

Megabit Modem

MODEL 400F

USER MANUAL



Catalog Number
MMD4076I1
Issue 1



Copyright

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ABOUT THIS USER MANUAL

Use this manual to install and configure the Megabit Modem 400F. This manual provides instructions on:

- information you will need to configure the modems
- unpacking and inspecting the modems for installation
- installing the modems
- setting up parameters for your applications that will be used to configure the modems
- configuring system parameters
- configuring sessions between the modem and a service provider
- monitoring and troubleshooting the modems

[Chapter 9](#) provides a technical reference for implementing data transmission in the Megabit Modem 400F. The chapter covers information about Asymmetric Digital Subscriber Line (ADSL), rate adaptive transmission, the bridging/routing operating mode, and Simple Network Management Protocol (SNMP) management.

IP addresses used in this manual are for example only. You will acquire your own addresses from your information services coordinator to configure the Megabit Modem 400F. You will, however, use the IP address specified in “[Accessing the 400F Web Pages](#)” on [page 23](#) to access the Megabit Modem 400F from a Web browser.

DOCUMENT CONVENTIONS

Two types of messages, identified by icons, appear in the text.



Notes contain information about special circumstances.



Cautions indicate the possibility of equipment damage or the possibility of personal injury.

PRODUCT CERTIFICATIONS

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

UL

The Megabit Modem 400F meets all safety requirements per UL-1950 and cUL standards.

CE

The Megabit Modem 400F meets all EMC and safety requirements per EN 300 386-02 and IEC 950.

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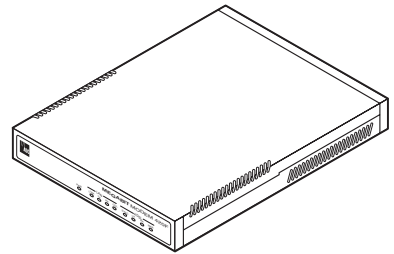
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ABOUT THE PRODUCT

1

You have purchased the ADC Megabit Modem 400F that connects your Ethernet LAN to service providers for instant and high-speed access to the Internet or to other types of Wide Area Network (WAN) applications. The modem provides this service over a single-pair telephone line with downstream ADSL transmission up to 7.552 Mbps. The upstream ADSL transmission is up to 928 kbps. You can also receive telephone service over the same single-pair line as your data.



The Megabit Modem 400F uses ATM over DMT ADSL technology to provide this high-speed transmission between the modem and the service provider. Asynchronous Transfer Mode (ATM) provides transmission of fixed-size cells over preestablished connections for a network interface that is predetermined and always in place. The Asymmetric Digital Subscriber Line (ADSL) provides rate-adaptive transmission which means that the service provider can deliver the best possible transmission rate to you based on distance and line conditions, in addition to providing phone service to you over the same single-pair line.

The Megabit Modem 400F is easy to install and configure. To install the modem:

- connect a telephone cable from the modem to a wall phone jack for ADSL service
- connect a cable from the modem to a PC or an Ethernet hub for LAN service
- connect a power cable to a local power source

To configure the modem, launch a Web browser on your PC and load the Megabit Modem Configuration and Management Tool Web pages that guide you through configuration. Use the Web page called EasySession™ to configure up to 32 simultaneous sessions with service providers. You can also configure other system parameters and monitor ADSL, LAN, and other networking functions using the Web pages.

LEDs on the modem front panel provide continual status at-a-glance for network and modem connections.

FEATURES

The Megabit Modem 400F provides:

- rate-adaptable ADSL transmission downstream at up to 7.552 Mbps and upstream at up to 928 kbps
- Internet or other types of WAN applications and phone service over your existing phone line
- Bridging/routing protocol RFC 1483 encapsulation method
- Dynamic Host Configuration Protocol (DHCP) server to provide network configuration information including IP addresses to LAN devices
- TFTP to download software
- AccessGain™ software that provides access through an HTTP server to configure, manage, and monitor the modem through a Web-based interface
- SNMP agent for management through any industry standard SNMP platform
- autosensing 10/100BASE-T Ethernet port for connection to the LAN
- DSLview™ LEDs that provide continual status at-a-glance for power, LAN, and ADSL connections
- ATM technology with 32 virtual channels allowing 32 simultaneous sessions

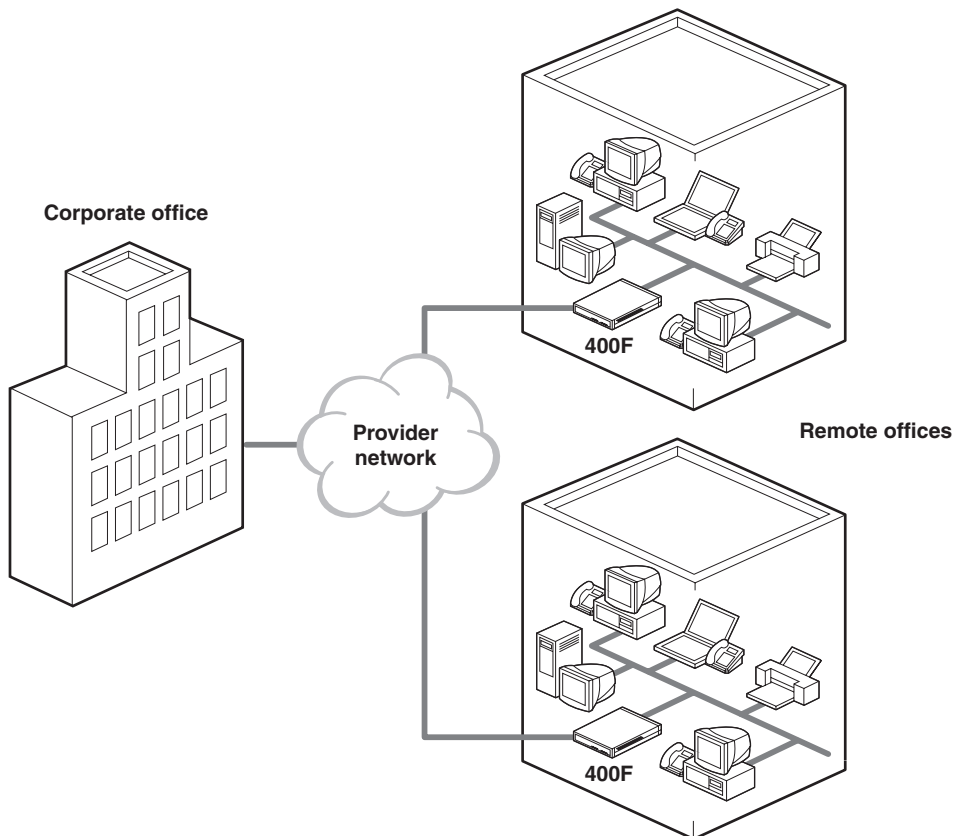
[Chapter 9, “Technical Reference” on page 61](#) provides more information about the technologies implemented in the Megabit Modem 400F.

APPLICATIONS

The Megabit Modem 400F provides a practical solution for many networking applications. The following illustrations show some of the many possible solutions when using the Megabit Modem 400F.

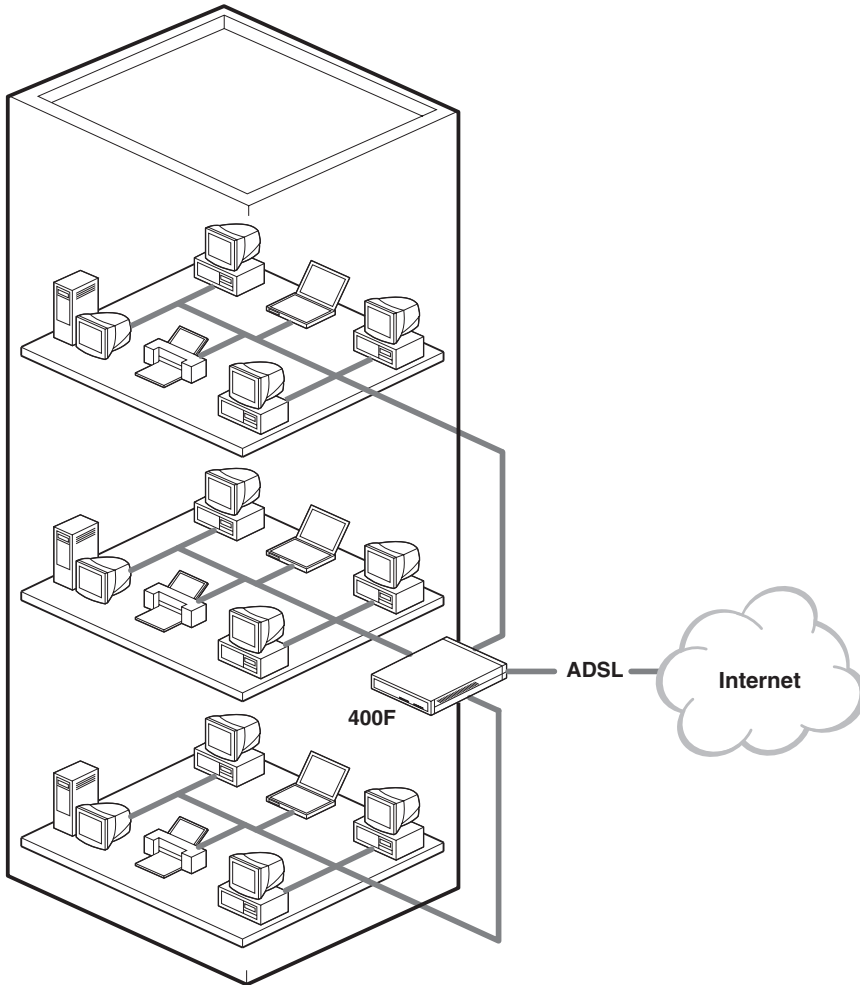
Connection Between a Remote Office and a Central Site

You can connect remote offices to a corporate office network.



Internet Access for Larger LANs

You can connect businesses with large LANs to the Internet.



WHAT YOU NEED TO START

2

This chapter identifies the preparations and prerequisites for installing the Megabit Modem 400F. To install the modem, verify that:

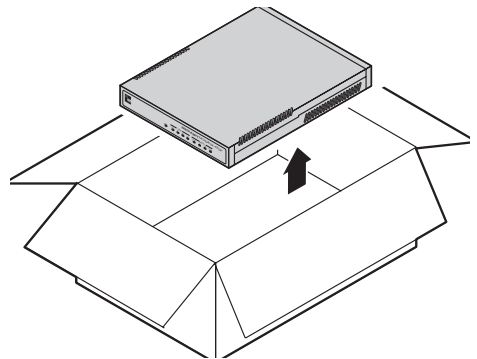
- the contents of the package are accurate as described on this page
- your system meets requirements for connecting to and configuring the modem (see [“Requirements For Your System”](#) on page 6)
- your facility meets installation site requirements (see [“Requirements For The Installation Site”](#) on page 6)
- the configuration parameters are available from your service provider (see [“What You Need from Your Service Provider”](#) on page 9)

VERIFY PACKAGE CONTENTS

As you unpack the Megabit Modem 400F, visually inspect the container for signs of damage. If the equipment was damaged in transit, report the damage to the transportation company and to the sales representative.

Check the contents of the package for the Megabit Modem 400F and the following:

- one black cable
- one grey phone cord
- four rubber, self-adhesive feet
- two screws
- power supply and optional power cord (see [“Power Cable”](#) on page 10 for options)
- grey cable and DB-9 console port adapter



If you need to store the modem for a prolonged period, store it in the original antistatic bag and packaging. Observe environmental specifications as stated on [page 69](#).

REQUIREMENTS FOR YOUR SYSTEM

You need the following hardware and software to complete the installation and configuration of the Megabit Modem 400F:

- PC with an Ethernet Network Interface Card (NIC)
- TCP/IP network protocol stack (see your documentation for your operating system)
- Web browser installed such as Netscape® or Internet Explorer® Version 4.0 or higher
- Ethernet hub (optional)

REQUIREMENTS FOR THE INSTALLATION SITE

To install the Megabit Modem 400F:

- select a location to install the modems as described in the section “[Location for Modem Installation](#)” on this page
- identify requirements to connect phones, if you get phone service, as described in the section “[Phone Service](#)” on [page 9](#)

Location for Modem Installation

You can install the modem either:

- placed on a flat surface (shown on [page 7](#))
- mounted on a wall (shown on [page 8](#))

Your facility must have the following minimum site requirements to install each modem:

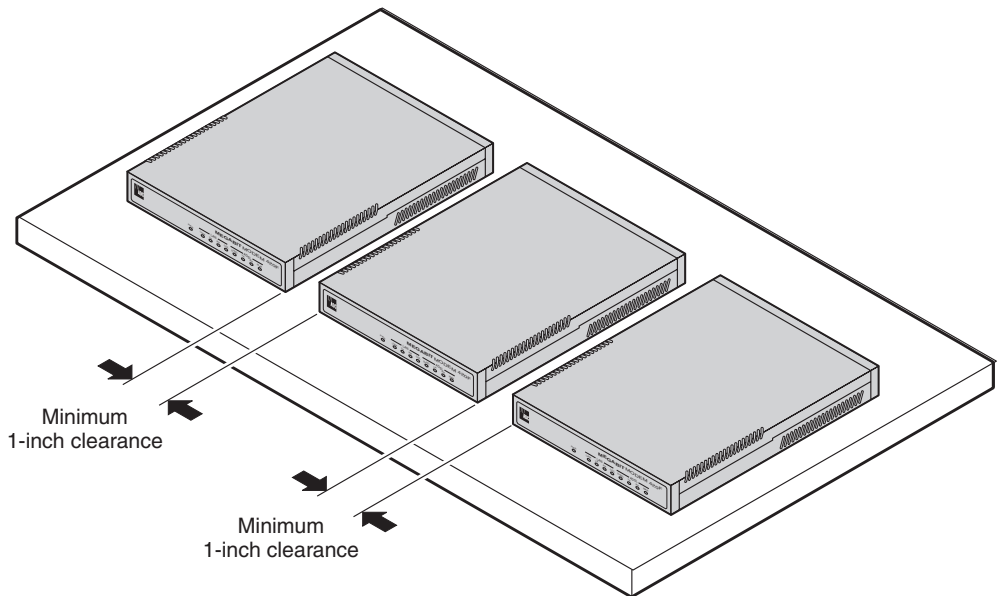
- power outlet
- RJ-11 wall jack that has DMT ADSL service available

Flat-Surface Mount



Do not stack the modems when installing on a flat surface. The modems do not dissipate heat properly when stacked.

Place the modems on a flat surface, such as on a table or in a rack.

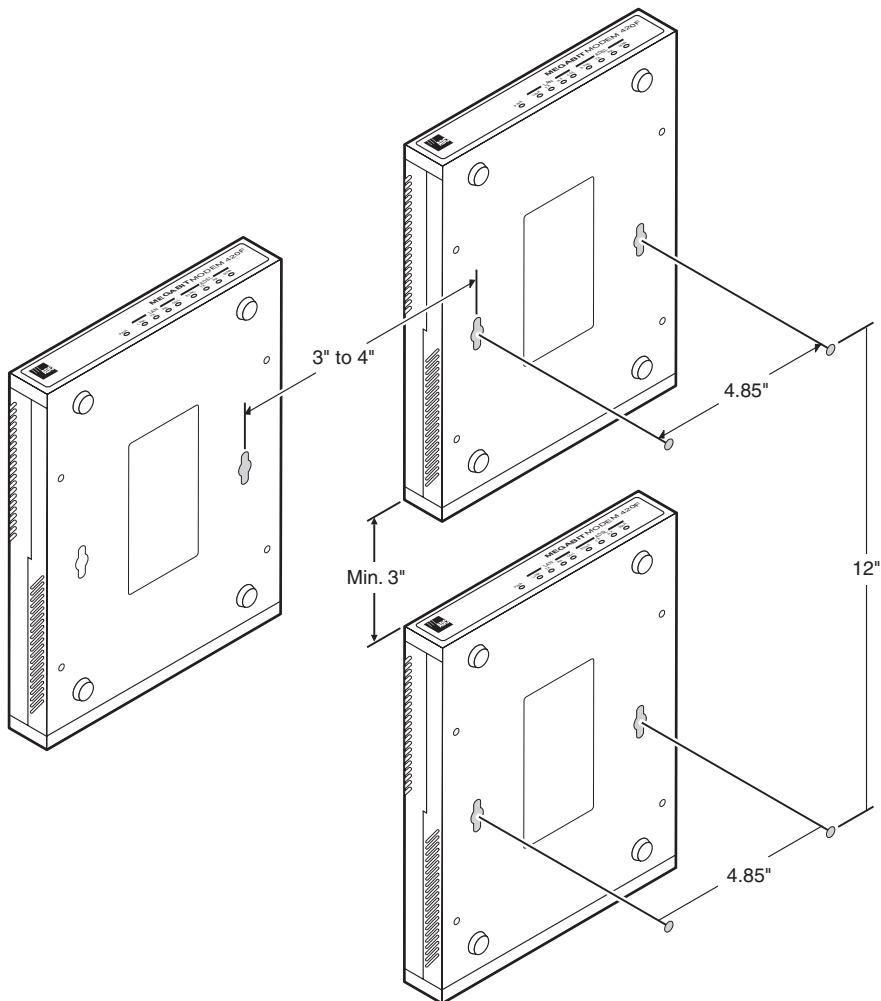


Wall Mount



Ensure the minimum dimensions (shown in the illustration) for spacing between modems are met to allow for heat dissipation, viewing of front panel LEDs, and cabling.

Mount the modems on a wall using the hardware included in the installation kit. Observe the minimum dimensions between multiple modems (shown in the illustration) to ensure sufficient ventilation for heat dissipation.



Phone Service

If you get phone service with your data service, you need the following:

- A POTS splitter, or micro filter may be required; check with your service provider
- RJ-11 phone jacks for phone service

The POTS splitter is a device that separates data transmission from phone service. After installing the POTS splitter, connect separate jacks for data from your session and for phone service. Ensure that your service provider indicates which jacks are for data and which jacks are for phone service.

WHAT YOU NEED FROM YOUR SERVICE PROVIDER

This section lists the information you need to configure system settings and sessions for the modem. Contact your service provider for this information. Use the worksheets, provided in [Appendix C on page 83](#), to record your configuration information. When you begin to configure the modem in [Chapter 4 on page 17](#), the procedures refer you to the proper table for the configuration information that you recorded.

- 1 System mode (WAN connection for the sessions between the modem and the service provider) utilizes Bridge/Router RFC 1483 protocol.
 - Configure as a Bridge only, as a Router only, **or** as a Bridge and Router.
 - Choose LLC or VC-MUX encapsulation.
 - If Router, choose version of and direction for RIP (RIP1, RIP2, or RIP1 compatible).
 - If Bridge, select whether or not to enable Spanning Tree.
- 2 Session address for Ports 1 through 32 (WAN configuration):
 - ATM VPI and ATM VCI (specified for each session)
 - IP address specified for each session by the service provider

For more information about the configuration choices listed above, see [Chapter 9, “Technical Reference” on page 61](#).

WHAT YOU WILL CHOOSE

Before configuring the modem, consider the options in the “[Configuration](#)” section, below. Also, ensure that you have the appropriate power cable for your facility as described below in the section “[Power Cable](#).”

Configuration

You can choose to use:

- Domain Name System (DNS) resolution. You must specify the IP address for a device to serve as the DNS resolver. You can also specify a second IP address to designate another device to serve as a secondary DNS resolver. The DNS device maps human-readable addresses to IP addresses. For more information about DNS resolution, see “[DNS Resolution](#)” on page 68.
- TFTP server for downloading software updates to the modem. You specify the IP address, subnet mask, and directory path (where software updates are located) for the device that will be the TFTP server.

Power Cable

The Megabit Modem 400F is available with a variety of power supplies and power cords. When you order your modem, indicate which power option you need:

- a power supply for International use that does not include a power cord.
- a power supply for North American use that includes a North American power cord.
- a Universal power supply that includes a European power cord.
- a Universal power supply that includes a UK/Ireland power cord.

INSTALLING THE MODEM

3

The Megabit Modem 400F is easy to install:

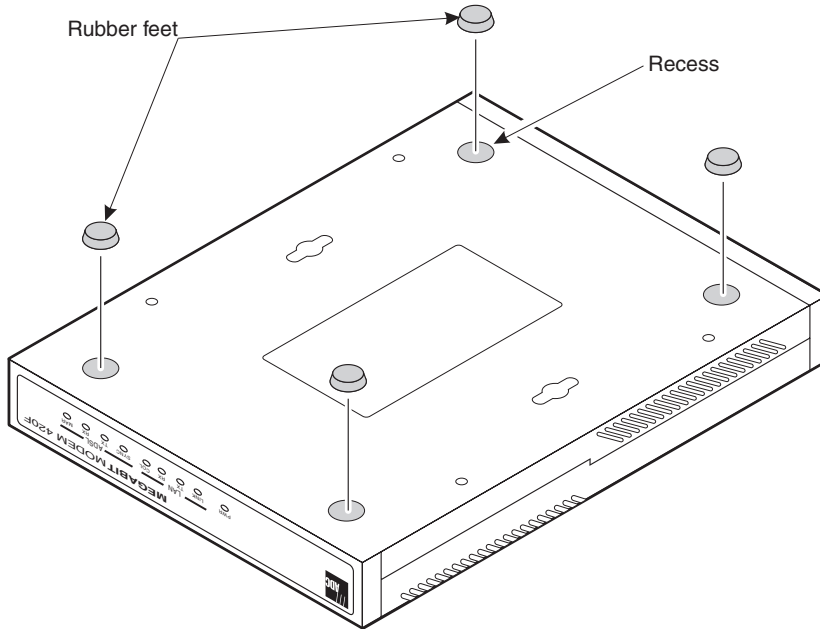
- attaching adhesive-backed feet
- setting the MDI/MDI-X switch
- connecting a cable from the modem to a PC or an Ethernet hub for LAN service
- connecting a phone cord from the modem to a wall phone jack for DMT ADSL Internet or other types of WAN services
- connecting a power cable to a local power outlet

Perform the installation on the following pages (see [“Location for Modem Installation”](#) on [page 6](#) to determine where to place modems). Use the parts listed below in the installation procedures.

Part	Function
Installation Kit	
Rubber feet (four)	Attaches to the base of the modem.
Black cable	Connects the modem 10/100BASE-T connector to the LAN through a hub or to a PC NIC.
Grey phone cord	Connects the modem ADSL connector to the RJ-11 wall jack with DMT ADSL service for access to the Internet or other types of WAN applications.
Power cable	Connects the modem POWER connector to the local power source. Power supply optionally has a power cord. (See “Power Cable” on page 10 for selection options.)
Not In Installation Kit (in ship box)	
Grey cable and adapter	Connects the RS-232 MGMT port to an ASCII terminal or a PC running terminal emulation software. Adapter assembly connects to a DB-9 connector on the PC. Then, one RJ-45 connector installs in the adapter and the other connector into the console port on the modem.

ATTACHING THE FEET

Attach each of the four adhesive-backed rubber feet to a footprint recess on the bottom of the modem.

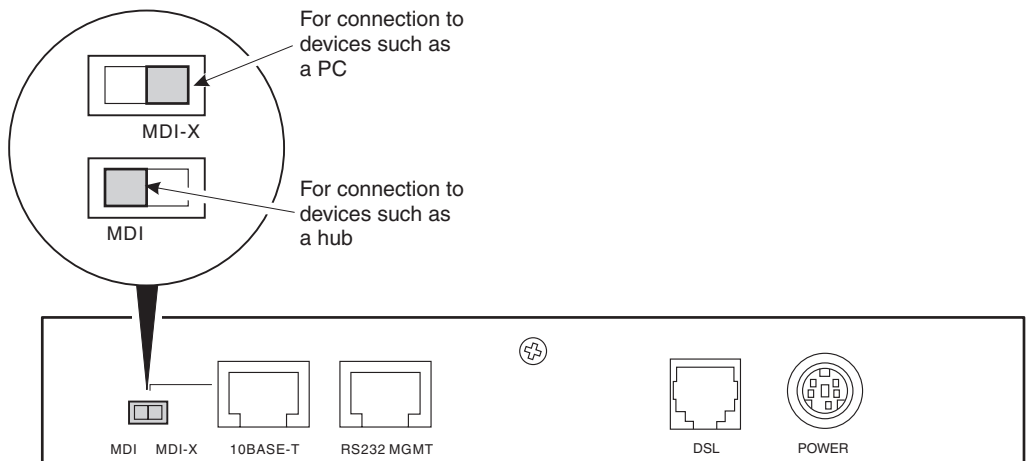


SETTING THE MDI/MDI-X SWITCH

Using the MDI/MDI-X switch, the Megabit Modem 400F can communicate with a device on the LAN that is either MDI or MDI-X without having to change the cable (a straight-through cable is supplied with the installation kit).

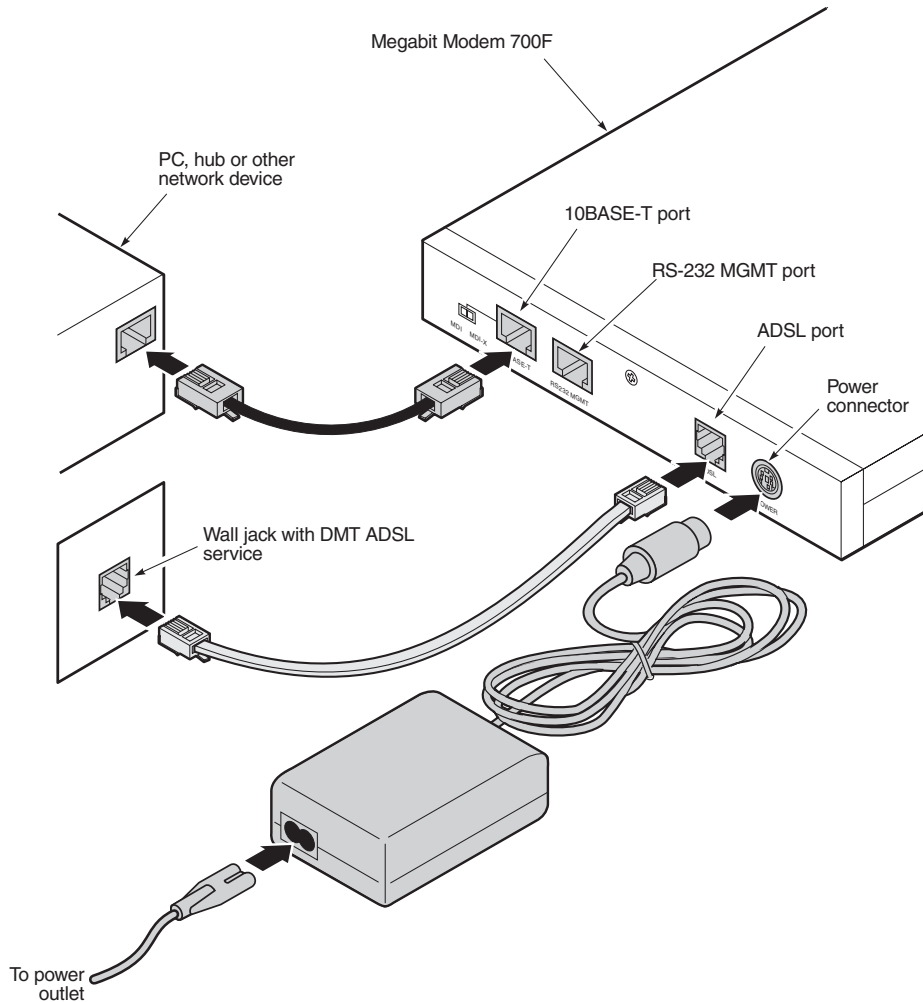
Set the switch for the 10/100BASE-T port to either:

- MDI-X when you are connecting to a device with an MDI port such as a PC with an Ethernet NIC
- MDI when you are connecting to a device with an MDI-X port such as a hub, repeater, bridge, or router



INSTALLING CABLING

Install the black cable for the 10/100BASE-T LAN connection, grey phone cord for the ADSL port WAN connection, and the power cable to the power connector (power cable specified on [page 11](#)).



If you need pinouts for the ADSL and 10/100BASE-T connectors, see [“Connector Pinouts”](#) on [page 75](#). For information on how to use the RS-232 management port for maintenance, see [“Using the RS-232 Management Port”](#) on [page 57](#).

SETTING UP ADSL SERVICE

The service provider sets up the ADSL parameters for your service. The modem must have the ADSL SYNC LED lit before you can connect sessions with your service provider. Verify SYNC in the following section, “[Checking LED Indications.](#)”

CHECKING LED INDICATIONS

The section below describes LED indications for all operational modes. LEDs on the modem front panel provide continual status at-a-glance for network and modem connections.

LED	State	Description
PWR	On green	Modem has power.
	Off	Modem does not have power.
LAN		
LINK	On green	A PC, hub, or other network device is connected to the modem 10/100BASE-T interface.
	Off	No device is connected to the modem 10/100BASE-T interface.
TX	Flashing green	Modem is transmitting data to devices on the LAN.
	Off	Modem is not transmitting data to the LAN.
RX	Flashing green	Modem is receiving data from devices on the LAN.
	Off	Modem is not receiving data from the LAN.
COL	Flashing green	Collision detected on the 10/100BASE-T port..
	Off	No collisions detected.
ADSL		
SYNC	On green	ADSL transceiver is synchronized and in normal operation mode.
	Flashing green	ADSL transceiver is in a start-up sequence.
	Off	ADSL transceiver is not synchronized or is in a mode other than normal operation or startup.
TX	Flashing green	Modem is transmitting data to the service provider.
	Off	Modem is not transmitting data to the service provider.
RX	Flashing green	Modem is receiving data from the service provider.
	Off	Modem is not receiving data from the service provider.
MAR	On green	ADSL margin is at or above the value set by the service provider.
	Off	ADSL margin is below the value set by the service provider.

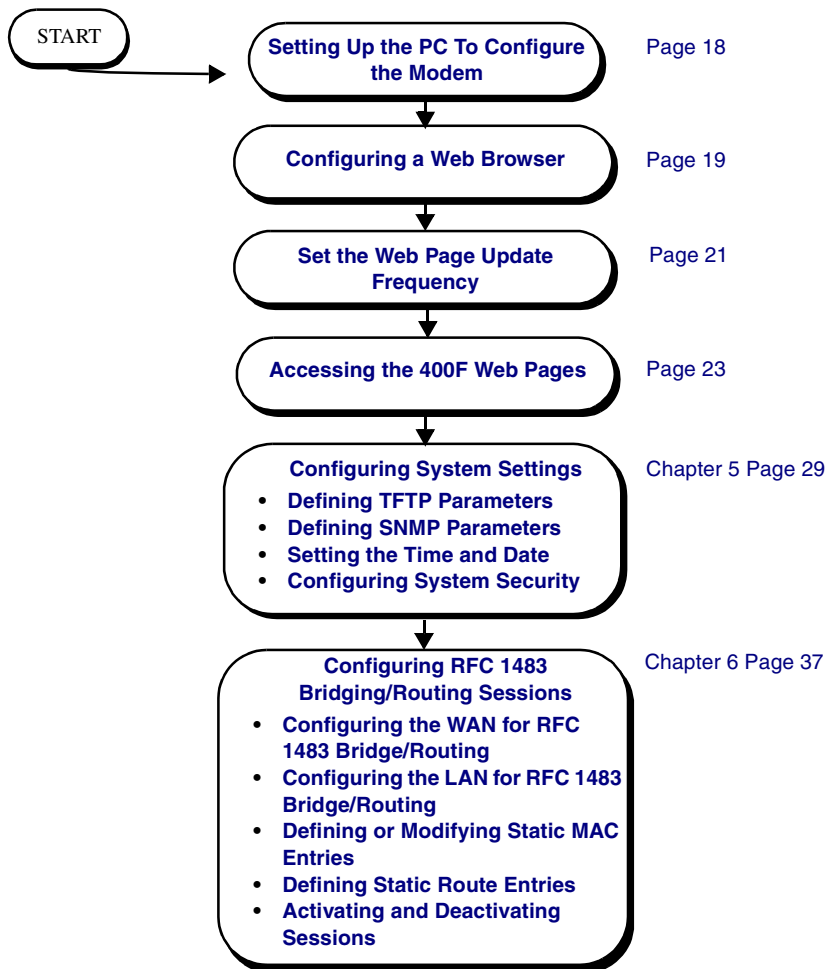
CONNECTING PHONE SERVICE

The service provider will supply a POTS splitter that separates the data transmission from phone service. You will have one or more jacks for phone service and one jack for ADSL data service. Connect your phones to the jacks indicated by the service provider for phone service.

SETTING UP FOR CONFIGURATION

4

Set up a PC and a Web browser to configure the Megabit Modem 400F. This chapter provides the set up procedures, then shows you how to access and navigate the Megabit Modem 400F Web pages. The configuration process flow is shown below.

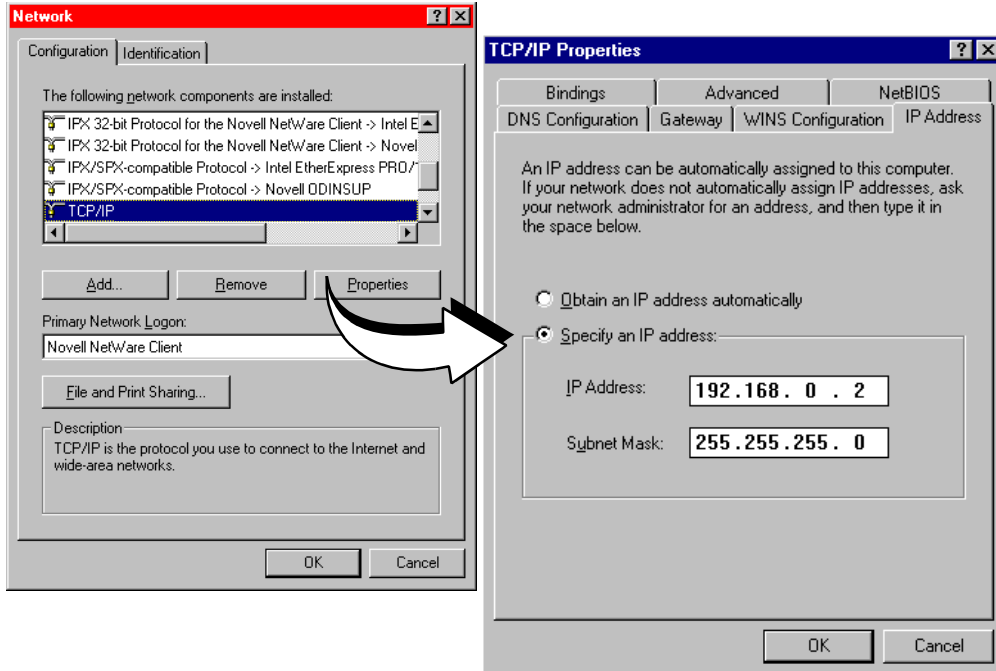


SETTING UP THE PC TO CONFIGURE THE MODEM

Configure the Megabit Modem 400F using a PC connected to the 10/100BASE-T port. The PC must be set to **Specify an IP address** to initially access the modem. Enter an IP address for PC NIC card that is on the same subnet as the IP address for the modem. If you want to view or change the default IP address for the modem, see “Using the RS-232 Management Port” on page 57.

The following is an example of how to set up the PC using Microsoft Windows® 95. If you use an operating system other than Windows 95, refer to the appropriate operating system user documentation.

- 1 Open the **Control Panel** window and double-click on the **Network** icon shown at right.
- 2 In the **Network** dialog (shown below), double-click **TCP/IP** under the **Configuration** tab (or highlight **TCP/IP** then click **Properties**).
- 3 In the **IP Address** tab, select **Specify an IP address**.
- 4 Enter an IP address and subnet mask for the PC, then click **OK**.
- 5 Restart the PC.



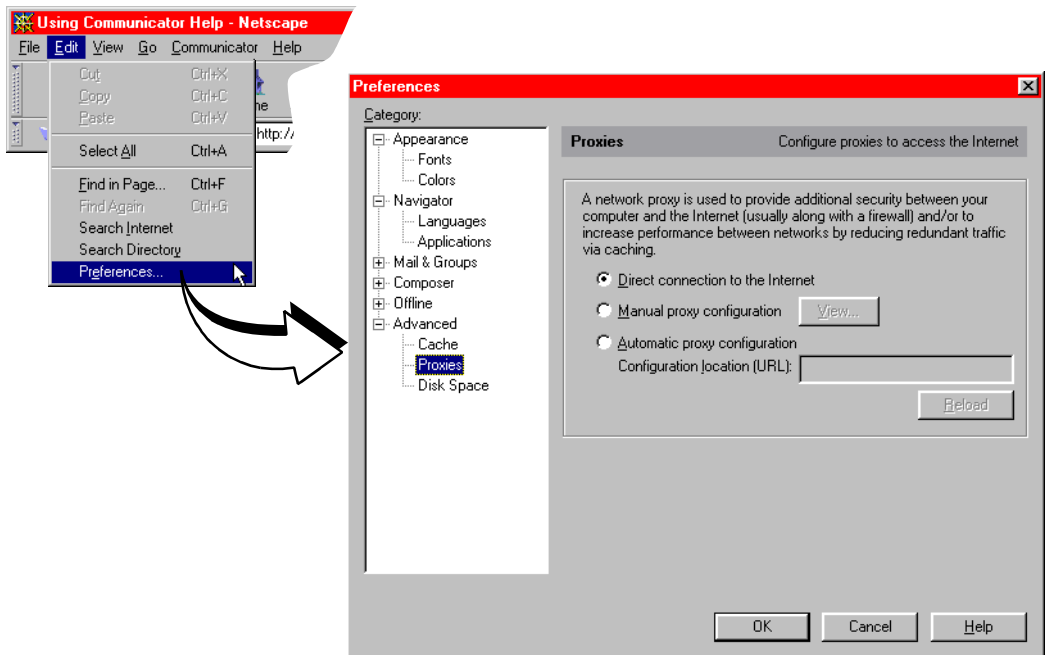
CONFIGURING A WEB BROWSER

Access the Megabit Modem 400F Web pages through a Web browser (see [Page 6](#) for Web browser versions supported). The Web browser must have the Proxies disabled. Change the Proxies for your Web browser.

The procedures include steps for both Netscape and Internet Explorer Web browsers.

Disable the Proxies for Netscape:

- 1 Open a Web browser.
- 2 Select **Edit, Preferences, Proxies**.
- 3 Select **Direct connection to the Internet**, then click **OK**.
- 4 .
- 5 .



Disable the Proxies for Internet Explorer (version 5.0.0) :

1 Open the Web browser.

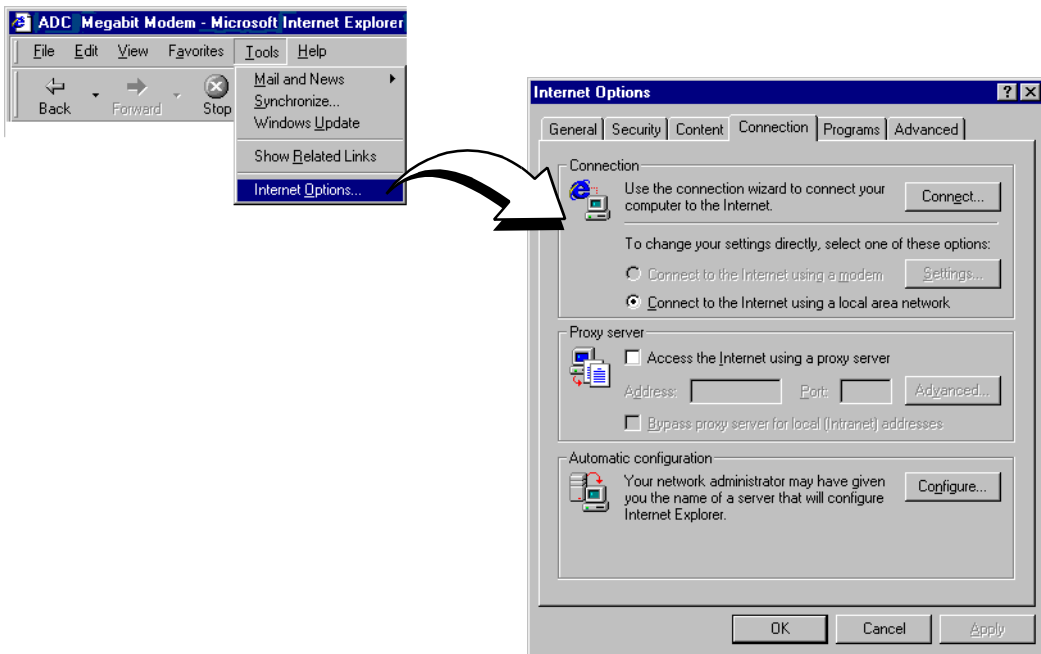
Select **Tools, Internet Options**, and the **Connection** tab.

If you have a version of Internet Explorer earlier than 5.0.0, **Internet Options** may be found under the **View** options.

2 Select **Connect to the Internet using a local area network**.

3 Ensure **Access the Internet using a proxy server** is not selected.

4 Click **OK**.

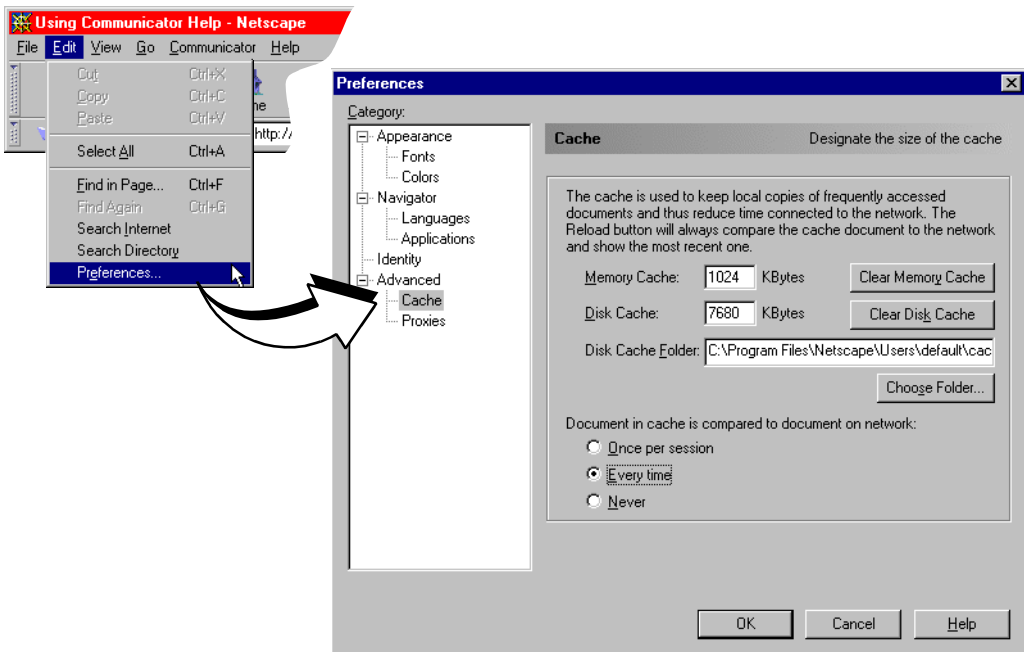


SET THE WEB PAGE UPDATE FREQUENCY

Set the update frequency on the Web browser so that you are viewing current rather than cached Web pages for the modem.

Set the Netscape Web page for update frequency:

- 1 Open the Web browser.
- 2 Select **Edit, Preferences, Cache**.
- 3 Select **Every time** under **Document in cache is compared to document on network**.
- 4 Click **OK**.

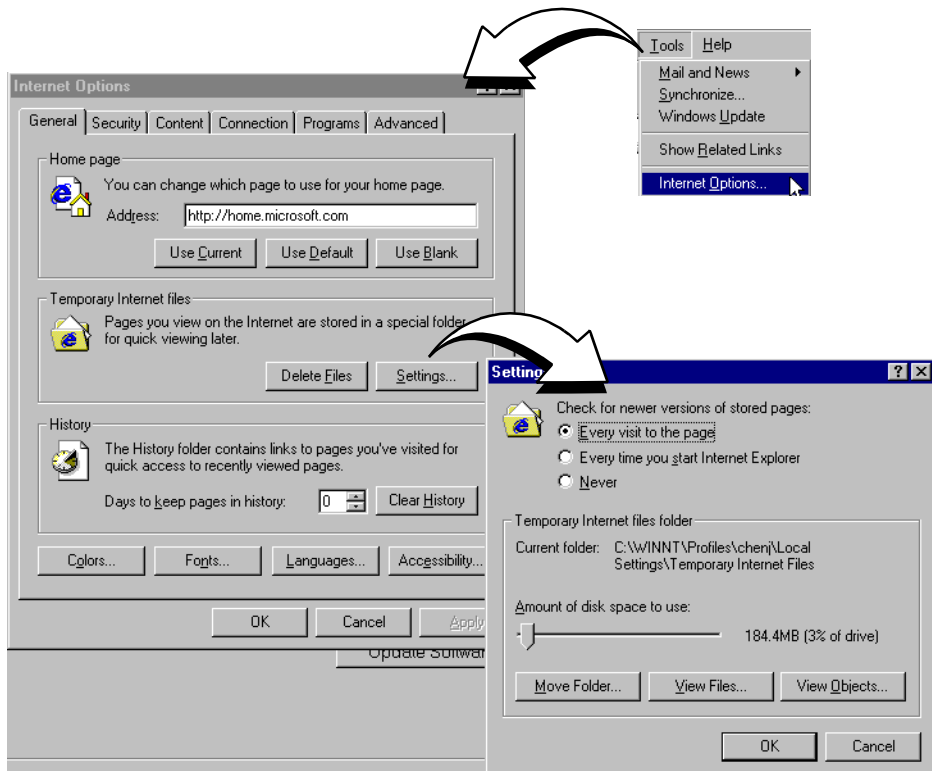


Set the Internet Explorer (version 5.0.0) Web page for update frequency:

- 1 Open the Internet Explorer Web browser.
- 2 Select **Tools**, then **Internet Options**.

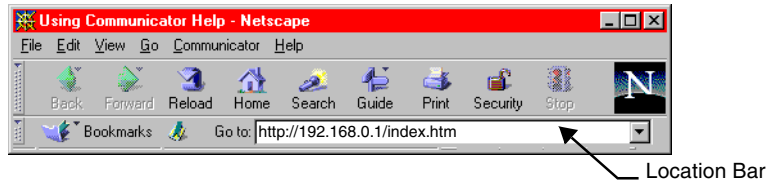
If you have a version of Internet Explorer earlier than 5.0.0, **Internet Options** may be found under the **View** options.

- 3 Select **Settings** under the **General** tab in the **Temporary Internet files** box.
- 4 Select **Every visit to the page** under **Check for newer versions of stored pages**.
- 5 Click **OK**.



ACCESSING THE 400F WEB PAGES

Type `http://192.168.0.1` in the **Location Bar** field of the Web browser (as shown below), then press **ENTER**. (192.168.0.1 is the default IP address for the Ethernet port and is a private address specified for use by RFC 1918. If you change the Ethernet IP address through the management port, you will enter the new IP address in the **Location Bar**.)



The Megabit Modem 400F Web page displays with two primary frames:

- Frame A contains the navigation menus. Use the menus to select the configuration or management page you want to view in Frame B.
- Frame B displays the configuration or management page associated with the menu item you selected from the navigation menu in Frame A.

Megabit Modem Configuration and Management Tool

<p>Main Menu</p> <p>Easy Session</p> <p>System</p> <p>ADSL</p> <p>Statistics</p> <p>Home</p>	<p style="text-align: center;"><i>The configuration and management tool for the Megabit Modem allows the user to:</i></p> <ul style="list-style-type: none"> • Setup the Megabit Modem • Configure the connection to your service provider • Monitor performance Configuration <p style="text-align: center;">Model: <input style="width: 50px;" type="text" value="400F"/></p> <p style="text-align: center;">BSP Version: <input style="width: 50px;" type="text" value="3.0.0(1)"/></p> <p style="text-align: center;">Software Version: <input style="width: 50px;" type="text" value="3.1.2"/></p> <p style="text-align: center; font-size: small;">Copyright 1998 FairGain Technologies Tustin, California USA http://www.fairgain.com</p>
---	---



The BSP Version and Software Version numbers reflect the current software version that you have on your modem. The version shown in the figure above is for example only.

SAVING THE CONFIGURATION

As you make changes to the modem configuration, click the **Submit** button on the Web page to accept changes and write the changes to RAM. Some configuration changes are not permanent, however, until you write them to Non-Volatile RAM (NVRAM) and reset the modem. You must reset the modem to effect these changes:

- LAN IP address
- LAN network mask
- when DHCP is enabled (see [Page 41](#) Bridge/Router system mode):
 - primary DNS IP address
 - secondary DNS IP address
- RIP version (see [Page 39](#) for selecting version and direction for RIP)

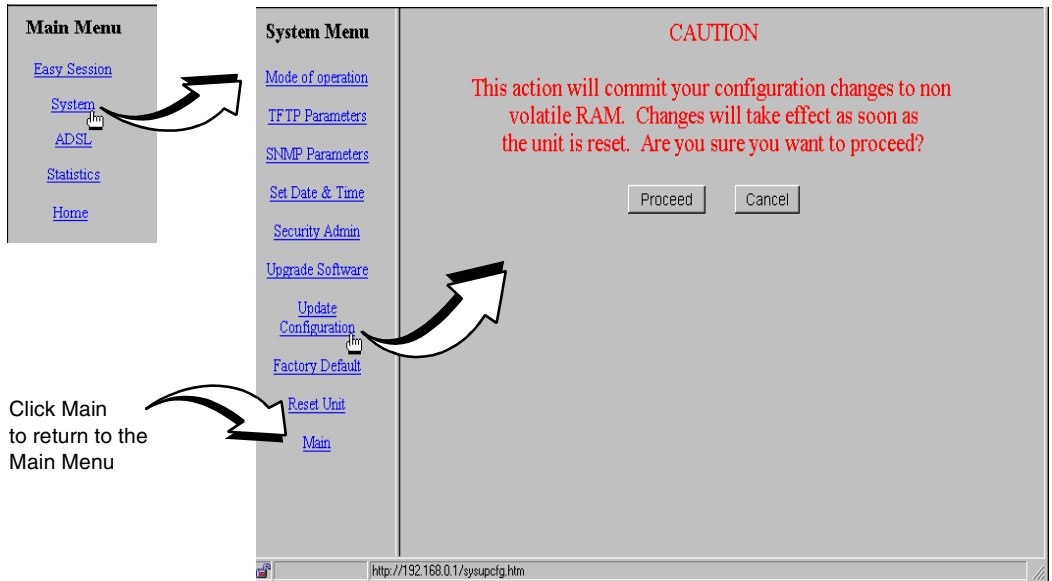
See the following sections to:

- save configuration changes to NVRAM on [Page 25](#)
- reset the modem to activate the configuration on [Page 28](#)
- reset the modem to restore the factory default values on [Page 26](#)

Saving the Configuration to NVRAM

Click **Submit** to write configuration parameters to RAM, then update your configuration by writing the parameters to NVRAM.

- 1 Click **System** on the **Main Menu** to access the **System Menu**.
- 2 Click **Update Configuration** on the **System Menu**.
- 3 Click **Proceed** to save to NVRAM.
- 4 Reset the modem to effect configuration using the procedure on [Page 28](#).
- 5 Click **Cancel** to return to the system menu.



Resetting the Modem to Factory Defaults

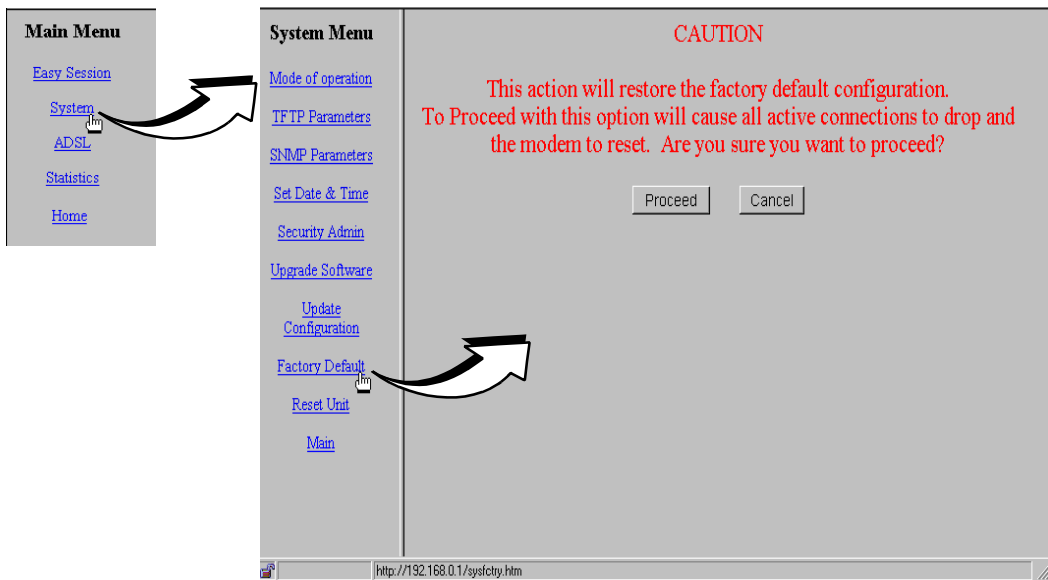
You can return the Megabit Modem 400F parameters to the factory default values. This provides a known starting point if you are troubleshooting the system or simply want to reconfigure parameters. The factory default values are listed on [Page 27](#).

- 1 Click **System** on the **Main Menu** to access the **System Menu**.
- 2 Click **Factory Default** on the **System Menu**.



When you click **Proceed to return to factory default values, the modem automatically resets.**

- 3 Click **Proceed** to return to factory default values.
- 4 Click **Cancel** to return to the system menu.



Parameter	Default Value	Parameter	Default Value
System Setup			
System Mode		SNMP parameters	
TFTP parameters		Enable trap sending	Not enabled
TFTP Server IP Address	192.168.0.2	Trap Server IP Address	0.0.0.0
TFTP Server Net Mask	255.255.255.0	Trap Server Net Mask	255.255.255.0
TFTP Server Path	blank field	Trap Community String	public
Set time and date	blank field	Get Community String	public
Admin IP Address	0.0.0.0	Set Community String	private

Parameter	Default Value	Parameter	Default Value
Bridge/Router RFC 1483			
Brouter WAN Configuration	Not selected	Spanning Tree	Selected
Service Name	Session 1	Brouter LAN Configuration	
ATM VPI	0	Bridging	Enabled
ATM VCI	100	Port Priority	100
Bridging	Enabled	Routing	Disabled
Port Priority	101	RIP Direction	Both
Routing	Disabled	RIP Version	Rip1
RIP Direction	Both	IP Address	192.168.0.1
RIP Version	Rip1	IP Net Mask	255.255.255.0
IP Address	192.168.10.1	Default gateway IP Address	0.0.0.0
IP Net Mask	255.255.255.0	Default gateway IP Net Mask	255.255.255.0
Encapsulation	LLC	DHCP	Disabled
Static Mac Address Entry	all zeros	Start IP Address	192.168.0.2
MAC Address	0:0:0:0:0:0	Primary DNS	0.0.0.0
Source Port	0	Secondary DNS	0.0.0.0
Dest Port	0	Gateway	192.168.0.1
Static Route Entry (IP Address, IP Network Mask, Gateway IP Address)	0.0.0.0		

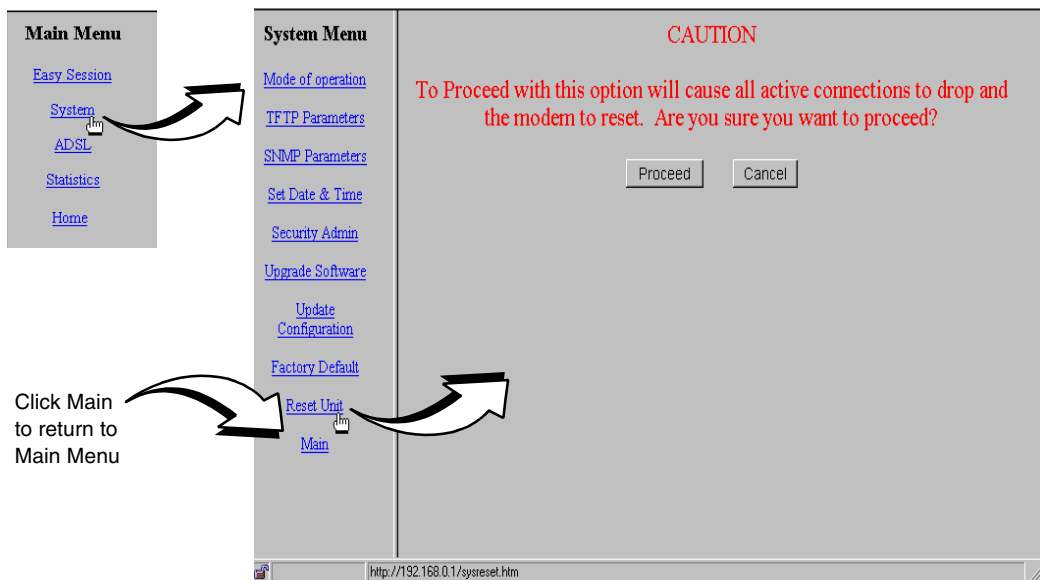
Resetting the Modem



Note that resetting the modem causes all active connections to drop.

After you make changes to the modem configuration and write the changes to NVRAM or return modem configuration to factory defaults, you must reset the modem. See [Page 24](#) for a list of changes that you must reset to effect.

- 1 Click **System** on the **Main Menu** to access the **System Menu**.
- 2 Click **Reset Unit** on the **System Menu**.
- 3 Click **Proceed** to reset the modem.
- 4 Click **Cancel** to return to the system menu.



CONFIGURING SYSTEM SETTINGS

5

Before configuring sessions with a service provider, set up system parameters for the Megabit Modem 400F. The following sections show the Web pages you use to configure system parameters. Set the:

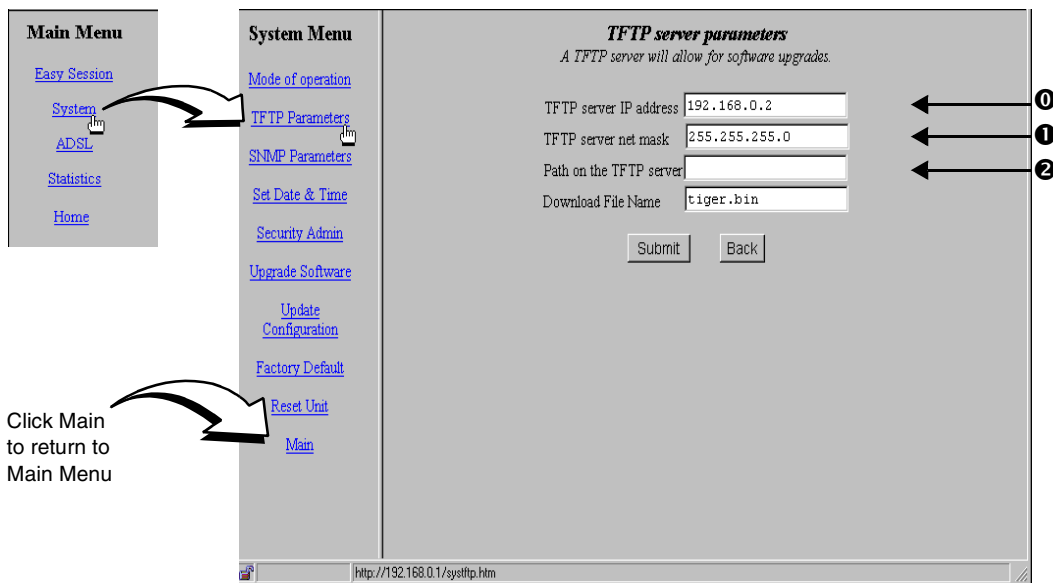
- TFTP server IP address and network mask for performing software upgrades on [page 30](#), when required
- SNMP parameters on [page 31](#)
- system time and date on [page 33](#)
- system security on [page 34](#)

Unless specified otherwise, configuration parameters shown in this section are for example only.

DEFINING TFTP PARAMETERS

A TFTP server is a device on the LAN from which you can download software updates to your modem. See [page 68](#) for more information on a TFTP server. Also, see [page 55](#) for procedures on how to update the software on your modem.

- 1 Click **System** from the **Main Menu**.
- 2 Click **TFTP Parameters** on the **System Menu**.
- 3 Do the following:
 - ① Enter the **TFTP server IP address** for the device that will be the TFTP server.
 - ① Enter the **TFTP server net mask** (subnet mask) for the TFTP server.
 - ② Enter the **Path on the TFTP server** where the download files reside. You can enter a path with a maximum of 20 characters.
- 4 Click **Submit** to accept the changes.
- 5 Click **Back** to return to the system menu.



DEFINING SNMP PARAMETERS

The modem has an SNMP agent that allows it to be managed remotely by a Network Management System (NMS). See [page 67](#) for more information about managing the modem through SNMP.

- 1 Click **System** from the **Main Menu**.
- 2 Click **SNMP Parameters** on the **System Menu**.
- 3 Do the following:
 - ❶ Select **Enable Trap Sending** if you want the modem to send traps to a server on your LAN.
 - ❷ Enter the **Trap Server IP Address** for the server to which the traps will be sent.
 - ❸ Enter the **Trap Server Net Mask** (subnet mask) for the server to which the traps will be sent.

The screenshot shows the modem's web interface. On the left is the **Main Menu** with links: [Easy Session](#), [System](#), [ADSL](#), [Statistics](#), and [Home](#). An arrow points from [System](#) to the **System Menu**. The **System Menu** contains links: [Mode of operation](#), [TFTP Parameters](#), [SNMP Parameters](#), [Set Date & Time](#), [Security Admin](#), [Upgrade Software](#), [Update Configuration](#), [Factory Default](#), [Reset Unit](#), and [Main](#). An arrow points from [SNMP Parameters](#) to the **SNMP Configuration** page. The **SNMP Configuration** page has the following fields: **Enable Trap Sending** (checkbox), **Trap Server IP Address** (text box), **Trap Server Net Mask** (text box), **Trap Community String** (text box), **Get Community String** (text box), and **Set Community String** (text box). A **Submit** button is at the bottom. Numbered callouts 1 through 5 point to the checkbox, IP Address, Net Mask, Trap Community String, Get Community String, and Set Community String fields respectively. A footer bar shows the URL <http://192.168.0.1/sysnmp.htm>.



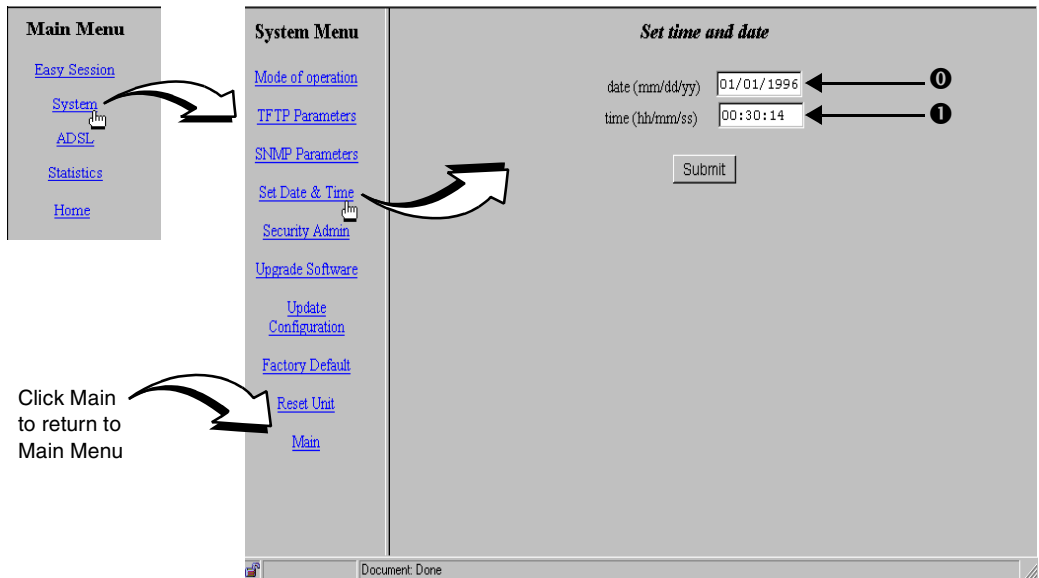
You can change the community string to a name you choose. The fields have default names as shown in the screen on [page 31](#) and are case sensitive. If you change the name, however, the community string name must match on both the manager and agent to allow access to the SNMP function.

- 3 Public is the default of **Trap Community String** which is an authentication string for the trap receiver. You can change the name, using up to 19 characters.
 - 4 Public is the default of **Get Community String** which is an authentication string that enables an NMS to get status from the modem agent. You can change the name, using up to 19 characters.
 - 5 Private is the default of **Set Community String** which is an authentication string for an NMS to set or change parameters on the modem agent. You can change the name, using up to 19 characters.
- 4 Click **Submit** to accept the changes.

SETTING THE TIME AND DATE

Set the time and date for the modem.

- 1 Click **System** from the **Main Menu**.
- 2 Click **Set Date & Time** on the **System Menu**.
- 3 Do the following:
 - ❶ Enter the **date** in the format **mm/dd/yy** (for example, 03/10/99 is March 10, 1999).
 - ❷ Enter the **time** in the format **hh:mm:ss** (for example, 07:21:55 is 21 minutes and 55 seconds past 7 a.m.).
- 4 Click **Submit** to accept the changes.



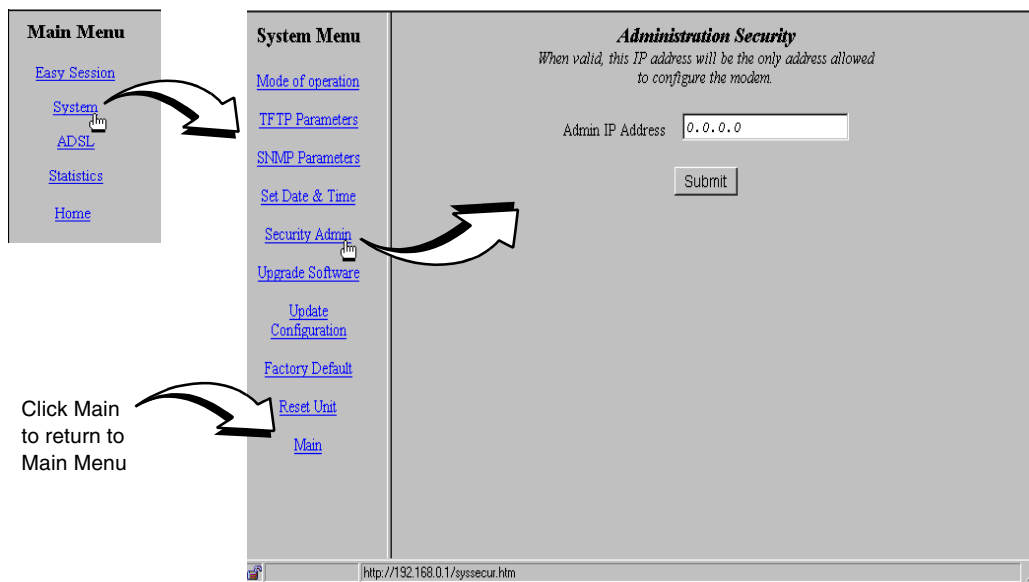
CONFIGURING SYSTEM SECURITY

The IP address you enter in the **Admin IP Address** field determines which devices on the LAN can manage the Megabit Modem 400F. You can select:

- limited access where only one device on the LAN can manage the modem
- general access where any device on the LAN can manage the modem

Do the following to configure administration for your modem:

- 1 Click **System** from the **Main Menu**.
- 2 Click **Security Admin** on the **System Menu**.
- 3 Select one of the following and enter the appropriate IP address:
 - a When you allow only one device on the LAN to manage the modem, enter the IP address for that one device in the **Admin IP Address** field.
 - b When you allow any device on the LAN to manage the modem, enter **0.0.0.0** in the **Admin IP Address** field.
- 4 Click **Submit** to accept the address you entered.



CONFIGURING SESSIONS

6

Configure sessions between the modem and a service provider using the **EasySession** pages. The Megabit Modem 400F supports up to 32 simultaneous RFC 1483 sessions.

There are many options from which you select when configuring sessions. See [“Selecting a Configuration Model”](#) on page 36 to determine the easiest and most efficient way set up sessions.

After determining the configuration model, set up the connection between the modem and the service provider (WAN) and the connection between your network users and the modem (LAN). After configuring the WAN and LAN for RFC 1483 Bridging/Routing, see [page 46](#) for [“Activating and Deactivating Sessions.”](#)

SELECTING A CONFIGURATION MODEL

There are many configuration options for the Megabit Modem 400F from which you can select. The following is a recommended model for configuring the Megabit Modem 400F:

- 1 Complete the WAN configuration on [page 38](#) for Bridge/Router RFC 1483.
- 2 On the EasySession page:
Select the sessions you want active then click Enable. The modem will set up the session with the service provider. The **Up** radio button next to the session(s) will indicate that the session was successfully set up.
- 3 Set up the LAN side configuration, including DHCP on [page 41](#) for Bridge/Router RFC 1483. The modem will serve IP addresses to devices on the LAN (routing mode only).

CONFIGURING RFC 1483 BRIDGING/ROUTING SESSIONS

You can configure the modem as a bridge to forward Ethernet data based on MAC addresses, as a router to route Ethernet-encapsulated IP datagrams based on IP addresses, or as both. From the **EasySession** pages, configure parameters for communicating between the modem and the service provider over the WAN (page 38). Then, configure parameters for communicating between the LAN and the modem (page 41). After setting up all appropriate Bridge/Router WAN and LAN parameters, select the sessions that you want to activate (see page 46).

- 1 Click **EasySession** on the **Main Menu** to access the **EasySession** page.
- 2 Click **Edit** next to any Port 1-32 field to display the **Brouter WAN Port Configuration** page for the selected port.

The screenshot displays the **EasySession™** web interface. On the left is a **Main Menu** with links for [Easy Session](#), [System](#), [ADSL](#), [Statistics](#), and [Home](#). The main content area is titled **LAN Configuration** and includes an **Edit** button and a checked **Spanning Tree Enable** option. Below this is the **WAN Ports Services** section, which is divided into two columns: **Ports 1-16** and **Ports 17-32**. Each column has a header with **Up**, **Down**, and **Set-Up** radio buttons. The **Ports 1-16** column lists **Bridge-25**, **Bridge-26**, **Route-29**, and several empty fields, each with an **Edit** button. A large white arrow points from the **Edit** button of the first empty field in the **Ports 1-16** column to the **WAN Port Configuration** dialog box. The dialog box contains the following fields and options:

- Service Name:** Session1
- ATM Configuration:** ATM VPI: 0, ATM VCI: 100
- Bridging:** Enable ; Port Priority: 101
- Routing:** Enable ; Rip Direction: Both; Rip Version: Rip Version 1; IP Address: 192.168.10.0; IP Net Mask: 255.255.255.0
- Encapsulation:** LLC VC-MUX
- Buttons: Previous, Delete, Submit, Next

Configuring the WAN for RFC 1483 Bridge/Routing

You will configure the WAN parameters for RFC 1483 sessions between the Megabit Modem 400F and the service provider.

- 1 Do the following to configure the WAN:



Select a name for the service that is descriptive. The service name is an identifier you use for the session and is not used for anything else. When you enter a service name, it displays as the Port name for that session on the EasySession page.

- 0 Enter a descriptive name for the **Service Name**. The name you enter here also displays in the **Port** field on the **EasySession** page (the fields are linked). Use a maximum of 19 characters for the service name, with no spaces allowed or double quotes in the name.
- 1 Enter the **ATM VPI** and **ATM VCI** values provided by the service provider. The addresses are the virtual path identifier and virtual channel identifier for the session connection (ATM) between the modem and the service provider. (See [page 85](#) for the VPI and VCI values you recorded from the service provider. Also, see “[Mapping an ATM Session](#)” on [page 62](#) for information on VPI and VCI values.)

The screenshot shows the 'WAN Port Configuration' web interface. It contains several sections with fields and checkboxes:

- Service Name:** A text input field containing 'Session1'. A callout '0' points to this field.
- ATM Configuration:** Two text input fields for 'ATM VPI' (value: 0) and 'ATM VCI' (value: 100). A callout '1' points to the ATM VPI field.
- Bridging:** An 'Enable' checkbox that is checked. A callout '2' points to this checkbox.
- Port Priority:** A text input field containing '101'. A callout '2' also points to this field.
- Routing:** An 'Enable' checkbox that is unchecked. A callout '3' points to this checkbox.
- Rip Direction:** A dropdown menu set to 'Both'. A callout '4' points to this dropdown.
- Rip Version:** A dropdown menu set to 'Rip Version1'. A callout '4' also points to this dropdown.
- IP Address:** A text input field containing '192.168.10.0'. A callout '5' points to this field.
- IP Net Mask:** A text input field containing '255.255.255.0'. A callout '5' also points to this field.
- Encapsulation:** Two radio buttons: 'LLC' (selected) and 'VC-MUX'. A callout '6' points to the VC-MUX radio button.

At the bottom of the form are four buttons: 'Previous', 'Delete', 'Submit', and 'Next'.

- ② Select **Enable** to use **Bridging** mode which forwards Ethernet data based on MAC addresses. (See [page 84](#) for the choice you recorded for **Bridging** mode.)
Assign a port priority when you enable **Bridging** mode and **Spanning Tree** (on the **EasySession** page). The port priority is a number you assign to each **Bridging** mode session to determine which has higher priority when sessions are active simultaneously. Spanning Tree protocol does not allow loops which would occur with simultaneous sessions on the same network. (You can enable Spanning Tree, if required, see [page 41](#) for more details. You recorded on [page 84](#) whether or not the service provider indicated **Spanning Tree** to be enabled to your system.)
 - ③ Select **Enable** to use **Routing** mode which forwards IP datagrams based on IP addresses. (See [page 84](#) for the choice you recorded for **Routing** mode. Also, see “[Routing](#)” on [page 66](#) for more information.)
 - ④ For **Routing** mode, select the direction you want RIP activated and the version of RIP for intergateway transmissions, as indicated by the service provider ([page 84](#)). See “[Routing](#)” on [page 66](#) for more information on RIP.
 - ⑤ Enter the assigned **IP Address** and the **IP Net Mask** (subnet IP mask) for this session. If you are bridging only, The WAN port is automatically assigned the same IP address as the configured LAN port IP address.
 - ⑥ Select the encapsulation method for this transmission over ATM as directed by your service provider, in compliance with RFC 1483 ([page 84](#)). Typically, select LLC. (See “[Encapsulation for RFC 1483 Bridging/Routing](#)” on [page 66](#) for more information on LLC and VC-MUX.)
- 2 Click **Submit** to accept the WAN Brouter session configuration.
 - 3 To configure other sessions:
 - a Click **EasySession** on the **Main Menu**, then click Edit by the Port 1-32 that you want to configure. (Or, if you want to modify an existing session, click **Previous** or **Next** to locate the session you want to modify.)
 - b Repeat [Step 1](#) and [Step 2](#) to configure the session.

Deleting an RFC 1483 WAN Session Configuration

- 1 From the **Brouter WAN Port Configuration** page, click Previous or Next to access the session configuration you want to delete.
- 2 Click **Delete** to remove a configuration that is displayed on the current Web page or the session from the Easy Session page edit.

Configuring the LAN for RFC 1483 Bridge/Routing

- 1 Click **EasySession** on the **Main Menu** to access the **EasySession** page.



When you enable **Spanning Tree**, it is enabled system-wide. If you select **Bridging mode**, **Spanning Tree** is active. If you choose **Routing**, it simply does not recognize **Spanning Tree**. **Spanning Tree** protocol eliminates loops in a LAN topology and is used with RFC 1483 Bridging/Routing only. See “**Spanning Tree Protocol**” on page 64 for more information.

- 2 At the top of the **EasySession** page, click **Spanning Tree Enable** if you implement **Spanning Tree** in **Bridging** mode (page 84).

EasySession™

LAN Configuration **Spanning Tree Enable**

WAN Ports Services

Ports

- Brid
- Brid
- Rout
-
-
-
-
-
-

LAN Configuration

Bridging Enable

Port Priority

Routing Enable

Rip Direction Rip Version

IP Address IP Net Mask

Default gateway IP address

DHCP Enable

Start IP Address Primary DNS

Secondary DNS Gateway

[Static Mac Table](#)

[Static Route Table](#)

- 3 Click **Edit** to access the LAN configuration page.

4 Enter the LAN configuration parameters.

- ① Select **Enable** to use **Bridging** mode which forwards Ethernet data based on MAC addresses, as indicated by the service provider (see page 84).
- ① Assign a port priority when you enable **Bridging** mode and **Spanning Tree** (on the **EasySession** page). The port priority is a number you assign to each **Bridging** mode session to determine which has higher priority when there are sessions active simultaneously. Spanning Tree protocol does not allow loops which would occur with simultaneous sessions on the same network. See the configuration on page 84 for whether or not **Spanning Tree** is enabled.
- ② Select **Enable** to use **Routing** mode which forwards IP datagrams based on IP addresses, as indicated by the service provider (see page 84).

The screenshot shows the 'LAN Configuration' interface with the following fields and callouts:

- ①: **Bridging** Enable
- ①: Port Priority
- ②: **Routing** Enable
- ③: Rip Direction Rip Version
- ④: IP Address IP Net Mask
- ⑤: Default gateway IP address
- ⑥: **DHCP** Enable
- ⑦: Start IP Address Primary DNS
- ⑧: Secondary DNS Gateway
- ⑨: [Static Mac Table](#)
- ⑩: [Static Route Table](#)

At the bottom of the form is a

- ③ For **Routing** mode, select the direction you want RIP activated and the version of RIP for intergateway transmissions. See “Routing” on page 66 for more information on RIP. RIP is a dynamic routing protocol.
 - ④ Enter the **IP Address** and **IP Net Mask** for the modem’s Ethernet 10/100BASE-T LAN port.
 - ⑤ Enter the **Default gateway IP address** and **Default gateway Net Mask** for the modem to access other LAN segments or IP addresses not in its routing table.
 - ⑥ Select **DHCP Enable** to enable the modem to act as a DHCP server to automatically assign IP addresses to devices on the LAN. If you select DHCP, ensure that all devices on the LAN have the TCP/IP stack set to **obtain an IP address automatically** (see “Setting Up the PC to Request an IP Address” on page 59). (Only in routing mode)
 - ⑦ The modem automatically enters the start IP address for the first device on the LAN as one address higher than the Ethernet port on the modem with DHCP enabled. You cannot edit this field.

Enter an IP address for a device that will provide **Primary DNS**. DNS translates human-readable machine names into IP addresses.
 - ⑧ Enter an IP address for a device that will provide **Secondary DNS**. DNS translates human-readable machine names into IP addresses (optional).

The modem automatically enter the **Gateway IP** address which is the same IP address as the Ethernet 10/100BASE-T port of the modem. You cannot edit this field.
 - ⑨ Click **Static MAC Table** to get a dialog to set up static MAC addresses for the modem. The modem will learn up to 1024 MAC addresses and accept up to 32 MAC static entries. Go to “Defining or Modifying Static MAC Entries” on page 44 to configure these parameters.
 - ⑩ Click **Static Route Table** to get a dialog to set up static Routing IP addresses for the modem to recognize. The modem can accept up to 32 static route entries. Go to “Defining Static Route Entries” on page 45 to configure these parameters.
- 5 Click **Submit** to accept the LAN configuration.
 - 6 After entering a LAN IP address and subnet mask (or changing the IP address and subnet mask), effect the configuration completing the procedures for “Saving the Configuration” on page 24.

Defining or Modifying Static MAC Entries

You can enter up to 32 static MAC addresses that the modem recognizes in the MAC address tables. The modem will also learn up to 1024 MAC addresses.

Static Mac Address Entry

Mac Address Source Port Dest Ports ← ❶

[Done](#)

Maximum Number of Static Mac Entries Allowed: 32

Destination Ports Bitmapped in 5 Bytes (1-8,9-16,17-24,25-32,33) ← ❶

Static Mac Address	Source Port	Destination Ports (Bitmapped)
0:0:0:88:88:88	1	2,8,10,0,0
0:0:0:88:88:89	1	3,0,0,0,0 ← ❷
0:0:0:88:88:90	1	4,5,6,0,0
0:0:0:88:88:91	1	7,0,0,0,0

1 Enter Static MAC addresses.

- ❶ Enter the **MAC Address** for a device on the LAN. The **Mac Address** field is case sensitive and does not accept uppercase alpha characters; use only lowercase alpha characters (for example, 00:aa:00:46:d6:4c).

Enter a number (1 through 33) for the **Source Port**. The port number is 1 when the source is the modem LAN port. The port number is 2 through 33 when the source is one of the 32 sessions. For example, if the source port is the second session set up (or port 2 on the **EasySession** page), enter the source port as 3. The source port number is always one number higher than the port number on the **EasySession** page.

- ❶ Enter a number 1 through 33 for the **Destination Port**. The port number is 1 when the destination is the modem LAN port. The port number is 2 through 33 when the destination is one of the 32 sessions. For example, if the destination port is the second session set up or port 2 on the **EasySession** page, enter the destination port as 3. The destination port number is always one number higher than the port number on the **EasySession** page.
- ❷ All static MAC address entries are listed in this table after you enter the parameters in fields ❶ and ❶ then **Add** them.

2 Click **Add** to accept this entry.

- 3 To delete a **Static MAC Address Entry** as follows:
 - a Click the entry in the list shown in field ❷ above to select it. The entry displays in the Mac address field ❶.
 - b Click **Delete** to remove the entry.
- 4 Click Done when you complete all configuration additions and deletions.

Defining Static Route Entries

You can enter up to 32 static routing IP addresses that the modem recognizes in the routing address tables, in addition to the routing IP addresses that the modem learns. (See “Routing” on page 66 for more information on defining static route entries.)

Static Route Entry

Destination net mask ← ❶

Gateway ← ❷

[Done](#)

Maximum Number of Static Route Entries Allowed: 32

Destination	Net Mask	Gateway
-------------	----------	---------

← ❸

- 1 Enter static routes.
 - ❶ Enter the **IP Address** and **net mask** destination.
 - ❷ Enter the **Gateway** IP address to the next hop.
- 2 Click **Add** to accept this entry.
- 3 To delete a **Static Route Entry**:
 - a Click the entry in the list shown in field ❷ above to select it. The entry displays in the **Static Route Entry** field ❶ and ❷.
 - b Click **Delete** to remove the entry.
- 4 Click Done when you complete all configuration additions and deletions.

ACTIVATING AND DEACTIVATING SESSIONS

Use the following procedures to activate sessions as you want to use them. Additionally, you may want to deactivate some sessions while leaving other sessions active.

The **EasySession** page provides status for each session. **Up** means that connection is active. **Down** means the connection is not active. **Set-Up** means the modem is negotiating the link with the service provider.



Up, Down, and Set-Up are read-only fields that provide status for the session. If you power down the modem with sessions enabled, those same sessions will be enabled when you again power up the modem.

Activating Sessions

- 1 On the **EasySession** main page, select the box next to each session that you want to activate.

EasySession™

LAN Configuration Spanning Tree Enable

WAN Ports Services

Ports 1-16	Up	Down	Set-Up	Ports 17-32	Up	Down	Set-Up
<input checked="" type="checkbox"/> Bridge-25 <input type="button" value="Edit"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input checked="" type="checkbox"/> Bridge-26 <input type="button" value="Edit"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/> Route-29 <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/> <input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 2 Click **Enable** at the bottom of the **EasySession** page to activate the selected sessions.

Deactivating Sessions

On the Web browser, click the Reload icon (shown to the right) to refresh the screen.



- 1 On the **EasySession** main page, select the box next to each session that you want to deselect.

EasySession™

LAN Configuration Spanning Tree Enable

WAN Ports Services

Ports 1-16			Up	Down	Set-Up	Ports 17-32			Up	Down	Set-Up
<input checked="" type="checkbox"/>	Bridge-25	<input type="button" value="Edit"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input checked="" type="checkbox"/>	Bridge-26	<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	Route-29	<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		<input type="button" value="Edit"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Click to select sessions

- 2 Click **Disable** at the bottom of the **EasySession** page to disable the selected sessions.

VIEWING STATISTICS

7

You can view status for the ADSL link (“[Viewing ADSL Status](#)”) and for WAN and LAN statistics (“[Viewing Network Statistics](#)” on page 52).

VIEWING ADSL STATUS

The Megabit Modem 400F displays the status of the ADSL link. From the **Main Menu**, select **ADSL** to display the **ADSL Menu** and **ADSL Statistics** page (see [page 50](#)). **Reset** on the **ADSL Menu** will bring down the ADSL loop between the modem and the service provider.

Description of the **ADSL Statistics** fields are on [page 51](#).

Click Main to return to Main Menu

ADSL Menu

- [Protocol Configuration](#)
- [Statistics](#)
- [Reset Link](#)
- [Main](#)

Main Menu

- [Easy Session](#)
- [System](#)
- [ADSL](#)
- [Statistics](#)
- [Home](#)

ADSL Statistics

Date: 02/01/199
Time: 04:01:33
Hours Up: 4

Sync No Connection

	Downstream	Upstream
Alarms	LOS ②	LOS
Current SNR margin	NA ③	NA
Min SNR margin	NA ④	NA
Errored seconds	0 ⑤	0
Unavailable seconds	14492 ⑥	14492
Line Attenuation	NA ⑦	NA
Data rate	0 ⑧	0

Clear ⑨



Reset on the ADSL Menu will bring down the ADSL loop between the modem and the service provider.

View the following ADSL statistics:

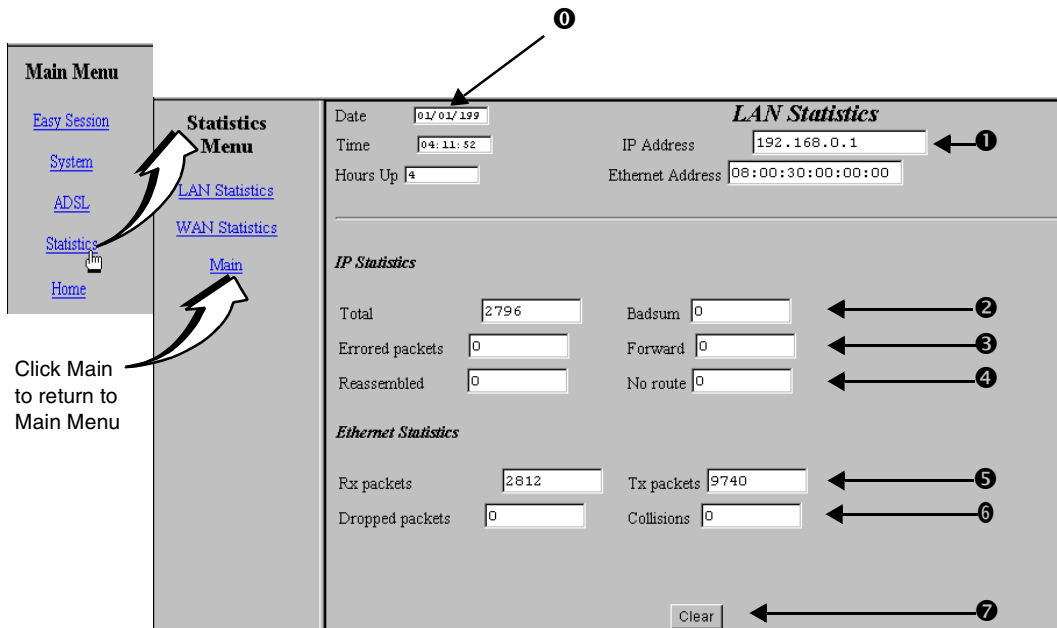
- ① System time and date and total hours link is up.
- ① ADSL link is synchronized between the modem and the service provider or the link has no connection.
- ② Any alarm conditions such as Loss of Sync (LOS), Loss of Frame (LOF), Loss of Margin (LOM), or Loss of Cell Delineation (LCD).
- ③ The SNR margin at which the modem is currently operating (dependent on parameters selected by the service provider).
- ④ Minimum SNR margin allowed before the MAR LED on the modem front panel illuminates.
- ⑤ Total number of errored seconds that the ADSL link has in a 24-hour span.
- ⑥ Total amount of time that the lines were not available for transmission since power on occurred or the modem statistics were last cleared (total unavailable seconds).
- ⑦ Line attenuation in decibels.
- ⑧ The upstream and downstream data rates at which your modem is connected.
- ⑨ Select **Clear** to reset all statistics.

VIEWING NETWORK STATISTICS

The Megabit Modem 400F displays status for the LAN and WAN links. From the **Main Menu**, select **Statistics** to display the **Statistics Menu**.

LAN Statistics

The Megabit Modem 400F displays status for the LAN. Click **LAN Statistics** from the **Statistics Menu**.

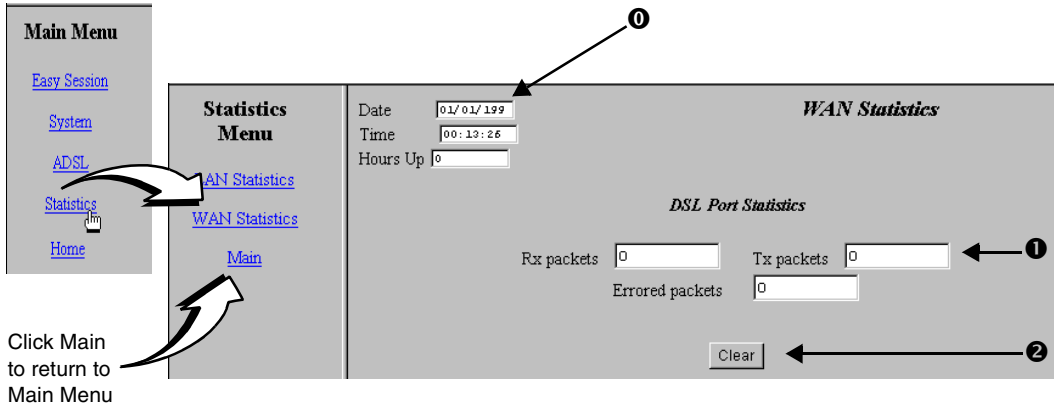


View the following LAN information:

- ① System time and date and total hours link is up.
- ① IP and Ethernet addresses for the modem LAN port.
- ② Total number of IP packets processed.
- ③ Number of errored packets detected at this port and the number of packets forwarded.
- ④ Number of packets reassembled at this port and the number of transmissions where a route was not found in router table.
- ⑤ Total number packets received and transmitted.
- ⑥ Total number of packets dropped and the number of collisions of devices on segment.
- ⑦ Selecting **Clear** resets all statistics.

WAN Statistics

The Megabit Modem 400F displays status for the WAN. Click **WAN Statistics** from the **Statistics Menu**. The values in the statistics fields are a total for all VCs configured.



View the following WAN information:

- ① System time and date and total hours the link is up.
- ① Statistics for the ATM layer including how many Protocol Data Units (PDUs) were transmitted and received on the session and how many PDUs were corrupted (Bad PDUs).
- ② Select **Clear** to reset statistics.

MAINTENANCE AND TROUBLESHOOTING

8

MAINTENANCE

You can update software by specifying a device on your LAN where you will place new software for the update (see “[Defining TFTP Parameters](#)” on [page 30](#)). Then, use the procedure “[Updating Software](#)” on [page 55](#) to download new software from the TFTP device to the Megabit Modem 400F.

Through the RS-232 MGMT port on the Megabit Modem 400F, you can change the modem LAN port IP address and network mask, the default gateway IP address, and the IP address for the device on the LAN that can administer the modem (see [page 57](#)).

Updating Software

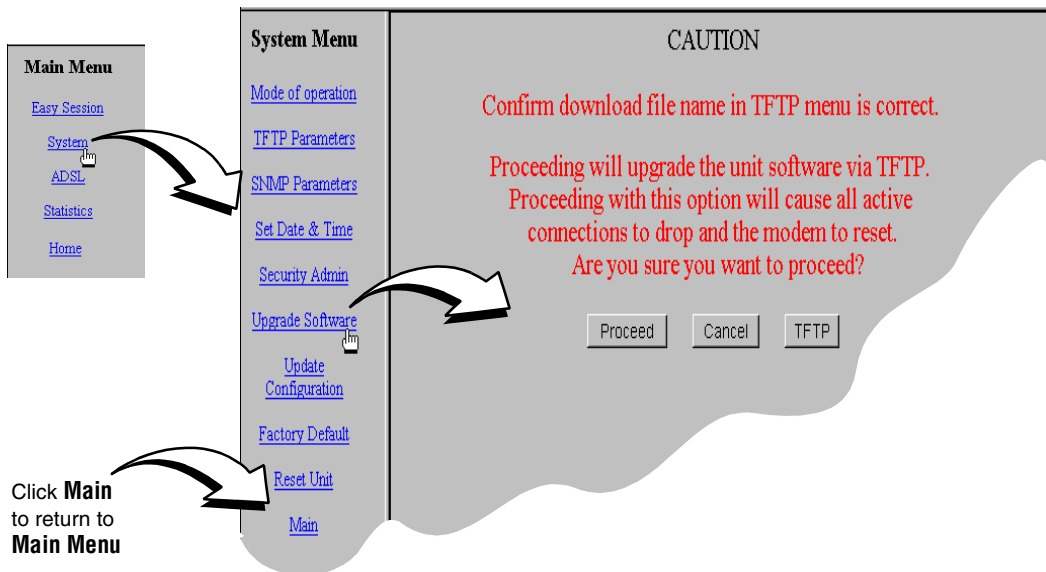
You may want to download software upgrades to your system. Use the Web page shown on [page 56](#) to initiate the upgrade. You download the new software from a TFTP server. You set up the IP address for the TFTP server and a directory path to the software when you configure system parameters in [Chapter 5](#), “[Defining SNMP Parameters](#)” on [page 31](#) or by clicking on **TFTP** in the **Upgrade Software** menu and entering TFTP server parameters.

To update the Megabit Modem 400F software, ensure that the .bin file is available to download from a TFTP server. The .bin file contains the bin (binary) image files for software updates and htm (HTML) files for web page updates.



Before initiating a software upgrade, ensure that the file is in the directory you specified on the TFTP server when you configured system parameters.

- 1 Click **System** on the **Main Menu** to access the **System Menu**.
- 2 Click **Upgrade Software** on the **System Menu** then click **Proceed**. The modem software upgrade for binary and HTML files automatically begins.

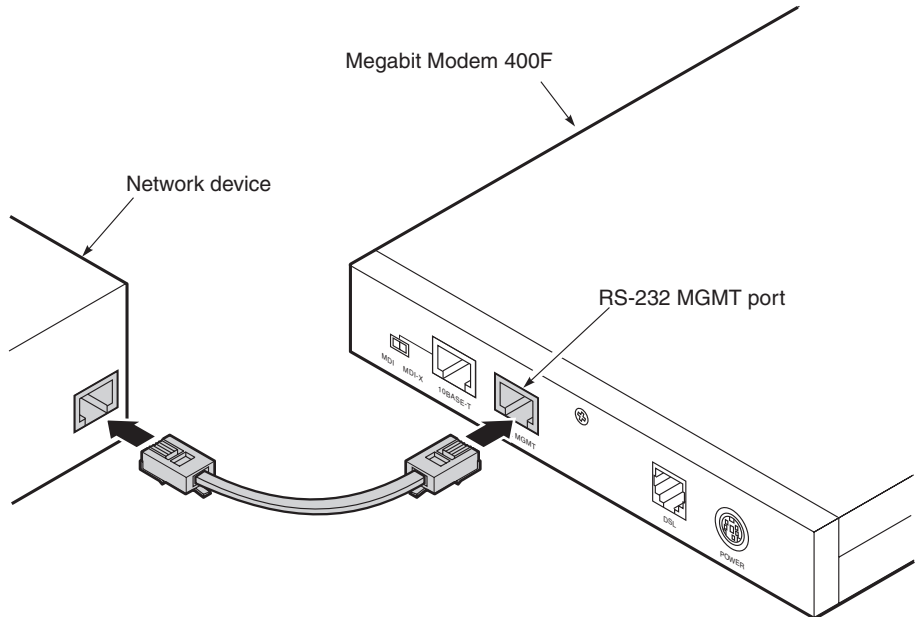


- 3 Click **TFTP** to see the TFTP server parameters. The TFTP server IP address, net mask, path to TFTP server, and download file name is displayed. These parameters can be changed if necessary.

Using the RS-232 Management Port

Use the RS-232 management port only when you must manually change the IP address and subnet mask. Also, use the port if you do not remember the administrative IP address you entered on your modem.

- 1 Connect the modem to a PC as shown below.



- 2 Configure these communication settings (if using terminal emulation, select ANSI):
 - 9600 baud
 - no parity
 - 8 data bits
 - stop bit
 - flow control off

3 Display the following screen:

```
Pairgain Megabit Modem 400F Setup Menu
=====
BSP version:                3.0.0(1)
SW version:                 3.1.2
IP address:                 192.168.0.1
IP network mask:           255.255.255.0
Default gateway IP address: 0.0.0.0
Admin IP address:          0.0.0.0
=====
(1)Enter IP address
(2)Enter IP network mask
(3)Enter default gateway IP address
(4)Enter IP Admin address
(5)Reset modem
```

4 Enter any of these parameters at the prompt:

- a** Type **1** then enter the LAN IP address for the modem (LAN port which is the 10/100BASE port).
- b** Type **2** then enter the LAN IP network mask for the modem.
- c** Type **3** then enter the Default gateway IP address.
- d** Type **4** then enter the IP address for a device on the LAN that will manage the modem.

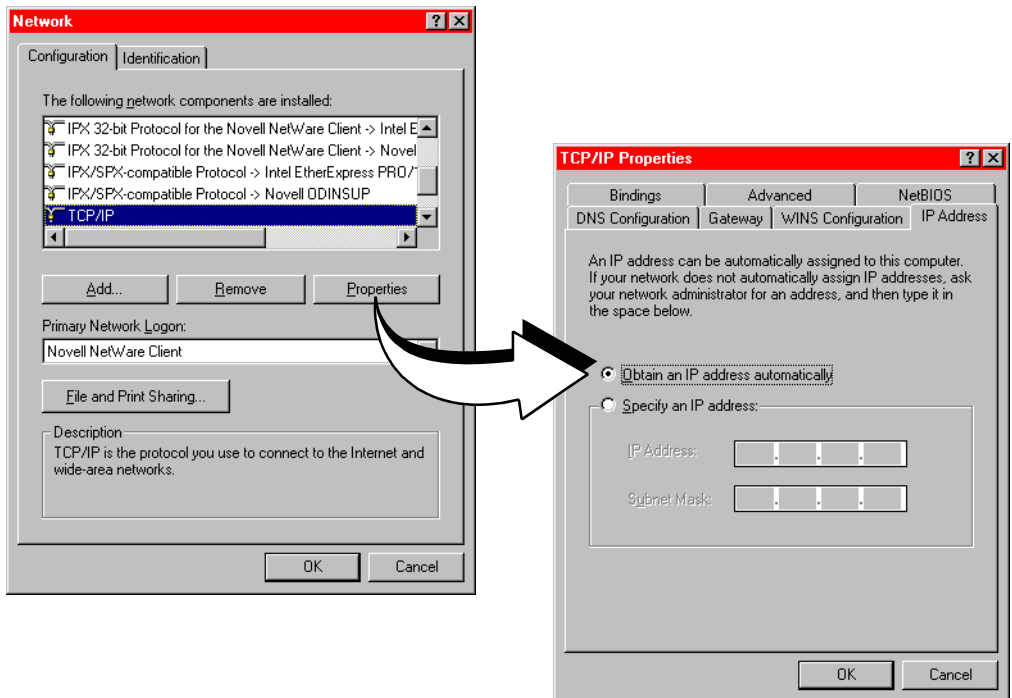
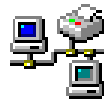
5 Type **5** to reset the modem after you change the LAN IP address and the LAN IP network mask.

SETTING UP THE PC TO REQUEST AN IP ADDRESS

The modem, as a Dynamic Host Configuration Protocol (DHCP) server, provides an IP address dynamically to devices on the LAN. When you choose to use DHCP for the modem to serve IP addresses to the devices on your LAN, ensure that the TCP/IP properties are set to automatically obtain the IP address from the modem.

The following is an example of how to set up the PC using Microsoft® Windows® 95. If you use an application other than Windows 95, refer to the appropriate operating system user documentation.

- 1 Open the **Control Panel** window and double-click on the **Network** icon shown at right.
- 2 In the **Network** dialog (shown below), double-click **TCP/IP** under the **Configuration** tab (or highlight **TCP/IP** then click **Properties**).
- 3 On the **IP Address** tab, select **Obtain an IP address automatically**, then click **OK**.
- 4 Restart the PC.



TROUBLESHOOTING

If this occurs:	Try this:
PC or hub not communicating with the modem	<ul style="list-style-type: none"> • Check the LINK LED. If it is off, check the cabling to the 10/100BASE port and to the hub or the NIC card in the PC to ensure it is secure. • Check the position of the MDI/MDI-X switch. Set the switch to MDI when connecting to a PC. Set the switch to MDI-X when connecting to a hub or router. • Check that you are using a Web browser (Netscape or Internet Explorer) version 4.0 or newer. • Check that you have a TCP/IP protocol stack installed on your PC. • If this is the initial installation, check that you set the IP address on your PC to obtain an IP address automatically. Make sure you have configured the LAN IP address of the modem to an address that is on the correct subnet. See “Setting Up the PC To Configure the Modem” on page 18. • You configured the LAN IP address of the modem to an address that is not on the same subnet. • Check the NIC card installation for correct IRQ, drivers, and adapter setup. See appropriate documentation for the NIC card. <p>If none of the above corrects your problem, contact your service provider.</p>
SYNC ADSL LED	<p>Contact the service provider when the LED remains off indicating that the modem is not detecting a transceiver at the far end. Flashing green indicates that the modem is attempting to bring up the link. Solid green indicates that the loop is up.</p> <p>The modem synchronizes at a minimum transmission rate of 64Kbps. The modem rate adapts in increments of 32Kbps.</p>
MARGIN ADSL LED lights green	<p>Contact the service provider when the LED is off indicating that the margin is below that specified by the service provider.</p>
LAN TX and RX LEDs are not on	<p>Check that the LINK LED is on. If it is on, you are simply not transmitting or receiving data on the LAN 10/100BASE-T port. If, however, the LINK LED is not on, check the section “PC or hub not communicating with the modem” in this table.</p>
ADSL TX and RX LEDs are not on	<p>Check that the SYNC LED is on. If it is on, you are simply not transmitting or receiving data on the WAN ADSL port. If, however, the SYNC LED is not on, contact your service provider.</p>

TECHNICAL REFERENCE

9

This chapter provides technical information about how your modem transmits data between users on your LAN and a service provider over the WAN.

ADSL

Asymmetric Digital Subscriber Line (ADSL) is the technology used to transmit data between the modem and service provider at the physical layer. It provides data at asymmetric rates so that downstream traffic from a service provider to you is faster than upstream traffic from you to the service provider. The downstream transmission rate is up to 7.552 Mbps, while the upstream rate is up to 928 kbps. Included in the ADSL bandwidth is analog POTS.

Discrete Multitone (DMT) is the line coding used for ADSL. Basically, it divides the bandwidth into subchannels. Some of the subchannels are reserved for analog POTS. The other subchannels are allocated to upstream and downstream traffic. Within the upstream and downstream subchannels, some subchannels are used for management and performance functions.

DMT ADSL provides rate-adaptive transmission that allows the service provider to deliver you the best transmission rate determined by distance and line conditions.

ATM

Asynchronous Transfer Mode (ATM) is a technology that can simultaneously transmit voice, data, and video over ADSL. ATM uses fixed-size cells that transmit over a preestablished connection called a Permanent Virtual Circuit (PVC). Quality of Service provides UBR.

ATM cells are 53 bytes that comprise a 5-byte header and 48-byte payload. The header includes the Virtual Path Identifier (VPI) and Virtual Channel Identifier (VCI) that you entered when you configured each session in [Chapter 4](#). The VPI and VCI provide the virtual connection between the modem and the service provider. The VPI identifies the Virtual Path (VP) that transports

ATM cells in a Virtual Channel (VC). The Megabit Modem 400F has 32 VCs in the VP, which provides the 32 sessions.

Mapping an ATM Session

Your service provider will give you a VCI and VPI address for each session. The VCI address for each session (each session is a VC) can be a number from 32 up to a maximum of 255, with the first 32 numbers (0 through 31) reserved. The VCI value for each VC must be unique for each of the 32 sessions. The addresses range from 0 to 253 for VCI and 0 to 15 for VPI.

RATE ADAPTIVE TRANSMISSION

The following definitions are useful for understanding the operation of the Megabit Modem:

- Bit Error Rate (BER) is the ratio of received bits that are in error relative to the total number of bits received, measured over time. For example, 10^{-7} BER means that on average one error occurs per 10^7 bits received.
- Signal to Noise Ratio (SNR) is the ratio (typically expressed in dB) of the received signal power to the received noise power. It is a measure of the quality of the transmission.
- Margin (SNR margin) is the amount of degradation in SNR that the system can tolerate under the current conditions and still achieve 10^{-7} BER. A margin of 6 dB, for example, means that the SNR can degrade by 6 dB and still provide a performance of 10^{-7} BER. The Megabit Modem 400F have a margin configuration option that defaults to 3 dB, but can be set anywhere between 0 to 15 dB.
- Reach is the longest loop length that the system can support with a given margin.

Rate Adaptation

With ADC's rate adaptive technology, the Megabit Modem 400F can automatically startup or adjust to the fastest speed possible, given the transmission distance and line conditions. Or, you can set the modem to a specific rate.

Reach, Data Rate, SNR Margin, and Noise Environment

The maximum transmission rate of the Megabit Modem 400F is determined by distance, SNR margin, and the condition of the line (wire gauge, condition noise environment). The figure on [page 73](#) shows the relationship between reach and data rate for a given set of conditions. The plots can be used to determine the achievable reach at a given data rate, or they may be used to determine the achievable data rates at a given distance. In all cases except the no noise case, a margin of 4 dB was allocated above the SNR that provides a 10^{-7} BER.

BRIDGING AND ROUTING

Bridging

You can configure the Megabit Modem 400F as a bridge to forward Ethernet data based on MAC addresses.

MAC Layer Bridging

A bridge moves information across an internetwork from a source to a destination at the link layer (of an OSI reference model). The information is sent to a physical address known as a Media Access Control (MAC) address. The Megabit Modem 400F provides transparent Ethernet MAC-layer bridging.

The bridge learns up to 1024 addresses. Additionally, when you configure the modem, you can add 32 static addresses through the static MAC address configuration page.

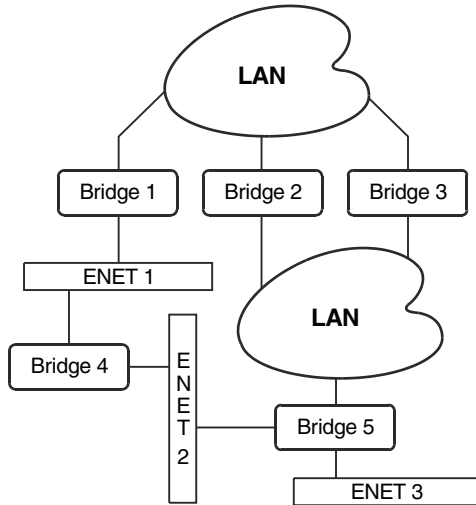
Spanning Tree Protocol

The Megabit Modem 400F supports 802.1d Spanning Tree protocol which eliminates loops in a LAN topology by partitioning out redundant links between LAN segments. This ensures that there is only one path, or link, between any two nodes on the network. If this link goes down, Spanning Tree re-enables partitioned links to create a new loop-free topology if possible.

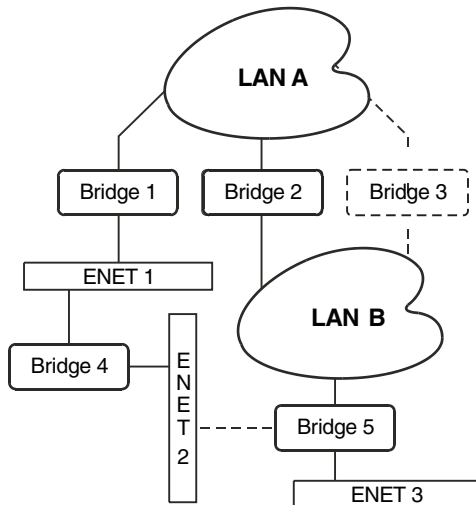
An example of the active topology is shown on [page 65](#). In the example, the spanning tree algorithm partitions out the bridge from LAN A to LAN B, and creates the link from ENET2 to Bridge 5.

Example LAN Physical Network

This physical configuration is valid only when used with Spanning Tree to eliminate loops.



Loop-free Topology Using Spanning Tree Protocol



Routing

You can configure the Megabit Modem 400F router to route Ethernet-encapsulated IP datagrams based on IP addresses. Use Routing Information Protocol (RIP) to automatically identify the route from the session on the Megabit Modem 400F to the destination. You can specify the direction and version of RIP that allows other routers to update their routing tables automatically (for example, information on how many hops between destinations). The version of RIP you select for the session must match the version supported by the service provider. Versions RIP1 and RIP-1 compatible are used for broadcast. Version RIP 2 is used for multicast.

The router also learns addresses. In addition to the addresses it learns, you can add 32 static route entries on the LAN Brouter configuration page. Through the static IP routing feature, you can configure the Megabit Modem 400F as an IP router with statically programmed route entries. You can enable this function to provide broadcast filtering and to prevent eavesdropping by specifying multiple destination gateways. When static IP routing is enabled, you can access only specific remote IP subnets or hosts.

Since IP routers make forward or filter decisions based on the network-layer IP address instead of the MAC hardware address, MAC-level broadcast frames are prevented from reaching unwanted destinations in the network.

When setting parameters for an external router, configure a Static Route entry in any of the external routers that may have been specified as a Default Router or as a Gateway. This implementation prevents other parties from discovering routes through eavesdropping. The format of this entry varies among the various router vendors, but is typically in the form of "Destination," "Mask," and "Gateway," where the "Destination" is the remote IP Subnet or host address, and "Gateway" is the IP address of the modem on the same subnet as the external router.

Encapsulation for RFC 1483 Bridging/Routing

Most users select LLC, which allows you to run multiple protocols over the VC. An encapsulation header identifies the types of protocol being carried in the transmission (for example, IP). VC-MUX allows only one protocol to run over the VC. The type of protocol must be negotiated between the modem and the service provider prior to the transmission. Because there is only one protocol allowed, the header is not required. This configuration is normally setup by the service provider.

MANAGEMENT PROTOCOLS

SNMP is used to configure system and bridge parameters, to monitor statistics, and to perform advanced management tasks.

SNMP

This management protocol specifies how to send information between a network management system (NMS) and managed devices on a network. Managed devices run a program called an agent. The agent interprets SNMP requests and responds to them. The NMS communicates with the agents in the managed devices to:

- set configuration
- get configuration
- get status

A Management Information Base (MIB) defines the configuration and status parameters. The Internet Engineering Task Force (IETF) specifies standard MIBs for certain types of devices, ensuring any NMS can manage them. Additionally, vendors can issue proprietary MIBs for their devices to fit specific needs.

MIBs and Traps

RFC 1213: "Management Information Base for Network Management of TCP/IP-Based Internet: MIB-II"

RFC 1493: "Definition of Managed Objects for Bridges"

RFC 1215: "A Convention for Defining Traps for Use with the SNMP"

ADSL MIB

PairGain Agent MIB

PairGain Tiger MIB

DNS RESOLUTION

If you want Domain Name System (DNS) resolution, you need to specify the IP address for a device to be the DNS resolver. You can also specify another IP address to designate a second device for a secondary DNS resolver. The DNS device maps human-readable addresses to IP addresses. A human-readable address is one such as `maggie.copro.company.com` that contains a host name and domain. The DNS resolver maps that name to the IP address that is a numeric (four octet) value such as `192.168.30.25` (see [page 43](#) for the example on how to configure a DNS address).

TFTP SERVER

Trivial File Transfer Protocol (TFTP) is the TCP/IP standard for file transfer. It provides the service with minimal capability and minimal overhead. TFTP uses UDP for connectionless delivery.

SPECIFICATIONS AND DATA



WAN INTERFACE SPECIFICATIONS

ADSL (Asymmetric Digital Subscriber Line)

Maximum transmission rate:

Downstream 7.552 Mbps

Upstream 928 kbps

Minimum transmission rate to sync 64 kbps

Rate-adaptive data rate resolution 32 kbps increments

Signal Format DMT (Discrete Multitone) line code

Connector RJ-11

ATM (Asynchronous Transfer Mode)

ATM Adaptation Layer AAL5 (ITU I.363.5) - Supports encapsulation and de-encapsulation of AAL5 Protocol Data Units (PDUs) for convergence. Segmentation and Reassembly (SAR) layer segments and reassembles AAL5 PDUs into ATM cells that are 48-byte SAR-PDUs.

ATM Layer Attaches or strips the 5-byte header to the 48-byte SAR-PDU. Performance is a maximum line rate of 17,812 cells per second downstream and 2,189 cells per second upstream.

Cell Format Format complies with ITU I.361 ATM cell format. Cell delineation complies with ITU I.432 Cell Delineation and HEC. Cells are fixed length (53 bytes), including 5 bytes of header and 48 bytes of payload. Included in the header are the VPI and VCI number.

Virtual Circuit type Permanent Virtual Circuit (PVC) per ATM forum UNI version 3.1

Maximum Virtual Circuits 32 virtual circuits that can simultaneously connect to service providers for sessions encapsulated either as RFC 1483 Bridging/Routing

ENCAPSULATION

When you activate RFC 1483 system mode, you can select WAN encapsulation as VC-MUX for some sessions and LLC for other sessions.

Routing

Routing Protocol	Supports RFC 1724 Routing Information Protocol (RIP and RIP Version 2).
Encapsulation	Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).
Static Routes	Supports up to 32 static routes
Address Resolution	Supports Address Resolution Protocol (ARP) over the LAN port (RFC 826)

Bridging

Bridging and Address Learning	Implements a transparent learning bridge with a bridging table of 1024 entries.
Encapsulation	Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).
Spanning Tree	Provides Spanning Tree support per IEEE 802.1d.

LAN INTERFACE

Connector RJ-45 Ethernet with auto-detecting 10/100BASE-T (IEEE 802.3i for 10BASE-T and IEEE 802.3u for 100BASE-T)

PHYSICAL SPECIFICATIONS

Height 1.2 inches (3.1 cm)
Width 6.9 inches (17.5 cm)
Depth 9.2 inches (23.4 cm)
Weight 2.2 pounds (1.0 kg)

POWER SUPPLY

Voltage 100 to 240 Vac
Frequency 50 to 60 Hz
Current 0.3 Amps

ENVIRONMENTAL

Temperature 32 to 122 °F (0 to 50°C)
Relative Humidity up to 95% non-condensing
Altitude between -200 and 13,000 feet (-61 to 3.962 meters)

COMPLIANCE

Emissions and Immunity Compliance

- FCC Part 15, Subpart B, Class B
- CENELEC/ETSI (IEC 555 and 801)
- CE (EN 55022 and EN 50082-1)
- cUL (UL-1950)
- CE (EN 300 386-01)
- ICE 950

Operations and Safety Compliances

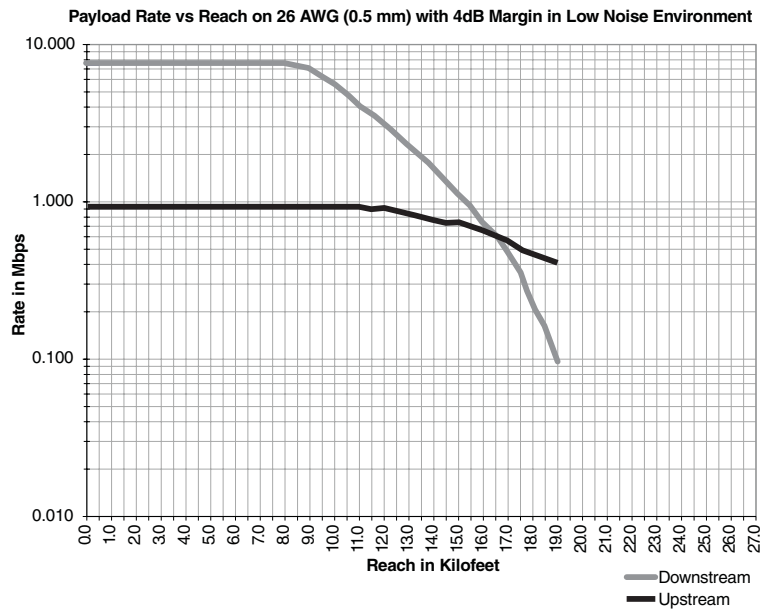
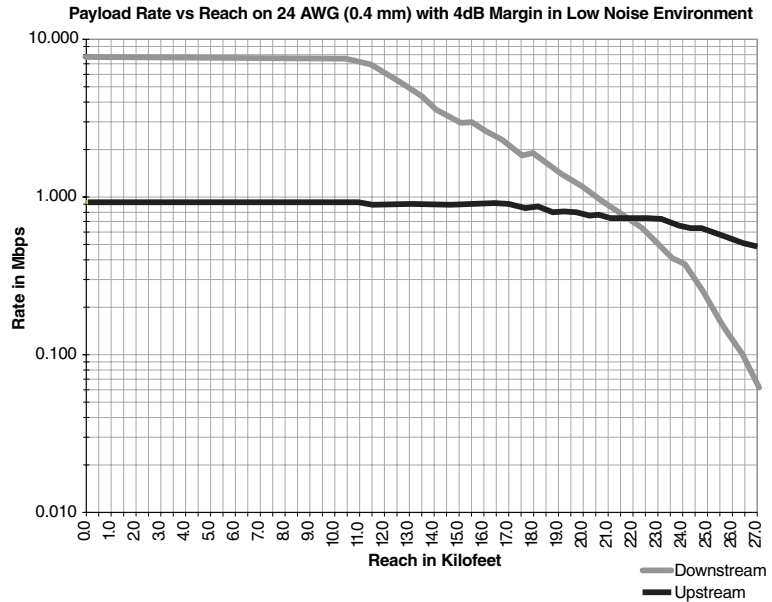
RFCs

- RFC 1483 Multiprotocol Encapsulation over ATM (Bridging/Routing)
- RFC 1994 for PAP/CHAP Authentication
- RFC 1631 IP Network Address Translator (for NAPT)
- RFC 1350 for TFTP client
- RFC 2131 and RFC 2132 for DHCP server and relay protocols (supported only in RFC 1483 Bridging mode) and extensions, respectively
- RFC 1493 Definitions of managed objects for bridges
- RFC 1695 Definitions of managed objects for ATM Management Version 8.0 using SMIv2
- RFC 1724 RIP Version 2 MIB Extensions
- RFC 2132 DHCP Options and BOOTP Vendor Extensions
- RFC 2662 Definitions of managed objects for ADSL lines (Also DSL Forum TR-006)

MIBs

- RFC 1213 Management Information Base for Network Management of TCP/IP-based internets: MIB-II
- RFC 1215 Conventions for defining traps for use with SNMP
- RFC 1493 Definitions of managed objects for bridges
- RFC 1695 Definitions of managed objects for ATM Management Version 8.0 using SMIv2
- RFC 1724 RIP Version 2 MIB Extensions
- RFC 2662 Definitions of managed objects for ADSL lines (Also DSL Forum TR-006)
- Pairgain Tiger MIB
- Pairgain Agent MIB

RATE VS. REACH



HARDWARE

The following provides additional information about Megabit Modem 400F such as the installation kit and modem connectors pinouts.

Installation Kit

The following items are included in the installation kit and are used to install the Megabit Modem 400F as shown in [Chapter 3 on page 11](#).

Part	Description	Function
Rubber feet	Four black rubber feet	Attaches to the base of the modem.
Grey cable	Silver-satin phone cord with 4-pin modular plugs (straight-through)	Connects the modem ADSL connector to the wall phone jack for access to the Internet.
Black cable	CAT 5, cable with 8-pin modular plugs (straight-through)	Connects the modem 10/100BASE-T connector to the LAN through a hub or to a PC NIC.
Power cable	Power supply with optional power cord (this item is ordered dependent on the type of power supply and cord required for your location)	Connects the modem POWER connector to the local power source.
Screws	Two 6x $\frac{1}{2}$ -inch sheet metal screws	Installs into a wall for wall-mounting modems.
Grey cable and adapter	Flat cable with RJ-45 connectors and a DB-9 to RJ-45 adapter.	Connects the RS-232 MGMT port to an ASCII terminal or a PC running terminal emulation software. Adapter assembly connects to a DB-9 connector on the PC. Then, one RJ-45 connector installs in the adapter and the other connector into the console port on the modem.

Connector Pinouts

You may choose to make your own cables for the ADSL RJ-11 connector and the 10/100BASE-T Ethernet connector on the rear of the modem. The following sections provide the pinout information you need.

ADSL Port

The following table shows the signal on each pin for the ADSL port. The connector for this interface is an RJ-11. See [page 14](#) for the location of this port.

Pin	Signal
1	Not used
2	No connection
3	Ring
4	Tip
5	No connection
6	Not used

10/100BASE-T Port

The following table shows the signal on each pin when the switch is in either the MDI or the MDI-X position for the 10/100BASE-T port. The connector for this interface is an RJ-45. See [page 14](#) for the location of this port.

MDI	MDI-X	Signal	Description
1	3	TX+	Transmit Data (+)
2	6	TX-	Transmit Data (-)
3	1	RD+	Receive Data (+)
4	4	Not used	Not used
5	5	Not used	Not used
6	2	RD-	Receive Data (-)
7	7	Not used	Not used
8	8	Not used	Not used

TECHNICAL ASSISTANCE AND WARRANTY



This chapter describes how to contact ADC for technical support and warranty service.

TECHNICAL SUPPORT

Technical support is available 24 hours a day, 7 days a week by contacting the ADC Wireline Systems Division Customer Service Engineering Group at one of the following numbers:

- Telephone: 800.638.0031
714.730.3222
- Fax: 714.832.9924
- Email wsd_support@adc.com

A Customer Service Engineer answers technical assistance calls Monday through Friday between 7:30 AM and 5:30 PM, Pacific Time, excluding holidays. At all other times, an on-duty Customer Service Engineer returns technical assistance calls within 30 minutes.

WORLD-WIDE WEB

Avidia product information can be found at <http://www.pairgain.com> using any web browser. To download product manuals from the Customer Site portion of the web page, you need to provide a customer password. If you do not have a password, contact your sales representative.

LIMITED WARRANTY

ADC DSL Systems, Incorporated (“ADC”) warrants that, for a period of twelve (12) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship under normal use. ADC's obligation, under this warranty, is limited to replacing or repairing, at ADC's option, any such hardware product which is returned during the 12-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

ADC warrants that, for a period of 90 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the ADC published specifications and documentation for such software. ADC's entire liability for software that does not comply with the foregoing warranty and is reported to ADC during the 90-day warranty period is, at ADC's option, either (a) return of the price paid or (b) repair or replace of the software. ADC also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. ADC will replace defective media at no charge if it is returned to ADC during the 30-day warranty period along with proof of the date of shipment.

The transportation charges for shipment of returned products to ADC will be prepaid by the Buyer. ADC will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

ADC may use reconditioned parts for such repair or replacement. This warranty *does not* apply to any product which has been repaired, worked upon, or altered by persons not authorized by ADC or in ADC's sole judgment has been subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

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ADC DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ITS PRODUCTS AND ANY ACCOMPANYING WRITTEN MATERIALS. FURTHER, ADC DOES NOT WARRANT THAT SOFTWARE WILL BE FREE FROM BUGS OR THAT ITS USE WILL BE UNINTERRUPTED OR REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE SOFTWARE IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY OR OTHERWISE.

ADVANCE REPLACEMENT

Any product determined by ADC not to comply with the applicable warranty within 30 calendar days from the date of shipment to the Buyer, or as otherwise authorized, are eligible for advance replacement free of charge. A replacement product will be shipped to the Buyer within 24 hours of ADC's receipt of notification from the Buyer.

If products returned to ADC for advance replacement are not received by ADC within 30 calendar days of shipment of the replacement product or if no trouble is found (NTF) as determined by ADC, the Buyer will be responsible for payment of the cost of the replacement product.

BILLING


ADC's repair of products returned for repair, replacement, or credit, whether in warranty or out of warranty, which is found to be damaged due to customer negligence or which has had parts removed will be billed on a time and material basis.

In the event that the returned equipment is not covered by warranty, ADC will contact the customer with the estimated repair or replacement charges and obtain customer disposition of the product if a purchase order has not been provided.

Equipment returned for repair or replacement is subject to a \$70 per unit NTF (no trouble found) charge in the event that diagnostic evaluation reveals no evidence of functional failure or physical defects.

RETURNING A PRODUCT

To return equipment to ADC Wireline Systems Division:

- 1 Locate the number of the purchase order under which the equipment was purchased. You will need to provide this number to ADC Wireline Systems Division Customer Service to obtain a return authorization.
 - 2 Call or write ADC Wireline Systems Division Customer Service to ask for a Return Material Authorization (RMA) number and any additional instructions. Use the telephone number, fax number, or email address listed below:
 - Telephone: 800.370.9670
 - Fax: 714.832.9923
 - Email Address: rma@adc.com
 - 3 Include the following information, in writing, along with the equipment you are returning:
 - Company name, address, telephone number, and the name of a person Customer Service can contact regarding this equipment.
 - The purchase order number provided to Customer Service when the RMA number was requested.
 - A description of the equipment, as well as the number of units that you are returning. Be sure to include the model and part number of each unit.
 - The shipping address to which Customer Service should return the repaired equipment.
 - The reason for the return:
 - The equipment needs an ECO/ECN upgrade.
 - The equipment is defective.
-  **If the equipment is defective, please tell us what you observed just before the equipment malfunctioned. Be as detailed in your description as possible.**
- If there is another reason for returning the equipment, please let us know so we can determine how best to help you.
- 4 Pack the equipment in a shipping carton.

- 5 Write the ADC Wireline Systems Division address and the Return Material Authorization Number you received from Customer Service clearly on the outside of the carton and return to:

ADC Wireline Systems Division
14352 Franklin Ave.
Tustin, CA 92780-7013

Attention: **RMA (Number)**



All shipments are to be returned prepaid. ADC will not accept any collect shipments.

CONFIGURATION WORKSHEETS



This chapter provides worksheets where you can record your system settings and system sessions configuration information prior to executing the procedures in [Chapter 4](#) through [Chapter 7](#).

The information that you need to configure the modem is listed below. Contact your service provider for this information. Use the worksheets in this appendix to record your configuration information. When you begin configuration of the modem in [Chapter 4](#), the procedures refer you to the proper table so you can use the information you have recorded.

CONFIGURATION INFORMATION

- 1 System mode Bridge/Router RFC 1483.
- 2 Bridge/Router:
 - Configure as a Bridge only, as a Router only, **or** as a Bridge and Router.
 - If Bridge or Router, choose LLC or VC-MUX encapsulation.
 - If Router, choose version of and direction for RIP (RIP1, RIP2, or RIP1 compatible).
 - If Bridge, select whether or not to enable Spanning Tree.
- 3 Session address for Ports 1 through 32 (WAN configuration):
 - ATM VPI and ATM VCI (specified for each session)
 - when using fixed IP addresses, IP address specified for each session by the service provider

System Mode Worksheet

Contact Service Provider:	Configuration Type
Enter system mode: <ul style="list-style-type: none"> Bridging/Routing 	<p>_____</p>
If Bridging/Routing, select one: <ul style="list-style-type: none"> Bridge and Router? Bridge only? Router only? If Bridging and/or Routing, choose Encapsulation method? <ul style="list-style-type: none"> LLC VC-MUX 	<p>_____</p> <p>_____</p>
When Routing with RIP, select: <ul style="list-style-type: none"> RIP direction Version of RIP 	<p>_____</p> <p>_____</p>
When Bridging, Enable Spanning Tree? (YES OR NO)	<p>_____</p>

WAN Configuration Worksheet

From Service Provider	Configuration Information	
ATM Configuration (VPI/VCI for each session)	VPI	VCI
	1 _____	1 _____
	2 _____	2 _____
	3 _____	3 _____
	4 _____	4 _____
	5 _____	5 _____
	6 _____	6 _____
	7 _____	7 _____
	8 _____	8 _____
	9 _____	9 _____
	10 _____	10 _____
	11 _____	11 _____
	12 _____	12 _____
	13 _____	13 _____
	14 _____	14 _____
	15 _____	15 _____
16 _____	16 _____	

WAN Configuration Worksheet - continued

From Service Provider	Configuration Information	
ATM Configuration (VPI/VCI for each session)	VPI	VCI
	17 _____	17 _____
	18 _____	18 _____
	19 _____	19 _____
	20 _____	20 _____
	21 _____	21 _____
	22 _____	22 _____
	23 _____	23 _____
	24 _____	24 _____
	25 _____	25 _____
	26 _____	26 _____
	27 _____	27 _____
	28 _____	28 _____
	29 _____	29 _____
	30 _____	30 _____
	31 _____	31 _____
	32 _____	32 _____

Login Name / Login Password Worksheet

From Service Provider	Login Information	
Login Name and Login Password (for each session)	Login Name	Login Password
1	_____	1 _____
2	_____	2 _____
3	_____	3 _____
4	_____	4 _____
5	_____	5 _____
6	_____	6 _____
7	_____	7 _____
8	_____	8 _____
9	_____	9 _____
10	_____	10 _____
11	_____	11 _____
12	_____	12 _____
13	_____	13 _____
14	_____	14 _____
15	_____	15 _____
16	_____	16 _____

Login Name / Login Password Worksheet - continued

From Service Provider	Login Information	
Login Name and Login Password (for each session)	Login Name	Login Password
	17 _____	17 _____
	18 _____	18 _____
	19 _____	19 _____
	20 _____	20 _____
	21 _____	21 _____
	22 _____	22 _____
	23 _____	23 _____
	24 _____	24 _____
	25 _____	25 _____
	26 _____	26 _____
	27 _____	27 _____
	28 _____	28 _____
	29 _____	29 _____
	30 _____	30 _____
	31 _____	31 _____
	32 _____	32 _____

GLOSSARY



10/100BASE-T	The Institute of Electrical and Electronic Engineers (IEEE) 802.3 specification for Ethernet over thin coaxial cable.
AAL5	ATM Adaptation Layer 5.
ADSL	Asymmetric Digital Subscriber Line is a technology in which data is transferred from the service provider to the subscriber at up to 7.552 Mbps, and transferred from subscriber to service provider at up to 928 Kbps. ADSL is the implementation of the physical layer for transmission of data.
ATM	Asynchronous Transfer Mode is a high bandwidth, low delay, connection-oriented, packet-like switching and multiplexing technique that uses 53-byte fixed-size cells to transmit voice, video and data over a network. ATM layers define how cells are formatted and provides the transport of the fixed length cells between the modem and the service provider (or endpoints of the virtual connection).
attenuation	The dissipation of the power of a transmitted signal as it travels over copper wire, measured in decibels (dB).
BER	Bit Error Rate is a measure of transmission quality. The ratio of error bits to the total number of bits transmitted.
bps	bit-per-second is the number of bits transferred during each second of data transmission.
CBR	Constant Bit Rate is a Service Class for the modem. It provides constant bit rate data with a timing relationship between the source and the destination. Also, a traffic class that carries a guaranteed constant bandwidth. Best suited for applications that require fixed bandwidth, such as uncompressed voice, video and circuit emulation. CBR is a Quality of Service class defined by the ATM Forum for ATM networks.
cell	A fixed-length packet. Also, the unit of data transmission used in ATM. Each ATM cell contains a fixed-size frame (53 bytes) consisting of a five-byte header and a 48-byte payload.

community string	A text string required for an SNMP trap to be received by a trap receiver(s). Also, a text string that identifies an SNMP community and is associated with specific access rights (read-only or read/write).
CRC	Cyclic Redundancy Check is a method used to verify the accuracy of data transmission.
DMT	Discrete Multi-Tone is a modulation coding for an ADSL line. DMT is the modulation technology used for the Megabit Modem 400F ADSL.
downstream traffic	Communications from a service provider to a user.
encapsulation	The inclusion of data in a protocol header prior to transmission, which enables successful data transmission between different protocol networks.
ES	Errored Seconds is the seconds during which errors occur that prevent the payload from being corrected.
Ethernet	A protocol used for LAN traffic, which has a transfer rate of 10 or 100 Mbps.
flash memory	Non-volatile memory that can be erased and reprogrammed.
gateway	A device (generally a router) that provides translation services to allow communication between two dissimilar networks.
IP	Internet Protocol is a TCP/IP protocol that controls packet transmission.
IP address	A 32-bit address used in IP routing. The address consists of four octets separated by decimals. The octets comprise a network section, a subnet section (optional) and a host section.
LAN	Local Area Network is a physically connected group of devices between which data transmission occurs at high speeds over relatively short distances.
LLC	Logical Link Control is an encapsulation protocol for data that you transmit from the modem over the WAN in 1483 Bridging/Routing mode.
LOF	Loss Of Frame is an error indicating that the receiving equipment has lost a frame.
LOS	Loss Of Signal is an error indicating that the receiving equipment has lost the signal.
MAC	Media Access Control is a physical address associated with a device such as a NIC. For modem configuration, the MAC is used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Used with 1483 Bridging/Routing Mode.
margin	The noise margin in decibels that the modem must achieve with a BER of 10^{-7} or better to successfully complete initialization.

MIB	Management Information Base is a set of variables that define the configuration and status parameters for network management. Network management stations can retrieve information from and write information to an MIB. The Internet Engineering Task Force (IETF) specifies standard MIBS for certain types of devices, ensuring any NMS can manage the devices. Vendors can specify proprietary MIBs for their devices to fit specific needs.
NAT	Network Address Translation provides the means to map private IP addresses to the public IP addresses (proxy addresses) that are set up for the PPP sessions. Used with PPP Mode. NAPT is Network Address and Port Translation.
NVRAM	Non-Volatile Random Access Memory is a medium for storing system configuration information, so the information is not lost when the system is reset.
octet	A TCP/IP term indicating eight bits.
PAP/CHAP	With PAP, the modem sends authentication requests to the service provider and authentication occurs only once during the life of the link. In CHAP, the service provider returns an authentication challenge to the modem during authentication. CHAP can be renegotiated during the life of the link. Also, both the modem and the service provider must support clear text versions of the password. The CHAP host field must be the same on both ends of the session.
PDU	Protocol Data Unit is data as it appears at the interface between a particular sublayer and the sublayer immediately below.
POTS	Plain Old Telephone Service.
proxy IP address	The proxy IP address is the WAN IP address for one of the 32 sessions. The proxy IP address is used to enter static NAT entries. See IP address.
PVC	Permanent Virtual Circuit is a logical connection comprised of a predefined static route across a packet-switched network that is always in place and always available.
QoS	Quality of Service is the configured traffic parameters that are assigned to a virtual circuit, which specifies how quickly and how accurately data is transferred from the sender to the receiver.
RFC	Request For Comment is a series of notes that contain surveys, measurements, ideas, techniques, and observations, as well as proposed and accepted TCP/IP protocol standards. RFCs are available on the Internet.
RIP	Routing Information Protocol allows routers to update the routing tables automatically (for example with information such as how many hops between destinations). The version of RIP you select for the session must match the version supported by the service provider. Versions RIP1 and RIP-1 compatible are used for broadcast. Version RIP 2 is used for multicast.

SEF	Severely Errored Frames is the incoming signal has at least four consecutive errored framing patterns.
SES	Severely Errored Seconds is the seconds during which more than 2,500 bipolar errors are detected on the line.
session	The time during which two computers maintain a communication connection. An example is a connection configured between the Megabit Modem 400F and the service provider.
SNMP	Simple Network Management Protocol is a protocol that specifies how to send information between a NMS and managed devices on a network. The managed devices run a program called an agent. The agent interprets SNMP request and responds to them. SNMP is used to set device configurations, read device configurations or read the device status.
Spanning Tree	A bridging protocol that detects and prevents loops from occurring in a system containing multiple bridges.
subnet mask	A type of IP address that allows a site to use a single IP address for multiple physical networks.
TCP	Transmission Control Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Establishes connection with remote user before data transmission.
TCP/IP	Transmission Control Protocol/Internet Protocol is a protocol used for communications between computers over networks and the internet.
TFTP	Trivial File Transfer Protocol is a protocol used to download card images or other files from an external TFTP server to the NVRAM of any installed cards, or to upload files from an installed card to an external TFTP server.
trap receivers	PCs configured to receive SNMP traps (messages).
traps	Autonomous, interrupt-driven, SNMP messages sent from a managed node to a network management station to indicate that an event has occurred.
UAS	UnAvailable Seconds is the number of seconds during which the line is unavailable.
UBR	Unspecified Bit Rate is an ATM traffic type used for LAN traffic. When network congestion occurs, the data is stored in a buffer until it can be sent.
UDP	User Datagram Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Uses a protocol port number for the destination at the remote location.
upstream traffic	Communications from a user to a service provider.

VCI	Virtual Channel Identifier is a 16-bit field addressing identifier in the header of an ATM cell used to route cell traffic. It identifies a particular VC link for a given VP.
VCMUX	Virtual Channel Multiplexer-based encapsulation used for networks with large numbers of virtual channels making it practical to carry a single protocol per virtual channel.
VC	A Virtual Channel is a logical connection in the ATM network over which ATM cells are transmitted.
VPI	Virtual Path Identifier is an 8-bit field addressing identifier in the header of an ATM cell that is used to route cell traffic. It identifies a particular VP link.
VP	A Virtual Path is a group of VCs carried between two points. The VP provides a means of bundling traffic traveling in the same direction. VPs are defined by a unique VPI value.
WAN	Wide Area Network is a network consisting of nodes located across a large geographical area. Also, the connection between a service provider and Megabit 400F Modem.

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