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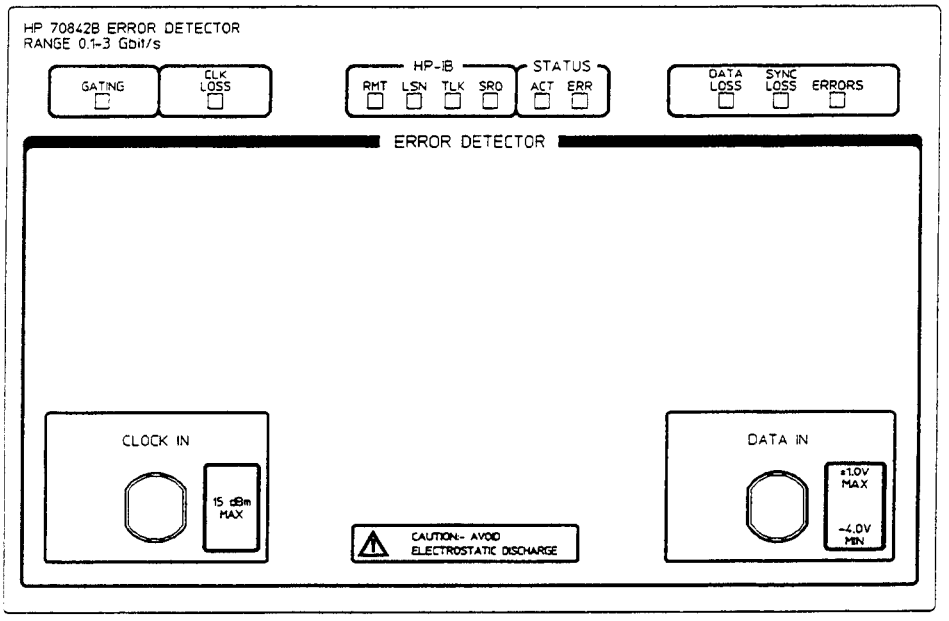
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HP 70842B Error Detector



Description

The HP 70842B error detector module complements the pattern generator module.

The HP 70842B occupies 4/8 MMS module slot and has five Input/Output ports, two on the front panel and three on the rear panel.

Specifications

The following gives an abbreviated version of the error detector module specifications; refer to the HP 71600B Series Installation and Verification manual for detailed specifications.

Operating Frequency Range:

HP 70842B: 100Mbit/s to 3Gbit/s.

Patterns

PRBS, zero substitution/variable mark density test patterns, and word test patterns are as specified for pattern generator modules.

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Error Measurements

The Error Detector counts bit errors by comparing the incoming data bit-by-bit with the internally generated reference pattern. All measurements run during the gating periods, with the exception of Delta Error Count and Delta Error Ratio which run continuously. The measurements performed are:

- Error Count
- Delta Error Count
- Error Ratio
- Delta Error Ratio
- Errored Intervals (second, decisecond, centisecond, millisecond)
- Error Free Intervals (second, decisecond, centisecond, millisecond)
- Error Count 0 → 1
- Error Count 1 → 0
- Error Ratio 0 → 1
- Error Ratio 1 → 0

Error Analysis

The error analysis measurements are based on CCITT Rec G.821 and derived from the bit error results.

- %Unavailability
- %Availability
- %Errored Seconds
- %Severely Errored Seconds
- %Degraded Minutes

Power-loss Seconds

Displayed as the number of seconds the error detector is not able to perform measurements during a gating period due to ac-power-loss. The gating continues to the end of the selected period following restoration of power.

Frequency Measurement

The incoming clock frequency is measured and displayed to five significant digits.

Measurement Definitions

Refer to Appendix B for definitions of measurements performed by HP 71600B Series Systems.

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Measurement Period

Real-time Clock:

Provides time and date information for event logging. Battery back-up allows clock to continue running when the instrument is switched off or power fails.

Gating Periods:

There are three gating (measurement timing) modes: Manual, Single and Repeat.

Manual:

Gating period is controlled by the Run/Stop Gating keys. Accumulating results are displayed throughout the measurement and the end of measurement results are held until a new gating period is started.

Single:

Gating period is started by pressing the `RUN GATING` softkey and terminates at the end of the gating period set by the user or when the `STOP GATING` softkey is pressed. Accumulating results are displayed throughout the gating period and the end of gating results are held until a new gating period is started.

Repeat:

Similar to Single but when one timed gating period ends, a new identical period starts. This continues until the measurement is terminated by pressing the Stop Gating key. The measurement results displayed during any period can be the final results of the previous period or the accumulated results for the current period. There is no *deadtime* between consecutive periods.

Gating Period Format

The gating period format can be specified in one of three modes.

- A time period ranging from 1 second to 99 days, 23 hours, 59 minutes, 59 seconds, (resolution 1 second).
- The time for a number of errors to occur, (resolution 1 second). The number of errors can be 10, 100 or 1000.
- The time for a number of bits to be received, (resolution 1 second). The number of bits can be in the range 1E7 through 1E15 in decade steps.

Results summary can be logged to an external printer over HP-IB at the end of each consecutive period.

Gating after a Power Loss

On instruments configured for Master/Slave operation and with AUTO sync selected, gating will restart after a power loss in the following manner.

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ON regaining power after a power loss the error detector will attempt to regain sync for approximately 25 seconds.

- If sync is regained within 25 seconds gating will restart immediately.
- If after 25 seconds has elapsed and sync has not been regained, gating is forced to start.

Gating Period Elapsed % Display

This display shows the percentage of gating period which has elapsed (time, errors or bits). When gating by errors or bits, it is a feature of the error detector that the displayed value can be greater than 100%. This arises because the gating period is only completed at 1 second boundaries. If the error or bit threshold is exceeded before the next 1 second boundary occurs then one of the following will be displayed:

Condition	Display
Threshold $\leq$ Count $<$10 $\times$ Threshold	100 to 999
Count $\geq$10 $\times$ Threshold	*****

ERROR OUTPUT

The rear panel ERROR OUTPUT port produces an NRZ output pulse when errors occur.

Pattern Synchronization

Synchronization to the incoming pattern can be performed automatically or manually. In manual mode, the Sync Start key forces the error detector to attempt synchronization with the received pattern.

Sync Gain/Loss Criteria:

Synchronization is gained when the measured error rate is less than the set sync threshold. Synchronization loss occurs when the measured error rate exceeds the selected sync threshold. Selectable thresholds between 1×10^{-1} and 1×10^{-8} are provided.

Sync Gain Times

For most RAM based patterns synchronization should occur in approximately 2 to 3 seconds. However synchronization times are dependent on pattern length and pattern content, and will increase as pattern length increases. For very long patterns (for example 4 Mbits) times could be of a minute or more.

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Clock and Data Inputs

Refer to the HP 71600B Series Installation and Verification manual for detailed specifications for these inputs.

ERROR COUNT INHIBIT (on rear panel)

An ECl (active high) signal present at the input will inhibit the error counting of errors in the instrument for a multiple of 16 clock periods.

TRIGGER OUTPUT (on rear panel)

The trigger output pulse is synchronous with the error detector reference pattern. For RAM based patterns the pulse position can change as follows following a resynchronization:

- The absolute position of the pulse can vary by 15 bits.
- The position of the trigger pulse relative to a pattern generator trigger can vary by a number of pattern lengths for patterns which are not a multiple of 128 bits.

Result Logging

Results can be logged to most standard HP-IB 80 column printers. There are two modes of operation; with and without an external controller.

With an external controller, information on results, status and alarms is provided for the controller.

Without an external controller, the error detector module can be set in controller mode to permit output of results, status and alarms to an external printer or other logging device.

Print Modes

Two modes are provided:

On-Demand:	Prints time-of-day and selected set of results when `Log On Demand` key is pressed.
Gating:	Logs time-stamped events during gating and/or a user selected summary of measured results and alarm durations at the end of each gating period. A conditional printing trigger can be set so that printing occurs only on errors or error ratios exceeding a value selected by the user.

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Status Indicators

Front Panel LEDs:

Gating:	Signifies measurements in progress.
Clock Loss:	Indicates nominal low clock power at Clock Input.
Data Loss:	Indicates no transitions in the last decisecond. Under certain circumstances, this LED will not be illuminated when there is no signal connected to the DATA IN port. With no input, 'auto-threshold' sets the input 0/1 threshold to the mean of the idle input. Noise is seen as valid transitions around that threshold. The Data Loss indicator is operative when 'manual threshold' is selected and the 0/1 threshold level altered from the 'auto-threshold' mean value.
Sync Loss:	Illuminated in accordance with sync gain/loss criteria as specified.
Errors:	Indicates one or more data errors in the last decisecond.
HP-IB/MSIB:	Six LEDs indicate status.

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