



ALT2000

Advanced line testing, qualification, maintenance and troubleshooting

General Characteristics and Specifications

Case: Flame retardant grade ABS – EMI/EMC shielded.

Connections:

- RTX (In/Out) and TX (Out) banana connectors (a-b-Gnd)
- External supply and battery charger polarized connector
- Headset RJ-45/4 connector
- Parallel printer connector
- RS-232 serial port connector
- PCMCIA II connector (3)

Display: 320 x 240 pixels B/W graphic LCD with adjustable back light.

Power supply:

- external: from 14 to 18 Vdc / 1.5 A max;
- internal: 8 x A size Ni-MH (green) or 8 x AA size Alkaline

Battery autonomy: 2 hours (approx.) depending on test conditions

Dimensions / Weight: 150 x 210 x 50 mm / 1.6 kg (with Ni-MH batteries)

Environmental:

- Full characteristics: +5 ÷ +45 °C; Operating: -5 ÷ +55 °C
- No-operating: -20 ÷ +70 °C; 95% RH, no-condensing

Over Voltage Auto Protections (1): RTX: 140 Vdc + 12 or 140 Vpp; TX: 140 Vdc + 12 Vpp

Freq. Ref. Accuracy & Stability (2): ≤ ± 1 ppm ± 1 ppm / year ± 2.5 ppm / temp. range

Level Ref. Accuracy & Stability (2): ≤ ± 0.025% ± 0.025% / year ± 0.005% / temp. range

Facilities & Capabilities:

- BMP Screen and CSV Files export to PC capability
- Measurements Storage and Printing capability
- Measurements Troubleshooting Tips facility

Sine & Noise Signal Generator

Output impedance (balanced): <1, 93, 100, 110, 120, 135, 150, 200, 300, 600 Ω.

Output impedance (unbalanced): <1, 47, 50, 55, 60, 68, 75, 100, 150, 300 Ω.

Sine Output frequency: 16 Hz ÷ 2.2 MHz - 1 Hz Resolution



Sine Output level range: -58 ÷ +22 dBm @ 100 Ω
- 0.1 dB Resolution

Sine Output level accuracy:

- ± 0.1 dB (@ 0 dBm; 2 kHz)
- ± 0.1 dB (@ 0 dBm; 200 kHz)

Sine Output level flatness:

- ± 0.1 dB (600 Hz ÷ 10 kHz) or (40 kHz ÷ 1 MHz)
- ± 0.2 dB (20 Hz ÷ 22 kHz) or (20 kHz ÷ 2 MHz)

White Noise Output: -74 ÷ +6 dBm ± 0.5 dB within 1 kHz ÷ 2 MHz @ 100 Ω

Level Meter

Input impedance (balanced): 93, 100, 110, 120, 135, 150, 200, 300, 600 W and >600 kΩ

Input impedance (unbalanced): 47, 50, 55, 60, 68, 75, 100, 150, 300 and > 300 kΩ

Input frequency band: 16 Hz ÷ 2 MHz - 1 Hz Tuning Resolution

Frequency tuning modes: user selectable and tracking on generator

Noise Band filters: Psophometric; C-Message; IEEE-743: D, 3.4 kHz Flat; 15 kHz flat, E, F, G; and other classic and useful noise band filters

Band Pass and Notch filters:

- Low Band: BP and Notch BW: 10 Hz @ fo < 200 Hz
- 5% of fo @ 200 Hz < fo < 4 kHz ; 200 Hz @ fo > 4 kHz
- High Band: BP BW: 0.04, 0.1, 0.2, 0.4, 1.2, 3.0, 3.4, 8.0 kHz

Level measurement units: absolute (dBm o V) or relative (dBr)

Level range: ≤ -120 ÷ +22 dBm @ 100 Ω - 0.1 dB Resolution

Level accuracy: ± 0.1 dB (@ 0 dBm; 2 kHz); ± 0.1 dB (@ 0 dBm; 200 kHz)

Level flatness

- ± 0.1 dB (600 Hz \div 10 kHz) or (40 kHz \div 1 MHz)
- ± 0.2 dB (20 Hz \div 22 kHz) or (20 kHz \div 2 MHz)

Intrinsic Return-Loss / Cross Talk: ≤ -40 dB / ≤ -90 dB

Noise floor (TX OFF): ≤ -136 dBm / Hz @ 100 Ω

Line Tests and Measurements

Automatic tests: SINGLE, COLLECTION and SPECTRUM measures on following services: VOICE, ISDN, HDSL, E1, T1, ADSL, G.lite, ADSL 2 MB/s, ADSL 8 MB/s, SDSL, ADSL2+, G.SHDSL:

- Noise, Return-Loss, Long. Balance, (NEXT), using a single instrument in 2 or (4) Wire mode
- Noise, Return-Loss, Longitudinal Balance, Insertion-Loss, ADSL Bit Rate Evaluation or SDSL
- Pay Load, (NEXT/FEXT), using two instruments in Master / Slave configuration, 2 or (4) Wire mode, with Pair Tracer facility

Advanced Tests and Measurements

- Spectrum & Network analyser with user-selectable frequency ranges, resolutions and impedances
- PSD (Power Spectrum Density) reading mode selectable to monitor line live services
- Generator & Meter for general transmission tests on programmable frequency and filters

Event Tests and Measurements

Line Immunity with White Noise Injection

Output level range

- 153.3 \div -73.3 dBm/Hz @ Zref = 100 Ω
- 0.1 dB Resolution

Output impedance (balanced): 1350 Ω

Reference impedances: 93 \div 600 Ω

Bandwidth: 1 kHz \div 2 MHz

Micro-Interruptions - 0.62

Threshold level: -3 \div -20 dB - 2 kHz Test Tone.6

Monitoring time: 4 min \div 24 hours

Events indicators: 5 Counters (0.3 ms \div >1 min); Event / Time; Secs with Events and time domain graphic representation

Impulsive noise - 0.71

Threshold level: 0 \div -60 dBm

BW filters: 200 \div 12000 Hz Flat, 600 \div 3000 Hz, 300 \div 500 Hz

Monitoring time: 4 min \div 24 hours

Events indicators: 1 Event Counter ; Event / Time Ratio; Secs with Events and time domain graphic representation

TDR – Fault Locator (requires “TDR” option module)

Short Ranges / Accuracy: from 48 to 192 m / from $\pm 0.64\%$ to $\pm 0.35\%$

Medium-Long Ranges / Accur.: from 384 to 12288 m / $\pm 0.24\%$

Resolution @ PVF=0.667 (feets unit also selectable):

- Short Ranges
- 1x: from 0.20 to 0.80 m, 4x: from 0.05 to 0.20 m
- Medium-Long Ranges
- 1x: from 1.60 to 51.20 m, 4x: from 0.40 to 12.80 m

Pulse Width:

- Short Ranges
- Wide: from 48 to 256 ns, Narrow: from 24 to 64 ns
- Medium-Long Ranges
- Wide: from 320 to 3200 ns, Narrow: from 80 to 800 ns

Sample accuracy: ± 0.9 m (all ranges).

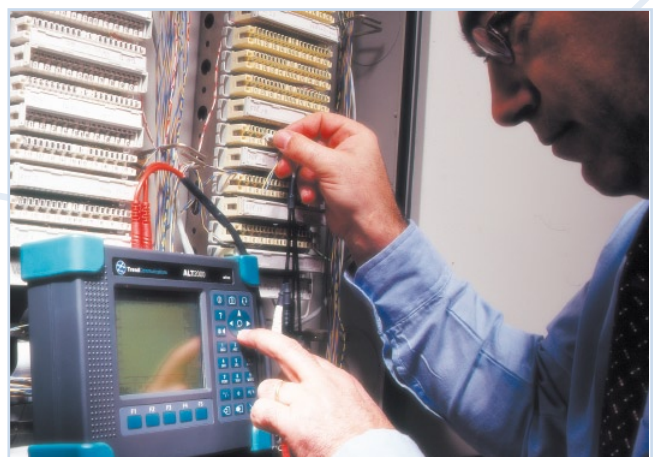
Operating mode:

Single Line; NEXT; Differential Comparison with Memorized; Peak (Sample & Hold function) for long-term measurements

I/O impedance (balanced): 81, 86, 93, 100, 110, 120, 135, 150, 174, 200, 246, 300 Ω

Pulse Output Level: High = 10 V peak and Low = 2 V peak

TGC (Time Gain Control): 0 \div 6.9 dB/km max. (limited by Range and Vertical Zoom)



Zoom:

- Vertical (Gain): -8 ÷ +77 dB
- Horizontal (Length): 1x, 2x, 4x

PVF (Pulse Velocity Factor): from 0.300 up to 0.999

Markers (distances): 1 or 2 differential; two step increments

Metallic Multimeter (if present (*), the item requires “R&I” or “POTS” option module)

RLC Bridge (AC Resistance and Capacitance meter)

Measuring Mode: a-b; a-Gnd(*); b-Gnd(*)

RLC General Characteristics:

- Test Frequency: 1 kHz
- Test Level: 1.1 Vpp

AC Resistance:

- Range: 3 Ω to 1 MΩ
- Resolution: 1 Ω
- Accuracy: 1% of reading ± 1 Ω (@ R < 10 kΩ and C < 500 nF)
- 5% of reading ± 1 digit (@ R < 100 kΩ and C < 500 nF)

Capacitance:

- Range: 0.1 to 3000 nF
- Resolution: 0.1 nF
- Accuracy: 1% of reading ± 1 nF (@ C < 500 nF and R > 500 Ω)
- 5% of reading ± 1 digit (@ C < 3000 nF and R > 500 Ω)

Line Length (as function of measured capacitance):

- Line Capacitance: 10.0 to 300.0 pF / Length Unit
- Range: 1 to 99999 units (meters or feet)
- Resolution: 1 units
- Accuracy: as derived from measured capacitance

Loop Multimeter (DC Voltage, Resistance, Insulation & Current)

Measuring Mode: a-b; a-Gnd(*); b-Gnd(*) and reverse of each ones(*)

Line Voltage: 0 ÷ 140 Vdc

DC Resistance (*):

- Test Voltage: ≤ 4 Vdc
- Range: 2 Ω ÷ 2 MΩ
- Accuracy: ≤ 1% of reading ± 1 Ω

Line Length (as function of measured resistance):

- Line Resistance: 10 to 999 Ω/m or 3 to 304 Ω/ft

- Range: 0 to 99.999 kUnits (meters or feet)
- Resolution: 1 units
- Accuracy: as derived from measured resistance

Low Voltage Insulation(*):

- Test Voltage: 15 Vdc
- Range: 25 kΩ ÷ 250 MΩ
- Accuracy: ≤ 2% of reading ± 1 digit



High Voltage Insulation(*):

- Test Voltage: 95 Vdc (60 uA max.)
- Range: 1 MΩ ÷ 1000 MΩ
- Accuracy: ≤ 2% of reading ± 1 digit

DC Current (*):

- Shunt Resistance: 20 Ω
- Range: 0.1 ÷ 150.0 mA
- Accuracy: ≤ 1% of reading ± 1 digit

POTS – Subscriber Simulator (requires “POTS” option module)

Provides Telephone Tests (like Line Tests) and Advanced Tests, with Subscriber Simulation capabilities. It also allows to perform “End-to-End” Automatic and Advanced tests.

Dial Encoder: Pulse (100 ms – off/on ratio 40/60 %); DTMF standard tones

Ring Detector Range & Meas: 10 ÷ 90 Vrms; 15 ÷ 70 Hz

Ring Detector AC Load: 7310 ≤ ± 2% in series with 940nF ± 10% capacitor

Ring current self limitation: ≤ 15 mApeak; safety fold-back limited



On Hook / Break specifications.: Loop Current < 0.4 mA

Off Hook / Make specifications.: Rloop = $170 \Omega \pm 2\%$
@ I = $10 \div 75$ mA; Voffset = 2.9 Vdc

Loop current measurement: $0.1 \div 100.0$ mA $\pm 2\%$ of reading ± 1 digit

Loop current self limitation: Ω 100 mAdc; safety fold-back limited

Standard configuration

- ALT2000 Base Instrument and the right for free updating with the latest software releases
- ALT Utilities -PC Programs to Update Software, Capture Screen, Export & Read Saved Tests
- Soft Carrying Case with the pocket for accessories
- AC Power Supply and Battery Charge (Line Voltage: $90 \div 264$ Vac; Output: 18 Vdc; 1.4A)
- Banana-Crocodile cables (2.30 m total length) (2 pcs.)
- User Guide (English or Italian language, as requested)
- Banana-Crocodile unipolar cable with Ground Crocodile
- RS-232 Serial cable

ALTAIR PC Software Option

For automatic single-ended qualification of cables.

Line types: ISDN, HDSL 1P, HDSL 2P, E1, T1, ADSL G.Lite, ADSL 2M, ADSL Full, ADSL 2P, SDSL, G.SHDSL.

Tests: Voltage, Insulation, Capacitance, TDR, Line length, Bitrate, Longitudinal Balance, NEXT, PSD, Return Loss, Noise

Options

- Headset with 2 m cable and RJ-45/4 connector
- Banana-Banana shielded cable (2.30 m total length) with 2 Pluggable Crocodile
- Bantam-Banana shielded cable (2.30 m total length)
- Resistive Termination Set (1pcs. of each: 100, 120, 135, 150 and 600 Ω)
- TDR Module (TDR-Fault Locator, Plug & Play internal board)
- R&I Module (Resistance and Insulation Meter, Plug & Play internal board)
- POTS Module (POTS-Subscriber Simul. with R&I functions too, Plug & Play int. board)
- MUX Box (Lines Multiplexer: external multiple lines switcher box) (3)
- RS-232 Male DB9 to Female DB9 Serial Cable

Notes:

- (1) RTX AC Over Voltage Level changes as function of operating modes.
- (2) Frequency and Level References are used to self-calibrate the instrument ("CAL" function).

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