Modicon TSX 174 CEV SECS 01

SECS to Ethernet bridge

User Manual

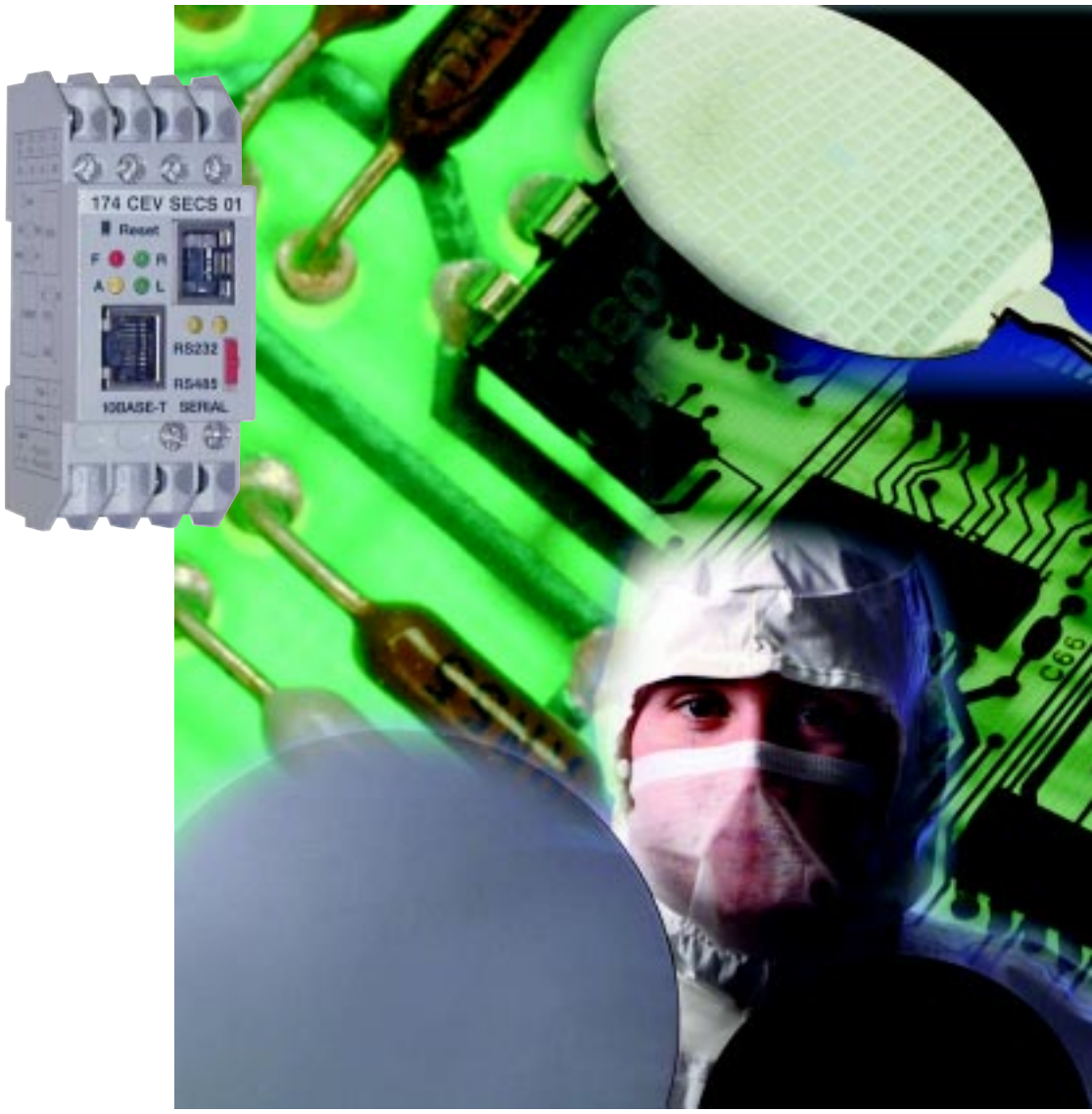

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Table of Contents

1.1 **Introducing the SECS to Ethernet Bridge**

1.1.1 Bridge Applications

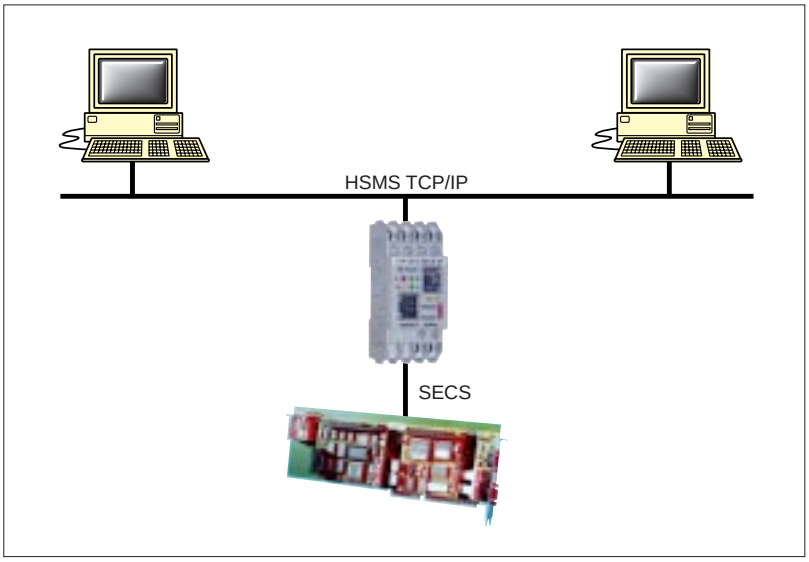
The Modicon SECS to Ethernet Bridge provides a means for transacting messages Between HSMS single session Ethernet TCP/IP (network port, SEMI standard E37, E37-1,) devices and SECS 1 (Serial port SEMI standard E4) serial devices. it concatenates multi block SECS 1 messages and generates a single HSMS frame, and vice versa, to a maximum block size of 22k, handling the conversion of TCP/IP and SECS protocol transparently to the user application.

Ethernet nodes using TCP/IP function as SECS “slaves”, originating messages to the Bridge for delivery to SECS Slave devices connected to the Bridge’s SECS port. The Bridge forwards the messages to the Slave devices using SECS protocol and returns their messages to the Master.

The procedure used by the SECS protocol to establish the direction of communications and provide the environment for passing message blocks is called the “block transfer protocol” Most of the protocol is accomplished with a handshake of single bytes. When both ends of the line try to send at the same time, a condition known as “line contention” exists. The protocol resolves contention by forcing the Slave Device (always the Host), to postpone its transmission, and enter the receive mode. Re transmission of blocks is used to correct communication errors.

Figure 1 shows an application in which a Bridge connects two SECS Slaves (Hosts) on Ethernet to a SECS Master (equipment) serial device The bridge supports a single active session and up to 2 “listeners.”

Figure 1



The bridge also allows multiple SECS networks to be linked together across an Ethernet connection. Multiple Bridges can furnish an Ethernet link between widely separated SECS networks. This extends the message path beyond the cable lengths allowed for serial connections,

Figure 2 shows a typical application in which Bridges join three SECS networks through a common Ethernet link.

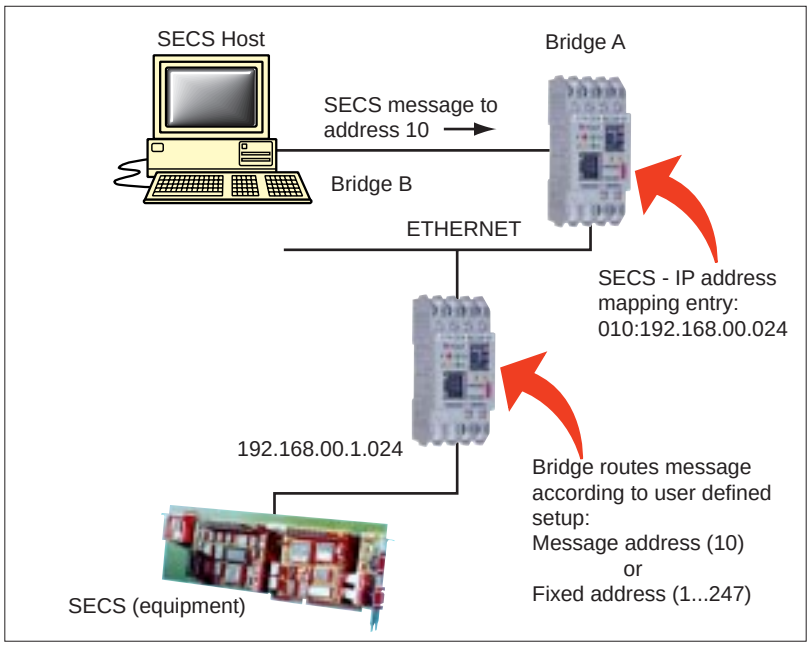


Figure 2 Bridging Between Multiple SECS Networks

1.1.2 **Overview: Installation and Configuration**

The Bridge is designed for easy ‘snap’ mounting on a standard DIN rail.
Its front panel has connectors for power, ground, Ethernet HSMS TCP/IP and SECS cables. It has
a switch for selecting either an RS–232 or RS–422/485 interface for the SECS port. (for use with SECS this should always be in the RS232 position)
Indicators show the status of communication at the Ethernet and SECS ports.
The Bridge contains a configuration utility program stored in its non–volatile memory.
With this utility you can assign the Bridge’s Ethernet and SECS parameters, using an
ASCII terminal at the serial port or a Telnet connection over Ethernet.
The Bridge contains a factory–assigned MAC address that is derived from the serial number printed on the Bridge’s label. This allows you to establish an Ethernet connection to the Bridge to assign its IP address and the other parameters for your application.

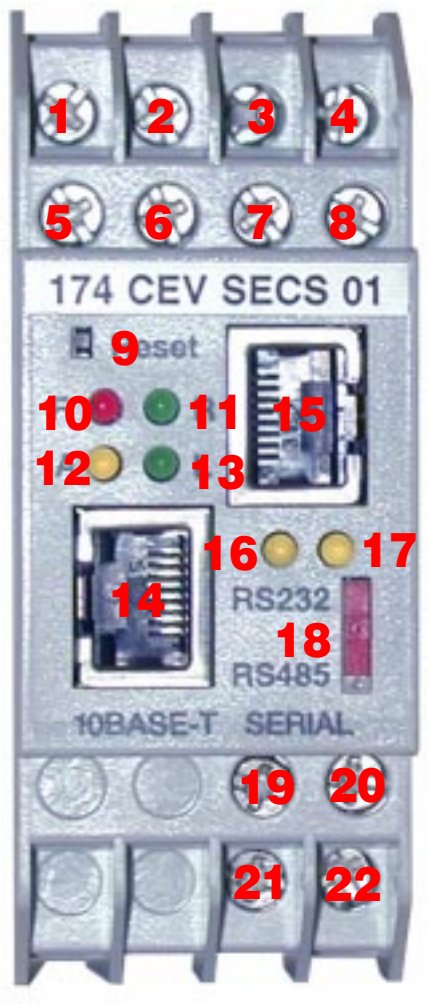


Figure 4: front panel layout

Front panel components

Item	Component	Name	Purpose
1	Wire terminal	RxD or RX-	SECS Signal: RS-232: RxD (Receive data)
2	Wire terminal	CTS or Rx+	SECS Signal: RS-232: CTS (Clear to send)
3	Wire terminal	RTS or Tx+	SECS Signal: RS-232: RTS (Request to send)
4	Wire terminal	TxD or TX-	SECS Signal: RS-232: TxD (Transmit data)
5, 6, 7	Wire terminal	NC	No connection
8	Wire terminal	GND	SECS signal ground
9	Reset switch	RST	Push to reset and initialize bridge
10	LED (red)	Fault or configuration	ON: Fault in bridge configuration (or) bridge in configuration menu
11	LED (green)	Ready	ON: Bridge is ready for communication on both ports
12	LED (yellow)	Active Ethernet	Flashing: Indicates activity at bridge's Ethernet port
13	LED (green)	Link good	ON: Bridge has good connection at Ethernet port
14	Connector (RJ45)	Ethernet port cable	RJ45 connector for Ethernet 10BaseT
15	Connector (RJ45)	SECS port	RJ45 connector for SECS RS-232
16	LED (yellow)	SECS Tx	Flashing: Indicates transmission or upload at SECS port
17	LED (yellow)	SECS Rx	Flashing: Indicates reception at SECS port
18	Switch	SECS interface selection	UP: SECS port is RS-232 (for SECS should only be set in UP position)
19	Wire terminal	DC+	Operating power, positive
20	Wire terminal	Ground	Earth ground
21	Wire terminal	DC-	Operating power, negative
22	Wire terminal	Ground	Earth ground

1.4 Specifications

Table 2 Power

Parameter	Specification
Operating power, nominal	12 or 24 VDC
Operating power range	9-30 VDC
Maximum power drain	3W
Connection	Screw terminal
Fuse	External, supplied by user. Fuse value according to supply voltage (see maximum power drain).
Grounding	SCrew terminals provided for power ground and safety (earth) ground.

Table 3 Environment

Parameter	Reference	Limits
Operating temperature	IEC-68-2-14	0-60° C ambient
Operating humidity	IEC-68-2-3	20-90% RH, non condensing

Table 4 Ethernet interface

Parameter	Specification
Protocol	HSMS single session mode (network port SEMI standard E37, E37-1.
Connector	RJ45 connector to 10BaseT cable

Table 5 Serial interface

Parameter	Specification
SECS Protocol	Serial port SEMI standard E4
Serial protocol	RS232C
Baud rate	300-38400 ± 2%
Connector	RJ45 connector, screw terminals

Table 6 Packaging

Parameter	Description
Dimensions	35x95x60mm (1.4x3.7x2.4 inches)
Enclosure material	High impact plastic
Weight	0.5 kg (1 pound)
Shipping weight	0.9 kg (2 pounds)
Mounting method	DIN rail: DIN EN 50022 (35mm)

Table 7 Approvals

Agency	Specification
UL, CSA, CE	Approved
FM	Pending

2.0 Installing the Bridge Hardware

2.1 **Mounting the Bridge on the DIN Rail**

2.1.1 **Before You Install the Bridge**

The Bridge has an Ethernet MAC address label on its side panel. The address is required for your Ethernet network administrator to configure the Bridge.
Before you install the Bridge on the DIN rail, write down the MAC address and give it to your network administrator. The label may not be visible after you install the Bridge.

Warning
COMMUNICATION DISRUPTION HAZARD Connecting any device to an active Ethernet network can disrupt communication on the network. Before you connect the Bridge to your network, and before you apply power to the Bridge, heed the steps in Chapter 3 for configuring the Bridge in your application.
Failure to observe this precaution can result in injury or equipment damage.

2.1.2 Mounting the Bridge

The Bridge is designed for mounting on a standard 35 mm X 7.5mm DIN rail (DIN EN S0 022). Snap the
Bridge into place on the rail as shown in the figure below. Figure 5 shows how to mount the Bridge

1. Note the slot on the Bridge's rear panel. Position the top edge of the slot over thetop edge of the DIN rail.
2. Snap the Bridge into place on the lower edge of the rail.

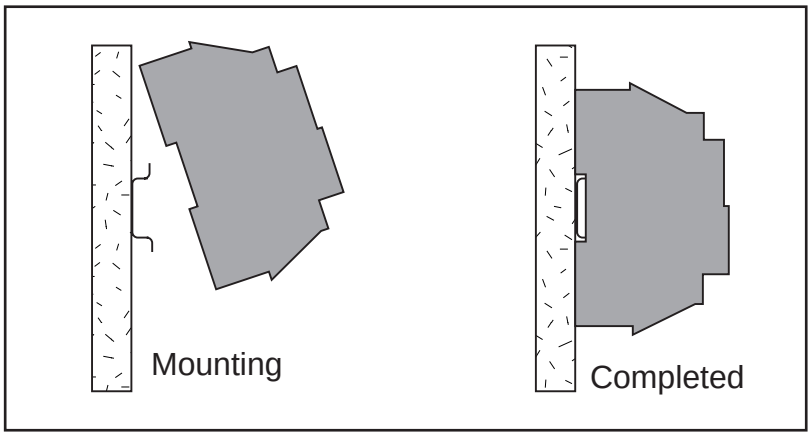


Figure 5 Mounting the Bridge on the DIN Rail

2.2 Connecting the Power Wiring

Figure 6 shows the connections for operating power and ground.

Operating power must be fused externally to the Bridge. The Bridge draws 3W maximum (9 ... 30 V dc). Select a fuse value according to the supply voltage.

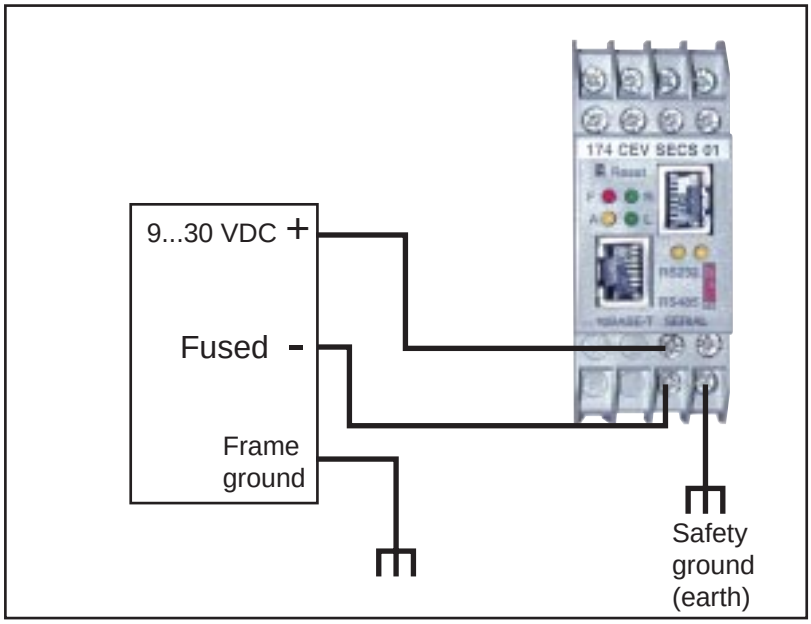


Figure 6 Connecting the Power Wiring

2.3 Connecting the Serial Cable (RJ45 Port)

Figure 7 shows serial cable connections for several devices for operation as SECS Host or Equipment devices. The figure also shows a typical connection to a standard PC 9–pin serial port for setting up the Bridge configuration.

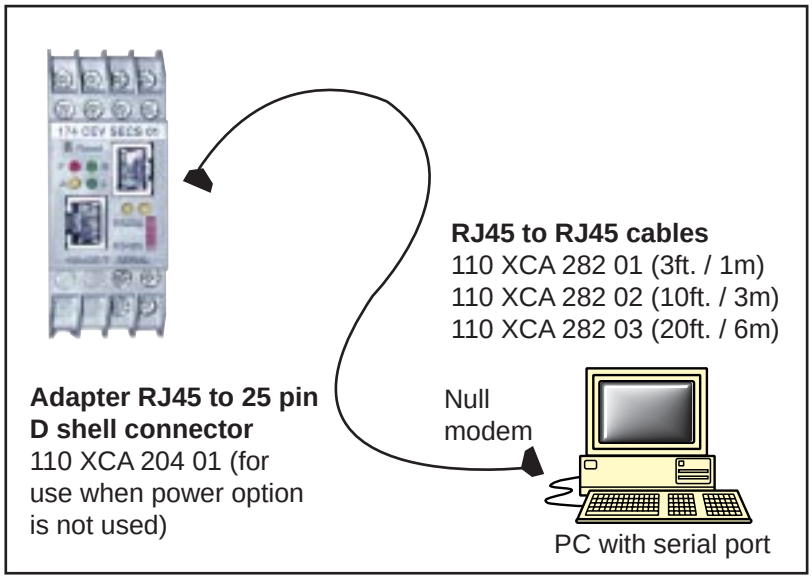
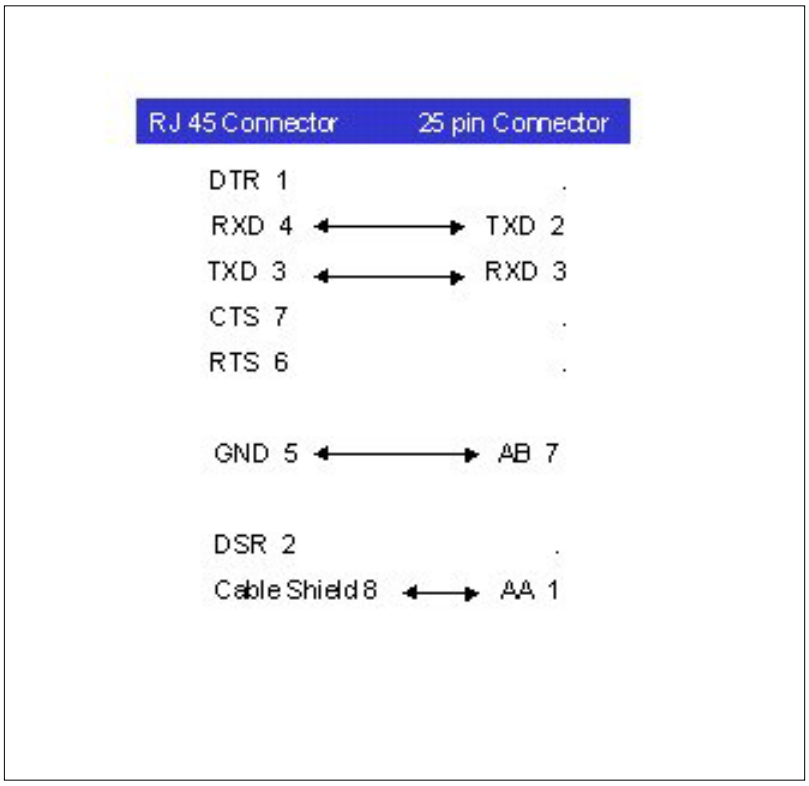


Figure 7 Connecting the Serial Cable (RJ45 Port)

2.5 Cable pinouts

RJ45 to SECS standard 25 pin connector



2.4 Connecting the Serial Cable (Wiring Terminals)

Figure 10 shows the connection for serial cables at the Bridge's wiring terminals

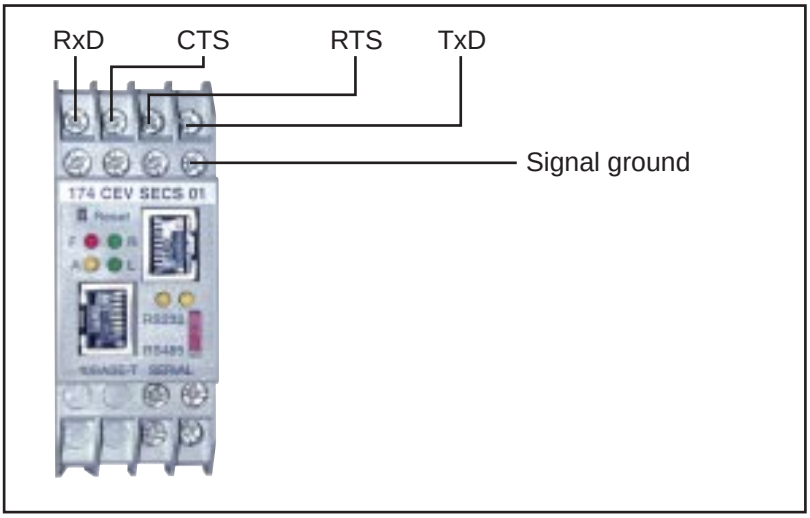


Figure 10 Connecting the Serial Cable (Wiring Terminals)

2.5 Setting the Serial Port Switch

Figure 11 shows the front panel switch for setting the Bridge's serial port interface.

Before you place the Bridge into service, set the switch for the type of interface used in your application:

- UP: RS–232 interface.
- DOWN: RS–422 or RS–485 interface. (not to be used with SECS protocol)

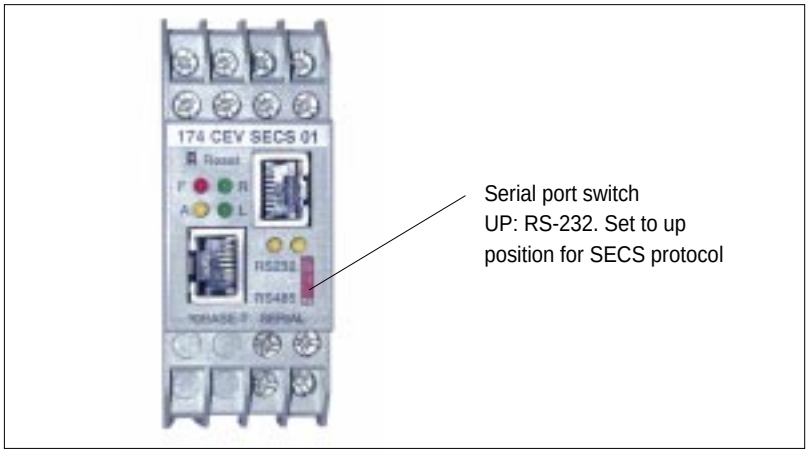
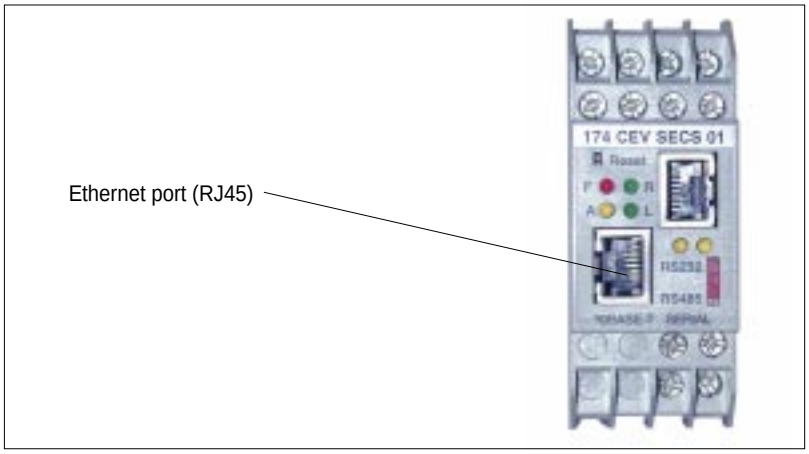


Figure 11 Setting the Serial Port Switch

Warning
COMMUNICATION DISRUPTION HAZARD The serial port switch is a hardware function. It is not sensed by the Bridge's firmware. Changing the switch setting while the Bridge is operating can disrupt communication on the network. Do not change the switch setting unless you have first verified that it will be safe for your application. Failure to observe this precaution can result in injury or equipment damage.



Warning
COMMUNICATION DISRUPTION HAZARD Connecting any device to an active Ethernet network can disrupt communication on the network. Before you connect the Bridge to your network, and before you apply power to the Bridge,heed the steps in Chapter 3 for configuring the Bridge in your application. Failure to observe this precaution can result in injury or equipment damage

3.0 Configuring the Bridge

3.1 Before You Start

3.1.1 Configuration Overview

Your Bridge must be configured to match your system application. Before you start to configure the Bridge, get the Bridge's Ethernet and serial port parameters from your network administrator.

Here is your check list for obtaining the configuration information:

- Ethernet IP address.
- Ethernet Gateway address, if applicable to your Bridge's network.
- Serial port interface: RS–232,.
- Serial port communication: Baud rate, Data bits, Parity mode, Stop bits.
- Serial port modem controls: .
- Serial port device: Master or Slave.
- Timeout values: Character timeout, Message timeout.
- Slave only: Address source from Unit_ID header, or Fixed address.
- Slave only: Allowing broadcasts to serial port: Enable or Disable.

3.1.2 Safety

Warning
COMMUNICATION DISRUPTION HAZARD When you view or change the configuration of a running Bridge, you will be restarting it on the network. This will disrupt communication with the Bridge. Ensure that this action will not cause any undesirable effect on your application. Failure to observe this precaution can result in injury or equipment damage.

Warning
DUPLICATE ADDRESS HAZARD Having two or more devices with the same IP address can cause unpredictable operation of your network. Ensure that you will be assigning a unique IP address to the Bridge. Failure to observe this precaution can result in injury or equipment damage.

3.2 Connecting by the RS–232 Port

To configure the Bridge at its local RS–232 port, use a serial terminal emulation program and a modem cable. See Figure 7 for a connection example.

Regardless of any serial parameters currently set into the Bridge for a user application, it will always use the following parameters for setup: 9600 baud, 8 data bits, No parity, 1 Stop bit (9600,8,N,1). Set your emulator to these parameters.

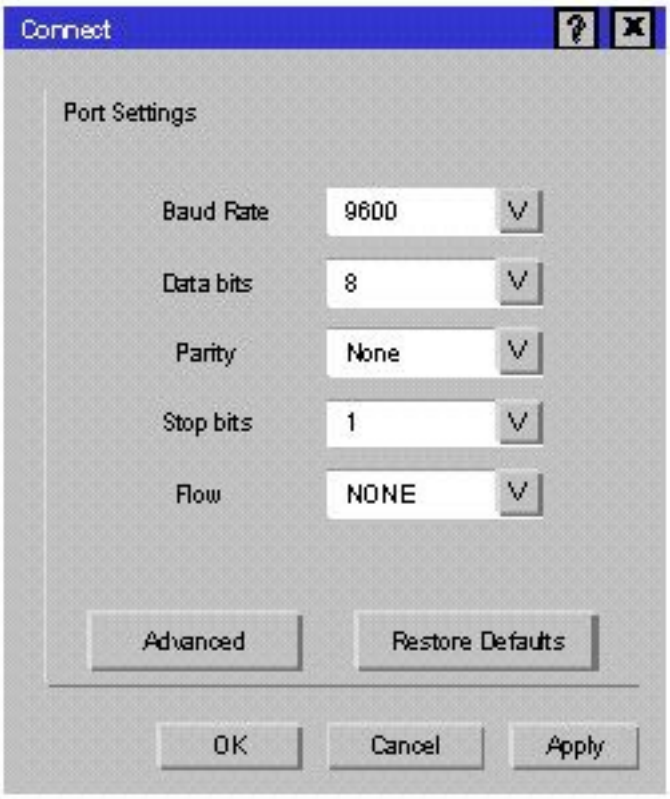


Figure 13 Example: RS–232 Serial Terminal Emulator Properties

Force the Bridge into its Configuration mode as follows:

- Ensure the emulator is connected to the Bridge's serial port and ready.
- Hold down the 'X' key on your emulator keyboard. While holding the key down, initialize the Bridge by cycling its power or by pressing its Reset button.

The Bridge will enter its configuration mode, and you will see this opening screen:

```
Schneider Automation, Inc. – SECS Bridge (174 CEV SECS 01)
Serial Number 101–161 Software Version V01.00 (990402)
Press Enter to go into Setup Mode, wait to close
```

At this screen, press <Enter> to go to the Configuration Menu (see Section 3.5).

3.3 Connecting by Telnet (IP Address Not Assigned)

If the Bridge does not yet have an IP address stored in its memory, you can establish an initial connection using its MAC address. This will allow you to access the Bridge's Configuration Menu, assign an IP address, and make it persistent in the Bridge.

If you are not sure about whether your Bridge has a stored IP address, you must connect at its serial port and access its Configuration Menu. Section 3.2 describes how to connect to the serial port.

Telnet Host Requirement
In order to use Telnet to set an initial IP address for the Bridge, your Telnet host must be on the same Ethernet subnetwork as the Bridge, both physically and in its IP range. Otherwise the configuration will not work.

Step 1 Get the Bridge's MAC Address.
The Bridge's MAC address is derived from its serial number, printed on its label. First, convert the Bridge's serial number to two hexadecimal digits.

Example: If the serial number is 101–161, it converts to 65 A1 hexadecimal.

The MAC address will contain six hexadecimal values. It will have these four fixed values: 00 20 4A 01 followed by the two hexadecimal values of the serial number. For the serial number above, the MAC address would be:

Example: MAC address: 00 20 4A 01 65 A1.

Step 2 Issue an "arp" Command to the Bridge.
Open a Console or DOS window. Issue an **arp** command to the Bridge with this syntax:

Syntax: `arp –s <IP_address> <MAC_address>`

Example (UNIX): `arp –s 192.168.1.23 00:20:4A:01:65:A1`
Example (DOS): `arp –s 192.168.1.23 00–20–4A–01–65–A1`

Step 3 Connect by Telnet to Port 1.
Open a Telnet connection to the IP address you assigned in Step 2, using port 1. This connection will fail, but the Bridge will change its IP address to the one in this Telnet connection. This will allow you to make your final connection for configuring the Bridge.

Step 4 Connect by Telnet to Port 9999.
Open a new a Telnet connection to the IP address using port 9999. This connection will succeed. You should now see the Bridge's opening screen:

```
Schneider Automation, Inc. – SECS Bridge (174 CEV SECS 01)
Serial Number 101–161 Software Version V01.00 (990402)
Press Enter to go into Setup Mode, wait to close
```

At this screen, press <Enter> to go to the Configuration Menu (see Section 3.5).

3.4 Connecting by Telnet (IP Address Assigned)

If the Bridge already has an IP address stored in its memory, and you know that address, you can establish a Telnet connection to the Bridge using port 9999.

If you do not know the IP address currently stored in the Bridge, you can find that address by connecting to the Bridge's serial port and accessing its Configuration Menu. Section 3.2 describes how to connect to the serial port.

If you want to verify the existence of an Ethernet device at a known IP address, you can use the PING utility. Refer to your Ethernet documents for a description of PING.

Telnet Host Requirement
In order to use Telnet to set an initial IP address for the Bridge, your Telnet host must be on the same Ethernet subnetwork as the Bridge, both physically and in its IP range. Otherwise the configuration will not work.

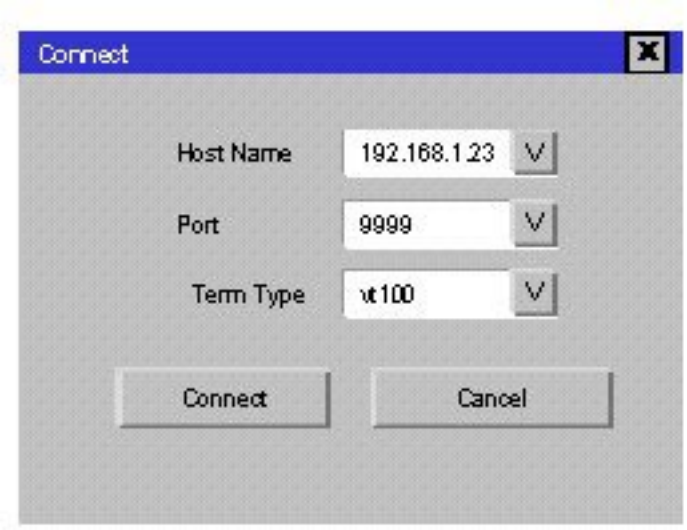


Figure 14 Example: Telnet Connection

When the connection is established, you should see the Bridge's opening screen:

```
Schneider Automation, Inc. – SECS Bridge (174 CEV SECS 01)
Serial Number 101–161 Software Version V01.00 (990402)
Press Enter to go into Setup Mode, wait to close
```

At this screen, press <Enter> to go to the Configuration Menu (see Section 3.5).

3.5 Using the Configuration Menu

When the Bridge enters its configuration mode it displays its opening screen:

```
Schneider Automation, Inc. – SECS Bridge (174 CEV SECS 01)
Serial Number 101–161 Software Version V01.00 (990402)
Press Enter to go into Setup Mode, wait to close
```

At this screen, press <Enter> to see the Configuration Menu.

3.5.1 Configuration Menu

The Configuration Menu shows the Bridge's current settings. Here is an example:

```
SECS Bridge Firmware Setup, Schneider Automation, Inc.

1) Network/IP Settings:
IP Address ..................................... 192.168.1.23
Default Gateway ................................ 192.168.1.30
Netmask ..................................... 255.255.255.000

2) Serial & Mode Settings:
Protocol ........................... SECS1, Slave(s) attached
Serial Interface ........................... 9600,8,E,1,RS232

3) Modem Control Settings:
RTS Output ................................ Fixed High/Active

Select Command or Parameter (1...3) to change:
```

3.5.3 Configuration Options: 1 ... 3

These are your configuration options. Each option is described in detail in the following sections of this book:

- Network/IP Settings: See Section 3.6.
- Serial & Mode Settings: See Section 3.7.
- Modem Control Settings: See Section 3.8.

3.5.4 Viewing and Changing Configuration Parameters

When you view the Bridge's configuration parameters, you can retain their current values or change them.

Retaining the Current Value
In all cases, if you press <Enter> when the current value is displayed, you will retain the current value. For example, if the Bridge's current values are as shown below, pressing <Enter> at each field will retain that current value:

```
IP Address : (192) .(168) .(001) .(023)
```

Changing a Value
To change a value, type the new value into the field at the point shown on your screen. For example, to change the Bridge's IP address to: 192.168.1.24:

```
IP Address : (192) .(168) .(001) .(023) 24
```

In this example, you would type the 24 immediately following the (023). Then press <Enter> for the Bridge to accept your entry.

3.5.5 Commands: Default settings, Save, Quit without save

These are your commands:

- E D)efault settings: Restores the Bridge's factory–installed default settings for all parameters except the Ethernet IP settings.
- S S)ave: Stores the current settings into the Bridge's memory, and exits the configuration. The Bridge will restart immediately using the current settings.
- Q Q)uit without save: Exits the configuration. The Bridge will restart immediately using the settings it had prior to the last Save.

3.6 Option 1: Network/IP Settings

When you select option 1 on the Configuration Menu, the Bridge displays its current Ethernet settings. Here is an example:

```
IP Address : (192) .(168) .(001) .(023)

Set Gateway IP Address (Y):

Gateway IP Address : (192) .(168) .(001) .(030)

Set Netmask (N for default) (Y): (255) .(255) .(255) .(000)
```

IP Address
The four entry fields for the IP address are shown as parenthesis ( ).

To retain the Bridge's current IP address, just press <Enter> at each field. To assign a new IP address, enter it into each field.

IP 0.0.0.0: Note that setting the IP address to all zero (0.0.0.0) causes the Bridge to be in an "Address Not Assigned" status. It reports its address as: 0.0.0.0/DHCP. Disregard the reference to DHCP.

Set Gateway IP Address
The Gateway IP Address is used only if your Ethernet network is larger than one continuous network (it contains subnetworks).

Each node within the subnetwork can directly reach all the other nodes within the same subnetwork. If the Bridge's subnetwork has a gateway to another subnetwork, the Gateway IP Address parameter identifies the gateway's address.

Set Netmask
If the Bridge's subnetwork has a gateway node, the Bridge needs to know how to recognize which IP addresses it can communicate with directly on its own subnetwork and which addresses it must refer to the gateway node.

The Netmask (subnetwork mask) specifies which portion of the an IP address defines devices on the local subnetwork, and which portion defines the entire subnetwork the devices are on. By comparing IP addresses with the subnetwork mask, the Bridge can determine which addresses are on its subnetwork and which are not.

Users can define different subnetwork masks to support their requirements. For example, common "Class C" IP addresses assume a default subnetwork mask of 0xFFFFFF00 or 255.255.255.0, using the lower 8 bits for the host part of the IP address. This allows up to 255 devices on the local subnetwork.

This default mask is the example shown in the menu above.

If the user desires to have multiple subnetworks with up to 32 devices on each the subnetwork mask could define 5 “host” bits or 255.255.255.224. With this setting, the decimal value 224 configures the lower 8 bits of the address, with the upper 3 of these bits addressing up to 8 subnetworks, and the lowest 5 bits forming the part of the address for the 32 local devices.

If you wish to specify a subnetwork mask, enter `Y` at the menu prompt and then enter your values for the mask.

Enter `N` to use the default subnetwork mask of 255.255.255.0.

3.7 Option 2: Serial and Mode Settings

When you select option 2 on the Configuration Menu, the Bridge displays its current serial port settings. Here is an example:

```
Attached Device (1=Slave, 2=Master) (001):

Interface Type (1=RS232, 2=RS422, 3=RS485) (001):

Enter Serial Parameters (9600,8,E,1):
```

Attached Device
Identify the type of SECS device (Slave or Master) attached to the Bridge’s serial port.

Interface Type
Identify the type of communication interface (RS232, RS422* or RS485*) used at the serial port. The default is RS232 The SECS protocol specifies RS 232.

Enter Serial Parameters
Enter the serial communication parameters used at the port, delimited by commas:

```
<baudrate>,<databits>,<parity>,<stopbits>
```

The defaults are: 9600,8,E,1.

The allowed values are:

- Baud rate: 300, 1200, 2400, 4800, 9600, 19200, 38000*,
- Data bits: 7, 8
- Parity: E, O, N
- Stop bits: 1, 2.

* = not part of the standard SECS protocol

3.8 Option 3: Modem Control Settings

When you select option 3 on the Configuration Menu, the Bridge displays:

```
RTS/CTS Mode (1=Fixed, 2=Variable) (001):
```

RTS/CTS Mode
RTS (Request to Send) and CTS (Clear to Send) are serial port signals that coordinate the starting and stopping of data requests between the Bridge and its port device. You can customize the RTS/CTS mode.

The options are: Fixed or Variable. The default is Fixed. This causes the Bridge to apply RTS/CTS with no time delays.

if you enter 2 to select the Variable option, you can specify timing values to allow a slower device to respond in the RTS/CTS dialog. When you choose this option the Bridge displays:

```
Delay after output RTS (0–1275 msec, 5 ms resolution) (00000):

Wait for CTS to go active (N):

Delay after CTS going active (0–1275 msec, 5 ms res) (00000):

Delay dropping RTS after TX (0–1275 msec, 5 ms res) (00000):
```

Example
If you select the RTS/CTS Variable mode and enter the following values:

```
RTS/CTS Mode (1=Fixed, 2=Variable) (001): 2

Delay after output RTS (0–1275 msec, 5 ms resolution) (00000):
  200

Wait for CTS to go active (N): Y

Delay after CTS going active (0–1275 msec, 5 ms res) (00000): 250

Delay dropping RTS after TX (0–1275 msec, 5 ms res) (00000): 300
```

you are specifying that after the Bridge asserts RTS it should wait up to 200 ms for the serial port device to respond with CTS. It will then wait 250 ms before sending data to the device. It will wait 300 ms before dropping RTS at the end of transmission.

Your new values will be now be shown in the Bridge's Configuration Menu:

```
3) Modem Control Settings:
   RTS Output ............. Variable, Delay 0200 ms, Hold 0250 ms
   CTS Input to TX Delay ............................. 0300 ms
```

4.0 Glossary

address
On a network, the identification of a station. In a frame, a grouping of bits that identifies the frame's source or destination.

API
Application Program Interface. The specification of functions and data used by one program module to access another; the programming interface that corresponds to the boundary between protocol layers.

ARP
Address Resolution Protocol. A network layer protocol used to determine the physical address which corresponds to the IP address for a host on the network. ARP is a sub–protocol which operates under TCP/IP.

BOOTP
Bootstrap Protocol. A TCP/IP–based protocol that allows a host to configure itself dynamically. Provides a means to assign a host its IP address, typically without user intervention.

bps
Bits per second.

bridge
A device that connects two or more physical networks which use the same protocol. Bridges read frames and decide whether to transmit or block them based on their destination address.

client
A computer process requesting service from other computer processes.

dest_idx
The destination field in a SECS Message. Corresponds to the SECS device addressed in the message.

default gateway
The IP address of the network or host to which all packets addressed to an unknown network or host are sent. The default gateway is typically a router or other device.

DHCP
Dynamic Host Configuration Protocol. A network protocol used to configure IP addresses dynamically. DHCP is an extension of BOOTP.

DNS
Domain Name System. A protocol within TCP/IP used to find IP addresses based on host names.

field
A logical grouping of contiguous bits that convey one kind of information, such as the start or end of a message, an address, data or an error check.

frame
A group of bits which form a discrete block of information. Frames contain network control information or data. The size and composition of a frame is determined by the network technology being used.

framing types
Two common framing types are Ethernet II and IEEE 802.3.

FTP
File Transfer Protocol. A networking protocol used to exchange files between stations on a network or over the Internet.

gateway
A device which connects networks with dissimilar network architectures and which operates at the Application Layer. This term may refer to a router.

host
A node on a network.

hostname
A domain name given to a specific computer on a network and used to address that computer.

HTTP
HyperText Transport Protocol. A protocol used to deliver hypertext documents.

hub
A device which connects a series of flexible and centralized modules to create a network.

ICMP
Internet Control Message Protocol. A protocol within TCP/IP used to report errors in datagram transmission.

Internet
The global interconnection of TCP/IP based computer communication networks.

IP
Internet Protocol. A common network layer protocol. IP is most often used with TCP.

IP Address
Internet Protocol Address. A 32–bit address assigned to hosts using TCP/IP.

layer
In the OSI model, a portion of the structure of a device which provides defined services for the transfer of information.

MAC Address
Media Access Control address. The hardware address of a device. A MAC address is assigned to an Ethernet TCP/IP module in the factory.

network
Interconnected devices sharing a common data path and protocol for communication.

node
An addressable device on a communications network.

OSI model
Open System Interconnection model. A reference standard describing the required performance of devices for data communication. Produced by the International Standards Organization.

packet
The unit of data sent across a network.

PING
Packet Internet Groper. A program used to test whether a destination on a network can be reached.

port
An access point for data entry or exit within a host using TCP services.

protocol
Describes message formats and a set of rules used by two or more devices to communicate using those formats.

repeater
A device that connects two sections of a network and conveys signals between them without making routing decisions or filtering packets.

router
A device that connects two or more sections of a network and allows information to flow between them. A router examines every packet it receives and decides whether to block the packet from the rest of the network or transmit it. The router will attempt to send the packet through the network by the most efficient path.

server
Provides services to clients. This term may also refer to the computer on which the service is based.

socket
The association of a port with an IP address, serving as an identification of sender or recipient.

stack
The software code which implements the protocol being used. In the case of the NOE modules it is TCP/IP.

STP
Shielded Twisted Pair. A type of cabling consisting of several strands of wire surrounded by foil shielding, twisted together.

subnet
A physical or logical network within an IP network, which shares a network address with other portions of the network.

subnet mask
Used to indicate which bits in an IP address identify a subnet.

switch
A network device which connects two or more separate network segments and allows traffic to be passed between them. A switch determines whether a frame should be blocked or transmitted based on its destination address.

TCP
Transmission Control Protocol.

TCP/IP
A protocol suite consisting of the Transmission Control Protocol and the Internet Protocol; the suite of communications protocols on which the Internet is based.

UDP
User Datagram Protocol. A protocol which transmits data over IP.

URL
Uniform Resource Locator. The network address of a file.

UTP
Unshielded Twisted Pair. A type of cabling consisting of insulated cable strands which are twisted together in pairs.

Winsock
The Microsoft implementation of the Windows Sockets networking API based on the Berkeley UNIX Sockets interface for supporting TCP/IP.

WWW
World Wide Web. A hypertext–based, distributed information system in which clients and servers are freely available.

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