

# JT2 6.3-MHz Serial Port Adapter

---

## Description

The JT2 6.3-MHz serial port adapter (PA-2JT2) is available on second-generation Versatile Interface Processor (VIP2) in Cisco 7500 series routers and in Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI).

The PA-2JT2 port adapter provides two data terminal equipment (DTE) interfaces with coaxial BNC connectors—one for transmit (TX) and one for receive (RX). This port adapter is compatible with G.703a allowing communication over a high-speed digital 6.3-MHz (HSD 6.3) leased line service specified in ITU Recommendation G.704. The PA-2JT2 port adapter provides the following features and capabilities:

- Uses bipolar with 8-zero substitution (B8ZS) encoding.
- Supports CRC-16 and CRC-32.
- Operates at 6.312 Mbps, with 50-percent pulse-width B8ZS encoding
- Provides a fixed clock rate on each JT2 interface port of 6.144 Mbps (not configurable).
- Provides the functions needed to frame a wideband payload to ITU G.704 and the Nippon Telegram and Telephone Corporation (NTT)-specified 6.144-Mbps frame format.
- Designed to conform with the following emissions standards: FCC Class Limits (FCC 47 CFR Part 15, Subpart B), and EN55022 Class Limits.
- Designed to conform with the following safety standards: UL 1950 D3 Dev., CSA 22.2 No. 950, and TUV-IEC 950.

## Platforms

This feature is supported on these platforms:

- Cisco 7500
- Cisco 7000 series routers with RSP7000 and RSP7000CI

## Configuration Tasks

For information on how to configure the PA-2JT2 serial port adapter, refer to the “Configure a Synchronous Serial Interface” section in the “Configuring Interfaces” chapter of the *Configuration Fundamentals Configuration Guide*.

In addition to the commands in the “Configure a Synchronous Serial Interface” section in the “Configuring Interfaces” chapter of the *Configuration Fundamentals Configuration Guide*, a new **crc bits 5** command has been added to allow the frame alignment search criteria to use cyclic redundancy check bit 5 (CRC5) on the PA-2JT2 serial port adapter. The default is no CRC5 checking. This is useful for checking data integrity.

For information on other commands that can be used by the PA-2JT2 serial port adapter, refer to the Cisco IOS Release 11.1 configuration guides.

## Configuration Example

The following example shows a configuration for serial interface 1/0/0 on a PA-2JT2 serial port adapter in a Cisco 7500 series router. In this example, the interface is configured to clock data using an internal clock source rather than the default line-derived clock source and to allow the frame alignment search criteria to use CRC5.

```
router# configure terminal
router(config)# interface serial 1/0/0
router(config-if)# ip address 1.1.1.10 255.255.255.0
router(config-if)# clock source internal
router(config-if)# crc bits 5
router(config-if)# no shutdown
router(config-if)# exit
router(config)# exit
router#
```

## Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.1 command references.

- **crc bits 5**
- **show interfaces serial**

## crc bits 5

To enable generation of CRC5 (per ITU Recommendation G.704 and G.703) to improve data integrity, use the **crc bits 5** interface configuration command. To disable this feature, use the **no** form of this command.

```
crc bits 5  
no crc bits 5
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

This command is available for the JT2 6.3-MHz serial port adapter (PA-2JT2) on second-generation Versatile Interface Processor (VIP2) in Cisco 7500 series routers and in Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI).

This command is useful for checking data integrity while operating in framed mode. CRC5 provides additional protection for a frame alignment signal under noisy conditions. For data transmission at JT2 (6.312 Mbps), the G.704 standard suggests 5 bits CRC. Refer to ITU Recommendation G.704 for a definition of CRC5.

You can also use the **crc** command to set the CRC size for the HDLC controllers.

### Example

The following example enables CRC 5 generation on the PA-2JT2 port adapter and also sets the CRC size to 32 bits:

```
interface Serial 0/0  
  crc 32  
  crc bits 5
```

## show interfaces serial

To display information about a serial interface, use the **show interfaces serial** privileged EXEC command.

**show interfaces serial** [*slot/port*] [**accounting**] (for the Cisco 7200 series)  
**show interfaces serial** [*slot/port*] [**:channel-group**] [**accounting**] (for the Cisco 7000 series)  
**show interfaces serial** [*slot/port-adapter/port*] [**accounting**] (for ports on VIP cards in the Cisco 7000 series and Cisco 7500 series)

### Syntax Description

<b>accounting</b>	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
<b>:channel-group</b>	(Optional) On the Cisco 4000 with an NPM or Cisco 7000 series with a MIP, specifies the T1 channel group number in the range of 0 to 23 defined with the <b>channel-group</b> controller configuration command.
<i>slot</i>	(Optional) On the Cisco 7000 series, slot location of the interface processor. On the Cisco 7200 series, slot location of the port adapter.
<i>port</i>	(Optional) Port number on the interface. For the VIP card, the port value can be 0, 1, 2, or 3 for 4-port serial interfaces. On the Cisco 7200 series, the port numbers depend on the type of port adapters installed.
<i>port-adapter</i>	(Optional) On the Cisco 7000 and Cisco 7500 series, specifies the ports on a VIP card. The value can be 0 or 1.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0 for the Cisco 4000 series.

This command first appeared in Cisco IOS Release 11.0 for the Cisco 7000 series.

This command was modified in Cisco IOS Release 11.1 CA to include sample output for the PA-2JT2 serial port adapter.

For additional command syntax and sample displays, refer to the show interfaces serial command in the “Interface Commands” chapter of the *Configuration Fundamentals Command Reference*.

### Sample Displays

The following is sample output from the **show interfaces** command for a PA-2JT2 serial interface:

```
Router# show interfaces serial 3/0/0
Serial3/0/0 is up, line protocol is up
Hardware is cyBus Serial
Internet address is 1.0.0.1/8
MTU 1500 bytes, BW 6312 Kbit, DLY 20000 usec, rely 255/255, load 26/255
Encapsulation HDLC, loopback not set, keepalive not set
Last input 00:04:31, output 00:04:31, output hang never
Last clearing of "show interface" counters 00:06:07
```

```

Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 162000 bits/sec, 8 packets/sec
5 minute output rate 162000 bits/sec, 8 packets/sec
 20005 packets input, 20080520 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 20005 packets output, 20080520 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
  0 cv errors, 0 crc5 errors, 0 frame errors
rxLOS inactive, rxLOF inactive, rxPAIS inactive
rxAIS inactive, rxRAI inactive, rxHBER inactive

```

The following counters appear in the output of the **show interfaces serial** command for a PA-2JT2 serial interface:

- cv errors—B8ZS/B6ZS coding violation counter
- crc5 errors—CRC-5 error counter
- frame errors—framing error counter

The following alarm indicators also appear in the output of the **show interfaces serial** command for a PA-2JT2 serial interface:

- rxLOS—receive loss of signal alarm
- rxLOF—receive loss of frame alarm
- rxPAIS—receive payload alarm indication signal (AIS)
- rxAIS—receive physical AIS
- rxRAI—receive remote alarm indication signal
- rxHBER—receive high bit error rate alarm

Table 28 describes significant fields shown in the display.

**Table 28 Show Interfaces Serial Field Descriptions**

Field	Description
Serial... is {up   down} ...is administratively down	Indicates whether the interface hardware is currently active (whether carrier detect is present), inactive, or has been taken down by an administrator.
line protocol is {up   down}	Indicates whether the software processes that handle the line protocol consider the line usable (that is, whether keepalives are successful) or if it has been taken down by an administrator.
Hardware is	Specifies the hardware type.
Internet address is	Specifies the Internet address and subnet mask.
MTU	Maximum Transmission Unit of the interface.
BW	Indicates the value of the bandwidth parameter that has been configured for the interface (in kilobits per second). The bandwidth parameter is used to compute IGRP metrics only. If the interface is attached to a serial line with a line speed that does not match the default (1536 or 1544 for T1 and 56 for a standard synchronous serial line), use the <b>bandwidth</b> command to specify the correct line speed for this serial line.

**Table 28 Show Interfaces Serial Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopback is set or not.
keepalive	Indicates whether keepalives are set or not.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed.
Last output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Last clearing of "show interface" counters	Time the counters were last cleared.
Queueing strategy	First-in, first-out queueing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
5 minute input rate 5 minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes.  The 5-minute input and output rates should be used only as an approximation of traffic per second during a given 5-minute period. These rates are exponentially weighted averages with a time constant of 5 minutes. A period of four time constants must pass before the average will be within two percent of the instantaneous rate of a uniform stream of traffic over that period.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffers	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
Received... broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.

**Table 28 Show Interfaces Serial Field Descriptions (Continued)**

Field	Description
input error	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum might not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating station or far-end device does not match the checksum calculated from the data received. On a serial link, CRCs usually indicate noise, gain hits, or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. On a serial line, this is usually the result of noise or other transmission problems.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. Broadcast storms and bursts of noise can cause the ignored count to be increased.
abort	Illegal sequence of one bits on a serial interface. This usually indicates a clocking problem between the serial interface and the data link equipment.
packets output	Total number of messages transmitted by the system.
bytes output	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the transmitter has been running faster than the router can handle. This might never be reported on some interfaces.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this might not balance with the sum of the enumerated output errors, as some datagrams might have more than one error, and others might have errors that do not fall into any of the specifically tabulated categories.
collisions	Number of messages retransmitted due to an Ethernet collision. This usually is the result of an overextended LAN (Ethernet or transceiver cable too long, more than two repeaters between stations, or too many cascaded multiport transceivers). Some collisions are normal. However, if your collision rate climbs to around 4 or 5%, you should consider verifying that there is no faulty equipment on the segment and/or moving some existing stations to a new segment. A packet that collides is counted only once in output packets.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within several seconds' time. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down.
output buffer failures	Number of no resource errors received on the output.
output buffers swapped out	Number of packets swapped to DRAM.

**Table 28 Show Interfaces Serial Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
carrier transitions	Number of times the carrier detect signal of a serial interface has changed state. For example, if data carrier detect (DCD) goes down and comes up, the carrier transition counter will increment two times. Indicates modem or line problems if the carrier detect line is changing state often.
cv errors	B8ZS/B6ZS (zero suppression) coding violation counter.
crc5 errors	CRC-5 error counter.
frame errors	Framing error counter.
rx LOS	Receive loss of signal alarm. Values are active or inactive.
rxLOF	Receive loss of frame alarm. Values are active or inactive.
rxPAIS	Receive loss of payload alarm indication signal (AIS). Values are active or inactive.
rxAIS	Receive loss of physical AIS. Values are active or inactive.
rxRAI	Receive remote AIS. Values are active or inactive.
rxHBER	Receive high bit error rate alarm. Values are active or inactive.

## What to Do Next

For more information on the PA-2JT2 serial port adapter, refer to the *JT2 6.3-MHz Serial Port Adapter Installation and Configuration* publication.