



# 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 K15 and 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, 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, 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 optimization.

### Features & Benefits

- Completely scalable platform, starting from a single probe (2x STM-1/OC-3 or 8x E1/DS1/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
- Immediate real-time analysis or subsequent offline investigations



## 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 PC is connected directly to the probe. 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

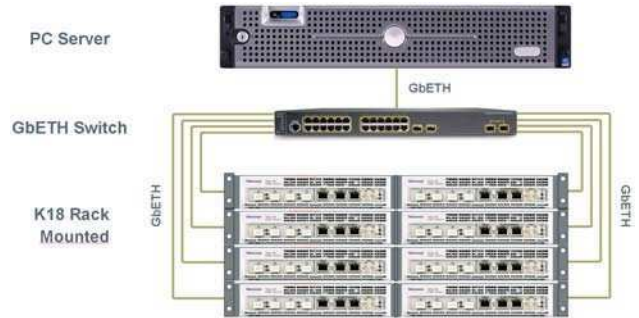
An external PC runs the Analyzer software. The PC is connected point-to-point to one probe that daisy chains the LAN connection to the next one. The data connection is daisy chained to the second, and all other probes. The solution is extremely portable since no external hub/switch is needed. For highly accurate time synchronization a dedicated sync cable is required.



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

### 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.

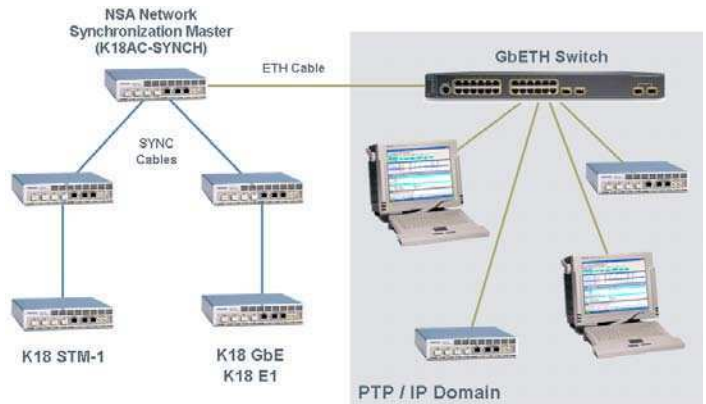


**Rack Mounted Set of K18 Probes**

### 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). It is also possible to synchronize K18 probes with k15 probes running NSA applications.

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**

4.25 x 5.5

## K18 Probes

### K18 STM-1 (K18HW-2STM1)

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

### 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  
Each port can be configured independently by means of SFP modules. Mixing different SFP types is possible  
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 reassembly  
HW based filters (Ranges of IP addresses, Ranges of Port Numbers, protocol-specific such as User Plane)

### 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 and LSSU duplicates, Duplicated 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)  
K15 boards operated as NSA probes (Power WAN K15MB030, PowerWAN Light K15MB080, PowerWAN Light 2 K15MB180, PCE-2 K15MB000)

Acts as hardware based time synchronization master (max 3 m distance between probes) for K18 STM1 (K18HW-2STM1) via SMB connector 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 corresponding power supplies.
- Transport Case (K18AC-BAG)  
Laptop bag with space for 2 probes with accessories or 1 Laptop and 1 Probe with accessories.

## Other Probe Characteristics

	K18 STM-1	K18 GbE & K18 E1
<b>Probe Dimensions</b>		
Width	212 mm	212 mm
Depth	212 mm	212 mm
Height	43.2 mm	43.2 mm
<b>Weight</b>		
Probe	1,200 g	1,250 g
External Power Supply	300 g	500 g
<b>Power Supply</b>		
Type	External 48 W power supply	External 60 W power supply.
AC Input	90 V to 254 V	90 V to 264 V
DC Output	15 V	24 V @ 2.5 A
<b>Front I/O</b>		
Debug	One serial RS232 port	One serial RS232 port
Data streaming	Two 10/100/1000Base-T ports with integrated LED	Two 10/100/1000Base-T ports with integrated LED
Time Synchronization	Timestamp input/output SMB connector	Timestamp one SMB output connector and two RJ45 input/output connectors
	Reset button	Reset button
<b>Regulatory</b>		
Safety	EN61010-1: 2001, UL61010-1: 2004, CAN/CSA C22.2 No. 1010.1: 2004, IEC61010-1: 2001	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 2064 Class A FCC 47 CFR Part 15, Subpart B, Class A	EC Council Directive 89/336/EEC. AS/NZS 3548 Class A FCC 47 CFR Part 15, Subpart B, Class A
<b>Environmental</b>		
Temperature	Storage: -20 °C to +75 °C / Operating: +5 °C to +40 °C	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	Non-operating: Up to 95% Operating: Up to 85%, non-condensing
Altitude	Non-operating: 12,000 m / Operating: 3,000 m	Non-operating: 12,000 m / Operating: 3,000 m
<b>Shock (probe only) - 50 g/11 ms Half-sine</b>		
Random Vibration	Non-operating: 2.0 gRMS Operating: 0.25 gRMS	Non-operating: 2.0 gRMS Operating: 0.25 gRMS
Acoustic Noise	<50 dB A	<50 dB A



### About Tektronix:

Tektronix has more than 60 years of experience in providing network operators and equipment manufacturers a comprehensive and unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks.

These solutions support such architectures and applications as fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV.

Learn more about Tektronix' communications test, measurement and network monitoring solutions by visiting:

[www.tektronix.com/communications](http://www.tektronix.com/communications)

### For Further Information:

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

Please visit [www.tektronix.com/communications](http://www.tektronix.com/communications)

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