

# Technical Reference



## **MTM400** **MPEG Transport Stream Monitor** **071-1560-00**

This document applies to firmware versions  
1.2 to 2.0.6.

### **Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

## To Avoid Fire or Personal Injury

**Use Proper Power Cord.** Use only the power cord specified for this product and certified for the country of use.

**Ground the Product.** This product is indirectly grounded through the grounding conductor of the mainframe power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Ground Equipment Connected to the Product.** Ensure that any equipment connected to this product is grounded and at the same potential.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Use Proper Fuse.** Use only the fuse type and rating specified for this product.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Keep Product Surfaces Clean and Dry.**

**Provide Proper Ventilation.** Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

**Symbols and Terms**

**Terms in this Manual.** These terms may appear in this manual:



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**WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

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**CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

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**Terms on the Product.** These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

**Symbols on the Product.** The following symbols may appear on the product:



CAUTION  
Refer to Manual



Protective Ground  
(Earth) Terminal

# Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

**Do Not Service Alone.** Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

**Disconnect Power.** To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

**Use Care When Servicing With Power On.** Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

Use only Teltronix approved components when servicing the unit.



# Preface

This manual contains the following information about the MTM400 MPEG Transport Stream Monitor:

- *Specifications* lists the electrical, physical and environmental specifications of the MTM400 monitor.
- *Test Parameters* describes the tests performed by the MTM400 monitor; it also describes the associated parameters.
- *Configuration File* describes the structure and composition of the MTM400 configuration file.
- *Hardware Maintenance* describes cleaning the unit and the installation of interface boards and batteries.

## Related Material

Additional documentation, such as Read Me files, may be included on the installation disks.

The *MTM400 MPEG Transport Stream Monitor User Manual* describes the functions and use of the instrument. This manual is available in English and Japanese languages.

The *MTM400 MPEG Transport Stream Monitor Programmer Manual* specifies the remote control and status monitoring interfaces available to a management application. This English language reference document is available only from the Tektronix Web site ([www.tektronix.com](http://www.tektronix.com)).

The following URLs access the Web sites for the standards organizations listed (the URLs listed were valid at the time of writing):

- MPEG-2 standards (International Organization for Standards)  
<http://www.iso.ch/>
- DVB standards (European Technical Standards Institute)  
<http://www.etsi.org/>
- ATSC standards (Advanced Television Systems Committee)  
<http://www.atsc.org/>
- ISDB/ARIB standards (Association of Radio Industries and Businesses)  
<http://www.arib.or.jp/english/>

## Manual Conventions

Naming conventions for the interface elements are based on standard Windows naming conventions. Naming conventions for MPEG-2, ATSC, and DVB structures follow the conventions derived from the standards documents found at the Web sites listed on page xi. In addition, the following formatting conventions apply to this manual:

- **Bold** text refers to specific interface elements that you are instructed to select, click, or clear.  
Example: Select **Settings** from the Configuration menu.
- Mono-spaced text can indicate the following:
  - Text you enter from a keyboard  
Example: Enter the network identity (`http://TSMonitor01`)
  - Characters you press on your keyboard  
Example: Press CTRL+C to copy the selected text.
  - Paths to components on your hard drive  
Example: The program files are installed at the following location:  
`C:\Program Files\Tektronix\`



## Contacting Tektronix

<b>Phone</b>	1-800-833-9200*
<b>Address</b>	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
<b>Web site</b>	<a href="http://www.tektronix.com">www.tektronix.com</a>
<b>Sales support</b>	1-800-833-9200, select option 1*
<b>Service support</b>	1-800-833-9200, select option 2*
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# Specifications



# Specifications

This section lists the electrical, environmental, and physical specifications of the MTM400 system. All specifications are guaranteed unless labeled typical. Typical specifications are provided for your convenience and are not guaranteed. Electrical characteristics apply to test systems operating within the environmental conditions.

## Electrical, Hardware, and Signal Specifications

**Table 1-1: Remote User Interface Platform Characteristics**

Characteristic	Description
Minimum Specification	500 MHz Intel Pentium Processor
Operating System	Any Microsoft Windows operating system
Disk Space	30 MB free disk space
Ethernet	10/100-base T
Installed Software	Microsoft Internet Explorer, Version 5.0 minimum; Microsoft Java Virtual Machine installed, Version 5.0 minimum
RAM	256 MB
CD-ROM Drive	8x
Display	1024 x 768 pixel video monitor with 16 available colors

**Table 1-2: TS Processor - System Timing Clock**

Characteristic	Description
PCR Offset Measurement Accuracy	$\pm 2.0$ ppm

**Table 1-3: TS Processor - ASI Interface**

Characteristic	Description
ASI Input	
Connector	BNC
Transport Stream Rate	155 Mbps maximum, 250 kbps minimum
Data Format	Accepts both Burst and Packet mode ASI format
Signal Amplitude	2.0 V <sub>p-p</sub> max; 200 mV <sub>p-p</sub> min
Termination	75 ohms nominal, transformer coupled
Return Loss	- 10 db min, 5 MHz to 270 MHz
Link Rate	270 Mbaud ± 100 ppm
ASI Output (The Output is an active loop through of the Input.)	
Connector	BNC
Impedance	75 ohms nominal, transformer coupled
Transport Stream Rate	Same as the ASI input
Signal Amplitude	1.0 V <sub>p-p</sub> max, 600 mV <sub>p-p</sub> min, into a 75 ohm load
Return Loss	- 10 db min at 270 MHz

**Table 1-4: TS Processor - SMPTE310M Interface**

Characteristic	Description
SMPTE310M Input	
Connector	BNC
Termination	75 ohms, transformer coupled
Data Format	Bi-phase coded. Compliant with SMPTE310M
Input Bit Rate	19,392,658.5 bps ± 2.8 ppm
Signal Amplitude	2.0 V <sub>p-p</sub> maximum, 200 mV <sub>p-p</sub> minimum
Return Loss	- 10 db min at 20 MHz
SMPTE310M Output (The Output is an active loop through of the Input.)	
Connector	BNC
Output Bit Rate	Same as the SMPTE310M input
Signal Amplitude	600 mV min, 1.0 V max, into a 75 ohm load
Output Impedance	75 ohms, transformer coupled
Return Loss	- 10 db min at 20 MHz

**Table 1-5: I/O Port Characteristics - QPSK (L-Band)**

Characteristic	Description
Connectors	
Input	Type F (loop through to output)
Output	Type F
Input Frequency Range	950 MHz to 2150 MHz in 100 kHz steps
Input Signal Amplitude Range	-60 dBm min, -30 dBm max for a CBER of $<1e^{-6}$
Input Termination Impedance	75 ohm nominal
Input Return Loss	-10 db min, 950 MHz to 2150 MHz
Modulation Format	QPSK
Modulated Baud Rate	2 MBaud min, 45 MBaud max
Viterbi Values Supported	1/2, 2/3, 3/4, 5/6, 6/7, 7/8
Loop Through Output Amplitude	-6 db to +3 db
Loop Through Output Reverse Isolation	30 db typical
LNB Support	
LNB Supply Voltage	selectable; 13.0 V $\pm$ 1.5 V or 18.0 V $\pm$ 1.5 V, with 100 ohms, 5 Watt resistor load
LNB Supply Maximum Current	200 mA maximum
LNB 22kHz Signaling Frequency	17.6 kHz min, 26.4 kHz max (22 kHz $\pm$ 20%)
LNB 22kHz Signaling Amplitude	600 mV <sub>p-p</sub> with a 100 ohm load

**Table 1-6: I/O Port Characteristics - ITU-J83 Annex A QAM**

Characteristic	Description
Input Frequency Range	51 MHz to 858 MHz, 62.5 kHz steps
Modulation Format	16 QAM, 64 QAM, 256 QAM (compliant with DVB-C ETS 300 421)
Modulation Baud Rate, QAM A	5.0 Mbaud/s minimum, 6.952 Mbaud/s maximum
Input Signal Level	-57 dBm (50 dBuV) to -27 dBm (80 dBuV), with a 16, 64, and 256 QAM input, providing five or less Transport Error Flags in 10 seconds, which corresponds to a post FEC rate of $1e^{-8}$
Modulation Error Ratio	38 dB min, with a 64QAM input
Receiver Bandwidth, QAM A	8 MHz nominal
Input Termination Impedance	75 ohm nominal
Input Return Loss	-6 db min, -10 dB typical, 51 MHz to 858 MHz
Loop Through Power Gain	1.5 db to 4 db typical, 51 MHz to 858 MHz
Loop Through Noise Figure	8 db typical
Loop Through Output Return Loss	Greater than 10 db typical

**Table 1-7: I/O Port Characteristics - ITU-J83 Annex B QAM**

Characteristic	Description
Input Frequency Range	88 MHz to 858 MHz, 62.5 kHz steps
Modulation Format	64QAM, 256QAM (compliant with ITU J-83 Annex B) Only interleaving modes with I,J = 128,1; 64,2; 32,4; 16,8; 8,16; 128,1 are supported. Modes described as I = 128, and J = 2,3,4,5,6,7,8 are not supported.
Modulation Baud Rate, QAM B	5.056941 Mbaud/s ( 64QAM); 5.360537 Mbaud/s (256QAM)
Input Signal Level	-57 dBm (50 dBuV) to -27 dBm(80 dBuV), with a 16, 64, and 256 QAM input, providing five or less Transport Error Flags in 10 seconds, which corresponds to a post FEC rate of $1e^{-8}$
Modulation Error Ratio	37 dB min, with a 64QAM input
Receiver Bandwidth, QAM B	6 MHz nominal
Input Termination Impedance	75 ohm nominal
Input Return Loss	-6 db min, -10 dB typ, 88 MHz to 858 MHz

**Table 1-8: I/O Port Characteristics - ITU-J83 Annex C QAM**

Characteristic	Description
Input Frequency Range	88 MHz to 858 MHz, 62.5 kHz steps
Modulation Format	16QAM, 64QAM, 256QAM (compliant with ITU J-83 Annex C)
Modulation Baud Rate, QAM C	4.5 Mbaud/s min; 5.5 Mbaud/s max
Input Signal Level	-57 dBm (50 dBuV) to -27 dBm(80 dBuV), with a 16, 64, and 256 QAM input, providing a 5 or less Transport Error Flags in 10 seconds, which corresponds to a post FEC rate of $1e^{-8}$
Modulation Error Ratio	38 dB min, with a 64QAM input
Receiver Bandwidth, QAM C	6 MHz nominal
Input Termination Impedance	75 ohm nominal
Input Return Loss	-6 db min, -10 dB typ, 51 MHz to 858 MHz




Table 1-9: TS Processor - Alarm Connector

26-Pin, D-Type Connector	Pin	Function	Description
	1	DGND	Ground
	2	TTL02	TTL Output 2
	3	DGND	Ground
	4	P5V	5 V
	5	RL1NC	Relay 1: Normally closed contact
	6	RL2NC	Relay 2: Normally closed contact
	7	RL3NC	Relay 3: Normally closed contact
	8	RL4NC	Relay 4: Normally closed contact
	9	RL5NC	Relay 5: Normally closed contact
	10	DGND	Ground
	11	DGND	Ground
	12	TTL03	TTL Output 3
	13	P5V	5 V
	14	RL1CC	Relay 1: Common contact
	15	RL2CC	Relay 2: Common contact
	16	RL3CC	Relay 3: Common contact
	17	RL4CC	Relay 4: Common contact
	18	RL5CC	Relay 5: Common contact
	19	TTL01	TTL Output 1
	20	DGND	Ground
	21	TTLI1	TTL Input 1
	22	RL1NO	Relay 1: Normally open contact
	23	RL2NO	Relay 2: Normally open contact
	24	RL3NO	Relay 3: Normally open contact
	25	RL4NO	Relay 4: Normally open contact
	26	RL5NO	Relay 5: Normally open contact
Connector shell - Chassis ground			

**Table 1-10: TS Processor - Alarms**

Characteristic	Value
Alarm Relay	
Number of relays	5
Maximum Switching Current	1 Amp
Maximum Switch Voltage	24 Vdc
Contact Resistance	100 milli-ohm max
TTL Output Pins of the Alarms Output Connector	
Output Type	TTL open collector, requires external pull up resistor
Logic High Voltage	2.0 V min
Logic Low Voltage	0.8 V max, sinking 100 mA
Maximum Switching Current	100 mA
TTL Input Pins of the Alarms Output Connector	
Maximum Input Voltage	5.1 V
Logic High Input Voltage	2.0 V min
Logic Low Input Voltage	0.8 V max
+5 V Output, Pins 4 and 13 of the Alarms Output Connector	
Output Voltage	4.9 V min, 5.1 V max, no load
Maximum Output Current	100 mA
Output Protection	Fused, self resetting

**Table 1-11: TS Processor - LTC In**

LTC 2-pin connector	Pin	Function	Description
	1	IN+	
	2	IN-	
	Connector shell - Chassis ground		
Port Specification			
Type	Linear time code, SMPTE standard to ANSI/SMPTE 12M - 1995		
Input Voltage	2.0 V <sub>p-p</sub> differentially min		

**Table 1-12: TS Processor - Ethernet RJ-45 Connector**

Characteristic	Description
Connector	10/100 Base-T; RJ-45 Use only good quality screened cable; Cat 6

## Power Source Characteristics

**Table 1-13: AC Power Source Characteristics**

Characteristic	Description
Source Voltage	100 VAC to 240 VAC
Frequency Range	50 Hz/60 Hz
Power Consumption	1 A max
Peak Inrush Current	7.2 A peak at 240 VAC, 50 Hz
Fuse Rating	Mains fuse is 3.15 A, 250 V (Not operator replaceable. Refer servicing to qualified service personnel.)

**Table 1-14: Transport Stream Board Batteries**

Characteristic	Description
Quantity	2 (In single carrier)
Voltage	3 V
Capacity	210 mAh
Continuous Discharge (Maximum)	3 mA
Overall Dimensions (Single cell)	
Height	3.2 mm (0.13 in)
Width (Diameter)	20 mm (0.79 in)
Battery Type	Tektronix part number: 146-0096-00

## Environmental Characteristics

**Table 1-15: Environmental Characteristics**

Characteristic	Description
Temperature	
Operating	+5 °C to +40 °C
Non-operating	-10 °C to +60 °C
Humidity	
Operating	10% to 80% relative humidity up to 31 °C. Above 31 °C, decreasing linearly to 50% at 40 °C.
Non-operating	10% to 95% relative humidity, non-condensing
Altitude	
Operating	0 m to 3000 m (9800 ft)
Non-operating	0 m to 12000 m (40000 ft)

## Mechanical (Physical) Characteristics

**Table 1-16: Mechanical Characteristics**

Characteristic	Description
Classification	Transportable platform also intended for 19 inch rack mounted applications, 1RU high.
Overall Dimensions	
Height	44 mm (1.73 in) (1RU)
Width	430 mm (17.13 in)
Depth	600 mm (23.62 in)
Required Clearance	Top and bottom: 0 mm; Sides: Standard 19 in rack mount
Weight	6.0 kg (13.3 lbs); fully loaded
Packaged Dimensions	
Height	241 mm (9.5 in)
Width	590 mm (23.1 in)
Depth	760 mm (30 in)
Weight (Packaged)	9 kg (19.7 lbs)

## Certifications and Compliances

**Table 1-17: Certifications and Compliances**

Category	Standard or Description																						
EC Declaration of Conformity - EMC	<p>Meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:</p> <p>EN 55103 Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use<sup>1</sup>. Environment E4 - controlled EMC environment</p> <p>Part 1 Emission</p> <table> <tr> <td>EN 55022</td> <td>Class A radiated and conducted emissions</td> </tr> <tr> <td>EN 55103-1, Annex A</td> <td>Radiated magnetic field emissions</td> </tr> <tr> <td>EN 55103-1, Annex B</td> <td>Inrush current</td> </tr> </table> <p>Part 2 Immunity</p> <table> <tr> <td>IEC 61000-4-2</td> <td>Electrostatic discharge immunity</td> </tr> <tr> <td>IEC 61000-4-3</td> <td>RF electromagnetic field immunity</td> </tr> <tr> <td>IEC 61000-4-4</td> <td>Electrical fast transient / burst immunity</td> </tr> <tr> <td>IEC 61000-4-5</td> <td>Power line surge immunity</td> </tr> <tr> <td>IEC 61000-4-6</td> <td>Conducted RF Immunity</td> </tr> <tr> <td>IEC 61000-4-11</td> <td>Voltage dips and interruptions immunity</td> </tr> <tr> <td>EN 55103-2, Annex A</td> <td>Radiated magnetic field immunity</td> </tr> <tr> <td>EN 55103-2, Annex B</td> <td>Balanced ports common mode immunity</td> </tr> </table> <p>EN 61000-3-2 AC power line harmonic emissions</p> <p><sup>1</sup> To ensure compliance with the listed standards, any cables attached to this instrument should be well shielded with low impedance connections of the cable shield to conductive housings at each end.</p>	EN 55022	Class A radiated and conducted emissions	EN 55103-1, Annex A	Radiated magnetic field emissions	EN 55103-1, Annex B	Inrush current	IEC 61000-4-2	Electrostatic discharge immunity	IEC 61000-4-3	RF electromagnetic field immunity	IEC 61000-4-4	Electrical fast transient / burst immunity	IEC 61000-4-5	Power line surge immunity	IEC 61000-4-6	Conducted RF Immunity	IEC 61000-4-11	Voltage dips and interruptions immunity	EN 55103-2, Annex A	Radiated magnetic field immunity	EN 55103-2, Annex B	Balanced ports common mode immunity
EN 55022	Class A radiated and conducted emissions																						
EN 55103-1, Annex A	Radiated magnetic field emissions																						
EN 55103-1, Annex B	Inrush current																						
IEC 61000-4-2	Electrostatic discharge immunity																						
IEC 61000-4-3	RF electromagnetic field immunity																						
IEC 61000-4-4	Electrical fast transient / burst immunity																						
IEC 61000-4-5	Power line surge immunity																						
IEC 61000-4-6	Conducted RF Immunity																						
IEC 61000-4-11	Voltage dips and interruptions immunity																						
EN 55103-2, Annex A	Radiated magnetic field immunity																						
EN 55103-2, Annex B	Balanced ports common mode immunity																						
Australia/New Zealand Declaration of Conformity - EMC	<p>Complies with EMC provision of Radiocommunications Act per the following standard(s):</p> <p>AS/NZS 2064.1/2 Class A limits for Industrial, Scientific, and Medical Equipment: 1992</p>																						
FCC	<p>Radiated and conducted emissions do not exceed the levels specified in FCC 47 CFR, Part 15, Subpart B, for Class A equipment.</p>																						
EC Declaration of Conformity - Low Voltage	<p>Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:</p> <p>Low Voltage Directive 73/23/EEC, amended by 93/69/EEC</p> <p>EN 61010-1:1993 Safety requirements for electrical equipment for measurement control and laboratory use.</p>																						
U.S. Nationally Recognized Testing Laboratory Listing	<p>UL3111-1 Standard for electrical measuring and test equipment.</p>																						

**Table 1-17: Certifications and Compliances (Cont.)**

Category	Standard or Description
Canadian Certification	CAN/CSA C22.2 No. 1010.1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Compliance	ANSI/ISA S82.02.01 : 1999 Safety standard for electrical and electronic test, measuring, controlling, and related equipment.
	IEC61010-1/A2 : 1995 Safety requirements for electrical equipment for measurement, control, and laboratory use (first edition).
Installation (Overvoltage) Category	<p>Terminals on this product may have different installation (overvoltage) category designations. The installation categories are:</p> <p>CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location.</p> <p>CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.</p> <p>CAT I Secondary (signal level) or battery operated circuits of electronic equipment.</p>
Pollution Degree Description	<p>A measure of the contaminates that could occur in the environment around and within a product.</p> <p>Typically the internal environment inside a product is considered to be the same as the external.</p> <p>Products should be used only in the environment for which they are rated.</p> <p>Pollution Degree 1 No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.</p> <p>Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.</p> <p>Pollution Degree 3 Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.</p> <p>Pollution Degree 4 Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.</p>

**Table 1-18: Environmental Limits and Use Classification for Safety Certification Compliance**

<b>Category</b>	<b>Standard or Description</b>
Temperature, operating	+5 °C to +40 °C
Altitude (maximum operating)	3000 meters
Equipment Type	Test and measuring
Safety Class	Class 1 (as defined in IEC61010-1) - grounded product
Installation (Overvoltage) Category	Overvoltage Category II (as defined in IEC61010-1)
Source Voltage Range	100 VAC to 240 VAC, 50 Hz/60 Hz, single phase
Fuse Rating	Mains fuse is 3.15A, 250 V, Fast; Not operator replaceable. Refer servicing to qualified service personnel.
Pollution Degree	Pollution Degree 2 (as defined in IEC61010-1). Rated for indoor use only.







# Test Parameters



# Test Parameters

Each error state displayed on the user interface is the result of making one or more measurements or tests on the incoming transport stream. The displayed tests are derived from the DVB and ATSC standards. Additional proprietary tests are also included.

Some measurements and tests translate directly to an error state; others are the result of a combination of tests. For many of the tests, the user can affect the result by varying parameters that influence the test result, for example, maximum and minimum bit rate values.

This section sets out each of the tests available through the user interface. For each of the tests, the following information is given:

Item	Description
Test Name	Name of the test.
Standard Applicable	DVB or ATSC.
Standard Equivalent	Source standard.
Description	The condition that causes the test to fail.
Variable Parameters	Parameters which can be varied by the user are available from the Test screen by right-clicking an Error State button and selecting <b>Parameters...</b>  Note: Not all tests have user variable parameters.
Config. File Reference	Cross reference to Configuration file parameter.  Refer to <i>Configuration File Structure</i> starting on page 3-1.

## All Stream Test

### Any Stream Error

Item	Description
Test Name	Any Stream Error
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Indicates the highest state of any stream error.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
PID bit rate bin duration (bit rate is over 10 bins)	ms	20	310	100	PS4
PID bit rate bin count for service log	Integer > 0	1	100	10	PS6
PAT/PMT obsolescence count	Integer > 0	5	100	25	PS10
PID reference transition time	ms	200	5000	1000	PS57
Minimum stream bit rate for processing	bits	64000	300000000	64000	PS59
Default PID Parameter					
PID bit rate limit and missing test integration test count	Integer > 0	1	60	1	PP1

## First Priority

First Priority tests are necessary for decodability (basic monitoring).

### 1.1 Sync

Item	Description
Test Name	Transport Stream synchronization loss
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.1, TS_sync_loss
Description	Loss of synchronization with consideration of hysteresis parameters.

**Variable Parameters.** This test uses no variable parameters.

### 1.2 Sync Byte

Item	Description
Test Name	Sync Byte error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.2, sync_byte error
Description	Sync_byte not equal to 0x47 (or 0xB8)

**Variable Parameters.** This test uses no variable parameters.

### 1.3a PAT

Item	Description
Test Name	PAT section maximum repetition interval
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.3a, PAT_error
Description	PID 0x0000 does not occur at least every 0.5s. A PID 0x0000 does not contain a table_id 0x00, i.e. a PAT. Scrambling_control_field is not 00 for PID 0x0000.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameter PAT section maximum repetition interval	ms	50	5000	500	PS8

**1.4 Continuity**

Item	Description
Test Name	Continuity Count Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.4, continuity_count_error
Description	Incorrect packet order. A packet occurs more than twice. Lost packet.

**Variable Parameters.** This test uses no variable parameters.

**1.5a PMT**

Item	Description
Test Name	PMT Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.5a, PMT_error
Description	Sections with table_id 0x02, (a PMT), do not occur at least every 0.5s on the PID which is referred to in the PAT. Scrambling_control_field is not 00 for all PIDs containing sections with table_id 0x02, (a PMT).

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameter PMT section maximum repetition interval	ms	50	5000	500	PS9

**1.6 PID**

Item	Description
Test Name	PID Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 1.6, PID_error
Description	Referred PID does not occur for a user specified period.

**Variable Parameters.** This test uses no variable parameters.

## Second Priority

Second Priority tests are recommended for continuous or periodic monitoring.

### 2.1 Transport

Item	Description
Test Name	Transport Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.1, transport_error
Description	Transport_error_indicator in the TS-Header is set to 1.

**Variable Parameters.** This test uses no variable parameters.

### 2.2 CRC

Item	Description
Test Name	CRC Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.2, CRC_error
Description	CRC error occurred in CAT, PAT, PMT, NIT, EIT, BAT, SDT or TOT table.

**Variable Parameters.** This test uses no variable parameters.

### 2.3a PCR Repetition

Item	Description
Test Name	PCR Repetition Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.3a, PCR_repetition_error
Description	Time interval between two consecutive PCR values more than 40 ms.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameter PCR maximum repetition interval	ms	10	500	40	PP2

### 2.3b PCR Discontinuity Indicator

Item	Description
Test Name	PCR Discontinuity Indicator Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.3b, PCR_discontinuity_indicator_error
Description	The difference between two consecutive PCR values. (PCR <sub>i</sub> + 1 - PCR <sub>i</sub> ) is outside the range of 0 ms to 100 ms without the discontinuity_indicator set.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameter Maximum PCR discontinuity	ms	10	1000	100	PP3

### 2.4 PCR Accuracy

Item	Description
Test Name	PID Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.4, PCR_accuracy_error
Description	PCR accuracy of selected program is not within $\pm 500$ ns.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
PCR accuracy/jitter history length	Integer > 0			32	PS11
PCR accuracy/jitter integration count	Integer > 0	25	2560	256	PS12
Default PID Parameter					
Maximum PCR accuracy error	ns	100	10000	500	PP4



**2.5 PTS**

Item	Description
Test Name	PTS Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.5, PTS_error
Description	PTS repetition period more than 700 ms.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameter Maximum PTS repetition interval	ms	100	5000	700	PP5

**2.6 CAT**

Item	Description
Test Name	CAT Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 2.6, CAT_error
Description	Packets with transport_scrambling_control not 00 present, but no section with table_id = 0x01 (a CAT) present.  Section with table_id other than 0x01 (not a CAT) found on PID 0x0001.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters CAT present timer	ms	1000	100000	10000	PS13
CAT obsolescence count	Integer > 0	5	100	25	PS61

## DVB Third Priority

DVB Third Priority tests are for application dependant monitoring.

### 3.1.a NIT Actual

Item	Description
Test Name	NIT Actual Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.1a, NIT_actual_error
Description	<p>Section with table_id other than 0x40 or 0x41 or 0x72 (not an NIT or ST) found on PID 0x0010.</p> <p>No section with table_id 0x40 (an NIT_actual) in PID value 0x0010 for more than 10s.</p> <p>Any two sections with table_id = 0x40 (NIT_actual) occur on PID 0x0010 within a specified value (25 ms or lower).</p>

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
NIT actual network minimum section repetition interval	ms	10	100	25	PS14
NIT actual network maximum repetition interval	ms	1000	30000	10000	PS15
NIT actual network obsolescence count	Integer > 0	5	100	25	PS16

**3.1.b NIT Other**

Item	Description
Test Name	NIT Other Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.1b, NIT_other_error
Description	Interval between sections with the same section_number and table_id = 0x41 (NIT_other) on PID 0x0010 longer than a specified value (10 s or higher).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
NIT other network minimum section repetition interval	ms	10	100	25	PS17
NIT other network maximum repetition interval	ms	1000	30000	10000	PS18
NIT other network obsolescence count	Integer > 0	5	100	25	PS19

**3.2 SI Repetition**

Item	Description
Test Name	SI Repetition Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.2, SI_repetition_error
Description	Repetition rate of SI tables outside of specified limits.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
Repetition interval history length	Integer > 0	1	256	32	PS7
TOT minimum repetition interval	ms	10	100	25	PS41
TOT maximum repetition interval	ms	5000	120000	30000	PS42
BAT minimum section repetition interval	ms	10	100	25	PS43
BAT maximum section repetition interval	ms	2000	50000	10000	PS44
BAT obsolescence count	Integer > 0	5	100	25	PS45
ETT maximum repetition interval	ms	50	20000	500	PS52
ETT obsolescence count	Integer > 0	5	100	25	PS53
TSDT maximum repetition interval	ms	1000	30000	10000	PS62
TSDT obsolescence count	Integer > 0	5	100	25	PS63
PCAT obsolescence count	Integer > 0	5	100	25	PS68
PCAT maximum repetition interval	ms	1000	30000	10000	PS69
LIT obsolescence count	Integer > 0	5	100	25	PS80
LIT maximum repetition interval	ms	1000	30000	10000	PS81
ERT obsolescence count	Integer > 0	5	100	25	PS82
ERT maximum repetition interval	ms	1000	30000	10000	PS83
ITT obsolescence count	Integer > 0	5	100	25	PS84
ITT maximum repetition interval	ms	1000	30000	10000	PS85

**3.4.a Unref PID**

Item	Description
Test Name	Unreferenced PID Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.4, Unreferenced_PID
Description	PID (other than PMT_PIDs, PIDs with numbers between 0x00 and 0x1F or PIDs user defined as private data streams) not referred to by a PMT or a CAT within 0.5 s.

**Variable Parameters.** This test uses no variable parameters.

**3.5.a SDT Actual**

Item	Description
Test Name	SDT Actual error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.5.a, SDT_actual_error
Description	Sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2 s.  Sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011.  Any two sections with table_id = 0x42 (SDT_actual) occur on PID 0x0011 within a specified value (25 ms or lower).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
SDT actual minimum section repetition interval	ms	10	100	25	PS20
SDT actual maximum repetition interval	ms	500	30000	2000	PS21
SDT actual obsolescence count	Integer > 0	5	100	25	PS22

**3.5.b SDT Other**

Item	Description
Test Name	SDT Other Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.5.b, SDT_other_error
Description	Interval between sections with the same section_number and table_id = 0x46 (SDT, other TS) on PID 0x0011 longer than a specified value (10 s or higher).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
SDT other minimum section repetition interval	ms	10	100	25	PS23
SDT other maximum repetition interval	ms	1000	30000	10000	PS24
SDT other obsolescence count	Integer > 0	5	100	25	PS25

**3.6.a EIT Actual**

Item	Description
Test Name	EIT Actual Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.6.a, EIT_actual_error
Description	<p>Section '0' with table_id = 0x4E (EIT-P, actual transport stream) not present on PID 0x0012 for more than 2 s.</p> <p>Section '1' with table_id = 0x4E (EIT-F, actual transport stream) not present on PID 0x0012 for more than 2 s.</p> <p>Sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012.</p> <p>Any two sections with table_id = 0x4E (EIT-P/F, actual transport stream) occur on PID 0x0012 within a specified value (25 ms or lower).</p>

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
EIT actual PF minimum section repetition interval	ms	10	100	25	PS26
EIT actual PF maximum repetition interval	ms	500	30000	2000	PS27
EIT actual PF obsolescence count	Integer > 0	5	100	25	PS28
EIT actual schedule minimum section repetition interval	ms	10	100	25	PS32
EIT actual schedule maximum repetition interval	ms	2000	120000	10000	PS33
EIT actual schedule obsolescence count	Integer > 0	5	100	25	PS34

### 3.6.b EIT Other

Item	Description
Test Name	EIT Other Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.6.a, EIT_other_error
Description	Interval between sections 0 with table_id = 0x4F (EIT-P, other transport stream) on PID 0x0012 longer than a specified value (10 s or higher).  Interval between sections 1 with table_id = 0x4F (EIT-F, other transport stream) on PID 0x0012 longer than a specified value (10 s or higher).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
EIT other PF minimum section repetition interval	ms	10	100	25	PS29
EIT other PF maximum repetition interval	ms	1000	30000	10000	PS30
EIT other PF obsolescence count	Integer > 0	5	100	25	PS31
EIT other schedule minimum section repetition interval	ms	10	100	25	PS35
EIT other schedule maximum repetition interval	ms	2000	600000	10000	PS36
EIT other schedule obsolescence count	Integer > 0	5	100	25	PS37

### 3.6.c Event Information Table Present/Following

Item	Description
Test Name	EIT PF Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.6.c, EIT_PF_error
Description	If either section (0 or 1) of each EIT P/F subtable is present, both must exist. Otherwise EIT_PF_error should be indicated.

**Variable Parameters.** This test uses no variable parameters.



**3.7 Running Status Table**

Item	Description
Test Name	RST Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.7, RST_error
Description	Sections with table_id other than 0x71 or 0x72 found on PID 0x0013.  Any two sections with table_id = 0x71 (RST) occur on PID 0x0013 within a specified value (25 ms or lower).

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameter RST minimum section repetition interval	ms	10	100	25	PS38

**3.8 Time and Date Table**

Item	Description
Test Name	TDT Error
Standard Applicable	DVB
Standard Equivalent	TR101 290, 3.8, TDT_error
Description	Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30 s.  Sections with table_id other than 0x70, 0x72 (ST) or 0x73 (TOT) found on PID 0x0014.  Any two sections with table_id = 0x70 (TDT) occur on PID 0x0014 within a specified value (25 ms or lower).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters TDT minimum section repetition interval	ms	10	100	25	PS39
TDT maximum repetition interval	ms	5000	120000	30000	PS40

## ATSC Third Priority

### A/53 Prog Paradigm

Item	Description
Test Name	A/53 Program Paradigm
Standard Applicable	ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the current copy of the PSI information conforms to the program paradigm specified in ATSC standard A/53 or explicitly states its non-conformance by setting bit 12 of the program_number to 1.

**Variable Parameters.** This test uses no variable parameters.

### A/65 MGT

Item	Description
Test Name	Master Guide Table
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65, 6.2
Description	The Master Guide Table (MGT) lists version numbers, length in bytes, and PIDs for all of the PSIP tables with the exception of the STT, which works independently from the other tables.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
MGT minimum section repetition interval	ms	50	2000	150	PS47
MGT obsolescence count	Integer > 0	5	100	25	PS64

**A/65 STT**

Item	Description
Test Name	System Time Table
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65, 6.1
Description	The System Time Table (STT) provides the current date and time of day information.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameter STT maximum section repetition interval	ms	250	60000	1000	PS46

**A/65 RRT**

Item	Description
Test Name	Rating Region Table
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65, 6.4
Description	The Rating Region Table (RRT) carries rating information for multiple geographical regions.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters RRT maximum section repetition interval	ms	5000	120000	60000	PS49
RRT obsolescence count	Integer > 0	5	100	25	PS66

**A/65 VCT**

Item	Description
Test Name	Virtual Channel Table
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65, 6.3
Description	The Virtual Channel Table (VCT) contains a list of attributes for virtual channels carried in the Transport Stream.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
VCT maximum subtable repetition interval	ms	50	3000	400	PS48
VCT obsolescence count	Integer > 0	5	100	25	PS65

**A/65 EIT**

Item	Description
Test Name	Event Information Table
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65, 6.5
Description	The Event Information Table (EIT) contains information (such as titles or start times) for events on defined virtual channels.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
EIT maximum repetition interval	ms	50	20000	500	PS50
EIT obsolescence count	Integer > 0	5	100	25	PS51

**A/65 Base PID**

Item	Description
Test Name	Base PID
Standard Applicable	ATSC
Standard Equivalent	ATSC A/65
Description	Only the following tables are allowed to be carried on PID 0x1FFB: MGT, CVCT, TVCT, STT and RRT.

**Variable Parameters.** This test uses no variable parameters.

**PID Test****Discontinuity**

Item	Description
Test Name	Discontinuity Indicator Error
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	The discontinuity_indicator must not be set to 1 in three consecutive transport stream packets of that same PID.

**Variable Parameters.** This test uses no variable parameters.

## Bit Rate Tests

### Transport Stream Occupancy

Item	Description
Test Name	Transport stream bit rate within limits
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the bit rate of the transport stream is within the expected limits.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
Measurement interval for overall bit rate	ms	100	60000	1000	PS1
Minimum overall bit rate	bit/s	64000	300000000	64000	PS2
Maximum overall bit rate	bit/s	64000	300000000	300000000	PS3

### PID Occupancy

Item	Description
Test Name	PID bit rate limits violated
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	The bit rate of this PID exceeds the user-set limits.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameters					
Minimum PID bit rate	bit/s	0	300000000	0	PP6
Maximum PID bit rate	bit/s	50	300000000	-1 (where -1 means disabled)	PP7

**Prog Occupancy**

Item	Description
Test Name	Program bit rate limits violated
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	The bit rate of this program exceeds the set limits.

**Variable Parameters.** This test uses no variable parameters.

**PID Group Occupancy**

Item	Description
Test Name	PID group bit rate limits violated
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	The bit rate of this PID Group exceeds the set limits.

**Variable Parameters.** This test uses no variable parameters.

**PID Bit Rate Variability**

Item	Description
Test Name	PID Bit Rate Variability
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	PID bit rate variability is a measure of individual PID bit rates over a set period.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameter					
PID bit rate bin count for variability	Integer > 0	1	10	3	PS5
Default PID Parameters					
PID bit rate variability integration count	Integer > 0	2	30	10	PP8
PID bit rate variability fraction	Fraction	0	1	0.25	PP9

## PCR Tests

### PCR Jitter

Item	Description
Test Name	PCR Overall Jitter
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	This test only applies to PIDs that are indicated as PCR_PIDs in a current PMT. Passes if the most recent PCR overall jitter PCR_OJ measurement is less than the limit.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameter Maximum PCR overall jitter	ns	250	250000	25000	PP11

### PCR Frequency Offset

Item	Description
Test Name	PCR Frequency Offset
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	This test only applies to PIDs that are indicated as PCR_PIDs in a current PMT. Passes if the most recent PCR frequency offset PCR_FO measurement is less than the limit.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameter Maximum PCR frequency offset	Hz	200	10000	800	PP12



**PCR Drift Rate**

Item	Description
Test Name	PCR Drift Rate
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	This test only applies to PIDs which are indicated as PCR_PID in a current PMT. Passes if the average of the most recent PP14 PCR frequency drift rate measurements is less than the limit.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Default PID Parameters					
Maximum PCR frequency drift	MHz/s	10	600	75	PP13
PCR frequency drift rate integration count	Integer > 0	1	250	25	PP14

## Table Tests

### Program Number Consistency

Item	Description
Test Name	PAT/PMT program_number consistency
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if, for all programs listed in the PAT, there is a PMT on the correct program_map_PID whose program_number matches that in the PAT.

**Variable Parameters.** This test uses no variable parameters.

### DVB - PAT/SDT Consistency

Item	Description
Test Name	PAT/SDT consistency
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if, for all programs listed in the PAT, there is an entry in the SDT actual_transport_stream subtable whose service_id matches the program_number in the PAT and whose transport_stream_id matches the PAT.

**Variable Parameters.** This test uses no variable parameters.

### ATSC - PAT/VCT Consistency

Item	Description
Test Name	PAT/VCT consistency
Standard Applicable	ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if, for all programs listed in the PAT, there is an entry in the VCT whose program_number matches that in the PAT and whose channel_TSID matches the PAT.

**Variable Parameters.** This test uses no variable parameters.

**ATSC - MGT/EIT - k  
Presence**

Item	Description
Test Name	MGT/EIT-k presence
Standard Applicable	ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the current version of the MGT contains entries for table_types EIT-0, EIT-1, EIT-2 and EIT-3 or if the MGT contains no table_type entry for TVCT.

**Variable Parameters.** This test uses no variable parameters.

**Table Syntax**

Item	Description
Test Name	Table Syntax Check
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	A long list of checks on the reserved bits, lengths, section numbers and indicators of table sections, depending on the severity of the error faults may be tolerated or result in the section being discarded.

**Variable Parameters.** This test uses no variable parameters.

## Single Frequency Network

### SFN Error

Item	Description
Test Name	Single Frequency Network Error
Standard Applicable	DVB
Standard Equivalent	Tektronix proprietary
Description	Several tests are made on the SFN content when present.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Stream Parameters					
MIP maximum repetition interval	ms	500	3000	1500	PS54
MIP synch time stamp jitter limit	ns	100	20000	300	PS55

## Template

### Any Template Error

Item	Description
Test Name	Any Template Error
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Indicates the highest state of any template error.

**Variable Parameters.** This test uses no variable parameters.

### Template Header Error

Item	Description
Test Name	Template Header Error
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Checks for correct content in the Service section of the Template, including: transportstreamid, networkid, originalnetworkid, and otherservicesallowed.

**Variable Parameters.** This test uses no variable parameters.

**Template Service Error**

Item	Description
Test Name	Template service information is acceptable
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the current copy of the service information matches the service information template parameters: constraint, serviceType, serviceName, PcrPid, and otherPIDsAllowed.

**Variable Parameters.** This test uses no variable parameters.

**Template PID Error**

Item	Description
Test Name	Template PID information is acceptable
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the program PID information, found in the current copy of the PSI, satisfies the PIDs part of the service information template.

**Variable Parameters.** This test uses no variable parameters.

**Template Rating Error**

Item	Description
Test Name	Template program rating is acceptable
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Passes if the program rating as found in the current copy of the service information satisfies the ratings part of the service information template.

**Variable Parameters.** This test uses no variable parameters.

## Operational Tests

### Processing Strained

Item	Description
Test Name	Processing strained
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Occurs when the monitoring system has to discard some information in order to keep up with events on the Transport Stream; however, monitoring continues.

**Variable Parameters.** This test uses no variable parameters.

### Processing Overwhelmed

Item	Description
Test Name	Processing overwhelmed
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	Occurs when, in spite of discarding some information, the monitoring system is unable to keep up with the Transport Stream. Results from the monitoring should be considered unreliable in this state. The monitoring system will recover when conditions improve.

**Variable Parameters.** This test uses no variable parameters.

### Service Information Strained

Item	Description
Test Name	Service Information Strained
Standard Applicable	DVB / ATSC
Standard Equivalent	Tektronix proprietary
Description	<p>In the MTM400, received tables are held in a fixed sized database. This is large enough for the majority of streams, but if the stream contains too much SI, some will be discarded and this test will indicate an error.</p> <p>The tables are discarded in a priority order that ensures that analysis is very unlikely to be affected. Once raised the priority will not fall until either the stream is reapplied, or a manual reset of this test is performed.</p>

**Variable Parameters.** This test uses no variable parameters.

## PID Tests

The tests in this section are accessed from the PID screen and are applicable on a per PID basis.

Some tests have parameters that can be varied by the user. The parameters are available from the PID screen by right-clicking an Error State button and selecting **Parameters...**

**Any PID Error**    **Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
PID bit rate limit and missing test integration count	Integer > 0	1	60	1	PP1

**PID Bit Rate**    **Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Minimum PID bit rate	bit/s	0	300000000	0	PP6
Maximum PID bit rate	bit/s	0	300000000	-1	PP7

**PCR Repetition**    This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
PCR maximum repetition interval	ms	10	500	40	PP2

**PCR Discontinuity** This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PCR discontinuity	ms	10	1000	100	PP3

**PCR Accuracy** This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PCR accuracy error	ns	100	10000	500	PP4

**PCR Jitter** This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PCR overall jitter	ns	250	250000	25000	PP11



**PCR Offset** This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PCR frequency offset	Hz	200	10000	800	PP12

**PCR Drift Rate** This test applies only to PIDs that are indicated as PCR\_PID in the current PMT.

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PCR drift rate	MHz/s	10	600	75	PP13
PCR frequency drift rate integration count	Integer > 0	1	250	25	PP14

**PTS Repetition** This test applies only to PIDs that carry an elementary stream expected to contain PTS values.

**Variable Parameters.** This test uses the following variable parameter:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
Maximum PTS repetition interval	ms	100	5000	700	PP5

**PID Variability** For this test, the multiplex occupancy bars indicate the variability value (0 to 1).

**Variable Parameters.** This test uses the following variable parameters:

Parameter name	Unit	Min	Max	Nominal	Config. file reference
PID bit rate variability integration count	Integer > 0	2	30	10	PP8
PID bit rate variability fraction	Fraction	0	1	0.25	PP9

**Missing PID** Equivalent to TR101 290, PID\_error, 1.6. The test only applies to PIDs referenced in the stream.

**Variable Parameters.** This test uses no variable parameters.

**Unreferenced PID** **Variable Parameters.** This test uses no variable parameters.

**Continuity** **Variable Parameters.** This test uses no variable parameters.

**Discontinuity** **Variable Parameters.** This test uses no variable parameters.



# Configuration File



# Configuration File Structure

This appendix provides an overview of the MTM400 configuration file, which allows units to be completely configured or partially updated. If no configuration file is implemented, settings will use default values. Note that configuration files can be uploaded to the unit, but must be made 'active' to have any effect.

The file is presented in XML (Extensible Markup Language) format. XML is a hierarchical language format that can be interpreted by the MTM400 units. It can be edited using a simple text editor such as Microsoft NotePad, although more sophisticated editors are available.

---

**NOTE.** Where a dedicated XML Editor is used, a configuration definition file or model can be downloaded by your browser by typing <http://<mtm400 address>/config.xsd> in the address field.

---

XML is formatted using elements and attributes, which are indicated in a document using tags. Tags begin with a '<' and close with a '>'. End tags include a '/' before the name of the element; empty tags include a '/' before the closing '>'. For example, the following section of a configuration file includes three elements: two elements with content, and one empty tag.

```
<LBandSettings Name = "Default">
    <OscillatorFrequency>10600000</OscillatorFrequency>
    <TransponderFrequency>11837000</TransponderFrequency>
    <PolarVolts>0</PolarVolts>
    <SymbolRate>27500000</SymbolRate>
    <ViterbiRate>2</ViterbiRate>
    <ViterbiRateAuto>1</ViterbiRateAuto>
    <Tone22K>0</Tone22K>
    <InvertSpectrum>1</InvertSpectrum>
</LBandSettings>
```

The <LBandSettings Name = "Default"> tag opens the LBandSettings element. The LBandSettings attribute, Name, is set to 'Default'. The LBandSettings element contains a number of discrete elements. This results in a nested structure. Any of the elements can contain further nested elements. The LBandSettings element is closed with the closing tag </LBandSettings>.

Configuration file sections can comprise arrays or ‘ever-present’ parameters.

- **Arrays** are lists or collections of related parameters, those relating to PIDs for example, and may or may not be present depending on the setup required.

In the extract shown below, an array of disabled events is allocated to PID number 0:

```
<PID Number="0" ForcePresence="0">  
<DisabledEvents>0x2004 0x2011 0x3017 0x3028 0x303a 0x3043 0x3044 0x3045  
0x3117 0x3118 0x3124 0x3132 0x3133 0x3728</DisabledEvents>  
</PID>
```

- **Ever-present** parameters always have current values in the MTM400, for example, <PI1> Interface Selection. They will never be deleted, but may be updated through the configuration file.

## Updating

---

**NOTE.** *The Update attribute is not used for ‘ever-present’ parameters.*

---

The Update attribute attached to a number of container elements allows members of a group to be completely replaced or partially updated.

For example, in the Programs group, each Program contains three parameters, that is, <PV1>, <PV2> and <PV3>.

- If the Programs Update attribute is set to Absolute (<Programs Update="Absolute">), values included in each Program container will completely replace the current values. Program values not explicitly stated in the configuration file will revert to default values. Table 3-1 shows an example.
- If the Programs Update attribute is set to Incremental (<Programs Update="Incremental">), values present in the configuration file will be created or overwrite the current values. Program values that have been previously set, but not included in this configuration file, will remain unchanged. Program values that do not exist in the current setup will be added. Table 3-2 shows an example.

**Table 3-1: Absolute Update - Example**

Current values	Configuration file values	Updated values
<p>.....</p> <p>Program 1  PV1 = 98 kbit/s  PV2 = 34 Mbit/s  PV3 = PMT test disabled</p> <p>Program 2  PV1 = 110 kbit/s  PV2 = 100 Mbit/s  PV3 = PMT test disabled</p> <p>Program 3  PV1 = 75 kbit/s  PV2 = 123 Mbit/s  PV3 = PMT test disabled</p> <p>.....</p>	<p>.....</p> <p>&lt;Programs Update="Absolute"&gt;  &lt;Program Number="1"&gt;  &lt;PV1&gt;300000&lt;/PV1&gt;  &lt;PV2&gt;2000000&lt;/PV2&gt;  &lt;PV3&gt;0&lt;/PV3&gt;  &lt;/Program&gt;  &lt;Program Number="3"&gt;  &lt;PV1&gt;400000&lt;/PV1&gt;  &lt;PV2&gt;100000000&lt;/PV2&gt;  &lt;PV3&gt;1&lt;/PV3&gt;  &lt;/Program&gt;  &lt;/Programs&gt;</p> <p>.....</p>	<p>.....</p> <p>Program 1  PV1 = 300 kbit/s  PV2 = 2 Mbit/s  PV3 = PMT test disabled</p> <p>(Program 2 will use default values.)</p> <p>Program 3  PV1 = 400 kbit/s  PV2 = 100 Mbit/s  PV3 = PMT test enabled</p> <p>.....</p>

**Table 3-2: Incremental Update - Example**

Current values	Configuration file values	Updated values
<p>.....</p> <p>Program 1  PV1 = 98 kbit/s  PV2 = 34 Mbit/s  PV3 = PMT test disabled</p> <p>Program 2  PV1 = 110 kbit/s  PV2 = 100 Mbit/s  PV3 = PMT test disabled</p> <p>Program 3  PV1 = 75 kbit/s  PV2 = 123 Mbit/s  PV3 = PMT test disabled</p> <p>.....</p>	<p>.....</p> <p>&lt;Programs Update="Incremental"&gt;  &lt;Program Number="1"&gt;  &lt;PV1&gt;300000&lt;/PV1&gt;  &lt;PV2&gt;2000000&lt;/PV2&gt;  &lt;PV3&gt;0&lt;/PV3&gt;  &lt;/Program&gt;  &lt;Program Number="3"&gt;  &lt;PV1&gt;400000&lt;/PV1&gt;  &lt;PV2&gt;100000000&lt;/PV2&gt;  &lt;PV3&gt;1&lt;/PV3&gt;  &lt;/Program&gt;  &lt;/Programs&gt;</p> <p>.....</p>	<p>.....</p> <p>Program 1  PV1 = 300 kbit/s  PV2 = 2 Mbit/s  PV3 = PMT test disabled</p> <p>Program 2  PV1 = 110 kbit/s  PV2 = 100 Mbit/s  PV3 = PMT test disabled</p> <p>Program 3  PV1 = 400 kbit/s  PV2 = 100 Mbit/s  PV3 = PMT test enabled</p> <p>.....</p>

For example, if the current active configuration contains the following section:

```
<LBandSettings Name = "Default">
    <OscillatorFrequency>10600000</OscillatorFrequency>
    <TransponderFrequency>11837000</TransponderFrequency>
    <PolarVolts>0</PolarVolts>
    <SymbolRate>27500000</SymbolRate>
    <ViterbiRate>2</ViterbiRate>
    <ViterbiRateAuto>1</ViterbiRateAuto>
    <Tone22K>0</Tone22K>
    <InvertSpectrum>1</InvertSpectrum>
</LBandSettings>
```

and it is replaced, using a configuration file, with the following section:

```
<LBandSettings Update = "Absolute" Name = "Default">
    <OscillatorFrequency>355000</OscillatorFrequency>
    <TransponderFrequency>24000</TransponderFrequency>
</LBandSettings>
```

the active configuration will be as follows:

```
<LBandSettings Update = "Absolute" Name = "Default">
    <OscillatorFrequency>355000</OscillatorFrequency>
    <TransponderFrequency>24000</TransponderFrequency>
</LBandSettings>
```

The original section was, in effect, deleted and replaced with the new section. However, if the original section was replaced with the following section:

```
<LBandSettings Update = "Incremental" Name = "Default">
    <OscillatorFrequency>355000</OscillatorFrequency>
    <TransponderFrequency>24000</TransponderFrequency>
</LBandSettings>
```

the active configuration will be as follows:

```
<LBandSettings Update = "Incremental" Name = "Default">
    <OscillatorFrequency>355000</OscillatorFrequency>
    <TransponderFrequency>24000</TransponderFrequency>
    <PolarVolts>0</PolarVolts>
    <SymbolRate>27500000</SymbolRate>
    <ViterbiRate>2</ViterbiRate>
    <ViterbiRateAuto>1</ViterbiRateAuto>
    <Tone22K>0</Tone22K>
    <InvertSpectrum>1</InvertSpectrum>
</LBandSettings>
```

Note that the original section was modified, but those tags not specified in the updating file were left unchanged.



## Defaults

Default values are ‘hardwired’ into the MTM400; they will be used when no value has been given using a configuration file. However for some elements, for example, <Program>, alternative default values can be supplied. If the defaults are supplied through the configuration file, all subsidiaries of that element will use those defaults unless specific values are given.

<pre>&lt;!-- Program Default Parameters --&gt; PV1 = 98 kbit/s PV2 = 34 Mbit/s PV3 = PMT test disabled</pre>	<p>Program default values: all programs will adopt these values unless specific values are given (as below).</p>
<pre>&lt;Programs Update="Absolute"&gt;   &lt;Program Number="1234"&gt;     PV1 = 400 kbit/s     PV2 = 100 Mbit/s     PV3 = PMT test enabled   &lt;/Program&gt; &lt;/Programs&gt;</pre>	<p>Specific program values: these values will be adopted by Program 1234. All other programs will adopt the default values given above.</p>



# Configuration File Content

Refer to *Example Configuration File* on page 3-54 to view an example configuration file.

The following pages list all of the parameters that can be used in the MTM400 configuration file. For each configuration parameter, the following information is given (where relevant):

Description	A brief description of the parameter.
Path	The specification of a parameter node by listing the node hierarchy from the top down.  Comment labels, for example <!-- Program parameters -->, are included in the configuration file to help orientate the user. These are also included in the path information given here to help the user.
Attribute	Attributes are name-value pairs which occur inside tags. Attribute values are enclosed in double-quotes, for example "Absolute".
Child Element(s)	A list of dependent parameter nodes.
Data Value	A brief description of the parameter. Information about the format and range of acceptable values is also given where relevant.

## General Parameters

### <MTM400Configuration Name = “ ”> <MTM400Configuration>

Description	A container for all MTM400 Configuration settings.
Attribute	Name: Configuration file name. For example: Tek Test Config.
Child Elements	All elements.

### <Streams></Streams>

Description	A container for all Stream settings.
Path	<MTM400Configuration> → <Streams>
Child Element	<Stream>

### <Stream Number=“ ”></Stream>

Description	A container for individual Stream settings.
Path	<MTM400Configuration> → <Streams> → <Stream>
Attribute	Number: '1' for MTM400
Child Elements	<PI1>, <LBand>, <QAM>, <Broadcast Standard>, <DvbRegion>, <TmccAcquisition>, <MpeAcquisition>, <ResetEventsOnSyncAcquired>, <MonitorRepetitionRates>, <PcrAccuracyMode>, <OS1>, <!-- Stream Miscellaneous Parameters -->, <!-- Stream Integer Parameters -->, <!-- Stream Interval Parameters -->, <PS56>, <PIDS>, <Programs>, <PIDGroups>, <Events>, <ServiceLog>

### <PI1></PI1>

Description	Interface selection.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PI1>
Data Value	Type: Numeral Values: 0 = ASI 1 = SMPTE 2 = Serializer 1 3 = Serializer 2

**<BroadcastStandard></BroadcastStandard>**

Description	Broadcast standard selection; MPEG, DVB, ATSC.
Path	<MTM400Configuration> → <Streams> → <Stream> → <BroadcastStandard>
Data Value	Type: Numeral Values: 0 = MPEG 1 = DVB 2 = ATSC

**<DvbRegion></DvbRegion>**

Description	DVB region selection. (Only relevant when the DVB <BroadcastStandard> is selected).
Path	<MTM400Configuration> → <Streams> → <Stream> → <DvbRegion>
Data Value	Type: Integer Values: 0 = DVB 1 = DVB (DTG) 2 = DVB (Nordic) 3 = DVB (Reserved) 4 = DVB (Aus)

**<TmccAcquisition></TmccAcquisition>**

Description	TMCC acquisition enable/disable.
Path	<MTM400Configuration> → <Streams> → <Stream> → <TmccAcquisition>
Data Value	Type: Numeral Values: 0 = Disabled 1 = Enabled

**<MpeAcquisition></MpeAcquisition>**

Description	MPE acquisition enable/disable. This parameter must be disabled, that is, set to 0.
Path	<MTM400Configuration> → <Streams> → <Stream> → <MpeAcquisition>
Data Value	Type: Numeral Values: 0 = Disabled 1 = Enabled

**<ResetEventsOnSyncAcquired></ResetEventsOnSyncAcquired>**

Description	Determines whether alarms for the stream should be reset to green when sync is reacquired after having been lost.
Path	<MTM400Configuration> → <Streams> → <Stream> → <ResetEventsOnSyncAcquired>
Data Value	Type: Numeral Values: 0 = Disable 1 = Enable

**<MonitorRepetitionRates></MonitorRepetitionRates>**

Description	Monitor Stream repetition rates enable/disable.
Path	<MTM400Configuration> → <Streams> → <Stream> → <MonitorRepetitionRates>
Data Value	Type: Numeral Values: 0 = Enable 1 = Disable

**<PcrAccuracyMode></PcrAccuracyMode>**

Description	Select the PCR Accuracy calculation algorithm to be used.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PcrAccuracyMode>
Data Value	Type: Numeral Values: 0 = Previous Point Differential 1 = Line Fit Differential

**<OS1></OS1>**

Description	Determines how often PID occupancy bitrate maximum and minimum values are written to the stream log.
Path	<MTM400Configuration> → <Streams> → <Stream> → <OS1>
Data Value	Type: Numeral Unit: s Range: 0 to 60000 Default: 60 s

## Interfaces Parameters

### <LBand></LBand>

Description	A container for all QPSK (L-Band) settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand>
Attribute	Selection: Use the <LBandSettings> Name attribute to indicate which collection of LBand settings should be activated.  Update: Indicates that existing settings should be either completely replaced (Absolute) or supplemented (Incremental).
Child Element	<LBandSettings>

### <LBandSettings Name=" " ></LBandSettings>

Description	A container for individual QPSK (L-Band) settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings>
Attribute	Name: LBand channel name. For example: LBand Channel 1. Up to 128 L-Band channels can be specified.
Child Elements	<OscillatorFrequency>, <TransponderFrequency>, <PolarVolts>, <SymbolRate>, <ViterbiRate>, <ViterbiRateAuto>, <Tone22K>, <InvertSpectrum>
Data Value	Type: Text Range: Up to 32 characters

### <OscillatorFrequency></OscillatorFrequency>

Description	The Local Oscillator (LO) frequency of the Low Noise Block (LNB) is dependent on the Transponder frequency and must be such that the difference falls within the input range of the receiver. Typically, these values are 10.6 GHz (Hi-Band) and 9.75 GHz (Lo-Band) when converting from KU band. The values are 5.7 GHz (Hi-Band) and 5.15 GHz (Lo-Band) respectively when converting from C-Band. This information should be confirmed for the specific type of LNBs used.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings> → <OscillatorFrequency>
Data Value	Type: Numeral Unit: Hz

**<TransponderFrequency></TransponderFrequency>**

Description	<p>The IF frequency which is used to initialize the L-Band Interface card is calculated as follows: Transponder_Frequency - LO_Frequency.</p> <p>If you want to specify the IF frequency rather than the individual LO and Transponder frequencies, set the &lt;OscillatorFrequency&gt; to a value of 0 (zero) and specify the required IF frequency under this parameter (&lt;Transponder_Frequency&gt;). If the IF frequency is specified, it must be in the range 0.950 GHz to 2.150 GHz; the tuning increment is 125 kHz.</p>
Path	<p>&lt;MTM400Configuration&gt; → &lt;Streams&gt; → &lt;Stream&gt; → &lt;LBand&gt; → &lt;LBandSettings&gt; → &lt;TransponderFrequency&gt;</p>
Data Value	<p>Type: Numeral Unit: Hz</p>

**<PolarVolts></PolarVolts>**

Description	<p>This parameter selects the polarization by applying 13 V (vertical) or 18 V (horizontal) to the LNB (Low Noise Block).</p> <p>A value of 0 can be used if no voltage is to be applied from this card; that is, the polarization voltage is being supplied from an external source.</p>
Path	<p>&lt;MTM400Configuration&gt; → &lt;Streams&gt; → &lt;Stream&gt; → &lt;LBand&gt; → &lt;LBandSettings&gt; → &lt;PolarVolts&gt;</p>
Data Value	<p>Type: Numeral Values: 0 = 0 V 1 = 13 V 2 = 18 V</p>

**<SymbolRate></SymbolRate>**

Description	<p>Symbol rate value.</p>
Path	<p>&lt;MTM400Configuration&gt; → &lt;Streams&gt; → &lt;Stream&gt; → &lt;LBand&gt; → &lt;LBandSettings&gt; → &lt;SymbolRate&gt;</p>
Data Value	<p>Type: Numeral Unit: symbol/s Range: 1 to 45 Msymbol/s</p>



**<ViterbiRate></ViterbiRate>**

Description	This is the harmonic fraction and takes one of the values specified. It may be overwritten if <ViterbiRateAuto> is on.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings> → <ViterbiRate>
Data Value	Type: Integer Values: 0 = 1/2    4 = 5/6 1 = 2/3    5 = 6/7 2 = 3/4    7 = 7/8

**<ViterbiRateAuto></ViterbiRateAuto>**

Description	This flag, values 0 or 1, indicates if the Viterbi Rate will be automatically tracked (0) or not (1).
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings> → <ViterbiRateAuto>
Data Value	Type: Numeral Values: 0 = Viterbi Rate Auto Off 1 = Viterbi Rate Auto On

**<Tone22K></Tone22K>**

Description	The <OscillatorFrequency> is selected by applying the 22 kHz tone.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings> → <Tone22K>
Data Value	Type: Numeral Values: 0 = Tone 22 kHz Absent (select Hi-Band) 1 = Tone 22 kHz Present (select Lo-Band)

**<InvertSpectrum></InvertSpectrum>**

Description	Frequency spectrum inversion.
Path	<MTM400Configuration> → <Streams> → <Stream> → <LBand> → <LBandSettings> → <InvertSpectrum>
Data Value	Type: Numeral Values: 0 = Invert Spectrum Off 1 = Invert Spectrum On

### <QAM></QAM>

Description	A container for all QAM (Annex A) settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM>
Attribute	Selection: Use the <QAMSettings> Name attribute to indicate which collection of QAM settings should be activated.  Update: Indicates that existing settings should be either completely replaced (Absolute) or supplemented (Incremental).
Child Element	<QAMSettings>

### <QAMSettings Name=" " ></QAMSettings>

Description	A container for individual QAM (Annex A) settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings>
Attribute	QAM channel name. For example: QAM 1. Up to 128 QAM channels can be specified.
Child Element	<Frequency>, <SymbolRate>, <TwoLoFrequency>, <Constellation>, <Inversion>, <VControl>, <UncorrectablePacketMode>
Data Value	Type: Text Range: Up to 32 characters

### <Frequency></Frequency>

Description	QAM Input frequency.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings> → <Frequency>
Data Value	Type: Numeral Unit: Hz

### <SymbolRate></SymbolRate>

Description	Symbol rate value.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings> → <SymbolRate>
Data Value	Type: Numeral Unit: symbol/s Range: 5 to 7 Msymbol/s

**<TwoLoFrequency></TwoLoFrequency>**

Description	Equal to the Symbol Rate Value plus 36.125 MHz.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings> → <TwoLoFrequency>
Data Value	Type: Numeral Range: Hz

**<Constellation></Constellation>**

Description	Sets the modulation scheme.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings> → <Constellation>
Data Value	Type: Numeral Values: 0 = Constellation 4 1 = Constellation 16 2 = Constellation 64 3 = Constellation 256

**<Inversion></Inversion>**

Description	Frequency spectrum inversion.
Path	<MTM400Configuration> → <Streams> → <Stream> → <QAM> → <QAMSettings> → <Inversion>
Data Value	Type: Numeral Values: Invert Spectrum Off = 0 Invert Spectrum On = 1

## Miscellaneous Stream Parameters

### <PS58></PS58>

Description	Name used in the user interface to identify this Transport Stream.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS58>
Data Value	Type: Text

### <PS60></PS60>

Description	ATSC broadcast type.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS60>
Data Value	Type: Numeral Values: 0 = Terrestrial 1 = Cable 2 = Either

## Stream Integer Parameters

### <PS2></PS2>

Description	Minimum transport stream bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS2>
Data Value	Type: Numeral Unit: bit/s Range: 64 kbit/s to 300 Mbit/s

### <PS3></PS3>

Description	Maximum transport stream bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS3>
Data Value	Type: Numeral Unit: bit/s Range: 64 kbit/s to 300 Mbit/s

### <PS5></PS5>

Description	Packet counting bin count for variability.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS5>
Data Value	Type: Numeral Unit: Integer Range: 1 to 10 Default: 1

### <PS6></PS6>

Description	Packet counting bin count for service log.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS6>
Data Value	Type: Numeral Unit: Integer Range: 1 to 100 Default: 1

**<PS7></PS7>**

Description	Repetition interval count. This determines how many repetition intervals are stored for each PID/table combination (in the case of section repetition), PCR PID (in the case of PCR repetition rate) or ES PID (in the case of PTS repetition rate).
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS7>
Data Value	Type: Numeral Unit: Integer Default: 32

**<PS10></PS10>**

Description	PAT/PMT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS10>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS11></PS11>**

Description	PCR accuracy/jitter store count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS11>
Data Value	Type: Numeral Unit: Integer Range: 0 to 1000 Default: 32

**<PS12></PS12>**

Description	PCR accuracy/jitter integration count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS12>
Data Value	Type: Numeral Unit: Integer Range: 25 to 2560 Default: 256

**<PS16></PS16>**

Description	NIT actual_network obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS16>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS19></PS19>**

Description	NIT other_network obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS19>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS22></PS22>**

Description	SDT actual_transport_stream obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS22>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS25></PS25>**

Description	SDT other_transport_stream obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS25>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS28></PS28>**

Description	DVB EIT actual_transport_stream present/following obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS28>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS31></PS31>**

Description	DVB EIT other_transport_stream present/following obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS31>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS34></PS34>**

Description	DVB EIT actual_transport_stream schedule obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS34>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS37></PS37>**

Description	DVB EIT other_transport_stream schedule obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS37>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25



**<PS45></PS45>**

Description	BAT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS45>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS51></PS51>**

Description	ATSC EIT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS51>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS53></PS53>**

Description	ATSC ETT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS53>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS55></PS55>**

Description	MIP synchronization_time_stamp jitter limit.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS55>
Data Value	Type: Numeral Unit: ns Range: 100 to 20000 Default: 300

**<PS59></PS59>**

Description	Minimum Transport Stream bit rate for availability.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS59>
Data Value	Type: Numeral Unit: bit/s Range: 64 kbit/s to 3005 Mbit/s

**<PS61></PS61>**

Description	CAT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS61>
Data Value	
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS63></PS63>**

Description	TSDT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS63>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS64></PS64>**

Description	MGT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS64>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS65></PS65>**

Description	VCT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS65>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS66></PS66>**

Description	RRT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS66>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS68></PS68>**

Description	PCAT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS68>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS70></PS70>**

Description	SDTT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS70>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS72></PS72>**

Description	BIT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS72>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS74></PS74>**

Description	NBIT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS74>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS76></PS76>**

Description	NBIT_LINK_INFO obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS76>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS78></PS78>**

Description	LDT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS78>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS80></PS80>**

Description	LIT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS80>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS82></PS82>**

Description	ERT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS82>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS84></PS84>**

Description	ITT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS84>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 25

**<PS92></PS92>**

Description	AIT obsolescence count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Integer Parameters --> → <PS92>
Data Value	Type: Numeral Unit: Integer Range: 5 to 100 Default: 10

## Stream Interval Parameters

### <PS1></PS1>

Description	Measurement interval for Transport Stream bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS1>
Data Value	Type: Integer Unit: ms Range: 0.1 s to 60 s Default: 1000 ms

### <PS4></PS4>

Description	Packet counting bin duration.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS4>
Data Value	Type: Integer Unit: ms Range: 0.1 s to 1.0 s Default: 100 ms

### <PS8></PS8>

Description	PAT section maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS8>
Data Value	Type: Integer Unit: ms Range: 0.05 s to 5.0 s Default: 500 ms

### <PS9></PS9>

Description	PMT section maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS9>
Data Value	Type: Integer Unit: ms Range: 0.05 s to 5.0 s Default: 500 ms

**<PS13></PS13>**

Description	CAT present timer.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS13>
Data Value	Type: Integer Unit: ms Range: 1 s to 100 s Default: 10000 ms

**<PS14></PS14>**

Description	NIT actual_network minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS14>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS15></PS15>**

Description	NIT actual_network maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS15>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS17></PS17>**

Description	NIT other_network minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS17>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS18></PS18>**

Description	NIT other_network maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS18>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS20></PS20>**

Description	SDT actual_transport_stream minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS20>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS21></PS21>**

Description	SDT actual_transport_stream maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS21>
Data Value	Type: Integer Unit: ms Range: 0.5 s to 30 s Default: 2000 ms

**<PS23></PS23>**

Description	SDT other_transport_stream minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS23>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms



**<PS24></PS24>**

Description	SDT other_transport_stream maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS24>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS26></PS26>**

Description	DVB EIT actual_transport_stream present/following minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS26>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS27></PS27>**

Description	DVB EIT actual_transport_stream present/following maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS27>
Data Value	Type: Integer Unit: ms Range: 0.5 s to 30 s Default: 2000 ms

**<PS29></PS29>**

Description	DVB EIT other_transport_stream present/following minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS29>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS30></PS30>**

Description	DVB EIT other_transport_stream present/following maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS30>
Data Value	Type: Integer Unit: ms Range: 1 s to 100 s Default: 10000 ms

**<PS32></PS32>**

Description	DVB EIT actual_transport_stream schedule minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS32>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS33></PS33>**

Description	DVB EIT actual_transport_stream schedule maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS33>
Data Value	Type: Integer Unit: ms Range: 2 s to 120 s Default: 10000 ms

**<PS35></PS35>**

Description	DVB EIT other_transport_stream schedule minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS35>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS36></PS36>**

Description	DVB EIT other_transport_stream schedule maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS36>
Data Value	Type: Integer Unit: ms Range: 2 s to 600 s Default: 10000 ms

**<PS38></PS38>**

Description	RST minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS38>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS39></PS39>**

Description	TDT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS39>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS40></PS40>**

Description	TDT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS40>
Data Value	Type: Integer Unit: ms Range: 5 s to 120 s Default: 30000 ms

**<PS41></PS41>**

Description	TOT minimum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS41>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS42></PS42>**

Description	TOT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS42>
Data Value	Type: Integer Unit: ms Range: 5 s to 120 s Default: 30000 ms

**<PS43></PS43>**

Description	BAT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS43>
Data Value	Type: Numeral Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS44></PS44>**

Description	BAT maximum subtable repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS44>
Data Value	Type: Integer Unit: ms Range: 2 s to 50 s Default: 10000 ms

**<PS46></PS46>**

Description	STT maximum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS46>
Data Value	Type: Numeral Unit: ms Range: 0.25 s to 60 s Default: 1000 ms

**<PS47></PS47>**

Description	MGT maximum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS47>
Data Value	Type: Numeral Unit: ms Range: 50 ms to 2000 ms Default: 150 ms

**<PS48></PS48>**

Description	VCT maximum subtable repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS48>
Data Value	Type: Numeral Unit: ms Range: 50 ms to 3000 ms Default: 400 ms

**<PS49></PS49>**

Description	RRT maximum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS49>
Data Value	Type: Integer Unit: ms Range: 5 s to 120 s Default: 60000 ms

**<PS50></PS50>**

Description	ATSC EIT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS50>
Data Value	Type: Integer Unit: ms Range: 50 ms to 20 s Default: 500 ms

**<PS52></PS52>**

Description	ATSC ETT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS52>
Data Value	Type: Integer Unit: ms Range: 50 ms to 20 s Default: 500 ms

**<PS54></PS54>**

Description	MIP maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS54>
Data Value	Type: Integer Unit: ms Range: 0.5 s to 3.0 s Default: 1500 ms

**<PS57></PS57>**

Description	PID reference transition time.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS57>
Data Value	Type: Integer Unit: ms Range: 0.2 s to 5.0 s Default: 1000 ms

**<PS62></PS62>**

Description	TSDT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS62>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS69></PS69>**

Description	PCAT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS69>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS71></PS71>**

Description	SDTT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS71>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS73></PS73>**

Description	BIT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS73>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS75></PS75>**

Description	NBIT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS75>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 20000 ms

**<PS77></PS77>**

Description	NBIT_LINK_INFO maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS77>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS79></PS79>**

Description	LDT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS79>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 20000 ms

**<PS81></PS81>**

Description	LIT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS81>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms



**<PS83></PS83>**

Description	ERT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS83>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS85></PS85>**

Description	ITT maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS85>
Data Value	Type: Integer Unit: ms Range: 1 s to 30 s Default: 10000 ms

**<PS86></PS86>**

Description	SDTT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS86>
Data Value	Type: Integer Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS87></PS87>**

Description	BIT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS87>
Data Value	Type: Integer Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS88></PS88>**

Description	NBIT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS88>
Data Value	Type: Integer Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS89></PS89>**

Description	NBIT_LINK_INFO minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS89>
Data Value	Type: Integer Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS90></PS90>**

Description	LDT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS90>
Data Value	Type: Integer Unit: ms Range: 10 ms to 100 ms Default: 25 ms

**<PS91></PS91>**

Description	VCT maximum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS91>
Data Value	Type: Integer Unit: ms Range: 999999.999 s to 9999999.999 s Default: 5000000000 ms

**<PS93></PS93>**

Description	AIT minimum section repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <!-- Stream Interval Parameters --> → <PS93>
Data Value	Type: Integer Unit: ms Range: 1 s to 100 s Default: 10000 ms

## Template Parameters

**<PS56></PS56>**

Description	Container for Service Information Templates.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56>
Child Elements	<TransportStreamId>, <NetworkId>, <OriginalNetworkId>, <OtherServicesAllowed>, <ServiceList>

**<TransportStreamId></TransportStreamId>**

Description	Match with DVB transport_stream_id in the PAT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <TransportStreamId>
Data Value	Type: Integer

**<NetworkId></NetworkId>**

Description	Match with the DVB network_identity in the NIT. Must be omitted for ATSC operation.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <NetworkId>

**<OriginalNetworkId></OriginalNetworkId>**

Description	Match with DVB original_network_id for the actual transport stream in the NIT. Must be omitted for ATSC operation.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <OriginalNetworkId>

**<OtherServicesAllowed></OtherServicesAllowed>**

Description	
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <OtherServicesAllowed>
Data Value	Type: Boolean Value: 0 - Disabled 1 - Enabled

**<ServiceList Update=" " ></ServiceList>**

Description	Container for all Service settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate>
Child Element	<Service>

**<Service Number=" " ></Service>**

Description	Container for individual Service settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service>
Attribute	Number: Service identifier
Child Elements	<Constraint>, <ServiceType>, <ServiceName>, <PCRPID>, <OtherPIDsAllowed>, <PIDList>, <RatingList>

**<Constraint></Constraint>**

Description	Specifies whether this service must be present, may be present or must not be present in the PAT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <Constraint>
Data Value	Type: Integer Values: 0 = Must be present 1 = May be present 2 = Must not be present

**<ServiceType></ServiceType>**

Description	DVB: Match against service_type in SDT service_descriptor, ATSC: Match against service_type in VCT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <ServiceType>
Data Value	Type: Integer

**<ServiceName></ServiceName>**

Description	DVB: Match against service_name in SDT service_descriptor, ATSC: Match against short_name in the VCT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <ServiceName>
Data Value	Type: Text Example: BBC 1

**<PCRPID></PCRPID>**

Description	Match against PCR PID for this service in the PMT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PCRPID>
Data Value	Type: Integer

**<OtherPIDsAllowed></OtherPIDsAllowed>**

Description	Specifies whether any pids other than those specified in the PID list (see below) are allowed to be present for this service.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <OtherPIDsAllowed>
Data Value	Type: Boolean

**<PIDList Update=" " ><PIDList>**

Description	Container for all PID settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList>
Child Element	<PID>

**<PID Number=" " ></PID>**

Description	Container for individual PID settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList> → <PID>
Attribute	Number: PID identifier
Child Elements	<Constraint>, <StreamType>, <CADescriptorPresent>, <IsScrambled>

**<Constraint></Constraint>**

Description	Specifies whether this PID must be present, may be present or must not be present for this service within the PMT. (This is not a test to check whether this PID is being transmitted.)
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList> → <PID> → <Constraint>
Data Value	Type: Integer Values: 0 = Must be present 1 = May be present 2 = Must not be present

**<StreamType></StreamType>**

Description	Match against stream_type in the PMT.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList> → <PID> → <StreamType>
Data Value	Type: Integer

**<CADescriptorPresent></CADescriptorPresent>**

Description	Specifies whether the CA_descriptor should be present in the PMT for this service, either in the per-program descriptor loop, or in the descriptor loop for this PID.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList> → <PID> → <CADescriptorPresent>
Data Value	Type: Boolean

**<IsScrambled></IsScrambled>**

Description	Match against the scrambled state of this PID.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <PIDList> → <PID> → <IsScrambled>
Data Value	Type: Boolean

**<RatingList></RatingList>**

Description	Container for all Rating Lists.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList>
Child Elements	<DVBRatingList>, <ATSCRatingList>

**<DVBRatingList Update=" " ></DVBRatingList>**

Description	Container for all DVB Rating Templates.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <DVBRatingList>
Child Element	<DVBRatingTemplate>

**<DVBRatingTemplate Country=" " ></DVBRatingTemplate>**

Description	Container for all DVB country-specific ratings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <DVBRatingList> → <DVBRatingTemplate>
Attribute	Country: The country_code from the parental_rating_descriptor in the EIT present table for this service. For example: FRA.
Child Element	<DVBAcceptableValues>

**<DVBAcceptableValues></DVBAcceptableValues>**

Description	Container for all DVB country-specific acceptable values.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <DVBRatingList> → <DVBRatingTemplate> → <DVBAcceptableValues>
Child Element	<DVBRatingValue>

**<DVBRatingValue></DVBRatingValue>**

Description	
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <DVBRatingList> → <DVBRatingTemplate> → <DVBAcceptableValues> → <DVBRatingValue>

**<ATSCRatingList Update=" " ></ATSCRatingList>**

Description	Container for all ATSC Rating Lists.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <ATSCRatingList>
Child Element	<ATSCRatingTemplate>



**<ATSCRatingTemplate Region=" " ></ATSCRatingTemplate>**

Description	Container for all ATSC country-specific ratings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <ATSCRatingList> → <ATSCRatingTemplate>
Attribute	Region: rating_region from the country_advisory_descriptor.
Child Element	<ATSCAcceptableValues>

**<ATSCAcceptableValues></ATSCAcceptableValues>**

Description	Container for all ATSC country-specific acceptable values.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <ATSCRatingList> → <ATSCRatingTemplate> → <ATSCAcceptableValues>
Attribute	None
Child Element	<ATSCRatingValue>

**<ATSCRatingValue></ATSCRatingValue>**

Description	
Path	<MTM400Configuration> → <Streams> → <Stream> → <PS56> → <ServiceListUpdate> → <Service> → <RatingList> → <ATSCRatingList> → <ATSCRatingTemplate> → <ATSCAcceptableValues> → <ATSCRatingValue>

## PIDs Parameters

### <PIDS></PIDS>

Description	A container for all individual PID settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDS>
Child Element	<PID>

### <PP1></PP1>

Description	PID bit rate bin count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP1>
Data Value	Type: Integer Range: 1 to 60 Default: 10

### <PP2></PP2>

Description	PCR maximum repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP2>
Data Value	Type: Integer Unit: ms Range: 10 ms to 500 ms Default: 40 ms

### <PP3></PP3>

Description	Maximum PCR discontinuity.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP3>
Data Value	Type: Integer Unit: ms Range: 10 ms to 1000 ms Default: 100 ms

**<PP4></PP4>**

Description	Maximum PCR accuracy error.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP4>
Data Value	Type: Integer Unit: ns Range: 100 ns to 10000 ns Default: 500 ns

**<PP5></PP5>**

Description	Maximum PTS repetition interval.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDS> → <PID> → <PP5>
Data Value	Type: Integer Unit: ms Range: 100 ms to 5000 ms Default: 700 ms

**<PP6></PP6>**

Description	Minimum PID bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP6>
Data Value	Type: Integer Unit: bps Range: 0 bps to 300 Mbps Default: 0

**<PP7></PP7>**

Description	Maximum PID bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP7>
Data Value	Type: Integer Unit: bps Range: 0 bps to 4294967295 bps Default: 1

**<PP8></PP8>**

Description	Bit rate variability period.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP8>
Data Value	Type: Integer Range: 2 to 30 Default: 10

**<PP9></PP9>**

Description	Bit rate variability fraction.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP9>
Data Value	Type: Integer Range: 0 to 1 Default: 0.25

**<PP11></PP11>**

Description	Maximum PCR overall jitter.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP11>
Data Value	Type: Boolean Unit: ns Values: 250 ns to 250000 ns Default: 25000 ns

**<PP12></PP12>**

Description	Maximum PCR frequency offset.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP12>
Data Value	Type: Integer Unit: Hz Range: 200 Hz to 10 kHz Default: 800 Hz

**<PP13></PP13>**

Description	Maximum PCR frequency drift rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP13>
Data Value	Type: Integer Range: 10 to 600 Default: 75

**<PP14></PP14>**

Description	PCR frequency drift rate integration count.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PP14>
Data Value	Type: Integer Range: 1 to 250 Default: 25

## PID Groups Parameters

**<PIDGroups><PIDGroups>**

Description	Container for all PID Group settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups>
Attribute	Update: Indicates that existing settings should be either completely replaced ( <i>Absolute</i> ) or supplemented ( <i>Incremental</i> ).
Child Element	<PIDGroup>

**<PIDGroup Number=" " ><PIDGroup>**

Description	Container for individual PID Group settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups> → <PIDGroup>
Attribute	Number: Unique PID group number. For example: 1.
Child Elements	<Name>, <PG1>, <PG3>, <PG3>

**<Name></Name>**

Description	PID Group name.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups> → <PIDGroup> → <Name>
Data Value	Type: Text Range: 20 characters max. Example: Radio 1 Audio Pids

**<PG1></PG1>**

Description	A list of PIDs in the group.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups> → <PIDGroup> → <PG1>
Data Value	Type: Space separated integers Example: 1 16 345 789 1010 1344 2040 8190

**<PG2></PG2>**

Description	Minimum group bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups> → <PIDGroup> → <PG2>
Data Value	Type: Integer Unit: bps Range: 0 bps to 155 Mbps

**<PG3></PG3>**

Description	Maximum group bit rate.
Path	<MTM400Configuration> → <Streams> → <Stream> → <PIDGroups> → <PIDGroup> → <PG3>
Data Value	Type: Integer Unit: bps Range: 0 bps to 4294967295 bps

## Events Parameters

### <Events Update=" " ><Events>

Description	Container for all Event settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <Events>
Attribute	Update: Indicates that existing settings should be either completely replaced (Absolute) or supplemented (Incremental).
Child Element	<Event>

### <Event ID=" " ><Event>

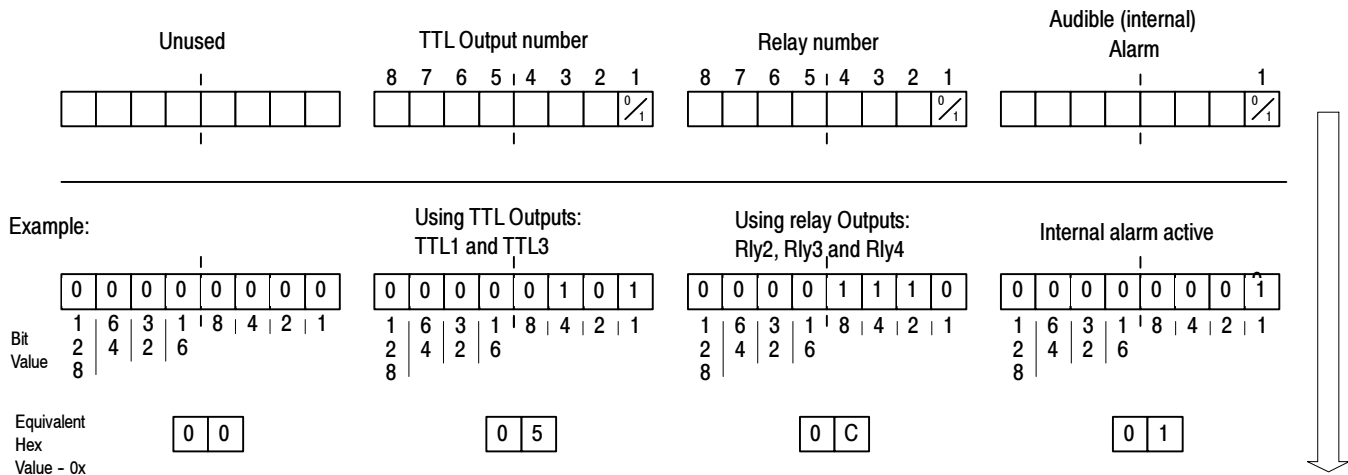
Description	Container for individual Event settings.
Path	<MTM400Configuration> → <Streams> → <Stream> → <Events> → <Event>
Attribute	ID: Unique event identity. Hex number format. For example: 0x1000.
Child Elements	<Enabled>, <AlarmSetting>

### <Enabled></Enabled>

Description	Alarm enabled/disabled. The event may still be logged even when disabled.
Path	<MTM400Configuration> → <Streams> → <Stream> → <Events> → <Event> → <Enabled>
Data Value	Type: Boolean Values: 0 = Disabled 1 = Enabled

**<AlarmSetting></AlarmSetting>**

Description	The Event Alarm Setting element uses a bit mask. A bit mask is a pattern of binary values, each of which is equivalent to a particular alarm output. The 32-bit bit mask, which can represent all of the available alarm outputs, is reduced to a four byte hex value; this is the value that is used in <AlarmSetting>.
Path	<MTM400Configuration> → <Streams> → <Stream> → <Events> → <Event> → <AlarmSetting>



<AlarmSetting>0x00050C01</AlarmSetting>

**Figure 3- 1: Alarm settings**



## Service Log Parameters

### <ServiceLog></ServiceLog>

Description	Container for Service Log settings.
Path	<MTM400Configuration> ' <Streams> ' <Stream> ' <ServiceLog>
Child Element	<PIDs>

### <PIDS></PIDS>

Description	A list of PIDs in the group.
Path	<MTM400Configuration> ' <Streams> ' <Stream> ' <ServiceLog> ' <PIDS>
Data Value	Type: Space separated integers Example: 1 16 345 789 1010 1344 2040 8190

## Example Configuration File

```

<?xml version="1.0" encoding="UTF-8"?>
<MTM400Configuration Name = "Telefonica_SubtableRepetitionTest"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="config.xsd">
  <Streams>
    <Stream Number="1">
      <PI1>1</PI1>
      <LBand Update = "Incremental" Selection = "Default">
        <LBandSettings Name = "Default">
          <OscillatorFrequency>10600000</OscillatorFrequency>
          <TransponderFrequency>11837000</TransponderFrequency>
          <PolarVolts>0</PolarVolts>
          <SymbolRate>27500000</SymbolRate>
          <ViterbiRate>2</ViterbiRate>
          <ViterbiRateAuto>1</ViterbiRateAuto>
          <Tone22K>0</Tone22K>
          <InvertSpectrum>1</InvertSpectrum>
        </LBandSettings>
      </LBand>
      <Qam Update = "Incremental" Selection = "QamADefault">
        <QamSettings Name = "QamADefault">
          <Frequency>474000000</Frequency>
          <SymbolRate>7000000</SymbolRate>
          <TwoLoFrequency>43125000</TwoLoFrequency>
          <Constellation>2</Constellation>
          <Inversion>1</Inversion>
        </QamSettings>
      </Qam>
      <BroadcastStandard>1</BroadcastStandard>
      <DvbRegion>0</DvbRegion>
      <TmccAcquisition>1</TmccAcquisition>
      <MpeAcquisition>0</MpeAcquisition>
      <ResetEventsOnSyncAcquired>0</ResetEventsOnSyncAcquired>
      <MonitorRepetitionRates>0</MonitorRepetitionRates>
      <PcrAccuracyMode>1</PcrAccuracyMode>
      <OS1>60000</OS1>

      <!-- Stream Miscellaneous Parameters -->
      <PS58>sh117</PS58>
      <PS60>0</PS60>

      <!-- Stream Integer Parameters -->
      <PS2>64000</PS2>
      <PS3>155000000</PS3>
      <PS5>1</PS5>
      <PS6>10</PS6>
      <PS7>32</PS7>
    </Stream>
  </Streams>
</MTM400Configuration>

```

```
<PS10>25</PS10>
<PS11>32</PS11>
<PS12>256</PS12>
<PS16>25</PS16>
<PS19>25</PS19>
<PS22>25</PS22>
<PS25>25</PS25>
<PS28>25</PS28>
<PS31>25</PS31>
<PS34>25</PS34>
<PS37>25</PS37>
<PS45>25</PS45>
<PS51>25</PS51>
<PS53>25</PS53>
<PS55>300</PS55>
<PS59>64000</PS59>
<PS61>25</PS61>
<PS63>25</PS63>
<PS64>25</PS64>
<PS65>25</PS65>
<PS66>25</PS66>
<PS68>25</PS68>
<PS70>25</PS70>
<PS72>25</PS72>
<PS74>25</PS74>
<PS76>25</PS76>
<PS78>25</PS78>
<PS80>25</PS80>
<PS82>25</PS82>
<PS84>25</PS84>
<PS92>10</PS92>
```

```
<!-- Stream Interval Parameters -->
```

```
<PS1>1000</PS1>
<PS4>100</PS4>
<PS8>530</PS8>
<PS9>500</PS9>
<PS13>10000</PS13>
<PS14>50</PS14>
<PS15>6700</PS15>
<PS17>25</PS17>
<PS18>10000</PS18>
<PS20>50</PS20>
<PS21>1700</PS21>
<PS23>25</PS23>
<PS24>10000</PS24>
<PS26>25</PS26>
```

```
<PS27>2100</PS27>
<PS29>25</PS29>
<PS30>10000</PS30>
<PS32>25</PS32>
<PS33>10000</PS33>
<PS35>25</PS35>
<PS36>10000</PS36>
<PS38>25</PS38>
<PS39>50</PS39>
<PS40>30100</PS40>
<PS41>50</PS41>
<PS42>31000</PS42>
<PS43>50</PS43>
<PS44>9000</PS44>
<PS46>1000</PS46>
<PS47>150</PS47>
<PS48>400</PS48>
<PS49>60000</PS49>
<PS50>500</PS50>
<PS52>500</PS52>
<PS54>1500</PS54>
<PS57>1000</PS57>
<PS62>10000</PS62>
<PS69>10000</PS69>
<PS71>10000</PS71>
<PS73>10000</PS73>
<PS75>20000</PS75>
<PS77>10000</PS77>
<PS79>20000</PS79>
<PS81>10000</PS81>
<PS83>10000</PS83>
<PS85>10000</PS85>
<PS86>25</PS86>
<PS87>25</PS87>
<PS88>25</PS88>
<PS89>25</PS89>
<PS90>25</PS90>
<PS91>999999999</PS91>
<PS93>10000</PS93>

<!-- Program Integer Default Parameters -->
<PV1>0</PV1>
<PV2>4294967295</PV2>
<PV3>1</PV3>

<!-- Pid Group Integer Default Parameters -->
<PG2>0</PG2>
<PG3>4294967295</PG3>
```

```

<!-- Pid Integer Default Parameters -->
<PP1>1</PP1>
<PP4>500</PP4>
<PP6>0</PP6>
<PP7>4294967295</PP7>
<PP8>10</PP8>
<PP11>25000</PP11>
<PP12>400</PP12>
<PP13>75</PP13>
<PP14>25</PP14>
<OP1>0</OP1>

<!-- Pid Interval Default Parameters -->
<PP2>40</PP2>
<PP3>100</PP3>
<PP5>700</PP5>

<!-- Pid Other Parameters -->
<PP9>0.000000</PP9>

<PS56>
</PS56>
<PIDS Update = "Incremental">
  <PID Number="0" ForcePresence="0">
    <DisabledEvents>0x3017 0x3028 0x3045 0x3117 0x3728</DisabledEvents>
  </PID>
  <PID Number="110" ForcePresence="0">
    <PP6>576000</PP6>
    <PP7>8513779</PP7>
  </PID>
</PIDS>
<Events Update = "Incremental">
  <Event ID="0x1000">
    <Enabled>1</Enabled>
    <AlarmSetting>0x0</AlarmSetting>
  </Event>
  (Events cut for brevity)
  <Event ID="0x6fff">
    <Enabled>1</Enabled>
    <AlarmSetting>0x0</AlarmSetting>
  </Event>
</Events>
<ServiceLog>
  <PIDS></PIDS>
</ServiceLog>
</Stream>
</Streams>
</MTM400Configuration>

```



**WARNING**

***The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all safety summaries before performing any service.***







# **Hardware Maintenance**



# Hardware Maintenance

This section describes the general care and service procedures for the MTM400 MPEG Transport Stream Monitor and includes the following subsections:

- *Preventive Maintenance* provides cleaning instructions.
- *Rack Mounting* provides instructions for installing the unit in a 19-inch equipment rack.
- *Removing and Replacing an Interface Board* provides instructions for adding an Interface board to the unit.
- *Battery Maintenance* provides instructions for replacing the batteries.
- *Repacking for Shipment* provides instructions for packing and shipping the MTM400 MPEG Transport Stream Monitor.

## Preventive Maintenance

Protect the unit from adverse weather conditions. The unit is not waterproof.



---

**CAUTION.** *To avoid damage to the unit, do not expose it to sprays, liquids or solvents.*

*Do not use chemical cleaning agents; they may damage the instrument. Avoid chemicals that contain benzene, toluene, xylene, acetone or similar solvents.*

---

Preventive maintenance mainly consists of periodic cleaning. The unit should be cleaned as needed based on the operating environment.

### Cleaning the Exterior

Clean the exterior surfaces of the instrument with a dry, lint-free cloth or a soft-bristle brush. If dirt remains, use a cloth or swab dampened with a 75% isopropyl alcohol solution. A swab is useful for cleaning in narrow spaces around the connectors. Do not use abrasive compounds on any part of the unit.



---

**CAUTION.** *Avoid getting moisture inside the unit during external cleaning. Use only enough cleaning solution to dampen the cloth or swab. Use a 75% isopropyl alcohol solution as a cleanser. To rinse repeat the same process using a cloth dampened with de-ionized water.*

---

## Rack Mounting



---

**CAUTION.** Efficient cooling will be maintained in a rack-mounted unit if the air temperature at all intake air vents (inside the rack) does not exceed 40 °C.

---



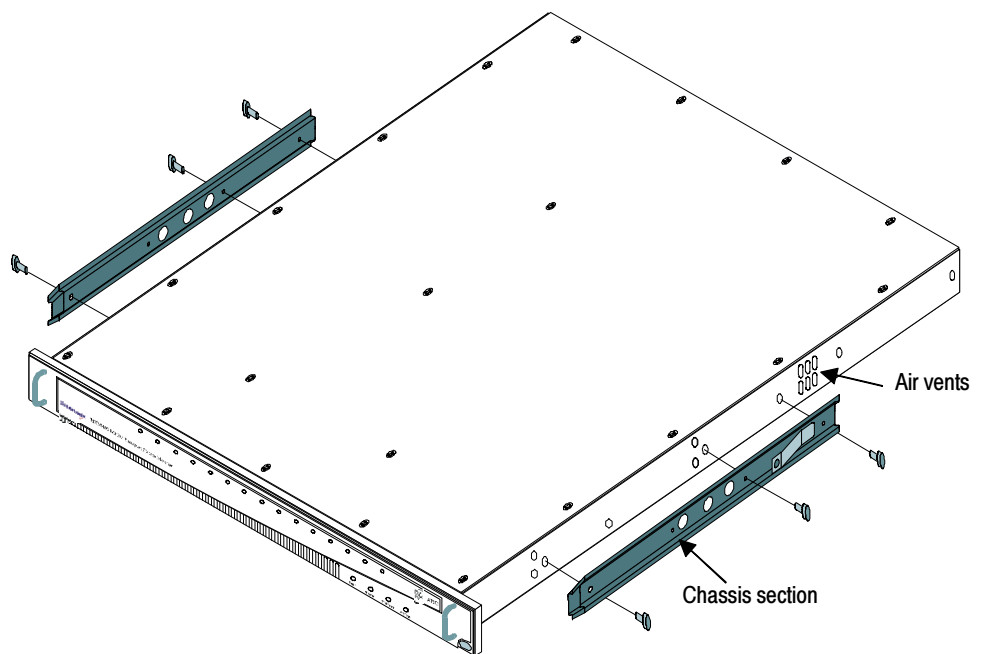
---

**WARNING.** To avoid fire hazard, the MTM400 must be installed in the rack only as specified, and proper ventilation must be maintained.

---

The MTM400 can be mounted in a standard 19-inch equipment rack.

The chassis components of the rack slides are attached during manufacture as shown in the diagram below:



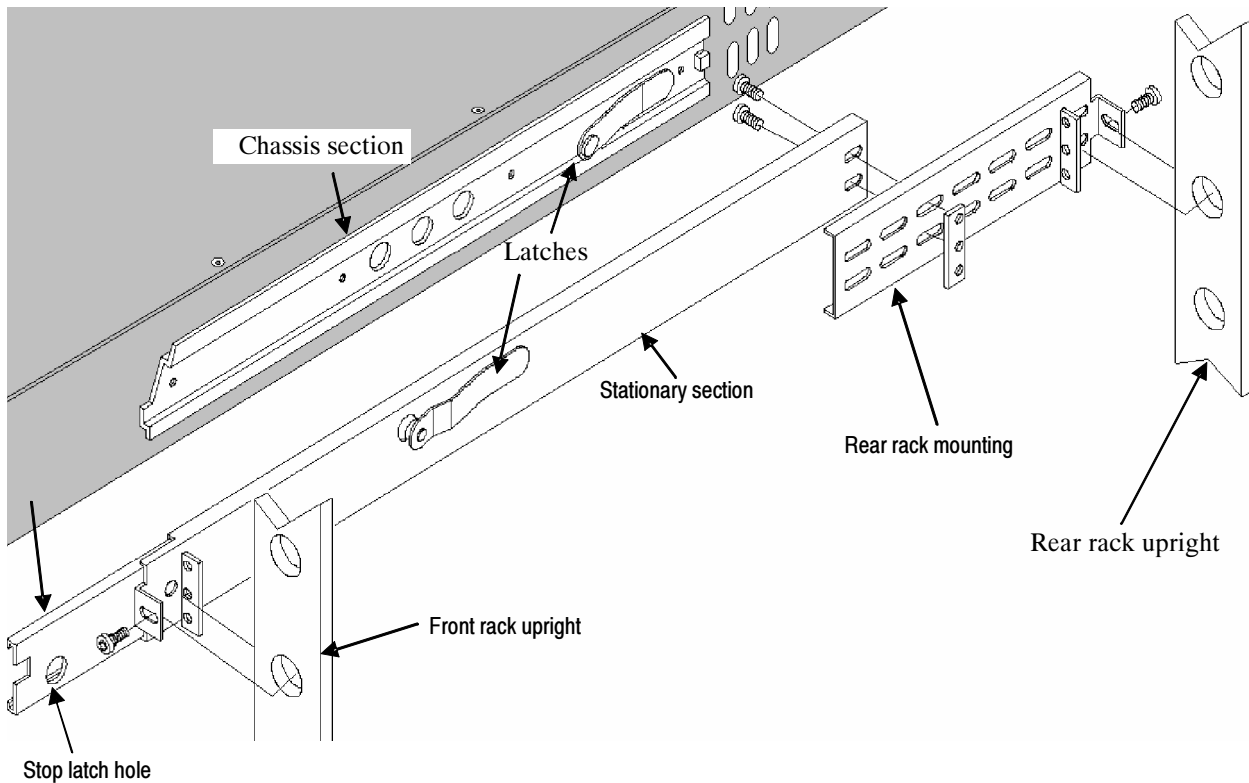
**Figure 4- 1: Chassis section rack slides**



---

**CAUTION.** If the right slide (shown) is replaced for any reason, it must not obstruct the adjacent air vents.

---



**Figure 4-2: Rack mounted sections**

The Chassis section is already installed on the unit. The position of the rear rack mounting can be adjusted to suit the depth of the rack. Approximately six inches of clearance is required between the rear panel of the unit and any rear cabinet panel to allow for connector space and adequate air circulation.

### Installing the MTM400 Unit

Refer to Figure 4-3 to install the unit in the rack.

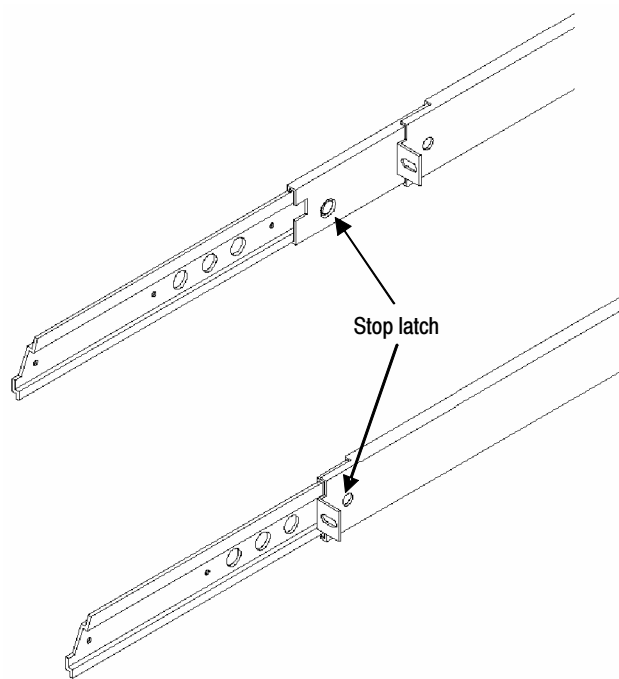
1. Pull the slide-out track section to the fully extended position.
2. Insert the MTM400 chassis sections into the slide-out sections.
3. Press the stop latches and push the unit toward the rack until the latches snap into their holes.
4. Press the stop latches again and push the unit fully into the rack.
5. Tighten the front panel retaining screw.

### Removing the MTM400 Unit

Refer to Figure 4-3 to remove the unit from the rack.

1. Loosen the front panel retaining screw and pull the unit out until the stop latches snap into the holes.
2. Press the stop latches and remove the unit.

When removing the unit from the rack, be sure to disconnect all cabling.



**Figure 4-3: Installing or removing the rack slides**

### Rack Adjustments

After installation, if the slide tracks are not properly adjusted, they may bind. To adjust the tracks, slide the instrument out about 10 inches, slightly loosen the screws holding the tracks to the front rails, and allow the tracks to seek an unbound position. Retighten the screws and check the tracks for smooth operation by sliding the instrument in and out of the rack several times.

Once the instrument is in place within the rack, tighten the knurled retaining screw to fasten it securely into the rack.

### Rack Slide Maintenance

The slide-out tracks do not require lubrication. The dark gray finish on the tracks is a permanent, lubricated coating.

## Removing and Replacing an Interface Board

The following procedure describes how to access and replace an Interface board.

A range of interface boards is available for the MTM400; contact Tektronix for a full list of those available. The principles involved in removing and replacing an interface board is similar; any differences in the procedure are indicated in the following paragraphs.



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**WARNING.** *To avoid personal injury or damage to the unit do not operate without covers.*

*Disconnect power to the unit before removing the covers or panels.*

*Do not operate this product with covers or panels removed.*

---



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**CAUTION.** *Only qualified personnel should perform this procedure. Read the Service Safety Summary and the General Safety Summary before performing this procedure.*

---

The following tools are recommended when removing and replacing MTM400 Interface board.

- An anti-static wrist-strap for safe handling of components containing static sensitive devices. It is advisable to wear the wrist-strap for all MTM400 maintenance activity.
- A screwdriver with T10, T15, and T20 TORX tips to remove the unit cover and module mounting screws

All connectors are polarized; they will only fit into their respective socket in one way. Do not use unnecessary force.

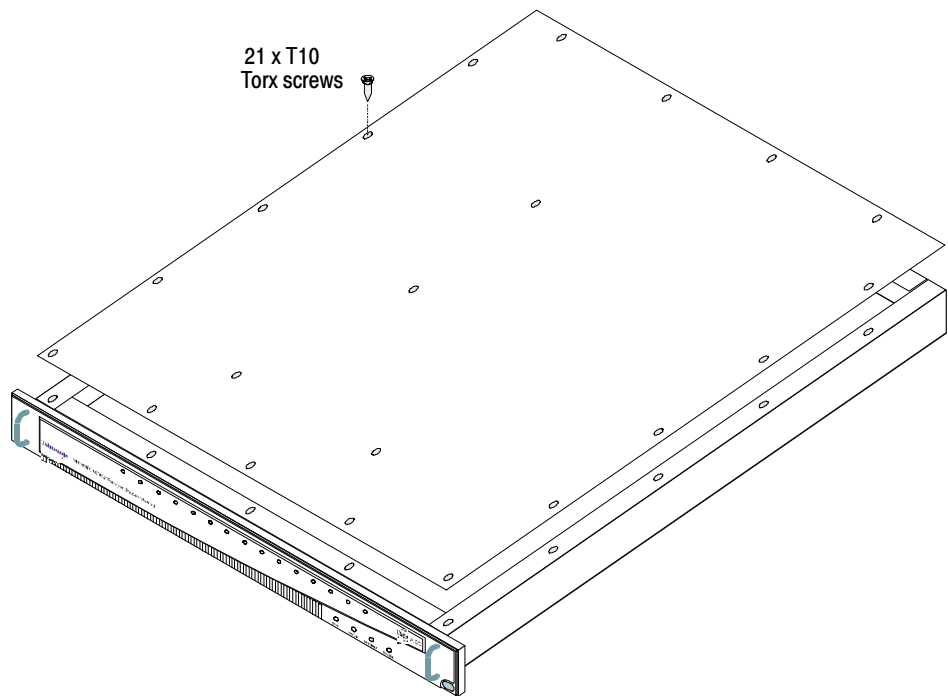
### Accessing the Components

To access the replaceable components, the MTM400 must be disconnected and removed to a suitable working area.

**Remove the Cover**

The unit cover is held in position by 21 x T10 Torx screws.

1. Remove and retain the 21 cover retaining screws.
2. Lift the cover clear of the unit.



**Figure 4- 4: Removing the cover**

**Remove the Existing Interface Board**

The Interface board is mounted on the right side of the MTM400 unit when viewed from the front (see Figure 4-5).



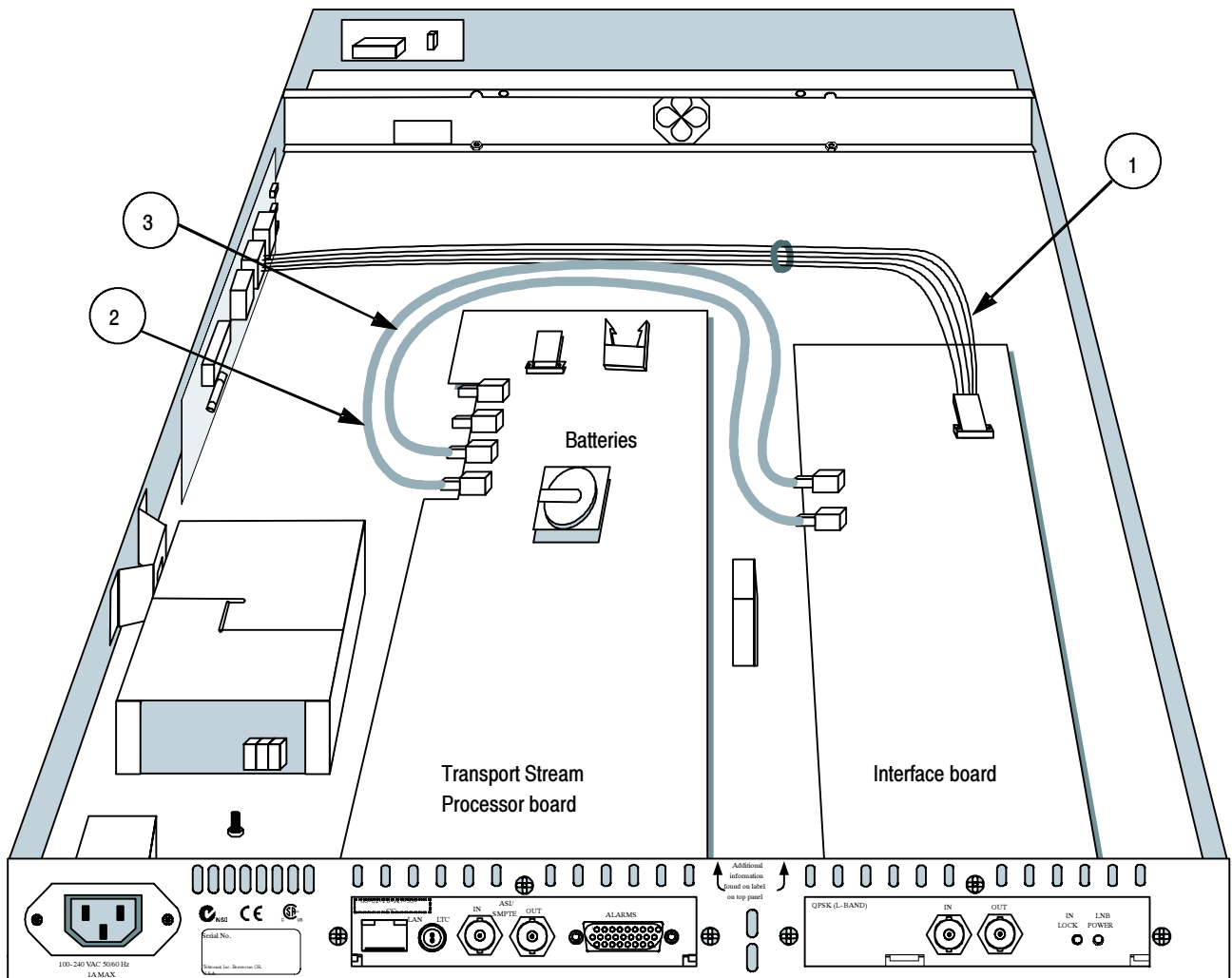
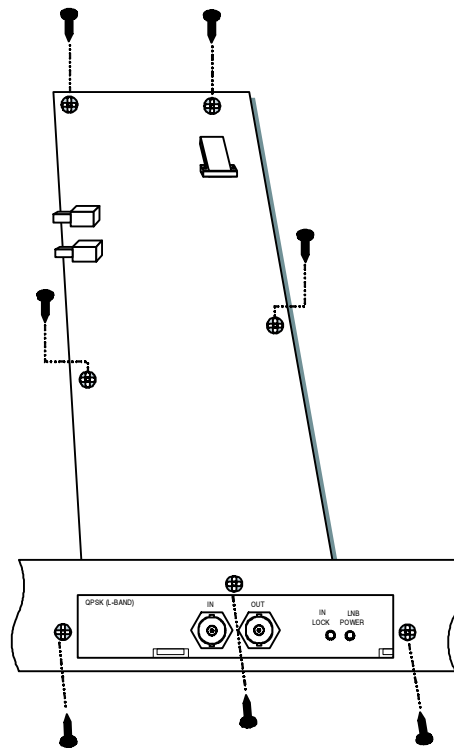


Figure 4-5: Interface board position and connections

Table 4-1: Interface board connections

Key	From Interface board	To	Function
1	Connector Identity: P1 8 wires	Power Distribution board Connector Identity: J7 8-way wire	Power
2	Connector Identity: O/P Miniature coaxial	TS Processor board Connector Identity: I/P A Miniature coaxial	Data (serializer)
3	Connector Identity: I/P Miniature coaxial	TS Processor board Connector Identity: O/P A Miniature coaxial	Data (serializer)

3. Remove the Interface board by performing the following steps:
  - a. Remove the four screws in the body of the board (see Figure 4-6).
  - b. Remove the three screws which secure the end-plate to the rear panel.
  - c. Remove the three connectors mounted on the board (excluding the rear panel connectors). Refer to Table 4-1.
  - d. Lift the board out of the MTM400 unit.



**Figure 4-6: Interface board mounting**

**Install the Interface Board**

4. If an interface board has not been previously installed in the unit, a blank cover is fitted in the rear panel. Before installing the board, undo the three retaining screws and remove the blank cover.
5. Place the Interface board in the unit.
6. Line up the mounting points and replace the seven retaining screws (four on the board, three in the rear panel).
7. Reconnect the connectors (refer to Table 4-1).

**Replace the Cover**

8. Before replacing the cover, ensure that all components are in place and that all connections are secure.
9. Replace the 21 cover retaining screws and tighten them uniformly.

**Select the Interface**

10. The Interface board will be detected and initialized when the MTM400 unit is switched on. Before the Interface board can be used, it must be selected through the user interface and an input provided.

Refer to the *MTM400 MPEG Transport Stream Monitor User Manual* for instructions on how to configure the Interface board using the Stream Configuration dialog.

## Battery Maintenance

The MTM400 unit uses a pair of Lithium batteries to provide power to the backup circuits when mains power is off. Under normal circumstances, the shelf life of the batteries is in excess of five years.

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**NOTE.** *The following precautions must be observed when replacing and handling the batteries:*

- *Batteries must only be replaced with the correct Tektronix part (refer to Table 1-14 on page 1-7).*
  - *Both batteries must always be replaced.*
  - *Batteries must be disposed of in accordance with local regulations.*
- 

### Replacing the Batteries

The batteries are mounted on the Transport Stream Processor board (see Figure 4-5 on page 4-7). It is only necessary to remove the top panel to gain access to the batteries.



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**WARNING.** *To avoid personal injury or damage to the unit do not operate without covers.*

*Disconnect power to the unit before removing the covers or panels.*

*Do not operate this product with covers or panels removed.*

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**CAUTION.** *Only qualified personnel should perform this procedure. Read the Service Safety Summary and the General Safety Summary before performing this procedure.*

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**NOTE.** *When the batteries are exhausted or removed, all configuration information will be lost, including the network address. The network installation procedure will have to be repeated (refer to Network Installation in the MTM400 MPEG Transport Stream Monitor User Manual).*

*It is also recommended that you save the configuration information to a storage slot, since this will also be lost. Refer to the MTM400 MPEG Transport Stream Monitor User Manual for instructions on how to save the configuration settings.*

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Perform the following steps to replace the batteries:

1. Remove the top panel (refer to *Remove the Cover* on page 4-6).
2. The batteries are held in a battery holder by a metal clip on the Transport Stream Processor board (see Figure 4-5 on page 4-7). Slide the batteries out of the holder.



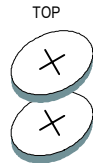
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**CAUTION.** *Dispose of the batteries in accordance with local regulations.*

*Use only the specified battery (refer to Table 1-14 on page 1-7).*

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3. Replace the batteries. The positive symbol (+) should be on top as shown below.



4. Before replacing the cover, ensure that all components are in place and that all connections are secure.
5. Replace the 21 cover retaining screws and tighten them uniformly.
6. Reconnect the unit and apply power (refer to *Electrical Installation* in the *MTM400 MPEG Transport Stream Monitor User Manual*).
7. Reinststate the network identity of the unit (refer to *Network Installation* in the *MTM400 MPEG Transport Stream Monitor User Manual*).
8. If required, reinststate the configuration information. Refer to the *MTM400 MPEG Transport Stream Monitor User Manual* for instructions on how to restore the configuration settings.

## Repacking for Shipment

If an instrument is to be shipped to a Tektronix field office for repair, attach a tag to the instrument showing the following:

- Owner's name and address
- Serial number
- Description of the problem(s) encountered and/or service required.

The MTM400 MPEG Transport Stream Monitor is shipped in cartons designed to provide it with the maximum protection. If you ship the instrument subsequently, you will need to use these cartons, the spacer pads, the protective bag, and the instrument support inserts to provide adequate protection.



**CAUTION.** *Tektronix cannot honor the instrument's warranties if the MTM400 arrives at the service center in a damaged condition. The unit must be packed in its original carton (and its supporting packaging material) or in such a way as to provide similar protection.*

*To prevent the loss of your instrument's warranties, Tektronix strongly recommends that you use an MTM400 MPEG Transport Stream Monitor shipping carton (that is in good condition) when you ship your instrument to another location or when you return the instrument to a Tektronix service center for repair.*

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New packaging material is available from Tektronix. To obtain these items, contact your nearest Tektronix office or representative.



# Glossary





# Glossary

**Program and Service:** In this manual the terms program and service are interchangeable.

**Accuracy**

The closeness of the indicated value to the true value.

**ARIB**

Association of Radio Industries and Businesses

**ASI**

Asynchronous Serial Interface

**ATSC**

Advanced Television Systems Committee

**BAT**

Bouquet Association Table

**BER**

Bit Error Rate

**CAT**

Conditional Access Table

**CRC**

Cyclic Redundancy Check

**CSV**

Comma Separated Values

**CVCT**

Cable Virtual Channel Table

**DNS**

Domain Name Server

**DVB**

Digital Video Broadcasting

**EIT**

Event Information Table

**EMM**

Entitlement Management Message

**ETT**

Extended Text Table

**EVM**

Error Vector Magnitude

**GMT**

Greenwich Meantime

**GPSI**

General Purpose Serial Interface

**IIP**

ISDB-T Information Packet

**ISA**

Integrated Systems Architecture

**ISDB**

Integrated Services Digital Broadcasting

**LNB**

Low Noise Block

**MER**

Modulation Error Ratio

**MGT**

Master Guide Table

**MHEG**

Multimedia and Hypermedia Experts Group

**MPEG**

Moving Picture Experts Group

**NIT**

Network Information Table

**PAT**

Program Association Table

**PCI**

Peripheral Component Interconnect

**PCR**

Program Clock Reference

**PID**

Packet Identifier

**PMT**

Program Map Table

**PSIP**

Program and System Information Protocol (ATSC)

**PTS**

Presentation Time Stamp

**QAM**

Quadrature Amplitude Modulation

**QPSK**Quaternary Phase-Shift Keying  
(also known as Quadrature Phase-Shift Keying)**RRT**

Rating Region Table

**RTM**

Real-Time Monitor

**RUI**

Remote User Interface

**SDT**

Service Description Table

**SI**

Service Information (DVB)

**SMC**

Sub Miniature Connector

**SMPTE**

Society of Motion Picture and Television Engineers

**SNMP**

Simple Network Management Protocol

**SSI**

Synchronous Serial Interface

**STT**

System Time Table

**TEF**

Transport Error Flag

**TMCC**

Transmission and Multiplexing Configuration Control (ISDB-S)

**TOT**

Time Offset Table

**TSDT**

Transport Streams Description Table

**TVCT**

Terrestrial Virtual Channel Table

**TVRO**

Television Receive Only

**UTC**

Coordinated Universal Time

**VCT**

Virtual Channel Table

**XML**

Extensible Markup Language