

## Module Description

This datasheet describes the Ethernet Option module for a VersaMax Micro-20, -40 or -64 PLC CPU. This module cannot be used with other types of VersaMax Nano or Micro PLCs.

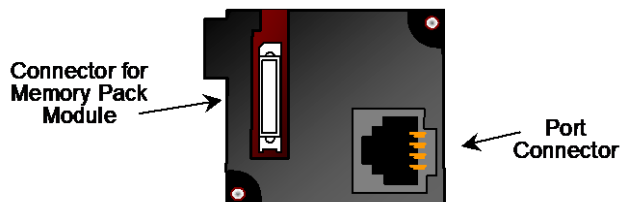
For more information about Option Modules, and about VersaMax Micro-20, -40 and -64 PLCs, please refer to the *VersaMax Nano and Micro PLCs User's Manual*, GFK-1645J or later.

## Ordering Information

IC200UEM001	RJ 45, 10/100 Mbit Ethernet Option module supporting SRTP
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## Ethernet Option Module

Ethernet Module IC200UEM001 can be used with a Micro-20, -40 or -64 -Point PLC to provide an Ethernet Port.



When installed on the Micro 20, 40 or 64 PLC, the Ethernet Port Option Module becomes Port 2. It supports the following communications protocols: SRTP, Modbus Server and client (separate download) and pass-through port (separate download). Protocol options are available online at <https://www.emerson.com/Industrial-Automation-Controls/support>.

## FCC and ICES Requirements for the US and Canada

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.

Note: 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 can radiate 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 expense.

Note: This Class A digital apparatus complies with Canadian ICES-003.

Changes or modifications not expressly approved by Emerson could void the user's authority to operate the equipment.

## Configuration

Use of the Port Option module as Port 2 and the protocol selection must be set up in the configuration software. After making those selections, the communications parameters can also be configured.

**The option port should be configured for Ethernet.** If the configuration and hardware do not match, the PLC logs a System Configuration Mismatch fault in the PLC Fault Table.

The configuration options are:

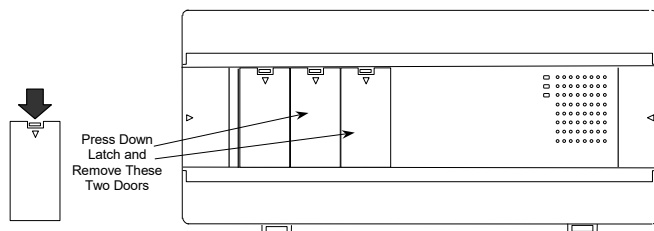
Protocol	Parameters	Value
<b>SRTP Server</b>	Port Mode	SNP
	Port Type	Slave
	Data Rate	19.2, 38.4 or 175.0 kbps (default)
	Flow Control	None
	Parity	Odd (default), Even, None
	Stop bits	1 (default) or 2
	Time Out	Long
	Turnaround Time	0
<b>Modbus TCP Client / Server*</b>	Port Mode	RTU
	Port Type	Slave
	Data Rate	19.2, 38.4 or 175.0 kbps (default)
	Flow Control	None
	Parity	Odd (default), Even, None
	Station Address	Valid range 0-247. Default=1
	Modbus/TCP Client Support (Refer to the <i>VersaMax Nano and Micro PLCs User's Manual</i> , GFK-1645J or later.)	Disabled (default) or Enabled.  Enabling Modbus/TCP Client Support sets the %I00488 status bit ON.
<b>Pass-Through or Tunneling</b>	Port Mode	Serial I/O
	Data Rate	19.2, 38.4 or 175.0 kbps (default)
	Flow Control	None
	Parity	Odd (default), Even, None
	Stop bits	1 (default), or 2
	Bits/Characters	7 or 8
	Station Address (Byte 1 to Byte 8)	Valid range: 0-F. Default=0

\* When the Ethernet Option Module is configured for Modbus/TCP Client, the configured Sequence Number and Command Data addresses should not overlap or conflict with any other variables used in the logic. These addresses are reserved exclusively for communications between the CPU and Ethernet module when initiating Modbus TCP commands.

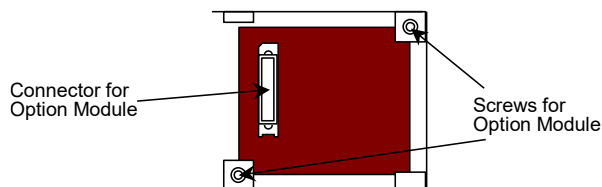
## Installation Instructions

Power to the VersaMax Micro PLC **must be turned off** when installing or removing Option Modules.

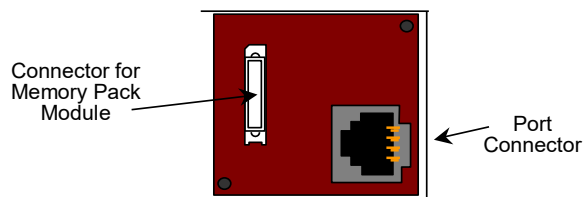
1. Remove the two doors shown below, by pressing downward on the latches and lifting them away from the module.



2. If a port-type Option Module is being installed, orient the connector on the Option Module with the connector in the Micro PLC. Be careful to avoid contact with the exposed components in the module.



3. Press the Option Module downward until it clicks into place.
4. Install the screws provided with the Option Module into the corners indicated above.



5. If a Memory Pack Module is being installed, orient the connector on the back of the Memory Pack Module with the connector on the Micro PLC or port-type Option Module. Press the Memory Pack down until it clicks into place.
6. Install the protective cover(s). If only the Memory Pack Module is used, both covers may be installed. If a port module is used, the right-hand cover is not installed, and the port connector remains accessible.

## Setting the IP Address

Key items to remember when setting the IP address on the VersaMax Micro Ethernet module (IC200UEM001):

- When connecting via Ethernet point-to-point, a crossover cable is required.
- IP address setting must be saved to the Flash on the Ethernet module or it will be lost during power cycle.
- The second port of the Micro PLC must be configured for Ethernet.

## Setting the Permanent IP Address

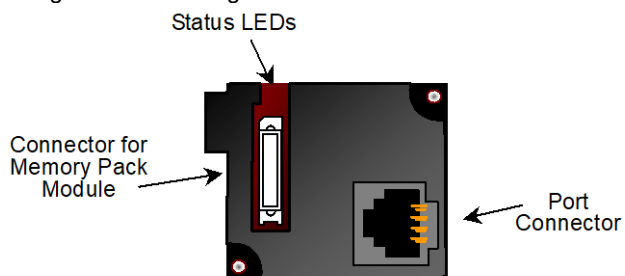
1. Go to C:/ Prompt on your computer and type: Ping [IP address] and press the Enter key. (This step is required to "establish" the ARP table by creating an entry in the table.) The address pinged should reply with Pinged data. (example c:/ Ping 10.10.0.5 and return data)
2. Type: *arp -a* (space between p and -a). You should see at least one entry in the ARP table. (example c:/ arp -a)
3. Type: *arp -s [IP address, including dots] [MAC Address of the Ethernet module, including dashes]*. You will not see any reply on the screen. (example c:/ arp -s 10.10.0.5 00-20-4a-ff-ff-e9)
4. Type: *telnet [IP address] 1* (leave space between IP address and 1) and press the Enter key. You will be prompted that the connection failed. This is normal. (example c:/ telnet 10.10.0.5 1)
5. Type: *telnet [IP address] 9999* (leave space between IP address and 9999) and press the Enter key. You will be prompted to Press Enter to go into Setup Mode. You have two seconds to press the Enter key again. If you get the message "Connection to host lost", re-enter *telnet [IP address]* and press the Enter key twice to get to the setup screen. (example c:/ telnet 10.10.0.5 9999)

Press 1 to change IP address (Enter the desired IP address) and Net Mask

Press 2 to change Serial Settings. For best performance, set the baud rate to 175000. Setting should be Mode#1, RS232 175000, 8, 0, 1. Port 2 needs to be configured with PAC Machine Edition to match these settings. Machine Edition should configure Port 2 for Ethernet and baud rate of 175000.

When complete, press **S** to save to the Ethernet module. You will see a prompt that informs you **Parameters saved, Display will Restart....** and then **Connection to host lost**. The data is now stored in the internal Flash of the IC200UEM001. You can change the settings by repeating the above steps.

Settings are now complete. Verify that Port 2 matches above configuration by connecting to the Micro PLC serial port and checking hardware configuration.



### Downloading Ethernet Drivers

The Ethernet drivers for the Ethernet Option Module are downloaded from <https://www.emerson.com/Industrial-Automation-Controls/support> Files and passwords are:

Function	Upgrade Kit for Release 3.3	Destination Password
Emerson SRTP	82A1587-MS10-000-B1	G7
Modbus TCP (Client and Server in single firmware)*	82A1588-MS10-000-B3	G7
Tunneling or Pass Thru**	82A1589-MS10-000-B1	G7

\* When the Ethernet option module is loaded with the Modbus image it cannot communicate with PME.

\*\*When the Tunneling image is loaded, the 175000 baud rate is configurable only when the CPU Performance parameter is set to High in Telnet Configurator. The CPU Performance parameter is available in the Expert Setting menu.

Downloading is done using the PumpKIN utility, which is included. To download a driver, perform the following procedure. Only one driver can be present at one time. After the driver has been downloaded you will have to reconfigure the port using Telnet.

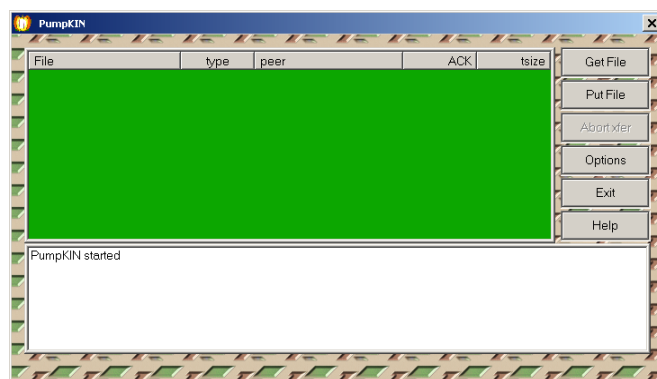
### To download Ethernet drivers:

- 1 Before performing the firmware upgrade, make sure TFTP Download is set to **Enabled**.

**Note:** Refer to the *Security Settings* section for more details.

**Important:** Failure to enable TFTP Download before updating firmware can result in damage to device.

- 2 Open the PumpKIN Utility.



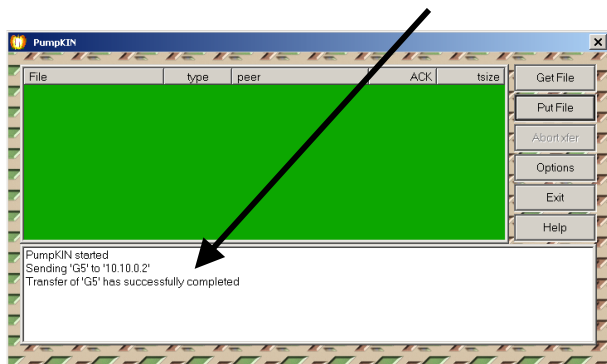
- 3 If your current firmware version is 3.x, go to step 4. Otherwise go to step 3.1.

- 3.1 Click on Put File and select "geamxcupg\_6104.rom" from upgrade kit for release 3.3.

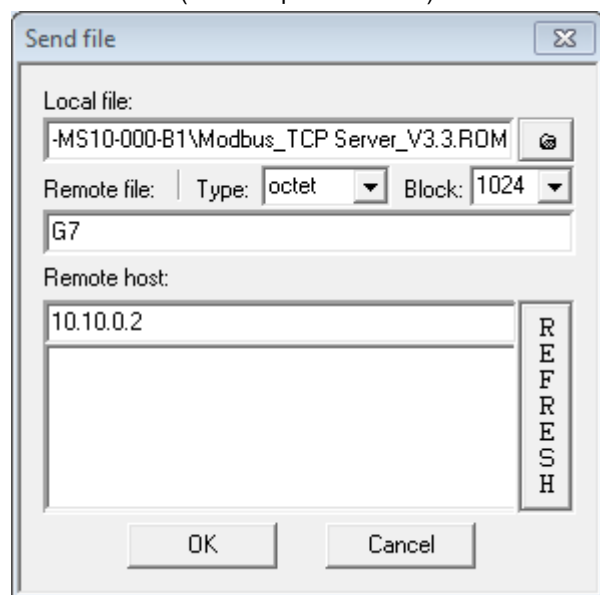
- 3.2 Enter password G5 (case sensitive, must be upper case G) in Remote file. For Remote host, enter the IP address of the Micro PLC (for example: 10.10.0.2).



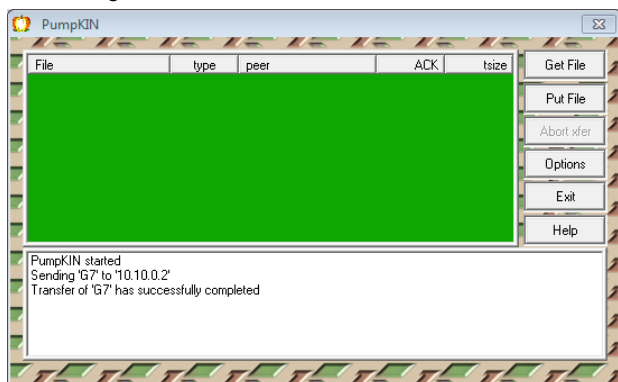
- 3.3 When the file is downloaded, the utility will respond with the following, then go to step 4:



- 4 Click on Put File and Local file to be downloaded (Modbus\_TCP).
- 5 Enter password G7 (case sensitive, must be upper case G) in Remote file. For Remote host, enter the IP address of the Micro PLC (for example: 10.10.0.2).



- 6 When the file is downloaded the utility will respond with the following:



- 7 When the transfer is accomplished, go back to Telnet and configure the settings by following the procedure listed under Setting the Permanent IP Address on page 2. Refer to GFK-1645 for more information on configuration options.
- 8 Settings are now complete. Verify that Port 2 matches above configuration by connecting to the Micro PLC serial port and checking hardware configuration.
- 9 Once the firmware upgrade completes, TFTP Download must be set to **Disabled** to provide the highest level of security to the module.

### Security Settings

**Note:** This information replaces the "Security Settings for the Ethernet Option Module" section in chapter 14 of GFK-1645J and will be included in the next revision of that manual.

Security settings are provided to prevent unauthorized access to the Ethernet Option Module configuration mode.

Five security parameters are supported for the Ethernet Option Module (firmware versions 3.3 and later).

Security settings are provided for the three protocols: SNMP/SRTP, Modbus TCP and Tunneling.

These parameters allow you to configure the Telnet password, enable the required ports and disable the unused ports

```

7) Security Settings:
SNMP ..... Disabled
TFTP Download ..... Disabled
Port 77FEh ..... Disabled
Web Server ..... Disabled
Telnet Config Password ..... Enabled
  
```

**Note:** We strongly recommend configuration of the Telnet password and closing the unused ports. This will reduce the exposure to security threats.

These ports are disabled by default. A port must be enabled if the application needs a service associated with that port.

To upgrade firmware, the TFTP Download must be enabled. Be sure to disable TFTP Download after the firmware update has been completed.

To connect with Device Installer, Port 77FE must be enabled.

For use as web server the configuration for Web Server must be enabled.

By default, Simple Network Management Protocol (SNMP) is Disabled.

For Modbus TCP and SRTP protocols, these security settings options are in the "Network/IP Settings" menu. For Tunneling (Passthrough), these security settings are in "basic parameters/server" menu.

The maximum password length is 16 characters. These characters can be alphanumeric or special characters. The password requires a minimum length of 8 characters.

A password set on a protocol's firmware remains in effect if the firmware is changed to that of a different protocol. For example, if a password is set on Modbus TCP firmware and later the

firmware is changed to SNP/SRTP, the same password set on Modbus TCP firmware will still apply.

### Status LEDs

<b>Link LED (Amber)</b>	<b>Solid Amber:</b> Connection to Micro PLC established and network is connected
<b>Activity (Green)</b>	<b>Flashing Green</b> when there is any activity on the network
<b>Status (Red)</b>	<b>OFF:</b> No errors <b>Red ON:</b> Duplicate IP address present or network controller error <b>Red BLINK (2x/sec):</b> No DHCP response or Setup menu active

### Module Specifications

<b>Processor Speed</b>	DSTni-EX CPU, 48MHz
<b>Memory</b>	256 kByte RAM, 512 kByte FLASH
<b>Connection Type</b>	RJ 45 10Base-T/100Base-TX Ethernet
<b>Entity Type</b>	Client/Server
<b>Bus Speed</b>	10/100Mbaud
<b>Protocols Supported</b>	SRTP (preloaded) Modbus TCP Server and Client (optional) Tunneling (optional)
<b>Number of Connections Supported</b>	<ul style="list-style-type: none"> <li>Supports up to 8 Modbus TCP/IP server channels.</li> <li>If client configured, then 1 client and 7 server channels supported.</li> <li>Supports 4 SRTP server channels</li> <li>Supports 1 connection for Tunneling</li> </ul>
<b>Mode</b>	Full Duplex

### Revision History

IC200UEM001-AA	Initial release. Compatible with VersaMax Micro 64 firmware release 3.5 and PAC Machine Edition 5.5
IC200UEM001-AB	Improved noise immunity.
IC200UEM001-BC	Added support for Modbus/TCP Client, enhanced data throughput (175,000bps), and 16-character password security.  Firmware requirements: Micro 20, 40 and 64 firmware versions 3.83 and later Ethernet Option Module firmware versions 2.0 and later.  Programmer requirements: PAC Machine Edition Logic Developer PLC, version 6.0 or later.
IC200UEM001-CC	Labeling change. No changes to functions, features or compatibility.
IC200UEM001-CD	Firmware release 3.3 addresses rare issue of the Ethernet Option module stopping communication and not responding to commands. It also adds new security settings in the Telnet interface.  Programmer and Micro CPU firmware requirements: same as version –BC.
IC200UEM001-CE	Firmware release 3.3.0.6 fixes issue of Modbus TCP firmware upgrade with CD version of modules.
IC200UEM001-CF	Firmware release 3.3.0.7 fixes issue of inconsistent Modbus communication for different baud rate settings.
IC200UEM001-DF	Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality.

### Upgrades

All previous versions can be upgraded to this firmware version. Once the module is upgraded to the 3.3 version, it will **not** support downgrade to older revision. Attempting to downgrade firmware may cause the module to fail permanently.

**Note:** To reduce the risk of this being accidentally or maliciously used, to permanently disable the module, Emerson strongly recommends that TFTP be disabled

by the user, and only enabled via (password-protected) telnet when a firmware update is required.

### **Functional Compatibility**

The default data rate with Ethernet option module firmware version 2.0 is 175000 bps. Micro firmware versions below 3.83 do not support 175000 bps. If firmware version 2.0 is to be used with Micro firmware versions prior to 3.83, the data rate on Ethernet Option module should be changed to 38400 bps or less, as per the requirement.

### **Problems Resolved by this Revision**

The Firmware release 3.3.0.7 (IC200UEM001-CF) fixes issue of inconsistent Modbus communication for different baud rate settings. This firmware upgrade can be done on CD and earlier versions of modules.

### **New Features and Enhancements in this Revision**

None

### **Telnet Configuration**

**Note:** The Ethernet option module will be power cycled and reset under the following conditions:

A connection to the Ethernet option module is established through TELNET and disconnected immediately.

A connection to the Ethernet option module is established through TELNET, the configuration is edited, and you press "Q" (Quit without Save).

## Serial IO Configurable Parameters

### Baud Rate

The supported baud rates are 19200, 38400 and 175000. This baud rate should match the baud rate of the configuration software.

### I/F Mode (Interface Mode)

The Interface (I/F) Mode is a bit-coded byte entered in hexadecimal notation.

The following table displays available I/F Mode options:

**Note:** All bit positions in the table that are blank represent “don’t care” bits for that particular option, which can be set to either a 0 or 1 value. Only RS-232C is supported and hence Bit 0 and Bit 1 always should be zeros. If you attempt to select an I/F Mode bit that pertains to RS-422/485 settings, the *WARNING: RS-422/485 I/F Modes Not Supported* message displays.

I/F Mode Option	7	6	5	4	3	2	1	0
RS-232C							0	0
7 Bit					1	0		
8 Bit					1	1		
No Parity			0	0				
Even Parity			1	1				
Odd Parity			0	1				
1 Stop bit	0	1						
2 stop Bit	1	1						

### Common Interface Mode Settings

Common I/F Mode Setting	Binary	Hex
RS-232C, 8-bit, No Parity, 1 stop bit	0100 1100	4C
RS-232C, 7-bit, Even Parity, 1 stop bit	0111 1000	78

### Flow

Flow control sets the local handshaking method for stopping serial input/output. This should be set to zero always.

### Port Number

The setting represents the source port number in TCP connections. It identifies the channel for remote initiating connections. The range is **1-65535**, except for the following.

Port numbers	Reserved for
1-1024	Reserved (well known ports)
9999	TELNET Setup
14000-14009	Reserved for Redirector
30704	Reserved (77F0h)
30718	Reserved (77FEh)

### Warning

**Do not use the reserved port numbers for this setting because incorrect operation may result.**

### Connect Mode

Connect Mode defines how the unit makes a connection, and how it reacts to incoming connections over the network.

Connect Mode Option	7	6	5	4	3	2	1	0
<b>a) Incoming Connection</b>								
Never accept Incoming	0	0	0					
Always Accept	1	1	0					
<b>b) Response</b>								
Nothing (quiet)				0				
Character response (C = Connect, D= disconnect, N = Unreachable)				1				
<b>c) Active Startup</b>								
With any character					0	0	0	1

### Remote IP Address

This setting specifies the remote IP address through which the communication needs to be established.

### Remote Port

The setting represents the destination port number in TCP connections. It is the number that identifies the channel for remote initiating connections.

**Note:** See the reserved port numbers from the table specified in *Port Number* section.

**DisConn Mode:** Set to zero.

**FlushMode:** Set to zero.

**DisConnTime:** Set to zero.

**SendChar 1:** Set to zero

**SendChar 2:** Set to zero.

**Examples**

User entries are shown in **bold**.

**To configure the Modbus/TCP Client in IC200UEM001 through TELNET:**

- Connect PLC with IC200UEM001 on port2 in the Network.
- For this example, the IP address of the IC200UEM001 is 10.10.0.5
- Load the Ethernet Option Module firmware upgrade kit, 82A1588-MS10-000-B1
- Type **TELNET 10.10.0.5 9999** at command prompt. Configure the parameters of the Ethernet Option Module as follows:

Modbus/TCP to RTU Bridge

MAC address XXXXXXXXXXXXX

Software version 02.5 (090526) XCARD

Press **Enter** to go into Setup Mode

Model: Device Server OEM (Firmware Code: G5)

**Modbus/TCP to RTU Bridge Setup**

## 1) Network/IP Settings:

IP Address .....10.10.0.5

Default Gateway ..... 10.10.0.1

Netmask .....255.000.000.000

SNMP is enabled

## 2) Serial &amp; Mode Settings:

Protocol .....Modbus/RTU, Slave(s) attached

Modbus/TCP Client. ....disabled

Serial Interface .....38400,8,O,1

## 4) Advanced Modbus Protocol settings:

Slave Addr/Unit Id Source .. Modbus/TCP header

Modbus Serial Broadcasts .. Disabled (Id=0 auto-mapped to 1)

MB/TCP Exception Codes ..... Yes (return 00AH and 00BH)

Char, Message Timeout ..... 00050msec, 05000msec

D)efault settings, S)ave, Q)uit without save

Select Command or parameter set (1..4) to change: Press **2**.

Attached Device (1=Slave 2=Master) (1) Press **Enter**

Modbus/TCP Client Enabled (N) **Y**

Close Idle TCP sockets after (3-60 sec, 0=leave open) (10) **Enter**

Serial Protocol (1=Modbus/RTU 2=Modbus/ASCII) (1) **Enter**

Enter serial parameters (38400,8,O,1) **175000,8,O,1**

After configuring all the parameters, Telnet will display the configured parameters. Press **S** to save the configuration to the Ethernet module. You will see the messages, **Parameters saved, Restarting....** and then **Connection to host lost**.

**To change the Serial Parameter Settings in SRTP Protocol:**

- Connect PLC with IC200UEM001 on port2 in the Network.
- For this example, the current protocol is SRTP and serial settings are 175000,8,O,1. The following procedure explains how to change the existing serial parameters to 38400,8,N,2
- For this example, the IP address of the IC200UEM001 is 10.10.0.5
- Type TELNET 10.10.0.5 9999 at command prompt. Follow the below procedure to configure the parameters of the Ethernet Option Module.

MAC address XXXXXXXXXXXXX

Software version 01.8 (090618) XPTX

Press **Enter** to go into Setup Mode

VMSE Emerson SNP.

## 1) Network/IP Settings:

IP Address ..... 10.10.0.5

Default Gateway .....10.10.0.1

Netmask .....255.000.000.000

## 2) CH1 Serial &amp; Protocol Settings:

Protocol Mode .....

## Mode#1 SRTP Ethernet to Serial SNP Slave

Serial Interface .....175000,8,O,1

T1, Turn-Around Delay ..... 00002 msec

T2, ACK/NAK Timeout ..... 09000 msec

T3, Link Idle Timeout ..... 10000 msec

T4, After Break Delay ..... 00400 msec

## 3) SNP ID to IP mapping table (not used in this mode)

D)efault settings, S)ave, Q)uit without save

Select Command or parameter set (1..3) to change: Press **2**

## 2) CH1 Serial &amp; Protocol Settings:

Mode#1 SRTP Ethernet to Serial SNP Slave

Mode#2 Serial SNP Master to Remote VMSE

Select desired operating mode (1)

Enter serial parameters (175000,8,O,1): **38400,8,N,2**

New T1, Line Turn-Around Delay (2-1280 msec, 1ms resolution)

(2) Press **Enter**

New T2, ACK/NAK Timeout (50-12,950 msec, 50ms resolution)

(9000) Press **Enter**

New T3, Link Idle Timeout (1000-60,000 msec, 250ms resolution) (10000) Press **Enter**

New T4, After <BREAK> Delay (5-1280 msec, 5ms resolution) (400) Press **Enter**

After configuring all the parameters, Telnet will display the configured parameters. Press **S** to save the configuration to the Ethernet module. You will see the messages, **Parameters saved, Restarting....** and then **Connection to host lost**.