



## ***BIT COMMANDER***

### **Serial RS232 / RS485 to Ethernet Converter**

(Part US2000B)





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### **Default parameters:**

IP address: 192.168.0.7

Subnet mask: 255.255.255.0

The default gateway: 192.168.0.1

User name: admin

Password: admin



## Introduction

### Overview

The US2000B is a light-industrial grade serial RS232 / RS485 to Ethernet converter which can be used to connect any standard RS232 or RS485 serial device to a computer over a standard Ethernet network.

It has a strong aluminum housing with screw mounting holes for easy installation which makes it ideal for most factory environments and other commercial facilities.

This converter is designed around the ARM Cortex-M4F chipset which makes it a very reliable converter with several advanced features and functions.

The included virtual COM software will allow you to create two serial ports, one RS232 and one RS485 which can be used individually at the same time.

The parameters of the adapter can be configured by a web-browser, through the serial port or by using the downloadable configuration software.

### Overall Features

1. ARM Cortex-M4F TM4C1294 processor; stable, reliable and multiple advanced functions.
2. Flow control: RS232: Hardware (RTS/CTS), Software (XON/XOFF), None, RAW mode (all lines). RS485: Automatic Send Control, Software (XON/XOFF), None.
3. Both serial ports (RS232 and RS485) can be used individually at the same time (two virtual COM ports are created in your computer).
4. Support TCP Server, TCP Client, UDP, UDP Server, HTTPD Client, DHCP, Web to serial, TCP Auto, ModBus TCP.
5. Virtual COM port software for Windows included.
6. Custom baud rates: Port 0 (RS232) 600 – 230400 bps, Port 1 (RS485) 600 – 230400 bps.
7. Wide voltage range: 5 – 36VDC
8. Supports DHCP and UDP broadcast protocol.
9. TCP/IP SOCKET programming examples available: VB, C++, Delphi, Android, IOS.
10. Parameter configuration via web-browser.
11. Ethernet RJ45 port status indicator lights with built-in 2KV isolation.
12. Auto-MDI/MIDX function, cross-over or direct network cable, automatic switching.
13. Option for unique IEEE MAC address, the user can define MAC address (special orders for over 100pcs only).
14. Firmware upgrade over network.
15. Support IP and domain name at the same time
16. Supports up to 8 clients per port in TCP mode.
17. Built in Keep alive function.
18. TCP Server mode supports transparent and 'ID' communication modes.



## Applications

- Fire and Security Panels
- Vending Machines
- Point of Sale Terminals
- Remote equipment management
- IT management services
- Access Control
- Industrial Control
- Home Automation
- Instrumentation
- Building Control
- Power Management



Most of this converter's parameter settings are self-explanatory so we will here just mention the available special functions.

## Functions

### TCP Server mode

TCP Server mode has 2 parameters: **max link number** and **link type**.

1. **Max link number:** 1 - 4;
2. **Link type:** **Typical: completely transparent, data is sent to all clients.**  
**Extend 1, communicate with ID, otherwise abandon.**  
**Extend 2, communicate with ID, otherwise send to all clients.**

### Httpd Client mode

This function is mainly used for web page development. PHP example code to create a web server page:

```
[<?php echo $_GET['data']; ?>]
```

This means that we can GET data from HTTP client's request. Open the following URL to see the data:

[www.usconverters.com/1.php?data=12345](http://www.usconverters.com/1.php?data=12345)

The web page is shown below, we can see that the web server have received the data (12345).

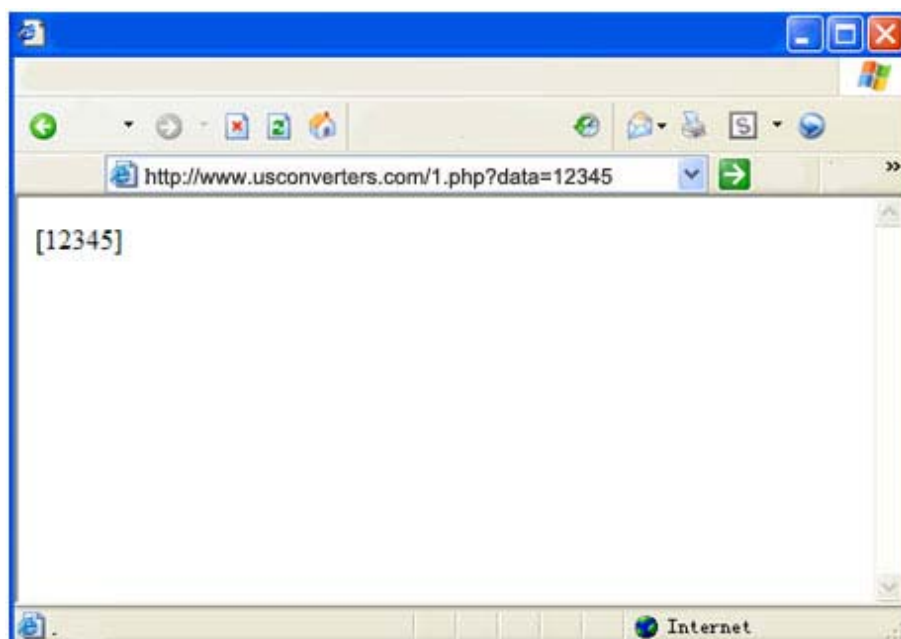


Diagram 0-1 Request [www.usconverters.com/1.php?](http://www.usconverters.com/1.php?) and upload data



## TCP Auto mode

If the converter is set to 'TCP Auto mode' it will when powered on work as a TCP Server, it listens on a local port, but if there is data received from the serial port before any connection is made, the converter will try to connect to the remote IP and port as a TCP Client.

## WEB to Serial mode

Communication between serial port and admin web page.

The screenshot displays the web interface for the BIT COMMANDER™ SERIAL ETHERNET CONVERTER (PART NUMBER: US2000B) in 'Web to Serial' mode. The browser address bar shows the URL http://192.168.0.7/. The interface includes a sidebar with navigation options: Current Status, Local IP Config, RS232, RS485, Web to Serial (highlighted), Misc Config, and Reboot. The main content area is divided into 'parameter' and 'help' sections. The 'parameter' section contains 'Connect' and 'Close' buttons, and two text input areas labeled 'Receive hex data' and 'Receive ascii data'. The 'ascii data' section has 'send ascii data', 'send hex data', and 'clear' buttons. The 'help' section contains a bullet point: 'Web to serial By using a TCP Socket you can send and receive data between the serial port and this webpage'. The footer shows 'Copyright © U.S. Converters LLC' and 'WWW.USCONVERTERS.COM'.



1. Receive window show data only when “Read” button is clicked or when selecting the “Auto read” checkmark.
2. Regardless if WEB to Serial mode is selected or not, the send web data to serial screen is always active.

## Hardware

- 1) Mechanical dimensions: 90 × 84 × 25mm, including RJ45 and connector
- 2) +5 ~ +36V power input
- 3) 2 x serial (1 x RS232, 1 x RS485)
- 4) 1 x RS232 support hardware flow control
- 5) 1 x RS485

## LED status

The converter has 4 indicator lights:

ID	Name	Description
1	Power (red)	Bright after power on
2	Work (green)	Flash at work
3	Link (green)	In RJ45 port, bright after network connection
4	Data (yellow)	In RJ45 port, flash if there are data on network

## RS232 interface

Standard DB9 male connector:

Number	RS232	Description
1	-	-
2	RXD	Receive
3	TXD	Transmit
4	-	-
5	GND	Signal ground
6	-	-
7	RTS	Request to send
8	CTS	Clear to send
9	-	-



## RS485 interface

The RS485 interface has a screw terminal connector with A+ (D +), B- (D-) and GND. .

BIT COMMANDER™  
SERIAL ETHNET CONVERTER  
PART NUMBER: US2000B

Current Status

Local IP Config

RS232

**RS485**

Web to Serial

Misc Config

Reboot

parameter

Baud Rate: 115200 bps(600~1024000)

Data Size: 8 bit

Parity: None

Stop Bits: 1 bit

Flow Control : Automatic Send Data Control  
Software(Xon/Xoff)

Local Port Number: 25

Remote Port Number: 26

Work Mode: TCP Server None

TCP Server detail: default type

Remote Server Addr: 192.168.0.201 [ N/A ]

Timeout: 0 seconds (< 256, 0 for no timeout)

UART packet Time: 0 ms (< 256)

UART packet length: 0 chars (<= 1460, 0 for no use)

Sync Baudrate(RF2217 similar):

Save Cancel

- **Baud:** From 300 to 115200bps(non-standard rates ok)
- **Local port:** 1-65535.Random local port is used if set to 0 in TCP Client mode
- **Remote port:** 1-65535
- **Packet time:** 1-255ms. Default 10ms, if baud rate is <=4800bps set packet time to 50ms

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http://192.168.0.7/websocket.shtml





## RJ45 interface

The Ethernet port supports 10 M / 100 M adaptive, AUTO MDI/MDIX, will work with standard straight through and cross-over Ethernet cables.

Pin	Name	Description
1	TX+	Transceiver Data+
2	TX-	Transceiver Data-
3	RX+	Receive Data+
4	n/c	Not connected
5	n/c	Not connected
6	RX-	Receive Data-
7	n/c	Not connected
8	n/c	Not connected

## Reset

### Reset button:

#### US2000A

The reset button is used for resetting the converter back to factory settings.

When the Ready LED is on, depress the reset button for more than 1 second and release, wait about 10 seconds until the converter has rebooted.

After releasing the reset button the green "Ready" LED light should turn off and then come ON again after the module has rebooted.

The converter is now reset to factory defaults.

#### US2000B

The reset button can be used to reboot the converter by pressing the button momentarily while the converter is powered ON.

The reset button can also be used to reset the converter to factory defaults as following:

1. Power off the converter
2. Press and hold the reset button
3. Power on the converter
4. Wait 5 seconds while pressing the reset button
5. Release reset button

The converter is now reset to factory defaults.



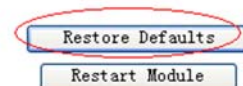
The default parameters are:

Address type:           Static IP  
 Static IP Address:     192.168.0.7  
 User name:             admin  
 Password:             admin

Default settings can also be set by software:

#### Restore Factory Defaults

Restore all options to their factory default states:  
 Restart module



## Parameter configuration

The parameters can be configured by logging into the converter by using a standard web browser, through the serial port or by using the software utility.

### Web browser

Simply use a web browser and login to the converter at IP address 192.168.0.7.

### Serial port

Power on the converter and press the reset button. The converter will now go into configuration mode. The default port parameters are:

9600, 8, N, 1,

The converter will send the character 'U', indicating that it is in serial configuration mode.

The character 'K' indicates successful configuration.

The character 'E' indicates an error.

Press the reset button after the parameters has been changed and the new configuration will take effect.

Protocol structure and examples:

name	Byte	Description	example	Hex(low front)
head	2	Head(55 BA/55 C1/55 C2)	55 BA	55 BA
Target IP	4	Target IP	192.168.0.201	C9 00 A8 C0
Target port	2	Target port	8234	2A 20
Module IP	4	Module IP	192.168.0.7	07 00 A8 C0
Module port	2	Module port	20108	8C 4E
gateway	4	Gateway IP	192.168.0.201	C9 00 A8 C0



Work mode	1	1 for TCP Client; 0 for UDP; 2 for UDP Server; 3 for TCP Server	TCP Client	01
Baud rate	3	Serial baud rate	115200	00 C2 01
serial param	1	Databits, stopbits, verifybits	N,8,1	03
Unique ID	3	ID-H, ID-L, ID-type, 0 for no use	No use	00 00 00
Subnet mask	4	Subnet mask, low front	255.255.255.0	00 FF FF FF
Sum verify	1	Sum verification, from target ip until end (sum itself not included)	sum	B9
Total cmd: 55 BA C9 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 03 00 00 00 00 FF FF FF B9				

Example:

55 BA for writing to Port 0, 55 BC for reading port 0

55 C1 for writing to Port 1, 55 C3 for reading port 1



## Configuration software

Device IP	Device Name	MAC	Version
192.168.0.7	US2000B	D8 B0 4C 00 B9 40	3008

UPNP Port: 6432 (?) HTTP Port: 80 (?) Device ID: 1 (?) Device ID Type: 0 (?) User Name: admin (?) Password: admin (?) Device Name: US2000B (?) User MAC: D8 B0 4C 00 B9 4 (?) IP Type: Static IP (?) Static IP: 192.168.0.7 (?) SubnetMask: 255.255.255.0 (?) Gateway: 192.168.0.1 (?)

Baudrate: 115200 (?) Parity/Data/Stop: NONE 8 1 (?) FlowControl: RS485 (?) Work Mode: TCP Server (?) RemoteIP: 192.168.0.201 (?) Remote Port: 23 (?) Local Port: 23 (?) TCP Server style: Transparent transmissio (?) ModbusTCP: None (?) PackTime: 0 ms (<256, 0 for (?) PackLen: 0 byte (<1024, 0 for (?)  Synchronize baudrate(RFC2217 similar) (?)

- (1) Click 'Search Device'.
- (2) Select device in search list.
- (3) Modify parameters.
- (4) Click 'Base Save' and the parameters will be saved.
- (5) Click 'Save Config' and the new parameters will take effect.

### Notice:

**After modifying the parameters, first click 'Base Save' or 'Save COM(0)', then click 'Save Config'. If not, the parameters will only be saved, but not take effect.**



## Other Functions and Features

### Hardware flow control

The RS232 interface supports hardware flow control (RTS/CTS)

Pin name	Description	IO type
RTS	Request to Send	O
CTS	Clear to Send	I

When RTS = 0, enables the other side to send, at this time, TTL is 0 volt, RS232 is -3V ~ -15V.

When CTS = 0, the converter is enabled to send, at this time, TTL is 0 volt, and RS232 is -3V ~ -15V.

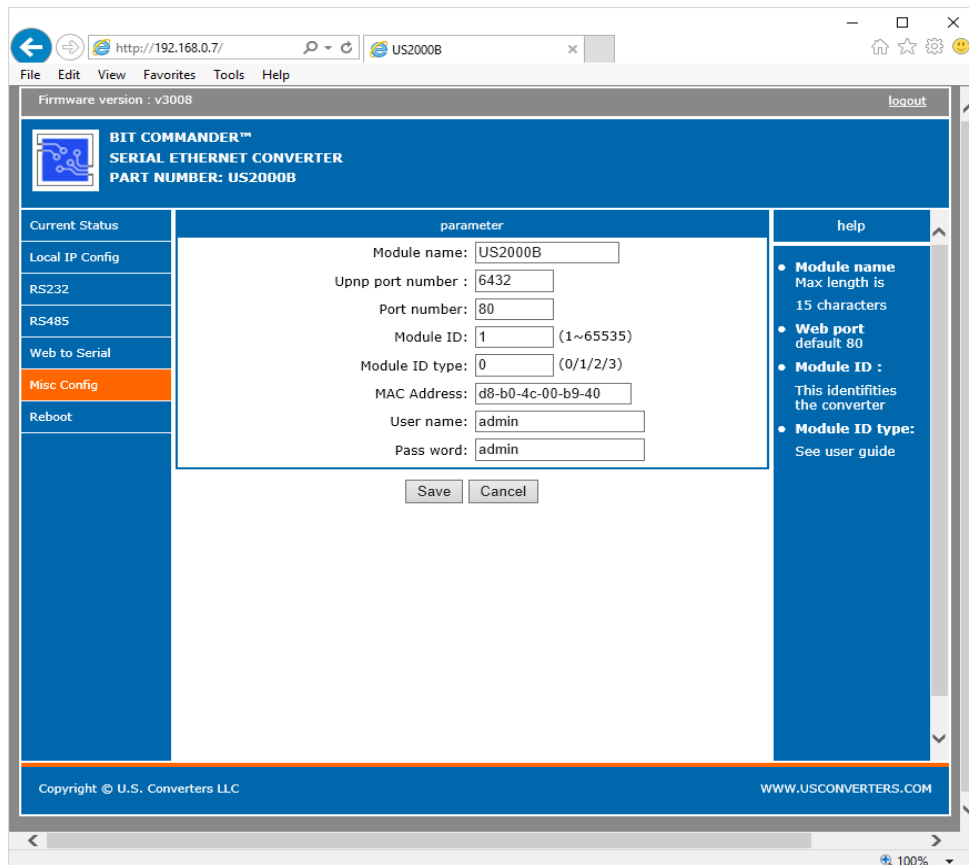
### User MAC address

The MAC address by default is 6 bytes (0xff): FF-FF-FF-FF-FF-FF.

MAC address example: ac- cf-23-20-fe-3d;

The user can change the MAC address through a web browser.

Enter the new address with '-' between each byte, (it will also work with just a 'space' between each byte). Click 'Update Settings' to save the new address, and reset the converter for the changes to take effect.





## Timeout

Timeout is by default not in use, the value is set to 0 as shown below, which means it is disabled. The max time out is 255 seconds.

The screenshot shows the web interface for the BIT COMMANDER™ SERIAL ETHERNET CONVERTER (PART NUMBER: US2000B). The interface is accessed via a browser at http://192.168.0.7/. The firmware version is v3008. The 'RS232' configuration page is active, showing the following parameters:

parameter	value	range/notes
Baud Rate	115200	bps(600~1024000)
Data Size	8	bit
Parity	None	
Stop Bits	1	bit
Flow Control	None	
Local Port Number	23	
Remote Port Number	23	
Work Mode	TCP Server	None (dropdown)
TCP Server detail	default	type
Remote Server Addr	192.168.0.201	[ N/A ]
Timeout	0	seconds (< 256, 0 for no timeout)
UART packet Time	0	ms (< 256)
UART packet length	0	chars (<= 1460, 0 for no use)
Sync Baudrate(RF2217 similar)	<input checked="" type="checkbox"/>	

Additional information from the right sidebar:

- Baud:** From 300 to 115200bps(non-standard rates ok)
- Local port:** 1-65535. Random local port is used if set to 0 in TCP Client mode
- Remote port:** 1-65535
- Packet time:** 1-255ms. Default 10ms, if baud rate is <=4800bps set packet time to 50ms

Buttons: Save, Cancel

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If no data is present within the specified time out, the converter will disconnect and attempt to reconnect.

When TCP Server mode is selected, the converter will disconnect with from the client, release the resources, wait for a new connection and clear the time out count.

When TCP Client mode is selected, the converter will disconnect from the server and reconnect.

Timeout represent no signal reconnect timeout.

**Send reset (RST) command over Ethernet**

This command can only be used with firmware 2002 and up.

Use UDP broadcast and send data to 255.255.255.255, port 1901.

Command structure:

function	head	len(from cmd to before verify)	cmd	User /password	verify(sum)
reset	FF	0D	02	[username] [password]	xx

For example:

FF 0D 02 61 64 6D 69 6E 00 61 64 6D 69 6E 00 20

Converter will respond (4 Byte):

FF 01 02 4B (command success) 4B = 'K';

or

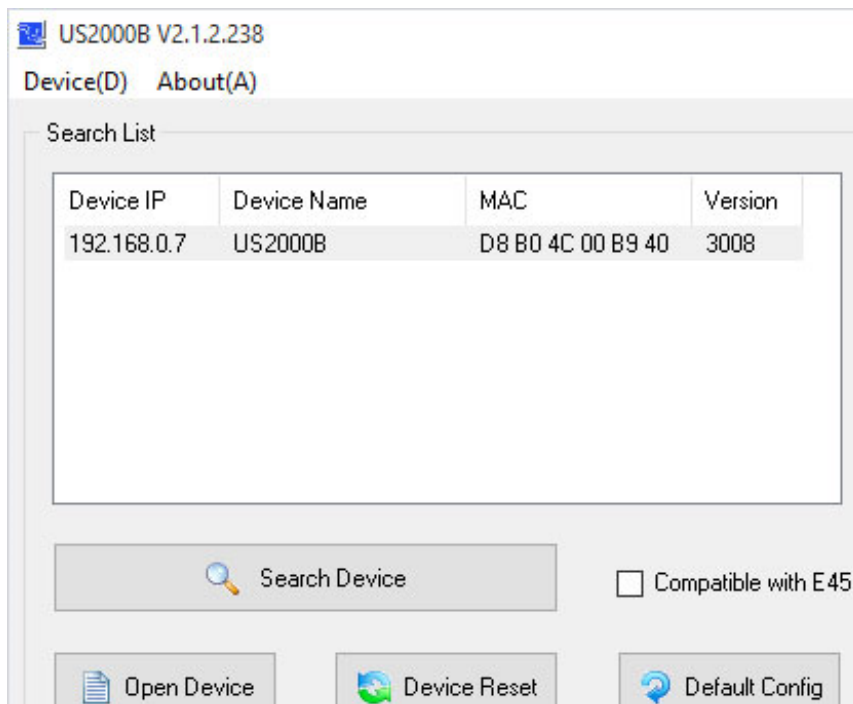
FF 01 02 45 (user name and password false) 45 = 'E'.



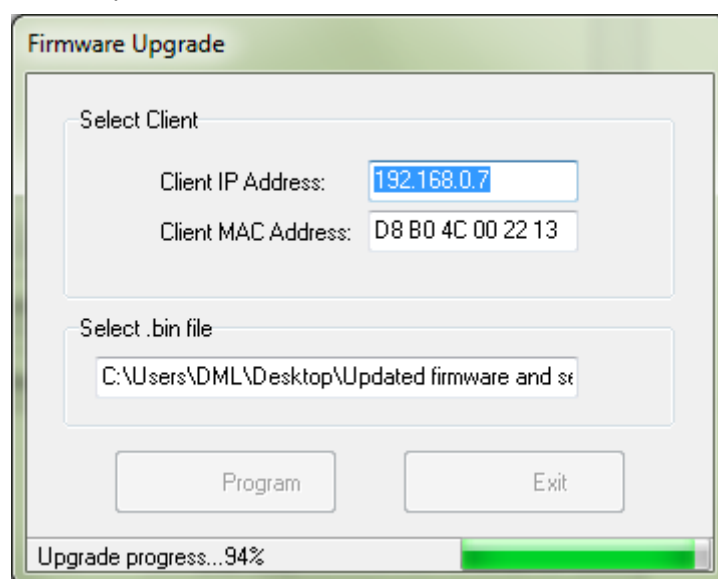
## Firmware update

Firmware updates can be made by using the configuration software. Updates can only be done by connecting directly to the converter, not over a network.

1. Click search and select the converter:



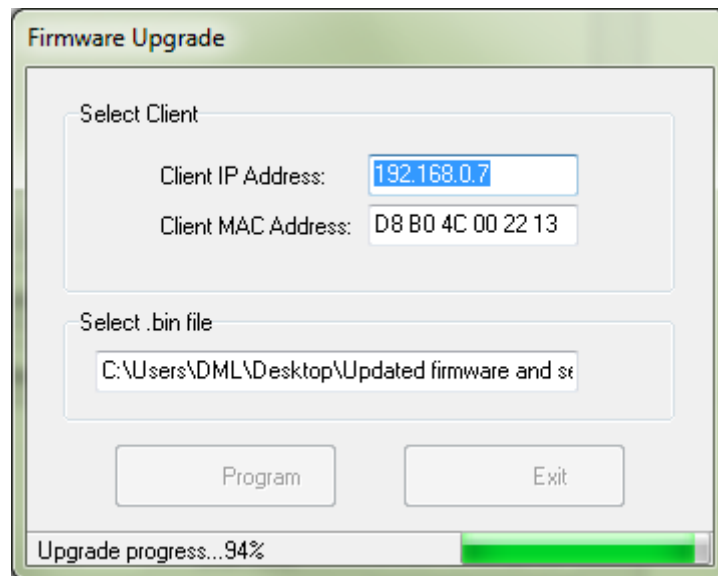
2. 'Device' -> firmware update



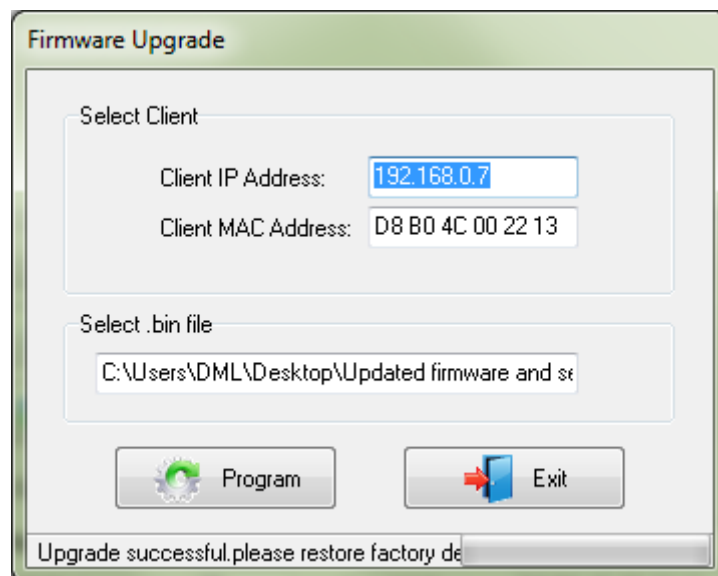




Click “Program” to start the update progress.



3. Update success, click exit.



**Notice: If the configuration software cannot find the converter after the firmware update, please reset the converter to factory defaults and click search again.**



### FAQ

#### **Problem: I can ping the converter but cannot login to it via web browser.**

Some possible causes:

1. Converter is set to a static IP and conflicts with another Ethernet device.
2. Incorrect subnet specified.
3. HTTP server port is modified (default 80).

Solutions:

1. Assign a different static IP address to the converter or use DHCP.
2. Set correct subnet mask.
3. Set the converter's port to 80 or open web page with correct port.

#### **Problem: I cannot login to the converter after a firmware update.**

Solution: Reset the converter back to factory settings.

#### **Problem: When the connection is established, the converter receives several random characters.**

Possible causes.

- 1) Telnet Protocol is set to use "Telnet" instead of "RAW". (US2000A only).
- 2) Module ID type is not set to "0".

Telnet Mode:	TCP Client	TCP Client
Telnet Protocol:	Telnet	Telnet
Telnet Server Addr:	192.168.0.161	161
Telnet Timeout:	0seconds	0 seconds (< 256, 0 for i

Module Id(use for indentify modue):	1	(1~65535)
Module Id type(0:no use, 1:send id when connect, 2:send id when send data, 3:both):	3	(0/1/2/3)



Solutions.

- 1) Set Telnet Protocol to “RAW” instead of “Telnet”.
- 2) Set Module ID type to “0”.

**Problem: The converter tries to reconnect every few seconds.**

Possible cause.

Telnet Timeout timer is set to a value higher than ‘0’.

Solution.

- 1) Set Telnet Timeout to ‘0’ or send data before timeout.

To access technical support, please visit the U.S. Converters website at:

**[www.USconverters.com](http://www.USconverters.com)**

Here you will find:

- Latest drivers and updates for download
- Technical tips
- Documentation
- Configuration support
- and much more...

Feel free to contact our technical support team at **[mail@usconverters.com](mailto:mail@usconverters.com)** with any issues.

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