



7H02-06 Fast Ethernet
SmartSWITCH™ Interface
Module User's Guide

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CHAPTER 1

INTRODUCTION

Welcome to Cabletron Systems 7H02-06 Fast Ethernet SmartSwitch™ Interface Module Installation Guide. This guide is a simple reference for installing and using the 7H02-06 Module. Before installing the module, carefully read this manual to gain a full understanding of its capabilities.

The 7H02-06 Module is a six port Fast Ethernet module that supports 10/100 operation in both half and full duplex. The 7H02-06 Module supports auto negotiation allowing it to automatically use the fastest link both it and the attached device are capable of. Connectivity to the ports is provided by 5 RJ45 connectors and one Fast Ethernet Port Interface Module (FEPIM), allowing either Category 5 twisted pair or multimode fiber optic cabling. This module connects to a network and the 7X00 SmartSwitch Control Module in the 7C03, 7C04 or 7C04-R MMAC SmartSwitch via a SmartSwitch bus.

1.1 USING THIS MANUAL

Chapter 1, **Introduction**, discusses the capabilities and special features of Cabletron Systems 7H02-06 Module. This chapter also includes a list of related manuals.

Chapter 2, **Network Requirements**, contains a list of available FEPIMs and the network requirements that should be considered before installing the 7H02-06 Module.

Chapter 3, **Installation**, contains instructions for installing the 7H02-06 in the 7C03 MMAC SmartSwitch, the 7C04 Workgroup SmartSwitch or the 7C04-R Workgroup SmartSwitch.

Chapter 4, **Troubleshooting**, contains instructions for using LANVIEW® (Cabletron Systems built-in diagnostic and status monitoring system).

Chapter 5, **Technical Specifications**, provides detailed information about the physical characteristics of the 7H02-06 Module.

1.2 THE 7H02-06 MODULE

The 7H02-06 Module provides six Fast Ethernet ports via 5 RJ45 connectors and one FEPIM. The 7H02-06 Module can be installed in:

- The 7C03 MMAC SmartSwitch
- The 7C04 Workgroup SmartSwitch Chassis
- The 7C04-R Workgroup SmartSwitch Redundant Chassis

The 7H02-06 Module has one backplane connection and six front panel connections. The backplane connection provides power to the 7H02-06 Module and a channel for communication with the 7X00 SmartSwitch Control Module. The six front panel ports provide Category 5 Twisted Pair (UTP) and one user configurable port for UTP or multimode fiber optic connectivity (through the FEPIM).

1.2.1 Cable Type and FEPIMs

The 7H02-06 module has six front panel connectors that interface to the 7X00 SmartSwitch through the chassis backplane. 100 Base-TX connections are provided through 5 RJ45s; one FEPIM provides 100 Base-TX (via RJ45) or 100 Base-FX (via multimode SC).

Note: *UTP operates at 10/100 Mbps, while Fiber operates at 100 Mbps. Both UTP and Fiber are capable of half or full duplex operation.*



Figure 1-1. 7H02-06 Module

1.2.2 7C03 MMAC SmartSwitch, the 7C04 Workgroup SmartSwitch and the 7C04-R Workgroup SmartSwitch

The 7H02-06 Module is designed to be installed in the 7C03 MMAC SmartSwitch, the 7C04 Workgroup SmartSwitch or the 7C04-R Workgroup SmartSwitch.

The modular design of the 7C03 MMAC SmartSwitch allows other modules that support Ethernet, Fast Ethernet, ATM, FDDI, or Token

Ring to be used with the 7H02-06 Module. These modules provide the capability to share data without the use of external bridges or routers.

The 7C03 MMAC SmartSwitch is a unique module that can be installed in an MMAC Series chassis. The 7C04 Workgroup SmartSwitch and the 7C04-R Workgroup SmartSwitch are stand-alone chassis that provide the same functions.

1.3 FEATURES

The 7H02-06 provides Fast Ethernet connectivity via 5 front panel RJ45 connectors and one FEPIM, and also includes the following features:

- LANVIEW LEDs
- FEPIMs
- Fixed connectivity ports

1.3.1 LANVIEW LEDs

The 7H02-06 Module incorporates LANVIEW - Cabletron Systems status monitoring and diagnostic system. Should a problem arise, such as a power failure, the LANVIEW LEDs help you diagnose the problem.

The 7H02-06 Module incorporates the following LANVIEW LEDs:

- Transmit (TX) LED
- Receive (RX) LED

For more information about the LANVIEW LEDs and the reset switch on the 7H02-06 Module, refer to Chapter 4, Troubleshooting.

1.3.2 FEPIMs

The front panel connections are standard Cabletron FEPIMs. Currently, the 7H02-06 supports the following two FEPIMs:

- FE-100TX (see Figure 1-2). The FE-100TX allows Fast Ethernet connectivity using Category 5 Twisted Pair (UTP) cabling with one RJ45 connector.



Figure 1-2. FE-100TX PIM.

- FE-100FX (see Figure 1-3). The FE-100FX allows Fast Ethernet connectivity using multi-mode fiber optic cabling with SC connector.

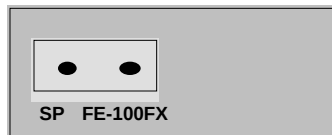


Figure 1-3. FE-100FX PIM.

Refer to Appendix A of this manual for the specifications for these FEPIMs.

1.3.3 Connectivity

The 7H02-06 Module has one backplane connection and five front panel RJ45 connections and one FEPIM connection. The backplane connection provides power to the 7H02-06 Module and a channel for communication with the 7X00 SmartSwitch Control Module. The six front panel ports provide Category 5 Twisted Pair (UTP) and/or multimode fiber optic connectivity.

1.4 RELATED MANUALS

The manuals listed below should be used to supplement the procedures and other technical data provided in this manual. The procedures will be referenced, where appropriate, but will not be repeated.

7X00 SmartSwitch Control Module User's Guide

7H02-06 Installation Guide

7H02-06 Local Management Appendix

7C03 MMAC SmartSwitch Installation Guide

7C04 Workgroup SmartSwitch Installation Guide

7C04-R Workgroup SmartSwitch Installation Guide

1.5 GETTING HELP

If you need additional support related to the Cabletron Systems 7H02-06 Module, or if you have any questions, comments or suggestions related to this manual, contact Cabletron Systems Technical support:

By phone:	(603) 332-9400
By CompuServe®:	GO CTRON from any! prompt
By Internet mail:	support@ctrn.com
By Fax:	(603) 337-3075
By BBS:	(603) 335-3358
By Mail:	Cabletron Systems, Inc. P.O. Box 5005 Rochester, NH 03866-5005

CHAPTER 2

NETWORK REQUIREMENTS

Before installing Cabletron Systems 7H02-06 Module, review the network requirements outlined in this chapter. All requirements included in this chapter should be met to ensure satisfactory performance of the 7H02-06 Module. Failure to do so may result in unsatisfactory network performance.

2.1 FEPIM MODULE SPECIFICATIONS

This module uses 5 RJ45 connectors and one Fast Ethernet Port Interface Modules (FEPIMs) to provide front panel cable connections. The FEPIMs are user-installable. See Section 3.2 **INSTALLING FEPIMS**.

2.2 FE-100FX

The FE-100FX provides a multimode fiber connection, using a SC type connector. The specifications for this device are listed in Table 2-1.

Table 2-1. FE-100FX Specifications

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
Receive Sensitivity	-30.5 dBm	-28.0 dBm	—	—
Peak Input Power	-7.6 dBm	-8.2 dBm	—	—

Transmitter power parameters are listed in Table 2-2.

Table 2-2. Transmitter Power Parameters

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
50/125 μm fiber	-13.0 dBm	-15.0 dBm	13.0 dB	17.5 dB
62.5/125 μm fiber	-10.0 dBm	-12.0 dBm	16.0 dB	20.5 dB
100/140 μm fiber	-7.0 dBm	-9.0 dBm	19.0 dB	23.5 dB
Error Rate	Better than 10 ⁻¹⁰			

The link distance is up to 2 kilometers on the multimode fiber-optic cable as specified by ANSI MMF-PMD.

***Note:** The link distance for Full Duplex is 2km; if Full Duplex is not being utilized, the link distance is 400 meters.*

2.3 FE-100TX AND FIXED RJ45 PORTS

The FE-100TX has an RJ45 connector supporting a Category 5 Unshielded Twisted Pair (UTP) connection. The pinouts for the FE-100TX and FE-100FX are listed in Table 2-3.

Table 2-3. FEPIM Pinouts

Pin Number	Represents	Pin Number	Represents
1	Transmit+	5	NA
2	Transmit-	6	Receive-
3	Receive+	7	NA
4	NA	8	NA

The link distance is up to 100 meters on unshielded Category 5 twisted pair cable as specified by ANSI TP-PMD.

CHAPTER 3

INSTALLATION

This chapter contains instructions for unpacking and installing the 7H02-06 Module in the 7C03, 7C04, 7C04-R MMAC SmartSwitch. Also included in the chapter are instructions for the front panel FEPIMs.

3.1 UNPACKING THE 7H02-06 MODULE

Unpack the 7H02-06 Module by using the following steps:

1. Carefully remove the module from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)
2. Remove the module from the plastic bag. Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
3. Carefully examine the module and check for damage. If damage exists, DO NOT install the module; contact Cabletron Systems Technical Support.

3.2 INSTALLING FEPIMS

The 7H02-06 module is shipped without an FEPIM. To install an FEPIM, follow the procedure below:

1. Remove the module if it is installed in the 7C03 MMAC SmartSwitch chassis (follow the procedure in Section 3.3.2.)

Note: *The procedure for removing the module depends upon the chassis (7C03, 7C04 or 7C04-R) the module is installed in. See the applicable removal procedure contained within the following pages.*

2. Remove the module faceplate by removing the 3 screws on the bottom of the module. Carefully remove the module faceplate exposing the slot for the FEPIM (see Figure 3-1).

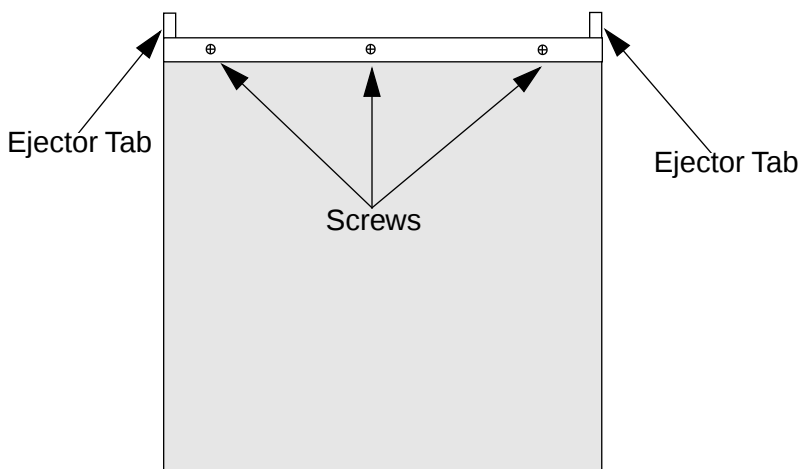


Figure 3-1. Module Bottom View

3. Remove the blank front cover over the FEPIM slot.
4. Install the FEPIM as shown in Figure 3-2. Ensure that the rear connector is seated firmly before tightening the three mounting screws.

Note: *Carefully push the FEPIM straight down once it is firmly seated onto the module.*

5. Re-install the module faceplate by adding the 3 mounting screws to the bottom of the module.

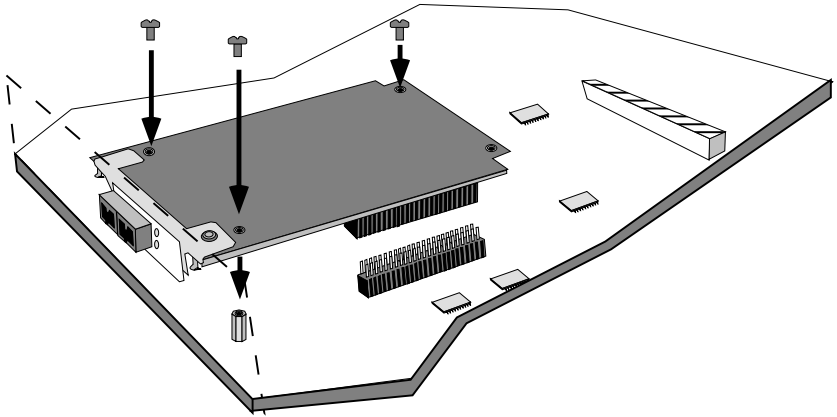


Figure 3-2. Installing an FEPIM

3.3 INSTALLING/REMOVING THE 7H02-06 MODULE

The 7H02-06 Module is installed in: the 7C03 MMAC SmartSwitch, the 7C04 Workgroup SmartSwitch or the 7C04-R Workgroup SmartSwitch by using the following steps and referring to the appropriate figure.

3.3.1 Installing the 7H02-06 Module in a 7C03 MMAC SmartSwitch

The 7H02-06 Module cannot be installed in the left most slot of the 7C03 MMAC SmartSwitch. That slot is reserved for the 7X00 SmartSwitch Controller Module.

Note: Before installing the 7H02-06 Module, attach the wrist strap included with the module (instructions are printed on the packet).

To install the 7H02-06 Module in a 7C03 MMAC SmartSwitch, follow the listed steps and refer to Figure 3-3.

1. Remove the blank panel covering the slot in which the module will be installed. All other slots in the 7C03 must remain covered to ensure proper airflow and cooling.
2. Slide the module into the slot. Make sure the printed circuit board (PCB) is between the card guides, slides in straight, and engages the backplane connectors properly.
3. Use a slotted screwdriver to tighten the module's front panel screws.

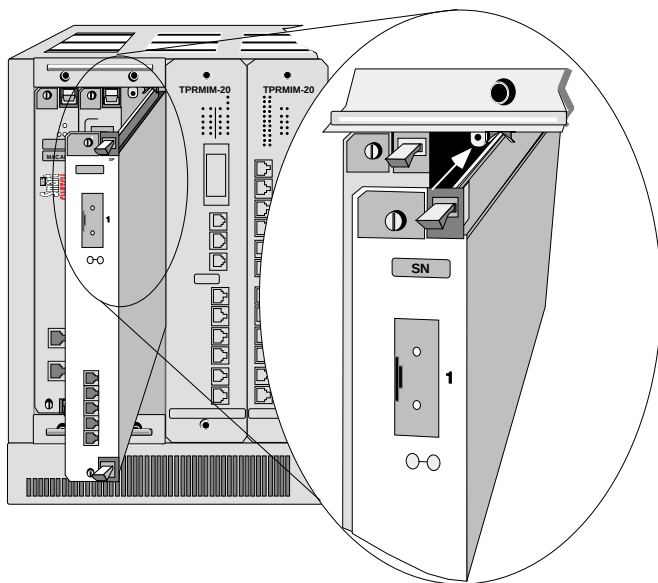


Figure 3-3. Installing the 7H02-06 Module in the 7C03 MMAC SmartSwitch

3.3.2 Removing the 7H02-06 Module from a 7C03 MMAC SmartSwitch

To remove the 7H02-06 Module from a 7C03 MMAC SmartSwitch, follow the listed steps and refer to Figure 3-4.

Note: Before removing the 7H02-06 Module, attach the wrist strap included with the module (instructions are printed on the packet).

1. Use a slotted screwdriver to loosen the two screws that secure the module to the chassis.
2. Locate the two ejector tabs on the module (to the right of the screws on the top and bottom of the module).
3. Simultaneously press down on the bottom ejector tab and press up on the top ejector tab until the module ejects from the backplane.
4. Grasp both ejector tabs and carefully slide the module out of the chassis.

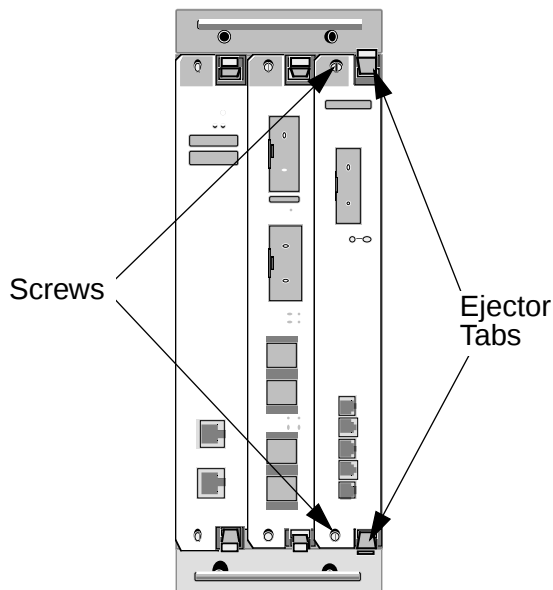


Figure 3-4. Removing the 7H02-06 Module from a 7C03 MMAC SmartSwitch

3.3.3 Installing the 7H02-06 Module in a 7C04 or 7C04-R Chassis

To install the 7H02-06 Module in a 7C04 or 7C04-R Chassis, follow the listed steps and refer to Figure 3-5 and Figure 3-6, respectively.

Notes: *The 7H02-06 Module cannot be installed in the top slot of the 7C04 Chassis. The top slot is reserved for the 7X00 SmartSwitch Module.*

The 7H02-06 Module cannot be installed in the bottom slot in the 7C04-R Chassis. The bottom slot is reserved for the 7X00 SmartSwitch Module.

Before installing the 7H02-06 Module, attach the wrist strap included with the module (instructions are printed on the packet).

1. Remove the blank panel covering the slot in which the module will be installed. All other slots in the chassis must remain covered to ensure proper airflow and cooling.
2. Slide the module into the slot. Make sure the printed circuit board (PCB) is between the card guides, slides in straight, and engages the backplane connectors properly.
3. Use a slotted screwdriver to tighten the module's front panel screws.

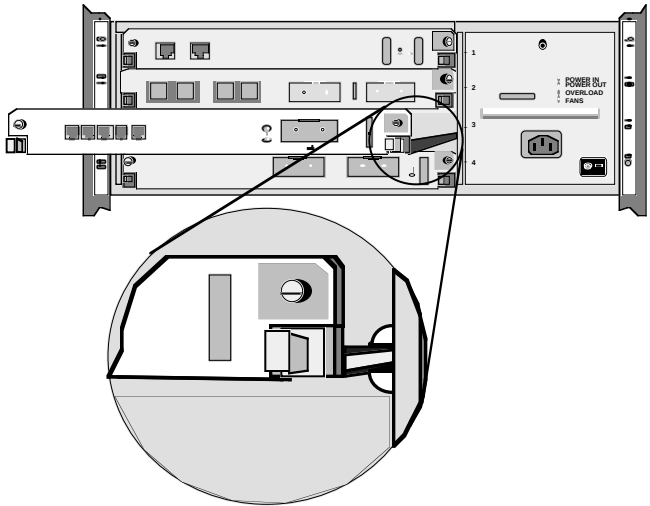


Figure 3-5. Installing the 7H02-06 Module in the 7C04 Workgroup SmartSwitch

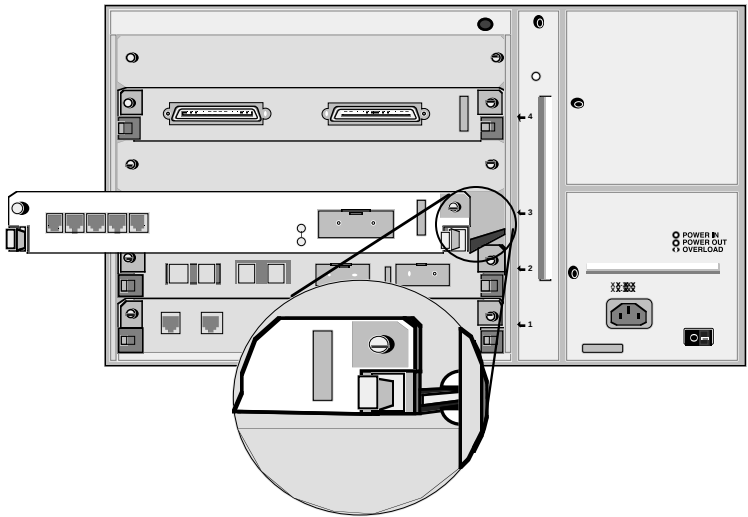


Figure 3-6. Installing the 7H02-06 Module in the 7C04-R Workgroup SmartSwitch

3.3.4 Removing the 7H02-06 Module from a 7C04 or 7C04-R Chassis

To remove the 7H02-06 Module from a 7C04 or 7C04-R Chassis, follow the listed steps and refer to Figure 3-7 and Figure 3-8 respectively.

Note: Before removing the 7H02-06 Module, attach the wrist strap included with the module (instructions are printed on the packet).

1. Use a slotted screwdriver to loosen the two screws that secure the module to the chassis.
2. Locate the two ejector tabs on the module (below the screws on the left and right ends of the module).
3. Simultaneously press left on the left ejector tab and press right on the right ejector tab until the module ejects from the backplane.
4. Grasp both ejector tabs and carefully slide the module out of the chassis.

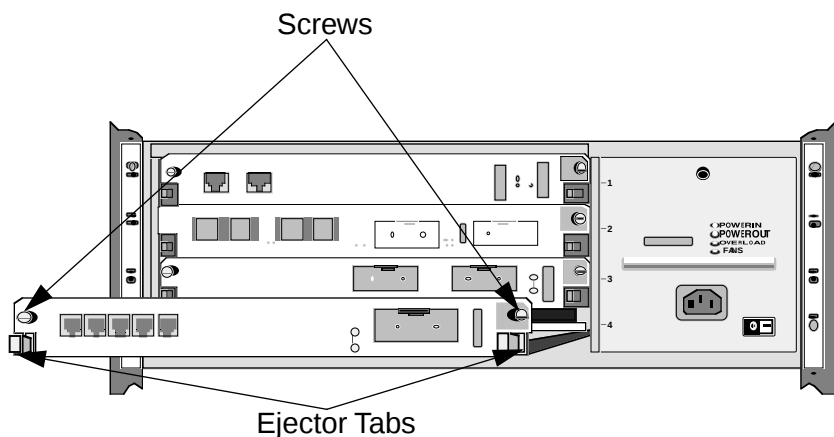


Figure 3-7. Removing the 7H02-06 Module from the 7C04 Workgroup SmartSwitch

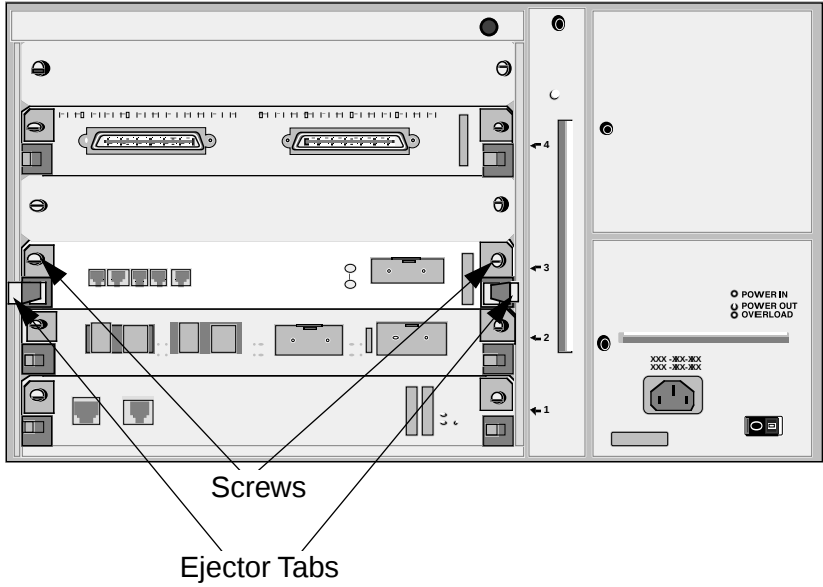


Figure 3-8. Removing the 7H02-06 Module from the 7C04-R Workgroup SmartSwitch.

CHAPTER 4

TROUBLESHOOTING

The 7H02-06 Module uses LANVIEW, Cabletron Systems built-in visual diagnostic and status monitoring system.

With LANVIEW LEDs the status of each transmit and receive port on the 7H02-06 Module can be determined, at a glance. This section discusses the function and purpose of the LEDs on the 7H02-06 Module.

Figure 4-1 shows the LANVIEW LEDs of the 7H02-06 Module.

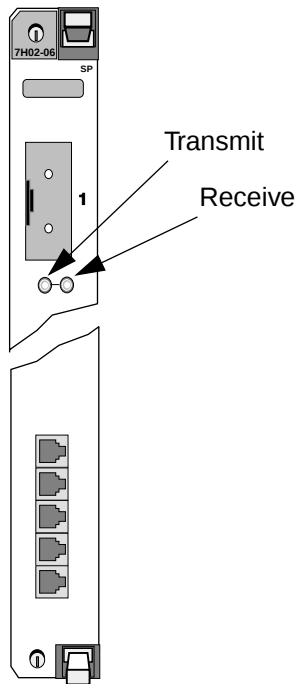


Figure 4-1. The LANVIEW LEDs

Table 4-1 indicates the state of the receive port.

Table 4-1. Port Receive LEDs

LED Color	State
Green	Link, no activity, port enabled
Green (Flashing)	Link, port disabled
Yellow (Flashing)	Link, activity, port enabled (flashing to steady-on indicates receive rate).
Red	Fault
Off	No link, port disabled

Table 4-2 indicates the state of the transmit port.

Table 4-2. Port Transmit LEDs

LED Color	State
Green (Flashing)	Data activity, port enabled (flashing to steady-on indicates rate).
Yellow (Blinking)	Port in Standby State
Red (Flashing)	Collision (flashing to steady-on indicates rate).
Red	Fault
Off	No activity, port enabled

CHAPTER 5

TECHNICAL SPECIFICATIONS

This chapter includes the technical specifications for Cabletron Systems 7H02-06 module. Cabletron Systems reserves the right to change these specifications at any time without notice.

5.1 SYSTEM RESOURCES

Internal Processor: Intel i960 running at 33 MHz

Read Only Memory: 256K bytes

CPU Memory: 8 MB

Packet Filter Rate: 750,000 packets

Packet Forward Rate: 750,000 packets

Aging Time: 5 minutes

5.2 STANDARDS

IEEE 802.1D

IEEE 802.3i 10BASE-T

5.3 SAFETY

The 7H02-06 module meets the following safety guidelines for limitations of conducted and radiated emissions:

- UL1950
- CSA C22.2 No.950
- EN60950
- IEC 950

5.4 EMI

The 7H02-06 Module meets the requirements of:

- FN55022 Class A
- FCC Part 15 Class A

- VCCI Class I

5.5 IMMUNITY

The 7H02-06 Module meets the requirements of EN50082-1 including:

- IEC 801-2 ESD
- IEC 803-1 radiated immunity
- IEC 801-4 EFT/B

5.6 NETWORK INTERFACES

5 RJ45 connectors and 1 FEPIM.

5.7 SERVICE

MTBF >200,000 hours

MTTR <0.5 hour

5.8 PHYSICAL

5.8.1 Dimensions

31.1 D x 22.9 H x 3.1 W centimeters

(12.3 D x 9.0 H x 1.2 W inches)

5.8.2 Weight

Unit: 1.8 kg. (4 lbs.)

Shipping 4.5 kg. (10 lbs.)

5.8.3 Environmental

Operating Temperature +5° to +40° C (+41° to +104° F)

Storage Temperature -30° to +80° C (-22° to +160° F)

Relative Humidity 5 to 95% (non-condensing)

APPENDIX A

The 7H02-06 module uses Fast Ethernet Interface Modules (FEPIMs) to provide front panel cable connections. The FEPIMs are user-installable. See the section 'Installing an FEPIM' on page 3-1.

A.1 FE-100TX

The FE-100TX is an RJ45 connector supporting Unshielded Twisted Pair (UTP) cabling.

The slide switch on the FE-100TX determines the crossover status of the cable pairs. If the switch is on the **X** side, the pairs are internally crossed over. If the switch is on the **=** side, the pairs are not internally crossed over. Figure A-1 shows the pinouts for the FEPIM-100TX in both positions.

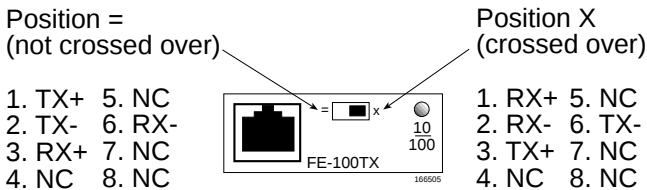


Figure A-1. FE-100TX Pinouts

A.2 FE-100FX

The FE-100FX shown in Figure A-2 supports multimode fiber optic cabling. The FE-100FX is equipped with an SC style port. Transmitter power specifications for the FE-100FX are listed in Table A-1 on the following page.

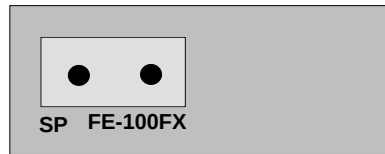


Figure A-2. FE-100FX

The transmitter power levels listed in Table A-1 are peak power levels after optical overshoot. A peak power meter must be used to correctly compare the values given below to those measured on any particular port. If power levels are being measured with an average power meter, add 3 dBm to the measurement to compare the measured values to the values listed below.

Table A-1. Transmitter Power Levels

Cable Type	Worst Case Budget	Typical Budget
50/125 μm fiber	6.0 dB	9.0 dB
62.5/125 μm fiber	9.0 dB	12.0 dB
100/140 μm fiber	15.0 dB	18.0 dB