

# **Programmer Manual**



## **MTS400 Series MPEG Test System**

**071-1725-02**

This document applies to MTS400 Series system  
version 1.4 and above.

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Tektronix, Inc.  
14200 SW Karl Braun Drive  
P.O. Box 500  
Beaverton, OR 97077  
USA

For product information, sales, service, and technical support:

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# Preface

This manual describes how to use the SCPI remote control commands for the MTS400 Series system MPEG Player application.

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**NOTE.** *SCPI remote control commands for the MTX100B MPEG Player and Recorder are described in the MTX100B User Manual, Tektronix part number 071-1927-xx.*

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The manual is organized into the following sections:

- **Getting Started**  
Provides instructions for connecting the MTS400 Series System to a single PC or a network and setting the network parameters for the 100/10 BASE-T port, as well as network interface specifications for the instrument.
- **Syntax and Commands**  
Information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands.
- **Error Messages and Codes**  
Lists the error messages and codes.
- **Appendix A: Default Settings**  
Lists the default settings of the remote commands.
- **Index**

## Related Documentation

Table i lists the other documentation available for the MTS400 Series System. Additional documentation, such as Read Me files, may be included on the installation disks.

**Table i: Related documentation**

Title	Part number	Description
MTS400 Series Getting Started Manual (English)	071-1505-xx	Describes the features of the product and provides instructions for installing the instrument, reinstalling the software, and troubleshooting network problems.
MTS400 Series Getting Started Manual (Japanese)	071-1727-xx	Provides a Japanese language version of the Getting Started manual described above.
MTS400 Series User Manual	071-1507-xx	Provides in-depth operating information for the various software applications included in the product.
MTS400 Series Technical Reference Manual	071-1724-xx	Provides the MTS400 Series specifications and a performance verification procedure. Available only as a PDF file on the <i>MTS400 Series Customer Documentation CD-ROM</i> .
MTS400 Series Release Notes	071-1726-xx	Provides information about software problems and behaviors.
MTS4EA Compressed Video Elementary Stream Analyzer User Manual	071-1641-xx	Provides operating information for the optional MTS4EA Compressed Video ES Analyzer application.

The following URLs access the Web sites for the standards organizations listed (the URLs listed were valid at the time of writing):

- MPEG-2 standards (International Organization for Standards)  
<http://www.iso.ch/>
- DVB standards (European Technical Standards Institute)  
<http://www.etsi.org/>
- ATSC standards (Advanced Television Systems Committee)  
<http://www.atsc.org/>

# Getting Started

This manual contains information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands you can use to program your MTS400 Series Player application. This manual also describes the optional commands that control the optional interface cards.

## Connecting to a Network

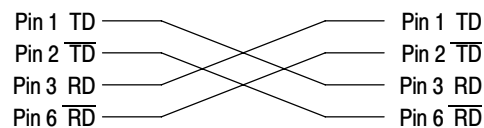
The MTS400 Series System has a 100/10 BASE-T port on the rear panel that allows you to upload and download stream files.

This section provides instructions for connecting the MTS400 Series System to a single PC or a network and setting the network parameters for the 100/10 BASE-T port.

### Connecting the MTS400 Series System to Your PC(s)

The MTS400 Series System uses the rear-panel 100/10 BASE-T port to communicate with a PC. Use one of the following two methods to connect the instrument to your PC(s).

- If you are connecting the instrument directly to a single PC, use a crossover Ethernet cable to connect between the 100/10 BASE-T port on the MTS400 Series System and the Ethernet port on the PC. If you need to construct your own crossover cable, Figure 1–1 shows the pin connections to change on a straight cable to produce a crossover cable.
- If you are connecting the instrument to your local Ethernet network, use a straight Ethernet cable to connect between the 100/10 BASE-T port on the MTS400 Series System and the Ethernet hub port of your local network. By connecting to an Ethernet network, you can access the instrument using any PC on the network.



**Figure 1–1: Pin connections for a crossover Ethernet cable**

## Setting Ethernet Network Parameters

You can set the network parameters for the MTS400 Series System using the Control Panel of Windows XP.

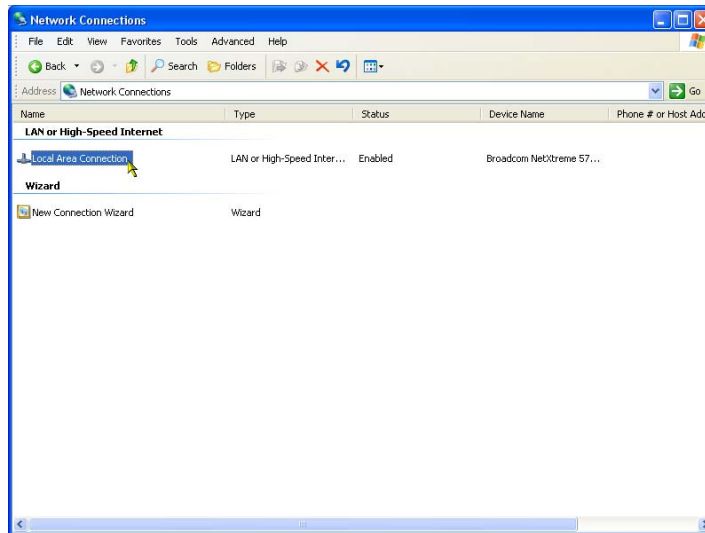
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**NOTE.** *The following procedure assumes that you are familiar with the basics of using the Windows XP operating system. If necessary, review the Windows XP documentation.*

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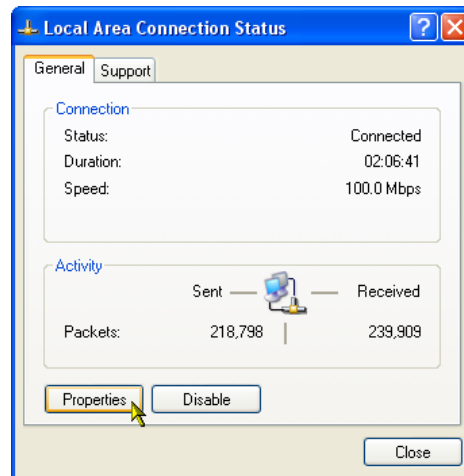
Perform the following procedure to set the network parameters for the MTS400 Series System.

1. Connect the keyboard and mouse provided with the instrument to the appropriate connectors on the instrument.
2. Select **Minimize** or **Exit** from the **File** menu to close the Play (or Record) screen. The Windows XP desktop appears.
3. Select **Settings** → **Control Panel** from the Start menu. The **Control Panel** window appears.
4. Double-click the **Network Connections** icon in the window. The **Network Connections** window appears as shown in Figure 1–2.



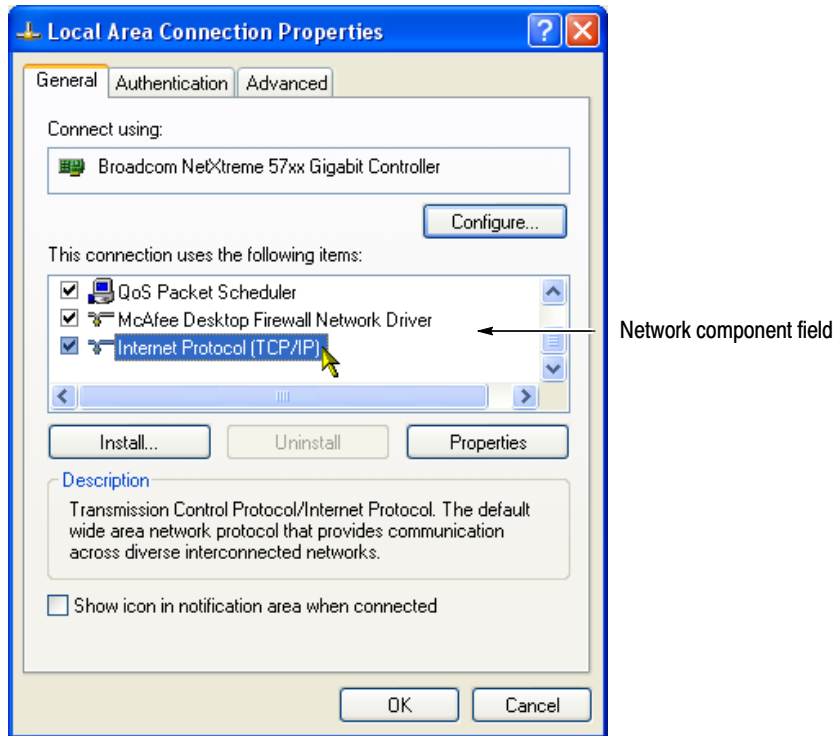
**Figure 1–2: Network and Dial-up Connections window**

5. Double-click the **Local Area Connection** icon. The **Local Area Connection Status** dialog box appears as shown in Figure 1–3.



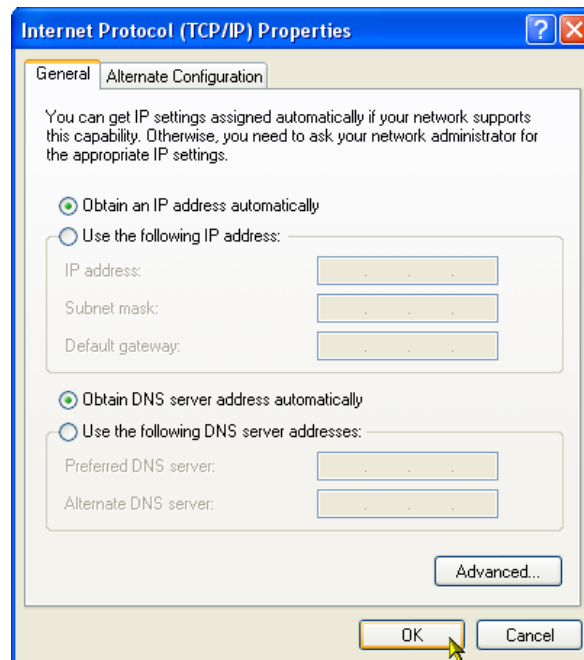
**Figure 1–3: Local Area Connection Status dialog box**

6. Click the **Properties** button. The **Local Area Connection Properties** dialog box appears as shown in Figure 1–4.



**Figure 1-4: Local Area Connection Properties dialog box**

7. In the network component field, click **Internet Protocol (TCP/IP)**.
8. Click the **Properties** button. The **Internet Protocol (TCP/IP) Properties** dialog box appears as shown in Figure 1-5.



**Figure 1-5: Internet Protocol (TCP/IP) Properties dialog box**

The settings in the dialog box depend on whether a DHCP (Dynamic Host Configuration Protocol) server is in the network connected to the MTS400.

#### **When the DHCP Server is in the Network.**

- 9.** In the dialog box, select the **Obtain an IP address automatically** and **Obtain DNS server address automatically** check boxes.
- 10.** Click the **OK** button.

The MTS400 accesses the DHCP server and obtains the addresses automatically when connected to the network.

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

---

**NOTE.** Under some network environments, the MTS400 may not be able to obtain the IP address automatically from a DHCP server. In this case, you need to enter the appropriate address value in each submenu item.

---

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

1. If you connect the MTS400 directory to a single PC:
  - a. In the dialog box, select the **Use the following IP address** check box.
  - b. Set the **IP address** parameter to be the same IP address as the PC's address except for the last number. The last number must be different than the last number in the PC's IP address.
  - c. Set the **Subnet mask** parameter to be the same net mask (subnet mask) used by the PC. Do not enter a number if the PC does not have a net mask.
  - d. You do not need to enter a **Default gateway** if you are directly connected to a single PC.
2. If you connect the MTS400 to your local Ethernet network:
  - a. In the dialog box, select the **Use the following IP address** check box.
  - b. Ask your local network administrator and set the appropriate addresses.



**CAUTION.** *To prevent communication conflicts on your Ethernet network, ask your local network administrator for the correct numbers to enter in the dialog box if you connect the MTS400 to your local Ethernet network.*

---

3. Verify the Ethernet connection by using a ping command from the PC.

## Network Interface Specifications

The MTS400 Series System supports remote control using the Ethernet interface. This section describes the network interface specifications for the instrument.

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 instrument 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.



- The IEEE 488.1 standard (for instance Device Clear, Service Request, etc.) 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 MTS400 Series System, perform the following procedure:

1. Connect the instrument to your PC using an Ethernet cable (refer to *Connecting to a Network* on page 1–1).
2. Click Windows **Start** button and select **Run** from the start menu.
3. In the dialog box, type **telnet** and then click **OK**.

The TELNET window appears.

4. Select **Preferences** from the **Terminal** pull-down menu.
5. In the **Preferences** dialog box, check the **Local Echo** check box and then click **OK**.
6. Select **Remote System** from the **Connect** pull-down menu.

The **Connect** dialog box appears.

7. In the **Host Name** field, enter the IP address of the MTS400 Series System.
8. In the **Port** field, enter the port number set by the Communication dialog box or the :SYSTem:COMMunicate:SOCKEt:PORT command (the default value is 49152).
9. Click **Connection**.
10. Type **\*IDN?** in the command line and press the Enter key.
11. Check that the ID information of the MTS400 Series System appears on the PC.



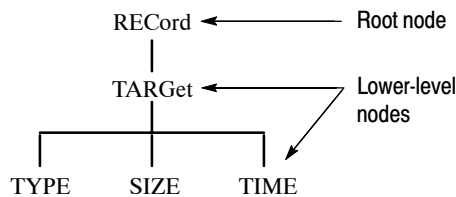
# Syntax and Commands

This section contains information on the Standard Commands for Programmable Instruments (SCPI) and IEEE 488.2 Common Commands you can use to program your MTS400 Series Player application. The information is organized in the following subsections: Syntax, Functional Command Groups, and Remote Commands.

## 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 manufacturer. The MTS400 Series Player application uses a command language based on the SCPI standard.

The SCPI language is based on a hierarchical or tree structure (see Figure 2–1) that represents a subsystem. The top level of the tree is the root node; it is followed by one or more lower-level nodes.



**Figure 2–1: 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 2–1, 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 Figure 2–1.

**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 in Figure 2–1.

**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 MTS400 Series Player application command set and some are defined by ANSI IEEE 488.2-1987 (see Table 2–1).

**Table 2–1: Parameter types used in syntax descriptions**

Parameter type	Description	Example
binary	Binary numbers	#B0110
arbitrary block <sup>1</sup>	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 values	MIN, MAX, UP, DOWN
hexadecimal <sup>2</sup>	Hexadecimal numbers (0–9, A, B, C, D, E, F)	#HAA, #H1
NR1 <sup>2,3</sup> numeric	Integers	0, 1, 15, -1
NR2 <sup>2</sup> numeric	Decimal numbers	1.2, 3.141516, -6.5
NR3 <sup>2</sup> numeric	Floating point numbers	3.1415E-9, -16.1E5
NRf <sup>2</sup> numeric	Flexible decimal number that may be type NR1, NR2 or NR3	See NR1, NR2, NR3 examples
string <sup>4</sup>	Alphanumeric characters (must be within quotation marks)	“Testing 1, 2, 3”

<sup>1</sup> Defined in ANSI/IEEE 488.2 as “Definite Length Arbitrary Block Response Data.”

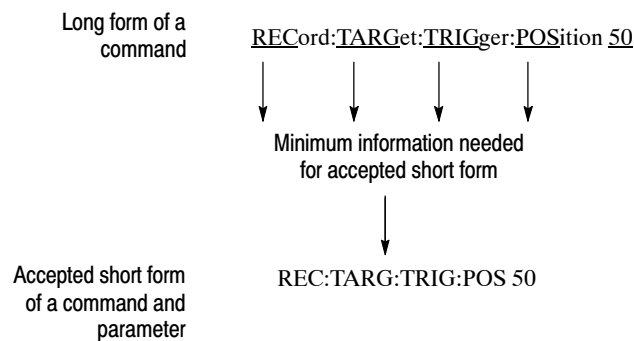
<sup>2</sup> An ANSI/IEEE 488.2–1992-defined parameter type.

**Table 2-1: Parameter types used in syntax descriptions (Cont.)**

Parameter type	Description	Example
<sup>3</sup>	Some commands and queries will accept a hexadecimal value even though the parameter type is defined as NR1.	
<sup>4</sup>	Defined in ANSI/IEEE 488.2 as “String Response Data.”	

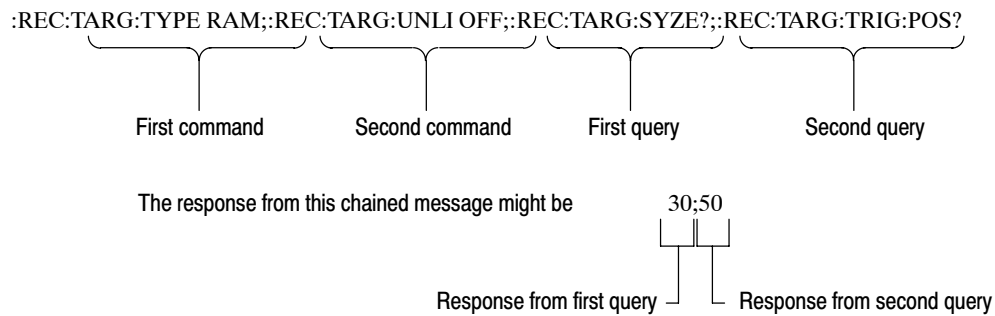
### Abbreviating Commands, Queries, and Parameters

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. As shown in Figure 2-2, you can create a short form by using only the upper case letters. The accepted short form and the long form are equivalent and request the same action of the instrument.

**Figure 2-2: Example of abbreviating a command**

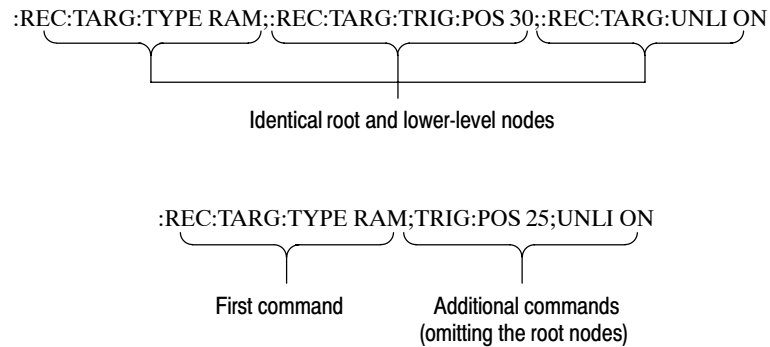
**Chaining Commands and Queries**

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 (:). Figure 2–3 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.



**Figure 2-3: 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. In Figure 2–4, the second command has the same root node (REC) and lower level node (TARG) as the first command, so these nodes can be omitted.



**Figure 2–4: 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 MTS400 Series Player application 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. Table 2–2 defines the standard BNF symbols:

**Table 2–2: 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



# Functional Command Groups

The commands are divided into the following groups:

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

The Player application can be controlled remotely through the 1000/100/10 BASE-T port on the rear panel. Refer to *Connecting to a Network* on page 1-1 for detailed information about how to connect and set up for remote operation.

## Common Commands

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

### Command Tree

- \*CLS
- \*ESE(?)
- \*ESR?
- \*IDN?
- \*LRN?
- \*OPC(?)
- \*OPT?
- \*RST
- \*SRE(?)
- \*STB?
- \*TRG
- \*TST?
- \*WAI

### Command 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.

**\*OPC?**

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.

**\*OPT?**

Lists 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 MTS400 Series System always returns 1.

**\*WAI**

Wait-to-continue command. This command is not necessary since the MTS400 Series System handles commands sequentially.

## DISPLAY Commands

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

### Command Tree

```
:DISPlay
  :VIEW
    :FORMat          HEXadecimal|DECimal|OCTal
```

### Command Description

```
:DISPlay:VIEW:FORMat HEXadecimal|DECimal|OCTal
```

Sets the base value used to describe the component information in the hierarchy display. The choices are HEXadecimal, DECimal, and OCTal. The default value is HEXadecimal.

```
: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.

### Command Tree

```
:MMEMory
  :CATalog?          [<directory_path>]
  :CDIRectory
    [:DATA]          <directory_path>
    :STATe           <directory_path>
  :LOAD
    :STATe           <preset_name>
  :MDIRectory        <directory_path>
  :STORe
    :STATe           <preset_name>
```

## Command Description

`:MMEMory:CATalog? [<directory_path>]`

Lists the files in the specified directory. The query response is as follows:  
<used\_bytes>, <available\_bytes>, “<file\_name>, <directory\_flag>, <file\_size>, <date>, <time>”...

`:MMEMory:CDIRectory[:DATA] [<directory_path>]`

Changes the current directory for data files. The default value is E:.

`:MMEMory:CDIRectory[:DATA]?`

Returns the current directory for data files.

`:MMEMory:CDIRectory:STATe <directory_path>`

Changes the current directory for setting files.

`:MMEMory:CDIRectory:STATe?`

Returns the current directory for setting files.

`:MMEMory:LOAD:STATe <preset_name>`

Loads the specified preset. This command accepts the name of a previously saved preset. Current instrument settings are overwritten by this command.

`:MMEMory:MDIRectory <directory_path>`

Creates a subdirectory. The command is invalid if a directory with the specified name already exists.

`:MMEMory:STORe:STATe <preset_name>`

Saves the instrument settings with the specified 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.

### Command Tree

:PLAY	
:AUTOplay	ON OFF
:CLOCK	
:DEFault	
:RATE	<numeric_value>
:RATE	
:RATIo	<numeric_value>,<numeric_value>
:ESRAtfixed	ON OFF
:ISDBT	
:CONVert	ON OFF
:RATE	<numeric_value>
:RATE	
:RATIo	<numeric_value>,<numeric_value>
:SOURce	INTernal EXT10M EXT27M EXTIfft EXTParallel EXTSerial
:LOAD	
:FILE	<file_name>
:LOOP	ON OFF
:ISDBT	
:FRAMe	ON OFF
:PACKet	188 204 208 NONTs
:PCR	
:INITial	<numeric_value>,<numeric_value>
:INACcuracy	NONE SINE SQUare TRIangle PULSe SAW RANDOM OFFSet[,,numeric_value,<numeric_value>[,<numeric_value>[,<numeric_value>[,<numeric_value>]]]]
:S192F	
:PARTialts	ON OFF
:SOURce	RAM DISK
:SPIOOutput	ON OFF
:SSPOsition	
:INITial	
:ENABle	ON OFF
[:POSition]	<numeric_value>
:TIME	<string>
[:POSition]	<numeric_value>,<numeric_value>
:TIME	<string>,<string>
:STANdard?	

:START	
:STOP	
:SYNC	
:PSYNc	TSPAcKet SF NONTs
:INTERval	NONE <numeric_value>
:DVALid	
:WIDth	NONE <numeric_value>
:TIMEpacket	
:DEFine	<numeric_value>,<numeric_value>, <numeric_value>,<numeric_value>, <numeric_value>,<numeric_value>
:MODE	ORIGinal OS USER
:UPDAte	ON OFF
:ITEM	
:CC	ON OFF
:NPT	ON OFF
:PCR	ON OFF
:METHod	HARDware SOFTware
:REEDsolomon	ON OFF
:TIMEpacket	ON OFF

## Command Description

:PLAY:AUTOplay ON|OFF

Sets whether or not the selected stream is automatically output using the last power-down settings when you turn the instrument on. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:PLAY:AUTOplay?

Return the current auto play mode status.

:PLAY:CLOCK:DEFault:RATE <numeric\_value>

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 happen, you can set the appropriate value by this command. You can set the rate from 0.001 MHz to 250.0 MHz. If you change the value, the :PLAY:CLOCK:RATE command setting will set to the same value. The default value is 56.61.

: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>`

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 happen, you can set the appropriate value by this command. The first argument represents a numerator and the second represents a denominator. You can set both values from 0 to 2000000000. If you change the value, the `:PLAY:CLOCK:RATE:RATIo` command setting will set to the same value. The default values are 629 for the numerator and 300 for the denominator.

`: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`

Sets whether or not elementary stream rate is fixed. When you set it to ON, the elementary stream rate becomes constant regardless of the clock rate setting. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

`:PLAY:CLOCK:ISDBT:CONVert ON|OFF`

Sets whether or not the clock rate is automatically set when the data file for ISDB-TSB is loaded. When you set it to ON, the clock rate is automatically set to  $(2048/1701) \times 27$  MHz and the elementary stream rate becomes constant regardless of the `:PLAY:CLOCK:ESRAtefixed` command setting. You can use 1 or 0 instead of ON or OFF. The default value is ON.

`:PLAY:CLOCK:ISDBT:CONVert?`

Returns whether or not 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>`

Sets the clock rate for the stream output. You can set the rate from 0.001 MHz to 250.0 MHz. The default value is 56.61.

`:PLAY:CLOCK:RATE?`

Returns the current clock rate for the stream output.



:PLAY:CLOCK:RATE:RATIo <numeric\_value>,<numeric\_value>

Sets the clock rate for the stream output using a fraction. The first argument represents a numerator and the second represents a denominator. You can set both values from 0 to 2000000000. The default values are 629 for the numerator and 300 for the denominator.

:PLAY:CLOCK:RATE:RATIo?

Returns the current clock rate for the stream output using a fraction.

:PLAY:CLOCK:SOURce INTernal|EXT10M|EXT27M|EXTIfft|EXTParallel|EXTSerial

Sets which clock to use as the reference for the stream output. The choices are:

INTernal: uses the internal clock.

EXT10M: uses a 10 MHz signal on the CLK/REF IN connector.

EXT27M: uses a 27 MHz signal on the CLK/REF IN connector.

EXTIfft: uses an IFFT sample clock signal (8.126984 MHz) on the CLK/REF IN connector.

EXTParallel: uses a clock signal on the CLK/REF IN connector as a parallel clock.

EXTSerial: uses a clock signal on the CLK/REF IN connector as a serial clock.

:PLAY:CLOCK:SOURce?

Returns the current reference clock for the stream output.

:PLAY:LOAD:FILE <file\_name>

Loads the specified stream file.

:PLAY:LOAD:FILE?

Returns the name of the file currently loaded.

:PLAY:LOOP ON|OFF

Sets whether or not the selected stream is output using looping method. When you set it to ON, the stream is continuously output. The default value is ON.

:PLAY:LOOP?

Returns the current output loop mode status.

:PLAY:LOOP:ISDBT:FRAMe ON|OFF

Sets whether to output an ISDB-T transport stream in OFDM frames when looped. When you set it to OFF, an ISDB-T transport stream is looped in packets. You can use 1 or 0 instead of ON or OFF. The default value is ON.

:PLAY:LOOP:ISDBT:FRAMe?

Returns whether to output an ISDB-T transport stream in OFDM frames when looped.

:PLAY:PACKet 188|204|208|NONTs

Sets the packet size for the selected stream file. The choices are 188, 204, 208, and NONTs (Non TS). The default value is 188.

:PLAY:PACKet?

Returns the current packet size setting for the selected stream file.

:PLAY:PCR:INITial <numeric\_value>,<numeric\_value>

Sets the initial value of the program\_clock\_reference\_base and program\_clock\_reference\_extension parameters. 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 are both 0.

:PLAY:PCR:INITial?

Returns the current initial value of the program\_clock\_reference\_base and program\_clock\_reference\_extension parameters.

:PLAY:PCR:INACcuracy NONE|SINe|SQUare|TRIangle|PULSe|SAW|  
 RANDom|OFFSet[,<PID>,<amplitude>  
 [<period>[,<pulse\_width>]]];

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 second to fifth 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. The ranges of each argument are as follows:

- PID: 0 to 8191
- Amplitude: 0 to 135000000
- Period: 5 to 3000
- Pulse width: 1 to (period -1)

:PLAY:PCR:INACcrracy?

Returns the current PCR jitter insertion settings.

:PLAY:S192F:PARTialts ON|OFF

Sets whether to output a stream file consisting of a 192-byte packet as a partial transport stream. When you set it to OFF, the stream is output in Non TS format. You can use 1 or 0 instead of ON or OFF. The default value is ON.

: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

Sets the source for stream output. The choices are RAM (system RAM) and DISK (hard disk). The default value is DISK.

:PLAY:SOURce?

Returns the current source setting for stream output.

:PLAY:SPIOOutput ON|OFF

Sets whether the signal output from the SPI IN/OUT connector is enabled or not. You can use 1 or 0 instead of ON or OFF. The default value is ON.

:PLAY:SPIOOutput?

Returns the current output status of the SPI IN/OUT connector.

:PLAY:SSPOsition:INITial:ENABle ON|OFF

Sets whether to enable to set the initial start position of the selected stream to be looped. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:PLAY:SSPOsition:INITial:ENABle?

Returns the current state of the initial start position setting.

: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 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>`

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. The default value is 00:00:00.

`:PLAY:SSPOsition:INITial:TIME?`

Returns the current initial start position of the selected stream by time.

`:PLAY:SSPOsition[:POSition] <numeric_value>,<numeric_value>`

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. You can set the positions from 0 to (available maximum value of the selected stream file). The default values are both 0.

`:PLAY:SSPOsition[:POSition]?`

Returns the current loop start and stop position settings of the selected stream by the number of packets.

`:PLAY:SSPOsition:TIME <string>,<string>`

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. You can set the time from 0 to (available maximum value of the selected stream file). The default values are both 00:00:00.

`:PLAY:SSPOsition:TIME?`

Returns the current loop start and stop position settings of the selected stream by time (hh:mm:ss).

`:PLAY:STANdard?`

Returns the standard of the loaded stream file. 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.

**:PLAY:START**

Starts outputting the selected stream. There are no arguments.

**:PLAY:STOP**

Stops outputting the selected stream. There are no arguments.

**:PLAY:SYNC TSPacket|SF|NONTs**

Sets the format of the PSYNC signal output from the SPI IN/OUT connector. 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.

**:PLAY:SYNC?**

Returns the current format setting of the PSYNC signal.

**:PLAY:SYNC:DVALid:WIDTh NONE|<numeric\_value>**

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. You can set the width from 16 bytes to 255 bytes. This value cannot be set more than the value set by the :PLAY:SYNC:PSYNc:INTerval command. The default value is 188.

**:PLAY:SYNC:DVALid:WIDTh?**

Returns the current status and data width of the DVALID signal.

**:PLAY:SYNC:PSYNc:INTerval NONE|<numeric\_value>**

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. You can set the interval from 16 bytes to 255 bytes. This value needs to be set equal to or greater than the value in the :PLAY:SYNC:DVALid:WIDTh command. The default value is 188.

**:PLAY:SYNC:PSYNc:INTerval?**

Returns the current status and output period of the PSYNC signal.

`:PLAY:TIMEpacket:DEFine <numeric_value>,<numeric_value>,  
<numeric_value>,<numeric_value>,  
<numeric_value>,<numeric_value>`

Sets the initial values of the TDT, TOT, or STT when selected USER in the `:PLAY:TIMEpacket:MODE` command. 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.

`:PLAY:TIMEpacket:DEFine?`

Returns the current data and time settings of the TDT, TOT, or STT.

`:PLAY:TIMEpacket:MODE ORIGINAL|OS|USER`

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. 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.

`: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`

Sets whether to update parameters in a stream when looped. You can select which parameters are updated using the `:PLAY:UPDAte:ITEM` commands. You can use 1 or 0 instead of ON or OFF. The default value is ON.

`:PLAY:UPDAte?`

Returns the current update mode status.

`:PLAY:UPDAte:ITEM:CC ON|OFF`

Sets whether to update continuity\_counter values when the `:PLAY:UPDAte` command is set to ON. You can use 1 or 0 instead of ON or OFF. The default value is ON.

`:PLAY:UPDAte:ITEM:CC?`

Returns whether to update continuity\_counter values when the `:PLAY:UPDAte` command is set to ON.

`:PLAY:UPDAte:ITEM:NPT ON|OFF`

Sets whether to update NPT values when the `:PLAY:UPDAte` command is set to ON. You can use 1 or 0 instead of ON or OFF. 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. The default value is OFF.

`: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`

Sets whether to update PCR/PTS/DTS values when the `:PLAY:UPDAte` command is set to ON. You can use 1 or 0 instead of ON or OFF. The default value is 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`

Sets the method to update PCR/PTS/DTS values. The choices are HARDware and SOFTWARE. The default value is HARDware.

`:PLAY:UPDAte:ITEM:PCR:METHod?`

Returns the update method for PCR/PTS/DTS values.

`:PLAY:UPDAte:ITEM:REEDsolomon ON|OFF`

Sets whether to update Reed-Solomon symbols in an ISDB-T transport stream when the `:PLAY:UPDAte` command is set to ON. You can use 1 or 0 instead of ON or OFF. The default value is ON.

`:PLAY:UPDAte:ITEM:REEDsolomon?`

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`

Sets whether to update TDT/TOT/STT values when the `:PLAY:UPDAte` command is set to ON. You can use 1 or 0 instead of ON or OFF. The default value is ON.

:PLAY:UPDAte:ITEM:TIMEpacket?

Returns whether to update TDT/TOT/STT values when the :PLAY:UPDAte command is set to ON.

## RECORD Commands

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

### Command Tree

```

:RECORD
  :ACQUIRE
    :START
    :STOP
  :CLOCK
    :RATE?
  :EXTERNAL          RISE|FALL|OFF
  :PACKET?
  :SOURCE            SPI|ASI|UNIVERSAL|BNCserial|DHEI|
                    I1394I|S310M|STANDARD|OPTION
  :STANDARD?
  :START
  :STOP
  :STORE
    :FILE             <file_name>
    :MODE             NEWfile|OVERwrite
  :TARGET
    :IGNOREDVALID    ON|OFF
    :SIZE             <numeric_value>
    :TIME             <string>
    :TRIGGER
      :CONTINUOUS     ON|OFF
      :LIMIT          <numeric_value>
      :POSITION       <numeric_value>
    :TYPE             RAM|DISK
    :UNLIMIT         ON|OFF
  :PROGRESS?
  
```



## Command 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:CLOCK:RATE?

Returns the clock rate of the input stream in MHz.

:RECOrd:EXTernal RISE|FALL|OFF

Sets whether to start input stream record using a trigger signal applied to the TRIG IN connector. The choices are RISE, FALL, and OFF. When you set it to RISE, the input stream record is started at the rising edge of the applied trigger signal. When you set it to FALL, the input stream record is started at the falling edge of the applied trigger signal. The default value is OFF.

:RECOrd:EXTernal?

Returns whether to start input stream record using a trigger signal applied to the TRIG IN connector.

:RECOrd:PACKet?

Returns the packet size of the input stream. The available responses are 188, 204, 208, or NONTs. When the :RECOrd:I1394I:PARTIaltS command is set to ON, the response is 192.

:RECOrd:SOURce SPI|ASI|UNIVersal|BNCserial|DHEI|I1394I|S310M|STANDard|OPTion

Sets the interface used to capture a stream data. The choices are SPI, ASI, UNIVersal, BNCserial, DHEI, I1394I (IEEE1394), S310M (SMPTE310M), STANDard (same as SPI), and OPTion (optional interface currently installed). The default value is SPI.

:RECORD:SOURCE?

Returns the current interface used to capture a stream data.

:RECORD:STORE:FILE <file\_name>

Specifies the file name used when the input stream is saved.

:RECORD:STANDARD?

Returns the current standard used to display the input stream. The available responses are MPEG, ARIB, ATSC, DVB, NONTs, MTMCc, STMCc, and ISDBT. The MTMCc, STMCc, and ISDBT standard are checked only when the :SYSTEM:STANDARD command is set to ARIB. When the RECORD:I1394I PARTIALts command is set to ON, the response is P\_TS.

:RECORD:START

Starts recording the input stream.

:RECORD:STOP

Stops recording the input stream.

:RECORD:STORE:FILE?

Returns the current file name used when the input stream is saved.

:RECORD:STORE:MODE NEWfile|OVERwrite

Sets the save mode when the input stream is saved. The choices are NEWfile and OVERwrite. For NEWfile, a new file is created whenever you save a stream file. The file name is the following: The name specified by the :RECORD:STORE:FILE command + # (1, 2, 3, 4...). For OVERwrite, the existing file is overwritten by the new file with the name specified in the :RECORD:STORE:FILE command. The default value is OVERwrite.

:RECORD:STORE:MODE?

Returns the current save mode setting when the input stream is saved.

:RECORD:TARGET:TRIGGER:IGNOREdvalid ON|OFF

Sets whether the instrument ignores the DVALID signal from the selected interface when a stream data is acquired. When you set it to ON, the instrument ignores the DVALID signal, and the stream data is acquired according to the internal clock signal. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:RECOrd:TARGet:TRIGger:IGNOredvalid?

Returns whether the instrument ignores the DVALID signal from the selected interface when a stream data is acquired.

:RECOrd:TARGet:SIZE <numeric\_value>

Sets the file size to record the input stream in MB. You can set the file size from 1 to free space of the system RAM or hard disk. This setting changes the :RECOrd:TARGet:TIME command setting. The default value is 50 MB.

:RECOrd:TARGet:SIZE?

Returns the current file size setting to record the input stream.

:RECOrd:TARGet:TIME <string>

Sets the recording time (hh:mm:ss) to record the input stream. 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. This setting changes the :RECOrd:TARGet:SIZE command setting. The default value is 00:00:00.

:RECOrd:TARGet:TIME?

Returns the current recording time (hh:mm:ss) to record the input stream.

:RECOrd:TARGet:TRIGger:CONTInuous ON|OFF

Turns Continuous Recording on or off. When you set it to ON, you can record multiple stream files continuously on the hard disk. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:RECOrd:TARGet:TRIGger:CONTInuous?

Returns the current Continuous Recording state.

:RECOrd:TARGet:TRIGger:CONTInuous:LIMit <numeric\_value>

Sets the number of files to stop Continuous Recording. You can set the value from 2 to 32767. The default value is 32767.

:RECOrd:TARGet:TRIGger:CONTInuous:LIMit?

Returns the number of files to stop Continuous Recording.

:RECOrd:TARGet:TRIGger:POSition <numeric\_value>

Sets the trigger position used to record the input stream. You can set the trigger position from 0% to 100%. The default value is 0%.

:RECOrd:TARGeT:TRIGger:POSition?

Returns the current trigger position setting.

:RECOrd:TARGeT:TYPE RAM|DISK

Sets the record target used to record the input stream. The choices are RAM and DISK (hard disk). The default value is DISK.

:RECOrd:TARGeT:TYPE?

Returns the current record target used to record the input stream.

:RECOrd:TARGeT:TRIGger:UNLlimit ON|OFF

Sets whether to record the input stream to the full free space in the hard disk or RAM. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:RECOrd:TARGeT:TRIGger:UNLlimit?

Returns whether to record the input stream to the full free space in the hard disk or RAM.

:RECOrd:PROGress?

Returns the current percentage of progress during recording.

## SYSTEM Commands

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

### Command Tree

```

:SYSTem
  :COMMunicate
    :SOCKet
      :PORT <numeric_value>
      :RXTERM CR|LF
      :TXTERM CR|LF|CRLF|LFCR
    :ERRor[:NEXT]?
    :KLOCK[:STATe] ON|OFF
    :MODE PLAY|RECOrd
    :OPTions?
    :PRESet
    :STANdard MPEG|ARIB|ATSC|DVB
    :STATus?
  
```

## Command Description

:SYSTem:COMMunicate:SOCKet:PORT <numeric\_value>

Sets the port number needed to remotely control the instrument over an Ethernet network. You can set the value from 1024 to 65535. When you change the value, the current network connection is disconnected.

:SYSTem:COMMunicate:SOCKet:PORT?

Returns the current port number setting.

:SYSTem:COMMunicate:SOCKet:RXTERM CR|LF

Sets the terminator used when the instrument receives commands from a controller. The choices are CR (carriage return) and LF (linefeed). The default value is LF.

:SYSTem:COMMunicate:SOCKet:RXTERM?

Returns the terminator used when the instrument receives commands from a controller.

:SYSTem:COMMunicate:SOCKet:TXTERM CR|LF|CRLF|LFCR

Sets the terminator used when the instrument sends information to a controller. The choices are CR (carriage return), LF (linefeed), CRLF, and LFCR. The default value is CRLF.

:SYSTem:COMMunicate:SOCKet:TXTERM?

Returns the terminator used when the instrument sends information to a controller.

:SYSTem:ERRor[:NEXT]?

Returns an error message from the error/event queue. The response format is as follows:

<error\_code>,"<error\_message>"

Refer to *Error Messages and Codes* on page 3–1 for detailed information.

:SYSTem:KLOCK[:STATe] ON|OFF

Locks or unlocks the front-panel buttons and mouse operation. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:SYSTem:KLOCK[:STATe]?

Returns the current status of lock function.

`:SYSTem:MODE PLAY|RECOrd`

Sets the operation mode of the instrument. The choices are `PLAY` and `RECOrd`. The default value is `PLAY`.

`: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`

Sets the standard used to display the input stream. The choices are `MPEG`, `ARIB`, `ATSC`, and `DVB`. The default value is `ARIB`.

`:SYSTem:STANdard?`

Returns the current standard used to display the input stream.

`:SYSTem:STATus?`

Returns the current operation status of the instrument. 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

## Optional Commands

This subsection describes the commands used to control the optional interface cards. These commands are available only when the appropriate interface card is installed into the MTS400 Series System.

### Option 07 SMPTE310M/ASI Interface

:PLAY:OP07AS:PORT:TYPE ASI|S310M

Selects the signal to output from the OUTPUT connector. The choices are ASI and S310M (SMPTE310M). The default value is ASI.

:PLAY:OP07AS:PORT:TYPE?

Returns the current output signal selection.

:PLAY:S310M M8VSB

Selects the SMPTE310M mode for output. The only choice is M8VSB.

:PLAY:S310M?

Returns the current SMPTE310M mode for output.

:PLAY:ASI:FORMAT BYTE|BURST|PACKET

Sets the output format of the ASI signal. The choices are BYTE, BURST, and PACKET. The default value is PACKET.

:PLAY:ASI:FORMAT?

Returns the current output format setting of the ASI signal.

:PLAY:OP07AS:PORT: THROughout ON|OFF

Selects play loop throughout. The default Value is OFF.

:PLAY:OP07AS:PORT: THROughout?

Returns the current loop throughout status.

:RECORD:OP07AS:INPUTPORT BNC|SPI

Selects the recording input port. The default value is BNC.

:RECORD:OP07AS:INPUTPORT?

Returns the current recording input port.

:RECORD:OP07AS:PORT:TYPE ASI|S310M

Selects the input signal expected from the INPUT connector. The choices are ASI and S310M (SMPTE310M). The default value is ASI.

:RECORD:OP07AS:PORT:TYPE?

Returns the current input signal selection.

:RECORD:S310M M8VSB

Selects the SMPTE310M mode for input. The only choice is M8VSB.

:RECORD:S310M?

Returns the current SMPTE310M mode for input.

## IP Interface

### General Settings

:PLAY:IPAvailable?

Returns whether the IP interface is available.

:PLAY:IPENable ON|OFF

Enables the IP interface when set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IPENable?

Returns whether the IP interface is enabled.

:PLAY:OPCArdenbl ON|OFF

Enables the optional card when set to ON. You can use 1 or 0 instead of ON or OFF.

: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:DVCName?

Returns the current device name for the IP playout.

:PLAY:IP:PARAMeters:DVINdex <numeric\_value>

Sets the index value of the network interface card. You can set the index value from 0 to N-1 where N is the number of available network interface cards.

:PLAY:IP:PARAMeters:DVINdex?

Returns the current index value of the selected network interface card.

:PLAY:IP:PARAMeters:TRANsmode UNICAST|MULTICAST|BROADCAST

Sets the transmission mode of the protocol. The choices are UNICAST, MULTICAST, and BROADCAST. The default value is MULTICAST.

:PLAY:IP:PARAMeters:TRANsmode?

Returns the current transmission mode of the protocol.

:PLAY:IP:PARAMeters:PACKetszmode IPPKSZMD|TSPKCTMD

Sets the packet size mode for the IP playout. The choices are IPPKSZMD and TSPKCTMD. The default value is TSPKCTMD.

:PLAY:IP:PARAMeters:PACKetszmode?

Returns the current packet size mode.

:PLAY:IP:PARAMeters:IPPKtsize <numeric\_value>

Sets the size of the IP packet. You can set the size from 1 bytes to 16,128 bytes.

:PLAY:IP:PARAMeters:IPPKtsize?

Returns the current size of the IP packet.

:PLAY:IP:PARAMeters:TSPKtcount <numeric\_value>

Sets the number of TS packets that needs to be embedded into an IP packet. You can set the TS packets from 1 to 85.

:PLAY:IP:PARAMeters:TSPKtcount?

Returns the current number of TS packets that is embedded into an IP packet.

:PLAY:IP:PARAMeters:TSFRagment ON|OFF

Allows fragmentation of TS packets. When set to ON, the TS packets will be split across the IP packets. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:PLAY:IP:PARAMeters:TSFRagment?

Returns whether to allow TS fragmentation across IP packets.

:PLAY:IP:PARAMeters:IPFRagment ON|OFF

Allows fragmentation of IP packets. When set to ON, the IP packets will be fragmented else they will retain the same size. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:PLAY:IP:PARAMeters:IPFRagment?

Returns whether to allow IP fragmentation during IP payout.

:PLAY:IP:PARAMeters:BITRate <numeric\_value>

Sets the IP bit rate value for the payout. You can set the values from 0.250 Mbps to 250.000 Mbps.

:PLAY:IP:PARAMeters:BITRate?

Returns the current value of the IP bit rate.

:PLAY:PROGRESS?

Returns the current percentage of progress during the IP payout.

### **Protocol Settings**

:PLAY:IP:PARAMeters:PRTOcol:SETTings:MODE UDP|RTP

Sets the protocol mode for IP payout. The choices are UDP and RTP. The default mode is RTP.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:MODE?

Returns the current protocol mode for IP payout.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:SRCIpadd <IP address of the instrument>

Sets the the source IP address for IP payout.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:SRCIpadd?

Returns the current value of the source IP address.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:DSTIpadd <IP address of the destination>

Sets the destination IP address for IP payout. The default value is 239.1.1.1.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:DSTIpadd?

Returns the current value of the destination IP address.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:SRCPort <numeric\_value>

Sets the source port for the IP payout. You can set the source port value from 0 to 65535. The default value is 16384.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:SRCPort?

Returns the current source port value.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:DSTPort <numeric\_value>

Sets the destination port value. You can set the destination port value from 0 to 65535. The default value is 16384.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:DSTPort?

Returns the current destination port value.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:VLAN ON|OFF

Enables the VLAN settings. When set to on, displays the VLAN parameters in the Advanced settings screen. You can use 1 or 0 instead of ON or OFF. The default value is OFF.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:VLAN?

Returns whether the VLAN settings is enabled.

:PLAY:IP:PARAMeters:PRTOcol:SETTings:VLNid <numeric\_value>

Sets the VLAN identification number to allow the identification of 4096 VLANs that is basically used by the 802.1Q standard. You can set the values from 0 to 4095. The default value is 1.

: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 of the format xx:xx:xx:xx:xx:xx>

Sets the destination MAC address of the Ethernet layer.

: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 of the format xx:xx:xx:xx:xx:xx>

Sets the source MAC address of the Ethernet layer.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHErnet:SRCEmac?

Returns the current source MAC address of the Ethernet layer.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHErnet:PROTOcol  
<numeric\_value>

Sets the value of the protocol field in the ethernet layer. You can set the values from 0 to 65535. The default value is 2048 which corresponds to IP.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHErnet:PROTOcol?

Returns the current value of the protocol field in the Ethernet layer.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHEr-  
net:VLAN:TPID <string>

Sets the TPID value of the VLAN in the Ethernet layer. You can set the values from 0 to FFFF. The default value is 0X8100.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHEr-  
net:VLAN:TPID?

Returns the current TPID value of the VLAN.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHER-  
net:VLAN:PRIOrity <numeric\_value>

Sets the priority level of the VLAN in the Ethernet layer. You can set the values from 0 to 7.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHER-  
net:VLAN:PRIOrity?

Returns the current priority value of the VLAN.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHERnet:VLAN:CFI  
ON|OFF

Sets the canonical format indicator for the VLAN. When set to on, non-canonical MAC is selected. The default value is OFF.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHERnet:VLAN:CFI?

Returns the current status of the CFI.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHERnet:VLAN:VID  
<numeric\_value>

Sets the identification for the VLAN. The VID values can range from 0 to 4095. The default value is 1.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:ETHER-  
net:VLAN:VID?

Returns the current VID value of the VLAN.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:VERSion?

Returns the IP version.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:TOS <numeric\_val-  
ue>

Sets the type of service that indicates the desired parameters. The parameters are delay, throughput, and reliability. You can set the type of service value from 0 to 255. The default value is 0.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:TOS?

Returns the current type of service.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:PROTOcol  
<numeric\_value>

Sets the value of the protocol field in the IP layer. You can set the values from 0 to 255. The default value is 17 which corresponds to UDP.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:PROTOcol?

Returns the current value of the protocol field.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:SRCIpadd <String of the format xx:xx:xx:xx:xx:xx>

Sets the source IP address for the IP layer.

: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 of the format xx:xx:xx:xx:xx:xx>

Sets the destination IP address for the IP layer.

: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>

Sets the value of Time to Live in the IP layer. You can set the value from 0 to 255. The default value is 5.

: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>

Sets the source port value of the UDP layer. You can set the value from 0 to 65535. The default value is 16384.

: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>

Sets the destination port value of the UDP layer. You can set the value from 0 to 65535. The default value is 16384.

: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>

Sets the first value of the sequence number field in RTP header. You can set the value from 0 to 65535.

: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>

Sets the SSRC value for the RTP layer. You can set the value from 0 to 65535.

: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>

Sets the value of the payload type for the RTP layer. You can set the value from 0 to 255. The default value is 33.

:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:RTP:PYLOadtype?

Returns the current value of the payload type for the RTP layer.

### **Protocol Settings–Stream Replication Settings**

:PLAY:IP:PARAMeters:REPLication:COUNT <numeric\_value>

Sets the number of replications for a stream. You can set the value from 0 to 65535. The default value is 0.

:PLAY:IP:PARAMeters:REPLication:COUNT?

Returns the number of stream replications.

:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:SRCMac <String of the format xx:xx:xx:xx:xx:xx> where xx is a hexadecimal value

Sets the increment value for the source MAC address. 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 of the format xx:xx:xx:xx:xx:xx> where xx is a hexadecimal value

Sets the increment value for the destination MAC address. The increments for these addresses can be specified per 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>

Sets the increment value for the ethernet protocol. You can set the value from 0 to 65535.

:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:EPROtocol?

Returns the current increment value of the ethernet protocol.

:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:VLANid <numeric\_value>

Sets the identification of the VLAN. The values can range from 0 to 4095.

:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:VLANid?

Returns the current identification value of the VLAN.

:PLAY:IP:PARAMeters:REPLication:INCRement:IP:TOS <numeric\_value>

Sets the increment value for the type of service of the IP protocol. You can set the value from 0 to 255.



: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>

Sets the increment value for time to live of the IP protocol. You can set the value from 0 to 255.

: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 of the format xx:xx:xx:xx:xx:xx> where xx is a hexadecimal value

Sets the increment value for the source IP address. 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 of the format xx:xx:xx:xx:xx:xx> where xx is a hexadecimal value

Sets the increment value for the destination IP address. 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>

Sets the increment value for the source port of the UDP layer. You can set the value from 0 to 65535.

: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>

Sets the increment value for the destination port of the UDP layer. You can set the value from 0 to 65535.

: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>

Sets the increment value for the payload of the RTP layer. You can set the value from 0 to 127.

:PLAY:IP:PARAMeters:REPLication:INCRement:RTP:PAYLoad?

Returns the current increment value of the payload.

:PLAY:IP:PARAMeters:REPLication:INCRement:RTP:SSRC <numeric\_value>

Sets the increment value for the SSRC of the RTP layer. You can set the value from 0 to 65535.

:PLAY:IP:PARAMeters:REPLication:INCRement:RTP:SSRC?

Returns the current increment value of the SSRC.

### **Error Insertion**

:PLAY:IP:ERRIns:ENBLed ON|OFF.

Enables error insertion in real time when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IP:ERRIns:ENBLed?

Returns whether the error insertion is enabled.

:PLAY:IP:ERRIns:PARAMeters:PLENbled ON|OFF

Enables packet loss when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IP:ERRIns:PARAMeters:PLENbled?

Returns whether the packet loss is enabled.

:PLAY:IP:ERRIns:PARAMeters:PLVAlue <numeric\_value>

Sets the number of packets that will be dropped. You can set the value from 0 to 65535.

:PLAY:IP:ERRIns:PARAMeters:PLVAlue?

Returns the current number of dropped packets.

:PLAY:IP:ERRIns:PARAMeters:PLRAnge <numeric\_value>

Sets the packet loss range. You can set the value from 0 to 65535.

:PLAY:IP:ERRIns:PARAMeters:PLRAnge?

Returns the current packet loss range.

:PLAY:IP:ERRIns:PARAMeters:SQEEndbled ON|OFF

Enables sequence error when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IP:ERRIns:PARAMeters:SQEEndbled?

Returns whether the sequence error is enabled.

:PLAY:IP:ERRIns:PARAMeters:SQEValue <numeric\_value>

Sets the frequency value at which the packets will be reordered. You can set the value from 0 to 65535.

:PLAY:IP:ERRIns:PARAMeters:SQEValue?

Returns the current frequency value at which the packets are reordered.

:PLAY:IP:ERRIns:PARAMeters:SQERange <numeric\_value>

Sets the sequence error range. You can set the value from 0 to 65535

:PLAY:IP:ERRIns:PARAMeters:SQERange?

Returns the current sequence error range value.

:PLAY:IP:ERRIns:PARAMeters:SQEDistance <numeric\_value>

Sets the distance value after which you want the reordering to happen. You can set the value from 0 to 65535

:PLAY:IP:ERRIns:PARAMeters:SQEDistance?

Returns the current distance value.

:PLAY:IP:ERRIns:PARAMeters:CSEnabled ON|OFF

Enables checksum error when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IP:ERRIns:PARAMeters:CSEnabled?

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>

Sets the frequency value at which the checksum error will be inserted. You can set the value from 0 to 65535.

:PLAY:IP:ERRIns:PARAMeters:CSEValue?

Returns the current frequency value at which the checksum errors are inserted.

:PLAY:IP:ERRIns:PARAMeters:CSERange <numeric\_value>

Sets the checksum error range. You can set the value from 0 to 65535.

:PLAY:IP:ERRIns:PARAMeters:CSERange?

Returns the current checksum error range value.

:PLAY:IP:ERRIns:PARAMeters:RANDOMizerr ON|OFF

Sets the error insertion type. When set to ON, the random type is enabled. You can use 1 or 0 instead of ON or OFF.

: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 payout.

:PLAY:IP:ERRGen:GSQNerr

Generates sequence error by re-sequencing a packet with another packet within a 100 packet boundary.

:PLAY:IP:ERRGen:GCHIper

Generates checksum error in the IP layer.

:PLAY:IP:ERRGen:GCHUperr

Generates checksum error in the UDP layer.

### **Statistics**

:PLAY:IP:STATistics:IP:BIRate?

Returns the IP bit rate value for the play.

:PLAY:IP:STATistics:IP:BRVariation?

Returns the percentage of IP bit rate variation from the set bit rate.

:PLAY:IP:STATistics:IP:BIRate:MIN?

Returns the minimum IP bit rate value for the play.

:PLAY:IP:STATistics:IP:BIRate:MINVariation?

Returns the minimum variation value from the set bit rate value.

:PLAY:IP:STATistics:IP:BIRate:MAX?

Returns the maximum IP bit rate value for the play.

:PLAY:IP:STATistics:IP:BIRate:MAXVariation?

Returns the maximum IP bit rate variation value from the set bit rate value.

:PLAY:IP:STATistics:IP:BIRate:AVG?

Returns the average bit rate value for the play.

:PLAY:IP:STATistics:IP:BIRate:AVGVariation?

Returns the average variation value from the set bit rate value.

:PLAY:IP:STATistics:IP:JITTer?

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:BYTRansmitted?

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.

: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:CSIPerrS?

Returns the number of IP checksum errors inserted during the play.

:PLAY:IP:STATistics:ERRORs:CSUDperrS?

Returns the number of UDP checksum errors inserted during the play.

:PLAY:IP:STATistics:REPLication:IP:BIRe?

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:BYTRansmitted?

Returns the total bytes transmitted in all the streams.

:PLAY:IP:STATistics:REPLication:TS:BIRe?

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:CSIPerrS?

Returns the total number of IP checksum errors of all the streams.

:PLAY:IP:STATistics:REPLication:IP:ERRORs:CSUDPerrs?

Returns the total number of UDP checksum errors of all the streams.

### Parametric Settings

:PLAY:IP:PRMEtric:PROCpriority NORMAL|ABOVE\_NORMAL|HIGHEST|REAL\_TIME

Sets the process priority for the player. The choices are NORMAL, ABOVE NORMAL, HIGHEST, and REAL TIME. The default value is REAL\_TIME.

:PLAY:IP:PRMEtric:THRPriority IDLE|BELOW\_NORMAL|NORMAL|ABOVE\_NORMAL|HIGHEST|REAL\_TIME

Sets the thread priority for the player. The choices are IDLE, BELOW NORMAL, NORMAL, ABOVE NORMAL, HIGHEST, and REAL TIME. The default value is NORMAL.

:PLAY:IP:PRMEtric:THRPriority?

Returns the current thread priority value of the play.

:PLAY:IP:PRMEtric:BSTEnabled ON|OFF

Enables the burst mode when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

:PLAY:IP:PRMEtric:BSTEnabled?

Returns whether the burst mode has been enabled.

:PLAY:IP:PRMEtric:BSTType BURST\_PERIOD|BURST\_SIZE

Sets the burst mode for the IP playout. The choices are BURST PERIOD and BURST SIZE. The default is BURST PERIOD.

:PLAY:IP:PRMEtric:BSTType?

Returns the current value of the burst mode.

:PLAY:IP:PRMEtric:BPERiod <numeric\_value>

Sets the burst period for the IP playout. The value can range from 1 ms to 1000 ms.

: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:JITEnabled ON|OFF`

Enables jitter when the value is set to ON. You can use 1 or 0 instead of ON or OFF.

`:PLAY:IP:PRMEtric:JITEnabled?`

Returns whether the jitter has been enabled.

`:PLAY:IP:PRMEtric:JITType LAPLACE|GAUSSIAN|SINE|FIXED`

Sets the jitter type for IP payout. The options are LAPLACE, GAUSSIAN, SINE, FIXED. FIXED is taken as the default value.

`:PLAY:IP:PRMEtric:JITType?`

Returns the current jitter type for IP payout.

`:PLAY:IP:PRMEtric:JITPeriod <numeric_value>`

Sets the jitter period value for IP payout. You can set the value in  $\mu$ s for FIXED jitter type and percentage value for all the other jitter types.

`:PLAY:IP:ERRIns:PARAMeters:JITPeriod?`

Returns the current value of jitter period for IP payout.



# Error Messages and Codes

This section lists the error messages and codes.

Error messages and codes can be obtained by using the query :SYSTem:ER-Ror[: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 3-1: 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

**Table 3-1: Command errors (Cont.)**

<b>Error code</b>	<b>Error message</b>
-138	suffix not allowed
-140	character data error
-141	invalid character data
-144	character data too long
-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 3-2: Execution errors**

<b>Error code</b>	<b>Error message</b>
-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
-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

**Table 3-2: Execution errors (Cont.)**

<b>Error code</b>	<b>Error message</b>
-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 3-3: 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 3-4: Query errors**

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





# Appendix A: Default Settings

Table A-1 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.

**Table A-1: Default settings**

Header	Default settings
<b>DISPLAY commands</b>	
:DISPlay:VIEW:FORMat	HEXadecimal
<b>PLAY commands</b>	
:PLAY:AUTOplay	OFF (0)
:PLAY:CLOCK:DEFault:RATE	5.6610E+001
:PLAY:CLOCK:DEFault:RATE:RATIo	629,300
:PLAY:CLOCK:ESRAtefixed	OFF (0)
:PLAY:CLOCK:ISDBT:CONVert	ON (1)
:PLAY:CLOCK:RATE	5.6610E+001
:PLAY:CLOCK:RATE:RATIo	0, 0
:PLAY:CLOCK:SOURce	INTernal
:PLAY:LOOP	ON (1)
:PLAY:LOOP:ISDBT:FRAMe	ON (1)
:PLAY:PACKet	188
:PLAY:PCR:INACcuracy	NONE
:PLAY:PCR:INITial	0, 0
:PLAY:S192F:PARTialts	ON (1)
:PLAY:SOURce	DISK
:PLAY:SPIOOutput	ON (1)
:PLAY:SSPOsition:INITial:ENABle	ON (1)
:PLAY:SSPOsition:INITial[:POSition]	0
:PLAY:SSPOsition:INITial:TIME	"00:00:00"
:PLAY:SSPOsition[:POSition]	0, 0
:PLAY:SSPOsition:TIME	"00:00:00","00:00:00"
:PLAY:SYNC	TSPAcet
:PLAY:SYNC:DVALid:WIDTh	NONE

**Table A-1: Default settings (Cont.)**

<b>Header</b>	<b>Default settings</b>
:PLAY:SYNC:PSYNc:INTerval	NONE
:PLAY:TIMEpacket:DEFine	Current data and time
:PLAY:TIMEpacket:MODE	ORIGinal
:PLAY:UPDAtE	ON (1)
:PLAY:ITEM:CC	ON (1)
:PLAY:ITEM:NPT	OFF (0)
:PLAY:ITEM:PCR	ON (1)
:PLAY:ITEM:PCR:METHod	HARDWare
:PLAY:ITEM:REEDsolomon	ON (1)
:PLAY:ITEM:TIMEpacket	ON (1)
<b>RECORD commands</b>	
:RECOrd:EXTernal	OFF (0)
: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)
<b>SYSTEM commands</b>	
: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
<b>Optional commands</b>	
Option 07 SMPTE310M/ASI Interface	
:PLAY:OP07AS:PORT:TYPE	ASI
:PLAY:S310M	M8VSB

**Table A-1: Default settings (Cont.)**

<b>Header</b>	<b>Default settings</b>
:PLAY:ASI:FORMAT	PACKET
:PLAY:OP07AS:PORT: THROughout	OFF
:RECORD:OP07AS:INPUTPOR T	BNC
:RECORD:OP07AS:POR T:TYPE	ASI
:RECORD:S310M	M8VSB
<b>IP Interface: General Settings</b>	
:PLAY:IPENable	OFF
:PLAY:OPCArdenbl	ON
:PLAY:IP:PARAmeters:DEFAult	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
<b>IP Interface: Protocol Settings</b>	
:PLAY:IP:PARAmeters:PRTOcol:SETTings:MODE	RTP
:PLAY:IP:PARAmeters:PRTOcol:SETTings:SRCIpadd	Autodetected from the active Net- work 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
<b>IP Interface: Protocol Settings: Advanced Screen</b>	
:PLAY:IP:PARAmeters:PRTOcol:CUSTomize: HEADers:ETHErnet:DESTmac	01:00:5E:01:01:01
:PLAY:IP:PARAmeters:PRTOcol:CUSTomize: HEADers:ETHErnet:SRCEmac	Autodetected from the active Net- work Interface Card (NIC interface)
:PLAY:IP:PARAmeters:PRTOcol:CUSTomize: HEADers:ETHErnet:PROTocol	2048
:PLAY:IP:PARAmeters:PRTOcol:CUSTomize: HEADers:ETHErnet:VLAN:TPID	0X8100

**Table A-1: Default settings (Cont.)**

<b>Header</b>	<b>Default settings</b>
: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
:PLAY:IP:PARAMeters:PRTOcol:CUSTomize:HEADers:IP:SRCPadd	Autodetected 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
<b>IP Interface: Protocol Settings: Stream Replication Settings</b>	
:PLAY:IP:PARAMeters:REPLication:COUNT	0
:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:SRCMac	00:00:00:00:00:00
:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:DSTMMac	00:00:00:00:00:00
:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:EPROtocol	0
:PLAY:IP:PARAMeters:REPLication:INCRement:ETHErnet:VLANid	0
:PLAY:IP:PARAMeters:REPLication:INCRement:IP:TOS	0
:PLAY:IP:PARAMeters:REPLication:INCRement:IP:TTL	0

**Table A-1: Default settings (Cont.)**

<b>Header</b>	<b>Default settings</b>
: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
<b>IP: Error Insertion</b>	
: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)
<b>IP: Error Generation</b>	
:PLAY:IP:ERRGen:GPKTIos	No parameters
:PLAY:IP:ERRGen:GSQNerr	No parameters
:PLAY:IP:ERRGen:GCHIpperr	No parameters
:PLAY:IP:ERRGen:GCHUdperr	No parameters
<b>IP: Parametric Settings</b>	
:PLAY:IP:PRMEtric:PROCpriority	ABOVE_NORMAL

**Table A-1: Default settings (Cont.)**

<b>Header</b>	<b>Default settings</b>
:PLAY:IP:PRMEtric:THRPriority	REAL_TIME
:PLAY:IP:PRMEtric:BSTEnabled	OFF (0)
:PLAY:IP:PRMEtric:BSTType	BURST PERIOD
:PLAY:IP:PRMEtric:BPPeriod	2 ms
:PLAY:IP:PRMEtric:BSIZE	10
:PLAY:IP:PRMEtric:JITEnabled	OFF (0)
:PLAY:IP:PRMEtric:JITType	FIXED
:PLAY:IP:PRMEtric:JITPeriod	1.000000 $\mu$ s

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