

Keysight Technologies

E6584A Wireless Protocol Advisor

Data Sheet

Introduction

A useful protocol analysis and troubleshooting tool designed to be used with the Keysight 8960 (E5515C) wireless communications test set.

- Troubleshoot protocol problems in multi-format wireless devices with one log containing GSM, GPRS, EGPRS, cdma2000®, 1xEVDO and W-CDMA messages
- Better understand your wireless device's TCP/IP data throughput inefficiencies with wireless protocol advisor's connection trace
- Observe actual protocol messaging activity with real-time logging of multiple layers and protocol messages
- Capture all the data you need in one log with powerful multilayer decodes that provide information from IP to bits
- Simplify analysis of complex protocol messaging sequences with flexible test set, log, and view filters
- Generate logs that include just the protocol messages you need using highly configurable start and stop triggers
- Post-capture analysis of protocol log files for a separate PC
- Simultaneously log data from two cell site emulators

[illegible]

Wireless Protocol Advisor Logging Software

Available formats: log messages from GSM, GPRS, EGPRS, cdma2000, 1xEV-DO, W-CDMA, TCP, IP, and UDP

WPA operating modes: real-time or post capture

Traffic overview

- **Description:** single-line display of individual protocol messages in sequential order as received
- **Grid lines:** easily distinguish individual messages and columns
- **Configurable colors:** background and text colors configurable to differentiate forward/downlink and reverse/uplink messages
- **Configurable display columns:** message number, message direction, timestamp (based on PC's real-time clock), system time, protocol, message name, control message, frame type, order, and other format-specific field parameters

Decode view

- **Description:** display of detailed message contents
- **Display choices:** one octet per line or each field on an individual line or set of lines
- **Configurable colors:** text colors configurable to differentiate layers within messages
- **Configurable display columns:** octet number, binary value, hexadecimal value, decimal value, and field description (English)

Data source view

- **Description:** connection and wireless protocol advisor licensing information for each format
- **Connection:** host name or IP address and status
- **Stacks and streams:** GSM/GPRS/EGPRS, CDMA, or W-CDMA availability and licensing

Measurement setup view

- **Description:** graphical block diagram of logging software
- **Settings:** test set, log, and view filters; triggers and connection trace can be configured

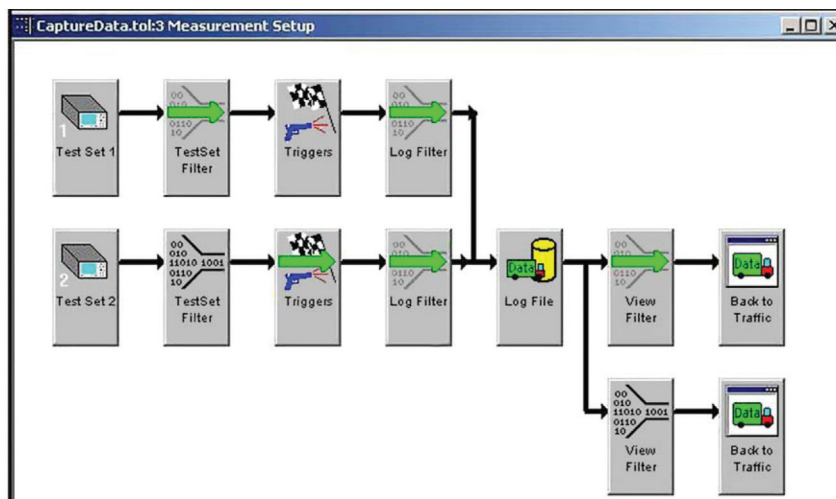


Figure 1: Set up filters, triggers, and multiple traffic overviews using the measurement setup view.

Save logged information

- Save entire traffic overview to a .csv file
- Save entire decode view or the decode views for all highlighted messages to a .txt file
- Save entire traffic overview or selected messages in a traffic overview to a new log file
- Captured logs can be saved to useful file types. These include *.tol for use with the WPA and *.csv for use with a spreadsheet program. Additionally, message decodes can be saved to a text file or copied to other applications

Search logged information

- Use Goto to find a specific timestamp or message number, or to move the active cursor to a percent of the total number of messages or to the first or last message
- Use the text search in the view filter editor to locate a specific text string or regular expression in the decode views for a log file

Filters

- **Description:** test set, log, and view filters; all individually configurable
- **Test set filters:** pass filters that limit the amount of information sent over the LAN
- **Log filters:** pass filters that limit the amount of information contained in the log
- **View filters:** pass filters that limit the amount of information displayed, but do not affect the amount of information actually logged
- **Event log or view filter:** pass all logged messages or only notices that messages have been dropped
- **Message match log or view filter:** pass messages that match or do not match selected message or message parameter(s)
- **Time log or view filter:** pass messages that occur before or after a certain time or between certain times
- **Text search log or view filter:** pass messages with decode text containing a specified string or regular expression
- **Combinations:** complex log or view filters can be constructed using AND and OR operations
- **Export and import:** log and view filter configurations can be exported and imported for later use

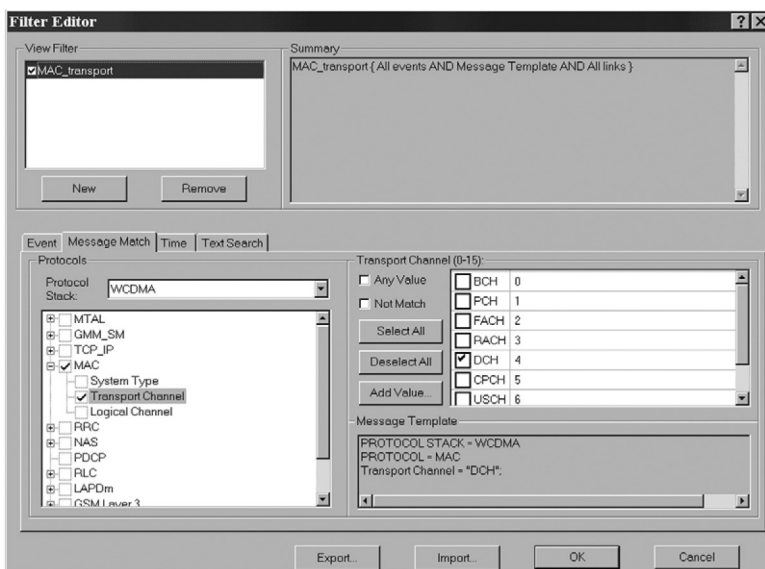


Figure 2: Set up detailed log and view filters using the filter editor.

Triggers

- **Description:** configurable conditions that define when to start and stop logging
- **Configurations:** five trigger types that allow pre-capture or post-capture of a specific number of messages
- **Event trigger:** start or stop logging when message dropped or message received
- **Message match trigger:** start or stop logging when received message matches or does not match selected message or message parameter(s)
- **Time trigger:** start or stop logging on specific timestamp and day based on PC's real-time clock
- **Text search:** start or stop logging when decode text contains a specified string or regular expression
- **Trigger counts:** number of start trigger occurrences before capture begins
- **Combinations:** complex triggers can be constructed using AND and OR operations
- **Export and import:** trigger configurations can be exported and imported for later use

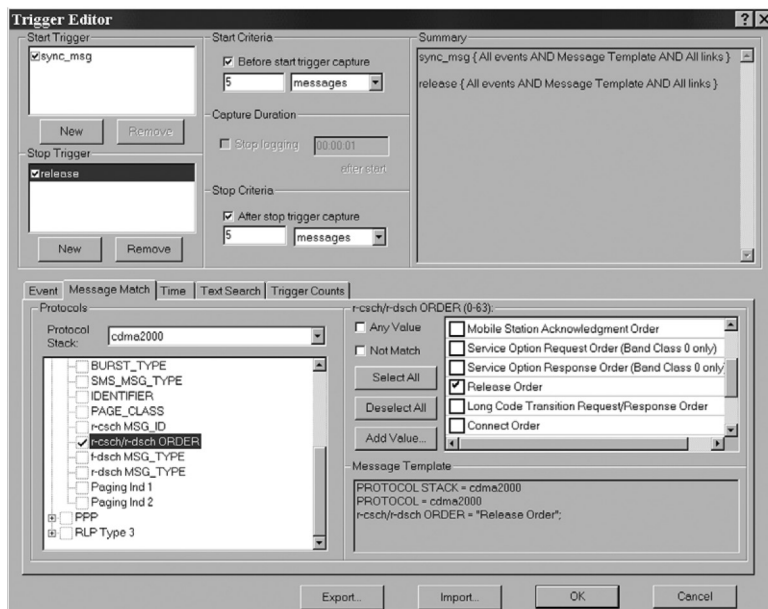
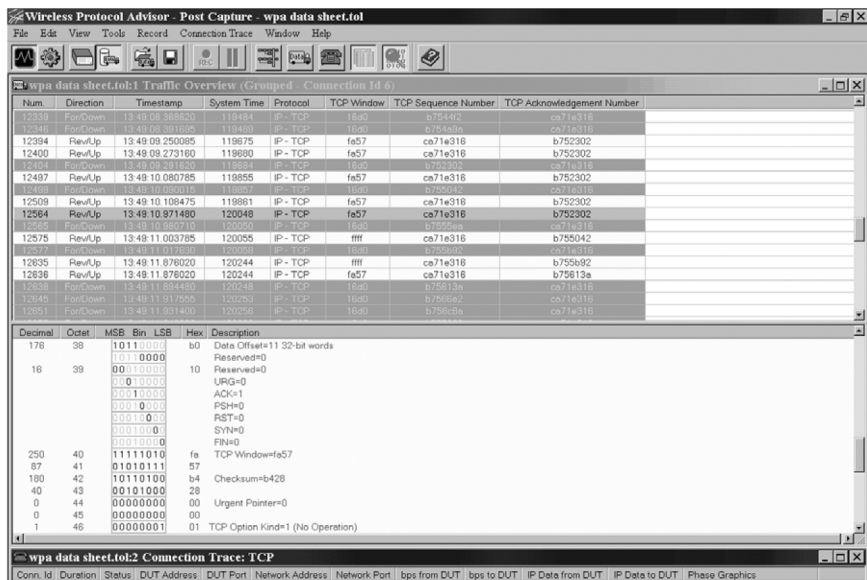


Figure 3: Capture just the messages you need with detailed triggers.

Connection trace view

- **Description:** tabular data about each TCP/IP connection in the currently displayed log for any format (GSM/GPRS/EGPRS, cdma2000, or WCDMA)
- **Configurable columns:** connection ID, duration, status, IP address of device under test (DUT) and network, TCP ports of DUT and network, user data to and from DUT, data rate to and from DUT in bps, IP data with headers to and from DUT
- **Phase graphics:** configurable colored blocks that display each of the phases used by a connection (establishing, established, reset, closing, time_wait, closed); hovering over block displays phase diagram
- **Message grouping:** double-click on connection to group messages from that connection in the traffic overview
- **Connection status:** configurable colors that display connection status as active, terminated, over duration or under duration with settable duration
- **Logging:** log connection trace information to a .csv file for more analysis or to create graph of throughput or phases



Application Programming Interface (API)

The API can be used when the wireless protocol advisor software is running from the startup dialog (before the operation mode has been selected). Nearly all control functionality is available via API.

This functionality includes:

- WPA API connectivity
- WPA API settings/queries
- WPA API logging operation

Refer to the help file within the E6584A wireless protocol advisor for a complete list of API commands.

GSM, GPRS, and EGPRS decodes

Following are examples of the information included in the GSM, GRPS, and EGPRS decodes. *This is not an exhaustive list.*

The mobile test adaptation layer (MTAL) is a proprietary protocol that carries information specific to the test set to the wireless protocol advisor software. Message discrimination is one of MTAL's functions.

- **Test set message filter settings:** GMM/SM, GSML3, LAPDm, LLC, MTAL, PPP, PPP_HDLC, RLC/MAC, RLP, RRLP, SMS, SMDCP, and TCP/IP
- **Log and view filter and trigger message match parameters:** configurable within the GMM_SM, GSM layer 3, LAPDm, LLC, MTAL, PPP, PPP_HDLC, RLC/MAC, RLP, RRLP, SMS, SMSCB, SMDCP, and TCP/IP layers
- **GMM/SM messages:** Activate EMMI, Activate EMMI Ack, Activate PDP Context Accept, Activate PDP Context Reject, Activate PDP Context Request, Activate Secondary PDP Context Accept, Activate Secondary PDP Context Reject, Activate Secondary PDP Context Request, Attach Accept, Attach Complete, Attach Reject, Attach Request, Authentication and Ciphering Fail, Authentication and Ciphering Reject, Authentication and Ciphering Response, Close Multislot Loop, Close Multislot Loop Ack, Close TCH Loop, Close TCH Loop Ack, Deactivate EMMI, Deactivate PDP Context Accept, Deactivate PDP Context Request, Detach Request, EGPRS Start Radio Loopback, GMM Information, GMM Status, GPRS Test Mode, Identity Request, Identity Response, Modify PDP Context Accept, Modify PDP Context Reject, Modify PDP Context Request, Open Loop, Open Multislot Loop, Open Multislot Loop Ack, P-TMSI Reallocation, P-TMSI Reallocation Complete, Request PDP Context Activation, Request PDP Context Activation Reject, Routing Area Update Accept, Routing Area Update Complete, Routing Area Update Reject, Routing Area Update Request, Service Accept, Service Reject, Service Request, SM Status, and Test Interface
- **GMM/SM service types:** data, paging response, and signaling
- **GSM layer 3 protocols:** CC, MM, RR, and SS
- **LAPDm message types:** DISC, RR, SABM, UA, and UI
- **LLC message types:** UI and XID
- **PPP protocols:** CCP, IPCP, and LCP
- **RLC/MAC control messages:** Packet Control Ack, Packet Downlink Ack/Nack, Packet Downlink Assignment, Packet Downlink Dummy Control Block, Packet Polling Request, Packet TBF Release, Packet Uplink Ack/Nack, Packet Uplink Assignment, and Packet Uplink Dummy Control Block
- **RRLP messages:** Assistance Data, Assistance Data Ack, Measure Position Request, Measure Position Response, and Protocol Error
- **SMS message types:** CP-ACK, CP-DATA, and CP-ERROR
- **TCP/IP protocols:** ICMP, IP, Mobile IP, TCP, and UDP

CDMA decodes

Following are examples of the information included in the CDMA decodes. *This is not an exhaustive list.*

MTAL is a proprietary protocol that carries information specific to the test set to the wireless protocol advisor software. MTAL event types include bad r-csch CRC, bad rdsch CRC, duplicate PDU, PDU, R-ACH erasure, and R-FCH erasure.

- **Test set filter settings:** access channel, forward traffic channel, mobile station directed, overhead, reverse traffic channel and synch channel messages, forward fundamental channel, forward PPP, forward RLP, quick paging channel, reverse fundamental channel, reverse PPP and reverse RLP frames, and forward and reverse IP datagrams
- **Log and view filter and trigger message match parameters:** configurable within the cdma2000, MTAL, PPP, RLP type 3, SMS, and TCP_IP layers
- **cdma2000 channel types:** f-csch (FPCH), f-csch (F-SYNCH), f-dsch, F-FCH, F-QPCH, F-SCH, r-csch, r-dsch, R-FCH, and R-SCH
- **cdma2000 messages:** Access Parameters, Alert With Information, Analog Handoff Direction, CDMA Channel List, Data Burst, Extended CDMA Channel List, Extended Channel Assignment, Extended Global Service Redirection, Extended Handoff Direction, Extended Neighbor List, Extended Release, Extended Release Response, Extended Supplemental Channel Assignment, Extended System Parameters, Flash With Information, General Neighbor List, General Page, Global Service Redirection, Handoff Completion, In-Traffic System Parameters, Neighbor List, Neighbor List Update, Order, Origination, Page Response, Parameters Response, Pilot Strength Measurement, Power Control, Private Neighbor List, Registration, Retrieve Parameters, Send Burst DTMF, Service Connect, Service Connect Completion, Service Option Control, Service Request, Service Response, Set Parameters, Status Request, Supplemental Channel Assignment, Sync Channel, System Parameters, Universal Handoff Direction, and User Zone Identification
- **cdma2000 orders:** Abbreviated Alert, Audit, Base Station Acknowledgement, Base Station Challenge Confirmation, Connect, Continuous DTMF Tone, Intercept, Local Control, Long Code Transition Request, LUPC/MR/Unlock, Maintenance, Message Encryption Mode, Mobile Station Acknowledgement, Mobile Station Reject, Outer Loop Report Request, Parameter Update, Parameter Update Confirmation, Pilot Measure Request/Periodic Pilot Measurement Request, Registration Accepted, Registration Rejected, Registration Request, Release, Reorder, Request Wide/Narrow Analog Service, Retry, Service Option Control, Service Option Request, Service Option Response, Slotted Mode, SSD Update Confirmation/Rejection, and Status Request
- **PPP message types:** Configure-Ack, Configure-Request, Configure-Nack, Discard-Request, Terminate-Ack, and Terminate-Request
- **PPP protocols:** CCP, IPCP, and LCP
- **RLP type 3 message types:** ACK control, idle frame, SYNC/ACK control, SYNC control, and unsegmented data
- **SMS message types:** acknowledge, broadcast, and point-to-point
- **TCP/IP protocols:** ICMP, IP, Mobile IP, TCP, and UDP

1xEV-DO decodes

Following are examples of information included in the 1xEV-DO decodes. *This is not an exhaustive list.*

MTAL is a proprietary protocol that carries information specific to the test set to the wireless protocol advisor software. MTAL event types include bad r-csch CRC, bad rdsch CRC, duplicate PDU, PDU, R-ACH erasure, and R-FCH erasure.

- DPA (data packet application)
- MFPA (multiflow packet application)
- TAP (test application protocol)
- ETAP (enhanced test application protocol)
- SLP (signal link protocol)
- STR (stream protocol)
- SMP (session management protocol)
- ADMP (address management protocol)
- SCP (session configuration protocol)
- ALMP (air link management protocol)
- ISP (initiated state protocol)
- OMP (overhead management protocol)
- IDP (idle state protocol)
- CSP (connection state protocol)
- CCMP (control channel MAC protocol)
- ACMP (access channel MAC protocol)
- FTCMP (forward traffic channel MAC protocol)
- RTCMP (reverse traffic channel MAC protocol)
- TAPPKT (test application protocol packet)
- ETAPPKT (enhanced test application protocol packet)
- RLPPKT (radio link protocol packet for DPA)
- MFPARLPPKT (radio link protocol packet for MFPA)

W-CDMA/HSDPA decodes

Following are examples of the information included in the W-CDMA decodes. *This is not an exhaustive list.*

MTAL is a proprietary protocol that carries information specific to the test set to the wireless protocol advisor software.

W-CDMA decodes are implemented to the R'5 version of the 3GPP standards.

- **Test set message filter settings:** HSDPA MAC-hs, MAC_Broadcast, MAC_Signaling, MAC_Traffic, RLC Traffic, RCL Signaling, RRC, GMM/SM, RR/CC/MM/TC, PDCP, SMS, MTAL, RLP, PPP, PPP_HDLC, IP
- **Log and view filter and trigger message match parameters:** configurable within the MAC-hs, MAC, RLC, NAS, GMM_SM, PDCP, PPP, PPP_HDLC, RLP, RRC, SMS, SMS-CB, MTAL, and TCP_IP layers
- **GMM/SM messages:** Activate PDP Context Accept, Activate PDP Context Request, Attach Accept, Attach Complete, Attach Request, Authentication and Ciphering Fail, Authentication and Ciphering Request, Deactivate PDP Context Accept, Deactivate PDP Context Request, Identity Request, Identity Response, and Service Request

- **NAS (CC, MM, RR, and TC) messages:** Activate RB Test Mode, Activate RB Test Mode Complete, Alerting, Authentication Fail, Authentication Reject, Authentication Request, Authentication Response, Call Confirmed, Call Proceed, CC Status, Close UE Test Loop, Close UE Test Loop Complete, CM Service Accept, CM Service Reject, CM Service Request, Connect, Connect Ack, Deactivate RB Test Mode, Deactivate RB Test Mode Complete, Disconnect, Emergency Setup, Handover Command, Identity Request, Identity Response, IMSI Detach Indication, Location Updating Accept, Location Updating Reject, Location Updating Request, MM Status, Open UE Test Loop, Open UE Test Loop Complete, Paging Response, Release, Release Complete, and Setup
- **RRC messages:** Paging Type 1 & 2, RRC Connection Request, RRC Connection Setup, RRC Connection Setup Complete, RRC Connection Release, RRC Connection Release Complete, Downlink Direct Transfer, Initial Direct Transfer, Uplink Direct Transfer, Radio Bearer Setup, Radio Bearer Setup Complete, Security Mode Command, Security Mode Complete, Physical Channel Reconfiguration, Physical Channel Reconfiguration Complete, Transport Channel Reconfiguration, Transport Channel Reconfiguration Complete, Handover From UTRAN Command, Master Information Block, and System Information Type I-18
- **RLC PDU types:** TMD, UMD, AMD, Status, Piggybacked Status, Reset, Reset Ack
- **MAC PDU types:** Non HS-DSCH and HS-DSCH
- **MAC logical channel types:** BCH, CPCH, DCH, DSCH, FACH, HS-DSCH, RACH, PCH, and USCH
- **TCP/IP protocols:** ICMP, IP, Mobile IP, TCP, and UDP
- **PPP protocols:** CCP, IPCP, and LCP
- **MAC control channel types:** CCCH, DCCH, DTCH, and PCCH
- **MAC logical channel types:** BCCH, CCCH, CTCH, DCCH, DTCH, PCCH, and SHCCH
- **MAC transport channel types:** BCH, CPCH, DCH, DSCH, FACH, RACH, PCH, and USCH
- **NAS messages:** Activate RB Test Mode, Activate RB Test Mode Complete, Alerting, Authentication Fail, Authentication Reject, Authentication Request, Authentication Response, Call Confirmed, Call Proceed, CC Status, Close UE Test Loop, Close UE Test Loop Complete, CM Service Accept, CM Service Reject, CM Service Request, Connect, Connect Ack, Deactivate RB Test Mode, Deactivate RB Test Mode Complete, Disconnect, Emergency Setup, Handover Command, Identity Request, Identity Response, IMSI Detach Indication, Location Updating Accept, Location Updating Reject, Location Updating Request, MM Status, Open UE Test Loop, Open UE Test Loop Complete, Paging Response, Release, Release Complete, and Setup
- **NAS protocols:** CC, MM, RR, and TC
- **NAS service types:** emergency call establishment, mobile originating call establishment or packet mode connection establishment, short message service, supplementary service activation, voice broadcast call establishment and location services, voice group call establishment
- **PPP protocols:** CCP, IPCP, and LCP
- **RRC messages:** Connection Release, Connection Release Complete, Connection Request, Connection Setup, Connection Setup Complete, Downlink Direct Transfer, Initial Direct Transfer, Paging Type 1, Radio Bearer Setup, Radio Bearer Setup Complete, Security Mode, Security Mode Complete, and Uplink Direct Transfer
- **TCP/IP protocols:** ICMP, IP, Mobile IP, TCP, and UDP

Requirements for Optimal Performance

- **Supported operating systems:** Windows XP
- **Software revision:** It is recommended that you use the latest software revision.
This is available from the E6584A product page at www.keysight.com/find/E6584A
under Technical Support >> Drivers and Software

For More Information

Wireless protocol advisor software includes on-line help. Click on the **help icon** for more information about wireless protocol advisor's features, uses, and benefits.

Wireless protocol advisor software is provided with every lab application purchased.

The E6584A wireless protocol advisor connects to test sets running the following lab applications. Connections are possible with older versions of lab applications as well, but newer features do not function optimally.

- E6701C GSM/GPRS Lab Application, revision C.03 or later
- E6701D GSM/GPRS Lab Application, revision D.00 or later
- E6702B cdma2000 Lab Application, revision B.00 or later
- E6703B W-CDMA Lab Application, revision B.01 or later
- E6706A 1xEV-DO Lab Application, revision A.01.10 or later
- E6785B GSM/GPRS/W-CDMA Lab Application, revision B.01 or later

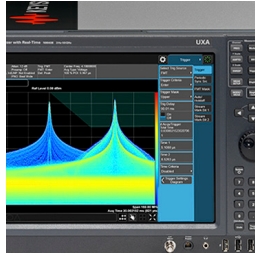
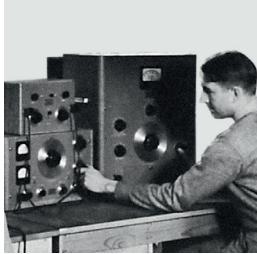
Ordering Information

The E6584A wireless protocol advisor is available as a free download under Technical Support >> Drivers & Software at the following site www.keysight.com/find/E6584A

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