JUNIPER
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CTP Series Circuit to Packet Platform

Using Bundles to Create Logical Configurations for Physical Interfaces

Release

6.1

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Overview

Overview of CTP Bundles

Types of Bundles Overview

Table 1 on page 3 shows the typical application for each bundle type, and lists the interfaces that each type of bundle supports.

Table 1: Bundle Types and Supported Interfaces

Bundle Type	Generally Used For	Interface Types Supported

CTP (circuit-to-packet)	Connecting legacy serial interfaces to the IP network	• CTP150
		  • Serial interface
		  • T1/E1 interface
		• CTP2000
		  • Serial interface
		  • Serial interface with T1/E1 daughter card
		  • Serial interface with 4WTO daughter card
		  • Serial interface with IRIG-B daughter card
		  • T1/E1 interface

SAToP (structure-agnostic TDM over IP)	Connecting single T1 or E1 interfaces to an IP network	• CTP150
		  • T1/E1 interface
		• CTP2000
		  • Serial interface with T1/E1 daughter card
		  • T1/E1 interface

Table 1: Bundle Types and Supported Interfaces *(continued)*

Bundle Type	Generally Used For	Interface Types Supported

CESoPSN (circuit emulation services over a packet-switched network)	Grouping multiple DS0s to one IP circuit	• CTP2000
		  • T1/E1 interface with unused DS0s
		
		• CTP150
		  • T1/E1 interface with unused DS0s
		
		An unused DS0 is a DS0 not assigned to another bundle. When a CESoPSN bundle is attached to a port, by default all unused DS0s are assigned to the bundle.

VCOMP (voice compression)	Grouping multiple analog circuits (channels) into one IP circuit	• CTP2000
		  • T1/E1 interface
		  • 4W-E&M interface
		  • Voice compression module

Interface Naming Conventions for the CTP Series

In the CTP software, interfaces are specified in the format:

type-slot/port

where

type—Type of interface. A 2-character abbreviation.

slot—Slot number on the CTP device.

port—Port number on the CTP device.

If the interface module has a daughter card installed, the interface format is as follows:

type-slot/port w/*daughter-card*

Table 2: Interface Type Specifiers

Interface Type	Type Specifier
4WE&M	4w
4WTO	4w
E1	e1
2W-FXO	fo
2W-FSX	fs
IRIG	irig
Serial	se

Table 2: Interface Type Specifiers *(continued)*

Interface Type	Type Specifier
T1	t1
T1E1	t1e1

Adaptive Clocking Overview for CTP Bundles

The goal of adaptive clocking is to prevent buffer anomalies by adjusting the clocks so that they are the same at each end of the network. If the clocks are not the same at each end of the network, the data rate entering and exiting buffers will not be the same, which causes a buffer underflow or overflow.

Adaptive clocking works by gathering information on packets arriving from the IP network and using that information to determine if adjustments need to be made to the local clock to maintain frequency lock with the remote end. This process is called adaptive time domain processing (ATDP). ATDP provides rapid convergence to the correct clock, and does not vary due to changes in the average jitter buffer fill. As a result, a circuit continuously operates without a buffer re-center, even when clock references are not used.

There are two types of adaptive clocking:

- Adaptive clocking with internal clock—Recovers the clock from the user equipment connected to the remote CTP device, and uses it to generate both transmit and receive timing. All clocking is performed by the DDS, which is initially configured to be locked to the local system clock. When packets begin to flow between the CTP devices, the adaptive clock begins time domain analysis of the packets that arrive from the remote CTP device. Based on this analysis, adjustments are made to the DDS clock to approximate the frequency of the clock used to create network-bound packets on the remote CTP. In this way, the local CTP port can maintain long term frequency lock with the remote CTP and pass this clock to the locally connected user equipment.

- Adaptive clocking with external TX clock—Data received from the local user equipment that is bound to the IP network is clocked using the CTP external user clock (the transmit timing clock). Data received from the remote CTP device and bound for the interface is adaptively clocked with the recovered clock from the user equipment connected to the remote CTP device. This configuration allows for independent adaptive configuration in each direction. With this method, the user equipment can send packets into the network with their local clock, and the remote end CTP devices adaptively recover this clock. This clocking method is useful when the port speed is high or the cable length between the user equipment and CTP device is large.

Related Documentation
- Configuring Adaptive Clocking for CTP Bundles (CTP Menu) on page 79
- Configuring Adaptive Clocking for CTP Bundles (CTPView) on page 77

Determining Optimal Packet Size for CTP Bundles Overview

You can specify the size of IP packets that are created from data received at the serial port. The CTP device uses packet size along with the serial interface rate to calculate the packet rate; that is, the rate that packets are created. The maximum packet rate is 1500 packets per second.

To determine the optimal packet size, consider the following:

- Bandwidth for transporting serial data

- Packet creation delay

- Performance of the IP network

For example, larger packet sizes are more bandwidth-efficient, but introduce more delay during packet creation.

Bandwidth for Transporting Serial Data

When considering bandwidth in relation to deciding packet size, add overhead for both the layer 2 encapsulation and the IP header. The IP header comprises 20 bytes; and the encapsulation overhead varies, but is typically either 6 or 8 bytes on serial links. This overhead causes smaller packets to be less efficient and result in serial data requiring more bandwidth.

Calculate the bandwidth required for a serial bit stream as follows:

IP Bandwidth = [Packet Size (bytes) + 20 (bytes) + 2 (bytes) + Encapsulation Overhead (bytes) x [Packet Rate (pps)] x 8

Packet Creation Delay

Serial data received at the CTP interface must be buffered long enough to allow a packet to be created. The delay to create the packet increases as either the size of the packet increases or as the rate of the serial interface decreases. Generally, this delay is minimal except when the rate of the serial interface is low and the packet size is large. We recommend that you set the packet size to a smaller value for lower-speed serial interfaces. Table 3 on page 6 provides examples of serial interface packet creation delay in milliseconds.

Table 3: Packet Creation Delay for Serial Interfaces

Interface Rate (Kbps)	Serial Interface Delay (msec) Packet Size (bytes)					
	128	256	512	768	1024	1400
64	16.0	32.0	64.0	96.0	128.0	175.0
128	8.0	16.0	32.0	48.0	64.0	87/5
256	4.0	8.0	16.0	24.0	32.0	43.8

Table 3: Packet Creation Delay for Serial Interfaces *(continued)*

| Interface Rate (Kbps) | Serial Interface Delay (msec) Packet Size (bytes) | | | | | |
	128	256	512	768	1024	1400
1024	1.0	2.0	4.0	6.0	8.0	10.9
1544	0.7	1.3	2.7	4.0	5.3	7.3
2048	.5	1.0	2.0	3.0	4.0	5.5

Performance of the IP Network

The number of packets created (packet rate) is inversely related to the packet size configured. For example, smaller packets result in a greater packet rate. When you configure the packet size, consider the packet-forwarding performance of the attached router and network. Table 4 on page 7 provides examples of packet rates for various packet sizes and serial interface rates.

Table 4: Packet Rate for Various Packet Size and Serial Interface Rate Settings

| Interface Rate (Kbps) | Packet Rate (Packets per Second) Packet Size (Bytes) | | | | | |
	128	256	512	768	1024	1400
64	62.5	31.3	15.6	10.4	7.8	5.7
128	125.0	62.5	31.3	20.8	15.6	11.4
256	20.0	125.0	62.5	41.7	31.3	22.9
1024	1000.0	500.0	250.0	166.7	125.0	91.4
1544	1507.8	753.9	277.0	251.3	188.5	137.9
2048	2000.0	1000.0	500.0	333.3	250.0	182.9

Related Documentation

- Configuring IP Parameters for CTP Bundles (CTP Menu) on page 20
- Configuring IP Parameters for CTP Bundles (CTPView) on page 18

Providing QoS for CTP Bundles by Using Service Type Overview

In IP networks, the IP flow is typically classified based on the Differentiated Services Code Point (DSCP) setting in the type of service (TOS) byte of the IP header. DSCP is a scalable solution for classifying flows in a large IP network based on the class of service desired on specific IP traffic flows.

With the CTP device, you can configure DSCP settings for each circuit's IP flow. For example, some circuits could be configured for the expedited forwarding (EF) class. When the network routers receive this EF-marked flow from the CTP device, they place the marked traffic into a high priority queue, enabling this traffic to be serviced before lower priority traffic. As an EF-marked flow traverses the IP network, routers can use its classification to provide the flow a more predictable level of performance across the network

When you configure the service type of a bundle, you specify the ToS byte to be used in IP headers of packets sent from the CTP device to the IP network. The ToS setting is applied to circuits created by the bundle for which the service type is configured.

Table 5 on page 8 shows the mapping for each DSCP class and setting to the ToS setting that you configure as the service type for a bundle. The EF class (ToS setting 184) is commonly used for circuit traffic.

Table 5: DSCP Classes and Service Type

DSCP Class	DSCP Setting	ToS Setting
CS7	56	224
CS6	48	192
EF	46	184
CS5	40	160
AF43	38	152
AF42	36	144
AF41	34	136
CS4	32	128
AF33	30	120
AF32	28	112
AF31	26	104
CS3	24	96

Table 5: DSCP Classes and Service Type *(continued)*

DSCP Class	DSCP Setting	ToS Setting
AF23	22	88
AF22	20	80
AF21	18	72
CS2	16	64
AF13	13	52
AF12	12	48
AF11	10	40
CS1	8	32

Related Documentation
- Configuring IP Parameters for CTP Bundles (CTPView) on page 18
- Configuring IP Parameters for CTP Bundles (CTP Menu) on page 20

Circuit Startup Process Overview

CTP devices use UDP operational and maintenance (OAM) packets to initially discover the circuit on the remote CTP device, and to verify continued connectivity with the remote device. When a bundle is activated, the CTP device sends OAM packets to the remote circuit until the required number of packets is received. The circuit then changes its state to in-sync, and begins sending data packets.

Circuits continue to send OAM packets to the remote device at a configured rate. If the number of OAM packets that the CTP devices misses reaches a configured number, the state of the circuit changes from in synchronization to no synchronization.

You can also specify how many consecutive packets the IP network must drop before the CTP device restarts the circuit. After the circuit restarts, the CTP device must receive a specified number of in-sequence packets before it transitions the circuit from in-sync to running.

Related Documentation
- Configuring Circuit Startup Parameters for CTP Bundles (CTPView) on page 21
- Configuring Circuit Startup Parameters for CTP Bundles (CTP Menu) on page 22

Transparent Encoding Overview

- Transparent Encoding Applications and Support Overview on page 10
- How Basic Transparent Encoding Works on page 10

- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11
- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13

Transparent Encoding Applications and Support Overview

Transparent mode is for unique applications that require the data and clock signals to be sampled at one end of a circuit and replicated at the far end. For example, applications in which:

- Data rates are low (32 Kbps or less) and rates can vary over time. The sampling jitter prevents use of higher data rates.

- Data rates are low and fixed and/or low network latency is required.

- Clocks must disappear (transitions stop) periodically during circuit operation.

The transparent encoding scheme is supported only when you have worked with the Juniper Networks Technical Assistance Center (JTAC) to verify that your application requires this encoding scheme. You may need to use special adapters on the cable to properly map the data and clock signals to the connector pins that the application uses.

We recommend that you do not use transparent encoding in WAN environments because of its large consumption of bandwidth.

Related Documentation
- How Basic Transparent Encoding Works on page 10

- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11

- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13

- Configuring Transparent Encoding for CTP Bundles (CTPView) on page 43

- Configuring Transparent Encoding for CTP Bundles (CTP Menu) on page 45

How Basic Transparent Encoding Works

Transparent encoding samples incoming data on four input signals (SD, TT, RTS, and DTR), transports these signals across the IP network to the remote end of the circuit, and sends the signals on four output signals (RD, RT, CTS, and DSR). Figure 1 on page 11 shows a simplified model of a transparent encoded circuit.

Figure 1: Simplified Model of a Transparent Encoded Circuit
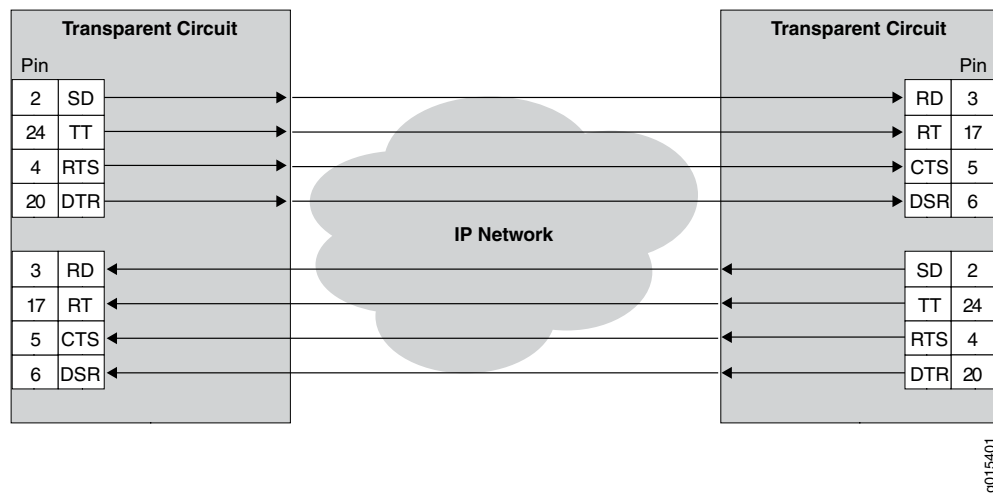
The signal sampling rate is based on the configured port rate. For example, if the port rate is 128 Kbps, then the four signals are sampled at 128 KHz, which generates a packet flow through the IP network of 512 Kbps (4 x 128 KHz). The smallest sampling rate available is 5.3 µsec (approximately 192 KHz).

To prevent errors in transport, both ends of the circuit must be synchronized with each other. You can achieve synchronization either by locking each CTP node to a common reference or by enabling adaptive clocking on one end of the circuit.

Related Documentation

- Transparent Encoding Applications and Support Overview on page 10
- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11
- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13
- Configuring Transparent Encoding for CTP Bundles (CTPView) on page 43
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Using Phase-Correction FIFO Buffer with Transparent Encoding

The transparent encoding feature provides a phase-correction FIFO buffer. This FIFO buffer aligns the clock and data phase relationship on a transparent encoded circuit in which the clock travels in one direction through the network, and the data travels in the opposite direction. The transparent FIFO buffer is needed because of the latency of signal transport over the IP network.

Figure 2 on page 12 shows the phase-correction FIFO buffers. You can enable the phase-correction FIFO buffer at either end of the circuit. You would not enable the FIFO buffer at both ends of the circuit.

Figure 2: Transparent Encoding with Phase-Correction FIFO Buffers
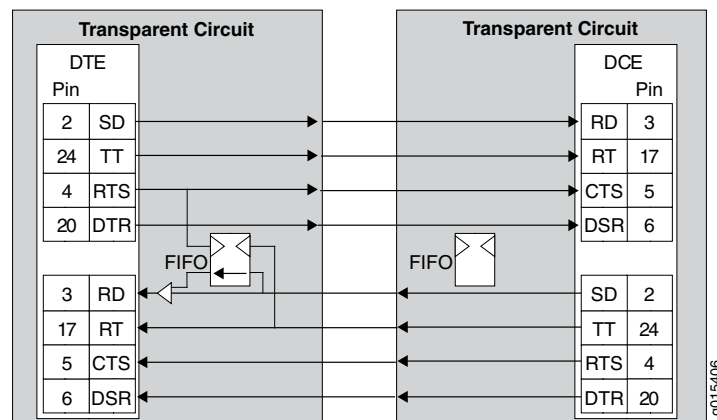
Figure 3 on page 12 shows the paths of the clock and data through the phase-correction FIFO buffer that is enabled on the transparent circuit on the right.

- The clock enters the network from the DCE, goes to the DTE, and then clocks data into the network on the DTE. The clock is also looped back on the DTE to enter the network in phase with the data as it travels from the DTE to the DCE.

- The data enters the FIFO buffer in phase with the clock passing through the network from the DTE to the DCE, while data is clocked out of the FIFO buffer with the clock that entered the network from the DCE, which is in phase with the user clock.

Figure 3: Clock and Data Paths with Transparent Phase-Correction FIFO Buffers
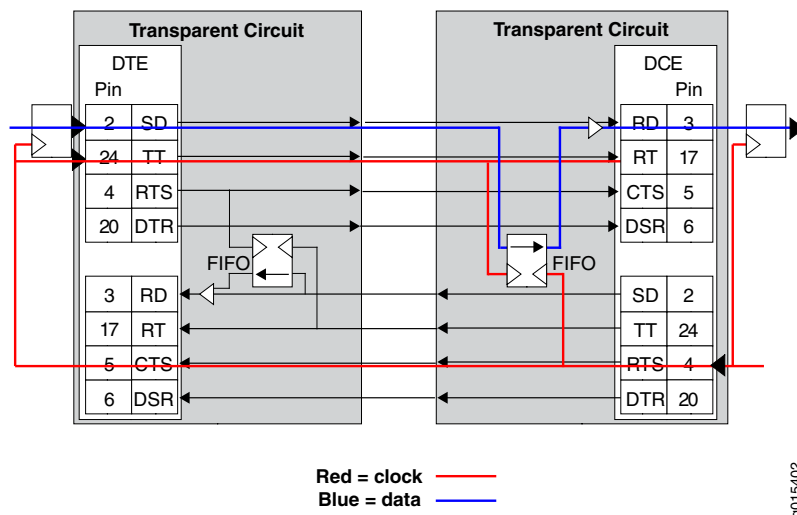
Red = clock
Blue = data

Related Documentation

- Transparent Encoding Applications and Support Overview on page 10

- How Basic Transparent Encoding Works on page 10

- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13

- Configuring Transparent Encoding for CTP Bundles (CTPView) on page 43
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Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding

When the relationship between the clock and the data signals is critical, you can use ST clocking with transparent encoding to prevent delay and jitter, making it possible to carry higher speed circuits in transparent mode.

Figure 4 on page 13 shows the issue of delay and jitter where a transparent encoded circuit connects a DCE to a DTE. The circuit is set up as follows:

- The high-speed clock and data lines (shown in red) are aligned by a FIFO buffer at the DCE.
- The signaling leads (shown in blue) are passed end-to-end without going through the FIFO buffer. The signaling paths that carry non-timing-critical signals are subject to delay and jitter.

The problem is that when a FIFO buffer is used at one end of the circuit, an additional clock path from the DCE to the DTE is needed to carry a clock to the DTE so that it can return a DTE-to-DCE clock that is in phase with the data. This DTE-to-DCE clock is needed to clock the FIFO input. Normally, one of the signal lead paths carries this transmit clock. However, when the circuit is running at speeds above 32k, the delay and jitter on these paths make these signal choices nonoptimal.

Figure 4: High-Speed and Low-Speed Paths with Transparent Encoding
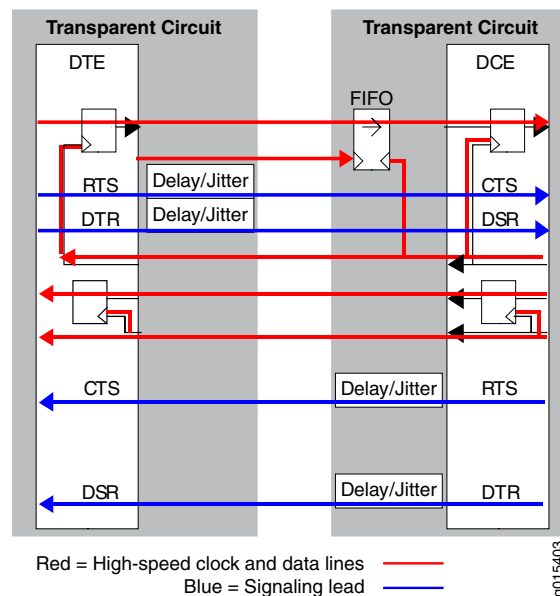
To solve the issue of delay and jitter associated with the signaling leads, you can use the ST interface signal to feed or sink the RTS-to-CTS signal path. By using the ST interface signal instead of the RTS-to-CTS signal path, delay and jitter are removed from that signal path. Figure 5 on page 14 shows a transparent-encoded circuit with the additional ST functionality:

- At the DCE, the RTS-to-CTS signal path is configured to use ST (as an input from the DCE) to feed that signal path through the network.

- At the DTE, that signal is placed onto the ST lead, which is configured as an output.

Figure 5: Transparent Encoding Using ST Clocking
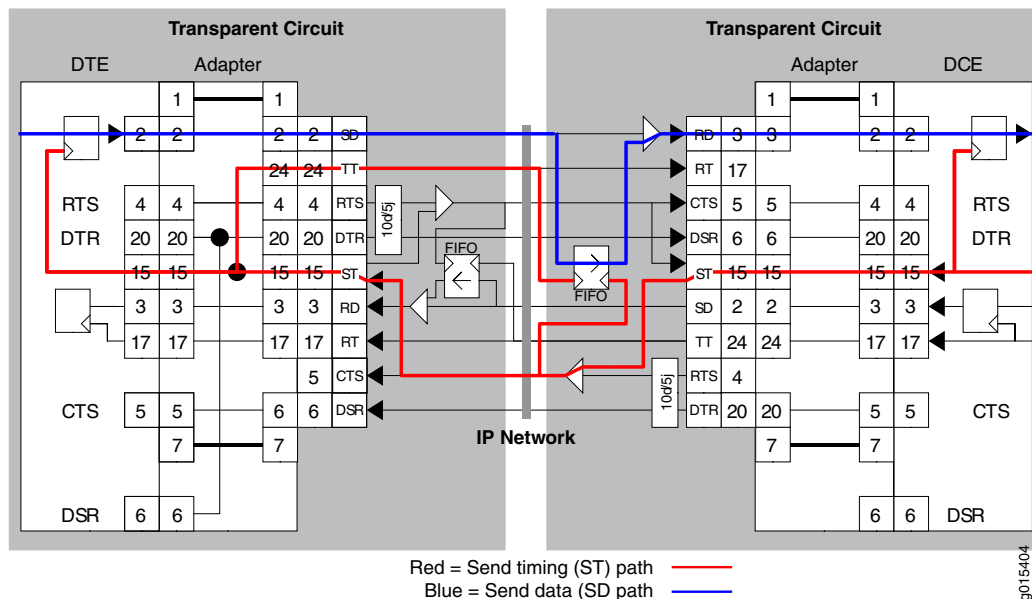
When you configure transparent encoding to use the ST lead instead of RTS/CTS, you can specify whether or not ST is an input lead.

Related Documentation

- Transparent Encoding Applications and Support Overview on page 10

- How Basic Transparent Encoding Works on page 10

- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11

- Configuring Transparent Encoding for CTP Bundles (CTPView) on page 43

- Configuring Transparent Encoding for CTP Bundles (CTP Menu) on page 45

CHAPTER 2

Adding Bundles

- Adding a Bundle (CTPView) on page 15
- Adding a Bundle (CTP Menu) on page 15

Adding a Bundle (CTPView)

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To add a bundle using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.
2. Run your mouse over the **Open Add Bundles Display** bar.
3. Under **New Bndl Number**, select a bundle number.
4. Under the type of bundle you want to add, select a source port, and click the button for the type of bundle.
5. Enter the parameters, and **Click to Submit Bundle AND Port Changes**.

Adding a Bundle (CTP Menu)

To add a bundle using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.
2. Select the type of bundle that you want to configure.
3. Enter **add** to add a new bundle.
4. Select the port you want to attach the bundle to.

Configuring CTP Bundles

Configuring IP Parameters for CTP Bundles (CTPView)

The CTP software uses the IP parameters to create IP packets.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure IP parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.
4. Under **Bundle Options**, configure the parameters described in Table 6 on page 18, and click **Click to Submit Bundle AND Port Changes**.

Table 6: CTP Bundle IP Parameter Settings in CTPView

Field	Function	Your Action
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.
State	Specifies whether the bundle is active or disabled.	Select **DISABLED** or **ACTIVE**.
Remote Address	Specifies the name and IP address of the remote CTP device.	In the first field, select the CTP device. In the second field, select an interface on the CTP device.
Remote Circuit ID	Specifies the bundle to connect to on the remote CTP device.	Enter a number from 0 through 249.
Local Circuit ID	Specifies the bundle on the local CTP device.	Enter a number from 0 through 249.

Table 6: CTP Bundle IP Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Packet Size	Specifies the size of IP packets that are created from data received at the serial port. The CTP device makes sure that the combination of packet size and data rate does not result in a packet rate that exceeds 1200 packets per second.	Select a packet size. For CTP150 devices, the available packet size is 8 through 1456. For CTP2000 devices, the available packet size is 4 through 1456.
Min Buffer	Specifies the minimum average buffer size. Use a value that is greater than the expected jitter and less than the Buffer Set parameter. The minimum buffer ensures that the buffer does not become too small because of timing variances between the local and remote serial interfaces. The entire buffer is available for accommodating and smoothing packet delay jitter, regardless of the minimum buffer setting.	Enter a number from 0.001 through 9999.000 ms.
Buffer Set	Specifies the buffer size when the circuit enters a running state. This value must be large enough to accommodate the anticipated packet delay, and it must be set to a value greater than the minimum buffer size and lower than the maximum buffer size.	Enter a number from 0.001 through 9999.000 ms.
Max Buffer	Specifies the maximum buffer size. The maximum buffer ensures that the buffer does not become too large due to timing variances between the local and remote serial interfaces. If buffer size exceeds the maximum buffer size, the buffer is recentered to the Buffer Set value. Periodic buffer recenters are not expected. If you notice recenters, we recommend that you verify the reference to the CTP (if used) or that you configure one port with adaptive clocking.	Enter a number from 0.001 through 9999.000 ms.
Service Type	Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network. For a mapping of ToS byte values to DSCP classes and settings, see "Providing QoS for CTP Bundles by Using Service Type Overview" on page 8. You do not need to set the ToS value to the same value on local and remote bundles.	Enter a number from 0 through 255.
Time to Live	Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. The IP network does not alter or optimize the packet routing based on the TTL setting. You do not need to set the same TTL value on local and remote ports.	Enter a number from 0 through 255.

Related Documentation

- Determining Optimal Packet Size for CTP Bundles Overview on page 6

- Providing QoS for CTP Bundles by Using Service Type Overview on page 8

Configuring IP Parameters for CTP Bundles (CTP Menu)

The CTP software uses the IP parameters to create IP packets.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure IP parameters for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config** to configure the bundle.

5. Configure options 1 through 9 as described in Table 7 on page 20.

Table 7: CTP Bundle IP Parameter Settings in the CTP Menu

Field	Function	Your Action
Remote Address	Specifies the name and IP address of the remote CTP device.	Enter the address of the remote CTP device.
Remote Circuit ID	Specifies the bundle to connect to on the remote CTP device.	Enter a number from 0 through 249.
Local Circuit ID	Specifies the bundle on the local CTP device.	Enter a number from 0 through 249.
Packet Size	Specifies the size of IP packets that are created from data received at the serial port. The CTP device makes sure that the combination of packet size and data rate does not result in a packet rate that exceeds 1200 packets per second.	For CTP150 devices, enter a number from 8 through 1456. For CTP2000 devices, enter a number from 4 through 1456.
Min Buffer	Specifies the minimum average buffer size. Use a value that is greater than the expected jitter and less than the Pkt Buffer Set parameter. The minimum buffer ensures that the buffer does not become too small because of timing variances between the local and remote serial interfaces. The entire buffer is available for accommodating and smoothing packet delay jitter, regardless of the minimum buffer setting.	Enter a number from 0.001 through 9999.000 ms.
Pkt Buffer Set	Specifies the buffer size when the circuit enters a running state. This value must be large enough to accommodate the anticipated packet delay, and it must be set to a value greater than the minimum buffer size and lower than the maximum buffer size.	Enter a number from 0.001 through 9999.000 ms.

Table 7: CTP Bundle IP Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Max Buffer	Specifies the maximum buffer size. The maximum buffer ensures that the buffer does not become too large due to timing variances between the local and remote serial interfaces. If the buffer size exceeds the maximum buffer size, the buffer is recentered to the Pkt Buffer Set value. Periodic buffer recenters are not expected. If you notice recenters, we recommend that you verify the reference to the CTP (if used) or that you configure one port with adaptive clocking.	Enter a number from 0.001 through 9999.000 ms.
Service Type	Specifies the ToS byte to be used in the IP headers of packets sent from the CTP device to the IP network. For a mapping of ToS byte values to DSCP classes and settings, see "Providing QoS for CTP Bundles by Using Service Type Overview" on page 8. You do not need to set the ToS value to the same value on local and remote bundles.	Enter a number from 0 through 255.
Time to Live	Specifies the maximum number of router hops that a packet can traverse. The CTP device sets the TTL value in IP packets that it sends to the IP network. The IP network does not alter or optimize the packet routing based on the TTL setting. You do not need to set the same TTL value on local and remote ports.	Enter a number from 0 through 255.
Bundle Description	Specifies identifying information about the bundle.	Type a description for the bundle.

Related Documentation
- Providing QoS for CTP Bundles by Using Service Type Overview on page 8

Configuring Circuit Startup Parameters for CTP Bundles (CTPView)

This topic describes how to configure advanced options are related to circuit startup. Set these parameters to the same values on the local and remote CTP devices.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure circuit startup parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 8 on page 22.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 8: CTP Bundle Advanced Options Parameter Settings for Circuit Startup in CTPView

Field	Function	Your Action
OAM Packet Spacing	Specifies the number of OAM packets per second that the circuit sends to the remote CTP device.	Enter a number from 1 through 255.
OAM Packets for Sync	Specifies the number of OAM packets that the circuit must receive before the state moves from no synchronization to in synchronization.	Enter a number from 1 through 255.
OAM Packets for Sync Loss	Specifies the number of received OAM packets that the CTP device misses before the state of the circuit moves from in synchronization to no synchronization.	Enter a number from 1 through 255.
Consecutive Pkt Loss To Starvation	Specifies how many consecutive circuit packets the IP network must drop before the CTP device restarts the circuit. We recommend that you set the parameter to a larger value when the IP network uses packet-encrypting devices. These devices cause momentary interruption in packet flows when encryption keys are updated.	Enter a number from 1 to 64.
InSync Pkts After Starvation	Specifies the number of in-sequence packets the CTP device must receive after a starvation before the circuit transitions from in-sync to running.	Enter a number from 1 to 64.

Related Documentation

- Circuit Startup Process Overview on page 9

Configuring Circuit Startup Parameters for CTP Bundles (CTP Menu)

This topic describes how to configure advanced options are related to circuit startup. Set these parameters to the same values on the local and remote CTP devices.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure circuit startup parameters using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Configure options 4, 5, 6, 7, and 8 as described in Table 9 on page 23.

Table 9: CTP Bundle Advanced Options Parameter Settings for Circuit Startup in the CTP Menu

Field	Function	Your Action
Consecutive pkts loss to starve	Specifies how many consecutive circuit packets the IP network must drop before the CTP device restarts the circuit. We recommend that you set the parameter to a larger value when the IP network uses packet-encrypting devices. These devices cause momentary interruption in packet flows when encryption keys are updated.	Enter a number from 1 through 64.
In sequence pkts after starve	Specifies the number of in-sequence packets the CTP device must receive after a starvation before the circuit transitions from in-sync to running.	Enter a number from 1 through 64.
OAM Chan Rate (pkt/sec)	Specifies the number of OAM packets per second that the circuit sends to the remote CTP device.	Enter a number from 1 through 255.
OAM pkts for Sync	Specifies the number of OAM packets that the circuit must receive before the state moves from no synchronization to in synchronization.	Enter a number from 1 through 255.
OAM pkts for Sync Loss	Specifies the number of received OAM packets that the CTP device misses before the state of the circuit moves from in synchronization to no synchronization.	Enter a number from 1 through 255.

Related Documentation
- Circuit Startup Process Overview on page 9

Configuring the Direction of the Circuit (CTPView)

This topic describes how to configure the direction of the circuit.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure the direction of circuits created with the CPT bundle using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, configure the parameters described in Table 10 on page 24, and click **Click to Submit Bundle AND Port Changes**.

Table 10: CTP Bundle Circuit Direction Setting in CTPView

Field	Function	Your Action
Unidirectional Circuit	Specifies whether the circuit is unidirectional or bidirectional. If unidirectional, specify the direction of the circuit—source or destination.	Select one: • BI-DIRECTIONAL—Circuit is bidirectional. • SOURCE—Circuit is unidirectional, and this end of the circuit is the source. • DESTINATION—Circuit is unidirectional, and this end of the circuit is the destination.

Configuring the Direction of the Circuit (CTP Menu)

This topic describes how to configure the direction of the circuit.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure the direction of circuits created with the CPT bundle using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Configure option 10 as described in Table 11 on page 24.

Table 11: CTP Bundle Circuit Direction Setting in the CTP Menu

Field	Function	Your Action
Unidirectional circuit	Specifies whether the circuit is unidirectional or bidirectional. If unidirectional, specify the direction of the circuit—source or destination.	Select one: • Bidirectional circuit—Circuit is bidirectional. • Unidirectional circuit source—Circuit is unidirectional, and this end of the circuit is the source. • Unidirectional circuit destination—Circuit is unidirectional, and this end of the circuit is the destination.

Configuring Virtual IP Parameters for CTP Bundles (CTPView)

The virtual IP parameters allow you to use a separate IP address for each bundle and to use an address that is different from the IP address for the CTP device. If you configure the IP address on the:

- Same subnet as CTP IP address, you do not need a static route on the router.

- Different subnet as CTP IP address, you need a static route on the router.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Create a list of the virtual IP addresses that will be associated with the CTP device. To do so, select **Node > Maintenance > Configure** *CTP Device* **Virtual IPs**, and follow the instructions on the pane. You can create up to 56 virtual IP addresses.

    When you submit your new configuration, the CTP device reboots.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure virtual IP parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 12 on page 25.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 12: CTP Bundle Virtual IP Parameter Settings in CTPView

Field	Function	Your Action
Use Virtual IP	Specifies whether or not the bundle uses an address that is different from the IP address of the CTP device. The virtual IP address is used in the IP packet's Origination Address field, and is used for the circuit's data and OAM flow.	Select one: - DISABLED—Circuits created by this bundle use the IP address of the CTP device. - ENABLED—Circuits created by this bundle use an address that is different from the CTP device.
Virtual IP [IPv4 only]	Specifies the virtual IP address for circuits created by this bundle.	Enter the virtual IP address. At the remote end of the bundle, specify this IP address as the Remote Address of the bundle.

Configuring Virtual IP Parameters for CTP Bundles (CTP Menu)

The virtual IP parameters allow you to use a separate IP address for each bundle and to use an address that is different from the IP address for the CTP device. If you configure the IP address on the:

- Same subnet as CTP IP address, you do not need a static route on the router.

- Different subnet as CTP IP address, you need a static route on the router.

Before you begin:

- Create a list of the virtual IP addresses that will be associated with the CTP device. To do so, from the main menu select **Node Operations > Configure network settings > Virtual IP addresses**, and follow the onscreen instructions.

  When you submit your new configuration, the CTP device reboots.

- Disable the bundle before you modify the bundle options.

To configure virtual IP parameters for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Configure options 1 and 2 as described in Table 13 on page 26.

Table 13: CTP Bundle Virtual IP Parameter Settings in the CTP Menu

Field	Function	Your Action
Use virtual ip for port	Specifies whether or not the bundle uses an address that is different from the IP address of the CTP device. The virtual IP address is used in the IP packet's Origination Address field, and is used for the circuit's data and OAM flow.	Select one: - n (no)—Circuits created by this bundle use the IP address of the CTP device. - y (yes)—Circuits created by this bundle use an address that is different from the CTP device.
Virtual ip for port	Specifies the virtual IP address for circuits created by this bundle.	Select an IP address from the list displayed. At the remote end of the bundle, specify this IP address as the Remote Address of the bundle.

Configuring the Missing Packet Fill Pattern for CTP Bundles (CTPView)

This topic describes how to specify the fill pattern that the CPT device inserts when IP packets are dropped.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure the missing packet fill pattern for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 14 on page 27.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 14: CTP Bundle Missing Packet Fill Pattern Parameter Setting in CTPView

Field	Function	Your Action
Missing Packet Fill Pattern	Specifies the data that the CTP device inserts into the circuit bit stream when an IP packet is dropped. The number of bits inserted is equal to the number of bits in the missed packet. This data insertion method prevents a loss of bit count integrity to attached circuit devices and encryptors.	Enter two hexadecimal digits. You must enter a value other than ff. This field does not require the 0x characters.

Configuring the Missing Packet Fill Pattern for CTP Bundles (CTP Menu)

This topic describes how to specify the fill pattern that the CPT device inserts when IP packets are dropped.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure the missing packet fill pattern for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Configure option **3) Missing pkt fill pattern** as described in Table 15 on page 28.

Table 15: CTP Bundle Missing Packet Fill Pattern Parameter Setting in the CTP Menu

Field	Function	Your Action
Missing pkt fill pattern	Specifies the data that the CTP device inserts into the circuit bit stream when an IP packet is dropped. The number of bits inserted is equal to the number of bits in the missed packet. This data insertion method prevents a loss of bit count integrity to attached circuit devices and encryptors.	Enter two hexadecimal digits. You must enter a value other than ff. This field does not require the 0x characters.

Configuring IP Forwarding for CTP Bundles (CTPView)

There are two ways to set up CTP bundles for IP forwarding:

- Direct drive—Packets are forwarded directly between drivers on the local and remote CTP device. Use this method for simple port-to-port configurations. We recommend that you use this method with supervision from JTAC.

- Direct drive disabled—Packets are forwarded based on information in the kernel's IP stack.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure IP forwarding for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 16 on page 29.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 16: CTP Bundle IP Forwarding Parameter Settings in CTPView

Field	Function	Your Action
Direct Drive	Specifies whether the CTP bundle uses direct drive or IP tables to forward packets. If you are using route redundancy, port mirroring, or VLANs, you must disable direct drive and use IP tables.	Select one: • DISABLED—CTP uses the kernel's IP stack to forward packets. • ENABLED—CTP uses direct drive to forward packets.

Configuring IP Forwarding for CTP Bundles (CTP Menu)

There are two ways to set up CTP bundles for IP forwarding:

- Direct drive—Packets are forwarded directly between drivers on the local and remote CTP device. Use this method for simple port-to-port configurations. We recommend that you use this method with supervision from JTAC.

- Direct drive disabled—Packets are forwarded based on information in the kernel's IP stack.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure IP forwarding for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Configure option 13 as described in Table 17 on page 29.

Table 17: CTP Bundle IP Forwarding Settings in the CTP Menu

Field	Function	Your Action
Disable direct drive	Specifies whether the CTP bundle uses direct drive or IP tables to forward packets. If you are using route redundancy, port mirroring, or VLANs, you must disable direct drive and use IP tables.	Select one: • YES—CTP uses the kernel's IP stack to forward packets. • NO—CTP uses direct drive to forward packets.

Configuring Signaling for CTP Bundles (CTPView)

You can set input and output signals for the CTP device. Your settings should be based on the settings of the user equipment.

- Output signals—You can set output signals to a fixed value, or you can set them to inband so that the output signal state is based on the state of the input signal at the user equipment. Output signals that you can set vary depending on whether the bundle is configured as the DTE or the DCE:

  - DTE output signals:

    - DTR (data set ready)

    - RTS (request to send)

    - LL (local loopback)

    - RL (remote loopback)

  - DCE output signals:

    - DSR (data set ready)

    - CTS (clear to send)

    - DCD (data carrier detect)

    - TM (test mode)

- Input signals—You can set the input signals to either unused (ignored) or used to create a demand circuit. When configured for demand, packets created from the circuit are transferred across the IP network only when the signal lead is in the specified state for the circuit to be **Demand Call – Active**. When two or more leads are configured for demand, all configured leads must be in the **Demand Call – Active** state for the circuit to transfer packets across the IP network.

  Input signals that you can set vary depending on whether the bundle is configured as the DTE or the DCE:

  - DTE—Input signals are TM, CTS, DSR, DCD.

  - DCE—Input signals are RL, RTS, DTR, LL.

  The input state of each signal lead is encoded once in every transmitted IP packet. Thus the granularity of the transitions (frequency or changes) that can be transferred across the network is equal to the packet rate of the circuit.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure signaling for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 18 on page 31.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 18: CTP Bundle Signaling Settings in CTPView

Field	Function	Your Action
Signal Out - Output Delay	Specifies the output signaling delay in packets.	Select the number of packets: • 0 • 1 • 2 • 3
Signal Out - DSR/DTR	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DSR output signal. • DTE—DTR output signal.	Select one: • Fixed - Low—Signal is turned on. • Fixed - High—Signal is turned off. • InBand - From Remote RL—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • InBand - From Remote RTS—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • InBand - From Remote DTR—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • InBand - From Remote LL—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.

Table 18: CTP Bundle Signaling Settings in CTPView *(continued)*

Field	Function	Your Action
Signal Out - CTS/RTS	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—CTS output signal. • DTE—RTS output signal.	Select one: • Fixed - Low—Signal is turned on. • Fixed - High—Signal is turned off. • InBand - From Remote RL—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • InBand - From Remote RTS—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • InBand - From Remote DTR—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • InBand - From Remote LL—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.
Signal Out - DCD/LL	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DCD output signal. • DTE—LL output signal.	Select one: • Fixed - Low—Signal is turned on. • Fixed - High—Signal is turned off. • InBand - From Remote RL—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • InBand - From Remote RTS—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • InBand - From Remote DTR—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • InBand - From Remote LL—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.
Signal Out - TM/RL	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—TM output signal. • DTE—RL output signal.	Select one: • Fixed - Low—Signal is turned on. • Fixed - High—Signal is turned off. • InBand - From Remote RL—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • InBand - From Remote RTS—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • InBand - From Remote DTR—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • InBand - From Remote LL—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.

Table 18: CTP Bundle Signaling Settings in CTPView *(continued)*

Field	Function	Your Action
Signal In - RL/TM	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—RL input signal. • DTE—TM input signal.	Select one: • Unused—Input signals are ignored. • Demand Call - Active High—Signal is turned off. • Demand Call - Active Low—Signal is turned on.
Signal In - RTS/CTS	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—RTS input signal. • DTE—CTS input signal.	Select one: • Unused—Input signals are ignored. • Demand Call - Active High—Signal is turned off. • Demand Call - Active Low—Signal is turned on.
Signal In - DTR/DSR	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DTR input signal. • DTE—DSR input signal.	Select one: • Unused—Input signals are ignored. • Demand Call - Active High—Signal is turned off. • Demand Call - Active Low—Signal is turned on.
Signal In - LL/DCD	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—LL input signal. • DTE—DCD input signal.	Select one: • Unused—Input signals are ignored. • Demand Call - Active High—Signal is turned off. • Demand Call - Active Low—Signal is turned on.

Configuring Signaling for CTP Bundles (CTP Menu)

You can set input and output signals for the CTP device. Your settings should be based on the settings of the user equipment.

- Output signals—You can set output signals to a fixed value, or you can set them to inband so that the output signal state is based on the state of the input signal at the user equipment. Output signals that you can set vary depending on whether the bundle is configured as the DTE or the DCE:

  - DTE output signals:

    - DTR (data set ready)

    - RTS (request to send)

    - LL (local loopback)

    - RL (remote loopback)

  - DCE output signals:

    - DSR (data set ready)

    - CTS (clear to send)

    - DCD (data carrier detect)

    - TM (test mode)

- Input signals—You can set the input signals to either unused (ignored) or used to create a demand circuit. When configured for demand, packets created from the circuit are transferred across the IP network only when the signal lead is in the specified state for the circuit to be **Demand Call – Active**. When two or more leads are configured for demand, all configured leads must be in the **Demand Call – Active** state for the circuit to transfer packets across the IP network.

  Input signals that you can set vary depending on whether the bundle is configured as the DTE or the DCE:

  - DTE—Input signals are TM, CTS, DSR, DCD.

  - DCE—Input signals are RL, RTS, DTR, LL.

  The input state of each signal lead is encoded once in every transmitted IP packet. Thus the granularity of the transitions (frequency or changes) that can be transferred across the network is equal to the packet rate of the circuit.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure signaling for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **2) Config**.

5. Select **10) Advanced Options**.

6. Select **11) Signaling Config**.

7. Configure the options as described in Table 19 on page 35.

Table 19: CTP Bundle Signaling Parameter Settings in the CTP Menu

Field	Function	Your Action
DSR (output) or DTR (output)	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DSR output signal. • DTE—DTR output signal.	Select one: • 0) Fixed • 1) In-Band If you chose Fixed, select: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off. If you chose In-Band, select a remote signal source: • 0) RL from rem DCE, TM from rem DTE—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • 1) RTS from rem DCE, CTS from rem DTE—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • 2) DTR from rem DCE, DSR from rem DTE—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • 3) LL from rem DCE, DCD from rem DTE—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.

Table 19: CTP Bundle Signaling Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
CTS (output) or RTS (output)	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—CTS output signal. • DTE—RTS output signal.	Select one: • 0) Fixed • 1) In-Band If you chose Fixed, select: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off. If you chose In-Band, select a remote signal source: • 0) RL from rem DCE, TM from rem DTE—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • 1) RTS from rem DCE, CTS from rem DTE—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • 2) DTR from rem DCE, DSR from rem DTE—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • 3) LL from rem DCE, DCD from rem DTE—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.
DCD (output) or LL (output)	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DCD output signal. • DTE—LL output signal.	Select one: • 0) Fixed • 1) In-Band If you chose Fixed, select: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off. If you chose In-Band, select a remote signal source: • 0) RL from rem DCE, TM from rem DTE—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • 1) RTS from rem DCE, CTS from rem DTE—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • 2) DTR from rem DCE, DSR from rem DTE—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • 3) LL from rem DCE, DCD from rem DTE—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.

Table 19: CTP Bundle Signaling Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
TM (output) or RL (output)	Specifies the output signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—TM output signal. • DTE—RL output signal.	Select one: • 0) Fixed • 1) In-Band If you chose Fixed, select: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off. If you chose In-Band, select a remote signal source: • 0) RL from rem DCE, TM from rem DTE—Output signal is based on the state of the RL input signal from the DCE or the TM signal from the DTE. • 1) RTS from rem DCE, CTS from rem DTE—Output signal is based on the state of the RTS input signal from the DCE or the CTS signal from the DTE. • 2) DTR from rem DCE, DSR from rem DTE—Output signal is based on the state of the DTR input signal from the DCE or the DSR signal from the DTE. • 3) LL from rem DCE, DCD from rem DTE—Output signal is based on the state of the LL input signal from the DCE or the DCD signal from the DTE.
RL (input) or TM (input)	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—RL input signal. • DTE—TM input signal.	Select one: • 0) Unused—Input signals are ignored. • 1) Demand call. If you chose Demand call, select an input signal value: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off.
RTS (input) or CTS (input)	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—RTS input signal. • DTE—CTS input signal.	Select one: • 0) Unused—Input signals are ignored. • 1) Demand call. If you chose Demand call, select an input signal value: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off.
DTR (input) or DSR (input)	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—DTR input signal. • DTE—DSR input signal.	Select one: • 0) Unused—Input signals are ignored. • 1) Demand call. If you chose Demand call, select an input signal value: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off.

Table 19: CTP Bundle Signaling Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
LL (input) or DCD (input)	Specifies the input signal depending on whether the bundle is configured as the DCE or the DTE: • DCE—LL input signal. • DTE—DCD input signal.	Select one: • 0) Unused—Input signals are ignored. • 1) Demand call. If you chose Demand call, select an input signal value: • 0=Space=Low=On—Signal is turned on. • 1=Mark=High=Off—Signal is turned off.
Output delay (pkts)	Specifies the output signaling delay in packets.	Enter a number from 0 through 3.

Configuring Serial Port Parameters for CTP Bundles (CTPView)

This topic describes how to configure port parameters for serial interfaces.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure serial port parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options** configure the parameters described in Table 20 on page 38.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 20: CTP Bundle Serial Port Parameter Settings in CTPView

Field	Function	Your Action
Port Description	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
I/F Mode	Specifies that the interface is connected to a data communication equipment (DCE) device or to a data terminal equipment (DTE) device.	Select one: • DCE—The interface is connected to a DCE device. • DTE—The interface is connected to a DTE device.

Table 20: CTP Bundle Serial Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Serial Encoding	Specifies the serial encoding method used on this bundle.	Select one: • NRZ—Nonreturn to zero (NRZ) line encoding. • ISOCH—Isochronous encoding. Isochronous encoding does not provide or embed the clock in the data. • CDI—Conditioned diphase. Conditioned diphase encoding recovers and embeds the clock in the data signal. • MSTAR—MilStar encoding. • TRANS—Transparent encoding. See "Configuring Transparent Encoding for CTP Bundles (CTPView)" on page 43 • TDM—Additional data is interleaved with the port's serial data. This option is used on TDM/TDC high-speed ports and is available only on even numbered ports on a CTP 2000 serial module. See "Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTPView)" on page 47.
TDM Function	This option is used only for TDM/TDC operation. See "Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTPView)" on page 47.	
TDM Rate	This option is used only for TDM/TDC operation. See "Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTPView)" on page 47.	
I/F Type	Specifies the electrical standard used on the serial interface.	Select one: • EIA-530 • EIA-530A • RS-232 • V.35 • OFF—Do not set the interface type to OFF.

Table 20: CTP Bundle Serial Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Port Speed	Specifies the speed of the port. In networks without bandwidth constraints, we recommend a multiple of 10. The port speed recommendations vary according to encoding type: • For transparent mode circuits, the port speed is the sample rate for user data. Therefore, port rate should be a multiple of the user data rate. • For CDI or ISOCH circuits, the port speed is limited to 1024 Kbps. The port speed also varies depending on hardware: • CTP2000 devices cannot have an aggregate port rate greater than 114.688 Mbps.	Enter a number from 0.00100 through 12288.00000 KHz.

Configuring Serial Port Parameters for CTP Bundles (CTP Menu)

This topic describes how to configure port parameters for serial interfaces.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure serial port parameters for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Configure the options as described in Table 21 on page 40.

Table 21: CTP Bundle Serial Port Parameter Settings in the CTP Menu

Field	Function	Your Action
Port descriptor text	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]

Table 21: CTP Bundle Serial Port Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Interface	Displays the menu used to configure the interface type, mode, and encoding.	Select **2) Interface**.
Type	Specifies the electrical standard used on the serial interface.	Select one: • OFF—Do not set the interface type to OFF. • EIA-530 • EIA-530A • RS-232 • V.35
Mode	Specifies that the interface is connected to a data communication equipment (DCE) device or to a data terminal equipment (DTE) device.	Select one: • DCE—The interface is connected to a DCE device. • DTE—The interface is connected to a DTE device.
Encoding	Specifies the serial encoding method used on this bundle.	Select one: • NRZ—nonreturn to zero (NRZ) line encoding. • ISOCH—isochronous encoding. Isochronous encoding does not provide or embed the clock in the data. • CDI—conditioned diphase. Conditioned diphase encoding recovers and embeds the clock in the data signal. • MSTAR—MilStar encoding. • TRANS—Transparent encoding. See "Configuring Transparent Encoding for CTP Bundles (CTP Menu)" on page 45. • TDM—Additional data is interleaved with the port's serial data. This option is used on TDM/TDC high-speed ports and is available only on even numbered ports on a CTP 2000 serial module. See "Configuring Bundle Pairs for TDM/TDC Operation (CTP Menu)" on page 49.

Table 21: CTP Bundle Serial Port Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Enter Synthesized port rate (KHz)	Specifies the speed of the port. In networks without bandwidth constraints, we recommend a multiple of 10. The port speed recommendations vary according to encoding type: • For transparent mode circuits, the port speed is the sample rate for user data. Therefore, the port rate should be a multiple of the user data rate. • For CDI or ISOCH circuits, the port speed is limited to 1024 Kbps. The port speed also varies depending on hardware: • CTP2000 devices cannot have an aggregate port rate greater than 114.688 Mbps.	Enter a number from 0.00100 through 12288.00000 KHz.
Enable adaptive clocking?	Specifies whether adaptive clocking is enabled for this circuit. If both end nodes are not locked to a clock reference, we recommend that you enable one end (not both) for adaptive clocking Appears only if you select ISOCH, CDI, MSTAR, TRANS, or TDM encoding.	Specify y (yes) or n (no).
Initialize adaptive clocking parameters? y[n]: y	If you enabled adaptive clocking, specifies whether or not to initialize adaptive clocking parameters to their default values, which depend on port speed, packet size, and buffering parameters set on the bundle. We recommend the following settings: • If you are configuring the bundle for adaptive clocking for the first time, enter **y**. • If you have previously configured the bundle to optimize adaptive clocking for this network, enter **n**.	Specify y (yes) or n (no).
TDC Clk/Data on port N+1	This option is used for TDM/TDC operation. See "Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTP Menu)" on page 49.	
TDM rates	This option is used for TDM/TDC operation. See "Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTP Menu)" on page 49.	

Configuring Transparent Encoding for CTP Bundles (CTPView)

This topic describes how to configure transparent encoding for CTP bundles. You must configure transparent encoding on each end of the circuit.

To reduce transport latency, we recommend that you use the smallest buffer values possible for networks.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure transparent encoding parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options**, set **Serial Encoding** to **TRANS**.

5. Configure the **Port Speed** and **Clock Cfg** and described in Table 22 on page 43.

6. Under **Port Options**, place a check mark in the **Advanced Options Show** check box to display advanced parameters, and configure the parameters described in Table 22 on page 43.

7. Click **Click to Submit Bundle AND Port Changes**.

Table 22: CTP Bundle Transparent Encoding Parameter Settings in CTPView

Field	Function	Your Action
Port Speed	Specifies the sample rate for user data. The port rate should be a multiple of the user data rate.	Enter a number from 0.00100 through 12288.00000 kHz.

Table 22: CTP Bundle Transparent Encoding Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Clock Cfg	Specifies the clocking method used for the transparent circuit. To prevent errors in transport, both ends of a circuit must be synchronized with each other. You can accomplish this by either locking each end of the circuit to a common reference or by enabling adaptive clocking at one end of a circuit.	Select one: • TRANS - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure TRANS - Slave End at the remote end. • TRANS - Slave End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. If you specify slave end, the adaptive clocking configuration appears. See "Configuring Adaptive Clocking for CTP Bundles (CTPView)" on page 77. • Custom—The custom clocking configuration is used. See "Configuring Custom Clocking for CTP Bundles (CTPView)" on page 71.
16-Bit Jitter Absorption FIFO	Enables or disables the phase correction FIFO buffer. This FIFO buffer aligns the clock and data phase relationship on a TRANS encoded circuit in which the clock travels in one direction and the data travels in the opposite direction. Enable this FIFO buffer at one end of the circuit, but not at both ends.	Select one: • DISABLED • ENABLED
Invert FIFO Write Clock	Appears only if you enable the 16-Bit Jitter Absorption FIFO buffer. Specifies whether or not to invert the FIFO buffer write clock.	Select one: • DISABLED • ENABLED
Invert FIFO Read Clock	Appears only if you enable the 16-Bit Jitter Absorption FIFO buffer. Specifies whether or not to invert the FIFO read clock.	Select one: • DISABLED • ENABLED

Table 22: CTP Bundle Transparent Encoding Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Use ST Lead (instead of RTS/CTS)	Appears only if you enable the 16-Bit Jitter Absorption FIFO buffer . Specifies that the circuit uses the ST lead instead of the RTS and CTS leads to sample local SD/TT/RTS/DTR signals and forward them to the remote RD/RT/CTS/DSR signals. The RTS and DTR signals are subject to additional delay and jitter because they are signaling leads. On higher-speed circuits, the delay and jitter on these paths make the signal choices nonoptimal. Therefore, you can specify that the circuit uses the ST lead instead of the RTS and CTS leads, which will not have this delay and jitter.	Select one: • DISABLED • INPUT—Enables the ST lead and specifies that the ST lead is an input lead. • OUTPUT—Enables the ST lead and specifies that the ST lead is an output lead.

Related
Documentation

- Transparent Encoding Applications and Support Overview on page 10

- How Basic Transparent Encoding Works on page 10

- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11

- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13

Configuring Transparent Encoding for CTP Bundles (CTP Menu)

This topic describes how to configure transparent encoding for CTP bundles. You must configure transparent encoding on each end of the circuit.

To reduce transport latency, we recommend that you use the smallest buffer values possible for networks.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure transparent encoding using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **2) Interface**.

6. Set **Mode** to **DCE** and set **Encoding** to **TRANS**.

7. Follow the onscreen instructions to configure the options as described in Table 23 on page 46.

Table 23: Transparent Mode Parameter Settings in the CTP Menu

Field	Function	Your Action
Enter Synthesized port rate (KHz)	Specifies the speed of the port. For transparent mode circuits, the port speed is the sample rate for user data. Therefore, the port rate should be a multiple of the user data rate. In networks without bandwidth constraints, we recommend a multiple of 10.	Enter a number from 0.00100 through 1024.000000 KHz.
Enable adaptive clocking?	Specifies whether adaptive clocking is enabled for this circuit. If both end nodes are not locked to a clock reference, we recommend that you enable one end (not both) for adaptive clocking	Specify y (yes) or n (no).
Initialize adaptive clocking parameters? y[n]: y	If you enabled adaptive clocking, specifies whether or not to initialize adaptive clocking parameters to their default values, which depend on port speed, packet size, and buffering parameters set on the bundle. We recommend the following settings: • If you are configuring the bundle for adaptive clocking for the first time, enter **y**. • If you have previously configured the bundle to optimize adaptive clocking for this network, enter **n**.	Specify y (yes) or n (no).
Enable 16 bit FIFO?	Enables or disables the phase-correction FIFO buffer. This FIFO buffer aligns the clock and data phase relationship on a TRANS encoded circuit in which the clock travels in one direction and the data travels in the opposite direction. Enable this FIFO buffer at one end of the circuit, but not at both ends.	Specify y (yes) or n (no).
Invert FIFO Write clock?	Appears only if you enable the 16-Bit Jitter Absorption FIFO buffer. Specifies whether or not to invert the FIFO write clock.	Specify y (yes) or n (no).
Invert FIFO Read clock?	Appears only if you enable the 16-Bit Jitter Absorption FIFO buffer. Specifies whether or not to invert the FIFO read clock.	Specify y (yes) or n (no).
Use ST lead (instead of RTS/CTS)?	Specifies that the circuit uses the ST lead instead of the RTS and CTS leads to sample local SD/TT/RTS/DTR signals and forward them to the remote RD/RT/CTS/DSR signals. The RTS and DTR leads are subject to additional delay and jitter because they are signaling leads. On higher-speed circuits, the delay and jitter on these paths make the signal choices nonoptimal. Therefore, you can specify that the circuit uses the ST lead instead of the RTS and CTS leads, which will not have this delay and jitter.	Specify y (yes) or n (no).
Is ST an input?	If you specify that the circuit uses the ST lead instead of the RTS and CTS leads, you can specify if the ST lead is an input lead.	Specify y (yes) or n (no)

Related
Documentation

- Transparent Encoding Applications and Support Overview on page 10

- How Basic Transparent Encoding Works on page 10

- Using Phase-Correction FIFO Buffer with Transparent Encoding on page 11

- Using Send Timing (ST) Clocking for Higher Speed Circuits with Transparent Encoding on page 13

Configuring Bundle Pairs for TDM/TDC Operation (CTPView)

The TDM/TDC feature is supported on CTP2000 serial interfaces. TDM/TDC operation requires both a low-speed bundle and a high-speed bundle. This topic describes how to configure the high-speed and low-speed bundle port options when used for TDM/TDC bundles using CTPView.

1. Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTPView) on page 47

2. Configuring the Low-Speed CTP Bundle for TDM/TDC Operation (CTPView) on page 48

Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTPView)

Configure the high-speed bundle on an even-numbered port.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure a high-speed CTP bundle for TDM/TDC operation using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify. You must configure the bundle on an even-numbered port.

4. Under **Port Options**, configure the parameters described in Table 24 on page 47, and click **Click to Submit Bundle AND Port Changes**.

5. Configure the rest of the bundle as you normally would.

Table 24: High-Speed CTP Bundle Parameters for TDM/TDC Operation in CTPView

Field	Function	Your Action
Serial Encoding	Specifies the serial encoding method used on this bundle.	Specify TDM as the encoding method.

Table 24: High-Speed CTP Bundle Parameters for TDM/TDC Operation in CTPView *(continued)*

Field	Function	Your Action
TDM Function	Specifies the TDM function. Currently only one TDM function issupported. This option is available only on even numbered ports on a CTP2000 serial module, and when the serial encoding parameter is set to TDM.	Select the following: TDC Clk/Data on port N+1—Oversamples the incoming clock (TT) and data (SD) from the adjacent port above this one (N+1) at this port's clock rate, and embeds it in its data. At the remote end of the network, the embedded circuit data is recovered and exits the node on port N+1 as RT and RD outputs. Because of the direct interleaving of two ports' data, TDC is maintained between these two ports with an accuracy of one bit time at this port's data rate.
TDM Rate	Specifies the number of bits out of 32 that are used for the TDM function (and not for local serial port data). Keep in mind the following when you configure the TDM rate: • If the rate is too low, the bundle may not carry the low-speed data because of insufficient oversampling. • If the rate is too high, the low-speed circuit will still run, but will likely use more bandwidth than necessary. • You may want to configure a higher rate to increase the TDM rate to reduce jitter on the the low-speed clock and data signals.	Select one: • 16 • 8 • 4 • 2

Configuring the Low-Speed CTP Bundle for TDM/TDC Operation (CTPView)

Configure the low-speed bundle on an odd-numbered port that is one port higher than the corresponding high-speed bundle.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure the low-speed CTP bundle using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Set the **Clock Cfg** to **TDM/TDC Interleaved Slow Port**.

> NOTE: Do not configure any other bundle parameters.

Configuring Bundle Pairs for TDM/TDC Operation (CTP Menu)

The TDM/TDC feature is supported on CTP2000 serial interfaces. TDM/TDC operation requires both a low-speed bundle and a high-speed bundle. This topic describes how to configure the high-speed and low-speed bundle port options when used for TDM/TDC bundles using CTP Menu.

1. Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTP Menu) on page 49

2. Configuring the Low-Speed CTP Bundle for TDM/TDC Operation (CTP Menu) on page 50

Configuring the High-Speed CTP Bundle for TDM/TDC Operation (CTP Menu)

Configure the high-speed bundle on an even-numbered port.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure a high-speed CTP bundle for TDM/TDC operation using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list. You must configure the bundle on an even-numbered port.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **2) Interface**.

6. Select **3) Encoding**.

7. Select **5) TDM**.

8. Follow the onscreen instructions to configure the parameters in Table 25 on page 50.

9. Configure the rest of the bundle as you normally would.

Table 25: High-Speed CTP Bundle Parameters for TDM/TDC Operation in the CTP Menu

Field	Function	Your Action
TDC Clk/Data on port N+1	Specifies that the TDM function is TDC Clk/Data on port N+1. This option is available only on even numbered ports on a CTP2000 serial module, and when the serial encoding parameter is set to TDM. TDC Clk/Data on port N+1 oversamples the incoming clock (TT) and data (SD) from the adjacent port above this one (N+1) at this port's clock rate, and embeds it in its data. At the remote end of the network, the embedded circuit data is recovered and exits the node on port N+1 as RT and RD outputs. Because of the direct interleaving of two ports' data, TDC is maintained between these two ports with an accuracy of one bit time at this port's data rate.	Press Enter.
TDM rates	Specifies the number of bits out of 32 that are used for the TDM function (and not for local serial port data). Appears only if you selected TDM encoding. Keep in mind the following when you configure the TDM rate: • If the rate is too low, the bundle may not carry the low-speed data because of insufficient oversampling. • If the rate is too high, the low-speed circuit will still run, but will likely use more bandwidth than necessary. • You may want to configure a higher rate to increase the TDM rate to reduce jitter on the low-speed clock and data signals.	Select one: • 16 • 8 • 4 • 2

Configuring the Low-Speed CTP Bundle for TDM/TDC Operation (CTP Menu)

Configure the low-speed bundle on an odd-numbered port that is one higher than the corresponding high-speed bundle.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure the low-speed CTP bundle using CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list. The bundle must be configured on an even-numbered port.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **3) Clock Config**.

6. Select **1) Port Clock Config**.

7. Select **8) TDM/TDC - Interleaved Slow Port**.

> **NOTE:** Do not configure any other bundle parameters.

Configuring T1 and E1 Port Parameters for CTP Bundles (CTPView)

This topic describes how to configure port parameters for T1/E1 interfaces.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure T1 and E1 port parameters for CTP bundles using CTPView:

1. In the side pane, select **Bundle > Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options**, configure the parameters described in Table 26 on page 51.

   The options vary depending on whether the bundle is T1 or E1 and whether fractional T1 or E1 is configured.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 26: CTP Bundle T1 and E1 Port Parameter Settings in CTPView

Field	Function	Your Action
Port Description	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
I/F Type	Specifies the daughter card as the interface type.	Select DCARD.
T1/E1 Choice	Specifies the type of interface.	Select one: • T1 • E1
Fractional	Specifies whether the card is fractional.	Select one: • DISABLED—Card is not fractional. • ENABLED—Card is fractional.
T1 Line Coding	For T1 interfaces, specifies the T1 encoding method used on this bundle.	Select one: • B8ZS • AMI

Table 26: CTP Bundle T1 and E1 Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Framing Mode	For fractional T1, ESF is only option supported. With ESF framing, the frame synchronization, data link, and CRC framing bits are passed across the IP network untouched.	
Fractional Frame Transport	For fractional T1, enable or disable fractional frame transport.	Select one: • Frame Transport—Framing bit is transported along with data, which results in data alignment with the frame. • No Frame Transport—Framing bit is not transported.
E1 Connector Type	For E1 interfaces, configure the termination to work with either coax or RJ-48.	Select one: • RJ48 • COAX
Number of Channels	Specifies the number of fractional T1 or E1 channels to transport.	For T1, select a number from 1 through 24. For E1, select a number from 1 through 31.
Signaling	Specifies the signaling method used for fractional E1.	Select one: • CSS—Common Channel Signaling. The common channel carries data messages that convey signaling for the circuits between two devices. • CAS—Channel associated signaling. Each traffic channel has a dedicated signalling channel (channel 16).

Table 26: CTP Bundle T1 and E1 Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Clock Cfg	Specifies the type of clocking for the port.	Select one: • CTP is Clock Source—The PBX either returns the clock received from the CTP device, or it returns a clock that is traceable to the same source as the CTP node clock reference. You typically use this configuration when you configure the CTP device with a clock reference input. • CTP is Looped Timed—The PBX provides the clock, and the CTP device returns the same clock to the PBX. You typically use this configuration when the PBX has the more accurate clock source. You can configure the far end of the circuit with adaptive clocking to recover this clock if necessary. • CTP is Clock Source – Adap—The PBX returns the clock received from the CTP device, and the CTP device uses the adaptive recovered clock. You typically use this configuration when the CTP device does not have a reference input and the PBX typically requires clock from the distant PBX.

Configuring T1 and E1 Port Parameters for CTP Bundles (CTP Menu)

This topic describes how to configure port parameters for T1/E1 interfaces.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure port parameters for T1/E1 daughter cards for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list. The bundle port must have a T1/E1 daughter card installed.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **2) Interface**.

6. Select **1) Type**, and set the type to **Optional Interface: T1/E1**.

7. Follow the onscreen instructions, and configure the options as described in Table 27 on page 54.

   The options vary depending on whether the bundle is T1 or E1 and whether fractional T1 or E1 is configured.

8. To configure clocking for the port, select **3) Clock Config**, and configure the Clock Config option as described in Table 27 on page 54.

Table 27: CTP Bundle T1/E1 Port Parameter Settings in the CTP Menu

Field	Function	Your Action
Port descriptor	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
Type	Specifies the type of interface.	Select one: • T1 • E1 • Fractional T1 • Fractional E1
Option (for T1)	Specifies the T1 encoding method used on this bundle.	Select one: • B8ZS • AMI
Option (for E1)	For E1 interfaces, configure the termination to work with either coax or RJ-48.	Select one: • RJ48 • COAX
Clock synthesizer	The following clock synthesizer settings are set by the software, and you cannot change them: • For T1, the clock synthesizer is set to 1544 KHz. • For E1 the clock synthesizer is set to 2048 KHz.	
Fractional channels	Specifies the number of fractional T1 or E1 channels to transport.	For T1, select a number from 1 through 24. For E1, select a number from 1 through 31.

Table 27: CTP Bundle T1/E1 Port Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Fractional Frame Transport	For fractional T1, enables or disables fractional frame transport.	Select one: • y (yes)—Frame Transport—Framing bit is transported along with data, which results in data alignment with the frame. • n (no)t—Framing bit is not transported.
CAS support	Specifies the signaling method used for fractional E1.	Select one: • n (no)—Common channel signaling (CSS) is used. The common channel carries data messages that convey signaling for the circuits between two devices. • y (yes)—Channel associated signaling (CAS) is used. Each traffic channel has a dedicated signaling channel (channel 16).
Clock Config	Specifies the type of clocking for the port.	Select one: • CTP is Clock Source—The PBX either returns the clock received from the CTP device, or it returns a clock that is traceable to the same source as the CTP node clock reference. You typically use this configuration when you configure the CTP device with a clock reference input. • CTP is Loop Timed—The PBX provides the clock, and the CTP device returns the same clock to the PBX. You typically use this configuration when the PBX has the more accurate clock source. You can configure the far end of the circuit with adaptive clocking to recover this clock if necessary. • CTP is Clock Source (Adaptive End)—The PBX returns the clock received from the CTP device, and the CTP device uses the adaptive recovered clock. You typically use this configuration when the CTP device does not have a reference input and the PBX typically requires clock from the distant PBX.

Configuring 4WTO Port Parameters for CTP Bundles (CTPView)

For CTP bundles, you can configure a 4WTO daughter card installed on a serial interface module.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure port parameters for 4WTO daughter cards for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, place a check mark in the Advanced Options show check box to display advanced parameters, and configure the parameters described in Table 28 on page 56.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 28: CTP Bundle 4WTO Port Parameter Settings in CTPView

Field	Function	Your Action
Port Description	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
I/F Mode	Specifies that the interface is connected to a data communication equipment (DCE) device.	Select DCE.
I/F Type	Specifies the daughter card as the interface type.	Select DCARD.
Channel Options	Specifies the voice channel or channels to enable on the 4WTO daughter card. Each CTP port with the daughter card installed can support either one or two channels.	Select one: - Channel 0—Enables only channel 0. - Channel 1—Enables only channel 1. - Dual Channel—Enables both channel 0 and channel 1.

Table 28: CTP Bundle 4WTO Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Output Level	Specifies the output level for the 4WTO daughter card. Note the following information about the values: • 0—Gain is 2:3 (signal is attenuated 33%, or 1.8 dB). • 25—Unity gain, which means there is no attenuation or gain. • 255—Gain is 4:1 (signal is amplified 400% or 6 dB). Intermediate values are derived with linear interpolation. The actual gain depends on the impedance of the attached device.	Enter a number from 0 through 255.
Input Level	Specifies the input level for the 4WTO daughter card. Note the following information about the values: • 0—Setting the value to 0 attenuates the signal 33% (1.8 dB). • 25—default and is the unity value (no attenuation or gain). • 255—Setting the value to 255 amplifies the signal 400% (6 dB). Note the following information about the values: • 0—Gain is 2:3 (signal is attenuated 33%, or 1.8 dB). • 25—Unity gain, which means there is no attenuation or gain. • 255—Gain is 4:1 (signal is amplified 400% or 6 dB). Intermediate values are derived with linear interpolation. The actual gain depends on the impedance of the attached device.	Enter a number from 0 through 255.
Port Speed		Enter a number from 0.00100 through 12288.00000 KHz.

Table 28: CTP Bundle 4WTO Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Talk Squelch	Enables or disables the active squelch function on the circuit. If enabled, specifies whether the squelch is active or inactive. The squelch function gates local audio output when DSR-A (channel 1) or RTS-A (channel 0) inputs are active/inactive.	Select one: • DISABLED—Disables the active squelch function on the circuit • ENABLED/ACTIVE—Squelch input is grounded, and analog output is disabled. • ENABLED/INACTIVE—No signal is applied to the squelch input. Input is open, and analog output is possible.
Clock Cfg	Specifies the type of clocking for the port. To prevent voice channels from generating occasional noise bursts caused by unsynchronized nodes, we recommend that you configure one end of the voice port (not both) for adaptive clocking or lock both ends to clock references.	Select one: • Custom—Custom clocking configuration is used. • Voice/IRIG-B Master End—This end of the circuit generates a clock signal and sends it to the remote end. • Voice/IRIG-B Slave End—This end of the circuit receives the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link.

Configuring 4WTO Port Parameters for CTP Bundles (CTP Menu)

For CTP bundles, you can configure a 4WTO daughter card installed on a serial interface module.

You do not need to configure port speed and clocking for the analog 4WTO interface. Selecting this interface causes the port speed and clocking to be automatically configured.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure port parameters for 4WTO daughter cards for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list. The bundle port must have a 4WTO daughter card installed.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **2) Interface**.

6. Select **1) Type**, and set the type to **Optional Interface: Voice 4W/TO**.

7. Follow the onscreen instructions.

   To prevent voice channels from generating occasional noise bursts caused by unsynchronized nodes, we recommend that you either enable adaptive clocking on one end of the voice port (not both) or lock both ends of the voice port to clock references.

8. Configure the options as described in Table 29 on page 59.

Table 29: CTP Bundle 4WTO Port Parameter Settings in the CTP Menu

Field	Function	Your Action
Dual Channel	Each CTP port with the daughter card installed can support either one or two channels. Enables or disables the use of both channels.	Select one: • Disabled—Only one channel can be enabled. • Enabled—Channels 1 and 2 are enabled.
Enabled Channel	If Dual Channel is disabled, specify which voice channel you want to enable on the 4WTO daughter card.	Enter either 0 or 1.
Input Level	Specifies the input level for the 4WTO daughter card. Note the following information about the values: • 0—Gain is 2:3 (signal is attenuated 33%, or 1.8 dB). • 25—Unity gain, which means there is no attenuation or gain. • 255—Gain is 4:1 (signal is amplified 400% or 6 dB). Intermediate values are derived with linear interpolation. The actual gain depends on the impedance of the attached device.	Enter a number from 0 through 255.

Table 29: CTP Bundle 4WTO Port Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Output Level	Specifies the output level for the 4WTO daughter card. Note the following information about the values: • 0—Gain is 2:3 (signal is attenuated 33%, or 1.8 dB). • 25—Unity gain, which means there is no attenuation or gain. • 255—Gain is 4:1 (signal is amplified 400% or 6 dB). Intermediate values are derived with linear interpolation. The actual gain depends on the impedance of the attached device.	Enter a number from 0 through 255.
Talk Squelch	Enables or disables the active squelch function on the circuit. If enabled, specifies whether the squelch is active or inactive. The squelch function gates local audio output when DSR-A (channel 1) or RTS-A (channel 0) inputs are active/inactive.	Select one: • DISABLED—Disables the active squelch function on the circuit • ENABLED/ACTIVE—Squelch input is grounded, and analog output is disabled. • ENABLED/INACTIVE—No signal is applied to the squelch input. Input is open, and analog output is possible.
Clock Config	Specifies the type of clocking for the port. To prevent voice channels from generating occasional noise bursts caused by unsynchronized nodes, we recommend that you configure one end of the voice port (not both) for adaptive clocking or lock both ends to clock references.	Select one: • 4WTO/IRIG - Master End—This end of the circuit generates a clock signal and sends it to the remote end. • 4WTO/IRIG - Adaptive End—This end of the circuit receives the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.

Configuring IRIG-B Port Parameters for CTP Bundles (CTPView)

This topic describes how to configure port parameters for IRIG-B daughter cards.

Adaptive clocking is configured by default on IRIG-B bundles, and the packet size is set to 64 bytes. The packet size combined with the default data rate of 16 Kbps, produces a packet rate of 32 pps, which is a good packet rate for adaptive clocking.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure IRIG-B port parameters using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Bundle Options**, configure the parameters described in Table 30 on page 61, and click **Click to Submit Bundle AND Port Changes**.

Table 30: CTP Bundle IRIG-B Port Parameter Settings in CTPView

Field	Function	Your Action
Port Description	Specifies a description for the port.	Enter a description of up to 62 alphanumeric characters. Do not use the following characters: (; ' ")]
I/F Type	Specifies the daughter card as the interface type.	Select DCARD.
Port Speed	Specifies the data rate on the IP connection. Unless network bandwidth is at a premium, we do not recommend that you change this value from the default of 16,000 bps.	Enter a number from 1.000 through 25.500 KHz. The port speed must be a multiple of 100 bps.
Direction	Specifies the direction of the circuit. Although the IP circuit connection through the network is full duplex, an IRIG-B circuit is actually a simplex application, and the daughter card can operate only in Rx or Tx mode and not both at the same time.	Select one: - RX—The end of the circuit that recovers IRIG-B from the attached cable and generates IP packets toward the network. - TX—The end of the circuit that accepts IP packets, extracts the IRIG-B data codes, and transmits IRIG-B signaling output onto the cable.

Table 30: CTP Bundle IRIG-B Port Parameter Settings in CTPView *(continued)*

Field	Function	Your Action
Output High Volts Level	This option appears only if you set the direction of the port to Tx. Specifies the high output level, which is measured in peak-to-peak voltage. This setting is based on a 50 ohm termination	Enter a number from 0.00 through 7.85 volts peak-to-peak.
Output Low Volts Level	This option appears only if you set the direction of the port to Tx. Specifies the low output level, which is measured in peak-to-peak voltage. This setting is based on a 50 ohm termination.	Enter a number from 0.00 through 7.85 volts peak-to-peak.
Clock Cfg	Specifies the type of clocking for the bundle.	Select one: • Custom—The custom clocking configuration is used. • Voice/IRIG-B Master End—This end of the circuit generates a clock signal and sends it to the remote end. • Voice/IRIG-B Slave End—This end of the circuit receives the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link.

Configuring IRIG-B Port Parameters for CTP Bundles (CTP Menu)

This topic describes how to configure port parameters for IRIG-B daughter cards.

Adaptive clocking is configured by default on IRIG-B bundles, and the packet size is set to 64 bytes. The packet size combined with the default data rate of 16 Kbps, produces a packet rate of 32 pps, which is a good packet rate for adaptive clocking.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure IRIG-B port parameters using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list. The bundle port must have an IRIG-B daughter card installed.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **2) Interface**.

6. Select **1) Type**, and set the type to **Optional Interface: IRIG-B**.

7. Follow the onscreen instructions, and configure the options as described in Table 31 on page 63.

   The options vary depending on whether the bundle is T1 or E1 and whether fractional T1 or E1 is configured.

8. To configure clocking for the port, select **3) Clock Config**, and configure the Clock Config option as described in Table 31 on page 63.

Table 31: CTP Bundle IRIG-B Port Parameter Settings in the CTP Menu

Field	Function	Your Action
Direction	Specifies the direction of the circuit. Although the IP circuit connection through the network is full duplex, an IRIG-B circuit is actually a simplex application, and the daughter card can operate only in Rx or Tx mode and not both at the same time.	Specify yes or no to the question: Is this an IRIG-B source end (IRIB-B signal enters CTP)? • Yes (y)—Sets direction to Rx. This end of the circuit recovers IRIG-B from the attached cable and generates IP packets toward the network • No (n)—Sets the direction to Tx. This end of the circuit accepts IP packets, extracts the IRIG-B data codes, and transmits IRIG-B signaling output onto the cable.
Output High Level	This setting appears only if you set the direction of the port to Tx. Specifies the high output level, which is measured in peak-to-peak voltage. This setting is based on a 50 ohm termination	Enter a number from 0.00 through 7.85 volts peak-to-peak.
Output Low Volts Level	This setting appears only if you set the direction of the port to Tx. Specifies the low output level, which is measured in peak-to-peak voltage. This setting is based on a 50 ohm termination.	Enter a number from 0.00 through 7.85 volts peak-to-peak.
Port Speed (kbps)	Specifies the data rate on the IP connection. Unless network bandwidth is at a premium, we do not recommend that you change this value from the default of 16 Kbps.	Enter a number from 1000 through 25,500 bps. The port speed must be a multiple of 100 bps.

Table 31: CTP Bundle IRIG-B Port Parameter Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Clock Config	Specifies the type of clocking for the bundle.	Select one: • 4WTO/IRIG - Master End—This end of the circuit generates a clock signal and sends it to the remote end. • 4WTO/IRIG - Adaptive End—This end of the circuit receives the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.

Configuring Advanced Port Options for CTP Bundles (CTPView)

Before you begin:

• Log in to the CTPView software at least at the Net_Admin level.

• Connect the CTPView server to the CTP device for which you want to configure bundles.

• Disable the bundle before you modify the bundle options.

To configure advanced port options for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options**, place a check mark in the **Advanced Options Show** check box to display advanced parameters, and configure the parameters described in Table 32 on page 64.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 32: CTP Bundle Advanced Port Options Settings in CTPView

Field	Function	Your Action
Single Ended Data/Clock Output	Do not change this value without consulting JTAC. Specifies whether or not the CTP device drives received data (RD) onto data set ready (DSR) and real-time (RT) data onto test mode (TM).	Select ENABLED or DISABLED.
Reclock to Align Clock and Data	Do not change this value without consulting JTAC. Specifies whether or not to reclock RD with the RT clock to align the data and the clock.	Select ENABLED or DISABLED.

Table 32: CTP Bundle Advanced Port Options Settings in CTPView *(continued)*

Field	Function	Your Action
Only High TT Checking	Specifies that the CTP device disqualifies transmit timing (TT) only when it is higher than the port speed. When enabled, this setting keeps the port from going to the TtFail state when the incoming user clock fluctuates between 0 and the configured port rate. If the TT rate goes above the configured port rate, the CTP device sends the port to the TtFail state to protect the system from an overspeed TT, which would cause problems for the port, CTP device, or network.	Select ENABLED or DISABLED.
TT Clock Gated by RTS	When request to send (RTS) is inactive, specifies whether or not the CTP device feeds TT with the internally created clock.	Select ENABLED or DISABLED.
RTS Clock Gated Invert	When clock gating is enabled, specifies whether or not to use the inverted RTS signal.	Select ENABLED or DISABLED.
Input/Output Data Inversion	Specifies whether or not to invert data bound for the interface with data bound for the IP network.	Select ENABLED or DISABLED.

Configuring Advanced Port Options for CTP Bundles (CTP Menu)

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure advanced port options for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **4) Advanced Options**.

6. Configure the options as described in Table 33 on page 65.

Table 33: CTP Bundle Advanced Port Option Settings in the CTP Menu

Field	Function	Your Action
Single ended data/clock outputs	Do not change this value without consulting JTAC. Specifies whether or not the CTP device drives received data (RD) onto data set ready (DSR) and real-time (RT) data onto test mode (TM).	Select y or n.

Table 33: CTP Bundle Advanced Port Option Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Reclock RD to align RD/RT	Do not change this value without consulting JTAC. Specifies whether or not to reclock RD with the RT clock to align the data and the clock.	Select y or n.
Only high TT checking	Specifies that the CTP device disqualifies transmit timing (TT) only when it is higher than the port speed. When enabled, this setting keeps the port from going to the TtFail state when the incoming user clock fluctuates between 0 and the configured port rate. If the TT rate goes above the configured port rate, the CTP device sends the port to the TtFail state to protect the system from an overspeed TT, which would cause problems for the port, CTP device, or network.	Select y or n.
TT Clock Gated by RTS	When request to send (RTS) is inactive, specifies whether or not the CTP device feeds TT with the internally created clock.	Select y or n.
RTS Clock Gate Invert	When clock gating is enabled, specifies whether or not to use the inverted RTS signal.	Select y or n.
Input/Output Data Invert	Specifies whether or not to invert data bound for the interface with data bound for the IP network.	Select y or n.

Selecting the Type of Clocking on Serial Ports for CTP Bundles (CTPView)

This topic describes how to select the type of clocking that you want to use on serial ports. The type of clocking supported depends on the type of encoding you are using.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To specify the clocking type for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options**, select a clocking type in the **Clock Cfg** field. Table 34 on page 67 describes the clocking types that are supported for each encoding type.

5. Click **Click to Submit Bundle AND Port Changes**.

Table 34: Clocking Type Supported for Each Encoding Type as Displayed in CTPView

Encoding Type	Clocking Type Supported
NRZ and TDM with interface mode set to DCE.	You can specify the following clocking methods for NRZ and TDM circuits with DCE mode specified: • Cfg Rate - Int Clk—Configured rate without external TX clock (TT). The CTP device synthesizes the rate that is used on the ST and RT outputs to the attached device. The ST is used to sample Send Data from the attached DTE. The clock is created by the CTP DDS circuitry and logic. This option is commonly used on circuits that are less than 1 Mbps. • Cfg Rate - Ext Clk—Configured rate with external TX clock (TT). The CTP device synthesizes the rate that is used on the ST and RT outputs to the attached device. The clock is created by the DDS circuitry and logic. This option is used to sample Send Data from the attached device. Assumes that the attached device is using ST or clock reference traceable to CTP reference. Typically used for higher data rates (>1 Mbps) and long cable. • All Clock - Ext Clk—All clocked with external TX clock (TT). The CTP clock uses the external TT timing from the DTE for all clocking. Ext TT is used to sample Send Data from the attached device, to generate the RT clock, and to clock data into the IP network. • Adap Rate - Ext Clk—Adaptive clocking with external TX clock (TT). • Adap Rate - Int Clk—Adaptive clocking with internal clock. • Auto Rate - Int Clk—Autobaud rate with internal clock. • Auto Rate - Ext Clk—Autobaud rate with external clock. • TDM/TDC Interleaved Slow Port—Available only on odd-numbered ports. Use this option for the low-speed port of a domain correlation (TDC) circuit. • Custom—The custom clocking configuration is used.
NRZ and TDM with interface mode set to DTE	You can specify the following clocking methods for NRZ and TDM circuits with DTE mode specified: • Custom—The custom clocking configuration is used. • DTE, All Clocked by Ext Clk (ST/RT)—The DCE equipment provides all clocks. The ST input clock is used to clock out the external transmit clock (TT) and the send data (SD). The RT input clock is used to clock in the receive data (RD).
ISOCH	You can specify the following clocking methods for ISOCH circuits: • ISOCH - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **ISOCH - Slave End** at the remote end. • ISOCH - Slave End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. If you specify slave end, the adaptive clocking configuration appears. • Custom—The custom clocking configuration is used.

Table 34: Clocking Type Supported for Each Encoding Type as Displayed in CTPView *(continued)*

Encoding Type	Clocking Type Supported
CDI	You can specify the following clocking methods for CDI circuits: • CDI - Master End—This end of the circuit generates a clock signal and sends it to the remote end. **Configure CDI - Slave End** at the remote end. • CDI - Slave End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. If you specify slave end, the adaptive clocking configuration appears. • Custom—The custom clocking configuration is used.
MSTAR	You can specify the following clocking methods for MSTAR circuits: • MSTAR - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **MSTAR - Slave End** at the remote end. • MSTAR - Slave End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. If you specify slave end, the adaptive clocking configuration appears. • Custom—The custom clocking configuration is used.
TRANS	You can specify the following clocking methods for TRANS circuits: • TRANS - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **TRANS - Slave End** at the remote end. • TRANS - Slave End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. If you specify slave end, the adaptive clocking configuration appears. • Custom—The custom clocking configuration is used.

Selecting the Type of Clocking on Serial Ports for CTP Bundles (CTP Menu)

This topic describes how to select the type of clocking that you want to use on serial ports. The type of clocking supported depends on the type of encoding you are using.

Before you begin:

• Disable the bundle before you modify the bundle options.

CTP Menu gives you the option of selecting the clocking type when you change the interface encoding for a circuit. You can also specify the clocking type for CTP bundles using the CTP Menu as follows:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **3) Clock Config**.

6. Select **1) Port Clock Config**.

7. Configure the options as described in Table 35 on page 69.

Table 35: Clocking Type Supported for Each Encoding Type as Displayed in CTP Menu

Encoding Type	Clocking Type Supported
NRZ and TDM with interface mode set to DCE	You can specify the following clocking methods for NRZ and TDM circuits with DCE mode specified: • Custom—The custom clocking configuration is used. • Configured Rate, w/o Ext Tx Clk (TT)—Configured rate without external TX clock (TT). The CTP device synthesizes the rate that is used on the ST and RT outputs to the attached device. The ST is used to sample Send Data from the attached DTE. The clock is created by the CTP DDS circuitry and logic. This option is commonly used on circuits that are less than 1 Mbps. • Configured Rate, Ext Tx Clk (TT—Configured rate with external TX clock (TT). The CTP device synthesizes the rate that is used on the ST and RT outputs to the attached device. The clock is created by the DDS circuitry and logic. This option is used to sample Send Data from the attached device. Assumes that the attached device is using ST or clock reference traceable to CTP reference. Typically used for higher data rates (>1 Mbps) and long cable. • All Clocked by Ext Tx Clk (TT)—All clocked with external TX clock (TT). The CTP device uses the external TT timing from the DTE for all clocking. Ext TT is used to sample Send Data from the attached device, to generate the RT clock, and to clock data into the IP network. • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • TDM/TDC Interleaved Slow Port—Available only on odd-numbered ports. Use this option for the low-speed port of a domain correlation (TDC) circuit.
NRZ and TDM with interface mode set to DTE	You can specify the following clocking methods for NRZ and TDM circuits with DTE mode specified: • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • DTE, All Clocked by Ext Clk (ST/RT)—The DCE equipment provides all clocks. The ST input clock is used to clock out the external transmit clock (TT) and the send data (SD). The RT input clock is used to clock in the receive data (RD). • TDM/TDC Interleaved Slow Port—Available only on even-numbered bundles. Use this option for the slower-port of the domain correlation (TDC) circuit. • Custom—The custom clocking configuration is used.

Table 35: Clocking Type Supported for Each Encoding Type as Displayed in CTP Menu *(continued)*

Encoding Type	Clocking Type Supported
ISOCH	You can specify the following clocking methods for ISOCH circuits: • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • ISOCH - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **ISOCH - Adaptive End** at the remote end. • ISOCH - Adaptive End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.
CDI	You can specify the following clocking methods for CDI circuits: • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • CDI - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **CDI - Adaptive End** at the remote end. • CDI - Adaptive End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.
MSTAR	You can specify the following clocking methods for MSTAR circuits: • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • MSTAR - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **MSTAR - Adaptive End** at the remote end. • MSTAR - Adaptive End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.

Table 35: Clocking Type Supported for Each Encoding Type as Displayed in CTP Menu *(continued)*

Encoding Type	Clocking Type Supported
TRANS	You can specify the following clocking methods for TRANS circuits: • Adaptive Rate, Ext Tx Clk (TT)—Adaptive clocking with external TX clock (TT). • Adaptive Rate, w/o Ext Tx Clk (TT)—Adaptive clocking with internal clock. • Autobaud Rate, Ext Tx Clk (TT)—Autobaud rate with internal clock. • Autobaud Rate, w/o Ext Tx Clk (TT)—Autobaud rate with external clock. • TRANS - Master End—This end of the circuit generates a clock signal and sends it to the remote end. Configure **TRANS - Adaptive End** at the remote end. • TRANS - Adaptive End—This end of the circuit uses adaptive clocking to receive the clock signal from the remote end. The clock slave uses its period to determine when to sample data and how to transmit data across the link. • Custom—The custom clocking configuration is used.

Configuring Custom Clocking for CTP Bundles (CTPView)

The custom clocking configuration allows you to configure the source for all clocks and specify which clocks are used to sample and transmit data. The configuration provides complete control over how clocks are used, and we recommend that you have a good understanding of circuit and system clocking before you use this configuration.

You can use custom clocking to:

- Configure the interface to use nonstandard clock configurations that meet the timing needs of your application.

- Configure asymmetric clocks.

- Create special configurations for devices such as tactical radios.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.

- Connect the CTPView server to the CTP device for which you want to configure bundles.

- Disable the bundle before you modify the bundle options.

To configure custom clocking for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.

2. Run your mouse over the **Display and Select an Existing Bundle** bar.

3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options** in the **Clock Cfg** field, select **Custom**.

5. Place a check mark in the **Custom Clocking Options** show check box to display custom clocking parameters, and configure the parameters described in Table 36 on page 72.

The options vary depending on the **I/F Type** selected.

6. Click **Click to Submit Bundle AND Port Changes**.

Table 36: CTP Bundle Custom Clocking Settings in CTPView

Field	Function	Your Action
DDS Frequency	Specifies a fixed frequency for the Direct Digital Synthesizer (DDS).	Enter a number from 1 through 2,147,483,647 Hz.
DDS Post Divider	Specifies the divider for the DDS.	Enter a number from 0 through 4.
DDS Source	Specifies the clock source for the DDS.	Select one: • USER—Clock is recovered from the user equipment. • ADAP—DDS uses adaptive clocking to recover the clock signal from the remote CTP device. • AUTO—Use for the autobaud feature. This setting enables the monitoring of OAM packets for the other end terminal timing (TT) frequency, and processing to accommodate frequency changes that are detected.
DIV Source	Specifies the source for the divider clock. The DIV clock is an alternate clock generator for the bundle, and its output clock is an even integer divider of its source clock. The divider is used to configure asymmetric circuits. For example, if the source clock is 512 KHz, the output of the DIV clock can be 256 KHz, 128 KHz, 85.333 KHz, etc.	Select one: • DDS—Direct digital synthesizer clock generator. • OSC—Oscillator system clock.
DIV Clk Divider	Specifies the divider clock value. The clock value of the DIV source is divided by this value to obtain the output clock value of the DIV clock.	Enter an even number from 2 through 64,000.
ST Net Bound I/F Clock	Specifies the clock used for Send Timing on the network bound interface.	Select one: • OFF—No clock is used. *Correct?* • DDS—Direct digital synthesizer clock generator. • TT—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). The TT clock is used only if the bundle is configured as the DCE. • DIV—Divider clock generator. • ST—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). The ST clock is used only if the bundle is configured as the DTE.

Table 36: CTP Bundle Custom Clocking Settings in CTPView *(continued)*

Field	Function	Your Action
RF Net Bound I/F Clock	Specifies the clock used for Receive Frequency on the network bound interface.	Select one: • OFF—No clock is used. *Correct?* • DDS—Direct digital synthesizer clock generator. • TT—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). The TT clock is used only if the bundle is configured as the DCE. • DIV—Divider clock generator. • ST—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). The ST clock is used only if the bundle is configured as the DTE.
RX Net Bound SCC Clock	Specifies the clock used for the Receive Data path on the network bound serial communications controller (SCC).	Select one: • OFF—No clock is used. • DDS—Direct digital synthesizer clock generator. • TT—Transmit timing clock. The external transmit clock used to provide clocking from the CTP device to the user equipment. • DIV—Divider clock generator. • ST—Send timing clock. The interface clock signal from the user equipment to the CTP device.
RT I/F Bound I/F Clock	Specifies the clock used for Receive Timing on the interface bound interface.	Select one: • OFF—No clock is used. • DDS—Direct digital synthesizer clock generator. • TT—Transmit timing clock. The external transmit clock used to provide clocking from the CTP device to the user equipment. • DIV—Divider clock generator. • ST—Send timing clock. The interface clock signal from the user equipment to the CTP device.
TX I/F Bound SCC Clock	Specifies the clock used for the Transmit Data path on the interface bound serial communications controller (SCC).	Select one: • OFF—No clock is used. • DDS—Direct digital synthesizer clock generator. • TT—Transmit timing clock. The external transmit clock used to provide clocking from the CTP device to the user equipment. • DIV—Divider clock generator. • ST—Send timing clock. The interface clock signal from the user equipment to the CTP device.

Configuring Custom Clocking for CTP Bundles (CTP Menu)

The custom clocking configuration allows you to configure the source for all clocks and specify which clocks are used to sample and transmit data. The configuration provides complete control over how clocks are used, and we recommend that you have a good understanding of circuit and system clocking before you use this configuration.

You can use custom clocking to:

- Configure the interface to use nonstandard clock configurations that meet the timing needs of your application.

- Configure asymmetric clocks.

- Create special configurations for devices such as tactical radios.

Before you begin:

- Disable the bundle before you modify the bundle options.

To configure custom clocking for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **3) Clock Config**.

6. Select **1) Port Clock Config**.

7. Select **Custom**.

8. Configure the options as described in Table 37 on page 75.

Table 37: CTP Bundle Custom Clocking Settings in the CTP Menu

Field	Function	Your Action
DDS Synthesizer Source	Specifies the clock source for the DDS.	Select: • User (OI)—Clock is recovered from the user equipment. • Adaptive—DDS uses adaptive clocking to recover the clock signal from the remote CTP device. • Autobaud—Use for the autobaud feature. This setting enables the monitoring of OAM packets for the other end terminal timing (TT) frequency, and processing to accommodate frequency changes that are detected.
DIV (clk divider) Source	Specifies the source for the divider clock. The DIV clock is an alternate clock generator for the bundle, and its output clock is an even integer divider of its source clock. The divider is used to configure asymmetric circuits. For example, if the source clock is 512 KHz, the output of the DIV clock can be 256 KHz, 128 KHz, 85.333 KHz, etc.	Select: • DDS Output—Direct digital synthesizer clock generator. • Oscillator—Oscillator system clock.
DIV (clk divider) Value	Specifies the divider clock value. The clock value of the DIV source is divided by this value to obtain the output clock value of the DIV clock.	Enter an even number from 2 through 64,000.
ST (net bound i/f) clk sel	Specifies the clock used for Send Timing on the network bound interface.	Select one (the values that appear depend on whether the bundle is configured as the DCE or as the DTE): • OFF—No clock is used. *Correct?* • ST (ext clk)—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). • DDS (synth)—Direct digital synthesizer clock • TT (ext clk)—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). • RT (ext clk)—Receive timing clock. Interface clock signal from the DCE to the DTE (CTP device). • DIV (synth)—Divider clock generator.

Table 37: CTP Bundle Custom Clocking Settings in the CTP Menu *(continued)*

Field	Function	Your Action
RF (net bound fifo) clk sel	Specifies the clock used for Receive Frequency on the network bound interface.	Select one (the values that appear depend on whether the bundle is configured as the DCE or as the DTE): • OFF—No clock is used. • ST (ext clk)—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). • DDS (synth)—Direct digital synthesizer clock • TT (ext clk)—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). • RT (ext clk)—Receive timing clock. Interface clock signal from the DCE to the DTE (CTP device). • DIV (synth)—Divider clock generator.
RX (net bound scc) clk sel	Specifies the clock used for the Receive Data path on the network bound serial communications controller (SCC).	Select one (the values that appear depend on whether the bundle is configured as the DCE or as the DTE): • OFF—No clock is used. • ST (ext clk)—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). • DDS (synth)—Direct digital synthesizer clock • TT (ext clk)—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). • RT (ext clk)—Receive timing clock. Interface clock signal from the DCE to the DTE (CTP device). • DIV (synth)—Divider clock generator.
RT (i/f bound i/f) clk sel	Specifies the clock used for Receive Timing on the interface bound interface. This parameter appears only if you have configured the bundle as the DCE.	Select one: • OFF—No clock is used. • DDS (synth)—Direct digital synthesizer clock • TT (ext clk)—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). • DIV (synth)—Divider clock generator.

Table 37: CTP Bundle Custom Clocking Settings in the CTP Menu *(continued)*

Field	Function	Your Action
TT (i/f bound i/f) clk sel	Specifies the Transmit Timing clock on the interface bound interface. This parameter appears only if you have configured the bundle as the DTE.	Select one: • ST (ext clk)—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). • DDS (synth)—Direct digital synthesizer clock • RT (ext clk)—Receive timing clock. Interface clock signal from the DCE to the DTE (CTP device). • DIV (synth)—Divider clock generator.
TX (i/f bound scc) clk sel	Specifies the clock used for the Transmit Data path on the interface bound serial communications controller (SCC).	Select one (the values that appear depend on whether the bundle is configured as the DCE or as the DTE): • OFF—No clock is used. • ST (ext clk)—Send timing clock. The interface clock signal from the DCE to the DTE (CTP device). • DDS (synth)—Direct digital synthesizer clock • TT (ext clk)—Transmit timing clock. The interface clock signal from the DTE to the DCE (CTP device). • RT (ext clk)—Receive timing clock. Interface clock signal from the DCE to the DTE (CTP device). • DIV (synth)—Divider clock generator.

Configuring Adaptive Clocking for CTP Bundles (CTPView)

The adaptive clocking configuration allows you to modify attributes that affect the adaptive clocking algorithm. The default settings are acceptable for most applications. We recommend that you change these settings only with the assistance of JTAC.

Before you begin:

- Log in to the CTPView software at least at the Net_Admin level.
- Connect the CTPView server to the CTP device for which you want to configure bundles.
- Disable the bundle before you modify the bundle options.

To configure adaptive clocking for CTP bundles using CTPView:

1. In the side pane, select **Bundle** > **Configuration**.
2. Run your mouse over the **Display and Select an Existing Bundle** bar.
3. In the table of bundles, select the bundle that you want to modify.

4. Under **Port Options** in the **Clock Cfg** field, select **Adap Rate - Ext Clk** or **Adap Rate - Int Clk**.

5. Place a check mark in the **Adaptive Clocking Options** show check box to display adaptive clocking parameters, and configure the parameters described in Table 38 on page 78.

6. Click **Click to Submit Bundle AND Port Changes**.

Table 38: CTP Bundle Adaptive Clocking Settings in CTPView

Field	Function	Your Action
Initialize Adaptive Settings	Sets the adaptive clocking configuration to the default settings.	Place a check mark in the **Yes** check box.
Aggressive Calc Period	Specifies the time period during initial start of adaptive clocking during which packet samples that are experiencing the least delay through the network are collected. These samples are used for aggressive state calculations.	Enter a number from 3 through 200 seconds.
Maintenance Calc Period	Specifies the time period during normal adaptive clocking during which packet samples that are experiencing the least delay through the network are collected. These samples are used for maintenance state calculations.	Enter a number from 3 through 300 seconds.
Slope for Maintenance	Specifies the number of packets per minute, which, when reached, causes the adaptive clocking algorithm to change from aggressive state to maintenance state. Lower values result in longer switchover times with a clock value closer to the remote clock.	Enter a number from 1 through 100 packets per minute.
Maintenance Decay	Specifies how quickly the clocking corrects to the buffer set point while in maintenance state.	Enter a number from 2 though 120 seconds.
Max Clock Adjustment Value	Specifies a cap for frequency acceleration, which constrains the frequency adjustments to the adaptive clock.	Enter a number from 1 through 200 parts per billion.
Max Clock Offset	Specifies a cap for frequency velocity, which constrains the frequency velocity of the adaptive clock.	Enter a number from 1 through 400 packets per minute.
Max Buffer Error	Specifies the buffer error rate required to change the adaptive clocking algorithm state from maintenance to aggressive.	Enter a number from 100 through 1,000,000 microseconds.

Configuring Adaptive Clocking for CTP Bundles (CTP Menu)

The adaptive clocking configuration allows you to modify attributes that affect the adaptive clocking algorithm. The default settings are acceptable for most applications. We recommend that you change these settings only with the assistance of JTAC.

Before you begin:

• Disable the bundle before you modify the bundle options.

To configure adaptive clocking for CTP bundles using the CTP Menu:

1. From the Main Menu, select **1) Bundle Operations**.

2. Select **1) CTP**.

3. Select a bundle from the list.

   If you select an active bundle, you are prompted to disable the bundle before configuring it.

4. Select **3) Port Config**.

5. Select **3) Clock Config**.

6. Select **1) Port Clock Config**.

7. Select **Set Adaptive Parameters**.

8. Configure the options as described in Table 39 on page 79.

Table 39: CTP Bundle Adaptive Clocking Settings in the CTP Menu

Field	Function	Your Action
Set to Defaults	Sets the adaptive clocking configuration to the default settings.	Select **Set to Defaults**.
AGGR Seconds/Calc	Specifies the time period during initial start of adaptive clocking during which packet samples that are experiencing the least delay through the network are collected. These samples are used for aggressive state calculations.	Enter a number from 3 through 200 seconds.
MNTN Seconds/Calc	Specifies the time period during normal adaptive clocking during which packet samples that are experiencing the least delay through the network are collected. These samples are used for maintenance state calculations.	Enter a number from 3 through 300 seconds.

Table 39: CTP Bundle Adaptive Clocking Settings in the CTP Menu *(continued)*

Field	Function	Your Action
Slope for MNTN in ppm	Specifies the number of packets per minute, which when reached, causes the adaptive clocking algorithm to change from aggressive state to maintenance state. Lower values result in longer switchover times with a clock value closer to the remote clock.	Enter a number from 1 through 100 packets per minute.
Maintenance Decay in calcs	Specifies how quickly the clocking corrects to the buffer set point while in maintenance state.	Enter a number from 2 though 120 seconds.
Max Clock Adjust in ppb	Specifies a cap for frequency acceleration, which constrains the frequency adjustments to the adaptive clock.	Enter a number from 1 through 1000 parts per billion.
Max Clock Offset in ppm	Specifies a cap for frequency velocity, which constrains the frequency velocity of the adaptive clock.	Enter a number from 1 through 400 packets per minute.
Max Buffer Error in usec	Specifies the buffer error rate required to change the adaptive clocking algorithm state from maintenance to aggressive.	Enter a number from 100 through 1,000,000 sec.

Related Documentation

- Adaptive Clocking Overview for CTP Bundles on page 5