

Setting SDH Receive Parameters

This section describes how to manually set the receive line rate, define the AU under test, set the payload mapping and content, check the received optical signal power, and view the overhead bytes.

The CTS850 SDH/PDH Test Set contains independent transmit and receive modules. One set of parameters controls the transmit module and a separate set controls the receive module. You can set the receive parameters independent of the transmit parameters or you can choose to link them to the transmit settings.

Pressing AUTOSCAN sets the receive parameters automatically based on the received signal.

Steps for Setting Parameters

The sequence of steps for setting receive parameters varies with the type of signal to be received. Figure 3-49 shows the sequence of steps required to set the receive parameters for an SDH signal without demapping a PDH signal. Figure 3-50 shows the steps required to set the receive parameters for an SDH signal when demapping a PDH signal. See a later section for details on setting PDH signal parameters (for example 2 Mb/s).



Figure 3 49: Sequence for Setting SDH Signal Parameters

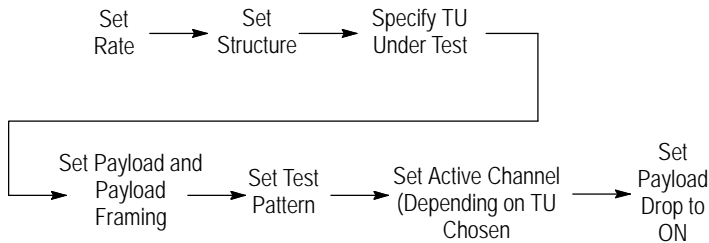


Figure 3 50: Sequence for Setting SDH Signal Parameters When Demapping a PDH Signal

Setting the Receive Rate

To set the receive rate:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	RECEIVE SETTINGS (see Figure 3 51)	Receive Rate	<i>as appropriate</i>

- H Select **STM-1E, STM-1, STM-4, STM-0E**, or **STM 0** to receive an SDH signal.
- H Select **2 Mb/s Balanced or Unbalanced, 8 Mb/s, 34 Mb/s**, or **140 Mb/s** to receive a PDH signal.
- H If your CTS 850 test set supports the 45 Mb/s option, there is also a **45 Mb/s** signal available for selection.

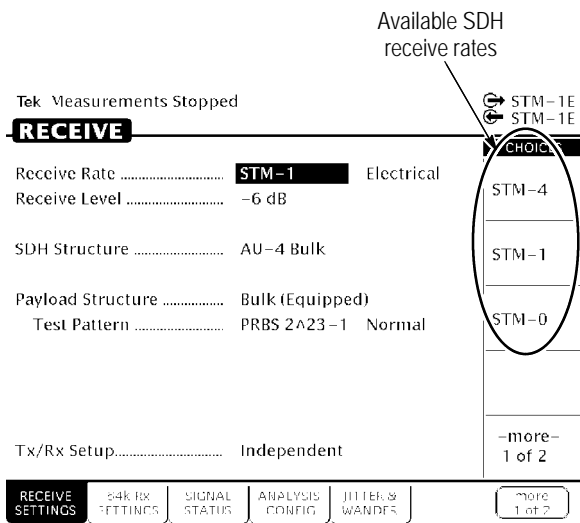


Figure 3 51: SDH Receive Rates

Independent Receive and Transmit Settings

Generally, you can set the receive and transmit settings independently. For example, you can receive an electrical signal at the STM-1E rate while simultaneously transmitting an optical signal at the STM-1 rate.

Coupling Receive and Transmit Settings

If your application requires that the receive settings and transmit settings be identical, you can save time by coupling them together. After they are coupled, any change you make to a parameter on the RECEIVE SETTINGS page will also be made to the corresponding setting in the Receive SETTINGS page of the RECEIVE menu. The inverse is also true.

To couple the receive and transmit settings together from the RECEIVE SETTINGS page:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	RECEIVE SETTINGS	Tx/Rx Setup	Coupled

NOTE. When settings are coupled from the RECEIVE SETTINGS page, the transmit parameters are changed to match the receive parameters. Conversely, when settings are coupled from the Transmit Settings page, the receive parameters are changed to match the transmit parameters.

To change receive and transmit settings so that they are no longer coupled:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	RECEIVE SETTINGS	Tx/Rx Setup	Independent

Notice that the signal status icons, in the upper-right corner of the display, changed to indicate that the settings are no longer coupled.

NOTE. When the incoming line rate changes, a valid LOS must occur between the old and new line rates; otherwise, the CTS850 might lose pattern lock and display an LOS or LOF status. If this occurs, reselect the correct Receive line rate after the change or initiate a valid LOS (for example, disconnect and reconnect the received signal or assert LOS at the source).

Specifying the AU to Test

AU under test is only displayed when the input rate is STM 4 and the signal structure is 1 x AU 4. To designate which AU to test:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	Receive SETTINGS	AU Under Test	1, 2, 3, 4

Setting the SDH Structure

This selection sets the structure of the AU or TU under Test (SDH input rates only).

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	Receive Settings	Structure STM 4	VC4 4c Bulk AU 4 Bulk AU 4 140 Mb/s TU 3 Async TU 12 Async
		STM 1	AU 4 Bulk AU 4 140 Mb/s TU 3 Async TU 12 Async
		STM 0	AU 3 only

Tek Measurements Stopped

RECEIVE

Receive Rate STM 1 Electrical

Receive Level 0 dB

SDH Structure **AU-4 Bulk**

Payload Structure Bulk (Equipped)

Test Pattern PRBS 2²³-1 Normal

Tx/Rx Setup..... Coupled

CHOICES

- VC4-4c Bulk
- AU-4 Bulk
- AU-4 140 Mb/s
- TU-3 Async
3.1 or 4.5 Mb/s
- TU-12 Async
2 Mb/s

RECEIVE SETTINGS S4R RX SETTINGS SIGNAL STATUS ANALYSIS CONFIG JITTER & WANDFS more 1 of 2

Figure 3 52: Example of SDH Structure

TU Under Test

If the structure choice is TU 12 or TU 3, the TU under test selection is as follows (Selections are mutually exclusive).

TU 12:	TUG 3:1, TUG 3:2, TUG 3:3 TUG 2:1 to TUG 2:7 TU 12:1, TUG 12:2, TUG 12:3
TU 3:	TU 3:1, TUG 3:2, TUG 3:3

Setting the Payload

Payload sets the final analysis rate. Because of the number of selections available, the rate and framing parameters have been split. If the payload rate is not the same as the mapping (SDH) or input (PDH) rate, then demultiplexing is implied.

Table 3 17: RX Rates and Structures

RX Rate	RX Structure	Demultiplexing combinations
STM 4 STM 1	VC4 4c AU 4 TU 12 TU 3 140 Mb/s	Bulk Equipped & Unequipped 2Mb/s, 64k 34Mb/s, 8Mb/s, 2Mb/s, 64k 140, 34, 8, 2 Mb/s, 64k
STM 0	AU 3	Bulk Equipped & Unequipped
140 Mb/s	Not Applicable	34Mb/s, 8Mb/s, 2Mb/s, 64k
34 Mb/s, 45 Mb/s	Not Applicable	34 Mb/s, 8Mb/s, 2 Mb/s, 64k
8 Mb/s	Not Applicable	8 Mb/s, 2Mb/s, 64k
2 Mb/s	Not Applicable	2Mb/s, 64k

Bulk fill of a TU 12 or TU 3 is not supported.

To set the payload:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
Receive	Receive SETTINGS	Payload	As appropriate

Table 3 18: Payload Framing/ Source

Payload	Allowable choices
140 Mb/s	Framed, Unframed, External Add
34 Mb/s	Framed, Unframed, External Add
45 Mb/s	C Bit, M13, Unframed
8 Mb/s	Framed, Unframed, External Add
2 Mb/s	Unframed, External Add Unbalanced/balanced, PCM30 CAS CRC, PCM31 CRC, PCM30 CAS, PCM31
64k	64k payload does not have framing

When 64k is the payload, framing can also be set from the 64k Rx SETTING menu.

Setting the Test Pattern

The Live choice is a valid test pattern selection (see bottom of table). Live implies in service, and bit errors will not be checked. User defined 16 and 24 bit patterns are supported.

Table 3 19: Test Patterns

Test Patterns	Allowable choices
PRBS 2 ⁹ 1	STM 4; STM 1; STM 0; 140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
PRBS 2 ¹¹ 1	140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
PRBS 2 ¹⁵ 1	STM 4; STM 1; STM 0; 140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
PRBS 2 ²⁰ 1	STM 4; STM 1; STM 0; 140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
PRBS 2 ²³ 1	STM 4; STM 1; STM 0; 140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k

Table 3 19: Test Patterns (Cont.)

Test Patterns	Allowable choices
All 1's	STM 4;STM 1;STM 0;140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
All 0's	STM 4;STM 1;STM 0;140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
10101010	140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k
1 in 8	140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s
8 bitfixed	STM 4;STM 1;STM 0;140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s
16 bitfixed	140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s
24 bitfixed	140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s
Live	STM 4;STM 1;STM 0;140Mb/s; 34 Mb/s; 8Mb/s; 2 Mb/s; 64k

Selecting the Active Channel Selection

If the payload selection forces demultiplexing, active channel selections will be displayed. This allows the operator to specify which of the four channels from the next higher rate will be selected for analysis (for example, 34Mb/s Active Channel 1 picks the first channel from 140Mb/s).

Selecting the Payload Drop

If the Receive rate is any PDH or SDH rate, SDH is mapped for PDH, and the PDH payload is less than the line rate, then a selection appears at the bottom of Receive, Receive Settings menu. This selection permits the operator to drop a certain PDH payload. 8 Mb/s and 64k rates can not be dropped.

Selecting the Tx/Rx Setup

Tx/Rx Setup permits the operator to couple Transmit and Receive settings, or select Through Mode. When coupled mode is selected, from the Receive Setting menu, applicable Receive Settings are copied to the Transmit side of the tester.

Selecting Signal Status

The Signal Status menu adds PDH Payload Frequency and Round Trip Delay Offset. The following two menus are displayed when the Rate is STM 4, the structure is TU 12, and the payload is 2 Mb/s. Set these parameters in the Receive, Receive Settings menu. Then press the Receive, Signal Status softkey to access the following two menus.

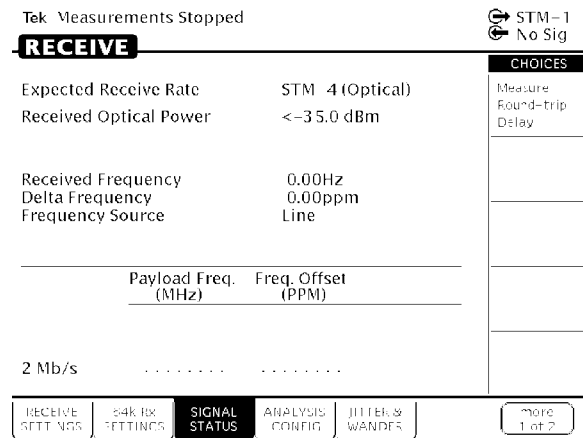


Figure 3 53: SIGNAL STATUS, Payload Frequency, from RECEIVE SETTINGS menu

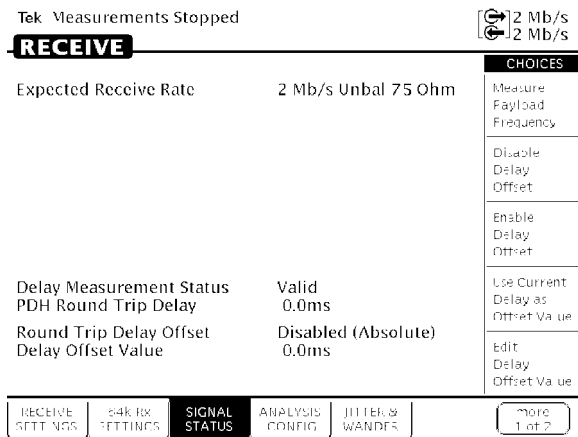


Figure 3 54: SIGNAL STATUS, Round Trip Delay Offset, from RECEIVE SETTINGS menu

Table 3 20: SIGNAL STATUS Choices

Signal Status	Choices
PDH Payload Frequency	PDH Payload Frequency is a direct measurement. Offset; Justification Ratios 140 Mb/s, 34 Mb/s, 8 Mb/s
Round Trip Delay Offset	Transmission of a long PRBS signal between the CTS850 TX and RX. A measurement, to 100 microseconds resolution, on how long it takes for this signal to travel through a DUT.

Checking Received Optical Power or Received Peak Voltage

To check the optical power or the peak voltage of the received SDH signal:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	Signal Status	<i>none</i>	<i>none</i>

If Receive Rate, on the RECEIVE SETTINGS page, is set to an optical rate, the SIGNAL STATUS page displays the received optical power. If Receive Rate is set to an electrical rate, the SIGNAL STATUS page displays the received peak voltage.

The optical power of the received signal is displayed in dBm. The peak voltage of the received signal is displayed in volts. The SIGNAL STATUS page does not display results for PDH signals.

If the Jitter/Wander option is installed, three additional items are displayed and updated on the SIGNAL STATUS page:

- H The actual received frequency in Hz
- H The delta frequency from the the expected frequency to the actual frequency in ppm
- H The frequency source, line or clock

Selecting Analysis Configuration

Analysis configuration permits the operator to configure items that affect how incoming data is interpreted. These items cannot be changed once a test has been started. If the operator changes a selection, a warning message will be displayed.

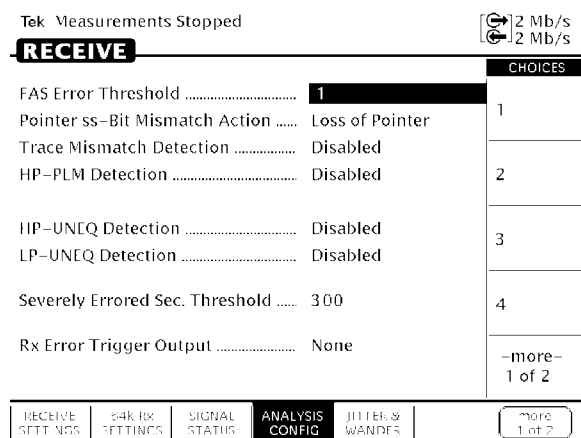


Figure 3 55:ANALYSIS CONFIG from Receive Setting Menu

Table 3 21:ANALYSIS CONFIG Choices

Analysis Config	Choices
FAS Error Threshold	The operator can set the number of consecutive errored frame alignment blocks that must be detected before an error is reported. The valid range for this parameter is 1 through 7, which would be set by the operator to match the provisioning of the equipment being used.
Pointer S Bit Mismatch Action	By definition, the pointer S bits should be 10 binary. This option allows the operator to choose to declare a loss of pointer error when the bits are incorrect, or ignore the error completely. Loss of Pointer, Ignore.

Table 3 21: ANALYSIS CONFIG Choices (Cont.)

Analysis Config	Choices
Trace Mismatch Detection	Comparison of Received J0 Trace value vs. expected value. Measurement in error seconds. HP Unequipped Detection Choices: Disabled, Enabled LP Unequipped Detection Choices: Disabled, Enabled HP Signal Label Mismatch Detection Choices: Disabled, Enabled
2Mb/s CRC SES Error Threshold	CRC SES Error Threshold can only be enabled when the line rate is 2 Mb/s. Previous versions of M.2100 specified that an SES be declared when 805 CRC4 or E bit errors were detected in one second. The latest version of M.2100 sets this threshold at 300 errors. This selection allows for backwards compatible measurements. Selections: 300, 805. Default value is 300. 2 Mb/s rate: 300 (for G.826) or 805 (for G.821) 45 Mb/s rate: 2444 (for G.826) or 45 (for G.821)
Rx Error Trigger Output	Valid selections, depending on Receive setup, are: None, B1, B2, B3, and Pattern.

Demapping a PDH Signal

To demap and test a PDH signal, you set Structure to the appropriate PDH mapping.

When you use tributary signal mapping, you must also specify the tributary under test and payload (see Figure 3-56).

When you use TU-12 or TU-3 signal mapping, you must also specify the tributary unit under test and payload (see Figure 3-56).

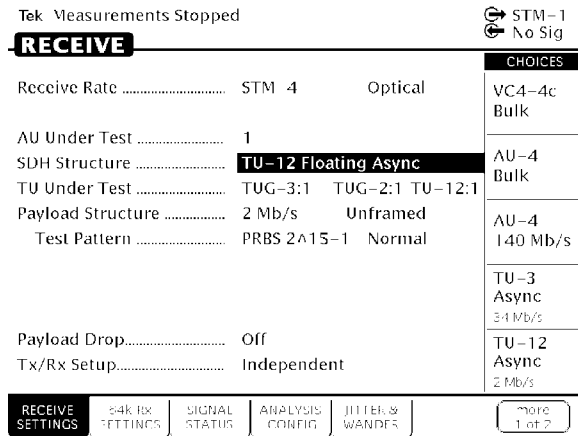


Figure 3-56: Setting PDH Mapping

To specify the TU Under Test and set the payload:

1. Specify the TU Under Test as follows:

NOTE. The choices available for TU Under Test depend on the selected Structure.

2. If the Structure is set to TU-12, specify the TU Under Test by first specifying the Tributary Unit Group (TUG) as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
		TU Under Test (TUG3 :n)	TUG3 :1
			TUG3 :2
			TUG3 :3

3. If TU12 Async is the selected mapping, specify the Tributary Unit (TU) as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
		TU Under Test (TU12 :n)	<i>as appropriate</i>

4. If TU3 Async is the selected mapping, specify the Tributary Unit (TU) as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
			TU3 :1
			TU3 :2
			TU3 :3

H Select **TU3:1**, **TU3:2**, or **TU3:3** to specify TU Under Test.

5. Specify the payload as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
		Payload Structure	<i>as appropriate</i>

NOTE. The choices available for Payload depend on the selected Structure.

Dropping a PDH Signal

To drop a signal it must be demapped, as described previously, and you must turn on Payload Drop.

If the Receive rate is any PDH or SDH rate, SDH is mapped for PDH, and the PDH payload is less than the line rate, then a selection appears at the bottom of Receive, Receive Settings menu. This selection permits the operator to drop a certain PDH payload. 8 Mb/s and 64k rates can not be dropped.

To turn on Payload Drop:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	RECEIVE SETTINGS	Payload Drop	Off
			On Balanced
			On Unbalance

NOTE. The choices available for Tributary Drop depend on the selected Structure.

- H Select **On** to drop the signal specified on the Payload line. The signal will be dropped to the appropriate OUT connector on the front panel.

Viewing Overhead Bytes

This section describes how to use the PATH OVERHEAD and PATH OVERHEAD pages to view overhead bytes. The display updates about once per second to track changes in the overhead. At any time, you can pause the updating process to analyze the bytes.

Viewing Section Overhead Bytes

To view section overhead bytes:

1. Display the section overhead as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD	<i>none</i>	<i>none</i>

If you are receiving a line rate higher than the SDH basic-level rates STM-1E or STM-1, you must indicate which overhead, at the STM-1 level, you want to display. One set of “columns” is the Section Overhead for an STM 0. STM 1 permits three choices; STM 4 permits three choices times four AU 4s; VC4 4c permits the same three choices as STM 1.

2. Select the columns you wish to display as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
		Showing Overhead for	<i>as appropriate</i>

Viewing Path Overhead Bytes

To view path overhead bytes:

1. Display the path overhead as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD	Overhead View	VC4 Overhead
			VC3 Overhead
			VC12 Overhead

NOTE. The choices available depend on the mapping of the received signal.

H Select **VC4 Overhead** to display the VC4 overhead bytes.

H Select **VC3 Overhead** to display the VC3 overhead bytes.

H Select **VC12 Overhead** to display the VC12 overhead bytes.

Displaying the J1 Path Trace Message

To view the Path Trace Message:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD (see Figure 3 57)	<i>none</i>	<i>none</i>

Displaying the J2 Path Trace Message

To view the J2 path trace message:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD (see Figure 3 57)	Overhead View	VC12 Overhead

Displaying the V5 Byte

To view the V5 byte:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD (see Figure 3 57)	Overhead View	VC12 Overhead

NOTE. When the VC12 Overhead is displayed, the J2, N2, and K4 bytes will also be displayed.

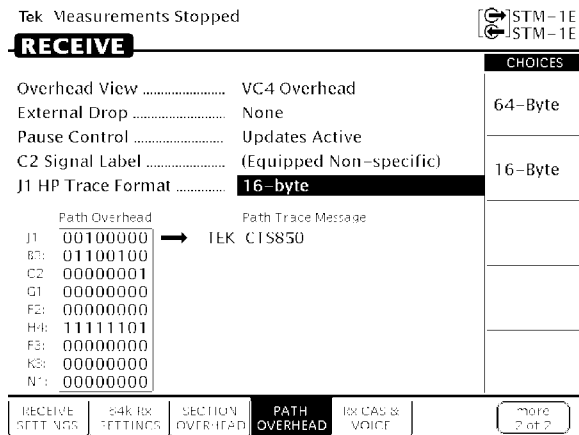


Figure 3 57: J1 Path Trace Message Received by the CTS850

Dropping DCC and User Channel Overhead Bytes

You drop the contents of the Data Communications Channel (DCC) and User Channel to an external protocol analyzer. The data from the DCC and User Channel is dropped through the Overhead Add/Drop Port located on the rear panel. See *Rear Panel Connectors in the Appendices* for detailed information on the port pin assignments.

To drop data from the DCC:

1. Connect an external protocol analyzer to the CTS850 using the Overhead Add/Drop Port on the rear panel of the CTS850.

2. Configure the CTS850 to drop the DCC data bytes:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD	External Drop (see Figure 3 58)	None
			D1 D3
			D4 D12
			E1, E2
			E1, E2 to handset
			F1

- H Select **None** if you do not want to drop the DCC bytes.
- H Select **D1 D3** to drop the D1 D3 bytes of the DCC.
- H Select **D4 D12** to drop the D4 D12 bytes of the DCC.
- H Select **F1** to drop the F1 byte of the DCC.

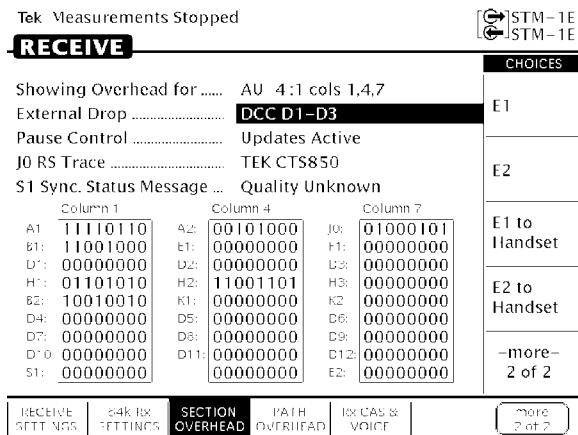


Figure 3 58: Dropping Data from the DCC

To drop data from the User Channel:

1. Connect an external protocol analyzer to the CTS850 using the Overhead Add/Drop Port on the rear panel of the CTS850.
2. Configure the CTS850 to drop the User Channel data byte:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD	External Drop (see Figure 3 59)	None
			F2

H Select **None** if you do not want to drop the User Channel data.

H Select **F2** to drop the User Channel byte.

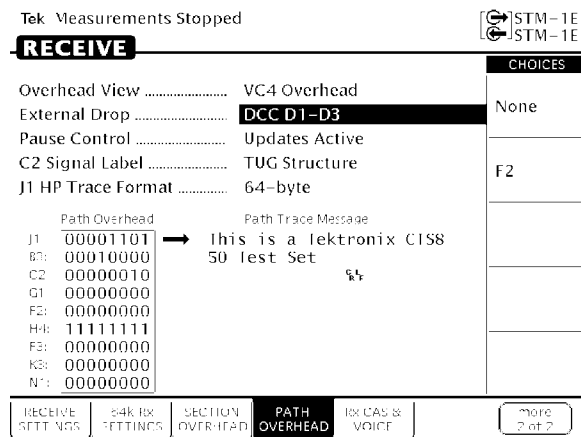


Figure 3 59: Dropping the User Channel Data Byte

Controlling the Display Update

To pause or continue overhead byte updating:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
RECEIVE	PATH OVERHEAD	Pause Control	Pause
			Continue

