Megabit Modem

MM701F User Manual

Version 1.x

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Trademark Information

Disclaimer of Liability

Specific Disclaimer for High-risk Activities

ABOUT THIS USER MANUAL

Use this manual to set up the MM701F modem. It provides instruction on:

- installing the modem
- configuring the modem
- monitoring the modem
- maintaining the modem

DOCUMENT CONVENTIONS

Notes contain information about special circumstances.

Cautions indicate the possibility of equipment damage or personal injury.

PRODUCT CERTIFICATIONS

FCC CLASS B COMPLIANCE

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

This product meets all safety requirements per UL-1950 standard.

CE

This product meets all EMC and safety requirements per EN 300 386-2 and IEC 950 (EN60950).

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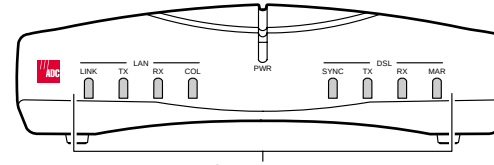
1 OVERVIEW



Status LEDs

The MM701F is a versatile, high speed modem that connects your LAN to one or more service providers. It employs ADSL technology for asymmetric rates up to 7.552 Mbps over single-pair wiring and allows for multiple management options, including an easy to use Web-based interface. In addition, the MM701F supports 32 simultaneous Bridge/Router or PPP sessions to the same or different service providers over its ADSL WAN interface. For sizeable deployment, the MM701F provides the ability to download pre-defined configuration files to the flash memory instead of manually defining each and every value for all modems.

The MM701F also includes several useful protocols and services. If you require IP addresses to be served dynamically on your LAN, use the built-in DHCP server. If you need to update your modem software, use the built-in TFTP client. If you require private IP addresses and need to translate them into public IP addresses, use the built-in NAT function. If you need to exchange IP routing information with another device, configure and implement RIP. For a complete list of features, see Appendix A.

Use this guide to install and configure your MM701F. Before installation, verify your shipping package contents and system requirements as described in the sections listed below.

VERIFY SHIPPING PACKAGE CONTENTS

As you unpack the modem, inspect the contents for damage. If the equipment was damaged in transit, report it to the shipping company and to your sales representative.

Check the contents of the package for the following:

- MM701F modem unit
- 6 Vdc power supply
- Ethernet cable
- phone cord with RJ-11 connectors
- console cable and DB-9 console port adapter

SYSTEM REQUIREMENTS

You need the following hardware and software to complete the installation and configuration of the MM701F:

- PC with an Ethernet NIC Card (10 Mbps Half Duplex) and serial port
- TCP/IP protocol stack installed (see your operating system documentation)
- Web browser installed such as Internet Explorer® Version 4.0 or higher
- Ethernet hub/switch (optional)
- Terminal emulation program (such as HyperTerminal)

WHAT TO DO NEXT

After you have verified the shipping package contents and system requirements, you are now ready to install the modem as explained in Chapter 2 on page 3.

2 INSTALLING THE MODEM

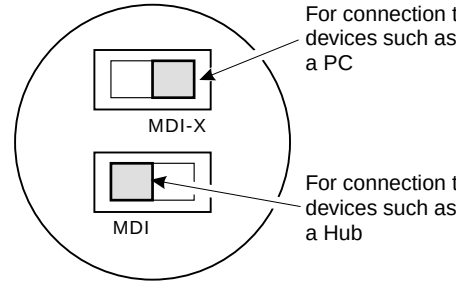
Perform the following installation procedures to install the modem:

SETTING THE MDI/MDI-X SWITCH

The MDI/MDI-X switch located on the modem rear panel allows you to connect a network device (such as a PC, hub, switch, or router) to the modem 10Base-T port.

Set the MDI/MDI-X switch for the 10Base-T port to:

- MDI-X when connecting to a network device such as a PC with an Ethernet NIC card with a MDI port.
- MDI when connecting to a device such as a hub, switch, or router with a MDI-X port.



CONNECTING THE CABLES

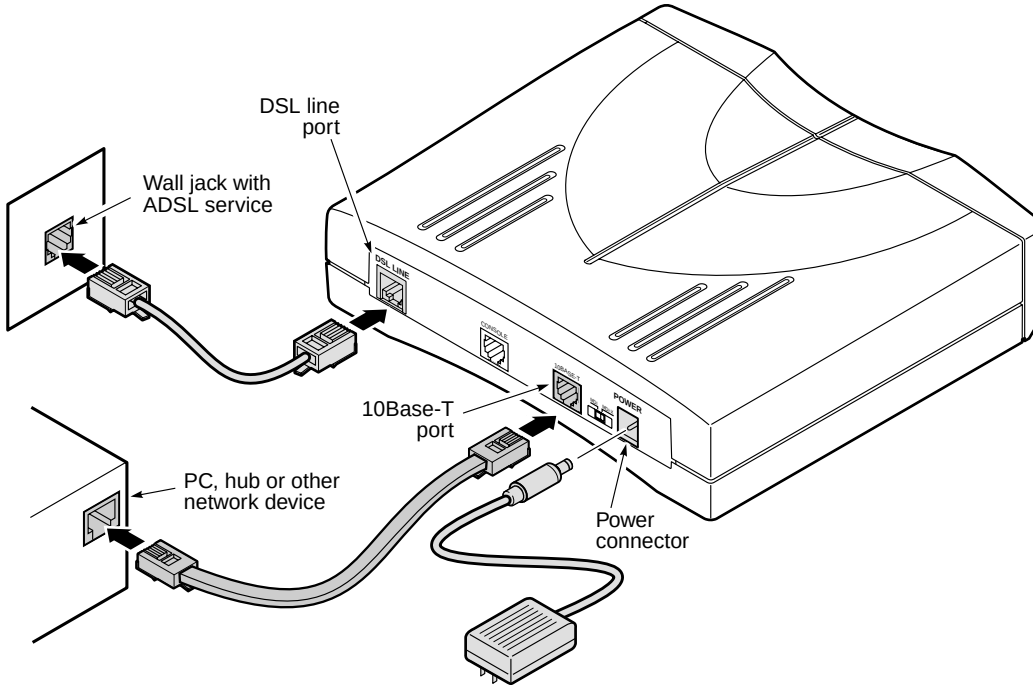
After you've verified the shipping package contents, follow this procedure to physically set up your modem:

1 Turn off your computer.

2 Connect the cables to the modem rear panel as shown below.

- grey phone cable for the DSL line port
- black cable for the 10Base-T port
- power cable for the modem Power connector

See "Connecting to the Console Port" on page 42 for connecting the console cabling.



CHECKING LED INDICATIONS

Your service provider sets up the ADSL parameters for your service. The MM701F must have the DSL SYNC LED lit before you can connect sessions with your service provider.

The table below describes LED indications for all operational modes. LEDs on the MM701F front panel provide continual status at-a-glance for network connections.

LED	State	Description
POWER	On green	MM701F has power.
	Off	MM701F does not have power.
		Ethernet
LINK	On green	A PC, hub, or other network device is connected to the MM701F 10Base-T interface.
	Off	No device is connected to the MM701F 10Base-T interface.
TX	Flashing green	MM701F is transmitting data to devices on the LAN.
	Off	MM701F is not transmitting data to the LAN.
RX	Flashing green	MM701F is receiving data from devices on the LAN.
	Off	MM701F is not receiving data from the LAN.
COL	Flashing green	Ethernet packet collisions are occurring on the LAN.
	Off	No Ethernet packet collisions are occurring.
		DSL
SYNC	On green	DSL transceiver is synchronized (connected) and in normal operation mode.
	Flashing green	Slow flashing green indicates that the DSL transceiver is in a start-up or handshaking sequence. Fast flashing green indicates the DSL transceiver is in training sequence.
	Off	DSL transceiver is not detecting a transceiver at the far end and is not connected.
TX	Flashing green	MM701F is transmitting data over the DSL connection.
	Off	MM701F is not transmitting data over the DSL connection.
RX	Flashing green	MM701F is receiving data over the DSL connection.
	Off	MM701F is not receiving data over the DSL connection.
MAR	On green	DSL margin is above the preset margin value.
	Off	DSL margin is at or below the preset margin value.

WHAT TO DO NEXT

After you have installed the modem, determine which method to use to manage the modem:

- To manage the modem through the Web interface using your Web browser (recommended), refer to Chapter 3 “Managing the Modem Using a Web Browser” on page 9.
- To manage the modem through the command-line interface using the modem console port or by a telnet session, refer to Chapter 4 “Managing the Modem Using the Console Port & Telnet” on page 41.

MANAGING THE MODEM USING A WEB BROWSER 3

You can manage the MM701F using a Web browser, console port, or a telnet session.

All of the MM701F features and functionality are accessible through the Web interface. In contrast, there are some features not supported through the console port. For example, you can enable or disable spanning tree through the Web interface, but not through the console port or telnet. The same principle applies for deleting a WAN session and selecting ATM VBR as a quality of service.

To prevent losing your configuration changes, be sure to save them as described in "Saving Changes" on page 39.

Refer to the following sections to take advantage of the Web interface:

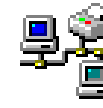
SETTING UP THE PC

To access the modem Web interface, connect your PC to the same LAN IP subnet as the MM701F. The default LAN IP subnet for the modem is 10.0.0.0 with a subnet mask of 255.255.255.0. In addition, the modem uses 10.0.0.1 as its default LAN IP address.

However, if you have an existing subnet to accommodate the modem, change the IP address of the modem from the command-line interface as described in "Setting Up the LAN" on page 48.

If your PC cannot connect to the modem, set your PC Ethernet NIC card for 10 Mbps half-duplex transmission (not auto-detect).

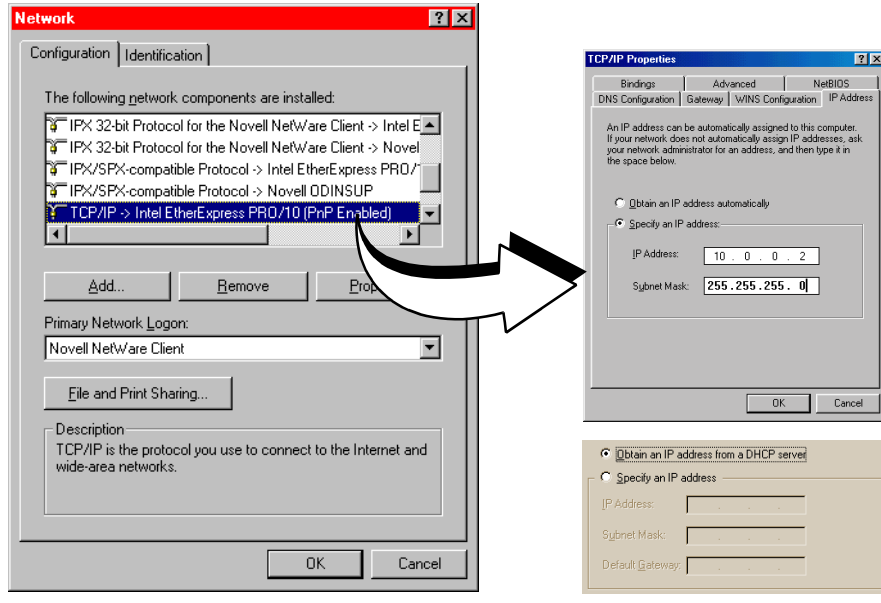
The following is an example of how to set up a PC running Microsoft Windows 98.



1. From the Windows desktop, click **Start**, **Settings**, **Control Panel** to open the **Control Panel** dialog.
2. From the **Control Panel** dialog, double-click the **Network** icon.
3. From the **Configuration** tab, double-click **TCP/IP**.

4 Do one of the following:

- If DHCP server has not been enabled on the modem (default), select **Specify an IP address**.
- If DHCP server has been enabled on the modem, select **Obtain an IP address automatically** and skip to step 6.



5 Enter **IP Address** and **Subnet Mask.** The default modem LAN IP address is 10.0.0.1 with a subnet mask of 255.255.255.0. Use an IP address for your PC between the range of 10.0.0.2 to 10.0.0.254.

6 Click **OK** to close the **TCP/IP Properties** dialog.

7 Click **OK** to close the **Network** dialog.

8 Click **OK** to restart the computer.

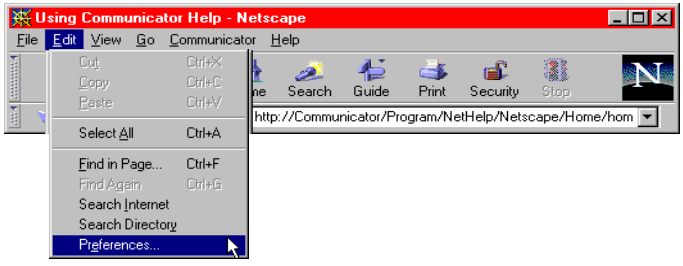
CONFIGURING THE WEB BROWSER

To view the modem Web pages properly, your Web browser must have the proxies disabled and cache settings enabled to compare the cached document against the network document every time it is accessed.

The following is an example of how to make the configuration changes using Netscape Navigator 4.0.

1 Open your Web browser.

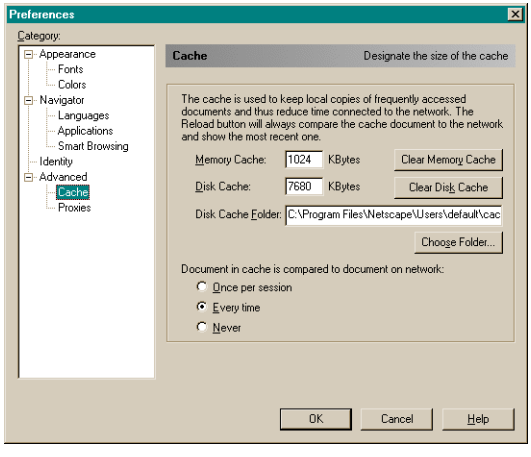
2 Click **Edit**, **Preferences** to open the **Preferences** dialog.

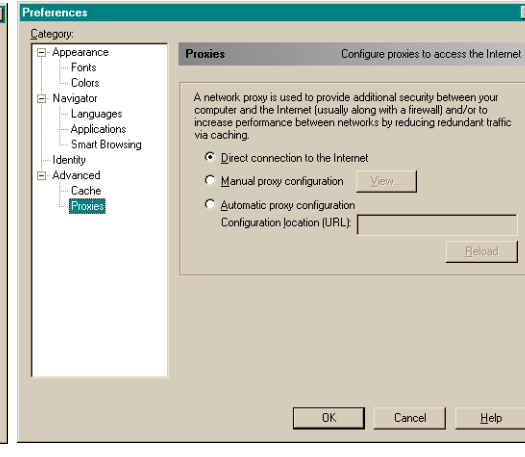


3 From Category, select **Advanced**, click **Cache**, then select **Every time** for **Document in cache is compared to document on network**.

4 From Category, select **Advanced**, click **Proxies**, then select **Direct connection to the Internet**.

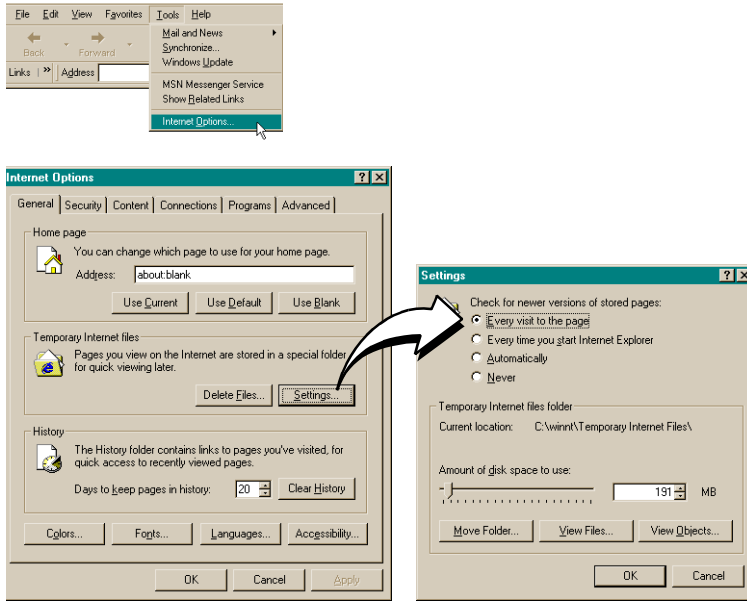
5 Click **OK** to close the **Preferences** dialog.





The following is an example of how to make the configuration changes using Internet Explorer 5.5:

1. Open your Web browser.
2. Click **Tools**, **Internet Options** to open the **Internet Options** dialog.
3. In the **Temporary Internet Files** section of the dialog, click **Settings**.
4. Select **Every visit to the page**, then click **OK**.

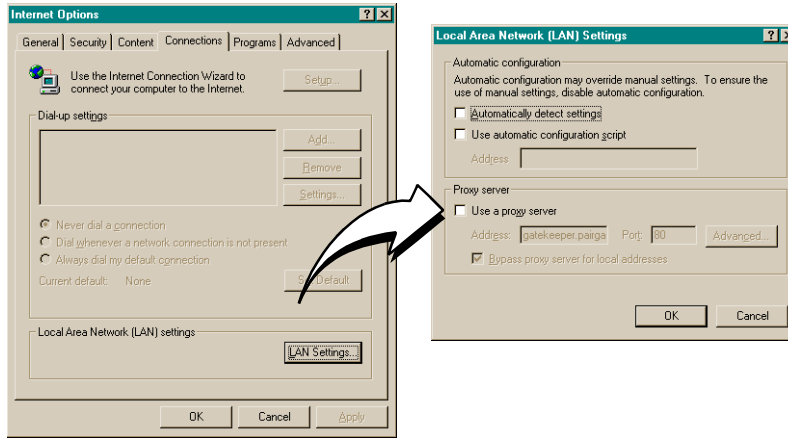


5 Click the **Connections** tab, then click **LAN Settings** to open the **LAN Settings** dialog.

6 In the **Proxy Server** section of the dialog, clear the **Use a proxy server** box.

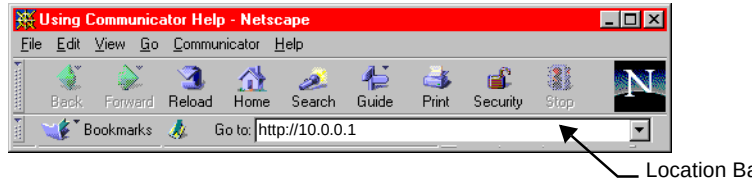
7 Click **OK** to close the **LAN Settings** dialog.

8 Click **OK** to close the **Internet Options** dialog.

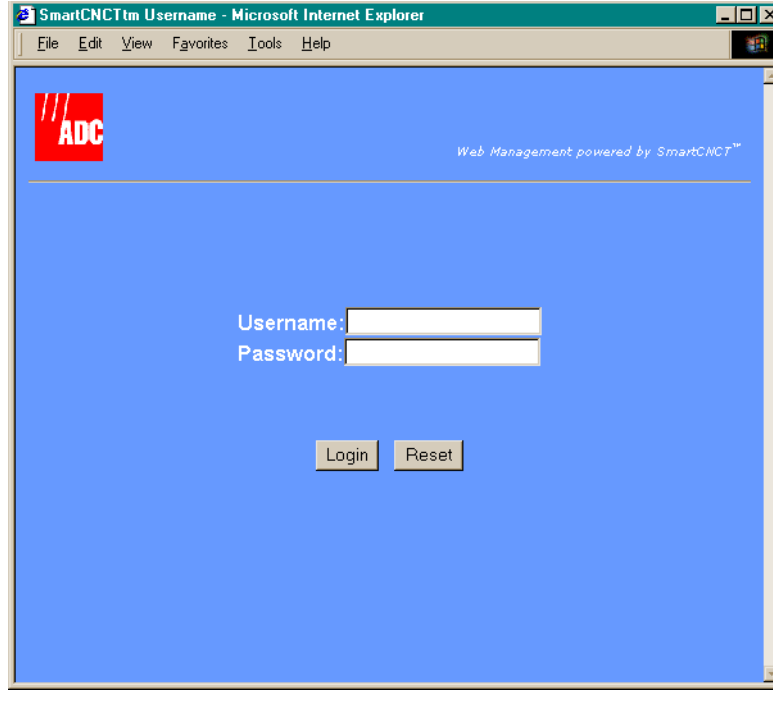


ACCESSING THE MODEM WEB PAGES

Type **http://10.0.0.1** in the Location Bar field of the Web browser (as shown below), then press Enter to display the MM701F Web pages.



The following login screen displays.



This login is for the system administrator responsible for configuring and managing the MM701F. Enter the default username (**admin**) and password (**password**), then click **Login**. Or, if you have changed the login username and password, enter the new login username and password.

MANAGING THE SYSTEM

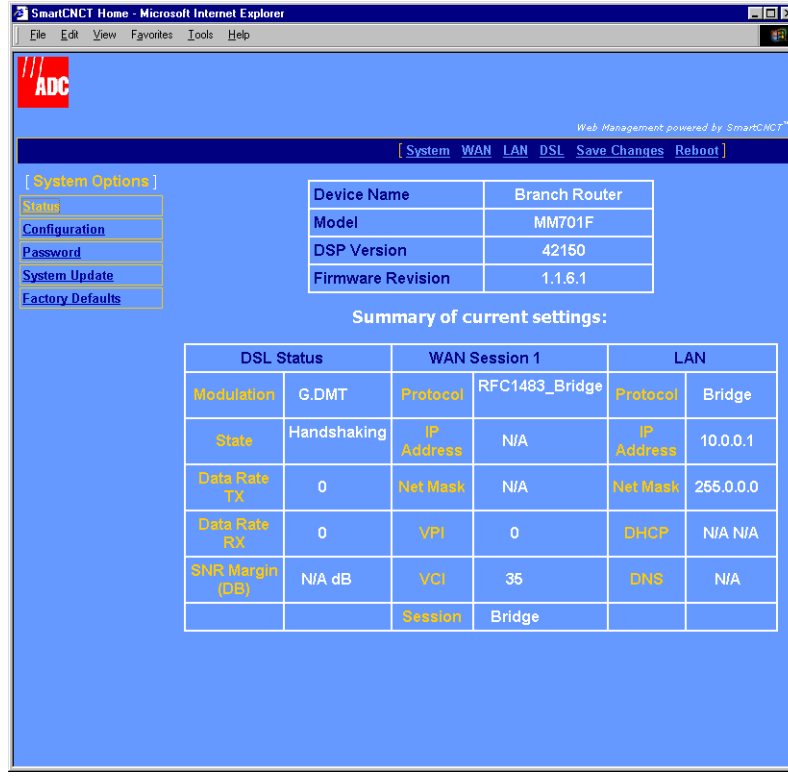
The System pages are designed so that you can manage, update, and troubleshoot the modem as a whole. From these pages you can:

- view the overall configuration of the modem
- enable or disable spanning tree
- change the login name and password
- update the modem software and configuration files
- revert back to the default factory values

View Modem Status

The **System Status** page is a read-only summary of the current modem configuration. It includes information about the modem software, DSL configuration values, WAN session settings, and LAN parameters. Use it as an overview of the modem status.

You cannot change the Device Name.



Refer to the following table for a description of the fields:

Parameter	Description
Device Name	Descriptive role of the modem. This is not configurable.
Model	Megabit Modem model number.
DSP Version	Version of the Digital Signal Processor of the modem.
Firmware Revision	Version number of the image downloaded to the modem.
DSL Status Fields	Configuration values specific to ADSL.
Modulation	ADSL standard (Multi Mode, T1.413, G.DMT, or G.Lite) in the current configuration.
State	Status of the DSL link.
Data Rate TX	Rate at which the modem is configured to send data.
Data Rate RX	Rate at which the modem is configured to receive data.
SNR Margin (DB)	Used to control the front panel LED.

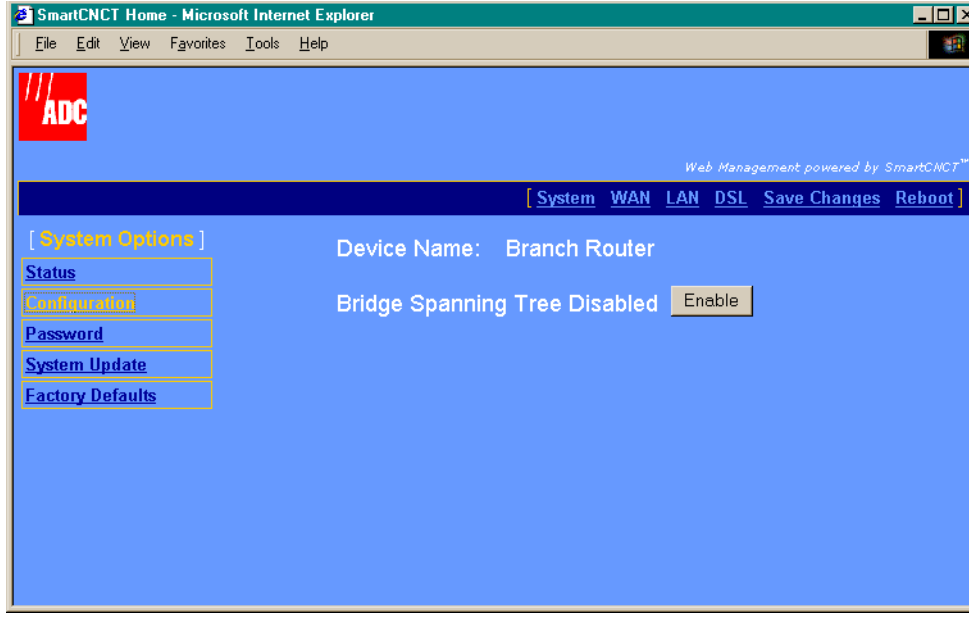
For WAN Session and LAN field descriptions, refer to

- "Configuring the WAN" on page 23 for WAN Session fields.
- "Configuring the LAN" on page 27 for LAN fields.

Set Spanning Tree

Spanning Tree eliminates loops in a LAN topology, ensuring that there is only one path (or link) between any two nodes on a network. Use Spanning Tree protocol only when you have already selected a Bridge session (as described in "Set Up WAN Sessions" on page 23) and when your LAN has more than one device (a PC only) on your LAN and those devices have more than one physical path connecting them.

1 Select **System** on the menu bar then click **Configuration** to access the **System Configuration** page.

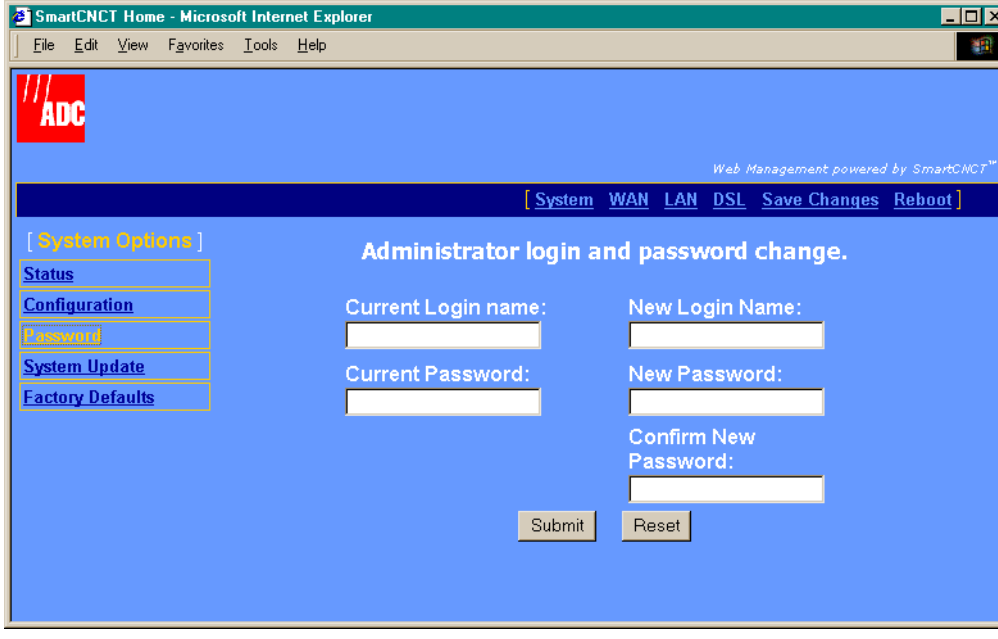


2 Select **Enable** to activate the Spanning Tree protocol for all bridging sessions.

Set Login Name and Password

You can change the login parameters for the system administrator. The default login name is **admin** and the default password is **password**.

1 Select **System** on the menu bar then click **Password** to access the **System Password** page.



2 Enter the **Current Login name** then enter the **Current Password**.

3 Enter the **New Login Name** then enter the **New Password**.

4 Enter the new password again to **Confirm New Password**.

5 Click **Submit**.

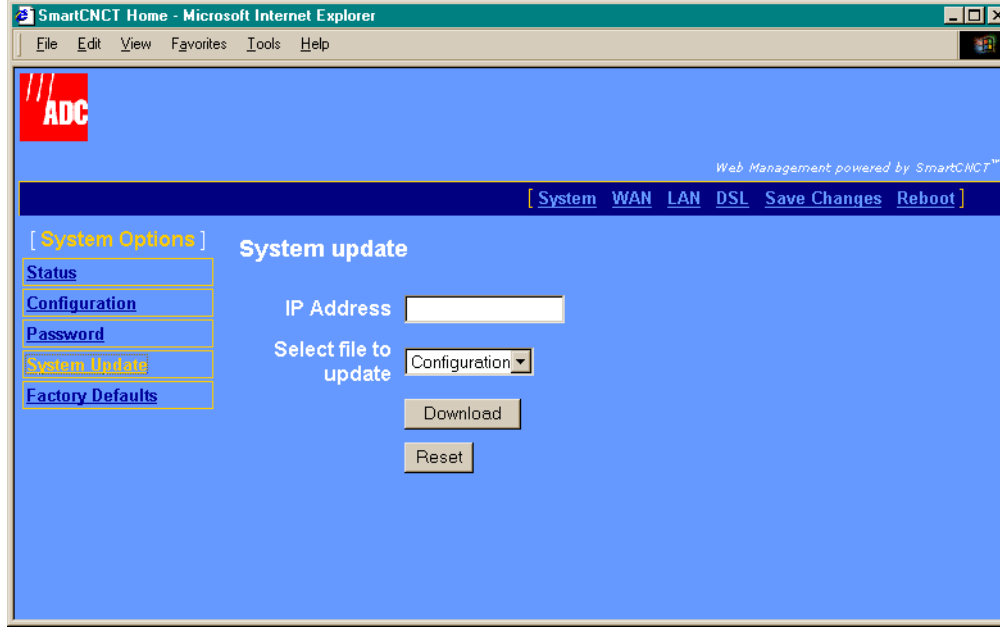
Use the new Login Name and Password the next time you login to the MM701F.

Update System Software

You can upgrade the software on your MM701F. To upgrade, you must specify the IP address of the server where the new software is stored. The MM701F uses TFTP to download the software which comprises a configuration file (must be named “celsiancfg”) and an image file (must be named “image”).

The software update process takes about 90 seconds to complete. After the update the modem resets itself. Do not recycle the power during this process. This will cause permanent image corruption.

1 Click **System** on the menu bar, then **System Update** to access the **System Update** page.



2 Enter the **IP Address** of the server where the firmware image or configuration file is located.

3 From **Select file to update**, do one of the following:

- select **Configuration** to download the configuration file “celsiancfg”
- select **Image** to download the image file “image”

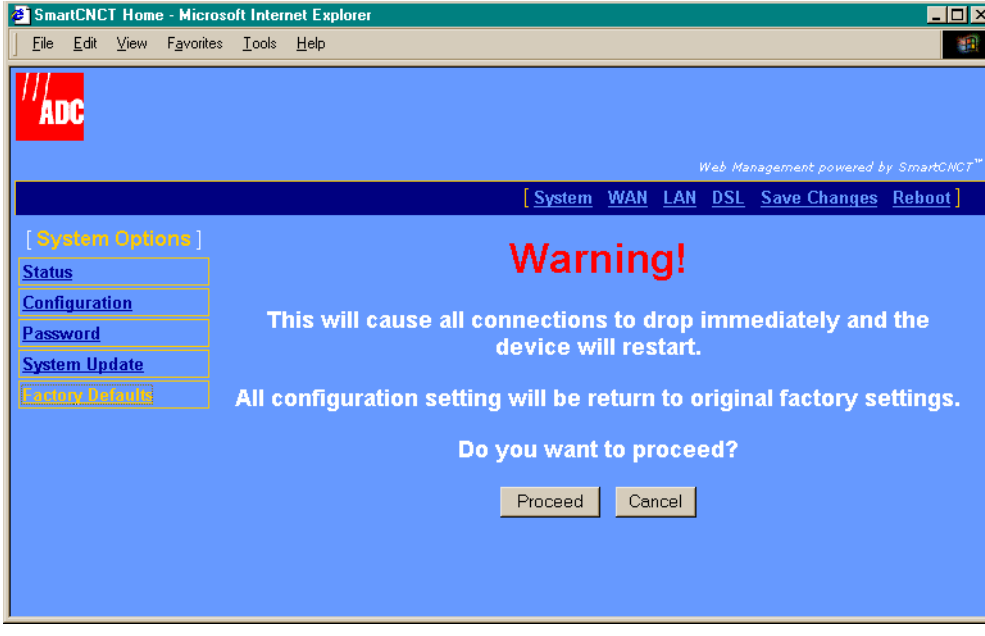
4 Click **Download** to start the file download.

Set to Factory Defaults

When you configure the MM701F, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or you simply want to configure new parameters. For session default values, see "Default Session Parameter Values" on page 70.

Active links are lost when you reset to factory default values.

1 Click **System** on the menu bar then **Factory Defaults** to access the **System Factory Defaults** page.



2 Click **Proceed** if you want to return all values to their original factory values.

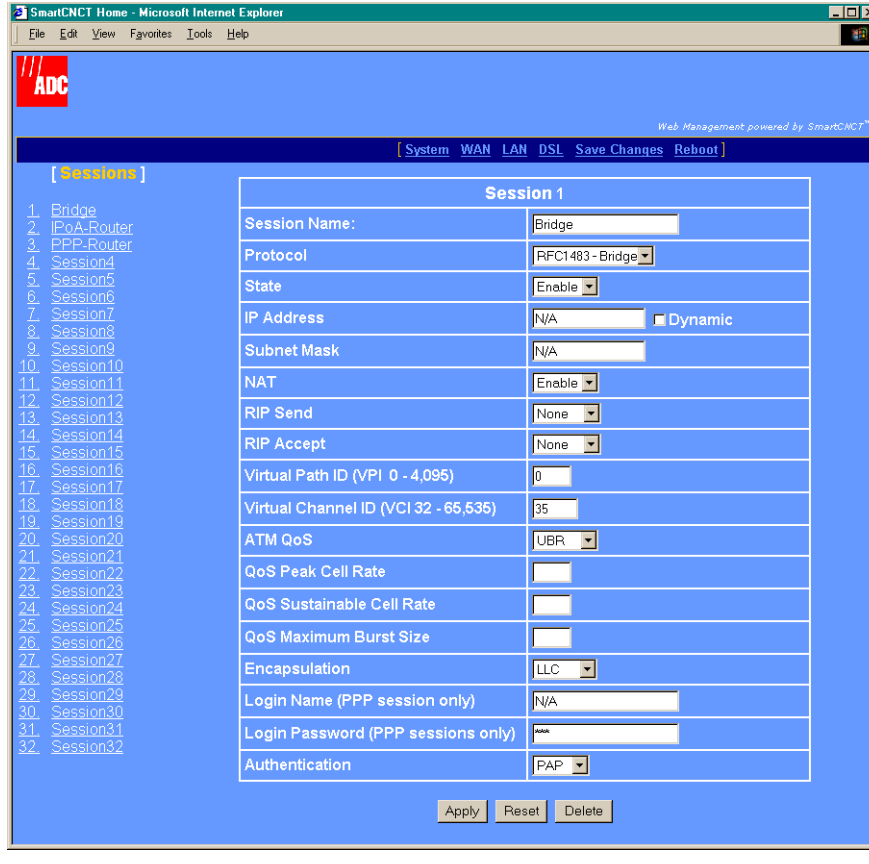
3 Click **Cancel** if you do not want to return all values to their original factory values.

CONFIGURING THE WAN

This configuration sets up the communication between the MM701F and the service provider for each session you set up.

Set Up WAN Sessions

1. Select **WAN** on the menu bar to access the **Session Configuration** page.
2. Select a session from the **[Sessions]** list. The configuration options for that session appear in the **Session *X*** table (where *X* equals the Session number).



3 Configure the following parameters for each session you set up, as defined in the following table.

Parameter	Description
Session Name	Enter a unique, descriptive identifier for the session. This name can have a maximum of 15 characters with no spaces.
Protocol	Select the message format to be used between the MM701F and the service provider. You can configure each session with any of the three protocols listed below. If you select RFC 1483 Bridge or RFC 1483 Router protocol, you only need to set up one session. You can, however, configure a combination of RFC 1483 Router/Bridge and PPP protocols for a multiple session configuration. • Select **RFC 1483-Bridge** if the MM701F forwards packets based on MAC addresses. You can enable Spanning Tree when you select Bridge sessions. See "Set Spanning Tree" on page 19. • Select **RFC 1483-Router** if the MM701F routes packets based on IP addresses. • Select **PPPoA** if the MM701F establishes PPP sessions with the service provider.
State	Select **Enable** to activate this session. Select **Disable** to deactivate this session. You can set the state for each session. You can also change the state for a session at any time using this parameter.
IP Address	Determine how an IP address is assigned to a session: • If you selected **PPPoA** protocol, **Dynamic** is automatically selected. The service provider automatically assigns an IP address to this session. The IP address displays in the box. • If you selected **RFC 1483-Router** protocol, you enter the **IP address** supplied by the service provider in the box. Do not select **Dynamic**. • If you selected **RFC 1483-Bridge** protocol, do not enter an **IP address** and do not select **Dynamic**.
Subnet Mask	Determine how the subnet mask is assigned to a session: • If you selected **PPPoA** protocol, the service provider automatically assigns a **Subnet Mask**. The **Subnet Mask** displays in the box. • If you selected **RFC 1483-Router** protocol, enter the **Subnet Mask** supplied by the service provider in the box. • If you selected **RFC 1483-Bridge** protocol, do not enter a **Subnet Mask**.
NAT	**Enable** or **Disable** the use of Network Address Translation (NAT) protocol to translate private IP addresses (addresses on your LAN) to public IP addresses assigned to each session (see IP Address above in this table for session IP addresses).

Parameter	Description
RIP Send	Routing Information Protocol (RIP) dynamically routes packets sent from the MM701F to the service provider. Select the same RIP version that is used by the service provider: • Select **Disable** if you selected **RFC1483 - Bridge** protocol. • Select **RIP1** to send broadcast packets from the MM701F. • Select **RIP2** to send multicast packets from the MM701F. • Select **RIP1&RIP2** to send both broadcast and multicast packets from the MM701F.
RIP Accept	To dynamically route packets sent from the service provider to the MM701F, select the same RIP version that is used by the service provider: • Select **Disable** if you chose **RFC 1483 Bridge** protocol. • Select **RIP1** to receive broadcast packets. • Select **RIP2** to receive multicast packets. • Select **RIP1&RIP2** to receive both broadcast and multicast packets.
Virtual Path ID (VPI)	Enter the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the MM701F and the service provider. This value must match the virtual path identification (VPI) that the service provider uses for this connection.
Virtual Channel ID (VCI)	Enter the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the MM701F and the service provider. This value must match the virtual channel identification (VCI) that the service provider uses for this connection.
ATM QoS	Select the ATM Quality of Service supplied by your service provider. The options are: • UBR (unspecified bit rate) • VBR-nrt (variable bit rate non-real-time) • CBR (constant bit rate)
QoS Peak Cell Rate	Enter the QoS Peak Cell Rate (PCR) value supplied by your service provider. A PCR value is required for CBR QoS, but is not used for UBR QoS. PCR is the maximum rate at which data is transferred on the line, measured in cells per second.
QoS Sustainable Cell Rate	Enter the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use only for VBR-nrt QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second.
QoS Maximum Burst Rate	Enter the QoS Maximum Burst Rate (MBR) value supplied by your service provider. Use only for VBR-nrt QoS. MBR is the maximum number of cells that can be transmitted at the peak cell rate.
Encapsulation	Select the encapsulation type that is supplied by the service provider. The options are: • VC-MUX—Virtual Channel Multiplexer-based encapsulation allows one protocol to be run over the session. • LLC—Logical Link Control allows multiple protocols to be run over the session.

Parameter	Description
Login Name	A PPP session requires a Login Name that is supplied by the service provider.
Login Password	A PPP session requires a Login Password that is supplied by the service provider.
Authentication	Select the authentication protocol provided by your service provider for PPP sessions. The authentication protocol type must match at the MM701F and the service provider. The options are: • PAP—The modem sends authentication requests to the service provider and authentication occurs only once during the life of the link. • CHAP—The service provider returns an authentication challenge to the modem during the authentication.

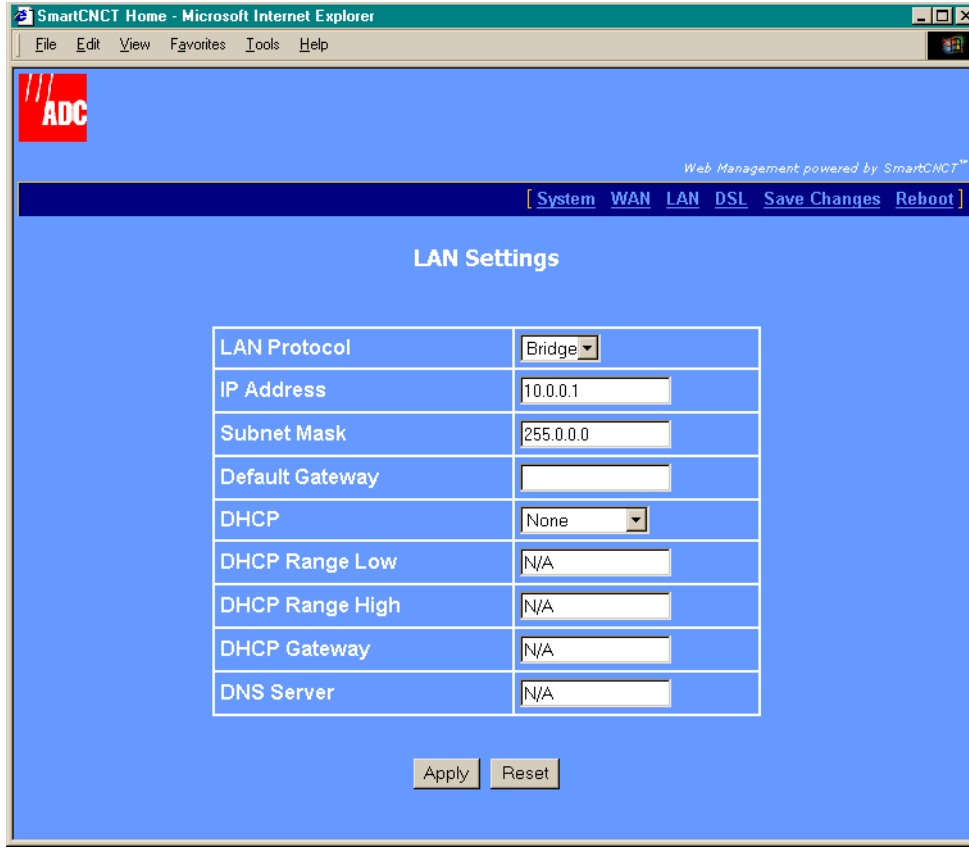
4 Do one of the following:

- Click **Apply** then save changes as described in "Saving Changes" on page 39.
- Click **Reset** to undo the changes you made to the screen. Reset will not work after you have made changes and Apply has been selected.
- Click **Delete** to remove the session, then save changes as described in "Saving Changes" on page 39.

CONFIGURING THE LAN

This configuration sets up the communication between your LAN and the MM701F.

1 Select **LAN** on the menu bar to access the **LAN Settings** page.



2 Configure the following parameters:

Parameter	Description
LAN Protocol	Select the message format to be used for your LAN. • Select **Bridge** if the LAN forwards packets based on MAC addresses. If you selected RFC 1483 Bridge protocol for the WAN sessions (page 23), select Bridge for the LAN traffic. • Select **Router** if the LAN routes packets based on IP addresses. If you selected RFC 1483 Router or PPP protocol for the WAN sessions (page 23), select Router for the LAN traffic.
IP Address	See your LAN administrator for LAN IP addresses. However, if you want to change the IP address through the Web interface, enter an IP address for the LAN (10BaseT) port provided by the LAN administrator. Or, you can use the default IP address for the LAN port which is 10.0.0.1. If you choose to use the default IP address, ensure that the devices on your LAN are on the same subnet as the MM701F LAN port. If you select **Client** for the DHCP configuration (below in this table), a DHCP server on your LAN automatically provides the IP address.
Subnet Mask	Enter the subnet mask for the LAN (10BaseT) port provided by the LAN administrator. Or, you can use the default subnet mask for the LAN port which is 255.255.255.0. If you choose to use the default subnet mask, ensure that it allows devices on your LAN to access the MM701F LAN port.
Default Gateway	Enter the default IP address for a default gateway that is supplied by the service provider.
DHCP	See your LAN administrator for the DHCP selection. You selected whether or not you wanted to enable DHCP in "Determining IP Addresses" on page 14. However, if you want to change that DHCP selection through the Web interface, select one of the following: • **None**—DHCP is not enabled. • **Client**—The MM701F is a DHCP client and can be served an IP address for the LAN port by a DHCP server on your LAN. • **Server**—The MM701F is a DHCP server and can serve IP addresses to devices on your LAN. See DHCP Range Low and High for the ranges of IP addresses that the MM701F can serve.
DHCP Range Low	Enter the IP address supplied by your LAN administrator. This is the lowest IP address value that the MM701F can serve when configured as a DHCP server.
DHCP Range High	Enter the IP address supplied by your LAN administrator. This is the highest IP address value that the MM701F can serve when configured as a DHCP server.

Parameter	Description
DHCP Gateway	Enter the IP address of the default gateway that is provided by the LAN administrator for devices on the LAN. The MM701F must be configured as a DHCP server and provides this gateway IP address to requesting DHCP clients (such as PCs) on the LAN.
DNS Server	Enter the IP address of the Domain Name System (DNS) server that is provided by either the service provider or the LAN administrator. The MM701F must be configured as a DHCP server and provides this DNS IP address to requesting DHCP clients (such as PCs) on the LAN. The DNS server maps human-readable addresses to IP addresses. A human-readable address is one such as: `maggie.copro.company.com`. The DNS resolver on the server translates this to a numeric value. This numeric value is the IP address assigned to a WAN session (see page 23).

3 Click **Apply**.

4 Save changes as described in "Saving Changes" on page 39.

5 If you enabled DHCP, reboot the modem as described in "Rebooting the Modem" on page 40 to activate the DHCP parameters.

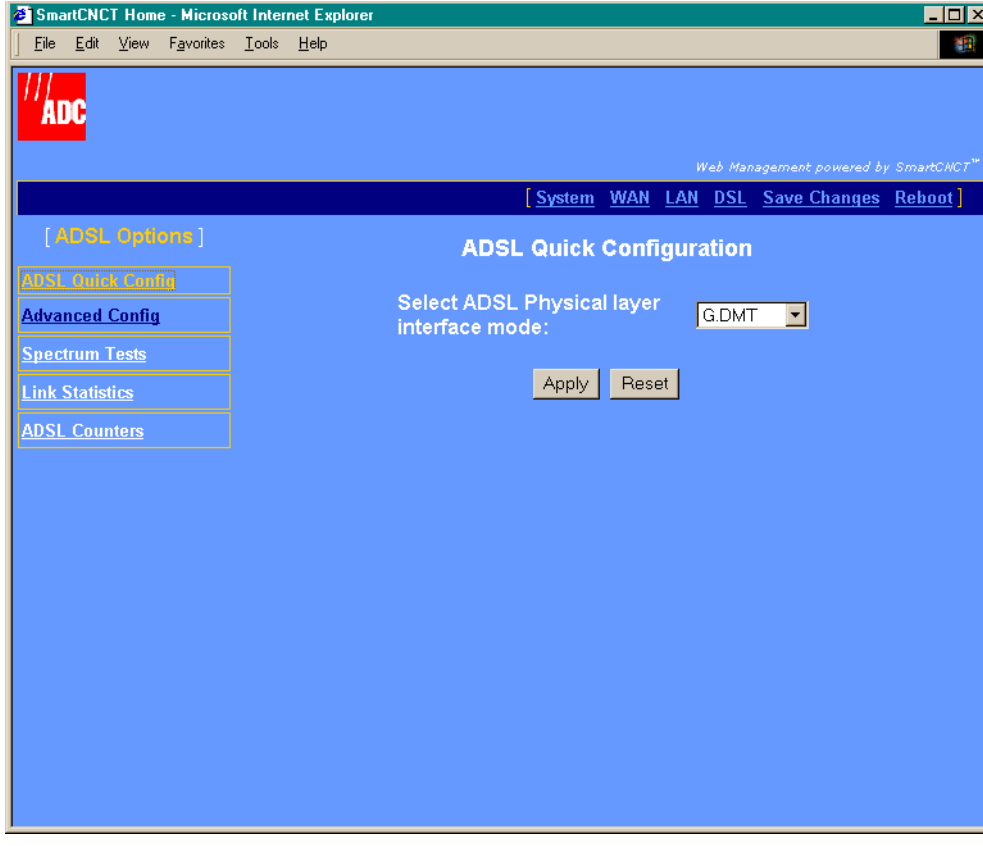
MANAGING DSL

Select either the DSL quick configuration or the advanced configuration as directed by your service provider.

DSL Quick Configuration

You can configure the MM701F to comply with different standards for DSL transmission. For the quick configuration, you only select the transmission type.

1 Select **DSL** on the menu bar then select **ADSL Quick Config** under **[ADSL Options]**.



2 Select one of the following options as directed by your service provider:

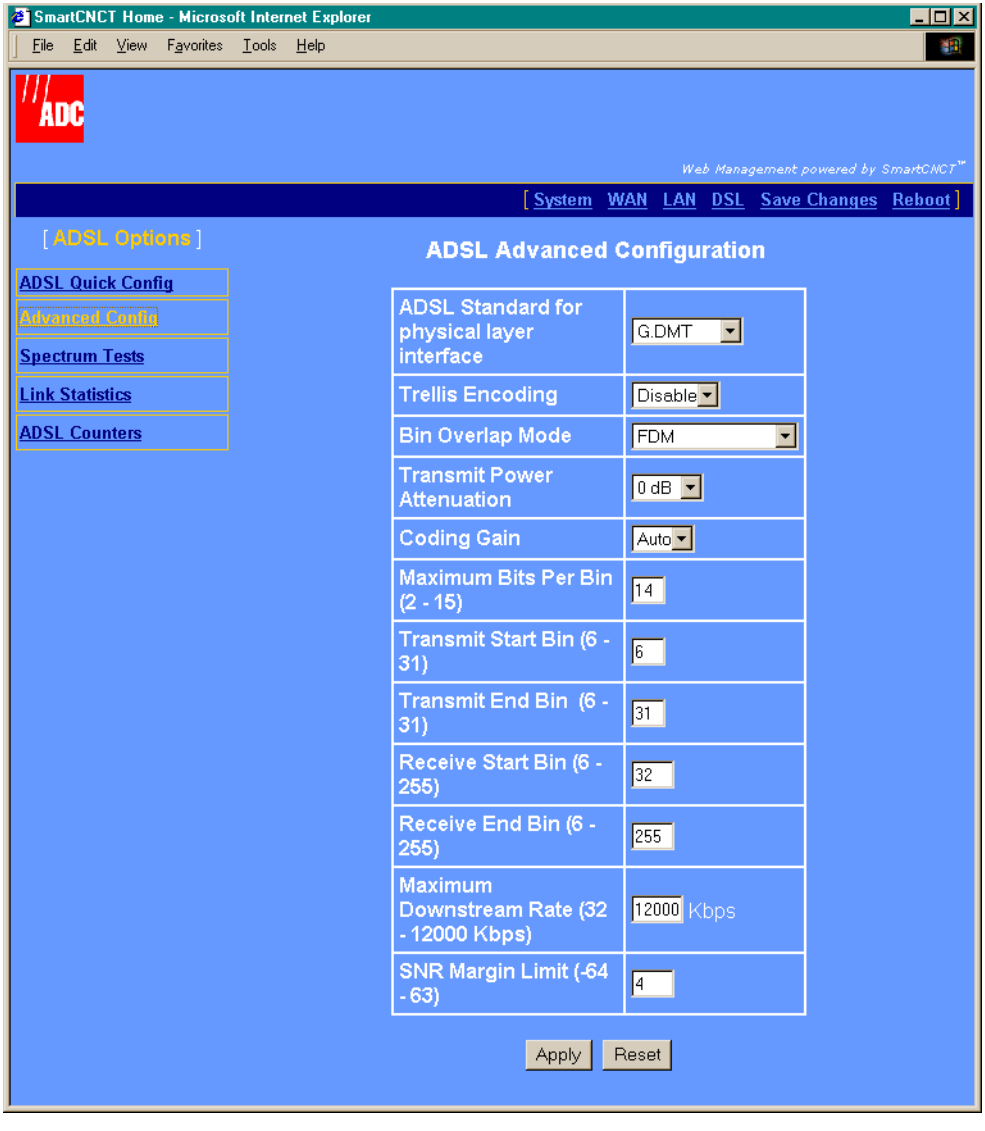
- **Multi Mode**: Multi-vendor version of T1.413 line code based off of the ANSI standard.
- **T1.413**: ANSI standard ADSL line code supporting full-rate transmission.
- **G.DMT**: ITU standard ADSL line code supporting full-rate transmission.
- **G.lite**: ITU standard ADSL line code that is a simplified version of G.dmt allowing up to 1.536 Mbps downstream and 512 Kbps upstream.

3 Click **Apply**.

DSL Advanced Configuration

You can configure the MM701F to comply with different standards for ADSL transmission as well as parameters.

1 Select **DSL** on the menu bar then select **DSL Advanced Config** under **[ADSL Options]**.



2 Configure the following parameters as supplied by your service provider:

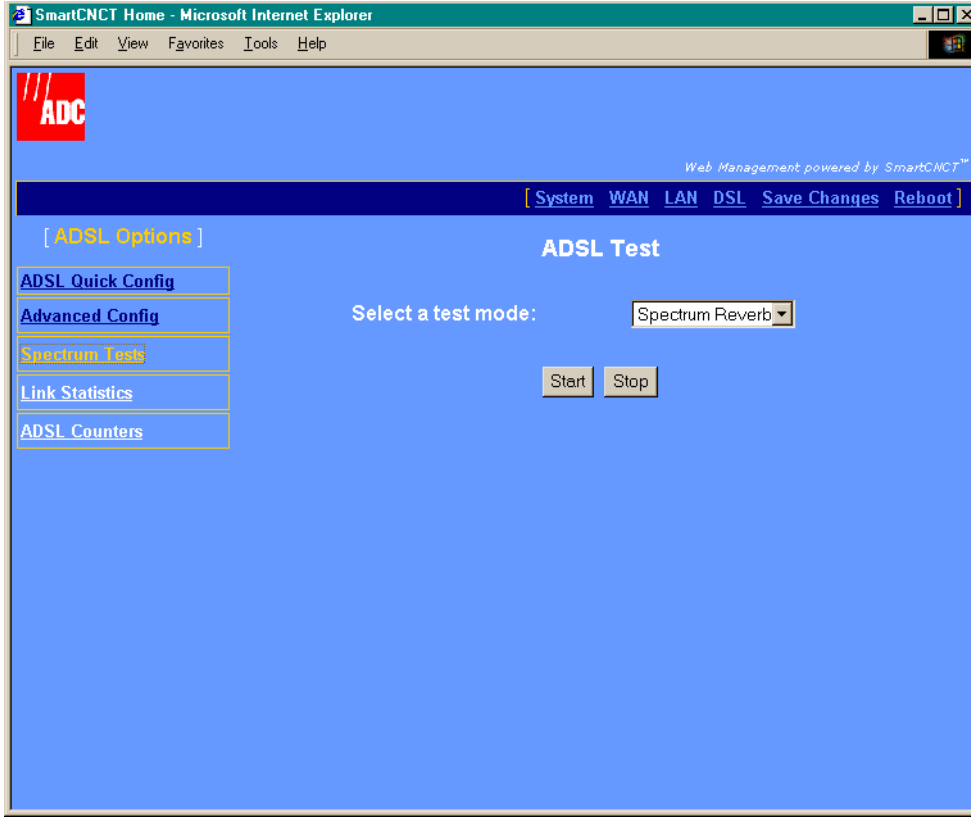
Parameter	Description
ADSL Standard for physical layer interface	Select from the options: • ITU G.992.2 **G.lite** • ITU G.992.1 **G.DMT** (default) • ANSI **T1.413** Issue 2 • **Multimode**
Trellis Encoding	**Enable** or **Disable** (default) Trellis Encoding. Trellis Encoding allows for high data speeds and reduces transmission errors.
Bin Overlap Mode	Select either **FDM** (default) or **EchoCancellation**.
Transmit Power Attenuation	Select a value from **0** to **12** decibels (0 is the default).
Coding Gain	Select either **Auto** (default) or a value from **0** to **7** decibels.
Maximum Bits per Bin	Select a value from **2** to **15** (14 is the default).
Transmit Start Bin	Select a value from **6** to **31** (6 is the default).
Transmit End Bin	Select a value from **6** to **31** (31 is the default).
Receive Start Bin	Select a value from **6** to **255** (32 is the default).
Receive End Bin	Select a value from **6** to **255** (255 is the default).
Maximum Downstream Rate	Select a value from **32k** to **12000k** (12,000 is the default).
SNR Margin Limit	Select a value from **-64** to **63** (4 is the default).

3 Click **Apply** then save changes using "Saving Changes" on page 39.

Test DSL

The MM701F has embedded diagnostics used for detecting line problems or as an aid in troubleshooting line related technical problems. These diagnostics are described in "Testing the DSL Line" on page 58. These diagnostic programs have significance only to technical support personnel.

1 Select **DSL** on the menu bar then select **Spectrum Tests** to access the **ADSL Test** page.



2 Select a test from the menu.

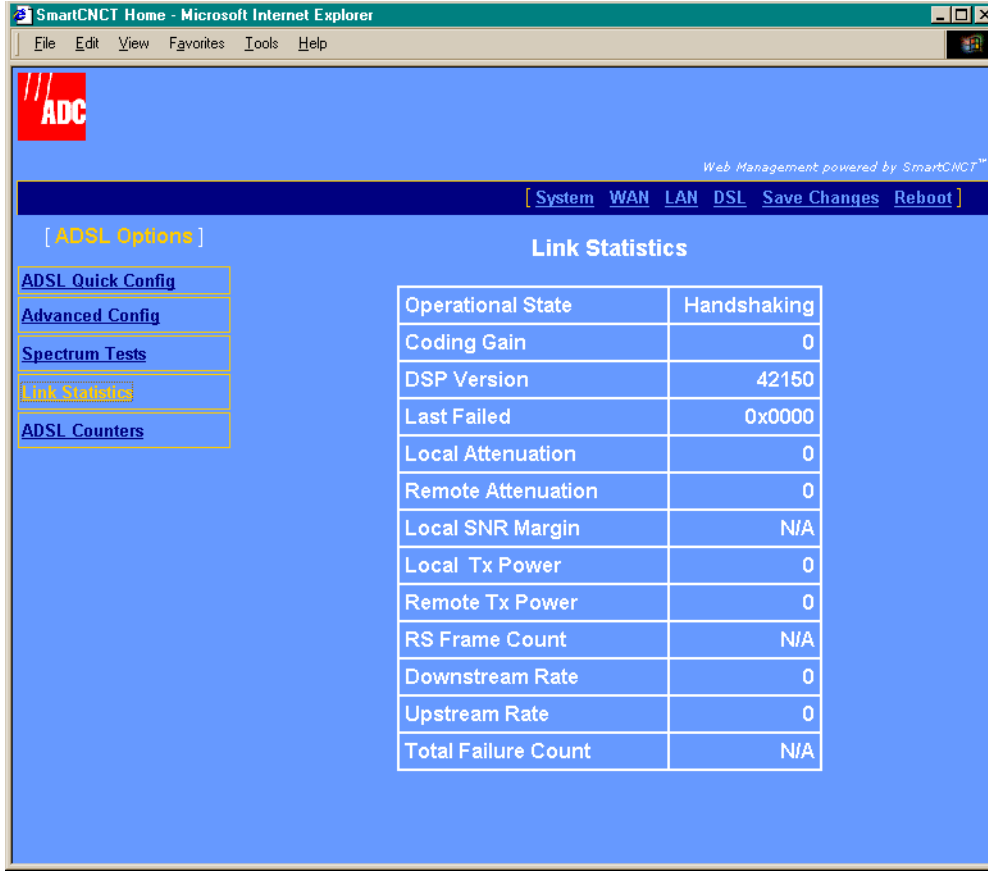
3 Do one of the following:

- Click **Start** to begin the test.
- Click **Stop** to terminate the test.

View Link Statistics

Use the ATM statistics on the **DSL Link Statistics** page for troubleshooting and monitoring ATM traffic.

1 Select **DSL** on the menu bar then select **Link Statistics** to access the **DSL Link Statistics** page.



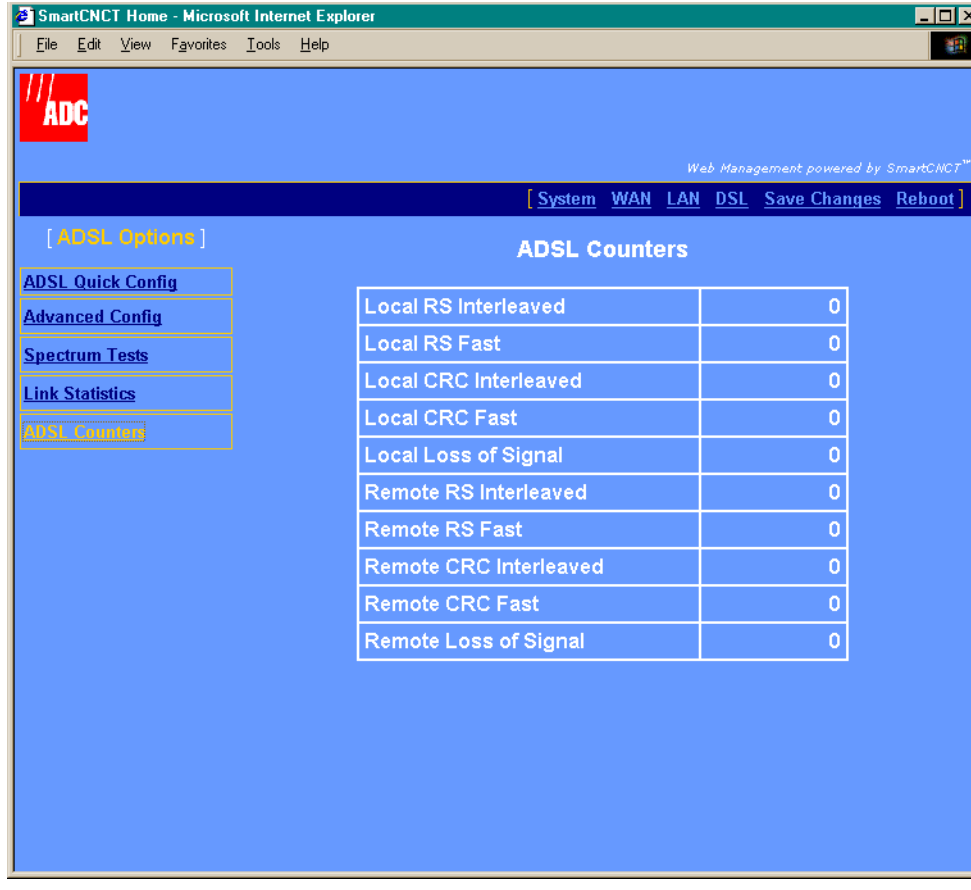
2 View the updated real-time statistics.

ADSL Statistical Parameter	Description
Operational State	Valid entries are: • **Handshaking**—the transceiver is exchanging or attempting to exchange information necessary to start up. • **Training**—the transceiver is in the process of starting up. • **Show Time**—the transceiver has started up, trained, and is capable of passing user data.
Coding Gain (dB)	Coding gain is the expected improvement or gain due to trellis/RS coding. It is used to help determine the downstream connection rate. The larger this value is, the higher the connection rate will be.
DSP Version	The modem DSP code can be upgraded—this is the current version that is running on your system.
Last Failed	Shows the last state reached before start-up failed. This is used for troubleshooting by technicians.
Local Attenuation (dB	Current power attenuation at the modem.
Remote Attenuation (dB)	Current remote power attenuation.
Local SNR Margin (dB)	Current Signal to Noise (SNA) ratio.
Local Tx Power (dB)	Current transmit power attenuation at the modem.
Remote Tx Power (dB)	Current remote transmit power attenuation.
RS Frame Count	Reed Solomon frame count of forward error corrections on the DSL line.
Downstream Data Rate	Actual downstream data bit rate after ATM headers have been removed.
Upstream Data Rate	Actual upstream data bit rate after ATM headers have been removed.
Total Failure Count	Total count of errors including CRC, loss of signal, and framing errors.

View Error Counters

Use the ATM statistics on the **DSL Error Counters** page for troubleshooting and monitoring ATM traffic.

1 Select **DSL** on the menu bar then select **ADSL Counters** to access the **ADSL Counters** page.



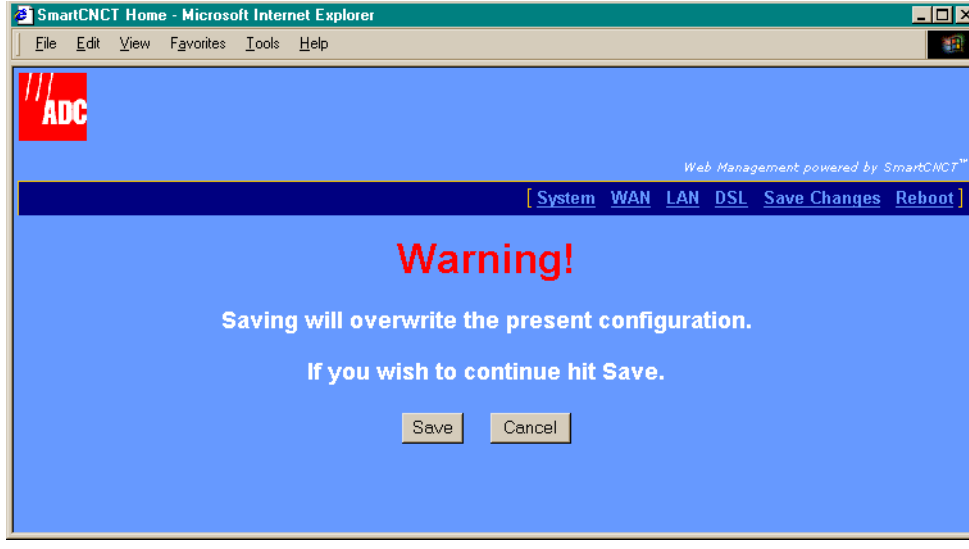
2 View the statistics.

ADSL Parameter	Description
Local RS Interleaved	Count of local Reed Solomon forward error correction for the interleaved data stream.
Local RS Fast	Count of local Reed Solomon forward error correction for fast stream.
Local CRC Interleaved	Count of local Cyclic Redundancy Check (CRC) anomalies for interleaved data stream.
Local CRC Fast	Count of local CRC anomalies for fast data stream.
Local Loss of Signal	Count of local loss of signal defects.
Remote RS Interleaved	Count of remote Reed Solomon forward error correction for the interleaved data stream.
Remote RS Fast	A Count of remote Reed Solomon forward error correction for fast stream.
Remote CRC Interleaved	Count of remote CRC anomalies for interleaved data stream.
Remote CRC Fast	Count of remote CRC anomalies for fast data stream.
Remote Loss of Signal	Count of remote loss of signal defects.

SAVING CHANGES

Use the **Save Changes** page for saving your current configuration to flash memory. This option immediately writes all current system configuration to permanent memory (NVRAM). You cannot selectively write configuration to NVRAM. When you issue the save command, all current configuration is written to NVRAM.

1 Select **Save Changes** on the menu bar to access the **Save Changes** page.



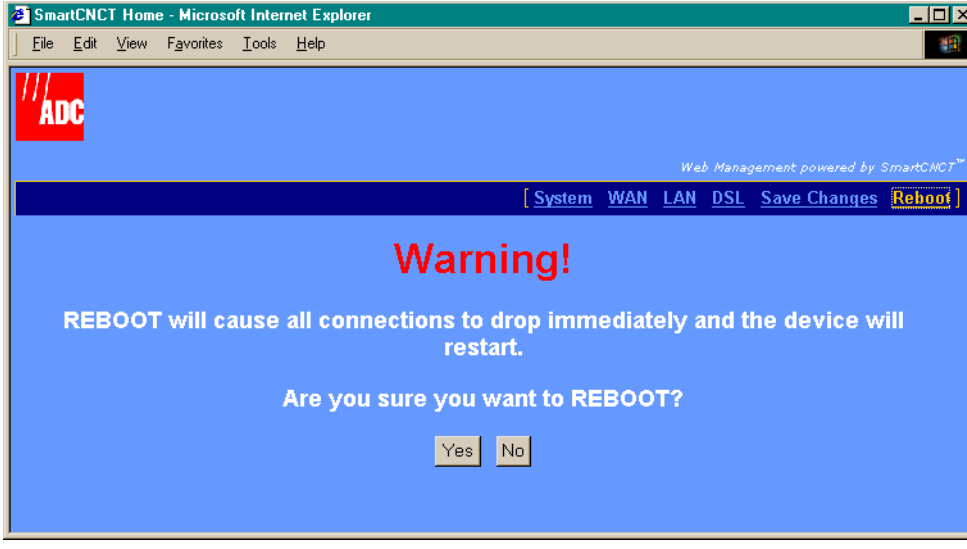
2 Do one of the following:

- Click **Save** to write the configuration to flash memory.
- Click **Cancel** to exit the current page without saving your configuration.

REBOOTING THE MODEM

Before you reboot the modem, make sure you have saved any configuration changes as described in "Saving Changes" on page 39.

1 Select **Reboot** on the menu bar to access the **Reboot** page.



2 Do one of the following:

- Click **Yes** to reboot the modem.
- Click **No** to cancel the rebooting process.

It is unlikely that the modem will lock up (no response to any of your requests through the Web interface and command-line interface). In this rare occurrence, power off the modem by disconnecting the power plug, wait 30 seconds, then reconnect the power. This process allows the modem to properly reset the power and eliminate the possibility of false values in memory. However, please note that the preferred method of rebooting is to access the Reboot page as described in the procedure above.

MANAGING THE MODEM USING THE CONSOLE PORT & TELNET

4

You can manage the MM701F using a Web browser, console port, and telnet session.

In comparison, you can manage more of the modem's functionality using a Web browser rather than using the modem console port and telnet access. For example, you can enable or disable spanning tree through the modem Web interface, but not through the console port or telnet. The same applies for deleting a WAN session and selecting ATM VBR as a quality of service.

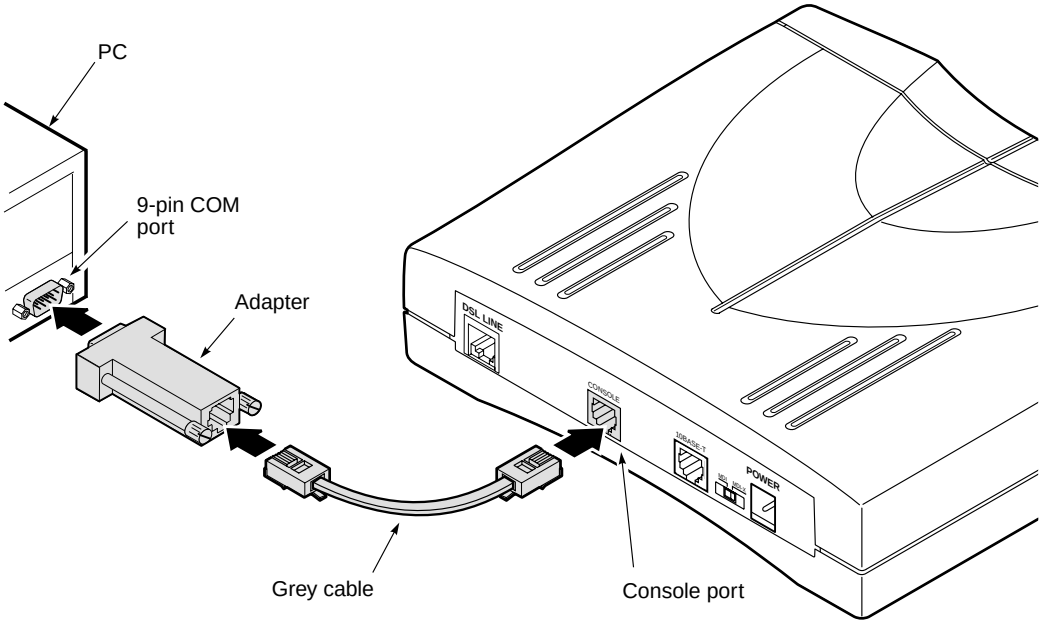
However, there are scenarios in which using the command-line interface is preferred over the Web interface. For example, if you cannot connect to the modem through the DSL line and 10Base-T port, you can still manage the modem through the console port.

To prevent losing your configuration changes, save them as described in "Saving the Current Configuration" on page 60.

The following sections describe how to use the command-line interface:

CONNECTING TO THE CONSOLE PORT

1 Install the supplied grey console cable between the modem Console port and your PC as shown below.

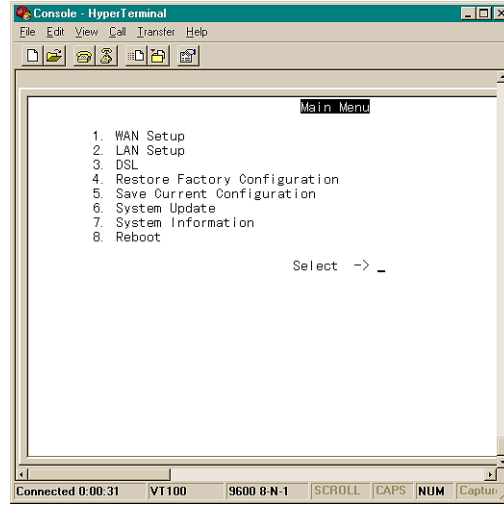


2 Using a terminal emulation program, verify the communication settings as follows:

- 9600 baud
- no parity
- 8 data bits
- no stop bit
- flow control off

Currently, Windows includes a terminal emulation program called HyperTerminal. In Windows 98, access it from the Windows desktop by clicking **Start**, **Programs**, **Accessories**, **HyperTerminal**.

Once you have established communication, the **Main Menu** page displays.



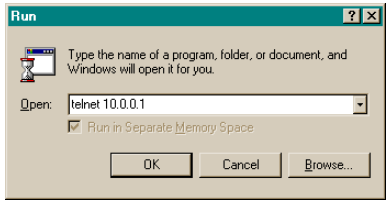
SETTING UP A TELNET SESSION

Make sure your PC is on the same IP subnet as the modem as described in "Setting Up the PC" on page 10. To set up a telnet session, specify the LAN IP address of the modem to establish communication. The default LAN IP address is 10.0.0.1. If this IP address has changed, contact your network administrator.

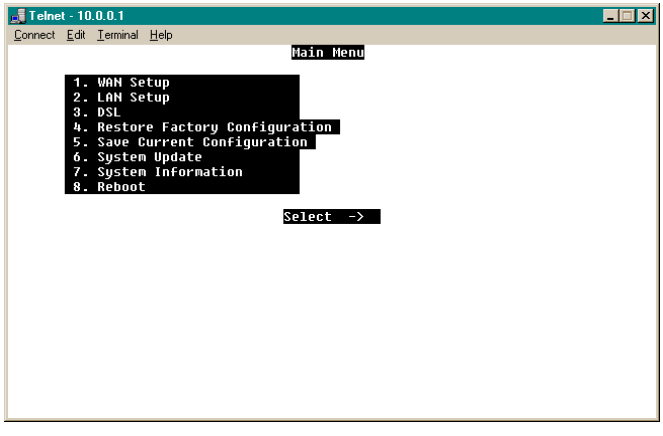
You cannot manage the modem through the console port and a telnet session at the same time.

Below is an example using the telnet application in Microsoft Windows 98:

1 Click **Start**, **Run** to access the **Run** dialog.



2 In the **Open** box, enter the telnet command and IP address (for example: 10.0.0.1) then click **OK** to start the Windows telnet client and access the password prompt. Enter the telnet password to access the **Main Menu** page. The default telnet password for the MM701F is **password**.



SETTING UP THE WAN

For Bridge or Router mode you need to set the WAN VPI/VCI as supplied by your service provider.

1 From the **Main Menu**, select **WAN Setup**. The WAN Session screen displays.

.

```
Session group 1 - 16

       1. Session 1               Bridge           RFC1483 Bridge   (Enabled)
       2. Session 2               IPoA-Router      RFC1483 Router   (Enabled)
       3. Session 3               PPP-Router       PPPoA            (Enabled)
       4. Session 4               UNDEFINED
       5. Session 5               UNDEFINED
       6. Session 6               UNDEFINED
       7. Session 7               UNDEFINED
       8. Session 8               UNDEFINED
       9. Session 9               UNDEFINED
      10. Session 10              UNDEFINED
      11. Session 11              UNDEFINED
      12. Session 12              UNDEFINED
      13. Session 13              UNDEFINED
      14. Session 14              UNDEFINED
      15. Session 15              UNDEFINED
      16. Session 16              UNDEFINED
      17. Get next group

               Select session for editing (Return to exit) ->
```

The WAN Session screen presents data related to each session defined for your Bridge/Router. The following table provides a description of the four fields displayed on the WAN Session screen.

Column	Description
1	The session number—Sessions 1-16 are displayed on the first page of the screen and sessions 17-31 are displayed on a the second page of the WAN session screen.
2	Session name—Up to 15 characters may be entered for a descriptive name for a session. No spaces are allowed. Use this field to help identify each of your sessions.
3	Session protocol—configured for this session.
4	Session status indicator—enabled or disabled.

2 Select a session by typing the session number at the **Select session for editing prompt** to display the **WAN Session Options** screen.

```
1. Session Name       Bridge           10. VPI               0
2. WAN Protocol       RFC1483 Bridge   11. VCI               35
3. State              Enabled          12. QOS               UBR
4. IP Addressing      N/A              13. QOS Peak Cell Rate
5. IP Address         N/A              14. Encapsulation     LLC
6. IP Net Mask        N/A              15. Login Name        N/A
7. NAT                N/A              16. Login Password    N/A
8. RIP Send           N/A              17. Authentication    N/A
9. RIP Accept         N/A              18. Apply

               Select parameter to edit (Return to exit) ->
```

3 Type **1** to select the Session Name then type a session name.

4 Type **10** to select the VPI parameters then enter the values supplied by your service provider.

5 Type **11** to select the VCI parameters then enter the values supplied by your service provider.

6 If you are operating in Router mode, you also need to enter the WAN IP address and the associated WAN IP subnet mask. Both of these values are provided by your service provider.

7 Type **18** to immediately activate the changes that you have made for this session.

8 Select **Save New System configuration** from the Main Menu as described in "Saving the Current Configuration" on page 60 or the changes will be lost upon reboot or power cycle.

Valid values for the parameters shown on the Sessions Options screen are defined in the following table. Unless there is a special circumstance, the default values for the remaining parameters should not be changed.

Session Parameter	Valid parameter Values
Session Name	The name assigned to the session by your service provider—up to 15 characters.
WAN Protocol	RFC1483-Router, RFC1483-Bridge, PPPoA.
State	Enable or Disable a session.
IP Addressing	Static or Dynamic. Not applicable to bridging.
IP Address	WAN IP address supplied by your service provider.
IP Net Mask	WAN IP subnet mask supplied by your service provider.
NAT	Enable or Disable.
RIP Send	Disable, RIP1, RIP2, Rip1&Rip2.
RIP Accept	Disable, RIP1, RIP2, Rip1&Rip2.
VPI	VPI supplied by your service provider.
VCI	VCI supplied by your service provider.
QoS	Supplied by your service provider.
QoS Peak Cell Rate	Supplied by your service provider.
Encapsulation	Select VC-MUX or LLC.
Login Name	PPP authentication name supplied by your service provider.
Login Password	PPP authentication password supplied by your service provider.
Authentication	Select PAP or CHAP.
Apply	Apply Settings.

SETTING UP THE LAN

If you are operating in Router mode and in a LAN environment, then you also need to set your LAN protocol, Ethernet Port IP address, and subnet mask.

If you prefer, you may use the default values of **10.0.0.1** for the Ethernet Port IP Address, and **255.255.255.0** for the subnet mask.

1 From the **Main Menu**, select **LAN Setup**. The LAN setup screen displays.

```
                                LAN

 1. LAN Protocol             Bridge
 2. IP address               10.0.0.1
 3. IP Net Mask              255.255.255.0
 4. Default Gateway
 5. DHCP                     None
 6. DHCP Range Low Address   N/A
 7. DHCP Range High Address  N/A
 8. DHCP Gateway Address     N/A
 9. DHCP DNS                 N/A
10. Apply

          Select Parameter to edit (Return to exit) ->
```

2 From the **LAN Setup** menu, select **LAN Protocol** by typing **1**.

3 Do one of the following from the LAN Mode menu:

- Type **1** to select **Router.**
- Type **2** to select **Bridge**. You must configure an IP address for the LAN port to use a Browser or Telnet to manage the MM701F.

4 From the **LAN Setup** menu, type **2** or **3** to select **IP Address** or **IP Net Mask** (respectively), then enter the values supplied by your LAN administrator or use the default values.

5 From the **LAN Setup** menu, type **4** to select **Default Gateway**, then enter the **Default Gateway** IP address supplied by your access provider.

6 From the **LAN Setup** menu, type **10** to select **Apply**. **Apply** immediately activates the changes that you have made for this session.

7 From the **Main Menu**, type **5** to select **Save New System Configuration** and save these settings.

Valid values for the parameters shown on the LAN Setup screen are defined in the following table.

LAN Parameter	Valid parameter Values
LAN Protocol	Select the message format to be used for your LAN. • Select **Bridge** if the LAN forwards packets based on MAC addresses. If you selected RFC 1483 Bridge protocol for the WAN sessions, select Bridge for the LAN traffic. • Select **Router** if the LAN routes packets based on IP addresses. If you selected RFC 1483 Router or PPP protocol for the WAN sessions, select Router for the LAN traffic.
IP address	See your LAN administrator for LAN IP addresses. However, if you want to change the IP address, enter an IP address for the LAN (10Base-T) port provided by the LAN administrator. Or, you can use the default IP address for the LAN port which is 10.0.0.1. If you choose to use the default IP address, ensure that the devices on your LAN are on the same subnet as the MM701F LAN port. If you select Client for the DHCP configuration (below in this table), a DHCP server on your LAN automatically provides the IP address.
IP Net Mask	Enter the subnet mask for the LAN (10Base-T) port provided by the LAN administrator. Or, you can use the default subnet mask for the LAN port which is 255.255.255.0. If you choose to use the default subnet mask, ensure that it allows devices on your LAN to access the MM701F LAN port.
Default Gateway	Enter the default IP address for a default gateway that is supplied by the service provider.
DHCP	See your LAN administrator for the DHCP selection. However, if you want to change that DHCP selection through the Web interface, select one of the following: • **None**—DHCP is not enabled. • **Client**—The MM701F is a DHCP client and can be served an IP address for the LAN port by a DHCP server on your LAN. • **Server**—The MM701F is a DHCP server and can serve IP addresses to devices on your LAN. See DHCP Range Low and High for the ranges of IP addresses that the MM701F can serve.

LAN Parameter	Valid parameter Values
DHCP Range Low Address	Enter the IP address supplied by your LAN administrator. This is the lowest IP address value that the MM701F can serve when configured as a DHCP server.
DHCP Range High Address	Enter the IP address supplied by your LAN administrator. This is the highest IP address value that the MM701F can serve when configured as a DHCP server.
DHCP Gateway Address	Enter the IP address of the default gateway that is provided by the LAN administrator for devices on the LAN. The MM701F must be configured as a DHCP server and provides this gateway IP address to requesting DHCP clients (such as PCs) on the LAN.
DHCP DNS	Enter the IP address of the Domain Name System (DNS) server that is provided by either the service provider or the LAN administrator. The MM701F must be configured as a DHCP server and provides this DNS IP address to requesting DHCP clients (such as PCs) on the LAN. The DNS server maps human-readable addresses to IP addresses. A human-readable address is one such as: maggie.copro.company.com. The DNS resolver on the server translates this to a numeric value.
Apply	Apply Settings.

Setting Up DHCP

This procedure is optional. Follow this procedure to enable or disable DHCP on the modem.

From the **Main Menu**, select **LAN Setup** screen and enter values for the following DHCP parameters:

1. To enable DHCP, select **DHCP** and type **2** or **3** to choose either **Client** or **Server** (respectively) on the **LAN Setup** menu. If **DHCP Client** is selected, you do not need to configure an IP address. **None** disables DHCP.
2. Type **6** to enter the low range of the DHCP IP addresses as supplied by your LAN administrator.
3. Type **7** to enter the high range of the DHCP IP addresses as supplied by your LAN administrator.
4. Type **8** to enter the default gateway address that is provided to the requesting DHCP client—only if you are operating in server mode. This IP Address is also available from your LAN administrator.

5 Type **9** to enter the DNS address that is provided to the requesting DHCP client—only if you are operating in server mode. This IP Address is also available from your LAN administrator.

6 Type **10** to select **Apply**. **Apply** immediately activates the changes that you have made for this session.

7 From the **Main Menu**, select **Save New System Configuration** to save these settings or the changes will be lost upon reboot or power cycle.

8 If you have enabled DHCP, select **Reboot** from **Main Menu** to reboot the router.

Setting Up NAT

This procedure is optional. Follow this procedure to enable or disable NAT for a WAN session.

From the **Main Menu**, select **WAN Setup** to access the **WAN Sessions** page.

1 Select the session for which you wish to enable NAT. The **WAN Sessions Options** screen displays.

2 From the **WAN Sessions Options** screen, select the NAT option and type **1** or **2** to either **disable** or **enable** (respectively) NAT.

```
Session State

       1. Disable
       2. Enable

                    Select session NAT (Return to exit) ->
```

3 From the **Main Menu**, type **10** to select **Apply**. **Apply** immediately activates the changes that you have made for this session.

4 From the **Main Menu**, type **5** to select **Save New System Configuration** and save these settings. Otherwise, the changes will be lost upon reboot or power cycle.

- **If DHCP Client is selected, you do not need to configure an IP address.**
- **In Bridge mode, you need an IP address for the LAN port to use a Browser or Telnet to manage the MM701F.**

MANAGING DSL

Use the **DSL** menu to manage the DSL line. This menu allows you to:

- view the DSL configuration
- configure the DSL line
- monitor the DSL statistics
- test the DSL line

```
Main Menu

       1. WAN Setup
       2. LAN Setup
       3. DSL
       4. Restore Factory Configuration
       5. Save Current Configuration
       6. System Update
       7. System Information
       8. Reboot

                                Select  ->
```

Viewing the DSL Configuration

1. From the **Main Menu**, type **3** to elect **DSL**. The **ADSL Menu** displays.
2. From the **ADSL Menu**, type **1** to select **ADSL Current Settings**. The **ADSL Current Setting** page displays.
3. View the DSL configuration as described by the table shown in "Advanced Configuration" on page 53.

Configuring the DSL Line

1. From the **Main Menu**, type **3** to select **DSL** and access the **ADSL Menu**.
2. From the **ADSL Menu**, do one of the following:
   - To configure an ADSL standard (G.Lite, G.DMT, T1.413, or Multimode), select **Quick Configuration Setting** and proceed to "Quick Configuration" on page 53.
   - To configure the advanced features of the modem, select **Advance Configuration Setting** and proceed to "Advanced Configuration" on page 53.

Quick Configuration

From the **ADSL Standard** page, select one of the following:

- **Multimode**: Multi-vendor version of T1.413 line code based off of the ANSI standard.
- **T1.413**: ANSI standard ADSL line code supporting full-rate transmission.
- **G.DMT**: ITU standard ADSL line code supporting full-rate transmission.
- **G.lite**: ITU standard ADSL line code that is a simplified version of G.dmt allowing up to 1.536 Mbps downstream and 512 Kbps upstream.

Save your changes by selecting **Save Current Configuration** from the Main Menu as described in "Saving the Current Configuration" on page 60.

Advanced Configuration

Use the **ADSL Advance Configuration Setting** page to configure the advanced setting for the DSL connection.

```
ADSL Advance Configuration Setting

       1. Standard                 G.DMT
       2. Trellis                  Disable
       3. BinOverlapMode           FDM
       4. TxPwrAtten               0dB
       5. CodingGain               Auto
       6. MaxBitsPerBin            14
       7. TxStartBin               6
       8. TxEndBin                 31
       9. RxStartBin               32
      10. RxEndBin                 255
      11. MaxDownstreamRate (Kbps) 12000
      12. SNRMarginLimit (dB)      4
      13. Apply

                Select Parameter to edit (Return to exit) ->
```

The table below describes each of the parameters displayed in the ADSL Current Settings screen:

ADSL Parameter	Description
Standard	May be either ANSI **T1.413** Issue 2, ITU G.992.1 (**G.dmt**), ITU G.992.2 (**G.lite**) or **Multimode**.
Trellis	Indicates whether Trellis coding is enabled or disabled. Trellis Encoding allows for high data speeds and reduces transmission errors.
BinOverlapMode	Valid options are FDM or Echo Cancellation.
TxPwrAtten	The current transmit power attenuation level. May range from 0 dB to 12 dB.
CodingGain	Coding Gain refers to the expected improvement or gain due to trellis coding. It is used to help determine the downstream connection rate.
MaxBitsPerBin	The maximum number of receive bits per bin that can be selected.
TxStartBin	The lowest bin number allowed for the transmit signal.
TxEndBin	The highest bin number allowed for the transmit signal.
RxStartBin	The lowest bin number allowed for the receive signal.
RxEndBin	The highest bin number allowed for the receive signal.
MaxDownstreamRate	The maximum downstream transmission rate.
SNRMarginLimit	The signal-to-noise ratio limit. This can be set between -64 and +63. The margin LED on the front panel indicates that the actual SNR is greater than the configured value.
Apply	Apply settings.

Monitoring the DSL Statistics

Use the **ADSL Statistics** page to monitor the following types of DSL statistics:

- General Statistics
- Error Counters

Viewing General Statistics

1 From the **Main Menu**, type **3** to select **DSL** and access the **ADSL Menu**.

2 Select **ADSL Statistics**, type **4** to access the **ADSL Statistics** page.

3 Select **ADSL General Statistics**, type **1** to access the **ADSL General Statistics** page.

```
ADSL General Statistics

       1. OperationalState         Handshaking
       2. CodingGain               0
       3. DSP Version              42150
       4. LastFailed               0x0000
       5. LocalSNRMargin           N/A
       6. LocalAttenuation         0
       7. RemoteAttenuation        0
       8. LocalTxPower             0
       9. RemoteTxPower            0
      10. RSFrameCount             N/A
      11. DwnstreamDataRate (Kb)   0
      12. UpstreamDataRate (Kb)    0
      13. TotalFailureCount        N/A

                     Press any key (Return to exit) ->
```

4 View the updated real-time statistics.

ADSL Statistical Parameter	Description
OperationalState	Valid entries are: • **Handshaking**—the transceiver is exchanging or attempting to exchange information necessary to start up. • **Training**—the transceiver is in the process of starting up. • **Show Time**—the transceiver has started up, trained, and is capable of passing user data.
CodingGain (dB)	Coding gain is the expected improvement or gain due to trellis/RS coding. It is used to help determine the downstream connection rate. The larger this value is, the higher the connection rate will be.
DSP Version	The modem DSP code can be upgraded—this is the current version that is running on your system.
LastFailed	Shows the last state reached before start-up failed. This is used for troubleshooting by technicians.
LocalSNRMargin (dB)	Current Signal to Noise (SNA) ratio.
LocalAttenuation (dB	Current power attenuation at the IAD.
RemoteAttenuation (dB)	Current remote power attenuation.
LocalTxPower (dB)	Current transmit power attenuation at the modem.
RemoteTxPower (dB)	Current remote transmit power attenuation.
RSFrameCount	Reed Solomon frame count of forward error corrections on the DSL line.
DownstreamDataRate (Kb)	Actual downstream data bit rate after ATM headers have been removed.
UpstreamDataRate (Kb)	Actual upstream data bit rate after ATM headers have been removed.
TotalFailureCount	Total count of errors including CRC, loss of signal, and framing errors.

Viewing Error Counters

1 From the **Main Menu**, select **DSL** to access the **ADSL Menu**.

2 Select **ADSL Statistics** to access the **ADSL Statistics** page.

3 Select **ADSL Counters** to access the **ADSL Counters** page.

```
ADSL Counters

       1. LclRSInterleaved         0
       2. LclRSFast                0
       3. LclCRCInterleaved        0
       4. LclCRCFast               0
       5. LclLOS                   0
       6. RmtRSInterleaved         0
       7. RmtRSFast                0
       8. RmtCRCInterleaved        0
       9. RmtCRCFast               0
      10. RmtLOS                   0

                      Press any key (Return to exit) ->
```

4 View the counters.

ADSL Parameter	Description
LclRSInterleaved	Count of local Reed Solomon forward error correction for the interleaved data stream.
LclRSFast	Count of local Reed Solomon forward error correction for fast stream.
LclCRCInterleaved	Count of local CRC anomalies for interleaved data stream.
LclCRCFast	Count of local CRC anomalies for fast data stream.
LclLOS	Count of local loss of signal defects.
RmtRSInterleaved	Count of remote Reed Solomon forward error correction for the interleaved data stream.
RmtRSFast	Count of remote Reed Solomon forward error correction for fast stream.
RmtCRCInterleaved	Count of remote CRC anomalies for interleaved data stream.
RmtCRCFast	Count of remote CRC anomalies for fast data stream.
RmtLOS	Count of remote loss of signal defects.

Testing the DSL Line

The MM701F has embedded diagnostics used for detecting line problems or as an aid in troubleshooting line related technical problems. These programs are used by technical support personnel to diagnose problems and determine the appropriate solutions.

1. From the **Main Menu**, select **DSL** to access the **ADSL Menu**.
2. Select **Hardware/Line Diagnostics** to access the **ADSL Hardware/Line Diagnostics** page.
3. Select a diagnostic test:
   - **SpectrumREVERB** continuously sends a R-REVERB signal for the CO to measure the upstream wideband power. This adjusts the CO transmit power level, its receiver gain, synchronize its receiver, and train its equalizer.
   - **SpectrumMEDLEY** continuously sends a R-MEDLEY signal (pseudo-random signal) for the CO to train its frequency domain equalizer and to estimate upstream SNR.
   - **SpectrumPILOT** continuously sends a R-PILOT signal (single frequency sinusoid) for the CO to synchronize with the modem.
   - **None** specifies no testing.

These diagnostic programs have significance only to technical support personnel and are not discussed further in this manual.

RESTORING FACTORY DEFAULTS

When you configure the MM701F, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or you simply want to configure new parameters.

Active links may be lost when you reset to factory default values.

1 From the **Main Menu**, select **Restore Factory Configuration** to access the **Restore Factory Configuration** page.

```
WARNING - This will delete configuration and return to default

       1. Continue
       2. Cancel

                          Select (Return to exit) ->
```

2 Do one of the following:

- Select **Continue** if you want to return all values to their original factory values.
- Select **Cancel** if you do not want to return all values to their original factory values.

If you restore the factory defaults, save the changes by selecting **Save Current Configuration** from the Main Menu as described in "Saving the Current Configuration" on page 60.

SAVING THE CURRENT CONFIGURATION

Use the **Save Current Configuration** page for saving your current configuration to flash memory. By saving your configuration changes, your changes will not be lost by resetting the modem.

1 From the **Main Menu**, select **Save Current Configuration** to access the **Save Current Configuration** page.

```
WARNING - This will overwrite configuration

       1. Continue
       2. Cancel

                          Select (Return to exit) ->
```

2 Do one of the following:

- Select **Continue** to write the configuration to flash memory.
- Select **Cancel** to exit the current page without saving your configuration.

UPDATING SYSTEM SOFTWARE

You can upgrade the firmware on your MM701F. To upgrade, you must specify the IP address of the server where the new firmware is stored.

1 Configure a TFTP server to download the system software. The MM701F uses TFTP to download the firmware which comprises a configuration file (must be named "celsiancfg") and an image file (must be named "image") located on the TFTP server.

2 From the **Main Menu**, select **System Update** to access the **System Update** page.

```
System Update

       1. IP Address              10.0.0.2
       2. File to update          CONFIGURATION
       3. Update

                          Select (Return to exit) ->
```

3 Type **1** to select **IP Address**. Configure the IP address of the TFTP server to download the system software.

4 Type **2** to select **File to update**. Select the type of file to download.

- **Configuration** to download the configuration file "celsiancfg"
- **Image** to download the image file "image"

5 Select **Update** to begin updating the software.

VIEWING SYSTEM INFORMATION

The System Information page is a read-only summary of the current modem configuration. It includes information about the firmware release, model, release date, MAC address, and DSP version. This information is often used by technical support when troubleshooting.

From the **Main Menu**, select **System Information** to access the **System Information** page.

```
                          System Information

      1. Firmware Release         1.1.6.1
      2. Model                    MM701F
      3. Release date             Aug 2 2001
      4. MAC address              00:20:A7:A2:01:C0
      5. DSP version              42150

                    Press any key (Return to exit) ->
```

REBOOTING THE MODEM

Before you reboot the modem, save configuration changes as described in "Saving the Current Configuration" on page 60.

1 From the **Main Menu**, select **Reboot** to access the **Reboot** page.

```
WARNING - This will reboot without saving configuration

       1. Continue
       2. Cancel

                          Select (Return to exit) ->
```

2 Do one of the following:

- Type **1** to **Continue** the reboot process.
- Type **2** to **Cancel** the reboot process.

It is unlikely that the modem will lock up (no response to any of your requests through the Web interface and command-line interface). In this rare occurrence, power off the modem by disconnecting the power plug, wait 30 seconds, then reconnect the power. This process allows the modem to properly reset the power and eliminate the possibility of false values in memory. However, please note that the preferred method of rebooting is to access the **Reboot** page as described in the above procedure.

SPECIFICATIONS A

The MM701F is a DSL CPE modem that takes advantage of ADSL technology by offering full-rate data transmission at a maximum downstream rate of 7.552 Mbps and a maximum upstream rate of 928 Kbps. In addition, the MM701F also provides:

- sessions for precise control of security, performance and management of users and resources per session. Allowing Service providers to offer additional services and class of service for Internet access, private ATM networks or connections to application servers like video servers or voice gateways.
- self-installation for non-technical users

For further information, reference the following:

OVERVIEW

The MM701F provides:

- compliance with full-rate ADSL (ITU G.dmt or ANSI T1.413i2) and ITU G.lite standards
- rates up to 7.552 Mbps downstream/928 kbps upstream for full rate
- rates up to 1.5 Mbps downstream/512 kbps upstream for G.lite
- symmetric rates up to 928 kbps
- RFC 2364 PPP traffic over ATM (AAL5)
- 1483 bridging and routing over ATM
- up to 32 connections set up as PPP Over ATM or RFC 1483 Bridge/Router
- embedded SNMP agent
- DHCP (client and server)
- Network and Port Translation (NAPT)
- Web server allowing ease-of-configuration for MM701F through a Web browser
- serial interface for configuration through Telnet or direct connection
- LED reporting status of ADSL and LAN connections
- 10Base-T Ethernet port

DATA SPECIFICATIONS

DSL Standards

- ADSL (G.dmt, G.lite, T1.413, and Multimode)

ATM standards

- ATM Forum UNI Version 3.1 and UNI Version 4.0
- ITU-T Q.2931, Q.2971 signaling
- ITU I.363.5 ATM Adaptation Layer 5
- ITU I.432 Cell Delineation and HEC
- ITU I.361 ATM Cell Format
- Classes of Service: CBR, UBR, VBR-nrt
- Virtual Circuits: 32 for data

Internetworking Features

- PPP: 1332, 1661, 1638, 1570
- NAT and NAPT: 1631
- DHCP Server & Client: 2131, 2132
- Dynamic IP routing, ARP: 826, RIP: 1058, 1723
- TCP/IP: 1112, 1122, 950, 894, 793, 791, 1812
- BOOTP: 951, 1542
- TFTP: 1350
- IP over ATM: 1577, 1755

WAN Protocols

- IETF RFC 2364 PPP over AAL5 (VC multiplexing and LLC encapsulation)
- IETF RFC 1483 Multiprotocol encapsulation over AAL5
- IETF RFC 1577 Classical IP over ATM

Security

- PPP authentication - PAP/CHAP: 1334, 1994
- Web and Telnet password

Management

- Embedded SNMP agent, Terminal, Telnet with Web based configuration and management tool
- Auto provisioning extensions
- ILMI, OAM F4 and F5 support
- Concise MIB: 1212, MIB-II: 1213, Traps: 1215, Bridge MIB: 1493
- SNMP MIB: 1471, 1472, 1473, 1474
- SNMP: 1157
- Open DSL
- DSL Forum Auto-Configuration
- Remote Configuration

Software Upgrade

- TFTP download into built-in flash memory
- Remote download (DSLAM support required)

Encapsulation

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

	PPP
Authentication (PAP/CHAP)	Provides authentication of PPP sessions for security through Password and Challenge-Handshake Authentication Protocols (RFC 1994).
Network Address Translation	Network Address Translation (NAT) maps LAN side private IP address to the public IP address assigned to the 32 virtual channels (RFC 1631). You can map to two private addresses to each of the 32 sessions for a total of 64 addresses.
	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.

RFCs

- RFC 1483 Multiprotocol Encapsulation over ATM (Bridging/Routing)
- RFC 2364 PPP Encapsulation over ATM
- 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

MIBs

- Bridge MIB - 1493
- SNMP MIBs - 1471, 1472, 1473, 1474
- MIB 1213 - MIB II
- MIB 1215 - Trap

Default Session Parameter Values

Session Parameter	Bridge	IPoA Router	PPP-Router
Protocol	RFC1483 - Bridge	RFC1483 - Router	PPPoA
State	Enable	Enable	Enable
IP Address	N/A	10.0.0.1	N/A (Dynamic)
Subnet Mask	N/A	255.255.255.0	N/A (Dynamic)
NAT	Enable	Disable	Disable
RIP Send	None	RIP 1& 2	RIP 1 & 2
RIP Accept	None	RIP 1 & 2	RIP 1 & 2
Virtual Path ID (VPI: 0 - 4095)	0	0	0
Virtual Channel ID (VCI: 32 - 65536)	35	36	38
ATM QoS	UBR	UBR	UBR
QoS Peak Cell Rate (PCR)	N/A	N/A	N/A
QoS Sustainable Cell Rate (SCR)	N/A	N/A	N/A
QoS Maximum Burst Size (MBS)	N/A	N/A	N/A
Encapsulation	LLC	LLC	LLC
Login Name	N/A	N/A	admin
Login Password	***	***	password
Authentication	PAP	PAP	CHAP

HARDWARE SPECIFICATIONS

LED

- Power
- Ethernet: Link, Tx, Rx, Collision
- DSL: Sync, Tx, Rx, Margin

Connectors

- DSL Interface: RJ-11
- 10Base-T: RJ-45
- Console Port: RJ-45 (serial connection to RS-232 for local configuration)

LAN Interface

- 10Base-T (IEEE 802.3i)
- Connector: RJ-45 with MDI/MDI-X switch

WAN Interface

ADSL (Asymmetrical Digital Subscriber Line)	
Maximum transmission rate:	
Downstream	7552 kbps
Upstream	928 kbps
Minimum transmission rate to sync	64 kbps
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 PPP or RFC 1483 Bridging/Routing.

Connector Pinouts

The following sections provide the pinout information for the various modem connectors.

DSL Port (RJ-11)

The following table shows the signal on each pin of the DSL port. The connector for this interface is an RJ-11. See "Connecting the Cables" on page 5 for the location of this port.

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

10Base-T Port (RJ-45)

The following table shows the signal on each pin of the 10Base-T port connector when the switch is in either the MDI or the MDI-X position. The connector for this interface is an RJ-45. See "Connecting the Cables" on page 5 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

Console Port (RJ-45)

The following table gives the signal designations and pin numbers for each end of the RJ-45 to RS-232 cable that is used between the modem Console port (RJ-45) and the PC Serial port (DB-9).

PC RS-232 Serial Port (DB-9)	Modem Console (RJ-45)	Signal	Description
	1	RTS	Ground
	2	DTR	Ground
3	3	TxD	Transmit Data
	4	GND	Ground
5	5	GND	Ground
2	6	RxD	Receive Data
	7	DSR	Ground
	8	CTS	Ground

TECHNICAL ASSISTANCE AND RETURNS B

TECHNICAL SUPPORT

Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center (TAC).

- Telephone: 800.638.0031
  714.730.3222
- Fax: 714.730.2400
- 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.

Refer to the ADC web site (see below) for specific warranty information.

WORLD WIDE WEB

Avidia product information can be found at *http://www. adc.com* using any Web browser.

KNOWLEDGE BASE

The ADC Knowledge Base can help you locate answers to frequently asked questions on a variety of topics, including:

- troubleshooting
- installation
- configuration
- upgrades

The Knowledge Base can be found at: *http://www.adc.com/Knowledge_Base/index.jsp* using any Web browser.

GLOSSARY C

10Base-T	The Institute of Electrical and Electronic Engineers (IEEE) 802.3 specification for Ethernet over thin coaxial cable.
AAL2	ATM Adaptation Layer 2. Used for compressed voice and video that is intolerant of delay. This layer is used by xDSL technology.
AAL5	ATM Adaptation Layer 5. AAL5 has been adopted by the ATM Forum from a Class of Service called High Speed Data transfer. It typically supports all types of data traffic. Originally designed to support TCP/IP.
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).
authentication	Security feature offered through PAP and CHAP with PPP sessions.
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.
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.
NAPT	Network Address and Port Translation provides the means to map private IP addresses and TCP/UDP ports to the public IP addresses (proxy addresses) and TCP/UDP ports that are set up for the PPP sessions. Used with PPP Mode.
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	Password Authentication Protocol and Challenge Handshake Authentication Protocol are two ways to authenticate PPP sessions. 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.
PPP	Point-to-Point Protocol exists between the hardware layer and the network-layer interface protocols. It is a widely used protocol for establishing connections on the Internet. PPP provides the set up and release of connections for each session. PAP/CHAP provide the authentication for the PPP sessions.
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 MM550 Integrated Access Device 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 MM701F Modem.

Numerics

A

B

C

D

E

S

T

U

V

W

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For Technical Assistance:
800.638.0031
714.730.3222

ISO 9001
DNV
DNV Certification, Inc.
Certificated Firm

1191789 Rev A