



LT51 LINE TESTER

H HEUER INSTRUMENTS



- Level Meter
- Level Oscillator
- Spectrum Analyser
- Return Loss
- LCL / Balance
- Recorder Function
- NE and FE X-Talk
- Insertion Loss
- Selective Level Meter
- DCV / ACV / Loop Current
- Impedance (1 kHz)
- Distortion Meter

LINE TESTER LT51

The LT51 Line Tester is a portable handheld battery powered instrument. It combines the features of several pieces of test equipment such as a Selective Level Meter / Spectrum Analyser, Distortion Analyser, Oscillator and Handheld DMM in the one small lightweight package.

It is the ideal instrument for testing, preparing and commissioning copper pairs for many types of telecommunication services such as xDSL, ISDN, voice frequency POTS and testing the analog interfaces of digital exchanges and PCM multiplexers. The LT51 is also very well suited to testing the carrier and information signals used in Power Line Communication (PLC) equipment.

The LT51 can be deployed as a stand-alone instrument in single-ending testing configurations to qualify cable pairs, or together with a second remote LT51, can perform more accurate terminated end-to-end testing. In stand-alone configurations (without PC control) testing can be automated with selected test sequences stored in the LT51. Alternatively the LT51 can be remotely controlled by a PC over the isolated USB link.

Great care has been taken to achieve easy operation of this instrument. Most functions are accessed by a single button press, or one further soft-key selection. Measurement results can be displayed graphically or numerically (in DMM mode) and can be simply saved into non-volatile memory for later recall or up-load to a PC for further evaluation and printing.

Firmware upgrades with new features are freely available and can be easily downloaded to the LT51 in the field.

Features and Benefits

- **Selectable Impedances from 50, 75, 600 Ω and bridging (~50 k Ω). Others by request (eg. 135 Ω)**
- **Level Spectrum, Return Loss, Noise, X-Talk and Balance Measurements upto 2.2 MHz.**
- **Spectrum Analyser with Zoom function over fixed spans from 4.5 kHz to 2.2 MHz.**
- **Selective Level Meter over 2.2 MHz BW with Resolution BW's from 29 Hz.**
- **Distortion Analyser from 200 Hz to 2.2 MHz (SNR, THD, SINAD, SFDR).**
- **Fully configurable Oscillator, up-to 2.2 MHz, -60 to +16 dBm.**
- **Tx Mute, Single Tone or Swept measurements.**
- **DMM functions DC/AC Voltage, DC Current (600 Ω shunt), AC Impedance (1 kHz).**
- **Recording function for Level and DCV, up-to 200k samples @ 1s, 2s, 5s, 10s or 60s intervals.**
- **Audio monitor (speaker) and Hands-free telephone for voice communication.**
- **Strong compact PC case designed to withstand rough treatment yet lightweight (< 1 kg).**
- **High contrast, sunlight-readable graphics display with a back-light.**
- **Large soft-touch keys with good feedback.**
- **Easy operation – one key press to set measurement then context sensitive soft-keys for configuration.**
- **>8 hours operation with easily replaceable AA NiMH batteries.**
- **Accepts commonly used 4mm banana plug test leads.**
- **Choice of Graphical or Numerical measurement display.**
- **Remote control of LT51 by PC via serial port over Opto-isolated USB link.**
- **Easy Test result storage and recall, up-load to PC for further evaluation.**
- **End-to-End testing utilising pair under test to second remote LT51 (dial-up or dedicated pair).**

The LT51 at a glance

Common 4mm Safety Connectors for Test lead connections.

Power or charge from AC/DC Adaptor or Auto Lighter Adaptor

Rugged but lightweight (700g) case withstands 1m drop onto concrete

Automated testing and reporting make testing efficient

Ergonomic grip for handheld applications

Easy access to widely available AA cells providing > 10 hrs use

USB Connection for Firmware Download, Result Upload

Integrated Speaker for line monitoring and hands-free telephone

Large bright LCD is easy to read and displays all relevant information

Large soft touch keys for easy identification and selection of functions

Knob for natural cursor movement, to increase / decrease values

Integrated Microphone for Hands-free telephone

LT51View PC Software

- Upload stored results
- Screen capture feature
- Save bitmaps and full results to files
- Download Firmware updates to LT51
- Remote control of LT51 over USB link for Automated testing using scripts
- Free download from the Heuer website

LT51View

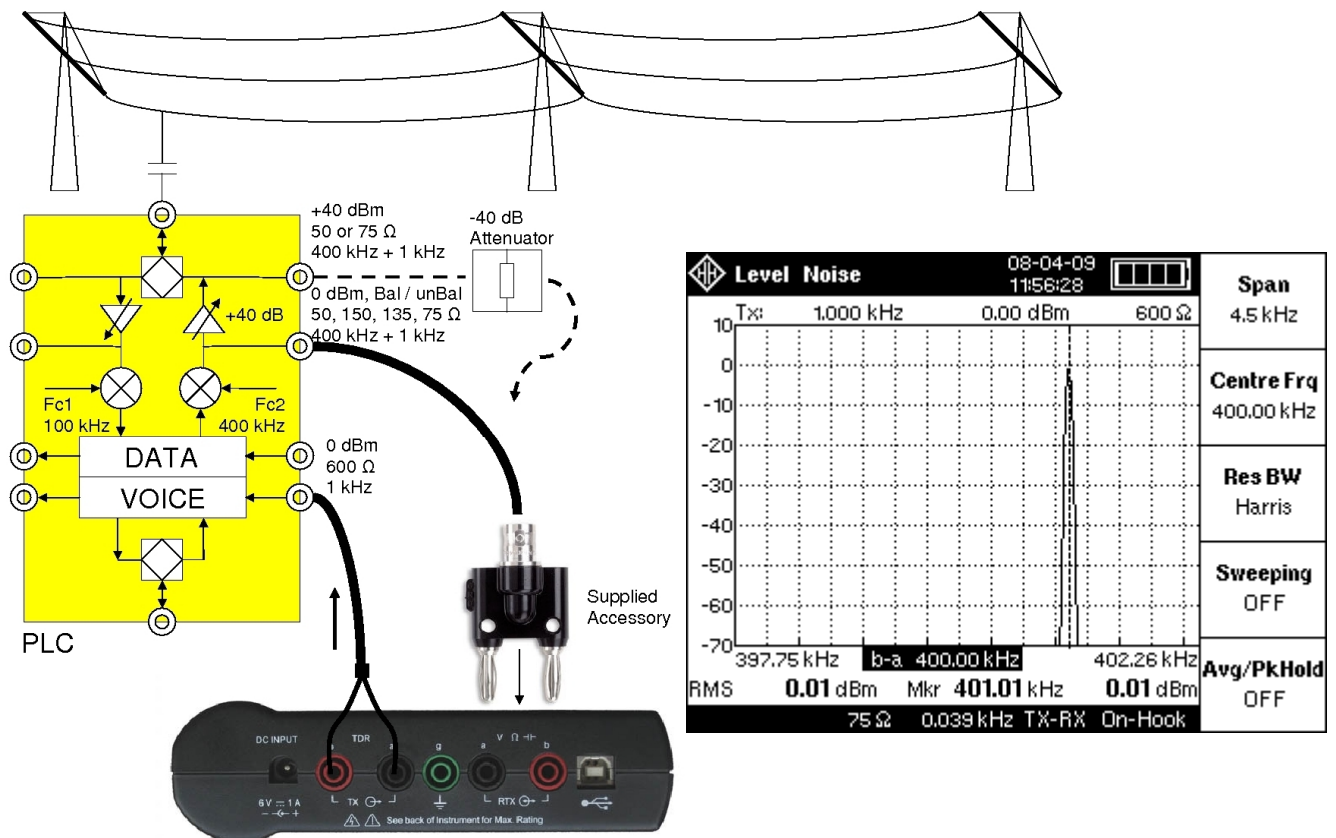
Upload | Download | Configuration | Factory

Saved DMM	Date	Time
Resistance	14-01-09	14:31:36
AC/DC Voltage	14-01-09	14:31:44
Level Spectrum	14-01-09	14:31:54
AC Impedance	14-01-09	14:31:59
Impulse Noise	14-01-09	14:32:09
AC/DC Voltage	14-01-09	14:32:15
Level Spectrum	14-01-09	14:32:19

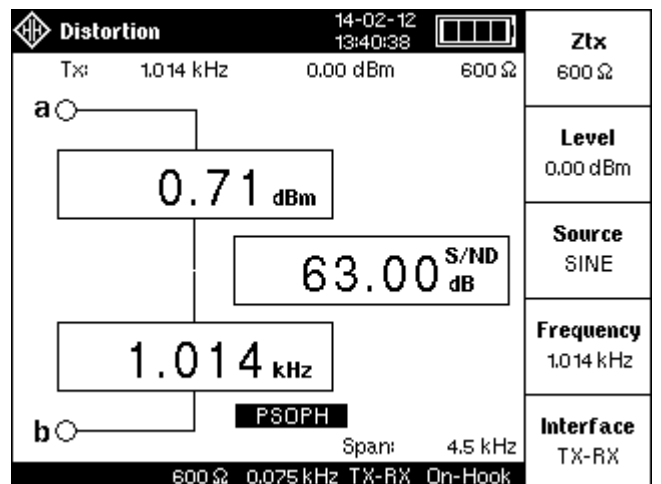
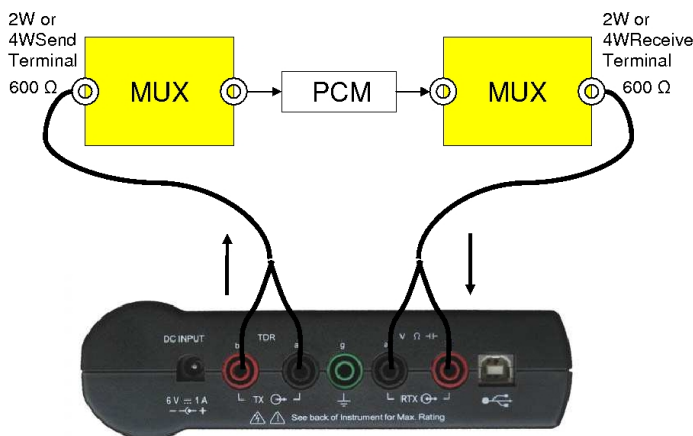
Resistance: 109.6 Ω, 1,992.7 m, 19.9 Ω, 361.8 m, 89.8 Ω, 1,632.7 m, 1.01 MΩ

USB Port: COM1

Testing PLC Systems with the LT51



Testing PCM Multiplexers with the LT51



The following measurements are possible with the LT51:

- Audio Level Setting
- Idle Channel Noise
- Frequency Response
- Gain Variation with Level
- Signal to Quantisation Noise (SINAD Distortion)
- Crosstalk
- DC Voltage

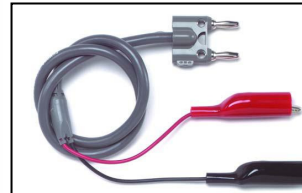
Standard Accessories



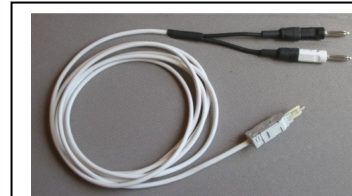
Optional Accessories



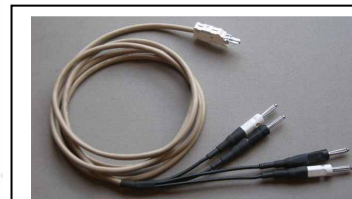
OPT51-04



OPT51-01



OPT51-02



OPT51-03

Standard Accessories

The following accessories are included with the purchase of the LT51:

LEADUSBAB	1.8m USB Cable
ADPT5V1ADC	AC/DC adapter 100-250 VAC (with appropriate AC Plug) input, 5 VDC 1 A output
HBKLT51	User Manual
BAGLT51	Soft Bag for storage of all accessories, transport and operation
ADPTBNC	Double Plug to BNC Adaptor

Optional Accessories

The following optional accessories are available for the LT51 (subject to availability):

OPT51-01	Test lead with Double Banana Plug to 2 Alligator Clips
OPT51-02	Test lead with 2-Pole Krone to 2 Banana Plugs
OPT51-03	Test lead with 4-Pole Krone to 4 Banana Plugs
OPT51-04	Red & Black Test leads with Safety Banana Plugs to 5-way Clips
OPT51-05	Test lead with Double Banana Plug to 2 Minigator Clips
OPT51-06	Test lead with Double Banana Plug to 2 MiniGrabber Clips
OPT51-07	Test lead with Double Banana Plug to 2 MicroGrabber Clips
OPT51-08	Test lead with Double Banana Plug to 2 Stackable Banana Plugs
OPT51-09	Auto Adaptor, 12V to 5V 1A with 2.1mm DC plug output

Specifications

Rev 6.1, 04 May 2012

Physical

Case	PolyCarbonate (FV-0 rating)
Display	320 x 240 Graphic LCD w LED backlight
Keypad	Silicone Rubber with 31 keys
Rotary Control	21mm knob with integrated push switch
LEDs	Charging, External DC Power
Operating Temperature	+5 °C to 40 °C, 20% to 80% RH
Storage Temperature	-20 °C to 60 °C
Battery Charging Temp	10 °C to 40 °C
Environmental	Use at altitudes <2000m, Pollution Deg2
Dimensions	190 mm x 155 mm x 40 mm (L x W x H)
Weight	700g

Power Supply

Battery Type	3 AA (NiMH, NiCd or Alkaline)
Battery Life	8 hours typical (2100mAh NiMH)
Battery Recharge Time	5 hours in LT51
AC Operation (charging)	Ext. Adaptor: 240Vac to 5 to 6 Vdc (1A)
Auto Power-Off	12 mins after last button press

Interfaces

RTX a-b-g	3 balanced, 4mm sockets (ab 19mm pitch)
TX a-b	2 balanced, 4mm sockets (ab 19mm pitch)
OverVoltage Protection	220 V b/w any 2 terminals
Maximum DC @ RTXa-b	60V with >600 Ω source (for Loop-Hold)
External DC	2.1 mm DC socket
Communication Port	USB Type B Receptacle

Regulatory Compliance

Safety	IEC 61010-1:2001
EMC	IEC 61326-1:2005 ClassA

Sine Signal Generator (transmitter)

Frequency	1 Hz to 2.2 MHz (1 Hz resolution)
Impedance (balanced)	50, 75, 600 Ω
Level	0.01 dB resolution

	200 Hz to 20 kHz	up to 2.2 MHz
600 Ω	-50 dBm to +10 dBm	-50 dBm to +5 dBm
50, 75, 135 Ω	-50 dBm to +16 dBm	-50 dBm to +10 dBm

Attenuator accuracy	As for Level Meter below
Frequency Response	600Ω: 200 Hz to 20 kHz: ± 0.25 dB 50 & 75 Ω: 2 kHz to 200 kHz: ± 0.25 dB 50 & 75 Ω: 2.2 MHz: ± 0.5 dB

SFDR (0dBm, 75 Ω, typ.) > 50 dBc

Level Meter (receiver)

Frequency Range	200 Hz to 2.2 MHz
Accuracy	± 0.05 % ± 0.1 Hz
Level Range (TX-RX mode)	< -120 to +30 dBm (50/75/600 Ω, Term) +40 dBm (50/75 Ω, Bridged), auto-ranging or manual range setting None, Psoph, C-Msg, 3k LP, 15k LP
Filters	Terminated: 50, 75, 600 Ω Bridged: > 47 kΩ

Attenuator accuracy	+30 dBm to -30 dBm: ± 0.2 dB -30 dBm to -60 dBm: ± 0.3 dB less than -60 dBm: ± 0.5 dB
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Frequency Response	600 Ω: 200 Hz to 20 kHz: ± 0.25 dB 600 Ω: 200kHz: ± 0.5 dB 50 & 75 Ω: 2 kHz to 200 kHz: ± 0.25dB 50 & 75 Ω: 2.2 MHz: ± 0.5 dB
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Level Display	absolute (dBm), relative (rdB)
Resolution	0.01 dB
Input Return Loss	> 25 dB, 75 Ω, 200 Hz to 2.2 MHz
Noise Floor	< -130 dBm/Hz

Spectrum Analyser / Selective Level Meter

Frequency Range	200 Hz – 2.2 MHz
Frequency Spans	4.5 kHz, 9 kHz, ..., 2.3 MHz
Resolution BWs	29 Hz min. to 38.75 kHz max.
Dynamic Range	> 60 dB (typically better than 70dB)
Max Displayed range	110 dB (80 dB + 30dB offset)
Frequency Resolution	< 0.5% of span

Distortion Analyser (THD, SINAD, SNR, SFDR)

Fundamental Freq range	200 Hz to 2.2 MHz
Harmonic Meas'mt range	2.2 MHz
Distortion Factor	Max: 10dB, Min: 60dB, typically >70dB

Loss, NEXT & FEXT Measurements

Impedance	50, 75, 600 Ω
Frequency Range	200 Hz to 2.2 MHz
Level range	-90 to +10 dB
Accuracy	± 1 dB
Intrinsic NEXT (75 Ω)	<1 MHz: <-80dB, <2.2 MHz: <-75dB

Balance Measurements

Impedance	50, 75, 600 Ω
Frequency Range	200 Hz to 2.2 MHz
Range	0 to 60 dB
Accuracy	± 2 dB
Intrinsic Balance (75 Ω)	200Hz – 1MHz: >80dB, 2.2MHz: >70dB

Return Loss Measurement

Reference Impedance	50, 75, 600 Ω
Frequency Range	600 Ω: 200 Hz to 200 kHz 50Ω, 75Ω: 200 Hz to 2.2 MHz
Tx level	-10 dBm
Range	0 to 40 dB
Accuracy	± 0.5 dB ± 5 % of reading for ref. Z
Intrinsic Return Loss (75 Ω)	200 Hz - 2.2 MHz: > 50 dB

Voltage

Max Inputs	± 100 Vdc or Peak AC: RTXa-g, RTXB-g TXa-g, TXb-g, , TXa-b
DC	± 200 Vdc or Peak AC: RTXa-b
AC	± 160 V ± 1 % + 0.5V 120Vrms ± 2% (10 - 1000 Hz), True RMS

Impedance (w/ or w/o Line voltage)

Test Frequency	1 kHz
Resistance	0 Ω to 4 kΩ ± 1 % + 5 Ω
Capacitance	1 nF to 1 μF ± 5% ± 1 nF

POTS (Plain Old Telephone System)

Dial Method	DTMF
Redial	Up to last 16 digits
Talk/Listen	built-in Speaker / Microphone
Ring Detector Range & Meas	10 to 90 Vrms, 15 –70 Hz
Loop Current	0 to 90 mA ± 1 % + 0.5 mA (600Ω Shunt)

Data subject to alterations without notice



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