MCN Monitoring and Control Network
Comparator Display System

Quad Router Panel
Installation Guide

S2-60649-200

Products Inc.

FCC Statement

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 his own expense.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

DOC Statement

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Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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Manual Revisions:

S2-60649-100	Release for original Router Manifold	S1-60604
S2-60649-200	Revised for new Quad Router Panel	S1-60819

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1. Introduction

The Quad Router Panel is used to install network data routers into a Monitoring and Control Network (MCN™) system. The panel consists of a single 19 inch rack assembly. Figure 1 shows the front view of the Quad Router Panel with four 90-11066 routers installed. When planning your rack panel space, make sure a space of 7 inches (4 rack units) is reserved for each Quad Router Panel.

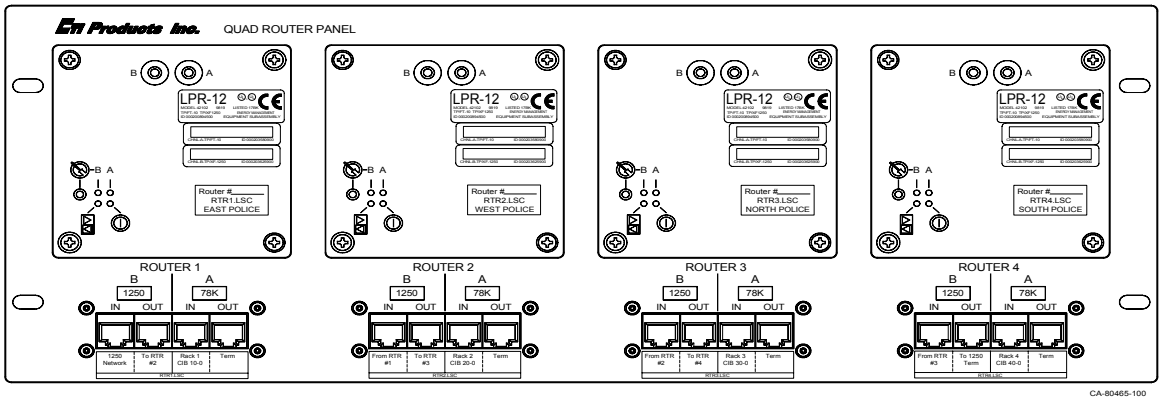


Figure 1 – Quad Router Panel (S1-60819)

Up to four routers can be mounted in a single Quad Router Panel. Blank plates cover any unused router positions.

1.1 Compatibility with Older Routers

These routers are electrically compatible with the older 90-11066 routers, and can be used to expand systems with the old routers. Operation of these routers is identical, but the new routers have a different physical form factor. See manual S2-62649-100 for details about the old routers.

1.2 Routers

The purpose of the routers in the MCN network is to connect two different communication channels and pass messages between the channels. In the case of the MCN network, the two channels are the 78 Kbps MCN network and the 1.25 Mbps channel. Figure 2 shows a system example that includes routers between the two communication channels.

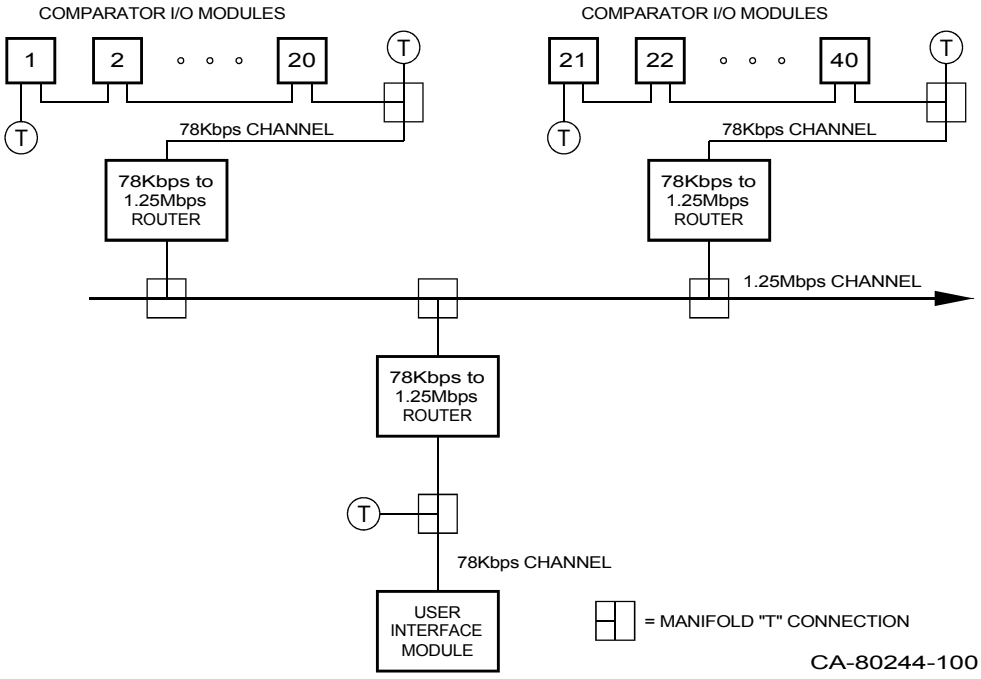


Figure 2 - Basic Router System

The 1.25 Mbps channel provides improved network performance in large MCN system (systems with more than 20 Comparator I/O Modules). Notice in the example system that there are two groups of Comparator I/O Modules, each containing 20 modules. There is also a single User Interface Module for displaying the status of all 40 Comparator I/O Modules.

If this system were setup without the 1.25 Mbps channel (all 41 MCN modules connected together on a single 78 Kbps network), system response time for status updates and control could be very slow at times due to the amount of data being transferred. Exceeding 20 Comparator I/O Modules on a 78 Kbps channel will cause data collisions and lost messages. When data collisions occur on the network or messages are lost, the system performs slower because the Comparator I/O Modules must re-send the data after a timeout period. By breaking the overall system into smaller segments of 78 Kbps channels that are connected by a 1.25 Mbps channel, overall system performance is achieved.

1.3 Reference Documents

1. Engineered System Installation Manual
   Part Number S2-60650

2. Router Description

Figure 3 shows the front view of a router.

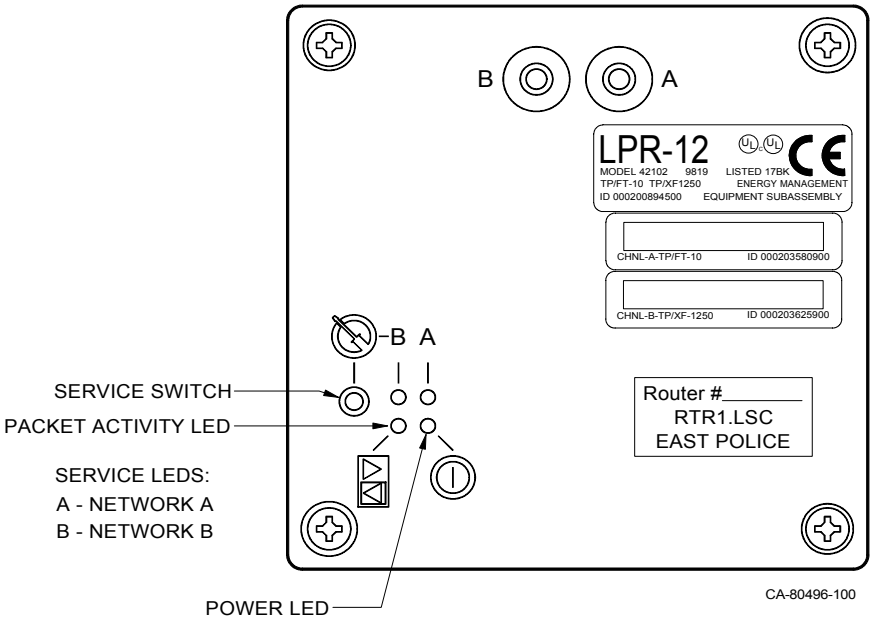


Figure 3 - Router Front View

Figure 4 shows the rear view of a router (router mounting shell).

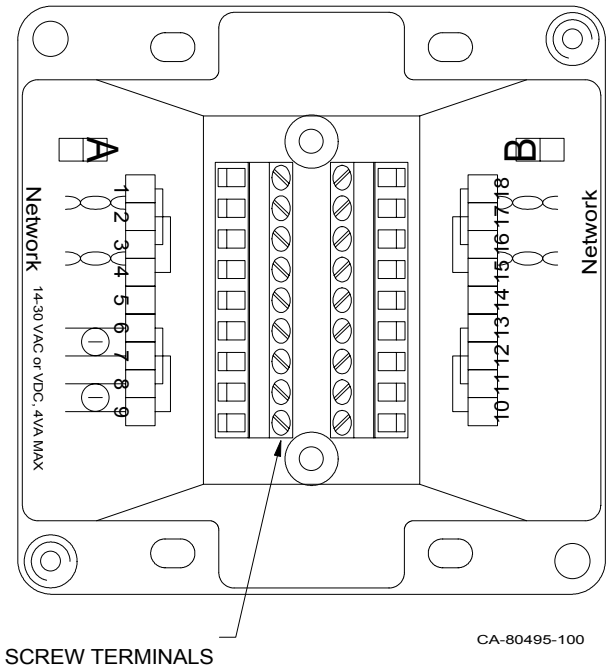


Figure 4 - Router Rear View

Table 1 describes the function of the router Service Switch and LED indicators.

Interface	Function
Service Switch (RSVC)	Used during system configuration. See the Engineered System Installation Manual and any custom data shipped with your system.
Service LED A	This LED should be off for normal operation.
Service LED B	This LED should be off for normal operation.
Power LED	This LED indicates that power is being supplied to the router.
Packet Activity LED	This LED flashes when data is being passed by the router. The rate of flashing can be used as a rough indicator of router activity.

Table 1 - Router User Interface

2.1 Router Power

The power to each router has input requirements of 16-30VAC or DC, 125mA (non-polarity sensitive). Each Quad Router Panel requires a separate power supply. Power supply options are listed in Table 2.

Country	Model	Input Specifications	Output Specifications
US	81-10398	120VAC, 60Hz, 25VA	18VDC, 800mA
Euro	81-11329	230VAC, 50Hz, 21VA	24VDC, 500mA
UK	81-11330	230VAC, 50Hz, 21VA	24VDC, 500mA

Table 2 – Power Supply Options

2.1.1 Power Supply Connections

The power inputs for all four routers are connected together on the rear of the Quad Router Panel. The power supply wires should be connected directly to screw terminal numbers 6 and 7 of Router 1.

2.2 Network Connections

The network IN and OUT connectors (RJ45) on the Quad Router Panel provide the network connections for the routers. These connectors have been pre-wired to appropriate terminals on the rear of each router mounting shell. Pins 1 and 2 of each "78K" IN/OUT connector pair are connected to the network terminals for side A of its respective router (terminals 1 and 2). Likewise, pins 1 and 2 of each "1250" IN/OUT connector pair are connected to the network terminals for side B of its respective router (terminals 17 and 18). In addition, pins 3 through 8 of each IN connector are wired in parallel to same-numbered pins of the adjacent OUT connector.

Table 3 summarizes the wiring for IN/OUT connector pairs. Figure 5 shows the location of the connector pins.

Pin	RJ45 IN to RJ45 OUT Connections	To Router's Network Terminals
1	✓	✓
2	✓	✓
3	✓	
4	✓	
5	✓	
6	✓	
7	✓	
8	✓	

Table 3 – IN/OUT Connector Pair Wiring

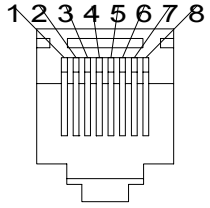


Figure 5 – Socket Connector Pins (viewed from front of panel)

3. Mounting and Cabling

The Quad Router Panel should be mounted as shown in Figure 1. The routers have been pre-installed in the panel. If additional routers are being installed, follow the steps below:

Step	Operation
1	Identify the routers to be installed into the Quad Router Panel. This information is provided in your Engineered System Installation Manual, reference 1.
2	Remove power from the Quad Router Panel.
3	Remove the two screws holding the cover in place over the router mounting shell.
4	Position the router into the router mounting shell, lining up the holes in the shell with the screw holes of the router.
5	Fasten the router to the panel with the screws that were removed in step 3.
6	Repeat steps 1 through 5 until all routers are mounted to the panel.

To verify proper operation of the routers, reconnect power to the Quad Router Panel. When power is applied, the following should be observed:

- The Power LED (green) should illuminate
- The Packet Activity LED (green) should illuminate briefly, then extinguish
- The Service A and B LED's (amber) should illuminate briefly, then extinguish.

If the network is connected to the Quad Router Panel, the Packet Activity LED may begin flashing
If either Service LED is on or flashing, contact CTI Products.

For instructions on how to connect the router manifold assembly into your system, see the Engineered System Installation Manual, reference 1.

Note: Routers are individually custom configured for a specific system. Routers are programmed to pass only specific groups of MCN modules. Routers must be connected to their associated MCN modules.

If a router is connected to the wrong network of MCN modules (wrong MCN Group numbers), the router will not pass traffic from the MCN modules.

See the Engineered System Installation Manual, reference 1, to determine which routers connect to which MCN modules.

If a router must be replaced with a spare router, you must reconfigure the spare router to pass the proper MCN Groups. See the Engineered System Installation Manual, reference 1, for reconfiguration instructions.

Figure 6 shows a typical Quad Router Panel installation. This drawing shows a Quad Router Panel with:

- Four routers connected to the standard 78K MCN networks
- One high-speed 1.25Mb (1250Kb) network

This system concentrates all of the 78K channels into a single 1.25Mb channel.

1.25Mb Channel (B sides of routers)

This channel daisy chains (OUT connector to IN connector) the 'B side' network connection of all routers. If the network cable does not proceed to another device, a 1250 terminator must be connected to the unused 1250 connector.

78Kb Channels (A sides of routers)

These channels come from CIBs and/or HIBs. Since the routers are the last device in the 78K channels, they each must have a 78K terminator connected to their 78K OUT connector.

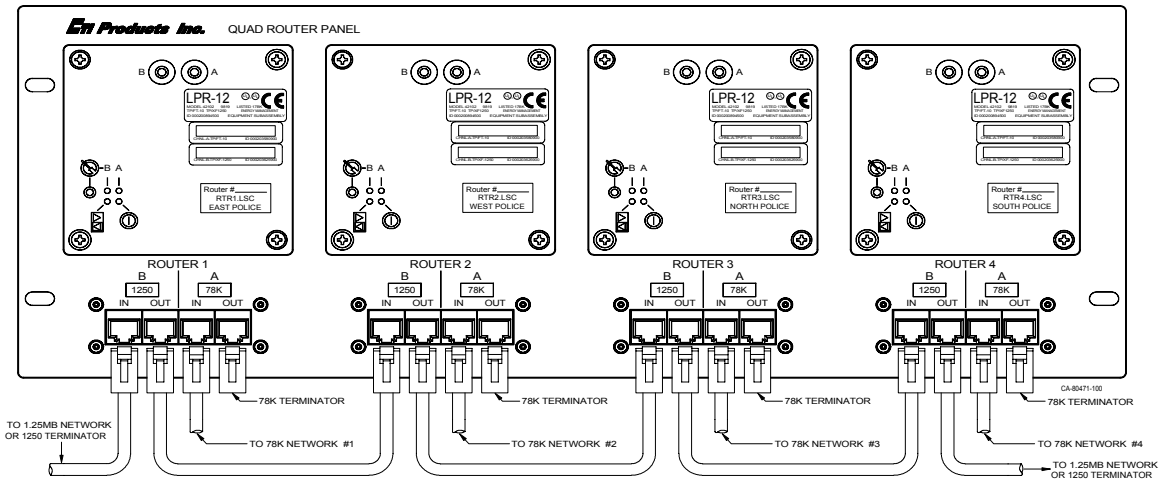


Figure 6 - Typical Router Manifold Cabling

Reference 1, the Engineered System Installation Manual, includes specific information about how each Quad Router Panel must be cabled for your system.

4. Troubleshooting

This table is a list of troubleshooting tips specific to the router modules. For additional troubleshooting tips, refer to the troubleshooting section found in the Engineered System Installation Manual, reference 1.

PROBLEM	CAUSE
Service LED A and/or Service LED B is blinking	The router module is in an error condition and is not functioning properly. See the Engineered System Installation Manual, reference 1, for information on how to reconfigure the router module.