



Advanced Test Equipment Rentals
www.atecorp.com 800-404-ATEC (2832)

50-15217-01
Rev. D

T-BERD 2207 USER'S GUIDE

This manual applies to all T-BERD 2207 software incorporating software level 3.x.

JANUARY 2000



Copyright ©1998 TTC®
USA 1-800-638-2049 • +1-301-353-1550 • FAX +1-301-353-0234
Canada 1-888-689-2165 • +1-905-507-4117 • FAX +1-905-507-4126
www.ttc.com

SECTION 9 SPECIFICATIONS

9.1 GENERAL SPECIFICATIONS

9.1.1 Physical Characteristics:

Height:	7.5" (19 cm)
Width:	11.5" (29.2 cm)
Depth:	2.25" (5.7 cm)
Weight:	4.25 lb. (1.93 kg.)

9.1.2 Environmental Characteristics:

Temperature:	
Operating:	32°F to 122°F (0°C to +50°C)
Non-Operating:	-40°F to 167°F (-40°C to +75°C)
Humidity:	10% to 90% Relative Humidity, non-condensing

9.1.3 Electrical Characteristics:

Battery Type:	10.8 V Nickel-Metal Hydride (NiMH)
Operating Time:	Typically, up to three hours of continuous operation on a full charge
Recharging Period:	Maximum of two hours from full discharge
AC Adaptor:	120VAC to 18 VDC 1.2A

9.2 DS1 SPECIFICATIONS

9.2.1 Input Specifications

9.2.1.1 *RX Jack*

Connector Type:	Bantam jack
Frequency:	1,544,000 Hz ±5000 Hz

Impedance	
BRIDGE:	1000 ohms minimum
TERM:	100 ohms $\pm 5\%$
DSX-MON:	100 ohms $\pm 5\%$
Range	
BRIDGE:	+6 to -35.0 dBdsx
TERM:	+6 to -35.0 dBdsx
DSX-MON:	+6 to -24.0 dBdsx of resistive los

9.2.1.2 Loop Codes Detection Criteria

In-Band:	At least 177 error-free bits of the selected repetitive pattern must be received (loop up or loop down).
Out-of-Band:	Datalink monitored every 125 ms for loop codes (loop up and loop down).

9.2.1.3 Pattern Synchronization Detection Criteria

Fixed Patterns:	30 consecutive error-free bits
Pseudo-random:	30 + n consecutive error-free bits for a pattern length of $2^n - 1$

9.2.2 Output Specifications

9.2.2.1 TX Jack

Connector Type:	Bantam jack
LBO Level:	Line build-out of 0, -7.5, -15.0, and -22.5 dB of cable loss at 772 Hz
LBO Tolerance:	± 2 dB at 772 kHz
Timing:	± 7 ppm internal or recovered
Line Codes:	AMI or B8ZS
Error Insert Type:	Logic, BPV, or Frame
Pulse Shape:	With output terminated in 100 ohms resistive load and 0 dB line build-out selected, the T-BERD 2207 meets ITU-T Recommendation G.703; AT&T Publications CB113, CB119, CB132, CB143, and PUB62508; and AT&T PUB62411 pulse shape specifications.

9.2.2.2 Transmitted Loop Codes

In-Band

CSU:	Loop-up: 10000; Loop-down: 100
Facility 1:	Loop-up: 1100; Loop-down: 1110
Facility 2:	Loop-up: 11000; Loop-down: 11100
Facility 3:	Loop-up: 100000; Loop-down: 100

Out-of-Band

Line:	Loop up: 1111 1111 0111 0000 Loop down: 1111 1111 0001 1100
Payload:	Loop up: 1111 1111 0010 1000 Loop down: 1111 1111 0100 1100
Network:	Loop up: 1111 1111 0100 1000 Loop down: 1111 1111 0010 0100

9.2.3 Measurement Specifications

Frequency

Range:	1,544,000 \pm 5000 Hz
Accuracy:	\pm 7 ppm
Resolution:	1 Hz

Received Level

Range:	+6 dBdsx to -40 dBdsx
Accuracy:	\pm 1.0 dB between +6 and -10 dBdsx \pm 2.0 dB between -10 and -20 dBdsx \pm 3.0 dB between -20 and -40 dBdsx
Resolution:	0.1 dB
Vp-p Range:	60 mV to 12.0 V
Vp-p Resolution:	0.05 V

Simplex Current

Range:	10 mA to 180 m
Accuracy:	\pm 5%
Resolution:	1 mA
Simplex path:	13.2 ohms (nominal)

9.2.4 Alarm Criteria

Signal Loss:	175 \pm 75 consecutive zeros
Frame Loss	
D4:	2 out of 5 Ft bits in error
ESF:	2 out of 5 frame bits in error
SLC-96:	2 out of 5 Ft bits in error
Pattern Loss:	100 errors detected in 1000 or fewer bits
Ones Density	
QRSS:	Alarm is suppressed.
Other Patterns:	Received data contains less than n ones in 8(n+1) bits, where n=1 to 23.
Excess Zero	
AMI:	16 or more consecutive zeros
B8ZS:	8 or more consecutive zeros
Yellow Alarm	
D4:	Bit 2 is a 0 for 255 consecutive channels.
ESF:	256 bits \pm 16 bits of a repetitive (1111 1111 0000 0000) pattern received in the 4 kb/s datalink.
SLC-96:	Bit 2 is a 0 for 255 consecutive channels.
AIS:	Unframed T1 signal has 2048 consecutive ones.
Low Battery:	Battery has less than 25% energy remaining.

9.3 DS3 OPTION SPECIFICATIONS

9.3.1 DS3 Specifications

9.3.1.1 Framing Formats

- Auto
- Unframed
- M13
- Muxed M13
- C-bit
- Muxed C-bit

9.3.1.2 Patterns

- 1111
- 1100 (Idle)
- 1010 (AIS)
- 1010
- $2^{15}-1$
- $2^{20}-1$
- $2^{23}-1$
- User (3 to 24 bit programmable)

9.3.1.3 Line Coding

- B3ZS

9.3.1.4 Connectors

- WECCO 560A jack

9.3.1.5 Receiver (Single)

Frequency: 44,736 Mb/s \pm 300ppm
Level: HIGH: Accepts Nominal 1.2 Vp, 0 ft. of cable from High source
DSX: Accepts Nominal 0.6 Vp, 450 ft. of cable from High source or monitor
LOW: Accepts Nominal 0.3 Vp, 900 ft. of cable from High source

9.3.1.6 Transmitter (Single)

Frequency: 44,736 Mb/s \pm 20ppm
Pulse: HIGH: Nominal 1.2 Vp (Signal meets ANSI specification T1.102-1993 and ITU-TG.703 when subjected to 450 feet of cable loss.)

DSX: Nominal 0.91 Vp (Signal meets ANSI specification T1.102-1993 and ITU-TG.703.)

LOW: Nominal 0.31 Vp

Timing: Internal Clock
Recovered Clock

9.3.2 DS3 Measurements

9.3.2.1 Summary

- Bit Errors
- Bipolar Violations
- Parity Errors
- C-bit Errors
- FEBE
- Frame Errors
- Receive Frequency
- FEAC Messages
- DS2 Frame Errors
- Pattern Slip

9.3.2.2 Logic

- Bit Errors
- Bit Error Rate
- Bit Errored Seconds
- Pattern Losses
- Pattern Slips
- Pattern Loss Seconds
- Error Free Seconds
- % Error Free Seconds

9.3.2.3 Bipolar Violations

- BPV
- BPV Rate
- BPV Errored Seconds

9.3.2.4 Frame Errors

- Frame Error Rate
- Frame Error Seconds
- Out of Frame Seconds
- C-bit Errors
- C-bit Error Rate
- FEBE
- FEBE Rate
- DS2 Frame Errors
- DS2 Frame Error Rate
- Received X-bit
- Transmit X-bit
- Frame Loss Count

9.3.2.5 Parity

- Parity Errors
- Parity Error Rate
- Parity Error Seconds

9.3.2.6 Signal

- Signal Loss
- Signal Loss Seconds
- Receive Frequency
- Receive Signal Level
- Transmit Frequency