

# HSSI-10/100 RIOP Installation Guide

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HSSI-10/100 RIOP Installation Guide, Version 1.0  
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# Introduction to the HSSI-10/100 RIOP

The HSSI-10/100 Routing Input/Output Processor (RIOP), as part of the VSR multigigabit switching router, allows you to connect a local Ethernet and remote corporate network. The HSSI interface has a data capacity of 44.736 Mbps, while the Ethernet interface can operate at either 10 Mbps or 100 Mbps.

This section of the manual contains information specific to the HSSI-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 HSSI-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 HSSI-10/100 for proper operation.

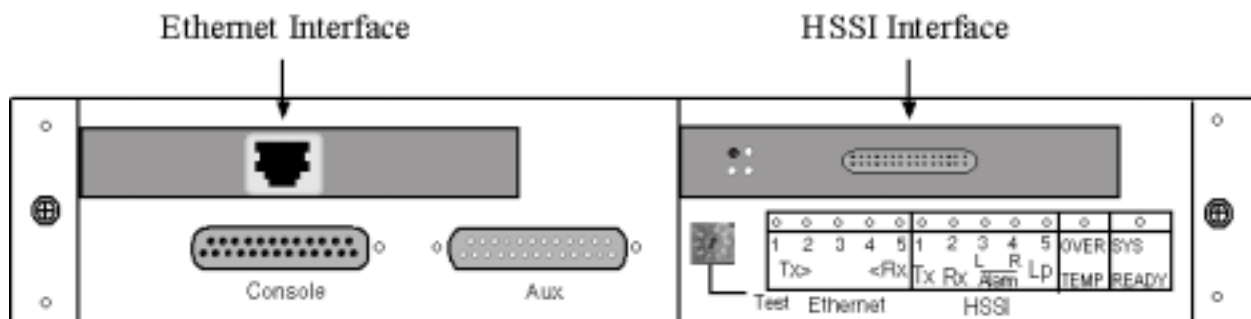
## **Chapter 3: Shipping Defaults**

This section of the manual lists factory defaults for each interface.

## **Chapter 4: LED Patterns**

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

# Chapter 1 - Network Installation



HSSI-10/100 RIOP Front Panel

This section of the manual will help you install the HSSI-10/100 RIOP to connect a local Ethernet and remote corporate network. These connections can be made to other Compatible Systems routers or routers 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 CSU/DSU or frame switch.
4. Power up the CSU/DSU or frame switch.
5. Connect a management console to the router (optional).
6. Plug in the power cable and power up the router.

## Connecting the HSSI-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 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 HSSI-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.*

If your twisted-pair hub is already in place, you can connect the router to an active network without interrupting network activity. Simply plug the twisted-pair cable into the RJ-45 Ethernet connector on the front of the unit.

## Connecting the HSSI-10/100 to a T3 Line Communications Device

The HSSI-10/100 RIOP is not a line communications device. It must be connected to a CSU/DSU or frame switch, which is then connected to the wide area transmission line. To connect the HSSI interface to your line communications device, you will need a standard HSSI cable. The cable is not supplied; again, you may contact your reseller or your Compatible Systems representative for information on obtaining the correct cabling supplies

❖ **Note:** *The HSSI-10/100 RIOP includes loopback features which can be used to check the functionality of your T3 line. Before attempting to route network traffic, use these features to check the line's basic integrity.*

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To connect the HSSI port on the HSSI-10/100 module to a T3 (or other HSSI-based) CSU/DSU, first make sure that both units are powered off. Then, simply connect a standard HSSI cable between the HSSI port of the HSSI-10/100 module and the appropriate port of the CSU/DSU, following the cable installation instructions supplied by the CSU/DSU manufacturer as well.

❖ **Note:** *Do not use a “null-modem” cable.*

The CSU/DSU connects to the appropriate WAN interface (usually a T3 link) as specified in the installation instructions supplied by the CSU/DSU manufacturer.

## Connecting a Management Console

If you wish to connect an out-of-band management console, use the supplied cable and connect to the Console interface on the HSSI-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 HSSI-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 CompaView.

❖ **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, CompaView, or with 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.*

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## Chapter 2 - Quickstart Configuration

This chapter briefly discusses the major parameters that must be set in order to use the HSSI-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** configuring or changing the configuration of your HSSI-10/100 RIOP.

❖ **Note:** *This guide 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 WAN 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 Dialog Box to set these parameters.

**TB:** Use the **configure** command and 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 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 autoadapt 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 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 autoadapt 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 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 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

In order to use the WAN interface, you may want to set some physical parameters. Then set up the link and protocol parameters.

### Physical Communications Settings

**Required for Dedicated Line Operation**

No changes from the default values are required for standard operation over a T3 line. The default values are listed in Chapter 3 - Shipping Defaults.

**Suggested for Dedicated Line Operation**

Changing to a different clocking or CRC setting may be required. These parameters can only be set using the command line interface.

**TB:** Use **configure** and the **HSSI Interface WAN 0** section.

### PPP Configuration

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

#### Link Configuration

**Required for Dedicated Line Operation**

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

- Set Dedicated connection
- Set PPP 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** 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 **OSPFEEnabled** keyword in the **IP WAN 0** section. Add static routes and a default router in the **IP Static** section.

❖ **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** 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.*

## Frame Relay Configuration

This section covers the settings required for Frame Relay operation of the HSSI WAN interface.

### Link Configuration

#### Required for Dedicated Line Operation

This is the only mode of operation supported via the built-in HSSI 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** 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 window.

**TB:** Use **configure** and set the **DLCI** keyword in the **Frame Relay WAN 0** 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** 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** 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 **OSPFEnabled** keyword in the **IP WAN 0** 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** 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** section.

### Suggested for AppleTalk

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

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## 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** 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 HSSI WAN interface (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 text-based configuration.

❖ **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.*

## Link Configuration

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

- Set Dedicated connection
- Set SMDS connection

**TB:** Use **configure** to set the **Mode** and **ConnectMode** keywords in the **Link Config WAN 0** section.

### Suggested for Dedicated/Leased Line Operation

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

## 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** 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.

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# 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 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

### Link and Physical Defaults

- PPP
- Internal clocking
- 16 bit CRC

## 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 and 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	HSSI 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.

### HSSI-10/100 RIOP LED Patterns

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

#### Ethernet Traffic Indicators

Scan from 1 to 3: Ethernet transmit packet

Scan from 5 to 3: Ethernet receive packet

#### HSSI Indicators

Scan from 1 to 3: WAN transmit packet

Scan from 5 to 3: WAN receive packet

❖ **Note:** *The four lights on the HSSI card are for manufacturing diagnostic purposes only and are off during normal operating conditions.*

#### 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.