

EtherSeries

Bridge

User's Guide

Revised August 21, 2007

Firmware Version 3.x

FCC Statement

This device complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

CE Marking Warning

This is a class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

RoHS

This product is RoHS Compliant.



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Version 3.X

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Chapter 1

Introduction

This chapter provides an overview of the EtherSeries Bridge's features and capabilities.

Congratulations on the purchase of your new EtherSeries Bridge. This bridge is a simple, easily configured learning MAC layer bridge with one 10/100BaseT Ethernet interface and one asynchronous RS-232/422/485 serial interface. If used as a simple learning bridge, no configuration is required other than setting the serial speed if different from the factory default of 115.2Kbps.

The bridge is used in pairs, connected via any asynchronous media such as digital radios, DSUs, satellite, or modems. It may also be used with an optional second serial port, and with multiple remote bridges using optional multi-point firmware.

The bridge operates at serial speeds of 300 bps up to 230Kbps.

In A Hurry?

We recommend that you read Chapter 1. Then skip to the Quick-Start section in Chapter 2. That's only 7 or 8 pages, and your bridge will be up and running in about 5 minutes.

This is a true learning bridge. It listens to data on its Ethernet interface, and learns the MAC address of each device on that LAN segment. Then, when it hears a broadcast packet or packet addressed to any address not on that LAN segment, it forwards the packet through a serial port to the remote bridge.

When used in its simplest mode, there is no configuration required. However, if Advanced Management is configured, the bridge can be remotely managed via a web browser or telnet connection, answers to SNMP queries, and maintains Ethernet traffic statistics. Advanced Management requires the bridge to be assigned an IP address. No IP address is required when used in basic bridging mode.

For easy connection to your LAN, the bridge supports 10BaseT or 100BaseT with auto-sensing.

EtherSeries Bridge Functions

The bridge is used to connect two LAN segments without having to resort to IP segmentation and routing. By using the EtherSeries bridge instead of a router, a "flat" LAN can be constructed. No complicated IP sub-netting is required, so bridging is ideal for sites with a small number of computers and a small IP address space.

The bridge works with all Ethernet protocols. Many LANs use non-routable protocols for industrial controls, or protocols that are quite "chatty" when routed. Bridging is ideal for IP as well as non-IP protocols.

Other Features

Dual WAN Ports

The EtherBridge is available in a version with two WAN ports. The two wide area network ports are independent.

Multi-point Version

The EtherBridge may be ordered with a point-to-multipoint option. When used with a multi-point communications system, multiple remote LAN segments may be connected to a single common EtherBridge. This type of operation is usually used with multi-point license-free radio modems.

TCP/IP Protocol

When configured with an IP address, the bridge may be managed using any web browser, via a telnet session to port 8000, or with the console configuration option. Note, however, that this is not required for proper bridge operation.

Protocol Independent

The Bridge is compatible with all Ethernet protocols.

Bridging Protocol

A proprietary protocol is used between the bridges for efficiency. This protocol works with any link that passes 8 bit asynchronous data.

Upgradeable Firmware

Firmware upgrades are downloadable to the bridge. The utility program required for this, and the actual firmware upgrades, are available from your dealer. A Windows 95/98/XP/NT workstation is required to run the download software.

Physical Details

The EtherSeries Bridge front and rear panels are shown below.

The two port unit will have an additional port (6). And indicator (5). Opto-isolated versions will have screw terminals.



Figure 1: EtherSeries Bridge



Figure 2: EtherSeries Bridge ESB-02-OPTO

1 Power Connector	Connect the power adapter here.
2 10/100Base-T port	Connect LAN cabling here.
3 C/S/Setup LED	Rapid flashing in configuration mode, flashes with transmit activity on the LAN
4 LAN LED	LAN Link Indicator. Solid for valid LAN link, flashes with any LAN activity
5 COM LED	Serial Activity Indicator.
6 Serial Port	DE-9 (DB-9) RS-232/485 Interface.

Configuration Switch

There is a momentary action push button switch between the LAN connector and the power connector behind a small hole. Pressing this switch places the unit in configuration mode and is used only when configuring the bridge **via the serial port**, as explained in *Chapter 3 - Configuration*. Return from configuration mode by exiting the configuration menu or by power cycling the unit. This switch may be depressed with a tiny screw driver or stiff wire. (A straightened paper clip works nicely).

LED IED Indicators

There are three LED indicators on the top panel.

Top Panel LED Indicators

- The C/S/Setup LED flashes rapidly when the unit is in configuration mode. It flashes slowly when the unit transmits packets on the LAN interface.
- The LAN LED This LED flashes with activity on the Ethernet (even if the activity isn't directly to this unit).
- The COM LED indicates activity on the serial port.

Package Contents

You should find the following items packaged with your EtherSeries Bridge:

- The Bridge Unit
- Power Adapter
- This User's Guide

If any of the above are missing, contact your dealer immediately.

Software Requirements

The Bridge supports all Ethernet protocols.

It may be configured using any terminal or terminal emulation software on a PC. If configured for *Advanced Management*, any standard telnet program may be used to telnet to the bridge for configuration, or any standard web browser may be used for configuration once the bridge has a valid IP address configured.

Chapter 2

Installation

This Chapter details the LAN installation process for the EtherSeries Bridge.

Overview

Remember, the EtherSeries bridge may be used with NO configuration if your serial device operates at 115.2Kbps. An IP address configuration is only required if you plan to use Advanced Management features.

For *Advanced Management*, either *Telnet* or *Web Browser based*, an IP address must be configured. The default value of 192.168.1.1 may not work with your network.

Terminal Mode configuration may be performed at any time, and no IP address is required. See Chapter 3 for details.

Quick Start

Quick start instructions are on the next page. Installation is an easy five-step process that is basically... ***plug it in.***

Installation

1. Connect the Network Cable

The EtherSeries Bridge network interface is auto-sensing. Simply connect your network cable to the appropriate connector on the bridge rear panel.

2. Connect the Power Adapter Cable

Plug in the power adapter cable. After about a 4 second boot process the bridge is ready for operation.

3. Connect the Serial Link Device

Connect the serial link device to the serial port on the Bridge. See the Appendix for wiring details. Typically, a standard PC (DE-9) -to-modem (DB-25) cable works with most DCE devices such as modems and DSUs.

4. Verify the Serial Link Device Speed

If you are using a serial speed of 115.2 Kbps, the bridge is ready to go. If not, then either configure the serial link devices to 115.2 Kbps or configure the bridge to the link device speed.

5. Apply Power to the Serial Link Device.

You are now ready to use the bridge. Of course, you need to do the same installation for the companion bridge on the other LAN so it can do useful work.

Chapter 3

Terminal/Telnet Configuration

This Chapter describes how to manage the EtherSeries Bridge using Terminal, or Telnet mode. Web Browser mode management is detailed in Chapter 4.

Overview

The EtherSeries Bridge may be managed using any of the following methods:

- **Web Browser** - After installing the bridge in your LAN, use your Web Browser for management. See *Chapter 4 - Browser Configuration* for details.
- **Terminal Mode** - Use a serial cable connection and a communication program. This is often required prior to other modes in order to configure a compatible IP address into the bridge.
- **Telnet Mode** - After installing the bridge in your LAN, manage it using Telnet.

Both *Terminal* and *Telnet* modes provide the same user interface.

Terminal Configuration

Terminal configuration requires the following:

- PC with terminal emulation program, or a dumb terminal.
- Serial cable to connect the PC to the bridge. See the Appendix for cable requirements. A Crossover (null modem) cable is required when using a 9-pin PC port.

Procedure

1. Connect the bridge to your PC or terminal.
2. Connect the bridge to the power supply.
3. Press the configuration setup switch momentarily. It is located on the side of the bridge and accessed through a small hole. Use a small pen or paper clip to access the switch.
4. Configure the terminal program with the following settings.

Setting	Value
Flow control protocol	None
Speed	9600
Data	8 bits
Parity	None
Stop Bit	1

5. Connect your terminal program to the appropriate port (e.g. COM 1).

6. The configuration program should now start and after a few seconds display a sign-on screen.

If nothing appears on your screen, press ESC.

Refer to Terminal/Telnet Interface on page 15 for details on using the configuration program.

Telnet Management

NOTE: To use telnet, there MUST be compatible IP addresses in both the PC and the bridge!

1. Install the bridge into your LAN as described in Chapter 2. Ensure that the bridge is powered on.
2. Connect to the bridge with the command:

```
telnet IP_Address 8000
```

Where:

IP_Address is the IP address of the bridge.

8000 is the management port number. For example, if the default IP address has not been changed, then you would enter the command:

```
telnet 192.168.1.1 8000
```

If you can't connect

If the bridge does not respond, check the following:

- The bridge is properly installed, LAN connections are OK, and it is powered ON.
- Check that your PC is using a compatible *IP Address* and *Network Mask*.

In Windows, using Control Panel-Network to examine the Properties for the TCP/IP protocol can check the IP Address and Network Mask. If your PC is NOT using an

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IP Address within the range 192.168.1.2 to 192.168.1.254, with a Network Mask of 255.255.255.0, then it will not connect to the default bridge IP address.

3. Refer to the following section for details on using bridge management.

Terminal/Telnet Interface

The banner screen displays the version number.

```
EtherSeries Bridge V2.0
-----
Device Name: GW004A9E
Physical Location: Head Office

Configuration setup.

[Press any key to continue]
```

Pressing any key will then take you to the Main Menu.

```
Main Menu
-----
 1 Set Local IP Address, Gateway IP Address
   and Subnet Mask
 2 Set Manager/Telnet IP Address
 3 Serial Port 1 Configuration
 4 Serial Port 2 Configuration
 5 Configure SNMP Trap
 6 Display Address Table
 7 Display Configuration Settings
 8 Reset Configuration to Default
 9 Save and Exit
 0 Exit without Saving

Choose a Number =>
```

Each of these menu options is explained in the following pages.

Entering Data

Enter the number of the field you wish to change, followed (on the same line) by a space and the data for that field.

Example

On screen one, to set the IP address (field 1) to 192.168.1.10
=>1 192.168.1.10

Menu Options

Main Menu Option 1. Setting IP Addresses

Selecting 1 (1 Local IP Address) from the Main Menu will result in a screen which is similar to the following.

LOCAL UNIT CONFIGURATION:

Local Address: 205.166.54.253 Serial NO: 00:60:E9:00:4A:9E

Gateway Address: (NOT SET) Subnet Mask: 255.255.255.0

Name of Contact Person: Supervisor

Device Name: GW004A9E

Physical Location: Head Office

SNMP Community: public

Advanced Management: Enabled

(CONTINUED ON NEXT PAGE)

SET LOCAL UNIT CONFIGURATION:

- 1 Local IP Address
- 2 Gateway IP Address
- 3 Subnet Mask
- 4 Name of Contact Person
- 5 Device Name
- 6 Physical Location
- 7 SNMP Community
- 8 Advanced Management [0=Bridge Only, 1=Enabled]
- 0 -- Return to previous menu

Enter Command =>

1. Local IP Address

The IP address of this bridge on your LAN. The default IP Address is 192.168.1.1

2. Gateway IP Address

If the remote bridge is not on the same LAN, then the gateway to the other LAN must be entered here.

3. Subnet Mask

The network mask indicates what class of TCP/IP network you have. The default value is for a class "C" network, with up to 255 users. This value should work in small networks. If in doubt, consult your network administrator.

4. Name of Contact Person: Supervisor

This is a text field. It can be used to store the name of the person responsible for the bridge.

5. Device Name

This is a text field. It can be used to store a descriptive name for the device.

6. Physical Location

This is a text field. It can be used to store the location of the device.

7. SNMP Community Name

The name of the SNMP community for SNMP reads.

8. Advanced Management

Set equal 1 to enable Advanced Management. With advanced management enabled, the maximum port speed should be 57.6 Kbps or less. Advanced management enables SNMP, the web browser, and telnet management screens.

Main Menu Option 2. Set Manager/Telnet IP Address

Selecting (2) from the Main Menu will result in the following screen. This is only useful when *Advanced Management* is enabled.

```
Entry  Manager_IpAddr
****  *****
      1.  000.000.000.000
      2.  000.000.000.000
      3.  000.000.000.000
      4.  000.000.000.000
```

```
MANAGER SETUP:
set Entry_Number IP_Address
clear Entry_Number
0  --Return to main menu.
```

EXAMPLE:

```
to set entry #3 to IP address=138.239.0.24,  
=> set 3 138.239.0.24  
to clear entry #2 IP address,  
=> clear 2
```

Enter Command =>

This screen shows a table containing four (4) entries. By default, all entries are blank. These entries provide a security feature. Only a user at one of the IP addresses shown can manage the bridge. (All users on the LAN can still use the bridge, but not configure it.)

If the entries are blank, then any user on the LAN can configure the bridge.

Entries in the table cannot be edited, but commands are provided to insert (SET) and delete (CLEAR) entries.

Main Menu Options 3 & 4. Serial Port Configuration

Selecting (3) from the Main Menu will result in the following screen for port 1. Selecting (4) from the Main Menu will result in a similar screen for port 2.

PORT 1 CONFIGURATION:

```
Flow Control: NONE  
Baud Rate: 115200  
Pin 6 Control: FORCED ON  
Modem: none  
Interface: rs422/4-wire
```

SET PORT CONFIGURATION:

```
1 Flow Control [0=None, 1=RTS/CTS]  
2 Baud Rate [0=230400, 1=115200, 2=57600, 3=38400, 4=19200,  
5=9600, 6=4800, 7=2400, 8=1200, 9=600, 10=300]  
3 Pin 6 Control [0=From Interface, 1=Forced ON]  
4 Modem [0=None, 1=Dial, 2=Answer]  
5 Interface [0=rs232, 1=rs422/4-wire]  
0 -- Return to previous menu.
```

EXAMPLE: To set the baud rate to 19200
=> 2 4

Enter Command =>

This screen configures the settings for the RS232 link. The settings used should match the device connected to the serial port of the bridge

Flow Control

The choices are “None or “RTS/CTS”. RTS/CTS is preferred, but set to None if needed to match your link devices.

Baud Rate

Speeds between 300 bps and 230.4Kbps are supported.

Pin 6 Control

The choices are [0=From Interface, 1=Forced ON]. If 1, Pin 6 is forced on within the firmware. If 0, the Pin 6 signal is read from the interface.

Modem

Enables use of dial-up modems. One bridge would be set for dial mode and the other for answer mode. The bridges will initialize the modems by giving the ATZ command. This command resets the modem and loads profile 0. The bridge configured for dial mode will give the ATDS=0 command causing stored phone number 0 to be dialed. Both bridges will monitor the DCD signal and will begin bridging when DCD goes active.

Your modems must support the AT command set and be pre-configured. To do so, you will have to use a terminal or terminal emulation program. It is not possible to configure the modems through the bridges. The configuration for the answering modem must have auto-answer enabled. The configuration for the dialing modem must have the phone

number stored in location 0. The configuration must be stored in profile 0.

The following two examples show a typical configuration when using DCB D-Series Modems.

Dialing Modem

```
at&fe1q0v1b1&c1&d2&k3&q5n1x4s7=60s0=0    {configuration}
OK                                         {modem response}
at&z0=5551234                             {store phone number}
OK                                         {modem response}
at&w0                                       {store profile 0}
OK                                         {modem response}
```

Answering Modem

```
at&fe1q0v1b1&c1&d2&k3&q5n1x4s0=1        {configuration}
OK                                         {modem response}
at&w0                                       {store profile 0}
OK                                         {modem response}
```

You **must** use a modem cable with full handshaking. **A 3-wire null modem cable will not work.** Also, it is recommended that RTS/CTS flow control be enabled.

Interface

Select RS-232 or RS422/RS-485(2-wire or 4-wire) to match the link between the bridges. NOTE: Once you configured the port for RS-422/485, your RS-232 terminal connection will no longer work.

Main Menu Option 5. Configure SNMP Trap

Selecting (5) from the Main Menu will result in the following screen:

CURRENT SNMP TRAP RECEIVERS:

Receiver_IpAddr	Severity	Community string	Active

1. 0.0.0.0	INFORMATIONAL		NO
2. 0.0.0.0	INFORMATIONAL		NO
3. 0.0.0.0	INFORMATIONAL		NO
4. 0.0.0.0	INFORMATIONAL		NO

SET TRAP CONFIGURATION:

set --set all values of an entry's fields.

clear --reset to default.

'0' --return to main menu.

USAGES:

set Entry_Num IpAddr(XXX.XXX.XXX.XXX) severity(1,2 or 3)
CommunityString

clear Entry_Num

Where severity : 1=INFORMATIONAL. 2=WARNING. 3=SEVERE.

EXAMPLE: To set entry #2 to IP address=138.239.1.57,

severity=WARNING and community string=public

=>set 2 138.239.1.57 2 public

Enter Command =>

Use this screen to configure SNMP trap receiver IP addresses and their severity level.

Main Menu Option 6. Display Address Table

This menu options displays a table showing all MAC addresses learned by the bridge.

1. This table has a maximum size of 256 entries.
2. Entries time out after 1 hour of inactivity and are relearned.
3. Moving a computer from one side of the bridges to the other side causes them to be relearned upon the first broadcast from the PC.

Choose a Number => 4

Ethernet Address : Interface	Ethernet Address : Interface
00-48-54-3e-5a-06 : Ethernet	00-10-61-b0-95-4f : Ethernet
00-48-54-8b-33-7a : Ethernet	00-48-54-3b-80-f0 : Ethernet
00-10-61-b0-a1-96 : Ethernet	00-d0-59-59-4b-02 : Ethernet
00-a0-4b-03-44-06 : Ethernet	00-00-00-01-5d-64 : Ethernet
52-54-05-f9-88-12 : Ethernet	00-48-54-67-24-09 : Ethernet
00-48-54-3b-4e-51 : Ethernet	00-48-54-39-d9-38 : Ethernet
00-48-54-39-da-da : Ethernet	00-a0-cc-26-2a-4e : Ethernet
00-48-54-d1-39-91 : Ethernet	00-10-61-b0-97-81 : Ethernet
00-05-5d-d6-b0-c3 : Ethernet	00-48-54-8b-36-1f : Ethernet
00-48-54-3b-67-7e : Ethernet	00-e0-98-04-d3-9a : Ethernet
00-c0-02-56-33-06 : Ethernet	00-05-5d-ed-60-13 : Ethernet
00-60-08-b7-6a-cb : Ethernet	00-48-54-3b-64-e4 : Ethernet
52-54-05-fb-ee-d3 : Ethernet	00-00-e8-42-6e-13 : Ethernet
00-d0-e8-5c-00-bb : Ethernet	00-48-54-3b-67-0c : Ethernet

[Press any key to continue]

Main Menu Option 7. Display Configuration Settings

Selecting (7) from the Main Menu will display the following information:

LOCAL UNIT CONFIGURATION:

Local Address: 205.166.54.253 Serial NO:
00:60:E9:00:4A:9E
Gateway Address: 205.166.54.1 Subnet Mask:
255.255.255.0
Name of Contact Person: Supervisor
Device Name: GW004A9E
Physical Location: Head Office
SNMP Community: public
Advanced Management: Enabled

MANAGER CONFIGURATION:

Entry Manager_IP_Addr

1. 0.0.0.0
2. 0.0.0.0
3. 0.0.0.0
4. 0.0.0.0

CURRENT SNMP TRAP RECEIVERS:

	Receiver_IpAddr	Severity	Community	Active
	*****	*****	*****	* ****
1.	1.2.3.4	INFORMATIONAL	PUBLIC	NO
2.	2.4.6.8	INFORMATIONAL	PUBLIC	NO
3.	1.1.1.1	INFORMATIONAL	PUBLIC	NO
4.	2.2.2.2	INFORMATIONAL	PUBLIC	NO

[Press any key to continue]

PORT 1 CONFIGURATION:

Flow Control: NONE

Baud Rate: 9600
Pin 6 Control: FORCED ON

PORT 2 CONFIGURATION:
Port 2 is not installed.

[Press any key to continue]

STATISTICS:
Network packets received: 379046
Network packets transmitted: 452
Network Receive Overruns: 0
Network Receive Dropped: 0
Network Transmit Collisions: 31
Network Late Collisions: 0
Network Collision Aborts: 0
Serial Packets received: 0
Serial Packets transmitted: 1336
Serial Receive Overruns: 0
Serial Receive Dropped: 0
Serial CRC Errors: 0
Serial Transmit Dropped: 0

[Press any key to continue]

This option displays the bridge configuration and some counters from its advanced management option.

Main Menu Option 8. Reset Configuration to Default

Selecting (8) from the Main Menu will restore all values to their default values.

If using Telnet or web browser configuration, the connection will be lost when the bridge reboots. To reconnect, you must use the default IP Address of 192.168.1.1 or change the bridge IP address before rebooting with main menu option 7. The

preferred method is to restore defaults with menu item 6, and then ***BEFORE REBOOTING***, change the IP information by using submenu 1 so your PC will still be able to connect to the bridge when it reboots.

Main Menu Option 9. Save and Exit

Selecting (9) from the Main Menu will store the configuration details in the bridge, and exit the configuration program.

If using Telnet, the connection may be lost when the bridge reboots. If you have changed the IP Address, you must use the new IP Address when you reconnect.

Main Menu Option 0. Exit without Saving

Selecting (0) from the Main Menu will exit the configuration program without saving any data you have entered.

Chapter 4

Browser Management

This Chapter describes how to manage the EtherSeries Bridge using a Web Browser.

Overview

This method uses your Web Browser to manage the bridge. This provides a more user-friendly interface than the Telnet/Terminal method.

- The bridge must be installed in your **LAN and have a compatible IP address** before this configuration method can be used.
- ***Advanced Management must be turned on.***
- Most Browsers will work. The only requirement is that they support HTML tables and forms. If your browser uses a proxy, the proxy function may need to be disabled.

Connection Procedure

To establish a connection to the bridge , follow this procedure:

1. Install the bridge in your LAN as described in Chapter 2. Ensure that the bridge is powered on.
2. Start your Web browser.

3. In the *Address* box of your browser, enter the following:

`http://IP_Address`

(*IP_Address* is the IP address of the bridge)

For example, if the default IP address has not been changed, then you would enter the command:

`http://192.168.1.1`

If you can't connect

If the bridge does not respond, check the following:

- The bridge is properly installed, LAN connections are OK, and it is powered ON.
- *Advanced Management* is turned ON.
- Check that your PC is using a compatible *IP Address* and *Network Mask*.

In Windows, using Control Panel-Network to examine the Properties for the TCP/IP protocol can check the IP Address and Network Mask.

If your PC is NOT using an IP Address within the range 192.168.1.2 to 192.168.1.254, with a Network Mask of 255.255.255.0, it will not be able to communicate with the bridge.

4. Once connected, you will see the first screen. Refer to the following section for details on using the Web-based interface.

Web-based Interface

The first screen is similar to Figure 2.

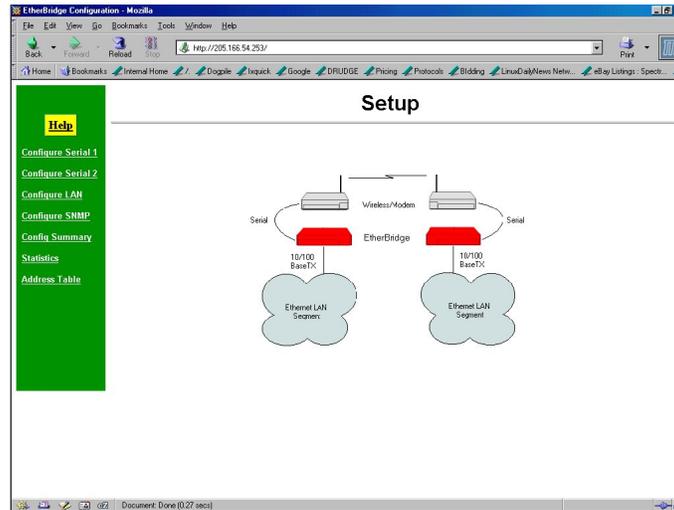


Figure 1: Sign on Screen

- Use the menu bar on the left to navigate to the desired screen.
- On-line help is available on each screen.
- Each screen is explained in the following sections.

Serial Configuration Screen



Figure 2: Serial Configuration Screen

This screen allows you to configure the Serial Ports on the bridge. The settings used should match the device connected to this serial port of the bridge. See Chapter 3 for details on these settings. There will be one screen for each serial port installed on the bridge. On a two port unit, the ports may be configured with different parameters.

Statistics Screen

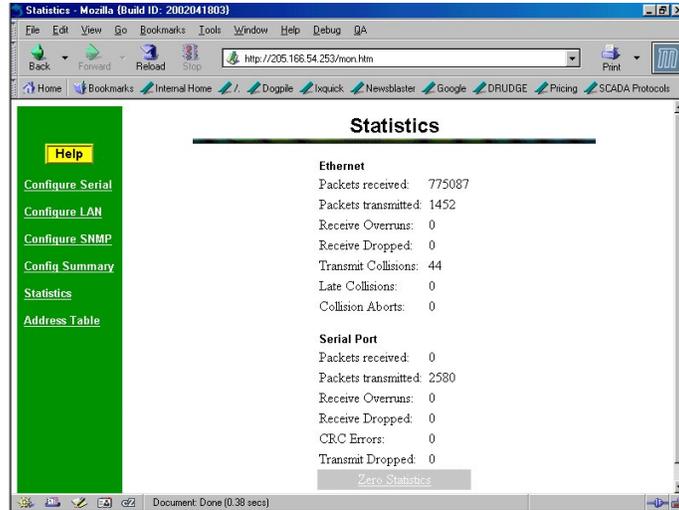


Figure 3: Statistics Screen

This screen displays details about the packets currently being transmitted or received, either through the LAN or Serial ports. The display is updated every 10 seconds.

Address Table Screen

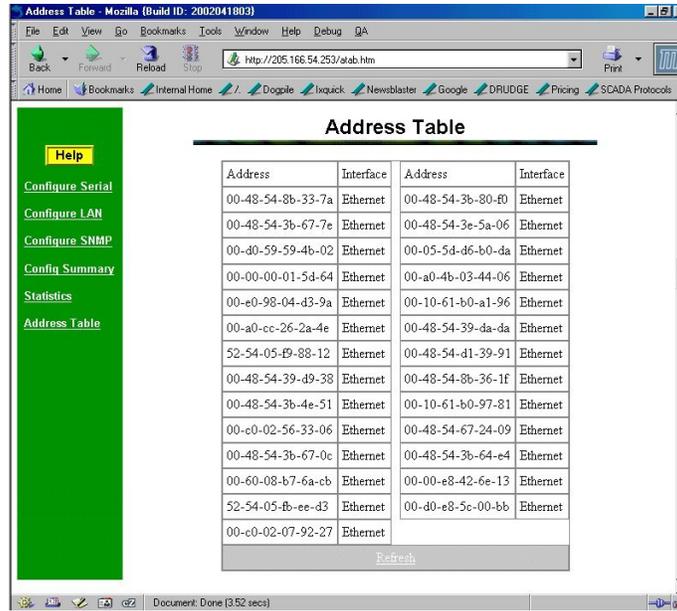


Figure 4: Address Table Screen

This screen lists the MAC address of each PC or network node that the bridge has heard. The table is limited to 256 values. If the table contains more information than one screen can display, additional information is displayed by pressing the "more" button.

LAN Configuration Screen

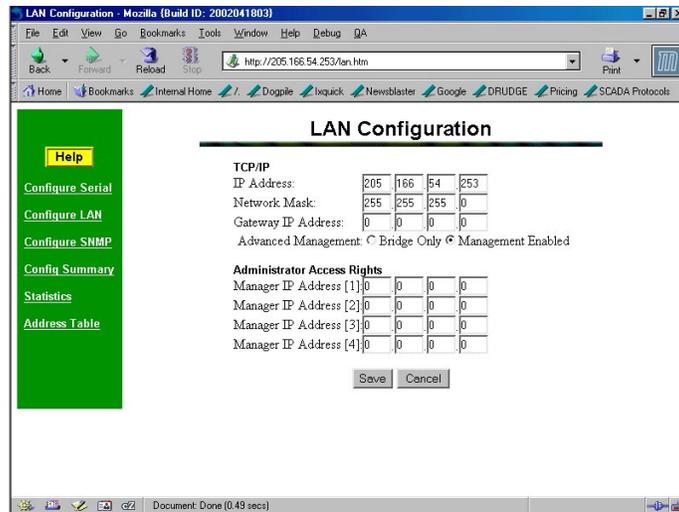


Figure 5: LAN Configuration Screen

This screen allows you to manage the Ethernet LAN configuration. See Chapter 3 for details.

SNMP Configuration Screen

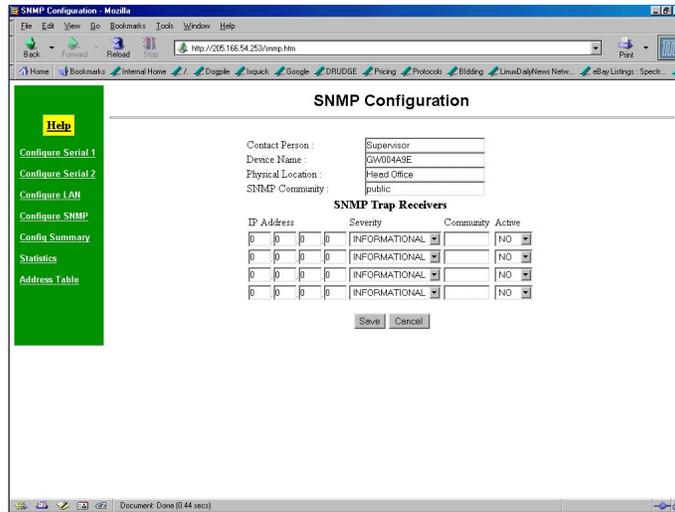


Figure 6: SNMP Configuration Screen

Overview

This screen may be ignored if SNMP is not used.

The text fields, commonly used in SNMP (Simple Network Management Protocol) Programs to identify this device when browsing the network, are required for SNMP operation. The community name should be changed from the default.

Trap information should match the values for your SNMP network monitor.

Configuration Summary Screen

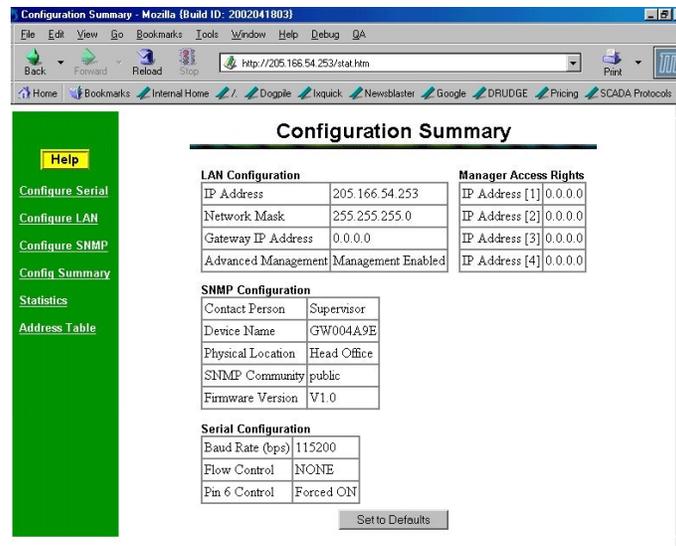


Figure 7: Configuration Summary Screen

Operation

- This screen displays all current settings for this bridge.
- Clicking the "Set to Defaults" button will restore ALL values to their factory default values. When this is done, the bridge will reboot, and the existing connection will be lost. You must reconnect using the default IP Address of 192.168.1.1.

Chapter 5

Configuration Security

This section discusses configuration options that restrict configuration .

Overview

The EtherBridge may be configured with several levels of security configuration and authentication. These restrict the ability of an unwanted user from changing the configuration of the EtherBridge. They do *not* restrict the ability of a remote device to deliver packets to the EtherBridge via its serial port or Ethernet port.

At the level 0, any workstation may be used to configure the EtherBridge via either telnet or web browser configuration. Level 1 restricts configuration to workstations claiming to be from one of four IP addresses previously stored in the EtherBridge. Either web-based or telnet configuration is allowed. Level 2 disables remote configuration using web browser, telnet, or SNMP in any combination. Level 3 requires a user name and password for remote configuration. Combinations of Level 2 and Level 3 are possible (ie. One may disable web browser configuration and SNMP and require a username/password for telnet configuration. The most secure method would be to disable all remote configuration.

The EtherBridge may always be configured using the direct connected terminal method. This requires physical access to the hardware, and pressing the configuration button while a terminal (or PC) is connected to the serial port. Although the EtherBridge may be Bridgeed using SNMP, and will report SNMP traps; it is not configurable via SNMP.

Level 0:

No specific security configuration is required. Make sure that no IP addresses have been entered in menu item 2, "Set Manager/Telnet IP Address" screen (or the "Administrator Access Rights" of the web browser "Configure LAN" screen). Also, any user name/password pairs that may have been entered on the terminal configuration/telnet "Security Configuration" screen should be cleared.

Level 1:

Using any configuration method, configure Administrator Access IP addresses. Enter the IP addresses that should have the ability to change the EtherBridge configuration. If configuring this remotely, insure that the workstation you are using is one of the valid addresses.

Level 2:

Using telnet or direct connection configuration, selectively enable or disable remote configuration via Telnet, via web

browser, and SNMP. This setting may not be performed from the web configuration screen.

Level 3:

Configure Level 1 and Level 2 security as needed. Using the telnet or direct connection configuration, enter up to three user name and password pairs. If there is at least one user name in this list, then a password prompt will be issued upon establishing a telnet configuration session.

There may be up to 3 user names and passwords configured. If no users are configured, password protection is disabled. User names and passwords are limited to 8 characters each. There is a six failed login attempt limit. After six failed attempts in a row, the unit will lock out all logins for a period of about 10 minutes.

Each user name has an associated user ID or index. The user with ID 1 is considered the master user. It has the ability to change the other user names and passwords. The other two user ID's are limited to only changing their own user name and password. All users may modify any other system parameters.

The serial interface is not subjected to user login since it requires physical access to the unit.

Security Configuration Screen

Chapter 6

Operation

This Chapter explains how to use the EtherSeries Bridge, once it is installed and configured.

Operation - Point-to-Point

- Two bridges should be configured as described in previous chapters.
 - Serial configurations on both bridges match the associated serial device.
 - LAN configuration is complete with appropriate IP addressing (**only needed if *Advanced Management* is used**).
 - **If the default serial speed of 115.2Kbps is used and *Advanced Management* isn't needed, there is no configuration required.**
- Power up both bridges and associated serial communications hardware.
- The bridges should automatically connect to each other and begin forwarding broadcast packets. As the bridges "learn" which MAC addresses are on each side of the bridge pair, they will begin forwarding appropriate packets to each other.
- Pin 6 input must be HIGH or Forced ON for the unit to send and receive packets over the serial link. When pin 6 is LOW, all serial packets are simply dropped. If your serial communications devices don't assert this signal (normally

DSR), then it can be forced on with the bridge configuration.

Operation - Second Serial Port

Configure the bridges as above for point-to-point operation. The second port on a bridge may be connected via any communications network to a third bridge to tie three networks together. **Do not connect two ports of a bridge to both ports of another bridge... that will confuse the learning process.**

Using the second serial port is equivalent to having two bridges on one LAN and connecting each to a different LAN segments.

Chapter 7

Troubleshooting

This chapter outlines some problems that may occur during installation or operation and some possible solutions to them.

If you follow the suggested troubleshooting steps and the EtherSeries Bridge still does not function properly, please contact your dealer for further advice.

Hardware Problems

Before anything else, check that all cables are wired correctly and properly connected.

P: All the LEDs are off.

S: Check the power supply or power connection.

P: When using 10/100Base-T cabling, the unit does not work.

S: Check the Hub's link LED for the port to which the bridge is connected. If it is off, make sure the network cable between the bridge and hub is in good condition.

Can't Connect via the LAN

P: Can't connect to the bridge using Telnet or Web Browser.

S: Check the following:

- Start troubleshooting from a known state. Power the bridge OFF and ON to reboot.
- Is *Advanced Management* configured ON?
- Is a proper IP address configured in the bridge?
- “Ping” the bridge to see if it responds. From the Windows command prompt or “Run” dialog box, use the command:

```
ping IP_Address
```

Where *IP_Address* is the IP Address of the bridge (e.g. `ping 192.168.1.1`). If it does not respond, then check all LAN connections. If the LAN connection are OK, the problem is in the LAN addresses or routing **The most common problem cause is incorrect IP addressing. Make sure the workstation and bridge have compatible IP addresses.**

- It may be that your "arp table" contains invalid entries. You can clear the "arp table" by rebooting, or, on Windows95 , by typing the following command at the command prompt or *Run* dialog box.: `arp -d`
- Check that you have used the correct port address for telnet access. The address is “8000” for configuration.
- MOST bridge connection problems are due to incorrect RS-232 wiring. Remember, there is no "standard" RS-232 wiring between devices. You may

need to contact your vendor for appropriately wired cables.

- In some cases, “smart” hubs and switches must be power-cycled to clear their internal arp cache. This is often a problem on test bench setups where IP addresses are moved between different equipment or a unit is moved between ethernet switch receptacles.

Other Problems

P: Can't run the configuration program using a serial cable connection.

S: Check that:

- The communication parameters are set properly.
- Disconnect and reconnect the power supply to the bridge.
- Power is available... a LED is on.
- The terminal program is operating properly. Try a loopback connector at the bridge end of the cable to verify program operation and the proper COM: port.
- The most common problems causing this symptom are incorrect RS-232 wiring or the Windows Hyperterm program not operating correctly.

Checking Bridge Operation

Once the bridge is installed on your Network, you verify proper operation by testing its functionality. If in basic bridging mode, attempt to send packets through it, to verify its operation. The procedure is as follows.

1. From a PC on one side of the bridges, ping a PC on the other side of the bridges, or attempt a web connection to a web server on the other side of the bridges. If either method succeeds, then two-way operation is confirmed.
2. If Advanced Management is enabled, ping the bridge from a PC or use the web browser screens to look at serial statistics and the address table.

Appendix A

Specifications

EtherSeries Bridge Specifications

- Flash Memory: 512 Kbytes
- SRAM: 512 Kbytes
- EEPROM: 512 Bytes
- LAN Buffer: 2 Kbytes
- RS-232 Buffer: 4 Kbytes
- RS-232: one male DE-9 connector
- RS-232 speed: Up to 230 Kbps
- Network: Ethernet 10Base-T/ 100Base-T
- CPU: 16 Bit
- Power: 5 VDC coaxial connector or 9-30 VAC or VDC. 120VAC power supply supplied
- Switch: Configuration
- LED: 3
- Default IP address: 192.168.1.1
- Telnet management port: 8000
- Operational Temperature -40C to +70C

RS-232 PIN Assignments

The EtherSeries RS-232 port wiring is identical to a standard PC 9 pin DE-9P COM: port. It operates as a DTE device. The chart below details signal directions and names.

Serial Port Pin Assignments		
Pin	Signal Name	Type
1	Carrier Detect (CD)	In
2	Receive (Rx)	In
3	Transmit (Tx)	Out
4	Data Terminal Ready	Out
5	Signal Ground (GND)	Power
6	Data Set Ready (DSR)	In
7	Request to Send (RTS)	Out
8	Clear to Send (CTS)	In
9	Ring Indicator (RI) (Not used)	In

Control Signal Operation

DCD

Input, ignored

Receive Data

Input, data into the bridge

Transmit Data

Output, Data from the bridge. The bridge only transmits when it has characters to send, Pin 6 is asserted, and it is not flowed-off with RTS/CTS flow control.

DTR

Output. Signal is enabled when the bridge has a valid signal on input pin 6 OR pin 6 (DSR) if forced on by configuration. When pin 6 input is LOW, the serial interface turns OFF the pin 4 (DTR) and 7 (RTS) output signals.

Signal Ground

Common ground

DSR

Input. Used for connection control. If the bridge is configured for "Hardware (Pin 6) from interface" and not "Forced ON", the bridge only transmits and receives data via the serial port when the signal is asserted. If configured for "Forced ON", the bridge may send and receive data via the serial port at any time. When pin 6 is LOW, the serial interface turns OFF the pin 4 (DTR) and 7 (RTS) output signals. When pin 6 is LOW, all

packets that would have been sent to the serial port are discarded.

RTS

Output. Input flow control. When the internal buffer reaches the “Flow Off” buffer level, this signal is lowered. When the buffer level decreases to the “Flow ON” buffer level, this signal is raised. When pin 6 input is LOW, the serial interface turns OFF the pin 4 (DTR) and 7 (RTS) output signals.

CTS

Input. When Flow Control is set for CTS/RTS, lowering this signal will halt data flow from the bridge's RS-232 port.

Ring Indicator

Not used

CABLES

Commonly used cable connections:

To PC 9-pin COM: port

SS-1		PC
1,6	—	4
2	—	3
3	—	2
4	—	1,6
5	—	5
7	—	8
8	—	7

This null-modem crossover cable is easily made by combining two “PC-Direct” adapter hoods with a mux-mux crossover cable. This cable is used for configuration and is available from your dealer.

Bridge to Modem

Use any commercially available PC-to-modem cable.

Appendix B

RS-422/ RS-485 Interface

This Appendix describes the RS-422/485 interface. This interface option may be jumper configured in the field or pre-configured at the factory.

Introduction

The 9-pin serial connector may be used for either RS-232, RS-422 (4-wire RS-485 point-to-point), or 2-wire RS-485 operation by changing software configuration settings on the Configure Port screens..

RS-422 / 4-Wire RS-485 Interface Pinout

Serial Port Pin Assignments		
Pin	Signal Name	Type
1	No Connection	N/A
2	Transmit Data (TX+)	Out
3	Receive Data (Rx+)	In
4	No Connection	N/A
5	Signal Ground (GND)	N/A
6	No Connection	N/A
7	Receive Data (Rx-)	In
8	Transmit Data (Tx-)	Out
9	No Connection	N/A

NOTE: Older versions of this product used a different pin out for RS-422 and RS-485. For plug-in compatibility with older units, order adapter part number 9802073 .

2-Wire RS-485 Interface Pinout

Serial Port Pin Assignments		
Pin	Signal Name	Type
1	No Connection	N/A
2	No Connection	N/A
3	Data +	In/Out
4	No Connection	N/A
5	Signal Ground (GND)	N/A
6	No Connection	N/A
7	Data -	In/Out
8	No Connection	N/A
9	No Connection	N/A

NOTE: Older versions of this product used a different pin out for RS-422 and RS-485. For plug-in compatibility, order adapter part number 9802073 .

RS-485 2-wire Fan-out

Since this unit is most often used as an RS-485 2-wire endpoint, it will support 32 devices on the RS-485 line. Use good engineer practice for RS-485 lines. Where applicable, include termination for long lines.

RS-422 / 4-Wire RS-485 Interface Pinout With Optical Isolation

The Optical Isolated version uses screw terminal connectors.

Serial Port Pin Assignments		
Pin	Signal Name	Type
1	Transmit Data (TX+)	Out
2	Transmit Data (Tx-)	Out
3	Receive Data (Rx+)	In
4	Receive Data (Rx-)	In
5	Signal Ground (GND)	N/A

Appendix C

Multi-Point Firmware Option

This Appendix describes configuration and use of the multi-point firmware option.

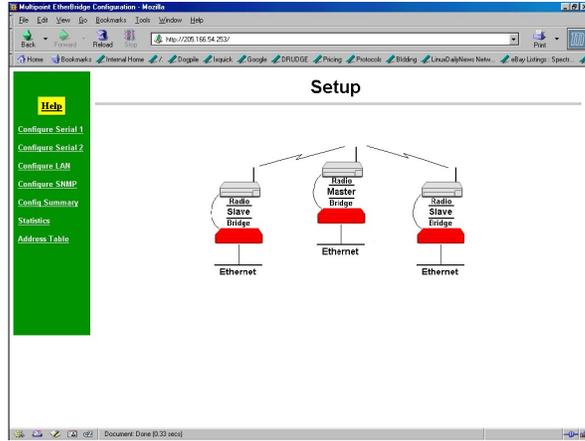
Introduction

The bridge may be supplied with optional point-to-multi-point firmware. This option enables the bridge to communicate with multiple bridges via the same serial port by using a multi-point (also known as a master/slave) communications network. The most commonly used methodology is via ISM band spread spectrum radio modems.

Multi-point operation requires several additional configuration settings. Multi-point bridges may be used in point-to-point applications, however their throughput or bandwidth will be lower than point-to-point firmware bridges due to the additional overhead required to handle multi-point operation.

Overview

If Multi-point firmware is installed in the EtherBridge, the sign-on web screen will differ from the standard unit shown earlier. It will be similar to the screen shown below:



Multi-Point Sign-on Screen

Additional Configuration

There are four additional parameters required for multi-point operation. After basic configuration, the timeouts may be "tuned" for best throughput.

Drop ID

The identification number for THIS unit. If this is the master bridge, then its Drop ID should be 0 . Drop unit ID numbers may range between 1 and 255. They should be numbered beginning at 1 and run consecutively.

Maximum Slave ID

The ID number of the highest numbered slave unit. The master bridge will poll slaves beginning at ID 1, and stopping at this ID number. If there is only one slave, this entry should be "1".

Fast Timeout

The maximum amount of time, in milliseconds, the master unit will wait for a slave to start responding to a poll. The setting is dependent upon the baud rate and the quality of the link between the Master and the Slaves. For the Wireless Transceivers running at 115K baud, 250ms is a good starting point. This value is set in the master unit only.

Slow Timeout

This item sets the maximum amount of time, in milliseconds, the master unit will wait for a slave to send a complete response. The setting is dependent upon the baud rate and the

quality of the link between the Master and the slaves. For the Wireless Transceivers running at 115K baud, 1000ms is a good starting point. This value is set in the master unit only