User Manual

Tektronix

**MTM300 Series
MPEG Transport Monitor**

071-0597-04

www.tektronix.com

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General Safety Summary

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

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

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

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

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

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

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

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

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

Symbols and Terms

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

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

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

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

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

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

CAUTION indicates a hazard to property including the product.

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

⚠️
CAUTION
Refer to Manual

⏚
Protective Ground
(Earth) Terminal

Service Safety Summary

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

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

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

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

To avoid electric shock, do not touch exposed connections.

Preface

This manual describes the functions and use of the Tektronix MTM300 Series MPEG Transport Monitor. The manual is organized into the following sections:

- *Getting Started.*

  This section provides a functional description of the transport monitor platform and the software modules that make up the MTM300 Series MPEG Transport Monitor. It also provides a list of items shipped with the transport monitor as well as optional accessories. Finally, *Getting Started* describes how to install the transport monitor in your monitoring environment.

- *Operating Basics.*

  This section provides a detailed description of the MTM300 Series MPEG Transport Monitor and a brief tutorial that shows how the client modules are used to monitor transport streams. *Operating Basics* also provides a comprehensive list of the buttons, icons, and menu selections for each client module.

- *Reference.*

  This section provides detailed descriptions and procedures for using each of the MTM300 Series client modules, including the TMCC real-time analysis modules. It also provides a reference for all user-controlled analyses (called *probes*) enabled by the MTM300 Series MPEG Transport Monitor.

- *Appendices.*

  This section is comprised of the following appendices:

  - *Appendix A: Specifications.* This appendix lists the electrical, physical, and environmental specifications for your instrument.

  - *Appendix B: Cleaning and Maintenance.* This appendix describes how to perform periodic user maintenance. This section does not include repair or replacement procedures.

  - *Appendix C: Networking.* This appendix provides networking requirements and procedures for installing the MTM300 Series MPEG Transport Monitor in a TCP/IP networking environment. *Networking* also provides basic network troubleshooting procedures.

■ *Appendix D: Software Repair and Installation*. This appendix provides the procedure for replacing device drivers, restoring the transport monitor operating system, and installing MTM300 Series applications onto a network management station, a remote monitoring station, or the transport monitor itself.

■ *Appendix E: Private Syntax Interpreter*. This appendix describes how to use the Private Syntax Interpreter. This application is a standard accessory with each MTM300 Series MPEG Transport Monitor.

■ *Appendix F: ATSC Program Paradigm*. This appendix describes the PID value restrictions for program elements in ATSC transport streams.

■ *Glossary.*

■ *Index.*

Related Material

In addition to the material in this manual, each MTM300 Series client module has an online help system accessed through the Help menu. The Expert client and Configuration client Help menus also provide access to an Analysis Server online help, describing the analyses performed by Analysis Servers.

Included on the software application CD-ROM is the Read Me file for the MTM300 Series software. This file lists the application files included with the software installation types and other important information.

The Read This First document that ships with each MTM300 Series product lists known problems with the software at the time the software was released and workarounds for those issues.

The following URLs access the websites for the standards organizations listed (the URLs listed were valid as of January, 2001):

■ MPEG-2 standards (International Organization for Standards)

http://www.iso.ch/

■ DVB standards (European Technical Standards Institute)

http://www.etsi.org/

■ ATSC standards (Advanced Television Systems Committee)

http://www.atsc.org/

The following ARIB (Association of Radio Industries and Business) and ITU-R (International Telecommunications Union) standards were used to develop the added ARIB and TMCC enhancements to the transport monitor:

■ ARIB STD-B10 (1.2), 1999, *Service Information for Digital Broadcasting System*

■ ARIB STD-B16 (1.1), 1999, *Digital Receiver Commonly Used for Digital Satellite Broadcasting Services Using Communication Satellite*

■ ARIB STD–B20 (1.1), *Digital Broadcasting System and Related Operational Guidelines for Broadcasting Satellites*

■ ITU-R BO. 1408, *Transmission System for Advanced Multimedia Services Provided by Integrated Services Digital Broadcasting in A Broadcasting Satellite Channel*

Finally, a PDF file of the *PQM300 Program QoS Monitor User Manual* (Tektronix part number, 071-0576-XX) is included on the software application CD-ROM. Refer to this manual for operating instructions if you have installed the PQM300 client module on your network management station and do not have access to the printed version of the manual.

Manual Conventions

Naming conventions for the interface elements and Windows elements in this manual follow the Microsoft Manual of Style, Third Edition. Naming conventions for MPEG-2, ATSC, and DVB structures follow the conventions derived from the standards documents listed above. In addition, the following formatting conventions apply to this manual:

■ **Bold** text refers to specific interface elements that you are instructed to select, click, or clear.

  Example: Select **Settings** from the Configuration menu.

■ *Italic* text refers to document names or sections. Italics are also used to refer to a named item when it is first described.

  Example: See *Details Panel* for more information.

  Example: A *transport stream* (also called a *multiplex*) is an ordered series of bytes representing valid MPEG-2, DVB, or ATSC elements.

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.

Getting Started

This section will help you install your MTM300 Series MPEG Transport Monitor in your broadcast environment and configure it for monitoring transport stream inputs. *Getting Started* includes the following information:

- MTM300 Series MPEG Transport Monitor and client applications overviews

- Transport monitor options and standard and optional accessories

- Hardware, electrical, and network installation procedures

- Procedures for configuring the MTM300 Series host machines

- Procedures for logging onto and turning off the transport monitor, as well as procedures for starting and exiting the Master client

- Procedure for verifying that the MTM300 Series transport monitor is working

MTM300 Series MPEG Transport Monitor

The Tektronix MTM300 Series MPEG Transport Monitor is a rack-mounted, MPEG-2 protocol monitor used to monitor single and multiple program transport streams in MPEG-2, DVB, ATSC, and ISDB-S/ARIB environments. The transport monitor depicted in Figure 1‑1 includes the optional user interface (keypad and touchscreen).
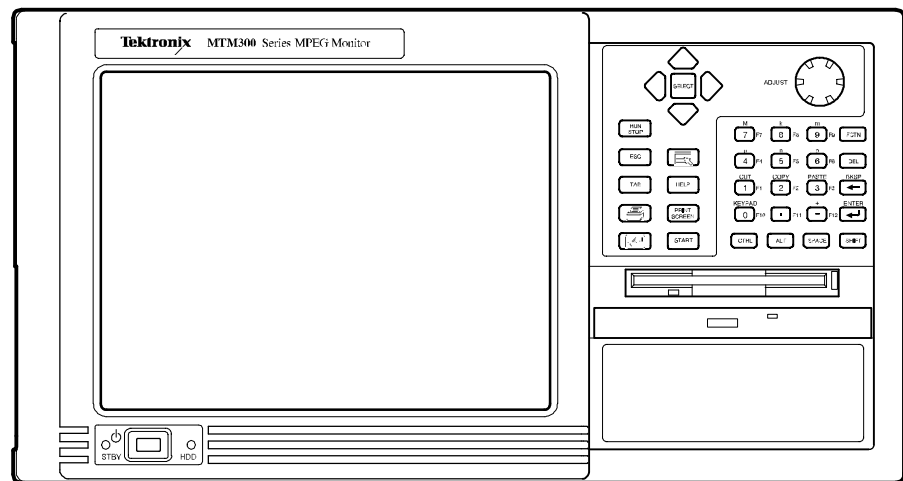
Figure 1‑1: The MTM300 Series MPEG Transport Monitor

> **NOTE**. *Refer to the MPEG-2, DVB, ATSC, and ISDB-S/ARIB standards for detailed information about the syntax and semantics of each system.*

Each monitor can analyze up to eight transport stream inputs simultaneously and accepts inputs in the following electrical formats:

- ASI/M2S (the monitor automatically detects the format)

- SMPTE 310M

The transport monitor allows you to output alarm signals using a 25-pin serial interface. Each critical or major error recorded by an Analysis Server closes a contact tied to the specific input. The pin-out for the alarm relay is provided in *Appendix A: Specifications*.

The transport monitor uses a client/server architecture consisting of of a Server Manager, multiple Analysis Servers, and the following client applications:

- Master client, which you use to monitor up to eight transport stream inputs in real time

- Expert client, which you use to analyze specific transport streams in real time

- Configuration client, which you use to configure the types of analyses performed on transport stream inputs

- TMCC Expert client, which you use to monitor a TMCC transport stream input in real time

- TMCC Configuration client, which you use to configure the types of TMCC analyses performed on TMCC basic and data streams

The Master client is tightly integrated with the other analysis and configuration clients making the transport monitor easy to use for experts and non-experts.

Server Manager The Server Manager is the process that makes the results of the Analysis Servers available to Master clients and starts automatically when you start the transport monitor. Only one Server Manager can run on a transport monitor or network management station.

The Server Manager process interacts with the following entities:

- The Analysis Server sends analysis results (called *traps*) to the Server Manager.

- The Master client displays the data collected by the Server Manager.

- The PQM300 Program QoS Monitor client sends traps to the Server Manager.

Analysis Servers   With this release of the software, there are two types of Analysis Server: one is used to analyze any valid MPEG-2, DVB, or ATSC transport stream, and one is used to analyze only TMCC transport streams. Analysis Servers are the processes that actually analyze transport stream inputs. One Analysis Server for each I/O port starts automatically when you start the transport monitor. Each transport monitor can support up to eight Analysis Server processes simultaneously.

The Analysis Server processes interact with the following entities:

■ The Server Manager collects the Analysis Server results (called *traps*).

■ The Expert client displays the results of the Analysis Server directly; similarly, the TMCC Expert client displays the results of the TMCC Analysis Server directly.

■ The Configuration client sets the monitoring and analysis parameters for each Analysis Server process operating on the inputs to the transport monitor; similarly, the TMCC Configuration client sets the monitoring and analysis parameters for each TMCC Analysis Server process.

Master Client   The Master client provides an intuitive interface for monitoring the status of transport stream inputs. You can also monitor a remote Tektronix PQM300 Program QoS Monitor from the Master client. Of the three MTM300 Series applications, the Master client is the one you will use most often.

The Master client characteristics are shown in the following list:

■ The Bouquet panel displays icons for the bouquets (groups of inputs) that you have defined for the workspace.

■ The Multiplex panel displays icons for the inputs that you have defined for a bouquet (if enabled).

■ The Services panel displays icons for the services (also called programs) encoded in the transport stream.

■ The Details panel displays icons indicating the type, status, and severity of errors on a transport stream or service.

■ The Expert and Configuration clients (MPEG-2 and TMCC), and PQM300 client can be started from the Master client. (See the *PQM300 Program QoS Monitor User Manual* for operating information about this client.)

Expert Client The Expert client analyzes a single stream in greater detail. You will use the Expert client to help troubleshoot errors in your digital transmission system.

The Expert client has the following characteristics:

- Graphical displays that show the structure (hierarchy) of the input transport stream and display characteristics of each component of the input stream (for example: PID and type allocation, section rate analyses, and timing analyses).

- Report views that indicate the types of errors recorded by the Analysis Server and the characteristics of the input stream.

- Error views that show specific errors recorded for the various components of the transport stream; for instance, PMT section rate errors and ETR290 errors.

The Expert client displays the results of only one Analysis Server (input) at a time.

Configuration Client The Configuration client allows you to specify which transport stream parameters you want monitored, and how you want errors in your system to be reported.

The Configuration client allows you to perform the following tasks:

- Specify the standard to which you are testing an input: MPEG-2, DVB, or ATSC.

- Set, remove, or modify the probes that test transport streams for valid syntax and semantics and rates.

- Specify the way in which errors are reported in both the Expert and Master clients. You can configure each probe to report an error as Critical, Major, Minor, Warning, or as information only.

- Specify the types of transport stream events that are recorded using the Data Logging function. You can also set the maximum file size and time period of each log file.

- Stop and restart an Analysis Servers running on a transport monitor.

- Set passwords on specific inputs that prevent others from changing the Analysis Server configuration for that input.

- Set parameters for capturing part of an input transport stream.

TMCC Expert Client   The TMCC (Transmission Multiplexing Configuration Control) Expert Client is a new application included with version 2.0 of the MTM300 Series MPEG Transport Monitor. This client allows you to analyze the TMCC data of an ARIB-compliant transport stream input in real time. You can also analyze an ARIB-compliant transport stream file stored on your local disk.

The TMCC Expert client has the following characteristics:

- Indicates the presence of sync bytes (0x47 for TMCC basic streams and W1, W2, or W3 sync bytes for TMCC data streams)

- Displays the syntax of TMCC data

- Displays Slot, TSID, TS Name, and Modulation mode information

- Displays information, warning, and error information

- Indicates the presence of TMCC alarm and update flags in the transport stream

- Displays the overall stream rate

TMCC Configuration Client   The TMCC (Transmission Multiplexing Configuration Control) Configuration client is a new application included with version 2.0 of the MTM300 Series MPEG Transport Monitor. This client allows you to set the monitoring, analysis, and reporting parameters of the TMCC Analysis Servers.

The TMCC Configuration client has the following characteristics:

- Configures the TMCC Analysis Servers to operate in either TMCC basic or TMCC data stream modes

- Enables you to specify a transport stream ID to analyze using the MPEG-2 Analysis Server (only in the TMCC data stream mode)

- Sets parameters for the following TMCC probes:

    - Frame size

    - Super frame size

    - Modulation mode and slot consistency

    - TMCC syntax

    - TMCC update counter (only in TMCC data stream mode)

SNMP Capabilities   The MTM300 Series MPEG Transport Monitor includes two SNMP management information bases (MIB). The Tektronix RTA MIBs are textual descriptions of the Analysis Server objects (functions and parameters) that can be monitored and controlled by the network management station using SNMP controls. The MIB text files are installed with each MTM300 Series MPEG Transport Monitor installation (on both the transport monitor and a computer with the network management software installed) at the following location:

C:\Mib\, where C is the letter designator of the local hard drive.

The two MIBs located in this directory, RTAv1.mib and RTAv2.mib, are used for SNMP version 1 and SNMP version 2 systems respectively.

An HP OpenView plug-in is provided that allows you to integrate the transport monitor into HP OpenView Network Node Manager network monitoring systems.

MTM300 Series MPEG Transport Monitor Installation Options   The MTM300 Series MPEG Transport Monitor client and server modules described in this manual can be installed as described in the following list. The items in the list correspond to the options you select from when installing or reinstalling the MTM300 Series software. See *Appendix E: Software Installation and Repair* for installation procedures, minimum system requirements, and the list of files and file locations for each installation option.

■ MPEG Transport Monitor

   All of the client and server modules (and required program files) are installed on the transport monitors. Each transport monitor can monitor up to eight transport streams simultaneously, with a combined maximum bit rate of 180 Mbps.

⚠ **CAUTION.** *You must ensure that transport monitors sending traps, and the network management stations receiving them, are using the same version of MTM300 series software. The network management station software does not work in mixed MTM300 series software version environments.*

■ Network Management Software (MTM3FMS)

NOTE. *You must have the software key in place to install the MTM300 Series Network Management Software. See* Installing the MTM 300 Series Software *on page D‑28 for more information.*

All of the client modules and the Server Manager (and required program files) are installed on the network management stations. In addition, you can install the PQM300 Program QoS Monitor client and operate the PQM300 from the network management station. See the *PQM300 Program QoS Monitor User Manual* for PQM300 operating information. See *Appendix D: Software Installation and Repair* for information about installing the PQM300 client.

The client applications installed on network management stations are identical to the transport monitor and program monitor client applications with one important exception: the Server Manager installed on a network management station can monitor up to 40 transport streams with acceptable performance (up to 250 inputs theoretical maximum)

The Analysis Server module is not installed on the network management stations.

■ Remote Monitoring Desktop

Only the Master, Expert, and Configuration client modules (and required program files) are installed on remote monitoring stations. Each remote monitoring station can connect to an arbitrary number of Server Managers running on remote transport monitors.

■ HP Openview Network Node Manager plug-in

A Master client plug-in (and required program files) for HP Openview Network Node Manager environment is installed.

Options and Accessories

The tables in this section list the options and the standard and optional accessories available for the MTM300 Series transport monitor and software.

Options

Table 1–1 lists the options available when you purchase the MTM300 Series MPEG Transport Monitor.

Table 1‑1: MTM300 Series transport monitor options

Option	Description
MTM300[1]	Transport monitor with one analysis board
MTM301[2]	Transport monitor with two analysis boards
Option AS	A two-input ASI/M2S I/O daughter board
Option SS	A two-input SSI (SMPTE310M) I/O daughter board
Option LC	LCD display, touchscreen, keypad, keyboard, and mouse
Option VK	External keyboard, monitor, and mouse

[1] **You must order one of the following: Option AS or Option SS**

[2] **You must order two of the following (any combination): Option AS or Option SS**

Standard Accessories

Table 1–2 lists the standard accessories that are shipped with your transport monitor. Use this list to ensure that your order is complete.

Table 1‑2: Standard accessories for the transport monitor

Quantity	Description	Part number
1	*MTM 300 Series MPEG Transport Monitor User Manual*	071-0597-XX
1	CD-ROM disc, jewel case, and liner; contains application software	063-3442-XX
1	CD-ROM disc, jewel case, and liner; contains transport monitor operating system software	063-3443-XX
1	Read This First	071-0598-XX
1	Statement of ISO Compliance (in envelope)	N/A
1	Emergency backup disk (3–1/4 inch floppy disk)	N/A
1	Rackmount slides hardware kit	N/A
1	Power cord (North American)	161-0066-00
2	Stylus (for use with the touchscreen, if ordered)	119-6107-00

Table 1‑2: Standard accessories for the transport monitor (cont.)

Quantity	Description	Part number
1	SCSI terminator (installed on the transport monitor)	650-4062-00
1	Front panel cover	200-4408-00

Table 1–3 lists the standard accessories for the MTM300 Series Network Management Software (MTM3FMS).

Table 1‑3: Standard accessories for the network management software

Quantity	Description	Part number
1	*MTM 300 Series MPEG Transport Monitor User Manual*	071-0597-XX
1	CD-ROM disc, jewel case, and liner; contains application software	063-3442-XX
1	Read This First	071-0598-XX
1	Software key	119-5927-00
1	License document	063-3158-00

Optional Accessories

Table 1–4 lists the optional accessories you can order for your transport monitor. See your Tektronix representative for help ordering these optional accessories.

Table 1‑4: Optional accessories

Description	Part number
MTM 300 Series MPEG Transport Monitor Service Manual	071-0601-XX
Two-input SMPTE310M I/O daughter board	MTM3FSS
Two-input ASI I/O daughter board	MTM3FAS
Analysis board	MTM3FPIA
Portable cabinet kit with instructions	016-1929-XX
Power cord options:	
Option A1 Universal Euro 230 V	161-0066-09
Option A2 United Kingdom, 230 V	161-0066-10
Option A3 Australian 240 V	161-0066-11
Option A5 Swiss 230 V	161-0154-00

Installation

This section describes how to install the MTM300 Series MPEG Transport Monitor. It includes instructions for installing the transport monitor in a rack, making the electrical connections necessary to begin monitoring transport stream inputs, and provides brief requirements for using the transport monitor in a TCP/IP network.

Hardware Installation

The factory installed cabinet is designed to operate in an equipment rack (see *Rackmount Installation* on page 1–12). The optional portable cabinet allows you to operate the instrument on a bench or cart (see *Portable Installation* on page 1–17).

> ⚠ **CAUTION.** *The transport monitor must be installed in the rackmount cabinet (not the portable cabinet) when you install the instrument in a rack.*
>
> *For proper cooling, provide at least two inches (5.1 cm) of clearance at the rear and to the sides of the transport monitor, and ensure that the air temperature at all air intake vents (inside of the rack) does not exceed 40 °C.*

Rackmount Installation   If your instrument has the rackmount cabinet, there is rackmounting hardware on each side of the cabinet.

⚠ **CAUTION.** *For proper cooling in an equipment rack installation, the air temperature at all air intake vents (inside of the rack) must not exceed 40 °C.*

Mounting the Stationary Tracks in the Equipment Rack. The slider kit consists of left and right stationary tracks that must be installed in the equipment rack. Extra hardware is provided with the slider assemblies. Since the hardware is intended to make the sliders compatible with a variety of racks and installation methods, not all of the hardware will be used for any installation procedure.

1. Attach the extension bracket to the rear of the stationary track.

   a. Measure the distance between the front and rear rails of the equipment rack using method A or method B. Refer to Figure 1-2.

      ■ Method A. If the extension bracket is to be mounted against the front edge of the rear rail in the equipment rack, measure from the front edge of the rear rail to the front edge of the front rail.

      ■ Method B. If the extension bracket is to be mounted against the inside surface of the rear rail in the equipment rack, measure from the front corner of the rear rail to the front edge of the front rail.

   b. Attach the extension bracket to the rear of the stationary track so that the length of the combined assembly is approximately that of the measurement taken in step a. above. Use the screws and bar nuts provided with the chassis tracks. Leave the screws loose.

2. Select the appropriate mounting holes in the front rails of the equipment rack, observing the clearance measurements shown in Figure 1-3. The front panel of the rack adapter is designed to fit in an 11-inch high opening.

Method A

Method B

Rear rail

10-32 PNH screw

Extension bracket

Stationary track

Automatic latch

Bar
Nut

Use this measurement

Stop latch
hole

Rear rail

Extension bracket

Stationary track

Automatic latch

Use this measurement

NOTE: Right-hand and left-hand stationary sections are designated by the RH and the LH marked on the rails. Stop latch holes should be towards the bottom when slides are in place. (The right hand rail is shown above.)

Figure 1‑2: Attaching the extension brackets to the stationary tracks

0.500 in.

1.75 in.

Adjacent equipment
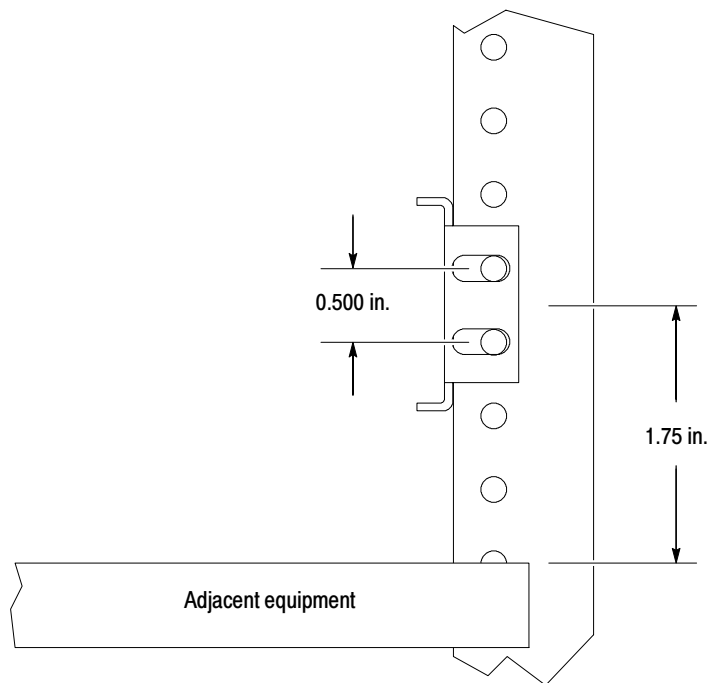
Figure 1‑3: Mounting hole selection on the front rails of the equipment rack

3. Mount the stationary sections (with extension brackets attached) to the front and rear rails of the equipment rack.

a. Install the rear of the stationary section in front of, behind, or beside the rear rail of the equipment rack. Use the mounting holes in the rear rails that correspond to the same level as the front rail holes selected.

If the rear-rail mounting holes are tapped, the bar nut is not used to attach the extensions. If the rear-rail mounting holes are not tapped, use the bar nut on the inside of the rail, as shown in Figure 1--4A or use suitable captive nut clips (not supplied). Figure 1--4B shows the extension bracket mounted to the inside surface of the rear rail.

Method A

Method B

Rear rail

Rear rail

10-32 PNH screws

Bar nut (use if rear rail is not tapped)
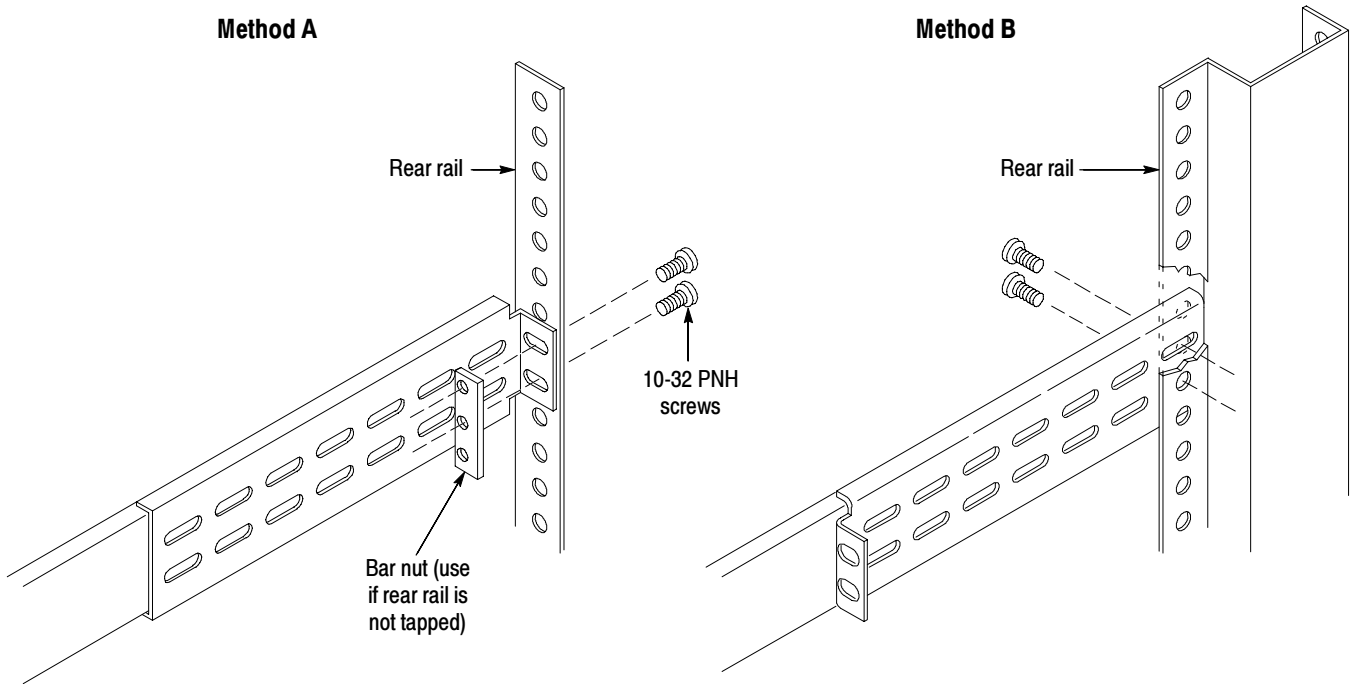
Figure 1- 4: Attaching the extension bracket to the rear rail of the equipment rack

b. Mount the stationary sections (with the bracket extensions) to the front rails. If the front rails are not tapped, use the bar nuts. Refer to Figure 1-5.

Front rail

Bar nut
(use if front rail
is not tapped)

10-32 PNH
screws
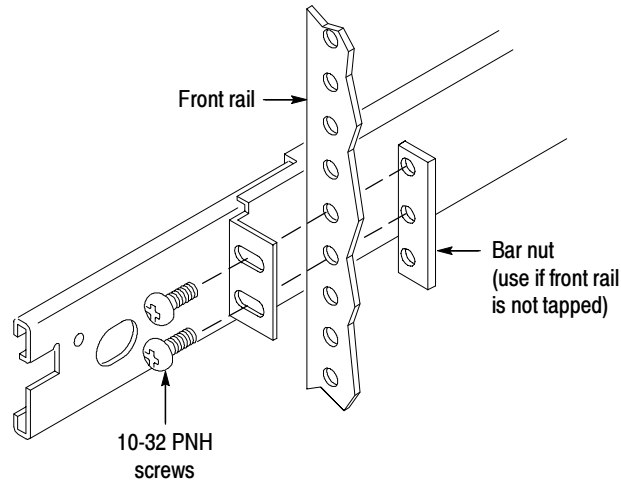
Figure 1- 5: Mounting the stationary section to the front rail of the equipment rack

4. Tighten the screws attaching the extension bracket to the stationary section. Refer to Figure 1-6.

Tighten these screws
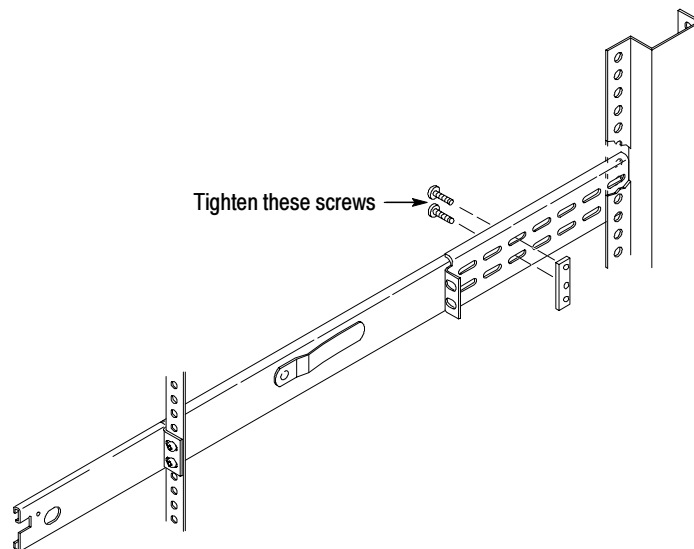
Figure 1- 6: Stationary bracket, extension bracket, and attaching screws

Installing the Instrument in the Equipment Rack. Perform the following steps to install the instrument in the equipment rack:

1. Pull out the intermediate sections of each slide-out track to the fully extended position. Refer to Figure 1-7.

2. Insert the tracks of the rack adapter into the slide-out intermediate sections.

3. Press both stop latch releases and push the rack adapter toward the rack until the latches snap into their holes.

4. Again press the stop latches and push the rack adapter fully into the equipment rack.
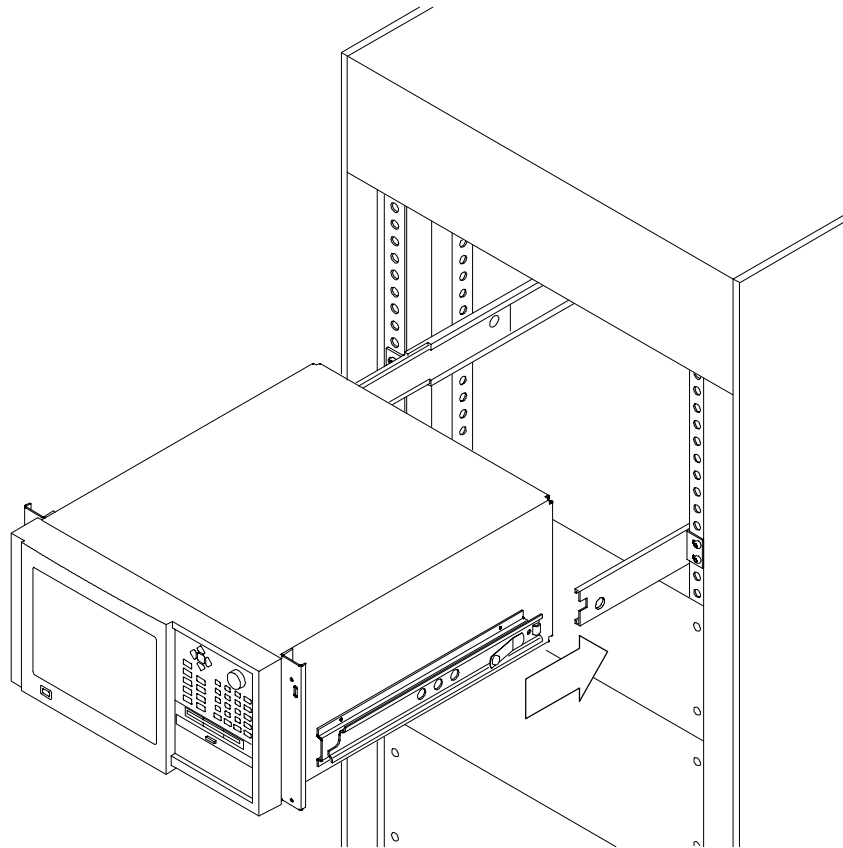
Figure 1-7: Installing the instrument into the equipment rack

5. If necessary, adjust the alignment of the stationary sections according to the following procedure:

    a. Loosen the mounting screws at the front of both stationary sections.

    b. Allow the tracks to seek their normal positions with the adapter centered in the rack.

    c. Tighten the mounting screws.

Portable Installation The optional portable cabinet allows you to operate the instrument on a bench or cart. If you operate the instrument while it rests on the rear feet, make sure that you properly route any cables coming out of the rear of the instrument to avoid damaging them. Table 1-4 on page 1-9 lists the part number of the portable cabinet.

⚠ *CAUTION. Keep the bottom of the instrument clear of obstructions to ensure proper cooling.*

Electrical Installation

The electrical operating requirements for the MTM300 Series transport monitor are listed in Table 1-5. See *Appendix A: Specifications* for more detailed electrical characteristics.

Table 1-5: Electrical operating requirements

Requirement	Specification
Source Voltage	100 VAC to 240 VAC
Fuse Rating	10 A Fast / 250 V
Maximum Power Consumption	185 Watts typical
Inrush Surge Current	36 Amps maximum
Power Factor Correction	Yes

Use the following procedure to make electrical, signal, and network connections:

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

---

1. After you have installed the transport monitor in a rack or mounted it on your bench, connect the power cord (provided with the instrument) to the power connector on the rear panel. See Figure 1‑8.

2. Make the transport stream, network, and peripheral device connections necessary for your environment using the connectors at the rear of the instrument. See Figure 1‑8 for the locations of these connectors.
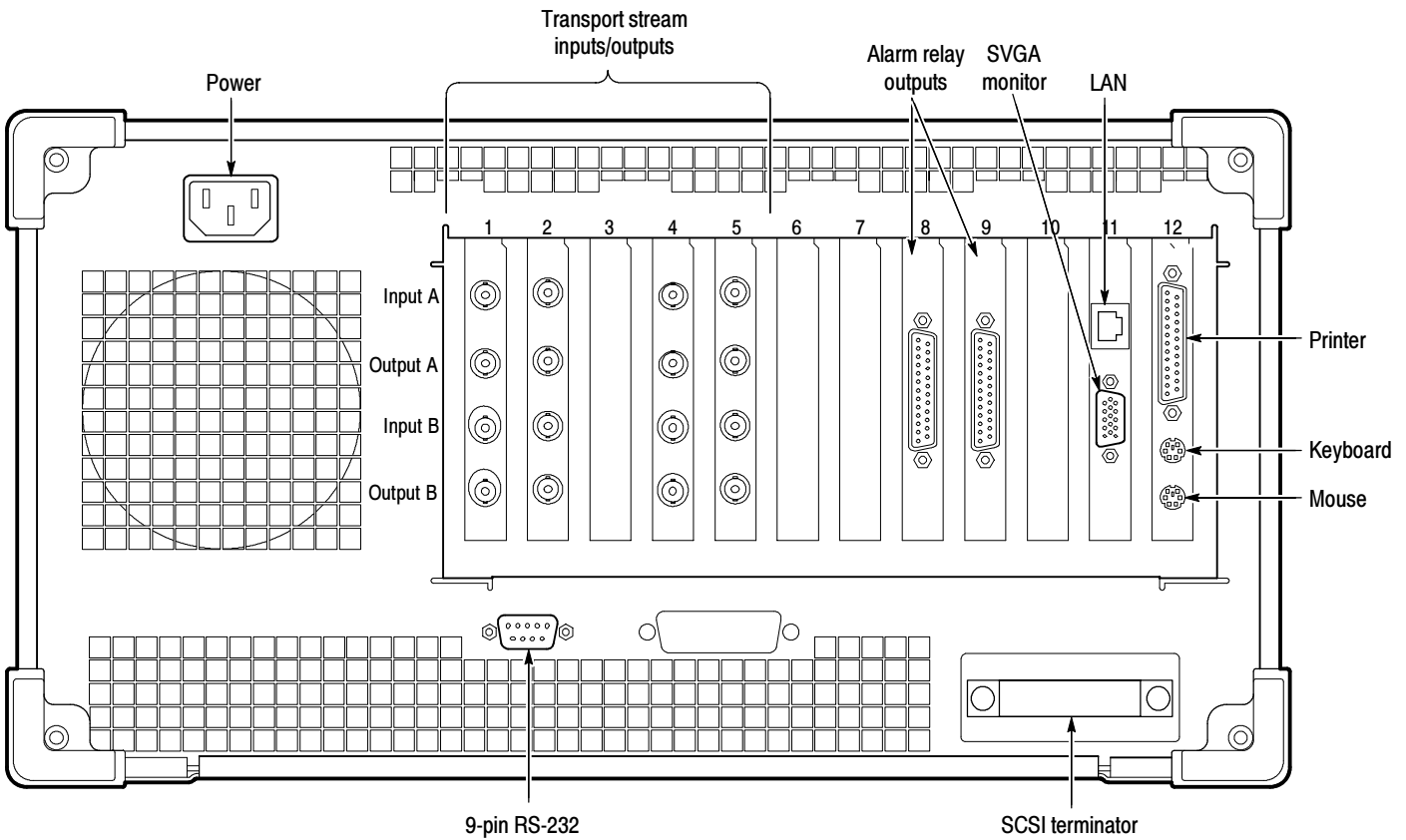
Figure 1‑8: MTM300 Series transport monitor rear panel connectors

Table 1-6 describes the transport stream, network, and peripheral device connectors. See *Appendix A: Specifications* for more detailed information about each connector and the signal formats you can use for inputs to the transport monitor.

Table 1-6: Rear-panel connectors

Connector	Description
Transport stream input / output	75 Ω BNC connectors for the following signal formats:
ASI Input	Accepts both Burst and Packet mode ASI formats and M2S
ASI Output	An active loop-through of the corresponding input
SMPTE310M Input	Compliant with SMPTE310M
SMPTE310M Output	An active loop-through of the corresponding input
Alarm relay output	25-pin sub-D connectors for relaying alarms
Monitor	15-pin female high density-D-sub connector for SVGA monitor
Keyboard	2, Mini-DIN connectors for PS2 compatible keyboard (on rear and side panels)
Mouse	2, 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-232/438	9-pin D-sub type connector for serial communication
SCSI	Standard, PC compatible SCSI port

Each transport stream input has a corresponding output. The output BNC connector is located immediately below the input BNC connector for each pair of inputs and outputs. Each transport monitor supports up to eight inputs as shown in Figure 1-8 on page 1-18.

The alarm relay connector pins described in Tables 1-7 and 1-8 are two contacts of each relay. The relay closes during each ETR 290 priority 1 and priority 2 error recorded by the transport monitor. The alarm relay board in slot 8 relays errors detected on the inputs installed in slots 1 and 2 (inputs 1A, 1B, 2A, and 2B). The alarm relay board in slot 9 relays errors detected on inputs installed in slots 4 and 5 (inputs 4A, 4B, 5A, and 5B). See Table 1-7 and Table 1-8 for the pin assignments for each relay board.

Table 1‑7: Relay closure pin assignment for the relay board in slot 8

Input	Error Priority	Pins
1A	1	4 and 17
	2	3 and 15
1B	1	7 and 20
	2	6 and 18
2A	1	10 and 23
	2	9 and 21
2B	1	12 and 25
	2	11 and 24

Table 1‑8: Relay closure pin assignment for the relay board in slot 9

Input	Error Priority	Pins
4A	1	4 and 17
	2	3 and 15
4B	1	7 and 20
	2	6 and 18
5A	1	10 and 23
	2	9 and 21
5B	1	12 and 25
	2	11 and 24

Alternative connectors for a mouse and keyboard are provided at the side panel of the transport monitor. See Figure 1--9.
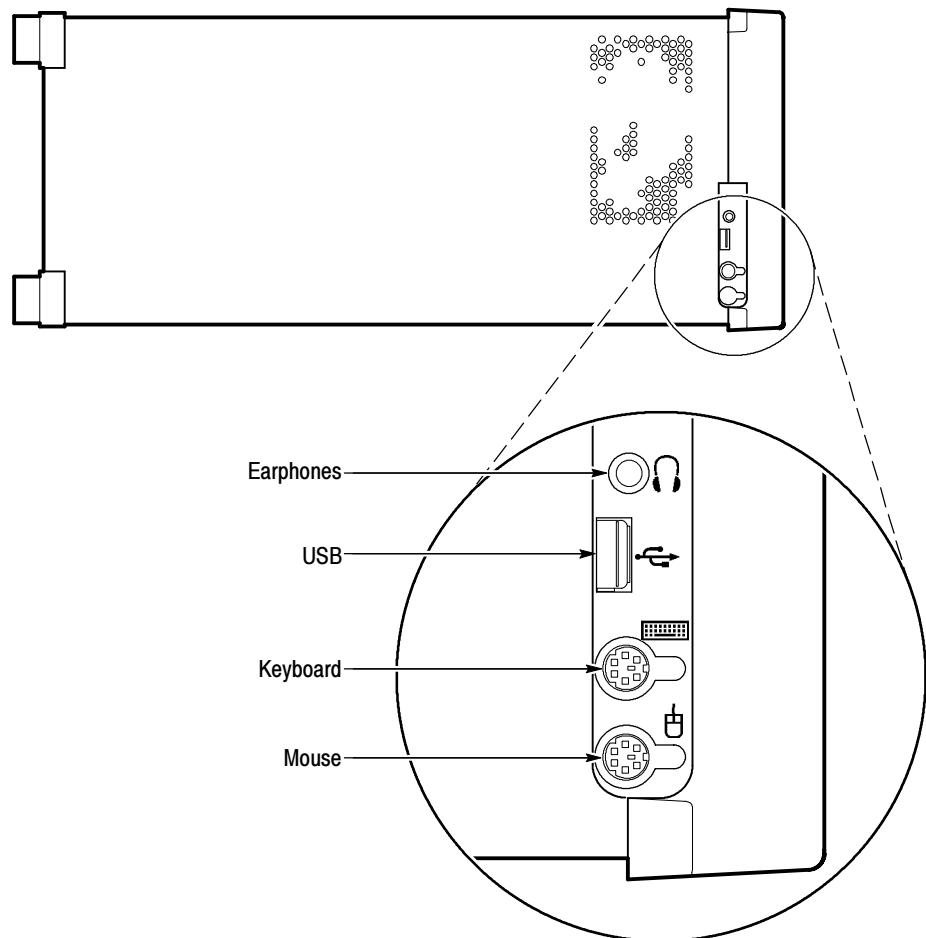
Figure 1- 9: Keyboard and monitor connections

3. After you have installed the transport monitor and completed making the signal, network and peripheral connections, plug the power cord into the mains.

Network Installation

The MTM300 Series MPEG Transport Monitor comes with the Microsoft TCP/IP software pre-installed and is designed to operate in TCP/IP networks. Your network or systems administrator may have already configured the TCP/IP parameters for your transport monitor. If not, see *Appendix C: Networking* for procedures to configure TCP/IP parameters.

To use the transport monitor, you need to specify the Server Managers to which you will send error messages. Error messages, called *traps*, are generated by the Analysis Servers and sent to one or more Server Managers running on the local or remote host machines. (A *host machine* can be either a transport monitor, or a personal computer with the remote desktop or network management software installed.)

By default, the transport monitor is configured to send traps to the local Server Manager (using the localhost loopback address as the trap target). If you are installing the transport monitor into a networked system, you can also send traps to one or more network management stations. See the procedures described in *Configuring the MTM300 Series MPEG Transport Monitor* beginning on page 1–28 for complete procedures on configuring host machines that have MTM300 Series modules installed on them.

Configuration

This section describes how to logon and power down the MTM300 Series MPEG Transport Monitor, how to start and exit applications, and how to configure the instrument.

Logging On to the MTM300 Series MPEG Transport Monitor

The default login configuration for the MTM300 Series transport monitor is to automatically log onto Windows NT (using Administrator for the user name and MPEG2 for the password). If the default configuration has not been changed, you should perform step 1 from the following procedure, and you should not have to enter a password or user name to log onto the transport monitor. However, if you have changed the default configuration, use the following procedure to log on to the transport monitor:

1. Switch the transport monitor power on to begin the Windows NT initialization process. See Figure 1-10. Initialization can take up to two minutes.

2. When the Begin Logon window appears, press CTRL + ALT + Delete (all three keys simultaneously) to open the Logon Information window.
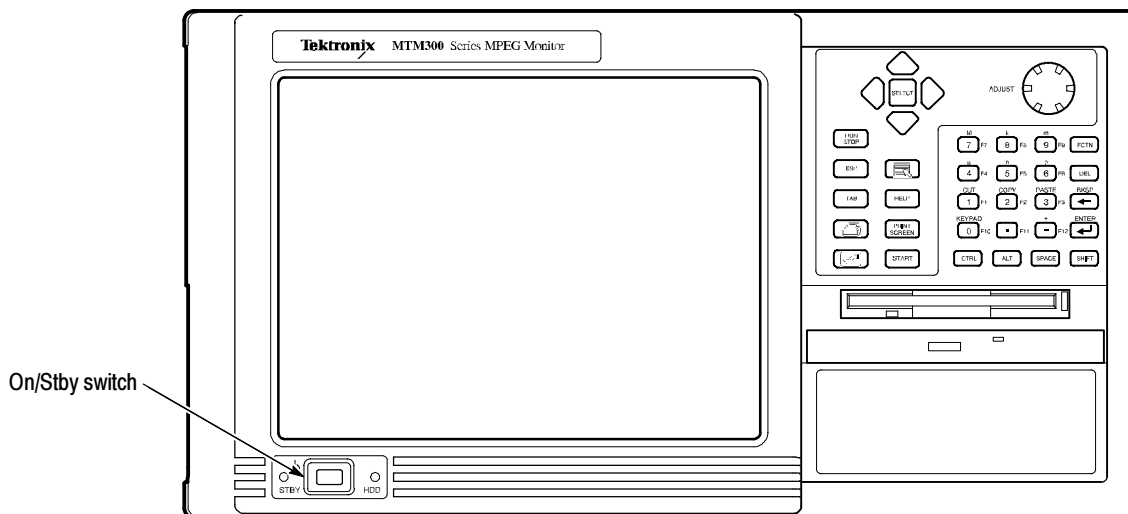
On/Stby switch

Figure 1-10: On/Stby switch

3. Enter Administrator in the User name box.

4. Enter MPEG2 for the password, and then press **Enter**.

This is the login account you should use for most of your work. See *Login Passwords* on page 1-24 for more information.

NOTE. *You must use the "administrator" login when you perform any software upgrades.*

CAUTION. *The "administrator" user has all the privileges of an administrator. If you are connected to a network, you may have more privileges than you realize within the network. Exercise caution when you use the administrator login.*

Both the Server Manager and Analysis Servers are configured to start when you start the transport monitor. You can check to see that the Server Manager and Analysis Servers are running by looking for the icons in the system tray as shown in Figure 1-11.

Figure 1-11: Server Manager and Analysis Server icons in system tray

Two Analysis Server icons per input capacity are displayed: one for MPEG-2, DVB, and ATSC streams, and one for ISDB-S/ARIB streams. Usually, all of the Analysis Server icons will be green, indicating that the Analysis Servers are running. If the icons are not displayed, restart the Server Manager and Analysis Servers. The easiest way to restart these services is to restart the transport monitor. See *Stopping and Restarting Analysis Servers and the Server Manager* on page 3-37 for an alternative procedure.

Login Passwords   You can change the login passwords if necessary; refer to the Windows NT documentation for instructions.

Starting and Exiting the Master Client Application

Starting the Master Client   To start the Master client, use one of the following techniques:

- Double-click the Master client icon in the Tektronix MPEG Transport Monitor program group window.

- Select **Master Client** from the Tektronix MPEG Transport Monitoring System program group as shown in Figure 1–12.
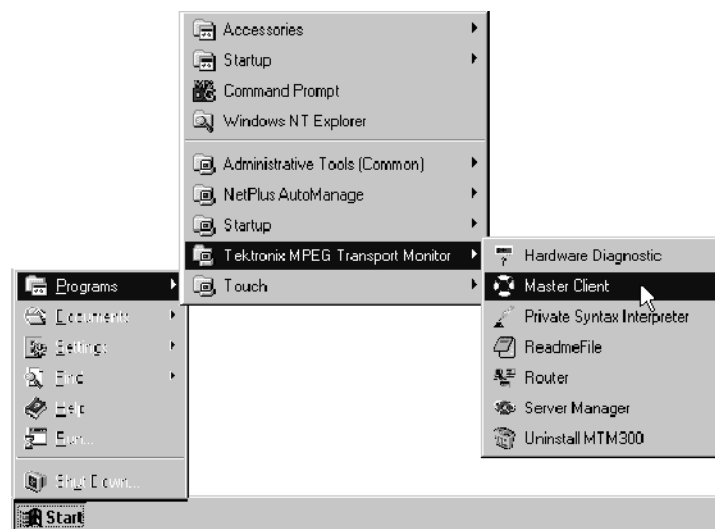
Figure 1‑12: The Tektronix MPEG Transport Monitor program group

Initially, the Master Client window is blank. To start monitoring an input, connect to a Server Manager and configure your workspace.

- See the procedures in *Configuring the MTM300 Series MPEG Transport Monitor* beginning on page 1–28 for information about configuring the transport monitor to send traps to a Server Manager.

- See the *Tutorial* beginning on page 2–15 for procedures on connecting to a Server Manager and configuring a workspace, or see related procedures in *Master Client Reference* beginning on page 3–9.

Exiting the Master Client   To exit the Master client, use one of the following techniques:

- Select **Exit** from the Master menu.

- Click the Close control button in the Master client title bar.

Shutting Down the MTM300 Series MPEG Transport Monitor

There are three ways to shut down the transport monitor: two standard approaches (depending on whether the transport monitor has a local user interface), and one hard power down procedure.

Soft Power Down

The transport monitor has a soft power down capability that allows you to exit Windows NT and put the transport monitor in standby. To use this capability, first exit all open applications running on the transport monitor.

⚠️ **CAUTION.** *Exit all open applications running on the transport monitor before using the soft power down capability. Some applications will prompt you to save unsaved data before exiting. If you do not have a local user interface, you will not see the prompt, and may lose data if you remove power to the transport monitor before Windows NT exits.*

To start the soft power down, press and release the On/Stby switch. After the transport monitor goes into standby, you can restart it pressing the On/Stby switch again.

To completely remove power to the instrument, disconnect the power cord at the rear panel.

Standard Power Down

If your transport monitor has a local user interface, use the normal Windows NT shutdown procedure to turn off the operating system as described below:

1. To avoid loss of data and possible problems during subsequent Windows NT initialization, always shut down Windows NT before switching computer power off. To shut down Windows NT, select **Shut Down** from the Start menu as shown in Figure 1–13.

Figure 1‑13: Shutting down the transport monitor

2. Select **Shut down the computer?** in the resulting Shut Down Windows dialog box shown in Figure 1‑14, and then click **Yes**.

Figure 1‑14: Windows NT Shut Down Windows dialog box

3. After a few seconds, the Shutdown Computer window appears with the message indicating that "It is now safe to turn off your computer." You can now put the MTM300 Series transport monitor into standby by pressing the On/Stby switch. After the transport monitor goes into standby, pressing the On/Stby switch will restart it.

⚠ *CAUTION. Use the following procedure only if all other attempts to shut down the transport monitor fail. The hard power down procedure can cause you to lose data.*

Hard Power Down

You can turn off the transport monitor in a emergency or other priority situation by holding the On/Stby button in for about 3 or 4 seconds. This method is a hard shutdown that can cause missing or corrupted files. The next time the transport monitor is powered on, the operating system performs a check for missing or corrupt files (SCAN DISK).

Configuring the MTM300 Series MPEG Transport Monitor

To monitor inputs, your transport monitor must be configured to send traps. By default, the transport monitor is configured to send traps to the local Server Manager. If your configuration has been changed (and you want to restore it to the default configuration), or if you need to send traps to a network management station, use the procedures described in this section.

Sending Traps to the Local Server Manager

Use the following procedure to restore the default configuration of the transport monitor to send traps to the local Server Manager:

1. Start the transport monitor.

2. Select **Router** from the Tektronix program group. The Router application is displayed.

3. Click **Home** (shown at left) to display the list of host machines receiving traps generated by the local Analysis Servers. The display may look similar to Figure 1–15.
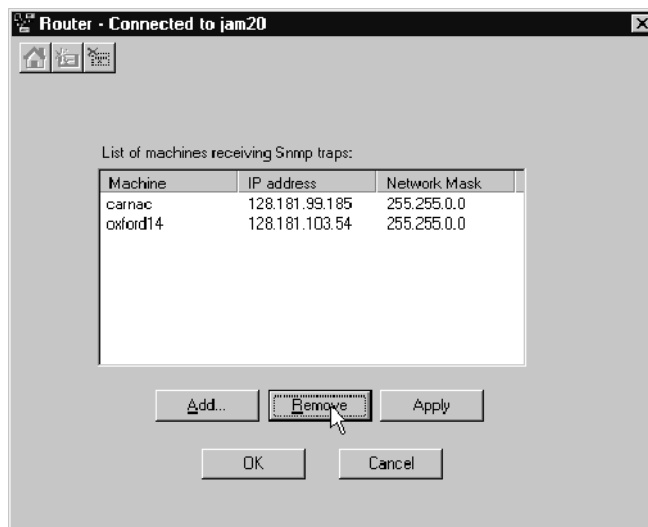
Figure 1‑15: Router application showing two host machines

4. To remove host machines from the list, select the host machine name and click **Remove**.

5. If localhost is not displayed in the Router application, click **Add**. The SNMP Traps to Target dialog box is displayed as shown in Figure 1‑16.
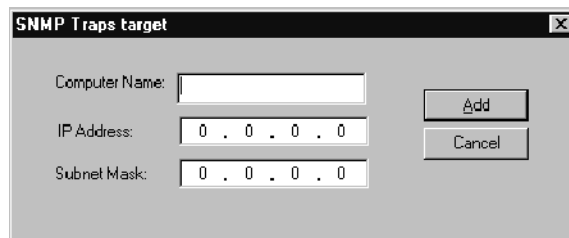
Figure 1‑16: SNMP Traps to Target dialog box

6. Enter localhost in the Computer Name text box.

7. After you have entered localhost, click in the IP Address text box. The IP address and subnet mask are automatically completed for you as shown in Figure 1‑17.
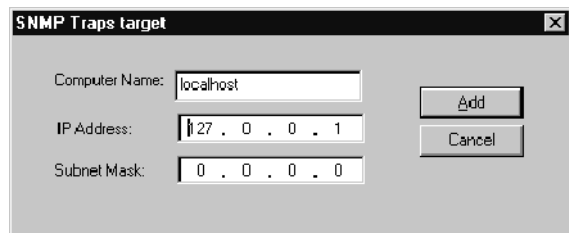
Figure 1‑17: SNMP Traps to Target dialog box showing localhost IP parameters

8. Click **Add** when you are finished.

Now, when you return to the Router application, the localhost IP parameters are displayed in the List of machines receiving traps selection box. Figure 1–18 shows the default configuration for the transport monitor: only the localhost is receiving traps.
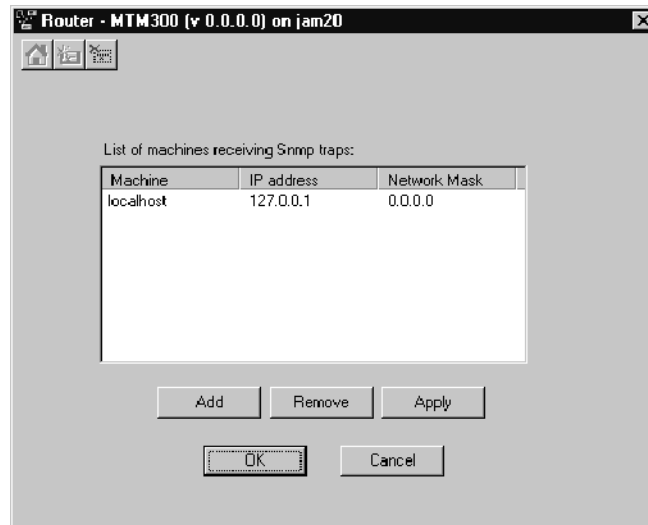
Figure 1‑18: Router application

9. Click **OK**. The Server Manager and the Analysis Servers are automatically stopped and restarted, and then the Router application is dismissed. These settings will remain in effect until you change them.

Sending Traps to a Network Management Station

When you are finished performing this procedure, your transport monitor will send traps to the network management station you specify. If you are installing your transport monitor into a network managed by a different vendor's software, use the procedures described in the documentation from that vendor. If you are installing your transport monitor into a network using the MTM300 Series Network Management Software (MTM3FMS), use the following procedure:

NOTE. The Server Manager running on the network management station must be running before a Server Manager on a transport monitor begins sending traps to the network management station.

1. Start the transport monitor. (If necessary, log on to Windows NT as Administrator.)

2. Select **Router** from the Tektronix program group. The Router application is displayed.

3. Click **Home**. The Router application displays the list of host machines receiving traps generated by the local Analysis Servers. See Figure 1‑18 on page 1‑30. A *host machine* can be a transport monitor or network management station with a Server Manager.

4. Click **Add**. The SNMP Traps to Target dialog box is displayed.

5. Enter the computer name of the network management station in the Computer Name text box.

   You can get this name from your network administrator, or you can get it from the Network dialog box on the network management station. Right-click the **Network Neighborhood** icon on the Windows NT desktop and select **Properties** from the shortcut menu to display the Network dialog box.

6. After you have entered the name of the network management station to which you will send traps, click in the **IP Address** text box. If the computer name is recognized, the IP address and subnet mask are automatically completed for you as shown in Figure 1‑19.
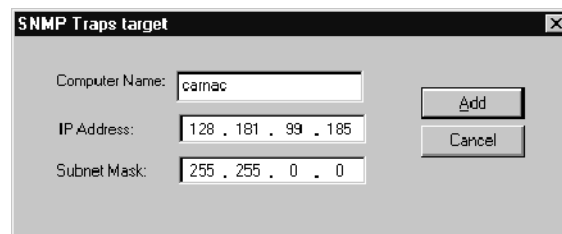
Figure 1‑19: IP parameters for network management station

   If the name is not recognized, enter the IP address by hand.

7. Click **Add** when you are finished.

When you return to the Router application, the IP parameters for the network management station are displayed in the List of machines receiving traps selection box as shown in Figure 1-20.
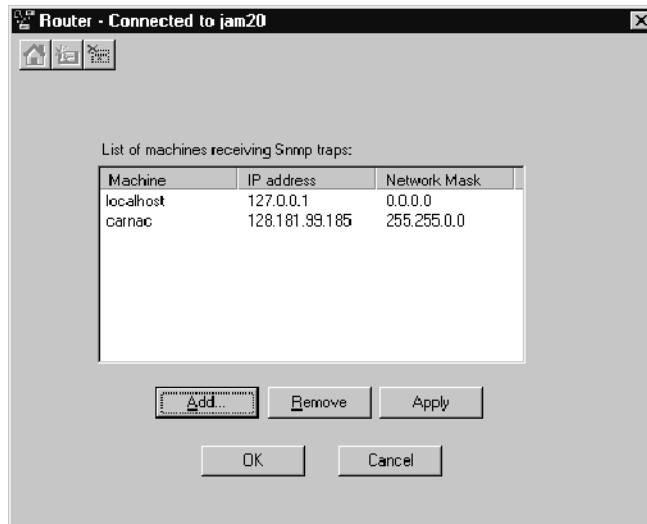
Figure 1-20: Network management station added

8. Click **OK** to accept your changes and close the Router application window.

   The Server Manager and the Analysis Servers are automatically stopped and restarted, and then the Router application is dismissed. These settings will remain in effect until you change them.

Configuring a Transport Monitor for use in a Small Network

Some TCP/IP networks are quite small and do not require many of the features available in larger TCP/IP networks such as DNS servers. The following procedure allows you to set up a transport monitor for use in a small TCP/IP network. In this procedure, you will modify the Hosts file to identify all of the computers you will send traps to, and then use the Router application to specify those host machines.

1. Start the transport monitor. (If necessary, log on to Windows NT as Administrator.)

2. Open the Hosts file using Notepad. The Hosts file is used to map IP addresses to host machine names and is located at the following location in the Windows NT directory:

   C:\winnt\system32\drivers\etc\Hosts

3. Use the following syntax to add the dotted decimal IP addresses of the machine(s) to which you will be sending traps. Figure 1-21 shows an example of the Host file after it has been edited.

IP Address   HostMachineName

Figure 1-21: Modified Hosts file

You can obtain the IP addresses and host machine names directly from the Network and TCP/IP properties dialog boxes on the host machines, or you can obtain them from your network administrator. Include at least one space between the IP address and the host name.

4. Save the Hosts file and exit Notepad.

5. Use the Router application and the procedure described in *Sending Traps to the Local Server Manager* beginning on page 1-28 to add the host machine names of the computers receiving the traps (error messages) generated by the Analysis Servers on the local machine.

Functional Check

This section provides procedures for checking the performance of the MTM300 Series MPEG Transport Monitor. The following procedures are provided:

- *Verifying the Performance of the MPEG-2 Components*

- *Verifying the Performance of the TMCC Components*

- *Verifying the Hardware Components*

Verifying the Performance of the MPEG-2 Components

Use this procedure to verify the operation of the MPEG-2 components of the MTM300 Series MPEG Transport Monitor.

NOTE. *If you are using the transport monitor in a TMCC environment, perform steps 1 through 7, cabling a TMCC stream input at step 1 and selecting the TMCC input in step 7. After performing these modified steps, perform the procedure described in* Verifying the Performance of TMCC Components, *beginning on page 1–43.*

If you have not already done so, perform the following procedures to prepare for the functional check:

1. Cable a Transport Stream Input. Use the information provided in *Electrical Installation* beginning on page 1–17 to provide a transport stream input to one of the rear-panel connectors.

2. Start the Transport Monitor. Use the procedure described in *Logging on to the MTM300 Series MPEG Transport Monitor* beginning on page 1–23.

3. Start the Master Client. Use the procedure described in *Starting and Exiting the Master Client Application* beginning on page 1–25.

**Connect to the Local
Server Manager**

4. Click the Home button in the Master client toolbar as shown in Figure 1‑22.
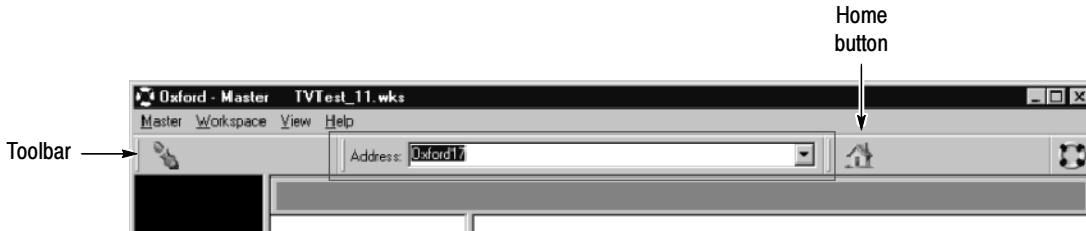
Figure 1‑22: Master client initial toolbar and Home button

**Edit a Workspace and
Select an Input**

5. Select **Edit** from the Workspace menu. The Workspace dialog box is displayed as shown in Figure 1‑23. Your dialog box will show a different mix of inputs.
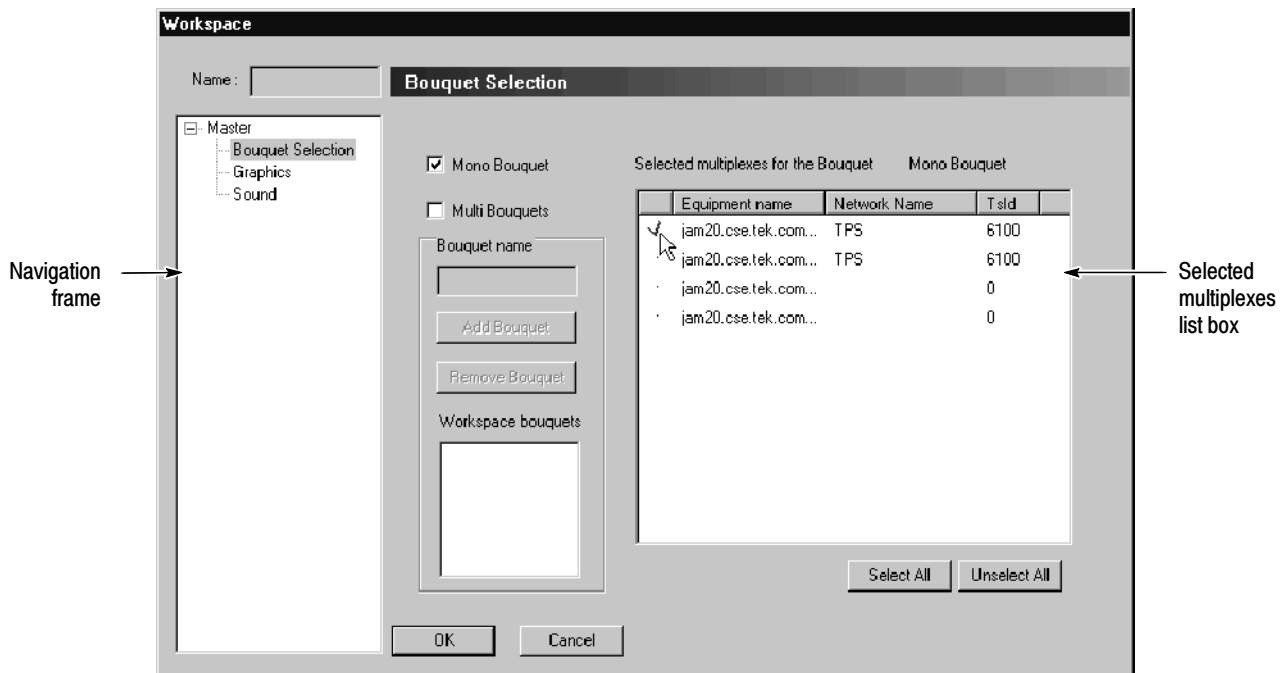
Figure 1‑23: Workspace dialog box with one input selected

6. Click in the left-hand column of the Selected multiplexes list box next to the name of the input you will monitor. See Figure 1‑23. (You can click **Select All** to select all of the listed transport stream inputs.)

7. Click **OK** to accept your changes and close the dialog box. The Master client should now look similar to Figure 1-24. The icons displayed are the default icons for the multiplex (or transport stream) and services (or programs).
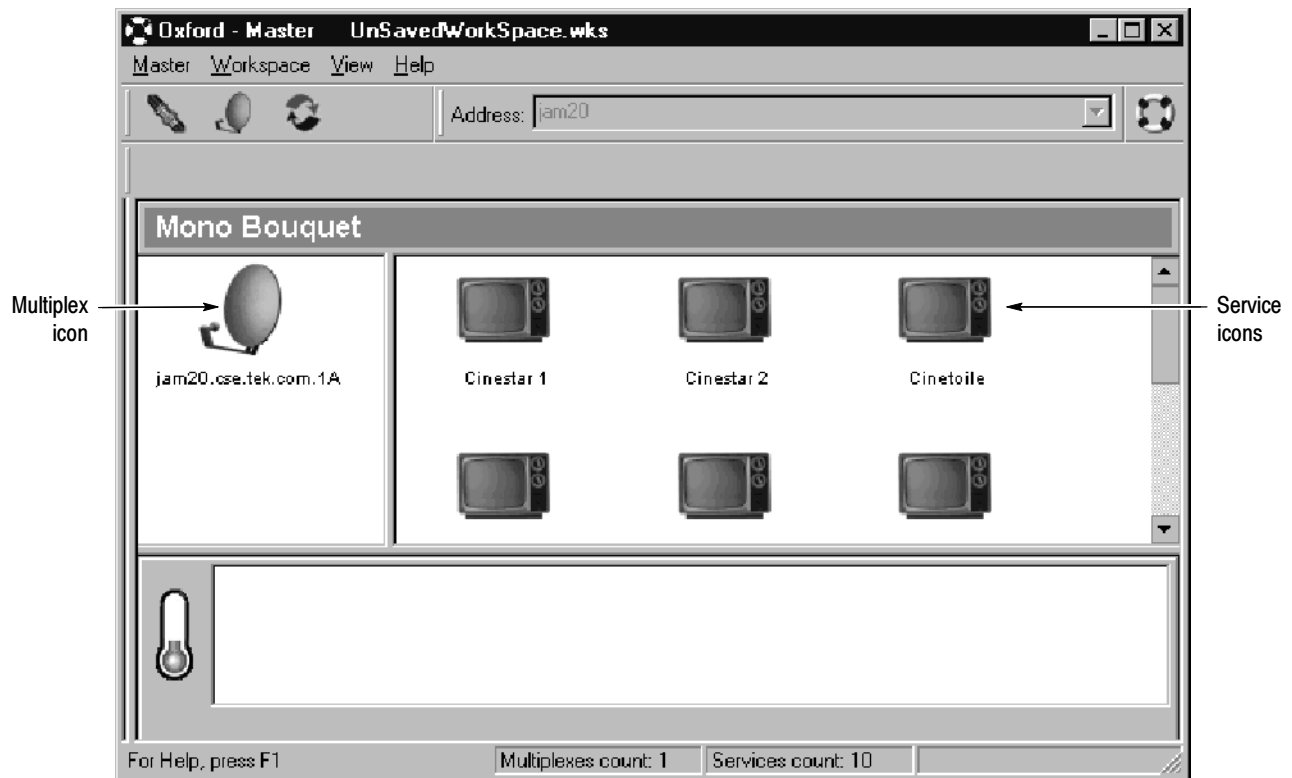
Figure 1-24: Monitoring a transport stream

Start the Configuration Client and Set ETR 290 Error Probes

8. Right-click the multiplex icon and select **Configuration Client** from the shortcut menu as shown in Figure 1–25. The Configuration client is displayed (see Figure 1-26).
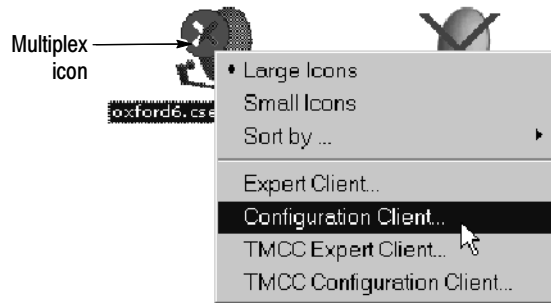
Figure 1- 25: Starting the Configuration client
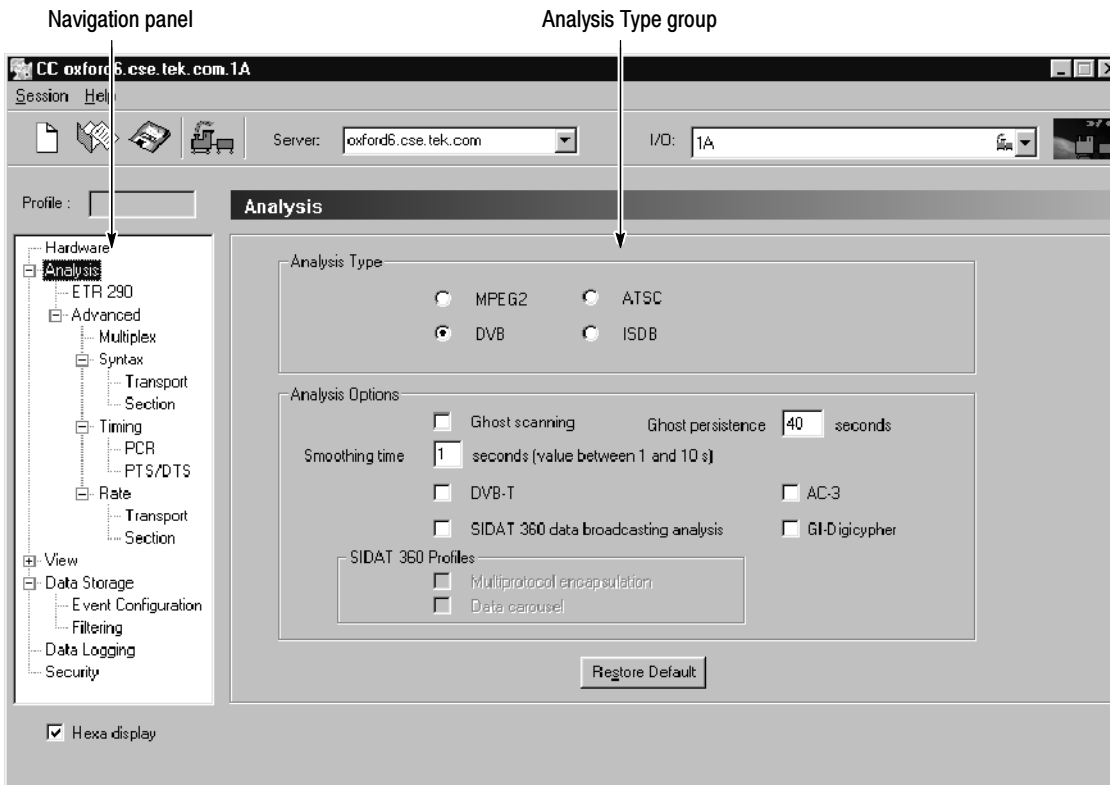
Figure 1- 26: Choosing the analysis type

9. Click **Analysis** in the Navigation panel and choose the appropriate analysis type from the Analysis Type group as shown in Figure 1-26, where the analysis type chosen is DVB.

10. Click **ETR290** in the Navigation panel, and then click **Add All** as shown in Figure 1-27.
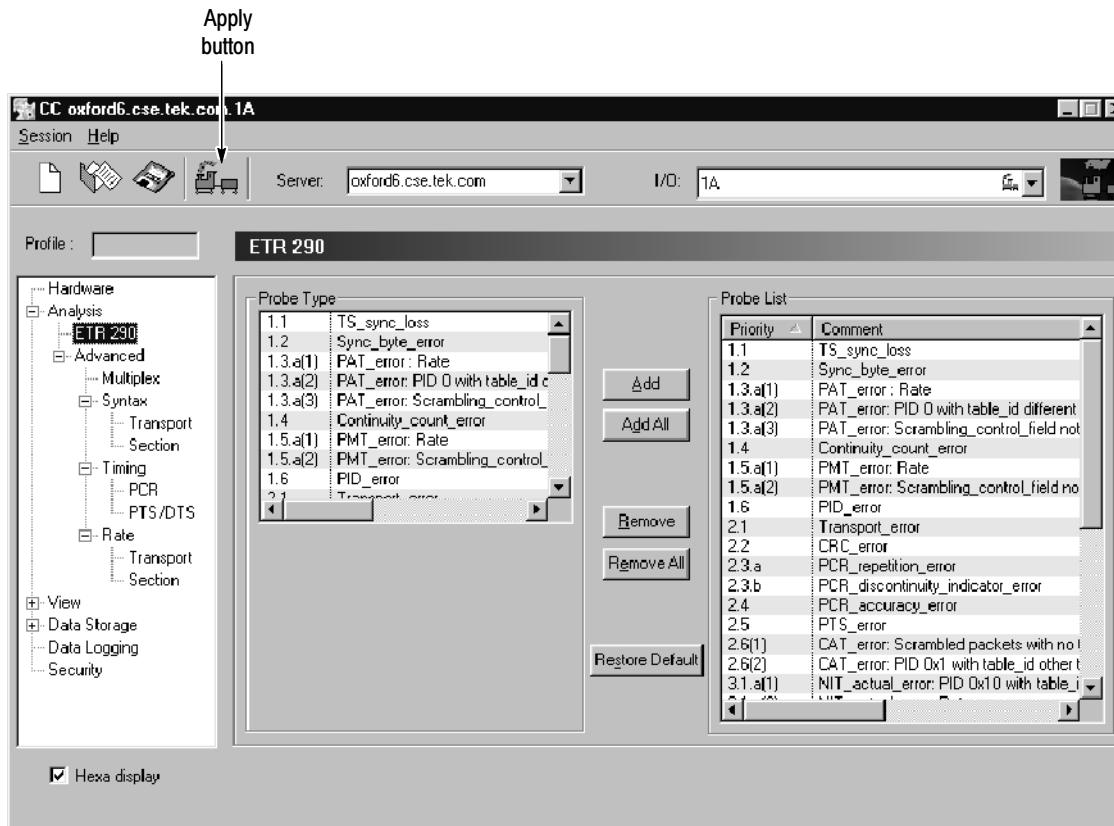
Figure 1-27: Adding all ETR290 probes

11. Click the **Apply** button. If you see a message asking whether you want to restart the analysis, click **Restart now**, and then close the Configuration client.

If there are errors on the input, the Master client should now look similar to Figure 1-28.
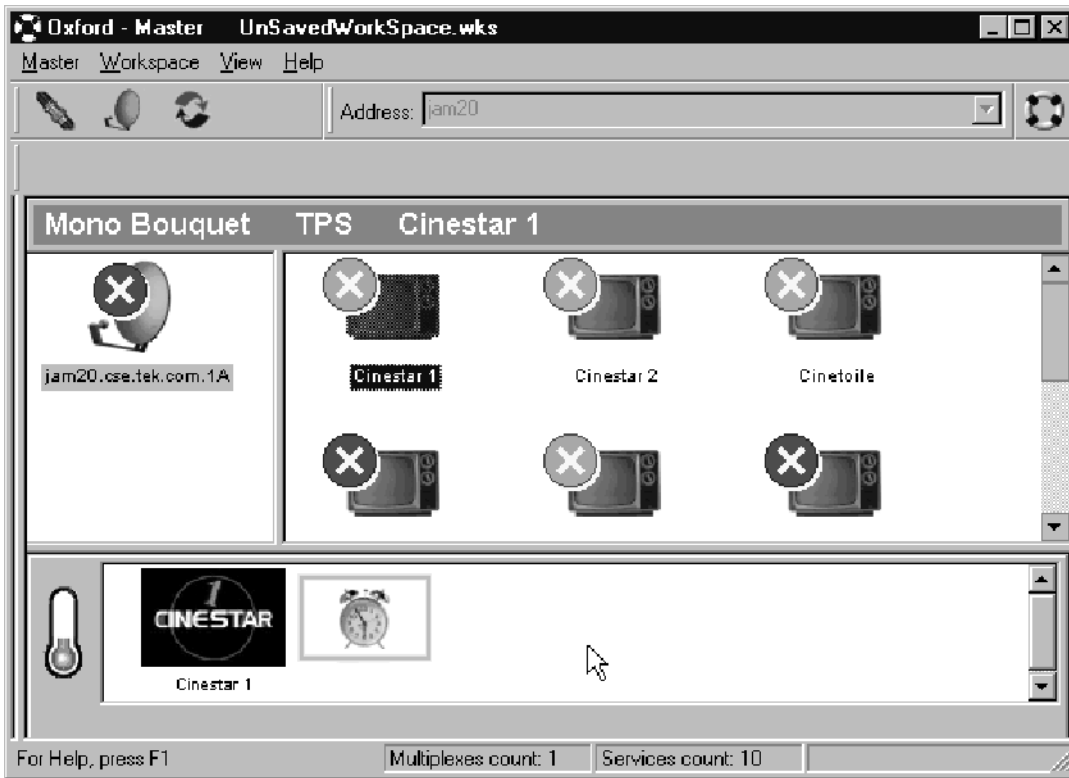
Figure 1-28: Master client showing errors on Cinestar

Start the Expert Client

12. Click an input icon and then right-click a service icon (or double-click a service icon), choosing a service icon that is displaying errors.

13. Select Expert Client from the shortcut menu. The Expert client is displayed showing the errors occurring on the selected service (if any). See Figure 1‑29.
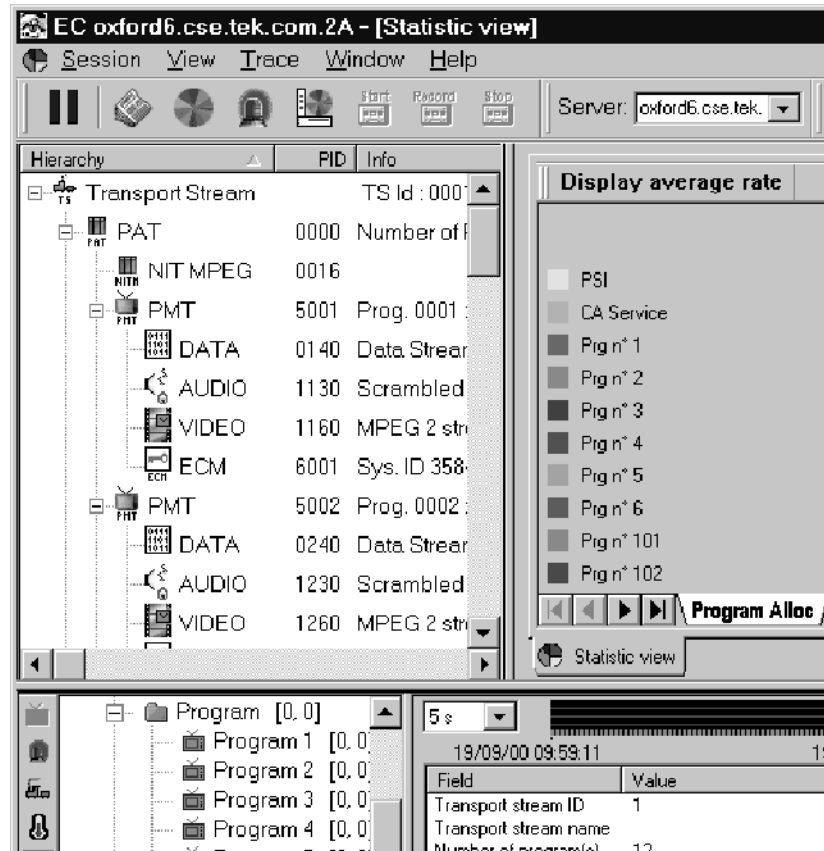
Figure 1‑29: Expert client showing errors on Cinestar

Verifying the Performance of the TMCC Components

Before performing the functional check, make sure that you have performed steps 1 through 7 of *Verifying the Performance of the MPEG-2 Software Components* beginning on page 1-35 (these procedures instruct you to cable an input, in this case a TMCC input; start the transport monitor; and start and configure the Master client).

Set TMCC Probes

1. Right-click the multiplex icon representing the TMCC transport stream input, and then select **TMCC Configuration Client** from the submenu.

2. After the TMCC Configuration Client is displayed, click Analysis in the Navigation panel and ensure that the Stream type selected is appropriate for your input. S_TMCC streams (TMCC basic streams) are TMCC multiplexes with a single transport stream. M_TMCC streams (TMCC data streams) are TMCC multiplexes with multiple transport streams. You need to select the correct stream type for the TMCC Expert Client to synchronize to the input.

3. Click **Add All** and notice that a number of probes are added to the List of Probes selection box. See Figure 1-30.
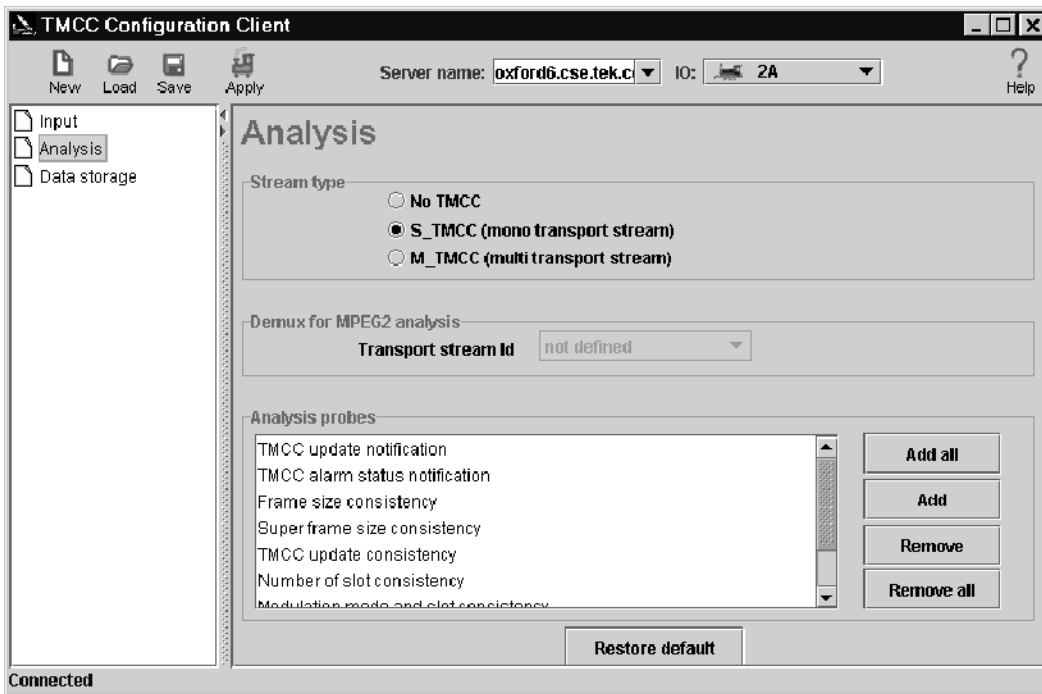
Figure 1-30: Probes added in the TMCC Configuration Client

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.

4. Click **Apply** to save your changes.

5. Exit the TMCC Configuration Client and return to the Master Client. If the transport stream you are analyzing has TMCC errors, you should see an error icon in the details panel.

Display the TMCC Expert Client

6. Right–click the Multiplex icon for the input you just configured, and then select **TMCC Expert Client** from the submenu.

7. Confirm that the TMCC Expert Client displays with data in the Slots, Syntax, Dump, and Report view frames. See Figure 1–31.
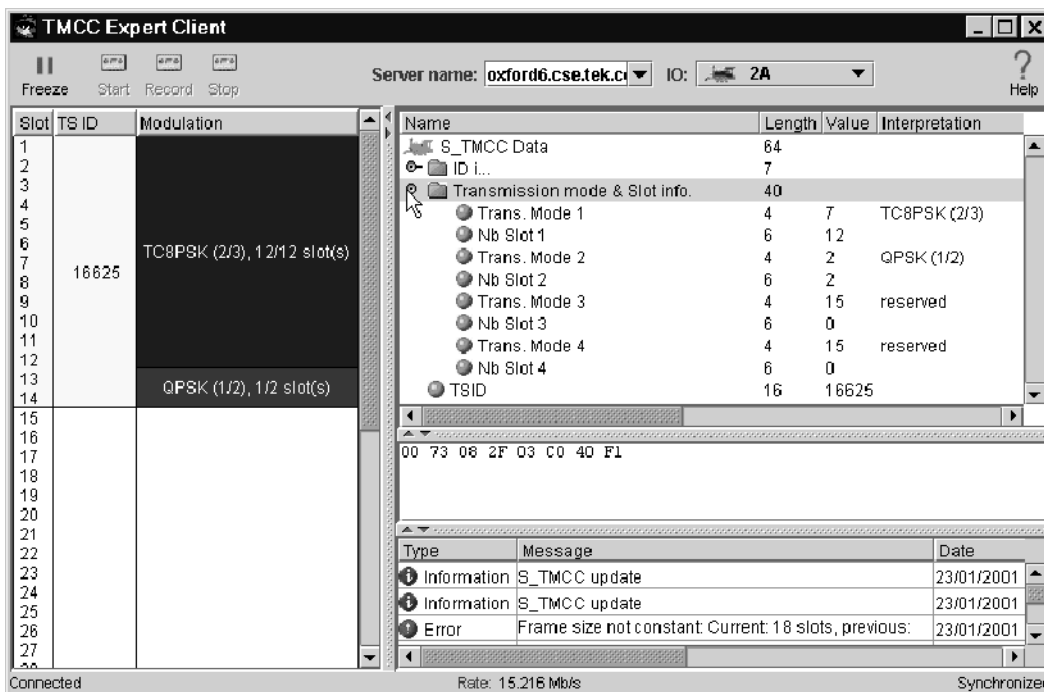
Figure 1‑31: TMCC Expert Client

8. Exit the TMCC Expert Client and return to the Master Client.

Set ARIB Table Probes

9. Right--click a Multiplex icon representing a TMCC stream and 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.

Verifying the Hardware Components

Each transport monitor is shipped with a Hardware Diagnostic application that verifies the performance of the hardware components of the MTM300 Series MPEG Transport Monitor. Using this tool, you check the following parameters:

■ Board access

■ Process paths

■ Stream paths

■ I/O parameters

■ External connections

You will not check the external connections during this functional check. For more detailed information about the Hardware Diagnostic tool, see *Appendix B: Cleaning and Maintenance.*

1. Select **Hardware Diagnostic** from the Tektronix MPEG Transport Monitor program group. The Pia+ Diagnostic Self Test application is displayed as shown in Figure 1–32 on page 1-46.

2. Click the Home button as shown in Figure 1–32.
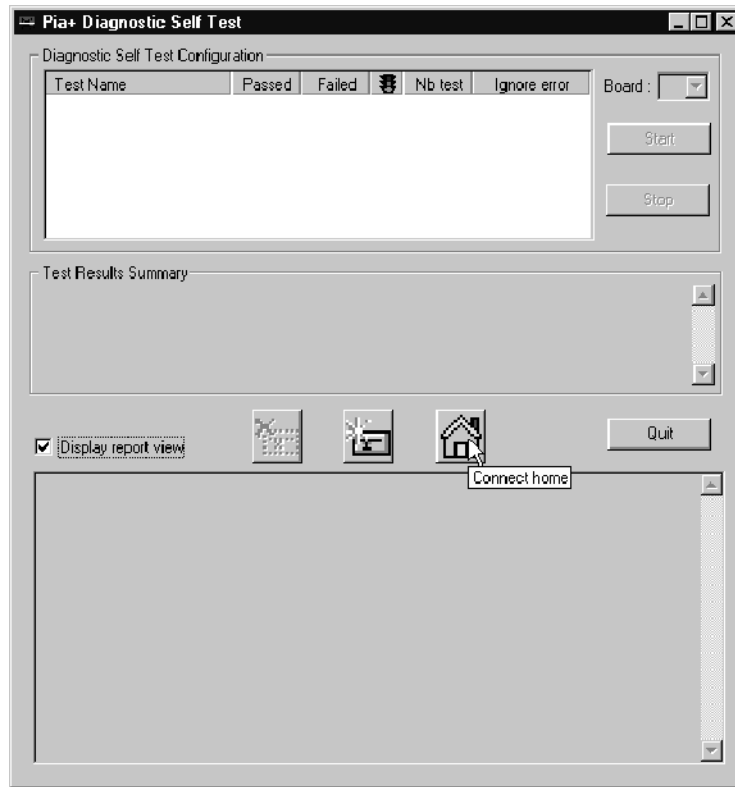
Figure 1‑32: Hardware diagnostic tool

3. Use the default selections as shown in Figure 1‑33 and click **Start**. You will be prompted to stop the Analysis Servers and Server Manager. Click **OK**
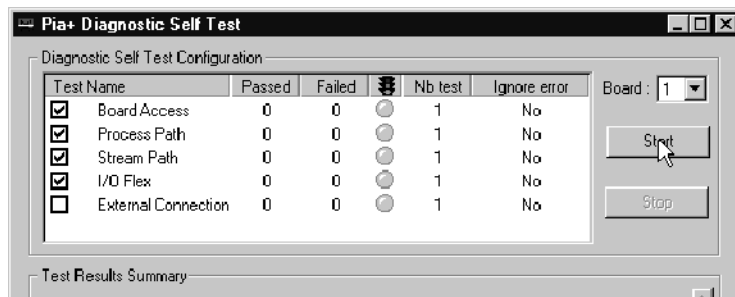
Figure 1‑33: Default self test selections

4. If you see a message indicating that the Analysis Servers will be stopped, click **OK**.

5. During the course of the self test, the Pia+ Diagnostic Self Test application window updates showing the progress of the tests. See Figure 1-34 on page 1-47.
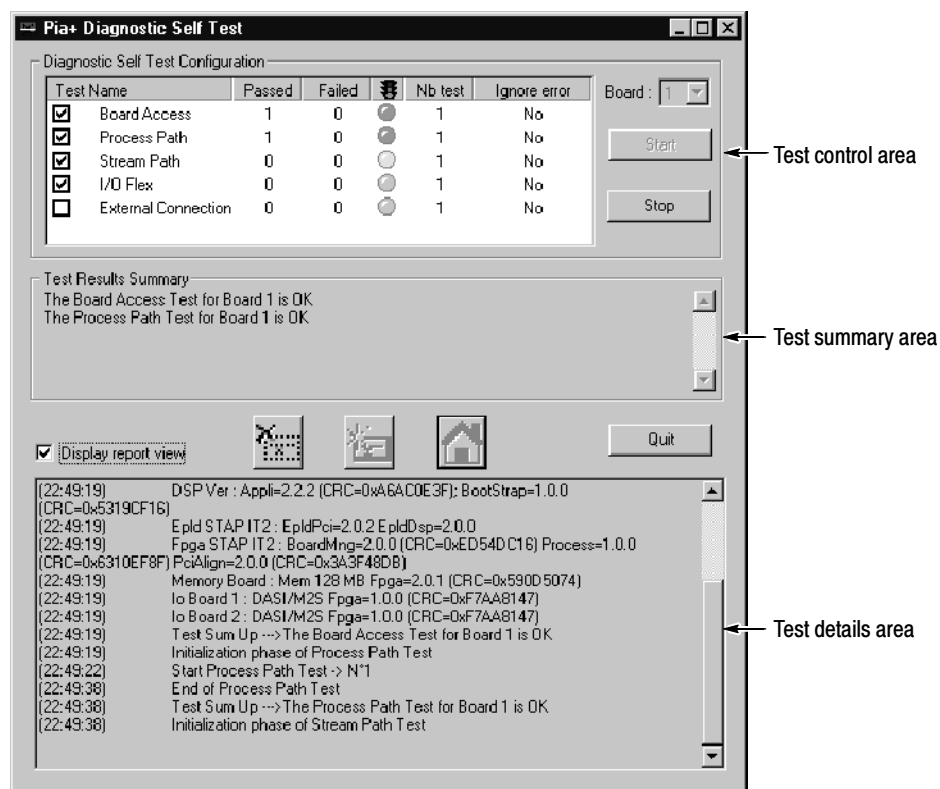
Figure 1-34: Self test in progress

■ The test control 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 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 test details area records details about each test as it is being performed.

When the self test is complete, you can save the details of the self test by right-clicking in the test details area, and then selecting Save Report from the shortcut menu as shown in Figure 1–35. You will be prompted for a file name using a standard Save As dialog box.
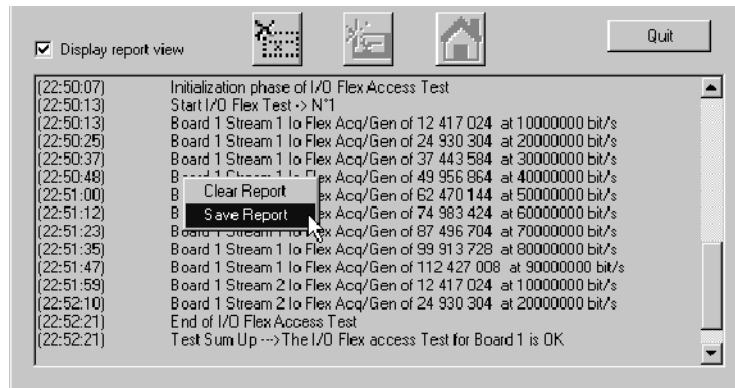
Figure 1- 35: Saving test results

6. When the test is completed, the Analysis Servers will restart.

This completes the Functional Check.

If you encountered any errors while performing these procedures, refer to other sections of this manual or in the optional *MTM300 Series MPEG Transport Monitor Service Manual* for additional information about the transport monitor. If you cannot resolve your problems using these resources, call your Tektronix representative.

Operating Basics

> **NOTE**. *If you are not familiar with the Windows 95 or Windows NT 4.0 operating systems, review the Windows NT documentation that accompanied your test system.*

This section provides a functional overview of the MTM300 Series MPEG Transport Monitor client modules and a tutorial that will show you how the modules work together. The rear-panel description is provided in *Getting Started* beginning on page 1–17.

Functional Overview

Functional Overview describes the following MTM300 Series elements:

- *Master Client*   page 2–2

  Describes the parts of the Master client application window that allow you to monitor transport stream inputs at various levels of detail.

- *Configuration Client*   page 2–6

  Describes the parts of the Configuration client application window that allow you to quickly and easily set probes on transport stream inputs.

- *Expert Client*   page 2–4

  Describes the parts of the Expert client application window that allow you to analyze in detail the characteristics of a transport stream input and the errors occurring on that input.

- *TMCC Expert Client*   page 2–7

  Describes the parts of the TMCC Expert client application window that allow you to analyze the characteristics of a transport stream input and the errors occurring on that input.

- *TMCC Configuration Client*   page 2–10

  Describes the parts of the TMCC Configuration client application window that allow you to set probes on TMCC transport stream inputs.

- *Front Panel*   page 2–12

  Describes the front-panel controls. The front panel user interface is an option and this section may not pertain to your configuration.

Master Client   The Master client views and elements enable you to monitor the results of the analyses being performed by Analysis Servers on up to eight transport stream inputs. See Figure 2-1. The Master client also allows you to monitor Video QoS measurements performed by a remote PQM300 Program QoS Monitor.
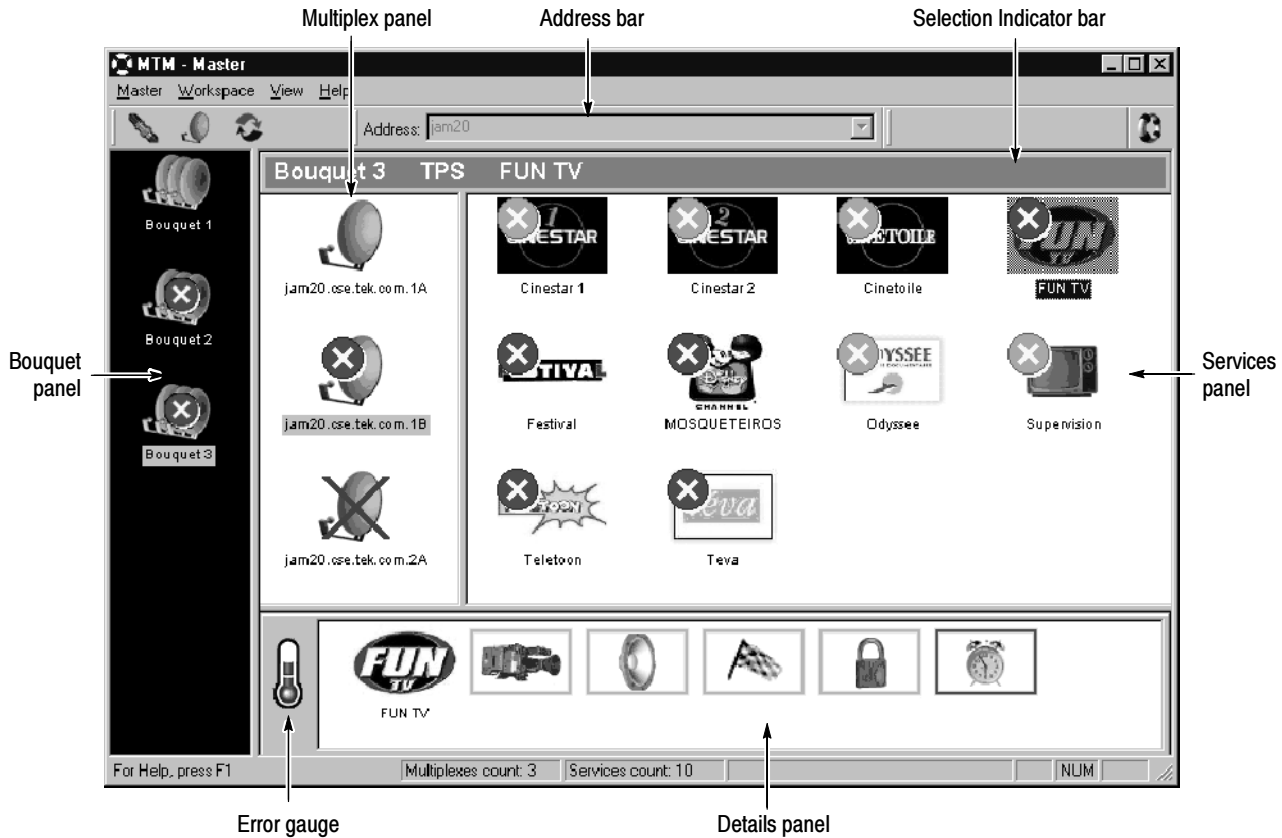
Figure 2- 1: The Master client application window

Note the following characteristics of the Master client window in Figure 2-1 (following the named items starting at the Bouquet panel and working clockwise):

■ The Bouquet panel shows that three bouquets are being monitored, one (Bouquet 1) has no errors, and Bouquet 3 is selected.

■ The Multiplex panel shows the inputs configured for the bouquet selected in the Bouquet panel. Bouquet 3 includes three transport stream inputs (multiplexes) on inputs 1A, 1B, and 2A. No errors are being detected on input 1A, errors are detected on input 1B, and input 2A has lost synchronization.

- The Address bar shows that the Master client is connected to the Server Manager running on jam20.

- The Selection Indicator bar shows the currently selected items in the Bouquet, Multiplex, and Services panels, respectively.

- The Services panel shows the services encoded on the input selected in the Multiplex panel. Input 1B is the currently selected input, and errors have been detected on all inputs. FUN TV is the currently selected service.

- The Details panel shows the status, types, and severity of errors occurring on the currently selected service (or multiplex). FUN TV is experiencing an array of errors. The most serious error is a major error.

- The Error gauge displays the severity of the most recent error for the service (or multiplex) displayed in the Details panel. It shows that a current major error exists on FUN TV.

See Master Client Reference for more detailed instruction on using the Master client. See the tutorial later in this section for an introduction to using the Master client. See the *PQM300 Program QoS Monitor User Manual* for operating information about the PQM300.

Expert Client   The Expert client views and elements show the detailed results of analyses being performed on one transport stream input. See Figure 2–2.
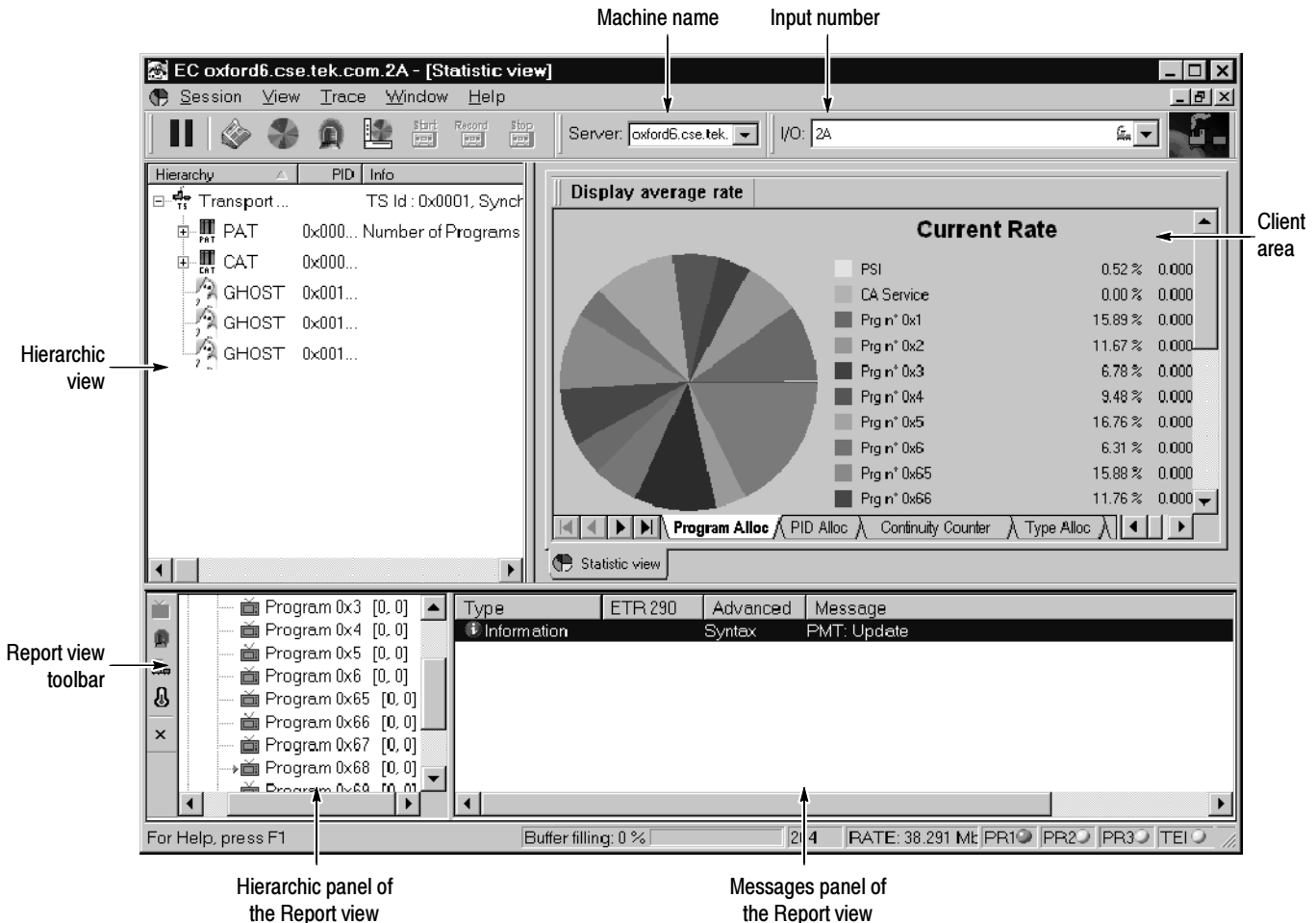
Figure 2- 2: The Expert client application window

Note the following characteristics of the Expert client window in Figure 2–2 (following the named items starting at the Hierarchic view and working clockwise):

- The Hierarchic view shows the structure of the transport stream you are monitoring. The hierarchy shown is based on the transport stream elements. For instance, since the Program Map Table (PMT), and the program elements the PMT references, are referenced by the Program Allocation Table (PAT), the PMT icons are shown subordinate to the PAT icon.

- The Address bar shows that the Expert client is connected to the Analysis Server analyzing input 1A on the machine named oxford6.

- The Client area is displaying the Program Allocation panel, which is one of the panel in the Statistics view. The Statistics view panels display statistical information about the input stream to which the Expert client is connected. Other views can also be displayed in the Client area. These views are accessed using shortcut menus displayed when you right-click an icon in the Hierarchic view.

- The Messages panel of the Report view shows the errors occurring on the input selected in the Hierarchic panel of the Report view. You can display more detail about a specific error by double-clicking the line on which the error is reported.

- The Hierarchic panel of the Report view allows you to select different ways, or modes, of displaying errors or statistics about the transport stream being analyzed. The mode of the Report view is determined using the toolbar to the left. The current mode is Program and FUN TV is selected.

NOTE. This is the way the Expert client would be displayed if you double-clicked FUN TV in the Services panel of the Master client.

- The Report view toolbar allows you to change the mode of the Report view. Using this toolbar you can display errors grouped in one of four logical modes: by program, ETR290 priority, error type, or error severity.

Configuration Client   The Configuration client views and elements allow you to quickly and easily set, modify, and remove probes for analyzing and monitoring transport stream inputs. See Figure 2‑3.
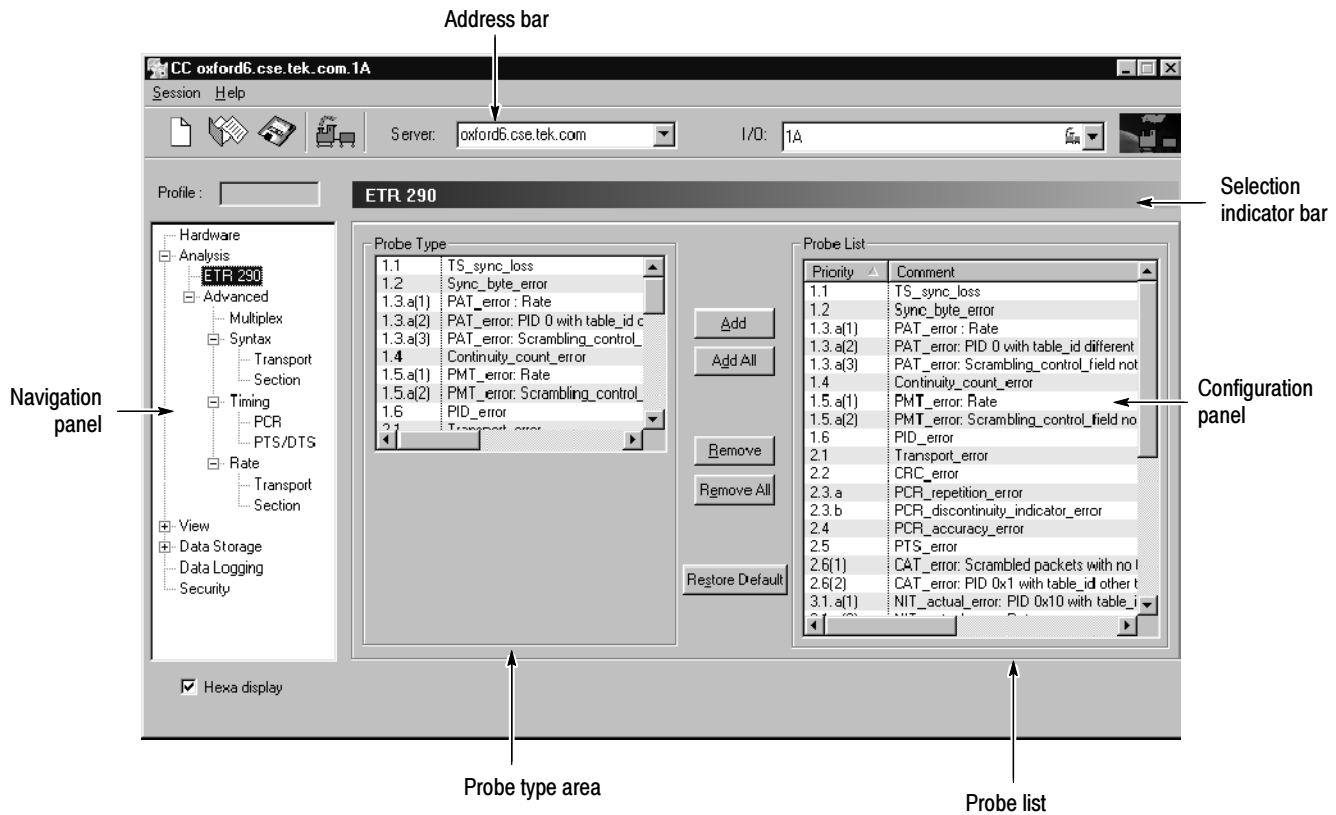
Figure 2‑3: The Configuration client application window

Note the following characteristics of the Configuration client window in Figure 2‑3 (following the named items starting at the Navigation panel and working clockwise):

■   The Navigation panel allows you to quickly choose the category of error for which you want the Analysis Server to probe. The currently selected error category is ETR290.

■   The Address bar shows that the Configuration client is connected to the Analysis Server that is analyzing input 1A on oxford6.

- The Selection Indicator bar shows the item currently selected in the Navigation panel.

- The Configuration panel allows you to specify probes for the connected Analysis Server and changes depending on the item selected in the Navigation panel.

- The Probes list shows the specific probes set for the connected Analysis Server. It also displays the probe limits, PID numbers, and other variables for each probe.

- The Probe type area allows you to add, modify, and remove specific probes. In most cases, you can also define various probe parameters used by the Analysis Server when analyzing the input shown in the Address bar.

TMCC Expert Client   The Expert client views and elements show the detailed results of analyses being performed on one transport stream input. See Figure 2-4.
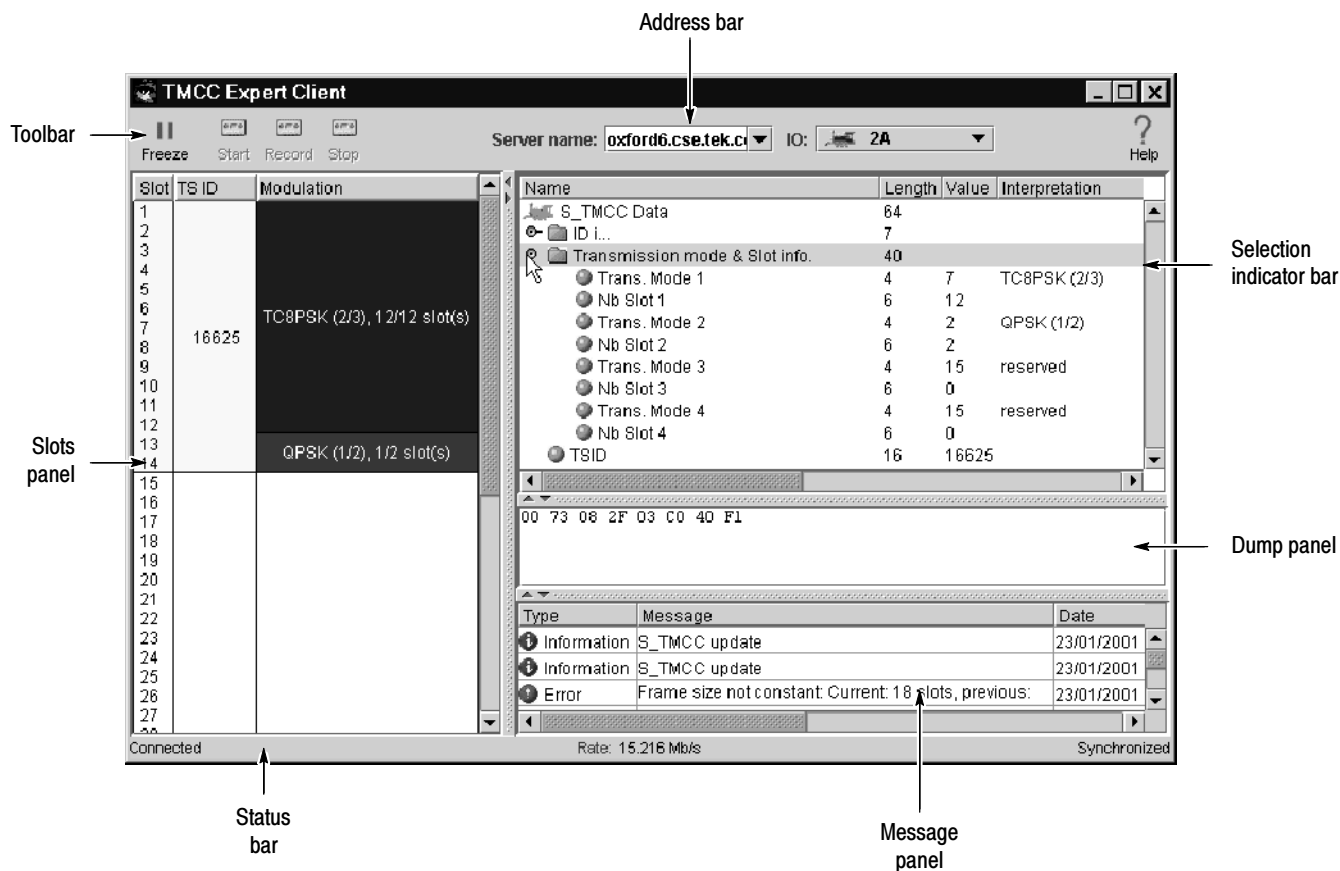
Figure 2- 4: The TMCC Expert client application window

Note the following characteristics of the TMCC Expert client window in Figure 2-4:

- The Slots panel uses three columns to show the following information:

    - The slot number (1 through 48)

    Note the following relationships between packets, slots, frames, and super frames:

        - A *slot* corresponds to one MPEG-2 TS packet with error coding (a 204-byte packet)

        - A *frame* is made up of 48 slots (48, TMCC TS packets)

        - A *super frame* is eight frames

    - The transport stream ID associated with each slot (if no TSID is associated with a slot, Unassigned is indicated)

    - The modulation mode, and the total and effective number of slots for each mode

    Modulation modes (BSPK, QPSK, and TC8PSK) for each slot are indicated in text and are color coded, as shown in Table 2-1.

NOTE. When the modulation mode and the number of slots are not consistent, the color for the modulation mode is red.

Table 2-1: Modulation mode color scheme

Modulation mode	Color code
BSPK (1/2)	Dark green
QPSK (1/2)	Purple
QPSK (2/3)	Light green
QPSK (13)4	Yellow
QPSK (5/6)	Brown
QPSK (7/8)	Dark blue
TC8PSK (2/3)	Light blue

- The following toolbar buttons allow you to control the TMCC Expert Client:

    - Freeze. Pauses the analysis of the input, causing the current display to become static.

- Start. Starts moving transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream.

- Record. Starts the manual capture of the transport stream input. This button is disabled until you enable a manual capture of a transport stream.

- Stop. Stops the movement of transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream and click the Record button.

- The Address bar shows the machine (IP address or machine name) and TMCC Analysis Server (input) to which the TMCC Expert client is connected.

- The Syntax panel shows the TMCC data in the transport stream. Parameter names and values are shown for ID and Transmission mode and slot information for single TMCC data streams. This panel is interactive; selecting icons in the hierarchic view of the Syntax panel changes the display in the right part of the Syntax panel.

- The Dump panel displays the hexadecimal values of the TMCC data.

- The Messages panel displays error, warning, and information messages generated by the TMCC Analysis Servers.

- The status bar indicates the status of the TMCC Expert Client connection to the Analysis Server, the instantaneous rate of the transport stream, and whether the Analysis Server is synchronized to the input.

TMCC Configuration Client

The TMCC Configuration client views and elements allow you to quickly and easily set, modify, and remove probes for analyzing and monitoring TMCC transport stream inputs. See Figure 2-5.
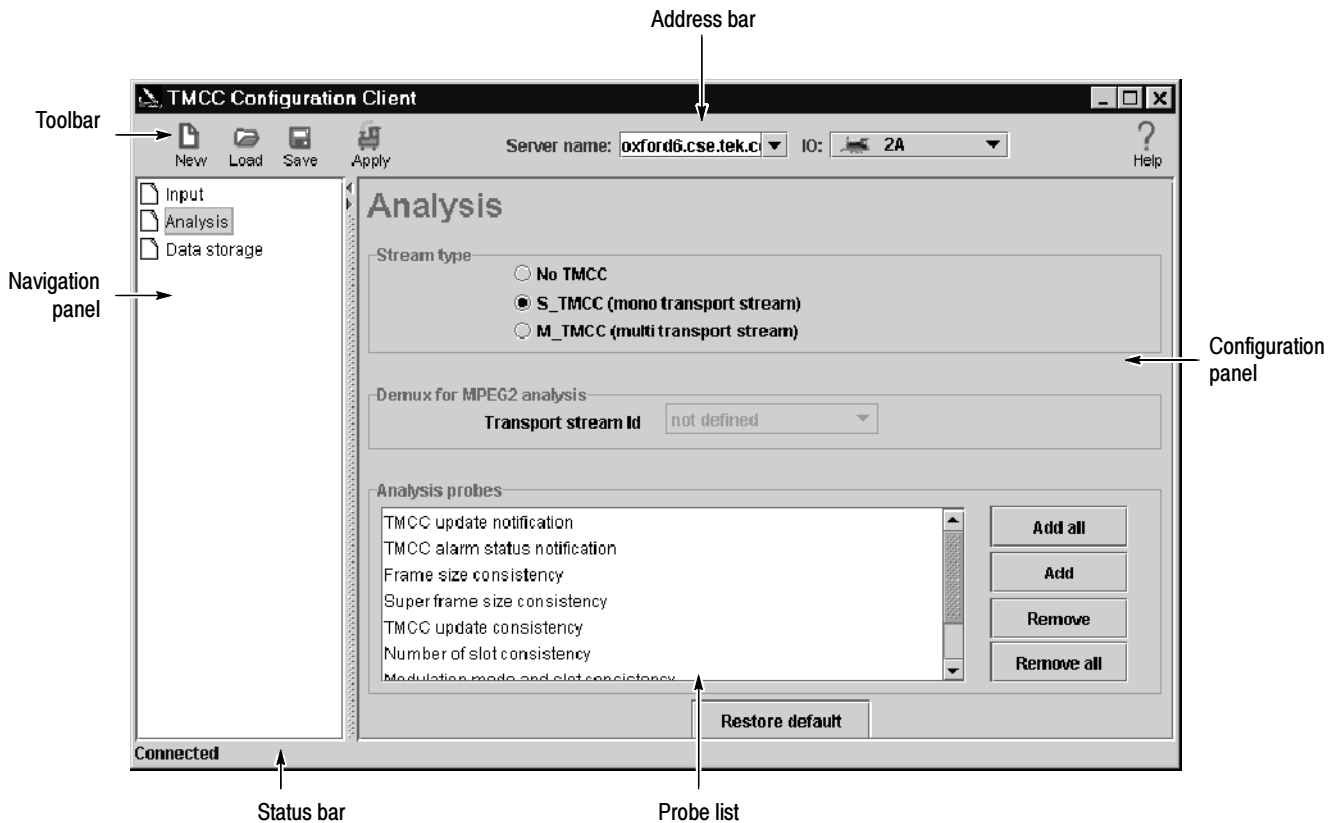
Figure 2-5: The TMCC Configuration client application window

Note the following characteristics of the Configuration client window in Figure 2-5:

■ The Navigation panel allows you to navigate to one of the three Configuration panels used to configure the TMCC Analysis Server:

■ The toolbar displays allows you to perform the following actions:

■ The New button allows you to create a new configuration for the Analysis Server to which you are connected. The new configuration of probes, inputs and outputs, trigger, and sync bytes will be applied to the new configuration file (a *.cnf file).

■ The Load button displays the Open dialog box, allowing you to open a saved configuration file (a *.cnf file). The default location for saved configuration files is the C:\MTM300\bin directory.

- The Save button opens the Save dialog box, allowing you to name the current configuration. The .cnf file name suffix is appended automatically.

- The Apply button applies the current configuration of the TMCC Configuration Client to the Analysis Server shown in the Address bar.

- The Address bar shows the machine (IP address or machine name) and TMCC Analysis Server (input) to which the TMCC Configuration client is connected.

- The Configuration panel displays the configuration options. Each panel allows you configure different aspects of the TMCC analysis.

  - Input panel. This panel allows you to configure the input and output format, the triggering mechanism, and the number of sync bytes to test before reporting a synchronization error.

  - Analysis panel. This panel allows you to set the multiplex type (single or multiple transport stream multiplexes), the transport stream ID for MPEG analysis, and the TMCC probes you will use to analyze the input.

  - Data Storage panel. This panel allows you to configure the errors upon which the TMCC Expert Client will automatically trigger a data capture.

- The Probe list shows the probes that are set on the input shown in the Address bar.

- The Status bar displays the status of the connection between the TMCC Configuration Client and the Analysis Server.

Front Panel   The default front panel configuration is blank with the exception of the On/Stby button and the 3–1/4 inch floppy disk and CD-ROM drives. If you ordered the front panel option with your monitor, your instrument will look similar to Figure 2-6.
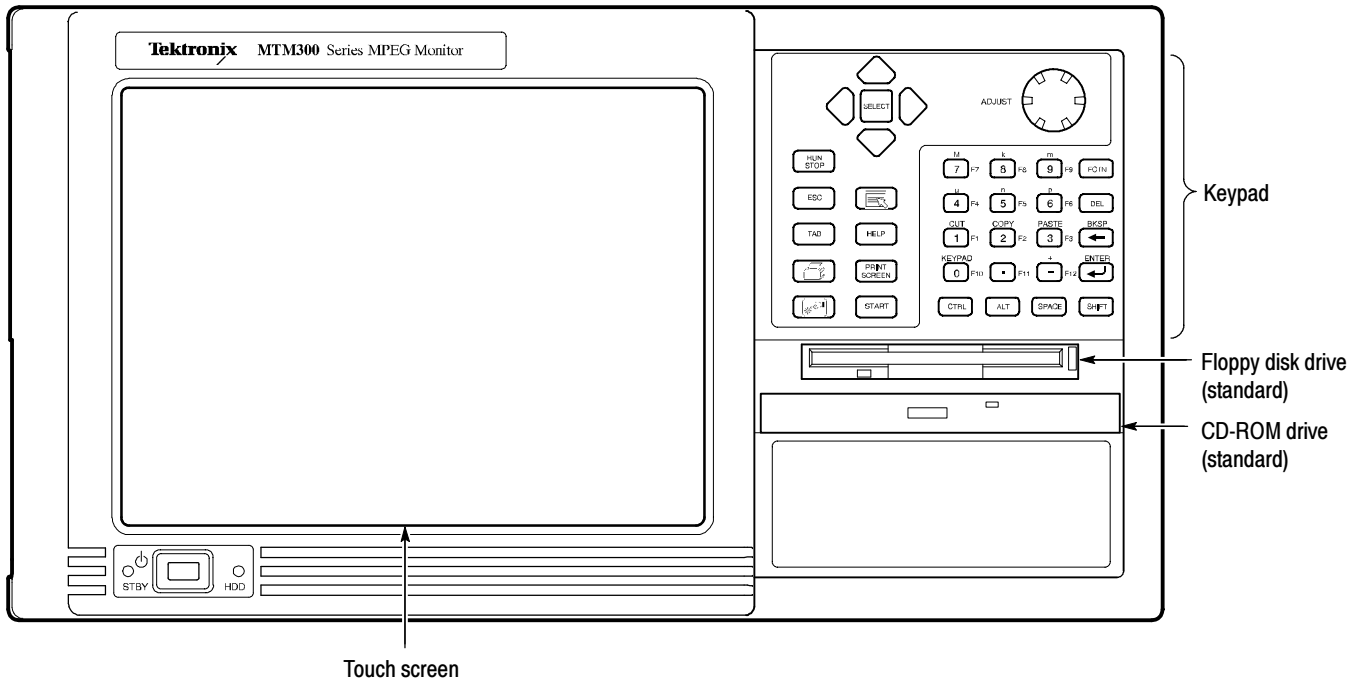
Figure 2- 6: Front-panel elements

This section shows how to use the touch screen features. Table 2–2 describes the keypad controls, Table 2–3 lists touch screen techniques for working with the Master client. Use similar techniques for the Expert and Configuration clients.

⚠ **CAUTION.** *Do not use sharp or abrasive objects to perform operations using the touch screen. Using sharp or abrasive objects can damage the LCD display.*

Included as a standard accessory with all transport monitors is a stylus that gives you more precise control over the items you touch on the touch screen.

Table 2‑2: Front panel-key controls

Control name	Mechanism	Description
Up Arrow	Button	Use to navigate and change focus from one window function to another.
Left Arrow	Button	
Right Arrow	Button	
Down Arrow	Button	
Select	Button	Same as the space key.
Adjust Knob	Knob (Rotary encoder)	Not enabled.
Run/Stop	Button	Not enabled.
Esc	Button	Standard Escape key.
Tab	Button	Standard Tab key.
Print	Button	Prints the current display.
Touch	Button (w/hand icon)	Toggle function not enabled. The touch screen is always on.
Menu (Application key)	Button (w/pointer icon)	Displays shortcut menus for selected items.
Help	Button	Opens the Help contents. Standard F1 key
Print Screen	Button (w/printer icon)	Copies the screen to the clipboard. Alt plus Print Screen copies the active window.
START Key	Button (w/Windows logo)	Opens the Windows Start menu.
Numbers 0 to 9, . (period), and – (minus	Buttons	Standard number keys, most have second (Shift) and third (Function) functions.
Fctn	Button with LED	Modifier for numeral keys to create keys F1 through F12. LED indicates when active.
Del	Button	Deletes selected text or object.
←	Button	Backspace key.
↵	Button	Enter key.
Ctrl	Button with LED	Control key. LED indicates when keypad is in control mode.
Alt	Button with LED	Alternate key. LED indicates when keypad is in alternate mode.
Space	Button	Use it like a keyboard space bar or use it as mouse button 1
Shift	Button with LED	Shift key. LED indicates when keypad is in shift mode. Locked mode key feature.

NOTE. Some of the functions of the Expert and Configuration clients require the use of an external keyboard and mouse.

Table 2‑3: Touch screen techniques

Task	Action
Highlighting an item	Touch the item.
Selecting an item	
Making a menu selection	Touch the menu name, and then touch the menu item.
Moving a window	Touch and drag the title bar of the window without lifting the stylus from the touch screen.
Displaying shortcut menus	Touch an icon that has a shortcut menu associated with it (for instance, a multiplex or service icon) and press the Menu button from the keypad.
Checking or clearing option boxes	Touch the option name or check box.
Entering values in text boxes	Touch the text box until a cursor appears in the text box, and then enter values using the keypad. (Only numeric values and the letters M, k, m, u, n, and p can be entered from the keypad.)
Scrolling through a list	Touch the scrolling list until a cursor appears in the list, and then press the Down Arrow button from the keypad.
Scrolling a window	Touch and drag a scroll bar without lifting the stylus from the touch screen.
Resizing windows	Touch and drag the lower right corner of the window to the desired size without lifting the stylus from the touch screen.
Following links in the online help	Touch the link text.
Expanding or collapsing a hierarchy	Double-tap the touch screen item at the point you want to expand or collapse a hierarchical display, or touch the Expand/Collapse control next to the item name.
Copying text or other values	Touch and drag over the area you want to copy, and then press the Shift button followed by the Copy button on the keypad.
Pasting text or other values	Touch the area into which you want to paste the contents of the clipboard, and then press the Shift button followed by the Paste button on the keypad.

Tutorial

This section contains a step-by-step tutorial that will introduce you to the capabilities and features of the three MTM300 Series MPEG Transport Monitor Master, Expert, and Configuration client modules. Refer to the *Reference* section for detailed operating information for each client module.

Perform this tutorial with your own input stream, and then spend some time experimenting with the various monitoring, configuration, and analysis options. The sections of the tutorial begin on the following pages:

For information about using the client modules not described in this tutorial, see the relevant sections of the *Reference* section:

Preliminary Setup

Connect an input to the rear panel of the instrument, start the transport monitor, and configure the Server Manager on the local transport monitor to send traps to itself. Refer to the relevant sections of *Getting Started* if you have not yet performed these tasks.

NOTE. *If you are not familiar with the Windows 95 or Windows NT 4.0 operating systems, review the Windows NT documentation that accompanied your test system.*

Starting the Master Client

Use the following procedure to start the Master client:

1. Click **Start**, point to **Programs** and T**ektronix MPEG Transport Monitor**.

2. Click **Master Client**. An empty Master client window is displayed as shown in Figure 2‑7.

    You can also double-click the Master client icon in the Program Group window on your desktop.
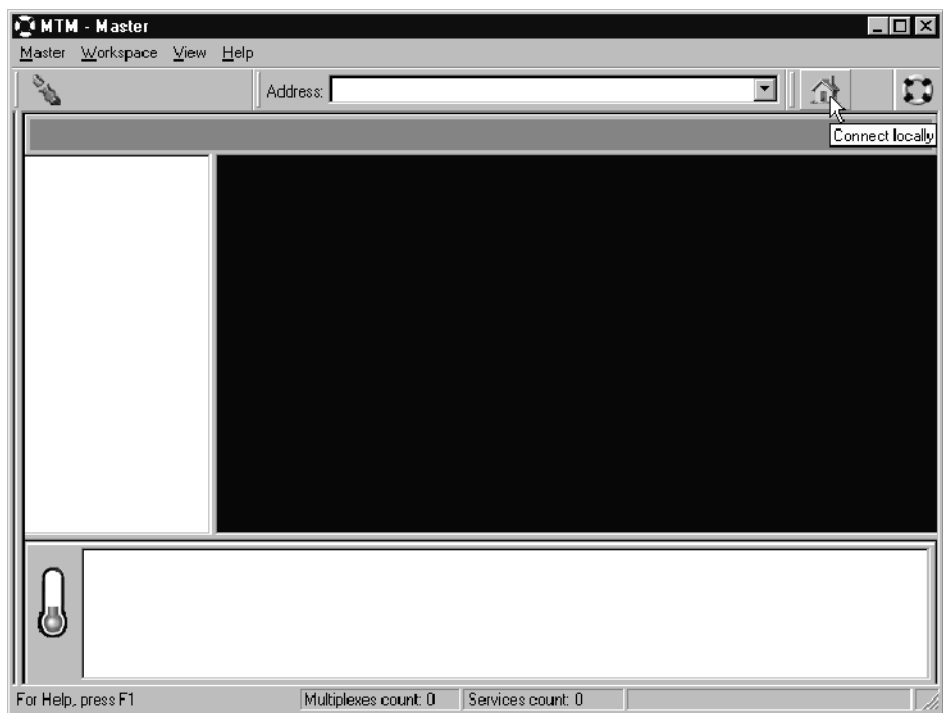
Figure 2‑7: Empty Master client application window

Connecting to the Local Server Manager

Before you can start monitoring inputs, you must connect the Master client to a Server Manager. The Server Manager (represented by the life preserver icon in the system tray) collects the information generated by the Analysis Servers about the transport stream errors and statistics. There are several ways to connect to a local Server Manager, but for this tutorial, use the simplest technique:

3. Click the **Home** button on the Master client toolbar as shown in Figure 2--7. The toolbar changes and the Server Manager to which you are connected is displayed in the Address bar.

Configuring the Master Client Workspace

Using the Workspace dialog box you can create one or more bouquets (collections of inputs), and specify the types of errors you want to monitor in the Master client.

Create a Bouquet
4. Click the Edit button on the toolbar. The Workspace dialog box is displayed.

5. Highlight the Bouquet Selection item in the Navigation panel as shown in Figure 2--8. The Bouquet Selection panel is displayed.
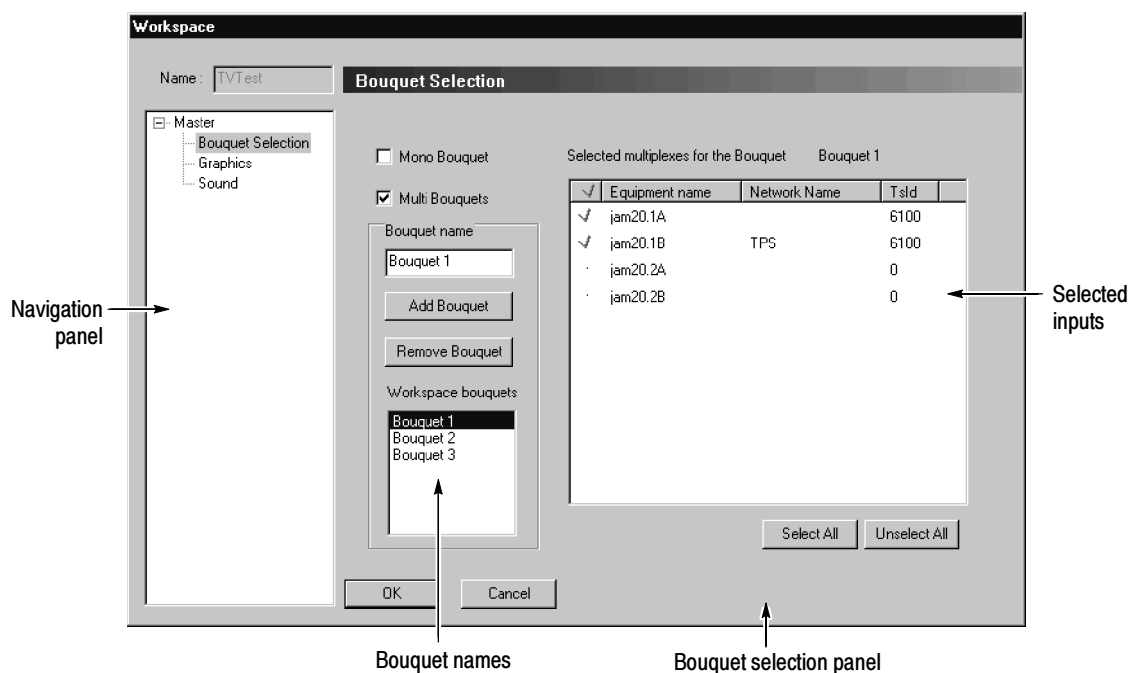
Figure 2--8: Creating workspace bouquets

6. Change the Bouquet Selection panel so that it looks similar to Figure 2‑8.

Specify Errors to Monitor
7. Highlight Graphics in the Navigation panel and the Graphics panel is displayed. Using this panel you can change the way your Master client reports errors and displays icons.

8. Change the Analysis display options to show only Critical and Major errors as shown in Figure 2‑9.

Analysis display options
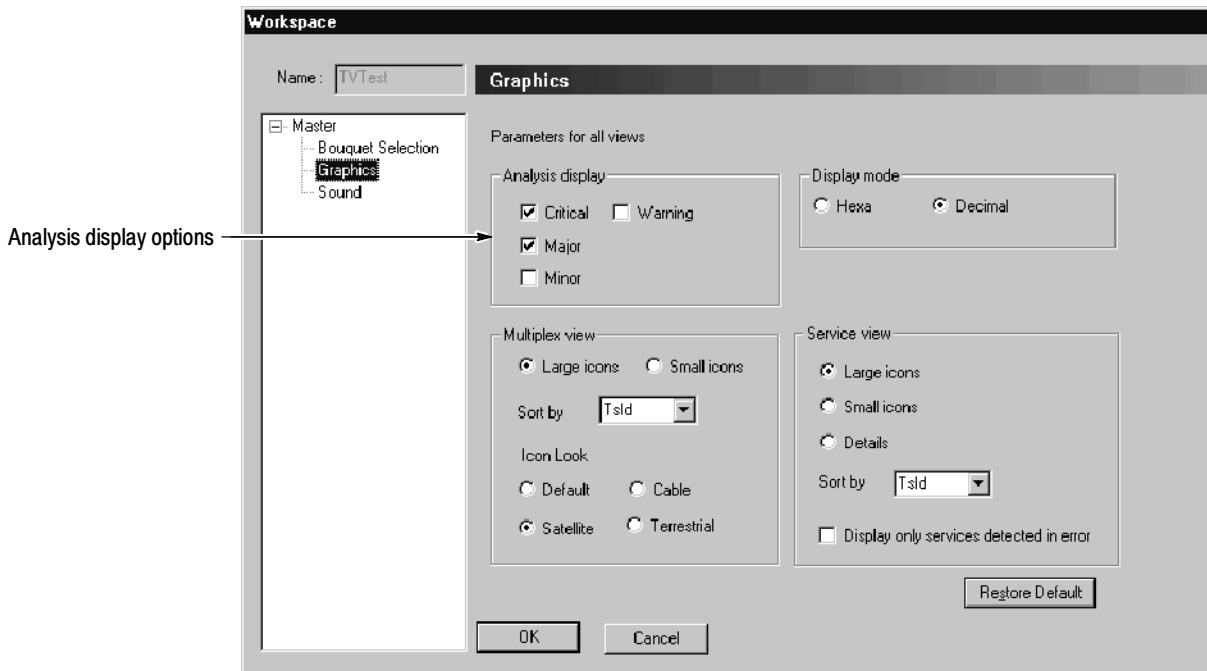
Figure 2‑9: Changing the analysis display options

9. Click **OK** to apply your changes and return to the Master Client.

Experiment with the other options available in this dialog box. Return to the Master client when you are ready to continue with the tutorial.

Monitoring Transport Stream Inputs

After creating a workspace, your Master client window should look similar to Figure 2‑10; except that you have not yet associated any logos with services. (You will do this later in the tutorial.)
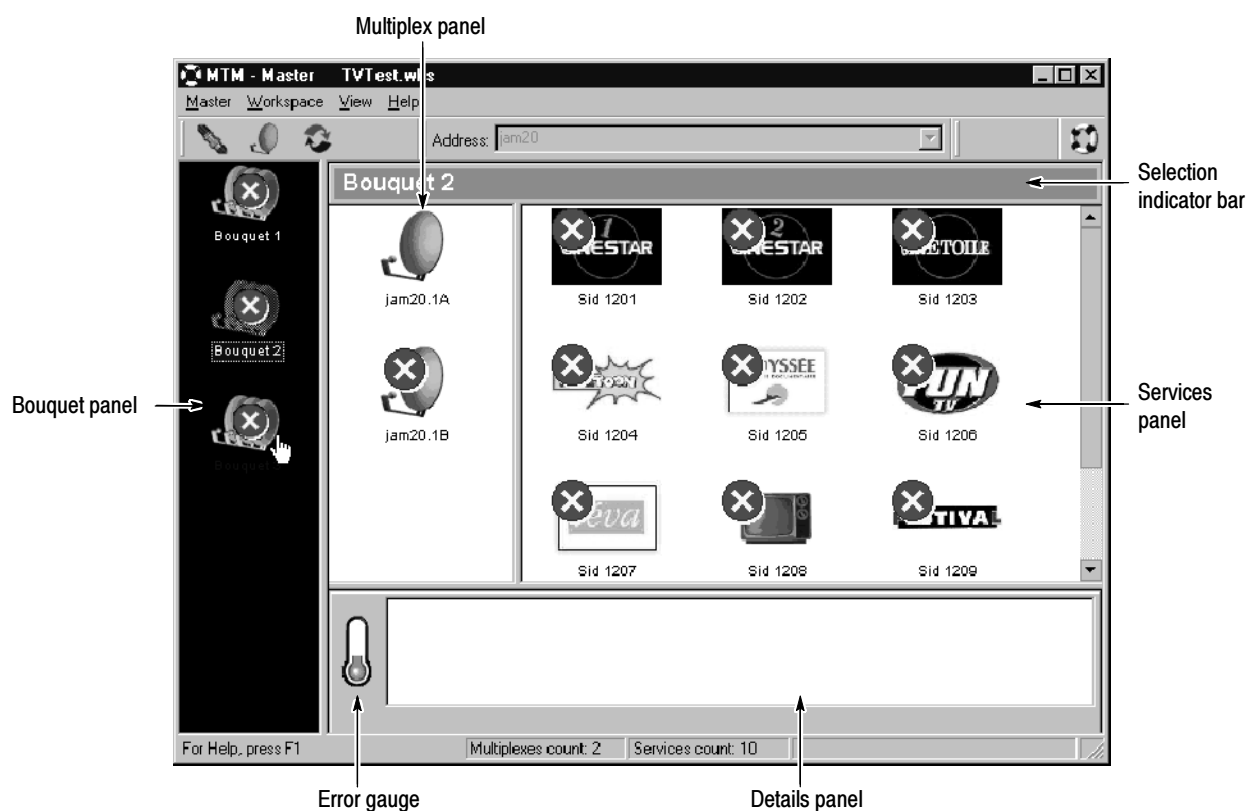
Figure 2‑10: Master client monitoring inputs

In this part of the tutorial you will learn how to interpret the icons used by the Master client to indicate errors, and you will learn how the different Master client panels allow you to see different levels of detail regarding the errors occurring on the input.

Use the Bouquet Panel
10. Select one of the bouquet icons in the Bouquet panel. In Figure 2-10 Bouquet 2 is selected.

If your input is displaying any critical or major errors, you will see error icons overlaying the icons in the bouquet panel (as well as the icons in the Multiplex and Services panels). Table 2-4 describes the different icon states.

Table 2-4: Error icon states

Icon state	Description
	Red. This icon indicates that a critical, major, or minor error is currently being experienced on the indicated bouquet, multiplex, or service.
	Orange. This icon indicates that a critical, major, or minor error was recorded on the indicated bouquet, multiplex, or service, but that no error condition currently exists.
	Yellow. This icon indicates that a warning is currently being experienced on the indicated bouquet, multiplex, or service.

Notice that the Details panel is blank, and that Bouquet 2 (or the similar text for your bouquet name) appears in the Selection Indicator bar. The Details panel is blank because you have not clicked an input icon in the Multiplex panel.

Use the Multiplex Panel
11. Select one of the icons in the Multiplex panel.

Notice the changes to the Details panel and the Selection Indicator bar. Notice also that when you select an icon in the Multiplex panel that the Error gauge changes. The Error gauge shows you the severity of errors being recorded on the selected item. Table 2-5 describes the Error gauge states.

Table 2-5: Error gauge icon states

Icon state	Description
	Red. This icon indicates at least one critical error is detected for the selected multiplex or service.
	Red. This icon indicates at least one major error is detected for the selected multiplex or service. No critical errors are detected.
	Red. This icon indicates at least one minor error is detected for the multiplex or service. No critical or major errors are detected.

Table 2‑5: Error gauge icon states (cont.)

Icon state	Description
	Yellow. This icon indicates at least one warning condition is detected for the selected multiplex or service. No critical, major, or minor errors are detected.
	Green. This icon indicates that no current errors or warning conditions are being recorded for the selected service or input.

In an earlier step, you set the workspace to show only critical or major errors. So, your error gauge should like the first, second, or last icons in Table 2‑5.

The icons that are displayed in the Details panel when you click a Multiplex icon are described in Table 2‑6 on page 2‑23.

12. Right-click in the Multiplex panel and experiment with the shortcut menu items.

Use the Services Panel

13. Click one of the icons in the Services panel experiencing errors. As you roll your cursor over an icon in the Services panel, a tool tip is displayed showing you the transport stream ID and service ID pair for the service.

Notice the changes to the Details panel and the Selection Indicator bar. The Details panel shows a different set of icons than those that were displayed when an Multiplex icon was selected (descriptions for the icons are shown in Table 2‑7 on page 2‑24).

14. Right-click an icon in the service panel, and then select Associate Logo from the shortcut menu.

15. Navigate to the Logos folder and choose a *.jpg or *.bmp file that you want to associate with the selected service.

16. Click **OK**. You are returned to the Master client, and the logo is displayed in place of the default service icon.

A folder with JPEG files suitable for your use is included with each MTM300 Series system installation. The location of the folder is C:\MTM300\Bin\Logos\.

NOTE. Some service providers do not allow their logos to be used without permission. Check with the service provider before you use their logo.

You can also go to the following URL to download logos for satellite services: http://www.satlogo.com/ (this link was valid as of January, 2001.)

After you have associated all of your service icons with a logo, the Master client should look similar to Figure 2-11.

Figure 2-11: Master client showing errors on a service

17. Right-click again in the service panel and choose **Details** from the shortcut menu.

The Services panel changes to show a tabular display that lists the more information about each service.

18. Click and drag the left border of the Services panel to display all of the columns in the Details view as shown in Figure 2-12 (you can do the same thing with all of the internal panel borders).

Figure 2‑12: Services panel details view

You can sort the inputs shown in this view by clicking on the column headers.

19. Experiment with some of the other Services panel shortcut menu items, and then return the Services panel to display Large Icons when you are finished and ready to proceed with the tutorial.

Use the Details Panel

20. Select a Multiplex icon and notice again the change to the Details panel. The icons in this panel indicate the types, severity, and status of errors occurring on the multiplex at the transport stream level. Table 2‑6 describes the icons displayed in the Details panel when a Multiplex icon is selected.

Table 2‑6: Multiplex level Details panel icons

Icon	Description
MPEG	Indicates that a current error for a PAT, CAT, or EMM is detected for the selected multiplex. This icon can also indicate general errors, such as sync loss.
DVB ATSC ISDB	Indicates a current error in one or more SI, PSIP, or ARIB parameters for the selected multiplex.

The colors used for these icons follow the same paradigm as do the rest of the error icons for the Master client:

■ Red indicates that a critical, major, or minor error is currently being experienced on the item.

■ Orange indicates that a critical, major, or minor has occurred on the item, but that an error does not currently exist.

■ Yellow indicates that a warning condition is currently being experienced on the item.

21. Now, select a Services panel icon and note again the changes to the Details panel.

When a Services icon is selected the Details panel icons show the type, severity, and status of the errors occurring on the multiplex at the service, or program level. Table 2-7 describes the icons displayed in the Details panel when a Services panel icon is selected.

Table 2-7: Service (or Program) level Details panel icons

Icon	Description
	Indicates a PCR error is detected for the selected service.
	Indicates that a rate or syntax error in the PMT, SDT, or EIT for the service is detected.
	Indicates that an error concerning a video component of the service is detected.
	Indicates that an error concerning an audio component of the service is detected.
	Indicates that a current error concerning the data components for the selected service is detected.
	Indicates that an error concerning the ECM components of the service is detected.
	Indicates that a PQM300 Program QoS error is detected (only displayed when a PQM300 probe is set on the video component of a monitored program).

Configuring the Analysis Servers

In this part of the tutorial, you will learn how to start the Configuration client from the Master client and how to change the configuration of the Analysis Server on the input selected in the Master client.

22. Right-click an icon in the Multiplex panel and select Configuration client from the shortcut menu. The Configuration client is displayed and is connected to the input you selected in the Master client (notice the machineName and inputNumber in the Address bar). See Figure 2‑13.
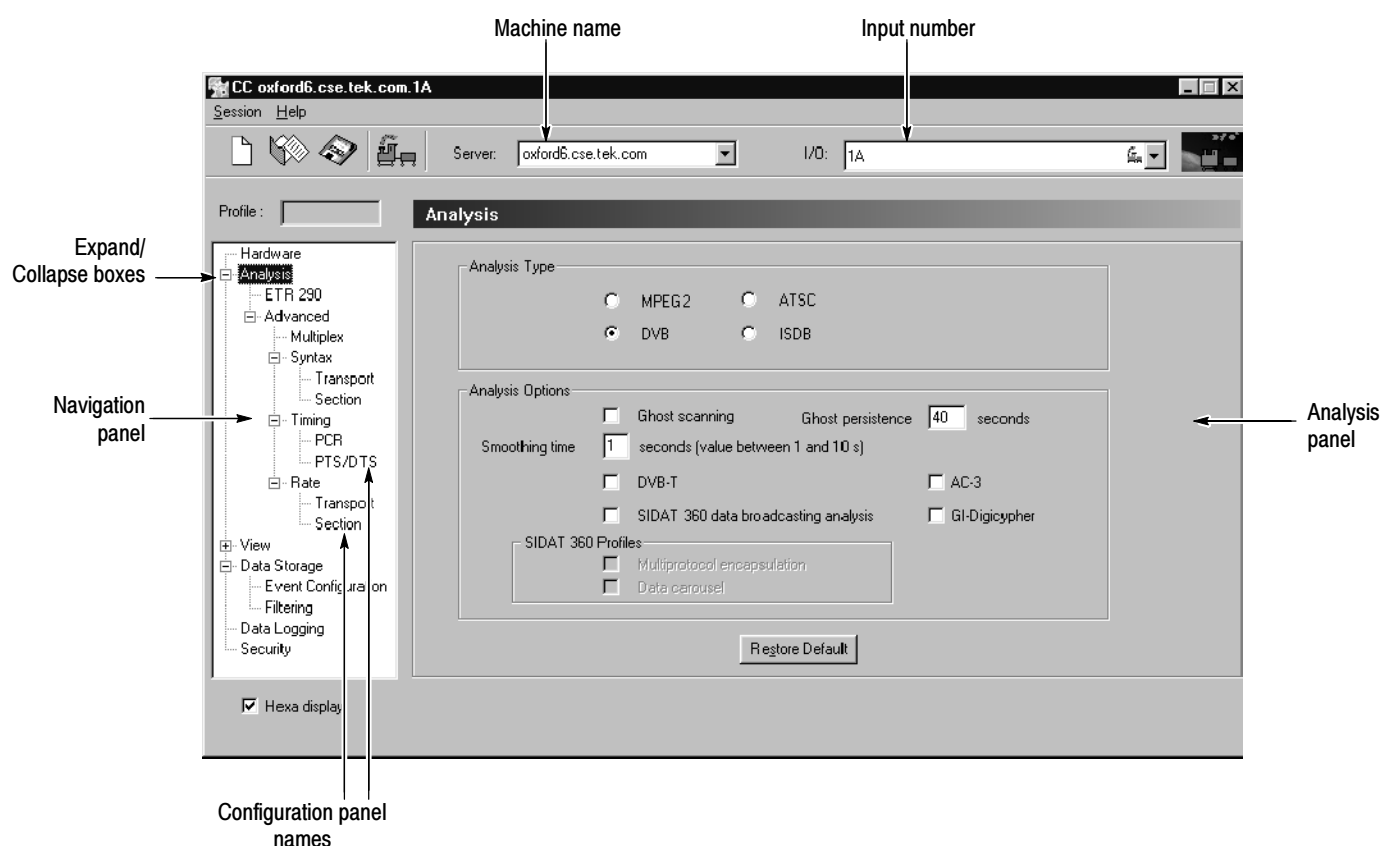
Figure 2‑13: Connected to the Configuration client

See *Configuration Client* on page 2‑6 for an overview of the Configuration client display elements. See *Configuration Client Reference* beginning on page 3‑159 for detailed information about the Configuration client and setting probes.

Select the Analysis Type

23. Expand the hierarchy in the Navigation panel so that it looks similar to Figure 2-13 by clicking on the expand/collapse boxes next to the Configuration panel names.

24. Highlight **Analysis**, and then select MPEG-2 in the Analysis panel.

Set ETR290 Probes

25. Highlight ETR 290 in the Navigation panel to display the ETR 290 panel. This panel includes probes for the ETR 290 recommendations.

26. Click **Add All** and notice the change to the Probe List selection box.

27. In the Probe List selection box, remove all ETR290 priority 3 probes by double-clicking the probe name.

28. Click Apply as shown in Figure 2-14 to apply the changes you have made to the Analysis Server analyzing the input on jam20.1B.

Figure 2-14: Setting ETR290 probes

Change an Error Level

29. Expand the View hierarchy in the Navigation panel, and then select **Message level**.

30. Scroll down the list of probes in the Report Message Level panel and highlight Continuity counter.

    The default for this display is to show the probes in alphabetical order by probe name. You can change this sort order by clicking one of the column headers.

31. Right-click in the Message level column on the highlighted row as shown in Figure 2-15 on page 2-27, and then select Major from the shortcut menu. This changes the level at which a continuity counter error is displayed in the Master client and in the Report view of the Expert client.
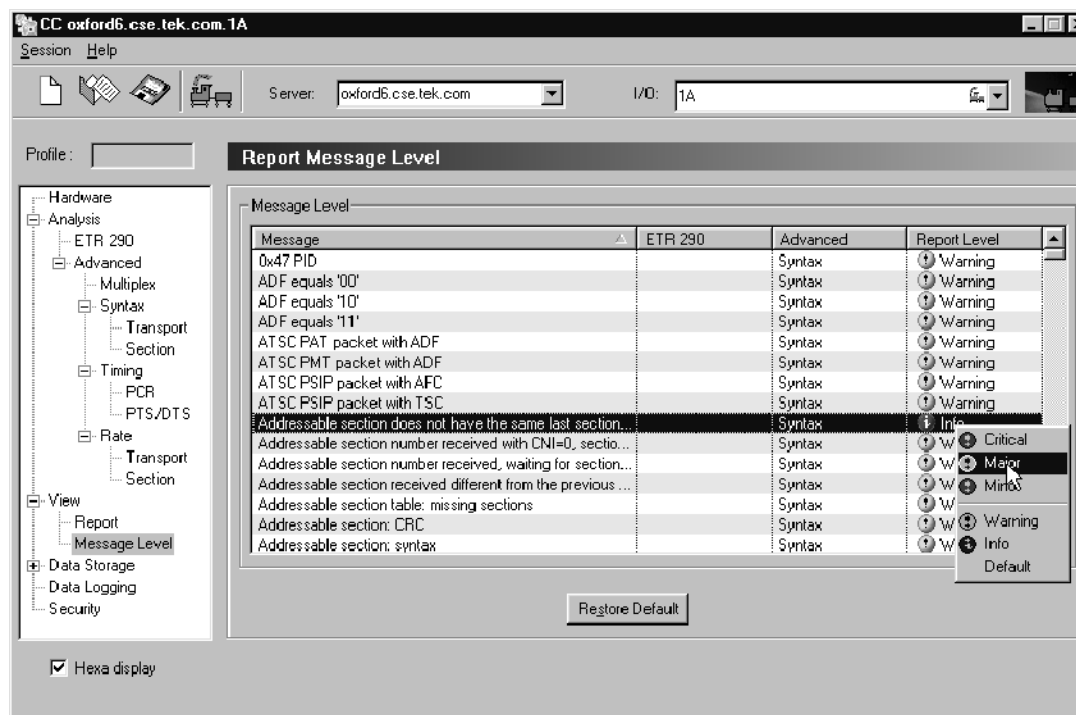
Figure 2-15: Changing the message level

32. Change all Critical errors to Major errors using the following procedure:

    a. Click the Report Level column header. This will sort all of the probes by error severity (the level the errors are reported by the Analysis Servers).

    b. Left-click on all of the Critical error icons in the Report Level column. Each click steps through the list of error levels. Since you are clicking the Critical errors, the report level changes to Major errors.

33. Apply your changes to the Configuration client and switch to the Master client.

34. Select **Edit** from the Workspace menu, and then highlight **Graphics** in the Workspace Navigation panel.

35. Deselect Major in the Analysis Display group, and then click **OK**.

36. Click the Acknowledge Errors button on the Master client toolbar. The error indicators in the Master client should go away.

37. Restore the settings in the Configuration client by clicking Restore Default at the bottom of the Report Message Level panel. Do not forget to apply your changes before minimizing the Configuration client (do not close it yet).

Configuring the Data Logging Function

The Data Logging function allows you to write a record of selected real-time analysis events to tab-delimited text files on the instrument hard drive. The Configuration Client enables and sets the parameters of the events that are recorded. Refer to *Data Logging* on page 3--166 for more information.

1. Open the Configuration Client from the Master Client window.

2. Select **Data Logging** in the Navigation Panel of the Configuration Client to open the Data Logging panel shown in Figure 2-16.

3. Click on **Enable Data logging** to enable the Data Logging function.

4. Click on the various **Report Selection** and **Field Selection** boxes to select which type of analysis events will trigger a log entry.

5. Use the **Logging Management** boxes to set the maximum size of each log file and to set the time span for each log file.

6. Click the **Apply** button to apply your changes. Your specified transport stream events will now be written to a text file in the following directory: C:\MTM300\DataLogging.
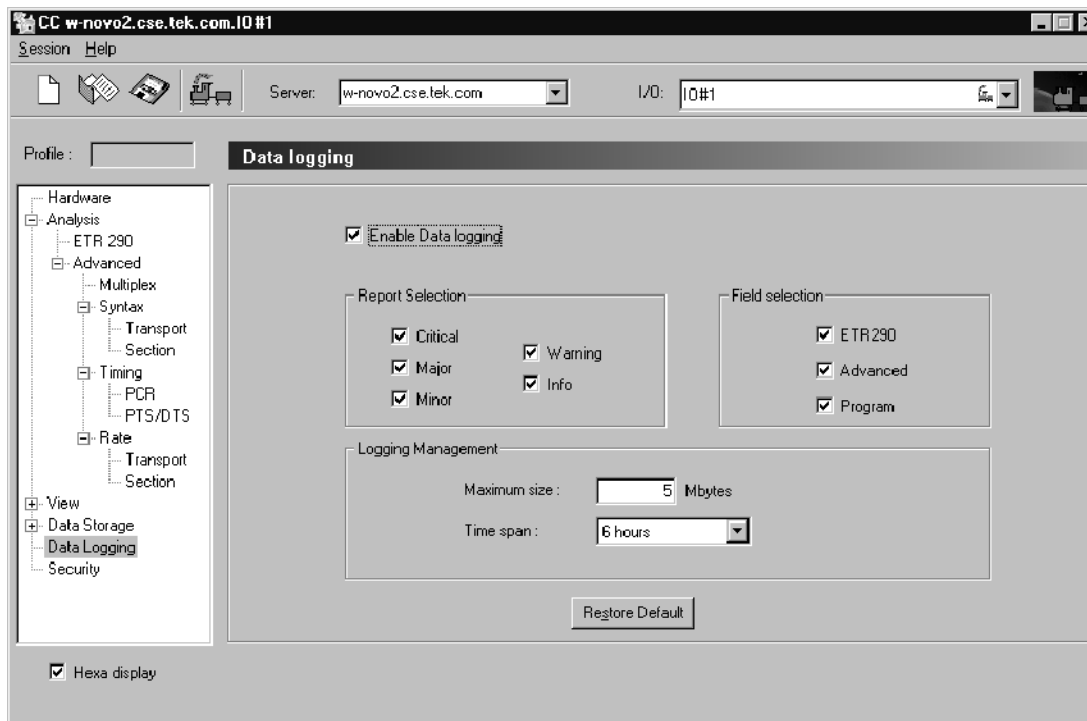
Figure 2-16: Data Logging configuration panel

Analyzing a Stream Using the Expert Client

The Expert client allows you to examine a specific input in more detail than is possible using the Master client. See *Expert Client* on page 2-4 for an overview of the Expert client. See *Expert Client Reference* beginning on page 3-93 for more detailed information about the Expert client and how to use it to analyze transport stream inputs.

7. To display the Expert client from the Master client, click the input icon that you used to start the Configuration client, and then right-click a service icon. If possible, choose a service icon that is displaying errors as shown in Figure 2-17.

NOTE. *It is important for this tutorial to choose the same input icon that you used to start the Configuration client, because later you will modify the Analysis Server settings and see the change in the Expert client.*

Figure 2-17: Selecting the Expert client

8. Select Expert Client from the shortcut menu. The Expert client is displayed showing the errors occurring on the selected service (if any). See Figure 2-18 on page 2-30.

Your Expert client display will look different in the details, but there are several items to note as you look at the Expert client:

- The Address bar shows that you have connected to the Analysis Server analyzing input 1B on jam20.

- The Hierarchic panel of the Report view indicates which service (program) you selected when you started the Expert client.

- The Messages panel of the Report view displays the errors that are occurring on the service indicated in the Hierarchic panel.
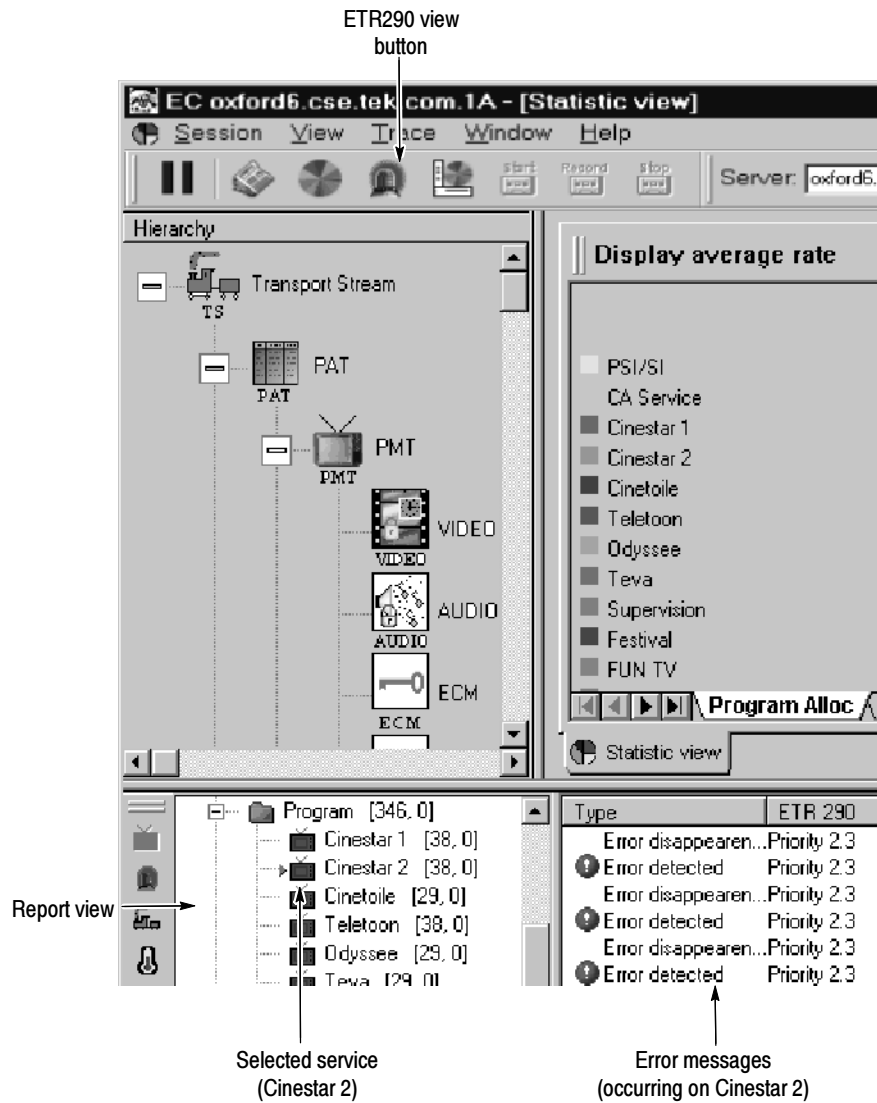
ETR290 view
button

Figure 2-18: Expert client showing errors

9. Click the ETR290 view button to display the ETR290 view in the Client area.

Note any error LEDs displayed. There are no Priority 3 error probes listed in this display (see Figure 2–19). This is because priority three probes are DVB SI specific, and (for this tutorial) you chose MPEG-2 as the analysis type. If you had chosen ATSC, there would have been a third column of probes displayed in this view, but the probes would have addressed ATSC PSIP tables rather than DVB SI tables.
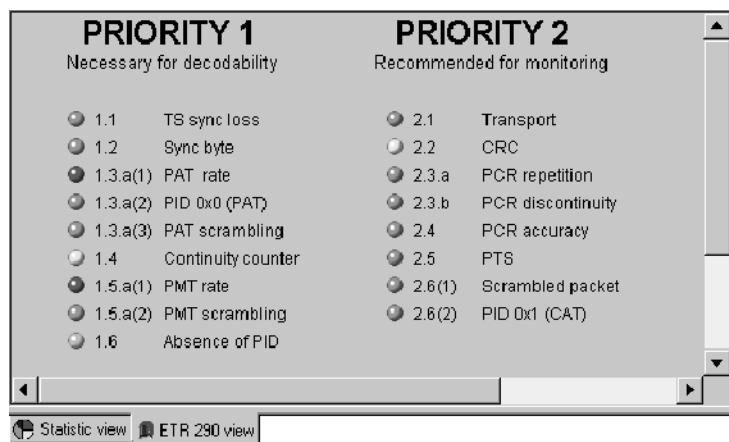
Figure 2‑19: ETR290 panel (for an MPEG-2 stream)

10. Switch to the Configuration client, and then display the ETR290 panel.

11. Click **Restore Default**. This removes all ETR290 probes on the input.

12. Click **Apply** in the Configuration client and return to the Expert client. Notice that all of the ETR290 recommendations are grayed out, with the exception of TS_sync_loss, which is the only probe always set in the Expert client.

This completes the MTM300 Series MPEG Transport Monitor tutorial. Exit the Expert, Configuration, and Master clients by selecting the Close control button in the title bar of each application. You will be prompted to save the Workspace changes in the Master client. If you select OK, use standard Windows techniques to name and save the *.wks file.

In this tutorial you learned how to start and exit the MTM300 Series clients, how to add inputs to the Master client, and how to modify the way the Master client displays inputs. You also learned how to interpret the icons used to display errors in the Master client. Finally, you learned how to start both the Configuration and Expert clients from the Master client, and you learned how changes to the Configuration client affect various aspects of both the Expert and Master client.

Reference

This section is a complete reference to the MTM300 Series MPEG Transport Monitor client modules: the Master client and both the MPEG-2 and TMCC Expert and Configuration clients. The information in this section is organized as indicated in the following list:

- *Reference.* This section suggests why monitoring transport stream inputs is important and briefly describes the terms MPEG-2, DVB, and ATSC. This section also explains client-server computing as it relates to the MTM300 Series software modules and describes the two server modules enabled by the MTM300 Series software.

- *Master Client Reference.* This section provides procedures for monitoring transport stream inputs. It also describes the Master client views, panels, menus, icons, and toolbar buttons.

- *Analysis Reference.* This section describes all of the MTM300 Series MPEG Transport Monitor analyses performed by the Analysis Servers. This section also provides procedures for setting, modifying, and removing the user-controlled analyses, called *probes*.

- *Expert Client Reference.* This section provides procedures for displaying and analyzing errors on transport stream inputs. It also describes the Expert client views, panels, menus, icons, and toolbar buttons.

- *Configuration Client Reference.* This section provides procedures for setting, modifying, and removing probes on transport stream inputs. This section also describes the Configuration client panels, menus, icons, and toolbar buttons.

- *TMCC Expert Client Reference.* This section describes the views, panels, menus, icons, and toolbar buttons of the TMCC Expert Client.

- *TMCC Configuration Client Referenc*e. This section describes the views, panels, menus, icons, and toolbar buttons of the TMCC Configuration Client.

Basic operating procedures for installing, starting, logging on to, and stopping the transport monitor are described in *Operating Basics*. *Operating Basics* also provides a tutorial that enables you to quickly become familiar with the use of the three client modules (see page 2-15).

See *Front Panel* on page 2-12 for information about the using the optional keypad and touch screen. See *Electrical Installation* beginning on page 1-17 for information about the rear-panel connectors of the transport monitor.

See *Appendix C: Networking* for information about installing transport monitors in networked environments and basic network troubleshooting procedures. See *Appendix A: Specifications* for electrical and physical specifications , and for environmental and safety compliance information.

Finally, see *Appendix D: Software Installation and Repair* for software installation (or re-installation) procedures and the minimum requirements for each type of MTM300 Series software installation.

MPEG Overviews

This section provides some brief overviews of MPEG monitoring and the types of transport streams monitored and analyzed by the MTM300 Series MPEG Transport Monitor.

MPEG Operational Monitoring

In today's compressed digital TV environments you can think about operational monitoring requirements in terms of layers:

■ Information layer. Is the information correct and of suitable quality?

   Monitoring this layer is an extension of picture quality measurements in the compressed digital realm.

■ Transmission layer. Does the signal itself conform to standards?

   Monitoring this layer is standard practice in all transmission systems: cable, terrestrial, and satellite.

■ Protocol layer. Can the transmitted data be decoded at the destination?

   Monitoring this layer is a new requirement of MPEG transmission systems. The protocol layer is monitored by the MTM300 Series monitor Master client.

The protocol layer provides the following functionality:

■ Metadata. Metadata refers to information about the transport stream that is carried by the transport stream such as PSI and SI or PSIP tables. This information describes the multiplex and the transmission environment completely so that the IRD (integrated receiver/decoder) can decode the transport stream correctly. Metadata is specified in the appropriate MPEG, DVB, and ATSC standards.

■ Timing information. Timing information is used by the IRD to decode and present the data correctly (at the right times and in the right sequence). Timing information is carried in both the transport stream layer and the elementary stream layer.

MPEG monitoring is used to verify that the transport stream you are transmitting conforms to the appropriate MPEG-2, DVB, ATSC, and ISDB-S/ARIB standards. The following list describes operational monitoring requirements that you may have for your environment:

- Ensure that transmitted data is free of defects and can be decoded appropriately at the destination. This monitoring task is performed by the Master client.

- Identify specific errors so you can isolate the source of errors quickly. This analysis task is performed by the Expert Clients.

- Specify monitoring parameters for transport streams in ways that make sense to you. This configuration task is performed by the Configuration Clients.

- Monitor and control transport monitors from a central, remote location. This network management task is performed by the MTM300 Series Network Management Software.

MPEG-2   MPEG stands for Motion Picture Experts Group. Among the standards developed by this ISO body are the set of standards describing Transport Stream System Target Decoders (T-STD) with defined behaviour when handling video, audio, or data elementary streams or when handling PSI (Program Specific Information) packets. By defining a T-STD, the output of encoders and multiplexers is implied. Consequently, the output of any valid MPEG-2 encoder or multiplexer can be used as input to another manufacturer's decoder or multiplexer.

MPEG-2 transport streams are two layer structures: the Compression layer (for encoded audio, video, and data elementary streams) and the System layer (for timing and describing different elements of the multiplexed transport stream and the network over which it is carried).

Valid MPEG-2 transport streams require certain information that describes the content and organization of transport streams and certain characteristics of the network over which the transport stream is carried. This information is called Program Specific Information (PSI) and is carried in table structures:

- Conditional Access Table

- Network Information Table

- Program Association Table

- Program Map Table

- Transport Stream Descriptor Table

See the MPEG-2 standards documents for more specific information about encoding elementary streams, multiplexing transport stream elements, and these transport stream structures.

One of the strengths of the MPEG standards is that they are generic and can be adapted to different broadcast environments. Three groups, the Digital Video Broadcasters (DVB), the Advanced Television Systems Committee (ATSC), and the Association of Radio Industries and Business (ARIB) have created MPEG-2 compliant standards that are used in DVB, ATSC, and ISDB-S/ARIB markets.

DVB DVB stands for Digital Video Broadcasting. DVB standards define MPEG-2 compatible transport streams used in DVB markets. The DVB standards define baseline systems for cable (DVB-C), terrestrial (DVB-T), and satellite (DVB-S) transmission environments.

Like the MPEG standards, the DVB standards describe both the compression layer (for encoded audio, video, and data elementary streams) and the system layer (for timing and describing different elements of the multiplexed transport stream and the network over which it is carried) of DVB transport streams.

The DVB standards define additional service information (SI) used to describe the network, transport stream, and services carried by the transport stream. This additional information is provided by the following table structures:

- Bouquet Association Table

- Event Information Table

- Network Information Table

- Running Status Table

- Service Description Table

- Time and Date Table

- Time Offset Table

- Discontinuity Information Table

- Selection Information Table

See the DVB standards documents for more specific information about these transport stream structures.

ATSC   ATSC stands for Advanced Television Systems Committee. ATSC standards were developed by the ATSC Technology Group on Distribution (T3). These standards define baseline systems for cable and terrestrial environments. ATSC transport streams are valid MPEG-2 transport streams.

Like the MPEG standards, the ATSC standards describe both the compression layer and the system layer for ATSC transport streams. The compression layer refers to the encoded audio, video, and data elementary streams; the system layer refers to timing information and descriptions of different elements of the multiplexed transport stream and the network over which it is carried.

The ATSC standards define additional information required for ATSC environments. This information is carried in the following program and system information protocol (PSIP) table structures:

- Event Information Table

- Extended Text Table

- Master Guide Table

- System Time Table

- Rating Region Table

- Virtual Channel Table

See the ATSC standards documents for more specific information about these transport stream structures. One of the ATSC standard documents (ATSC Document A/58) describes how to ensure that valid ATSC transport streams are also valid DVB transport streams (conforming to DVB standards).

ARIB/ISDB Overview   ARIB stands for the Association of Radio Industries and Business. ARIB standards define elements (carried in table structures) for managing ARIB-compliant transport streams (these are the ARIB structures analyzed by the MTM300 Series MPEG Transport Monitor):

- Broadcaster Information Table

- Download Control Table

- Download Table

- Software Download Trigger Table

ARIB transport streams are MPEG-2 compliant streams that conform to the ITU-R standard for ISDB (Integrated Service Digital Broadcasting) multiplexing. An ISDB stream uses TMCC (Transmission and Multiplexing Configuration Control) data multiplexed in the first eight bytes of the 16 Reed-Solomon bytes of 204 byte MPEG-2 transport streams. TMCC information is used to manage the modulation parameters of the transponders in digital broadcast environments that include multiple types of services with different transmission requirements.

Client-Server Overview

This section briefly describes client-server software architecture and the two server modules enabled by the MTM 300 Series software.

Client-Server   The client-server software architectural model allows software to be developed into two or more modules:

- The server module performs CPU intensive operations, runs in the back-ground (or remotely), and responds to requests from clients. Usually requests are due to some action you have taken.

- The client module is often a graphical user interface that allows you to configure or display the status of the server module.

The MTM300 Series MPEG Transport Monitor client/server architecture uses three server and six client applications:

- The Server Manager

- The Analysis Server

- The TMCC Analysis Server

- The Master client

- The Expert client

- The Configuration client

- The TMCC Expert client

- The TMCC Configuration client

Combined, the MTM300 Series client and server modules enable you to monitor multiple transport stream inputs simultaneously, perform in-depth analyses of one transport stream input, configure the monitoring and reporting parameters of the analysis servers, and write all or part of an input to a file on your local disk.

Analysis Servers

The Analysis Servers are the processes that perform the actual analyses on transport stream inputs. One Analysis Server (of each Analysis Server type: MPEG-2 and TMCC) for each input starts automatically when you start the transport monitor. Each MTM300 Series transport monitor can support up to eight Analysis Server processes simultaneously. The Analysis Server sends analysis results to the Server Manager.

Each Analysis Server interacts with the following entities as described:

- The Master client displays the analysis results that are collected by the Server Manager.

- The Expert clients display the results of the Analysis Servers directly.

- The Configuration clients set the monitoring and analysis parameters for each input.

- The Server Manager collects the Analysis Server results (called traps).

Server Manager

The Server Manager is the process that allows the transport monitor to be managed over a network. The Server Manager also makes the results of the Analysis Servers available to Master clients. The Server Manager starts automatically when you start the transport monitor. Only one Server Manager can run on a transport monitor.

The Server Manager process is available to or responds to the following two entities:

- The Master client, which displays the data collected by the Server Manager.

- The Analysis Server, which sends messages (or traps) to the Server Manager.

You can configure the destination of Analysis Server traps collected by the Server Manager using the Router utility (see *Sending Traps to a Network Management Station* on page 1--30.)

Master Client Reference

The Master client interface elements are described in this section, followed by a description of the tasks you perform when monitoring transport stream inputs. The following list shows the contents and page references of the *Master Client Reference*:

Master Client Application Window

The Master client application window includes three or four panels, depending on whether you create bouquets of inputs. One of the panels, the Services panel, can be displayed using two related views. Together, the title bar, menu bar, toolbar, panels, and status bar comprise the Master client application window. This section describes the views and panels that are part of the Master client workspace.

When the Master client is first displayed, it is empty. You need to create a workspace and add inputs before you see anything in the workspace panels. Once you have created a workspace and added inputs, the display looks similar to Figure 3-1. Use this figure to refer to throughout this section. The discussions that follow start with the Bouquet panel and work clockwise around Figure 3-1.
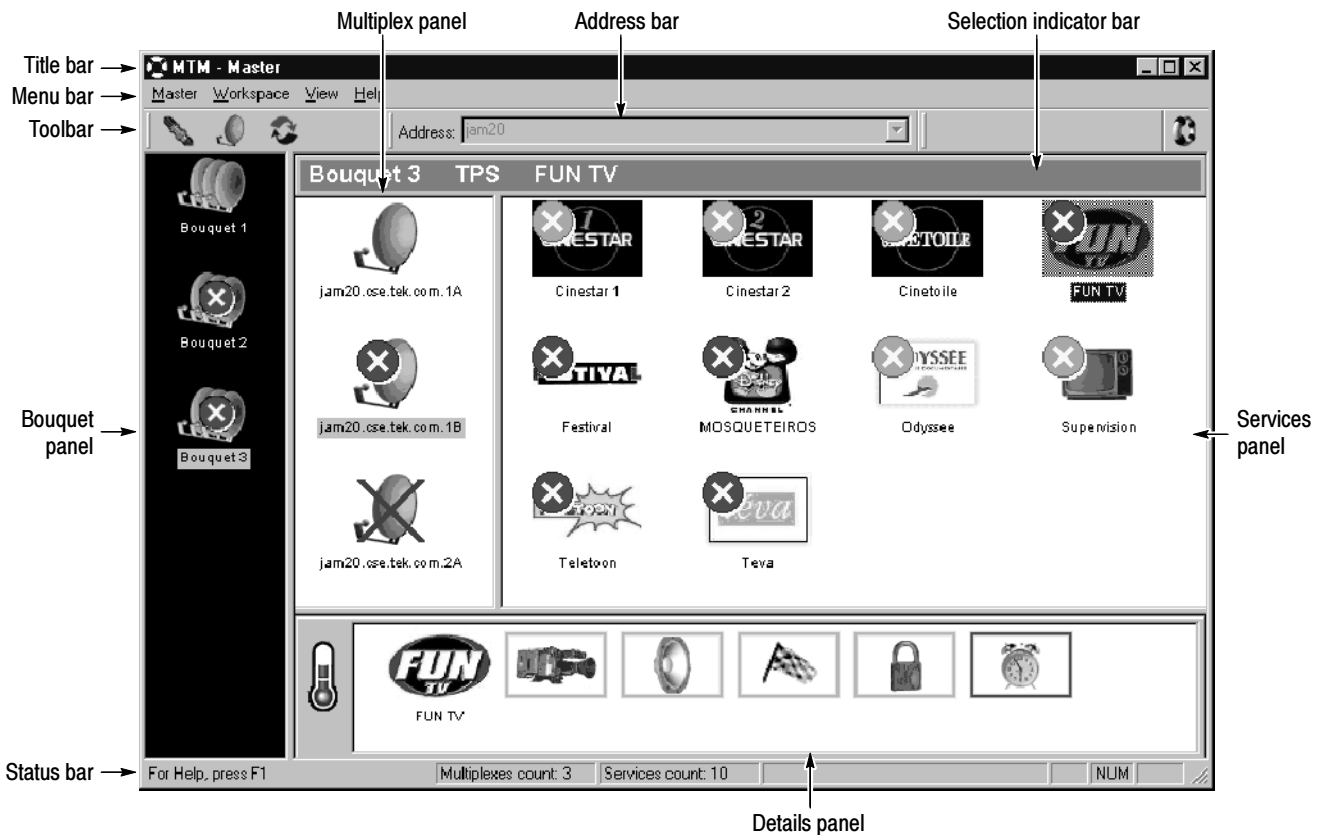
Figure 3-1: Master client application window

You can resize the Master client application window using standard Windows NT techniques.

Bouquet Panel   The Bouquet panel displays icons representing collections of inputs. You can resize the width of the Bouquet panel by clicking and dragging the right panel border.

This panel is present only when you configure your workspace to include bouquets, or collections of inputs. Specify the number and composition of bouquets using the Workspace dialog box. Once multiple bouquets are defined and added to your workspace, you can switch between bouquets by selecting a bouquet icon.

When you select a bouquet, the rest of the Master client views change as described below:

■   The Multiplex panel displays icons for each input defined for the selected bouquet.

■   The Services panel displays icons for all of the services in the selected bouquet.

■   The Details panel goes blank.

The location and type of inputs included in each bouquet is arbitrary, allowing you to organize the inputs in whatever ways seems most reasonable. For instance, if you monitor both satellite and cable transmissions, you can group these inputs into two separate bouquets.

The error icons that overlay the icons in the Bouquet panel are used to show the status of errors on the services in the bouquet:

■   Red error icons indicate that one or more transport streams in that bouquet are currently experiencing an error.

■   Orange error icons indicate that one or more transport streams recorded one or more errors, but that the error condition no longer exists.

■   Yellow error icons indicate that a warning condition exists for one or more transport streams in the bouquet.

Toolbar   The toolbar buttons shown in Figure 3-1 provide shortcuts to the following menu selections: Disconnect (from the Master menu), Edit (from the Workspace menu), and Acknowledge Past Errors (from the Master menu). See Table 3-1 on page 3-17 for more information about the Master client toolbar buttons.

Menu Bar   See *Master Client Menus* on page 3-23 for information regarding the Master client menus and menu selections.

Title Bar   The title bar is a standard Windows NT title bar:

- Clicking the application icon in the upper left-hand corner of the application window displays a Windows NT Control menu.

- The application name is followed by the name of the open workspace file.

- The upper right-hand corner uses standard window control buttons to minimize, maximize, or close the Master client window.

Multiplex Panel   The Multiplex panel displays icons for the inputs to which you are connected. You can resize the height of the Multiplex panel by clicking and dragging the lower panel border, and you can resize the width by dragging the right panel border. If you are using a multi bouquet workspace, you can also drag the left panel border.

When you select a Multiplex panel icon, the Services panel and the Details panel both change:

- The Services panel changes to show icons for the services that you are monitoring on that input

- The Details panel changes to show icons indicating the error type and severity of MPEG, DVB, or ATSC transport stream level errors.

The error icons that overlay the input icons in the Multiplex panel are used to show the status of errors on the input:

- Red error icons indicate that transport stream, or one or more services in the transport stream are experiencing an error.

- Orange error icons indicate that the transport stream, or one or more services in the transport stream, recorded one or more errors, but that the error condition no longer exists.

- Yellow error icons indicate that a warning condition exists for one or more services in the transport stream.

Icons in the Multiplex panel can be configured to show as cable, terrestrial, or satellite broadcast inputs, they can be shown as large or small icons, and they can be sorted by error (multiplexes with errors are displayed before multiplexes without errors), transport monitor name, or TSID. See *Workspace Tasks* beginning on page 3–30 for these procedures.

Right-click an icon in the Multiplex panel (shown below) to start one of the Expert or Configuration clients. The client will be connected to the Analysis Server on the selected input when it starts.
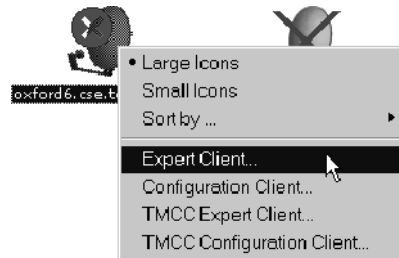
Address Bar

The Address bar indicates the name of the host machine running the Server Manager to which you are connected. You can use the selection box of the address bar to choose a remote machine name as shown below. The selection box is available only when the Master client is disconnected from a Server Manager.
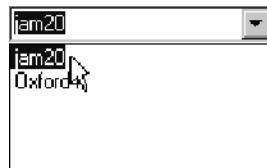
The selection box keeps a record of the transport monitors to which you have successfully connected. So, rather than entering a host name or IP address each time you connect to a remote machine, you can choose the name from the list.

You can choose to display or hide the Address Bar by selecting it in the View menu.

Selection Indicator Bar

The Selection Indicator bar (shown below) shows you which Master client workspace items are currently selected. From left to right, the Selection Indicator bar shows the name of the bouquet, input, and service selected.

Services Panel The Services panel displays icons for the selected input and is located to the right of the Master client window. You can resize the width of the Service panel by clicking and dragging the left panel border, and you can resize the height by dragging the lower panel border.
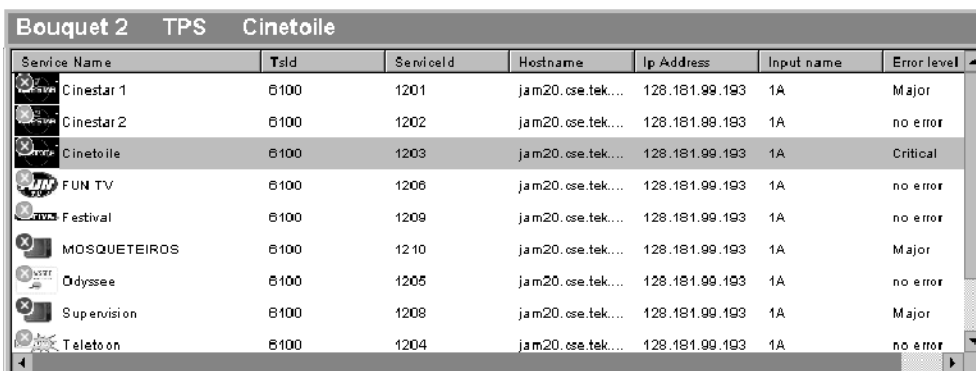
A default service icon is used to display each monitored service in the selected Multiplex. You can also assign a custom icon to each service (see *Assigning an Icon to a Service* on page 3-31).

The Services panel has three modes of display:

- Large Icons

- Small Icons

- Detailed

The first two are basic views: you can view the service icons as either small or large icons. In both cases, if the transport stream encodes the name for the service, the name appears with the icon. If no name is provided, the service icon is identified by the Transport Stream ID | Service ID (TSID | SID) pair. You can display the TSID | SID pair by pausing your cursor over a service icon; a tool tip is displayed showing the TSID | SID pair.

The Details view of the Services panel is shown in Figure 3-2. Display this view by right-clicking in the Services panel and selecting Details from the shortcut menu.

Figure 3-2: Details view of the Services panel

The Details view provides the following information in tabular format (listed from left to right):

- An icon for each input

- The service name for each input (if service names are provided in the transport stream)

- The TSID for the input

- The SID for the service

- The name of the transport monitor analyzing the input

- The IP address of the transport monitor analyzing the input

- The input number on the transport monitor analyzing the input (1A, 1B, 2A, 2B, 4A, 4B, 5A, or 5B)

- The error severity level of the current error (if there is no current error, the report is "no error")

You can sort the icons in the Service panel by name, error, TSID, or SID using the Services panel shortcut menu as shown below.

When you select a service experiencing an error in any of the Services panel views, the Details panel updates to display more information about the errors detected for that service.

The error icons that overlay the icons in the Service panel are used to show the status of errors on the input:

- Red error icons indicate that an error is detected for the monitored service.

- Orange error icons indicate that the service recorded one or more errors, but that the error condition no longer exists.

- Yellow error icons indicate that a warning condition exists for the monitored service.

By selecting an input icon in the Multiplex and then double-clicking an icon in the Services panel, you can start the Expert client. The Expert client will be connected to the Analysis Server on the selected input. When the Expert client is displayed, the Report view will be in the Program mode showing the error messages for the selected service.

The Services panel icons also allow you to set PQM300 Program QoS probes on the video component of a selected service. Once a probe is set, you can view the PQM300 measurement results provided you have installed the PQM300 client. See the *PQM300 Program QoS Monitor User Manual* for more information about setting PQM300 probes. See *Installing the PQM300 Client* on page 3-40 for more information on installing the PQM300 client.

Details Panel

The Details panel displays icons representing error status, types, and levels for a selected service or multiplex. You can resize the height of the Details panel by clicking and dragging the top panel border.

The Details panel contains icons only if you have selected a multiplex or service icon that has an error associated with it. If the selected multiplex or service icon has no errors (past or present), or if you click in the white space of the Multiplex or Service panel, the Details panel goes blank.

From left to right in the Details panel, you will see the types of icons indicated in the following list (see *Master Client Toolbars and Icons* beginning on page 3-17 for more information about these elements):

■ Error severity gauge indicating the highest error level, current or past, for the selected item (multiplex or service)

■ Icons that represent the selected multiplex or service

 You can use the default icon for a service, or you can assign an icon to a service. You can also assign an icon for a multiplex that represents cable, satellite, or terrestrial broadcast networks using the Configuration Client.

■ Icons indicating the service error types, current or past, for the selected service

■ Icons indicating the multiplex error type, current or past, for the selected multiplex

The last two list items are mutually exclusive: the Details panel displays one or the other, not both at the same time.

Status Bar

The Status bar displays brief messages about selected menu items. The status bar also displays the number of inputs and services being monitored.

Master Client Toolbars and Icons

The Master client uses toolbar buttons as shortcuts to various menu selections and provides various icons so that you can customize the look and feel of your workspaces. Icons are used in the Master client workspace to represent inputs and various error conditions and error types. These interface elements are described in this section.

Toolbar Buttons

Table 3-1 describes the buttons displayed on the Master client toolbar. Not all of these buttons are displayed all of the time.

Table 3-1: Master client toolbar buttons

Button	Description
	Connect button. Click to connect to the Server Manager running on the transport monitor indicated in the Address bar.
	Disconnect button. Click to break the connection to the currently connected Server Manager.
	Edit button. Click to open the Workspace Dialog box. If no workspace has yet been opened, clicking this button will open a new workspace in the Workspace dialog box.
	Edit button (showing a new input). Click to open the Workspace dialog box. This variation of the Edit button is displayed when a new input is detected.
	Acknowledge Errors button. Click this button to acknowledge the errors.
	Acknowledge Alarm button. Click this button to acknowledge the sound alarm for current errors. This button is not shown if you have not defined a *.wav file for the current workspace.
	Home Button. Click this button to connect to the local Server Manager. This button is removed when you connect to a Server Manager.

Workspace Icons   The tables in this section describe all of the icons used in the Master client. Table 3--2 identifies the icons used in the Bouquet, Multiplex, and Service panels.

Table 3--2: Master client multiplex and service icons

Icon	Description
	Default Service icon (displayed in the Services panel) A magnifying glass icon appears to the lower left of this icon when a PQM300 probe is set on the service.
	Default Input icon (displayed in the Multiplex panel)
	Terrestrial input icon (displayed in the Multiplex panel)
	Cable input icon (displayed in the Multiplex panel)
	Satellite input icon (displayed in the Multiplex panel)
	Bouquet icon (displayed in the Bouquet panel)

Each of the Multiplex panel input icons can also show whether the input is experiencing errors, whether the Analysis Server monitoring the input is synched to the signal, whether the Analysis Server has been stopped, or whether the Analysis Server is no longer present at that input. Table 3-3 shows these variations using the satellite input icon.

Table 3- 3: Multiplex icon variations

Icon	Description
	Multiplex icon with errors
	Multiplex icon showing loss of sync between the Analysis Server and the signal
	Multiplex icon showing that the Analysis Server on the input has been stopped
	Multiplex icon showing that the Analysis Server on the input is no longer present

Table 3-4 describes the different modes of the error icons that overlay the Bouquet, Multiplex, and Service panel icons.

Table 3- 4: Error icons

Icon	Description
	Red. Indicates that a critical, major, or minor error is currently being experienced on the indicated bouquet, multiplex, or service.
	Orange. Indicates that a critical, major, or minor error was recorded on the indicated bouquet, multiplex, or service, but no error condition currently exists.
	Yellow. Indicates that a warning condition is currently being experienced on the indicated bouquet, multiplex, or service.

Table 3‑5 describes the different modes of the Error Severity gauge icon.

Table 3‑5: Error severity gauge icons

Icon	Description
	Red. At least one critical error is detected for the selected multiplex or service.
	Red. At least one major error is detected for the selected multiplex or service. No critical errors are detected.
	Red. At least one minor error is detected for the multiplex or service. No critical or major errors are detected.
	Yellow. At least one warning condition is detected for the selected multiplex or service. No critical, major, or minor errors are detected.
	Green. No current errors or warning conditions are being recorded for the selected service or input.

Table 3‑6 describes the icons displayed in the Details panel when a multiplex icon is selected. A red border represents a current error. An orange border represents an unacknowledged error of that type with no current errors.

Table 3‑6: Detail panel error icons with an input selected

Icon	Description
	Indicates that a current error for a PAT, CAT, or EMM is detected for the selected multiplex. This icon can also indicate general errors, such as sync loss.
	Indicates that an error in one or more SI, PSIP, or ARIB parameters for the selected multiplex was detected, but does not currently exist.

Table 3-7 describes the icons displayed in the Details panel when a service icon is selected. A red border represents a current error. An orange border represents an unacknowledged error of that type with no current errors.

Table 3-7: Detail panel error icons with a service selected

Icon	Description
	Indicates that a current PCR error is detected for the selected service.
	Indicates that a rate or syntax error in the PMT, SDT, or EIT for the service was detected.
	Indicates that an error concerning a video component of the service was detected.
	Indicates that an error concerning an audio component of the service was detected.
	Indicates that an error concerning the data components for the selected service is detected.
	Indicates that an error concerning the ECM components of the service was detected.
	Indicates a PQM300 QoS error for the selected service. The icon border indicates whether the error is current (red) or past (orange).

The icons in Table 3–8 are only displayed in MTM300 Series MPEG Transport
Monitors.

Table 3‑8: Transport monitor server icons

Icon	Description
	Server Manager icon. This icon is displayed in the system tray of transport monitors when the Server Manager process is running. Right-click this icon and select **Exit** from the shortcut menu to Exit the Server Manager manually.
	Analysis Server icon. This icon is displayed in the system tray of transport monitors. There can be from one to eight Analysis Server icons displayed at once, depending on the number of inputs for the transport monitor. Green indicates that the Analysis Server process is started. Right-click this icon and use the shortcut menu selections to Stop and Start the Analysis Server process for the indicated input manually.
	TMCC Analysis Server icon. This icon is displayed in the system tray of transport monitors. There can be from one to eight TMCC Analysis Server icons displayed at once, depending on the number of inputs for the transport monitor. Green indicates that the Analysis Server process is started. Right-click this icon and use the shortcut menu selections to Stop and Start the Analysis Server process for the indicated input manually.

Master Client Menus

The Master client uses four menus that allow you to control, configure, and access help for the Master client. In addition to these four menus, there are two shortcut menus, one each for the Multiplex and Service panels.

Master Menu Table 3–9 describes the Master menu selections.

Table 3‑9: Master client Master menu

Menu item	Description
Connect	Connects to the Server Manager running on the transport monitor indicated in the Address Bar.
Connect Locally	Connects to the local Server Manager.
Disconnect	Disconnects the Master client from the Server Manager to which you are connected.
Acknowledge Past Errors	Acknowledges all errors.
Acknowledge Sound	Acknowledges all audible alarms.
Exit	Closes the Master client.

Workspace Menu Table 3–10 describes the Workspace menu selections.

Table 3‑10: Master client Workspace menu

Menu item	Description
New	Creates a new workspace and opens the Workspace dialog box.
Open	Displays a standard Open dialog box from which you can choose the *.wks file (workspace file) to open.
Edit	Opens the Workspace dialog box with the current workspace settings displayed.
Save	Saves the current workspace settings to the workspace named in the title bar.
Save As	Opens a standard Save as dialog box that allows you to save the current workspace settings to a *.wks file.

View Menu   Table 3–11 describes the View menu selections.

Table 3‑11: Master client View menu

Menu item	Description
Toolbar	Hides/Displays the toolbar.
Address Bar	Hides/Displays the Address bar.
Local Connection Bar	Hides/Displays the Home button.
Status Bar	Hides/Displays the status bar.

Help Menu   Table 3–12 describes the Help menu selections.

Table 3‑12: Master client Help menu

Menu item	Description
Help Topics	Displays the Master client online help contents.
About Master	Displays version and copyright information about the Master client.

Multiplex Panel Shortcut Menu   Table 3–13 describes the Multiplex panel shortcut menu selections.

Table 3‑13: Multiplex panel shortcut menu

Menu item	Description
Large Icons	Displays large input icons.
Small Icons	Displays small input icons.
Sort by	
Error	Displays icons representing inputs or services experiencing errors from left to right, top to bottom. When you choose this submenu selection, the Master client uses three levels of sort order criteria: error status, error severity, and transport monitor name (alphabetical sort order).
Name	Displays the icons in alphabetical order (from left to right, top to bottom) based on the name of the transport monitor on which the input or service is located.
TSID	Displays the icons in numeric order (from left to right, top to bottom) based on the transport stream ID of the inputs or services.
Expert Client	Starts the Expert client showing the selected input.

Table 3‑13: Multiplex panel shortcut menu (cont.)

Menu item	Description
Configuration Client	Starts the Configuration client showing the configuration of the selected Analysis Server.
TMCC Expert Client	Starts the TMCC Expert client showing the selected input.
TMCC Configuration Client	Starts the TMCC Configuration client showing the configuration of the selected Analysis Server.

Services Panel Shortcut Menu

Table 3‑14 describes the Services panel shortcut menu selections. Display this shortcut menu by right-clicking an icon in the Services panel.

Table 3‑14: Services panel shortcut menu

Menu item	Description
Large Icons	Displays large service icons.
Small Icons	Displays small service icons.
Details	Displays the icons in the Services panel in tabular format, showing more information about each service.
Sort by	
Error	Displays icons representing inputs or services experiencing errors from left to right, top to bottom. When you choose this submenu selection, the Master client uses three levels of sort order criteria: error status, error severity, and transport monitor name (alphabetical sort order).
Name	Displays the icons in alphabetical order (from left to right, top to bottom) based on the name of the transport monitor on which the input or service is located.
TSID	Displays the icons in numeric order (from left to right, top to bottom) based on the transport stream ID of the inputs or services.
SID	Displays the icons in numeric order (from left to right, top to bottom) based on the service ID of the services.

Table 3‑14: Services panel shortcut menu (Cont.)

Menu item	Description
Expert Client	Starts the Expert client showing the selected input.
Program QoS	
Set/Remove Probe	Displays the List of Program Qos Monitor channels and associations dialog box from which you can set or remove PQM300 probes.
Display Measurements	Starts the PQM300 Program QoS Monitor client, displaying the QoS probe measurement results for the selected program.
Associate Logo	Opens a standard Open dialog box from which you choose the JPEG or BMP file that you will use to represent the selected service.

Workspace Dialog Box

The Workspace dialog box allows you to add and organize your inputs, configure the look and feel of the Master client, and specify how errors are reported and whether you use audible alarms for error reporting. See Figure 3–3. The dialog box includes the following elements:

- A navigation panel to display the three configuration panels that comprise this dialog box

- The active workspace name

- Three configuration panels

Bouquet Selection Panel   The Bouquet Selection panel allows you to define groups of inputs called bouquets and specify the inputs that you will monitor. The inputs shown in the Selected Multiplexes for the Bouquet list box represent the inputs to the transport monitor(s) to which the Master client is connected. You may see inputs from multiple transport monitors. Figure 3-3 shows inputs from one monitor.
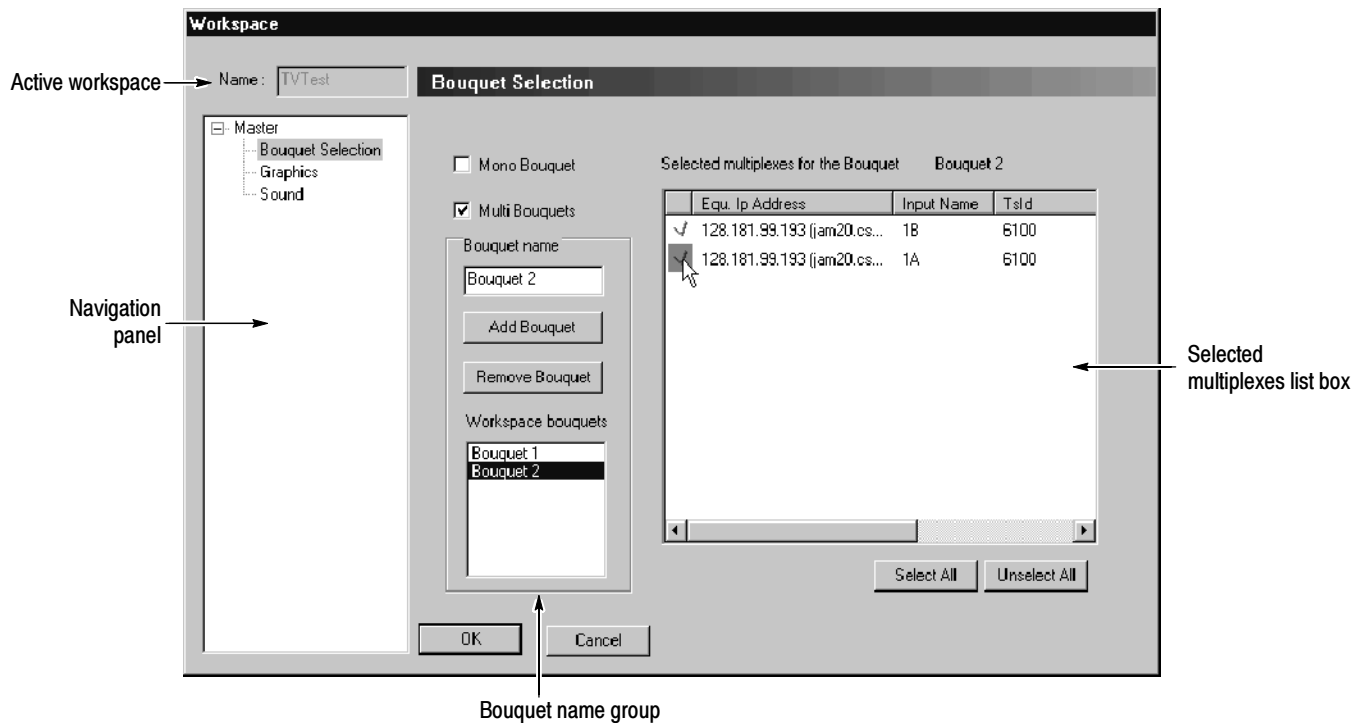
Figure 3-3: Bouquet Selection panel

See the procedures described for creating workspaces, adding and removing inputs, and creating bouquets for more information on using this panel.

Graphics Panel   The Graphics panel shown in Figure 3-4 allows you to configure the display of the Master client and to determine the level of Analysis Server errors reported in the Master client.
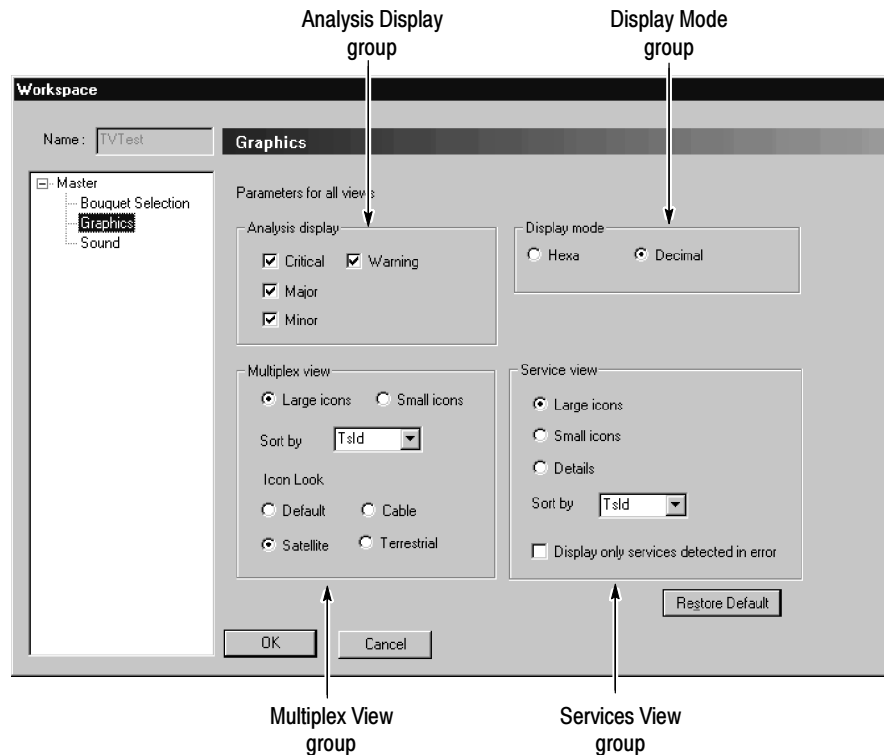
Figure 3- 4: Graphics panel

The following list describes the option groups in this panel:

■   Analysis Display. The selections in this group indicate which type of errors you want displayed. You can choose any combination of options.

■   Display Mode. The selections in this group indicate the numeric base for the workspace. You can display the TSID and SID in decimal or hexadecimal base.

■   Multiplex View. The options in this group allow you to control the look and sort order of the icons in the Multiplex panel.

■   Services View. The options in this group allow you to control the look of the icons in the Services panel, the sort order of the service icons, and whether to show icons for all services all the time or only the services in error. If you choose to show only those services in error, once an error is recorded, the icon remains until you acknowledge the error.

See the procedures for creating workspaces, specifying error levels reported in the Master client, and changing the numeric base elsewhere in this section for more information about using this panel.

Sound Panel   The Sound panel allows you to specify a WAV file to be played each time an error is reported in the Master client.
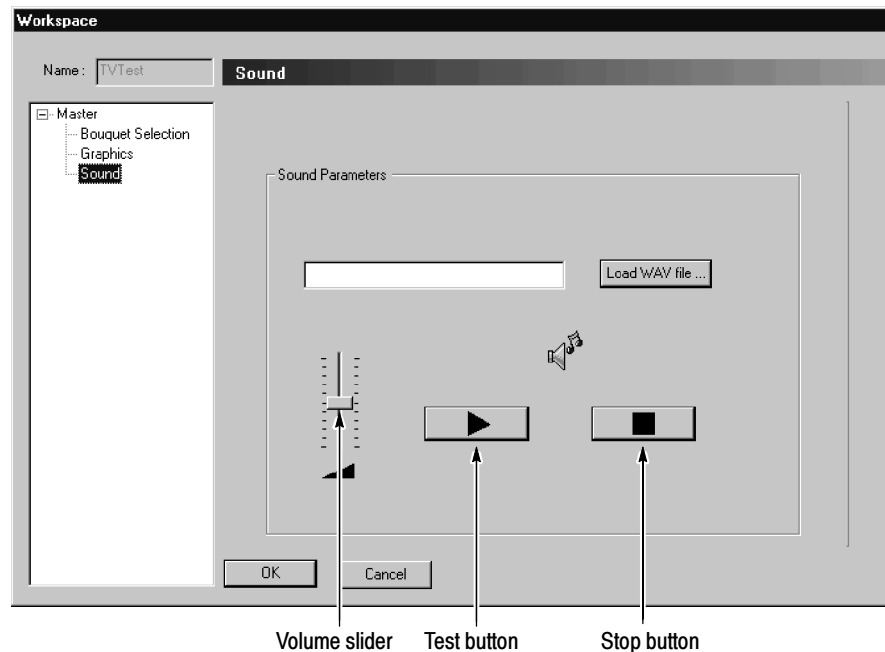
Figure 3‑5: Sound panel

To play an audible alarm for errors when they are detected, use the following procedure:

1. In the Workspace dialog box, select **Sound**.

2. Click **Load WAV** file and then select a *.wav file.

   Sample alarm files are located at C:\MTM300\Bin\Sounds

   ■ Use the vertical slider bar to set the volume. Drag the slider up for more volume.

   ■ Test the WAV file using the ▶ button.

   ■ Stop the WAV file using the ■ button.

Workspace Tasks

The procedures in this section are arranged alphabetically. Unless indicated otherwise, the Master client must be started and connected to a Server Manager to perform these procedures.

Adding and Removing Bouquets to a Workspace

Use the procedures in this section to add and remove bouquets.

Add a bouquet to a workspace.

1. Click the **Edit Workspace** button or select **Edit** from the Workspace menu.

2. In the Workspace dialog box, select **Bouquet Selection**, and then select **Multi Bouquet** as shown in Figure 3-6.
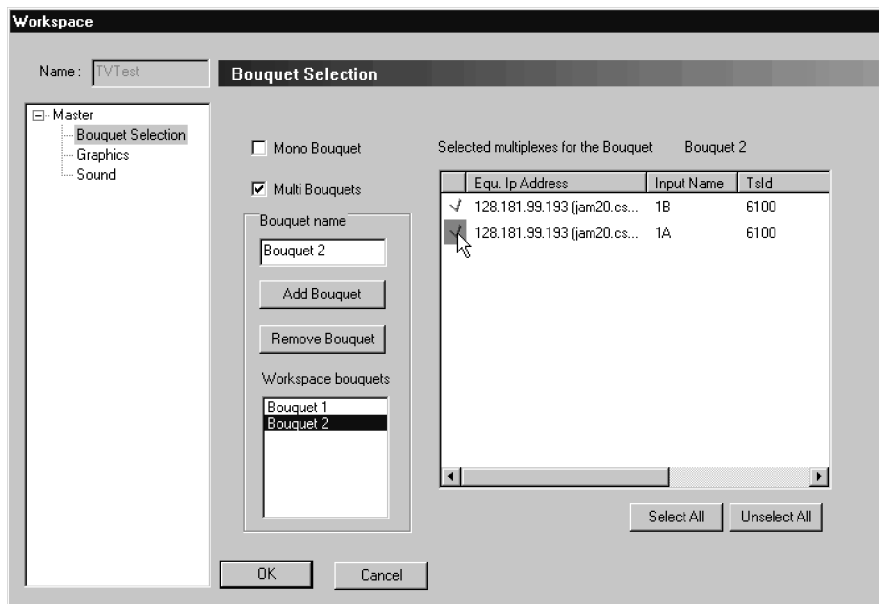
Figure 3-6: Selecting inputs in the Bouquet Selection panel

3. Enter a name for the new bouquet in the Bouquet Name text box, and then click **Add**.

4. Repeat step 3 for each additional bouquet you want to create for your workspace, making each bouquet name descriptive and unique for the workspace.

5. Select a bouquet name in the Workspace Bouquets list box.

6. Select the inputs that you want to monitor from the Selected Multiplexes selection area. Click to the left of the input name as shown in Figure 3–6 on page 3–30; a check mark indicates that the input is selected.

7. Repeat steps 5 and 6 for each additional bouquet you want to add to the workspace.

Remove a bouquet from a workspace.

1. Select **Edit** from the Workspace menu.

2. In the Workspace dialog box, select **Bouquet Selection**.

3. Select a bouquet in the Workspace Bouquets selection box and click **Remove Bouquet**.

Assigning an Icon to a Service

To assign an icon to a service, you must save an appropriate bitmap or JPEG file somewhere on your local hard drive (*.bmp or *.jpg file respectively). The default logo directory is C:\MTM300\BIN\Logos.

NOTE. Some service providers do not allow their logos to be used without permission. Check with the service provider before you use their logo. The logos provided with the installation of the MTM300 Series MPEG Transport Monitor can be used to associate the icon in the Services panel of the transport monitor to the logo for that service.

One alternative source for satellite service logos is at the following URL: www.satlogo.com/logos.html (this link was valid as of November, 1999). Remember to check the copyright statements before using any logo.

1. Right-click the service icon (in the Services panel) and select **Associate Logo** from the shortcut menu.

2. Using standard Windows NT techniques, select an image file of the service's logo from the Open dialog box.

   The location of the image files (JPEG and bitmap) included with the installation of the MTM300 Series monitor is C:\MTM300\Bin\Logos.

Assigning an Icon to a Transport Stream Input

Use the following procedure to change the icon displayed in the Multiplex panel:

1. Click the **Edit** button, or select **Edit** from the Workspace menu.

2. In the Workspace dialog box, select **Graphics**.

3. Choose the input icon option you want to display from the Multiplex View group.

Changing Icon Sizes   Right-click in the white space of either the Multiplex or Service panel and select an icon size from the shortcut menu (Large or Small).

Alternatively, you can use the following procedure:

1. Select **Edit** from the Workspace menu.

2. Select **Graphics**.

3. Change the selections in the Multiplex View and Service View as appropriate.

Changing the Numeric Base   Use the following procedure to change the numeric base used to display the transport stream ID and the service ID in the Master client:

1. Click the **Edit** button, or select **Edit** from the Workspace menu.

2. In the Edit Workspace dialog box, select **Graphics**.

3. Change the numeric base using the options in the Display Mode group.

Showing Details in the Service Panel   Right-click in the white space of the Service panel, and then select **Details** from the shortcut menu.

Alternatively, use the following procedure:

1. Select **Edit** from the Workspace menu.

2. In the Edit Workspace dialog box, select **Graphics**.

3. Select **Details** from the Service View group.

Copying a Workspace   Select Save As from the Workspace menu, and then, using standard Windows NT techniques, name the workspace file something other than the current file name.

Creating a Bouquet   Use the following procedure to create a bouquet or multiple bouquets:

1. Click the **Edit** button or select **Edit** from the Workspace menu.

2. In the Workspace dialog box, select **Bouquet Selection**.

3. Select the **Multi Bouquet** option.

4. Type the name of a bouquet in the Bouquet Name text box, and then click **Add**.

5. Repeat step 4 for each additional bouquet you want to create, making each bouquet name descriptive and unique for the workspace.

6. In the Workspace Bouquets list box, select a bouquet, and then in the Selected Multiplexes list box, click in the left-hand column of each input that you want to include in the selected bouquet. See Figure 3-6 on page 3-30.

7. Repeat step 6 for each bouquet in the list.

8. Click **OK**.

Displaying all Services in a Bouquet   Click a bouquet icon to display all services monitored in the bouquet.

Click in the white space of the Multiplex panel to display all services of the current bouquet.

Opening the Configuration Client   Use the following procedure to start the Configuration client (or the TMCC Configuration client) from the Master client:

1. Select an icon in the Multiplex panel.

2. Right-click the selected icon, and then select **Configuration Client** (or **TMCC Configuration Client**) from the shortcut menu.

The Configuration client is displayed showing the Analysis Server configuration for the selected input. If another Configuration client is connected to the Analysis Server you are connecting to, you will see a message saying that you have read-only access to the Analysis Server and cannot change any parameters.

See the *Configuration Client Reference* and *TMCC Configuration Client Reference* for more information about using these clients.

Opening the Expert Client   Use the following procedure to start the Expert client (or the TMCC Expert client) from the Master client:

NOTE. The Expert client displays the analyses of only one transport stream at a time. If the input you are analyzing is an M_TMCC stream, you can specify which transport stream to display from the TMCC Configuration client (see page 3--228).

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1. Select a multiplex icon in the Multiplex panel, or select a service icon in the Service panel.

2. Right-click the selected icon, and then select Expert client from the shortcut menu.

You can start the MPEG-2 Expert client from either the Multiplex panel or the Service panel; you can start the TMCC Expert client only from the Multiplex panel. If opened from the Multiplex panel, the Expert client default display shows the following views:

- At the left of the display, the Hierarchic view shows up to six levels of the transport stream hierarchy. You can use the icons and shortcut menus to access deeper levels of detail about the selected transport stream component.

- At the right of the display, the Statistics view shows the Program Allocation panel and provides access to other panels showing various high-level statistics about the transport stream. In this view the Pie Chart option is selected for the Program Allocation panel.

If you open the Expert client from the Service panel, the default display shows the following views:

- At the top left of the display, the Hierarchic view shows up to six levels of the transport stream hierarchy.

- At the top right of the display, the Statistics view shows the Program Allocation panel and provides access to other panels showing various high-level statistics about the transport stream. In this view the Bar Chart option is selected for the Program Allocation panel.

- At the bottom of the display, the Report view shows the Message panel for the selected service. In this example the service selected was the Fun service.

See the *Expert Client Reference* and *TMCC Expert Client Reference* sections (beginning on pages 3--93 and 3--209, respectively) for more information about using these clients.

Removing a Workspace   A workspace is defined by a *.wks file. To remove a workspace, delete the file using standard Windows NT procedures.

Removing an Icon From a Service   To remove an icon from a service, use the following procedure

1. Record the transport stream ID and the service ID of each serivce for which you want to modify the icon by resting your cursor over the icon and displaying the Tool Tip (shown below). Also, record the label for each icon/service (the name that appears below the icon in the Services panel).

2. Exit the Master client. You can choose to save workspace changes or not when you exit.

3. Open the Windows NT Explorer and navigate to the following directory:

   C:\MTM300\Bin\Logos\

4. Identify the BMP file (or files) with the following syntax that match the association(s) you want to remove:

   TransportStreamID-ServiceID-Label.bmp

5. Delete these files.

When you restart the Master client and display the inputs again, the icon/service association will be removed and the default icon will be used to represent the service.

Saving a Workspace   Select Save from the Workspace menu. The workspace name appears in the title bar.

The current workspace settings defined in the Bouquet Selection, Graphics, and Sound panels are saved. If you have not yet saved the current settings, a standard Save As dialog box is displayed from which you can specify the file name and location.

Sending Traps to a Network Management Station   Refer to *Sending Traps to a Network Management Station* beginning on page 1–30.

Sorting Multiplex and Service Panel Icons

Use the following procedure to sort Multiplex or Service panel icons:

1. Right-click in the panel (Multiplex or Service) for which you want to sort icons.

2. Point to **Sort by** in the shortcut menu, and then choose one of the following selections from the submenu:

   ■ Error. This option displays icons representing inputs or services experiencing errors from left to right, top to bottom. When you choose this submenu selection, the Master client uses three levels of sort order criteria: error status, error severity, and transport monitor name (alphabetical sort order).

   ■ Name. This option displays the icons in alphabetical order (from left to right, top to bottom) based on the name of the transport monitor on which the input or service is located.

   ■ TSID. This option displays the icons in numeric order (from left to right, top to bottom) based on the transport stream ID of the inputs or services.

   ■ SID. This option displays the icons in numeric order (from left to right, top to bottom) based on the service ID of the services. This option is available only in the Services panel.

Specifying the MPEG Analysis Formats

Use the following procedure after you have added inputs to your workspace (you need to be able to start the Configuration Client from a specific input):

1. Click the multiplex icon for the input you want to configure.

2. Right-click the icon, and then select **Configuration Client** from the submenu. The Configuration client for the selected input is displayed.

3. In the left-hand pane, click **Analysis**.

4. Select the appropriate format from the Analysis Type group.

5. Click the **Apply** button or select Apply from the Session menu.

6. Click **Restart Now** when you are prompted with the following message box.

For more information about specifying an MPEG analysis formats, see the *Configuration Client Reference* beginning on page 3-159.

Stopping and Restarting Analysis Servers and the Server Manager

The Analysis Servers and Server Manager start automatically with Analysis Server processes on all inputs when the transport monitor is started. If for some reason an Analysis Server fails, restart the monitor.

You can also use the following procedure to stop and restart these processes (these steps are carried out using the Services dialog box, which is accessed from the Control panel):

1. Stop the MPEG Analysis Service

   a. Open the Windows NT Control Panel and double-click **Services**.

   b. Find and select **MPEG Analysis Service** in the Service list box.

   c. Click **Stop**.

2. Restart the MPEG Analysis Service

   a. Select **MPEG Analysis Service**.

   b. Click **Start**.

NOTE. This procedure stops and restarts both the Server Manager and all of the necessary Analysis Servers on your transport monitor.

You can also stop, start, and exit Analysis Servers using the shortcut menu displayed when you rest the mouse cursor over an Analysis Server icon in the system tray as shown below.

Error Reporting Tasks

Use the procedures in this section to configure your Master client monitoring environment.

Defining Error Levels
The following procedure shows you how to configure an Analysis Server to report errors at a defined level using the Configuration client:

1. Select an input icon from the Multiplex panel.

2. Right-click the icon and select **Configuration Client** from the shortcut menu.

3. Expand the **View** hierarchy in the left-hand pane of the Configuration client, and then select **Message Level**. The right-hand panel changes to show a list of tests performed by the Analysis Server. See Figure 3-7.

   For each test performed by the Analysis Server, you can define the error level as Critical, Major, Minor, Warning, or Info (information).
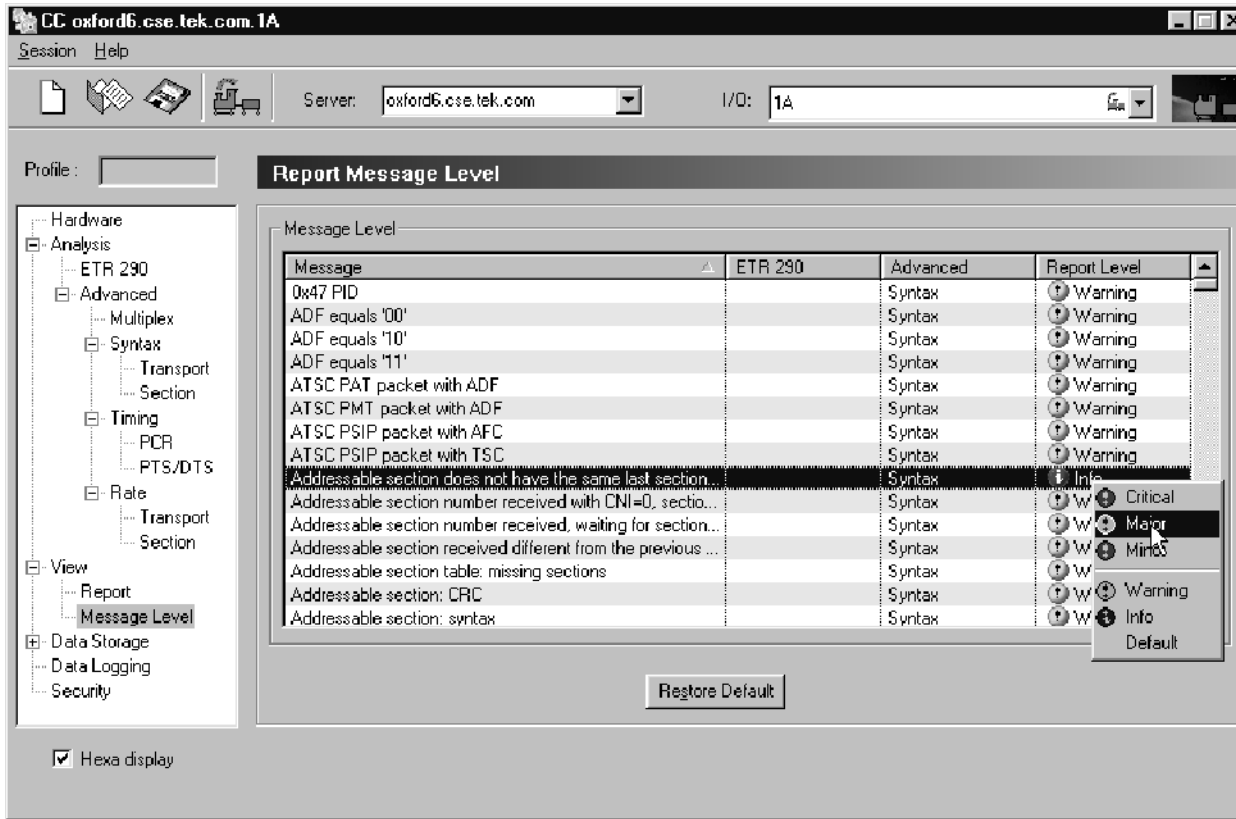
Figure 3-7: Report Message Level panel in the Configuration client

4. In the Report Level column, right-click the current severity level definition for the error you want to change. (You can also left-click the definition term to step through each shortcut menu item.)

5. Select the appropriate menu item from the shortcut menu.

To set error levels to the factory defaults, use one of the following techniques:

■ To reset the error message level for the selected error to the default state (corresponding to ETR290), select the **Default** shortcut menu selection.

■ To reset the error message levels for all errors to the default state (corresponding to ETR290), click the **Restore Default** button.

Displaying Only Services with Errors

Use the following procedure to limit the service icons displayed in the Master client to those with errors detected on them:

1. Click the **Edit Workspace** button, or select **Edit** from the Workspace menu.

2. In the Workspace dialog box, click **Graphics**.

3. Check the **Display only Services with Errors** option in the Service view group.

4. Click **OK**, and when you return to the workspace, only those icons currently experiencing errors will be displayed.

Specifying the Level of Errors Reported in the Master Client

The following procedure shows you how to specify the level of errors reported in the Master client:

1. Click the Edit Workspace button or select **Edit** from the Workspace menu.

2. In the Workspace dialog box, select **Graphics** in the left-hand pane.

3. In the Analysis Display group, choose the level of errors that you want reported in the Master client.

Using the Master Client to Monitor PQM300 Program QoS Monitor Results

The Master client on a network management station (MTM3FMS) can set and monitor PQM300 probes. These probes monitor the decoded video component for MPEG defects (blockiness and artifacts), frozen and repeated frames, uncorrelated noise, and loss of service. (See the *PQM300 Program QoS Monitor User Manual* for information about the measurements enabled by the PQM300 program monitor.) This section describes how to perform the following tasks:

- Install the PQM300 remote client on an MTM300 network management station

- Configure the remote PQM300 program monitor to send SNMP traps to an MTM300 network management station Server Manager

- Set and remove PQM300 probes from the Master client

- Monitor PQM300 measurement results from the Master client

- Display PQM300 probe measurement results

For PQM300 program monitor operating and configuration information, see the *PQM300 Program QoS Monitor User Manual*. This manual is provided in PDF format on the *MTM300 Series MPEG Transport Monitor Application Software* CDROM.

Installing the PQM300 Client

Use this procedure to download and install the PQM300 remote client on an MTM300 Series Network Management Station (MTM3FMS).

1. Start your web browser and enter the URL of a networked program monitor.

2. After connecting to the PQM300, click on the line "Download PQM300 Remote Application (Self Extracting 7Mb)" to download the application.

3. After the program is downloaded and installed, double click on the PQM300 icon on your PC desktop to start the application.

Operating the application installed on your PC is the same as using the PQM300 Java applet. However, you do not need to download the Java applet everytime you connect to the program monitor. Simply start the PQM300 application on your network management station and connect to any PQM300 that is known on the network. Refer to *Making Program Monitor Connections* in the PQM300 Program QoS Monitro User Manual for more information.

Configuring a Remote PQM300 Program QoS Monitor

Refer to *Sending Traps to a Network Management Station* beginning on page 1–30.

1. Select **Router** from the Tektronix program group. The Router application is displayed.

2. Click the Connect button, and then enter the IP address of the PQM300 you want to configure. As soon as the Router applicaiton connects to the PQM300, you will see a list of machines that recieve PQM300 traps.

3. Click **Add**. The SNMP Traps to Target dialog box is displayed.

4. Enter the computer name of your network management station in the Computer Name text box, and then click in the **IP Address** text box. If your computer name is recognized, the IP address and subnet mask are automatically completed for you.

   If the name is not recognized, enter your IP address by hand.

5. Click **Add** when you are finished.

6. Click **OK** to accept your changes and close the Router application window.

   The Server Manager and the Analysis Servers are automatically stopped and restarted, and then the Router application is dismissed. These settings will persist until you change them.

Setting and Removing PQM300 Probes

To set a PQM300 probe from the MTM300 Master client, you must determine the program number of the input to the program monitor. The program number will allow you to see which icon you need to select in the Services panel of the Master client. After you have determined the program number, use the following procedure to set a PQM300 probe:

1. In the Multiplex panel, select the multiplex that is carrying the video component of the program you need to monitor.

2. In the Services panel, right–click the appropriate program/service icon, point to PQM300, and then select Set Probe.

3. In the List of Program Qos Monitor channels and associations dialog box, select the PQM300 monitor that is monitoring the video part of the service you selected in step 2, and then click **OK**.

To remove a PQM300 probe, repeat the procedure, deselecting the appropriate PQM300 monitor in the list.

Monitoring PQM300 Measurement Results

After you have set a Program QoS probe on the video part of a transport stream you are monitoring, you can monitor probe results just as you would a remote transport monitor. When an error is detected by the program monitor and a trap is sent to your network management station, an error icon appears in the Details panel of the Master client.

Displaying PQM300 Measurement Results

Use this procedure to display the results of PQM300 probes:

NOTE. *There must be errors on the monitored video component to display PQM300 measurement results.*

1. Ensure the following conditions:

   ■ The PQM300 remote client is installed on your network management station. (Refer to page 3-40.)

   ■ The PQM300 for which you want to display measurement results is configured to send your network management station traps. (Refer to page 3-40.)

   ■ A Program QoS probe is set on the video component of a program you are monitoring. (Refer to page 3-41.)

2. Right-click a Service panel icon and select Display Measurement results from the sub menu.

The PQM300 remote client application is started, and, after a few seconds of initialization, the measurement results are displayed. Using the PQM300 remote client is identical to using the application locally on a PQM300 program monitor. See the *PQM300 Program QoS Monitor User Manual* for operating information.

Analyses Reference

This section describes Analysis Servers and the default and user-controlled analyses performed by the MTM300 Series MPEG Transport Monitor. This section also describes the generic procedure you will use to set, remove, and modify probes. This information is provided in the following sections (the page references indicate the page on which the discussion for the probe type begins):

Analysis Servers

An *Analysis Server* is the process that performs the actual analyses on a transport stream input and starts automatically when you start the transport monitor. Each MTM300 Series transport monitor can support up to eight Analysis Server processes simultaneously. The Analysis Server sends analysis results to the Server Manager.

Analysis Servers conduct very few full-time, default analyses on inputs. The only default analyses performed are fundamental to monitoring and analyzing transport streams and cannot be disabled. Refer to *Default Analyses* on page 3-44 for a description of these default analyses.

You set and control all remaining analyses, which are called *probes*. The term *probes*, differentiates analyses that you set and control from the default analyses performed by the Analysis Servers.

You configure each Analysis Server to perform specific analyses using the Configuration client. The results of the analyses performed by the Analysis Servers are displayed in both the Master and the two Expert clients. Each client displays the analysis results at different levels of detail.

See the following sections for further information about how the Analysis Servers are configured and report errors:

- See *Master Client Reference* (beginning on page 3-9), *Expert Client Reference* (beginning on page 3-93), and *TMCC Expert Client Reference* (beginning on page 3-209) for more information about how each client reports errors detected by Analysis Servers.

- See *Configuration Client Reference* (beginning on page 3-159) and *TMCC Configuration Client Reference* (beginning on page 3-219) for more information about the two Configuration clients.

- See *Probe Operating Conventions* on page 3-45 for more information about using the Configuration client to set probes and probe limits.

Default Analyses

Analysis Servers always check for synchronization and monitors transport rates.

Synchronization   If the Analysis Server cannot synchronize to an input, a general error is reported in the Report view. This error is the same as ETR 290 error 1.1, TS_sync_loss.

NOTE. *If the Analysis Server cannot synchronize with the input stream, no other tests or analyses can be conducted.*

Transport Rate   Analysis Servers calculate the average bit rate of each PID in the input stream and displays the results in the Expert client Program Allocation, PID Allocation, and Type Allocation panels of the Statistic View. The analysis is automatic and cannot be disabled.

Use the Transport Rate Analysis panel of the Configuration client to set probes on selected stream PIDs for transport rates that fall below or exceed limits of your choosing (see page 3-84). Refer to *Analysis:Advanced: Rate:Transport Panel* on page 3-192 for information about using the Transport Rate Analysis panel.

User Controlled Analyses (Probes)

You control all probes using the the Configuration client. Refer to *Configuration Client Reference* on page 3--159 for detailed descriptions of each panel. This section describes basic procedures you use to set, modify, and remove probes. It also describes the options available in the Configuration client Analysis panel.

Probe Operating Conventions

The following information pertains to all user-controlled analyses (probes):

■ Probes are not part of the default analyses. To restore operation to only the default analyses, select **New Configuration** from the Configuration client Session menu and click **Apply**. See *Saving and Restoring MTM300 Configurations* beginning on page 3--161 for procedures on saving and loading configurations.

Alternatively, you can select **Restore Default** at each panel in the Configuration client, and then apply your changes by clicking the **Apply** button.

■ An Analysis Server for a particular input stores probe settings and uses those settings whenever analyzing an stream at that input. If a probe is set when you stop analysis and power the transport monitor down, it is also set the next time you use the transport monitor.

■ To maximize performance (especially with input streams that contain many errors), limit the number of probes set at any one time.

Setting Probes. The following procedure uses the Multiplex Analysis panel as an example. You can set probes on other configuration panels using the same basic steps.

1. Start the Configuration client from the Master client:

   a. Click the icon for the input you want to modify in the Multiplex panel of the Master client.

   b. Right-click the icon, and then select **Configuration client** from the shortcut menu.

   c. Click **Advanced**, and then **Multiplex** in the Navigation frame of the Configuration client. The Multiplex Analysis panel is displayed in the right-hand part of the Configuration client application window.

2. Select the desired probe in the Probe Type list of the Multiplex Analysis panel (see Figure 3-8).
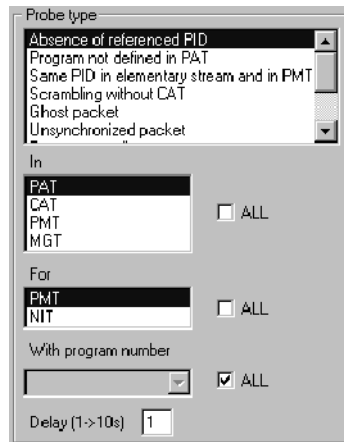
Figure 3-8: Multiplex Analysis panel, Probe Type list box

3. Make any additional selections required for the particular probe. Additional configuration settings for the selected probe appear below the Probe Type list when you select the probe, as shown in the following illustration.

    a. In this example, when you select Absence of referenced PID, the In box appears that allows you to select the absence table to analyze. When you select an item in the In box, a For box appears that allows you to select the table.

    b. When you select an item in the For box, a With PID or With program number box appears that allows you to select PIDs or program numbers for PMTs. A Delay box appears that allows you to set the delay (1 to 10 s).

4. Click **Add** to add the probe to the Probe List.

5. Click the **Apply** button on the Configuration client toolbar to activate the probe (and all other changes made since you opened the Configuration client or last clicked Apply) or click **OK** to activate the probe (and all new settings) and close the Configuration client.

Changing Current Probe Settings. The following procedure uses the Multiplex Analysis panel as an example. You can change current probe limits on other configuration panels without removing and resetting the probe using the same functional steps.

1. Select (select) the probe name in the Probe List.

2. Change the limit settings as desired.

3. Click **Add**. The error limit change appears in the Probe List.

4. Click **Apply** to change the probe error limits, or click **OK** to change the limits and to close the Configuration client.

*NOTE. You must click **Apply** or **OK** to put the changed probe limits into effect.*

Removing Probes. The following procedure uses the Multiplex Analysis panel as an example. You can remove probes on other configuration panels using the same functional steps.

1. Remove the probe or probes from the Probe List.

   ■ To remove a single probe from the list, select the probe in the Probe List and then click **Remove**. (You can also remove a probe by double-clicking the Probe List entry.)

   ■ To remove several probes from the list at one time, select each probe name in the Probes List and then click **Remove**. To select several contiguous names, click the first name and then hold the SHIFT key down while selecting the last name; to select non-contiguous names, hold the CTRL key down while making your selections.

   ■ To remove all probes from the Probes List, click either **Remove All** or **Restore Default**.

2. To confirm your selections, use one of the following techniques:

   ■ Click **OK** to deactivate the probes and close the Configuration client.

   ■ Click **Apply** to confirm your selections and deactivate the probes while leaving the Configuration client open

*NOTE. Removing a probe from the Probe List does not end the probe/analysis; you must also click **Apply**.*

Analysis Types and Analysis Options

Use the Analysis panel of the Configuration client to select the analysis type and analysis options. Refer to *Analysis Panel* on page 3--174 for detailed information about the Analysis panel settings.

NOTE. *Before configuring or initiating probes, always select the appropriate analysis type and analysis options using the Analysis panel of the Configuration client. Your selections on the Analysis panel determine which analyses are available on other configuration panels.*

Analysis Type. The Analysis Type setting determines the standard used to monitor the input stream. You can select from MPEG-2 (the default), DVB, and ATSC analysis types.

Analysis Options. The Ghost scanning and Smoothing time options are available for all three analysis type settings. The remaining analysis options are available only when you select the DVB analysis type.

Select **DVB-T** to enable Mega Frame analysis. Three of the Settings panels (Mega Frame Syntax, Mega Frame Timing, and Mega Frame Rate) are available only when you select the DVB analysis type and the DVB-T analysis option.

Select **SIDAT 360 Profiles** to enable SIDAT 360 analysis and to enable the two SIDAT 360 options Multiprotocol Encapsulation and Data Carousel.

SIDAT 360 is a set of analyses that allow you to analyze the following two main types of standard DVB Data Broadcasting streams: Multiprotocol Encapsulation and Data Carousel.

Multiprotocol Encapsulation streams usually carry IP packets and Data Carousel streams may carry application-specific data modules that are broadcast cyclically, such as teletext pages.

Selecting SIDAT 360 data broadcasting analysis from the Analysis panel of the Configuration client sets a probe that checks the validity and consistency of the related data_broadcast_descriptor carried in the SDT or the EIT. The three different types of tables carried on those streams have the same probing facilities as standard DVB tables, except for defining the maximum and minimum allowed rates.

Additionally, when you select the Multiprotocol Encapsulation option, you can use the IP Monitoring view to monitor the IP traffic on the input stream. Refer to *IP Monitoring View* on page 3--158 for more information about the view.

ETR 290 Probe Descriptions

The Configuration client ETR 290 panel allows you to set and configure ETR 290 probes. Refer to *ETR 290 Panel* on page 3–176 for information about using the ETR 290 panel. This section describes the list of probes set using the ETR 290 recommendations selected from the ETR 290 panel.

The DVB Measurement Guidelines (ETR 290) provides guidelines for measurement in Digital Video Broadcasting (DVB) satellite, cable, and terrestrial digital television systems. The document is designed to define a number of measurement techniques, such that the results obtained are comparable when the measurements are carried out in compliance with the appropriate definition. Chapter 5 of ETR 290 recommends and defines tests at the Transport Stream level. The discussion for the probes included for each recommendation are arranged according to the assigned ETR 290 priority level:

- First priority: necessary for decodability (basic monitoring)

- Second priority: recommended for continuous or periodic monitoring

- Third priority: application-dependent monitoring

You can configure Analysis Servers to perform most first, second, and third priority ETR 290 measurements. Table 3–15 lists the measurements recommended in ETR 290 and indicates how the Analysis Servers perform each one.

Table 3-15: ETR 290 tests

Test number	Test name	Automatic	User-requested	Not performed
1.1	TS sync loss	●		
1.2	Sync byte error		●	
1.3	PAT error		●	
1.4	Continuity count error		●	
1.5	PMT error		●	
1.6	PID error		●	
2.1	Transport error		●	
2.2	CRC error		●	
2.3	PCR error		●	
2.4	PCR accuracy error		●	
2.5	PTS error		●	
2.6	CAT error		●	
3.1	NIT error		●	

Table 3-15: ETR 290 tests (cont.)

Test number	Test name	Automatic	User-requested	Not performed
3.2	SI repetition rate		●	
3.3	Buffer error			●
3.4	Unreferenced PID		●	
3.5	SDT error		●	
3.6	EIT error		●	
3.7	RST error		●	
3.8	TDT error		●	
3.9	Empty buffer error			●
3.10	Data delay error			●

Tests 3.3, 3.9, and 3.10 are related to the T-STD (the hypothetical Transport Stream System Target Decoder defined in the MPEG-2 standard) and are too computation-intensive to be performed by the Analysis Servers. You can perform T-STD analysis with the deferred-time analyzer that is part of the Tektronix MTS300 MPEG Test System if you first capture part of the input stream to the data store disks of the MTS300 test system. Refer to the *MTS300 MPEG-2 System Analyzer User Manual* for more information.

The remainder of this section describes each ETR 290 recommendation performed by the MTM300 Series MPEG Transport Monitor. The discussions for each recommendation indicates how errors are defined for each test and the probes you need to set using the individual panels, should you choose to do so. However, when you select a recommendation from the ETR 290 panel, all the probes necessary to test to the recommendation are set automatically.

TS_Sync_Loss (1.1)   Each packet of the transport stream is preceded by a header consisting of four bytes. The first byte of the header is the synchronization byte, whose content is always the hexadecimal value 0x47. In the MPEG-2 decoder, the synchronization byte serves for synchronization with the packetized transport stream. DVB recommendations define synchronism such that a sequence of at least five synchronization bytes have to be detected by the MPEG-2 decoder. Synchronization is lost if the synchronization byte in a sequence of at least three TS packets are not detected according to the DVB recommendations. This status is referred to as TS_Sync_Loss.

TS_Sync_Loss is the only ETR 290 parameter that is always monitored by the Real-Time Analyzer.

Error Precondition. In the DVB Measurement Guidelines (ETR290), the preconditions for a TS_Sync_Loss message is as follows:

Indicator	Precondition	Reference
TS_Sync_Loss	Loss of synchronization with consideration of hysteresis parameters	ISO/IEC 13818-1: Sub clause 2.4.3.3 / annex G.01

Sync_byte_error (1.2)   Each packet of the transport stream is preceded by a header consisting of four bytes. The first byte of the header is the synchronization byte, whose content is always the hexadecimal value 0x47. In the MPEG-2 decoder the synchronization byte serves for synchronization with the packetized transport stream. If the synchronization byte is missing or contains errors too often, the decoder will not be able to synchronize to the transport stream. The MPEG test decoder checks the synchronization byte of every packet in the transport stream for correct contents.

Error Precondition. The precondition for a Sync_Byte_Error message is defined in ETR 290 as follows:

Indicator	Precondition	Reference
Sync_byte_error	Sync_byte not equal 0x47	ISO/IEC 13818-1: Sub clause 2.4.3.3

Analysis Server Configuration. To configure the Analysis Server to monitor for Sync_byte errors, activate the following probe:

ETR 290	Probe name	Configuration panel
1.2	Unsynchronized Packet Error	Multiplex Analysis

PAT_error (1.3)   The Program Association Table (PAT) contains a list of all programs and PIDs contained in the transport stream and of associated PMTs (Program Map Tables), which contain detailed program descriptions. The PAT is of key importance for decoding TV and audio programs. If the PAT is not available or contains an error, the MPEG-2 decoder will not be able to select and decode a program from the transport stream multiplex.

The syntactic structure of a PAT is comprehensively defined in MPEG-2 systems (ISO/IEC 13818-1). The PAT is exclusively transmitted in packets with PID 0x0000. The table may be divided into a maximum of 256 sections with the table index (table_id) of each section being 0x00.

Error Precondition. The preconditions for a PAT_Error message are defined in ETR 290 as follows:

Indicator	Precondition	Reference
PAT_error	PID 0x0000 does not occur at least every 0.5 seconds A PID 0x0000 does not contain a table_id 0x00 (that is, a PAT) Scrambling_control_field is not 00 for PID 0x0000	ISO/IEC 13818-1: Sub clauses 2.4.3.3, 2.4.4.4

Analysis Server Configuration. To configure the Analysis Server to monitor for PAT errors, activate the following probes:

ETR 290	Probe name	Configuration panel
1.3.a(1)	Maximum Interval Between Consecutive PAT Sections	Section Rate Analysis
1.3.a(2)	Table ID Error (PAT)	Section Syntactic Analysis
1.3.a(3)	Reserved PID with TSC Error	Transport Syntactic Analysis

Continuity_count_error (1.4)

Each packet of the transport stream is preceded by a header consisting of four bytes. The fourth byte of the header contains the count of a four-bit continuity counter. The count must be increased by one for every packet of the transport stream that has the same PID. The count may consist of values ranging from 0 to 15; beyond 15, it will start from 0 again (modulo-16 counter). The continuity counter serves to recognize packets of a video or audio program that are either missing or repeated more than once.

The MPEG-2 standard also tolerates counter discontinuity, provided this is indicated by a discontinuity indicator in the optional adaptation field (AF) of the same packet. This method is used primarily for the suppression of error messages when changing programs preceded by remultiplexing of the transport stream.

In the case of null packets (packets that do not contain any useful data but have a PID of 0x1FFF), continuity is not checked, since the value of the continuity counter in zero packets is not defined in the MPEG-2 standard.

Error Precondition. The preconditions for a Continuity_Count_Error_Error message are defined in ETR 290 as follows:

Indicator	Precondition	Reference
Continuity_count_error	Incorrect packet order A packet occurs more than twice Lost packet	ISO/IEC 13818-1: Sub clauses 2.4.3.2, 2.4.3.3

Analysis Server Configuration. To configure the Analysis Server to monitor for continuity count errors, activate the following probe:

ETR 290	Probe name	Configuration panel
1.4	Continuity Counter Error	Transport Syntactic Analysis

PMT_error (1.5)

The PMT (Program Map Table) is a table for detailed program descriptions referenced in the PAT. As essential information for the MPEG-2 decoder, it contains the PIDs of all packets of the individual TV, audio, and data streams (elementary-stream PIDs) as well as the PIDs of packets serving for the transmission of PCR values associated with the program. Like the PAT, the PMT is of key importance for decoding TV and audio programs. If PMT is not available or contains an error, the MPEG-2 decoder will not be able to select and decode a program from the transport stream multiplex.

The syntactic structure of a PMT is defined in MPEG-2 systems (ISO/IEC 13818-1). In contrast to the PAT, the PIDs of the individual PMTs are variable; MPEG-2 permits values ranging from 0x0010 to 0x1 FFE (compare to DVB ETS 300468: 0x0020 to 0x1 FFE). The table may be divided into a maximum of 256 sections with one section for each program. The table index (table_id) of each section must be 0x02.

Error Precondition. ETR290 states the preconditions for a PMT_Error message as follows:

Indicator	Precondition	Reference
PMT_error	Sections with table_id 0x02 (that is, a PMT) do not occur at least every 0.5 sec on the PID, which is referred to in the PAT Scrambling_control_field is not 00 for all PIDs containing sections with table_id 0x02 (i.e. a PMT)	ISO/IEC 13818-1: Sub clauses 2.4.3.3, 2.4.4.4, 2.4.4.8

Analysis Server Configuration. To configure the Analysis Server to monitor for PMT errors, activate the following probes:

ETR 290	Probe name	Configuration panel
1.5.a(1)	Maximum Interval Between Consecutive PMT Sections	Section Rate Analysis
1.5.a(2)	PMT PID with TSC Error	Transport Syntactic Analysis

PID_error (1.6)

The PMT (Program Map Table) entries reveal the elementary-stream PIDs that are contained in the transport-stream multiplex. To decode a program with the corresponding PID, these packets must be contained in the transport stream, and for the MPEG-2 decoder to function error-free these packets also need to be transmitted at certain intervals. The DVB Measurement Guidelines speak of a user-specified period, which means that it can be freely selected by the user. The default value used by the Analysis Server is 1 second; you can change this value when you set the "Absence of reference PID" probe through the Multiplex Analysis configuration panel of the Settings window (refer to *Multiplex Analysis Panel* on page 3-177).

Error Precondition. ETR 290 states the precondition for a PID_Error message as follows:

Indicator	Precondition	Reference
PID_error	Referred PID does not occur for a user-specified period	ISO/IEC 13818-1: Sub clause 2.4.3.8

Analysis Server Configuration. To configure the Analysis Server to monitor for PID errors, activate the following probe:

ETR 290	Probe name	Configuration panel
1.6	Absence of Referenced PID Error	Multiplex Analysis

Transport_error (2.1)

The second byte of every packet header in the transport stream contains the transport_error_indicator, which is a flag that serves to indicate bit errors in the following packet. This flag is generated and inserted by the Viterbi or Reed-Solomon decoder at the receiver end if the decoder is no longer capable of correcting all bit and byte errors in the transport stream.

Because it is not possible in the case of a set transport_error_indicator to predict which bit or byte contains an error, this packet must not be evaluated by an MPEG-2 decoder. For this reason, the MPEG test decoder only indicates the Transport_Error, which means that the packet is not checked for further transport stream errors.

Error Precondition. ETR 290 states the precondition for a Transport_error message as follows:

Indicator	Precondition	Reference
Transport_error	Transport_error_indicator in the TS-Header is set to 1.	ISO/IEC 13818-1: Sub clauses 2.4.3.2 / 2.4.3.3

Analysis Server Configuration. To configure the Analysis Server to monitor for non-zero Transport_Error_indicator fields, activate the following probe:

ETR 290	Probe name	Configuration panel
2.1	Transport Error Indicator	Transport Syntactic Analysis

CRC_error (2.2)

If program-specific information (PSI tables such as PAT, CAT, PMT, NIT, EIT, SDT, BAT, and TOT) is transmitted, a value for checking the check sum of this section is inserted at the end of each table section. The CRC (Cyclic Redundancy Check) is used for calculating the check sum at the transmitter and receiver end. Combined with the additionally transmitted CRC value, the check sum for each table section must be zero.

If the resulting check sum does not equal zero, the MPEG-2 decoder must reject the information contained in this table.

If a CRC_error is detected, it cannot be predicted which part of the information contained in the table is not correct. In this case, the MPEG test decoder signals the CRC_error, but the transport stream is not checked for further errors, which are derived from the faulty content of this table (for example, a search for PMT PIDs from a PAT or ES PIDs from a PMT).

Error Precondition. ETR 290 states the precondition for a CRC_Error message as follows:

Indicator	Precondition	Reference
CRC_error	CRC error occurred in CAT, PAT, PMT, NIT, EIT, BAT, SDT or TOT table	ISO/IEC 13818-1: Sub clause 2.4.4 / annex B ETS 300 468: Sub clause 5.2

Analysis Server Configuration. To configure the Analysis Server to monitor for CRC errors, activate the following probe:

ETR 290	Probe name	Configuration panel
2.2	CRC Error	Section Syntactic Analysis

PCR_error (2.3) In every transport stream, coded time values derived from the system time clock are transmitted so that the MPEG-2 decoder can link its own timing to the coder system timing in order to decode the input stream. Each program contained in the transport stream may have its own independent program system timing. The Program Map Table (PMT) identifies the PID of the transport packets that contain the PCR (<u>P</u>rogram <u>C</u>lock <u>R</u>eference) values used by the particular program.

The specified packets contain the optional Adaptation Field in which 42 bit PCR values are transmitted. The 42 bits contain two parts: a 33 bit PCR base and a 9-bit PCR extension. The following formulas hold for the bit structure:

PCR base (i) $\quad = \quad$ (system clock frequency $\times$ t(i) DIV 300) % 2^{33}

PCR extension (i) $\;=\;$ (system clock frequency $\times$ t(i) DIV 1) % 300

PCR (i) $\qquad = \quad$ (PCR base (i) $\times$ 300) + PCR extension (i)

A 42-bit PCR value coded this way starts again from count 0 after the elapse of $2^{33} \times 300$ clocks (corresponding to a time period of approximately 26.5 hours at 27 MHz).

The MPEG-2 standard also tolerates discontinuity of PCR values following one another, provided this is indicated by the discontinuity indicator in the optional adaptation field (AF) of the same packet. This method is primarily used for the suppression of PCR error messages when changing programs preceded by remultiplexing of the transport stream.

Error Precondition. ETR 290 states the preconditions for a PCR_Error message as follows:

Indicator	Precondition	Reference
PCR_error	PCR discontinuity of more than 100 ms occurring without specific indication	ISO/IEC 13818-1: Sub clauses 2.4.3.4 / 2.4.3.5
	Time interval between two consecutive PCR values more than 40 ms	ISO/IEC 13818-4: Sub clause 9.11.3
		ETR 154: Sub clause 4.5.4

The specified intervals are the default values of the Analysis Server. You can change the intervals, however, on the PCR Timing Analysis panel of the Configuration client.

Analysis Server Configuration. To configure the Analysis Server to monitor for PCR errors, activate the following probe:

ETR 290	Probe name	Configuration panel
2.3.a	PCR Timing Analysis[1]	PCR Timing Analysis
2.3.b	PCR Discontinuity	

[1] This probe also monitors the selected program(s) for PCR_accuracy errors.

PCR_accuracy_error (2.4)

The DVB Measurement Guidelines also recommend additional monitoring of the accuracy of the PCR values transmitted. Accuracy of PCR values may be impaired by inaccurate calculation of the 42-bit PCR word width or by errors during modification of PCR values in a remultiplex.

NOTE. The term accuracy in this case does not refer to absolute frequency accuracy of the 27 MHz system timing, but to the fluctuation width of the PCR values of a program, which is caused by the above mentioned errors.

Error Precondition. ETR 290 states the precondition for a PCR_accuracy_Error message as follows:

Indicator	Precondition	Reference
PCR_accuracy_error	PCR accuracy of selected program is not within ±500 ns	ISO/IEC 13818-1: Sub clause 2.4.2.2

Analysis Server Configuration. The PCR Timing Analysis probe measures the overall PCR jitter, which is the combination of the arrival-time jitter and the PCR-accuracy jitter. The overall PCR jitter will equal the PCR-accuracy jitter if the arrival-time jitter of the transmission is negligible.

To configure the Analysis Server to monitor for PCR_accuracy errors, activate the following probe:

ETR 290	Probe name	Configuration panel
2.4	PCR Timing Analysis[1]	PCR Timing Analysis

[1] This probe also monitors the selected program(s) for PCR errors.

PTS_error (2.5)   Presentation Time Stamps (PTS values) in the PES headers are transmitted by transport stream packets of a program. They enable the MPEG-2 decoder to identify the exact time that a transmitted data block (picture for video streams and beginning of an audio sequence for audio streams) is to be presented. The time stamps are transmitted with a word width of 33 bits and relate to the 27 MHz system timing sequence transmitted in the transport stream together with the PCR values.

Error Precondition. ETR 290 states the precondition for a PTS_Error message as follows:

Indicator	Precondition	Reference
PTS_error	PTS repetition period more than 700 ms	ISO/IEC 13818-1: Sub clauses 2.4.3.6 / 2.4.3.7 / 2.7.4

Analysis Server Configuration. To configure the Analysis Server to monitor for PTS errors, activate the following probe:

ETR 290	Probe name	Configuration panel
2.5	PTS/DTS Timing Analysis	PTS/DTS Timing Analysis

CAT_error (2.6)   If encrypted data are contained in a packet of the transport stream, this must be indicated in the packet header (2nd byte) within the field that is two bits wide and is labeled transport_scrambling_control. The individual values indicate the following:

Value (binary)	Description
00	No encrypted data contained in the packet
01, 10, 11	Defined by user

If encrypted data are to be transmitted, the MPEG-2 standard recommends the additional transmission of the tables containing the encryption data (Conditional Access Table, CAT) in separate packets with (0x0001) as PID and 0x01 as table index.

The MPEG-2 standard prescribes that packet header including the optional adaptation fields must not be transmitted in encrypted form. According to DVB specifications (ETS 300 468), the same applies to tables containing service information (SI tables PAT, PMT, NIT, EIT, BAT, TDT, TOT, and SDT). The only exception to this rule is the EIT (Event Information Table) when program overviews are transmitted.

Error Precondition. ETR 290 states the preconditions for a CAT_Error message as follows:

Indicator	Precondition	Reference
CAT_error	Packets with transport_scrambling_control not 00 present, but no section with table_id = 0x01 (that is, a CAT) present	ISO/IEC 13818-1: Sub clause 2.4.4
	Section with table_id other than 0x01 (that is, not a CAT) found on PID 0x0001	

Analysis Server Configuration. To configure the Analysis Server to monitor for CAT errors, activate the following probes:

ETR 290	Probe name	Configuration panel
2.6(1)	Scrambling without CAT Error	Multiplex Analysis
2.6(2)	CAT Table ID Error	Section Syntactic Analysis

NIT_error (3.1)
SDT_error (3.5)
EIT_error (3.6)
RST_error (3.7)
TDT_error (3.8)

These types of service information (SI) are also inserted into the transport stream as additional data (multiplex) and contain items such as the current date, time, and description of the TV program. Each of these tables is transmitted in the form of packets with a given packet number (PID) and must be contained in the transport stream at certain intervals according to the DVB specification. However, not every SI has a different PID; packets for TDT and TOT as well as SDT and BAT have identical PIDs. These tables are differentiated by an entry in the table header, the so-called table index (table_id). This table_id enables an MPEG-2 decoder working in compliance with the DVB standard to identify the type of service information with which it is dealing.

Table 3–16 on page 3–61 is an overview of the service information according to ETS 300 468. In the standard configuration, the Analysis Servers use these values. You can change the maximum interval for each table type using the Section Rate Analysis configuration panel of the Settings window (refer to *Section Rate Analysis Panel* on page 3–193). Do not change Maximum interval settings, however, if you plan to use ETR 290 tests to judge DVB compliance of the input stream.

Table 3-16: Overview of service information defined in ETS 300 468

Service Information	PID [hex]	Table_id [hex]	Max. interval [sec]
NIT	0x0010	0x40, 0x41, 0x42	10
SDT	0x0011	0x42, 0x46	2
BAT	0x0011	0x4A	10[1]
EIT	0x0012	0x4E to 0x4F, 0x50 to 0x6F	2[2]
RST	0x0013	0x71	—
TDT	0x0014	0x70	30
TOT	0x0014	0x73	30
Stuffing Table	0x0010 to 0x0013	0x72	—

[1] **Only if present.**

[2] **For the current transport stream multiplexer.**

Error Precondition. ETR 290 states the preconditions for NIT_error, SDT_error, EIT_error, RST_error, or TDT_error messages as follows:

Indicator	Precondition	Reference
NIT_error	Section with table_id other than 0x40 or 0x41 or 0x72 (that is, not an NIT or ST) found on PID 0x0010	ETS 300 468: Sub clause 5.2.1
	No section with table_id 0x40 or 0x41 (for example an NIT) in PID value 0x0010 for more than 10 sec	ETR 211: Sub clauses 4.1, 4.4
SDT_error	Sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2 sec	ETS 300 468: Sub clause 5.1.3
	Sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011	ETR 211: Sub clauses 4.1, 4.4
EIT_error	Sections with table_id = 0x4E (EIT-P/F, actual TS) not present on PID 0x0012 for more than 2 sec	ETS 300 468: Sub clause 5.1.3
	Sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012	ETR 211: Sub clauses 4.1, 4.4
RST_error	Sections with table_id other than 0x71 or 0x72 found on PID 0x0013	ETS 300 468: Sub clause 5.1.3
TDT_error	Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30 sec	ETS 300 468: Sub clause 5.1.3
	Sections with table_id other than 0x70, 0x72 (ST) or 0x73 (TOT) found on PID 0x0014	ETR 211: Sub clauses 4.1, 4.4

Analysis Server Configuration. To configure the Analysis Server to monitor for SI Table ID errors, activate the following probes:

ETR 290	Probe name	Configuration panel
3.1.a(1)	NIT Table ID Error	Section Syntactic Analysis
3.5.a(1)	SDT and BAT Table ID Error	Section Syntactic Analysis
3.6.a(1)	EIT Table ID Error	Section Syntactic Analysis
3.7	RST Table ID Error	Section Syntactic Analysis
3.8.2	TDT Table ID Error	Section Syntactic Analysis

To configure the Analysis Server to monitor for NIT, SDT, EIT, RST, and TDT Repetition errors, activate the following probes:

ETR 290	Probe name	Configuration panel
3.1.a(2)	NIT actual section rate probes	Section Rate Analysis
3.1.b	NIT other section rate probes	Section Rate Analysis
3.5.a(2)	SDT actual section rate probes	Section Rate Analysis
3.5.b	SDT other rate probes	Section Rate Analysis
3.6.a(2)	EIT actual section rate probes	Section Rate Analysis
3.6.b	EIT other rate probes	Section Rate Analysis
3.8.1	All TDT section rate probes	Section Rate Analysis

SI_repetition_error (3.2)

The ETR211 standard prescribes minimum and maximum intervals for the repetition of individual packets; Table 3-17 lists the values for service information (SI). The Analysis Server uses these values in the standard configuration. You can change the maximum interval for each table type using the Section Rate Analysis panel of the Settings window (refer to *Section Rate Analysis Panel* on page 3-193). Do not change Maximum interval settings, however, if you plan to use ETR 290 tests to judge DVB compliance of the input stream.

Table 3-17: SI repetition rates according to DVB

Service information	Maximum interval (complete table)	Minimum interval (individual sections)
PAT	0.5 s	25 ms
CAT	0.5 s[1]	25 ms[1]
PMT	0.5 s	25 ms
NIT	10 s	25 ms
SDT	2 s[2]	25 ms
BAT	10 s[1]	25 ms[1]

Table 3-17: SI repetition rates according to DVB (cont.)

Service information	Maximum interval (complete table)	Minimum interval (individual sections)
EIT	2 s[2]	25 ms
RST	—	25 ms
TDT	30 s	25 ms
TOT	30 s	25 ms

[1] **If present.**

[2] **For current transport stream multiplex.**

Error Precondition. ETR 290 states the precondition for an SI_repetition_Error message as follows:

Indicator	Precondition	Reference
SI_repetition_error	Repetition rate of SI tables outside of specified limits	ETS 300 468: Sub clause 5.1.4
		ETR 211: Sub clause 4.4

Analysis Server Configuration. To configure the Analysis Server to monitor for SI Repetition errors, activate the following probes:

ETR 290	Probe name	Configuration panel
3.2	Max/Min Interval Between Consecutive SI Sections (All SI tables, all PIDs)	Section Rate Analysis (Select **Add all**)

Unreferenced PID (3.4)   The transport stream multiplex is permitted to contain only packets with program-specific information (PSI and SI tables), packets with certain PIDs that are reserved in the MPEG-2 standard, and packets that are identified in a Program Map Table (PMT).

Error Precondition. ETR 290 states the precondition for an Unreferenced_PID message as follows:

Indicator	Precondition	Reference
Unreferenced_PID	PID (other than PAT, CAT, CAT_PIDs, PMT_PIDs, NIT_PID, SDT_PID, TDT_PID, EIT_PID, RST_PID, re-served_for_future_use PIDs, or PIDs user defined as private data streams) not referred to by a PMT within [0.5] seconds	ETS 300 468: Sub clause 5.1.3

Notice that according to the DVB Measurement Guidelines, if a program is changed (a new PMT), an unreferenced PID may appear in the transport stream during a transition period of no more than 0.5 s.

Analysis Server Configuration. To configure the Analysis Server to monitor for Unreferenced PID errors, activate the following probe:

ETR 290	Probe name	Configuration panel
3.4	Ghost Packets Error	Multiplex Analysis

Multiplex Probe Descriptions

This section discusses each of the multiplex analyses in the order that they are listed in the Configuration client Multiplex Analysis panel. Refer to *Multiplex Analysis Panel* on page 3-177 for information about using the configuration panel. Each section describes the errors detected by each of the multiplex probes and where the error is displayed in the Expert client.

Table 3-18 lists all of the multiplex analyses, the associated ETR 290 recommendation, and the analysis type setting required for the probe to be available (refer to *Analysis Panel* on page 3-174).

Table 3-18: Multiplex analyses

Analysis probe		ETR 290	Analysis type
Absence of referenced PID		1.6	All
Program not defined in PAT		—	All
Same PID in elementary stream and in PMT		—	All
Scrambling without CAT		2.6(1)	All
Ghosts packet		3.4.a	All
Unsynchronized packet		1.2	All
Table ID	PAT	1.3.a(2)	All
	CAT	2.6(2)	All
	NIT	3.1.a(1)	All
	TSDT	—	All
	SDT	3.5.a(1)	DVB only
	EIT	3.6.a(1)	DVB only
	RST	3.7	DVB only
	TDT	3.8(2)	DVB only
	TOT	—	DVB only
	MGT	—	ATSC only
	TVCT	—	ATSC only
	CVCT	—	ATSC only
	STT	—	ATSC only
	RRT	—	ATSC only
Inter SI consistency		—	DVB and DVB-T
Mega Frame size		—	DVB-T only
Terrestrial descriptor consistency		—	DVB-T only
Program paradigm		—	ATSC only
Scrambled ES without CA descriptor		—	ATSC only
Absence of mandatory EIT		—	ATSC only

Absence of Referenced PID Probe

Error Condition: Reports an error if the time interval between a PID reference in a PAT, CAT, PMT, or DCT and the appearance of that PID in the stream exceeds the period of delay (1 to 10 seconds) you specify.

Associated ETR 290 recommendation: PID_error, 1.6.

How/where an error is reported in the Expert client: In the ETR 290 view and as a general error message in the Report view.

Program Not Defined in PAT Probe

Error Condition: Reports an error if a PMT program number is not defined in the PAT.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Same PID in Elementary Stream and in PMT Probe

Error Condition: Reports an error if a PMT and an elementary stream are identified with the same PID.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Scrambling without CAT Probe

Error Condition: Reports an error if packets with non 00 transport_scrambling_control exist in the stream but no section with table_id 0x01 (a CAT) is found.

Associated ETR 290 recommendation: CAT_error, 2.6(1).

How/where an error is reported in the Expert client: In the ETR 290 view and as a general error message in the Report view.

Ghosts Packet Probe

Error Condition: Reports an error if a PID (other than one of the defined or reserved values) appears in the stream but is not referenced in a PMT within 0.5 seconds.

Associated ETR 290 recommendation: Unreferenced_PID, 3.4.a.

How/where an error is reported in the Expert client: In the ETR 290 view, as a general error message in the Report view, as a Ghost icon in the Hierarchic view, and as a Ghost service/program in several Statistic view panels.

Unsynchronized Packet Probe

Error Condition: Reports an error if the transport packet header Sync_byte is not 0x47.

NOTE. If synchronization is lost, no other analyses are possible.

Associated ETR 290 recommendation: Sync_byte_error, 1.2.

How/where an error is reported in the Expert client: As a general error message in the Report view, the UNP indicator on the application window status bar, the Unsynchro Packets panel of the Statistic View, and the ETR 290 level 1.2 indicator.

Table ID Probe

Error Condition: Reports an error if the Table ID of the PSI/SI selected is not correct.

Associated ETR 290 recommendation: See the table below.

Table 3-19: Table ID analyses

Table ID analysis error	ETR 290
PAT error: PAT 0 with table_id different to 0x0	1.3.a(2)
CAT error: PID 0x1 with table_id other than 0x1	2.6.2
NIT error: PID 0x10 with table_id other than 0x40, 0x41, or 0x72 (ST)	3.1.a(1)
SDT error: PID with 0x11 table_id other than 0x42, 0x46, 0x4A (BAT), or 0x72 (ST)	3.5.a(1)
EIT error: PID with 0x12 table_id other than 0x4E - 0x6F or 0x72 (ST)	3.6.a(1)
RST error: PID with 0x13 table_id other than 0x71 or 0x72 (ST)	3.7
TDT error: PID with 0x14 table_id other than 0x71 or 0x72 (ST) or 0x73 (TOT)	3.8(2)

How/where an error is reported in the Expert client: As an error message in the Report view, the ETR 290 PR1, PR2, and PR3 indicators on the application window status bar, and the ETR 290 views of the Statistic View.

Inter SI Consistency Probe (DVB only)

This analysis probe appears only when the analysis type setting is set to DVB (refer to *Analysis Panel* on page 3-174). Refer to the InterSI sections on page 3-68 for more information about the InterSI probe.

Error Condition: Reports an error if the Analysis Server detects problems between PSI and SI tables.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Setting the InterSI probe activates two types of analysis:

■ Intra analysis, which detects problems *within* PSI or SI tables.

■ Inter analysis, which detects problems of coherence between SI tables.

InterSI analyses within tables. When the InterSI probe is set, the Analysis Server checks the PMT, NIT, BAT, EIT and SDT for the presence of mandatory descriptors and checks all descriptors for compliance with DVB standards.

The Analysis Server also checks the following specific characteristics of the NIT and EIT:

■ In the NIT, the transport_stream_id and the network_id must be unique for a given network_id.

■ In the EIT, the field event_id must be unique for a given service_id, transport_stream_id, and original_network_id.

■ In the EIT, if either section zero (0) or one (1) are present, both must be present.

■ If an EIT is of type "schedule," then the running_status field must be set to "undefined."

■ If EIT is of type "following," then the running_status field shall not be set to "running."

InterSI analyses between tables. When the InterSI probe is set, the Analysis Server monitors the NIT, SDT, EIT, and BAT for inter-table compatibility and reports errors if the tables do not satisfy the following conditions:

■ The transport_stream_id and original_network_id fields of the NIT should be referenced in an SDT.

■ Each transport_stream_id, original_network_id, service_list_descriptor, and service_id of the NIT must be present in an SDT.

■ The transport_stream_id, and original_network_id fields of the EIT must be declared in the NIT.

■ Each transport_stream_id, original_network_id, service_list_descriptor, and service_id of the BAT must be present in an SDT.

■ There should be an EIT referencing the service_id, transport_stream_id, and original_network_id fields of the SDT.

■ If the EIT_schedule_flag field of the SDT is set to 1, then an EIT schedule for service_id, transport_stream_id, and original_network_id must be present.

■ If the EIT_schedule_flag of the SDT is set to 0, then an EIT schedule should not be present for service_id, transport_stream_id, or original_network_id.

■ If the EIT_present_following_flag of the SDT is set to 1, then an EIT present/following for service_id, transport_stream_id, and original_net-work_id must be present.

■ If the EIT_present_following_flag of the SDT is set to 0, then an EIT present/following should not be present for service_id, transport_stream_id, or original_network_id.

Mega Frame Size Probe (DVB-T only)

This analysis probe appears only when the analysis type setting is set to DVB and DVB-T is selected (refer to *Analysis Panel* on page 3–174).

Error Condition: Reports an error if the Mega Frame Size probe detects inconsistency between the indicated size of the Mega Frames in the MIP and the measured size (calculated from the packet rate and the PIA time stamps.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Terrestrial Descriptor Consistency Probe (DVB-T only)

This analysis probe appears only when the analysis type setting is set to DVB and DVB-T is selected (refer to *Analysis Panel* on page 3–174).

Error Condition: Reports an error if the parameters carried in the MIP match those carried in the terrestrial delivery system descriptor (if present in the NIT).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Program Paradigm Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the Analysis Server detects problems of consistency with the method specified by the program paradigm. Refer to *Appendix F: ATSC Program Paradigm* for more information.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view and as a specific report of the ES or table concerned. The messages are logged in the multiplex folder.

Scrambled ES Without CA Descriptor Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the CA descriptor is not found where expected for an ES PID.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view and in the specific report of the stream in the Hierarchic window.

Absence of Mandatory EIT Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the mandatory EIT (0, 1, 2, 3) are not all present.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view. The messages are logged in the multiplex folder.

Syntax Probe Descriptions

The MTM300 Series MPEG Transport Monitor provides the following levels of syntax analyses (the page references indicate where the discussions for that probe type begin):

- Private syntax analysis (beginning on page 3--72)

- Transport syntax analyses (beginning on page 3--73)

- Section syntax analyses (beginning on page 3--77)

- Mega Frame syntax analyses (DVB-T only) (beginning on page 3--79)

Refer to *Appendix E: Using the Private Syntax Interpreter* for more information about using the Private Syntax Interpreter and generating user-defined private syntax definition files.

When the Analysis Servers detect a section syntax error, the error indicator above the Expert client Hierarchic view icon turns red and a general error message appears in the Report view. You can also double-click the Hierarchic view icon to open a Message view particular to the affected table. The Expert client also displays the presence and nature of each section syntax error in the section analysis view (refer to *Section Analysis View* on page 3--148).

Use the Configuration client Transport Syntactic Analysis, Section Syntactic Analysis, and Mega Frame Syntactic Analysis panels to set, modify, and remove probes that check transport stream syntax:

- Refer to *Transport Syntactic Analysis Panel* on page 3--181 for information about using the Transport Syntactic Analysis panel.

- Refer to *Section Syntactic Analysis Panel* on page 3--183 for information about using the Section Syntactic Analysis panel.

- Refer to *Mega Frame Syntactic Analysis Panel* on page 3--185 for information about using the Mega Frame Syntactic Analysis panel.

Private Syntax Probe Descriptions

This section describes the private syntax options available on the Analysis panel of the Configuration client.

Private Syntax and General Syntactic Information

The Configuration client Syntactic Analysis panel contains general configuration and private syntax options that affect private section interpretation and syntax error reporting:

- The Map private section as DVB section option appears only when you have set the analysis type to DVB using the Analysis panel (refer to *Analysis*, beginning on page 3--43 and *Analysis Panel* on page 3--174).

  When you select Map private section as DVB section (a check appears in front of the option), the Analysis Server attempts to interpret all private sections encountered in the stream as DVB SI sections.

- The Maximum number of errors by entity setting allows you set the maximum number of errors the Analysis Server detects before stopping the analysis for an entity. This limits the number of syntax errors reported by the Analysis Server for each entity. This option is convenient when you are analyzing non-compliant streams that contain many errors.

Including Private Syntax Definition Files

You can load user-defined private syntax definition (.cta) files using the Private Syntax portion of the Configuration client Syntactic Analysis panel. The files you load, generated with the Private Syntax Interpreter, allow you to analyze proprietary or non-standard tables and descriptors contained in the input stream. To load one or more Private syntax definition files, use the following procedure:

1. Click **Modify** in the Private Syntax group. The Syntax Selection dialog box is displayed.

2. Select the private syntax definition file you want to load from the List of available syntax list box and click **Add**. The file name is added to the List of selected syntax list box.

3. Repeat step 2 for each file you want to load into the Analysis Server configuration.

4. Click **OK** when you are finished, and then apply your changes in the Configuration client.

Refer to *Appendix E: Private Syntax Interpreter* for more information about using the Private Syntax Interpreter and generating user-defined private syntax definition files.

Transport Syntax Probe Descriptions

Table 3-20 lists the transport syntax analyses, the associated ETR 290 recommendation, and the analysis type selected when the probe is available (refer to *Analysis Panel* on page 3-174).

Table 3-20: Transport syntax analyses

Analysis probe	ETR 290	Analysis type
Null packet with PUSI	none	All
Reserved PID	none	All
PID 0x47	none	All
Reserved (PAT, CAT, or Null Packet) PID with TSC	1.3.a(3)	All
PMT PID with TSC	1.5.a(2)	All
Continuity counter	1.4	All
PCR/OPCR flags	none	All
Null packet with ADF	none	All
ADF flags	none	All
Transport error indicator	2.1	All
PAT PID with AFC & DI	—	ATSC only
PMT PID with AFC & DI	—	ATSC only
PSIP tables PID with TSC	—	ATSC only
PSIP tables PID with ADF	—	ATSC only
MGT PID with PUSI & pointer field	—	ATSC only

Null Packet with PUSI Probe

Error Condition: Reports an error if a null packet (PID 0x1FFF) is received with the bit PUSI (payload_unit_start_indicator) set to 1. If the PUSI bit is set to 1, it indicates that the payload of this transport stream packet will commence.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

Reserved PID Probe

Error Condition: Reports an error if any PID value is not equal to the following: 0x0000 (PAT), 0x0001 (CAT), 0x0002 (TSDT), or in the interval 0x0010-0x1FFF (user-defined).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

PID 0x47 Probe

Error Condition: Reports an error if a packet with PID 0x47 is received.

*NOTE. The **PID 0x47** error is not a violation of the MPEG-2 standard. However, you may want to detect PID 0x47 since it can lead to troubles during decoding if the decoder incorrectly interprets the PID as a sync byte.*

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Reserved (PAT, CAT, and Null Packet) PID with TSC Probe

Error Condition: Reports an error if a PID 0x0000 (PAT), 0x0001 (CAT), or 0x1FFF (null/stuffing) packet has a transport_scrambling_control field that does not equal 00.

Associated ETR 290 recommendation: PAT_error, 1.3.a(3).

How/where an error is reported in the Expert client: In the ETR 290 view, as a general error message in the Report view, and in the item Message view, if any.

PMT PID with TSC Probe

Error Condition: Reports an error if a PMT PID (described by the PAT) has a transport_scrambling_control field that does not equal 00. MPEG standards do not allow scrambled PMT.

Associated ETR 290 recommendation: PMT_error, 1.5.a(2).

How/where an error is reported in the Expert client: In the ETR 290 view, as a general error message in the Report view, and in the PMT Message view (if it is open in the Client view).

Continuity Counter Probe

Error Condition: Reports an error if the Analysis Server detects an incorrectly incremented transport packet continuity_counter. Except for null packets and in cases of duplicate packets or discontinuities, the continuity counter of each successive payload-carrying packet of the same PID must increment by one, from 0x0 to 0xF (module 16).

Associated ETR 290 recommendation: Continuity_count_error, 1.4.

NOTE. The Continuity Counter panel displays detected errors on a per-service basis. Refer to Continuity Counter Panel *on page 3–141 for more information about this panel.*

How/where an error is reported in the Expert client: The ETR 290 view, the Continuity Counter panel of the Statistic view, and the appropriate Message view(s).

PCR/OPCR Flags Probe

Error Condition: Reports an error if the Analysis Server detects a transport packet adaptation field PCR_flag set to 0, and if the OPCR_flag is set to 1 (cannot have an OPCR without a PCR).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: An error message in the appropriate Message view(s).

Null Packet with ADF Probe

Error Condition: Reports an error if the Analysis Server detects a null packet that has an adaptation field.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a general error message in the Report view.

ADF Flags Probe

Error Condition: Reports an error if the Analysis Server detects no coherence between the adaptation field control and the adaptation field length. The Analysis Server detects three error conditions:

- The adaptation_field_control is 00.

- The adaptation_field_control is 10, but the adaptation_field_length is not equal to 183.

- The adaptation_field_control is 11, but the adaptation_field_length is not in the range of 0 through 182.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Transport Error Indicator Probe

Error Condition: Reports an error if the Analysis Server detects a transport_error_indicator field (of a transport packet header) is equal to 1, which indicates that at least one uncorrectable bit error exists in the associated transport packet.

Associated ETR 290 recommendation: Transport_error, 2.1.

How/where an error is reported in the Expert client: The ETR 290 view, the TEI indicator on the status bar, and the TP Error Indicator panel of the Statistic View (refer to *TP Error Indicator Panel* on page 3-143).

PAT PID with AFC & DI Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the Analysis Server detects no coherence between the adaptation field control and the discontinuity indicator (if the AFC = 10 or 11, the DI must be set to 1) within the PAT.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

PMT PID with AFC & DI Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the Analysis Server detects no coherence between the adaptation field control and the discontinuity indicator (if the AFC = 10 or 11, the DI must be set to 1) within a PMT.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

PSIP Tables PID with TSC Probe (ATSC only)

This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3-174).

Error Condition: Reports an error if the Analysis Server detects PSIP table packet PID with a transport_scrambling_control field that does not equal 00.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

PSIP tables PID with ADF Probe (ATSC only)
This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3–174).

Error Condition: Reports an error if the Analysis Server detects PSIP table packet PID that has an adaptation field.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

MGT PID with PUSI & Pointer Field Probe (ATSC only)
This analysis probe appears only when the analysis type setting is set to ATSC (refer to *Analysis Panel* on page 3–174).

Error Condition: Reports an error if the Analysis Server detects no coherence between the payload_unit_start_indicator and the pointer field (if the PUSI is 1 then the pointer field must be set to 0).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Section Syntax Probe Descriptions

Table 3–21 lists the section syntax analyses, the associated ETR 290 recommendation, and the analysis type selected when the probe is available (refer to *Analysis Panel* on page 3–174).

Table 3-21: Section syntax analyses

Analysis probe	ETR 290	Analysis type
Section number or version number	—	All
CRC	2.2	All
Section syntax	—	All

The Analysis Server notes the presence and nature of each section syntax error in the section analysis view. Refer to *Section Syntactic View* on page 3–148 for information about the section analysis view.

Section Number or Version Number Probe

Error Condition: Reports an error if one or more of the following section and version numbering errors are found in a PSI, SI, PSIP, ISDB-S/ARIB table section:

- Sections received out of order; for example section number 1 arrives before section number 0

- All sections with the same version number do not have the same last section number

- The version number is improperly incremented

- The version number increments before the last section of the previous version number has been received

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

CRC Probe

Error Condition: Reports an error if the Analysis Server detects a CRC error in a PSI, SI, or PSIP table.

Associated ETR 290 recommendation: CRC_error, 2.2.

How/where an error is reported in the Expert client: In the ETR 290 view, and as a syntax error in the appropriate Message view(s).

Section Syntax Probe

Section syntax probes perform a complete analysis of every field in all sections of the selected table type.

Error Condition: Reports an error if the section syntax of the PSI, SI, PSIP, or ISDB-S/ARIB table section selected is not correct.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As coloration of the associated Hierarchic view icon error indicator(s), and as a syntax error in the appropriate Message view(s).

The Analysis Server also notes the presence and nature of each section syntax error in the section analysis view. Refer to *Section Analysis View* on page 3–148 for information about the section analysis view.

Mega Frame Syntax Probe Descriptions

Table 3–22 lists the Mega Frame syntax analyses, the associated ETR 290 recommendation and the analysis type selected when the probe is available.

Table 3‑22: Section syntax analyses

Analysis probe	ETR 290	Analysis type
CRC	—	DVB-T
Syntax	—	DVB-T
Time offset	—	DVB-T
Frequency offset	—	DVB-T
Power	—	DVB-T

NOTE. To access the Mega Frame syntax analyses, you must select the DVB analysis type with the DVB-T analysis option. Refer to Analysis Panel *on page 3–174 for information about using the Analysis panel.*

Use the Configuration client Mega Frame Syntactic Analysis panel to set and remove probes that monitor Mega Frame syntax. Refer to *Mega Frame Syntactic Analysis Panel* on page 3–185 for information about using the Mega Frame Syntactic Analysis panel.

This section describes the Mega Frame syntax analyses in the order that they are listed in the Mega Frame Syntactic Analysis panel.

CRC Probe

Error Condition: Reports an error if the computed Mega Frame CRC and the Mega Frame CRC carried in the MIP do not match.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Syntax Probe

Error Condition: Reports an error if every field of Mega Frame syntax is not valid.

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Time Offset Probe

Error Condition: Reports warnings if the value carried in the time offset function of a transmitter exceeds the user-defined limits. Three parameters are required for the probe: transmitter ID (entered in hex), and the minimum and maximum values (entered in 100 nanosecond units).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Frequency Offset Probe

Error Condition: Reports warnings if the value carried in the frequency offset function of a transmitter exceeds the user-defined limits. Three parameters are required for the probe: transmitter ID (entered in hex), and the minimum and maximum values (entered in Hertz).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Power Probe

Error Condition: Reports warnings if the value carried in the power function of a transmitter exceeds the user-defined limits. Three parameters are required for the probe: transmitter ID (entered in hex), and the minimum and maximum values (entered in 0.1 dBm units).

Associated ETR 290 recommendation: None.

How/where an error is reported in the Expert client: As a syntax error in the appropriate Message view(s).

Timing Probe Descriptions

Analysis Servers provide the following levels of timing analyses (the page references indicate where the discussions for that probe type begin):

- PCR timing analyses (beginning on page 3–81)

- PTS/DTS timing analyses (beginning on page 3–82)

- Mega Frame timing analysis (DVB-T only) (beginning on page 3–83)

PCR Timing Analyses

PCR probes monitor the clock references of a selected program for regularity and precision. When you set a PCR probe in the standard configuration, the Analysis Server reports a PCR error if one of the following conditions is detected:

- The interval between consecutive PCR packets is greater than 100 ms in MPEG-2 mode or greater than 40 ms in DVB mode

- The PCR overall is greater than ± 500 ns

  The PCR Timing Analysis probe measures the overall PCR jitter, which is the combination of the arrival-time jitter and the PCR-accuracy jitter. The overall PCR jitter will equal the PCR-accuracy jitter if the arrival-time jitter of the transmission is negligible.

NOTE. The default PCR error limits used by the Analysis Server are consistent with ETR 290 recommendations. You can change the error limits, if necessary, using the PCR Timing Analysis configuration panel in the Settings window (refer to Analysis:Advanced:Timing:PCR Panel *on page 3–187).*

Setting PCR Probes. Use the PCR Timing Analysis panel to configure and set PCR probes one program at a time and, if desired, use unique error limits for each individual program. You can also set PCR probes on all stream programs at once, but you must then use the same measurement error limits for all programs.

Refer to *PCR Timing Analysis Panel* on page 3–187 for information about using the PCR Timing Analysis panel to set PCR probes.

NOTE. The Analysis Server uses an internal settling filter to improve the accuracy of PCR jitter analysis. The Settling Filter must have at least 60 seconds of data before before the Analysis Server can detect and report PCR jitter errors. Wait 60 seconds after setting a PCR probe to judge the PCR jitter performance or compliance.

PCR error reporting in the Expert client. When a PCR error occurs, the colored indicator above the affected Hierarchic view PMT icon turns red and a general error message appears in the Report view. The message also appears on the PMT Message view if it is open in the Client window.

The Analysis Server also indicates PCR errors in the ETR 290 and PCR Analysis views.

PTS/DTS Timing Analyses

PTS/DTS probes monitor the time stamps of selected elementary streams for compliance with the ETR 290 recommended interval of no more than 700 ms (default setting; you can set a different value) between consecutive PES packets with non-zero PTS/DTS flags.

NOTE. You can set PTS/DTS probes only on unscrambled elementary streams.

Refer to *PTS/DTS Timing Analysis Panel* on page 3--189 for information about using the PTS/DTS Timing Analysis panel.

Setting PTS/DTS Probes. You can use either of the following two methods to set PTS/DTS probes:

■ Select an audio or video elementary stream icon in the Hierarchic view, right-click to open the shortcut menu, and then select **PTS/DTS Probe** or **View PTS/DTS Analysis**. To remove the PTS/DTS probe, select **PTS/DTS Probe** a second time from the selected icon shortcut menu in the Hierarchic view.

When you select **View PTS/DTS Analysis**, a PTS/DTS Analysis view opens in the Client view and the PTS/DTS probe is enabled. Refer to *PTS/DTS Analysis View* on page 3--154 for information about using the PCR Analysis view.

■ Use the PTS/DTS Timing Analysis panel of the Settings window (shown on the previous page) to configure and set PTS/DTS probes one program at a time and, if desired, use unique error limits for each individual elementary stream. You can also set PTS/DTS probes on all elementary streams at once, but you must then use the same measurement error limits for all programs.

Refer to *PTS/DTS Timing Analysis Panel* on page 3--189 for information about using the PTS/DTS Timing Analysis panel.

PTS/DTS error reporting in the Expert client. When a PTS/DTS error occurs, the colored indicator above the affected Hierarchic view elementary stream icon turns red and a general error message appears in the Report view. The message also appears on the elementary stream Message view if it is open in the Client window.

In addition, the Analysis Server also indicates PTS/DTS errors in the ETR 290 and PTS/DTS Analysis views.

Mega Frame Timing Analysis (DVB-T Only)

The only specific timing analysis performed on DVB-T streams (in addition to the regular MPEG-2/DVB rate analyses) is the STS interval check.

Use the STS interval probe to check that the difference between two consecutive Synchronization Time Stamps carried in the MIP remains within a user-defined interval, and to report warnings every time the limits are exceeded.

The STS interval probe has two parameters: the Min and Max values allowed (expressed in 100 nanosecond units). Typically the STS interval should remain within the (0.5, 0.61) seconds interval.

Set the STS interval probe using the Mega Frame Timing Analysis configuration panel in the Settings window (refer to *Mega Frame Timing Analysis Panel* on page 3--185).

Transport Rate Probe Descriptions

When performing transport rate analysis on an input, the Analysis Server calculates the average bit rate of each PID in the input stream. Transport rate analysis is automatic and cannot be disabled.

The Analysis Server calculates transport rates every 500 ms, but uses a smoothing period for transport rate averaging. In the default configuration, the Analysis Server averages the reported transport rate over one second, or two 500 ms sample periods. You can increase the smoothing period up to 10 seconds using the Analysis panel of the Settings window. Refer to *Analysis Panel* on page 3‑174 for more information.

In addition to calculating transport rates for every PID in the stream, the Analysis Server can also monitor selected PIDs and alert you when the transport rate of the selected PID(s) violates user-specified high and low error limits.

Viewing Transport Rate Analysis Results

The Analysis Server displays the results of transport rate analysis in the Program Allocation, PID Allocation, and Type Allocation panels of the Statistic View.

Program Allocation Panel. The Program Allocation panel of the Expert client Statistic view shows the bandwidth allocation of the input multiplex. Both the numeric data and the pie chart update every 500 ms to give a near-instantaneous report of input stream composition. Double-click on a slice of the pie chart to change to the PID Allocation panel with the corresponding program already selected.

Refer to *Program Allocation Panel* on page 3‑135 for more information.

PID Allocation Panel. The PID Allocation panel of the Statistic view provides a more detailed, program-level view of input stream bandwidth allocation. The panel also indicates whether or not transport rate error limits are set and shows rate errors when they occur. Click a button on the left side of the panel to select a service and see the instantaneous, previous maximum, and previous minimum multiplex rates for every PID in the service. As in the Program Allocation panel, all values update every 500 ms.

Refer to *PID Allocation Panel* on page 3‑138 for more information.

Type Allocation Panel. The Type Allocation panel of the Statistic view shows the bandwidth allocation of each PID type in a pie chart display. Each slice of the pie chart represents a PID type (such as audio, video, or data). The number of PIDs, the allocation percentage, the minimal and maximal rate and its current value are displayed for each pie chart slice.

Refer to *Type Allocation Panel* on page 3‑142 for more information.

Setting Transport Rate Probes
Use the Configuration client Transport Rate Analysis panel to set probes on selected stream PIDs for transport rates that fall below or exceed the limits that you specify. You must enter a high- or low-limit value to add a probe.

Refer to *Transport Rate Analysis Panel* on page 3--192 for information about using the Transport Rate Analysis panel.

Section Rate Probe Descriptions

Use the Configuration client Section Rate Analysis panel to specify the maximum acceptable interval between consecutive subtable sections of each selected table type.

NOTE. *The Intervals settings determine the threshold for errors reported on the ETR 290 view. The default settings are consistent with ETR 290 recommendations. Do not change these settings if you plan to use ETR 290 tests to judge DVB compliance of the input stream.*

Refer to *Section Rate Analysis Panel* on page 3--193 for information about using the Section Rate Analysis panel.

To open a dynamic Section Rate analysis view in the Expert client, select an icon in the Hierarchic view, right click to open the shortcut menu, and then select **View Section Rate**.

Refer to *Section Rate View* on page 3--150 for more information about using the Section Rate view.

Table 3–23 lists each of the section rate probes, the associated ETR 290 recommendation for each applicable probe, and the analysis type setting when the probe is available (refer to *Analysis Panel* on page 3–174).

Table 3‑23: Section rate analyses

Analysis probe	ETR 290	Analysis type
Maximum interval between consecutive PAT subtable sections	1.3.a(1)	All
Maximum interval between consecutive CAT subtable sections	—	All
Maximum interval between consecutive TSDT subtable sections	—	All
Maximum interval between consecutive PMT subtable sections	1.5.a(1)	All
Maximum interval between consecutive NIT subtable sections. Two probes are available: NIT actual and NIT other.	3.1.a(2)	DVB and DVB-T
Maximum interval between consecutive SDT subtable sections. Two probes are available: SDT actual and SDT other.	3.5.a(2)	DVB and DVB-T
Maximum interval between consecutive EIT subtable sections. Four probes are available for DVB and DVB-T analysis: EIT actual present-following, EIT other present-following, EIT actual schedule, and EIT other schedule. One EIT probe is available for ATSC/PSIP analysis.	3.6.a(2)	DVB, DVB-T, and ATSC
Maximum interval between consecutive BAT subtable sections	—	DVB and DVB-T
Maximum interval between consecutive TDT subtable sections	3.8(1)	DVB and DVB-T
Maximum interval between consecutive TOT subtable sections	—	DVB and DVB-T
Maximum interval between consecutive SIT subtable sections	—	DVB and DVB-T
Maximum interval between consecutive DIT subtable sections	—	DVB and DVB-T
Maximum interval between consecutive MGT subtable sections	3.5	ATSC
Maximum interval between consecutive TVCT subtable sections	3.6.1	ATSC
Maximum interval between consecutive CVCT subtable sections	3.6.2	ATSC
Maximum interval between consecutive STT subtable sections	3.3	ATSC
Maximum interval between consecutive RRT subtable sections	3.7	ATSC
Maximum interval between consecutive EIT subtable sections	—	ATSC
Minimum interval between consecutive sections with the same table ID, table ID extension	3.2	All
Maximum interval between consecutive BIT subtable sections	—	ISDB only
Maximum interval between consecutive DCT subtable sections	—	ISDB only
Maximum interval between consecutive DLT subtable sections	—	ISDB only
Maximum interval between consecutive SDTT subtable sections	—	ISDB only

Maximum Interval Between Consecutive subtables Probe

Error Condition: Reports an error if the maximum interval between consecutive subtable sections of the specified stream item exceeds the value set on the Section Rate Analysis panel of the Settings window. Refer to Table 3–23 for a list of section rate probes.

Associated ETR 290 recommendation: Refer to Table 3–23 for a list of associated ETR 290 recommendations for each stream item.

How/where an error is reported in the Expert client: In the ETR 290 view, as a general error message in the Report view, and in the appropriate Message view(s).

Minimum Interval Between Consecutive Sections Probe

Error Condition: Reports an error if the minimum interval between consecutive table sections with the same table ID is less than 25 ms.

Associated ETR 290 recommendation: SI_repetition_error, 3.2.

How/where an error is reported in the Expert client: In the ETR 290 view and as an error message in the appropriate Message views(s).

NOTE. *You cannot change the minimum interval setting from the default (25 ms).*

Mega Frame Rate Probe Descriptions (DVB-T only)

The only specific rate analysis performed on DVB-T streams (in addition to the regular MPEG-2/DVB rate analyses) is the measurement of the intervals between two consecutive MIPs.

Use the MIP interval probe to check that the difference between the PIA time stamps (the arrival time of the packets) of two consecutive MIPs remains within a user-defined interval, and to report warnings every time the limits are exceeded.

The MIP interval probe has two parameters: the Min: and Max: values allowed (expressed in 100 nanosecond units). Typically the MIP interval should remain within the (0.5, 0.61) seconds interval.

Set the MIP interval probe using the Mega Frame Rate Analysis configuration panel in the Settings window (refer to *Mega Frame Rate Analysis Panel* on page 3–195).

TMCC Probe Descriptions

You can use the new TMCC analysis capabilities to set TMCC analysis probes on either the Analysis Server or the TMCC Analysis Server. This section describes these probes. See the *Configuration Client Reference* and the *TMCC Configuration Client Reference* sections for information about using those clients.

The Configuration Client allows you to set Multiplex, Syntax, and Rate probes for various ISDB/ARIB tables. Each of these probes are described in earlier sections, as indicated below.

- For the Absence of Referenced PID probe, see *Multiplex Probes Desctriptions* beginning on page 3-65.

- For the Continuity Counter and ADF Flags probes, see *Transport Syntax Probe Descriptions* beginning on page 3-73.

- For the Section or Version Number and Section Syntax probes, see *Section Syntax Probes Descriptions* beginning on page 3-77.

- For the Rate Interval probes, see the *Transport Rate Probe Descriptions* beginning on page 3-84.

- For the Section Rate probes, see *Section Rate Probe Descriptions* beginning on page 3-85.

The TMCC Configuration Client allows you to set the following TMCC probes (page numbers indicate the page on which the probe is described):

- *TMCC Update Notification Probe*   page 3-89

- *TMCC Alarm Status Notification Probe*   page 3-89

- *Frame Size Consistency Probe*   page 3-89

- *Super Frame Size Consistency Probe*   page 3-90

- *TMCC Update Consistency Probe*   page 3-90

- *Number of Slots Consistency Probe*   page 3-90

- *Modulation Mode and Slot Consistency Probe*   page 3-91

- *TMCC Syntax Consistency Probe*   page 3-91

- *Modulation Order Consistency Probe*   page 3-91

The TMCC Analysis Servers always perform the following analyses (the results are displayed in the Status bar of the TMCC Expert Client):

■ Synchronization bytes

■ 0x47 for single-transport stream multiplexes

■ W1 (0x1B95), W2 (0xA340), and W3 (0x5CBF) for multiple-transport stream multiplexes

■ Overall TMCC stream rate when used in the real-time mode

When the TMCC Expert Client is used in the deferred-time mode, you set the rate in the TMCC Configuration Client.

TMCC Update Notification Probe

Error Condition: A message is generated when at least one bit is modified in the TMCC information. The transmission_frame_id and super_frame_id fields are not analyzed for this probe:

How/Where and alarm is displayed: This is reported as an information message in the Messages panel of the TMCC Expert Client.

TMCC Alarm Status Notification Probe

Error Condition: A message is generated when the alarm_signal_flag or the emergency_alarm_flag fields are set to 1.

How/Where and alarm is displayed: This is reported as an information message in the Messages panel of the TMCC Expert Client.

Frame Size Consistency Probe

Error Condition: The following statements must be true, or an error is generated by the TMCC Analysis Server:

■ The current computed frame size is the same as the latest frame size.

■ The computed frame size is equal to the total number of slots inidicated in the transmission_mode and slot_info fields.

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client and as an error message in the Message panel of the TMCC Expert Client.

Super Frame Size Consistency Probe

Error Condition: The following statements must be true, or an error is generated by the TMCC Analysis Server:

- The super frame size is eight (8).

- If the transmissioin_frame_id is one (1), the super_frame_id must also be one (1). This ensures that the first frame of the super frame is synchronized with the first frame.

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client and as an error message in the Message panel of the TMCC Expert Client.

TMCC Update Consistency Probe

Error Condition: The following statements must be true, or an error is generated by the TMCC Analysis Server:

- When the TMCC information is updated, the following statements are also true:

  - The update_indication flag is one (1).

  - The update_indication counter is correctly incremented.

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client and as an error message in the Message panel of the TMCC Expert Client.

Number of Slots Consistency Probe

Error Condition: The following statements must be true, or an error is generated by the TMCC Analysis Server:

- For TMCC basic streams, the number of slots must be less than 48

- For TMCC data streams, the number of slots must be 48

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client, as an error message in the Message panel of the TMCC Expert Client, and the modulation scheme color becomes red in the Slots panel of the TMCC Expert Client.

Modulation Mode and Slot Consistency Probe

Error Condition: The following statements must be true, or an error is generated by the TMCC Analysis Server:

- The minimum number of slots is not consistent with the modulation mode. The number of packets transmitted and the number of symbols used for a given modulation scheme are given by the following equation:

$$I_k = \frac{8 \times B \times P_k}{E_k}$$

Where:

- I_k is the integer number of symbols transmitted with the *k-th* combination of the modulation scheme and inner code rate

- P_k is the integer number of packets transmitted with the *k-th* combination of the modulation scheme and inner code rate

- E_k is the spectrum efficiency of the *k-th* combination of the modulation scheme and inner code rate

- B is 204, the number of bytes per packet

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client, as an error message in the Message panel of the TMCC Expert Client, and the modulation scheme color becomes red in the Slots panel of the TMCC Expert Client.

TMCC Syntax Consistency Probe

Error Condition: If the syntax of TMCC fields is incorrect, an error is generated by the TMCC Analysis Server.

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client and as an error message in the Message panel of the TMCC Expert Client.

Modulation Order Consistency Probe

Error Condition: If the order of the different modulation schemes used in the transport stream is incorrect, an error is generated by the TMCC Analysis Server. (The highest efficiency modulation scheme used in the transport stream must use the lower numbered slots, and the lower efficiency modulation schemes used must use the higher numbered slots.)

How/Where and alarm is displayed: This error is reported as an ISDB multiplex error in the Master Client, as an error message in the Message panel of the TMCC Expert Client, and the modulation scheme color becomes red in the Slots panel of the TMCC Expert Client.

Expert Client Reference

The Expert Client application is a full-featured, MPEG-2 protocol analyzer capable of analyzing transport streams in real time. You start the Expert Client from the Master Client by right-clicking an Analysis Server icon in the Port Manager panel and selecting Launch Expert Client from the submenu.

The Expert client has the following characteristics:

- Graphical displays showing the structure (hierarchy) of the input transport stream and display characteristics of each component of the input stream (for example: PID and type allocation, section rate analyses, and timing analyses).

- Report views indicating the types of errors recorded by the Analysis Server and the characteristics of the input stream.

- Error views showing the errors recorded for the various components of the transport stream; for example, PMT section rate errors and ETR 290 errors.

NOTE. *The Expert client displays the analyses of only one transport stream at a time. If the input you are analyzing is an M_TMCC stream, you can specify which transport stream to display from the TMCC Configuration client.*

The Expert client displays the results of only one Analysis Server (input) at a time. You can connect more than one Expert client to the same Analysis Server input from your own machine, and several Expert clients on different machines may connect to the same transport monitor, and even to the same Analysis Server, at once.

You can use the Data Logging function to record selected transport stream events to tab-delimited text files. You can use the text files for record keeping or for further analysis. Refer to *Data Logging* on page 3-166 for more information.

This section describes the Expert client in the following subsections:

Expert Client Display Elements

Figure 3‑9 shows the different elements of the Expert client display.
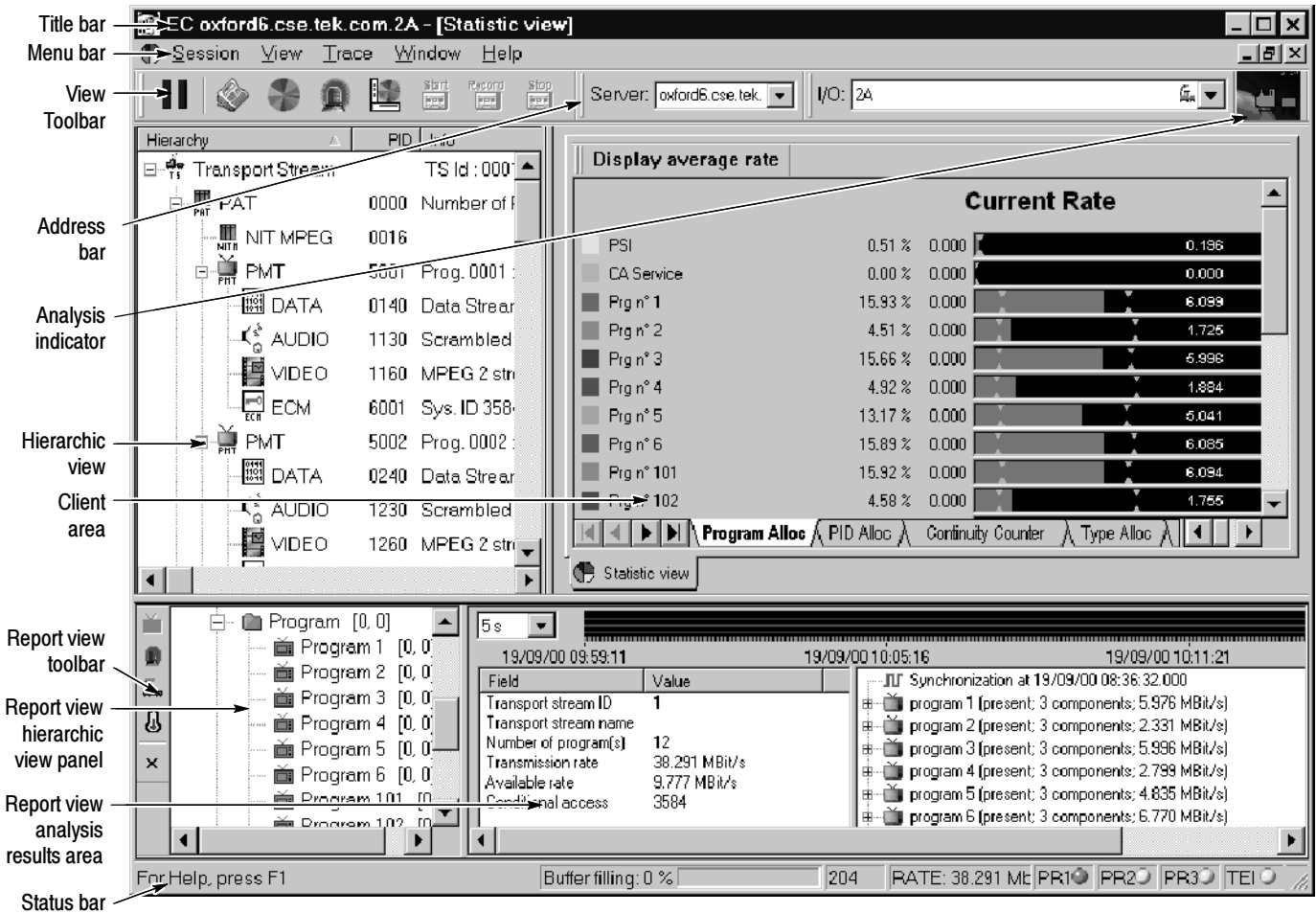
Figure 3‑9: Expert client display elements

Title Bar   The Title bar (see Figure 3‑9) displays the following information:

- Name of the application in the window (EC is displayed for Expert client)

- Address and channel number of the signal source (jam20.cse.tek.com is the address and 1B is the channel number)

- Name of the view displayed in the Client area (in this example the Statistic view is currently displayed)

The Expert client window control buttons are located on the far right side of the Title bar.

Menu Bar   The Menu bar provides access to the menus and contains the control buttons for the Client area of the Expert client display. Refer to *Expert Client Menus* on page 3‑100 for detailed descriptions of the menu functions available within the Menu bar. The menus contain commands grouped by their functions:

- The active view menu performs standard Windows NT window‑management actions on the top (active) view in the Client area. You access this menu by clicking the icon at the far left of the Menu bar.

- The Session menu lists commands that configure connection and display parameters for the Expert client.

- The View menu lists commands to manage and print the Expert client views.

- The Window menu lists commands that control the appearance of open windows in the Client area.

- The Help menu provides access to the online Help systems of the Expert client and the Analysis Server. In addition, there is a command to access the version and copyright information for the Expert client.

View Toolbar   The command buttons in the View toolbar provide direct access to the most-used menu commands for the Expert client. Click a command button to perform the associated command. You can toggle the View toolbar on and off using the Toolbar command in the View menu. Table 3--24 lists the function of each icon in the View toolbar.

Table 3--24: Functions of the View Toolbar buttons

Button	Name	Function
▐▐	Freeze views (or pause)	Freezes (pauses) the updates to the current Expert client display. The analyses occurring on the input are not stopped, and the history of the analyses is preserved while the views are frozen. This button is equivalent to the Freeze Views command in the View menu.
	Report view	Opens or selects the Report view located at the bottom of the Expert client display. This button is equivalent to the Report View command in the View menu.
	Statistic view	Opens or selects the Statistic view in the Client area. This button is equivalent to the Statistic View command in the View menu.
	ETR 290 view	Opens or selects the ETR 290 Monitor view in the Client area. This button is equivalent to the ETR 290 View command in the View menu.
	Restore standard views	Restores the default Expert client display, which consists of the Hierarchic, Statistic, and Report views. This button is equivalent to the Restore Standard command in the Window menu.
start	Start trace	Starts moving transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream (see *Manually Capturing a Transport Stream* beginning on page 3--103).
Record	Record trace	Starts the manual capture of the transport stream input. This button is disabled until you enable a manual capture of a transport stream.
stop	Stop trace	Stops the movement of transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream and click the Record Trace button.

Address Bar   Use the Address bar to specify the Analysis Server that you want the Expert client to connect to. There are two parts to an address: the IP address (or machine name) of the transport monitor you are connecting to, and the input number. If you open the Expert client from the Master client, the IP address or host machine name and input number of the analysis server is displayed in the text box.

Enter the IP Address (or machine name) and the input channel number in the text boxes provided using one of the following two formats:

- Enter 121.181.77.121 and 1A to analyze the signal from channel 1A of a transport monitor with an IP address of 121.181.77.121.

- Enter jam20.cse.tek.com and 1B to analyze the signal from channel 1B of a transport monitor named jam20 on the cse.tek.com network.

The drop-down selection box list the machines you have successfully connected to in the past. You can select a transport monitor name or IP address from the drop-down selection box.

Analysis Indicator   The Analysis indicator (shown below) at the far right of the Address bar is animated when the Expert client is actively analyzing the input stream. The indicator is motionless when analysis by the Expert client is disconnected.

Hierarchic View   The Hierarchic view area displays the hierarchy of the transport stream as indicated by the PSI/SI/PSIP/ISDB tables. This view enables you to display specific analyses, using shortcut menus associated with each transport stream item (you access these menus by right-clicking the icons). Refer to *Using the Hierarchic View* on page 3–110 for more information.

Client Area   The Client area contains various views of the current analyses. There are three basic views you can display in this area:

- The Statistic view is the default display for the Client area. There are six tabs at the bottom of the Statistic view that you can use to display different aspects of the transport stream analysis.

- The ETR 290 view shows the results of the ETR 290 analysis. You access the ETR 290 view using the ETR 290 button on the View toolbar.

- The Analysis, Rate, and Report views show the result of specific analyses being performed on the transport stream using various graphs. You open these views using the Hierarchic view shortcut menus.

Report View Toolbar
The Report view toolbar buttons allow you to change the display mode of the Report view. Table 3-25 lists the functions of the toolbar buttons.

Table 3-25: Functions of the Report View Toolbar buttons

Button	Name	Function
	Program mode	Groups analysis results by program name in the Report view hierarchy.
	ETR 290 mode	Groups analysis results by ETR 290 priority level (priority 1, 2, 3 and Warning) in the Report view hierarchy.
	Advanced mode	Groups analysis results by error type (Multiplex, Syntax, Timing, and Rate) in the Report view hierarchy.
	Error mode	Groups analysis results by user-defined error severity (Critical, Major, Minor, and Warning) in the Report view hierarchy.
	Close report view	Closes the Report view.

Report View Hierarchic View Panel
The Report view displays the results of the analyses performed by the Analysis Server on the selected input. The Report view hierarchic display organizes the analysis results according to the mode you select from the Report view toolbar:

■ Program mode groups analysis results by program name.

■ ETR 290 mode groups analysis results by ETR 290 priority level (priority 1, 2, or 3).

■ Advanced mode groups analysis results by error type (Multiplex, Syntax, Timing, or Rate).

■ Error mode groups analysis results by user-defined error severity (Critical, Major, Minor, and Warning).

Report View Analysis Results Area

The Analysis Results area has three types of views. The type of view displayed depends on the type of icon selected in the Report view hierarchy:

■ First level icon (a folder): Displays the Summary view (the default Report view) which displays various summary information about the transport stream being analyzed.

■ Second level icon (a folder): Displays the Error Graph view which displays graphs showing the number errors occurring on the transport stream. The graphs are presented based on the mode of the Report view.

■ Third level icon (changes depending on the mode): Displays the Message view (first, second, or third level icon) which displays the text of error messages. The error messages are presented based on the mode of the Report view.

The second- and third-level icon views display the results of the transport stream analysis organized based on the display mode selected from the Report view toolbar (Program, ETR 290, Advanced, or Error).

Status Bar

The Status bar displays short Help and status messages and also contains several analysis indicators. The Status bar shows the following information:

■ Help and status messages for menu and toolbar commands. In the Status bar in Figure 3–9 on page 3–94, the message "For Help, press F1" appears.

■ The status (percent usage) of the communication buffer. When the buffer reaches 100% usage, you may need to remove probes to ensure that complete measurements are made from the active probes.

■ The number of bytes (188, 204, or 208) in the input stream transport packets.

■ The global bit-rate of the input stream.

■ Presence of priority one (PR1), priority two (PR2), and priority three (PR3) ETR 290 errors. If no error is detected, a green LED icon is displayed; when an error occurs, the LED icon becomes red. If the error stops, the LED icon becomes orange to indicate that at least one error has been detected in the past.

■ Status of the TEI (Transport Error Indicator). The error indicator icon follows the same color conventions as the PR1, 2, and 3 indicators. The icon is gray when TEI analysis is disabled.

■ State of the UNP (Unsynchronized Packet). The error indicator icon follows the same color conventions as the MG1, 2, and 3 indicators. The icon is gray when UNP analysis is disabled.

Expert Client Menus

The menu bar (shown below) in the Expert client display contains the command menus (Active View, Session, View, Window, and Help). The following pages describe the selections available within each of the menus.

Active view menu

↓

`⬚ Session  View  Window  Help`

Active View Menu

The Active View menu performs standard Windows NT window-management actions on the top view in the Client area. You can access this menu by clicking the icon at the far left of the Menu bar when the Client views are maximized (the example below shows the Statistic view icon). The Menu bar icon representing the Active View menu changes to match the type of view currently displayed in the Client area. When the panels in the Client area are tiled, this menu can be accessed for each panel in the Client area. Table 3-26 describes the menu selections available in the Active View menu.

Table 3-26: Expert client Active View menu commands

Command	Function
Restore	Changes all open Client area views to windows or icons within the Client area, depending on the last state of each window. The Active View menu icon disappears from the Menu bar when you select this command.
Move	Moves the selected view within the Client area.
Size	Resizes the selected view within the Client area.
Minimize	Minimizes all open Client area views to icons within the Client area. The Active View menu icon disappears from the Menu bar when you select this command.
Maximize	Maximizes all open Client area views. The Active View menu icon returns to the Menu bar when you select this command.
Close	Closes the active (top) Client area view.
Next	Selects the next Client area view. This command is equivalent to clicking the view tab to the right of the currently active view tab.

Session Menu

The Session menu contains commands for configuring the Expert client settings, for saving and loading analysis configurations, and for exiting the Expert client. Table 3-27 describes the menu selections available in the Session menu.

Table 3-27: Expert client Session menu commands

Command	Function
Connection	Opens the Connection dialog box where you can select an Analysis Server and input to begin Expert client analysis. This command is only available when the Expert client is not performing analysis.
Disconnection	Disconnects the Expert client from the Analysis Server and stops analysis. You can still examine the displayed analysis results. When you select this command, the analysis indicator (train icon) at the far right of the toolbar becomes motionless.
Settings	Opens the Settings configuration window. Refer to *Configuring the Expert Client* on page 3-105 for information about using the Settings window.
Load	Restores a previously-saved analysis configuration.
Save as	Saves the current analysis configuration.
Restore standard	Restores the default settings for the Expert client. This command is only available when analysis is stopped.
Exit	Stops analysis and exits the Expert client.

View Menu

Use the View menu commands to control the information displayed in the Expert client. Table 3-28 describes the menu selections available in the View menu.

Table 3-28: Expert client View menu commands

Command	Function
Freeze views	Suspends (freezes) window updates while analysis continues. Freezing the views allows you to examine or capture transitory information (that is likely to soon disappear from the display) and to find and examine error messages that have scrolled off the top of a message window.
Report view	Opens the Report view (if it is closed) or selects the Report view and places it in front of all other views in the Client area, if necessary.
Statistic view	Opens the Statistic view (if it is closed) or selects the Statistic view and places it in front of all other views in the Client area, if necessary.
ETR 290 view	Opens an ETR 290 view or selects the ETR 290 view and places it in front of all other views in the Client area, if necessary.

Table 3‑28: Expert client View menu commands (cont.)

Command	Function
Toolbar	Toggle the presence of the View Toolbar (Command buttons) on and off. A check mark precedes the command when the Toolbar is present.
Status bar	Toggle the presence of the Status bar on and off. A check mark precedes the command when the Status bar is present.
Print	Prints the current window or window pane. In the Message view just the contents of the message view are printed.
Print Setup	Opens the Print Setup dialog box where you can configure the printer.

Window Menu

Use the Window menu commands to manage the various windows within the Client area display. Table 3‑29 describes the menu selections available in the Window menu.

Table 3‑29: Expert client Window menu commands

Command	Function
Cascade	Arranges windows in the Client area in an overlapping upper-left to lower-right cascade. The active window is on the lower right.
Tile horizontally	Arranges Client area windows as non-overlapping tiles that stretch from left to right across the Client area.
Tile vertically	Arranges Client area windows as non-overlapping tiles that stretch from the top to bottom in the Client area.
Arrange icons	Arranges minimized-view icons along the bottom of the Client area.
Restore standard	Restores the default Expert client window arrangement (will close all Client area views except for the Statistic view.
(List of open Client area windows)	Selects the Client area window to be shown in front of all other open windows.

Help Menu

Use the Help menu to access to online help and Expert client version information. Table 3‑30 describes the menu selections available in the Help menu.

Table 3‑30: Expert client Help menu commands

Command	Function
Expert client help	Opens the Expert client online help.
Analysis Server help	Opens the Analysis Server online help.
About Expert client	Displays Expert client version and copyright information.

Manually Capturing a Transport Stream

The MTM300 transport monitor allows you to manually capture a transport stream input using the Expert Client. Use the Event Configuration panel of the Configuration Client to enable a manual capture, and then use the Trace menu commands or toolbar buttons to control a manual capture from the Expert Client.

NOTE. *This procedure is for manually capturing transport stream input. Refer to* Configuration Client Reference *starting on page 3–159 for information about configuring the MTM300 transport monitor to capture specified transport stream events.*

Perform the following steps to manually capture a transport stream:

1. Launch the **Configuration Client** for the transport stream input you are monitoring.

2. Open the **Event Configuration panel** of the Configuration Client (expand the Data Storage item in the navigation panel of the Configuration Client).

3. Use the **Current Input Used Size slide bar** to set the size of the capture file in kBytes. You can set the capture size to a value up to the amount listed in the Overall Available Size box (determined by the available room on the disk drive).

NOTE. *You must set a capture size greater than 0 kBytes to enable a capture.*

4. Verify that the **Manual stop of acquisition event** is enabled in the Message list.

5. Right-click the **File** column of the **Manual stop of acquisition row**, and then click **Configure** from the shortcut menu to open the Event Settings dialog box.

6. In the Event Settings dialog box, use the **File name box** to enter the name of the capture file. The default file name is RTA.trp.

NOTE. *The captured file will be stored on the C: drive of the MTM300 transport monitor in a directory whose name matches the I/O port number being used to perform the capture. For example, if you are capturing a transport stream on I/O port 1 to a file named RTA.trp, the path to the file is: C:\IO#1\RTA.trp.*

7. Use the **Before Event** and **After Event** boxes to set the amount of transport stream data captured before and/or after you initiated the capture event. For example, if you set the Before Event value to 1024 and the After Event Value to 2048, the capture file will included 1024 kBytes of data from before you initiated the capture and 2048 kBytes of data from after you initiated the capture.

8. Click **Center Trace** if you want to save the same amount of data before and after the capture occurs. The size of the file will be the size you set in the Current Input Used Size selection box in the Event Configuration panel in step 3.

9. Click the appropriate **Max** button to save data up to the amount you set in the Current Input Used Size selection box in the Event Configuration panel in step 3, before or after the capture event occurs.

10. Click **OK** after you finish configuring the Event Settings dialog box.

11. If desired, open the **Filtering panel** of the Configuration Client to select specific PIDs to capture.

12. After you have completed the capture configuration, click the **Apply** toolbar button to enable the new Event Configuration settings.

13. Click **Restart now** to restart the Expert Client. The Start Trace shortcut button is now enabled (highlighted) in the Expert Client window.

14. Click **Start Trace** in the Expert Client window to begin moving transport stream data through the event--capture buffer.

15. Click **Record Trace** to initiate a transport stream capture, or click **Stop Trace** to stop the capture process without recording a file.

The capture point in a captured transport stream file will be based on your capture configuration as set up in the Event Configuration panel of the Configuration Client.

Configuring the Expert Client Views

You can configure different aspects of the Expert client display using the Settings configuration window. Access the Settings configuration window by selecting Settings from the Session menu. The Settings window contains four configuration panels: View, Report View, Graphics View, and PID Allocation View.

Common Options

The following options appear on each of the Settings panels:

Hexa display. Use the Hexa display check box to set the PID and other values to be displayed in hexadecimal or decimal format in the Expert client display and in the Settings panels. When cleared, values are displayed in decimal format.

Restore default. Click this button to restore the default configuration selections for the displayed panel.

View Panel

Select View in the Settings window hierarchy to open the View configuration panel (see Figure 3-10). The View panel contains the following options:

Default view on start. Use the Report view check box to select or deselect the Report view to be visible when the Expert client is started. When cleared, this option causes only the Hierarchic view and the Client area to occupy the Expert client window when you start the Expert client.
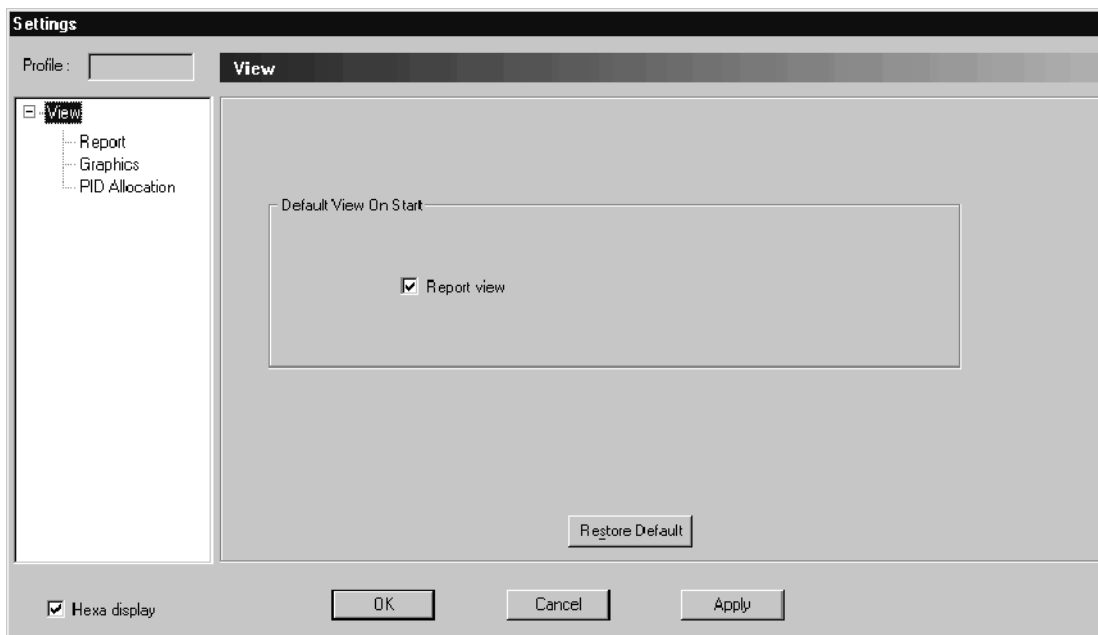
Figure 3-10: View panel in the Settings window

Report View Panel   Select View:Report in the Settings window hierarchy to open the Report View configuration panel (see Figure 3–11). Use this panel to limit the types of messages displayed in all report message views.
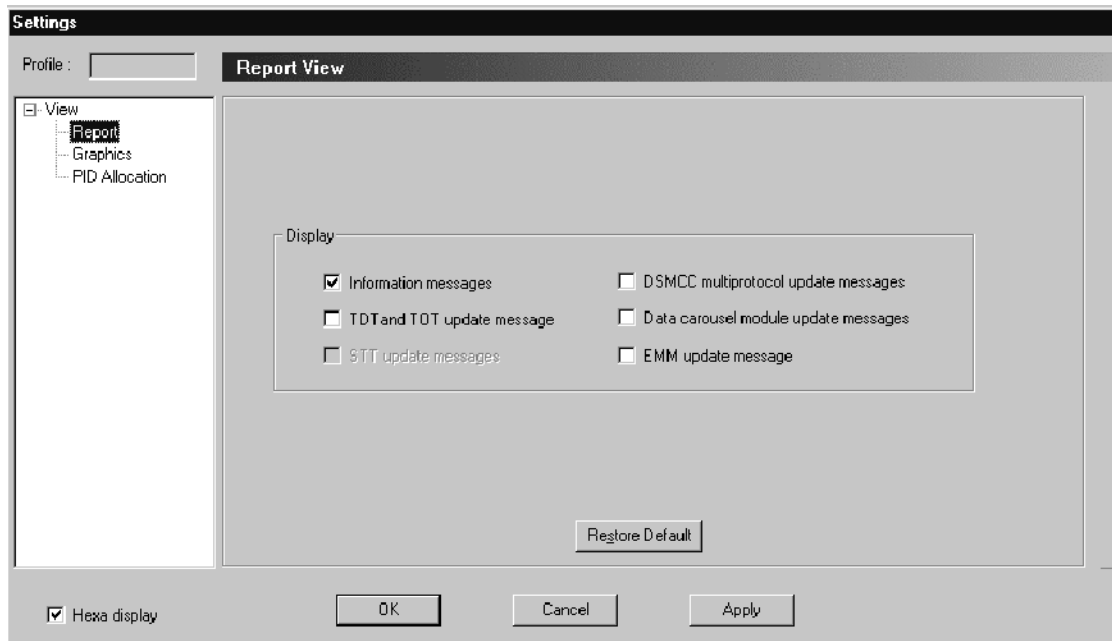
Figure 3- 11: Report View configuration window

The Report View panel contains the following configuration options:

Information messages. Selected by default, this option alerts you to input stream events that are not considered errors, but may be important to your stream analysis. These events include as PSI and SI table updates, the presence of ghost (unreferenced) packets, and error disappearance. Clear the Information messages check box to prevent the display of these information events.

TDT and TOT update message. Not selected by default, this option lets you see information messages that report TDT (time and date table) and TOT (time offset table) updates.

STT update messages. This option is only valid when ATSC mode is selected in the Analysis configuration panel in the Configuration client (refer to *Analysis Panel* on page 3–174).

DSMCC multiprotocol update messages. This option is only valid when SI-DAT 360 data broadcasting analysis is selected in the Analysis configuration panel in the Configuration client (refer to *Analysis Panel* on page 3–174). Select this option to inform you of errors and events detected in a SIDAT 360 stream. Clear this option when the message rate is too high.

Data carousel module update messages. This option is only valid when SIDAT 360 data broadcasting analysis is selected in the Analysis configuration panel in the Configuration client (refer *Analysis Panel* on page 3–174). Select this option to inform you of errors and events detected in a SIDAT 360 stream. Clear this option when the message rate is too high.

EMM update message. Not selected by default, this option lets you see information messages that report EMM (Entitlement Management Message) updates.

Graphics View Panel   Select View:Graphics in the Settings window hierarchy to open the Graphics View configuration panel (see Figure 3–12). Use this panel to set options that determine how the Expert client updates the various analysis graphs.

The Graphics View panel contains the following configuration options:

Scrolling option. In the standard configuration, scrolling is disabled for all graph types. You can enable (selected) or disable the scrolling mode for each of the listed views. The scrolling mode causes the data in the display to be updated from right to left without using a cursor.

Background gradation option. You can change the background color of the Statistic view by clicking the Statistic view background gradation check box.

Hierarchic view. Select this option to display the transport stream using small icons. By default, the stream components are displayed using large icons.
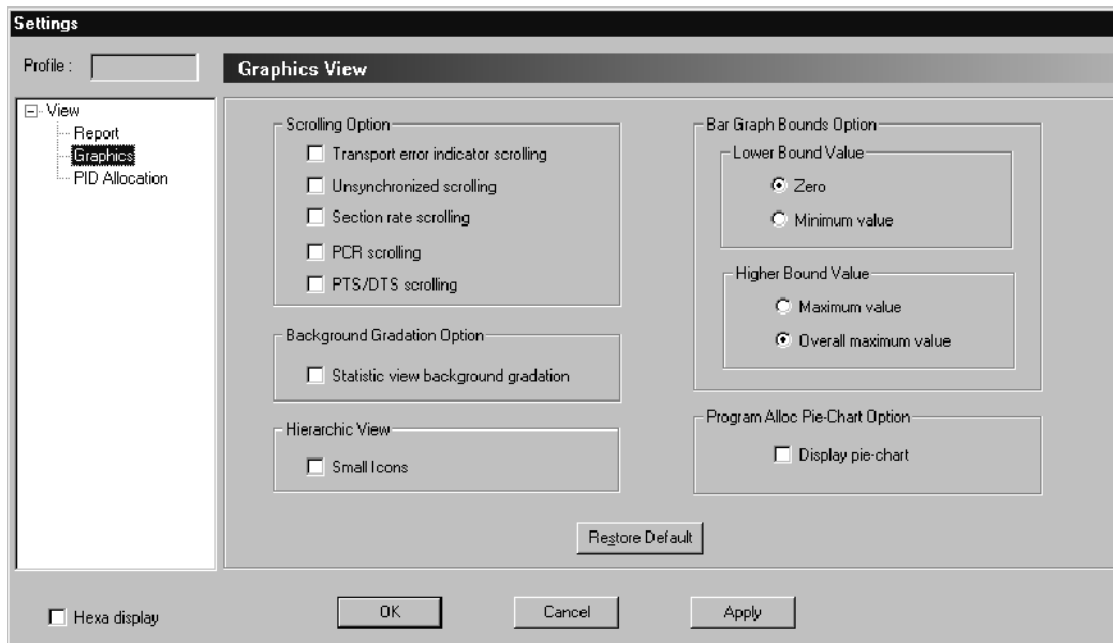
Figure 3-12: Graphics View configuration window

Bar graph bounds option. The bar graphs displayed in the Program Allocation view (first panel of the Statistics view) can be configured, specifically for the lower and higher bound values. You need to make these changes in order to draw an accurate comparison between all the bar charts displayed.

If you need to display the bar graphs as histograms, for example, to compare the values with each other, select Zero for the Lower Bound Value option (default selection), and select Overall maximum value for the Upper Bound Value option (default selection).

If you need to accurately assess the change of a value, select Minimum value for the Lower Bound Value option, and select Maximum value for the Upper Bound Value option.

Program alloc pie-chart option. Use this option to hide the pie-chart in the Program Allocation panel of the Statistic view by deselecting the box (in order to display the bar graphs as histograms, for instance).

PID Allocation View Panel   Select View:PID Allocation in the Settings window hierarchy to open the PID Allocation View configuration panel (see Figure 3-13). Use this panel to select which PIDs are displayed in the PID Allocation panel of the Statistic view when you select the Selection button (refer to the note on page 3-139).
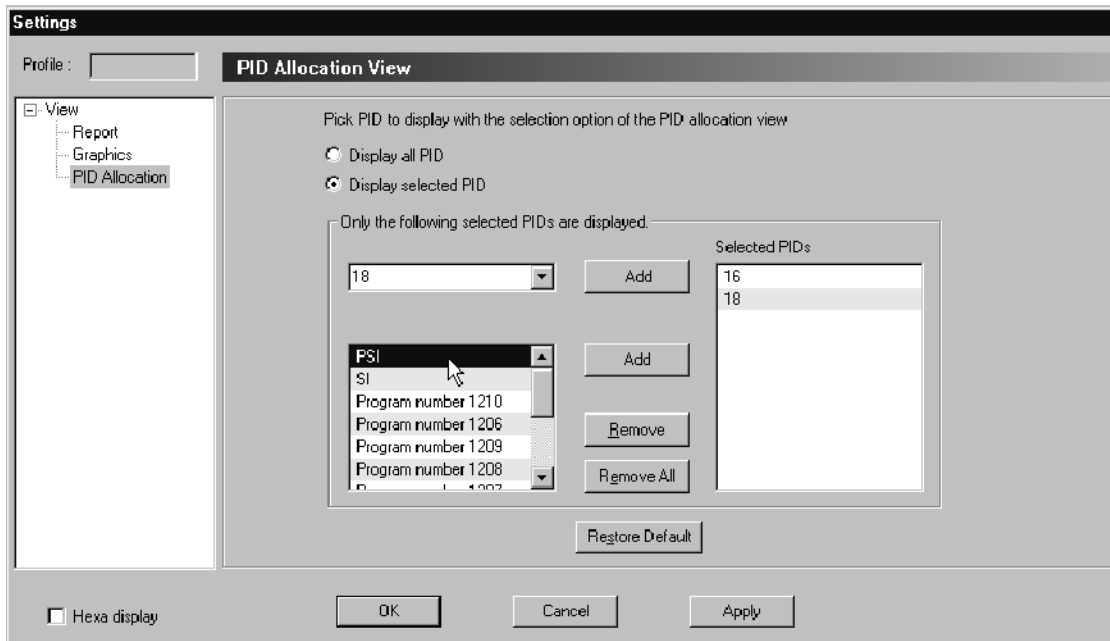
Figure 3-13: PID Allocation View configuration window

The PID Allocation View panel contains the following configuration options:

Display all PID. Select this option to display all PIDs in the transport stream.

Display selected PID. Select this option to display only the PIDs in the transport stream that you select in the PID Allocation View configuration panel. After you select Display selected PID, use the following methods to select PIDs to display:

■   You can select a specific PID number from the top list box. Apply this choice by clicking the Add button.

■   You can select a group of PID such as PSI, SI or a specific Program in the bottom list box. Apply this choice by clicking the Add button.

■   You can remove a PID in the Selected PIDs list box by selecting the PID and clicking the Remove button or double-clicking the PID.

■   You can remove all the PIDs in the Selected PIDs list box by clicking the Remove All button.

Using the Hierarchic View

The Hierarchic view displays the contents of the transport stream as a hierarchical structure based on the PSI and SI or PSIP tables. Each item in the transport stream is located in the hierarchy to show its relationship to other transport stream items. You can click the hierarchy boxes to show or hide lower-level hierarchy items. See Figure 3–14.
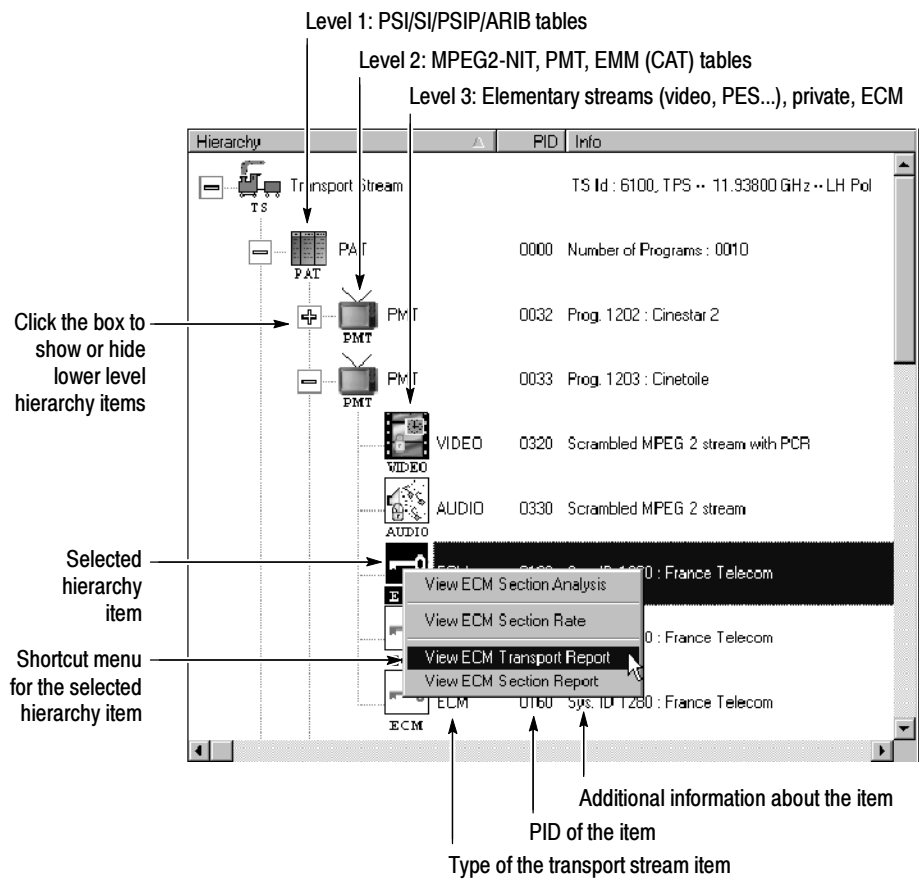
Figure 3- 14: Expert client hierarchic display

To the right of each hierarchy icon is text that shows the type of the transport stream item. The hierarchic display includes columns which display the PID of the item and additional information about the item. The type of additional information that is listed depends on the type of the transport stream item. Figure 3–15 describes the specific information displayed for the various transport stream item types.

Polarization as read in the
satellite_delivery_system_descriptor
of the NIT.
LH = linear horizontal
LV = linear vertical
CL = circular left
CR = circular right

Network name as read in the
network_name_descriptor
of the NIT.

Transport Stream Items

Hierarchy	△ PID	Info
Transport Stream		TS Id : 0x000D, ECHOSTAR -- 12.39896 GHz -- CR Pol

Transport stream ID
as read in the PAT.

Frequency of the transport stream
as read in the
satellite_delivery_system_descriptor
of the NIT.

Number of programs defined in the PAT
and described in the sub-levels of the
hierarchy.

PAT Items

PAT   0x0000   Number of Programs : 0010

Program number
as read in the PAT.

PMT Items

PMT   0x0021   Prog. 0x03C3 : CD 14Urban Beat

Service name
as read in the SDT.

System ID and name of
the encryption service.

ECM/EMM Items

EMM   0x0020   Sys. ID 0x1234 : TV/Com

Figure 3‑15: Specific information displayed for transport stream items

Setting the Appearance of the Hierarchic View

Table 3–31 summarizes the effects of mouse and keyboard actions that change the appearance of the Hierarchic view and show (or hide) additional information about the input stream.

Table 3‑31: Mouse and keyboard actions in the Hierarchic view

Mouse action	Keyboard action	Effect on Hierarchic view
Left-click an icon		Selects the icon.
Right-click an icon		Displays a shortcut menu for the hierarchy item. Refer to *Hierarchic Icon Shortcut Menus* on page 3–115.
Double-click an icon		Opens an item Report view in the Client view.
Click the + box next to an icon	Press + on the numeric keypad	Displays one sub-level (if any) below the selected icon.
Click the − box next to an icon	Press − on the numeric keypad	Collapses the sub-level below the selected icon (will not override the F7 through F10 selections explained below).
	Press * on the numeric keypad	Opens all sub-levels below the selected icon.
	Press the up or down arrow key	Selects the icon immediately above or below the currently-selected icon.
	Press F1	Opens the Expert client online Help.
	Press F2	Toggles the numeric display between hexadecimal and decimal (for example, 0x00C1 ↔ 193).
	Press F3	Freezes or unfreezes the updates to the displayed views (analysis does not stop when the views are frozen).
	Press F7	Expands or collapses the hierarchic view to only display the first-level icons.
	Press F8	Expands or collapses the hierarchic view to only display the first and second-level icons.
	Press F9	Expands or collapses the hierarchic view to only display the first, second, and third-level icons.
	Press F10	Expands or collapses the hierarchic view to display the first, second, third, and fourth-level icons.

Identifying Hierarchic Icons

The Expert client uses a variety of icons to represent stream items. Each of the hierarchic icons has an associated menu that allows you to perform specific functions related to the stream item. Table 3-32 identifies the icons used in the Hierarchic view.

If an item is referenced in a table, but not found in the stream, the icon is grayed.

Table 3-32: Hierarchic view icon identification

Icon	Hierarchy level	Element type
	1	Transport stream. This icon represents all (188/204/208-byte) transport packets that make up the stream. If you visualize the transport stream as a train, this icon represents every car in the train, regardless of its configuration or what it contains.
	2	PAT, CAT, or TSDT table.
	2	Any other table except ATSC PSIP tables (such as DVB-SI and ISDB/ARIB).
	2	ATSC-PSIP tables (such as CVCT, TVCT, MGT, STT, and RRT).
	2	A specific transport packet (such as MIP).
	2	GHOST. A ghost indicates one or more transport packets identified with a PID that is not referenced in an appropriate table.
	3	PMT table.
	3	MPEG-2 NIT table.
	3	For ATSC: EIT and/or ETT tables referenced by MGT.
	3	EMM table.
	4	Video stream.
	4	Audio stream.
	4	Data stream.
	4	ECM table for program.

Table 3-32: Hierarchic view icon identification (Cont.)

Icon	Hierarchy level	Element type
	4	For SIDAT 360 streams: Download Info Indication tables for one-layer Data Carousels.
	4	For SIDAT 360 streams: Download Server Initiate tables for two-layer Data Carousels.
	4	For SIDAT 360 streams: Multiprotocol Encapsulation sections.
	4	DSM-CC generic stream (may carry several tables).
	4	Private table.
	5	ECM table for elementary stream.
	5	For SIDAT 360 streams: Download Info Indication tables for two-layer Data Carousels.
	5	For SIDAT 360 streams: Data Carousel module (one-layer Data Carousels).
	6	For SIDAT 360 streams: Data Carousel module (two-layer Data Carousels).

PCR clock and scrambling symbols. A PCR clock () symbol is added to the upper-right corner of stream icons to indicate which stream in a program or service is carrying PCR clocks.

A padlock symbol () is added to the lower-left corner of stream icons to signify the streams that are scrambled.

Hierarchic Icon Shortcut Menus

Each active hierarchy item that is represented by an icon has a shortcut menu that enables you to learn more about the selected item. Right-click an icon to display the shortcut menu, and then select a menu command. Table 3-33 describes the commands you will find in the shortcut menus.

Table 3-33: Hierarchic view menu commands

Command	Description
View section analysis	Opens a section view window for the transport stream table selected in the hierarchic view. Refer to *Section Analysis View* on page 3-148.
	Section analysis will be performed only if a section probe is set from the Configuration client.
View section rate	Opens a section rate view in the Client area for the transport stream table selected in the hierarchic view. Refer to *Section Rate View* on page 3-150.
	Section rate analysis will be performed only if a section rate probe is set from the Configuration client.
View PCR analysis	Opens a PCR analysis view for the selected program in the Client area. Refer to *PCR Analysis View* on page 3-151.
	This command is available for PMTs and independent PCRs only. The analysis will be performed only if a timing (PCR) probe is set from the Configuration client.
View PTS/DTS analysis	Opens a PTS/DTS analysis view for the selected video or audio elementary stream in the Client area. Refer to *PTS/DTS Analysis View* on page 3-154.
	This command is available for video and audio streams only. The analysis will be performed only if a timing (PTS/DTS) probe is set from the Configuration client.
View IP traffic	Opens an IP traffic monitor view for the selected item in the Client area. Refer to *IP Monitoring View* on page 3-158.
	This command is available for DSM-CC private sections and SIDAT 360 multiprotocol encapsulation streams only. The analysis will be performed only if a section probe is set on those streams from the Configuration client.
View transport or section report	Opens an error message window for the selected stream item in the Client area, or brings an already-opened error message view to the front of the Client area views.
	This command is available for all stream items.

Using the Report View

The Report view (see Figure 3-16) occupies the bottom of the default Expert client application window. Using the Report view, you can display all analysis results or only selected results. You can set the Expert client to display the Report view by default using the View panel of the Settings window.

You can use the Data Logging function to record selected transport stream events to tab-delimited text files. You can use the text files for record keeping or for further analysis. Refer to *Data Logging* on page 3-166 for more information.

The Report view consists of three primary elements: Report view toolbar, hierarchic view panel, and the analysis results area panel.

- Report View Toolbar. Click a Report view toolbar button to quickly change the display mode of the hierarchic view panel.

- Hierarchic View Panel. Use this panel to select which analysis results are displayed in the analysis results area, to select how the analysis results are displayed, and to acknowledge error messages.

- Depending on the item selected in the hierarchic view panel, the analysis results area can contain a summary view, a graph view, or a message view.
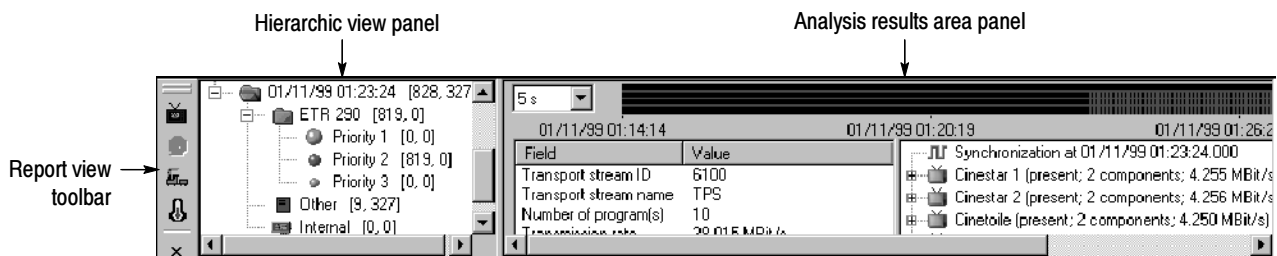
Figure 3-16: Report view display

Positioning the Report View

By default, the Report view occupies the bottom of the Expert client display (this is called the "docked" state). You can toggle the location of the Report view to the Client area using the Toggle Docking command. Right-click in the white space of the Report view Hierarchic panel and select Toggle Docking from the shortcut menu (repeat to return the Report view to the default position).
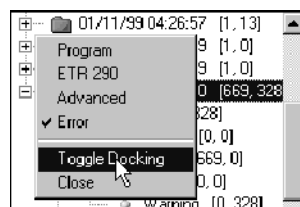
Report View Toolbar

The Report view toolbar buttons allow you to quickly change the display mode of the Report view. These buttons duplicate the commands in the shortcut menu of the hierarchic view panel in the Report view. Table 3-34 lists the functions of the toolbar buttons.

Table 3-34: Functions of the Report View Toolbar buttons

Button	Name	Function
	Program mode	Groups analysis results by program name in the Report view hierarchy.
	ETR 290 mode	Groups analysis results by ETR 290 priority levels (priority 1, 2, 3 and Warning) in the Report view hierarchy.
	Advanced mode	Groups analysis results by error type (Multiplex, Syntax, Timing, and Rate) in the Report view hierarchy.
	Error mode	Groups analysis results by user-defined error severity (Critical, Major, Minor, and Warning) in the Report view hierarchy. Set the severity level using the Message Level panel in the Configuration client. Refer to *Message Level Panel* on page 3-198.
	Close report view	Closes the Report view.

Report View Hierarchic View Panel

The Report view displays the results of the analyses performed by the Analysis Server on the selected input. The hierarchic view panel gives you access to the following different views of the transport stream analysis:

- A summary of all the analysis results, which displays summary statistics of the transport stream.

- A graph of the errors that have occurred on the transport stream (current and past).

- A listing of the unacknowledged error messages for the selected item.

Hierarchy icons and levels. The hierarchic view panel in the Report view displays a hierarchic view of analysis results. The hierarchy display changes depending on the report display mode. The hierarchic view panel is a three-level display, and uses the Windows NT conventions for collapsing and expanding directory structures. The default display for the panel is to show the complete three level hierarchy.

Each hierarchic view, regardless of the display mode, has the following characteristics in common:

■ Top Level Icon (Folder). The top level of the hierarchy displays a new folder each time a new synchronization event occurs. The top level folder represents a Configuration. A Configuration is a collection of all analysis results since the previous synchronization. Listed next to the top level icon is the time of the synchronization event and the running total of errors detected. When you select a first level icon, the Analysis Results area changes to display the default summary view.

When the Expert client loses sync with the signal, the number of errors represents the total that occurred while the Expert client was connected and synched to the input. The history of each input is maintained in the folders from previously synched sessions. You can delete all or some of these folders by right-clicking in the report view and making the appropriate selection from the shortcut menu.

NOTE. The Expert client creates a new Configuration every time synchronization is established. Therefore, if you stop and restart analysis, or if the Expert client loses and regains synchronization for any reason (such as a momentary loss of the input signal), another Configuration icon appears in the hierarchic view.

■ Second Level Icons (Folder, Other, and Internal). The second level of the hierarchy displays a folder representing the organization (report mode) of the error messages you have chosen. When you select an icon at this level, the Analysis Results area to the right of the Report view updates to display graphs representing the average number of errors occurring on the transport stream.

The second level Other icon contains messages that are not related to the selected report mode.

The second level Internal icon contains the following messages when appropriate:

■ Hardware Input Overflow. This message appears when the user has set too many probes for the corresponding Analysis Server input.

■ Extraction stopped for PID *<n>*. This message appears when the requested measurements for PID *<n>* exceed system resources. The message indicates that incomplete measurements should be expected for PID *<n>*(for example, only some of the subtables of an SI table would be available for section analysis). When you see this message, you must removes probes from PID *<n>* in order to make complete measurements.

■ Third Level Icon. The third level icons change depending on which report mode is selected (Program, ETR 290, Advanced, or Error).

The color of each report hierarchy icon signifies the presence or absence of errors and warnings within the corresponding item.

- A *green* icon indicates that no error or warning messages have been generated for the item or its hierarchic descendents.

- A *red* icon indicates that at least one unacknowledged error message has been generated for the item or its hierarchic descendents.

- A *yellow* icon indicates that at least one unacknowledged warning message has been generated for the item or its hierarchic descendents.

When the item (or its descendents) contains both errors and warnings, the errors take precedence, and the icon is red. The Expert client displays the total number of error messages and the total number of warning messages in the item (or its descendents) in square brackets.

Report modes. The Report view hierarchic display organizes the analysis results using a user-selected graphical format. You can select a report mode using the Report view toolbar or the shortcut menu in the hierarchic view panel.

You can select between the following report modes (see Figure 3–17):

- The Program mode groups analysis results by program name (listed alphabetically).

- The ETR 290 mode groups analysis results by ETR 290 priority level (priority 1, 2, and 3).

- The Advanced mode groups analysis results by error type (Multiplex, Syntax, Timing, and Rate).

- The Error mode groups analysis results by user-defined error severity (Critical, Major, Minor, and Warning). Set the severity level using the Message Level panel in the Configuration client. Refer to *Message Level Panel* on page 3–198.

Program mode

```
□─ ◻ 10/12/99 11:30:00  [0, 13]
    □─ ◻ Program  [0, 3]
        ⋯⋯ ▣ EWTN  [0, 0]
     ▸▣ TVP  [0, 0]
        ⋯⋯ ◻TVASA  [0, 0]
```

ETR 290 mode

```
◻─ ◼ 01/11/99 08:08:04  [181, 328]
    □─ ◼ ETR 290  [172, 0]
        ⋯⋯ ● Priority 1  [0, 0]
     ▸● Priority 2  [172, 0]
        ⋯⋯ ● Priority 3  [0, 0]
```

Advanced mode

```
□─ ◻ 10/12/99 11:30:00  [0, 13]
    □─ ◻ Advanced  [0, 3]
        ▸◪ Multiplex  [0, 3]
        ⋯⋯ ✎ Syntax  [0, 0]
```

Error mode

```
□─ ◻ 10/12/99 11:30:00  [0, 13]
    □─ ◻ Error  [0, 13]
        ⋯⋯ ● Critical  [0, 0]
        ⋯⋯ ● Major  [0, 0]
        ⋯⋯ ● Minor  [0, 0]
        ▸● Warning  [0, 13]
        ⋯⋯ ▤ Information  [0, 0]
```
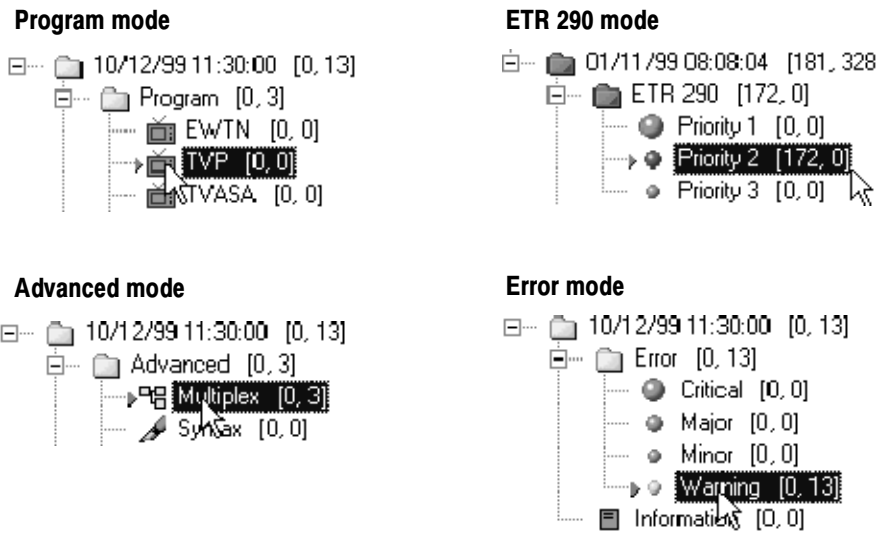
Figure 3‑17: Report view display modes

Acknowledging error messages and deleting configurations. You can acknowledge error messages from the Report view and delete report configurations by right-clicking in the hierarchic view panel and selecting the appropriate item from the shortcut menu. Table 3–35 lists the commands in the shortcut menu.

⚠ *CAUTION. You cannot undo the following menu commands. Acknowledged messages cannot be reset, and deleted messages or configurations cannot be recovered.*

Table 3‑35: Report view shortcut menu

Menu selection	Function
Acknowledge all messages	Acknowledges all of the Report view error messages for the selected configuration. Acknowledging all messages is equivalent to resetting past errors; the hierarchic icon becomes green (at least momentarily) as if no messages had been generated. A checkmark precedes all acknowledged messages.
Delete acknowledged messages	Deletes all acknowledged error messages from the selected configuration. Error messages that have not been acknowledged will not be deleted.
Delete all messages	Deletes all error messages (acknowledged or not) for the selected configuration.
Delete configuration	Deletes the selected configuration.
Delete all configurations	Deletes all but the most recent configuration.

Report View Analysis Results Area

The Analysis Results area has three types of views. The type of view displayed depends on the type of icon selected in the Report view hierarchy and the selected report mode (Program, ETR 290, Advanced, or Error):

■ First level icon (a folder): Displays the Summary view (the default Report view) which displays various summary information about the transport stream being analyzed.

■ Second level icon (a folder): Displays the Error Graph view which displays graphs showing the number errors occurring on the transport stream. The graphs are presented based on the mode of the Report view.

■ Third level icon (changes depending on the mode): Displays the Message view (first, second, or third level icon) which displays the text of error messages. The error messages are presented based on the mode of the Report view.

The second- and third-level icon views display the results of the transport stream analysis organized based on the display mode selected in the Report view hierarchy (Program, ETR 290, Advanced, or Error).

Report view Summary (default) view. The Report view Summary view appears in the right section of the Report view whenever you select a Configuration icon (folder) in the Report view hierarchic view panel. The summary view presents a record of the input stream characteristics, contents, and errors.

The Summary view is divided into three regions (see Figure 3–18): the summary error graph, the general information panel, and the event panel.

■ Error Graph. The error graph provides a high-level indicator of the frequency and severity of the errors measured during the current configuration, or monitoring session. The height of each segment in the graph indicates the most significant error level, if any, detected during the corresponding time period. The most recent segments appear at the right end of the graph, while the oldest segments scroll off the left end of the graph. The error level indicator for the current time period is indicated at the right of the error graph.
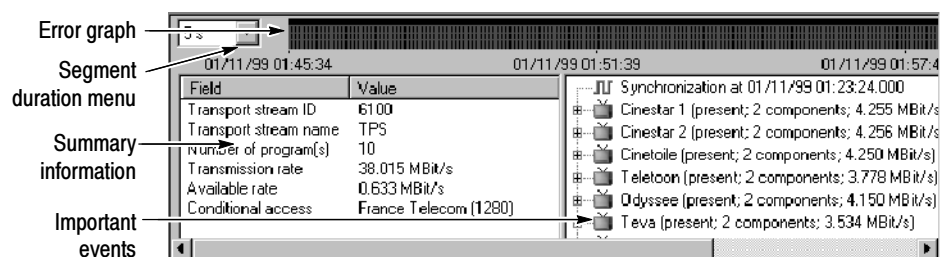
Figure 3-18: Analysis Results area of the Report view

As each measurement time period expires (as set by the Segment Duration menu), one of the five symbols shown in Table 3-36 appears in the right-most graph segment:

Table 3-36: Error graph symbols

Symbol	Description
Small green bar	Indicates that no error was detected during the measurement time period.
Short yellow bar	Indicates that at least one warning message was generated during the measurement time period.
Short red bar	Indicates at least one ETR 290 priority level three or other non-critical error was detected during the measurement time period.
Medium red bar	Indicates at least one ETR 290 priority level two or other critical error was detected during the measurement time period.
Tall red bar	Indicates at least one ETR 290 priority level one or other very critical error was detected during the measurement time period.

- The Segment Duration menu at the left end of the error graph controls the duration of each graph segment. The selections range from 5 s (five seconds) to 15 m (fifteen minutes). The time span of the error graph (from 18 minutes, 15 seconds to 54 hours, 45 minutes) depends on the settings in the segment duration menu.

- Summary Information. The summary information section (see Figure 3-18) displays a variety of information about the input stream. Displayed information includes the transport stream ID, the network name, the number of programs, the transmission rate, the available rate, and the conditional access for the transport stream being analyzed.

- Important Events. The important events section (see Figure 3-18) displays information about the stream and its contents as well as significant changes to the stream characteristics and content. Information is presented in a three-level hierarchic format. To expand the hierarchy at any point and reveal additional information about a stream item, either click the + box to the left of the item icon or double-click the icon itself.

Each level of the hierarchy displays the history of the transport stream at a different level of detail (see Table 3-19). First level icons displays information about the transport stream as a whole. Second level icons display information for each program in the stream. Third level icons display information about each program component.
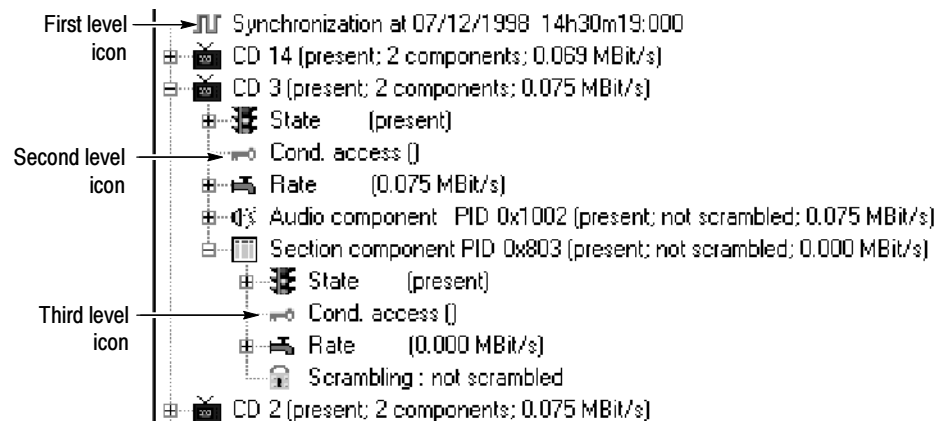
Figure 3- 19: Hierarchy levels in the Analysis Results area

Table 3- 37: Icons used in the Report view Analysis Results area

Icon	Level	Description
⏻	1	**Synchronization** icons display the time of the last synchronization and consequently the beginning of a configuration.
▨	1	**Program** icons display the program name and its current state (presence, number of components, and rate).
⏻	1	**Lost Synchronization** icons display the time of synchronization loss and, consequently, the end of a configuration.
▤	2	The program **State** icon indicates whether the program is "present" or "not present." You can expand the State icon to reveal all program appearance and disappearance times.
▭	2	The program **Cond. access** icon displays all changes in the program conditional access.
⛲	2	The program **Rate** icon displays the current bitrate for the program. Expand the rate item to reveal the time of all program rate changes.
▦ ◁ː ▤ ▥	2	The Section, Audio, Video, or Data **Component** icons display the program component type, its PID, and its current state (presence, scrambling, and current rate). Expand each component to display the last level of important events.
▤	3	The component **State** icon indicates whether the component is "present" or "not present." You can expand the State icon to reveal all component appearance and disappearance times.
▭	3	The component **Cond. access** icon displays all changes in the component conditional access.
⛲	3	The component **Rate** icons show the current bitrate for the component. Expand the rate item to reveal all component rate changes.
🔒	3	The component **Scrambling** icon displays the status and history of changes in the component scrambling state.

Report views using the Program report mode. The Program report mode displays information about the transport stream analysis and errors organized by program name. When you select the Program mode for the Report view, the information displayed in the Analysis Results area depends on the icon selected in the hierarchic view panel:

■   When you select a first-level icon (configuration folder), the default Summary view is displayed (see Figure 3–18 on page 3–121).

■   When you select a second-level icon (program folder), the Error Graph panel is displayed in the Analysis Results area. The Error Graph panel (see Figure 3–20) displays a graph of errors for each program in the transport stream. The summary graph of the errors for all components is displayed at the top of the Error Graph view.
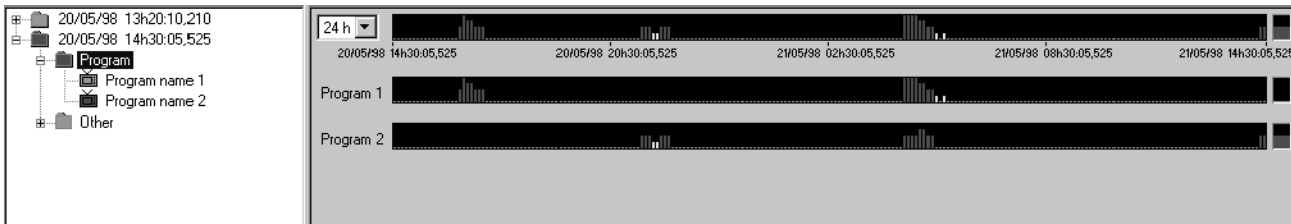
Figure 3‑20: Error Graph panel for the Program report mode

■   When you select a third-level icon (program name), the Message panel is displayed in the Analysis Results area. The Message panel (see Figure 3–21) displays all errors that have occurred for the selected program. The Message panel is divided into five columns as listed in Table 3–38. You can sort messages by clicking the column headers. Double-click an error message to display the details of the error in a dialog box.
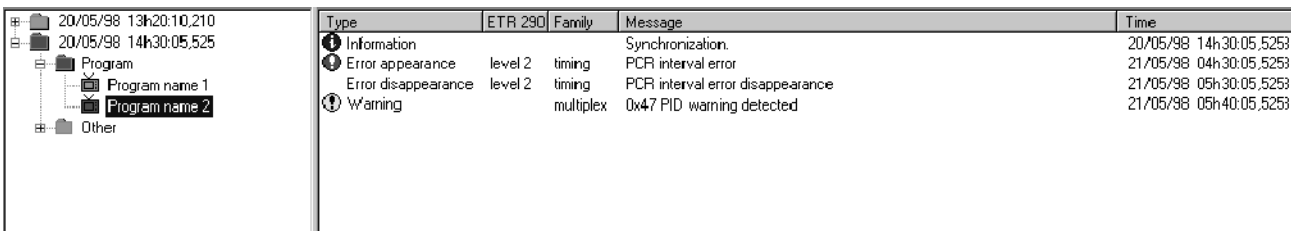
Figure 3‑21: Message panel for the Program report mode

To change the width of a column in the message view, position the cursor over the divider to the right of the column heading; the cursor shape changes to indicate that you can change the width. Then click and drag the divider right or left to increase or decrease column width.

Table 3‑38: Message view column descriptions (Program mode)

Column	Description
Type	Displays the type of error message: information, warning, error detected, or error disappearance.
ETR 290	Displays the ETR 290 priority level of the message (priority 1.1 to 3.8(2)).
Family	Displays the family of the message (multiplex, syntax, timing, or rate).
Message	Displays the content of the message.
Time	Displays the time and date of the message.

Report views using the ETR 290 report mode. The ETR 290 report mode displays information about the transport stream analysis and errors organized by ETR 290 priority level (priority 1, 2, or 3). When you select the ETR 290 mode for the Report view, the information displayed in the Analysis Results area depends on the icon selected in the hierarchic view panel:

- When you select a first-level icon (configuration folder), the default Summary view is displayed (see Figure 3–18 on page 3–121).

- When you select a second-level icon (ETR 290 folder), the Error Graph panel is displayed in the Analysis Results area. The Error Graph panel (see Figure 3–22) displays a graph of errors for each ETR 290 priority level. The summary graph of the errors for all ETR 290 priority levels is displayed at the top of the Error Graph view.
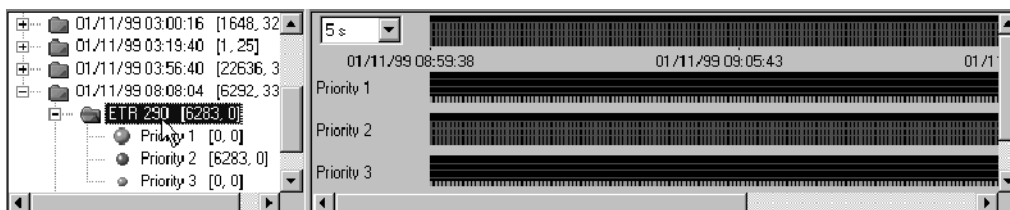
Figure 3‑22: Error Graph panel for the ETR 290 report mode

■ When you select a third-level icon (ETR 290 priority level), the Message panel is displayed in the Analysis Results area. The Message panel (similar to Figure 3‑21) displays all errors that have occurred for the selected ETR 290 priority level. The Message panel is divided into six columns as listed in Table 3‑39. You can sort messages by clicking the column headers. Double-click an error message to display the details of the error in a dialog box.

To change the width of a column in the message view, position the cursor over the divider to the right of the column heading; the cursor shape changes to indicate that you can change the width. Then click and drag the divider right or left to increase or decrease column width.

Table 3‑39: Message view column descriptions (ETR 290 mode)

Column	Description
Type	Displays the type of error message: information, warning, error detected, or error disappearance.
Program	Displays the name of the program on which the error occurred.
ETR 290	Displays the ETR 290 priority level of the message (priority 1.1 to 3.8.(2)).
Advanced	Displays the type of error (multiplex, syntax, timing, or rate).
Message	Displays a statement briefly describing the error and the PID on which it occurred.
Time	Displays the time and date of the message.

Report views using the Advanced report mode. The Advanced report mode displays information about the transport stream analysis and errors organized by analysis type (Multiplex, Syntax, Timing, and Rate). When you select the Advanced mode for the Report view, the information displayed in the Analysis Results area depends on the icon selected in the hierarchic view panel:

- When you select a first-level icon (configuration folder), the default Summary view is displayed (see Figure 3–18 on page 3–121).

- When you select a second-level icon (Advanced folder), the Error Graph panel is displayed in the Analysis Results area. The Error Graph panel (see Figure 3–23) displays a graph of errors for each Advanced analysis type. The summary graph of the errors for all Advanced analysis types is displayed at the top of the Error Graph view.
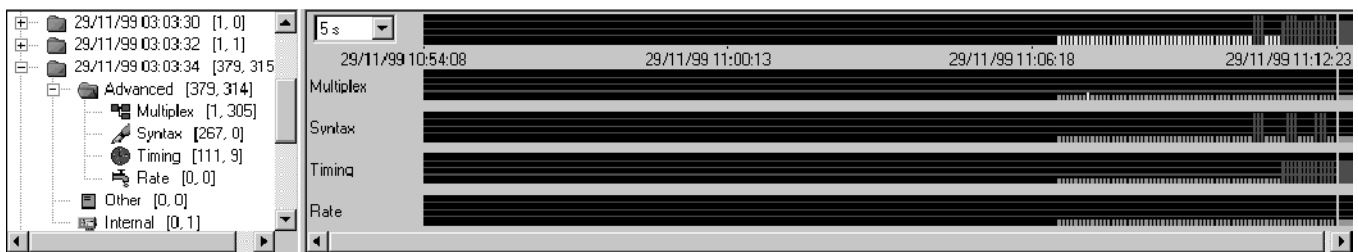
Figure 3‐23: Error Graph panel for the Advanced report mode

- When you select a third-level icon (Advanced analysis type), the Message panel is displayed in the Analysis Results area. The Message panel (similar to Figure 3–21 on page 3–124) displays all errors that have occurred for the selected analysis type. The Message panel is divided into five columns as listed in Table 3–40. You can sort messages by clicking the column headers. Double-click an error message to display the details of the error in a dialog box.

To change the width of a column in the message view, position the cursor over the divider to the right of the column heading; the cursor shape changes to indicate that you can change the width. Then click and drag the divider right or left to increase or decrease column width.

Table 3‑40: Message view column descriptions (Advanced mode)

Column	Description
Type	Displays the type of error message: information, warning, error detected, or error disappearance.
Program	Displays the name of the program on which the error occurred.
ETR 290	Displays the ETR 290 priority level of the message (priority 1.1 to 3.8.(2)).
Message	Displays a statement briefly describing the error and the PID on which it occurred.
Time	Displays the time and date of the message.

Report views using the Error report mode. The Error report mode displays information about the transport stream analysis and errors organized by error severity (Critical, Major, Minor, and Warning). You can specify the severity for each test performed by the Analysis Server using the Message Level panel of the Configuration client. Refer to *Message Level Panel* on page 3‑198 for more information about setting error message levels.

When you select the Error mode for the Report view, the information displayed in the Analysis Results area depends on the icon selected in the hierarchic view panel:

- When you select a first-level icon (configuration folder), the default Summary view is displayed (see Figure 3‑18 on page 3‑121).

- When you select a second-level icon (Error folder), the Error Graph panel is displayed in the Analysis Results area. The Error Graph panel (see Figure 3‑24) displays a graph of errors for each severity level. The summary graph of the errors for all error severities is displayed at the top of the Error Graph view.
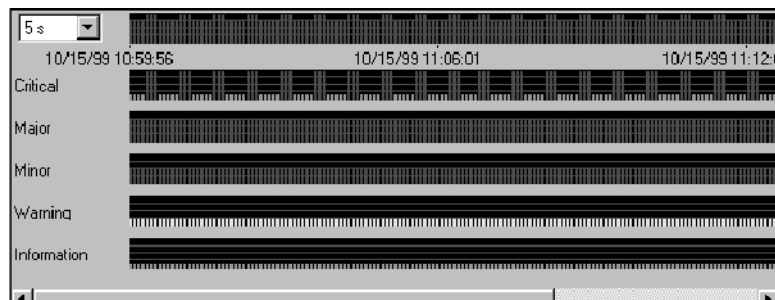
Figure 3‑24: Error Graph panel for the Error report mode

■ When you select a third-level icon (error severity), the Message panel is displayed in the Analysis Results area. The Message panel (similar to Figure 3-21 on page 3-124) displays all errors that have occurred for the selected error severity. The Message panel is divided into six columns as listed in Table 3-41. You can sort messages by clicking the column headers. Double-click an error message to display the details of the error in a dialog box.

To change the width of a column in the message view, position the cursor over the divider to the right of the column heading; the cursor shape changes to indicate that you can change the width. Then click and drag the divider right or left to increase or decrease column width.

Table 3- 41: Message view column descriptions (Error mode)

Column	Description
Type	Displays the type of error message: information, warning, error detected, or error disappearance.
Program	Displays the name of the program on which the error occurred.
ETR 290	Displays the ETR 290 priority level of the message (priority 1.1 to 3.8.(2)).
Advanced	Displays the type of error (multiplex, syntax, timing, or rate).
Message	Displays a statement briefly describing the error and the PID on which it occurred.
Time	Displays the time and date of the message.

Printing Reports and Messages

To print some or all of the data for a Report view Configuration, select the Configuration icon (first-level folder icon) and then select Print from the View menu or press CTRL+P to open the Print window (shown below).
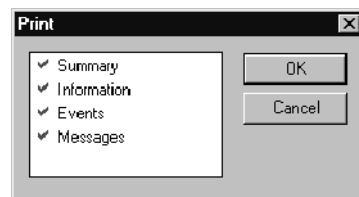
The Print window lists all the items you can print from the selected Configuration. All items preceded by a check mark will be printed when you click OK. Click a Print window item to select or deselect the item for printing.

NOTE. *A full report printout can be quite lengthy, depending on the complexity of the input stream, the duration of the analysis, and the number of events and errors encountered.*

To print only the messages for one program, a single ETR 290 priority level, one advanced analysis type, or one error type, select the corresponding report hierarchy icon so the messages are displayed in the right report view section. Then select Print from the View menu (or press CTRL+P).

Messages and the Windows NT Event Viewer

The Analysis Server can save error message details in the Windows NT Event Viewer Application log. This gives you the opportunity to save a permanent record of analysis events, which would otherwise be lost when you pause window updates (Freeze views in the View menu) or exit the application.

Turn Event Viewer logging on or off using the Report configuration panel of the Configuration client (refer to *Report Panel* on page 3–196).

When you open an Event viewer messages window from within a Message view, you are accessing the Event Viewer Application log. To access the log directly, perform the following steps:

1. Start the Event Viewer application from the Windows NT Start menu by pointing to **Programs, Administrative Tools (Common),** and then selecting **Event Viewer**.

2. When the **Event Viewer** window opens, select **Application** from the Log menu.

3. The Application Log can contain hundreds of entries. Use the vertical scroll bar and arrows to see entries that will not fit in the window. As long as the Analysis Server is running, the log is continuously updated. To open an **Event Detail** window, double-click a log entry.
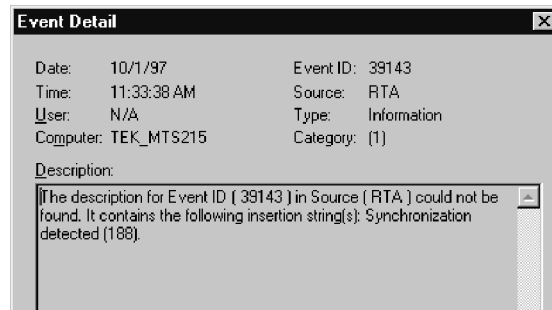
4. From the Event Viewer Application log window you can save the current contents of the Application Log to a file for later use, you can clear the log to make room for more entries, you can change the log size, and you can specify how the Event Viewer acts when the log is full. Refer to the Windows NT documentation (or the Event Viewer online help) for more information.

*NOTE. For best results, do not select any Event Viewer Log Wrapping setting other than **Overwrite Events as Needed**. The Expert client may freeze if the application event log fills to capacity during stream analysis. Choose **Log Settings** from the Log menu of the Event Viewer to verify the current log wrapping option and to change the size of the application event log, if necessary.*
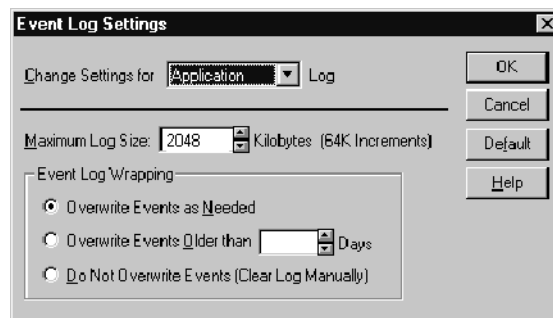
Using the Client Area

The Client area occupies the upper-right panel of the default Expert client window (see Figure 3--9 on page 3--94). The Client area can display several different views which represent various aspects of the analysis of the input stream.

By default, the Client area displays the Statistic view whenever you start analysis. The Statistic view contains several panels, which display data about the input stream and the programs carried in the stream. Refer to *Statistic View* on page 3--134 for more information. The Client area can contain numerous other analysis panels that you can access through the Hierarchic view icons. Refer to *Using the Hierarchic View* on page 3--110.

Positioning and Sizing the Client Area Views

By default, the individual Client area views are maximized. That means that each view occupies the entire Client view. If more than one view is open at a time in the Client view, you can switch among them by clicking the appropriate Client area view tab as shown below.

Client area view panel tabs   Statistic view panel tabs
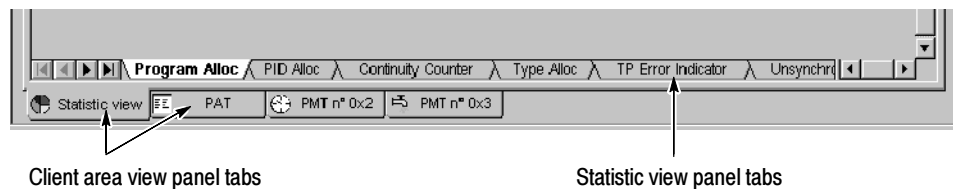
You can use the Window menu to change how multiple open views in the Client area are displayed, such as tiling or cascading the views. Refer to *Window Menu* on page 3--102 for more information.

To simultaneously maximize the Statistic view and close other Client area views, click the **Restore standard views** toolbar button.

The Client area control buttons appear at the right end of the Menu bar when the Client area views are maximized as shown below.

Expert client control buttons

Client area control buttons

Click the Minimize button (⎯) to reduce the top Client area view to an icon within the Client area and change all other Client area views to windows or icons within the Client area, depending on their previous size. Each window and icon then has its own control buttons.

Click the Tile button (⊟) to reduce all Client area views to windows or icons within the Client area, depending on their previous status, if any. The sizing buttons disappear from the menu bar because each icon and window has its own sizing buttons.

Click the Close button (☒) to close the top (currently selected) view.

NOTE. Closing a Client area view clears all existing information. Unless you are logging messages to the Event Viewer, all information in a Client area view is lost when you close the view. Use the Report panel in the Configuration client to enable Event Viewer logging. Refer to Report Panel *on page 3–196.*

Error Indicators The Client area views use the following colors for error indicators:

- *Gray* signifies that no test is currently running.

    A test is not performed for one of three reasons: the user probe is not set, the test is disabled, or the input stream does not contain the applicable table. (For example, MPEG-2 streams, do not contain SI tables; therefore, ETR 290 tests 3.2 through 3.8 cannot be performed on non-DVB streams.)

- *Green* signifies that a probe is set and that the measurement has remained within the user-specified limits.

- *Red* signifies that an error is occurring.

- *Orange* signifies that the monitored parameter is currently within the limits you defined but that an error has occurred since monitoring began.

Statistic View   The Statistic view is a collection of different tabbed panels that display data about the input stream and the programs carried in the stream. You can display only one Statistic view panel at a time.

By default, the Program Allocation panel of the Statistic view appears in the Client area after you begin analysis on the input stream. You can view a different panel by clicking the corresponding tab on the bottom of the Statistic view panel (see illustration on page 3-132).

When the Statistic view first opens, some of the panel tabs are hidden by the horizontal scroll bar. You can click the scroll arrows to reveal the remaining tabs, or you can click the thin split box and drag to the right to shorten the scroll bar.
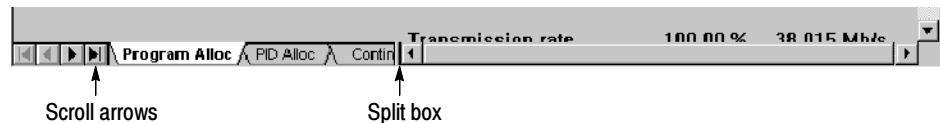
Bandwidth allocation tool tip displays. The Program Allocation, PID Allocation, and Type Allocation panels of the Statistic view provide different views of how the transport stream bandwidth is allocated. In each view, you can rest the mouse cursor anywhere in a transport stream item row, and a Tool Tip (shown below) is displayed. The information provided shows the minimum and maximum values taken by the element since the last synchronization.
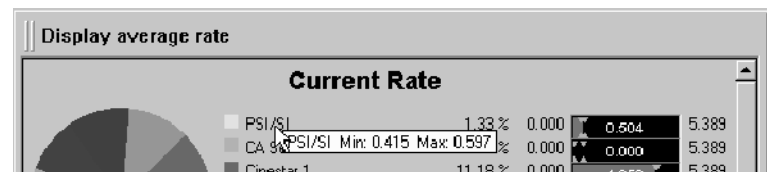
Program Allocation panel. The Program Allocation panel (see Figure 3‑25) shows the bandwidth allocation of individual items in the input multiplex using a graphical pie chart. The yellow slice of the pie chart represents PSI and either SI PSIP, or ISDB information (depending on the analysis mode set by the Configuration client); each remaining colored slice represents a program, null packets, or unreferenced (ghost) packets. The accompanying color-coded list of programs (matches the pie-chart colors) provides a numeric report of bandwidth usage. A graphic bar displaying the current or average transport rate for each program or service in the multiplex is displayed on the right.

Display current or average rate button

Service or program name

Portion of the input stream used by the service or program

Current or average transport rate of the service or program

Display average rate

Current Rate

PSI/SI	1.32 %	0.000	0.501	20.167
CA Service	0.08 %	0.000	0.029	20.167
Cinestar 1	11.19 %	0.000	4.253	20.167
Cinestar 2	11.20 %	0.000	4.258	20.167
Cinetoile	11.19 %	0.000	4.255	20.167
Teletoon	9.95 %	0.000	3.784	20.167
Odyssee	10.91 %	0.000	4.146	20.167
Teva	9.29 %	0.000	3.530	20.167
Supervision	14.15 %	0.000	5.380	20.167
Festival	9.94 %	0.000	3.780	20.167
FUN TV	9.03 %	0.000	3.434	20.167

Program Alloc PID Alloc Continuity Counter Type Alloc TP

Statistic view

Minimum transport rate (Current Rate display mode only)

Maximum transport rate (Current Rate display mode only)

Figure 3‑25: Program Allocation panel (Current Rate mode)

You can double-click a slice of the pie chart to switch to the PID Allocation panel (see Figure 3-25 on page 3-135) with the corresponding program or service already selected. You can turn off the pie-chart display using the Graphics View panel of the Settings window (select Settings from the Session menu).

The Reused rate is the rate of shared items (that is, PIDs shared between programs). The Used rate is the transmission rate less the Null Packet rate.

You can set the Program Allocation and PID Allocation panels to display current or average transport rates for the current configuration.

■ Select Display current rate to display current transport rates. In this mode the minimum and maximum transport rates for the current configuration are displayed as well as the current transport rate. Current Rate is displayed on both the Program Allocation and PID Allocation panels when this mode is selected.

■ Select Display average rate to display average transport rates. In this mode the transport rates for the current configuration are averaged and only the average rates are displayed. Average Rate is displayed on both the Program Allocation and PID Allocation panels when this mode is selected.

You can set user-defined upper and/or lower transport rate error limits for individual stream items so that the Analysis Server can alert you when the transport rate is outside of the desired range. Use the Transport Rate Analysis panel of the Configuration client to set user-defined measurement limits. Refer to *Transport Rate Analysis Panel* on page 3-192 for more information.

When you set user-defined limits on a stream item, the appearance of the graphic bar display changes. See Figure 3-26. In Figure 3-26, the low and limit levels for PSI/SI have been set (using the Configuration client) to 0.50 and 0.51 Mbps respectively. The two blue bars represent these limits.
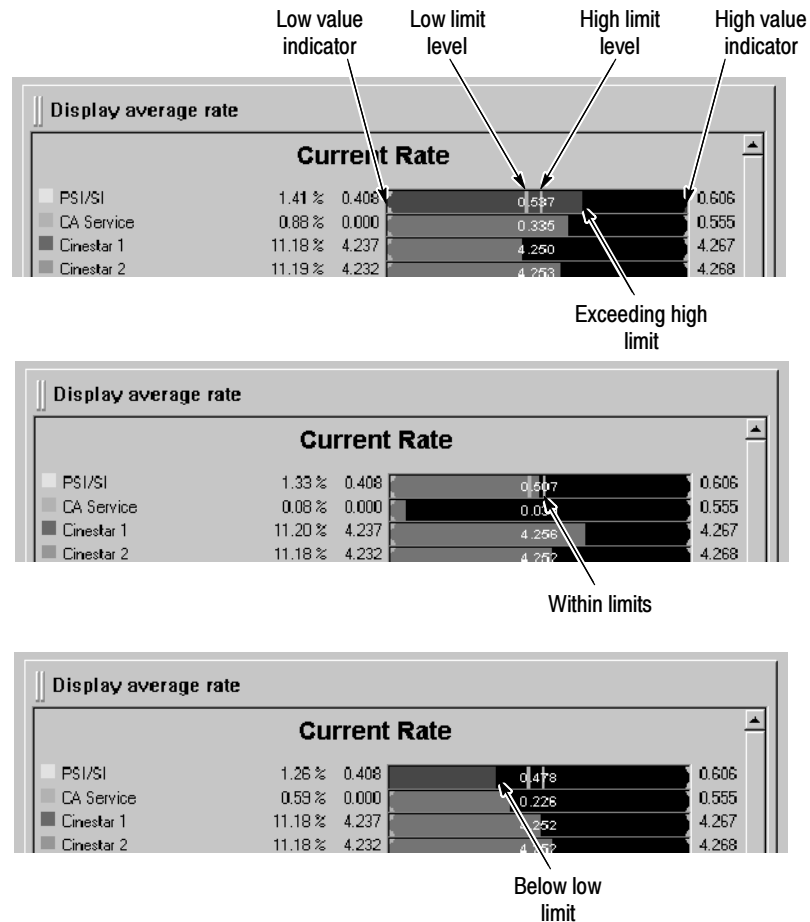
Figure 3-26: Reading the Program Allocation panel bar graphs

When you set measurement limits inside the range of the measured minimal and/or maximal rates, the graphic bar is green. When a limit has been violated, the bar becomes red. When the rate returns to within limits, the bar becomes green again, but the maximum and/or minimum value indicators become orange, indicating that the respective limit was surpassed. Refer to *Error Indicators* on page 3-133 for more information.

PID Allocation panel. The PID Allocation panel (see Figure 3–27) gives a more detailed, program-level view of input stream bandwidth allocation. Instantaneous, previous maximum, and previous minimum multiplex rates are shown by PID for the selected program. Each PID icon corresponds to the stream item type shown in the Hierarchic view.
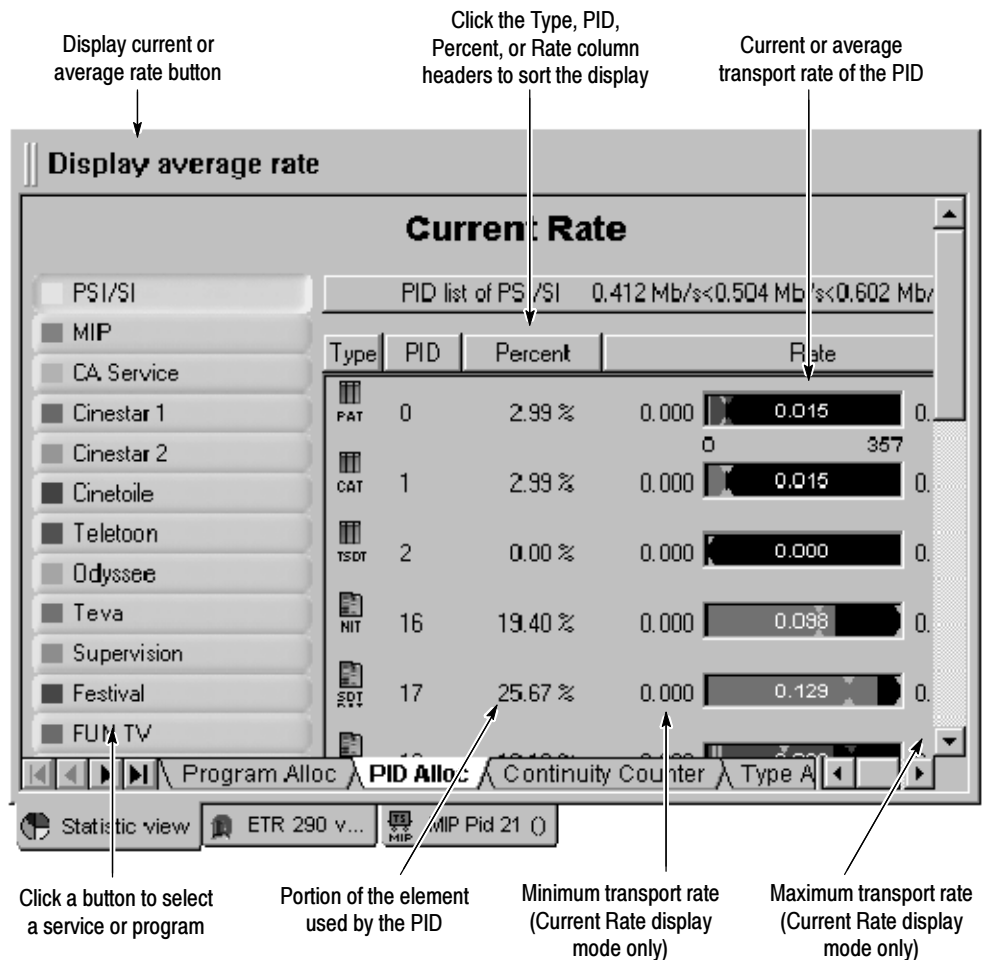
Figure 3‑27: PID Allocation panel (current rate mode)

You can select a program to view in the PID Allocation panel using one of the following methods:

■ Double-click the program slice in the Program Allocation panel to open the PID Allocation panel for that program.

■ Click the corresponding program or transport stream item button in the PID Allocation panel.

Additionally, you can view selected PIDs only by clicking the Selection button. When you click the Selection button, the PIDs you referenced using the PID Allocation View panel of the Settings window are displayed. Refer to *PID Allocation View Panel* on page 3-109 for more information.

NOTE. *You can add and remove PIDs directly from the PID Allocation panel by dragging and dropping stream icons between the Hierarchic view and the PID Allocation panel in the Client area. Doing so will automatically update the PID Allocation View panel of the Settings window.*

The banner over the displayed PIDs in the PID Allocation panel contains information about the selected program or service. In the PID Allocation panel shown in Figure 3-27, PSI/SI has an instantaneous transport rate of 0.504 Mbps and the rate has been between 0.412 and 0.602 Mbps for the current configuration.

The area below the banner lists each PID in the program or service and, with graphics and text, reveals additional information about the stream item identified with that PID. If the program or service contains more than a few PIDs, you may have to use the vertical scroll bar to view the information for every PID.

NOTE. *You can sort the PID Allocation display by clicking the Type, PID, Percent, or Rate column headers.*

You can set the Program Allocation and PID Allocation panels to display current or average transport rates for the current configuration.

- Select Display current rate to display current transport rates. In this mode the minimum and maximum transport rates for the current configuration are displayed as well as the current transport rate. Current Rate is displayed on both the Program Allocation and PID Allocation panels when this mode is selected.

- Select Display average rate to display average transport rates. In this mode the transport rates for the current configuration are averaged and only the average rates are displayed. Average Rate is displayed on both the Program Allocation and PID Allocation panels when this mode is selected.

You can set user-defined upper and/or lower transport rate error limits for individual stream PIDs so that the Analysis Server can alert you when the transport rate is outside of the desired range. Use the Transport Rate Analysis panel of the Configuration client to set user-defined measurement limits. Refer to *Transport Rate Analysis Panel* on page 3-192 for more information.

When you set user-defined limits on a PID, the appearance of the graphic bar display changes (shown below). When you set measurement limits inside the range of the measured minimal and/or maximal rates, the graphic bar displays the standard colors to indicate error conditions (the corresponding PID selection button color will match the error condition). The display will show the current rate in red when it violates either limit. When a limit has been violated, the region of the bar between the limit and the actual min or max value becomes red; when the rate returns to the preferred range, the region becomes orange. Refer to *Error Indicators* on page 3‑133 for more information.
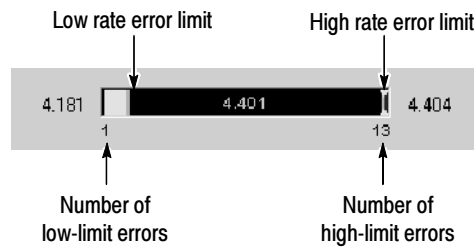
The number of low-limit errors detected (in this case, 1) appears immediately below the left end of the rate bar while the number of high-limit errors appears below the right end. The number of (low- or high-limit) errors reported is the number of 500 ms samples in which the actual transport rate has been below or above the specified limits.

Continuity Counter panel. The Continuity Counter panel (see Figure 3‑28) shows the results of continuity counter monitoring for each PID in the selected program or service. The data are displayed PID-by-PID, similar to the PID Allocation view. If a continuity error is detected, a message is displayed in the Report view.

The Transport Syntactic Analysis panel of the Configuration client controls which PIDs are shown in this view. Refer to *Transport Syntactic Analysis Panel* on page 3‑181 for more information.
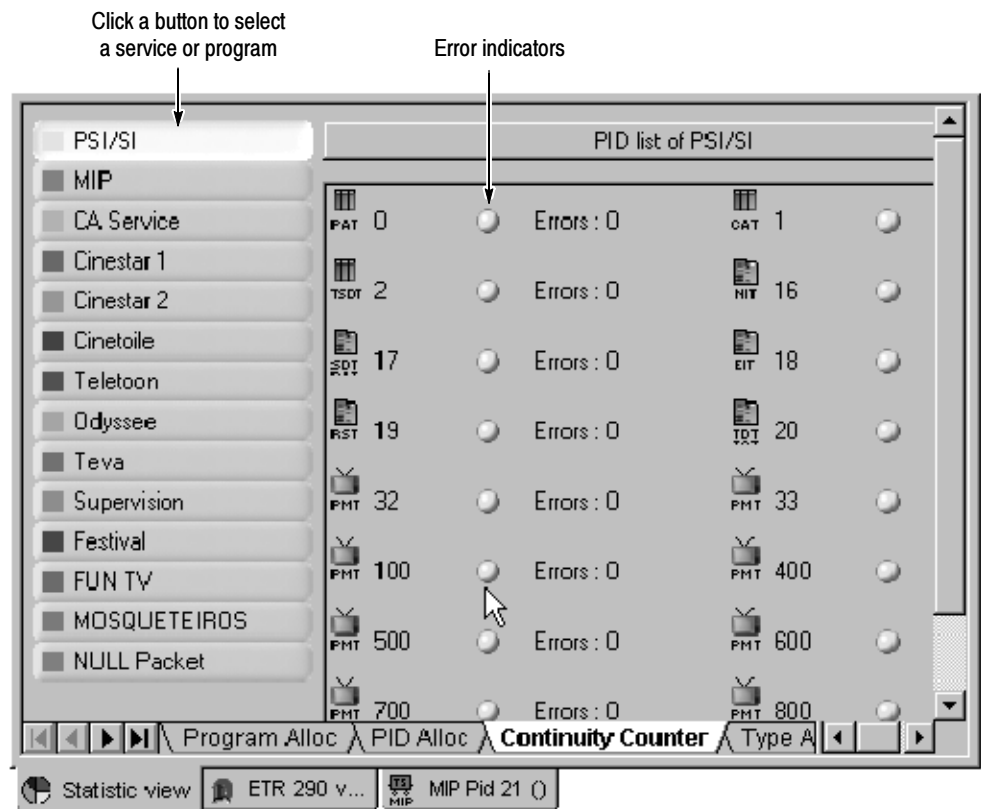
Figure 3‑28: Continuity Counter panel

Select a program by clicking the corresponding button on the left edge of the panel. Each program button can change color to indicate the presence or absence of continuity counter errors in that program. The right portion of the panel shows the error status and number of errors for each individual PID in the program. The error indicators use colors to indicate error conditions. Refer to *Error Indicators* on page 3‑133 for more information.

Type Allocation panel. The Type Allocation panel (see Figure 3–29) shows the bandwidth allocation of each PID type in a pie-chart display. Each slice of the pie chart represents a PID type (such as audio, video, or data).

The accompanying color-coded list of PIDs (matches the pie-chart colors) provides a numeric report of bandwidth usage. A graphic bar displaying the current transport rate for each PID in the multiplex is displayed on the right, along with the minimum and maximum rates.
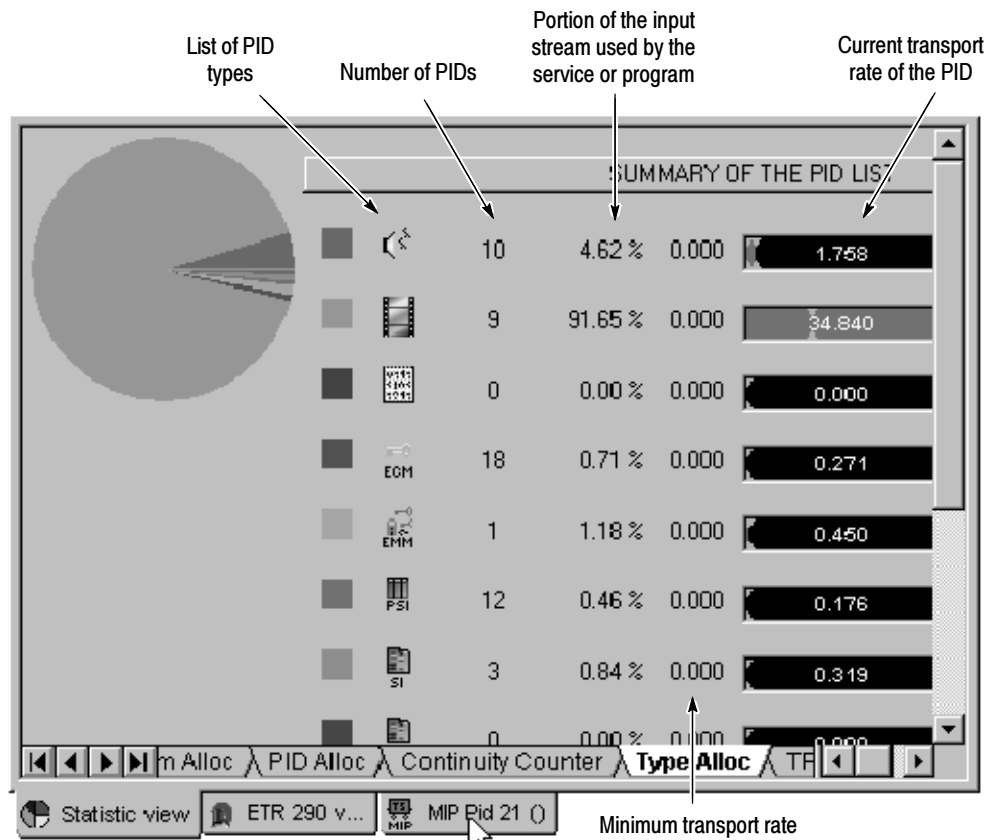
Figure 3- 29: Type Allocation panel

TP (Transport Packet) Error Indicator panel. The TP Error Indicator panel (see Figure 3-30) reports the results of transport error indicator (TEI) monitoring per ETR 290. The *transport_error_indicator* field of every transport packet header is checked and the number of packets is counted with this bit-field set to 1 every 500 ms. The TP Error Indicator panel displays the last 150 seconds of the results in graphical form.

The Transport Syntactic Analysis panel of the Configuration client controls this view. Refer to *Transport Syntactic Analysis Panel* on page 3-181 for more information about activating the transport error indicator probe. You can also add this probe using the 2.1 Transport error probe from the ETR290 panel of the Configuration client.

The horizontal (time) scale of the graph is linear. The vertical (errors/500 ms) scale is logarithmic to show both very low and very high error rates.

The TEI indicator in the status bar uses color conventions for error reporting. Refer to *Error Indicators* on page 3-133 for more information.
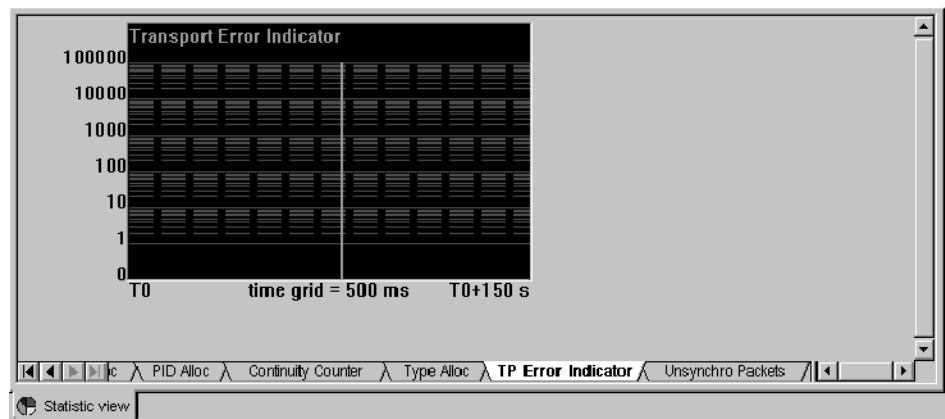
Figure 3-30: TP (Transport Packet) Error Indicator panel

Unsynchronized Packets panel. The Unsynchronized Packets panel (see Figure 3-31) reports the results of sync byte monitoring. The *sync_byte* field of every transport packet header is checked and the number of packets without the 0x47 sync_byte is counted every 500 ms. The number of packets with sync bytes are plotted on a graph with a logarithmic vertical scale to display both very low and very high rates of error. The vertical units are UNP per 500 ms.

You must set the unsynchronized packet probe using the Multiplex Analysis panel of the Configuration client to perform sync byte monitoring. Refer to *Multiplex Analysis Panel* on page 3-177 for more information.

The UNP indicator in the status bar uses color conventions for error reporting. Refer to *Error Indicators* on page 3-133 for more information.
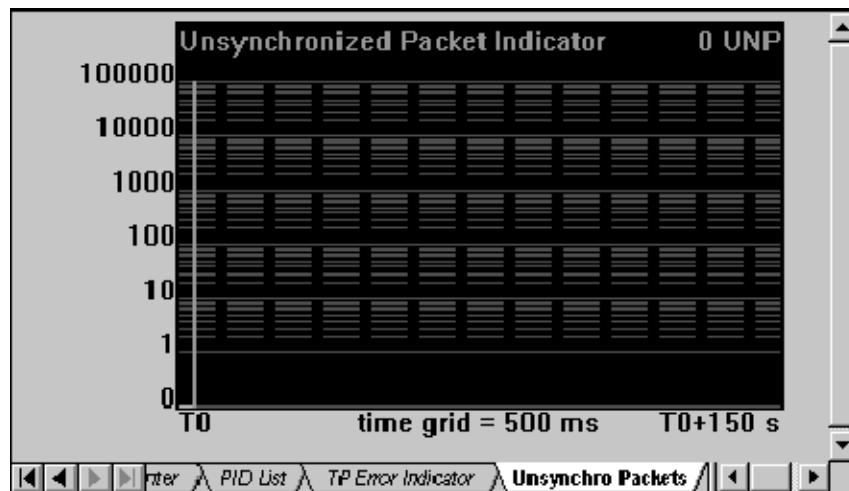
Figure 3-31: Unsynchronized Packets panel

ASI/M2S Distribution panel. The ASI/M2S Distribution panel (see Figure 3–32) shows the statistical distribution of the gaps between consecutive data bytes. The vertical axis represents the percentage of gaps in useful data (bytes) and the horizontal axis represents number of NULL (dummy) bytes between data bytes. In the Figure 3–32, over 70 percent of the packets in the transport stream being analyzed have twelve NULL bytes between them.

By default, the display is auto-scaled. If you clear the Auto-scale check box, you can select scales of 1%, 2%, 5%, 10%, or 20%.

The input transport stream mode can be one of two types (this mode is automatically detected):

■   Burst mode which provides single bytes separated with dummy bytes.

■   Packet mode which provides continuous transmission of bytes separated with continuous dummy bytes.
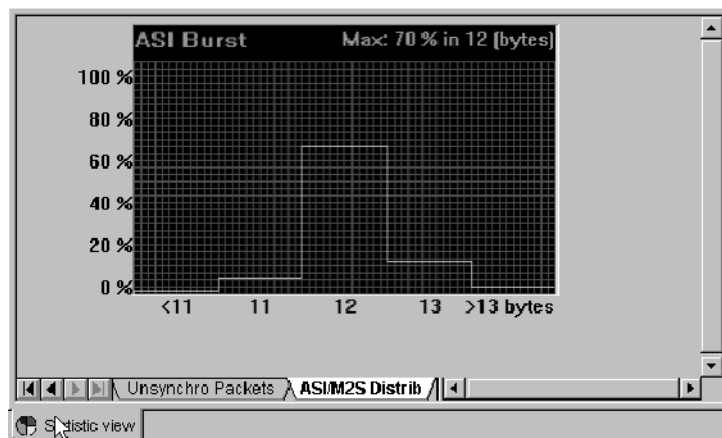
Figure 3‑32: ASI/M2S Distribution panel

ETR 290 View   The ETR 290 view (see Figure 3--33) provides a high-level report of all ETR 290[3] recommended tests performed by the Expert client. To open an ETR 290 view, either select ETR 290 View from the View menu or click the ETR 290 View toolbar button. The status bar includes indicators (PR1, PR2, and PR3) to indicate the status of ETR 290 priority errors.

NOTE. *ETR 290 priority 3 checks DVB-SI tables. In ATSC analysis mode these checks do not apply except for 3.4 Unreferenced_PID. Therefore, the Expert client uses six tests specific to ATSC/PSIP tables based on the model of ETR 290. Consequently, the ETR 290 view changes dynamically with the analysis mode.*

In the ETR 290 view, test numbers are those used in the DVB measurement guidelines, ETR 290, except for the priority 3 checks which apply only to the DVB mode. In MPEG-2 mode, the priority 3 column does not appear and in ATSC mode the column is customized for that mode. Colored indicator lights show the status of each test. The error indicators follow color conventions for error reporting. Refer to *Error Indicators* on page 3--133 for more information.
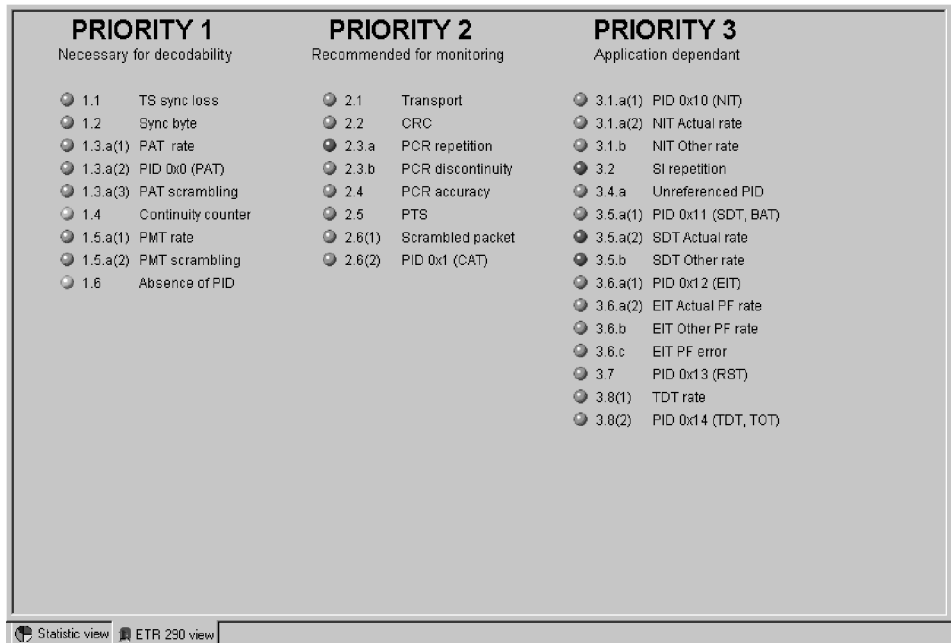
Figure 3--33: ETR 290 view (DVB mode)

[3]   **ETR 290 is the DVB consortium working group that recommends the measurements and controls performed on elements of a digital television chain. Refer to *ETR 290 Analysis* on page 3--49 for additional information about the ETR 290 recommendations, priority levels, and tests.**

Positioning your pointer over the test name or LED displays a Tool Tip (as shown below) describing the Analysis Server test or tests represented by that ETR 290 priority LED. You can double-click an error indicator to open a Message view in the Client area that displays the error messages pertaining to that particular ETR 290 error condition.

Tests 1.3.a(1), 1.5.a(1), 3.1.a(2), 3.1.b, 3.5.a(2), 3.5.b, 3.6.a(2), 3.6.b, and 3.8(1) use error criteria that can be changed on the Section Rate Analysis panel of the Configuration Client. Refer to *Section Rate Analysis Panel* on page 3–193 for more information. The values you set in the Section Rate Analysis panel are displayed in the Tool Tips when you position your pointer over the test name or LED.

Tests 2.3.a, 2.3.b, 2.4, and 2.5 (PCR and PTS/DTS probes) are performed only on PMTs and elementary streams that you specify using the Configuration Client timing analysis panels. The ETR 290 view shows how many of the PMTs and elementary streams (ES) in the input stream have been selected for monitoring.

Section Analysis View

The Section Analysis view (see Figure 3–34) is available for all tables carried in a transport stream, whether they are part of the system information tables (PSI, DVB–SI, ATSC/PSIP, ISDB/ARIB) or part of other transport stream data. Set section probes using the Configuration client.
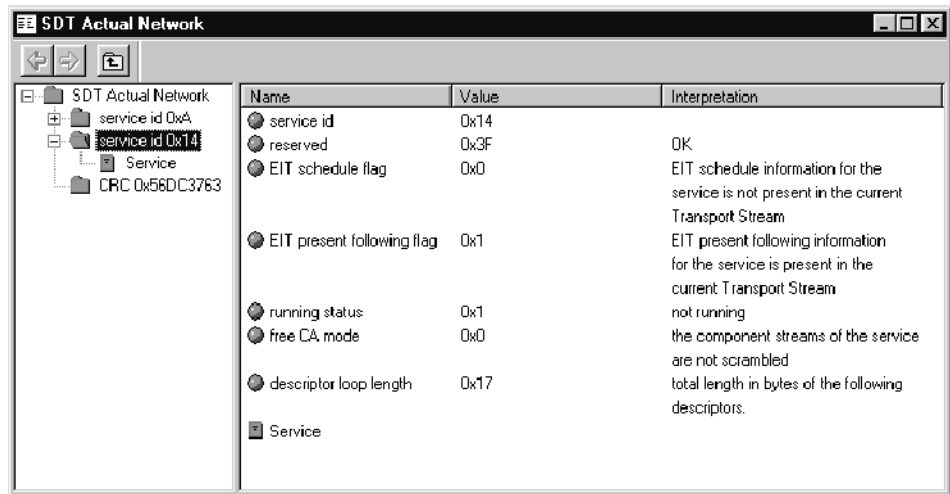
Figure 3-34: Section Analysis view

The Section Analysis view provides both a hierarchic and field view of the selected table section. In the Section Analysis view hierarchy, related fields are grouped and shown as folders and other icons. With some table types you can expand and collapse the hierarchy as you would a Windows NT Explorer directory hierarchy. Click a hierarchy icon to show the contents of the represented item in the right sub-view as shown below. You can also double-click the same folder icon in the right sub-view to show the same information.

Click the Close Folder button (📁) to close an open folder in the hierarchy. When more than one section of the selected sub-table exists, use the section selection buttons to scroll among the sections.

Section selection buttons
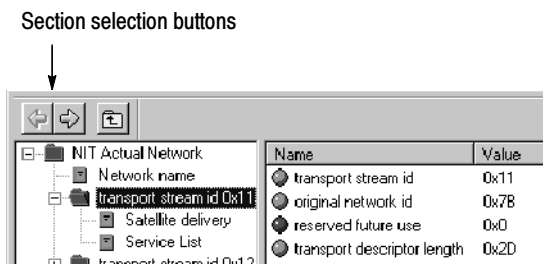
Although the normal numeric display is hexadecimal, it may be convenient in some instances to see the decimal value of one or more fields. Press the F2 function key to toggle between decimal and hexadecimal display.

Opening a section analysis view. To display the results of a section analysis, select View Section Analysis from the Hierarchic view shortcut menu. If an item in the Hierarchic view represents several sub-tables (such as an NIT, SDT, DCT, or EIT), an intermediate dialog box enables you to select one particular sub-table to analyze. For an SDT, for instance, a dialog box (shown below) enables you to choose the original_network_id and the transport_stream_id of the SDT sub-table. Double-click the sub-table you need to display or highlight the sub-table and click OK. You can click the column headers to reorder the listed sub-tables.
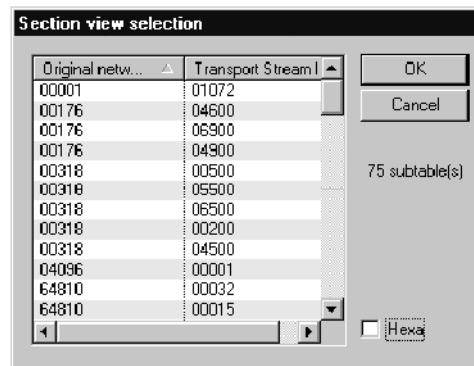
Printing a section analysis view. You can print a record of the current Section Analysis view by clicking inside the view to select the view, and then choosing Print from the View menu (or pressing CTRL+P).

NOTE. Before printing a view, check the Expert client title bar to confirm that the desired view is selected.

Section Rate View   The Section Rate view (see Figure 3–35) contains graphs that show the section rate and time interval between sections of the selected table. Before you can open a Section Rate view of a table, you must first set a rate probe on the desired table using the Configuration client. After the probe is set, select the corresponding Hierarchic view icon, right-click to open the shortcut menu, and then select View Section Rate. An intermediate dialog box lets you select a sub-table if necessary.

If a section rate error is detected the graph trace is red. The error indicator corresponding to the error is displayed in red in the ETR 290 view if the rate error is classified in the ETR 290 reference (for example, ETR 290 1.3.1 is a PAT rate condition). To see which error occurred, double-click the Hierarchic view icon corresponding to the Section Rate view or choose the View Report command in the shortcut menu to open the associated report view.

The lower Sub-Table Max Interval graph displays interval errors in red when a maximum section interval probe is set for the particular table type.

You can use the Graphics View panel of the Settings window (select Settings from the Session menu) to set the scrolling mode for the graphs.
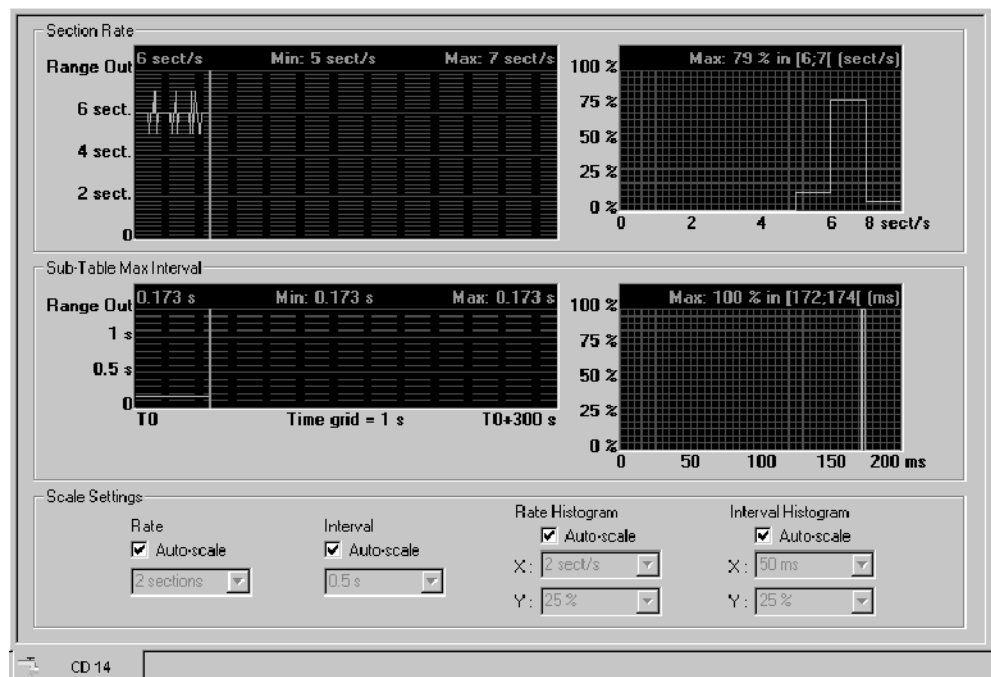

Figure 3-35: Section Rate view

Setting graph scales. All scales on the rate and interval graphs are linear and by default the Expert client auto-scales the vertical scale on the graphs. To change the vertical scale on a graph, clear the corresponding Auto-scale check box and select an appropriate scale increment from the drop-down list box. The Section Rate vertical scale in the graph ranges from zero to four times the selected scale increment; the Sub-Table Max Interval scale ranges from zero to approximately three times the scale increment. Both vertical scales begin at zero regardless of the scale setting.

Histogram readout. The two section-analysis graphs on the right are histograms, which show the relative frequency of section rates and intervals. Histograms are a percentage value distribution since the beginning of the analysis. By default, the histogram readout lists the maximum rate or interval measured. If you position the cursor within a histogram, the cursor shape changes to resemble cross hairs and the histogram readout changes to display the rate or interval value at the cursor position.

PCR Analysis View

The PCR Analysis view (see Figure 3–36) is a graphical display of PCR precision and frequency. Before you can open a PCR Analysis view, you must first set a probe on the desired program using the Configuration client.
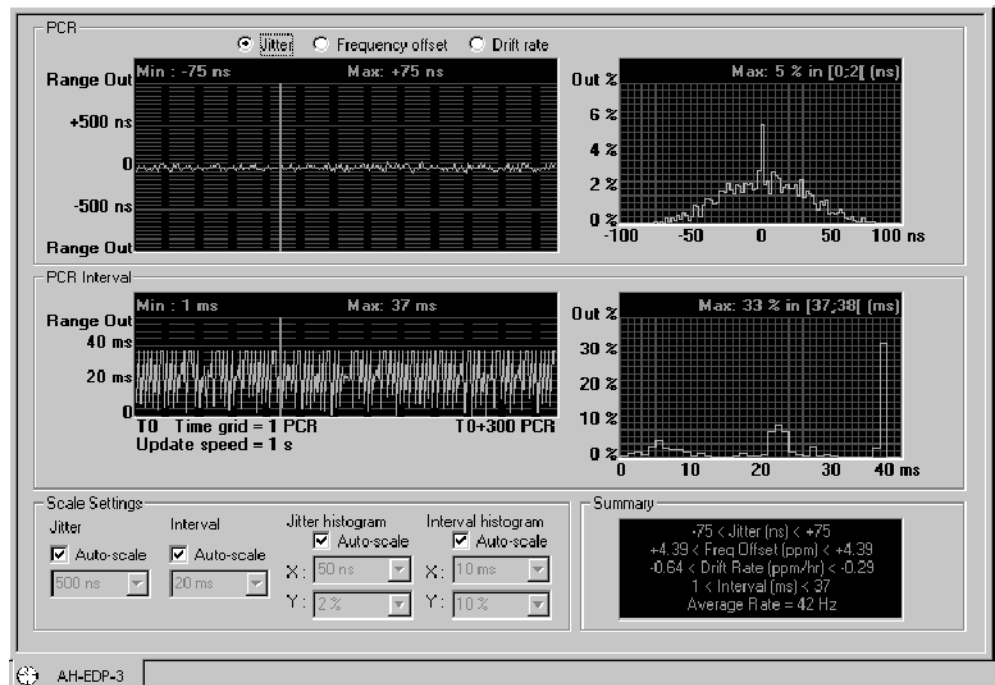
Figure 3-36: PCR Analysis view

The upper PCR graph plots your selection of either the Jitter, Frequency offset, or Drift rate of each clock reference of the selected program. The Jitter graph displays two kinds of information: jitter (a high-frequency component) and wander (a low-frequency component). Low-pass and high-pass filters are used to isolate these frequency components. The Frequency Offset graph displays the frequency error of the program clock reference (PCR). The Drift Rate graph displays the rate of change of the first two low frequency effects extracted from the signal.

The lower PCR Interval graph plots the time interval between consecutive PCR references used by the program. Each graph contains numeric readouts of the minimum and maximum values measured in the last 300 clock references. The graphs on the right are histograms, which show the relative frequency of the PCR data in the graphs on the left.

Red colored portions of the graphs and red Min or Max readouts indicate that the data exceeds the PCR error limits. The default interval error limit is 100 ms in MPEG-2 and ATSC mode and 40 ms in DVB mode. Any interval between consecutive clock references that exceeds these values is reported as an error. The default overall jitter error limit is ± 500 ns for all three modes. You can view or change PCR error limits using the PCR Timing Analysis panel of the Settings window. Refer to *PCR Timing Analysis Panel* on page 3-187 for more information.

You can use the Graphics View panel of the Settings window (select Settings from the Session menu) to set the scrolling mode for the graphs.

Settling filter. The Expert client uses an internal Settling Filter to improve the accuracy of PCR jitter analysis. The Settling Filter must have at least 60 seconds of data before the Expert client can detect and report PCR jitter errors. When you first set a PCR probe and open a PCR Analysis view, a message appears in the upper histogram displaying how many seconds remain before the settling filter completes its operation.

Opening a PCR analysis view. Before you can open a PCR Analysis view, you must first set a probe on the desired program using the Configuration client. After the probe is set, select the appropriate Hierarchic view PMT icon, right-click to open the shortcut menu, and then click View PCR Analysis. If you set Mask Discontinuities when you enabled the PCR probe with the Configuration client, each PCR discontinuity with a magnitude greater than 1 ms (millisecond) is ignored. If no discontinuity mask is set, the discontinuity is taken into account and the model needs a delay to resettle.

NOTE. The PCR interval and PCR overall jitter settings determine the thresholds for errors reported on the ETR 290 view. The default settings are consistent with ETR 290 recommendations. Do not change these settings if you plan to use ETR 290 tests to judge DVB compliance of the input stream.

Setting graph scales. The scales on the PCR Analysis view graphs are linear and by default the Expert client auto-scales the vertical scale on the graphs. To change the vertical scale on a graph, clear the corresponding Auto-scale check box and select an appropriate scale increment from the drop-down list box. The range of the Precision graph is approximately twice the selected increment; the range of the Interval graph is from zero to approximately three times the selected interval.

Histogram readout. The graphs on the right of the PCR Analysis view are histograms, which show the relative frequency of the PCR data in the graphs on the left. Histograms are a percentage value distribution since the beginning of the analysis. The histogram readout lists the maximum measured result. If you position the cursor within the histogram, the cursor shape changes to resemble cross hairs and the histogram readout changes to display the interval value at the cursor position. The histogram scales range from zero to approximately four times the selected increment.

PTS/DTS Analysis View   The PTS/DTS Analysis view (see Figure 3-37) graphs the interval between consecutive time stamps in the selected video or audio elementary stream. The minimum and maximum intervals between any two of the last 300 time stamps are also shown.

The PTS/DTS Interval graph displays each second of the PTS/DTS interval analysis. The interval is computed with two real time of successive PES that have PTS/DTS flags values other than zero. If the time between those two packets is higher than 700 ms, an error is reported.

You can use the Graphics View panel of the Settings window (select Settings from the Session menu) to set the scrolling mode for the graphs.
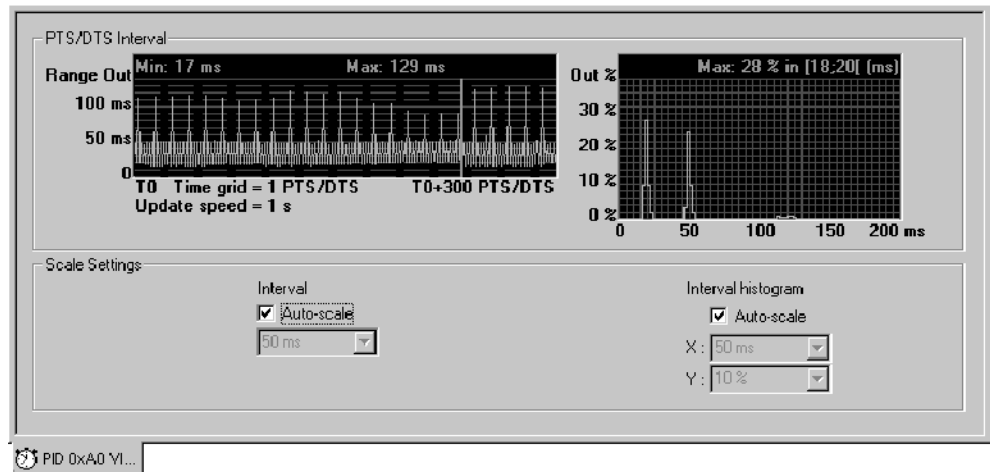
Figure 3-37: PTS/DTS Analysis view

Opening a PTS/DTS analysis view. Before you can open a PTS/DTS Analysis view, you must first set a probe on the desired elementary stream using the Configuration client. To open a PTS/DTS Analysis view of a video or audio elementary stream, select the corresponding Hierarchic view icon, right-click to open the shortcut menu, and then select View PTS/DTS Analysis.

NOTE. The PTS/DTS Interval setting determines the threshold for errors reported on the ETR 290 view. The default setting is consistent with ETR 290 recommendations. Do not change this setting if you plan to use ETR 290 tests to judge DVB compliance of the input stream.

The Expert client cannot display a PTS/DTS Analysis view for a scrambled elementary stream.

Setting graph scales. The scales on the PTS/DTS Analysis view graphs are linear and by default the Expert client auto-scales the vertical scale on the graphs. To change the vertical scale on a graph, clear the corresponding Auto-scale check box and select an appropriate scale increment from the drop-down list box. The PTS/DTS Interval vertical scale ranges from zero to approximately three times the scale increment. The vertical scale begin at zero regardless of the scale setting.

Histogram readout. The right graph is a histogram, which shows the relative frequency of PTS/DTS intervals. Histograms are a percentage value distribution since the beginning of the analysis. The histogram readout lists the maximum interval measured. If you position the cursor within the histogram, the cursor shape changes to resemble cross hairs and the histogram readout changes to display the interval value at the cursor position.

MIP Packet Analysis View (DVB-T Only)

The MIP Packet Analysis view (see Figure 3–38) provides both a hierarchic and a field view of the selected MIP.
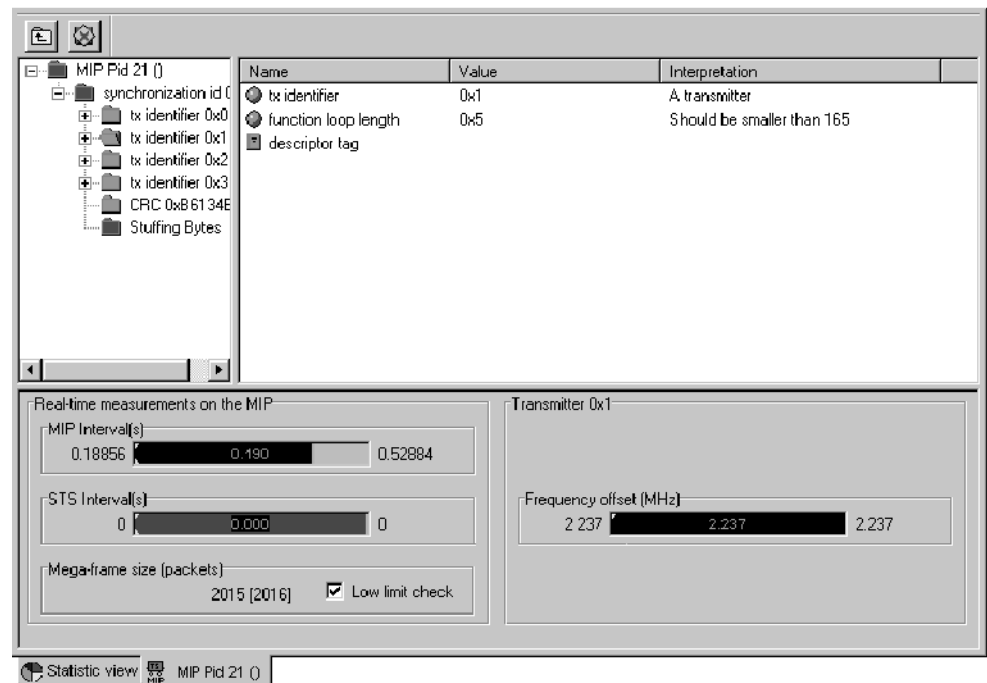
Figure 3‑38: MIP Packet Analysis view

In the MIP Packet Analysis view hierarchy, related fields are grouped and shown as folders and other icons. With some table types you can expand and collapse the hierarchy as you would a Windows NT Explorer directory hierarchy. Click a hierarchy icon to show the contents of the represented item in the right sub-view as shown below. You can also double-click the same folder icon in the right sub-view to show the same information.

Click the Close Folder button (⬆) to close an open folder in the hierarchy.

Below the hierarchy view (which displays the MIP syntax) and the list view (which displays the name, values, and interpretation for each item of the analyzed MIP structure), the MIP Packet Analysis view displays the most important values associated with the MIP.

The bar graphs on the left side report the intervals between MIPs and synchronization time-stamps. Those measurements can be controlled by adding allowed variation intervals using the Configuration client.

Also displayed are the emitted mega-frame size (between brackets) and the measured mega-frame size. If the measured mega-frame size differs from the emitted size, it means that an error occurred between the emission point and the reception point.

The bar graphs on the right side display the current values of the transmitter functions; they appear only when the corresponding transmitter is selected. Those bar graphs can be given allowed variation intervals (those intervals can also be defined from the mega-frame syntax settings box in the Configuration client).

Opening an MIP packet analysis view. To open a MIP Packet Analysis view, select the appropriate Hierarchic view MIP icon, right-click to open the shortcut menu, and then select View MIP Packet Analysis.

NOTE. Before the Expert client can recognize an MIP, DVB-T must be selected in the Analysis panel of the Configuration client. Refer to Analysis Panel *on page 3–174 for more information.*

Setting user-defined intervals. On the bottom-left side of the view there are bar graphs, which report the intervals between MIPs and synchronization time-stamps. You can control these measurements by adding user-defined intervals.

You can set user-defined intervals using the Mega Frame Timing Analysis panel to set the STS interval (refer to *Analysis:Advanced:Timing:Mega Frame Panel* on page 3–191) or use the Mega Frame Rate Analysis panel to set the MIP interval (refer to *Mega Frame Rate Analysis Panel* on page 3–195).

On the bottom-right side of the view there are bar graphs that display the current values of the transmitter functions. These bar graphs appear only when the corresponding transmitter is selected. You can control these measurements by adding user-defined intervals.

You can set user-defined intervals for the transmitters using the Mega Frame Syntactic Analysis panel to set the interval (refer to *Mega Frame Syntactic Analysis Panel* on page 3–185).

**IP (Internet Protocol)
Monitoring View
(SIDAT 360 Only)**

Depending on the type of protocol in use, the Analysis Server can monitor the data transfer between two Internet or MAC addresses. This is done only on Multiprotocol Encapsulation sections, which are the only sections in which IP headers can be detected and read properly.
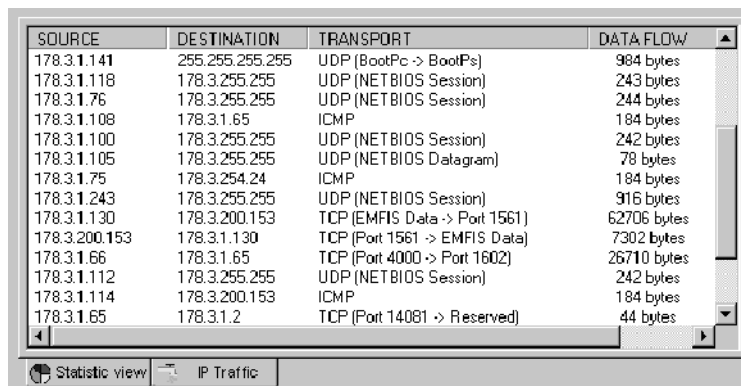
If the probed stream contains multiprotocol encapsulated datagrams, an interpretation of the IP (and TCP/UDP if present) headers is displayed, along with the sender and receiver addresses, and the total amount of data exchanged on that session. The Expert client assumes that packets which have the same IP source/destination couple and the same TCP/UDP ports belong to the same session. A session line may disappear from the view when no corresponding packets are sent for a certain period of time (40 seconds usually).

Opening an IP monitoring view. Before you can open an IP Monitoring view, you must first set a probe on the desired DSM-CC stream using the Configuration client. To open an IP Monitoring view (see Figure 3–39), select the appropriate Hierarchic view DSM-CC icon, right-click to open the shortcut menu, and then click IP Traffic.

NOTE. Before the Analysis Server can recognize a multiprotocol encapsulation section, SIDAT 360 data broadcasting analysis must be selected in the Analysis panel of the Configuration client. Refer to Analysis Panel *on page 3–174 for more information.*

There is only one IP Monitoring view for the Expert client. Therefore, if you add a probe on another stream, the results will be added to the same view.

IP monitoring can be tremendously bandwidth- and CPU-consuming. The section rate of such streams is usually very high.

SOURCE	DESTINATION	TRANSPORT	DATA FLOW
178.3.1.141	255.255.255.255	UDP (BootPc -> BootPs)	984 bytes
178.3.1.118	178.3.255.255	UDP (NETBIOS Session)	243 bytes
178.3.1.76	178.3.255.255	UDP (NETBIOS Session)	244 bytes
178.3.1.108	178.3.1.65	ICMP	184 bytes
178.3.1.100	178.3.255.255	UDP (NETBIOS Session)	242 bytes
178.3.1.105	178.3.255.255	UDP (NETBIOS Datagram)	78 bytes
178.3.1.75	178.3.254.24	ICMP	184 bytes
178.3.1.243	178.3.255.255	UDP (NETBIOS Session)	916 bytes
178.3.1.130	178.3.200.153	TCP (EMFIS Data -> Port 1561)	62706 bytes
178.3.200.153	178.3.1.130	TCP (Port 1561 -> EMFIS Data)	7302 bytes
178.3.1.66	178.3.1.65	TCP (Port 4000 -> Port 1602)	26710 bytes
178.3.1.112	178.3.255.255	UDP (NETBIOS Session)	242 bytes
178.3.1.114	178.3.200.153	ICMP	184 bytes
178.3.1.65	178.3.1.2	TCP (Port 14081 -> Reserved)	44 bytes

Statistic view   IP Traffic

Figure 3‑39: IP Monitoring view

Configuration Client Reference

The Configuration client of the MTM300 Series MPEG Transport Monitor is used to configure the analyses performed by the Analysis Server. The results of the analyses are displayed in both the Master and Expert clients.

The Configuration client has the following characteristics:

- Multiple configuration panels (at the right side of the Configuration client window) are used to group related probes.

- A hierarchic navigation panel (at the left side of the Configuration client window) is used to display the Configuration client panels.

- The Report Message Level panel allows you to define the level of more than 300 monitored MPEG-2, DVB, ISDB, and ATSC parameters.

- You can start, stop, and restart Analysis Servers using the Configuration client; you can also restart a remote transport monitor using the Configuration client.

NOTE. Only one Configuration client at a time can set parameters on an Analysis Server. If a Configuration client is already connected to an Analysis Server, you can view the current settings, but you cannot change them. Also, Analysis Servers can be password protected so that your configuration settings cannot be changed without first supplying a password.

This section describes the use of the Configuration client and explains each of the analysis settings in detail.

See *Analysis Reference*, beginning on page 3-43, for more details about the probes enabled by the MTM300 Series MPEG Transport Monitor and how to set, modify, and remove them.

Changing Configurations

To change the current MTM300 configuration, perform the following procedure:

1. Select one of the input streams (multiplex icon) in the Master client.

2. Right-click on the selected input stream and select Configuration client from the shortcut menu.

   The Configuration client is displayed for the selected input. All modifications made to this Analysis Server will be reflected in both the Expert and Master clients connected to the Analysis Server.

3. Select the appropriate configuration category from the Configuration client Navigation panel to open the associated configuration panel.

4. Change configuration settings using standard Windows techniques such as the following:

   ■ Click the appropriate option button to select among options

   ■ Select or clear a check box

   ■ Select from a list of several alternatives

   ■ Enter a new value in a text box

NOTE. Most of the configuration panels have a Restore Default button that you can click to return all settings on the displayed panel to the settings used in the MTM300 standard configuration.

5. When you have changed all the appropriate settings on one or more configuration panels, click the **Apply** toolbar button or select Apply from the Session menu to confirm and apply all configuration changes.

NOTE. MTM300 Series configuration settings are saved to the Windows NT registry and automatically persist from session to session, even if you exit the program and power down the instrument.

Saving and Restoring Configurations

Through the Configuration menu, you can perform the following functions:

■ Save all of the current MTM300 configuration settings as a named profile in the Windows NT registry

■ Load a registry profile to restore a previously saved configuration

■ Restore the standard, default MTM300 configuration

Saving the Current Configuration

To save the current MTM300 configuration in the Windows NT registry, perform the following procedure:

1. Select **Save Configuration as** from the Session menu to open the **Save Configuration As** window (shown below).

2. Save the current configuration using one of the following methods:

■ Enter a unique name in the **Profile name** box and click **Save** to create a new configuration profile.

■ Highlight a name on the **List of existing profiles** and click **Save** to overwrite an existing named profile with the current Analysis Server settings displayed in the Configuration client.

Restoring the Default Configuration

To restore the default MTM300 Series Analysis Server configuration, select **New Configuration** from the Session menu and click **Apply**. All settings will now be restored to the default state (no probes set, and MPEG-2 analysis type).

Loading a Saved Configuration

To restore an MTM300 configuration that has been saved in the Windows NT registry, perform the following procedure:

1. Select **Load Configuration** from the Configuration menu to open the **Load Configuration** window.

2. Highlight the name of the profile that you want to restore (by clicking on the name in the **Profiles** list) and then click **Load**.

3. Click the **Apply** toolbar button or select Apply from the Session menu.

NOTE. *You must click the Apply toolbar button or select Apply from the Session menu before your configuration changes will be applied to the Analysis Server input.*

Some configuration changes require that you restart the Analysis Server before the configuration changes can be applied. A message box that allows you to restart the Analysis Server appears when applicable.

Deleting a Saved Configuration

To delete a saved MTM300 configuration, you must use the Registry Editor program, Regedt32.exe. Perform the following procedure to delete an existing configuration profile:

1. Open the Windows NT Start menu and select **Run**. The Run window (shown below) opens.

2. Type **regedt32** in the **Open** text box and click **OK** to open the Registry Editor window.

3. Select the **HKEY_LOCAL_MACHINE on Local Machine** window and double-click the folder icons to open the path to the MTM300 profiles. The profiles are in the following directory path:

   HKEY_LOCAL_MACHINE\Software\Tektronix\MTM\Configuration Client\1.0\Profiles

   The named profiles in the following example are ATSC, DVB, DVB-T, and MPEG-2.
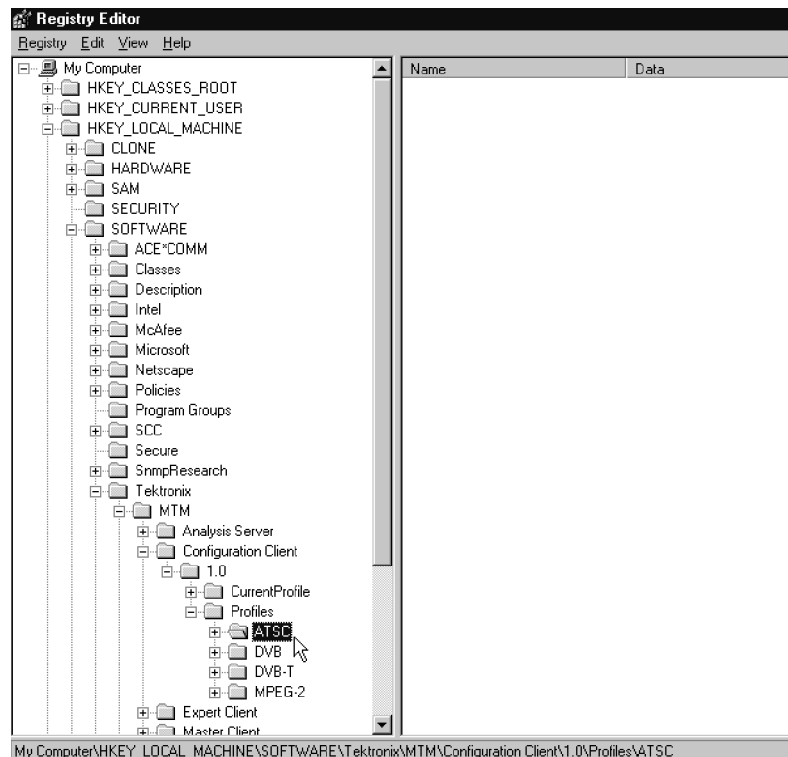
4. Highlight the name of the configuration profile to delete and press DEL (or select **Delete** from the Registry Editor Edit menu). A warning message appears; click **Yes** to confirm the deletion.

5. Exit the Registry Editor.

Managing Remote Transport Monitors

You can shut down and/or restart a remote transport monitor from the Configuration client using the following procedure:

CAUTION. *To avoid potential loss of data, use the Shut Down Server option only when necessary.*

1. If not already connected, connect to an Analysis Server running on the transport monitor you want to shut down or restart.

2. From the Session menu, select **Shut Down Server**. The Shutdown dialog box appears (shown below).
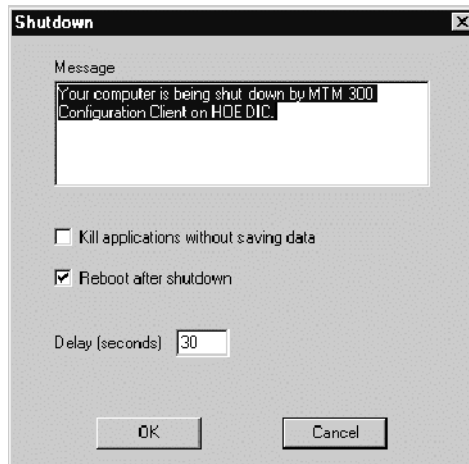
3. Make changes to the Shutdown dialog box using the option information provided in the following list:

   ■ The Message box contains a default shutdown message that you can edit. This message will appear in the System Shutdown message displayed on the transport monitor indicated in the address bar.

   ■ Select the Kill applications without saving data option to close all applications on the transport monitor indicated in the address bar without saving changes.

   ■ Select the Reboot after shutdown option to restart the transport monitor indicated in the address bar after it has shut down.

   ■ Use the Delay box to specify a delay period before the transport monitor indicated in the address bar shuts down. You can specify a delay period from 0 to 600 seconds. This number will appear in the System Shutdown message displayed on the transport monitor indicated in the address bar.

4. Click **OK** to close the Shutdown dialog box and send a message to the transport monitor indicated in the address bar, alerting the user of that device that it will be shut down within a specified period. The following illustration shows an example of the message that is displayed on the transport monitor being shut down.
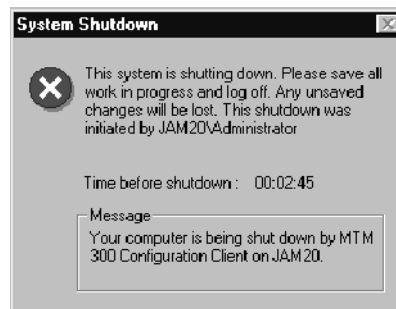
The System Shutdown message box shows the message and the name of the host machine that initiated the shutdown, an active clock showing the hours:minutes:seconds left until the machine shuts down, and the message you specified in the Shutdown dialog box.

Data Logging

The Data Logging function allows you to record real-time transport stream events as they are detected by the analysis server to tab-delimited text files. You can use these text files for record keeping or for further analysis. The Data Logging function is configured and enabled using the Data Logging panel in the Configuration Client.

NOTE. Once the Data Logging function has been enabled, it will continue until you disable the function, stop analysis, or until the hard drive gets full. When the hard drive has less than 100 Mbytes of free space left, the Data Logging function stops and the last entry in the log indicates a full-disk condition.

Log File Directory Hierarchy

Data Logging files are stored in the C:\MTM300\DataLogging directory on the instrument hard drive. Files are created in a directory structure indicating when the log file was created and its input source. As shown in Figure 3-40, data logging directory folders are created corresponding to the year, month, day, and I/O port number of the input being analyzed.
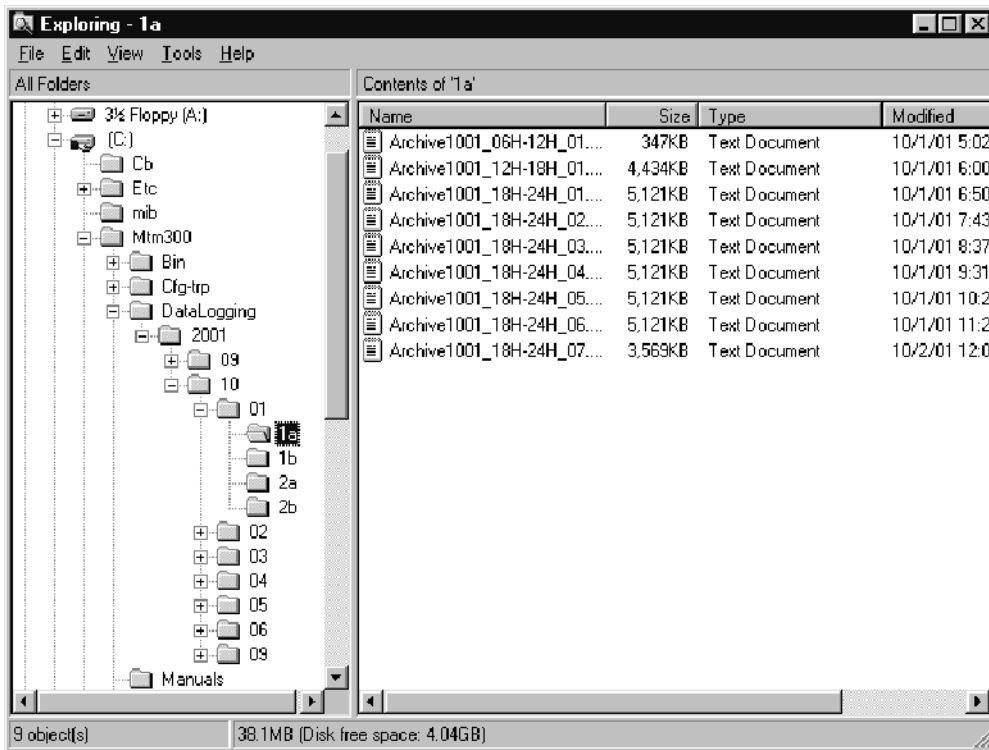
Figure 3-40: Data logging directory hierarchy

The file name of the log file (see Figure 3–40) indicates the month and day the log file was created, the time period in hours covered by the log file, and the sequential number of the file. More than one log file can be created for a time period if the maximum file size set in the configuration panel is exceeded.

Log File Structure   The Data Logging function records real-time transport stream events as they are detected by the Expert Client to tab-delimited text files. The log entries of transport stream events include the type of error, the program involved, the ETR290 error detected, the advanced type of event, the error message, and the date and time of the event (see Figure 3–41).

Figure 3‑41: Data logging file structure

Configuration Client Display Elements

Figure 3–42 shows the different elements of the Configuration client display. The display elements are described on the following pages.
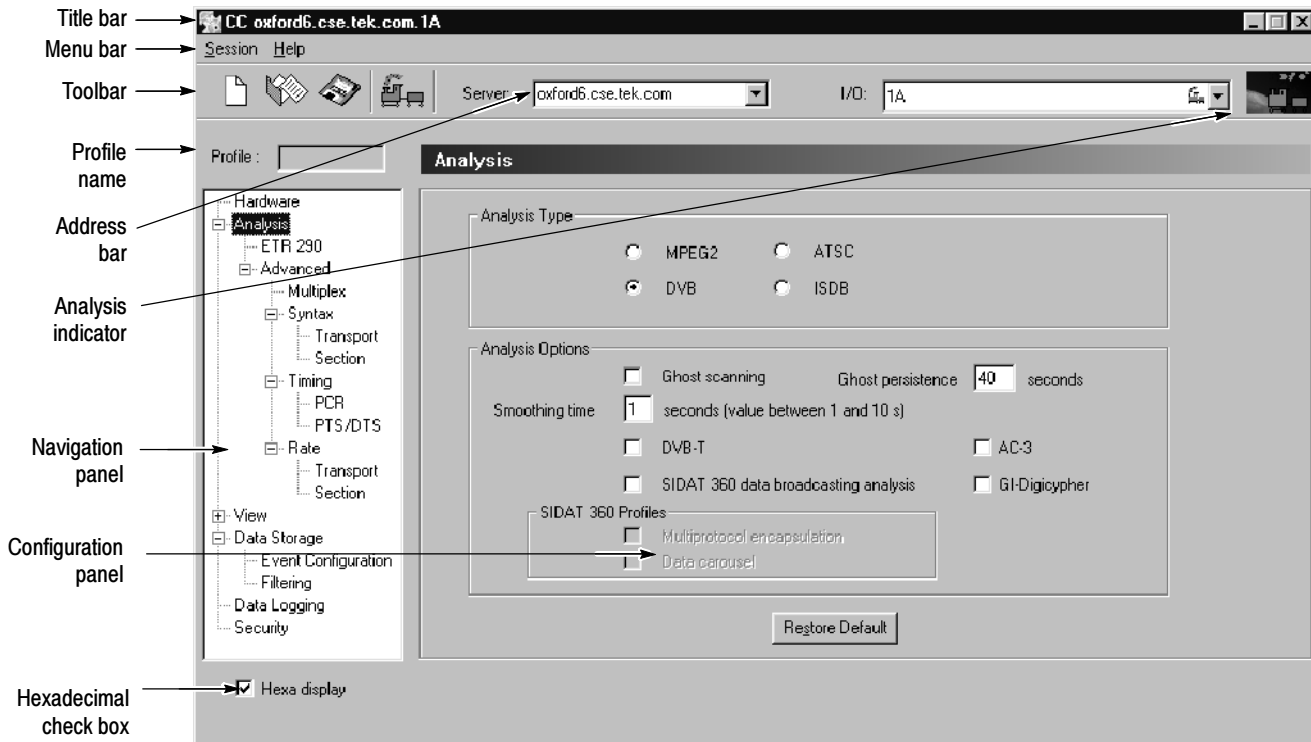
Figure 3- 42: Configuration client display elements

Title Bar   The Title bar displays the following information:

■   Name of the application in the window (CC is displayed for Configuration client)

■   Address and channel number of the signal source (oxford6 is the machine name on the cse.tek.com network, and the signal source is being input on channel 2A)

The standard Windows NT window-sizing control boxes for the Configuration client are located on the far right side of the Title bar.

Menu Bar   The Menu bar (see Figure 3‑42) provides access to the Session and Help menus.

Session menu. The Session menu contains commands for connecting or disconnecting the Configuration client, for saving and loading analysis configurations, for starting and stopping the Analysis Server, and for exiting the Configuration client. Table 3‑42 describes the menu selections available in the Session menu.

Table 3‑42: Configuration client Session menu commands

Command	Function
Connection	Opens the Connection dialog box from which you select the Analysis Server that you will connect to.
Disconnection	Disconnects the Configuration client from the Analysis Server indicated in the address bar. When you select this command, the indicator (train icon) at the far right of the toolbar becomes motionless.
New configuration	Loads the default analysis configuration in the Configuration client (MPEG-2 analysis type, with no probes set). You must use the Apply toolbar button or menu command to apply the setting changes to the Analysis Server indicated in the address bar.
Load configuration	Displays a dialog box from which you select saved configurations. You must use the Apply toolbar button or menu command to apply the setting changes to the Analysis Server.
Save configuration as	Saves the current analysis configuration to the Windows NT registry. A dialog box appears where you can enter a profile name. Configurations are saved in the following directory in the registry: HKEY_LOCAL_MACHINE\Software\Tektronix\MTM\Configuration Client\1.0\Profiles.
Apply	Applies the current Configuration client parameters to the Analysis Server that you are connected to.
Restart analysis server	Stop and restarts the Analysis Server indicated in the address bar (the one you are currently connected to).
Stop analysis server	Stops the Analysis Server of the Analysis Server indicated in the address bar (the one you are currently connected to).
Start analysis server	Starts the Analysis Server indicated in the address bar.
Shut down server	Displays the Shutdown dialog box. Using this dialog box, you can restart or shut down the transport monitor indicated in the address bar. See *Managing Remote Transport Monitors* on page 3‑164.
Exit	Exits the Configuration client.

Help menu. The Help menu provides access to the online Help systems of the Configuration client and the Analysis Server. In addition, there is a command to access the version and copyright information for the Configuration client. Table 3–43 describes the menu selections available in the Help menu.

Table 3- 43: Configuration client Help menu commands

Command	Function
Configuration client help	Opens the Configuration client online help.
Analysis Server help	Opens the Analysis Server online help.
About Configuration client	Displays Expert client version and copyright information.

Toolbar

The command buttons in the Toolbar provide direct access to the most-used menu commands for the Configuration client. Click on a command button to perform the associated command. Table 3–44 lists the function of each icon in the Toolbar.

Table 3- 44: Functions of the Configuration client Toolbar buttons

Button	Name	Function
	New configuration (CTRL+N)	Loads the default analysis configuration in the Configuration client (MPEG-2 analysis type, with no probes set). You must use the Apply toolbar button or menu command to apply the setting changes to the Analysis Server indicated in the address bar.
	Load configuration (CTRL+L)	Displays a dialog box from which you select saved configurations. You must use the Apply toolbar button or menu command to apply the setting changes to the Analysis Server.
	Save configuration as (CTRL+S)	Saves the current analysis configuration to the Windows NT registry. A dialog box appears where you can enter a profile name. Configurations are saved in the following directory in the registry: HKEY_LOCAL_MACHINE\Software\Tektronix\MTM\Configuration Client\1.0\Profiles.
	Apply (CTRL+A)	Applies the current Configuration client parameters to the Analysis Server you are connected to.

Profile Name

If you have loaded a saved analysis configuration, this box will list the name of the saved configuration.

Address Bar   Use the Address bar to specify the Analysis Server that you want the Configuration client to connect to. If you open the Configuration client from the Master client, the IP address or host machine name and input number of the analysis server is displayed in the text box.

Enter the IP Address (or machine name) and the input channel number in the text box using one of the following two formats:

■   <transport monitor IP address>.<input channel number>

For example, enter 121.181.77.121.1A to analyze the signal from channel 1A of a transport monitor with an IP address of 121.181.77.121.

■   <transport monitor name>.<input channel number>

For example, enter jam20.cse.tek.com.1B to analyze the signal from channel 1B of a transport monitor named jam20 on the cse.tek.com network.

The Configuration client saves machine names and IP addresses that you have successfully connected to in the past. You can select a transport monitor name or IP address from the drop-down selection box.

Analysis Indicator   The Analysis indicator (shown below) at the far right of the Address bar is animated when the Expert client is actively analyzing the input stream. The indicator is motionless when analysis by the Expert client is disconnected.

Navigation Panel   Use the Navigation panel to select which configuration panel to open. Use standard Windows NT hierarchy navigation techniques to move through the available panels.

Configuration Panel   Displays the configuration panel selected in the Navigation panel. Each configuration panel displays analysis options related to different aspects of the transport stream.

Hexadecimal Check Box   Select the Hexa Display option to display all appropriate values in the Configuration client in hexadecimal base. Clear the check box to display decimal values. This option appears on each configuration panel and affects all configuration panel displays.

Configuration Settings

This section describes and explains each of the MTM300 settings on the various configuration panels. Each hierarchy item in the Navigation panel opens a different configuration panel. Shown below is a fully expanded hierarchy with page numbers listed where the associated configuration panel is described.

Each configuration panel contains a Restore Default button. Click this button to restore the settings for the displayed panel back to their default settings.

NOTE. *DVB-T analysis mode must be selected from the Analysis configuration panel before the Mega Frame Syntactic, Timing, or Rate panels become available. Refer to* Analysis Panel *on page 3–174.*

Hardware Panel   Select Hardware in the Navigation panel to display the Hardware configuration panel (see Figure 3--43). Use the Hardware panel to configure the Input and Output of the transport monitor's Analysis board. **(Is there a trigger input for the MTM300?)**
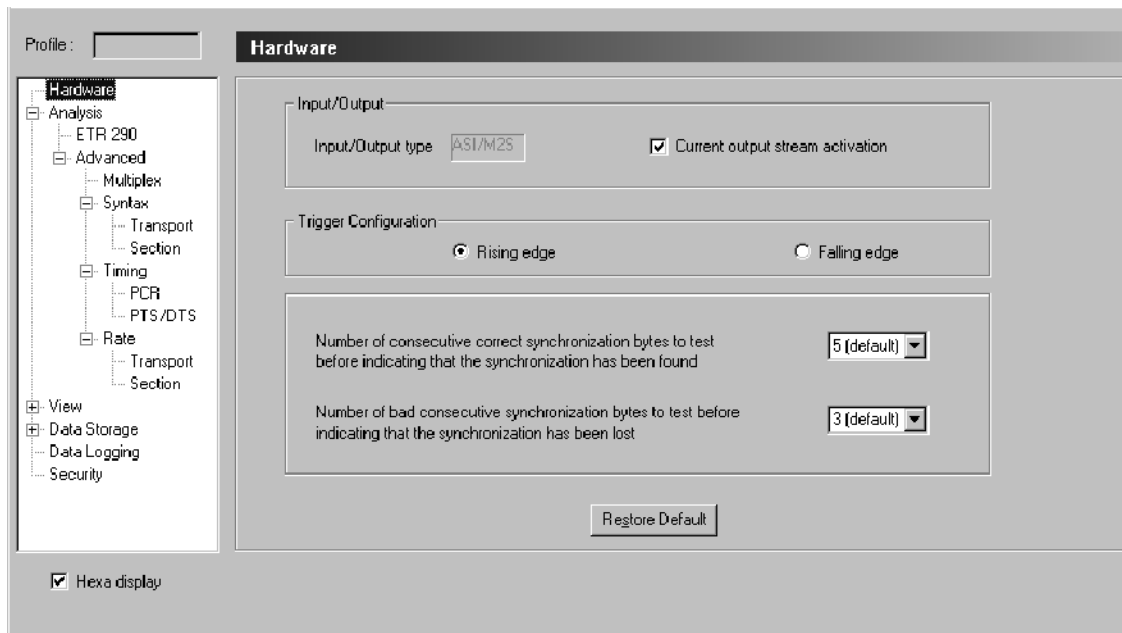
Figure 3-- 43: Hardware configuration panel

The panel displays the current configuration of the transport monitor input/output parameters (ASI/M2S, SSI, SPI, //ECL, which depend on the I/O boards installed in the transport monitor).You can select from the following options:

Output activation. Select this option to loop the input signal you are monitoring to the MTM300 output connector.

Number of consecutive correct synchronization bytes to test. Use the drop-down list box to select the number of consecutive correct synchronization bytes to test before indicating that the Analysis Server is synchronized to the input (3, 5, 7 or 9 correct synchronization bytes).

Number of bad consecutive synchronization bytes to test. Use the drop-down list box to select the number of consecutive bad synchronization bytes to test before indicating that synchronization has been lost (1, 3, 5 or 7 bad synchronization bytes).

Analysis Panel   Select Analysis in the Navigation panel to open the Analysis configuration panel (see Figure 3-44).
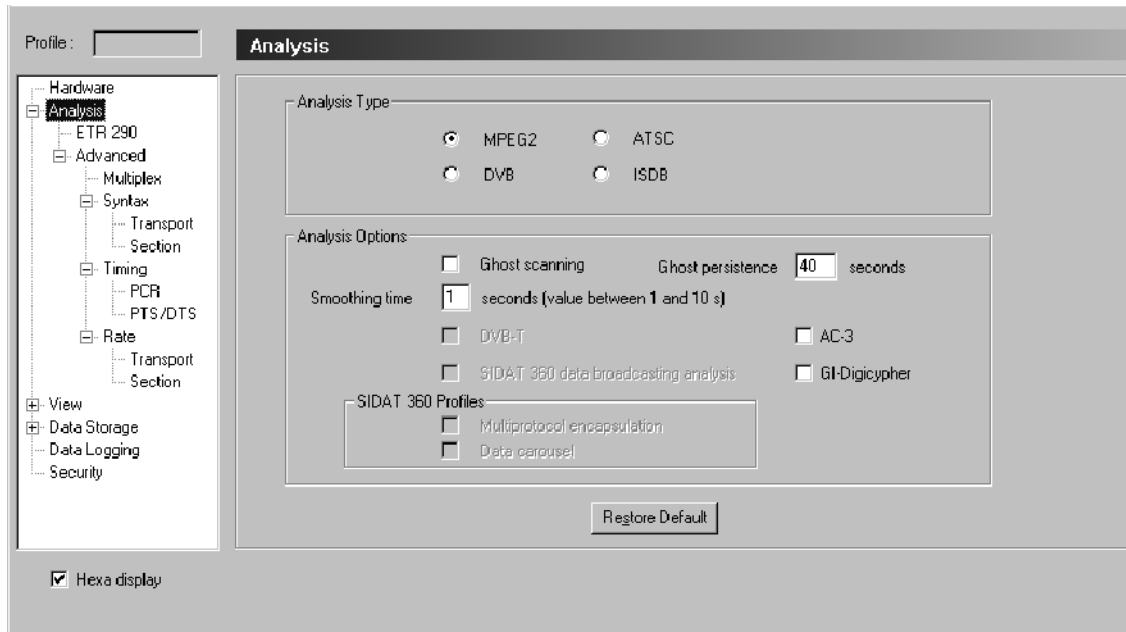
Figure 3-44: Analysis configuration panel

The Analysis panel contains the following configuration options:

Analysis type. The Analysis Type setting determines which standard the MTM300 uses to monitor the input stream.

- Select MPEG-2 (the default) if the stream you are analyzing complies with the MPEG standard.

- Select DVB to analyze stream compliance with DVB standards.

    Two of the Analysis Options settings, DVB-T and SIDAT 360, are available only when you select the DVB analysis type. Three of the configuration panels (Mega Frame Syntax, Mega Frame Timing, and Mega Frame Rate) are available only when you select the DVB analysis type and the DVB-T analysis option.

- Select ATSC to analyze the stream to the ATSC standards.

- Select ISDB to analyze the stream to ISDB-S/ARIB standards.

Analysis options. The first two analysis options are available for all three analysis types.

■ Select Ghost scanning to attempt to define all ghost packets[4] found in the stream. For example, if the MTM300 identifies a ghost packet as a PMT, the MTM300 positions the icon under the PAT as shown in the following illustration. You can then perform on the ghost sections all the analyses allowed on PMT sections, such as Section syntax analysis and PCR analysis.

A PMT Ghost ────────▶
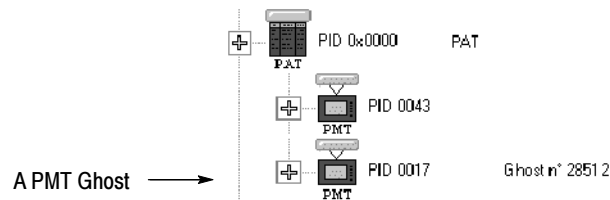
■ Select Smoothing time to adjust the period over which the MTM300 averages the transport rates reported in the Statistic view Program Allocation, PID Allocation, and Type Allocation panels. The default value is one second; you can enter any integer value from 1 to 10. In most cases, selecting a longer smoothing time reduces the range over which reported transport rates vary.

■ Select AC-3 to perform analysis on Dolby AC–3 audio parameters when you are monitoring MPEG-2 or DVB streams containing embedded AC–3 audio.

■ Select GI-Digicypher to interpret Digicipher II video streams as MPEG video elementary streams (instead of private data), and to perform PCR and PTS analyses on these streams.

The following analysis options are available only when you select DVB analysis (in the Analysis type portion of this configuration panel).

■ Select DVB-T to enable Mega Frame analysis. Three of the configuration panels (Mega Frame Syntax, Mega Frame Timing, and Mega Frame Rate) are available only when you select the DVB-T analysis option.

■ Select SIDAT 360 data broadcasting analysis to enable SIDAT analysis and the two SIDAT 360 Profiles options. You can enable both options simultaneously. Refer to *SIDAT 360 Analyses* on page 3–48 for more information.

  ■ Select Multiprotocol Encapsulation to enable protocol encapsulation testing for SIDAT 360 analysis.

  ■ Select Data Carousel to enable monitoring of data carousel presence.

---

[4] **One or more packets found in the transport stream but not referenced in any appropriate table.**

ETR 290 Panel   Select Analysis:ETR 290 in the Navigation panel to open the ETR 290 configuration panel (see Figure 3-45).

NOTE. ETR 290 probes in the Probes List box can appear in italics on this panel. If an ETR 290 probe is listed in italics in the Probe List, then at least one probe of the corresponding ETR 290 recommendation is not set. This can happen if you have already set specific probes for the ETR 290 recommendation using the Advanced configuration panels in the Navigation panel.

Use this panel to activate all probes for a selected ETR 290 recommendation.
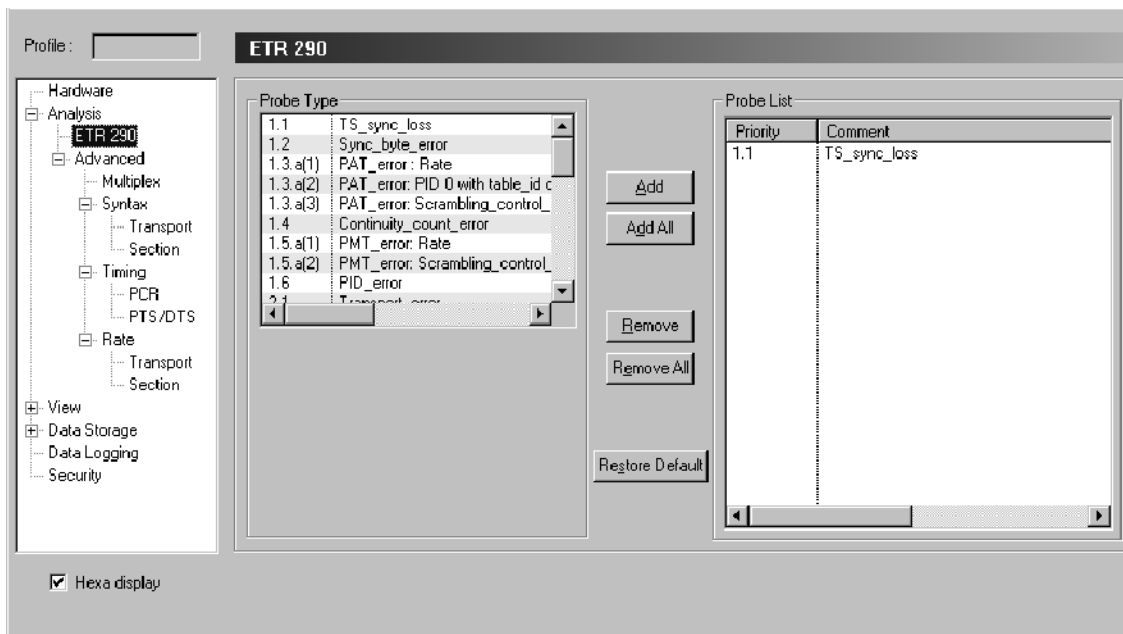
Figure 3-45: ETR 290 configuration panel

The ETR 290 panel contains the following configuration options:

Probe Type. The Probe Type box contains a list of the available ETR 290 probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Probes List. The Probes List box contains a list of the selected ETR 290 probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Multiplex Analysis Panel   Select Analysis:Advanced:Multiplex in the Navigation panel to open the
Multiplex Analysis configuration panel (see Figure 3-46).

NOTE. *The Multiplex Analysis panel is one of several panels used for setting and
configuring MTM300 probes. The probes available on this panel apply to the
entire input stream multiplex and are appropriate for the current Analysis
configuration panel selections.*
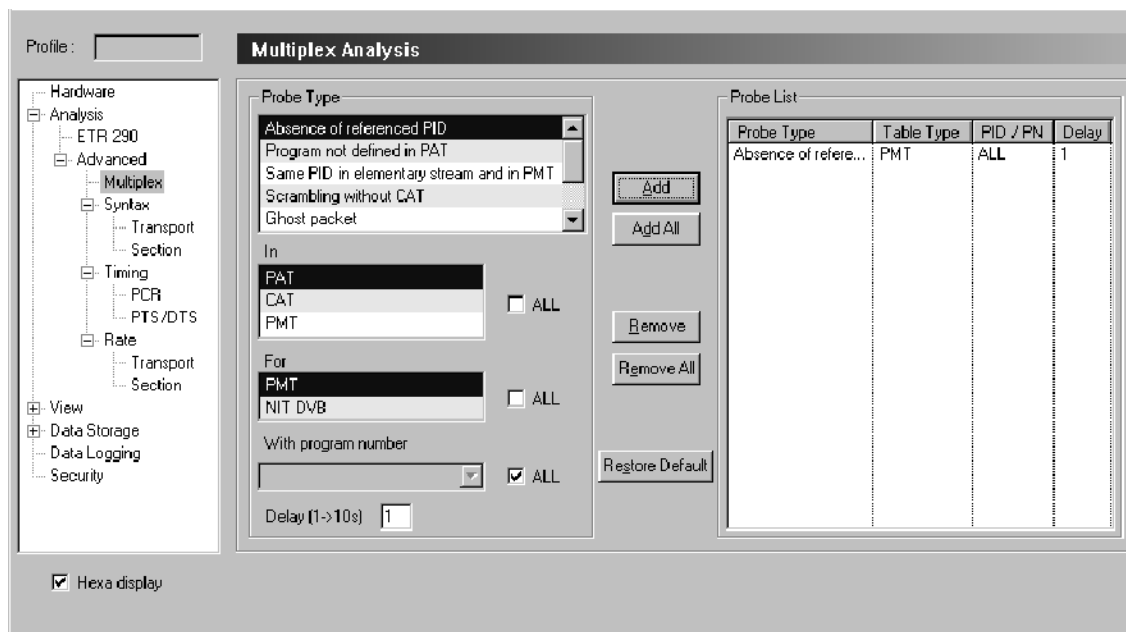
Figure 3- 46: Multiplex Analysis configuration panel

The Multiplex Analysis panel contains the following configuration options:

Probe type. The Probe Type box contains a list of the available multiplex probes.
Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting,
changing, and removing probes.

Probes list. The Probes List box contains a list of the selected multiplex probes.
Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting,
changing, and removing probes.

Available multiplex probes. Table 3–45 lists all of the probes that you can control through the Multiplex Analysis panel. Some probes are only available for certain analysis types.

Table 3- 45: Multiplex analysis probes

Probe title		Analysis type	ETR 290 level
Absence of referenced PID		All	1.6
Program not defined in PAT		All	—
Same PID in elementary stream and in PMT		All	—
Scrambling without CAT		All	2.6(1)
Ghost packet		All	3.4
Unsynchronized packet		All	1.2
Table ID	PAT	All	1.3.a(2)
	CAT	All	2.6(2)
	NIT	All	3.1.a(1)
	TSDT	All	—
	BAT	DVB only	3.5.a(1)
	SDT	DVB only	3.5.a(1)
	EIT	DVB only	3.6.a(1)
	RST	DVB only	3.7
	TDT	DVB only	3.8(2)
	TOT	DVB only	3.8(2)
	MGT	ATSC only	—
	TVCT	ATSC only	—
	CVCT	ATSC only	—
	STT	ATSC only	—
	RRT	ATSC only	—
	DCT	ISDB only	—
	DLT	ISDB only	—
	SDTT	ISDB only	—
Inter SI consistency		DVB and DVB-T	—
Mega Frame Size		DVB-T only	—
Terrestrial descriptor consistency		DVB-T only	—
Program paradigm		ATSC only	—
Scrambled ES without CA descriptor		ATSC only	—
Absence of mandatory EIT		ATSC only	—

Refer to *Multiplex Analyses* beginning on page 3–65 for detailed information about the Multiplex Analysis probes.

Syntactic Analysis Panel   Select Analysis:Advanced:Syntax in the Navigation panel to open the Syntactic Analysis panel as shown in Figure 3–47. The Syntactic Analysis panel contains options that affect private section interpretation and syntax error reporting.
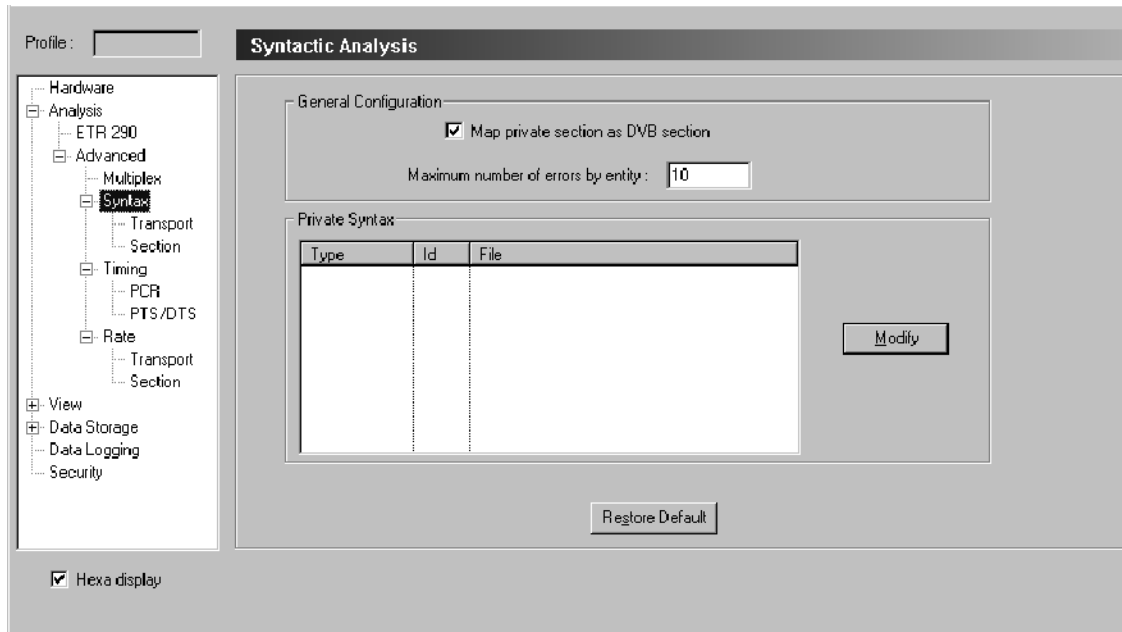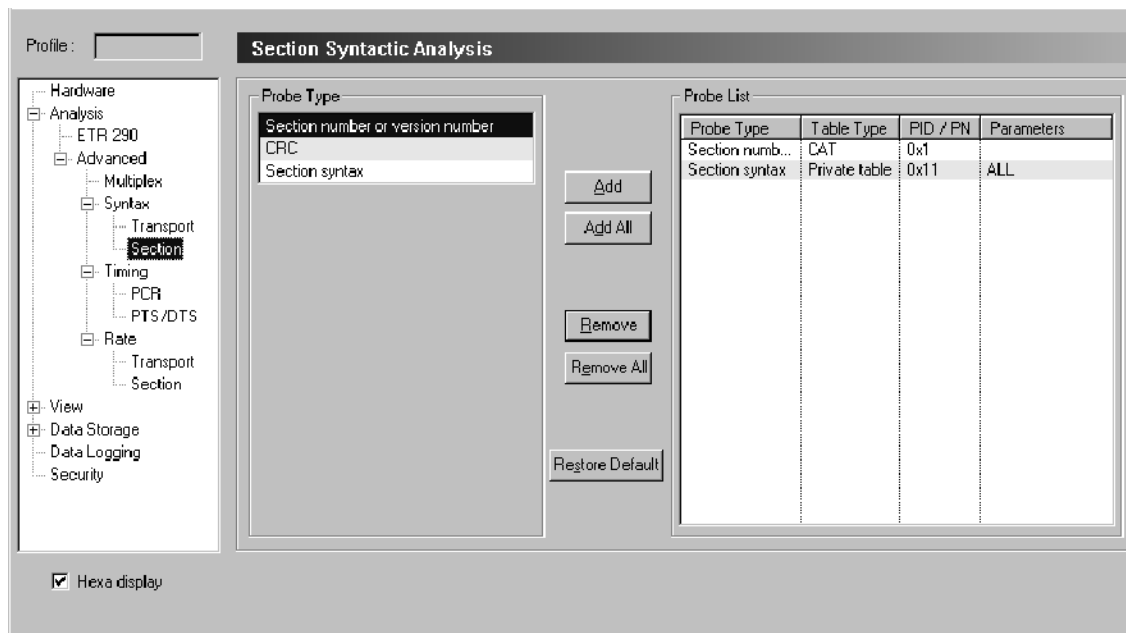

Figure 3- 47: Syntactic Analysis configuration panel

The Syntactic Analysis panel contains the following configuration options:

General configuration. There are two possible general configuration settings:

■   The Map private section as DVB section option appears only when you have set the analysis type to DVB through the Analysis panel (refer to *Analysis Panel* on page 3–174).

When you select Map private section as DVB section (a check appears in front of the option), the MTM300 interprets all private sections encountered in the stream as DVB SI sections. The option is not present in the standard MPEG-2 configuration.

■   The Maximum number of errors by entity setting allows you to set the maximum number of errors the MTM300 detects before stopping analysis for one entity. This limits the number of syntax errors reported by the MTM300 for each entity. This option is convenient when you are analyzing non-compliant streams that contain many errors.

NOTE. The Map private section as DVB section option is cleared when you first specify DVB monitoring on the Analysis panel; select this option if necessary to force the MTM300 to interpret PIDs 0x10 through 0x14 as SI. The Map private section as DVB section option must be cleared before you can load private syntax files.

Private syntax. You can load private syntax definition (.cta) files through the Private Syntax portion of the panel. These files, generated with the Private Syntax Interpreter application, make it possible to analyze proprietary or non-standard tables and descriptors contained in the MTM300 input stream. Use the following procedure:

1. Click **Modify** in the Private Syntax group. The Syntax Selection dialog box is displayed.

2. From the List of available syntax, highlight a definition file you want to add and click **Add**, or you can add all of the definition files by selecting **Add All**.

3. When you have added (or removed) all of the private syntax files, click **OK** to close the dialog box and return to the Configuration client.

4. Click the **Apply** button to include the private syntax files into the Analysis Server indicated in the address bar.

Refer to *Appendix E: Using the Private Syntax Interpreter* for more information about using the Private Syntax Interpreter and generating user-defined private syntax definition files.

Transport Syntactic Analysis Panel   Select Analysis:Advanced:Syntax:Transport in the Navigation panel to open the Transport Syntactic Analysis configuration panel as shown in Figure 3‑48. Use this configuration panel to set and configure MTM300 transport syntax probes.
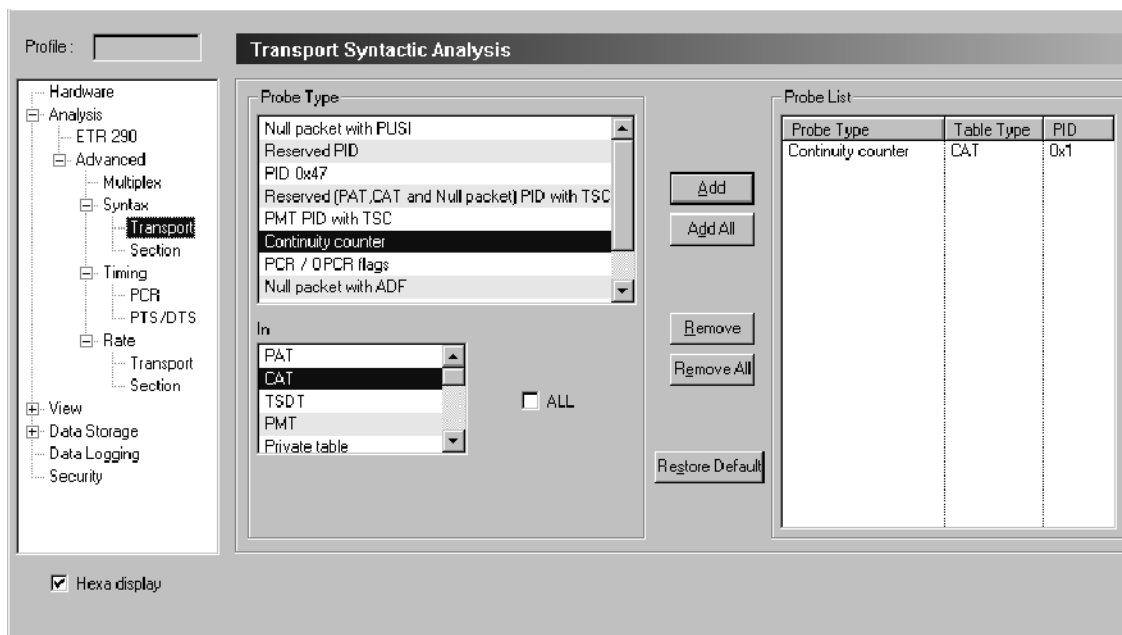
Figure 3‑48: Transport Syntactic Analysis configuration panel

The Transport Syntactic Analysis panel contains the following configuration options:

Probe type. The Probe Type box contains a list of the available probes. Refer to *Probe Operating Conventions* on page 3‑45 for instructions on setting, changing, and removing probes.

Probe list. The Probe List box contains a list of the selected probes. Refer to *Probe Operating Conventions* on page 3‑45 for instructions on setting, changing, and removing probes.

Available transport syntax probes. Table 3-46 lists all of the probes that you can control through the Transport Syntactic Analysis panel. Some probes are only available for certain analysis types. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Table 3- 46: Transport syntax probes

Probe title	Analysis type	ETR 290 level
Null packet with PUSI	All	—
Reserved PID	All	—
PID 0x47	All	—
Reserved (PAT, CAT, and Null packet) PID with TSC	All	1.3.a(3)
PMT PID with TSC (scrambling)	All	1.5.a(2)
Continuity counter indicator	All	1.4
PCR/OPCR flags	All	—
Null packet with ADF	All	—
ADF flags	All	—
Transport error indicator	All	2.1
PAT PID with AFC & DI	ATSC only	—
PMT PID with AFC & DI	ATSC only	—
PSIP tables PID with TSC	ATSC only	—
PSIP tables PID with ADF	ATSC only	—
MGT PID with PUSI & pointer field	ATSC only	—

Refer to *Transport Syntax Probe Descriptions* beginning on page 3-73 for detailed information about any of the transport syntax probes.

Section Syntactic Analysis Panel Select Analysis:Advanced:Syntax:Section in the Navigation panel to open the Section Syntactic Analysis configuration panel (shown below). Use this configuration panel to set and configure syntax probes for private, PSI, SI, and PSIP tables.

Figure 3-49: Section Syntactic Analysis configuration panel

The Section Syntactic Analysis panel contains the following configuration options:

Probe type. The Probe Type box contains a list of the available probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Probe list. The Probe List box contains a list of the selected probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Available section syntax probes. Table 3-47 lists all of the probes that you can control through the Section Syntactic Analysis panel. Some probes are only available for certain analysis types. Refer to *Setting Probes* on page 3-45 and *Removing Probes* on page 3-47 for instructions on setting and removing probes.

Table 3-47: Section syntax probes

Probe title	Analysis type	ETR 290 level
Section number or version number	All	—
CRC	All	2.2
Section syntax	All	—

Refer to *Section Syntax Probe Descriptions* beginning on page 3-77 for detailed information about any of the section syntax probes.

Mega Frame Syntactic Analysis Panel

Select Analysis:Advanced:Syntax:Mega Frame in the Navigation panel to open the Mega Frame Syntactic Analysis configuration panel as shown in Figure 3-50. Use this configuration panel to set and configure mega frame syntax probes.

NOTE. The Mega Frame Syntactic Analysis panel is available only when you have specified DVB-T analysis from the Analysis panel (refer to Analysis Panel *on page 3-174).*
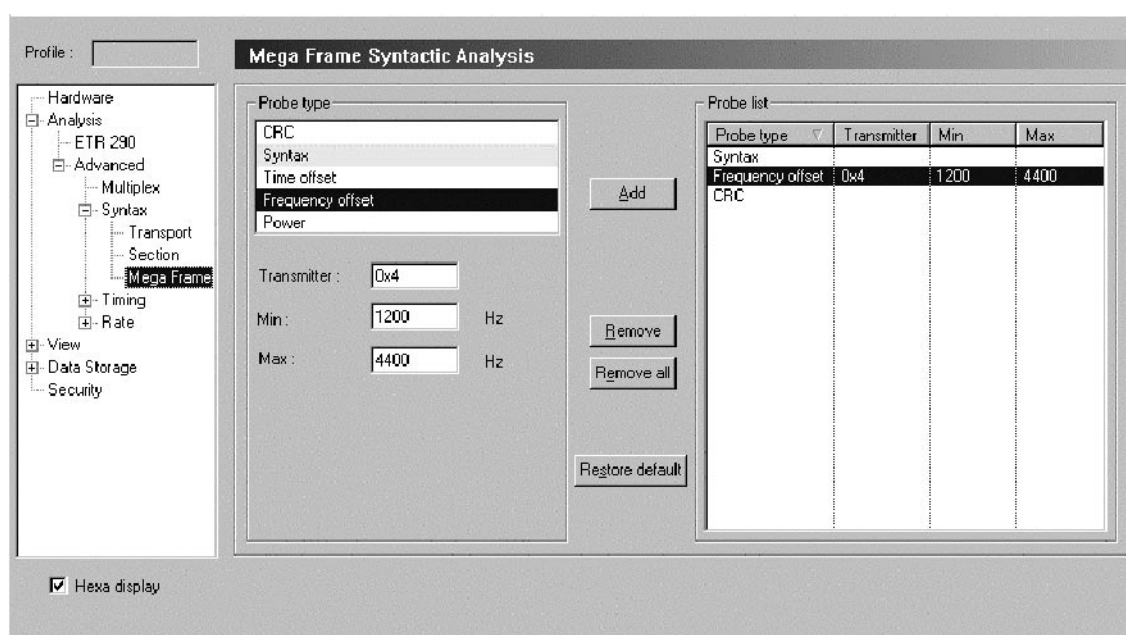

Figure 3-50: Mega Frame Syntactic Analysis configuration panel

This panel contains the following configuration options:

Probe type. The Probe Type box contains a list of the available probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Probe list. The Probe List box contains a list of the selected probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Available mega frame syntax probes. Table 3--48 lists all of the probes that you can control through the Mega Frame Syntactic Analysis panel. Some probes are only available for certain analysis types. Refer to *Setting Probes* on page 3--45 and *Removing Probes* on page 3--47 for instructions on setting and removing probes.

Table 3-48: Mega Frame syntax probes

Probe title	Analysis type	ETR 290 level
CRC	DVB-T only	—
Syntax	DVB-T only	—
Time offset	DVB-T only	—
Frequency offset	DVB-T only	—
Power	DVB-T only	—

Refer to *Mega Frame Syntax Analyses* beginning on page 3--79 for information about any of the Mega Frame syntax probes.

**PCR Timing Analysis
Panel**

Select Analysis:Advanced:Timing:PCR in the Navigation panel to open the PCR Timing Analysis configuration panel as shown in Figure 3-51. Use the PCR Timing Analysis panel to configure and set PCR probes one program at a time and, if desired, use unique error limits for each individual program. You can also set probes on all stream programs at once, but you must then use the same measurement error limits for all programs.

NOTE. *The MTM300 uses an internal Settling Filter to improve the accuracy of PCR jitter analysis. The Settling Filter must have at least 60 seconds of data before before the MTM300 can detect and report PCR jitter errors. Wait 60 seconds after setting a PCR probe to judge the PCR jitter performance or compliance.*

Refer to *PCR Timing Analysis* on page 3-81 for more information about PCR analysis and PCR probes.
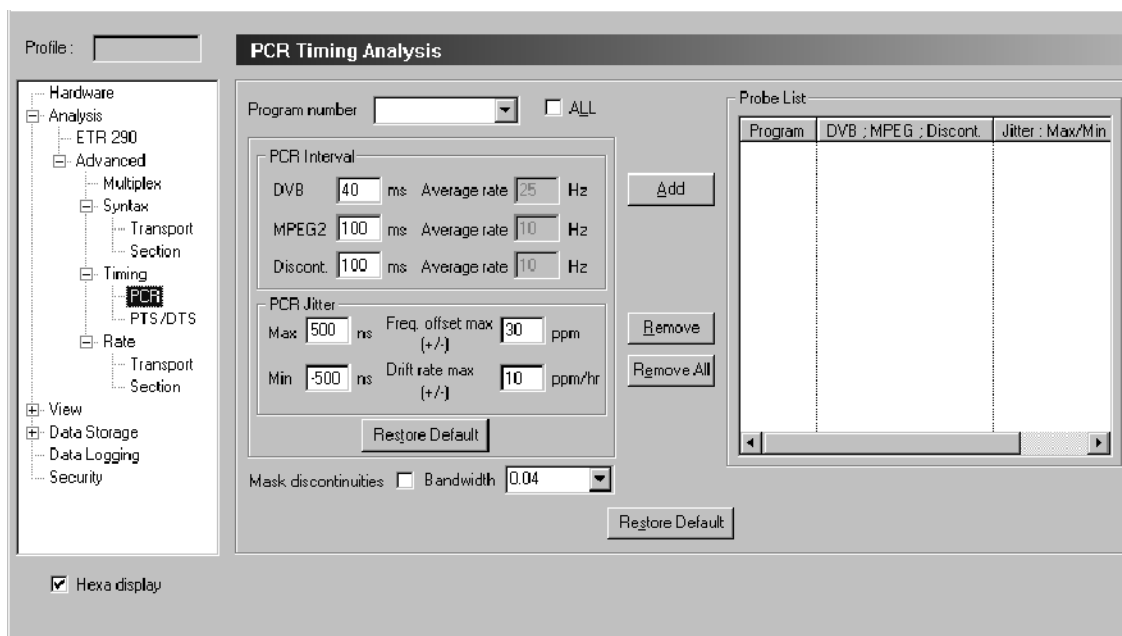
Figure 3-51: PCR Timing Analysis configuration panel

The PCR Timing Analysis panel contains the following configuration options:

Program number. Use the Program Number box to select individual programs or all programs to probe. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Table identity. The Table Identity box contains a list of the selected programs. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

NOTE. *The PCR Interval and the PCR Jitter Max and Min settings determine thresholds for errors reported on the ETR 290 view. The default settings are consistent with ETR 290 recommendations.* Do not *change these settings if you plan to use ETR 290 tests to judge DVB compliance of the input stream.*

PCR interval. These settings specify the maximum permissible interval between consecutive PCRs. When a PCR probe is active, the MTM300 reports an error when the interval between two consecutive PCRs for the monitored program exceeds the applicable (DVB or MPEG-2) value. The default for DVB mode is 40 ms; the default for MPEG-2 is 100 ms.

PCR jitter. The Max and Min settings specify the maximum permissible deviation from the expected PCR value. When a PCR probe is active, the MTM300 reports an error when the deviation falls outside of the Max and Min values. The default for all analysis modes is ± 500 ns.

The Frequency offset setting determines the threshold for frequency offset errors. The default for all analysis modes is 30 ppm.

The Drift rate max setting determines the threshold for frequency drift rate errors. The default for all analysis modes is 10 ppm/hr.

Mask discontinuities. Under normal circumstances, the MTM300 uses every PCR value in the stream to build the accuracy model that is used to judge the jitter of each newly decoded PCR. Occasional discontinuities (large PCR errors due to looped input, for example) can prevent creation of a valid model and hinder PCR analysis. Select Mask discontinuities to ignore very inaccurate PCRs, both for error reporting and for calculating the PCR jitter model.

Bandwidth. The Bandwidth box allows you to define the bandwidth of the highpass filter response used to calculate PCR Jitter. You can enter a discrete value, or you can choose one of the profiles from the ETR290 standard (TR 101 290): .01 Hz, .1 Hz, or 1 Hz. The default bandwidth is .04 Hz.

PTS/DTS Timing Analysis Panel

Select Analysis:Advanced:Timing:PTS/DTS in the Navigation panel to open the PTS/DTS Timing Analysis configuration panel as shown in Figure 3-52. Use this panel to set and configure PTS/DTS probes on one or more of the unscrambled video and audio elementary streams in the multiplex.
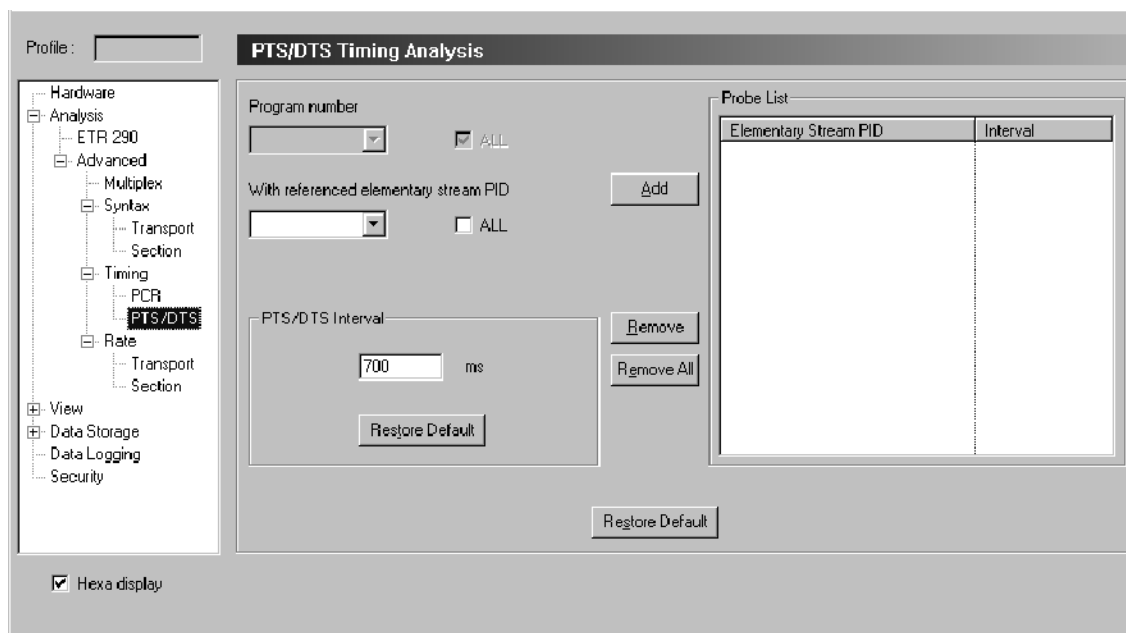
Figure 3-52: PTS/DTS Timing Analysis configuration panel

The PTS/DTS Timing Analysis panel contains the following configuration options:

Program number. Use the Program Number box to select individual programs or all programs to probe. Selecting a program number activates the With referenced elementary stream PID box. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Table Identity. The Table Identity list box contains a list of the programs that will be probed. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

With referenced elementary stream PID. This box is activated when you select a program in the Program number box. Use this box to select elementary stream PIDs to reference with the selected program.

NOTE. *The PTS/DTS Interval setting determines thresholds for errors reported on the ETR 290 view. The default settings are consistent with ETR 290 recommendations.* Do not *change these settings if you plan to use ETR 290 tests to judge DVB compliance of the input stream.*

PTS/DTS interval. This box allows you to change the PTS/DTS interval if necessary. The default value is 700 ms.

Mega Frame Timing Analysis Panel Select Analysis:Advanced:Timing:Mega Frame in the Navigation panel to open the Mega Frame Timing Analysis configuration panel as shown in Figure 3-53. Use this panel to set the STS interval probe. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

NOTE. *The Mega Frame Timing Analysis panel is available only when you have specified DVB-T analysis type from the Analysis panel (refer to* Analysis Panel *on page 3-174).*
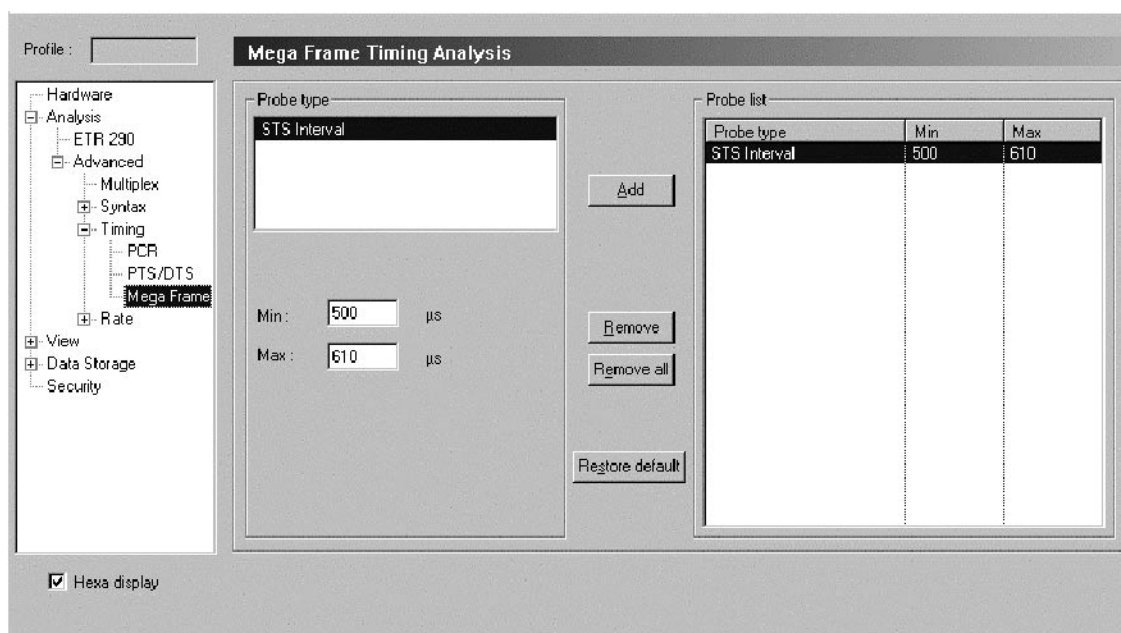
Figure 3-53: Mega Frame Timing Analysis configuration panel

The STS interval probe is used to check that the difference between two consecutive Synchronization Time Stamps carried in the MIP remains within an interval you define, and to report warnings every time the limits are exceeded.

The STS interval probe has two parameters: the Min and Max values allowed (expressed in 100 nanosecond units). Typically the STS interval should remain within the (0.5, 0.61) seconds interval.

You must enter a Min and/or Max value to add the STS interval probe.

Transport Rate Analysis Panel

Select Analysis:Advanced:Rate:Transport in the Navigation panel to open the Transport Rate Analysis configuration panel as shown in Figure 3-54. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

NOTE. *The Analysis Servers automatically perform transport rate analysis whenever you analyze an input stream. These analyses appear in the Program Allocation, PID Allocation, and Type Allocation panels of the Statistic view.*

Use this Transport Rate Analysis panel to set probes on selected stream items for transport rates that fall below or exceed limits that you define. You must enter a limit value to add a probe.
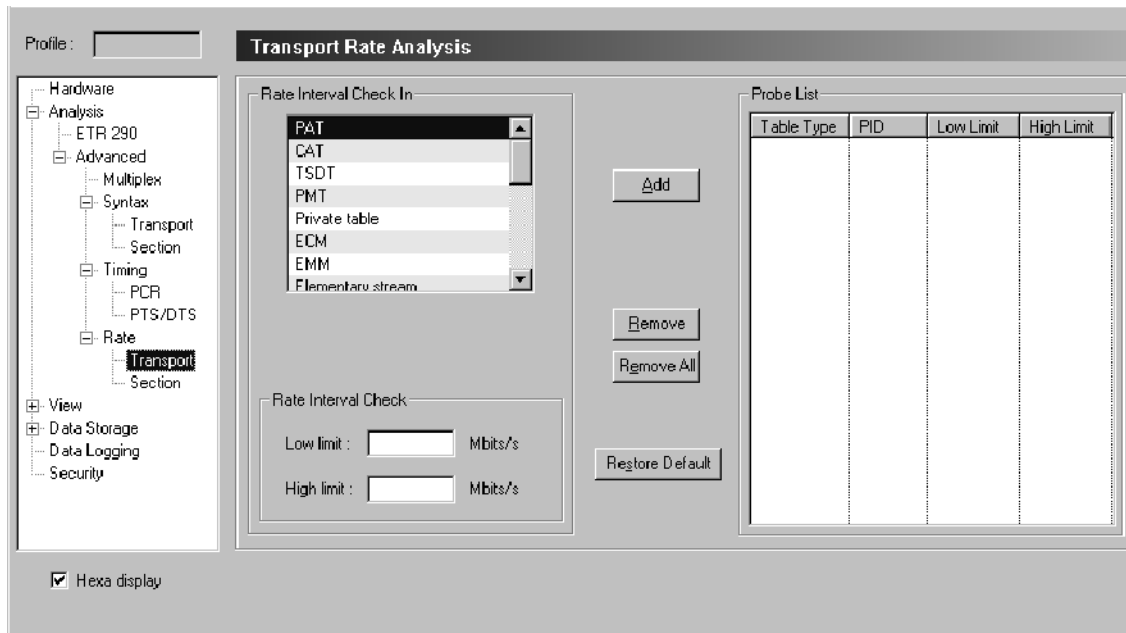
Figure 3-54: Transport Rate Analysis configuration panel

The Transport Rate Analysis panel contains the following configuration options:

Rate interval check in. This box contains the list of transport stream items available for you to probe.

Probe list. This box contains the list of transport rate probes that are set (or that will be set when you apply your changes).

Rate interval check. Use the Low limit and High limit boxes to set user-defined transport rate interval values. You must enter a limit value to add a probe.

Section Rate Analysis Panel

Select Analysis:Advanced:Rate:Section in the Navigation panel to open the Section Rate Analysis configuration panel as shown in Figure 3-55. Use this panel to specify the maximum acceptable interval between consecutive sub-table sections of each table type and the minimum interval between consecutive sections. User-defined intervals appear on the ETR 290 Detailed view. Refer to *ETR 290 Panel* on page 3-176 for more information.

NOTE. The Analysis Type setting in the Analysis configuration panel controls which stream items appear in the Probe Type list. Refer to Analysis Panel *on page 3-174.*
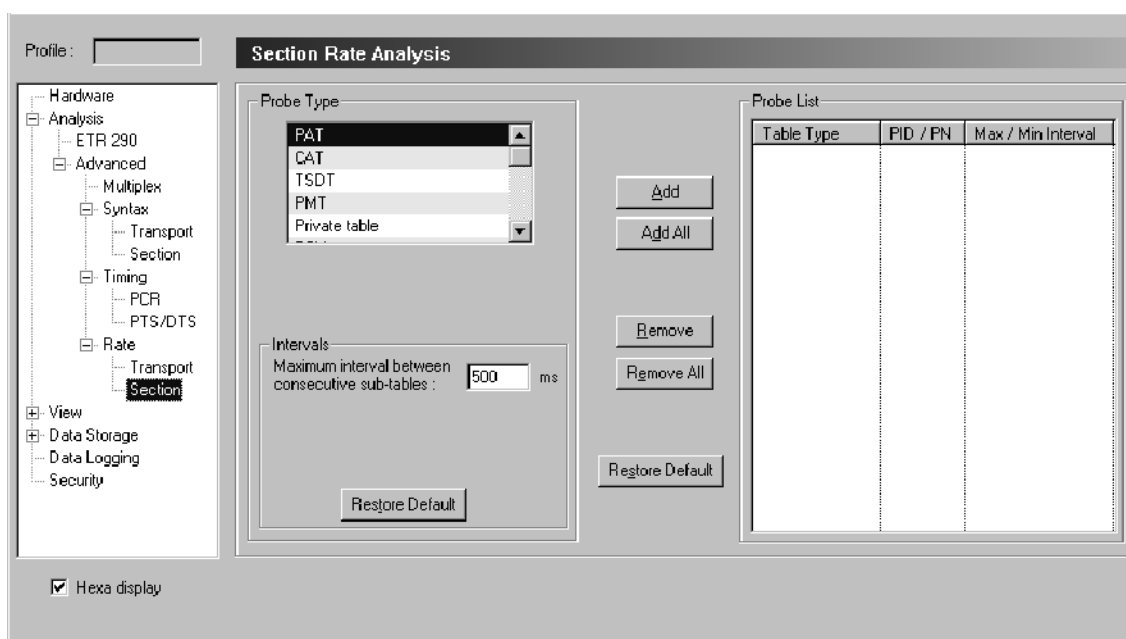
Figure 3-55: Section Rate Analysis configuration panel

The Section Rate Analysis panel contains the following configuration options:

Probe type. This box contains the list of available section rate probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

Probe list. This box contains the list of user-defined section rate probes. Refer to *Probe Operating Conventions* on page 3-45 for instructions on setting, changing, and removing probes.

NOTE. *The two Intervals settings determine the threshold for errors reported on the ETR 290 view. The default settings are consistent with ETR 290 recommendations. Do not change these settings if you plan to use ETR 290 tests to judge DVB compliance of the input stream.*

Intervals. The Intervals box contains the following two available options:

■ When you select a section rate probe from the Probe Type list, the ETR 290 recommended value for the Maximum interval between consecutive sub-tables is displayed. You can enter an alternative value if necessary.

■ The Minimum interval between consecutive sections with the same table ID, table ID extension box shows that 25 ms is the minimum permissible interval between consecutive sections. You cannot change this interval.

Mega Frame Rate Analysis Panel

Select Analysis:Advanced:Rate:Mega Frame in the Navigation panel to open the Mega Frame Rate Analysis configuration panel shown in Figure 3--56. Use this panel to set the MIP interval probe.

NOTE. *The Mega Frame Rate Analysis panel is available only when you have specified DVB-T analysis type on the Analysis panel (refer to* Analysis Panel *on page 3--174).*
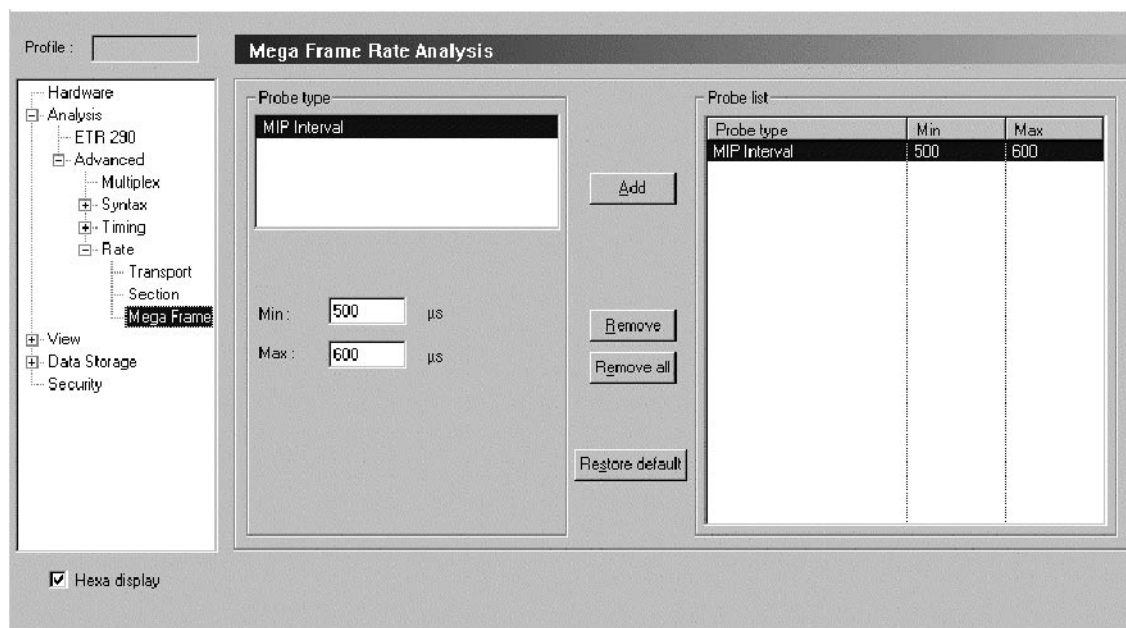
Figure 3- 56: Mega Frame Rate Analysis configuration panel

Use the MIP interval probe to check that the difference between the Analysis board time stamps (the arrival time of the packets) of two consecutive MIPs remains within a user-defined interval, and to report warnings every time the limits are exceeded.

The MIP interval probe has two parameters: the Min and Max values allowed (expressed in 100 nanosecond units). Typically the MIP interval should remain within the (0.5, 0.61) seconds interval.

You must enter a Min and/or Max value to add the MIP interval probe. Refer to *Probe Operating Conventions* on page 3--45 for instructions on setting, changing, and removing probes.

Report Panel Select View:Report in the Navigation panel to open the Report configuration panel as shown in Figure 3-1. The Report panel allows you to set options for the way in which error messages are displayed in the Expert client Report view.
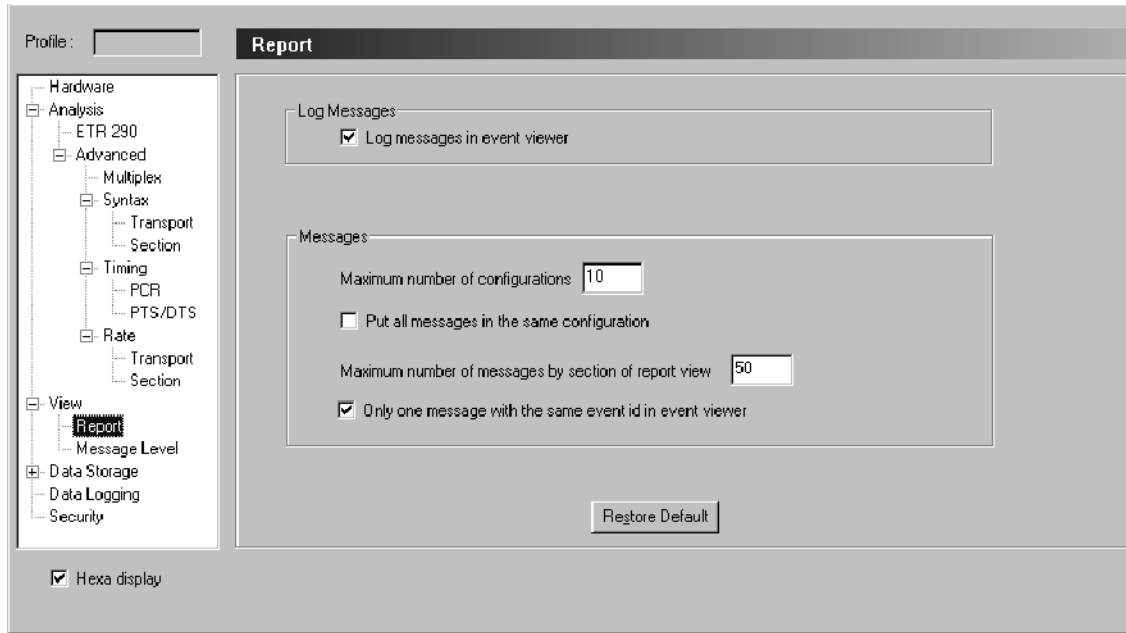
Figure 3-57: Report configuration panel

The Report View panel contains the following configuration options:

Log messages. Select the Log messages in event viewer option to log all events detected by the MTM300 to the Windows NT Event Viewer. Clear the option to prevent MTM300 error and message logging. Event Viewer is selected in the default configuration.

For further information about the Event Viewer, refer to *Messages and the Event Viewer* on page 3-130. Also consult the Windows NT documentation and the Event Viewer online Help.

Messages. The Messages portion of the panel contains display and logging options that affect all messages.

- The Maximum number of configurations option sets the maximum number of configurations the Report window displays. The default number of configurations is 10. Select Put all messages in the same configuration to limit the number of Report window configurations to one.

- The Maximum number of messages by sub-part of the report view option allows you to limit the number of messages that any Message view can contain. The maximum includes those messages that have scrolled off the top of the current message window or window pane; use the vertical scroll bar to see the messages that will not fit in the display window (you may have to press **F3** to pause view updates when monitoring a stream with many errors). When a Message view reaches the specified maximum, the oldest message is discarded as each new message appears. The default maximum is 50 messages.

  This setting does not affect the capacity of the Windows NT Event Viewer application log.

- Select Only one message with the same event id in Event Viewer to limit the amount of message detail logged to the Event Viewer.

  The MTM300 posts only one general message for each event ID in the Message views. In reality, a Message view entry can represent many error or information messages. In the standard configuration, all information or error detail represented by the general message is logged to the Event Viewer.

  Double-clicking an error message in the Expert client Message view opens a window that provides event details. If the Only one message with the same event id in Event Viewer option is selected, only one message would appear in the Event viewer messages window for each event ID.

NOTE. *When you monitor a stream that contains many items with many errors, logging all details can delay the appearance of messages in the Message views and quickly fill the Event Viewer application log. To log only general messages in the Event viewer, select the Only one message with the same event id in Event Viewer option.*

Message Level Panel   Select View:Message Level in the Navigation panel to open the Report Message
Level configuration panel as shown in Figure 3-1.
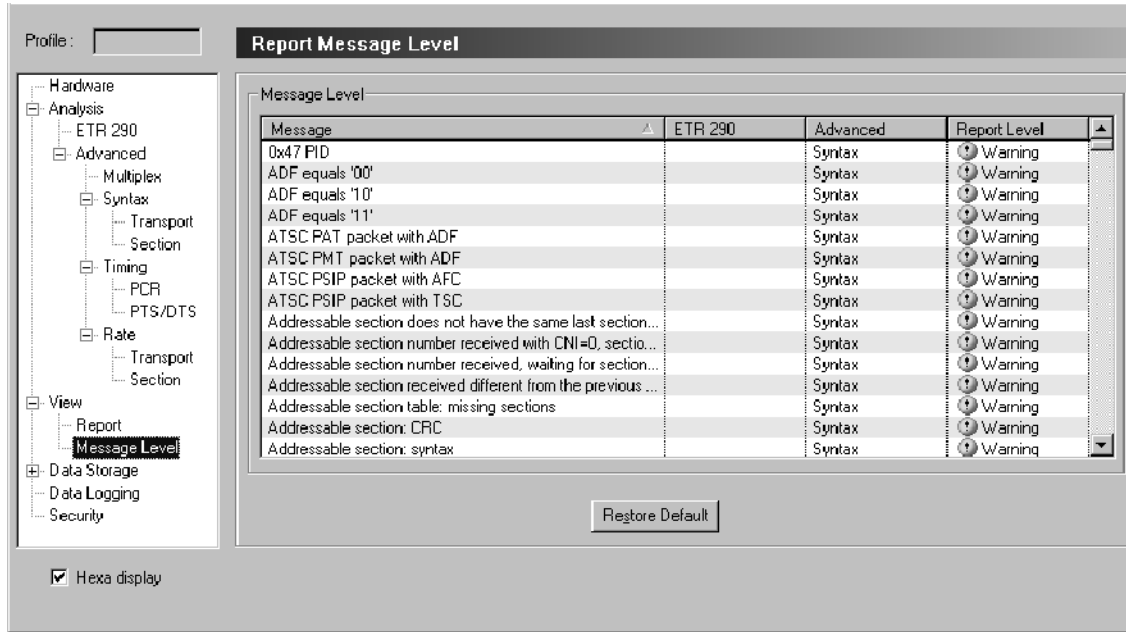
Figure 3- 58: Report Message Level configuration panel

The Report Message Level panel allows you to specify how the MTM300 Series
transport monitor reports each error in both the Expert and Master clients:

■ Critical

■ Major

■ Minor

■ Warning

■ Information (Info)

The Report Message Level panel provides the following information (you can sort this information by clicking the column headers):

■ Message. This column lists each test performed by the transport monitor.

■ ETR290. This column lists the priority level of each ETR290 test performed by the Analysis Servers.

■ Advanced. This column lists the type of error that each failed test reports.

■ Report Level. This column lists the level of error that each failed test reports.

Setting error message report levels. Use one of the following techniques to set the error level reported in the Expert and Master clients:

■ Right click the Report Level column of the test you want to modify, and then select the reporting level you want to use from the shortcut menu (shown below).
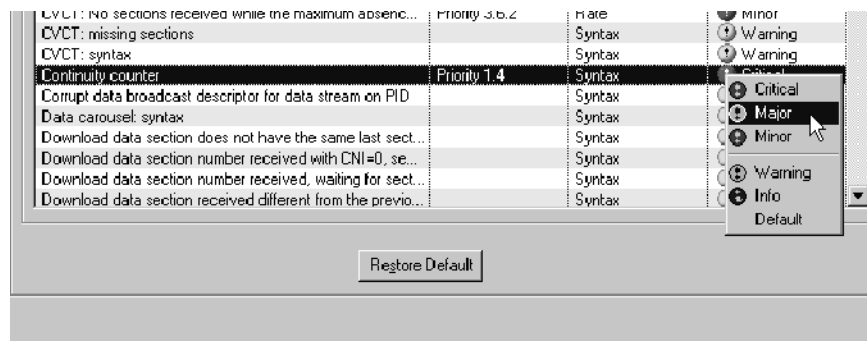
■ Left-click in the Report Level column of the test you want to modify to step through each error level in the list.

Restoring default error report levels. Use one of the following techniques to restore the default the error level reported in the Expert and Master clients for one or all error messages:

■ Click Restore Default to restore the default error reporting level for all tests.

■ Choose Default from the shortcut menu selection to restore the default value for an individual test.

Event Configuration Panel Select Data Storage:Event Configuration in the Navigation panel to open the Event Configuration panel as shown in Figure 3‑59. The Event Configuration panel allows you select the method of initiating data storage, the conditions that will stop data storage, and how much of the input stream is to be captured. If the Analysis board memory module is not present, this panel is not available and the option does not appear in the Navigation panel.
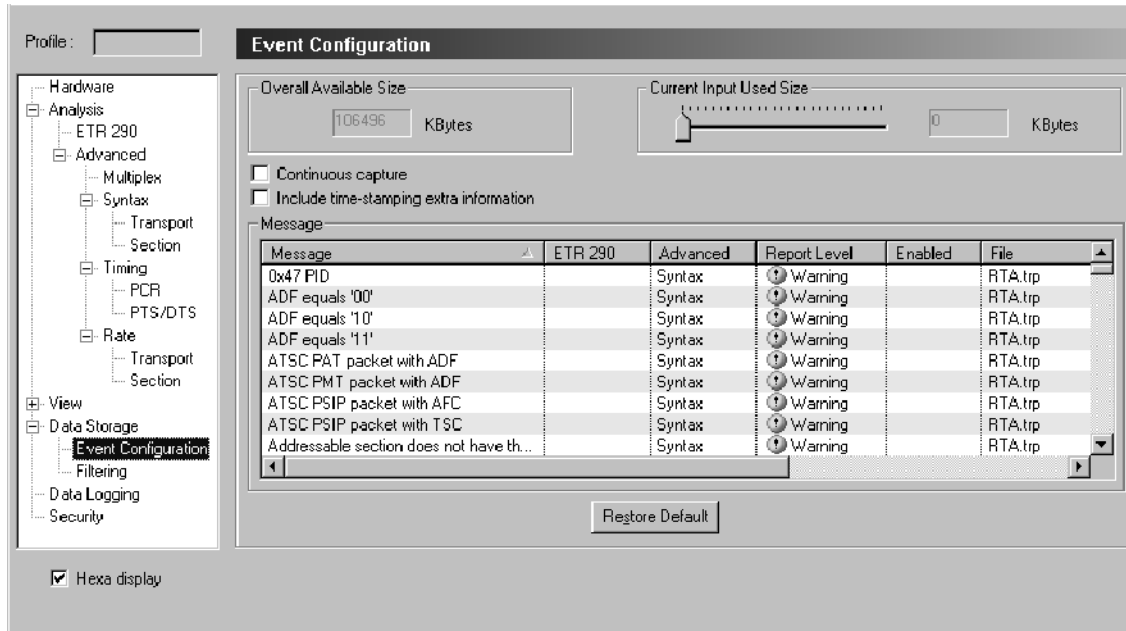
Figure 3‑59: Event Configuration configuration panel

When a portion of an input is captured, the data is written to a file in the following directory:

C:\MTM300\Cfg‑Trp\<Input>, where <Input> represents the input number on the transport monitor . If your transport monitor has eight inputs, you would have the following subdirectories: 1A, 1B, 2A, 2B, 4A, 4B, 5A, and 5B.

You specify the file name and the size of the captured input file using the procedure described in *Enabling data storage*, beginning on page 3‑202. The captured input file is saved as a *.TRP file, which you can then analyze using the Tektronix MTS200 Series MPEG-2 DVB/ATSC System Analyzer.

The Event Configuration panel displays the current settings used to capture transport stream input. This panel has the following options:

Overall available size. This indicates the amount of disk space (in kilobytes) available to create an event trace file. Each Analysis board has one memory board. The disk space available is shared among the number of inputs installed on each analysis board. You specify how much disk space can be used for each input using the Current input used size option described below.

Current input size used. This is the amount of disk space (in kilobytes) reserved for the one or more event traces taken from the input of the transport monitor to which you are connected. Set this size using the slider bar (the size is updated in the text box to the right). You need to apply your changes and restart the Analysis Server on the connected input for the changes to take effect.

Continuous capture. This option determines whether the transport monitor will perform multiple input stream captures on the selected input, or whether only one event is saved.

If this option is selected, each enabled event will trigger an new input transport stream capture. Each new captured input file increments the number 'n' in the file name. If the first captured input file is fileName.trp, the second file name will be fileName_1.trp.

If this option is not selected, only the first enabled event will trigger an input stream capture. To reset event capturing after some input has been captured, return to this panel, disable and re-enable the event, and then press the Apply button.

Include time stamping extra information. This option allows you to add extra time stamp information to captured data. When this option is selected, each captured packet header includes a time stamp from the transport monitor.

Message. This area lists the following information (you can sort the information in this area by clicking the column headers):

■ Message. This column lists all of the tests performed by the MTM300 Series transport monitor.

■ ETR290. This column lists the ETR290 priority level for each ETR290 test performed by the transport monitor.

■ Advanced. This column lists the test type for the test indicated in the row. For instance, the ATSC PSIP packet with AFC test is a test on the Syntax of the transport stream.

■ Report Level. This column lists the error level you have specified for the test indicated in the row. You set the error level using the Report Message Level panel.

■ Enabled. This column indicates whether the indicated error will generate a input stream capture. If an input fails the test, the error will trigger an input stream capture. Enabled is displayed with a disk icon.

■ File. This column indicates the file name for the captured input based on the error that triggered the capture.

Enabling data storage. To enable a portion of the input stream to be captured you need to perform the following steps:

1. If not already accomplished, set the amount of memory available for data storage for the current input using the Current Input Size Used slider as described in *Current input size used* on page 3‒201.

2. Enable the probe or probes that will trigger data storage.

NOTE. *An error condition must be detected by the Analysis Server to cause data to be captured. Always confirm that the related analysis or probe is enabled before enabling data acquisition. To confirm that a ETR 290 test is enabled, open the ETR 290 view and verify that the test indicator is colored green, orange, or red (not gray).*

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3. Specify the conditions under which data storage is stopped by selecting or deselecting the **Continuous capture** option. See *Continuous capture* on page 3‒201.

4. Specify whether to include time stamps by selecting or deselecting **Include time-stamping extra information**.

5. Configure the size and name of the file that results from capturing input as described in the following steps:

  a. Use the scroll bar to find the test that, if failed, will trigger an input stream capture.

  b. Right-click the file name displayed in the File column for that test (the default is RTA.trp), and then select **Configure** from the shortcut menu as shown below. The Event Settings dialog box is displayed.
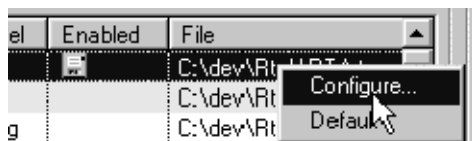
  c. Configure the following parameters and click **OK** (see Figure 3-60):

  - File name. This file (a *.trp file) will be written in the following location:

    C:\MTM300\Cfg-Trp\InputNumber\, where InputNumber is the number of the input to which you are connected.

  - Before Event and After Event. These selections determine how much information (in kilobytes) before and after the error is written to the saved .trp file.

  - Center Trace. Use this option to save the maximum amount of information split evenly before and after the error that triggers data capture.

  - Max. Use this option to save all the content up to the size of the loop partition before or after the error occurs.
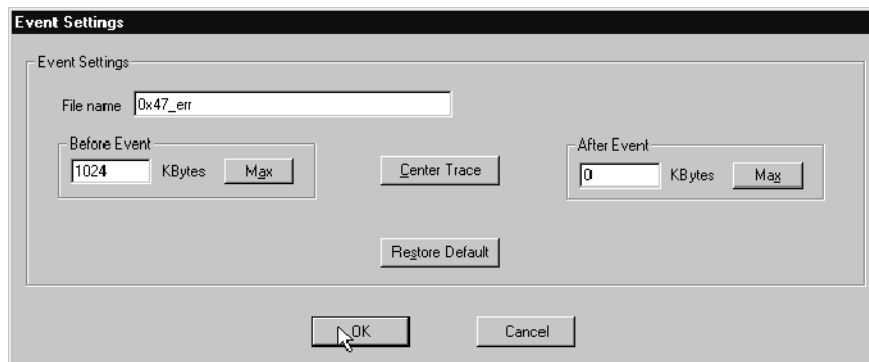
Figure 3-60: Event Settings dialog box

6. From the Event Configuration panel, click the event row in the Enable column to enable the error condition to trigger data capture. Left clicking in this column toggles between enabled and disabled states. You can also right-click and select **Enabled** from the shortcut menu as shown below.
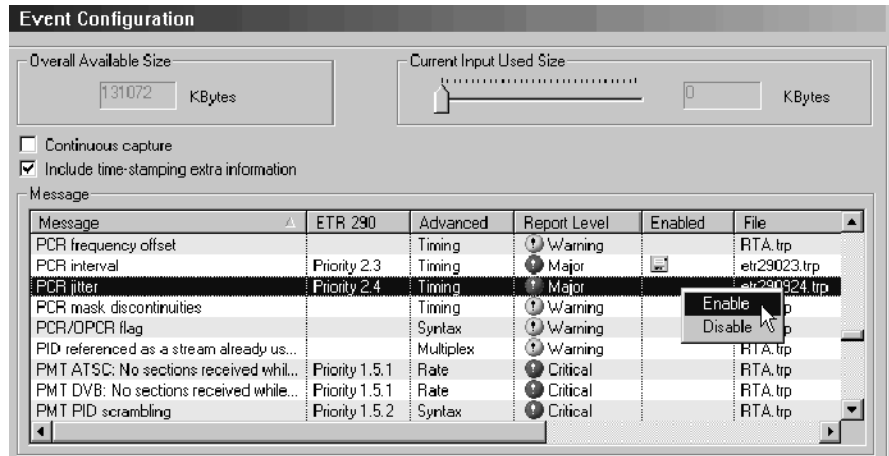
A disk icon in the Enabled column indicates that the selected error will trigger input data capture.

7. Click **Apply** (and restart the Analysis Server) before exiting the Configuration client to enable the new Event Configuration settings.

Filtering Panel   Select Data Storage:Filtering in the Navigation panel to open the Filtering panel as shown in Figure 3-61. You will use the Event Configuration panel in conjunction with the Filtering panel to configure the capture of a transport stream event. The Filtering panel allows you to specify which PIDs of the input stream you want to be captured.
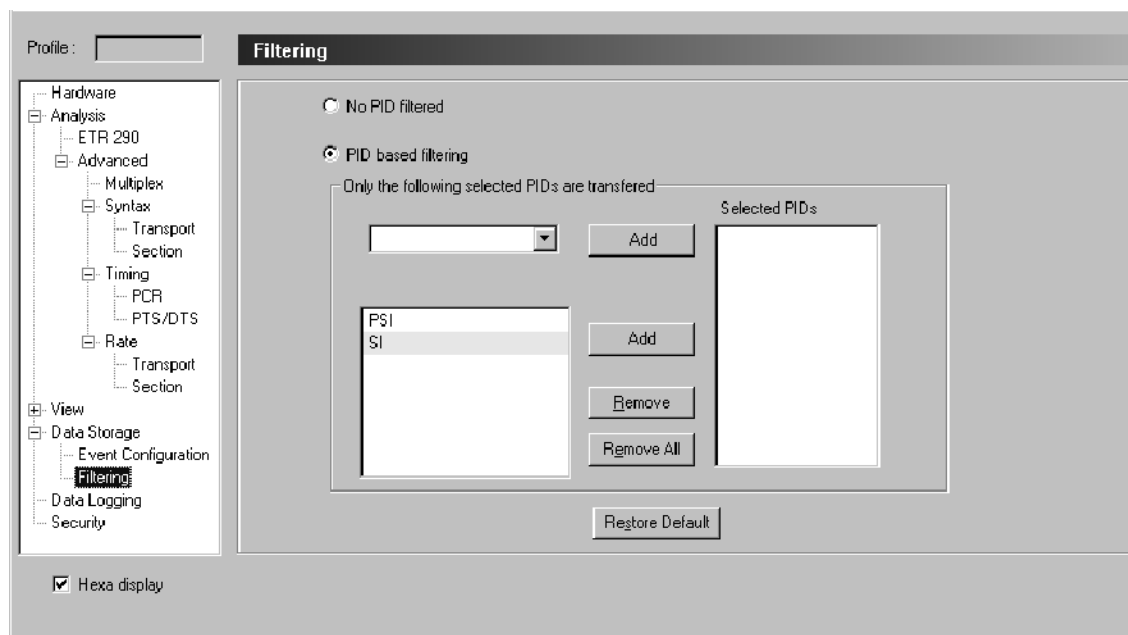
Figure 3-61: Filtering configuration panel

The Filtering panel contains the following configuration options:

No PID filtered. Select No PID filtered to capture the entire contents of the transport stream.

PID based filtering. Select PID based filtering to capture selected PIDs of the stream. After you select the PID based filtering option, you can select specific PID numbers from the upper list box or you can select groups of PIDs such as PSI, SI, PSIP or specific programs from the lower list box to add to the Selected PIDs list. Click the associated Add button to add items from either list box to the Selected PIDs list.

Data Logging Panel Select Data Logging in the Navigation panel to open the Data Logging panel as shown in Figure 3-62. Use this panel to configure the logging of specified transport stream events. Refer to *Data Logging* on page 3-166 for more information.
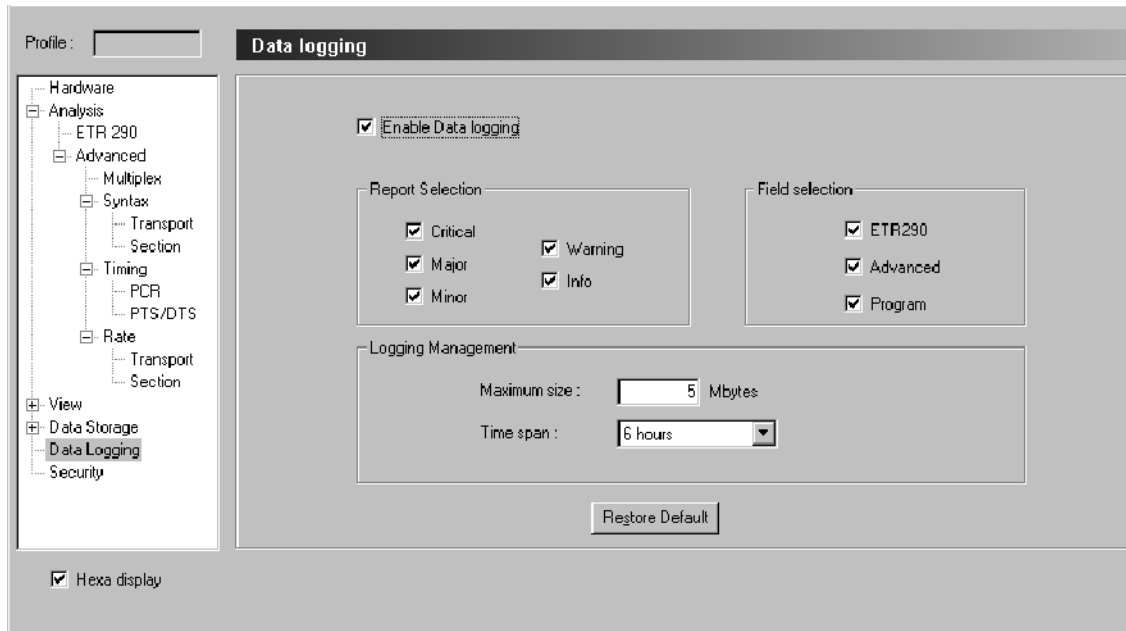
Figure 3-62: Data Logging configuration panel

The Data Logging panel contains the following configuration options:

Enable Data logging. Click this box to enable the logging of transport stream events. A check mark appears when data logging is enabled.

Report Selection. Click the desired boxes to select the severity of the event messages to be logged. You can select from Critical, Major, Minor, Warning, and Info. A check mark appears in the box of selected severity levels. You set the severity level of transport stream events using the Message Level panel (see page 3-198).

Field Selection. Click the desired boxes to select which part of the available data for each message is logged. You can select from ETR290, Family, and Program.

Logging Management. These selections manage the file processing for the Data Logging function. Use the Maximum size box to set the maximum file size in Mbytes. 5 Mbytes is the default size. Use the Time span box to select the period of time covered by each data logging file. You can select from 6 hours, 12 hours, and 24 hours. When the maximum file size is reached or when the selected time span is completed, the current log file is closed and a new one is started.

Security Panel   Select Security in the Navigation panel to display the Security panel (see Figure 3-63). The Security panel allows you to set a password for an Analysis Server configuration that protects your current settings from being changed. This password applies only to the input indicated in the Address bar.
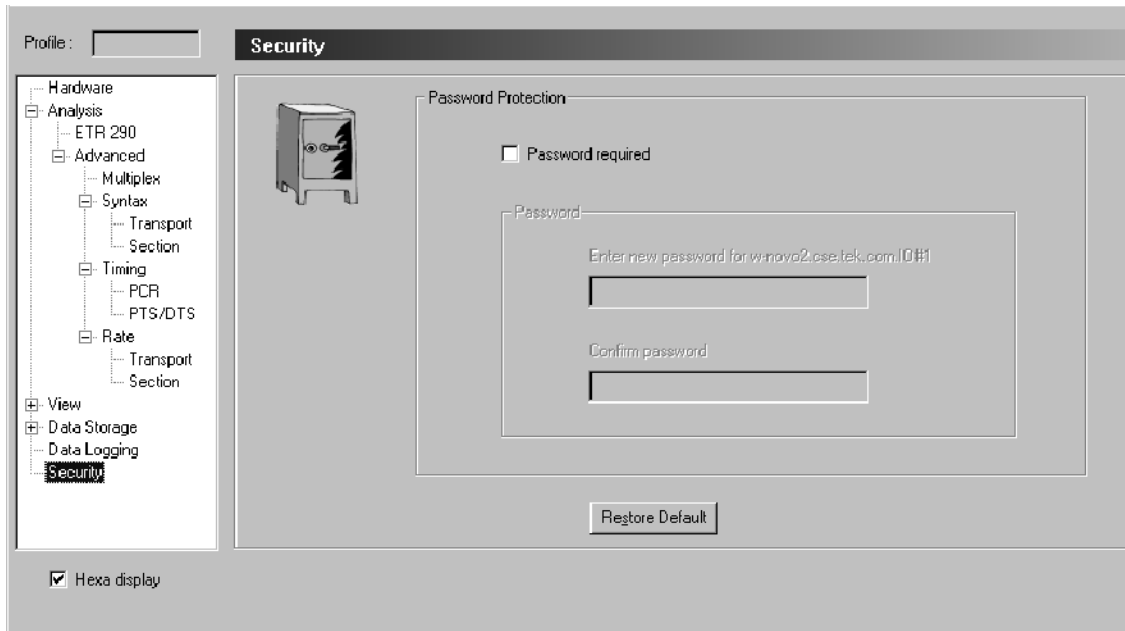
Figure 3-63: Security configuration panel

To set a password on an Analysis Server to which you are connected, use the following procedure:

1.   Select the **Password required** option (it is not selected by default).

2.   Enter the password and confirm it using the text boxes provided. The password is case sensitive.

3.   Click the **Apply** button.

After setting a password, any Configuration client that tries to connect to the Analysis Server will see the following Password dialog box. If you do not know the password, you can still open the Configuration client for the indicated Analysis Server. However, you will be unable to apply any changed any settings.

TMCC Expert Client Reference

The TMCC (Transmission and Multiplexing Configuration Control) Expert Client application allows you analyze the TMCC data of an ISDB-S/ARIB-compliant transport stream in real time.

The TMCC Expert client has the following characteristics:

- Indicates the presence of sync bytes (0x47 for TMCC basic streams and W1, W2, or W3 sync bytes for TMCC data streams)

- Displays the syntax of TMCC data

- Displays Slot, TSID, TS Name, and Modulation mode information

- Displays information, warning, and error messages

- Indicates the presence of TMCC alarm and update flags in the transport stream

- Displays the overall stream rate

The TMCC Expert Client displays the results of only one TMCC Analysis Server (input) at a time. You can connect more than one TMCC Expert Client to the same TMCC Analysis Server input from your own instrument, or from a remote MTM300 transport monitor.

The following sections describe the TMCC Expert Client:

- *Using the TMCC Expert Client Display Elements*   page 3–210

- *Manually Capturing a TMCC Transport Stream*   page 3–216

To display the TMCC Expert Client, right-click an Analysis Server icon from the Multiplex panel of the Master client and select **TMCC Expert Client** from the submenu. The TMCC Expert Client is displayed showing the analysis results for the selected input (see Figure 3–64 on page 3–210).

NOTE. *For the TMCC Expert Client to sync to an input, you must first specify the stream type (S_TMCC or M_TMCC) from the Analysis panel of the TMCC Configuration Client.*

Using the TMCC Expert Client Display Elements

Figure 3-64 shows the different elements of the TMCC Expert Client display.
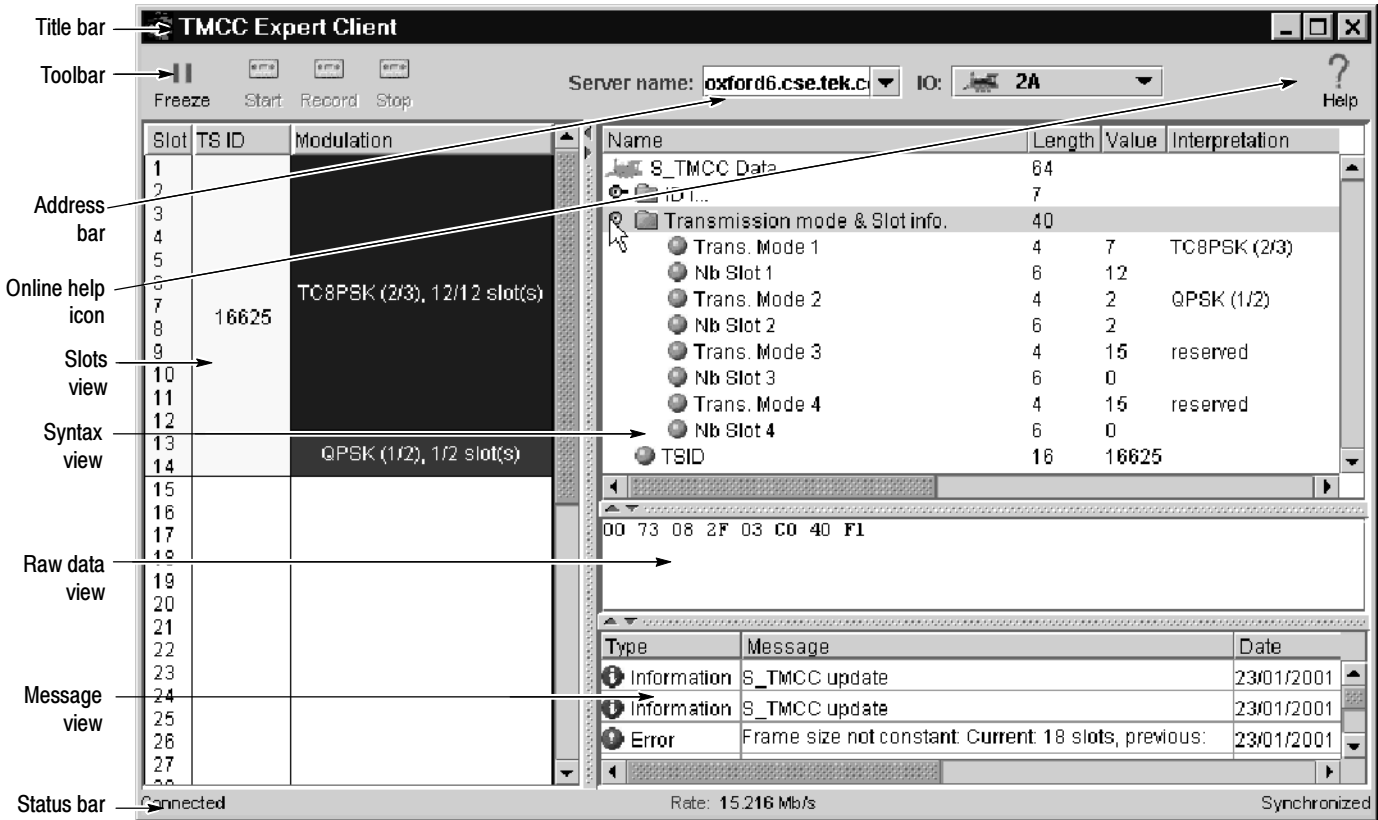
Figure 3-64: TMCC Expert Client display elements

Title Bar   The Title bar displays the name of the application (TMCC Expert Client).

The standard Windows NT window-sizing control boxes for the TMCC Expert Client are located on the far right side of the Title bar.

Toolbar Table 3-49 lists the function of each toolbar button.

Table 3-49: Functions of the TMCC Expert Client toolbar buttons

Button	Name	Function
❚❚ Freeze	Freeze all views (or pause)	Freezes (pauses) the updates to the current TMCC Expert Client display. The analyses occurring on the input are not stopped, and the history of the analyses is preserved while the views are frozen.
Start	Start trace	Starts moving transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream (see *Manually Capturing a Transport Stream* beginning on page 3-216).
Record	Record trace	Starts the manual capture of the transport stream input. This button is disabled until you enable a manual capture of a transport stream.
Stop	Stop trace	Stops the movement of transport stream data through the capture memory buffer. This button is disabled until you enable a manual capture of a transport stream and click the Record Trace button.

Address Bar The Address bar contains two address boxes that allow you to specify which Analysis Server and which input you want the TMCC Expert Client to analyze. If you open the TMCC Expert Client from the Master Client, the address boxes automatically indicate the IP address or host machine name and port number (input) of the Analysis Server to which you are connected.

Server name list box. Enter the (dotted decimal) IP Address or machine name in the Server name list box.

For example, enter 121.181.77.121 to analyze the signal from an MTM300 transport monitor with an IP address of 121.181.77.121. Or, enter jam20.cse.tek.com to analyze the signal from an MTM300 transport monitor named jam20 on the cse.tek.com network.

The TMCC Expert Client saves machine names and IP addresses that you have successfully connected to in the past. You can select an MTM300 transport monitor name or IP address from the drop-down selection box.

I/O list box. Use the I/O list box to select the input to which you want to connect. The selection box uses icons to indicate the inputs available.

Help Icon Click the Help icon at the far right of the Address bar to access online help for the TMCC Expert Client.

Slots View

The Slots view (see Figure 3-64 on page 3-210) displays the properties of each slot using three columns:

- The first column lists the slot numbers (1 through 48).

- The second column shows the TS ID (transport stream identifier) associated with each slot.

- The third column lists the modulation mode for each slot and the number of effective slots. Each modulation mode is represented by a different color (see Table 3-50).

NOTE. When the modulation mode and the number of slots are not consistent, the color of the Modulation column is red.

Table 3-50: Color for each TMCC Expert Client modulation mode

Modulation	Color
BPSK(1/2)	Dark green
QPSK(1/2)	Dark purple
QPSK(2/3)	Green
QPSK(3/4)	Mustard
QPSK(5/6)	Brown
QPSK(7/8)	Dark blue
TC8PSK(2/3)	Blue

Syntax View

The Syntax view (see Figure 3-64 on page 3-210) displays the content of the TMCC data in a hierarchic list, including the length, value, and description of the hierarchic item. Each hierarchic item is represented by a colored icon (icons are gray when the TMCC Syntax Consistency probe is not set). A green LED icon indicates that the field value is correct, a green folder icon indicates that all parameters displayed within that folder are correct. A red icon indicates that an error exists in the field value of the item or, in the case of a folder icon, in one of the subitems of a group. (See Table 3-52 on page 3-214 for error conditions that cause LED icons to change color.)

NOTE. For S_TMCC streams, the Transmission frame ID and the Super frame ID fields are not updated in real time in the TMCC Analysis Server. Their values are displayed as 0/1 in the TMCC Expert Client.

Table 3-51 on page 3-213 shows the hierarchy used for the S_TMCC and M_TMCC streams.

Table 3-51: TMCC data syntax

S_TMCC data	64 bits
ID info.	8 bits
Extended data	4 bits
Alarm signal	1 bit
Update indication	1 bit
Transmission frame ID	1 bit
Super frame ID	1 bit
Transmission mode & Slot info.	40 bits
Trans. mode 1	4 bits
Nb slot 1	6 bits
Trans. mode 2	4 bits
Nb slot 2	6 bits
Trans. mode 3	4 bits
Nb slot 3	6 bits
Trans. mode 4	4 bits
Nb slot 4	6 bits
TSID	16 bits
M_TMCC data	**384 bits**
Update indication	5 bits
Transmission mode / slot info.	40 bits
Trans. mode 1	4 bits
Nb slot 1	6 bits
Trans. mode 2	4 bits
Nb slot 2	6 bits
Trans. mode 3	4 bits
Nb slot 3	6 bits
Trans. mode 4	4 bits
Nb slot 4	6 bits
Relative TS / Slot info.	144 bits
Relative TS number slot 1	
through	3 bits each
Relative TS number slot 48	
Relative TS / TSID	128 bits
TSID for relative TS number 0	
through	16 bits each
TSID for relative TS number 7	
Alarm control	5 bits
Emergency alarm	1 bit
Reserved	4 bits
Extended data	62 bits
Extended flag	1 bit
Extended data	61 bits

To open or close hierarchy items in the Syntax view, click on the open/close icon to the left of the folder icon as shown below.
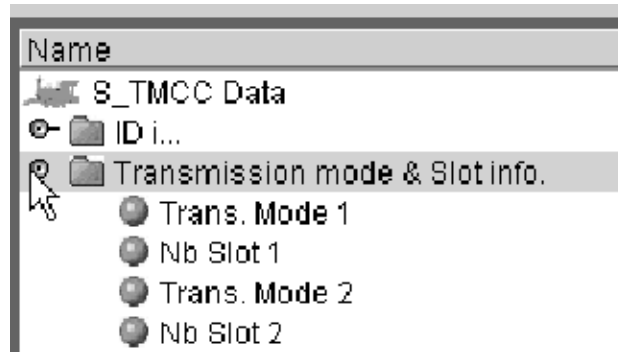
The folder and LED icons are gray when the TMCC Syntax Consistency probe is not set. When this probe is set, icons turn red when the conditions described in Table 3–52 are detected.

Table 3‑52: Syntax view LED icons and error conditions

LED icon	Error condition causing an LED icon to turn red	
Trans. Mode *n*	When the transmission mode parameter is not 15 (reserved) or not one of the following values (representing transmission modes):	
	Value	**Transmission mode**
	1	BPSK (1/2)
	2	QPSK (1/2)
	3	QPSK (2/3)
	4	QPSK (3/4)
	5	QPSK (5/6)
	6	QPSK (7/8)
	7	TC8PSK (2/3)
Nb. Slot *n*	For S_TMCC streams (TMCC basic streams), when the total number of assigned slots is greater than 47.	
	For M_TMCC streams (TMCC data streams), when the total number of assigned slots is greater than 48.	
	When the transmission mode parameter is 15 (reserved) and the slot parameter is not zero (0)	
Extended Data	When the Extended Flag parameter is zero (0) and all 61 bits of the Extended Data field are not one (1).	

Raw Data View   The Raw Data view (see Figure 3--64 on page 3--210) displays the hexadecimal values of the TMCC data encoded in the transport stream. You can use standard Windows NT methods for selecting and copying the data to a text file.

Message View   The Message view displays error, warning, and information messages for the TMCC analysis in progress. The messages include the message type (error, warning, and information), the message content, and the time of the message. The maximum number of displayed messages is 1000. Additional messages are handled on a first-in/first-out basis.

You can right-click in the Message view to open the dialog box shown below where you can sort and clear messages. You can also use the dialog box to change the number of lines allowed for each message so that you can view the complete content of multiple-line messages.
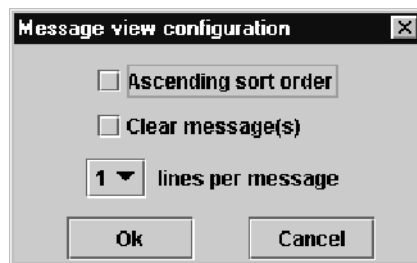
NOTE. Some messages are too long to be displayed in three lines; double-click the message to display a pop-up message window with the full message text.

Status Bar   The Status bar displays the synchronization status and the TMCC stream rate.

Manually Capturing a TMCC Transport Stream

The MTM300 transport monitor allows you to manually capture a TMCC transport stream input using the TMCC Expert Client. Use the Data Storage panel of the TMCC Configuration Client to enable a manual capture (refer to *Event Configuration* on page 3–231), and then use the Trace toolbar buttons to control a manual capture from the TMCC Expert Client.

NOTE. *This procedure is for manually capturing a TMCC transport stream input. Refer to* TMCC Configuration Client Reference *starting on page 3–219 for information about configuring the MTM300 transport monitor to automatically capture specific TMCC transport stream events.*

Perform the following steps to manually capture a transport stream:

1. Start the TMCC Configuration Client for the transport stream input that you are monitoring.

2. Open the Data Storage panel of the TMCC Configuration Client.

3. Use the Current Input Used Size slide bar to limit the size of the capture file in kilobytes (KB). You can set this limit up to the value listed in the Overall Available Size box (determined by the available room on the local drive of the transport monitor).

NOTE. *You must set a capture size greater than 0 KB to enable a capture.*

4. Verify that the Manual stop of acquisition event is enabled in the Message list.

   a. Double click the Manual stop of aquisition row in the Event Configuration list to open the Data Storage Event Configuration dialog box shown below.
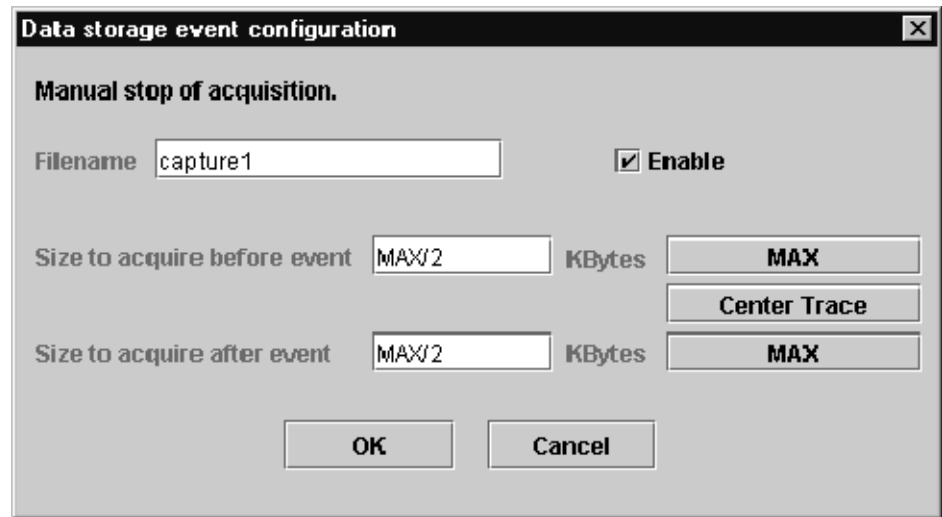
b. Enter the name of the transport stream file you will generate in the **File name** text box. The default file name is stream.trp.

NOTE. The captured file will be stored in C:\MTM300\CFG-TRP (on the MTM300 transport monitor to which you are connected) in a directory whose name matches the input being used to perform the capture. For example, if you are capturing a transport stream on port 1A to a file named stream.trp, the path to the file is: C:\MTM300\CFG-TRP\IO#1A\stream.trp.

c. Use the Size to acquire before event and Size to acquire after event text boxes to set the amount of transport stream data captured before and/or after you initiated the capture event. For example, if you set the Before Event value to 1024 and the After Event Value to 2048, the saved file will include 1024 KB of data before and 2048 KB of data after you initiate the capture.

d. Click **Center Trace** if you want to save the same amount of data before and after the capture occurs. The size of the file will be the size you set in the Current Input Used Size selection box in the Event Configuration panel in step 3.

e. Click the appropriate **Max** button to save data up to the amount you set in the Current Input Used Size selection box in the Event Configuration panel in step 3, before or after the capture event occurs.

f. Click **OK** after you finish configuring the Data storage event configuration dialog box.

5. Click **Apply** to enable the new Event Configuration settings, and then return to the TMCC Expert Client..

6. The Start Trace shortcut button is now enabled (highlighted) in the TMCC Expert Client window.

7. Click **Start Trace** in the TMCC Expert Client window to begin moving transport stream data through the event-capture buffer.

8. Click **Record Trace** to initiate a transport stream capture, or click **Stop Trace** to stop the capture process without recording a file.

The capture point in a captured TMCC transport stream file will be based on your capture configuration as set up in the Data Storage panel of the TMCC Configuration Client.

TMCC Configuration Client Reference

The TMCC (Transmission and Multiplexing Configuration Control) Configuration Client is used to configure the analyses performed by the TMCC Analysis Server. The results of the analyses are displayed in the TMCC Expert Client.

> **NOTE**. *Only one TMCC Configuration Client at a time can set parameters on a TMCC Analysis Server. If a TMCC Configuration Client is already connected to a TMCC Analysis Server, you can view the current settings, but you cannot change them.*
>
> *The settings in the TMCC Configuration Client configure only the measurements made by the TMCC Analysis Server, which are displayed in the TMCC Expert Client application. The TMCC Configuration Client settings do not affect the configuration settings in the Configuration Client, which is used to configure the measurements made by the MPEG Analysis Server.*

The TMCC Configuration Client has the following characteristics:

- Uses multiple configuration panels to group related configuration functions

- Uses a hierarchic navigation panel to display the multiple configuration panels

- Configures the TMCC Analysis Servers to operate in either TMCC basic or TMCC data stream modes

- Enables you to specify a transport stream ID to analyze using the MPEG-2 Analysis Server (only in the TMCC data stream mode)

- Sets parameters for the following TMCC probes:

    - Frame size

    - Super frame size

    - Modulation mode and slot consistency

    - TMCC syntax

    - TMCC update counter (only in TMCC data stream mode)

Changing Configurations

To change the current TMCC Analysis Server configuration, perform the following procedure:

1. Select one of the Analysis Server icons in the Port Manager panel of the Master Client.

2. Right-click on the Analysis Server icon and select **Launch TMCC Configuration Client** from the shortcut menu.

   The TMCC Configuration Client is displayed for the selected input (represented by the Analysis Server icon). All modifications made to the TMCC Analysis Server configuration will be reflected in the TMCC Expert Client after you click the Apply toolbar button.

NOTE. The Analysis Server icon in the Master Client represents both the MPEG and TMCC Analysis Servers connected to the I/O port. Which Analysis Server, MPEG or TMCC, you configure depends on which configuration client you access from the shortcut menu.

3. Select the appropriate configuration category from the Navigation panel in the TMCC Configuration Client to open the associated configuration panel.

4. You can change configuration settings using standard Windows techniques such as the following:

   ■ Click the appropriate option button to select among options

   ■ Select or clear a check box

   ■ Select from a list of several alternatives

   ■ Enter a new value in a text box

NOTE. Each of the configuration panels have a Restore Default button that you can click to return all settings on the displayed panel back to the factory-default settings.

5. After you change the desired settings on one or more configuration panels, click the **Apply** toolbar button to apply all configuration changes.

NOTE. Analysis Server configuration settings are saved to the Windows NT registry and automatically persist from session to session, even if you exit the application and power down the instrument.

Saving and Restoring Configurations

The toolbar buttons allow you to perform the following functions:

■ Save all of the current TMCC analysis configuration settings to a file

■ Load a saved TMCC analysis configuration file

■ Restore the standard, factory-default TMCC analysis configuration

■ Apply any configuration setting changes to the TMCC Analysis Server

---

NOTE. *You must click the Apply toolbar button before your configuration changes will be applied to the TMCC Analysis Server input.*

Saving the Current Configuration

To save the current TMCC analysis configuration, perform the following procedure:

1. Click the **Save** toolbar button to open the Save window.

2. Use the Save window to save the current TMCC analysis settings to a file on the hard drive of the MTM300 transport monitor.

It is recommended that you save TMCC analysis configurations in the following directory on the MTM300 transport monitor: C:\MTM300\CFG-TRP.

Restoring the Default Configuration

To restore the default TMCC Analysis Server configuration, click **New**, and then click **Apply**. All TMCC analysis settings will be restored to the factory-default state (stream type of No TMCC, and with no probes set).

Loading a Saved Configuration

To restore a saved TMCC Analysis Server configuration, perform the following procedure:

1. Click the **Load** toolbar button to open the **Load Configuration** window.

2. Highlight the name of the configuration file that you want to restore, and then click **Load**.

3. Click the **Apply** toolbar button to apply the configuration changes to the TMCC Analysis Server.

Deleting a Saved Configuration

Use Windows NT Explorer to locate and delete a saved TMCC Analysis Server configuration file on the hard drive of the MTM300 transport monitor. The file name will have a .CFG extension.

TMCC Configuration Client Display Elements

Figure 3-65 shows the different elements of the TMCC Configuration Client display. The display elements are described on the following pages.
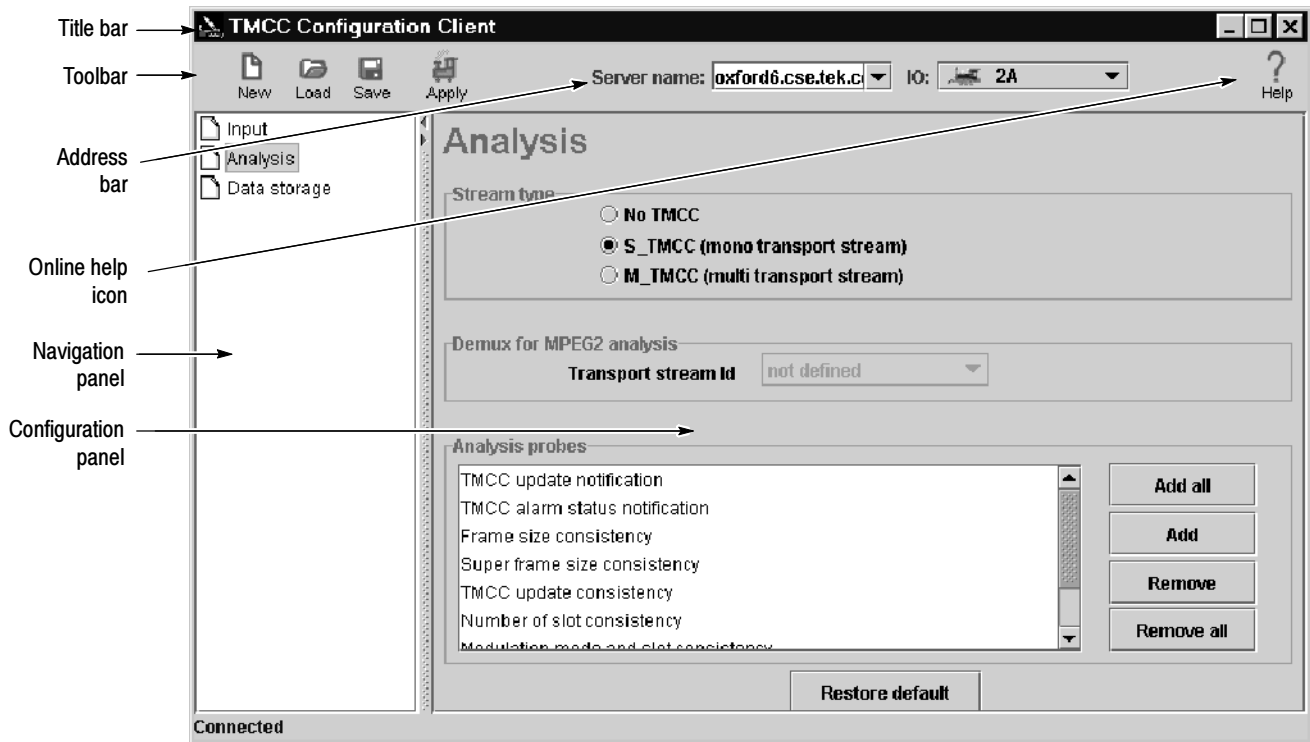
Figure 3-65: TMCC Configuration Client display elements

Title Bar The Title bar displays the name of the application (TMCC Configuration Client).

The standard Windows NT window-sizing control boxes for the TMCC Configuration Client are located on the far right side of the Title bar.

Toolbar The buttons in the toolbar provide direct access to the functions available in the TMCC Configuration Client. Click on a toolbar button to perform the associated command. Table 3–53 lists the function of each toolbar button.

NOTE. You must click the Apply toolbar button before your configuration changes will be applied to the TMCC Analysis Server and displayed in the TMCC Expert Client.

Table 3-53: Functions of the TMCC Configuration Client Toolbar buttons

Button	Name	Function
New	New configuration (CTRL+N)	Loads the default TMCC analysis settings into each of the configuration panels in the TMCC Configuration Client (stream type of No TMCC, with no TMCC probes set).
Load	Load configuration (CTRL+L)	Loads a previously saved set of analysis settings into each of the configuration panels in the TMCC Configuration Client. A dialog box is displayed from which you select a previously saved TMCC configuration file.
Save	Save configuration (CTRL+S)	Saves the current TMCC analysis settings to a file. A dialog box appears where you can enter a path and file name. It is recommended that you save the TMCC configurations in the following directory on the MTM300 transport monitor: C:\MTM300\CFG-TRP.
Apply	Apply (CTRL+A)	Applies the current TMCC analysis settings to the TMCC Analysis Server indicated in the address bar.

Address Bar   The Address bar contains two address boxes that allow you to specify which Analysis Server and which I/O port that you want the TMCC Configuration Client to analyze. If you open the TMCC Configuration Client from the Master Client, the address boxes automatically indicate the IP address or host machine name and I/O port number of the Analysis Server to which you are connected.

Server name list box. Enter the IP Address (or machine name) in the Server name list box using either the (dotted decimal) IP adress or the host machine name.

For example, enter 121.181.77.121 to analyze the signal from an MTM300 transport monitor with an IP address of 121.181.77.121, or enter jam20.cse.tek.com to analyze the signal from an MTM300 transport monitor named jam20 on the cse.tek.com network.

The TMCC Configuration Client saves machine names and IP addresses that you have successfully connected to in the past. You can select an MTM300 transport monitor name or IP address from the drop-down selection box.

I/O list box. Use the I/O list box to select the I/O port to which you want to connect. You can only connect to I/O ports that have been assigned to an Analysis Server. The I/O drop-down selection box uses icons to indicate which application is assigned to each I/O port.

Help Icon   Click the Help icon at the far right of the Address bar to access online help for the TMCC Configuration Client.

Navigation Panel   Use the Navigation panel to select which configuration panel to open. Use standard Windows NT hierarchy navigation techniques to move through the available panels.

Configuration Panel   The Configuration panel area displays the various configuration panel selected from the Navigation panel. Each configuration panel displays analysis options related to different aspects of the transport stream.

TMCC Configuration Settings

This section describes and explains each of the analysis settings on the various configuration panels. Each hierarchy item in the Navigation panel opens a different configuration panel.

Each configuration panel contains a Restore Default button. Click this button to restore the settings for the displayed panel back to their default settings.

The TMCC Configuration Client contains the following panels:

- Input   page 3-226
- Analysis   page 3-227
- Data Storage   page 3-229

Input Panel   Select Input in the Navigation panel to display the Input configuration panel (see Figure 3-66).
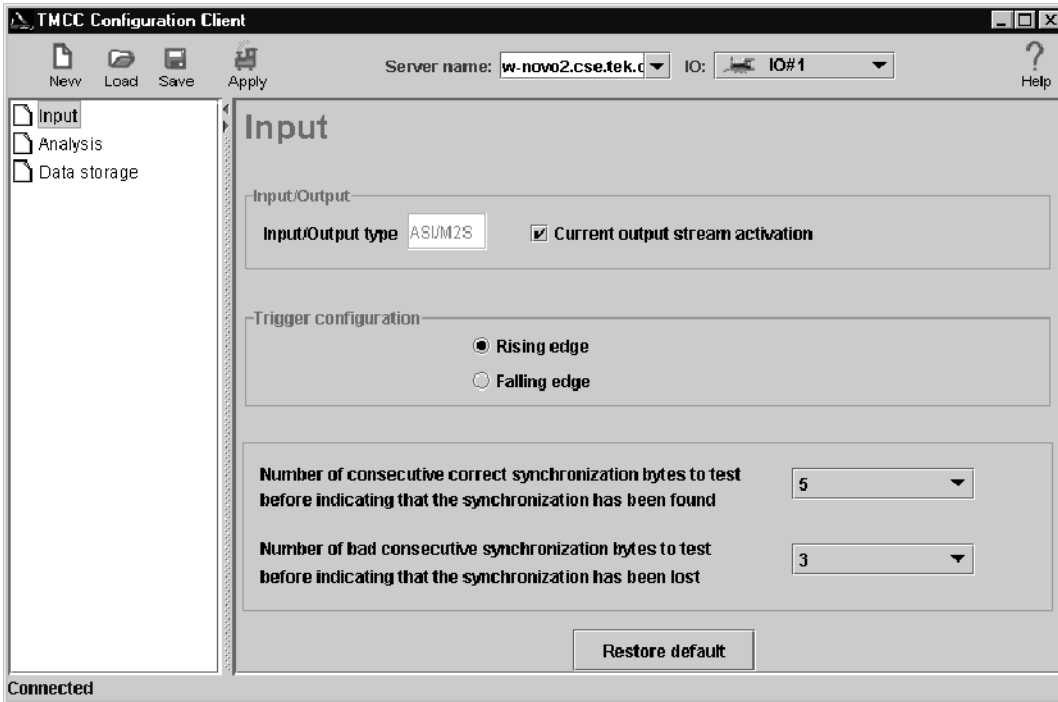
Figure 3-66: TMCC Input configuration panel

The Input panel displays the current configuration of the MTM300 transport monitor Input/Output type. ASI/M2S is the standard I/O type. The SSI is also an available input option.

You can select from the following options in the Hardware panel:

Current output stream activation. Select this option to loop the input signal on the I/O port that you are monitoring to the output connector on the same I/O port.

Trigger configuration. You can configure the MTM300 transport monitor to use the rising or falling edge of a signal connected to the trigger input of the I/O port.

Number of consecutive correct synchronization bytes to test. Select the number of consecutive correct synchronization bytes to test before indicating the Analysis Server is synchronized to the input. Select from 3, 5 (default), 7, or 9 correct synchronization bytes.

Number of bad consecutive synchronization bytes to test. Select the number of consecutive bad synchronization bytes to test before indicating that synchronization has been lost. Select from 1, 3 (default), 5, or 7 bad synchronization bytes.

Analysis Panel   Select Analysis in the Navigation panel to open the Analysis configuration panel (see Figure 3-67).
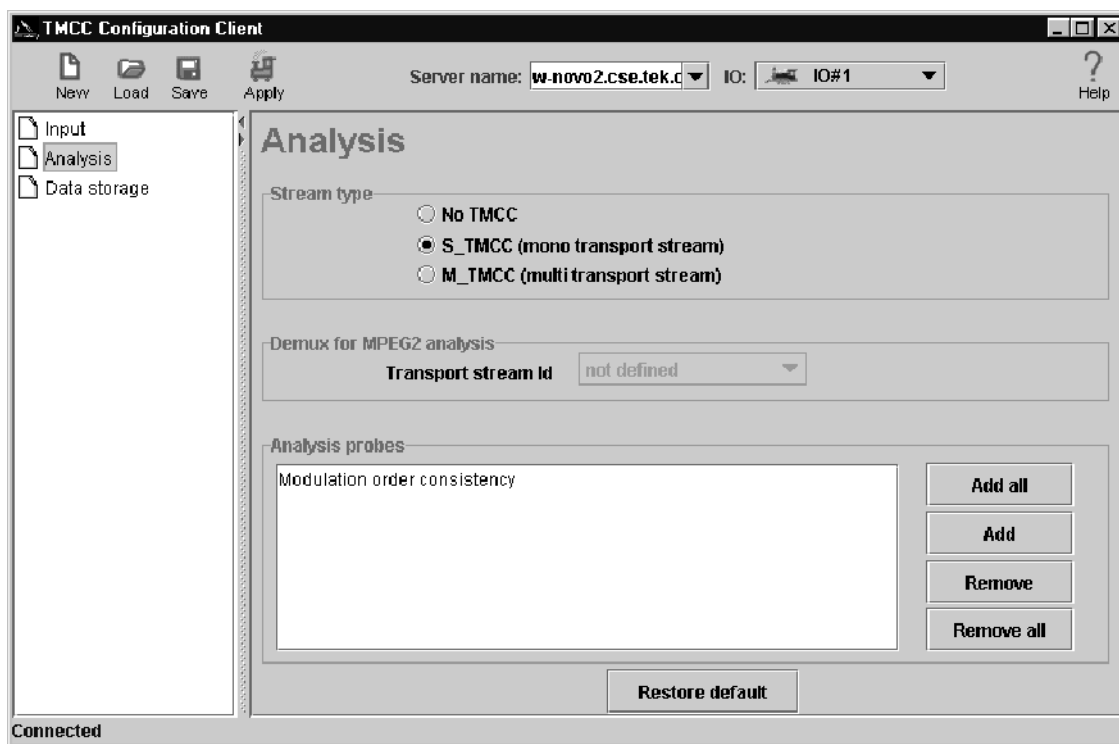
Figure 3-67: TMCC Analysis configuration panel

The Analysis panel contains the following configuration options:

Stream type. The Stream Type setting determines which stream type the MTM300 transport monitor expects when it monitors the input stream.

■ Select No TMCC (default) to analyze a transport stream containing no TMCC data.

■ Select S_TMCC (mono transport stream) to analyze a transport stream with a single program.

■ Select M_TMCC (multi transport stream) to analyze a transport stream with multiple programs.

When you select the M_TMCC stream type, you can select a transport stream by TSID to be demuxed for MPEG-2 analysis.

Demux for MPEG2 analysis. Use the drop-down box to select a transport stream by TSID to demux for MPEG analysis. The TSIDs are displayed in both decimal and hexadecimal values. This selection is only available when the M_TMCC stream type is selected.

NOTE. When you are analyzing an M_TMCC stream using the MPEG Expert Client application, you must use this Demux for MPEG2 analysis box in the TMCC Configuration Client to select which transport stream to analyze in the Expert Client.

Analysis probes. This box contains the list of available TMCC probes. Refer to *Probe Operating Conventions* on page 3--45 for instructions on setting, changing, and removing probes.

Refer to *TMCC Probe Descriptions* on page 3--88 for more information about each of the TMCC analysis probes.

Data Storage Panel   Select Data Storage in the Navigation panel to open the Data Storage panel
(see Figure 3‑68). The Data Storage panel allows you select the method of
initiating data storage, the conditions that will stop data storage, and how much
of the input stream is to be captured.
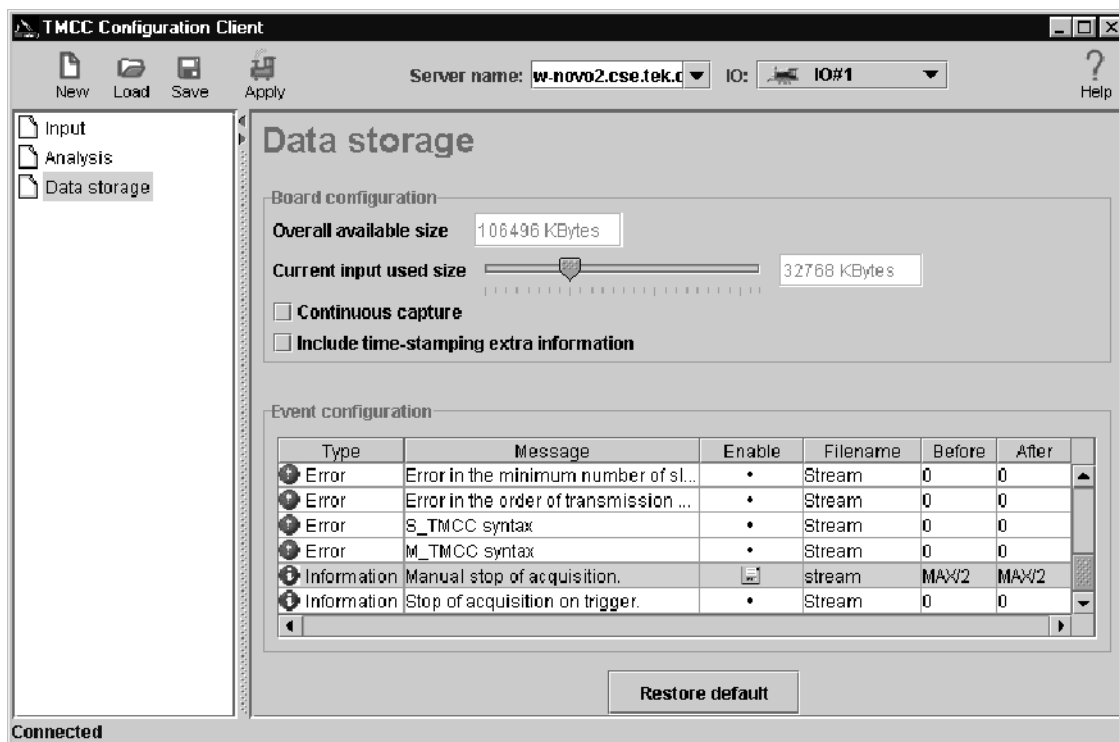
Figure 3‑68: TMCC Data Storage configuration panel

The capture file will be stored on the C: drive of the transport monitor (or the C:
drive of the TMCC client host machine) in a directory whose name matches the
input number being used to perform the capture. For example, if you are
capturing an event on I/O port 1A to a file named RTA.trp, the directory path to
the file is: C:\IO#1\RTA.trp.

You specify the file name and the size of the capture file using the procedure
described in *Capturing a TMCC Transport Stream Event*, beginning on
page 3‑231. The captured input file is saved as a *.TRP file, which you can later
analyze using the MPEG-2 DVB/ATSC System Analyzer application (MTS300,
Option DT).

NOTE. To enable a manual transport stream capture using the TMCC Expert Client, you must enable the Manual stop of acquisition event in the Event Configuration list as shown in Figure NO TAG and ensure that the Current Input Used Size value is not zero (but less than the Overall Available Size value).

The Data Storage panel displays the current settings used to capture transport stream input. This panel has the following options:

Overall available size. This indicates the amount of disk space (in kilobytes) available to create an event trace file. Each Analysis board has one memory board. The disk space available is shared among the number of inputs installed on each analysis board. You specify how much disk space can be used for each input using the Current input used size option described below.

Current input size used. This is the amount of disk space (in kilobytes) reserved for the one or more event traces taken from the input of the system to which you are connected.

NOTE. You must enter an amount greater than 0 KB to enable data storage.

Set the file size using the slider bar (the size is updated in the text box to the right). You need to apply your changes and restart the Analysis Server on the connected input for the changes to take effect.

Continuous capture. This option determines whether the system will perform multiple input stream captures on the selected input, or whether only one event is saved.

If this option is selected, each enabled event will trigger a new stream capture. Each new captured input file increments the number 'n' in the file name, so if the first captured input file is fileName.trp, the second file name will be fileName_1.trp.

If this option is not selected, only the first enabled event will trigger an input stream capture. To reset event capturing after some input has been captured, return to this panel, disable and re-enable the event, and then click the Apply button.

Include time stamping extra information. This option allows you to add extra time stamp information to captured data. When this option is selected, each captured packet header includes a time stamp.

Event configuration. The Event Configuration area lists the status of the available TMCC tests. Double click on the row of the desired test to open the Event Configuration dialog box for that test. The Event Configuration area lists the following information:

- The Type column lists the error level for the associated test listed in the Message column.

- The Message column lists all of the TMCC tests performed by the TMCC analysis servers.

- The Enable column indicates whether the indicated error will generate a input stream capture. If a transport stream fails the test, the error will trigger a stream capture of the error event. When a test is enabled, the Enable column will display a disk icon.

- The Filename column indicates the file name to be used for the captured stream based on the error that triggered the capture.

- The Before column lists the amount of data that will be captured before an error event.

- The After column lists the amount of data that will be captured after an error event.

NOTE. You must enable the Manual stop of acquisition test before you can perform a manual stream capture using the TMCC Expert Client.

Capturing a TMCC Transport Stream Event. The transport monitor allows you to capture a user-defined transport stream event. The Event Configuration panel of the TMCC Configuration Client controls the selection of TMCC transport stream events on which the MTM300 transport monitor can trigger a capture.

NOTE. You can manually capture transport streams using the TMCC Expert Client. Refer to Manually Capturing a TMCC Transport Stream *on page 3–216.*

To enable a manual transport stream capture using the TMCC Expert Client, you must enable the Manual stop of acquisition event in the Event configuration list as shown in Figure NO TAG.

To capture a user-defined TMCC transport stream error event, perform the following steps:

1. Start the TMCC Configuration Client for the transport stream input you are monitoring.

2. From the Data Storage panel, open the Event Configuration dialog box by double-clicking the event that you want to trigger a capture.

3. Use the Current Input Used Size slide bar to set the size of the capture file in kBytes. You can set the capture size to a value up to the amount listed in the Overall Available Size box (determined by the available room on the SCSI drives).

NOTE. You must set a capture size greater than 0 kBytes to enable a capture.

4. Double click on the row of a TMCC test you want to enable in the Event Configuration list to open the Data Storage Event Configuration dialog box (see Figure 3-69).

NOTE. An error condition must be detected by the Analysis Server to cause data to be captured.
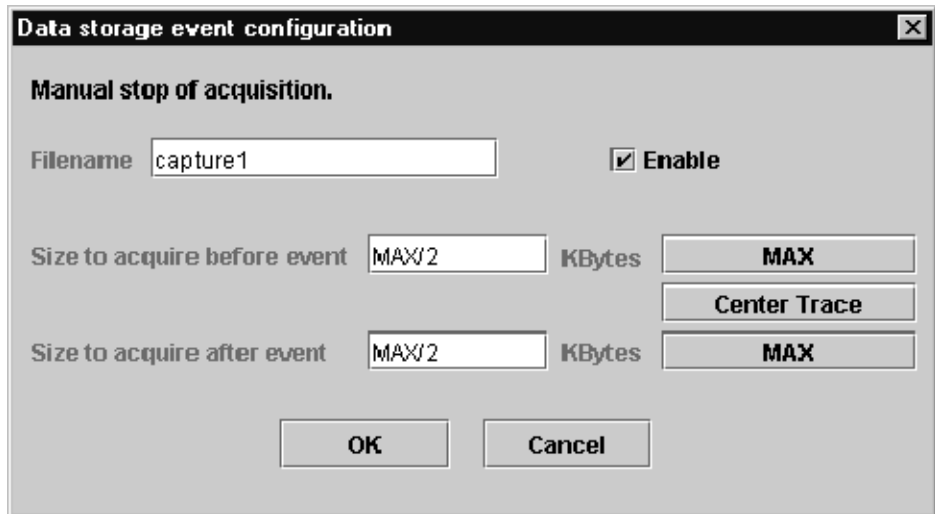
Figure 3-69: Data Storage Event Configuration dialog box

5. In the **Filename** box (see Figure 3-69), enter the name of the file that you want to use when an error event is detected.

   The capture file will be stored in the C:\MTM300\CFG-TRP directory of the MTM300 transport monitor in a subdirectory whose name matches the input number used to perform the capture. For example, if you are capturing an event on I/O port 1A to a file named RTA.trp, the directory path to the file is: C:\MTM300\CFG-TRP\IO#1A\RTA.trp.

6. Click the **Enable** check box to enable the error condition to trigger data capture. A check mark appears when the test is enabled. A disk icon appears in the Enabled column to indicate that the selected error will trigger input data capture (see Figure NO TAG on page NO TAG).

7. Use the **Size to Acquire Before Event** and **Size to Acquire After Event** boxes to set the amount of transport stream data captured before and/or after the capture event. For example, if you set the Before Event value to 1024 and the After Event Value to 2048, the resulting transport stream file will include 1024 KB of data before and 2048 KB of data after you initiate the capture.

8. Click **Center Trace** if you want to save the same amount of data before and after the capture occurs. The size of the file will be the size you set in the Current Input Used Size selection box in the Event Configuration panel in step 3.

9. Click the appropriate **Max** button to save data up to the amount you set in the Current Input Used Size selection box in the Event Configuration panel in step 3, before or after the capture event occurs.

10. Click **OK** after you finish configuring the Data Storage Event Configuration dialog box.

11. Click **Apply** before exiting the TMCC Configuration Client to enable the new Event Configuration settings.

The transport stream data will continue to move through the capture buffer until a transport stream event occurs (one you selected in the Event Configuration panel) that triggers a capture.

The capture point in a captured transport stream file will be based on your capture configuration as set up in the Event Configuration panel of the Configuration Client.

Appendix A: Specifications

The tables in this section list the characteristics of the MTM300 Series MPEG Transport Monitor.

Performance Conditions

The performance characteristics listed in the following tables are typical within the environmental limits if the instrument was adjusted at 25 °C ± 5 °C and you allowed a minimum warm-up time of 20 minutes.

In Tables A-1 through A-5, and Tables A-7 through A-10, the information in the *Description* column provides performance information. These are not considered to be statements of guaranteed performance and are not supported by a performance check.

Electrical, Hardware, and Signal Specifications

Table A-1: Processing Interface Adapter (PIA) board

Characteristic	Description
Frequency offset	
Accuracy, initial	± 1.0 ppm
Drift, typical	± 0.5 ppm per year

Table A-2: ASI mezzanine

Characteristic	Description
ASI input	
Connector	BNC, Female
ASI bit rate	270 Mbps, ± 100 ppm
Transport stream rate	180 Mbps, maximum for one input or an aggregate maximum of 2, 3, or 4 inputs per analysis board
	1 Mbps, minimum
Data format	Accepts both burst and packet mode of ASI format
	Accepts M2S format
Packet length	188, 204 byte

Table A‑2: ASI mezzanine (cont.)

Characteristic	Description
Signal amplitude	880 mV$_{p-p}$ maximum
	200 mV$_{p-p}$ minimum
Termination	75 Ω
Return loss	−17 dB, 27 to 270 MHz
ASI output	Active loop-through of the input on the same channel
Connector	BNC, Female
ASI bit rate	Same as the input
Data format	Same as the input
Signal amplitude	880 mV$_{p-p}$ maximum
	720 mV$_{p-p}$ minimum
Output impedance	75 Ω
Return loss	−17 dB, 27 to 270 MHz

Table A‑3: SSI mezzanine

Characteristic	Description
SSI input (SMPTE310M)	
Connector	BNC, Female
Input bit rate	19,392,658.5 bps , ± 54 bps
	38,785,316.9 bps, ± 108 bps
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

Table A‑3: SSI mezzanine (cont.)

Characteristic	Description
SSI output (SMPTE310M)	Active loop-through of the input on the same channel
Connector	BNC, Female
Output bit rate	Same as the input
Data format	Same as the input
Signal amplitude	880 mV$_{p-p}$ maximum
	720 mV$_{p-p}$ minimum
Signal DC offset	$\pm$ 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 A‑4: Alarm relay board

Characteristic	Description
Relay contact rating	6 A at 15 V
Relay contact resistance	100 milliohms maximum
Relay life expectancy	10,000,000 actuations minimum

Table A-5: Rear panel interface characteristics

Characteristic	Description
Parallel interface port (printer port)	Port supports standard Centronics mode, Enhanced Parallel Port (EPP), or Microsoft high-speed mode (ECP) and uses a 25-pin D-sub connector.
	Compliant with IEEE P1284-C/D2 for bidirectional Parallel Peripheral Interface for Personal Computers (draft) style 1284-C.
	Pin assignments for compatible mode:
	1. STROBE* 14. AUTOLF*
	2. D0 15. ERR*
	3. D1 16. INIT*
	4. D2 17. SELECTIN*
	5. D3 18. STROBE*
	6. D4 19. GND
	7. D5 20. GND
	8. D6 21. GND
	9. D7 22. GND
	10. ACK* 23. GND
	11. BUSY 24. GND
	12. PaperEnd 25. GND
	13. SELECT.
Serial interface port	9-pin male-D-sub connector to support RS232 serial port. Compliant to EIA/TIA 574.
	Pin assignments (RS232):
	1. DCD 6. DSR
	2. RXD 7. RTS
	3. TXD 8. CTS
	4. DTR 9. RI
	5. GND
	Pin Assignments (RS485):
	1. RXD– 6. CTS–
	2. RXD+ 7. RTS+
	3. TXD+ 8. CTS+
	4. TXD– 9. RTS–
	5. GND
SVGA Output Port	15-pin female high density-D-sub SVGA connector. Compliant with EIA RS 343A. Selectable 640 X 480 (VGA), 800 X 600, and 1024 X 768 (SVGA).
	Pin assignments:
	1. Red 9. (key)
	2. Green 10. GND
	3. Blue 11. NC
	4. NC 12. NC
	5. GND 13. HSYNC
	6. AGND 14. VSYNC
	7. AGND 15. NC
	8. AGND

Table A‑5: Rear panel interface characteristics (cont.)

Characteristic	Description
USB Port	Series A USB receptacle. Pin assignments: 1. Vbus 3. +Data 2. –Data 4. GND
Ethernet Port	10 Base-T/100 Base-T on PCI bus, RJ45 Connector, Plug & Play compatible, Bus master mode. RJ45 pin assignments: 1. TX+ 5. NC 2. TX– 6. RX– 3. RX+ 7. NC 4. NC 8. NC
Alarm relay output	25-pin male D-sub connector to support alarm relay out. Pin Assignment, see Table A–6

Table A‑6: Relay closure for alarm relay boards

Alarm relay output slot	Input	ETR 290 priority	Pins
8	1A	1	4 and 17
		2	3 and 15
	1B	1	7 and 20
		2	6 and 18
	2A	1	10 and 23
		2	9 and 21
	2B	1	12 and 25
		2	11 and 24
9	4A	1	4 and 17
		2	3 and 15
	4B	1	7 and 20
		2	6 and 18
	5A	1	10 and 23
		2	9 and 21
	5B	1	12 and 25
		2	11 and 24

Table A-7: Side and front panel interface characteristics

Characteristic	Description
Mouse Port	PS2 compatible mouse port utilizing a mini-DIN connector. Pin assignments: 1. Data 4. +5V. 2. NC 5. Clock 3. GND 6. NC
Keyboard Port	PS2 compatible keyboard port utilizing a mini-DIN connector. Pin assignments: 1. Data 4. +5V. 2. NC 5. Clock 3. GND 6. NC
USB Port	Series A USB receptacle. Pin assignments: 1. Vbus 3. +Data 3. +Data 4. GND
Touch Panel (optional)	Standard 10.4 in touch panel pointing device mounted on the surface of the TFT display, connecting to the Front Panel Interface Board.

System Components

Table A‑8: System components

Characteristic	Description
Mainframe	Tektronix manufactured, common-platform mainframe
Form Factor	Rack-mountable in standard 19-inch rack
Processor	Two 400 MHz Pentium II processors
System Memory	256 MB for MTM 300, 384 MB for MTM 301
Real Time Clock	Real-time clock/calendar with a resolution of 1 second or less
Retention Time: Real-time clock, CMOS setup, and PnP NVRAM	Projected battery life is10 years
BIOS	Phoenix BIOS, Y2K compliant, field upgradable
Bus	32-bit PCI
Expansion Slots	8 PCI slots
Graphics	1024 × 768 SVGA resolution with 32K colors minimum
Non-volatile Storage	
Floppy Disk drive	3.5 inch PC compatible floppy disk drive; 1.44 Mbyte high-density double sided (2HD)
CD-ROM drive	PC compatible half height IDE CDROM drive, 32X
Hard Disk Drives	9 GB Small Computer Systems Interface (SCSI) HDD
Mainframe Interfaces	One loop-through ethernet port
	One bi-directional RS-232/RS-422/RS-485 port
	Two alarm relay out
	One parallel port (printer)
	Two hot-pluggable keyboard ports (one on the rear panel, one on the left front side panel)
	Two hot-pluggable mouse ports (one on the rear panel, one on the left front side panel)

Power Characteristics

Table A-9: AC power source characteristics

Characteristic	Description
Source Voltage	100 VAC to 240 VAC, 47 Hz to 63 Hz, continuous range CAT II
Fuse Rating	10 A Fast / 250 V
Maximum Power Consumption	185 Watts typical
Inrush Surge Current	36 Amps maximum
Power Factor Correction	Yes

Mechanical (Physical) Characteristics

Table A-10: Mechanical characteristics

Characteristic	Description
Classification	Transportable platform intended for either rackmount or bench/lab based applications
Overall Dimensions	
Height	8.9 in (w/o ft) (22.5 cm)
Width	16.75 in (42.5 cm)
Depth	21.5 in (55.0 cm)
Weight	
MTM300 Series mainframe	39 lb (17.7 kg)
Shipping Weight	60 lb (27.2 kg), including pouch
Construction Materials	Chassis parts are constructed of aluminum alloy and aluminized steel; front panel and trim pieces are constructed of plastic; circuit boards are constructed of glass and/or ceramic-glass laminate.

Environmental Characteristics

Table A‑11: 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, non-condensing (derated 1 °C per 1,000 ft above 5,000 ft altitude)
Non-operating	–20 °C to 60 °C, 30 °C/hr max gradient (without disk media installed in disk drives)
Humidity	
Operating	20% to 80% relative humidity, non-condensing. Max wet bulb temperature: 29 °C (derates relative humidity to ~46% at 40 °C)
Non-operating	8% to 80% relative humidity, non-condensing. 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)
Non-Operating	Up to 40,000 ft (12,190 m)

Certification and Compliances

Table A‑12: Electromagnetic Compatibility

Category	Standards or description
EC Declaration of Conformity – EMC	Compliance was demonstrated per EN55103–1/2 Product Family Standard for Audio, Video, Audio-Video, and Entertainment Lighting Control Apparatus for Professional Use (Environment Class E2; rack-mount application), using the following specifications:

Emissions:

EN 55022	Class B[1], Radiated and Conducted Emissions.
IEC61000-3-2	Harmonic Currents, Conducted Emissions, AC Power Port
EN55103-1	Radiated Magnetic Field Emissions, Annex A, rack-mount, Inrush Currents, Conducted Emissions, AC Power Port, Annex B Signal and Control Ports, Conducted Emissions, Annex E

Peak Inrush Currents
MTM300 main unit   36 A peak at 240 VAC/50 HZ, 15 A peak at 100 VAC/50 Hz

Immunity:

IEC 61000-4-2	Electrostatic Discharge Immunity, Performance Criterion "B"
IEC 61000-4-3	RF Electromagnetic Field Immunity, Performance Criterion "A"
IEC 61000-4-4	Electrical Fast Transient/Burst Immunity, Performance Criterion "B"
IEC 61000-4-5	Electrical Slow Transient (Surge) Immunity, Performance Criterion "B"
IEC 61000-4-6	Conducted Radio Frequency Immunity, Performance Criterion "A"
IEC 61000-4-11	Voltage Short Interruption Immunity, AC Power Port, Performance Criterion "C"
IEC 61000-4-11	Voltage Dips Immunity, AC Power Port, Performance Criterion "B" and "C"
EN55103–2	Radiated Magnetic Field Immunity, Annex A, Rack mount, Performance Criterion "A"

Performance Criterion A: The apparatus will continue to operate as intended, in the presence of the disturbing phenomena.

Performance Criterion B: The apparatus will continue to operate as intended after the disturbing phenomena is removed. There will be no change of operating state or stored data.

Performance Criterion C: Normal function of apparatus is automatically restored when the disturbing phenomena is removed or can be restored by operation of the controls. Apparatus may self-reboot.

[1]   **When equipped with Option VK, the external monitor may degrade the system radiated emissions performance to Class A.**

Table A‑12: Electromagnetic Compatibility (cont.)

Category	Standards or description
Australia Declaration of Conformity	EMC Framework, with compliance demonstrated using the following standard: AS/NZS 2064, Australian EMC Emissions Standard for Industrial, Scientific, and, Medical Equipment.
USA, FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits.

Table A‑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	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.	
	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.
	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.
	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.

Table A-13: Environmental Limits and Use Classification for Safety Certification Compliance (cont.)

Category	Standards or description	
European Union Compliance	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union: Low Voltage Directive 73/23/EEC, amended by 93/68/EEC	
	EN 61010-1/A2	Safety Requirements for Electrical Equipment for Measurement Control and Laboratory Use.
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.
Additional Compliance	UL3111-1	Standard for Electrical Measuring and Test Equipment.
	IEC61010-1/A2	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Installation (Overvoltage) Category	Terminals on this product may have different installation (overvoltage) category designations. The installation categories are: CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location. CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected. CAT I Secondary (signal level) or battery operated circuits of electronic equipment.	
Laser Classification	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.	

Appendix B: Cleaning and Maintenance

This appendix describes general care and service procedures for the MTM300 Series MPEG Transport Monitor.

- *Preventative Maintenance* provides cleaning instructions.

- *In Case There is a Problem* provides some hints for troubleshooting startup errors, and it provides the procedure for running the Hardware Diagnostic application that ships with each transport monitor. Service troubleshooting procedures are located in the *MTM300 Series MPEG Transport Monitor Service Manual* (refer to the *Preface* for a list of manuals).

- *Repackaging for Shipment* gives instructions for packing and shipping the program monitor for reshipment.

General Care

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

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

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

Preventive Maintenance

Check the electrical performance and the instrument accuracy certified (calibrated) once a year.

Preventive maintenance mainly consists of periodic cleaning. Periodic cleaning reduces instrument breakdown and increases reliability. You should clean the instrument as needed, based on the operating environment. Dirty conditions may require more frequent cleaning than computer room conditions.

Cleaning the Exterior

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

> ⚠ **CAUTION.** *Avoid getting moisture inside the instrument during external cleaning and use only enough solution to dampen the cloth or swab. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.*
>
> *Do not wash the front-panel On/Standby switch. Cover the switch while cleaning the instrument.*

Cleaning the Compact Disc Drive

The compact disc drive requires routine maintenance to operate at maximum efficiency. The compact discs can be damaged if dirt and dust accumulate on the surface of the discs. Store any discs in their protective containers to keep them from being exposed to dust or dirt.

> ⚠ **CAUTION.** *Electrostatic discharge (ESD) can damage components in the CD ROM drive. Do not touch lens or exposed metallic parts on the platter, with the exception of the center hub.*

Clean the face of the CD–ROM drive monthly with a cloth dampened with deionized water.

> ⚠ **CAUTION.** *Do not allow moisture to enter the disc drive. When power is applied, the internal components may be damaged.*

Cleaning the Keyboard and Mouse

Clean the exterior surfaces of the keyboard and mouse (part of Option VK) with a dry, lint-free cloth or a soft-bristle brush. A swab is useful for cleaning in narrow spaces around the controls and connectors. Do not use abrasive compounds on any part of the instrument.

> ⚠ **CAUTION.** *Avoid getting moisture inside the keyboard and mouse during external cleaning and use only enough solution to dampen the cloth or swab. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.*

**Cleaning the Optional
SVGA Monitor**

Clean the monitor CRT using a soft cloth dampened with deionized water to remove accumulated dust or fingerprints. Refer to the monitor service manual for any additional cleaning procedures and preventative maintenance servicing.

In Case of Problems

This section addresses problems that you may encounter while using the transport monitor. This section does not identify specific problems related to performance verification or adjustments. The diagnostic procedures for the MTM300 Series MPEG Transport Monitor modules provided in this section can help you isolate problems to a specific module. For detailed performance verification, adjustment, or remove and replace procedures, refer to the *MTM300 Series MPEG Transport Monitor Service Manual*, available as an optional accessory.

Power-on Diagnostics

Power-on diagnostics run when you first power on the instrument to start the transport monitor application. These diagnostics check the operating system and hardware for correct operation. If error messages occur during the power-on diagnostics, there may be a system error that prevents the MTM300 Series software modules from starting.

Table B-1 lists some of the symptoms of hardware problems (related to the operating system and peripheral devices) and possible solutions.

Table B-1: Troubleshooting power-on failures

Symptom	Possible causes and recommended actions
Instrument does not power on	Verify that the power cord is connected to the instrument and to the power source.
	Check that the instrument receives power when you press the On/Standby switch; check that fans start.
	Check that power is available at the power source.
	Contact your local Tektronix service center.
Instrument powers on but does not complete the power-on sequence	Check for and remove any disk in the floppy disk drive; make sure instrument boots from the hard disk drive.
Power-on diagnostics fail	Isolate problem to faulty platform or to faulty module (see *Transport Monitor Hardware Diagnostics*).
	Contact your local Tektronix service center.

Table B-1: Troubleshooting power-on failures (cont.)

Symptom	Possible causes and recommended actions
Instrument does not recognize accessories such as monitor, printer, or keyboard	Check that accessories are properly connected or installed.
	Contact your local Tektronix service center.
Instrument will not power off with On/Standby switch	If the transport monitor has a monitor, keyboard, and mouse connected, try powering off the instrument using the Windows NT shutdown procedure. If the instrument still does not power off, use the task manager to close down tasks. Finally, try the hard shutdown procedure; push and hold the On/Standby switch for five seconds to power off the instrument.

Software Problems

Your MTM300 Series MPEG Transport Monitor comes with software already installed. For any suspected software problems, try to isolate the problem to the test system application software or to other installed software.

Many software problems are due to corrupted or missing files. In most cases the easiest way to solve software problems is to reinstall the software and follow the on-screen instructions. See *Appendix D: Software Repair and Installation.*

Appendix D: Software Repair and Installation also has procedures for restoring system settings, device drivers, and the transport monitor operating system.

If you suspect networking problems, see *Network Troubleshooting* beginning on page C-10.

Transport Monitor Hardware Diagnostics

Hardware problems can have several causes. Review the installation instructions in this manual to verify that you have properly installed the instrument. If you are certain that you have installed the instrument correctly, run the Hardware Diagnostics application to identify problems with the individual transport monitor modules.

The MTM300 Series MPEG Transport Monitor ships with a Hardware Diagnostic application that tests several transport monitor hardware components. If you think that you have a problem associated with the one of the following aspects of the transport monitor, use the procedure described in this section to run the Hardware Diagnostic application:

- Analysis board

- I/O board

- I/O connectors

- Alarm relay board

Use the following procedure to run the Hardware Diagnostics application:

⚠ **CAUTION.** *Disconnect the power cord at the rear of the instrument before connecting the loop-through cables.*

1. Power off the transport monitor and disconnect it from the mains power.

2. Cable the inputs and outputs as shown in Figure B--1. Each input must be looped through to the corresponding output.
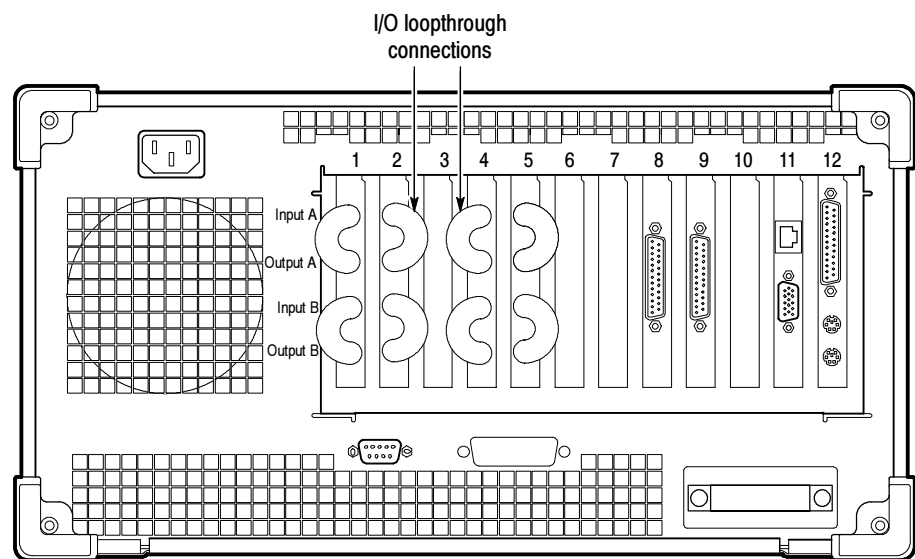
Figure B- 1: Connecting the loopthroughs on the back of the transport monitor

3. Reconnect the power cord at the rear of the transport monitor.

4. Start the transport monitor and log on to Windows NT.

5. Select **Hardware Diagnostic** from the Tektronix MPEG Transport Monitor program group. The PIA+ Diagnostic Self Test application is displayed as shown in Figure B--2 on page B--6.
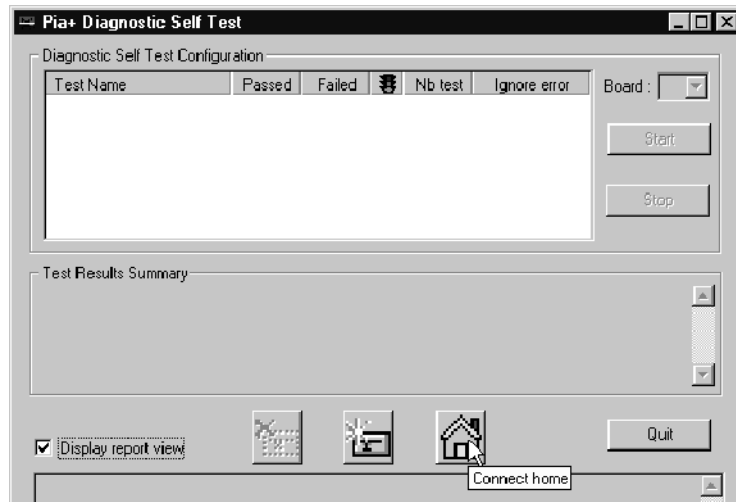
Figure B‑2: Hardware diagnostic tool

6. Click the **Home** button as shown in Figure B‑2.

7. Select the **External Connection** check box. All of the check boxes in the top part of the application window should be selected as shown in Figure B‑3.
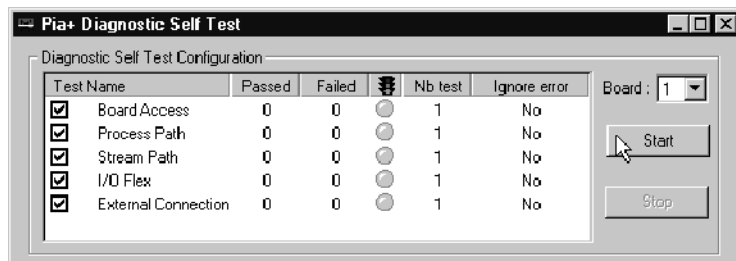
Figure B‑3: Default self test selections

The tests performed during the diagnostic are briefly described in the following list:

■ Board Access. This set of tests verifies the access of the PIA+ board with the PCI bus. It also test the DSP and PIA+ driver.

■ Process Path. This set of tests verifies data transfer between the PC and the DSP. It also tests various aspects of DPRAM and SRAM.

■ Stream Path. This set of tests verifies the presence of data transfer through the memory board.

- I/O Flex. This set of tests verifies that the I/O board is connected to the main board and tests various aspects of data transfer using the I/O flex at multiple rates.

- External Connection. This set of tests verifies data transfer through the external I/O connectors at multiple rates.

8. Configure the number of times each set of tests is performed, whether the self test stops upon encountering an error, and the number of the analysis board to be tested. Set these parameters by left-clicking in the **Nb test** and **Ignore error** columns, and by clicking the selection box as shown in Figure B-4.
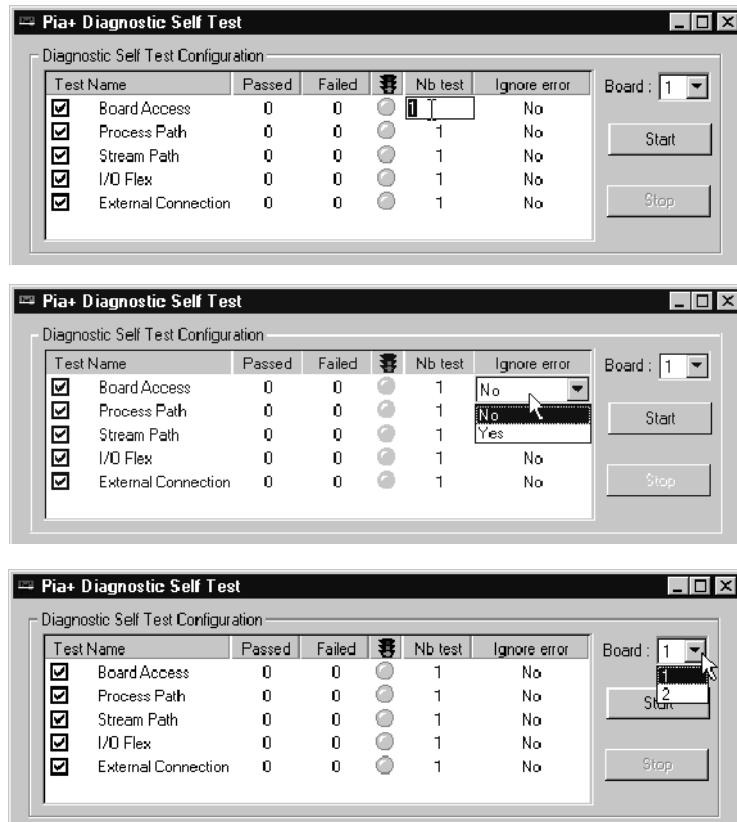
Figure B-4: Changing self test parameters

9. Click **Start** to begin the self test.

10. If you see a message indicating that the Analysis Servers will be stopped, click **OK**.

11. During the course of the self test, the Pia+ Diagnostic Self Test application window updates showing the progress of the tests. See Figure B-5.
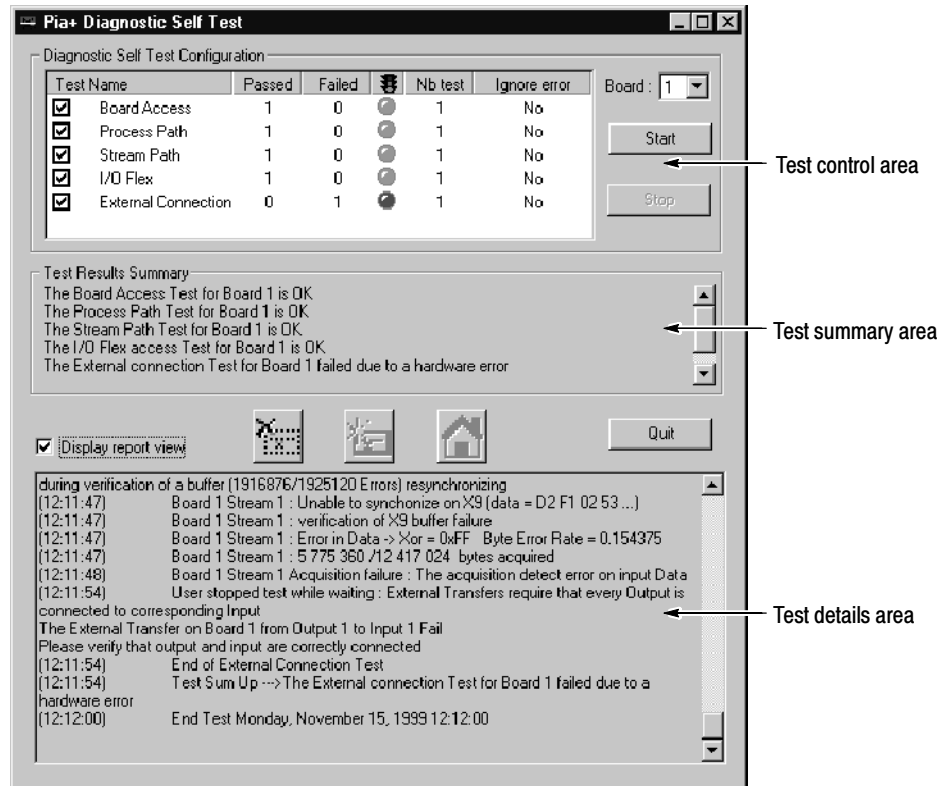
Figure B-5: Self test in progress

■ The test control 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 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 test details area records details about each test as it is being performed.

When the self test is complete, you can save the details of the self test by right-clicking in the test details area, and then selecting Save Report from the shortcut menu as shown in Figure B‑6. You will be prompted for a file name using a standard Save As dialog box.
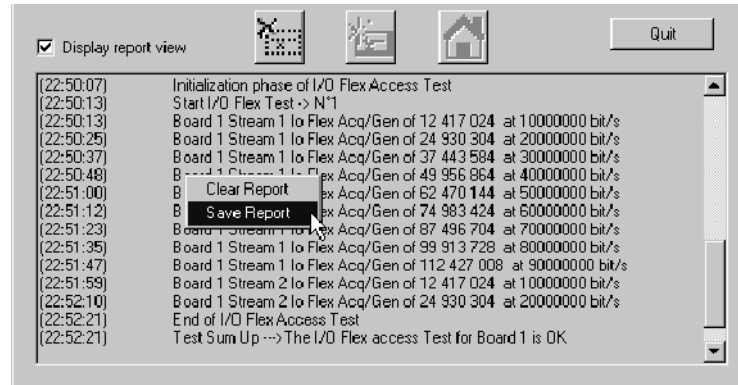
Figure B‑6: Saving test results

12. When the test is completed, click **Quit**. The Analysis Servers will restart.

NOTE. *In order to stop the self test before suite of selected tests is completed, you must click **Stop** before clicking the Quit button. When you click the Quit button, the Analysis Servers are restarted and then the Pia+ Diagnostic Self Test application exits.*

If you encountered any errors while performing these procedures you can find additional information about the transport monitor in the optional *MTM300 Series MPEG Transport Monitor Service Manual.* Alternatively, save your Hardware Diagnostic report as described above, and email the file with a description of your environment and your problem to Tektronix support at the following email address:

tm_app_supp@tek.com

If you cannot resolve your problems using these resources, call your Tektronix representative.

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 B–7 and B–8 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 B‑7. Each packaging component in the illustration has an index number, which corresponds to reference numbers in the packaging procedure.
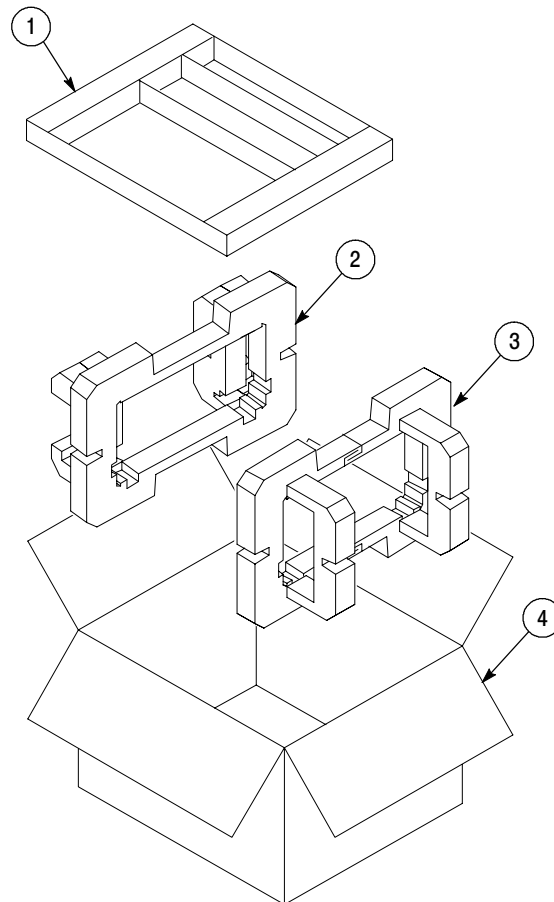
Note: The keyboard, mouse, manual, and their boxes do not need to be returned with the instrument for servicing. A protective bag for the instrument is included in the packaging kit, but is not shown.

Figure B‑7: 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 B-7 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 B-7 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 B-7.

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 B-8, inspect your existing packaging materials to make sure they are complete and in good condition as described in *Packaging Inspection* on page B-10. 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 B-8 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 B-8 will accommodate only the portable version of the instrument cabinet.
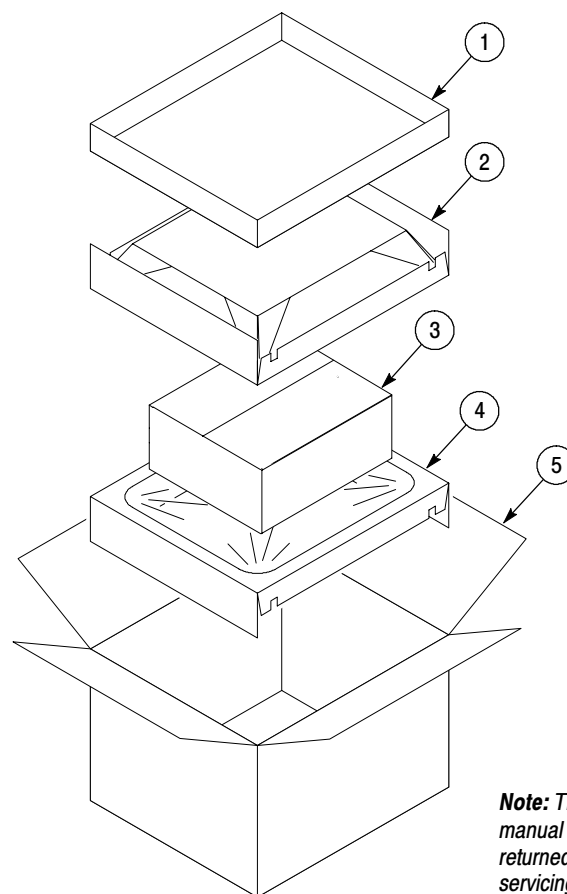
Note: The keyboard, mouse, and manual boxes do not need to be returned with the instrument for servicing.

Figure B-8: 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 B-9.

Bottom spacer pad

Outside edge of box

Spacer pad positioned inside the bottom of the box
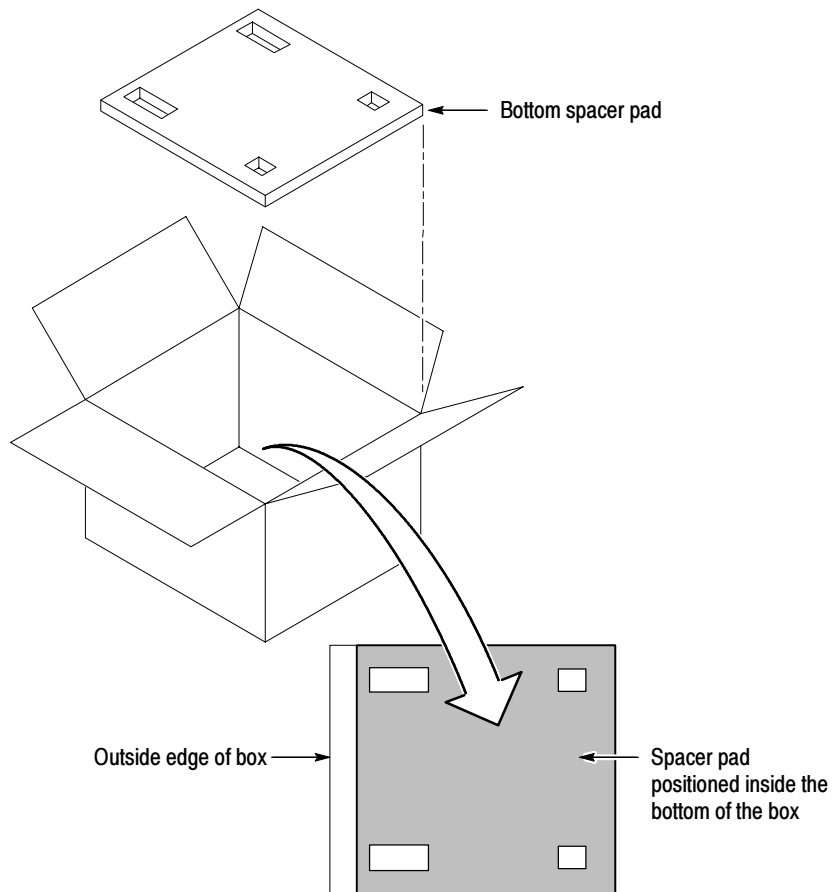
Figure B-9: Placement of bottom spacer pad in inner shipping box

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 B–8.

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.

MTM300 Series MPEG Transport Monitor User Manual

Appendix C: Networking

This appendix provides the following information:

- Network requirements for the MTM300 Series MPEG Transport Monitor and the MTM300 Series Network Management Software

- Network installation procedures for configuring the TCP/IP and SNMP parameters of your MTM300 Series MPEG Transport Monitor

- Network troubleshooting techniques for solving basic networking issues common to many network installations

See *Appendix D: Software Installation and Repair* for procedures on reinstalling the application software.

Network Requirements

The Transmission Control Protocol/Internet Protocol (TCP/IP) protocol stack is pre-loaded on MTM300 Series MPEG Transport Monitors. The open nature of TCP/IP allows you to create networks using various protocols and signaling techniques. This section lists the physical and network requirements for using transport monitors over a network.

Physical Requirements   The following list describes the physical requirements for networking transport monitors:

- Ethernet network or subnetwork to the transport monitor

- 10Base-T / 100Base-T network drop to your local transport monitor

- Network interface card (NIC) and driver

NOTE. *The Intel EtherExpress Pro/100B Adapter NIC and E100BT.sys adapter driver are pre-loaded on all transport monitors; this combination of NIC and adapter driver is the only one supported by the transport monitor.*

Network management stations do not have requirements beyond basic connectivity between two points; the network adapter at a network management station can be of any type that allows it to communicate over a TCP/IP network. The routers installed in the network convert data to the appropriate format for the protocols used in your network.

**Minimum Network
Requirements**

To use the transport monitor over a network, you must install it in a TCP/IP network. TCP/IP networks have specific addressing and routing requirements that your network administrator will typically have already configured. Use this section as a checklist for the TCP/IP parameters that your network administrator assigns to your transport monitor host machine.

- Unique IP address

- Unique host name

- Subnet mask (if you are installing the transport monitor in a network with multiple subnets)

- Default gateway IP address (if your environment uses multiple networks or subnets)

- DNS server IP address(es) (if you use the DNS service to resolve Internet addresses; some networks use multiple DNS servers)

- WINS server IP address(es) (if your system uses WINS to resolve computer names to IP addresses; some networks use multiple WINS servers)

NOTE. In order to use transport monitors over a network, your network administrator needs to assign your host machine an IP address: you cannot use the transport monitor with Dynamic Host Configuration Protocol (DHCP).

Network Installation

This section describes how to set the parameters listed in *Minimum Network Requirements*, and how to configure transport monitors to be managed in an SNMP-based network management environment. The information in this section will not replace the value added by networking professionals and describes only basic network installation procedures.

Setting TCP/IP Parameters

Each network uses specific values for such parameters as IP addresses and default gateways, so the parameter values used in the examples for this section are for illustrative purposes only unless otherwise specified. You can configure transport monitors as stand-alone instruments which need only minimal network parameters set, or you can configure them to be installed into a LAN or WAN (local or wide area network, respectively).

Display the Microsoft TCP/IP Properties dialog box.

1. Click the **Start** button on the taskbar, point to **Settings** and then **Control Panel**. (Alternatively, right-click the **Network Neighborhood** icon and select **Properties** from the shortcut menu. Skip to step 3.)

2. Double-click the **Network** icon.

3. Select the **Protocols** tab from the Network dialog box as shown in Figure C-1.
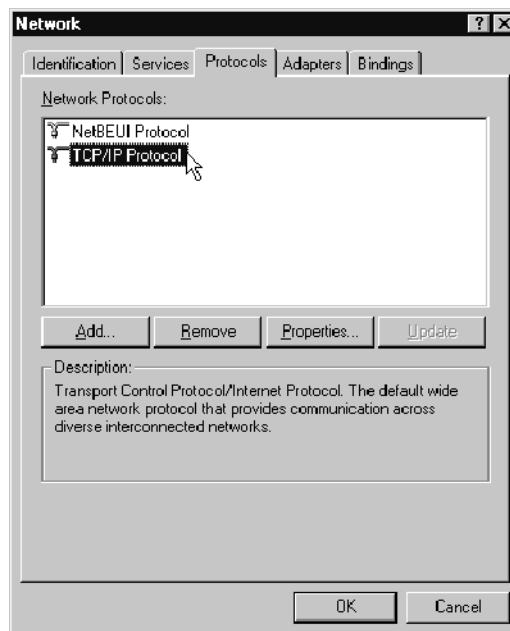
Figure C-1: Network dialog box showing TCP/IP Protocol item

4. Highlight **TCP/IP Protocol** from the Network Protocol selection box, and then click **Properties**.

The TCP/IP Properties dialog box is displayed showing the IP Address tab. See Figure C-2 on page C-4.

Set IP Address tab parameters.

5. Set the following IP Address tab parameters as shown in Figure C–2 and described below:

   a. Select the Intel EtherExpress Pro Adapter (it should be the only option available for transport monitors).

   b. Select **Specify an IP Address**.

   c. Enter the IP address for your transport monitor. If not already specified, obtain the IP address from your network administrator. IP addresses must be unique.

   d. If necessary, enter the subnet mask value and default gateway, both of which, you obtain from your network administrator.
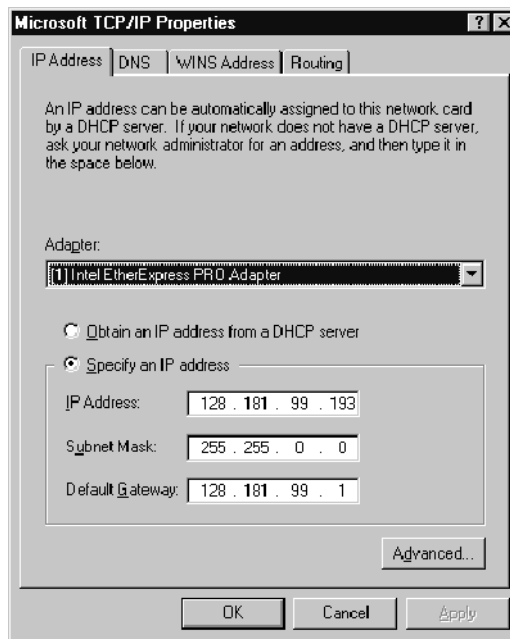
Figure C‑2: IP tab parameters

Incorrect values for any one of these parameters can make your transport monitor behave unpredictably over a network. See *IP Parameters* beginning on page C–11 for more information about these values.

6. Click Apply, and then click the DNS tab.

Set DNS tab parameters.

7. Set the following DNS values as indicated in Figure C–3:

NOTE. Do not set DNS parameters unless your network uses the DNS service. Setting these parameters when your network does not use this service will make your host machine run very slowly when trying to resolve network addresses.

---

    a. Enter your host machine name provided by your network administrator into the Host name text box. Host/domain name pairs must be unique.

    b. Enter the name of the domain of which your transport monitor is a member in the Domain text box as directed by your network administrator.

    c. Click **Add** in the DNS Service Search Order group, and then enter the IP address of the Domain Name System server in the TCP/IP DNS Server dialog box.

    d. Click **Add** to accept your changes and dismiss the TCP/IP DNS Server dialog box.
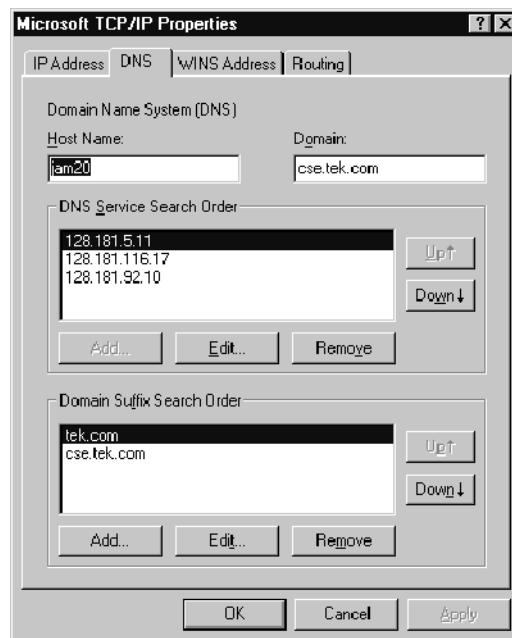
Figure C‑3: DNS tab parameters

It should not be necessary to configure the parameters on the WINS Address or the Routing tabs.

8. Click **OK** when you are finished configuring the IP Address and DNS tab parameters and are certain that all of the values correct.

9. Restart your transport monitor or network management station for the TCP/IP changes to take effect.

SNMP Network Management

SNMP is a communication protocol built on the top of UDP/IP. It implements a set of commands consisting of operations and variables. Equipment or applications (such as the MTM300 Series transport monitor) that support SNMP present a set of variables that you can modify or consult as well as a set of notifications. All of these parameters are grouped into a Management Information Base (MIB).

MIBs are specifications containing definitions of management information so that network systems can be remotely monitored, configured, and controlled.

Accessing the MIB files. To remotely control the MTM300 Series modules using any SNMP MIB browser, you load the RTA MIB files. Two files are located in the following directory (you need to load only one of them):

C:\Mib\

The two MIB text files found in this directory, RTAv1.mib and RTAv2.mib, are for managing your transport monitors in SNMP version 1 and SNMP version 2 environments respectively.

The operations in SNMP are limited to retrieving the value of management information, modifying the value of management information, and reporting an event.

Retrieval. The most common type of retrieval operation requires that the identities are those that exactly match the identity of returned variables. This retrieval operation is called GET.

For instance, from a DOS prompt window you can run the following command to check that the Analysis Server is running on the first input:

getone –v2c <machineName> rta0 rtaStartStop.0

Where <machineName> is the network name of the transport monitor for which you are trying to determine the Analysis Server status.

Modification. There is one modification operation, which is called SET. The operand for SET is a list of pairs. Each pair consists of the identity of a variable and its desired value. Use this operation to configure and control a managed system.

For instance, from a DOS prompt window you can run the following command (all on one line) to stop analysis on the first input of a named transport monitor:

    setany −v2c <machineName> rta0 rtaStartStop.0
     -i stop

Where <machineName> is the network name of the transport monitor for which you are trying to start the Analysis Server.

To restart the Analysis Server, use the same syntax, but change the -i switch parameter to start.

    setany −v2c <machineName> rta0 rtaStartStop.0
     -i start

Event Reporting. The SNMP event reporting operation is called TRAP. It specifies an event and a list of pairs. A *pair* consists of the identity of a variable and its value or values. This operation reports the occurrence of events on a managed system to a list of managers configured to receive events. To send traps to a specific monitoring station, perform the following steps:

NOTE. A monitoring station can be any host machine on the network running a Server Manager. Usually, the host machine will be the network management station, but you can also send traps to Server Managers running on other transport monitors.

---

1. Start the transport monitor and log on to Windows NT.

2. Select **Router** from the Tektronix program group. The Router application is displayed.

3. Click the **Home** button in the Router application window to display the list of host machines receiving traps generated by the local Analysis Servers. See Figure C-4 on page C-8.
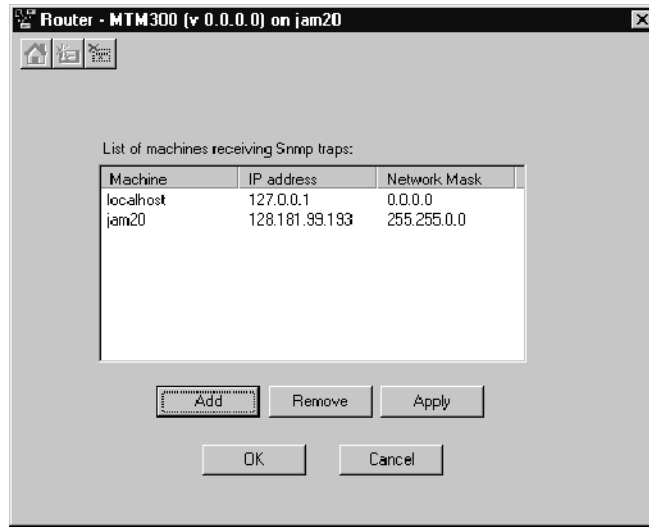
Figure C-4: Router application window

4. Click the **Add**. The SNMP Traps to Target dialog box is displayed.

5. Enter the computer name of the network management station in the Computer Name text box.

You can get this name from your network administrator, or you can get it from the Network dialog box on the network management station itself. Right-click the **Network Neighborhood** icon on the Windows NT desktop and select **Properties** from the shortcut menu to display the Network dialog box.

6. After you have entered the name of the network management station to which you will send traps, click in the **IP Address** text box. If the computer name is recognized, the IP address and subnet mask are automatically completed for you as shown in Figure C-5.
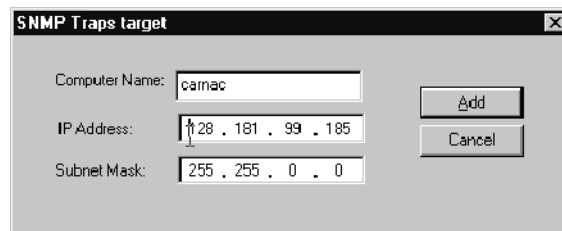
Figure C-5: IP parameters for network management station

If the name is not recognized, enter the IP address manually. If the subnet mask does not update, see your network administrator, or see *Network Troubleshooting* beginning on page C-10.

7. Click **Add** when you are finished.

When you return to the Router application the IP parameters for the network management station are displayed in the List of machines receiving traps selection box as shown in Figure C-6.
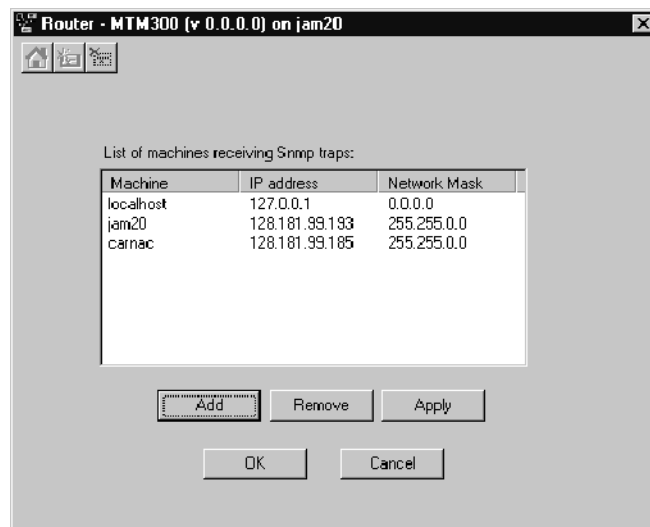
Figure C-6: Management station added

8. Click **OK** to accept your changes and close the Router application window.

The Server Manager and the Analysis Servers are automatically stopped and restarted, and then the Router application closes. These settings will remain in effect until you change them.

NOTE. *The event reporting (TRAP) operation can be very CPU-intensive. To disable the TRAP operation, repeat the steps above, and remove the management station from the list of machines receiving traps.*

Network Troubleshooting

Networks are based on standards; however, there are many unique characteristics of each network (LAN or WAN) that make it difficult to troubleshoot without a thorough knowledge of the specific network. Consequently, in-depth network troubleshooting should be performed by an expert who knows your network characteristics.

This section provides some basic procedures that can eliminate some of the more common sources of network errors. The information in this section is organized as indicated in the following list:

- *Basic Assumptions*

- *IP Parameters*

- *Common Troubleshooting Procedures*

- *Troubleshooting Transport Monitors*

- *Troubleshooting Remote Monitoring Desktops*

- *Troubleshooting Network Management Stations*

- *Sources of Information*

If you cannot resolve problems using the procedures described in this section, see your network administrator.

Basic Requirements   Fulfill the following requirements before troubleshooting your host machines:

- Your MTM300 Series Network Management Software is loaded on a host machine that fulfills the minimum requirements listed in *Minimum Software Installation Requirements* on page D--27.

- Your remote monitoring clients are loaded on a host machine that fulfills the minimum requirements listed in *Minimum Software Installation Requirements* on page D--27.

- Your network is a TCP/IP network (or minimally UDP/IP for SNMP environments).

- Your host machine has a static IP address and does not use DHCP (Dynamic Host Configuration Protocol).

- Additional applications loaded on your network management station are not using the ports assigned to the network management software.

IP Parameters   The illustrations in this section depict how each IP parameter (IP address, subnet mask, and default gateway) can negatively impact network connectivity.

Incorrect IP address. If the IP address for your transport monitor is incorrect (not unique), then you may, or may not be able to communicate over the network. In Figure C-7, TVTest_1 uses the same IP address as Rennes. If Rennes is started first, TVTest_1 will recognize the IP address conflict and will not load TCP/IP; consequently, the transport monitor will not be reachable over the network.

If your IP address is incorrect, and the IP address does not exist on your subnet, you may be able to communicate from the device (transport monitor or monitoring station), but you may not be able to communicate with the device.
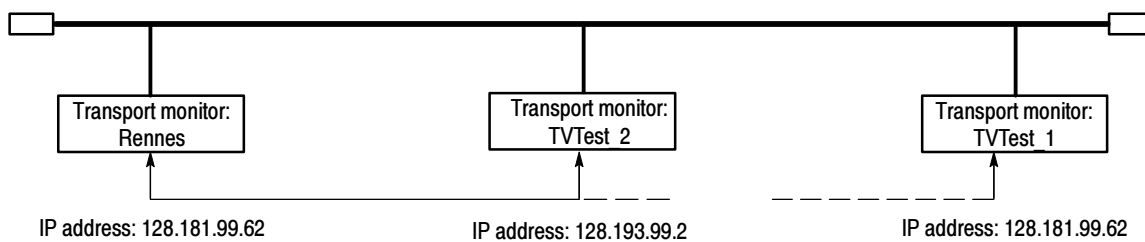
Figure C-7: Incorrect IP address

Incorrect subnet mask. Subnets and subnetting networks is complex and requires a thorough understanding of IP addressing. Call your network administrator if you think your networking problem involves subnets. Figure C-8 shows a simple (and fairly common) subnet mask problem.

In Figure C-8, the subnet mask for TVTest_1 indicates that the network address is contained in the first two bytes of the IP address. In dotted decimal notation, the network address is 128.181. This information allows the device to communicate with any other device with the same network address without being routed through a default gateway.

IP address: 128.181.96.201
Subnet mask: 255.255.255.0

Router

Transport monitor:
Carnac

Transport monitor:
Rennes

Transport monitor:
TVTest_2

Transport monitor:
TVTest_1

IP address: 128.181.99.82
Subnet mask: 255.255.255.0

IP address: 128.181.99.72
Subnet mask: 255.255.255.0

IP address: 128.181.99.62
Subnet mask: 255.255.0.0
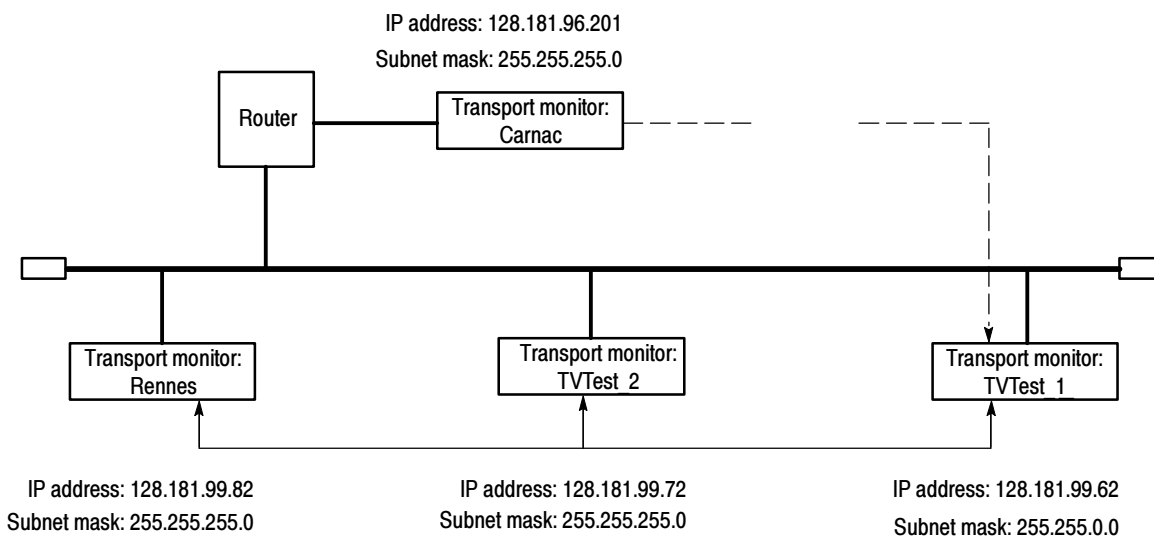
Figure C-8: Incorrect subnet mask

TVTest_1 can communicate with TVTest_2 and Rennes because these three devices share a medium, so messages from TVTest_1 do not need to be routed. TVTest_1 is therefore able to find the correct addresses for TVTest_2 and Rennes in spite of having an incorrect subnet mask.

TVTest_1 cannot communicate with Carnac, because, according to the subnet mask on TVTest_1, Carnac and TVTest_1 are logically on the same network. Consequently, messages sent from TVTest_1 to Carnac are never routed. Because these two devices do not share a medium, TVTest_1 will never find the correct address for the network card on Carnac and will not be able to reach Carnac.

Incorrect default gateway IP address. The default gateway you have specified in the TCP/IP Properties dialog box is the device that "knows about" your subnetwork and others on your network. When you send messages (for instance traps from your transport monitor) to a device on another subnet, the default gateway is able to route the message to the appropriate subnet. If the IP address specified in the TCP/IP Properties dialog box is incorrect, messages to devices on other subnets will not reach their destination (because they never made it to the default gateway).

IP address: 128.181.96.201
Subnet mask: 255.255.255.0
Default gateway: 128.181.96.1

Transport monitor:
Carnac

IP address: 128.181.96.1

Gateway
(router)

WAN

Gateway
(router)

IP address: 128.181.99.1

Transport monitor:
Rennes

Transport monitor:
TVTest_2

Transport monitor:
TVTest_1_

IP address: 128.181.99.82
Subnet mask: 255.255.255.0
Default gateway: 128.181.99.1

IP address: 128.181.99.72
Subnet mask: 255.255.255.0
Default gateway: 128.181.99.1

IP address: 128.181.99.62
Subnet mask: 255.255.255.0
Default gateway: 128.181.99.10

Figure C‑9: Incorrect default gateway IP address

Common Troubleshooting Procedures

Many of the procedures performed in the following sections are common tasks. Use these procedures when called for in the following sections.

Stopping and restarting the Analysis Servers. Usually the Analysis Servers for all of your inputs start automatically when the transport monitor starts. However, sometimes what may at first seem to be a network problem can be cleared simply by stopping and restarting one or more Analysis Servers.

Use the following procedure to perform this task from the desktop:
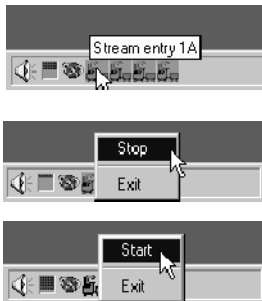
1. Place your cursor over the Analysis Server icons in the system tray to display the Tool Tip indicating the input each Analysis Server is monitoring.

2. Right-click the Analysis Server you want to stop, and then select **Stop** from the shortcut menu.

3. Wait for the icon to lose the green highlighting, and then repeat step 2, selecting **Start** from the shortcut menu.

   The green highlighting will reappear, indicating that the Analysis Server is started on the indicated input.

You can also stop and restart the MPEG Analysis Service from the Services dialog box. This technique stops and restarts the Server Manager and all Analysis Servers without restarting the transport monitor:

1. From the Start menu, point to **Settings**, and then select **Control Panel**.

2. Double-click the **Services** icon.

3. In the Services dialog box scroll down the list of services, and then highlight **MPEG Analysis Service**.

4. Click **Stop**, and then wait for the Server Manager and Analysis Server icons to disappear from the system tray (at the lower right-hand corner of the desktop).

5. Click **Start** to restart both the Server Manager and Analysis Server processes. The Server Manager icon and the Analysis Server icons for all of your inputs will reappear in the system tray.

Finally, you can restart your transport monitor, which will automatically restart the Server Manager and Analysis Server processes.

Pinging a host machine. One of the utilities provided with all TCP/IP installations is Ping.exe. (Look in the C:\winnt\system32\ directory.) This utility allows you to send communication packets to and record the response from an indicated host machine. This, in essence, determines whether or not your packets arrived at the destination. To run ping, use the following procedure:

1. Select Run from the Start menu. The Run dialog box appears.

2. Type one of the following into the Run text box:
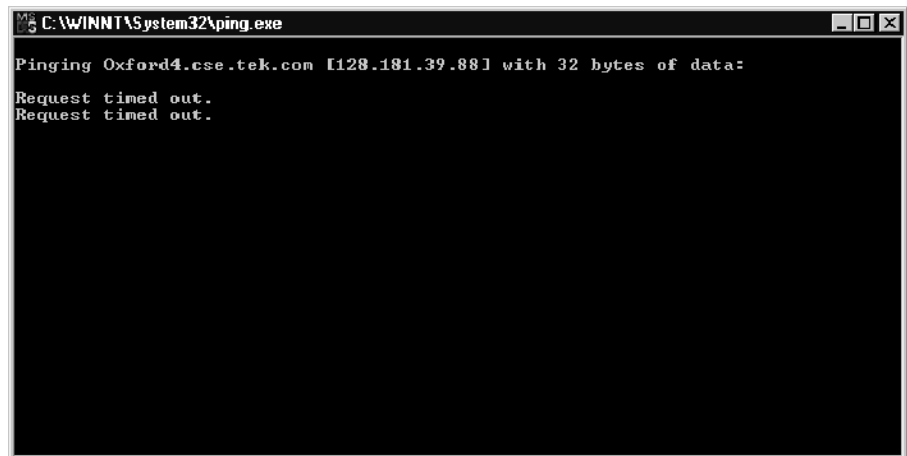
   ping machineName

   ping IPaddress

   In the examples, machineName and IPaddress represent the host machine name and IP address, respectively, of the networked device you are trying to ping.

3. Click OK.

   A DOS window appears indicating whether or not the destination is responding to the ping. In Figure C-10 the destination machine (Oxford4) is not responding.

Figure C-10: Ping.exe command window

Ping only runs briefly, and the DOS window closes when the process is complete.

Tracing the route of TCP/IP packets. Sometimes it is helpful to know how far your packets made it on the way to a destination machine and which devices the packets pass through on the way. The utility that provides this functionality is tracert.exe. Tracert can also indicate a congested point in the network. To run tracert, use the following procedure:

1. Select Run from the Start menu. The Run dialog box appears.

2. Type one of the following into the Run text box:

    tracert machineName

    tracert IPaddress

    In the examples, machineName and IPaddress represent the host machine name and IP address, respectively, of the networked device you are trying to reach.

3. Click OK.

    A DOS window appears (see Figure C–11) indicating the progress of your packets. The far right column indicates the IP address of the nodes on the network that successfully pass your tracert packets. This information indicates the last good node on the path to the destination device.
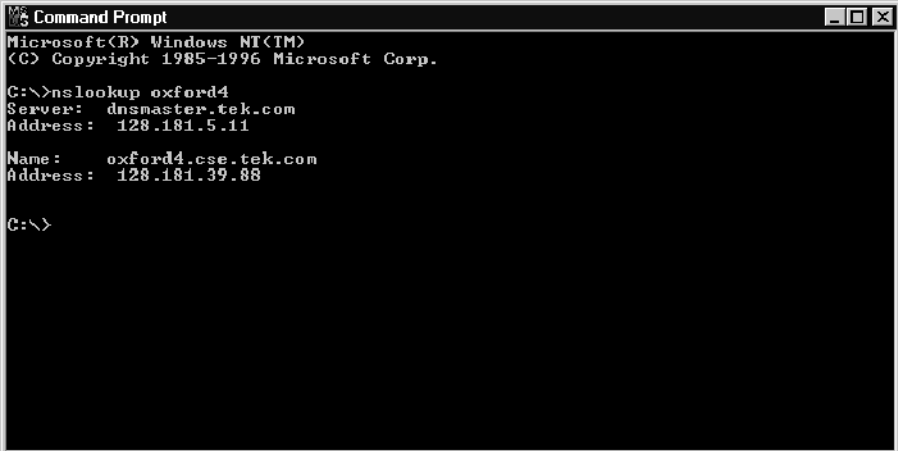

```
C:\WINNT\System32\tracert.exe                                    _ □ ×

Tracing route to ibm.com [204.146.80.99]
over a maximum of 30 hops:

  1    <10 ms    <10 ms    <10 ms   rs39aU106.ens.tek.com [128.181.240.2]
  2    <10 ms    <10 ms    <10 ms   r19a.ens.tek.com [128.181.1.2]
  3    <10 ms    <10 ms    <10 ms   r63a.ens.tek.com [192.65.3.6]
  4    <10 ms    <10 ms    <10 ms   rs63a.ens.tek.com [134.62.1.3]
  5      *         *         *      Request timed out.
  6      *         *         *      Request timed out.
  7      *         *         *      Request timed out.
  8      *         *         *      Request timed out.
  9      *         *         *      Request timed out.
 10      *         *         *      Request timed out.
 11      *         *         *      Request timed out.
 12      *         *         *      Request timed out.
 13      *         *         *      Request timed out.
 14      *         *         *      Request timed out.
 15     94 ms     93 ms      *      204.146.80.99
 16      *         *        78 ms   _
```

Figure C-11: Tracert.exe command window

Finding IP addresses for devices on your network. At times, you may need to find or confirm the IP address of a computer on your network (or, conversely, the network name if all you have is an IP address). You may want to find this information to ensure that IP addresses and network names you use in the Hosts file are correct. The utility that will display this information is nslookup.exe. Use nslookup as described below:

1. Point to the Start button and then select **MSDOS**. The command line interface appears.

2. Enter one of the the following and press **Enter**, where machineName or IP address is the network name or IP address, respectively, of the device you are trying to lookup.

   - nslookup machineName

   - nslookup IP address

   The network name and IP address of the device you are trying to lookup is displayed. If your network uses DNS, the IP address and network name of the DNS server is also displayed. See Figure C-12.

Figure C-12: Command prompt with nslookup results

**Troubleshooting
Transport Monitors**

Each potential problem in this section begins with a problem statement, one or more possible reasons for problem, and one or more potential solutions for each reason. If the solutions do not solve the problems you are experiencing, call your network administrator.

Problem. *When I connect to the Master client on my local transport monitor and open the Workspace dialog box, I do not see any inputs.*

Reason. The local machine name and IP address is not included as one of the machines receiving traps.

Solution. The localhost machine name and IP address (127.0.0.1) are already configured to receive traps. Ping localhost using the procedure described in *Pinging a host machine* on page C–15. If you are unable to ping localhost, reinstall the Microsoft TCP/IP software. See your network administrator.

If you can ping localhost, check to ensure that localhost is one of the names in the List of Machines receiving traps in the Router application window. See *Sending Traps to the Local Server Manager* on page 1–28.

If you can ping localhost, and localhost shows in the Router application, add the network name of your transport monitor to the list of machines receiving traps using the procedure described on page 1–28. You can get the network name of your transport monitor by displaying the Network dialog box using the following technique:

Right-click the **Network Neighborhood** icon and select **Properties** from the shortcut menu. The network name for your transport monitor is displayed in the Computer name text box as shown in Figure C–13.
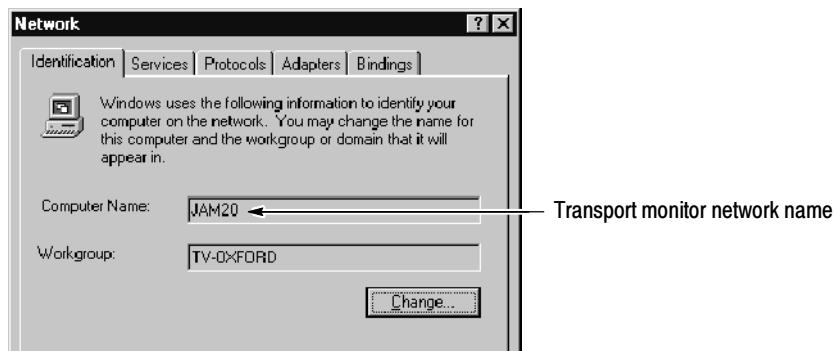
Figure C-13: Network name

If, after adding your transport monitor network name, you still cannot ping your transport monitor using that name, your network adapter card may need to be replaced. See the procedure described in *Reason 4* on page C–21.

Problem. *I am monitoring inputs from my Master client, but it seems to be running very slowly.*

Reason 1. The transport monitor is not connected to the network.

Solution. If you can ping the local machine, but cannot ping any other device on the network, check the physical network connections to ensure that your network cable is not loose. Check at both the network interface card in your device (the LAN connector) and the network drop.

Reason 2. You have specified a DNS server when your network does not use the Domain Name System to resolve host names and IP addresses. Check with your network administrator to determine whether your network uses a DNS server.

Solution. Check your TCP/IP DNS tab entries (see *Setting TCP/IP Parameters* beginning on page C–2) and make sure you haven't specified a domain name server IP address. If you have, remove the entry or entries on this panel.

Reason 3. The Host file (C:\winnt\system32\drivers\etc\Hosts) on the transport monitor is incorrectly configured. You use the Hosts file to resolve network host names and IP addresses if your network does not use the DNS.

Solution. Check your Hosts file for the potential problems indicated in the following list:

■ Ensure that the network computer name of your transport monitor is associated with the IP address of your transport monitor.

■ Check the spelling of the host name and IP address. The Hosts file is case sensitive, so double-check the capitalization of the host names.

■ Pound sign symbols (#) "comment out" everything else that follows the symbol on that line. Make sure that this symbol does not precede any information on a line that you want parsed when the file is used to resolve host machine names.

Reason 4. If your network uses a DNS server, the server may be down or poorly configured.

Solution. Ping the DNS server IP address using the procedure described in *Pinging a host machine* on page C–15. If you do not get a response from the DNS server, the server may be down. Call your network administrator.

You can avoid using a DNS server by modifying the Hosts file as described in *Configuring a Transport Monitor for use in a Small Network* on page 1–32, and entering the IP address and transport monitor network name. When the transport monitor tries to resolve host names and IP addresses, the Hosts file is parsed first. If a relevant entry is found in the Hosts file, the DNS server is not used.

Troubleshooting Remote Monitoring Desktops

Each potential problem in this section begins with a problem statement, one or more possible reasons for problem, and one or more potential solutions for each reason. If the solutions do not solve the problems you are experiencing, call your network administrator.

Problem. *I cannot connect to a transport monitor or a network management station.*

Reason 1. The remote monitoring desktop is not connected to the network.

Solution. If you can ping the local machine, but cannot ping any other device on the network, check the physical network connections to ensure that your network cable is not loose. Check at both the network interface card in your device (the LAN connector) and the network drop.

Reason 2. The transport monitor or the network management station may not be operating, or it may be disconnected from the network.

Solution. Ping the host machine to which you are trying to connect using the procedure described in *Pinging a host machine* on page C-15. If the ping response is *Request timed out*, double-check that the transport monitor or network management station is operating and that the network cable to the device is connected.

Reason 3. If the ping response from above (the solution to Reason 1) is *Bad IP address* followed by the name of the host you were trying to reach, the DNS server may be down or poorly configured.

Solution. Ping the DNS server (you can find the IP address for your DNS server on the DNS tab of the TCP/IP Properties dialog box):

■   If you can reach the DNS server, use nslookup (see *Finding IP addresses for devices on your network* on page C-17) to check the DNS server entry for the host you are trying to reach.

Using the information from above, check your Hosts file and ensure that the IP address/network name combination is correct if it has been used in the Hosts file. If the entry is already correct, call your network administrator.

■   If the ping response is *Request timed out*, double-check the IP address for your DNS server in the TCP/IP Properties dialog box. If the IP address for the DNS server is correct, the DNS server may be down or disconnected from the network Call your network administrator.

Reason 4. If the ping response from above (the solution for Reason 2) is *Host unreachable*, you may have a bad network adapter card.

Solution. Perform the following procedure, which tests your network adapter card:

1. From the Windows NT Control Panel, double-click **Network**.

2. Select the **Adapters** tab in the Network dialog box, highlight the network adapter card indicated in the list box, and then click **Properties**. See Figure C‑14.
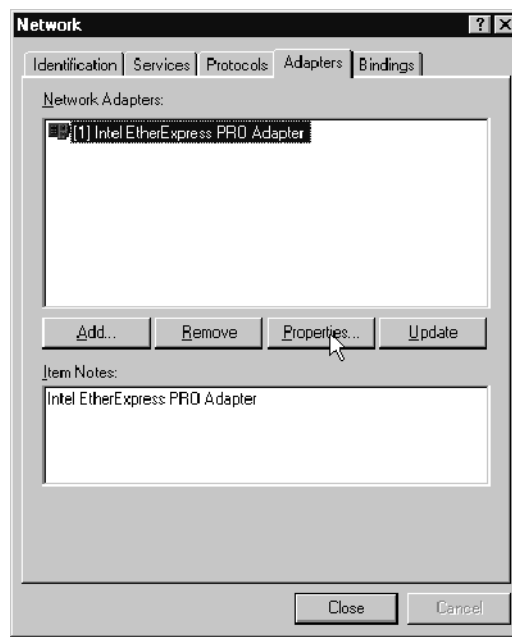
Figure C‑14: Network dialog box, Adapters tab

3. Click **OK** at the message indicating that the properties for the active adapter will be displayed.

4. A dialog box for your adapter card will be displayed as shown in Figure C‑15 on page C‑22. Click **Test**.
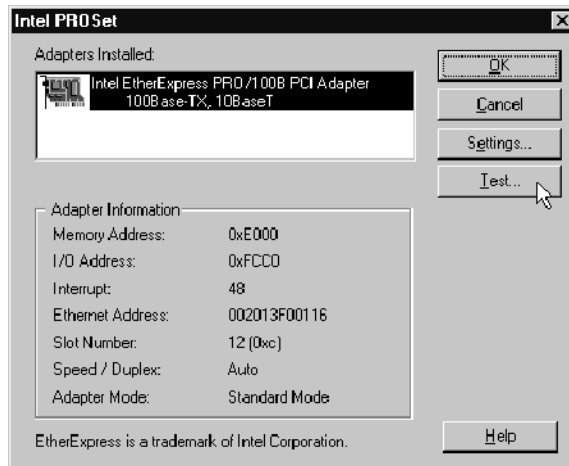
Figure C-15: Adapter card dialog box

A status bar in the Monitoring Drive Activity dialog box indicates the progress of the adapter test. Upon completion, the dialog box will look similar to Figure C-16. If the test indicates any errors, replace your network adapter card.
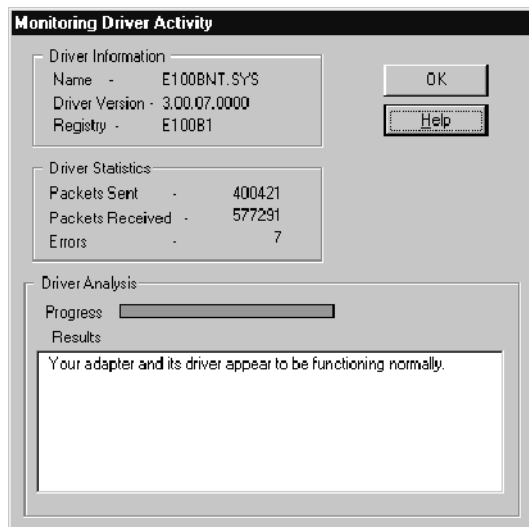
Figure C-16: Adapter card test complete

Reason 5. If the ping response from Reason 2 is *Host unreachable*, and if your network adapter card is okay, the default gateway for your remote monitoring desktop may be down.

Solution. Ping the the IP address of the default gateway. This address is on the IP Address tab of the TCP/IP Properties dialog box.

- If you can reach your default gateway, trace the packets sent to the DNS server using the procedure described in *Tracing the route of TCP/IP packets* on page C--16. Use the IP address of the first DNS server listed on DNS tab of the TCP/IP Properties dialog box. Note the last good node in the network to your DNS server and call your network administrator.

- If you cannot reach your default gateway, the default gateway may be down or you may need to double-check your subnet mask. See *Incorrect subnet mask* on page C--12 for one possible subnet mask solution, or call your network administrator.

Reason 6. The transport monitor or network management station to which you are trying to connect may be behind a firewall.

Solution. Ping the the IP address of the of the host machine (transport monitor or network management station). If you can reach the host machine, but still cannot connect to the Server Manager running on the remote host machine, call your network administrator and make sure that your local host machine is included within the firewall of the remote host machine(s).

Troubleshooting Network Management Stations

Each potential problem in this section begins with a problem statement, one or more possible reasons for problem, and one or more potential solutions for each reason. If the solutions do not solve the problems you are experiencing, call your network administrator.

Problem. *I am not receiving traps from the transport monitors that are supposed to be sending me traps.*

Reason 1. The network management station is not connected to the network.

Solution. If you can ping the local machine, but cannot ping any other device on the network, check the physical network connections to ensure that your network cable is not loose. Check at both the network interface card in your device (the LAN connector) and the network drop.

Reason 2. The Server Manager on the network management station was started (or restarted) after the Server Manager(s) on remote machines started sending traps to the network management station.

Solution. Stop and restart the Server Manager and Analysis Servers on the remote machine(s) using the procedure described in *Stopping and Restarting Analysis Servers and the Server Manager* on page 3-37.

Reason 3. The TCP/IP parameters on the remote transport monitor are incorrect.

Solution. Ping the remote transport monitor from the network management station using the procedure described in *Pinging a host machine* on page C-15. If you cannot reach the transport monitor, follow the procedure in *Setting TCP/IP Parameters* beginning on page C-2 to ensure that the TCP/IP parameters on the transport monitor are correct.

Reason 4. The IP address of the network management station specified using the Router application on the remote transport monitor is incorrect.

Solution. Start the Router application locally and use the following procedure to check and modify the IP address of the network management station on the remote transport monitor that is not sending the network management station traps:

1. Click the **Connect** button.

2. Enter the name of the transport monitor to which you want to connect in the Server name text box (or pick a name from the list) as shown in Figure C-17 on page C-25.
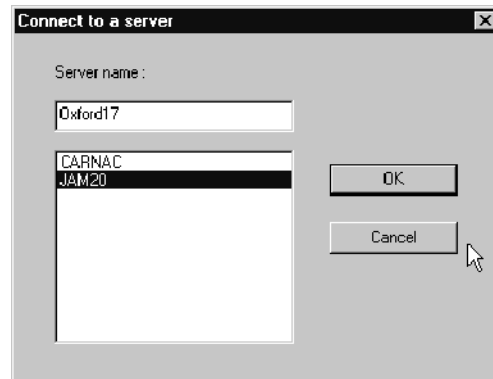
Figure C-17: Connecting to a remote Server Manager with the Router

Once you are connected to the remote Router application, You will see the names and IP addresses of the MTM300 Series devices the Server Manager on that machine is sending traps to appear in the List of machines receiving traps selection box. See Figure C-18.
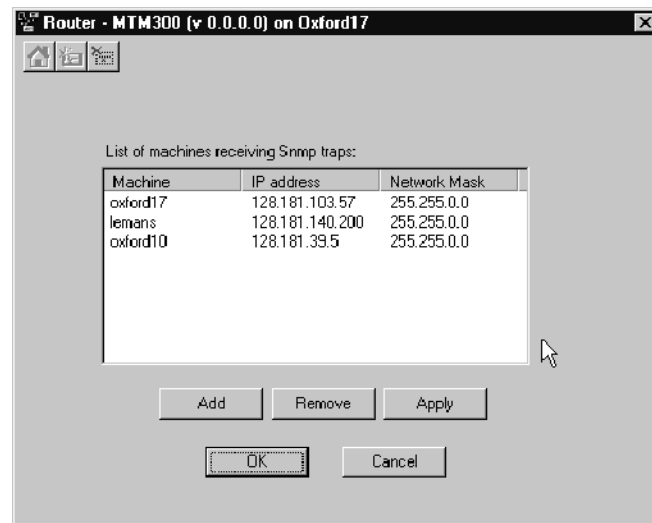
Figure C-18: List of machines receiving traps

3. Ensure that the name, IP address, and subnet mask for the network management station are correct. If any of these values are incorrect, remove the current entry in the Router (highlight the name and click **Remove**), and then add a new entry with the correct parameters using the procedure described in *Sending Traps to a Network Management Station* beginning at step 4 on page 1-31.

Reason 5. The TCP/IP parameters on the network management station are incorrect.

Solution. From the remote transport monitor, ping the network management station using the procedure described in *Pinging a host machine* on page C–15. If you cannot reach the network management station, follow the procedure in *Setting TCP/IP Parameters* beginning on page C–2 to ensure that the TCP/IP parameters on the network management station are correct.

Reason 6. If the TCP/IP parameters on the network management station are correct, the network management station may not be accessible from the transport monitor.

Solution. If the TCP/IP parameters on the network management station are correct, see the first problem statement and solutions in *Troubleshooting Remote Monitoring Desktops* on page C–20.

Sources of Information

If you need more information about network troubleshooting, some potential resources are listed below.

NOTE. These resources may provide you with more information. Most of this information is supplied as is, with no warranty as to its fitness, written or implied. The best source of network troubleshooting help is your network administrator.

■ Cisco Systems, Inc.   http://www.cisco.com/

   This site is particularly useful for networks that use Cisco devices. (This URL was valid as of November, 1999.)

■ Dulaney, E; Lawrence, S; Scrimger, R; Tilke, A; White, J; Williams, R; Wolford, K. *MCSE Training Guide: TCP/IP.* Indianapolis, IN. New Riders, 1998

   This is a training guide for Microsoft Certified Systems Engineer certification, and covers TCP/IP and network troubleshooting.

■ Taylor, E. *Network Troubleshooting Handbook.* New York, NY. McGraw-Hill, 1999

Appendix D: Software Repair and Installation

There are six parts to this appendix:

■ Software Repair Strategy

■ Restoring System Settings

■ Restoring Device Drivers

■ Restoring the Operating System

■ Installing the MTM300 Series Software

Software Repair Strategy

Depending on the severity of the suspected software problem, you may need to restore only a portion of the MTM300 Series MPEG Transport Monitor 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 MTM300 Series transport monitor system application software.

3. Restore the transport monitor operating system. Since restoring the operating system destroys all data on the hard drive, you will have to restore the complete MTM300 system application software and reenter the General License password.

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 corrupted DLL files, start by restoring the Windows NT service pack.

Restoring System Settings You can restore the following system settings using the *MTM300 Series Transport Monitor Operating System Recovery* CD:

Restoring Device Drivers   You can restore the following device drivers using the *MTM300 Series Transport Monitor Operating System Recovery* CD:

Restoring the Operating System and MTM300 Application Software   You can restore the operating system and MTM300 Series application software using the following procedures:

Restoring System Settings

This section contains procedures for restoring system settings, services, and the Windows NT Service Pack 6a.

Restoring the Boot Order   By factory default, the boot order of the MTM300 Series system is set to the following:

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

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

1. Reboot the transport monitor (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 transport monitor 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 does 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 boot order, 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 transport monitor will continue its power-on process using the new settings.

**Restoring the BIOS
Settings**

To help restore the transport monitor BIOS settings, the *MTM300 Series Transport Monitor 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 transport monitor BIOS settings:

1. Insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor, and then reboot the instrument.

2. When the transport monitor 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 transport monitor after the BIOS value array is displayed.

NOTE. To manually configure the BIOS of the transport monitor, refer to the MTM300 Series MPEG Transport Monitor Service Manual.

Restoring the SCSI Drive Controller Settings

The transport monitor is equipped with an ultra-wide SCSI hard disk. The SCSI controller must be configured with the Ultra SCSI Speed option enabled to ensure the required data-access performance to and from the hard disk.

By default, the SCSI controller has this option disabled. The transport monitor 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 transport monitor without a recovery disk in the CD-ROM drive.

2. Hit **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 transport monitor using the new settings.

Restoring the Display Setting

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

1. Boot up the transport monitor (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 transport monitor uses the COM1, COM3, and COM4 ports. COM2 is not used by the transport monitor.

Perform the following procedure to restore the COM port settings:

1. Boot up the transport monitor (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 transport monitor does not have configured.

7. Use Table D-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 transport monitor (without a recovery CD in the CD-ROM drive) to use the new COM port settings.

Table D-1: MTM300 Series 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 transport monitor 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 transport monitor (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 transport monitor (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 transport monitor (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 transport monitor (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 MTM300 Series Transport Monitor 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 transport monitor (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 *MTM300 MPEG Transport Monitor System Operating System Recovery* CD (where D is the drive letter of your CD–ROM drive)

   ■ **C:\Mtm300\Bin\AutoLogon.exe** on the transport monitor

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 MTM300 Series monitor 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 transport monitor 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 transport monitor 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 transport monitor (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_MA-CHINE 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 transport monitor 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 transport monitor (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 transport monitor (without a recovery CD in the CD-ROM drive).

7. After the system has rebooted and you have logged on, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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:\I386** 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 transport monitor will boot using the recovery CD.*

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13. Click **Yes** in the Network Settings Change message box to reboot the transport monitor using the new settings.

14. After the transport monitor reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page D-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 transport monitor (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 transport monitor (without a recovery CD in the CD-ROM drive).

7. After the system has rebooted and you have logged on, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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:\I386** 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 transport monitor will boot using the recovery CD.*

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13. Click **Yes** in the Network Settings Change message box to reboot the transport monitor using the new settings.

14. After the transport monitor reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page D–16.

Restoring the SNMP Service

SNMP service is required if you are connecting the MTM300 Series transport monitor to your local network. Perform the following procedure to restore the SNMP service:

1. Boot up the transport monitor (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 transport monitor (without a recovery CD in the CD-ROM drive).

7. After the system has rebooted and you have logged on, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor will boot using the recovery CD.*

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14. Click **Yes** in the Network Settings Change message box to reboot the transport monitor using the new settings.

15. After the transport monitor reboots, you must perform the procedure in *Restoring Microsoft Windows NT Service Pack 6a* on page D–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 transport monitor (without a recovery CD in the CD-ROM drive).

2. After the transport monitor boots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor will boot using the recovery CD.

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

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 transport monitor (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 transport monitor.

7. After the transport monitor reboots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor 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 transport monitor (without a recovery CD in the CD-ROM drive).

2. After the transport monitor boots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor 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 transport monitor using the new display driver.

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

---

11. After the transport monitor reboots, you must perform the procedure in *Restoring the Display Setting* on page D–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 transport monitor (without a recovery CD in the CD-ROM drive).

2. After the transport monitor boots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor will boot using the recovery CD.

---

11. Reboot the transport monitor (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 transport monitor (without a recovery CD in the CD-ROM drive).

2. After the transport monitor boots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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 transport monitor 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 the 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 transport monitor 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 transport monitor.

10. While the transport monitor boots, click **OK** to continue through any service or driver error messages that appear.

11. After the transport monitor 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 the 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 transport monitor on a network, enter **1.1.1.1** in the IP Address box.

21. If you are using the transport monitor on a local network, enter the network IP address, subnet mask, and default gateway your network administrator assigned to your transport monitor.

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 transport monitor (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 transport monitor (without a recovery CD in the CD-ROM drive).

2. After the transport monitor boots, insert the *MTM300 Series Transport Monitor Operating System Recovery* CD into the CD-ROM drive of the transport monitor.

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\tnsetup.exe** as the file you want to run and click **Open**.

6. Click **OK** in the Run dialog box to run the tnsetup.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 D–2 to set the touchscreen parameters in the Hardware Controls (Serial) dialog box, and then click **OK**.

Table D‑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 transport monitor.

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

15. After the transport monitor 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 transport monitor to beep each time you make a touchscreen selection.

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

Restoring the MTM300 Series MPEG Transport Monitor Operating System

In some situations, such as a power interruption or accidental deletion of files, the transport monitor may fail to boot from the hard drive. To recover, you must use the *MTM300 Series Transport Monitor Operating System Recovery* CD to restore the hard drives back to their factory-default installation status.

⚠ **CAUTION.** *Restoring the operating system software will destroy all existing data on the transport monitor hard drive and will restore only the system and drivers that were originally factory installed on the transport monitor.*

If you restore the operating system, you must also reinstall the MTM300 Series applications and reenter the general license password.

To restore the content of the transport monitor hard drive, which includes the Microsoft Windows NT 4.0 operating system, Windows NT Service Pack 6a, and the MTM300 Series MPEG Transport Monitor applications, perform the following steps:

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

1. Install the *MTM300 Series MPEG Transport Monitor Operating System Recovery* CD in the CD-ROM drive of the transport monitor, and then boot the transport monitor.

NOTE. *If the transport monitor does not boot from the CD-ROM drive, verify that the boot order is properly set. Refer to* Restoring the Boot Order *on page D‑4. If the transport monitor 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 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.

NOTE. *During the operating system recovery process, you may see a message box with* Resizing past cylinder 1023 *in the title bar. Ignore this message by pressing OK. The system will boot properly after the recovery 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 transport monitor.

8. After the transport monitor reboots, you must install the MTM300 Series MPEG Transport Monitor applications as described next.

Installing the MTM300 Series Application Software

This section lists mimimum software requirements and describes how to reinstall the application software. You must install the application software if you have restored the operating system software.

NOTE. *You must install the Software Protection key supplied with your transport monitor before you install the application software. Install the Software Protection key (see Figure D–1) on the rear-panel printer port of the transport monitor (see Figure 1–8 on page 1–18 for the location of the printer port).*

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

To printer
parallel port
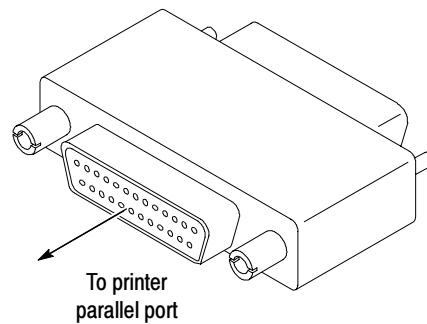
Figure D‑1: Software Protection key

Mimimum Software Installatoin Requirements

This section describes the minimum requirements for each MTM300 Series software installation type.

MTM300 Series MTEG Transport Monitor. To reinstall the application software onto a transport monitor, use the original hardware and software configuration of the transport monitor.

MTM300 Series Network Management Software.

- Windows NT 4.0 with Service Pack 6 installed

- 150 MB free disk space

- 400 MHz Pentium II processor

- 128 MB RAM

- Software key (shipped with the purchase of the network management software)

- Ethernet network adapter card (10BASE-T minimum)

- SNMP service installed

- Parallel port

Remote Monitoring Desktop.

- Windows NT 4.0 with Service Pack 6 installed

- 150 MB free disk space

- 200 MHz Pentium processor

- 64 MB RAM

- Ethernet network adapter card (10BASE-T minimum)

HP OpenView Network Node Manager.

- Windows NT 4.0 with Service Pack 6 installed

- 150 MB free disk space

- HP OpenView Network Node Manager, version 5.02 or later installed

- Minimum requirements for HP OpenView Network Node Manager

Installing the MTM300 Series Software

This section describes how to install the MTM300 Series software into the environments listed in *Minimum Software Installation Requirements*. The procedure is basically the same for each installation type. Variations are discussed in the installation procedure.

NOTE. If you are installing the MTM300 Series Network Management Software, you need to install the Software protection key before starting the software installation. Ensure that the software key (shown in Figure D--2) is installed onto the printer parallel port of the workstation on which the software is being installed. Also, make sure that you have the General License Password document available. You will be asked to enter the password from this document after you complete the software installation procedure.

To printer
parallel port
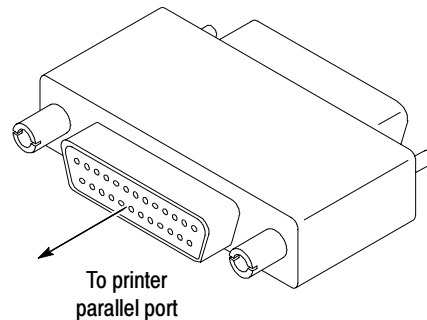
Figure D--2: Software protection key

⚠ *CAUTION. To prevent software problems, uninstall the MTM300 Series applications before you reinstall them. If you just reinstalled the operating system, you do not need to uninstall the MTM300 Series applications (they are removed during the operating system reinstallation process).*

Uninstalling existing MTM300 Series application files. If you are reinstalling the MTM300 Series software, uninstall the current software using the following procedure:

1. Exit all open applications.

2. Select **Uninstall MTM300** from the Tektronix MPEG Transport Monitor to remove existing MTM300 Series application files.

3. Click **Yes** in the Confirm File Deletion message box. Also, click **OK** if you are notified that SNMP is being stopped.

4. Click **OK** when the software files have been removed.

NOTE. *Some of the steps in this procedure are specific to one software installation type. Disregard steps that are not appropriate for your installation (for instance, if you are installing the remote monitoring desktop, disregard the discussions of the software key). The procedure indicates which steps are specific to a particular installation type.*

NOTE. *If you do not have the Java run–time environment installed on your system, or if the environment is incorrect for this software, run the executable file located in the* jre *directory on the Application CD.*

Installing the MTM300 Series application files.

1. Log onto your NT workstation as Administrator.

2. Right-click the **My Computer** icon on your Windows NT desktop, and then select **Explore** from the submenu. In the Exploring window, select the icon that represents the disk drive on which you will install the software (usually drive C:).

3. Check the status bar at the bottom of the Exploring window to verify that the target disk has at least 150 MB of free space. You cannot install the software on a disk that has less than 150 MB of free space.
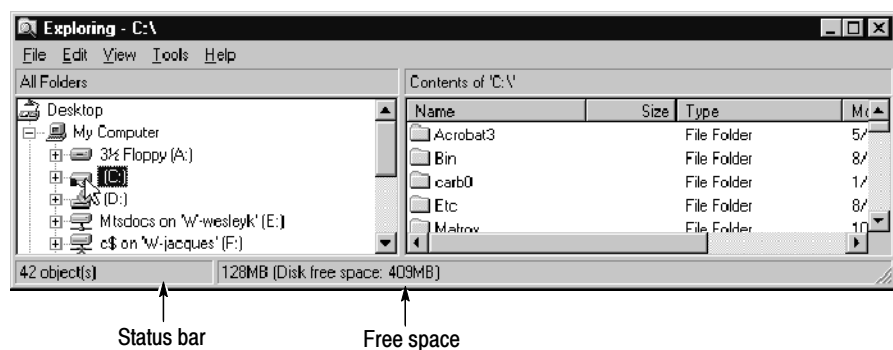
Figure D-3: Check free disk space

4. Insert the *MTM 300 Series Application Software* disc into the CD-ROM drive.

5. Click the **Start** button, and then select **Run**.

6. Enter the following text in the Run dialog box, and then click **OK**.

    D:\Setup.exe, where D is the letter designator of your CD-ROM drive.

7. Click **Next** after you review the copyright and licensing agreement.

    The Tektronix MPEG Transport Monitor Setup window appears with the Setup Type dialog box displayed. In Figure D‑4, the Remote Monitoring Desktop is selected.
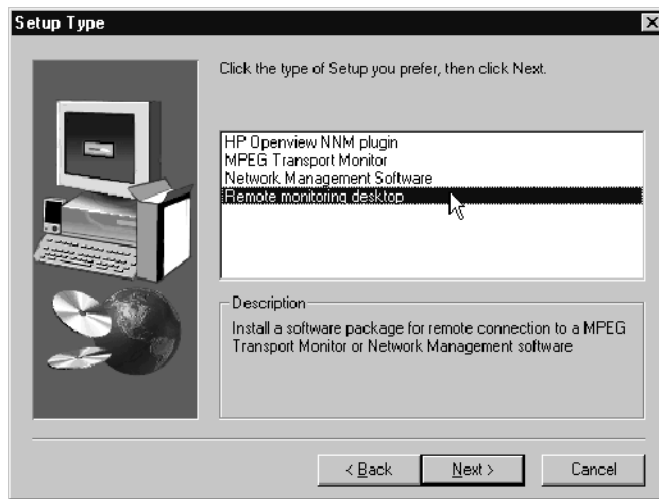
Figure D‑4: Setup type dialog box

⚠️ **CAUTION.** *Make sure that you select the appropriate installation type. The default is* MPEG Transport Monitor. *Each installation type installs a different combination of application files into the directories specified later, and makes different changes to the Windows NT registry.*

8. Select the type of installation appropriate for your environment, and then click **Next** (the MPEG Transport Monitor is the default):

    ■ HP Openview NNM plugin

    This option allows you to install the Master client plug-in to integrate your transport monitor into HP OpenView NNM network management environments.

■ MPEG Transport Monitor

This option allows you to install all of the applications with which to monitor up to eight transport streams. Select this option only if you are reinstalling the software onto an MTM300 Series MPEG Transport Monitor.

■ Network Management Software

This option allows you to install all of the applications with which to monitor up to 40 transport streams. Ensure that the software key is installed on your workstation before proceeding with this installation.

■ Remote monitoring desktop

This option allows you to install the Master client from which you can connect to a Server Manager running on a remote transport monitor or network management station.

NOTE. *It is strongly recommended that you use the default destination folder: C:\MTM300.*

9. Select the destination directory and click **Next**.

NOTE. *Steps 10 through 16 apply only to MPEG Transport Monitor installations. For other types of installations, proceed at step 17 on page D-32.*

10. After some required files are copied, you will need to reboot the host machine. You need to reboot to continue with the installation, so click **OK** at the prompt shown in Figure D-5. (Leave the disc in the CD-ROM drive. If you are installing the software over a network, you may need to restart Setup.exe after you log in again to complete the installation.)
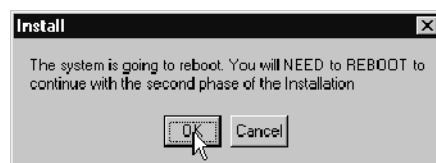
Figure D‑5: Interim reboot message

The installation software will shut down Windows NT and restart it. You will need to logon as Administrator, as you did in step 1. While you are waiting for the transport monitor to restart, check your configuration of inputs (how many inputs and which slots are used). You will need to provide this information during phase two of the installation procedure.

11. After you have logged back on to Windows NT, and the second phase of the installation has begun, click **Next** (accepting the defaults) at the Setup Type, Welcome, Select Program Folder, and Selection Summary screens.

   The setup program begins installing the software and related program files. The activity and progress gauges appear at first to show that installation is progressing.

12. When asked if you want to use Auto Logon capabilities, click Yes. You must use this feature for transport monitors without a local user interface.

13. Enter the auto logon user name and password: Administrator and MPEG2 and then click **OK**.

14. Click **OK** at the registry updated message.

15. At the Number of TS Input Option screen, select the number and configuration of inputs option that accurately describes your transport monitor configuration, and then click **Next**.

16. An MSDOS 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.** *Do not close this window until you are prompted to do so from the DOS window.*

   During a normal setup, two empty program group windows are displayed after the program files have been copied to your disk drive. Proceed at step 20 on page D–33.

17. Click **Next** in the Select Program Folder window to accept the default folder name (Tektronix MPEG Transport Monitor) and continue.

18. Review the Destination Directory, Selection, and Start Menu Folder selections in the Selection Summary window. If the selections are incorrect, click **Back** and change the information as needed. Once the information is correct, click **Next** to proceed with installation.

   The setup program begins installing the software and related sample files. The activity and progress gauges appear at first to show that installation is progressing.

During a normal setup, two empty program group windows are displayed after the program files have been copied to your disk drive.

NOTE. *The following step applies only to Network Management Station installations. For other types of installations, proceed at step 20.*

19. If you are installing the network management software, shortly after the program group windows appear, a message reminds you to verify that the software key is installed. Ensure that the software key is installed on the parallel printer port of your computer, and then click **OK**.

20. When the program group windows are populated with icons, dismiss them, and then click **Finish** in the Setup Complete window to complete the installation. (You can choose to view the Read Me file now, or later. It is installed in C:\MTM300\Bin.)

21. If you choose to view the Read Me file, a Notepad window opens. Read this file for important information, and then exit Notepad.

22. Another Setup Complete window opens. Accept the *Yes, I want to restart my computer now* option, remove the MTM300 Installation Software disc from the CD-ROM drive, and click **Finish** to complete setup and restart the system.

NOTE. *You need to restart your computer before you enter the license password in the next procedure or before you can use the software.*

23. When prompted, log on as any user.

The software is now installed. If you are installing network management software, perform the procedure in *Entering the General License Password*.

Entering the General License Password

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 MTM300 Series Network Management Software and identify the General 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** and return to step 2.

After you enter the correct password, the installation of the network management software is complete.

Appendix E: Using the Private Syntax Interpreter

You can use the Private Syntax Interpreter to create and compile private syntax definitions for use with the MTM300 Series MPEG Transport Monitor. When you load the compiled definition through the Syntactic Analysis panel of the Configuration client, the Analysis Server uses the definition to monitor and analyze the syntax of the corresponding private sections or private data descriptors that are contained in the input stream. Refer to *Syntactic Analysis Panel* on page 3--179 for more information.

Using the Private Syntax Interpreter, you can construct private syntax definitions of short private sections (section_syntax_indicator = 0), long private sections (section_syntax_indicator = 1), and private data descriptors.

These are the basic steps you use to construct and use private syntax definitions:

1. Open the desired private syntax template or existing file

2. Change parameters of existing syntax items (such as fields, loops, and if-then branches)

3. Add and edit syntax items in the template or existing file as necessary

4. Save the private syntax definition to a text file

5. Compile the text file to create a binary data file for use with the Analysis Server (the Analysis Server results are displayed in the Expert client)

6. Load the binary data file into the Analysis Server using the Syntactic Analysis panel of the Configuration client

This appendix contains the following information:

- *Private Syntax Interpreter Interface*   page E--2
- *Editing Private Syntax Definitions*   page E--12
- *Compiling Private Syntax Definitions*   page E--21
- *Analyzing Private Syntax with the Expert Client*   page E--21
- *Private Data Reference*   page E--23

Private Syntax Interpreter Interface

This section provides information describing how to start the Private Syntax Interpreter application and how to use the elements of the application display.

Starting the Application

Once you have logged in to the MTM300 Series system, you can start the Private Syntax Interpreter application using one of the following two methods:

- Select **Private Syntax Interpreter** from the Windows NT Start menu

- Double-click the **Private Syntax Interpreter** icon in the **Tektronix MPEG Test System** window

Elements of the Application Window

The Private Syntax Interpreter application window is shown below.
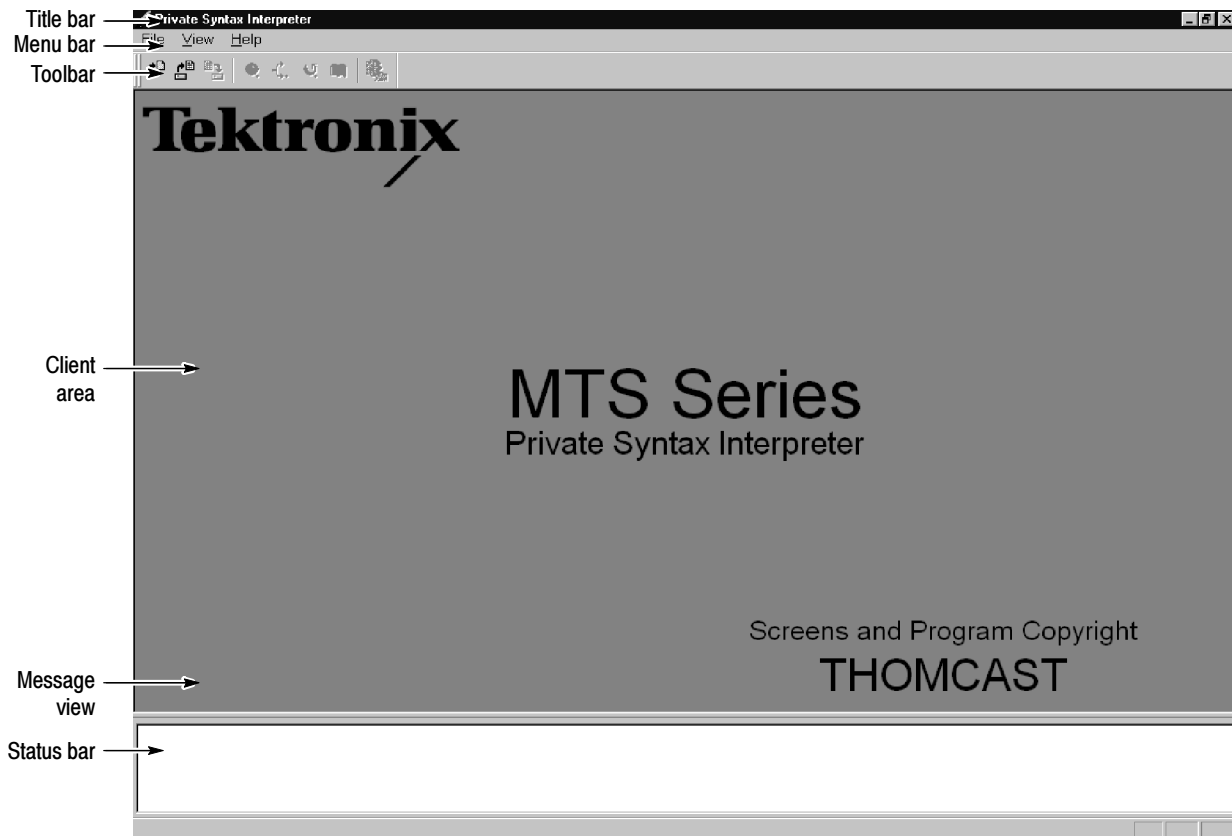
The Private Syntax Interpreter window contains the following elements:

■ Title Bar. In addition to identifying the Private Syntax Interpreter application, the title bar indicates which private syntax text file is open, or if more than one text file is open, the title bar indicates which text file is currently selected.

■ Menu Bar. The menu bar provides access to the various Private Syntax Interpreter command menus. Refer to *Menu Bar* on the following page for descriptions of the menu functions available within the menu bar.

■ Toolbar. The toolbar contains graphical command buttons for many of the most-used menu commands. Refer to *Toolbar* on page E-6 for more information.

■ Client Area. The Client area provides the workspace for creating and editing private syntax table or descriptor definitions.

■ Message View. The Message view provides a place for operational messages to be displayed. This area is not displayed except when appropriate (refer to *Message View* on page E-11 for more information). You can manually display this area by selecting Messages from the View menu.

■ Status Bar. The status bar displays first-level help messages about the Private Syntax Interpreter menus and icons pointed to by the mouse (as shown below).

Menu Bar. The menu bar contains the Private Syntax Interpreter menus. Listed below are the functions available in each of the menus.

■ File Menu**.** The File menu contains standard Windows NT file management commands. Table E–1 describes the menu selections available in the File menu.

Table E‐1: Menu bar File menu

Menu selection	Function
New	Create a new table/descriptor text file
Open	Open an existing table/descriptor text file
Close	Close the active table/descriptor text file
Close all	Close all table/descriptor text files
Save	Save the active table/descriptor text file
Save as	Save the active table/descriptor text file with a new name
Print	Print the active document
Print setup	Change the printer and printing options
Exit	Exit the application; will prompt to save documents

■ Edit Menu**.** The Edit menu is present only when a private syntax editing window is open. This menu contains commands for editing the various syntax components and for compiling the syntax definition. Table E–2 describes the menu selections available in the Edit menu.

Table E‐2: Menu bar Edit menu

Menu selection	Function
Undo	Undo the last action
Add field	Add a new field to the active table/descriptor text file
Add condition	Add a new condition to the active table/descriptor text file
Add loop	Add a new loop to the active table/descriptor text file
Add descriptor	Add a new descriptor to the active table/descriptor text file
Compile	Compile the active table/descriptor text file
Delete	Delete the selection
Copy	Copy the selection and put it on the Clipboard
Paste	Paste the Clipboard contents

■ View Menu. The View menu contains commands for changing the appearance of the Private Syntax Interpreter application window. Table E-3 describes the menu selections available in the View menu.

Table E-3: Menu bar View menu

Menu selection	Function
Toolbar	Display or hide the toolbar
Status bar	Display or hide the status bar
Messages	Display or hide the message view

■ Window Menu. The Window menu, present only when one or more syntax windows are open in the Client area, contains commands for managing the various syntax windows. Table E-4 describes the menu selections available in the Window menu.

Table E-4: Menu bar Window menu

Menu selection	Function
Cascade	Arrange the Client area windows so that they overlap
Tile	Arrange the Client area windows as non-overlapping tiles
Arrange icons	Arrange the icons at the bottom of the Client area if you have reduced the Client area windows to icons

■ Help Menu. The Help menu provides access to Private Syntax Interpreter online help and version information. Table E-5 describes the menu selections available in the Help menu.

Table E-5: Menu bar Help menu

Menu selection	Function
Help topics	Open the Private Syntax Interpreter help window
About Private Syntax Interpreter	Display program information, version number, and copyright

Toolbar. The toolbar command buttons are shortcuts to various menu commands. Table E‑6 describes the functions available in the toolbar.

Table E‑6: Private Syntax Interpreter toolbar buttons

Button	Equivalent menu command	Function
	File menu: New	Create a new table/descriptor text file
	File menu: Open	Open an existing table/descriptor text file
	File menu: Save	Save the active table/descriptor text file
	Edit menu: Add Field	Add a new field to the active table/descriptor text file
	Edit menu: Add Condition	Add a new condition to the active table/descriptor text file
	Edit menu: Add Loop	Add a new loop to the active table/descriptor text file
	Edit menu: Add Descriptor	Add a new descriptor to the active table/descriptor text file
	Edit menu: Compile	Compile the active table/descriptor text file

Table/Descriptor Window

The Table/Descriptor window (shown below) is used for assembling and editing tables or descriptors syntax. The window is divided into two portions: the Hierarchic view and the Characteristics view. The Characteristics view displays different panels depending on which Hierarchic view icon is selected.
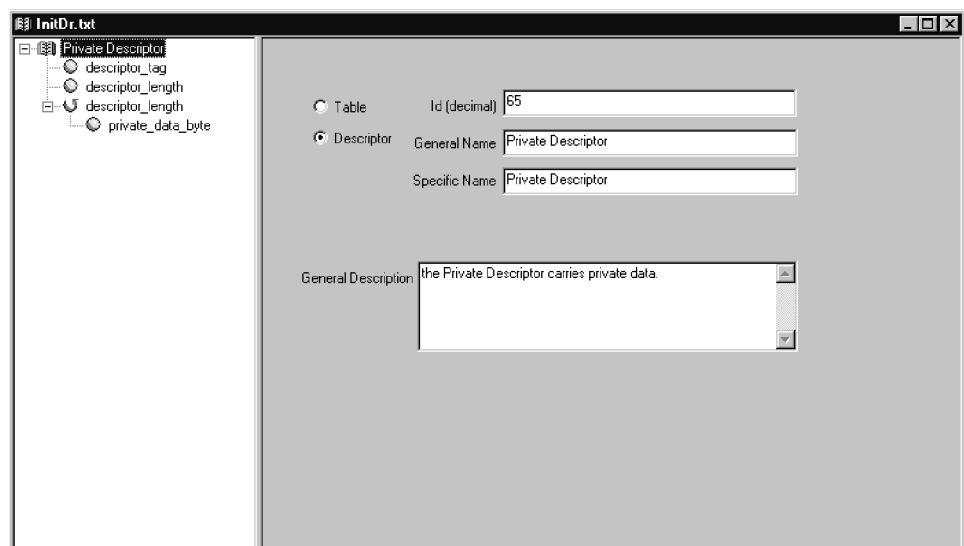
Hierarchic View. The Hierarchic view displays all the items related to making a table/descriptor pattern as well as the labels associated to each item. An item can be the root of the table/descriptor pattern, a field of the private syntax, a loop of items, a conditional branch of items, or a descriptor space reservation.
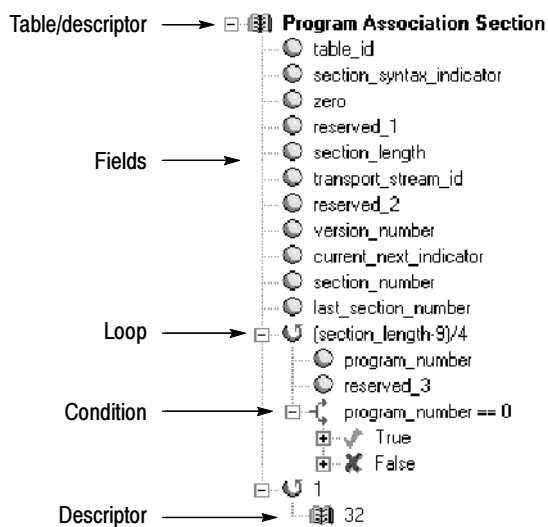
Table E–7 lists the icon types found in the Hierarchic view and the meaning of their associated labels.

Table E-7: Hierarchic view icons and label descriptions

Icon type	Description
Table/descriptor	This icon gathers the characteristics of the table/descriptor when located at the top of the tree. The label is then the name of the table/descriptor.
	If not at the top of the tree, the descriptor icon represents a space reserved for a descriptor and the label indicates the length in bytes.
Field	The field icon labels are the unique field ID for the associated field.
Loop	The loop icon label indicates the number of iterations of this branch.
Condition	The condition icon label indicates the validity of the conditional branch.
True	The true icon indicates the conditional branch in case the previous condition expression is valid.
False	The false icon indicates the conditional branch in case the previous condition expression is valid.

Table Panel. The Table panel (shown below) appears in the Characteristics view when you select the root icon in the Hierarchic view.

After you have defined the type of private syntax by selecting **Table** or **Descriptor**, enter the **Id (decimal)** value (table ID or descriptor tag) of the private syntax you are editing.

NOTE. Table or descriptor ID decimal values cannot exceed 255. In addition, decimal values cannot be one of the following because they are reserved: 0 (PAT); 1 (CAT); 2 (TSDT); 66 and 70 (SDT); 200 and 201 (VCT).

The **General Name**, **Specific Name**, and **General Description** fields are optional fields to let you enter more information about the private syntax you are editing.
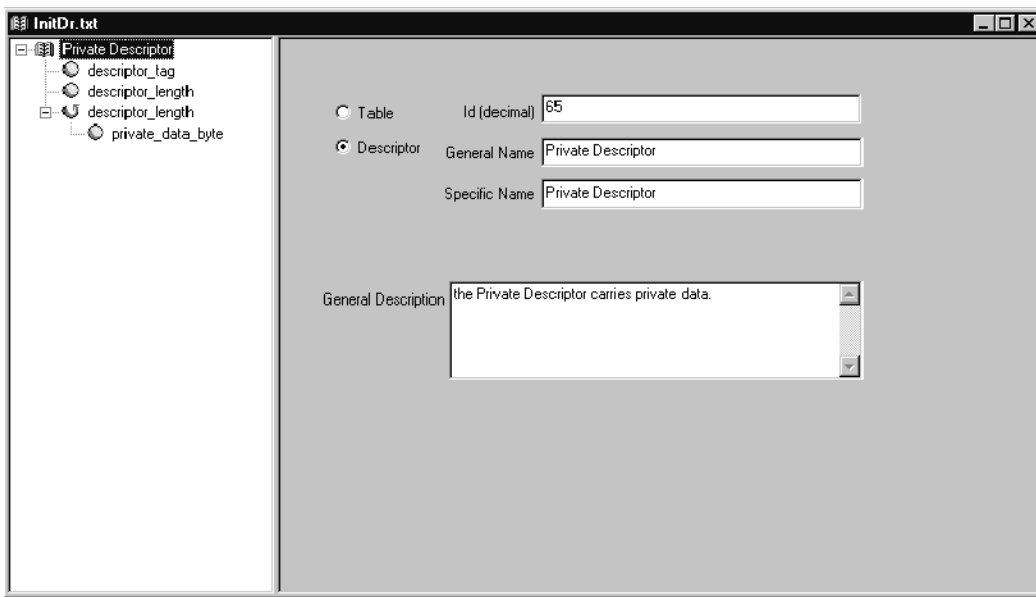
Field Panel. The Field panel (shown at the top of the following page) appears in the Characteristics view when you select a field icon in the Hierarchic view. This panel allows you to enter the unique **Field Id**. The panel provides the **Length** in bits of the field. In addition, the **Name** and **Description** fields give more information about the selected field icon.

The **Data Type** selection determines the interpretation of field data bits according to their type and order of transmission. Select the appropriate interpretation from the drop-down list (bslbf, rpchof, tbsv, or uimsbf).

The **Valid Condition** field declares the condition under which a field shall be considered valid or not.

At the bottom of the Field panel appears the list of **Interpretations**, which is a list of pairs (expression, interpretation). They are checked following the top-to-bottom order that they are listed. The interpretations indicate what descriptor will appear to the right of the item in the Section Analysis view of the Configuration client application.

Expression Panel. The Expression panel (shown below) appears in the Characteristics view when you select a Condition, Loop, or Descriptor icon not located at the top of the Hierarchic view.

When you select a Condition icon in the Hierarchic view, the expression field is the test of the condition. The calculation of this field will determine whether the condition is true or false.

When you select a Loop icon in the Hierarchic view, the expression field indicates the number of iterations of the loop.

When you select a Descriptor icon in the Hierarchic view, the expression field indicates the space in bytes occupied by this item.
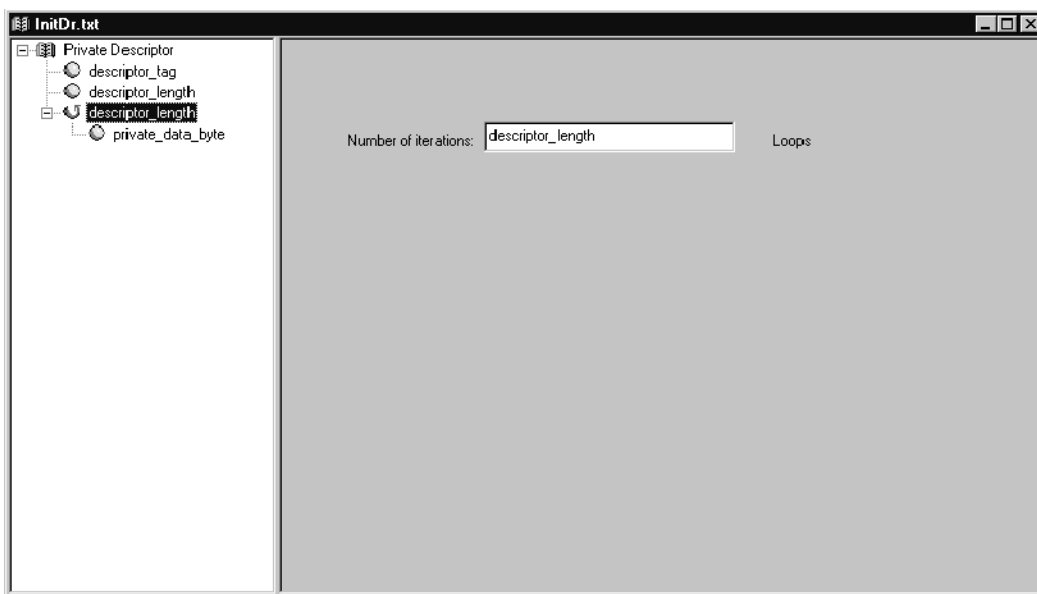
Message View   The Message view (as shown below) appears on the bottom of the application window when you compile the private syntax you are editing.

If any errors occur during compiling, the Message view displays appropriate error messages. If you double-click on an error message that contains the text: ERROR LINE *<number>*, the application highlights the erroneous item in the Hierarchic view.
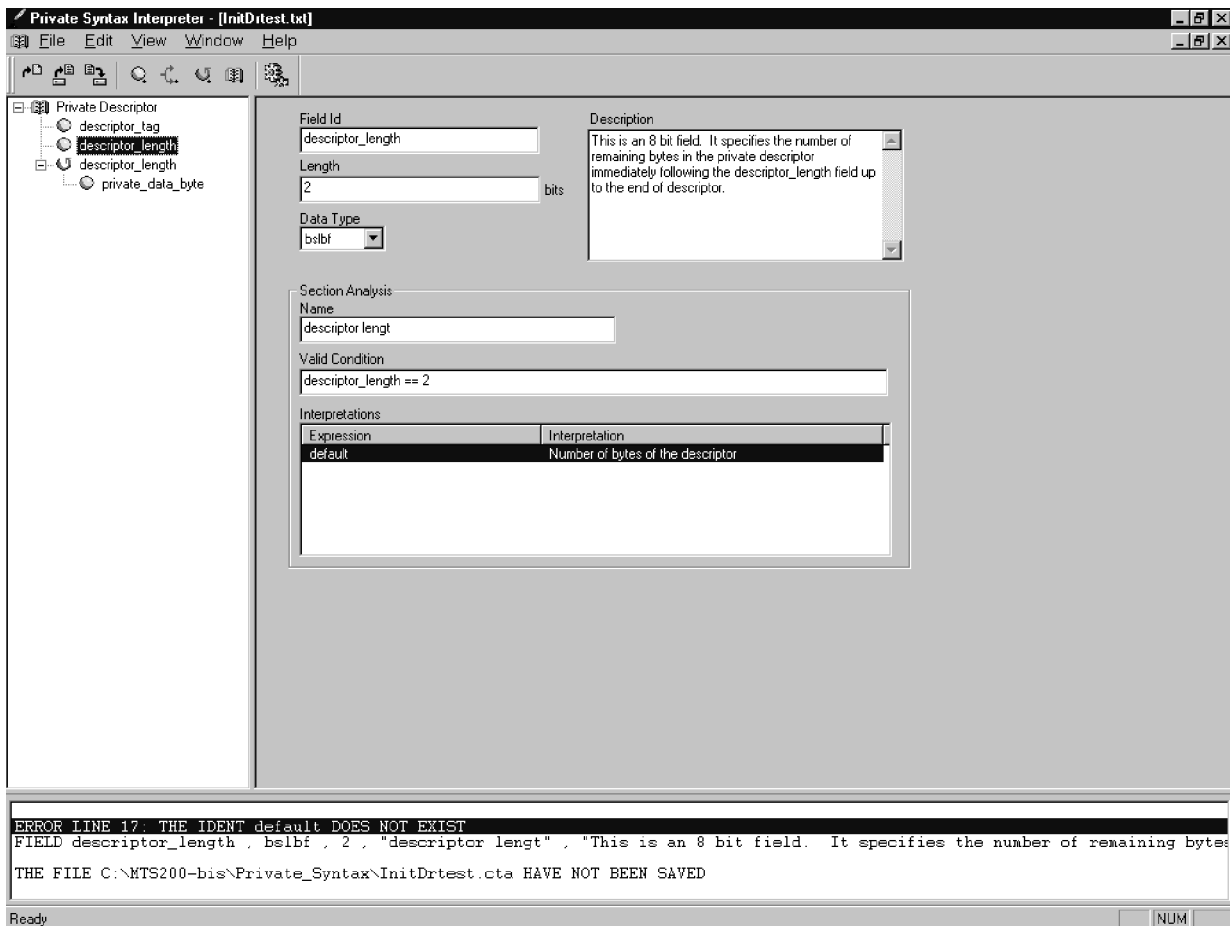
Editing Private Syntax Definitions

The editing of a private syntax definition consists of creating, modifying, and saving the pattern of a syntax definition. This pattern is made of syntax fields organized around loops, conditional branches, and space reservation for descriptors.

Private syntax definitions reside in text (.txt) files. The application uses standard Windows NT file management techniques to create, open, and save private syntax definition files.

Creating a New Private Syntax Definition File

To create a new private syntax definition, select **New** from the File menu or click the **New** toolbar button (refer to *Toolbar* on page E-6). The following **New Table/Descriptor** dialog box appears.
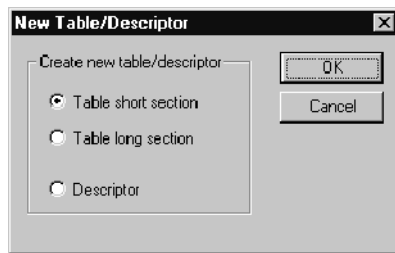
Select **Table short section** to define a new short private section syntax with the section_syntax_indicator field set to 0.

Select **Table long section** to define a new long private section syntax with the section_syntax_indicator field set to 1.

Select **Descriptor** to define a private syntax descriptor.

Click **OK** to open a section or descriptor template in the Private Syntax Interpreter. Client area.

⚠ *CAUTION. Always save new syntax definitions under a new, unique filename. It is possible to modify and replace the default template files (InitDr, InitLg, and InitSt). Do not do so without saving a backup of the original template. Refer to* Saving a Private Syntax File *on page E-20 for instructions.*

Editing an Existing Private Syntax Definition File

To open an existing private syntax definition, select **Open** from the File menu or click the **Open** toolbar button (refer to *Toolbar* on page E-6). The standard Windows NT **Open** dialog box appears. Enter or select the file name and then click **OK** to open the private syntax definition window in the Client area.

Private Syntax Definition Window

When you create or open a private syntax definition, a Private Syntax Definition window appears within the application window. The Private Syntax Definition window is divided into two portions: the Hierarchic view and the Characteristics view. The Characteristics view contains the parameters that define the selected Hierarchic view icon. The Characteristics view displays different definition panels depending on which Hierarchic view icon is selected.
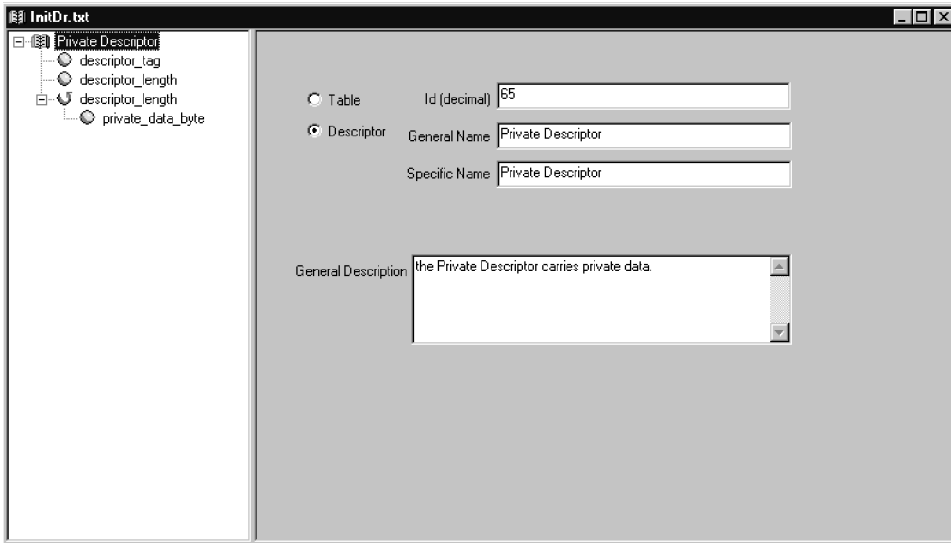
To completely expand the Hierarchic view, press the numeric keypad asterisk (*) key. To expand hierarchy items designated with a + symbol, click the symbol. The long private section, short private section, and descriptor template hierarchies expand as shown below.

The private syntax hierarchies are consistent with the ISO/IEC presentation of section syntax (refer to Table E–13 on page E–24). Use standard Windows NT mouse and cursor-key techniques to navigate within the hierarchies.

Table long section
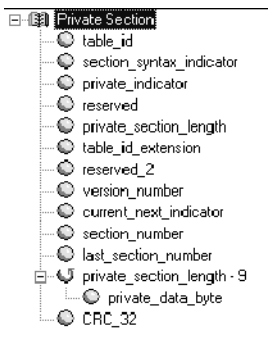
Table short section
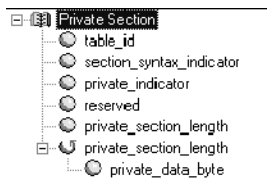
Descriptor

**Adding and Editing
Hierarchy Items**

The hierarchy is a collection of syntax fields organized around loops and conditional branches as well as descriptors. The hierarchy root is a table item and is the only mandatory hierarchy item.
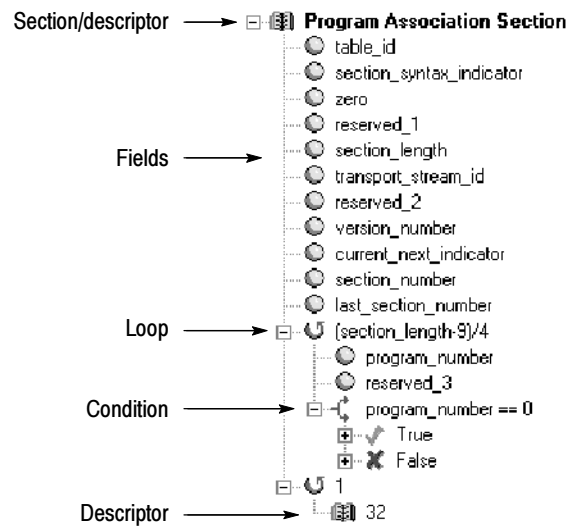
To add a new item to the section or descriptor, select (highlight) the hierarchy item that is to be the parent of the new item. Then choose **Add Field** from the Edit menu or click the **Add Field** toolbar button (refer to *Toolbar* on page E‑6). Table E‑8 lists the position in the hierarchy that added items appear.

Table E‑8: Hierarchy position of added items

Selected item	Position of added item
Section/descriptor	Right after the selected item if it is a descriptor; at the end of the hierarchy if the table is a root item
Field	Immediately following the selected field
Condition	Immediately following the conditional branch
(Condition) True	Last item of the true conditional branch
(Condition) False	Last item of the false conditional branch
Loop	Last item of the loop branch

You can copy or delete existing hierarchy items using the Edit menu Delete, Copy, and Paste commands. You can also move existing hierarchy items by performing a drag-and-drop action on the item.
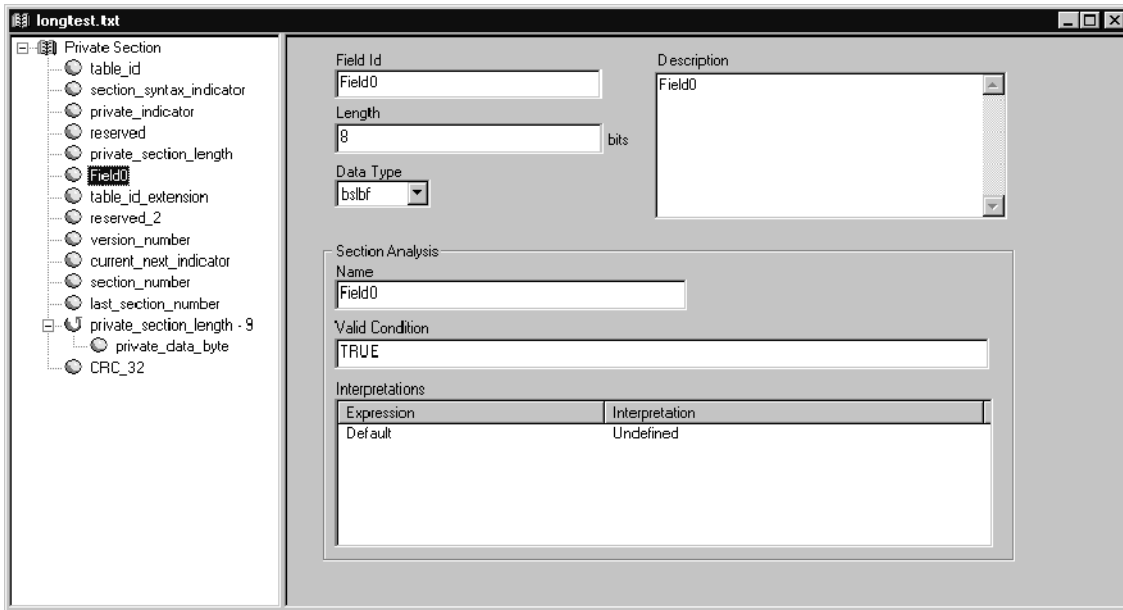
When you add a field hierarchy item, the Field panel appears in the Characteristics view as shown above. The default parameters for added field items are listed in Table E-9.

Table E-9: Default parameters for added private syntax fields

Field parameter	Default value
Field ID	Field $<n>$[1]
Length	8 bits
Data type	bslbf
Description	Field $<n>$[1]
Name	Field $<n>$[1]
Valid condition	True
Interpretations	
Expression	Default
Interpretation	Undefined

[1] **The number $<n>$ starts at 0 for the first added field and increments with each new field insertion.**

Data Types. The four available data types are defined in Table E‑10. These are the different data types supported by digital television standards and the application.

Table E‑10: Private syntax data type definitions

Data type	Definition
bslbf	Bit string, left bit first
rpchof	Remainder polynomial coefficients, highest order first
tbsv	Text bit string value
uimsbf	Unsigned integer, most significant bit first

Expressions. An interpretation expression is a Boolean combination of operators and terminals. Table E‑11 defines the operators you can use.

You can express conditional values in either hexadecimal or decimal base; that is, the following expressions are equivalent:

    program_number == 422
    program_number == 0x1A6

Table E‑11: Private syntax expression operators and terminals

Type	Definition
Operators	
<	less than
>	greater than
<=	less than or equal
>=	greater than or equal
==	equal
!=	different
+	addition
-	subtraction
*	multiplication
/	division
||	OR
&&	AND
!	NOT
Terminals	
integer	
field ID	Unique identifier of a field
TRUE	
FALSE	
API_COMPUTE_CRC_32	Computed value of the CRC32 for the section
API_GET_VALIDITY	True if CRC32 is OK
Default	For always applicable interpretation

Table E‑12 lists examples of interpretation expressions with their definitions.

Table E‑12: Private syntax example interpretation expressions

Expression	Definition
CRC_32==API_COMPUTE_CRC_32	Value of field CRC_32 is equal to the computed CRC32 value of the section
private_section_length<=4093	private_section_length field value is less than or equal to 4093
(section_length‑9)/4	Number equal to the section_length field value minus 9, all divided by 4

Adding Interpretations. The Analysis Servers check the conditions in this list to determine the interpretation text to display on the Expert client Section Analysis view. To add an entry to the interpretations list, right-click on the background of the interpretations box and then choose **New** from the resulting menu**.**
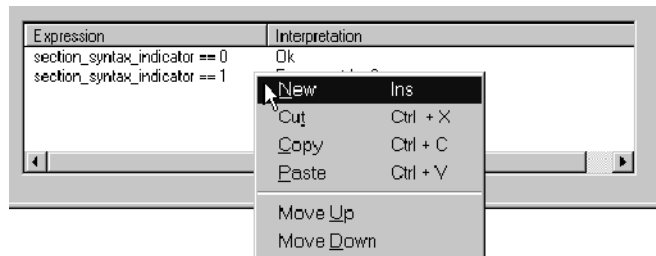
A new, default interpretation appears immediately after the selected item. Because the Analysis Server checks conditions in top-to-bottom order, you may want to move the new condition/interpretation pair below one or more of the existing entries.
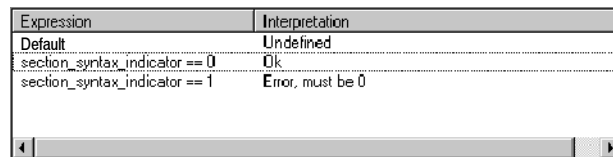
Changing Interpretation Order. To change the interpretation order within a field, right-click on the background of the list of interpretations box, and choose **Move Up** or **Move Down** from the menu**.**
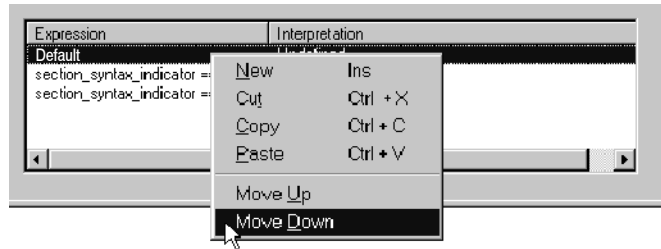
The selected condition/interpretation moves down one position as shown below. You can reselect the item and repeat the command to move the item to the bottom of the list.
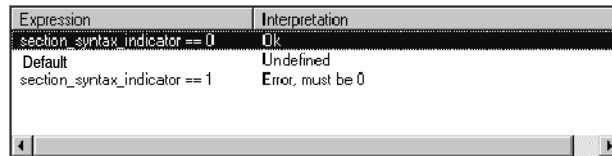
Editing an Expression/Interpretation. Click once on an expression/interpretation line to select it. Click on the expression or interpretation portion of the selected expression/interpretation to position the cursor at the end of the expression or interpretation and to enable text entry as shown below. You can then double-click a word to select it.
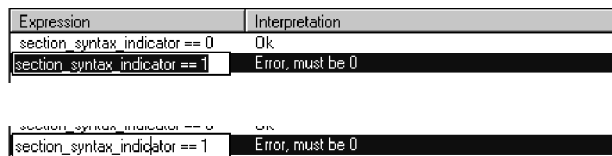
Once you have selected the expression or interpretation text to edit, you can right-click to open a shortcut menu. You can use the **Cut**, **Copy**, **Paste**, **Delete**, and **Select All** commands to edit the selected text. The **Undo** command lets you undo the previous text-editing action.

Adding a New Conditional Branch. To add a new conditional branch, select **Add Condition** from the Edit menu or click the **Add Condition** toolbar button (refer to *Toolbar* on page E-6). The default **Valid condition** is TRUE.
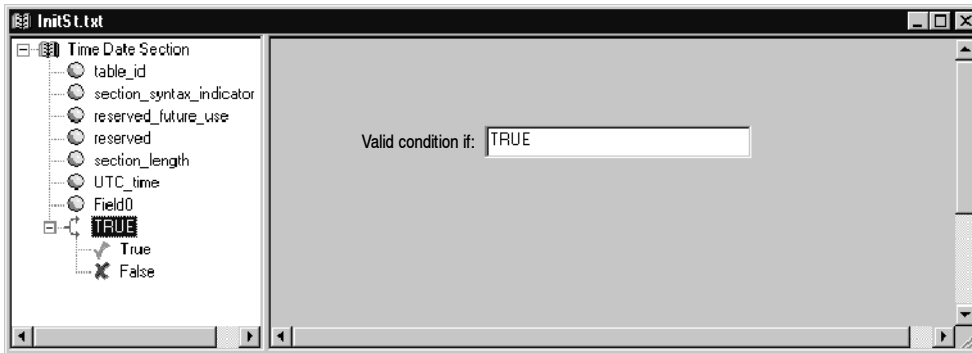
Adding a New Loop. To add a new loop, select **Add Loop** from the Edit menu or click the **Add Loop** toolbar button (refer to *Toolbar* on page E-6). The default **Number of iterations** is 1 loop.
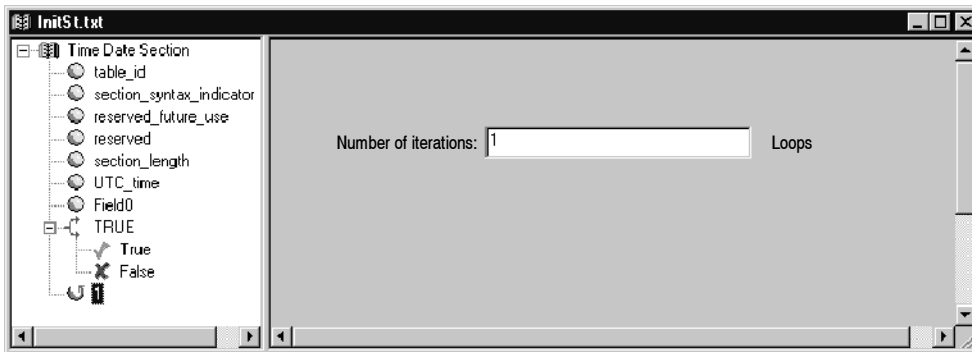
Adding a New Descriptor. To add a new descriptor, select **Add Descriptor** from the Edit menu or click the **Add Descriptor** button (refer to *Toolbar* on page E-6). The default **Descriptor Size** is 8 bytes.
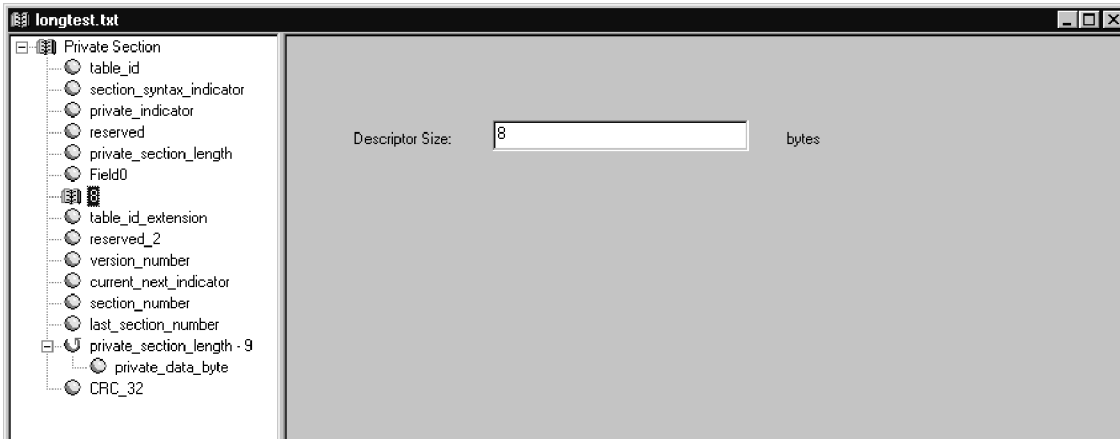
Changing the Hierarchy. Items or branches of the hierarchy can be moved within the hierarchy by selecting and dragging the associated icon.

Items or branches of the hierarchy can be copied from one position to another by holding the **CTRL** key down while dragging the selected icon.

To delete selected items or branches from the hierarchy, select **Delete** from the Edit menu or press the **DEL** button on your keyboard.

Saving a Private Syntax File

To save a private syntax definition in text file format, select **Save** from the File menu or click the **Save** toolbar button (refer to *Toolbar* on page E-6).

When you save a new syntax definition file, the standard Windows NT **Save As** dialog box appears. Enter a file name with a .txt extension and then click **OK**.

To save an existing syntax definition file under a new name, select **Save As** from the Edit menu.

*NOTE. If you are using an existing syntax definition as a template for a new definition, it is good practice to always select **Save As** to create the new file before you make any changes to the original definition.*

Compiling Private Syntax Definitions

To compile a private syntax definition, select **Compile** from the Edit menu or click the **Compile** toolbar button (refer to *Toolbar* on page E-6).

The Message view opens at the bottom of the Private Syntax Interpreter window. If there is no compiling error, a file containing the private syntax table, with the extension .cta, is created in the same directory as the table file.

Analyzing Private Syntax with the Expert Client

Once you have created, saved, and compiled a private syntax definition, use the following procedure to monitor private data sections or descriptors in the input stream:

1. Open the Configuration client and connect to the input on which the private data sections you want to monitor are encoded: you can start the Configuration client from the Master client by right-clicking the appropriate multiplex icon and selecting Configuration client from the shortcut menu.

2. Select **Analysis:Advanced:Syntax** in the Navigation frame to open the Syntactic Analysis configuration panel (shown below).
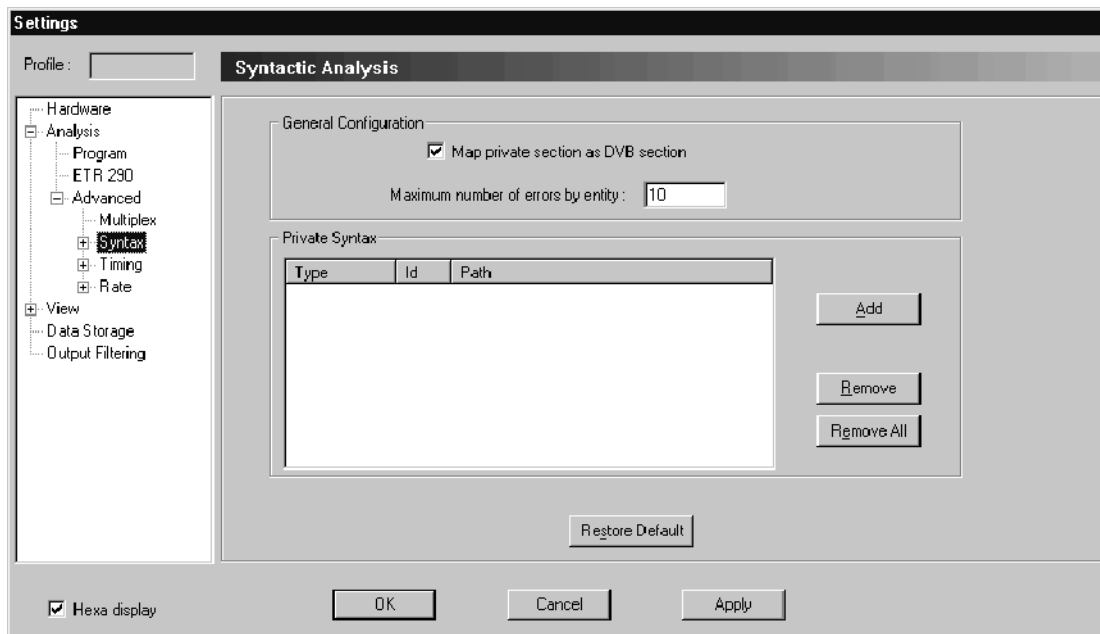
3. Click **Add**. A standard Windows **Open** window appears, with only .cta files displayed.

4. Change the the appropriate directory, if necessary, and then select the desired binary syntax definition file (either double-click the file name or highlight the file name and click **Open**).

5. Repeat steps 3 and 4 for every private syntax definition you want to use.

6. Click **Apply** on the bottom of the Syntactic Analysis configuration panel to confirm your additions; click **OK** to confirm the additions and close the Settings window.

7. Start the Expert client and connect to the input you want to analyze: you can start the Expert client from the Master client by right-clicking the appropriate multiplex icon and selecting Expert client from the shortcut menu..

8. Open a section analysis view of the appropriate table. Refer to *Section Analysis View* on page 3–148 for instructions.

Red folder icon and error indicator

Unique interpretation for item in Name column
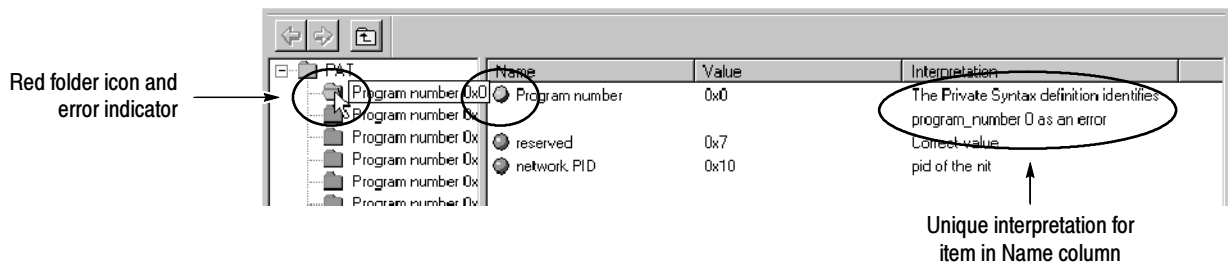
You can run the Private Syntax Interpreter and the Expert client applications simultaneously. You can therefore use the following technique to experiment with the effects of different private syntax definition parameters on known sections or descriptors:

1. Load the private syntax description in the Configuration client and begin analysis as described above. Open a section analysis window to see how the Analysis Server analyzes and reports the contents of the private section or descriptor.

2. Edit the private syntax text file as necessary.

3. Compile the syntax definition. The new definition overwrites the original definition.

4. Stop and then restart Analysis Server:

   a. Right-click the Analysis Server icon for the input you are analyzing in the system tray and select **Stop** from the shortcut menu.

   b. Wait for the green highlight to disappear, and then repeat the step, selecting **Start** from the shortcut menu.

When you restart analysis, the Analysis Server reads the new contents of the binary definition (.cta) file.

5. Open a section analysis window in the Expert client to see how the Analysis Server analyzes and reports the contents of the private section or descriptor.

Private Data Reference

The Private Syntax Interpreter application builds tables and descriptors as defined in *ISO/IEC 13818-1, Generic coding of moving pictures and associated audio information: Systems*, July 1996. Refer to the standard for additional parameter value information.

The following information is taken from ITU-T Rec. H.222.0 (ISO/ IEC 13818-1).

Private Section Types

The private_section provides a further means to carry private data also in two forms. This type of elementary stream may be identified under stream_type as private_data in PSI sections. The short type of private_section() includes only the first five defined fields, and is followed by private data. For this structure the section_syntax_indicator shall be set to a value of 0. For the long type, the section_syntax_indicator shall be set to a value of 1 and the full syntax up to and including last_section_number shall be present, followed by private_data_bytes and ending with the CRC_32.

Syntax of the Private Section

When private data is sent in Transport Stream packets with a PID value designated as a Program Map Table PID in the Program Association Table, the private_section shall be used. The private_section allows data to be transmitted with a minimum of structure while enabling a decoder to parse the stream. The sections may be used in two ways: if the section_syntax_indicator is set to 1, then the whole structure common to all tables shall be used; if the indicator is set to 0, then only the fields table_id through private_section_length shall follow the common structure syntax and semantics and the rest of the private_section may take any form the user determines.

A private table may be made of several private_sections, all with the same table_id (see Table E–13).

Table E-13: Private section

Syntax	No. of bits	Mnemonic
private_section() {		
table_id	8	uimsbf
section_syntax_indicator	1	bslbf
private_indicator	1	bslbf
reserved	2	bslbf
private_section_length	12	uimsbf
if (section_syntax_indicator = = 0) {		
for (i = 0; i < N; i++) {		
private_data_byte	8	bslbf
}		
}		
else {		
table_id_extension	16	uimsbf
reserved	2	bslbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
for (i = 0; i < private_section_length−9; i++) {		
private_data_byte	8	bslbf
}		
CRC_32	32	rpchof
}		

Semantic Definition of Private Section Fields

The following paragraphs describe the various private section fields.

table_id - This 8-bit field, the value of which identifies the Private Table this section belongs to. Only values from 0x40 through 0xFE may be used.

section_syntax_indicator - This is a 1-bit indicator. When set to 1, it indicates that the private section follows the generic section syntax beyond the private_section_length field. When set to 0, it indicates that the private_data_bytes immediately follow the private_section_length field.

private_indicator - This is a 1-bit user definable flag that shall not be specified by ITU-T | ISO/IEC in the future.

private_section_length - A 12-bit field. It specifies the number of remaining bytes in the private section immediately following the private_section_length field up to the end of the private_section. The value in this field shall not exceed 4093 (0xFFD).

private_data_byte - The private_data_byte field is user definable and shall not be specified by ITU-T | ISO/IEC in the future.

table_id_extension - This is a 16-bit field. Its use and value are defined by the user.

version_number - This 5-bit field is the version number of the private_section. The version_number shall be incremented by 1 modulo 32 when a change in the information carried within the private_section occurs. When the current_next_indicator is set to 0, then the version_number shall be that of the next applicable private_section with the same table_id and section_number.

current_next_indicator - A 1-bit field, which when set to 1 indicates that the private_section sent is currently applicable. When the current_next_indicator is set to 1, then the version_number shall be that of the currently applicable private_section. When the bit is set to 0, it indicates that the private_section sent is not yet applicable and shall be the next private_section with the same section_number and table_id to become valid.

section_number - This 8-bit field gives the number of the private_section. The section_number of the first section in a private table shall be 0x00. The section_number shall be incremented by 1 with each additional section in this private table.

last_section_number - This 8-bit field specifies the number of the last section (that is, the section with the highest section_number) of the private table of which this section is a part.

CRC_32 - This is a 32-bit field that contains the CRC value that gives a zero output of the registers in the CRC decoder defined in ITU-T Rec. H.222.0 Annex A after processing the entire private section.

Private Descriptors   Descriptors exist within Program Streams and Transport Streams. A range of private descriptors may be defined by the user (see Table E--14). These descriptors shall commence with descriptor_tag and descriptor_length fields. For private descriptors, the value of descriptor_tag may take the values 64--255. These descriptors may be placed within a program_stream_map(), a CA_section(), a TS_program_map_section(), and in any private section(). Specifically private_data_bytes also appear in the CA_descriptor().

Table E--14: Private descriptor

Syntax	No. of bits	Mnemonic
private_descriptor() {		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
for (i = 0; i < descriptor_length; i++) {		
private_data_byte	8	uimsbf
}		
}		

descriptor_tag - This 8-bit field identifies the private descriptor. Values from 64–255 (0x40 through 0xFF) may be used.

descriptor_length - An 8-bit field. It specifies the number of remaining bytes in the descriptor immediately following the descriptor_length field.

Appendix F: ATSC Program Paradigm

The ATSC program paradigm specifies the method to be used for allocating the values of the Packet Identifier (PID) field of the transport packet header in a systematic manner. Within one transport multiplex, television programs that follow the ATSC program paradigm are assigned a program number ranging from 1 to 255. The binary value of the program number is used to form b_{11} through b_4 of the PID. Programs adhering to the paradigm shall have b_{12} equal to '0'. Programs not adhering to the paradigm shall have b_{12} equal to '1'.

Additionally: base_PID = program number <<4, where the program number refers to each program within one transport multiplex and corresponds to the 16-bit program_number identified in the PAT and PMT. The b_0 through b_3 of the PID are assigned according to Table F-1.

The paradigm to identify the transport bit streams containing certain elements of the program is defined in Table F-1.

Table F-1: PID assignment for the elementary streams of a program

Name	PID definition	Description
PMT_PID	base_PID+0x0000	PID for the bit stream containing the program_map_table for the program.
Video_PID	base_PID+0x0001	PID for the bit stream containing the video for the program.
PCR_PID	base_PID+0x0001	Implies the video bit stream also carries the PCR values for the program.
Audio_PID	base_PID+0x0004	PID for the bit stream containing the primary audio for the program. The primary audio shall be a complete main audio service (CM) as defined by ATSC Standard A/52 and shall contain the complete primary audio of the program including all required voice-overs and emergency messages.
Data_PID	base_PID+0x000A	PID for the bit stream containing the data for the program.

The program_map_table must be decoded to obtain the PIDs for services not defined by the paradigm but included within the program (such as a second data channel). According to the program paradigm, every 16th PID is a PMT_PID and may be assigned to a program. If a PMT_PID is assigned to a program by the program paradigm, the next 15 PIDs after that PMT_PID are reserved for elements of that program and shall not be otherwise assigned.

Table F-2 lists the program paradigm errors for programs adhering to the program paradigm b_{12}=0.

Table F-2: Program paradigm errors

Error	Requirement	A/53 Annex C Paragraph 5.3
Bad program number assignment	program_number shall be ranged from 1 to 255.	A_PSI_PRPA_001
Bad PMT_PID assignment	PMT_PID shall be equal to 'base_PID+0x0000.'	A_PSI_PRPA_002
Bad Video_PID assignment	If a program contains only one Video ES, this one shall be assigned to base_PID+0x0001. The PID of the other Video ES must be in the range [base_PID+0x0002; base_PID+0x000F], except the values (base_PID+0x0004, base_PID+0x000A).	A_PSI_PRPA_003
Bad PCR_PID assignment	If a program contains PCR data, this one shall be assigned to base_PID+0x0001.	A_PSI_PRPA_004
Bad Audio_PID assignment	If a program contains only one Audio ES, this one shall be assigned to base_PID+0x000f. The PID of the other Audio ES must be in the range [base_PID+0x0002; base_PID+0x000F], except the value base_PID+0x000f, base_PID+0x000A).	A_PSI_PRPA_005
Bad Data_PID assignment	If a program contains only one Data ES, this one shall be assigned to base_PID+0x000A. The PID of the other Data ES must be in the range [base_PID+0x0002; base_PID+0x000F], except the value (base_PID+0x0004, base_PID+0x000A).	A_PSI_PRPA_006
PID reserved by a program adhering to the program paradigm	The PID range from 0x0XX0 to 0x0XXF are reserved by programs adhering to the program paradigm with program_number = XX. These PIDs cannot be used elsewhere in the multiplex.	A_PSI_PRPA_007

Glossary

AC-3

Audio coding scheme developed by Dolby Laboratories, Inc. and adopted by ATSC.

ARIB (Association of Radio Industries and Business)

ARIB is a body of broadcasters, manufacturers, and communication carriers who are responsible for preparing standards on radio spectrum use in Japan.

Analysis Server

The Analysis Server is the process that performs the actual analyses on transport stream inputs and starts automatically when you start the transport monitor. Each MTM300 Series transport monitor can support up to eight Analysis Server processes simultaneously. The Analysis Server sends analysis results to the Server Manager.

ATSC

Advanced Television Systems Committee

BAT (Bouquet Association Table: DVB SI)

Describes the bouquets (collections of services) carried by one or more transport streams.

BIT (Broadcaster Information Table)

ARIB only.

CAT (Conditional Access Table: MPEG-2 PSI)

Associates one or more EMM (Entitlement Management Message) streams to specific PID values.

See also ECM.

Client/Server

The client / server software architectural model allows software to be developed into two or more modules:

■ The server module performs CPU intensive operations, runs in the background (or remotely), and responds to "requests" from clients. Usually requests are due to some action you have taken.

■ The client module is often a graphical user interface that allows you to configure or display the status of the server module.

Compression Layer

The compression layer is the compressed elementary stream and associated metadata that describes the elementary stream. Usually this layer is organized into variable length packets with headers and payloads of data, in which case the bitstream is called a packetized elementary stream, or PES.

See the appropriate MPEG-2, DVB, or ATSC standards for more information.

See also System Layer.

CRC (Cyclic Redundancy Check)

One of the fields described in the MPEG2 standard, used to check the accuracy of data in PSI and SI tables.

CVCT (Cable Virtual Channel Table)

One of the tables defined by ATSC PSIP; contains a list of attributes for virtual channels carried in the TS for a cable system.

Data Broadcast Descriptor

The key to data broadcasting protocols that fall within the scope of DVB SIDAT 360. The data_broadcast_descriptor that can be found in the SDT and DVB EIT. The data_broadcast_descriptor is the key to identifying data piping and synchronous/asynchronous data streaming.

DDB (Download Data Block)

The DownloadDataBlock table is a table that carries chunks of a module. DDBs are referenced by DSIs.

DII (Download Info Indication)

The DownloadInfoIndication table is a Data Carousel specific table that defines a group of modules. DIIs may be referenced either by the data_broadcast_descriptor of the Data Carousel (one-layer Data Carousels), or by the associate DSI (two-layer Data Carousels).

DIT (Discontinuity Information Table)

DVB table.

DLT (Download Table)

ARIB only.

DSI (Download Server Initiate)

The DownlardServerInitiate table is a Data Carousel specific table that defines a super-group of modules. It is referenced by the data_broadcast_descriptor of the Data Carousel (2-layer).

DSM-CC (Digital Storage Media Command and Control)

The Digital Storage Media Command and Control specification is a set of protocols which provides the control functions and operations specific to managing ISO/IEC 11172 (MPEG-1) and ISO/IEC 13818 (MPEG-2) bit

streams, although the concepts and protocols are considered to apply to more general use. DSM-CC is defined in ISO/IEC 13818-6. The strength of DSM-CC is that it enables a single DSM (in the server) to serve clients on these and other network topologies with one common protocol. DSM-CC messages are encapsulated in MPEG-2 sections whose format is compliant with the private section format defined in ISO/IEC 13818-1.

DTS (Decoding Time Stamp)
One of the fields described in the MPEG2 standard; may be present in a PES packet header that indicates the time that an access unit is decoded in the T-STD.

DVB
Digital Video Broadcasting

DVB-MG
Digital Video Broadcasting Measurement Guidelines

DVB-SI
Digital Video Broadcasting Service Information

DVB-T
Digital Video Broadcasting Terrestrial

ECM (Entitlement Control Message: MPEG-2 PSI)
The ECM is private conditional access information that specifies control words and possibly other, typically stream-specific, scrambling and/or control parameters.

See also EMM and CAT.

EIT (Event Information Table: DVB SI and ATSC PSIP)
DVB
Provides information about the chronological order of events carried by the transport stream.

ATSC
Provides information about the programs (or data broadcasting sessions) defined for the virtual channels.

EMM (Entitlement Management Message: MPEG-2 PSI)
The EMM is private conditional access information that identifies the authorization levels or the services of specific decoders.

See also ECM and CAT.

Elementary Stream
An ordered series of bytes representing compressed audio, video, or data including associated control data. Elementary streams are described in the MPEG-2 standards.

ETR (ETSI Technical Report)
One of the types of documents released by ETSI.

ETS (European Telecommunication Standard)
One of the types of documents released by ETSI.

ETSI
European Telecommunication Standards Institute

ETT (Extended Text Table: ATSC PSIP)
Provides detailed textual information about the virtual channels and events (programs) carried by the transport stream.

Frame
An ISDB-S/ARIB structure comprised of 48 slots. *See Slot* and *Super frame*.

GPS
Global Positioning System

Input
See Multiplex.

IRD (Integrated Receiver/Decoder)
A receiving decoder that can automatically configure itself using the MPEG-2 Program Specific Information (PSI).

ISDB-S (Integrated Service Digital Broadcast Satellite)
Standard adopted by ARIB describing the TMCC information used in satellite broadcast environments.

ISO (International Organization for Standardization)
Organization responsible for establishing standards at the world wide level.

Mega-Frame
A mega-frame is a set of OFDM frames, defined in such a way that the number of packets contained in a mega-frame does not depend on the transmission mode (2K or 8K).

MGT (Master Guide Table: ATSC PSIP)
Provides PID values for all PSIP tables carried in the transport stream (except for the STT).

MIP
Mega-frame Initialization Packet

MPEG
Moving Picture Experts Group

M_TMCC
An ISDB-S/ARIB compliant multiplex with multiple transport streams. *See TMCC*.

Multiplex (Input)
A Multiplex, as used in this online help system, is any single or multiple program transport stream. The terms Input and Multiplex are interchangeable when discussing a monitored bitstream.

NIT (Network Information Table: MPEG-2 PSI)
Describes the physical network over which the transport stream is carried. The DVB and ATSC standards extend the MPEG-2 definition of the NIT.

PAT (Program Association Table: MPEG-2 PSI)
Associates program numbers and PMT PIDs.

PCR (Program Clock Reference)
One of the fields defined in the MPEG2 standard, a time stamp in the TS from which the decoder timing is derived.

PES (Packetized Elementary Stream)
One of the structures defined by the MPEG2 standard, used to carry elementary stream data.

PIA (Processing Interface Adapter)
One of the boards designed by THOMCAST. The PIA+ board filters and analyzes the input transport stream for compliance to MPEG-2, DVB, and ATSC TS standards.

PID (Packet Identifier)
One of the fields described in the MPEG2 standard; a unique integer value used to identify elementary streams of a program in a single or multi-program TS.

PMT (Program Map Table: MPEG-2 SI)
Lists the PID values of program elements (for instance, elementary stream PID(s) and the PID of the clock references for the program elements).

Program
The following structures are elements of MPEG-2 programs (or services): PES packets, PMT, ECM. Program elements may, or may not, have a common time base.

PSI (Program Specific Information)
Program Specific Information is used to describe the structure of a transport stream encoded using the MPEG-2 standards. PSI is carried in the following MPEG-2 table structures: CAT, NIT, PAT, PMT, and TSDT.

PSIP (Program and System Information Protocol)
Program and System Information Protocol is used to describe the structure of a transport stream encoded using the ATSC standards. PSIP is carried in the following ATSC table structures: EIT, ETT, MGT, RRT, STT, and VCT

PTS (Presentation Time Stamp)

One of the fields described in the MPEG2 standard; it may be present in a PES packet header that indicates the time that a presentation unit is presented in the T-STD.

RRT (Rating Region Table: ATSC PSIP)

Provides rating information pertaining to a specified geographic region.

RST (Running Status Table: ATSC PSIP)

Allows quick updates to the timing information for the transport stream.

SDT (Service Description Table: DVB PSI)

Describes the services carried by the transport stream.

SDTT (Software Download Trigger Table)

ARIB only.

Service

A service, also called a program, is a collection of program elements that may, or may not have a common time base.

See also Program.

SFN

Single Frequency Network

SI (Service Information)

Service information is used to describe the structure of a transport stream encoded using the DVB standards. SI is carried in the following DVB table structures: BAT, EIT, NIT, RST, SDT, TDT, and TOT.

SID (Service ID)

The parameter used to uniquely identify a service within a transport stream.

SIT (Selection Information Table)

DVB-SI table.

Slot

An ISDB-S/ARIB structure corresponding to one, 204-byte error coded packet. *See Frame* and *Super frame*.

SNMP (Simple Network Management Protocol)

SNMP is the most common protocol used in network management systems. SNMP is built on top of UDP/IP (User Datagram Protocol / Internet Protocol) and provides a common interface between all the various devices on a network and central network management stations. Network management stations use network software to monitor network traffic and respond to errors reported by devices on the network.

S_TMCC

An ISDB-S/ARIB compliant multiplex with only one transport stream. *See TMCC*.

STS Interval

The STS interval measurement is obtained by calculating the difference between the STS of the current MIP and the STS of the previous MIP, modulo one second.

STT (System Time Table: ATSC PSIP)

Provides time and date information for the transport stream, as well as offset and daylight savings time data.

Super frame

An ISDB-S/ARIB structure comprised of eight frames. *See Frame* and *Slot*.

System Layer

The system layer is the transport stream with program data and associated metadata that describes the composition and organization of the transport stream.

MPEG-2 system layer information includes synchronization bytes, PID numbers, scrambling information, and other indicators, including the start of the transport packet payload. Transport packets can be PES packet, a PSI table, or other private data. ATSC and DVB transport streams are MPEG-2 compatible because the required ATSC and DVB system layer data are MPEG-2 private data structures.

See the appropriate MPEG-2, DVB, or ATSC standards for more information.

TDT (Time and Date Table: DVB SI)

Provides the time and date information (in UCT) for the transport stream.

TOT (Time Offset Table: DVB SI)

Provides time offset information for the transport stream.

Traps

Traps are SNMP messages generated by the Analysis Server. These messages are sent to one or more Server Managers (which you specify using the Router utility). Ultimately, the traps regarding errors on the transport stream are displayed as various error icons using the Master client.

Transport Stream

A transport stream is an ordered series of bytes representing valid MPEG-2, DVB, or ATSC elements used to deliver video, audio, or data. A transport stream may be composed of one or more elementary streams.

The following MPEG-2, DVB, and ATSC structures are transport stream elements: Program elements (including elementary streams and time stamps), and PSI, SI, and PSIP tables.

TS

See Transport Stream

T-STD (Transport Stream - System Target Decoder)

Described by the MPEG2 standard; a hypothetical reference model of a decoding process used to define the semantics of a TS.

TMCC (Transmission and Multiplexing Configuration and Control)

Information encoded in the first eight bytes of the 16-byte Reed-Solomon area of 204-byte packet transport streams. TMCC information includes modulation modes, slot assignments, and alarms.

TSC

Transport Scrambling Control

TSDT (Transport Stream Descriptor Table: MPEG-2 PSI)

The TSDT uses descriptors to provide information about the transport stream; for instance, information about the elementary streams, system clock, bit rate, and other parameters.

TSID (Transport Stream ID)

The parameter that uniquely identifies a transport stream within an original network.

VCT (Virtual Channel Table: ATSC PSIP)

There are two types of VCT: Terrestrial and Cable. Both describe attributes of the virtual channels defined for the transport stream including the transmission system and data about the services and programs for the network.

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