Setting Alarms and Inserting Errors

This section describes how to simulate error conditions, set alarms, and simulate network failures. To test the response of a network, you might need to simulate parity errors, send alarm signals, and simulate network failures. This type of testing is simple and convenient using the CTS850 SDH/PDH Test Set.

To insert PDH errors, it is necessary to set the layer in the mux chain where anomalies, defects and failures will be inserted. Some errors, like CRC, are specific to a particular layer (in this case, 2 Mb/s Multiframe). Insertion of a layer specific error will not change the insertion layer. Layer selection is not limited to active tributary rates. See the example of a TRANSMIT, Defects & Anomalies menu screen for PDH at the end of this section on how to set the layer for PDH Anomalies, Defects and Failures.

Simulating Error Conditions

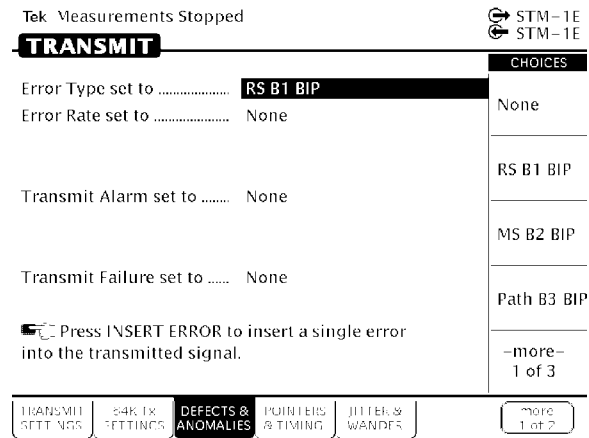The specific errors the CTS850 simulates depend on the transmit rate and payload structure.

Figure 3 73: Example of TRANSMIT, Defects & Anomalies menu

Specifying the Error to Insert

Specify the type of error transmitted as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
TRANSMIT	Defects & Anomalies	Error type set to	None
			RS B1BIP
			MS B2BIP
			Path B3 BIP
			HP REI
			TU BIP
			TU Path BIP
			LP REI
			Pattern Bit
			PDH FAS Error
			PDH FAS Burst
			Code
			PDH CRC

NOTE. The errors available to insert depend on the Structure and Payload settings. Not all errors are available all the time.
FAS Burst is defined in terms of M errors in N frames, rather than a rate.

Inserting Errors

You can choose to insert errors manually (one at a time) or you can have errors inserted automatically at a rate you specify.

To insert a single error, press the **INSERT ERROR** button.

To have the CTS850 insert errors automatically:

1. Turn on automatic error insertion as follows:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
TRANSMIT	Defects & Anomalies	Error rate set to	None
			1e 3
			1e 4
			1e 5
			1e 6
			1e 7
			1e 8
			USER DEFINED

H Select **None** to turn off automatic error insertion. However, you can still insert errors manually using the front-panel INSERT ERROR button.

H The maximum allowable error rate depends on the transmit rate, signal structure, and error type (see Tables 3 24 and 3 25).

Table 3 24: Maximum Error Rates for SDH Signals

Error Type	Rate	
	STM-1	STM-4
RS B1 BIP	1E 4	1E 5
MS B2 BIP	1E 4	1E 4
Path B3 BIP	1E 4	1E 4
HP REI	1E 4	1E 4
Pattern Bit	1E 3	1E 3

CTS850 SDH/PDH Test Set User Manual

Table 3 25:Maximum Error Rates for TU Mappings and PDH Signals

Error Type	N x 64k		2 Mb/s		8, 34 Mb/s		140 Mb/s	
	Min Rate	Max Rate	Min Rate	Max Rate	Min Rate	Max Rate	Min Rate	Max Rate
TU BIP			1E 8	1E 4	1E 10	1E 4	N/A	N/A
LP REI			1E 8	1E 4	1E 10	1E 4	N/A	N/A
CRC			1E 8	1E 4	N/A	N/A	N/A	N/A
Frame			N<M<1000 M=Frame Count, N=Consecutive FAS Error Count					
Pattern Bit	1E 6	1E 2	1E 8	1E 2	1E 9	1E 2	1E 9	1E 2
Line Code	N/A	N/A	1E 8	1E 3	1E 10	1E 3	N/A	N/A

If your CTS 850 supports the 45 Mb/s option, the following Min/Max error rates for TU Mappings and PDH signals are available:

Parity (45 Mb/s P)	**Min. 1E 9**	**Max. 2E 4**
Parity (45 Mb/s CP)	**Min. 1E 9**	**Max. 2E 4**
REI (45 Mb/s)	**Min. 1E 9**	**Max. 2E 4**

2. Select **USER DEFINED** to specify an error rate different from the preset choices. The CTS850 enters edit mode.

  H If the knob is assigned to Coarse, it changes the exponent.

  H If the knob is assigned to Fine or Finer, it changes the decimal number.

3. Select **DONE** to enter the error rate you have specified.

Setting Alarms

The CTS850 can simulate alarm conditions to test the response of the network.

To transmit an alarm:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
TRANSMIT	Defects & Anomalies	Transmit alarm set to	None
			MS AIS
			MS RDI
			AU AIS
			HP RDI
			TU AIS
			LP RDI
			PDH RAI
			PDH AIS

H   Select **None** to stop transmitting an alarm.

H   Select **MS AIS** to transmit an MS AIS alarm.

H   Select **MS RDI** to transmit an MS RDI alarm.

H   Select **AU AIS** to transmit a AU AIS alarm.

H   Select **HP RDI** to transmit a HP RDI alarm.

H   Select **TU AIS** to transmit a TU AIS alarm.

H   Select **LP RDI** to transmit a LP RDI alarm.

H   Select **PDH RAI** to transmit a PDH RAI alarm.

H   Select **PDH AIS** to transmit a PDH AIS alarm.

NOTE. The TU AIS and LP RDI choices will be displayed only if Structure, on the TRANSMIT SETTINGS page, is set to TU-12 Async or TU 3 Async.

All transmit alarm choices remain in effect until they are deliberately turned off.

Simulating Transmit Failures

The CTS850 can simulate transmit failure conditions to test the response of the network.

To simulate a transmit failure:

Press Menu Button	Select Menu Page	Highlight Parameter	Select Choice
TRANSMIT	Defects & Anomalies	Failure set to	None
			LOS
			LOF
			AU LOP
			TU LOP
			TU LOM

NOTE. TU LOP (TU LOP is TU3 or TU12 mapping) and TU LOM (TU LOM is TU12 only) can be selected only if Structure, on the TRANSMIT SETTINGS page, is set to TU-12 Async.

H   Select **None** to stop simulating failures.

H   Select **LOS** to simulate a loss of signal failure.

H   Select **LOF** to simulate a loss of frame failure.

H   Select **AU LOP** to simulate a loss of pointer failure in the administrative unit.

H   Select **TU LOP** to simulate a loss of pointer failure in the
    tributary unit.

H   Select **TU LOM** to simulate a loss of multiframe failure in the
    TU12 mapping.

All transmit failures remain in effect until they are deliberately
turned off.

An exception to the previous sentence has to do with LOF and LOS
transmit failures. The RX test unit will not reacquire a LOF transmit
failure from a TX source, if the RX has experienced a loss of signal
(LOS). The solution to this situation is to clear the TX source (either
the CTS 850 operating in a loopback test or an external transmitter)
that is sending a LOF transmit failure, so that the RX test unit can
acquire the LOF transmit failure again. An indication of this
situation is that the front panel of the RX test unit will initially
register the LOF, but the red LED light will extinguish itself when
the red LED of the LOS appears. As the signal is restored to the test
unit, and the TX source is still transmitting LOF transmit failures,
the front panel LED of the RX test unit will not light up.

PDH Defect & Anomaly Insertion

To insert PDH errors, it is necessary to set the layer in the mux chain
where anomalies, defects and failures will be inserted. Some errors,
like CRC, are specific to a particular layer (in this case, 2 Mb/s
Multiframe). Insertion of a layer   specific error will not change the
insertion layer. Layer selection is limited to active tributary rates.
See the example of a TRANSMIT, Defects & Anomalies menu
screen for PDH at the end of this section on how to set the layer for
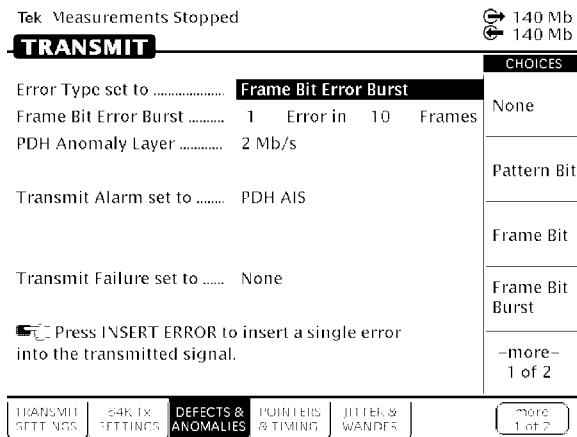PDH Anomalies, Defects and Failures.

Figure 3 74: Set the Anomaly, Defect, Failure layer in the Mux chain

Table 3 26: Anomaly, Defect, Transmit Failure options

Type options	Choices
Anomaly	None, RS B1 BIP (1), MS B2 BIP (1), Path B3 BIP (1), HP REI (1), TU BIP (1), LP REI (1), Pattern Bit (1), FAS Error (1,2), FAS Burst (2,3), Code (4), CRC (1)
Defect	None, MS AIS, MS RDI, Path AIS, Path RDI, TU AIS, LP RDI, PDH RAI (2), PDH AIS
Transmit Failure	None, LOS, LOF, AU LOP, TU LOP, TU LOM

(1) Error insertion rate will be displayed

(2) PDH Layer selection will be displayed

(3) PDH FAS Burst error insertion will be displayed.

(4) Code error insertion is available for E1 E3 rates (2 Mb/s, 8 Mb/s, 34 Mb/s) only.

CTS850 SDH/PDH Test Set User Manual