MCN Monitoring and Control Network
Engineered System

Installation Manual

S2-60650-105

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1.1 Introduction and Overview

CTI Products' Monitoring and Control Network (MCN™) system provides a modular, scaleable system for managing your comparator and input / output display requirements. At times, this system requires CTI Products engineers to design custom networks to meet customer applications that go beyond the limits of our base MCN systems. These engineered systems are designed in conjunction with our customers' needs, documented by system drawings and spreadsheets, and supported during and after installation.

This manual includes sections on Engineered System architecture, operation, installation, and troubleshooting.

1.2 Custom Engineered System Architecture

Engineered systems are defined by an MCN system made up of more than 20 Comparator I/O modules (See reference 2 *MCN System Manual*) and / or have a ROUTER in the system. A ROUTER is a device that can limit the flow of specified data to a certain part of a network and connect networks of different bus speeds together. (See reference 1, *Router Manual*) Within an engineered system, Routers are used to increase the overall performance of the network by attaching to a high speed (1.25MB) network and reduce the amount data flowing into a slower speed area of network. An example of an engineered system is shown in Figure 1.

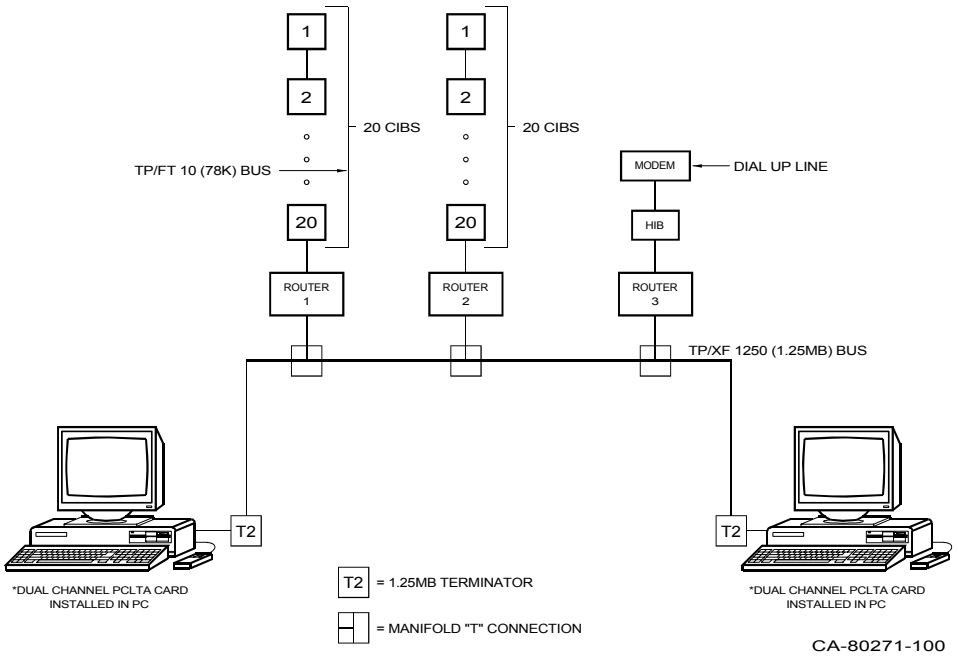


Figure 1. - Engineered System Example

1.3 Reference Documents

1. ROUTER Manifold Installation Guide
   Part Number S2-60649

2. Monitoring and Control Network Comparator Display System Manual
   Part Number S2-60425

3. PC Interface Card PCLTA Hardware Reference Manual
   Part Number S2-60648

4. Monitoring and Control Network Remote Comparator Display Software
   Part Number S2-60426

5. Monitoring and Control Network Extender Module EXB User Guide
   Part Number S2-60596

1.4 Engineered System Components

Your CTI Products engineered system is made up of the Engineered system disk, system drawings, module configuration spreadsheets, and this document. At times, depending on your system, there can be another design document which accompanies this manual that describes your system in greater detail. If another design manual is not included with your package, all previously mentioned information will be kept in Appendix A of this manual. This package is shipped along with your system hardware and software under the NRE (non-recurring engineering) number.

2. System Hardware Identification

2.1 Labeling Conventions

MCN hardware units have model number labels on the rear panel of the units. The unit acronym (Example CIB), CTI part number (Example S2-60442-110), and serial number (Example 1075) are displayed on the label. **Many of the MCN family of products look alike. Always verify the type of unit before installation.**

Note: The final three digit section of the CTI part number is the revision of the unit. Normally CTI part numbers will be shown without a revision unless there is a specific feature that is available only in certain revisions of the product.

PCLTA cards, CIB Test boards and any other open type printed circuit boards will have a model number label directly on the PC board. In the case of the PCLTA card, another label on the PC bracket will allow the customer to identify the card as well as any network interface installed on the card.

ROUTERS and Network Extender (EXB) modules will have model number labels located either on the back panel or bottom of the unit. In addition, they will have a label identifying how the unit is programmed. See section 5 of this manual.

Accessory items such as cables, terminators, and router manifolds will have a CTI Products part number in an easily seen location on the device or on the package in which the accessory is shipped.

2.2 Module Addressing

MCN networks are structured around unique Group and Module addressing. The two common ways in which units are given an address are described below.

2.2.1 Modules using Address Switches

Each MCN module is identified by a unique address that has been set up at the factory for your engineered system. This address is specified by the combination of a Group and Module number. On most modules, the Group and Module numbers are assigned with the rotary switches on either the front or back of the module. See figure 1.

Whenever the Group or Module number is changed, the module must be reset or power cycled for the change to occur. **NOTE: DO NOT CHANGE ANY ENGINEERED SYSTEM UNIT ADDRESS !! THEY ARE SET CORRECTLY AT THE FACTORY.**

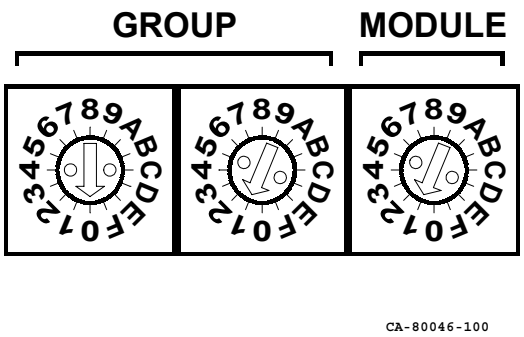


Figure 1 - Group and Module Switches

Refer to the specific unit hardware reference manual for details about setting the addresses for the unit **ONLY** if a change in module address is required.

IIB modules have dual addresses--one address for the CIB module that it communicates to and the IIB's own address. See the IIB manual for addressing information.

> **CAUTION**
> If two or more modules are set to the same address, your system will not work properly and you could have unintended operation.

2.2.2 Modules without Address Switches

Modules without address switches such as the PCLTA card, EXB modules, and routers are configured via software. PCLTA Card addresses are configured through MCNCFG software using the Edit HIB Address command. See the Module Configuration Sheets in Appendix A or accompanying manual for the correct PCLTA address for each PC.

ROUTER and EXB modules are preconfigured at the factory. They will not conflict with other MCN unit addresses in the network. ROUTER and EXB modules are configured using scripts that use unique addresses defined by CTI Products during the development of the customer's custom network.

2.3 Terminator Types

Terminators are required on both ends of both types of networks. The terminators are specific for each type of network.

2.3.1 1.25 MB Terminators

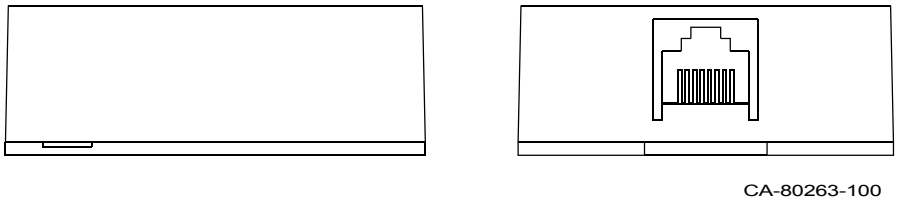


Figure 2. - TP /XF 1.25MB Terminator Part # 90-11191

The TP/XF 1.25MB terminator is used only on the main TP/XF 1.25MB network. It has a special termination network inside that is especially for TP/XF 1.25MB networks. **DO NOT connect to a TP/FT 10 (78K) network**. Depending on the system, these terminators are generally connected on the first and last TP/XF 1.25MB RJ45 connector located on the Router Manifold.

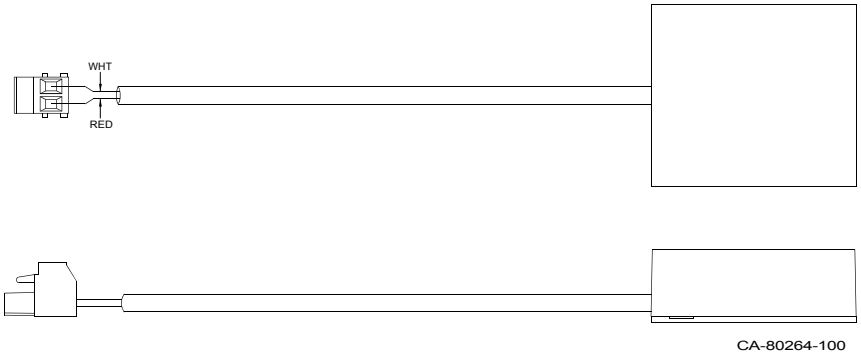


Figure 3. - TP/XF 1.25MB Terminator with Wire Part # S2-60605

The TP/XF 1.25MB terminator with Wire is used only on the main 1.25MB TP/XF 1.25MB network when a PCLTA card is the last connection on the network. It has a special termination network inside that is especially for TP/XF 1.25MB networks. **DO NOT connect to a TP/FT 10 (78K) network**. This terminator generally has a screw terminal connector on the end of the wire ;but this connector may change based on the network interface of the unit it plugs into. **DO NOT lengthen the wire on the terminator assembly. System operation will be disturbed.**

2.3.2 78KB Terminators

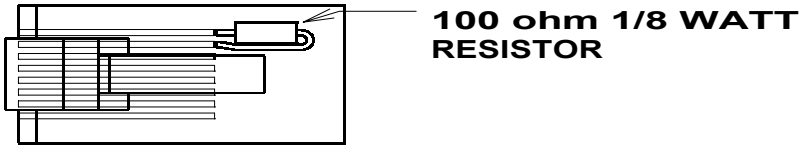


Figure 4. - 78K Terminator Part # S2-60318

The 78K terminator is used only on TP/FT 10 (78K) networks. It has a specific value resistor inside that is especially for TP/FT 10 (78K) networks. **DO NOT connect to a TP/XF 1.25MB network**. Each TP/FT 10 (78K) network requires two 78K terminators. One plugged into the open port of the last module in the network, and the other plugged into the open port of the TP/FT 10 (78K) Router Manifold.

3. System Installation

This section provides basic guidelines for installing your engineered system. Since engineered systems can be quite large and complicated, many small organized steps will assist in getting your system installed right the first time. The following guideline sections cover most possibilities that could be encountered during installation.

3.1 Cabling Guidelines

3.1.1 78K Cabling

In general, the system drawings in Appendix A or the accompanying design manual will specify the cable lengths needed to connect units. When lengths are not listed, the following guidelines apply:

Cable between modules - 9" cable

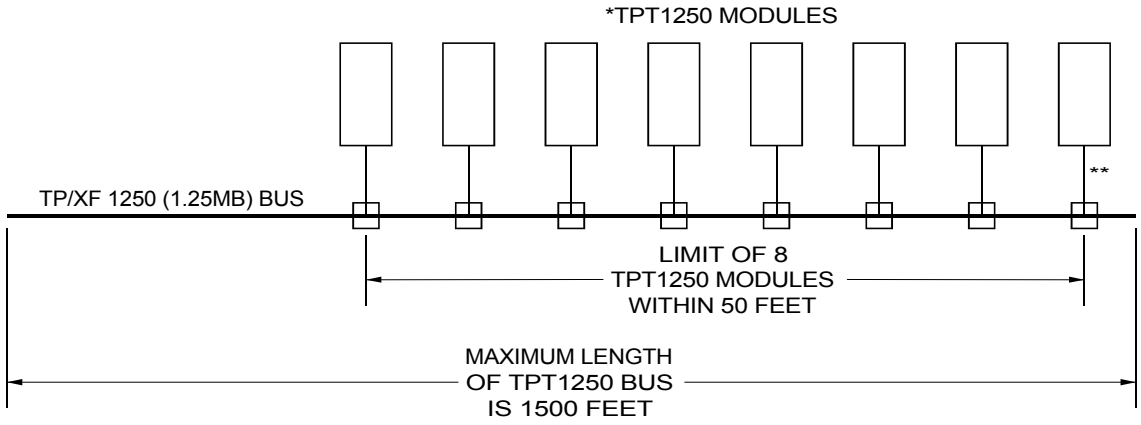
Cable between panels - 3' cable

Cable between racks - depends on customer setup

3.1.2 TP/XF 1.25MB Cabling:

Figure 6 illustrates the TP/XF 1.25MB network restrictions. Any deviations from these guidelines may result in unsatisfactory system performance.

If you have more than eight 1250 modules (Routers, EXB Modules, PCLTA cards) within 50 cable feet, add an appropriate length of network cable in approximately the middle of the group of modules to bring the distance to greater than 50 feet.



*TPT1250 MODULES CONSIST OF ROUTERS, NETWORK COMBINERS AND PCLTA CARDS WITHIN CTI PRODUCTS ENGINEERED SYSTEMS.

**MAXIMUM STUB LENGTH IS 12".

CA-80266-100

Figure 6. - TP/XF 1.25MB Bus Characteristics

3.2 TP/XF 1.25MB Network Installation Guidelines

The following is a list of steps required for installing the TP/XF 1.25MB portion of an Engineered system.

Step	Operation
1	Place all modules at locations determined from the system and panel drawings and from system configuration spreadsheets in Appendix A*. For convenience, some systems may already have modules mounted into their rack mount specified in the system configuration spreadsheets.
2	Mount all routers, ROUTER Manifolds, and EXB modules that are connected to the 1.25MB network. Refer to the system and panel drawings in Appendix A* for module location. Refer to reference 1 *Router Guide*, 2 *MCN System Manual* and 5 *EXB Manual* for mounting information.
3	Install the PCLTA cards into their PCs and mount the HIB modules. Refer to the system and panel drawings in Appendix A* for location. Refer to reference 3 *PCLTA Manual* for mounting instructions.
4	Route the network cables to connect all modules involving the 1.25MB network and HIBs connected to routers. Refer to Cabling topic in section 3.1 if the cable lengths are not indicated on the system drawing in Appendix A*.
5	Install all 1.25MB terminators. Refer to the system drawing in Appendix A* for location.
6	Connect power supplies or power source to the 1.25MB modules. Refer to reference 2 *MCN System Manual*. **WARNING: ROUTER units are supplied with router supplies. These supplies must be used.**
7	Install MCNRCD software into all network computers. Refer to reference 4 *MCNRCD Manual* for instructions. Verify that the HIB Address settings for the MCNRCD screens. Refer to reference 4 *MCNRCD Manual* and the module configuration sheets in Appendix A*.
8	Install Engineered System files on PC. See section 4 of this manual.
9	Power up the system and verify that, for all modules, except PCLTA, the PWR LED is ON and the ERR LED is OFF. ROUTERS should not have blinking NET LEDs.
10	Connect any Leased Line service required to connect your EXB modules to the remote site. Refer to reference 5 *EXB Manual*.

***** Separate design manual may have been sent with your engineered system.

3.3 78K Network Installation Guidelines

The following is a list of steps required for installing the Module and Modem portions of an Engineered system.

1	Identify all modules needed to complete Module Network 1 on your system drawing. See Appendix A*.
2	Mount all modules at their proper location. Refer to reference 2 *MCN System Manual* for mounting options.
3	Route the network cables to connect the modules together within this network. Refer to Cabling topic in section 3.1 if the cable lengths are not indicated on the system drawing in Appendix A*.
4	Install 78K terminators at locations specified by the system drawings in Appendix A*.
5	Connect power supplies or power source to the modules. Refer to reference 2 *MCN System Manual*.
6	Connect one Comparator I/O Module for each type of Comparator being used in the module network. Refer to the system configuration sheets and any special connection drawings in Appendix A*.
7	Connect the User Interface Modules to their operator stations. Refer to the system configuration sheets and any special connection drawings in Appendix A*.
8	Power up the system and verify that, for all modules, the PWR LED is ON and the ERR LED is OFF (the ACT LED of all modules will be ON and the ACT LED of the HIB module will blink only if the MCNRCD runtime software is running on the PC and a screen configuration screen is loaded).
9	Test the system for proper operation. Verify the operation of each comparator setup done in Step #6. If MCNRCD screens have been developed, this is also the time to verify MCNRCD operation. See reference 4 *MCNRCD Manual*. Refer to section 7 for troubleshooting hints if the system is not working properly.
10	Duplicate the wiring for the rest of the Comparator I/O modules in the module network that are similar to the configurations from Step #6. Refer to the system configuration sheets and any special connection drawings in Appendix A*.
11	Repeat steps above for all Networks within the system.
12	Install all Dial Up modems for your system. Refer to reference 4 *MCNRCD Manual*.

* Separate design manual may have been sent with your engineered system.

4. Engineered System Disk Information

4.1 Engineered System Disk Contents

The Engineering System Disk contains all custom software files necessary to operate or support your custom engineered system. The following is the disk structure and description of contents for each directory.

Volume in drive A is KA-8xxxx-xxx

a:\MCNRCD
a:\MISC
a:\SCRIPTS
a:\SCRIPTS\78K
a:\SCRIPTS\1250

Volume Label - Contains the CTI Products archive number for your specific engineered system. All released revisions to your system will be kept in our files.

MCNRCD directory - Contains any MCNRCD configuration files and screens developed specifically for your system. If no MCNRCD files were needed for your system, this directory will be empty.

MISC directory - This directory will contain any other files required for the system. It may contain a spreadsheet with system configuration information in it. A README.DOC file will provide a content explanation if files are in this directory.

SCRIPTS directory - Contains all script programming files needed to program the various routers and EXB modules within your custom system. They are grouped in the 1250 (1.25 Mb) and 78K subdirectories, depending upon which side the unit is being programmed from. See section 5 of this manual for details.

4.2 Updating System Software Files

CTI Products recommends copying Engineered System Disk files to a personal computer and keeping the disk as a backup copy. Some files on the Engineered System Disk must be copied to specific directories while others can be copied anywhere the customer desires. The following are recommendations for loading your custom software files.

- MCNRCD directory files should be copied directly to the MCNRCD directory (normally C:\CTI) location the customer specified when installing MCNRCD software.

  Note: there is a possibility of having a Status Text Configuration file named CUSTOM.CFG. This file should be copied to your MCNRCD directory.
  To install this file, erase a file named MCNRCD.CFG in the MCNRCD directory and copy the CUSTOM.CFG file to MCNRCD.CFG. See reference 4 *MCNRCD Manual* for details.

- MISC directory files may be copied anywhere the customer would like.

- SCRIPT directory files should be copied to a personal computer that will program routers and EXB modules. We recommend that these files be placed on the same computer in which MCNRCD resides. Creating a new directory under the MCNRCD software directory would keep all engineered system programs in one location.

5. Programming routers and EXB Modules

The ROUTER and EXB module scripts will probably only be used during initial system installation, system expansions, and spare replacements. During initial system installation the scripts could be used to verify that the ROUTER configurations match the units contained in that ROUTER network. **This operation should be performed only under the direction of CTI Products.** During system expansions, the ROUTER and EXB modules that already exist in the system may need to be re-programmed for the new system. In case of any ROUTER or EXB module failures, the spare units which are usually purchased with your system will be programmed with the script that was running on the failed unit.

5.1 Programming Methods

The Routers and EXB modules are programmed for each system as required to segment traffic flow, so as to pass only the required traffic and not overload the lower speed channels in the system. For instance, routers may be programmed to *pass* traffic from CIBs from the 78K side to the 1.25M side, but to *block* CIB traffic from the 1.25M side to the 78K side.

The programming of the routers and EXB modules deals with *Near Side* and *Far Side* of the devices. The *Near* side is the side that is closest to the PC doing the programming. **Since the routing tables are different in each direction, the programming files must be run from the proper side of the device**

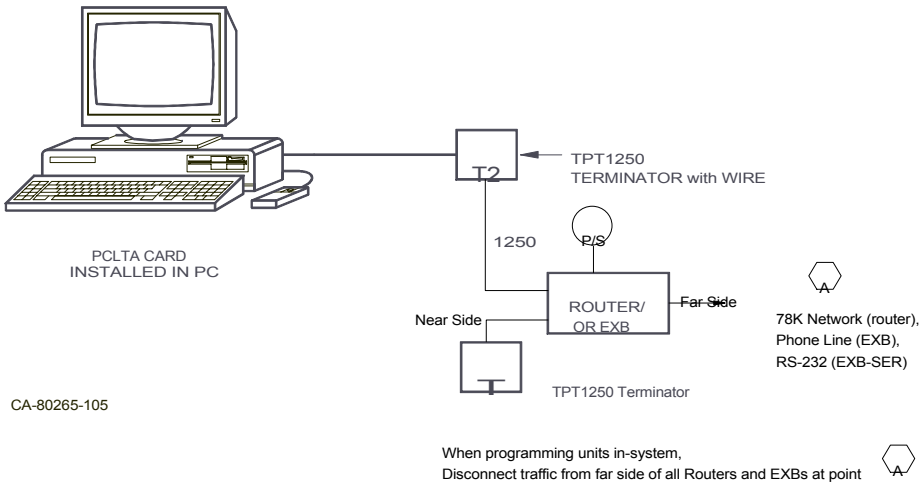


Figure 7. - General Method for Programming Routers and EXB Modules

5.1.1 General Method

The general method for programming routers and EXB modules are:

Routers	Program from the 1250 (1.25Mb) side. Use the appropriate \Scripts\1250\RTRxx.LSC file. Use your 1250 PCLTA card, terminators, and software driver.
EXB Modules 1.25M	Program from the 1250 (1.25Mb) network side of the EXB module. Use the appropriate \Scripts\1250\EXBxx.LSC file. Use your 1250 PCLTA card, terminators, and software driver.
EXB Modules 78K	Program from the 78K network side of the EXB module. Use your 78K PCLTA card, software driver, and 78K terminators Use your HIB module, CTIHIB.SYS driver, 78K terminators and driver Use the appropriate \Scripts\78K\EXBxx.LSC file. If this is normally a remote EXB, you need to either take the PC to the remote site or bring the EXB to the central site to program it.

Figure 7 applies to the general method. **Be sure to disconnect remote traffic as described in Figure 7.**

Notice that the 78K or 1250 subdirectory must match the network side that your programming PC is attached to.

5.1.2 Reverse Programming Method for Remote EXB Modules

What happens if you have *78K EXB modules*, but have only a *1250 PCLTA network interface*?

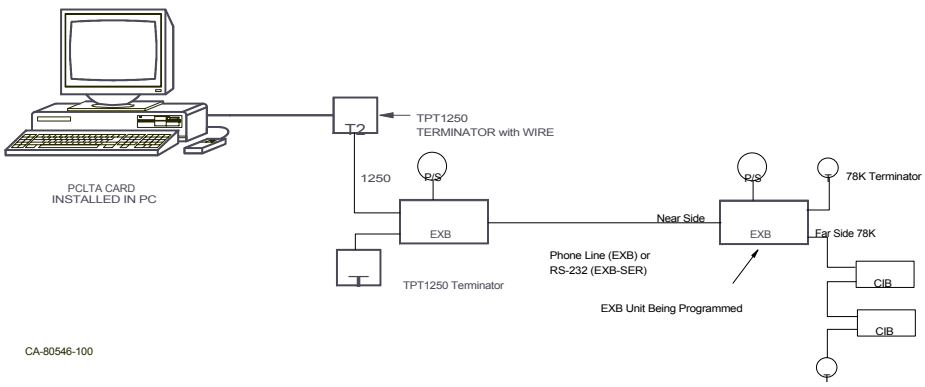


Figure 8 Reverse Programming Method for Remote EXB Modules

You would then program them using the *reverse* LSC file from the central PC on the 1.25M side as shown in figure 8. When there is no 78K PCLTA or HIB module shipped with the system, we provide *reverse* programming files to let you program the remote EXB modules from the central site. These files are labeled EXBxxREV.lsc.

EXB Modules 78K	Reverse program from the 1.25 Mb central network side of the EXB module. Use your 1250 PCLTA card and driver and terminators. Use the appropriate \Scripts\1250\EXBxxREV.LSC file.

When you program the distant EXB module in this way, it must first be communicating with its companion EXB module at the central site.

5.2 Programming the Units with the LONSCRPT Program

Connect your Router or EXB module to the PC with either the General Method or Reverse method as described above, as appropriate.

Programming routers or EXB modules within a TP/XF 1.25MB custom system can be done using your systems existing setup, **but the FTT traffic should be removed from all routers and EXB modules in the system**. Simply unplug all (78K) network cables from the Router and disconnect the telephone line or RS-232 connection from the EXB modules. Special care should be used when programming within a system to notify all users of system downtime.

The Routers and EXB modules use custom programming script files to program unique configurations. All scripts provided with your system follow the same command line structure.

LONSCRPT *script name* <enter>

Instructions within each script will step the user through the programming process. Be sure to follow all instructions completely. **Important ! Power cycle the unit after programming to make sure the programming changes take effect.**

The programming script name for the ROUTER or EXB module relates to the Router or EXB number as shown on the system documentation. The Router or EXB number is also shown on the unit labeling.

For example, Router 1 would be programmed with the file RTR1.LSC and EXB 1 would use EXB1.LSC.

Caution: Downloading of router files should NOT be needed unless something goes wrong with the existing system. Please call CTI Products if there is an operational problem with your system. There are cases like system expansion where ROUTERS and EXB modules may need to be programmed again. The following are examples of how to program scripts into ROUTERS and EXB modules.

5.2.1 Programming Steps

1. Make sure the Router or EXB unit is properly connected and terminated. (See above)
2. Select the correct script directory (78K or 1250), based upon your PC's PCLTA or HIB speed..
3. Select the proper Script File (*.LSC) name based upon the Router or EXB unit number.
4. Power ON the unit to be programmed.
5. If you are programming a remote EXB module with the Reverse method, make sure both EXB units are connected and communicating.
6. Enter the command line with the script name inserted.
   Ex: LONSCRPT RTR1 <enter>
7. Follow the script instructions.
8. Power cycle the unit after programming.
9. Return the unit to service.
10. Reconnect any cables that were disconnected.
11. Re-label the router or EXB unit if required to indicate its proper unit number.

5.3 ROUTER and EXB Module Script Names

Again, the ROUTER and EXB module scripts will probably only be used during initial system installation, system expansions, and spare replacements. During initial system installation the scripts could be used to verify the ROUTER configuration match the units contained in that ROUTER network. During system expansions, the routers and EXB modules, which already exist in the system, may need to be re-programmed for the new system. In case of any ROUTER or EXB module failures, the spare units which are usually purchased with your system will be programmed with the script that was running on the failed unit.

The following ROUTER and EXB module script names briefly describe the script functionality. Specific information about individual scripts are contained in the header of each script. Since each Engineered System is unique, not all of these scripts will be provided on your Engineered System Disk. Script file names may vary in certain systems. See the custom documentation shipped with the system for details.

5.3.1 CHKRTR.LSC

Reads the configuration tables from routers. This script **should only be run under the direction of a CTI Products Inc. engineer** in conjunction with diagnostics and troubleshooting.

5.3.2 CHKEXB.LSC

Reads the configuration tables from EXB modules. This script **should only be run under the direction of a CTI Products Inc. engineer** in conjunction with diagnostics and troubleshooting.

5.3.3 HIBRTR.LSC

Programs routers which will be used to work with the HIB interface modules which talk to MCNRCD.

5.3.4 RTRxx.LSC

Custom configured ROUTER scripts developed specifically for the customer. The xx indicates the router number as shown on its label, the system diagrams, and system configuration spreadsheets. See your specific installation system drawing in Appendix A or in a separate design manual describing the specific location of each ROUTER.

5.3.5 EXBxx.LSC

Custom configured EXB module scripts developed specifically for the customer. The xx indicates the EXB number as shown on its label, the system diagrams, and system configuration spreadsheets. See your specific installation system drawing in Appendix A or in a separate design manual describing the specific location of each EXB module.

5.3.6 EXBxxREV.LSC

If these files are present, they are the Reverse Programming files for the EXB modules. These are typically used on the central 1250 network when there is no 78K HIB or PCLTA to program the EXB modules.

5.3.7 RTRREPTR.LSC

Programs routers to work in repeater mode. Repeater mode allows all data to pass through the ROUTER. This is the default setting script for routers.

5.3.8 EXBREPTR.LSC

Programs EXB modules to work in repeater mode. Repeater mode allows all data to pass through the EXB module. This is the default setting script for EXB modules

6. Customer Support

If you need help in setting up your engineered system, call one of our engineers at:

(513) 595-5900.

Ask to speak to a CTI Products engineer.
Office hours are from 8:30 to 5:00 Eastern time.

If you are calling about a problem with a specific module, please have the module's model name, model number and serial number available when you call.

If you are having a problem with your engineered system, have your engineering system documentation available when you call.

7. Troubleshooting Engineered Systems

Below is a table listing some common problems encountered when installing Engineered Systems. If after using this diagnostic table, you still have a problem, check the module's hardware reference manual for any other module-specific troubleshooting guides.

PROBLEMS	CAUSES
PWR LED is off	If using a power supply, make sure it is plugged into the DC IN port of the module. Also, make sure the power supply is plugged into the wall outlet. If power is being supplied over the network cable, verify that the network cable is connected between NETWORK OUT ports and NETWORK IN ports. See reference 2 *MCN System Manual*.
PWR LED is blinking	This indicates low voltage. Plug a power supply directly into the DC IN port and see if the PWR LED stops blinking. If so, make sure that the system's power distribution requirements are met as stated in reference 2 *MCN System Manual*.
ERR LED is blinking	Reset the module. If LED still blinks, call CTI Products' customer support.
ERR LED is on	Verify that the module's Group and Module numbers match the system configuration sheets in Appendix A*. Correct them if necessary, then press the reset button. Verify that the option switches are set properly. Refer to module configuration sheets in Appendix A*. Correct them if necessary, then press the reset button
ACT LED is off	Verify that the module's Group and Module numbers were properly assigned. Check the network cables for proper insertion into the receptacle. Verify the terminators are installed. See section 2.3 of this manual and the system drawings in Appendix A*. Note: The HIB modules' ACT LED only blinks if a PC that is running the MCNRCD software has a screen configuration file loaded.

PROBLEMS	CAUSES
System does not correctly display the VOTE, RECEIVE, DISABLE, or FAIL status of a receiver or input from I/O device	Verify that all wiring between the Comparator I/O Module and the comparator or I/O device is correct. Verify that all wiring between the User Interface Module and the operator station is correct. Verify that all unit addresses and option switch settings were set correctly. Check for duplicate module address settings. Verify that the correct MCNRCD.CFG file is loaded. See reference 4 *MCNRCD Manual*. Verify that the group configuration files (.GCF) have the proper Module Configuration Settings for each module. See reference 4. If your system uses custom status text subcategories, verify that the hardware strapping for the subcategory selection signals are set properly. See reference 4 *MCNRCD Manual*. Verify that the total TP/XF 1250 system cable length is less than the maximum specified in section 3 of this manual and reference 2 *MCN System Manual*.
System does not correctly FORCE VOTE or DISABLE a receiver or output to a I/O device	Verify that all wiring between the Comparator I/O Module and the comparator or I/O device is correct. Verify that all wiring between the User Interface Module and the operator station is correct. Verify that the correct MCNRCD.CFG file is loaded. See reference 4. Verify that the VOTE and DISABLE settings in your MCNRCD.CFG file are set correctly. See reference 4 *MCNRCD Manual*. Verify that the group configuration files (.GCF) have the proper Module Configuration Settings for each module. See reference 4. Verify that all unit addresses and option switch settings were set correctly. Check for duplicate module address settings. Verify that the total TP/XF 1250 system cable length is less than the maximum specified in section 3 of this manual and reference 2 *MCN System Manual*.

PROBLEMS	CAUSES
An entire ROUTER module network does not communicate properly	Verify that the proper ROUTER is connected to module network. See system drawings in Appendix A*. Verify cabling between ROUTER and Router Manifold as well as Router Manifold to module network. See reference 1 *Router Manual* and system drawings in Appendix A*. Verify that the HIB address within your screen file for the PC matches the module configuration sheets in Appendix A*.
Entire system does not work with MCNRCD	Verify that the TP/FT 10 (78K) and TP/XF 1.25MB buses are not connected together. Verify cabling connections between the PCLTA card and the TP/XF 1.25MB bus. Cable should be plugged into the TP/XF 1.25MB transceiver on the PCLTA card. See reference 3 *PCLTA Manual*. Verify the HIB connection to the HIB ROUTER. See system drawings in Appendix A*. Verify that the HIB address within your screen file for the PC matches the module configuration sheets in Appendix A*. Verify the CTIHIB.SYS or LDVPCLTA.SYS settings for your User Interface device. See reference 3 *PCLTA Manual* or your HIB user guide. Try connecting the HIB module directly to the individual module network segment and check operation. If PCLTAs are used remember to switch LDVPCLTA driver to D2 to run TP/FT 10 (78K) network. Move the MCN network cable to the TP/FT 10 (78K) connector on the PCLTA. *** If you purchased a Dial Up EXB with your system, Call CTI Products and we will dial into your system and help diagnose the problem.
Modems do not connect properly with HIB	Perform all suggestions on Modem error screen. Verify correct MODEM.INI file is loaded for your modem. See reference 4 *MCNRCD Manual*. Verify proper dialing string in MCNRCD. See reference 4 *MCNRCD Manual*.
Cannot find internal modem using MCNRCD	Verify that CTIHIB.SYS driver settings are set to proper modem port. See reference 4 *MCNRCD Manual*. Verify there are no computer interrupt conflicts on your system. See your modem user guide for alternate serial port and interrupt settings. Verify that the proper MODEM.INI file is being used. See reference 4 *MCNRCD Manual*.

PROBLEMS	CAUSES
ROUTER NET1 or NET2 LEDs are blinking	Configuration of ROUTER has been corrupted. See section 5 to program ROUTER. Call CTI Products to report the problem.
ROUTER or EXB is not successfully programmed or does not work properly after being put back in the system	Verify proper script was used to program unit. See label on unit or check system drawing in Appendix A*. If problems persist call CTI Products. Verify TP/FT 10 (78K) traffic has been removed from assembled system setup. See section 5 of this manual.

* Separate design manual may have been sent with your engineered system.

8. Appendix A - Engineered System Documentation

All engineering documentation will follow this title page.

A separate design manual may have been sent with your system. In that case, this Appendix will be empty. The separate design manual goes into much more detail than an Appendix could reasonably cover.