

**MTS4KUP Upgrade Kit
MTS4000 and MTS4SAV3
MPEG Test Systems
Instructions**



075-1036-03

Tektronix

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

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Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

To safely perform service on this product, additional information is provided at the end of this section. (See page vi, *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

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. Do not use the provided power cord for other products.

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, make sure that the product is properly grounded. Do not disable the power cord grounding connection.

Power disconnect. The power switch disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to disconnect the power switch; it must remain accessible to the user at all times to allow for quick disconnection if needed.

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 apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

The measuring terminals on this product are not rated for connection to mains or Category II, III, or IV circuits.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

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

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

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

Use proper fuse. Use only the fuse type and rating specified for this product.

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

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

Provide proper ventilation. Refer to the installation instructions in the manual for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Avoid improper or prolonged use of keyboards, pointers, and button pads. Improper or prolonged keyboard or pointer use may result in serious injury.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

Use care when lifting and carrying the product. This product is provided with handles for lifting and carrying.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

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 product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

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.

Verify safety after repair. Always recheck ground continuity and mains dielectric strength after performing a repair.

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.*

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.



When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

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



CAUTION
Refer to Manual



Protective Ground
(Earth) Terminal



Mains Disconnected
OFF (Power)



Mains Connected
ON (Power)



Standby

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
- MTS4SAV3 MPEG Test System

Covered upgrades

The following MTS4KUP upgrades are covered by this document.

Table i: Covered software-only upgrades

MTS4KUP option	Description
ESS	Adds standard ES analysis. Includes MTS4CC with all options and ES Analyzer.
ESB	Enhanced ES analysis. Includes MTS4EAV7 base software (single user license only) and ES Analyzer.
ESE	Adds enhanced ES analysis. Includes MTS4EAV7 with all options including HEVC/H.265 (single user license only) and ES Analyzer.
GEN	Adds the Multiplexer, Carousel Generator, ISDB-T Remux, and Transport Stream Editor. Includes the Tclips test streams media.
PB	Adds the PES and T-STD Buffer Analyzers.
PQ	Adds picture quality analysis software, single and double ended. Includes PQASW with IP option.
VQ	Adds video quality software, single ended. Includes VQS1000 with all options.
V3	Upgrade existing MTS4SA Version 2 to MTS4SAV3

Table ii: Covered hardware upgrades

MTS4KUP option	Description
ASI	Adds the Multiport ASI interface (four ports).
QB2	Adds the QAM B interface. (Requires Option ASI.)
S2	Adds the DVB-S/S2 interface supporting QPSK, 8PSK, 16APSK AND 32APSK demodulation. (Requires Option ASI.)
VS	Adds the 8VSB interface. (Requires Option ASI.)
10GS	Adds the 10GBASE-SR dual optical port 10Gb/s NIC. Includes short reach SFP+ modules (850 nm).
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:
SX	Adds a 1000 Base-SX Short Wavelength Optical Port with LC Connector for IPTV Ethernet Interface (Multi Mode 850 nm).
LX	Adds a 1000 Base-LX Long Wavelength Optical Port with LC Connector for IPTV Ethernet Interface (Single Mode 1310 nm).
ZX	Adds a 1000BASE-ZX optical port with LC connector for IPTV Ethernet interface (single mode 1550 nm).

Kit parts lists

The following tables list the parts that are supplied with each upgrade kit.

MTS4KUP ESS MTS4KUP ESB MTS4KUP ESE MTS4KUP V3

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 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 VQ

Quantity	Part Number	Description
1	N/A	VQS1000 OPTION KEY LABEL
1	N/A	VQS1000 SOFTWARE LICENSE FOR MAIN CONCEPT AUDIO CODEX
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	PQASW 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 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
8	210-1039-xx	WASHER, LOCK; 0.521 ID, INT, 0.025 THK, STEEL, ZINC FINISH
4	220-0497-xx	NUT, PLAIN, HEX; .5-28 X .562 HEX, BRS, NI (NICKEL) PLATED

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 MTS4SAV3.

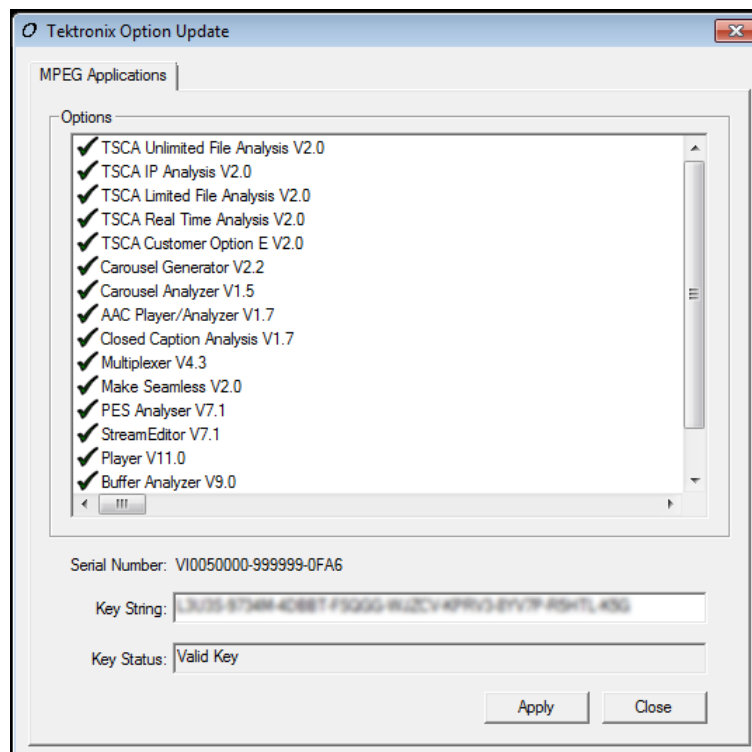
The software only upgrades are:

MTS4KUP ESE	MTS4KUP GEN	MTS4KUP VQ
MTS4KUP ESS	MTS4KUP PB	MTS4KUP V3
MTS4KUP ESB	MTS4KUP PQ	

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

MTS4KUP ESE, ESS, GEN, and PB 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.

MTS4KUP V3 upgrade

System requirements. If you are not installing the MTS4SAV3 software on a MTS4000 instrument, the computer hosting the MTS4SAV3 software needs to meet the following requirements:

- Processor speed > 2.5GHz
- Intel or 100% compatible motherboard chipset
- Microsoft Windows 7, 64-bit operating system
- 4 GB of RAM
- 250 GB of available hard disk space for the applications and documentation
- Additional space is required for storage of captured video streams
- SVGA (800×600) resolution video adapter and monitor (XVGA (1024×768) or higher resolution recommended)
- CD-ROM or DVD drive
- Keyboard and Microsoft mouse or compatible pointing device
- Video over IP Analysis option requires a standard Network Interface Card (NIC)
- Detailed graphical displays provided by the next-generation compressed video analyzer (MTS4EAV7) require Microsoft Excel

Upgrade procedure. Perform the following steps to upgrade your existing MTS4SA version 2.x to MTS4SAV3:

NOTE. *Your existing MTS4SA software must be version 2.x or above to upgrade to the MTS4SAV3 software.*

You do not need to uninstall your old MTS4000 or MTS4SA software. If the installation process detects an older version of the software, it is automatically uninstalled during the upgrade process.

1. Download the MTS4SAV3 software from the Tektronix Web site:
 - a. Use your Web browser to access the Tektronix Web site (www.tektronix.com).
 - b. Search for **MTS4SAV3**.
 - c. Download the software to your MTS4000 instrument or to your PC.
2. If installed, remove your existing MTS4000 or MTS4SA USB software key (dongle) from the instrument or PC.



CAUTION. *To prevent installation problems, it is recommended that you remove the software key (dongle) from the instrument or PC before you install the software.*

3. Right-click the **MTS4000_Setup.exe** file, and select **Run as administrator** to start the software installation.

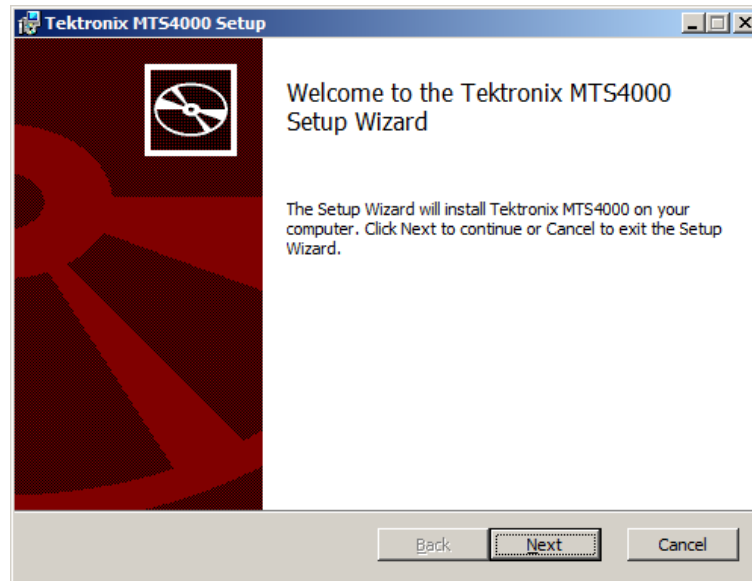
NOTE. *You need to have administrator privileges to install the MTS4SAV3 software.*

4. In the **Tektronix MTS4000** pop-up window, select the desired installation path. Click **OK** to continue.

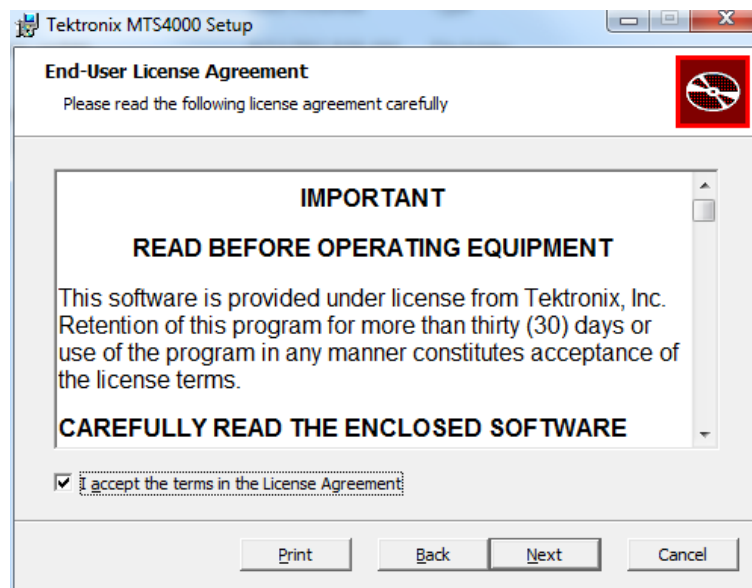
5. The MTS4000 Setup Wizard opens and displays a Welcome screen.

NOTE. Depending on your Windows setup and security settings, the MTS4000 installation autostart may not launch. If necessary, you can use Windows explorer to locate and run the file *MTS4000_setup.exe*.

6. In the installation Welcome screen, select **Next**.



7. Read the End-User License Agreement. Accept the agreement and select **Next**.

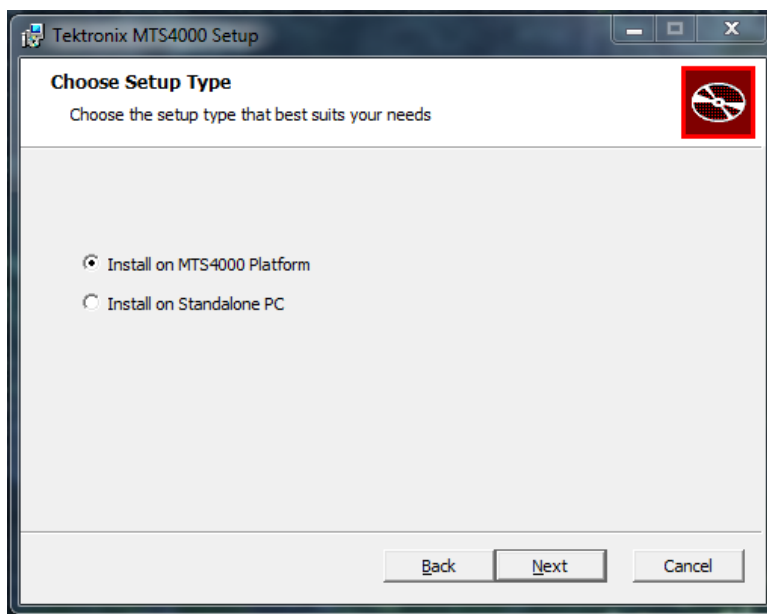


8. In the Choose Setup Type screen, you need to indicate if the installation is for a PC or for the MTS4000 platform.

- Select **Install on MTS4000 Platform** to install the MTS4SAV3 software on your MTS4000 instrument.

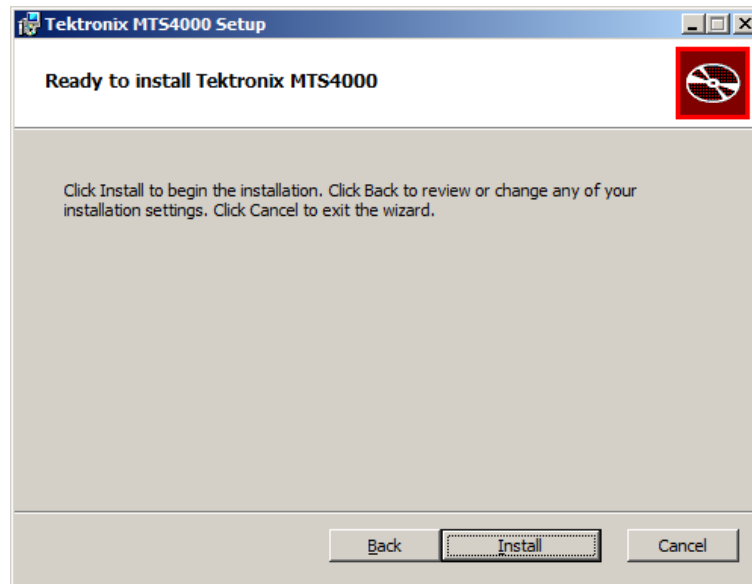
NOTE. When you select *Install on MTS4000 Platform*, all of the necessary drivers for the interface cards are installed.

- Select **Install on Standalone PC** to install the MTS4SAV3 software on your PC.



9. Select **Next**.

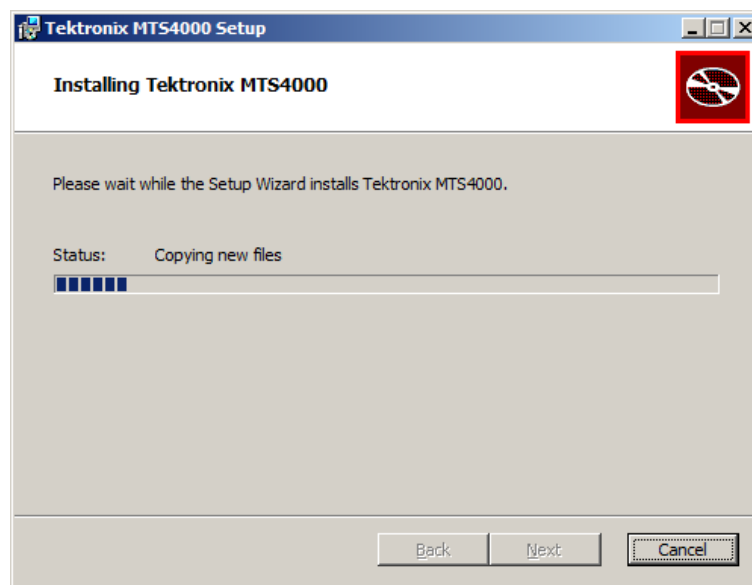
10. In the Ready to Install screen, select **Install**.



11. Allow the installation to proceed.

NOTE. A number of installation message boxes display during the installation process. Normally, no user intervention is required.

If the installation program detects your older version of the MTS4SA software, the software is automatically uninstalled.



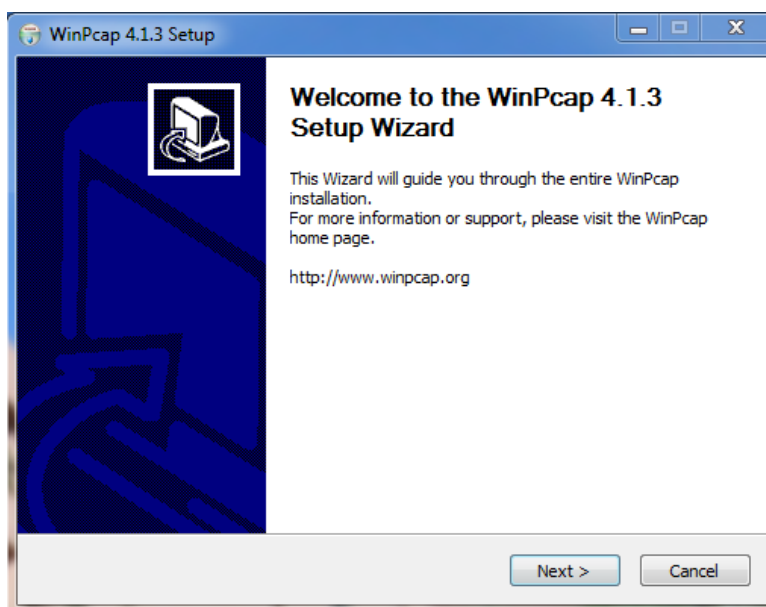
12. When the DESkey installer displays, select **Next** to proceed with the DESkey installation process. Depending on the Windows security settings, you may see a Windows Security message to install device software. Select **Install**.

NOTE. The DESkey installation is skipped if the MTS4000 installation process detects that the correct version of DESkey is already installed.

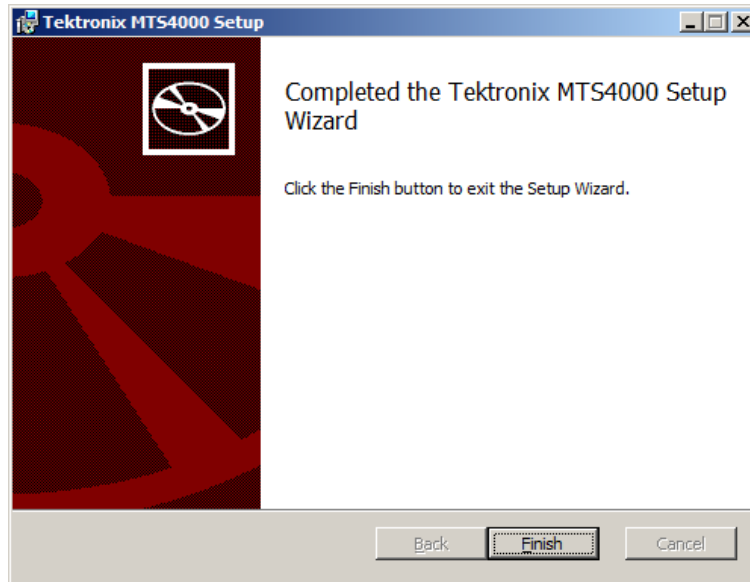


13. When the WinPcap installer displays, select **Next** to proceed with the WinPcap installation process.

NOTE. The WinPcap installation is skipped if the MTS4000 installation process detects that the correct version of WinPcap is already installed.



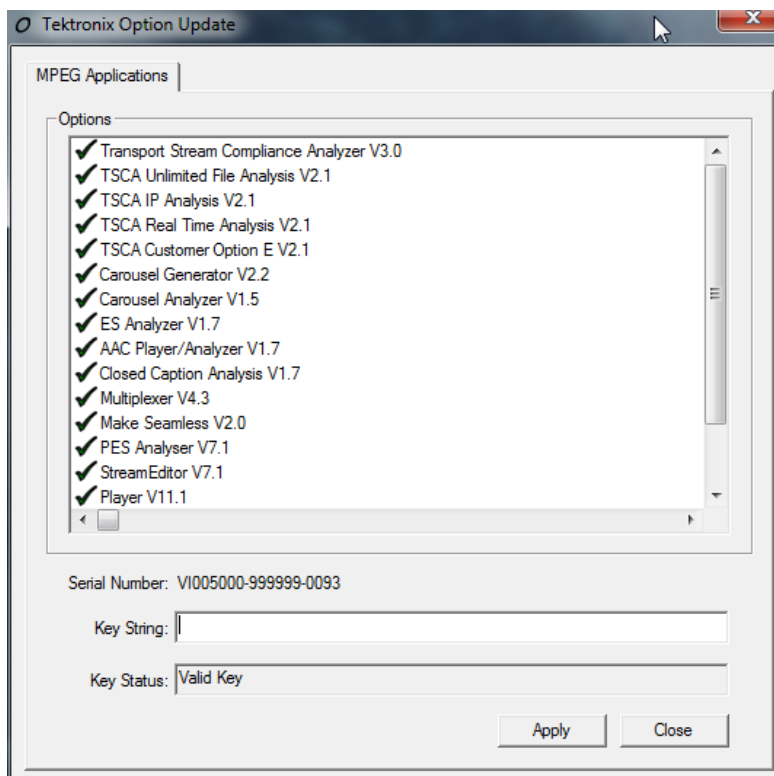
14. When installation completed screen displays, select **Finish**.



15. In the pop-up window, select to reboot your instrument or PC now.

NOTE. *A reboot is necessary before entering the option key or using the applications.*

16. After the instrument or PC has restarted, install your existing MTS4000 or MTS4SA USB software key (dongle) into a USB port on the instrument or PC.
17. After the instrument or PC detects the software key (dongle), open the MTS4000 Option Key Wizard by selecting **Start > Programs > Tektronix MTS4000 > OptionKey Wizard**.



18. In the Tektronix Option Update dialog box, enter the Option Key String supplied with the upgrade kit in the Key String field.
19. Click **Apply**.
20. Inspect and verify the list of licensed options.

NOTE. Operational access to features is controlled by the licenses that are available on the software key. Applications and features can be installed, but will not be available unless the appropriate license has been obtained. Notification of these is provided when the product or additional licenses are purchased.

The MTS4EAV7 and MTS4CC licensing is stored in the USB dongle. The VQS and PQA software require separate licensing.

21. Close the Option Key Wizard.
22. The licensed MTS4SAV3 applications are now available in the Windows Start menu.

MTS4SAV3 product documents. The following table lists the part numbers of the documents supporting the MTS4SAV3 software. You can download these documents from the Tektronix Web site (www.tektronix.com).

Table 1: MTS4SAV3 product documentation

Title	Tektronix part number
Quick Start User Manual	071-2970-03 or later (English) 077-0657-02 or later (Russian) 077-0665-02 or later (Simplified Chinese) 077-0666-02 or later (Japanese)
Analyzer Applications User Manual	077-0622-02 or later
Generator Applications User Manual	077-0623-02 or later
Carousel Applications User Manual	077-0624-02 or later
Release Notes	077-0627-01 or later

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 2: 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.

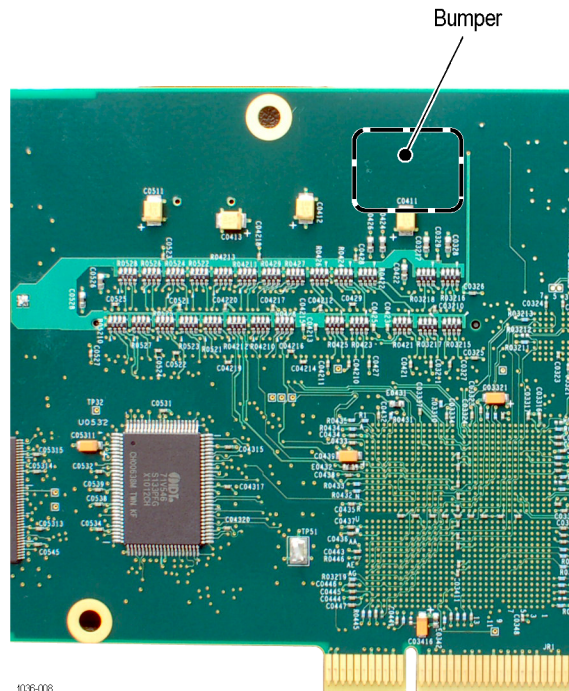


Figure 1: IPTV interface card bumper installation

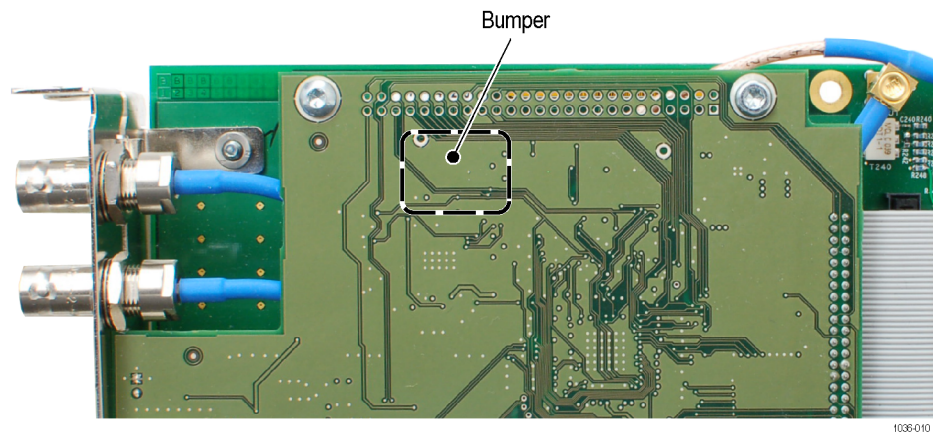
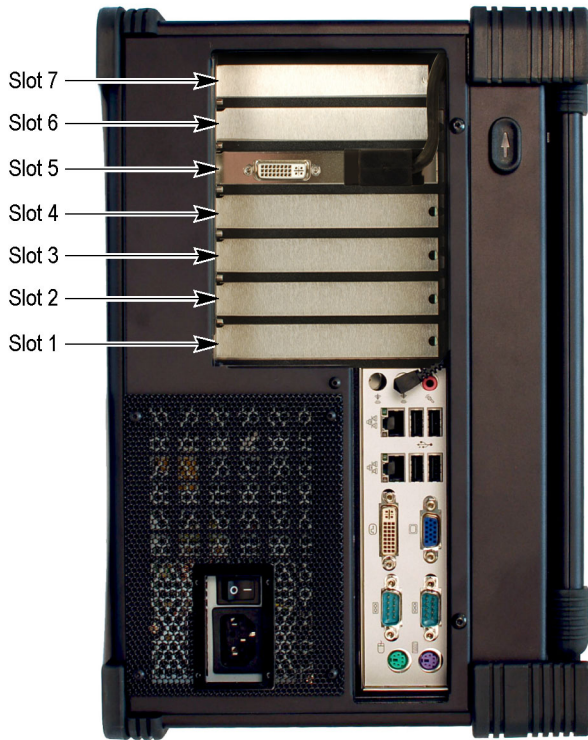


Figure 2: QB2, S2, and VS interface cards bumper installation

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 3: 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

¹ 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.

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.)

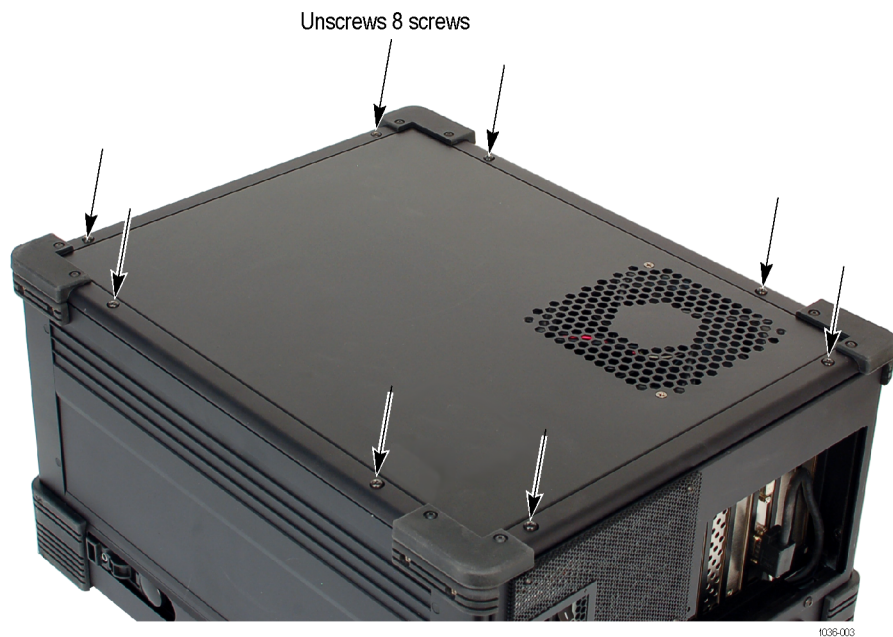
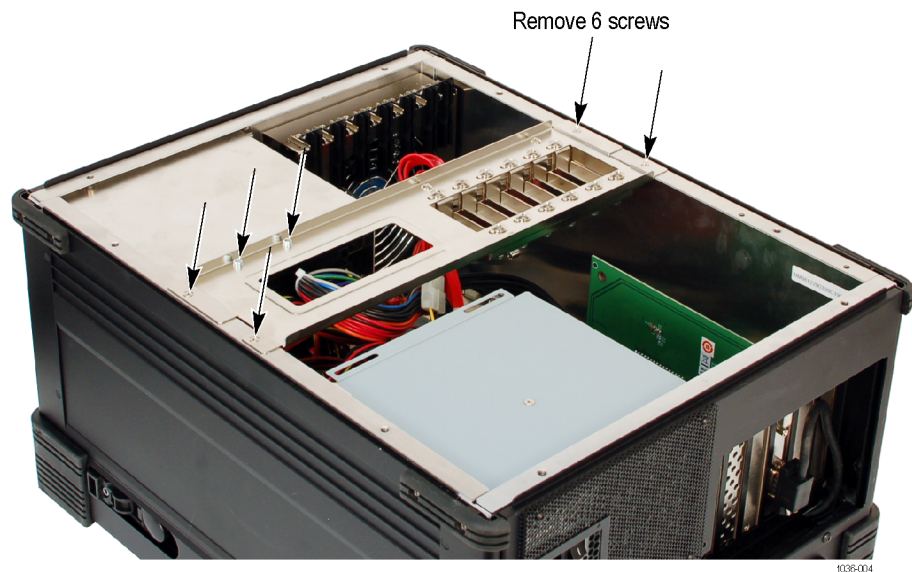


Figure 3: Remove rear panel

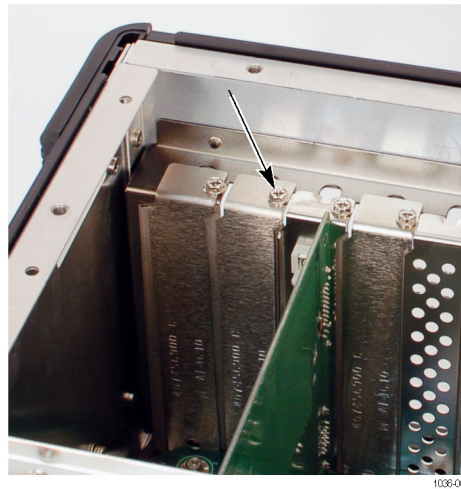
5. Lift the rear panel off the instrument. If necessary, disconnect the power connector to the fan.

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

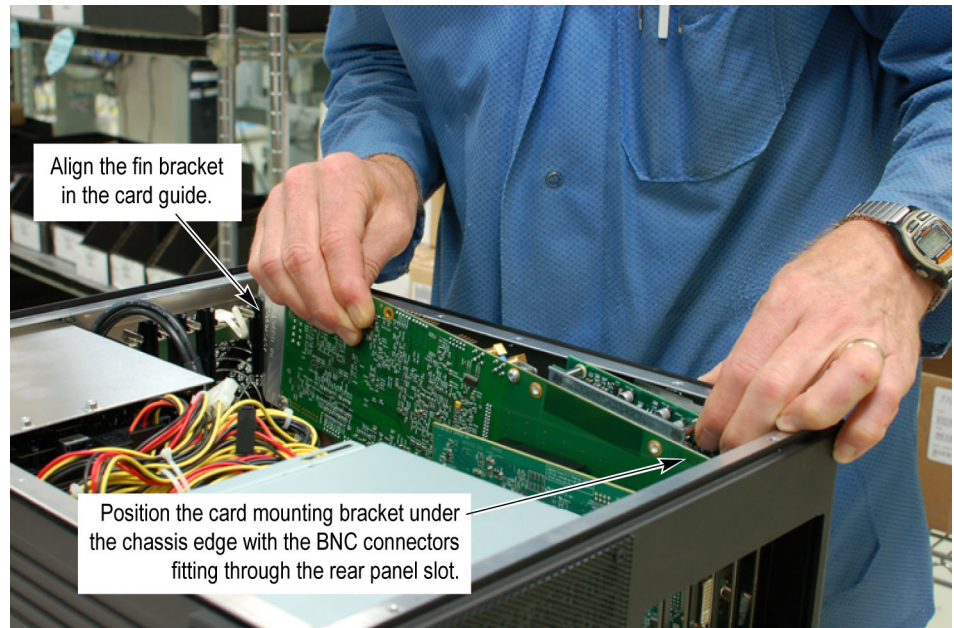


7. Depending on the option card being installed, remove the appropriate blank panel from the rear of the instrument. Use the table to identify the recommended location for each of the available interface card. See the table *Interface card slot locations*.

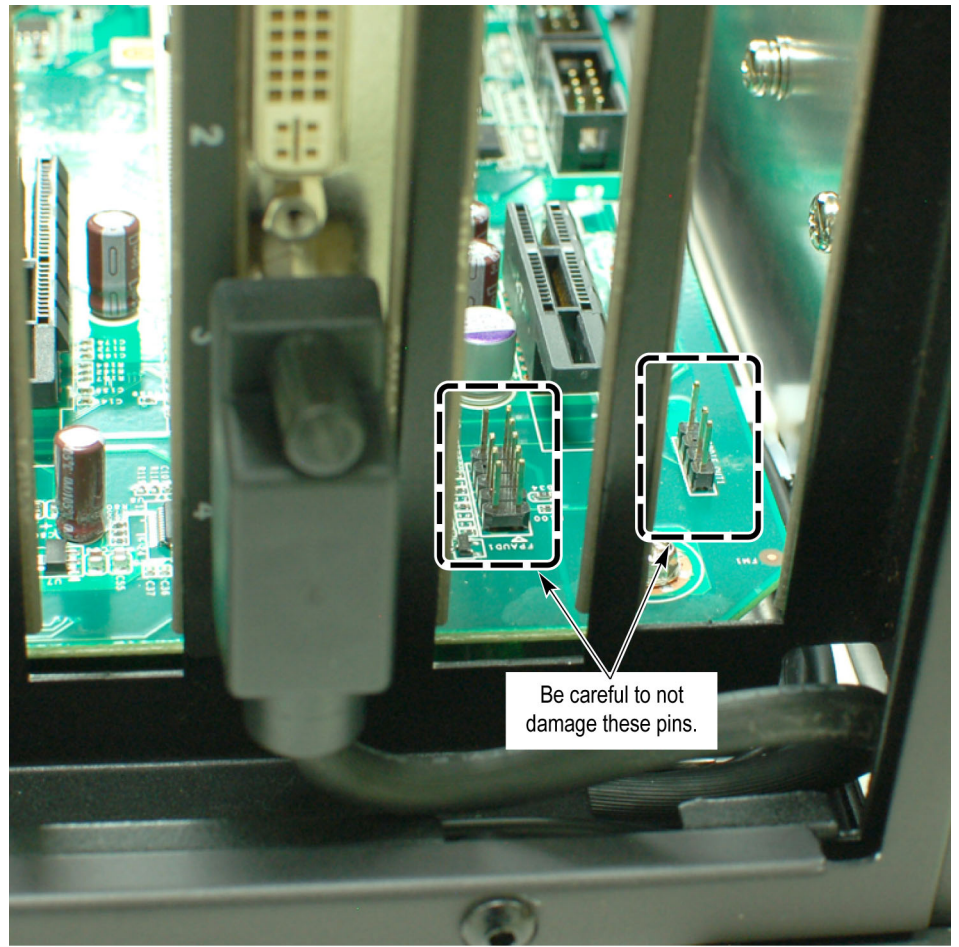
If installing multiple option cards, remove all appropriate blank panels at this time.



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.

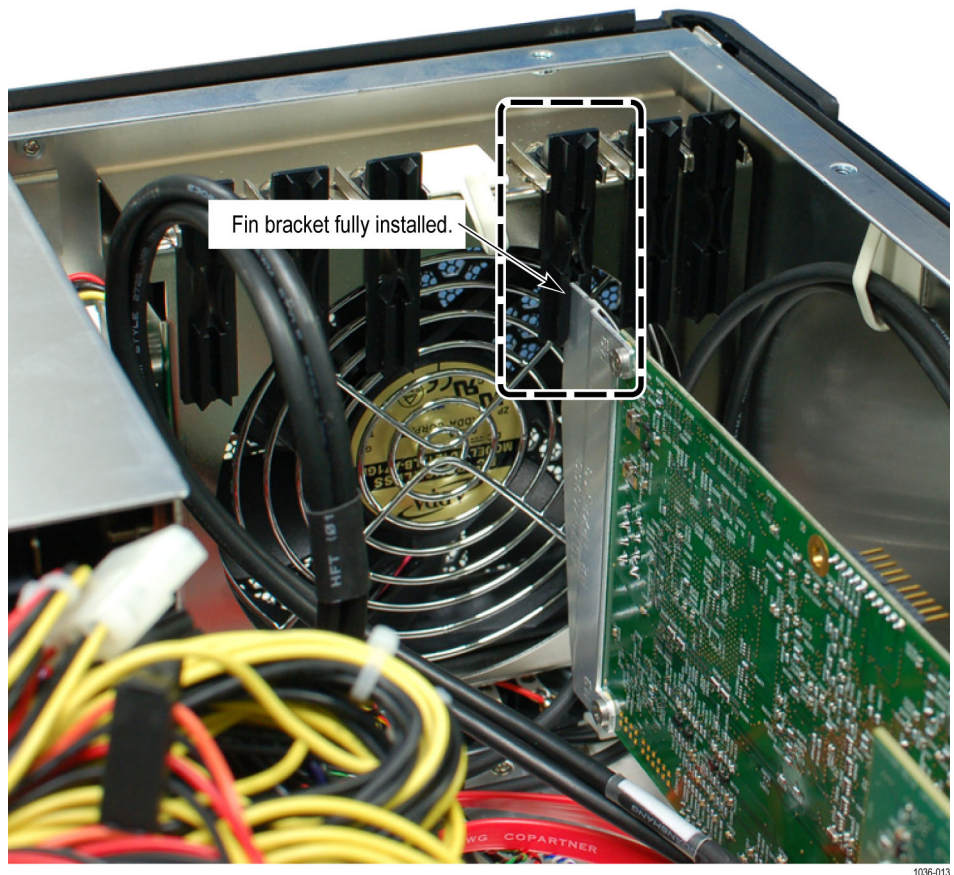


CAUTION. *If you are installing the interface card in slots 6 and 7, take care while installing the card to prevent damage to the pins on the motherboard shown below.*



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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.

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.

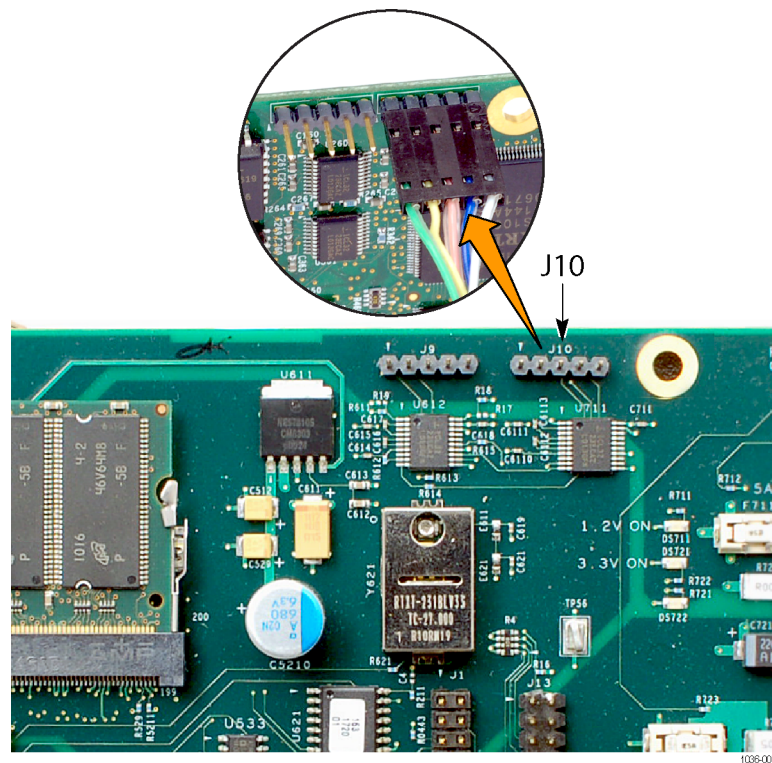


Figure 4: CIP cable installation on option IPTV interface card

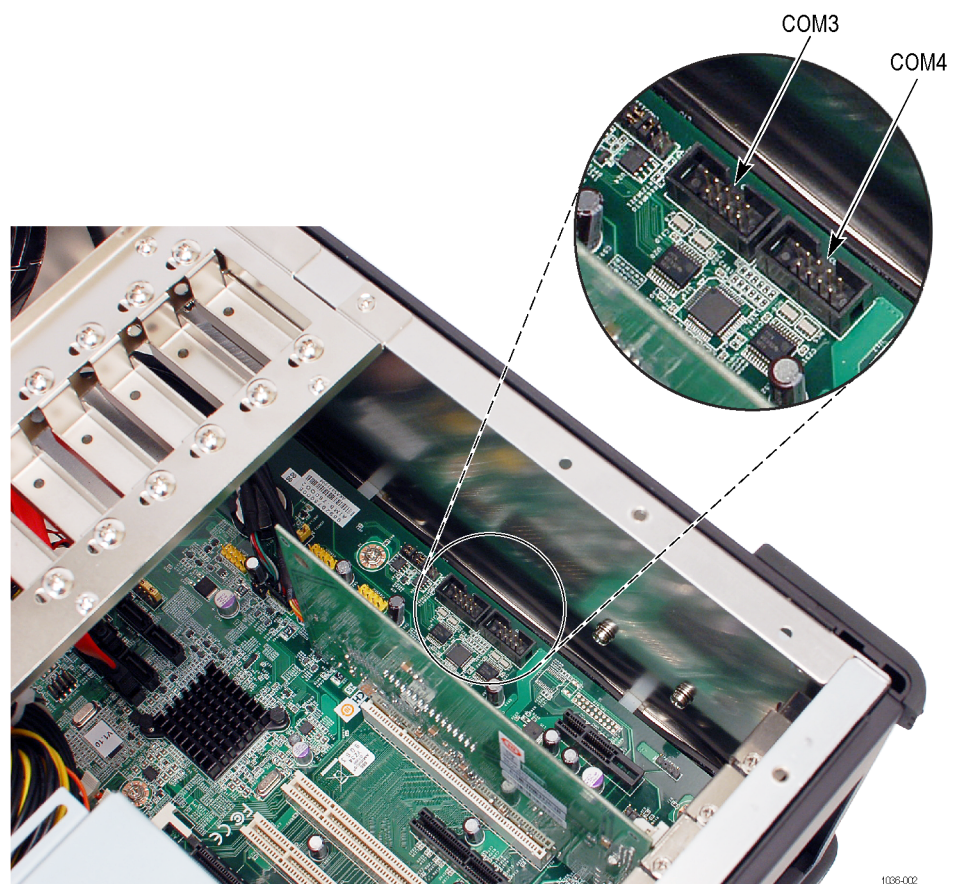


Figure 5: COM connectors on motherboard

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.

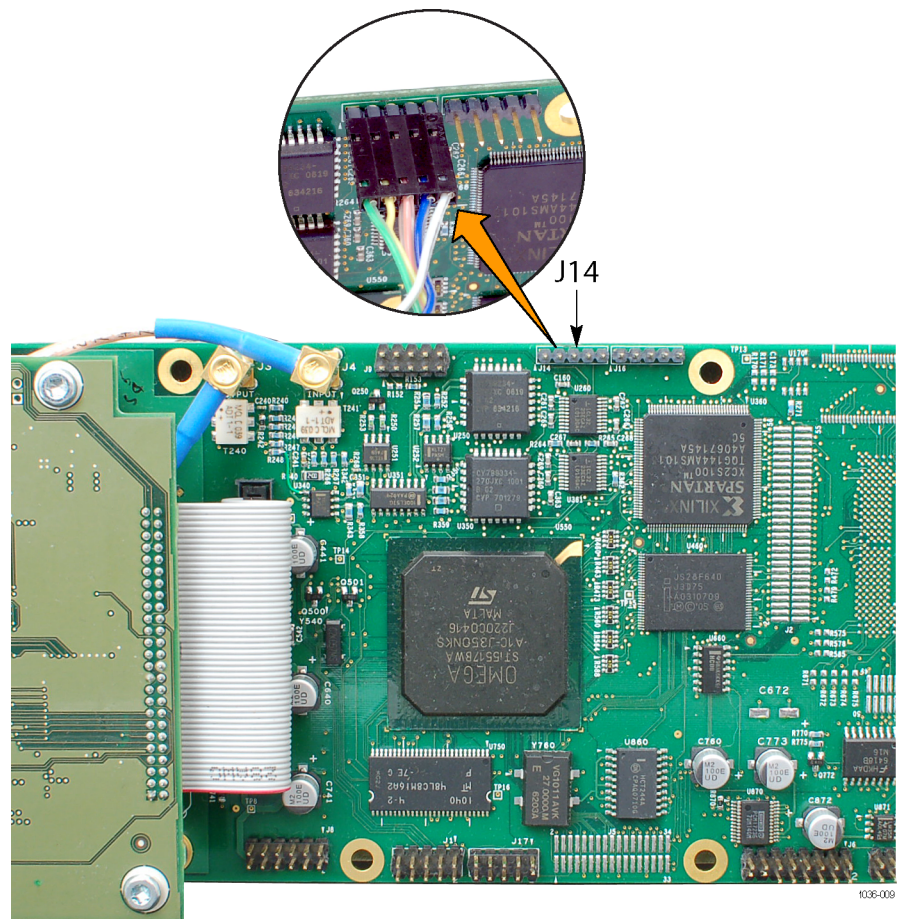
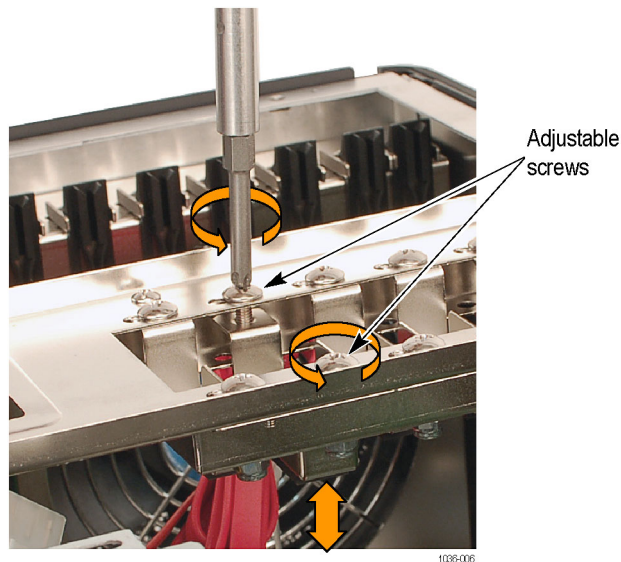


Figure 6: CIP cable installation on option QB2, S2, and VS interface cards



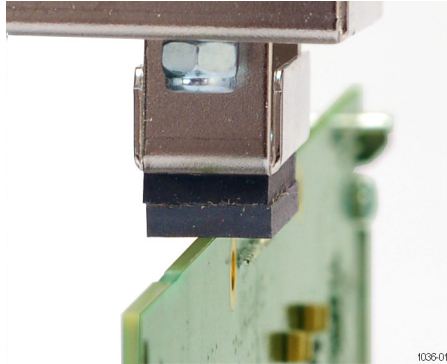
CAUTION. Before reinstalling the interface card support bracket in the next step, check that none of the card stabilizers are already in their lowered position.

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.

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



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