
Connector	RJ45
Auto MDI/MDI-X	Yes
Serial	
Interface	RS232/422/485 software selectable(MB5001C) RS422/485 isolation with software selectable(MB5001C-Sis)
Ports	1-port DB9 or TB5
Baud Rate	1200bps to 230Kbps
Parity	None, Odd, Even, Mark, Space
Data Bits	7 or 8
Stop Bits	1 or 2
Data Packet Delimiter	0 to 30000 mini sec. (0:auto)
Connector	9-pin D-Sub(DB9) / Terminal Block(TB5)
Power	
Input	DC 5V for DC Jack DC 9-30V for Terminal Block
Consumption	Max. 2.7W (MB5001C) Max. 3.6W (MB5001C-Sis)
Environment	
Operating	0°C~60°C (32°F~140°F)
Storage Temperature	-20°C~70°C (-4°F~158°F), 5~95%RH,(non-condensing)
Dimension	
W x H x D	65mm x 28mm x 78mm.(MB5001C) 85mm x 28mm x 74mm.(MB5001C-Sis)
Software	

Configuration	Web console, Telnet
Device View	For Windows
Support Protocol	Modbus RTU,ASCII and TCP
Ordering Information	
MB5001C MB5001C-Sis	Modbus 1-port Gateway Compact(RS232/422/485 DB9 type serial port*1) Modbus 1-port Gateway Compact(RS422/485 isolation TB5 type serial port*1)
Regulatory Approvals	
FCC	FCC Part 15, Subpart B, Class A CISPR 22:1997, Class A ICES-003:2004, Class A ANSI C63.4-2003
CE	EN 55022:1994+A1 :1995+A2 :1997, Class A
	EN 61000-3-2:2000, Class A
	EN 61000-3-3:1995+A1 :2001
	EN 55024:1998+A1:2001+A2:2003
	IEC 61000-4-2:2001
	IEC 61000-4-3:2002+A1:2002
	IEC 61000-4-4:2004
	IEC 61000-4-5:2001
	IEC 61000-4-6:2003+A1:2004
	IEC 61000-4-8:2001
	IEC 61000-4-11:2004
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
RoHS	Lead(Pb) Free
MTBF	454442 hrs(51.88 years) in 25℃ (MB5001C)
Warranty	5 years
Optional Accessories	
Power Adapter	US315-12(US/EU): AC100~240V / DC 12V, 5.08mm pitch terminal block AD5V1A(US/EU): DC5V for DC Jack