

# BERT and Protocol Analyzer Family

## 2M E1 and Datacom Protocol Analyzer



### HCT-7000

The HCT-7000, our flagship tester, is a portable, battery powered E1 and data communication tester, designed for a wide range of protocol analysis and BERT (Bit Error Rate Test) at full E1 speeds (2.048Mbps) and is fully suitable for equipment installations, on-line or off-line diagnostics, debugging, and interface development. The HCT-7000 features a backlit Liquid Crystal Display (LCD), push-button switch keyboard, interface lead indicator LEDs, user replaceable data port interface modules and internal rechargeable Li-Ion battery. The unit includes the Basic Interfaces, basic operational firmware, comprehensive User Guide, universal AC power adapter (100~240 VAC) and a sturdy hard shell carry case.

#### Features

- E1, Datacom, Protocol Analyzer and BERT
- Protocols: Frame Relay, SS#7, X.25, PPP (Sync.), V5.1, V5.2, ISDN-D, Sync (BSC), HDLC, SDLC, Async
- Dual pluggable interface ports with available modules:  
 Datacom Module: RS-232C/D (V.24), RS-449 (V.36), RS-530, X.21, V.35  
 E1 Module: G.703 E1 (2048K)
- Supports Centronics printer & control serial port.
- LCD Display: 320x240 graphic (30 lines x 40 characters), with backlight
- Auto Configuration
- Menu driven setup
- ASYNC terminal Emulation
- File Management
- Self Tests and Diagnostics
- Display Modes: Full /Half Duplex Data, Frame / Packet and Lead Status
- Error Check: None, Parity, LRC, CRC-16, CRC-CCITT.
- Capture Buffer: SDRAM
- Line Monitor: DTE; DCE; DTE & DCE
- Emulation: DTE; DCE; MONITOR only
- Counters & Timers: 5 each internal counters and timers.
- MUX/DEMUX BERT (E1 & Datacom BERT)

#### Specifications

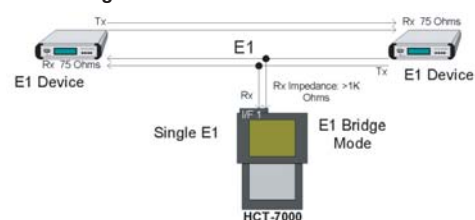
Ports	Data Rate: Async (50 ~ 256Kbps), Sync(150 ~ 2048Kbps)
	Data Code: ASCII, EBCDIC, HEX, IPARS, Transcode, EBCD
	Data Length: ASYNC Mode: 5,6,7, or 8 bits SYNC Mode: 8 bits
	Parity Bit: ASYNC Mode:None, Odd, Even, Mark, Space.
	Stop Bits: ASYNC Mode: 1, 2
	E1 I/F Module: Signal Present, HDB3, Signal Loss, FAS Loss, AIS, RAI, MRAl, MFAS Loss, CAS Loss, Pattern Loss, Excess Zero, Error.
LEDs	System: External power, I/F 1 Error, I/F 2 Error, Paused. Datacom I/F Module:TD, RD, RTS, CTS, DSR, DTR, DCD, RI, XTC, TC, RC, RL, LL, TM.
Power	AC100~240V adapter to DC 19V/2.9A
Dimensions(WxDxH)	275 x 220 x 65mm
Weight	2.5 Kg
Temperature	0 ~ 50°C (Operating), -20 ~ 60°C (Storage)
Humidity	10~90% non-condensing
Certification	CE, FCC
MTBF	35,000 hours

#### Application

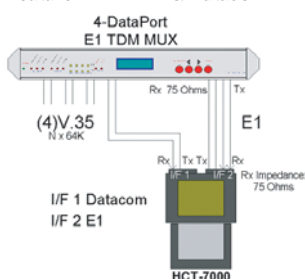
##### E1 Terminal Mode



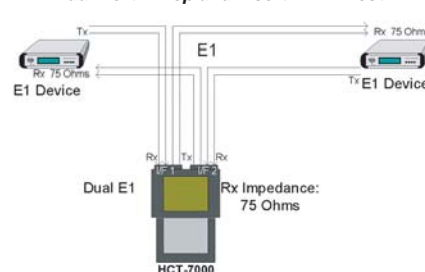
##### E1 Bridge Mode



##### MUX feature - E1 BERT & Datacom BERT



##### E1 Dual Port - Drop and Insert BERT Test



## Specifications for G.703 E1 BERT

- **BERT Patterns**  
63, 127, 29<sup>-1</sup> (511), 2<sup>-11</sup> (2047), 2<sup>-15</sup> ITU standard,  
2<sup>-15</sup> non- standard (inverted), 2<sup>-20</sup> ITU standard,  
2<sup>-20</sup> non-standard (inverted), QRSS, 2<sup>-23</sup> ITU standard,  
2<sup>-23</sup>-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
- **BERT Display Format**  
ITU G.821  
ITU G.826
- **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
- **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 errored 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 error second (SES)  
G.826 errored second ratio (ESR)  
G.826 Severely error second ratio (SESR)  
G.826 Background block error ratio (BBER)  
LOF (Loss of Frame) Events  
COFA (Change of Frame Alignment) Events  
Severely Error Frame Count.

## Specifications for Datacom BERT

- **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<sup>-1</sup> (511), 2<sup>-11</sup> (2047), 2<sup>-15</sup> ITU standard,  
2<sup>-15</sup> non- standard (inverted), 2<sup>-20</sup> ITU standard,  
2<sup>-20</sup> non-standard (inverted), QRSS, 223 -1 ITU standard,  
2<sup>-23</sup> 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.

## Ordering Information

### Master Unit

- HCT 7000 Master unit with LCD display and AC power adapter

### Hardware Options

- **Datacom Interface Module** Two HD26 ports module with adapter cable  
for RS-232,V.35, RS-530, RS-449, X.21.
- **E1 Interface Module** Two BNC ports module with adapter cable

### Software Options

- **Frame Relay (A) Protocol** Frame Relay Analysis Software package

### Analysis software package

- **SS#7 F/W** E1 CCS SS#7 Protocol Analysis Firmware Pack.
- **ISDN -D F/W** E1 CCS ISDN D-channel Protocol Analysis Firmware Pack.
- **V5 F/W** E1 CCS V5.1/V5.2 Protocol Analysis Firmware Pack