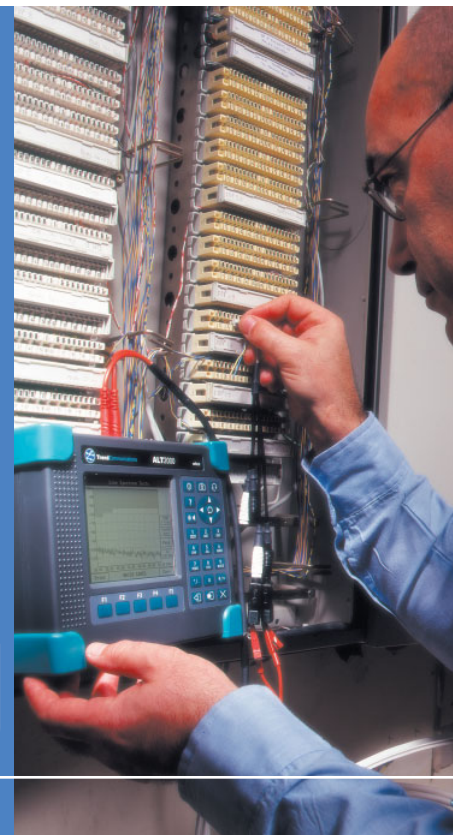


ALT2000



Comprehensive Line Tester



Line Testing

qualification, maintenance and troubleshooting

TrendCommunications

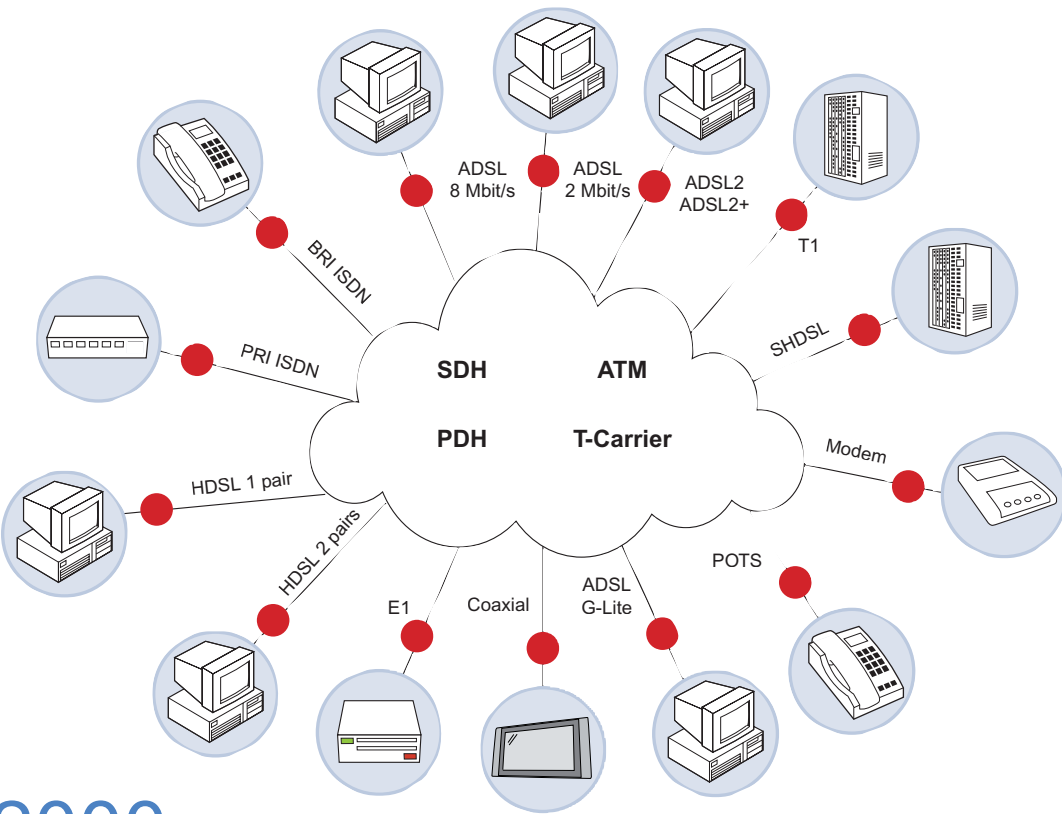
Copper Line

qualification and maintenance

Copper testing has become more critical with the appearance of broadband services that use higher bandwidths on the existing copper infrastructure.

Tests are needed to make sure that reliable service can be offered at these higher data rates. The copper pair that operates flawlessly for POTS and ISDN might not be suitable for high-speed xDSL services.

Suitable test equipment for both preinstallation and in-service qualification becomes of paramount importance to ensure quality of service.



ALT2000

Meets the Needs of Any User

The ALT2000 is a sophisticated analogue tester with a wide range of test methods covering ADSL2, ADSL2+, ADSL, SHDSL, HDSL, POTS, Modem, ISDN, E1 and T1.

Because engineers with analogue performance testing skills have become a scarce resource, ALT2000 includes both preprogrammed and internationally standardised tests for rapid Pass/Fail testing by field engineers.

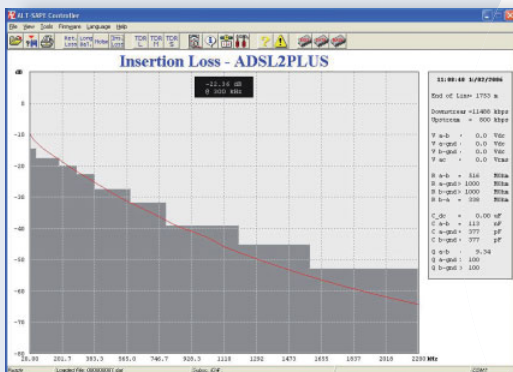
The more advanced users can take advantage of the full capabilities of ALT2000 to rapidly pin-point and resolve line problems.

Specialised Software

ALT2000 now includes an optional PC software package, ALTAIR, for completely automatic single-ended qualification of all line parameters.

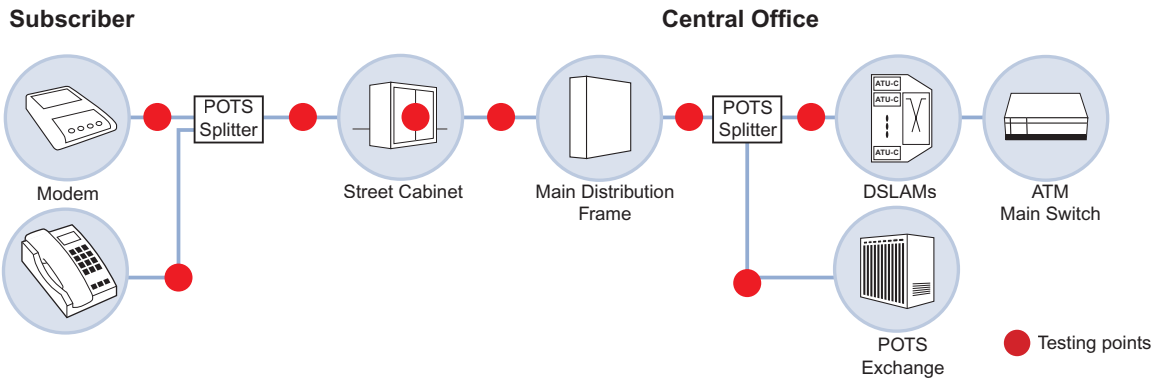
Use ALTAIR to test ISDN, HDSL, HDSL 1P, HDSL 2P, E1, T1, ADSL, ADSL G.Lite, ADSL 2M, ADSL full, ADSL2, SDSL and G.SHDSL lines from any PC.

- Automatic line tests with Master/Slave mode for one-man end-to-end testing
- Built-in Pass/Fail templates
- A wide range of analogue tests
- High-performance spectrum analyser from 20 Hz to 2.2 MHz
- TDR option to locate and identify faults
- Portable, hand-held
- Many line types included
- 2-wire and 4-wire testing
- Unbalanced cable test
- PC utility included as standard

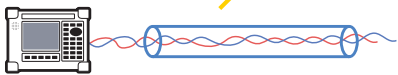


Copper Pair

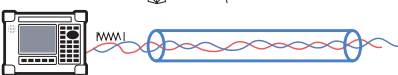
test applications



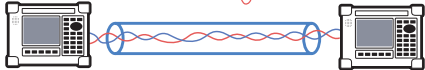
Impulsive Noise



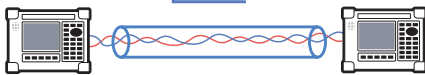
Noise



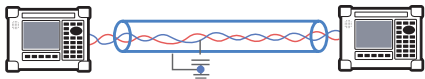
Microinterruptions



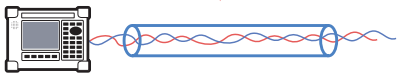
Insertion Loss



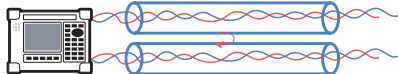
Longitudinal Balance



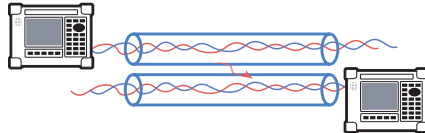
Return Loss



Crosstalk NEXT



Crosstalk FEXT



With ALT2000 you can carry out a wide range of measurements, all contained in a remarkably small, portable package. This means that you don't have to carry several separate, dedicated testers.

The goals of low capital spending, minimal training costs and, most importantly, increased productivity from field engineers, are easily achieved with ALT2000. The tester's easy-to-use graphical interface simplifies testing, and both qualification and maintenance tests are straightforward.

Qualification

The tests performed during the qualification and certification of a line provide evidence that the line has been correctly installed and suitable for the type of service that will be used on it.

These tests include:

- Noise
- Return loss
- Insertion loss
- Longitudinal balance
- Bit rate evaluation (ADSL, SHDSL)

Maintenance

The measurements used for maintenance and fault location are more analytical and specialised:

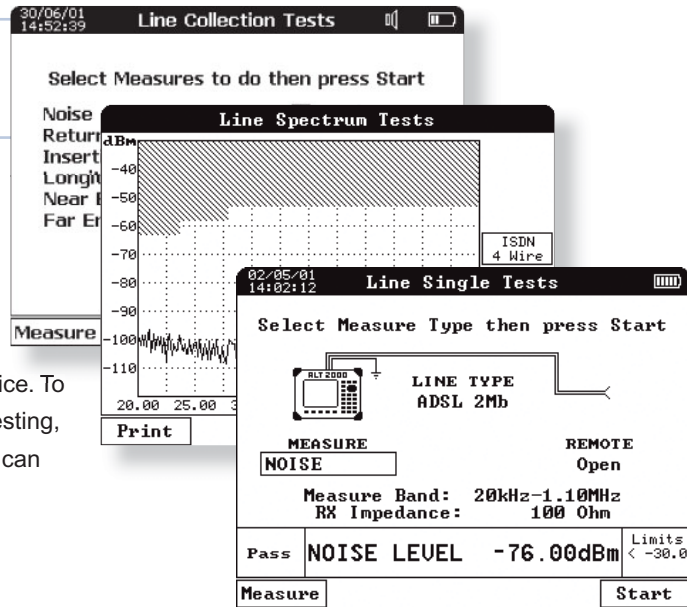
- Near End Cross Talk (NEXT)
- Far End Cross Talk (FEXT)
- Impulsive noise
- Microinterruptions
- Isolation
- Spectral analysis of noise
- Power Spectrum Density of the signal
- TDR test to identify possible causes of problems
- Analysis of the base band (POTS) functionality
- Spectrum analyser
- Network analyser



Automated

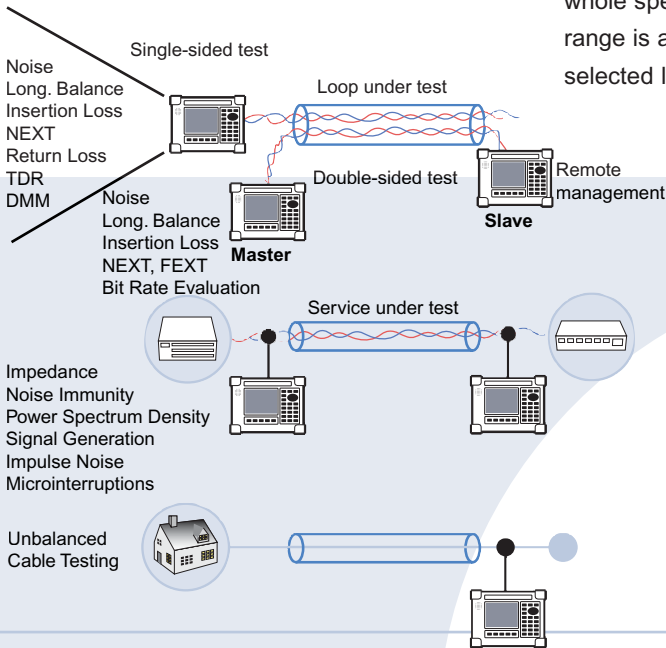
line quality verification

Line measurements are intended to qualify a line for one specific service. To make the process easy, ALT2000 has separate modes for collection testing, spectrum testing and single tests. In all of these operation modes you can specify if the test is carried out on one or two pairs.



Collection Tests

In Collection mode you can automatically run tests that are essential to qualify a copper pair for a specific service, with Pass/Fail results for each test.



Spectrum Tests

Spectrum tests are ideal for more detailed study of the line characteristics. In Spectrum mode you can look graphically at a single parameter displayed across the whole spectrum. The frequency range is automatically chosen for the selected line type.

Single Tests

In Single mode ALT2000 runs a specific test over the correct band for the service you have chosen; ADSL, ISDN, POTS, etc.

A numeric result and a Pass/Fail indication based on international industry standards are displayed.

- Wideband noise
- Return loss
- Insertion loss
- Longitudinal balance
- NEXT
- FEXT
- ADSL and SHDSL bit rate evaluation

Advanced Measurements

for qualification and maintenance

- Spectrum Analyser
- Generator and Meter
- Network Analyser
- White Noise Generator

Advanced measurements can be run in base band and high band, independently of the service to be installed.

With the Spectrum Analyser you can view the noise or signal strength across the selected band. The Power Spectrum Density (PSD) function can be used for spectral policing.

The Generator and Meter enables you to test balanced and unbalanced lines and network elements at single frequencies.

The Network Analyser enables you to test lines and network elements graphically over the spectrum.

The White Noise Generator stresses the installation to test its tolerance to interference.

Time Domain Reflectometer

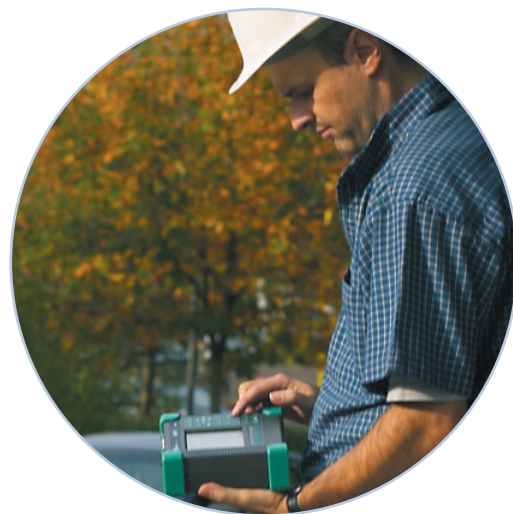
for high-performance fault finding

The Time Domain Reflectometer (TDR) is very useful for both qualification and maintenance. With a TDR you can measure the length of the loop accurately, or find the precise location of a fault. The high performance of the optional TDR module enables you to find faults within a maximum range of 10 km or 30 kft.

ALT2000 also has a 4-wire setting for identifying problems caused by coupling and crosstalk between the line under test and another line.

The tester's display settings include Zoom, Shift, Save, Shape Comparison, numeric indications and so on, to analyse the shape of the trace in detail.

The shape of the trace can be used to analyse the nature of the fault on the line. Faults may be man-made (split pairs, wire gauge, insulation, conductor changes, load coils, bridge tap lines, ground shift) or environmental (bad or dry joints, broken insulation, water ingress, short circuit).



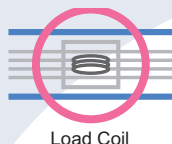
Events Qualification and Maintenance

When the service has been installed, poor performance and random interruptions may occur for several reasons.

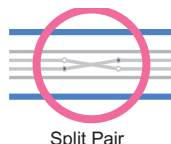
Use ALT2000 to run Service Measurements to detect events such as impulsive noise, microinterruptions or noise immunity.

ALT2000 can also inject a white noise signal into the active line and then increase the signal until the plant begins to indicate errors.

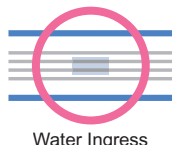
- Impulsive Noise
- Microinterruptions
- Noise immunity



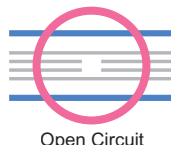
Load Coil



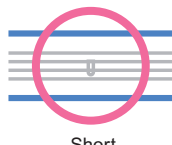
Split Pair



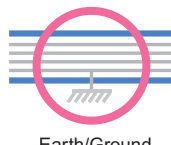
Water Ingress



Open Circuit



Short



Earth/Ground

DMM Measurements

With ALT2000 you can measure voltage, resistance, capacitance, insulation and current across the connectors, as well as between each connector and earth (ground).

Faults on a line may be due to poor line insulation caused by age or contamination. At voice band frequencies this may result in extra noise on the line, and at the higher xDSL frequencies the service may not work at all.

Measuring the insulation resistance with a high voltage test (95V) will quickly prove if the insulation is up to standard, thus saving time in deciding whether a line can be repaired or needs replacing.

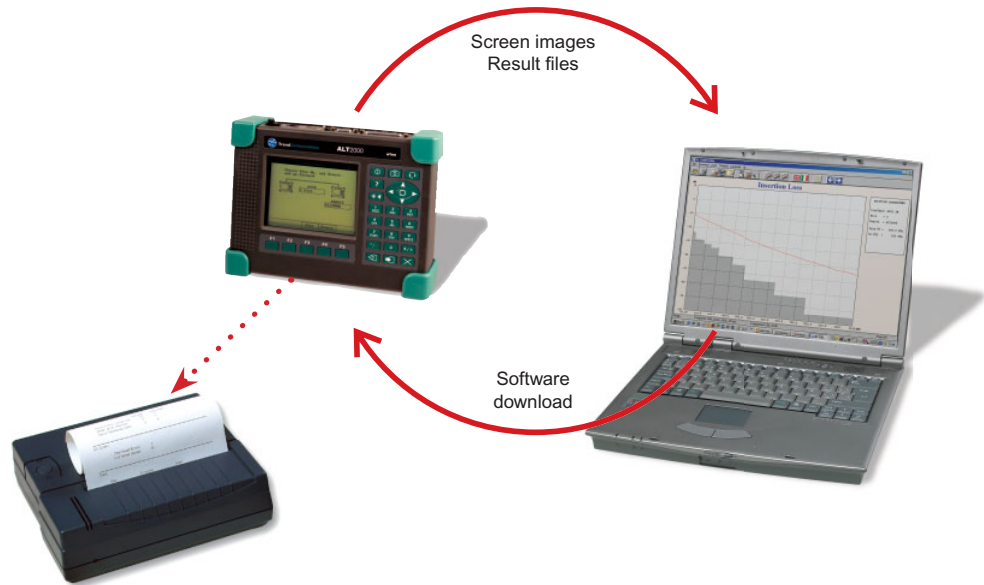
With the RLC bridge you can measure loop resistance and capacitance, as well as calculate the loop length.



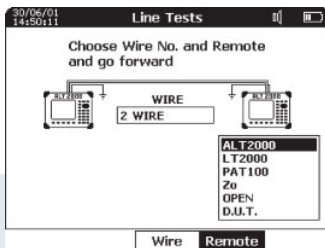
Operation

facilities

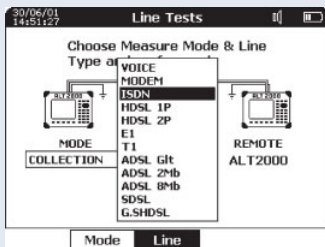
Collection Test Procedure



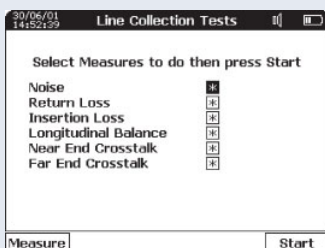
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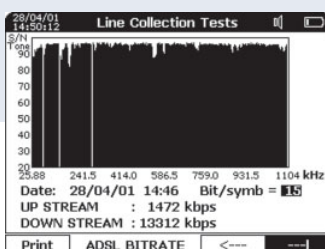
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3



4



Automatic Quality Verification

ALT2000 makes automatic testing very easy. With the automated step-by-step guide you can easily test any of the preprogrammed line types.

The graphical user interface shows you how to connect the tester to the line, displays the test setup selected, and automates the test procedure for quick and easy Pass/Fail testing. The ALT2000 operates in both Manual and Automatic mode.

Master/Slave

Certain tests, for example bit rate evaluation, FEXT or signal attenuation, require two testers; one generating the signal and the other analysing it.

You can use two ALT2000s to carry out this type of tests, and program both ALT2000s from one tester.

Masks and Margins

To verify that a circuit is suitable for a specific service, ALT2000 has a collection of predefined masks that give you an easy-to-interpret Pass/Fail indication.

You can also change the tolerance margin for the mask that you are using.

File Manager

The file manager enables you to store, recall and view test results, as well as transfer them onto a PC.

Printer

With the parallel port you can easily print results directly from your ALT2000.

PC Connection

Analysing your test results is essential.

The ALT2000 is supplied with a single Windows™ utility providing you detailed results analysis. You can copy screen shots to your PC to illustrate the results, and copy text result files to include them in your reports.

You can easily view the results as tables or as graphs. You can also edit the masks used in deciding whether a test has been passed or failed.

Technical data

ALT2000

Tone Generator/Level Meter	Attenuation/Insertion loss Noise measurement Level measurement Near-End Cross Talk Far-End Cross Talk
Voice band filters: C, psophometric, flat, selective, notch, SNR	Noise measurement using standard filters, including Signal/Noise Ratio, Signal/Noise and Distortion ratio
Wide band filter: IEEE743 E, F, G	Noise filters for selected services
Bridge Meter	Return Loss – Fixed frequency or swept Impedance matching Longitudinal Balance loss
Multi-meter	Loop resistance and capacitance, with Loop length assessment DC voltage – measurement of battery supply
Spectrum/Network Analyser	Voice band (up to 22 kHz) Wideband (up to 2.2 MHz) Insertion Loss measurement Spectrum Policing Interference detection
White Noise generator	Noise Immunity assessment
Impulsive noise (ITU-T O.71)	Time domain noise interference measurement
Micro-interruptions (ITU-T O.62)	Identification of bad line connections
Time Domain Reflectometer (option)	Fault location
Insulation/Isolation resistance test (option)	Identification of faulty line insulation
POTS module (option)	Telephone CPE emulation Off hook Line Seize Ring voltage detector Dialling, pulse and DTMF
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 polarised connector Headset RJ-45/4 connector Parallel printer connector· RS-232 serial port connector
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 life	Approximately 2 hours depending on use and conditions
Dimensions / Weight	150 x 210 x 50 mm / 1.6 kg (with Ni-MH batteries)
Environmental	Full characteristics: +5 to +45 °C; Operating: -5 to +55 °C; non-operating: -20 to +70 °C; 95% RH, non-condensing
Over Voltage Auto Protections	RTX: 140 Vdc + 12 or 140 Vpp; TX: 140 Vdc + 12 Vpp
Freq. Ref. Accuracy & Stability	Freq. Ref. Accuracy & Stability : ± 1 ppm ± 1 ppm /year ± 2.5 ppm / temp.range
Level Ref. Accuracy & Stability	< ± 0.025% ± 0.025% / year ± 0.005% / temp.range
Facilities & Capabilities	BMP Screen and CSV Files export to PC capability



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Distributor

To arrange a demonstration or to obtain the latest information on the Trend **ALT2000** or any of Trend's other test equipment, contact your nearest Trend Distributor.



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