MTM400A
New MPEG Monitor with FlexVuPlus™
Simplifying DTV & IPTV Monitoring
Simplifying DTV & IP Video Monitoring . . .
The MTM400A with FlexVuPlus™ delivers

- Complete solution for real-time transmission monitoring of MPEG transport streams over RF, IP, and ASI interfaces.
- Highly scalable monitoring solution combining powerful confidence monitoring capability with diagnostics measurements, to tailor capital expenditure with operational growth.
- Intuitive and simplified presentation of video quality and diagnostic information, to empower operational and engineering teams with simplest information to enable delivery of superior QoS levels.
Building on Industry Leadership
The MTM400A with FlexVuPlus™ delivers

- Powerful end to end monitoring with video management solution and 3rd party management support.

- Comprehensive monitoring solution to support:
  - Superior QoS levels to maximise subscriber growth and advertising revenue.
  - Reduced operational costs by empowering operations staff with concise information to deliver greater accountability for QoS levels; whilst also optimising workflow between varying operations and engineering resources.
  - Minimised network downtime with subsequent advertising revenue penalties and subscriber churn.

2007 Technical Emmy for MPEG Monitoring Technology
MTM400A - Summary
Confidence Monitoring

Enabling Network Operation Centre operators to provide assurance that broadcast services are being delivered within defined quality thresholds.

- *FlexVuPlus™ uniquely* presents simplified presentation of video quality and diagnostic information, to enable delivery of superior QoS levels in an increasing complex broadcast environment.

- At a glance service view with video thumbnails empowering operations staff with the simplest information to monitor service delivery.

- Comprehensive seven day trending of IP and RF broadcast streams with *unique* dual level alarming supports proactive network monitoring to minimise downtime.
Diagnostic Monitoring

- Powerful user interface provides intuitive hierarchical views of IP/RF parameters, Programs, SI/PSI and PIDs etc allowing Engineers to rapidly identify the root cause of underlying service problems.
- Accelerate time to insight with context sensitive navigation and filtered logging to isolate root cause of test failure.
- Deep cross-layer diagnostic capability correlates relationship between the physical interface (RF/IP) and the MPEG TS.

Enabling skilled engineers to detect problems before they impact viewers and rapidly solve network problems to minimize downtime.
FlexVuPlus™ Digital Terrestrial TV

Unique presentation of video quality information
FlexVuPlus™ Digital Terrestrial TV
Video quality information your way
FlexVuPlus™ Digital Terrestrial TV
Deep diagnostic with “One click”
FlexVuPlus™ for Cable
7 Day RF Trending with unique Dual Level Alarming
FlexVuPlus™ for Cable
Deep diagnostic with “One click”
FlexVuPlus™ for IP Video & IPTV
7 Day IP Trending with *unique* Dual Level Alarming
FlexVuPlus™ for IP Video & IPTV
Deep diagnostic with “One click”
MTM400A - Summary

Electronic Program Guide (EPG) view
MTM400A - Summary

Video Thumbnail with “at a glance” Channel Health
MTM400A - Summary

Simultaneously monitor up to 500 IP sessions

- **IP Layer KPIs**
  - MDI
  - Ethernet Frame Check Sum
  - IP Header Check Sum
  - Dropped packets
  - Out of order packets
  - Packet Inter-arrival Time (PIT)

- **MPEG KPIs**
  - Sync byte
  - Sync Loss
  - Continuity Counter (4 bit counter & header)
  - PCR measurements

- Bit Rate alarming on all sessions
- IGMPv3 multicast & IPv6 protocol support
Cross Layer IP/ MPEG Monitoring

- **IP Transmission**
  - IP Transient *(Dropped, Out of Order, corrupt)*
  - IP Timing Errors *(Max PIT)*

- **MPEG Protocol Compliance**
  - MPEG Transient *(CC & Sync loss)*
  - TR 101-290
    - Priority 1,2,3
    - Proprietary Extensions

- **Configurable Polling**
Unique ‘Green Stream’ Learning Mode

- Create an automatic baseline for physical & Transport Stream parameters to eliminate non-customer impacting alarms.
- Enables "monitor by exception" showing only real deviations from known good measurement parameters
- **Example**
  - PMT repetition rate is 550ms (TR 101 290 standard is 500ms) so TR 101 290 test 1.5 fails and gives alarm
  - Applying learning mode will auto-configure the repetition rate measurement limit is set >550ms
  - TR 101 290 standard 1.5 test is no longer failing and generating alarms
- Auto configure mode optimises test parameters at the IP physical layer (*e.g.* PIT, MDI); RF physical layer (*e.g.* MER, SNR) and Transport Layer (*e.g.* repetition rates, PCR drift),
- Reduce operational expenditure by eliminating non-customer impacting alarms and focusing resources on other critical activities
MTM400A Summary

Video Backhaul

- Backhaul video and audio from key network monitoring points for content checking
- Select audio only (including PCR) for confidence check
- Remap MPTS into SPTS for STB or VLC playout
- Video & audio is back-hauled real-time in native bit-rate (not compressed) at full resolution
MTM400A Video & Audio Backhaul

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MTM400A Summary

Video Backhaul Terrestrial Hybrid System Example

**MTM400A Video & Audio Backhaul**

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MTM400A - Summary

MTM400A Monitoring System Manager

- The WebMSM Monitoring System Manager is an installable application that enables complete visibility of the error status of a transmission network, as measured by the MTM400 or MTM400A, from a standard Web browser.

- The Network Manager is able to customize the user interface, building up geographical maps showing the location and status of the monitoring network as well as mimic diagrams of the transmission network.

- When a fault occurs, the corresponding monitoring point is highlighted in red, enabling the network manager to drill down to the individual monitor and determine the nature of the fault.
MTM400A - Summary

Extended Confidence Monitor in Standard Configuration

- MPEG-2, DVB (TR 101 290), ATSC, and ISDB for Brazil and Japan supported
- TR 101 290 Priority 1, 2, and 3 measurements in accordance with the techniques specified in TR 101 290
- Constant Bit Rate (CBR) and Variable Bit Rate (VBR) streams supported
- Continuity Count displayed on a per PID or per TS basis
- Bit rate measurement in accordance with the methodology specified in TR 101 290 MGB2
- Maximum input transport stream bit rate up to 155 Mbps
- SFN measurements according to TR 101 290
- Packet size detection
- Comprehensive error logging that context filters with navigation
- Status of all tests and measurements available via SNMP MIB with support for SNMP traps
Diagnostic Monitoring Options

- Service logging of user-selected PIDs to record packet rates at user definable intervals
- Channel polling allows up to 200 channels to be polled sequentially from either the IP or the RF interface.

- Triggered recording with user definable pre-triggered buffering and up to 160 MB available storage
- PSI/SI/PSIP/ARIB SI analysis and repetition rate graphing. Transport stream structure view with ability to drill down to examine tables and service contents plus real-time graphical representation of table repetition rates
- Template testing (for user-defined service plan testing). User-definable tests with scheduled template updating
- Bit rate testing on a per PID, program, or user-defined groups of PIDs basis
- In-depth timing analysis with graphical results views for
  - PCR_OJ (overall jitter)
  - PCR_AC (accuracy)
  - PCR_FO (frequency offset)
  - PCR_DR (drift rate)
  - PTS Arrival interval
MTM400A - Summary

Standards Compliance

- Standards change, grow, and are updated
  - MTM400 grows with them

- Common code base with new MTS400 series
  - Consistent results across products

- Interfaces & Standards
  - Tektronix has the broadest range of industry standard electrical interfaces & Standards support
    - Gigabit Ethernet
    - ASI
    - SMPTE 310M
    - COFDM
    - QAM Annex A/B/C
    - 8-PSK
    - 8-VSB
    - DVB
    - ATSC
    - ISBD
    - SCTE 35 DPI
    - Digicipher II

  - Signalling Support:
    - DVB-H SI
    - TV Anytime SI
    - MPEG-4, H.264, VC-1 SI
Why Choose Tektronix for Video and IPTV?

- Trusted brand with over 50 years of industry experience
- Market leader with broadest portfolio of products
- Recognized technology expertise and innovation
- Strong new product pipeline
- Number one supplier of monitoring systems for modern IP networks
- Well positioned to enable the transition to digital and the convergence of voice, video and data on a wide variety of networks
Tektronix Compressed Digital TV: Product Portfolio

Solving today’s digital video delivery and quality challenges

MPEG Test Systems & Software
MTS400/430/4SA

Next Generation Compressed Video ES Analysis
MTS4EA/MTS4CC

Analysis

MPEG Generators
MTX100B/RTX100B/RTX130B

Test Streams
Vclips

Generation

MPEG Monitors
MTM400A

File-Based Video Content Analysis

Cerify™

Operational
Appendix A
Customer Network Examples
Typical Monitoring Points for IPTV Headend

- Content Acquisition
- Encode Transcode
- Play-Out servers
  - VoD & Time shift TV
- IP Core
- RF Monitoring
- MPEG Monitoring
- IP Monitoring
- Baseband Monitoring

- RF → SDI
- IP → IP
- SDI → IP
Typical Monitoring Points for Cable Headend

- IP Monitoring
- RF Monitoring
- MPEG Monitoring
- Baseband Monitoring
Typical Monitoring Points for Satellite Hybrid Uplink

- Content Acquisition
- Encode
- Transcode
- IP Core
- Play-Out servers
- SDI
- IP
- RF
- Modulate
- DTH Broadcast
- IP Core
- VOD

Key Points:
- IP Monitoring
- RF Monitoring
- MPEG Monitoring
- Baseband Monitoring
Typical Monitoring Points for Terrestrial Hybrid System

- **Content Acquisition**
  - RF
  - IP
  - SDI

- **Encode Transcode**
  - SDI
  - IP
  - IP

- **Play-Out servers**
  - VoD
  - IP

- **Modulate**
  - IP
  - RF
  - DTT Broadcast

Monitors:
- **IP Monitoring**
- **RF Monitoring**
- **MPEG Monitoring**
- **Baseband Monitoring**
Appendix B
MTM400A Nomenclature
### MTM400A Base Product, Options & Field Upgrades

<table>
<thead>
<tr>
<th>MTM400A Nomenclature</th>
<th>Other Opts</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTM400A</td>
<td>N/A</td>
<td>MPEG Transport Stream Monitor. Includes: 1RU chassis fitted with transport stream processor card, manual, rack slides, power cord, and license key certificate.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>01</td>
<td>Triggered recording capability up to 160 MB.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>02</td>
<td>Transport stream service information analysis (PSI/SI/PSIP/ARIB view).</td>
</tr>
<tr>
<td>MTM400A</td>
<td>03</td>
<td>Template testing (for user-defined service plan testing).</td>
</tr>
<tr>
<td>MTM400A</td>
<td>04</td>
<td>In-depth PCR analysis with graphical result views.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>05</td>
<td>Bit rate testing functionality.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>06</td>
<td>Service logging.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>07</td>
<td>IP/RF Polling functionality</td>
</tr>
<tr>
<td>MTM400A</td>
<td>CF</td>
<td>COFDM Interface</td>
</tr>
<tr>
<td>MTM400A Nomenclature</td>
<td>Other Opts</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>MTM400A</td>
<td>QB2</td>
<td>QAM Annex B Level 1 and Level 2 Interface</td>
</tr>
<tr>
<td>MTM400A</td>
<td>EP</td>
<td>8PSK/QPSK Interface</td>
</tr>
<tr>
<td>MTM400A</td>
<td>VS</td>
<td>8-VSB Interface</td>
</tr>
<tr>
<td>MTM400A</td>
<td>QA</td>
<td>QAM Annex A interface.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>QC</td>
<td>QAM Annex C interface.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>GE</td>
<td>Ethernet Interface With 10/100/1000Base-T RJ-45 Electrical Port</td>
</tr>
<tr>
<td>MTM400A</td>
<td>SX</td>
<td>1000Base-SX Short Wavelength Optical port with LC connector (Multi-Mode 850 nm)</td>
</tr>
<tr>
<td>MTM400A</td>
<td>LX</td>
<td>1000Base-SX Short Wavelength Optical port with LC connector (Multi-Mode 1310 nm)</td>
</tr>
<tr>
<td>MTM400A</td>
<td>ZX</td>
<td>1000Base-SX Short Wavelength Optical port with LC connector (Multi-Mode 1550 nm)</td>
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## MTM400A Base Product, Options & Field Upgrades

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<td>MTM400A</td>
<td>C3</td>
<td>Calibration Service 3 Years</td>
</tr>
<tr>
<td>MTM400A</td>
<td>C5</td>
<td>Calibration Service 5 Years</td>
</tr>
<tr>
<td>MTM400A</td>
<td>R3</td>
<td>Repair Service 3 Years (including warranty)</td>
</tr>
<tr>
<td>MTM400A</td>
<td>QA</td>
<td>QAM Annex A interface.</td>
</tr>
<tr>
<td>MTM400A</td>
<td>CA1</td>
<td>Provides a single calibration event or coverage</td>
</tr>
<tr>
<td>MTM400A</td>
<td>R1PW</td>
<td>Repair Service coverage 1 year post warranty</td>
</tr>
<tr>
<td>MTM400A</td>
<td>R2PW</td>
<td>Repair service coverage 2 years post warranty</td>
</tr>
<tr>
<td>MTM400A</td>
<td>R3DW</td>
<td>Repair service coverage 3 years (includes product warranty period); 3 year period starts at time of customer instrument purchase</td>
</tr>
<tr>
<td>MTM400A</td>
<td>R5DW</td>
<td>Repair service coverage 5 years (includes product warranty period); 5 year period starts at time of customer instrument purchase</td>
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<td>01</td>
<td>Field upgrade kit to add triggered recording capability up to 160 MB.</td>
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<td>MTM4UP</td>
<td>02</td>
<td>Field upgrade kit to add transport stream service information analysis (PSI/SI/PSIP/ARIB view).</td>
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<td>MTM4UP</td>
<td>03</td>
<td>Field upgrade kit to add template testing (for user-defined service plan testing).</td>
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<td>MTM4UP</td>
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<td>Field upgrade kit to add in-depth PCR analysis with graphical result views.</td>
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<td>Field upgrade kit to add bit rate testing functionality.</td>
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<td>07</td>
<td>Field upgrade kit to add IP/ RF Polling functionally</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>QA</td>
<td>Field upgrade kit to add QAM Annex A Interface to an existing probe.</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>QC</td>
<td>Field upgrade kit to add QAM Annex C Interface to an existing probe.</td>
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<td>CF</td>
<td>Field Upgrade Kit To Add COFDM Interface</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>QB2</td>
<td>Field Upgrade Kit To Add QAM Annex B Interface</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>EP</td>
<td>Field Upgrade Kit To Add 8PSK/QPSK Interface</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>VS</td>
<td>Field Upgrade Kit To Add 8-VSB Interface</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>GE</td>
<td>Upgrade kit to add Gigabit Ethernet Interface With 10/100/1000 Base-T RJ-45 Electrical port to MTM400A</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>SX</td>
<td>Upgrade kit to add 1000 Base-LX Long Wavelength Optical port with LC connector (Single Mode 850 nm) for MTM400 Gigabit Ethernet Interface (requires Option GE)</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>LX</td>
<td>Upgrade kit to add 1000 Base-LX Long Wavelength Optical port with LC connector (Single Mode 1310 nm) for MTM400 Gigabit Ethernet Interface (requires Option GE)</td>
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<td>MTM4UP</td>
<td>ZX</td>
<td>Upgrade kit to add 1000Base-LX Long Wavelength Optical port with LC connector (Single Mode 1550 nm) for MTM400 Gigabit Ethernet Interface (requires Option GE)</td>
</tr>
<tr>
<td>MTM4UP</td>
<td>ICF</td>
<td>One-time install of all selected options and calibration for one product (Does not include TSCL option)</td>
</tr>
</tbody>
</table>