

**Installation Guide**

**M15-155**

**ATM SWITCHING MODULES  
FOR THE AVAYA M770**



## Overview

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This installation guide is divided into the following main sections:

- **Overview:** A general description of the Avaya M15-155F, M15-155SF and M15 155MS modules, including interfaces, LED indicators, a front panel illustration and a list of hardware features.
  - **Installation:** Step-by-step instructions for installing the M15-155 in an Avaya M770 ATM switch.
  - **Troubleshooting:** Suggested solutions for commonly encountered problems.
  - **Appendix:** Port connector pin assignments.
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**Note:** The Command Line Interface (CLI) software setup and control of the Avaya M770 ATM modules is described in the Avaya M770 ATM Switch User's Guide.

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## Description

There are three 15-port ATM OC-3 modules for the Avaya M770 Multifunction switch: the M15-155F Multi-Mode Fiber (MMF) module, the M15-155SF Single-Mode Fiber (SMF) module and the combined M15-155MS module which has 2 Single-Mode and 13 Multi-Mode ports. They provide connection for OC-3 ATM servers and end stations and act as a backbone between switches.

The M15-155 modules and other M770 ATM switching modules comprise a fully functional ATM switch within the Avaya M770 Multifunction chassis. There is no need for a central ATM switching or processing module. The only central module required is the M-SPV/M-SPX/M-SPS Supervisor module (one or two for redundancy) for clock generation for all the Avaya M770 ATM modules.

The M770 ATM switch is a high-performance distributed Asynchronous Transfer Mode (ATM) switch that is designed for building campus backbone applications, high-performance centralized servers, and power-user environments. Its advanced architecture can support very high traffic loads with no data loss or breaks in communication. The M770 ATM Switch 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 LANs can communicate with ATM end-stations.

The Avaya M770 supports a range of ATM switching modules that enable you to customize the switch for different applications in your network. The M770 ATM switch is designed as a software-upgradeable product, so that you can expand the functionality of the switch by downloading new software.

The M15-155 is manageable with CajunView™, Avaya's family of SNMP network management systems, or any other SNMP-based management system.

## Features



**Note:** For Software Features please refer to the Avaya M770 ATM Switch User's Guide.

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- *M15-155F* — 15 ATM OC-3 Multi-Mode Fiber (MMF) ports with SC connectors (3 m to 2000 m cable lengths)
- *M15-155SF* — 15 ATM OC-3 Single-Mode Fiber (SMF) ports with SC connectors (3 m to 15 km cable lengths)
- *M15-155MS* — 2 ATM OC-3 Single-Mode Fiber ports with (SMF – 3 m to 15 km cable lengths) and 13 Multi-Mode Fiber ports (MMF – 3 m to 2000 m cable lengths) with SC connectors.
- 32K cells output buffers
- 16K cells input buffers
- Low Cell Transfer Delay through the switch is 20  $\mu$ sec (in port to out port)
- Low Cell Variation Delay through the switch is 5  $\mu$ sec (in port to out port)
- Clock Generation /Clock Propagation of clock to all other ports
- Supports CBR, VBR-rt, VBR-nrt, ABR, UBR Classes of Service
- Supports AAL1, AAL2, AAL3/4 and AAL5 classes
- Cell Loss Priority (CLP) discard
- Early Packet Discard (EPD) and Partial Packet Discard (PPD) for AAL5
- ABR with EFCI Tagging
- Hot swapping of modules
- Line Indication – Loss of Signal (LOS), Remote Defect Indicator (RDI), Transmit and Receive traffic
- 32K Virtual Channels per port and 120K Virtual Channels per module. The Software version may limit the number of the VCs currently supported.
- LANE servers: LECS, BUS, LES, on each module. LEC on elected module.
- Idt R4650 (100 MIPS) RISC processor, 32 Mbyte RAM and 4 Mbyte Flash on EACH module for fast call set up and protocol processing.

## Front Panel Components

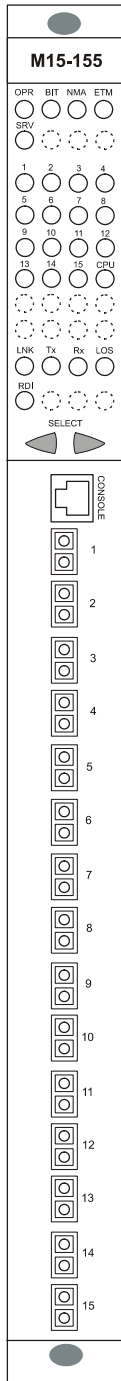


Table 1 M15-155 Front Panel Diagnostic LEDs

LED Indicator	Description	State	Meaning
OPR	Module Operational Status	ON OFF Blink	Module is OK Module is not operational Module Fault
BIT	Built-In Test	ON OFF	BIT in progress BIT not in progress
NMA	Network Management Agent	ON OFF	This module is the Master Agent Not currently the Master Agent
ETM	For future use	–	–
SRV	For future use	–	–
Function LED*		Port LED (1 ... 15, CPU)	
	LNK (default)	Port Status	ON OFF 1 Blink Port is enabled and Link OK Port is disabled Link failure (LOS or RDI)
	Tx	Transmit to line	ON OFF Data transmitted to line No activity on port
	Rx	Receive from line	ON OFF Data received from line No activity on port
	LOS	Loss of Signal	ON OFF Loss of Signal State No LOS
	RDI	Remote Defect Indicator	ON OFF Remote defect (RDI) detected No RDI

\* Use the ◀ ▶ pushbuttons on the front panel to select the Function to be displayed on the Port LEDs.

Table 2 M15-155 Front Panel Ports

Port/Connector	Function
Ports 1 and 2	M15-155F – ATM OC-3 MMF ports M15-155SF and M15-155MS – ATM OC-3 SMF ports
Ports 3 ... 15	M15-155F and M15-155MS – ATM OC-3 MMF ports M15-155SF – ATM OC-3 SMF ports
Console Connector	Terminal setup of M15-155

### **Resetting the Module**

To reset the module, press both the ◀ ▶ pushbuttons simultaneously and hold for about 2 seconds, until all LEDs light ON.

### **Entering Boot Loader Program**

To enter Boot Loader Mode, press both the ◀ ▶ pushbuttons simultaneously and hold until the OPR LED switches OFF (about 4 seconds).

# Installation

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## Installation Overview

There are several stages involved in the installation of the M15-155:

- **Module Installation:** Inserting the module in the Avaya M770 chassis and connecting cables to the module's ports for connection to other equipment such as a switch or station.
- **Command Line Interface (CLI):** Connecting a terminal to the local console to access the CLI and configuring all parameters. The CLI commands and the explanation of how to configure the switch are described in the Avaya M770 ATM Switch User's Guide.



**Caution:** The M15-155 contains components sensitive to electrostatic discharge. To prevent ESD damage, always hold the card by its sides only, and do not touch the circuit board components unless instructed to do so.

Before handling the module or inserting it in the hub, touch the chassis of the hub to discharge any electrostatic charge on your body.

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**Note:** The recommended Avaya M770 configuration is two M-PS800 units, plus a third unit for redundancy. Such a configuration supports any number of ATM, DomainX and Avaya M400 Gate Switch Modules in the chassis.

- One M-PS800 supports 7 M15-155 modules.
  - One M-PS500 supports 4 M15-155 modules.
  - Three M-PS500 support up to 12 M15-155 modules with no power supply redundancy.
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### Laser Safety

The M15-155SF Single-Mode transceiver module and the two M15-155MS Single-Mode transceiver ports are Class 1 Laser devices. They comply with IEC 825-1 and Food and Drug Administration (FDA) 21 CFR 1040.10 and 1040.11.

The transceivers must be operated under recommended operating conditions.

CLASS 1  
LASER PRODUCT

### Laser Classification

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**Note:** Class 1 lasers are inherently safe under reasonably foreseeable conditions of operation.

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**Caution:** The use of optical instruments with this product will increase eye hazard.

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### Usage Restriction

The optical ports of the module must be terminated with an optical connector or a dust plug when not in use.

### Laser Data

- Wavelength: 1300 nm
- Single-Mode Ports:
  - Transmit power (M15-155SF, M15-155MS SM ports, 9  $\mu$ m SMF):  
Minimum -15 dbm, Maximum -8 dbm
  - Receive power (M15-155SF, M15-155MS SM ports, 9  $\mu$ m SMF):  
Minimum -30 dbm, Maximum -8 dbm
- Multi-Mode Ports:
  - Transmit power (M15-155F, M15-155MS MM ports, 62.5  $\mu$ m and 50  $\mu$ m MMF):  
Minimum -20 dbm, Maximum -14 dbm
  - Receive power (M15-155F, M15-155MS MM ports, 62.5  $\mu$ m and 50  $\mu$ m MMF):  
Minimum -31 dbm, Maximum -14 dbm

## Installing the Module

The M15-155 modules occupy one slot in the Avaya M770 chassis and can be inserted into any available position. The Avaya M770 chassis ATM Backplane is available in two versions: a single-domain or a dual domain ATM Backplane. If you have the dual-domain version note that slots 1 to 7 and slots 8 to 14 in the chassis function as two separate, unconnected ATM switching domains. Therefore, if you intend to use several ATM modules as a single switch they should be on the same side of the Avaya M770 chassis.

The M15-155 can be installed or removed while power is on.

To install the M15-155:

- Hold the module (shaped like an upside down L) using both hands. The colored module name panel and LEDs should be on top (see Figure 3).
- Fold out the plastic handles on the top and bottom of the front panel.



- While holding the module by its handles, place it onto the top and bottom guide rails in the chassis and gently slide it in by pressing in the middle of the module. The module should slide in smoothly.



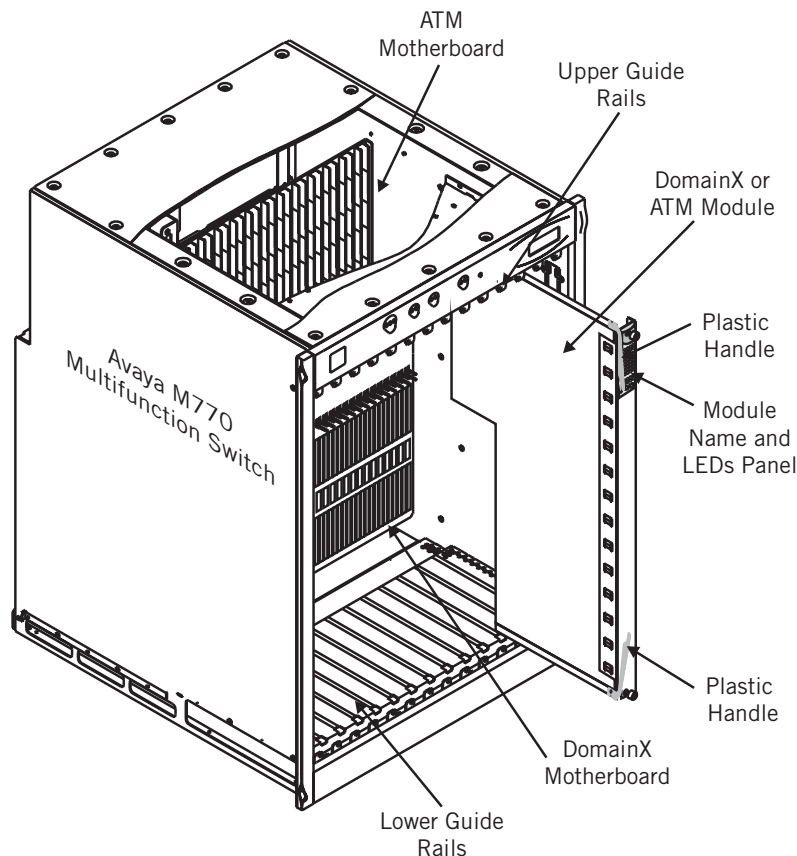
**Caution:** Ensure that the metal edges of the card (not the PCB) are aligned with the guide rails. Align the bottom edge first and then the top edge since the module slots in the bottom rail before the top rail.

- Plug in the module by pressing firmly on the mid-section of the front panel. Fold down the handles and secure the module using the two screws at the top and bottom of the front panel. *Do not over-tighten the screws.*



**Note:** Even though the modules are hot-swappable, a self initialization period is required when inserting them into the chassis. Allow about 30 seconds initialization time after inserting the module for self testing and decompression of code from Flash to RAM. If the local LECS is in Resilient mode then it will take 2 minutes for the LANE to function (see the Avaya M770 ATM Switch User's Guide).

Figure 3 Inserting the Module into the Chassis



### Power-on Check

When you plug in the M15-155, wait until first the CPU LED lights and then the OPR lights steadily before commencing work. If there are several M15-155 modules, one module will be elected as the Master Agent, and the NMA LED on that module will also light ON. For a detailed explanation of the Master Agent please refer to the Avaya M770 ATM Switch User's Guide.

### Connecting the Console Terminal

Initial software configuration of the M15-155 is done using a console terminal connected to the Console connector on the front panel of the module. See the Appendix for connector pin assignments.

To connect the M15-155 to a console terminal:

1. Turn on the VT100 terminal (or PC terminal emulator in VT100 or VT52 mode) and set its communication parameters to:  
Baud rate: 9600 bps  
Start bit: 1  
Data bits: 8  
Stop bit: 1  
Parity: None  
Refer to your terminal's user manual for instructions on how to set these parameters.
2. Insert the RJ-45 connector of the cable into the Console port on the M15-155 front panel (see Table 3 for connector pinout).
3. Insert the other end of the cable into the terminal's RS-232 port.
4. Press **<Enter>** to verify that the cabling process was successful. The system prompt appears (*M770sXX: />*).
5. The CLI commands and the explanation of how to configure the switch are described in the Avaya M770 ATM Switch User's Guide.

## Troubleshooting

Use the table below to troubleshoot common problems. If you still experience problems, please contact Avaya Communication Technical Support.

Problem	Probable Cause	Solution
BIT LED remains ON after power up or reset	Module self-test failed	i) Check that the module is correctly and fully inserted into the M770 ATM switch chassis ii) Reboot or power-up again
All LEDs remain ON after power up or reset	Module fault	Reboot or power-up again
Port LED blinks while function LED is on LNK	Link failure	Check the fiber connection to the port
OPR LED does not light ON after reboot (after more than 30 seconds)	The module may be in Monitor mode because of a Long Reset	Reset the module again but this time make a Short Reset (less than 4 seconds)

### Software Download Troubleshooting

The following are Activity Status messages that can appear during software download, their meanings, and suggested solutions.

Activity Status message	Description	Suggested action
File format unknown	File format unknown	Ensure that the correct agent software file is being downloaded to the agent
File not found	Failure of TFTP Get	Type in the correct path and filename
Server is unreachable <i>or</i> Server timeout	Failed to find the server after 1 minute	Check that you typed in the correct TFTP Server IP address. Ensure the server is accessible to the agent by typing <b>ip ping</b> < <i>ip_address_of_agent</i> >. The router is defined in the IP Gateway menu.
To many Boot Images in Flash		Erase one of the Boot Images from Flash memory
To many Main Images in Flash		Erase one of the Software Version from Flash memory
Access Violation	You do not have the required access permission	You must obtain the required access permission

## Connector Pin Assignments

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The following table shows the wiring connection to the Terminal port of the M15-155 module.

*Table 3 M15-155 Terminal Port Wiring Connections*

DCE RJ-45 PINS	Name	DTE DB-25 PINS	DTE DB-9 PINS
1	no connection		
2	TXD	3	2
3	RCV	2	3
4	DTR	20	1
5	GND	7	5
6	no connection		
7	CTS	4	7
8	RTS	5	8

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