StackMaster™ TR

Active Retiming Managed Hub

SMHB-TR-16
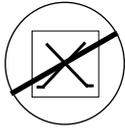
CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

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
© 1995, 1996 TRANSITION Networks Inc.
All rights reserved. No part of this work may be reproduced or used in any form or by any means – graphic, electronic, or mechanical – without written permission from TRANSITION Networks Inc.

Trademark Notice
All registered trademarks and trademarks are the property of their respective owners.

Table of Contents

Preface

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

1. Introduction

The TRANSITION Networks 16-Port StackMaster™TR Active Retiming Managed Hubs are designed for building SNMP managed token ring LANs using twisted pair cable.
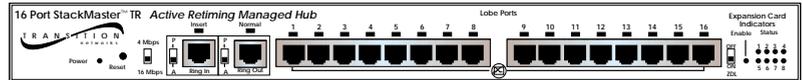
The StackMaster™TR Managed Hub:

*   Complies with current IEEE 802.5 token ring standards to ensure interoperability

*   Supports external SNMP network management

*   Provides sixteen RJ-45 lobe ports support both STP and UTP

*   Provides active signal retiming and regeneration on a per port basis maximizes lobe and RI/RO cable runs

*   Supports Category 3, 4 or 5 UTP/STP and IBM Type 1 Cable

*   Allows 4 or 16 Mbps operation

*   Allows RI/RO connection to both "active hubs" and "passive hubs"

*   Delivers fault-tolerant, automatic ring wrap capability at RI/RO

*   Provides Zero Delay Lockout, automatic lockout of station configured at wrong speed

*   Installed as standalone or rackmount in a standard 19″ rackmount frame.

*   Provides serial port connection for Out of Band management.

NOTE: The StackMaster™TR 16-Port Hub is designed to support an Active Retime environment with HOT SWAP capability. An active hub can be added or removed without bringing the network down.

Connectors

Ring In/Ring Out Connector
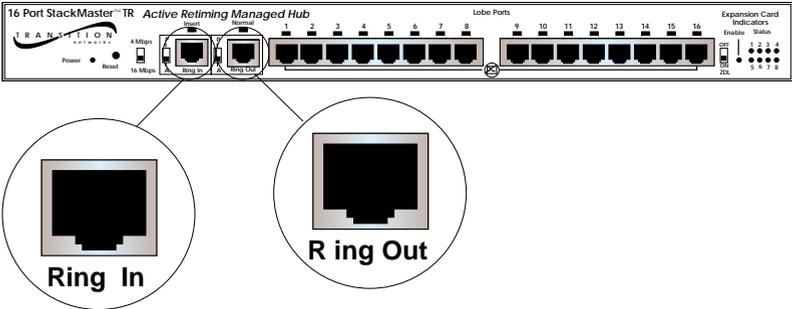
An RJ-45 Ring In connector and an RJ-45 Ring Out connector are provided at the front of the 16-Port StackMaster™TR Active Retiming Managed Hub.

Lobe Connectors
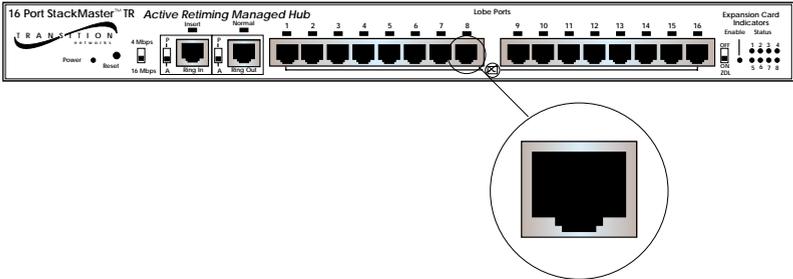
Sixteen (16) RJ-45 lobe connectors are provided at the front of the 16-Port StackMaster™TR Active Retiming Managed Hub.

Connectors at Back

Cascade (Bus) Connectors

Serial
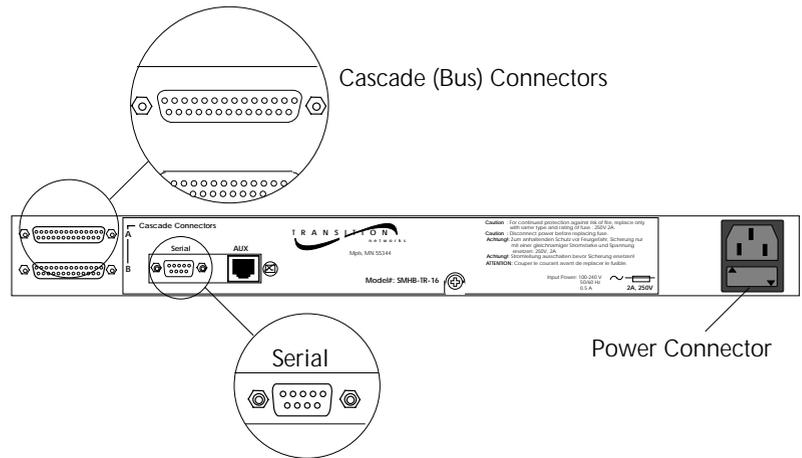
Power Connector

A serial port connector for SNMP management and maintenance, two (2) Cascade (bus) connectors, and a power connector are provided at the back of the StackMaster™TR 16-Port.

NOTE: The AUX connector is intended for future development.

Indicators

Power LED
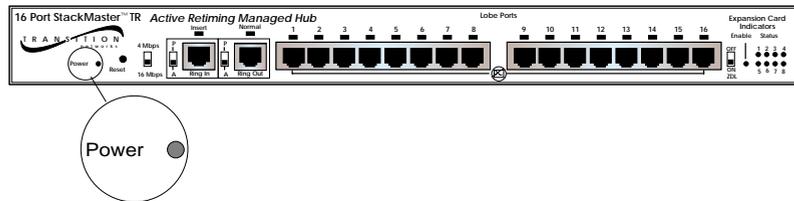
When the StackMaster™TR 16-Port Unit is powered, the **Power** indicator is illuminated.
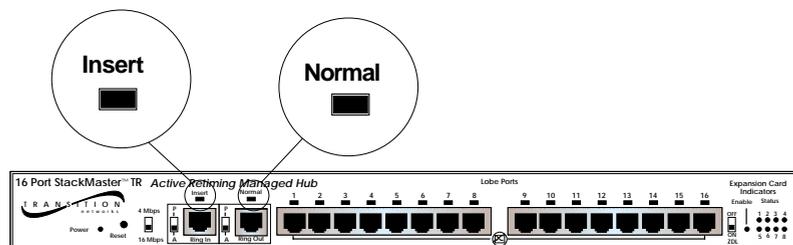
Insert/Normal LEDs

The **Insert** LED (above the Ring In port) is illuminated if the StackMaster™TR 16-Port RI port is connected to the RO port of a hub.

NOTE: When the RI switch is in the passive position, the LED always is ON, indicating that the RI port is configured in the passive mode.

The **Normal** LED (above the Ring Out port) is illuminated if the StackMaster™TR 16-Port RO port is connected to the RI port of a hub which is powered.

NOTE: When the RO switch is in the passive position, the LED always is ON, indicating that the RO port is configured in the passive mode.

StackMaster™TR
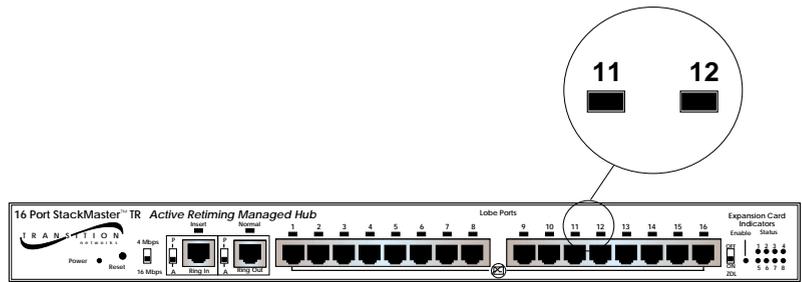
Port Status LEDs

Port Status LEDs above each of the sixteen (16) RJ-45 lobe port connectors indicate insertion status for each of the sixteen connections:

      green LED: good insertion

NOTE: Illuminated LEDs indicate insertion EXCEPT when a wrong speed station is plugged into the hub; when a wrong speed station is plugged into the hub, the iluminated LED indicates only that the connecting cable is good.

Management Board LEDs
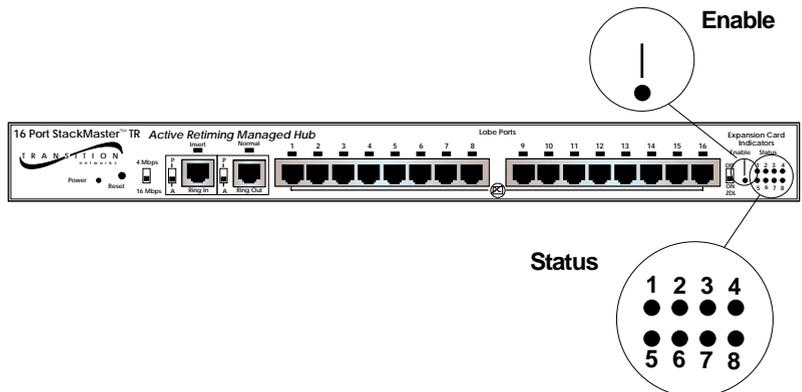
When the SNMP Management circuit board is installed and managing the StackMaster™TR 16-Port Stack, the SNMP Management circuit board indicators are active. The **Enable** indicator is illuminated when the SNMP Management circuit board is installed. The eight **Management Status** indicators cycle in a steady roll when the StackMaster™TR 16-Port Stack is functioning normally.

Switches

Active/Passive Switches
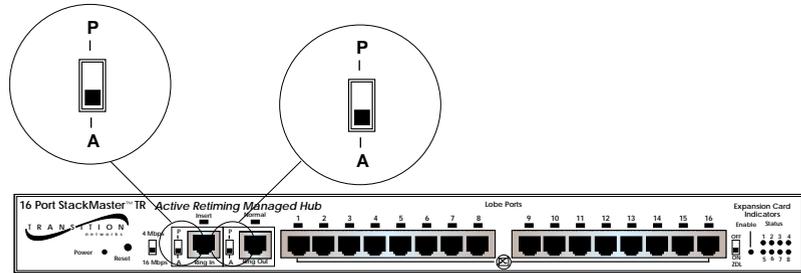
A(ctive) and P(assive) switches are provided for the Ring In port and for the Ring Out port for connection to active ("A") or to passive ("P") hubs.

ZDL Switch
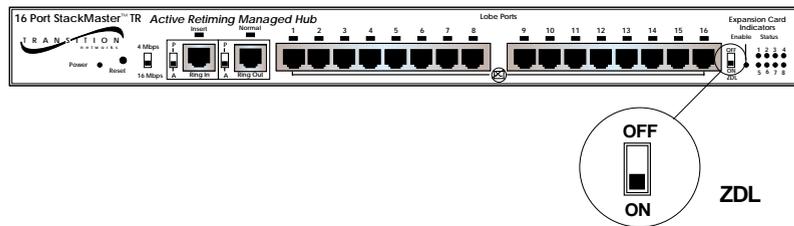
The **ZDL Switch** allows selection of automatic speed detection. NOTE: The default position is ON. The OFF position is used for connecting non-802.5 compliant equipment, such as the Hewlet Packard token ring tester.

NOTE: The StackMaster™TR 16-Port Hub must be reset when the ZDL switch position is changed.

Reset Switch
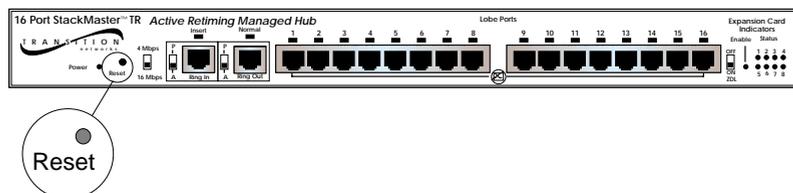
A **reset** switch is located on the front of the StackMaster™TR 16-Port Hub. The reset switch reinitializes the StackMaster™TR 16-Port Unit. If the SNMP Management Board is installed in the StackMaster™TR 16-Port Unit and the StackMaster™TR 16-Port Unit is installed at the top of a Stack, the reset switch reinitializes the entire Stack.

StackMaster™TR

4Mbps/16Mbps Switch
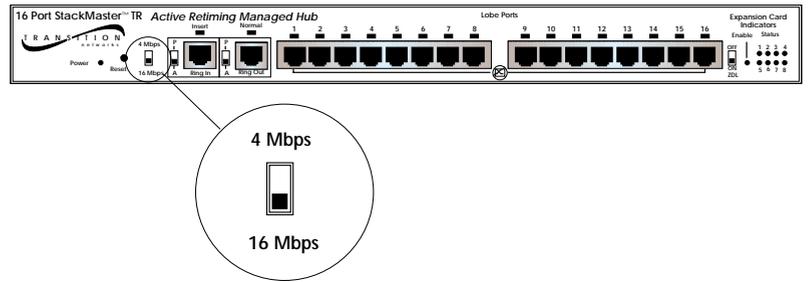
The **4Mbps/16Mbps Speed Selection Switch** allows selection of data rate (4Mbps or 16Mbps).

NOTE: The StackMaster™TR 16-Port Hub must be reset when the 4Mbps/16Mbps switch position is changed.

NOTE: Network speed affects maximum twisted pair cable distances.

Speed: 16 Mbps

Speed: 4 Mbps
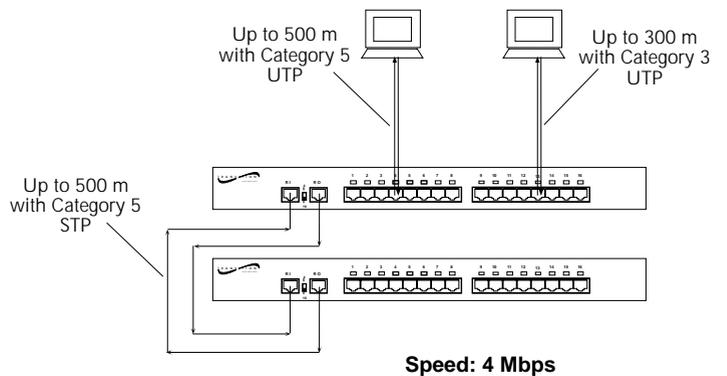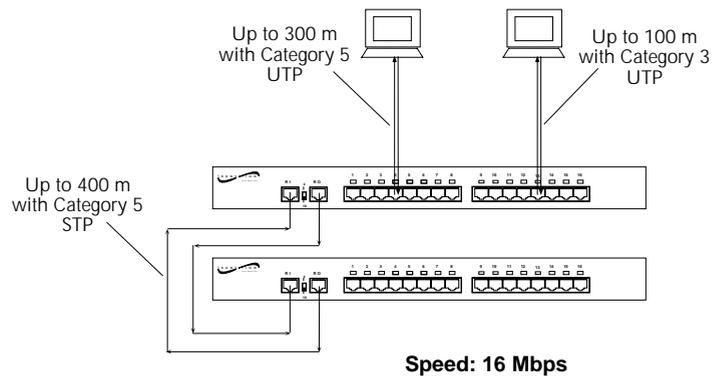
2. Site Planning

Site planning for the StackMasterTR Stack requires consideration both of site conditions and of token ring standards.

2.1 Site Considerations

The site for the StackMasterTR Token Ring Stack must provide the following:

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

Additionally:
- The token ring 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 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	StackMasterTR 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**) 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	

Table 2-1. TCP/IP Network Parameters Data Sheet

StackMaster™TR

SNMP Network Parameters Data Sheet

CATEGORY	StackMasterTR 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	

Table 2-2. SNMP Network Parameters Data Sheet

Serial Port Parameters Data Sheet

CATEGORY	StackMasterTR DEFAULT	SITE ENTRY
Transmission rate (**bps**) Transmission speed, in bits per second Format: 9600/	9600	
Name (**stop bitse**) 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	

Table 2-3. Serial Port Parameters Data Sheet

3. Installation

To install the StackMaster™TR 16-Port Active Retiming Managed Hub::

- Unpack the StackMaster™TR Equipment

- Stack Units in Rack or on Table

- Cascade StackMaster™TR Units

- Connect StackMaster™TR to Network

- Connect Units to Power

- Optionally Configure SNMP Network Management

3.1 Unpacking StackMaster™TR 16-Port Equipment

Use the packing contents lists to verify the shipment:

Item	Part Number
StackMaster Modular Chassis	SMHB-TR-16
Special 6-inch DB-25 data cable	6005
Power Cord	3344 (or refer to Appendix D)
User's Guide	7361

3.2 Stacking Units in Rack or on Table

NOTE: StackMaster™TR 16-Port 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: The StackMaster™TR 16-Port 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™TR 16-Port Units.

To install the StackMaster™TR 16-Port Stack in a standard 19-inch rack:

1.   Locate four (4) screws (and clip nuts, if necessary) for each StackMaster™TR 16-Port Unit to be installed.

2.   Locate the StackMaster™TR 16-Port Unit to be installed at the bottom of the stack.

3.   Carefully align the StackMaster™TR 16-Port 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™TR 16-Port Unit above the StackMaster™TR 16-Port Unit already installed.

6.   Repeat steps 4 and 5 in reverse order until all StackMaster™TR 16-Port Units have been installed.

3.2.2 Table-Top Installation

NOTE: StackMaster™TR 16-Port Units are shipped with a separate, unattached set of adhesive-backed rubber feet.

CAUTION: The rubber feet MUST BE INSTALLED on the StackMaster™TR 16-Port Unit if a StackMaster™TR 16-Port Unit is installed on a table-top or other flat surface. Failure to observe this caution could cause the StackMaster™TR 16-Port Unit to overheat and could result in data transmission failure and/or equipment damage.

CAUTION: The StackMaster™TR 16-Port 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™TR 16-Port Stack on table or other flat surface:

1. Determine StackMaster™TR 16-Port Unit to be installed at bottom of stack.

2. Carefully turn StackMaster™TR 16-Port 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 Lanmaster Unit
    *   Secure rubber foot to StackMaster™TR 16-Port Unit.
    *   Repeat for remaining rubber feet.

3. Return StackMaster™TR 16-Port Unit to upright position.

4. Repeat step 2 for next StackMaster™TR 16-Port Unit to be installed.

5. Carefully set StackMaster™TR 16-Port Unit on StackMaster™TR 16-Port Unit previously installed.

6. Continue steps 4 and 5 until all StackMaster™TR 16-Port Units have been installed.

NOTE: The mounting brackets that come installed on the StackMaster™TR 16-Port Unit can be removed and saved for later use.

3.3 Cascading StackMaster™TR Units

Cascading the StackMaster™TR cascades ONLY the SNMP management. To cascade the StackMaster™TR units, use the RI/RO connections at the front.

NOTE: Use only the special six-inch DB-25 (male-to-male) cables (PN 6005).The StackMaster™TR 16-Port DOES NOT require terminators.

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

1.   Connect six-inch DB-25 (male-to-male) cable to Cascade B of StackMaster™TR 16-Port Unit.
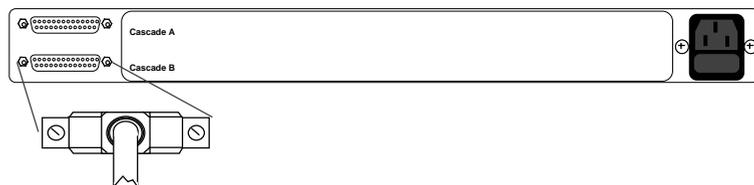
Cascade A
Cascade B

2   Connect six-inch DB-25 (male-to-male) cable from StackMaster™TR 16-Port Unit above to Cascade A of next StackMaster™TR 16-Port Unit.

Cascade A
Cascade B
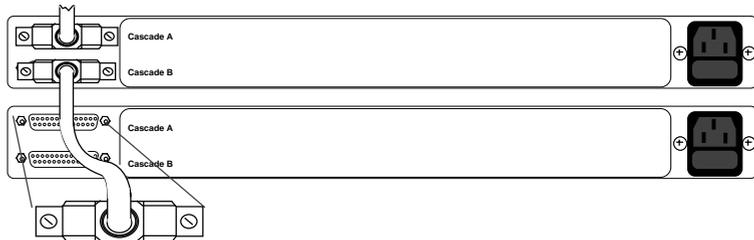
Cascade A
Cascade B

3.   Connect six-inch DB-25 (male-to-male) cable from Cascade A to Cascade B of same StackMaster™TR 16-Port Unit.

Cascade A
Cascade B

4.   Continue steps 2 and 3 until all StackMaster™TR 16-Port Units are connected.

3.4   Connecting StackMaster™TR to Token Ring Network

When NO connection to RI port:

• **ALWAYS** set **Ring In** switch to **Active** position.

NOTE: The INSERT LED should remain OFF.

When NO connection to RO port:

• **ALWAYS** set **Ring Out** switch to **Active** position.

NOTE: The NORMAL LED should remain OFF.

When adding passive hub to RI port:

• Connect cable between StackMaster™TR RI and RO of the passive hub

• Set **Ring In** switch to **Passive** position.

When adding passive hub to RO port:

• Connect cable between StackMaster™TR RO and RI of the passive hub

• Set **Ring Out** switch to **Passive** position.

When removing passive hub from RI port:

• Set **Ring In** switch to **Active** position

• Disconnect cable between StackMaster™TR RI and RO of the passive hub.

When removing passive hub from RO port:

• Set "Ring Out" switch to **Active** position

• Disconnect cable between StackMaster™TR RO and RI of the passive hub.

When interfacing to other manufacturers' hub: The StackMaster™TR 16-Port is fully tested for interoperatbility with other manufacturers' concentrators that are compliant with 802.5 standards. Ensure that the RI/RO configuration of the manufacturers' concentrators functions with the StackMaster™TR 16-Port.

3.5 Connecting Units to Power

The StackMaster™TR 16-Port Stack is connected to power by connecting each of the StackMaster™TR 16-Port Units to power.

NOTE: Connect StackMaster™TR 16-Port Units from bottom to top.

To connect the StackMaster™TR 16-Port Stack to power:

1.   At StackMaster™TR 16-Port 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.

110-120 Orientation   220-240 Orientation

Fuse Holder   Fuse Holder
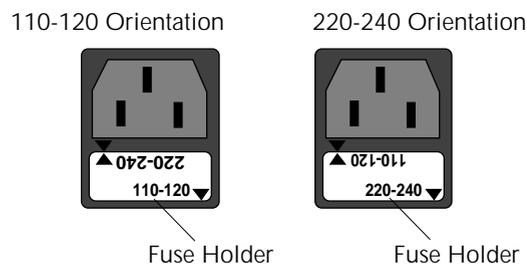
If not installed at correct setting for power source voltage:

- 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 unit end (female) of power cord into StackMaster™TR 16-Port Unit power receptacle.

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

5.   At StackMaster™TR 16-Port Unit front, verify that POWER LED is illuminated.

6.   Repeat steps 1 through 5 until all StackMaster™TR 16-Port Units have been powered.

3.6 Resetting StackMaster™TR 16-Port Stack

NOTE: The StackMaster™TR 16-Port Stack must be reset during installation to initialize the internal software.

Managed Stack

- If the StackMaster™TR 16-Port Stack is managed, use a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside the StackMaster™TR 16-Port Unit with SNMP Management installed. *The entire StackMaster™TR 16-Port Stack will recycle and then resume normal operation.*

Unmanaged Stack

- Reset the StackMaster™TR 16-Port units individually by using a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside each StackMaster™TR 16-Port unit. *The StackMaster™TR 16-Port unit will recycle and then resume normal operation. Other units in the StackMaster™TR 16-Port Stack will not be affected.*

3.7   Optionally Configuring SNMP Network Management at Attached Terminal

To set SNMP management parameters through an attached terminal:

- Connect the StackMaster™TR 16-Port to an ASCII terminal or terminal emulator
- Bring up the StackMaster™TR 16-Port configuration software
- Reset the StackMaster™TR 16-Port
- Set Network and SNMP parameter values.

Connecting to ASCII Terminal

NOTE: The DB9 serial port on the StackMaster™TR 16-Port 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.

To ASCII Terminal

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™TR 16-Port .

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™TR 16-Port 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™TR 16-Port 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™TR 16-Port Configuration Software Display available at the attached terminal.

To bring up the StackMaster™TR 16-Port configuration software, at the attached terminal command line, enter:

^D   ("control D")

The StackMaster™TR 16-Port Configuration Main Menu comes up.

```
   StackMaster™TR Configuration Main Menu


   main                     serial
   ip                       bootp
   snmp                     misc



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


MAIN >   __
```

At the StackMaster™TR 16-Port 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**

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™TR 16-Port Configuration Main Menu **MAIN>** prompt, type and enter:

    > MAIN> **ip**

    The StackMaster™TR 16-Port 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, 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> **ip**

    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™TR 16-Port 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™TR 16-Port 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, 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 values.

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

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

The StackMaster™TR 16-Port restarts and the parameter values entered are written to non-volatile memory.

Resetting the StackMaster™TR 16-Port

NOTE: The StackMaster™TR 16-Port can be reset in any of the following ways:.

- Disconnect power cord to StackMaster™TR 16-Port unit with installed SNMP management board, then reconnect the power cord.

- Press the reset button on the StackMaster™TR 16-Port unit 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™TR 16-Port 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™TR 16-Port software is waiting for an optional user interrupt.*

4. Operation

4.1 Power On/Power Off

The StackMaster™TR 16-Port Stack is powered ON when the power cords are connected from all the StackMaster™TR 16-Port Units to AC outlets.

NOTE: When powered, the POWER LED on each StackMaster™TR 16-Port Unit should be illuminated.

The StackMaster™TR 16-Port Stack is powered OFF when the power cords are disconnected from all the StackMaster™TR 16-Port Units or from all the AC outlets.

5. Maintenance

Maintenance of the StackMaster™TR 16-Port Stack is required only when a StackMaster™TR 16-Port unit fails. Recovery of a failed StackMaster™TR 16-Port 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™TR 16-Port Stack. Table 5-1 presents a list of faults and probable causes, presented in the order of increasing probability, with suggested remedial action.

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 Technical Support. 1-800-260-1312

Insert RI LED not illuminated and RI connected to active hub RO port	The active hub's RO port may be configured as passive.	Switch RO to "P" (passive) position.
Normal RO LED not illuminated and RO connected to active hub RI port	The active hub's RI port may be configured as passive.	Switch RI to "P" (passive) position.
Lobe Port LED not illuminated	Cable failure (open/short).	Check cable assembly or tester or swap cable with known good cable.
	Incorrect RJ45 cable installed. Invalid cable pin-outs.	See 3.5.2 for pin specifications See 3.5.2 for cable pin-outs
	Workstation or server NIC failure.	Check NIC configuration/setup with manufacturer.
	Lobe port connector failure.	Contact TN Technical Support. 1-800-260-1312.

Unit "freezes".	RI, RO switches are in passive position but one port is not connected.	Set unconnected port switch to "A"(active) position.
	ZDL disabled and wrong speed station tries to insert.	Switch ZDL to ON and reset hub.
	RI or RO cable broken while in "Passive" position.	Replace cable.
Cannot manage stack	Stack initialization	Reset Stack (See 5.2
	Incorrect management cable used.	Replace cable.

Table 5-1. Fault Isolation in the StackMaster™TR 16-Port Stack

5.2 Recovery Procedures

Recovery of a failed StackMaster™TR 16-Port Unit or Stack is accomplished, often, by resetting the StackMaster™TR 16-Port Stack

Managed Stack

- If the StackMaster™TR 16-Port Stack is managed, use a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside the StackMaster™TR 16-Port Unit with SNMP Management installed. *The entire StackMaster™TR 16-Port Stack will recycle and then resume normal operation.*

NOTE: Disconnecting power also will reset the StackMaster™TR 16-Port Stack.

Unmanaged Stack

- Reset the StackMaster™TR 16-Port units individually by using a jewelers screwdriver, paper clip, or other small device to depress the reset switch inside each StackMaster™TR 16-Port unit. *The StackMaster™TR 16-Port unit will recycle and then resume normal operation. Other units in the StackMaster™TR 16-Port Stack will not be affected.*

NOTE: Disconnecting power also will reset the StackMaster™TR 16-Port Stack.

StackMaster™TR

5.3 Replacement Procedures

WARNING! StackMaster™TR 16-Port Units contain no user-serviceable parts. With the exception of installation of the SNMP management board, DO NOT, UNDER ANY CIRCUMSTANCES, open and attempt to repair StackMaster™TR 16-Port equipment. Failure to observe this warning could result in electrical shock and personal injury.

NOTE: Failure to observe the above warning will immediately void any warranty.

Replacing StackMaster™TR 16-Port Unit Fuses

To replace a StackMaster™TR 16-Port Unit fuse:

1.   Disconnect outlet end of power cord from AC wall socket.

2.   Disconnect the power cord from the StackMaster™TR 16-Port Unit 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.

110-120 Orientation   220-240 Orientation
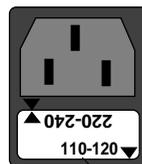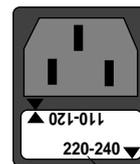
Fuse Holder   Fuse Holder

4.   Install replacement fuse holder in correct rating orientation.

5.   Close fuse receptacle.

6.   Connect unit end (female) of power cord to StackMaster™TR 16-Port Unit power receptacle.

7.   Connect outlet end (male) of the power cord to the AC wall socket.

8.   At StackMaster™TR 16-Port Unit front, verify that POWER LED is illuminated.

5.4 StackMaster™TR 16-Port Field Upgrades

StackMaster™TR 16-Port allows a field upgrade installation of an SNMP Management Board

5.4.1 Installing SNMP Management Board

WARNING: DISCONNECT THE POWER CORD from theStackMaster™TR 16-Port Unit 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 SNMP Management board:

1.   Place StackMaster™TR 16-Port Unit on table or other stable surface.

2.   Using Phillips screwdriver, remove four (4) screws that secure the cover to the StackMaster™TR 16-Port Unit left side and four (4) screws that secure the cover to the StackMaster™TR 16-Port Unit right side.

3.   Using Phillips screwdriver, remove two (2) screws that secure the cover to StackMaster™TR 16-Port Unit 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.
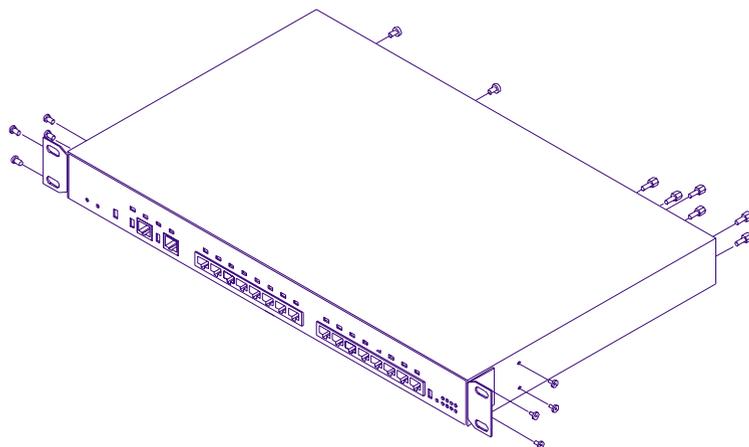
StackMaster™TR

NOTE: The internal fan is attached to the cover. Fan wires connect to the attachedStackMaster™TR 16-Port circuit board.

5.   Using necessary force, slide cover back to disengage from chassis.

6.   Without disconnecting fan wires, carefully lift the front of the StackMaster™TR 16-Port Unit cover. Rotate the cover over the StackMaster™TR 16-Port Unit until the cover rests securely behind, and next to, the StackMaster™TR 16-Port Unit.

7.   Align the two snap-fit ends of the two SNMP Management circuit board plastic spacers to the associated SNMP Management circuit board holes.
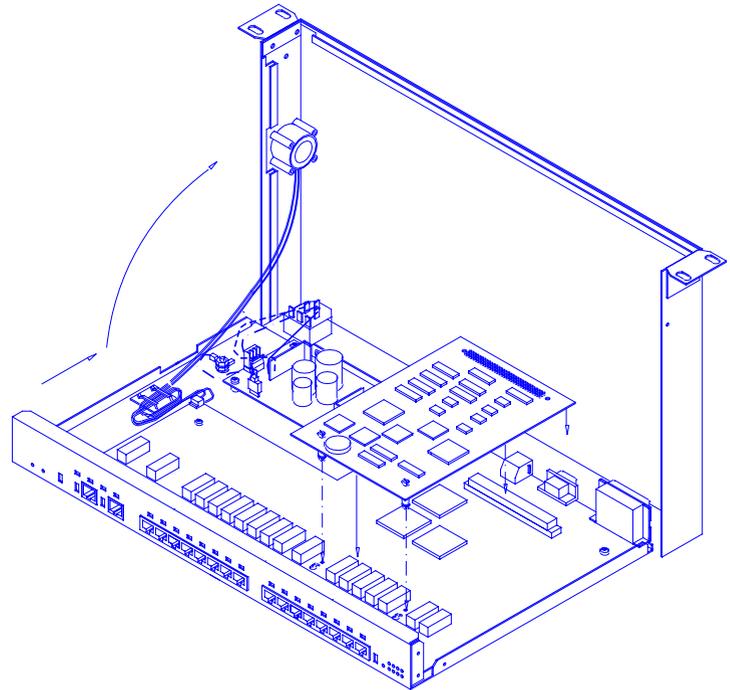
8.   Align the SNMP Management circuit board DIN connector pins (male connector) to the StackMaster™TR 16-Port circuit board DIN connector (female connector).

9.   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.

USER'S GUIDE

5.4.1 Installing SNMP Management Board (continued)

10. Without crimping the fan wires, rotate the StackMaster™TR 16-Port Unit cover to rest on chassis.
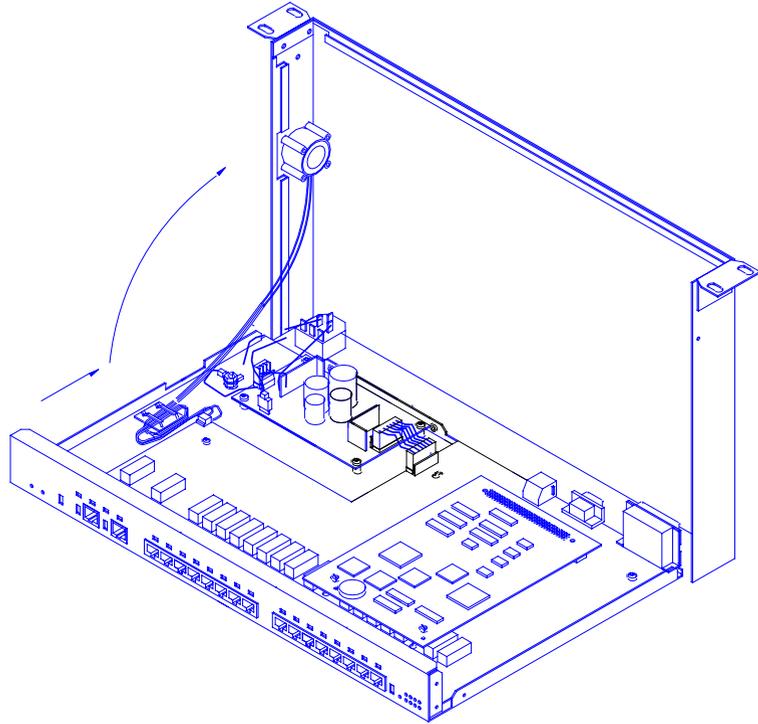
11. Slide cover forward to engage cover against chassis

12. Replace the cover screws.

5.5 Software Upgrades

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

5.5.1 Software Upgrade at Attached ASCII Terminal

To upgrade the flash ROM:

*   Obtain a copy of updated StackMaster™TR 16-Port software
*   Establish a serial connection to an ASCII terminal or terminal emulation.
*   Reset the StackMaster™TR 16-Port Management Unit
*   Transfer the file.

Obtaining Updated StackMaster™TR 16-Port Software

Updated software can be obtained through the Transition Networks Bulletin Board Service at:
>   **(612) 941-9304**

 through the Transition Networks Web site at:
>   **www.transition.com**

or by contacting Transition Networks.

Connecting to ASCII Terminal

NOTE: The DB9 serial port on the StackMaster™TR 16-Port 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™TR 16-Port .

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™TR 16-Port 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™TR 16-Port port parameter values. If necessary, modify the attached terminal port parameter values. THEN RESET THE STACKMASTER™TR.

Resetting the StackMaster™TR 16-Port

Reset the StackMaster™TR 16-Port in any of the following ways:.

- Disconnect power cord to SNMP Management Unit or to StackMaster™TR 16-Port Unit with installed SNMP management board, then reconnect the power cord.

- Press the reset button on the SNMP Management Unit or StackMaster™TR 16-Port Unit with installed SNMP management board.

- At the attached terminal or terminal emulation, type and enter:

```
Ready to RECEIVE file using XMODEM/crc/binary/xon/xoff.
Initiate SEND from host . . .

Stop                                              Sending
□
```

ANY MENU>   **restart**

ANY MENU>   **quit**

At power on or reset, the Status LEDs cycle through diagnostic test patterns as internal StackMaster™TR 16-Port 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™TR 16-Port 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.

Appendix A. Technical Specifications

Network Standards
> Ethernet IEEE 802.5

Interface Connector
> One (1) Ring In, one (1) Ring Out, and sixteen (16) Lobe RJ-45 connectors are provided on the front of the StackMaster™TR.
>
> One (1) DB9 connector is provided on the back of the StackMaster™TR for Out-Of-Band communication.

Universal Power Supply
> Input Range: 85 to 265 VAC at 47 to 63 Hz. Rated at 40 watts maximum.
>
> AC Input:

TE 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

Twisted Pair Cable Specifications

Either shielded or unshielded twisted pair can be used. Category 5wire or better is recommended.

- Gauge. . . . . 26 to 22 AWG
- Attenuation . . . . Less than 11.5 dB @ 5-10 MHz
- Differential Characteristic   . . 85 -110 Ω Impedance
                                @ 10 MHz

RJ-45 Pin Specifications

The two active pairs in the token ring RJ-45 connector are pins 4 & 5 and pins 3 & 6. Use only dedicated wire pairs (such as blue/white & white/blue, orange/white & white/orange) for the active pins.

Straight Through Cable at RJ-45 Plug

RJ-45 Male   RJ-45 Male
          3 3
          4 4
          5 5
          6 6

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

Chassis Ground	1 ——————— 1	Chassis Ground
Transmit Data	2 ——————— 3	Receive Data
Receive Data	3 ——————— 2	Transmit Data
Request To Send	4 ┐ ┌ 4	Request To Send
Clear To Send	5 ┘ └ 5	Clear To Send
Data Set Ready	6 ┐ 20	Data Terminal Ready
Carrier Detect	8 ┘ ┌ 6	Data Set Ready
Data Terminal Ready	20 ┘ └ 8	Carrier Detect
Signal Ground	7 ——————— 7	Signal Ground
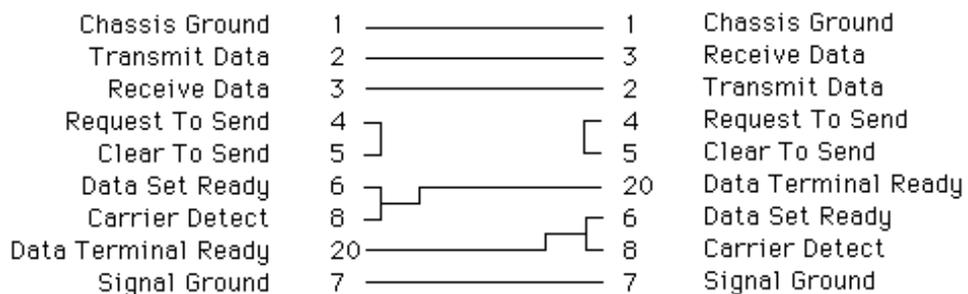
Appendix C. Cable Distance

Cable	Catagory	Speed	Max-Lobe Length*	Max-RI\RO Length*
UTP	3	16Mbps	100 meters	150 meters
UTP	5	16Mbps	300 meters	300 meters
STP	5	16Mbps	400 meters	400 meters
UTP	3	4Mbps	300 meters	300 meters
UTP	5	4Mbps	500 meters	500 meters
STP	5	4Mbps	500 meters	500 meters

*Distances as tested with IBM Token Ring and SMC Token Elite Cards. Other cards guaranteed to 100 meters per 802.5 specification.

Appendix D. Approved European Power Cord Set

Approval Organization	Embossed Harmonization Marking	Alternative Wire Color Codes		
		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.

StackMaster™TR