Collage 740 Backbone ATM Switch User Guide

Software Release 1.1

U.S. Department of Defence & U.S. civilian agencies

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Before you start

This guide explains how to use the Collage 740 Backbone ATM Switch. It does not provide information about installing the Collage 740 or any of the option cards. For information about installing the Collage 740 and option cards, refer to the manuals provided with the switch and the option cards.

Audience

This guide is for network administrators. It assumes you are familiar with:

- Local Area Network (LAN) concepts and technical terminology.
- Asynchronous Transfer Mode (ATM) networking concepts and technical terminology.

Safety

For safety reasons, you are advised to read the “Safety Information” section before you install a Collage 740 or an option card.

Structure

This user guide is organized as follows:

Chapter 1	Describes the new features and standards that this software release implements.
Chapter 2	Explains how to start using a Collage 740.
Chapter 3	Explains how to connect a Collage 740 to another Madge ATM device.
Chapter 4	Explains how to use the command-line interface in a Collage 740.
Chapter 5	Explains how to use MISC commands in a Collage 740.
Chapter 6	Explains how to manage physical ports in a Collage 740.
Chapter 7	Explains how to manage virtual ports in a Collage 740.
Chapter 8	Explains how to manage option cards in a Collage 740.
Chapter 9	Explains how to manage the routing table in a Collage 740.
Chapter 10	Explains how to manage the management LEC in a Collage 740.
Chapter 11	Explains how to manage a Collage 740 by setting up authorized managers and trap destinations via SNMP.
Chapter 12	Describes system monitoring commands and how to configure the terminal outputs.
Chapter 13	Explains how to manage events in a Collage 740.
Chapter 14	Explains how to upgrade your Collage 740 software.
Chapter 15	Explains how to manage PVC connections in a Collage 740.
Chapter 16	Describes glossary of terms used in the user guide.
Appendix A	Lists the default settings on a new Collage 740.
Appendix B	Describes how to use the BOOT Loader program.
Appendix C	Describes routing and signalling concepts that are used in a Collage 740.
Appendix D	Describes how to design a network that uses a Collage 740.
Appendix E	Lists Madge technical support services.

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List of commands in the Collage 740 command-line interface

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Introduction

This chapter provides information about the Collage 740 Backbone ATM Switch, and the features that this software release supports.

About the Collage 740 Backbone ATM Switch

The Collage 740 Backbone ATM Switch is a high-performance Asynchronous Transfer Mode (ATM) switch that is designed for building and campus backbone applications, high-performance centralized servers, and power-user environments. Its advanced architecture, incorporating Madge Cellrunner switching technology, can support very high traffic loads with no data loss or breaks in communication. The Collage 740 also implements LAN Emulation (LANE) components. LANE enables legacy LAN applications to use a transparent ATM transport medium. In this way, end-stations on existing Token Ring and Ethernet LANs can communicate with ATM end-stations.

The Collage 740 supports a range of option modules that enable you to customize the switch to fulfil applications that are appropriate to your networking requirements. It is designed as a software-upgradeable product. Therefore, you can expand the functionality of the switch by downloading new software.

About this software release

Software release 1.1 introduces the following features:

- Support for the Collage 744 UTP Option Card.
- Support for the Collage 763 SMF Option Card.
- Support for the Collage 764 Mixed Option Card.
- Hot swap of Option Cards.
- Backup PSU monitoring.
- Proprietary LES/BUS resilience.
- Multiple LES/BUS per switch (up to 16).
- LECS support of multiple ELANs (up to 64).
- LECS ELAN client mapping (for secure ELANs).
- LANE MIB.
- Extension of Collage 740 MIB.
- Remote management of the switch using TrueView Collage 740 Manager.
- Statistics for each Virtual Channel.
- Virtual ports for Virtual Path (VP) tunnelling.
- Additional DRAM support.
- SDH support.
- CLP discard.
- Priority event reporting.
- Proprietary Dynamic Routing (PDR).

Software revision history

Release 1.0

The Collage 740 software release 1.0 provided the following features:

- Support for Constant Bit Rate (CBR), Variable Bit Rate (VBR), and Unspecified Bit Rate (UBR) traffic using three priority queues.
- Early Packet Discard (EPD) and Partial Packet Discard (PPD) for coping with congestion.
- ATM Forum UNI 3.0 and UNI 3.1 signalling, selectable on a per-port basis, supporting point-to-point and point-to-multipoint Switched Virtual Circuits (SVCs).
- Translation between UNI 3.0 and UNI 3.1 signalling and vice-versa.
- ATM Forum IISP (Interim Inter-switch Signalling Protocol) for signalling between switches and static routing across the ATM network.
- Permanent Virtual Circuits (PVCs).
- Full LAN Emulation (LANE) suite consisting of a LECS (LAN Emulation Configuration Server), a combined LES (LAN Emulation Server) and BUS (Broadcast Unknown Server), and a management LEC (LAN Emulation Client).
- SNMP (Simple Network Management Protocol) management over IP over LAN emulation, using the following MIBs (Management Information Bases):
  - MIB II, RFC 1213
  - ATM MIB, RFC 1695
  - SONET/SDH MIB, RFC 1595
  - Extensions MIB, RFC 1573
  - Madge Box MIB
- Software download over TFTP (Trivial File Transfer Protocol) or XMODEM.
- Remote management over Telnet.

Hardware revision history

Table 1.1 lists the new hardware features supported by the new software release.

Table 1.1 Hardware Revision History

Revision	Hardware supported
Software Version 1.1	Support for three further option cards that each provide a four port data rate of 155.52 Mbps, conforming to the ITU I.432 (B-ISDN UNI Physical Layer) Specification. The option cards are: • Collage 744 UTP Option Card, provides four ATM interfaces using RJ45 connectors to UTP physical media. • Collage 763 SMF Option Card, provides four ATM interfaces using SC (Snap Connectors) duplex connectors to Single Mode Fiber (SMF) physical media. • Collage 764 Mixed Option Card, provides four ATM interfaces via SC (Snap Connectors) duplex connectors. Two of the interfaces are for Single-Mode Fiber (SMF) media, and two are for Multi-Mode Fiber (MMF) media. Support for Backup PSU. • The Backup PSU, provides the Collage 740 with a dual Power Supply Unit (PSU) should there be a failure in the internal PSU. A single Backup PSU can support two separate Collage 740 units.

Table 1.1 Hardware Revision History

Revision	Hardware supported
Software Version 1.0	Support for an option card that provides a four port data rate of 155.52 Mbps, conforming to the ITU I.432 (B-ISDN UNI Physical Layer) Specification. • Collage 743 MMF Option Card, provides four ATM interfaces using SC (Snap Connection) duplex connectors to Multi-Mode Fiber (MMF) physical media.

Standards implemented

The Collage 740 Control Software implements the following standards:

ATM Forum documents:

- Interim Inter-switch Signalling Protocol (IISP) Specification, version 1.0 (document number: af-pnni-0026.000, December 1994)
- LAN Emulation (LANE) over ATM, version 1.0 (document number: af-lane-0021.000, January 1995)
- LAN Emulation Client (LEC) Management Specification (document number: af-lane-0038.000, May 95
- UNI 3.0 Specification (September 1993)
- UNI 3.1 Specification (September 1994)
- Interim Local Management Interface (ILMI) (refer to section 4 of the UNI 3.1 Specification)

ITU-T recommendations:

- I.361 B-ISDN ATM Layer Specification, March 1993
- I.363 B-ISDN ATM Adaptation Layer (AAL) Specification, March 1993
- I.432 B-ISDN UNI Physical Layer Specification, March 1993

Network Management standards:

- RFC 1213 (MIBii)
- RFC 1573 (Interface table extensions)
- RFC 1595 (SONET MIB)
- RFC 1695 (AToM MIB)

Getting started

This chapter describes how to get started with a Collage 740. This includes an overview of the management and configuration task that you should perform soon after installation.

For step by step instructions on how to connect a Collage 740 to other Madge ATM devices, see Chapter 3 “Connecting to another Madge ATM device”.

Powering up the Collage 740

During the system startup of a Collage 740, the switch automatically performs a number of self-tests on its internal hardware.

The startup process is documented in the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238). This guide includes information about the self-tests that are carried out by a Collage 740 and how the LED indicators on the switch indicate the status of the self-tests.

If any non-critical hardware self-test fails then the Collage 740 Boot Loader will be entered. From the Boot Loader you may be able to diagnose and remedy the problem. For more information on how to use the Boot Loader, see Appendix B “Using BOOT Loader”.

If the Collage 740 passes all the self-tests, it will load the main image from flash memory and you can manage the Collage 740. For information on how to manage the Collage 740, see “Managing a Collage 740” later in this chapter.

Managing a Collage 740

The Collage 740 provides a console management interface, which enables you to configure the switch. TrueView Collage 740 Manager is also supplied. This is an easy-to-use management application that combines a range of management features with a graphical user interface to manage the switch.

When you have finished installing the Collage 740, you can use the following management methods:

- Management from a local or remote console using the Collage 740 command-line interface.
- Management from a network management station using TrueView Collage 740 Manager and SNMP.

Management from a local or remote console

You can manage the Collage 740 using the following methods:

- Out-of-band console management by means of a VT100-compatible terminal connected to the upper serial port.
- Remote console management using a terminal using Telnet over TCP/IP over an emulated LAN.

For information about connecting a terminal device to the serial interfaces, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).

Management from a network management station

You can manage the Collage 740 using the following methods:

- SNMP management running over UDP/IP over an Emulated LAN (ELAN).
  When you manage the Collage 740 over SNMP:
  - — Connect the management station to the ELAN that the Collage 740 management LEC is connected to, or make sure it can communicate with that ELAN.
  - — If you manage the Collage 740 using SNMP over IP, set the IP address of the Collage 740 management LEC, and make sure the management station is either on the same subnet or can communicate with that subnet. If the management station and management LEC are on different subnets, set the default gateway on the Collage 740 so it can communicate with the management station.
  - — Make sure you know the SNMP community name (for both read and write access).
- TrueView network management station running TrueView Collage 740 Manager. TrueView is a network management platform that supports management applications for a range of Madge products. TrueView Collage 740 Manager enables you to view the device and check the status indicators from the management station, and perform a range of management tasks. For more information about TrueView Collage 740 Manager, refer to the *TrueView Collage 740 Manager User Guide* (part number: 100-241).

Setup procedures on a Collage 740

To install a Collage 740 successfully, do the following:

- To access and manage a Collage 740 remotely, an IP address must be assigned to the switch. For more information on setting up an IP address on a Collage 740, see “Setting the IP address” later in this chapter.
- To access an attached device or switch, set up static routing entries to switches that do not support Madge Proprietary Dynamic Routing (PDR) and to any attached devices that do not support ILMI. For more information on setting up a routing table on a Collage 740, see “Setting up an IISP routing table” later in this chapter.
- To enable an attached device or switch to communicate, you may need to configure ports. For more information on configuring ports on a Collage 740, see “ATM port configuration on the Collage 740” later in this chapter.
- To enable communication over the network - LAN Emulation must be set up on the switch. For more information on setting up LAN Emulation on a Collage 740, see “Setting up LAN Emulation” later in this chapter.

Setting the IP address

To access and manage a Collage 740 remotely, for example using Telnet or SNMP, an IP address must be set for the switch.

You will need to decide whether the Collage 740 switch will use BOOTP to acquire its IP address or whether you wish to set it manually.

If you plan to use BOOTP, make sure a BOOTP server is on the same ELAN as the Collage 740 management LEC, or there is a route from a BOOTP server to the ELAN. You will need to set the IP address of the Collage 740 to 0.0.0.0. (this is the default IP address for a new Collage 740). The Collage 740 will then attempt to learn its IP address using the BOOTP protocol. For more information about setting IP addresses, see "Configuring the Collage 740 address information" in Chapter 5 "Managing miscellaneous commands using the command-line interface".

If you plan to set the IP address manually, first make sure that the terminal or terminal emulator is connected to serial interface A then follow the procedure described in "Setting the Collage 740 IP address, subnet mask, and gateway" in Chapter 5 "Managing miscellaneous commands using the command-line interface".

Note: The IP address commands will take effect immediately, and will disrupt IP traffic (for example, Telnet or SNMP) that is going to the Collage 740.

Setting up an IISP routing table

For information about how IISP routing works, see "IISP routing" in Appendix C "Routing and signalling concepts".

Connecting an end-station or an edge device to a Collage 740

If you are connecting an end-station or an edge device (which behaves as an end-station) that supports ILMI to a Collage 740, the routing entries for the device will be automatically generated and added to the IISP routing table in the Collage 740. This is due to ILMI dialog between the virtual port on the Collage 740 and the device. Normally, automatically generated routing entries are composed by concatenting the switch network prefix with the End-Station Identifier (ESI) of the attached devices.

Note: You will need to enable ILMI on both the attached device and the corresponding virtual port on the Collage 740. You must also ensure that this virtual port is using its default configuration, which will allow ILMI to automatically configure the virtual port as required to communicate with the attached device. For more information about setting the virtual port to its default configuration, see "ATM port configuration on the Collage 740" later in this chapter.

Connecting two Collage 740s

If you are connecting two Collage 740s that have Madge PDR enabled then no manual routing entries are required.

If PDR is disabled or not supported on the Collage 740s then static routing will be required.

Connecting an ATM switch to a Collage 740

If you are connecting an ATM switch that does not support Madge PDR to a Collage 740 then a static route must be added manually to the IISP routing table. This will enable the ATM switches to communicate with one another. For more information about adding routes to the routing table, see "Setting up routing entries" in Chapter 9 "Managing the routing table using the command-line interface".

Adding a route to access a remote LECS

You will need to manually add a routing entry in a Collage 740 routing table to access a remote LECS, if:

- the Collage 740 is in secure mode and the LECS is not being hosted on it.
- not directly attached to a device registers the LECS over ILMI.

For more information about adding routes to the routing table, see "Setting up routing entries" in Chapter 9 "Managing the routing table using the command-line interface".

ATM port configuration on the Collage 740

Setting the virtual port to its default configuration

If you are attaching an end-station or an edge device that supports ILMI to a Collage 740 then you must ensure that virtual port on the Collage 740 is using its default configuration.

This will enable ILMI to automatically configure the virtual port so that it can communicate with the attached device. For more information on resetting the parameters on the virtual port, see “Resetting parameters on a virtual port” in Chapter 7 “Managing virtual ports using the command-line interface”.

Connecting to an end-station, an edge device, a Collage 250/280, or another Collage 740

If you are attaching one of the following to a Collage 740

- an end-station
- an edge device (such as a Collage 530 or Collage 540)
- a Collage 250/280 Workgroup ATM Switch (only in its default state)
- another Collage 740

then the Collage 740 will automatically configure the virtual port to communicate with the attached device.

Ensure that ILMI is enabled on the all devices and the ports have been set to their default port configuration before attaching the device. ILMI will not alter any parameters that have been manually configured by the administrator. If a parameter has been automatically configured for a port, using ILMI, the parameter will be displayed with an asterisk "*" next to it.

Connecting to a non-Madge ATM switch

If you are attaching a non-Madge ATM switch to a Collage 740 then you must disable ILMI on the ports that connect the two switches.

Note: You must disable ILMI on the ports that attach the two ATM switches and manually configure the virtual port on the Collage 740.

The following parameters must be set on the virtual port:

- The profile must be set to either Network or User (the opposite to the configuration on the remote switch).
- The signalling stack type must be set to either IISP 3.0 or IISP 3.1 (according to the configuration on the remote switch).
- You may also need to configure other signalling parameters on the Collage 740.

Setting up LAN Emulation

For more information on how to configure the LANE components on a Collage 740, refer to the *Collage 740 LAN Emulation Services User Guide* (part number: 100-289).

If LANE services are to be hosted on the Collage 740 then you must determine the following:

- Determine whether this Collage 740 will host the LECS. If the LECS is local you will need to consider the ELANs that the LECS is in charge of.
- Determine what ELANs this Collage 740 will host and create LESes to host the required ELANs.
- Determine if secure ELANs are required. If secure ELANs are required then setup ELAN client database in the Collage 740.

Note: If you are not using Madge Proprietary Dynamic Routing (PDR), you will need to set up static routing entries in the Collage 740 routing table to access a remote LECS. For more information about PDR and setting up static routing entries, see Chapter 9 "Managing the routing table using the command-line interface".

- If appropriate, configure the management LEC in the Collage 740 to join the correct ELAN type. For more information about configuring the management LEC, “Configuring the management LEC” in Chapter 10 “Managing the management LEC using the command-line interface”.

Connecting to another Madge ATM device

This chapter describes how to connect a Collage 740 to other Madge ATM devices.

It is assumed that the Collage 740 and all the Madge devices that are being attached to the Collage 740 are in their factory default states and that LAN Emulation (LANE) configurations have been completed, as required. For more information about the LANE configuration required, refer to the *Collage 740 LAN Emulation Services User Guide* (part number: 100-289).

Default state of a Collage 740

- Default port configuration
  For a list of all the Collage 740 default port settings, see Appendix A “Default settings on a new Collage 740”.
- Default routing table configuration
  No routes are held in the routing table on a Collage 740.
  By default the Madge Proprietary Dynamic Routing (PDR) is enabled on all Collage 740s to communicate routing and LANE information.
- Default LAN Emulation configuration
  For a list of all the Collage 740 default LANE services settings, see Appendix A “Default settings on a new Collage 740”.

Connecting a Collage 740 to a Madge 155 NIC Workstation

Assumptions

The LECS, LES and BUS are situated in the Collage 740.

The Madge 155 NIC Workstation:

- is running software version 1.1 or later.
- is attached on port 2.1.0 on the Collage 740.
- LEC wants to join a Token-Ring ELAN.

Configuration	Commands
Port	No port changes required on the Collage 740.
Routing Table	No routing entries required on the Collage 740.
LAN Emulation	Set the Collage 740 to host the LECS locally, by typing: C740:/>lane lecs location local wka

Connecting a Collage 740 to a Collage 540

Assumptions

The LECS, LES and BUS are situated in the Collage 740.

The Collage 540 Token Ring-ATM Access Switch:

- is running software version 1.0.0 or later.
- the LECS is not advertising its internal LECS at the WKA.

Configuration	Commands
Port	No port changes required on the Collage 740.
Routing Table	No routing entries required on the Collage 740.
LAN Emulation	Set the Collage 740 to host the LECS locally, by typing: C740:/>lane lecs location local wka

Connecting a Collage 740 to another Collage 740

Assumptions

The LECS, LES and BUS are situated in the Collage 740 (switch one).

Configuration	Commands to be executed on switch one
Port	No port changes required on the Collage 740 (switch one).
Routing Table	No routing entries required on switch one.
LAN Emulation	Set switch one to host the LECS locally, by typing: C740:/>lane lecs location local wka

Configuration	Commands to be executed on switch two
Port	No port changes required on the Collage 740 (switch two).
Routing Table	No routing entries required on switch two.
LAN Emulation	No LANE changes required on the Collage 740 (switch two). This will give you a resilient LES/BUS for the Collage740ElanTrn ELAN.

Connecting a Collage 740 to a Collage 250 or a Collage 280

Assumptions

The LECS, LES and BUS are situated in the Collage 740.

The Collage 250/280 Workgroup ATM Switch:

- is running software version 2.1.2 or later.
- is attached on port 2.3.0 on the Collage 740.
- is using the prefix 39.00.01.02.03.04.05.06.07.08.09.10.22.

Configuration	Commands
Port	No port changes required on Collage 740 when connecting to the Collage 280/250 (if in factory default).
Routing Table	Add static route on Collage 740 to access the Collage 250/280, by typing: C740:/>route add 39.00.01.02.03.04.05.06.07.08.09.10.22 2.3.0
LAN Emulation	Set the Collage 740 to host the LECS locally, by typing: C740:/>lane lecs location local wka

Connecting a Collage 740 to a Collage 530

Assumptions

The LECS, LES and BUS are situated in the Collage 740.

The Collage 530 Ethernet-ATM Access Switch is running software version H2.1S or later.

The Collage 530 is attached on port 2.4.0 on the Collage 740.

Configuration	Commands
Port	Configure port 2.4.0 on the Collage 740 by performing the following steps: C740:/>disable 2.4.0 C740:/>set stacktype 2.4.0 UNI 3.0 C740:/>enable 2.4.0
Routing Table	No routing entries required on the Collage 740.
LAN Emulation	Set the Collage 740 to host the LECS locally, by typing: C740:/>lane lecs location local wka Create a 'default' LES/BUS on the Collage 740, by typing: C740:/>lane les create default auto ethernet 5 6

How to use the command-line interface

This chapter explains how to get management access to the Collage 740 command-line interface and how to use the command-line interface to manage the switch.

Getting connected

You can access the Collage 740 command-line interface by one of the following methods:

- Direct connection using serial interface A, using a VT100 terminal or a PC running a terminal emulation program. For information about serial interface A, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).
- Telnet connection, using a standard Telnet program.

When a terminal is connected to the command-line interface, the Collage 740 displays a welcome message on the terminal screen and logs the user directly to the root of the command-line interface. You can set a password for remote connections into the switch. For more information about setting up a password, see "Setting passwords for remote connections" in Chapter 5 "Managing miscellaneous commands using the command-line interface".

Note: You can access the command-line interface using Telnet, only if the Collage 740's management LEC is currently joined to an ELAN that is accessible from the network management station and the IP address of the switch has been set.

How the command-line interface works

The command-line interface provides a set of commands that you can use to configure the Collage 740. The commands are arranged in a hierarchy such that related commands are grouped together in a single functional group. A functional group can also contain one or more functional groups, and so forth. When you login to the command-line interface, you will be placed at the root of the hierarchy. To perform an operation using a command, you will need to specify the full hierarchical path followed by the command. For example:

```
C740:/>route show
```

This command shows routes in the routing table and is contained in the route functional group. Alternatively, you can descend the hierarchy by typing:

```
C740:/>route
```

This will cause the prompt to change, displaying the position in the hierarchy:

```
C740:/route>
```

You can now perform the command simply by typing show, as follows:

```
C740:/route>show
```

The advantage of descending the hierarchy is that you can perform multiple related commands without having to type them out in full (that is, specifying their full hierarchical path).

Note: You do not need to enter all the letters of a command: you need only enter sufficient letters to uniquely identify it from other commands in the directory. For example, instead of typing route show you could just enter `r s` in the command-line interface.

Table 4.1 lists the commands that are used to navigate the hierarchy.

Table 4.1 Navigational commands

Command	Description
top	Returns you to the root of the hierarchy.
up	Returns you to the previous level in the hierarchy.

Note: If you press the RETURN key immediately after the prompt, it has the same effect as entering the up command.

If you are at a particular point in the hierarchy and you need to perform a command elsewhere in the hierarchy, you must enter the slash symbol (/) followed by the full hierarchical path followed by the command. For example:

```
C740:/route>/vport show
```

This command will list information about virtual ports while you are in the route functional group. After the command has been executed you will still be in the route functional group.

Command hierarchy

Figure 4.1 and Figure 4.2 display the hierarchy of the commands in the command-line interface. To locate information about a specific command, use the commands listed at the beginning of the user guide or see "Locating a topic in the command-line interface" later in this chapter for information about a specific topic.

Note: Certain functional groups in the hierarchy are also commands in their own right. For example, the vport show functional group is also a command when entered on its own.

Figure 4.1 Hierarchy of commands from the root directory

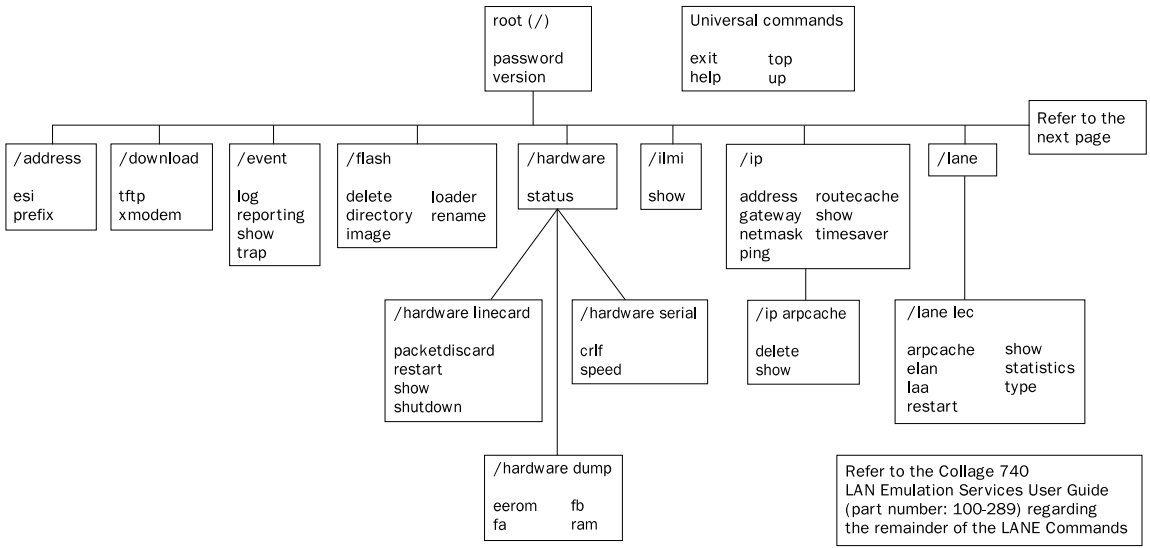
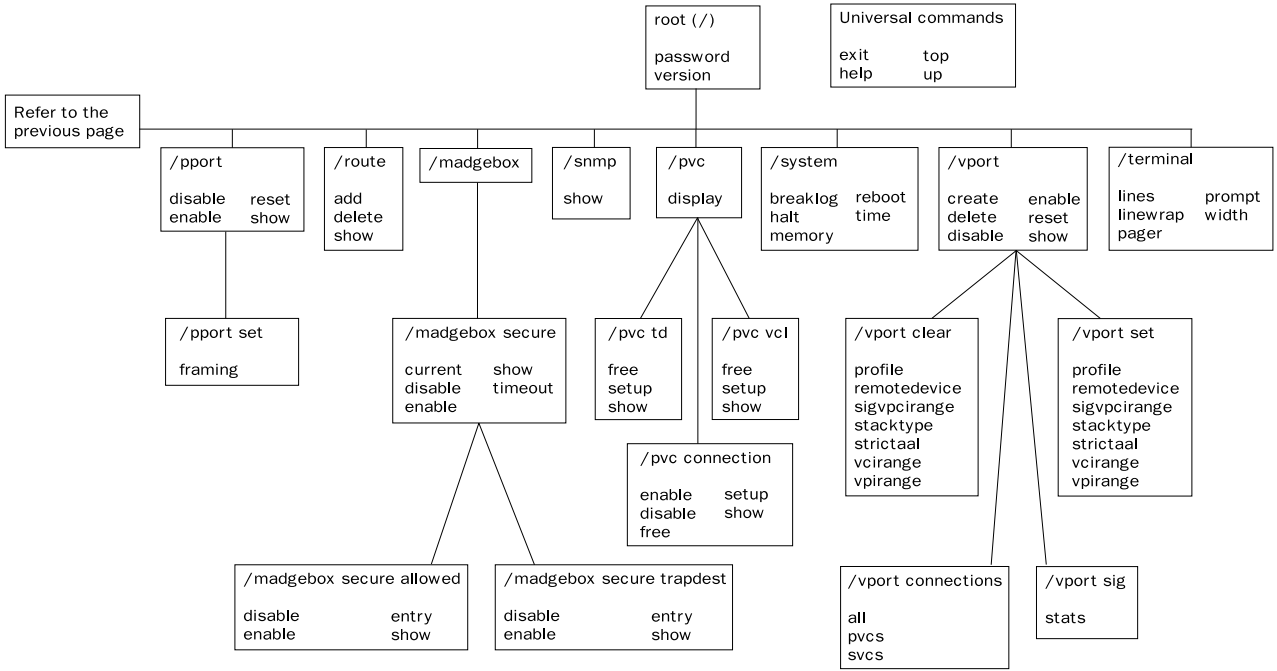


Figure 4.2 Hierarchy of commands from the root directory (continued)



Conventions used to describe commands

Throughout this chapter the following conventions are used:

- All command examples are given in relation to the root of the hierarchy. That is, this is how you would enter the command if you were at the root of the hierarchy.
- The syntax of commands are described using the symbols displayed in Table 4.2.

Table 4.2 Symbols used to describe command syntax

Syntax	Description
[ ]	Characters surrounded by square brackets denote optional arguments.
{ }	Characters surrounded with braces denote a selection list. When there are several argument selections surrounded by braces and separated by a vertical bar (|) then one of the arguments must be included in the command.
< >	Characters surrounded by angle brackets denote information that you must provide.

Using the on-line help

On-line help is always available and can be obtained at any time by typing `help`. The following information will be displayed:

- All commands and functional groups available at the current position in the hierarchy, in alphabetical order.
- The universal commands. These are commands that are independent of the hierarchy. They can be executed irrespective of where you are in the hierarchy.

The help output from the root is shown below.

Command: C740:/>help

Output:

```
Commands:-
address     --- ATM address info
download    --- Download a software image
event       --- Event message commands
flash       --- Flash management commands
hardware    --- Hardware commands
ilmi        --- ILMI information
ip          --- IP configuration commands
lane        --- LANE configuration commands
madgebox    --- Madgebox MIB management
password    --- Set the remote login password
pport       --- Physical Port management
pvc         --- Management of Permanent Virtual Circuits (PVCs)
route       --- Routing table management
snmp        --- Console network management
system      --- System wide commands
terminal    --- Terminal settings
version     --- Display build version number
vport       --- Virtual Port management

Universal commands:-
exit, help, top, up
```

Help is also available for individual commands. To obtain help on a command, type help followed immediately by the full command. As an example, the help output for the ip address command is:

Command: C740:/>help ip address

Output:
```
address -- Display or set the IP address
Syntax: ip address [<address>]
The address is a standard 4-dotted-byte IP address (e.g. 111.112.113.114).
If you set the address to 0.0.0.0, the Collage 740 will attempt to learn its IP
address using BOOTP.

This command takes immediate effect, and will disrupt all IP traffic (Telnet,
SNMP, etc) going to the Collage 740.
```

Note: If there is a discrepancy between the information in the on-line help and the information in this manual, always follow the advice in the on-line help, as it is the most current information available.

Locating a topic in the command-line interface

To locate a specific topic in the Collage 740 command-line interface, refer to the table below. For a list of all commands documented in this user guide, refer to the list of commands at the beginning of the user guide.

Table 4.3 Description of topics covered in this user guide

Topic	Refer to ...
About this software release. Includes: Standards implemented in this software release.	Chapter 1
Getting started. Includes: Setup procedures for a Collage 740.	Chapter 2
Connecting to another Madge ATM device. Includes: Step by step commands to attach to a Madge ATM device.	Chapter 3
How to use the command-line interface. Includes: A chart showing the hierarchy of the command-line interface.	Chapter 4
Misc commands. Includes: Setting passwords for remote connections, configuring address information, and viewing the status of the Collage 740.	Chapter 5
Managing physical ports.	Chapter 6

Table 4.3 Description of topics covered in this user guide

Topic	Refer to ...
Managing virtual ports.	Chapter 7
Managing option cards. Includes: Configuring packet discard thresholds for option cards.	Chapter 8
Managing the routing table. Includes: Setting up routing entries.	Chapter 9
Managing the management LEC. Includes: Details of the management LEC components in the Collage 740.	Chapter 10
Managing SNMP security. Includes: Configuring authorized managers and trap destinations.	Chapter 11
Managing system commands. Includes: System monitoring commands and how to configure terminal outputs.	Chapter 12
Managing events. Includes: Assigning event priority levels.	Chapter 13
Upgrading the Collage 740 software	Chapter 14
Managing PVC connections. Includes: An overview on setting up a PVC connection.	Chapter 15

Table 4.3 Description of topics covered in this user guide

Topic	Refer to ...
Glossary of terms used in this guide.	Chapter 16
Default settings on a new Collage 740.	Appendix A
Using BOOT Loader after a failure in a non-critical hardware self-test during the start-up procedure in a Collage 740.	Appendix B
Routing and signalling concepts that are used in a Collage 740.	Appendix C
Network design.	Appendix D

Managing miscellaneous commands using the command-line interface

This chapter describes how use the command-line interface to set passwords and address information, and to view the status of the switch. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface”.

Setting passwords for remote connections

To protect the Collage 740 from accidental or unauthorized configuration from a remote end-station (via Telnet), you may want to set a password for the switch.

The following sequence shows you how to set a password for the switch for the first time. Because no password exists, the Collage 740 does not prompt for the old password.

Command: C740:/>password

Output:
```
There is no password at the moment.
Enter the new password (does not echo): ******** [ENTER]
Enter the new password again (does not echo): ******** [ENTER]
Password changed.
```

Note: The new password will take effect on all new Telnet sessions.
If you are accessing the device directly using the serial port, a password is not required.

Configuring the Collage 740 address information

Setting the Collage 740 IP address, subnet mask, and gateway

A Collage 740 will need an IP address so that it can be managed remotely. You must decide whether the Collage 740 will use BOOTP to acquire its IP address or whether the address must be set manually.

If you plan to use BOOTP, make sure the BOOTP server is on the same ELAN as the Collage 740 management LEC, or there is a route from the BOOTP server to the ELAN. You will need to set the IP address of the Collage 740 to 0.0.0.0. (this is the default IP address for a new Collage 740). The Collage 740 will then attempt to learn its IP address using the BOOTP protocol.

Note: IP address configuration commands will take effect immediately and may disrupt IP traffic (for example, Telnet or SNMP) going to the Collage 740.

To set the Collage 740's IP address, enter the ip address command:

Command:	C740:/>ip address <ip_address>	
Example:	C740:/>ip address 192.32.220.61	
Parameters:	<ip_address>	An unique IP address that is to be assigned to the Collage 740. If you set the address to 0.0.0.0 the Collage 740 will attempt to learn its IP address using BOOTP.

To set the subnet mask, enter the ip netmask command.

Command: C740:/>ip netmask <netmask>

Example: C740:/>ip netmask 255.255.255.0

Parameters:

<netmask>	A valid IP subnet mask. 0.0.0.0 indicates that the default subnet mask should be determined from the IP address.

To enable remote access to the Collage 740 from a different IP subnet, you must identify the IP address of a default gateway. The gateway must be on the same IP subnet as the Collage 740.

To set the gateway IP address, enter the ip gateway command.

Command: C740:/>ip gateway <ip_address>

Example: C740:/>ip gateway 192.32.220.8

Parameters:

<ip_address>	A valid IP address for the gateway.

Viewing Collage 740 IP address information

You can display IP address information for the Collage 740. For information about changing the IP address information, see "Setting the Collage 740 IP address, subnet mask, and gateway" earlier in this chapter.

To view the IP address information, use the ip show command.

Command: C740:/>ip show

Output:
```
IP address: 192.32.220.61 (The address was obtained using BOOTP.)
IP gateway address: 192.32.220.8
IP subnet mask: 255.255.255.0
```

Viewing the End System Identifier (ESI)

The End System Identifier (ESI), also referred to as the Burnt-In Address (BIA), is the factory-assigned world-wide unique address for the switch. If the management LEC on the Collage 740 is joined to an Ethernet ELAN, its MAC address will default to the ESI (Ethernet format). However, if the management LEC on the Collage 740 is joined to a Token-Ring ELAN, its MAC address will default to the bit-swapped ESI (Token Ring format). Therefore, both formats are shown.

To display the BIA (ESI) of the Collage 740, use the address esi command.

Command: C740:/>address esi

Output:
```
Switch ESI Address  (Ethernet Format)     : 00.00.6f.07.00.0e
                    (Token Ring Format)  : 00.00.f6.e0.00.70
```

Note: The ESI cannot be changed. However, in the case of LANE, a Locally Administered Address (LAA) can be defined. For more information see "Managing the ELAN for the management LEC" in Chapter 10 "Managing the management LEC using the command-line interface".

Viewing or changing the switch prefix

When a Collage 740 with a blank EEROM is powered up, a default prefix is generated and stored in the EEROM.

The default prefix is 39.00.00.00.00.00.xx.xx.xx.xx.xx.xx where x is the MAC address of the switch.

Note, the first byte of all switch prefixes must start with one of the following:

- 39. An ATM Forum Identifier AFI) for the Data Country Code (DCC). This is allocated and assigned to countries and administered by the ISO member for that country.
- 47. An AFI for the International Code Designator (ICD). This is allocated and assigned to countries, and administered by an ISO registration authority for that country, for example the British Standard Institute (BSI).
- 45. An AFI for E.164 encapsulated. This is useful for organizations who wish to use the exiting number plan used in public networks.

To display the current switch prefix, use the address prefix command.

Command: C740:/>address prefix

Output: Current Prefix : 39.00.00.00.00.00.00.00.00.f6.e0.00.10

If you have an ATM network that uses its own block of ATM addresses, you can make the Collage 740 conform to this scheme by changing the default switch prefix. Any end-stations directly connected to the Collage 740 will only obtain their new prefix if they re-register over ILMI.

To change the switch prefix for the Collage 740, use the address prefix command.

Command: C740:/>address prefix <prefix>

Parameters:	<prefix>	The new switch prefix. The prefix must be a 13-byte address and expressed as 13 two-digit hexadecimal numbers separated by periods. (39.00.01.02.03.04.05.06.07.08.09.aa.bb is an example of a switch prefix address. The first byte of the switch prefix address must be 39, 45 and 47. For more information see text in the introduction to this section.

Note: The above command changes the switch prefix immediately. You must update all the other affected switches' static routing table entries with the new switch prefix. If you are using PDR then the affected routing entries will be updated automatically.

Viewing or changing the IP time server address

A time server is a server that provides the date and time, as specified by RFC 1129, such as a UNIX machine running 'timed' to the Collage 740. You must provide the Collage 740 with the IP address of a time server or set the Collage 740 to discover the server on the network by broadcasting requests. To view the time received from the time server, use the system time command in Chapter 12 "Managing system commands using the command-line interface".

Note: The time displayed on the Collage 740 will be in GMT.

To view the current time server, use the ip timeserver command.

Command: C740:/>ip timeserver

Output:
```
The Collage 740 is requesting the time from a server at 192.16.1.14
The Collage 740 will use the first time server that responds to a broadcast
request.
```

To set or change the time server, use the ip timeserver command.

Command: C740:/>ip timerserver [<address> | discover]

Parameters:

<address>	This enables you to specify the IP address of the time server.
discover	This enables the Collage 740 to discover the server by broadcasting requests.

Using PING

The Collage 740 allows you to PING an IP address. The Collage 740 will send one Internet Control Message Protocol (ICMP) echo request to the address each second until you press CTRL-C. Whenever the remote device responds, the time taken to respond is displayed in milliseconds.

To PING an IP address, use the ip ping command.

Command: C740:/>ip ping <address>

Example: C740:/>ip ping 192.32.220.5

Parameters: <address> The IP address for the remote device.

Output:
```
PING: target address is 192.32.220.5
Type Control+C to stop the ping sequence
Response from 192.32.220.5: seq 0, delay 5 ms
Response from 192.32.220.5: seq 1, delay 2 ms
Response from 192.32.220.5: seq 2, delay 2 ms
Response from 192.32.220.5: seq 3, delay 1 ms
Response from 192.32.220.5: seq 4, delay 1 ms
Ping of 192.32.220.5
    Packets sent:     5
    Packets receieved: 5
```

Note: The command will continue to PING. To interrupt it, press CTRL-C.

Managing the IP ARP cache

This section explains how to view the IP ARP cache of the Collage 740 and how to delete entries in the ARP cache.

Listing the contents of the Collage 740's IP ARP cache

When listing the contents of the Collage 740's IP ARP cache, the destination IP and MAC addresses are shown. Also displayed is whether or not the ARP process has completed for each destination IP address in the IP ARP cache.

To display the contents of the Collage 740's IP ARP cache, use the ip arpcache show command.

Command: C740:/>ip arpcache show

Output:
```
IP ARP cache entries
--------------------------------
192.32.220.5      - 00.00.F6.1A.3C.62 (complete)
196.32.220.4      - 00.00.F6.09.18.59 (complete)
196.32.220.8      - 00.00.F6.09.44.3F (complete)
196.32.220.19     - incomplete
```

Deleting an entry from the Collage 740's IP ARP cache

When you delete an entry from a Collage 740 IP ARP cache that still has IP traffic on it, there will be a short delay while the ARP process finds the remote host and the IP address is added to the ARP cache again.

Note: If an IP address is moved on the network then you should delete the entry in the IP ARP cache to force the Collage 740 to locate the new MAC address.

To delete an entry from the Collage 740's IP ARP cache, use the ip arpcache delete command.

Command: C740:/>ip arpcache delete <address>

Parameters:	<address>	A standard IP address that is to be removed from the ARP cache.

Listing the contents of the Collage 740's IP route cache

The destination IP address, the router address, and the network mask are displayed for each entry in the IP route cache. The default router address is also displayed. This uses the Collage 740's IP gateway address.

To display the contents of the Collage 740's IP route cache, use the ip routecache command.

Command: C740:/>ip routecache

Output:

```
IP route cache entries
----------------------------------
Destination     Mask              Router
default         *                 196.32.220.8
172.24.128.0    255.255.255.255   196.32.220.102
149.49.69.125   255.255.255.255   196.32.220.205
```

Viewing the status of the Collage 740

To display the status of the Collage 740, use the hardware status command.

Command: C740:/>hardware status

Output:

```
Hardware status: Fan speeds
        Fan 1: - 2250 - OK
        Fan 2: - 2250 - OK
        Fan 3: - not presented or not fitted with speed sensor
        Fan 4: - not presented or not fitted with speed sensor

Hardware Status: Operating temperature
        Temperature is 29.0 degrees C - OK

Hardware Status: Power supplies
        Internal PSU OK
        External PSU not present
    -   All supplies OK
```

Setting the speed for the serial port

To set up the speed for a serial interface port, use the hardware serial speed command.

Command: C740:/>hardware serial speed [A | B] [9600 | 38400]

Example: C740:/>hardware serial speed B 9600

Parameters:		
	[A | B]	Select the serial interface port. This can be either A (the upper serial interface port) or B (the lower serial interface port).
	[9600 | 38400]	Select the speed at which the serial interface port will communicate.

Managing physical ports using the command-line interface

This chapter describes how use the command-line interface to manage physical ports on an installed option card. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface” .

Managing physical ports

This section describes the commands that enable you to configure the physical ports on an installed option card in the Collage 740.

Listing information about all physical ports

You can view information about all of the physical ports. When an option card is installed in the Collage 740, default physical ports are created for all ports on the option card. Each of these default physical ports is assigned a physical port id. The physical port id consists of the slot the option card is installed in and the port number.

To display information for all physical ports, enter the pport show command.

Command: C740:/>pport show

Output:

Physical Port Information

Physical Port Id	Admin State	Oper State	Line Speed	SDH/ Sonet	VPI Range	VCI Range	Media Type
0.1	Up	Up	156000	Sonet	[0..7]	[0..1023]	None
2.1	Up	Down	155520	Sonet	[0..7]	[0..1023]	MMF
2.2	Down	Down	155520	Sonet	[0..7]	[0..1023]	MMF
2.3	Up	Up	155520	Sonet	[0..7]	[0..1023]	MMF
2.4	Up	Down	155520	Sonet	[0..7]	[0..1023]	MMF

Note: Physical port 0.1 is an internal Collage 740 port and cannot be configured.

The pport show command displays the information described in Table 6.1.

Table 6.1 Output from the pport show command

Field	Description
Physical Port Id	The physical port number. This is displayed in the format <slot>.<port number>.

Table 6.1 Output from the pport show command

Field	Description
Admin State	The administrative state of the physical port. If the state is UP then this physical port is enabled. If the state is DOWN then this physical port is disabled. This will occur when you disable the physical port using the command-line interface or using SNMP.
Oper State	The operational state of the physical port. If the state is UP then this physical port is functional. If the state is DOWN then this physical port is not functional. This could be due to a problem with the physical connection.
Line Speed	The speed of the physical port.
SDH/Sonet	The framing for the physical port. This can be either Sonet or SDH. The default setting is Sonet.
VPI Range	The VPI range assigned to the physical port. All physical ports have a VPI range of [0..7].
VCI Range	The VCI range assigned to the virtual port.
Media Type	The media type for the physical port. MMF (Multi-Mode Fibre) cable. SMF (Single-Mode Fibre) cable. UTP (Unshielded Twisted Pair) cable. The internal port will display “None”.

Displaying counter information for a physical port

You can view counter information for all physical ports.

To display counter information for all physical ports, enter the pport show counters command.

Command: C740:/>pport show counters

Output:

Physical Port Counters

Physical Port Id	Tx Cells	Rx Cells	Tx Discards	Rx Discards	Rx Errors
2.1	0	0	0	0	0
2.2	0	0	0	0	0
2.3	279163	101045	0	0	5
2.4	0	0	0	0	0

The pport show counters command displays the information described in Table 6.2.

Table 6.2 Output from the pport show counters command

Field	Description
Physical Port Id	The physical port. This is displayed in the format <slot>.<port>.
Tx Cells	The number of cells that have been transmitted through the physical port.
Rx Cells	The number of cells that have been received through the physical port.
Tx Discards	The number of transmitted cells that have been discarded.
Rx Discards	The number of received cells that have been discarded.
Rx Errors	The number of cell errors that have been received through the physical port.

Disabling a physical port

Before any physical port parameters can be changed, cleared, or reset, you must disable the physical port.

To disable a physical port, use the pport disable command.

Command: C740:/>pport disable <pport id>

Example: C740:/>pport disable 2.1

Parameters:

<pport id>	The physical port identifier in the form <slot>.<port number>.

Enabling a physical port

To enable a physical port, use the pport enable command.

Command: C740:/>pport enable <pport id>

Example: C740:/>pport enable 2.1

Parameters:

<pport id>	The physical port identifier in the form <slot>.<port number>.

Setting physical port parameters

You can set individual parameters for a physical port. Once a physical port parameter has been set, ILMI will not override the parameter when the physical port is re-enabled.

You can set framing parameters for a physical port.

Note: Before any physical port parameters can be changed, cleared, or reset, you must disable the physical port. For more information about how to disable a physical port, see "Disabling a physical port" earlier in this chapter.

To set a parameter for a physical port, you must perform the following steps:

1 Disable the physical port.
2 Set the parameter for the disabled physical port, as required.
3 Enable the physical port.

Framing

You can specify whether the framing mode used for a physical port is Sonet or SDH. The default setting is Sonet.

Note: Before any physical port parameters can be changed, cleared, or reset, you must disable the physical port. For more information about how to disable a physical port, see "Disabling a physical port" earlier in this chapter.

To specify framing for a physical port, use the pport set framing command.

Command: C740:/>pport set framing <pport> [sonet | SDH]

Example: C740:/>pport set framing 2.1 SDH

Parameters:		
	<pport id>	The physical port identifier in the form <slot>.<port number>.
	sonet	Sets the framing mode for the physical port to Sonet. The default setting is Sonet.
	SDH	Sets the framing mode for the physical port to SDH.

Resetting parameters on a physical port

You can reset all configurable parameters for a specific physical port to their default values.

Note: Before any physical port parameters can be changed, cleared, or reset, you must disable the physical port. For more information about how to disable a physical port, see "Disabling a physical port" earlier in this chapter.

To reset all configurable parameters on a physical port to their default values, use the pport reset command.

Command: C740:/>pport reset <pport id>

Parameters:	<pport id>	The physical port number in the form <slot>.<port number>.

Managing virtual ports using the command-line interface

This chapter describes how use the command-line interface to manage virtual ports for an installed option card. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface”.

Managing virtual ports

This section describes the commands that enable you to configure the virtual ports in the Collage 740. For more information about virtual ports, see “Virtual ports” in Appendix C “Routing and signalling concepts”.

Listing information about virtual ports

You can view information about all of the virtual ports on the Collage 740. When an option card is installed in the Collage 740, default virtual ports are created for ports on the option card. Each of these default virtual ports is assigned a virtual port id of zero.

Any virtual port information that is marked with an asterisk (*) has been learnt by the Collage 740 during the ILMI dialogue with the remote device. Information that is not marked with an asterisk has been either configured by the user or is the default setting for the virtual port.

To view configuration information about all of the virtual ports, use the vport show command with the following parameters.

Command: C740:/>vport show [config | status | vpivciranges]

Parameter:		
	When no parameter is entered.	This will display link configuration information about all virtual ports.
	config	This will display the link configuration information for all of the virtual ports on the Collage 740. For more information see "Listing the link configuration information for all virtual ports" later in this chapter.
	status	This will display the link status information for all of the virtual ports on the Collage 740. For more information see "Listing the status information for all virtual ports" later in this chapter.
	vpivciranges	This will display the VPI and signalling VCI ranges for all of the virtual ports on the Collage 740. For more information see "Listing the VPI and VCI range information for all virtual ports" later in this chapter.

To view information about all virtual ports, use the vport show command.

Command: C740:/>vport show

Output:

Virtual Port Id	Admin State	Oper State	Stack Type	User /Net	Q.SAAL State	VPI Range	Sig VCI Range	ILMI State
2.1.0	Up	Down	UNI 3.0	Net	Down	[0..7]	[32..1023]	Inactive
2.2.0	Up	Down	IISP*	User*	Up	[0..7]	[32..1023]	Interswitch*
2.3.0	Up	Down	UNI 3.0	Net	Down	[0..7]	[32..1023]	Inactive
2.4.0	Up	Down	UNI 3.0	Net	Down	[0..7]	[32..1023]	Inactive

The vport show command displays the information described in Table 7.1.

Table 7.1 Output from the vport show command

Field	Description
Virtual Port Id	The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>.
Admin State	The administrative state of the virtual port. If the state is UP then this virtual port is enabled. If the state is DOWN then this virtual port is disabled. This will occur when you disable the virtual port using the command-line interface or TrueView Collage 740 Manager.

Table 7.1 Output from the vport show command

Field	Description
Oper State	The operational state of the virtual port. If the state is UP then this virtual port is functional. If the state is DOWN then this virtual port is not functional. This could be due to a problem with ILMI or ILMI has been disabled due to a problem with the physical connection.
Stack Type	The type of signalling used. This can be UNI (IISP) 3.0 or UNI (IISP) 3.1.
User/Net	The signalling profile of the virtual port. This can be either “user” or “network”. For more information on which signalling profile should be used, refer to “ATM port configuration on the Collage 740” in Chapter 2 “Getting started”.
Q.SAAL State	The state of the signalling data-link layer (Q.SAAL-SSCOP).
VPI Range	The VPI range assigned to the virtual port. Root virtual ports are assigned a VPI range of [0..7].
VCI Range	The VCI range assigned to the virtual port.

Table 7.1 Output from the vport show command

Field	Description
ILMI State	The ILMI state of the virtual port. The possible ILMI states are: Inactive — The virtual port is disabled or the physical layer is down. NoContact — The physical layer is up but the remote ILMI entity is not responding. CStartSent — The Collage 740 is attempting to start an ILMI dialogue (a cold start trap has been sent). GNTimeout — The Collage 740 has received no response to a getnext request from the ILMI prefix table of the remote device. GetRemoteInfo — The Collage 740 is interrogating the remote device to determine link characteristics. SwDoRegPrefix — The Collage 740 telling the remote device about the switch prefix of the Collage 740. SwWaitAddress — The Collage 740 has set the prefix and is waiting to receive the address from the remote device. SwHaveAddress — The Collage 740 has received the address from the user side. SwToSwPause — There is a pause in the ILMI dialogue between two switches.

Table 7.1 Output from the vport show command

Field	Description	
ILMI State (continued)	Ready	ILMI is up on an UNI link (not between two switches).
	InterSwitch	ILMI is up on a link between two switches.
	NoPrefixes	ILMI has tried repeatedly to tell the remote device its prefix without success. It will try to bring signalling up but remains in this state.
	Disabled	ILMI is disabled on this port.

Creating a virtual port

You can only create a virtual port for a physical port on an option card that is installed in the switch.

Note: Before you can create a new virtual port you must assign a VPI range. To do this you must first reduce the VPI range of the root virtual port. For more information about setting the VPI range for a virtual port, see "Setting virtual port parameters" later in this chapter.

To create a virtual port, use the vport create command.

Command: C740:/>vport create <vport id> <VPI>

The example below shows virtual port 4 on port 1 for linecard 2 with a VPI of 3 being created.

Example C740:/>vport create 2.1.4 3

Parameters:		
	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	<VPI>	The virtual path identifier to be associated with this virtual port. Note that only one VPI can be assigned to manually created virtual ports. For more information about virtual ports, see "Virtual ports" in Appendix C "Routing and signalling concepts".

Deleting a virtual port

To delete a virtual port, use the vport delete command.

Command: C740:/>vport delete <vport id>

Example: C740:/>vport delete 2.1.4

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.

Disabling a virtual port

Before any virtual port parameters can be changed, cleared, or reset you will have to disable the virtual port.

To disable a virtual port, use the vport disable command.

Command: C740:/>vport disable <vport id>

Example: C740:/>vport disable 2.1.0

Parameters: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Enabling a virtual port

To enable a virtual port, use the vport enable command.

Command: C740:/>vport enable <vport id>

Example: C740:/>vport enable 2.1.0

Parameters: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Disabling ILMI on a virtual port

If an attached end-station does not support ILMI, you will need to disable ILMI on the virtual port on the Collage 740. Note if the remote device is an end-station then address registration will not take place automatically on the virtual port and a static route will need to be added for the attached device.

To disable ILMI on a virtual port, use the vport disable command.

Command:	C740:/>vport disable <vport id> ilmi	
Example:	C740:/>vport disable 2.1.0 ilmi	
Parameters:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	ilmi	ILMI is a protocol used by a switch to learn about an attached device.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

Disabling ILMI polling on a virtual port

If an attached end-station does not support ILMI polling, the Collage 740 will not poll to ensure the integrity of the link. However, if the end-station does support ILMI polling but is not responding to polls in time, the virtual port will not become operational at all or be intermittent. Before the virtual port can become operational, you will need to disable ILMI polling.

To disable ILMI polling on a virtual port, use the vport disable command.

Command:	C740:/>vport disable <vport id> poll	
Example:	C740:/>vport disable 2.1.0 poll	
Parameters:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	poll	ILMI polling is a mechanism used by the Collage 740 to ensure that the same end-station is still attached to it. Since ILMI polling is an enhancement to ILMI, when ILMI is disabled, polling is also disabled.

Enabling ILMI on a virtual port

To enable ILMI on a virtual port, use the vport enable command.

Command:	C740:/>vport enable <vport id> ilmi	
Example:	C740:/>vport enable 2.1.0 ilmi	
Parameters:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	ilmi	ILMI is a protocol used by a switch to learn about an attached device.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

Enabling ILMI polling on a virtual port

To enable ILMI polling on a virtual port, use the vport enable command.

Command: C740:/>vport enable <vport id> poll

Example: C740:/>vport enable 2.1.0 poll

Parameters:		
	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	poll	ILMI polling is a mechanism used by the Collage 740 to ensure that the same device is still attached. Since ILMI polling is an enhancement to ILMI, ILMI must be enabled already.

Setting virtual port parameters

You can set individual parameters for a virtual port. Once a virtual port parameter has been set, ILMI will not override the parameter when the virtual port is re-enabled. If you want ILMI to override a set parameter, you must disable the virtual port and clear the parameter. You must then re-enable the virtual port.

You can set the following virtual port parameters using the vport set command:

- Signalling profile
- Remote device
- Signalling stack type
- Signalling VPCI range
- Strict AAL conversion
- Signalling VCI range
- VPI range

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set a parameter for a virtual port, you must perform the following steps:

1 Disable the virtual port.
2 Set the parameter for the disabled virtual port, as required.
3 Enable the virtual port.

Setting the signalling profile parameter

You can set the signalling profile on a virtual port to either "user" or "network". One side of the link must be set to "user" and the other side to "network".
If ILMI is enabled, then normally end-stations are always the "user" side of a link. For more information on which signalling profile should be used for an attached device, see "ATM port configuration on the Collage 740" in Chapter 2 "Getting started".

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set the signalling profile for a virtual port, use the vport set profile command.

Command:	C740:/>vport set profile <vport id> [user | network]	
Example:	C740:/>vport set profile 2.1.0 user	
Parameters:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
	user	During signalling the virtual port will act as the user side of the connection.
	network	During signalling the virtual port will act as the network side of the connection. The default signalling profile is "network". However, on a interswitch link, using IISP, one side of the link will have to be configured to "user" side. This does not apply when 2 Collage 740s are connected together which will automatically configure one side of the link to "user".

Setting the remote device parameter

You can set the remote device attached to a virtual port to either "switch" or "endstation". The default remote device is "auto-detect". If ILMI is enabled then this parameter will be automatically set, otherwise this parameter is not used.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set the remote device for a virtual port, use the vport set remotedevice command.

Command: C740:/>vport set remotedevice <vport id> [switch | endstation]

Example: C740:/>vport set remotedevice 2.1.0 switch

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
switch	The remote device for the virtual port is set to a "switch" and address registration is disabled.
endstation	The remote device for the virtual port is set to an "endstation". If ILMI is enabled, then this parameter will force address registration to take place.

Setting the stack type parameter

You can set the signalling stack type for a virtual port. The default signalling stack type is UNI 3.0.

The signalling stack type can be:

- UNI 3.0
- UNI 3.1
- IISP 3.0
- IISP 3.1

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set the signalling stack type for a virtual port, use the vport set stacktype command.

Command: C740:/>vport set stacktype <vport id> <value>

Example: C740:/>vport set stacktype 2.1.0 UNI 3.1

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
<value>	Selects the type of signalling stack that will be used for the virtual port.

Setting the signalling VPCI range

You can set a signalling VPCI range for a virtual port. This range can only be changed on the root virtual port. By default, the VPCI range for root virtual port is [0..7].

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set a signalling VPCI range for a virtual port, use the vport set sigvpcirange command.

Command: C740:/>vport set sigvpcirange <vport id> <range>

Example: C740:/>vport set sigvpcirange 2.1.0 [0..2]

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
<range>	Selects the signalling VPCI range that will be used for the virtual port.

Setting the strict AAL conversion parameter

You can specify whether strict AAL conversion is enabled or disabled for a virtual port.

If the above parameter is disabled on a port then the setup call will only be rejected, if there is no reasonable way to translate the signalling stack. By default, the strict AAL conversion is disabled.

If the above parameter is enabled on a port then when the signalling stack is converted from UNI (IISP) 3.0 to UNI (IISP) 3.1 or vice versa, the setup attempt will be refused if the information in the AAL parameter cannot be translated exactly.

Note: This parameter should only be set based on advice from Madge Technical Support.

To enable the strict AAL conversion for a virtual port, use the vport set strictaal command.

Command: C740:/>vport set strictaal <vport id> [on | off]

Example: C740:/>vport set strictaal 2.1.0 ON

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
on	Enables strict AAL conversion for the virtual port.
off	Disables strict AAL conversion for the virtual port.

Setting the signalling VCI range

You can set the signalling port used for SVCs on a virtual port.
The default signalling VCI range is [32..1023].

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To set a signalling VCI range for a virtual port, use the vport set vcirange command.

Command: C740:/>vport set vcirange <vport id> <range>

Example: C740:/>vport set vcirange 2.1.0 [32..800]

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
<range>	Selects the signalling VCI range that will be used for the virtual port.

Note: Do not reduce the lower limit of the signalling VCI range below 32 since these values are reserved for signalling protocol.

Setting the VPI range

The default VPI range for the root virtual port is [0..7].

Note: Before you can create a new virtual port you must reduce the VPI range of the root virtual port. For more information about creating a virtual port, see "Creating a virtual port" earlier in this chapter.

To set a VPI range for a virtual port, use the vport set vpirange command.

Command: C740:/>vport set vpirange <vport id> <range>

Example: C740:/>vport set vpirange 2.1.0 [0..4]

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.
<range>	Selects the VPI range that will be used for the virtual port. Note that this range cannot be greater than the VPI range of the physical port.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

Clearing virtual port parameters

You can clear a virtual port parameter so that the value returns to the default value. When the virtual port is re-enabled ILMI will, where possible, attempt to learn a value for the parameter through its dialogue with the remote device. If ILMI cannot discover a value for the parameter, the parameter remains at the default setting.

You can clear the following virtual port parameters using the vport clear command:

- Signalling profile
- Remote device
- Stack type
- Signalling VPCI range
- Strict AAL conversion
- Signalling VCI range
- VPI range

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear a parameter for a virtual port, you must perform the following steps:

1 Disable the virtual port.
2 Clear the parameter for the disabled virtual port.
3 Enable the virtual port.

Clearing the signalling profile parameter

If you clear the virtual port's signalling profile parameter, the port will re-learn what is on the other end of the link when it is enabled and a remote device is connected. For more information about this parameter, see "Setting the signalling profile parameter" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the profile parameter for a virtual port, use the vport clear profile command.

Command: C740:/>vport clear profile <vport id>

Example: C740:/>vport clear profile 2.1.0

Parameter: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the remote device parameter

If you clear the virtual port's remote device parameter, the port will re-learn what is on the other end of the link when it is enabled and a remote device is connected. For more information about this parameter, see "Setting the remote device parameter" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the remote device parameter for a virtual port, use the vport clear remotedevice command.

Command: C740:/>vport clear remotedevice <vport id>

Example: C740:/>vport clear remotedevice 2.1.0

Parameter: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the stack type parameter

If you clear the virtual port's stack type parameter, the port will re-learn the stack type when it is enabled and a remote device is connected. For more information about this parameter, see "Setting the stack type parameter" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the stack type parameter for a virtual port, use the vport clear stacktype command.

Command: C740:/>vport clear stacktype <vport id>

Example: C740:/>vport clear stacktype 2.1.0

Parameter: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the signalling VPCI range

For more information about this parameter, see "Setting the signalling VPCI range" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the signalling VPCI range for a virtual port, use the vport clear sigvpcirange command.

Command:	C740:/>vport clear sigvpcirange <vport id>	
Example:	C740:/>vport clear sigvpcirange 2.1.0	
Parameter:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the strict AAL conversion parameter

For more information about this parameter, see "Setting the strict AAL conversion parameter" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the AAL conversion parameter for a virtual port, use the vport clear strictaal command.

Command: C740:/>vport clear strictaal <vport id>

Example: C740:/>vport clear strictaal 2.1.0

Parameter: <vport id> The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the signalling VCI range

If you clear the virtual port's signalling VCI range and the remote device is an end-station, the port will re-learn the signalling VCI range supported by the end-station when it is enabled and a remote device is connected. For more information about this parameter, see "Setting the signalling VCI range" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the signalling VCI range for a virtual port, use the vport clear vcirange command.

Command:	C740:/>vport clear vcirange <vport id>	
Example:	C740:/>vport clear vcirange 2.1.0	
Parameter:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.

Clearing the VPI range

If you clear the virtual port's VPI range and the remote device is an end-station, the port will re-learn the VPI range supported by the end-station when it is enabled and a remote device is connected. For more information about this parameter, see "Setting the VPI range" earlier in this chapter.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To clear the VPI range for a virtual port, use the vport clear vpirange command.

Command:	C740:/>vport clear vpirange <vport id>	
Example:	C740:/>vport clear vpirange 2.1.0	
Parameter:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.

Resetting parameters on a virtual port

You can reset all configurable parameters for a specific virtual port to their default values.

Note: Before any virtual port parameters can be changed, cleared, or reset, you must disable the virtual port. For more information about how to disable a virtual port, see "Disabling a virtual port" earlier in this chapter.

To reset all configurable parameters on a disabled virtual port to their default values, use the vport reset command.

Command: C740:/>vport reset <vport id>

Parameters:	<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>.

Listing the link configuration information for all virtual ports

You can view the link configuration information for all virtual ports or for a specific virtual port.

Any virtual port information that is marked with an asterisk (*) has been learnt by the Collage 740 during the ILMI dialogue with the remote device. Information that is not marked with an asterisk has either been configured by the user or is the default setting for the virtual port.

To view the link configuration information about all virtual ports, enter the vport show config command.

Command: C740:/>vport show config [<vport id>]

Parameter:

<vport id>	The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>. If a <virtual port number> parameter is not supplied then the link configuration summary information is displayed for all virtual ports.

Example: C740:/>vport show config

Output:

Virtual Port Configuration Information

Virtual Port Id	Admin State	Oper State	ILMI Enabled	Remote Behaviour	Poll Mode	Strict AAL Trans.
2.1.0	Up	Down	Yes	-	None	Normal
2.2.0	Down	Down	Yes	Switch	None	Normal
2.3.0	Up	Up	Yes	-	Port + ESI	Normal
2.4.0	Up	Up	Yes	-	SysUpTime	Normal

The vport show config command displays the information described in Table 7.2.

Table 7.2 Output from the vport show config command

Field	Description
Virtual Port Id	The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>.
Admin State	The administrative state of the virtual port. If the state is UP then this virtual port is enabled. If the state is DOWN then this virtual port is disabled. This will occur when you disable the virtual port using the command-line interface or TrueView Collage 740 Manager.
Oper State	The operational state of the virtual port. If the state is UP then this virtual port is functional. If the state is DOWN then this virtual port is not functional. This could be due to a problem with ILMI or ILMI has been disabled due to a problem with the physical connection.
ILMI Enabled	Whether or not ILMI is enabled on the virtual port.
Remote Behaviour	The remote device attached to the virtual port. This can be “switch”, “end-station”, or “-” (auto detect). The default is auto detect.

Table 7.2 Output from the vport show config command

Field	Description
Poll Mode	ILMI polling is used to verify that the same end-station remains attached at a given port. There are two methods that can be used: — check the ESI has not changed. This is referred to as "Port + ESI". — check that the system up-time has not changed by a significant amount. This is referred to as "SysUpTime".
AAL Trans.	This specifies whether the translation of the AAL parameter, that is between UNI 3.0 (IISP) and UNI 3.1 (IISP 3.1) should be normal or strict.

Listing the VPI and VCI range information for all virtual ports

You can view the VPI and signalling VCI range information for all virtual ports that exist or for a specific virtual port.

Any virtual port information that is marked with an asterisk (*) has been learnt by the Collage 740 during the ILMI dialogue with the remote device. Information that is not marked with an asterisk has either been configured by the user or is the default setting for the virtual port.

To view VPI and signalling VCI range information about the virtual ports, enter the vport show vpivciranges command.

Command: C740:/>vport show vpivciranges [<vport id>]

Parameter: <vport id> — The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>. If a <vport number> parameter is not supplied then the VPI and signalling VCI ranges are supplied for all virtual ports.

Example: C740:/>vport show vpivciranges

Output:

Virtual Port VPI and VCI Ranges

Virtual Port Id	VPI Range	Sig Vpci Range	Sig VCI Range
2.1.0	[0..4]	[0..0]	[32..1023]
2.2.0	[0..7]	[0..0]	[32..1023]
2.3.0	[0..7]	[0..0]	[32..1023]
2.4.0	[0..7]	[0..0]	[32..1023]*

The vport show vpivciranges command displays the information described in Table 7.3.

Table 7.3 Output from the vport show vpivciranges command

Field	Description
Virtual Port Id	The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>.
VPI Range	The VPI range assigned to the virtual port. Default virtual ports are assigned a VPI range of [0..7].
Sig VPCI Range	The signalling VPCI range assigned to the virtual port.
Sig VCI Range	The signalling VCI range assigned to the virtual port. The default signalling VCI range is [32..1023].

Listing the status information for all virtual ports

You can view the status information for all virtual ports that exist or for a specific virtual port.

Any virtual port information that is marked with an asterisk (*) has been learnt by the Collage 740 during the ILMI dialogue with the remote device. Information that is not marked with an asterisk has either been configured by the user or is the default setting for the virtual port.

To view the virtual port status, enter the vport show status command.

Command: C740:/>vport show status [<vport id>]

Parameter: <vport id> — The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>. If a <vport number> parameter is not supplied then the link status summary information is supplied for all virtual ports.

Example: C740:/>vport show status

Output:

Virtual Port Status Information

Virtual Port Id	Admin State	Oper State	Stack Type	User /Net	Q.SAAL State	Q.2931 State	Remote Device	ILMI State
2.1.0	Up	Down	IISP*	User*	Up	Up	NoContact	
2.2.0	Down	Down	IISP*	User*	Up	Up	Collage 740	InterSwitch
2.3.0	Up	Up	IISP*	Net*	Up	Up	Collage 740	InterSwitch
2.4.0	Up	Down	UNI 3.0	Net	Down	Down	NoContact	

The vport show status command displays the information described in Table 7.4.

Table 7.4 Output from the vport show status command

Field	Description
Virtual Port Id	The virtual port. This is displayed in the format <slot>.<port>.<virtual port number>.
Admin State	The administrative state of the virtual port. If the state is UP then this virtual port is enabled. If the state is DOWN then this virtual port is disabled. This will occur when you disable the virtual port using the command-line interface or TrueView Collage 740 Manager.
Oper State	The operational state of the virtual port. If the state is UP then this virtual port is functional. If the state is DOWN then this virtual port is not functional. This could be due to a problem with ILMI or ILMI has been disabled due to a problem with the physical connection.
Stacktype	The type of signalling used. This can be UNI (IISP) 3.0 or UNI (IISP) 3.1.
User/Net	The signalling profile of the virtual port. This can be either “user” or “network”. For more information on which signalling profile should be used, refer to “ATM port configuration on the Collage 740” in Chapter 2 “Getting started”.

Table 7.4 Output from the vport show status command

Field	Description
Q.SAAL State	The state of the signalling data-link layer (SAAL).
Q.2931 State	The state of the signalling layer (Q.2931).
Remote Device	The remote device attached to the virtual port.
ILMI State	The ILMI state of the virtual port. For a list of the different ILMI states, see Table 7.1, "Output from the vport show command," earlier in this chapter.

Displaying signalling information for a virtual port

To display signalling information for a virtual port, enter the vport sig stats command.

Command: C740:/>vport sig stats <vport id> [all]

Example: vport sig stats 2.3.0

Parameters:

<vport id>	The virtual port identifier in the form <slot>.<port>.<virtual port number>.
[all]	Displays all protocol statistics for the virtual port (see Table 7.5 and Table 7.6). If all is omitted, only high-level statistics are displayed (see Table 7.5).

The vport sig stats command displays the high-level statistics described in Table 7.5.

Table 7.5 High-level statistical output from the vport sig stats command

Field	Description
Statistics Info.	The number of times signalling has been started and stopped on the virtual port.
Stack up count	The number of times signalling has come up since it was last started on the virtual port.

Table 7.5 High-level statistical output from the vport sig stats command

Field	Description
Stack down count	The number of times signalling has gone down since it was last started on the virtual port.
Number of restarts	The number of times signalling has been restarted since it was last started on the virtual port.
Q.SAAL up count	The number of times Q.SAAL (data link protocol) has established a link to its peer since it was last started on the virtual port.
Q.SAAL down count	The number of times Q.SAAL (data link protocol) has lost the connection to its peer since it was last started on the virtual port.
Q93B statistics Messages	Lists all the signalling protocol (Q93B) messages that have been transmitted and received on the virtual port.
TOTAL	The total number of signalling protocol (Q93B) messages that have been transmitted and received on the virtual port.
Total connections	The total number of connections that have been established on the virtual port since signalling was started.
Active connections	The number of currently active connections on the virtual port. If the port is down, the number of connections that were on the virtual port before it went down is displayed. When the port comes up, this counter will be cleared.

Table 7.5 High-level statistical output from the vport sig stats command

Field	Description
Last transmitted cause	The “cause” code sent in the last transmitted call clearing message on the virtual port.
Last transmitted diagnostic	The first byte of the diagnostics string sent in the call clearing message that was last transmitted on the virtual port.
Last received cause	The “cause” code from the call clearing message that was last received on the virtual port.
Last received diagnostic	The first byte of the diagnostics string from the call clearing message that was last received on the virtual port.

If you specify the all parameter, the vport sig stats command displays the additional statistics described in Table 7.6.

Table 7.6 Additional low-level output from the vport sig stats command

Field	Description
Q.SAAL statistics PDUs	The messages that have been transmitted and received on the virtual port using the signalling data transfer protocol (Q.SAAL). BAD Indicates an unrecognised message. BGN Requests the establishment of a data-link connection. BGAK Confirms the establishment of a data-link connection. BGREJ Rejects the establishment of a data-link connection. RS Indicates an error recovery. RSAK Confirms an error recovery. SD Indicates assured data. UD Indicates unassured data. MD Indicates management data. POLL Indicates a status request. STAT Indicates a status. END Terminates a data-link connection. ENDAK Acknowledges the termination of a data-link connection. USTAT Indicates an unsolicited status. ER Indicates an error recovery. This applies only for UNI 3.1. ERAK Confirms an error recovery. This applies only for UNI 3.1. SDP Indicates a combined poll and assured data frame. This applies only for UNI 3.0.

Table 7.6 Additional low-level output from the vport sig stats command

Field	Description
Real retransmission rate	The approximate re-transmission rate of assured data frames to the peer entity.
Q.SAAL error statistics	If any Q.SAAL protocol errors have been detected on the link, counts of them will be displayed here in the appropriate ITU-T standard. For more information, refer to Appendix 1 of the ATM Forum Q.SAAL1 specification (for UNI 3.0) and Appendix 1 of the ATM Forum Q.2210 specification (for UNI 3.1).
Q.SAAL up count	The number of times Q.SAAL (data link protocol) has established a link to its peer since it was last started on the virtual port.
Q.SAAL down count	The number of times Q.SAAL (data link protocol) has lost connectivity to its peer since it was last started on the virtual port.

Listing all virtual circuits

To list the details of all virtual circuits, enter the vport connections all command.

Command: C740:/>vport connections all

The vport connections all command displays all SVCs, PVCs, and internal virtual circuits such as ILMI signalling that are set up on the Collage 740. Information displayed in the output is described in Table 7.7.

Listing switched virtual circuits

To list the details of all SVCs, enter the vport connections svc command.

Command: C740:/>vport connections svc [<vport id>]

Example: C740:/>vport connections svc 2.1.0

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>. If you do not enter a virtual port then SVCs for all ports will be displayed.

The vport connections svc command displays the information described in Table 7.7.

Listing permanent virtual circuits

To list the details of all PVCs, enter the vport connections pvc command.

Command: C740:/>vport connections pvc [<vport id>]

Example: C740:/>vport connections pvc 2.1.0

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>. If you do not enter a virtual port then PVCs for all ports will be displayed.

Note: When the above command is used only PVCs that are enabled will be listed.

The vport connections pvc command displays the information described in Table 7.7.

Table 7.7 Output from the vport connections command

Field	Description
SLOT.PORT.VPI.VCI	The physical port, VPI, and VCI that are assigned to the connection. For a PVC, this is the Virtual Circuit Link (VCL).
rXcount	The number of cells received on this connection.

Table 7.7 Output from the vport connections command

Field	Description
tXcount	The number of cells transmitted on this connection.
PD	Indicates whether or not packet discard is enabled. OFF indicates that it is not enabled.
SCAT	The service category that is used for the virtual circuit.
Up Time	Indicates how long the virtual circuit has been active in days, hours, minutes, seconds, and hundredths of a second.
Type	The type of connection. PP : Point-to-Point SVC. PMP : Point-to-Multipoint SVC. PVC:PP : Point-to-Point PVC. RES : Reserved circuit. LANE_DD_TR : LANE Data Direct Token-Ring VC LANE_DD_ET : LANE Data Direct Ethernet VC LANE_MC_TR : LANE Multicast Token-Ring VC LANE_MC_ET : LANE Multicast Ethernet VC CTRL : LANE configure VC DIAG : Diagnostic ILMI : ILMI.

Viewing ILMI information for a virtual port

To display ILMI MIB information for the remote end of a virtual port, use the ilmi show command.

Command: C740:/>ilmi show [<vport id>]

Parameters:

<vport id>	The virtual port in the form <slot>.<port>.<virtual port number>. If no virtual port id is entered then ILMI information is displayed for all virtual ports.

The ilmi show command displays the information described in Table 7.8.

Table 7.8 Output from the ILMI show command for a specific virtual port

Field	Description
UNI Version	The version of UNI that the remote device uses for signalling.
UNI Type	The UNI type that is used. This is either Private or Public.
IP address	The IP address of the remote device attached to the virtual port.
OSI NSAP address	The Open Systems Interconnection (OSI) Network Service Access Point (NSAP) address. An OSI NSAP address is an address to which a management station can send network management protocol messages to access network management information about the operation of the ATM device local to this UNI Management Entity (UME).

Table 7.8 Output from the ILMI show command for a specific virtual port

Field	Description
IfName	The textual name of this interface.
MaxVpiBits	The maximum VPI bits. This, together with the MaxVpc, determines the limits of the VPI range that can be supported.
MaxVciBits	The maximum VCI bits. This, together with the MaxVcc, determines the limits of the signalling VCI range that can be supported.
MaxVpc	The maximum Virtual Path Connections (VPCs) that the remote device can support.
MaxVcc	The maximum Virtual Circuit Connections (VCCs) that the remote device can support.
SysObjectId	The value for the SysObjectId in RFC 1213 MIB.
SysUpTime	The number of days, hours, minutes, and seconds that the remote device has been on-line.
SysName	The administratively-assigned name for this node.

Note: The above information, except for the SysUpTime, is only retrieved when ILMI comes up on the link and therefore, it will not be “current”. This is only a problem when the ILMI MIB information is changed for the remote device.

Managing option cards using the command-line interface

This chapter describes how to use the command-line interface to manage option cards installed in a Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface” .

Managing option cards

This section describes the commands that allow you to manage the option cards installed in the Collage 740.

Viewing the status of option cards

To display the current status of the option cards installed in the Collage 740, use the hardware linecard show command.

Command: C740:/>hardware linecard show

The hardware linecard show command output is described in Table 8.1.

Table 8.1 Output from the hardware linecard show command

Field	Description
Slot Number	The slot number where a card can be installed in a Collage 740. Slot 0 indicates to the CPU card in the Collage 740. Slot 1 to 5 indicates to the option card slots in the Collage 740. Slot 6 indicates to the Switch Fabric card in the Collage 740. For the location of the slots in a Collage 740, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).
Slot Data	The slot data will either indicate that the option slot is empty or will display the name of the card that is installed in the option slot. For an installed option card the following information is displayed: the name of the card, the number of ports on the card, the speed of each port, the type of port connectors, the type of card, and the version number of the card. For an installed CPU card the following information is displayed: the name of the card, the type of card, and the version number of the card. For an installed Switch Fabric card the following information is displayed: the name of the card, the type of card, and the version number of the card.

Table 8.1 Output from the hardware linecard show command

Field	Description
Number of ports	The number of ports on the card that is installed in the Collage 740. For an installed CPU card the following information is displayed: the CPU port number, the physical port number within the switch, the speed of the CPU port, the type of port connectors (this is none, since there is no external connection to the CPU port), and the status of the CPU port. There are no ports in a Switch Fabric card.
Port Data	Data information for each port in an installed option card. The following information is displayed: the port number, the speed of each port, the type of port connectors, and the status of the port.

Shutting down an option card

Before removing an option card from the Collage 740, you must ensure that all connections, through the card, have been disconnected.

Once all connections have been disconnected, you will need to shut down the option card. This will delete the port data structures for the option card.

Note: If any connections are still active when this shutdown command is used then these will now be forced to break, causing network errors.

To shut down an option card, use the hardware linecard shutdown command.

Command:	C740:/>hardware linecard shutdown <slot>	
Example:	C740:/>hardware linecard shutdown 4	
Parameters:	<slot>	The slot number of the option card that is to be shut down.

Note: Before 'Hot Swapping' option cards in the Collage 740, you must shut down the option card. For information on how to install option cards, refer to the *Collage 740 Option Card Installation Guide* (part number: 100-244).

Restarting an installed option card

If by mistake you have shut down an option card and the option card has not been removed from the slot in the Collage 740 then use the hardware linecard restart command to restart the option card.

Command:	C740:/>hardware linecard restart <slot>	
Example:	C740:/>hardware linecard restart 4	
Parameters:	<slot>	The slot number of the option card that is to be restarted.

Note: If you have installed a new option card, do not use the hardware linecard restart command as the option card will automatically be initialized by the Collage 740.

Managing packet discard thresholds for an option card

There are two packet discard thresholds for each option card, called Early Packet Discard (EPD), and Partial Packet Discard (PPD). By default, both thresholds have a set limit (see below) and are enabled.

The Collage 740 uses EPD to discard entire AAL5 frames for ABR and UBR traffic (rather than random cells from different frames), when it determines that it is about to become congested. The Collage 740 still passes through the last cell of each AAL5 frame so that end-stations are aware of the discard that has taken place. You can configure a threshold at which the EPD will be invoked. The threshold is a percentage of the overall shared buffer space. The default for EPD is set at 80% of the buffer fill.

PPD works similarly to EPD, but it is generally invoked at higher levels of congestion. The difference is that, while with EPD the Collage 740 can wait for the start of a suitable frame, PPD is involved when congestion is too serious to wait that long. Therefore, packet discarding will start in the middle of the frame. The default for PPD is set at 90% of the buffer fill.

The default for PPD is higher than the default for EPD. Under normal circumstances, EPD would deal with the congestion before the 90% buffer capacity is reached, and PPD should never be invoked.

Note: Under normal circumstances, the packet discard thresholds should not be changed. Before attempting to change the thresholds, contact Madge Technical Support.

Displaying the packet discard threshold for option cards

To display the current packet discard thresholds for all option cards, use the hardware linecard packetdiscard command.

Command: C740:/>hardware linecard packetdiscard

Output:

```
Slot    EPD    PPD
 2      80%    90%
```

The hardware linecard packetdiscard command displays the information described in Table 8.2.

Table 8.2 Output from the hardware linecard packetdiscard command

Field	Description
Slot	The slot number of the option card.
EPD	The percentage threshold that is currently set for Early Packet Discard (EPD). The default EPD threshold is 80%. When the switch's buffers are more full than the EPD threshold then the switch module will discard NEW AAL5 frames on UBR circuits.
PPD	The percentage threshold that is currently set for Partial Packet Discard (PPD). The default PPD threshold is 90%. When the switch's buffers are more full than the PPD threshold then the switch module will truncate the AAL5 frames on UBR circuits, by discarding cells randomly within the AAL5 frame.

Changing the packet discard thresholds for option cards

You can change the default thresholds for packet discard.

- Decreasing the percentage will cause packets to be discarded at an earlier stage during congestion.
- Increasing the percentage will cause the congestion to reach a higher level before the packet discard threshold is reached and packets are discarded.

Note: Under normal circumstances, the packet discard thresholds should not be changed. Before attempting to change the thresholds, contact Madge Technical Support.

To change the packet discard thresholds for an option card, use the hardware linecard packetdiscard command.

Command: C740:/>hardware linecard packetdiscard <slot> <epd%> <ppd%>

Example: C740:/>hardware linecard packetdiscard 2 70 80

Parameters:

<slot>	The option card slot.
<epd%>	The new percentage threshold for EPD.
<ppd%>	The new percentage threshold for PPD.

Displaying threshold levels for option cards

To display the thresholds levels for an option card, use the hardware linecard threshold show command. For CBR/VBR traffic, by default the Collage 740 will ignore the CLP bit..

Command: C740:/>hardware linecard threshold show

Output:
```
CBR:50%     DISABLED
VBR:50%     DISABLED
```

Enabling threshold levels for option cards

If you enable the threshold levels, cells with the CLP bit set for CBR/VBR traffic will be discarded, if the traffic level in the switch fabric reaches 50% capacity.

To enable the thresholds levels for an option card, use the hardware linecard threshold enable command.

Command: C740:/>hardware linecard threshold enable

Output:
```
CBR:50%     ENABLED
VBR:50%     ENABLED
```

Disabling threshold levels for option cards

If you disable the threshold levels, the Collage 740 ignores the CLP bit for CBR/VBR traffic.

To disable the thresholds levels for an option card, use the hardware linecard threshold disable command.

Command: C740:/>hardware linecard threshold disable

Output:
```
CBR:50%     ENABLED
VBR:50%     ENABLED
```

Managing the routing table using the command-line interface

This chapter describes how use the command-line interface to manage the routing table in a Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface”.

Setting up routing entries

This chapter describes the commands that allow you to configure the routing table in the Collage 740. For information about setting up routing entries for an attached device in the Collage 740, see “Setting up an IISP routing table” in Chapter 2 “Getting started”.

Adding a new routing entry to the routing table

To add a new routing entry to the routing table, enter either the 19-byte hexadecimal address, or a truncated address, followed by one or more virtual ports. A 19-byte ATM address is composed by combining the switch network prefix with the End-Station Identifier (ESI) of the attached device. You can also specify a default route by entering “default” in place of the address; this route will be used when no other route is available.

Note: It is recommended that the use of default routes is avoided whenever possible to reduce the likelihood of routing loops. For more information about routing loops, see “Routing loops” in Appendix C “Routing and signalling concepts”.

To add a new routing entry to the routing table, use the route add command.

Command: C740:/>route add <address> <outport> [<outport>...]

Examples:
route add 39.00.00.00.00.00.00.00.01.f6.e0.00.21.11.31.6f.00.28.01 2.1.0
route add 39.00.00.00.00.00.00.00.01.f6.e0.00.22 2.2.0 2.2.3
route add 39.00 2.4.0
route add default 2.4.0

Parameters:

<address>	This can be a 19-byte hexadecimal address or a truncated address. To add a default route type the word "default".
<outport>	A virtual port that will be used to route to the specified ATM address.

Note: All ATM addresses that are entered in the routing table must begin with the AFI that is supported by the switch. The current AFIs supported by a Collage 740 are 39, 47, and 45. For more information about these AFIs, see "Viewing or changing the switch prefix" in Chapter 5 "Managing miscellaneous commands using the command-line interface".

Once routes have been added, you can view them using the route show command. For more information about displaying the routes in a routing table, see "Listing the routing entries in a routing table" later in this chapter.

Deleting a routing entry from the routing table

When you delete a routing entry that is currently being used for an established connection, this connection will not be affected.

To delete a route from the routing table, use the route delete command.

Command: C740:/>route delete <address> <outport> [<outport>...]

Examples:
route delete 39.00.00.00.00.00.00.00.01.f6.e0.00.21.11.31.6f.00.28.01 2.1.0
route delete default 2.4.0

Parameters:

<address>	This can be either the 19-byte hexadecimal address or a truncated address.
<outport>	A virtual port that was used to route to the specified ATM address.

Note: It is not recommended that you delete routes that were added dynamically by ILMI.

Note: Internal routes that have been added to the routing table by an entity that is internal to the switch (for example, by LANE services) cannot be deleted.

Listing the routing entries in a routing table

To list the entire routing table, including routes that have been disabled, use the route show command.

Command: C740:/>route show

Output:

Port	ATM prefix	Status	Origin
2.4.0	default	Up	Static
2.4.0	39	Up	Static
2.1.0	39.00.00.00.00.00.00.01.01.f6.e0.00.00.01.01.6f.00.28.01	Down	Static
2.3.0	39.00.00.00.00.00.00.01.01.f6.e0.00.00.01.01.6f.00.00.05	Up	ILMI
2.2.0	39.00.00.00.00.00.00.01.01.00.00.00.02	Up	Static
2.2.3	39.00.00.00.00.00.00.01.01.00.00.00.02	Down	Static
0.1.0	47.00.79.00.00.00.00.00.00.00.00.00.00.a0.3e.00.00.01	Up	Internal

The route show command displays the information described in Table 9.1.

Table 9.1 Output from the route show command

Field	Description
ATM Prefix	The full ATM address or a truncated ATM address.
Port	The virtual port to route through.
Status	The status of the entry. UP indicates that the route is functional. DOWN indicates that the route is non-functional. This could be because the port is down or disabled by the user.

Table 9.1 Output from the route show command

Field	Description
Origin	The origin of the routing entry. Static - The routing entry has been manually entered. ILMI - The routing entry has been learnt using ILMI. Such entries are added by Collage 740 for end-stations that are attached to it and are using the ILMI protocol. Internal - The routing entry was added by an entity that is internal to the switch (for example, by LANE services).

Managing the management LEC using the command-line interface

This chapter describes how to manage the management LEC in a Collage 740 and how to use the command-line interface to manage these components using the Collage 740. For information about how to access and use the command-line interface, see Chapter 4 “How to use the command-line interface”.

Collage 740 LANE services

The Collage 740 can host one LECS, one management LEC, and multiple combined LES and BUS. The Collage 740 LES can be disabled and does not have to reside in the same device as the LECS. For a list of all the Collage 740 default LANE services settings, see Appendix A “Default settings on a new Collage 740”.

For information on how to manage the LANE services in a Collage 740, refer to the *Collage 740 LAN Emulation Services User Guide* (part number: 100-289).

Note: It is recommended, if the Collage 740 LANE services are to be used, then the LECS, LES, and BUS reside in a Collage 740 that is running software release 1.1 or later.

Configuring the management LEC

The Collage 740 has one management LEC for managing the Collage 740. It supports several high-level protocols such as:

- Telnet for a command-line interface.
- UDP for SNMP management and TFTP software upgrades.
- BOOTP for obtaining Collage 740's IP address from a server.
- ICMP for PING inward and outward for IP network configuration diagnosis.

By default, the Collage 740 management LEC uses the Burnt-In Address (BIA) as its MAC address. This address can be overriden and a Locally Administered Address (LAA) can be assigned. The management LEC will register this address with the LAN Emulation Server (LES) that is hosting the Emulated LAN (ELAN) the LEC wishes to join.

The Collage 740 management LEC can be assigned to register with a Token-Ring or an Ethernet ELAN. By default, it is assigned to a Token-Ring ELAN.

Viewing information about the management LEC

To view information about the management LEC, enter the lane lec show command.

Command: C740:/>lane lec show

The lane lec information command displays the information described in Table 10.1.

Table 10.1 Output from the lane lec show command

Field	Description
BIA	The switch's BIA, which will be used as the management LEC's MAC address, if the LAA address is not set.
LAA	The LAA, which will be used as the management LEC's MAC address if set. If zeros are displayed, the management LEC will use the BIA.
ELAN name (actual)	The name of the ELAN that the management LEC is currently registered with.
ELAN name (configured)	The name of the ELAN that the management LEC will attempt to register with when it is restarted.
ELAN type (actual)	The type of ELAN that the management LEC is currently registered with.

Table 10.1 Output from the lane lec show command

Field	Description
LAN type (configured)	The type of ELAN that the management LEC will attempt to register with when the LEC is restarted.
LES address	The ATM address of the LES that is hosting the ELAN.
Maximum frame size (bytes)	The maximum frame size that the ELAN can support. The value is obtained from the LES.
Ring number	The ring number of the emulated Token-Ring ELAN. This applies only if the ELAN type is Token-Ring.

Managing the ELAN for the management LEC

You can select the ELAN that the management LEC will attempt to join. By default, the management LEC leaves this decision to the LECS.

You can:

- Specify the ELAN that the management LEC will attempt to join.
- Set up the LECS to dictate which ELAN the management LEC will attempt to join.
- View the current ELAN that the management LEC will attempt to join.

Note: Any changes caused by the following commands will not take effect until the Collage 740 management LEC is restarted. To restart the Collage 740 management LEC, use the lane lec restart command.

To specify the ELAN that the management LEC will attempt to join, enter the lane lec elan command:

Command: C740:/>lane lec elan <name>

Example: C740:/>lane lec elan Collage740ElanTrn

Parameters:

<name>	The name of the new ELAN that the management LEC will attempt to join. The ELAN must be somewhere on the network and known to the LECS.

To leave the decision about the ELAN that the management LEC joins, to the LECS, enter the lane lec elan command:

Command:	C740:/>lane lec elan -	
Example:	C740:/>lane lec elan -	
Parameters:	- (hypen)	The decision about which ELAN the management LEC will attempt join is left to the LECS.

To view the name of the ELAN that the management LEC will try to join, enter the lane lec elan command:

Command:	C740:/>lane lec elan
Output:	The management LEC will ask to join the default ELAN

Viewing or changing the ELAN type for the management LEC

You can view or change the type of ELAN that the management LEC will attempt to join. By default, the ELAN type is set to Token Ring in the Collage 740.

To view the ELAN type for the management LEC, enter the lane lec type command:

Command: C740:/>lane lec type

Output:
```
The Management LEC will join a Token Ring ELAN
The Management LEC is currently joined to a Token Ring ELAN
```

To change the ELAN type for the management LEC, enter the lane lec type command:

Command: C740:/>lane lec type <type>

Parameters:

<type>	This can be set to either “ethernet” or “token-ring”.

Note: The change caused by the above commands will not take effect until the Collage 740 management LEC is restarted. To restart the Collage 740 management LEC, use the lane lec restart command.

Managing a Locally Administered Address for the management LEC

If you have an ELAN that uses its own block of MAC addresses, you may want the management LEC's MAC address to conform to this scheme by assigning a Locally Administered Address (LAA). When no LAA is defined, the management LEC will use the Collage 740's BIA.

You can:

- View the currently assigned LAA for the management LEC.
- Set the LAA to cause the management LEC to use the BIA as its MAC address.
- Assign a specific LAA to the management LEC.

To view the current management LEC address, use the lane lec laa command.

Command: C740:/>lane lec laa

Output: The Management LEC will use the BIA

To force the management LEC to use the BIA, use the lane lec laa command.

Command: C740:/>lane lec laa [none | <laa>]

Examples: C740:/>lane lec laa none

Example: C740:/>lane lec laa 51.00.00.62.6A.3E

Parameters:

none	The management LEC will use the BIA.
<laa>	A MAC address in the format appropriate to the management LEC's ELAN type. A MAC address consists of 6 hexadecimal bytes. For a Token-Ring ELAN, the first byte is 4x, 5x, 6x, or 7x. For an Ethernet ELAN, the first byte is x2, x6, xA, or xE.

Note: The change caused by the above command will not take effect until the Collage 740 management LEC is restarted. To restart the Collage 740 management LEC, use the lane lec restart command.

Restarting the management LEC

This command is used after changing the management LEC configuration.

To restart the management LEC, use the lane lec restart command.

Command: C740:/>lane lec restart

Note: The above command may disrupt Telnet and SNMP management sessions.

Displaying the LANE-ARP cache

You can display the management LEC's LANE-ARP (Address Resolution Protocol) cache. This is a list of all other LECs in the ELAN that have sent specifically-addressed LAN frames to the management LEC, or that the management LEC has sent frames to. These frames include Telnet session control and data frames, SNMP requests and responses, and PING requests and responses.

There are two kinds of entries that are displayed in the LANE-ARP cache:

- MAC addresses, which are normally other nodes on the ELAN.
- Route Descriptors (RDs), which occur only in a source-routed Token Ring ELAN and show either destinations for frames that must cross a source-routing bridge, or a device that bridges from ATM to physical Token-Ring networks, for example, a Collage 540.

To view the LANE ARP cache, use the lane lec arpcache command.

Command: C740:/>lane lec arpcache

Output:
```
MAC addresses:
Destination  00.00.F6.E0.01.07
  ATM address  39.00.00.00.00.00.00.00.00.6F.07.80.E0.00.00.6F.07.80.E0.81
Route Descriptors:
Destination  1-001
  ATM address  39.00.00.00.00.00.00.00.00.6F.07.80.E0.00.00.6F.00.28.05.8B
Destination  1-618
  ATM address  39.00.00.00.00.00.00.00.00.6F.07.80.E0.00.00.6F.00.28.05.82
```

Viewing the management LEC statistics

To display statistics about the control and data planes of the management LEC, use the lane lec statistics command.

Command: C740:/>lane lec statistics

The control plane information for the lane lec statistics command is shown in Table 10.2.

Table 10.2 Output from the lane lec statistics command (control plane)

Field	Description
control packets	IN The number of ELAN control frames that this management LEC has received. OUT The number of ELAN control frames that this management LEC has sent. BAD The number of corrupted control frames that this management LEC has received.
arp requests	IN The number of LANE-ARP requests that this management LEC has received. OUT The number of LANE-ARP requests that this management LEC has sent to the LES.

Table 10.2 Output from the lane lec statistics command (control plane)

Field	Description
arp replies	IN The number of responses to LANE-ARP requests that this management LEC has received. OUT The number of LANE-ARP requests that this management LEC has responded to.
raw data	IN The total number of control bytes received. OUT The total number of control bytes sent.
SVCs	IN The number of incoming SVCs to the management LEC. OUT The number of outgoing SVCs from the management LEC. FAILURE OUT The number of outgoing SVCs that have failed to be set up.

The data plane information for the lane lec statistics command is shown in Table 10.3.

Table 10.3 Output from the lane lec statistics command (data plane)

Field	Description
unicasts	unicasts (in/out) The number of data frames sent to a single destination. multicasts (in/out) The number of data frames sent to a group MAC address. broadcasts (in/out) The number of data frames sent to all MAC addresses.
packets sent to BUS	The number of packets sent to the BUS by the management LEC.
BUS packets discarded	The number of packets sent to the BUS that have been discarded.
errors	IN The number of data frames discarded, for example, due to an unrecognised MAC address or an illegal data format. OUT The number of oversize data frames that have been discarded.
unknown protocols	The number of data frames received for unassigned Link Layer Control (LLC) protocols.
raw data (bytes)	IN The total number of data bytes received. OUT The total number of data bytes sent.

Managing SNMP security using command-line interface

This chapter describes how use the command-line interface to use SNMP Security to secure the Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface” .

Note: The Madgebox secure commands do not affect Telnet sessions access to a Collage 740. Telnet sessions use password security.

Madgebox secure commands

This section describes the Madgebox secure commands that enable you to enable or disable security on the switch and set up a list of Network Management Station (NMS) addresses on the Collage 740 as authorized managers and trap destinations stations.

An authorized manager is any NMS, that is listed in the Madge secure allowed table. If you enable Madge security then only authorized managers that have been specified in the security tables will be able to manage traps from the Collage 740.

There is a limit on the number of concurrent NMS’s that can manage a single Collage 740. If SNMP security is enabled then a maximum of 15 concurrent NMS’s can manage the Collage 740, otherwise up to 20 concurrent NMS’s can manage the switch.

Listing the status of the SNMP security

You can list all NMS's that are assigned access as authorized managers and trap destination stations. Also displayed are the NMS's that are currently accessing the Collage 740.

For each NMS in the table the following information is displayed; an index entry number for the NMS, the address type for the NMS, the IP address for the NMS and in hexadecimal format, and when the current NMS lasted accessed the Collage 740.

To display the all security information for the Collage 740, use the madgebox secure show command.

Command: C740:/>madgebox secure show

Output:

```
Secure mode is currently Disabled

Madge SNMP Security Information : currently active NMS's
-------------------------------------------------------------------------------
Index   Type   IP Address       Generic Address   Time Since Last Access (H:M:S)
1       IP     194.32.220.129   C2.20.DC.81       0:02:50
2       IP     194.32.220.26    C2.20.DC.1A       0:02:20

Secure mode is currently Disabled
No entries specified in Madge secure allowed table

Trap Destination mode is currently Enabled

Madge SNMP Trap Destinations
-----------------------------------------------
Index   Type   IP Address       Generic Address
1       IP     194.32.220.169   C2.20.DC.A9
```

Viewing or changing Madge secure current table row timeout

Timeout is the duration of time before the NMS's are removed from the secure tables. By default timeout is set to 300 seconds.

To display the timeout for security information, use the madgebox secure timeout command.

Command: C740:/>madgebox secure timeout [timeval]

Output: Current table row timeout is 300 seconds

Parameter timeval A timeout value in seconds.

Listing all current NMS's accessing the Collage 740

You can list all the NMS addresses that are currently communicating with the Collage 740.

For each NMS in the table the following information is displayed; an index entry number for the NMS, the address type for the NMS, the IP address for the NMS and in hexadecimal format, and when the current NMS lasted accessed the Collage 740.

Note: If SNMP security is enabled then a maximum of 15 concurrent NMS's can manage the Collage 740, otherwise upto 20 concurrent NMS's can manage the switch.

To display the current security information, use the madgebox secure current command.

Command: C740:/>madgebox secure current

Output:

```
Secure mode is currently Disabled

Madge SNMP Security Information : currently active NMS's
-------------------------------------------------------------------------------------------
Index     Type    IP Address          Time Since Last Access (H:M:S)

1         IP      194.32.220.129      0:02:50
2         IP      194.32.220.26       0:02:20
```

Disabling SNMP security on the Collage 740

To disable the security information, use the madgebox secure disable command.

Command: C740:/>madgebox secure disable

Note: This command takes immediate effect.

Enabling SNMP security on the Collage 740

Before enabling SNMP security, you should ensure that you have at least set up your NMS as an authorized managers in the Madge Allowed Secure Table, otherwise you will not be able to manage the Collage 740 via SNMP.

To enable the SNMP security information, use the madgebox secure enable command.

Command: C740:/>madgebox secure enable

Output: Warning : all entries in allowed table of type ‘unused’. SNMP access disabled.

Configuring authorized managers

This section describes how to view and set up a list of Network Management Station (NMS) addresses on the Collage 740 as authorized managers.

An authorized manager is any NMS that is listed in the Madgebox secure allowed table. The NMS will be able to access the Collage 740 by sending SNMP requests and receiving SNMP traps from the Collage 740.

If you enable Madge security then only authorized managers that have been specified in the security tables will be able to manage the Collage 740 using SNMP.

There is a limit on the number of concurrent NMS's that can manage a single Collage 740. If SNMP security is enabled then a maximum of 15 NMS's can manage the Collage 740, otherwise upto 20 NMS's can manage the switch.

Listing all authorized managers

You can list all NMS's that are set up as authorized managers in the Collage 740. For each NMS in the table the following information is displayed; an index entry number for the NMS, the address type for the NMS, the IP address for the NMS and in hexadecimal format.

To display a list of authorized managers, use the madgebox secure allowed show command.

Command: C740:/>madgebox secure allowed show

Output:
```
Secure mode is currently Disabled
No entries specified in Madge secure allowed table
```

Setting up an authorized manager entry

You can add upto 15 authorized managers into the Madge Allowed Secure Table. Only these authorized managers will be able to access this Collage 740.

To add an authorized manager entry, use the madgebox secure allowed entry command.

Command:	C740:/>madgebox secure allowed add index <ipaddress>	
Example:	C740:/>madgebox secure allowed add 3 IP 172.16.1.152	
Parameter:	No parameters entered	If no parameters are entered then the Madge Allowed Secure Table is displayed.
	index	The index number for the entry into the table. The index value must be an integer in the range 1 to 15.
	ipaddress	The IP address for the NMS that is the authorized manager.

Disabling the authorized managers table

To disable the SNMP secure mode, use the madgebox secure allowed disable command.

Command: C740:/>madgebox secure allowed disable

Note: This command takes immediate effect.

Enabling the authorized managers table

Before enabling SNMP security, you should ensure that you have at least set up your NMS as an authorized managers in the Madge Allowed Secure Table, otherwise you will not be able to manage the Collage 740 via SNMP.

To enable the SNMP secure mode, use the madgebox secure allowed enable command.

Command: C740:/>madgebox secure allowed enable

Output:
```
Warning : all entries in allowed table of type 'unused'. SNMP access
disabled.
SNMP secure mode enabled.
```

Configuring trap destinations

This section describes how to view and set up a list of Network Management Station (NMS) addresses on the Collage 740 as trap destination stations.

Enabling trap destination mode

When enabling SNMP trap destination mode, only NMSs that are listed in the Madge SNMP Trap Destination Table will be sent SNMP traps from the Collage 740.

To enable the trap destination mode, use the madgebox secure trapdest enable command.

Command: C740:/>madgebox secure trapdest enable

Output: SNMP Trap Destination mode enabled.

Disabling trap destination mode

You disable trap destination mode, all stations which have been in contact with the Collage 740 using SNMP (that is those NMS listed in the “current” table) will receive traps from the Collage 740.

To disable the trap destination mode, use the madgebox secure trapdest disable command.

Command: C740:/>madgebox secure trapdest disable

Note: This command takes immediate effect.

Listing the trap destination stations

You can list all NMS's that are set up as trap destination stations for this Collage 740.

For each NMS in the table the following information is displayed; an index entry number for the NMS, the address type for the NMS, the IP address for the NMS and in hexadecimal format.

Note: If SNMP security is enabled then a maximum of 15 concurrent NMS's can manage the Collage 740, otherwise upto 20 concurrent NMS's can manage the switch.

To display the trap destination NMS's, use the madgebox secure trapdest show command.

Command: C740:/>madgebox secure trapdest show

Output:

```
Trap Destination mode is currently Enabled

Madge SNMP Trap Destinations
-----------------------------------------------------
Index    Type    IP Address        Generic Address
1        IP      194.32.220.169    C2.20.DC.A9
```

Setting up a trap destination station

You can add up to 15 trap destination stations to the Madge SNMP Trap Destination Table. Only these trap destination stations will receive SNMP traps from this Collage 740.

To set up a trap destination station entry, use the madgebox secure trapdest add command.

Command:	C740:/>madgebox secure trapdest add index <ipaddress>	
Example:	C740:/>madgebox secure trapdest add 1 IP 194.32.220.169	
Parameter:	No parameter entered	If no parameters are entered then the Madge SNMP Trap Destination Table is displayed.
	index	The index number for the NMS that is to receive the trap destination. The index value must be an integer in the range 1 to 15.
	ipaddress	The IP address for the NMS that is to receive the trap destination.

Deleting a trap destination station

To delete a trap destination station from the Madge SNMP Trap Destination Table, use the madgebox secure trapdest delete command.

Command: C740:/>madgebox secure trapdest delete index

Example: C740:/>madgebox secure trapdest delete 1

Parameter:		
	index	The index number for the NMS that received the trap destination. The index value must be an integer in the range 1 to 15.

Managing system commands using the command-line interface

This chapter describes how use the command-line interface to manage system and terminal commands. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface”.

Using system commands

This section describes system commands that are used to monitor or perform operations on the Collage 740.

Viewing a list of fatal system exceptions

A fatal system exception occurs when the Central Processing Unit (CPU) detects an error such as a division by zero or accesses to non-existent memory. A fatal exception causes the Collage 740 to reboot. A breakpoint is a special type of exception which is invoked by the Collage 740 software, when it detects an internal inconsistency.

To dump a list of fatal system exceptions, use the system breaklog command.

Command: C740:/>system breaklog

Output:

```
Filename          :lmaux.c
Line No           :553
pml_time          :1234
Abs_time          :Unknown
Stablised Count   :0
Reason            :0000b024
epc               :c005dce4
badva             :c8681734
```

Note: The breaklog provides vital information for diagnosing why the Collage 740 has crashed. This information needs to be reported to Madge Technical Support.

Clearing the list of fatal system exceptions

To clear the list of fatal system exceptions, use the system breaklog clear command.

Command: C740:/>system breaklog clear

Rebooting the Collage 740

It is highly recommended that you use the system reboot command to reboot the Collage 740 instead of the reset button. This is because the system reboot command first flushes any outstanding configuration updates to the non-volatile memory, whereas pressing the reset but may cause configuration information to be lost.

To reboot the switch, use the system reboot command. You will be prompted to confirm the operation.

Command: C740:/>system reboot

Note: When the Collage 740 is rebooted, all connections will be lost.

Note: If the reset button is used to reset the switch, configuration information may be lost.

Viewing time received from the time server

A time server is a server that provide the date and time, as specified by RFC 1129, such as a UNIX machine running 'timed' to the Collage 740. For information about setting up a time server, see "Viewing or changing the IP time server address" in Chapter 5 "Managing miscellaneous commands using the command-line interface".

To view the current time received from the time server, use the system time command.

Command: C740:/>system time

Output: The time is 14:28:04 14 Aug 1996 GMT

Viewing the current Collage 740 memory allocation

You can view the current breakdown of memory allocation on the Collage 740. The total amount of memory is equal to the amount of RAM memory you have in the Collage 740.

By default a Collage 740 has 8Mbytes of RAM memory. You can increase this amount to 40Mbytes, adding two 16Mbytes SIMM chips. For more information about adding SIMM chips to a Collage 740, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).

To display the current Collage 740 memory allocation, use the system memory command.

Command: C740:/>system memory

Output:
```
Free memory:   4026 Kbytes
Used memory:   2318 Kbytes
```

Controlled shutdown of the Collage 740

This command is used for a controlled shutdown of the Collage 740, any connections that still remain on the switch will be lost. A warning to this effect is displayed and confirmation is requested to power down the switch.

To stop the switch in preparation for a power down, use the system halt command.

Command: C740:/>system halt

Output: This will stop the switch, losing all connections - do you want to continue (y/n)?

Using SNMP commands

These commands allow you to access all the MIBs supported by the Collage 740.

Viewing the system group information

To display the information for the system group (sys), use the snmp show command.

Command: C740:/>snmp show

Output:

```
SNMP System Group Information
SysDescr    : Madge Collage 740 ATM Switch, Software Version 1.0.0

SysObjectID : 1.3.6.1.4.1.494.7.1

SysContact  : System Administrator

SysName     : public

SysLocation : No location specified

SysUpTime (HH:MM:SS) : 23:23:05
```

Note: For more information about the system group, refer to MIB II documentation in RFC 1213.

Using terminal commands

These commands allow you to configure how the Collage 740 displays output on the terminal.

Viewing the pager status

The pager is a facility that enables you to view the information that the Collage 740 outputs to the screen a number of lines at a time. By default, the pager is enabled.

To display the pager status, use the terminal pager command.

Command: C740:/>terminal pager

Output: pager is enabled

Enabling the pager

If the pager is enabled, the Collage 740 displays output on the terminal screen a number of lines at a time. To enable the pager, use the terminal pager enable command.

Command: C740:/>terminal pager enable

Output: pager enabled

Disabling the pager

If the pager is disabled, the Collage 740 displays output on the terminal screen continuously. To disable the pager, use the terminal pager disable command.

Command: C740:/>terminal pager disable

Output: pager disabled

Viewing the number of lines

If the pager is enabled, this is the number of lines that the Collage 740 will output before pausing. For more information about the pager, see "Viewing the prompt" later in this chapter.
By default, the terminal lines is set to 24.

To display the current number of lines, use the terminal lines command.

Command: C740:/>terminal lines

Output: lines: 24

Setting the number of lines

To set the number of lines, use the terminal lines command.

Command: C740:/>terminal lines <rows>

Example: C740:/>terminal lines 48

Parameter: <rows> The number of lines to be displayed on the terminal.

Viewing the terminal width

By default, the terminal width is set to 79.

To display the current terminal width, use the terminal width command.

Command: C740:/>terminal width

Output: terminal width 79

Setting the terminal width

To set the terminal width, use the terminal width command.

Command: C740:/>terminal width <columns>

Example: C740:/>terminal width 90

Parameter: <columns> The number of columns to be displayed on the terminal.

Viewing the linewrap status

To display the linewrap status, use the terminal linewrap command.

Command: C740:/>terminal linewrap

Output: no linewrapping

Setting the linewrap

To set the linewrap, use the terminal linewrap command.

Command: C740:/>terminal linewrap {none | pager | terminal}

Example: C740:/>terminal linewrap pager

Parameter:

none	The line wrapping is carried out by the terminal. The Collage 740 will not try to calculate how many lines have actually been used on the terminal. In fact, it will assume that no wrapping has occurred when performing pager functions.
pager	When the line output by the Collage 740 reach the defined terminal length, the Collage 740 will insert a line break and assume that no line wrapping is carried out by the terminal.
terminal	The line wrapping is carried out by the terminal. The Collage 740 will keep a record of the number of lines (using the terminal width).

Viewing the prompt

To display the current system prompt, use the terminal prompt command.

Command: C740:/>terminal prompt

Output: prompt is “C740”

Changing the prompt

To change the system prompt, use the terminal prompt command.

Example: C740:/>terminal prompt Collage_740

Output: Collage_740:/>

Managing events using the command-line interface

This chapter describes how to use the command-line interface to set and display event priority levels that occur on a Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface” .

Assigning an event priority level

All events in the Collage 740 are assigned a priority level between 1 and 16, in order of severity. Examples of priority levels:

- Priority 1 is assigned to low priority events, such as existing a Telnet connection.
- Priority 8 is assigned to informational events such as LANE services.
- Priority 15 is assigned to fatal events that do not causes the Collage 740 to reboot.
- Priority 16 is assigned to fatal events that causes the Collage 740 to reboot.

Note: The event log is a temporary file and will not be saved, when the Collage 740 is restarted.

Displaying or setting the event logging priority level

All events in the Collage 740 are assigned a priority level between 1 and 16, in order of severity. For examples of priority levels, see "Assigning an event priority level" earlier in this chapter.

You can specify a priority level for events that will be logged. Once you have assigned a priority level, all events assigned with this priority or higher that occur will be logged in the event log file. By default all events on the Collage 740 are logged.

To display the event logging priority level, use the event log command.

Command: C740:/>event log

Output: All events are being logged.

If you change the event priority, this will not affect the existing contents of the event log.

To set the event logging priority level, use the event log command.

Command: C740:/>event log [<number> | all | none]

Parameters:		
	<number>	An event priority level is assigned, where events with the same priority or higher will be logged.
	all	All events will be logged. This can cause the event log to fill up quickly.
	none	No events will be logged.

Displaying or setting the event reporting priority level

You can report events to all attached reporting consoles. A reporting console is a Telnet session attached to TCP port 1047. All events in the Collage 740 are assigned a priority level between 1 and 16, in order of severity. For examples of priority levels, see "Assigning an event priority level" earlier in this chapter.

You can specify a priority level for events that will be reported. Once you have assigned a priority level, all events assigned with this priority, or higher that occur will be reported on all attached reporting consoles. By default all events on the Collage 740 are reported.

To display the event reporting priority level, use the event reporting command.

Command: C740:/>event reporting

Output: All events are being reported.

To set the event reporting level, use the event reporting command.

Command: C740:/>event reporting [<number> | all | none]

Parameters:

<number>	An event priority level is assigned, where events with the same priority or higher will be reported on attached reporting consoles.
all	All events will be reported on attached reporting consoles.
none	No events will be reported on attached reporting consoles.

Displaying or setting the event trap priority level

When an event occurs the switch will dispatch a trap, via SNMP, to all attached SNMP network management stations. All events in the Collage 740 are assigned a priority level between 1 and 16, in order of severity. For examples of priority levels, see "Assigning an event priority level" earlier in this chapter.

You can specify a priority level for event traps that will be dispatched. Once you have assigned a priority level, all event traps assigned with this priority, or higher, that occur on the switch will be reported. By default, all events on the Collage 740 are dispatched as traps.

To display the event trap priority level, use the event trap command.

Command: C740:/>event trap

Output: All events are being dispatched as traps.

To set the event trap priority level, use the event trap command.

Command: C740:/>event trap [<number> | all | none]

Parameters:		
	<number>	An event priority level is assigned, where events with the same priority or higher will be dispatched via SNMP traps.
	all	All events will be dispatched via SNMP traps.
	none	No events will be dispatched via SNMP traps.

Displaying logged events

You can list the last 100 event messages that have been logged on the Collage 740. The latest event that has occurred is displayed first. If less than 100 messages have been logged, then only the messages that have been logged will be displayed.

Note: This event log will not be saved, when the Collage 740 is restarted.

To display any logged events, use the event show command.

Command: C740:/>event show

Output:

```
09:13:53 04 Jun 1996 GMT TELNET:console Connection accepted
09:13:53 04 Jun 1996 GMT TELNET:console Connection opened from 194.32.220.154
17:16:03 03 Jun 1996 GMT TELNET:console Connection from 194.32.220.154 closed
09:09:25 03 Jun 1996 GMT TELNET:console Connection accepted
09:09:25 03 Jun 1996 GMT TELNET:console Connection opened from 194.32.220.154
17:07:18 31 May 1996 GMT TELNET:console Connection from 194.32.220.154 closed
16:35:21 31 May 1996 GMT LES:suraya ELAN activated
11:52:10 31 May 1996 GMT TELNET:console Connection accepted
11:52:10 31 May 1996 GMT TELNET:console Connection opened from 194.32.220.154
00:00:14 01 Jan 1970 GMT LEC:holly joined ELAN sucessfully
00:00:11 01 Jan 1970 GMT LEC:holly failed to connect to LECS
00:00:00 01 Jan 1970 GMT LECS activated
```

Upgrading Collage 740 software

This chapter describes how use the command-line interface to upgrade the software on a Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface”.

Managing Collage 740 software

The Collage 740 is designed as a software-upgradable product. Therefore, you can expand the functionality of the switch by downloading new microcode.

The Collage 740 has two flash memory banks that contain the run-time software. To find out whether you are running the latest software release, you can view the release of the software in the flash memory banks. This chapter explains how to manage the run-time software that is held in flash memory, and how to download microcode to the Collage 740.

Note: To upgrade the software, the Collage 740 does not need to be powered down. However, if you do power down the Collage 740, remember to use the system halt command before powering down.

Viewing software version information

To obtain software version information, use the version command.

Command: C740:/>version

Output:

```
Build Version:   1.1.0
Build Time:      Tue Mar 1 13:06:29 GMT 1996
Built By:        release
Build Directory: /release/collage740
Build Host:      builder
```

Downloading microcode

The Collage 740 supports the following methods to download software:

- TFTP (Trivial File Transfer Protocol)
- XMODEM

Downloading over TFTP

In order to download over TFTP, the remote file server must be part of, or accessible from the ELAN to which the management LEC in the Collage 740 belongs. To verify this you should attempt to PING the Collage 740 from the file server or vice versa.

To download a software image over TFTP, use the download tftp command.

Command: C740:/>download tftp <ip_address> <filename>

Example: C740:/>download tftp 194.31.222.23 collage740_2.0

Parameters:

<ip_address>	The IP address of the remote TFTP server.
<filename>	The full name of the file on the TFTP server. If the file is contained in a sub-directory, the complete path and filename must be supplied.

Downloading over XMODEM

The following sequence shows you how to download a software image over XMODEM.

1 Connect the serial cable to serial interface port that will download the software image over XMODEM. For more information about the default settings and pin-out of the serial port, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).

2 Enter the download xmodem command:

Command:	C740:/>download xmodem <port> <baud_rate>	
Example:	C740:/>download xmodem B 9600	
Parameters:	<port>	Enter valid port. This can be either A (upper serial interface port) or B (lower serial interface port). The default port is B.
	<baud_rate>	The default baud rate is 9600. The higher rate is not recommended but can be set to 38400.

After you press ENTER, the Collage 740 will wait for data on the selected serial interface port.

3 Start the transmission on the serial link.

Note: Set up of new calls has priority over the XMODEM download, so on a busy network it may be necessary to disconnect the Collage 740 from the network in order to achieve a successful download.

Managing the flash filing system

The following commands enable you to manage the flash memory bank.

Viewing the contents of the flash memory bank

You can view all files that are held in flash memory. For each file in the directory the following information is displayed:

- The type of file.
- The size of each file in bytes.
- The name of the file is displayed.
- The default boot loader image file is distinguished with a "+" (plus) sign, next to the file type.
- The default main image is distinguished with an "*" (asterisk), next to the file type.
- Any main image file that is compressed, is indicated with the letter "C".
- Any main image file that is uncompressed, is indicated with the letter "U".
- Also displayed are comments attached to files.

To display a listing of the flash memory bank, use the flash directory command.

Command: C740:/>flash directory

Output:

```
Flash Filing System contains 5files
BOOT+          343557   boot_loader.1.1.1
BOOT           376442   boot_loader.1.1.2
MAIN* (C)      494710   collage740.1.1.1
TEXT             5516   config.data          Configuration data - do not delete
MAIN  (U)     1598440   collage740.1.0.11
MAIN* (C)      494710   collage740.1.2.0
```

Viewing the default boot image

The default boot image is the software image that will be run when the Collage 740 boots up.

To display the default boot image, use the flash default command.

Command: C740:/>flash default

Output: The current default boot image is "collage740.1.1.1".

Changing the main boot image

To change the main boot image that the Collage 740 will next run, use the flash default command.

Command: C740:/>flash default <filename>

Example C740:/>flash default collage740.1.2.0

Parameters: <filename> The name of the image that the Collage 740 will next run.

Note: This command checks the integrity of the selected image therefore it may take a few seconds for the cursor to return.

Changing the default boot loader image

To change the default boot loader image that the Collage 740 will load, use the flash loader command.

Command:	C740:/>flash loader <filename>	
Example	C740:/>flash loader boot_loader.1.1.2	
Parameters:	<filename>	The name of the default boot loader image that the Collage 740 load.

Note: This command checks the integrity of the selected image therefore it may take a few seconds for the cursor to return.

Deleting a file from the flash memory bank

To delete a file from the flash memory bank, use the flash delete command. You will be asked to confirm the deletion.

Command: C740:/>flash delete <filename>

Example C740:/>flash delete collage740.1.0.11

Parameters:

<filename>	The name of the file you wish to delete from the flash directory.

Note: Once a file is deleted it cannot be recovered. The file must be downloaded again. You must not delete the *config.data* file without consulting Madge Technical Support.

Renaming a file in the flash memory bank

To rename a file in the flash memory bank, use the flash rename command.

Command: C740:/>flash rename <old_name> <new_name>

Example C740:/>flash rename collage740.1.0.11 fieldrelease

Parameters:

<old_name>	The current name of the flash file.
<new_name>	The new name you wish to assign to the file.

Managing PVC connections using the command-line interface

This chapter describes how use the command-line interface to manage PVC connections in a Collage 740. For information about how to access and use the Collage 740 command-line interface, see Chapter 4 “How to use the command-line interface” .

Managing PVC connections

Not all ATM equipment currently supports the UNI 3.0 or UNI 3.1 signalling protocols. Therefore, you may need to manually establish a virtual circuit to make a connection between two ATM endpoints over an ATM network. These connections are referred to as Permanent Virtual Circuits (PVCs).

A PVC is a concatention of Virtual Circuit Links (VCLs), where each VCL is bi-directional. Figure 15.1 illustrates the terms VCL and PVC.

Figure 15.1 A breakdown of a PVC connection

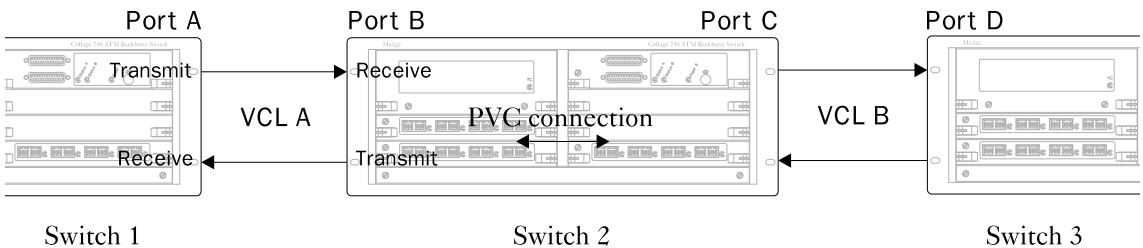


Figure 15.1 shows a PVC, consisting of two VCLs, that spans three switches. A VCL is a bi-directional link between two entities, such as two switches or a switch and an end-station. With respect to switch 2, VCL A is identified by specifying the physical port (port B) and the VPI/VCI used at that port. Similarly, with respect to switch 1, VCL A is identified by specifying the physical port (port A) and the VPI/VCI used at that port. Note that the VPI/VCI is the same at both ports. For more information about managing VCLs, see "Managing Virtual Circuit Links" later in this chapter.

Note: Before you attempt to set up a PVC you will need to reduce the upper limit of the VCI range, for a virtual port, that is used for SVCs. The default VCI range for signalling is [32..1023]. Do not use a VCI in the range [0..31] as these are reserved by the ATM Forum. To reduce the VCI range, see "Setting virtual port parameters" in Chapter 7 "Managing virtual ports using the command-line interface".

Since a VCL is bi-directional, a traffic descriptor needs to be defined for the transmit and receive data paths belonging to the VCL. For VCL A, the traffic descriptor for the receive data path at port B should be the same as the traffic descriptor for the transmit data path at port A. Similarly, the traffic descriptor for the transmit data path at port B should be the same as the traffic descriptor for the receive data path at port A. For more information about managing traffic descriptors, see "Managing traffic descriptors" later in this chapter.

Creating a PVC connection

To create a PVC connection, you must have set up the two Virtual Circuit Links (VCLs) that associate the transmit and receive traffic descriptors at a given port. For more information about creating and managing VCLs, see "Managing Virtual Circuit Links" later in this chapter.

PVC connections will be re-established automatically when the Collage 740 powers up. You can have up 256 PVC connections on a Collage 740. To set up a PVC with uni-directional traffic, you must set up a bi-directional PVC that has a Peak Cell Rate (PCR) of zero in one direction.

To create a PVC connection, use the pvc connection setup command.

Command: C740:/>pvc connection setup <pvc_id> <vcl_id> <vcl_id>

Example: C740:/>pvc connection setup 1 4.1.0.1009 4.2.0.1011

Parameters:

<pvc_id>	An unique PVC identifier.
<vcl_id>	An unique VCL identifier for the port. Two VCLs must be supplied to set up a PVC connection across the switch.

Note: You can create a PVC connection using the a one step pvc setup command, listed in "One-step PVC commands" later in this chapter.

Note: Collage 740 currently only implements point-to-point PVC connections, therefore once a VCL is assigned to a PVC connection it cannot be used to setup another PVC connection.

Listing the current PVC connections

To list all current PVC connections that are set up on the Collage 740, use the pvc connection show command.

Command: C740:/>pvc connection show

Output:

```
--ID-  VCL1        VCL2        Admin    Oper    Host
 1     4.1.0.1009  4.2.0.1011  UP       UP
 2     4.1.0.1010  4.2.0.1012  UP       UP
```

The pvc connection show command displays the information described in Table 15.1.

Table 15.1 Output from the pvc connection show command

Field	Description
ID	The identifier for the PVC connection.
VCL1	The transmitting VCLs for a PVC connection.
VCL2	The receiving VCLs for a PVC connection.
Admin	The management state of the PVC connection. If the state is “UP” then this PVC connection is enabled. If the state is “DOWN” then this PVC connection is disabled. This will occur if you have disabled the PVC connection using the command-line interface.

Table 15.1 Output from the pvc connection show command

Field	Description
Oper	The operational state of the PVC connection. If the state is “UP” then this PVC is functional. If the state is “DOWN” then this PVC is not functional. This may be because either the PVC is disabled or a port (on this switch) used by the PVC is down.
Host	If the PVC connection originates or terminates on the switch, this indicates whether or not an application has claimed the PVC. “YES” indicates that the PVC has been claimed.

Enabling or disabling the displaying of PVC setup failures

You can enable or disable the failure messages that appear when a PVC connection fails to set up. The default is set to OFF.

To enable or disable the displaying of PVC setup failures, use the pvc display command.

Command: C740:/>pvc display {on | off}

Example: C740:/>pvc display on

Parameters:		
	on	Enables the displaying of PVC setup failures.
	off	Disables the displaying of PVC setup failures.

Removing a PVC connection

You can remove a PVC connection if it is no longer required.

Note: This does not mean that the bandwidth used by the PVC connection is now released. To free the reserved bandwidth, you must free the VCLs that were used to create the PVC connection.

To remove a PVC connection, use the pvc connection free command.

Command: C740:/>pvc connection free <pvc-id>

Example: C740:/>pvc connection free 1

Parameters: <pvc_id> An unique PVC identifier.

Note: You can remove a PVC connection and free the bandwidth used by the VCLs in the PVC connection, by using the a one step pvc free command, listed in "One-step PVC commands" later in this chapter.

Disabling a PVC connection

To temporarily disable an established PVC connection, use the pvc connection disable command.

Command: C740:/>pvc connection disable <pvc-id>

Example: C740:/>pvc connection disable 1

Parameters: <pvc_id> An unique PVC identifier.

Enabling a PVC connection

To enable a disabled PVC connection, use the pvc connection enable command.

Command: C740:/>pvc connection enable <pvc-id>

Example: C740:/>pvc connection enable 1

Parameters: <pvc_id> An unique PVC identifier.

Managing Virtual Circuit Links

This section describes how to set up, free, and list Virtual Circuit Links (VCLs).

Setting up a VCL

When setting up a VCL it is recommended that you re-use traffic descriptors wherever possible, as there is a limit on the number of traffic descriptors that can be setup. The Collage 740 can support upto 16 different traffic descriptors that can be used to setup 512 VCLs.

To create a VCL, use the pvc vcl setup command.

Command:	C740:/>pvc vcl setup <vcl_id> <td_rx> <td_tx>	
Example:	C740:/>pvc vcl setup 4.1.0.1009 1 1	
Parameters:	<vcl_id>	The unique VCL identifier. This has the format <slot>.<port number>.<vpi>.<vci>.
	<td_rx>	The receive traffic descriptor identifier.
	<td_tx>	The transmit traffic descriptor identifier.

Note: The service category (CBR, VBR, or UBR) must be the same for both traffic descriptors unless the PCR in one direction is zero.

Note: Collage 740 currently only implements point-to-point PVC connections, therefore once a VCL is assigned to a PVC connection it cannot be used to setup another PVC connection.

Freeing a VCL

Freeing a VCL will release the bandwidth allocated to that VCL.

To free a VCL, use the pvc vcl free command.

Command: C740:/>pvc vcl free <vcl_id>

Example: C740:/>pvc vcl free 4.1.0.1009

Parameters: <vcl_id> The unique VCL identifier. This has the format <slot>.<port number>.<vpi>.<vci>.

Note: Before attempting to free the associated VCLs, you must free a PVC connection.

Listing all the VCLs

To list details of all VCLs, use the pvc vcl show command.

Command: C740:/>pvc vcl show

Output:

VCL ID	TD - RX		TD - TX		-Xid-	Oper	LastChange
4.1.0.1009	1	1	1	1	1	UP	163:30:58
4.2.0.1011	1	1	1	1	1	UP	163:30:58
4.1.0.1010	2	2	1	2	2	UP	163:31:59
4.2.0.1012	2	2	1	2	2	UP	163:31:59
4.2.0.1000	5	5	5	5	0	NULL	

The pvc vcl show command displays the information described in Table 15.2.

Table 15.2 Output from the pvc vcl show command

Field	Description
VCL ID	The unique VCL identifier is displayed.
TD-RX	The receive traffic descriptor identifier.
TD-TX	The transmit traffic descriptor identifier.
Xid	The PVC connection that is using this VCL, if there is one.

Table 15.2 Output from the pvc vcl show command

Field	Description
Oper	The operational state of the corresponding PVC connection. If the state is “UP” then the PVC is functional. If the state is “DOWN” then the PVC is not functional. This may be because either the PVC is disabled or a port (on this switch) used by the PVC is down. If the state is “NULL” then the VCL in question has no PVC associated with it.
LastChange	Indicates when the operational state of the VCL last changed. This is displayed as hours, minutes, and seconds. At power up, 0:0:0 is displayed.

Managing traffic descriptors

A Traffic Descriptor defines the service category that will be used to transport traffic and the bandwidth that is required. Each service category has its own set of parameters. The Collage 740 can support up to 16 traffic descriptors.

The Collage 740 supports three service categories:

- Constant Bit Rate (CBR) traffic, such as uncompressed voice or video.
  For CBR traffic you will need to specify the Peak Cell Rate (PCR). Bandwidth for CBR traffic is guaranteed for the duration of the connection.
- Variable Bit Rate (VBR) traffic, such as compressed voice or video.
  For VBR traffic you will need to specify a dedicated Peak Cell Rate (PCR), a Sustainable Cell Rate (SCR), and a Maximum Burst Size (MBS). Bandwidth for VBR traffic is guaranteed for the duration of the connection.
- Unspecified Bit Rate (UBR) traffic, such as broadcasts or data.
  UBR connections will always be accepted but bandwidth will not be guaranteed. This is also referred to as “best effort” traffic.

  If the CLP bit is not set in the ATM cell header, it indicates high priority traffic.

Creating a CBR traffic descriptor

To create a CBR traffic descriptor, use the pvc td setup CBR command.

Command: C740:/>pvc td setup CBR <td_id> pcr0+1=<pcr0+1> [pcr0=<pcr0>]

Example: C740:/>pvc td setup CBR 2 pcr0+1=64000 pcr0=48000

Parameters:

<td_id>	An unique identifier for this traffic descriptor.
<pcr0+1>	The combined PCR for all cells regardless of whether the CLP (Cell Loss Priority) bit is set in the ATM cell header.
<pcr0>	An optional PCR for cells where the CLP bit is not set in the ATM cell header. This PCR must be less than or equal to the combined PCR.

Creating a UBR traffic descriptor

To create a UBR traffic descriptor, use the pvc td setup UBR command.

Command: C740:/>pvc td setup UBR <td_id>

Example: C740:/>pvc td setup UBR 1

Parameters:

<td_id>	An unique identifier for this traffic descriptor.

Creating a VBR traffic descriptor

There are three types of VBR traffic descriptors that can be created.

To create a VBR traffic descriptor, use one of the three methods described in this section.

Use the pvc td setup VBR command as follows:

Combination 1

Command: C740:/>pvc td setup VBR <td_id> pcr0+1=<pcr0+1> [pcr0=<pcr0>]

Example: C740:/>pvc td setup VBR 3 pcr0+1=64000 pcr0=48000

Parameters:

<td_id>	An unique identifier for this traffic descriptor.
<pcr0+1>	The combined PCR for all cells regardless of whether the CLP bit is set in the ATM cell header.
<pcr0>	An optional PCR for cells where the CLP bit is not set in the ATM cell header. This PCR must be less than or equal to the combined PCR.

Combination 2

Command: C740:/>pvc td setup VBR <td_id> pcr0+1=<pcr0+1> scr0+1=<scr0+1> mbs0+1=<mbs0+1>

Example: C740:/>pvc td setup VBR 4 pcr0+1=128000 scr0+1=64000 mbs0+1=1000

Parameters:

<td_id>	An unique identifier for this traffic descriptor.
<pcr0+1>	The combined PCR for all cells regardless of whether the CLP bit is set in the ATM cell header.
<scr0+1>	The SCR for all cells regardless of whether the CLP bit is set in the ATM cell header.
<mbs0+1>	The MBS for all cells regardless of whether the CLP bit is set in the ATM cell header.

Combination 3

Command: C740:/>pvc td setup VBR <td_id> pcr0+1=<pcr0+1> scr0=<scr0> mbs0=<mbs0>

Example: C740:/>pvc td setup VBR 4 pcr0+1=128000 scr0=48000 mbs0=800

Parameters:

<td_id>	An unique identifier for this traffic descriptor.
<pcr0+1>	The combined PCR for all cells regardless of whether the CLP bit is set in the ATM cell header.
<scr0>	The SCR for cells where the CLP bit is not set.
<mbs0>	The MBS for cells where the CLP bit is not set.

Removing a traffic descriptor

To remove a traffic descriptor, use the pvc td free command:

Command: C740:/>pvc td free <td_id>

Example: C740:/>pvc td free 1

Parameters: <td_id> An identifier for the traffic descriptor.

Note: A traffic descriptor that is in use cannot be freed. First, you will need to free the VCLs that are using the traffic descriptor.

Listing the traffic descriptors

To list all traffic descriptors, use the pvc td show command:

Command:
```
C740:/>pvc td show
```

Output:
```
--ID--    Count    ---Quality of Service----
   1        3     UBR=UBR(BestEffort-Data): Best Effort Traffic
   2        0     CBR: PCR0+1=20000
   3        0     VBR: PCR0+1=30000
   4        4     CBR: PCR0+1=20000 PCR0=17000
   5        0     VBR: PCR0+1=30000 PCR0=27000
   6        0     VBR=VBR: PCR0+1=30000 SCR0+1=18000 MBS0+1=2000
   7        0     VBR=VBR: PCR0+1=30000 SCR0=18000 MBS0=2000
   8        1     UBR=UBR(BestEffort-Data): Best Effort Traffic
```

The pvc td show command displays the information described in Table 15.3.

Table 15.3 Output from the pvc td show command

Field	Description
ID	The traffic descriptor identifier.
Count	The number of times the traffic descriptor is used by VCLs.
Quality of Service	The service category of the traffic descriptor as well as the PCR, SCR, and MBS values (where applicable).

One-step PVC commands

The following commands are one-step commands for setting up and freeing PVC connections. Previously this required a sequence of user commands (

Creating a PVC connection

This command will setup a VCL on each <slot.port.vpi.vci> and a PC connection joining the two. The PVC connection will be automatically assigned an id.

Traffic descriptors do not have be specified. If they are not, UBR traffic will be assumed and an existing UBR traffic descriptor will be used. If no such traffic descriptor exists, one will be automatically set up for UBR traffic. If any other type of traffic is required, you must first set up the traffic descriptors in the usual way (using the command pvc td setup).

If one of the specified VCLs already exists, this VCL's traffic descriptors will be used in preference to any user-specified ones. If both VCLs already exist, their traffic descriptors must be compatible (that is the transmit and receive traffic descriptor identifiers) for the command to succeed.

To create a PVC connection, use the pvc setup command:

Command:	C740:/>pvc setup <slot1.port1.vpi1.vci1> <slot2.port2.vpi2.vci2> [<td1> <td2>]	
Example:	C740:/>pvc setup 2.1.0.1055 2.2.0.1077 2.1 6 2 2.2 4 5	
Parameters:	<slot.port.vpi.vci>	The VCL for the PVC connection.
	td1	This refers to the transmit traffic descriptors for the first VCL and the receive traffic descriptor for the second VCL for the PVC connection.

td2	This refers to the receive traffic descriptors for the first VCL and the receive transmit descriptor for the second VCL for the PVC connection.

Freeing a PVC connection

To free a PVC connection, use the pvc free command:

Command: C740:/>pvc free <slot.port.vpi1.vci1>

Example: C740:/>pvc setup 2.1.0.1055

Parameters: <slot.port.vpi.vci> The VCL for the PVC connection.

Listing all current PVC connections

This command is the same as the pvc connections show command in "Listing the current PVC connections" listed earlier in this chapter.

To show PVC connections, use the pvc show command:

Command: C740:/>pvc show

Glossary

ASN.1 Object Id

An ASN.1 Object Id is a number that identifies a manageable object or MIB object. It is usually expressed in dot notation. For example, 1.3.6.1.2.1.1.5 is the identifier for the sysName MIB object.

ATM Address

An ATM address is an E.164 address (telephone number) or a NSAP.

ATM EndStation Identifier (ESI)

This is sometimes called the MAC address. It is a six byte address usually expressed in dot notation.

Example: 88.0B.90.6C.56.90

ATM NSAP Address

Is a 20 byte address made up of the address of the ATM device (19 bytes) plus a selector (1 byte). The ATM device address consists of the prefix and the ESI. The selector is used to identify an individual application on an end-station.

Example: 39.00.00.00.00.00.00.00.00.00.00.00.01.88.0B.90.6C.56.90.2

ATM Switch Prefix

This is a 13 byte address prefix usually expressed in dot notation.

Example: 39.00.00.00.00.00.00.00.00.00.00.00.01

Cell Loss Priority (CLP)

The CLP (Cell Loss Priority) bit is the last bit of byte four in an ATM cell header. It indicates the eligibility of the ATM cell for discard by the network under congested conditions. Under congestion, cells that have their CLP bit set will be discarded in preference to cells that do not have their CLP bit set.

ELAN segment

ELAN segment is a number consisting of one to three hex digits which uniquely identifies a ELAN known to the LECS. This number should not be the same as any existing Token Ring ring number.

End-point

An imaginary point in an end-station which originates or terminates a connection.

ESI

An ESI (End-Station Identifier) is a 48-bit identifier, taken from the IEEE universally-administered MAC address space, which uniquely identifies an ATM device.

Internet Control Message Protocol (ICMP)

ICMP handles control messages and error message that are sent by internet gateways and hosts.

PDR

The Madge Proprietary Dynamic Routing.

Peak Cell Rate (PCR)

PCR is the maximum number of cells per second.

PCR0+1

PCR for cells regardless of whether the CLP bit is set or not.

PCR0

PCR for cells with CLP bit cleared.

Permanent Virtual Circuit (PVC)

A PVC differs from a signalled circuit in that each switch needs to be programmed individually to set up a connection across the network.

Proprietary Dynamic Routing (PDR)

PDR enables two Collage 740s that are connected together to learn about each other's existence, without the need for manually entering static routes.

Maximum Burst Size (MBS)

MBS is the maximum amount of cells that can be transmitted at the PCR in a single burst. This parameter is only used when setting up calls using the VBR traffic service category.

Selector

The selector is a single byte value. A particular ATM application is typically assigned to a selector. The selector is the last byte of a NSAP address and may be used by an end-station to identify a particular ATM application.

Sustainable Cell Rate (SCR)

SCR is the average rate of cell transmission for this connection, taking bursting into account. This parameter is only used when setting up calls using the VBR traffic service category.

Switched Virtual Circuit (SVC)

SVCs are established on demand by UNI (User-to-Network Interface)/NNI (Network-to-Network Interface) signalling protocols through the switch. SVCs are used for communication between two endpoints.

Traffic Descriptor (TD)

A set of parameters describing the traffic class (CBR, VBR, UBR, and ABR) and service required on the connection.

Virtual Circuit Link (VCL)

A bi-directional link between two switches or an end-station and a switch which, when concatenated with other VCLs forms a VCC.

Virtual Circuit Connection (VCC)

A bi-directional connection between two end-points.

Virtual Circuit Identifier (VCI)

A unique identifier for a virtual circuit.

Virtual Port

For more information on virtual ports, see “Virtual ports” in Appendix C “Routing and signalling concepts”.

Virtual Path Identifier (VPI)

A unique identifier for a virtual path.

WKA

The Well-Known Address, which is a pre-defined address at which a service can be reached. In the context of LAN emulation, the WKA is usually the pre-defined address of the LECS. The ATM Forum defines the WKA as 47.00.79.00.00.00.00.00.00.00.00.00.00.A0.3E.00.00.01. By default, a Collage 740 ignores its own local LECS and seeks a remote LECS at the WKA.

Default settings on a new Collage 740

The factory-configured default settings for a Collage 740 are shown in Table A.1.

Table A.1 Default settings for a Collage 740

System default parameters	
Community password	Public
Front-end password	No password
Date	01-JAN-1970
Time	00:00:00
IP address	Will use BOOTP to obtain an IP address.
Authorized managers	Disabled
Trap destinations	Disabled
UNI version	3.0
IP for the management LEC	Enabled

Table A.1 Default settings for a Collage 740

LANE Services default parameters	
LECS	Remote at WKA
Internal LES	Enabled
LES ELAN Default Token-Ring ELAN	Collage740ElanTrn
LES ELAN Default Ethernet ELAN	Collage740ElanEth
LES ELAN type	Token Ring
Management LEC status	Enabled
Management LEC ELAN	Will join a default ELAN determined by the LECS.
Management LEC type	Token Ring

Table A.1 Default settings for a Collage 740

Default port configurations parameters	
ILMI	Enabled on all ports
Signalling stacktype	UNI 3.0
Signalling profile	Network
VPI range	[0..7]
VCI range	[32..1023]
Remote device	Endstation
Signalling VPI range	[0..0]
Strict AAL conversion	off

Using BOOT Loader

This appendix describes the commands that are available in the BOOT Loader interface.

Start-up process

During the normal boot-up process, the Collage 740 monitors the hardware for non-critical faults. If no problems are detected then the BOOT Loader will not be activated. If a fault is detected then the BOOT Loader is enabled.

Note: The status indicators on the front panel of the Collage 740 will indicate any fault that has occurred during the start-up process. For more information about the start-up test, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).

Getting connected to the BOOT Loader

The BOOT Loader program will only be executed by the Collage 740, if the one of the following occurs:

- a fault is detected during hardware self test.
- by holding down the reset button at the start of the boot-up process until the Status A LED changes from red to amber.

You can access the Collage 740 BOOT Loader by direct connection on the serial interface A, using a VT100 terminal or a PC running a terminal emulation program. For information about the default settings and pin-out of the serial port, refer to the *Collage 740 Backbone ATM Switch Installation Guide* (part number: 100-238).

When you have connected a VT100 terminal and the BOOT PROM software has been executed, the terminal screen will display the BOOT MENU.

```
Welcome to Collage 740 - PROM 1.1.4
1 Run boot loader image 1
2 Run boot loader image 2 - current default
3 Download boot loader image (9600 baud)
4 Download boot loader image (38400 baud)

Select a menu item (1-4):
```

From the BOOT MENU, you can view the current default BOOT Loader image that is stored in flash memory. You can execute this image file or select the secondary BOOT Loader image. If the secondary image is selected then this will become the new default BOOT Loader image when the switch is next booted.

The last two options on the BOOT MENU, enable you to download a BOOT Loader image on to the Collage 740 via XMODEM at either 9600Mbps or 38400Mbps.

Note: The download options should only be used in an emergency since all files and configuration on the Collage 740 will be wiped.

How the BOOT Loader command-line interface works

The command-line interface provides a set of commands that you can use to configure the BOOT Loader in a Collage 740. These commands are arranged in a hierarchy such that related commands are grouped together in a single functional group. A functional group can also contain one or more functional groups, and so forth. When you login to the BOOT Loader command-line interface you will be placed at the root of the hierarchy. To perform an operation using a command you will need to specify the full hierarchical path followed by the command. For example:

```
C740:/>hardware wipe
```

This command shows `hardware wipe` commands that are contained in the `hardware` functional group. Alternatively, you can descend the hierarchy by typing:

```
C740:/>hardware
```

This will cause the prompt to change, displaying the position in the hierarchy:

```
Monitor:hardware>
```

You can now perform the command simply by typing `wipe`, as follows:

```
Monitor:hardware>wipe
```

The advantage of descending the hierarchy is that you can perform multiple related commands without having to type them out in full (that is, specifying their full hierarchical path).

Table B.1 lists the commands that are used to navigate the hierarchy.

Table B.1 Navigational commands

Command	Description
top	Returns you to the root of the hierarchy.
up	Returns you to the previous level in the hierarchy.

Note: If you press the RETURN key immediately after the prompt, it has the same effect as entering the up command.

If you are at a particular point in the hierarchy and you need to perform a command elsewhere in the hierarchy, you must enter the slash symbol (/) followed by the full hierarchical path followed by the command. For example:

```
Monitor:hardware/wipe>/flash directory
```

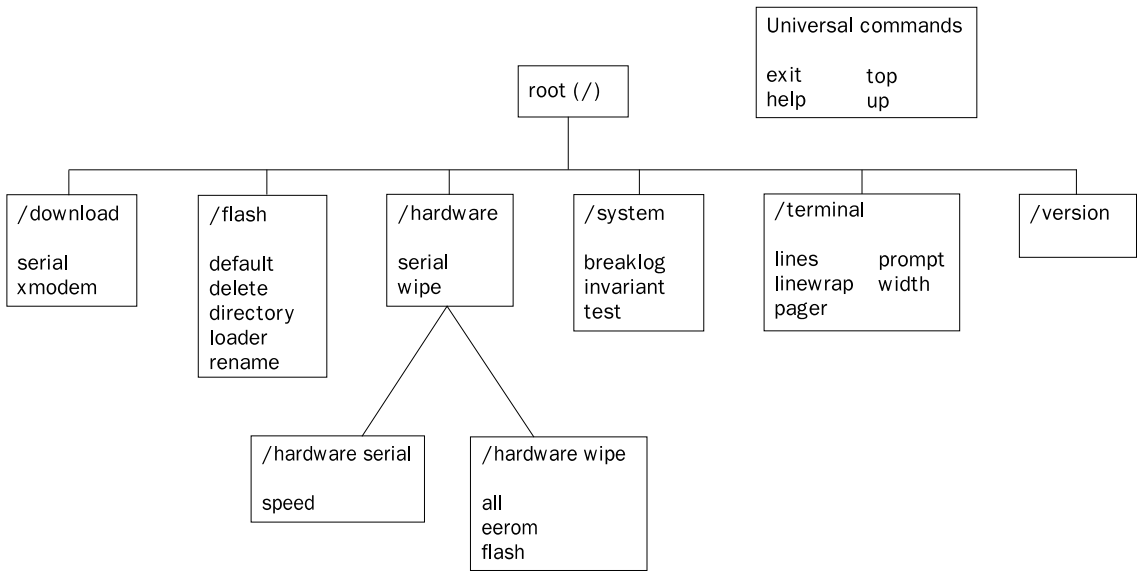
This command will list all files in the flash directory while you are in the hardware wipe functional group. After the command has been executed you will still be in the hardware wipe functional group.

Command hierarchy

Figure B.1 displays the hierarchy of the commands in the BOOT Loader command-line interface. Use the index to locate information about a specific command.

Note: Certain functional groups in the hierarchy are also commands in their own right.

Figure B.1 Hierarchy of commands from the root directory



Conventions used to describe commands

Throughout this chapter the following conventions are used:

- All command examples are given in relation to the root of the hierarchy. That is, this is how you would be entered the command, if you were at the root of the hierarchy.
- The syntax of commands are described using the symbols displayed in Table 4.2.

Using the on-line help

On-line help is always available and can be obtained at any time by typing help. The following information will be displayed:

- All commands and functional groups available at the current position in the hierarchy, in alphabetical order.
- The universal commands. These are commands that are independent of the hierarchy. They can be executed irrespective of where you are in the hierarchy.

The help output from the root is shown below.

Command: C740:/>help

Output:

```
Commands:-
download--- Download a software image
flash     --- Flash management commands
hardware--- Hardware commands
system  --- System wide commands
terminal--- Terminal settings
version --- Display build version number

Universal commands:-
exit, help, top, up
```

Help is also available for individual commands. To obtain help on a command, type help followed immediately by the full command. As an example, the help output for the download xmodem command is:

Command: C740:/>help download xmodem

Output:
```
Syntax: download xmodem <port> <baud_rate>
        valid ports are A or B
        valid baud rates are 9600 or 38400
        port defaults to port B
        baud rate defaults to 9600
```

Note: If there is a discrepancy between the information in the on-line help and the information in this manual, always follow the advice in the on-line help, as it is the most current information available.

Viewing software version information

You can list information about the BOOT PROM and the BOOT Loader images that have been loaded on the Collage 740.

To view the software version information, use the version command.

Command: C740:/>version

Output:

```
PROM Version: 1.0.0
Build Version:   1.1.7
Build Time:      Tue Mar 1 13:06:29 GMT 1996
Built By:        release
Build Directory: /release/bootloader1.1.7
Build Host:      builder
```

Downloading microcode

You can download an image via the serial interface or over XMODEM. Download from XMODEM will provide some protocol checks during transfer, whereas the serial download provides no check on the data transfer.

Downloading over XMODEM

If you wish to download a software image over XMODEM, use the following steps:

1 Connect the cable to serial interface port B to download the software image over XMODEM.

2 Enter the download xmodem command:

Command:	C740:/>download xmodem <port> <baud_rate>	
Example:	C740:/>download xmodem B 9600	
Parameters:	<port>	Enter valid port. This can be either A (upper serial interface port) or B (lower serial interface port). The default port is B.
	<baud_rate>	The default baud rate is 9600. The higher baud rate that is supported is 38400.

After you press ENTER, the Collage 740 will wait for data from the XMODEM source, on the selected serial interface port.

3 Start the transmission on the serial link.

Downloading over serial interface

You can only download a software image over serial interface B.

To download over serial interface, use the following steps:

1 Connect the cable to serial interface port B to download the software image.

2 Enter the download serial command:

Command: C740:/>download serial <baud_rate>

Example: C740:/>download serial 9600

Parameters: <baud_rate> The default baud rate is 9600. The higher baud rate that is supported is 38400.

After you press ENTER, the Collage 740 will wait for data on serial interface port B.

3 Start the transmission on the serial link.

System-wide commands

This section describes system commands that are available in BOOT Loader.

Viewing the invariant information in BOOT Loader

Invariant information is shared between the BOOT PROM image, the BOOT Loader image and the main image. This is common information in all the image files.

To view invariant information, use the system invariant command.

Command: C740:/>system invariant

Output:
```
Software is running 1.1+ mode
BIA is set to :0000f6123456
Loader 1 is start OX12345678, length 345841
Loader 2 is start OXb2615678, length 345841
Selected boot image: 2
Done!
```

Software is running	Indicates the software image that is currently running on the switch.
BIA is set to	The BIA of the switch.
Loader is started	The BOOT Loader start address (in hexadecminals) and the length of the BOOT Loader file.
Selected boot image	The BOOT Loader image that has been selected.

Running all the hardware tests

You can run all the non-critical hardware tests on a Collage 740. If all the tests pass the Collage 740 will respond with DONE!

If a test fails then the BOOT Loader will display the test that has the failed and the Collage 740 LEDs will display the sequence that represents the error. For more information about the LED status sequence, see chapter XX Understanding Status Indicators.

To run all hardware tests, use the system test command.

Command:	C740:/>system test
Example out for an all passed test:	Done!
Example out for test with one failure:	SELF-TEST failed: BIA is invalid

Viewing a list of fatal system exceptions

A fatal system exception occurs when the Central Processing Unit (CPU) detects an error such as a division by zero or accesses to non-existent memory. A fatal exception causes the Collage 740 to reboot. A breakpoint is a special type of exception which is invoked by the Collage 740 software, when it detects an internal inconsistency.

To dump a list of fatal system exceptions, use the system breaklog command.

Command: C740:/>system breaklog

Output:

```
Filename          :lmaux.c
Line No           :553
pml_time          :1234
Abs_time          :Unknown
Stablised Count:0
Reason            :0000b024
epc               :c005dce4
badva             :c8681734
```


Note: The breaklog provides vital information for diagnosing why the Collage 740 has crashed. This information needs to be reported to Madge Technical Support.

Hardware commands

This section describes hardware commands that are available in BOOT Loader.

Wiping flash and eerom memory in a Collage 740

To wipe non-volatile memory in a Collage 740, use the hardware wipe command.

Command:	C740:/>hardware wipe [eerom | flash | all]	
Parameters	eerom	Wipes the eerom memory. This will clear all configuration information that has been setup in switch.
	flash	Wipes the flash memory. This will wipe the flash memory in the switch clean.
	all	Wipes both the eerom and flash memory.

Note: Use this command with care, you can not reverse the operation and the effect is immediate.

Note: You must download boot loader and main image if you wipe flash memory before you reset the switch.

Hardware Serial command

To set the serial port line speed on ports A or B, use the hardware serial speed command.

Command: C740:/>hardware serial speed [A | B] [9600 | 38400]

Example: C740:/>hardware serial speed B 9600

Parameters:		
	[A | B]	Select the serial interface port. This can be either A (the upper serial interface port) or B (the lower serial interface port).
	[9600 | 38400]	Select the speed at which the serial interface port will communicate.

Managing the flash filing system

The following commands enable you to manage the flash memory bank.

Viewing the contents of the flash memory bank

You can view all files that are held in flash memory. For each file in the directory the following information is displayed:

- The type of file.
- The size of each file in bytes.
- The name of the file is displayed.
- The default boot loader image file is distinguished with a “+” (plus) sign, next to the file type.
- The default main image is distinguished with an “*” (asterisk), next to the file type.
- Any main image file that is compressed, is indicated with the letter “C”.
- Any main image file that is uncompressed, is indicated with the letter “U”.
- Also displayed are comments attached to files.

To display a listing of the flash memory bank, use the flash directory command.

Command: C740:/>flash directory

Output:
```
Flash Filing System contains 4 files
BOOT+  343557boot_loader.1.1.1
MAIN*  (C)494710collage740.1.1.1
TEXT    5516   config.dataConfiguration data - do not delete
MAIN   (U)1598440collage740.1.0.11
```

Viewing the default main image

The display the default main software image that will be run, use the flash default command.

Command: C740:/>flash default

Output: The current default boot image is "collage740.1.1.1".

Changing the main image

To change the main image that the Collage 740 will next boot from, use the flash default command.

Command: C740:/>flash default <filename>

Example C740:/>flash default collage740.1.1.1

Parameters: <filename> The name of the default image that the Collage 740 will next run.

Note: This command checks the integrity of the selected image therefore it may take a few seconds for the cursor to return.

Viewing the current boot image

To display the default boot software image that will run, use the flash loader command.

Command: C740:/>flash loader

Output: The current default boot image is "boot_loader.1.1.1".

Changing the boot loader image

To change the boot loader image that the Collage 740 will next boot from, use the flash loader command.

Command: C740:/>flash loader <filename>

Example C740:/>flash loader boot_loader.1.1.1

Parameters:

<filename>	The name of the default boot loader image that the Collage 740 will next boots up.

Note: This command checks the integrity of the selected image therefore it may take a few seconds for the cursor to return.

Deleting a file from the flash memory bank

To delete a file from the flash memory bank, use the flash delete command. You will be asked to confirm the deletion.

Command: C740:/>flash delete <filename>

Example C740:/>flash delete boot_loader_740.1.9

Parameters:

<filename>	The name of the file you wish to delete from the flash directory.

Note: Once a file is deleted it cannot be recovered. The file must be downloaded again.

Renaming a file in the flash memory bank

To rename a file in the flash memory bank, use the flash rename command.

Command: C740:/>flash rename <old_name> <new_name>

Example C740:/>flash rename boot_loader_740.2.0 fieldrelease

Parameters:

<old_name>	The current name of the flash file.
<new_name>	The new name you wish to assign to the file.

Terminal commands

These commands allow you to configure how the BOOT Loader in a Collage 740 displays output on the terminal.

Viewing the number of lines

If the pager is enabled, this is the number of lines that a Collage 740 will output before pausing. For more information about the pager, see "Viewing the pager status" later in this chapter.

To display the current number of lines, use the terminal lines command.

Command: C740:/>terminal lines

Output: lines: 24

Setting the number of lines

To set the number of lines, use the terminal lines command.

Command: C740:/>terminal lines <rows>

Example: C740:/>terminal lines 48

Parameter: <rows> The number of lines to be displayed on the terminal.

Viewing the terminal width

To display the current terminal width, use the terminal width command.

Command: C740:/>terminal width

Output: terminal width 79

Setting the terminal width

To set the terminal width, use the terminal width command.

Command: C740:/>terminal width <columns>

Example: C740:/>terminal width 90

Parameter: <columns> The number of columns to be displayed on the terminal.

Viewing the linewrap status

For more information about the different linewrap statuses, see "Setting the linewrap" later in this chapter.

To display the linewrap status, use the terminal linewrap command.

Command: C740:/>terminal linewrap

Output: no linewrapping

Setting the linewrap

To set the linewrap, use the terminal linewrap command.

Command: C740:/>terminal linewrap {none | pager | terminal}

Example: C740:/>terminal linewrap pager

Parameter:		
	none	The line wrapping is carried out by the terminal. The Collage 740 will not try to calculate how many lines have actually been used on the terminal. In fact, it will assume that no wrapping has occurred when performing pager functions.
	pager	When the line output by the Collage 740 reach the defined terminal length, the Collage 740 will insert a line break and assume that no line wrapping is carried out by the terminal.
	terminal	The line wrapping is carried out by the terminal. The Collage 740 will keep a record of the number of lines (using the terminal width).

Viewing the pager status

To display the pager status, use the terminal pager command.

Command: C740:/>terminal pager

Output: pager is enabled

Enabling the pager

To enable the pager, use the terminal pager enable command.

Command: C740:/>terminal pager enable

Output: pager enabled

Disabling the pager

To disable the pager, use the terminal pager disable command.

Command: C740:/>terminal pager disable

Output: pager disabled

Viewing the prompt

To display the current system prompt, use the terminal prompt command.

Command: C740:/>terminal prompt

Output: prompt is “Monitor”

Changing the prompt

To change the system prompt, use the terminal prompt command.

Command: C740:/>terminal prompt Monitor_C740

Output: Monitor_C740:/>

Note: The Boot Loader prompt is not saved when changed. The next time the loader is run the prompt will revert to the default setting of “Monitor”.

Routing and signalling concepts

This chapter describes how the Collage 740 switches ATM cells through an ATM network and provides background information about the concepts of routing and signalling.

Switching ATM cells through the ATM network

There are two types of connections that can be used to switch ATM cells through an ATM network.

- Permanent Virtual Circuits (PVCs), which are created manually by the network administrator. Every switch through which the connection will pass will need to be configured separately. PVCs are used for communication between two endpoints, through a pre-configured circuit, until the administrator disables the PVC and frees the connection.
- Switched Virtual Circuits (SVCs), which are established on demand by UNI (User-to-Network Interface)/NNI (Network-to-Network Interface) signalling protocols. SVCs are used for communication between two endpoints until one endpoint clears the connection. There are two types of SVCs:
  - — Point-to-point virtual circuits
  - — Point-to-multipoint virtual circuits.

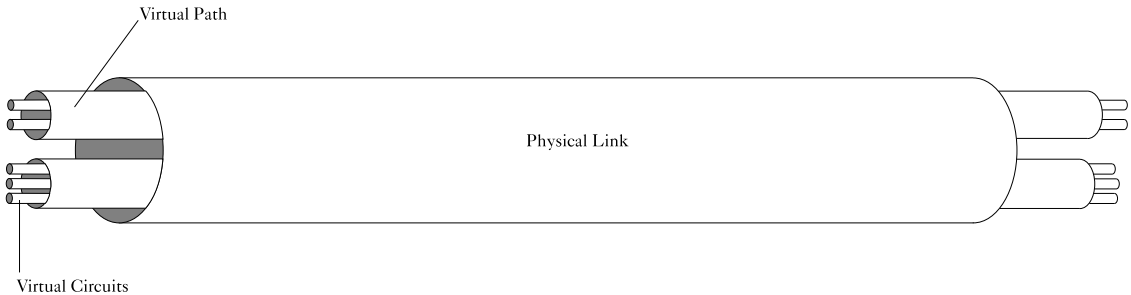
In an ATM network, an end-station can establish a SVC to another end-station by transmitting a signalling call setup request across the network. This request is routed across the ATM network to the destination end-station. If the destination agrees to accept the connection, a SVC is set up across the ATM network, between the two end-stations.

Virtual circuits and virtual paths

In ATM networks data is multiplexed on physical links using virtual circuits and virtual paths. A virtual circuit is a channel of communication that allows data transfer between two ATM devices. A virtual path is used to group virtual circuits within the same transmission medium so that they can be switched together. Virtual circuits are identified by an unique Virtual Circuit Identifier (VCI). Virtual paths are identified by an unique Virtual Path Identifier (VPI).

Figure C.1 shows how virtual circuits are bundled together within a virtual path.

Figure C.1 Virtual circuits in a virtual path



Virtual ports

To support terminating virtual paths, the Collage 740 uses virtual ports. Virtual ports are typically used for Virtual Port Muxing or tunnelling through public networks.

A physical port contains several virtual ports and each virtual port can be considered a port in its own right. When a physical port initialises, a default root virtual port is created. Further virtual ports can be created when you need them. Connections are set up between virtual ports, and you can perform operations on virtual ports, such as enabling and disabling them. For each physical port you can create upto 8 virtual ports. A virtual port will use a single VPI or a range of VPIs for all calls set up through that virtual port.

Note: Only the root virtual port can have a range of VPIs. Subsequent virtual ports can only be assigned a single VPI.

A virtual port has a range of VPIs so that:

- It can support a larger number of circuits than it could on the basis of its VCI range alone.
- It can contain several virtual paths that are to be tunnelled up to a certain point in the network after which they will diverge.

A virtual port in the Collage 740 is represented by

<slot number>.<port number>.<virtual port number>.

For example, 2.1.1 represents a virtual port number of 1, on physical port number 1 on option card in slot number 2. Root virtual ports are all assigned with an identifier of 0.

For more information about managing virtual ports, see “Managing virtual ports” in Chapter 7, “Managing virtual ports using the command-line interface”.

ILMI

The Collage 740 supports ILMI version and UNI 3.0 and UNI 3.1 signalling protocols.

ILMI is used between an end-station and a switch for the following:

- Automatic configuration of signalling and port parameters.
- Address registration

Setting up SVCs

The Collage 740 supports UNI 3.0 and 3.1 signalling for connection setup between an end-station and a switch and IISP signalling for inter-switch connection.

When a connection setup request is transmitted by an end-station using the UNI signalling protocol, the Collage 740 will use the ATM address of the called party and look up the longest matching addresses in its internal routing table.

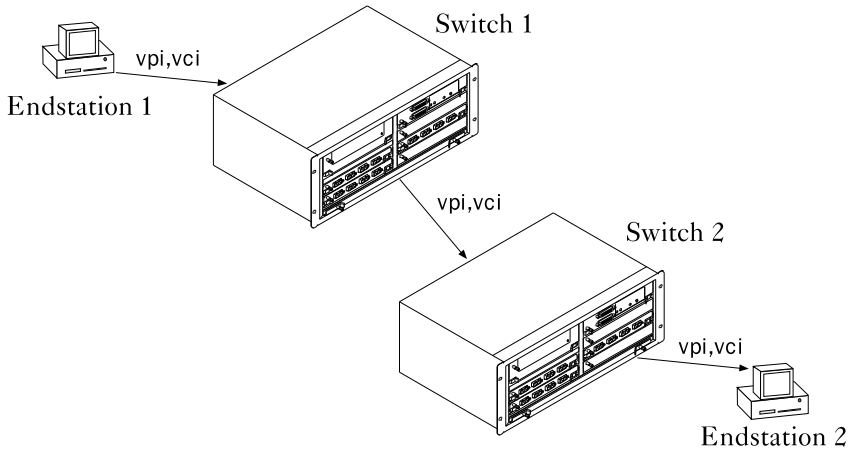
If there is more than one longest matching address then load balancing will be applied to select the appropriate port to route, depending on the service category the traffic will be using:

- For traffic using service categories of Consent Bit Rate (CBR) traffic or Variable Bit Rate (VBR) traffic, the call criterion is the port with the least allocated bandwidth.
- For traffic using service category of Unspecified Bit Rate (UBR) traffic, the call criterion is the port with the largest value of:

$$\frac{\text{unallocated bandwidth}}{\text{number of existing calls} + 1}$$

Once the preferred output port has been determined, the setup request is forwarded to that port. Each switch forwards the connection setup request, in the same manner, until the destination end-station is reached. If the destination end-station agrees to accept the connection, a SVC is set up.

Figure C.2 Signalling through the switches



During the setup request of a SVC, the network switches negotiate a VPI and a VCI for each physical link that the virtual circuit transverses. All setup request travel on reserved channel 0/5 (VPI=0, VCI=5 on root virtual port 0) but the ATM switch will assign an incoming and outgoing VPI and VCI on a particular port, for the connection through the switch. Therefore, an ATM virtual circuit is a sequence of switch VPI/VCI translations.

The value of the VPI and VCI within a particular ATM cell header will change as the ATM cell is switched through the ATM network. In a single switch configuration a cell's VPI and VCI are translated only once, but in a multiple switch environment a cell's VPI and VCI may be translated many times. VPI and VCI values are assigned symmetrically, that is, the same values are reserved in both directions across a link. This means that all virtual circuits are inherently bi-directional. This does not imply that SVC traffic must be sent in both directions; it can be either bi-directional or uni-directional. With point-to-multipoint virtual circuits, data is only sent from the root (source) to the leaves (destination parties).

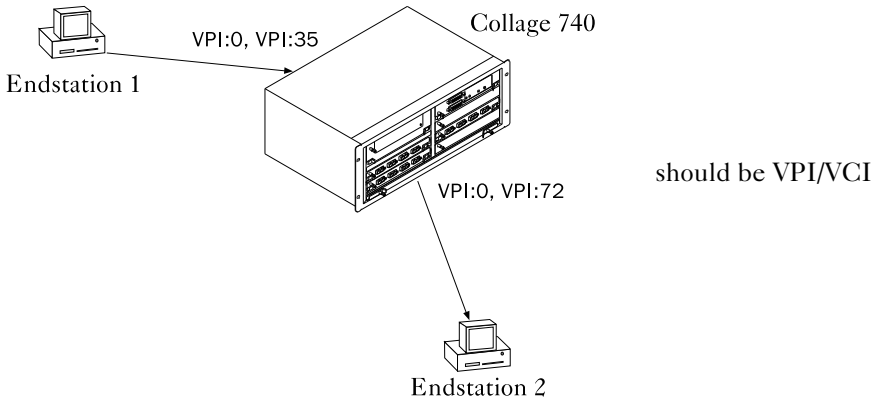
Note: On a given link, VPI/VCI identifiers are assigned in both direction of a circuit. However if a circuit is uni-directional, one of these will not be used.

Note: A cell's VPI and VCI are of local significance only. They identify the cell as being associated with a particular virtual circuit through a single link.

When the Collage 740 receives a cell, it examines the ATM cell header to determine the VPI/VCI on which the cell was transmitted. Using this information, the Collage 740 determines the destination port and appropriate VPI/VCI for the transmission of the ATM cell.

For example, in a single switch environment the switch can be configured such that a cell received on port A with VPI.VCI=0.35 is switched to port B with VPI.VCI=0.72. The translation from input port VPI and VCI to output port VPI and VCI is carried out by the switch hardware.

Figure C.3 Cell switching through a Collage 740 from end-station one to end-station two



IISP routing

The Collage 740 supports IISP routing. IISP uses a routing table to route a SVC through a switch. All end-stations and edge-devices that support ILMI address registration and are attached to the switch will have their routing entries generated automatically for them. The automatically generated routing entries are composed by combining the switch ATM address prefix and the End-Station Identifier (ESI) address for the end-station or edge-device.

Static routes between switches will need to be added to the routing tables. Static routes will also need to be added for end-stations directly attached to a switch, which do not support ILMI address registration and for those end-stations which have multiple addresses and so not support registration of multiple addresses.

The Collage 740 also supports Proprietary Dynamic Routing (PDR). This enables two Collage 740s that are connected together to learn about each other's existence, without the need for manually entering static routes.

You should also be aware of the rules of IISP routing:

- Calls will always be routed to the longest matching route.
- If there are several longest matching routes, UNI routes will take precedence over NNI routes.
- If there are several longest matching UNI routes, then load balancing will be used.
- If there are several longest matching NNI routes and no longest matching UNI routes, then load balancing will be used.
- For calls that come in on an NNI virtual port, this virtual port is not considered when calculating the longest matching routes. This prevents calls being looped back down the same NNI virtual port. This is however allowed with UNI virtual ports.

A UNI route is a route to an end-station, whereas an NNI route is a route between switches.

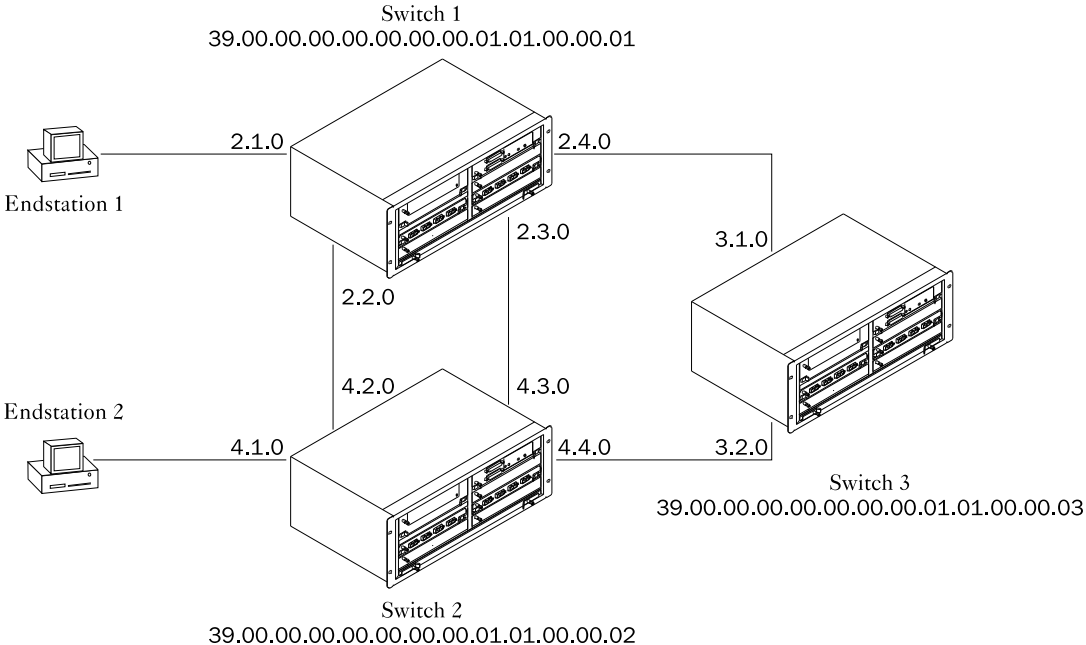
Load balancing means that a route is selected based on its present load. The load can be measured in terms of allocated bandwidth or the number of connections through the route.

For information about setting up routing entries for attached device in the Collage 740, see “Setting up an IISP routing table” in Chapter 2, “Getting started”.

For information about managing routing tables, see Chapter 9 “Managing the routing table using the command-line interface”.

The following example shows how SVCs are routed according to routing tables. The network configuration is shown in Figure C.4.

Figure C.4 Example of a network comprising of three Collage 740s



Tables displayed below show the routing tables information for the network configuration shown in Figure C.4.

Table C.1 Routing table for switch 1 (switch prefix: 39.00.00.00.00.00.00.00.01.01.00.00.01)

Destination ATM Address	Virtual Port	Origin
39.00.00.00.00.00.00.00.01.01.00.00.01.00.01.01.00.00.01	2.1.0	ILMI
39.00.00.00.00.00.00.00.01.01.00.00.02	2.2.0	Static
39.00.00.00.00.00.00.00.01.01.00.00.02	2.3.0	Static
39.00.00.00.00.00.00.00.01.01.00.00	2.4.0	Static

Table C.2 Routing table for switch 2 (switch prefix: 39.00.00.00.00.00.00.00.01.01.00.00.02)

Destination ATM Address	Virtual Port	Origin
39.00.00.00.00.00.00.00.01.01.00.00.02.00.05.01.07.00.02	4.1.0	ILMI
39.00.00.00.00.00.00.00.01.01.00.00.01	4.2.0	Static
39.00.00.00.00.00.00.00.01.01.00.00.01	4.3.0	Static
39.00.00.00.00.00.00.00.01.01.00.00	4.4.0	Static

Table C.3 Routing table for switch 3 (switch prefix: 39.00.00.00.00.00.00.00.01.01.00.00.03)

Destination ATM Address	Virtual Port	Origin
39.00.00.00.00.00.00.00.01.01.00.00.01	3.1.0	Static
39.00.00.00.00.00.00.00.01.01.00.00.02	3.2.0	Static

Each routing table displays the destination ATM address, the output virtual port and the origin of the routing entry. When a route has been added manually then this will be indicated by “Static”. For more information about the information displayed in routing tables, see “Listing the routing entries in a routing table” in Chapter 9 “Managing the routing table using the command-line interface”.

In Figure C.4, if a connection establishment request is made from end-station 1 to end-station 2 (destination ATM address 39.00.00.00.00.00.00.00.01.01.00.00.02.00.05.01.07.00.02) then more than one route will be found. There are two longest matching routes available to this address (via virtual port 2.2.0 and 2.3.0) and therefore, load balancing will be used to route the connection. If several connections are established, some of the connections will be routed out of port 2.2.0 and others out of port 2.3.0.

Default routes

You can add a default route to your switch's routing table and assign virtual ports to the default route. The switch uses the default route to route SVCs when no other route matches.
For more information about adding a route entry to the routing table, see "Adding a new routing entry to the routing table" in Chapter 9 "Managing the routing table using the command-line interface".

Note: It is recommended that the use of default routes is avoided whenever possible to reduce the likelihood of routing loops.

Routing loops

Truncated and default routes should be entered carefully to prevent routing loops in the network. A routing loop is when a SVC is looped back on itself via another switch or switches. If the Collage 740 detects a routing loop at a switch-to-switch interface, the call setup will be abandoned. The Collage 740 can only detect a routing loop when a call is routed from the same virtual port that it came in on. More elaborate loops will go undetected but the call will still fail and may interfere with the setting up of other calls. The offending routing tables will need to be corrected before the call can be set up. Routing loops can significantly degrade the performance of the switches in an ATM network.

Network design

Introduction

This chapter illustrates some LAN designs that may help you to plan your network. It refers to current Madge products for purposes of illustration, but the principles it describes are general ones.

Madge Products used in ATM Network Illustrations

- *Collage 250 and 280 Workgroup ATM Switches.*
  These are stackable, 25Mbps ATM switches. The Collage 280 adapts automatically between switched Ethernet and 25Mbps ATM. Available with the Collage 250/280 switches are the Collage 214/215 155Mbps Network Option Modules (for 155Mbps ATM connectivity), and the Collage 218 Stacking Bus Modules (for linking as many as twelve stacked Collage 250/280s to each other).
- *Smart Ringswitch.*
  This is a high-performance Token Ring backbone switch. The Ringswitch is optimized for high-speed connectivity between existing Token Ring LANs.
- *Collage Connection.*
  This is a kit for performing source route bridging between emulated LANs and real Token Ring LANs via a NetWare server running Novell's Multiprotocol Router. The kit includes a Collage 25 PCI Adapter and a Smart 16/4 EISA Ringnode.

- *Collage 530 Ethernet-ATM Access Switch*.
  This is a high-performance Ethernet-to-ATM access switch. The Collage 530 connects individual Ethernet LANs to each other and to a 155Mbps ATM backbone switch. The Collage 530 is optimized for direct connectivity between Ethernet and ATM.
- *Collage 540 Token Ring-ATM Access Switch*.
  This is a high-performance Token Ring-to-ATM access switch for connecting individual Token Ring LANs both to each other and to a 155Mbps ATM backbone switch. The Collage 540 is optimized for direct connectivity between Token Ring and ATM.
- *Collage 740 Backbone ATM Switch*.
  This is a high-performance 155Mbps backbone ATM switch with onboard support for LAN emulation.

Adding the Collage 740 Backbone ATM Switch to an existing LANs

This section illustrates ways of accessing a 155Mbps ATM backbone from existing LAN technologies.

The examples it uses focus on:

- Token Ring-to-ATM access switches
- Token Ring switches
- Ethernet-to-ATM access switches

In each case, the diagrams that are provided illustrate ways of speeding up server access by moving servers to interface directly with the Collage 740 Backbone ATM Switch.

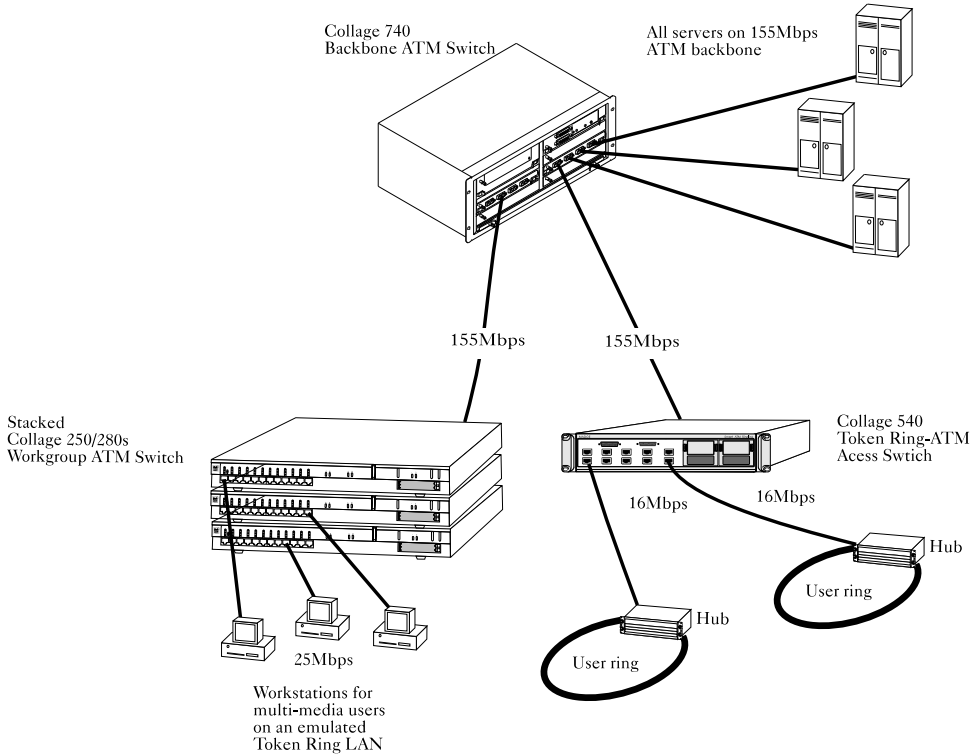
The direct route from token ring to ATM

The Collage 540 Token Ring-to-ATM Access Switch provides a direct route from Token Ring to ATM for customers who are keen to adopt ATM early as a backbone technology.

In figure D.1, all the servers on the network are accessible to network users over 155Mbps ATM.

The diagram shows a stack of Collage 250/280 switches and a Collage 540 attached to a Collage 740 Backbone ATM Switch. All the network users benefit from fast server access.

Figure D.1 Access an ATM backbone via the Collage 540 Token Ring-ATM Access Switch



Upgrading a switched token ring backbone to an ATM backbone

If you already have your servers attached to a collapsed-backbone Token Ring switch, a strategy for further upgrading the network is as follows:

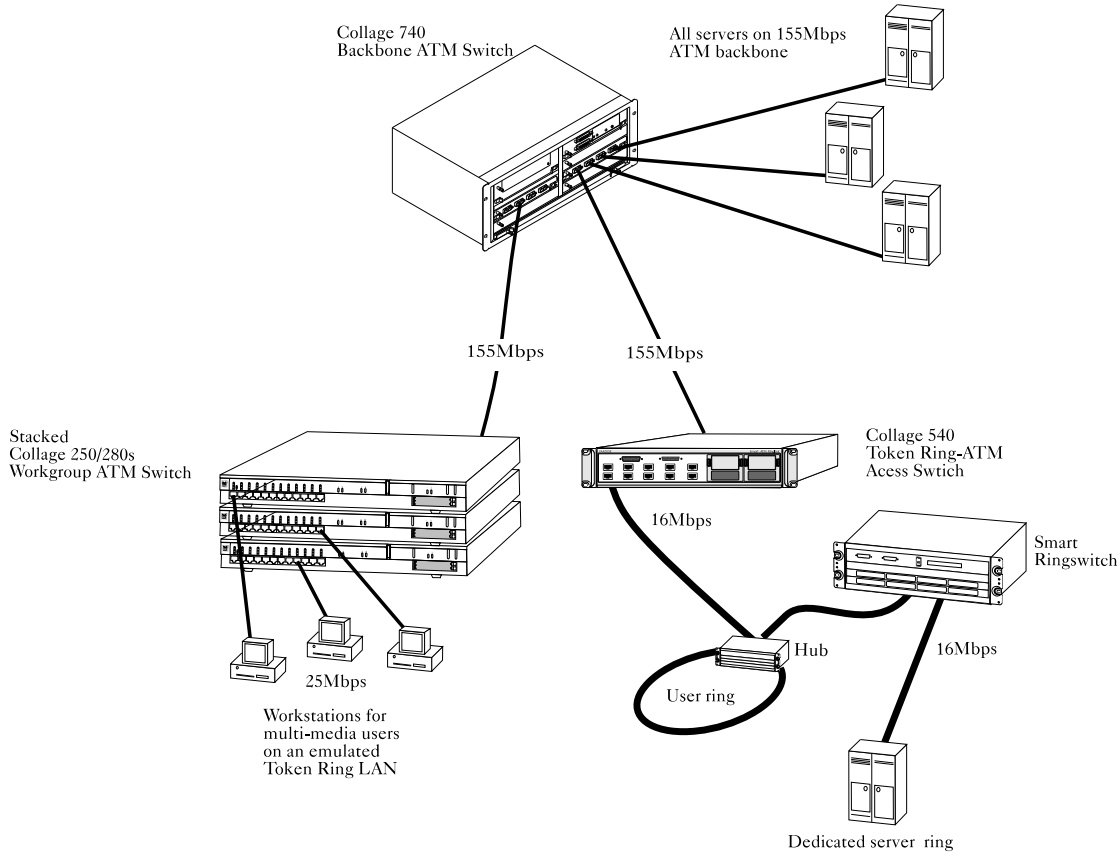
1 Connect a Collage 540 Token Ring-ATM Access Switch to the hub.
2 Connect a 155Mbps ATM link from the Collage 540 to a Collage 740 Backbone ATM Switch.
3 Gradually replace desktop Token Ring adapters with 25Mbps desktop ATM adapters.

In the future, 155Mbps ATM expansion modules will be available for the Smart Ringswitch. In this case, a strategy for upgrading the network would be as follows:

1 Start to connect individual Token Ring switches to an ATM backbone switch.
2 When you have connected a Token Ring switch to the ATM backbone, start to move the servers from the Token Ring switch to the 155Mbps backbone switch.
3 Gradually replace desktop Token Ring adapters with 25Mbps desktop ATM adapters.

Figure D.2 shows a Collage 540 Token Ring-ATM Access Switch connected by a 155Mbps link to Collage 740 Backbone ATM Switch. A series of stacked Collage 250/280 switches are also connected directly to the Collage 740 (which includes its own onboard LAN emulation software). Most of the servers on the network are accessible over 155Mbps ATM, although one server remains on a dedicated Token Ring attached to a Smart Ringswitch.

Figure D.2 Upgrading a switched Token Ring backbone to an ATM backbone

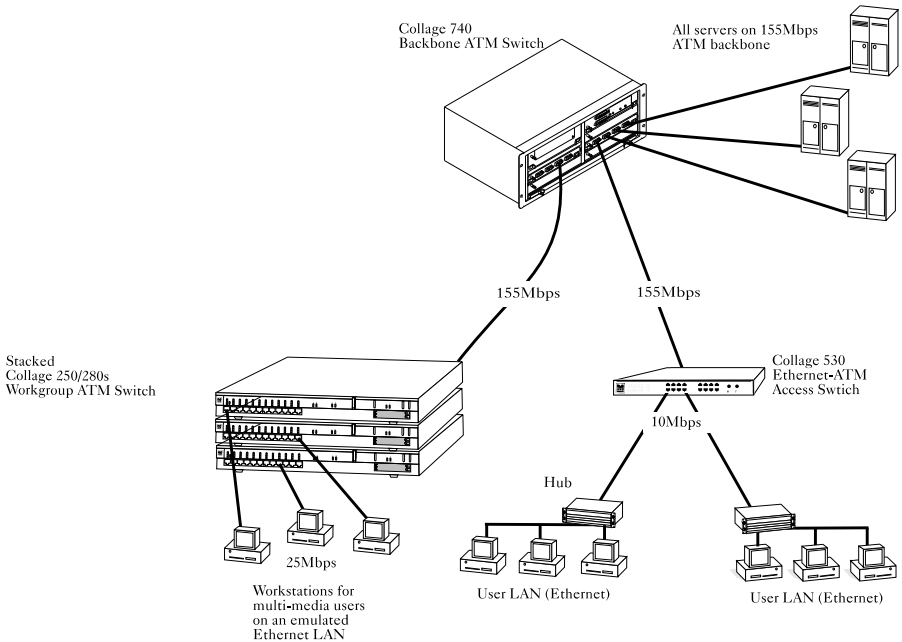


Upgrading an Ethernet backbone to an ATM backbone

The Collage 530 Ethernet-to-ATM Access Switch provides a direct route from Ethernet to ATM.

In Figure all the servers on the network are accessible to network users over 155Mbps ATM. The diagram shows a series of stacked Collage 250/280 switches and a Collage 530 attached to the Collage 740. All the network users benefit from fast server access. Access to an ATM backbone via the Collage 530 Ethernet-ATM Access Switch.

Figure D.3 Upgrading an Ethernet backbone to an ATM backbone

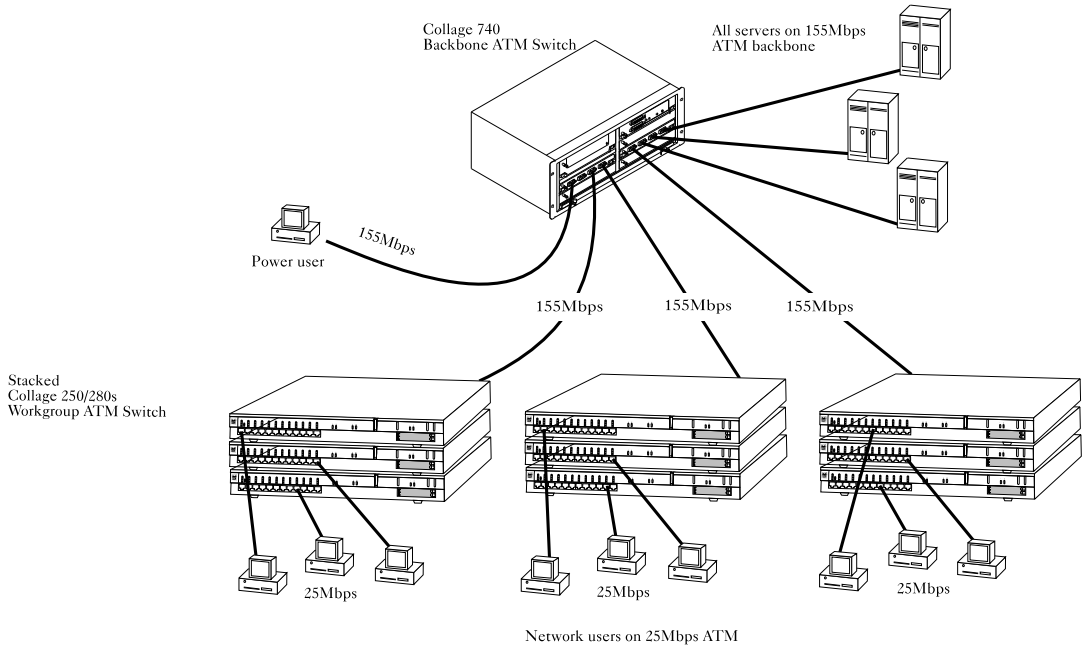


An ATM-only network

Eventually you may seek to have a network where all users benefit from the improved performance and network efficiency of ATM.

In Figure D.4 all the servers are attached to the Collage 740 Backbone ATM Switch, and all the network users are attached via 25Mbps or 155Mbps ATM.

Figure D.4 An ATM-only network



Technical support services

This appendix provides information about the Madge Networks' technical support services. The addresses, telephone numbers, and fax numbers for each region are printed on the back cover of this manual.

When you contact Madge Networks, we record all details of the problem, including full details about you and your company, which remain strictly confidential. Our technical-support engineers work to resolve your networking problems and ensure that you have configured our products in the way that is most suited to your needs.

This appendix contains the following information about technical support services:

- Contacting technical support services, on page 252
  This section describes the types of support that are available, and provides technical support numbers and toll-free regional support numbers.
- Using technical support services, on page 255
  This section explains how to use the technical support services provided on CompuServe, the Bulletin Board System (BBS), the Worldwide Web (WWW) page, the FaxBack service, and the NIFTY-Serve service.

Contacting technical support services

Technical support is available to all Madge customers. To obtain support for Madge products, refer to the following table for the method that most suits your needs. Technical support numbers are provided on page 253, and regional support numbers are provided on page 254.

Requirement	Support services
Initial troubleshooting	Ensure that the product has been installed and configured according to the instructions in the documentation supplied with your Madge product.
Late-breaking product information	Use the following services: • Bulletin Board System (BBS) • Worldwide Web (WWW) page
Upgrading Madge products	Use the following services: • Bulletin Board System (BBS) • PC Vendor G Forum on CompuServe • Madge Networks' FTP server • Contact your local Madge office or representative
Support queries	Use the following services: • PC Vendor G Forum on CompuServe • In Japan, the Madge Networks section on NIFTY-Serve • Send e-mail to Madge Networks' Technical Support Services • Telephone Madge Networks' Technical Support Services, or speak to a Madge field-support engineer

Technical support numbers

Madge Networks provides voice, fax, and email support services as shown in this section. Local technical-support phone numbers, that are toll-free, are provided on page 254.

Region	Service	Number
Europe, Middle East, Africa	Support	+44 1628 858008
	Support Fax	+44 1628 858977
	BBS	+44 1628 858700
	Email	eurtech @ madge.com
Americas	BBS	+1 408 955 0262
	Support	800 876 2343
	Email	us-suprt @ madge.com
Asia, Australia, New Zealand	BBS	+852 2593 9829
	Support	+852 2593 9839
	Email	support @ madge.com
Japan	Support	+81 3 5232 3281
	Email	support @ madge.com

Regional telephone numbers

Madge Networks provides local technical-support phone numbers that are toll-free, and are listed in the table below. You cannot use toll-free numbers from outside of the country with which they are associated.

* Indicates local telephone numbers where the calls are charged at the normal rate.

Country	Number
Americas	800 876 2343
Australia	02 9936 1739 *
Austria	0660 8366
Belgium	0800 10485
Denmark	800 17649
Finland	0800 118 074
France	05 90 82 50
Germany	0130 868828
Hong Kong	2593 9839 *
Israel	177 440 2530
Italy	1678 72092
Malaysia	800 4137

Country	Number
Netherlands	06022 7120
Norway	800 11759
Portugal	0505 44 4602
Singapore	800 852 3151
South Africa	0800 991013
Spain	900 974412
Sweden	020 793127
Switzerland *(French)*	155 6432
Switzerland *(German)*	155 1057
Thailand	2231 8191 *
United Kingdom	Lo-call: 0345 125539

Using technical support services

This section contains information about:

Using CompuServe

If you are a CompuServe member, access the Madge Networks Section by typing GO MADGE at the ! prompt or, load a Windows application such as WinCIM, and type MADGE in the Go option from the Services menu.

Madge Networks' service on CompuServe provided the following facilities:

- Message section
- Library
- Conference area
- Latest software releases

For customers who have not experienced the benefits that access to CompuServe can bring, Madge Networks offers a free introductory membership. This includes a user-ID and password, one month's access to all of CompuServe's Basic services, and an introductory US$15 usage credit that enables you to access the Madge Networks Section of the PC Vendor G Forum and CompuServe's other Extended and Premium services. You also get complimentary subscription to the monthly CompuServe magazine.

To obtain your free introductory membership, call:

Area	Number
UK	0800 289378
Germany	0130 3732
Rest of Europe	+44 272 255111
Americas	800 524 3388
Rest of the world	+1 614 457 0802

Using the Bulletin Board System (BBS)

Madge Networks maintains a free 24-hour Bulletin Board System (BBS) that provides the latest software and technical-support information.

You need a modem to access the BBS. We recommend you use an ANSI (VT100) terminal emulator (for example, ProComm) with your serial port set to: 8-bit data, NO parity check, and ONE stop bit. This is because it is likely that any other setup will cause transmission errors. The BBS supports modem speeds of up to 14 400 baud (with MNP5). Download protocols supported are X Modem, Y Modem, and Z Modem.

Because the BBS is an open system, anyone can log in. The first time that you log in, the system prompts you for your name and for a password. It also asks you to complete a brief questionnaire. Please take the time to complete the questionnaire. The system displays Madge's license agreement and asks you to acknowledge it.

When you log in on subsequent occasions, make sure you enter the same name and password that you entered when you first logged in. The system tells you the last time that you logged in, asks whether you want to read the bulletins, and tells you whether there are any new mail messages for you. To find out more about the Madge BBS service call:

Area	Number
Germany	0180 535 7273
Rest of Europe	+44 1628 858008
Americas	+1 408 955 0262
Asia	+ 852 2593 9829

Using the Worldwide Web (WWW) page

The Madge Networks home page provides information under a variety of categories, including:

- About the company
- Latest news
- Products
- Services
- ATM news digest

To access any Internet site use, either a web browser or FTP software.

If you use a web browser, you can access the full home page service. If you do not have a web browser, you can still download new or updated software using FTP software.If you use a web browser, enter the URL http://www.madge.com.

If you use FTP software:

1 Connect to ftp.madge.com.

The system prompts you for your login name.

2 Type ANONYMOUS

The system prompts you for your password.

3 Type your full email address.

Once this is complete, you can issue file transfer commands.

Using Madge FaxBack

The Madge FaxBack Product Information Service (based in the United States) is an international service for all Madge customers.

Phone +1 408 383 1002, to request technical-support documents, marketing documents, and information about seminars and events organized by Madge Networks.

Using NIFTY-Serve

This is an equivalent service to CompuServe but is only available in Japan.

Log into NIFTY-Serve and, at the **>** prompt, type GO FLANVA.

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