



MEGGER® **InterroGatr 10T1 and 20T1**

- Complete in-service or out-of-service testing
- End-to-end T1 span testing with the most common industry standard loop codes
- Model 20T1 performs BERT on one of 17 standard stress patterns and two user-definable 32-bit patterns
- Determines T1 framing and BERT patterns
- Model 20T1 transmits standard, HDSL and Smart Repeater T1 loop codes
- Intuitive, user-friendly interface
- Portable for outside plant applications

Hand-Held T1 Span Verifier and Testers

DESCRIPTION

The Megger® InterroGatr 10T1 and 20T1 are compact, feature packed T1 test sets that can be used for in-service or out-of-service testing. Complete end-to-end testing may be performed at any point in the span by utilizing industry standard Loop Codes. The units may be used at the DSX-1 cross connect jack panel, bridged onto the span or can be a substitute for transmission equipment for real world testing.

InterroGatr 10T1

The unit provides common T1 BERT results including:

- Bit errors
- BPV errors
- Frame errors
- CRC6 errors
- Errored seconds

The InterroGatr 10T1 also provides common alarm/status results and history including:

- Signal present
- Out of frame
- Pattern sync loss
- Yellow alarm

- Blue alarm
- Excess zeros
- Ones density
- DS1 idle code

The unit measures DS1 and DS0 level and frequency, with the DS1 level displayed in either dBDSX or in volts. Receive Channel Data Bits and Signaling Bits are quickly viewed on the front panel display. The InterroGatr 10T1 provides a VF drop with volume control to a speaker or headset for use in noisy environments.

Since the unit's receiver is always in evaluate mode and is completely independent of the transmitter, the InterroGatr 10T1 doesn't even require you to know how the span is provisioned prior to testing. It will tell you how the span is provisioned and immediately start diagnosing your problems.

InterroGatr 20T1

In addition to its lightweight, battery-operated design, features of the InterroGatr 20T1 include:

- Transmits standard, HDSL and Smart Repeater T1 loop codes.

- Operating Modes include Originate, Fractional T1, Half duplex Drop & Insert, Test Loopback, Local Loopback, Tone Insert, BTP (Bridge Tap Testing), MPT (Multi-pattern Testing), and Loop Delay Measurement.

- Performs BERT on one of 17 standard stress patterns and two user definable 32-bit patterns.
- Store and recall up to four programs.
- Measures DS1 level and frequency in volts and dB.
- Detects timing problems, such as clock slips.
- Indicates AMI or B8ZS line coding.
- Measures DS0 level and frequency.
- Displays DS0 data and signaling.
- Logic, BPV and Frame Single and Error Rate Inject.
- Detects DTMF digits.
- G821 performance analysis.
- Printer port.

APPLICATIONS

Telco Installation and Maintenance personnel who are responsible for turning-up and maintaining their DS1 and HDSL/2 spans are perfect candidates for the MEGGER *InterroGatr 10T1* and *20T1*. The units are also used by end-users (ISP's and VPN) who lease lines from the telco to verify performance and aid in troubleshooting when problems arise.

Cellular providers who need to measure network delays associated with cellular service would also use the *InterroGatr 20T1*.

The units' durable construction and long battery life is suited for applications in a hostile environment such as in a manhole or on a telephone poll.

FEATURES AND BENEFITS

- Intuitive, user friendly interface. There are no buried menus or parameters to confuse the operator.
- Its small size allows the unit to be unobtrusively clipped to a belt for use up a utility pole, down a manhole, or just about anywhere else you might need to test.
- A full work shift of testing can be performed by the long lasting and rechargeable NiMH batteries. A full recharge typically takes 4 to 6 hours on fully drained battery.



Model 10T1 in use monitoring DS0 channels

SPECIFICATIONS

Physical

Dimensions

1.75 H x 5 W x 9 D in.
(44 H x 127 W x 229 D mm)

Weight

1 lb, 10 oz (46 kg)

Environmental

Operating Temperature

-4° to +122° F (-20° to +50° C)

Storage Temperature

-4° to +158° F (-20° to +70° C)

Humidity

95% maximum, noncondensing

Power

Batteries

3.6 V 4 Ah NiMH

Battery Life

(InterroGatr 10T1)

Approximately 6 hours of continuous operation

(InterroGatr 20T1)

Approximately 7 hours of continuous operation (in monitor mode measuring clock slips, DS0 Drop on full speaker volume with a fully-charged battery)

Low Battery Indicator

Red LED flashes if voltage is below 3.55 V, indicating approximately 30 minutes of operation remaining

Auxiliary Power

12 V dc, 1100 mA

RX T1 Receiver

Input Impedance

Bridge > 1000 ohms

Term = 100 ohms \pm 5%

Monitor = 100 ohms \pm 5%

Range

Bridge = +6 to -36 dB

Term = +6 to -36 dB

Monitor = -15 to -24 dB

Compatibility

ANSI T1.403, AT&T Pub 62411

Framing

None, D4, ESF, SLC[®] 96

Line Coding

AMI, B8ZS

Patterns

(InterroGatr 10T1)

QRSS, 1 in 8, 2 in 8, 3 in 24, all zeros, all ones, 1:1, NET55, OCT55, DALY55 (all TX Patterns are framed aligned)

(InterroGatr 20T1)

63, 511, 2047, REV2047, 2[^]15, 2[^]20, 2[^]23, QRSS, 1 IN 8, 1 IN 16, 2 IN 8, 3 IN 24, All Zeros, All Ones, 1:1, OCT55, DALY55, two 32-bit user patterns

Status/History

(InterroGatr 10T1)

AMI, B8ZS, Signal present, out of frame, blue alarm (AIS), one density, excess zeros, yellow alarm, DS1 idle signal, pattern sync loss

(InterroGatr 20T1)

Test Summary, AMI, B8ZS, Frame Sync, Pattern Sync, Signal Present, Out of Frame, Pattern Sync Loss, Blue Alarm, AIS), Ones Density, Excess Zeros, Yellow Alarm, DS1 Idle Signal, Pattern Sync Loss

Pattern Sync Loss

100 bit errors in 1000 bits

Pattern Sync Gain

0 bit errors in N + 1200 bits, N = 20 for QRSS, N = pattern length for the other pattern

Signal Present

Absent when 192 consecutive zeros (no pulses) have been detected

Out of Frame

D4, SLC[®] 96: 2 out of 4 FR bits in error

ESF: 2 out of 4-FPS bits in error

Blue Alarm (AIS)

Unframed all ones per TR-TSY-000191 (no framing and 14 or less zeros in 13, 895 bits)

Ones Density

<N ones in 8 (N+1) bits, N = 1 to 23 per ANSI T1.403

Excess Zeros

>15 consecutive zeros per ANSI T1.403

Yellow Alarm

D4: >255 consecutive DS0 channels with bit 2 = 0

ESF: 16 repetitions of "00FFh" on 4 kbps data link

DS1 Idle

All 24 DS0 channels contain 00010111 per ANSI T1.403-1995

DS0 Drop

Selected DS0 channel to 8 data-bit LEDs and speaker

DS0 Signaling Types

ROBBED BIT, CCIS

DS0 Signaling Bits

A, B, C, D

Reference T1 Receiver**Input Impedance**

100 ohms \pm 5%

Range

0 to -36 dB

Compatibility

AT&T TA24/CB113

TX T1 Transmitter**Line Coding**

AMI, B8ZS

Framing

None, D4, ESF, SLC[®] 96

Frequency

1,544,000 Hz \pm 5%

Patterns**(InterroGatr 10T1)**

QRSS, 1 in 8, 2 in 8, 3 in 24, all zeros, all ones, 1:1, NET55, OCT55, DALY55 (all TX Patterns are framed aligned)

(InterroGatr 20T1)

63, 511, 2047, REV2047, 2¹⁵, 2²⁰, 2²³, QRSS, 1 IN 8, 1 IN 16, 2 IN 8, 3 IN 24, All Zeros, All Ones, 1:1, OCT55, DALY55, two 32-bit user patterns

Standard Loop Codes

CSU, NIU4, NIU5, NTWK, LINE, PYLD

T1E1.4/92 Loop Codes

ARM, HTU-C, DOUB, HTU-R

ADTRAN/ADC-Pair Gain HDSL Loop Codes

ARM, NLOC, NDU1, NDU2, NDU3, NDU4, NREM, CLOC, CDU1, CDU2, CDU3, CDU4, CREM

Teltrend IOR9132 (GTE)**(InterroGatr 20T1)**

ARM/DISARM from DSX-1, ARM/DISARM from Network, Far End NIU Activate, Issue Query, Sequential Loopback, Loopback Timeout Disable, Loopback Query, Power Loopback Query, Power Down

Teltrend ILR7238 (GTE)**(InterroGatr 20T1)**

ARM/DISARM from DSX-1, ARM/DISARM from Network, Loopback ILR, Loopback Timeout Disable, Loopback Query, Alt Loopback Query, Loopback ILR Power Loop, ILR Power Cut-Thru

Teltrend ILR7239LG (GTE)**(InterroGatr 20T1)**

ARM/DISARM from DSX-1, ARM/DISARM from Network, Loopback ILR, Loopback Timeout Disable, Loopback Query, Auto Loopback Query, Issue Query, Open Power Loop Query, Sequential Loopback, Remote Sequential Address, Remote Random Address, Address Reset, Change Address, ILR Power Cut-Thru

LBO**(InterroGatr 10T1)**

Fixed at 0 dB

(InterroGatr 20T1)

User Selectable at 0, -7.5, -15 dB

Pulse Shape

Complies with AT&T Pub 62411 and ANSI T1.403

Jitter Tolerance

Complies with AT&T Pub 62411

Results**Display****(InterroGatr 10T1)**

7-segment LED

(InterroGatr 20T1)

4X20 Character LCD display with EL Backlight

Display Results Selection**(InterroGatr 10T1)**

Discrete LED selection

(InterroGatr 20T1)

NORM, SUMMARY, G.821

Result Types**Signal**

DS1 FREQ, DS1 LEVEL, DS0 FREQ, DS0 LEVEL, CLK SLIPS

DS1 FREQ Accuracy

\pm 5 ppm, 0° to 40° C

DS1 FREQ Resolution

1 Hz

DS1 FREQ Range

1,544,000 \pm 10,000 Hz

DS1 LEVEL Accuracy (DSX)

+6 to -16 dB, \pm 1 dB

-16 to -40 dB, \pm 3 dB

DS1 LEVEL Range

+6 to -40 dBdsx

DS0 FREQ Accuracy

\pm 1.5 Hz

DS0 LEVEL Accuracy

\pm 0.2 dBm

DTMF Capture Buffer**(InterroGatr 20T1)**

16 digits

Errors**(InterroGatr 10T1)**

BIT, BPV, CRC, FRAME, ERR SEC

(InterroGatr 20T1)

Logic Errors, Logic Error Rate, BPV, BPV Error Rate, Frame Errors, Frame Error Rate, CRC Errors, CRC Error Rate, Errored Seconds, Error Free Seconds, Error Free Seconds %, Severely Errored Seconds

Maximum count: 2.8147E14

Item [Qty]	Cat. No.
Compact T1/HDSL Span Verifier and Tester	INTERR-10T1
Enhanced T1/HDSL Span Verifier and Tester	INTERR-20T1

Included Accessories

Bantam to Bantam cable, 5 ft (1.5 m) [2]	620036
Power supply, 12 Vdc, 1000 mA [1]	561013
Carry case [1]	684012
Instruction manual	

Optional Accessories

RJ48 to Bantam Y cable (pins 1, 2 and 7, 8)	620032
RJ48 to Bantam Y cable (pins 1, 2 and 4, 5)	620029
Bantam to dual alligator clip cable, 5 ft (1.5 m).....	620030
Bantam to RJ48 cable (pins 4, 5), 8 ft (2.4 m)	620031
RJ45-F to Bantam Y cable (pins 1, 2 and 4, 5)	620033
Bantam to DB15 male, 4 ft (1.2 m)	620034
Bantam to mini-grabber cable, 6 ft (1.8 m).....	620035
Power supply, 12 Vdc, 40 mA	561014