Acterna T-BERD® T-Carrier Analyzers

Total testing capability for the entire span

Today's demanding network-testing environment calls for test instrumentation that is powerful, rugged, compact and easy to use. Ideal for testing from the central office, in the field, or at customers' premises, Acterna T-BERD Analyzers for T1 (Model 107A) and T3 (Model 307) testing meet these requirements and more. Each instrument provides all the testing capabilities necessary for troubleshooting the entire network in a compact and highly portable, battery-powered unit.

The T-BERD T1 Analyzer is a physical layer services tester that provides the ability to troubleshoot equipment and test the full T1 span. Used during PDH circuit installation, acceptance testing, and fault isolation, the T1 Analyzer can transmit and receive test patterns during out-of-service circuit testing. The T1 Analyzer also monitors a T1 circuit without interrupting revenue-generating service.

The T-BERD T3 Analyzer is specifically designed and powerfully engineered to comprehensively test DS3 circuits and the host of new DS3-based communications technologies including wireless communications, video conferencing, distributed data processing, and workstation based graphics. DS1/DS0 signals can also be tested while verifying DS3 circuits. The T-BERD T3 Analyzer fully tests DS3 and DS1 circuits simply and easily with automatic configuration and setup to save time and money.

Product summary

Both ActernaT-BERD instruments can transmit and receive preprogrammed, long user-patterns including 55 OCTET and T1 DALY, allowing circuits to be tested to the maximum. With its powerful emulation of both the customer premises service unit (CSU) and network interface unit (NIU) from the span, companies can isolate the toughest problems and simplify troubleshooting. When troubleshooting DS0 problems users can also listen to individual VF channels and monitor data and ABCD signaling bits on all 24 channels. The channel monitor feature also makes it possible to measure VF level, frequency, and quality.

Highlights

- Test complex digital transmission networks rapidly and economically
- Identify network synchronization problems quickly
- Combine convenience and power with these rugged yet lightweight test instruments
- Reduce setup time with automatic configuration

ACTERNA™
The Keepers of Communications

This instrument is ideal for full installation and maintenance testing along T-Carrier spans

T-BERD T1 Analyzer (107A)
The T-BERD T1 Analyzer's comprehensive capabilities help save considerable time at every stage of the installation and test process. Error and signal analysis can be performed at any point along a T1 span. This instrument is ideal for full installation and maintenance testing along T-Carrier spans.

Downtime is also minimized. The Smart Loopback/Command Codes option enables the technician to isolate problems anywhere along the network with minimal circuit downtime. It can use intelligent repeater technology in the field to qualify and maintain circuits or non-intrusively query performance data. Span problems can be sectionalized remotely before dispatching maintenance personnel.

Further time is saved with automated test patterns that eliminate the need for individual tests. T1 spans can be qualified at the touch of a button with the automated BRIDGTAP and MULTIPAT® tests developed by Acterna.

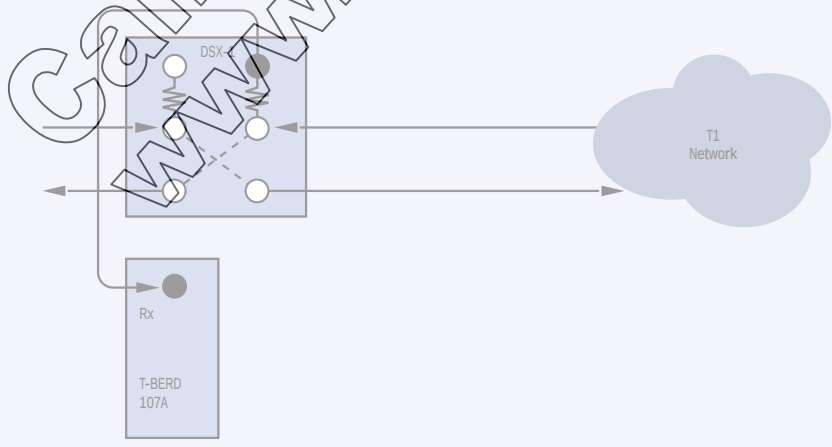

figure 1

Applications

The T-BERD T1 Analyzer is ideal for T1 turn-up and maintenance. It makes it possible to troubleshoot and isolate physical layer problems, measure VF level, frequency, and quality with the channel monitor feature. Network synchronization problems are also isolated easily.

Monitor live T1 networks

The instrument determines framing, coding, and pattern automatically. It can also detect errors for instant display on the front panel. Signal quality and data bits can be monitored on any DS0 channel. Decode the SLC data link or ESF signal and monitor signaling bits to troubleshoot problems in the field (see figure 1).

Qualify T-Carrier circuits

Utilize preprogrammed loop codes for intelligent repeaters to sectionalize span problems before dispatching maintenance personnel. Loop NIUs and CSUs from the central office with one test instrument. Perform automated pattern tests to test the span and identify problems rapidly (see figure 2 below).

Isolate network synchronization problems

Timing problems are identified easily. Compare a T1 circuit with a network reference clock to isolate timing slips (see figure 3 below).

Verify Fractional T1 Service

Use the Fractional T1 option to perform bit error rate tests on selected channels to verify transmission quality on contiguous and noncontiguous FT1 bandwidths. Insert VF tones on single DS0 channels.

Decode ESF Signal

Verify remote in-service circuit performance from the decoded ESF broadcast and access performance statistics by monitoring NIUs with the Enhanced ESF option.

Decode SLC® Datalinks

Decode alarms and datalink messages when installing and troubleshooting SLC systems with the SLC Decode option.

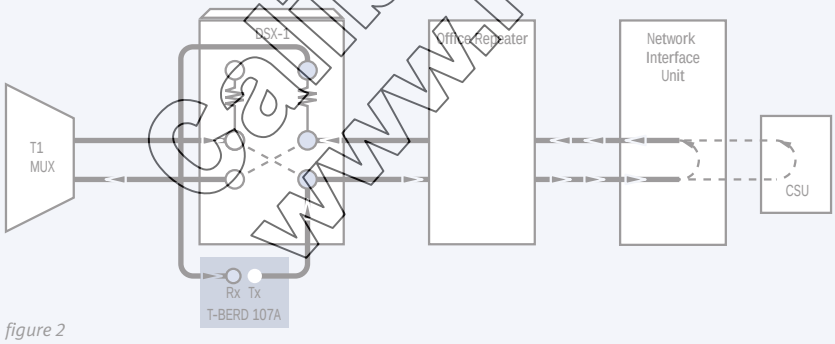

figure 2

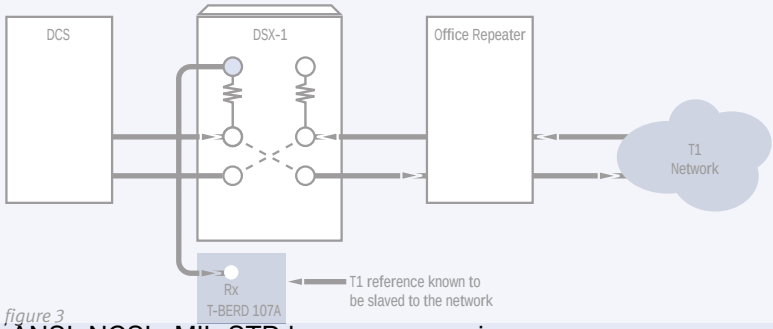

figure 3

T-BERD T3 Analyzer (307)

The Acterna T-BERD T3 Analyzer delivers powerful features that speed testing from a versatile, lightweight battery-powered instrument that is ideal for field service technicians. Unmatched flexibility means tests can be carried out from a variety of access points. Users can verify tributaries at DS3 access points or use the instrument as a DS1 test instrument.

Timing errors are identified rapidly and the DS1 timing reference can be accessed from either DS3 or DS1 access points.

Applications

Multiplexed DS3 patterns

The instrument can simulate 3:1 multiplexers or cross-connects for DS3 and DS1 circuit qualification. Test tones, patterns, loop codes or errors on one or all DS1 channels. For additional testing flexibility DS1 channels can be dropped from the received DS3 signal for analysis (see figure 4 below).

Isolate network synchronization problems

Timing problems are identified rapidly, particularly timing impairments, a common source of errors in asynchronous and synchronous networks. Compare a T1 circuit against a network reference clock to isolate timing slips (see figure 5 below).

Test far-end equipment with ease

Automatically loop up the far-end equipment and verify if data is being received properly on specified DS1 channels by transmitting C-bit FEAC or DS1 loop codes. Results and alarms are immediately visible on the front panel.

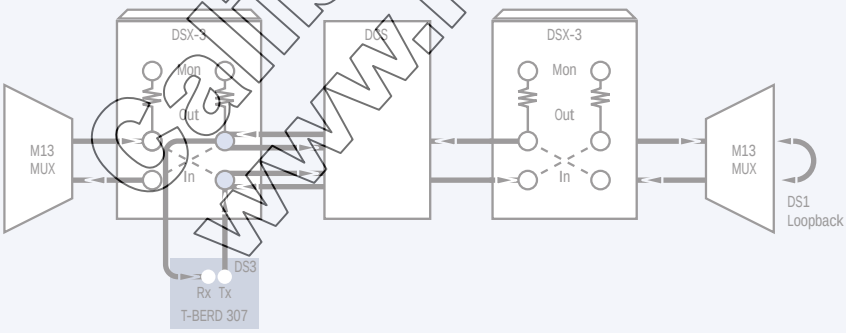

figure 4

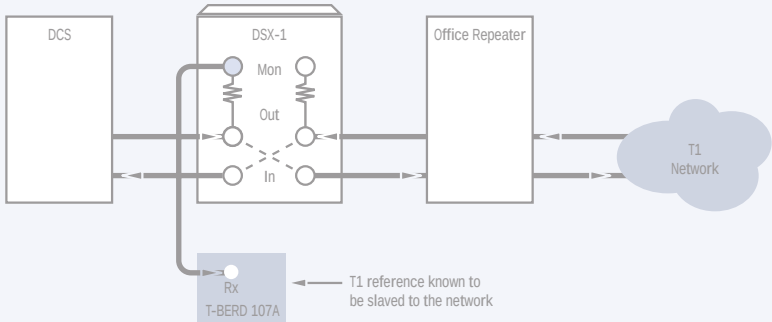

figure 5

Technical specifications

T-BERD T1 Analyzer (107a)

Operating modes
Self Test, Automatic Configuration, T1, T1 D4, T1 ESF, T1 SLC, SLC-M1*, SLC-M2*, T1 D1D, FT1 D4 Framed*, FT1 ESF Framed*, T1 Test Loopback, T1 Line Loopback, SMARTNIU*, T1 MBLT

Patterns
All Ones, 1:1, 1:7, 2 IN 8, 3 IN 24, T1-QRSS, BRIDGTAP, MULTIPAT, User 1, User 2, User 3, All Zeros, 404 Hz*, 1004 Hz*, 2804 Hz*, 2713 Hz*, T1 DALY*, T1-2/96*, T1-3/54*, T1-4/120*, T1-5/53*, 55 OCTET*, MIN/MAX*

Input and output connectors
Bantam and RS-232 (printer operation)

Input impedance

BRIDGE	>1000 W or greater with ALBO
TERM	100 Ω ±5% with ALBO
DSX-MON	100 Ω ±5% with AGC

Receive level

BRIDGE or TERM	+6 to –35 dBdsx
DSX-MON	+6 to –24 dBdsx (of resistive loss)

Output level
Isolated T1 pulse is 3.0 Volts Peak ±0.6 V at 0 dBdsx (conforms with ANSI T1.102-1993 and ITU-T G.703-1998)

LBO level
Line Build Out (LBO) of 7.5, 15.0, and 22.5 dB measured in a 3 kHz ±1 kHz band centered at 772 kHz

LBO tolerance	±2 dB at 7.5, 15.0, and 22.5 dB

VF level

Range	+3.0 to –40 dBm
Resolution	0.1 dB
Accuracy	±0.5 dBm

VF frequency

Range	60 to 3904 Hz (+3.0 to –26.0 dBm) 60 to 3400 Hz (–26.0 to –40.0 dBm)
Resolution	1 Hz
Accuracy	±1 Hz

Transmit timing sources
Internal Clock, Recovered Clock, External Clock

Loopback codes
CSU, CSU Line (ESF), CSU Payload (ESF), NIU (FAC1, FAC2, FAC3), NIU Network (ESF), programmable (3 to 8 bit), intelligent repeaters

Line codes
AMI, B8ZS

Electrical/Mechanical specifications

Size (H x W x D)	8.5 x 4.25 x 3.25 in (21.6 x 10.8 x 8.3 cm)
Weight	4.5 lb (2.1 kg)
Operating temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	–40°F to 167°F (–40°C to 75°C)
Power	AC Adapter: 120 VAC to 12 VDC
Charging time	8 hours (nominal)
Battery	12 VDC, lead-acid electrolyte
Operation	4 hours (nominal)

T-BERD T3 Analyzer (307)

Operating modes
Unframed, M13, Muxed M13, C-Bit, Muxed C-Bit, DS1 Insert, Self Test, Automatic Configuration

Patterns
2^23-1, 2^20-1, 2^15-1, All Ones, Idle, AIS1010, User 1

Input and output connectors
WECO 560A jack

Receive frequency
44,736,000 Hz ±300ppm

Input impedance
75 ohms ±5%, unbalanced to ground

Transmitter frequency
44.736 Mb/s ±5ppm

Transmit timing sources
Internal Clock, Recovered Clock

Line codes
B3ZS

Electrical/Mechanical specifications

Size (H x W x D)	8.5 x 4.24 x 3.25 in (21.6 x 10.8 x 8.3 cm)
Weight	4.2 lb (1.9 kg)
Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	–40°F to 167°F (–40°C to 75°C)

Ordering information

T-BERD T1 Analyzer (107A)

Model no.	*Description*
107A	T-BERD T-Carrier Analyzer
107A-P1	T-BERD T-Carrier Analyzer with 107A-1, 107A-2, 107A-3, 107A-4, 107A-5

Includes
Soft carrying case
AC adapter/charger
Printer cable

Model no.	*Description*
107A-1	SLC Decode
107A-2	Advanced Stress Patterns
107A-3	Enhanced ESF
107A-4	Smart Loopback/Command Codes
107A	Fractional T1

T-BERD T3 Analyzer (307)

Model no.	*Description*
307	T-BERD DS3 Communications Analyzer

Options

Model no.	*Description*
307-1	DS1 Analysis

Warranty and repair service
Acterna offers a three-year warranty on all mainframes and options and includes repair and has calibration facilities worldwide. We also provide extended warranty options. As part of our ISO9001-approved quality system, our components are screened before installation and all instruments are operated at elevated temperatures and vibration levels before being shipped.

Technical support
To complement our instruments and systems, Acterna provides superior technical support. Our TAC engineers offer expert consultation on any technical problem from 8 am to 8 pm Monday through Friday, EST (1-866-ACTERNA).

Training
The right technical training makes everyone more productive and every test instrument more effective. Whether your goal is to shorten installation time, reduce downtime or increase productivity, Acterna's instructors provide practical, hands-on training tailored to your specific needs. We can provide training at our facility (in Maryland, USA) or at any location you designate.

Acterna is the world's largest provider of test and management solutions for optical transport, access and cable networks, and the second largest communications test company overall. Focused entirely on providing equipment, software, systems and services, Acterna helps customers develop, install, manufacture and maintain optical transport, access, cable, data/IP and wireless networks.

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Note: Specifications, terms and conditions are subject to change without notice.

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