# AT.One, the world in your hand

in Test we Trust

The AT.One is the ultimate tester designed specifically for field engineers that are installing, commissioning and trouble-shooting T1/E1 and Datacom circuits. The AT.One has been designed and manufactured by ALBEDO Telecom in a brand new platform incorporating the latest available electronics. Consequently you will enjoy top performance, high accuracy and, of course, a very competitive price.

The AT.One analyzer is a simple to use, rugged handset, equipped with a full color GUI specifically designed for field use for the analysis and maintenance of telecom circuits. Its comprehensive performance includes framed and unframed signalling, drop and insert Nx64Kbps, data and jitter into any time slot.
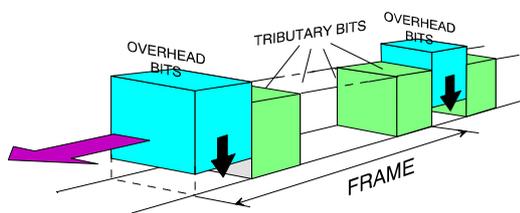
Moreover, AT.One also provides the markets most complete variety of T1 and E1 line status, transmission events, performance testing, BERT, monitoring, results, remote control and configurations. In other words, this equipment has been designed to match the performance and budget over five continents.

Best in Town

The AT.One is a very powerful and fully featured tester and we have two good reasons to justify this point: (a) our architects have designed more T1 and E1 testers than any one else, (b) based on latest technologies available in 2016, you will manage easily to execute any verification, whether it is - channel test, alarm report, quality monitoring, faultfinding or signalling verification

"Quality tester, full featured for T1, E1, Datacom, Jitter & Wander measurements"

Friendly and rugged, the AT.One is presented in a compact case and equipped with all interfaces to reach every point of the network topology.

Have a look and try this flexible tool, you will love it after discovering how the latest FPGA can overcome previous limitations in accuracy, space or performance. Honestly, nothing else can really be compared with this outstanding update of T1, E1, Datacom, Jitter and Wander testing.

ALBEDO Telecom

First-class T1 / E1 tester

Designed and manufactured *in Europe* and equipped with the latest components in the industry including a long life battery, TFT full colour 480x272 touch-screen, SD memory, USB and Ethernet port, Smart serial 26p DTE/DCE ports. Moreover, it has also adopted the state-of-the-art technology in FPGAs, ergonomics, GUI, and testing methodologies. Honestly, nothing compares with the AT.One.

Excellence

After such extended experience, we can at least say we understand field technician needs. The AT.One is an excellent tester for network operators, contractors and enterprise users that have to manage fixed and mobile networks that are using T1, E1 and Datacom backhaul circuits. Your engineers will require a minimum training for installation and commissioning.

a full set of physical layer tests for T1, E1 balanced and unbalanced circuits including BERT, VF, round trip delay and signal level.

Upgradable software via an integrated USB interface is offered. Some important functions include:

- Multi-interface capability: V.24/RS232, V.11/X.24, V.35, V.36/RS449, G.703 (2048/704kbit/s), G.703 co-directional,
- ITU-T G. 821, G. 826, and M. 2100 performance analysis,
- Collection of call records from remote locations,
- CAS signalling generation and monitoring,
- Extensive error and alarm generation,

Highlights

The AT.One reports and generates all events to verify your circuit performance, including frequency level and other functions to ensure a healthy support of any customer applications. The T1, E1 frame defines a cyclical set of time slots of 8 bits that can be analysed in detail including a list of event reports and graphics such as logs, chronograph and histograms for maintenance. The time slot 0 is devoted to transmission management and the central time slot for signalling; the rest were assigned originally for voice/data transport. All of them can be tested with PRBS, Fixed Code and 16-bit user word.

Top Featuring

The robust, handheld T1, E1 and data tester is used for installation, commissioning and maintenance of digital networks. It can carry out both framed and unframed tests on a wide range of equipment. The AT.One provides a scalable test solution for T1, E1 and Datacom testing applications, supported by a large range of software options and sub rate multiplexing features. It allows for rapid evaluation of circuits through a user interface with an auto configure feature. For large, clear results the screen employs

- VF tone generation and measurement,
- Frequency, clock slip and level measurement,
- Jitter measurement,
- Pulse mask representation.

Applications

T1, E1 still is probably the best and most reliable standard established in telecommunications. It is so widely deployed that it will last for many years to come.

Airport channels
Railways
Power utilities
Data Links
Leased Lines
Synchronization

Testing market

This market has plenty of new opportunities including traditional applications such as voice, data, synchronization and leased lines, plus the new challenging architectures that combine T1, E1 circuits with Carrier-Ethernet and IP.

Voice and Data

T1 / E1 systems were designed 40 years ago to support voice applications and have the capability to handle up to 23 / 31 voice conversations at once. These circuits are still widely used today to connect millions of users attached to a PBX, base stations, satellite and microwaves links supporting voice and signalling of any standard including ISDN, POTS, VoIP, etc. In other words this is the most popular legacy telecom solution used by an oustanding number of organizations.

Earth-to-earth communications

Voice and data signals use compression techniques to maximize available bandwidths that

are often transported by T1, E1 lines. For instance, audio codec's like the G729 very popular in WANs, uses T1, E1 to handle up to 107 simultaneous calls interconnecting the new voice solutions by means of TDM circuits.

Synchronization

Most of the mobile base-stations rely on T1, E1 backhaul connections then synchronization is not an issue. When transport is migrated to Ethernet/IP packets, then mobile networks use to maintain the T1, E1 circuits to achieve the synchronous timing and frequency needed.

TDM emulation

The network convergence has moved Service Providers to carry native T1, E1 TDM traffic transparently across the packet switched network (PSN), using various circuit emulation techniques. The TDM traffic is encapsulated in Ethernet or IP frames to emulate the functionality of a TDM circuit, ensuring that all original feature sets are preserved. The AT.One will ensure that the jitter, typical of packet networks, is compliant with the ITU-T O.172 rec. ❑

Smart Cisco Data Cables

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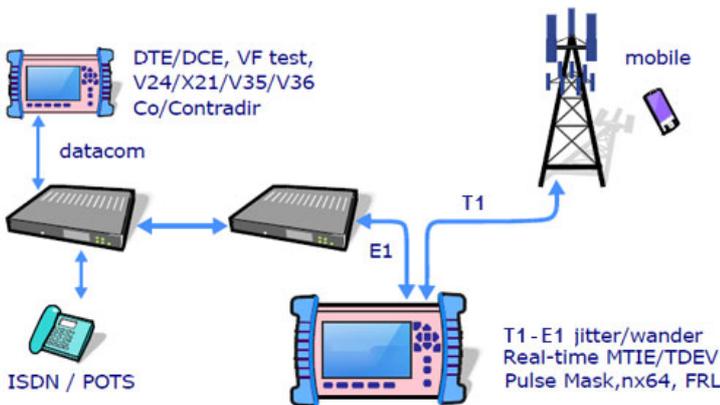
BENEFITS	KEY FEATURES	USERS
• All in one: T1, E1, Datacom	• Touchscreen & mouse	• T1 and E1 installers
• Designed in 2016	• Pulse Mask	• Mobile base stations
• Ultra high performance	• Jitter/Wander test	• Fixed line operators
• Double Port	• Field tester extra rugged	• Datacom Maintenance
• Extra rugged & lightweight	• Cisco Data Cables	• Electrical power utilities
• Hand-held 1kg	• X.21/V.11, V.35, V.36, V.24/V.28	• Air traffic control
• High value - Top quality	• Analogue and VF test	• Frame Relay service
• Very High accuracy	• 2 x USB & RJ45 ports	• Synchronization networks
• SoftLEDs all events at a glance	• 24h on batteries	• Defence links

T1, E1 testing	
Connectors	• Port A: Unbalanced (BNC) 75 Ω and balanced (RJ-45) 120 Ω; Balanced (Bantam) 100 Ω and balanced (RJ-48) 100 Ω • Port B: Balanced (RJ-45) 120 Ω Balanced (Bantam) 100 Ω (AT-1544 only) and balanced (RJ-48) 100 Ω • Port C: Unbalanced (BNC) 75 Ω Analogue voice frequency audio port
Line	• Connection modes: DS1/E1 monitor, DS1/E1 endpoint, DS1/E1 mux, DS1/E1 demux, DS1/E1 through, G.703/E0 endpoint, analogue • Bidirectional testing (DS1/E1 monitor, T1/E1 endpoint, T1/E1 through) by simultaneous operation of Port A and Port B • Configurable input impedance: nominal line PMP 20dB, PMP 25dB, PMP 30dB, high (>1000 Ω), Cable delay equalization up to a 6dB • Configurable output frequency offset within ±25,000 ppm around the nominal frequency • Line codes: HDB3, AMI; Input Level: 0 to -45dB; Pulse mask compliance: ANSI T1.102-1999, ITU-T G.703; Jitter compliance: ITU-T G.823
Frame	• 1544 kb/s unframed, SF (D4) and ESF in accordance with ANSI T1.403-1999 and ITU-T G.704 • 2048 kb/s unframed, ITU-T G.704, ITU-T G.704 CRC, ITU-T G.704 CAS, ITU-T G.704 CRC + CAS • Generation of custom NFAS spare bits (ITU-T G.704 frame with CRC-4 multiframe) • CAS A, B, C, D bit generation for each voice channel. Generation of CAS multiframe spare bits (ITU-T G.704 frame with CAS multiframe)
Patterns	• PRBS 9 (0.150, 0.153), PRBS 11 (0.150, 0.152, 0.153), PRBS 15 (0.150, 0.151), PRBS 20 (0.150, 0.153), PRBS 23 (0.150, 0.151), PRBS 9 inverted, PRBS 11 inverted, PRBS 15 inverted, PRBS 20 inverted, PRBS 23 inverted, QRSS, all 0, all 1; User config 32 bit word • Tone (10 Hz to 4000 Hz, +6 dBm to -60 dBm); External signal: Analogue, 64 kb/s G.703 / E0(AT.One only), Datacom interface
Analysis	• Analogue: Attenuation (dB), freq. (Hz), freq. deviation (ppm), round trip delay (ms). Results include pass / fail indications • Anomalies & Defects: LOS, LOF, AIS, RAI, CRC-LOM, CAS-LOM, MAIS, MRAI, LSS, All 0, All 1, Code, FAS, CRC, REBE, MFAS, TSE, Slip • Live and history LEDs for all Defects and Anomalies • ITU-T G.821, G.826 and M.2100 performance results include Near / Far-end statistics, PASS / FAIL indications • ITU-T G.711 / μ law occupation map and time slot analysis: maximum code, minimum code, average code, time slot level and frequency • CAS A, B, C, D bit analysis; Drop to external output: Analogue, 64 kb/s codirectional (Port A only), data communications interface
Events	• Physical: AIS, LOS; Frame: FAS, CRC, MFAS, REBE, LOF, MAIS, CAS-LOM, RAI, MRAI, CRC-LOM; Pattern: TSE, Slip, LSS, All 0, All 1 • Insertion modes: Single (anomalies), rate (anomalies), continuous (defects), burst of M (defects), M out of N (defects)
Pulse Mask	• Measurement of pulse width, rise time, fall time, level, overshoot and undershoot (positive and negative pulses) • Modes: Eye diagram or continuous; Pass/Fail compliance with ANSI T1.101-1999 / ITU-T G.703 T1 mask, ITU-T G.703 E1 mask

Jitter & Wander	
Generation	• Waveform: sinusoidal; Freq. range: 1 μHz to 100 kHz; Resolution: 0.1 Hz (jitter), 1 μHz (wander) • Amplitude: 0 – 1000 UIpp Max. depends on Freq.; Resolution: 1 mUIpp or $1/10^4$ configured value; Accuracy: better than 0.172 • Smooth amplitude changes in jitter range (10 Hz – 100 kHz); Intrinsic jitter < 10 mUIpp
Jitter Analysis	• Closed loop phase method, range .1 to 100kHz (locking time 10s), 1Hz to 100kHz (locking time 1s), 10Hz to 100kHz (locking t. < 1s) • Amplitude: 0 to 1000 UIpp (single range) (max. depends on modulation freq.); Resolution: 1 mUIpp; Accuracy: better than ITU-T 0.172 • Jitter results: peak to peak, RMS, max. (user reseteable), hits detection, count (user selectable threshold), observation time: 1, 10 & 60s • Filters: LP (f < 40 kHz), LP+HP1 (10 Hz < f < 40 kHz), LP+HP2 (8 kHz < f < 100 kHz), LP+RMS (12 kHz < f < 100 kHz)
Wander Analysis	• Open loop measurement method. Reference freq. required; Modulation Freq. range: 1μHz to 10 Hz; Sampling: 50 Hz • Modulation amplitude: 0 to ±2 s (single range); Accuracy: 2 ns • Instantaneous: TIE, freq. offset & drift; Built-in & real-time Statistics: TIE, MTIE, TDEV; Statistics range: 10^2, 10^3, 10^4, 10^5, 10^6 s

Datacom	
Interfaces	• V.24/V.28 asynchronous/synchronous (RS-232) from 50 b/s to 128 kb/s • X.21/V.11, V.35, V.36 (RS-449), EIA-530 from 50 b/s to 2048 kb/s
Operation	• Test pattern generation and analysis over a datacom interfaces • Defects/ Anomalies: LOC, AIS, LSS, All 0, All 1, TSE, Slip; Analogue: Line attenuation (dB), Freq. (Hz), Freq. deviation (ppm)

Miscellaneous	
E0/nx64	• Balanced (RJ-45) 120 Ω ; Clock ITU-T G.703 contradirectional and centralized • Bit rate N x 64 kb/s; Test pattern generation and analysis over co-directional interfaces • Anomalies and Defect insertion and analysis: LOS, AIS, LSS, All 0, All 1, TSE, Slip
Frame Relay	• Interfaces: X.21/V.11, V.35, V.36 (RS-449); EIA-530 / EIA-530A from 50 b/s to 2048 kb/s • Settings: DLCI, Events, Long frames, short frames, Alignment errors, FCS errors, Frame abort count • Statistics: Bandwidth, Maximum and minimum frame size; Frames with FECN, BECN and DE; Active DLCI list, LMI frame count
Analogue	• Tone Generation (from 10 Hz to 4000 Hz, from 0 dBm to -60 dBm); Level and Freq. • ITU-T G.711 analysis: maximum code, minimum code, average code.
Synchronization	• Internal clock reference; External reference clock: 2,048 kb/s (ITU-T G.703), 2,048 kHz; Configurable input gain: 0 dB, -20 dB

Platform	
Instrument	• Touchscreen 480 x 272 TFT, Mouse, USB & Ethernet ports; SNMP, VNC support; Soft LEDS, 1 kg, 223 x 144 x 65mm; IP-54 • Rechargeable Batteries continuous working up to 24 hours • Operating 0°C ~ 50° C Storage -20°C ~ 70°C; Humidity 5% ~ 95% • All events at a glance: 2xLEDS executing logical OR and Multiple Soft LEDS in screen

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