

**MTS4KUP Upgrade Kit  
MTS4000 and MTS4SA  
MPEG Test Systems  
Instructions**



075-1036-02

**Tektronix**



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- Worldwide, visit [www.tektronix.com](http://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.

**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.

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Power disconnect.** The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

**Do not operate without covers.** Do not operate this product with covers or panels removed.

**Do not operate with suspected failures.** If you suspect that there is damage to this product, have it inspected by qualified service personnel.

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

**Wear eye protection.** Wear eye protection if exposure to high-intensity rays or laser radiation exists.

**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.

**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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**Symbols and 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.

The following symbol(s) may appear on the product:



## 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.

# Kit description

This document provides instructions for performing hardware and/or software and option key upgrades on the following Tektronix products:

- MTS4000 MPEG Test System
- MTS4SA MPEG Test System

## Upgrade kits covered by these instructions

- MTS4KUP GEN – Multiplexer, MPEG Player, Transport Stream Editor, Make Seamless Wizard, Transport Stream Cutter, and Script Pad.  
Includes Tclips test streams media.
- MTS4KUP ESS – Standard ES analysis. Includes MTS4CC with all options plus MPEG-2 ES Analyzer.
- MTS4KUP ESB – Enhanced ES analysis. Includes MTS4EAV7 base software plus MPEG-2 ES Analyzer.
- MTS4KUP ESE – Enhanced ES analysis. Includes MTS4EAV7 with all options (including HEVC/H.265) plus MPEG-2 ES Analyzer.
- MTS4KUP VQ – Video quality software, single ended. Includes VQS1000 with all options.
- MTS4KUP PQ – Picture quality analysis software, single and double ended. Includes PQASW with IP option.
- MTS4KUP PB – PES and T-STD Buffer Analyzers.
- MTS4KUP ASI – Adds the Multiport ASI interface (four ports).
- MTS4KUP S2 – Adds the DVB-S/S2 interface supporting QPSK, 8PSK, 16APSK AND 32APSK demodulation. (Requires Option ASI.)
- MTS4KUP VS – Adds the 8VSB interface. (Requires Option ASI.)
- MTS4KUP QB2 – Adds the QAM B interface. (Requires Option ASI.)
- MTS4KUP 10GS – Adds the 10GBASE-SR dual optical port 10Gb/s NIC. Includes short reach SFP+ modules (850 nm).

- MTS4KUP IPTV – Adds the IPTV Gigabit Ethernet Interface with 10/100/1000 Base-T RJ45 Electrical Port. (Requires Option ASI.)

The following optical length input options are available for use with option IPTV:

- MTS4KUP SX – 1000 Base-SX Short Wavelength Optical Port with LC Connector for IPTV Ethernet Interface (Multi Mode 850 nm)
- MTS4KUP LX – 1000 Base-LX Long Wavelength Optical Port with LC Connector for IPTV Ethernet Interface (Single Mode 1310 nm)
- MTS4KUP ZX – 1000BASE-ZX optical port with LC connector for IPTV Ethernet interface (single mode 1550 nm).



# Kit parts lists

## MTS4KUP GEN

Quantity	Part Number	Description
1	N/A	MTS4000 OPTION KEY LABEL
1	020-2965-xx	TCLIPS MPEG TEST STREAMS DVD PACKAGE
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

## MTS4KUP ESS

Quantity	Part Number	Description
1	N/A	MTS4000 OPTION KEY LABEL
1	N/A	CD FOR DONGLE UPDATE
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

## MTS4KUP ESB

Quantity	Part Number	Description
1	N/A	MTS4000 OPTION KEY LABEL
1	N/A	CD FOR DONGLE UPDATE
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

## MTS4KUP ESE

Quantity	Part Number	Description
1	N/A	MTS4000 OPTION KEY LABEL
1	N/A	CD FOR DONGLE UPDATE
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP VQ

Quantity	Part Number	Description
1	N/A	VQS1000 OPTION KEY LABEL
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP PQ

Quantity	Part Number	Description
1	N/A	PQA600 OPTION KEY LABEL
1	020-3054-xx	PQA600 APPLICATION SOFTWARE KIT
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP PB

Quantity	Part Number	Description
1	N/A	MTS4000 OPTION KEY LABEL
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP ASI

Quantity	Part Number	Description
1	N/A	QUAD ASI/SDI ADAPTER CIRCUIT BD ASSEMBLY
1	N/A	MTS4000 OPTION KEY LABEL
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

**MTS4KUP S2**

Quantity	Part Number	Description
1	N/A	BASE BAND AND DVB-S2 CIRCUIT BD ASSEMBLY
1	174-5135-00	CABLE ASSY; RF, BNC TO BNC;75 OHM
1	174-6103-00	CABLE, ASSEMBLY
1	348-2003-00	BUMPER, RUBBER; CLEAR, 0.375 DIA X 0.200 H
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

**MTS4KUP VS**

Quantity	Part Number	Description
1	N/A	BASE BAND AND 8VSB CIRCUIT BD ASSEMBLY
1	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
1	174-6103-00	CABLE, ASSEMBLY
1	348-2003-00	BUMPER, RUBBER; CLEAR, 0.375 DIA X 0.200 H
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

**MTS4KUP QB2**

Quantity	Part Number	Description
1	N/A	BASE BAND AND QB2 CIRCUIT BD ASSEMBLY
1	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
1	174-6103-00	CABLE, ASSEMBLY
1	348-2003-00	BUMPER, RUBBER; CLEAR, 0.375 DIA X 0.200 H
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

**MTS4KUP 10GS**

Quantity	Part Number	Description
1	N/A	10G ETHERNET ADAPTER WITH SFP+ CONNECTIVITY CIRCUIT BD ASSEMBLY
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP IPTV

Quantity	Part Number	Description
1	N/A	IPTV CIRCUIT BD ASSEMBLY
1	174-5135-00	CABLE ASSY; RF, BNC TO BNC; 75 OHM
1	174-6103-00	CABLE, ASSEMBLY
1	348-2003-00	BUMPER, RUBBER; CLEAR, 0.375 DIA X 0.200 H
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP SX

Quantity	Part Number	Description
1	131-7834-00	OPTICAL GIGABIT ETHERNET/FIBRE CHANNEL 850NM SFP, 1.25/1.0625GBAUD, 3.3V
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP LX

Quantity	Part Number	Description
1	131-7957-00	OPTICAL GIGABIT ETHERNET/FIBRE CHANNEL 1310NM SFP SFF, 1.25/1.0625GBAUD, 3.3V
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

### MTS4KUP ZX

Quantity	Part Number	Description
1	131-7958-00	OPTICAL GIGABIT ETHERNET/FIBRE CHANNEL 1550NM SFP, 1.25/1.0625GBAUD, 3.3V
1	075-1036-xx	MTS4KUP UPGRADE KIT INSTRUCTIONS
1	071-2179-xx	MANUAL, TECH; SMPLP; TEKTRONIX SUPPLEMENTAL INFORMATION SHEET FOR THE PEOPLES REPUBLIC OF CHINA; CHINA ROHS

# Software upgrade instructions

Many of the upgrades available for the MTS4000 are software only; there is no hardware to install. These software upgrades are also available for the MTS4SA.

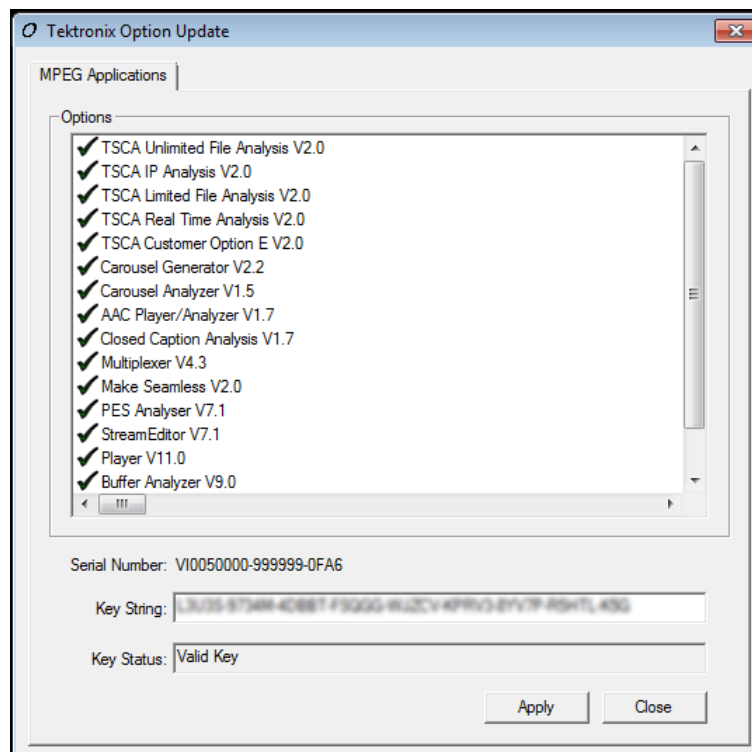
The software only upgrades are:

MTS4KUP ESE	MTS4KUP PB	MTS4KUP GEN
MTS4KUP ESS	MTS4KUP PQ	MTS4KUP VQ
MTS4KUP ESB		

Software only upgrades require that the pre-installed software be unlocked. Use the following procedure(s) to unlock the software.

## MTS4KUP ESE, ESS, PB, and GEN key entry

1. Check that the USB software key (dongle) is installed in one of the USB ports.
2. Power on the instrument.
3. Start the MTS4000 Option Key Wizard. Select **Start > Programs > Tektronix MTS4000 > OptionKey Wizard**.



4. In the Tektronix Option Update dialog box, enter the Option Key String supplied with the installation documentation in the Key String field.
5. Click **Apply**.

6. Verify that the Option is enabled in the MPEG Applications list.
7. ESE, ESB, or ESS Options only:
  - a. Insert the CD, provided in the kit, into the CD/DVD drive.
  - b. Navigate to the CD and display its contents. Double click the remoteupdate.exe file to update the dongle.
  - c. Follow any on-screen instructions.
  - d. When completed, remove the CD.
8. Peel the backing off of the Product Option Key label and apply it to the instrument rear panel.

#### **MTS4KUP PQ license entry**

Option PQ enables the PQASW software that is installed on the MTS4000 instrument.

1. Power on the instrument.
2. Launch the PQASW software.
3. From the PQA toolbar, go to **Help > License Manager**.
4. Enter the License string supplied with the installation documentation.
5. Peel the backing off of the PQA Product Option label and apply it to the instrument rear panel. Do not cover any existing labels.

#### **MTS4KUP VQ license entry**

Option VQ enables the VQS1000 software that is installed on the MTS4000 instrument.

1. Power on the instrument.
2. Launch the VQS1000 software.
3. From the VQS1000 toolbar, go to **Help > License Manager**.
4. Enter the License string supplied with the installation documentation.
5. Peel the backing off of the VQS Product Option label and apply it to the instrument rear panel. Do not cover any existing labels.

# Hardware upgrade instructions

Interface card upgrades available for the MTS4000 require the installation of hardware internal to the instrument. These upgrades are:

MTS4KUP 10GS	MTS4KUP IPTV	MTS4KUP S2
MTS4KUP ASI	MTS4KUP QB2	MTS4KUP VS

These instructions are for personnel who are familiar with servicing the product. Contact your nearest Tektronix, Inc., Service Center or Tektronix Factory Service for installation assistance.

**NOTE.** *Up to four optional interface cards can be installed into the instrument, but only two of the following options: S2, VS, QB2, IPTV.*



**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.*

## Recommended tool list

Table 1: Recommended tool list

Description
Anti-static wrist strap
Screwdriver handle with P2 tip
9/16 inch socket and wrench (Option ASI only)

## Prepare IPTV, QB2, S2, and VS interface cards

Some interface cards require the application of a rubber bumper to the interface card before installing into the instrument. Refer to the following illustrations for the proper locations to install the bumper.

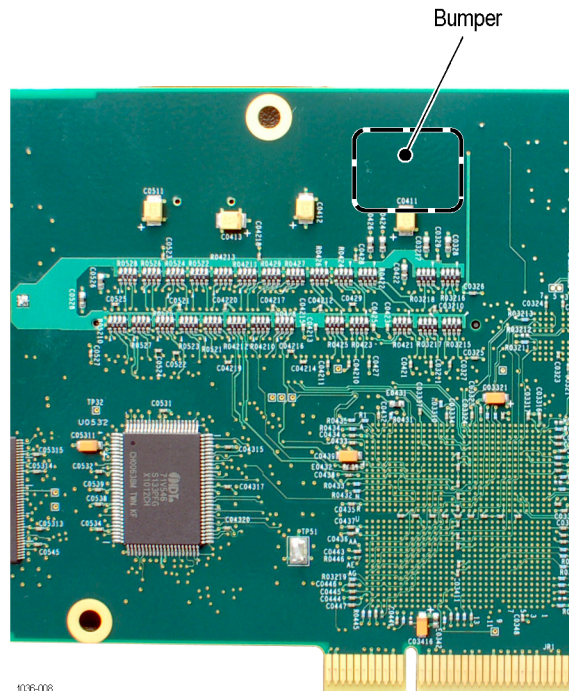


Figure 1: IPTV interface card bumper installation

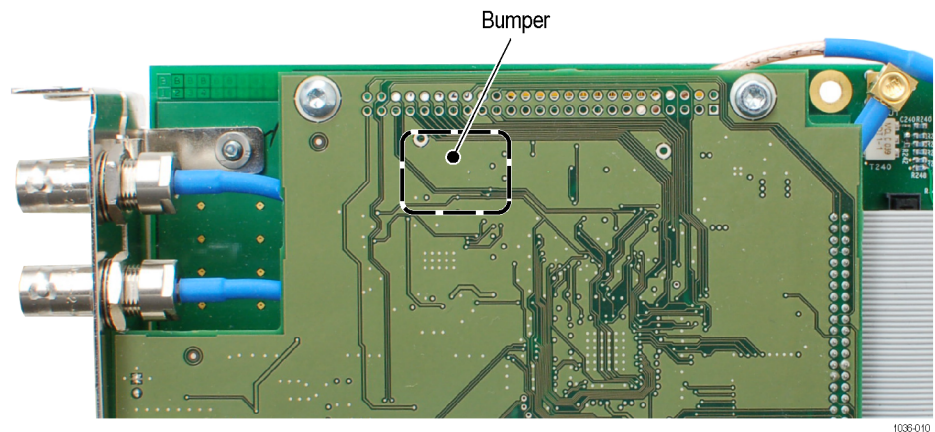


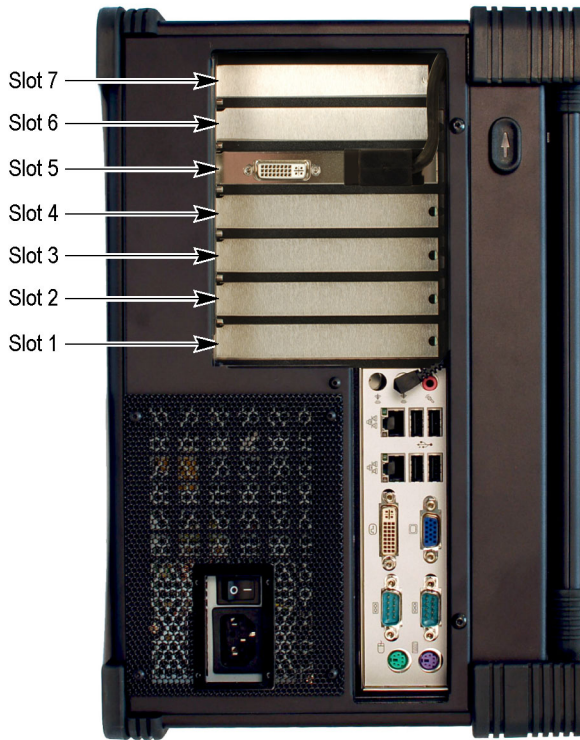
Figure 2: QB2, S2, and VS interface cards bumper installation



**Install the interface card**

Before installing any of the interface cards, refer to the following table and illustration to determine which slots in the instrument you'll be installing your interface card or cards. Due to their size, some interface cards require two slots.

**Table 2: Interface card slot locations**

Instrument Slot Identification	Interface Card	Slot Location	CIP connection on motherboard	CIP connection on interface card
	10GS	1	N/A	N/A
	ASI	4	N/A	N/A
	IPTV	6	COM3	J10
	QB2	2 & 3	COM3	J14
	S2	2 & 3	COM3	J14
	VS	2 & 3	COM3	J14
	IPTV	6	COM3	J10
	QB2	2 & 3	COM4	J14
	IPTV	6	COM3	J10
	VS	2 & 3	COM4	J14
	IPTV	6	COM3	J10
	S2	2 & 3	COM4	J14
	QB2	6 & 7	COM3	J14
	S2	2 & 3	COM4	J14
	QB2	6 & 7	COM3	J14
	VS	2 & 3	COM4	J14
	VS	6 & 7	COM3	J14
	S2	2 & 3	COM4	J14

<sup>1</sup> Up to four optional interface cards can be installed into the instrument, but only two of the following options: S2, VS, QB2, IPTV.

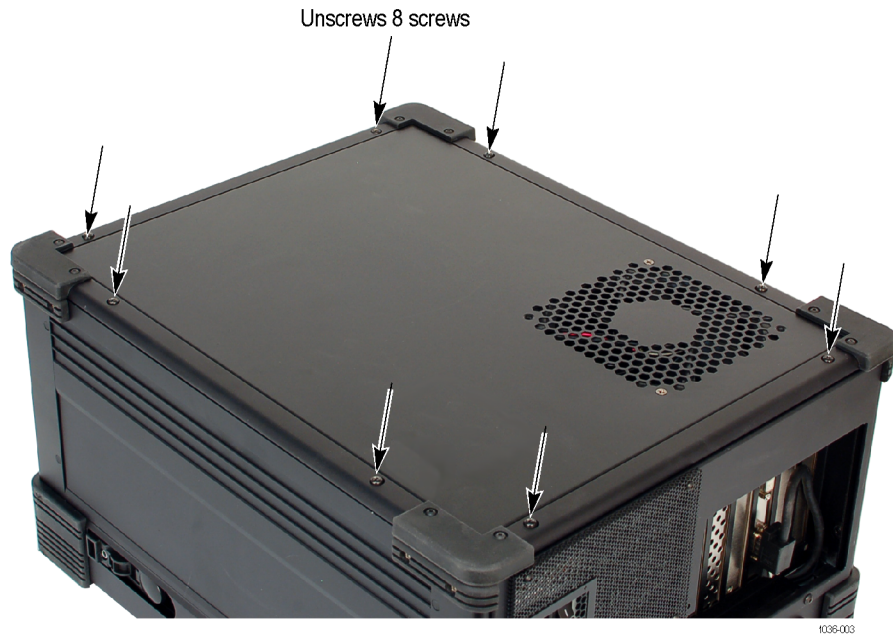
1. Power off the system and disconnect the power cord.



**WARNING.** To avoid electric shock, verify the power cord is disconnected from the instrument. Failure to do so can cause injury or death.

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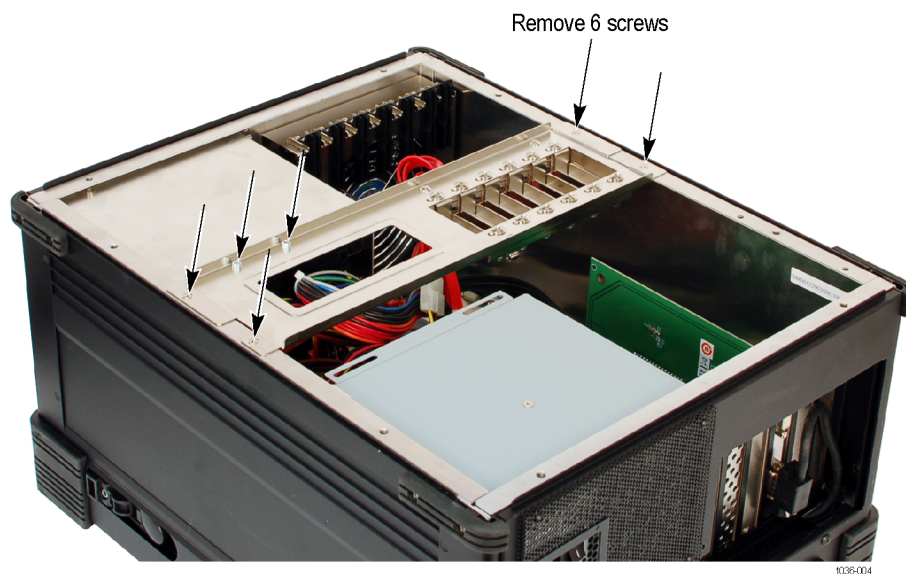
2. Disconnect any cables from the rear panel. Note the location of any cables for reinstallation.
3. Close front of the instrument and place the cabinet on the working surface with the rear panel facing up.
4. Unscrew the eight screws securing the rear panel. (The screws do not come out of the panel.)



**Figure 3: Remove rear panel**

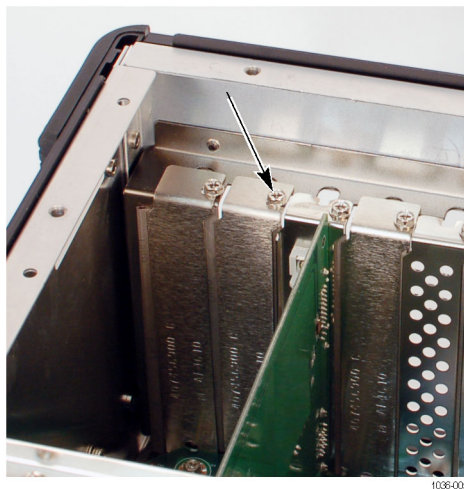
5. Lift the rear panel off the instrument. If necessary, disconnect the power connector to the fan.

6. Remove the six screws from the interface card support bracket and lift it from the cabinet.

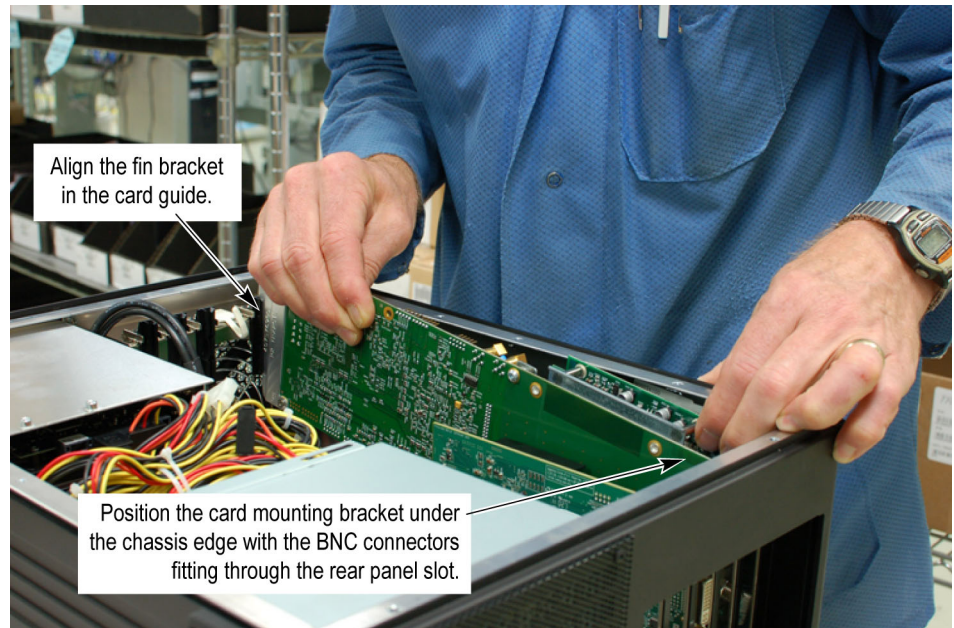


7. Depending on the option card being installed, remove the appropriate blank panel from the rear of the instrument. Use the table to identify the recommended location for each of the available interface card. See the table *Interface card slot locations*.

If installing multiple option cards, remove all appropriate blank panels at this time.

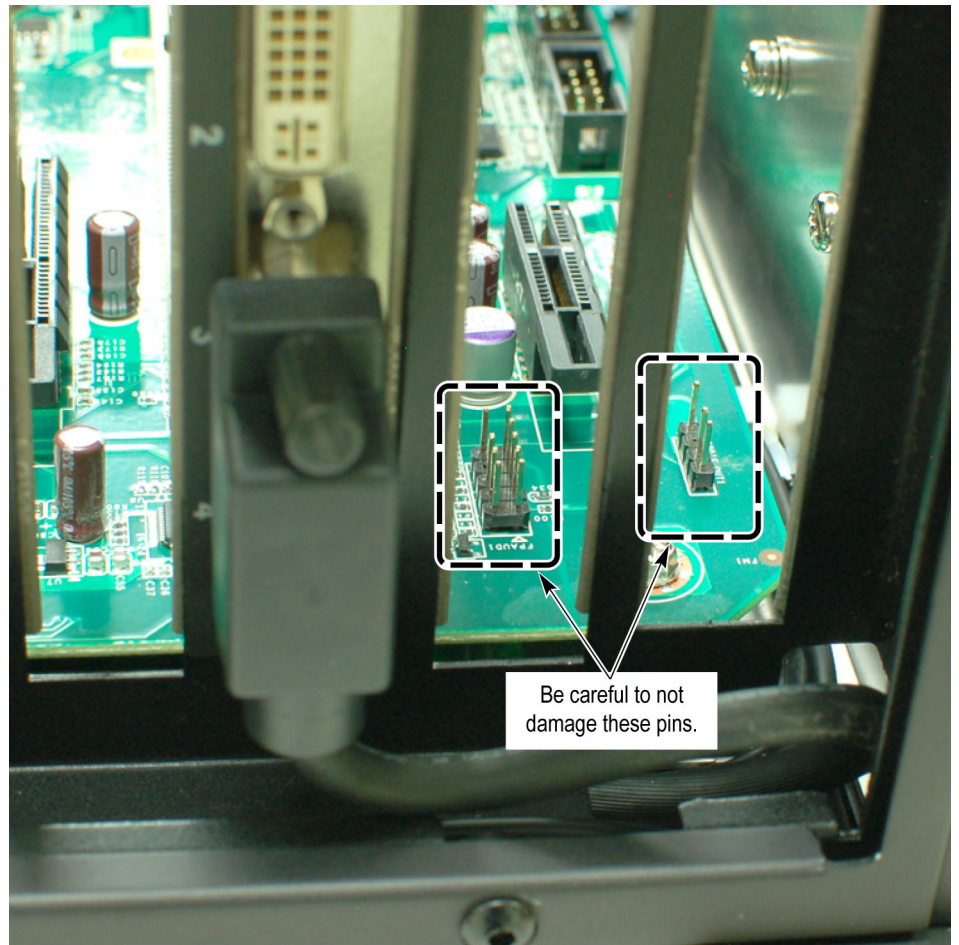


8. Install the interface card into the appropriate slot. Align the interface card with the interface slot on the motherboard and the rear panel opening and push the card into the interface slot.
9. IPTV, QB2, S2, and VS Options only:
  - a. As you align the fin bracket with the card guide, position the rear panel of the interface card so that the card mounting bracket is under the edge of the chassis with the BNC connectors fitting through the rear panel slot of the chassis. As shown below, the interface card will be at an angle.



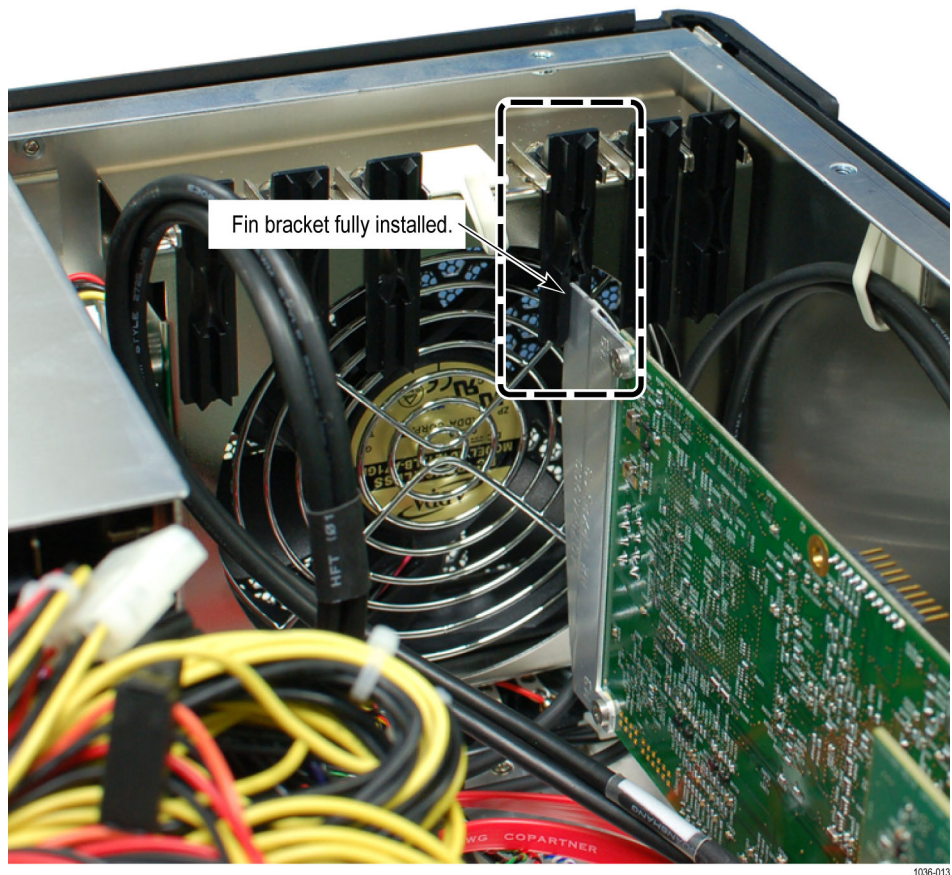
**CAUTION.** *If you are installing the interface card in slots 6 and 7, take care while installing the card to prevent damage to the pins on the motherboard shown below.*





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- b. Once the interface card is aligned, push down on the raised end of the interface card until the card is level.
- c. Carefully press down on both ends of the card until the card seats into the motherboard connectors. The figure below shows the interface card fully installed.



10. Use the screw(s) from the removed blank panel(s) and attach the interface card to the chassis.

---

**NOTE.** *Some interface cards require the removal of two blank panels.*

---

**11. ASI Option only:**

- a. Install two BNC washers and a nut to each of the four BNC connectors. Torque the BNC nuts to 14 in/lb. with a 9/16" socket.

**12. IPTV Option only:**

- a. Install the CIP cable from J10 on the IPTV interface card to a COM connector on the motherboard. Refer to the Interface card slot locations table at the beginning of this procedure to identify the proper placement of the interface card and proper COM connector.

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**NOTE.** The CIP cable must be installed so that the green wire on the CIP cable connects to pin 1 on the option card. Pin 1 on the card is identified with a triangle.

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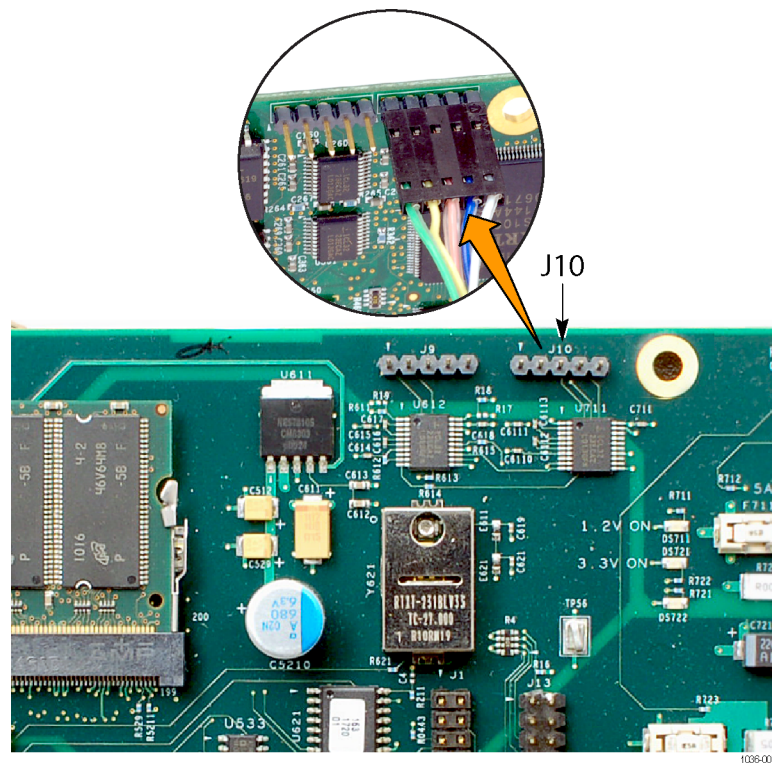
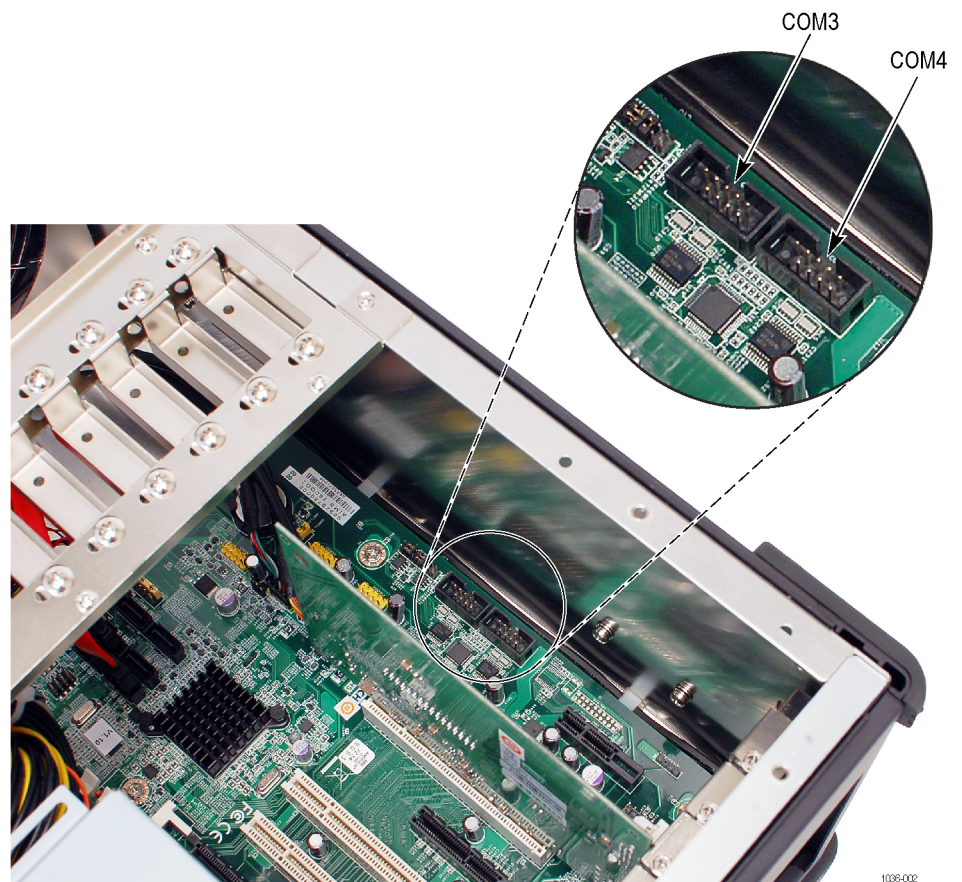


Figure 4: CIP cable installation on option IPTV interface card





**Figure 5: COM connectors on motherboard**



### 13. QB2, S2, and VS Options only:

- a. Install the CIP cable from J14 on the interface card to a COM connector on the motherboard. Refer to the Interface card slot locations table at the beginning of this procedure to identify the proper placement of the interface card and proper COM connector.

**NOTE.** The CIP cable must be installed so that the green wire on the CIP cable connects to pin 1 on the option card. Pin 1 on the card is identified with a triangle.

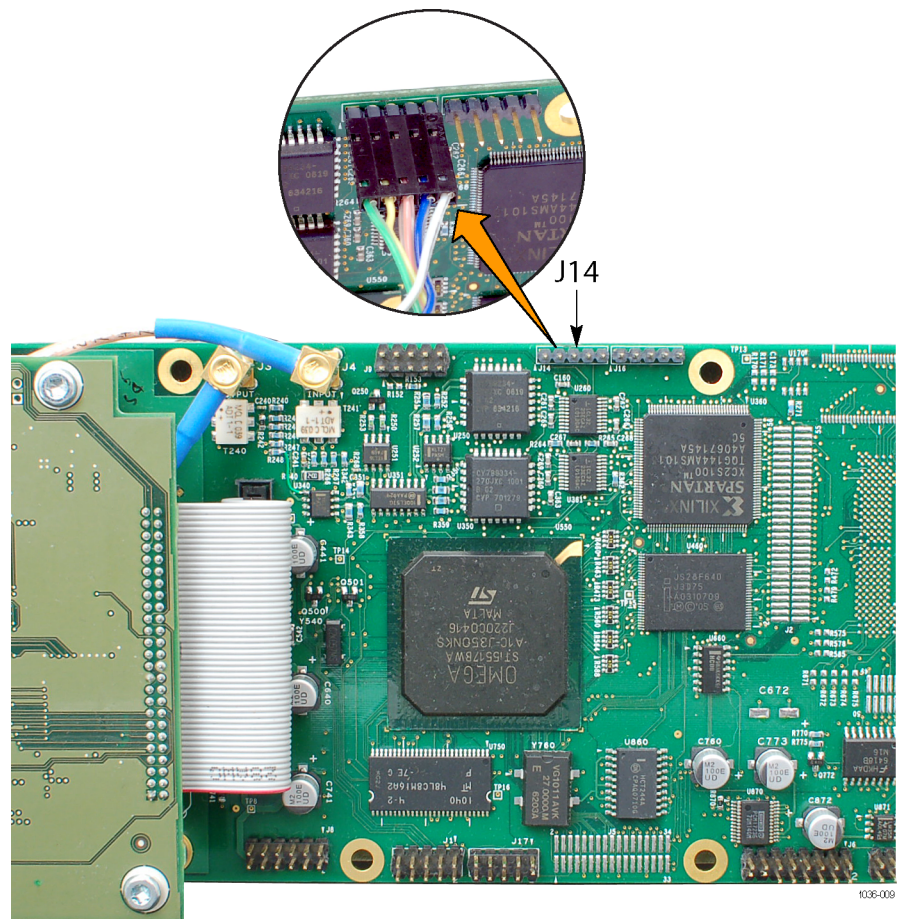


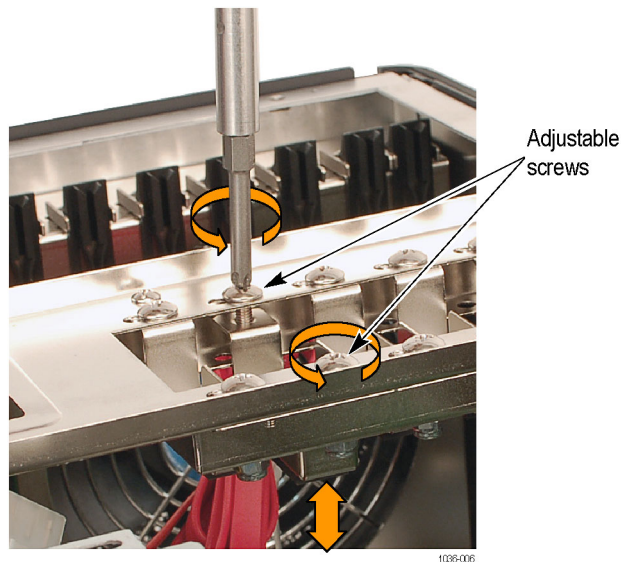
Figure 6: CIP cable installation on option QB2, S2, and VS interface cards



**CAUTION.** Before reinstalling the interface card support bracket in the next step, check that none of the card stabilizers are already in their lowered position.

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14. Reinstall the interface card support bracket.
15. Some option cards are longer than others. If the option card being installed reaches the adjustable card stabilizers on the interface card support bracket, then you need to support the circuit board.
  - a. Align the circuit board with the center of the pad on the stabilizer.
  - b. Slowly, lower the stabilizer by adjusting the two screws counterclockwise. Adjust the screws a few turns at a time, alternating between the two screws. Continue lowering the stabilizer until the pad makes contact with the interface card.

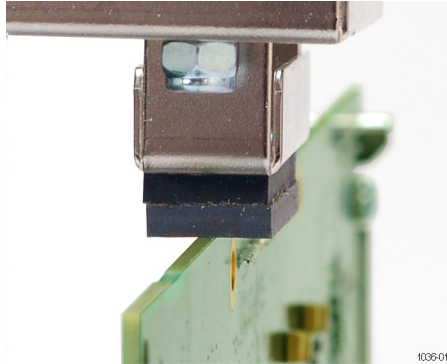


- c. After the pad has made contact with the interface card, adjust the screws tight enough so they don't wobble.

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**NOTE.** *There should be two pads stacked together on the stabilizer. If not, use one from an unused stabilizer.*

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16. Connect the power cable to the rear panel fan (if it was disconnected) and install the rear panel.

# Optical SFP upgrades

The Optical SFP upgrade kits simply contain the new optical SFP module, to be used with the Option IPTV interface card.

There are no installation requirements other than installing the SFP module into the Option IPTV interface card when required.

The Optical SFP upgrade kits are:

MTS4KUP SX	MTS4KUP LX	MTS4KUP ZX
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**Figure 7: Sample SFP optical module**