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 CompactPCI-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" XGA color display and attachable keyboard with pointing device. A central front foot allows optimal viewing angle. The top cover, which opens to the rear, can be left in place to protect from dust even when cables are connected.

Flexible Data Storage and Communication resources are provided; drives are accessible from the side of the unit.

Top access is provided for up to six 6U CompactPCI boards, housed vertically, and for a dual-slot plug-in AC power supply. Five slots are available for Interface/Measurement Application Boards; the sixth slot is equipped with a Pentium III CPU board. The backplane is compliant with the telecom extension of CompactPCI (H.110/PICMG2.5) GPS input is also supported.

An Intelligent Platform Management subsystem (IPMI version 1.1 compliant) provides flexible management of platform ID, temperatures, fans, and other system values, and also provides low acoustic noise in low-power-consumption application.

▶ Features & Benefits

"Automatic UMTS Iub Monitoring/ Configuration," Configures all Parameters Without the Need of Restarting the Node B. Reduces the Time to Set Up From Hours to a Few Minutes

"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 and Interactive Multimedia Services

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

"H324.M KPI and Video Quality Analysis," Enable 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, cdma2000 Protocol Decoding

"Stream to Disk" Capabilities for Subsequent Off-line 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 Mobile Network Operators' Operation and Maintenance Technicians for Troubleshooting Live or Trial Networks Under Significant Traffic Load Conditions

GSM/GPRS/EDGE/UMTS/ cdmaONE/cdma2000 Equipment Manufactures' Test Engineers for Troubleshooting During Load, Stress, Duration and Acceptance Tests of Network Elements

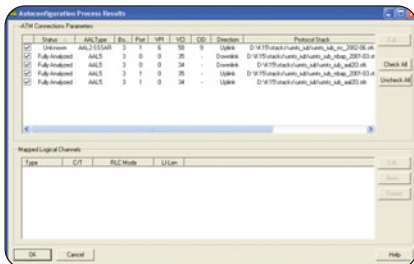**Tektronix**
Enabling Innovation

Automatic UMTS Iub Monitoring Configuration

Just by monitoring the UMTS Iub interface live traffic and without the need of restarting the Node B, this application consists of an expert software capable of automatically configuring all the logical links necessary to carry out Iub monitoring in just a few minutes.

On the Iub interfaces being monitored by the equipment, the expert software automatically identifies the following parameters and configures the logical links accordingly:

▶ AAL5 ATM VPI/VCI for NBAP and ALCAP traffic for each Node B

▶ AAL2 ATM VPI/VCI/CID for RACH, FACH and PCH CCCH for each cell

A wizard, designed for both beginners and experts, guides the user through the configuration process. Once the configuration process is finished and all the necessary logical links have been set up, the results can be saved for subsequent use.

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

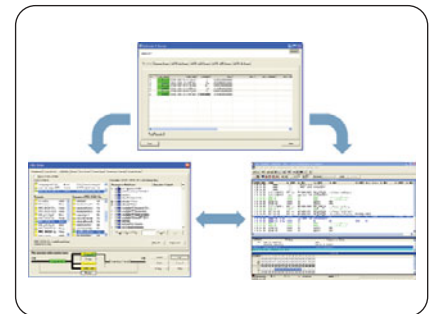The "Multi Interface Call Trace" application is an expert software that helps trace calls/sessions in real-time and off-line as they evolve over multiple interfaces. Simple parameters like the IMSI are used to identify the subscriber identity and to trigger the search. The call/session can even be traced 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 – G$_r$) 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. A 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)

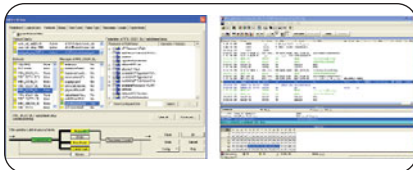▶ cdmaONE/CDMA2000 (A1, A10/A11)

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 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 asses the customer perceived quality of service

▶ Extract the video stream in .3gp format for subsequent in-depth off-line video quality analysis with the Tektronix MTS4EA Software Suite.

Protocol Analysis

The K15 monitors a wide range of SS7, GSM, GPRS, EDGE, UMTS, 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.
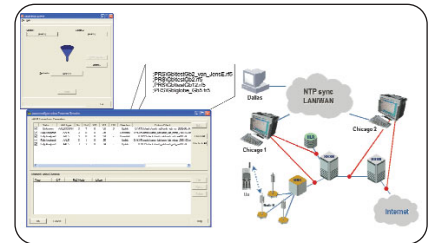The "Remote Desktop" capabilities, allow the K15 to:

▶ Reduce technicians travelling 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 in to 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

► Characteristics

General

Host Processor Board

Processor –
Mobile Pentium III, 256 KB L2 cache on chip,
full speed.
Memory – 256 MB SDRAM ECC.
Timer –
User programmable, allows real-ime functions.
Bus – CompactPCI; 64 bit/33 MHz.
Ethernet Interface –
Two 10/100Base-T; connectors on the board panel.
VGA Interface – Connector on the board panel.
USB Interface –
Connector on the board panel USB 1.1.
PMC Slots –
One, providing connection to the backplane.

Rear panel I/O

PS/2 Interface –
Two connectors for ext. keyboard/mouse.
Parallel Interface –
One IEEE 1284 Type A connector.
SCSI Interface – Connector on the rear of the unit.
USB Interface – One connector.

Relay Output –
4 mm banana plug providing ext. trigger/alarm.
Clock/Sync –
Two connectors for ext. clock/sync I/O SMB.
Two connectors for 1 pps/10 MHz I/O (can accept
GPS signals) output 10 MHz/3 ppm.

Data Storage

Floppy – 3.5", 1.44 MB.
Hard disk – 30+ GB, 2.5" IDE hard disk drive.
CD-R/W.

Display

Type –
TFT LC active-matrix color display with backlight
and sleep mode.
Dimensions – 14".
Resolution – 1024 x 768 pixel -XGA compliant.
*An external monitor may be connected, using the
VGA connector located on top of the unit.*

Keyboard

Type –
Full-QWERTY; attachable to the front of the unit
for transport.
*An External Keyboard may be connected, using the
PS/2 connector on the rear-panel.*

Pointing Device

Type –
2-button touch pad integrated with the keyboard.
*An External Mouse may be connected, using the
PS/2 connector on the rear-panel.*

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	10.9 kg

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; 6 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 – 4 signals distributed on P2.

Power
Type –
Industrial grade, 350 W; plug-in module with
over-temperature protection.
Fuse Data – 6.3 A time-delayed, 250 V.
AC Input –
600 VA, 100 to 240 VAC ±10%, 50/60 Hz.
DC Output – 50 W per application slot.
DC Output Available for the Application Slots

+5V	35A
+3.3V	30A
+12V	10A
−12V	2.5A

Regulatory
Safety –
UL and CUL to UL3111-1 [reference: PO61];
CE mark: EN61010-1.
EMC –
FCC part 15, class A; CE mark: EN61326, class A.

Environmental
Temperature –
Operating: +4 ºC to +40 ºC.
Non-Operating: −20 ºC to +65 ºC.
Relative Humidity –
Operating: Up to 80% below 30 ºC, derate to
45% at 40 ºC, non-condensing.
Non-operating: Up to 90% below 20 ºC, derate
to 60% at 20 ºC, non-condensing.
Altitude –
Operating: 10,000 ft. (3000 m).
Non-Operating: 40,000 ft. (12,000 m).
Shock –
Operating: Half-sine 2 g.
Non-Operating: Half-sine 30 g.
Random Vibration –
Operating: 0.22 g_{RMS}.
Non-operating: 2.28g_{RMS}.
Acoustic Noise –
ETSI 300 753 for Business area (63 dBa).
ETSI 300 753 for Office-desktop (50 dBa) for low-
power-consumption applications.

Timestamps accuracy
NTP – ± 10 ms with network jitter ± 3 ms.
GPS – ± 1 ms.

Interface Boards
(Depending on selected configuration)

Single slot boards
PowerWAN –
Interfaces up to 8 E1/DS1/J1 bi-directional
PCM links.
PowerWANlight –
Interfaces up to 4 E1/DS1/J1 bi-directional
PCM links.
PowerWANlight with Ethernet Module –
Interfaces up to 4 E1/DS1/J1 bi-directional PCM
links and up to 2 10/100 Mbps 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.

► Ordering Information

► Predefined Configurations

Ordering Code	Options (choose one)	Name	Description (basic content)
K15BU010	GSM	HW/SW GSM Monitor	Ports: 4xE1/DS1/J1; SW: Fixed NW (ISDN PRI, SS7, IP) + GSM (all Interfaces incl. A_{bis})
	CDMA	HW/SW CDMA Monitor	Ports: 4xE1/DS1/J1; SW: Fixed NW (ISDN PRI, SS7, IP) + CDMA
K15BU011		HW/SW GERAN Monitor	Ports: 4xE1/DS1/J1; SW: GSM,GPRS and EDGE monitoring software (A_{bis}+Gb+A)
K15BU012	GSM+GPRS	HW/SW GSM+GPRS Monitor	Ports: 4xE1/DS1/J1 + 2x Eth. 10/100 Mb/s; SW: Fixed NW (ISDN PRI, SS7, IP) +GSM/GPRS (all interfaces incl. A_{bis})
	cdmaONE+ cdma2000	HW/SW cdmaONE+ cdma2000 Monitor	Ports: 4xE1/DS1/J1 + 2x Eth. 10/100 Mb/s; SW: Fixed NW (ISDN PRI, SS7, IP) + cdmaONE + cdma2000 (IS-41,A1, A10/A11)
K15BU101	1 x STM-1/OC-3 LIF	HW/SW UMTS Monitor	Ports: PCE-2 Board + 2xSTM-1 SW: UMTS Iub Autoconfiguration, UTRAN (Iub, Iur, Iu-CS, Iu-PS), proprietary NBAP
	1 x E1/T1/J1 LIF		Ports: PCE-2 Board + 4xE1/DS1/J1 ATM SW: UMTS Iub Autoconfiguration, UTRAN (Iub, Iur, Iu-CS, Iu-PS), proprietary NBAP
K15BU100	2 x STM-1/OC3 LIF	HW/SW GSM+GPRS+ UMTS Monitor	Ports: PCE-2 Board, 4xE1/DS1/J1 PCM, 2xEth. 10/100 Mb/s + 4xSTM-1 SW: UMTS Iub Autoconfiguration, All GSM/GPRS/UMTS Interface and Protocols
	2 x E1/T1/J1 LIF		Ports: PCE-2 Board, 4xE1/DS1/J1 PCM, 2xEth. 10/100 Mb/s + 8xE1/DS1/J1 ATM SW: UMTS Iub Autoconfiguration, All GSM/GPRS/UMTS Interface and Protocols
	1 x STM-1/OC-3 LIF + 1 x E1/T1/J1 LIF		Ports: PCE-2 Board, 4xE1/DS1/J1 PCM, 2xEth. 10/100 Mb/s + 2xSTM-1 + 4xE1/DS1/J1 ATM SW: UMTS Iub Autoconfiguration, All GSM/GPRS/UMTS Interface and Protocols

▶ Software

Ordering Code	Name	Description
K15SW00-6BD11	SW CDMA + Fixed NW	Fixed Network (ISDN PRI, SS7, IP) + CDMA decoding; includes base SW and basic applications
K15SW00-6BE11	SW cdma2000	cdma2000 decoding; includes base SW and basic applications
K15SW00-6BH11	SW GPRS + EDGE	GPRS + EDGE decoding; includes deciphering, base SW and basic applications
K15SW00-6BJ11	SW GSM + Fixed NW	Fixed Network (ISDN PRI, SS7, IP) + GSM decoding; includes base SW and basic applications
K15SW00-6BL11	SW UTRAN	UTRAN decoding (Iub, Iu, Iur), proprietary NBAP; UMTS Autoconfiguration; includes base SW and basic applications
K15SW00-6BP11	SW UMTS	UMTS decoding (Iub, Iu, Iur, Gr, Gs, Gn, ISUP, BICC, INAP, proprietary NBAP, etc.); UMTS Autoconfiguration; includes base SW and basic applications
K15SW00-5CC11	SW CDMA2000 Multi Interface Calltrace	Application: cdma2000 RAN Multi-interface Calltrace (A1-A10/A11), Single Interface Calltrace IS-41
K15SW00-5CG11	SW GPRS + EDGE Multi Interface Calltrace	Application: GPRS+EDGE Multi-interface Calltrace (A, Gb,Gr,Gn,A$_{bis}$)
K15SW00-5CA11	SW SS7 + GSM Multi Interface Calltrace	Application: SS7/GSM Multi-interface Calltrace (ISUP,INAP)
K15SW00-5CU11	SW UTRAN Multi Interface Calltrace	Application: UTRAN Multi-Interface Calltrace (Iub,Iu-CS,Iu-PS,Gr)
K15SW00-6WF11	SW UMTS Iub Deciphering	Application: UMTS Iub Deciphering
K15SW00-6VK11	SW Videotelephony QoS Package	Application: UMTS Iu-CS Videotelephony H324M QoS package
K15SW00-6AA11	SW Access ISDN/V5.x Package	Access ISDN/V5.x Monitoring Package
K15SW00-6NQ11	SW Q.3 Package	Q.3 Monitoring Package
K15SW00-6UJ11	SW IMA Monitoring	IMA Monitoring Package
K15SW00-4PP11	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, incl. zoom, filter and statistics
K15SW00-4PV11	SW K15 Record Viewer	Tool for Offline Analysis: Record Viewer; aligned to WINDOWS 2000/XP (Engl.); analysis of K1103-, K1205-, K1297-, K15- record files
K15SW00-3FTS11	SW K15 Record file API	Record file API
K15SW00-9CP11	SW K15 Monitoring API for C++	Monitoring API for C++

▶ Hardware

Ordering 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

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Accessories

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

Transport Case with Wheels and Retractable Handle – Order K15AC002.

External Hard Disk Drive – Order K15AC003.

Cables and Connectors – See www.tektronix.com/Measurement/signaling/index/selection_guide/order.html.

Our most up-to-date product information is available at:
www.tektronix.com

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