TEMPO COMMUNICATIONS

STANLAY™

ACT6000
ADVANCED
COMMUNICATION TESTER

INSTALL | TEST | TROUBLESHOOT



The ACT6000 has a variety of test features including transmission, metallic, and special tests. These features make it one of the most advanced Test Sets for qualifying and maintenance of advanced transmission systems. Its copper pairs can be used for various telecommunication services: POTS, ISDN, T1, E1, HDSL 1/2P, SHDSL, ADSL, ADSL2+, VDSL2, VDSLp

Features:

- Color LCD High-Resolution Graphic Display
- Single and Dual-ended line tests
- Predicts Thoughput/Data Rate for ADSL-VDSL2
- Service and Layer 1 testing

Test Features:

- Sine Signal & Noise Generator
- Selective Level Meter
- Cross Talk Meter
- Spectrum & Network Analyzer
- Longitudinal Balance & Return Loss Meter
- Micro interruption & Impulsive Noise Meter
- Voltage
- Resistance
- Capacitance Meter
- TDR & Resistance Fault Locator
- POTS Device Simulator

DATA-COMMUNICATION CHANNELS & COPPER PAIRS QUALIFICATION / CERTIFICATION

When the ACT6000 is coupled with another of its kind, they can perform easy and quick Single-End Line Tests and End-to-Line Tests. The wide measurements of the ACT6000 allow for qualification and certification on various communication carriers and copper pairs used for digital streams with bandwidth up to 6 MHz (or 35 MHz - optional). The instrument can automatically extrapolate and accurately predict the expected data rate of the copper line under testing for the ADSL, ADSL2+, VDSL2, and VDSL.

COPPER PAIRS DIAGNOSTIC & FAULT FINDING/LOCATION

The ACT6000 can be configured for troubleshooting by using special functions and internal optional modules to localize anomalies and/or faults on the copper line and on communication systems.



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FAULT LOCATION

A powerful TDR allows the quick identification of not only the End-of-Line but also the location of possible faults or anomalies. These events could be interruptions, short circuits, insulation breakdowns, bridge-taps, split pairs, identifiable thanks to the Sample & Hold Test mode. The Resistive Bridge - Resistive Fault Locator allows localization of various combinations of Earth & Contact faults.

DATA-AUTOMATIC SINGLE END-OF-LINE QUALIFICATION

To start an Automatic Sequence to perform a complete set of electrics and transmission tests to qualify the line for a specific service requires the ASW-1 software. For the ADSL, ADSL2+, and VDSL2 services this is where the S/N Ratio and maximum BitRate estimations are added.

Once the sequence is finished (about 100 seconds) a summary table will appear on the screen with a pass/fail indication for each result using the international acceptability criteria and transmission masks - ETSI or ANSI. This will be shown in red. The results can be saved on the device and then visualized or exported on the USB pendrive or PC as a .CSV file (Windows Excel compatible) or as a .BMP photo of the screen.

POWER SPECTRUM DENSITY (HIGH IMPEDANCE)

The ACT6000's Spectrum Analyzer can operate on various frequency bands, readout mode, and special Front/End configuration as the High Impedance. When using the High Impedance configuration (non-intrusive mode), it is possible to perform the PSD to verify the spectrum and energy of any digital stream connecting the input instrument on active and powered lines. On the Main Distribution Frame or Street Cabinet, another PSD application is to perform a quick signals map.

Specifications:

General:

Case	ABS shielded for EMI / EMC
Connections	• "RTX" connectors IN/OUT and "TX" OUT triple banana-jack; • Polarized connector for external supply; • RJ-45/4 connector for headset; USB port for PC connector; • USB for pen-drive connector.
Display	LCD color 320 x 240 pixel (¼ VGA) back lit.
Power Supply (Internal)	• Rechargeable battery pack (blue) NiMh, with life of about 8 h. (Typical), 5 h.(Minimum). • External: from 16,5 to 26,5 Vdc / max 2,5 Ah.
Dimensions and Weight	150 x 210 x 50 mm / 1,5 Kg. (batteries included).
Temperature Range	Operating: -5, +50° C. / Storage -20, +70° C.
Humidity Range	5 / 90% non-condensing.
Over voltage Protection	In/Out RXT connectors up to 150 Vdc / 140 Vpp.
Reference Frequency Accuracy	±1 ppm within the operating temperature ±2 ppm/year.
Reference Level Accuracy	±0.025% within the operating temp. ±0.025% / year.
CE mark - EMC	• Directive 2004/108/CE, 89/336/EEC, • Decree 2007/194 CISPR 11, ISO • 14253 and CEI EN: 61326/A1/A2, • 55011, 61000-4-2, 61000-4-3, • 61000-4-4, 61000-4-6, 61000-4-11.
Special Features and Setup	• Results storage on internal flash memory; • Software update and Results • Exportation on Pen Drive or PC; • PC Remote interface by USB port.

Level Generator:

Sine output frequency range	• base band: from 20 Hz to 25 kHz • med. band: from 20 kHz to 6 MHz • high band: from 20 kHz to 35 MHz
Reference Frequency Accuracy	±1 ppm within the operating temp. ±2 ppm/year. Reference Level accuracy ±0.025% within the operating temp. ±0.025% / year.
Frequency Resolution	1 Hz up to 9.999999 MHz; 10 Hz over 10.0 MHz.
Frequency setup mode	Manual on single frequency and step mode on programmable band/steps.
Balanced output impedances	• base band: 150, 200 and 600 Ω; • medium band: 100, 110, 120, 135, 150 Ω; • high band*: 100 Ω.
Unbalanced out. Impedances	50, 55, 60, 68 and 75 Ω by Banana/BNC optional adapt.
Output level - Base Band	• -70 , +14 dBm @ 600 Ω balanced / 0.1 dB steps • -64 , +17 dBm @ 75 Ω unbalanced / 0.1 dB steps.
Output level - Medium Band	-64 , +20 dBm @ 100 , 150 Ω balanced / 0.1 dB steps; -64 , +17 dBm @ 50 , 75 Ω unbalanced / 0.1 dB steps;
Output level - High Band*	0 dBm @ 100 Ω balanced;
Output level - High Band*	0 dBm @ 50 Ω unbalanced.
Output level accuracy	• base band: ±0.2 dB from 50 Hz to 20 kHz @ 600 Ω ; • medium band: ±0.2 dB up to 2 MHz ±0.3 dB up to 6 MHz @ 100 Ω; • high band: ±0.5 dB up to 10 MHz ±1 dB up to 35 MHz @ 100 Ω.
White Noise Generator	1 kHz , 6 MHz / -74 , -144 dBm/Hz / 0.1 dB steps. (available on Network Analyzer)

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Level Meter:

Frequency range	from 50 Hz to 6 MHz (two bands) base version; up to 35 MHz *
Manual tuning / resolution	• 1 Hz up to 9.999999 MHz; • 10 Hz over 10.0 MHz.
Level measurement mode	absolute (dBm, dBV, dBu,Volt) and relative (dBr)
Reading resolution	0.1 dB
Input range	• base band: -110 , +10 dBm @ 1 kHz / 600 Ω; • medium band: - 120 , +12 dBm @ 1 MHz / 120 Ω; • high band*: -70 , +5 dBm @ 10 MHz / 100 Ω;
Level meter accuracy	• ±0.2 dB from 100 Hz to 20 kHz @ 0 dBm / 600 Ω; • ±0.2 dB up to 2 MHz, ±0.3 dB up to 6 MHz; @ 120 Ω; • ±1 dB up to 10 MHz, ±1.5 dB up to 35 MHz*@ 100 Ω.
Noise floor (TX OFF)	• ≤ -140 dBm/Hz up to 6 MHz; • ≤ -100 dBm/Hz up to 35 MHz*.
Frequency Meter sensitivity	≤ -30 dBm - base and medium band
Input impedances balanced	• base band: 150, 200, 300, 415, 600 Ω and >10 kΩ; • medium band: 100, 110, 120, 135 150 Ω and >10 kΩ; • high band*100 Ω and > 5 kΩ.
Input impedances unbalanced	• base and medium band: 50, 55, 68, 75 Ω and >10 kΩ; • high band*: by Banana/BNC: 50 Ω and > 2.5 kΩ.
Noise filters	• base band: wide band, • Psophometric; C-Message; 300 , 3400 Hz, 20 , 3400 Hz, 300 Hz , 6 kHz, 20 Hz , 6 kHz, 300 Hz , 15 kHz, 20 Hz , 15 kHz, 300 Hz , 20 kHz, 20 Hz , 20 kHz and 20.0 kHz flat. • medium / high band*: E, F, G /VDSL 2 and VDSL plus.
Selective filters / notch	• base band: (200 Hz , 20 kHz) pass band and notch for S/N+D (dB and %) test;Selectivity: 10 Hz @ fo <200 Hz, 5% fo @ >200Hz fo <4 kHz,200 Hz @ fo >4 kHz.Selective for telegraph. channels: 120, 240, 360, 480 Hz. • Medium / high band (20 kHz , 6 orup to 35 MHz*): 25, 100, 200, 400 Hz and 1.74,3.1, 4.0, 8.0 and 16.0 kHz.

Spectrum and Network Analyzer:

Frequency range	from 200 Hz to 6 MHz (two bands)base version; up to 35 MHz*
Input Impedance Balanced	• base band: 150, 200, 300, 415, 600 Ω and >10 kΩ; • medium band: 100, 110, 120, 135, 150 Ω and >10 kΩ; • high band*100 Ω and > 5 kΩ.
Input Impedance Un-Balanced	base and medium band: 50, 55, 68, 75 Ω and >10 kΩ , high band*: by Banana/BNCadapter: 50 Ω and > 5 kΩ.
Level reading mode	dBm, dBV, dBu,Volt and dBr.
Measurements readout	normal, peak (max, mean or min. value),
Measurement mode	• Base and medium bands: 2 Wires +/- (for Return-Loss measurement), 2 Wires +/+(for Longitudinal Balancement measurement) and 4 Wires. • High band*: 2 Wires for Return-loss measurement and 4 Wires.
Input range	from noise floor ÷ +12 dBm @ 100 Ω
Noise floor	≤-140 dBm/Hz.
Resolution vertical	192 pixel / 8 div.: 1, 2, 3 , 20 dB / division.
Resolution marker	0.1 dB / as selected resolution (BW).
Tracking Level Generator	in sweep or single frequency in 2/4 wires mode; Output Level & Resolution are thesame of Level Generator.
Base band range	200 , 25000 Hz, by FFT analyzer (Kaiser window).
Span	6250 Hz (and zoom / 2), 12500 Hz and 25000 Hz.
Resolution horizontal	250 pixel/10 div. : 625 + zoom, 1250, 2500 Hz / division.
Resolution (BW)	50, 100, 200 .. Hz (other resolutions are interpolated).
Medium band range Span	1 kHz to 6 MHz, by Digital SSB quad. conversion.
Span	0 ranges: from 10 to 8000 kHz, 10 per decade.
Resolution hor. on display	• 250 pixel / 10 div: 1, 2, 4, 8, 16.. • / 800 kHz / division.
Measurement hor. resol	1000 points (available on saved and exported CSV file).
Resolution (BW)	0.2, 0.5, 1, 2, 5, 8 kHz (other resolutions are Interpolated)
Max level freq. readout	up to 10 Hz resolution on 1 kHz / Div.
High band* Range	20 kHz to 30 MHz, by double conversion receiver in fourbands:0.02 to 12, to 18, to 30 to 35 MHz.
Resolution horizontal	250 pixel / 10 div: 1.2, 1.8 3 and 3.6 MHz / division.

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Mix measurements
Generator/Meter and Network Analyzer:

Cross-Talk (4 Wires) by Generator & Meter	NEXT (in Single-End mode) and FEXT (in End-to-End mode) on single frequency.
Test by Network Analyzer	NEXT (in Single-End mode on single frequency or wide band by tracking generator) and FEXT (in End-to-End mode) on single frequency or wide band using the frequency Step Generator and sample & hold Spectrum Analyzer.
Freq. range TX and RX	200 Hz , 6 MHz, up to 35 MHz*
Impedances TX and RX	same of the Signal Generator & Level Meter, excluded the high impedances. Measurement accuracy • up to 2 MHz: ±1 dB / 0 , -90 dB; • up to 6 MHz: ±2 dB / 0 , -86 dB; • up to 35 MHz*: ±3 dB / 0 , -80 dB.
Intrinsic crosstalk	<- 90 dB (by precise termination).
Return Loss (2 wires) Test by Network Analyzer	in Single-End mode on single frequency or wide band (spectral)
Freq. range TX and RX	200 Hz , 6 MHz, up to 35 MHz*
Impedances TX and RX	same of the Signal Generator & Level Meter, excluded High Z.
Measurement accuracy	• up to 2 MHz: ±1 dB / 0 , -50 dB; • up to 6 MHz: ±2 dB / 0 , -46 dB; • up to 35 MHz*: ±3 dB / 0 , -40 dB.
Longitudinal Balance Loss (2 Wires + Gnd) **Test by Network Analyzer**	in Single-End mode on single frequency or wide band - spectral readout, by tracking generator.
Impedances TX and RX	same of the Signal Generator & Level Meter, excluded high Z.
Frequency range	200 Hz , 6 MHz.
Impedances TX and RX	same of the Signal Generator & Level Meter, excluded High Z.
Measurement accuracy	• up to 2 MHz: ±1 dB / 0 , -60 dB; • up to 6 MHz: ±2 dB / 0 , -56 dB. • Single-End Insertion Loss (available on the automatic SELTest sequence) • by Advanced Software ASW-1/II;
Measuring Mode / readout	by wide band FDR technology with Spectral readout.
Operating limits	minimum line length: 50 meters; max. line length: 4.5 km with wires diameter of 0.4 mm.
Graphic Extrapolation	1 kHz , 6 MHz or up to 30 MHz*.
Accuracy	• ±1 dB up to 2.2 MHz; • ±2 dB up to 30 MHz*.
Operating Impedance	120 Ω balanced line.

Event Tests:

Micro-Interruptions - 0.62 (base band) and on medium band	Threshold level -3 ,-20 dB - 2 kHz Test Tone (default) or on programmble input frequency up to 6MHz.
Monitoring time	4 min., 24 hours.
Events indicators	• 5 Counters (0.3ms , >1min); • Event/Time ; Secs. with Events.
Readout	Tabular and Time Domain histogram representation.
Measure facilities	2 kHz reference tone output from TX connector for loop back tests.
Impulsive Noise 0.71 (base band) or medium or high band Threshold level	0 , -60 dBm.
Base band 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.
Readout	Tabular and Time Domain Histogram representation.

Special Measurements:

Line Immunity by White Noise injection (available on Network Analyzer) Bandwidth	1 kHz , 6 MHz.
Output level range	-70 , -144 dBm/Hz @ Zref 100 Ω 0.1 dB Resolution.
Output impedance	100, 120, 135, 150 and 1350 Ω (balanced).
TDR Fault locator Distance ranges	90, 180, 450, 900, 1800, 3600, 7200 m. @ 0.600 PVF.
Zoom	• vertical: -8 , +77 dB; • horizontal : 1x, 2x, 4x.
Distance res. (by marker)	• minimum range: about 0.4 meters • maximum range: about 40 meters
Operative mode	single line, Crosstalk (4 Wires), Differential by comparison of other test saved on internal memory; Monitoring to events localization by Peak mode (Sample & Hold).
Pulse output level	short / long: 2.2 Vpp; Boost: 5.5 Vpp.
Pulse length	automatic on range selection, from 10 to 5000 ns.;
IN/OUT impedance	100, 110, 120, 135, 150 Ω (bal.)

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Special Measurements:

TGC (autom. gain control)	0 , 6 dB/km.
Propagation velocity	PVF: 0,300 to 0,999 or PV (90 to 300 m/µs)
Digital Multimeter DC / AC (by DMM - ACT-12 optional module) Measuring mode	between a-b; a-c (Gnd); b-c (Gnd) and reverse.
DC Voltage Range	0 , 140 Vdc
DC Voltage Accuracy	≤2% of reading ±1 digit.
AC Voltage Range	0 , 100 Vrms
AC Voltage Accuracy	15 - 3300 Hz
DC LOOP RESISTANCE / INSULATION	
Test Voltage	≤ 100 Vdc (with current limit 1mA)
Range / Accuracy	2 Ω , 1 GΩ / ≤2% of reading ± digit;
LINE LENGTH BY LOOP RESISTANCE	
Line length evaluation	as function of measured resistance
Line Gauges setting	from 0.2 to 2.5 mm or from AWG 26 to AWG 11.
Multi-section setup	up to 5 different cables type.
Line Resistance correction	from 1.01 to 1.60 x standard copper resistance.
Line Temperature setting	set from -20° , +60° C.
Range / Resolution	0 to 99.999 Units (meters or feet) / 1 units.
Accuracy	derived from measured resistance.
RESISTANCE METER (real-time) (by optional module ACT-18 installed on DMM module)	
Range / Resolution	0.1 Ω to 50 kΩ / 0.1 Ω to 999.9 Ω
Accuracy	±2% ±1 digit.
RESISTANCE balancement: for unbalance >5 Ω, shorting a-b-c.	
Loop resistance	1Ω to 5 kΩ maximum.
Multi-section facility	as the setup for Loop Resistance.
Fault resistance	from 5 Ω to 20 MΩ max.
Accur. of RTF @ 1 MW	±0.5% of Loop resistance.
DC CAPACITANCE (time of DC discharge method)	
Test Voltage	≤ 100 Vdc
Range	> 10 nF , 10 mF.
Accuracy	≤ 5% of reading ±1 digit.
AC CAPACITANCE and Q factor (by capacitive bridge)	
Measuring mode	by 1 kHz tone - 1.1 Vpp.
Range / Resolution	0.1 to 3000 nF / 0.1 nF.
Accuracy	• ±1% of read. ± 1 nF @ C <500 nF; • ±5% of reading ± 1 digit @ C >500 nF and < 3000 nF.
LINE LENGTH BY CAPACITANCE	
Line length estimation	function of measured capacitance:
Line Capacitance setup	10.0 to 300.0 pF / Length Unit.
Range / Resolution	1 to 99999 Units (m. or ft.)
Accuracy	as from capacitance measurement.
LINE IMPEDANCE RESPONSE	
Measuring range	from 30 to 3200 Ohm in five steps.
Frequency Range	from 5 kHz to • POTS Subscriber Simulator • (by optional module ACT-11 installed on DMM module)
Dial Encoder	Pulse, progr. duration/ratio 100ms / 40/60%); DTMF std. tones, progr. Level, Duration, Inter-tone. **Ring Detect. Range & Measurement** • Level: 10 ÷ 90 Vrms; • Frequency: 15 ÷ 70 Hz.
Ring Detector AC Load	R 7310 Ω ± 2% in series + 940nF ±10% capacitor.
Ring current self-limitation	≤ 15 mA peak ; safety fold-back limited.
On Hook / Break & Make	R = 120 Ω ±2% @ I = 100 mA; Voffset = 4 Vdc.

Automatic pre-configured SELT sequence for line prequalification * With single ACT6000 - Single-End Tests on open line, 2 or [4] Wire mode:

Metallics:	AC / DC Voltage, DC Insulation, AC / DC Capacitance, End-of-Line (TDR).
Transmissive (wide band / spectral):	Noise (local), Return-Loss, Longitudinal Balance-Loss, "FDR" Insertion-loss & frequency response estimation, Noise (far-end estimation),[NEXT], and SNR prediction, Bit-Rate prediction for ADSL - ADSL2+ - VDSL2 and VDSLPlus**masks.
Manual pre-configured SELT*	Transmissive (wide band / spectral readout) measurements: Noise, Return-Loss,Longitudinal Balance-Loss, NEXT and PSD in high impedance (sniffer mode).
Automatic pre-configured DELT sequence for line qualification & certification*	With two **ACT6000** (Master/Slave mode) for **End-to-End Tests**, 2 or [4] Wire mode: Only Transmissive (wide band / spectral): Noise (bilateral), Return-Loss (bilateral),Longitudinal Balance-Loss (bilateral"LCTL"), Insertion-Loss, [NEXT and FEXT] and Bit-Rate evaluation (Up & Down stream) and SNR for ADSL - ADSL2+ VDSL2 and VDSLplus** masks.
Automatic DELT for two unidirectional channels qualification / certification*	With **two ACT6000** (Master/Slave mode) for End-to-End Tests, in Base Band (Voice or Modem 56K) according to EIA-464 4W E&M tests. Only bilateral Noise and Insertion-Loss measurements.
Automatic POTS Telephone DELT sequence*	By optional module ACT-11 installed on DMM module). With two **ACT6000** (Master/Slave mode) for End-to-End Tests, to perform a complete qualification on POTS links, included Signaling and Transmissive tests according to M1040 mask.
Pre-configured masks for manual SELT or SELT / DELT line tests sequences	Wide band: **VOICE, MODEM 56k, ISDN, HDSL 1p** and **2p, E1, T1, SHDSL, ADSL, ADSL2+,and VDSL2-12a, VDSL2-17a,VDSL2-30a, VDSL Plus**.**
DBPO Masks	Automatic generation of the Threshold Mask for VDSL2** related to the primary line parameters included the "ESEL" measured by ADSL2+ SELT Sequence*

* by Advanced Software ASW-1/II.
** by adoption of EBM 30 (ACT-13) Extension Band for 35MHz operation.

Ordering Information:

ACT6000 w/DMM
ADVANCED COMMUNICATIONS TESTER mod. ACT6000 equipped with:
- (ACT-1/II Advanced Software)
- DMM Module (Digital Module for Electronic Tests)

Supplied Accessories:
- NiMh Battery-Pack
- AC Power Supply & Battery Charger
- Carrying Case
- 2 ACT-06 Banana/Banana + Crocodile cables
- 1 ACT-08 Ground cable with Crocodile Clip
- User Guide

ACT6000 Telco Standard
ADVANCED COMMUNICATIONS TESTER mod. ACT6000 equipped with:
- (ACT-1/II Advanced Software)
- DMM Module (Digital Module for Electronic Tests)
- ACT-11 POTS Module (Subscriber Simulator Module for POTS for signalling tests)

Supplied Accessories:
- NiMh Battery-Pack
- AC Power Supply & Battery Charger
- Carrying Case
- 2 ACT-06 Banana/Banana + Crocodile cables
- 1 ACT-08 Ground cable with Crocodile Clip
- User Guide

ACT6000 Telco 35MHz/VDSL
ADVANCED COMMUNICATIONS TESTER mod. ACT6000 equipped with:
- (ACT-1/II Advanced Software)
- DMM Module (Digital Module for Electronic Tests)
- ACT-11 POTS Module
- ACT-13 (30MHz option).
- **Supplied Accessories**:
- NiMh Battery-Pack
- AC Power Supply & Battery Charger
- Carrying Case
- 2 ACT-06 Banana/Banana + Crocodile cables
- 1 ACT-08 Ground cable with Crocodile Clip
- User Guide
- ACT-15 Probes

ACT6000 Power/Utility
ADVANCED COMMUNICATIONS TESTER mod. ACT6000 (ACT-1/II Advanced Software), DMM Module (Digital Module for Electronic Tests)
Supplied Accessories:
- NiMh Battery-Pack
- AC Power Supply & Battery Charger
- Carrying Case
- 2 ACT-06 Banana/Banana + Crocodile cables
- 1 ACT-08 Ground cable with Crocodile Clip
- User Guide
- ALT-16 (x2)
- ACT-17-U Unbalanced attenuator and coax cable

Accessories and-or Spares:

Banana/Banana (2 each). + Crocodile Clips (4 each)

Ground Cable (1 each) + Crocodile Clip (1 each)

High impedance Probes to PSD tests on powered lines (ADSL2+ and VDSL2)

Unbalanced 50 dB Attenuator - High Z Input / 75 Ohm Output + Coax cable 75 Ohm

Banana to BNC Adapter + BNC/BNC coaxial cable 75 Ohm

ALT6K-BPA (NiMh Battery-Pack) 2700 mA

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Quality Management System
ISO 9001: 2015
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