



Short Operating Manual



**KURTH
ELECTRONIC**

KE3600

xDSL MULTITEST

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KURTH ELECTRONIC GmbH

**Made in
Germany**

Application

The KE3600 is a fast, easy to use and affordable multitester for the installation and troubleshooting of DSL services in hybrid ADSL1/2/2 + / VDSL2 and combined networks. With its numerous interfaces, it supports the entire range of broadband network technology such as vectoring, G.FAST, bonding, SHDSL, Gigabit Ethernet and GPON.

Operation

The KE3600 is a powerful troubleshooting tool for quickly finding faults in the network, outside wiring, customer devices or inside wiring. Even in hybrid networks where FTTH is installed, measurements can be made at any LAN connection using the Ethernet ports of the KE3600. For this reason, the KE3600 is the ideal solution for all broadband technologies.

Use

With its small size, robust design and intuitive operation, it is the perfect tester for installers and service technicians. The user can perform his tasks quickly and efficiently with automatic detection of the xDSL service and definable test procedures. The large display increases operating convenience and, when storing results, the technician has numerous options for exporting the tests and for compiling reports.

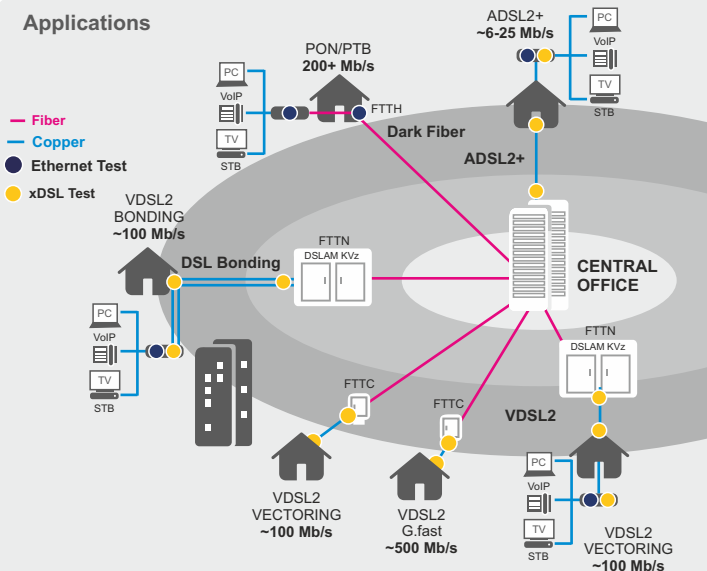
At a Glance

- ADSL-VDSL2 in one device
- Annex A/B/J/L/M
- DSL vectoring (ITU-T G.993.5)
- Web browser
- GbE port for expanded Ethernet tests
- All DSL parameters at one glance
- IP Ping, Traceroute with IPv4 and IPv6
- HTTP / FTP up / download test up to 700 MBit/s
- Sunlight viewable color TFT
- High-power rechargeable battery and expandable memory
- Includes Software for management and protocols

Ready for

- DSL bonding (ITU-T G.998.1/2/3)
- SHDSL
- Copper tests for qualification up to 31 MHz
- TDR module
- GPON module
- ISDN U_{ko}/S_o/analog interface
- ISDN BRI/PRI interface
- Software tools for VoIP
- Software tools for IPTV
- S₂M

Applications



Documentation and Software

Up-to-date operating instructions and software updates can be found in our download area after logging on in the **CUSTOMER LOGIN**.

You will find the download area for the KE3600 under the Downloads menu item. After entering the serial number, you will find all current documents available for download in the following window.

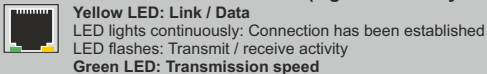
Keyboard / Display / Ports



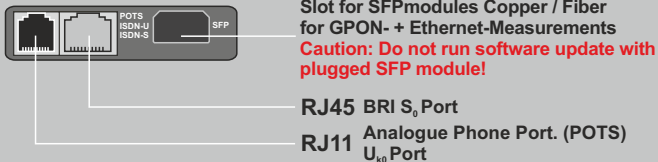
Information LEDs

- DSL CRC - orange > Indicates a CRC error
- DSL LOSS - orange > Loss display with beep
- DSL L1 - green > DSL connection established
- DSL L2 - green > DSL line 2 connection established (bonding)
- BATT CHRG - green and red > Charge state display

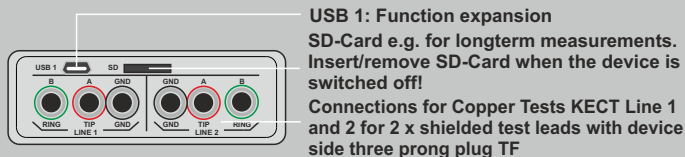
Ports upper side: Ethernet Ports



Ports upper side (optional): ISDN (BRI) / Analogue (POTS) / SFP



Side Ports: KECT Copper Testing (optional)



Bottom Ports: xDSL Ports



SHDSL + S2M Interface / optional (upper side)
See chapter SHDSL, in Operating Manual, page 40.

Keypad

When the KE3600 was developed, emphasis was placed on fast and easy operation.

F1–F4

Menu function buttons. F1: Help function if provided.

ESC

Similar to a computer, the ESC button means "undo the last step," or Back.

SEL

SELECT button. Use this button for selecting like an Enter key.

ON/OFF

Button for turning the device On and Off.

Arrow buttons ▲▼◀▶

The arrow buttons are for menu scrolling UP ▲ / DOWN ▼ and LEFT ◀ / RIGHT ▶.

Keypad

Alphanumeric keypad with 1-0, A-Z, special characters.

Text input

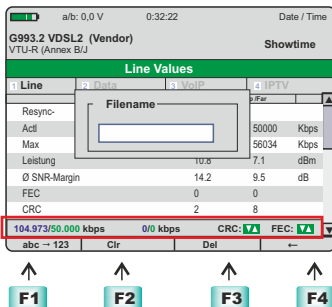
F1: abc → 123 Switch between letters and numbers input. Special characters can be found under the keys * and #.

*: .-/@:_+;[]:=? #: #\$\$\$%&'(){}~

F2: Delete the entire entry line with **Clr**

F3: With **Del** delete individual digits

F4: With ← deleting individual digits from right to left



Caution: The device may be operated only with the supplied original KE power supply, UMEC UP0181A-09PE! Damage to the appliance resulting from non-observance will be repaired for a fee!

Generally the PSU has to get plugged into the device first and then into the wall outlet.

Note: Please fully charge battery before first use!

Changes the charging LED from orange to green the charging is completed. To check the charge indicator after the initial charging turn off the device and then turn it on again with the AC adapter connected for about 1 minute. During this time, the battery indicator will be calibrated and now displays the correct value.

Switch on > Main Menu

After a short boot with subsequent self-test screen appears with the device information such as firmware version, modem version, installed options and the hardware ID. Then the main menu appears with the following selections:

1. **Broadband > Selection of the interface**
2. **Telephony (optional)**
3. **Copper Test (optional)**
4. **Analysis > Retrieve stored measurements**
5. **Setup > Basic Device Settings**
6. **Address book**

Setup

1. Display & Signals:

1.1. Automatic Off after the last button is pushed. Possible settings:

Always On / 3 minutes / 5 minutes / 15 minutes / 30 minutes / 60 minutes.

When a test is running the KE3600 does not shut off even after the time has elapsed.

1.2. Backlight: Possible settings: *Always On / Always Off / 3 minutes.* Lets you specify the duration before the screen is dimmed in order to preserve the battery. In the selection of *3 minutes* additionally appears *1.9. Brightness Dimmed* as another menu item. Possible values are from Level 1 to 7, where 1 is dark and 7 is light.

1.3. Date & Time: **1.3.1. Setting Date & Time.** **1.3.2. Setting Date Format** DD/MM/YYYY or MM/DD/YYYY **1.3.3. Setting Time Format** either 24 Hours or 12 Hours **1.3.4. Setting Number Format** x xxx,xx or x,xxx.xx

1.4. Confirm power off: Warning when pressing the ON / OFF button prevents accidental switching off

1.5. Storage: Switch between Micro SD card and a USB storage as your storage location

1.6. Display Measurements: Shows or hides the display of the Min / Max values inside the Telco Multimeter measurement results in Copper Test.

1.9. Brightness dimmed: See 1.2

1.8. to 1.13.: Turn the warning tones On or Off (for example Keyboard Beep)

1.14. Brightness: Level 1 to 7 (1 dark, 7 light)

1.15. A/B Threshold: Set a threshold value to display the voltage at the upper edge of the display

2. Language: Setting the menu language

3. Software Updates: Checks if an update is available and allows its installation. See the detailed firmware update instructions **KE-Manager-Firmware-Update.pdf**

Caution: Do not run software update with plugged-in SFP module!

4. Management Port: Choose between *Auto / Static*. When Static typing own fixed IP address is possible

5. Reset Management IF: Reset and restart the Management Interface


6. System information: Information about the built-in module (hardware and software versions).


7. License information: Display of open source software and its license terms used in the device


8. Start VNC: Launches virtual network computing (VNC) that displays the screen contents of the tester on a local computer (installed using KE-Manager)

9. Modem Debug: Creates an additional modem log

General Operation Help

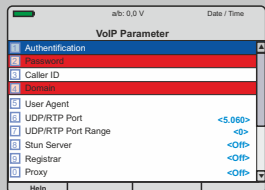
<X> disabled, activate with  -key

<> activated, all inputs in order
> test possible

<> activated, complement inputs
> test possible

<> activated, correct entries
> test not possible

**Red bar:
Input / verification
required!**



1. Interface

Setting options: <xDSL>, <Ethernet>, <SFP*>, >SHDSL*>. The menu view changes depending on the selection.
*optional

2. xDSL Interface

Setting options: <Annex A/M>/ <Annex B/J>. In Annex J, a second synchronization approach is needed because the filter from Annex B to Annex J has to be switched over.

3. Terminal (xDSL) with autom. detection of DSL Services

Synchronization with **1** / START...

Line Values Display

Status line: Recognized ITU Version of the ATU-C, DSLAM manufacturer (ia)

Resync-Counter: Number of resync.

Net Data Rate: Current Up/Downstream

Max Data Rate: Max.Up/Downstream

Capacity: Display in %

Tx Pwr: Transmission power / dBm

Ø SNR-Margin: Difference between line SNR and required SNR in dB

FEC: Forward Error Correction

CRC: Checksum error

HEC: ATM-Header Error Check

Bitswap: Redirected data of a disturbed communication channel to other chan.

Ø Line Atten.: Attenuation in dB

INP: Impulse Noise Protection

Interleave: Delay in ms or 0 for Fast-Path

Line Loss: Loss of synchronized con.

LOF: ATM receiving station has lost the frame description

LOM: Loss of Margin

SES: Severely Errored Second: a second with bit error rate

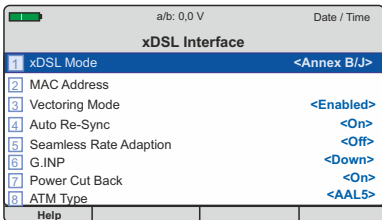
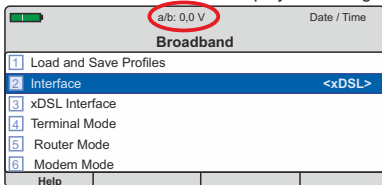
UAS: Number of seconds during which no transfer was possible

ES: Errored Second: one second of measurement time during which one or more bit errors are present

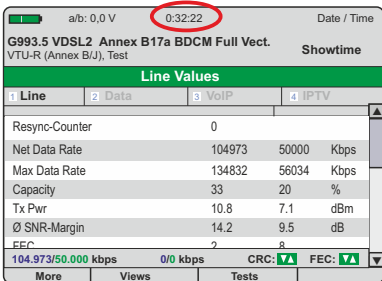
Total Sync: Total duration of sync.

Resync History: During sync.

Display line voltage



Duration of the synchronized connection



Help
Reset errors
Save measurement
Zoom

Line Values
PPP Status / IP Status
PPP Log / IP Log
Bands
Vectoring
SNR
BAT
Hlog
QLN

Summary
Web browser
Ping
Traceroute
Http Download
FTP Download
FTP Upload
VoIP Log
VoIP Statistics
VoIP Dial

Function keys and options

F1 More (select with SEL)

- **Help** (reserved for help functions)
- **Resert errors** (shown errors will be set to zero)
- **Save measurement** or directly during the measurement by pressing the **SEL** key. It opens up a Window where the file name can be entered as a name / number. After confirming with **SEL** the measurement is stored on the internal memory, and can be edited using the supplied KE Manager software
- **Zoom** for graphs

F2 Views (Line Values, Bands, Vectoring, ...)

- **Line Values**(see page 8)
- **PPP Status / IP Status**
- **Bands** (Displays individual bands for SNR Margin, Line Attenuation, Signal attenuation and TX Power)
- **Vectoring** (Vectoring status, G.INP and possible errors)
- **SNR/BAT/Hlog/QLN**: Graphs for Bits per tone, SNR per tone, Hlog and QLN can be called up here (Downstream blue, Upstream green)

F3 Tests

- **Data Tests, VoIP- and IPTV-Tests, Web browser**

4. Router Mode

Connection of the KE3600 to the xDSL port and to the PC. Replaces the modem and the router.

5. Modem Mode

Connection of the KE3600 to the xDSL port and to the PC. Replaces the modem.

Terminal Mode <Ethernet>

Connection to the Ethernet interface of a modem / router or a hub / switch. Settings for Ping, Traceroute, HTTP Download, FTP Download and FTP Upload.

Save measurement

Line	Data	VoIP	IPTV
Resync-			
ActI			50000 Kbps
Max			56034 Kbps
Leistung	10.8		7.1 dBm
Ø SNR-Margin	14.2		9.5 dB
FEC	0		0
CRC	2		8
104.973/50.000 kbps 0/0 kbps CRC: [▲] FEC: [▲]			
abc → 123	Clr	Del	←

Status bar with data rate and CRC / FEC

Analysis

You have the option to retrieve saved **broadband** and **copper measurements** and analyze them within the device. In this case, not only the stored snapshot but the whole measurement sequence from the start of the synchronization is displayed. In the selection menu you can start the display with **F2 <Info>** (this can be a lengthy process depending on synchronization time). You can rename a measurement file with **F3 <Edit>** and delete it with **F4 <Delete>**. Since the display is not an active representation of the measured values, it is displayed with a different background color and a red border.

Line		Data	VoIP	IPTV
Resync-Counter	0			
Net Data Rate	104973	50000	Kbps	
Max Data Rate	134832	56034	Kbps	
Capacity	33	20	%	
Tx Pwr	10.8	7.1	dBm	
Ø SNR-Margin	14.2	9.5	dB	
FEC	0	0		
CRC	2	8		

Help
Reset errors
Save measurement
Zoom


Summary
Web browser
Ping
Traceroute
Http Download
FTP Download
FTP Upload
VoIP Log
VoIP Statistics
VoIP Dial

Line Values
PPP Status / IP Status
PPP Log / IP Log
Bands
Vectoring
SNR
BAT
Hlog
QLN

Address book

In the address book you can store phone numbers, IP addresses, VoIP access data and SIP data, frequently used URLs as well as user names and passwords.

You can create a new address entry with **F1 > add contacts** and add the details for the above-mentioned rubrics in the next menu via **F2**.

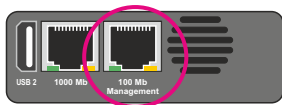
These are then available in the corresponding menus (with the  key) and you do not need to repeat the entry again.

KE-Manager software

You can install the KE-Manager software on your PC by double clicking the setup file within the explorer window. A windows installation wizard will guide you through the following steps.

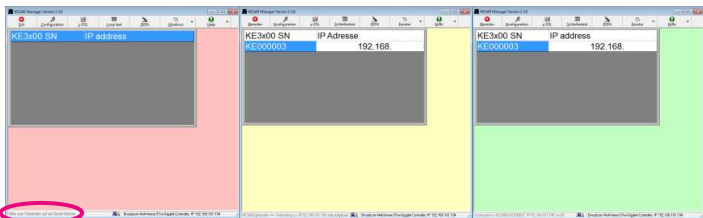
Connect the Multitester to your network / PC

Switch the xDSL Multitester on. Use a RJ45 ethernet cable to connect the Multitester via the management port (100 Mb, top side of the device) to an ethernet port within your network or directly to an ethernet port at your PC.



Opening the KE Manager

Click the KE-Manager icon on your PC Desktop. The KE-Manager opens and shows the connection status between your device and the PC via different colors.



red > no connection

red > device found,
connection is
being established

green > connected

The connection status is shown at the bottom row:

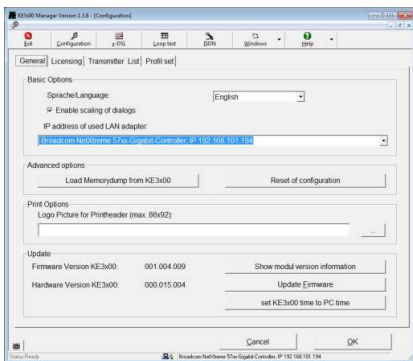
- For connecting please click on KE3x00
- KE3x00 found ==> Connection to IP 192.xxx will be established
- VConnection to KE3500 (serial number, IP192.xxx) is OK

The green background signals the established connection. The serial number and IP address are shown in the top left corner of the window. In case of multiple KE-Multitesters plugged to the network, you can find the desired one using the displayed serial number. Now you can adjust the settings for the KE-Multitester using the KE-Manager.

The KE-Manager is a flexible tool to manage the KE3600 and download saved measurement data. Like the KE3600, the KE-Manager is designed very distinct and largely intuitive.

Configuration

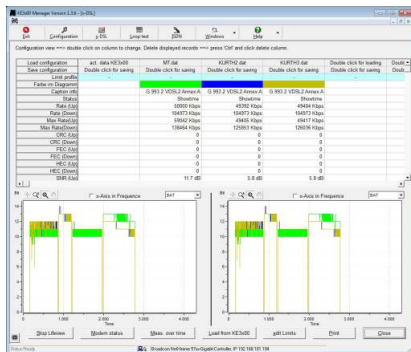
Settings for several basic options and licensing, transmitter list (IPTV profiles) and the profil set can be executed here as well as updating the device firmware. A detailed update guide is found under Help in the KE-Manager.



Important: Always connect the KE-Multitester to the PSU before starting the update process! An unintentional shutdown during the update results in the need to send the device in.

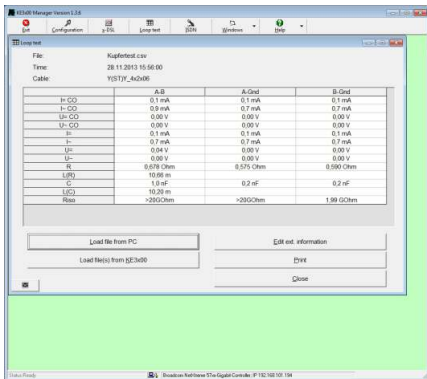
Result center

Provides accurate information about the active and stored tests. Available for xDSL, Ethernet, SHDSL and evaluation of test errors. The display of the parameters is individually configurable.



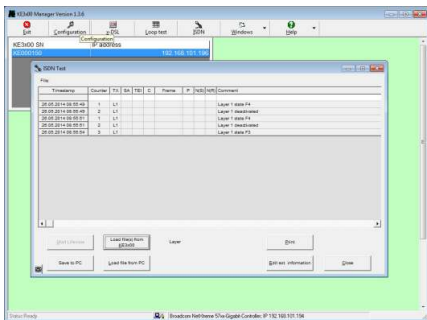
Loop Test

Here you can view the stored loop analysis tests from the KECT copper Interface.



ISDN

Here you can view the stored ISDN tests.



General Data

Graphic TFT Display	3.5" 240 (RGB) x 320
Languages	German, English, French Italian, Dutch
Test Port	RJ11 + RJ45
LAN Port	RJ45
GbE Port	RJ45
Power supply	Built in LiPo battery
Capacity	> 4 hours in Test Mode
Low batt indication	Coloumb counter
Power supply	100 - 230 V AC 50/60 Hz

Unit comes with:

AC power supply and charger, test leads RJ11-RJ45, RJ11 banana plug with rubber insulated crocodile clips, Ethernet cable for PC connection, bag made of rugged cordura with additional space. Windows software for download of results and upgrade of unit.

Dimensions

Size	230 x 114/90 x 70 mm 9" x 4.5/3.5" x 2.8"
Weight	850 g (28 oz.)
Housing	High impact resistant ABS, with drop protection
Display protection	2 mm Plexiglass

Environmental conditions:

Operation temperature:	0° - +50°C
Storage temperature	-20° - +60°C
Humidity:	up to 93%, non-condensing

The device was manufactured according to the following guidelines:

Electromagnetic Compatibility Directive 2014/30/EC

LVD Directive 2014/35/EC

IEC/CISPR: 11:2009 + A1:2010, 16-1-2:2006 Edition 1.2, 16-2-1:2008 + A1:2010, 16-2-3:2008 + A1:2010

IEC: 61000-4-1:2016, 61000-4-2:2008 Edition 2, 61000-4-3:2006 + A1:2007 + A2:2010, 61000-4-8:2009, 61326-1:2012, 61326-2-1:2012



Safety Instructions

The KE3600 may only be operated with the accessories originally provided. Using the device with accessories that are not original or for applications for which it was not intended can lead to incorrect measurements and may damage the device. The relevant safety regulations in VDE 0100, 0800 and 0805 must be observed.

- The use of connections other than those provided can damage the device. The device should not be used with high-voltage current. Kurth Electronic assumes no liability for damage resulting from improper use.
- Never apply external voltage to the device.
- Open the device only to change the batteries. There are no other parts in the device that need to be serviced or calibrated.
- The measuring device is protected from splashing water and dust by the front film covering. However, it is not water-tight.
- Never pull unnecessarily on the cables connected to the device.

Last Revision: 11.2016