

Basic and Optional Applications

Basic Software

VF Options

- Speaker
- Drop and Insert
- VF In / Out TS settings

Monitoring Options

- Monitor T1/E1 Line
- Byte Values & Binary Byte Values
- Signaling bits, Power Level, DC Offset, & Frequency
- Multi-frames, and Real-time Multi-frames
- T1/E1 Data as Real-time Bitmap
- Time-slot Window
- ASCII Timeslot Display
- Oscilloscope & Power Spectral
- Active Voice Level

Intrusive Testing

- Bit Error Rate Test
- Enhanced Bit Error Rate
- ATM BERT
- Transmit Tone
- Transmit Gaussian Noise
- Transmit Multiframe
- Transmit Signaling Bits
- Precision Delay Measurement
- Rx-to-Tx Loop back
- Error Insertion

Optional Software

Protocol Analysis

- ISDN, HDLC, SS7, GSM, GPRS, UMTS, GR303, V5.x
- Frame Relay, ATM, PPP, TRAU, CDMA, DCME, T1
- Facility Data Link, E1 Maintenance Data Link, SS1
- Fax, Modem

Protocol Emulation

- ISDN, SS7, ISUP Conformance Scripts, GSM Abis,
- GSM A, MAP, MLPPP Conformance, MLPPP, CAS,
- TRAU, SS1, Multi-link Frame Relay Emulation
- Inverse Multiplexing over ATM

Windows Client / Server—w/ Remote access to T1/E1 server using Clients - C++, TCL, C#

Record / Playback Files—Manual, Automated

Capture, Analysis, & Emulation

- DTMF / MF / MFC-R2, Voice, Fax, Modem, Raw Data

Voice Band Analysis Software

Call Data Records

Multi-Channel BERT

Pulse Mask & Jitter Measurement

Protocol Identifier, Traffic Classifier

Echo Cancellation Testing / Compliance -Manual, Semi-automated, & Automated—G.168, G.160, G.169

- Measure Loop Delay/ERL
- Delay Attenuate Timeslots
- Digital Echo Canceller Simulator
- Audio Processing Utility (APU)

Signaling Transitions Recording

Real-time Strip Chart

Real-time Multichannel Audio Bridge

Multiplex / Demultiplex Software

Network Surveillance, Voice Quality Testing

Future applications include...

- 10/100 Ethernet Interface for standalone embedded applications
- 2-Wire Daughter Board for FXO and FXS (RJ-11) connections
 - FXO – 2-Wire Calling/Answering, Caller ID, T1 E1 to 2-Wire FXO Drop or Insert, PC to 2-Wire FXO Drop or Insert
 - FXS – Ring and Battery Voltage Generation, T1 E1 FXS Drop or Insert, PC to 2-Wire FXS Drop or Insert
- Optional DataCom Board (Dual DB-25 Connections) supporting the following DTE/DCE interfaces:
 - RS-232 (V.28), EIA-530 (V.10 & V.11), X.21 (V.11), EIA-530A (V.10 & V.11), RS-449/V.36 (V.10 & V.11), V.35 (V.35 & V.28)
- Data Interface Support for DTE/DCE
- Standalone Embedded Processor Flash and Platform Flash (SDRAM 512 MByte)
- Additional Daughter Boards planned include ADSL, Octal T1 E1, T1 E1 Switch, etc.



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tProbe™ – Specification

Physical Interface

USB Connector	(1) USB TYPE B Jack
Ethernet Connector	(1) RJ-45 10/100 Ethernet Jack
T1/E1 Connectors	(2) RJ-48c Jacks
Audio Connectors	(4) 3.5 mm Audio Jacks (TX & RX) or (4) Bantam Jacks (TX & RX)
External Clock Connector	(1) MCX Coaxial Jack
External Power Connector	(1) Coaxial DC Power Jack (mates with 5.5mm x 2.1mm coaxial plug)

External Power Requirements

Power Adapter Requirements	+5V @ 2A Max Power to the Center Ring
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T1/E1 Line Interface

Framing Formats	Unframed, D4 (T1) , ESF(T1), CAS(E1), FAS (E1), CRC4 Hardware Compliant: SLC96, T1ESF ZBTISI
Line Code format	AMI, B8ZS (T1) or HDB3 (E1)
Internal Clock Specification	Standard: +/- 3ppm Optional: +/- 1ppm
Output Clock Source	Internal (+/- 1 ppm or 3 ppm), Recovered, External Clock
T1 Output Level	T1: 3.0V Base to Peak Selectable 0-655Ft Pulse Equalization Setting; Tx Capability - DSX-1 Outputs (to 655 feet)
E1 Output Level	E1: 3.0V ± 0.3V Base to Peak
Input Level	75 mV to 6V base to peak or -30 dBsx to -6 dBsx
Line Built Out Selections	0dB, -7.5dB, -15dB, -22.5dB – for T1 only
Loopback	Normal (Outward and Inward) Cross-Port Transmit Loopback Cross-Port Through Loopback

Transmit

T1/E1 Interface Hardware Compliance	- ANSI: T1.403.1995, T1.231-1993, T1.408 - AT&T: TR54016, TR62411 - ITU: G.703, G.704, G.706, G.736, G.775, G.823, G.932, I.431, O.151, Q.161 - ITU-T: Recommendation I.432-03/93 B-ISDN User-Network Interface-Physical Layer Spec - ETSI: ETS 300 011, ETS 300 166, ETS 300 233, CTR12, CRT4 - Japanese: JTG.703, JTI.431, JJ-20.11 (CMI Coding Only)
BERT Pattern Generation	Pseudorandom patterns: (63) 2 ⁶ -1, (511) 2 ⁹ -1, (2047) 2 ¹¹ -1, (32767) 2 ¹⁵ -1, (1048575) 2 ²⁰ -1, (8388607) 2 ²³ -1, QRSS. Hardware Compliant: T1 In-Band Loop Code Generation and Detection Fixed patterns: All Ones, All Zeros, 1:1, 1:7, 3 in 24, User Defined 24- Bits Hardware Compliant: User pattern of up to 32 bits in length
Alarm Insertion	Blue, Yellow, Remote, Distant Multiframe Hardware Compliant: Bit 7 Zero Suppression D4 Yellow: 1 in S bit of frame 12 AIS-CI Code, ESF-RAI CI Code Receive Carrier Loss: 0's for 2047 or 255 bits (For E1 only)
Error Insertion	BPV, Bit Error, Frame Error, CRC Errors, Burst Frames, Fixed Error Rate, Random Error Rate, auto logic from 10 ⁻² to 10 ⁻⁹ for selectable 56K or 64Kps channels.
Drop and Insert	Any contiguous set of digital timeslots and/or audio input
Facility Data Link	T1 ESF Mode: Transmit/Receive Messages, Bit -Oriented Messages, and Files.
Zero Suppression	B7 Stuffing, Transparent, & B8ZS (T1)
Signaling	Robbed-Bit or Clear Channel



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tProbe™ – Specification (Contd...)

Receive

Input Impedance	100 ohms for Terminate and Monitor (T1) 120 ohms for Terminate and Monitor (E1) > 1K ohms for Bridge
Terminations	Terminate, Monitor, Bridge
T1 Input Frequency	1.544MHz +/- 20 KHz
E1 Input Frequency	2.048Mhz +/- 20 KHz
Frequency Measurement	+/- 1ppm
Error Detection	Frame Error, CRC Error, BPV Error, Logic Error, Frame Alignment Error Hardware Compliant: * 10 or 24 bits for sync time * 2/4, 2/5, or 2/6 frame bit in error frame select * Frame error bit corruption for 1 or 3 frame bits * E-Bit Error * Line Code Violation
Alarm Detection	T1 - D4 Yellow Alarm, ESF Yellow Alarm Yellow Alarm (B2 Suppressed-2nd MSB) Yellow Alarm (S-Bit) Yellow Alarm (00FF in FDL) Blue Alarm (Framed or Unframed All Ones) E1 - Remote Alarm Distant Multi-Frame Alarm Signaling All Ones Unframed All Ones Hardware Compliant: J1 Yellow Alarm
Intrinsic Jitter	Meets Jitter Tolerance: Meets AT&T TR 62411 (Dec. 90) Meets ITU-T G.823 Jitter Transfer: Meets AT&T TR 62411 (Dec. 90)
Input Range	T1: Terminate, 0 to 36dB (Long Haul), DSX Monitor, Bridge Hardware Compliant: Terminate, 0 to 15dB (Limited Long Haul), DSX Monitor 20 dB, 26 dB, 32 dB E1: Terminate, 0 to 43dB (Long Haul), DSX Monitor, Bridge Hardware Compliant: Terminate, 0 to 13 dB (Short Haul), DSX Monitor 20 dB, 26 dB, 32 dB

Physical Dimensions

Dimensions	6.05 inches (153.67mm) (L) 5.55 inches (141.224mm) (W) 1.60 inches (40.64mm) (H)
Weight	1.24 lbs. (0.56 kg)

Display and Logging

BERT	Bit Errors, Bit Error Rate, Error Seconds, Error Free Seconds, %EFS, Severely Error Seconds, % SES, Degraded Minutes, %Dmin, Loss Pattern Sync Count, Loss of Sync Seconds, Available Seconds, %Available Seconds, Unavailable Seconds, Bipolar Violations, BPV Rate, BPV Seconds, BPV Free Seconds, Frame Errors, FE Rate, FE Seconds, FE Free Seconds, with Detailed logging into disk file.
Alarms	Resync In Progress, Loss of Signal, Blue Alarm, Change of Frame Alignment, Bipolar Violation, Frame Error, Carrier Loss, Yellow Alarm, Out of Frame Events Counter, Error Super frame Counter, Bipolar Violations, Remote Alarm, Distant Multiframe Alarm, Signaling All Ones, CAS Multiframe Error, CRC4 Error.

VF Drop and Insert

Rx Termination	High Impedance (>50K Ohms) for Non-Intrusive Testing or Software selectable 135, 150, 600, 900 Ohms for Intrusive Testing
Tx Termination	135, 150, 600, 900 Ohms
Sampling Rates	8KHz to 96KHz
Datawidth (bits)	Supports 8, 16, 20, 24, 32 Bit Data
VF Tx Gains	Supports -12 dB to +59 dB in 0.5dB Steps Gain (0.1 dB steps can also be accommodated in tProbe™)
VF Rx Gains	Supports -63.5 dB to +9 dB in 0.5dB Steps Attenuation (0.1 dB steps can also be accommodated in tProbe™)
Connectors	(4) 3.5 mm Audio Jacks (TX & RX) or (4) Bantam Jacks (TX & RX)

Buyer's Guide

- PTE001** – tProbe™ T1 E1 Base Unit
- PTA001** – tProbe™ Basic T1 Software
- PEA001** – tProbe™ Basic E1 Software
- SA000C** – High Stability Internal Clock Option



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