StackMaster™ Manageable Hub

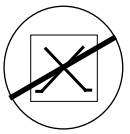
#7332.H

SMHB-E-TBT-16, SMHB-E-TBT-24, SMHB-E-FL-6, SMHB-E-FL-12, SMME-E, SMMC-E

For assistance in installing, using, or maintaining the TRANSITION Networks StackMaster™ Manageable Hub, contact TRANSITION Networks Technical Support at:

(800) 260-1312

or contact your local distributor.



CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Compliance Information

UL Listed
C-UL Listed (Canada)
CISPR/EN55022 Class A

FCC Regulations

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Canadian Regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications.

European Regulations

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Copyright Restrictions

Trademark Notice

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Preface

This guide is intended for the system or network administrator responsible for installing, configuring, using, and maintaining a Transition Networks StackMaster™ unit or stacked set of units. A working knowledge of local area network (LAN) operations, including familiarity with communications protocols used on interconnected LANs, is assumed.

1. Introduction

The StackMaster™ Ethernet Repeater Stack is an expandable stack of repeater hubs, connected to various media, that functions through an inter-repeater bus as a single Ethernet repeater. The minimum StackMaster™ configuration consists of a single unit: the 16-Port 10BaseT hub, the 24-Port 10BaseT hub, the 6-Port 10BaseFL hub, or the 12-Port 10BaseFL hub.

The StackMaster™ configuration is expanded by adding up to five additional StackMaster™ repeaters selected from among the 24-Port 10BaseT hub, the 6-Port 10BaseFL hub, and/or the 12-Port 10BaseFL hub. Inter-repeater bus connectors, located on the back of the StackMaster™ hubs, are used for cascading the six hubs into a single repeater.

Optional SNMP Management of a StackMaster™ stack is provided either by an external SNMP Management hub or by an optional SNMP Management circuit board installed in the 16-Port 10BaseT hub, the StackMaster™ 24-Port 10BaseT hub, the 6-Port 10BaseFL hub or the 12-Port 10BaseFL hub. The SNMP Management hub and SNMP management circuit boards provide SNMP formatted information to external network management platforms.

Fully configured StackMaster™ stacks can be connected to each other in a network. (Each stack must have separate SNMP network management.) Standard Ethernet network conventions regarding cable distances and segment numbers must be followed.

Selectable hubs used in the StackMaster™ stack include:

- 16-Port 10BaseT hub (with optional SNMP management board)
- 24-Port 10BaseT hub (with optional SNMP management board)
- 6-Port 10BaseFL hub (with optional SNMP management board)
- 12-Port 10BaseFL hub (with optional SNMP management board)
- SNMP Management hub

1.1 24-Port 10BaseT Repeater

The StackMaster™ 24-Port 10BaseT hub supports twenty-four RJ-45 10BaseT connections to either shielded or unshielded twisted pair. Additionally, the StackMaster™ 24-Port 10BaseT hub supports installation of an SNMP Management Board that allows the StackMaster™ 24-Port 10BaseT hub to manage the entire StackMaster™ Stack.

Connectors

Twenty-four (24) RJ-45 connectors are provided at the front of the 24-Port 10BaseT hub.

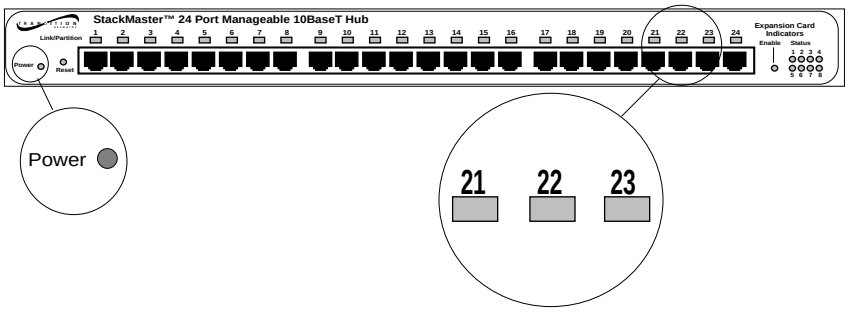
NOTE: A power connector, DB9 serial port connector, AUI port connector, and Cascade (bus) connector are provided at the back of the 24-Port 10BaseT hub.

Indicators

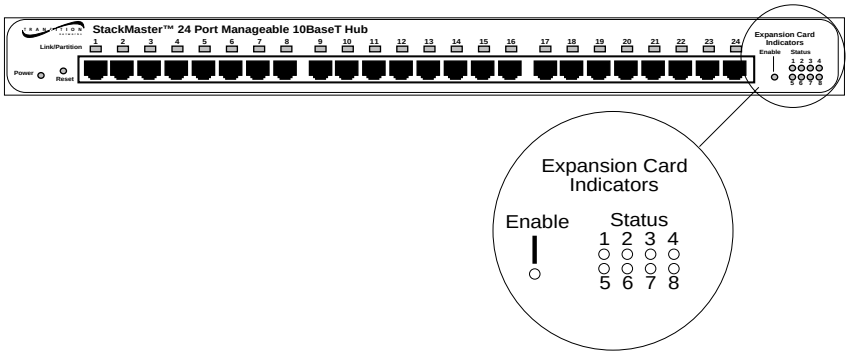
When the StackMaster™ 24-Port 10BaseT hub is powered, the **Power** indicator is illuminated. Combination **Link/Partition** LEDs above each of the twenty-four RJ-45 connectors indicate link and partition status for each of the twenty-four 10BaseT connections:

green LED: good link

red LED: partition

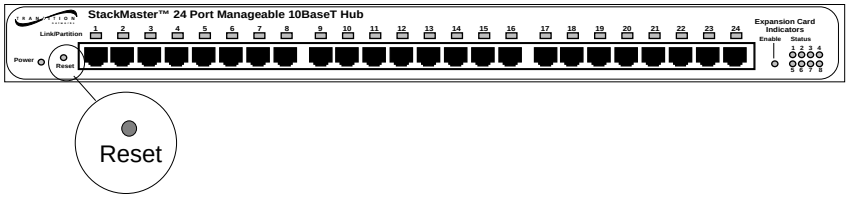


When the SNMP Management circuit board is installed and managing the StackMaster™ Stack, the **Expansion Card Indicators** (SNMP Management circuit board indicators) are active. The **Enable** indicator is illuminated when the SNMP Management circuit board is installed. When the StackMaster™ Stack is functioning normally, the eight **Status** indicators cycle in a steady roll.



Switches

The reset switch reinitializes the StackMaster™ 24-Port 10BaseT hub.



NOTE: If the SNMP Management Board is installed in the StackMaster™ 24-Port 10BaseT hub and the StackMaster™ 24-Port 10BaseT hub is installed at the top of a Stack, the reset switch resets the entire Stack.

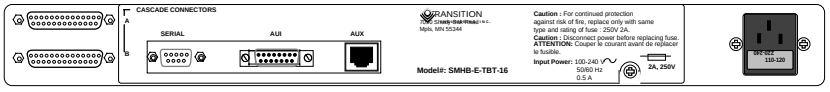
1.2 16-Port 10BaseT Repeater

The StackMaster™ 16-Port 10BaseT Repeater hub supports sixteen RJ-45 10BaseT connections to either shielded or unshielded twisted pair. Additionally, the StackMaster™ 16-Port 10BaseT hub supports installation of an SNMP Management Board that allows the StackMaster™ 16-Port 10BaseT hub to manage the entire StackMaster™ Stack.

Connectors

Sixteen (16) RJ-45 connectors are provided at the front of the 16-Port 10BaseT Repeater hub.

A power connector, DB9 serial port connector, AUI port connector, and Cascade (bus) connector are provided at the back of the 16-Port 10BaseT hub.

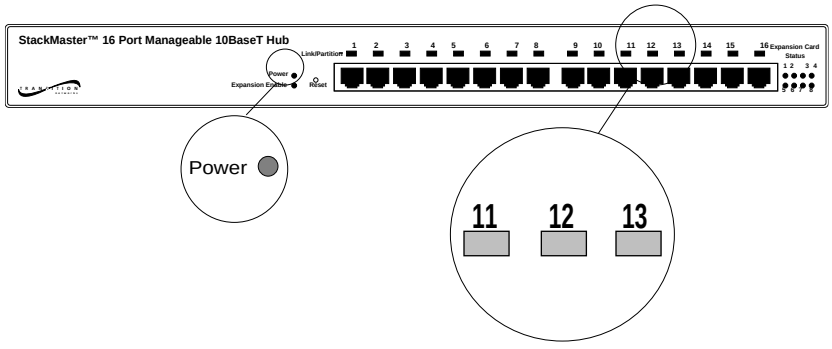


Indicators

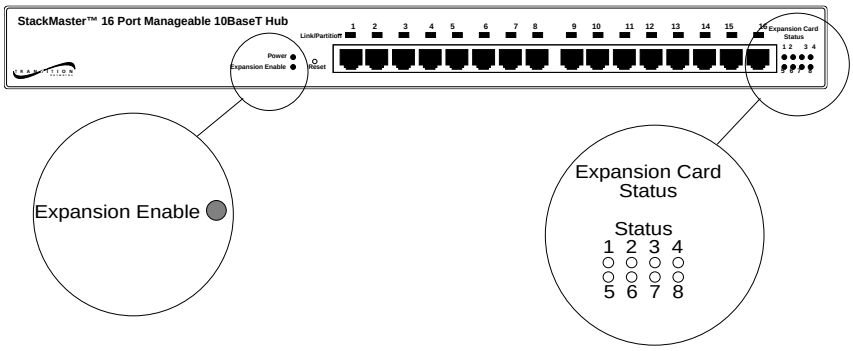
When the StackMaster™ 16-Port 10BaseT Repeater hub is powered, the **Power** indicator is illuminated. Combination **Link/Partition** LEDs above each of the sixteen RJ-45 connectors indicate link and partition status for each of the sixteen 10BaseT connections:

green LED: good link

red LED: partition

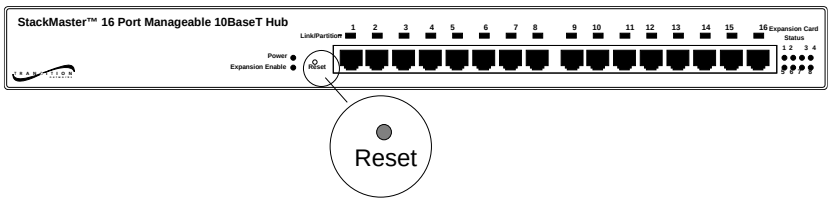


When the SNMP Management circuit board is installed and managing the StackMaster™ Stack, the **Expansion Enable** and **Expansion Card Status Indicators** (SNMP Management circuit board indicators) are active. The **Expansion Enable** indicator is illuminated when the SNMP Management circuit board is installed. When the StackMaster™ Stack is functioning normally, the eight **Expansion Card Status** indicators cycle in a steady roll.



Switches

The **Reset** switch reinitializes the StackMaster™ 16-Port 10BaseT Repeater.



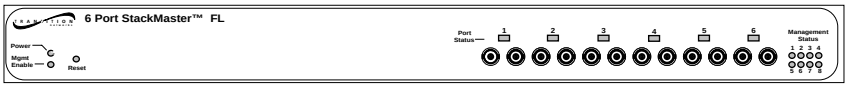
NOTE: If the SNMP Management Board is installed in the StackMaster™ 16-Port 10BaseT Repeater hub and the StackMaster™ 16-Port 10BaseT Repeater hub is installed at the top of a Stack, setting the reset switch resets the entire Stack.

1.3 6-Port 10BaseFL Repeater

The StackMaster™ 6-Port 10BaseFL Repeater hub supports six 10BaseFL port connections. Additionally, the StackMaster™ 6-Port 10BaseFL hub supports installation of an SNMP Management Board that allows the StackMaster™ 6-Port 10BaseFL hub to manage the entire Stack.

Connectors

Six (6) 10BaseFL port connections through transmit (TX) and receive (RX) ST connectors are provided at the front of the 6-Port 10BaseFL Repeater.

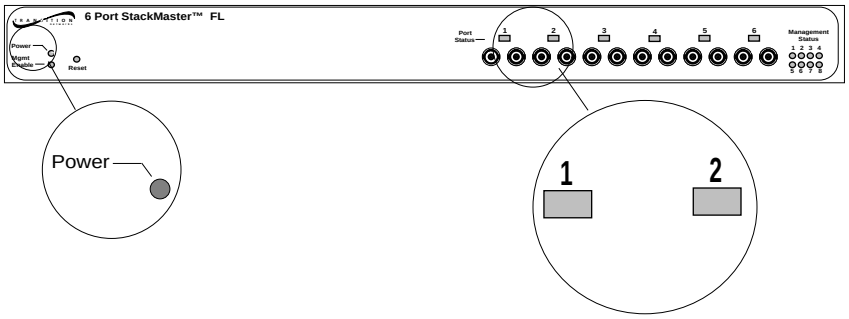


NOTE: A power connector, DB9 serial port connector, AUI port connector, and Cascade (bus) connector are provided at the back of the 6-Port 10BaseFL hub.

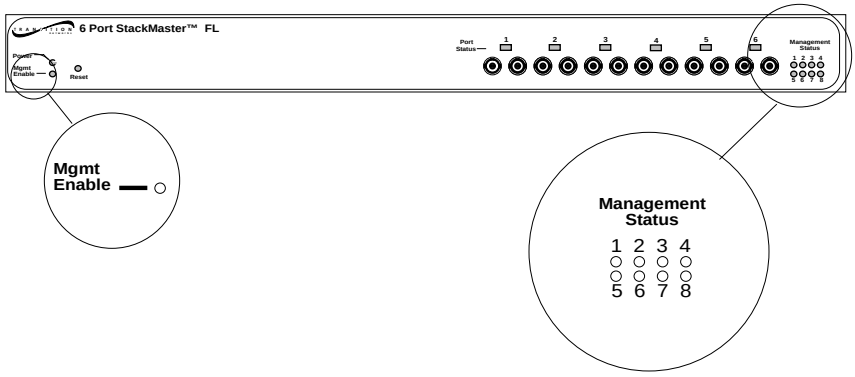
Indicators

When the StackMaster™ 6-Port 10BaseFL hub is powered, the **Power** indicator is illuminated. **Port Status** LEDs above each of the six 10BaseFL TX/RX port connector pairs indicate link status for each of the six connections:

green LED: good link

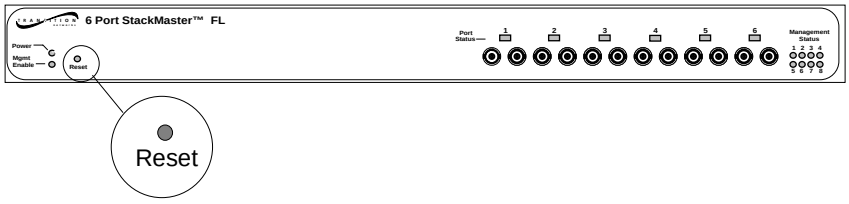


When the SNMP Management circuit board is installed and managing the StackMaster™ Stack, the SNMP Management circuit board indicators are active. The **M**ana**g**e**m**en**t** (**Mgmt**) **Enable** indicator is illuminated when the SNMP Management circuit board is installed. When the StackMaster™ Stack is functioning normally, the eight **Management Status** indicators cycle in a steady roll.



Switches

The reset switch reinitializes the StackMaster™ 6-Port 10BaseFL hub.



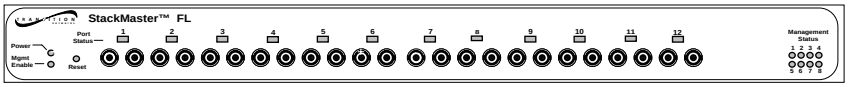
NOTE: If the SNMP Management Board is installed in the StackMaster™ 6-Port 10BaseFL hub and the StackMaster™ 6-Port 10BaseFL hub is installed at the top of a Stack, the reset switch resets the entire Stack.

1.4 12-Port 10BaseFL Repeater

The StackMaster™ 12-Port 10BaseFL hub supports twelve 10BaseFL port connections. Additionally, the StackMaster™ 12-Port 10BaseFL hub supports installation of an SNMP Management Board that allows the StackMaster™ 12-Port 10BaseFL hub to manage the entire Stack.

Connectors

Twelve (12) 10BaseFL port connections through transmit (TX) and receive (RX) ST connectors are provided at the front of the 12-Port 10BaseFL hub.

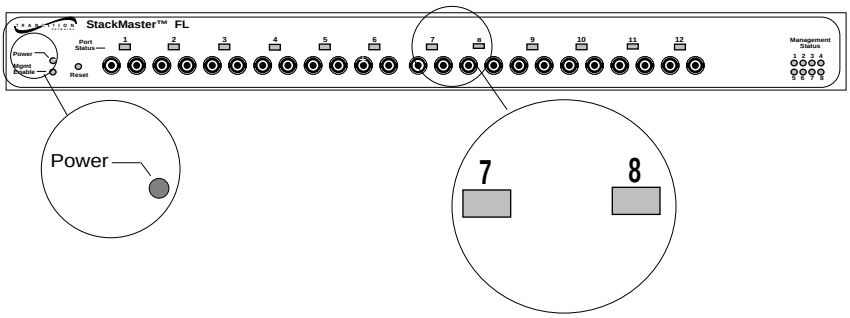


NOTE: A power connector, DB9 serial port connector, AUI port connector, and Cascade (bus) connector are provided at the back of the 12-Port 10BaseFL hub.

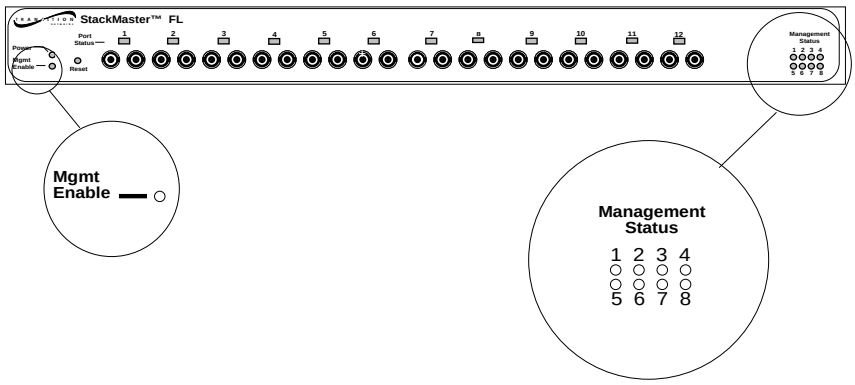
Indicators

When the StackMaster™ 12-Port 10BaseFL hub is powered, the **Power** indicator is illuminated. **Port Status** LEDs above each of the twelve 10BaseFL TX/RX port connector pairs indicate link status for each of the twelve input/output connections.

green LED: good link

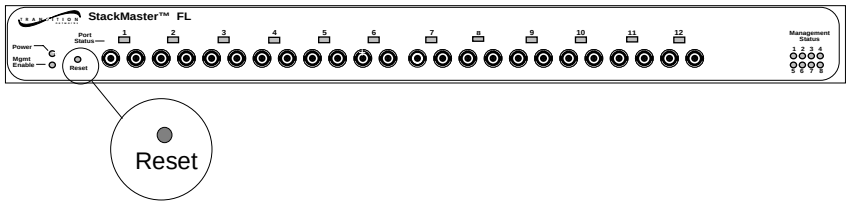


When the SNMP Management circuit board is installed and managing the StackMaster™ Stack, the SNMP Management circuit board indicators are active. The **M**ana**g**e**m**en**t** (**Mgmt**) **Enable** indicator is illuminated when the SNMP Management circuit board is installed. When the StackMaster™ Stack is functioning normally, the eight **Management Status** indicators cycle in a steady roll.



Switches

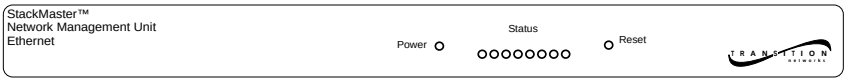
The reset switch reinitializes the StackMaster™ 12-Port 10BaseFL hub.



NOTE: If the SNMP Management Board is installed in the StackMaster™ 12-Port 10BaseFL hub and the StackMaster™ 12-Port 10BaseFL hub is installed at the top of a Stack, the reset switch resets the entire Stack.

1.5 StackMaster™ SNMP Management Unit

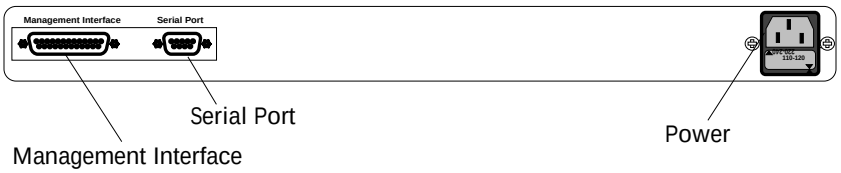
The optional StackMaster™ SNMP Management unit can be installed at the top of the StackMaster™ stack to provide SNMP formatted information to external network management platforms.



NOTE: SNMP management also can be provided by an optional SNMP management circuit board installed in one of the StackMaster™ units.

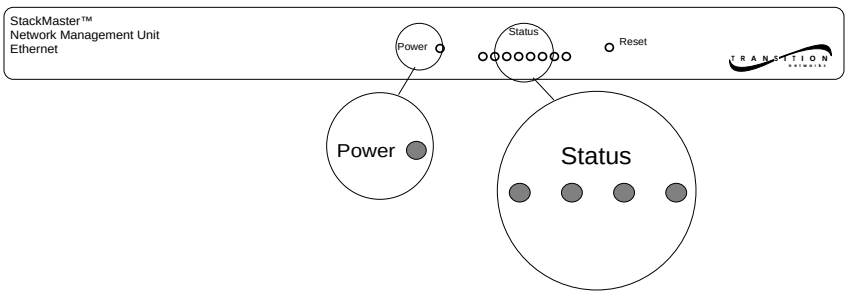
Connectors

A **Management Interface** (bus) connector, DB9 **Serial Port** connector, and power connector are provided at the back of the SNMP Management hub.



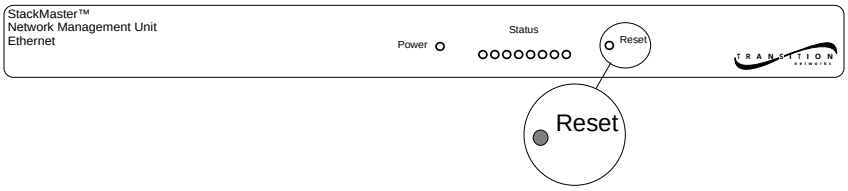
Indicators

When the StackMaster™ SNMP Management hub is powered, the **Power** indicator is illuminated. When the StackMaster™ Stack is functioning normally, the eight **Status** indicators cycle in a steady roll.



Switches

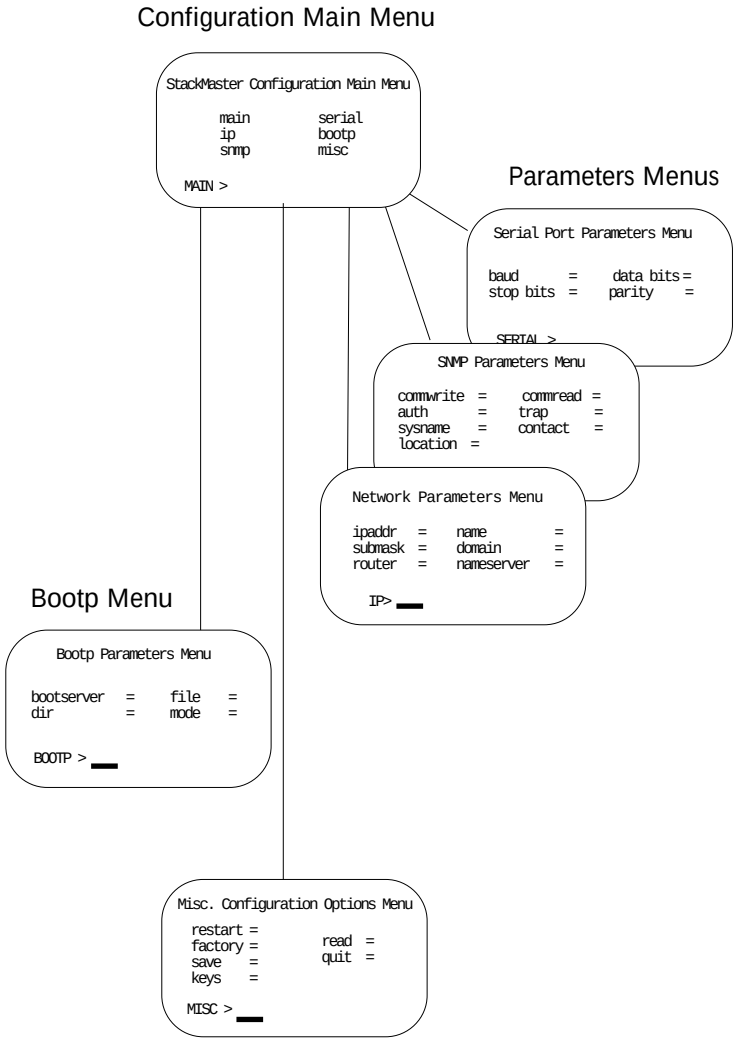
The reset switch on the StackMaster™ SNMP Management hub reinitializes the entire stack.



NOTE: The StackMaster™ SNMP Management hub uses “flash ROM”, which allows firmware upgrades over the network.

1.6 SNMP Configuration Software

The StackMaster™ comes with software configuration parameters set to standard default values. Through a set of configuration menus displayed at an ASCII terminal or terminal emulation attached to the SNMP Management hub or to a StackMaster™ hub which has the SNMP management board installed , users are guided through modifying SNMP management configuration parameters.



1.6.1 StackMaster™ Configuration Main Menu

The StackMaster™ Configuration software comes up with the StackMaster™ Configuration Main Menu:

```
    StackMaster Configuration Main Menu

      main                      serial
      ip                        bootp
      snmp                      misc



 Select a parameter [main ==> root menu OR ? ==> help]
MAIN >
```

The StackMaster™ Configuration Main Menu allows selection of the following menus:

ip	Network Parameters Menu
snmp	SNMP Parameters Menu
serial	Serial port Parameters Menu
bootp	Bootp Parameters Menu (for loading configuration parameters from attached terminal or network server)
misc	Miscellaneous Configuration Options Menu (for access to configuration software commands)

Parameter values can be set at any of the configuration menus, including the StackMaster™ Configuration Main Menu.

NOTE: Any StackMaster™ configuration menu also allows command line entry of any menu-selectable command.

Command Syntax

At any and all StackMaster™ configuration menus, the command syntax for modifying a parameter is:

ANY MENU > **<parameter> = <value>**

The commands for saving the modified parameter are:

ANY MENU > **<save>**

ANY MENU > **<restart>**

ANY MENU > **<quit>**

? (Help) Option

At any and all StackMaster™ configuration menus, entering the help command in the format:

MENU > **<parameter> = <?>**

brings up all acceptable values for the parameter.

Keys Option

At any and all StackMaster™ configuration menus, entering the keys command in the format:

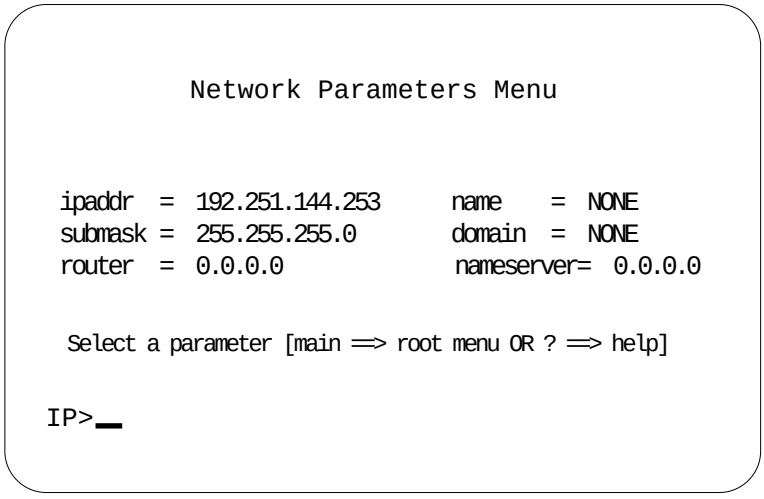
MENU > **keys**

brings up a reference list of line-editing commands.

```
        Key Mapping for Command Line Editing

^B =  One character back      ^F = One Character forward
^W = Start of current word    ^N = Start of next word
^A = Start of command line    ^Z = End of command line
^H = Back Space and Erase     ^X = Erase at cursor
^E = Erase current word       ^Q = Abort current command line
^I = Toggle insert mode      CR! = Repeat last command line

      Select a parameter [main ==> root menu OR ? ==> help]


  MAIN >
```

1.6.2 IP Parameters Menu

The IP Parameters Menu, selectable from the Configuration Main Menu, brings up software for verifying or for setting the Internet protocol network parameters.



The Network Parameters Menu comes up with system values for the following network parameters:

IP address	**= x.x.x.x**	Management station to which asynchronous SNMP reports will be sent, in format: nnn.nnn.nnn.nnn*
submask	**= x.x.x.x**	Subnet mask (Site-specific identifier)
router	**= x.x.x.x**	Site-specific identifier
name	**= up to 256 characters**	UNUSED
domain	**= up to 256 characters**	UNUSED
nameserver	**= x.x.x.x**	UNUSED

NOTE: Parameter values which have not been set are indicated at the Network Parameters Menu by zeros or by the word “NONE”.

* IP addresses, which form the logical address basis for TCP/IP and SNMP networking, can be obtained by contacting:

Network Information Center
SRI International
Stanford, California USA

telephone: 1-800-235-3155

network: HOSTMASTER@SRI-NIC.ARPA

1.6.3 SNMP Parameters Menu

The SNMP Parameters Menu, selectable from the Configuration Main Menu, brings up software for verifying or for setting Simple Network Management Protocol (SNMP) parameters.

```
                SNMP Parameters Menu


commwrite       =  PRIVATE      commread        =  PUBLIC
auth            =  DISABLE      trap            =  0.0.0.0
sysname         =  NONE         contact         =  NONE
location        =  NONE

Select a parameter [main ==> root menu OR ? ==> help]


SNMP >
```

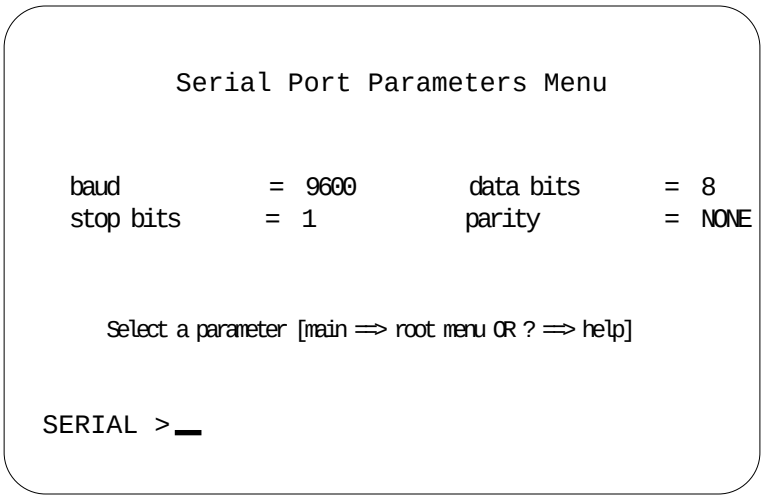
NOTE: SNMP is the standard management protocol for multi-vendor IP networks.

The SNMP Parameters Menu comes up with default values for the following network parameters:

commwrite	**= PRIVATE** or **PUBLIC**	Security permission
auth	**= DISABLE** or **ENABLE**	Security identifier
sysname	**= up to 256 characters**	Site-specific identifier (usually the host name)
location	**= up to 256 characters**	Site-specific identifier
commread	**= PRIVATE** or **PUBLIC**	Security permission
trap	**= address**	IP address to which SNMP messages are sent

1.6.4 Serial Port Parameters Menu

The Serial Port Parameters Menu, selectable from the Configuration Main Menu, brings up software for verifying or for setting the serial port parameters.

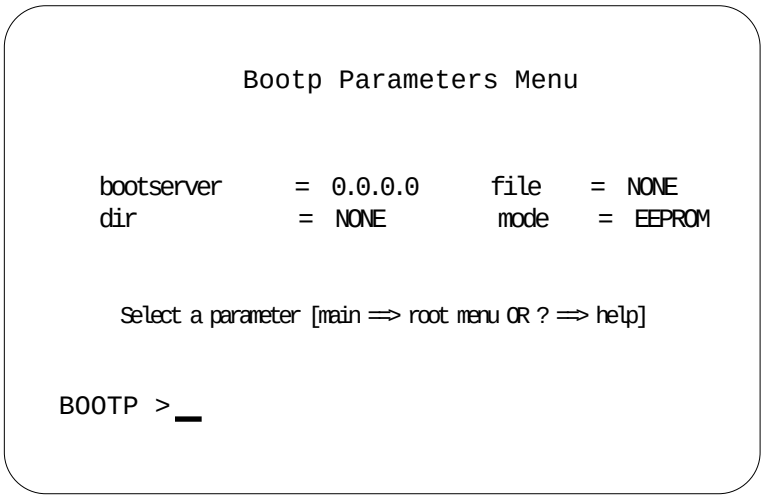


The Serial Parameters Menu comes up with standard values for the following serial port parameters:

baud	**= 9600**	Transmission speed, in bits per second
stop bits	**= NONE** or **1**	Serial protocol definition entry
data bits	**= 7** or **8**	Serial protocol definition entry
parity	**= NONE** or **1**	Optional error checking entry.

1.6.5 Bootp Parameters Menu (Currently Not Available)

The Bootp Parameters Menu, selectable from the Configuration Main Menu, brings up bootstrap protocol software that allows software upgrades.



NOTE: The bootstrap protocol allows a network device to receive network information, including its own IP address.

The Bootp Parameters Menu lists the following commands:

bootserver	**= x.x.x.x**	IP address from which configuration parameters will be read
dir(ectory)	**= NONE** or **1**	Directory from which configu ration parameters will be read
file	**= NONE** or **1**	File from which configuration parameters will be read
mode	**= EPROM**	Source of bootp configuration parameter.

NOTE: Parameter values which have not been set are indicated at the Bootp Parameters Menu by zeros or by the word “NONE”.

1.6.6 Miscellaneous Configuration Options Menu

The Miscellaneous Configuration Options Menu provides a reference list of StackMaster™ configuration commands.

```
        Misc. Configuration Options Menu



  restart      = 0
  factory      = 0          read         = 0
  save         = 0          quit         = 0
  keys         = 0

   Select a parameter [main ==> root menu OR ? ==> help]

MISC >
```

NOTE: Miscellaneous Configuration Options commands can be entered at any StackMaster™ configuration menu.

The Miscellaneous Configuration Options Menu lists the following commands:

restart	Resets the configuration software.
factory	Restores the configuration parameter values to the default parameter values set during manufacture.
read	Displays the default configuration parameter values set during manufacture
save	Commits configuration changes entered at any of the menus to non-volatile memory.
quit	Exits the configuration software
keys	Brings up a reference list of commands used for command line editing.

2. Site Planning

Site planning for the StackMaster™ Stack requires consideration both of site conditions and of Ethernet IEEE 802.3 standards, to which the StackMaster™ Stack conforms.

2.1 Site Considerations

The site for the StackMaster™ Ethernet Repeater Stack must provide the following:

- AC power outlet for each StackMaster™ Unit
- Adequate ventilation
- Standard environmental conditions
- Isolation from electrical noise, including radio transmitters and broadband amplifiers, motors, high power electrical lines, or fluorescent light fixtures

Additionally:

- The twisted pair cables should not run in the same conduit with power line cables.
- Phone lines should be separated from data cables.
- Flat or “silver satin” wires should not be used.

2.2 Ethernet Network Considerations

The StackMaster™ Stack functions as an Ethernet Repeater connecting to 10BaseT, 10Base5, 10Base2 and 10BaseFL networks. 10Base5 and 10Base2 networks are configured using a bus topology in which multiple devices tap into a backbone cable. 10BaseT and 10BaseFL networks are configured using a star topology in which devices connect to a repeater or hub. The topologies can be interconnected within a network.

NOTE: A segment is the cable connection, including connectors, between cable interfaces in an Ethernet LAN.

For 10BaseT and mixed media networks containing 10BaseT segments:

- Repeater sets are required for all segment interconnections
- A Media Access Unit (MAU) is part of the repeater set and counts toward the maximum number of transceiver devices on a segment
- The transmission path between any data source and destination can consist of no more than five segments.

2.3 Network Parameters Data Sheets

NOTE: SNMP network management is optional.

The network parameter data sheets are intended to be a permanent record of site-specific network parameter values that will be required for configuring SNMP network management.

TCP/IP Network Parameters Data Sheet

CATEGORY	StackMaster DEFAULT	SITE ENTRY
IP address (**ipaddr**) Management station to which asynchronous SNMP reports will be sent. Format: xxx.xxx.xxx.xxx EXAMPLE: 192.251.144.253	192.251.144.253	
Subnet mask (**submask**) Format: xxx.xxx.xxx.xxx EXAMPLE: 255.255.255.224	255.255.255.224	
Router (**router**) Site-specific identifier. Format: x.x.x.x EXAMPLE: 0.0.0.0	0.0.0.0	
Name (**name**) Site-specific identifier Format: up to 256 characters EXAMPLE: NONE	NONE	
Domain (**domain**) **C**Site-specific identifier. Format: up to 256 characters EXAMPLE: NONE	NONE	
Name of server (**nameserver**) Site-specific identifier Format: x.x.x.x EXAMPLE: 0.0.0.0	0.0.0.0	

SNMP Network Parameters Data Sheet

CATEGORY	StackMaster DEFAULT	SITE ENTRY
(**commwrite**) Security permission Format: PRIVATE/PUBLIC	PRIVATE	
Authorization (**auth**) Security identifier Format: DISABLE/ENABLE	DISABLE	
System name (**sysname**) Site-specific identifie -- usually. the host name. Format: Up to 256 characters	NONE	
Location (**location**) Site-specific identifie -- usually. the host name. Format: Up to 256 characters	NONE	
(**commread**) Security permission Format: PRIVATE/PUBLIC	PUBLIC	
Location for SNMP messages (**trap**) Format: x.x.x.x EXAMPLE: 0.0.0.0	0.0.0.0	
(**contact**) Site-specific identifier Format: Up to 256 characters	NONE	

Serial Port Parameters Data Sheet

CATEGORY	StackMaster™ DEFAULT	SITE ENTRY
Transmission rate (**bps**) Transmission speed, in bits per second Format: 9600/	9600	
Name (**stop bits**) Serial protocol definition entry. Format: NONE/1	1	
(**data bits**) Serial protocol definition entry. Format: NONE/1	8	
(**parity**) Optional error checking entry Format: NONE/1	NONE	

Bootp Parameters Data Sheet (Bootp Currently Not Available)

CATEGORY	StackMaster™ DEFAULT	SITE ENTRY
Server address (**bootserver**) IP address from which configuration parameters will be read Format: x.x.x.x EXAMPLE: 0.0.0.0	0.0.0.0	
Directory (**dir**) Directory from which configuration parameters will be read Format: NONE/1	NONE	
File (**file**) File from which configuration parameters will be read Format: NONE/1	NONE	
(**mode**) Source of bootp configuration parameters Format: EEPROM	EEPROM	

3. Installation

To install the StackMaster™ stack:

- Unpack the StackMaster™ equipment
- Install units in rack or on table
- Cascade StackMaster™ units
- Verify inter-repeater bus termination
- Connect StackMaster™ to network
- Connect units to power
- Optionally configure SNMP Network Management.

3.1 Unpacking StackMaster™ Equipment

Use the following packing contents lists to verify the shipment.

6-Port 10BaseFL Unit Packing Contents

Item	*Part Number*
6-Port 10BaseFL Unit	SMHB-E-FL-6
Special 6-inch DB-25 data cable	6005
Terminator	SM-7132
Power Cord	3344 (or refer to Appendix D)
USER'S GUIDE	7332

12-Port 10BaseFL Unit Packing Contents

Item	*Part Number*
12-Port 10BaseFL Unit	SMHB-E-FL-12
Special 6-inch DB-25 data cable	6005
Terminator	SM-7132
Power Cord	3344 (or refer to Appendix D)
USER'S GUIDE	7332

16-Port 10BaseT Unit Packing Contents

Item	*Part Number*
24-Port 10BaseT Unit	SMHB-E-TBT-16
Special 6-inch DB-25 data cable	6005
Terminator	SM-7132
Power Cord	3344 (or refer to Appendix D)
USER'S GUIDE	7332

24-Port 10BaseT Unit Packing Contents

Item	*Part Number*
24-Port 10BaseT Unit	SMHB-E-TBT-24
Special 6-inch DB-25 data cable	6005
Terminator	SM-7132
Power Cord	3344 (or refer to Appendix D)
USER'S GUIDE	7332

SNMP Management Unit Packing Contents (EXTERNAL UNIT)

Item	*Part Number*
SNMP Management Unit	SMME-E
Special 6-inch DB-25 data cable	6005
Terminator	SM-7132
Power Cord	3344 (or refer to Appendix D)
USER'S GUIDE	7332

SNMP Management Board Packing Contents (INTERNAL UNIT)

Item	*Part Number*
SNMP Management Board	SMMC-E
USER'S GUIDE	7332

3.2 Installing Units in Rack or on Table

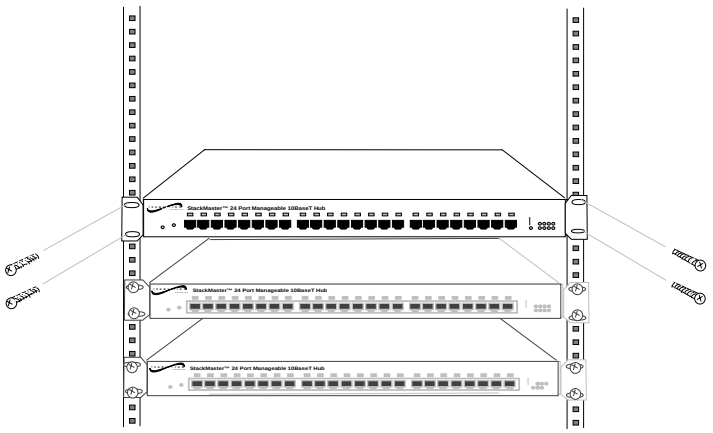
NOTE: StackMaster™ Units are shipped with attached brackets for standard 19-inch rack installation and with attachable feet for table-top installation.

3.2.1 Standard 19-Inch Rack Installation

CAUTION: If the StackMaster™ Stack will include an SNMP Management Unit or a StackMaster™ Unit with an SNMP Management Board, the SNMP Management Unit or the StackMaster™ Unit with the SNMP Management Board must be installed at the top of the stack. Failure to observe this caution will invalidate the SNMP network management.

NOTE: Rackmount screws and clip nuts are NOT provided with the StackMaster™ Units.

To install the StackMaster™ Stack in a standard 19-inch rack:



1. Locate four (4) screws (and clip nuts, if necessary) for each StackMaster™ Unit to be installed.

2. Determine the StackMaster™ Unit to be installed at the bottom of the stack.

3. Carefully align the StackMaster™ Unit between the 19-inch rack mounting rails at the lowest installation position.

4. Install two screws through right front bracket and two screws through left front bracket, using clip nuts if necessary.

5. Carefully align the next StackMaster™ Unit above the StackMaster™ Unit already installed.

6. Repeat steps 4 and 5 in reverse order until all StackMaster™ Units have been installed.

3.2.2 Table-Top Installation

NOTE: StackMaster™ Units are shipped with a separate, unattached set of adhesive-backed rubber feet.

CAUTION: The rubber feet MUST BE INSTALLED on the StackMaster™ Unit if a StackMaster™ Unit is installed on a table-top or other flat surface. Failure to observe this caution could cause the StackMaster™ Unit to overheat and could result in data transmission failure and/or equipment damage.

CAUTION: If the StackMaster™ Stack will include an SNMP Management Unit or a StackMaster™ Unit with an SNMP Management Board, the SNMP Management Unit or the StackMaster™ Unit with the SNMP Management Board must be installed at the top of the stack. Failure to observe this caution will invalidate the SNMP network management.

To install the StackMaster™ Stack on table or other flat surface:

1. Determine StackMaster™ Unit to be installed at bottom of stack.

2. Carefully turn StackMaster™ Unit to side and install four (4) rubber feet:

   - Remove protective paper from adhesive surface of rubber foot.
   - Position rubber foot at bottom corner of Stackmaster Unit
   - Secure rubber foot to StackMaster™ Unit.
   - Repeat for remaining rubber feet.

3. Return StackMaster™ Unit to upright position.

4. Repeat step 2 for next StackMaster™ Unit to be installed.

5. Carefully set StackMaster™ Unit on StackMaster™ Unit previously installed.

6. Continue steps 4 and 5 until all StackMaster™ Units have been installed.

NOTE: The mounting brackets that come installed on the StackMaster™ Unit can be removed and saved for later use.

3.3 Cascading StackMaster™ Units

Cascading the StackMaster™ Units allows all cascaded Units to function as a single Ethernet repeater.

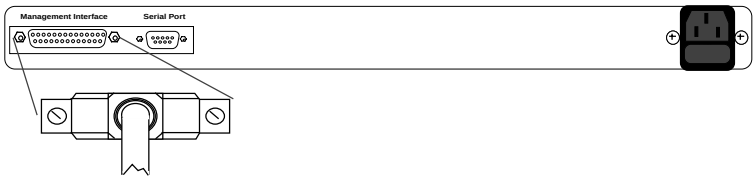
NOTE: Use only the special six-inch DB25 (male-to-male) cables (PN 6005) and terminator pack connectors (PN SM-7132).

3.3.1 Cascading Units that Use SNMP Management

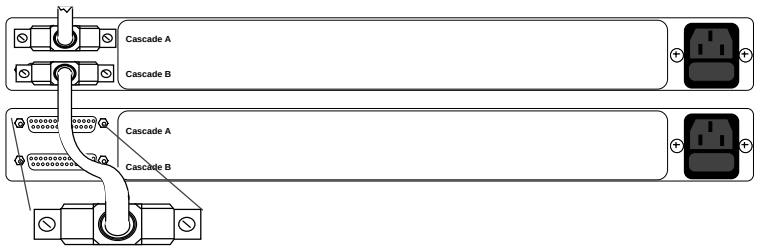
Stack with EXTERNAL SNMP Management

To cascade a Stack in which the top hub is an SNMP Management Unit:

1. Connect six-inch DB25 (male-to-male) cable to Management Interface connector.



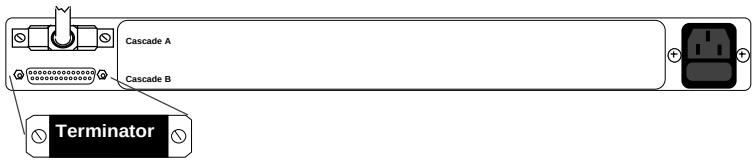
2. Connect six-inch DB25 (male-to-male) cable from StackMaster™ Unit above to Cascade A of next StackMaster™ Unit.



3. Connect six-inch DB25 (male-to-male) cable from Cascade A to Cascade B of same StackMaster™ Unit.

4. Continue steps 3 and 4 until all StackMaster™ Units are connected.

5. At Cascade B of bottom StackMaster™ Unit, install terminator pack connector.

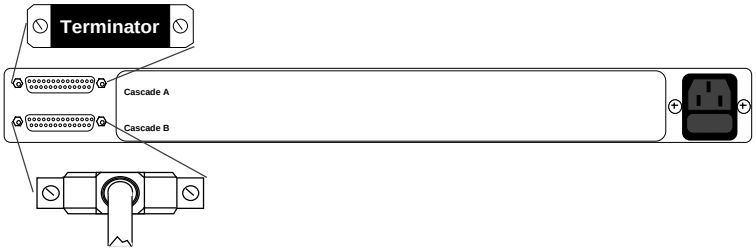


Stack with INTERNAL SNMP Management

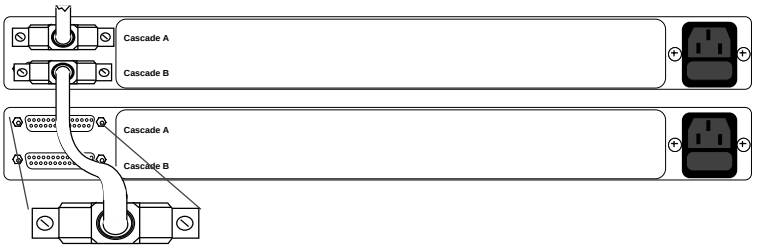
To cascade a Stack in which the top hub has an SNMP management board installed:

1. At Cascade A of top StackMaster™ Unit, install terminator pack connector.

2. Connect six-inch DB25 (male-to-male) cable to Cascade B of StackMaster™ Unit.



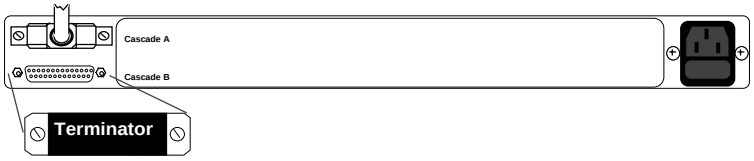
3. Connect six-inch DB25 (male-to-male) cable from StackMaster™ Unit above to Cascade A of next StackMaster™ Unit.



4. Connect six-inch DB25 (male-to-male) cable from Cascade A to Cascade B of same StackMaster™ Unit.

5. Continue steps 3 and 4 until all StackMaster™ Units are connected.

6. At Cascade B of bottom StackMaster™ Unit, install terminator pack connector.



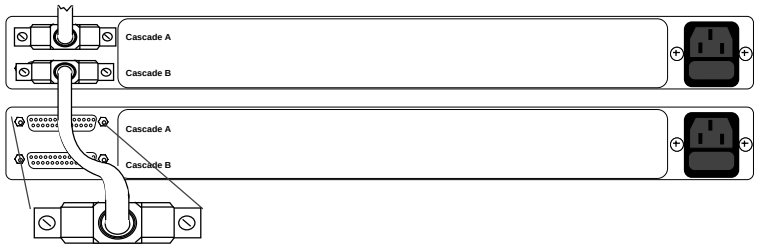
3.3.2 Cascading Units that do NOT Use SNMP Management

STACKED Unmanaged Units

1. At Cascade A of top StackMaster™ Unit, install terminator pack connector.

2. Connect six-inch DB25 (male-to-male) cable to Cascade B of StackMaster™ Unit.

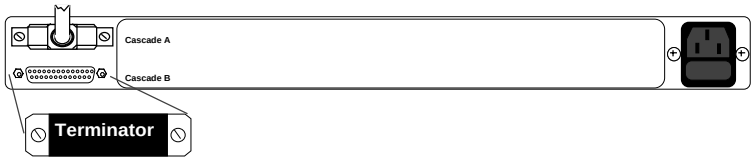
3. Connect six-inch DB25 (male-to-male) cable from StackMaster™ Unit above to Cascade A of next StackMaster™ Unit.



4. Connect six-inch DB25 (male-to-male) cable from Cascade A to Cascade B of same StackMaster™ Unit.

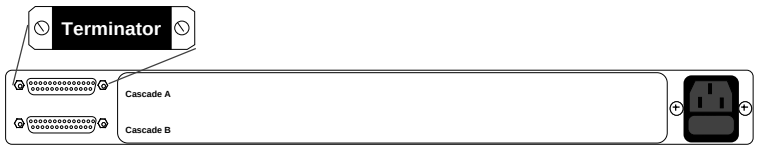
5. Continue steps 3 and 4 until all StackMaster™ Units are connected to Cascade A.

6. At Cascade B of the bottom StackMaster™ Unit, install terminator pack connector.



3.4 Terminating SINGLE StackMaster™ Units

All single StackMaster™ Units, managed or unmanaged, must be



terminated properly.

3.4.1 Terminating SINGLE Unmanaged Unit

To terminate a single unmanaged StackMaster™ unit:

1. At Cascade A of StackMaster™ Unit, install terminator pack connector.

3.4.2 Terminating SINGLE Managed Unit

To terminate a single managed StackMaster™ unit:

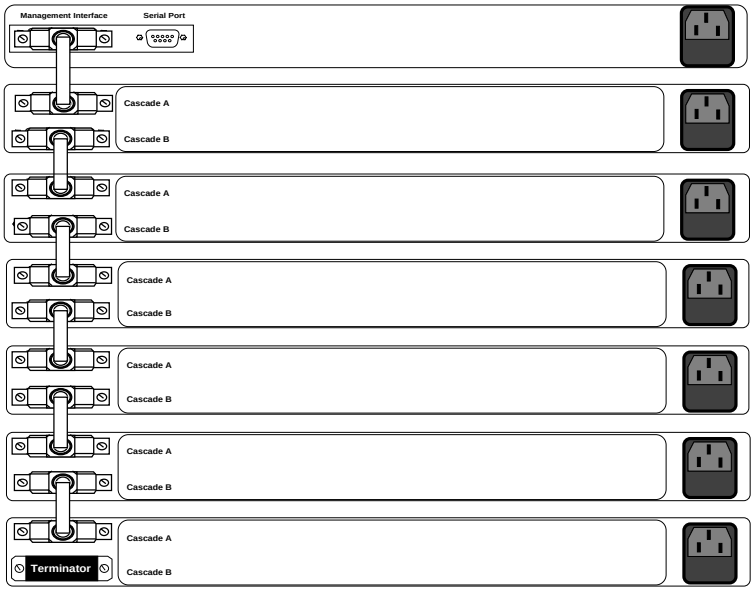
1. At Cascade A of StackMaster™ Unit, install terminator pack connector.

3.5 Verifying Correct Bus Termination

Visually inspect the StackMaster™ Units to ensure proper termination.

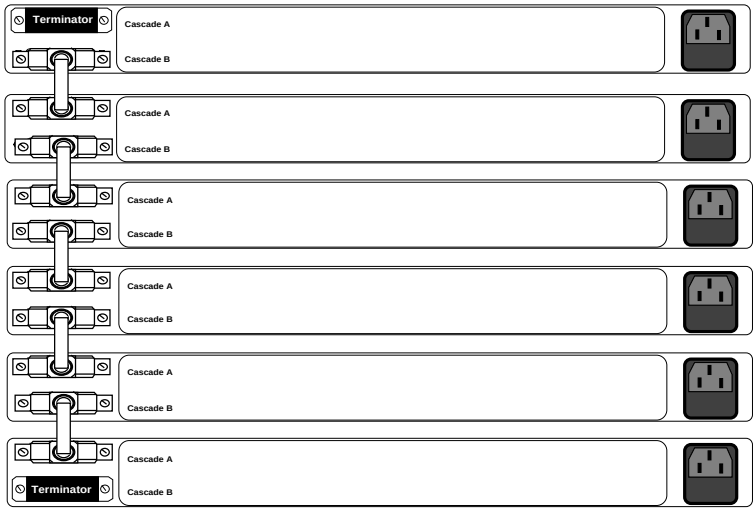
Stack with EXTERNAL SNMP Management

If external SNMP network management is used in a stack, a terminator should be installed at the bottom position of the BOTTOM hub of the stack.



Stack with INTERNAL SNMP Management

If internal SNMP network management is used in a stack, a terminator should be installed at the top position of the TOP hub of the stack AND at the bottom position of the BOTTOM hub of the stack.

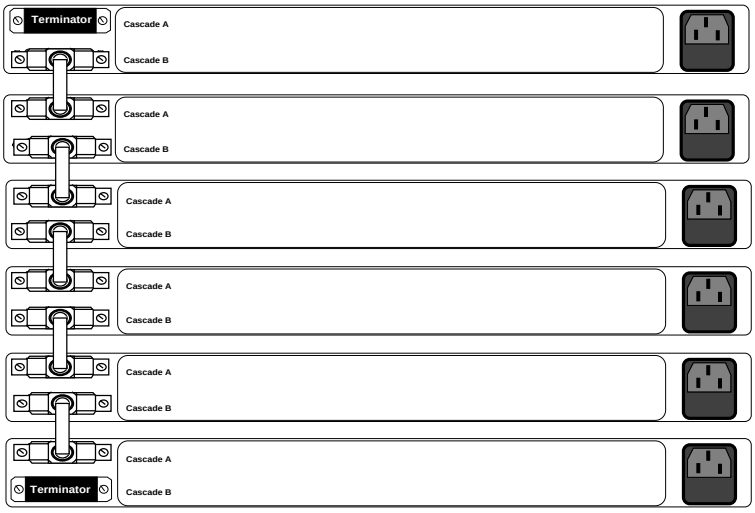


SINGLE Managed Unit

If internal SNMP network management is used in a stack consisting of a single hub, a terminator should be installed at the top cascade position of the hub.

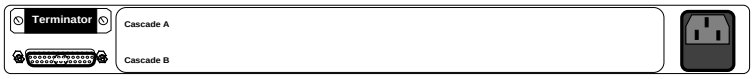
STACKED Unmanaged Units

If no SNMP network management is used in a stack, a terminator should be installed at the top position of the TOP hub of the stack AND at the bottom position of the BOTTOM hub of the stack.



SINGLE Unmanaged Unit

If a stack consists of a single hub without network management, a terminator should be installed at the top cascade position of the hub.



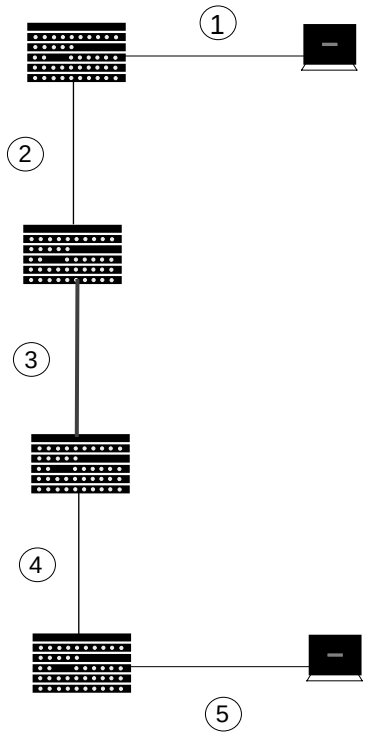
3.6 Connecting StackMaster™ to Network

Ethernet™ connections between Stacks can be 10BaseT, 10Base2, 10Base5, and/or 10aseFL.

3.6.2 Ethernet™ Five-Segment Rule

When connecting StackMaster™ Stacks, the transmission path between any two Data Terminating Equipment (DTE) devices can consist of no more than five segments.

NOTE: A segment is the cable connection, including connectors, between LAN devices.



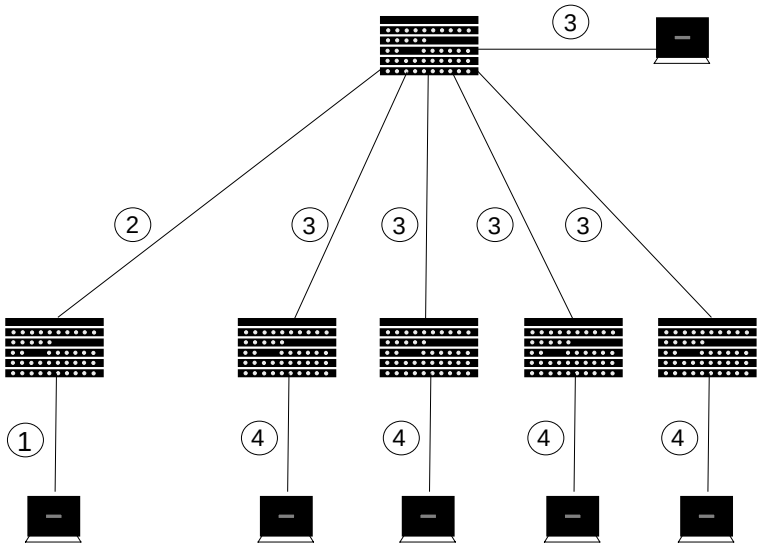
NOTE: Use care when assigning segment numbers to cable connections.

To assign segment numbers to cable connections:

1. Determine the two terminals in the network which are separated by the greatest number of segments.

2. Assign a segment path between the terminals by labelling the cable connected to one of the terminals “segment 1” and the segment connected to the other terminal “segment n” (n = 5 or less).

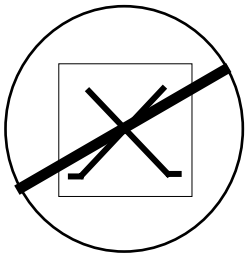
3. Assign segment paths and numbers to all other terminals to verify that no segment paths contain more than n segments.



3.6.2 Connecting to 10BaseT

The StackMaster™ connects to 10BaseT Ethernet through RJ-45 connectors at the front of the StackMaster™ Unit.

CAUTION: The RJ-45 connectors on the StackMaster™ Units are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.



Der Hersteller/Lieferant **Transition Engineering, Inc.**
7090 Shady Oak Road
Eden Prairie, MN 55344 USA

erklärt, dass **6-Port 10BaseFL Unit SMHB-E-FL-6**
12-Port 10BaseFL Unit SMHB-E-FL-12

nicht zum Anschluss an ein öffentlickes Telekommunikationsnetz bestimmt ist.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

RJ-45 Pin Specifications

Individual wires that make up a **straight through** twisted pair modular cable are shown below. Each pair has designated pin connections on an RJ-45 modular connector. There are only two active pairs in a 10BaseT network, pins 1 & 2 and 3 & 6. Use only dedicated wire pairs (such as blue-white/white-blue, orange-white/white-orange).

Hub		**to**	**Terminal**	
RJ-45 (male)			RJ-45 (male)	
1	(RX+)		(TX+)	1
2	(RX-)		(TX-)	2
3	(TX+)		(RX+)	3
6	(TX-)		(RX-)	6

The following is the pinout for a **crossover** cable. A 10BaseT (RJ45) crossover cable is used to connect any two like devices, such as hub-to-hub or terminal-to-terminal.

Hub		**to**	**Hub**	
Terminal		**to**	**Terminal**	
RJ-45 (male)			RJ-45 (male)	
1	(TX+)		(RX+)	3
2	(TX-)		(RX-)	6
3	(RX+)		(TX+)	1
6	(RX-)		(TX-)	2

3.6.3 Connecting to 10BaseFL

The StackMaster™ connects to 10BaseFL Ethernet through fiber optic connectors at the front of the StackMaster™ Unit.

Fiber connections are always transmit to receive.

3.7 Connecting Units to Power

The StackMaster™ Stack is connected to power by connecting each of the StackMaster™ Units to power.

NOTE: Connect StackMaster™ Units from bottom to top.

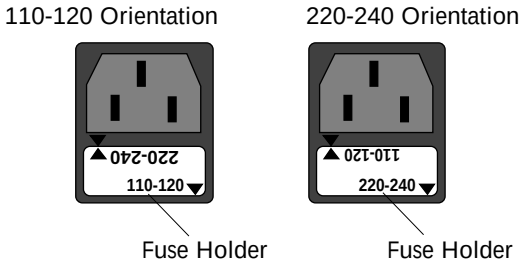
To connect the StackMaster™ Stack to power:

1. At StackMaster™ Unit back, locate the Unit power receptacle and associated fuse.

NOTE: Fuse must be installed at correct setting for power source voltage before connecting to AC outlet.

2. Verify that fuse is installed at correct setting for power source voltage.

NOTE: The installed fuse rating is indicated by the reading at lower right corner of fuse holder.



If not installed at correct setting for power source voltage:

- Carefully open fuse receptacle, using a small flat blade screwdriver.
- Rotate fuse holder 180° to the correct rating orientation.
- Install fuse holder in correct rating orientation.
- Close fuse receptacle.

3. Plug hub end (female) of power cord into StackMaster™ Unit power receptacle.

4. Plug outlet end (male) of power cord into correct voltage AC wall socket.

5. At StackMaster™ Unit front, verify that POWER LED is illuminated.

6. Repeat steps 1 through 5 until all StackMaster™ Units have been powered.

3.7 Resetting StackMaster™ Stack

NOTE: The StackMaster™ Stack must be reset during installation to initialize the internal software.

CAUTION: If the StackMaster™ Stack contains an SNMP Management Unit or if an SNMP Management Board is installed in the 24-port 10BaseT Unit, the 6-port 10BaseFL Unit, or the 12-port 10BaseFL Unit and the hub with the management board is installed at the top of the Stack, DO NOT reset an individual hub. Reset the entire StackMaster™ Stack by resetting the SNMP Management Unit or the hub with SNMP management board installed. In a managed StackMaster™ Stack, resetting an individual Unit will cause the Unit to become invisible to the SNMP Management software.

Managed Stack

- If the StackMaster™ Stack is managed, use a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside the SNMP Management Unit or the StackMaster™ Unit with SNMP Management installed. *The entire StackMaster™ Stack will recycle and then resume normal operation.*

Unmanaged Stack

- Reset the StackMaster™ Units individually by using a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside each StackMaster™ Unit. *The StackMaster™ Unit will recycle and then resume normal operation. Other hubs in the StackMaster™ Stack will not be affected.*

3.8 Optionally Configuring SNMP Management

To set SNMP management parameters through an attached terminal:

- Connect the StackMaster™ to an ASCII terminal or terminal emulator
- Bring up the StackMaster™ configuration software
- Reset the StackMaster
- Set Network and SNMP parameter values.

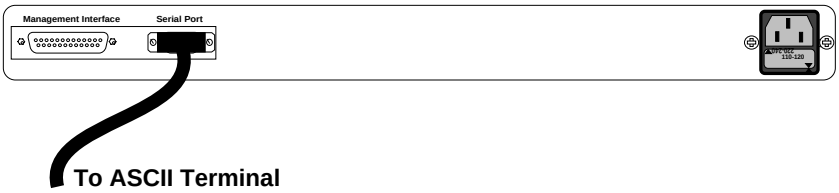
Connecting to ASCII Terminal

NOTE: The DB9 serial port on the StackMaster™ is a DTE device. If the DB9 serial port cable will be attached directly between two DTE devices, use a null modem cable. If the cable will be attached to a 9600 baud modem, use a straight through DB9 cable.

1. Locate the correct DB9 serial port cable with female DB9 connector.

2. Attach the DB9 serial port female cable connector to the male DB9 serial port connector on the StackMaster.

3. Attach the other end of the DB9 serial port cable (directly or indirectly through a modem) to an ASCII terminal or terminal emulator.



NOTE: The StackMaster™ is shipped with standard serial port parameter values:

baud	9600
stop bits	1
data bits	8
parity	NONE

Using methods appropriate to the attached terminal, verify that the serial port parameters of the attached terminal match the StackMaster™ port parameter values. If necessary, modify the attached terminal port parameter values.

Bringing up Configuration Software.

NOTE: Refer to 1.6 for a detailed description of the StackMaster™ Configuration Software Display available at the attached terminal.

To bring up the StackMaster™ configuration software, at the attached terminal command line, enter:

^D ("control D")

The StackMaster™ Configuration Main Menu comes up.

```
    StackMaster Configuration Main Menu

      main                    serial
      ip                      bootp
      snmp                    misc



 Select a parameter [main ==> root menu OR ? ==> help]
MAIN >
```

At the StackMaster™ Configuration Main Menu, to select any of the listed configuration menus, type and enter the name of the selected menu:

MAIN> **<selected menu>**

AT ANY AND ALL CONFIGURATION MENUS:

To modify a parameter, use the command syntax:

ANY MENU> **<parameter> = <value>**

Alternatively, select a parameter available at a different menu by using the command syntax:

ANY MENU> **<any menu> <parameter> = <value>**

To reference acceptable values for a parameter, use the help command syntax:

ANY MENU> **<parameter> = <?>**

To bring up a reference list of line-editing commands, type and enter:

ANY MENU > **keys**

To exit, enter the command:

ANY MENU> **quit**

Resetting the StackMaster

NOTE: The StackMaster™ can be reset in any of the following ways:.

- Disconnect power cord to SNMP Management hub or to StackMaster™ hub with installed SNMP management board, then reconnect the power cord.
- Press the reset button on the SNMP Management hub or on the StackMaster™ hub with installed SNMP management board
- At the attached terminal or terminal emulation, type and enter:

  ANY MENU> **restart**

  ANY MENU> **quit**

At power on or reset, the Status LEDs cycle through diagnostic test patterns as internal StackMaster™ software tests: Flash, serial port, dynamic RAM, static RAM, dual port memory, and each of the Ethernet ports.

*After the diagnostic test patterns, **for twenty seconds**, the Status LEDs display a pattern in which four LEDs remain illuminated while four LEDs flash continuously. This pattern indicates that the StackMaster™ software is waiting for an optional user interrupt.*

Setting Network and SNMP Parameters

SNMP Network Management is configured by setting network and SNMP parameter values.

Network Parameters

To set the Network parameter values at an attached terminal:

1. At the StackMaster™ Configuration Main Menu MAIN> prompt, type and enter:

   MAIN> **i p**

The StackMaster™ Network Parameters Menu comes up:

```
                Network Parameters Menu


  ipaddr  =  192.251.144.253      name    =  NONE
  submask =  255.255.255.0        domain  =  NONE
  router  =  0.0.0.0              nameserver=  0.0.0.0

   Select a parameter [main ==> root menu OR ? ==> help]

 IP>
```

2. Referring to the Site Configuration Data Sheet (See 2.3), type and enter modified configuration values in the format:

   IP > **<parameter> = <value>**

3. Verify the modified configuration values by bringing up the same menu:

   IP > **i p**

The menu is redisplayed with the modified values.

4. Save the configuration values to non-volatile memory by typing and entering:

   IP> **save**
   IP> **restart**
   IP> **quit**

The StackMaster™ restarts and the parameter values entered are written to non-volatile memory.

SNMP Parameters

To set the SNMP parameter values:

1. To access the SNMP Parameters Menu, at the Network Parameters MAIN> prompt, type and enter:

   MAIN> **snmp**

The StackMaster™ SNMP Parameters Menu comes up to provide guidance in setting parameters for data to be used by the external SNMP network management software:

```
                SNMP Parameters Menu


commwrite       =  PRIVATE      commread        =  PUBLIC
auth            =  DISABLE      trap            =  0.0.0.0
sysname         =  NONE         contact         =  NONE
location        =  NONE

Select a parameter [main ==> root menu OR ? ==> help]


SNMP >
```

2. Referring to the Site Configuration Data Sheet (See 2.3), type and enter modified configuration values in the format:

   SNMP > **<parameter> = <value>**

3. Verify the modified configuration values by bringing up the same menu:

   MENU > **snmp**

*The menu is redisplayed with the modified value*s.

3. Save the configuration values by typing and entering the following

   SNMP> **save**
   SNMP> **restart**
   SNMP> **quit**

The StackMaster™ restarts and the parameter values entered are written to non-volatile memory.

4. Operation

4.1 Power On/Power Off

The StackMaster™ Stack is powered ON when the power cords are connected from all the StackMaster™ Units to AC outlets.

NOTE: When powered, the POWER LED on each StackMaster™ Unit should be illuminated.

The StackMaster™ Stack is powered OFF when the power cords are disconnected from all the StackMaster™ Units or from all the AC outlets.

5. Maintenance

Maintenance of the StackMaster™ is required only when a StackMaster™ unit requires updating or fails. Recovery of a failed StackMaster™ unit requires fault isolation, using methods provided in this section, and corrective action. Corrective action is taken by simple procedures described in this section or by contacting Transition Networks Technical Support.

5.1 Fault Isolation

Use Table 5-1 for troubleshooting the StackMaster™ stack.

To use Table 5-1, locate the problem in the FAULT column. In the PROBABLE CAUSE box next to the fault, find one or more probable cause(s) associated with the fault. Examine each probable cause in turn, beginning at the top. When the probable cause is identifed, take the associated corrective action in the CORRECTIVE ACTION column.

FAULT	PROBABLE CAUSE	CORRECTIVE ACTION
Unit POWER LED not illuminated	Disconnected power cord.	Connect power cord.
	Improperly installed fuse.	For 110-120V use, fuse should read 110-120V in upright position; for 210-240V use, fuse should read 210-240V in upright position.
	Fuse failure.	Replace fuse. (See 5.3.1.)
	Power supply failure.	Contact TN Technical Support. 1-800-260-1312
All LEDs continuously illuminated	Faulty terminator installation.	Install terminator (See 5.2.1)
	Inter-repeater cable failure.	Install replacement inter-repeater cable.
	Terminator failure.	Contact TN Technical Support. 1-800-260-1312

Table 5-1. Fault Isolation in the StackMaster™ Stack

Link LED not illuminated on 10BaseT port	Disconnected RJ45 cable. RJ45 cable failure. Cable failure (open/short). Incorrect RJ45 cable installed. Invalid cable pin-outs. Workstation or server NIC failure. RJ45 connection failure.	Connect RJ45 cable. Replace RJ45 cable. Check cable assembly or tester or swap cable with known good cable. See 3.5.2 for straight-through/crossover specification.s See 3.5.2 for cable pin-outs Check NIC configuration/setup with manufacturer. Contact TN Technical Support. 1-800-260-1312.
Steady green or red LED illuminated in a Unit with no physical device present	Repeater requires reset. Invalid terminator installation. Terminator failure.	Reset StackMaster Repeater or StackMaster stack. (See 5.2.2) Install terminator (See 5.2.1.) Contact TN Technical Support. 1-800-260-1312.
Fiber port connector LED not illuminated	Disconnected fiber port cable or cables. Wrong fiber cable type used. Connected to a non-10BaseFL device. TX and RX cables attached to wrong connectors.	Connect BOTH fiber optic cables.. Use multimode fiber cable ONLY. The other end of the fiber must be connected to a 10BaseFL compliant device. Swap the TX and RX lines.

Table 5-1. Fault Isolation in the StackMaster™ Stack (continued)

Part of stack allows connections but part does not	Cascaded stack not terminated properly.	Install terminator. (See 5.2.1) THEN Reset StackMaster™ Repeater or StackMaster stack. (See 5.2.2)
	Improperly connected cascaded stack.	See that all inter-repeater cables between the repeaters are installed and tightened securely. (See 3.4) THEN Reset StackMaster™ Repeater or StackMaster stack. (See 5.2.2)
	Unit with SNMP management not installed at top of stack.	Install Unit with SNMP management at top of stack. THEN Reset StackMaster™ Repeater or StackMaster stack. (See 5.2.2)
No serial connection allowed by Management software.	Stack initialization failurel	Reset StackMaster™ Repeater or StackMaster Stackl (See 5.2.2)
	Cannot connect using terminal program.	Incorrect serial cable used. (See Appendix)
Loud fan noise	Fan failurel	Contact TN Technical Support. 1-800-260-1312

Table 5-1. Fault Isolation in the StackMaster™ Stack (concluded)

5.2 Recovery Procedures

Recovery of a failed StackMaster™ Unit or stack is accomplished, often, by one or both of the following:

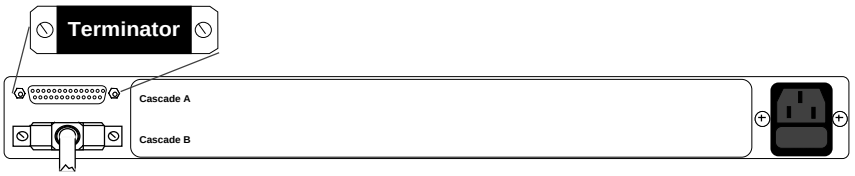
- Installing a cascade terminator
- Resetting the StackMaster™ stack

Installing a Cascade Terminator

NOTE: If terminators are not installed on the StackMaster™ stack as shown, install the terminators. If terminators are installed on the StackMaster™ stack, verify that the terminators are installed correctly.

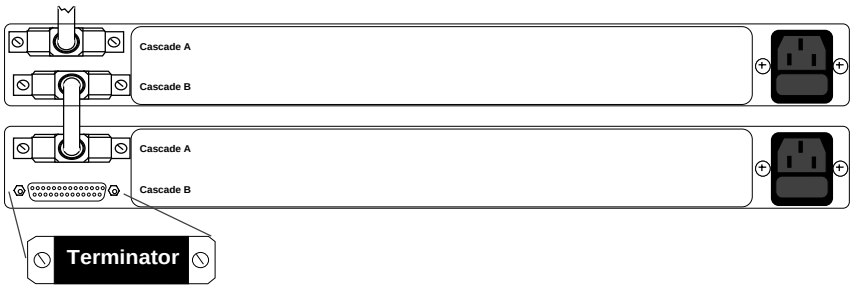
If External SNMP Management Unit is NOT used:

1. At **Cascade A** of top StackMaster™ Unit, install terminator pack connector (PN SM-7132).



For ALL Stacks of Two or More Hubs

2. At **Cascade B** of the bottom StackMaster™ hub, install terminator pack connector (PN SM-7132).



Resetting the StackMaster™ Stack

CAUTION: If the StackMaster™ stack contains an SNMP Management hub or if an SNMP Management Board is installed in the 24-port 10BaseT hub, the 6-port 10BaseFL hub, or the 12-port 10BaseFL hub and the unit with the management board is installed at the top of the stack, DO NOT reset an individual unit. Reset the entire StackMaster™ stack. In a managed StackMaster™ stack, resetting an individual hub will cause the hub to become invisible to the SNMP Management software.

Managed Stack

If the StackMaster™ stack is managed, use a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside the SNMP Management hub or the StackMaster™ hub with SNMP Management installed. The entire StackMaster™ stack will recycle and then resume normal operation.

Unmanaged Stack

Reset the StackMaster™ hubs individually by using a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside each StackMaster™ hub. The StackMaster™ hub will recycle and then resume normal operation. Other units in the StackMaster™ stack will not be affected.

5.3 Replacement Procedures

WARNING! StackMaster™ hubs contain no user-serviceable parts. With the exception of the 24-port 10BaseT hub, the 6-port 10BaseFL hub, or the 12-port 10BaseFL hub, which are designed to be opened for installation of the SNMP management board, DO NOT, UNDER ANY CIRCUMSTANCES, open and attempt to repair StackMaster™ equipment. Failure to observe this warning could result in electrical shock and personal injury.

NOTE: Failure to observe the above warning for any StackMaster™ units except the 24-port 10BaseT hub, the 6-port 10BaseFL hub, or the 12-port 10BaseFL hub will immediately void any warranty.

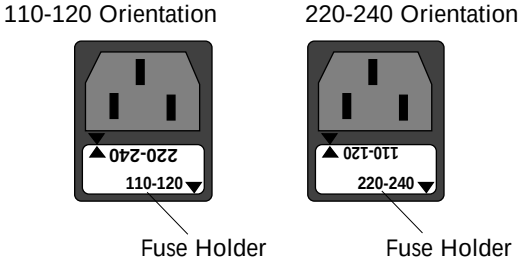
Replacing StackMaster™ Hub Fuses

To replace a StackMaster™ hub fuse:

1. Disconnect outlet end of power cord from AC wall socket.
2. Disconnect the power cord from the StackMaster™ hub power receptacle.
3. Carefully open fuse receptacle, using small flat blade screwdriver.

CAUTION: Replace fuse only with same size and rating. Failure to observe this caution could result in equipment damage.

NOTE: Installed fuse rating orientation is indicated as read in lower right corner of fuse holder.



4. Install replacement fuse holder in correct rating orientation.
5. Close fuse receptacle.
6. Connect power cord to StackMaster™ hub power receptacle.
7. Connect outlet end of the power cord to the AC wall socket.
8. Verify that POWER LED at the front of the StackMaster™ hub is illuminated.

5.4 StackMaster™ Field Upgrades

StackMaster™ field upgrades discussed in this section include:

- Installing SNMP Management Board in 24-Port 10BaseT hub
- Installing SNMP Management Board in 6-Port or 12-Port 10BaseFL hub

Installing SNMP Management Board in 24-Port 10BaseT Hub

The SNMP Management circuit board attaches to the 96-pin DIN connector located on the 24-Port 10BaseT circuit board inside the 24-Port 10BaseT hub.

WARNING: DISCONNECT THE POWER CORD from the 24-Port 10BaseT hub before installing the SNMP Management Board. Failure to observe this warning could result in personal injury or death from electrical shock.

WARNING: AVOID CONTACT WITH POWER SUPPLY during Board installation. Failure to observe this warning could result in personal injury from electrical shock caused by capacitive discharge.

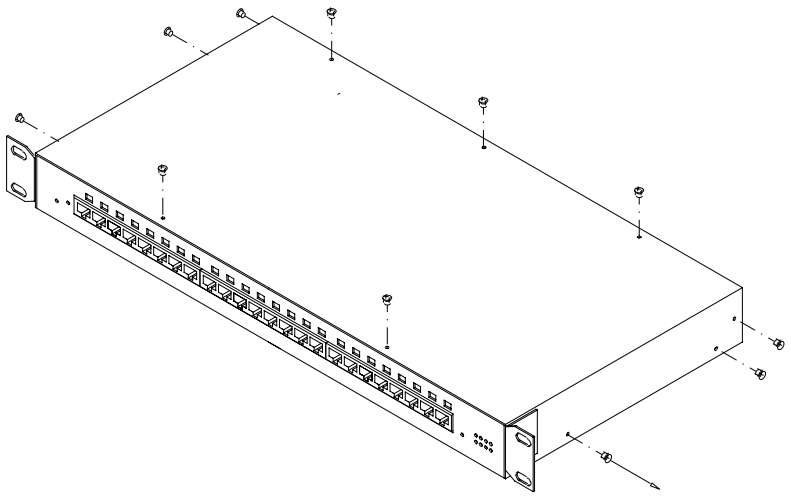
CAUTION: Wear a grounding device and observe electrostatic discharge precautions when installing the SNMP Management board. Failure to observe this caution could result in circuit board failure.

Tools: Medium Phillips screwdriver

To install the 24-Port 10BaseT SNMP Management board:

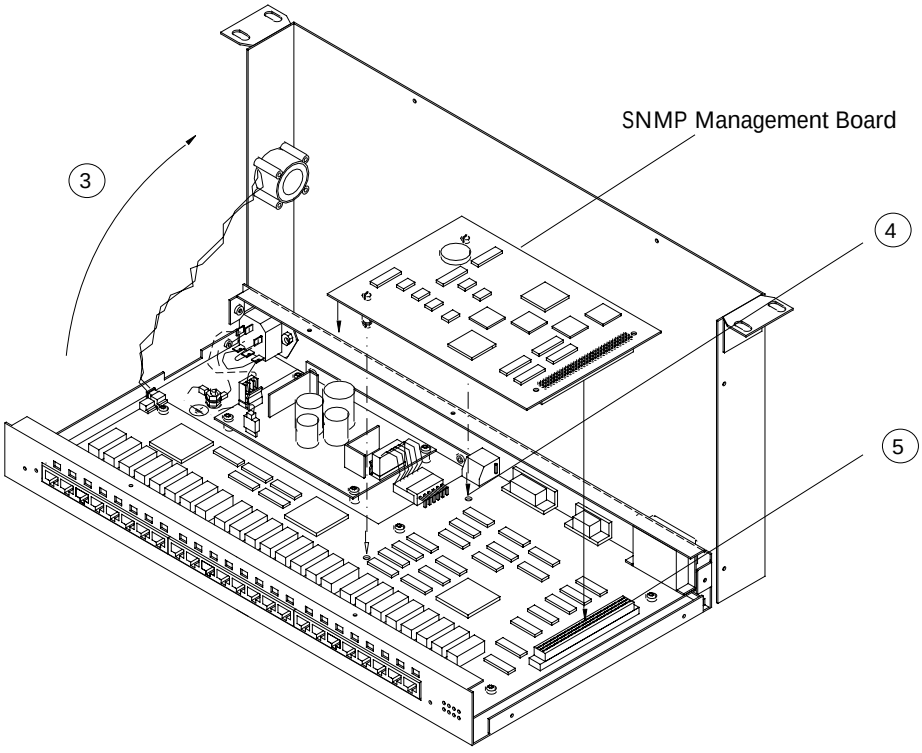
1. Place 24-Port 10BaseT hub on table or other stable surface.

2. Using a medium Phillips screwdriver, remove eleven (11) screws that secure the cover to the 24-Port 10BaseT hub.



NOTE: The internal fan is attached to the cover. Fan wires connect to attached 24-Port 10BaseT circuit board.

3. Without disconnecting fan wires, carefully lift the front of the 24-Port 10BaseT hub cover. Rotate the cover over the 24-Port 10BaseT hub until the cover rests securely behind, and next to, the 24-Port 10BaseT hub.

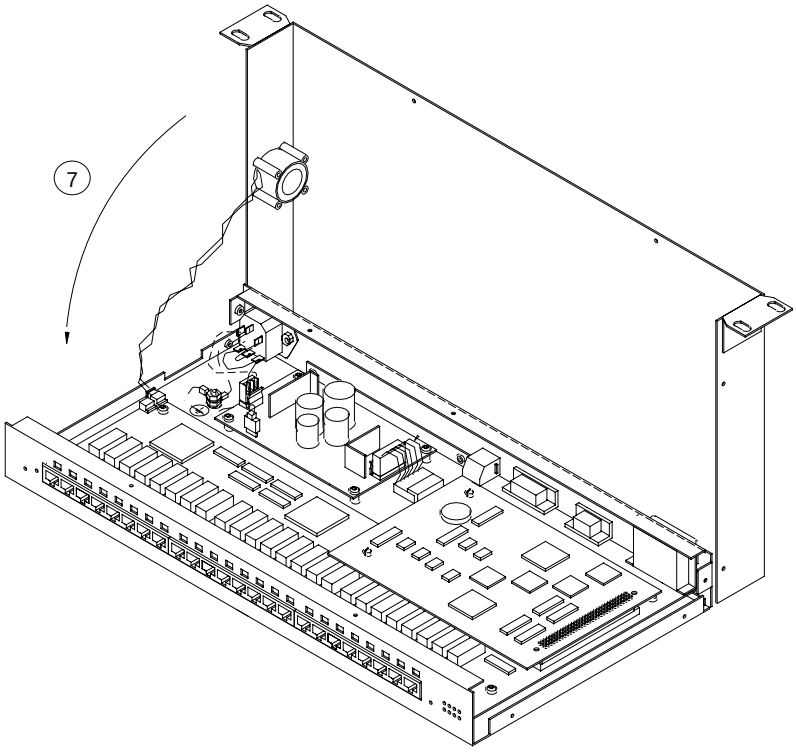


4. Align the two snap-fit ends of the two SNMP Management circuit board plastic spacers to the associated SNMP Management circuit board holes

5. Align the SNMP Management circuit board DIN connector pins (male connector) to the 24-Port 10BaseT circuit board DIN connector (female connector).

6. Apply downward pressure to the SNMP Management circuit board until the SNMP Management circuit board DIN connector is seated securely and the snap-fit connectors snap into place.

7. Without crimping the fan wires, rotate 24-Port 10BaseT hub cover to rest on chassis.



8. Replace cover screws.

Installing SNMP Management Board in 6-Port/12-Port 10BaseFL Hub

WARNING: DISCONNECT THE POWER CORD from the 6-Port or 12-Port 10BaseFL hub before installing the SNMP Management Board. Failure to observe this warning could result in personal injury or death from electrical shock.

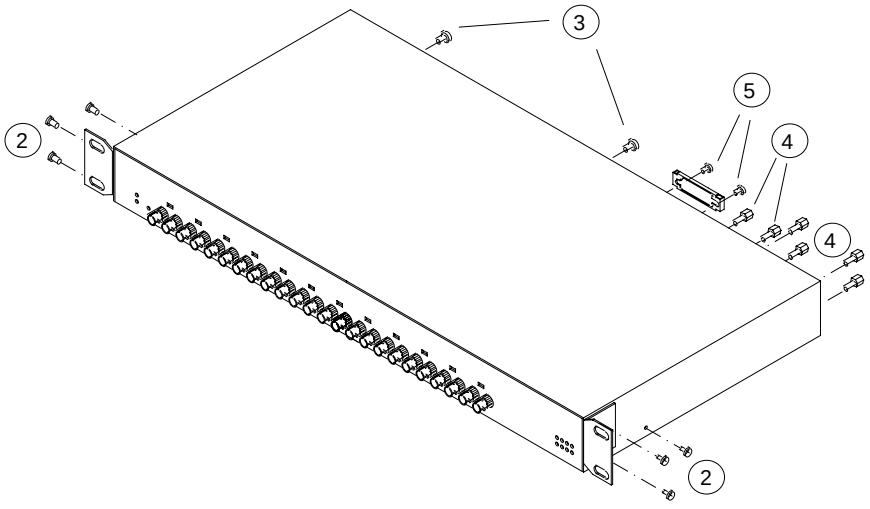
WARNING: AVOID CONTACT WITH POWER SUPPLY during Board installation. Failure to observe this warning could result in personal injury from electrical shock caused by capacitive discharge.

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when installing the SNMP Management board. Failure to observe this caution could result in circuit board failure.

Tools: Medium Phillips screwdriver
Small slotted screw driver
3/16-inch nut driver

To install the 6-Port or 12-Port 10BaseFL SNMP Management board:

1. Place 6-Port or 12-Port 10BaseFL hub on table or other stable surface.
2. Using Phillips screwdriver, remove three (3) screws that secure the cover to the 6-Port or 12-Port 10BaseFL hub left side and three (3) screws that secure the cover to the 6-Port or 12-Port 10BaseFL hub right side.
3. Using Phillips screwdriver, remove two (2) screws that secure the cover to 6-Port or 12-Port 10BaseFL hub back.
4. Using 3/16-inch nut driver, remove four (4) hex nuts that secure the cover to the Cascade Connectors and two (2) hex nuts that secure the cover to the serial port connector.

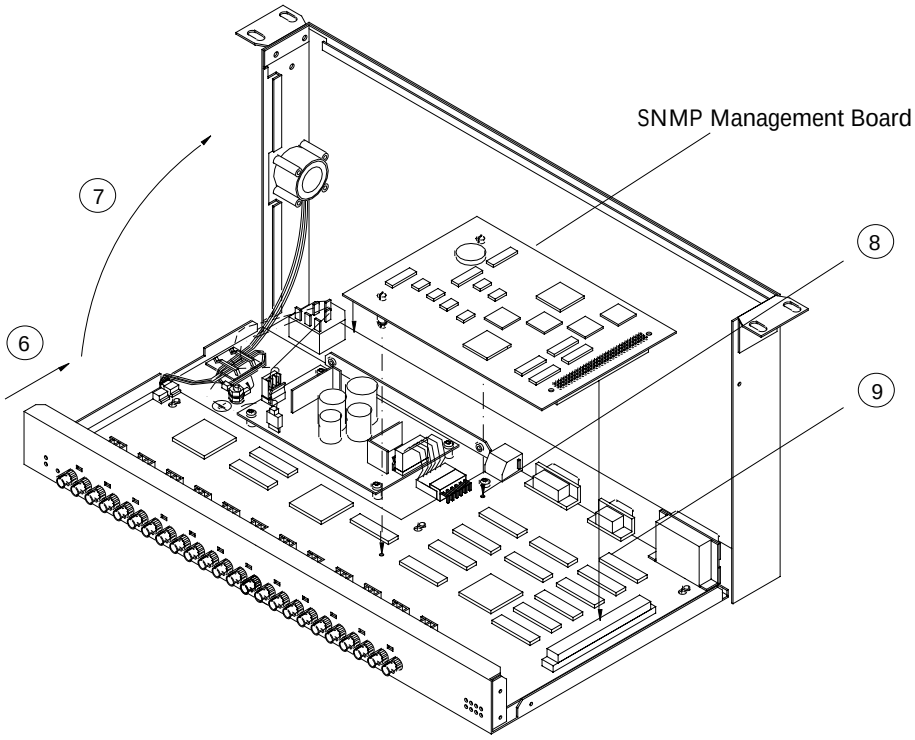


5. Using slotted screwdriver, remove two (2) screws that secure the slide lock to 6-Port or 12-Port 10BaseFL hub back.

NOTE: The internal fan is attached to the cover. Fan wires connect to the attached 6-Port or 12-Port 10BaseFL circuit board.

6. Slide cover back to disengage from chassis.

7. Without disconnecting fan wires, carefully lift the front of the 6-Port or 12-Port 10BaseFL hub cover. Rotate the cover over the 6-Port or 12-Port 10BaseFL hub until the cover rests securely behind, and next to, the 6-Port or 12-Port 10BaseFL hub.



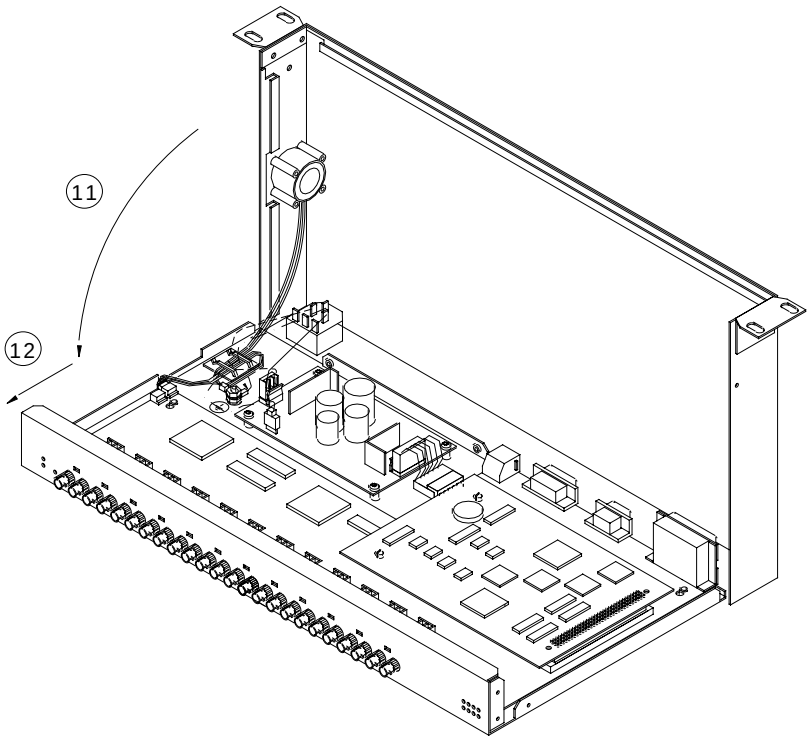
8. Align the two snap-fit ends of the two SNMP Management circuit board plastic spacers to the associated SNMP Management circuit board holes.

9. Align the SNMP Management circuit board DIN connector pins (male connector) to the 6-Port or 12-Port 10BaseFL circuit board DIN connector (female connector).

10. Apply downward pressure to the SNMP Management circuit board until the SNMP Management circuit board DIN connector is seated securely and the snap-fit connectors snap into place.

11. Without crimping the fan wires, rotate the 6-Port or 12-Port 10BaseFL hub cover to rest on chassis.

12. Slide cover forward to engage cover against chassis



13. Replace the cover screws.

Installing SNMP Management Board in 16-Port 10BaseT Hub

The SNMP Management circuit board attaches to the 96-pin connector located on the 16-Port 10BaseT circuit board inside the 16-Port 10BaseT hub.

WARNING: DISCONNECT POWER CORD from 16-Port 10BaseT hub before installing the SNMP Management Board. Failure to observe this warning could result in personal injury or death from electrical shock.

WARNING: AVOID CONTACT WITH POWER SUPPLY during board installation. Failure to observe this warning could result in personal injury from electrical shock caused by capacitive discharge.

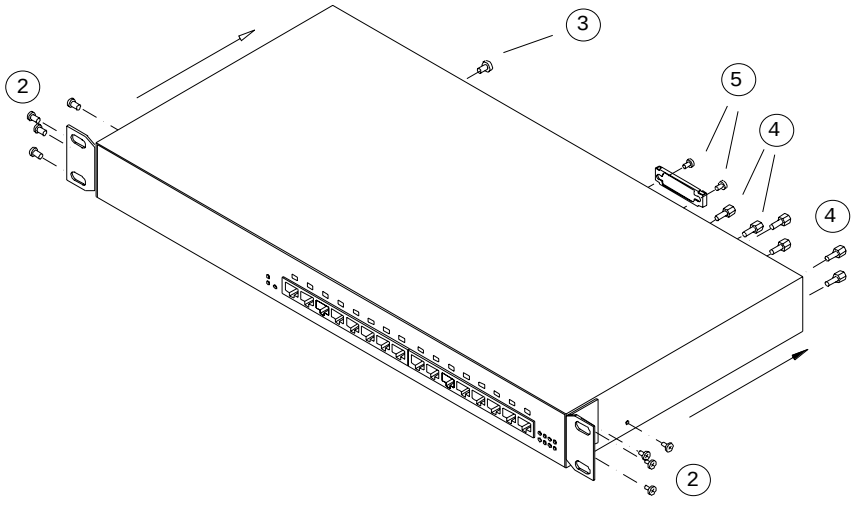
CAUTION: Wear a grounding device and observe electrostatic discharge precautions when installing the SNMP Management board. Failure to observe this caution could result in circuit board failure.

Tools: Medium Phillips screwdriver
Small standard screwdriver
3/16-inch nut-driver

1. Place 16-Port 10BaseT hub on table or other stable surface.

2. Using medium Phillips screwdriver, remove four (4) screws that secure the cover to the 16-Port 10BaseT hub left side and four (4) screws that secure the cover to the 16-Port 10BaseT hub right side.

3. Using Phillips screwdriver, remove one (1) screw that secures cover to 16-Port 10BaseT hub back.

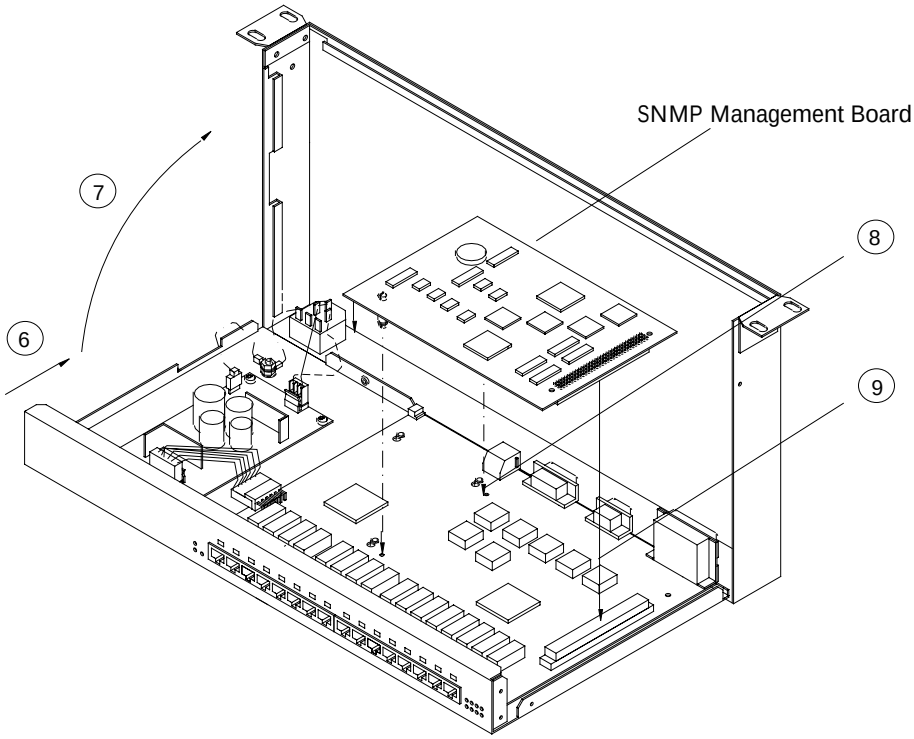


4. Using 3/16-inch nut driver, remove four (4) hex nuts that secure the cover to the Cascade Connectors and two (2) hex nuts that secure the cover to the serial port connector.

5. Using slotted screwdriver, remove two (2) screws that secure slide lock to 16-Port 10BaseT hub back.

6. Slide cover back to disengage from chassis.

7. Without disconnecting power leads, carefully lift the front of the 16-Port 10BaseT hub cover. Rotate the cover over the 16-Port 10BaseT hub until the cover rests securely behind, and next to, the 16-Port 10BaseT hub.

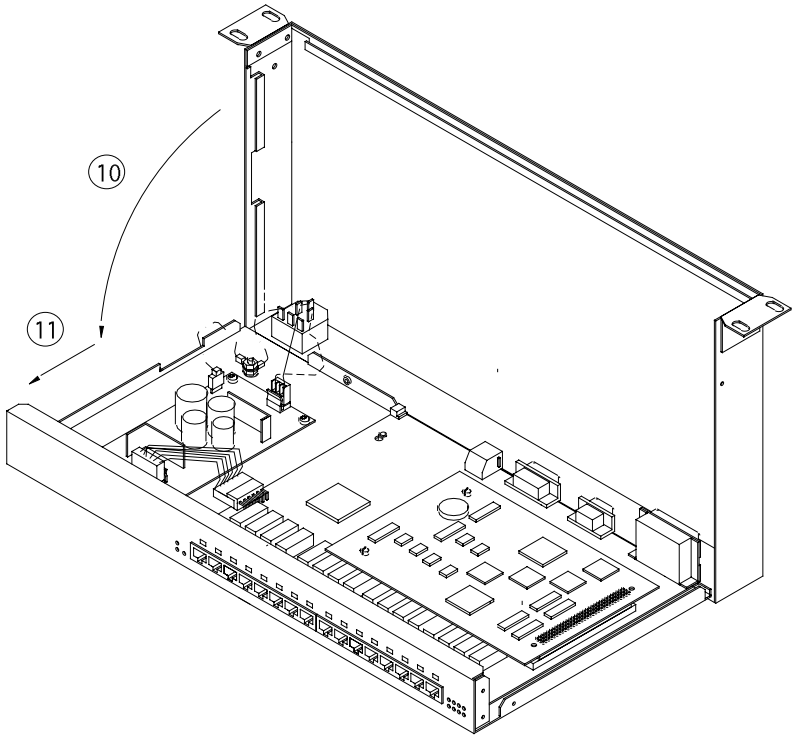


8. Align the two snap-fit ends of the two SNMP Management circuit board plastic spacers to the associated SNMP Management circuit board holes.

9. Align the SNMP Management circuit board connector pins (male connector) to the 16-Port 10BaseT circuit board connector (female connector).

10. Rotate the 16-Port 10BaseT hub cover to rest on chassis.

11. Slide cover forward to engage cover against chassis.



12. Replace cover screws and hex nuts.

5.5 Software Upgrades

NOTE: The management circuit board uses “flash ROM”, which allows firmware upgrades to be received over a serial interface.

Software Upgrade at Attached ASCII Terminal

To upgrade the flash ROM:

- Obtain a copy of updated StackMaster™ software
- Establish a serial connection to an ASCII terminal or terminal emulation.
- Reset the StackMaster™ Management hub
- Transfer the file.

Obtaining Updated StackMaster™ Software

Updated software can be obtained through the TRANSITION Networks, Inc., Bulletin Board Service at:

(612) 941-9304

or by contacting TRANSITION Networks, Inc..

Connecting to ASCII Terminal

NOTE: The DB9 serial port on the StackMaster™ is a DTE device. If the DB9 serial port cable will be attached directly between two DTE devices, use a null modem cable. If the cable will be attached to a 9600 baud modem, use a straight through DB9 cable.

1. Locate the correct DB9 serial port cable with female DB9 connector.

2. Attach the DB9 serial port female cable connector to the male DB9 serial port connector on the StackMaster.

3. Attach the other end of the DB9 serial port cable (directly or indirectly through a modem) to an ASCII terminal or terminal emulator.

NOTE: The StackMaster™ is shipped with standard serial port parameter values:

baud	9600
stop bits	1
data bits	8
parity	NONE

Using methods appropriate to the attached terminal, verify that the serial port parameters of the attached terminal match the StackMaster™ port parameter values. If necessary, modify the attached terminal port parameter values.

Resetting the StackMaster

Reset the StackMaster™ in any of the following ways:.

- Disconnect power cord to SNMP Management hub or to StackMaster™ hub with installed SNMP management board, then reconnect the power cord.
- Press the reset button on the SNMP Management hub or StackMaster™ hub with installed SNMP management board.
- At the attached terminal or terminal emulation that has a StackMaster™ configuration menu displayed, type and enter:

  ANY MENU> **restart**

  ANY MENU> **quit**

At power on or reset, the Status LEDs cycle through diagnostic test patterns as internal StackMaster™ software tests: Flash, serial port, dynamic RAM, static RAM, dual port memory, and each of the Ethernet ports.

*After the diagnostic test patterns, **for twenty seconds**, the Status LEDs display a pattern in which four LEDs remain illuminated while four LEDs flash continuously. This pattern indicates that the StackMaster™ software is waiting for an optional user interrupt.*

Transferring the File

To transfer the file:

1. Determine the exact drive and path to the updated .BIN file.

NOTE: Step 2 must be completed during the twenty-second period that the Status LEDs display the optional user interrupt pattern.

2. At the attached ASCII terminal or terminal emulation, type and enter:

   ^X (“control X”)

A file transfer message appears on the ASCII terminal or terminal emulation.

NOTE: The SEND BINARY FILE option will time out after sixty seconds.

3. At the terminal program options display, select the option:

SEND BINARY FILE

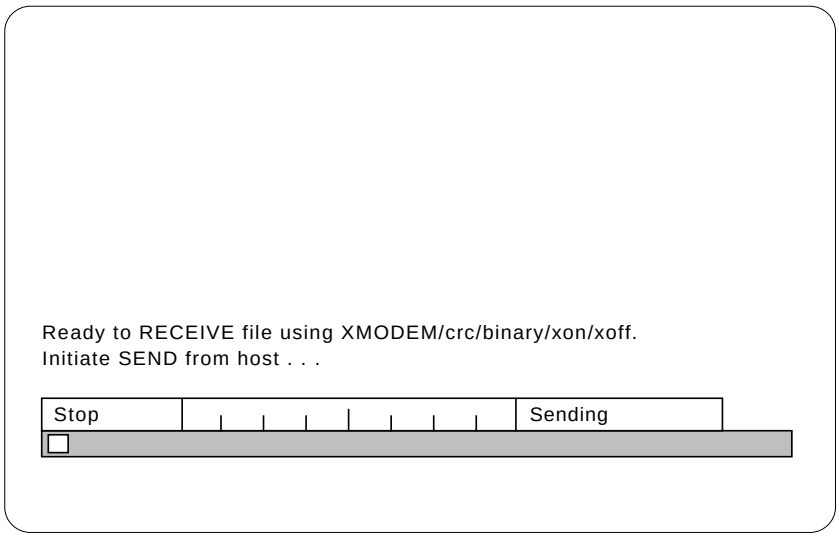
The SEND BINARY FILE display prompts for the path to the .BIN file.

Enter the .BIN path.

Select the option

OK TO SEND

The StackMaster™ will begin receiving the selected .BIN file. A bar graph displays the status of the file transfer:



When file transfer is completed, the SNMP Management hub or StackMaster™ hub with installed SNMP management board automatically resets and begins to communicate with the associated StackMaster™ hubs.

Appendix A. Technical Specifications

Network Standards

Ethernet IEEE 802.3 10BaseT, 10Base2, 10BaseFL, and 10Base5

Universal Power Supply

Input Range: 85 to 265 VAC at 47 to 63 Hz. Rated at 40 watts maximum.

AC Input:

TN PN	Requirement	Location
3344	120 volts, 60 hertz	USA/Canada/Mexico
3344	100 volts, 50-60 hertz	Japan
3347	230 volts, 50 hertz	Europe
3348	240 volts, 50 hertz	Australia
3349	240 volts, 50 hertz	United Kingdom

Operating Environment

Temperature:	32° to 122° F (0° to 50° C)
Humidity:	10% to 90% non-condensing
Altitude:	0 to 10,000 feet

Dimensions

Height 1.625” (4cm) Width 19” (48cm) Depth 8“ (20cm).

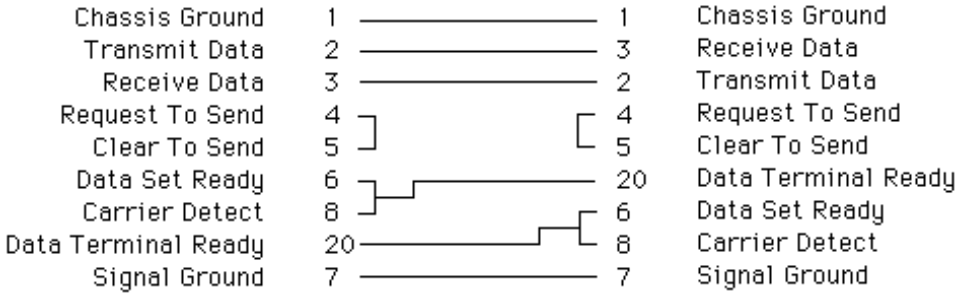
Appendix B. Cable Specifications

A. Null Modem Cable Specifications

The table below shows the pin assignments for the DB9 cable.

Function	Mnemonic
Carrier Detect	CD
Receive Data	RXD
Transmit Data	TXD
Data Terminal Ready	DTR
Signal Ground	GND
Data Set Ready	DSR
Request To Send	RTS
Clear To Send	CTS
Ring Indicator	RI

25 Pin RS-232 Null Modem Cable



B. 10Base5 Cable Specifications

The AUI cable must be IEEE approved. Attach one end of the cable to a DTE port and the other end to a DCE port or transceiver.

Note: The total length of a cable segment must be less than 50 meters (150 feet).

C. 10BaseFL Cable Specifications

The IEEE 802.3 standard for fiber optic segments are listed below:

- 62.5/125µm multimode fiber (recommended).
- 100/140 µm multimode fiber.
- 85 µm multimode fiber.
- 50/125 µm multimode fiber.

D. 10BaseT Cable Specifications

The following describes the specifications when twisted pair is used. Either shielded or unshielded twisted pair can be used. The physical characteristics must meet or exceed those set forth by the IEEE 802.3 10BaseT specifications. Generally, Level 3 wire or better is recommended. The cable must have a minimum of 2 pairs of twisted 26 to 22 AWG wire.

Note: Do not use flat or "silver satin" wire.

Gauge	26 to 22 AWG
Attenuation	Less than 11.5 dB, 5 - 10 MHz
Differential Characteristic	85 - 110 Ω @ 10 MHz Impedance
Maximum Distance	100 Meters (330 Feet)

E. RJ-45 Pin Specifications

Individual wires that make up a straight through twisted pair modular cable are shown below.

Each pair has designated pin connections on an RJ-45 modular connector. There are only two active pairs in a 10BaseT network, pins 1 & 2 and 3 & 6. Use only dedicated wire pairs (such as blue/white, white/blue, orange/white, white/orange, etc.).

Hub RJ-45 Male		**Terminal RJ-45 Male**
1	----------	1
2	----------	2
3	----------	3
6	----------	6

The following are the pins for a crossover cable to cascade hubs or connect transceiver to transceiver.

Hub Terminal RJ-45 Male	**to RJ-45 Male**	**Hub Terminal**
1	----------	3
2	----------	6
3	----------	1
6	----------	2

F. 10Base2 Cable Specifications

The IEEE 802.3 standard for a thin coax segment is listed below:

- Maximum distance of 185 meters (610 feet) at 50 ohms.

Appendix C. Segment Distance

The IEEE 802.3 CSMA/CD specification has defined standards which are differentiated by the operating link, the type of signaling, the type of media and distances supported. The following chart highlights the characteristics of the major standards:

	10BaseT	**10Base2**	**10Base5**	**FOIRL**	**10BaseFB**	**10BaseFL**	**10BaseFP**
Operating rate	10	10	10	10	10	10	10 (Mbps)
Signaling	baseband	baseband	baseband	baseband	baseband	baseband	baseband
Max Segment Length (Meters)	100 (328 ft)	185 (607 ft)	500 (1640 ft)	1000 (3280 ft)	2000 (6560 ft)	2000 (6560 ft)	500 (1640 ft)
MAUs/ Segment	2	30	100	2	2	2	2
Medium	unshielded twisted pair	50 ohm coaxial (thinnet)	50 ohm coaxial (thicknet)	fiber optic	fiber optic	fiber optic	fiber optic
Topology	star	bus	bus	star	star	star	star
Notes:				4 Repeaters/	5 Repeaters/ Backbone	5 Repeaters/ Backbone	Backbone

When viewing this chart remember that 10Base5 and 10Base2 use bus topology where multiple devices tap into a segment. 10BaseT and the various 10BaseF implementations use star topologies where individual devices connect to a repeater or hub via a single cable or segment. The various topologies can be interconnected within a single network.

Appendix D. Approved European Power Cord Set

	Embossed Harmonization	Alternative Wire Color Codes		
Approval Organization	**Marking**	**Blk**	**Red**	**Ylw**
Belgium:Comite Electrotechnique Beige (CEBEC)	CEBEC-HAR	10	30	10
Verband Deutscher Elektrotechniker (VDE)e, V., Prufstelle	VDE-HAR	30	10	10
Technique de l'Electricite (UTE)	UTE-HAR	30	30	10
Institute del Marchio Qualita	IEMMEQU-HAR	10	30	50
British Approvals Service For Electric Cables (BASEC-HAR)	BASEC-HAR	10	10	30
N.V. tot Keuring van Electro-technische Matarialien (KEMA)	KEMA-KEUR-HAR	10	30	30
Svenska Elecktriska (SMEKO)	SMEKO-HAR	10	10	50
Osterreichnischer Verband ful Electrotechnik (OVE)	OVE-HAR	30	10	50
Danmark Elektriske Materielkontroll (DEMKO)	DEMKO-HAR	30	10	30
Institute for Industrial Research and Standards (IIRS)	IRS-HAR	30	30	50
Norges Elektriske Materielkontroll (NEMKO)	NEMKO-HAR	10	10	70
National Standards Authority of Ireland (NSAI)	NSAI-HAR	30	30	50

Warranty Statement

A. Five Year Warranty

Transition Networks, Inc. (TN) warrants, for a period of five years, that TN products (with the exception of power supplies and fans that TN warrants for two years) will be free from defects in materials and workmanship, and will be in conformity with TN's specifications.

TN's warranty on products manufactured by or assembled for TN in accordance with a customer's specifications, is a five-year warranty that the goods conform to such specifications.

The warranty is invalidated if the goods have been subject to alterations, misuse, accident, Acts of God (e.g., damage by floods, lightning strikes, Etc.), tampering, improper maintenance, improper installation, or abuse. If the user is unsure about the proper means of installing or using the equipment, contact TN's free Technical Support or Network Design Services, which can be reached by:

Telephone 1.800.LAN.WANS or 612.941.7600
Fax 612.941.2322
E-mail techsupport@transition.com
Internet http://www.transition.com

THE ABOVE WARRANTY IS EXCLUSIVE AND EXTENDS ONLY TO PRODUCTS ASSEMBLED BY TRANSITION NETWORKS, INC. TO THE EXTENT PERMITTED BY LAW, TN DOES NOT MAKE AND DISCLAIMS ALL OTHER WARRANTIES, EXCEPT TITLE, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF DESCRIPTION, MERCHANTIBILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, AND ANY WARRANTY BASED UPON PRIOR WRITTEN OR ORAL REPRESENTATIONS REGARDING SUCH PRODUCTS MADE BY TN, ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES.

B. Limitations and Exclusions

If the customer believes any goods sold by TN are defective and within the warranty period, the following general procedure will be followed:

1. Locate the serial number and delivery date of the item(s).
2. Notify TN within the warranty period.
3. TN will promptly issue a return authorization form for the goods.
4. Upon receiving the form, the customer will promptly return the item(s) at customers own expense, shipped prepaid, to the distributor from which it was purchased, or directly to TN.

TN will only accept goods for return if the following conditions have been met:

1. A return form is obtained from TN.
2. The freight charges have been prepaid by the customer.
3. Goods are re-packed in their original packaging.

If under warranty TN shall, at its option, (1) repair the goods free of charge (2) replace the goods free of charge, or (3) accept the return of the item(s) and credit the current price to the reseller (within 90 days of purchase), or (4) if the goods are not under warranty, will repair the item(s) at a minimum charge of USD $200 (two hundred U.S. dollars) per item.

THIS IS THE EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY. IN NO EVENT SHALL TRANSITION NETWORKS BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, WHETHER FOR BREACH OF ANY CONDITION OF SALE, FOR NEGLIGENCE, ON THE BASIS OF STRICT LIABILITY, CONTRACT, OR OTHERWISE AND IRRESPECTIVE OF WHETHER TN IS INFORMED BY CUSTOMER OF THE POSSIBILITY OF SUCH DAMAGES IN ADVANCE OF THIS SALE.

The sole purpose of this remedy shall be provided the customer with the replacement or repair of non-conforming goods in the manner described in this Warranty statement. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as TN is willing and able to repair or replace the defective item(s) or refund the purchase price.

TN reserves the right to inspect products claimed to be defective under warranty either at the customer's location or at TN's plant. TN assumes no liability for liability charges incidental to the adjustment, service, repairing, removal or replacement of the product, or other costs, or the expense of repairs made outside of its factory, except when made with TN's prior written consent. Additionally, Transition Networks reserves the right to charge for all testing and shipping incurred, if after testing, a return is classified as "No Problem Found".

TN's total liability in connection with the products and their installation to all persons and from all causes in the aggregate, whether in contract, tort, or strict liability, shall not exceed the amount paid to TN for the product directly related to the alleged damage. However, in no event shall TN have any liability to a customer or any third party for products manufactures according to the customer's specifications.

C. Return Procedure

The customer must follow this procedure for the return of defective items:

1. Locate the serial number(s) of the item(s) to be returned.
2. Determine the date the item(s) was received.
3. Contact Transition Networks Technical Support to determine if the problem can be corrected on site.

If not, and the product is covered by warranty, then:

- Call the distributor directly or contact TN.
- Request a Return Material Authorization (RMA).
- Ship the item, prepaid in original packaging to Transition Networks at the above address.
- Include the RMA number on the outside of the carton and/or on the Packing List.
- Include a copy of the RMA form.
- Include a copy of the original invoice or packing list (if possible) to expedite processing.
- The item(s) may be shipped by the customer or the distributor.
- Transition Networks will repair or replace the unit, at TN's discretion, and cover the cost of the return freight to the distributor or to the customer, whichever requested the RMA number.

If the item(s) was received **more than five years ago**, or if the item(s) is **no longer covered by warranty** for other reasons, then:

- Call the distributor or contact TN.
- Request a Material Repair Authorization number (MRA).
- Ship the item(s), prepaid, in the original packaging to Transition Networks at the above address.
- Include the MRA number on the outside of the carton add/or on the Packing List.
- Include a copy of the MRA form.
- Include a copy of the original invoice or packing list (if possible) to expedite processing.
- Only the customer (end-user) may send the items(s) to TN.
- TN will contact the customer after the item(s) have been received, inspected, and a cost estimate of the repair determined.
- The repair charges may be billed, with customer's approval, though the distributor, or on a prepaid or C.O.D. basis directly to the customer. The charges will include the cost of shipping.

The return authorization numbers are valid only for 90 days from the date issued.