

Tektronix Monitoring Solution for Mobile Networks

► K15



Breakthrough Solution for Mobile Network Troubleshooting

The K15 is the new Tektronix dedicated monitoring solution for mobile network testing, based on a high-performance transportable platform equipped with real-time powerful troubleshooting applications and designed to handle the new demanding high-performance requirements of mobile networks.

Platform

The Compact-PCI compliant platform houses a PC running Windows XP Embedded operating system and up to five application boards in a small, easily transportable box. A complete operator interface is provided on the front panel, including a 14.1" XGA color display and attachable keyboard with pointing device. A central front foot allows optimal viewing angle. The top cover opens to the rear and can be left in place in order to protect from dust even when cables are connected. Top access is provided for up to six 6U CompactPCI boards that are housed in vertical position, and for a dual-slot plug-in AC power supply. Five slots are available for Interface/Masurement application boards; the sixth slot is equipped with a 1.8 GHz Pentium M CPU board,

providing also one free PMC slot for RAM memory upgrades. The backplane is compliant with the telecom extension of CompactPCI (H.110/PICMG2.5) and provides access to four system-wide clock/sync signals. Each K15 unit can act as a synchronization master or slave; GPS input is also supported. There are four USB 2.0 interfaces (backward compatible with USB 1.0 and USB 1.1) available for connecting external data mass storage devices (for example, DVD/CD-RW drive). Internal CD-RW drive, floppy disk drive, LPT parallel printer port and SCSI interface have been removed in order to accommodate powerful internal mass storage capabilities consisting of two RAID0 SATA HD drives with capacity >250 GB each, >500 GB in total. A standard AC97 Sound Codec and Line IN/Line OUT and MIC IN via 3.5 mm phone jacks provides standard sound capabilities. An Intelligent Platform Management subsystem provides flexible management of platform ID, temperatures, fans and other system values, allowing also low acoustic noise in low-power-consumption applications.

► Features & Benefits

"UMTS Iub Deciphering" Deciphers in Real-time All Messages on the Iub Interface. Extensive Troubleshooting by Enabling Full Access to the Content of all Frames

"H324.M Protocol Suite," "HSDPA Protocol Suite," "EDGE Test Suite" Troubleshooting Video Telephony Services and Interactive Multimedia Services

"Multi Interface Call Trace," an Expert Software for SS7, GSM, GPRS, EDGE, UMTS, cdmaOne and cdma2000 Networks, Enables Fast and Easy Identification of Problems From the Symptom to the Root Cause

"H324.M KPI and Video Quality Analysis" Enables Videotelephony Troubleshooting and Quality of Service Analysis

Availability of E1/DS1/J1, STM-1/OC-3c, 10/100 Fast Ethernet Monitoring Cards With High Port Density Along with Fixed Network, SS7, GSM, GPRS, EDGE, UMTS, cdmaOne and cdma2000 Protocol Decoding

"Stream to Disk" Capabilities for Subsequent Offline Analysis

NTP and GPS Synchronization Along With the "File Merge" Application Permits Distributed Multi-site Monitoring

"Hardware Filters" for STM-1/OC-3 based UTRAN Interfaces Allow Network Analysis Under Heavy Load

► Applications

GSM/GPRS/EDGE/UMTS/cdmaOne/cdma2000 Applications for Troubleshooting Live or Trial Networks Under Significant Traffic Load Conditions at Mobile Network Operators

GSM/GPRS/EDGE/UMTS/cdmaOne/cdma2000 Applications for Troubleshooting During Load, Stress, Duration and Acceptance Tests of Network Elements at Equipment Manufacturers

Automatic UMTS Iub Deciphering

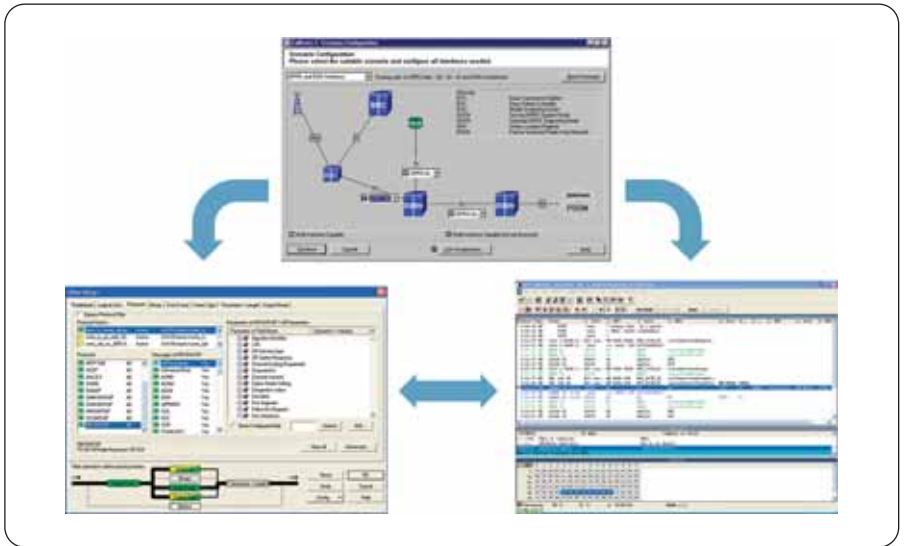
The UMTS Iub Deciphering application consists of an expert software capable of automatically deciphering in real-time all the ciphered protocol messages traveling on the UMTS Iub interface. All the necessary parameters needed for deciphering are collected automatically by the instrument by monitoring the Iu interface.

Multi-Interface Call Trace

The Multi-Interface Call Trace application is expert software that helps trace calls/sessions in real-time and offline as they evolve over multiple interfaces.

Simple parameters like the IMSI are used to identify the subscriber identity and to trigger the search. The call/session can even be traced if the identifying parameters change dynamically during the transactions (for example IMSI, P-TMSI), even if it spans over multiple interfaces (such as Iub - Iu-PS - Gb) and involves different network elements (like Node B, RNC, HLR). The GUI allows drill-down troubleshooting from the problem symptom to the root cause with just a mouse-click.

The Overview Window lists detected calls/sessions and highlights their status at a glance (normal, failed) for quick identification of problems. This allows filtering out calls that are not of interest for the particular test being performed (normal calls).



The Arrow Diagram graphically shows the message flow (arrows) of the call/session and the involved network elements (vertical lines) in a very intuitive way. Deep protocol knowledge is not required.

For in-depth troubleshooting of the problem's root cause, all details about the protocol messages and their parameters are shown in the Detailed Monitor Window. Supported interfaces are:

- SS7/GSM (ISUP, INAP)
- GPRS/EDGE (Abis, A, Gb, Gr, Gn/Gp)
- UMTS (Iub, Iu-PS, Iu-CS)
- cdmaOne/cdma2000 (A1, A10/A11)

H.324M Video Telephony QoS Analysis

By tracking H.324M video calls on the Iu-CS interface, the H.324M Video Telephony QoS Analysis application enables users to:

- Calculate H.324M key performance indicators (KPI) to speed up troubleshooting activities
- Extract the H.324M video/audio stream to assess its quality
- Look and listen at video calls to assess the customer perceived quality of service
- Extract the video stream in .3gp format for subsequent in-depth offline video quality analysis with the Tektronix MTS4EA Software Suite

Protocol Analysis

The K15 monitors a wide range of SS7, GSM, GPRS, EDGE, UMTS, HSDPA, cdmaOne and cdma2000 protocols, featuring a graphical user interface that allows visualizing protocol messages with increasing level of details, along with easy-to-use powerful filtering capabilities.

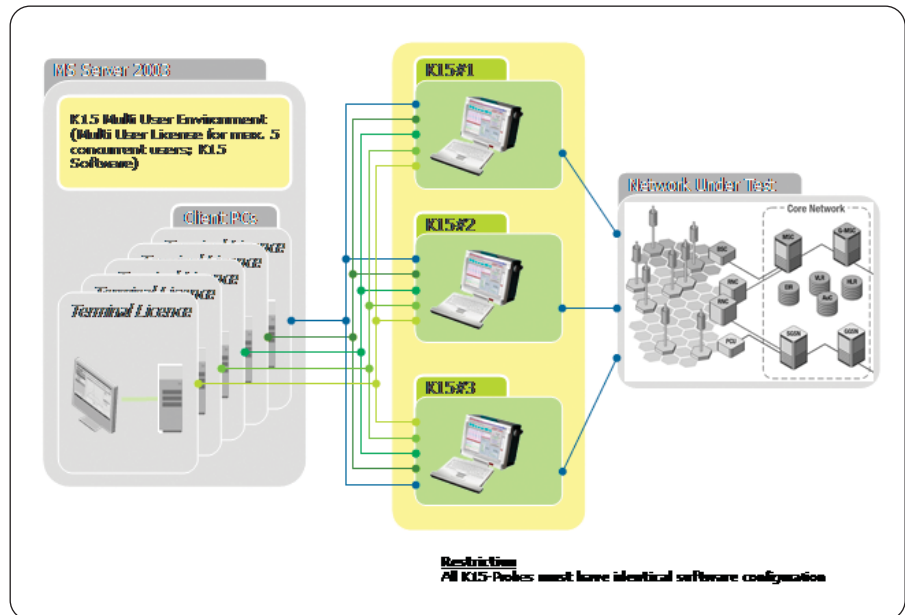
Distributed Monitoring Applications

The K15 embeds all the fundamental building blocks for a distributed monitoring architecture. The Remote Desktop capabilities allow the K15 to:

- Reduce technicians' traveling cost and time, because operations can be centralized
- Reduce the time needed to solve problems, because inexperienced technicians in remote sites can be supported by skilled personnel at headquarters
- Maximize use of experts at headquarters, because troubles can be analyzed in real-time without waiting for the technicians to collect traces

With the NTP and GPS synchronization capabilities, the K15:

- Reduces the time needed to identify the root cause of a problem: With the new multi-interface call trace, all interfaces and network elements in the problem domain can be analyzed simultaneously
- Grows with the needs: If one instrument is not enough to cope with an increasing number of interfaces, additional test systems can be added and synchronized with the existing instrumentation



- Deals with the new high-complexity problems in 2.5/3G networks: The new categories of problems which occur in the next generation mobile infrastructures require the ability to measure simultaneously and time synchronized at multiple interfaces in different geographic locations

The capability to stream protocol data to a hard drive while simultaneously conducting real-time analysis allows the K15 to:

- Collect a large amount of data for subsequent analysis by using a simple "recording pipeline" that stores monitored protocol data into an internal HD, to an external HD or to a network file system
- Merge data collected from different instruments at different sites by using an easy-to-use File Merge Application

- Use previously collected data to perform offline analysis by using our offline or post-processing software

Multi-User Environment

With software release V 2.20, the K15 becomes a true multi-user test system. Five users can work concurrently on the same K15 hardware connected to one server. The system is scalable with additional servers. Full functionality with real time analysis is possible for each user and each user can see all data from all the test ports.

► Additional Interfaces Available Within the New K15 Hardware Platform

Interface Type	K15 Classic HW platform		K15-2 HW platform	
	Rear I/O	Front I/O	Rear I/O	Front I/O
USB 2.0	–	–	2 x Type A	2 x Type A
USB 1.0	1 x Type A	1 x Type A	–	–
COM 1 (RS232)	–	1 x D-sub 9	–	1 x RJ-45
1000BaseTx (Gb Ethernet)	–	–	2 x RJ-45	2 x RJ-45
100BaseTx	–	2 x RJ-45	–	–
DVI-I	–	–	–	1 x MicroCross 29 pol. MOLEX#74320
VGA	–	1 x D-sub 15	–	–
Keyboard/Mouse	2 x PS/2	1 x PS/2	–	1 x PS/2
IPMI (EMP)	1 x D-sub 9	–	1 x RJ-45	–
RELAIS Switch	2 x 4 mm	–	–	–
LPT Printer Port	1 x D-sub 25	–	–	–
Time Sync Module	4 x SMB	–	–	–
UW-SCSI	1 x HD68	–	–	–
Line IN	–	–	1 x 3.5 mm phone jack	–
Line OUT	–	–	1 x 3.5 mm phone jack	–
MIC IN	–	–	1 x 3.5 mm phone jack	–
Extension Modules Slot	–	1 x PMC	–	1 x PMC

► Characteristics

General

Host Processor Board

Processor –

Mobile Pentium M 1.8 GHz, 2 MB L2 cache.

Memory –

1 GB expandable to 2 GB with a PMC plug in SDRAM ECC.

Timer –

User programmable, allows real-time functions.

Bus – CompactPCI; 64-Bit/33 MHz.

Front Panel I/O

PS/2 Interface –

One connector for external keyboard/mouse.

USB 2.0 Interface – Two connectors.

Serial Interface – One RS-232 RJ-45 connector.

DVI-I Interface – Connector on the board panel.

PMC Slots –

One, providing connection to the backplane.

Gb Ethernet Interface –

2 10/100/1000-BaseTx RJ-45 connectors.

Rear panel I/O

USB 2.0 Interface – Two connectors.

Serial interface –

One RS-232 RJ-45 connector for IPMI.

Gb Ethernet –

Two 10/100/1000-BaseTx RJ-45 connectors.

Line IN – One 3.5 mm phone jack.

Line OUT – One 3.5 mm phone jack.

MIC IN – One 3.5 mm phone jack.

Data Storage

Hard disk I – 30+ GB, 2.5" IDE hard disk drive.

Hard disk II-III – Two RAID0 SATA HD >250 GB.

Display

Type –

TFT LC active-matrix color display with backlight and sleep mode.

Dimensions – 14.1".

Resolution – 1024x768 pixel -XGA compliant.

An external monitor may be connected using the DVI-I connector on the top of the unit.

Keyboard

Type –

Full-QWERTY; attachable to the front of the unit.

An External Keyboard may be connected via a PS/2 connector on the rear of the unit.

Pointing device

Type – Integrated touch pad with two buttons.
An External Mouse may be connected via a PS/2 connector on the rear of the unit.

Platform Management Subsystem (IPMI compliant)**Features** –

Fan speed control, temperature control, platform hardware ID management, power outage control.
The IPMI interface connector is for Tektronix service use only.

Operating System

Microsoft Windows XP Embedded.

Physical Characteristics**Dimensions (Excluding Handle) –**

Width	365 mm
Depth	227 mm
Height	340 mm
Without Cover	305 mm

Weight

Without Application Boards	11.8 kg
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Others

Inclination	One reclinable central front foot (can reach 70 mm)
Top Cover	Detachable plastic cover; open on the rear
Transport Handle	Fiber enforced plastic with rubber overmold
Transport Case (Optional)	Hard-shell case with wheels and retractable handle (520 mm H x 695 mm W x 405 mm D)

Backplane – Compact PCI**Features** –

Passive; six slots; one CompactPCI segment, PICMG 2.1 compliant, 64-Bit/33 MHz.

H.110 Bus – (PICMG 2.5) on P4 of peripheral slots.

Clock/Sync – Four signals distributed on P2.

Power**Type** –

Industrial grade, 350 W; plug-in module with over-temperature protection.

AC Input –

460 VA, 100-240 VAC \pm 10%, 50/60 Hz.

DC Output –

50 W per application slot (available for the +5 V, +3.3 V, +12 V and –12 V application slots as follows): 35 A; 30 A; 7 A; 2.5 A.

Fuse data – 6.3 A Time-delayed, 250 V.

Regulatory**Safety** –

UL and cUL to UL61010B-1 [reference: PO61];

CE mark: EN61010-1.

EMC –

FCC Part 15, Class A; CE mark: EN61326, Class A.

Environmental**Temperature** –

Operating: +5 °C to +40 °C.

Non-operating: –20 °C to +65 °C.

Relative Humidity –

Operating: Up to 80% below 30 °C, derate to 45% at 40 °C, non-condensing.

Non-operating: Up to 90% below 20 °C, derate to 60% at 20 °C, non-condensing.

Altitude –

Operating: 10,000 ft. (3000 m).

Non-operating: 40,000 ft. (12000 m).

Shock –

Operating: Half-sine 2 g.

Non-operating: Half-sine 30 g.

Random Vibration –

Operating: 0.31 g_{RMS}.

Non-operating: 2.28 g_{RMS}.

Acoustic Noise –

ETSI 300 753 for Business area (63 dBA).

Timestamps Accuracy

NTP – \pm 10 ms with network jitter \pm 3 ms.

GPS – \pm 1 ms.

Monitoring Interface/ Measurement Application Boards**Single Slot Boards****PowerWAN** –

Interfaces up to 8 E1/DS1/J1 bi-directional PCM links.

PowerWAN Light –

Interfaces up to 4 E1/DS1/J1 bi-directional PCM links.

PowerWAN Light with Ethernet Module –

Interfaces up to 4 E1/DS1/J1 bi-directional PCM links and up to 2 10/100 Mb/s Fast Ethernet links.

Double Slot Boards**PCE-2** –

Can mount up to 2 LIF (LIF type A or LIF type B) in any combination.

LIF type A – Interfaces up to 2 STM-1/OC-3c bi-directional optical links.

LIF type B – Interfaces up to 4 E1/DS1/J1 ATM links.

Accessories

GPS Kit Including Antenna, Receiver and Cable – Order K15AC001.

Transport Case with Wheels and Retractable Handle – Order K15AC002.

Cables and Connectors – See www.tek.com/cableandaccessories

► Ordering Information

► Predefined Configurations

Order Code	Description
K15SYS-CORE	K15 Fixed Network Bundle; 5-slot K15-2 Unit with Fixed Network SW (CORE + ACCESS)
K15SYS-GPRS ^{*1}	K15 GPRS Bundle; 5-slot K15-2 Unit with Fixed Net + GSM + GPRS SW
K15SYS-GSM ^{*1}	K15 GSM Bundle; 5-slot K15-2 Unit with Fixed Net + GSM SW
K15SYS-TRB-U ^{*1}	K15 UTRAN Bundle Troubleshooting; 5-slot K15-2 Unit with NSA UTRAN Troubleshooting Suite
K15SYS-UMTS ^{*1}	K15 2G/2.5G/3G Bundle; 5-slot K15-2 Unit with Fixed Net + 2G/2.5G/3G SW

^{*1} Multi-Interface Calltrace and Deciphering software included.

► Optional Interface Boards

Order Code	Name	Description
K15MB080	HW 4xE1/DS1/J1 Interface board	PowerWAN light, 4 x E1/DS1/J1 PCM Rx/Rx
K15MB081	HW 2x10/100 Mb/s module	Ethernet plug-in for the 4xE1/DS1/J1 Interface Board (K15MB080) contains 2 x 10/100 Mb/s ports
K15MB030	HW 8xE1/DS1/J1 Interface board	PowerWAN, 8 x E1/DS1/J1 PCM Rx/Rx ports
K15MB000	HW ATM Interface board w/o LIF	PCE-2 board without LIF
K15MB020	HW E1/DS1/J1 ATM Interface module	E1/DS1/J1 LIF, 4 x E1/DS1/J1 ATM Rx/Rx ports
K15MB010	HW STM-1/OC-3 ATM Interface module	STM-1/OC-3 LIF, 2 x STM-1/OC-3 ATM Rx/Rx ports

► Software

Order Code	Name	Description
K15SW00-6BD-FULL	SW CDMA + Fixed NW	Fixed Network (ISDN PRI, SS7, IP) + CDMA decoding; includes base SW and basic applications
K15SW00-6BE-FULL	SW cdma2000	cdma2000 decoding; includes base SW and basic applications
K15SW00-6BH-FULL	SW GPRS + EDGE	GPRS + EDGE decoding; includes deciphering, base SW and basic applications
K15SW00-6BJ-FULL	SW GSM + Fixed NW	Fixed Network (ISDN PRI, SS7, IP) + GSM decoding; includes base SW and basic applications
K15SW00-6BL-FULL	SW UTRAN	UTRAN decoding (Iub, Iu, Iur), proprietary NBAP; UMTS Autoconfiguration; includes base SW and basic applications
K15SW00-6GF-FULL	GPRS Deciphering	Gb Interface deciphering software
K15SW00-6NK-FULL	NBAP Nokia	NBAP Nokia Decoder
K15SW00-6UJ-FULL	IMA Monitoring	IMA Monitoring Decoder
K15SW00-6VK-FULL	Videotelephony QoS	Videotelephony QoS Application: UMTS Iu-CS Videotelephony; H324M QoS package
K15SW00-6WF-FULL	Iub Deciphering	Iub Interface deciphering software
NSA15SW-D-U	NSA15 Iub Deciphering	NSA15 SW: Iub Deciphering
NSA15SW-OFFUS	NSA15 Offline	NSA15 SW – Offline SW license for one user
NSA15SW-PAS-U	UTRAN PAS	Network and Service Analyzer UTRAN Performance Analysis Suite
K15SW00-3FT-FULL	Record File API	Record File API
K15SW00-4PP-FULL	SW K15 PC Monitoring	Tool for Offline Analysis: Record play back; aligned to WINDOWS 2000/XP (Engl.); analysis and play back of K1103-, K1205-, K1297-, K15-record files, including zoom, filter and statistics
K15SW00-4PV-FULL	SW K15 Record Viewer	Tool for Offline Analysis: Record Viewer; aligned to WINDOWS 2000/XP (Engl.); analysis of K1103-, K1205-, K1297-, K15- record files
K15SW00-9CP-FULL	SW K15 Monitoring API for C++	Monitoring API for C++
K15SW00-4PM-FULL	K15 Multi-User License	3/2.5/2G for five concurrent users. Prerequisite: K15 base SW ≥V 2.20; Windows 2003 Server, Client Licenses
K15SW00-4PN-FULL	K15 Multi-User License	2.5/2G for 5 concurrent users. Prerequisite: K15 Base SW ≥V 2.20; Windows 2003 Server, Client Licenses

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Updated 5 January 2006

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2/06 HB/WWW

2FW-16841-4

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Enabling Innovation

