

Technical Reference



MTS300 MPEG Test System Hardware and Software Installation

071-0667-03

This document applies to firmware version 6.1.

Warning

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

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating 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.

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.

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

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.

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

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.

Preface

This manual provides installation and first-time operating instructions for the MTS300 MPEG Test Systems software version 6.1.

The individual sections of this manual provide specific information on the following topics:

- The *Hardware Installation* section contains basic instructions on how to install and operate the test system.
- The *First Time Operation* section contains procedures to verify the test system is functioning properly.
- The *Specifications* section lists the electrical characteristics of the platform, I/O system, and the Synchronous Serial Interface. This section also includes environmental and physical characteristics and repackaging information.
- The *Software Repair and Recovery* section contains procedures to troubleshoot and restore the operating system and device drivers and reinstall the MTS300 applications software.

For the latest information about MTS300 system software features and bugs, refer to the *MPEG Test System Software Version 6.1 Read This First* document, Tektronix part number 071-0666-XX, that accompanied your test system, software product, or upgrade.

Related Documents

For additional information about using MTS300 system software to monitor, analyze, and generate MPEG-2, DVB, and ATSC data streams, refer to the following manuals:

The *MTS300 MPEG Test System Real-Time Analysis User Manual*, Tektronix part number 071-0658-XX, contains information about using the Real-Time MPEG-2 Analyzer application.

The *MTS300 MPEG Test System MPEG-2 DVB/ATSC/ISDB-S/ARIB System Analyzer User Manual*, Tektronix part number 071-0659-XX, contains information about using the Deferred-Time Analyzer and DVB Channel Coding and Decoding applications.

The *MTS300 MPEG Test System Program Stream Analyzer User Manual*, Tektronix part number 071-0662-XX, contains information about using the deferred-time Program Stream Analyzer application.

The *MTS300 MPEG Test System Stream Creation Applications User Manual*, Tektronix part number 071-0778-XX, contains information about using the Multiplexer, DVB Table Editor, ATSC Table Editor, DVB Channel Coding and Decoding, Jitter Adder, Error Injector, and Open MUX Controller applications.

The *MTS300 MPEG Test System Dolby Digital Audio Stream Analyzer User Manual*, Tektronix part number 071-0661-XX, contains information about using the deferred-time AC-3 Audio Stream Analyzer application.

The *MTS300 MPEG Test System Audio Stream Analyzer User Manual*, Tektronix part number 071-0663-XX, contains information about using the deferred-time MPEG Audio Stream Analyzer application.

The *MTS300 MPEG Test System Video Stream Analyzer User Manual*, Tektronix part number 071-0664-XX, contains information about using the deferred-time MPEG Video Stream Analyzer application.

The *MTS300 MPEG Test Options User Manual*, Tektronix part number 1000-3031, contains information about using the Data Broadcast Carousel Analyzer application, the Elementary Stream Analyzer application, and the Multiplexer application.

For additional information about test system maintenance and repair, refer to the optional *MTS300 MPEG Test System Service Manual*, Tektronix part number 071-0668-XX. Contact your nearest Tektronix representative or field office for ordering information.

For additional information about the Windows NT operating system, refer to the online help provided with the test system.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 6:00 a.m. - 5:00 p.m. Pacific time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.**



Hardware Installation

Hardware Installation

This section contains the following information:

- Unpacking the MTS300 system
- Hardware installation
- Repackaging the MTS300 system for shipment

For information on generating and analyzing MPEG transport streams, refer to the MTS300 system user manuals. See page ix for a list of the available manuals.

Refer to *First Time Operation* on page 2-1 for instructions on how to verify basic instrument operation after the MTS300 system has been installed.

Unpacking the MTS300 System

The tables in this section list the standard and optional accessories available for the MTS300 system.

NOTE. *You must use the original box and packaging when returning your test system to Tektronix. In the event shipping is required for upgrade or repair, refer to Packaging for Shipment on page 1-16.*

Accessories

Table 1-1 lists the standard accessories that are shipped with your MTS300 system. Use this list to ensure that your order is complete.

Table 1-1: Standard accessories for the MTS300 system

Quantity	Description	Part number
1 ea	Read This First	071-0666-XX
1 ea	MTS300 MPEG Test System Hardware and Software Installation Technical Reference (this manual)	071-0667-XX
1 ea	MTS300 MPEG Test System Real-Time Analysis User Manual (includes 063-3325-XX CD-ROM)	071-0658-XX
1 ea	MTS300 MPEG Test System Stream Creations User Manual	071-0778-XX
1 ea	Applications software recovery disc (supplied with 071-0658-XX manual)	063-3325-XX (not orderable)
1 ea	Operating system recovery disc	063-3366-XX
1 ea	License Password document Note: <i>Keep this document in a safe place. You will need it if you ever have to reinstall your software.</i>	063-3158-XX
1 ea	Rackmount kit (sliding drawer style) with instructions <i>This kit ships in a separate box.</i>	016-1691-XX
1 ea	Power cord (North American)	161-0066-00
1 ea	Stylus (for use with the touchscreen)	119-6107-XX
1 ea	SCSI terminator (installed on the test system)	650-4062-XX
1 ea	Front panel cover	200-4408-XX
1 ea	Emergency backup disk (floppy disk)	
1 ea	Mouse	
1 ea	Keyboard	
1 ea	Statement of ISO Compliance (in envelope)	

Table 1-2 lists the optional accessories you can order for your MTS300 system. See your Tektronix representative for help ordering these optional accessories.

Table 1-2: Optional accessories

Description	Part number
MTS300 MPEG Test System Service Manual	071-0668-XX
Rackmount cabinet conversion kit with instructions	016-1921-XX
Power cord options:	
Option A1 Universal Euro	161-0066-09
Option A2 United Kingdom	161-0066-10
Option A3 Australian	161-0066-11
Option A5 Swiss	161-0154-00

Options

Table 1-3 lists the options available when you purchase the test system. Table 1-4 lists the possible interface configurations.

Table 1-3: MTS300 test system options

Category	Option	Description
MTS300	Basic instrument	Test System with at least one user-selected interface and the following client applications: Master Client Expert Client TMCC Expert Client Configuration Client TMCC Configuration Client Stream Player Client Stream Recorder Client The MTS300 also comes with the Private Syntax Interpreter and the Jitter Adder applications.
Interface ¹	Option AS	ASI/M2S asynchronous serial interface
	Option DE	DHEI (GI-Digicypher) interface ²
	Option LV	SPI (LVDS) synchronous parallel interface ²
	Option SS	SSI (SMPTE310M) synchronous serial interface

Table 1-3: MTS300 test system options (Cont.)

Category	Option	Description
Software	Option DT	Deferred-Time Analysis System (user manual 071-0659-XX), which includes the following applications: MPEG-2 DVB/ATSC/ISDB-S/ARIB System Analyzer TMCC Deferred-Time Analyzer MPEG-2 DVB/ATSC/ISDB-S/ARIB Multiplexer DVB Table Editor ATSC Table Editor ARIB Table Editor DVB Channel Coding and Decoding Error Injector
	Option AC3	Dolby Digital (AC-3) Analyzer (user manual 071-0661-XX)
	Option OC	ViAccess Conditional Access (requires Option DT)
	Option OM	OpenMux™ Real-Time Multiplexer (user manual 071-0778-XX)
	Option ES	MPEG Audio and MPEG Video Elementary Stream Analyzers (user manuals 071-0663-XX and 071-0664-XX)
	Option PS	Program Stream Analyzer (user manual 071-0662-XX)
	Option TM	TMCC Combiner

- ¹ Each hardware interface option adds two input/output pairs, clock, and trigger connections. The test system maximum capacity is any two interface options except as noted in Table 1-4.
- ² The SPI (LVDS) and DHEI (GI-Digicypher) interfaces can only be ordered when you order an ASI/M2S interface.

Table 1-4: Possible interface configurations

First mezzanine	Second mezzanine (one of the following)
ASI/M2S interface	None
	ASI/M2S interface
	SMPTE310M (SSI) interface
	DHEI (GI-Digicypher) interface ¹
	SPI (LVDS) interface ¹
SSI (SMPTE310M) interface	None
	SSI (SMPTE310M) interface
	ASI/M2S interface ²

- ¹ The SPI (LVDS) and DHEI (GI-Digicypher) interfaces can only be ordered when you order an ASI/M2S interface.
- ² This configuration is only available when you install the MTS3FAS hardware upgrade into an existing MTS300 with an SSI (SMPTE310M) interface.

Upgrades

Table 1-5 lists the upgrades available for an existing MTS300 MPEG Test System. You can order some of these upgrades when you purchase your instrument and they will be installed at the factory.

NOTE. All of the MTS300 upgrade kits require that you run the Sales Wizard file *MTS3WIZ.ZIP*. The latest version is available from www.tektronix.com.

Table 1-5: MTS300 test system upgrades

Category	Part number	Description
Interface ¹	MTS3FAS	Adds ASI/M2S interface to existing MTS300
	MTS3FDE	Adds DHEI (GI-Digicypher) interface to existing MTS300
	MTS3FLV	Adds SPI (LVDS) synchronous parallel interface to existing MTS300
	MTS3FSS	Adds SSI (SMPTE310M) synchronous serial interface to existing MTS300
Software	MTS3FDT	Adds Deferred-Time Analysis System to existing MTS300
	MTS3FAC	Adds Dolby Digital (AC-3) Analyzer to existing MTS300
	MTS3FOC	Adds ViAccess Conditional Access to existing MTS300
	MTS3FOM	Adds Real-Time Multiplexing (Open Mux) to existing MTS300
	MTS3FES	Adds MPEG Audio/Video Elementary Stream Analyzers to existing MTS300
	MTS3FPS	Adds Program Stream Analyzer to existing MTS300
	MTS3FTM	Adds TMCC Combiner to existing MTS300
	MTS3FDB	Adds Data Broadcast Carousel Analyzer to existing MTS300
	MTS3FIN	Adds Elementary Stream Analyzer for all MPEG-1 and MPEG-2 transport streams to existing MTS300
MTS3FMX	Adds off-line Multiplexer to existing MTS300	

¹ Each interface option adds two input/output pairs, clock, and trigger connections. The test system maximum capacity is any two interface options except as noted in Table 1-4.

Hardware Installation

This section provides instructions for installing the MTS300 system and making the necessary electrical connections. The MTS300 system can be operated from a bench or installed in a rack using the optional rack-mount kit. The rack-mount kit includes installation instructions.



CAUTION. For proper cooling, provide at least two inches (5.1 cm) of clearance at the rear and to the sides of the test system, and ensure that the air temperature at all air intake vents (inside of the equipment rack) does not exceed 40 °C.

Use the two collapsible front feet on the bottom of the MTS300 system to change the height of the front panel.

Test System Interconnections

The location of the connectors on a typical test system rear panel is shown Figure 1-1. Table 1-6 describes the transport stream, network, and peripheral device connectors. Refer to *Connecting the MTS300 System I/O Ports* on page 1-11 for illustrations of the various rear-panel connector configurations.

Table 1-6: Rear-panel connectors

Connector	Description
Transport stream input/output ASI/M2S Input/Output SPI (LVDS) Input/Output DHEI (GI Digicypher) Input/Output SSI Input/Output	Each format includes two input/output pairs
Monitor	15-pin female high density-D-sub connector for SVGA monitor
Keyboard	Mini-DIN connectors for PS2 compatible keyboard (on rear and side panels)
Mouse	Mini-DIN connectors for PS2 compatible mouse (on rear and side panels)
Printer	25-pin sub-D connector for parallel communication
LAN (Ethernet)	10 Base-T/100 Base-T, RJ45 connector for Ethernet communications
RS-232/422	9-pin D-sub type connector for serial communication
SCSI	Standard, PC compatible Ultra-Wide SCSI port, 68 Pins

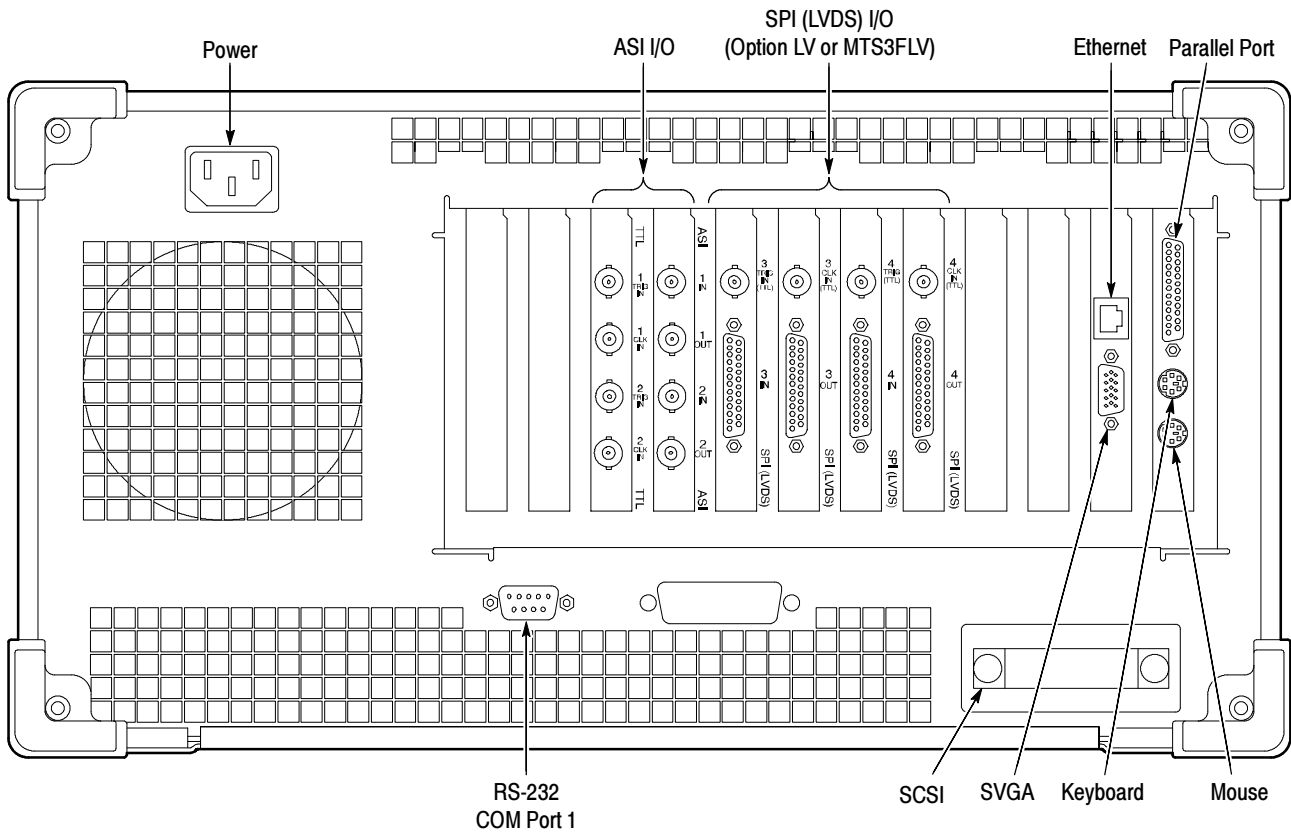


Figure 1-1: Typical MTS300 test system rear panel connectors

The following procedure identifies the electrical connections.

1. Plug in the keyboard and mouse to the proper rear panel connectors. Refer to Figure 1-1. Figure 1-2 shows alternative connectors for a mouse and keyboard. The optional connections are located on the instrument side panel.

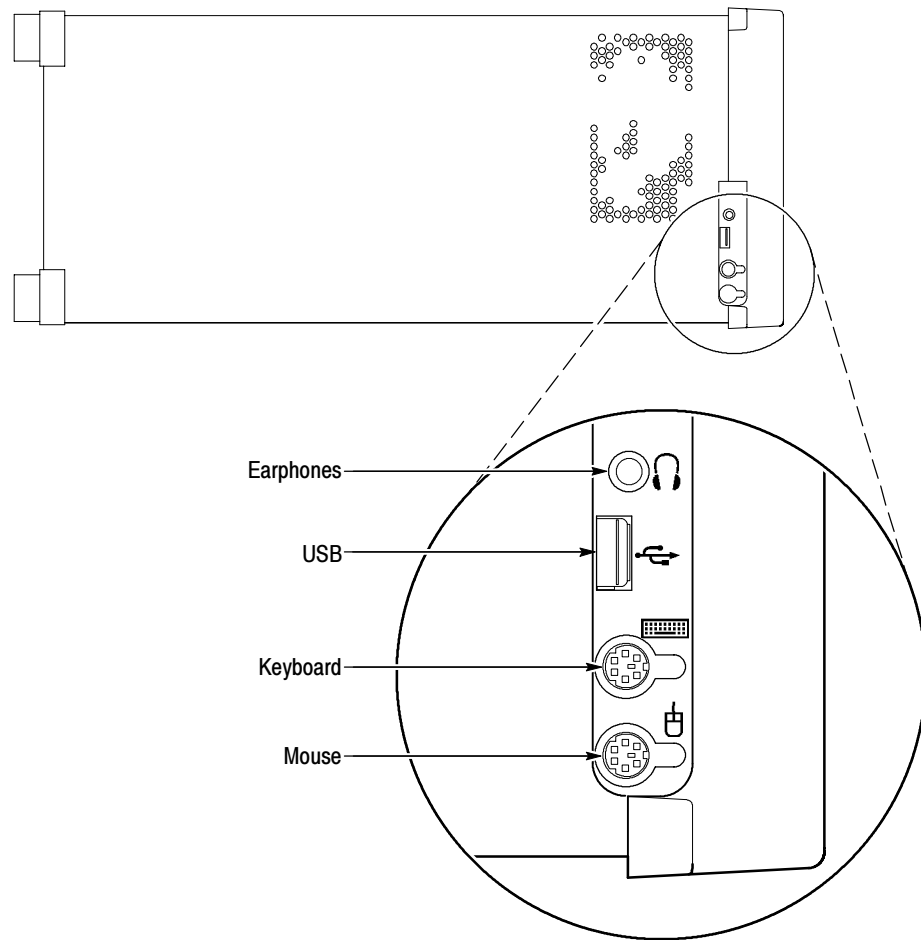


Figure 1-2: Keyboard and mouse alternative connections

2. Install the Software Key on the rear panel Parallel port. MTS300 MPEG Test System software applications will not run without the Software Key installed; do not remove or misplace the Software Key.

To use the Parallel port with the Software Key installed, attach any parallel port cables (such as a printer) directly to the Software Key. The Software Key does not interfere with parallel communications.

NOTE. To run MTS300 MPEG Test System applications, the Software Key must be on the computer Parallel port. If you return the test system to a Tektronix Service Center for upgrade or repair, include the Software Key.

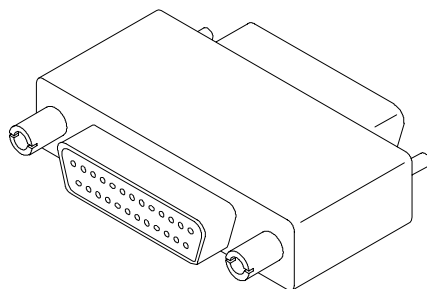


Figure 1-3: Software Key

Supplying Power

The MTS300 MPEG Test System platform is designed to operate from a single-phase power source having one of its current carrying conductors at or near earth ground (the neutral conductor). Power sources that have both current carrying conductors live with respect to ground, such as phase-to-phase or multiphase systems, are not recommended. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation. The electrical operating requirements are listed in Table 1-7.

Table 1-7: Electrical operating requirements

Requirement	Specification
Source Voltage	100 VAC to 240 VAC 47 Hz to 63 Hz
Fuse Rating	10 A Fast / 250 V
Maximum Power Consumption	170 Watts typical
Inrush Surge Current	36 Amps maximum
Power Factor Correction	Yes

After you have installed the MTS300 system and completed making the signal, network, and peripheral connections, plug the power cord into the mains. See Figure 1-1 for location of power connector.



CAUTION. *Do not supply power to the instrument until all connections have been made.*



WARNING. *The test system is designed for connection to an earth-grounded AC outlet. To avoid risk of electrical shock or equipment damage, do not disable the grounding plug.*

Mains Voltage Range. You can power the test system computer and monitor from mains that supply between 100 VAC and 240 VAC without setting a voltage selection switch.

Mains Frequency. The test system computer and monitor operate on either 50 Hz or 60 Hz line frequencies.



CAUTION. *To prevent damage, protect the system computer from power fluctuations and temporary interruptions with a regulating noninterruptible power supply. This device protects the hardware from damage caused by power surges and voltage spikes. In addition, it allows the system to operate temporarily during a power failure.*

Power Cord Options. Unless a specific power cord option is ordered, the system computer and monitor come standard with a power cord for North American 60 Hz, 120 VAC supplies. Table 1-2 on page 1-3 lists the power cord options.

Connecting MTS300 System I/O Ports

Figure 1-4 through Figure 1-11 show the available input and output (I/O) connector configurations on the MTS300 rear panel. For I/O port specifications, refer to the *Specifications* section beginning on page 3-1. Use the I/O ports that best suit your operating environment and signal sources. A description of each connector type follows.

- Input** You must provide input to the MTS300 system to monitor an MPEG-2, DVB, or ATSC bit stream. The MTS300 system I/O ports can be ASI serial, SPI (LVDS), DHEI (GI-Digicypher), or SSI (SMPTE310M). To change the configuration, refer to *Configuration Client Reference* in the *MTS300 MPEG Test System Real-Time Analysis User Manual*.
- Trigger Input** The trigger input accepts a TTL level (0 to +5 V) signal you can use to control capture of the MTS300 system input stream to the system disks. You can configure the system to start/stop data capture on either the rising edge (low to high transition) or the falling edge (high to low transition) of the trigger signal. Refer to the *MTS300 MPEG Test System Real-Time Analysis User Manual* for further information on capturing transport stream inputs.
- Clock Input** Each output port has a corresponding clock input which can be used to clock the transport stream output when using Stream Player. The clock rate is at the byte rate of the transport stream for the ASI/M2S and SPI (LVDS) formats. The clock rate is at the bit rate of the transport stream for the SMPTE310M (SSI) and DHEI (GI Digicypher) formats.
- Output to Other Equipment** Applications generating an output will do so on the I/O port to which the application has been assigned. Applications requiring an input have an output activation option that will loop-through the input signal to the output connector on the assigned I/O port.
- When an output port is used to generate signals using the Stream Player or OpenMux applications, the corresponding input port cannot be used.

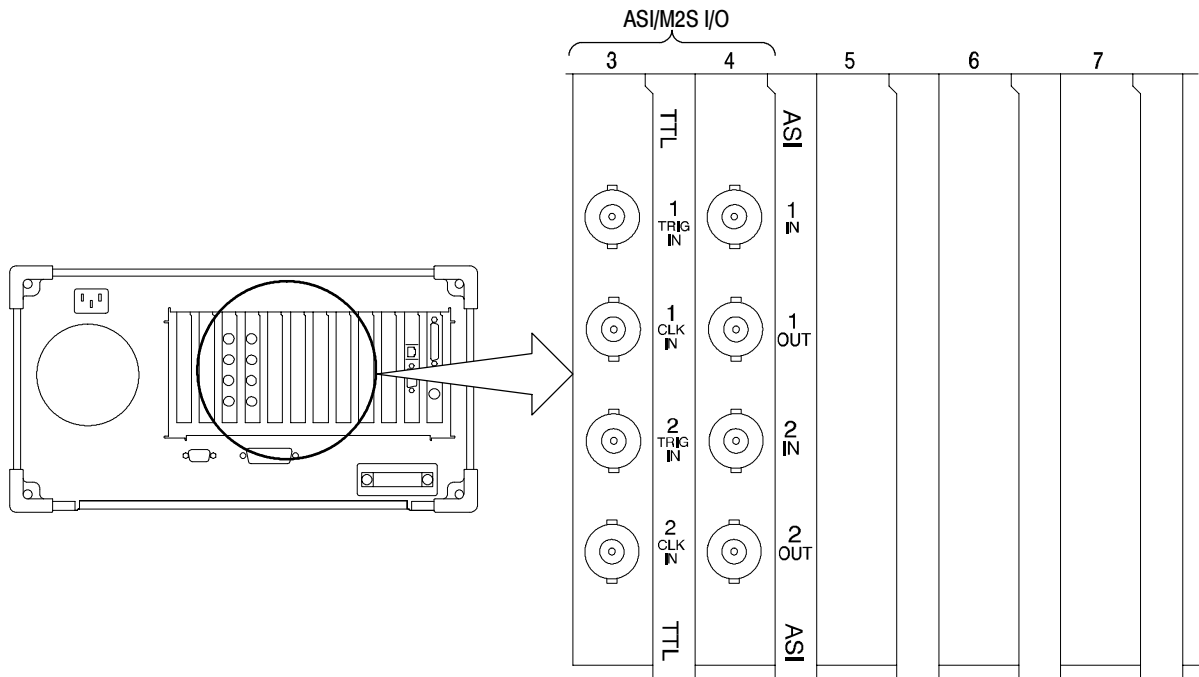


Figure 1-4: Rear-panel configuration with one ASI/M2S (Option AS) interface installed

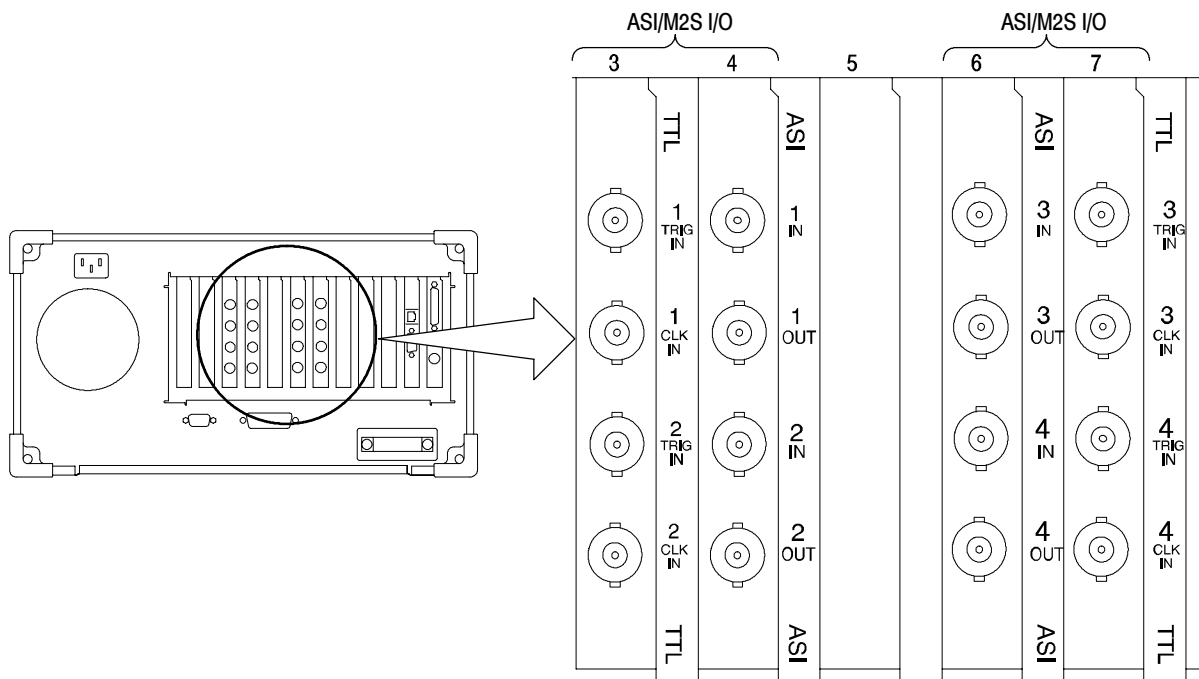


Figure 1-5: Rear-panel configuration with two ASI/M2S (Option AS) interfaces installed

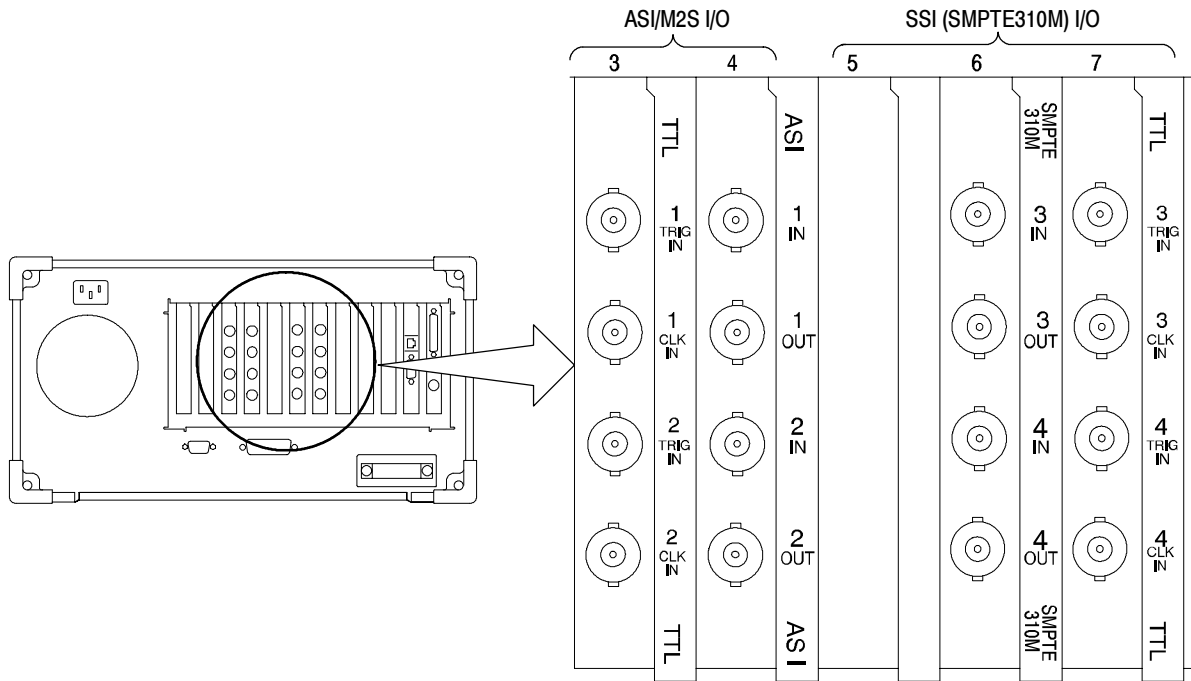


Figure 1-6: Rear-panel configuration with ASI/M2S (Option AS) and SSI (Option SS) interfaces installed

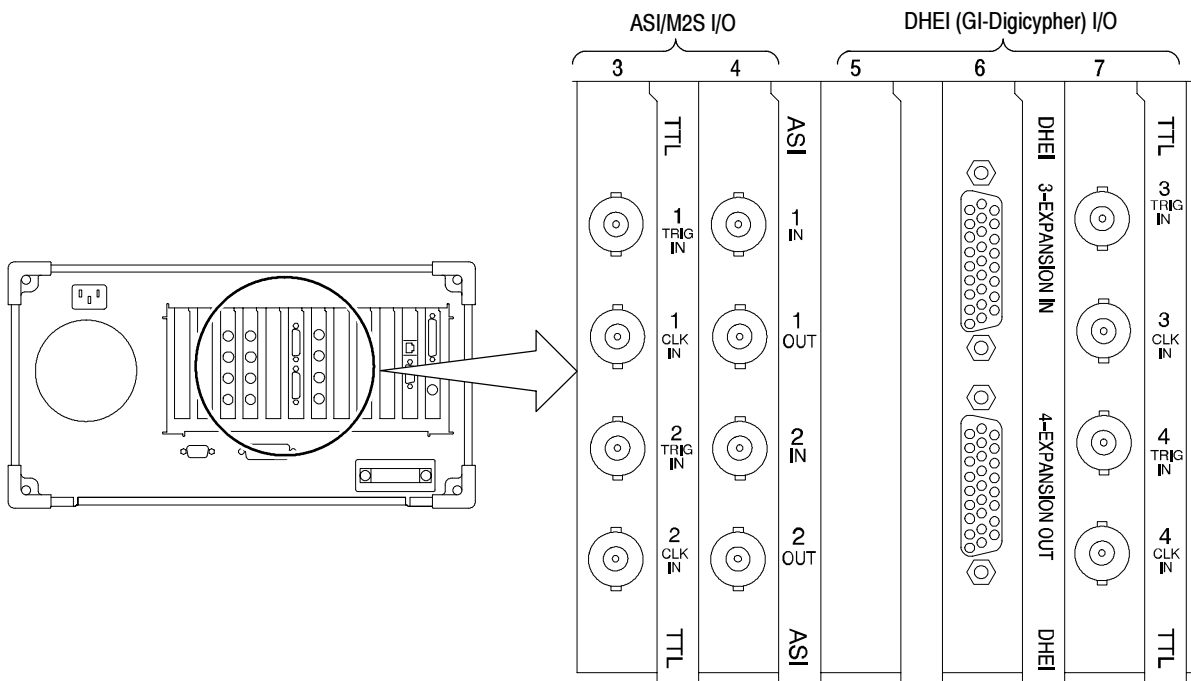


Figure 1-7: Rear-panel configuration with ASI/M2S (Option AS) and DHEI (Option DE) interfaces installed

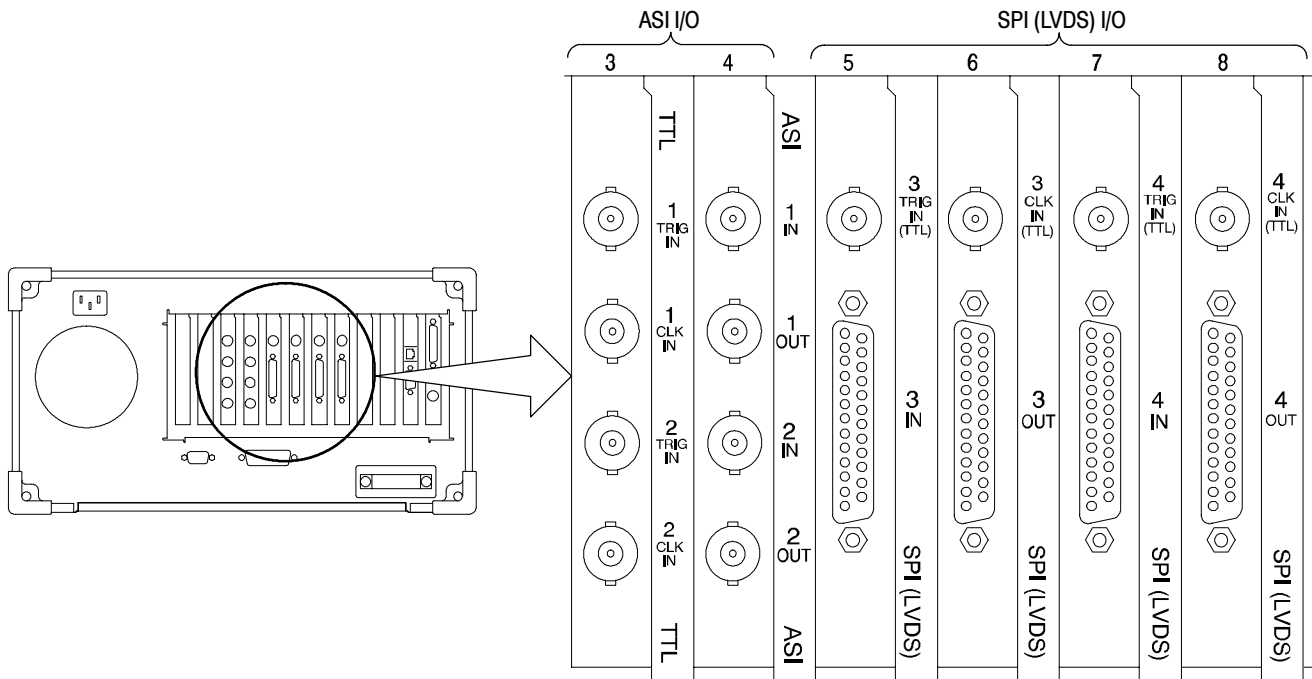


Figure 1- 8: Rear-panel configuration with ASI/M2S (Option AS) and SPI (Option LV) interfaces installed

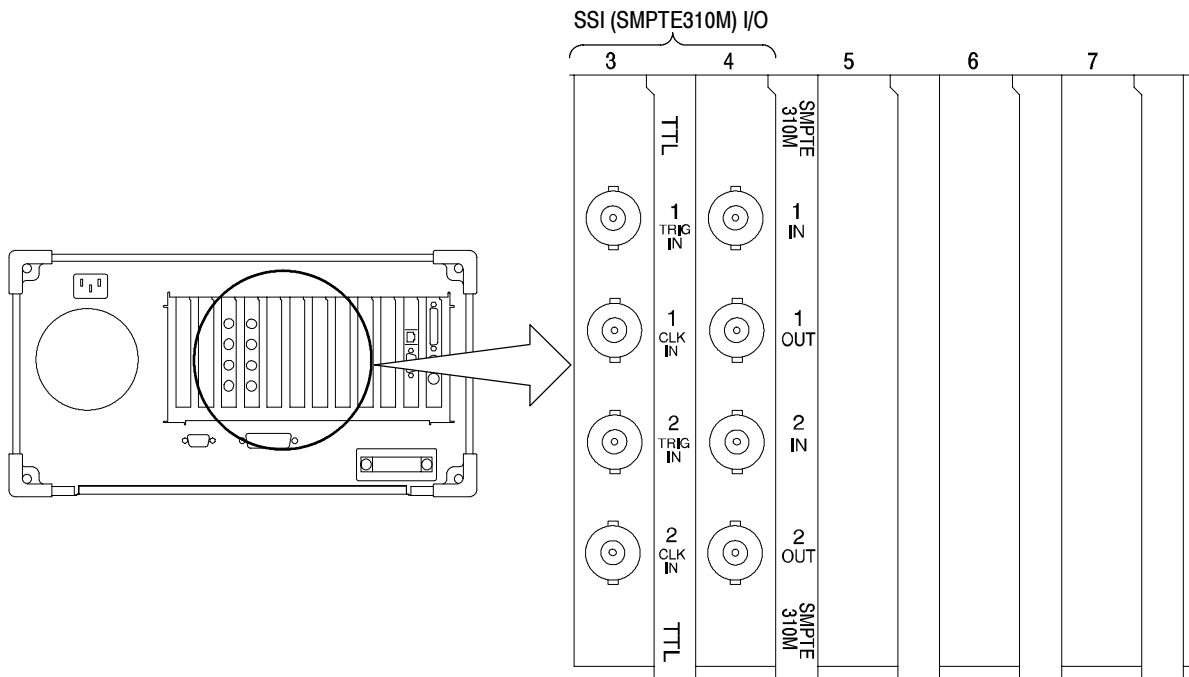


Figure 1- 9: Rear-panel configuration with one SSI (Option SS) interface installed

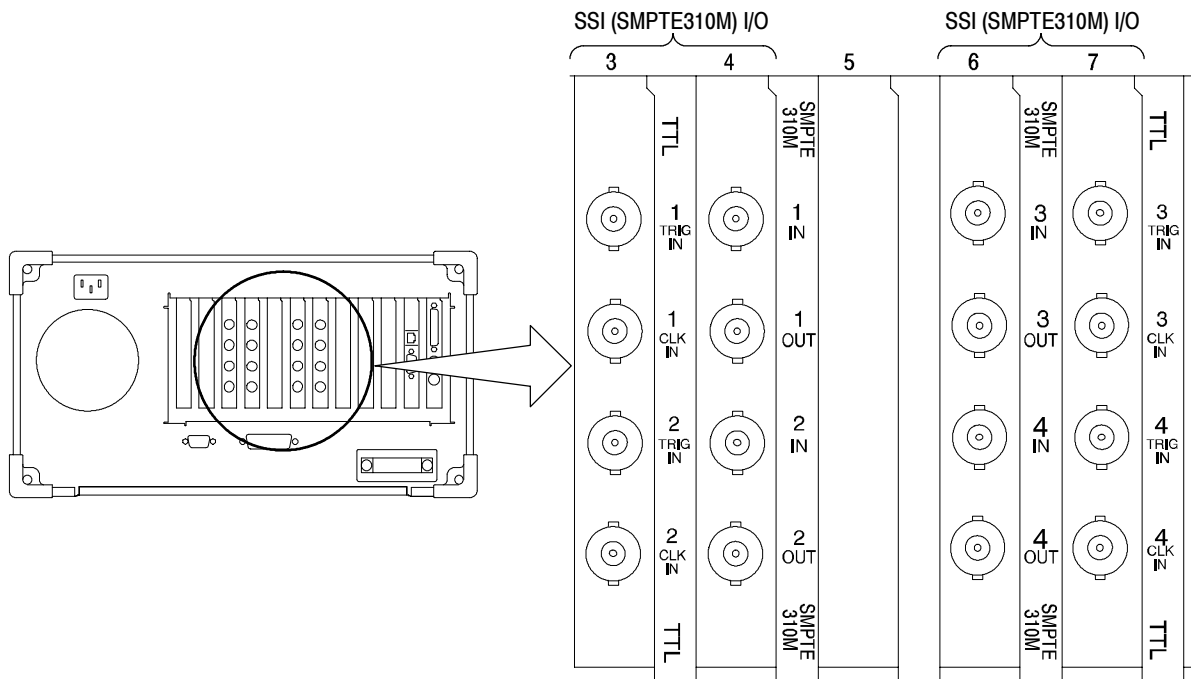


Figure 1-10: Rear-panel configuration with two SSI (Option SS) interfaces installed

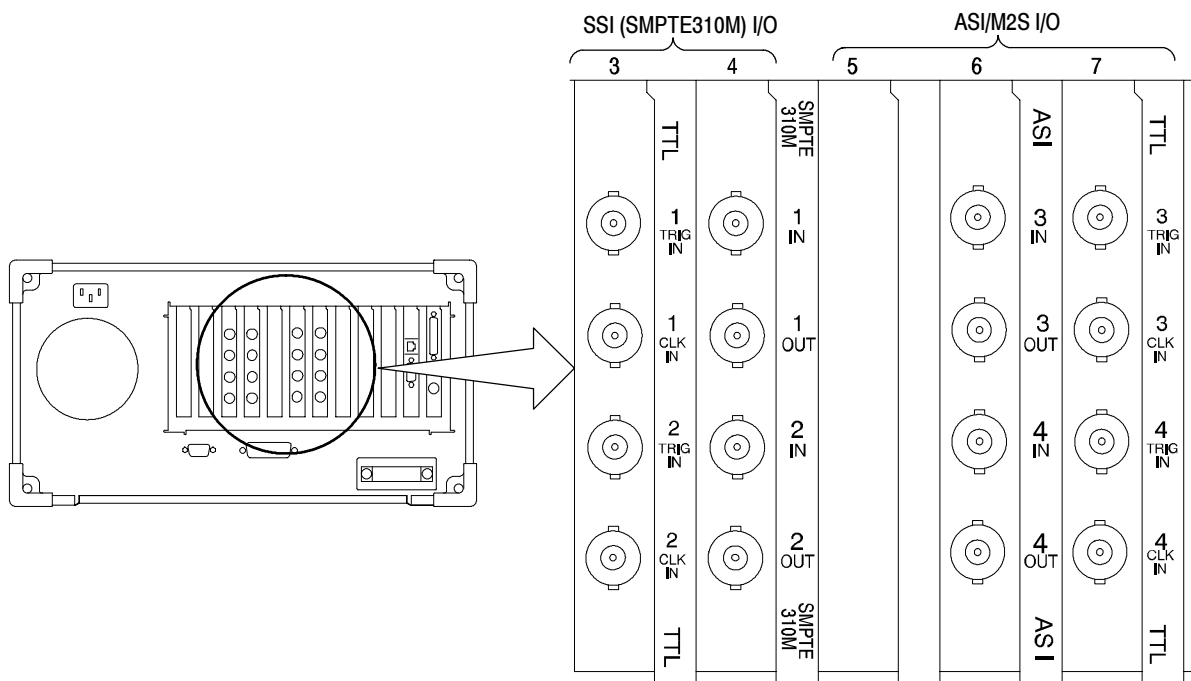


Figure 1-11: Rear-panel configuration with SSI (Option SS) and ASI/M2S (MTS3FAS) interfaces installed

Repackaging for Shipment

Your instrument was originally shipped by Tektronix in a carton with packaging components designed to protect the instrument from damage during shipment. If you need to ship the instrument to another location, it is strongly recommended that you use the original shipping carton and packaging components to provide adequate protection during shipment.



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

Tektronix cannot honor the instrument's warranties if the instrument arrives at the service center damaged and it was not shipped in its original carton or in a replacement carton (and its supporting packaging material) purchased from Tektronix. If you lose your original packaging material, contact your Tektronix representative to obtain replacement packaging.

Packaging Inspection

When preparing to ship your instrument to another location, it is important to inspect your existing packaging materials for condition, missing components and vintage.

- If the condition of your existing packaging materials is poor, or if you are missing some of the components, it is strongly recommended that you order a new packaging kit. The new packaging kit will accommodate both the portable and the rackmount versions of the instrument cabinet.

If your existing packaging materials are in good condition, compare them against Figures 1-12 and 1-13 to determine which packaging procedure to use. Use the procedure associated with your existing packaging materials.

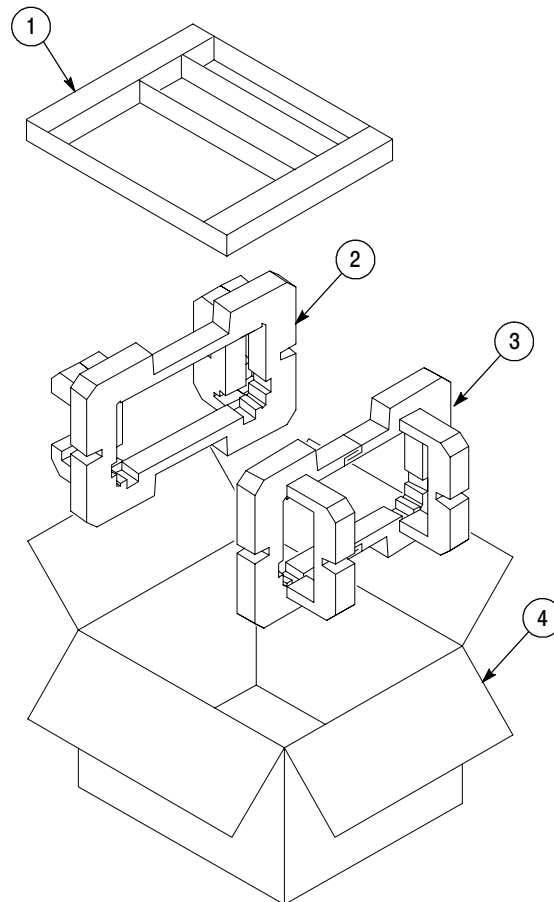
- The configuration (vintage) of the packaging materials is important to note. Replacement components for the old-design packaging materials are no longer available. Also, the components of the new and old designs are not interchangeable. If your packaging materials are of the old design, and require any replacement components, you must order a new packaging kit.

If your instrument was originally shipped in the older design packaging and you have converted the cabinet from portable to rackmount configuration, use the new design packaging which contained the rackmount conversion kit, or order a new design shipping kit.

Replacement Packaging Materials

New packaging materials are available from Tektronix. To obtain these items, contact your nearest Tektronix representative.

The replacement packaging kit, Tektronix part number 065-0651-XX, includes all of the packaging material shown in Figure 1-12. Each packaging component in the illustration has an index number, which corresponds to reference numbers in the packaging procedure.



Note: The keyboard, mouse, manual, and their boxes do not need to be returned with the instrument for servicing. A protective bag for the instrument is included in the packaging kit, but is not shown.

Figure 1-12: Repackaging the instrument (new packaging)

Repackaging Procedure (New Design)

When the instrument is shipped, it is important to package it well to protect the instrument. Figure 1-12 shows how to repackage the instrument for shipment using the new packaging materials. It is not necessary to return the accessories received with the instrument when returning the instrument for repair.

NOTE. *The packaging materials illustrated in Figure 1-12 will accommodate both the portable and the rackmount versions of the instrument cabinet.*

1. If the instrument is to be shipped to a Tektronix field office for repair, attach a tag to the instrument showing the following:
 - Owner's name and address
 - Instrument serial number
 - Description of the problem(s) encountered and/or service required.
2. Place the protective front cover on the front of the instrument.
3. Place the instrument in the protective bag. The bag prevents dust moisture, or other debris from entering the cabinet.
4. Fold the top of the bag neatly over the top of the instrument to make it as flat as possible and seal with packing tape.
5. Place the front cushion (3) over the front of the instrument.
6. Place the rear cushion (2) over the rear of the instrument.
7. Carefully lift the instrument with front and rear cushions attached and lower into the shipping box (4) as indicated by Figure 1-12.
8. Position the tray (1) into the top of the box, pressing the tray down until it rests on the tops of the front and rear cushions.

NOTE. *To ensure packaging integrity and product safety, the tray (1) must be installed regardless if any accessories are being included in the package.*

9. If you are shipping the accessories, arrange the accessories in the tray.
10. Close and tape the shipping box.
11. Attach the appropriate shipping documents needed to ship the instrument to its destination.

Repackaging Procedure (Old Design)

If your instrument was shipped in the older packaging materials as shown in Figure 1-13, inspect your existing packaging materials to make sure they are complete and in good condition as described in *Packaging Inspection* on page 1-16. If your existing earlier packaging materials are in good condition, follow the procedure below to repackage your instrument for shipment.

When the instrument is shipped, it is important to package it well to protect the instrument. Figure 1-13 shows how to repackage the instrument for shipment using the old packaging materials. It is not necessary to return the accessories received with the instrument when returning the instrument for repair.

NOTE. The packaging materials illustrated in Figure 1-13 will accommodate only the portable version of the instrument cabinet.

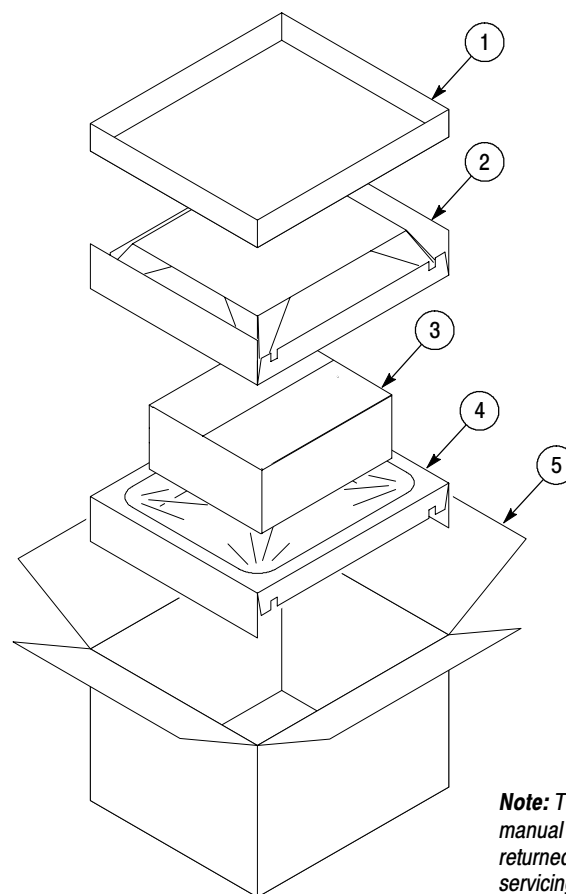


Figure 1-13: Repackaging the instrument (old packaging)

The inner shipping box, pads, and protective bag provide the necessary protection to allow the shipping materials of the outer shipping box to correctly support the product for shipment. Pack the inner shipping box as follows:

1. If an instrument is to be shipped to a Tektronix field office for repair, attach a tag to the instrument showing the following:
 - Owner's name and address
 - Instrument serial number
 - Description of the problem(s) encountered and/or service required.
2. If you have the original packaging material, start by placing one of the spacer pads in the bottom of the inner box (3). Position the side of the pad with the smaller, square holes against the side of the box as shown in Figure 1-14.

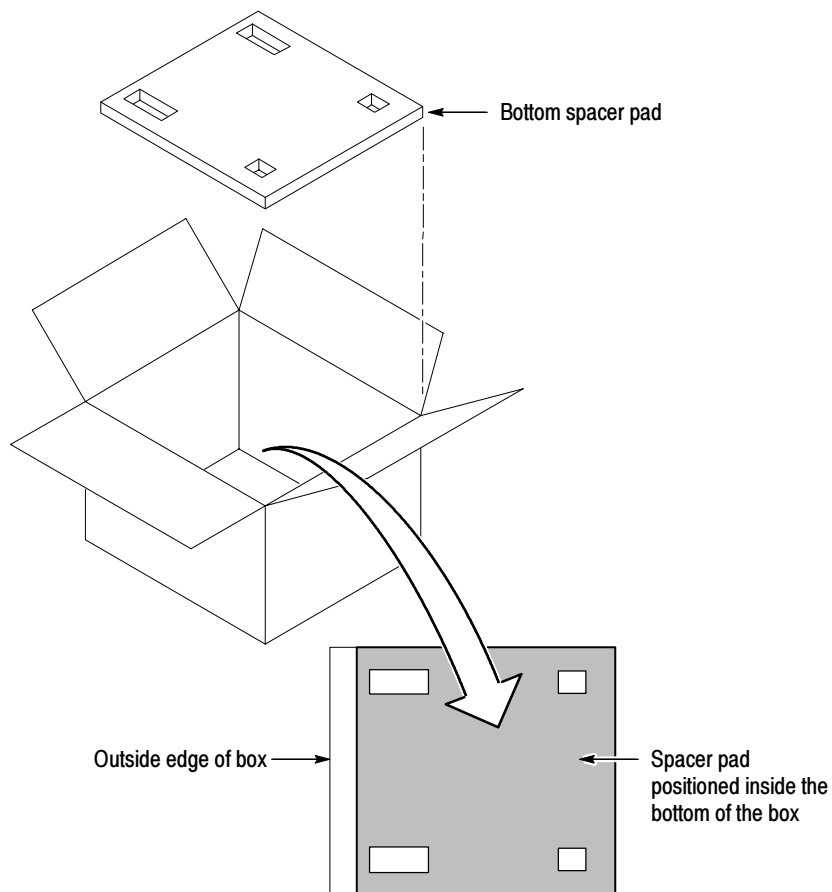


Figure 1-14: Placement of bottom spacer pad in inner shipping box

3. Place the protective front cover on the front of the instrument.
4. Place the instrument in the protective bag. The bag prevents dust, moisture, or other debris from entering the cabinet.
5. Fold the top of the bag neatly over the top of the instrument to make it as flat as possible and seal with packing tape.
6. Place the bagged instrument in the inner shipping box. The small feet on the bottom of the cabinet go in the square holes in the spacing pad and the larger feet near the front of the instrument go in the larger rectangular holes. The bezel end of the cabinet fits over the edge of the spacer pad.
7. Place the other spacer pad on top of the instrument. Place the side with the small square holes against the side of the box. The protective front cover on the bezel of the instrument is not covered by the top spacer pad.
8. Close and tape the inner shipping box (3).
9. Place one of the support inserts (4) in the bottom of the outer shipping box, film side up as shown in Figure 1-13.
10. Place the sealed inner shipping box (3) in the center of the bottom support insert in the outer shipping box (4).
11. Put the second support insert (2) over the inner shipping box, film side down.

NOTE. *It may be necessary to pre-stretch the film in the support inserts by pushing down firmly several times on the top support insert.*

12. Place the top tray (1) in the box. If you are not shipping accessories with the instrument, close and tape the outer shipping box (5).
13. When shipping the accessories, place the two accessory trays in the top tray, then arrange the accessories in the trays.
14. Close and tape the outer shipping box (5).
15. Attach the appropriate shipping documents needed to ship the instrument to its destination.



First Time Operation

First Time Operation

This section contains information for first-time operators about starting and shutting down the MTS300 system. A functional check procedure is provided to verify basic instrument operation.

Starting the MTS300 System

Perform the following procedure to power on the MTS300 system:

1. Connect the power cord to the rear-panel power connector.
2. Press the **On/Stby** switch to power on the instrument. Figure 2-1 shows the switch location.

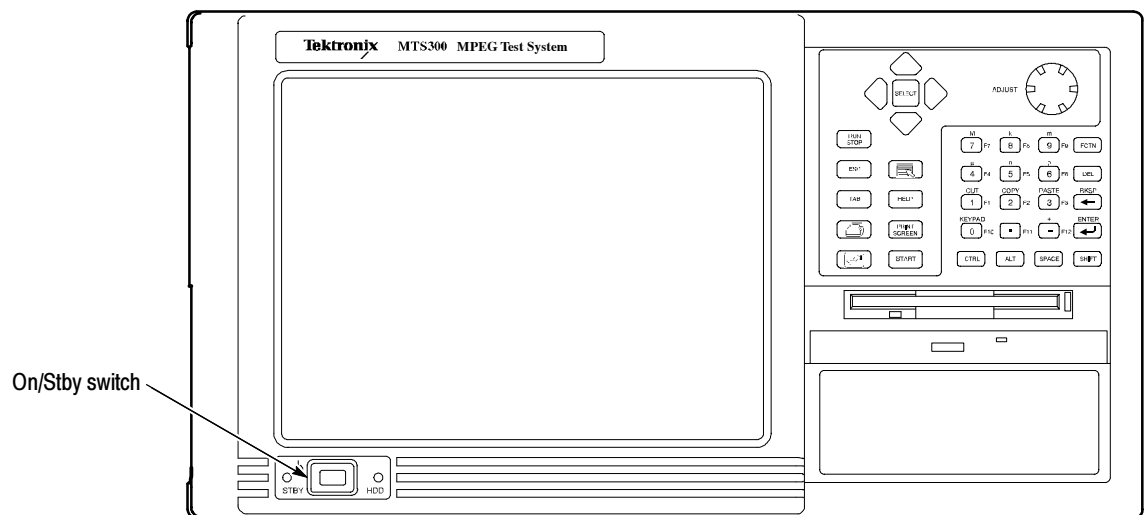


Figure 2-1: On/Stby switch

3. The Windows NT initialization process takes up to two minutes. Under normal circumstances, no action is required until the Begin Logon message appears.
4. When the Begin Logon message appears, simultaneously press the **CTRL + ALT + Delete** keys to open the Logon Information dialog box.

Logging On

The MTS300 system uses the Windows NT auto-logon feature by default. The default user name and password are Administrator and MPEG2, respectively. You do not need to enter a user name or password to log on to the MTS300 the first time.

Changing the Passwords. After you log on to the MTS300 system the first time (or at any subsequent time), you can change the password for that user name, or create new profiles for different users of the test system. Refer to the Windows NT online help for instructions.

Refer to *Setting, Resetting, and Disabling Auto Logon* on page 4-11 if you want to disable automatic logon to Windows NT when you power-on the instrument.

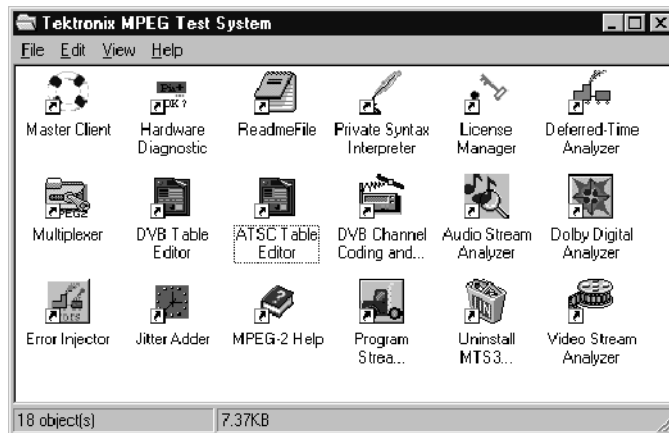


CAUTION. To prevent the loss of data, if you change the default user names and passwords, secure the new names in a safe place. If you forget your user-defined user names and passwords and cannot logon to the MTS300 system, you will have to reinstall the operating system software which will result in the loss of all data on the hard drives of the MTS300 system.

Starting MTS300 System Applications

After you have logged on, the Tektronix MPEG Test System program group window appears as shown below. Double-click the appropriate application icon to launch the desired application.

NOTE. The example below shows an MTS300 system program group with most of the available options installed. Depending on which options you ordered, your program group may not contain all application icons.



General License Password

When you first receive your MTS300 system, the General License password is already installed. You will have to reenter the General License password only when you restore the MTS300 operating system software.

Refer to *Software Repair and Recovery* on page 4-1 for information about repairing system software or resetting system parameters. The procedure for entering the General License password starts on page 4-29.

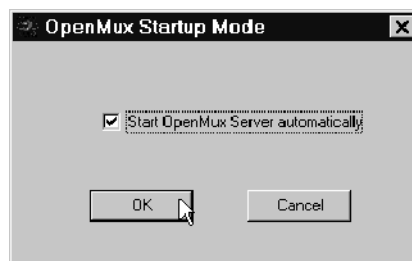
Enabling the OpenMux Demonstration Period

If you ordered Option OM with your MTS300 system, the OpenMux server starts automatically with the rest of the MPEG Analysis Services, and you can ignore this section. If you did not order Option OM, you can enable the OpenMux server and client application for a thirty day demonstration period at any time using the following procedure. Performing this procedure will also clear the *Failure in socket connection* error message that appears when you try to connect the OpenMux server to the local Server Manager without a valid license password.

NOTE. *Once the demonstration period begins, it lasts for 30 consecutive days and then ends. You cannot start, stop, and restart the demonstration period.*

Also note that the demonstration license enables all MTS300 applications for the same thirty day demonstration period. So, you cannot enable one application for a thirty day period and then enable other applications for a subsequent thirty day period.

1. Double-click the **OpenMux Mode.exe** file located in the C:\MTS300\Bin directory.
2. Click the **Start OpenMux server automatically** option and then click **OK** as shown below.



3. Reboot the test system and enter the demonstration license password that shipped with the MTS300 test system when prompted to do so.

Disabling the OpenMux Server Startup

If you enabled the demonstration period for the OpenMux server and you want to remove the message that appears at startup after the demonstration period is over, use the following procedure:

1. Double-click the **OpenMux Mode.exe** file located in the C:\MTS300\Bin directory.
2. Clear the **Start OpenMux server automatically** option and then click **OK**.
3. Reboot the test system.

Shutting Down the MTS300 System

This section contains information about how to exit MTS300 system applications and how to shutdown the MTS300 system.

Exiting MTS300 System Applications

To exit an MTS300 system application, select **Exit** or **Quit** from the File menu or click the close button in the upper-right corner of the application window.



Shutting Down the MTS300 System

There are three methods to shut down the MTS300 system: standard power down, soft power down, and hard power down. For the standard and hard power down methods, you should exit all MTS300 applications before shutting the instrument down.



CAUTION. *To prevent data loss, it is recommended that you exit all open MTS300 applications before powering down the instrument. Some applications will prompt you to save unsaved data before exiting. If you do not close all MTS300 applications before exiting Windows NT, you may lose data.*

Standard Power Down. To power down the MTS300 system during normal instrument operations, perform the following standard Windows NT power down procedure:

1. Exit all open MTS300 applications.



CAUTION. To prevent data loss, exit all open MTS300 applications before powering down the instrument. Some applications will prompt you to save unsaved data before exiting.

2. After the MTS300 applications are closed, shut down Windows NT by selecting **Shut Down** from the Windows NT Start menu as shown below.



CAUTION. To prevent data loss and possible system problems during subsequent Windows NT initializations, always exit Windows NT before you power down the MTS300 system. Wait until the message “It is now safe to turn off your computer” appears before you press the On/Stby switch.

3. Select **Shut down the computer?** in the resulting Shut Down Windows dialog box shown below, and then click **Yes**.



4. After the Shutdown Computer window appears with the message “It is now safe to turn off your computer,” press the **On/Stby** switch to put the MTS300 system into standby mode.
5. After the MTS300 system goes into standby mode, you can restart the instrument by pressing the On/Stby switch.
6. To completely remove power to the instrument, disconnect the power cord at the rear panel.

Soft Power Down. The MTS300 system is shipped from the factory with a soft power-down capability enabled. The soft power-down capability allows you to directly exit Windows NT without closing the MTS300 applications first. Using this technique, the MTS300 system will automatically close all open applications and put the instrument into standby mode.

To soft power-down the MTS300 system, perform the following steps:

1. Press and release the **On/Stby** switch to initiate the soft power-down process. Some applications will prompt you to save unsaved data before exiting.
2. After the MTS300 system goes into standby mode, you can restart the instrument by pressing the On/Stby switch.
3. To completely remove power to the instrument, disconnect the power cord at the rear panel.

Hard Power Down. You can use the hard power-down capability to immediately power-down the MTS300 system in an emergency situation such as fire.



CAUTION. *To prevent data loss and the corruption or deletion of application and system files, perform this procedure only if all other attempts to shut down the MTS300 system have failed.*

Using this hard power down procedure will likely cause file problems. When you use this method to power down the MTS300 system, the next time the instrument is powered on, the operating system will use the Scan Disk utility to perform a check for missing or corrupt files. You may be prompted to reinstall the operating system or application software.

To hard power-down the MTS300 system, perform the following steps:

1. Press and hold the **On/Stby** button for about 3 or 4 seconds.
2. After the MTS300 system goes into standby mode, you can restart the instrument by pressing the On/Stby switch. Read the power-on messages for information about possible missing or corrupted files.
3. To completely remove power to the instrument, disconnect the power cord at the rear panel.

Functional Check

You can verify the performance of the MTS300 test system to the published specifications by performing the following procedures:

- *10 MHz Reference Clock*
- *I/O System*
- *MPEG-2 Software Components*
- *TMCC Software Components*

NOTE. *The 10 MHz Reference Clock procedure requires a qualified technician to remove the instrument cabinet and to apply a probe to a test point on the PIA+ circuit board. If the reference clock is out of tolerance, a procedure is provided to instruct the technician how to remove the PIA+ board and to adjust the reference clock. This test must be performed in a static-free workspace.*

If you do not have access to a qualified technician or to a static-free work space, you can perform only the last three procedures. If the instrument passes the last three procedures, you can have a high level of confidence that all of the major functions of the instrument are functioning properly.

10 MHz Reference Clock



CAUTION. *Be sure to read the General Safety and Service Safety summaries at the beginning of this manual before you perform this procedure.*

To prevent potential damage to the MTS300 test system, only perform this procedure to verify the accuracy of the 10 MHz reference clock if you are a qualified technician and are working in a static-free work space.

Recommended Tools

You will need the following tools to verify the 10 MHz reference clock:

- An anti-static wrist strap for safe handling of assemblies containing static sensitive devices
- A screwdriver with T10, T15, and T20 Torx tips to remove the cabinet cover and the module mounting screws.

- A 1/4 inch or larger flat blade screwdriver.
- An 8 inch adjustable wrench or appropriate size open-end wrench (an aid for cabinet removal).
- A digital frequency counter to measure the 10 MHz clock. Accuracy: ± 2 Hz at 10 MHz. Example: Tegam DC5010 with an external frequency reference.

NOTE. *Some frequency counters require an external signal reference to attain the required accuracy.*

- A 10X probe for use with the frequency counter. Example: Tektronix P6109B.
- If you need to adjust the 10 MHz reference clock, you will need a small, narrow adjustment tool.

Removing the Cabinet

You will remove the instrument cabinet to access most of the mainframe modules and the test system application modules. Use the following procedure to remove the cabinet (portable or rackmount):

1. Put on a static grounding wrist strap.
2. Before removing the cabinet, shut down the test system and unplug the power cord.
3. Disconnect any cables connected to the rear panel connectors of the test system. Note their locations for reinstallation.
4. Put the protective front cover on the test system and sit the cabinet upright on the working surface with the rear panel facing up.

NOTE. *If your MTS300 system is configured as a rackmount instrument, ignore step 5. There is no handle installed. Continue with the step 6.*

5. Remove the two screws from the handle on the right side of the instrument (see Figure 2-2). These screws attach to posts mounted on the power supply module.
6. Remove the screws from the four feet on the rear of the instrument (see Figure 2-3).

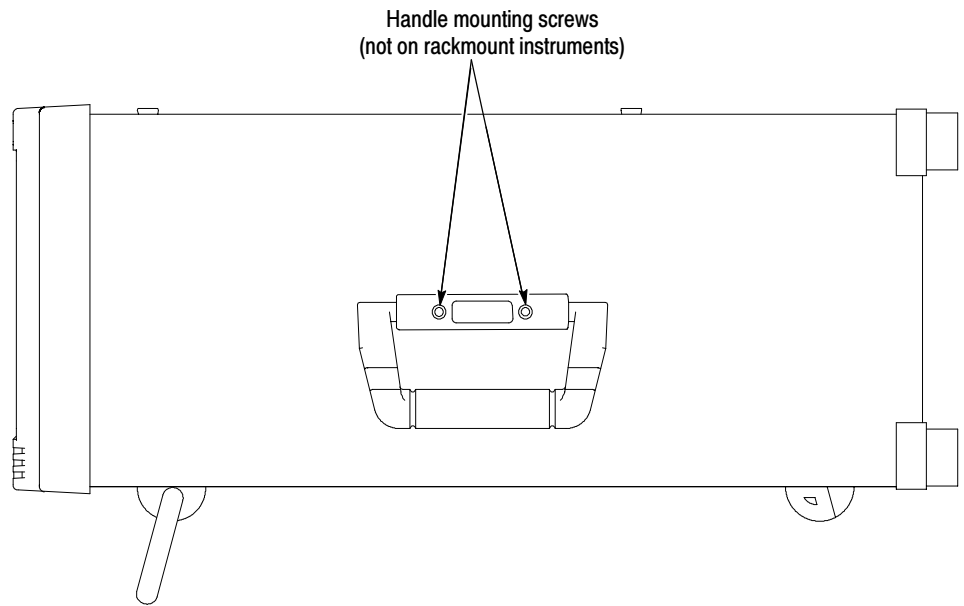


Figure 2-2: Removing the cabinet handle

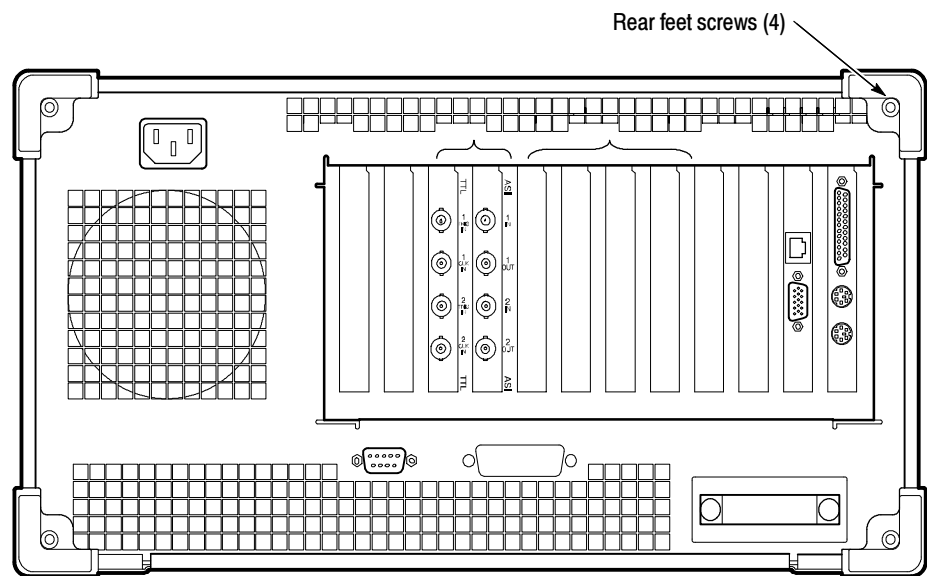


Figure 2-3: Removing the cabinet feet

7. Use either an adjustable wrench or appropriate size open-end wrench as a lever to pry the cabinet loose from the chassis. Loosen each side alternately until the cabinet is released from the EMI gasket.
8. Slide the cabinet up and off the chassis.



CAUTION. Use care when touching the EMI shielding strips around the front of the chassis. The fingers of the strip are easily bent and any protruding sharp edges become a potential cutting hazard when you handle the chassis to position it during the remaining remove and replace procedures.

Remove the Circuit Board Retaining Plate

Remove the circuit board retaining plate (see Figure 2-4).

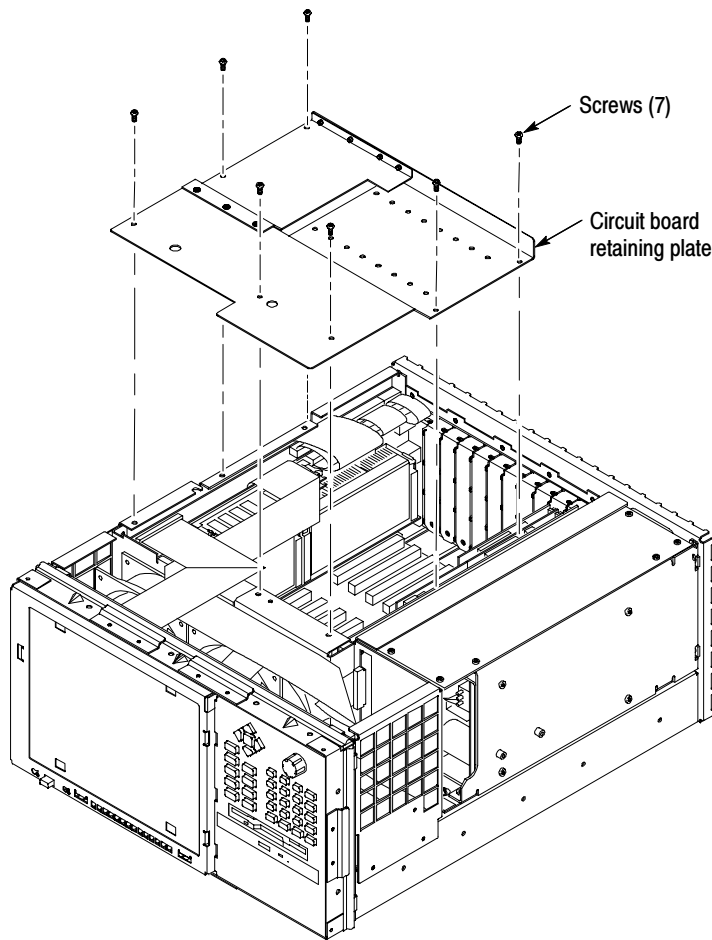


Figure 2-4: Removing the circuit board retaining plate

Check the Clock Frequency

Perform the following steps to check the 10 MHz reference clock frequency.

NOTE. Be sure that the counter accuracy is within ± 2 Hz at 10 MHz.

1. Reconnect power to the instrument and reboot the test system.
2. Allow the instrument to warm up for 20 minutes.
3. Connect a 10X probe to the input of the frequency counter. Set the frequency counter for AC coupling and high impedance input ($1\text{ M}\Omega$).
4. Touch the 10X probe to the 10 MHz clock output on the PIA+ board (be sure that the probe ground clip is connected to a suitable point). See Figure 2-5.

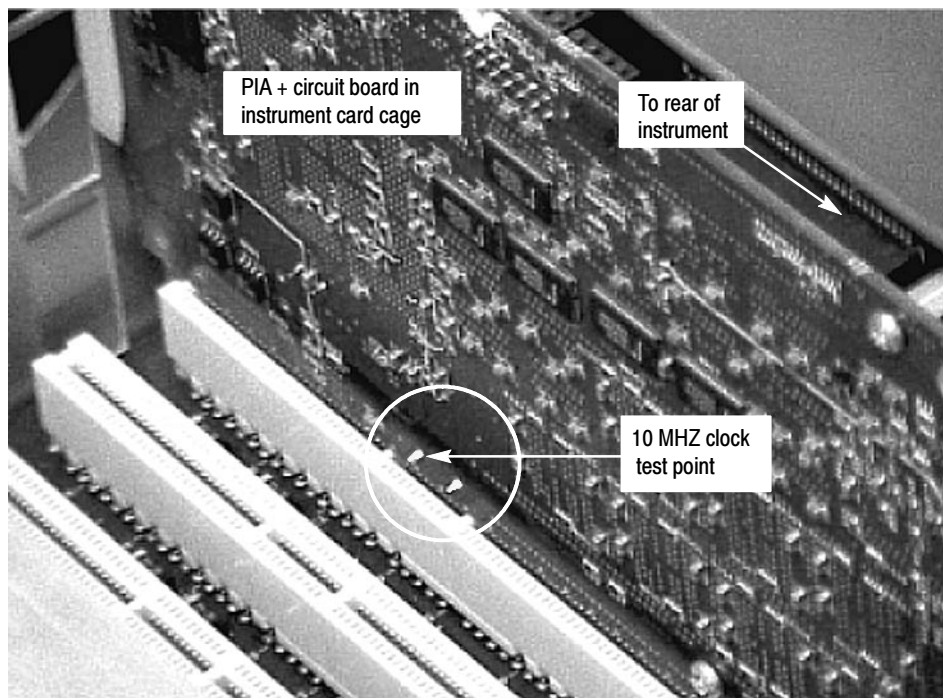


Figure 2-5: Location of 10 MHz clock test point

5. Adjust the frequency counter as necessary to trigger on the clock signal.
6. Check that the clock frequency is within $1.0/\text{ppm}$ or $\pm 10\text{Hz}$ of 10 MHz.

If the clock frequency is within ± 10 Hz of 10 MHz, proceed to *I/O System* on page 2-16. Otherwise perform the procedure in *Adjust the Clock Frequency* starting on page 2-12.

Adjust the Clock Frequency

Perform the following steps to adjust the frequency of the 10 MHz reference clock.

NOTE. *Only perform this procedure if the 10 MHz reference clock was measured to be out of tolerance in the preceding procedure.*

1. Note the measured clock frequency from step 6 on page 2-11.
2. Power down the MTS300 test system and remove the power cord.

NOTE. *To adjust the reference clock, you must remove the PIA+ module from the instrument. If there is an optional interface installed on the PIA+ module (two interfaces installed), you will also have to remove the second interface with the PIA+ module.*

3. Remove the retaining screws from the top and bottom of the PIA+ module (see Figure 2-6) and from the top and bottom of the brackets for any optional interfaces that may be installed.
4. Loosen the retaining screws from the top and bottom of any brackets adjacent to the module brackets you are removing.
5. Carefully pull up on the PIA+ board to loosen it from the backplane module connectors. You may have to alternate lifting up on the front and the rear of the board to work it loose from the connectors and the card bay.
6. When the PIA+ board is loose from the connector, lift the module out of the module bay.
7. Place the removed PIA+ board on a static-free work surface.

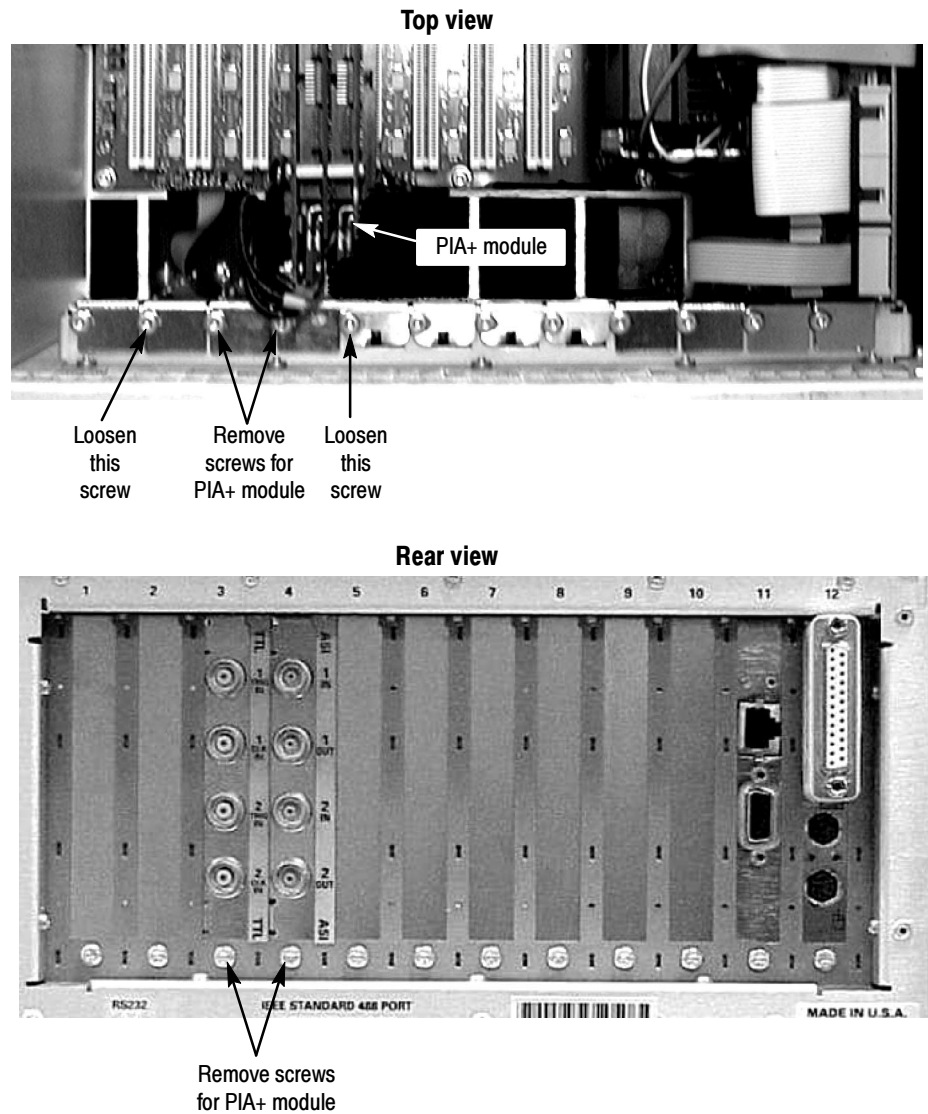


Figure 2-6: Removing the PIA+ module

8. Locate R500 (a 10 turn pot) on the PIA+ board (see Figure 2-7). R500 is located just behind J10 next to Y501.

NOTE. It is possible to adjust R500 without removing the Mezzanine board from the PIA+ board if you use caution. If you need to remove the Mezzanine board to make this adjustment, remove the three screws shown in Figure 2-7, and then carefully remove the Mezzanine board from the three connectors on the PIA+ board (J10, J501, and J502).

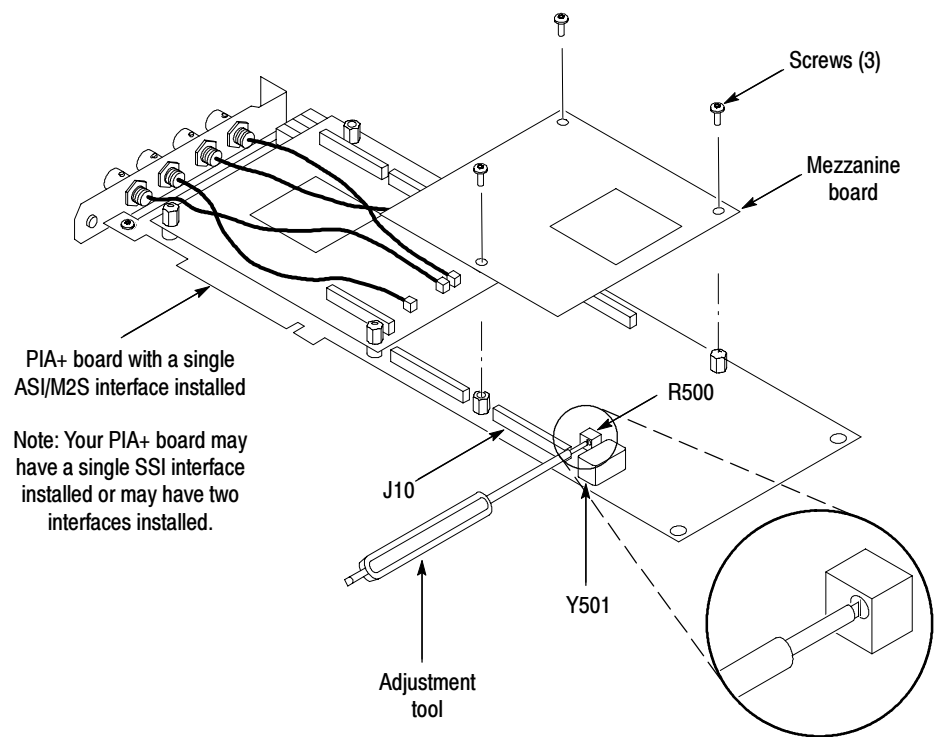


Figure 2-7: Adjusting the 10 MHz reference clock

9. Adjust R500 using the values in Table 2-1 and the measured clock frequency from step 6 on page 2-11.

Table 2-1: Adjustment table for 10 MHz reference clock

Measured frequency	Error	Error in PPM	Rotation required to correct (CW or CCW) ¹
10.000984 MHz	-16 Hz	-1.6 ppm	2 turns CCW
10.000988 MHz	-12 Hz	-1.2 ppm	1.5 turns CCW
10.000992 MHz	-8 Hz	-0.8 ppm	1.0 turn CCW
10.000996 MHz	-4 Hz	-0.4 ppm	0.5 turn CCW
10.000000 MHz	0 Hz	0 ppm	0 turns
10.000004 MHz	+4 Hz	+0.4 ppm	0.5 turn CW
10.000008 MHz	+8 Hz	+0.8 ppm	1.0 turn CW
10.000012 MHz	+12 Hz	+1.2 ppm	1.5 turns CW
10.000016 MHz	+16 Hz	+1.6 ppm	2.0 turns CW

¹ One turn in the CW or CCW direction will change the frequency by 8 Hz or 0.8 ppm

10. After you have adjusted R500, reinstall the PIA+ board by inserting the module into the module bay at the correct slot position.
11. Carefully align the PIA+ board edge connector with the backplane connectors.
12. Apply firm pressure to completely seat the PIA+ board in the connectors.
13. Replace the retaining screws which secure the PIA+ board in the card bay (the ones you remove in step 3 on page 2-12).
14. Torque the screws to 8 in-lbs (including the ones you loosened in step 4 on page 2-12).
15. Reconnect power to the MTS300 test system and reboot the instrument.
16. Allow the instrument to warm up for 20 minutes.
17. Perform the procedure in *Check the Clock Frequency* on page 2-11 and repeat this clock adjustment procedure as necessary until the measured clock frequency is within tolerance.

- | | |
|--|---|
| Reinstall the Circuit Board Retaining Plate | Power down the instrument, remove the power cord, and then install the circuit board retaining plate (see Figure 2-4 on page 2-10). |
| Reinstall the Instrument Cabinet | Reinstall the instrument cabinet by performing the procedure in <i>Removing the Cabinet</i> starting on page 2-8 in reverse order. |

I/O System

Use the following procedure to verify the hardware components of the MTS300 system.

Recommended Tools

You will need the following tools to perform this I/O system test:

- Interface cables for each type of I/O port installed in the MTS300 system (75 Ω BNC cables for ASI/M2S and SSI (SMPTE310M) interfaces, and appropriate cables if you have a DHEI (GI Digicypher) or SPI (LVDS) interface installed)
- 50 Ω BNC cable (for use with the signal generator)
- BNC T-connector
- Digital frequency counter. Accuracy: ± 2 Hz at 10 MHz.
- Signal generator with 50 Ω output of TTL-level signals

Initial Setup

1. Connect all the inputs to the corresponding outputs as shown in Figure 2-8. (Your rear-panel configuration may differ from the illustration.) For the BNC connectors, use 75 Ω cables.
2. Power up and log on to the MTS300 system.
3. Once you have correctly logged on, double-click the Tektronix MPEG Test System program group icon on the desktop.
4. The Tektronix MPEG program group window similar to that shown in Figure 2-9 on page 2-18 will be displayed.

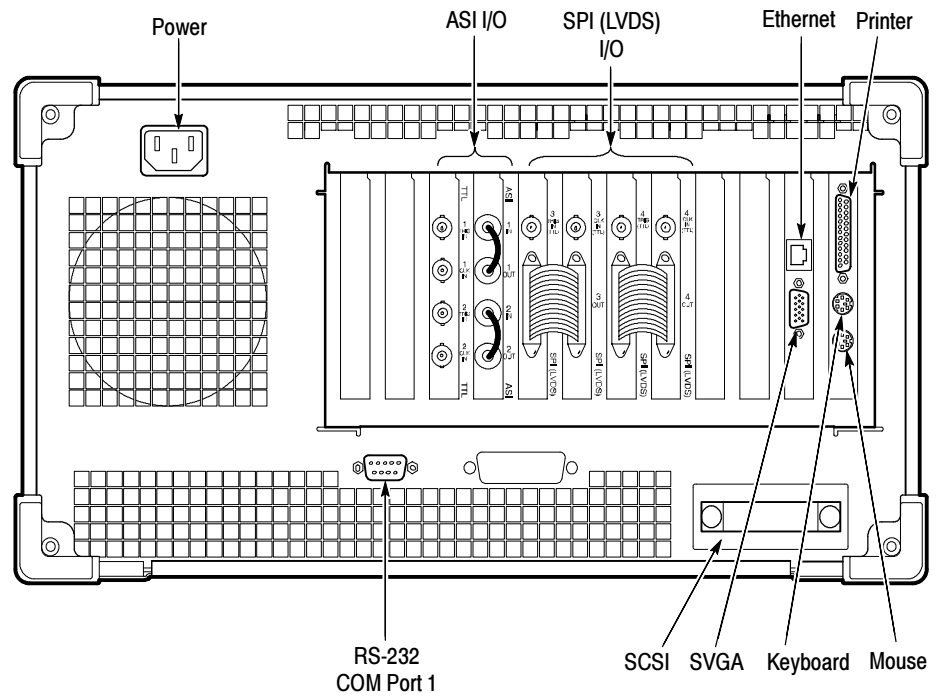


Figure 2-8: Typical initial equipment setup

Verify the Performance of Hardware Components

Each test system is shipped with a Hardware Diagnostic application that verifies the performance of the hardware components of the MTS300 system. Using this tool, you check the following parameters:

- Board access
- Process paths
- Stream paths
- I/O parameters
- External connections
- Trigger and Clock

- Diagnostic Self Test**
1. Start the Hardware Diagnostic by double-clicking the **Hardware Diagnostic** icon in the Tektronix MPEG Test System program window.

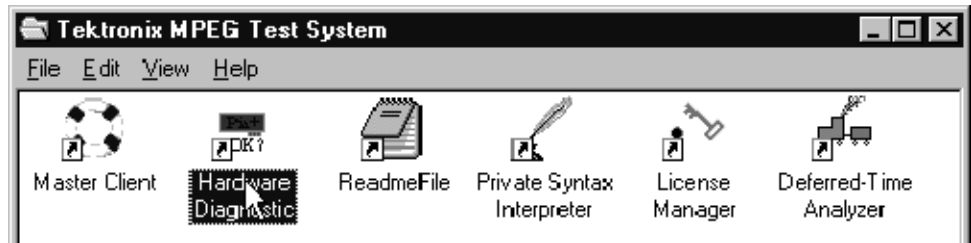


Figure 2-9: Tektronix MPEG Test System program window

2. Initially, the Hardware Diagnostic window is blank (see Figure 2-10). To start the diagnostic, you must first connect to the local Server Manager.

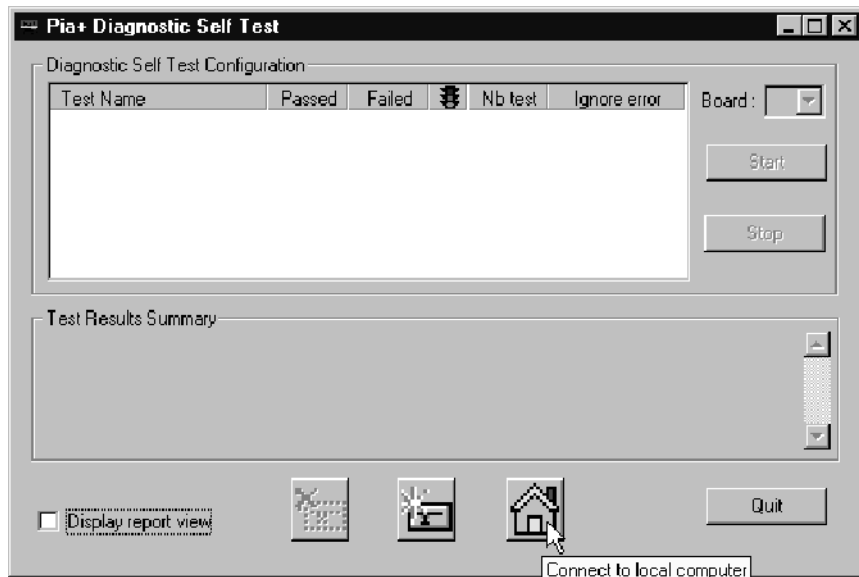


Figure 2-10: Connect to local Server Manager

3. Select all of the tests to be performed by clicking all of the appropriate boxes under **Test Name** as shown in Figure 2-11.

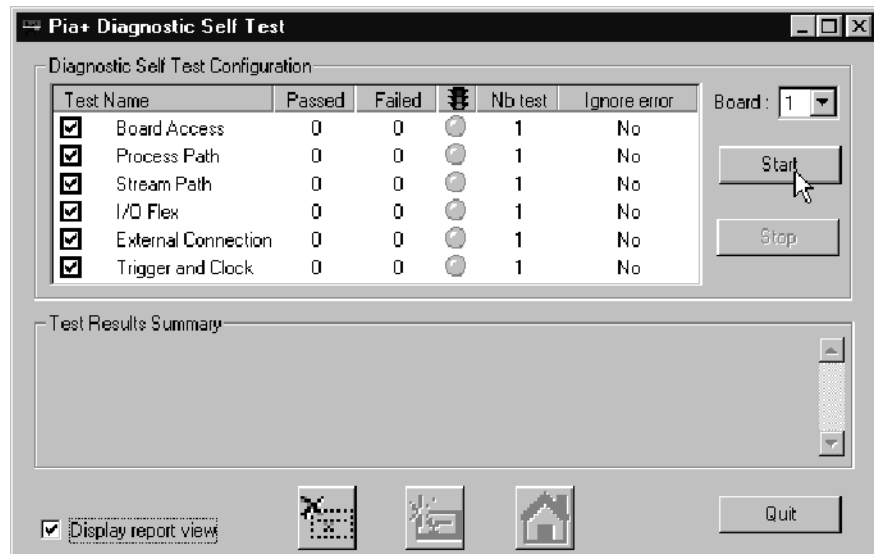


Figure 2-11: Start the testing routine

4. Select Display Report View, and then click **Start**.
5. The following message is displayed. Click **Yes** to begin the routine.

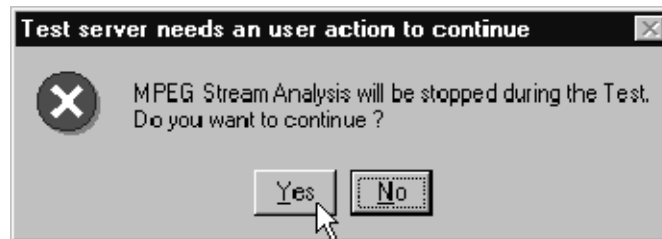


Figure 2-12: Begin the self test routine

6. As the routine continues, the display records the results as shown in Figure 2-13.

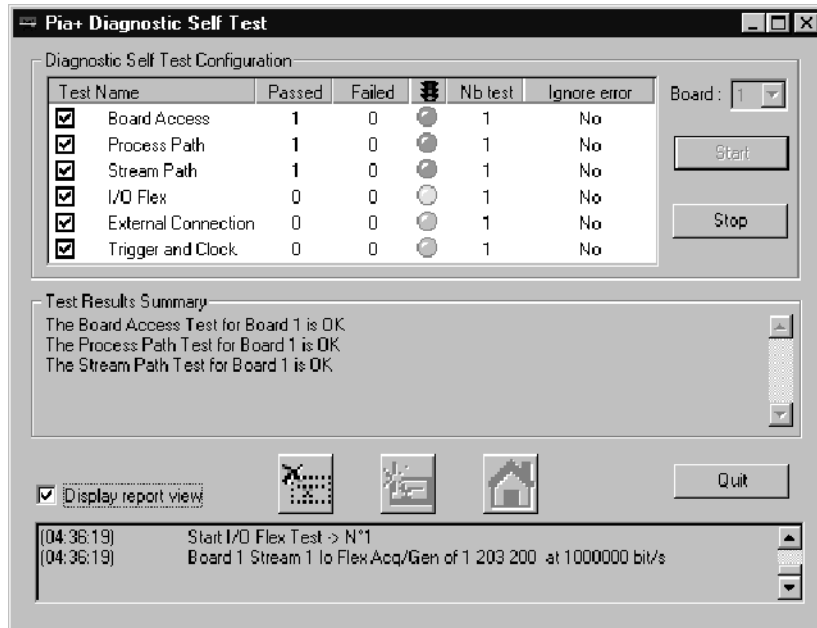


Figure 2-13: Window showing sample test results summary

The Diagnostic Self Test Configuration area indicates which tests are being performed and the progress of each test:

- A yellow LED icon indicates the test is in process.
- A green LED icon indicates that the test is completed and passed.
- A red LED icon indicates that the test failed, and the self test stops.

The Test Results Summary area displays a summary of each test checked in the test control area. This section updates with a summary of the test results when all tests for that set of diagnostics has been performed.

The Report View area records details about each test as it is being performed.

7. If the corresponding input and output connections have not been made as shown in Figure 2-8 on page 2-17, the routine will stop at the beginning of the **External Connection** test and the following message will appear.

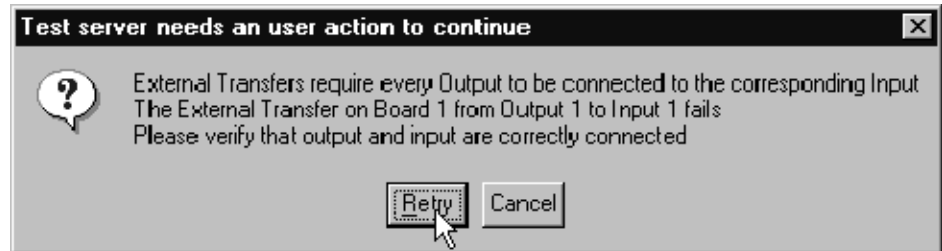


Figure 2-14: Message box with connection requirements

8. Connect the cabling as prompted by the message box. To continue the routine click **Retry** once the connection has been made.

NOTE. *If you connect all the I/O's at this time each I/O test will be performed without interruption. If you connect only one, then the message will appear at the conclusion of each test. Move the cable to the next I/O as prompted in the message box.*

Trigger and Clock

1. Connect the output from the signal generator to the I/O #1 Trigger input on the rear panel of the MTS300 as shown in Figure 2-15. Use a 50 Ω BNC coaxial cable to make the connection.

NOTE. All input signals to the MTS300 must be at TTL levels and the trigger and clock inputs must come from 50 Ω sources.

2. Follow the on-screen procedure.

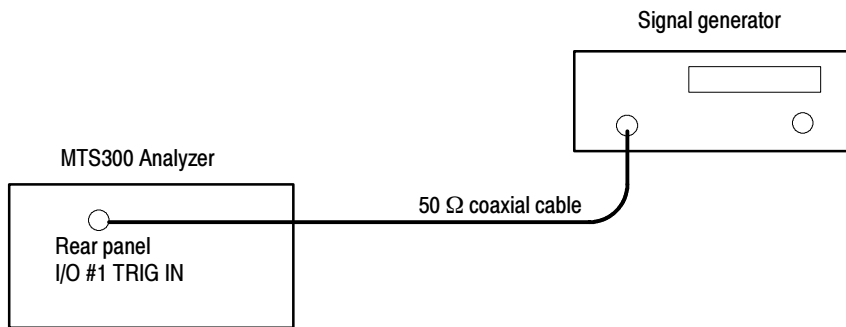


Figure 2- 15: Connections for trigger test

3. Connect the output from the signal generator to the I/O #1 Clock input on the rear panel of the MTS300 and to a frequency counter as shown in Figure 2-16. Use a BNC T-connector and a 50 Ω BNC coaxial cable to make the connection.
4. Follow the on-screen procedure.

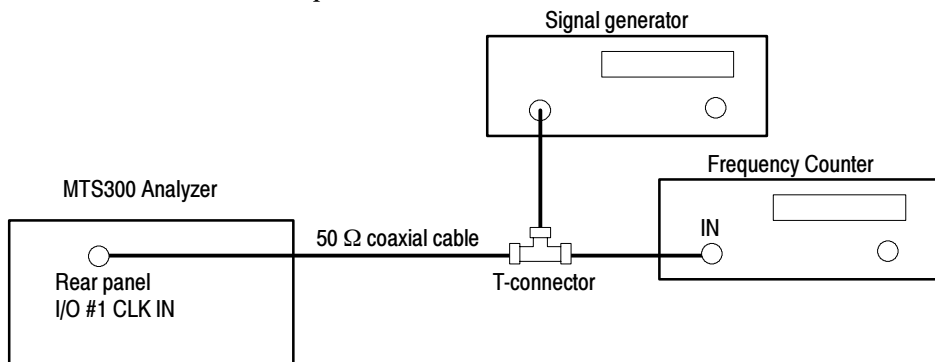


Figure 2- 16: Connections for clock test

5. This concludes the Hardware Diagnostics. Click Quit to end the routine.

MPEG-2 Software Components

Use this procedure to verify the operation of the MPEG-2 software components of the MTS300 system.

Monitoring an Input

1. Connect the input of I/O #1 to the output of I/O #2 as shown in Figure 2-17. Use a 75 Ω BNC cable to make the connection.

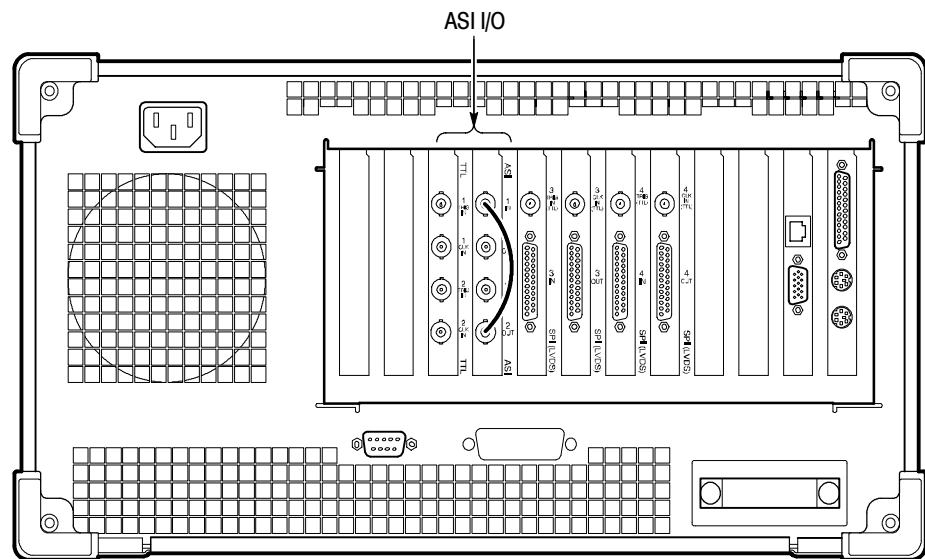
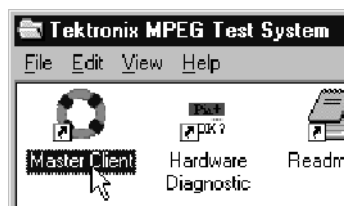


Figure 2-17: ASI cabling

2. Start the Master Client by double-clicking the **Master Client** icon in the Tektronix MPEG Test System program window.



- Initially, the Master Client window is blank as shown in Figure 2-18. To start monitoring an input, you must first connect to the local Server Manager.

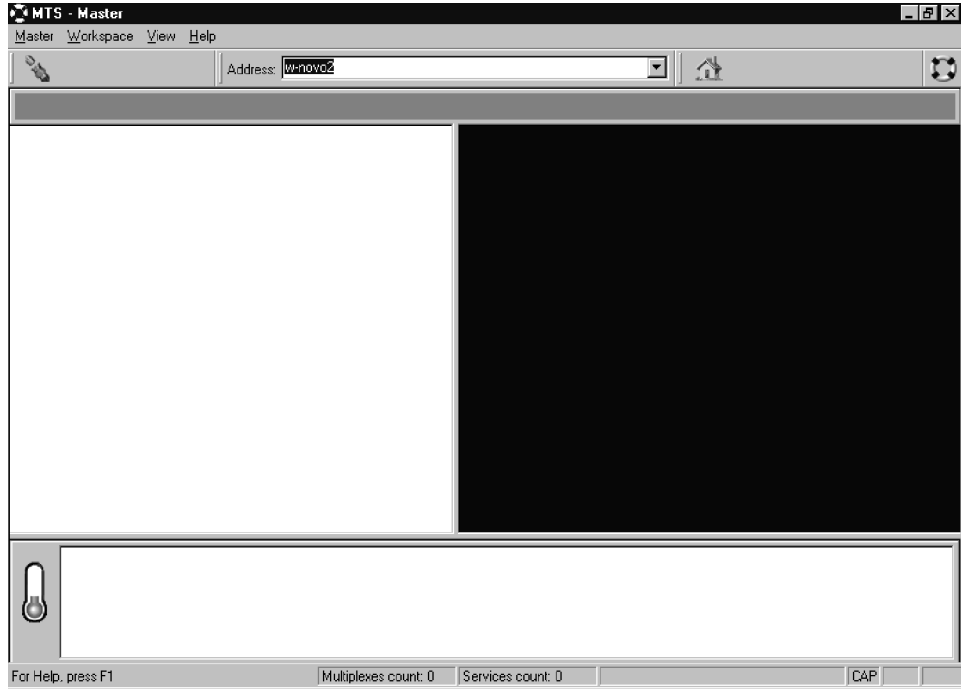


Figure 2- 18: Initial Master Client application window

- Connect to the local Server Manager by selecting **Master | Connect locally**.

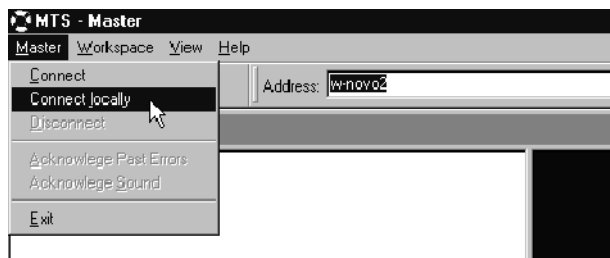


Figure 2- 19: Connecting to the local Server Manager

5. Once you have connected to the local Server Manager, the Master Client appears as in Figure 2-20 with the I/O ports labeled Free in the Port Manager panel. You are now ready to assign the I/O ports to an Analysis Server and application.



Figure 2-20: Master Client window showing no assigned ports

6. Select I/O #1 in the Port Manager panel, right click, and then select **Assign Server | Analysis Server** from the shortcut menu.



Figure 2-21: Port Manager panel showing Analysis Server selected

7. Select I/O #2 in the Port Manager panel, right click, and then select **Assign Server | Stream Player** from the shortcut menu.
8. Select the Stream Player icon (I/O #2), right click, and then select **Launch Stream Player Client** from the shortcut menu.

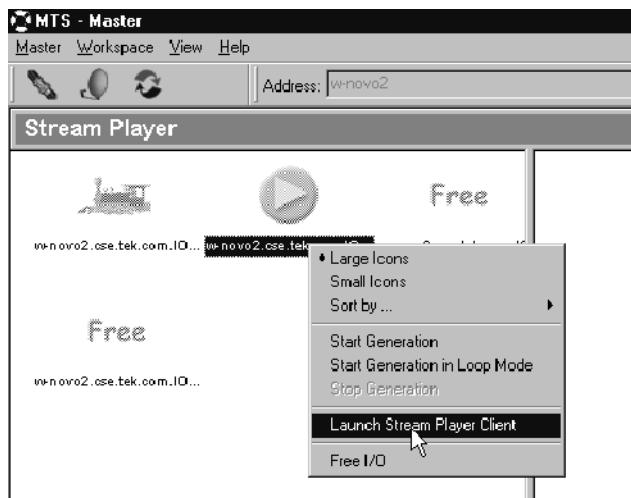


Figure 2-22: Selecting Launch Stream Player Client

9. Click the **Browse** button to select a transport stream file (*.trp) from the MTS300 system hard drive.



Figure 2-23: Stream Player Application window

10. Browse to C:\MTS300\Cfg-Trp directory, and then highlight the *Sample.trp* file. Click **Open** to load the file into the Stream Player.

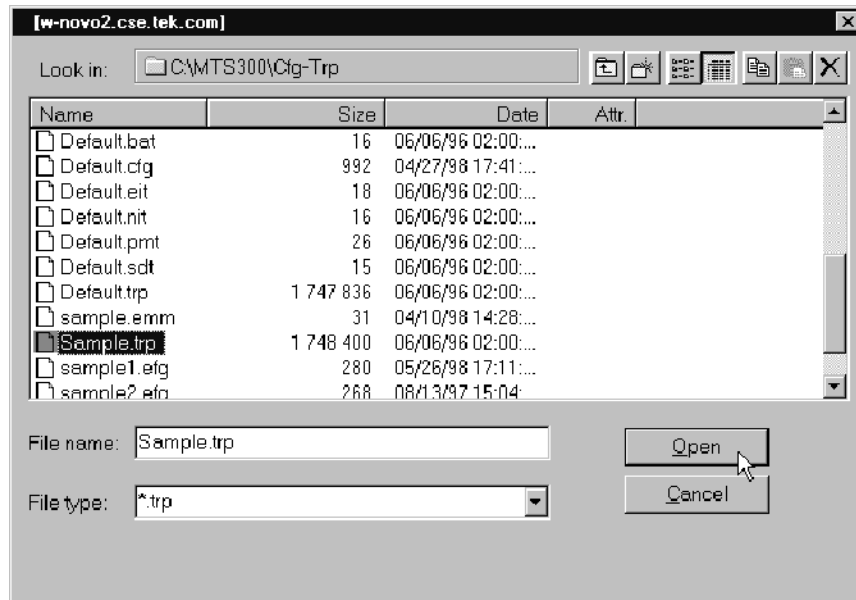



Figure 2-24: C:\MTS300\Cfg-Trp directory

11. Click the loop play  button in the Stream Player window to begin output of the transport stream. See also Figure 2-23.
12. Minimize the Stream Player application window.

13. Select the Analysis Server icon (I/O #1), right click, and then select **Start Analysis** from the shortcut menu.

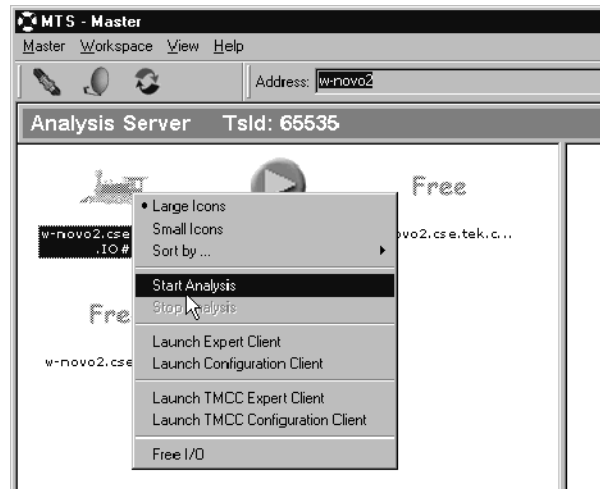


Figure 2-25: Starting transport stream analysis

14. After you start the analysis, an icon representing the service in the Sample.trp file appears in the Services panel.
15. Select the Analysis Server icon, right-click, and then select **Launch Expert Client**.

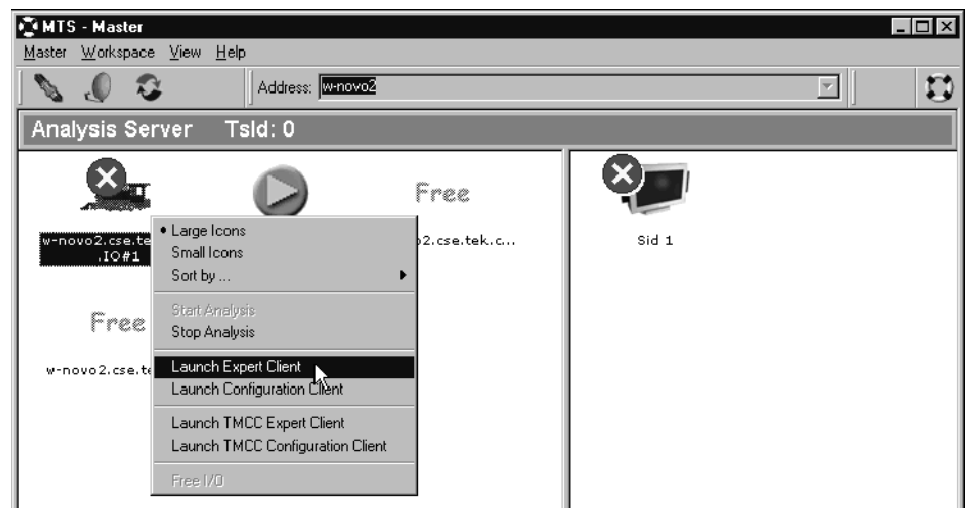


Figure 2-26: Master Client in Analysis mode

16. The Expert Client applications window opens. A typical display is shown in Figure 2-27.

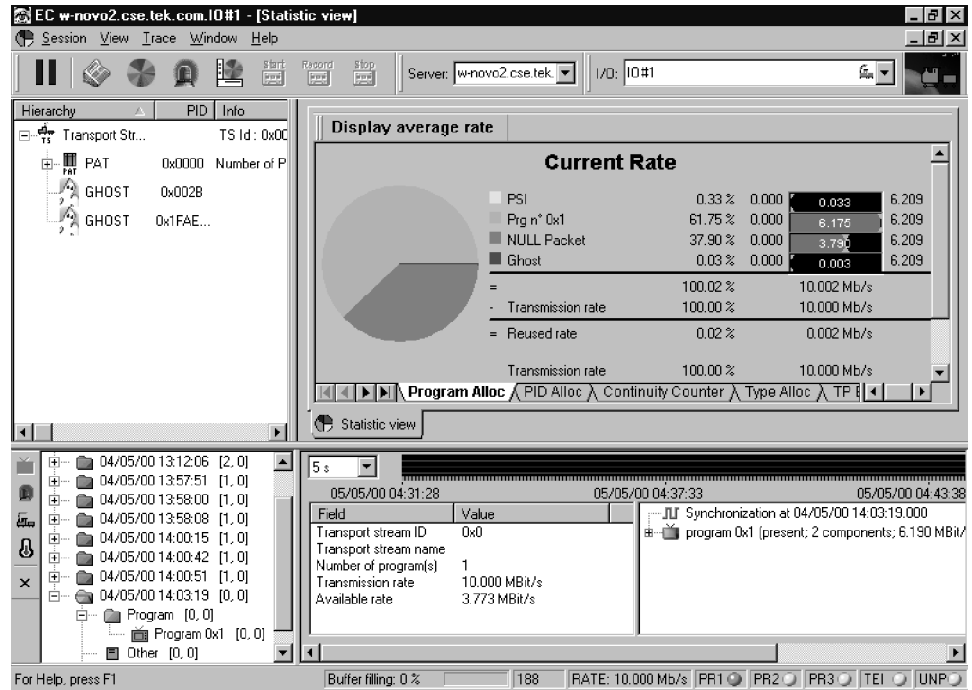


Figure 2-27: Expert Client application window

17. Verify proper operation.

- Check that stream is acknowledged on Port 1.
- Confirm that the Program Allocation pie chart correctly shows one program slice. (The PSI slice is too small to display.)

2nd I/O Pair Setup Procedure

1. Connect the output of I/O #1 to the input of I/O #2 as shown in Figure 2-28. Use a 75 Ω BNC cable to make the connection.

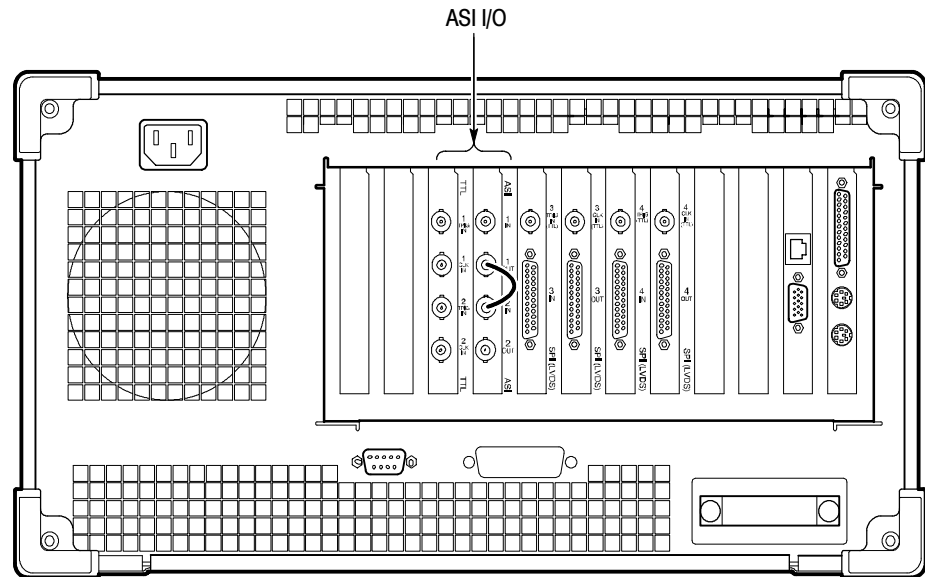


Figure 2-28: Setup for testing second input

2. Exit the Expert Client application window.

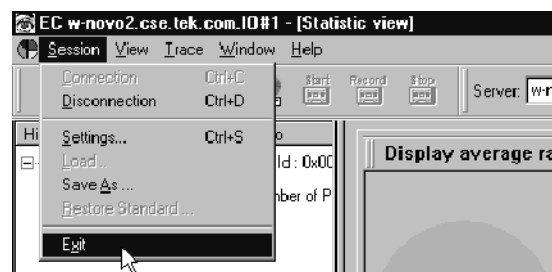



Figure 2-29: Exit Expert Client application

3. Select I/O #1 in the Port Manager panel, right click, and then select **Stop Analysis** from the shortcut menu.
4. Select I/O #1 in the Port Manager panel, right click, and then select **Free I/O** from the shortcut menu.
5. Select I/O #2 in the Port Manager panel, right click, and then select **Stop generation** from the shortcut menu.

6. Exit the Stream Player Client application.
7. Select I/O #2 in the Port Manager panel, right click, and then select **Free I/O** from the shortcut menu.
8. Select I/O #2 in the Port Manager panel, right click and then select **Assign Server | Analysis Server** from the shortcut menu.
9. Select I/O #1 in the Port Manager panel, right click, and then select **Assign Server | Stream Player** from the shortcut menu.
10. Select the Stream Player icon (I/O #1), right click, and then select **Launch Stream Player Client** from the shortcut menu.
11. Click the **Browse** button to select a transport stream file (*.trp) from the MTS300 system hard drive.
12. Browse to C:\MTS300\Cfg-Trp directory, and then highlight the *Sample.trp* file. Click **Open** to load the file into the Stream Player.
13. Click the loop play  button in the Stream Player window to begin output of the transport stream.
14. Minimize the Stream Player application window.
15. Select the Analysis Server icon (I/O#2), right click, and then select **Start Analysis** from the shortcut menu.
16. After you start the analysis, an icon representing the service in the Sample.trp file appears in the services panel.
17. Select the Analysis Server icon, right-click, and then select **Launch Expert Client**.

18. The Expert Client applications window opens. A typical display is shown in Figure 2-30.

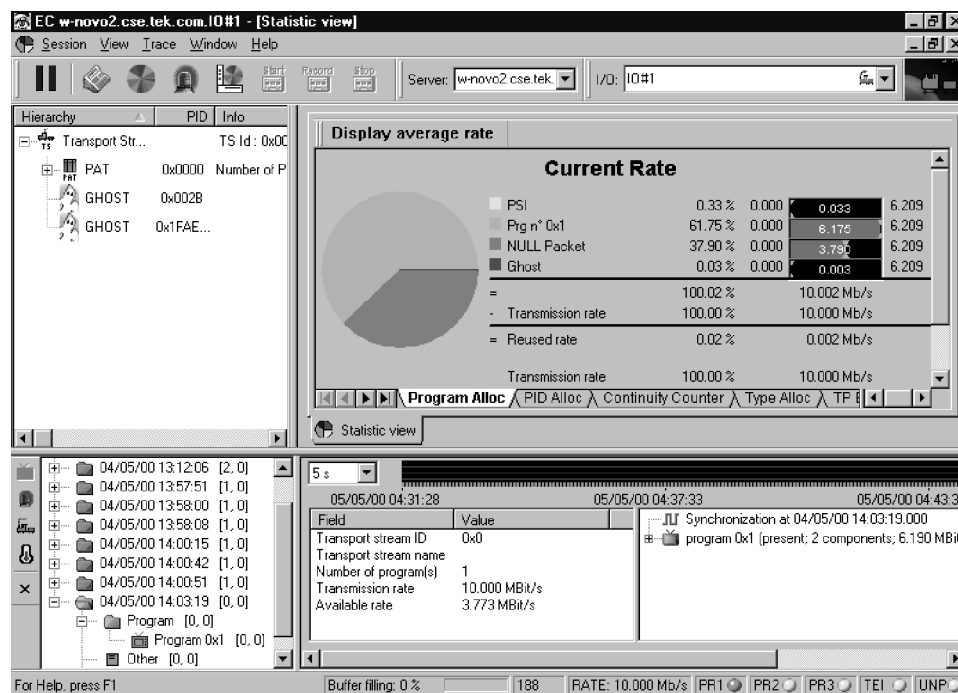


Figure 2-30: Expert Client application window

19. Verify proper operation:

- Check that stream is acknowledged on Port 2.
- Confirm that the Program Allocation pie chart correctly shows one program slice.

If the analyzer successfully checks Sample.trp, functionality of the Analysis Server, Stream Player Client and Stream Player Server, and the Expert Client is confirmed. If the program allocation display does not show the pie chart or report transmission rates correctly, switch the MTS300 system off and verify that the PIA+ board is firmly seated in the PCI connector (slot 4 of the test system card cage).

3rd and 4th I/O Pair Setup Procedure

1. If you have one of the I/O options installed, repeat the procedure that you have just completed for the remaining I/O pairs (I/O #3 and I/O #4).
2. Connect the input to the corresponding output. Figure 2-31 shows the connections using the rear panel with the SPI (LVDS) I/O option installed.

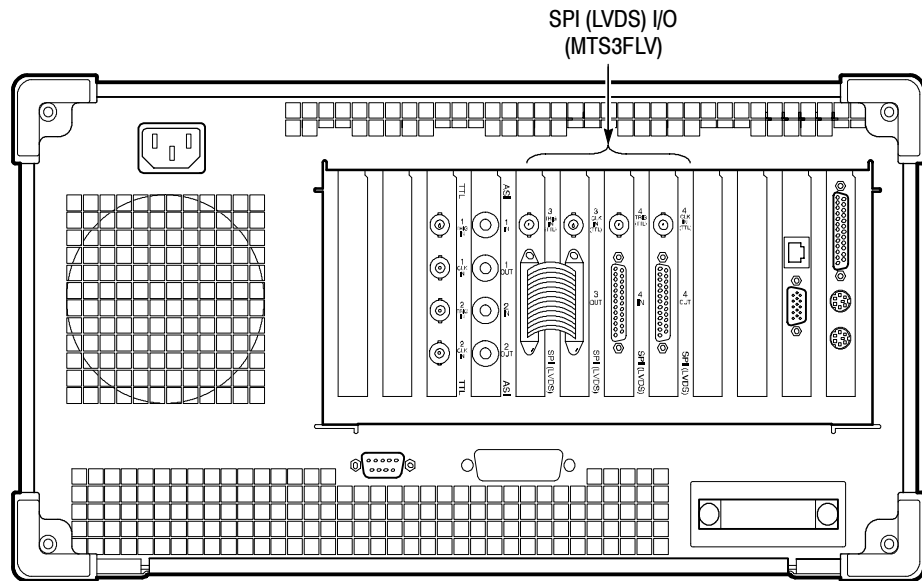


Figure 2-31: Rear panel connections for I/O #3 test procedure

If your MTS300 test system has software version 6.0 or higher and you are operating in a TMCC environment, proceed with *TMCC Software Components* beginning on page 2-35.

Otherwise, after a successful functional check, exit the Expert Client, Stream Player, and Master Client and shut down the test system.

TMCC Software Components

Perform the following steps only if you are operating the MTS300 system in a TMCC environment.

- Setup**
1. Remove any signal cables that may still be connected to the MTS300 test system rear panel from the previous procedure.
 2. Connect a TMCC transport stream input signal to the I/O #1 input connector.
 3. Select I/O #1 in the Port Manager panel, right click, and then select **Assign Server | Analysis Server** from the shortcut menu.

- Set TMCC Probes**
1. Right-click the multiplex icon representing the TMCC transport stream input (I/O #1), and then select **TMCC Configuration Client** from the submenu.
 2. After the TMCC Configuration Client is displayed, click **Analysis** in the navigation panel to open the Analysis configuration panel shown in Figure 2-32.
 3. Click the appropriate stream type for the type of TMCC transport stream you are monitoring.

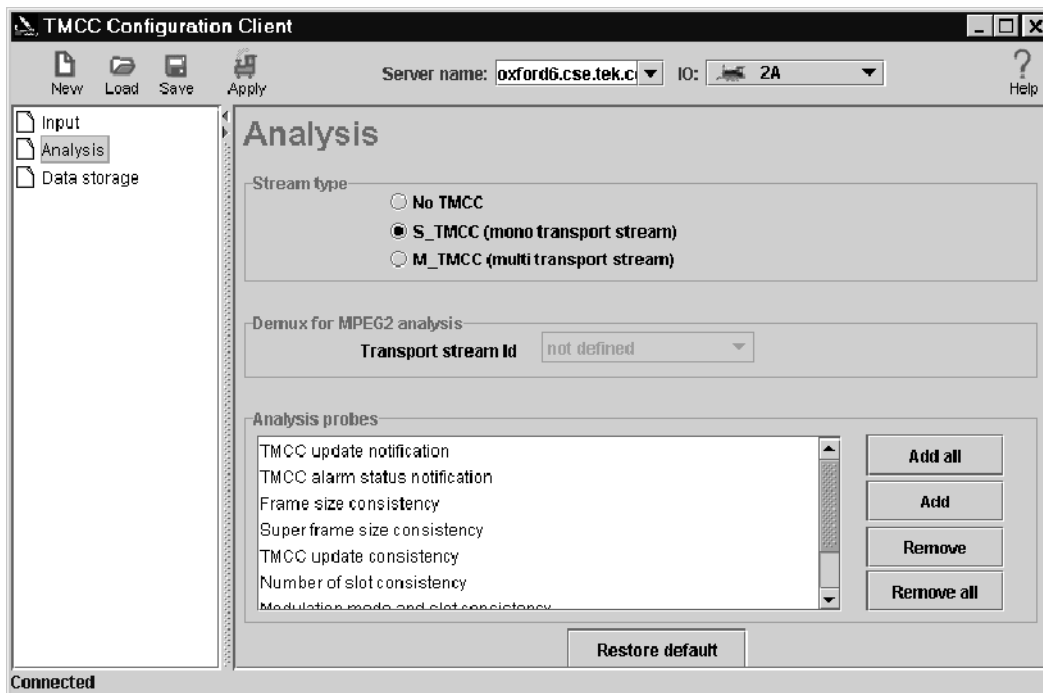


Figure 2-32: Probes added in the TMCC Configuration Client

- Click **Add All** and notice that a number of probes are added to the List of Probes selection box. See Figure 2-32.

The exact number of probes added will vary depending on whether you are analyzing a TMCC basic or TMCC data stream. Data streams are analyzed for the TMCC Update counter, whereas basic streams are not.

- Click **OK** to save your changes, close the TMCC Configuration Client and return to the Master Client.

Display the TMCC Expert Client

- Right-click the Multiplex icon for the input you just configured, and then select **TMCC Expert Client** from the submenu.
- Confirm that the TMCC Expert Client displays with data in the Slots, Syntax, Dump, and Report view frames. See Figure 2-33.
- Close the TMCC Expert Client and return to the Master Client.

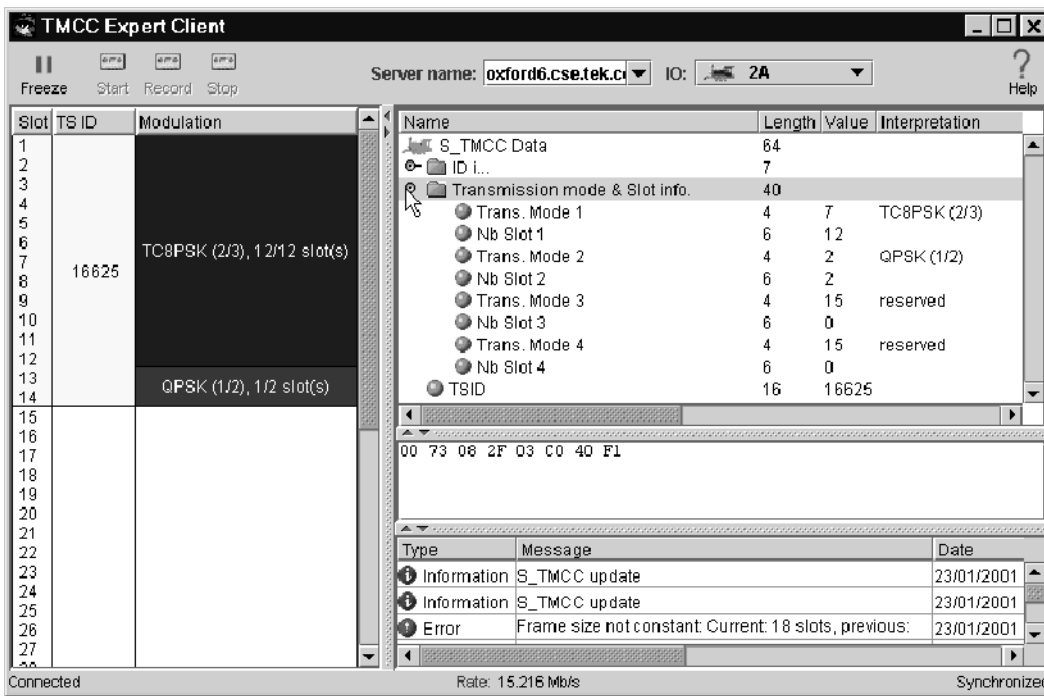


Figure 2-33: TMCC Expert Client

Set ARIB Table Probes

9. Right-click the Multiplex icon for the input you just configured, and then select **Configuration Client** from the submenu.
10. In the Analysis Panel of the Configuration Client, select **ISDB** (this panel is the default panel displayed when first starting the Configuration Client).
11. Select **Rate | Section** in the Navigation panel, and configure the Analysis Server to check that the DCT is updated at least every .0001 seconds (the rate, 0.1 Mbps, is a much higher rate than standard and will generate errors from the Analysis Server.)
12. Apply your changes, restarting the Analysis Server when prompted, and then exit the Configuration Client.
13. Confirm that errors are being reported for the input you just modified.

Display the Section Rate using the MPEG-2 Expert Client

14. In the Master Client, click the Multiplex icon for the input you just configured, and then right-click the TMCC Service icon displaying an error and select **Expert Client** from the submenu.
15. When the Expert Client is displayed, locate a DCT icon in the Hierarchic view.
16. Right-click the DCT icon select **Section Rate** from the submenu.
17. In the dialog box that is displayed, select one of the section numbers and click **OK**.
18. Confirm that the client area of the Expert Client changes to show the section rate analysis of the selected element.
19. Quit the Expert Client.

After a successful functional check, exit the Master Client and shut down the test system.



Specifications

Specifications

This section lists the electrical, environmental, and physical specifications of the MTS300 system. All specifications are guaranteed unless labeled *typical*. Typical specifications are provided for your convenience and are not guaranteed. Electrical characteristics apply to test systems operating within the environmental conditions specified in Table 3-10.

To verify performance of the test system, use the procedures in the performance verification section of the *MTS300 MPEG Test System Service Manual*, an optional accessory. Contact your Tektronix representative for ordering information.

Monitoring Characteristics

MPEG Characteristics:

- Supports MPEG-2, DVB, and ATSC protocols.
Monitors transport and multiplex errors.
- Monitors PSI, SI, and PSIP table syntax and consistency errors.
Monitors transport signal for sync loss.
- Generates MPEG transport streams (including ATSC and DVB-SI).

Data Rate Characteristics:

- Up to 140 Mbps with one input or 240 Mbps total using 2 to 4 inputs.
For example, Port 1 can run at 100 Mbps while port 2 is running at 140 Mbps for a total of 240 Mbps.

Number of Inputs:

- Standard Inputs: Two ASI/M2S input/output pairs
- Optional inputs: Two SPI (LVDS parallel), two SMPTE310M (SSI), or two DHEI (GI-Digicypher) input/output pairs.

Interface Platform Characteristics

Table 3-1: Platform characteristics

Characteristic	Description	Supplemental information
Operating system	Windows NT 4.0 (Service pack 6)	
Disk space	System: 10 GB MPEG Storage: 27 GB	
COM Port	RS-232	
Ethernet	10/100-base T; RJ45	
Mouse	Mini DIN	
Keyboard	Mini DIN	
SVGA	15-pin, High density, Sub-D	
RAM	256MB	
CD-ROM drive	8x	
Display	LCD, 800 x 600	
Character input	Touch screen and keyboard	
Printer Port	IEEE P1284	

I/O Port Electrical Characteristics

Table 3-2: ASI

Characteristic	Description	Supplemental information
Input Port (ASI/M2S)		
Connector	BNC	
Bit Rate	270 Mbps \pm 100 ppm	
Transport Stream Data rate	Maximum: 140 Mbps Minimum: 1 Mbps	
Signal Amplitude	Maximum: 800 mV _{p-p} Minimum:: 200 mV _{p-p}	
Termination	75 Ω nominal	
Return Loss	17 dBm minimum from 27 MHz to 270 MHz	
Output Port (ASI/M2S)		
Connector	BNC	
Bit Rate	270 Mbps \pm 100 ppm	

Table 3-2: ASI (Cont.)

Characteristic	Description	Supplemental information
Transport Stream Data Rate	Maximum: 140 Mbps Minimum: 1 Mbps	
Signal Amplitude	Maximum: 880 mV _{p-p} , typical Minimum: 500 mV _{p-p} , typical	
Termination	75 Ω	
Format	Can be configured as ASI Burst, ASI Packet, or M2S	
Rise and Fall times	1.2 ns maximum, typical	20% to 80%
External Clock Input Port		Clocks the stream player output byte rate
Voltage Levels	TTL Low: < 0.8 V, typical High: > 2.0 V, typical	
Termination	50 Ω resistive nominal	
Frequency Range	125 kHz to 17.5 MHz	
External Trigger Input Port		Initiates a capture of a transport stream input
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	

Table 3-3: SPI-LVDS parallel (Option MTS3FLV)

Characteristic	Description	Supplemental information
Input Port		See Table 3-4 on page 3-5 for pin descriptions. See Figure 3-1 on page 3-5 for the timing diagram.
Connector	25-pin sub D-type	
Data Rate	Maximum: 140 Mbps Minimum: 1 Mbps	
Signal Amplitude	LVDS	
Termination	100 Ω resistive nominal, line-to-line	
Timing reference	Rising edge of clock	

Table 3-3: SPI-LVDS parallel (Option MTS3FLV) (Cont.)

Characteristic	Description	Supplemental information
Clock-to-Data Timing	Data must be stable ± 5 ns of rising clock edge	
Output Port		See Table 3-4 on page 3-5 for pin descriptions. See Figure 3-1 on page 3-5 for the timing diagram.
Connector	25-pin sub D-type	
Data Rate	Maximum: 140 Mbps Minimum: 1 Mbps	
Signal Amplitude (LVDS)	Maximum: 454 mV _{p-p} , typical Minimum: 247 mV _{p-p} , typical	
Termination	100 Ω resistive nominal, line-to-line	
Signal Common-Mode Range (LVDS)	1.125 V to 1.375 V, typical	
External Clock Input Port		Clocks the stream player output byte rate
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	
Frequency Range	125 KHz to 17.5 MHz	
External Trigger Input Port		Initiates a capture of a transport stream input
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	

Table 3-4: LVDS parallel data pin connections

LVDS/ECL/RS422 parallel port	Pin	Function	Pin	Function
	1	DCLK	14	$\overline{\text{DCLK}}$
	2	Ground	15	Ground
	3	DATA 7	16	$\overline{\text{DATA 7}}$
	4	DATA 6	17	$\overline{\text{DATA 6}}$
	5	DATA 5	18	$\overline{\text{DATA 5}}$
	6	DATA 4	19	$\overline{\text{DATA 4}}$
	7	DATA 3	20	$\overline{\text{DATA 3}}$
	8	DATA 2	21	$\overline{\text{DATA 2}}$
	9	DATA 1	22	$\overline{\text{DATA 1}}$
	10	DATA 0	23	$\overline{\text{DATA 0}}$
	11	DVALID	24	$\overline{\text{DVALID}}$
	12	PSYNC	25	$\overline{\text{PSYNC}}$
	13	Shield		

Asserted Low differential signal.

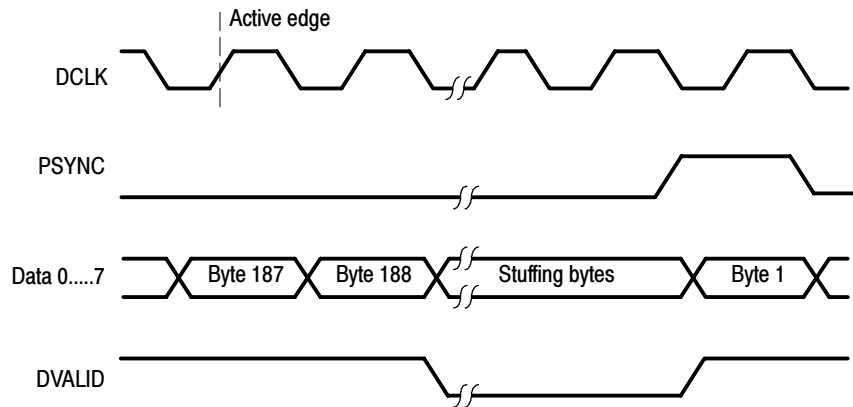


Figure 3-1: Parallel data timing, 188-byte packets

Table 3-5: SSI (Option SS)

Characteristic	Description	Supplemental information
SSI input (SMPTE310M)		
Connector	BNC, Female	
Input bit rate	19,392,658.5 bps ± 1000 bps (typical) 38,785,316.9 bps ± 1000 bps (typical)	
Synchronization	0x47	Synchronization will occur when the sync_byte is 0x47
Data format	Compliant with SMPTE310M	
Packet length	188 byte	
Signal amplitude	880 mV _{p-p} , maximum 720 mV _{p-p} , minimum	
Signal DC offset	± 0.5 VDC, maximum	
Termination	75 Ω	
Return loss	-17 dB, 100 kHz to 77.6 MHz	
SSI output (SMPTE310M)		
Connector	BNC, Female	
Output bit rate	19,392,658.5 bps (nominal) or 38,785,316.9 bps (nominal)	Same as the input when the output is a loop through of the input
Data format	Compliant to SMPTE310M	
Signal amplitude	880 mV _{p-p} maximum 720 mV _{p-p} minimum	
Signal DC offset	± 0.5 VDC, maximum	
Signal rise and fall times	0.4 ns minimum 5.0 ns maximum	Rise and fall times shall not differ by more than 1.6 ns, measured between 20% and 80%
Signal overshoot	10% of maximum signal amplitude	
Output impedance	75 Ω	
Return loss	-17 dB, 100 kHz to 77.6 MHz	

Table 3-5: SSI (Option SS) (Cont.)

Characteristic	Description	Supplemental information
External Clock Input Port		Clocks the stream player output bit rate
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	
Frequencies	19.393 MHz 38.785 MHz	
External Trigger Input Port		Initiates a capture of a transport stream input
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	

Table 3-6: DHEI-Digicipher II

Characteristic	Description	Supplemental information
Expansion Input Port		
Connector	26-pin D, HD-22 Series	See Table 3-7 on page 3-9 for the pin descriptions
Data Rate	Maximum: 40 Mbps Minimum: 1 Mbps	
Signal Amplitude	ECL	
Termination	120 Ω resistive nominal, line-to-line	
Timing reference	Falling Edge of clock	
Clock-to-Data Timing	Data must be stable ± 5 ns of falling clock edge	
Output Port		See Table 3-8 on page 3-10 for the pin descriptions
Connector	26-pin D, HD-22 Series	
Data Rate	Maximum: 40 Mbps Minimum: 1 Mbps	
Signal Amplitude	ECL	

Table 3-6: DHEI-Digicipher II (Cont.)

Characteristic	Description	Supplemental information
Termination	120 Ω resistive nominal, line-to-line	
External Clock Input Port		Clocks the stream player output bit rate
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	
Frequency range	1 MHz to 40 MHz	
External Trigger Input Port		Initiates a capture of a transport stream being input to the real-time analyzer
Voltage Levels	TTL Low: < 0.8 V High: > 2.0 V	
Termination	50 Ω resistive nominal	

Table 3-7: DHEI Expansion In pin connections

DHEI 26-pin connector	Pin	Function	Description
	1	PROTOGND	Protective or shield ground
	2	SENSEAIR	Enable sense A input return
	3	PSYNCAI-	Packet sync A input (-)
	4	PDATAI-	Packet data A input (-)
	5	PCLKAI+	Packet clock A input (+)
	6	PCLKAI-	Packet clock A input (-)
	7	REFCLKAI+	Ref_clock A input (+)
	8	REFCLKAI-	Ref_clock A input (-)
	9	SIGND	Signal or circuit ground reference
	10	RSVD	DHEI reserved
	11	SENSEAIL	Enable sense A loop input
	12	PSYNCAI+	Packet sync A input (+)
	13	PDATAI+	Packet data A input (+)
	14	RSVD	DHEI reserved
	15	PDATBO-	Packet data B output (-)
	16	PSYNCBO-	Packet sync B output (-)
	17	SENSEBOR	Enable sense B output return
	18	RSVD	DHEI reserved
	19	REFCLKBO+	Ref_clock B output (+)
	20	REFCLKBO-	Ref_clock B output (-)
	21	PCLKBO+	Packet clock B output (+)
	22	PCLKBO-	Packet clock B output (-)
	23	PDATBO+	Packet data B output (+)
	24	PSYNCBO+	Packet sync B output (+)
	25	SENSEBOL	Enable sense B loop output
	26	RSVD	DHEI reserved

Table 3-8: DHEI Expansion Out pin connections

DHEI 26-pin connector	Pin	Function	Description
<p>The diagram shows a 26-pin DHEI connector with pins arranged in two columns of 13 pins each. Pin 1 is at the top left, pin 9 is at the bottom left, pin 10 is at the top center, pin 18 is at the bottom center, pin 19 is at the top right, and pin 26 is at the bottom right.</p>	1	PROTOGND	Protective or shield ground
	2	SENSEAOR	Enable sense A output return
	3	PSYNCAO-	Packet sync A output (-)
	4	PDATAO-	Packet data A output (-)
	5	PCLKAO+	Packet clock A output (+)
	6	PCLKAO-	Packet clock A output (-)
	7	REFCLKAO+	Ref_clock A output (+)
	8	REFCLKAO-	Ref_clock A output (-)
	9	SIGND	Signal or circuit ground reference
	10	RSVD	DHEI reserved
	11	SENSEAOL	Enable sense A loop output
	12	PSYNCAO+	Packet sync A output (+)
	13	PDATAO+	Packet data A output (+)
	14	RSVD	DHEI reserved
	15	PDATBI-	Packet data B input (-)
	16	PSYNCB-	Packet sync B input (-)
	17	SENSEBIR	Enable sense B input return
	18	RSVD	DHEI reserved
	19	REFCLKBI+	Ref_clock B input (+)
	20	REFCLKBI-	Ref_clock B input (-)
	21	PCLKBI+	Packet clock B input (+)
	22	PCLKBI-	Packet clock B input (-)
	23	PDATBI+	Packet data B input (+)
	24	PSYNCB+	Packet sync B input (+)
	25	SENSEBIL	Enable sense B loop input
	26	RSVD	DHEI reserved

Power Characteristics

Table 3-9: AC power source characteristics

Characteristic	Description
Source Voltage	100 VAC to 240 VAC 47 Hz to 63 Hz, continuous range CAT II
Maximum Power Consumption	170 Watts, typical

Environmental Characteristics

Table 3-10: Environmental characteristics

Characteristic	Description
Cooling Airflow	Intake is from the front and sides of the instrument. Exhaust is to the bottom and rear of the instrument.
Required Clearance	2 in (50 mm) air space adjacent to the bottom of the instrument is required.
Use Rating	Rated for indoor use only.
Atmospherics	
Temperature:	
Operating	+5 °C to +40 °C, 30 °C/hr max gradient, noncondensing (derated 1 °C per 1,000 ft above 5,000 ft altitude)
Nonoperating	-20 °C to 60°C, 30 °C/hr max gradient (without disk media installed in disk drives)
Humidity	
Operating	20% to 80% relative humidity, noncondensing. Max wet bulb temperature: 29 °C (derates relative humidity to ~ 22% at 50 °C)
Nonoperating	8% to 80% relative humidity, noncondensing. Max wet bulb temperature: 40 °C (derates relative humidity to ~ 55% at 50 °C)
Altitude	
Operating	Up to 10,000 ft (3,040 m), (derated 1 °C per 1,000 ft above 5,000 ft altitude)
Nonoperating	Up to 40,000 ft (12,190 m)

Mechanical (Physical) Characteristics

Table 3- 11: Mechanical characteristics

Characteristic	Description
Classification	Transportable platform intended for either rackmount or bench applications
Overall Dimensions	
Height	8.9 in (w/o feet) (22.5 cm)
Width	16.75 in (42.5 cm)
Depth	21.5 in (55.0 cm)
Weight	38 lb (17.3 kg)
Rack Space	5 rack units, standard length

Certifications and Compliances

Table 3- 12: Certifications and compliances

Category	Standard
EC Declaration of Conformity-EMC	<p>Meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility.</p> <p>Compliances was demonstrated using EN 61326: 1997 EMC Product Family Standard for Electrical Equipment for Measurement, Control, and Laboratory use.</p> <p>Emissions¹:</p> <p>EN 61326 Class A Radiated and Conducted Emissions</p> <p>IEC 61000-3-2 Conducted Power Line Harmonic Current</p> <p>Immunity¹:</p> <p>IEC 61000-4-2 Electrostatic Discharge Immunity</p> <p>IEC 61000-4-3 Radiated RF Electromagnetic Field Immunity²</p> <p>IEC 61000-4-4 Electrical Fast Transient/Burst Immunity</p> <p>IEC 61000-4-5 Power Line Surge Immunity</p> <p>IEC 61000-4-6 Conducted RF Immunity²</p> <p>IEC 61000-4-11 Voltage Dips and Short Interruptions Immunity</p>
Australia/New Zealand declaration of conformity	Complies with EMC Framework and demonstrated per Emission standard: AS/NZS 2064 Industrial, Scientific, and Medical Equipment.
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits

¹ **Compliance demonstrated using high quality, shielded interface cables.**

² **Performance Criterion: Product continues to operate properly and display remains readable.**

Table 3- 13: Environmental limits and use classification for safety certification compliance

Category	Standards or description	
Safety Certification Compliance		
Temperature, operating	+5 °C to +40 °C	
Altitude (maximum operating)	3000 meters	
Equipment Type	Test and measuring	
Safety Class	Class 1 (as defined in IEC 61010-1, Annex H) - grounded product	
Installation (Overvoltage) Category	Overvoltage Category II (as defined in IEC 61010-1, Annex J)	
Pollution Degree	Pollution Degree 2 (as defined in IEC 61010-1). Note: Rated for indoor use only.	
Supply Voltage Range	100 VAC to 240 VAC, 50/60 Hz, single phase	
Fuse Rating	Mains fuse is 10A, 250V, Fast; Not operator replaceable. Refer servicing to qualified service personnel.	
Current Rating	6.0 Amps maximum	
Relative Humidity (maximum operating)	80% for temperatures up to 31 °C, decreasing linearly to 50% at 40 °C	
Pollution Degree Definition	<p>A measure of the contaminates that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external environment. Products should be used only in the environment for which they are rated.</p> <p>Pollution Degree 1 No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.</p> <p>Pollution Degree 2 Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.</p> <p>Pollution Degree 3 Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.</p>	
European Union Compliance	<p>Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:</p> <p>Low Voltage Directive 73/23/EEC, amended by 93/68/EEC</p> <p>EN 61010-1/A2 Safety Requirements for Electrical Equipment for Measurement Control and Laboratory Use.</p>	
Listing by a U.S. Nationally Recognized Testing Laboratory	ANSI/ISA S82.01	Safety Standard for Electrical and Electronic Test, Measuring, Controlling, and Related Equipment., 1994.
Canadian Certification	CAN/CSA C22.2 No. 1010.1	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

Table 3- 13: Environmental limits and use classification for safety certification compliance (Cont.)

Category	Standards or description
Additional Compliance	<p>UL3111-1 Standard for Electrical Measuring and Test Equipment.</p> <p>IEC61010-1/A2 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.</p>
Installation (Overvoltage) Category	<p>Terminals on this product may have different installation (overvoltage) category designations. The installation categories are:</p> <p>CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location.</p> <p>CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.</p> <p>CAT I Secondary (signal level) or battery operated circuits of electronic equipment.</p>
Laser Classification	<p>This product contains a CD ROM drive which utilizes a Class 1 laser and complies with EN60825-1:94, as well as with the U.S. FDA regulations. The drive is marked with the laser's classification and the date of manufacture, as well as the following information: Complies with the DHHS rules 21 CFR Chapter 1, Subchapter J applicable at the date of manufacture.</p>



Software Repair and Recovery

Software Repair and Recovery

The MTS300 system is shipped with a 3 1/2 in floppy disk and two CD-ROMs that you will use to restore the system software and configuration when the MTS300 system has operating system or application software problems.

Use the *MTS300 MPEG Test System Operating System Recovery* CD to restore the Windows NT operating system, device drivers, and services. This CD is bootable from the CD-ROM drive of the MTS300 system.

Use the *MTS300 MPEG Test System Application Software Recovery* CD to reinstall the MTS300 application software.

Software Repair Strategy

Depending on the severity of the problem, you may need to restore only a portion of the MTS300 system software. Repair suspected software problems in the following order:

1. Restore the individual device driver or configuration setting that appears corrupt.
2. Restore the MTS300 system application software.
3. Restore the MTS300 operating system. Since restoring the operating system destroys all data on the IDE hard drive, you will have to restore the complete MTS300 system application software, restripe the SCSI hard drives, and reenter the MTS300 General License password.

The software recovery procedures in this section are divided into three sections: System Settings, Device Drivers, and Operating System and MTS300 Application Software.

Troubleshooting

Use the following troubleshooting techniques to identify drivers or services that need to be restored:

1. Restore the indicated service or driver when you observe an error message or if an attempted action fails to start.
2. When a device driver or service fails to start, Windows NT will log an event about the problem in the Event Viewer. If you suspect a software problem, but have not seen an error message, open the Event Viewer by selecting Start | Administrative Tools | Event Viewer from the Windows NT Start menu.

For example, if the audio device driver fails, an event in the log says:
 “The following boot-start or system-start driver(s) failed to load: auddrive.”

Reinstalling the device driver or service indicated in the Event Viewer will repair most driver or service problems of this kind.

3. If new components of Windows NT are installed, such as SNMP service, some DLL file versions may not match. If you observe an error message about missing or corrupt DLL files, start by restoring the Windows NT service pack (see *Restoring Microsoft Windows NT Service Pack 6a* beginning on page 4-16).

Restoring System Settings

You can restore the following system settings using the *MTS300 MPEG Test System Operating System Recovery CD*:

<i>Restoring the Boot Order</i>	page 4-3
<i>Restoring the BIOS Settings</i>	page 4-4
<i>Restoring the SCSI Drive Controller Settings</i>	page 4-5
<i>Restoring the SCSI Drive Stripe Set</i>	page 4-6
<i>Restoring the Display Setting</i>	page 4-7
<i>Restoring the COM Port Settings</i>	page 4-8
<i>Restoring the Taskbar Auto-Hide Setting</i>	page 4-9
<i>Restoring the Event Viewer Setting</i>	page 4-9
<i>Restoring the Windows NT Explorer Settings</i>	page 4-10
<i>Restoring the Boot Initialization Countdown Setting, Resetting, and Disabling Auto Logon</i>	page 4-11
<i>Restoring NetBEUI Protocol</i>	page 4-13
<i>Restoring the Microsoft TCP/IP Printing Service</i>	page 4-14
<i>Restoring the SNMP Service</i>	page 4-15
<i>Restoring Microsoft Windows NT Service Pack 6a</i>	page 4-16

Restoring Device Drivers

You can restore the following device drivers using the *MTS300 MPEG Test System Operating System Recovery CD*:

<i>Restoring the Sound Chip Driver</i>	page 4-17
<i>Restoring the Display Driver</i>	page 4-18
<i>Restoring the Soft Power-Off Driver</i>	page 4-19
<i>Restoring the PCI Adapter Driver</i>	page 4-19
<i>Restoring the Touch Screen Driver</i>	page 4-21

Restoring the Operating System and MTS300 Application Software

You can restore the operating system and MTS300 application software using the following procedures:

<i>Restoring the Operating System Software</i>	page 4-23
<i>Restoring the MTS300 Application Software</i>	page 4-25
<i>Entering the MTS300 General License Password</i>	page 4-29

Restoring System Settings

This section contains procedures for restoring the following system settings: boot order, BIOS, SCSI drive controller, SCSI drive stripe set, display, COM port, taskbar auto-hide, event viewer, Windows NT Explorer, boot initialization countdown, Auto Logon, NetBEUI protocol, Microsoft TCP/IP printing service, SNMP service, and Windows NT service pack 6a.

Restoring the Boot Order

By factory default, the boot order of the MTS300 system is set to the following:

1. Removable devices
2. CD-ROM drive
3. Hard drive
4. Network

By factory default, the hard disk boot order of the MTS300 system is set to the following:

1. <disk brand name and model> (IDE drive)
2. Bootable add-in cards (SCSI drives)

If either boot-order has been changed on your MTS300 system, use the following procedure to restore the factory-default boot options in the system BIOS:

1. Reboot the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Press the **F2 function key** to enter the BIOS Setup utility when you are prompted in the MTS300 system start-up messages. The message will appear in the lower left of the display.
3. In the System BIOS utility window, highlight **F4-BOOT OPTIONS** and press **Enter**.
4. If the items in the BOOT ORDER list and the HARD DISK ORDER list do not match the factory-default orders listed above, use the **Up/Down** arrow keys to select a device in the desired list, and then use the **Left/Right** arrow keys to move the selected device to the factory-default position in the list.
5. After you have corrected the order of the boot lists, press the **ESC key** to return to the main menu.
6. Highlight **F10-EXIT** and press **Enter** to access the Exit menu.
7. Select **Exit Saving Changes** and press **Enter** to exit the BIOS setup utility and save changes. The MTS300 system will continue its power-on process using the new settings.

Restoring the BIOS Settings

To help restore the MTS300 system BIOS settings, the *MTS300 MPEG Test System Operating System Recovery* CD contains a CMOS NVRAM Read/Write utility program and the factory-default BIOS image.

Perform the following steps to restore the MTS300 system BIOS settings:

1. Insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system, and then reboot the instrument.
2. When the MTS300 system has booted from the recovery CD-ROM, a readme text file will be displayed. The readme text file contains instructions on how to perform various commands.
3. Type the following command in the DOS window to reprogram the CMOS NVRAM back to the factory-default setting for the BIOS:

RESTBV14.BAT
4. When the BIOS has been successfully restored, an array of BIOS values will be displayed on the screen.
5. Reboot the MTS300 system after the BIOS value array is displayed.

NOTE. To manually configure the BIOS of the MTS300 system, refer to the MTS300 MPEG Test System Service Manual.

Restoring the SCSI Drive Controller Settings

The MTS300 system is equipped with 3 ultra-wide SCSI hard disks. The SCSI controller must be configured with the Ultra SCSI Speed option enabled to ensure the required data-access performance to and from the SCSI hard disks.

By default, the SCSI controller has this option disabled. The MTS300 system is shipped from the factory with this option enabled. If the Ultra SCSI Speed option has been changed, either manually or by resetting the SCSI host adapter, you must restore the factory default SCSI controller settings and enable the Ultra SCSI Speed option to ensure proper performance.

Perform the following procedure to restore the SCSI controller settings back to the factory-default values and to enable the Ultra SCSI Speed option:

1. Reboot the MTS300 system without a recovery disk in the CD-ROM drive.
2. Press **CTRL+A** when you are prompted to access the SCSI Select Utilities.
3. Select **Configure/View Host Adapter Settings** in the utility window and press **Enter**.
4. Press the **F6 function key** to reset the Host Adapter settings back to the factory-default values.
5. Select **Yes** to confirm loading all of the default configuration settings.
6. Select **Advanced Configuration Options** in the utility window and press **Enter**.
7. Select the **Support for Ultra SCSI Speed** option and press **Enter**.
8. Select **Enabled** and press **Enter**.
9. Press **ESC** to return to the previous menu.
10. Press **ESC** again to return to the main utility menu.
11. Select **Yes** in the Save Changes Made? dialog box and press **Enter**.
12. Press **ESC**, and then select **Yes** in the Exit Utility? dialog box to exit the SCSI Select utility.
13. Press any key to reboot the MTS300 system using the new settings.

Restoring the SCSI Drive Stripe Set

If the three SCSI hard drives have their striped-set condition corrupted, or you have restored the operating system, all transport stream data stored on them is lost and cannot be recovered. You can use the Disk Administrator utility to restore the striped-set condition of the SCSI hard drives so that you can store new data on them.

NOTE. *This restoration procedure will only be effective if each of the three SCSI hard drives are still functional.*

Perform the following steps to format the SCSI hard drives into a striped set:

1. Select **Start | Programs | Administrative Tools | Disk Administrator** in the Windows NT Start menu to open the Disk Administrator utility.

The Disk Administrator will display information about each of the drives of the MTS300 system. In the utility display, disk 0 (C:) is the IDE drive containing the operating system software. Disks 1, 2, and 3 (E:) are the striped-set SCSI hard drives containing the transport stream data. The CD-ROM drive (D:) is shown at the bottom of the display.

2. Select all three SCSI hard drives (disks 1, 2, and 3). Click within the large box next to the Disk 1 label to select the disk (the outline of the box will highlight).
3. If all three SCSI disk drives do not highlight as shown in Figure 4-1, hold down the CTRL key and left-click the other two drive boxes to select all three disk drives.

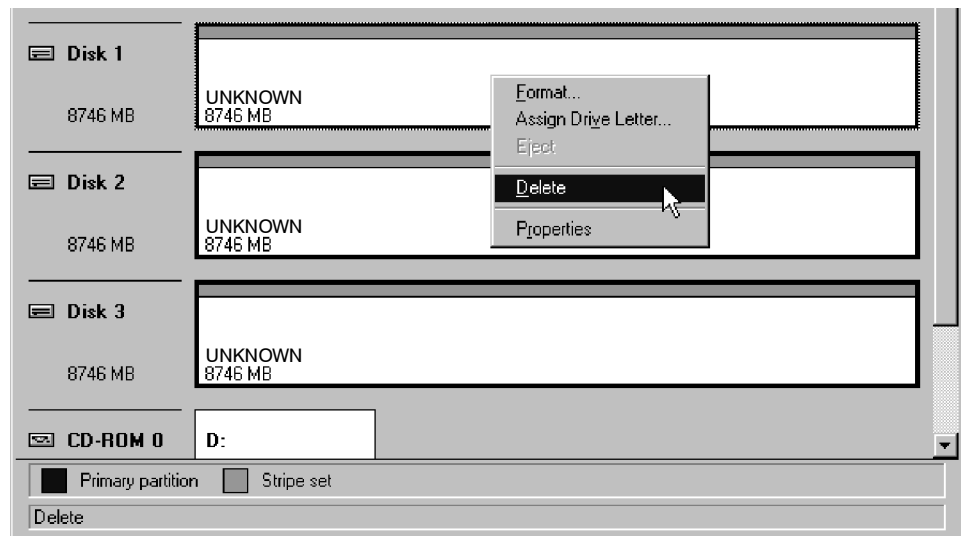


Figure 4- 1: Deleting partitions using the Disk Administrator utility

4. Right-click within one of the highlighted boxes of the selected SCSI drives, and select **Delete** from the shortcut menu to delete any existing partitions on the three SCSI hard drives. Click **Yes** in the Confirm dialog box to continue.
5. Reselect the three SCSI hard drives as described above, and then select **Create Stripe Set** from the shortcut menu.
6. Click **OK** in the Create Stripe Set dialog box to create a stripe set of maximum size (the default setting in the dialog box).
7. Verify that the striped set should be displayed as unformatted logical drive E: and the CD-ROM as logical drive D:. If the drive letters are labeled incorrectly, use the menu selection **Assign Drive Letter** to change them.
8. Select the unformatted striped-set SCSI hard drives. All three drives should highlight when you click one of the drive boxes.
9. Select **Format** from the Tools menu to open the Format dialog box.
10. In the Format dialog box, select **NTFS File System**, verify that no Format Options are selected, and then click **Start**.
11. Click **OK** in the Warning dialog box to continue the formatting process. The Format dialog box will show the formatting progress. The process will take several minutes.
12. When the formatting is complete, click **OK** in the Format Complete dialog box, and then click **Close** to close the Format dialog box.
13. Exit the Disk Administrator utility.

Restoring the Display Setting

Perform the following procedure to restore the resolution and color palette settings for the display:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click **Display** in the Control Panel window to open the Display Properties dialog box.
4. Select the **Settings** tab, and then click **Display Type** to open the Display Type dialog box.
5. Set the **Desktop Area** option to **800 by 600 pixels**.
6. Set the **Color Palette** option to **16777216 colors**.
7. Click **Test** to verify the changes, and then click **OK** to apply the changes and exit the Display Properties dialog box.

Restoring the COM Port Settings

The MTS300 system uses the COM1, COM3, and COM4 ports. COM2 is not used by the MTS300 system.

Perform the following procedure to restore the COM port settings:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click **Ports** in the Control Panel window to open the Ports dialog box. The COM ports that are configured are listed in the Ports list box.
4. Delete any listed COM port other than COM1, COM3, and COM4. For example, if COM2 appears in the Ports list, highlight **COM2**, click **Delete**, and then click **OK** in the Ports Control Panel dialog box.
5. If COM1, COM3, or COM4 are not in the Ports list, click **Add** to open the Advanced Settings for New Port dialog box.
6. Use the COM Port Number list box to select the COM port number (1, 3, or 4) that the MTS300 system does not have configured.
7. Use Table 4-1 to set the proper Base I/O Port address and Interrupt Request Line (IRQ) parameter values for the selected COM port.
8. Click **OK** in the Advanced Settings for New Port dialog box. The System Setting Change dialog box will appear asking you to restart Windows NT.
9. Click **Don't Restart Now** to continue setting the remaining COM port parameters.
10. After you set the parameters for COM1, COM3, and COM4, close the Ports dialog box and reboot the MTS300 system (without a recovery CD in the CD-ROM drive) to use the new COM port settings.

Table 4- 1: MTS300 system COM port settings

Parameter	COM1	COM3	COM4
Base I/O port address	03F8-03FF	03E8-03EF	02E8-02EF
Interrupt request line (IRQ)	10	04	03
FIFO	Enabled	Enabled	Enabled
Baud rate	9600	2400	9600
Data bits	8	8	8
Parity	None	None	None
Stop bits	1	1	1
Flow control	None	None	None

Restoring the Taskbar Auto-Hide Setting

The MTS300 system is shipped with the Taskbar auto-hide option enabled. This option hides the Taskbar and requires you to move the mouse cursor to the bottom of the screen to display the Taskbar. Perform the following procedure to restore the Auto-Hide setting for the Microsoft Windows NT Taskbar:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Taskbar** from the Windows NT Start menu.
3. Select the **Taskbar Options** tab of the Taskbar properties dialog box.
4. Click the **Auto hide** check box to select the option (check mark in the box).
5. Click OK to close the dialog box and apply the setting change.

Restoring the Event Viewer Setting

Perform the following procedure to restore the log size and file overwrite settings for the Event Viewer:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Programs | Administrative Tools | Event Viewer** from the Windows NT Start menu.
3. Select **Log Settings** from Log menu in the Event Viewer window to open the Event Log Settings dialog box.
4. In the Event Log Settings dialog box, select **Application** in the Change Settings For list box.
5. Set the **Maximum Log Size** option to **20480** Kilobytes.
6. Click the **Overwrite Events as Needed** option box to select the option.
7. Select **System** from the Change Settings For list box.
8. Click the **Overwrite Events as Needed** option box to select the option.
9. Select **Security** from the Change Settings For list box.
10. Click the **Overwrite Events as Needed** option box to select the option.
11. Click **OK** to close the Event Log Settings dialog box, and then select **Exit** from the Log menu to close the Event Viewer window.

Restoring the Windows NT Explorer Settings

Perform the following procedure to restore the file display settings for Windows NT Explorer:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Programs | Windows NT Explorer** from the Windows NT Start menu.
3. Select **Options** from the View menu in the Explorer window.
4. Select the View tab of the Options dialog box.
5. Select the **Show all files** option, and then deselect the **Hide file extensions for known file types** option.
6. Click **OK** to close the Options dialog box, and then select **Close** from the File menu in the Explorer window.

Restoring the Boot Initialization Countdown

The Boot Initialization Countdown setting controls the amount of time the OS Loader waits for the user to select which operating system to load while the instrument boots. The factory default setting is 3 seconds. Perform the following procedure to restore the operating system boot initialization countdown:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click the **System** icon to open the System Properties dialog box.
4. Select the **Startup/Shutdown** tab.
5. Select **3 seconds** in the **Show list for** list box.
6. Click **OK** to close the System Properties dialog box and apply the setting change.

Setting, Resetting, and Disabling Auto Logon

The Auto Logon option allows you to select a user name and password that the MTS300 system will use to automatically log on to Windows NT when you power-on the instrument. This feature is enabled at the time the instrument was manufactured. This section contains two procedures. The first procedure initializes the Auto Logon option and changes an existing Auto Logon user name and password. The second procedure disables the Auto Logon option (requiring the entry of a user name and password each time the instrument is powered on).

Setting and Resetting Auto Logon. Perform the following procedure to set or reset the automatic logon option:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Run** from the Windows NT Start menu, and then click **Browse** in the Run dialog box.
3. The Auto Logon utility is located in two directory locations:
 - **D:\Tools\Autologn.exe** of the *MTS300 MPEG Test System Operating System Recovery CD*
 - **C:\Mts300\Bin\AutoLogon.exe** on the MTS300 system
4. In the Browse dialog box, specify one of the directory paths shown above, and then click **Open**.
5. Click **OK** in the Run dialog box to run the selected Auto Logon utility. The Auto Logon dialog box will open.



CAUTION. *Entering a new user name and password will overwrite the existing user name and password used by the MTS300 system to Auto Logon.*

The default user name and password for the auto-logon feature are Administrator and MPEG2, respectively.

6. Use the Auto Logon dialog box to enter the user name and password that the MTS300 system will use to automatically logon to Windows NT when the instrument boots. The factory defaults are Administrator (user name) and MPEG2 (password).
7. Click **OK** to apply the Auto Logon setting. The next time the MTS300 system boots, the new Auto Logon settings will be used.

Disabling Auto Logon. Perform the following procedure to disable Auto Logon (requiring the entry of a user name and password each time the instrument is powered on):

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Run** from the Windows NT Start menu.
3. Enter **regedt32** in the Run dialog box, and then click **Open**. This opens the Registry Editor window.
4. In the Registry Editor window, select the **HKEY_LOCAL_MACHINE on Local Machine** panel.
5. In the HKEY_LOCAL_MACHINE on Local Machine panel, select **Winlogon** in the following directory path:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion
6. After you select Winlogon, the right pane of the HKEY_LOCAL_MACHINE on Local Machine panel displays the contents of the file. Highlight the line in the right pane that starts **DefaultUserName:**, and then select **Edit | Delete** from the menu.
7. Click **Yes** in the Warning message box.
8. Highlight the line in the right pane that starts **DefaultPassword:**, and then select **Edit | Delete** from the menu.
9. Click **Yes** in the Warning message box.
10. Select **Registry | Exit** from the menu to close the Registry Editor window.
11. The next time the MTS300 system boots, Auto Logon will be disabled and the user will be asked for user name and password to logon to Windows NT.

Restoring the NetBEUI Protocol

The NetBEUI protocol is a network protocol for small local networks. The NetBEUI protocol allows users to browse on a network without setting TCP/IP parameters. Perform the following procedure to restore the NetBEUI protocol:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click the **Network** icon to open the Network dialog box, and select the **Protocols** tab.
4. If **NetBEUI Protocol** is already in the Network Protocols list, highlight it and click **Remove**.
5. Click **Yes** in the message box, and then click **Close** in the Network dialog box.
6. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system (without a recovery CD in the CD-ROM drive).
7. After the system has rebooted and you have logged on, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
8. Select **Settings | Control Panel** from the Windows NT Start menu.
9. Double-click the **Network** icon to open the Network dialog box, and select the **Protocols** tab.
10. In the Select Network Protocol dialog box, select **NetBEUI Protocol** in the list, and then click **OK**.
11. Verify that **D:\1386** is the path shown in the Windows NT Setup dialog box, and then click **Continue**.
12. After the protocol is installed, click **Close** to close the Network dialog box, and then remove the recovery CD from the CD-ROM drive.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

13. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system using the new settings.
14. After the MTS300 system reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page 4-16.

Restoring the Microsoft TCP/IP Printing Service

The TCP/IP printing service allows users to print over their network. Perform the following procedure to restore the Microsoft TCP/IP printing service:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click the **Network** icon to open the Network dialog box, and then select the **Services** tab.
4. If **Microsoft TCP/IP Printing** is already in the Network Services list, highlight it and click **Remove**.
5. Click **Yes** in the message box, and then click **Close** in the Network dialog box.
6. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system (without a recovery CD in the CD-ROM drive).
7. After the system has rebooted and you have logged on, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
8. Select **Settings | Control Panel** from the Windows NT Start menu.
9. Double-click the **Network** icon to open the Network dialog box, and then select the **Services** tab.
10. In the Select Network Service dialog box, select **Microsoft TCP/IP Printing** in the list, and then click **OK**.
11. Verify that **D:\1386** is the path shown in the Windows NT Setup dialog box, and then click **Continue**.
12. After the service is installed, click **Close** to close the Network dialog box, and then remove the recovery CD from the CD-ROM drive.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

13. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system using the new settings.
14. After the MTS300 system reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page 4-16.

Restoring the SNMP Service

SNMP service is required if you are connecting the MTS300 system to your local network. Perform the following procedure to restore the SNMP service:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click the **Network** icon to open the Network dialog box, and then select the **Services** tab.
4. If **SNMP Service** is already in the Network Services list, highlight it and click **Remove**.
5. Click **Yes** in the message box, and then click **Close** in the Network dialog box.
6. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system (without a recovery CD in the CD-ROM drive).
7. After the system has rebooted and you have logged on, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
8. Select **Settings | Control Panel** from the Windows NT Start menu.
9. Double-click the **Network** icon to open the Network dialog box, and then select the **Services** tab.
10. In the Select Network Service dialog box, select **SNMP Service** in the list, and then click **OK**.
11. Verify that **D:\1386** is the path shown in the Windows NT Setup dialog box, and then click **Continue**.
12. After the SNMP service is installed, the Microsoft SNMP Properties dialog box is displayed. Click **OK** to accept the default SNMP properties, or enter the specific SNMP management settings for your network. Contact your network administrator if you need assistance setting SNMP properties.
13. Click **Close** to close the Network dialog box, and then remove the recovery CD from the CD-ROM drive.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

14. Click **Yes** in the Network Settings Change message box to reboot the MTS300 system using the new settings.
15. After the MTS300 system reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page 4-16.

**Restoring Microsoft
Windows NT
Service Pack 6a**

Perform the following procedure to restore the Microsoft Windows NT service pack 6a:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. After the MTS300 system boots, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
3. Select **Run** from the Windows NT Start menu.
4. Click **Browse** in the Run dialog box.
5. In the Browse dialog box, specify **d:\sp6a\sp6i386.exe** as the file you want to run and click **Open**.
6. Click **OK** in the Run dialog box to run the sp6i386.exe file. The Extracting Files dialog box displays the progress of the program.
7. Read the Windows NT Service Pack Setup license agreement. Click the **Accept the License Agreement** box, and then click **Install**.
8. The Extracting Files dialog box displays continued program progress.



CAUTION. *To prevent system problems, click **No** if you see a message about overriding the E100B.SYS file.*

9. After the installation is complete, the Windows NT Service Pack Setup dialog box appears.
10. Remove the recovery CD from the CD-ROM drive.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

11. Click **Restart** in the Windows NT Service Pack Setup dialog box to reboot the MTS300 system.

Restoring Device Drivers

This section contains procedures for restoring the following device drivers: sound chip, display, soft power-off, PCI adapter, and touch screen.

Restoring the Sound Chip Driver

Perform the following procedure to restore the ESS Technology ES1869 sound chip driver:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. Select **Settings | Control Panel** from the Windows NT Start menu.
3. Double-click **Multimedia** in the Control Panel window to open the Multimedia Properties dialog box.
4. Select the **Devices** tab, and then double-click **Audio Devices** to display the available selections.
5. Select **ES1879/1869/1878/1868/1887/1888 AudioDrive**, and then click **Remove**. Click **Yes** to remove the existing audio driver.
6. Click **Restart now** to reboot the MTS300 system.
7. After the MTS300 system reboots, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
8. Double-click **Multimedia** in the Control Panel window, and then select the **Devices** tab.
9. Select **Audio Devices**, and then click the **Add** button.
10. Select **Unlisted or Updated Driver** from the list of drives in the Add dialog box, and then click **OK**.
11. Click **Browse** in the Install Driver dialog box.
12. Select **D:** in the Drives list box, and then specify the following directory path: **D:\drivers\essaudio**.
13. Click **OK** to return to the Install Driver dialog box, and then click **OK** in the Add Unlisted or Updated Driver box to install the sound-chip driver.
14. Click **New** in the Driver Exists dialog box to use the new auddrive.dll driver.
15. Remove the operating system recovery CD from the CD-ROM drive.
16. Click **Restart now** to reboot the MTS300 system using the new ES1869 sound chip driver.

Restoring the Display Driver

Perform the following procedure to restore the Chip & Technology 69000 display driver:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. After the MTS300 system boots, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
3. Select **Settings | Control Panel** from the Windows NT Start menu.
4. Double-click **Display** in the Control Panel window to open the Display Properties dialog box.
5. Select the **Settings** tab, and then click **Display Type** to open the Display Type dialog box.
6. Click the **Change** button, and then click the **Have Disk** button in the Change Display dialog box.
7. Select **D:** in the Copy manufacturer's files from list box, and then click the **Browse** button. Select the directory path **D:\Drivers\Chipstec** in the Locate File dialog box, and then click **Open**.
8. Click **OK** in the Install From Disk dialog box (the MTS300 system will find the correct driver), and then click **OK** in the Change Display dialog box to start the driver installation.
9. After the driver is successfully installed, remove the operating system recovery CD from the CD-ROM drive.
10. Close the Display Properties dialog box, and then click **Yes** in the System Settings Change dialog box to reboot the MTS300 system using the new display driver.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

11. After the MTS300 system reboots, you must perform the procedure in *Restoring the Display Setting* on page 4-7 to restore the display setting.

Restoring the Soft Power-Off Driver

Perform the following procedure to restore the soft power-off driver:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. After the MTS300 system boots, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
3. Select **Programs | Command Prompt** from the Windows NT Start menu.
4. At the command prompt, type **d:** and press **Enter**.
5. At the command prompt, type **cd drivers\poweroff** and press **Enter**. The command prompt should read **D:\DRIVERS\POWEROFF**.
6. At the command prompt, type **regini jamshut.ini** and press **Enter**.
7. At the command prompt, type **copy jamshut.sys c:\winnt\system32\drivers** and press **Enter**.
8. At the command prompt, type **regini jamsrv.ini** and press **Enter**.
9. At the command prompt, type **copy jamsrv.exe c:\winnt\system32** and press **Enter**.
10. After the command prompt returns, close the Command Prompt window and remove the recovery CD from the CD-ROM drive.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

11. Reboot the MTS300 system (without a recovery CD in the CD-ROM drive) to use the new soft power-off driver.

Restoring the PCI Adapter Driver

Perform the following procedure to restore the Intel EtherExpress PRO/100B PCI Adapter driver:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. After the MTS300 system boots, insert the *MTS300 MPEG Test System Operating System Recovery* CD into the CD-ROM drive of the MTS300 system.
3. Select **Programs | Command Prompt** from the Windows NT Start menu.



CAUTION. To prevent installation problems with the EtherExpress driver, follow this procedure and copy the driver from the CD to a location on the MTS300 system hard drive before you install the driver. Installing the driver directly from the recovery CD may result in the PCI adapter driver not functioning properly.

4. At the command prompt, type **copy d:\drivers\etherexp c:\temp** and press **Enter**.
5. Select **Settings | Control Panel** from the Windows NT Start menu.
6. Double-click **Network** in the Control Panel window to open the Network dialog box, and then select the **Adapters** tab.
7. Select the displayed driver and click **Remove**. Click **Yes** in the Warning dialog box.
8. Remove the operating system recovery CD from the CD-ROM drive.

NOTE. If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.

9. Close the Network dialog box and click **Yes** in the Network Settings Change dialog box to reboot the MTS300 system.
10. While the MTS300 system boots, click **OK** to continue through any service or driver error messages that appear.
11. After the MTS300 system boots, select **Settings | Control Panel** from the Windows NT Start menu.
12. Double-click **Network** in the Control Panel window to open the Network dialog box, and then select the **Adapters** tab.
13. Click **Add** in the Network dialog box, and then click **Have Disk** in the Select Network Adapter dialog box.
14. Type **c:\temp**, click **OK** in the Inset Disk dialog box, and then click **OK** in the Select OEM Option dialog box.
15. Select **(1) Intel(R) PRO/100B PCI Adapter (TX)** in the Network Adapters list and click **Update**.
16. Specify **c:\temp** as the directory location for the driver in the Windows NT Setup dialog box, and then click **Continue**.
17. Click the **Bindings** tab in the Network dialog box to update the Network bindings, and then click the **Protocols** tab.

18. Select **TCP/IP Protocol** in the Network Protocols list, and then click **Properties** to open the Microsoft TCP/IP Properties dialog box.
19. Select the **IP Address** tab, and then select **(1) Intel(R) PRO/100B PCI Adapter (TX)** in the Adapter list box.
20. If you are not going to use the MTS300 system on a network, enter **1.1.1.1** in the IP Address box.
21. If you are using the MTS300 system on a local network, enter the network IP address, subnet mask, and default gateway your network administrator assigned to your MTS300 system.
22. After you enter your network IP address parameters, click **Apply** to apply the changes, and then click **Close** to close the Network dialog box.
23. Reboot the MTS300 system (without a recovery CD in the CD-ROM drive).

Restoring the Touch-Screen Driver

Perform the following procedure to restore the Touch-Base SC3 Touch-Screen driver:

1. Boot up the MTS300 system (without a recovery CD in the CD-ROM drive).
2. After the MTS300 system boots, insert the *MTS300 MPEG Test System Operating System Recovery CD* into the CD-ROM drive of the MTS300 system.
3. Select **Run** from the Windows NT Start menu.
4. Click **Browse** in the Run dialog box.
5. In the Browse dialog box, specify **d:\drivers\touchbas\tsetup.exe** as the file you want to run and click **Open**.
6. Click **OK** in the Run dialog box to run the tsetup.exe file. The TNdriver Setup window opens.
7. Click **OK** to select **c:\win32app** (default selection) as the directory location for the touchscreen control files to be located.
8. Read the License Agreement and then click **Agree** to continue.
9. Select **Dynapro - Serial, SC3** in the Select Touchscreen dialog box, and then click **OK**.
10. Click **OK** to select **Touch** (default selection) as the group where the touchscreen control program will be located.
11. Click **OK** in the Hardware Configuration dialog box to open the Hardware Controls (Serial) dialog box.

12. Use Table 4-2 to set the touchscreen parameters in the Hardware Controls (Serial) dialog box, and then click **OK**.

Table 4-2: Touchscreen driver hardware settings

Parameter	Setting
Com Port	Com 3
Configuration address	3E8
Configuration Irq	4
Baud rate	2400
Parity	None
Data bits	8
Stop bits	1

13. Read the Readme file, click **OK**, and then click **OK** in the Installation complete dialog box.
14. Remove the operating system recovery CD from the CD-ROM drive, and then reboot the MTS300 system.

NOTE. *If you do not remove the operating system recovery CD from the CD-ROM drive, the MTS300 system will boot using the recovery CD.*

15. After the MTS300 system reboots, select **Programs | Touch | Touchscreen Control** from the Windows NT Start menu.
16. In the resulting Touch Screen Control Program window, click **Calibrate**.
17. Follow the displayed instructions to calibrate the touch screen. Click **OK** when the calibration is complete.
18. Click **User Controls** in the Touch Screen Control Program window to display the User Controls dialog box.
19. In the User Controls dialog box, click the **Sound** option box to deselect the option (no check mark in the Sound box), and then click **OK** to close the User Controls dialog box.

NOTE. *Having the Sound option deselected (no sound) is the factory-default setting. You can select the Sound option if you want the MTS300 system to beep each time you make a touchscreen selection.*

20. Select **File | Exit** to close the Touch Screen Control Program window.

Restoring the Operating System and Application Software

In some situations, such as a power interruption or accidental deletion of files, the MTS300 system may fail to boot from the hard drive. To recover, you must use the *MTS300 MPEG Test System Operating System Recovery* CD to restore the hard drives back to their factory-default installation status.

The MTS300 system contains one IDE hard drive with a single partition, and three SCSI hard drives that are striped as a single logical drive to obtain high data-storage rates. The IDE hard drive is used to store the MTS300 system and application software. The SCSI hard drives are used to store and generate transport streams. The SCSI drive stripe-set and the IDE hard drive are formatted using the NTFS file system.

NOTE. *If you restore the Microsoft Windows NT operating system, you must also restripe the SCSI hard drives, restore the MTS300 system applications, and enter the General License password for the MTS300 system.*

Software Repair Strategy

Depending on the severity of the suspected software problem, you may only need to restore a portion of the MTS300 system software. Since restoring the operating system destroys all data on the IDE hard drive, the procedure in this section should be used only as a last resort.

It is recommended that you attempt to repair suspected operating system problems in the following order:

1. Restore the individual device driver or configuration setting that appears to be not functioning properly.
2. Restore the MTS300 system application software.
3. Restore the MTS300 operating system. Since restoring the operating system destroys all data on the IDE hard drive, you will have to restore the complete MTS300 system application software, restripe the SCSI hard drives, and reenter the MTS300 General License password.

Restoring the Microsoft Windows NT Operating System

This procedure will be effective only if the IDE hard drive is still functional. If the MTS300 system does not boot after you perform this procedure, contact a Tektronix, Inc. representative for assistance.



CAUTION. Restoring the MTS300 operating system software will destroy all existing data on the MTS300 system IDE hard drive and will restore only the operating system(s) that were originally factory installed on the MTS300 system.

If you restore the operating system, you must also perform the procedures listed below in the order indicated:

1. *Installing the MTS300 System Applications* page 4-25
 2. *Entering the General License Password* page 4-29
 3. *Restoring the SCSI Drive Stripe Set* page 4-6
-

To restore the content of the MTS300 system IDE hard drive, which includes the Microsoft Windows NT 4.0 operating system and the MTS300 MPEG Test System applications, perform the following steps:

1. Install the *MTS300 MPEG Test System Operating System Recovery* CD in the CD-ROM drive of the MTS300 system, and then boot the MTS300 system.

NOTE. *If the MTS300 system does not boot from the CD-ROM drive, verify that the MTS300 system boot order is properly set. Refer to Restoring the Boot Order on page 4-3. If the MTS300 system still does not boot from the CD-ROM drive, contact a Tektronix, Inc. representative for assistance.*

2. After you read the displayed instructions, enter **RESTSYS** at the DOS prompt and press the **Enter** key to run the RESTSYS.BAT file.
3. Read the PowerQuest (R) EasyRestore (TM) End User License Agreement. You can press any key to continue reading through the software license.
4. After you finish reading the license agreement, click **Continue** to start the software recovery process, or click **Cancel** to exit the recovery program.
5. A Warning dialog appears to warn you that continuing the recovery process will destroy all data on the MTS300 system IDE hard drive. This is your last opportunity to exit the operating system recovery process. Click **Yes** to continue the recovery process or click **No** to exit the process.
6. When the operating system recovery starts, a window displays the progress of the recovery process. The DOS prompt returns when the process is completed. The restore process should take less than 15 minutes.

7. Remove the operating system recovery CD from the CD-ROM drive, and then reboot the MTS300 system.
8. After the MTS300 system reboots, you must perform the procedures listed in the previous *Caution* note.

Installing the MTS300 System Application Software

This section describes how to reinstall the MTS300 application software. You must install the application software if you have restored the MTS300 operating system software.

NOTE. You must install the Software Protection key supplied with your MTS300 system before you install the MTS300 application software. Install the Software Protection key (see Figure 4-2) on the rear-panel printer port of the MTS300 system (see Figure 1-1 on page 1-7).

Make sure that you have the General License Password document that was supplied with your MTS300 system. You may be prompted to enter the General License password after you complete the MTS300 application software installation.

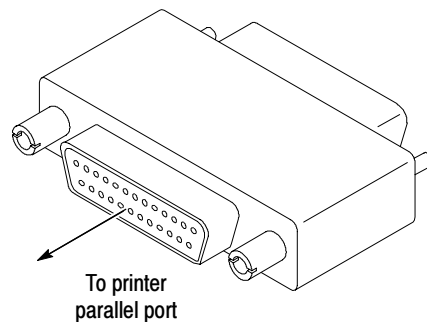


Figure 4-2: Software Protection key

Uninstalling the Existing MTS300 Application Software. If you are reinstalling the MTS300 application software without having reinstalled the operating system software, you must first uninstall the MTS300 application software before you can reinstall the software.

Perform the following steps to uninstall the MTS300 application software:

1. Boot the MTS300 system if necessary (without a recovery CD in the CD-ROM drive), or exit all open applications if the instrument is already booted.

2. Double-click the **Uninstall MTS300** icon in the Tektronix MPEG Test System program group to remove existing MTS300 application files.
3. Click **Yes** in the Confirm File Deletion message box. Click **OK** if you are notified that SNMP is being stopped.
4. Click **OK** in the Remove Programs From Your Computer dialog box when the software files have been removed, and then click **OK** in the reboot message box.

Installing the MTS300 Application Software. If you are reinstalling the MTS300 application software without having reinstalled the operating system software, you must first uninstall the existing MTS300 applications. If necessary, perform the previous uninstall procedure before you reinstall the MTS300 application software.

NOTE. *The Install shield application checks for the Java run-time environment before installing the MTS300 software. If you are prompted to install this software, run the executable in the jre directory on the Application CD before you perform this procedure.*

Perform the following steps to reinstall the MTS300 application software:

1. Log on to the MTS300 system using the Administrator user name and password. Refer to *Logging On* on page 2-2 for more information.
2. Select **Programs | Windows NT Explorer** from the Windows NT Start menu to open the Explorer window.
3. In the Exploring window, select **(C:)** in the drive list box, and then verify that the hard disk has at least 150 MB of free space (see Figure 4-3). You cannot install the MTS300 application software on a disk that has less than 150 MB of free space. Close the Explorer window.

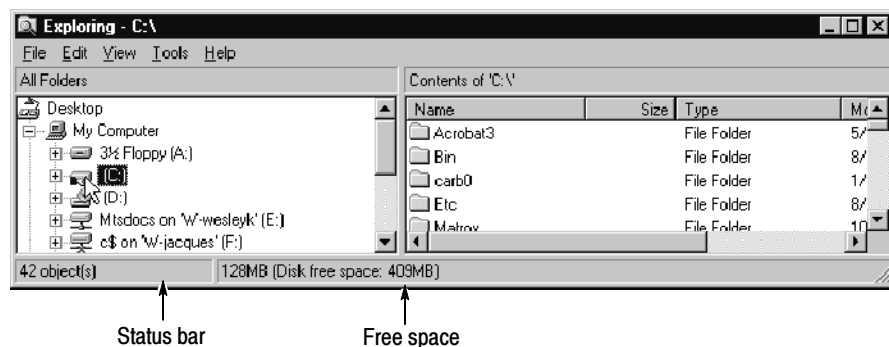


Figure 4-3: Checking the free disk space

4. Insert the *MTS300 MPEG Test System Application Software Recovery* CD into the CD-ROM drive of the MTS300 system.
5. Select **Run** from the Windows NT Start menu.
6. Enter **d:\setup.exe** in the Run dialog box, and then click **OK**.
7. Read the copyright and licensing agreement, and then click **Next**.
8. Select **MPEG Test System** in the Setup Type dialog box to restore the complete MTS300 application software, and then click **Next**.
9. After some files are copied, click **OK** in the Install message box to reboot the MTS300 system. Leave the application software recovery CD in the CD-ROM drive.
10. After the MTS300 system reboots, log on again as the Administrator as you did in step 1.
11. Click **Next** in the Second Phase of MTS300 Installation window. The installation program will show progress while files are copied.
12. Click **Yes** in the Auto Logon dialog box if you want to enable the Auto Logon feature. Click **No** if you want a manual logon process for your MTS300 system.

NOTE. *The Auto Logon option allows you to select a user name and password that the MTS300 system will use to automatically logon to Windows NT when you power-on the instrument. You can change the Auto Logon behavior later by selecting the Auto Logon icon in the program group directory.*

13. If you selected the Auto Logon option, enter the Auto Logon user name and password you want to use (for example, MTS300 with no password, which is a login supplied with all test systems), and then click **OK**.
14. Click **OK** in the Registry Editor message box.
15. In the Number of I/O Ports dialog box, select **2 I/O Ports (1 Mezzanine)** or select **4 I/O Ports (2 Mezzanines)** depending on the number of I/O ports your MTS300 system has installed
16. After you select the number of I/O ports, click **Next**, and then click **OK** in the Registry Editor message box.

17. A Command Line Interpreter (CLI) window appears indicating that DSP files are being loaded. At times while this window is displayed, you may not see any activity (this can last up to two minutes).



CAUTION. *To prevent damage to the MTS300 application software, do not close the displayed CLI window while the installation is in progress. You will be able to continue when you see the **Press any key to continue** message in the window.*

18. Press any key to continue the installation program when you see the **Press any key to continue** message in the CLI window.
19. Verify that the Software Protection key is installed on the MTS300 printer port, and then click **OK** when the Information box asks you to verify that a dongle is installed.
20. Click Finish to finish the application software installation. Select the **Readme file** option to read last minute updates to the software and to read a list of known software bugs. (You can choose to view the Readme file now, or later. It is installed in C:\MTS300\Bin.)
21. After you read the readme file, select the **Yes, I want to restart my computer now** option.
22. Remove the *MTS300 MPEG Test System Application Software Recovery* CD from the CD-ROM drive, and then click **Finish** to reboot the MTS300 system.

NOTE. *You must reboot the MTS300 system before you can enter the General License password or before you can use the software.*

23. The software is now installed. After the MTS300 system reboots, log on again as the Administrator as you did in step 1 on page 4-26.

Entering the General License Password

When you first receive your MTS300 system, the General License password is already installed. You will have to reenter the General License password only when you restore the MTS300 operating system software, or when you purchase a software upgrade.

Perform the remaining steps to enter the General License password:

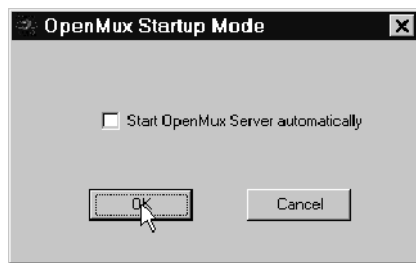
1. Double-click the **License Manager** icon in the Tektronix MPEG Test System window to start the application. The Tektronix Software Protection window appears.
2. Consult the password document supplied with your MTS300 system and identify the General License password.
3. Enter the three 6-character Hexadecimal numbers of the password in the corresponding **Tektronix Software Protection** window entry fields (lowercase characters are acceptable) and then click **OK**. A License message window appears.
4. If the password is correct, click **OK** to acknowledge the message. If you made an error entering the password, click **OK** to acknowledge the error message and return to step 2.

After you enter the correct General License password, the installation of the MTS300 application software is complete.

OpenMux Startup Mode

The OpenMux server and client are installed on each MTS300 system. If you need to reinstall the application software, the default behavior of the OpenMux server is to start when the MTS300 system boots. If your system is not licensed for this application, you need to disable this feature using the following procedure:

1. Double-click the **OpenMux Mode.exe** file located in the C:\MTS300\Bin directory. The OpenMux Startup Mode dialog box is displayed.
2. Clear the checkbox and click **OK** as shown in the following illustration.



Now, when the MTS300 system starts, the OpenMux server will not start with the rest of the MPEG Analysis Services. If you want to enable the thirty day demonstration period for this application, use the procedure described in *Enabling the OpenMux Demonstration Period* on page 2-3.



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