

Octal T1-10/100 RIOP Installation Guide

Compatible Systems Corporation
4730 Walnut Street
Suite 102
Boulder, Colorado 80301

303-444-9532
800-356-0283
<http://www.compatible.com>

Octal T1-10/100 RIOP Installation Guide, Version 1.0
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Introduction to the Octal T1-10/100 RIOP

The Octal T1-10/100 Routing Input/Output Processor (RIOP), as part of the VSR multigigabit switching router, allows you to connect a local Ethernet and up to eight remote corporate networks. Each of the T1 interfaces has a data capacity of 1.544 Mbps, while the Ethernet interface can operate at either 10 Mbps or 100 Mbps.

This section of the manual contains information specific to the Octal T1-10/100 RIOP. It is divided into the following sections:

Chapter 1: Network Installation

Here you will find step-by-step instructions on how to physically install the Octal T1-10/100 and connect it to your network.

Chapter 2: Quickstart Configuration

The Quickstart section provides a basic list of parameters that must be entered into the Octal T1-10/100 for proper operation.

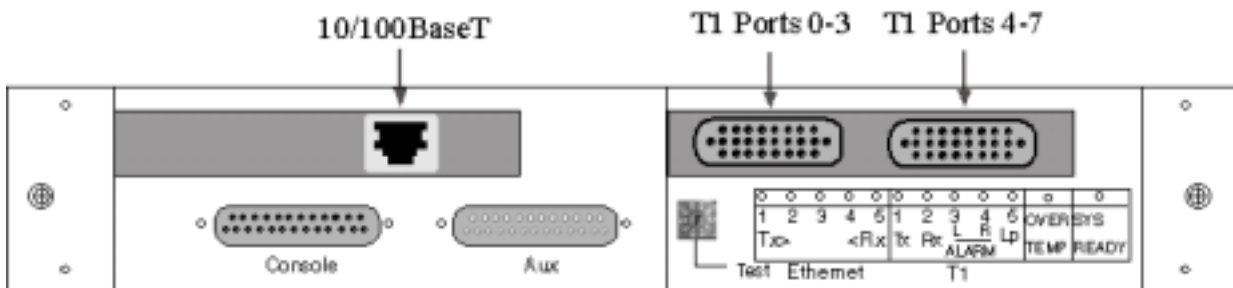
Chapter 3: Shipping Defaults

This section of the manual lists factory defaults for the interfaces.

Chapter 4: LED Patterns

This section of the manual describes the LED indicators for the Octal T1-10/100.

Chapter 1 - Network Installation



Octal T1-10/100 RIOP Front Panel

This section of the manual will help you install the Octal T1-10/100 RIOP to connect a local Ethernet and up to eight remote corporate networks. These connections can be made to other Compatible Systems devices or internetworking equipment from other vendors.

In summary, the steps for installation are:

1. After mounting the router or placing on a desktop, make sure it is not connected to any power source.
2. Connect the router to the Ethernet network.
3. Connect the router to the T1 transmission equipment.
4. Connect a management console to the router (optional).
5. Plug in the power cable and power up the router.

Connecting the Octal T1-10/100 to the Ethernet

The 10/100 Ethernet interface directly supports 100BaseTx or 10BaseT twisted-pair Ethernet. To connect the router's Ethernet interface to twisted-pair Ethernet cabling, you will need an unshielded twisted-pair station cable that is already connected to a 10BaseT-compatible twisted-pair hub (for a transmit speed of 10 Mbps) or a 100Mbps Fast Ethernet hub (for a transmit speed of 100 Mbps).

❖ **Note:** *Ethernet cables and cable connectors are not supplied with the Octal T1-10/100 RIOP product. Category 5 cabling is required for 100 BaseT operation. Please contact your reseller or your Compatible Systems representative for information on obtaining the correct Ethernet cabling supplies.*

To connect the router to the twisted-pair network, simply plug the twisted-pair cable into the RJ-45 Ethernet connector on the front of the unit.

Connecting the Octal T1-10/100 to a T1 Line

To connect each T1 port to a T1 line, you need an 8-pin connector jumper cable (four wires are used). The jumper cable should already be connected to the RJ-45 jack which was installed by your telephone company.

Plug one of the supplied DB-26 male to Quad RJ-45 cables into the DB-26 T1 female connector on the front of the device. Make sure that the jack screws on the DB-26 connector are secured. Then plug the jumper cable into one of the RJ-45 T1 connectors on the Quad RJ-45 cable.

❖ **Note:** *Port numbers 0 - 3 are stamped on each T1 RJ-45 connector. For ports 4 - 7, the connector marked "Port 0" is Port 4, the connector marked "Port 1" is Port 5, etc.*

❖ **Note:** *The Octal T1-10/100 RIOP includes loopback features which can be used to check the functionality of your T1 lines. Before attempting to route network traffic, use these features to check each line's basic integrity.*

Connecting a Management Console

If you wish to connect an out-of-band management console, use the supplied DB-25 male to DB-25 female console cable and connect to the Console interface on the Octal T1-10/100 RIOP. You can use a dumb terminal or a computer equipped with VT100 terminal emulation.

The default settings for the Console interface are VT100 terminal emulation, 9600 bps, 8 bits, no parity, 1 stop bit and no Flow Control.

❖ **Note:** *The Octal T1-10/100 RIOP also has an AUX interface. This is a modem connection which should only be used in consultation with Compatible Systems Technical Support staff, who will provide instruction on its use.*

Powering Up the Router

Connect the supplied power cord to the front of the VSR and set the power switch to "On." At power-up, the router will take approximately one minute to become visible to CompatiView.

❖ **Note:** *If you want to use Telnet as a management method, you must first configure an IP address into the router with either an out-of-band console, CompatiView, or a reconfigured IP host or workstation on the same Ethernet segment as the router. See the appropriate VSR chassis section of the manual for more information on Command Line Management.*

Chapter 2 - Quickstart Instructions

This Quickstart chapter briefly discusses the major parameters that must be set in order to use the Octal T1-10/100 RIOP as part of your VSR multigigabit switching router.

Detailed information on the meaning of the router's parameters is provided in the *CompatiView Management Software Reference Guide* and the *Text-Based Configuration and Command Line Management Reference Guide*. You should use this list as a starting point to look up more specific information in the other documents.

If you need more general information on IP, IPX, AppleTalk or wide area protocols, see the Appendices in the *CompatiView Management Software Reference Guide*.

There are a number of parameter settings which are optional, in the sense that they are not required for all installations. These settings are not covered in this chapter.

In this chapter:

CV = CompatiView

TB = Text-Based Configuration

In order to successfully connect to an Internet Service Provider (ISP), you must use router configuration parameters which will be provided by the technical staff of the ISP. These parameters must include all IP addresses, WAN settings and any applicable authorization routines. Please check with your ISP **before** changing the configuration of your Octal T1-10/100 RIOP.

❖ **Note:** *This Quickstart does not include information on setting up packet filters for using the router as a Firewall. See the **CompatiView Management Software Reference Guide** or **Text-Based Configuration and Command Line Management Reference Guide** regarding IP packet filters for more information.*

Ethernet Interface Configuration

Ethernet interfaces are considerably easier to set up than wide area interfaces since there are fewer choices that need to be made regarding communications protocols and parameters. We recommend that you begin by configuring any Ethernet interface parameters before proceeding to configure WAN interface parameters.

IP Protocol

Required for IP

These parameters set the basic address characteristics of the interface. They provide enough information for another IP node to find the interface (such as a Telnet client), but not enough information for routing to take place.

- IP address
- IP subnet mask
- IP broadcast address

CV: Use the TCP/IP Routing: Ethernet 0 Dialog Box to set these parameters.

TB: Use the **configure** command and set the **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP Ethernet 0** section.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2 or OSPF (Open Shortest Path First)

- IP static routes

CV: Use the TCP/IP Routing: Ethernet 0 Dialog Box to set RIP, and the IP Static Routing Dialog Box (under Global/IP Static Routes) to set static routes. OSPF can only be configured using text-based configuration.

TB: Use **configure** and set either the **RIPVersion** keyword or the **OSPFEnabled** keyword for the **IP Ethernet 0** section. Use **edit config** and add static routes in the **IP Static** section.

IPX Protocol

Required for IPX

Generally, there are no required changes from the shipping Ethernet configuration for IPX. The Ethernet interface will autoconfigure to use the two most common IPX frame types, and will adapt to conditions on the Ethernet.

Suggested for IPX

You may want to set your own network numbers, rather than using the autoconfigured values. You may also want to turn off unused frame types.

CV: Use the IPX Routing: Ethernet 0 Dialog Box.

TB: Use **configure** and set keywords in the **IPX Ethernet 0** section.

AppleTalk Protocol

Required for AppleTalk

Generally, there are no required changes from the shipping Ethernet configuration for AppleTalk. The Ethernet interface will autoconfigure to use AppleTalk Phase 2, and will adapt to conditions on the Ethernet.

Suggested for AppleTalk

You may want to set your own network numbers, rather than using the autoconfigured values. You may also want to use more meaningful zone names.

CV: Use the AppleTalk Routing: Ethernet 0 Dialog Box.

TB: Use **configure** and set keywords in the **AppleTalk Phase 2 Ethernet 0** section.

DECnet Protocol

Required for DECnet

The router's shipping configuration does not have DECnet turned on. In order to be used, DECnet must be turned on both globally and for a particular port.

- Set DECnet on (globally, and for this port)
- Set DECnet area
- Set DECnet node

CV: Use the DECnet Routing Dialog Box (under Global/DECnet Routing) and the DECnet: Ethernet 0 Dialog Box.

TB: Use **configure** and set the **Mode** keyword in the **DECnet Ethernet 0** section. Use **configure** and set the **Enabled**, **Area**, and **Node** keywords in the **DECnet Global** section.

❖ **Note:** *Setting DECnet on for any port with the command line also sets DECnet on globally. In CompatiView you must set a global parameter and a port-specific parameter.*

Suggested for DECnet

Setting the parameters above should be adequate for most installations.

WAN Interface Configuration

The default setting for all WAN interfaces on your Octal T1-10/100 RIOP is **Off** for all protocols and for the link configuration. In order to use a WAN interface, you may first need to set some physical parameters and then set up the link and protocol parameters.

T1 Physical Communications Settings

Required for Dedicated Line Operation

No changes from the default values are required for standard operation over a T1 line. The default values are listed in Chapter 3.

Suggested for Dedicated Line Operation

Changing to fractional T1, different coding or framing, etc., may be required for a particular installation.

CV: Use the Physical Configuration: WAN Dialog Box.

TB: Use **configure** and the **T1 Interface WAN 0** (and/or any other port you wish to configure) section.

PPP Configuration

This section covers the settings required for PPP (point-to-point) protocol operation of the T1 WAN interfaces.

WAN Link Configuration

Required for Dedicated Line Operation

This is the only mode of operation supported via the built-in T1 CSU/DSU.

- Set PPP connection

CV: Use the Link Configuration: WAN Dialog Box.

TB: Use **configure** and then set the **Mode** keyword in the **Link Config WAN 0** (and/or any other port you wish to configure) section.

Suggested for Dedicated Line Operation

Dedicated line operation generally does not require additional parameters for operation.

IP Protocol

Required for IP

WAN interfaces which are set for PPP operation do not generally use an IP address. They are set to act as an “unnumbered interface.” In this mode of operation, there are no required settings.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2, OSPF (Open Shortest Path First) or BGP (Border Gateway Protocol)
- Set IP static routes

CV: Use the TCP/IP Routing: WAN Dialog Box to set RIP, and the IP Static Routing Dialog Box (under Global/IP Static Routes) to set static routes. OSPF and BGP can only be configured using text-based configuration.

TB: Use **configure** and set either the **RIPVersion** keyword or the **OSPFEnabled** keyword in the **IP WAN 0** (and/or any other port you wish to configure) section. Add static routes and a default router using the **edit config IP Static** command.

❖ **Note:** *Due to the complexity of BGP, configuration parameters for BGP are not given in this Quickstart. For help with BGP configuration parameters, and other configuration questions, refer to the Tech Support pages on the Compatible Systems Web site at:*

<http://www.compatible.com/>.

IPX Protocol

Required for IPX

WAN interfaces which are set for PPP operation do not generally use an IPX address. They are set to act as an “unnumbered interface.” In this mode of operation, there are no required settings.

AppleTalk Protocol

Required for AppleTalk

WAN interfaces which are set for PPP operation do not generally use an AppleTalk address. They are set to act as an “unnumbered interface.” In this mode of operation, there are no required settings.

DECnet Protocol

Required for DECnet

The router’s shipping configuration does not have DECnet turned on. In order to be used, DECnet must be turned on both globally and for a particular port.

- Set DECnet on (globally, and for a port)
- Set DECnet area
- Set DECnet node

CV: Use the DECnet Routing Dialog Box (under Global/DECnet Routing) and the DECnet: WAN Dialog Box.

TB: Use **configure** and set the **Mode** keyword in the **DECnet WAN 0** (and/or any other port you wish to configure) section. Use **configure** and set the **Enabled**, **Area**, and **Node** keywords in the **DECnet Global** section.

❖ **Note:** *Setting DECnet on for any port with the command line also sets DECnet on globally. In CompatiView you must set a global parameter and a port-specific parameter.*

Suggested for DECnet

Setting the parameters above should be adequate for most installations.

Frame Relay Configuration

This section covers the settings required for Frame Relay operation of the T1 WAN interfaces.

WAN Link Configuration

Required for Dedicated Line Operation

This is the only mode of operation supported via the built-in T1 CSU/DSU.

- Set Dedicated connection
- Set Frame Relay connection

CV: Use the Link Configuration: WAN Dialog Box.

TB: Use **configure** and then set the **Mode** and **ConnectMode** keywords in the **Link Config WAN 0** (and/or any other port you wish to configure) section.

Suggested for Dedicated Line Operation

Dedicated line operation generally does not require additional parameters for operation.

Frame Relay DLCI Mappings

If you are connecting to another Compatible Systems router, this information is not required for Frame Relay operation. Compatible Systems uses IARP (Inverse Address Resolution Protocol) to dynamically generate this information. To connect to other vendors' routers which do not support IARP, you must provide DLCI-to-protocol mapping information.

❖ **Note:** *Many Internet Service Providers (ISP's) do not support IARP as a default. If your WAN interface will be connected to an ISP via Frame Relay, check with your ISP technical staff on whether or not you must manually enter DLCI information.*

CV: Use the DLCI Mapping Database Dialog Box (under WAN/Link Configuration/DLCI button).

TB: Use **configure** and set the **DLCI** keyword in the **Frame Relay WAN 0** (and/or any other port you wish to configure) section.

IP Protocol

There are two ways to set up Frame Relay. One is to set the WAN interface as a "numbered interface." This means that the interface (and thus the Frame Relay network) will have an IP address, subnet mask, etc. The other is to set it as an unnumbered interface and specify that the link is point-to-point Frame Relay and set the local DLCI. Unnumbered Frame Relay can only be configured using text-based configuration. Instructions are provided for both options.

Required for IP Numbered Interface

- IP numbered interface
- IP address
- IP subnet mask
- IP broadcast address

CV: Use the TCP/IP Routing: WAN Dialog Box.

TB: Use the **configure** command and the **Numbered**, **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP WAN 0** (and/or any other port you wish to configure) section.

Required for IP Unnumbered Interface

- IP unnumbered interface
- Point-to-Point Frame Relay
- Local DLCI

TB: Use the **configure** command and the **Numbered**, **PointToPointFrame**, and **InterfaceDLCI** keywords in the **IP WAN 0** (and/or any other port you wish to configure) section.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2, OSPF (Open Shortest Path First) or BGP (Border Gateway Protocol)
- IP static routes

CV: Use the TCP/IP Routing: WAN Dialog Box to set RIP, and the IP Static Routing Dialog

Box (under Global/IP Static Routes) to set static routes. OSPF and BGP can only be configured using text-based configuration.

TB: Use **configure** and set either the **RIPVersion** keyword or the **OSPFEEnabled** keyword in the **IP WAN 0** (and/or any other port you wish to configure) section. Add static routes and a default router using the **edit config IP Static** command.

❖ **Note:** *Due to the complexity of BGP, configuration parameters for BGP are not given in this Quickstart. For help with BGP configuration parameters, and other configuration questions, refer to the Tech Support pages on the Compatible Systems Web site at:*

<http://www.compatible.com/>.

IPX Protocol

Required for IPX

Frame Relay operation requires that the WAN interface be set as a “numbered interface.” This means that the interface (and thus the Frame Relay network) must have an IPX network number.

- IPX numbered interface
- IPX network number

CV: Use the IPX Routing: WAN Dialog Box.

TB: Use **configure** and set the **Numbered** and **Net** keywords in the **IPX WAN 0** (and/or any other port you wish to configure) section.

Suggested for IPX

The settings above are all that is generally required for IPX operation over Frame Relay.

AppleTalk Protocol

Required for AppleTalk

Frame Relay operation requires that the WAN interface be set as a “numbered interface.” This means that the interface (and thus the Frame Relay network) must have an AppleTalk network number and the interface must have an AppleTalk node number.

- AppleTalk numbered interface
- AppleTalk network number
- AppleTalk node number
- AppleTalk zone name

CV: Use the AppleTalk Routing: WAN Dialog Box.

TB: Use **configure** and set the **Numbered**, **NetLower**, and **DefZone** keywords in the **AppleTalk WAN 0** (and/or any other port you wish to configure) section.

Suggested for AppleTalk

You may want to use more meaningful zone names.

CV: Use the AppleTalk Routing: WAN Dialog Box.

TB: Use **configure** and set keywords in the **AppleTalk Phase 2 WAN 0** (and/or any other port you wish to configure) section.

DECnet Protocol

Required for DECnet

In order to be used, DECnet must be turned on both globally and for a particular port.

WAN interfaces which are set for Frame Relay operation do not need any additional parameters set in order to function.

- Set DECnet on (globally, and for this port)

CV: Use the DECnet Routing Dialog Box (under Global/DECnet Routing) and the DECnet: WAN Dialog Box.

TB: Use **configure** and set the **Mode** keyword in the **DECnet WAN 0** (and/or any other port you wish to configure) section.

❖ **Note:** *Setting DECnet on for any port with the command line also sets DECnet on globally. In CompatiView you must set a global parameter and a port-specific parameter.*

SMDS Configuration

This section covers the settings required for SMDS (Switched Multi-megabit Data Service) operation of the T1 WAN interfaces (IP only). SMDS is a connectionless, packet-switched service that offers LAN-to-LAN connectivity across a wide area at up to 1.544 Mbps. SMDS addresses and other parameters can only be set using the command line interface.

❖ **Note:** *The IP protocol settings and the physical communication settings are the same as they would be for Frame Relay operation. The only parameters which should be set differently for SMDS are the Link Configuration and the SMDS addressing section.*

WAN Link Configuration

SMDS is presently supported in the Octal T1-10/100 RIOP only via synchronous dedicated line operation.

- Set Dedicated connection
- Set SMDS connection

TB: Use **configure** and then set the **Mode** and **ConnectMode** keywords in the **Link Config WAN 0** (and/or any other port you wish to configure) section.

SMDS Addressing

Many of these parameters will be given to you by your service provider.

TB: Use **configure** and set the **StationAddress**, **IPMulticast** and **PollingFrequency** keywords in the **SMDS WAN 0** (and/or any other port you wish to configure) section.

Saving a Configuration File to Flash ROM

Once a configuration is complete, you can save it to the router's Flash ROM. Until saved, all changes are made in a separate buffer and the actual router interfaces continue to run as before the changes were made.

CV: Use the Save to/Device option from the File menu.

TB: Use the **save** command.

Chapter 3 - Shipping Defaults

Ethernet Interface

IP Routing Defaults

- On
- Address: 198.41.12.1
- Subnet Mask: 255.255.255.0
- Broadcast Address: 198.41.12.255
- IP RIP off

IPX Routing Defaults

- 802.3 on, autoseeding
- 802.2 on, autoseeding
- Type II on, nonseeding
- 802.2 SNAP on, nonseeding

AppleTalk Routing Defaults

- Phase 1 off
- Phase 2 on, autoseeding

DECnet Defaults

- Off

WAN 0 Interface

IP Defaults

- On
- Unnumbered interface
- RIP off
- Van Jacobson compression off

IPX Defaults

- On
- Unnumbered interface

AppleTalk Defaults

- On
- Unnumbered interface

DECnet Defaults

- Off

T1 CSU/DSU Defaults

- Full T1
- Slave clock
- B8ZS encoding
- ESF framing
- PRM transmit
- Accept V.54 or line loopback commands from remote

WAN 1 - 7 Interfaces**IP Defaults**

- Off

IPX Defaults

- Off

AppleTalk Defaults

- Off

DECnet Defaults

- Off

T1 CSU/DSU Defaults

- Off

Chapter 4 - LED Patterns

Some of the LEDs on the front of the VSR multigigabit switching router serve dual functions. In addition to indicating certain router-wide operating conditions, they may also display port-specific information.

❖ **Note:** *Any continuous flashing pattern not noted in this chapter may be caused by a hardware failure. Please call Compatible Systems Technical Support if your router shows a hardware failure.*

Router LED Patterns

The following LEDs and light patterns provide information about the VSR's physical state and operating conditions.

Over Temp

The router is above the proper operating temperature. The filter needs changing. See the appropriate VSR chassis section of the manual for instructions.

Sys Ready

The router booted properly without detecting any failures.

General Indicators

| Ethernet Lights | T1 Lights | Indication |
|-----------------|----------------|----------------------------------------------------------------------------------------------------|
| 5 flashing | 1 flashing | Router stacks starting up. |
| 3&4 flashing | 2&3 flashing | No OS loaded. Running from ROM. |
| 1&4 flashing | 2&5 flashing | Erasing OS in Flash ROM. |
| 5 flashing | 1,2&3 flashing | Erasing config in Flash ROM. |
| 1 - 5 scanning | 5 - 1 scanning | Flash ROM erase due to switch setting five or six is complete. Set switch to zero and cycle power. |

Octal T1-10/100 RIOP LED Patterns

The following LEDs and light patterns provide information about the Octal T1-10/100 RIOP interfaces.

Ethernet Traffic Indicators

Scan from 1 to 3: Ethernet transmit packet

Scan from 5 to 3: Ethernet receive packet

T1 Indicators

Tx - WAN transmit packet

Rx - WAN receive packet

Alarm L - An internal T1 CSU/DSU is detecting a line error and sending a yellow alarm.

Alarm R - An internal T1 CSU/DSU is receiving a telephone company yellow alarm

Loop - Loopback mode in an internal T1 CSU/DSU has been set by the remote end.

Ethernet Connection Indicators

Link: The Link light indicates that there is a good connection to the hub.

Activity: The Activity light indicates that there is activity across the link.

100: The 100 light indicates that the interface is operating at 100 Mbps.

T1 Connection Indicators

TX: WAN transmit packet

RX: WAN receive packet

Link: The Link light indicates that the interface is receiving signal from the upstream terminal.