IP Video Monitor

IPM400A Data Sheet

Applications

- Diagnostic Monitoring of IP Video Contribution and Primary Distribution
  - Cable Headend Monitoring
  - Terrestrial Distribution
  - DTH or Network Operator Satellite Uplink Monitoring
- IPTV Ingest and Headend Monitoring

Introduction

As the worldwide DTV market continues to evolve, a shift of consumer viewing behavior, combined with increasing competitive pressure, is driving the explosion of growth in broadcast channels and overall capex investment. A key operational challenge for video network operators is how to efficiently deliver superior Quality of Service (QoS) levels to maintain differentiation in this competitive market. The IPM400A provides an intuitive and simplified presentation of video quality and diagnostic information. This benefit enables the delivery of superior QoS levels in an increasingly complex broadcast environment. When used together with VQNet™, facility and network-wide views allow engineers to sectionalize network problems.

The IPM400A is designed for monitoring networks which carry both Multi-program Transport Streams (MPTS) or Single-program Transport Streams (SPTS), at either Constant Bit Rate (CBR) or Variable Bit Rate (VBR).

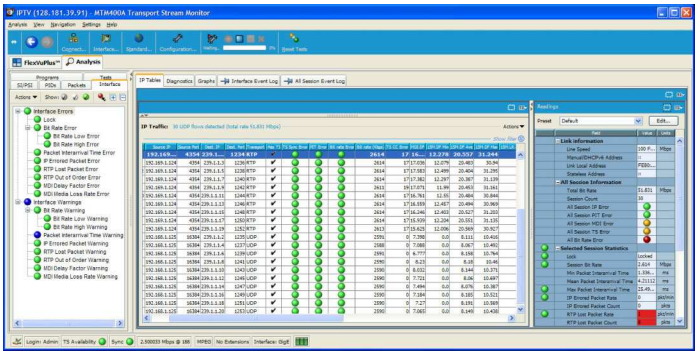
Features & Benefits

- Simultaneously verify IP and TS integrity on all IP Video flows (sessions) on a GbE link; ideal for monitoring networks which carry both Multi-program Transport Streams (MPTS) or Single-program Transport Streams (SPTS), at either Constant Bit Rate (CBR) or Variable Bit Rate (VBR)
- In-depth, real-time MPEG analysis option allows diagnostics to be performed on live payload without always having to use labor-intensive deferred-time analysis of captured streams
- No additional analysis software is required – all confidence and diagnostic analysis can be carried out with the IPM400A
- When used in conjunction with the VQS1000 Video Quality Software application, provides reliable and sophisticated analysis algorithms applied to decoded MPEG-2 or H.264 video to identify stuck, black, macro-blocking, and compression artifacts

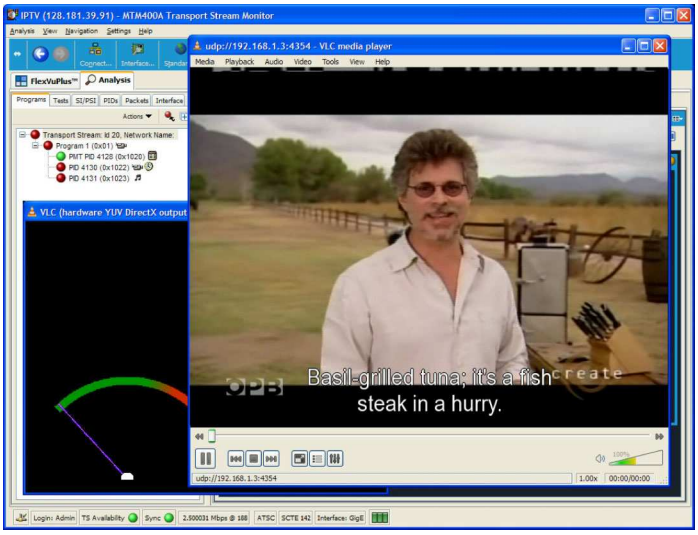
Tektronix®

Product Information

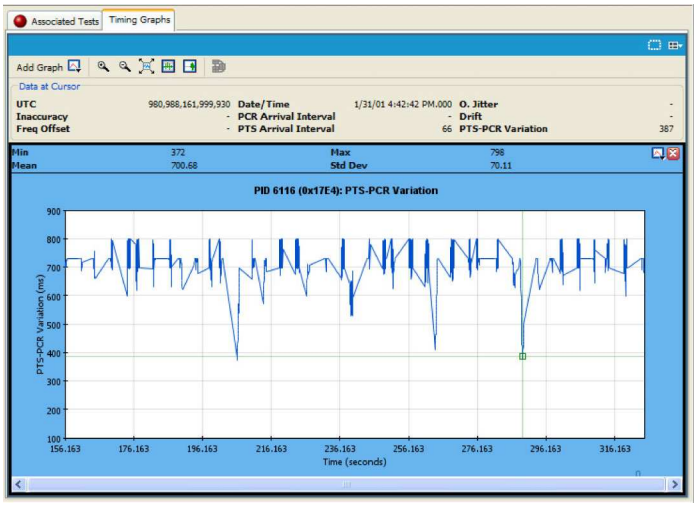
- Monitor up to 500 IP flows (sessions) including all essential parameters (continuity count, sync byte, packet interarrival time (PIT))
  - Ensure IP and TS integrity for all services up to fully loaded GbE link
- Video/Audio backhaul
  - Allows actual content to be fed back to the central monitoring point to see and hear the content being broadcast (encrypted content sent to a STB for hardware decode)
- "Green Stream" learning mode
  - Allows monitoring-by-exception and elimination of false alarms
- Multiplex view
  - Allows an at-a-glance view of program utilization over an extended period allowing the user to see if bandwidth spikes occurred, which leads to overwhelmed routers resulting in dropped packets
- Unique 2-level Alarms
  - Uniquely provides advanced warning of impending problems to avoid customer complaints. Single-level alarming means the alert can only be generated. With 2-level alarms, separate warning and failure alarms are not possible
- FlexVuPlus™
  - Uniquely presents simplified presentation of video quality and diagnostic information
- Filtered logs
  - Allows diagnostics to be performed at the TS, Program or PID levels to "zoom in" on problems quickly
- Diagnostic option to add root-cause analysis
  - Advanced Timing Analysis including PTS-PCR and DTS-PCR for real-time buffer measurements to give indication of encoding and multiplexing errors
  - Triggered recording with pretrigger buffers enables capture of intermittent issues for offline analysis
  - Service logging, bit rate testing, and template testing functionality provides verification of bandwidth allocation and service plans
  - Polling allows cost-effective monitoring of low revenue-earning channels
- Simultaneous connection of multiple remote users and Multi-sink SNMP traps for Network Management Systems (NMS)
  - Provides early visibility of problems to key individuals throughout the organization, supporting quicker notification and corrective action
  - Allow multiple users and/or NMS to access the IPM400A simultaneously



Simultaneous QoS monitoring of all IP Video flows.



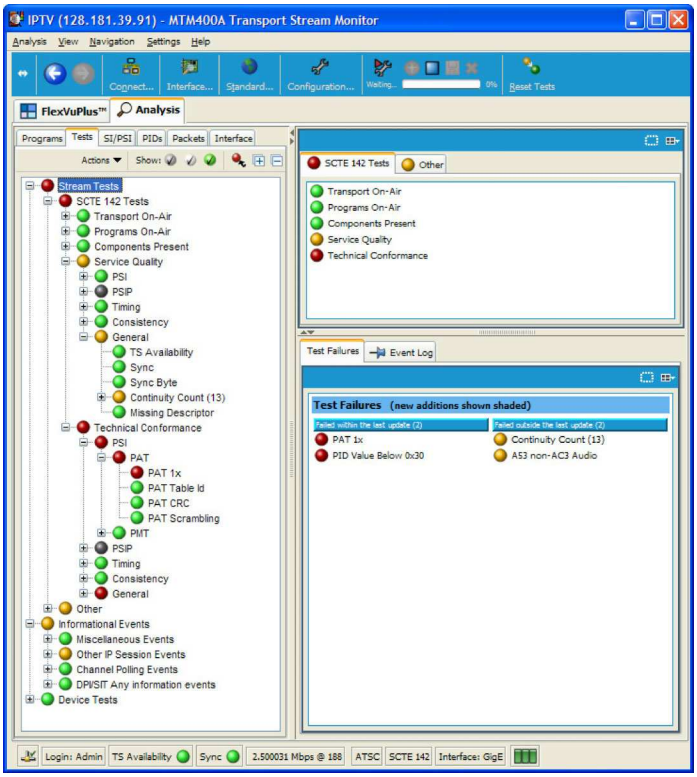
Video and audio content monitoring to ensure QoE is maintained.



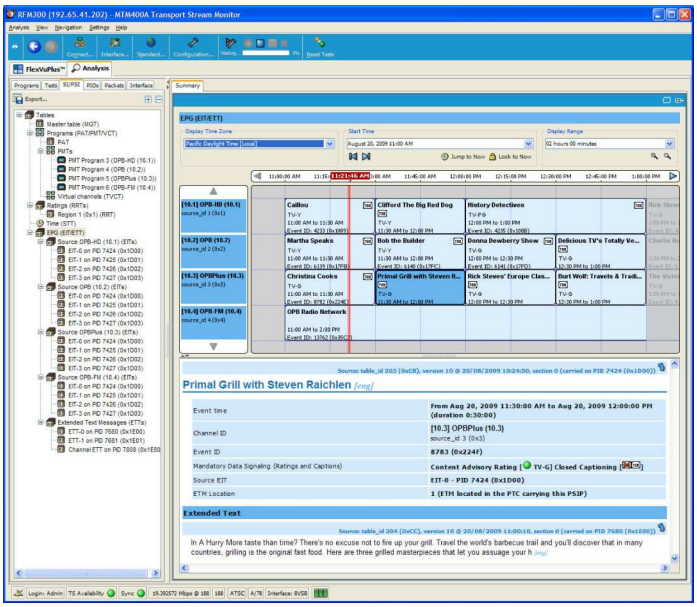
Advanced Timing Analysis including PTS-PCR for real-time buffer measurements to give indication of encoding and multiplexing errors.

Technical Overview

- SCTE-142 and A/78 monitoring modes classify five distinct levels of importance
  - Transport Stream Off-air (TOA), Program Off-air (POA), Component Missing (CM), Quality of Service (QoS), Technically Nonconformant (TNC)
  - Enables filtering and display only of errors that require immediate attention
- Comprehensive TR 101 290 Priority 1, 2, and 3 MPEG measurement mode
  - Provides in-depth analysis of Transport Stream, syntax, timing, and content to support root-cause analysis of system interoperability issues
- Superior PCR measurements (PCR_OJ, DR and FO)
  - PCR_OJ enable deterministic measurements on Transport Stream and network-induced jitter allowing Transport Stream and network errors to be isolated
  - DR and FO measurements allow diagnosis of longer-term system degradation
- PSI/SI/PSIP/DC-II conformance and consistency checking
  - Checks compliance with ATSC A/65, DVB, and ARIB standards
  - Closed Caption (EIA608/708 and SCTE20/21) and Regional Ratings Descriptor (RRT) checking ensures conformance to FCC regulations. Status is indicated in both thumbnail and EPG views
  - PSI/PSI/PSIP testing ensures set-top box performance (channel change etc.) can be verified
- SCTE 35 DPI monitoring
  - Allows analysis and diagnostics of "splice" advertising and other local content



SCTE-142 and A/78 modes classify five distinct levels of importance.



EPG View.

Characteristics

Power Requirements

Characteristic	Description
Power Consumption (Nominal)	40 VA
Voltage	100 to 240 V
Frequency	50/60 Hz

GbE IP Video Monitoring Interface Specifications

Characteristic	Description
Interconnect Port Options	10/100/1000BASE-T RJ45 electrical port standard. Optional optical SFP modules which plug into IPM400A to provide optical connectivity: 1000BASE-SX Short Wavelength Optical port with LC connector for MTM400A Gigabit Ethernet Interface (Multi Mode 850 nm) Opt. SX 1000BASE-LX Long Wavelength Optical port with LC connector for MTM400A Gigabit Ethernet Interface (Single Mode 1310 nm) Opt. LX 1000BASE-ZX Optical port with LC connector for MTM400A Gigabit Ethernet Interface (Single Mode 1550 nm) Opt. ZX
Maximum Data Rate	Line rate
ASI Output	ASI compliant with specification EN 50083-9 ASI smoothing can be activated to compensate for bursty IP traffic
Protocol Stack Support	IPv4 support IPv6 support UDP/IP/Ethernet UDP/IP/VLAN/Ethernet RTP/UDP/IP/Ethernet RTP/UDP/IP/VLAN/Ethernet
Multicast and Control Support	IGMP v2 support IGMP v3 support MLD v2 support ARP ICMP (Inbound and Outbound ping)
IP Packet Support	7 Transport Stream packets per IP packet (188 byte packets) FEC (FEC is parsed but is not processed)
Multi Session Monitoring Parameters	Discovery of up to 500 IP sessions, simultaneous monitoring of key parameters including: Continuity Count Sync Byte Packet Interarrival Time (PIT) for all sessions Session Bit Rate Out-of-Order and Dropped Packet errors (RTP only)
Statistics	Static IP header contents Total bit rate for all Ethernet traffic Instantaneous TS bit rate for selected IP session Errored packets rate per minute and absolute count Dropped packets rate per minute and absolute count Out-of-Order packets rate per minute and absolute count TS Continuity Count
Graphs	IP session TS bit rate Traffic graph for all IP sessions with per session error indication IP packet interarrival time of the selected IP session Min, Max, and Average IP session lock status trend graph (up to seven days) IP Dropped Packet Rate trend graph (up to seven days) IP Out-of-Order Packet Rate trend graph (up to seven days) IP Corrupted Packet Rate trend graph (up to seven days) Packet Interarrival Time histogram view, Average and Peak trend graph (up to seven days)
Alarms	User-definable thresholds for alarms on all sessions including: Errored packets rate Dropped packets rate Packet interarrival time maximum Out-of-Order packet rate
	Event alarms on all sessions including: TS Continuity Count Errors TS Sync Byte TS Sync Loss Dropped Session
Control	Line select (optical, electrical rate) Filters for MAC, IP, Port Protocol control for ARP, RTP, IGMP and VLAN IGMP (single or multiple subscription)

Environmental

Characteristic	Description
Temperature	
Operating	+5 °C to +40 °C
Nonoperating	–10 °C to +60 °C
Humidity	
Operating	Maximum relative humidity 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C
Nonoperating	10% to 95% relative humidity, noncondensing
Altitude	
Operating	0 m to 3000 m (9800 ft.)
Nonoperating	0 m to 12000 m (40000 ft.)
Random Vibration	
Operating	5 to 500 Hz, G_{RMS} = 2.28
Nonoperating	.5 to 500 Hz, G_{RMS} = 0.27
Functional Shock	
Operating	30 G, half sine, 11 ms duration
Electromagnetic Compatibility	
EC Declaration of Conformity	Meets EN55103. Electromagnetic Environment E4
Australia / New Zealand Declaration of Conformity	Meets AS/NZS 2064
FCC	Emissions are within FCC CFR 47, Part 15, Subpart B, Class A limits
Safety	Meets 73/23/EEC, EN61010-1, UL3111-1 and CAN/CSA 22.2 No. 1010.1-92, IEC61010-1

Physical Characteristics

Dimension	mm	in.
Height	44	1.73
Width	430	17.13
Depth	600	23.62
Weight	**kg**	**lb.**
Net	6.0	13.3
Shipping	9.0	19.7
Required Clearance	**mm**	**in.**
Top	0	0
Bottom	0	0
Left Side	Standard 19 in. rackmount	
Right Side	Standard 19 in. rackmount	
Front	Clearance for handles required	
Rear	Clearance for connectors required	

Ordering Information

IPM400A

IP Video Monitoring Probe for QoS of up to 500 MPTS or SPTS IP Video Flows.

Includes: 1RU chassis fitted with GbE interface and Transport Stream processor cards, manual, rack slides, power cord, and license key certificate.

Options

Option	Description
Opt. DIAG	Deep-dive diagnostic analysis for a single IP Video flow
Opt. SX	1000BASE-SX Short Wavelength Optical port with LC connector (Multi Mode 850 nm)
Opt. LX	1000BASE-LX Long Wavelength Optical port with LC connector (Single Mode 1310 nm)
Opt. ZX	1000BASE-ZX Optical port with LC connector (Single Mode 1550 nm)

Language Options

Option	Description
Opt. L0	English manual
Opt. L5	Japanese manual

Service Options

Option	Description
Opt. R3	Repair Service 3 Years (including warranty)
Opt. R5	Repair Service 5 Years (including warranty)

Power Connections

Option	Description
Opt. A0	North America power plug
Opt. A1	Universal EURO power plug
Opt. A2	United Kingdom power plug
Opt. A3	Australia power plug
Opt. A4	240 V North America power plug
Opt. A5	Switzerland power plug
Opt. A6	Japan power plug
Opt. A10	China power plug
Opt. A99	No power cord or AC adapter

Complementary Products

Option	Description
MTS4SA Opt. TSCL	Stand-alone Deferred-time Software package. DVB/ATSC/ARIB TS Compliance Analyzer Software (TS file size limited to 192 MB). For full details see separate data sheet
VQNet	Video Service Assurance Management Software for installation on customers own PC. For full details see separate data sheet
VQS1000	Video Quality Software application for single-ended QoE analysis of video and audio content

Field Upgrade Kits

Option	Description
Opt. DIAG	Add deep-dive diagnostic analysis for a single IP Video flow
Opt. SX	1000BASE-SX Short Wavelength Optical port with LC connector (Multi Mode 850 nm)
Opt. LX	1000BASE-LX Long Wavelength Optical port with LC connector (Single Mode 1310 nm)
Opt. ZX	1000BASE-ZX Optical port with LC connector (Single Mode 1550 nm)
Other	
Opt. IFC	One-time install of all selected options and calibration for one product

CE

Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria 00800 2255 4835*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 00800 2255 4835*

Brazil +55 (11) 3759 7627

Canada 1 800 833 9200

Central East Europe and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France 00800 2255 4835*

Germany 00800 2255 4835*

Hong Kong 400 820 5835

India 000 800 650 1835

Italy 00800 2255 4835*

Japan 81 (3) 6714 3010

Luxembourg +41 52 675 3777

Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90

Middle East, Asia, and North Africa +41 52 675 3777

The Netherlands 00800 2255 4835*

Norway 800 16098

People's Republic of China 400 820 5835

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 001 800 8255 2835

Russia & CIS +7 (495) 7484900

South Africa +41 52 675 3777

Spain 00800 2255 4835*

Sweden 00800 2255 4835*

Switzerland 00800 2255 4835*

Taiwan 886 (2) 2722 9622

United Kingdom & Ireland 00800 2255 4835*

USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

Updated 10 February 2011

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**

02 Oct 2011 2AW-24494-4