MTX100B
MPEG Player and Recorder
Specifications and Performance Verification

Technical Reference

Tektronix

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Contacting Tektronix

Warranty

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

[W2 – 15AUG04]

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

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

To Avoid Fire or Personal Injury

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

Ground the Product. This product is 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.

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

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

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

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

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

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

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

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

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

Symbols and Terms on the Product   These terms may appear on the product:

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

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

- CAUTION indicates a hazard to property including the product.

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

⚠   ⏚   ⏻
CAUTION   Protective Ground   Standby
Refer to Manual   (Earth) Terminal

Preface

This manual lists the published specifications for the MTX100B MPEG Recorder and Player and provides a procedure for verifying the performance of the instrument.

Manual Structure

This manual is divided into following sections:

- *Specifications* Contains a description of the MTX100B and characteristics that apply to it.

- *Performance Verification* Contains procedures for confirming that an MTX100B functions properly and meets warranted characteristics.

Sections containing procedures also contain introductions to those procedures. Be sure to read these introductions because they provide information needed to do the service correctly and efficiently.

Related User Documents

Item	Purpose	Location
MTX100B Quick Start User Manual (071-2593-xx English, 071-2594-xx Japanese)	Provides installation and high-level operational overviews	
MTX100B Technical Reference (077-0189-xx)	Provides in-depth operating information	
MTX100B Service Manual (077-0191-xx)	Optional manual supporting module-level servicing of the instrument	
MTX100B Declassification and Security Instructions (077-0187-xx)	Provides instructions for removing your proprietary information from the instrument	
MTX/RTX Release Notes (077-0195-xx)		

Manual Conventions

This manual uses certain conventions with which you should become familiar.

Some sections of the manual contain procedures for you to perform. To keep those instructions clear and consistent, this manual uses the following conventions:

■ Names of front panel controls and menus appear in the same case (initial capitals, all uppercase, and so forth) in the manual as is used on the MTX100B front panel and menus.

■ Instruction steps are numbered unless there is only one step.

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

Example: Press the **Menu** button to open the **File** menu.

■ *Italic* text refers to document names or sections. Italics are also used in NOTES, CAUTIONS, and WARNINGS.

Example: Generally, the performance check described in the *Performance Verification* section, should be done every twelve months. In addition, a performance check is recommended after module replacement.

Introduction

This manual contains information needed to properly service the MTX100B MPEG Recorder & Player, as well as general information critical to safe and effective servicing.

To prevent personal injury or damage to the MTX100B, consider the following before attempting service:

- The procedures in this manual should be performed only by a qualified service person.

- Read the General Safety Summary and the Service Safety Summary.

When using this manual for servicing, be sure to follow all warnings, cautions, and notes.

Performance Check Interval

Generally, the performance check described in the *Performance Verification* section, should be done every twelve months. In addition, a performance check is recommended after module replacement.

If the MTX100B does not meet performance criteria, repair is necessary.

Specifications

Specifications

Tables 1 through 13 list the functional, electrical, mechanical, and environmental characteristics of the MTX100B. All listed specifications are guaranteed unless labeled "typical". Typical specifications are provided for your convenience but are not guaranteed.

Software Protection

The MTX100B software options require that a software key, and beginning with V10.1, an OptionDongle be installed so that the purchased set of options can be accessed.

⚠ **CAUTION.** *The software key/OptionDongle must be installed on the instrument before the MTX100B software application will operate.*

The software key is the character string that is entered into the Option Update Key string field. Beginning with V10.1, an OptionDongle is also provided. The OptionDongle is a small hardware device that is available in parallel port form. The software key and the OptionDongle work together; the software polls the OptionDongle at the beginning of the application and during the Play and Record to verify the option coding. The type of software key used by your test system is determined at the time of the original product order.

Any printer compatible with the installed operating system can be connected to the unit through the parallel port version of the OptionDongle.

Performance Conditions

The electrical characteristics listed on the following pages are valid under the following conditions:

- The MTX100B must be in an environment where the temperature, altitude, humidity, and vibration conditions are within the operating limits. (See Table 1-13.)

- The MTX100B must have a warm-up period of at least 20 minutes.

- The MTX100B must be operating at an ambient temperature between +5 C to +40 C, unless otherwise noted.

Functional Specifications

Table 1-1: Functional specifications

Characteristics		Descriptions
System configuration	System OS	Windows XP Professional
	CPU	1.3 GHz
	System memory	1GB
	Display	6.3 inch, XGA (1024 x 768), Windows Control Panel setting is SVGA (800 x 600)
	Hard disk drive	250 GB

Electrical Specifications

Table 1-2: Mainframe

Characteristics		Description
Maximum output rate		
	Hard disk	≥ 120 Mbps
	RAM	≥ 200 Mbps
Maximum record rate		
	Hard disk	≥ 120 Mbps (File size: < 4 GB, just after disk format operation)
		≥ 90 Mbps (File size: 33 GB, just after disk format operation)
	RAM	≥ 200 Mbps
Internal reference clock		For Output_clock, PCR/PTS/DTS, packet operation timing, and TDT/STT time.
	Frequency	27 MHz ± 1 ppm
	Stability	±0.5 ppm per year
		±1 ppm over temperature range
External reference/clock input		
	Connector type	BNC
	Input impedance, typical	50 Ω
	Reference input	
	Frequency	8.129698 MHz, 10 MHz, 27 MHz
	Input level, typical	Sine wave: 0 ± 6 dBm
		Square wave: 0.5 Vp-p to 3.0 Vp-p
	Clock input	
	Frequency	160 kHz to 25 MHz (parallel clock)
		1.28 MHz to 32 MHz (serial clock)
	Input level, typical	0.5 V to 3.0 V

Characteristics	Description
External trigger input/MISC output	
Connector type	BNC
Input impedance, typical	1 kΩ
Threshold level	Rising and falling edges are programmable.
High level	> 3.5 V (maximum input voltage: 7 V)
Low level	< 0.8 V
Output level	
High level	> 2.2 V (with 50 Ω termination)
Low level	< 0.8 V (with 50 Ω termination)
Output impedance	50 Ω
PLL	
Frequency	50 MHz to 100 MHz, Locked to reference clock
Output clock	50 MHz maximum (serial clock)
	26.75 MHz maximum (parallel clock)
Output rate	214 Mbps maximum
	64 Kbps minimum
TS clock	
(Internal and external reference, 27 MHz and 10 MHz)	TS clock = (X / (2 * Y * Z)) * 27 MHz
	15362 < X < 31248
	1686 < Y < 3376
	2 ≤ Z ≤ 65536
(External parallel clock)	TS clock = (X / (2 * Y * Z)) * external parallel clock, 214 MHz maximum
	15632 < X < 31248
	1 < Y < 16383
	2 ≤ Z ≤ 65536
(External serial clock)	TS clock = (X / (2 * Y * Z)) * external serial clock / 8,32 MHz maximum
	15632 < X < 31248
	1<Y < 16383
	2 ≤ Z ≤ 65536
P/N and Jitter (serial clock)	< −104 dBc/Hz at 21.455707 MHz +20 kHz (RBW=300 Hz)

Characteristics		Description
SPI interface		
	Connector type	D-sub, 25 pin
	Data rate	256 Kbps to 214 Mbps
	Pin assignments	1: DCLK 2: GND 3 to 10: DATA 7 to DATA 0 11: DVALID 12: PSYNC 13: Shield 14: /DCLK 15: GND 16 to 23 :/DATA 7 to /DATA 0 24: /DVALID 25: /PSYNC
Output		
	Output level, typical	330 mV to 550 mV (termination: internal 100 Ω, external 100 Ω), bus LVDS with 50 Ω termination
	Offset	1.1 V to 1.5 V
	Output resistance, typical	100 Ω, between differential outputs (output off)
	Data delay, typical	± 5 ns from the falling edge of DCLK. (See Figure 1-1 on page 1-13.)
Input		
	Input level, typical	> +100 mV, < −100 mV, (RI+)-(RI−) with 100 Ω termination
	Input resistance, typical	100 Ω (between differential inputs)
	Clock pulse width, typical	T/2 ± T/10, T=1/f (f=byte clock frequency). (See Figure 1-1 on page 1-13.)
	Data hold time, typical	T/2 ± T/10, T=1/f (f=byte clock frequency, Data are latched on DCLK rising edge.) (See Figure 1-1 on page 1-13.)

Characteristics	Description
VGA output	
Connector type	D-sub, 15 pin
Pin assignments	1: RED 2: GREEN 3: BLUE 4: NC 5: GND 6: GND 7: GND 8: GND 9: NC 10: GND 11: NC 12: NC 13: HSYNC 14: VSYNC 15: NC
Printer port	Supports SPP (Standard Parallel Port), EPP (Enhanced Parallel Port), and ECP (Extended Capabilities Port) modes.
Connector type	D-sub, 25 pin
Pin assignments	1: STROBE 2: D0 3: D1 4: D2 5: D3 6: D4 7: D5 8: D6 9: D7 10: ACK 11: BUSY 12: Paper Empty 13: SELECT 14: AUTOLF 15: ERR 16: INIT 17: SELECT 18: GND 19: GND 20: GND 21: GND 22: GND 23: GND 24: GND 25: GND

Characteristics	Description
USB 2.0 interface	
Number of connectors	2
Pin assignments	1: VCC 2: –DATA 3: +DATA 4: GND
LAN interface	10/100/1000 Base-T Ethernet interface
Connector type	RJ45
Pin assignments	1: MDI_0+ 2: MDI_0– 3: MDI_1+ 4: MDI_2+ 5: MDI_2– 6: MDI_1– 7: MDI_3+ 8: MDI_3–
Serial interface (Com)	RS-232C
Connector type	D-sub, 9 pin
Pin assignments	1: DCD 2: RX 3: TX 4: DTR 5: GND 6: DSR 7: RTS 8: CTS 9: RI
IEEE1394B interface	
Compliant	IEEE1394B-2002
Pin assignments	1: TPB– 2: TPB+ 3: TPA– 4: TPA+ 5: TPA (R) 6: VG 7: NC 8: VP 9: TPB (R)

Characteristics	Description
AC line power	
Rating Voltage	100 VAC to 240 VAC, CAT II
Voltage Range	90 VAC to 250 VAC
Frequency Range	50 Hz to 60 Hz
Maximum power	180 VA
Maximum current	1.3 A
Main fuse data	5 A Time-delayed, 250 V (not operator replaceable)
	2 A Time-delayed, 250 V (not operator replaceable)

Table 1-3: ASI interface (Option 01)

Characteristics	Description
Standard conformance	EN50083-9 Annex B
Connector type	BNC
Impedance, typical	75 Ω
Data rate	256 Kbps to 214 Mbps
Output	
Number of outputs	2
Output voltage	800 mV ± 10%
Jitter	≤ 0.2 UI (p-p)
Rise/fall time (20% to 80%)	≤ 1.2 ns
Return loss	< −17 dB (5 MHz to 270 MHz) into 75 Ω load
Input	
Number of inputs	1 (with active loop-through output)
Input voltage	200 mV to 800 mV
Return loss	< −17 dB (5 MHz to 270 MHz) into 75 Ω load
Data format	Accepts both burst and packet modes ASI

Table 1-4: Universal parallel/serial interface (Option 02)

Characteristics	Description
Parallel interface mode	
Connector type	D-sub, 25 pin (the same connector as serial output)
Data rate	256 Kbps to 214 Mbps
Pin assignments	1: DCLK 2: GND 3 to 10: DATA 7 to DATA 0 11: DVALID 12: PSYNC 13: Shield 14: /DCLK 15: GND 16 to 23: /DATA 7 to /DATA 0 24: /DVALID 25: /PSYNC
Output level, typical	Note: Do not connect the /Asserted Low pins for single-end use.
TTL without termination	LO: 0 V
	HI: 3.3 V
LVDS without termination	0.66 Vp-p to 1.1 Vp-p (amplitude)
	1.1 V to 1.5 V (offset)
ECL without termination	LO: –2.1 V
	HI: –0.5 V
Output impedance, typical	50 Ω ± 5% (per pin, single-end)
Output resistance, typical	≥ 1 kΩ (when the output is off, per pin, single-end)
Data delay, typical	0 ± 5 ns from the falling edge of DCLK. (See Figure 1-1.)
Single-end input level, typical	
TTL with termination	LO: 0.0 V to 0.5 V
	HI: 1.2 V to 5.0 V
ECL with termination	LO: –5.2 V to –1.05 V
	HI: –0.25 V to 0.0 V
Differential input level, typical	0.4 V to 1.0 Vp-p (between +pin and –pin without termination)
	0.2 V to 1.0 Vp-p (between +pin and –pin with termination)
Input resistance, typical	50 Ω ± 5% to GND pin (single end termination: ON)
	110 Ω ± 5% (differential termination: ON)
	≥ 1 kΩ to GND (termination: OFF)
Clock pulse width, typical	T/2 ± T/10, T=1/f (f=byte clock frequency.)
	(See Figure 1-1.)
Data hold time, typical	T/2 ± T/10, T=1/f (f=byte clock frequency, data are latched on DCLK rising edge.)
	(See Figure 1-1.)

Characteristics	Description
Serial interface mode	
Connector type	D-sub, 25 pin (uses a common connector with parallel interface)
Data rate	256 Kbps to 40 Mbps
Pin Assignments	1: DCLK 2: GND 3 to 9: Not managed 10: DATA 0 11: DVALID 12: PSYNC 13: Shield 14: /DCLK 15: GND 16 to 22: Not managed 23: /DATA 0 24: /DVALID 25: /PSYNC
Output level, typical	***NOTE.*** *Note: Do not connect the /Asserted Low pins for single-end use.*
TTL without termination	LO: 0 V HI: 3.3 V
LVDS without termination	0.66 Vp-p to 1.1 Vp-p (amplitude) 1.1 V to 1.5 V (offset)
ECL without termination	LO: –2.1 V HI: –0.5 V
Output impedance, typical	50 Ω ± 5% (per pin, single-end)
Output resistance, typical	≥ 1 kΩ (when the output is off, per pin, single-end)
Data delay, typical	0 ± 5 ns from the falling edge of DCLK. (See Figure 1-1.)
Single-end input level, typical	
TTL with termination	LO: 0.0 V to 0.5 V HI: 1.2 V to 5.0 V
ECL with termination	LO: –5.2 V to -1.05 V HI: –0.25 V to 0.0 V
Differential input level, typical	0.4 V to 1.0 Vp-p (between +pin and –pin without termination) 0.2 V to 1.0 Vp-p (between +pin and –pin with termination)
Input resistance, typical	50 Ω ± 5% to GND pin (single end termination: On) 110 Ω ± 5% (differential termination: On) ≥ 1 kΩ to GND pin (termination: Off)
Clock pulse width, typical	$T/2 \pm T/10$, $T=1/f$ (f=byte clock frequency.) (See Figure 1-1 on page 1-13.)
Data hold time, typical	$T/2 \pm T/10$, $T=1/f$ (f=byte clock frequency, data are latched on DCLK rising edge.) (See Figure 1-1 on page 1-13.)

Characteristics	Description
Event output (EVENT OUT)	
Connector type	BNC
Output level, typical	TTL without termination
	LO: < 0.4 V
	HI: > 2.4 V
Output impedance, typical	50 Ω

Table 1-5: IEEE1394/ASI interface (Option 05)

Characteristics	Description
IEEE1394 interface	
Standard conformance	IEEE Std 1394-1995 IEEE Standard for High Performance serial Bus
Number of connectors	2
Serial interface rate	S-400
Maximum TS rate	40 Mbps
ASI interface	
Standard conformance	EN 50083-9 Annex B
Connector type	BNC
Impedance, typical	75 Ω
Data rate	256 Kbps to 214 Mbps
Input vlotage, typical	200 mV to 800 mV
Output voltage	800 mV ± 10%
Return loss	< –17 dB (5 MHz to 270 MHz) into 75 Ω load

Table 1-6: SMPTE310M/ASI/SPI interface (Option 07)

Characteristics			Description
SMPTE310M interface			Uses common input/output connectors with the ASI interface.
	Standard conformance		SMPTE310M
	Connector type		BNC
	Impedance		75 Ω
	Data rate		19.392658 Mbps (8 VSB, 188 bytes packet size)
	Output		
		Number of outputs	1
		Output voltage	800 mV ± 10%
		Jitter	≤ 0.2 UI p-p
		Rise/fall time	0.4 ns to 5.0 ns (20% to 80%)
		Frequency range, typical	± 3%
	Input		

Table 1-6: SMPTE310M/ASI/SPI interface (Option 07) (cont.)

Characteristics			Description
		Number of inputs	1
		Input voltage, typical	800 mV ± 10%
		Frequency range, typical	± 3%
ASI interface			Uses common input/output connectors with the SMPTE310M interface.
	Standard conformance		EN 50083-9 Annex B
	Connector type		BNC
	Impedance		75 Ω
	Data rate		256 Kbps to 214 Mbps
	Output		
		Number of outputs	1
		Output voltage	800 mV ± 10%
		Jitter	≤ 0.2 UI p-p
		Rise/fall time	≤ 1.2 ns (20% to 80%)
		Return loss	< –17 dB (5 MHz to 270 MHz) into 75 Ω load
	Input		
		Number of inputs	1
		Input voltage, typical	200 mV to 800 mV
		Return loss	< –17 dB (5 MHz to 270 MHz) into 75 Ω load
SPI interface			
	Connector type		D-sub, 25 pin
	Data rate		256 Kbps to 214 Mbps
	Pin assignments		1: DCLK
			2: GND
			3 to 10: DATA 7 to DATA 0
			11: DVALID
			12: PSYNC
			13: Shield
			14: /DCLK
			15: GND
			16 to 23: /DATA 7 to /DATA 0
			24: /DVALID
			25: /PSYNC

Table 1-6: SMPTE310M/ASI/SPI interface (Option 07) (cont.)

Characteristics		Description
Input		
	Input level, typical	> +100 mV, < –100 mV, (RI+)-(RI–) with 100 Ω termination
	Input resistance, typical	100 Ω (between differential inputs)
	Clock pulse width, typical	T/2 ± T/10, T=1/f (f=byte clock frequency.) (See Figure 1-1.)
	Data hold time, typical	T/2 ± T/10, T=1/f (f=byte clock frequency, Data are latched on DCLK rising edge.) (See Figure 1-1.)

Output data delay

Input clock pulse width

Th = T/2   T/10: SPI and universal parallel interfaces
Th = T/5   T/10: universal serial interface

* In the universal parallel/serial interface,
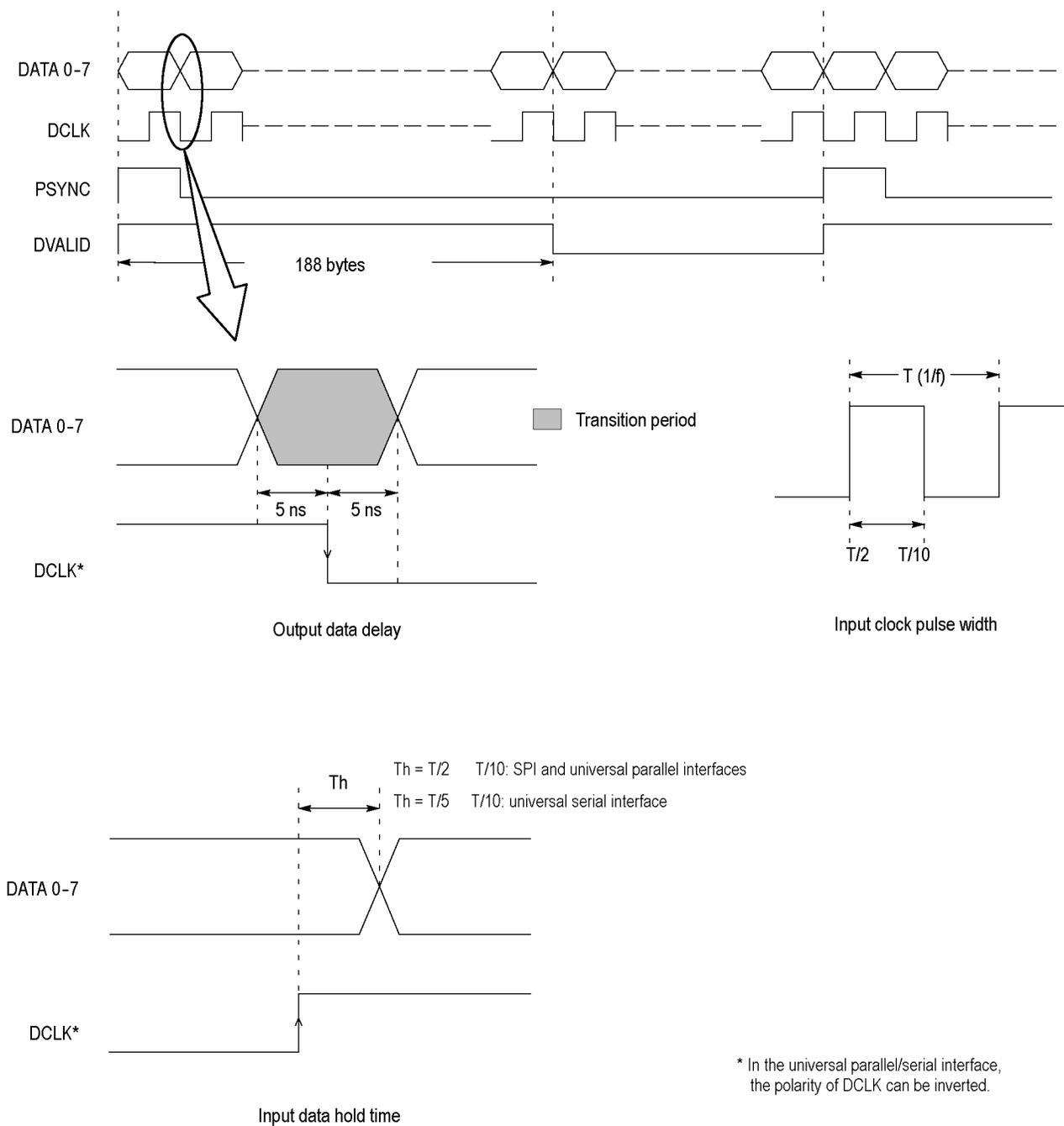 the polarity of DCLK can be inverted.

Input data hold time

Figure 1-1: Timing diagram of the SPI and universal parallel/serial interfaces

Table 1-7: GigE interface card - general characteristics

Characteristic	Description
Ethernet Port	The Ethernet Interfaces supports 1000/100/10 Mbit/s data transmission. The Ethernet Interface to the card will be an IEEE 802.3 compliant 10/100/1000 Ethernet interface supporting 10/100/1000BT, 1000BSX(multi-mode), and 1000BLX(single-mode).
	Two Ethernet interfaces are available - a copper RJ-45 interface and an MSA (multisource agreement) compliant SFP (Small Form-factor Pluggable) connector. The SFP connector will provide for pluggable optical interfaces. Only one interface, either the copper or optical, will be active at a time for video over IP monitoring. The active interface will be selectable via software control.
Transport stream rate over IP	250 Kbps to 155 Mbps; typical

Table 1-8: GigE interface card - Ethernet electrical port

Characteristic	Description
Standard	10/100/1000BASE-T IEEE 802.3
Connector Type	RJ-45
Data Format 10/100 Base T	NRZ
Data Format 1000 Base T	Trellis encoded, PAM5 symbols full-duplex on 4-pair Cat-5 UTP per IEEE 802.3ab
Ethernet optical transmitter - general characteristics	
Optical Operating Mode	Single Mode or Multimode
Connector Type	Duplex data link MSA compliant SFP connector
Standard	1000 BASE-X
Data Format	NRZ
Ethernet Optical Transmitter - single mode 1550nm using Tektronix supplied SFP module	
Output Power	−2 dBm to +4 dBm; typical
Center Wavelength - 1550 nm	1530 nm Min, 1550 nm Typ, 1570 nm Max; typical
Total Jitter (Peak-to-Peak)	170 ps
Extinction Ratio	9.0 dBm
Ethernet optical receiver - single mode 1550nm using Tektronix supplied SFP module	
Optical Input Power	−26 dBm to −3 dBm, BER 1 X 10^{-12}; typical
Input Wavelength	1270 nm = λ = 1610 nm
Ethernet optical transmitter - single mode 1310nm using Tektronix supplied SFP module	
Output Power	−11 dBm to −3 dBm; typical
Center Wavelength - 1310 nm	1270 nm Min, 1310 nm Typ, 1355 nm Max; typical
Total Jitter (Peak-to-Peak)	170 ps
Extinction Ratio	9.0 dBm

Table 1-8: GigE interface card - Ethernet electrical port (cont.)

Characteristic	Description
Ethernet optical receiver - single mode 1310nm using Tektronix supplied SFP module	
Optical Input Power	-19 dBm to -3 dBm, BER 1 X 10^{-12}; typical
Input Wavelength	1270 nm = λ = 1610 nm
Ethernet optical transmitter - multimode 850nm using Tektronix supplied SFP module	
Output Power	-9.5 dBm to -2 dBm; typical
Center Wavelength - 850 nm	830 nm Min, 850 nm Typ, 860 nm Ma; typical
Total Jitter (Peak-to-Peak)	170 ps
Extinction Ratio	9.0 dBm
Ethernet optical receiver - multimode 850nm using Tektronix supplied SFP module	
Optical Input Power	-17 dBm to 0 dBm, BER 1 X 10^{-12}; typical
Input Wavelength	770 nm = λ = 860 nm

Table 1-9: GigE interface card - ASI input

Characteristic	Description
Connector	BNC
Transport Stream Rate	250 Kbps to 155 Mbps; typical
Data Format	Accepts both Burst and Packet mode ASI format
Signal Amplitude	2.0 V $_{p-p}$ max; 200 mV pk to pk min
Termination	75 Ω nominal, transformer coupled
Return Loss	10 dB min, 5 MHz to 270 MHz
Link Rate	270 Mbaud 100 ppm

Table 1-10: GigE interface card - ASI output

Characteristic	Description
Connector	BNC
Impedance	75 Ω nominal, transformer coupled
Transport Stream Rate	250 Kbps to 155 Mbps max
Transport Stream Smoothing	Smoothing mechanism for the TS packets before retransmitting packets out on ASI port
Signal Amplitude	600 mV pk to pk min, $1.0V_{p-p}$ max into a 75 Ω load
Return Loss	10 dB min at 270 MHz

Table 1-11: GigE interface card - SMPTE310M input (loop-through to ASI output)

Characteristic	Description
Connector	BNC
Termination	75 Ω nominal, transformer coupled
Data Format	Bi-phase coded. Compliant with SMPTE310M
Input Bit Rate	19,392,658.5 bps ±2.8 ppm
Signal Amplitude	2.0 V_{p-p} max; 200 mV_{p-p} min
Return Loss	10 dB min at 20 MHz

Mechanical (Physical) Characteristics

Table 1-12: Mechanical characteristics

Characteristics	Description
Net weight	
Standard	Approximately 6 kg (13.2 lb)
Dimensions	
Height	132 mm (5.1 in), without feet
Width	214 mm (8.4 in)
Length	435 mm (17.1 in)

Environmental Characteristics

Table 1-13: Environmental characteristics

Characteristics			Description
Temperature			
	Operating		+5 °C to +40 °C
	Non-operating		–20 °C to +60 °C
Relative humidity			
	Operating		20% to 80% (No condensation)
			Maximum wet-bulb temperature 29 °C
	Non-operating		5% to 90% (No condensation)
			Maximum wet-bulb temperature 29 °C
Altitude			
	Operating		Up to 3 km (approximately 10,000 feet)
			Maximum operating temperature decreases 1 °C each 300 m above 1.5 km
	Non-operating		Up to 15 km (approximately 50,000 feet)
Dynamics			
	Vibration		
		Operating	2.65 m/s ^{2} rms (0.27 Grms), 5 Hz to 500 Hz, 10 min, three axes
		Non-operating	22.3 m/s ^{2} rms (2.28 Grms), 5 Hz to 500 Hz, 10 min, three axes
	Shock		
		Non-operating	294 m/s ^{2} (30 G), half-sine, 11 ms duration
Installation requirements			
	Power dissipation		100 W maximum. Maximum line current is 1.3 A$_{rms}$ at 50 Hz
	Surge current		≤ 12 A peak for less than 5 line cycles at 25 °C after product has been off for at least 30 seconds
	Cooling clearance		
		Top clearance	5 cm (2 in)
		Side clearance	5 cm (2 in)
		Rear clearance	5 cm (2 in), from the fan guard

Performance Verification

Performance Verification

This section provides procedures to verify the performance and functionality of the MTX100B network interface.
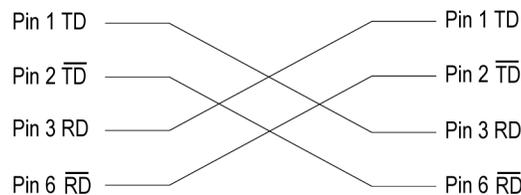
Connecting to a Network

The MTX100B has a LAN (10/100/1000 Base-T) port on the rear panel for Ethernet communications.

This section provides instructions for connecting the MTX100B to a single PC or a network and setting the network parameters for the LAN port.

Connecting the MTX100B to your PC or MTS400 system

The MTX100B uses the rear-panel LAN port to communicate with a PC or an MTS400 system. Use one of the following methods to connect the MTX100B to your PC or MTS400:

- If you are connecting the MTX100B directly to a single PC, use a crossover Ethernet cable to connect between the LAN port on the MTX100B and the Ethernet port on the PC. If you need to construct your own crossover cable, the following figure shows the pin connections to change on a straight cable to produce a crossover cable.

Pin 1 TD		Pin 1 TD
Pin 2 $\overline{TD}$		Pin 2 $\overline{TD}$
Pin 3 RD		Pin 3 RD
Pin 6 $\overline{RD}$		Pin 6 $\overline{RD}$

Figure 2-1: Pin connections for a crossover Ethernet cable

- If you are connecting the MTX100B to your local Ethernet network, use a straight Ethernet cable to connect between the LAN port on the MTX100B and the Ethernet hub port of your local network. By connecting to an Ethernet network, you can access the MTX100B using any PC on the network.

Setting Ethernet Network Parameters

You can set the network parameters for the MTX100B using the Control Panel of Windows XP.

NOTE. *The following procedure requires that you are familiar with the basics of using the Windows XP operating system. If necessary, review the Windows XP documentation.*

Perform the following procedure to set the network parameters for the MTX100B:

1. Connect the keyboard and the mouse provided with the instrument to the USB connectors on the front panel. You can connect them to either of the connectors.

2. Select **File** > **Minimize** or **File** > **Exit** to close the MTX100B MPEG player. The Windows XP desktop appears.

3. Select **Settings** > **Control Panel** from the Start menu to display the Control Panel window.

4. Double-click the **Network Connections** icon in the window to display the Network Connections window.
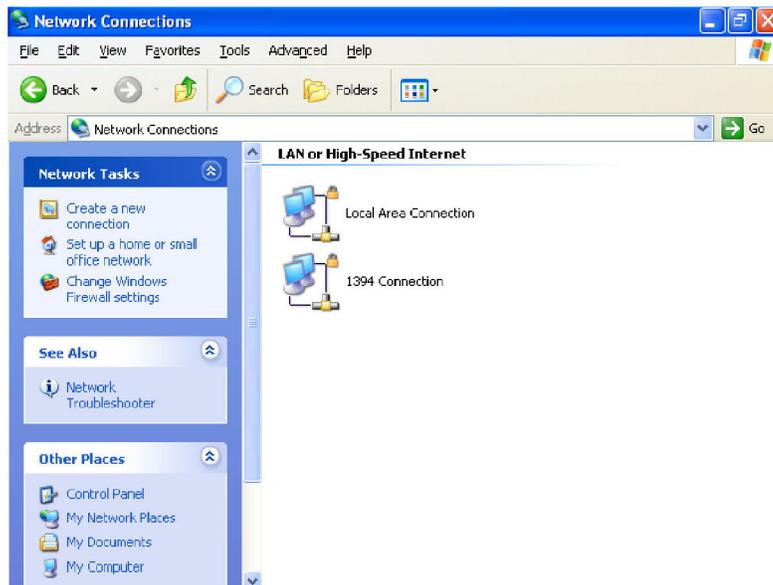
Figure 2-2: Network Connections window

5. Double-click the **Local Area Connection** icon. The Local Area Connection Status dialog box appears.
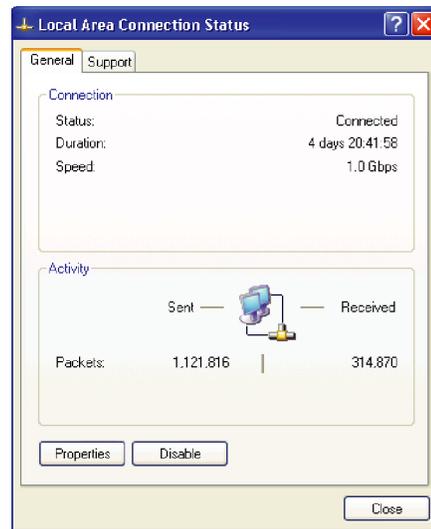

Figure 2-3: Local Area Connection Status dialog box

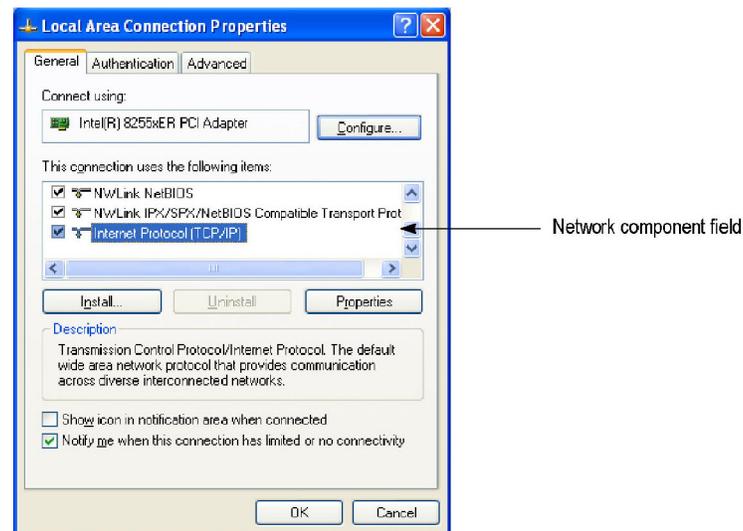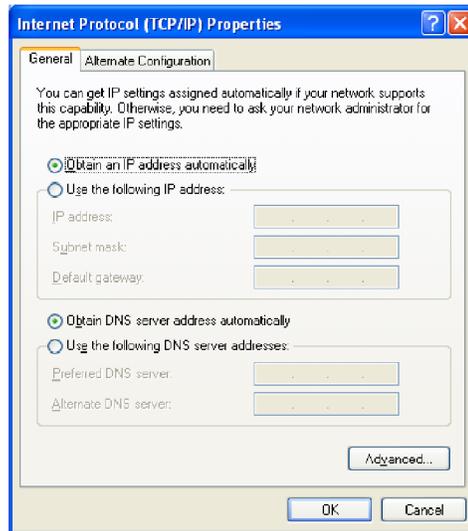6. Click the **Properties** button. The Local Area Connection Properties dialog box appears.

Figure 2-4: Local Area Connection Properties dialog box

7. In the network component field, select **Internet Protocol (TCP/IP)**.

8. Click the **Properties** button. The Internet Protocol (TCP/IP) Properties dialog box appears.

Figure 2-5: Internet Protocol (TCP/IP) Properties dialog box

The settings in the dialog box depend on whether a DHCP (Dynamic Host Configuration Protocol) server is in the network connected to the MTX100B.

When the DHCP Server Is in the Network. If the DHCP server is in the network, perform steps 9 and 10, otherwise skip to step 11.

9. In the dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically**.

10. Click the **OK** button.

The MTX100B accesses the DHCP server and obtains the addresses automatically when connected to the network.

Refer to the user documentation supplied with your server OS for detailed information about DHCP server functions.

NOTE. In some network environments, the MTX100B may not be able to obtain the IP address automatically from a DHCP server. In this case, you need to enter the appropriate address value in each submenu item.

When the DHCP Server Is Not in the Network. If the DHCP server is not in the network, perform the following procedure to set the network parameters.

11. If you connect the MTX100B directly to a single PC or an MTS400 system:

    a. In the dialog box, select **Use the following IP address**.

    b. Set the **IP address** parameter to be the same IP address as the PC or the MTS400 system address except for the last digit. The last digit must be different from the last number in the PC or the MTS400 system IP address.

    c. Set the **Subnet mask** parameter to be the same net mask (subnet mask) used by the PC or the MTS400 system. Do not enter a number if the PC or the MTS400 system does not have a net mask.

    d. You do not need to enter a **Default gateway** if you are directly connected to a single PC or an MTS400 system.

12. If you connect the MTX100B to your local Ethernet network:

    a. In the dialog box, select **Use the following IP address**.

    b. Ask your local network administrator and set the appropriate addresses.

⚠ *CAUTION. To prevent communication conflicts on your Ethernet network, ask your local network administrator for the correct numbers to enter in the dialog box if you connect the MTX100B to your local Ethernet network.*

13. Verify the Ethernet connection by using a ping command from the PC or the MTS400 system.

Required Equipment

The following table lists the test equipment required to do the performance verification procedures. The table identifies examples of recommended equipment and lists the required precision where applicable. If you substitute other test equipment for the examples listed, the equipment must meet or exceed the listed tolerances.

Table 2-1: Equipment required for performance verification

Item	Qty.	Minimum requirements	Recommended equipment
Frequency counter	1 ea.	Frequency range: 27 MHz Precision: 8 digits or higher	Agilent Technologies 53181A
MPEG analyzer	1 ea.		Tektronix MTS430 or MTS400
Function generator	1 ea.	Frequency: 40 M clock pattern Amplitude: 3 V Outputs: 2 channel	Tektronix AFG3102
Oscilloscope	1 ea.	Bandwidth: 1 GHz or higher	Tektronix TDS5104B
D-VHS digital recorder	1 ea.		JVC HM-DH5U
MPEG recorder and player	1 ea.		Tektronix MTX100A(B) Option 02
Video monitor	1 ea.		Sony LMD-1420
Probe	1 ea.		Tektronix P5050
75 Ω signal adapter	1 ea.	Bandwidth: 1 GHz Amplitude precision: –3 dB	Tektronix AMT75
50 Ω BNC cable	2 ea.	Length: 42 inches	Tektronix part number 012-0057-01
75 Ω BNC cable	2 ea.	Length: 42 inches	Tektronix part number 012-0074-00
Parallel interface cable	1 ea.	25-pin, D-type	Tektronix part number 012-A220-00 (supplied with the MTX100B)
IEEE1394b cable	1 ea.	9 pin-9 pin	
IEEE1394 cable	1 ea.	4 pin-4 pin	
RCA(Ma)-to-BNC(Fe) adapter	1 ea.		Zifor Enterprise BJ-7071
IEEE1394b hard disk drive	1 ea.		Novac NV-HD352WB and hard disk drive (Tektronix part number 119-7146-00)

MTX100B Test Record

Print this page and use it to record the performance test result.

Table 2-2: MTX100B test record

Serial Number:	Cal Date:	Temperature:	Humidity:

Performance Test	Minimum	Measured	Maximum
Internal Clock Frequency	26.999924 MHZ		27.000076 MHz

1 Test record limits are based on the SMPTE 310M frequency accuracy requirement.

Procedures

The following conventions are used in the performance verification procedures:

- Each test lists the characteristic that is being tested and the equipment required to perform the test.

- Each test contains complete setup instructions, which allows you to perform each test individually or in order.

- The equipment connection illustrations are specific to the recommended equipment (equipment nomenclature is labeled). If you are using substitute equipment, the location of your signal connections may vary from those in the illustrations.

NOTE. Before you begin the performance verification procedures, be sure that the MTX100B is operating in an environment that is within the operating limits. (See Table 1-13 on page 1-17.)

In addition, the MTX100B and the test equipment must be warmed up for at least 20 minutes to ensure accurate test results.
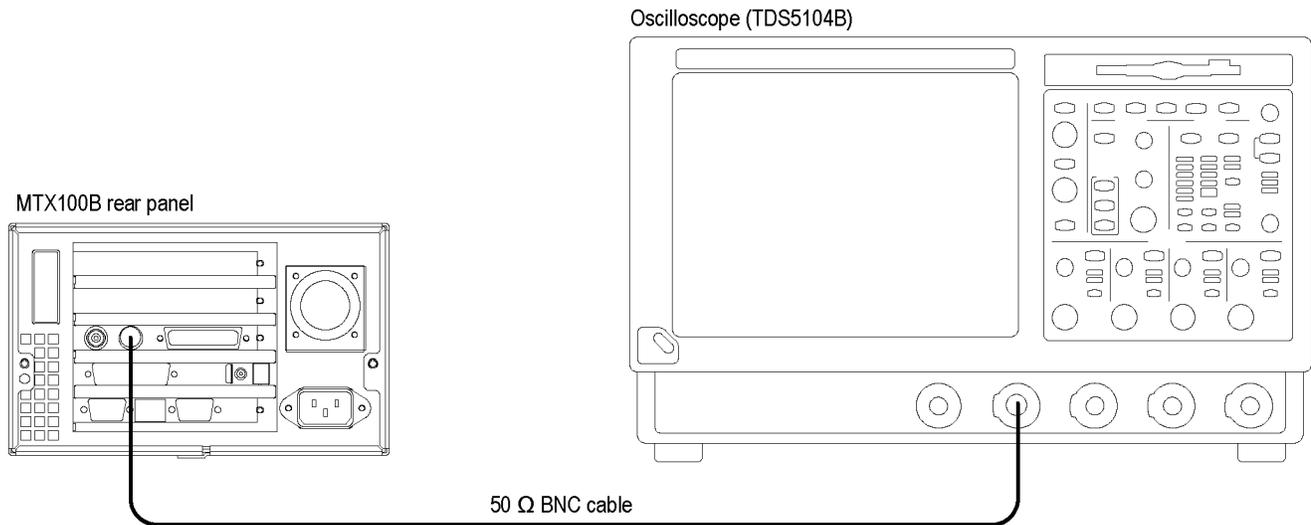
Internal Clock Output Level and Frequency Accuracy

This test verifies the internal clock output level and frequency accuracy.

Equipment required

■ Oscilloscope

■ Frequency counter

■ 50 Ω BNC cable

1. Use the 50 Ω BNC cable to connect the Trig In/Out connector on the MTX100B to the oscilloscope CH1 input.

Oscilloscope (TDS5104B)

MTX100B rear panel

50 Ω BNC cable

Figure 2-6: Equipment connection for verifying the internal clock output level

2. Set the oscilloscope as indicated below:

Control	Setting
Vertical scale	1 V/div (CH1)
Input impedance	50 Ω
Horizontal scale	10 ns/div
Trigger position	50%
Acquire mode	Average 16
Trigger mode	Auto
Trigger level	1.20 V
Trigger source	CH1
Trigger slope	Rising Edge
Input coupling	DC
Measure	High Level, Low level

3. Select **Play** > **Others** on the MTX100B to open the Others dialog box.

4. In the dialog box, select the **Ext Trigger BNC** button to open the Ext Trigger BNC dialog box.

5. In the dialog box, set **BNC IN/OUT** to **Output** and **BNC OUT Selection** to **27 MHz**.

6. Verify that the measured values are as follows:

Control	Setting
High Level	> 2.2 V
Low Level	< 0.8 V

7. Disconnect the 50 Ω BNC cable from the oscilloscope CH1 input, and then connect the BNC cable to the CH1 connector on the frequency counter.
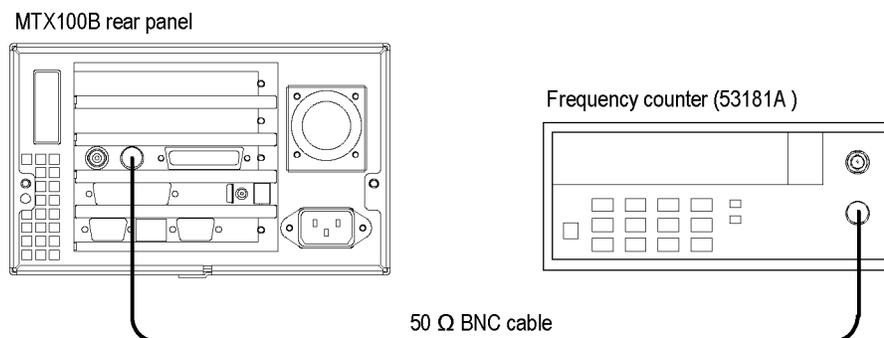
Figure 2-7: Equipment connection for verifying the internal clock frequency

8. Set the frequency counter settings as indicated below:

Control	Setting
MEASURE	Frequency1
Gate Time	0.20 s
CHANNEL1	Coupling: DC
Impedance	50 Ω
Trigger	AUTO TRIG ON

9. Record the frequency counter reading in the test record. (See page 2-7.)

10. In the Ext Trigger BNC dialog box, change **BNC IN/OUT** to **Input**.

11. Disconnect the BNC cable from the MTX100B and the frequency counter.

SPI Interface　　This test verifies that the transport stream data is correctly played from and recorded through the SPI In/Out connector on the MTX100B.

Equipment required

■ MPEG analyzer

■ Parallel interface cable

■ test40.TRP file

Checking the Play Operation.

1. Use the parallel interface cable to connect the SPI In/Out connector on the MTX100B to the DVB SPI In connector on the MPEG analyzer.

MPEG analyzer rear panel (MTS430)

MTX100B rear panel

Parallel interface cable

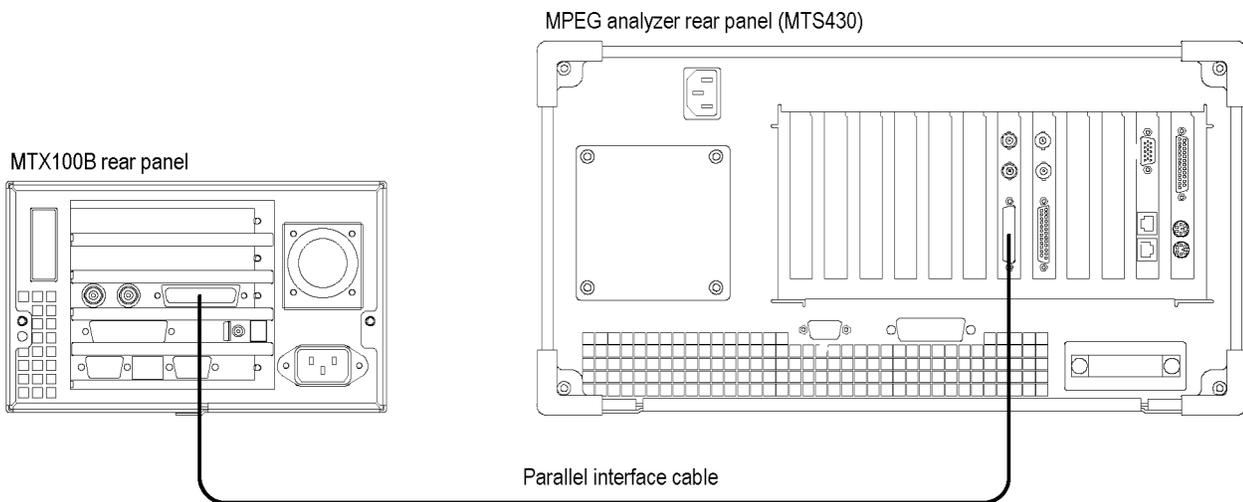**Figure 2-8: Equipment connection for verifying the SPI interface**

2. Start the **MPEG Player** application on the MPEG analyzer.

3. Set the application to the **Record** mode.

4. Set the MPEG analyzer settings as follows:

Control		Setting
Record	Source	SPI
	Target	RAM
	Size	100 MB
File	Save Mode	Over Write
	Save	E:\MTXRTX_Test streams\Record_Files\ SPI214Mbps

5. To open the **test40.TRP** file on the MTX100B, do the following:

    a. Select **File** > **Open** in the Play screen to open the Select File dialog box.

    b. In the dialog box, select the **test40.TRP** file.

6. In the **Play** menu, make the following settings:

Control	Setting
Clock	Data Rate: 214 Mbps
Update	Off
Source	RAM

7. Press the **Play/Pause** button on the MTX100B to start playing the test40.TRP file.

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen. In addition, verify that the bit rate is **214** Mbps and the packet size is **188** bytes.

9. Click the **Record** button on the MPEG Player application to record the file.

10. After the recording is complete, press the **Stop** button on the MTX100B.

Checking the Record Operation.

11. Change the interface cable connection from the DVB/SPI In connector to the DVB/SPI Out connector on the MPEG analyzer.

12. Press the **Record** button on the MTX100B to display the Record screen.

13. On the MTX100B, make the following settings:

Control		Setting
Record	Source	SPI
	Target	RAM
	Size	100 MB
	Save Mode	Over Write
File	Save Mode	Over Write
	Save	D:\Record_Files\SPI214Mbps

14. Change the MPEG analyzer to the Play mode.

15. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

16. In the dialog box, navigate to the **E:\MTXRTX_Test streams\ Record_Files**, and then select the **SPI214Mbps.trp** file.

17. Set the MPEG analyzer settings as follows:

Control	Setting
Data Rate	214 Mbps
Update	Off
Source	RAM

18. Click the **Play/Pause** button on the MPEG Analyzer to start playing the **SPI214Mbps.trp** file.

19. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate display is **214** Mbps and the packet size display is **188** bytes.

20. Press the **Record** button on the MTX100B to record the file.

21. After the recording is complete, click the **Stop** button on the MPEG analyzer.

22. Exit the MPEG Player application on the MPEG analyzer.

Checking the Recorded File.

23. Change the interface cable connection from the DVB/SPI Out connector to the DVB/SPI In connector on the MPEG analyzer.

24. Start the **TS Compliance Analyzer** on the MPEG analyzer.

25. In the TS Compliance Analyzer window, select **Real-time..** and make the following settings:

Control	Setting
Interfaces	DVB Parallel
Interface Settings	Time Stamping

26. Click the **OK** button.

27. Press the **Play/Pause** button on the MTX100B to display the Play screen.

28. Select **File** > **Open** to open the Select File dialog box.

29. In the dialog box, navigate to the **D:\ Record_Files** directory, and then select the **SPI214Mbps.trp** file.

30. Select **Play** > **Update** > **On**.

31. Press the **Play/Pause** button on the MTX100B to start playing the **SPI214Mbps.trp** file.

32. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **40** Mbps and that the transport stream packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the Navigation view because these are caused by the original test40.TRP file.

33. Press the **Stop** button on the MTX100B.

34. Close the TS Compliance Analyzer window.

External Clock/Reference and External Trigger Inputs

This test verifies that the external clock/reference input (Clock/Ref In) and external trigger input (Trig In/Out) on the MTX100B are functioning correctly.

Equipment required.

- MPEG analyzer
- Function generator
- Two 50 Ω BNC cables
- Parallel interface cable
- test64.TRP file

1. Use a 50 Ω BNC cable to connect the Clock/Ref In connector on the MTX100B to the Ch1 connector on the function generator.

2. Use the 50 Ω BNC cable to connect the Trig In/Out connector on the MTX100B to the Ch2 connector on the function generator.

3. Use the parallel interface cable to connect the SPI In/Out connector on the MTX100B to the DVB/SPI In connector on the MPEG analyzer.
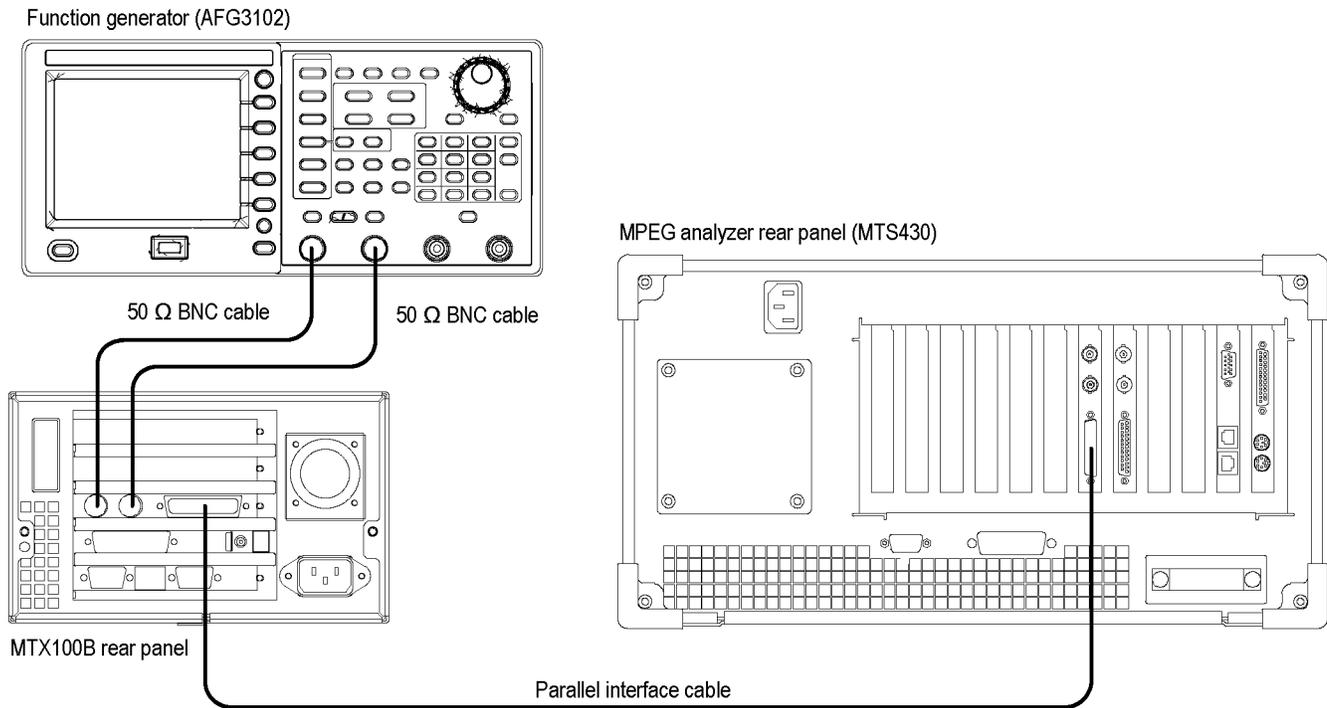
Figure 2-9: Equipment connections for verifying the external clock/reference and trigger inputs

4. Set the function generator settings as indicated below:

Control		Setting
Ch 1 output	Function	Square
	Run Mode	Continuous
	Frequency	10 MHz
	Output Amplitude	0.5 V
	Output Offset	2.0 V
Ch 2 output	Function	Arb (Edit: Point Number: 100, All Data: 16382)
	Run Mode	Continuous
	Output Menu	Load Impedance: 1 kΩ
	Output Amplitude	1.75 V
	Output Offset	0.875 V

5. Press the **On** button of the Ch1 output on the function generator.

6. To open the **test64.TRP** file on the MTX100B, do the following:

   a. Select **File** > **Open** in the Play screen to open the Select File dialog box.

   b. In the dialog box, select the **test64.TRP** file.

7. Select **Play** > **Update** > **On**.

8. Select **Play** > **Clock** to open the Clock dialog box.

9. In the dialog box, select **ExtRef 10**.

10. Press the **Play/Pause** button on the MTX100B to start playing the **test64.TRP** file.

11. Verify that PLL unlock error does not occur on the MTX100B.

12. Start the **TS Compliance Analyzer** on the MPEG analyzer.

13. In the TS Compliance Analyzer window, select **Real-time..**, and then make the following settings:

Control	Setting
Interfaces	DVB Parallel
Interface Settings	Time Stamping

14. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the data rate is **64** Mbps and that the packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the Navigation view because these are caused by the original test40.TRP file.

---

15. Change the clock source setting on the MTX100B and output frequency setting on the function generator with the following and then repeat step 14.

Clock source setting (MTX100B)	Output frequency setting (function generator)
ExtRef 27	27 MHz
Ext Ref 8.126984 MHz	8.126984 MHz
Ext P Clk	8 MHz

16. Change the output frequency of the function generator to 32 MHz.

NOTE. You have to click the Ext S Clk to select the Ext P Clk.

17. Select **Play** > **Clock** on the MTX100B to open the Clock dialog box.

18. In the dialog box, select **Ext S Clk**.

19. Repeat step 14 and verify that all items in the **Priority 1** row are green.

*NOTE. Ignore 2.3.a PCR Repetition and 2.5 PTS errors in the Priority 2 row.*

20. Press the **Stop** button on the MTX100B to stop the stream output.

21. Select **Play** > **Clock** on the MTX100B to open the Clock dialog box.

22. In the Clock dialog box, select **Internal**.

23. Press the **On** button of the Ch1 output on the function generator to stop the signal output.

24. Press the **On** button of the Ch2 output on the function generator to start the signal output.

25. Select **Play** > **Others** on the MTX100B to open the Others dialog box.

26. In the Others dialog box, set **Ext Play Start** to **Rise**.

27. Verify that the MTX100B starts playing when the Output menu is set to **Invert** on the function generator.

28. Press the **Stop** button on the MTX100B to stop the stream output.

29. Press the **On** button of the Ch2 output on the function generator to stop the signal output.

30. Return **Ext Play Start** to **Off** on the MTX100B.

31. Disconnect all cables from the MTX100B, the function generator, and the MPEG analyzer.

IEEE1394b Interface   This test verifies that the IEEE1394b interface is functioning correctly.

Equipment required.

- IEEE1394b hard disk drive

- IEEE1394b cable (9 pin-9 pin)

- test40.TRP file

1. Use the IEEE1394b cable to connect the IEEE1394b connector on the MTX100B to the IEEE1394b hard disk drive.
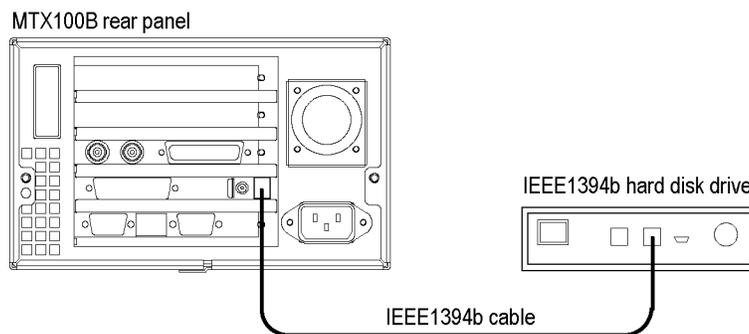
Figure 2-10: Equipment connection for verifying the IEEE1394b interface

2. Select **Play** > **Minimize** to minimize the MTX100B application.

3. Power on the IEEE1394b hard disk drive.

4. Double-click the **My Computer** icon on the Windows desktop to open the My Computer window.

5. In the window, verify that the hard disk drive is recognized as the **F:** (or **G:)** drive.

6. Use the Windows file copy operation to copy the **test40.TRP** file on the **D:** drive to **F:** (or **G:)** drive.

7. Verify that the **test40.TRP** file is copied to the F: (or G:) drive correctly.

8. Delete the **test40.TRP** file from the F: (or G:) drive.

9. Power off the IEEE1394b hard disk drive.

ASI Interface (Option 01 Only)

This test verifies that the transport stream data is correctly output from and is recorded through the ASI interface on the MTX100B.

Required Equipment.

- ■ MPEG analyzer

- ■ Oscilloscope

- ■ 75 Ω signal adapter

- ■ test40.TRP file

- ■ Two 75 Ω BNC cables

Checking the Output Signal.

1. Use a 75 Ω BNC cable and the 75 Ω signal adapter to connect the ASI Out 1 connector on the MTX100B to the oscilloscope CH1 input.
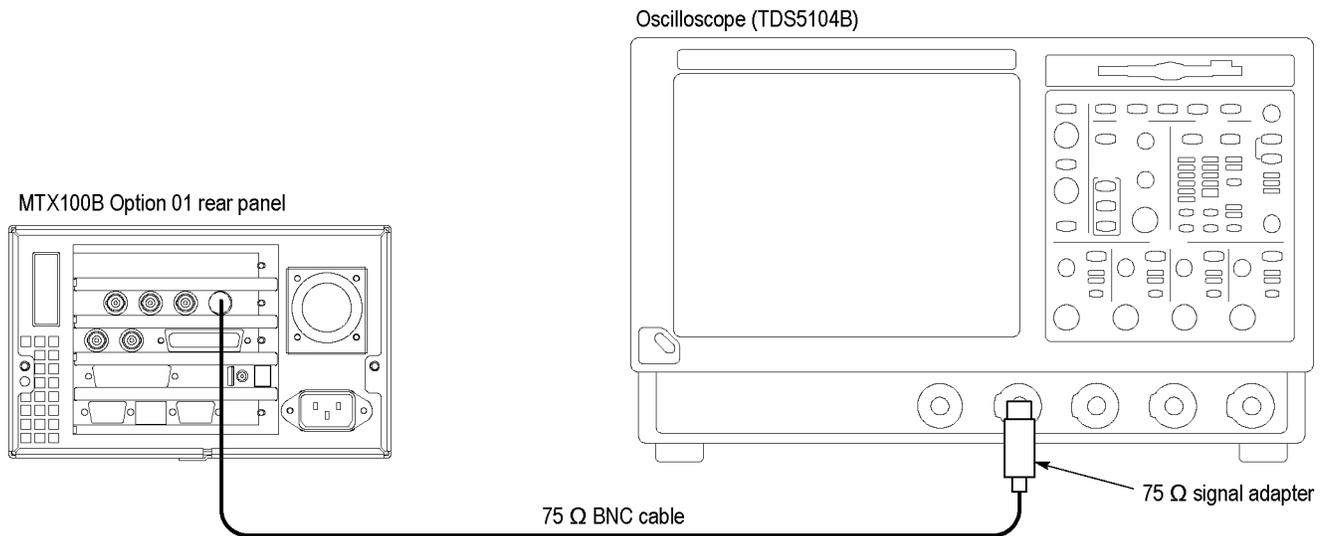
Figure 2-11: Equipment connection for verifying the output signal-ASI interface

2. Set the oscilloscope settings as follows:

Control	Setting
Vertical scale	200 mV/div
Input impedance	50 Ω
Horizontal scale	1.25 ns/div
Trigger position	50%
Acquire mode	Average 32
Trigger mode	AUTO
Trigger source	CH1

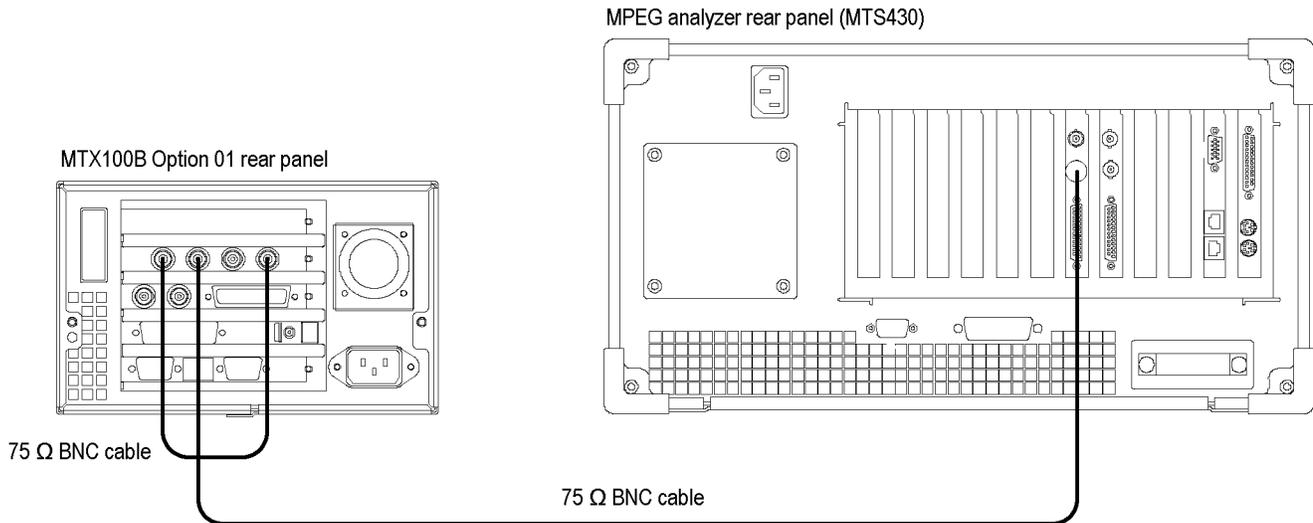| Control	Setting
Trigger level	0 V
Trigger slope	Rising Edge
Input coupling	DC
Measure	Amplitude, Rise Time, Fall Time
Ref Level	High Ref 80%, Low Ref 20%
Gating	Cursor Curs1 Pos1: –2.5 ns/Curs2: 2.75 ns

3. To open the **test40.TRP** file on the MTX100B, do the following:

   a. Select **File** > **Open** in the Play screen to open the Select File dialog box.

   b. In the dialog box, select the **test40.TRP** file.

4. Press the **Play/Pause** button to start playing the **test40.TRP** file.

5. Use the oscilloscope to measure that the amplitude, rise and fall times are as follows:

Control	Setting
Amplitude	720 mV to 880 mV
Rise and fall time	≤ 1.2 ns

6. Move the BNC cable connection from the ASI Out 1 connector to the ASI Out 2 connector on the MTX100B and repeat step 5.

7. Move the BNC cable connection from ASI Out 2 connector to the through output of the ASI In connector.

8. Connect the ASI Out 1 connector to the ASI In connector on the MTX100B using the 75 Ω BNC cable.

9. Select **ASI/IF** > **Through Out** > **On** on the MTX100B and repeat step 5.

Checking the Play Operation.

1. Disconnect the BNC cable from the 75 Ω signal adapter on the oscilloscope, and then connect the cable to the ASI/SMPTE In connector on the MPEG analyzer.

Figure 2-12: Equipment connections for verifying the play operation-ASI interface

2. Start the **MPEG Player** application on the MPEG analyzer.

3. Set the application to the **Record** mode.

4. Set the MPEG analyzer settings as follows:

Control		Setting
Record	Source	SPI/ASI/310M
	Target	RAM
	Record Size	100 MB
SPI/ASI/310M menu	Input Port	BNC
	BNC Port	ASI
File	Save Mode	Ove Write
	Save	E:\MTXRTX_Test streams\Record_Files\ASI214Mbps.trp

5. In the **Play** menu on the MTX100B, make the following settings:

Control	Setting
Clock	Data Rate: 214 Mbps
Update	Off
Source	RAM

6. Select **ASI I/F** > **Through Out** > **On**.

7. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen. In addition, verify that the bit rate is **214** Mbps and the packet size is **188** bytes.

9. Click the **Record** button on the MPEG Player application to record the file.

10. After the recording is complete, press the **Stop** button on the MTX100B.

11. Disconnect the 75 Ω BNC cables from the MTX100B and the MPEG analyzer.

Checking the Record Operation.

1. Use a 75 Ω BNC cable to connect the ASI In connector on the MTX100B to the ASI/SMPTE Out connector on the MPEG analyzer.

MPEG analyzer rear panel (MTS430)
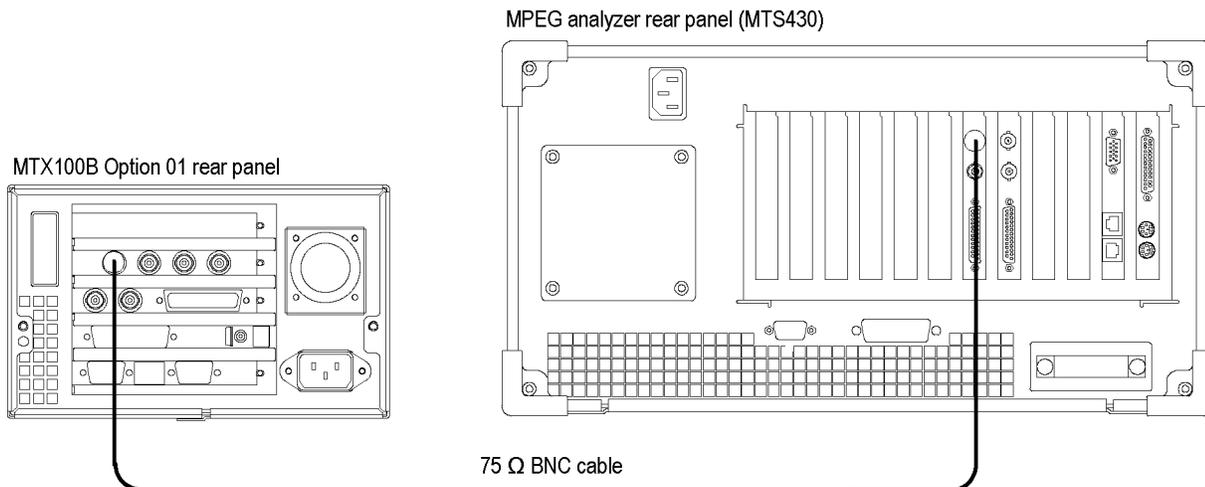
MTX100B Option 01 rear panel

75 Ω BNC cable

Figure 2-13: Equipment connection for verifying the record operation-ASI interface

2. Press the **Record** button on the MTX100B to display the Record screen.

3. On the MTX100B, make the following settings:

Control		Setting
Record	Source	ASI
	Target	RAM
	Record Size	100 MB
File	Save Mode	Ove Write
	Save	D:\Record_Files\ASI214Mbps.trp

4. Set the MPEG analyzer to the Play mode.

5. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

6. In the dialog box, navigate to the **E:\MTXRTX_Test Streams\ Record_Files** directory, and select the **ASI214Mbps.trp** file.

7. Set the following settings on the MPEG analyzer:

Control		Setting
Play	Clock	Data Rate: 214 Mbps
	Update	Off
	Source	RAM
SPI/ASI/310M	BNC Port	ASI
	Through Out	Off

8. Click the **Play** button on the MPEG analyzer to start playing the **ASI214Mbps.trp** file.

9. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate is **214** Mbps and packet size is **188** bytes.

10. Press the **Record** button on the MTX100B to record the file.

11. After the recording is complete, click the **Stop** button on the MPEG analyzer.

12. Exit the MPEG Player application on the MPEG analyzer.

13. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the Recorded File.

1. Use the 75 Ω BNC cable to connect the ASI Out 2 connector on the MTX100B to the ASI/SMPTE In connector on the MPEG test system.

MPEG test system rear panel (MTS430))

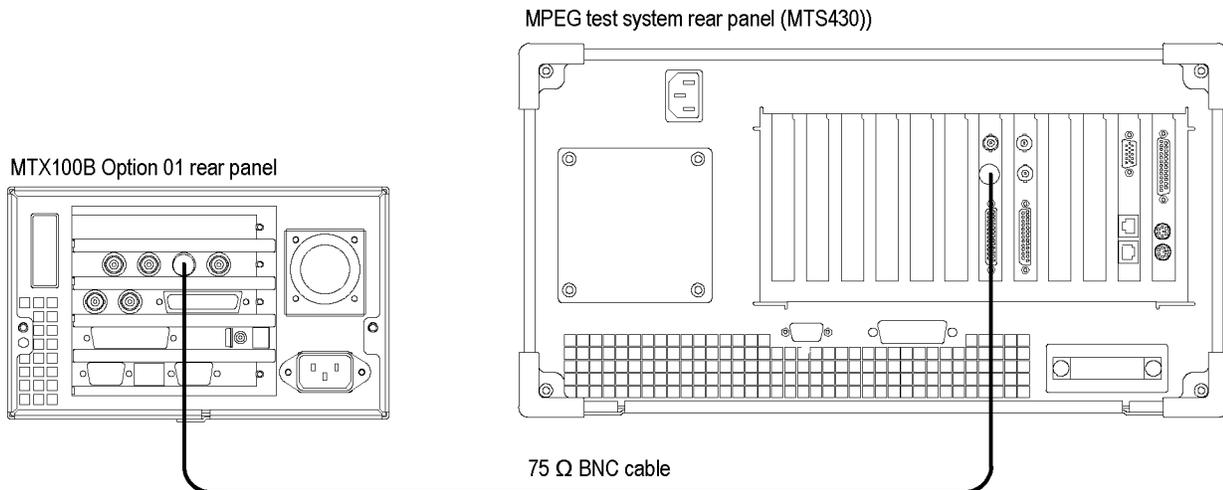MTX100B Option 01 rear panel

75 Ω BNC cable

Figure 2-14: Equipment connection for verifying the recorded file-ASI interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. Select **Play** > **Update >On**.

4. To open the **ASI214Mbps file** on the MTX100B, do the following.

   a. Select **File** > **Open** to open the **Select File** dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **ASI214Mbps.trp** file.

5. Press the **Play/Pause** button to start playing the file.

6. Start the **TS Compliance Analyzer** on the MPEG analyzer.

7. In the TS Compliance Analyzer window, select **Real-time...** and make the following settings:

Control	Setting
Interfaces	ASI
Interface Settings	Time Stamping

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **40** Mbps and that the transport stream packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the Navigation view because these are caused by the original test40.TRP file.

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9. Press the **Stop** button on the MTX100B to stop the stream output.

10. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Universal Parallel/Serial Interface (Option 02 Only)

This test verifies that transport stream data is correctly output from and is recorded through the Universal Parallel/Serial interface on the MTX100B.

Equipment required.

- MPEG analyzer
- MPEG recorder and player (MTX100A(B) Option 02)
- Oscilloscope
- Probe
- 50 Ω BNC cable
- Parallel interface cable
- test40.TRP file

Checking the Output Signals.

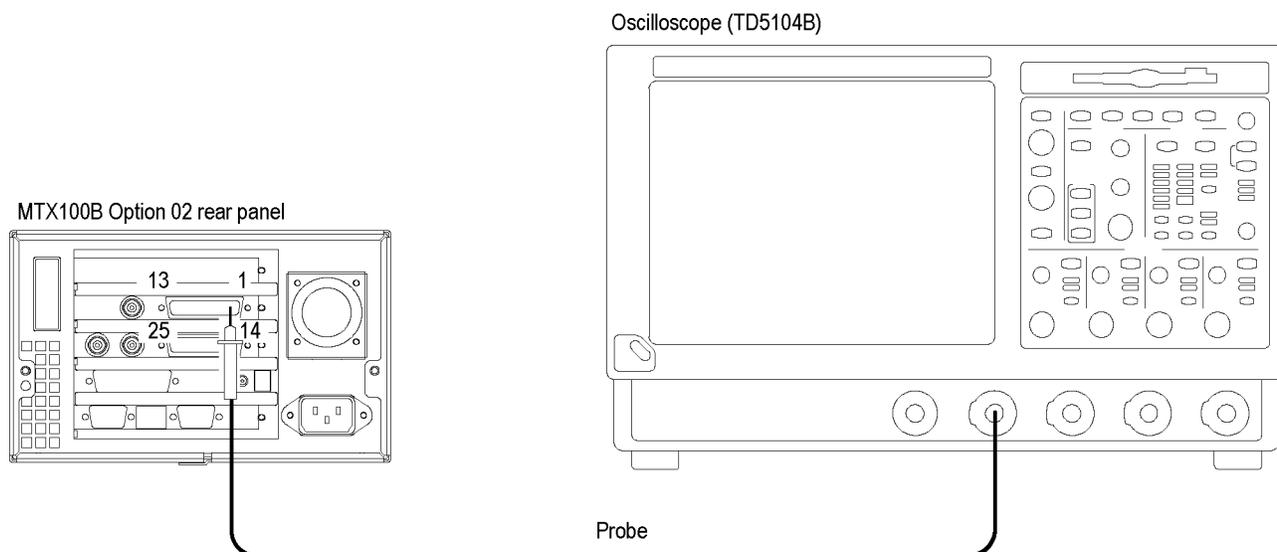1. Connect the probe to the oscilloscope CH1 input.

Figure 2-15: Equipment connection for verifying the output signals-universal parallel/serial interface

2. Set the oscilloscope settings as indicated below:

Control	Setting
Vertical scale	500 mV/div
Vertical offset	−1.3 V
Horizontal scale	400 ns/div
Horizontal position	Center
Trigger source	CH1
Trigger level	−1.3 V (at ECL level)
	1.4 V (at TTL level)
	1.2 V (at LVDS level)

3. Press the **Play/Pause** button on the MTX100B to display the Play screen.

4. Open the **test40.TRP** file on the MTX100B.

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, select the **test40.TRP** file.

5. Select **Play** > **Clock** to open the **Clock** dialog box.

6. In the dialog box, set **Data Rate** to **10 Mbps**.

7. Select **Univ I/F** > **Level** > **ECL**.

8. Press the **Play/Pause** button to start playing the **test40.TRP** file.

9. Attach the probe tip to **pin 1** of the Universal In/Out connector on the MTX100B.

10. Use the oscilloscope to measure that the ECL high and low levels of pin 1 are as follows:

Control	Setting
High level	–0.5 V
Low level	–2.1 V

11. Move the probe tip attachment from pin 1 to pin 14, and measure that the ECL high and low levels correspond to the values shown in the following table.

12. Repeat step 11 for all other pins.

Table 2-3: Output level of each connector pin

Pin number	ECL High	ECL Low	TTL High	TTL Low	LVDS High	LVDS Low
1, 14 (CLK)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
3, 16 (DATA 7)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
4, 17 (DATA 6)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
5, 18 (DATA 5)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
6, 19 (DATA 4)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
7, 20 (DATA 3)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
8, 21 (DATA 2)	–0.5 V	–2.1 V	3.3 V	0.1 V	1.6 V	0.8 V
9, 22 (DATA 1)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
10, 23 (DATA 0)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V
11 (DVALID)	–0.5 V	—	3.3 V	—	1.6 V	—
14 (DVALID)	—	–2.1 V	—	0.0 V	—	0.8 V
12, 25 (PSYNC)	–0.5 V	–2.1 V	3.3 V	0.0 V	1.6 V	0.8 V

13. Select **Univ I/F** > **Level** > **TTL** on the MTX100B.

14. Use the oscilloscope to measure that TTL High and Low levels of all the pins correspond to the values shown in the table. (See Table 2-3.)

15. Select **Univ I/F** > **Level** > **LVDS** on the MTX100B.

16. Use the oscilloscope to measure that LVDS High and Low levels of all the pins correspond to the values shown in the table. (See Table 2-3.)

Checking the Play Operation (Parallel Mode).

1. Use the parallel interface cable to connect the Universal In/Out connector on the MTX100B to the Universal In/Out connector on the MPEG recorder and player.

MTX100B Option 02 rear panel

MPEG recorder and player
(MTX100A(B) Option 02) rear panel

Parallel interface cable
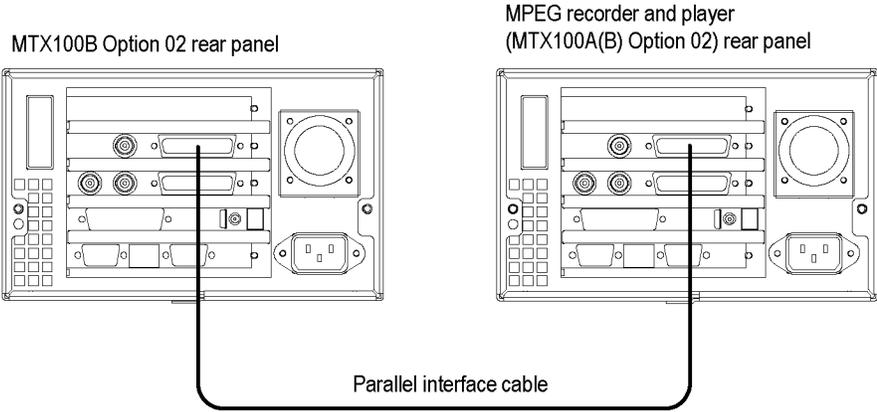
Figure 2-16: Equipment connection for verifying the play operation-universal parallel/serial interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. On the MTX100B, make the following settings:

Control		Setting
Play	Data rate	214 Mbps
	Update	Off
	Source	RAM
Univ I/F	Level	LVDS
	Format	Parallel

4. Press the **Record** button on the MPEG recorder and player to display the Record screen.

5. On the MPEG recorder and player, make the following settings:

Control		Setting
Record	Source	Univ I/F
	Record size	100 MB
	Target	RAM
Univ I/F menu	Level	LVDS
	Format	Parallel
	Receive	Differential
	Termination	On
File	Save Mode	Over Write
	Save	E:\Record_Files\Parallel_LVDS.trp

6. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

7. Verify that the hierarchical view is displayed on the MPEG recorder and player screen. In addition, verify that the bit rate display is **214** Mbps and packet size is **188** bytes.

8. Press the **Record** button on the MPEG recorder and player to record the file.

9. After the recording is complete, press the **Stop** button on the MTX100B.

Checking the Play Operation (Serial Mode).

10. Select **Play** > **Clock** on the MTX100B to open the Clock dialog box.

11. In the dialog box, set **Data Rate** to **40** Mbps.

12. Select **Univ I/F** > **Format** > **Serial** on the MTX100B.

13. Press the **Record** button on the MPEG recorder and player to display the Record screen.

14. On the MPEG recorder and player, make the following settings:

Control		Setting
Univ I/F	Format	Serial
File	Save	D:\Record_Files\Serial_LVDS.trp

15. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

16. Verify that the hierarchical view is displayed on the MPEG recorder and player screen. In addition, verify that the bit rate display is **40** Mbps and the packet size is **188** bytes.

17. Press the **Record** button on the MPEG recorder and player to record the file.

18. After recording is complete, press the **Stop** button on the MTX100B.

Checking the Record Operation (Parallel Mode).

19. Press the **Record** button on the MTX100B to display the Record screen.

20. On the MTX100B, make the following settings:

Control		Setting
Record	Source	Univ I/F
	Record size	100 MB
	Target	RAM
Univ I/F	Level	LVDS
	Format	Parallel
	Receive	Differential
	Termination	On
File	Save Mode	Over Write
	Save	D:\Record_Files\Parallel_LVDS.trp

21. Press the **Play/Pause** button on the MPEG recorder and player to display the Play screen.

22. To open the **Parallel_LVDS.trp** file on the MPEG recorder and player.

    a. Select **File** > **Open** to open the **Select File** dialog box.

    b. In the dialog box, navigate to the **E:\Record_Files** directory, and then select the **Parallel_LVDS.trp** file.

23. On the MPEG recorder and player, make the following settings in the Play menu:

Control	Setting
Data rate	214 Mbps
Update	Off
Source	RAM

24. Press the **Play/Pause** button on the MPEG recorder and player to start playing the file.

25. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate display is **214** Mbps and the packet size is **188** bytes.

26. Press the **Record** button on the MTX100B to record the file.

27. After the recording is complete, press the **Stop** button on the MPEG recorder and player.

Checking the Record Operation (Serial Mode).

1. On the MTX100B, make the following settings:

Control		Setting
Univ I/F	Format	Serial
File	Save	D:\Record_Files\Serial_LVDS.trp

2. To open the **Serial_LVDS.trp** file on the MPEG recorder and player.

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **Serial_LVDS.trp** file.

3. Select **Play** > **Clock** on the MPEG recorder and player to open the **Clock** dialog box.

4. In the dialog box, set **Data Rate** to **40 Mbps**.

5. Press the **Play/Pause** button on the MPEG recorder and player to start playing the file.

6. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate display is **40 Mbps** and the packet size is **188** bytes.

7. Press the **Record** button on the MTX100B to record the file.

8. After the recording is completed, press the **Stop** button on the MPEG recorder and player.

Checking signal acquisition for ECl and TTL Levels.

1. On the MTX100B, make the following settings:

Control		Setting
Univ I/F	Level	ECL
	Format	Parallel

2. Open the **test40.TRP** file on the MPEG recorder and player.

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, navigate to the **E:** drive, and then select the **test40.TRP** file.

3. On the MPEG recorder and player, make the following settings:

Control		Setting
Play	Clock	Data Rate: 214 Mbps
	Update	Off
Univ/I/F	Level	ECL
	Format	Parallel
	Receive	Differential

4. Press the **Play/Pause** button on the MPEG recorder and player to start playing the test40.TRP file.

5. Verify that no **Non-TS** and **No Signal** messages appear on the MTX100B screen. In addition, the hierarchical view and the bit rate are displayed correctly (214 Mbps and 188).

6. Select **Univ I/F** > **Receive** > **Single** on the MTX100B, and then repeat step 5.

7. Select **Univ I/F** > **Level** > **TTL** on the MPEG recorder and player.

8. Select **Level** > **TTL** and **Receive** > **Differential** in the **Univ I/F** menu on the MTX100B, and repeat step 5.

9. Select **Univ I/F** > **Receive** > **Single** on the MTX100B, and then repeat step 5.

10. On the MTX100B , make the following settings:

Control		Setting
Univ/I/F	Level	ECL
	Format	Serial
	Receive	Differential

11. On the MPEG recorder and player, make the following settings:

Control		Setting
Play	Clock	Data Rate: 40 Mbps
	Receive	Differential
Univ/I/F	Format	Serial
	Receive	Differential

12. Press the **Play/Pause** button on the MPEG recorder and player to start playing the file.

13. Repeat step 14.

14. Select **Univ I/F** > **Receive** > **Single** on the MTX100B , and then repeat step 14.

15. Select **Univ I/F** > **Level** > **TTL** on the MPEG recorder and player.

16. Select **Level** > **TTL** and **Receive** > **Differential** from the **Univ I/F** menu on the MTX100B, and then repeat step 14.

17. Select **Univ I/F** > **Receive** > **Single** on the MTX100B , and then repeat step 14.

18. Press the **Stop** button on the MPEG recorder and player to stop the stream output.

19. Disconnect the parallel interface cable from the MTX100B and the MPEG recorder and player.

Checking the Recorded File.

1. Use the parallel interface cable to connect the Universal In/Out connector on the MTX100B to the DVB/SPI In connector on the MPEG test system.
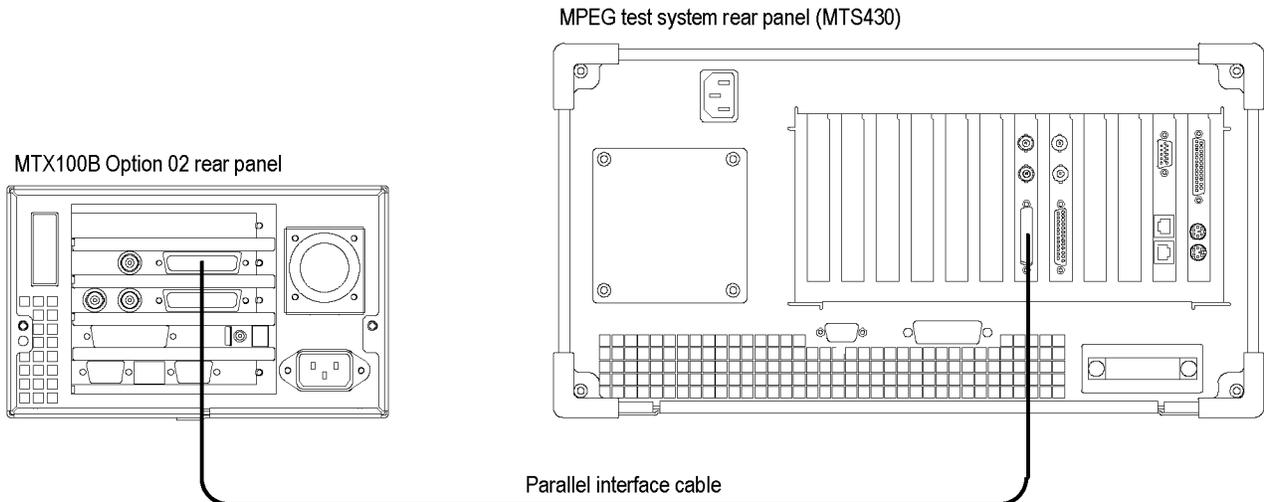
Figure 2-17: Equipment connection for verifying the recorded file-universal parallel/serial interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. Select **Play** > **Update** > **On**.

4. Select **Univ I/F** > **Level** > **LVDS**.

5. Select **Univ I/F** > **Format** > **Parallel**.

6. Open the **Parallel_LVDS.trp** file on the MTX100B.

   a. Select **File** > **Open** to open the **Select File** dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **Parallel_LVDS.trp** file.

7. Press the **Play/Pause** button on the MTX100B to start playing the file.

8. Start the **TS Compliance Analyzer** on the MPEG analyzer.

9. In the **Open Transport Stream** dialog box, select **Real-time Analysis**, and then make the following settings:

Control	Setting
Interfaces	DVB Parallel
Interface Settings	Time Stamping

10. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **40 Mbps** and that the transport stream packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the hierarchical view because these are caused by the original test40.TRP file.

11. Press the **Stop** button on the MTX100B to stop the stream output.

12. Open the **Serial_LVDS.trp** file on the MTX100B.

    a. Select **File** > **Open** to open the Select File dialog box.

    b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **Serial_LVDS.trp** file.

13. Press the **Play/Pause** button on the MTX100B to start playing the file.

14. Restart analysis on the MPEG analyzer.

15. Repeat steps 10 and 11.

16. Disconnect the parallel interface cable from the MTX100B and the MPEG analyzer.

Checking the Event Output.

1. Use the 50 Ω BNC cable to connect the Event Out connector on the MTX100B to the oscilloscope CH1 input.

Oscilloscope (TDS5104B)

MTX100B Option 02 rear panel

50 Ω BNC cable
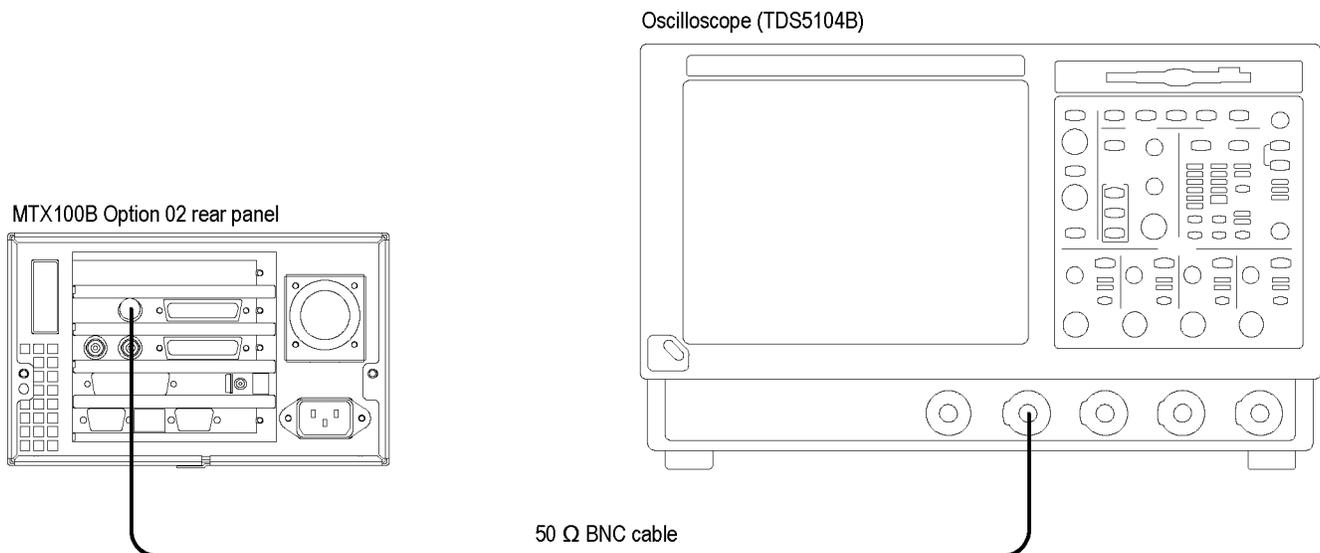
Figure 2-18: Equipment connection for verifying the Event output

2. Set the oscilloscope settings as follows:

Control	Setting
Vertical scale	1 V/div
Horizontal scale	80 ns/div
Horizontal position	Center
Acquire mode	Average 16
Trigger level	1.20 V
Trigger source	CH1
Trigger position	50 %
Trigger slope	Rising Edge
Trigger mode	AUTO
Input coupling	DC
Input impedance	1 MΩ
Measure	High Level, Low Level

3. Open the **test40.TRP** file on the MTX100B.

    a. Select **File** > **Open** in the Play screen to open the **Select File** dialog box.

    b. In the dialog box, select the **test40.TRP** file.

4. Press the **Play/Pause** button on the MTX100B to start playing the test40.TRP file.

5. Use the oscilloscope to measure that the high and low levels of the Event output are as follows:

Control	Setting
High level	> 2.4 V
Low level	< 0.4 V

6. Press the **Stop** button on the MTX100B to stop the stream output.

IEEE1394/ASI Interface (Option 05 Only)

This test verifies that transport stream data is correctly output from and is recorded through the IEEE1394/ASI interface on the MTX100B.

Equipment required.

- ■ MPEG analyzer
- ■ Oscilloscope
- ■ D-VHS digital recorder
- ■ Video monitor
- ■ 75 Ω BNC cable
- ■ IEEE1394 cable (4 pin-4 pin)
- ■ 75 Ω signal adapter
- ■ RCA(Ma)-to-BNC(Fe) adapter
- ■ test40.TRP file

Checking the Output Signal.

1. Use the 75 Ω BNC cable and 75 Ω signal adapter to connect the ASI Output connector on the MTX100B to the oscilloscope CH1 input.
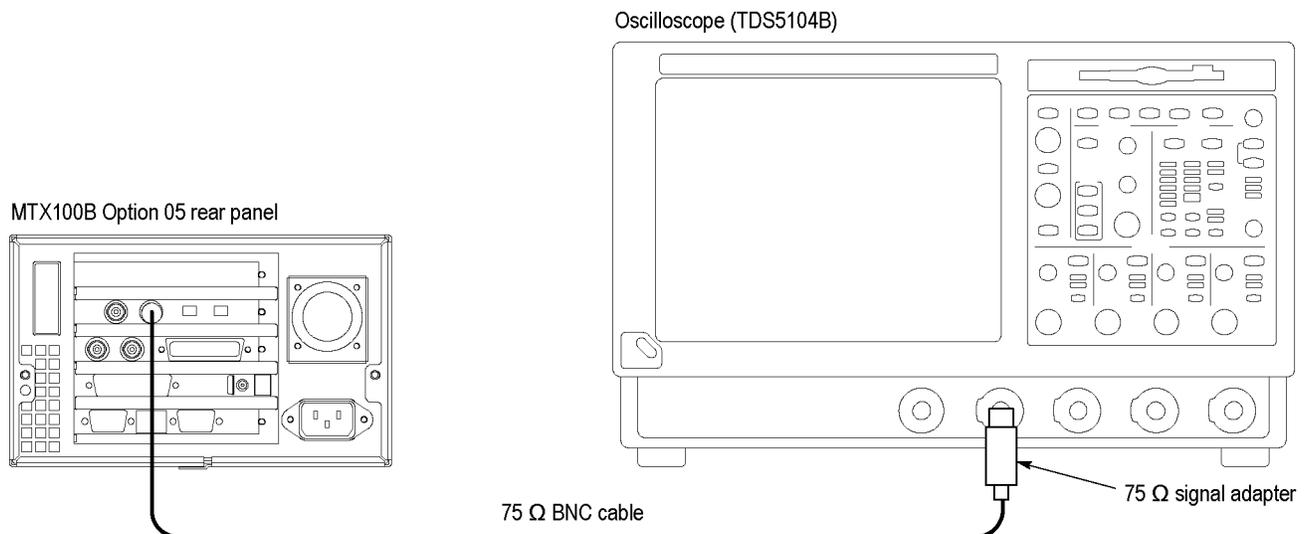
Figure 2-19: Equipment connection for verifying the output signal-IEEE1394/ASI interface

2. Set the oscilloscope controls as follows:

Control	Setting
Vertical scale	200 mV/div
Horizontal scale	1.25 ns/div
Acquire mode	Average 32
Trigger mode	AUTO
Trigger level	0 V
Trigger source	CH1
Trigger position	50%
Trigger slope	Rising Edge
Input impedance	50 Ω
Measure	Amplitude, Rise Time, Fall Time
Ref Level	High Ref 80%, Low Ref 20%
Gating	Cursor Curs1 Pos1: –2.5 ns/Curs2: 2.75 ns

3. Open the **test40.TRP** file on the MTX100B.

    a. Select **File** > **Open** to open the **Select File** dialog box.

    b. In the dialog box, select the **test40.TRP** file.

4. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

5. Use the oscilloscope to verify that the amplitude and rise and fall times are within the following range.

Control	Setting
Amplitude	720 mV to 880 mV
Rise and fall time	≤ 1.2 ns

6. Disconnect the 75 Ω BNC cable from the MTX100B and the oscilloscope.

Checking the Play Operation.

1. Disconnect the BNC cable from the 75 Ω signal adapter on the oscilloscope, and then connect the cable to the ASI/SMPTE In connector on the MPEG analyzer.
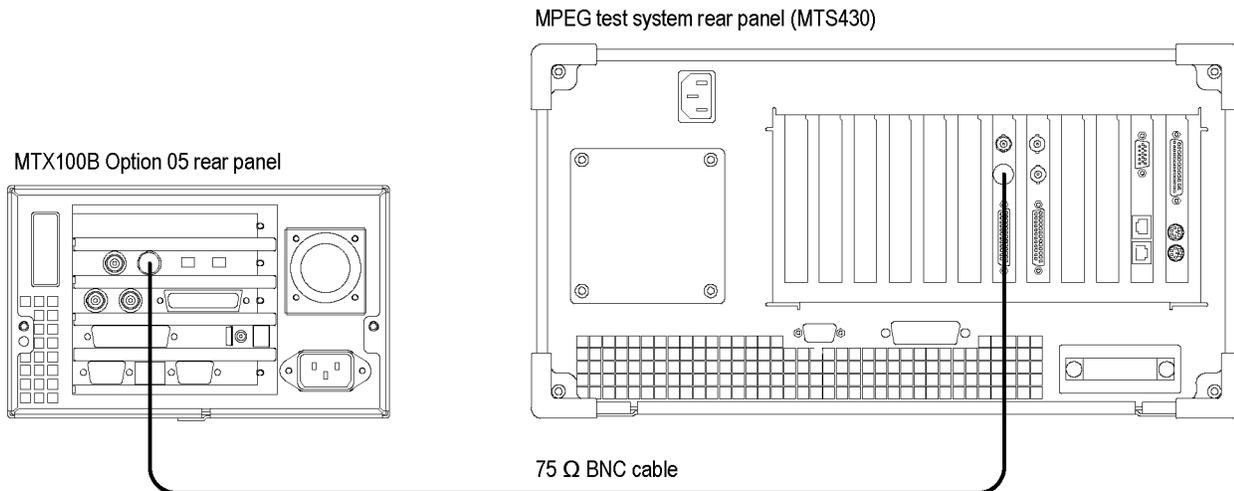
Figure 2-20: Equipment connection for verifying the play operation-IEEE1394/ASI interface

2. Start the **MPEG Player** application on the MPEG analyzer.

3. Set the application to the **Record** mode.

4. Set the MPEG analyzer settings as follows:

Control		Setting
Record	Source	SPI/ASI/310M
	Target	RAM
	Record Size	100 MB
SPI/ASI/310M	Input Port	BNC
	BNC Port	ASI
File	Save Mode	Over Write
	Save	E:\MTXRTX_Test streams\Record_Files\ ASI214Mbps.trp

5. On the MTX100B , make the following settings:

Control		Setting
Play	Clock	Data Rate: 214 Mbps
	Update	Off
	Source	RAM

6. Press the **Play/Pause** button on the MTX100B to start playing the test40.TRP.

7. Verify that the hierarchical view is displayed on the MPEG analyzer screen. In addition, verify that the bit rate is **214 Mbps** and the packet size is **188** bytes.

8. Click the **Record** button on the MPEG Player application to record the file.

9. After the recording is completed, press the **Stop** button on the MTX100B.

10. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the Record Operation.

1. Use the 75 Ω BNC cable to connect the ASI In connector on the MTX100B to the ASI/SMPTE Out connector on the MPEG analyzer.

MPEG analyzer rear panel (MTS430)

MTX100B Option 05 rear panel

75 Ω BNC cable
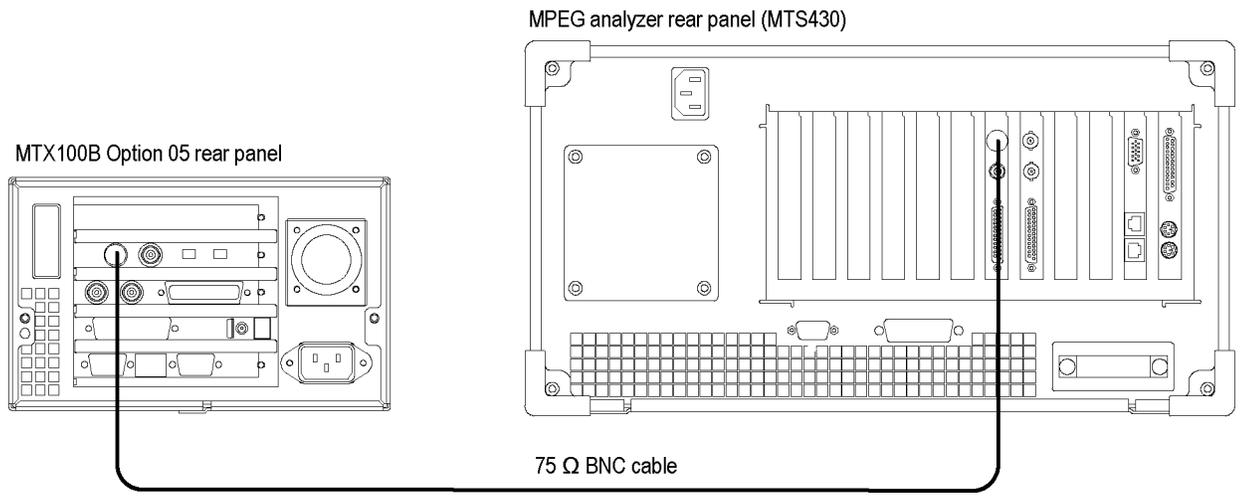
Figure 2-21: Equipment connection for verifying the record operation-IEEE1394/ASI interface

2. Press the **Record** button on the MTX100B to display the Record screen.

3. On the MTX100B, make the following settings:

Control		Setting
Record	Source	ASI/1394
	Record size	100 MB
	Target	RAM
File	Save Mode	Over Write
	Save	D:\Record_Files\ASI214Mbps.trp

4. Set the MPEG analyzer to the Play mode.

5. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

6. In the dialog box, navigate to the **E:\MTXRTX_Test Streams\ Record_Files** directory, and select the **ASI214Mbps.trp** file.

7. Set the following settings on the MPEG analyzer:

Control		Setting
Play	Clock Data Rate	214 Mbps
	Update	Off
	Source	RAM
SPI/ASI/310M	BNC Port	ASI
	Through Out	Off

8. Click the **Play** button on the MPEG analyzer to start playing the **ASI214Mbps.trp** file.

9. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate is **214 Mbps** and that the packet size is **188** bytes.

10. Press the **Record** button on the MTX100B to record the file.

11. After the recording is complete, click the **Stop** button on the MPEG analyzer.

12. Exit the MPEG Player application on the MPEG analyzer.

13. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the Recorded File.

1. Use the 75 Ω BNC cable to connect the ASI Output connector on the MTX100B to the ASI/SMPTE In connector on the MPEG test system.

Figure 2-22: Equipment connection for verifying the recorded file-IEEE1394/ASI interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. Select **Play** > **Update >On**.

4. To open the **ASI214Mbps** file on the MTX100B, do the following:

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **ASI214Mbps.trp** file.

5. Press the **Play/Pause** button on the MTX100B to start playing the file.

6. Start the **TS Compliance Analyzer** on the MPEG analyzer.

7. In the TS Compliance Analyzer window, select **Real-time..** and make the following settings:

Control	Setting
Interfaces	ASI
Interface Settings	Time Stamping

8. Verify that the hierarchical view is displayed on the screen and that no error messages appear. In addition, verify that the bit rate is **40** Mbps and that the packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the hierarchical view because these are caused by the original test40.TRP file.

9. Press the **Stop** button on the MTX100B to stop the stream output.

10. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the IEEE1394 Output Signal.

1. Use the IEEE1394 cable to connect the IEEE1394 port on the MTX100B to the i.LINK IN/OUT connector of the D-VHS digital recorder. (See Figure 2-23.)

2. Use the 75 Ω BNC cable and RCA(Ma)-to-BNC(Fe) adapter to connect the VIDEO OUTPUT connector on the D-VHS digital recorder to the video input on the video monitor.
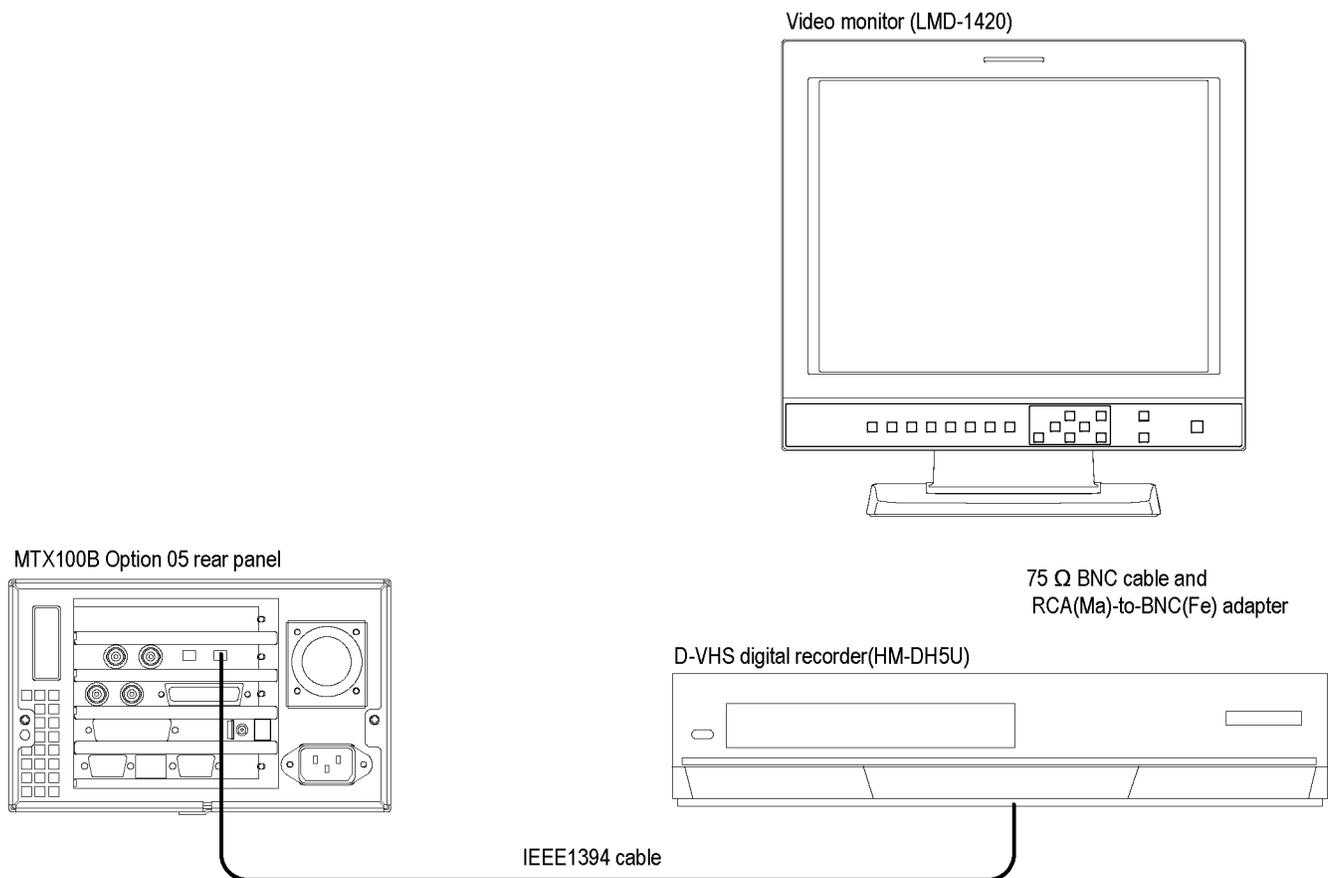
Figure 2-23: Equipment connection for verifying the IEEE1394 output signal

3. To make the following i.LINK setup on the D-VHS digital recorder:

a. Press the **MENU** button on the remote controller that is provided with the D-VHS digital recorder to display the Main Menu screen.

b. Press the left or right arrow button on the remote controller to move the arrow to **INITIAL SET UP**, and press the **OK** button.

c. Press the left or right arrow button to move the arrow to **OTHER**, and then press the **OK** button.

d. Press the up or down arrow button to move the arrow to **LINK**, and then press left or right arrow button to set to **AUTO**.

e. Press the **MENU** button to return to Main Menu screen.

4. Press the **Play/Pause** button on the MTX100B to display the Play screen.

5. To open the **Flower.trp** file on the MTX100B, do the following:

    a. Select **File** > **Open** to open the Select File dialog box.

    b. In the dialog box, navigate to the **D:\525** directory, and select the **Flower.trp** file.

6. Select **ASI/1394** > **1394Mode** > **PtoP Connect** on the MTX100B to open the IEEE1394 dialog box.

7. In the dialog box, select **J VC HM-DH5** in the **Instrument** list box.

8. In the dialog box, select the **Connect** button, and select the **OK** button.

9. Press **TV/VCR CH +** button on the remote controller to select **I** as a recording channel.

10. Press the **Play/Pause** button on the MTX100B to start playing the **Flower.trp** file.

11. Press the **REC** button on the D-VHS digital recorder.

12. Verify that any block noise does not appear on the video monitor.

13. After about 30 seconds of recording, press the **STOP** button on the D-VHS digital recorder.

14. Press the **REW** (AA) button on the D-VHS digital recorder.

15. Press the **Record** button on the MTX100B to display the Record screen.

16. Select **Record** > **Source** > **ASI/1394** on the MTX100B.

17. Select **ASI/1394** > **Input Port** > **1394** on the MTX100B.

18. Select **ASI/1394** > **1394 Mode** > **PtoP Connect** to open the IEEE1394 dialog box.

19. In the dialog box, select the **Disconnect** button, and select the **OK** button.

20. Select **ASI/1394** > **1394 Mode** > **PtoP Connect** to open the IEEE1394 dialog box.

21. In the dialog box, select the **Connect** button, and then select the **OK** button.

22. Press the **PLAY** button on the D-VHS digital recorder.

23. Verify that correct the hierarchical display appears on the MTX100B screen.

24. Disconnect all the cables from the MTX100B, the D-VHS digital recorder, and the video monitor.

SMPTE310M/ASI/SPI Interface (Option 07 Only)

This test verifies that the transport stream data is correctly output from and is recorded through the SMPTE310M/ASI/SPI interface on the MTX100B.

Equipment required.

- Oscilloscope

- MPEG analyzer

- 75 Ω precision termination

- 75 Ω BNC cable

- 75 Ω signal adapter

- test40.TRP file

- Flower.trp file

Checking the Output Signal.

1. Use the 75 Ω BNC cable and the 75 Ω signal adapter to connect the SMPTE310M/ASI Output connector on the MTX100B to the oscilloscope CH1 input.
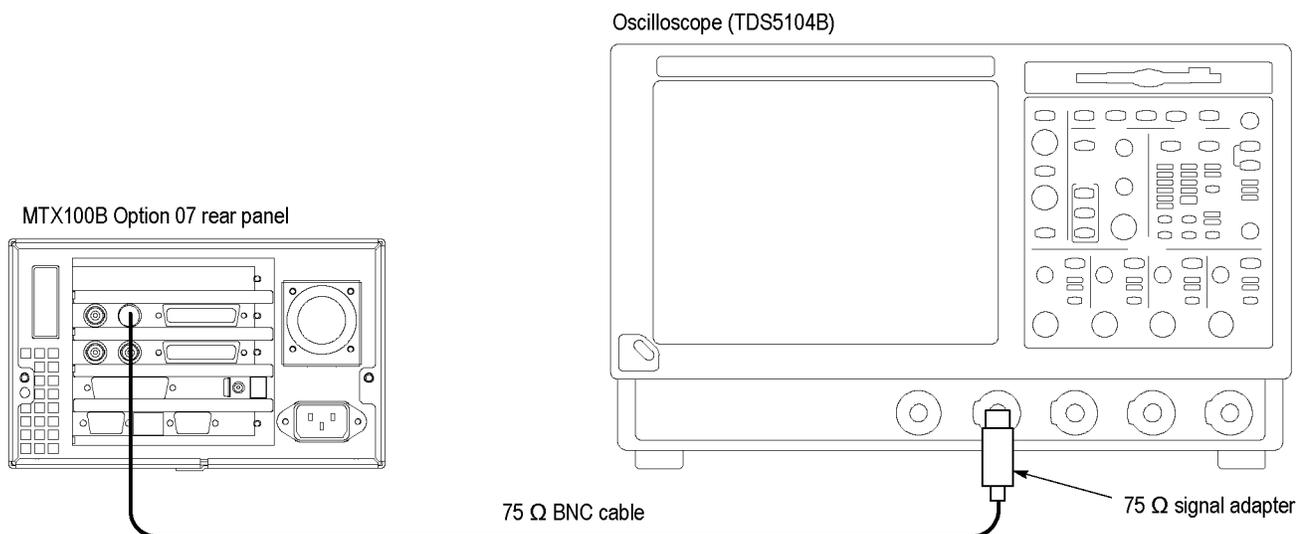
Figure 2-24: Equipment connection for verifying output signal-SMPTE310M interface

2. Set the oscilloscope settings as indicated below:

Control	Setting
Vertical scale	200 mV/div
Horizontal scale	1.25 ns/div
Trigger position	50%
Acquire mode	Average 32

Control	Setting
Trigger mode	AUTO
Trigger source	CH1
Trigger level	0 V
Trigger slope	Rising Edge
Input impedance	50 Ω
Measure	Amplitude, Rise Time, Fall Time
Ref Level	High Ref 80%, Low Ref 20%
Gating Cursor	Curs1 Pos1: −2.5 ns/Curs2: 2.75 ns

3. To open the **test40.TRP** file on the MTX100B, do the following:

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, select the **test40.TRP** file.

4. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

5. Use the oscilloscope to measure that the amplitude, rise and fall times are as follows:

Control	Setting
Amplitude	720 mV to 880 mV
Rise and fall time	≤ 1.2 ns

Checking the ASI Play Operation.

1. Disconnect the BNC cable from the 75 Ω signal adapter on the oscilloscope input, and connect the cable to the ASI/SMPTE In connector on the MPEG analyzer.
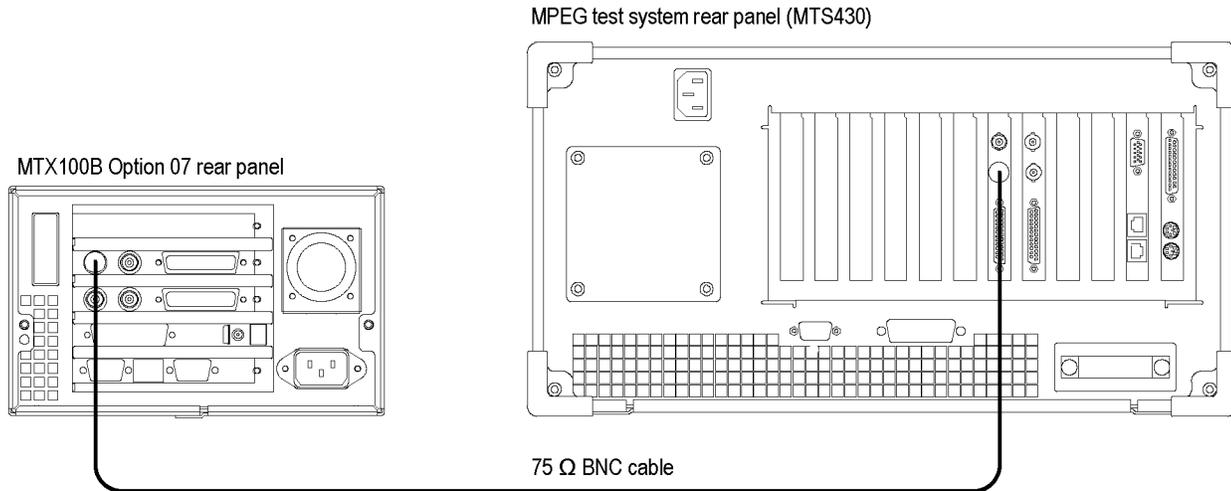
Figure 2-25: Equipment connection for verifying the ASI play operation

2. Start the **MPEG Player** application on the MPEG analyzer.

3. Set the application to the **Record** mode.

4. Set the MPEG analyzer settings as follows:

Control		Setting
Record	Source	SPI/ASI/310M
	Target	RAM
	Record Size	100 MB
SPI/ASI/310M	Input Port	BNC
	BNC Port	ASI
File	Save Mode	Over Write
	Save	E:\MTXRTX_Test streams\Record_Files\ASI214Mbps.trp

5. On the MTX100B, make the following settings:

Control		Setting
Play	Clock Data Rate	214 Mbps
	Update	Off
	Source	RAM
310M/ASI/SPI	BNC Port	ASI
	Through Out	Off

6. Press the **Play/Pause** button on the MTX100B to start playing the **test40.TRP** file.

7. Verify that the hierarchical view is displayed on the MPEG analyzer screen. In addition, verify that the bit rate is **214** Mbps and the packet size is **188** bytes.

8. Click the **Record** button on the MPEG Player application to record the file.

9. After the recording is complete, press the **Stop** button on the MTX100B.

10. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the ASI Record Operation.

1. Use the 75 Ω BNC cable to connect the SMPTE/ASI Input connector on the MTX100B to the ASI/SMPTE Out connector on the MPEG analyzer.
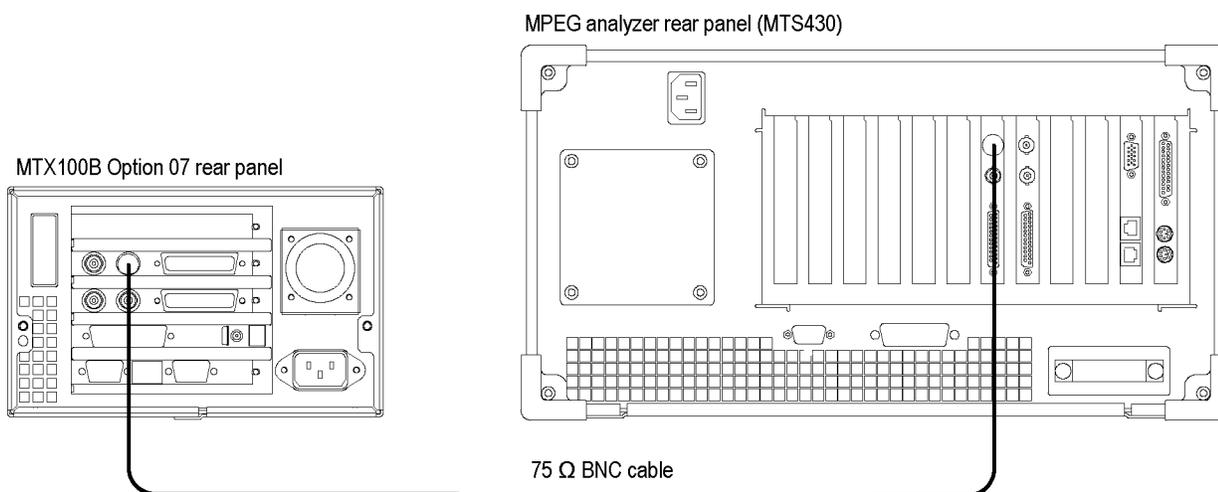
Figure 2-26: Equipment connection for verifying the ASI record operation

2. Press the **Record** button on the MTX100B to display the Record screen.

3. On the MTX100B, make the following settings:

Control		Setting
Record	Source	310M/ASI/SPI
	Record size	100 MB
	Target	RAM
310M/ASI/SPI	Input Port	BNC
	BNC Port	ASI
File	Save Mode	Over Write
	Save	D:\Record_Files\ASI214Mbps.trp

4. Set the MPEG analyzer to the Play mode.

5. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

6. In the dialog box, navigate to the **E:\MTXRTX_Test Streams\Record_Files** directory, and select the **ASI214Mbps.trp** file.

7. Set the following settings on the MPEG analyzer:

Control		Setting
Play	Clock Data Rate	214 Mbps
	Update	Off
	Source	RAM
SPI/ASI/310M	BNC Port	ASI
	Through Out	Off

8. Click the **Play** button on the MPEG analyzer to start playing the **ASI214Mbps.trp** file.

9. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate is **214** Mbps and packet size is **188** bytes.

10. Press the **Record** button on the MTX100B to record the file.

11. After the recording is complete, click the **Stop** button on the MPEG analyzer.

12. Exit the MPEG Player application on the MPEG analyzer.

13. Disconnect the BNC cable from the MTX100B and the MPEG analyzer.

Checking the Recorded File.

1. Use the 75 Ω BNC cable to connect the SMPTE310M/ASI Output connector on the MTX100B to the ASI/SMPTE In connector on the MPEG analyzer.

MPEG analyzer rear panel (MTS430)

MTX100B Option 07 rear panel

75 Ω BNC cable

Figure 2-27: Equipment connection for verifying the recorded file-ASI interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. Select **Play** > **Update >On**.

4. To open the **ASI214Mbps** file on the MTX100B, do the following:

   a. Select **File** > **Open** to open the **Select File** dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and then select the **ASI214Mbps.trp** file.

5. Press the **Play/Pause** button to start playing the file.

6. Start the **TS Compliance Analyzer** on the MPEG analyzer.

7. In the TS Compliance Analyzer window, select **Real-time..**, and make the following settings:

Control	Setting
Interfaces	ASI
Interface Settings	Time Stamping

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **40** Mbps and that the packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the hierarchical view because these are caused by the original test40.TRP file.

9. Press the **Stop** button on the MTX100B to stop the stream output.

10. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the SMPTE310M Play Operation.

1. Use the 75 Ω BNC cable to connect the SMPTE310M/ASI Output connector on the MTX100B to the ASI/SMPTE In connector on the MPEG analyzer.

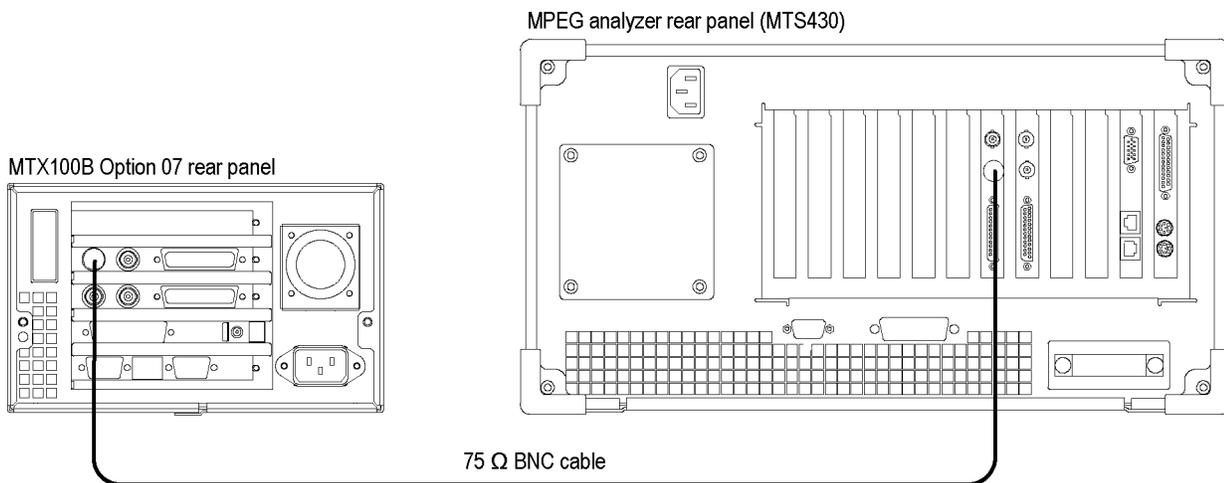**Figure 2-28: Equipment connection for verifying the SMPTE310M play operation**

2. Start the **MPEG Player** application on the MPEG analyzer.

3. Set the application to the **Record** mode.

4. Set the MPEG analyzer settings as indicated bellow:

Control		Setting
Record	Source	SPI/ASI/310M
	Target	RAM
	Record Size	100 MB
SPI/ASI/310M	Input Port	BNC
	BNC Port	310M
File	Save Mode	OverWwrite
	Save	E:\MTXRTX_Test streams\Record_Files\ S310M.trp

5. To open the **Flower.trp** file on the MTX100B.

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, navigate to the **D:\525** directory, and select the **Flower.trp** file.

6. On the MTX100B, make the following settings:

Control		Setting
Play	Clock Data Rate	19.392658 Mbps
	Update	Off
	Source	RAM
310M/ASI/SPI	BNC Port	310M 8VSB
	Through Out	Off

7. Press the **Play/Pause** button on the MTX100B to start playing the **Flower.trp** file.

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen. In addition, verify that the bit rate is **19.392** Mbps and packet size is **188** bytes.

9. Click the **Record** button on the MPEG Player application to record the file.

10. After the recording is completed, press the **Stop** button on the MTX100B.

11. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the SMPTE310M Record Operation.

1. Use the 75 Ω BNC cable to connect the SMPTE310M/ASI Input connector on the MTX100B to the ASI/SMPTE Out connector on the MPEG analyzer.
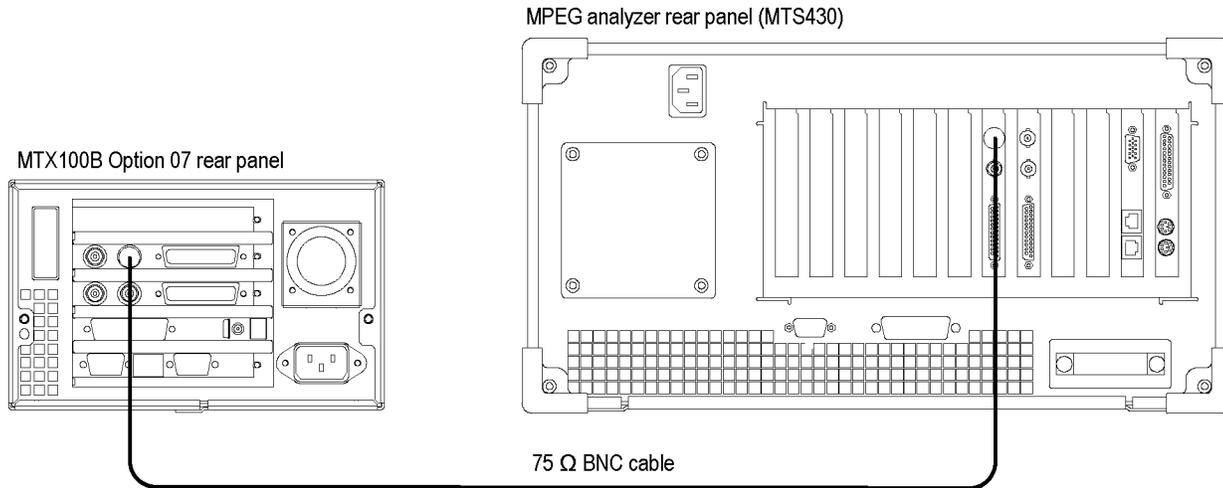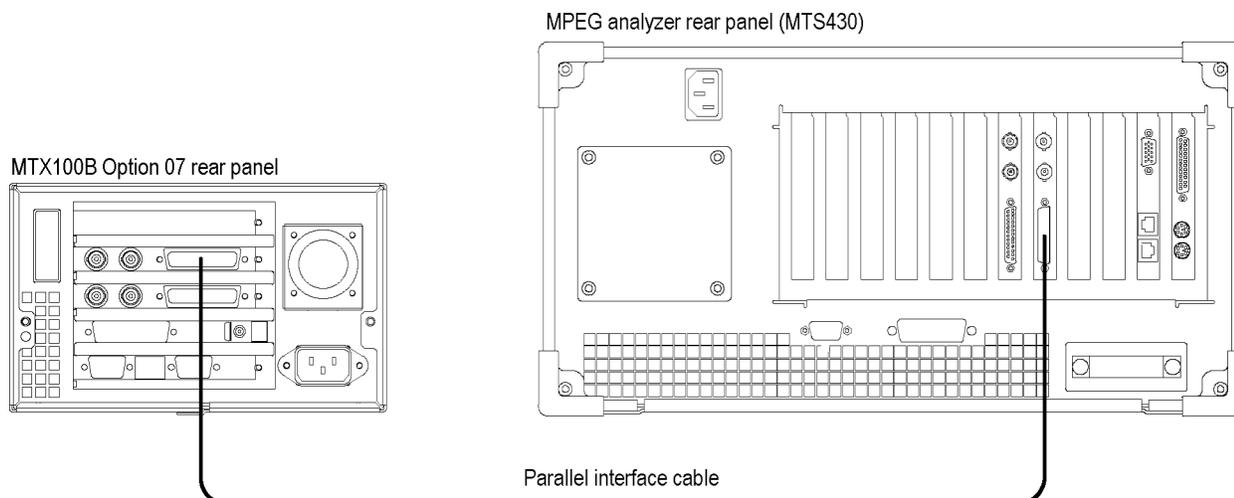

Figure 2-29: Equipment connection for verifying the SMPTE310M record operation

2. Press the **Record** button on the MTX100B to display the Record screen.

3. On the MTX100B, make the following settings:

Control		Setting
Record	Source	310M/ASI/SPI
	Record size	100 MB
	Target	RAM
310M/ASI/SPI	Input Port	BNC
	BNC Port	310M
File	Save Mode	Over Write
	Save	D:\Record_Files\S310M.trp

4. Set the MPEG analyzer to the Play mode.

5. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

6. In the dialog box, navigate to the **E:\MTXRTX_Test Streams\Record_Files** directory, and select the **S310M.trp** file.

7. On the MPEG player, make the following settings:

Control		Setting
Play	Update	Off
	Source	RAM
SPI/ASI/310M	BNC Port	310M 8VSB
	Through Out	Off

8. Click the **Play** button on the MPEG analyzer to start playing the **S310M.trp** file.

9. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate is **19.392** Mbps and packet size is **188** bytes.

10. Press the **Record** button on the MTX100B to record the file.

11. After the recording is complete, click the **Stop** button on the MPEG analyzer.

12. Exit the MPEG Player application on the MPEG analyzer.

13. Disconnect the 75 Ω BNC cable from the MTX100B and the MPEG analyzer.

Checking the Recorded File.

1. Use the 75 Ω BNC cable to connect the SMPTE310M/ASI Output connector on the MTX100B to the ASI/SMPTE In connector on the MPEG analyzer.

MPEG analyzer rear panel (MTS430)

MTX100B Option 07 rear panel

75 Ω BNC cable

Figure 2-30: Equipment connection for verifying the recorded file-ASI interface

2. Press the **Play/Pause** button on the MTX100B to display the Play screen.

3. To open the **310M.trp** file on the MTX100B, do the following:

   a. Select **File** > **Open** to open the Select File dialog box.

   b. In the dialog box, navigate to the **D:\Record_Files** directory, and select the **310M.trp** file.

4. Select **Play** > **Update** > **On**.

5. Press the **Play/Pause** button to start playing the file.

6. Start the **TS Compliance Analyzer** on the MPEG analyzer.

7. In the TS Compliance Analyzer window, select **Real-time..**, and make the following settings:

   Interfaces: ASI

   Interface Settings: Time Stamping

8. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **19.392** Mbps and that the packet size is **188** bytes.

NOTE. Ignore 3.4.a Unref PID error in the Priority 3 row.

---

9. Press the **Stop** button on the MTX100B to stop the stream output.

10. Disconnect the 75 Ω BNC cable from the MTX100B and MPEG analyzer.

Checking the SPI Record Operation.

1. Use the parallel interface cable to connect the SPI Input connector on the MTX100B to the DVB SPI Out connector on the MPEG analyzer.

Figure 2-31: Equipment connection for verifying the SPI record operation

2. Press the **Record** button on the MTX100B to display the Record screen.

3. On the MTX100B, make the following settings:

Control		Setting
Record	Source	SPI
	Target	RAM
	Record Size	100 MB
File	Save Mode	Over Write
	Save Mode	D:\Record_Files\SPI214Mbps

4. Change the MPEG analyzer to Play mode.

5. Select **File** > **Open** on the MPEG analyzer to display the Open dialog box.

6. In the dialog box, navigate to the **E:\MTXRTX_Test streams\ Record_Files**, and select the **SPI214Mbps.trp** file.

7. On the MPEG analyzer, make the following settings:

Control		Setting
Play	Clock Data Rate	214 Mbps
	Update	Off
	Source	RAM

8. Click the **PLAY** button on the MPEG Analyzer to start playing the **SPI214Mbps.trp** file.

9. Verify that the hierarchical view is displayed on the MTX100B screen. In addition, verify that the bit rate display is **214** Mbps and the packet size display is **188** bytes.

10. Press the **Record** button on the MTX100B to record the file.

11. After recording is complete, click the **Stop** button on the MPEG analyzer.

12. Exit the MPEG Player application on the MPEG analyzer.

Checking the Recorded File.

1. Change the interface cable connection from DVB/SPI Out connector to DVB/SPI In connector on the MPEG analyzer.

2. Start the **TS Compliance Analyzer** on the MPEG analyzer.

3. In the TS Compliance Analyzer window, select **Real-time..**, and make the following settings:

   Interfaces ASI

   Interface Settings Time Stamping

4. Press the **Play/Pause** button on the MTX100B to display the Play screen.

5. Select **File > Open** to open the Select File dialog box.

6. In the dialog box, navigate to the **D:\ Record_Files** directory, and select the **SPI214Mbps.trp** file.

7. Select **Play** > **Update** > **On**.

8. Press the **Play/Pause** button on the MTX100B to start playing the **SPI214Mbps.trp** file.

9. Verify that the hierarchical view is displayed on the MPEG analyzer screen and that no error messages appear. In addition, verify that the bit rate is **40** Mbps and that the transport stream packet size is **188** bytes.

NOTE. Ignore Program 3 and PID 120 (0x78) errors in the hierarchical view because these are caused by the original test40.TRP file.

10. Press the **Stop** button on the MTX100B.

11. Close the TS Compliance Analyzer window.

IP Interface   The following tests verify that the transport stream data is correctly output from the MTX100B instrument.

Recommended Settings for MPEG Player in IP mode.

Perform this procedure in Category/Classic view to check the settings of Intel/Pro 1000 MT drivers:

1. Click **Control Panel** > **Network and Internet Connections** > **Network Connections** in Category view or click **Control Panel** > **Network Connections** in Classic view.

2. Select **Intel(R) Pro/1000 MT Network Connection** device and right-click to select the **Properties** option.

3. Click **Configure** > **Advanced** and check if the following options are set in the dialog box:

Control	Setting
Adaptive Inter-Frame Spacing	Disabled
Flow Control	Off
Interrupt Moderation Rate	Off
Jumbo Frames	16128
Link Speed and Duplex	Auto-negotiate 1000Mbps
	NOTE. If the MTX100B MPEG system is connected to 100 Mbps network, select "Auto Detect" for Link Speed and Duplex option.
Receive Descriptors	2048
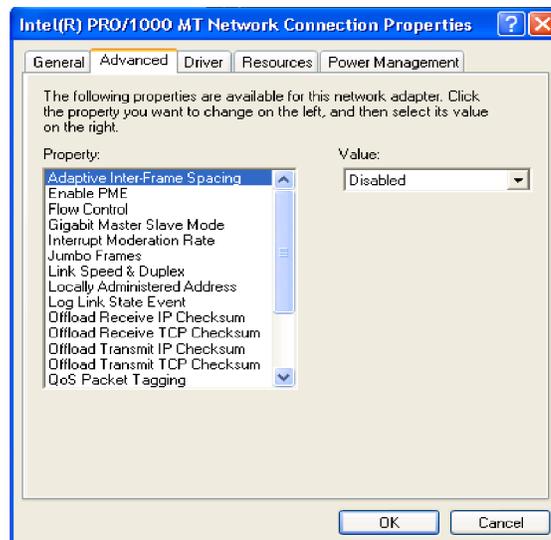
Perform this procedure to check the settings of Administrative tools for improved performance during the Playout:

1. Click **Control Panel** > **Administrative Tools** > **Services** in Classic view.

2. Select **Windows Firewall/Internet Connection Sharing (ICS)** to open the dialog box. Check if the Startup type is set to **Disabled**.
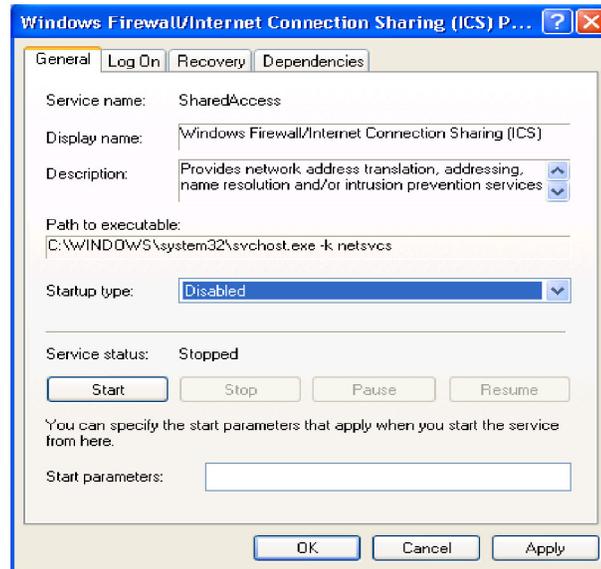
3. Select **Automatic Updates** to open the dialog box. Check if the Startup type is set to **Disabled**.
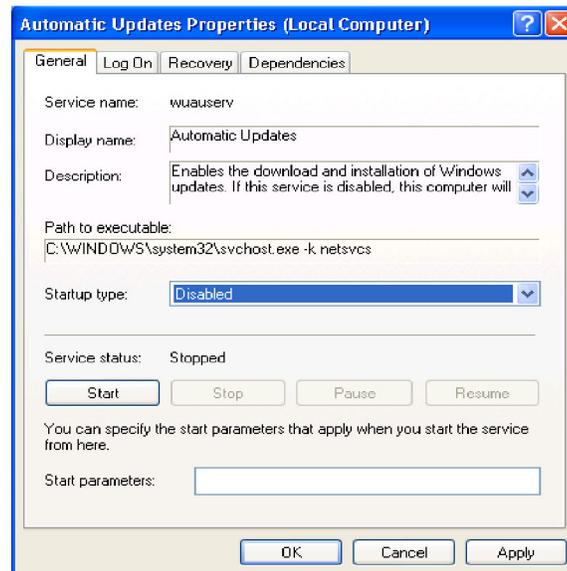
4. Select IIS admin to open the dialog box. Check if the Startup type is set to **Disabled**.
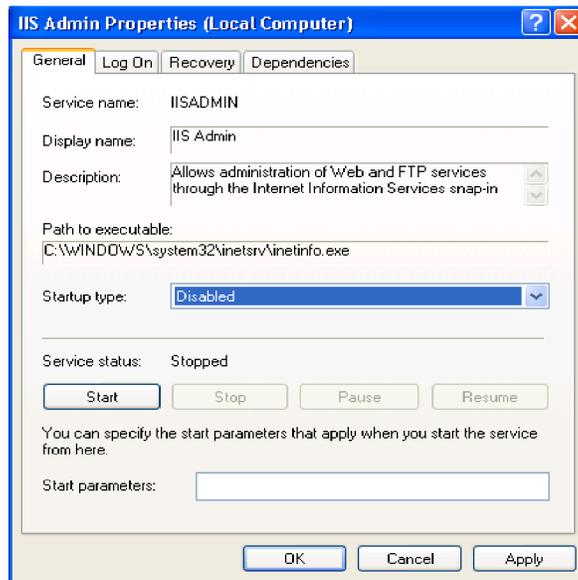
Perform this procedure to check if the automatic Java updates are disabled:

1. Click **Control Panel** > **Java**.

2. Select the **Update** tab and check if the **Check for Updates Automatically** check box is deselected.
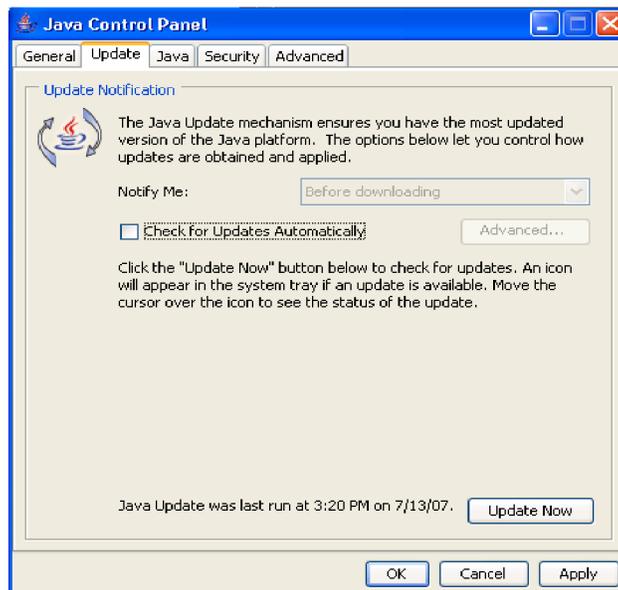
Perform this procedure to check for the settings of VLAN:

1. Click **Start** > **Run** and type **regedit**. Press **OK** to display the Registry Editor Window.

2. Browse to HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\
   Control\Class\{4D36E972-E325-11CE-BFC1-08002BE10318}\00XX where
   XX is the instance of the network adapter that you need to see tags on. You
   can check by opening and viewing the driver descriptor value (DriverDesc
   value should be Intel(R) PRO/1000 MT Network Connection).
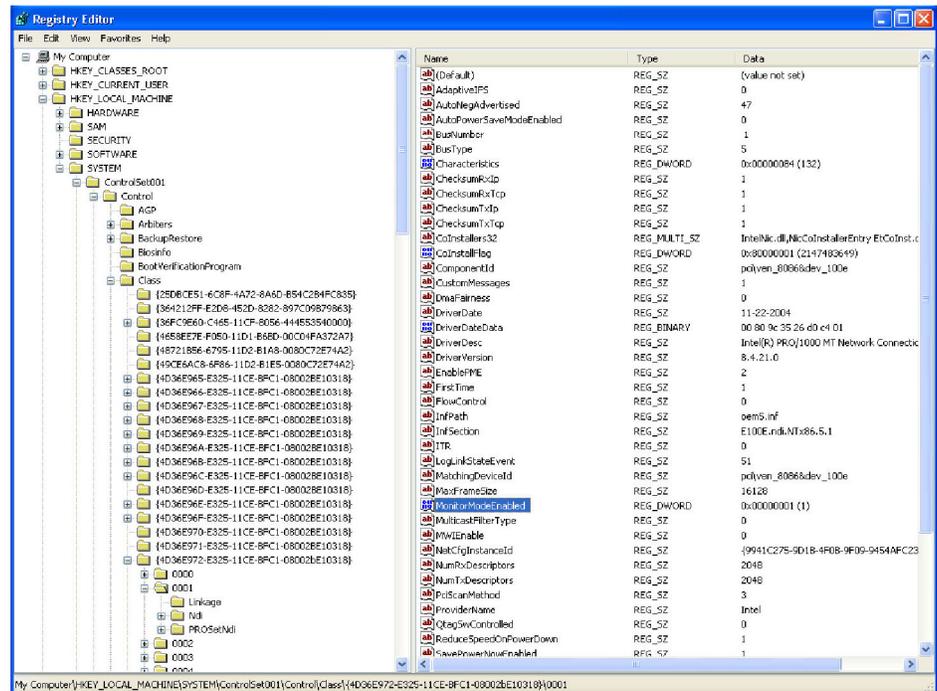
3. Select MonitorModeEnabled DWORD Value that you created.

4. Double-click the DWORD Value to open the Edit DWORD Value dialog box.
   Check if the Value data is set to 1.
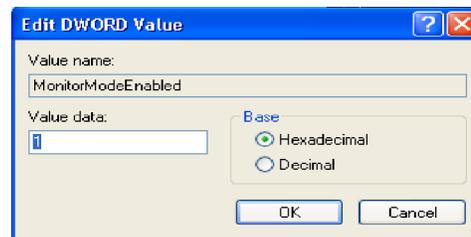
Checking Option GbE performance. Perform this procedure to check that the GbE Gigabit Ethernet interface of MTX100B is operating properly. This test checks that the transport stream data is correctly output from the MTX100B instrument.

Equipment required.

■ MTS400 Series MPEG system

■ RJ-45 cables

■ Crossover RJ-45 cable

1. Connect the equipment as shown below.
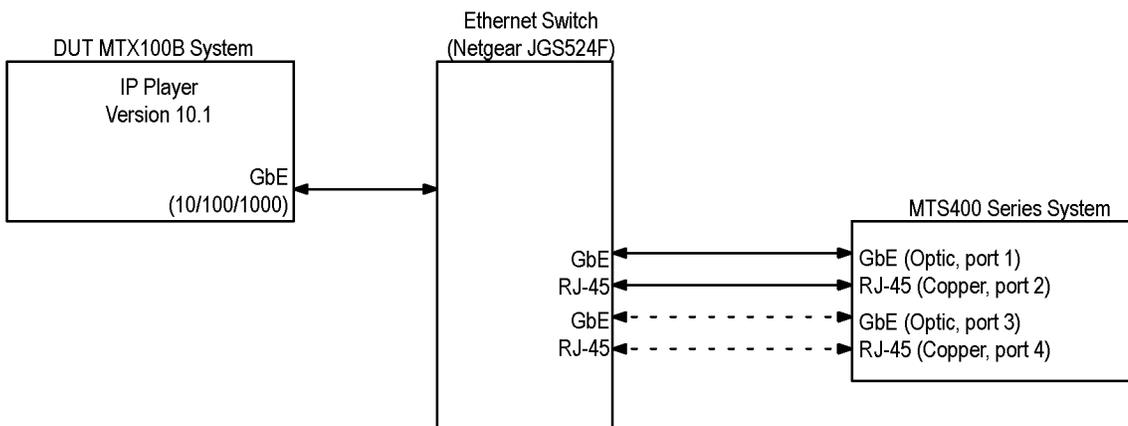
Figure 2-32: Equipment setup for Option GbE performance verification

NOTE. Check that V10.1 or greater MTX100B software is installed.

2. Power on the MTS400 Series MPEG system and allow the Windows operating system to boot completely. Wait an additional 90 seconds for the MPEG system to complete the Option GbE firmware loading process.

3. Configure the DUT MTX100B system with the following settings for GbE testing:

    a. Double-click the **MTX100B MPEG player** icon on the desktop to start the player.

MPEGPlayer.lnk

    b. From the **File** menu, select **Open** > **Look in** (dropdown menu) > **Local Disk (D)** > **test streams** > **test40.TRP** > **Open**.

c. Make the following selections in the Play menu:

Play Interface > IP

Play Packet Size >188

Play Clock dialog box
Make sure the Internal button is selected
Make sure the "Data Rate" section shows:

$$\frac{40}{27} \quad X \ 27.0 = \ 40.000000$$

Play > Update > On (checked)

Play > PCR Initial Value... dialog box:
Base Value (33): 0
Extension Value (9): 0

Click the OK button

Play > Source > Disk (checked)

Play > Loop > On (checked)

Start > Stop... dialog box:
Start radio button selected
0% text-entry-box set to 0
100% text-entry-box set to 386555
Format set to Packets

Play > Auto Play > Off (checked)

Play > Timer Play... (ignore this; it should show the current date and time)

4. Select Configuration from the IP menu to launch the IP Playout Configuration dialog box, and make the following entries/selections.

Control	Setting
Device Name	Intel(R) PRO/1000 MT Network Connection
Transmission Mode	Multicast
Destination IP Address	239.1.1.1
Protocol	UDP
Destination Port	1234
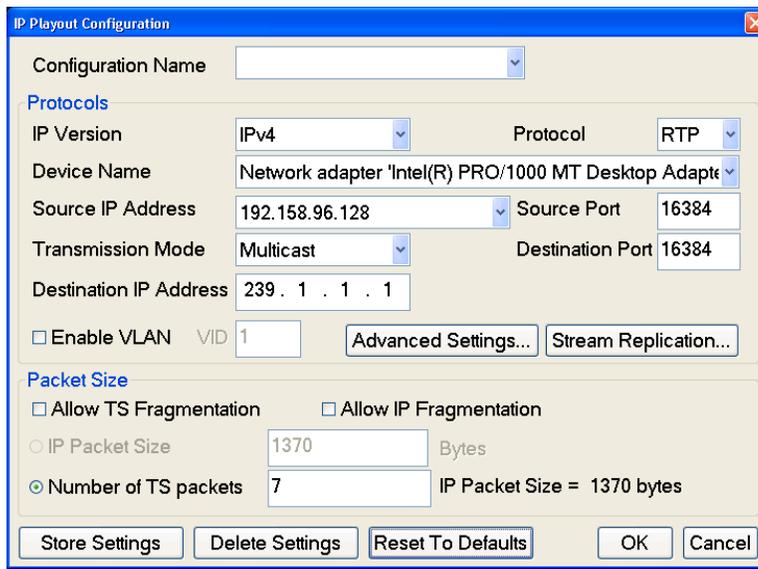
Now the MTX100B MPEG Player should appear as the following figure.
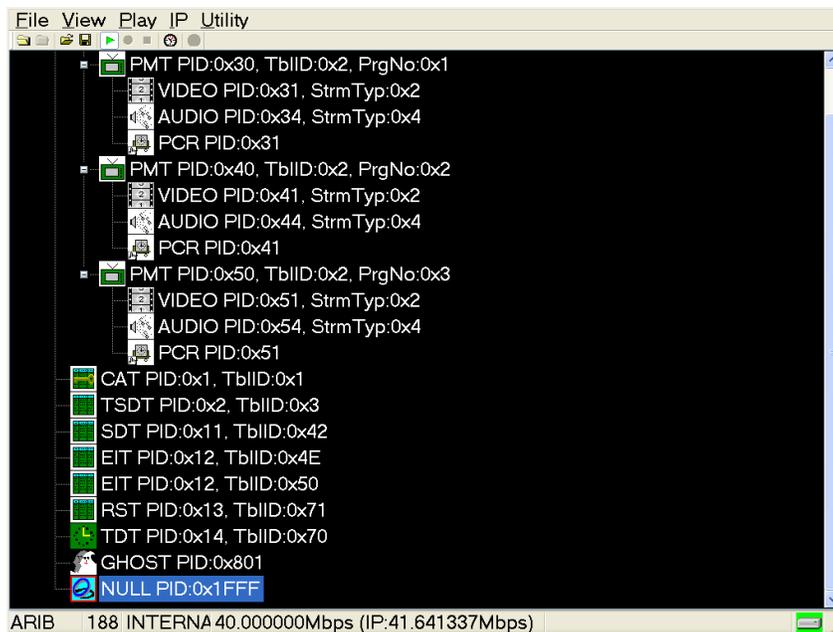
5. Click the **Start** button to start the stream playout.

6. Double-click the MTS400 Series system's **TS Compliance Analyser**

desktop icon `TS Compliance Analyser.lnk` to launch the TS Compliance Analyser application (TSCA). This starts with the Open Transport Stream dialog box as shown in the following figure.
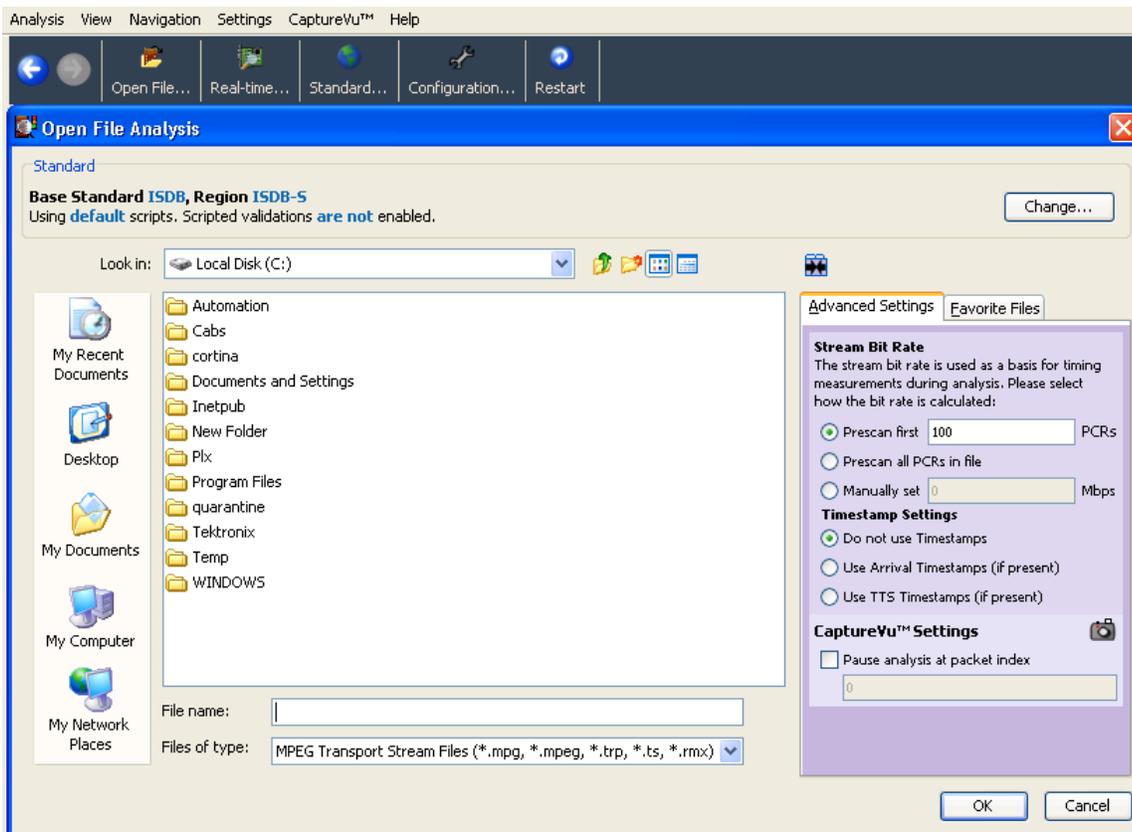
7. Select **Real-time...**. The Select Real-time Interface dialog box appears.

8. In the Select Real-time Interface dialog box, select **IP** from the Interfaces drop-down menu.
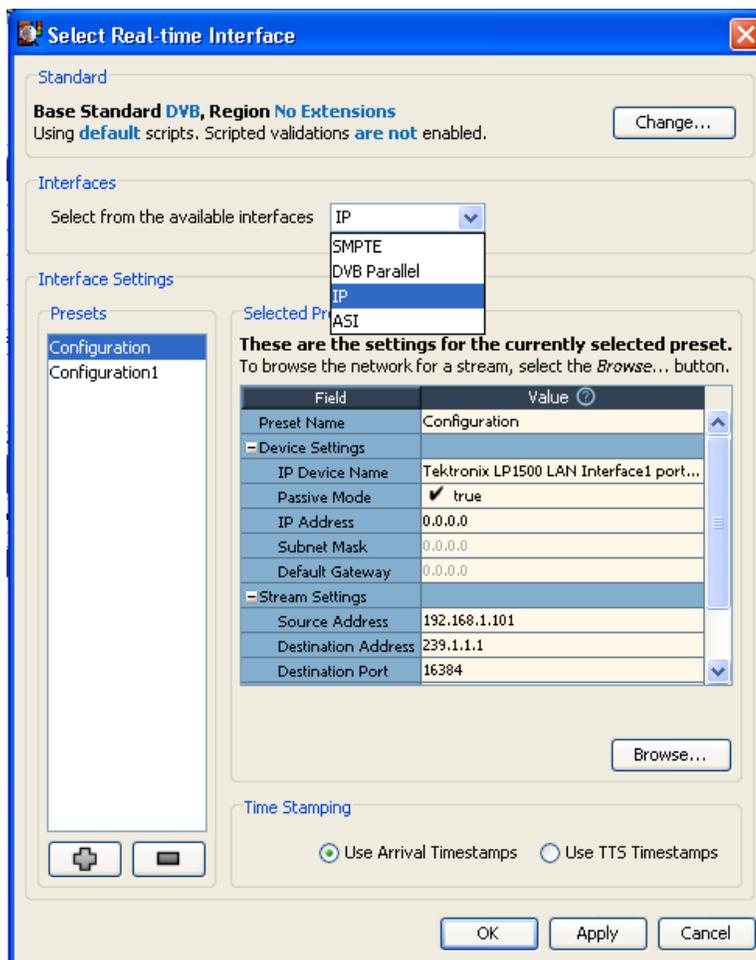
9. Click the **Browse** button to open the Browse for UDP Flow dialog box. (See Figure 2-33.)

NOTE. You may have to click the + button below the Configurations list to make the settings pane change. The Browse button, which is needed for the next step, will then be active.

10. Select Tektronix LP1500 LAN Interface Port 4 from the **Browse Device** drop-down menu.

11. In the Browse for UDP flow dialog box, make these selections:

    a. Select the Passive mode radio button.

    b. In the Detected UDP Flows pane, select the IP stream with a Destination IP Address of 239.1.1.1.
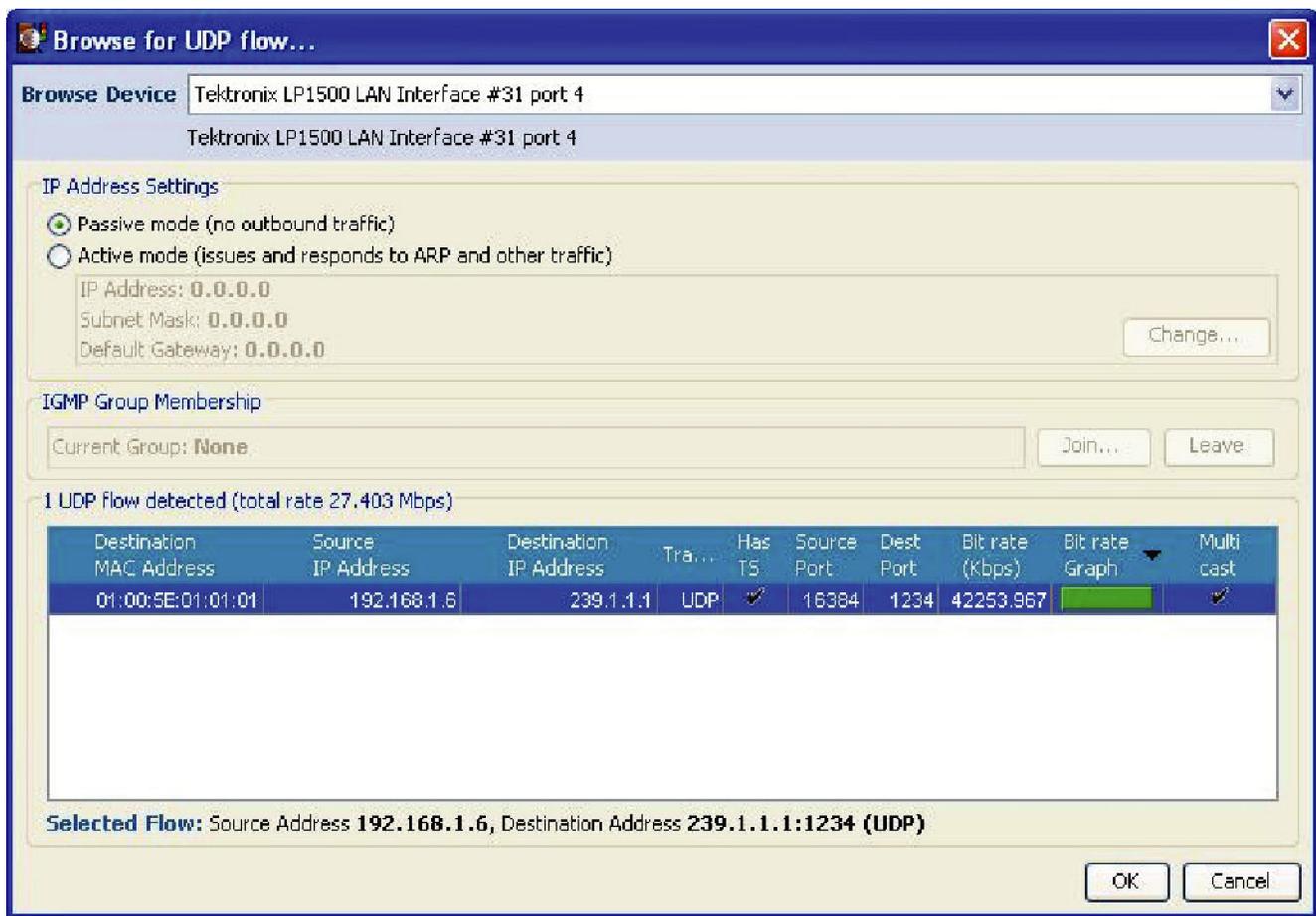
Figure 2-33: IP Flow selection

    c. Click the **OK** button. The MTS400 Series TS Compliance Analyzer dialog box opens.

12. Allow the DUT MTX100B MPEG system to loop at least three times.

13. On the MTS400 Series MPEG system, verify that the TS Availability and Sync indicators, in the bottom left corner of the Compliance Analyzer display, remain green.

14. Check that all the parameters under **Priority 1** of the Compliance Analyzer display are green. The TS bit rate displayed in the status bar should be approximately equal to 40.00000 Mbps which was set in the MTX100B instrument.

NOTE. Ignore the 2.5 PTS errors as they are generated by the test40.trp file.
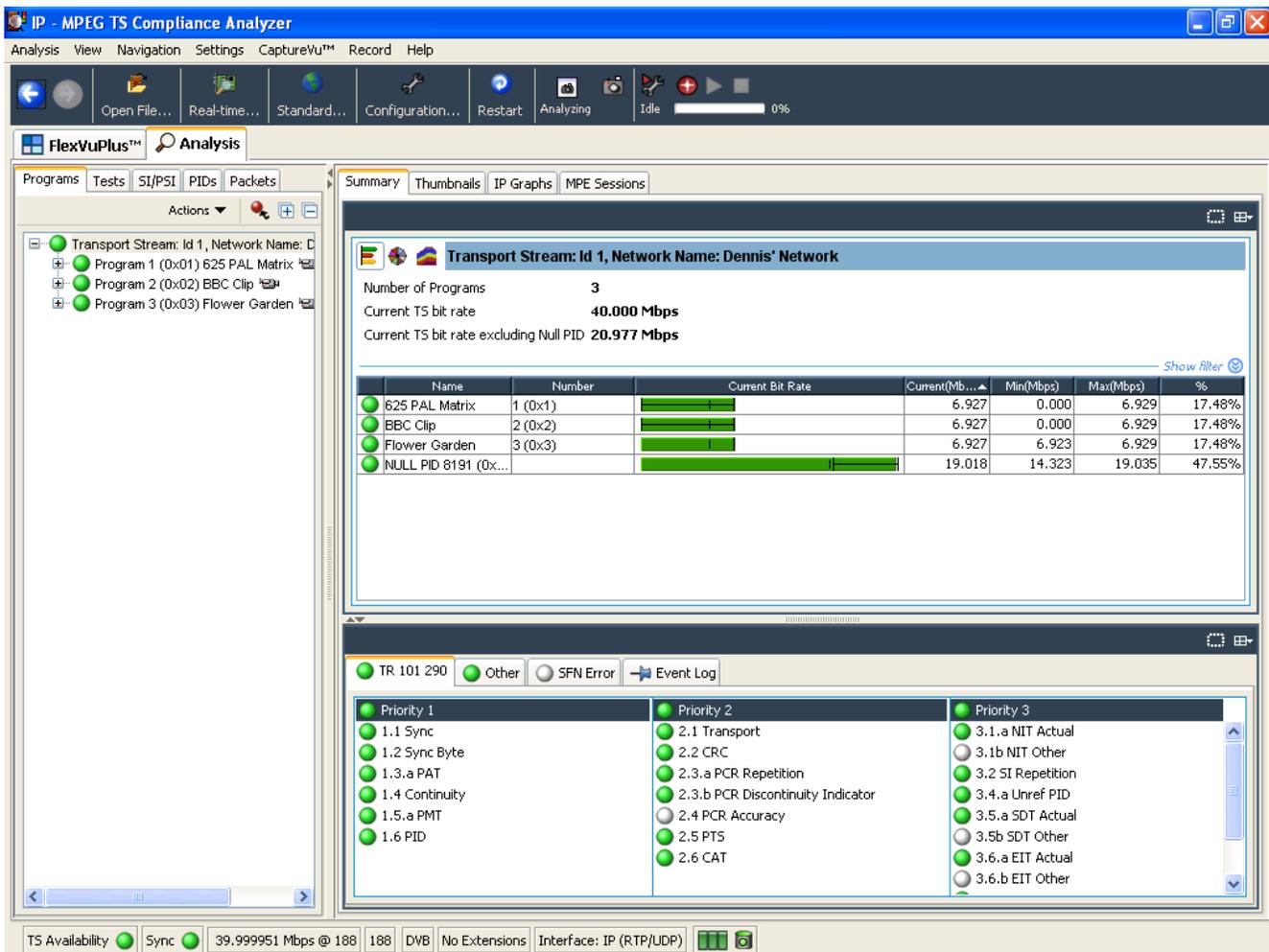
15. Disconnect the DUT MTX100B MPEG system from the test setup and turn it off using the front panel POWER switch. After the Windows shutdown completes, unplug the power cord from the system.

16. Disconnect the MTS400 Series MPEG system from the test setup:

   a. Disconnect the cable to the SFP module.

   b. Remove the SFP module.

   c. Close all applications running on the MTS400 Series MPEG system and turn it off using the front panel POWER switch. After the Windows shutdown completes, unplug the power cord from the system.

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1   The Start button is the button with the green horizontally oriented triangle, just below the SPI/ASM/310M menu near the top of the application-window.

Checking maximum bit rate performance. Perform this test to check that the maximum transport stream data is correctly output from the MTX100B instrument.

NOTE. You can perform the maximum bit rate performance test on MTS400 Series with a Cheetah card only.

1. Perform the steps 1 through 4 listed in the *Checking Option GbE performance* section.

2. Set the TS bit rate value to 160.000000 Mbps as shown in the following figure.
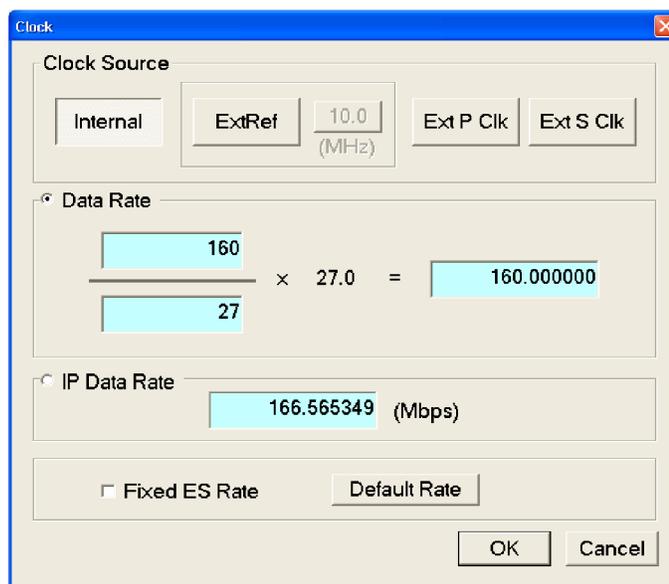
Figure 2-34: Clock dialog box

The status bar displays the TS bit rate as 160.0000000 Mbps.
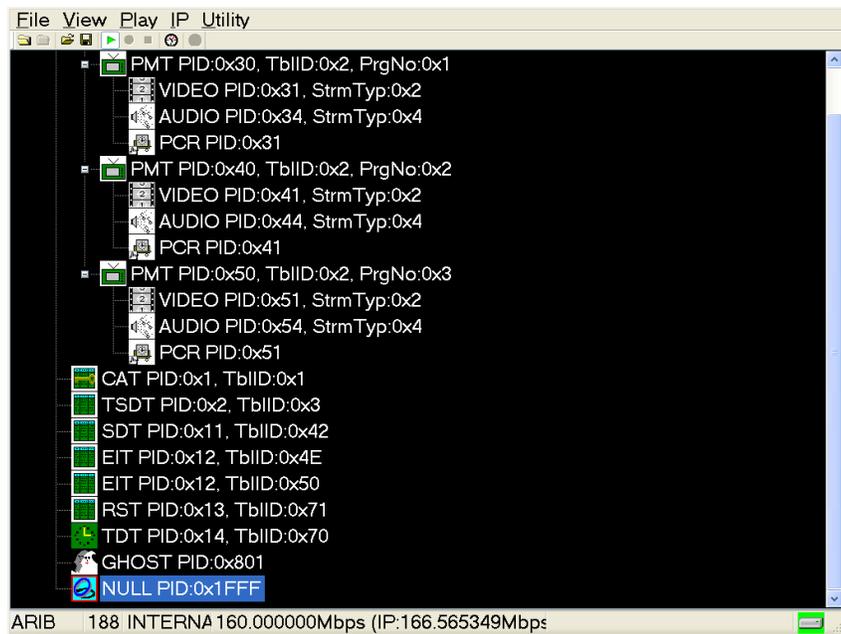
3. Perform the steps 6 through 15 listed in the *Checking Option GbE performance* section.

4. Check that the TS bit rate displayed in the status bar is approximately equal to 160.000000 Mbps as set in the MTX100B instrument.
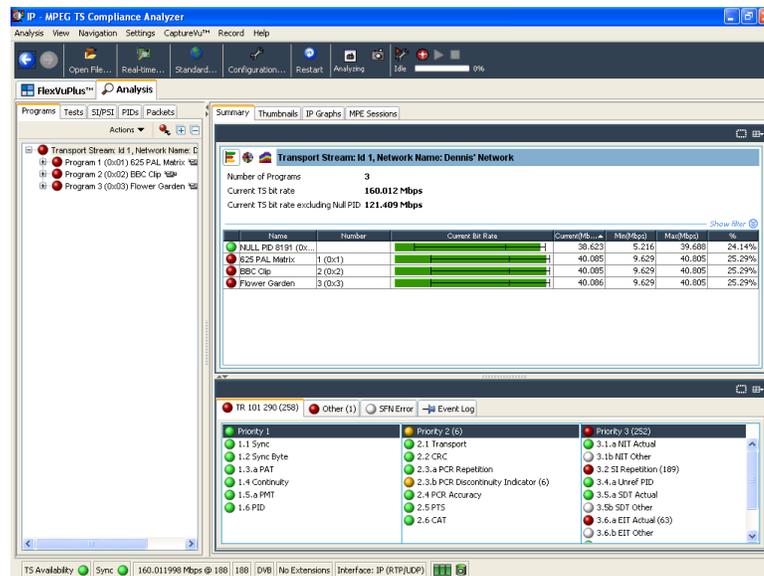
5. Disconnect the DUT MTX100B MPEG system from the test setup and turn it off using the front panel POWER switch. After the Windows shutdown completes, unplug the power cord from the system.

6. Disconnect the MTS400 Series MPEG system from the test setup:

    a. Disconnect the cable to the SFP module.

    b. Remove the SFP module.

    c. Close all applications running on the MTS400 Series MPEG system and turn it off using the front panel POWER switch. After the Windows shutdown completes, unplug the power cord from the system.

GbE Interface (Option IPTVP)

1. Connect an Ethernet cable from the RJ45 connector on the rear panel to the LAN connector, as shown:
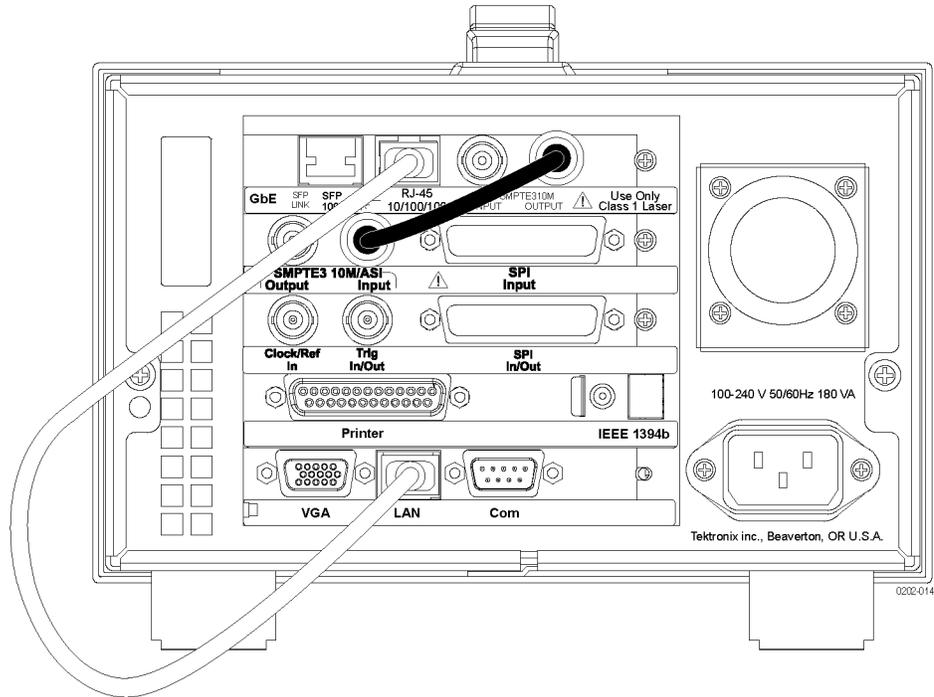
2. Launch the **TS Compliance Analyzer** application from the desktop.

3. In the TS Compliance Analyzer window, select **Real-time..** and close any dialog boxes which are open.

NOTE. The Firmware version is up-to-date. If it is not up-to-date, a message appears to update the version and the Update Firmware button is activated. Click ***Update Firmware*** *and allow the update to complete.*

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4. In the Select Real-time Interface window, verify that the **GigE** interface appears in the **Select from the available interface** drop-down menu.
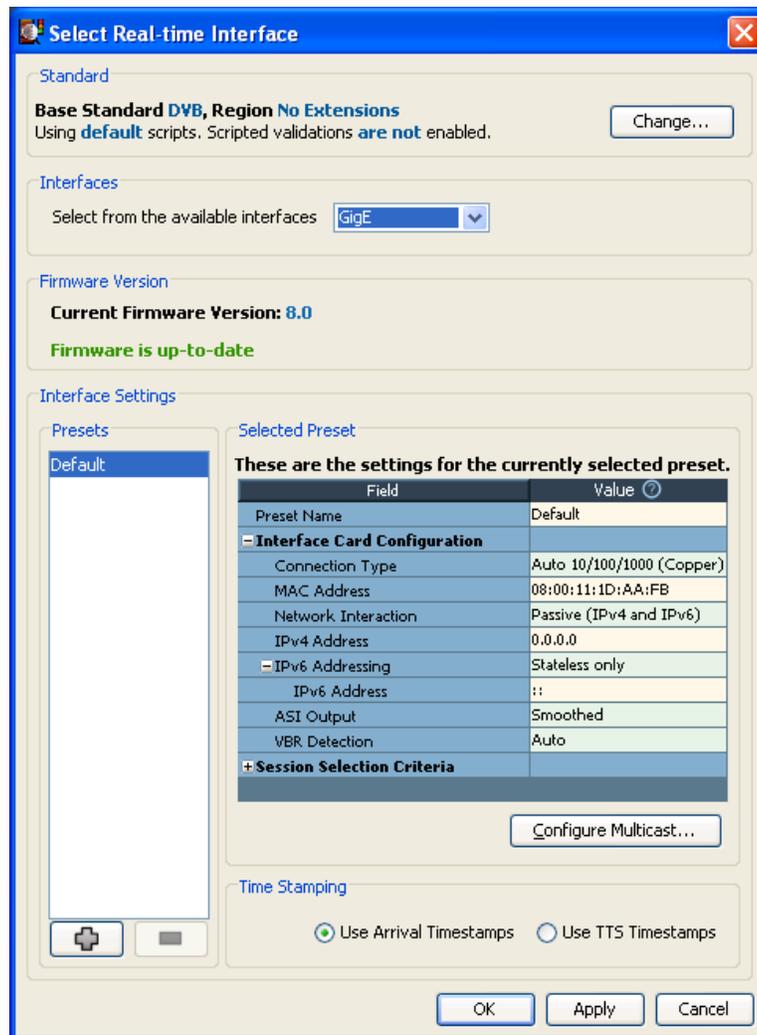
NOTE. *If the GigE interface appears, the Interface Settings displayed should be similar to the values shown above. If you wish to proceed with the analysis, make sure that the Connection Type is set to **Auto**.*

5. If you want to start the analysis and if the local setup matches the interface settings, click **OK** to close the Select Real-time Interface dialog box.

6. Click the **Interface** tab and select the **IP Tables** tab.

7. Minimize the TSCA Application. Do not close the application window.

8. Launch the MPEG Player Application.

9. Select **File > Open**, then browse to C:\test streams and select **Sym1.mpg**.
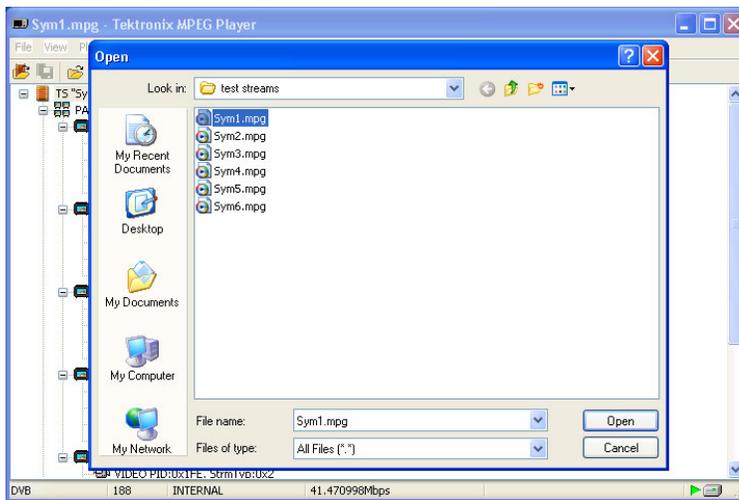
10. Select **Play > Interface > IP**.

11. If this is the first time running the IP interface, you should select "Auto Configure" on the following settings page. Otherwise, click the **OK** button.
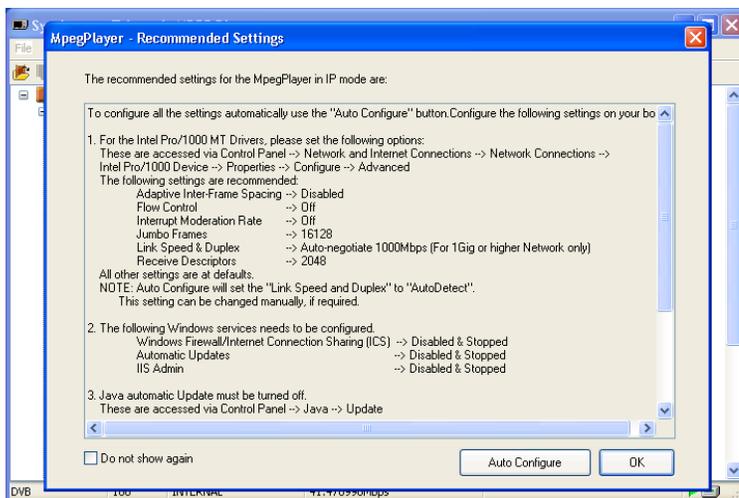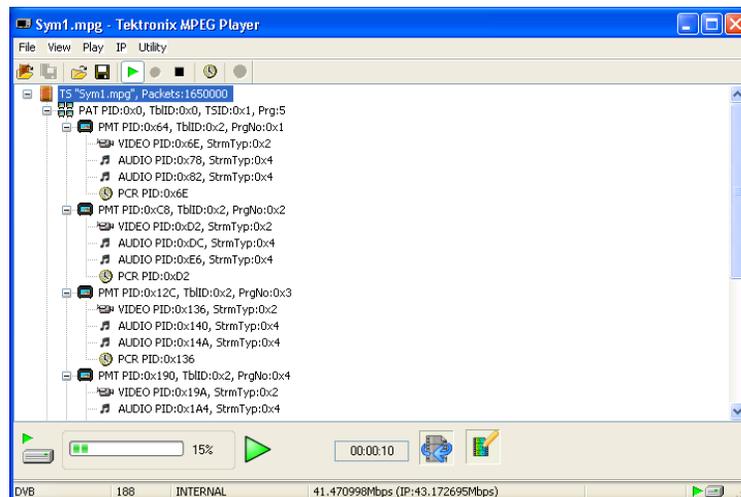

12. If Auto Configure was selected in the previous step, reboot the box and repeat steps 2 through 11 above.

13. Select **IP > Configuration**. Set the items in the dialog box as shown in the following figure and then click the **OK** button.
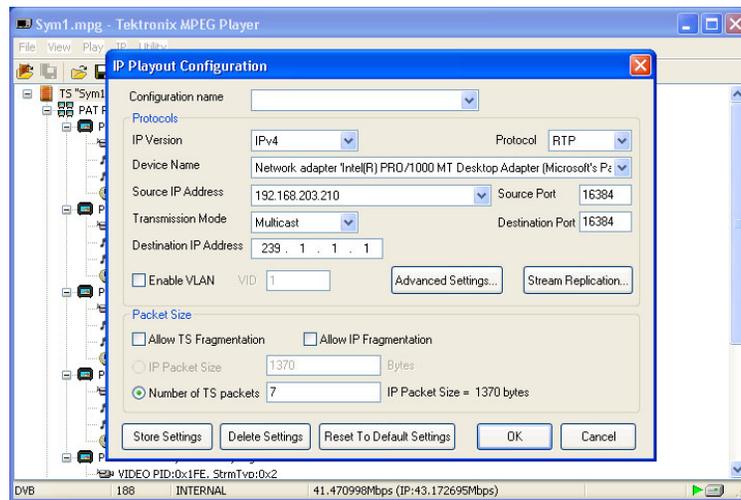
14. Start the IP packet generator by selecting the **Play** button ( ) on the MPEG Player application toolbar.

15. The following screen should appear.

16. Maximize the TSCA application (minimized in step 7) and select the generated IP session on the Traffic Table. This is done by double clicking the specific line on the table.
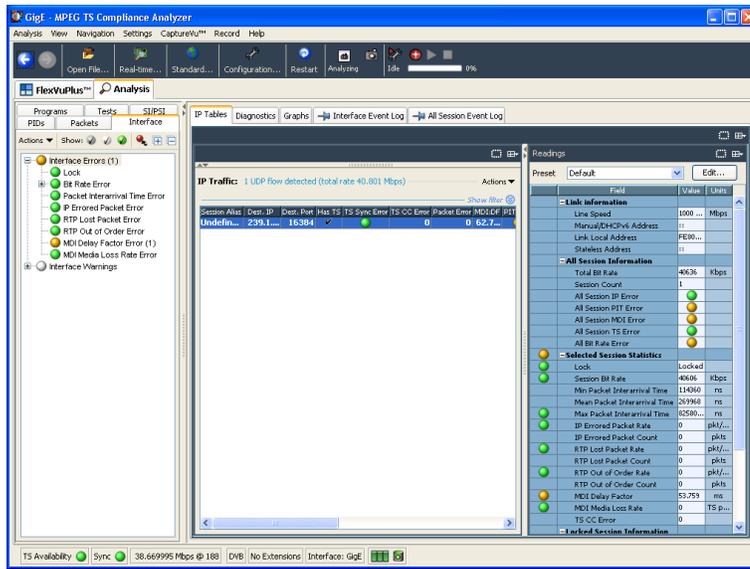
17. Select the **Restart Button** ( ) on the TSCA Toolbar. After restart, the TSCA analyzes the generated IP traffic. Error and limit indicators will be red, yellow, or green depending on where the specific limits are set for the instrument.

18. Check that the traffic is selectable. Check that the bitrate, TS CC errors, Packet errors, and other measurements are similar to the readings in the following figure. If they are, the instrument is working correctly.
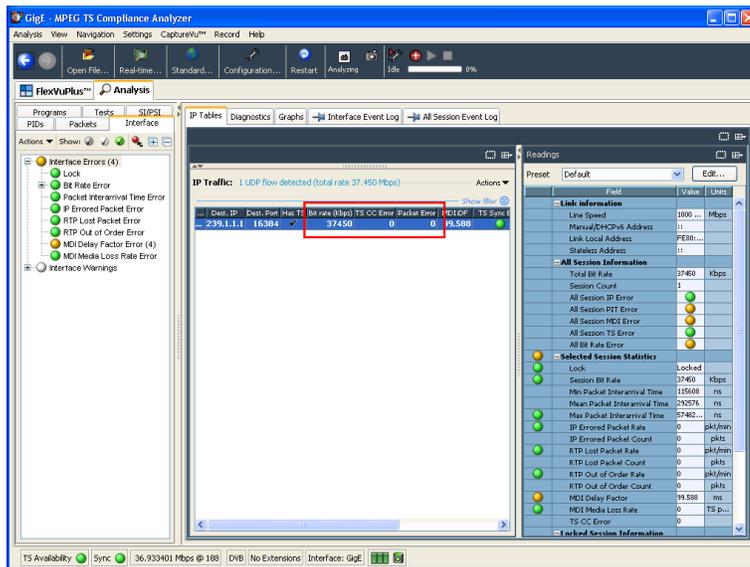
This completes the MTX100B performance verification.