

**MT-800 MULTIPORT
TRANSCEIVER**

USER'S MANUAL

**CABLETRON
SYSTEMS^{Inc.}**

The Complete Networking Solution™

CABLETRON SYSTEMS, P.O. Box 5005, Rochester, NH 03867-0505

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NOTICE**FCC NOTICE**

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 protection against harmful interference when the equipment is operated in a commercial environment. This equipment uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required at his own expense to correct the interference.

If this equipment does cause interference to radio or television, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.
- Relocate the transceiver with respect to the antenna.
- Move the transceiver away from the receiver.
- Plug the Ethernet device into a different outlet so that the device and the receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communication Commission helpful:

"How to Identify and Resolve Radio TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402 - Stock No. 004-000-00345-4.

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CHAPTER 1

INTRODUCTION

Welcome to the Cabletron Systems MT-800 Multiport Transceiver. We have designed this manual to introduce you to the MT-800 and explain how it is used with other Cabletron Systems products in creating a complete network solution.

1.1 USING THIS MANUAL

You should read this manual thoroughly to gain a full understanding of the MT-800 and its capabilities.

Chapter 1, **Introduction**, contains general information about how the MT-800 is connected to a network and how it operates. This chapter also includes a list of related user manuals.

Chapter 2, **Network Requirements/Specifications**, lists the network design guidelines plus operating specifications and power requirements for the MT-800.

Chapter 3, **Installation**, contains the steps for unpacking the MT-800, setting its switches and installing the Multiport Transceiver on your network.

Chapter 4, **Testing and LANVIEW**, contains procedures for checking that the MT-800 is properly installed on your network and a description of the LANVIEW® LEDs and their function.

We assume that you have a general working knowledge of Ethernet or IEEE 802.3 type data communications networks and their physical layer components.

1.2 GETTING HELP

If any additional support is needed related to the Cabletron Systems MT-800, contact Cabletron Systems Technical Support at:

Cabletron Systems
P.O. Box 5005
Rochester, NH 03867-0505
Phone: (603) 332-9400

INTRODUCTION

1.3 AN OVERVIEW OF THE MT-800

The MT-800 (Figure 1-1) is an eight port transceiver designed to link up to eight network or host devices together. The MT-800 allows these devices to communicate with a network or just between themselves. The MT-800 is compatible with specifications for a 10 Mb/s Medium Access Unit under Ethernet Versions 1.0 and 2.0, and IEEE 802.3 standards.

The MT-800 works in two modes - Local or Network. In the Local mode, the MT-800 only receives and transmits traffic from the devices attached to it. This mode is enabled by the Loopback (LBK) switch on the front of the MT-800.

The MT-800 can also be configured with another transceiver to allow the devices attached to it to communicate with a larger network. The other transceiver could be attached to a thick or thin coax cable, a fiber optic link or a twisted pair segment.

The MT-800 contains nine AUI ports. Ports 1-8 connect the MT-800 to network devices or host units. These eight ports act as transceivers. The ninth port allows the MT-800 to be connected to an external transceiver, giving the other devices access to the network.

The MT-800 can also be configured in a cascaded method with a second layer of MT-800s. Up to eight additional MT-800s could be connected through one MT-800, allowing up to 64 users.

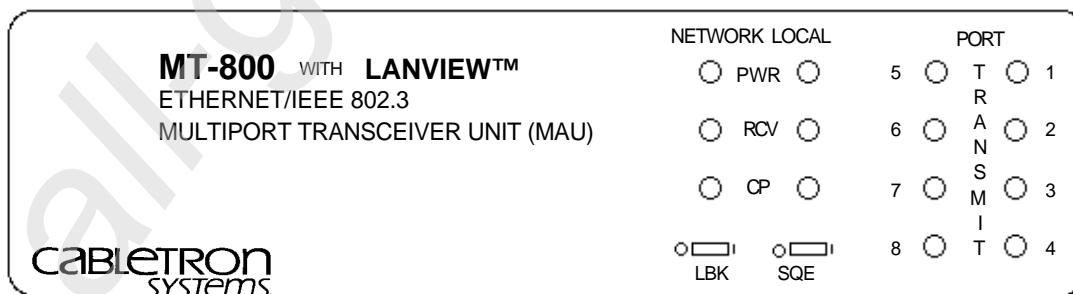


Figure 1-1. MT-800

The MT-800 also incorporates Cabletron Systems LANVIEW diagnostic and monitoring LEDs. Should a physical layer problem arise, troubleshooting of power failures, collisions, cable faults, or many other problems can be diagnosed rapidly using these LEDs.

1.4 RELATED USER MANUALS

The manuals identified below should be used to supplement the procedures and other technical data provided in this manual. The procedures contained in these manuals will be referenced rather than repeated in this manual:

Cabletron Systems **LAN-MD Portable Ethernet Tester** User's Manual.

Cabletron Systems **ST-500 Coaxial Transceiver** User's Manual.

Cabletron Systems **TPT Twisted Pair Transceiver** User's Manual.

Cabletron Systems **FOT-F1 Fiber Optic Transceiver** User's Manual.

CHAPTER 2

NETWORK REQUIREMENTS/SPECIFICATIONS

This chapter contains the network design guidelines, specifications, power supply requirements, and environmental guidelines for Cabletron Systems MT-800.

Review all specifications and requirements outlined in this chapter before you install the MT-800. All outlined conditions must be met to ensure satisfactory performances of your network.

NOTE: *Cabletron Systems reserves the right to change these specifications at any time without notice.*

2.1 NETWORK DESIGN GUIDELINES

The following network design guidelines must be followed when connecting the MT-800 Multiport transceiver to other devices. If not, unsatisfactory network performance may result.

- The transceivers that the MT-800 is connected to must meet IEEE 802.3 standards.
- The AUI cables connecting the MT-800 to the transceivers on the network must be IEEE 802.3 type cables.
- The length of the AUI cables attached to the MT-800 is dependent on the configuration:
 - a. When one MT-800 is being used in a stand alone configuration, the total length of any AUI cable from the MT-800 to a node must not exceed 40 meters (Figure 2-1).

NETWORK REQUIREMENTS/SPECIFICATIONS

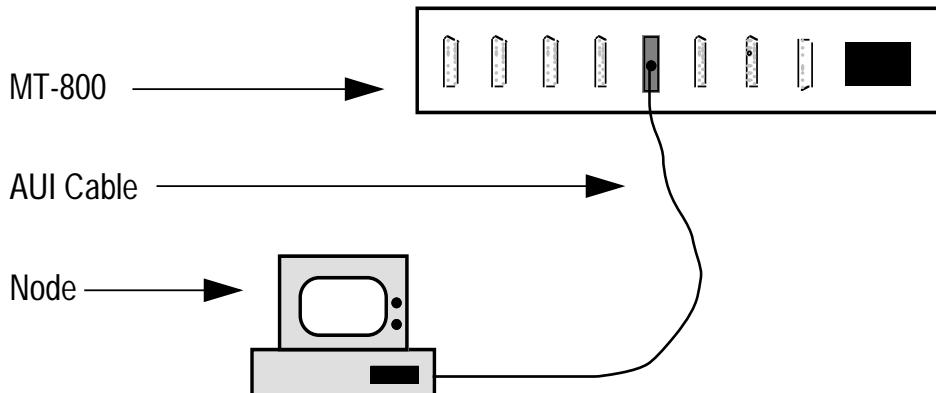


Figure 2-1. MT-800 in Stand Alone Configuration

- b. When one MT-800 is being used in the network mode (Fig. 2-2), the total AUI length, as measured from the network transceiver to the end device, must not exceed 40 meters.

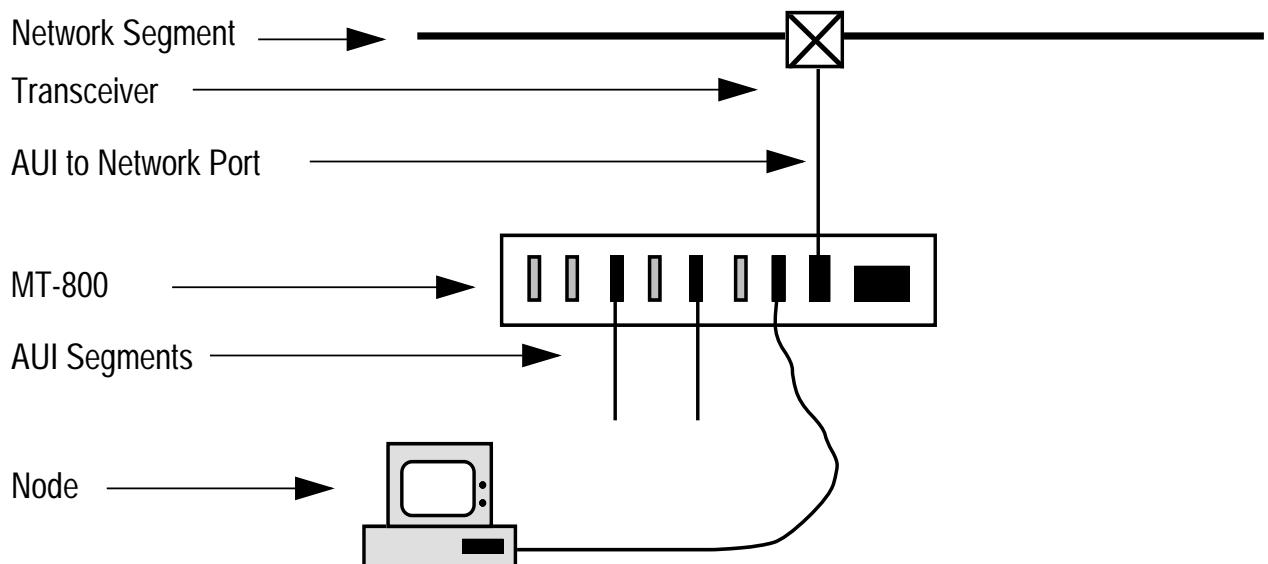


Figure 2-2. MT-800 in Network Configuration

- c. When an MT-800 in the stand alone mode is cascaded with another MT-800 (Fig. 2-3), the total AUI length from the main MT-800 (1) to an end device must not exceed 30 meters.

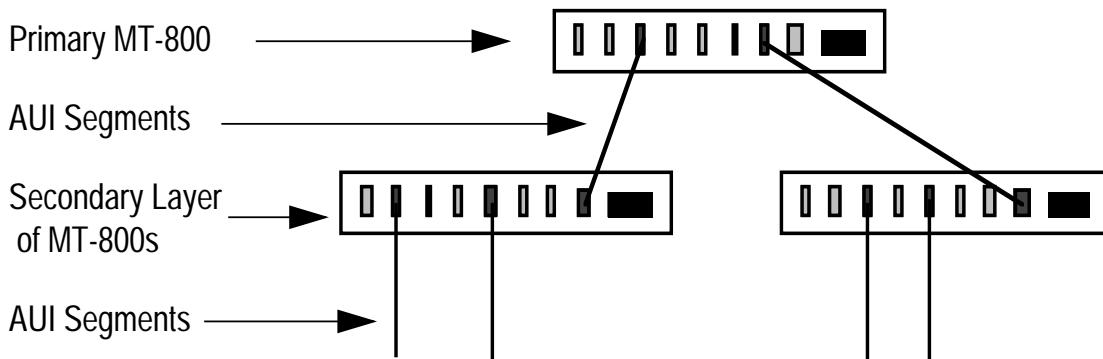


Figure 2-3. MT-800 in Stand Alone Cascaded Configuration

- d. When an MT-800 in the network configuration is cascaded with another MT-800 (Fig. 2-4), the total AUI length from the network transceiver to the end device must not exceed 30 meters.

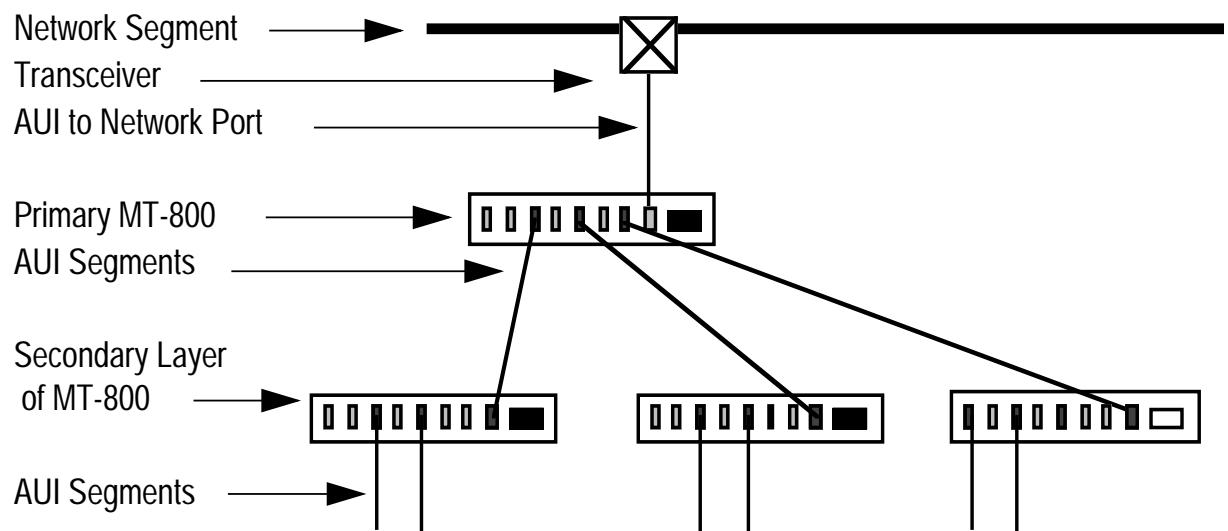


Figure 2-4. MT-800 in Network Cascaded Configuration

- The MT-800 device can be cascaded up to 2 units deep.
- One MT-800 can support up to 64 users.

NETWORK REQUIREMENTS/SPECIFICATIONS

2.2 SPECIFICATIONS

TRANSMIT

TX-in and TX-out Ports 1-8

Parameter	Typical Value	Worst Case
Frequency range:	4-20 MHz	5-15 MHz
Input impedance differential: common-mode:	78 ohms > 20.0 ohms	76-80 ohms
Common-mode voltage range at TX-in:	0-30 Volts	0-5 Volts
Input sensitivity:	±100 mV	± 75 to 150 mV
Delay time, TX-in (any) to TX-out start-up: steady-state:	50 ns 10 ns	100 ns 20 ns
Waveform Symmetry TX-out:	± 0.25 ns	± 0.50 ns
Output Voltage into 78 ohms TX-out:	900 mV	550 mV

RECEIVE

RX-in and RX-out Ports 1-8

Parameter	Typical Value	Worst Case
Frequency range:	4-20 MHz	5-15 MHz
Input impedance differential: common-mode:	78 > 20.0 ohms	76-80 ohms

RECEIVE (cont.)**RX-in and RX-out Ports 1-8**

Parameter	Typical Value	Worst Case
Common-mode voltage range at TX-in:	0-30 Volts	0-5 Volts
Input sensitivity:	± 100 mV	± 75 to 150 mV
Delay time, RX-in to RX-out start-up: steady-state:	50 ns 10 ns	100 ns 20 ns
Waveform Symmetry RX-out (any):	± 0.25 ns	± 0.50 ns
Output Voltage into 78 ohms RX-out (any):	900 mV	550 mV

COLLISION DETECTOR

Parameter	Typical Value	Worst Case
Output frequency:	10 MHz	9-11 MHz
Turn-on delay. CP-in to CP-out (any):	50 ns	150 ns
Turn-off delay:	250 ns	300 ns
Frequency range:	4-20 MHz	5-15 MHz
Input impedance CP-in. differential: common-mode:	78 ohms > 20.0 ohms	76-80 ohms

NETWORK REQUIREMENTS/SPECIFICATIONS**COLLISION DETECTOR (cont.)**

Parameter	Typical Value	Worst Case
Common-mode voltage range at CP-in:	0-30 Volts	0-5 Volts
Input sensitivity:	±100 mV	± 75 to 150 mV
Output Voltage into 78 ohms CP-out (any):	900 mV	550 mV
Interframe test signal (SQE TEST) (Switch selectable in LOOPBACK mode only.)		
delay:	700 ns	600-1000 ns
duration:	800 ns	600-1000 ns

NOTES:

- 1) *The MT-800 will generate SQE (10 MHz) at Ports 1-8 if either the CP-in pair is active or if more than one of the TX-in pairs (Port 1-8) are active.*
- 2) *The MT-800 will generate a JAM signal (5 MHz) on the TX-out pair whenever more than one of the TX-in pairs (Port 1-8) is active.*

INTERFACE CONNECTORS**POR TS 1-8**

Type:15 position D type plug.

Pin	Pin		
1	Logic Ref	9	Collision -
2	Collision +	10	Transmit -
3	Transmit +	11	Logic Ref.
4	Logic Ref.	12	Receive -
5	Receive +	13	N/C
6	N/C	14	Logic Ref.
7	N/C	15	N/C
8	Logic Ref.		

INTERFACE CONNECTORS (cont.)**NETWORK**

Type: 15 position D type receptacle.

Pin	Pin
1 Logic Ref.	9 Collision -
2 Collision +	10 Transmit -
3 Transmit +	11 Logic Ref.
4 Logic Ref.	12 Receive -
5 Receive +	13 Power (+12 Vdc)
6 Power Return	14 Logic Ref.
7 N/C	15 N/C
8 Logic Ref.	

INDICATORS

NOTE: The MT-800 has PWR, RCV and CLN LEDs for both the Local and Network modes.

PWR Indicates that the MT-800 is receiving power (green LED).

RCV Indicates that the MT-800 is receiving a data packet (orange LED).

CLN Indicates that a collision has been detected on the network or local mode (red LED).

NOTE: The MT-800 has a Transmit LED for each AUI port.

TRANSMIT Indicates that the port is transmitting data to the other devices attached to the MT-800 and to the network, if the network mode is selected (green LED).

NETWORK REQUIREMENTS/SPECIFICATIONS**POWER SUPPLY**

Parameter	Typical Value	Worst Case
Input Voltage Vac 47-63 Hz.		
120 volts	120 Vac	90-130 Vac
220 volts	220 Vac	180-250 Vac

NOTE: The MT-800 automatically differentiates and selects for the proper input voltage.

Overload Protection:	(2) 3AG 3 Amp fuses in series with both primary inputs.
Output Voltage Vdc:	12 Vdc 11.5-15.5 Vdc
Overload Protection:	(1) 3AG 1 Amp fuse.

ENVIRONMENTAL

NOTE: It is the responsibility of the person who sells the system of which the MT-800 will be a part of to ensure that the total system meets the allowed limits of conducted and radiated emissions.

Operating temperature:	+5° to +40° C
Non-operating temperature:	-30° to +90° C
Operating humidity:	5 to 95% non-condensing

SAFETY

Designed in accordance with UL478, UL910, NEC 725-2(b).Meets FCC part 15 Class A limits.

NETWORK REQUIREMENTS/SPECIFICATIONS

Isolation: 500 Vac 47-63 Hz Applied between any of the input ports shields and safety earth ground.

SERVICE

MTBF: 743,373 hrs. projected

MTTR: <.5 hr.

PHYSICAL

Dimensions: 3.2 H x 15.0 W x 12.4 D inches
(8.13 x 38.1 x 31.5 cm)

Weight:

Unit: 3 lbs.
Shipping: 4 lbs.

CHAPTER 3

INSTALLATION

This chapter outlines the steps for installing the Cabletron Systems MT-800. Be sure the guidelines and requirements in *Chapter 3, Installation Requirements*, and all the specifications and requirements outlined in *Chapter 2, Specifications*, are met before installing the MT-800.

3.1 UNPACKING THE MT-800

Before you install the MT-800, you should check the contents of the accessory package.

1. Carefully remove the MT-800 from the shipping box.
2. Remove the MT-800 from the packing material and its protecting plastic bag. Be sure to save the shipping box in the event the MT-800 has to be reshipped. Set the transceiver aside to prevent it from being damaged.
3. Remove the plastic bag containing the accessories and check that it contains the following items:
 - One standard 3 prong USA power cord
 - One Cable Support
 - Ten Cable Ties
4. Inspect the MT-800. If any damage appears to have occurred, call Cabletron Systems Technical Support immediately.

3.2 SETTING THE SWITCHES ON THE MT-800

Before installing the MT-800, set the SQE switch, the Loopback switch, and input power as described below.

3.2.1 Setting the SQE Switch

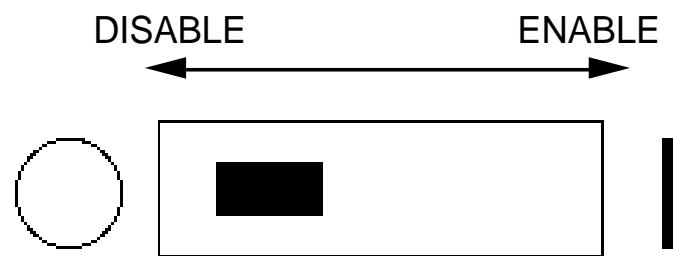
The **SQE** Test switch (Figure 3-1) allows you to enable or disable the SQE or “heartbeat” test function. The **SQE** switch is the two position switch on the front of the MT-800. The MT-800 is shipped with the SQE disabled.

INSTALLATION

CAUTION: The **SQE** must not be enabled when the MT-800 is attached to an IEEE 802.3 compliant repeater or equipment meeting Ethernet Version 1.0 specifications.

Set the **SQE** switch as follows, using a pen, small screwdriver or similar object:

- To enable the **SQE** test function slide the **SQE** Switch to the on position (|), as indicated on the front of the MT-800.
- To disable the **SQE** test function, slide the **SQE** switch to the off position (O), as indicated on the front of the MT-800.



SQE

Figure 3-1. SQE Switch

3.2.2 Setting the Loopback Function

The Loopback (**LBK**) Select switch (Figure 3-2) allows the MT-800 to be configured for use in the stand alone mode or as part of a larger network. If the MT-800 will be used in the stand alone mode, the **LBK** function must be enabled. The MT-800 is shipped with the loopback function disabled.

NOTE: *SQE function is disabled if the LBK function is disabled*

Set the **LBK** select switch as follows, using a small screwdriver, pen or similar object:

- To enable loopback function, move the **LBK** switch to the on (|) setting.
- To disable loopback function, move the **LBK** switch to the off (O) setting.

The Loopback function can be enabled if the MT-800 is attached to a network through the Network Port. With Loopback enabled, the traffic from the segments attached to Port 1-8 will not be allowed to pass to the larger network attached to the Network Port.

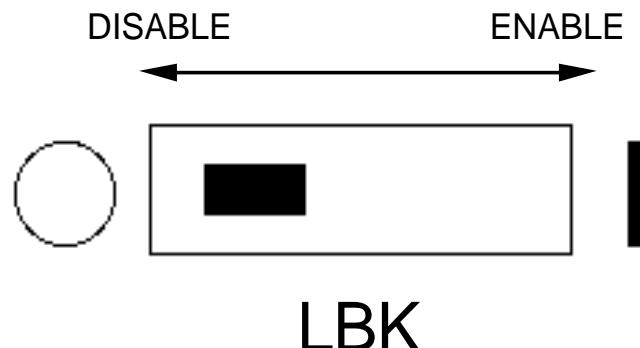


Figure 3-2. Loopback (LBK) Switch

3.3 INSTALLING THE MT-800

The MT-800 can be installed for use as a stand alone unit or attached to a network.

NOTE: *A location should be selected before installation procedures begin. The device must be within reach of the AUI cables that will be attached to it.*

3.3.1 Attaching the MT-800 to a Network

The MT-800 is attached to a network through the **Network** port on the rear of the Multiport transceiver. If the MT-800 will be used exclusively in the stand alone mode, and will not be attached to a larger network, skip these steps and go to Section 3.3.2, **Connecting Devices to the MT-800**.

Attach the MT-800 to a network as follows:

1. Attach an AUI cable to the AUI port on the network transceiver.
2. Attach the other end of the AUI cable to the **Network** Port on the back of the MT-800.
3. Check that the **LBK** switch is in the off (**0**) position.

INSTALLATION

NOTE: The MT-800 can still be used in the stand alone mode when attached to a network. To do so, enable the loopback function.

4. Attach segments to Ports 1-8 as described below.

3.3.2 Connecting Devices to the MT-800

Up to eight devices can be attached to the MT-800 through the AUI ports. The devices could be nodes or another MT-800. The MT-800s can be configured in layers (cascaded) up to two deep.

Connect nodes or another multiport transceiver to your MT-800 as follows:

NOTE: If the MT-800 will be used in the stand alone mode, be sure the loopback function is enabled.

1. Connect an AUI cable to a male port (Ports 1-8) on the back of the MT-800.
2. Connect the AUI cable to the other device.

NOTE: If the device being attached to one of the male ports is another MT-800, be sure the loopback function is disabled on the second MT-800.

3. Plug the power cord into the power cord port on the MT-800.
4. Plug the power cord into a standard 3-prong outlet.

The MT-800 will now be receiving power, since it does not have a power switch.

5. Check that the LEDs are lit under the mode you have selected, either **Network** or **local**. They should be displayed as follows:

The Power (**PWR**) LED should be on.

If this LED is not lit, check the power cord connections. Unplug each end and plug it back in.

The **RCV** and **CP** LEDs will flash as data is received and collisions are detected by the MT-800.

The **TRANSMIT** LEDs should flash as the device connected to that port transmits data.

If the **RCV**, **CP** or **TRANSMIT** LEDs fail to flash, disconnect the respective AUI cable, check the connections and reattach the cable.

If the LEDs still fail to light, contact Cabletron Systems Technical Support.

6. Strain relief the cables attached to the MT-800.

Your MT-800 is now ready for operation. It is recommended that the system be tested prior to transmitting data, using the steps outlined in Chapter 4, Testing and LANVIEW.

CHAPTER 4

TESTING AND LANVIEW

This chapter outlines procedures to check that the MT-800 Multiport Transceiver is properly connected to your network and is functioning properly.

Instructions are provided for using Cabletron Systems LANVIEW to troubleshoot network problems on the physical layer.

4.1 INSTALLATION CHECKOUT

This section contains procedures to test the MT-800 after it has been installed onto your network to ensure that the physical layer of the network is operating properly.

For the procedures in this section, you will need:

- If the MT-800 is being used in the network mode, two Ethernet testers capable of generating valid data packets are needed, such as Cabletron Systems LAN-Specialist or LAN-MD.
- If the MT-800 is being used in the local mode, one Ethernet tester capable of generating valid data packets is needed, such as Cabletron Systems LAN-Specialist or LAN-MD.

NOTE: Steps 1, 2 and 3 are performed for both local or network mode. The procedures under step 5 are performed only if the MT-800 is attached to a network. The test procedures should be repeated for Ports 1-8.

1. Disconnect the AUI cable from one of the devices attached to the MT-800.
2. Using the AUI cable, connect a LAN-Specialist to the MT-800.

TESTING AND LANVIEW

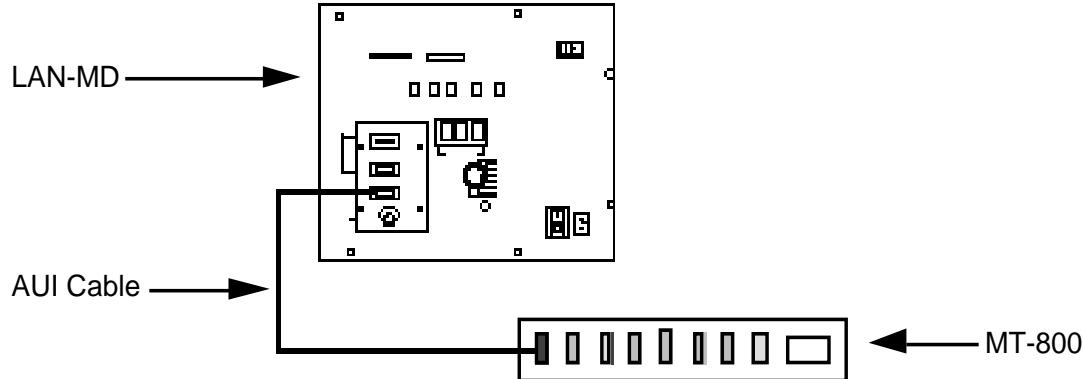


Figure 4-1 Checkout Configuration

3. Select **6 - SERVER** on the LAN-Specialist and run the test. Verify that this test passes.
 - The status on the LAN-Specialist should read **000**, and a pass LED should be lit on the LAN-Specialist.
 - This LAN-Specialist now acts as the **SERVER** unit and will act as a packet echoer when used with another LAN-Specialist.
4. Repeat these steps for each port, 1-8.
5. If the MT-800 will be connected to a network, use the following checkout procedures:
 - a. Using an AUI cable, attach the other LAN-Specialist to a properly functioning transceiver elsewhere on the network.
 - b. Select **4 - NODE** on the second LAN-Specialist and run the test. Verify that this test passes.
 - At least 100 packets should be sent and received with no errors. The packets will be received and sent back from the **SERVER** LAN-Specialist that was left running on the other segment.
 - If this test fails, check that the tap connections are made properly.
 - c. Repeat these steps for Ports 1-8 on the MT-800.

When each port on the MT-800 Multiport Transceiver successfully completes this test, the unit is ready for operation. If any failures were noted, please contact Cabletron Systems Technical Support.

4.2 USING LANVIEW

The MT-800 Multiport Transceiver uses Cabletron Systems built-in visual diagnostic and monitoring system, **LANVIEW**. LANVIEW LEDs allow a troubleshooter to quickly diagnose network problems and determine which node or segment is faulty.

The following discusses the function and purpose of each LANVIEW LED on the MT-800.

Transmit (TRANSMIT) LED

This green LED flashes when a data packet is being transmitted through the respective port. The flash of the LED is pulse stretched for viewing effect.

These LEDs are only lit if an active segment is attached to that port and the device on that AUI is transmitting data.

NOTE: *PWR, RCV and CP LEDs are installed for both the Network and Local modes. These LEDs are only lit under the mode which is selected with the LBK switch.*

Power (PWR) LED

When lit, this green LED indicates that the MT-800 is receiving power. If this LED is not lit, the problem may be with the input power or the MT-800.

Receive (RCV) LED

This orange LED normally flashes on and off to indicate the MT-800 is receiving a data packet from:

- node attached to the MT-800, if the loopback mode is enabled
- node or the network if the network mode is enabled.

The flash of the LED is pulse stretched for viewing effect.

TESTING AND LANVIEW

Collision Present (CLN) LED

This red LED flashes to indicate a collision has been detected.

If the MT-800 is in the network mode, collisions are detected on the network or the AUI segments attached to the MT-800.

If the MT-800 is in the loopback mode, collisions are only detected on the segments attached to Ports 1-8.

The flash of the LED is pulse stretched for viewing effect.