



# ALT2000-MDF

## Update the C/O Main Distribution Frame



### Telephone Tests

- Subscriber Simulator
- Central Simulator

### Metallic Tests

- Voltage AC-DC
- Capacitance AC-DC
- Insulation
- Loop Resistance

### Transmissive Tests

- Noise
- Return-Loss
- Longitudinal Balance
- Insertion-Loss
- PSD

### Troubleshooting

- TDR fault location
- Microinterruptions Test
- Impulsive Noise Tests

**One test equipment for thousands of lines**

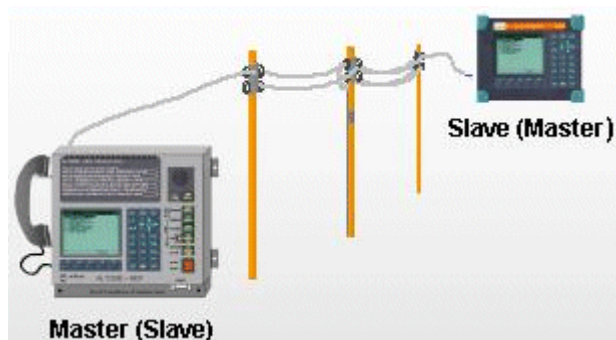
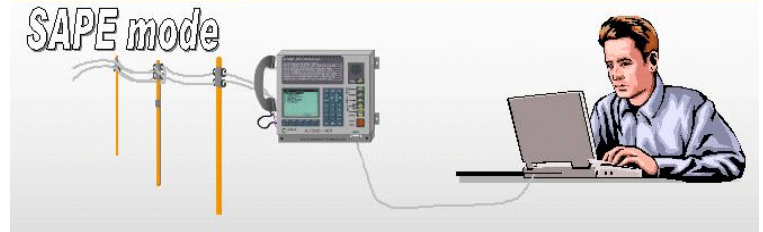
# ALT2000-MDF

## Fixed test equipment

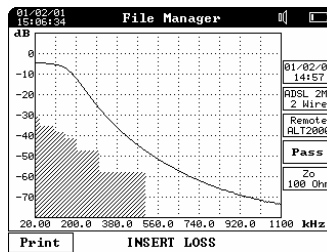
This test instrument designed and produced by ATEN, allows to perform several telephonic metallic and transmissive measurements for qualification, management and maintenance of copper local loop and/or telephone exchange equipments for any service: **POTS - ISDN - T1 - E1 - xDSL**

### Single-Ended Measurements

By the "**SAPE-KIT**" inside, the ALT2000-MDF allows all the "Single-Ended" measurements for automatic xDSL line pre-qualification, with slightest employment of field technicians and without the least trouble at the users.



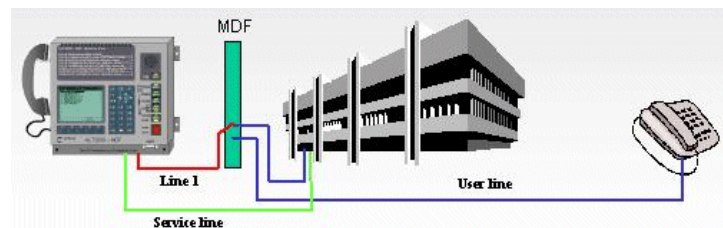
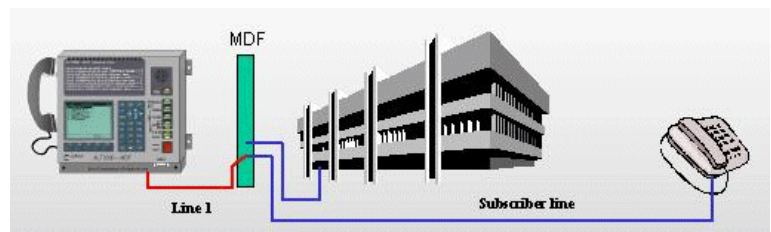
For accurate line qualification & certification are suggested the "**End-to-End**" measurements, using a portable ALT2000 at the opposite side of the line.



The transmissive measurement results are displayed with high resolution graphics (320 x 240 dots) where are also displayed the threshold areas, extracts form the international regulations, and Pass/Fail indication.

### CENTRAL SIMULATOR

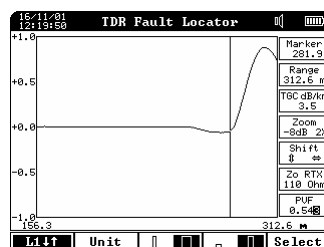
By-passing the Central office circuits is possible to test the subscribers loop and telephones devices. With this configuration, the ALT2000-MDF allows to supply the standard "line feed" and the "Ring" signal to the subscriber line under tests.



### SUBSCRIBER SIMULATOR - (Central Exchange test)

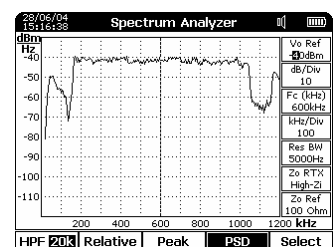
Connecting the instrument to the subscriber interface, is possible to perform all the signalling tests. For a short functionality test of CO subscriber interface is possible to perform a simple loop test for the Ring tone feedback detection.

The **TDR Faults Locator** is optimised for various troubles finding: permanent or random interruptions, open or short circuit, split pair, water ingress, parallels and others impedance mismatching.



### Power Spectrum Density

When selected the Hi-Zo input impedance (sniffer mode) the "Spectrum Analyzer" function allows to measure the energy and the band-width of any digital stream on line.



## ALT2000-MDF Characteristics and Specifications

Case .....:Stainless steel – EMI/EMC shielded.  
Connections.....: • Line 1 - RTX (In/Out), Line 2 - TX (Out) and Service Line (RTX POTS);  
• DC supply and GND;  
• Headset RJ-45/4 connector;  
• RS232 serial port connector;  
Display .....: 320x240 pixels B/W graphic LCD with adjustable back light.  
Power supply .....: from 36 to 72 Vdc / 1 A max.  
Dimensions / Weight.....: 300 x 300 x 90 mm / 2.6 Kg.  
Environmental.....: Full Characteristics: +5 ÷ +45 °C; Operating: -5 ÷ +55 °C;  
Non-operating: -20 ÷ +70 °C; 95% RH, non-condensing.  
IN/OUT Protections.....: Standard ITU-T K.20;  
Over Voltage Auto (1) .....: RTX: 140Vdc + 12 or 140Vpp; TX: 140Vdc + 12 Vpp.  
Frequency Reference,  
Accuracy & Stability (2).....: ≤ ± 1 ppm ± 1 ppm / year ± 2.5 ppm / temp.range.  
Level Reference,  
Accuracy & Stability (2).....: ≤ ± 0.025% ± 0.025% / year ± 0.005% / temp.range.

### Sine & Noise Signal Generator

Output impedance.....:<1, 93, 100, 110, 120, 135, 150, 200, 300, 600, 1350 Ω. (bal.)  
Sine Output frequency .....: 20 Hz ÷ 2 MHz - 1 Hz Resolution.  
Sine Output level range .....: -58 ÷ +22 dBm @ 100 Ω - 0.1 dB Resolution.  
Sine Output level acc.....: ± 0.1 dB (@ 0 dBm; 2kHz); ± 0.1 dB (@ 0 dBm; 200kHz).  
Sine Output level flat.....: ± 0.1 dB (600 Hz ÷ 10 kHz) or (40 kHz ÷ 1 MHz);  
± 0.2 dB (25 Hz ÷ 22 kHz) or (20 kHz ÷ 2.2 MHz).  
White Noise Output .....: -74 ÷ +6 dBm ± 0.5 dB within 1 kHz ÷ 2.2 MHz @ 100 Ω.

### Level Meter

Input impedance (bal).....: 93, 100, 110, 120, 135, 150, 200, 300, 600 Ω and >600 kΩ.  
Input frequency band .....: 20 Hz ÷ 2.2 MHz - 1 Hz Tuning Resolution.  
Freq. tuning modes .....: user selectable and tracking on generator.  
Noise Band filters.....: Psophometric; C-Message; IEE743: 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: 10Hz @ fo < 200Hz;  
5% of fo @ 200Hz < fo < 4kHz; 200Hz @ fo > 4kHz;  
• High Band: BP BW: 0.04, 0.1, 0.2, 0.4, 1.2, 3.0, 3.4, 8.0kHz.  
Level meas. 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; 2kHz); ± 0.1 dB (@ 0 dBm; 200kHz).  
Level flatness.....: ± 0.2 dB (600 Hz ÷ 10 kHz) or (40 kHz ÷ 1 MHz);  
± 0.3 dB (25 Hz ÷ 22 kHz) or (20 kHz ÷ 2.2 MHz).  
Intrinsic Return-Loss .....: ≤ -40 dB  
Cross Talk.....: ≤ -90 dB.  
Noise floor (TX OFF).....: ≤ -136 dBm / Hz @ 100 Ω.

### Line Tests and Measurements

**Automatic tests: SINGLE, COLLECTION and SPECTRUM measurements on following services: VOICE, ISDN, HDLSL, E1, T1, ADSL GIt, ADSL 2M, ADSL Full, ADSL2+, SDSL:**

- Single instrument, using a in 2 or (4) Wire mode: Noise, Return-Loss, Long. Balance, (NEXT). In SAPE mode, by the adoption of a PC note book, with the execution of the Collection Measurement, besides the above-mentioned measurements, the metallic measurements (Voltage, AC - DC Capacitance and Insulation) and the Insertion-Loss evaluation with the maximum ADSL Bit-Rate prediction are added.

- Two instruments in Master / Slave configuration, 2 or (4) Wire mode: Noise, Return-Loss, Long. Balance, Insertion-Loss, ADSL Bit Rate Evaluation, (NEXT/FEXT).

### Advanced Tests and Measurements

- Spectrum & Network analyzer with user selectable freq. 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 ÷ -73.3 dBm/Hz @ Zref = 100 Ω - 0.1 dB Resolution.
  - Output impedance .....: 1350 Ω (balanced).
  - Ref. impedances.....: 93 ÷ 600 Ω.
  - Bandwidth .....: 1 kHz ÷ 2.2 MHz.
- **Micro-Interruptions - O.62**
  - Threshold level .....: -3 ÷ -20 dB - 2kHz Test Tone.
  - Monitoring time .....: 4 min ÷ 24 ours.
  - Events indicators .....: 5 Counters (0.3ms ÷ >1min); Event/Time; Secs with Events.
- **Impulsive noise - O.71**
  - Threshold level .....: 0 ÷ -60 dBm.
  - BW filters .....: 200 ÷ 12000 Hz Flat, 600 ÷ 3000 Hz, 300 ÷ 500 Hz..
  - Monitoring time .....: 4 min ÷ 24 hours.
  - Events indicators .....: 1 Event Counter; Event/Time Ratio; Secs. with Events.

### TDR – Fault Locator

- Short range accuracy .....: from 48 to 192 m / from ± 0.64% to ± 0.35% @ PVF = 0.667.  
- Medium-Long range accuracy .....: from 384 to 12288 m / ± 0.24%  
- Sample accuracy .....: ± 0.9 m (all ranges).  
- Resolution @ PVF=0.667:  
- Short range .....: 1x: from 0.20 to 0.80 m, 4x: from 0.05 to 0.20 m  
- Medium-Long range.....: 1x: from 1.60 to 51.20 m, 4x: from 0.40 a 12.80 m  
- Pulse width:  
- Short range.....: Wide: from 48 to 256 ns, Narrow: from 24 to 64 ns  
- Medium-Long range.....: Wide: from 320 to 3200 ns, Narrow: from 80 to 800 ns  
- Operating mode .....: Single Line; NEXT; Differential Comparison with Mem; Sample & Hold function for long term measurement.  
- I/O impedance (bal.) .....: 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 Ctrl).....: 0 ÷ 6.9 dB/km max (limited by Range and Vertical Zoom).  
- Zoom .....: Vertical (Gain): -8 ÷ +77 dB; Horizontal (Length): 1x, 2x, 4x.  
- PV (Pulse Velocity).....: PVF: from 0.300 up to 0.999 or PV: from 90 up to 300 m/μs  
- Markers (distances) .....: 1 or 2 differential; two step increments.

## Metallic Multimeter

• **RLC Bridge (AC Resistance and Capacitance meter)**  
MEASURING MODE.....: a-b; a-Gnd; b-Gnd.

RLC GENERAL CHARACTERISTICS:  
Test Frequency .....: 1kHz.  
Test Level .....: 1.1Vpp.

### AC RESISTANCE:

Range .....: 3 Ω to 1 MΩ.  
Resolution .....: 1Ω.  
Accuracy .....: 2% of reading ± 1 Ω (@ R < 10 kΩ and C < 500nF).  
5% of reading ± 1 digit (@ R < 100 kΩ and C < 500nF).

### CAPACITANCE:

Range .....: 0.1 to 3000 nF.  
Resolution .....: 0.1 nF.  
Accuracy .....: 2% of reading ± 1 nF (@ C < 500 nF and R > 500 Ω).  
5% of reading ± 1 digit (@ C < 3000 nF and R > 500 Ω).

### LINE LENGHT (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 DC VOLTAGE .....: 0 ÷ 140 Vdc.  
Accuracy .....: ≤ 2% of reading ± 1 digit.

### DC RESISTANCE

Test Voltage.....: ≤ 4 Vdc.  
Range .....: 2 Ω ÷ 2 MΩ;  
Accuracy .....: ≤ 2% of reading ± digit.

### LINE LENGHT (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.

### DC CAPACITANCE (time of DC discharge method)

Test Voltage.....: 95 Vdc  
Range .....: > 40 nF ÷ 10 μF;  
Accuracy .....: ≤ 5% of reading ± 1 digit.

### DC INSULATION (low voltage)

Test Voltage.....: 15 Vdc (60 uA max).  
Range .....: 25 kΩ ÷ 250 MΩ;  
Accuracy .....: ≤ 2% of reading ± 1 digit.

### DC INSULATION (high voltage)

Test Voltage.....: 95 Vdc (60 uA max).  
Range .....: 1 MΩ ÷ 1000 MΩ;  
Accuracy .....: ≤ 5% of reading ± 1 digit up to 500 MΩ.

### DC CURRENT

Shunt Resistance .....: 20 Ω.  
Range .....: 0.1 ÷ 150.0 mA;  
Accuracy .....: ≤ 2% of reading ± 1 digit.

### POTS – Subscriber Simulator

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 Ω ± 2% in series with 940nF ± 10% capacitor.  
Ring current self limitation .....: ≤ 15 mApeak; safety fold-back limited.  
On Hook / Break specs.....: Loop Current < 0.4 mA.  
Off Hook / Make specs.....: Rloop = 170 Ω ± 2%; I = 10 ÷ 75 mA; Voffset = 2.9Vdc.  
Loop current measurement .....: 0.1 ÷ 100.0 mA ± 2% of reading ± 1 digit.  
Loop current self limitation .....: ≤ 100 mAdc; safety fold-back limited.

### POTS – Central Exchange Simulator

Line Feed Generator.....: 48 Vdc / 24 mA max.  
Ring Tone Generator .....: 72 Vpp / 25 Hz.

### Standard configuration

- ALT2000-MDF Equipment for fixed mounting:
- Hedset with cable
- User Guide
- PC Software utility for:
  - Software up-date
  - Screen export (BMP format)
  - File-measurement export
  - File converter and reader
  - ALT-SAPE Controller for single-end pre-qualification measurements.

### 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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