

# E1/T1 Datacom BERT

## E1/T1 Datacom BERT tester



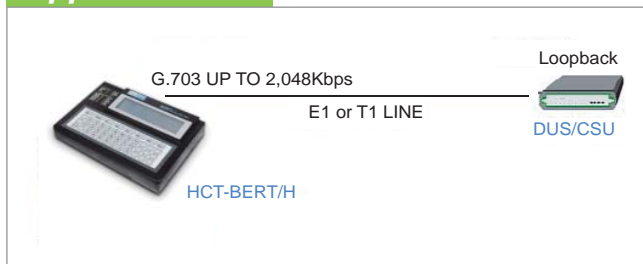
# HCT-BERT/H

The HCT-BERT/H is a compact, sub-note sized E1/T1 Bit Error Rate Tester (BERT) designed for field use in maintenance of data communications (V.35, RS-530/449/232/422 and X.21), E1 (2.048Mbps) or T1 (1.544Mbps) lines. The HCT-BERT/H performs framed, unframed, signaling analysis, drop and insert Nx64Kbps, or Nx56Kbps data into any time slot. The HCT-BERT/H analyzer also provides a variety of E1 or T1 line statuses, transmission performance testing (BERT) and monitoring. On the E1 or T1 line, the BTM10 may be used as a generator or receiver.

### Features

- E1 BERT Analysis: E1/T1 frame, code, CRC, and BPV performance analysis and generator.
- Alarm Setting: Manual or automatic alarm setting.
- Signal Result: E1/T1 PCM level meter and frequency analysis
- Signaling Setting: ABCD bit setting
- Signaling Display: Display all channel's of ABCD bits
- BERT on Data port: Data port BERT performance analysis
- Remote control: Remote controlled by PC terminal or modem
- Example Analysis: off-line analysis of BERT performance
- External Drop and insert: Acts as a fractional E1 or T1 converter
- User Programmable pattern setting:  
There are three 32 bit programmable patterns, which can be inserted onto the E1/T1 line and drop for analysis available, by passed, or idle
- Timeslot setting: Timeslot, Drop and Insert Nx64k data onto E1/T1 line
- Timeslot mapping data: Analyze any channel data of two frames
- Slip measure: Uncontrolled, Controlled, Frame, and Timing SLIP measure
- Sa bits setup and monitor: Multi-frame Sa bits setup and monitor.(E1 only)
- File management: Ten configuration and result memory locations can be stored and recall by user
- Datacom clock measurement

### Application



### Specifications

Ports	<ul style="list-style-type: none"> <li>• 1 port E1 (BNC unbalanced and DB15 balanced), T1 (DB15 balanced) ITU G.703(E1), ANSI T1.403(T1) &amp; ITU G.703(T1)</li> <li>• 1 port data communications s/w selectable V.35, RS530, X.21, RS-232</li> <li>• 1 port RS-232 console, remote</li> <li>• 1 port parallel printer port Print out via parallel Port</li> <li>• LCD display 32 Characters x 8 Lines, Text / Graphic mode</li> </ul>
LEDs	TD, RD, RTS, CTS, DSR, DTR, DCD, TC, RC, XTC, DTE,ECE, Sync loss
Power	AC100~240V adapter to DC 12V 1A
Dimension (D x W x H) mm	137 x 235 x 54mm
Weight	1.6 Kg
Temperature	0~50°C (Operating), -20~60°C (Storage)
Humidity	10~90% non-condensing
Certification	CE, FCC
MTBF	35,000 hours

### G.703 E1/T1 BERT specification

#### 1. BERT Patterns

63, 127, 29-1 (511), 211-1 (2047), 215-1 ITU standard, 215-1 non-standard (inverted), 220-1 ITU standard, 220 -1 non-standard (inverted), QRSS, 223 -1 ITU standard, 223-1 non-standard (inverted), ALL ONEs (Mark), ALL ZEROS (Space), ALT (0101..), 3 in 24, 1 in 16, 1 in 8, 1 in 4, User Programmable

#### 2. BERT Display Format

Normal ITU-M.2100 (option)  
ITU G.821  
ITU G.826

#### 3. BERT Transmit Error Rate

Force Single Error: Logic (Bit), Frame, CRC, and BPV (Bipolar Violation)  
Force 10-3 to 10-7 Error Rate: Logic (Bit), Frame, CRC, and BPV

#### 4. Performance Analysis

Logic, Frame, CRC, BPV, E-bit Errors / Receive Counter  
Error Seconds / Error Free Seconds / Error Rate  
G.821 Available Seconds / G.821 Degraded Minutes  
G.821 Severely Error Seconds / G.821 Error Seconds  
G.821 Unavailable Seconds / G.826 Blocks  
G.826 Available Seconds / G.826 errored block (EB)  
G.826 background block error (BBE) / G.826 errored second (ES)  
G.826 severely errored second (SES)  
G.826 errored second ratio (ESR)  
G.826 severely errored second ratio (SESR)  
G.826 background block error ratio (BBER)  
LOF (Loss of Frame) Events  
COFA (Change of Frame Alignment) Events  
Severely Errored Frame Count.

### Ordering Information

- HCT-BERT/H E1 / T1 /Datacom BERT

## E1 Specification

### 1.Receiver Interface of E1/CEPT

- Line Code:HDB3/AMI
- Pulse characteristics: meets ITU G.703
- Jitter Tolerance: meets ITU G.823
- Input Port Type: Coaxial pair
  - Symmetrical pair
  - DB15 (balanced)
- Input mode (with AGC):Coaxial Pair Impedance:
- Termination: 75ohm resistive (unbalanced)
  - Symmetrical Pair Impedance:
  - 120ohm resistive(balanced)
  - Return Loss: >18dB
  - Receive Sensitivity:+3dB to -40dB
  - Impedance: >1000ohm
- Bridge Mode: Receive Sensitivity: +3dB to -30dB
  - Coaxial Pair Impedance
- DSX-Monitor Mode:75ohm resistive(unbalanced)
  - Symmetrical Pair Impedance:
  - 120 ohm resistive (balanced)
  - Receive Sensitivity: +6dBsx to -30dBsx
- Receive Timing Range: 2.048MHz±4000Hz

### 2.Transmitter Interface of E1/CEPT

- Bit Rate:2048K bit/s±/3ppm
- Line Code: HDB3/AMI
- Pulse characteristics: Meets ITU G.703
- Pulse Amplitude: Nominal 2.37V for Coaxial Pair 75 ohm
  - Nominal 3.00V for Symmetrical Pair 120 ohm
- Zero Amplitude: +0.1 V max.
- Jitter Tolerance: Meets ITU G.823
- Output Port Type: Coaxial pair: BNC (unbalanced)
  - Symmetrical pair: Bantam or DB15 (balanced)
- TX Clock Source: 1. Internal Timing: 2.048MHz±/3ppm.
  2. Internal Timing plus 50ppm offset (30ppm factory option)
  3. Internal Timing minus 50ppm offset (30ppm factory option)
  4. Recovery from RX Timing (Loop Timing)
  5. External Timing
  6. Data Port Timing

### 3. E1/CEPT Frame Structure

- Unframed
- FAS (PCM31)
- FAS+CRC4 (PCM31 with CRC)
- FAS+CAS (PCM30)
- FAS+CRC4+CAS (PCM30 with CRC)

### 4. Line Build Out

0dB / -7.5dB / -15dB

## E1/T1 Analyzer mode

- Channel Map
- Line Attenuation
- Slip Measure
- Signaling
- General Status:
  - Signal Present / HDB3 / Pattern Sync / Frame Sync / Looping
- Results:
  - Bit Errors / BPV Errors / Frame Errors / CRC Errors / G.821 Analysis / G.826 Analysis
- Alarm/Warning:
  - Signal Loss(Pulses) / Frame Loss / Pattern Loss / EXcess Zero Error / One Density / AIS / SLIP / RAI / MRAI
- Print out of test results.

## T1 specifications

### 1. Receiver Interface of T1/DS1

- Line Code:B8ZS/AMI
- Pulse characteristics: meets ITU G.703
- Jitter Tolerance: meets ITU G.824
- Input Port Type: Symmetrical pair: Bantam or DB15 (balanced)
- Input mode (with AGC):
- Termination: Symmetrical Pair Impedance:
  - 100ohm resistive +/- 5% resistive (unbalanced)
- Return Loss: >18dB
- Receive Sensitivity:+6dB to -36dB
- Bridge Mode: Impedance: >1000ohm
- Receive Sensitivity: +6dB to -36dB
- DSX-Monitor Mode: Symmetrical Pair Impedance:
  - 100ohm +/- 5% resistive
  - Receive Sensitivity: up to -30dBdsx
- Receive Timing Range:1.544MHz +/- 4000Hz

### 2. Transmitter Interface of T1/DS1

- Bit Rate: 1544K bit/s±/3ppm
- Line Code: B8ZS/AMI
- Pulse characteristics: Meets ITU G.703
- Pulse Amplitude: Nominal 3.00V for Symmetrical Pair 100 ohms
- Zero Amplitude:+0.1 V max.
- Jitter Tolerance: Meets ITU G.824
- Output Port Type: Symmetrical pair: Bantam or DB15 (balanced)
- TX Clock Source:1. Internal Timing: 1.544MHz±/3ppm.
  2. Internal Timing plus 50ppm offset
  3. Internal Timing minus 50ppm offset
  4. Recovery from RX Timing (Loop Timing)
  5. External Timing
  6. Data Port Timing

### 3. T1/DS1 Frame Structure

ESF / ESF+CRC6 / D4(SF) / SLC-96 / T1DM / Unframed

### 4. Line Build Out

0dB / -7.5dB / -15dB / -22.5dB (Accuracy: +/-1dB )

## Datacom BERT Specification

### Mode A: DTE or DCE Synchronous BERT

- Interface
  - RS-232, V.35, X.21, RS-449, RS-530
- Data rates for 56Kbps Multiples; Nx56Kbps (n=1~32)
  - 56k, 112k, 168k, 224k, 280k, 336k, 392k, 448k, 504k, 560k, 616k, 672k, 728k, 784k, 840k, 896k, 952k, 1008k, 1064k, 1120k, 1176k, 1232k,1288k, 1344k, 1400k, 1456k,1512k, 1568k,1624k, 1680k, 1736k, and 1792k bps.
- Data rates for 64Kbps Multiples; Nx64Kbps (n=1~32)
  - 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1024k, 1088k, 1152k, 1216k, 1280k, 1344k,1408k, 1472k, 1536k, 1544k, 1600k, 1664k, 1728k, 1792k, 1856k, 1920k, 1984k, and 2048k bps.
- BERT Patterns:
  - 63, 127, 29-1 (511), 211-1 (2047), 215-1 ITU standard, 215-1 non- standard(inverted), 220-1 ITU standard, 220 -1 non-standard(inverted), QRSS, 223 -1 ITU standard, 223-1 non-standard(inverted), ALL ONEs (Mark), ALL ZEROs (Space), ALT (0101..), 3 in 24, 1 in 16, 1 in 8, 1 in 4, User Programmable
- Tx Clock Source: The Tx Clock may be set to internal or external.
  - The polarity may also be inverted.
- Rx Clock Source: The Rx Clock is set to external. The polarity of the external clock may also be inverted.
- BERT Transmit Error Rate: single, 10e-3, 10e-4, 10e-5, 10e-6, or 10e-7.
- Flow Control: DCE permitted to transmit on RTS signal or not, DTE permitted to transmit on CTS signal or not.
- Mode B: DTE or DCE Synchronous BERT
  1. Data Rate: Asynchronous: from 50 to 115.2K bps.
    - Synchronous: from 150 to 72K bps.
  2. BERT Patterns: 63, 511, 2047, FOX, SPACE, MARK, and ALT
  3. Tx Clock Source: DTE or DCE.
  4. Flow Control: Xon/Xoff, RTS/CTS, or disable