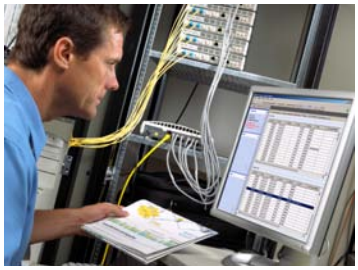
K18 Probes for the Network and Service Analyzer



High Performance Passive Monitoring Solution

- Solve network and service problems faster by having full visibility of network traffic in live and in load test conditions
- Reduce total cost of ownership by modularity, scalability and inexpensive upgrades to faster external processors
- Meet time-to-market objectives to test and deploy the latest mobile network technologies, including 4G
- Unique combination of high-performance and extreme portability
- Modular scaleable solution can grow from installation test to network optimization

Troubleshooting and Optimization Solution for GSM, GPRS, UMTS, WiMAX, LTE networks

The NSA solution combines K18 probes with the Network and Service Analyzer suite of software applications. NSA is a completely scalable solution, starting from a few links (stand-alone probe) to a high number of links (multiple probes), to address the varied needs of network operators and equipment manufacturers. Different versions of the K18 probes exist, for the different physical interfaces used in telecommunication networks: STM-1/OC-3 (including channelized STM-1), E1/DS1/J1, Fast/Gigabit Ethernet.

K18 probes are designed for the highest requirements in terms of data capturing. Data processing is offloaded to an external PC or Server, to minimize the acquisition cost and to offer the maximum performance scalability. K18 probes perform first level processing at line rate speed: filters, such as UTRAN Control Plane/User Plane, ATM VPI/VCI, Ethernet VLAN, IP Address Ranges, frame reassembling, such as AAL-2 reassembling, IP reassembling, other sophisticated functions, such as autoconfiguration of UTRAN logical channels.

K18 monitors 2G/3G/4G networks: GSM, GPRS, UMTS, LTE, and Mobile WiMAX. Specific NSA applications address the different stages of technology development, from feature and system test in labs to live network troubleshooting and optimziation.

Features & Benefits

- Completely scalable platform, starting from a single probe (2x STM-1/OC-3 or 8x E1/DS/J1 or 4x GbE bi-directional links) to a high number of links (multiple time-synchronized probes)
- Excellent portability for field installation and maintenance activities
- Reliable rack-mounted stationary monitoring for test plant, operation and maintenance, and network optimization activities
- Exceeding 400 Mbps stream-to-disk performance for long term capture without data loss
- 100% line rate, state-of-the-art hardware filters for data reduction
- Time synchronization between different probes enabling multi-Interface, multi-Protocol, delay-sensitive measurements and applications
- Real-time analysis or subsequent offline investigations
- Auto-configuration of IMA groups by NSA software when used with channelized STM-1 or E1/DS1/J1 ATM probes

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Typical Configurations

K18 probes connect to a PC via Fast/Gigabit Ethernet. The PC performs application measurements and acts as a data archive server. The K18 probes connect to the PC using 10/100/1000Base-T ports. Basic configurations with a laptop or desktop PC and one or two probes are suitable for most field troubleshooting and many design verification activities. In order to meet more demanding needs, larger configurations are made possible through the use of multiple probes, and are controlled by single or multiple users.

One K18 Probe Controlled by a Laptop or a Desktop PC

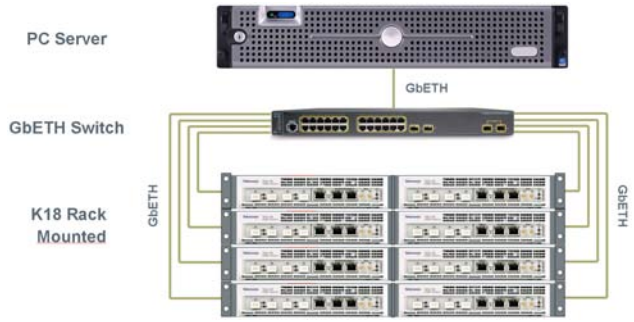
An external PC (typically a laptop or a desktop) runs the Client/Server software. The probe is then typically connected via a switch to the PC. Automatic detection and crossconnection of the Ethernet link to the host PC allows using a normal cable instead of a cross-connected cable.

Several K18 Probes, Synchronized, Controlled by One PC for a Portable Solution

An external PC runs the NSA software. The PC is also connected via a switch to multiple K18 probes. For highly accurate time synchronization a dedicated sync cable is required. Multiple K18 probes can be daisy-chained for the purpose of time synchronization.

Several K18 Probes, Rack-mounted, Synchronized and Controlled by one PC

Several K18 probes can be stacked into a 19" rack. Two K18 probes side-by-side fit into a 1U 19" rack.

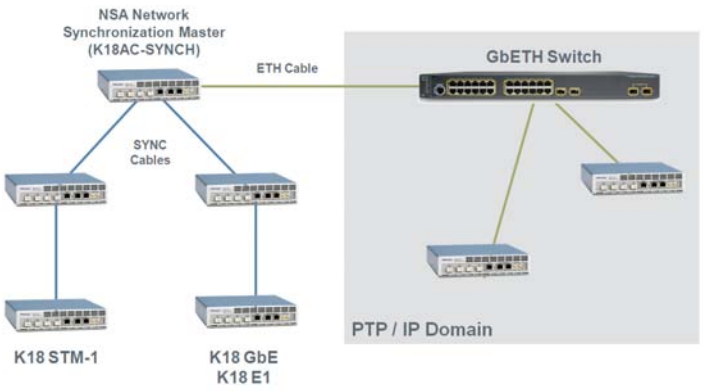


Rack Mounted Set of K18 Probes

Distributed configuration with K18 probes synchronized via LAN

Time synchronization of different probes is required to align the time stamps of protocol messages monitored on different network interfaces. When the distance between adjacent probes exceeds 3 m, probes can be synchronized over LAN, by means of a special device, the NSA Network Synchronization Master (K18AC-SYNCH).

The network connection used for synchronization is the same used to stream data to the NSA server. To ensure accurate synchronization, the LAN must guarantee Low Jitter (< 1 millisecond) and must allow IP multicast and broadcast.



Distributed configuration with K18 probes synchronized via LAN

K18 Probes

K18 STM-1 (K18HW-2STM1)

4x STM-1/OC-3 Receiver ports with LC connector
HW based AAL-2 and AAL-5 reassembling
HW based filters (VPI/VCI, UTRAN protocol-specific such as User Plane)

K18 STM-1 Channelized (K18HW-CH-STM1)

1x STM-1/OC-3 (bi-directional) via 2x LC optical connectors
HW based reassembling and filters (same as with K18HW-2STM1)

K18 GbE (K18HW-GBE-RJ)

4x RJ-45 Receiver ports for 100-BaseT and 1000-BaseT Ethernet (100/1000 Mb/s)
HW based IP reassembling
HW based filters (Ranges of IP addresses, Ranges of Port Numbers, protocol-specific such as User Plane)

K18 GbE (K18HW-GBE-SFP)

4x SFP connectors for support of optical and electrical interfaces (mixed configurations are also supported).
- 1000-Base-SX Optical 850nm MultiMode, LC connector. Ordering code: K18HW-SFPSX
- 1000-Base-LX Optical 1300nm SingleMode, LC connector. Ordering code: K18HW-SFL-LX
- 1000-Base-T Electrical, RJ-45 connector Ordering code: K18HW-SFPT

HW based IP reassembling and filters (same as with K18HW-GBE-RJ)

K18 E1 (K18HW-E1)

8x RJ-45 ports for 16 E1/DS1/J1 receivers (8x bi-directional links)
High-impedance connection
RJ-45 connectors with cables to adapt to all standards (Coax, Bantam, RJ-45, open ends)
Supports ATM monitoring:
- HW-based AAL-2 and AAL-5 Reassembly
- HW-based Filters (VPI/VCI, UTRAN protocol-specific such as User Plane)
- IMA Inverse multiplexing for ATM

Supports PCM monitoring:
- 512 Timeslots
- HW-Based HDLC Framing
- HW-based Filters (FISU, FISU duplicates, Retransmitted MSU due to PCR)

Accessories

- **NSA Network Time Synchronization Master (K18AC-SYNCH)**

Autonomic operating high precision clock source for NSA probes
Synchronizes NSA probes over LAN, at longer distance than what possible with point-to-point synchronization cables
Same form factor of K18 probes
Firmware updatable
Gets initial time from configurable NTP server
Acts as software-based time synchronization master, using PTP Standard - IEEE 1588(TM) Std-2002 over 100/1000 Mb/s Ethernet, for:
- K18 STM-1 (K18HW-2STM1)
- K18 E1/DS1/J1 (K18HW-E1)
- K18 GbE (K18HW-GBE-RJ, K18HW-GBE-SFP)
- K18 STM-1 Channelized

Acts as hardware based time synchronization master (max 3 m distance between probes) for K18 STM-1 (K18HW-2STM1), for K18 STM-1 Channelized (K18HW-CH-STM1) for K18 GBE (K18HW-GBE-RJ, K18HW-GBE-SFP) and K18-E1/DS1/J1 (K18HW-E1) via RJ-45 connector

Time-synchronization connectors:
- 2x RJ-45 Ethernet connectors for PTP
- 1x SMB clock output
- 1x RJ-45 clock output

- Rack mountable kit (K18HW-RCK)
  19" Sheet metal Rack Mount Kit 1HU. 1HU hosts 2 K18 probes side by side with the corre sponding power supplies.
- Transport Case (K18AC-BAG)
  Laptop bag with space for 2 probes with acces sories or 1 Laptop and 1 Probe with accessories.

Other Probe Characteristics

	K18 STM-1 / K18 Channelized STM1 / K18 GbE / K18 E1
Probe Dimensions	
Width	212 mm
Depth	212 mm
Height	43.2 mm
Weight	
Probe	1,250 g
External Power Supply	500 g
Power Supply	
Type	External 60 W power supply.
AC Input	90 V to 264 V
DC Output	24 V @ 2.5 A
Front I/O	
Debug	One serial RS232 port
Data streaming	Two 10/100/1000Base-T ports with integrated LED
Time Synchronization	Timestamp one SMB output connector and two RJ45 input/output connectors
	Reset button
Regulatory	
Safety	EN61010-1: 2001, IEC61010-1: 2001, UL60950-1: 2003, CAN/CSA C22.2 No.60950-1: 2003 (Power supply)
EMC	EC Council Directive 89/336/EEC. AS/NZS 3548 Class A FCC 47 CFR Part 15, Subpart B, Class A
Environmental	
Temperature	Storage: –20 °C to +75 °C / Operating: +5 °C to +40 °C
Relative Humidity	Non-operating: Up to 95% Operating: Up to 85%, non-condensing
Altitude	Non-operating: 12,000 m / Operating: 3,000 m
Shock (probe only) – 50 g/11 ms Half-sine	
Random Vibration	Non-operating: 2.0 gRMS Operating: 0.25 gRMS
Acoustic Noise	<50 dB A

About Tektronix Communications:

Tektronix Communications provides network operators and equipment manufacturers around the world an unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks. This comprehensive set of solutions support a range of architectures and applications such as LTE, fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV. Tektronix Communications is headquartered in Plano, Texas. Learn more about the company's test, measurement and network monitoring solutions by visiting www.tektronixcommunications.com

For Further Information:

Tektronix Communications maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

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