ISis ImageStream.

Configuring a Packet over Sonet Interface

Version: 2258

Table of Contents

Router Installation and Configuration Manual/Configuring a Packet over Sonet Interface

This chapter describes how to configure the ImageStream router POS OC3/OC12 WAN interfaces and includes the following topics:

◊ Packet over SONET/SDH overview
◊ WAN Port Uses
◊ Understanding the Network Interface Configuration File
◊ Configuring a POS OC3/OC12 Interface
◊ Configuring OC12 Ethernet Accelerated Cross-Connect Mode

Before configuring the WAN interface, you must make the appropriate cabling connection for your needs. Refer to the hardware installation guide for your ImageStream product for information on making the WAN connection. See the Technical Notes section on the ImageStream Web site or the Command Reference for more detailed command descriptions, examples and instructions.

Packet over SONET/SDH overview

Packet over SONET/SDH, abbreviated POS, is a communications protocol for transmitting packets in the form of the Point to Point Protocol (PPP) over SDH or SONET, which are both standard protocols for communicating digital information using lasers or light emitting diodes (LEDs) over optical fibre at high line rates. POS is defined by RFC 2615 as PPP over SONET/SDH. PPP is the Point to Point Protocol that was designed as a standard method of communicating over point-to-point links. Since SONET/SDH utilises point-to-point circuits, PPP is well suited for use over these links. Scrambling is performed during insertion of the PPP packets into the SONET/SDH frame.

WAN Port Uses

WAN ports uses has been explained in Chapter 7, Router Installation and Configuration Manual/Configuring a Synchronous Serial WAN Interface and in Chapter 31 Router Installation and Configuration Manual/Basic Networking.

Understanding the Network Interface Configuration File

The **wan.conf** file is explained in detail in Chapter 5, Router Installation and Configuration Manual/Configuring a LAN Interface, and in Chapter 31,Router Installation and Configuration Manual/Basic Networking.

Configuring a POS OC3 or OC12 Interface

```
Configuration menu
1. AAA (Password) Configuration
2. Global configuration
3. Network interface configuration
```

```
   4. Firewall and QOS configuration
   5. Service configuration
   6. Dynamic routing configuration
   7. Save configuration to flash
   0. ISis-Router main menu
```

From the :Configuration menu", select menu option 2, Network interface configuration, and press **Enter**. This will open the ImageStream router's primary configuration file, **wan.conf** in the default editor. The **wan.conf** file is also accessible from the command line in the **/usr/local/sand** directory.

Default POS OC3/OC12 WAN Card Configuration

The default values of cards equipped with an POS interface are as follows:

◊ SONET interface mode
◊ Scrambler enabled
◊ 16-bit CRC
◊ Line (external) clock source for transmit
◊ C2 byte 0x16

Remember that default settings are not necessarily shown in the configuration file.

Customizing the Configuration

To customize the WAN port configurations, complete the following sections. The ordering of the commands is done by convention, but a specific order is not required. Likewise, all configurations are indented to make configurations easy to read, but indentation is not required. In general, ImageStream follows this ordering convention:

1. Comments
2. Port description
3. Bandwidth scaling statement
4. POS interface settings
5. Other optional settings
6. IP address/netmask
7. Secondary IP addresses/netmasks

Setting the Port Description

You can assign description to all WAN ports. Although this feature is optional, it may be particularly useful to assign names to facilitate administration. Setting a description does not change the operation or name of the port.

To assign a description to a port, enter this command in the wan.conf file in the Serial interface configuration section:

description *string*

Using the router's default configuration below, we have modified the description for Serial0:

```
!
interface Serial0
  shutdown
  description ATM connection to branch offices
  encapsulation PPP
!
```

Setting the IP Address and Netmask

The ATM master interface does not contain IP addressing information. All IP addresses are contained in the subinterfaces (logical interfaces) configured on the master interface. Using the default configuration below, we have deleted the **ip address** line.

```
!
interface Serial0
  shutdown
  description POS connection to branch offices
  encapsulation ppp
  ip address 192.168.10.1 255.255.255.252
!
```

Setting Serial Transport Encapsulation

The serial transport encapsulation can be set to PPP or Cisco HDLC encapsulation for an ATM interface. No other encapsulation types may be specified.The syntax of this command is:

encapsulation *ppp | hdlc*:

In the default configuration below, we have changed the encapsulation to PPP.

```
!
interface Serial0
  shutdown
  description POS connection to branch offices
  encapsulation ppp
  ip address 192.168.10.1 255.255.255.252
!
```

Setting POS OC-3/OC-12 Circuit Transport

ImageStream's POS OC-3 and OC-12 cards support either SONET or SDH as the underlying network transport for the POS traffic. By default, the cards use SONET mode. The mode can be set using the **service-module** *{ oc3 | oc12 }* mode command and specifying a value of either sonet or sdh.

service-module oc3 mode *sonet | sdh*:

Setting POS OC-3/OC-12 Payload Scrambling

ImageStream's POS OC-3 and OC-12 cards default to scrambling enabled. To disable scrambling use the **service-module** *{oc3 | oc12 }* *scrambling* command specifying a value of either *on* or *off*.

service-module oc3 scrambling *on | off*:

Overriding the POS OC-3/OC-12 C2 Byte

ImageStream's POS OC-3 and OC-12 cards use a SONET C2 byte value of 0x16 when scrambling is enabled and 0xCF when scrambling is disabled according to RFC 2615. To allow interoperability with routers the predate RFC 2615 use the **service-module** *{oc3 | oc12 } c2-flag* command specifying the C2 byte value. To specify a hexidecimal value use a format like 0xcf. To specify a decimal value omit the *0x* like 207.

```
service-module oc3 c2-flag 0x16:
```

Enabling or Disabling a Serial Interface

To disable an interface, use the **shutdown** interface configuration command. Unlike other command line interfaces, the **wan.conf** file does not require a "no" version of a command to reverse the operation. Entering "no" followed by a command will be ignored by SAND.

By default, Serial0 is disabled in the default configuration below because the **shutdown** command has been entered. Disabling a master interface will also disable all subinterfaces configured on the master device.

```
!
interface Serial0
  shutdown
  description POS connection to branch offices
  encapsulation PPP
!
```

To enable Serial0 in the configuration, remove the **shutdown** command. Do not use "no shutdown', as this will be ignored by SAND. It is not necessary to enter "no" and a command to negate the command. Simply remove the command from the configuration file.

Adding Comments to a Serial Configuration

Comments may be added to the Serial configuration, or anywhere in the **wan.conf** file by inserting a line that begins with the **#** symbol. The contents of the line will be ignored by SAND. Comments may be used to place contact information, ticket numbers, circuit IDs or any other information into the **wan.conf** file. There are no limits on the number or length of comments that may be inserted.

```
!
interface Serial0
  #NOC phone: 800-555-1212 - Our account #58935
  description POS connection to branch offices
  encapsulation PPP
!
```

Scaling The Connection Speed Calculation

For some media, such as Ethernet and Token Ring, the bandwidth is fixed; for other media, such as serial lines, you can change the actual **bandwidth** by adjusting the hardware. For both classes of media, you can use the **bandwidth** configuration command to communicate the current **bandwidth** to the router's statistical output program and other programs. The **bandwidth** command sets an

informational parameter only to communicate the current bandwidth to other programs.

The **bandwidth** command does not adjust the actual bandwidth of an interface. ATM ports automatically calculate the bandwidth value based on the type of ATM device configured and the bandwidths of the subinterfaces. The syntax of the bandwidth command is:

bandwidth *bits per second*:

In the default example below, we have added a bandwidth equal to 10 Mbps line (less overhead) to the Serial0 interface. This value is calculated automatically, so this command is optional:

```
!
interface Serial0
  #NOC phone: 800-555-1212 - Our account #58935
  description POS connection to branch offices
  encapsulation ppp
  bandwidth 10000000
!
```

Configuring the OC-3/OC-12 Line Clocking Source

One and only one clock source should be configured on a line. In most cases, your line provider will provide a clock source for the POS circuit. The POS OC-3/OC-12 card can also be configured to provide a clock source for back-to-back testing. The syntax of this command is:

service-module { oc3 | oc12 } 'clock source' *{ line | internal }*

The line or internal keyword specifies the type of clocking to use on this interface. Line (also known as "network" or "external') timing is the default value. Using the internal keyword will enable the card's internal clock and will instruct the card to place this clock source on the line. Configuring more than one clock source, or having no clock source, can cause a line to have synchronization problems resulting in framing errors and data loss. Check with your line provider before enabling internal clocking to ensure that this setting is needed. We have specified the default value in the default configuration below:

```
!
interface Serial0
  #NOC phone: 800-555-1212 - Our account #58935
  description POS connection to branch offices
  bandwidth 10000000
  encapsulation ppp
  service-module oc3 clock source line
!
```

Configuring OC12 Ethernet Accelerated Cross-Connect Mode

The POS OC12 card is not capable of OC12 line rates without the Ethernet accelerated cross-connect feature. This feature requires a Gigabit Ethernet SFP placed in the bottom SFP slot of the POS OC12 card. This Gigabit Ethernet SFP port should be connected via Category 5 or better straight-through Ethernet cable to another Gigabit Ethernet port known as the *xconnect port*. All IPv4 data transmitted on this xconnect port will be transmitted on the OC12 port using wirespeed hardware acceleration in

the card. All IPv4 data received on the OC12 port will be received on the xconnect port.

A sample xconnect configuration:

```
interface Serial0
 service-module oc12 xconnect Ethernet0
 encapsulation ppp
!
interface Ethernet0
 ip address 5.5.5.1 255.255.255.252
 !

18:51:44              Interface Summary                        lab1
#  Interface Description        Encaps       Bandwidth   HW   Proto   In   Out
 0 Ethernet0 1Gb Ethernet       1000baseTx-FD601.00 Mbit  up   up     0%   0%
 1 Ethernet1 100Mb Ethernet     100baseTx-FD 100.00 Mbit  up   up     0%   0%
 2 Serial0   ISis 1104-O3 Port 0  PPP          601.34 Mbit  up   up     0%   0%
-----------------------------------------------------------------------------
d Detail | s Sleep interval | h Help | q Quit
```

The system will automatically set the bandwidth to 600 Mbps and install an HTB shaper for the xconnect Ethernet port. Hardware status on the xconnect Ethernet port will also follow the OC12's hardware status.

Note: You must save the settings to the router's non-volatile flash memory! If the router is rebooted before saving, your changes will be lost! See Chapter 26, "Backup/Restore Menu: Managing Configurations" for more information.