Instructions

Tektronix

Signal Interface Hardware Upgrades for MTM400 MPEG Transport Stream Monitor

075-0768-05

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- Worldwide, visit www.tektronix.com to find contacts in your area.

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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 grounded through the grounding conductor of the 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 tot he 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:

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

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

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 Tektronix approved components when servicing the unit.

MTM400 Signal Interface Hardware Upgrade Instructions

Kit Description

This document provides instructions for installing interface hardware upgrades into an existing Tektronix MTM400 MPEG Transport Stream Monitor. Removal of any currently installed interface hardware is also described.

The following MTM400 interface hardware upgrades are covered by this kit:

- MTM4FQA. Adds a QAM (Annex A) interface board.

- MTM4FQB2. Adds a QAM (Annex B, Level 1 and 2) interface board.

- MTM4FQC. Adds a QAM (Annex C) interface board.

- MTM4FQP. Adds a QPSK (L-Band) interface board.

- MTM4FEP. Adds a 8PSK interface board.

- MTM4FVS. Adds a 8VSB interface board.

- MTM4FCF. Adds a COFDM interface board.

NOTE. With the release of MTM400 firmware version 2.1.0, the MTM4FQB interface option has been supply depleted and is no longer available. That option has been replaced by the MTM4FQB2 interface option.

The discontinued MTM4FQB interface option will operate properly with MTM400 firmware version 2.1.0.

Products

The following products are supported by this kit (except as noted under *MTM400 Serial Number Variants* below):

MTM400 MPEG Transport Stream Monitor
WebMSM Web Monitoring System Manager
WebMSM Configuration Editor

MTM400 Serial Number Variants

Two variants in the construction of the MTM400 have been available. They are differentiated by the format of the Serial Number as shown below. The serial number of each unit is printed on a label attached to the rear panel of the unit.

Serial number formats
GB400-xxxx (Example: GB400-1234)
Bxxxxxx (Example: B010100)

NOTE. *These instructions do not apply to units carrying the GB* serial number. If your unit carries this form of serial number, you will be advised on the correct procedure when you order your upgrade.*

Minimum Tool and Equipment List

You will need the equipment listed below to install the interface hardware.

Required tools and equipment	Part number
Anti-static wrist strap	NA
A screwdriver with T10, T15, and T20 TORX tips	NA

Kit Parts Lists

The following tables list the parts supplied with each of the interface hardware upgrade kits.

Table 1: MTM4FQA parts list for QAM (Annex A) interface

Quantity	Part number	Description
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
2 EA	174-4850-00	CA ASSY, RF; COAXIAL; RFD, 50 OHM, 16.0 L, RTANG SMB BOTH ENDS
7 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	671-5608-xx	CIRCUIT BD ASSY; QAM, BUILD OPTION A

Table 2: MTM4FQB2 parts list for QAM (Annex B) interface

Quantity	Part number	Description
1 EA	015-0688-00	ADAPTER, RF; BNC JACK TO F PLUG
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
1 EA	174-5063-00	CABLE ASSY; SERIAL, 1X5; 8.00 INCHES LONG, BASE BAND TO PROCESSOR
1 EA	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
9 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	672-1771-xx	CKT BD ASSY, TESTED SET; BASE BAND AND QAM B

Table 3: MTM4FQC parts list for QAM (Annex C) interface

Quantity	Part number	Description
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
2 EA	174-4850-00	CA ASSY, RF; COAXIAL; RFD, 50 OHM, 16.0 L, RTANG SMB BOTH ENDS
7 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	671-5625-xx	CIRCUIT BD ASSY; QAM, TESTED; BUILD OPT C

Table 4: MTM4FQP parts list for QPSK (L-Band) interface

Quantity	Part number	Description
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
2 EA	174-4850-00	CA ASSY, RF; COAXIAL; RFD, 50 OHM, 16.0 L, RTANG SMB BOTH ENDS
7 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	671-5607-xx	CKT BD ASSY; QPSK, L–BAND, TESTED

Table 5: MTM4FEP parts list for 8PSK interface

Quantity	Part number	Description
1 EA	015-0688-00	ADAPTER, RF; BNC JACK TO F PLUG
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
1 EA	174-5063-00	CABLE ASSY; SERIAL, 1X5; 8.00 INCHES LONG, BASE BAND TO PROCESSOR
1 EA	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
9 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	672-1770-xx	CKT BD ASSY, TESTED SET; BASE BAND AND 8PSK

Table 6: MTM4FVS parts list for 8VSB interface

Quantity	Part number	Description
1 EA	015-0688-00	ADAPTER, RF; BNC JACK TO F PLUG
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
1 EA	174-5063-00	CABLE ASSY; SERIAL, 1X5; 8.00 INCHES LONG, BASE BAND TO PROCESSOR
1 EA	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
9 EA	211-0722-00	SCREW, MACHINE; 6–32 X 0.250, PNH, T–15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	672-1772-xx	CKT BD ASSY, TESTED SET; BASE BAND AND 8VSB

Table 7: MTM4FCF parts list for COFDM interface

Quantity	Part number	Description
1 EA	015-0688-00	ADAPTER, RF; BNC JACK TO F PLUG
1 EA	063-3719-xx	FIRMWARE PKG, CD: MTM400 FIRMWARE
1 EA	071-1224-xx	USER MANUAL; MTM400 MPEG TRANSPORTATION STREAM MONITOR
1 EA	075-0768-05	KIT INSTRUCTIONS; MTM400 INTERFACE HARDWARE UPGRADES
1 EA	174-4782-00	CA ASSY, PWR; 8 CONDUCTOR, 15.9 L
1 EA	174-5063-00	CABLE ASSY; SERIAL, 1X5; 8.00 INCHES LONG, BASE BAND TO PROCESSOR
1 EA	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
9 EA	211-0722-00	SCREW, MACHINE; 6-32 X 0.250, PNH, T-15 TORX
1 EA	334-9141-00	MARKER, IDENT; BLANK STOCK, SUPER LABEL
1 EA	672-1769-xx	CKT BD ASSY, TESTED SET; BASE BAND AND COFDM

Installation Instructions

These instructions are for personnel who are familiar with servicing the product. If you need further details for disassembling or reassembling the product, refer to the appropriate product manual. Contact your nearest Tektronix, Inc., Service Center or Tektronix Factory Service for installation assistance.

⚠ *CAUTION. To prevent static discharge damage, service the product only in a static-free environment. Observe standard handling precautions for static-sensitive devices while installing this kit. Always wear a grounded wrist strap, grounded foot strap, and static resistant apparel while installing this kit.*

The following software activities require access to the MTM400, using either the Remote User Interface or a WebMSM interface. (Refer to the *MTM400 User Manual* supplied in this kit, Tektronix part number: 071-1224-xx.)

The activities for adding any of the hardware options to the MTM400 are essentially the same. The steps required are listed below and are detailed on the following pages:

- If necessary, upgrade the BIOS version and the Processor board software version

- Enter and upload the new license key

- Install the new interface board and, if required, install the RF cable

- Configure the MTM400 for the new interface type

- If necessary, configure the new interface board

- Reinstall the WebMSM software

Identifying the Current BIOS and Firmware Versions

Before proceeding, identify the current BIOS and firmware versions. Ensure that power and networking are available; a signal source is not required.

1. Power up the MTM400 and wait for initialization to complete.

2. From a client PC, open the MTM400 remote user interface.

    a. At a networked PC, launch Microsoft Internet Explorer.

    b. In the browser address bar, enter the network identity or IP address of the MTM400 unit;
        for example, http://TSMonitor01 or http://192.123.234.345.

        When the Enter key is pressed, a Java applet is downloaded from the MTM400 unit and launched. The file size is approximately 1.5 MB; the download time will depend on the network speed and traffic.

        When the Java applet has launched, the MTM400 splash screen is displayed, overlaid shortly thereafter by the Login Details dialog as shown in Figure 1.

NOTE. *The MTM400 user interface can also be accessed using the Web Monitoring Systems Manager (WebMSM). Instructions are located in the WebMSM User Manual.*
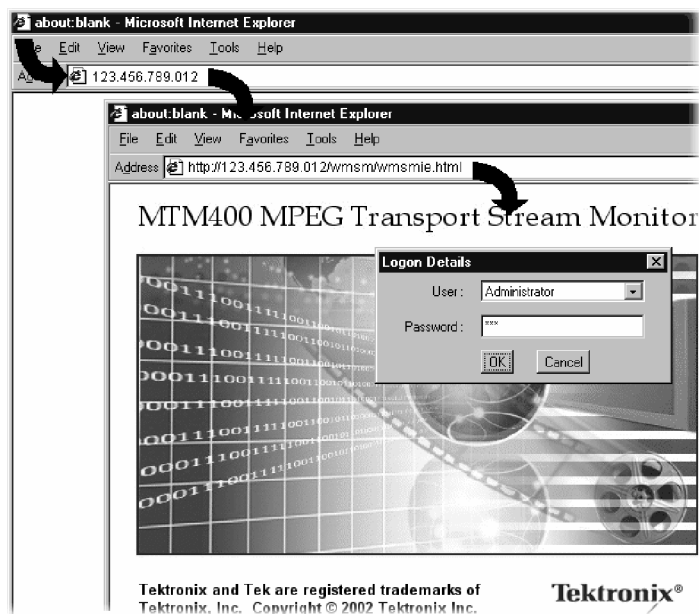

Figure 1: Logging on

**3.** Select the User name (Administrator) and enter the password.

NOTE. *The upgrade can only be done by logging on as an administrator; the default password is 'tek'.*

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4. Select OK to accept the details. Select Cancel to close the dialog.
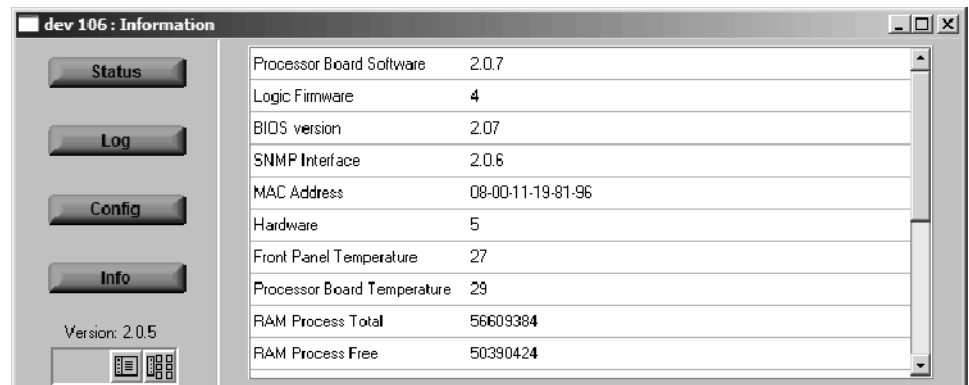
(To redisplay the Login Details dialog, either reenter the network identity of the MTM400 or select the Refresh button in the browser.)

5. After you select OK, the Hotspot view is displayed (see Figure 2).
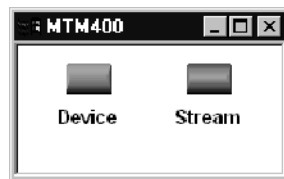
Figure 2: Hotspot view

6. In the Hotspot view, select Device to open the Device view.

7. In the Device view, select Info to display the Device Information view (see Figure 3).


Figure 3: Device view - Information

8. Note the Processor Board Software and BIOS version values shown in the Device Information view.

NOTE. The Device Information view details the software and hardware build state of the MTM400. The values shown in Figure 3 will differ from the values shown for your instrument.

9. Refer to Figure 4 and identify which upgrade steps are required for your instrument.
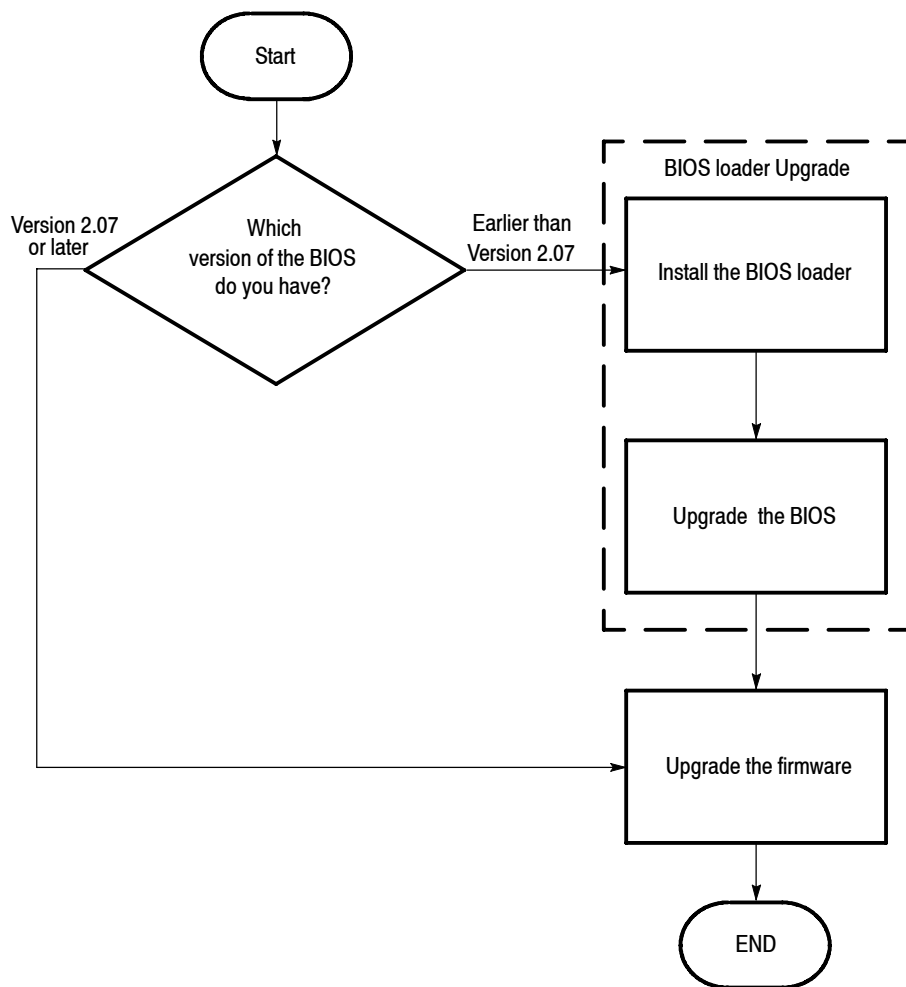
Figure 4: MTM400 upgrade path

Installing the Upgrade Files

NOTE. *For the update to be successful, the upgrade file(s) must be copied from the CD-ROM to a writable location such as the local hard drive.*

Perform the following steps to copy the upgrade files from the CD-ROM to the local hard drive:

1. Insert the MTM400 CD-ROM supplied with this kit into the CD-ROM drive of your PC.

2. Locate the following upgrade files on the CD-ROM:

   ■ MTM400 <bios loader version> BIOSLDR <bios version>.hex

   For example: MTM400 v2.0.6.1 BIOSLDR v2.07.hex

   ■ MTM400 <Processor board software version>.hex

   For example: MTM400 v2.1.0.hex

3. If the BIOS version on your instrument is earlier than version 2.07, then copy both of the *.hex files listed above to your local hard drive.

4. If the BIOS version on your instrument is version 2.07 or later, then copy only the MTM400 <Processor board software version>.hex file to your local hard drive.

Removing Signal Sources

⚠ CAUTION. *To prevent upgrade problems, disconnect all transport stream inputs and outputs from the MTM400 before attempting the upgrade procedure.*

Upgrading the MTM400 BIOS

The BIOS is upgraded by installing a program (BIOS Loader) which, when activated, automatically installs the new BIOS.

⚠ **CAUTION.** *The BIOS upgrade is a critical process. If, for any reason, the BIOS upgrade procedure fails, the unit may need to be returned to Tektronix service for reprogramming.*

Therefore, this procedure should only be carried out when monitoring is not required or when alternative arrangements can be made for system monitoring.

Do not remove power or manually reboot the MTM400 during the following procedures, unless instructed to do so.

Perform this procedure only if the BIOS version of your instrument is earlier than v2.07 (see Figure 4 on page 10).
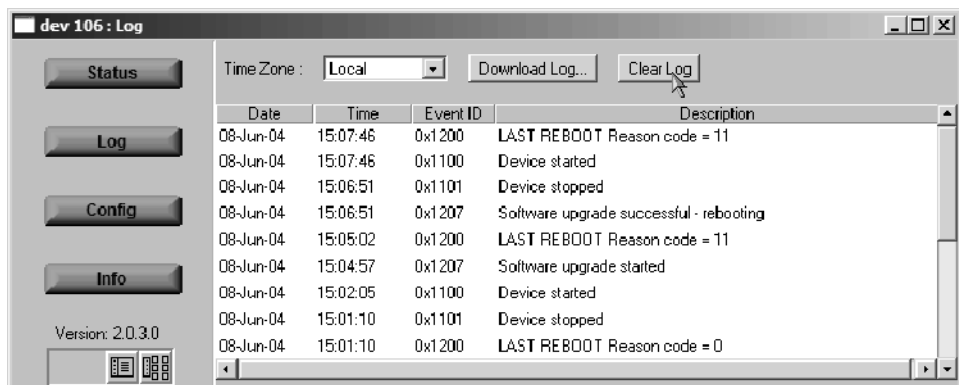
Install the BIOS Loader   Perform the following steps to install the BIOS loader:

⚠ **CAUTION.** *You must clear the Device Log immediately before uploading the firmware.*

1. In the Device view, select Log to display the Device Log view.

2. Select Clear Log to clear the device log (see Figure 5). A message is displayed in the Device Log view confirming that the log has been cleared.

Figure 5: Device view - Log

3. In the Device View, select Config to display the Device Configuration screen shown in Figure 6.
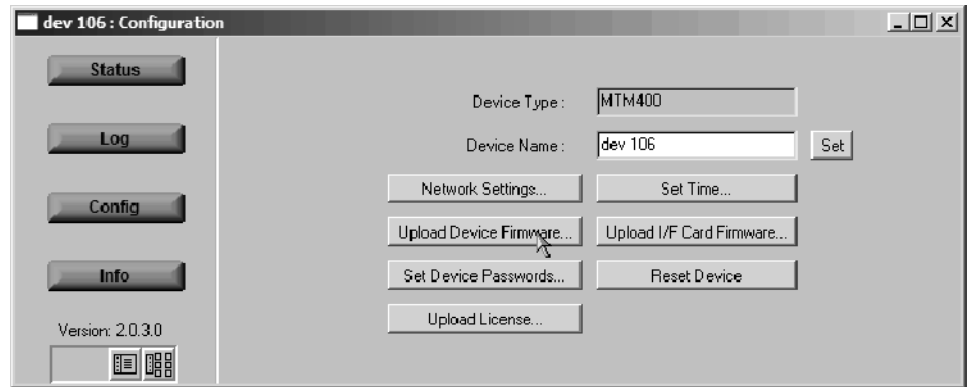
**Figure 6: Device view - Configuration**

4. In the Configuration screen, select Upload Device Firmware. This opens the Device Firmware Upload window shown in Figure 7.

5. Click the Browse button and navigate to the location of the upgrade files. Select the BIOS loader file.

For example, MTM400 v2.0.6.1 BIOSLDR v2.07.hex.

NOTE. For the BIOS update to be successful, the file must be copied from the CD-ROM to a writable location such as the local hard drive.
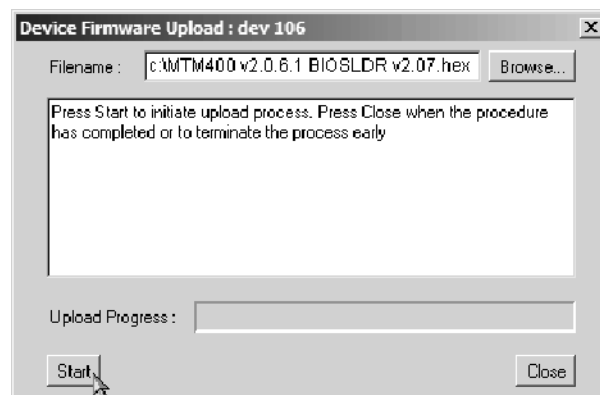

Figure 7: Device Firmware Upload window

6. After you select the upgrade file, click Start (see Figure 7). The BIOS loading process may take a few minutes. While the process completes, the four buttons in the Device view will be grayed. The MTM400 will be automatically restarted when the process has completed.

7. When all four buttons in the Device view have been active (colored red, green, or yellow) for longer than 20 seconds, and the progress bar in the Device Firmware Upload dialog is full as shown in Figure 8, the BIOS Loader is successfully loaded.

⚠ **CAUTION.** *Do not proceed until all four buttons in the Device view have been active (colored red, green, or yellow) for more than 20 seconds.*
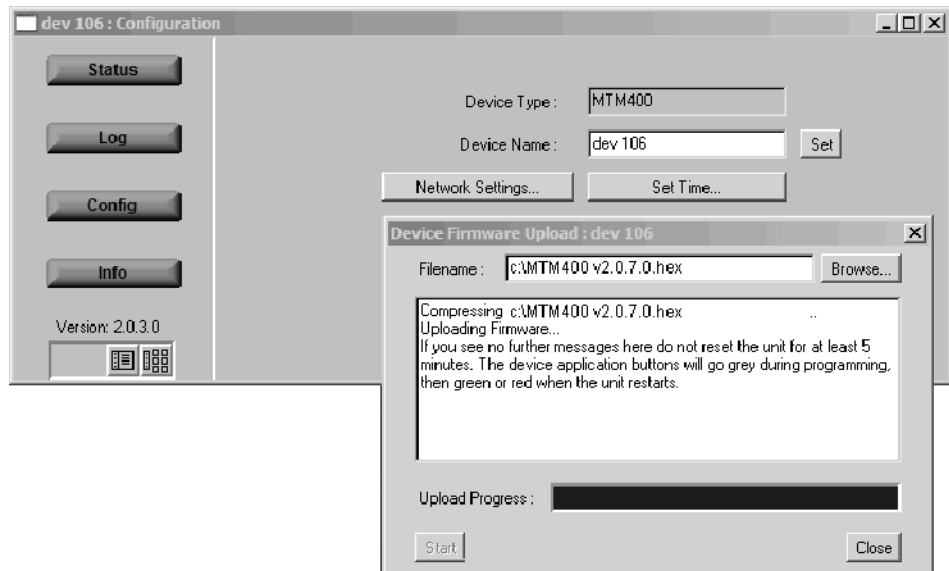
Figure 8: Completing the BIOS upload

Upgrade the BIOS   With the BIOS Loader successfully loaded, the BIOS can now be upgraded.

⚠️ *CAUTION. To prevent damage to the instrument that will require the instrument to be returned to Tektronix for repair, do not remove power or manually reboot the MTM400 during the following procedures, unless instructed to do so.*

8. From the client PC, launch a second instance of Microsoft Internet Explorer.

9. In the address bar of the browser, enter the following command and then press the Enter key (see Figure 9):

    <IP address>/cgi‐bin/biosupgrade

    where : <IP address> is the IP address of the MTM400 unit.
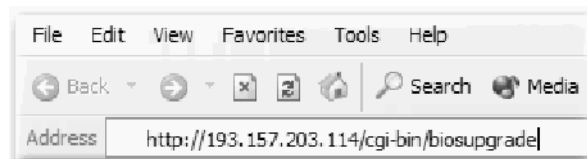
Figure 9: Entering the BIOS upgrade command

10. This begins the BIOS upgrade. The process should take no longer than 15 seconds. On successful completion of the BIOS upgrade, a message is displayed in the browser and the buttons in the Device view are active.

⚠️ *CAUTION. Do not proceed until all four buttons in the Device view have been active (either red, green, or yellow) for more than 20 seconds.*

If the upgrade is unsuccessful, the original BIOS will be reinstated, if possible, and the MTM400 will automatically restart.

11. Close the Internet Explorer and then close the Device Firmware Upload dialog box.

Verify the BIOS Version   **12.** Using the Device view Information screen, check that the BIOS version matches the BIOS uploader version as shown in Figure 10.
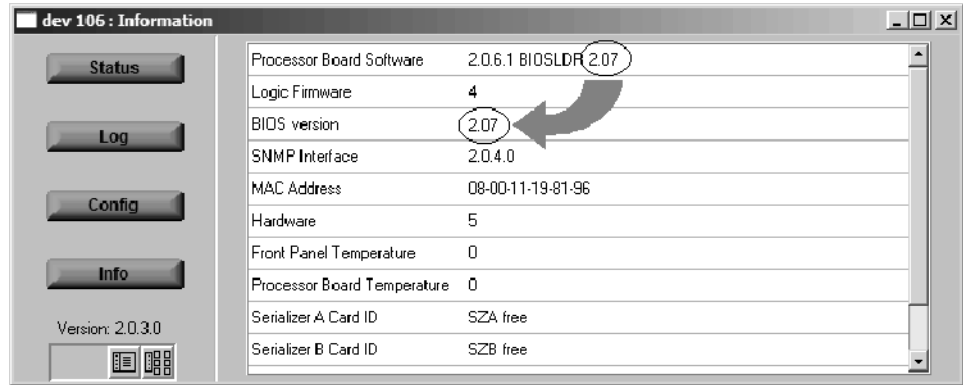
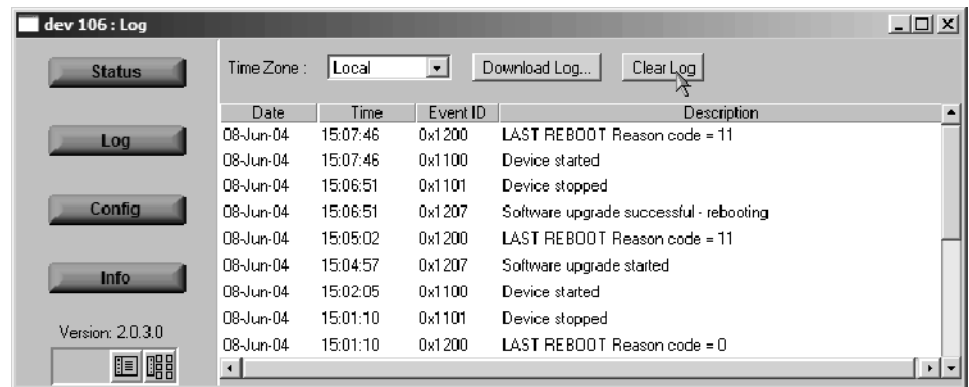**Figure 10: Verifying the BIOS version**

Upgrading the MTM400 Firmware

⚠️ **CAUTION.** *To prevent upgrading problems, you must clear the Device Log immediately before uploading the firmware.*

1. In the Device view, select Log to display the Device Log screen. Select Clear Log to clear the device log (see Figure 11).


Figure 11: Clearing the Device Log

2. In the Device view, select Config to display the Device Configuration screen.

3. To upload the device firmware, select Upload Device Firmware as shown in Figure 6 on page 13. This opens the Device Firmware Upload window (see Figure 12).

4. Click the Browse button and navigate to the location of the upgrade files. Select the MTM400 firmware file.

   For example, MTM400 v2.1.0.hex.

NOTE. *For the MTM400 firmware upgrade to be successful, the file must be copied from the CD-ROM to a writable location such as the local hard drive.*

5. Select Start to upload the firmware (see Figure 12).

6. The firmware upgrade process may take a few minutes to complete. While the process completes, the four buttons in the Device view will remain grayed out. The MTM400 will be automatically restarted when the process has completed.
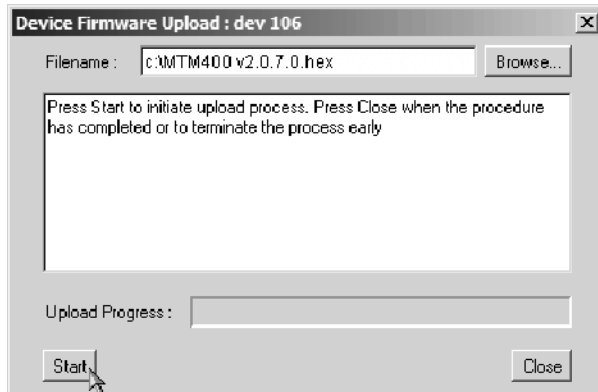
Figure 12: Device Firmware Upload window

7. When all four buttons in the Device view have been active for more than 20 seconds (colored red, green, or yellow), and the progress bar in the Device Firmware Upload dialog is full as shown in Figure 13, the firmware is successfully loaded.

CAUTION. Do not proceed until all four buttons in the Device view have been active (colored red, green or yellow) for more than 20 seconds.

8. Select Close when the process is complete or to terminate the process.
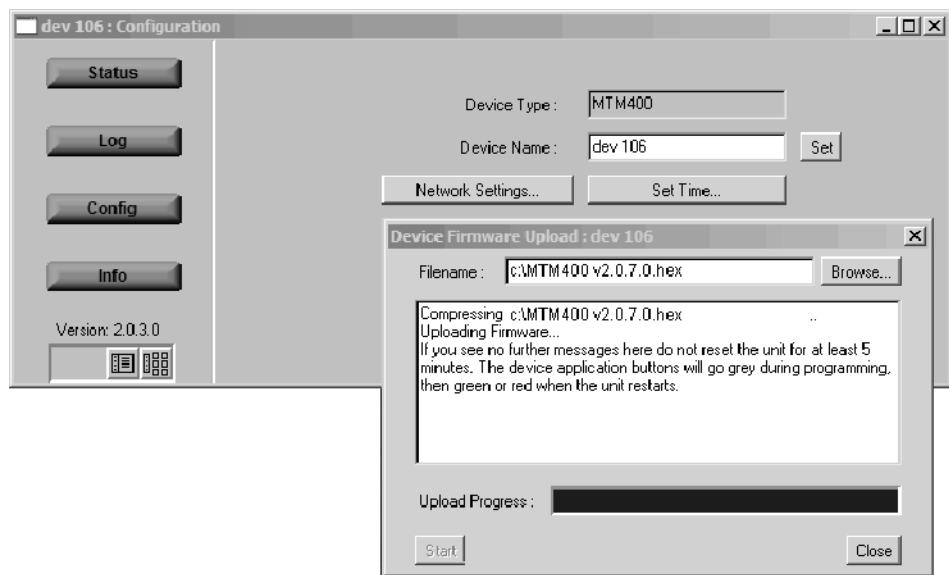
Figure 13: Completing the MTM400 firmware upload

9. When the MTM400 instrument contains an interface card, or when an interface card is added, programming of the card will start automatically as soon as the processor firmware has finished uploading or when the unit is restarted.

The progress of the programming can be observed in the Device Log view. The following messages will be displayed:

```
<Date> <Time> <Event ID> Interface card: CIP Firmware
Programming Started
```

```
<Date> <Time> <Event ID> Interface card: CIP Firmware
Programming Successful
```

```
<Date> <Time> <Event ID> Interface card: CIP Card Startup
```

The Input Card button on the Stream view bar will not be displayed until programming of the interface card is complete.

⚠️ **CAUTION.** *Programming of the interface card can take up to ten minutes. Do not remove power from or restart the MTM400 unit during that time. If the process fails, programming will automatically restart.*
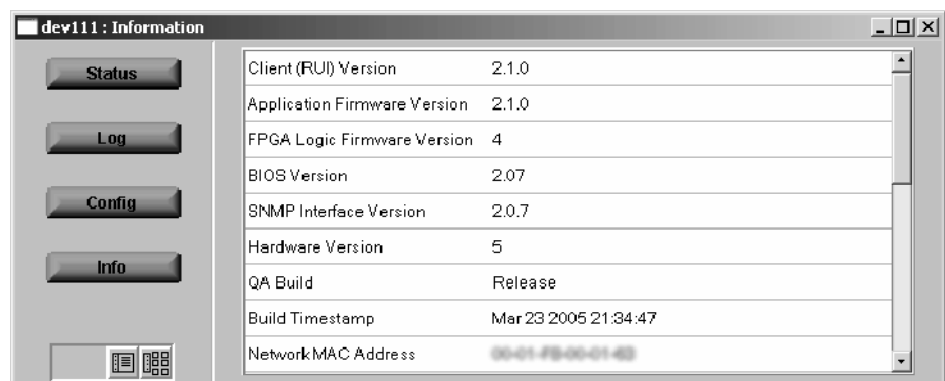
Verifying the Upgrade

To verify the upgrade, check the values displayed in the Device Information view. Before this can be done, the MTM400 user interface (including the browser) must be closed and restarted.

1. Open the MTM400 user interface and log on (refer to *Identifying the Current BIOS and Firmware Versions* on page 8).

2. In the Device view, select Info to display the Device Information view as shown in Figure 14. The view details the software and hardware build state of the MTM400. (The values shown in Figure 14 may differ from the values shown on your display.)

NOTE. *With firmware version 2.1.0, the information shown in the Device Information view (see Figure 14) changed from the previous firmware version. The Device Information view for firmware version 2.0.7 and earlier is shown in Figure 3 on page 9.*

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dev111 : Information	
Client (RUI) Version	2.1.0
Application Firmware Version	2.1.0
FPGA Logic Firmware Version	4
BIOS Version	2.07
SNMP Interface Version	2.0.7
Hardware Version	5
QA Build	Release
Build Timestamp	Mar 23 2005 21:34:47
Network MAC Address	

Figure 14: Device view - Information

3. In the Device Information view, verify that the following items:

- Application Firmware Version. This version number should now match the MTM400 firmware number listed in the name of the firmware .hex file you copied from the CD-ROM supplied with this kit.

- BIOS Version. This version number should be 2.07 or higher.

⚠ **CAUTION.** *The BIOS version displayed should not be less than 2.07. Earlier BIOS versions are not able to decompress the new Processor board software uploads correctly.*

Entering the New License Key

Each MTM400 requires a license key to enable functionality. When new or upgraded functions are added to the MTM400, you may have to enter a new license key before the new functions will be enabled. If a new license key was shipped with this upgrade kit, perform the following steps to enter the new license key:

1. Select Upload License from the Device Configuration window (see Figure 6 on page 13) to open the License Upload dialog box.

2. In the License Upload dialog box (see Figure 15), enter the new License Key supplied with this kit, and then click Upload.

3. A progress message will be displayed as the license key is loaded.

NOTE. *Once the license key is entered, it is stored on the MTM400. The license is specific to a single MTM400instrument.*

Figure 15: Entering the software license key

Installing a New Interface Board

Perform the following steps to install the interface board supplied with this kit.

Preparation   If necessary, disconnect any signal and power cables from the instrument, remove the instrument from the instrument rack, and then place the instrument on a static-free workbench.

⚠ *WARNING. To prevent serious injury or death from electrical shock, do not operate the instrument with the cover or panels removed. Disconnect power from the instrument before removing the covers or panels.*
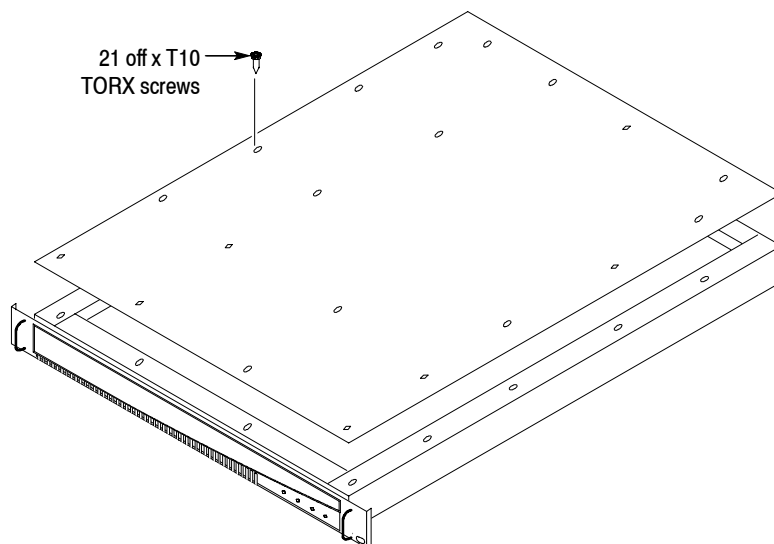
⚠ *CAUTION. Only qualified personnel should perform this procedure. Read the* Service Safety Summary *located at the beginning of these instructions before performing the following procedure.*

Remove the Instrument Cover

1. Remove the 21 cover retaining screws (see Figure 16) and set them aside.

2. Lift the cover clear of the instrument.

21 off x T10
TORX screws

Figure 16: Removing the instrument cover

Remove the Installed Interface Board

3. Locate the interface board in your instrument (see Figure 17 and Figure 18). The interface board is mounted on the right side of the instrument as viewed from the rear.

4. If your instrument does not have an interface board already installed, proceed to step 10 on page 27.

5. If your instrument has an interface board already installed, use Figure 17 and Figure 18 to determine which type of interface board is installed.

CAUTION. To avoid incorrectly installing the interface board, be sure to follow the removal directions for the type of interface board that is installed in your instrument. There are two types of interface boards as shown in Figure 17 and Figure 18. Each board type has different cable connections.
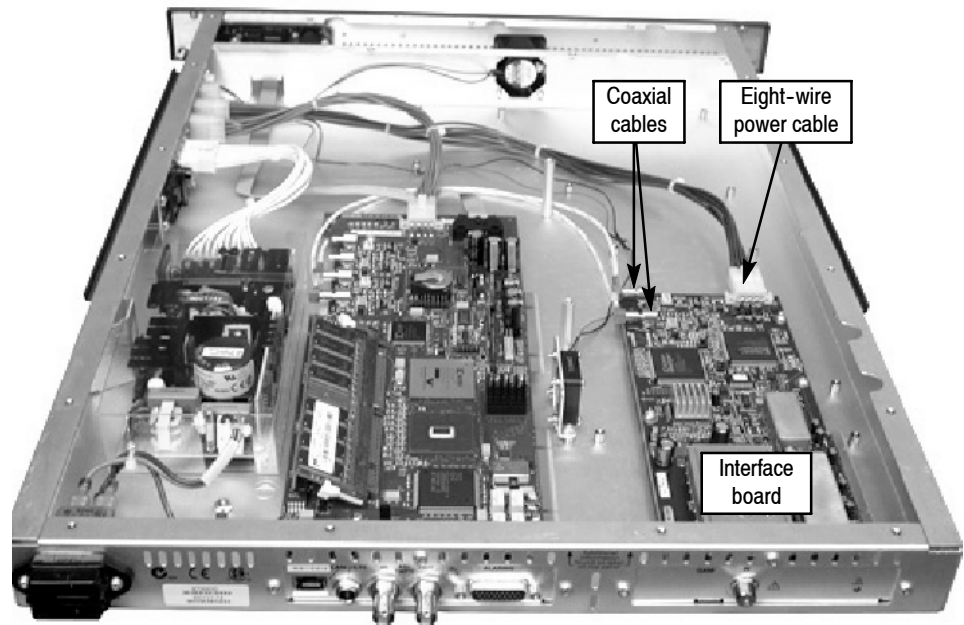
6. If a QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), or QPSK (L-Band) interface board is currently installed, perform the following steps. Table 8 describes the cable connections to these interface boards. Otherwise, proceed to step 7.

   a. Disconnect the two coaxial cables from the SMB connectors labeled I/P and O/P (see Figure 17). These are push-fit connectors.

   b. If you are going to install a QAM (Annex B, new version), 8PSK, 8VSB, or COFDM interface board, completely remove the two coaxial cables by removing them from the connectors labeled I/P A and O/P A on the TS Processor board.

NOTE. Leave the two coaxial cables connected to the TS Processor board if you are going to install a QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), or QPSK (L-Band) interface board.
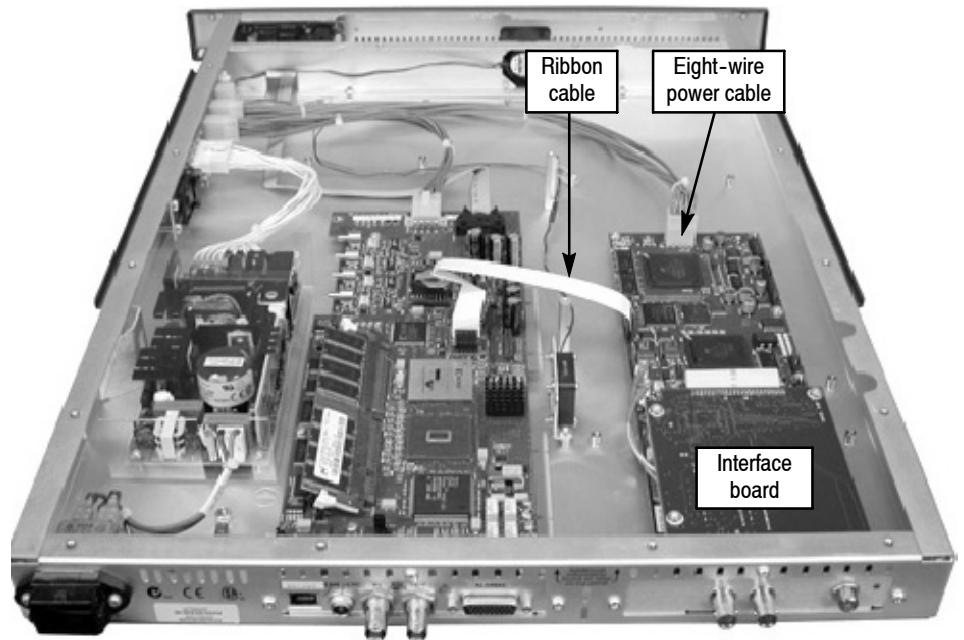
   c. Disconnect the eight-wire power cable from the connector labeled J7 on the interface board.

   d. Proceed to step 8.

Table 8: QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) board connectors

Figure 17 key	Interface board connection	Cable type	Connects to location	Function
1	P1	Eight wires	J7 on Power Distribution board	Power
2	O/P	Miniature coaxial	I/P A on TS Processor board	Data (serializer)
3	I/P	Miniature coaxial	O/P A on TS Processor board	Data (serializer)

Figure 17: QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface board location

Figure 18: QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface board location

7. If a QAM (Annex B, new version), 8PSK, 8VSB, or COFDM interface board is currently installed, perform the following steps. Table 9 describes the cable connections to these interface boards.

    a. Disconnect the ribbon cable from the connector labeled J14 on the interface board (see Figure 18).

    b. If you are going to install a QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), or QPSK (L-Band) interface board, completely remove the ribbon cable by removing it from the connector labeled J750 on the TS Processor board.

NOTE. Leave the ribbon cable connected to the TS Processor board if your are going to install a QAM (Annex B, new version), 8PSK, 8VSB, or COFDM interface board.

    c. Disconnect the eight-wire power cable from the connector labeled JR7 on the interface board.

Table 9: QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface board connectors

| Interface board connection (see Figure 18)	Cable type	Connects to location	Function
JR1	Eight wires	J7 on Power Distribution board	Power
J14	Ribbon	J750 on TS Processor board	Data (serializer)

8. Remove the retaining screws from the interface board as described below:

    a. For QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface boards, remove the four retaining screws from the board and remove the three retaining screws from the rear panel as shown in Figure 19.

    b. For QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards, remove the six retaining screws from the board and remove the three retaining screws from the rear panel as shown in Figure 20.

9. Lift the interface board clear of the instrument and place the board on a static-free surface.
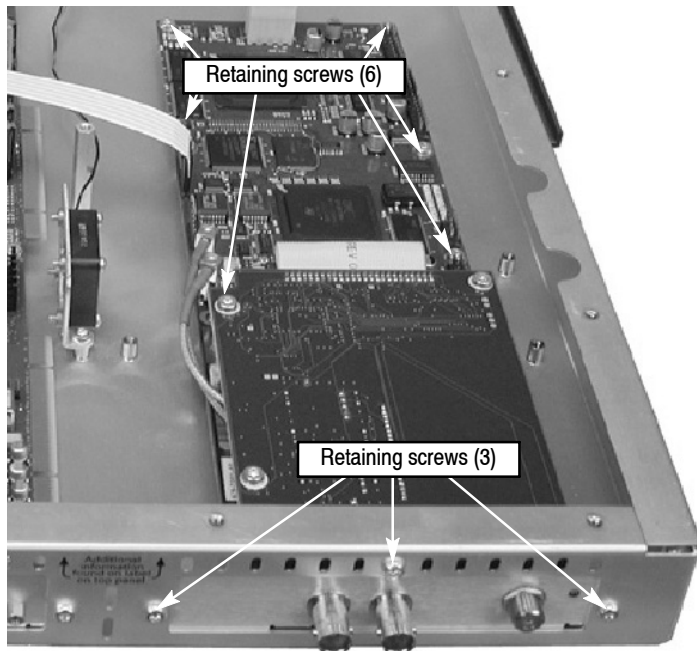
CAUTION. To prevent static damage to the removed board, be sure to store the board in static-free packaging. Failure to properly store the board may result in the board needing repair before it will operate properly when reinstalled.
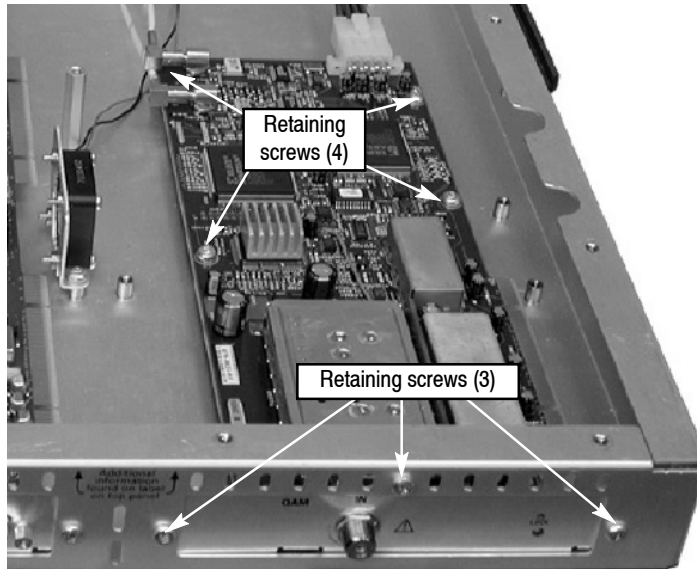
Figure 19: Retaining screw locations for QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-BAND) interface boards

Figure 20: Retaining screw locations for QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards

Install the New Interface Board

10. If an interface board was not previously installed in the instrument, a blank cover is installed on the right side of the rear panel (as viewed from the rear of the instrument). If your instrument has a blank cover, remove the three retaining screws and remove the blank cover.

11. Place the new interface board into the right side of the instrument (as viewed from the rear of the instrument). See Figure 17 and Figure 18 on page 24.

12. Line up the mounting points and install the retaining screws as described below:

a. For QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface boards, install the four retaining screws in the board and install the three retaining screws in the rear panel as shown in Figure 19.

b. For QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards, install the six retaining screws in the board and install the three retaining screws in the rear panel as shown in Figure 20.

**13.** Connect the signal and power cables as described below.

⚠ *CAUTION. To prevent damage to the interface board connectors, do not use unnecessary force to connect the cables. All of the connectors are polarized and they will only fit into their respective socket in one way.*

a. For QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface boards, make the following cable connections. Refer to Table 8 on page 23 for a description of the cable connections for these interface boards.

- Connect one coaxial cable from the connector labeled O/P on the interface board to the connecter labeled I/P A on the TS Processor board. This is a push-fit connector. See Figure 21 for cable locations.

- Connect the other coaxial cable from the connector labeled I/P on the interface board to the connecter labeled O/P A on the TS Processor board.

- Connect the eight-wire power cable from P1 on the interface board to J7 on the Power Distribution board.
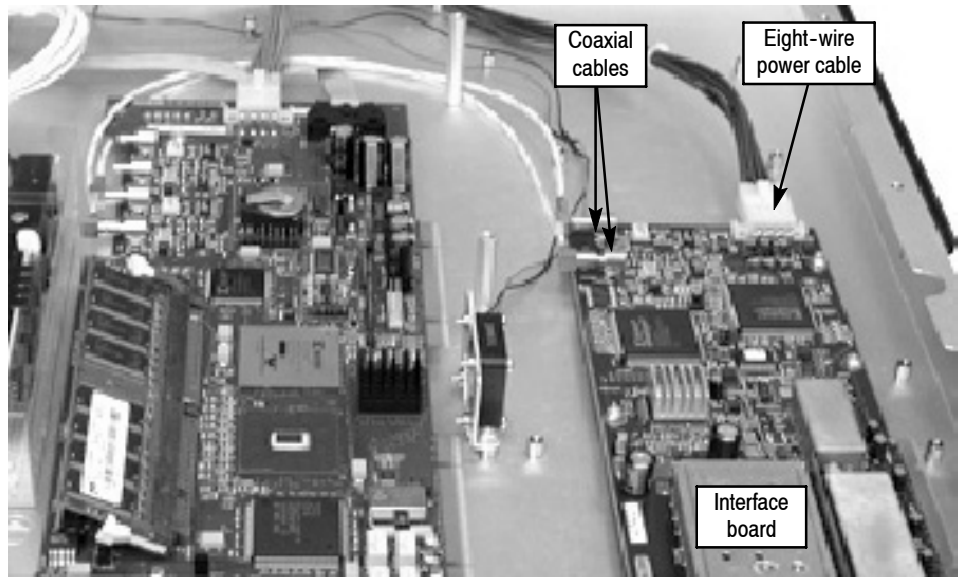
Figure 21: Cable connections for QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface boards
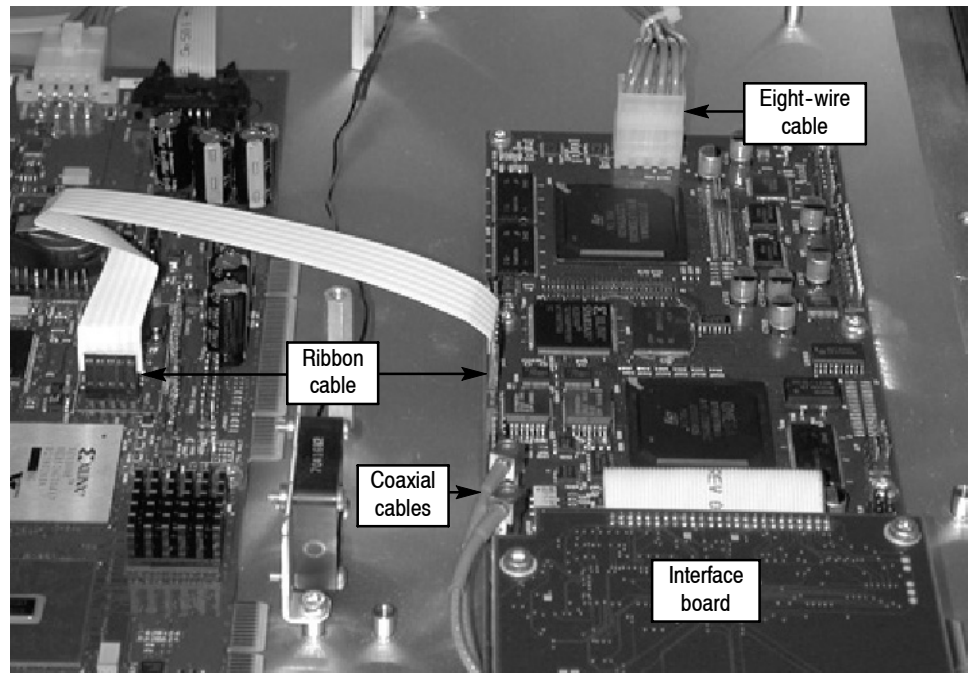
Figure 22: Cable connections for QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards

b. For QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards, make the following cable connections. Refer to Table 9 on page 25 for a description of the cable connections for these interface boards.

- Connect the ribbon cable from the connector labeled J14 on the interface board to the connecter labeled J750 on the TS Processor board. See Figure 22 for cable locations.

- Connect the eight-wire power cable from JR1 on the interface board to J7 on the Power Distribution board.

- Verify that the two coaxial cables on the interface board are firmly attached to their connectors.

14. Line up the instrument top cover and replace the 21 retaining screws (see Figure 16 on page 22).

Affixing the Installation Label

Affix the label supplied in the kit to the top of the instrument. Instructions are supplied with the new label.

## Connecting the External RF Cable

For QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interface boards only, if you want to monitor ASI and RF signals, (for example, both the input and output of a modulator), perform the following steps:

1. Connect an ASI signal from the modulator to the interface card ASI In.

2. Connect the RF cable supplied in this kit between the ASI/SMPTE310M Out connector on the interface card to the ASI In connector on the Transport Stream Processor card (see Figure 23).

3. Select the signal to monitor using the Stream view configuration screen.

NOTE. The QAM (Annex A), QAM (Annex B, old version), QAM (Annex C), and QPSK (L-Band) interface cards do not need an external cable connection since these interface boards are connected to the Transport Stream Processor card inside the instrument.
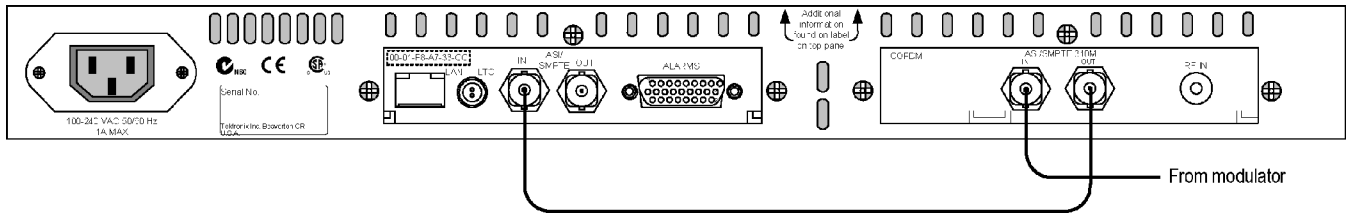
Figure 23: Monitoring ASI and RF signals - QAM (Annex B, new version), 8PSK, 8VSB, and COFDM interfaces only

Verifying the Hardware Options

Perform the procedures in this section to verify that the required hardware option has been installed and is functioning correctly.

Preparation

The verification procedures require the following conditions:

- The MTM400 is powered up and connected to a network

- A suitable input signal is connected to the interface board

- The signal under test is known to be good

- The user is familiar with the technical characteristics of the signal under test

- The user is familiar with the MTM400 user interface (refer to the *MTM400 MPEG Transport Stream Monitor User Manual* included with this kit)

- The user is logged on to the MTM400 as the Administrator (instructions are given in *Identifying the Current BIOS and Firmware Versions* starting on page 8)

Selecting the Interface Board

Perform the following steps to select the new interface board:

1. From the user interface Hot Spot view, see Figure 24, click the Stream button.

Figure 24: Hotspot view

2. Select Config from the Stream view button bar (see Figure 25).

Figure 25: Stream view button bar

3. On the Stream Configuration screen, select the desired interface from the Interface drop-down list. Figure 26 shows the QAM (Annex A) interface being selected.

NOTE. If the required interface entry is not available in the drop-down list, one of the following events has occurred:

■ *Insufficient time was allowed for the interface board to be detected and programmed. After upgrading the firmware, installing the board and powering up the unit, the interface board will take up to ten minutes to be programmed and recognized.*

■ *The startup routine failed to detect the new board after ten minutes. Remedy: Power down the instrument and reapply power.*

■ *The interface board was not installed correctly in the instrument. Remedy: After powering down and disconnecting any cables, remove the top cover and verify the presence of the board and its connections. Replace the top cover, reconnect any cables to the instrument, and apply power.*
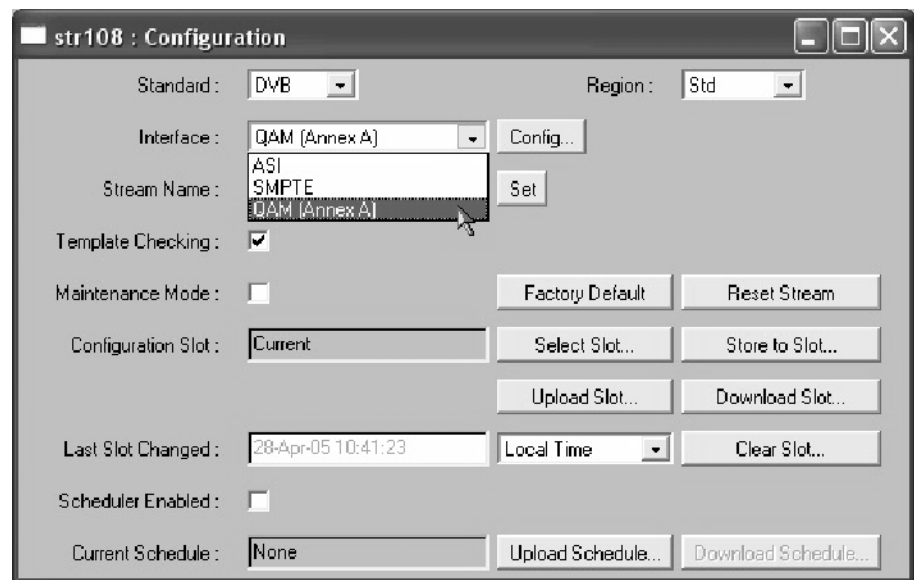
Figure 26: Selecting the interface
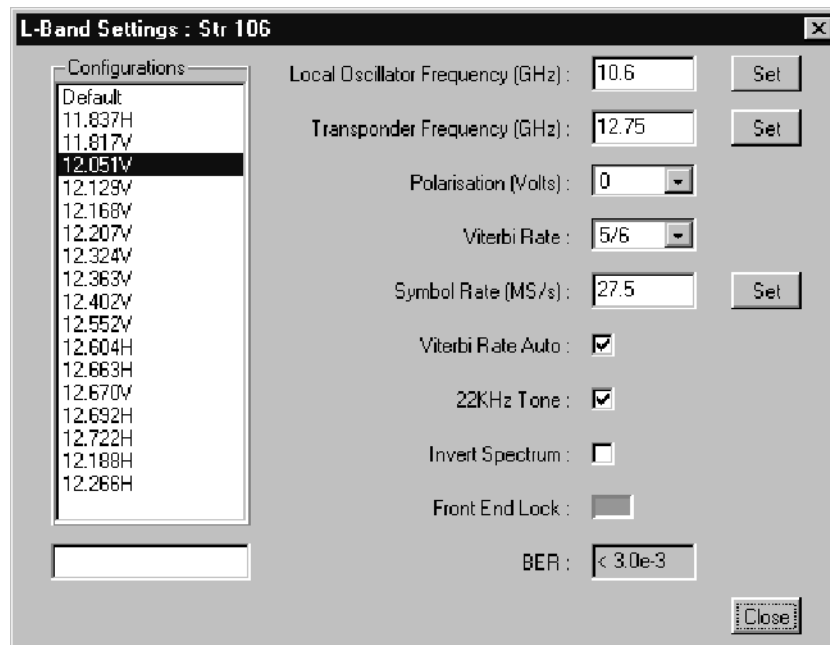
Configuring the Interface

After you select the desired interface board type, click the Config button to access the Settings window for the selected interface type. Figure 27 shows the Settings window for the QPSK (L-Band) interface. The Settings windows for the other interfaces have a similar appearance.

Refer to the *MTM400 MPEG Transport Stream Monitor User Manual* for detailed information about the configuration settings for your interface type, and then use the Settings window to configure the interface as needed for your application.

NOTE. Refer to the Specification *section in the* MTM400 MPEG Transport Stream Monitor Technical Reference *(071-1560-xx) for information about the specifications for each interface type.*

Figure 27: QPSK (L-Band) interface configuration window

Reinstalling the WebMSM Software

If you own the WebMSM software, you must reinstall WebMSM and the WebMSM Configuration Editor as part of this upgrade. The necessary files are available on the Tektronix Web site, www.tektronix.com.

The following steps are required:

■ Download the WebMSM software from the Tektronix Web site. There are two software files to download: WebMSM Application and WebMSM Configuration Editor.

■ Uninstall WebMSM and WebMSM Configuration Editor.

■ Install WebMSM and WebMSM Configuration Editor.

All configuration files and enabled options will be retained.

Uninstalling the WebMSM Software

1. At the computer containing WebMSM, run Setup for the WebMSM application.

2. Follow the onscreen instructions and remove the WebMSM application.

Uninstalling the WebMSM Configuration Editor

1. At the computer containing the WebMSM Configuration Editor, run Setup for the WebMSM Configuration Editor.

2. Follow the onscreen instructions and remove the WebMSM Configuration Editor.

Installing the WebMSM Software

1. Run Setup for the WebMSM application.

2. Follow the onscreen instructions and install the WebMSM application.

Installing the WebMSM Configuration Editor

1. Run Setup for the WebMSM Configuration Editor.

2. Follow the onscreen instructions and install the WebMSM Configuration Editor.

If you require further information regarding either WebMSM or the WebMSM Configuration Editor, refer to the Web Monitoring System Manager User Manual (Tektronix part number 071-1239-xx).

Technical Support

If the upgrade is unsuccessful, please contact Tektronix Technical Support. Ensure that the serial number for your MTM400 is available.

■■ **End of document** ■■