

xDSL-Multitester

Performs Efficiency in Broadband Networks



KE3600 xDSL MULTITEST



Made in Germany

xDSL

ADSL-ADSL2+ / VDSL2 / SHDSL 8-wire
 VDSL2 Vectoring ITU-T G.993.5
 xDSL Bonding ITU-T G.998.1/2/3
 IPv4 Ping, Trace Route, IPv6 ready
 Modem / Router / Terminal Mode

NEW

- BNG / TR069
- G.FAST
- Vplus/SuperVector
- Web browser
- IPv6
- QR Code

GbE

LAN connectivity via 10/100/1000 MBit/s-Ethernet Test Interface
 Copper and Fiber

FTP and HTTP Up- and Download up to 700 MBit/s

ISDN / POTS

ISDN BRI Uk0/S0-TE and Analog (POTS) Interface

Copper Test

Line Qualification up to 30 MHz, DMM Test Functions
 and TDR Measurements

High Speed Interface

Optical GbE Test Interface
 GPON (ONT, Modem Emulation)
 Second Copper GbE-Port

Software Tools

Triple Play: VoIP and IPTV Tests Suite

New Broadband Technologies

High Speed Internet makes the availability of more and more increasing bandwidth in the data transmission absolutely necessary.

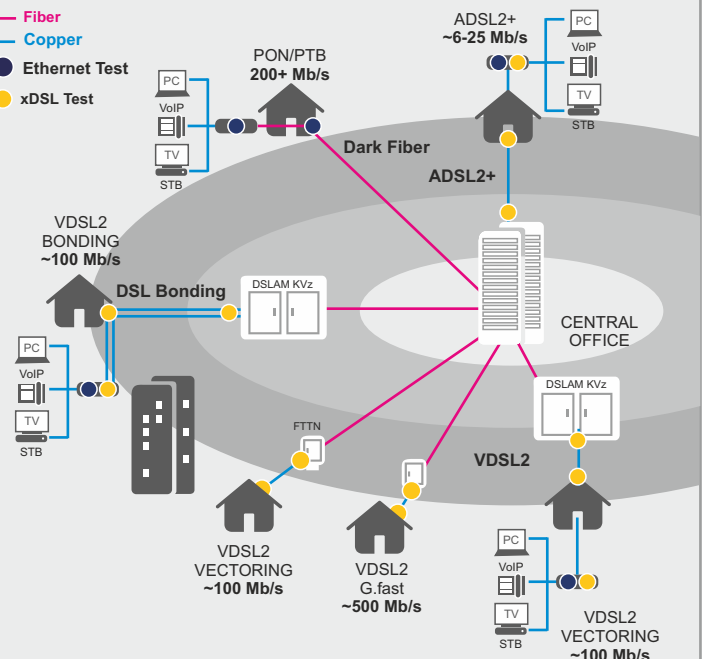
In addition to the widespread ADSL technology over the copper pair, the expansion of VDSL2 is promoted especially in urban areas. VDSL2 allows higher bandwidths, but only over short distances. Another costly and therefore little used solution is eg the GPON or Dark Fiber technology. This fiber is not routed as used with VDSL2 up to the street cabinet (FTTC), but also directly to the customer.

Service providers use to optimize the existing VDSL ports the Vectoring technology. This significantly increases the data transfer by eliminating the noise on the twisted pair. Even higher speed on the copper line is to be achieved with G.fast, here data rates up to 500 Mbit/s are possible.

The use of new technologies, especially VDSL2 Vectoring, G.fast and FTTH require a new generation of test and measurement equipment.

The innovative multi xDSL test family does full Vectoring measurement, is prepared for DSL Bonding* and GPON* and can handle their testing tasks reliably in these environments without restrictions.

* KE3600 - future-proof modular technology



KE3600 Multitester



- NEW**
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The KE3600 is the new, innovative and versatile **xDSL MULTITEST** for installation and troubleshooting of DSL services in ADSL1/2/2+ / VDSL2 and bundled networks and as well in FTTx deployments (GPON, Dark Fiber).

With a variety of interfaces the outstanding KE3600 **xDSL MULTITEST** supports many access network technologies. Accelerated fault diagnosis is made possible by its simple operation even for untrained technicians. Interferences in the network, in the outdoor and inhouse cabling but also in CPE can be narrowed down quickly. Even in FTTH networks KE3600 carries out measurements at its Ethernet or built-in SFP port.

Automatic detection of the DSL Service and automated test procedures for measurements on the copper line enable fast and efficient work. The universal SFP slot for future measurement in FTTx and GPON deployments highlights the KE3600 as a perfect test solution for next generation access networks.

The excellent price-performance ratio of the KE3600 **xDSL MULTITEST** makes it the perfect working tool for all inspection tasks of current and future technologies and sets standards in its class!

At a glance

- New handheld tester with many interfaces and fast performance
- Intuitive operation and multitasking
- ADSL-VDSL2 and VDSL2 Vectoring (ITU-T G.993.5) in one unit
- Supports Annex A/B/J/L/M with xDSL Autodetection
- GbE Port for advanced Ethernet testing
- Dial-in Test, Ping and Trace Route with IPv4 (IPv6 ready)
- Modem, Router and Terminal Mode shows all important DSL parameters
- FTP Up/Download, HTTP Download Tests up to 700 MBit/s
- Large, daylight-readable color TFT with high resolution
- High performance LiPo battery and expandable memory
- Including software for managing and creating protocols
- Future-proof modular technology

The Advantage: KE3600 MULTITEST Operating Concept



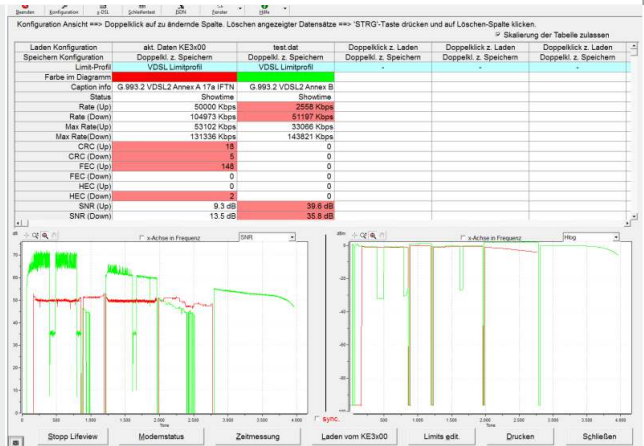
Fast multi-tasking operating

After a successful synchronization line values or graphs are shown on the large 3.5" sunlight readable color display. Waiting periods or complicated and time-consuming switching between menu items and views belong to the past. The selection keys provide easy exchange between the DSL line parameters, their impact on the application layers, results of Up/Download tests, Ping and Trace Route plus VoIP and IPTV parameters. The multitester are likely to be used as a PC, with real multitasking functionality the user can scroll between the windows. Without the loss of the current synchronization, other parameters or tests can be added and thus enables fast, easy and comprehensive diagnosis.

KE-Manager Software included

The supplied KE-Manager Software is a flexible tool to manage the KE3600, to download the measurements and for the creation of customized measurement reports. The surface is very clearly arranged and intuitive to use. Profiles can be easily created and edited in order to transfer them to the **xDSL MULTITEST**.

The optional LiveView function allows to transfer the current measurements from the tester to the Manager Software and look directly at the detailed test results on the PC. Extensive settings facilitates the evaluation of the results. The data can be stored and conveniently printed.



KE3600 Options

ISDN/POTS Test Telephone

- Handsfree function
- Port and self-testing call
- Detailed information on the line status
- BERT Test and Monitoring

Coppertests with KECT

- Prequalification of the copper lines: Impedance, Return Loss, Balance, NEXT Measurement, Receive Level and Spectrum, Wideband Noise and Impulse Noise
- Digitale Multimeter Measurements for troubleshooting: Current, Voltage, Insulation, Resitance and Capacitance
- The Loop Analysis summarizes the key measurements and automates the configurable measurement process
- KE905 functions: sends switching commands to the optional Remote Unit KE905 directly for comfortable remote switching of copper pairs at the far end of the line

TDR functions

- TDR functions for precise fault detection and localisation (up to 6 km cable length with \varnothing 0,5 mm)

SFP: Copper/Fiber or GPON

- SFP Copper (as second GbE-Port) or SFP Fiber
- GPON: ONT, Modem emulation

xDSL Bonding

- ADSL2+ and VDSL2 Bonding (ITU-T G.998.1/2/3)

SHDSL 2- to 8-wire

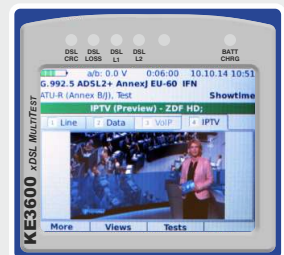
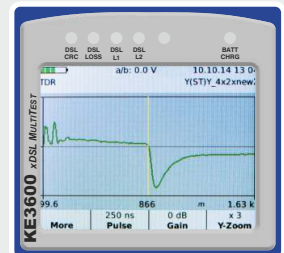
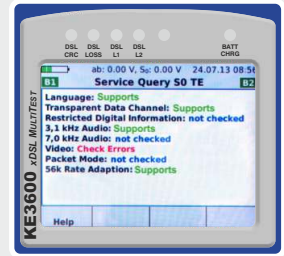
- Terminal-, Bridge- and Router-Mode
- Ethernet First Mile (EFM), TDM and ATM support
- Modem (STU-R) and CO / DSLAM emulation (STU-C)

VoIP Tests














- VoIP connections via xDSL and Ethernet
- VoIP signaling protocol SIP
- Displays Bitrate, Packets and Packet Loss
- Jitter, Jitter min/max, R-Value and MOS
- Call setup both with and without a registrar / proxy

IPTV Tests

- Set-Top-Box emulation
- Review audio and video packets
- Displays Bitrate and Packet Loss
- Jitter, MOS
- Preview function



Configuration

| No. | Type | | Description | Configuration |
|------------|---------------|---|---|---|
| 0.49830 | KE3600 |  | xDSL MULTITEST for ADSL/ADSL2/2+ Annex A/B/L/M/J, Up/Downstream, IP Ping, Modem, Router and Terminal Mode, Software, integrated LiPo battery pack. Incl. power supply, test leads for built-in interfaces and transportation pouch. | |
| 0.49830-10 | Upgrade VDSL2 |  | VDSL2 Annex A und B with Vectoring. Profile 8a/b/c/d, 12a/b, 17a (30a only in combination with Bonding) | |
| 0.49830-13 | KECT |  | Copper Test Interface for DMM Testing (Digital Multimeter), xDSL Line Qualification up to 31 MHz. Integrated Remote Control Functions for Line Test Assistant KE905 Remote | |
| 0.49830-11 | TDR |  | TDR measurements up to 6 km cable length with 0,5 mm \varnothing . Adjustable pulse length, attenuation and zoom. Dead zone 10 m | Only in conjunction with 0.49830-13 KECT |
| 0.49830-25 | ISDN |  | ISDN BRI S0-TE, ISDN Uk0 (4B3T or 2B1Q) and Analog (POTS) Interface | |
| 0.49830-6 | IPTV |  | IPTV-Test (Set Top Box Emulation) including TV preview | |
| 0.49830-5 | VoIP |  | VoIP-Test (Terminal simulation) including VoIP phone function | |
| 0.49830-3 | SFP-Port |  | SFP Port for SFP Copper or SFP Fiber modules. Usable as second GbE-Port or GPON (ONT, modem emulation). The according SFP Transceivers are available separately | |
| 0.49830-7B | Bonding |  | DSL Bonding Module Supports profiles 8a/b/c/d, 12a/b, 17a, 30a | |
| 0.49830-26 | SHDSL |  | SHDSL 2- to 8-wire Interface usable for 2, 4, 6, or 8 wire bonding with EFM, ATM or TDM support | |
| 0.49830-27 | S2M |  | ISDN PRI S2M Primary Rate Multiplex Interface | |
| 0.49820-16 | Car | | Car Charger 12 V 1,5 A | |
| 0.49602 | Earset | | Ear set including microphone with 3,5 mm phone jack | |
| 0.49620 | KE901 |  | KE901 Remote Switch Kit: KE905 Remote Line Switch and KE910 Controller performing manual test procedures at the far end of the line | |
| 0.49620-10 | KE905 |  | KE905 Remote Electronic Line Switch for control of manual and automated test procedures via KE3600 xDSL Multitester equipped with KECT option | Works in conjunction with 0.49830-13 KECT |

Specifications

| | | | | | | |
|------------------------------|------------|---|--|---|-----------------------------------|---|
| Compliance | ADSL1/2/2+ | ITU-T G.992.5 (ADSL2+ incl. Annex A, B, J, M), ITU-T G.992.3 (ADSL2 incl. Annex A, B, J, L), ITU-T G.992.1 (G.DMT incl. Annex A, B, J) ATIS/ANSI T1.413 Issue 2 IEEE 802.3ah (PTM) ITU-T G.998.1/2/3 (Bonding) | | | | |
| | VDSL2 | ITU-T G.998.1/2/3 (Bonding mit Profil 30a) ITU-T G.993.2 Annex A, B (Vectoring) Profiles: 8a/b/c/d, 12a/b, 17a, 35b Band Plan: 997, 998, US0 IEEE 802.3ah (PTM) | | | | |
| | G.FAST | ITU-T G.9700/9701 | | | | |
| DSL parameters | | <ul style="list-style-type: none"> ■ Maximum attainable bit rates ■ Actual achieved bit rates ■ Actual bonded achieved rates ■ Latency modes: fast, interleaved ■ Data modes: ATM, PTM ■ Capacity (%) ■ Signal-to-noise ratio (SNR) margin ■ Output power ■ Attenuation ■ Bits/bin ■ Attenuation/bin (Hlog/bin) ■ QLN/bin | <ul style="list-style-type: none"> ■ SNR/bin ■ Vendor code, revision ■ Interleave depth ■ Interleave delay ■ INP ■ G.INP ■ Vectoring ■ Modes: PTM, ATM, LOS, FEC, CRC, HEC, LOF, LOM, SES, ES, UAS ■ LATN per band ■ SATN per band | | | |
| Test interfaces | | <ul style="list-style-type: none"> ■ G.FAST, VDSL2, ADSL 1/2/2+ ■ Ethernet 10/100 MBit/s Management Port | <ul style="list-style-type: none"> ■ Ethernet 10/100/1000 MBit/s Test Port ■ Web browser applicable for test interfaces | | | |
| Encapsulation methods | | <ul style="list-style-type: none"> ■ RFC 2684 supporting bridged Ethernet (IPoE) ■ IPoA (RFC 1577) | <ul style="list-style-type: none"> ■ PPPoE (RFC 2516) ■ PPPoA/LLC and PPPoA/VC-MUX (RFC 2364) | | | |
| Operating modes | | <ul style="list-style-type: none"> ■ DSL Terminal ■ Modem Replacement (DSL to Ethernet) pass through | <ul style="list-style-type: none"> ■ Ethernet Terminal Mode | | | |
| Login format | | User name and password using PAP/CHAP | | | | |
| Connectivity support | | <ul style="list-style-type: none"> ■ TR609 / BNG ■ LAN/WAN status ■ DNS, gateway ■ DHCP client/server, DHCP vendor class ■ NAT | <ul style="list-style-type: none"> ■ VLAN ID, VLAN tagging ■ VPI/VCI ■ IP release ■ Signal Strength | | | |
| Ping test | | Ping destination: Gateway, IPv4 (IPv6 ready) adress or URL Number of pings: 1 to 99 Packet size: 32 to 1200 bytes (default is 32) Timeout: 1 to 10 seconds Results: Packets sent/received, average round-trip delay (ms) | | | | |
| Trace Route test | | Trace Route destination: Gateway, IPv4 (IPv6 ready) adress or URL Timeout: In seconds, default is 1 s, maximum is 10 s Packet size: 32 bytes Number of hops: 1 to 32 (default is 30) Results: Indicates IP address of hop and round-trip time in milliseconds (ms) | | | | |
| FTP/HTTP speed test | | Address: IP or URL Direction: Upload and/or download up to 700 MBit/s Results: Time, kB transferred, speed in kbit/s Bookmarks: User-definable | | | | |
| Software options | | IPTV Tests VoIP Tests | | | | |
| Interface options | | <ul style="list-style-type: none"> ■ xDSL Bonding-Module ■ SHDSL 8 wire interface ■ KECT copper qualifying up to 31 MHz and Telco Multimeter ■ TDR fault detection / localization | <ul style="list-style-type: none"> ■ SFP Port for copper, fiber (second GbE port) or GPON (ONT), Transciever optional ■ ISDN U_{ko} / S_o / POTS interface ■ S_{2M} PRI S2M Interface | | | |
| General data | | Display 3,5" TFT-Display RGB 240 x 320 | Power Supply Built-in LiPo battery > 4 hours in test mode charging time 6 hours | Size 23 x 11/9 x 7 cm 9 x 4.5/3.5 x 2.8" | Weight 800 g 1.76 lb | Housing High impact resistant ABS, w. drop protection |



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