

**RTX100B Series
RF Signal Generators
Technical Reference**



077-0192-00

Tektronix

**RTX100B Series
RF Signal Generators
Technical Reference**

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General Safety Summary

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

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

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

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

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

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

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

Power Disconnect. The power switch disconnects the product from the power source. See instructions for the location. Do not block the power switch; it must remain accessible to the user at all times.

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.*

- 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.



CAUTION
Refer to Manual



WARNING
High Voltage



Standby











Preface

This manual contains the following sections:

- *Introduction* briefly describes the generator and provides installation instructions, option and accessory lists, repacking instructions, and power on and off instructions.
- *Programming Information* presents descriptions of all programming commands and the syntax used in command descriptions. This section also provides instructions for setting the network parameters for the Ethernet port.
- *Appendices* provide product specifications, instructions for operating the ReMux and Scheduler applications, defragging the hard disk, recovering the system, and inspecting and cleaning the generator.

Related Documentation

The following related documentation for the instrument is available:

| Item | Purpose | Location |
|--|---|--|
| RTX100B Series RF Signal Generators Specifications and Performance Verification Technical Reference Manual (077-0193-xx) | Provides complete product specifications and a procedure for verifying the operation of the instrument. |  +  www.Tektronix.com |
| RTX100B Series RF Signal Generators Quick Start User Manual (071-2595-XX English, 071-2596-xx Japanese) | Provides installation and high-level operational overviews. |  +  +  www.Tektronix.com |
| RTX100B Series RF Signal Generators Technical Reference (077-0192-xx) | Provides in-depth operating information. |  +  www.Tektronix.com |
| RTX100B Series RF Signal Generators Service Manual (077-0194-xx) | Optional manual supporting module-level servicing of the instrument. |  +  www.Tektronix.com |
| MTX/RTX Release Notes (077-0195-xx) | |  |

Terms Used in This Manual

This manual uses the following terms:

- **Stream:** Generic term for transport streams and data streams of Non-TS format (data format other than transport stream format).
- **S-TMCC (Single TMCC):** Transport stream to which TMCC (Transmission and Multiplexing Configuration Control) information is inserted into the 8 bytes in its Reed-Solomon code area (16 bytes). It is defined in the ISDB-S (Integrated Services Digital Broadcasting-Satellite) system.
- **M-TMCC (Multi TMCC):** Transport stream to which TMCC information is inserted into the sync byte area, and having super frame structure. It is defined in the ISDB-S system.
- **RTX130B (QAM & VSB RF Signal Generator) Generator** references in the document refer to the information that is specific to the RTX130B module.
- **RTX100B (ISDB-T RF Signal Generator) Generator** references in the document refer to the information that is specific to the RTX100B module.

Introduction

The RTX130B QAM & VSB RF Signal Generator generates QAM and 8VSB modulated signals that are compliant with the DVB-C/ITU-T J.83 Annex A/B/C and ATSC standards. In addition to the RF signal output feature, the generator records and plays MPEG-2 transport streams that are compliant with ATSC, DVB, and ARIB standards.

The RTX100B ISDB-T RF Signal Generator converts a broadcast transport stream into an RF signal and outputs it. In addition to the RF signal output feature, the generator records and plays MPEG-2 transport streams that are compliant with ATSC, DVB, and ARIB standards.

Common Features for Both the RTX100B Generator and the RTX130B Generator

- Hierarchy display of stored or captured transport streams
- 188, 204, 208 bytes packet size, S-TMCC, M-TMCC, nontransport stream, and partial transport stream output formats
- Real-time updating of stream parameters; continuity_counter, PCR/PTS/DTS, TOT/TDT/STT, NPT, and Reed Solomon (ISDB-T only)
- Continuous recording of captured streams
- PCR jitter insertion
- Triggered stream capture
- Full remote control using Ethernet interface
- Scheduler application for automated stream playout and record (Option SC only)
- IP, ASI, universal parallel/serial, IEEE1394/ASI, and SMPTE310M/ASI/SPI interfaces available
- Playout on one interface at a time, either IP or other interfaces
- Two IP versions namely IPv4 and IPv6 are supported
- Stream replication (IP) with some attributes of the stream incremented by a certain value

Specific Features for RTX100B Generator

- RF modulated output of broadcast transport streams
UHF: 13 channel to 62 channel (473 MHz to 767 MHz)
- Direct RF output of ASI input signals

Specific Features for RTX130B Generator

- 16/64/256QAM and 8VSB modulation formats
- Modulation frequency range: 50 MHz to 860 MHz
- 44 MHz or 36 MHz IF output
- Support the following standards:
 - DVB-C/ITU-T J.83 Annex A (Option M1)
 - ITU-T J.83 Annex B (Option M2)
 - ITU-T J.83 Annex C (Option M3)
 - ATSC (Option M4)

Windows Operations

All the functions of the generator are performed as an application on the Windows XP operating system. If you connect the keyboard and the mouse provided with the instrument to the front-panel USB connectors, you can operate the generator with the same environment as a Windows PC.

Operation on the Play/Record Screen

When you have connected a keyboard and a mouse to the instrument, you can use them to make menu selections and parameter settings in the Play/Record screen. These operations behave in the same manner as the other Windows applications.

Displaying the Windows Screen (Desktop)

To display the Windows screen (Desktop), select Minimize or Exit from the File menu in the Play screen or Record screen. When you click Minimize, the generator window minimizes and the Windows XP desktop appears. When you click Exit, the generator application exits and the Windows XP desktop appears.

File Operation

There are no menu commands to manage file operations in the generator application. Perform file operations such as copy, delete, or upload/download on Windows. Refer to Windows XP Online Help or other documentation about file operations.

The generator application is placed in the C:\ProgramFiles\Tektronix\Mpeg Player folder. The sample transport stream files are placed on the D: drive (Volume D).

System Settings

This manual describes only the settings for connecting to an Ethernet network. Refer to the Windows XP Online Help or other documentation for information about other system settings.

Reference

The Reference section is divided into subsections that give you information on how to use the menus, add jitters to PCRs, use the continuous recording feature, and use the Preset File.

Using the Menus

This subsection describes the function of each selection that is available in the menus. This section is divided into the following subsections:

- *Menus in the Play Screen* describes all the menu commands and their features available in the Play screen.
- *Menus in the Record Screen* describes all the menu commands and their features available in the Record screen.
- *Toolbar Buttons* describes the toolbar buttons and their functions.

Refer to the *RTX100B Series RF Signal Generator Quick Start User Manual* for information on how to operate the menus.

Menus in the Play Screen

This subsection describes the menus available in the Play screen.

File Menu. The File menu in the Play screen contains commands for selecting a stream file and for loading and saving a preset file. This menu also contains commands to exit the generator application and the instrument. (See Table 1.)

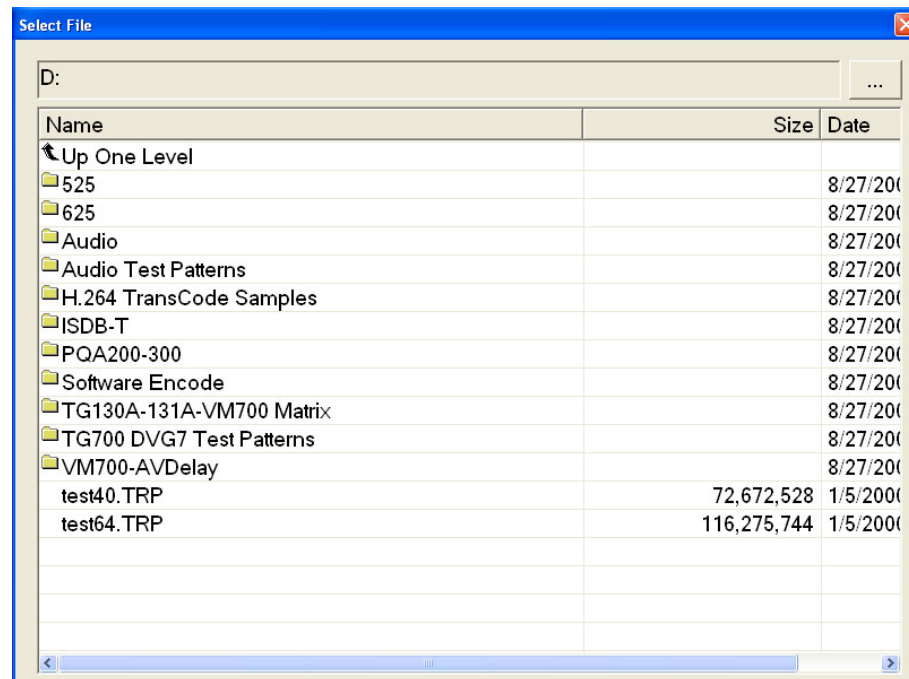
Table 1: File menu commands (Play screen)

| Command | Description |
|-------------|---|
| Open | Opens a stream file. When a file is selected, the generator checks the packet size of the file. For a transport stream file, the data is output in packets. If an incomplete packet is included at the start or end of the file, that portion of the file is not output. The available minimum data size is 104 KB. When you select this command, the Select File dialog box appears. (See Figure 1.) |
| Load Preset | Loads the specified preset file (*.set). When a preset file is loaded, the current instrument settings are replaced by the settings in the preset file. |
| Save Preset | Saves the current instrument settings as a preset file. |
| RECORD | Switches to the Record screen. The Record screen is disabled for the IP interface. |
| Scheduler | Starts the Scheduler application when the Option SC is installed. |

Table 1: File menu commands (Play screen) (cont.)

| Command | Description |
|----------|--|
| Minimize | Minimizes the generator application window. |
| Exit | Exits the generator application. The generator application settings are saved. |
| Shutdown | Exits the generator application and shuts down the generator Series. |

Select File Dialog Box. When you select the Open command from the File menu, the Select File dialog box appears. (See Figure 1.)

**Figure 1: Select File dialog box**

You can perform the following functions in Select File dialog box:

- Press the arrow buttons to select the desired file, and press the Enter button to load the selected file.
- Select Up One Level to move from the current directory to a directory one level higher.
- Click the “...” button at the upper right of the dialog box to select a file that is not listed.

View Menu The View menu contains commands that control the display of the Toolbar and the Status bar. (See Table 2.)

Table 2: View menu commands

| Command | Description |
|------------|---|
| Toolbar | Toggles the display of the Toolbar on and off in the Play screen. A check mark precedes the command in the menu when the Toolbar is selected for display. |
| Status Bar | Toggles the display of the Status bar on and off in the Play screen. A check mark precedes the command in the menu when the Status bar is selected for display. |

Play Menu The Play menu contains commands for defining output parameters such as packet size, output clock rate, or output source. (See Table 3.)

Table 3: Play menu commands

| Command | Description |
|-------------|--|
| Interface | Sets the interface to transmit and receive Ethernet packets. You can select either IP or QAM/VSB/DMB-T/ or ISDB-T/ISDTV/ASI |
| Packet Size | <p>Sets the packet size (in bytes) for the stream. You can set the packet size to 188 (188 + 0), 204 (188 + 16), 208 (188 + 20) bytes, or Non-TS.</p> <p>These packet sizes can only be set for an MPEG-2 transport stream. For an S-TMCC or an M-TMCC transport stream, the packet size is fixed to 204. For a Non-TS stream, the packet size is fixed to Non-TS. In addition, if you select 8VSB for an output signal format in Option 07, the packet size is fixed to 188.</p> <p>When you select Non-TS, the generator deals with stream data in a byte unit (not a packet unit) and outputs all of the data in a file. If a transport stream contains any error, you can output it by selecting Non-TS.</p> |
| Clock | Opens the Clock dialog box where you can set the clock rate of the stream output. (See Figure 2.) |

Table 3: Play menu commands (cont.)

| Command | Description |
|-------------------|--|
| Update | <p>Sets whether to update parameters in the stream when looped. You can select On or Off. You cannot select On for a Non-TS stream.</p> <p>You can select which parameters in the stream are updated using the Others dialog box. (See Figure 7.)</p> |
| Sync | <p>Sets the format of the PSYNC signal output from the SPI In/Out connector. You can select TS Packet, SF, or Non-TS. For TS Packet, a single pulse signal is output at the start of each packet. For SF, a single pulse is output at the start of the SF appearing every 204 X 48 X 8 bytes. For Non-TS, the Set Non-TS Sync dialog box appears, where you can enable the PSYNC and DVALID signals. (See Figure 3.)</p> |
| PCR Initial Value | <p>Opens the PCR Initial Value dialog box where you can set the initial value of the program_clock_reference_base and program_clock_reference_extension parameters when the transport stream is output. (See Figure 4.)</p> |
| Source | <p>Selects the source for stream output. You can select RAM or Disk.</p> |
| Loop | <p>Sets whether the stream output is using the looping method. You can select On or Off. If you select On, the selected stream is continuously output. If you select Off, the selected stream is output once.</p> |
| Start/Stop | <p>Opens the Start/Stop Position dialog box where you can set the start and stop positions of the stream, and initial start position of the stream for loop output. (See Figure 5.)</p> |
| Auto Play | <p>Sets whether the transport stream is automatically output using the last power-off settings when you turn on the RTX100B Series. You can select On or Off.</p> |

Table 3: Play menu commands (cont.)

| Command | Description |
|------------|---|
| Timer Play | Opens the Timer Play/Record dialog box where you can set the date and time used to output a stream automatically. (See Figure 6.) |
| Other | Opens the Other dialog box where you can set the standard used to display the selected stream and display radix for the text information. (See Figure 7.) |

Clock Dialog Box. When you select the Clock command from the Play menu, the Clock dialog box appears. (See Figure 2.)

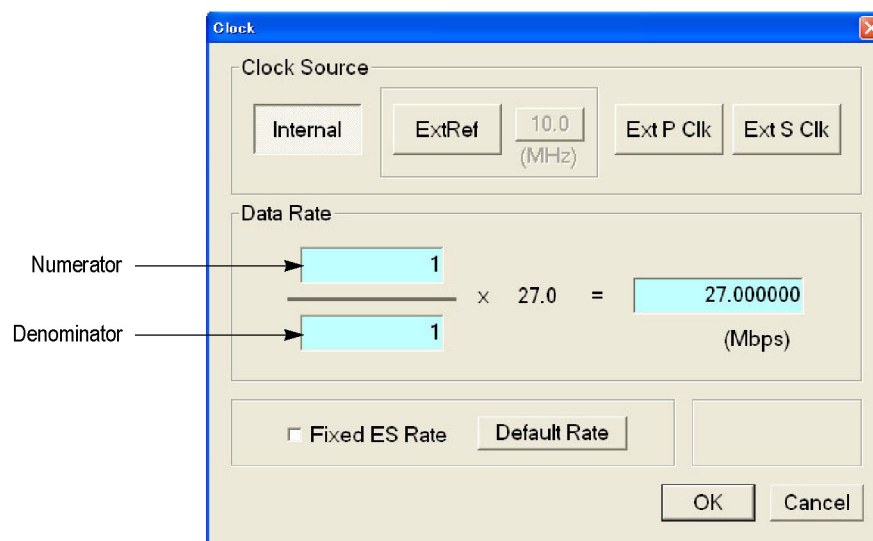


Figure 2: Clock dialog

- **Clock Source:** Sets the clock that will be used as the reference for the stream output. You can select from the following settings:
 - **Internal** uses the internal clock of the generator as the clock reference.
 - **Ext Ref** allows you to input a signal on the Clock/Ref In connector for use as the clock reference. When you select the button to the right of the ExtRef box, the following External Reference dialog box appears.
 - **10 MHz** selects a 10 MHz signal on the Clock/Ref In connector.
 - **27 MHz** selects a 27 MHz signal on the Clock/Ref In connector.
 - **ISDB-T IFFT Clock** selects a signal corresponding to the IFFT sample clock rate (8.126984 MHz) on the Clock/Ref In connector.

- **Ext P Clk** (external parallel clock) allows you to input a clock signal on the Clock/Ref In connector for use as the parallel clock.
- **Ext S Clk** (external serial clock) allows you to input a clock signal on the Clock/Ref In connector for use as the serial clock.
- **Data Rate:** Sets the clock rate for the transport stream output. You can enter the clock rate using the following methods (the first method provides greater clock-rate precision):
 - Enter values into the numerator and denominator text boxes. (See Figure 2.) The generator will calculate the clock rate based on the ratio of the numerator and denominator values.
 - Enter a value into the clock rate text box. The generator will calculate the numerator and denominator values based on the clock rate.

NOTE. *The IP data rate will be automatically calculated based on the available TS data rate. IP Data Rate is calculated as follows:*

$$IP\ Data\ Rate = (TS\ Data\ Rate \times IP\ Packet\ Size) / Payload\ Size$$

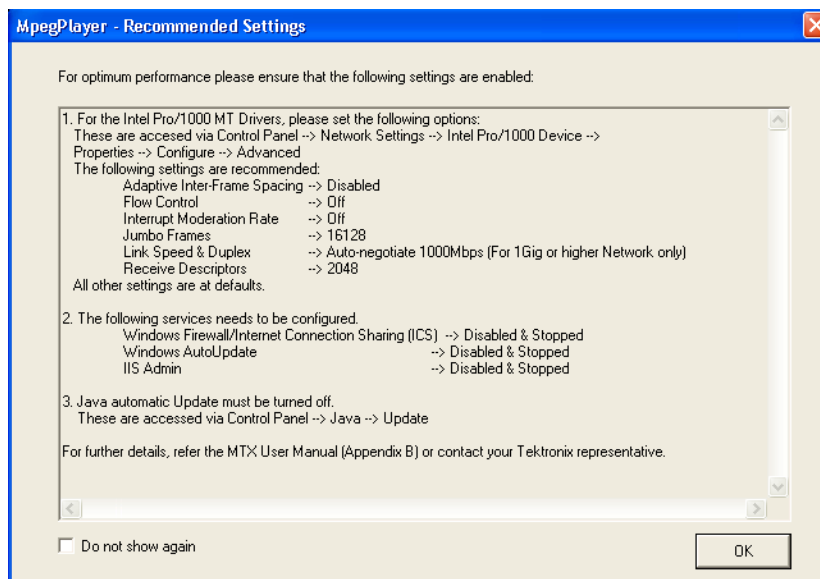
When you use the Ext P Clk or Ext S Clk mode, set the clock rate to the same value as the input clock signal. Also, when you use the Ext S Clk mode, you cannot set the value more than 32 Mbps.

- **IP Data Rate:** Sets the clock rate for the IP packet. In the IP mode, a change in the IP data rate will impact the TS data rate and a change in the TS data rate will impact the IP data rate. The packet length changes according to the selected protocol.

NOTE. *The TS data rate will be automatically calculated based on the available IP data rate and consequently will influence the PCR/PTS/DTS update cycles. TS Data Rate is calculated as follows:*

$$TS\ Data\ Rate = (IP\ Data\ Rate \times Payload\ Size) / IP\ Packet\ Size$$

When the IP data rate is more than 80 Mbps, a Recommended Settings dialog box is displayed, asking you to modify the settings for optimal performance.



- **Fixed ES Rate:** Sets whether the elementary stream rate is fixed. When it is checked, the elementary stream rate is played at constant rate regardless of the clock rate setting. If you fix the elementary stream rate, you cannot set the output clock rate (Data Rate) to less than the data rate set when the stream file was downloaded.

When Fixed ES Rate is selected, PCR/PTS/DTS Update Method in the Select Update Item dialog box is set to Hardware automatically. (See page 3, *Using the Menus.*)

Table 4: Relationship between Fixed ES Rate Setting and PCR Jitter

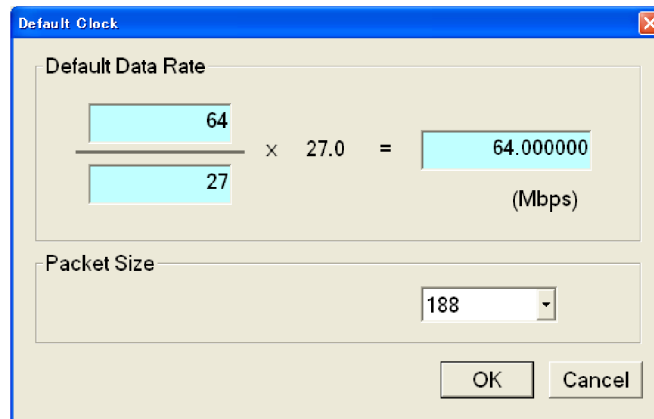
| | Fixed ES Rate: checked | Fixed ES Rate: not checked |
|------------------|-------------------------------|--|
| Update: Hardware | PCR jitter meets the standard | PCR jitter meets the standard |
| Update: Software | | PCR jitter meets the standard, provided that the original file does not contain any PCR jitter |
| Update: Off | PCR Jitter occurs | PCR, PTS/DTS discontinuity occurs on loop points |

- **Default Rate:** Displays the default clock rate and packet size, and then changes the values. When you select this button, the following Default Clock dialog box appears.

- **Default Data Rate:** Overwrites the scanned bit rate value of the stream file.

Since the default clock rate is calculated based on the PCRs in the downloaded stream file, the value can be different from the original clock rate. When the elementary stream rate is fixed (refer to the Fixed ES Rate description), the instrument refers to the default clock rate. Therefore, if the default clock rate is different from the original clock rate, you need to set it to the appropriate value. If you change the value, the clock rate value in the Data Rate dialog box is also changed.

- **Packet Size:** Changes the default packet size when the selected stream file is downloaded. If you change the value, the Packet Size setting in the Play menu will also change.



Set Non-TS Sync Dialog Box. When you select Non-TS from the Sync command in the Play menu, the Set Non-TS Sync dialog box appears. (See Figure 3.)

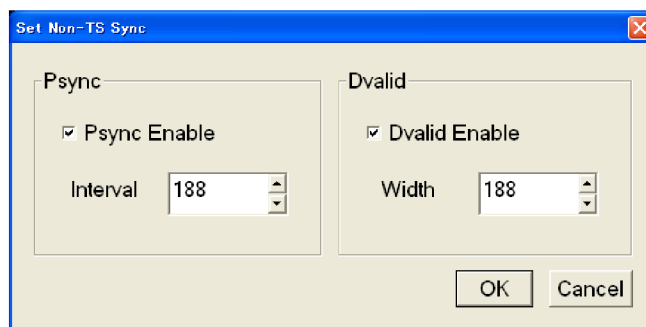


Figure 3: Set Non-TS Sync dialog box

- **Psync Enable:** Sets the status of the PSYNC signal output from the SPI In/Out connector.
- **Interval:** Enter the output period of the PSYNC signal in the range of 16 to 255 bytes. A value equal to or greater than the Width value can be entered in the Interval field.
- **Dvalid Enable:** Sets the status of the DVALID signal output from the SPI In/Out connector.
- **Width:** Enter the data width of the DVALID signal in the range of 16 to 255 bytes.

PCR Initial Value Dialog Box. When you select the PCR Initial Value command from the Play menu, the PCR Initial Value dialog box appears. (See Figure 4.)

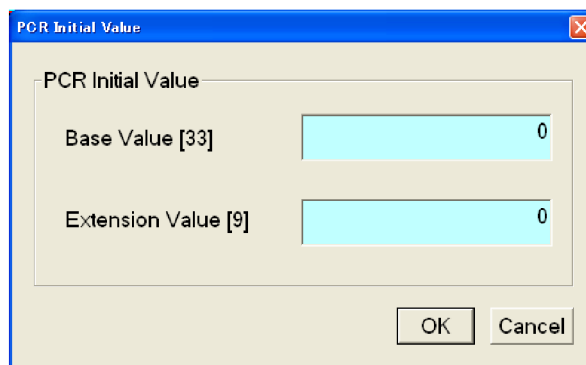


Figure 4: PCR Initial Value dialog box

- **Base Value:** Sets the initial value for the `program_clock_reference_base` value. You can enter a value from 0 to 8589934591. The bracketed number represents the number of bits for the `program_clock_reference_base` field.
- **Extension Value:** Sets the initial value for the `program_clock_reference_extension` value. You can enter a value from 0 to 299. The bracketed number represents the number of bits for the `program_clock_reference_extension` field.

Start/Stop Position Dialog Box. When you select the Start/Stop command from the Play menu, the Start/Stop dialog box appears. (See Figure 5.)

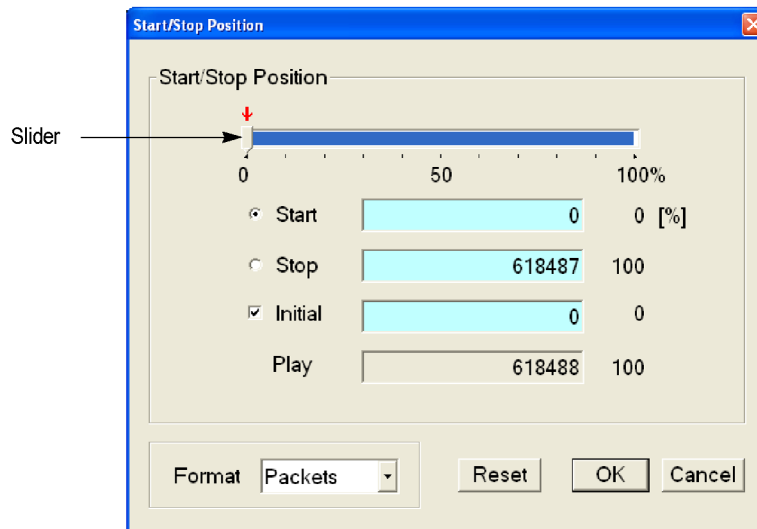


Figure 5: Start/Stop Position dialog box

- **Start:** Sets the start position of the stream by time (h:m:s) or the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file). Based on the format selected from the Format field, you can either enter the value or move the slider to set the position.
- **Stop:** Sets the stop position of the stream by time (h:m:s) or the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file). Based on the format selected from the Format field, you can either enter the value or move the slider to set the position.
- **Initial:** Sets the initial start position of the stream for loop output. You can set the value by time (h:m:s) or the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file). Based on the format selected from the Format field, you can either enter the value or move the slider to set the position.
- **Play:** Shows the actual time or number of packets (the number of super frames for an M-TMCC file, or the number of bytes for an Non-TS file) that is calculated by the values of the Start and Stop text boxes.
- **Format:** Specifies the way to set the start, stop, and initial positions of the stream. For a transport stream file, you can select Time or Packets. For an M-TMCC file, you can select Time or SF (super frame). For a Non-TS file, you can select Time or Bytes.

For an ISDB-T file, the start packet is defined as the first-appearing packet including an OFDM frame start flag after the specified start position. The stop packet is defined as the packet before the last-appearing packet including an OFDM frame start flag before the specified stop position. If the number of OFDM frames between the start packet and stop packet is not an even number, the packet in the last OFDM frame becomes the stop packet.

To set the start, stop, and initial positions, either use the slider or enter the values directly in the text boxes. (See Figure 5.)

Using the slider.

1. For the start and stop positions:
 - a. Press the **Tab** button repeatedly to select the slider.
 - b. Press the left (◀) or right (▶) arrow button to move the slider to the place you want to set the start position.
 - c. Press the **Tab** button repeatedly to select the Stop option button, and then press the **Num Pad/Select** button. This moves the slider to the right end.
 - d. Repeat steps a and b to set the value for the Stop option.
 - e. Press the **Enter** button to enable the values.
2. For the initial start position for loop output:
 - a. Press the **Tab** button repeatedly to select the Initial check box, and then press the **Num Pad/Select** button. A red arrow appears on the slider.
 - b. Press the **Tab** button repeatedly to select the red arrow.
 - c. Press the left (◀) or right (▶) arrow button to move the slider to the place you want to set the initial start position.
 - d. Press the **Enter** button to enable the value.

Using the text boxes.

1. Press the **Tab** button repeatedly to select the Start text box. If you set a time, select one of the text boxes for setting the hour, minute, or second.
2. Press the **Num Pad/Select** button. The keypad appears.
3. Use the keypad to enter the value.
4. If you set a time, repeat step 1 through step 3 to set the hour, minute, and second.
5. Use the same procedure given in step 1 through step 4 to set the value in the **Stop** text box.
6. Press **Enter** to enable the values.

To reset all of the settings to the values when the dialog box was first displayed, press the **Tab** button repeatedly to select the Reset button, and then press the Num Pad/Select button.

Timer Play/Record Dialog Box. When you select the Timer Play command from the Play menu, the Timer Play/Record dialog box appears. (See Figure 6.)

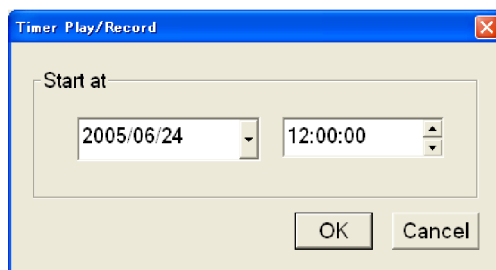


Figure 6: Timer Play/Record dialog box

- **Start at:** Sets the date and time when the stream output or record starts.

If a mouse is connected to the generator, you can display a calendar for setting the date by clicking the ▼ arrow button to the right of the date display.

When you press the **Enter** button after setting the date and time, a dialog box showing the current date and time, and set date and time is displayed. When the set date and time arrives, the dialog box closes and stream output or stream record starts automatically.

If you want to cancel the operation, press the **Enter**, **Cancel/Close**, or **Num Pad/Select** button. When the dialog box that prompts you to confirm that the operation is displayed, press the **Num Pad/Select** or **Enter** button to execute the operation.

Others Dialog Box. When you select the Other command from the Play menu, the Others dialog box appears. (See Figure 7.)

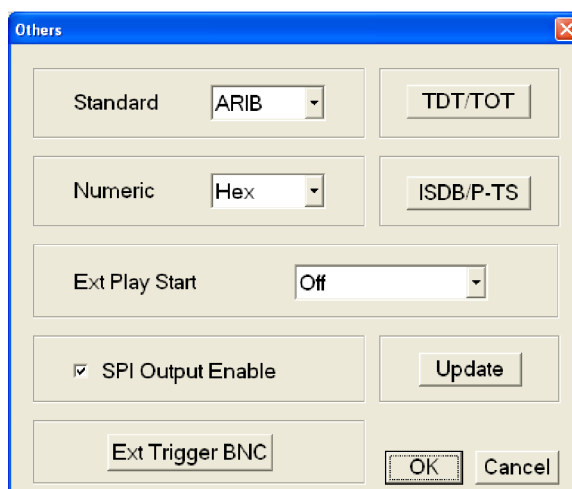
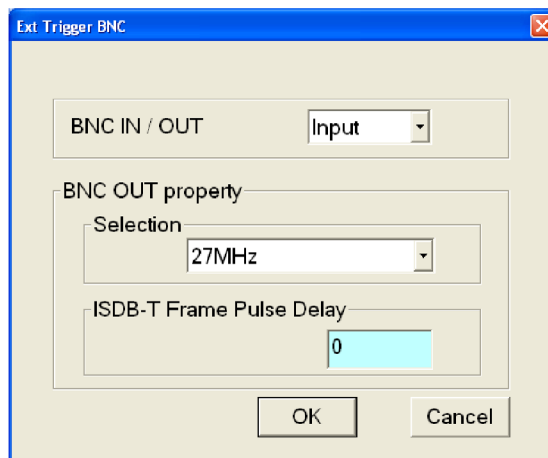


Figure 7: Others dialog box

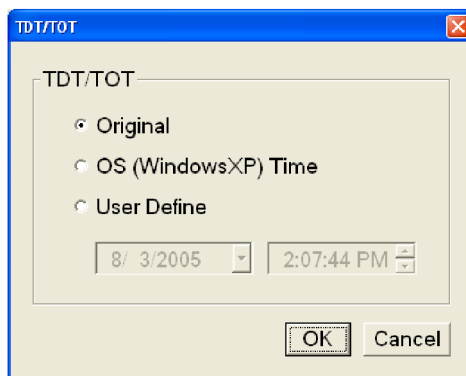
- **Standard:** Sets the standard used on the hierarchy-display screen. You can select ARIB, ATSC, DVB, or MPEG-2. For a transport stream (ARIB, ATSC, DVB, or MPEG-2), the standard is set to the previous setting as a default. For an S-TMCC, M-TMCC, or ISDB-T transport stream, you need to select ARIB for proper display.
- **Numeric:** Sets the base value used to describe the component information in the hierarchy display. You can select Decimal, Hex, or Octal.
- **Ext Play Start:** Sets whether to start stream output using a trigger signal applied to the Trig In/Out connector. You can select Off, Rise, or Fall. When you select Rise, the stream output is started at the rising edge of the applied trigger signal. When you select Fall, the stream output is started at the falling edge of the applied trigger signal.
- **SPI Output Enable:** Sets whether the signal output from the SPI In/Out connector is enabled. Use this function to set the SPI In/Out connector to input only and the Universal In/Out connector to output only when the universal parallel/serial interface option is installed. If the Source command in the Record menu is set to STD, the signal output from the SPI In/Out connector is disabled even if you have enabled the SPI Output Enable.
- **Ext Trigger BNC:** When you select this button, the following Ext Trigger BNC dialog box appears.



- **BNC IN/OUT:** Sets whether to use the rear-panel Trig In/Out connector as a trigger signal input or a reference clock/ISDB-T frame clock signal output. You can select Input or Output. For Input, the Trig In/Out connector can be used to input an external trigger event. For Output, the Trig In/Out connector can be used to output a 27 MHz reference clock or an ISDB-T frame pulse signal. Use the Selection list box to select which signal is output from the connector.

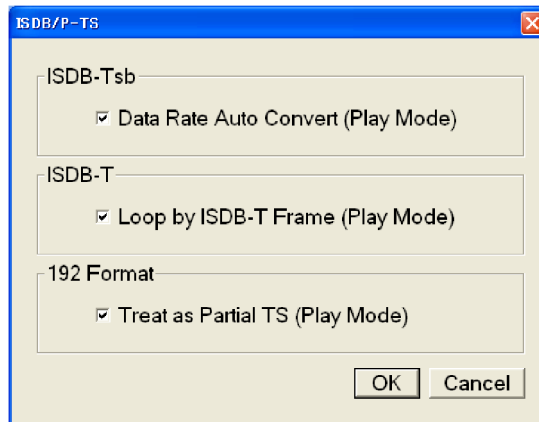
- **BNC OUT property:** Selects the output signal from the Trig In/Out connector when BNC IN/OUT is set to Output. You can select 27 MHz or ISDB-T Frame Pulse. If you select 27 MHz, a 27 MHz reference clock signal is output from the Trig In/Out connector. Use this option to check the clock frequency accuracy. If you select ISDB-T Frame Pulse, an ISDB-T frame pulse signal is output from the Trig In/Out connector.
- **ISDB-T Frame Pulse Delay** Sets the delay for the start packet pulse of the ISDB-T frame in 1-parallel clock of the SPI output. You can set the value from 0 to 15.
- **TDT/TOT or STT:** When you select this button, the following TDT/TOT dialog box appears. The name changes to the standard that is selected in the Standard list box: TDT/TOT for ARIB or DVB, and STT for ATSC. Use this dialog box to change the initial date and time of the TDT (Time and Data Table), TOT (Time Offset Table), or STT (System Time Table) in the selected stream.

The button is disabled when MPEG-2 is selected in the Standard list box.

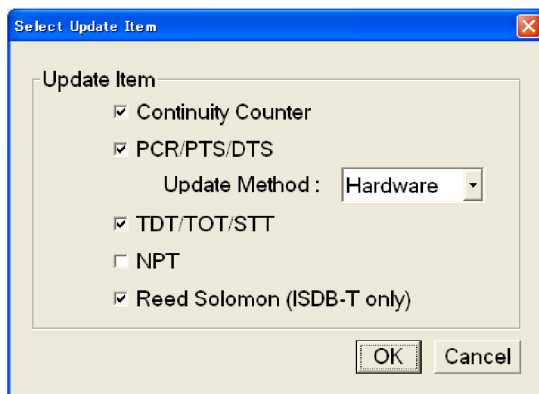


- **Original:** Uses the original (default) value that is already defined in the selected stream.
- **OS (Windows XP) Time:** Uses the clock/calendar of the operating system (Windows XP) to set the initial value. When you select this option, the date and time of all the TDTs, TOTs, or STTs in the selected stream are locked to the clock/calendar of the operating system.
- **User Define:** Uses a user-defined value to set the initial value. When you select this option, the list boxes for setting the initial date and time of the TDT, TOT, or STT are available.

- **ISDB/P-TS:** When you select this button, the following ISDB/P-TS dialog box appears.



- **Data Rate Auto Convert (Play Mode):** Determines whether the clock rate is set automatically when the ISDB-TSB file is loaded. When selected, the clock rate is automatically set to $(2048/1701) \times 27$ MHz and the elementary stream rate becomes constant regardless of the Fixed ES Rate setting.
 - **Loop by ISDB-T Frame (Play Mode):** When selected, outputs the ISDB-T transport stream in OFDM frames when looped. When cleared, the ISDB-T transport stream is looped in packets.
 - **Treat as Partial TS (Play Mode):** When selected, sets the output to a stream file consisting of a 192-byte packet as a partial transport stream. When cleared, the stream is output in Non-TS format.
- **Update:** When you click **Update**, the following Select Update Item dialog box appears. Use this dialog box to select which parameters in a stream are updated when looped.



- **Continuity Counter:** When selected, sets whether to update the continuity_counter.

- **PCR/PTS/DTS:** Sets whether to update PCR (Program Clock Reference), PTS (Presentation Time Stamp), and DTS (Decoding Time-Stamp).
- **Update Method:** Specify the method to update PCR/PTS/DTS. The optional interface supports both Software or Hardware update methods but the IP interface supports only the software method.
 - **Hardware:** PCR/PTS/DTS are updated using the counter values of the 27 MHz clock on the output board. Since data output and PCRs are completely locked, the continuity of PCRs is maintained at the loop point even when playing long stream loops. However, timing errors occur in PTS/DTS.
 - **Software:** PCR/PTS/DTS are updated by adding the actual looping time (defined by the start and stop positions) to the stream every time it is looped. However, if there are no timing errors in PTS/DTS, it is difficult to maintain the continuity of PCRs at the loop point because the update is not synchronized with the 27 MHz clock on the output board. Since this method is used to update NPT, if you enable the NPT option, the Software is selected automatically.
- **TDT/TOT/STT:** Sets whether to update TDT (Time & Data Table), TOT (Time Offset Table), and STT (System Time Table).

The NPT check box is available only when PCR/PTS/DTS is enabled and the Update Method is set to Software. When selected, PCR/PTS/DTS is enabled and the Update Method is set to Software. In addition, the Fixed ES Rate option in the Clock dialog box is disabled.

- **NPT:** Sets whether to update NPT (Normal Play Time; STC_Reference field in NPT Reference Descriptor defined by ISO/IEC 18318-6).
- **Reed Solomon (ISDB-T only):** Sets whether to update Reed-Solomon codes in an ISDB-T transport stream.

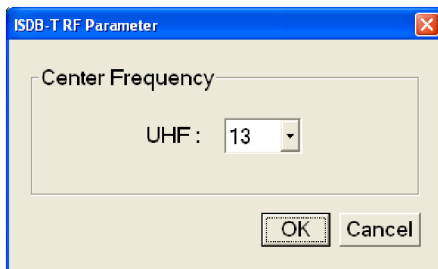
ISDB-T/ISDTV/ASI Menu

The ISDB-T/ISDTV/ASI menu contains commands for setting the parameter for the RF modulated output of a broadcast transport stream and an ASI output format.

Table 5: ISDB-T/ISDTV/ASI menu commands (Play screen)

| Command | Description |
|--------------|--|
| ASI Format | Sets the output format of the ASI signal. You can select Byte or Packet. For Byte, valid data is output using a burst transmission mode. For Packet, valid data is output in each transport stream packet. |
| RF Standard | Sets the standard for the RF signal. You can select ISDB-T or ISDTV. |
| RF Parameter | Sets the parameter for the RF modulated output of the broadcast transport stream. |
| | When you select this command, the ISDB-T or ISDTV Parameter dialog box appears. |

ISDB-T/ISDTV RF Parameter Dialog Box. When you select the RF Parameter command from the ISDB-T/ISDTV/ASI menu, the RF Parameter dialog box appears depending on the selected RF standard (ISDB-T or ISDTV).



- **Center Frequency:** Sets the center frequency (UHF channel number) for the RF modulated output. For ISDB-T standard, the channels range from 13 to 62 and for ISDTV standard the channels range from 14 to 69.

QAM/VSF Menu

The QAM/VSF menu contains commands for setting the parameter for the RF modulated output of a transport stream and an ASI output format.

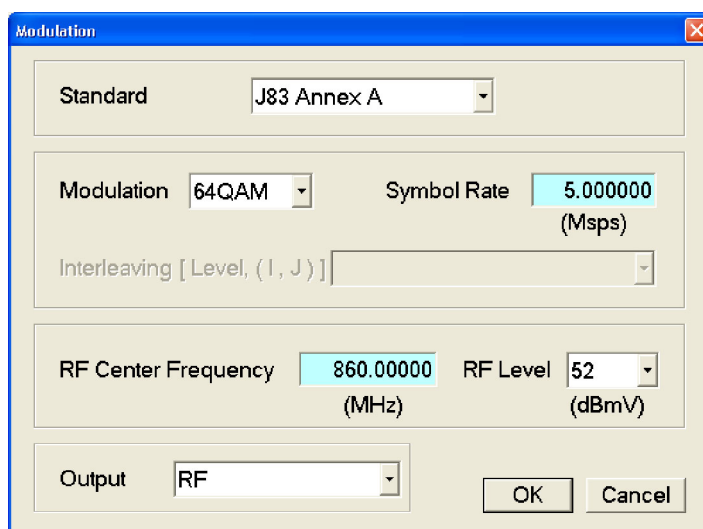
Table 6: QAM/VSF menu commands (Play screen)

| Command | Description |
|----------------|--|
| BNC Port | Sets the signal format output from the ASI/SMPTE Output connector. You can select ASI or 310M 8VSB (SMPTE310M signal with data rate of 8 VSB). |
| Through Out | Sets whether the signal supplied to the ASI/SMPTE Input connector is output from the ASI/SMPTE Output connector when a stream is not output. You can select On or Off. |
| ASI Format | Sets the output format of the ASI signal. You can select Byte or Packet. For Byte, valid data is output using a burst transmission mode. For Packet, valid data is output in each transport stream packet. |
| RF Output | Sets whether to output an RF signal from the RF Output connector. You can select On or Off. When you select On, the outputs from the ASI/SMPTE Output and SPI In/Out connectors stop. Also, the clock rate is fixed to the rate that is calculated from the symbol rate and RF parameters. |
| RF Power Level | Sets the output level of the RF signal. When you select this command the RF Power Level dialog box appears. |
| Modulation | Sets the parameter for the RF modulated output of the transport stream. When you select this command, the Modulation dialog box appears. (See page 21, <i>Modulation Dialog Box</i> .) |

Table 6: QAM/VSF menu commands (Play screen) (cont.)

| Command | Description |
|------------------|---|
| Noise Generation | Sets the amount of Gaussian noise to be added to the RF output. When you select this command the Noise Generation dialog box appears. |
| Calibration | This command is not for users of generator. This command is used only by factory personnel to calibrate the instrument. |

Modulation Dialog Box. When you select the Modulation command from the QAM/VSF menu, the Modulation dialog box appears. If RF Output in the QAM/VSF menu is set to Off, you cannot set the parameters in the dialog box.



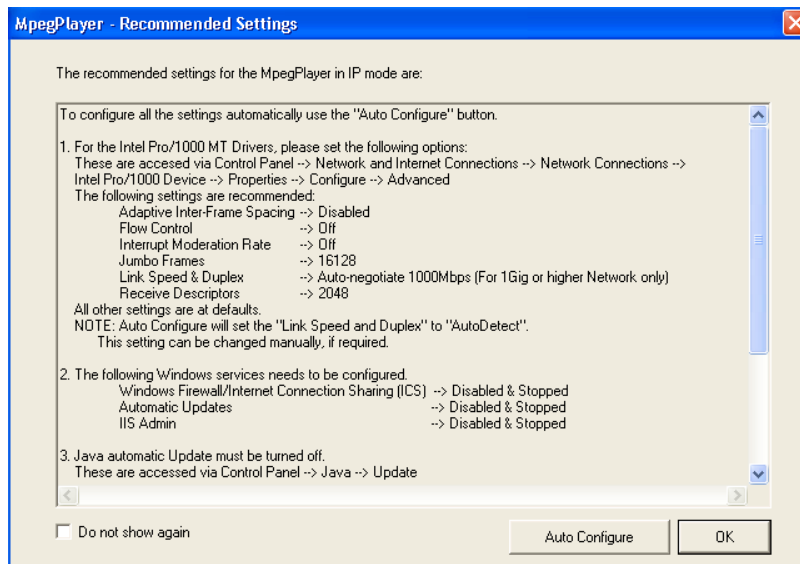
- **Standard:** Sets the RF modulation standard. The available selections depend on the installed modulation options. The various standards available are J83 Annex A, J83 Annex B, J83 Annex C, ATSC, and DTMB.

If the ITU-T J.83 Annex C modulation option is installed in the instrument, you can select J83 Annex C and J83 Annex C-JCTEA. J83 Annex C-JCTEA is a modulation scheme that is defined by JCTEA STD-002.

- **Modulation:** Sets the modulation mode. The available selections depend on the standard selected in the Standard list box.
 - For J83 Annex A: 16 QAM, 64 QAM, or 256 QAM
 - For J83 Annex B: 64 QAM or 256 QAM
 - For J83 Annex C and J83 Annex C-JCTEA: 64 QAM
 - For ATSC: 8VSB

- **Symbol Rate:** Sets the symbol rate. The available values depend on the standard selected from the Standard list box.
 - For J83 Annex A: 1.0 Msps to 6.956522 Msps (IF output), 5.0 Msps to 6.956522 Msps (RF output)
 - For J83 Annex B: 5.056941 Msps (64QAM), 5.360537 Msps (256QAM)
 - For J83 Annex C: 1.0 Msps to 5.3097 Msps (IF output), 5.0 Msps to 5.3097 Msps (RF output)
 - For J83 Annex C-JCTEA: 5.274 Msps
 - For ATSC: 10.762237 Msps
 - For DTMB: 7.560000 Msps
- **Interleaving [Level, (I,J)]:** Sets the operating mode of interleaving (Level 1 or Level 2) and interleaving parameters I and J when the selected standard is J83 Annex B.
- **RF Center Frequency:** Sets the center frequency of the RF signal. You can set the value from 50 MHz to 860 MHz in 12.5 kHz steps.
- **Output:** Selects the signal output from the RF Out and IF Out connectors.
 - **RF:** An RF signal is output from the RF Out connector.
 - **IF (44 MHz):** A 44 MHz IF signal is output from the IF Out connector.
 - **IF Reversed (44 MHz):** A 44 MHz IF signal with reversed spectrum is output from the IF Out connector.
 - **IF (36 MHz):** A 36 MHz IF signal is output from the IF Out connector.
 - **IF Reversed (36 MHz):** A 36 MHz IF signal with reversed spectrum is output from the IF Out connector.

IP Menu The IP Payout is capable of transmitting TS streams on both IPv4 and IPv6 network. Select the IP option from the **Play > Interface** menu. A Recommended Settings dialog box is displayed, which allows you to automatically configure the settings for improved IP payout performance. (See Table 7.)



NOTE. The CPU is used 100 % when the MPEG Player plays in IP mode with TS bit rate more than 10 Mbps. During this payout, duplex operation is not possible, so TSCA cannot be run.

NOTE. Playing the MPEG Player at high bit rates in IP mode could saturate the network.

Table 7: IP menu commands

| Commands | Description |
|---------------------|--|
| Configuration | Configures the IP interface and the IP version. You can set the packet size, device name, protocol, ports, and the transmission mode of the interface. |
| Parametric Settings | Sets the player process priority, transmitter thread priority, burst mode parameters, low jitter mode, and jitter parameters. |
| Error Insertion | Inserts errors like packet loss, checksum, and sequence errors in the transmitted stream. |
| Error Generation | Manually generates errors like packet loss, checksum, and sequence in the transmitted stream. |

Table 7: IP menu commands (cont.)

| Commands | Description |
|--------------|--|
| Statistics | Displays details about parameter names, current stream values, and the history of the previous transmission. |
| TTS Settings | Enables whether to play out a TS file as a TTS file by prefixing a 4byte time stamp to each TS packet. |

Configuration. When you select Configuration from the IP menu, the IP Playout Configuration dialog box is displayed. (See Figure 8.) and (See Figure 9.)

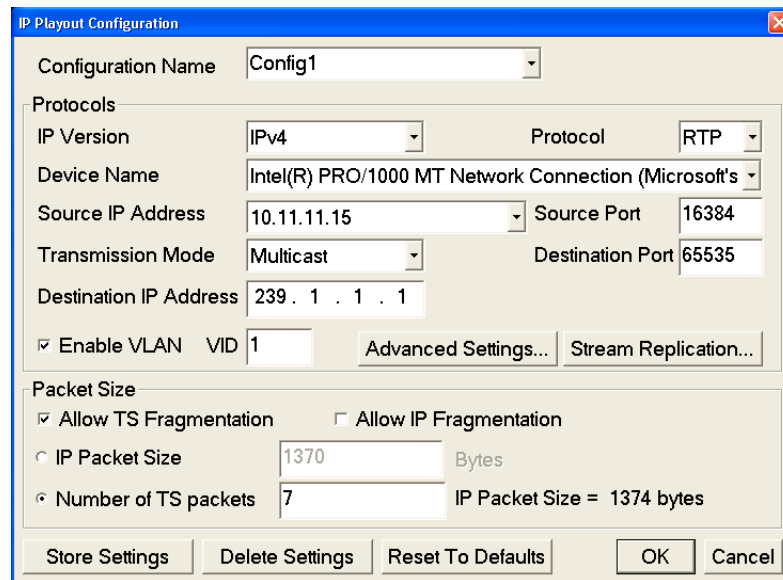


Figure 8: IP Configuration for IPv4

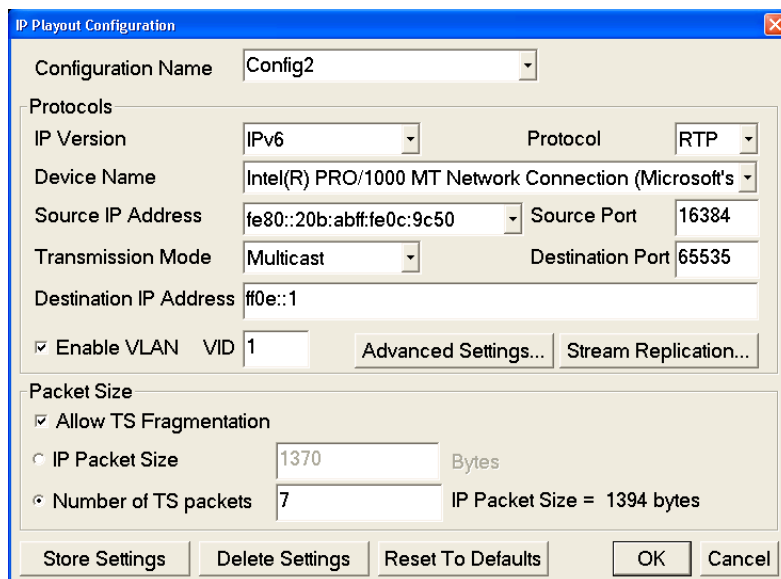


Figure 9: IP Configuration for IPv6

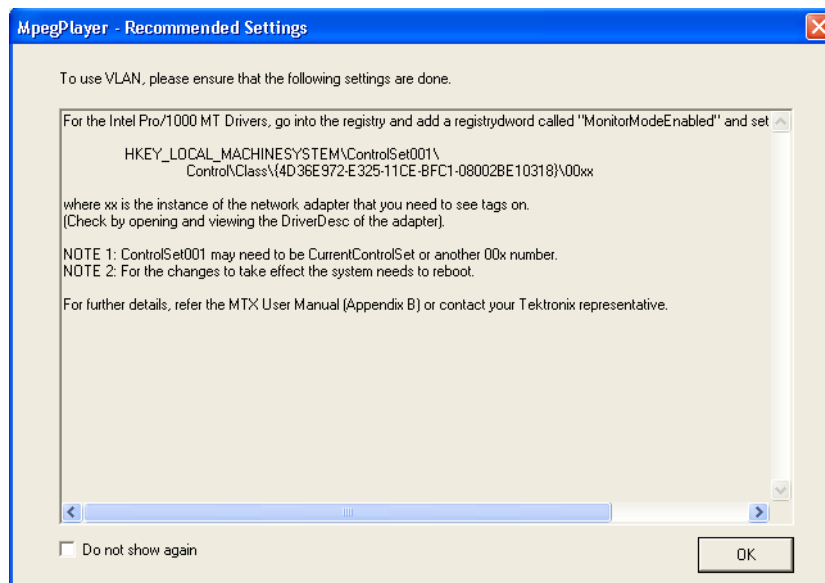
This dialog box allows you to configure the following settings:

- **Configuration name:** Allows you to enter or select a configuration name from the drop-down list. The configuration will include all the settings of the Configuration dialog box, Advanced Protocol Settings, and Stream Replication Settings. This list can store up to ten configuration names. The default value is blank.
- **IP Version:** Allows you to select the IP version (IPv4, IPv6) for the IP playout. IPv4 is set as the default value.
- **Protocol:** Allows you to set the protocol (UDP, RTP) for the IP playout. RTP is set as the default value.
- **Device Name:** Allows you to select the device for the IP playout. The Device Name lists all the active Network Interface Cards (NIC) in the system based on the selected IP version. The first interface card that has a valid IP address assigned to it is always automatically selected as the default value for both IPv4 and IPv6 versions.
- **Source IP Address:** Sets the source IP address for the IP playout. The first valid IP address of the selected device will be set as the default. A customized value can be selected only if a different source address is first set in the Advanced Protocol Settings dialog box.

Based on the selected IP version, the source addresses will be listed in the drop-down list.

- **Source Port:** Allows you to set the source port for the IP playout. The port value ranges from 0 to 65535. The default value for UDP and RTP protocol is 16384.

- **Transmission Mode:** Allows you to set the transmission mode of the protocol. Unicast and Multicast transmission modes are supported by both IP versions. Broadcast transmission mode is supported only by the IPv4 version. Multicast is set as the default value for both the versions.
- **Destination IP Address:** Sets the destination IP address for the IP payout. 239.1.1.1 is set as the default value for IPv4 and ff0e::1 is set as the default value for IPv6. Depending on the selected transmission mode, the system validates the entry based on the following rules:
 - **Unicast Range:** Any IP address that does not fall into the Multicast or the Broadcast range is the Unicast address. This range holds good only for IPv4 version.
 - **Multicast Range:** 224.0.0.0 to 239.255.255.255 for IPv4 and FFxx:y:y:y:y:y (where x is 0 to F and Y is 0000 to FFFF) for IPv6.
 - **Broadcast Range:** The Network or node portion of an IP address will be set to “1”s or “0”s for IPv4 version.
- **Destination Port:** Allows you to set the destination port for the IP payout. The port value ranges from 0 to 65535. 16384 is set as the default value.
- **Enable VLAN:** Allows you to enable the VLAN headers in the protocol headers of an IP packet as per the 802.1Q standard. VLAN ID identifies the VLAN that ranges from 0 to 4095. When you click OK with VLAN enabled on the IP Payout Configuration dialog box, a Recommended Settings dialog box is displayed asking you to do the required settings for using VLAN.



- Advanced Settings:** Click Advanced Settings to view or customize the protocol settings of active protocols in the current configuration. As per the IP version selected, the IPv4 and IPv6 layer attributes are displayed in the Settings screen. The RTP layer attributes are displayed only for RTP protocol selection. If VLAN is enabled, the Advanced Settings dialog box displays all the VLAN attributes under 802.1Q VLAN Layer header. (See page 125, *Settings for VLAN*.) The protocol headers of Advanced Protocol Settings can be customized but are not validated.

The parameters displayed in the Advanced Protocol Settings dialog box are as follows:

- Ethernet Layer: Destination Mac Address, Source Mac Address, Protocol
- 802.1Q VLAN Layer: Tag Protocol Identifier, Priority Levels, Canonical Format Indicator, VLAN Identifier
- IPv4 Layer: Version (read only), Header Length (read only), Type Of Service, Total Length (read only), Time To Live, Protocol, Source IP Address, Destination IP Address
- IPv6 Layer: Version (read only), Traffic Class, Flow Label, Payload Length (read only), Next Header, Hop Limit, Source IP Address, Destination IP Address
- UDP Layer: Source Port, Destination Port, Length (read only)
- RTP Layer: Version (read only), Payload Type, Sequence Number, SSRC

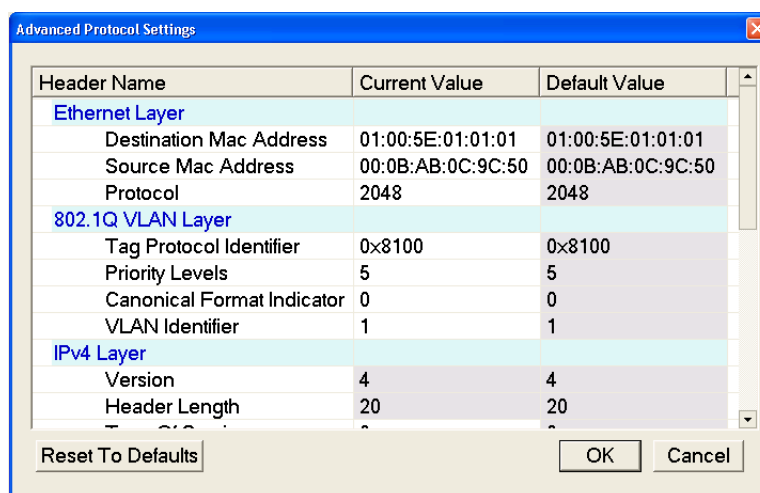


Figure 10: Advanced Protocol Settings for IPv4

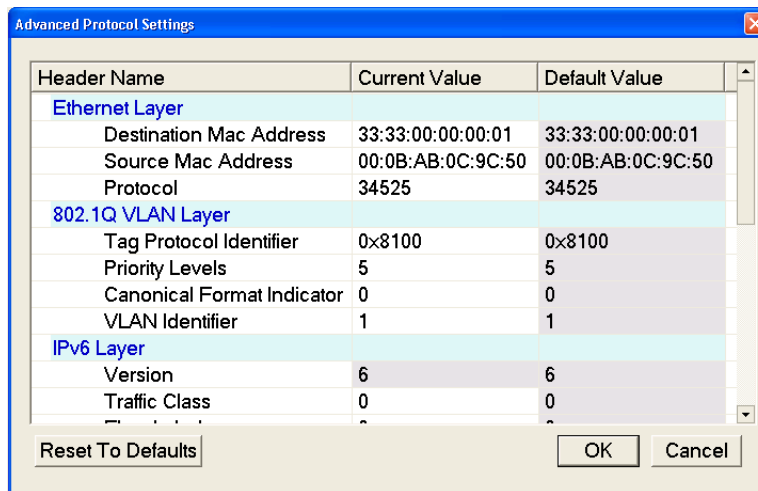


Figure 11: Advanced Protocol Settings for IPv6

The Header Name and Default Value are read-only options. The protocol headers displayed are limited to headers common to all packets except for the RTP Sequence Number. The Current Value attributes of all the protocol layers that are specified at packet creation can be customized. The customized valid values are displayed in lavender and the customized invalid values are displayed in pink. If any of the attributes are customized, the status bar displays an icon during playout.

The Reset To Defaults button resets the customized values of the active (selected) IP version to the default values.

NOTE. A condition where multicast is selected as the transmission mode and a unicast destination address is entered in the Advanced Protocol Settings dialog box will not be validated.

NOTE. If the destination IP address is changed in the Advanced Protocol Settings dialog box, the application will not check for the accessibility of the address. A change in the source and the destination IP address will not change the source and the destination MAC address of the Advanced Screen Settings.

- **Stream Replication Settings:** Click Stream Replication Settings to set the number of replicated streams and customize the attributes accordingly.

As per the selected IP version, the IPv4 and IPv6 layer attributes are displayed in the Stream Replication Settings screen. The RTP layer attributes are displayed only for RTP protocol selection. If VLAN is enabled, the Stream Replication Settings dialog box displays only the VLAN identifier. (See page 125, *Settings for VLAN*.)

You can specify the increment value for the following attributes:

- Ethernet Layer: Destination Mac Address, Source Mac Address, Protocol
- 802.1Q VLAN Layer: VLAN Identifier
- IPv4 Layer: Type Of Service, Time To Live, Protocol, Source IP Address, Destination IP Address
- IPv6 Layer: Traffic Class, Flow Label, Next Header, Hop Limit, Source IP Address, Destination IP Address
- UDP Layer: Source Port, Destination Port
- RTP Layer: Payload Type, SSRC

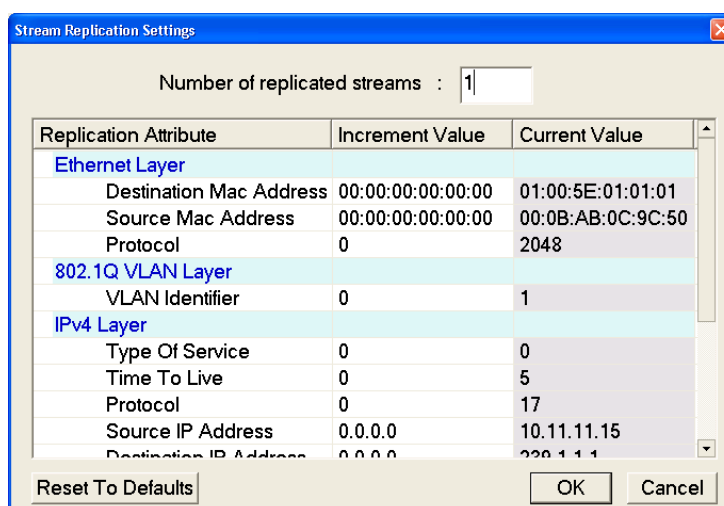


Figure 12: Stream Replication Settings for IPv4

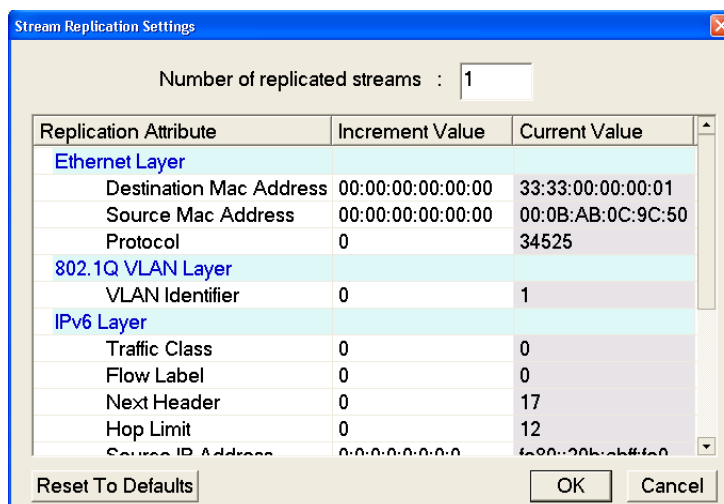


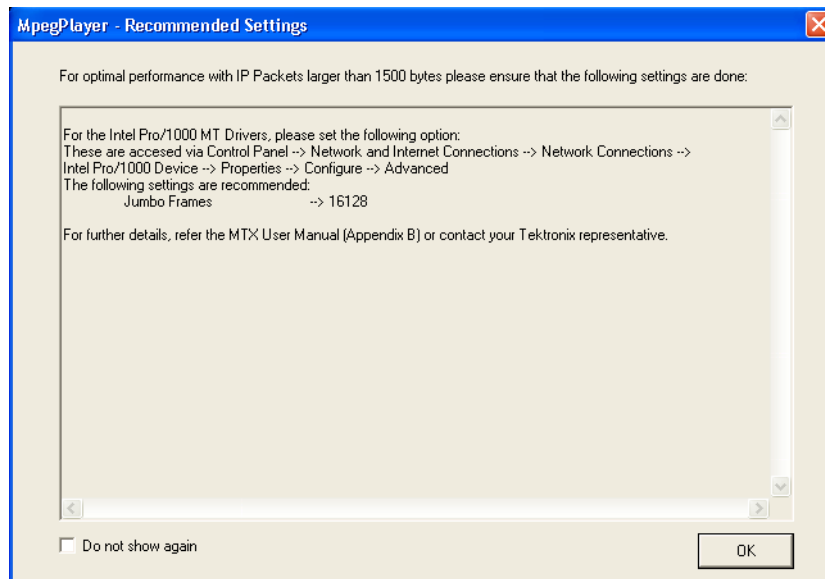
Figure 13: Stream Replication Settings for IPv6

Stream Replication Settings are used to replicate the streams n times with certain attributes of the stream incremented by a value within the n replicated streams. You can enter the number of replications in the **Number of replicated streams** text box.

The dialog box lists the attributes which can be incremented by entering a number in the Increment Value column. All attributes except for MACs and IP addresses accept an integer. The customized valid values are displayed in lavender and customized invalid values are displayed in pink.

The Reset to Defaults button resets the increment values of the active (selected) IP version to the default values. Whenever the stream replication is active, an icon is displayed in the status bar during layout.

- **Allow TS Fragmentation:** Controls the fragmentation of the transport stream packets. If this option is selected, the IP packet can have fragmented transport stream packets (last or first TS packet of an IP packet). When **Allow TS fragmentation** is selected, both IP Packet size and Number of TS packets option are enabled. Allow TS Fragmentation is not selected by default.
- **Allow IP Fragmentation:** Controls the fragmentation of the IP packets for IPv4 version only. This option is applicable to packet sizes which are greater than the MTU size (typically 1500 bytes). If this option is selected, the IP packets will be fragmented during transmission else they will be retained with the same size. When IP fragmentation is selected, the maximum packet size is 16128 bytes. If the IP packet size is more than 1500 bytes, a Recommended Settings dialog box is displayed asking you to do the required settings for optimal performance.



- **IP Packet Size:** Allows you to set the size of the IP packet for payout. This option is enabled only when **Allow TS fragmentation** is selected. The maximum size of the IP packet for IPv6 version is 16128 bytes and for IPv4 version is 1500 bytes.

The IP packet size includes the headers and hence the payload size is calculated at runtime using the following equation:

$$IP\ Packet = Payload\ Size + Header\ Size$$

For IPv4 version, the header size is 54 (58 with VLAN enabled) for RTP and 42 (46 with VLAN enabled) for UDP. For IPv6 version, the header size is 74 (78 with VLAN enabled) for RTP and 62 (66 with VLAN enabled) for UDP.

- **Number of TS Packets:** Allows you to enter the number (integers) of TS packets that needs to be embedded into an IP packet. Seven is set as the default value. The maximum value of the number of TS packets depends on the maximum allowed IP packet size and the minimum value is 1.

A read only text field showing the IP packet size is displayed next to this option. The IP packet size will be calculated automatically and displayed in bytes. Based on the number of TS packets, the IP packet size is calculated using the following equation:

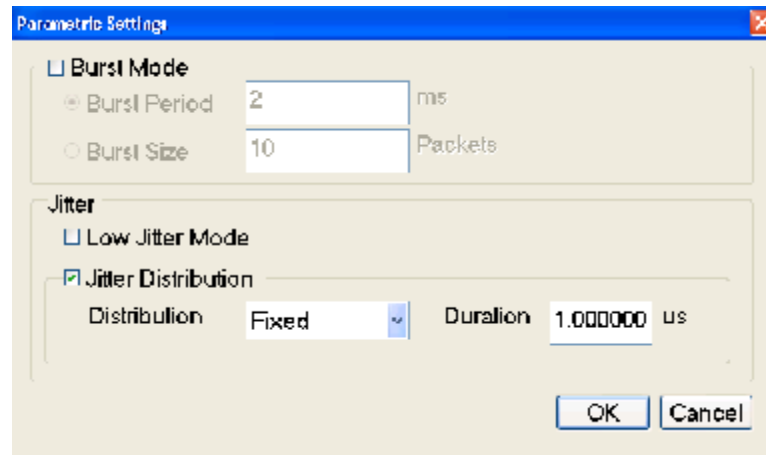
$$IP\ Packet = Payload\ Size + Header\ Size$$

where payload size is calculated as follows:

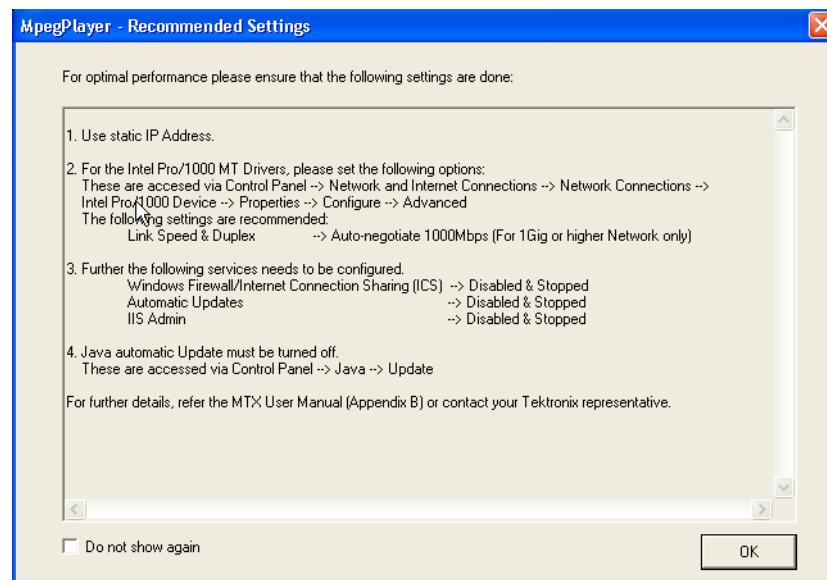
$$Payload\ Size = Number\ of\ TS\ Packets \times TS\ Packet\ Size$$

- **Store Settings:** Creates or updates the entire configuration settings including the Advanced Protocol Settings and Stream Replication Settings. All these settings will be stored in a name that is listed in the Configuration Name drop-down list.
- **Delete Settings:** Deletes the selected configuration settings from the Configuration Name drop-down list and displays the next configuration. If there are no more configurations stored in the list, the values in the configuration dialog box will be reset to the default values.
- **Reset to Defaults:** Resets the selected configuration settings, Advanced Protocol Settings, and Stream Replication Settings to the default values. It clears the selected configuration name also.

Parametric Settings. When you select Parametric Settings from the IP menu, the Parametric Settings dialog box is displayed as shown.



When you click **OK** with Low Jitter Mode selected, a Recommended Settings dialog box is displayed asking you to do the required settings for optimal performance. Refer to the *Recommended Settings for MPEG Player in IP Mode* section for additional information. (See page 119.)



The Parametric Settings dialog box allows you to set the following parameters:

- **Burst Mode:** Allows you to transmit the stream in the form of bursts. The player does not support Burst in stream replication mode.
 - **Burst Period:** You can set the time during which the packets will be transmitted in the burst mode. Burst period is set as the default.
 - **Burst Size:** You can set the burst size which determines the number of packets being transmitted in every burst.
- **Jitter:** Configures jitter during the IP ployout.
 - **Low Jitter Mode:** This mode is selected when you want the jitter to be very low. Low Jitter Mode text will be displayed instead of the progress bar and the elapsed time in the status indicator. The Statistics dialog box will be disabled for this mode.



Figure 14: Low Jitter Mode Status Indicator

- **Jitter Distribution:** Inserts jitter during IP ployout. The player does not support jitter insertion in stream replication mode. The overall bit rate is not affected by the inserted jitter.

There are four types of jitter distribution namely Fixed, Laplacian, Gaussian, and Sinusoidal. Fixed is set as the default distribution. When Fixed is selected, a Duration text box is displayed where you can enter the jitter in microseconds. When Laplacian, Gaussian, or Sinusoidal is selected, a slider is displayed which can be moved to set the jitter as a percentage of the interpacket time. The interpacket gap will follow the selected jitter distribution.

Error Insertion. When you select Error Insertion from the IP menu, the Error Insertion dialog box is displayed. (See Figure 15.)

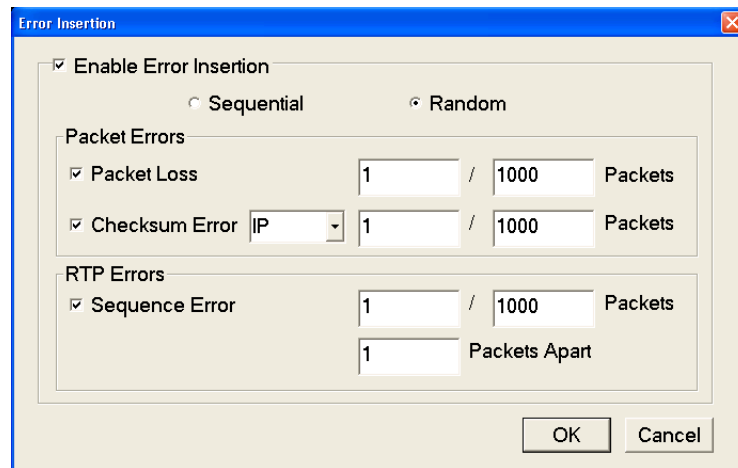


Figure 15: Error Insertion

This dialog box allows you to insert errors during playout. For UDP playout, the error insertions are limited to packet drop and checksum errors.

- **Enable Error Insertion:** Enables error insertion. The errors can be inserted in sequential or random order. Random is set as the default insertion order. All error insertions are specified as X errors per Y packets.
 - **Sequential:** The errors are inserted in sequential packets, that is for every Y packets the first X packets have errors inserted in them.
 - **Random:** The errors are inserted in random packets, that is for every Y packets X random packets have errors inserted in them. Random mode is set as the default.
- **Packet Loss:** Inserts packet loss in random or sequential order. The packets are dropped at a frequency you specify. The rate can be specified as X packets within Y packets.
- **Checksum Error:** Inserts checksum error. The checksum error can be inserted in the UDP layer of both IPv4 and IPv6 versions but only in IP layer of IPv4 version. The CRC errors are generated in packets at a frequency you specify. The rate can be specified as X packets within Y packets.
- **Sequence Error:** Inserts packet sequence errors. This option is enabled only if RTP protocol is selected in the IP configuration Playout dialog box. The packets will be reordered at a specified frequency.

You can enter the number of packets after which you want the reordering to happen in the Packets Apart text box. The rate can be specified as X packets per Y packets reordered after every Z number of packets.

Error Generation. When you select Error Generation (enabled only during playout) from the IP menu, the Error Generation dialog box appears. (See Figure 16.)

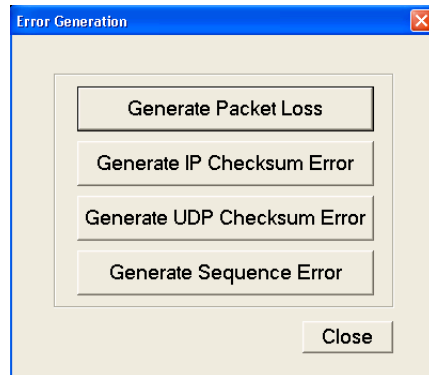
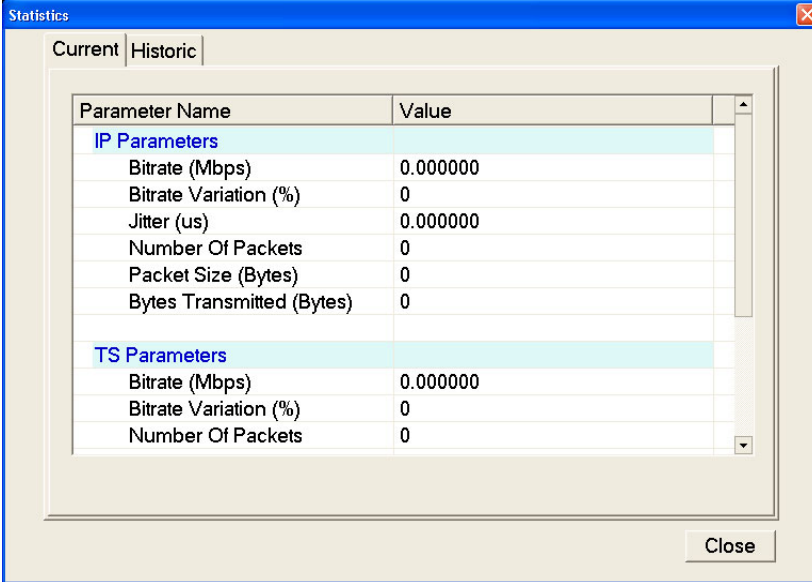


Figure 16: Error Generation

This dialog box allows you to insert the following errors manually in real time:

- **Generate Packet Loss:** Drops an IP packet during the IP playout. The number of packets dropped will be equal to the number of times you click the button.
- **Generate IP Checksum Error:** Generates checksum errors manually in the IP layer (IPv4 version).
- **Generate UDP Checksum Error:** Generates checksum errors manually in the UDP layer.
- **Generate Sequence Error:** Generates sequence error manually. When you click this button the packet will be sent after x number of packets where x is a number between 1 and 100.

Statistics. When you select Statistics from the IP menu, the Statistics dialog box is displayed.



The screenshot shows a dialog box titled "Statistics" with two tabs: "Current" and "Historic". The "Current" tab is selected. Inside the dialog, there is a table with two columns: "Parameter Name" and "Value". The table is divided into two sections: "IP Parameters" and "TS Parameters".

| Parameter Name | Value |
|---------------------------|----------|
| IP Parameters | |
| Bitrate (Mbps) | 0.000000 |
| Bitrate Variation (%) | 0 |
| Jitter (us) | 0.000000 |
| Number Of Packets | 0 |
| Packet Size (Bytes) | 0 |
| Bytes Transmitted (Bytes) | 0 |
| TS Parameters | |
| Bitrate (Mbps) | 0.000000 |
| Bitrate Variation (%) | 0 |
| Number Of Packets | 0 |

A "Close" button is located at the bottom right of the dialog box.

Figure 17: Statistics

The player displays the current and historic statistics of IP parameters, TS parameters, and errors. These statistics are cleared at the start of the next play, when a new file is opened, or when the player is restarted. In Low Jit mode the Statistics option is disabled and when the player switches back to the normal mode it displays the statistics of the previous TS packet that was played out.

- **Current:** Displays the instantaneous statistics of parameters at that time. Once the play starts, this dialog box is refreshed every second.
- **IP Parameters:** The current bit rate, percentage variation of this current bit rate from the nominal (set) bit rate, number of IP packets transmitted, and the IP packet size used for the playout are all displayed. The jitter value which reflects the insertions performed at run time is also displayed.
- **TS Parameters** The TS bit rate, TS packet size, and the number of TS packets of the currently played MPEG file are displayed. When TTS Playout settings is enabled, the packet size displays the actual packet size (188 bytes) along with the extra 4-byte time stamp. If the player is in the NonTS mode, all the statistics will display NonTS playout.

- **Errors** The number of packets dropped, packet loss rate, sequential errors, UDP checksum errors, and IP checksum errors are all displayed.
 - **Value (per stream):** When stream replication is enabled, the Current tab displays the Value column. (See Figure 17.) This column gives the value of each parameter per stream.
 - **Total Value (in n streams):** When stream replication is enabled, the Current tab displays the Total Value column. (See Figure 17.) This column gives the total value of each parameter for the set number of streams. Here n is equal to the sum of the replicated streams and the actual stream.
- **Historic:** Displays the minimum, maximum, and average value of parameters (IP, TS) for the current play. When stream replication is enabled, the Historic tab signifies that the statistics displayed is per flow.
 - **IP Parameters:** The current bit rate, percentage variation of this current bit rate from the nominal (set) bit rate, and the jitter value are displayed.
 - **TS Parameters:** The bit rate and the percentage variation from this bit rate are displayed.

Timestamped TS Payout Settings. When you select TTS Settings from the IP menu, the TTS Settings dialog box is displayed. The TTS Settings option is only supported by IP mode.

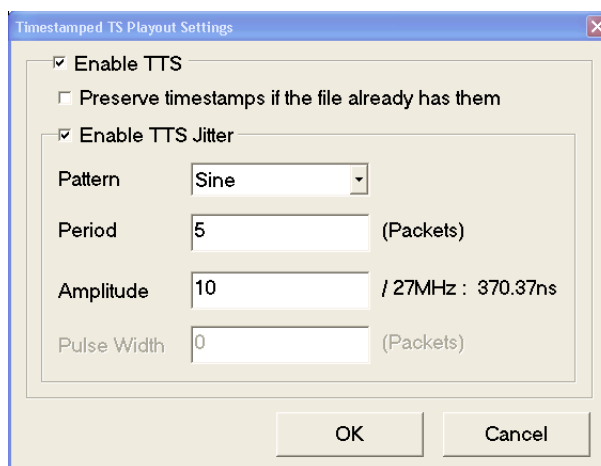


Figure 18: Timestamped TS Payout Settings

When TTS is enabled, each packet (188 bytes) of TS file is prefixed by a 4-byte time stamp and converted into a TTS stream. If the TS packet size is more than 188 bytes (192, 204, 208), the extra bytes following the 188th byte are truncated and 4-bytes of time stamp will be transmitted along with it. For a partial TS file with the TTS settings selected (with Preserve timestamp not selected), the submenus namely the Update mode, Clock dialog box, and the PCR initial value of the Play menu are all enabled.

- **Preserve timestamps if the file already has them:** By selecting this option, you can preserve the time stamps of the TTS file if it already exists or add 4-bytes of time stamp to the TS packet.
- **Enable TTS Jitter:** By selecting this option, you can insert jitter to the time stamps that gets appended to the TS packets.
- **Pattern:** You can select the distribution of jitter that is inserted to time stamp from the Pattern list. The various patterns listed are Sine, Pulse, Triangle, Square, Saw, Random, and Offset. Sine is set as the default pattern.
- **Period:** You can set the period for the time stamp as number of packets. Based on the selected pattern, the **Period** text box is enabled or disabled. 100 packets is set as default period value.
- **Amplitude:** You can enter the amplitude of the time stamp in the Amplitude text box. Based on the selected pattern the **Amplitude** text box is enabled or disabled. 0.00 ns is set as the default amplitude.
- **Pulse Width:** You can set the pulse width as the number of packets. Based on the selected pattern, the **Pulse width** is enabled or disabled. 50 packets is the default pulse width.

In the TTS mode, the Packet size option of the Play menu is disabled with 188 bytes selected. When the TTS mode is selected, the status bar displays TTS mode as the standard with 192 packet size.

The displayed IP bit rate changes because there will be four extra bytes that is added to each TS packet. When TTS Playout settings is enabled, the packet size in the Statistics screen displays the actual packet size (188 bytes) with the four time-stamped bytes.

Utility Menu The Utility menu contains commands to set the parameters for remote control with the Ethernet interface and to display the system information such as software and hardware versions. (See Table 8.)

Table 8: Utility menu commands

| Command | Description |
|---------------|---|
| Communication | Opens the Communication dialog box where you can set the port number needed to remotely control the generator over an Ethernet network and the terminator used to communicate with a controller. (See Figure 19.) |
| Status | Opens the Status dialog box where you can check general system information including the software and hardware versions. |

Communication Dialog Box. When you select the Communication command from the Utility menu, the Communication dialog box appears. (See Figure 19.)

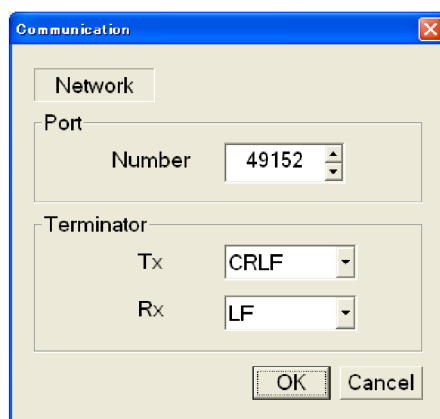
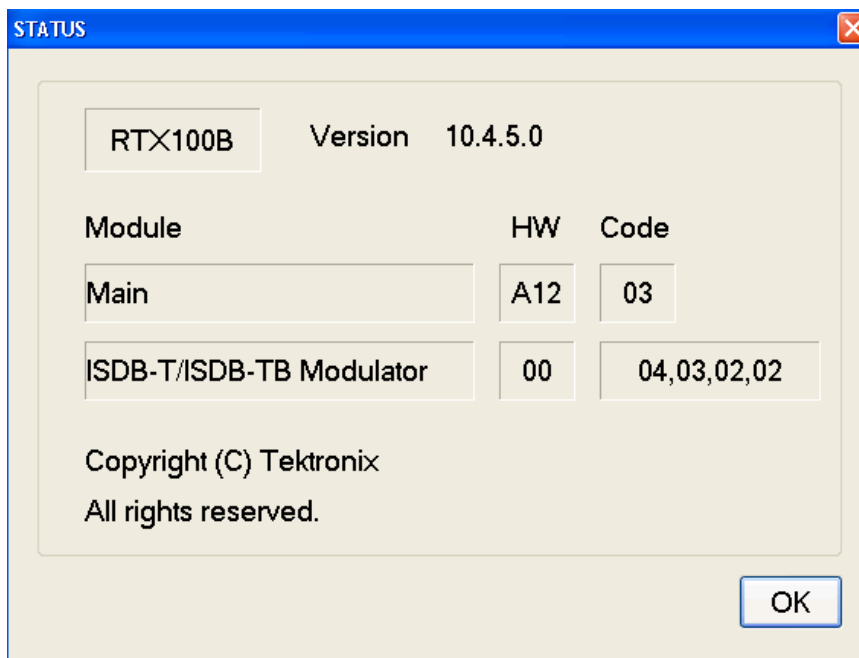


Figure 19: Communication dialog box

- **Port Number:** Sets the port number needed to remotely control the generator over an Ethernet network. You can set the value from 1024 to 65535.
- **Terminator Tx:** Sets the terminator used when the generator sends information to a controller. You can select LF (linefeed), CR (carriage return), CRLF (carriage return and linefeed), or LFCR (linefeed and carriage return).
- **Terminator Rx:** Sets the terminator used when the generator receives commands from a controller. You can select LF (linefeed) or CR (carriage return).

Status Dialog Box. When you select the Status command from the Utility menu, the Status dialog box appears.



This dialog box shows the version of the generator application and hardware version of the main and installed interface modules.

Menus in the Record Screen

This subsection describes the menus in the Record screen.

NOTE. *The IP interface mode does not support the Record function, so the Record option is disabled for IP.*

File Menu

The File menu in the Record screen contains commands for setting the save mode and for saving and loading a preset file. This menu also contains commands for exiting the generator application and for shutting down of the instrument. (See Table 9.)

Table 9: File menu commands (Record screen)

| Command | Description |
|-------------|--|
| Save | Specifies the file name used when you save stream data. When you select this command, the Save as dialog box appears. By default, the current date (yymmdd) is used as a file name. |
| Save Mode | Sets the save mode when you save stream data. You can select Over Write or New File. In the Over Write mode, the existing file is overwritten by the new file with the name specified in the Save command whenever you save a stream data. In the New File mode, a new file is created whenever you save a stream file. The file name is the name specified by the Save commands + # (1,2,3,4...). |
| Load Preset | Loads the specified preset file (*.set). When a preset file is loaded, the current instrument settings are replaced by the preset file's settings. |
| Save Preset | Saves the current instrument settings as a preset file. |
| PLAY | Switches to the Play screen. |
| Scheduler | Starts the Scheduler application when Option SC is installed. |
| Minimize | Minimizes the generator application window. |
| Exit | Quits the generator application. The generator application settings are saved. |
| Shutdown | Quits the generator application and shuts down the generator. |

View Menu

The View menu contains commands that control the display of the Toolbar and Status bar. The View menu in the Record screen is the same as the View menu in the Play screen. (See Table 2 on page 5.)

Record Menu The Record menu contains commands for setting the input interface, record size, trigger position, and target source. (See Table 10.)

Table 10: Record menu commands

| Command | Description |
|--------------|--|
| Source | Sets the interface used to input a stream data. You can select SPI (standard) or the name of the interface option currently installed (Univ I/F, ASI, ASI/1394, or ASI/310M). For SPI, use the SPI In/Out connector. |
| Target | Opens the Target Dialog box where you can set the record size, trigger position, and target source to record the input stream. (See Figure 20.) |
| Timer Record | Opens the Timer Play/Record dialog box where you can set the time used to record the input stream automatically. (See Figure 6.) |
| Other | Opens the Others dialog box where you can set the standard used to display the input stream, display radix for the text information, and external trigger status. (See Figure 7.) |

Target Dialog Box. When you select the Target command from the Record menu, the Target dialog box appears. (See Figure 20.)

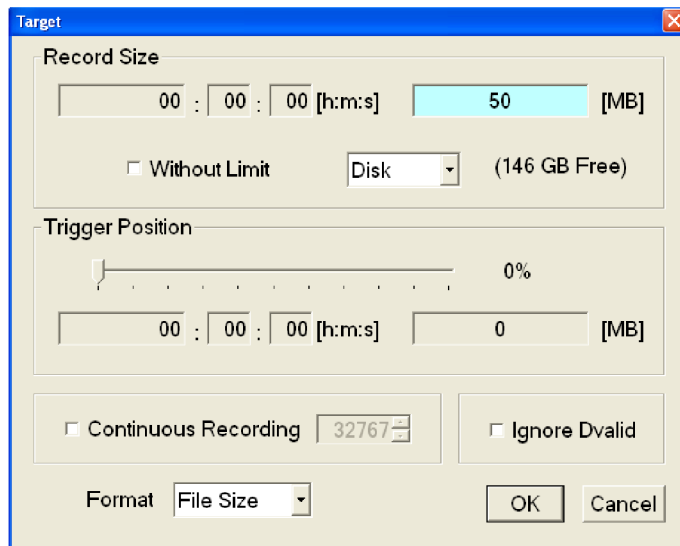


Figure 20: Target dialog box

- **Record Size:** Sets the recording time (h:m:s) or file size (MB) to record the input stream. Use the Format list box to select the method to set the record size.

The amount of free space available for the RAM or hard disk is displayed below the data size text box. You cannot set the record size beyond this value.

Use the **Without Limit** check box to record the input stream to the full free space in the hard disk or RAM. When it is checked, the available recording time and data size are automatically set. In addition, when the check box is enabled, the Continuous Recording check box becomes disabled.

NOTE. *When you set the pretrigger portion, the same free space as the record size is required.*

A list box in the Record Size field is available to select the record target (RAM or hard disk) that is used to record the input stream.

- **Trigger Position:** Sets the trigger position used to record the input stream. You can set the trigger position by specifying the time (h:m:s) or the file size (MB).
- **Continuous Recording:** Sets whether to enable Continuous Recording. With Continuous Recording, you can record multiple stream files continuously on the hard disk.

When selected, the Continuous Recording box (to the right of the check box) becomes available. Use this box to set the number of files after which to stop Continuous Recording. After the specified number of files are created, stream capture stops automatically. You can set the value from 2 to 32767.

When this option is selected, the Without Limit check box is disabled.

- **Ignore Dvalid:** Sets whether the generator ignores the DVALID signal from the selected interface or not when a stream data is acquired. When it is checked, the generator ignores the DVALID signal, and the stream data is acquired according to the internal clock signal. This option is not available for the ASI interface option.
- **Format:** Specifies how to set the record size and trigger position. You can select Time or File Size.

Others Dialog Box. When you select the Other command from the Record menu, the Others dialog box appears. (See Figure 21.)

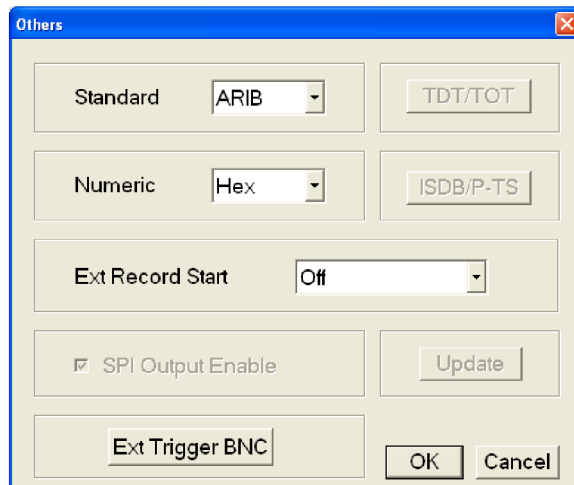


Figure 21: Others dialog box

- **Standard:** Sets the standard used to display the input stream. You can select ARIB, ATSC, DVB, or MPEG-2.
- **Numeric:** Sets the base value used to describe the component information in the hierarchy display. You can select Decimal, Hex, or Octal.
- **Ext Record Start:** Sets whether or not to start input stream record using a trigger signal applied to the Trig In/Out connector. You can select Off, Rise, or Fall. When you select Rise, the input stream record is started at the rising edge of the applied trigger signal. When you select Fall, the input stream record is started at the falling edge of the applied trigger signal.

When you use the external trigger signal with the pretrigger portion defined to record the input stream, the generator acquires pretrigger data when a valid trigger signal occurs and waits for the trigger. When a valid trigger signal occurs again, the generator acquires posttrigger data and creates a stream file.

- **Ext Trigger BNC:** This item is common to the Play screen.

QAM/VSB Menu (RTX130B Generator)

The QAM/VSB menu contains commands for setting the parameters for the RF modulated output of an input transport stream and selecting the reference clock for the RF modulated output. This menu is available only when ASI is selected from the Source command in the Record menu. (See Table 11.)

Table 11: QAM/VSB menu command (Record screen)

| Command | Description |
|-----------------|---|
| BNC Port | Sets the signal format applied to the ASI/SMPTE Output connector. You can select ASI or 310M 8VSB (SMPTE310M signal with data rate of 8 VSB). |
| Through Out | Sets whether the signal supplied to the ASI/SMPTE Input connector is output from the ASI/SMPTE Output connector when a stream is not output. You can select On or Off. |
| RF Output | Sets whether to modulate and output a signal that is applied to the ASI/SMPTE Input connector. You can select On or Off. |
| Modulation | Sets the parameter for the RF modulated output of the transport stream. When you select this command, the Modulation dialog box appears. The dialog box is same as the Modulation dialog box displayed in the Play screen. (See page 21, <i>Modulation Dialog Box</i> .) |
| RF Clock Source | Opens the RF Clock Source dialog box where you can set the reference clock for the RF modulated output of the transport stream applied to the ASI/SMPTE Input connector. (See page 45, <i>RF Clock Source Dialog Box</i> .) |

RF Clock Source Dialog Box. When you select the RF Clock Source command from the RF/ASI/310M menu, the RF Clock Source dialog box appears.

(See Figure 22 on page 45.)

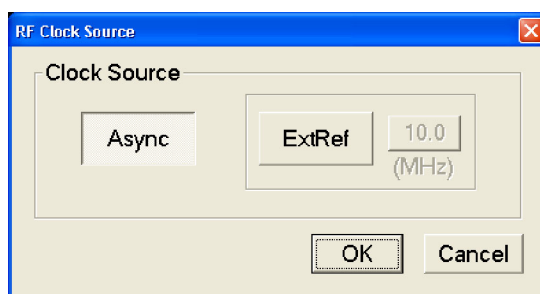


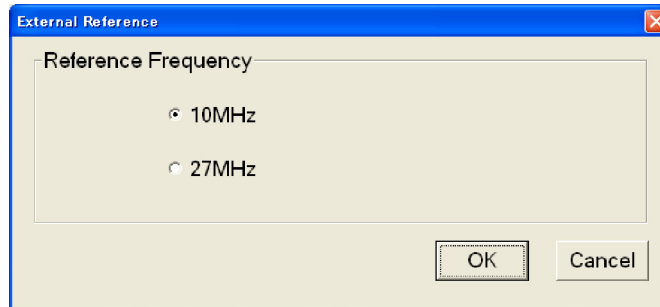
Figure 22: RF Clock Source dialog box

- **Async:** Uses the internal clock, which is not synchronized with the clock that is created by an ASI or SMPTE310M signal, for real-time modulation.

In this mode, the input transport stream clock is not synchronized with the symbol rate. The transport stream rate that is calculated by the symbol rate and the modulation parameters that are synchronized with the actual transport stream signal by inserting null packets. In this case, PCR jitter of maximum 1 packet is generated.

NOTE. *If the bit rate of the input transport stream is higher than the calculated bit rate, a non-modulated signal is output.*

- **Ext Ref:** Uses a signal applied to the Clock/Ref In connector as the reference signal. When you select the button to the right of the ExtRef button, the following External Reference dialog box appears. This button is available only when J.83 Annex C-JCTEA or ATSC is selected as a modulation standard.



- **10 MHz** Selects a 10 MHz signal on the Clock/Ref In connector.
- **27 MHz** Selects a 27 MHz signal on the Clock/Ref In connector.

Press the **TAB** button repeatedly to select an option button, and then press the arrow buttons to select one of the options.

NOTE. *If the input transport stream and external reference signal are not synchronized, a non-modulated signal is output.*

ISDB-T/ISDTV/ASI Menu (RTX100B Generator)

The ISDB-T/ISDTV/ASI menu contains commands for setting the parameters for the RF modulated output of an input broadcast transport stream and selecting the reference clock for the RF modulated output. This menu is available only when ASI is selected from the Source command in the Record menu.

Table 12: ISDB-T/ISDTV/ASI menu command (Record screen)

| Command | Description |
|-----------------|---|
| RF Standard | Sets the standard for the RF signal. You can select ISDB-T or ISDTV. |
| RF Parameter | Opens the ISDB-T RF Parameter dialog box where you can set the parameter for the RF modulated output (ISDB-T or ISDTV) of the broadcast transport stream applied to the ASI In connector. |
| RF Clock Source | Opens the ISDB-T Clock Source dialog box where you can set the reference clock for the RF modulated output of the broadcast transport stream applied to the ASI In connector. |

ISDB-T/ISDTV RF Parameter Dialog Box. When you select the RF Parameter command from the ISDB-T/ISDTV/ASI menu, the RF Parameter dialog box appears as per the selected RF standard. This dialog box is same as the ISDB-T Parameter dialog box displayed in the Play screen.

- **Center Frequency:** Sets the center frequency (UHF channel number) for the RF modulated output. For ISDB-T standard the channels range from 13 to 62 and for ISDTV standard the channels range from 14 to 69.

ISDB-T Clock Source Dialog Box. When you select the ISDB-T Clock Source command from the ISDB-T/ISDTV/ASI menu, the ISDB-T Clock Source dialog box appears.

- **ASI Input:** Uses an ASI signal applied to the ASI In connector as the reference signal.
- **Ext Ref:** Uses a signal applied to the Clock/Ref In connector as the reference signal. When you select the button to the right of the ExtRef button, the following External Reference dialog box appears:
 - **10 MHz:** Selects a 10 MHz signal on the Clock/Ref In connector.
 - **27 MHz:** Selects a 27 MHz signal on the Clock/Ref In connector.
 - **ISDB-T IFFT Clock:** Selects a signal corresponding to the IFFT sample clock rate (8.126984 MHz) on the Clock/Ref In connector.

Utility Menu

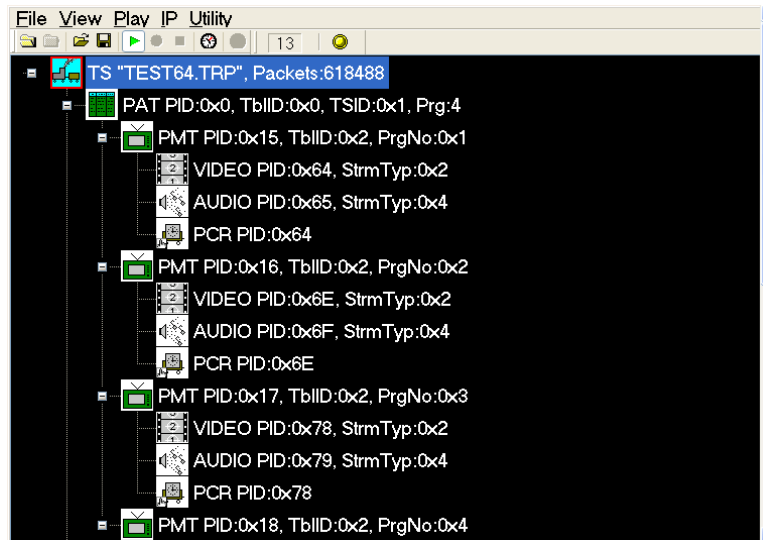
The Utility menu contains commands for displaying the system information such as software and hardware versions. The Utility menu in the Record screen is the same as that of the Play screen. (See Table 8.)

Hierarchy Display

The generator displays the selected transport stream using a hierarchy structure. This section describes the hierarchy display and defines each icon you might encounter in the display.

Overview of the Hierarchy Display

The generator uses icons displayed in a hierarchical structure to show the interrelationship of transport stream components. Additional information about each stream component such as PID and Table ID numbers is displayed next to each icon.



The “+” symbol displayed to the left of some icons indicates that the item includes lower-level transport stream components that are not displayed. The symbol changes to “-” when the lower level components are displayed. To expand the hierarchy, select the desired upper-level icon and press the right control button. To collapse the selected upper-level icon press the left control button.

When a transport stream contains more items than will display on the screen at one time, a scroll bar appears at the right of the screen.

The icon cursor is used to select individual transport stream components as represented by the icons. The icon cursor is displayed as a red square (border) surrounding a hierarchy icon. Use the arrow buttons to move the icon cursor through the hierarchy. The hierarchy display scrolls (if applicable) when the Icon cursor reaches the top or bottom of the displayed portion of the hierarchy.

When the menus are enabled, the icon cursor is disabled. Press the front-panel Menu button to toggle control between the Icon cursor and the menus.

Hierarchy Display Icons

The hierarchy display contains icons. The specific icons you may encounter depend on the format of the transport stream, as shown in the following four tables. The text next to each icon describes each transport stream component.

(See Table 13 on page 49.)

Table 13: Icons used for MPEG-2, ARIB, DVB, and ATSC formats









| Icon | Element type |
|---|---|
|  | ISDB-T Broadcast transport stream that is defined ARIB STD-B31. |
|  | S-TMCC Transport stream into which TMCC information is inserted into 8 bytes in its Reed-Solomon area (16 bytes). |
| | M-TMCC Transport stream into which TMCC information is inserted into its sync byte area, and having super frame structure. |
|  | Non-TS Data stream other than transport stream format. |
|  | Transport Stream (TS) This icon represents all transport stream packets that make up the stream. |
|  | Program Association Table (PAT) One or more transport packets with a PID value and table_id value of 0x00. |
| | Transport Stream Description Table (TSDT) One or more transport packets with a PID value of 0x02 and a table_id value of 0x03. |
|  | Network Information Table (NIT) One or more transport packets with a PID value specified by the network_PID in the PAT. |
|  | Conditional Access Table (CAT) One or more transport packets with a PID value of 0x01 and a table_id value of 0x0001. |
|  | Program Map Table (PMT) One or more transport packets with a PID value specified by the program_map_PID in the PAT and a table_id value of 0x02. |

Table 13: Icons used for MPEG-2, ARIB, DVB, and ATSC formats (cont.)














| Icon | Element type |
|---|---|
|  | <p>Program Clock Reference (PCR)</p> <p>One or more transport packets with a PID value specified by the PCR_PID in the PMT and a PCR_flag value of 1.</p> |
|  | <p>Video elementary stream</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x01 or 0x02.</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
|  | <p>H264 Video elementary stream</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x1B.</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
|  | <p>MPEG-4 Video elementary stream</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x10.</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
|  | <p>Audio elementary stream</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x03, 0x04, or 0x11.</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
|  | <p>Audio AAC, Audio AC3 (ATSC format)</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x0F or 0x81 (ATSC format).</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
|  | <p>Data stream</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of other than 0x01-0x05, 0x08, and 0x0F (in ATSC format, 0x81).</p> |
|  | <p>A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |

Table 13: Icons used for MPEG-2, ARIB, DVB, and ATSC formats (cont.)











| Icon | Element type |
|---|--|
|  | Private Section One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x05. |
|  | A lock symbol appears in the icon when the transport_scrambling_control value is set to 01. |
|  | Digital Storage Media Command and Control (DSM-CC) One or more transport packets with a PID value specified by the elementary_PID in the PMT and a stream_type value of 0x08. |
|  | A lock symbol appears in the icon when the transport_scrambling_control value is set to 01. |
|  | Entitlement Control Message (ECM) One or more transport packets with a PID value specified by the CA_PID of the CA_descriptor in the PMT, a payload_start_unit_indicator value of 1, and the payload does not start 000001 (section) or the payload starts 000001 (PES). |
|  | Entitlement Management Message (EMM) One or more transport packets with a PID value specified by the CA_PID of the CA_descriptor in the CAT, a payload_start_unit_indicator value of 1, and the payload does not start 000001 (section) or the payload starts 000001 (PES). |
|  | GHOST One or more transport packets with a PID value not specified in the PSI or Private Section PID file when the transport stream is downloaded. |
|  | NULL One or more transport packets with a PID value of 0x1FFF. |
|  | GARBAGE One or more transport packets in the section-data structure at the beginning of the section are not complete. |
|  | Adaptation Field Error (ADFERR) One or more transport packets with an adaptation_field_control value of 0x00. |

Table 14: Icons specific to DVB format



| Icon | Element type | |
|---|---|---|
|  | Service Description Table (SDT) One or more transport packets with a PID value of 0x0011 and a table_id value of 0x42. | |
| | Bouquet Association Table (BAT) One or more transport packets with a PID value of 0x0011 and a table_id value of 0x4A. | |
| | Event Information Table (EIT) One or more transport packets with a PID value of 0x0012 and a table_id value of 0x4E-0x6F. | |
| | Running Status Table (RST) One or more transport packets with a PID value of 0x0013 and a table_id value of 0x4E-0x71. | |
| | Stuffing Table (ST) One or more transport packets with a PID value of 0x0010-0x0013 and a table_id value of 0x72. | |
| | Discontinuity Information Table (DIT) One or more transport packets with a PID value of 0x1E and a table_id value of 0x7E. | |
| | Selection Information Table (SIT) One or more transport packets with a PID value of 0x1F and a table_id value of 0x7F. | |
| |  | Time and Data Table (TDT) One or more transport packets with a PID value of 0x0014 and a table_id value of 0x72. |
| | | Time Offset Table (TOT) One or more transport packets with a PID value of 0x0014 and a table_id value of 0x73. |

Table 15: Icons specific to ARIB format



| Icon | Element type |
|---|---|
|  | <p>Service Description Table (SDT)</p> <p>One or more transport packets with a PID value of 0x0011 and a table_id value of 0x42.</p> |
|  | <p>Bouquet Association Table (BAT)</p> <p>One or more transport packets with a PID value of 0x0011 and a table_id value of 0x4A.</p> |
| | <p>Event Information Table (EIT)</p> <p>One or more transport packets with a PID value of 0x0012 and a table_id value of 0x4E-0x6F.</p> |
| | <p>Running Status Table (RST)</p> <p>One or more transport packets with a PID value of 0x0013 and a table_id value of 0x4E-0x71.</p> |
| | <p>Stuffing Table (ST)</p> <p>One or more transport packets with a PID value of 0x0010-0x0013 and a table_id value of 0x72.</p> |
| | <p>Discontinuity Information Table (DIT)</p> <p>One or more transport packets with a PID value of 0x1E and a table_id value of 0x7E.</p> |
| | <p>Selection Information Table (SIT)</p> <p>One or more transport packets with a PID value of 0x1F and a table_id value of 0x7F.</p> |
| | <p>Local event Information Table (LIT)</p> <p>One or more transport packets with a PID value of 0x0020 and a table_id value of 0xD0. One or more transport packets with a PID value specified by the elementary_PID in the PMT and a table_id value of 0xD0 when a stream type value is 0x05.</p> |
| | <p>Event Relation Table (ERT)</p> <p>One or more transport packets with a PID value of 0x0021 and a table_id value of 0xD1. One or more transport packets with a PID value specified by the elementary_PID in the PMT and a table_id value of 0xD1 when a stream type value is 0x05.</p> |
| | <p>Index Transmission Table (ITT)</p> <p>One or more transport packets with a PID value specified by the elementary_PID in the PMT and a table_id value of 0xD2.</p> |
| | <p>Partial Content Announcement Table (PCAT)</p> <p>One or more transport packets with a PID value of 0x22 and a table_id value of 0xC2.</p> |

Table 15: Icons specific to ARIB format (cont.)




| Icon | Element type |
|---|--|
| | <p>Software Download Trigger Table (SDTT) One or more transport packets with a PID value of 0x23 and a table_id value of 0xC3.</p> |
| | <p>Download Control Table (DCT) One or more transport packets with a PID value of 0x17 and a table_id value of 0xC0.</p> |
| | <p>DownLoad Table (DLT) One or more transport packets with a PID value specified by the DL_PID in the DCT and a stream_type value of 0xC1. A lock symbol appears in the icon when the transport_scrambling_control value is set to 01.</p> |
| | <p>Broadcaster Information Table (BIT) One or more transport packets with a PID value of 0x24 and a table_id value of 0xC4.</p> |
| | <p>Network Board Information Table (NBIT) One or more transport packets with a PID value of 0x25 and a table_id value of 0xC5 or 0xC6.</p> |
| | <p>Linked Description Table (LDT) One or more transport packets with a PID value of 0x25 and a table_id value of 0xC7.</p> |
|  | <p>Time and Data Table (TDT) One or more transport packets with a PID value of 0x0014 and a table_id value of 0x72.</p> |
| | <p>Time Offset Table (TOT) One or more transport packets with a PID value of 0x0014 and a table_id value of 0x73.</p> |

Table 16: Icons specific to ATSC format

| Icon | Element type | |
|---|---|--|
|  | Master Guide Table (MGT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xC7. | |
| | Terrestrial Virtual Channel Table (TVCT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xC8. | |
| | Cable Virtual Channel Table (CVCT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xC9. | |
| | Rating Region Table (RRT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xCA. | |
| | Event Information Table (EIT) One or more transport packets with a PID value specified by the table_type_PID in the MGT and a table_id value of 0xCB. | |
| | Channel Extended Text Table (CETT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xC8. | |
| | Event Extended Text Table (EETT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xC9. | |
| | Program Identifier Table (PIT) One or more transport packets with a PID value specified by the elementary_PID in the PMT and a table_id value of 0xD0 when a stream_type value is 0x85. | |
| |  | System Time Table (STT) One or more transport packets with a PID value of 0x1FFB and a table_id value of 0xCD. |

Icon Text and Dialog Box

To the right of each icon, the generator displays text that describes each transport stream component. In addition, for the PCR icon, you can display a dialog box to change the parameters for the component.

This subsection describes the text information for each icon type and the dialog box available for the PCR icon.

ISDB-T Icon

The following text information is displayed for the ISDB-T icon:

- “xxx.rmx”: Shows the file name.
- Packets: Shows the total number of packets in the broadcast transport stream.

- S-TMCC Icon** The following text information is displayed for the M-TMCC icon:
- “xxx.trp”: Shows the file name.
 - SF: Shows the number of super frames.
- M-TMCC Icon** The following text information is displayed for the M-TMCC icon:
- “xxx.trp”: Shows the file name.
 - SF: Shows the number of super frames.
- Non-TS Icon** The following text information is displayed for the Non Transport Stream (Non-TS) icon:
- “xxx.xx”: Shows the file name.
 - FileSize: Shows the file size in bytes.

- Transport Stream (TS) Icon** The following text information is displayed for the Transport Stream (TS) icon:
- “xxx.trp”: Shows the file name of the transport stream.
 - Packets: Shows the total number of packets in the transport stream.
- When this icon is used with the S-TMCC or M-TMCC icon, the following text information is displayed:
- TSID: Shows the ID number for the transport stream.
 - TC8PSK/xx, BPSK/xx, or QPSK/xx: Shows the modulation system and the number of contract slots (xx).

- Program Association Table (PAT) Icon** The following text information is displayed for the Program Association Table (PAT) icon:
- PID: Shows the PID value of the PAT.
 - TblID: Shows the table_id value of the PAT.
 - TSID: Shows the transport_stream_id value of the PAT.
 - Prg: Shows the number of programs contained in the transport stream.

- Transport Stream Description Table (TSDT) Icon** The following text information is displayed for the Transport Stream Description Table (TSDT) icon:
- PID: Shows the PID value of the TSDT.
 - TblID: Shows the table_id value of the TSDT.

| | |
|---|--|
| Network Information Table (NIT) Icon | <p>The following text information is displayed for the Network Information Table (NIT) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the NIT.■ TblID: Shows the table_id value of the NIT. |
| Conditional Access Table (CAT) Icon | <p>The following text information is displayed for the Conditional Access Table (CAT) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the CAT.■ TblID: Shows the table_id value of the CAT. |
| Program Map Table (PMT) Icon | <p>The following text information is displayed for the Program Map Table (PMT) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the PMT.■ TblID: Shows the table_id value of the PMT.■ PrgNo: Shows the program number associated with the PMT. |
| Program Clock Reference (PCR) Icon | <p>The following text information is displayed for the Program Clock Reference (PCR) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the PCR. <p>PCR Inaccuracy Dialog Box. If you press the Num Pad/Select button when the PCR icon is selected, the PCR Inaccuracy dialog box appears. (See Figure 23.) This dialog box allows you to add jitter to the program_clock_reference_base value and the program_clock_reference_extension value.</p> <p>The PCR Inaccuracy dialog box contains four parameters that you can use to specify the jitter. (See Table 17.)</p> |

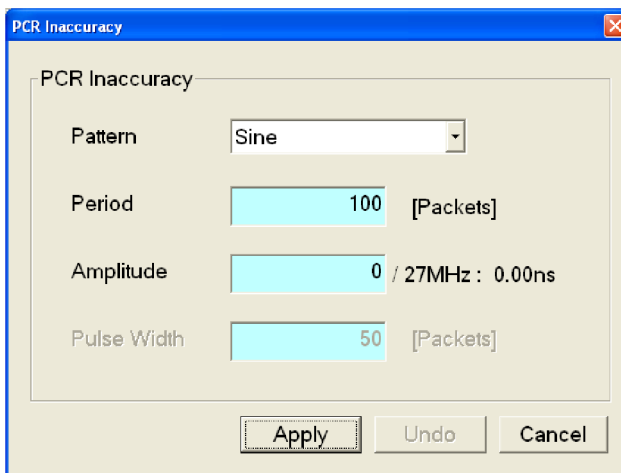


Figure 23: PCR Inaccuracy dialog box

Table 17: PCR Inaccuracy dialog box parameters

| Parameter | Description |
|-------------|--|
| Pattern | Selects the waveform type of the waveform used to add jitter. You can select Sine, Square, Triangle, Pulse, Sawtooth, Random, or Offset. |
| Period | Sets the period of the waveform used to add jitter. You can set the value from 5 to 3000 packets in 1 packet steps. |
| Amplitude | Sets the amplitude of the waveform used to add jitter. You can set the value from 0/27 MHz to 135000000/27 MHz (0 s to 5 s). |
| Pulse Width | Sets the pulse width of the waveform used to add jitter. You can set the value from 1 to (period-1) packet(s) in 1 packet step. This Pulse Width parameter is available only when the Pattern parameter is set to Pulse. |

Video Elementary Stream (VIDEO) Icon

The following text information is displayed for the video elementary stream (VIDEO) icon:

- PID: Shows the PID value of the video elementary stream.
- StrmTyp: Shows the type of the video elementary stream (0x01 or 0x02).

VIDEO_H264 Icon

The following text information is displayed for the H264 video elementary stream (VIDEO_H264) icon:

- PID: Shows the PID value of the H264 video elementary stream.
- StrmTyp: Shows the type of the H264 video elementary stream (0x1B).

| | |
|---|---|
| VIDEO_MP4 Icon | <p>The following text information is displayed for the MPEG-4 video elementary stream (VIDEO_MP4) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the MPEG-4 video elementary stream.■ StrmTyp: Shows the type of the MPEG-4 video elementary stream (0x10). |
| Audio Elementary Stream (AUDIO) Icon | <p>The following text information is displayed for the audio elementary stream (AUDIO) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the audio elementary stream.■ StrmTyp: Shows the type of the audio elementary stream (0x03 or 0x04). |
| AUDIO_AAC and AUDIO_AC3 Icons | <p>The following text information is displayed for the AUDIO_AAC and AUDIO_AC3 (ATSC only) icons:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the audio elementary stream.■ StrmTyp: Shows the type of the audio elementary stream (0x0F or 0x81). |
| Data Stream (DATA) Icon | <p>The following text information is displayed for the data stream (DATA) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the data stream.■ StrmTyp: Shows the type of the data stream. |
| Private Section (DATA_SECT) Icon | <p>The following text information is displayed for the private section (DATA_SECT) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the private section.■ TblID: Shows the table_id value of the private section.■ StrmTyp: Shows the type of the private section. |
| DSM_CC Icon | <p>The following text information is displayed for the digital storage media command and control (DSM_CC) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the data DSM-CC.■ StrmTyp: Shows the type of the DSM-CC. |
| Entitlement Control Message (ECM) Icon | <p>The following text information is displayed for the Entitlement Control Message (ECM) icon:</p> <ul style="list-style-type: none">■ PID: Shows the PID value of the ECM.■ TblID: Shows the table_id value of the ECM. |

Entitlement Management Message (EMM) Icon

The following text information is displayed for the Entitlement Management Message (EMM) icon:

- PID: Shows the PID value of the EMM.
- TblID: Shows the table_id value of the EMM.

GHOST Icon

- PID: Shows the PID value of the GHOST.

Adaptation Field Error (ADFERR) Icon

The following text information is displayed for the Adaptation Field Error (ADFERR) icon:

- PID: Shows the PID value of the ADFERR.

NULL Icon

The following text information is displayed for the NULL icon:

- PID: Shows the PID value of the NULL.

GARBAGE Icon

The following text information is displayed for the GARBAGE icon:

- PID: Shows the PID value of the GARBAGE.

SDT, BAT, EIT, RST, ST, DIT, SIT, LIT, ERT, ITT, PCAT, SDTT, DCT, DLT, BIT, NBIT, and LDT Icons

The following text information is displayed for the Service Description Table (SDT), Bouquet Association Table (BAT), Event Information Table (EIT), Running Status Table (RST), Stuffing Table (ST), Discontinuity Information Table (DIT), Selection Information Table (SIT), Local event Information Table (LIT), Event Relation Table (ERT), Index Transmission Table (ITT), Partial Content Announcement Table (PCAT), Software Download Trigger Table (SDTT), Download Control Table (DCT), DownLoad Table (DLT), Broadcaster Information Table (BIT), Network Board Information Table (NBIT), and Linked Description Table (LDT) icons:

- PID: Shows the PID value of the SDT, BAT, EIT, RST, ST, DIT, SIT, LIT, ERT, ITT, PCAT, SDTT, DCT, DLT, BIT, NBIT, or LDT.
- TblID: Shows the table_id value of the SDT, BAT, EIT, RST, ST, DIT, SIT, LIT, ERT, ITT, PCAT, SDTT, DCT, DLT, BIT, NBIT, or LDT.

TDT and TOT Icons

The following text information is displayed for the Time and Data Table (TDT) and Time Offset Table (TOT) icons:

- PID: Shows the PID value of the TDT or TOT.
- TblID: Shows the table_id value of the TDT or TOT.

MGT and PIT Icons

The following text information is displayed for the Master Guide Table (MGT) and Program Identifier Table (PIT) icons:

- PID: Shows the PID value of the MGT or PIT.
- TblID: Shows the table_id value of the MGT or PIT.

TVCT, CVCT, RRT, EIT, CETT, and EETT Icons

The following text information is displayed for the Terrestrial Virtual Channel Table (TVCT), Cable Virtual Channel Table (CVCT), Rating Region Table (RRT), Event Information Table (EIT), Channel Extended Text Table (CETT), and Event Extended Text Table (EETT) icons:

- PID: Shows the PID value of the TVCT, CVCT, RRT, EIT, CETT, or EETT.
- TblID: Shows the table_id value of the TVCT, CVCT, RRT, EIT, CETT, or EETT.
- TblType: Shows the table_type value of the TVCT, CVCT, RRT, EIT, CETT, or EETT.

System Time Table (STT) Icon

The following text information is displayed for the System Time Table (STT) icon:

- PID: Shows the PID value of the STT.
- TblID: Shows the table_id value of the STT.

Programming Information

This section contains information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands you can use to program your generator.

Syntax

This section contains information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands you can use to program your generator.

SCPI Commands and Queries

SCPI is a standard created by a consortium that provides guidelines for remote programming of instruments. These guidelines provide a consistent programming environment for instrument control and data transfer. This environment uses defined programming messages, instrument responses, and data format across all SCPI instruments, regardless of the manufacturer. The generator uses a command language based on the SCPI standard.

The SCPI language is based on a hierarchical or tree structure that represents a subsystem. The top level of the tree is the root node; it is followed by one or more lower-level nodes. (See Figure 24.)

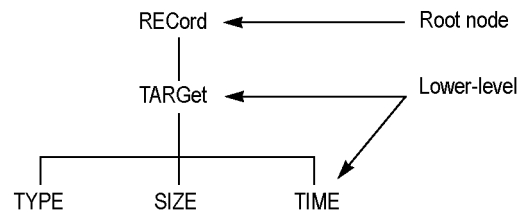


Figure 24: Example of SCPI subsystem hierarchy tree

You can create commands and queries from these subsystem hierarchy trees. Commands specify actions for the instrument to perform. Queries return measurement data and information about parameter settings.

Creating Commands

SCPI commands are created by stringing together the nodes of a subsystem hierarchy and separating each node by a colon.

In Figure 342, RECOrd is the root node and TARGet, TYPE, SIZE, and TIME are lower-level nodes. To create a SCPI command, start with the root node RECOrd and move down the tree structure adding nodes until you reach the end of a branch. Most commands and some queries have parameters; you must include a value for these parameters. If you specify a parameter value that is out of range, the parameter will be set to a default value.

For example, RECOrd:TARGeT:TYPE DISK is a valid SCPI command created from the hierarchy tree in this example.

Creating Queries

To create a query, start at the root node of a tree structure, move down to the end of a branch, and add a question mark. RECOrd:TARGeT:TYPE? is an example of a valid SCPI query using the hierarchy tree. (See Figure 24.)

Parameter Types

Every parameter in the command and query descriptions is of a specified type. The parameters are enclosed in brackets, such as <pattern>. The parameter type is listed after the parameter and is enclosed in parentheses, for example, (discrete). Some parameter types are defined specifically for the generator command set and some are defined by ANSI/IEEE 488.2-1987. (See Table 18.)

Table 18: Parameter types used in syntax descriptions

| Parameter type | Description | Example |
|------------------------------|---|--|
| binary | Binary numbers | #B0110 |
| arbitrary block ¹ | A specified length of arbitrary data | #512234xxxx . . . where 5 indicates that the following 5 digits (12234) specify the length of the data in bytes; xxxx ... indicates the data |
| boolean | Boolean numbers or values | ON or 1, OFF or 0 |
| discrete | A list of specific value | MIN, MAX, UP, DOWN |
| hexadecimal | Hexadecimal numbers (0-9, A, B, C, D, E, F) | #HAA, #H1 |
| NR1 ^{2,3} numeric | Integers | 0, 1, 15, -1 |
| NR2 ² numeric | Decimal numbers | 1.2, 3.141516, -6.5 |
| NR3 ² numeric | Floating point numbers | 3.1415E-9, -16.1E5 |
| NRf ² numeric | Flexible decimal number that may be type NR1, NR2, or NR3 | See NR1, NR2, NR3 examples |
| string ⁴ | Alphanumeric characters (must be within quotation marks) | "Testing 1,2,3" |

¹ Defined in ANSI/IEEE 488.2 as "Definite Length Arbitrary Block Response Data."
² An ANSI/IEEE 488.2-1992-defined parameter type.
³ Some commands and queries will accept a hexadecimal value even though the parameter type is defined as NR1.
⁴ Defined in ANSI/IEEE 488.2 as "String Response Data."

Abbreviating Commands, Queries, and Parameters

You can abbreviate most SCPI commands, queries, and parameters to an accepted short form. This manual shows these short forms as a combination of upper and lower case letters. The upper case letters indicate the accepted short form of a command. You can create a short form by using only the upper case letters. (See

Figure 25.) The accepted short form and the long form are equivalent and request the same action of the instrument.

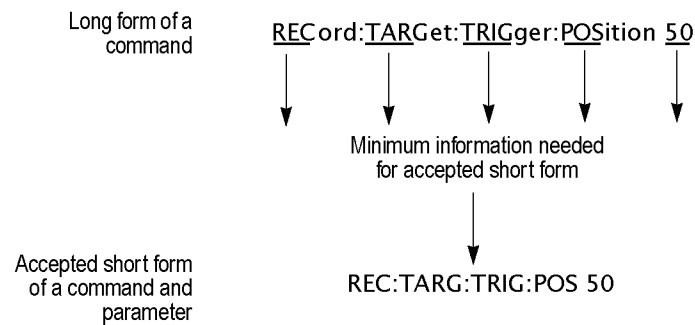
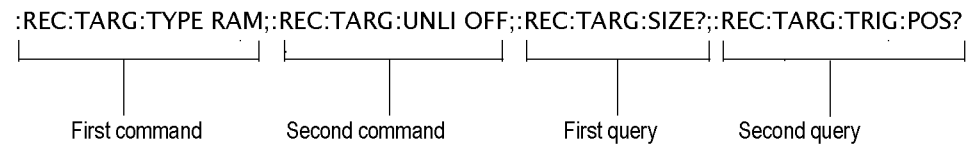


Figure 25: Example of abbreviating a command

Chaining Commands and Queries

You can chain several commands or queries together into a single message. To create a chained message, first create a command or query, add a semicolon (;), and then add more commands or queries and semicolons until you are done. If the command following a semicolon is a root node, precede it with a colon (:). The following figure illustrates a chained message consisting of several commands and queries. The single chained message should end in a command or query, not a semicolon. Responses to any queries in your message are separated by semicolons.



The response from this chained message might be

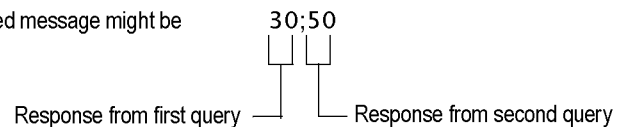


Figure 26: Example of chaining commands and queries

If a command has the same root and lower-level nodes as the previous command, you can omit these nodes. For example, the second command has the same root node (REC) and lower level node (TARG) as the first command, so these nodes can be omitted. (See Figure 27.)

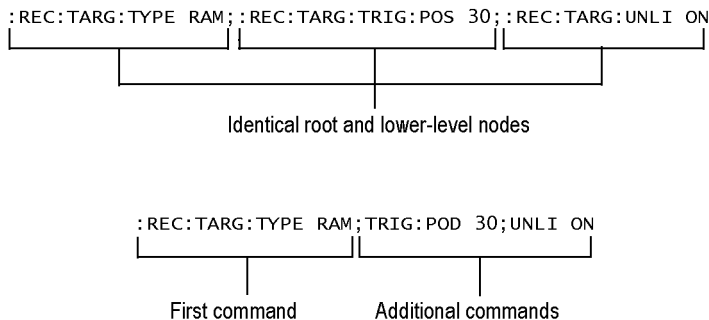


Figure 27: Example of omitting root and lower-level nodes in a chained message

General Rules

Here are three general rules for using SCPI commands, queries, and parameters:

- You can use single (‘ ’) or double (“ ”) quotation marks for quoted strings, but you cannot use both types of quotation marks for the same string.
 correct: “This string uses quotation marks correctly.”
 correct: ‘This string also uses quotation marks correctly.’
 incorrect: “This string does not use quotation marks correctly.’
- You can use upper case, lower case, or a mixture of both cases for all commands, queries, and parameters.

RECORD:TARGET:TRIGGER:POSITION 50

is the same as

record::position target:trigger50

and

RECORD:target:trigger:POSITION 50

NOTE. *Literal strings (quoted) are case sensitive. For example: file names.*

- No embedded spaces are allowed between or within nodes.
 correct: RECORD:TARGET:TRIGGER:POSITION 50
 incorrect: RECORD: TARGET: TRIGGER: POSI TION 50

IEEE 488.2 Common Commands

Description. ANSI/IEEE Standard 488.2 defines the codes, formats, protocols, and usage of common commands and queries used on the interface between the controller and the instruments. The generator complies with this standard.

Command and Query Structure. The syntax for an IEEE 488.2 common command is an asterisk (*) followed by a command and, optionally, a space and parameter

value. The syntax for an IEEE 488.2 common query is an asterisk (*) followed by a query and a question mark. All of the common commands and queries are listed in the last part of the Syntax and Commands section. The following are examples of common commands:

- *ESE 16
- *CLS

The following are examples of common queries:

- *ESR?
- *IDN?

Backus-Naur Form Definition. This manual may describe commands and queries using the Backus-Naur Form (BNF) notation. (See Table 19.)

Table 19: BNF symbols and meanings

| Symbol | Meaning |
|--------|-------------------------------------|
| < > | Defined element |
| : := | Is defined as |
| | Exclusive OR |
| { } | Group; one element is required |
| [] | Optional; can be omitted |
| . . . | Previous element(s) may be repeated |
| () | Comment |

Remote Commands

This section describes the remote command set that is used in the generator. The commands for the generator are divided into the following six groups:

- Common commands
- DISPLAY commands
- MASS MEMORY commands
- PLAY commands
- RECORD commands
- SYSTEM commands

This section also contains commands that are used to control the optional interface cards.

You can connect and set up the generator for remote operation through the LAN port on the rear panel.

Common Commands The Common commands have a “*” prefix and address of all the instruments that support IEEE 488.2.

Table 20: Common command description

| Variable | Description |
|----------|---|
| *CLS | Clears SESR (Standard Event Status Register), the SBR (Status Byte Register), and Event Queue, which are used in the instrument status and event reporting system. |
| *ESE | Sets the bits of the ESER (Event Status Enable Register) used in the status and events reporting system. |
| *ESE? | Returns the contents of the ESER. |
| *ESR? | Returns the contents of SESR (Standard Event Status Register) used in the status and events reporting system. |
| *IDN? | Returns the ID information of the instrument. The ID information contains manufacturer, model, firmware version, hardware version, and FPGA code version. |
| *LRN? | Returns the current instrument settings. |
| *OPC | Causes bit 0 in the SESR (Standard Event Status Register) to be set, and the operation complete message to be issued, when all pending operations are finished. This command is only available just after the :PLAY:START or :RECORD:START command is executed. |
| *OPT? | Waits until all pending operations are finished and returns a “1” ASCII character. This query is only available just after the :PLAY:START or :RECORD:START command is executed. |
| *OPC? | Returns the installed interface option. |
| *RST | Resets the instrument to the factory default state. This command has the same effect when the :SYSTEM:PRESET and *CLS commands are executed successively. |
| *SRE | Sets the bits of the SRER (Service Request Enable Register). |
| *SRE? | Returns the contents of SRER |
| *STB? | Returns the value of the SBR (Status Byte Register). Bit 6 of the SBR is read as a MSS (Master Status Summary) bit. |
| *TRG | Generates a trigger event. |
| *TST? | Performs the self test and returns its result. The generator Series always returns 1. |
| *WAI | Wait-to-continue command. This command is not necessary because the generator Series handles commands sequentially. |

DISPLAY Commands Use these commands to select a display format of the base value in the hierarchy display.

| Variable name | Valid values | Description |
|-----------------------|---|--|
| :DISPlay:VIEW:FORMat | HEXadecimal DECimal OCTal The choices are HEXadecimal, DECimal, and OCTal. The default value is HEXadecimal. | Sets the base value used to describe the component information in the hierarchy display. |
| :DISPlay:VIEW:FORMat? | | Returns the current display format of the base value in the hierarchy display. |

MASS MEMORY Commands Use these commands to perform file related operations such as changing and moving a directory, and loading and saving a preset.

| Variable name | Valid values | Description |
|-------------------------------|---|---|
| :MMEMemory:CATalog? | [<directory_path>] The query response is as follows: <used_bytes>, <available_bytes>, "<file_name>, <directory_flag>," <file_size>, <date>,<time>"... | Lists the files in the specified directory. |
| :MMEMemory:CDIRectory[:DATA] | [<directory_path>] | Changes the current directory for data files. <directory_path> is a quoted string that defines the directory path. The default value is D:. |
| :MMEMemory:CDIRectory[:DATA]? | | Returns the current directory for data files. |
| :MMEMemory:CDIRectory:STATe | <directory_path> <directory_path> is a quoted string that defines the directory path. The default value is D:. | Changes the current directory for setting files. |
| :MMEMemory:CDIRectory:STATe? | | Returns the current directory for setting files. |
| :MMEMemory:LOAD:STATe | <preset_name> | Loads the specified preset. <preset_name> is a quoted string that defines the preset name. This command accepts the name of a previously saved preset. Current instrument settings are overwritten by this command. |
| :MMEMemory:MDIRectory | <directory_path> | Creates a subdirectory. The command is invalid if a directory with the specified name already exists. |
| :MMEMemory:STORE:STATe | <preset_name> | Saves the instrument settings with the specified preset name. <preset_name> is a quoted string that defines the preset name. |

PLAY Commands Use these commands to set parameters related to the stream output. These include packet size, output clock rate, data output source, and PCR jitter insertion.

Table 21: RTX100B and RTX130B common PLAY commands

| Variable name | Valid values | Description |
|---------------------------------|---|---|
| :PLAY:AUTOPlay | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether the selected stream is automatically output using the last power-off settings when you turn the generator on. |
| :PLAY:AUTOPlay? | | Returns the current auto play mode status. |
| :PLAY:PROGress? | | Returns the current percentage of progress of the play. |
| :PLAY:CLOCK:DEFault:RATE | <numeric_value> You can set the rate from 0.001 MHz to 250.0 MHz. The default value is 56.61. | Sets the default clock rate that is automatically set when the selected stream file is downloaded. Since the clock rate is calculated based on the PCRs in the file, the value may be different from the original clock rate. If this happens, you can set the appropriate value by this command. If you change the value, the :PLAY:CLOCK:RATE command setting will set to the same value. |
| :PLAY:CLOCK:DEFault:RATE? | | Returns the default clock rate that is automatically set when the selected stream file was downloaded. |
| :PLAY:CLOCK:DEFault:RATE:RATIo | <numeric_value>, <numeric_value> You can set both values from 0 to 2000000000. The default values are 629 for the numerator and 300 for the denominator. | Sets the default clock rate that is automatically set when the selected stream file is downloaded using a fraction. Since the clock rate is calculated based on the PCRs in the file, the value may be different from the original clock rate. If this happens, you can set the appropriate value by this command. The first argument represents a numerator and the second represents a denominator. If you change the value, the :PLAY:CLOCK:RATE:RATIo command setting will set to the same value. |
| :PLAY:CLOCK:DEFault:RATE:RATIo? | | Returns the default clock rate that is automatically set when the selected stream file is downloaded using a fraction. |
| :PLAY:CLOCK:ESRatefixed | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether the elementary stream rate is fixed. When you select ON, the elementary stream rate becomes constant regardless of the clock rate setting. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|----------------------------|--|--|
| :PLAY:CLOCK:ISDBT:CONVERT | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether the clock rate is automatically set when the data file for ISDB-TSB is loaded. When you select ON, the clock rate is automatically set to (2048/1701) x 27 MHz and the elementary stream rate becomes constant regardless of the :PLAY:CLOCK:ESRATEFIXED command setting. |
| :PLAY:CLOCK:ISDBT:CONVERT? | | Returns whether the clock rate is automatically set when the data file for ISDB-TSB is loaded. |
| :PLAY:CLOCK:ESRATEFIXED | | Returns the current elementary stream rate status. |
| :PLAY:CLOCK:RATE | <numeric_value> You can set the rate from 0.001 MHz to 250.0 MHz. The default value is 56.61. | Sets the clock rate for the stream output. |
| :PLAY:CLOCK:RATE? | | Returns the current clock rate for the stream output. |
| :PLAY:CLOCK:RATE :RATIO | <numeric_value>, <numeric_value> You can set both values from 0 to 2000000000. The default values are 629 for the numerator and 300 for the denominator. | Sets the clock rate for the stream output using a fraction. The first argument represents a numerator and the second represents a denominator. |
| :PLAY:CLOCK:RATE:RATIO? | | Returns the current clock rate for the stream output using a fraction. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|-----------------------|---|---|
| :PLAY:CLOCK:SOURce | <p>INTerna1 EXT10M EXT27M EXTIfft EXTParalle EXTSerial</p> <p>The choices are: INTerna1: uses the internal clock. EXT10M: uses a 10 MHz signal on the Clock/Ref In connector. EXT27M: uses a 27 MHz signal on the Clock/Ref In connector. EXTIfft: uses an IFFT sample clock signal (8.126984 MHz) on the Clock/Ref In connector. EXTParalle: uses a clock signal on the Clock/Ref In connector as a parallel clock. EXTSerial: uses a clock signal on the Clock/Ref In connector as a serial clock.</p> | Sets which clock to use as the reference for the stream output. |
| :PLAY:CLOCK:SOURce? | | Returns the current reference clock for the stream output. |
| :PLAY:EXTerna1 | <p>RISE FALL OFF</p> <p>The choices are RISE, FALL, and OFF. When you select RISE, the stream output is started at the rising edge of the applied trigger signal. When you select FALL, the stream output is started at the falling edge of the applied trigger signal. The default value is OFF.</p> | Sets whether to start stream output using a trigger signal applied to the Trig In/Out connector. |
| :PLAY:EXTerna1? | | Returns whether to start stream output using a trigger signal applied to the Trig In/Out connector. |
| :PLAY:EXTTrigger:BNC | <p>INPUt OUTPUt</p> <p>For INPUt, the connector can be used to input an external trigger signal. For OUTPUt, the connector can be used to output a 27 MHz reference clock or an ISDB-T frame pulse signal. Use the :PLAY:EXTTrigger:OUTPUt:SELEct command to select which signal is output from the connector. The default value is INPUt.</p> | Sets whether to use the rear-panel Trig In/Out connector as an input or an output. |
| :PLAY:EXTTrigger:BNC? | | Returns the current input/output status of the Trig In/Out connector. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|------------------------------------|--|---|
| :PLAY:EXTTrigger:OUTPut :DELAy | <numeric_value> You can set the value from 0 to 15. The default value is 0. | Sets the amount of delay for the start packet pulse of the ISDB-T frame in 1-parallel clocks of the SPI output. |
| :PLAY:EXTTrigger:OUTPut :DELAy? | | Returns the current delay for the start packet pulse of the ISDB-T frame. |
| :PLAY:EXTTrigger:OUTPut :SELEct | C27M ISDBT The choices are C27M and ISDBT. For C27M, a 27 MHz reference clock signal is output. For ISDBT, an ISDB-T frame pulse signal is output. The default value is C27M. | Selects which signal to output from the Trig In/Out connector when the :PLAY:EXTTrigger:BNC command is set to OUTPUT. |
| :PLAY:EXTTrigger:OUTPut:SELEct? | | Returns the current output signal selection when the Trig In/Out connector is used as an output. |
| :PLAY:LOAD:FILE | <file_name> | Returns the name of the file currently loaded. |
| :PLAY:LOOP | ON OFF The default value is ON. | Sets whether the selected stream is output using the looping method. When you select ON, the stream is continuously output. |
| :PLAY:LOOP? | | Returns the current output loop mode status. |
| :PLAY:LOOP:ISDBT:FRAME | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to output an ISDB-T transport stream in OFDM frames when looped. When you select OFF, an ISDB-T transport stream is looped in packets. |
| :PLAY:LOOP:ISDBT:FRAME? | | Returns whether to output an ISDB-T transport stream in OFDM frames when looped. |
| :PLAY:PACKet | 188 204 208 NONTs The choices are 188, 204, 208, and NONTs (Non-TS). The default value is 188. | Sets the packet size for the selected stream file. |
| :PLAY:PACKet? | | Returns the current packet size setting for the selected stream file. |
| :PLAY:PCR:INITia1 | <numeric_value>, <numeric_value> You can set the program_clock_reference_base value from 0 to 8589934591 and set the program_clock_reference_extension value from 0 to 299. The default values for both are 0. | Sets the initial value of the program_clock_reference_base and program_clock_reference_extension parameters. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|----------------------------------|---|---|
| :PLAY:PCR:INITial? | | Returns the current initial value of the program_clock_reference_base and program_clock_reference_extension parameters. |
| :PLAY:SPIOutput | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON | Sets whether the signal output from the SPI In/Out connector is enabled. |
| :PLAY:PCR:INACcuracy | NONE SINE SQUare TRIangle PULSe SAW RANdOm OFFSet [<PID>, <amplitude> [<period> [, <pulse_width>]]], The ranges of each argument are as follows: PID: 0 to 8191 Amplitude: 0 to 13500000 Period: 5 to 3000 Pulse width: 1 to (period -1) | Sets the PCR jitter insertion. Use the first argument to set the waveform type used to add jitter. When NONE is selected, the jitter insertion is disabled. Use the SINE, SQUare, TRIangle, PULSe, and SAW arguments to set the PID of the PCRs, the amplitude of the waveform, the period of the waveform, and pulse width of the waveform. The pulse width is available only when the waveform is set to PULSe. |
| :PLAY:PCR:INACcuracy? | | Returns the current PCR jitter insertion settings. |
| :PLAY:S192F:PARTialts | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to output a stream file consisting of a 192-byte packet as a partial transport stream. When you select OFF, the stream is output in Non-TS format. |
| :PLAY:S192F:PARTialts? | | Returns whether to output a stream file consisting of a 192-byte packet as a partial transport stream. |
| :PLAY:SOURce | RAM DISK The choices are RAM (system RAM) and DISK (hard disk). The default value is DISK. | Sets the source for stream output. |
| :PLAY:SOURce? | | Returns the current source setting for stream output. |
| :PLAY:SPIOutput | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON | Sets whether the signal output from the SPI In/Out connector is enabled. |
| :PLAY:SPIOutput? | | Returns the current output status of the SPI In/Out connector. |
| :PLAY:SSPosition:INITial:ENABle | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether to enable the initial start position setting of the selected stream to be looped. |
| :PLAY:SSPosition:INITial:ENABle? | | Returns the current state of the initial start position setting. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|--------------------------------------|---|--|
| :PLAY:SSPosition:INITIAL[:Position] | <numeric_value> | Sets the initial start position of the selected stream to be looped by the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file). The setting range depends on the :PLAY:SSPosition[:Position] command settings. The default value is 0. |
| :PLAY:SSPosition:INITIAL[:Position]? | | Returns the current initial start position of the selected stream by the number of packets. |
| :PLAY:SSPosition:INITIAL:TIME | <string> The default value is 00:00:00. | Sets the initial start position of the selected stream to be looped by time (hh:mm:ss). The setting range depends on the :PLAY:SSPosition:TIME command settings. |
| :PLAY:SSPosition:INITIAL:TIME? | | Returns the current initial start position of the selected stream by time. |
| :PLAY:SSPosition[:Position] | <numeric_value>, <numeric_value> You can set the positions from 0 to (available maximum value of the selected stream file). The default values for both are 0. | Sets the loop start and stop positions of the selected stream to be looped by the number of packets (the number of super frames for M-TMCC file, or the number of bytes for a Non-TS file). Specify the start position in the first argument and specify the stop position in the second argument. |
| :PLAY:SSPosition[:Position]? | | Returns the current loop start and stop position settings of the selected stream by the number of packets. |
| ::PLAY:SSPosition:INITIAL:TIME | <string>,<string> You can set the time from 0 to (available maximum value of the selected stream file). The default values for both are 00:00:00. | Sets the loop start and stop positions of the selected stream to be looped by time (hh:mm:ss). Specify the start time in the first argument and specify the stop time in the second argument. |
| :PLAY:SSPosition:TIME? | | Returns the current loop start and stop position settings of the selected stream by time (hh:mm:ss). |
| :PLAY:STANDARD? | The available responses are MPEG, ARIB, ATSC, DVB, NONTs, MTMCC, STMCC, or ISDBT. The MTMCC, STMCC, and ISDBT standards are checked only when the :SYSTEM:STANDARD command is set to ARIB | Returns the standard of the loaded stream file. |
| :PLAY:START | | Starts outputting the selected stream. There are no arguments. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|----------------------------|---|---|
| :PLAY:STOP | | Stops outputting the selected stream. There are no arguments. |
| :PLAY:SYNC | TSPacket SF NONTs For TSPacket, a single pulse signal is output at the start point of each packet. For SF, a single pulse is output at the start point of the SF appearing every 204x48x8 bytes. For NONTs, you can set the output period and data width of the PSYNC signal using the :PLAY:SYNC:PSYNC:INTERVAL command and :PLAY:SYNC:PSYNC:WIDTH commands. SF is available only when MTMCc is returned by the :PLAY:STANDARD? query. The default value is TSPacket. | Sets the format of the PSYNC signal output from the SPI In/Out connector. |
| :PLAY:SYNC? | | Returns the current format setting of the PSYNC signal. |
| :PLAY:SYNC:DVALID:WIDTH | NONE <numeric_value> You can set the width from 16 bytes to 255 bytes. The default value is 188. | Sets the status and data width of the DVALID signal when NONTs is selected in the :PLAY:SYNC command. When you select NONE, the DVALID signal is disabled. This value cannot be set more than the value set by the :PLAY:SYNC:PSYNC:INTERVAL command. |
| :PLAY:SYNC:DVALID:WIDTH? | | Returns the current status and data width of the DVALID signal. |
| :PLAY:SYNC:PSYNC:INTERVAL | NONE <numeric_value> You can set the interval from 16 bytes to 255 bytes. The default value is 188. | Sets the status and output period of the PSYNC signal when NONTs is selected in the :PLAY:SYNC command. When you select NONE, the PSYNC signal is disabled. This value must be set equal to or greater than the value in the :PLAY:SYNC:DVALID:WIDTH command. |
| :PLAY:SYNC:PSYNC:INTERVAL? | | Returns the current status and output period of the PSYNC signal. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|--------------------------|---|--|
| :PLAY:TIMEpacket:DEFine | , <numeric_value>, <numeric_value>, <numeric_value>, <numeric_value>, <numeric_value>, <numeric_value> The arguments are <year>, <month>, <date>, <hour>, <minute>, and <second>. You can set the values from 1900,3,1,0,0,0 to 2038,4,22,23,59,59 for the TDT and TOT and from 1980,1,6,0,0,0 to 2116,2,12,6,28,15 for the STT. The default values are the current date and time. | Sets the initial values of the TDT, TOT, or STT when USER is selected in the :PLAY:TIMEpacket:MODE command. |
| :PLAY:TIMEpacket:DEFine? | | Returns the current data and time settings of the TDT, TOT, or STT. |
| :PLAY:TIMEpacket:MODE | ORIGinaL OS USER The choices are ORIGinaL, SYSTem, and USER. For ORIGinaL, the original (default) value defined in the selected stream is used. For OS, the clock/calendar of the operating system is used. For USER, you can set any value in the :PLAY:TIMEpacket:DEFine command. The default value is ORIGinaL. | Selects the reference time used to set the initial value of the TDT, TOT, or STT when the :PLAY:UPDate command is set to ON. |
| :PLAY:TIMEpacket:MODE? | | Returns the current reference time selection used to set the initial value of the TDT, TOT, or STT. |
| :PLAY:UPDate | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to update parameters in a stream when looped. You can select which parameters are updated using the :PLAY:UPDate:ITEM commands. |
| :PLAY:UPDate? | | Returns the current update mode status. |
| :PLAY:UPDate:ITEM:CC | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to update continuity_counter values when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:CC? | | Returns whether to update continuity_counter values when the :PLAY:UPDate command is set to ON. |

Table 21: RTX100B and RTX130B common PLAY commands (cont.)

| Variable name | Valid values | Description |
|--------------------------------|--|--|
| :PLAY:UPDate:ITEM:NPT | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether to update NPT values when the :PLAY:UPDate command is set to ON. This command is only available when the :PLAY:UPDate:PCR command is set to ON and the :PLAY:UPDate:ITEM:PCR:MEthod command is set to SOFTware. |
| :PLAY:UPDate:ITEM:NPT? | | Returns whether to update NPT values when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:PCR | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to update PCR/PTS/DTS values when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:PCR? | | Returns whether to update PCR/PTS/DTS values when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:PCR:MEthod | HARDware SOFTware The choices are HARDware and SOFTware. The default value is HARDware. | Sets the method to update PCR/PTS/DTS values. |
| :PLAY:UPDate:ITEM:PCR:MEthod? | | Returns the update method for PCR/PTS/DTS values. |
| :PLAY:UPDate:ITEM:REEDso1omon | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to update Reed-Solomon symbols in an ISDB-T transport stream when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:REEDso1omon? | | Returns whether to update Reed-Solomon symbols in an ISDB-T transport stream when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:TIMEpacket | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets whether to update TDT/TOT/STT values when the :PLAY:UPDate command is set to ON. |
| :PLAY:UPDate:ITEM:TIMEpacket? | | Returns whether to update TDT/TOT/STT values when the :PLAY:UPDate command is set to ON. |

Table 22: RTX100B-only PLAY commands

| Variable | Valid values | |
|--------------------------------|--|---|
| :PLAY:ISDBT:FREQUENCY:CHANNEL | <numeric_value> You can set the channel from 13 to 62. The default value is 13. | Sets the center frequency (channel number) for the RF modulated output of the broadcast transport stream. |
| :PLAY:ISDTV:FREQUENCY:CHANNEL? | | Returns the current center frequency (channel number) setting for the ISDTV RF modulated output of the broadcast transport stream. |
| :PLAY:ISDBT:PLL:LOCKED? | | Returns the current lock status of the PLL for the ISDBT RF modulated output. When the PLL is locked to the clock source, 1 is returned. When the PLL is not locked to the clock source, 0 is returned. |
| :PLAY:ISDTV:PLL:LOCKED? | | Loads the specified stream file. <file_name> is a quoted string that defines the file name. |

Table 23: RTX130B- only PLAY commands

| variable name | Valid values | Description |
|--------------------------------|--|--|
| :PLAY:QAMVsb:INTERleave | <numeric_value>. The default value is 1. | Sets the operating mode and modulation parameters (I and J) of interleaving. You can set the value from 0 to 13. (See Table 24.) This command is only available when the :PLAY:QAMVsb:STANDARD command is set to J83B and :PLAY:QAMVsb:MODULATION command is set to M64Qam or M256Qam. |
| :PLAY:QAMVsb:INTERleave:LEVEL? | | Returns the current operating mode and modulation parameters of interleaving. |
| :PLAY:QAMVsb:MODULATION | M16Qam M64Qam M256Qam M8Vsb The available selections depend on the standard that is selected by the :PLAY:QAMVsb:STANDARD command. The default value is M8Vsb for the ATSC standard and M64Qam for the other standards. The choices are M16Qam (16QAM), M64Qam (64QAM), M256Qam (256QAM), and M8Vsb (8VSB). | Sets the modulation mode. |
| :PLAY:QAMVsb:MODULATION? | | Returns the current modulation mode setting. |

Table 23: RTX130B– only PLAY commands (cont.)

| variable name | Valid values | Description |
|-------------------------------|--|---|
| :PLAY:QAMVsb:OUTPut:MODE | RF IF44M IFR44M IF36M IFR36M The choices are RF (RF output), IF44M (44 MHz IF output), IFR44M (44 MHz IF output that the spectrum is reversed), IF36M (36 MHz IF output), and IFR36M (36 MHz IF output that the spectrum is reversed). The default value is RF. | Sets the signal output from the RF Out and IF Out connectors. |
| :PLAY:QAMVsb:OUTPut:MODE? | | Returns the current output status of the RF Out and IF Out Connectors. |
| :PLAY:QAMVsb:PORT:THROUGHout | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets the throughout mode; whether the signal applied to the ASI/SMPTE Input connector is output from the ASI/SMPTE Output connector when a stream is not output. This setting changes the :RECOrd:QAMVsb:PORT:THROUGHout command setting. |
| :PLAY:QAMVsb:PORT:THROUGHout? | | Returns the current throughout mode status when a stream is not output. |
| :PLAY:QAMVsb:PORT:TYPE | ASI S310M The choices are ASI and S310M (SMPTE310M). The default value is ASI. | Sets which signal to output from the ASI/SMPTE Output connector. |
| :PLAY:QAMVsb:PORT:TYPE? | | Returns the current output signal selection. |
| :PLAY:QAMVsb:RF:FREQuency | <numeric_value> You can set the value from 50.0 MHz to 860.0 MHz. The default value is 50.0 MHz. | Sets the center frequency of the RF output signal. |
| :PLAY:QAMVsb:RF:FREQuency? | | Returns the current center frequency of the RF output signal. |
| :PLAY:QAMVsb:RF:LEVEl | <numeric_value> You can set the value from 45 dBmV to 58 dBmV. The default value is 45 dBmV. | Sets the RF signal output level. |
| :PLAY:QAMVsb:RF:LEVEl? | | Returns the current RF signal output level. |
| :PLAY:QAMVsb:STANdard | J83A J83B J83C J83CJ ATSC The choices are J83A (DVB-C/ITU-T J.83 Annex A), J83B (ITU-T J.83 Annex B), J83C (ITU-T J.83 Annex C), J83CJ (ITU-T J.83 Annex C-JCTEC), and ATSC. The available selections depend on the installed options. | Sets the RF modulation standard. |
| :PLAY:QAMVsb:STANdard? | | Returns the current RF modulation standard. |

Table 23: RTX130B– only PLAY commands (cont.)

| variable name | Valid values | Description |
|--------------------------------|--|---|
| :PLAY:QAMVsb:STANDARD:CATALOG? | | Lists the RF modulation standards that are installed in the instrument. |
| :PLAY:QAMVsb:SYMBOL:RATE | <numeric_value> You can set the value from 1.0 to 6.956532 Msps for J83A and from 1.0 to 5.274 for J83C. The default value is 1.0 Msps. | Sets the symbol rate when the :PLAY:QAMVsb:STANDARD command is set to J83A or J83C. |
| :PLAY:QAMVsb:SYMBOL:RATE? | | Returns the current symbol rate setting. |

Table 24: RTX130B operating mode and modulation parameters

| Setting value | Operating mode and modulation parameters | | |
|---------------|--|-------|------|
| 0 | Level 1: | I=128 | J=1 |
| 1 | Level 2: | I=128 | J=1 |
| 2 | Level 2: | I=64 | J=2 |
| 3 | Level 2: | I=32 | J=4 |
| 4 | Level 2: | I=16 | J=8 |
| 5 | Level 2: | I=8 | J=16 |
| 6 | Level 2: | I=128 | J=1 |
| 7 | Level 2: | I=128 | J=2 |
| 8 | Level 2: | I=128 | J=3 |
| 9 | Level 2: | I=128 | J=4 |
| 10 | Level 2: | I=128 | J=5 |
| 11 | Level 2: | I=128 | J=6 |
| 12 | Level 2: | I=128 | J=7 |
| 13 | Level 2: | I=128 | J=8 |

RECORD Commands

Use these commands to set parameters related to the data record. These include input interface, record size, and trigger position.

| Variable name | Valid values | Description |
|-----------------------|--|--|
| :RECORD:ACQUIRE:START | | Starts input stream acquisition. When two or more record commands are sent to the instrument successively, the instrument stops stream acquisition and then starts stream acquisition for each command. Therefore, when many commands are sent to the instrument, it takes a long time to complete all settings. If you send the :RECORD:ACQUIRE:STOP command before sending record commands and send the :RECORD:ACQUIRE:START command after sending record commands, you can shorten the setting time. |
| :RECORD:ACQUIRE:STOP | | Stops input stream acquisition. Refer to the :RECORD:ACQUIRE:START command description on how to use this command. |
| :RECORD:PROGRESS? | | Returns the current percentage of progress of the record. |
| :RECORD:CLOCK:RATE? | | Returns the clock rate of the input stream in MHz. |
| :RECORD:EXTERNAL | RISE FALL OFF The choices are RISE, FALL, and OFF. When you select RISE, the input stream record is started at the rising edge of the applied trigger signal. When you select FALL, the input stream record is started at the falling edge of the applied trigger signal. The default value is OFF. | Sets whether to start input stream record using a trigger signal applied to the Trig In/Out connector. |
| :RECORD:EXTERNAL? | | Returns whether to start input stream record using a trigger signal applied to the Trig In/Out connector. |
| :RECORD:SOURCE | SPI ASI UNIVERSAL I1394I S310M STANDARD OPTION The choices are SPI, ASI, UNIVERSAL, I1394I (IEEE1394), S310M (SMPTE310M), STANDARD (same as SPI), and OPTION (optional interface currently installed). The default value is SPI. | Sets the interface used to capture a stream data. |

| Variable name | Valid values | Description |
|----------------------------|---|---|
| :RECO:SOURCE? | | Returns the current interface used to capture a stream data. |
| :RECO:STORE:FILE | <file_name> | Specifies the file name used when the input stream is saved. |
| :RECO:STANDARD? | The available responses are MPEG, ARIB, ATSC, DVB, NONTs, MTMCc, STMCc, or ISDBT. The MTMCc, STMCc, and ISDBT standard are checked only when the :SYSTEM:STANDARD command is set to ARIB. When the RECO:I1394I PARTIALts command is set to ON, the response is P_TS. | Returns the current standard used to display the input stream. |
| :RECO:START | | Starts recording the input stream. |
| :RECO:STOP | | Stops recording the input stream. |
| :RECO:STORE:FILE? | | Returns the current file name used when the input stream is saved. |
| :RECO:STORE:MODE | NEWfile OVERwrite The choices are NEWfile and OVERwrite. For NEWfile, a new file is created whenever you save a stream file. The file name is the name specified by the :RECO:STORE:FILE command + # (1, 2, 3, 4...). For OVERwrite, the existing file is overwritten by the new file with the name specified in the :RECO:STORE:FILE command. The default value is OVERwrite. | Sets the save mode when the input stream is saved. |
| :RECO:STORE:MODE? | | Returns the current save mode setting when the input stream is saved. |
| :RECO:TARGET:IGNOREDVALID | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether the instrument ignores the DVALID signal from the selected interface when a stream data is acquired. When you select ON, the instrument ignores the DVALID signal, and the stream data is acquired according to the internal clock signal. |
| :RECO:TARGET:IGNOREDVALID? | | Returns whether the instrument ignores the DVALID signal from the selected interface when a stream data is acquired. |

| Variable name | Valid values | Description |
|--|--|---|
| :RECORD:TARGET:SIZE | <numeric_value> You can set the file size from 1 to free space of the system RAM or hard disk. The default value is 50 MB. | Sets the file size to record the input stream in MB. This setting changes the :RECORD:TARGET:TIME command setting. |
| :RECORD:TARGET:SIZE? | | Returns the current file size setting to record the input stream. |
| :RECORD:TARGET:TIME | <string> The minimum value of the setting range depends on the clock rate of the input stream. The maximum value of the setting range depends on the free space of the RAM or hard disk, or the clock rate of the input stream. The default value is 00:00:00. | Sets the recording time (hh:mm:ss) to record the input stream. This setting changes the :RECORD:TARGET:SIZE command setting. |
| :RECORD:TARGET:TIME? | | Returns the current recording time (hh:mm:ss) to record the input stream. |
| :RECORD:TARGET:TRIGGER:CONTINUOUS | ON OFF You can use 1 or 0 instead of ON or OFF. | Turns Continuous Recording on or off. When you select ON, you can record multiple stream files continuously on the hard disk. The default value is OFF. |
| :RECORD:TARGET:TRIGGER:CONTINUOUS? | | Returns the current Continuous Recording state. |
| :RECORD:TARGET:TRIGGER:CONTINUOUS:LIMIT | <numeric_value> You can set the value from 2 to 32767. The default value is 32767. | Sets the number of files to stop continuous recording. |
| :RECORD:TARGET:TRIGGER:CONTINUOUS:LIMIT? | | Returns the number of files to stop Continuous Recording. |
| :RECORD:TARGET:TRIGGER:POSITION | <numeric_value> You can set the trigger position from 0% to 100%. The default value is 0%. | Sets the trigger position used to record the input stream. |
| :RECORD:TARGET:TRIGGER:POSITION? | | Returns the current trigger position setting. |
| :RECORD:TARGET:TYPE | RAM DISK The choices are RAM and DISK (hard disk). The default value is DISK. | Sets the record target used to record the input stream. |
| :RECORD:TARGET:TYPE? | | Returns the current record target used to record the input stream. |

| Variable name | Valid values | Description |
|---------------------------------|--|--|
| :RECORD:TARGET:TRIGGER:UNLIMIT | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Sets whether to record the input stream to the full free space in the hard disk or RAM. |
| :RECORD:TARGET:TRIGGER:UNLIMIT? | | Returns whether to record the input stream to the full free space in the hard disk or RAM. |

Table 25: RTX100B-only RECORD commands

| Variable name | Valid values | Description |
|----------------------------------|--|---|
| :RECORD:ISDBT:CLOCK:SOURCE | ASI EXT10M EXT27M EXT1fft The choices are ASI, EXT10M (an external 10 MHz signal), EXT27M (an external 27 MHz signal), and EXT1fft (an external signal equivalent to an IFFT sample clock rate). The default value is ASI. | Sets the reference clock used for the RF modulated output of the broadcast transport stream applied to the ASI In connector. This setting changes the :PLAY:CLOCK:SOURCE command setting. |
| :RECORD:ISDBT:CLOCK:SOURCE? | | Returns the current reference clock used for the RF modulated output of the broadcast transport stream applied to the ASI In connector. |
| :RECORD:ISDBT:FREQUENCY:CHANNEL | <numeric_value> You can set from channel 13 to channel 62. The default value is 13. | Sets the center frequency (channel number) for the RF modulated output of the broadcast transport stream applied to the ASI In connector. This setting changes the :PLAY:ISDBT:FREQUENCY:CHANNEL command setting. |
| :RECORD:ISDBT:FREQUENCY:CHANNEL? | | Returns the current center frequency (channel number) setting for the ISDBT RF modulated output of the broadcast transport stream that is applied to the ASI In connector. |
| :RECORD:ISDBT:PLL:LOCKED? | | Returns the current lock status of the PLL for the ISDBT RF modulated output. When the PLL is locked to the clock source, 1 is returned. When the PLL is not locked to the clock source, 0 is returned. |
| :RECORD:SOURCE? | | Returns the current interface used to capture a stream data. |

Table 25: RTX100B-only RECORD commands (cont.)

| Variable name | Valid values | Description |
|-----------------------------------|---|---|
| :RECORD:ISDBT:CLOCK:SOURCE | ASI EXT10M EXT27M EXTIfft The choices are ASI, EXT10M (an external 10 MHz signal), EXT27M (an external 27 MHz signal), and EXTIfft (an external signal equivalent to an IFFT sample clock rate). The default value is ASI. | Sets the reference clock used for the ISDBT RF modulated output of the broadcast transport stream applied to the ASI In connector. This command changes the :PLAY:CLOCK:SOURCE setting. |
| :RECORD:ISDBT:CLOCK:SOURCE? | | Returns the current reference clock used for the ISDBT RF modulated output of the broadcast transport stream applied to the ASI In connector. |
| :RECORD:ISDBT:FREQUENCY:CHANNEL | <numeric_value> You can set from channel 13 to channel 62. The default value is 13. | Sets the center frequency (channel number) for the RF modulated output of the broadcast transport stream applied to the ASI In connector. This setting changes the :PLAY:ISDBT:FREQUENCY:CHANNEL command setting. |
| :RECORD:ISDBT:FREQUENCY:CHANNEL?? | | Returns the current center frequency (channel number) setting for the RF modulated output of the broadcast transport stream that is applied to the ASI In connector. |
| :RECORD:ISDBT:PLL:LOCKED? | | Returns the current lock status of the PLL for the RF modulated output. When the PLL is locked to the clock source, 1 is returned. When the PLL is not locked to the clock source, 0 is returned. |
| :RECORD:PACKET? | The available responses are 188, 204, 208, or NONTs. | Returns the packet size of the input stream. When the :RECORD:I1394I:PARTIALTS command is set to ON, the response is 192. |

Table 26: RTX130B-only RECORD commands

| Variable name | Valid values | Description |
|---------------------------------|---|---|
| :RECORD:QAMVsb:CLOCK:SOURCE | ASYNC EXT10M EXT27M The choices are ASYNc (the internal clock, which is not synchronized with an ASI signal or SMPTE310M signal), EXT10M (an external 10 MHz signal), and EXT27M (an external 27 MHz signal). The default value is ASYNc. | Sets the reference signal used for the RF modulated output of the transport stream applied to the ASI/SMPTE Input connector. This setting changes the :PLAY:CLOCK:SOURCE command setting. |
| :RECORD:QAMVsb:CLOCK:SOURCE? | | Returns the current reference signal used for the RF modulated output of the transport stream applied to the ASI/SMPTE Input connector. |
| :RECORD:QAMVsb:PORT:THROUGHOUT | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is ON. | Sets the throughout mode; whether the signal applied to the ASI/SMPTE Input connector is output from the ASI/SMPTE Output connector. This setting changes the :PLAY:QAMVsb:PORT:THROUGHOUT command setting. |
| :RECORD:QAMVsb:PORT:THROUGHOUT? | | Returns the current throughout mode status. |
| :RECORD:QAMVsb:PORT:TYPE | ASI S310M The choices are ASI and S310M (SMPTE310M). The default value is ASI. | Sets the input signal expected from the ASI/SMPTE Input connector. |
| :RECORD:QAMVsb:PORT:TYPE? | | Returns the current input signal selection. |

SYSTEM Commands

Use these commands to set or query the system related functions.

| Variable name | Valid values | Description |
|-----------------------------------|---|--|
| :SYSTEM:COMMUNICATE:SOCKET:PORT | <numeric_value> You can set the value from 1024 to 65535. When you change the value, the current network connection is disconnected. | Sets the port number needed to remotely control the instrument over an Ethernet network. |
| :SYSTEM:COMMUNICATE:SOCKET:PORT? | | Returns the current port number setting. |
| :SYSTEM:COMMUNICATE:SOCKET:RXTERM | CR LF The choices are CR (carriage return) and LF (linefeed). The default value is LF. | Sets the terminator used when the generator receives commands from a controller. |

| Variable name | Valid values | Description |
|------------------------------------|---|---|
| :SYSTem:COMMUnicate:SOCKET:RXTERM? | | Returns the terminator used when the RTX100B Series receives commands from a controller. |
| :SYSTem:COMMUnicate:SOCKET:TXTERM | CR LF CRLF LFC The choices are CR (carriage return), LF (linefeed), CRLF, and LFCR. The default value is CRLF. | Sets the terminator used when the generator sends information to a controller. |
| :SYSTem:COMMUnicate:SOCKET:TXTERM? | | Returns the terminator used when the generator sends information to a controller. |
| :SYSTem:ERRor[:NEXT]? | | Returns an error message from the error/event queue. The response format is as follows: <div style="text-align: center;"><error_code>,"<error_message>"</div> Another section of this manual describes the error messages. (See page 112, <i>Error Messages and Codes</i> .) |
| :SYSTem:KLOCK[:STATe] | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Locks or unlocks the front-panel buttons and mouse operation. |
| :SYSTem:KLOCK[:STATe]? | | Returns the current status of the lock function. |
| :SYSTem:MODE | PLAY RECOrd The choices are PLAY and RECOrd. The default value is PLAY. | Sets the operation mode of the instrument. |
| :SYSTem:MODE? | | Returns the current operation mode of the instrument. |
| :SYSTem:OPTions? | | Returns the option number, hardware version, and code version of the installed interface card. |
| :SYSTem:PRESet | | Resets the instrument to the factory default settings. |
| :SYSTem:STANDard | MPEG ARIB ATSC DVB The choices are MPEG, ARIB, ATSC, and DVB. The default value is ARIB. | Sets the standard used to display the input stream. |

| Variable name | Valid values | Description |
|-------------------|--|--|
| :SYSTem:STANdard? | | Returns the current standard used to display the input stream. |
| :SYSTem:STATus? | The available responses are: 0: the instrument stops any operations 1: the instrument is outputting a data 2: the instrument is acquiring a data 3: the instrument is recording a data | Returns the current operation status of the instrument. |

Optional Commands

This subsection describes the commands that are used to control the optional interface cards. These are available only when the appropriate interface card is installed into the generator.

| Variable name | Valid values | Description |
|---------------------------------------|---|--|
| IP Interface: General Settings | | |
| :PLAY:IPAVaIlable? | | Returns whether the IP interface is available. |
| :PLAY:IPENable | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables the IP interface when set to ON. |
| :PLAY:IPENable? | | Returns whether the IP interface is enabled. |
| :PLAY:OPCArdenbl | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables the optional card when set to ON. |
| :PLAY:OPCArdenbl? | | Returns whether the optional card is enabled. |
| :PLAY:IP:PARAMeters:DEFAUlt | | Resets the configuration settings to the default values. |
| IP Configuration Settings | | |
| :PLAY:IP:PARAMeters:IPLAyver | IPVFOUR IPVSIX The choices are IPVFOUR and IPVSIX. The default value is IPVFOUR. | Selects the IP player version for the payout. |
| :PLAY:IP:PARAMeters:IPLAyver? | | Returns the IP player version of the payout. |
| :PLAY:IP:PARAMeters:DVCName? | | Returns the current device name for the IP payout. |

| Variable name | Valid values | Description |
|-----------------------------------|--|---|
| :PLAY:IP:PARAMeters:DVIndex | <numeric_value> You can set the index value from 0 to N-1 where N is the number of available network interface cards. | Sets the index value of the network interface card. |
| :PLAY:IP:PARAMeters:DVIndex? | | Returns the current index value of the selected network interface card. |
| :PLAY:IP:PARAMeters:TRANsmode | UNICAST MULTICAST BROADCAST The choices are UNICAST, MULTICAST, and BROADCAST. The default value is MULTICAST. | Sets the transmission mode of the protocol. |
| :PLAY:IP:PARAMeters:TRANsmode? | | Returns the current transmission mode of the protocol. |
| :PLAY:IP:PARAMeters:PACKetszmode | IPPKSZMD TSPKCTMD The choices are IPPKSZMD and TSPKCTMD. The default value is TSPKCTMD. | Sets the packet size mode for the IP payout. |
| :PLAY:IP:PARAMeters:PACKetszmode? | | Returns the current packet size mode. |
| :PLAY:IP:PARAMeters:IPPKtsize | <numeric_value> You can set the IPv4 packet size from 55-1500 bytes (TS fragmentation) and from 55-16128 bytes (both TS and IP fragmentation). The default value is 1370 bytes. | Sets the size of the IP packet. |
| :PLAY:IP:PARAMeters:IPPKtsize? | | Returns the current size of the IP packet. |
| :PLAY:IP:PARAMeters:TSPKtcount | <numeric_value> You can set the TS packets from 1-7 (TS Fragmentation) and from 1-85 (both TS and IP fragmentation). The default value is 7. | Sets the number of TS packets that needs to be embedded into an IP packet. |
| :PLAY:IP:PARAMeters:TSPKtcount? | | Returns the current number of TS packets that is embedded into an IP packet. |
| :PLAY:IP:PARAMeters:TSFRagment | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Allows fragmentation of TS packets. When set to ON, the TS packets will be split across the IP packets. |
| :PLAY:IP:PARAMeters:TSFRagment? | | Returns whether to allow TS fragmentation across IP packets. |

| Variable name | Valid values | Description |
|---|--|--|
| :PLAY:IP:PARAMeters:IPFRagment | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Allows fragmentation of IP packets. When set to ON, the IP packets will be fragmented else they will retain the same size. |
| :PLAY:IP:PARAMeters:IPFRagment? | | Returns whether to allow IP fragmentation during IP ployout. |
| :PLAY:IP:PARAMeters:BITRate | <numeric_value> You can set the values from 0.250 Mbps to 250.000 Mbps. | Sets the IP bit rate value for the ployout. |
| :PLAY:IP:PARAMeters:BITRate? | | Returns the current value of the IP bit rate. |
| Protocol Settings | | |
| :PLAY:IP:PARAMeters:PRTocol :SETTings:MODE | UDP RTP The choices are UDP and RTP. The default mode is RTP. | Sets the protocol mode for IP ployout. |
| :PLAY:IP:PARAMeters:PRTocol :SETTings:MODE? | | Returns the current protocol mode for IP ployout. |
| :PLAY:IP:PARAMeters:PRTocol :SETTings:SRCIpadd | <IP address of the instrument> | Sets the source IP address for the IPv4 version of the ployout. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:SRCIpadd? | | Returns the current value of the source IP address for the IPv4 version. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:DSTIpadd | <IP address of the destination> The default value is 239.1.1.1. | Sets the destination IP address for the IPv4 version of the ployout. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:DSTIpadd? | | Returns the current value of the destination IP address for the IPv4 version. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:SRC6ipadd | <IP address of the instrument> | Sets the source IP address for the IPv6 version of the ployout. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:SRC6ipadd? | | Returns the current value of the source IP address for the IPv6 version. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:DST6ipadd | <IP address of the destination> | Sets the destination IP address for the IPv6 version of the ployout. |
| :PLAY:IP:PARAMeters:PRTocol: SETTings:DST6ipadd? | | Returns the current value of the destination IP address for the IPv6 version. |

| Variable name | Valid values | Description |
|---|---|--|
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:SRCPort | <numeric_value> You can set the source port value from 0 to 65535. The default value is 16384. | Sets the source port for the IP ployout. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:SRCPort? | | Returns the current source port value. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:DSTPort | <numeric_value> You can set the destination port value from 0 to 65535. The default value is 16384. | Sets the destination port value. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:DSTPort? | | Returns the current destination port value. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:VLAN | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF | Enables the VLAN settings. When set to on, displays the VLAN parameters in the Advanced settings screen. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:VLAN? | | Returns whether the VLAN settings is enabled. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:VLNid | <numeric_value> You can set the values from 0 to 4095. The default value is 1. | Sets the VLAN identification number to allow the identification of 4096 VLANs that is basically used by the 802.1Q standard. |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:VLNid? | | Returns the current VLAN identification number. |
| Protocol Settings-Advanced Settings | | |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:ETHErnet:DESTmac | <string> The choices are BYTE and PACKet. For BYTE, valid data is output using a burst transmission mode. For PACKet, valid data is output in each transport stream packet. The default value is PACKet. | Sets the output format of the ASI signal. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:ETHErnet:DESTmac? | | Returns the current destination MAC address of the Ethernet layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:ETHErnet:SRCEmac | <string> | Sets the source MAC address of the Ethernet layer, where <string> is of the format "xx:xx:xx:xx:xx:xx". |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:ETHErnet:SRCEmac? | | Returns the current source MAC address of the Ethernet layer. |

| Variable name | Valid values | Description |
|--|---|--|
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet: PRTOco1 | <numeric_value> You can set the values from 0 to 65535. The default value is 2048 which corresponds to IP. | Sets the value of the protocol field in the Ethernet layer. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:PRTOco1? | | Returns the current value of the protocol field in the Ethernet layer. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:TPID | <string> You can set the values from 0 to FFFF. The default value is 0X8100. | Sets the TPID value of the VLAN in the Ethernet layer. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:TPID? | | Returns the current TPID value of the VLAN. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet: VLAN:PRIOrity | <numeric_value> You can set the values from 0 to 7. The default value is 5. | Sets the priority level of the VLAN in the Ethernet layer. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet: VLAN:PRIOrity? | | Returns the current priority value of the VLAN. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:CFI | ON OFF The default value is OFF. | Sets the canonical format indicator for the VLAN. When set to on (1), non-canonical MAC is selected. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:CFI? | | Returns the current status of the CFI. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:VID | <numeric_value> The VID values can range from 0 to 4095. The default value is 1. | Sets the identification for the VLAN. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:ETHERnet:VLAN:VID? | | Returns the current VID value of the VLAN. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:IP:VERSIon? | | Returns the IP version. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:IP:TOS | <numeric_value> You can set the type of service value from 0 to 255. The default value is 0. | Sets the type of service that indicates the desired parameters. The parameters are delay, throughput, and reliability. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:IP:TOS? | | Returns the current type of service. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:IP:PRTOco1 | <numeric_value> You can set the values from 0 to 255. The default value is 17 which corresponds to UDP. | Sets the value of the protocol field in the IP layer. |
| :PLAY:IP:PARAMeters:PRTOco1 :CUSTomize:HEADers:IP:PRTOco1? | | Returns the current value of the protocol field. |

| Variable name | Valid values | Description |
|---|---|--|
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:SRCIpadd | <string> | Sets the source IP address for the IP layer, where <string> is of the format "xx:xx:xx:xx:xx:xx". |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:SRCIpadd? | | Returns the current source IP address for the IP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:DSTIpadd | <string> | Sets the destination IP address for the IP layer, where <string> is of the format "xx:xx:xx:xx:xx:xx". |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:DSTIpadd? | | Returns the current destination IP address for the IP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:HEADerlngth? | | Returns the current length of the IP header. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:TOTAlLngth? | | Returns the current total length of the IP packet. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:TTL | <numeric_value> You can set the value from 0 to 255. The default value is 5. | Sets the value of Time to Live in the IP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:IP:TTL? | | Returns the current value of Time to Live in the IP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:UDP:SRCPort | <numeric_value> You can set the value from 0 to 65535. The default value is 16384. | Sets the source port value of the UDP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:UDP:SRCPort? | | Returns the current source port value of the UDP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:UDP:DSTPort | <numeric_value> You can set the value from 0 to 65535. The default value is 16384. | Sets the destination port value of the UDP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:UDP:DSTPort? | | Returns the current destination port value of the UDP layer. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:UDP:LENGth? | | Returns the current length of the UDP packets. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:RTP:VERSIon? | | Returns the current version of the RTP. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:RTP:SQNCnumber | <numeric_value> You can set the value from 0 to 65535. | Sets the first value of the sequence number field in RTP header. |
| :PLAY:IP:PARAMeters:PRTOcol CUSTomize:HEADers:RTP:SQNCnumber? | | Returns the first value of the sequence number field. |
| :PLAY:IP:PARAMeters:PRTOcol :CUSTomize:HEADers:RTP:SSRC | <numeric_value> You can set the value from 0 to 65535. | Sets the SSRC value for the RTP layer. |

| Variable name | Valid values | Description |
|---|---|--|
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:RTP:SSRC? | | Returns the SSRC value for the RTP layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:RTP:PYLoadtype | <numeric_value> You can set the value from 0 to 255. The default value is 33. | Sets the value of the payload type for the RTP layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:RTP:PYLoadtype? | | Returns the current value of the payload type for the RTP layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:VERSion? | | Returns the version number of the IPv6 protocol. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:TRFCCls | <numeric_value> You can set the value from 0 to 255. The default value is 0. | Sets the value of the traffic class for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:TRFCCls? | | Returns the current value of the traffic class for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:FLOWlbl | <numeric_value> | Sets the value of the flow label for the IPv6 layer. The default value is 0. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:FLOWlbl? | | Returns the current value of the flow label for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:PYLDlen? | | Returns the current value of the payload length. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:NXTHdr | <numeric_value> You can set the values from 0 to 255. The default value is 17. | Sets the value of the next header for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:NXTHdr? | | Returns the current value of the next header for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:HOPLimit | <numeric_value> You can set the value from 0 to 255. The default value is 12. | Sets the value of the hop limit for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:HOPLimit? | | Returns the current value of the hop limit for the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:SRCIpadd | <numeric_value> | Sets the source address of the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:SRCIpadd? | | Returns the source address of the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:DSTIpadd | <numeric_value> | Sets the destination address of the IPv6 layer. |
| :PLAY:IP:PARAMeters:PRTocol :CUSTomize:HEADers:IPV6:DSTIpadd? | | Returns the destination address of the IPv6 layer. |

| Variable name | Valid values | Description |
|---|---|--|
| Protocol Settings-Stream Replication Settings | | |
| :PLAY:IP:PARAMeters:REPLiCation:COUNT | <numeric_value> You can set the value from 0 to 65535. The default value is 0. | Sets the number of replications for a stream. |
| :PLAY:IP:PARAMeters:REPLiCation:COUNT? | | Returns the number of stream replications. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:SRCMac | <string> | Sets the increment value for the source MAC address, where <string> is of the format "xx:xx:xx:xx:xx:xx" and xx is hexadecimal. The increments for these addresses can be specified for each node. The value of the next node will be rolled over when the value of the incremented node reaches the maximum. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:SRCMac? | | Returns the current increment value of the source MAC address. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:DSTMMac | <string> | Sets the increment value for the destination MAC address, where <string> is of the format "xx:xx:xx:xx:xx:xx" and xx is hexadecimal. The increments for these addresses can be specified for each node. The value of the next node will be rolled over when the value of the incremented node reaches the maximum. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:DSTMMac? | | Returns the current increment value of the destination MAC address. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:EPROtoCol | <numeric_value> You can set the value from 0 to 65535. | Sets the increment value for the Ethernet protocol. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:EPROtoCol? | | Returns the current increment value of the Ethernet protocol. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:VLANid? | | Returns the current identification value of the VLAN. |
| :PLAY:IP:PARAMeters:REPLiCation:INCRement:ETHErnet:VLANid | <numeric_value> | Sets the identification of the VLAN. The values can range from 0 to 4095. |

| Variable name | Valid values | Description |
|---|---|--|
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:TOS | <numeric_value> You can set the value from 0 to 255. | Sets the increment value for the type of service of the IP protocol. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:TOS? | | Returns the current increment value of the type of service. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:TTL | <numeric_value> You can set the value from 0 to 255. | Sets the increment value for time to live of the IP protocol. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:TTL? | | Returns the current increment value of the time to live attribute. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:SRCIpadd | <string> | Sets the increment value for the source IP address, where <string> is of the format "xx:xx:xx:xx:xx:xx" and xx is hexadecimal. The increments for IP addresses can be specified for each node. The value of the next node will be rolled over when the value of the incremented node reaches the maximum. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:SRCIpadd? | | Returns the current increment value of the source IP address. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:DSTIpadd | <string> | Sets the increment value for the destination IP address, where <string> is of the format "xx:xx:xx:xx:xx:xx" and xx is hexadecimal. The increments for IP addresses can be specified for each node. The value of the next node will be rolled over when the value of the incremented node reaches the maximum. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:DSTIpadd? | | Returns the current increment value of destination IP address. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:IPROtocol | <numeric_value> | Sets the increment value for the IP protocol. You can set the value from 0 to 255. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IP:IPROtocol? | | Returns the current increment value of the IP protocol. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:UDP:SRCPort | <numeric_value> You can set the value from 0 to 65535. | Sets the increment value for the source port of the UDP layer. |

| Variable name | Valid values | Description |
|--|---|--|
| :PLAY:IP:PARAMeters:REPLication :INCRement:UDP:SRCPort? | | Returns the current increment value of the source port. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:UDP:DSTPort | <numeric_value> You can set the value from 0 to 65535. | Sets the increment value for the destination port of the UDP layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:UDP:DSTPort? | | Returns the current increment value of the destination port. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:RTP:PAYLoad | <numeric_value> You can set the value from 0 to 127. | Sets the increment value for the payload of the RTP layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:RTP:PAYLoad? | | Returns the current increment value of the payload. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:RTP:SSRC | <numeric_value> You can set the value from 0 to 65535. | Sets the increment value for the SSRC of the RTP layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:RTP:SSRC? | | Returns the current increment value of the SSRC. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:TRFCCls | You can set the value from 0 to 255. The default value is 0. | Sets the increment value for the traffic class of the IPv6 layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:TRFCCls? | | Returns the current increment value of the traffic class. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:FLOWlbl | The default value is 0. | Sets the increment value for the flow label of the IPv6 layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:FLOWlbl? | | Returns the current increment value of the flow label. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:NXTHdr | You can set the value from 0 to 255. The default value is 17. | Sets the increment value for the next header of the IPv6 layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:NXTHdr? | | Returns the current increment value of the next header. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:HOPLimit | You can set the value from 0 to 255. The default value is 12. | Sets the increment value for the hop limit of the IPv6 layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:HOPLimit? | | Returns the current increment value of the hop limit. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:SRCIpadd | | Sets the increment value for the source IPv6 address of the IPv6 layer. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:SRCIpadd? | | Returns the current increment value of the source IPv6 address. |
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:DSTIpadd | The default value is ff0e::1. | Sets the increment value for the destination IPv6 address of the IPv6 layer. |

| Variable name | Valid values | Description |
|--|---|---|
| :PLAY:IP:PARAMeters:REPLication :INCRement:IPV6:DSTIpadd? | | Returns the current increment value of the destination IPv6 address. |
| Error Insertion | | |
| :PLAY:IP:ERRIns:ENBLed | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables error insertion in real time when the value is set to ON. |
| :PLAY:IP:ERRIns:ENBLed? | | Returns whether the error insertion is enabled. |
| :PLAY:IP:ERRIns:PARAMeters:PLENbled | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables packet loss when the value is set to ON. |
| :PLAY:IP:ERRIns:PARAMeters:PLENbled? | | Returns whether the packet loss is enabled. |
| :PLAY:IP:ERRIns:PARAMeters:PLVAlue | <numeric_value> You can set the value from 0 to 65535. | Sets the number of packets that will be dropped. |
| :PLAY:IP:ERRIns:PARAMeters:PLVAlue? | | Returns the current number of dropped packets. |
| :PLAY:IP:ERRIns:PARAMeters:PLRAnge | <numeric_value> You can set the value from 0 to 65535. | Sets the packet loss range. |
| :PLAY:IP:ERRIns:PARAMeters:PLRAnge? | | Returns the current packet loss range. |
| :PLAY:IP:ERRIns:PARAMeters:SQEENbled | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables sequence error when the value is set to ON. |
| :PLAY:IP:ERRIns:PARAMeters:SQEENbled? | | Returns whether the sequence error is enabled. |
| :PLAY:IP:ERRIns:PARAMeters:SQEVAlue | <numeric_value> You can set the value from 0 to 65535. | Sets the frequency value at which the packets will be reordered. |
| :PLAY:IP:ERRIns:PARAMeters:SQEVAlue? | | Returns the current frequency value at which the packets are reordered. |
| :PLAY:IP:ERRIns:PARAMeters:SQERAnge | <numeric_value> You can set the value from 0 to 65535. | Sets the sequence error range. |
| :PLAY:IP:ERRIns:PARAMeters:SQERAnge? | | Returns the current sequence error range value. |
| :PLAY:IP:ERRIns:PARAMeters:SQEDistance | <numeric_value> You can set the value from 0 to 65535. | Sets the distance value after which you want the reordering to happen. |

| Variable name | Valid values | Description |
|---|---|---|
| :PLAY:IP:ERRIns:PARAMeters:SQEDistance? | | Returns the current distance value. |
| :PLAY:IP:ERRIns:PARAMeters:CSEEnabled | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables checksum error when the value is set to ON. |
| :PLAY:IP:ERRIns:PARAMeters:CSEEnabled? | | Returns whether the checksum error has been enabled. |
| :PLAY:IP:ERRIns:PARAMeters:CSEType | IP UDP | Sets the checksum error type. The choices are IP and UDP layer. |
| :PLAY:IP:ERRIns:PARAMeters:CSEType? | | Returns the current value of the checksum error type. |
| :PLAY:IP:ERRIns:PARAMeters:CSEValue | <numeric_value> You can set the value from 0 to 65535. | Sets the frequency value at which the checksum error will be inserted. |
| :PLAY:IP:ERRIns:PARAMeters:CSEValue? | | Returns the current frequency value at which the checksum errors are inserted. |
| :PLAY:IP:ERRIns:PARAMeters:CSERange | <numeric_value> You can set the value from 0 to 65535. | Sets the checksum error range. |
| :PLAY:IP:ERRIns:PARAMeters:CSERange? | | Returns the current checksum error range value. |
| :PLAY:IP:ERRIns:PARAMeters:RANDOMizerr | ON OFF You can use 1 or 0 instead of ON or OFF. | Sets the error insertion type. When set to ON, the random type is enabled. |
| :PLAY:IP:ERRIns:PARAMeters:RANDOMizerr? | | Returns the current value of the randomizer. |
| Error Generation | | |
| :PLAY:IP:ERRGen:GPKTlos | | Generates packet loss by dropping one packet during the IP playout. |
| :PLAY:IP:ERRGen:GSQNerr | | Generates sequence error by re-sequencing a packet with another packet within a 100packet boundary. |
| :PLAY:IP:ERRGen:GCHIper | | Generates a checksum error in the IP layer. |
| :PLAY:IP:ERRGen:GCHUdperr | | Generates a checksum error in the UDP layer. |
| Statistics | | |
| :PLAY:IP:STATistics:IP:BITRate? | | Returns the IP bit rate value for the play. |

| Variable name | Valid values | Description |
|--|--------------|--|
| :PLAY:IP:STATistics:IP:BRVArIation? | | Returns the percentage of IP bit rate variation from the set bit rate. |
| :PLAY:IP:STATistics:IP:BITRate:MIN? | | Returns the minimum IP bit rate value for the play. |
| :PLAY:IP:STATistics:IP:BITRate:MINVArIation? | | Returns the minimum variation value from the set bit rate value. |
| PLAY:IP:STATistics:IP:BITRate:MAX? | | Returns the maximum IP bit rate value for the play. |
| :PLAY:IP:STATistics:IP:BITRate:MAXVArIation? | | Returns the maximum IP bit rate variation value from the set bit rate value. |
| :PLAY:IP:STATistics:IP:BITRate:AVG? | | Returns the average bit rate value for the play. |
| :PLAY:IP:STATistics:IP:BITRate:AVGVArIation? | | Returns the average variation value from the set bit rate value. |
| :PLAY:IP:STATistics:IP:JITer? | | Returns the jitter value for the play. |
| :PLAY:IP:STATistics:IP:JITter:MIN? | | Returns the minimum jitter value for the play. |
| :PLAY:IP:STATistics:IP:JITter:MAX? | | Returns the maximum jitter value for the play. |
| :PLAY:IP:STATistics:IP:JITter:AVG? | | Returns the average jitter value for the play. |
| :PLAY:IP:STATistics:IP:PKTSize? | | Returns the IP packet size for the play. |
| :PLAY:IP:STATistics:IP:PKTCount? | | Returns the IP packet count for the play. |
| :PLAY:IP:STATistics:IP:BYTRansmited? | | Returns the number of IP bytes transmitted during the play. |
| :PLAY:IP:STATistics:TS:BITRate? | | Returns the TS bit rate value for the play. |
| :PLAY:IP:STATistics:TS:BRVArIation? | | Returns the TS bit rate variation value from the set bit rate value. |
| :PLAY:IP:STATistics:TS:BITRate:MIN? | | Returns the minimum TS bit rate value for the play. |
| :PLAY:IP:STATistics:TS:BITRate:MINVArIation? | | Returns the minimum TS bit rate variation value from the set bit rate value. |
| :PLAY:IP:STATistics:TS:BITRate:MAX? | | Returns the maximum TS bit rate value for the play. |
| :PLAY:IP:STATistics:TS:BITRate:MAXVArIation? | | Returns the maximum TS bit rate variation value from the set bit rate value. |

| Variable name | Valid values | Description |
|--|--------------|--|
| :PLAY:IP:STATistics:TS:BITRate:AVG? | | Returns the average TS bit rate value for the play. |
| :PLAY:IP:STATistics:TS:BITRate:AVGVariation? | | Returns the average TS bit rate variation value from the set bit rate value. |
| :PLAY:IP:STATistics:TS:PKTSize? | | Returns the TS packet size for the play. |
| :PLAY:IP:STATistics:TS:PKTCount? | | Returns the TS packet count for the play. |
| :PLAY:IP:STATistics:ERRORs:PKTDropped? | | Returns the number of packets dropped during the play. |
| :PLAY:IP:STATistics:ERRORs:SQNErrs? | | Returns the number of sequence errors inserted during the play. |
| :PLAY:IP:STATistics:ERRORs:CSIPerrrs? | | Returns the number of IP checksum errors inserted during the play. |
| :PLAY:IP:STATistics:ERRORs:CSUDPerrrs? | | Returns the number of UDP checksum errors inserted during the play. |
| :PLAY:IP:STATistics:REPLication:IP:BITRate? | | Returns the total IP bit rate of all the streams. |
| :PLAY:IP:STATistics:REPLication:IP:PKTCount? | | Returns the total IP packet count of all the streams. |
| :PLAY:IP:STATistics:REPLication:IP:BYTTransmitted? | | Returns the total bytes transmitted in all the streams. |
| :PLAY:IP:STATistics:REPLication:TS:BITRate? | | Returns the total TS bit rate of all the streams. |
| :PLAY:IP:STATistics:REPLication:TS:PKTCount? | | Returns the total count of TS packets of all the streams. |
| :PLAY:IP:STATistics:REPLication:ERRORs:PKTDropped? | | Returns the total packets dropped of all the streams. |
| :PLAY:IP:STATistics:REPLication:ERRORs:SQNErrs? | | Returns the total number of sequential errors of all the streams. |
| :PLAY:IP:STATistics:REPLication:ERRORs:CSIPerrrs? | | Returns the total number of IP checksum errors of all the streams. |
| :PLAY:IP:STATistics:REPLication:ERRORs:CSUDPerrrs? | | Returns the total number of UDP checksum errors of all the streams. |

| Variable name | Valid values | Description |
|---------------------------------|---|--|
| Other Settings | | |
| :PLAY:IP:OTHSttngs:PROCpriority | NORMAL ABOVE_NORMAL HIGHEST REAL_TIME The choices are NORMAL, ABOVE_NORMAL, HIGHEST, and REAL_TIME. The default value is REAL_TIME. | Sets the process priority for the player. |
| :PLAY:IP:OTHSttngs:THRPriority | IDLE BELOW_NORMAL NORMAL ABOVE_NORMAL HIGHEST REAL_TIME The choices are IDLE, BELOW_NORMAL, NORMAL, ABOVE_NORMAL, HIGHEST, and REAL_TIME. The default value is NORMAL. | Sets the thread priority for the player. |
| :PLAY:IP:OTHSttngs:THRPriority? | | Returns the current thread priority value of the play. |
| Parametric Settings | | |
| :PLAY:IP:PRMetric:BSTENbled | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables the burst mode when the value is set to ON. |
| :PLAY:IP:PRMetric:BSTENbled? | | Returns whether the burst mode has been enabled. |
| :PLAY:IP:PRMetric:BSTType | BURST_PERIOD BURST_SIZE The choices are BURST_PERIOD and BURST_SIZE. The default is BURST_PERIOD. | Sets the burst mode for the IP payout. |
| :PLAY:IP:PRMetric:BSTType? | | Returns the current value of the burst mode. |
| :PLAY:IP:PRMetric:BPERiod | <numeric_value> The value can range from 1 ms to 1000 ms. | Sets the burst period for the IP payout. |
| :PLAY:IP:PRMetric:BPERiod? | | Returns the current value of the burst period. |
| :PLAY:IP:PRMetric:BSIZE | <numeric_value> | Sets the burst size for the IP payout. The values can range from 1 to 65535. |
| :PLAY:IP:PRMetric:BSIZE? | | Returns the current value of the burst size. |
| :PLAY:IP:PRMetric:JITENbled | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables jitter when the value is set to ON. |
| :PLAY:IP:PRMetric:JITENbled? | | Returns whether the jitter has been enabled. |

| Variable name | Valid values | Description |
|---------------------------------------|--|---|
| :PLAY:IP:PRMetric:LOWJitmd | ON OFF You can use 1 or 0 instead of ON or OFF. | Enables the low jitter mode when set to ON. |
| :PLAY:IP:PRMetric:LOWJitmd? | | Returns whether the low jitter mode has been enabled. |
| :PLAY:IP:PRMetric:JITType | LAPLACE GAUSSIAN SINE FIXED The options are LAPLACE, GAUSSIAN, SINE, and FIXED. The default value is FIXED. | Sets the jitter type for IP payout. |
| :PLAY:IP:PRMetric:JITType? | | Returns the current jitter type for IP payout. |
| :PLAY:IP:PRMetric:JITPeriod | <numeric_value> You can set numeric value in micro seconds for FIXED jitter type and percentage value for all the other jitter types. | Sets the jitter period value for IP payout. |
| :PLAY:IP:ERRIns:PARAMeters:JITPeriod? | | Returns the current value of jitter period for IP payout. |
| Timestamped TS Payout Settings | | |
| :PLAY:IP:TTSttns:TTSEnabled | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Enables the timestamped TS (TTS) settings for the payout when set to ON. |
| :PLAY:IP:TTSttns:TTSEnabled? | | Returns whether the TTS settings has been enabled for the payout. |
| :PLAY:IP:TTSttns:PRSRvts | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is to OFF. | Enables the preservation of the file that stores the TTS settings. |
| :PLAY:IP:TTSttns:PRSRvts? | | Returns whether the preserve TTS settings option is enabled for the player. |
| :PLAY:IP:TTSttns:TTSJitter:JTREnable | ON OFF You can use 1 or 0 instead of ON or OFF. The default value is OFF. | Enables the TTS jitter settings for the payout. |
| :PLAY:IP:TTSttns:TTSJitter:JTREnable? | | Returns whether the TTS jitter settings is enabled for the payout. |

| Variable name | Valid values | Description |
|--|--|---|
| :PLAY:IP:TTSttngs:TTSJitter:PATtern | SINE SQUARE TRIANGLE PULSE SAW RANDOM OFFSET The various options are SINE, SQUARE, TRIANGLE, PULSE, SAW, RANDOM, and OFFSET. The default option is SINE. | Sets the TTS jitter pattern for the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:PATtern? | | Returns the TTS jitter pattern of the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:PERIOD | <numeric_value> You cannot set the period for random and offset jitter patterns. The default value is 0. | Sets the TTS jitter period for the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:PERIOD? | | Returns the TTS jitter period of the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:AMPLitude | <numeric_value> You can set the amplitude for all the jitter patterns. The default value is 0. | Sets the TTS jitter amplitude for the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:AMPLitude? | | Returns the TTS jitter amplitude of the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:PLSwidth | <numeric_value> You can set the width of only pulse pattern. The default value is 0. | Sets the TTS jitter pulse width for the payout. |
| :PLAY:IP:TTSttngs:TTSJitter:PLSwidth? | | Returns the TTS jitter pulse width of the payout. |

Default Settings

The following table lists the default settings of the remote commands.

These default settings can be set by using the *RST command, except for the :SYSTEM:COMMUNICATE:SOCKET command settings.

| Variable name | Default settings |
|-------------------------------------|-----------------------|
| DISPLAY commands | |
| :DISPlay:VIEW:FORMat | HEXadecima1 |
| PLAY commands | |
| :PLAY:AUTOp1ay | OFF (0) |
| :PLAY:CLOCK:DEFau1t:RATE | 5.6610E+001 |
| :PLAY:CLOCKDEFau1t:RATE:RATI0 | 629,300 |
| :PLAY:CLOCK:ESRatefixed | OFF (0) |
| :PLAY:CLOCKISDBT:CONVert | ON (1) |
| :PLAY:CLOCK:RATE | 5.6610E+001 |
| :PLAY:CLOCK:RATE:RATIO | 0, 0 |
| :PLAY:CLOCK:SOURce | INTerna1 |
| :PLAY:EXTTtrigger:BNC | INPUT |
| :PLAY:EXTTtrigger:OUTPut:DELAy | 0 |
| :PLAY:EXTTtrigger:OUTPut:SELEct | C27M |
| :PLAY:LOOP | ON (1) |
| :PLAY:LOOP:ISDBT:FRAMe | ON (1) |
| :PLAY:PACKet | 188 |
| :PLAY:PCR:INACcuracy | NONE |
| :PLAY:PCR:INITia1 | 0, 0 |
| :PLAY:SOURce | DISK |
| :PLAY:SPIOutput | ON (1) |
| :PLAY:SSP0sition:INITia1:ENABle | ON (1) |
| :PLAY:SSP0sition:INITia1[:P0Sition] | 0 |
| :PLAY:SSP0sition:INITia1:TIME | 00:00:00 |
| :PLAY:SSP0sition[:P0Sition] | 0, 0 |
| :PLAY:SSP0sition:TIME | 00:00:00, 00:00:00 |
| :PLAY:SYNC | TSPacket |
| :PLAY:SYNC:DVALid:WIDTh | NONE |
| :PLAY:SYNC:PSYNc:INTerva1 | NONE |
| :PLAY:TIMEpacket:DEFine | Current data and time |
| :PLAY:TIMEpacket:MODE | ORIGina1 |
| :PLAY:UPDAte | ON (1) |
| :PLAY:ITEM:CC | ON (1) |

| Variable name | Default settings |
|--|-------------------------|
| :PLAY:ITEM:NPT | OFF (1) |
| :PLAY:ITEM:PCR | ON (1) |
| :PLAY:ITEM:PCR:METHOD | HARDware |
| :PLAY:ITEM:REEDSolomon | ON (1) |
| :PLAY:ITEM:TIMEpacket | ON (1) |
| PLAY Commands Specific to RTX130B Generator | |
| :PLAY:QAMVsb:INTERleave | 1 |
| :PLAY:QAMVsb:MODulation | M64Qam (M8Vsb for ATSC) |
| :PLAY:QAMVsb:OUTPut:MODE | RF |
| :PLAY:QAMVsb:PORT:THROUGHout | ON (1) |
| :PLAY:QAMVsb:PORT:TYPE | ASI |
| :PLAY:QAMVsb:RF:FREquency | 50.0 MHz |
| :PLAY:QAMVsb:RF:LEVEl | 45 dBm |
| :PLAY:QAMVsb:SYMBol:RATE | 1.0 |
| PLAY Commands Specific to RTX100B Generator | |
| :PLAY:ISDBT:FREquency:CHANne1 | |
| RECORD commands | |
| :RECOrd:EXTErnal | OFF (0) |
| :RECOrd:ISDBT:CLOCK:SOURce | ASI |
| :RECOrd:ISDBT:FREquency:CHANne1 | 13 |
| :RECOrd:SOURce | SPI |
| :RECOrd:STORe:MODE | OVERwrite |
| :RECOrd:TARGet:IGNOredvalId | OFF (0) |
| :RECOrd:TARGet:SIZE | 50 [MB] |
| :RECOrd:TARGet:TIME | 00:00:00 |
| :RECOrd:TARGet:TRIGger:CONTInuous | OFF (0) |
| :RECOrd:TARGet:TRIGger:CONTInuous:LIMIt | 32767 |
| :RECOrd:TARGet:TRIGger:POSItion | 0 [%] |
| :RECOrd:TARGet:TYPE | DISK |
| :RECOrd:TARGet:UNLIMIt | OFF (0) |
| SYSTEM commands | |
| :SYSTem:COMMUnicate:SOCKET:PORT | 49152 |
| :SYSTem:COMMUnicate:SOCKET:RXTERM | LF |
| :SYSTem:COMMUnicate:SOCKET:TXTERM | CRLF |
| :SYSTem:KLOCK[:STATE] | OFF (0) |
| :SYSTem:MODE | PLAY |
| :SYSTem:STANDard | ARIB |
| :SYSTem:MODE | PLAY |
| :SYSTem:STANDard | ARIB |

Default Settings

| Variable name | Default settings |
|--|---|
| Optional commands | |
| IP Interface: General Settings | |
| :PLAY:IPENable | OFF |
| :PLAY:OPCardenbl | ON (1) |
| :PLAY:IP:PARAMeters:DEFAuIt | No parameters |
| PLAY:IP:PARAMeters: DVINdex | 0 |
| :PLAY:IP:PARAMeters:TRANsmode | MULTICAST |
| :PLAY:IP:PARAMeters:PACKetszmode | TSPKTZMODE |
| :PLAY:IP:PARAMeters:IPPktsize | 1370 |
| :PLAY:IP:PARAMeters:TSPktcount | 7 |
| :PLAY:IP:PARAMeters:TSFRagment | OFF (0) |
| :PLAY:IP:PARAMeters:IPFRagment | OFF (0) |
| :PLAY:IP:PARAMeters:BITRate | 28.107902 Mbps |
| IP Interface: Protocol Settings | |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:MODE | RTP |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:SRCIpadd | Automatically detected from the active Network Interface Card (NIC interface) |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:DSTIpadd | 239.1.1.1 |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:SRCPort | 16384 |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:DSTPort | 16384 |
| :PLAY:IP:PARAMeters:PRTOcol: SETTings:VLAN | OFF |
| IP Interface: Protocol Settings: Advanced Screen Settings | |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:DESTmac | 01:00:5E:01:01:01 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:SRCEmac | Automatically detected from the active Network Interface Card (NIC interface) |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:PROTOcol | 2048 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:VLAN:TPID | 0x8100 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:VLAN:PRIOrity | 5 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:VLAN:CFI | OFF (0) |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:ETHERnet:VLAN:VID | 1 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:IP:TOS | 0 |
| :PLAY:IP:PARAMeters:PRTOcol: CUSTomize:HEADers:IP:PROTOcol | 17 |

| Variable name | Default settings |
|--|---|
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IP:SRCIpadd | Automatically detected from the active Network Interface Card (NIC interface) |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IP:DSTIpadd | 239.1.1.1 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IP:TTL | 5 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:UDP:SRCPort | 16384 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:UDP:DSTPort | 16384 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:RTP:SQNCnumber | Randomly generated |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:RTP:SSRC | Randomly generated |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:RTP:PYLOadtype | 33 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:VERSion | 6 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:TRFCCls | 0 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:FLOWlbl | 0 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:PYLDlen | 1336 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:NXTHdr | 17 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:HOPLimit | 12 |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:SRCIpadd | Automatically detected from the active Network Interface Card (NIC interface) |
| :PLAY:IP:PARAMeters:PRTocol: CUSTomize:HEADers:IPV6:DSTIpadd | ff0e::1 |
| IP Interface: Protocol Settings: Stream Replication Settings | |
| :PLAY:IP:PARAMeters:REPLication:COUNT | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCRemet:ETHERnet:SRCMac | 00:00:00:00:00:00 |
| :PLAY:IP:PARAMeters:REPLication: INCRement:ETHERnet:DSTMac | 00:00:00:00:00:00 |
| :PLAY:IP:PARAMeters:REPLication: INCRement:ETHERnet:EPRotocol | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCRement:ETHERnet:VLANid | 0 |
| :RECORD:I1394I:PARTIALts | ON (1) |

Default Settings

| | |
|--|-----------------|
| :PLAY:IP:PARAMeters:REPLication: INCREment:IP:TOS | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IP:TTL | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IP:SRCIpadd | 0.0.0.0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IP:DSTIpadd | 0.0.0.0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IP:IPROtocol | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:UDP:SRCPort | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:UDP:DSTPort | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:RTP:PAYLoad | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:RTP:SSRC | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:TRFCcls | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:FLOWlbl | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:NXTHdr | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:HOPLimit | 0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:SRCIpadd | 0:0:0:0:0:0:0:0 |
| :PLAY:IP:PARAMeters:REPLication: INCREment:IPV6:DSTIpadd | 0:0:0:0:0:0:0:0 |
| IP>Error Insertion | |
| :PLAY:IP:ERRIns:ENBLed | OFF (0) |
| :PLAY:IP:ERRIns:PARAMeters:PLENbled | OFF (0) |
| :PLAY:IP:ERRIns:PARAMeters:PLVAlue | 1 |
| :PLAY:IP:ERRIns:PARAMeters:PLRAnge | 1000 |
| :PLAY:IP:ERRIns:PARAMeters:SQEEabled | OFF (0) |
| :PLAY:IP:ERRIns:PARAMeters:SQEVAlue | 1 |
| :PLAY:IP:ERRIns:PARAMeters:SQERAnge | 1000 |
| :PLAY:IP:ERRIns:PARAMeters:SQEDistance | 1 |
| :PLAY:IP:ERRIns:PARAMeters:CSEabled | OFF (0) |
| :PLAY:IP:ERRIns:PARAMeters:CSEType | IP |
| :PLAY:IP:ERRIns:PARAMeters:CSEVAlue | 1 |
| :PLAY:IP:ERRIns:PARAMeters:CSERange | 1000 |
| :PLAY:IP:ERRIns:PARAMeters:RANDOmizerr | ON (1) |
| IP>Error Generation | |
| :PLAY:IP:ERRGen:GPKTlOs | No parameters |
| :PLAY:IP:ERRGen:GSQNerr | No parameters |
| :PLAY:IP:ERRGen:GCHIper | No parameters |
| :PLAY:IP:ERRGen:GCHUdperr | No parameters |
| IP:Parametric Settings | |
| :PLAY:IP:OTHStngs:PROCpriority | ABOVE_NORMAL |
| :PLAY:IP:OTHStngs:THRPriority | REAL_TIME |
| :PLAY:IP:PRMEtric:BSTEnabled | OFF (0) |
| :PLAY:IP:PRMEtric:BSTType | BURST PERIOD |
| :PLAY:IP:PRMEtric:BPERiod | 2 MS |

| | |
|--|------------------|
| :PLAY:IP:PRMetric:BSIZE | 10 |
| :PLAY:IP:PRMetric:JITEnabled | OFF (0) |
| :PLAY:IP:PRMetric:LOWJitmd | OFF (0) |
| :PLAY:IP:PRMetric:JITType | FIXED |
| :PLAY:IP:PRMetric:JITPeriod | 1.000000 μ s |
| IP:Timestamped TS Playout Settings | |
| :PLAY:IP:TTSSttngs:TTSEnabled | OFF (0) |
| :PLAY:IP:TTSSttngs:PRSRvts | OFF (0) |
| :PLAY:IP:TTSSttngs:TTSJitter:JTREnable | OFF (0) |
| :PLAY:IP:TTSSttngs:TTSJitter:PATtern | SINE |
| :PLAY:IP:TTSSttngs:TTSJitter:PERIOD | 0 |
| :PLAY:IP:TTSSttngs:TTSJitter:AMPLitude | 0 |
| :PLAY:IP:TTSSttngs:TTSJitter:PLSWidth | 0 |

Error Messages and Codes

This section lists the error messages and codes.

Error messages and codes can be obtained by using the query :SYSTem:ERRor[:NEXT]?. These are returned in the following format:

```
<error_code>,"<error_message>"
```

Command Errors

Command errors are returned when there is a syntax error in the command.

Table 27: Command errors

| Error code | Error message |
|------------|------------------------------|
| -100 | command error |
| -101 | invalid character |
| -102 | syntax error |
| -103 | invalid separator |
| -104 | data type error |
| -105 | GET not allowed |
| -108 | parameter not allowed |
| -109 | missing parameter |
| -110 | command header error |
| -111 | header separator error |
| -112 | program mnemonic too long |
| -113 | undefined header |
| -114 | header suffix out of range |
| -120 | numeric data error |
| -121 | invalid character in numeric |
| -123 | exponent too large |
| -124 | too many digits |
| -128 | numeric data not allowed |
| -130 | suffix error |
| -131 | invalid suffix |
| -134 | suffix too long |
| -138 | suffix not allowed |
| -140 | character data error |
| -141 | invalid character data |
| -144 | character data too long |

Table 27: Command errors (cont.)

| Error code | Error message |
|-------------------|----------------------------------|
| -148 | character data not allowed |
| -150 | string data error |
| -151 | invalid string data |
| -158 | string data not allowed |
| -160 | block data error |
| -161 | invalid block data |
| -168 | block data not allowed |
| -170 | command expression error |
| -171 | invalid expression |
| -178 | expression data not allowed |
| -180 | macro error |
| -181 | invalid outside macro definition |
| -183 | invalid inside macro definition |
| -184 | macro parameter error |

Execution Errors

These error codes are returned when an error is detected while a command is being executed.

Table 28: Execution errors

| Error code | Error message |
|-------------------|--------------------------|
| -200 | execution error |
| -201 | invalid while in local |
| -202 | settings lost due to RTL |
| -210 | trigger error |
| -211 | trigger ignored |
| -212 | arm ignored |
| -213 | init ignored |
| -214 | trigger deadlock |
| -215 | arm deadlock |
| -220 | parameter error |
| -221 | settings conflict |
| -222 | data out of range |
| -223 | too much data |
| -224 | illegal parameter value |
| -225 | out of memory |

Table 28: Execution errors (cont.)

| Error code | Error message |
|-------------------|---------------------------------|
| -226 | lists not same length |
| -230 | data corrupt or stale |
| -231 | data questionable |
| -240 | hardware error |
| -241 | hardware missing |
| -250 | mass storage error |
| -251 | missing mass storage |
| -252 | missing media |
| -253 | corrupt media |
| -254 | media full |
| -255 | directory full |
| -256 | FileName not found |
| -257 | FileName error |
| -258 | media protected |
| -260 | execution expression error |
| -261 | math error in expression |
| -270 | execution macro error |
| -271 | macro syntax error |
| -272 | macro execution error |
| -273 | illegal macro label |
| -274 | execution macro parameter error |
| -275 | macro definition too long |
| -276 | macro recursion error |
| -277 | macro redefinition not allowed |
| -278 | macro header not found |
| -280 | program error |
| -281 | cannot create program |
| -282 | illegal program name |
| -283 | illegal variable name |
| -284 | program currently running |
| -285 | program syntax error |
| -286 | program runtime error |

Device Specific Errors

These error codes are returned when an internal instrument error is detected. This type of error may indicate a hardware problem.

Table 29: Device specific errors

| Error code | Error message |
|------------|---------------------------|
| -300 | device specific error |
| -310 | system error |
| -311 | memory error |
| -312 | PUD memory lost |
| -313 | calibration memory lost |
| -314 | save/recall memory lost |
| -315 | configuration memory lost |
| -330 | self test failed |
| -350 | queue overflow |

Query Errors

These error codes are returned in response to an unanswered query.

Table 30: Query errors

| Error code | Error message |
|------------|---|
| -400 | query error |
| -410 | query interrupted |
| -420 | query untermiated |
| -430 | query deadlocked |
| -440 | query untermiated after indefinite period |

Network Interface Specifications

The generator supports remote control using the Ethernet interface. This section describes the generator network interface specifications.

The TCP/IP is used as the network protocol. The commands can be sent from the application program through the socket interface of the TCP/IP. Also, the query can be received through the interface.

Keep the following in mind while controlling the generator remotely with the Ethernet interface.

- The LF (linefeed) or CR (carriage return) code is needed at the end of a message as a terminator. Use the Communication dialog box or the :SYSTem:COMMunicate:SOCKet:RXTERM command to set which terminator is used. (See Figure 19.)
- The IEEE 488.1 standard (for instance Device Clear or Service Request) is not supported.
- The Message Exchange Control Protocol in the IEEE 488.2 is not supported. However, the common commands such as *ESE and the event handling features are supported.
- The Indefinite format (the block start at #0) in the <ARBITRARY BLOCK PROGRAM DATA> of the IEEE 488.2 is not supported.

Checking Remote Command Operation

To check remote command operation of the generator, perform the following steps:

1. Connect the generator to your PC using an Ethernet cable.
2. Click the Windows **Start** button and select **Run** from the start menu. The Run dialog box appears as shown. (See Figure 28.)

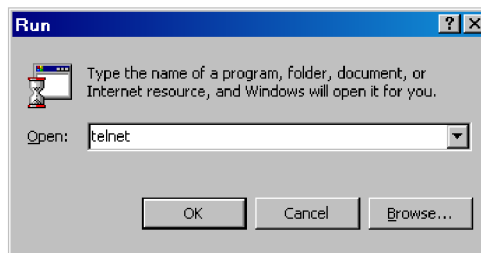


Figure 28: Run dialog box

3. In the Open text box, type `telnet` and then click **OK**. The Telnet window appears. (See Figure 29.)

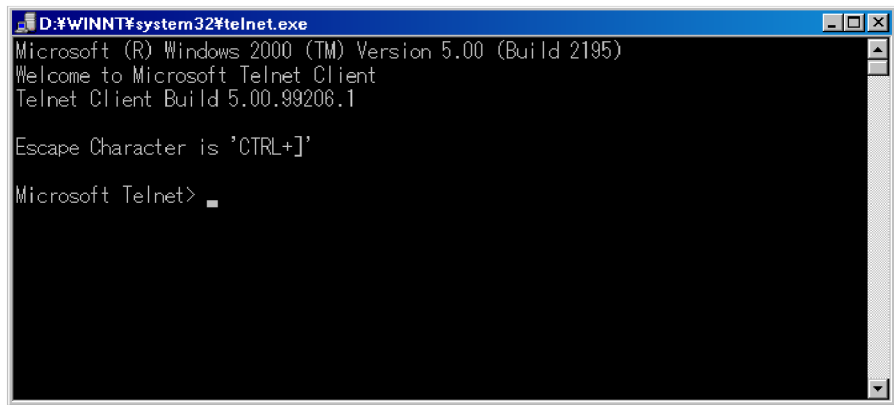


Figure 29: Telnet window

4. At the command line prompt, type `set local_echo` and press the **Enter** key. This sets the local echo mode to on.
5. At the command line prompt, type `open <host name> <port number>` and press the **Enter** key.

Where `<host name>` is a computer name of the generator to be connected and `<port number>` is the port number set in the Communication dialog box (default value: 49152).

6. At the command line prompt, type `*IDN?` and press the **Enter** key.
7. Check that the following ID information of the generator appears:
`TEKTRONIX, RTX100B Series, Vx.xx, Hxx, Cxx`

Appendix A: Recommended Settings for MPEG Player in IP Mode

This appendix lists the recommended settings that are required to improve the performance of the MPEG player in IP mode.

NOTE. For optimum performance of the MPEG player, you can run the batch file *Optimum_Performance_Settings.bat*. To reset the NIC settings to default, you can run the batch file *Reset_NIC_Settings.bat*. The batch files are available at *C:\Program Files\Tektronix\MpegPlayer*.

Settings for Intel(R) Pro/1000 MT Drivers

Perform the following steps to set the options for Intel/Pro 1000 MT drivers in Category/Classic view:

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** to set the following options in the dialog box:
 - Adaptive Inter-Frame Spacing: Disabled
 - Flow Control: Off
 - Interrupt Moderation Rate: Off
 - Jumbo Frames: 16128
 - Link Speed and Duplex: Auto-negotiate 1000Mbps
 - Receive Descriptors: 2048

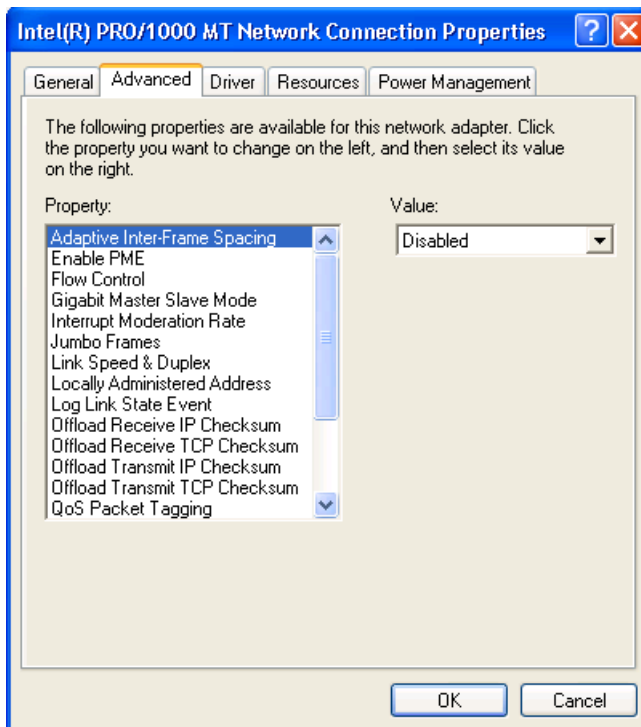


Figure 30: Intel(R) PRO/1000 MT Network Connection Properties

Settings for Playout Performance

Perform the following steps to set the options 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. Stop the service and select **Disabled** from the Startup Mode list to disable the startup.

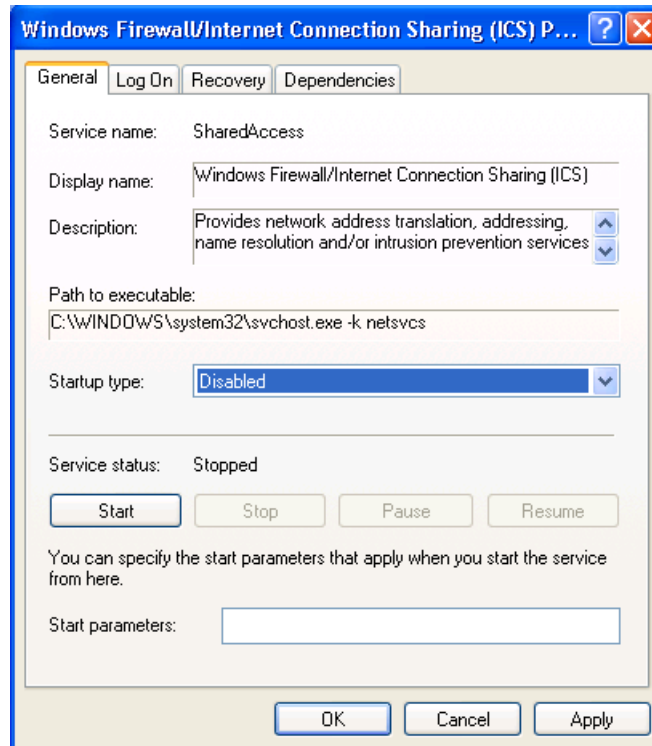


Figure 31: Windows Firewall/Internet Connection Sharing (ICS)

3. Select **Automatic Updates** to open the dialog box. Stop the service and select **Disabled** from the Startup Mode list to disable the startup.

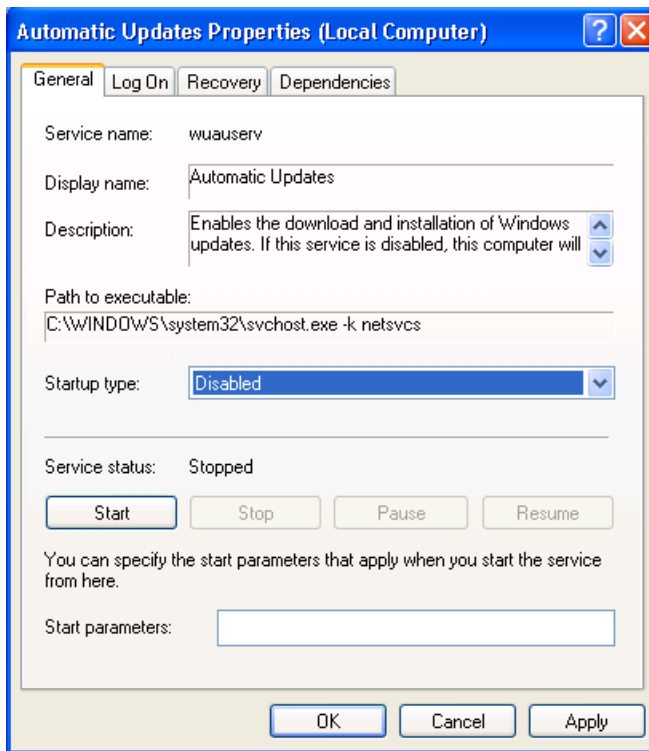


Figure 32: Automatic Updates Properties

4. Select **IIS admin** to open the dialog box. Stop the service and select **Disabled** from the Startup Mode list to disable the startup.

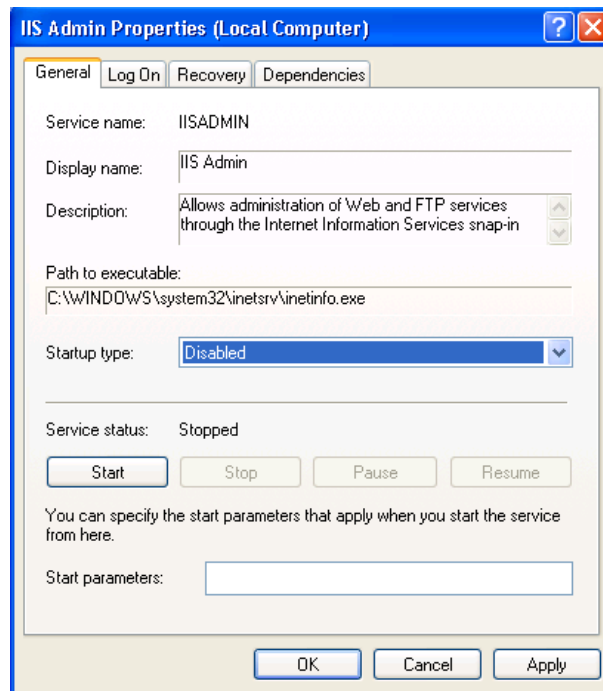


Figure 33: IIS Admin Properties

Settings for Java Update

Perform the following steps to disable the automatic Java updates:

1. Click **Control Panel > Java**.
2. Select the **Update** tab and clear the **Check for Updates Automatically** check box.

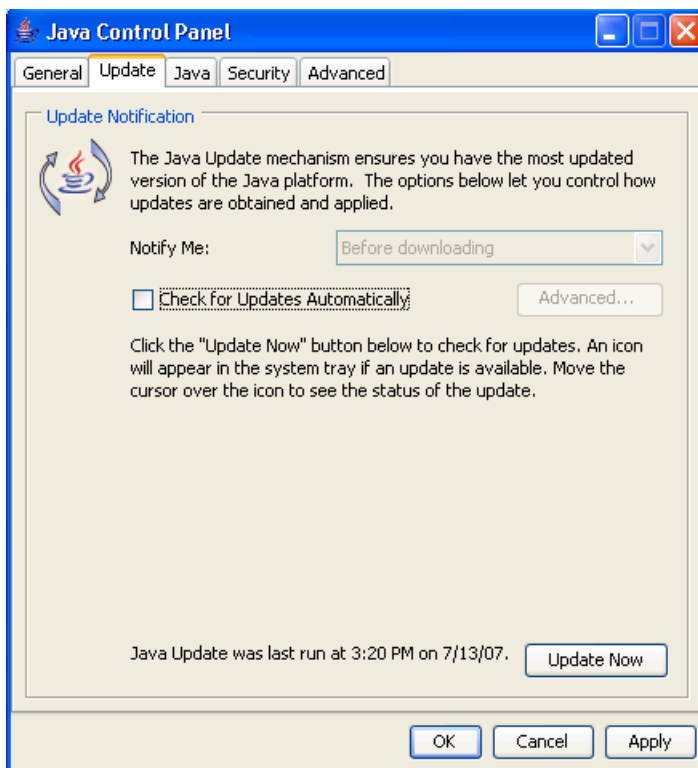


Figure 34: Java Control Panel

A Java warning message is displayed. Click **Never Check** to not check the updates.

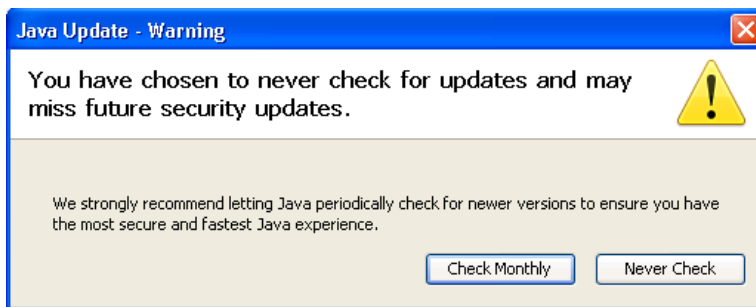


Figure 35: Java Update-Warning

Settings for VLAN

Perform the following steps to set the options for 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).

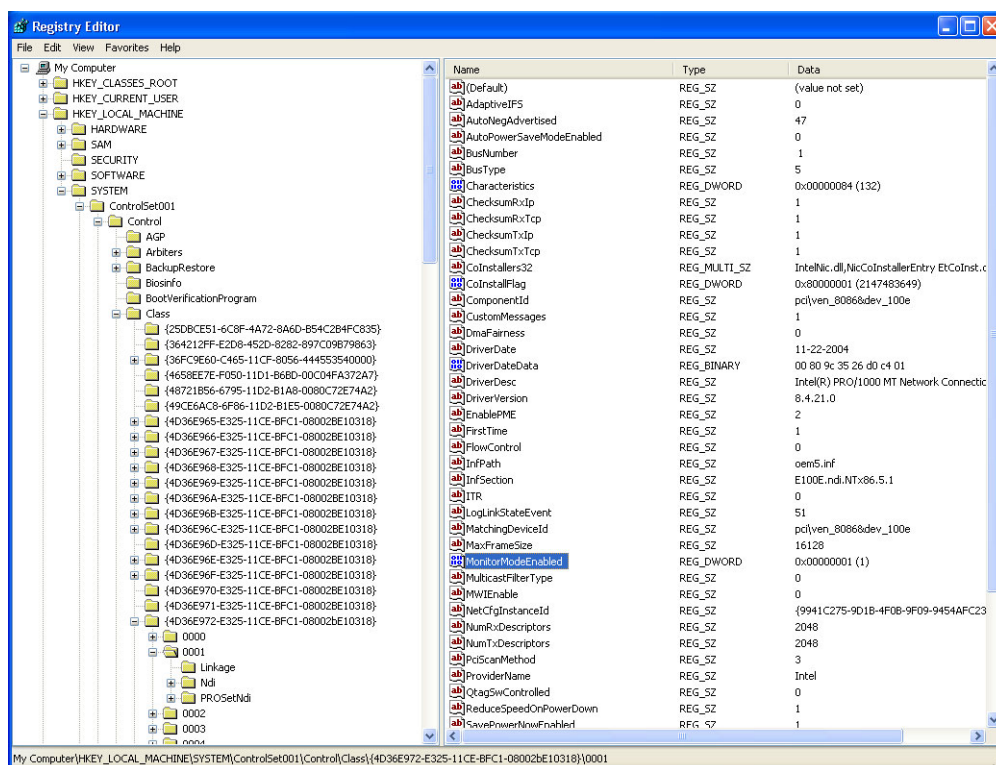


Figure 36: Registry Editor

3. Right-click to select **New > DWORD Value** or select **Edit > DWORD Value** option. Rename the option to **MonitorModeEnabled**.

4. Double-click the **DWORD Value** to open the Edit DWORD Value dialog box. Set the Value data to 1 and press **OK**.

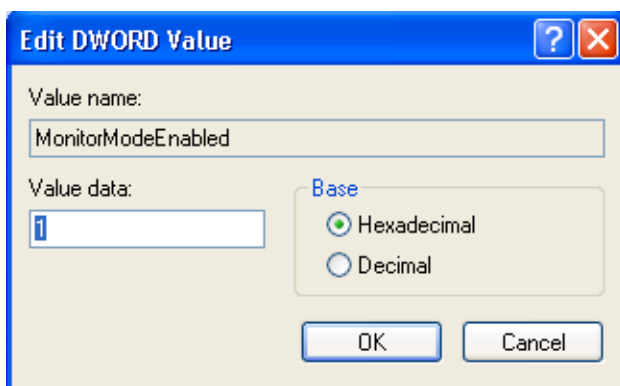


Figure 37: Edit DWORD Value

Appendix B: Using the ReMux Application

ReMux provides the capability to create a transport stream of super frame structure defined in the ISDB-S system from an MPEG-2 transport stream.

This appendix describes the functions of the ReMux application and shows how to create a transport stream of super frame structure.

NOTE. *The ReMux application cannot handle files larger than 2 GB.*

Starting and Exiting ReMux

The ReMux application is preinstalled on the generator. To start the ReMux application, select **Start >Programs >Tektronix > MPEG > ReMux** from the Windows desktop.

If you create a shortcut icon for the Remux application on the Windows desktop, you can start the ReMux application by double-clicking the icon. Refer to the Windows help for information about how to create a shortcut icon.

To exit (quit) the ReMux application, select **File > Exit**.

Elements of the ReMux Window

The following figure and table describe the elements in the ReMux application window.

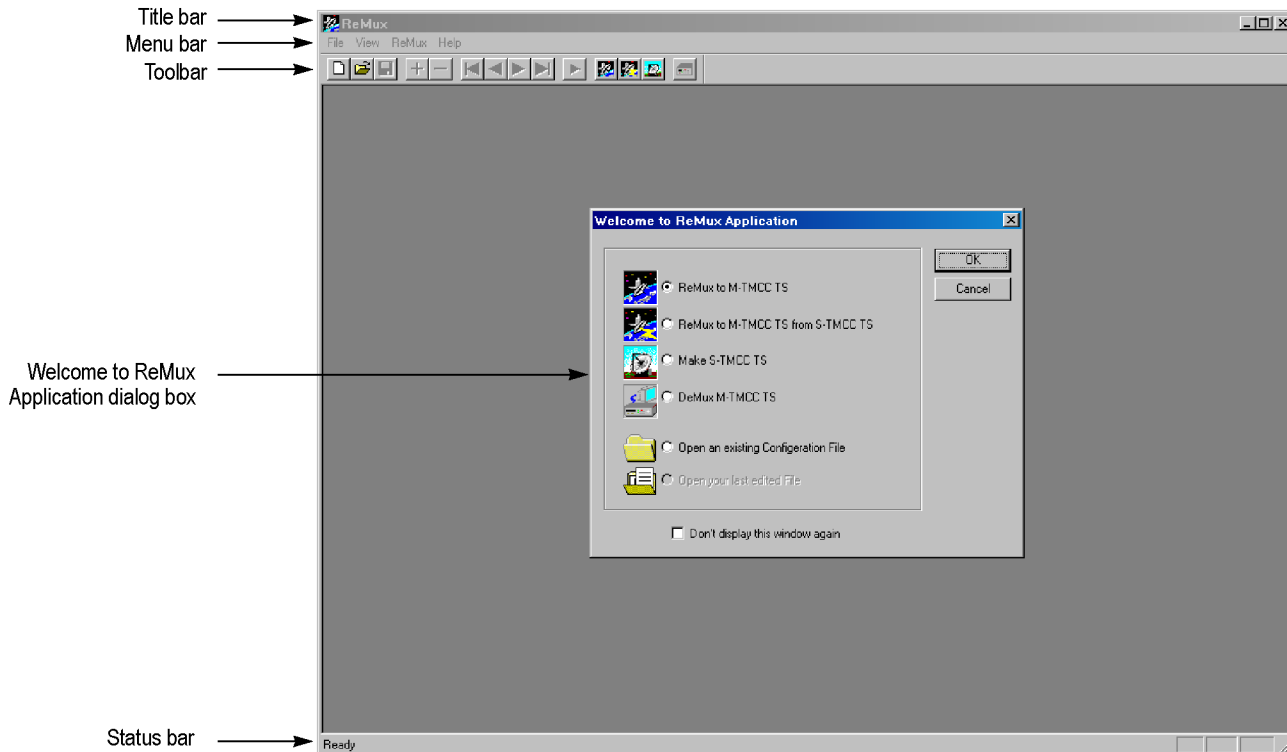


Figure 38: ReMux application window

Table 31: Elements of the ReMux window

| Element | Description |
|-----------|--|
| Title bar | The Title bar displays the name of the application and contains the standard window-sizing boxes for Windows. |
| Menu bar | The Menu bar displays the names of the six drop-down menus. (See page 130, <i>Using the ReMux Menus.</i>) |
| Toolbar | The toolbar provides shortcut buttons for many of the most often used menu commands. (See Table 32.) Click a toolbar button to select the corresponding command. You can toggle the toolbar display on and off using the Toolbar command in the View drop-down menu. |

Table 31: Elements of the ReMux window (cont.)

| Element | Description |
|---|--|
| Welcome to ReMux Application dialog box | <p>Use this dialog box to select the operation mode.</p> <ul style="list-style-type: none"> ■ ReMux to M-TMCC TS: Create a transport stream of M-TMCC structure from a transport stream. ■ ReMux to M-TMCC TS from S-TMCC TS: Create a transport stream of M-TMCC structure from a transport stream of S-TMCC structure. ■ Make S-TMCC TS: Creates a transport stream of S-TMCC structure from a transport stream. ■ DeMux M-TMCC TS: De-multiplexes (separates) the original transport stream from a transport stream of M-TMCC structure. ■ Open an existing Configuration File: Opens a stored configuration file (.cfg). ■ Open your last edited File: Opens the file used last (configuration file or transport stream file). <p>You can toggle the dialog box display on or off using the OPTION dialog box.</p> |
| Status bar | <p>The status bar displays a short explanation of the currently selected command and information related to the operation. You can toggle the status bar display on and off using the Status Bar command in the View drop-down menu.</p> |

Table 32: Toolbar button descriptions















| Icon | Name | Function |
|---|----------|--|
|  | New | Equivalent to the New command in the File menu. |
|  | Open | Equivalent to the Open command in the File menu. |
|  | Save | Equivalent to the Save command in the File menu. |
|  | Add | Equivalent to the Add command in the Edit menu. |
|  | Delete | Equivalent to the Delete command in the Edit menu. |
|  | First | Equivalent to the First command in the Edit menu. |
|  | Previous | Equivalent to the Previous command in the Edit menu. |

Table 32: Toolbar button descriptions (cont.)

| Icon | Name | Function |
|---|-----------------------------------|--|
|  | Next | Equivalent to the Next command in the Edit menu. |
|  | Last | Equivalent to the Last command in the Edit menu. |
|  | Execute | Equivalent to the Execute command in the ReMux menu. |
|  | ReMux to M-TMCC TS | Equivalent to the Mode: ReMux to M-TMCC TS command in the ReMux menu. |
|  | ReMux to M-TMCC TS from S-TMCC TS | Equivalent to the Mode: ReMux to M-TMCC TS from S-TMCC TS command in the ReMux menu. |
|  | Make S-TMCC TS | Equivalent to the Mode: Make S-TMCC TS command in the ReMux menu. |
|  | DeMux to M-TMCC TS | Equivalent to the Mode: DeMux to M-TMCC TS command in the ReMux menu. |

Using the ReMux Menus

The Menu bar has six drop-down menus: File, Edit, View, ReMux, Window, and Help. This section describes the function of each selection in these menus.

File Menu

The File menu contains commands for managing file operations and for exiting the ReMux application. (See Table 33.)

Table 33: ReMux File menu commands

| Command | Function |
|---------|--|
| New | Opens the Select Remux Mode dialog box where you can select the mode to execute. (See page 131, <i>Select Remux Mode Dialog Box</i> .) |
| Open | Opens a saved configuration file or a transport stream file of M-TMCC structure. If you try to open other files, an error message appears. |
| Close | Closes the active window. |
| Save | Saves the active window settings to a configuration file. |
| Save as | Saves the active window settings to the specified configuration file. |
| Exit | Exits the ReMux application. |

Select Remux Mode Dialog Box. The Select Remux Mode dialog box appears after you select the New command in the File menu. (See Figure 39.) Select one of the ReMux modes, and then click the **OK** button.

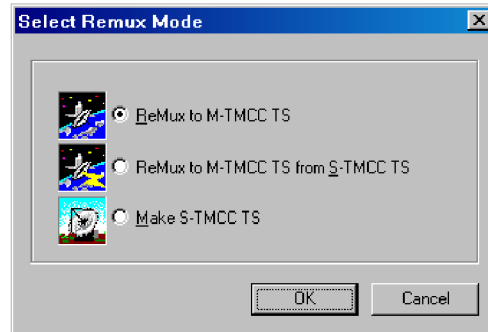


Figure 39: Select Remux Mode dialog box

- **ReMux to M-TMCC TS:** Creates a transport stream of M-TMCC structure from a transport stream.
- **ReMux to M-TMCC TS from S-TMCC TS:** Creates a transport stream of M-TMCC structure from a transport stream of S-TMCC structure.
- **Make S-TMCC TS:** Creates a transport stream of S-TMCC structure from a transport stream.

Edit Menu

The Edit menu contains commands that control TMCC information display and add/delete TMCC information and transport stream. (See Table 34.)

Table 34: ReMux File menu commands

| Command | Function |
|----------|---|
| Previous | Displays the previous TMCC information. |
| Next | Displays the next TMCC information. |
| First | Displays the first TMCC information. |
| Last | Displays the last TMCC information. |
| Add | Adds TMCC information or a transport stream. |
| Delete | Deletes TMCC information or a transport stream. |

ReMux Menu The ReMux menu contains commands that execute the selected operation, select a ReMux mode, and select option settings. (See Table 35.)

Table 35: ReMux menu commands

| Command | Function |
|---------|--|
| Execute | Executes the ReMux or DeMux operation. |
| Mode | Selects a ReMux mode. This command has the same function as the New command in the File menu. |
| Option | Opens the OPTION dialog box where you can set the TS ID of the transport stream(s) inserted as a dummy and toggle the Welcome dialog box display on or off. (See page 132, <i>OPTION Dialog Box</i> .) |

OPTION Dialog Box. The OPTION dialog box appears after you select the Option command in the ReMux menu. (See Figure 40.)

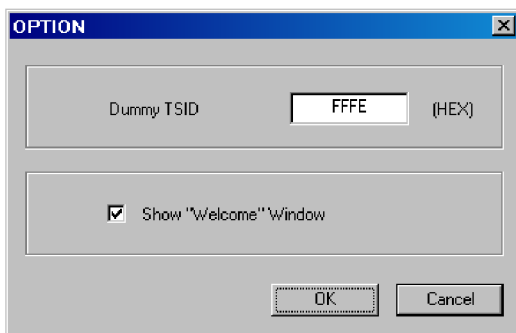


Figure 40: OPTION dialog box

In the dialog box, you can set the following parameters:

- **Dummy TSID:** When you select ReMux to M-TMCC TS or ReMux to M-TMCC TS from S-TMCC mode, if the number of slots of the transport stream of M-TMCC structure is less than 48, dummy transport streams are inserted automatically so that the number of slots is equal to 48. This parameter sets the transport stream ID for all of them.
- **Show “Welcome” Window:** Sets whether or not the Welcome to ReMux Application dialog box appears when you start the ReMux application.

Window Menu The Window menu contains commands that control the appearance of the editing windows and open the new window. (See Table 36.)

Table 36: ReMux Window menu commands

| Command | Function |
|------------|--|
| New Window | Opens the new window with the same settings as those of the active window. |
| Cascade | Arranges the editing windows so that they overlap each other. |

Table 36: ReMux Window menu commands (cont.)

| Command | Function |
|---------------|--|
| Tile | Arranges the editing windows so that they do not overlap each other. |
| Arrange Icons | When the editing windows are minimized, arranges their title bars. |

View Menu The View menu contains commands that control the appearance of the ReMux application window. (See Table 37.)

Table 37: ReMux View menu commands

| Command | Function |
|------------|--|
| Toolbar | Toggles the display of the Toolbar on and off in the application window. A check mark precedes the command in the menu when the Toolbar is selected for display. |
| Status Bar | Toggles the display of the Status bar on and off in the application window. A check mark precedes the command in the menu when the Status bar is selected for display. |

Help Menu The About ReMux command displays information including the ReMux software version number and copyright information.

ReMux Tutorials

This subsection describes the basics of operating the ReMux application.

Make S-TMCC TS Mode This mode allows you to create a transport stream of S-TMCC structure from a transport stream.

This subsection describes the procedure to create a transport stream of S-TMCC structure from a transport stream.

1. Select **File > New** or click the **New** button on the toolbar to open the **Select Remux Mode** dialog box. (See Figure 39.)
2. Select **Make S-TMCC TS** in the dialog box, and then click the **OK** button to open the editing window for the Make S-TMCC TS mode. (See Figure 41.)

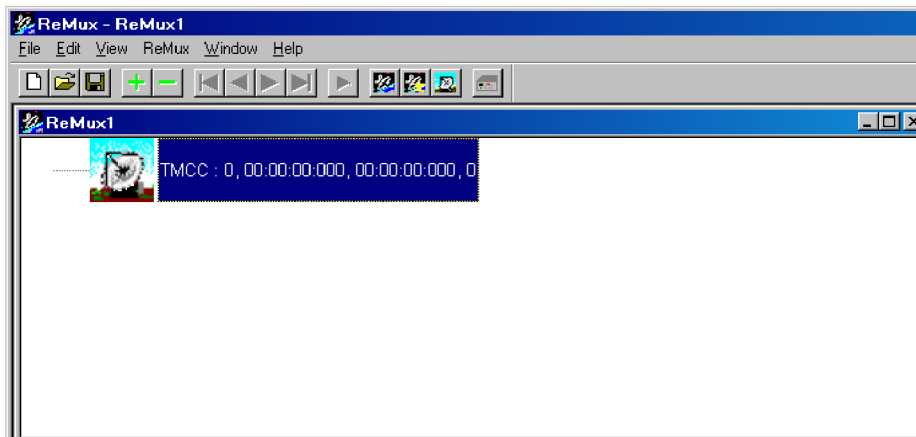
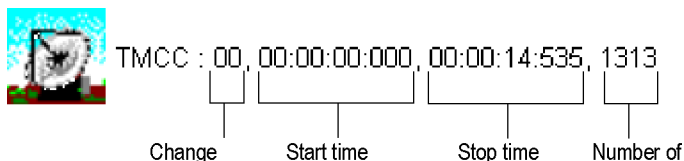


Figure 41: Editing window for the Make S-TMCC TS mode

The information displayed to the right of the TMCC icon has the following meaning:



Selecting a Transport Stream File.

3. Select **Edit > Add** or click the + (Add) button on the toolbar to open the **Open** dialog box.
4. In the dialog box, select a transport stream file, and click the **Open** button to open the Edit TS Information dialog box. (See Figure 42.)

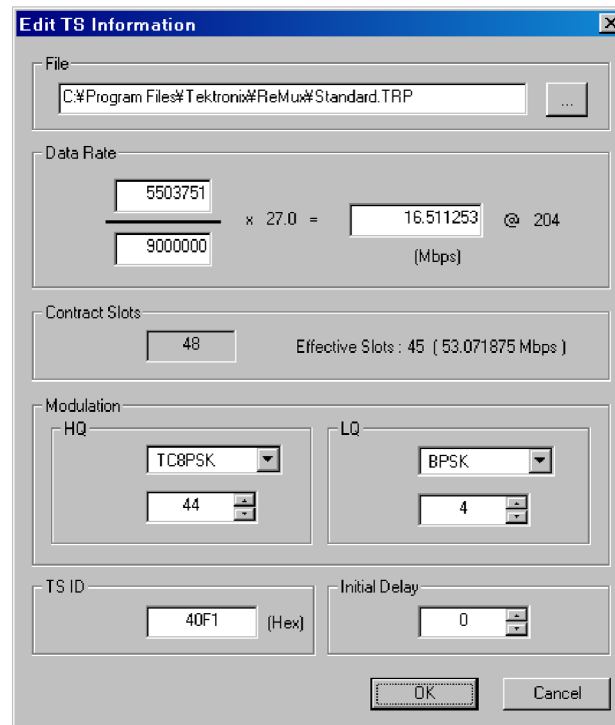


Figure 42: Edit TS Information dialog box

In this dialog box, you can set the following parameters:

- **File:** Specify the transport stream file that has to be converted to a transport stream file of S-TMCC structure.
- **Data Rate:** Specify the data rate of the transport stream. You cannot set the value exceeding the data rate of the effective slots. If this value is less than the data rate of the effective slot, the data rate is converted by inserting null packets.
- **Contract Slots:** Shows the number of contract slots. This value depends on the number of slots set in the Modulation item.
- **Modulation:** Specify the modulation system and the number of slots to be assigned to HQ and LQ when performing hierarchical data transfer.
 - **HQ:** Specify the modulation system and the number of slots to be assigned to HQ level.
 - **LQ:** Specify the modulation system and the number of slots to be assigned to LQ level. This field is enabled only when the hierarchical control descriptor exists in PMT.
- **TS ID:** Specify the transport stream ID. This value is used to change the ID value in TMCC, and the ID value in PAT is not changed.

- **Initial Delay:** Specify the number of delay packets (null packets) to be inserted at the start of remultiplex. You can set the value in the range of 0 to 65535.
5. After you change the parameters, click the **OK** button to confirm the changes and close the dialog box.

This displays a transport stream icon under the TMCC icon. (See Figure 43.)

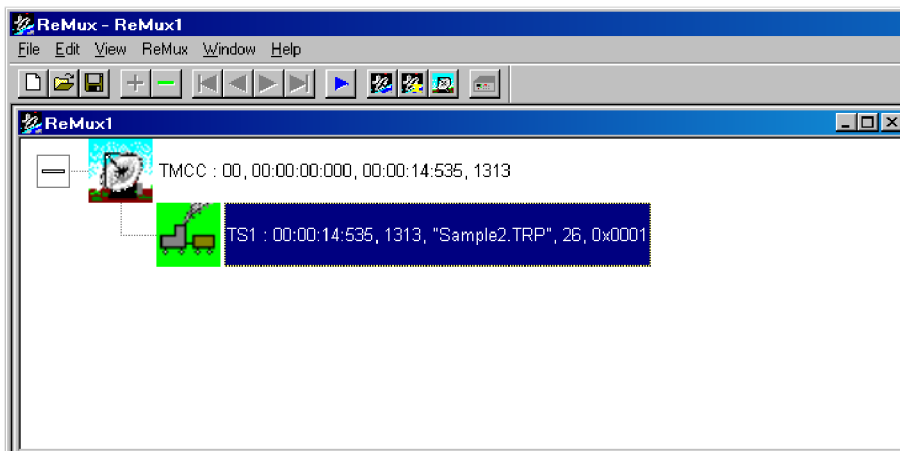
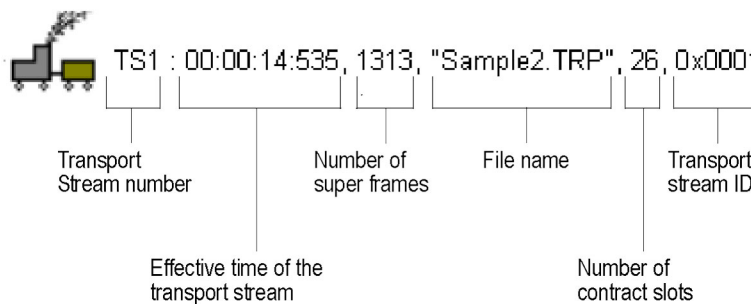


Figure 43: Windows displaying a transport stream icon

The information displayed to the right of the transport stream icon has the following meaning:



Editing the TMCC Information for the Transport Stream.

6. Double-click the **TMCC** icon to open the Edit TMCC Information dialog box to edit the TMCC information for the transport stream. (See Figure 44.)

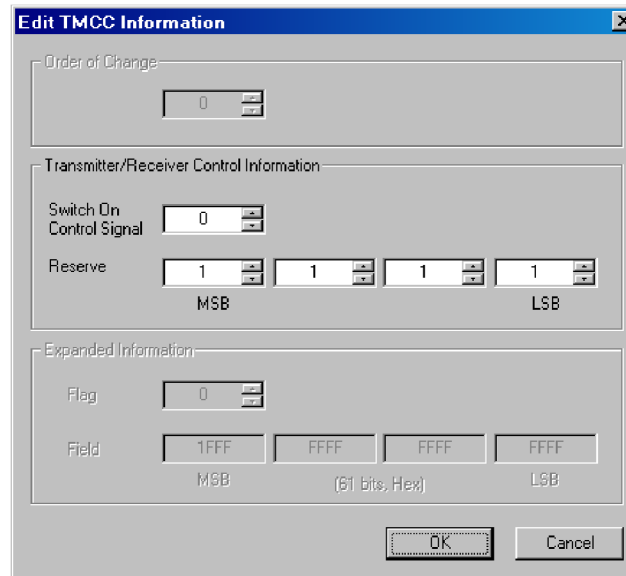


Figure 44: Edit TMCC Information dialog box (S-TMCC)

In this dialog box, you can set the following parameters:

- **Transmitter/Receiver Control Information:** Set the transmission/receiving control information.
 - **Switch On Control Signal:** Set the start control signal to on (1) or off (0).
 - **Reserve:** Set the reserve bit.
7. After you change the parameters, click the **OK** button to confirm the changes and close the dialog box.

Creating a Transport Stream of S-TMCC Structure.

8. Select **ReMux > Execute** or click the ► (Execute) button to open the **Save As** dialog box.
9. In the dialog box, specify a file name and click the **Save** button.

ReMux to M-TMCC TS from S-TMCC TS Mode

This mode allows you to create a transport stream of M-TMCC structure from a transport stream of S-TMCC structure.

This subsection describes the procedure to create a transport stream of M-TMCC structure from a transport stream of S-TMCC structure.

1. Select **File > New** or click the **New** button on the toolbar to open the Select Remux Mode dialog box. (See Figure 39.)
2. Select **ReMux to M-TMCC TS from S-TMCC TS** in the dialog box, and click the **OK** button to open the editing window for the ReMux to M-TMCC TS from S-TMCC TS mode. (See Figure 45.)

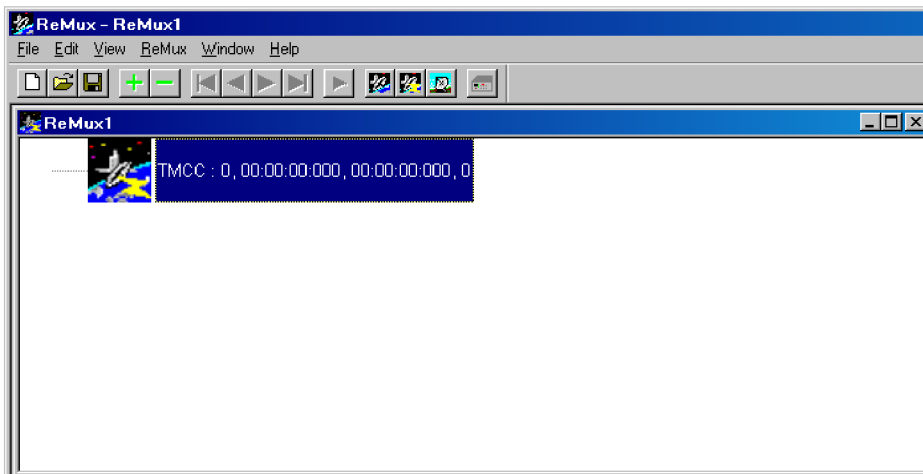


Figure 45: Editing window for the ReMux to M-TMCC TS from S-TMCC TS mode

Selecting a Transport Stream File.

3. Select **Edit > Add** or click the + (Add) button on the toolbar to open the Open dialog box.
4. In the dialog box, select a transport stream file of S-TMCC structure, and click the **Open** button to open the Edit TS Information dialog box. (See Figure 42.)

NOTE. *If you select a transport stream file that does not have S-TMCC structure, an error message appears.*

5. In the dialog box, set the parameters, and click the **OK** button. This displays a transport stream icon in the window.

Multiplexing Transport Streams. In the ReMux to M-TMCC TS from S-TMCC TS mode, you can multiplex transport streams of S-TMCC structure until the total number of slots reaches 48.

6. Select **Edit > Add** or click the + (Add) button on the toolbar to open the Open dialog box.
7. In the dialog box, select a transport stream file of S-TMCC structure, and click the **Open** button to open the Edit TS Information dialog box. (See Figure 42.)
8. In the dialog box, set the parameters, and click the **OK** button.

This multiplexes the newly selected transport stream and the transport stream icon is added in the window. (See Figure 46.)

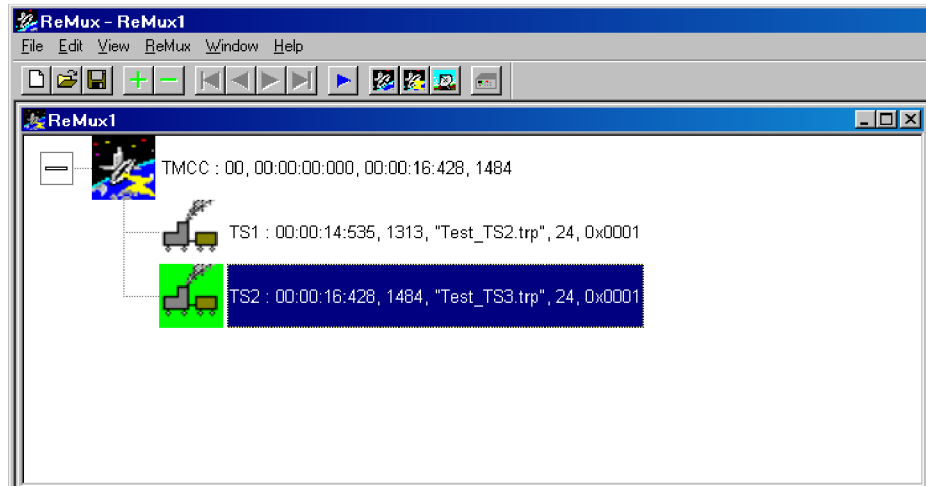


Figure 46: Transport stream is multiplexed

9. If you want to multiplex more transport streams, repeat steps 3 through 8.

Editing the TMCC Information for the Transport Stream.

10. Double-click the **TMCC** icon to open the Edit TMCC Information dialog box to edit the TMCC information for the transport stream. (See Figure 47.)

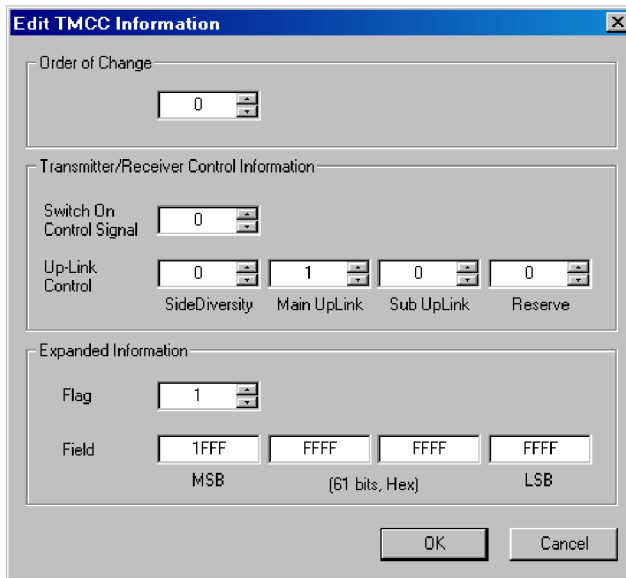


Figure 47: Edit TMCC Information dialog box (M-TMCC)

In this dialog box, you can set the following parameters:

- **Order of Change:** Set the TMCC change instruction. You can set the value in the range of 0 to 31.
- **Transmitter/Receiver Control Information:** Set the transmission/receiving control information.
 - **Switch On Control Signal:** Set the control signal on (1) or off (0).
 - **Up-Link Control:** Enter the Up-Link Control value.
- **Extended Information:** Set the extended information. When you set the Flag (extension flag) item to 1, the Field item becomes active.

11. After you change the parameters, click the **OK** button to confirm the changes and close the dialog box.

Creating a Transport Stream of M-TMCC Structure.

12. Select **ReMux > Execute** or click the ► (Execute) button to open the Save As dialog box.
13. In the dialog box, specify a file name, and click the Save button.

If the number of slots of M-TMCC structure transport stream is less than 48, one or more dummy streams are inserted so that the number of slots equal 48. The transport stream has the ID value set in the OPTION dialog box and TS8PSK is used as the modulation system. (See Figure 40.)

Multiplexing Transport Streams of M-TMCC Structure with Different TMCC Information.

Information. In the ReMux to M-TMCC TS from S-TMCC TS mode, you can multiplex a transport stream of M-TMCC structure with a transport stream of M-TMCC structure having different TMCC information.

14. Click the TMCC icon of the M-TMCC stream created in step 13.
15. Select **Edit > Add** or click the + (Add) button on the toolbar to open the Add TMCC dialog box. (See Figure 48.)

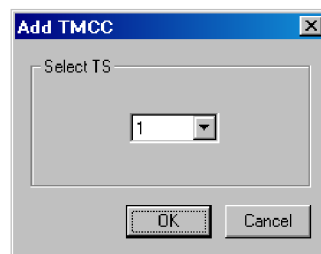
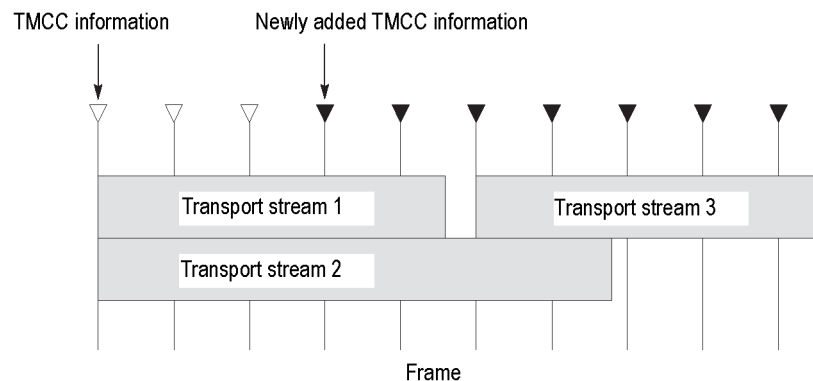


Figure 48: Add TMCC dialog box

In this dialog box, you can specify the transport stream to which the new TMCC information is inserted if more than one transport stream is multiplexed.



This illustration shows the placement of the new TMCC information and the transport stream 3 when they are multiplexed after the transport stream 1. The

new TMCC information is inserted two frames before the location in which the new transport stream is inserted.

16. In the Add TMCC dialog box, select a transport stream number, and click the **OK** button to open the Edit TMCC Information dialog box. Edit the TMCC information. (See Figure 47.)
17. After you change the parameters, click the **OK** button to confirm the changes and close the dialog box.

This opens a new editing window with a TMCC icon displayed. In this case, note the increase of the value indicating change instruction at the right side of the TMCC icon. In addition, the **First** and **Previous** buttons on the toolbar change to green indicating that a TMCC exists before this TMCC.

18. Repeat steps 3 through 5 to select a transport stream file.
19. Repeat steps 6 through 8 to multiplex the transport stream file.
20. If you want to further multiplex a transport stream(s) of M-TMCC structure having different TMCC information, repeat steps 14 through 19.

Creating a Transport Stream of M-TMCC Structure.

21. Select **ReMux > Execute** or click the ► (Execute) button to open the Save As dialog box.
22. In the dialog box, specify a file name, and then click the **Save** button.

If the number of slots of the M-TMCC structure transport stream is less than 48, one or more dummy streams are inserted so that the number of slots equal 48. The transport stream thus inserted has the ID value set in the OPTION dialog box. (See Figure 40 on page 132.)

ReMux to M-TMCC TS Mode

This mode allows you to create a transport stream of M-TMCC structure from a transport stream. In this mode, two Remux functions are simultaneously executed: the Make S-TMCC TS and the ReMux to M-TMCC TS from S-TMCC TS mode.

This subsection describes the procedure to create a transport stream of M-TMCC structure from a transport stream.

1. Select **File** > **New** or click the **New** button on the toolbar to open the Select Remux Mode dialog box. (See Figure 39.)
2. Select **ReMux to M-TMCC** in the dialog box, and then click the **OK** button to open the edit window for the ReMux to M-TMCC TS mode. (See Figure 49.)

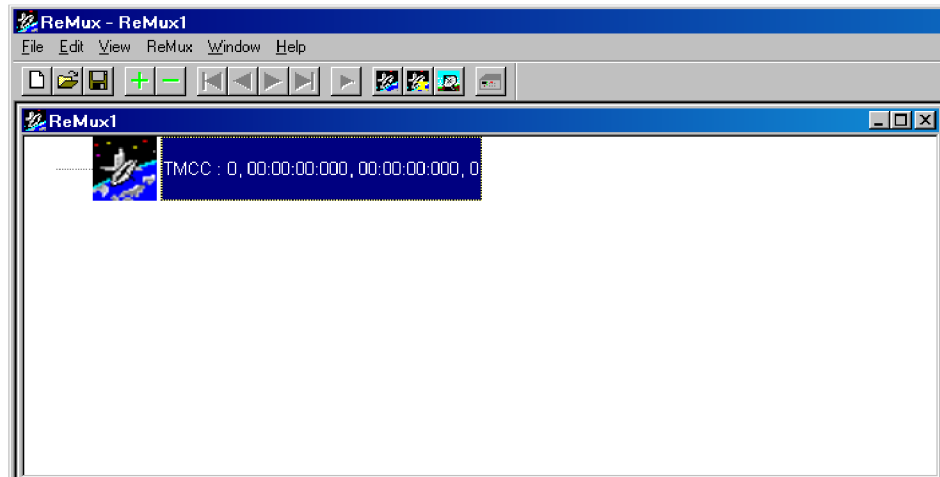


Figure 49: Editing window for the ReMux to M-TMCC TS mode

Selecting a Transport Stream File.

1. Select **Edit** > **Add** or click the + (Add) button on the toolbar to open the Open dialog box.
2. In the dialog box, select a transport stream file, and click the **Open** button to open the Edit TS Information dialog box. (See Figure 42 on page 135.)
3. In the dialog box, set the parameters, and click the **OK** button. This will display a transport stream icon in the window.

Multiplexing Transport Streams. Perform steps 6 through 9 of the previous procedure. (See page 138, *Multiplexing Transport Streams*.)

Editing the TMCC Information for M-TMCC. Perform steps 10 and 11 of the previous procedure. (See page 140, *Editing the TMCC Information for the Transport Stream*.)

Multiplexing Transport Streams of M-TMCC Structure with Different TMCC Information. Perform steps 14 through 20 of the previous procedure. (See page 141, *Multiplexing Transport Streams of M-TMCC Structure with Different TMCC Information*.)

Creating a Transport Stream of M-TMCC Structure. Perform steps 21 and 22 of the previous procedure. (See page 142, *Creating a Transport Stream of M-TMCC Structure.*)

DeMux M-TMCC TS Mode

This mode allows you to demultiplex (separate) the original transport stream from a transport stream of M-TMCC structure. The resulting demultiplexed transport stream is converted to a bit rate packet form of 204 bytes.

This subsection describes the procedure to demultiplex the original transport stream from a transport stream of M-TMCC structure.

1. Select **ReMux > DeMux** or click the **DeMux M-TMCC TS** button on the toolbar to open the Open dialog box.
2. In the dialog box, select a transport stream file of M-TMCC structure, and then click the Open button to open the editing window for the DeMux M-TMCC TS mode. (See Figure 50.)

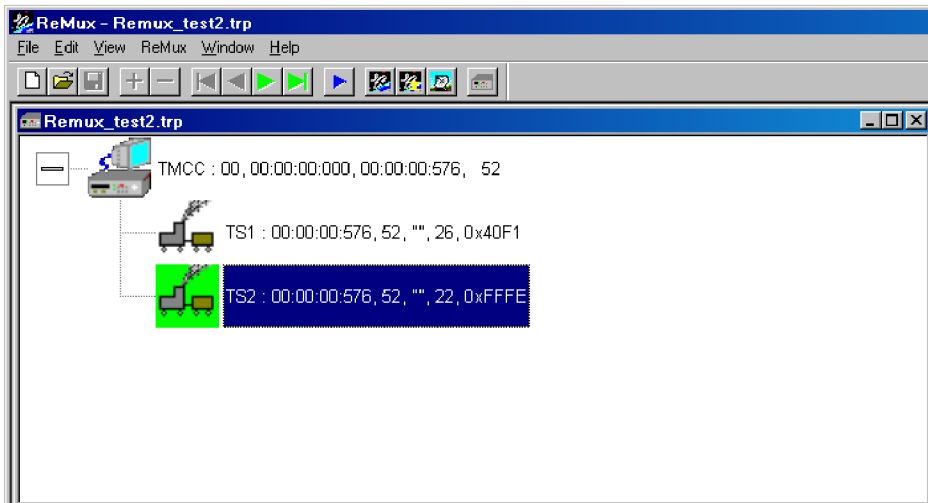


Figure 50: Editing window for the DeMux M-TMCC TS mode

NOTE. If you select a transport stream file that does not have M-TMCC structure, an error message appears.

3. Select **ReMux > Execute** or click the ► (Execute) button to open the DEMUX dialog box. (See Figure 51.)

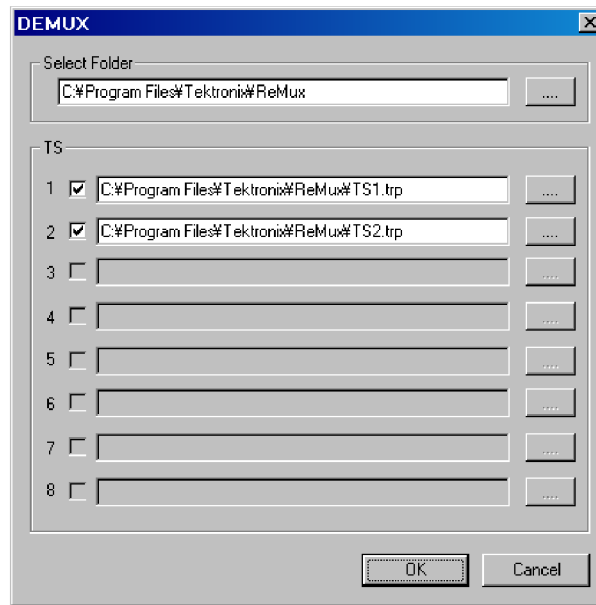


Figure 51: DEMUX dialog box

In this dialog box, you can set the following parameters:

- **Select Folder:** Specify the directory to which the demultiplexed transport stream is to be saved.
 - **TS:** Select the transport stream(s) to be demultiplexed. Click the check box at the front of the file name to select the file to be demultiplexed. When you click the ... button to the right of the file name, the Save As dialog box appears, where you can specify a file name and save the file.
4. After you select the directory and transport stream(s), click the **OK** button. The transport stream(s) will be demultiplexed and saved to the directory.

Appendix C: Using the Scheduler Application (Option SC Only)

The Scheduler is a software application that provides scheduling capability for the generator. The application enables you to create a schedule list of streams for subsequent play or record.

This appendix describes the functions of the Scheduler application and how to create a schedule list, play, and record streams within the list.

Starting and Exiting Scheduler

To start the Scheduler application on the generator, select **File > Scheduler** in the Play or Record screen.

- **In the Play screen:** Starts Scheduler in the schedule play mode. This mode allows you to create a schedule list and play streams.
- **In the Record screen:** Starts Scheduler in the schedule record mode. This mode allows you to create a schedule list and record streams.

To exit (quit) the Scheduler application, select **File > Exit** or click the **Close** button in the upper-right corner of the application window.

Elements of the Scheduler Application Window

The Scheduler application window contains a title bar, a menu bar, a toolbar, a status/control panel, a schedule list, and a status bar. (See Figure 52.)

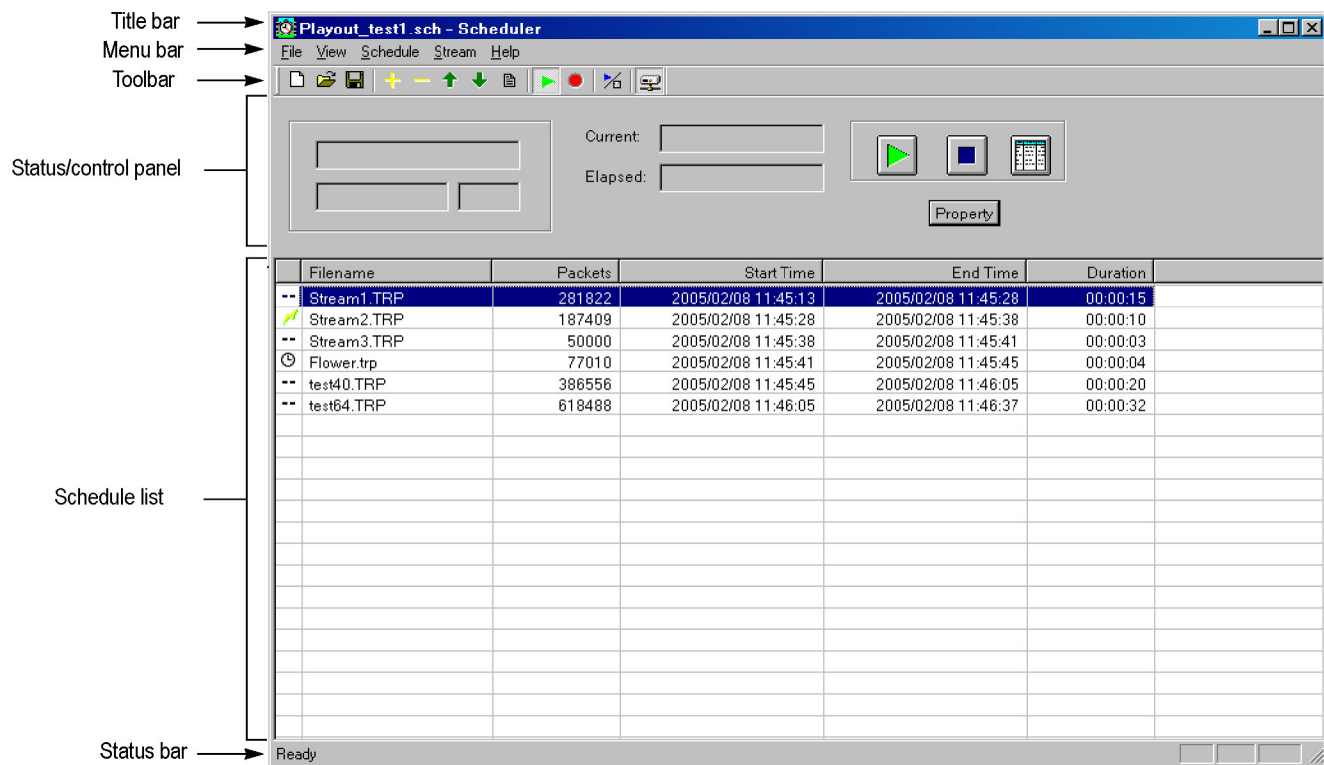


Figure 52: Scheduler application window (schedule play mode)

Title Bar The title bar displays the file name of the currently selected schedule list and the name of the application. It also contains the standard window-sizing boxes for Windows.











Menu Bar The menu bar displays the names of the drop-down menus. (See page 150, *Using the Scheduler Menus.*)

Toolbar The Toolbar provides shortcut buttons for many of the most often used menu commands. Click a toolbar button to select the corresponding command. You can toggle the toolbar display on and off using the Toolbar commands in the View drop-down menu. (See Table 38.)

Table 38: Toolbar button descriptions

| Icon | Name | Function |
|------|------|--|
| | New | Equivalent to the New command in the File menu. |
| | Open | Equivalent to the Open command in the File menu. |

Table 38: Toolbar button descriptions (cont.)

| Icon | Name | Function |
|---|------------|--|
|  | Save | Equivalent to the Save command in the File menu. |
|  | Add | Equivalent to the Add command in the Stream menu. |
|  | Delete | Equivalent to the Delete command in the Stream menu. |
|  | Move up | Equivalent to the Move Up command in the Stream menu. |
|  | Move down | Equivalent to the Move Down command in the Stream menu. |
|  | Properties | Equivalent to the Properties command in the Stream menu. |
|  | Play | Equivalent to the Play command in the Schedule menu. |
|  | Record | Equivalent to the Record command in the Schedule menu. |
|  | Execute | Equivalent to the Execute command in the Schedule menu. |
|  | Connect | Equivalent to the Connect command in the Schedule menu. |



Status/Control Panel


The status/control panel appears when you select the Execute command from the Schedule menu or click the Execute button on the toolbar. This panel allows you to set properties for the whole schedule list, and start/stop stream playout or record. (See page 161, *Status/Control Panel*.)

Schedule List

Lists the streams currently included in the schedule. The schedule list is composed of the following items:

- **Schedule icon:** The following icons are displayed in front of the file name:

| Icon | Description |
|---|--|
|  | This icon shows that no start time or triggered start has been specified for the stream. |
|  | This icon shows that the start time has been specified for the stream. |

| Icon | Description |
|---|---|
|  | This icon shows that a triggered start has been specified for the stream. |

These icons change depending on the Start Time option setting in the Play Properties or the Record Properties dialog box. (See Figure 55 on page 156.) (See Figure 57 on page 160.)

- **Filename:** Shows the file name of the stream.
- **Packets:** Shows the number of packets contained in the stream (For a Non-TS stream, it shows the number of bytes). This item does not appear in the schedule record mode.
- **Start time:** Shows the start date/time for the stream.
- **End time:** Shows the end date/time for the stream.
- **Duration:** Shows the duration time of the stream.

To select a stream, click the stream name. Only one stream can be selected at a time.

When you start playing or recording streams, the background of the schedule list changes to gray, and the stream currently being played or recorded is highlighted.

Status Bar The status bar displays a short explanation of the currently selected command and information related to the operation. You can toggle the status bar display on and off using the Status Bar command in the View drop-down menu.

Using the Scheduler Menus

The Menu bar displays the names of the five pull-down menus. This section describes the function of each selection in these menus.

File Menu The File menu contains commands for managing file operations and for exiting the Scheduler application. (See Table 39.)

Table 39: File menu commands

| Command | Function |
|---------|---|
| New | Opens a new (blank) schedule. |
| Open | Opens the Open dialog box where you can select a schedule list file (*.sch). |
| Save | Saves the currently selected schedule list. |
| Save As | Opens the Save As dialog box where you can save the currently selected schedule list. |

Table 39: File menu commands (cont.)

| Command | Function |
|-----------|--|
| 1 xxx.sch | Lists up to four of the most recently opened schedule list files. When you select a file name, the schedule opens. |
| ... | |
| 4 xxx.sch | |
| Exit | Exits the application. |

View Menu

The View menu contains commands that control the appearance of the application window. (See Table 40.)

Table 40: View menu commands

| Command | Function |
|--------------|--|
| Show message | Opens the Show error message dialog box that lists all errors that have occurred in the generator. |
| Toolbar | Toggles the display of the Toolbar on and off in the application window. A check mark precedes the command in the menu when the toolbar is selected for display. |
| Status Bar | Toggles the display of the Status bar on and off in the application window. A check mark precedes the command in the menu when the status bar is selected for display. |

Schedule Menu

The Schedule menu contains commands that control the remote connection to the generator and changes between the play mode and record mode. (See Table 41.)

Table 41: Schedule menu commands

| Command | Function |
|------------|--|
| Connect | Opens the MTX/RTX Host Name dialog box. (See page 152, <i>MTX/RTX Host Name Dialog Box</i> .) |
| Disconnect | Closes the connection to the generator. |
| Play | Sets the schedule play mode. |
| Record | Sets the schedule record mode. |
| Settings | Opens the Scheduler Settings dialog box. (See page 152, <i>Scheduler Settings Dialog Box</i> .) |
| Execute | Displays the status/control panel in the application window. (See page 161, <i>Status/Control Panel</i> .) |

MTX/RTX Host Name Dialog Box. When you select the Connect command from the Schedule menu, the MTX/RTX Host Name dialog box appears. (See Figure 53.)

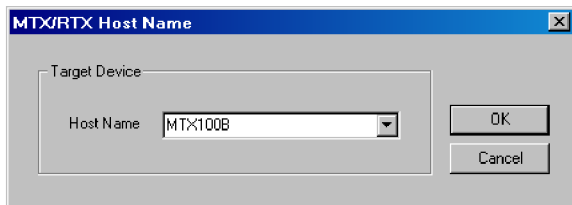


Figure 53: MTX/RTX Host Name dialog box

You can select the host name generator to which the Scheduler is connected.

Scheduler Settings Dialog Box. When you select the Settings command from the Schedule menu, the Scheduler Settings dialog box appears. (See Figure 54.)

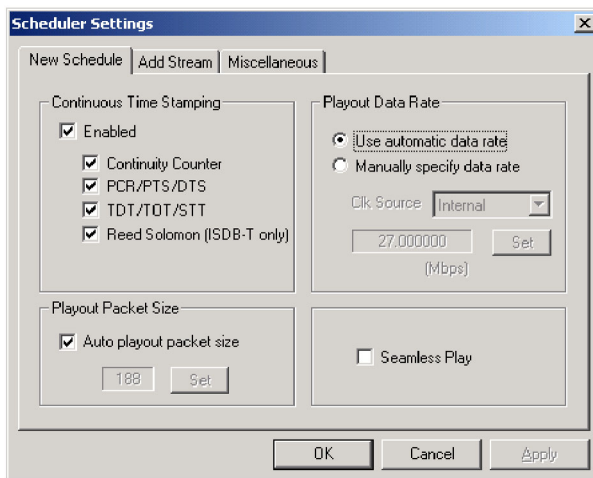


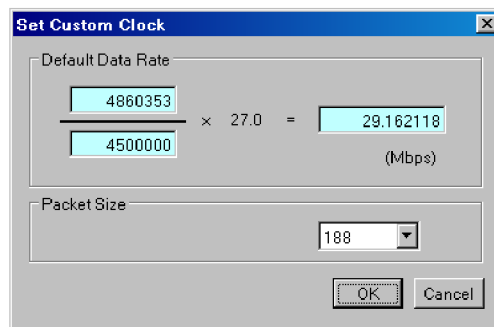
Figure 54: Scheduler Settings dialog box

The Schedule Settings dialog box has three tabs: New Schedule, Add Stream, and Miscellaneous.

New Schedule tab

- **Continuous Time Stamping:** Specify the parameters in the transport stream that should be modified when looping a transport stream to simulate continuous playout. After selecting the Enabled check box, select the appropriate parameter(s) you intend to modify. The parameters are updated by the system hardware (27 MHz clock).
- **Playout Packet Size:** When you select the Auto playout packet size check box, the default packet size displayed is derived from the first stream added to the schedule list. However, if the first stream in the schedule list is a Non-TS stream, the packet size of subsequent streams is set to 188 bytes.

If you clear the **Auto playout packet size** check box, the **Set** button becomes available. When you click the **Set** button, the Set Custom Clock dialog box appears. In this dialog box, you can set the appropriate packet size.



- **Default Data Rate:** Set the default bit rate.
- **Packet Size:** Set the default packet size. You can select 188, 204, and 208.
- **Playout Data Rate:** Set the playout bit rate for the overall schedule.
 - **Use automatic playout data rate:** Uses the bit rate derived from the first stream in the schedule list.
 - **Manually specify a playout data rate:** Uses a clock source and bit rate that you specify. When you select this option, the Clk Source list box and the Set button become available. Use the Clk Source list box to select a clock source for the stream playout. You can select Internal, ExtRef 10M, ExtRef 27 M, ExtRef IFFT, Ext P Clk, or Ext S Clk. When you click the Set button, the Set Custom Clock dialog box appears. In this dialog box, you can set the appropriate bit rate.
- **Seamless Play:** Set whether the streams in the schedule list are played continuously. Normally, stream output stops at every file, changing points if each stream has different bit rate. When this option is checked, all the streams are played using the same bit rate set by the Playout Bitrate options.

NOTE. *You cannot play a Non-TS or M-TMCC stream(s) using the Seamless Play mode.*

Before you play streams that have different packet sizes using the Seamless Play mode, clear the Enabled check box in the Continuous Time Stamping field.

If you play streams that have different bit rates using the Seamless Play mode, the Fixed ES Rate setting in the generator does not work properly.

Add Stream tab

- **Playout Properties:** Set the default playout properties (bit rate and packet size) to be used when a stream is added to a schedule list.
 - **from Schedule:** Uses the settings in the dialog box.
 - **from Source:** Uses the default bit rate and packet size derived from the original stream.
 - **Custom:** Uses the custom bit rate and packet size set in the tab. When you select this option, the Set Custom Clock dialog box appears.

Miscellaneous tab

- **Loop Mode:** Set whether the schedule is run in the loop mode. When this option is checked, the current schedule is restarted when it reaches the end of the last stream.

NOTE. *You cannot use the loop mode if the stream has a time or triggered start specified in a schedule list.*

- **Local lock out:** Set whether the front-panel lockout function is enabled or not. When it is checked, all front-panel buttons are disabled.
- **Port:** Set the port number of the generator to which Scheduler is connected. The default value is 49152.

Stream Menu The Stream menu contains commands to add, delete, and move a stream in the schedule list. It also contains the command to view and set the stream properties of the currently selected stream. (See Table 42.)

Table 42: Stream menu commands

| Command | Function |
|------------|---|
| Move up | Moves the currently selected stream one position up in the schedule list. If the stream is currently at the top of the list, this command has no effect. |
| Move down | Moves the currently selected stream one position down in the schedule list. If the stream is currently at the bottom of the list, this command has no effect. |
| Add | <ul style="list-style-type: none"> ■ For the schedule play mode: Opens the Open dialog box where you can select a stream to be added to the schedule list. ■ For the schedule record mode: Opens the Save as dialog box where you can specify a path and file name for the stream file to be recorded. (See page 159, <i>Save as Dialog Box</i>.) |
| Delete | Deletes the currently selected stream from the schedule list. |
| Properties | <ul style="list-style-type: none"> ■ For the schedule play mode: Opens the Play Properties dialog box for the selected stream. (See page 156, <i>Play Properties Dialog Box</i>.) ■ For the schedule record mode: Opens the Record Properties dialog box for the selected stream. (See page 160, <i>Record Properties Dialog Box</i>.) |

Play Properties Dialog Box. If Scheduler is set to the schedule play mode, when you select the Properties command from the Stream menu, the Play Properties dialog box appears. (See Figure 55.) This dialog box allows you to display the properties for the selected stream, and set the start/stop position and the start time of the stream. This dialog box can be displayed by selecting Properties from the right-click menu or by double-clicking the stream name.

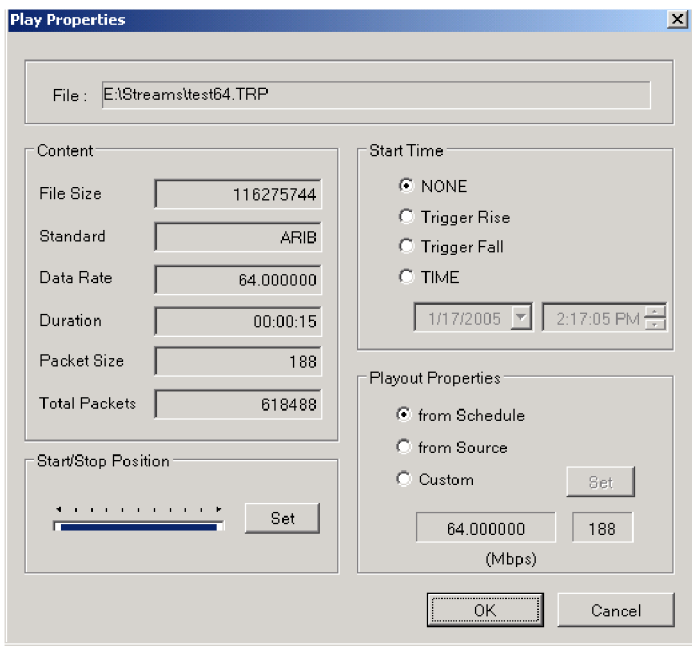
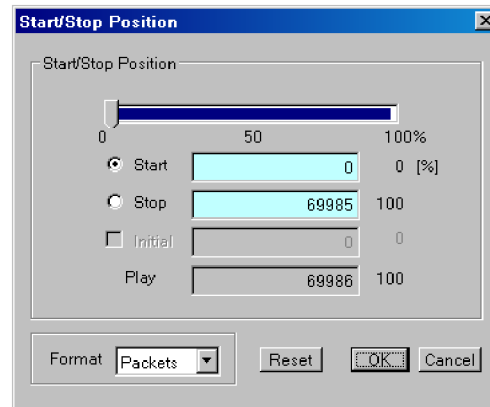


Figure 55: Play Properties dialog box

- **File:** Shows the name and location of the stream.
- **Content:** Shows the content of the stream.
 - **File Size:** Shows the file size of the stream in bytes.
 - **Standard:** Shows the standard of the stream (MPEG-2, ARIB, DVB, ATSC, S-TMCC, M-TMCC, ISDB-T, or NON-TS).
 - **Data Rate:** Shows the bit rate derived from the PCRs in the stream.
 - **Duration:** Shows the duration of the stream.
 - **Packet Size:** Shows the packet size of the stream. For a Non-TS file, a dash is displayed.
 - **Total Packets:** Shows the total number of the packets in the stream. For a Non-TS file, a dash is displayed.

- **Start/Stop Position:** Set the start and stop positions of the stream. When you click the Set button, the Start/Stop Position dialog box allows you to set the start/stop position.



- **Start:** Set the start position of the stream by the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file).
- **Stop:** Set the stop position of the stream by the number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file).
- **Play:** Shows the actual number of packets (the number of super frames for an M-TMCC file, or the number of bytes for a Non-TS file) that is calculated using the Start and Stop values.
- **Format:** Shows the unit of the start and stop positions of the stream. It shows Packets for a transport stream file, SF (super frame) for an M-TMCC file, and Bytes for a Non-TS file.

For an ISDB-T file, the start packet is defined as the first-appearing packet including an OFDM frame start flag after the specified start position. The stop packet is defined as the packet before the last-appearing packet including an OFDM frame start flag before the specified stop position. At this time, if the number of OFDM frames between the start packet and stop packet is not an even number, the packet in the last OFDM frame becomes the stop packet.

First, specify the format for the setting in the Format list box at the bottom of the dialog box. Click the Start or Stop option button, and set the number of packets or time using the slider. You can directly enter the desired values in the text boxes.

- **Start Time:** Specify the time at which the stream will start to play within a schedule. If the Seamless Play option is selected in the Schedule Settings dialog box, this field is disabled.

NOTE. *If the trigger does not occur within a specified time, the subsequent stream will be played out.*

- **NONE:** The stream is integrated into the schedule and obeys the overall timing of the schedule. It will follow on from the previous stream without a break in the playout bit stream.
- **Trigger Rise:** The stream playout starts on the rising edge (low to high transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, the spin boxes used to set date and time are available.
- **Trigger Fall:** The stream playout starts on the falling edge (high to low transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, the spin boxes used to set date and time are available.
- **TIME:** The stream playout starts at an absolute time. When you select this option, spin boxes to set date and time become available.
- **Playout Properties:** Set the playout bit rate and packet size of the stream. If the Seamless Play option is selected in the Schedule Settings dialog box, this field is disabled.
 - **from Schedule:** Uses the values from the Schedule Settings dialog box. (See Figure 54.)
 - **from Source:** Uses the original bit rate and packet size of the stream.
 - **Custom:** Uses the bit rate and packet size specified in the Play Properties dialog box. When you select this option, the Set button becomes available. Click the Set button, and then set the appropriate bit rate and packet size in the resulting Set Custom Clock dialog box.

Save as Dialog Box. If the Scheduler is set to the schedule record mode, when you select the Add command from the Stream menu, the Save as dialog box appears. (See Figure 56.)

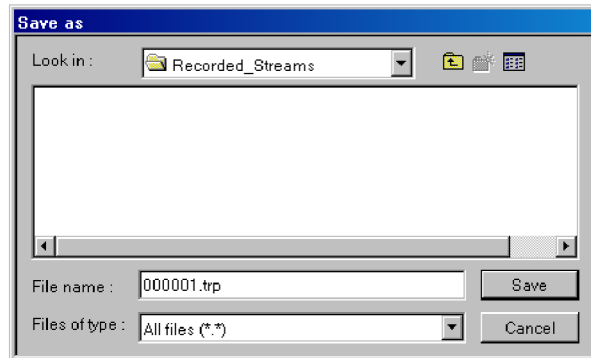


Figure 56: Save as dialog box

Use this dialog box to do the following:

1. Select the appropriate drive and directory for the stream file you are going to record.
2. Specify a file name for the stream. You can use the default file name that is automatically displayed in the File name text box. Do not use the following characters in a file name: \ / : , ; * ? " < > |.
3. Click the **Save** button to add the stream file to a schedule list.

When you click the Save button, the Record Properties dialog box appears. (See page 160, *Record Properties Dialog Box*.)

Record Properties Dialog Box. If Scheduler is set to the schedule record mode, when you select the Add command from the Stream menu and click the Save button on the Save as dialog box, the Record Properties dialog box appears. (See Figure 57.) This dialog box allows you to set the start time, record time, and stop time for the stream to be recorded. This dialog box can be displayed by selecting Properties from the right-click menu, the Stream menu, or by double-clicking the stream name.

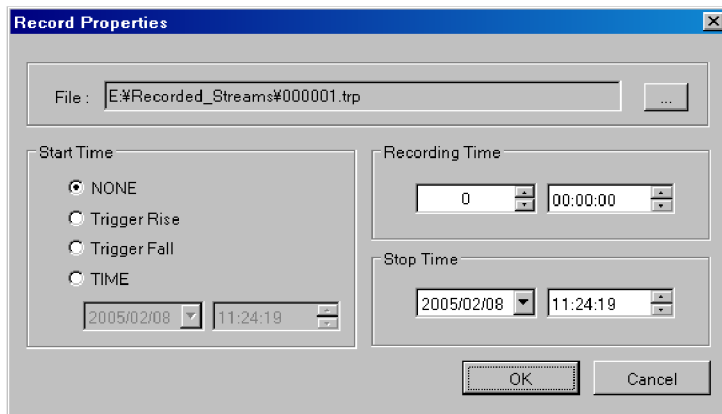


Figure 57: Record Properties dialog box

- **File:** Shows the directory path and file name for the stream to be recorded.
- **Start Time:** Specifies the time at which a stream will start to record. The choices are:
 - **NONE:** The stream is integrated into the schedule and obeys the overall timing of the schedule. It will follow on from the previous stream without a break.
 - **Trigger Rise:** The stream record starts on the rising edge (low to high transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, spin boxes to set date and time become available.
 - **Trigger Fall:** The stream record starts on the falling edge (high to low transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, spin boxes to set date and time become available.

NOTE. *If the trigger does not occur within a specified time, the subsequent stream will be recorded.*

- **TIME:** The stream record starts at an absolute time. When you select this option, spin boxes to set date and time become available.

- **Recording Time:** Specifies the recording time for the stream.
- **Stop Time:** Specifies the time at which a stream will stop recording. When you click the down arrow (▼) to the right side of the date spin box, a calendar allows you to set a date.

Help Menu

The About Scheduler command displays information including the Scheduler software version number and the copyright information.

Status/Control Panel

The status/control panel appears when you select the Execute command from the Schedule menu or click the Execute button on the toolbar. (See Figure 58.) This panel allows you to set properties for the whole schedule list. You can start and stop the stream playing and recording.

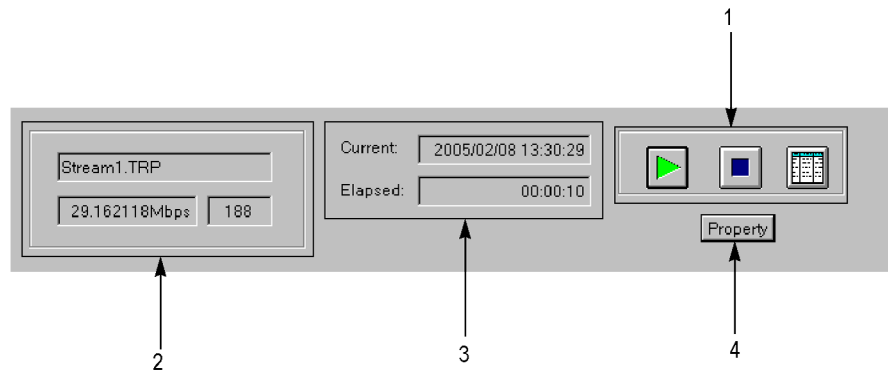






Figure 58: Status/control panel (schedule play mode)

- 1. Control buttons.** Controls the schedule play, schedule record, and application window display.

| Button | Description |
|---|---|
|  | Play button: Starts the schedule playing. This button is displayed in the schedule play mode. |
|  | Record button: Starts the schedule recording. This button is displayed in the schedule record mode. |
|  | Stop button: Stops the schedule playing or recording. |
|  | Schedule list button: Closes the status control panel. |

- 2. Stream information.** Shows the file name, bit rate, and packet size of the stream currently being played or recorded.

3. Payout or record status. Shows the following time information:

- **Current:** Shows the current date and time.
- **Elapsed:** Shows the elapsed time from the start of the stream being played or recorded.

4. Property button. Displays the Schedule Property dialog box. (See Figure 59.)

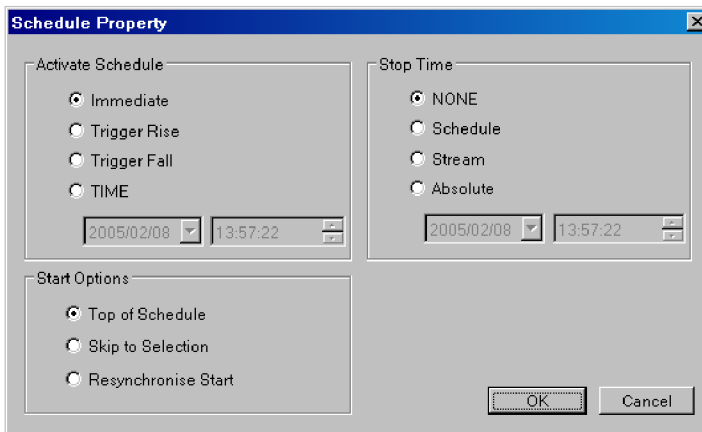


Figure 59: Schedule Property dialog box

- **Activate Schedule:** Sets the way in which the schedule is activated. The setting in this field affects the Start Time setting of a stream at the top of the schedule list.
 - **Immediate:** In the schedule play mode, the schedule playing starts as soon as you click the Play button in the status/control panel. In the schedule record mode, the schedule recording starts as soon as you click the Record button in the status/control panel.
 - **Trigger Rise:** The schedule playing or recording starts on the rising edge (low to high transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, spin boxes to set date and time become available.
 - **Trigger Fall:** The schedule playing or recording starts on the falling edge (high to low transition) of the trigger signal applied to the Trig In/Out connector. When you select this option, spin boxes to set date and time become available.

NOTE. *If the trigger does not occur within a specified time, the subsequent stream will be played out or recorded.*

- **TIME:** The schedule playing or recording starts by an absolute starting time. When you select this option, spin boxes to set date and time become available.

- **Start Options:** Set the actual time when the schedule starts.
 - **Top of Schedule:** The schedule playing or recording starts with the first stream in the schedule list.
 - **Skip to Selection:** The schedule playing or recording starts at the currently highlighted stream. If no stream is highlighted, the schedule will start at the top of the schedule list. This option is available only when you select Immediate in the Active Schedule field.
 - **Resynchronize Start:** The start time of the first stream is adjusted to equal to the current time (the first stream must have an absolute Start Time specified). This option is available only when you select Immediate in the Active Schedule field.
- **Stop Time:** Set the way in which the schedule stops playing or recording.
 - **NONE:** The schedule plays or records according to the start and stop times of each stream.
 - **Schedule:** The schedule playing or recording stops at the specified date and time but not until the current (schedule) pass is completed. When you select this option, the spin boxes used to set date and time are available.
 - **Stream:** The schedule playing or recording stops at the specified date and time but not until the current stream is completed. When you select this option, the spin boxes used to set date and time are available.
 - **Absolute:** The schedule playing or recording stops immediately at the specified date and time. When you select this option, the spin boxes used to set date and time are available.

Scheduler Tutorials

This section describes the basics of operating the Scheduler application. The application has the following two operating modes:

- Schedule play mode
- Schedule record mode

Schedule Play Mode

The schedule play mode allows you to create a schedule list of streams (defined playout properties) and playout up to 256 streams continuously. You can set the start and stop positions, absolute start time, bit rate, and packet size as playout properties for each stream.

In the schedule play mode, you can play five kinds of stream files:

- Transport stream (188/204/208) file
- S-TMCC file
- M-TMCC file
- ISDB-T file
- Non-TS file

Creating a Schedule List. Perform the following procedure to create a schedule list and play streams:

1. Select **Schedule > Play** or click the **Play** button on the toolbar to set Scheduler to the schedule play mode.
2. Select **Schedule > Settings** to open the Scheduler Settings dialog box. (See Figure 54.)
3. In the **New Schedule** tab, set parameters to be updated, playout packet size, and playout bit rate. You can also set whether or not the streams in the schedule list are played continuously.
4. Click the **Add Stream** tab.
5. In the **Add Stream** tab, set the playout properties used when a stream is added to the schedule.
6. Click the **Miscellaneous** tab.
7. In the **Miscellaneous** tab, set the loop mode, the local lock out status, and the port number. The port number needs to be the same port number as the generator.
8. Click the **OK** button to confirm the changes and close the dialog box.
9. Select **Stream > Add** or click the **Add** button on the toolbar to open the Open dialog box.
10. In the **Open** dialog box, select a file to be added to the schedule list and click the **Open** button.

11. Repeat steps 9 and 10 until all the stream files you want to play are added to the schedule list. You can add up to 256 files in a single schedule.
12. Select **Schedule > Execute** or click the **Execute** button on the toolbar to open the status/control panel.
13. Click the **Property** button on the panel to open the Schedule Property dialog box. (See Figure 59.)
14. In the **Schedule Property** dialog box, set conditions to activate, start, and stop the schedule.
15. If you want to set properties for an individual stream, use the following methods to open the Play Properties dialog box. (See Figure 55.)
 - Highlight the stream name you want to set (by clicking the name on the schedule list), and then select **Properties** from the Stream menu.
 - Double-click the stream name you want to set.
 - Right-click the stream name you want to set, and select **Properties** from the pop-up menu.
16. In the **Play Properties** dialog box, set the start/stop positions, start time, and playout properties for the stream.

Schedule Playout Timing

Schedule playout timing is determined by the Active Schedule setting in the Schedule Property dialog box and the Start Time setting in the Play Properties dialog box.

- When you add a stream to a new schedule list with no Active Schedule date/time set, the Start Time is set to the current date/time. The start times of streams subsequently added to the schedule list are cumulative.

| Filename | Packets | Start Time | End Time | Duration |
|----------------|---------|--------------------|--------------------|----------|
| -- Stream1.TRP | 281822 | 2005/02/09 9:23:48 | 2005/02/09 9:24:03 | 00:00:15 |
| -- Stream2.TRP | 187409 | 2005/02/09 9:24:03 | 2005/02/09 9:24:13 | 00:00:10 |
| -- Stream3.TRP | 50000 | 2005/02/09 9:24:13 | 2005/02/09 9:24:16 | 00:00:03 |
| -- test40.TRP | 386556 | 2005/02/09 9:24:16 | 2005/02/09 9:24:36 | 00:00:20 |
| -- test64.TRP | 618488 | 2005/02/09 9:24:36 | 2005/02/09 9:25:08 | 00:00:32 |
| | | | | |
| | | | | |

- If you set an Active Schedule date/time (for example, 2005/2/12 12:00:00) in the Schedule Property dialog box, this is applied to all streams.

| | Filename | Packets | Start Time | End Time | Duration |
|----|-------------|---------|---------------------|---------------------|----------|
| -- | Stream1.TRP | 281822 | 2005/02/12 12:00:00 | 2005/02/12 12:00:15 | 00:00:15 |
| -- | Stream2.TRP | 187409 | 2005/02/12 12:00:15 | 2005/02/12 12:00:25 | 00:00:10 |
| -- | Stream3.TRP | 50000 | 2005/02/12 12:00:25 | 2005/02/12 12:00:28 | 00:00:03 |
| -- | test40.TRP | 386556 | 2005/02/12 12:00:28 | 2005/02/12 12:00:48 | 00:00:20 |
| -- | test64.TRP | 618488 | 2005/02/12 12:00:48 | 2005/02/12 12:01:20 | 00:00:32 |
| | | | | | |
| | | | | | |

- If you set a Start Time (for example, 2005/2/10 15:00:00) in the Play Properties dialog box for an individual stream, the start date/time of all subsequent streams are changed. This does not affect the preceding streams.

| | Filename | Packets | Start Time | End Time | Duration |
|----|-------------|---------|---------------------|---------------------|----------|
| -- | Stream1.TRP | 281822 | 2005/02/09 9:34:38 | 2005/02/09 9:34:53 | 00:00:15 |
| -- | Stream2.TRP | 187409 | 2005/02/09 9:34:53 | 2005/02/09 9:35:03 | 00:00:10 |
| ⊙ | Stream3.TRP | 50000 | 2005/02/10 15:00:00 | 2005/02/10 15:00:03 | 00:00:03 |
| -- | test40.TRP | 386556 | 2005/02/10 15:00:03 | 2005/02/10 15:00:23 | 00:00:20 |
| -- | test64.TRP | 618488 | 2005/02/10 15:00:23 | 2005/02/10 15:00:55 | 00:00:32 |
| | | | | | |
| | | | | | |

NOTE. If there is an inconsistent time setting between the Schedule Property and Play Properties dialog boxes or between two streams, an error message appears.

Saving a Schedule List. Perform either of the following methods to save the schedule list:

- Select > **Save** > **File** menu to save a new schedule list or save an existing schedule list.
- Select > **Save As** > **File** menu to save a schedule list under a different name.

Playing Streams. Click the **Play** button (▶) on the status/control panel to start the schedule.

Schedule Record Mode

The schedule record mode allows you to create a schedule list for stream files to be recorded and to record an input stream continuously on the hard disk drive of the generator. You can set record properties for each stream, and record up to 256 stream files.

Creating a Schedule List. Perform the following procedure to create a schedule list and record streams.

1. Select **Schedule > Record** or click the **Record** button on the toolbar to set the schedule record mode.
2. Select **Stream > Add** or click the **Add** button on the toolbar to open the Save as dialog box. (See Figure 56 on page 159.)
3. In the **Save as** dialog box, specify the appropriate drive, directory, and file name for the stream file to be recorded. You can use the default file name that is automatically displayed in the file name text box.
4. Click the **Save** button to open the Record Properties dialog box. (See Figure 57 on page 160.)
5. In the **Record Properties** dialog box, set the start time and stop time (or recording time) for the stream.
6. Repeat steps 2 through 5 for all the files that you want to record.
7. Select **Schedule > Execute** or click the **Execute** button on the toolbar to open the status/control panel.
8. Click the **Property** button on the panel to open the Schedule Property dialog box. (See Figure 59 on page 162.)
9. In the **Schedule Property** dialog box, set conditions to activate, start, and stop the schedule.

Schedule Record Timing. Schedule record timing is determined by the Active Schedule setting in the Schedule Property dialog box and the Start Time setting in the Record Properties dialog box. Set the timing using the same method as described in Schedule Playout Timing. (See page 165.)

Recording Streams. Click the **Record** button (●) on the status/control panel to start the schedule.

NOTE. *You cannot change a property in the schedule while a schedule is running.*

If you try to run a schedule after the assigned time, an error message appears. If this happens, change the Start Time setting of the corresponding stream(s).

If you continuously output streams that have different bit rates, the instrument requires the start and end times to accumulate a certain amount of data in FIFO and output the last data from FIFO to output each stream in a specific bit rate. Therefore, the actual start and end times of streams are slightly different from the displayed Start and End times in a schedule list.

Any discontinuity may be caused by streams that have different playout properties.

If you output streams from the SMPTE 310 interface (Option 07), set the bit rate to 19.392658 Mbps and set the packet size to 188 bytes.

In the schedule record mode, the Without Limit feature of the generator is automatically set to On.

Appendix D: Defragment the Hard Disk Drive

The generator displays the following messages when fragmentation occurs and data output or data record rate is slower than the specified characteristics.

- FIFO is underflow (when data is being output)
- FIFO is overflow (when data is being acquired)

If this condition happens, you need to optimize the hard disk drive by performing the Disk Defragmenter of Windows XP. This appendix provides instructions on how to defragment the hard disk drive.

Procedure

Perform the following procedure to defragment the hard disk drive:

1. Connect the keyboard and mouse provided with the instrument to the USB port on the front panel.
2. Select **File > Exit** in the Play or Record screen to exit the generator application.
3. Select **Programs > Accessories > System Tools > Disk Defragmenter** from the Start menu. The Disk Defragmenter window appears. (See Figure 60.)

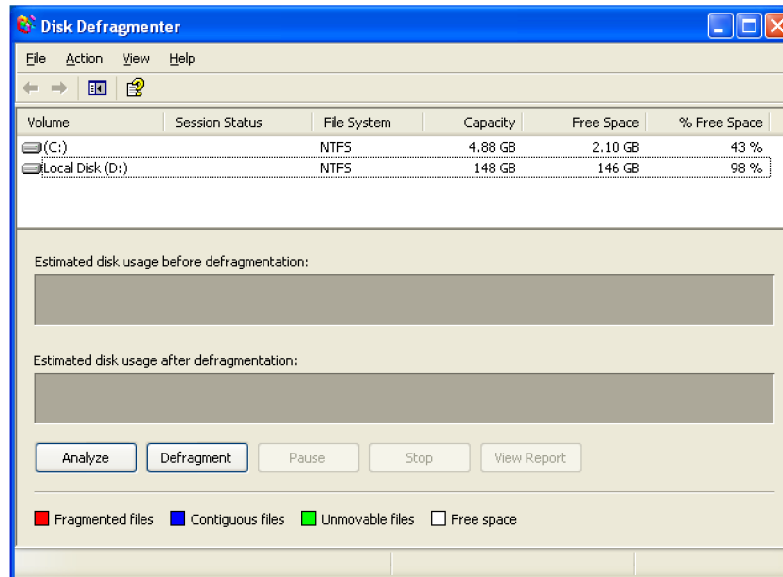


Figure 60: Disk Defragmenter window

4. Click **Local Disk (D:)**.

5. Click the **Defragment** button to start the defragmentation. When the defragmentation is completed, the Defragmentation Complete dialog box appears. (See Figure 61.)

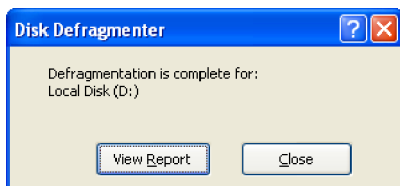


Figure 61: Defragmentation Complete dialog box

6. Click the **Close** button.
7. Click the **Close** button at the upper right of the screen to close the Disk Defragmenter window.

Appendix E: System Software Recovery

If the generator does not start or is corrupted, you can recover the system software by using this recovery procedure.



CAUTION. *Running the recovery procedure overwrites all the contents of the hard disk drive and resets the system to the factory defaults.*

The recovery can be performed in two ways:

- **Recover Boot Partition:** This permanently overwrites the contents of your boot partition. This mode of recovery is preferred if you want to keep your old data files on the D drive.
- **Recover Entire Disk:** This permanently overwrites the contents of your entire hard disk drive and resets the system to the factory defaults.

Recovery Procedure

Perform the following procedure to recover the Windows XP and generator application software:

1. Restart your system and press the **F5** key as soon as the BIOS tests are complete. This opens the Acronis image tool screen with the following options:
 - Restore
 - Windows
2. Click **Restore System > Yes**. Click **Windows** if you want to keep your current configuration intact.

The “skipped probe” messages are normal and can be ignored. Acronis is gathering information on your hardware.



CAUTION. *Do not power off the system after the recovery process is initiated. Cancelling the process will leave your hard disk drive in a partially recovered, unstable state. Immediately after the data is recovered, the system will let you know that the recovery was successful. On selecting OK, the instrument restarts and the Windows XP setup wizard is displayed. You will need to install the latest version of the software that is available for your instrument.*

NOTE. *The software that is already in the instrument must be reinstalled after the Operating System is restored, because the software is no longer available in the system.*

Glossary

ACTS (Advanced Communications Technologies and Services)

A set of telecommunication research projects financed by the European Union.

ARIB

Association of Radio Industries and Businesses.

ATSC

Advanced Television Systems Committee.

BAT (Bouquet Association Table)

One of the tables defined by DVB-SI. The BAT provides information regarding bouquets (collections of services marketed as a single entity). DVB only.

CAT (Conditional Access Table)

One of the PSI tables described by the MPEG-2 standard. The CAT provides the association between one or more CA systems, their EMM (Entitlement Management Message) streams, and any special parameters associated with them.

CRC (Cyclic Redundancy Check)

One of the fields described in the MPEG-2 standard. CRC is used to verify the correctness of data in PSI and SI tables.

Defragmentation

The process of rewriting parts of a file to contiguous sectors on a hard disk to increase the speed of access and retrieval. When files are updated, the computer tends to save these updates on the largest continuous space on the hard disk, which is often on a different sector than the other parts of the file. When files are thus “fragmented,” the computer must search the hard disk each time the file is accessed to find all of the file’s parts, which slows down response time.

DVB (Digital Video Broadcast)

A project group of the European Broadcasting Union (EBU).

DVB-MG

Digital Video Broadcasting - Measurement Guidelines.

DVB-SI (Digital Video Broadcast Service Information)

The DVB-SI adds the information that enables DVB IRDs to automatically tune to particular services and allows services to be grouped into categories with relevant schedule information. It has several tables, including: NIT, SDT, BAT, and EIT. (NIT is also required for MPEG-2.)

DTS (Decoding Time-Stamp)

One of the fields described in the MPEG-2 standard. The DTS may be present in a PES packet header that indicates the time that an access unit is decoded in the T-STD.

ECM (Entitlement Control Message)

Private conditional access information that specifies control words and possibly other, typically stream-specific, scrambling and/or control parameters.

EISA (Extended Industry Standard Architecture)

The PC bus used to communicate with the CARB and PIA boards.

EIT (Event Information Table)

One of the tables defined by DVB-SI. The EIT contains data concerning events (a grouping of elementary broadcast data streams with a defined start and end time belonging to a common service) and programs (a concatenation of one or more events under the control of a broadcaster, such as event name, start time, and duration).

EMM (Entitlement Management Message)

Private conditional access information that identifies the authorization levels or the services of specific decoders.

ETS (European Telecommunication Standard)

One of the types of documents released by ETSI.

ETSI

European Telecommunications Standards Institute.

ETR (ETSI Technical Report)

One of the types of documents released by ETSI.

IP

Internet Protocol.

IRD (Integrated Receiver/Decoder)

A receiving decoder that can automatically configure itself using the MPEG-2 Program Specific Information (PSI).

ISDB-T (Integrated Services Digital Broadcasting-Terrestrial)

The Japanese broadcasting standard developed by ARIB. In ISDB-T, the television, radio, and data services are covered by one standard.

ISO (International Standard Organization)

Organization responsible for establishing standards at the world-wide level.

MPEG-2

A standard developed by MPEG (Moving Picture Experts Group) for the compression of digital video.

NIT (Network Information Table)

One of the PSI tables described by the MPEG-2 standard and also one of the tables defined by DVB-SI. The NIT conveys information relating to the physical organization of the multiplex; that is, transport streams carried through a given network and the characteristics of the network itself. Transport streams are identified by the combination of an original network ID and a transport stream ID in the NIT.

PAT (Program Association Table)

One of the PSI tables described in the MPEG-2 standard. The PAT provides information about the structure of a transport stream.

PCR (Program Clock Reference)

One of the fields defined in the MPEG-2 standard. A time stamp in the transport stream from which decoder timing is derived.

PES (Packetized Elementary Stream)

A structure defined in the MPEG-2 standard used to carry elementary stream data.

PID (Packet Identifier)

One of the fields described in the MPEG-2 standard. A unique integer value used to identify elementary streams of a program in a single or multiprogram TS.

PMT (Program Map Table)

One of the PSI tables described by the MPEG-2 standard. The PMT identifies and indicates the locations of the streams that make up each service and the

location of the Program Clock Reference (PCR) fields for a service. This table is transmitted in sections.

PSI (Program Specific Information)

A set of tables described by the MPEG-2 standard. The PSI contains all of the tables that define the MPEG-2 transport stream. It consists of the PAT, PMT, CAT, and NIT tables. (NIT is also used for DVB-SI).

PSIP

Program and System Information Protocol.

PTS (Presentation Time Stamp)

One of the fields described in the MPEG-2 standard. The PTS may be present in a PES packet header that indicates the time that a presentation unit is presented in the T-STD.

RST (Running Status Table)

One of the tables defined by DVB-SI. The RST gives a quick updating mechanism for the status information carried in the EIT.

SDT (Service Description Table)

One of the tables defined by DVB-SI. The SDT contains data describing the services in the system. Examples include names of services and the service provider.

SI (Service Information)

Set of tables defined by DVB-SI. The SI provides information on services and events carried by different Multiplexes, and even other networks. SI is structured as six tables (PAT, NIT, CAT, SDT, EIT, and BAT). The applications are only concerned with NIT, BAT, SDT, and EIT.

ST (Stuffing Table)

One of the tables defined by DVB-SI. The ST provides stuffing sections.

TDT (Time & Date Table)

One of the tables defined by DVB-SI. The TDT carries the current time and date information.

TOT (Time Offset Table)

One of the tables defined by DVB-SI. The TOT gives information about a local time offset in a given area.

TS (Transport Stream)

A bit stream that contains 0 or more elementary streams combined in a manner that conforms to the MPEG-2 standard.

T-STD (Transport Stream System Target Decoder)

Described by the MPEG-2 standard, the T-STD is a hypothetical reference model of a decoding process used to define the semantics of a TS.

VLAN

Virtual Local Area Network.

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