LeCroy

WaveJet 300 Series Oscilloscopes
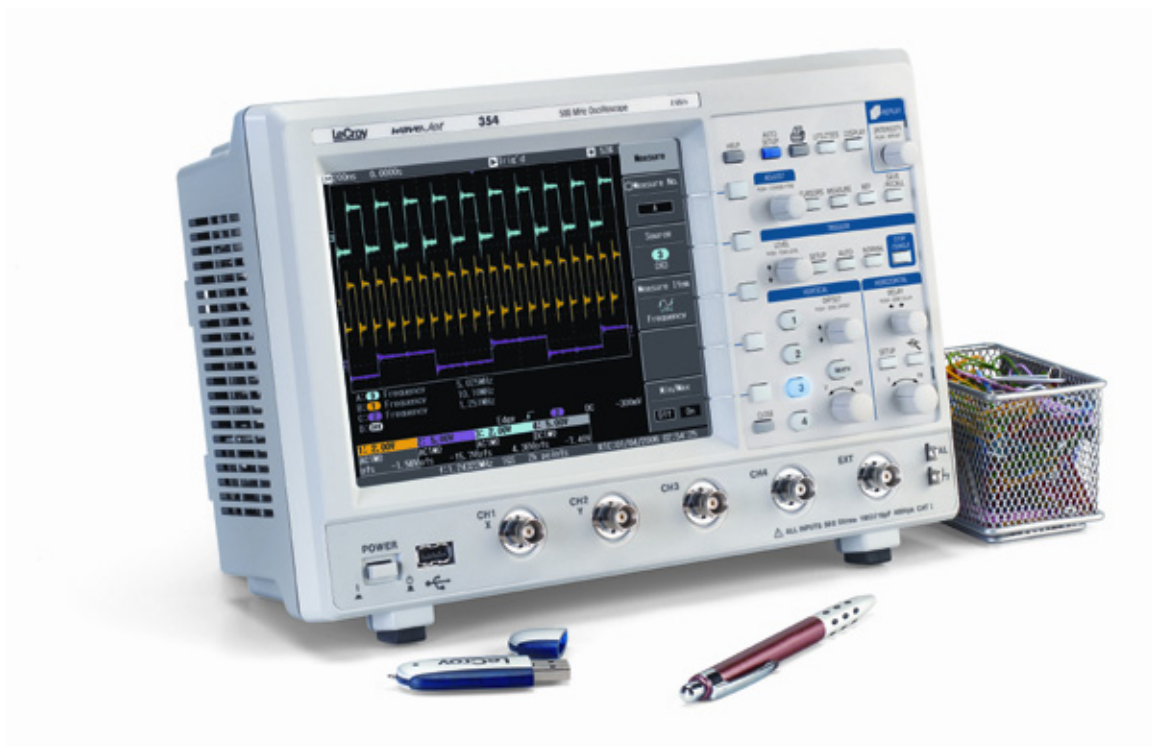
REMOTE CONTROL MANUAL

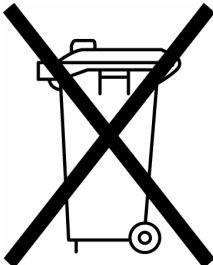### February 2007

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1. INTRODUCTION

The WJ-GPIB and WJ-LAN are interface boards exclusively for the WaveJet3xx series.

- Insert the board into one of the option slots on the rear of the WaveJet3xx before use.

- It can be inserted into either of the two option slots provided.

- Once the board is inserted into the slot, the WaveJet main unit automatically recognizes it as a remote interface, allowing you to select it.

- The WJ-GPIB and the WJ-LAN can be inserted at the same time, but only one of them can be selected.

- Two of the same kind of interface board must not be inserted at the same time (prohibited).

CAUTION!

To prevent damage to the instrument, turn instrument power OFF before inserting a WJ-GPIB or WJ-LAN interface board.

ESD Sensitive

The WJ-GPIB and WJ-LAN interface boards are sensitive to electrostatic discharge (ESD). To avoid causing damage to the boards, always follow anti-static procedures (wear wrist strap, etc.) when handling the boards.

1.1 WJ-GPIB Hardware

Applicable standard	GPIB IEEE-488.1
Usable unit	WaveJet 3xx series firmware 3.xx or later
Power supply	Supplied from WaveJet3xx option slot
Power consumption	Included in WaveJet3xx main unit
Dimensions	63 mm $\times$ 80 mm (excluding protrusion of connector terminal)
Mass	Approximately 70 g
Operating temperature range	0 to 40 °C
Operating humidity range	80% RH or lower (when operated within 0 to 40 °C)
Storage temperature range	-20 to +60 °C

1.2 WJ-LAN Hardware

Applicable standard	TCP/IP 10BASE-T/100BASE-T
Usable unit	WaveJet 3xx series firmware 3.xx or later
Power supply	Supplied from WaveJet3xx option slot
Power consumption	Included in WaveJet3xx main unit
Dimensions	63 mm $\times$ 80 mm (excluding protrusion of connector terminal)
Mass	Approximately 55 g
Operating temperature range	0 to 40 °C
Operating humidity range	80% RH or lower (when operated within 0 to 40 °C)
Storage temperature range	-20 to +60 °C

2. INSTALLATION OF GPIB AND TCP/IP

The Remote Function uses GPIB and TCP/IP as the interface. GPIB is installed according to IEEE488.1 and IEEE488.2, while TCP/IP is installed according to LeCroy VICP.

WaveJet Remote Control Interface Installation Procedure

The WaveJet remote control interfaces, WJ-LAN and WJ-GPIB are compatible with all WaveJet units running firmware version 3.06 or higher. For firmware upgrades please visit www.lecroy.com. The firmware and firmware installation instructions are available for download.

1. Confirm the installed firmware version is 3.06 or higher. To do this press **UTILITIES** on the front panel, select **Status and Update** and then select **Update**. If it is 3.06 or greater proceed to step 2. If not please update the firmware.

2. With the power off, remove the screws from the rear panel option slot.

3. Insert the WJ-LAN and/or WJ-GPIB interfaces into the slot and fasten the screws.

4. Turn the WaveJet power on and then press **UTILITIES** on the front panel.

5. In the **Utilities** menu a new selection, **Remote** will be available, if two cards are installed there will be a choice between TCP/IP and GPIB. If only one is installed there will only be one listing.

6. For GPIB operation use the **ADJUST** knob to set the appropriate GPIB address.

7. For TCP/IP use the **ADJUST** knob to set the IP address. Rotate the knob to change values; push the knob to jump from field to field. The WaveJet works with static IP addressing only.

8. Press the soft key next to the down arrow to move to **Subnet Mask and Default Gateway**. Rotate the knob to enter values; push the knob to change fields.

9. After entering the correct addresses, press **Enter** at the bottom of the remote menu and reboot the scope.

The WaveJet can be operated with both WJ-LAN and WJ-GPIB installed, or with only one interface card installed. However, two GPIB or two LAN cards cannot be installed simultaneously.

2.1 List of IEEE 488.1 interface functions subsets implemented

Table 2-1. List of IEEE 488.1 interface functions subsets implemented

Interface function	Subset
Source Handshake	SH1
Acceptor Handshake	AH1
Talker	T6,TE0
Listener	L4, LE0
Service Request	SR1
Remote Local	RL2
Parallel Poll	PP0
Device Clear	DC1
Device Trigger	DT1
Controller	C0
Electrical Interface	E2

2.2 Device behavior when the address is changed outside the range 0 to 30

- With GPIB, values that do not fall within the range of 0 to 30 cannot be selected.

- TCP/IP has 4 fields, IPv4, for which values that do not fall within the range of 0 to 255 cannot be selected.

2.3 When a user-initiated address change is recognized by the device

- GPIB immediately recognizes the address change.

- TCP/IP recognizes the change when the system is rebooted after the change.

2.4 Device setting at power-on, including commands which modify the power-on settings

- At power-on, device settings are restored to their values when the device was last powered off.

- A command for changing the power-on settings is not installed.

2.5 Message exchange options

Size and behavior of input buffer

The size of the input buffer is 512 bytes.

Queries that return more than one <RESPONSE MESSAGE UNIT>

See the list of commands.

Queries that generate a response when parsed

See the list of commands.

Queries that generate a response when read

See the list of commands.

Commands that are coupled

See the list of commands.

2.6 Functional elements used in constructing device-specific commands

Whether <compound command program header> elements are used must also be included.

Table 2-2. Device listening functional elements

Element	Implemented?
<PROGRAM MESSAGE>	Yes
<PROGRAM MESSAGE TERMINATOR>	Yes
<PROGRAM MESSAGE UNIT>	Yes
<PROGRAM MESSAGE UNIT SEPARATOR>	Yes
<COMMAND MESSAGE UNIT>	Yes
<QUERY MESSAGE UNIT>	Yes
<COMMAND PROGRAM HEADER>	Yes
<QUERY PROGRAM HEADER>	Yes
<PROGRAM HEADER SEPARATOR>	Yes
<PROGRAM DATA SEPARATOR>	Yes
<PROGRAM DATA>	Yes
<DECIMAL NUMERIC PROGRAM DATA>	Yes
<CHARACTER PROGRAM DATA>	Yes
<SUFFIX PROGRAM DATA>	Yes (see Figure 2-1)
<NON-DECIMAL NUMERIC PROGRAM DATA>	No
<STRING PROGRAM DATA>	No
<ARBITRARY BLOCK PROGRAM DATA>	Yes
<EXPRESSION PROGRAM DATA>	No
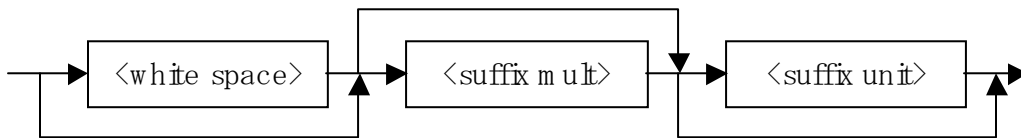
Figure 2-1. <SUFFIX PROGRAM DATA> element

- Enter <white space> according to IEEE488.2.

- Enter <suffix mult> in <upper/lower case alpha> according to IEEE488.2.

- Enter <suffix unit> according to IEEE488.2.

The following combinations only can be used for <compound command program header>.

Table 2-3. List of \<compound command program header\>

Selectable Depth1 Element	Selectable Depth2 Element
C1, C2, C3, C4 and M1	VDIV Command/Query
C1, C2, C3, C4 and M1	OFST Command/Query
C1, C2, C3, C4 and M1	TRA Command/Query
C1, C2, C3 and C4	CPL Command/Query
C1, C2, C3 and C4	PROBE Command/Query
C1, C2, C3 and C4	BWL Command/Query

2.7 Buffer size limitations related to block data

- If data exceeding the input buffer limit is received, the excess data is discarded until a delimiter is detected.

- If data exceeding the output queue limit is transmitted, commands that are not interpreted and excess data are discarded.

2.8 List of \<PROGRAM DATA\> elements

These may appear within an \<expression\>, and maximum sub-expression nesting depth.

Table 2-4. List of \<PROGRAM DATA\> elements

Element	Implemented?
\<CHARACTER PROGRAM DATA\>	Yes
\<DECIMAL NUMERIC PROGRAM DATA\>	Yes
\<SUFFIX PROGRAM DATA\>	Yes (see Figure 2-1)
\<NON-DECIMAL NUMERIC PROGRAM DATA\>	No
\<STRING PROGRAM DATA\>	No
\<ARBITRARY BLOCK PROGRAM DATA\>	Yes
\<EXPRESSION PROGRAM DATA\>	No

2.9 Response syntax for every query.

Table 2-5. Device listening functional elements

Element	Implemented?
\<RESPONSE MESSAGE\>	Yes
\<RESPONSE MESSAGE TERMINATOR\>	Yes
\<RESPONSE MESSAGE UNIT\>	Yes
\<RESPONSE MESSAGE UNIT SEPARATOR\>	Yes
\<RESPONSE DATA\>	Yes
\<RESPONSE DATA SEPARATOR\>	Yes
\<NR1 NUMERIC RESPONSE DATA\>	Yes
\<ARBITRARY ASCII RESPONSE DATA\>	Yes
\<RESPONSE HEADER SEPARATOR\>	No
\<RESPONSE HEADER\>	No
\<CHARACTER RESPONSE DATA\>	Yes

<NR2 NUMERIC RESPONSE DATA>	No
<NR3 NUMERIC RESPONSE DATA>	Yes
<HEXADECIMAL RESPONSE DATA>	No
<BINARY NUMERIC RESPONSE DATA>	No
<STRING RESPONSE DATA>	No
<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA>	Yes
<INDEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA>	No

2.10 Device-to-device message transfer traffic that does not follow the rules for <RESPONSE MESSAGE> elements

None.

2.11 Size of block data responses

Block data response is made for DTWAVE query, DTSTUP query, and TSCRN query.

Table 2-6. Size of block data responses (MLEN 500K, DTPOINTS 500000 and DTSTART 0)

Query	Status	Size of block data
DTWAVE?	Normal Sampling	500,010 bytes
DTWAVE?	Average Sampling	1,000,010 bytes
DTWAVE?	Multiplication Wave	2,000,010 bytes
DTWAVE?	Other Sampling	500,010 bytes
DTSTUP?	(Constant)	476 bytes
TSCRN?	TIFF	308,956 bytes
TSCRN?	BMP	308,288 bytes
TSCRN?	PNG	(Variable)

2.12 List of common commands and queries which are implemented

Table 2-7. List of common commands and queries

Mnemonic	Name	Implemented?
*AAD	Accept Address Command	No
*CAL?	Calibration Query	No
*CLS	Clear Status Command	Yes
*DDT	Define Device Trigger Command	No
*DDT?	Define Device Trigger Query	No
*DLF	Disable Listener Function Command	No
*DMC	Define Macro Command	No
*EMC	Enable Macro Command	No
*EMC?	Enable Macro Query	No
*ESE	Standard Event Status Enable Command	Yes

*ESE?	Standard Event Status Enable Query	Yes
*ESR?	Standard Event Status Register Query	Yes
*GMC?	Get Macro Contents Query	No
*IDN?	Identification Query	Yes
*IST?	Individual Status Query	No
*LMC?	Learn Macro Query	No
*LRN?	Learn Device Setup Query	No
*OPC	Operation Complete Command	Yes
*OPC?	Operation Complete Query	Yes
*OPT?	Option Identification Query	No
*PCB	Pass Control Back Command	No
*PMC	Purge Macro Command	No
*PRE	Parallel Poll Register Enable Command	No
*PRE?	Parallel Poll Register Enable Query	No
*PSC	Power On Status Clear Command	No
*PSC?	Power On Status Clear Query	No
*PUD	Protected User Data Command	No
*PUD?	Protected User Data Query	No
*RCL	Recall Command	Yes
*RDT	Resource Description Transfer Command	No
*RDT?	Resource Description Transfer Query	No
*RST	Reset Command	Yes
*SAV	Save Command	Yes
*SRE	Service Request Enable Command	Yes
*SRE?	Service Request Enable Query	Yes
*STB?	Read Status Byte Query	Yes
*TRG	Trigger Command	Yes
*TST?	Self-Test Query	Yes
*WAI	Wait-to-Continue Command	Yes

2.13 State of the device after successful completion of the Calibration query

Not implemented.

2.14 Maximum length of the block used to define the trigger macro, if *DDT is implemented

Not implemented.

2.15 Macro parameters

Maximum length of macro labels, maximum length of the block used to define a macro, and how recursion is handled during macro expansion, if macro commands are implemented

Not implemented.

2.16 Response to the identification common query, *IDN?

See the list of commands.

2.17 Size of protected user data storage area if the *PUD command and *PUD? query are implemented

Not implemented.

2.18 Size of resource description if the *RDT command or *RDT? query are implemented.

Not implemented.

2.19 States affected by *RST, *LRN?, *RCL, and *SAV

Table 2-8. List of states affected

Name	State
*RST	Same as Recall Default Setup
*LRN	Not implemented
*RCL	Same as Recall Setup
*SAV	Same as Save Setup

2.20 Scope of self-test performed by the *TST? query

The Acquisition Memory test is conducted.

2.21 Additional status data structures used in the device's status reporting

Status Byte Register

Table 2-9. Model of Status Byte Register

Bit	Definition	Implemented?
7	Device-Defined Summary Message	No (always zero)
6	Master Summary Status	Yes
5	Standard Event Status Bit (ESB) Summary Message	Yes
4	MAV Queue Summary Message	Yes (only GPIB)
3	Device-Defined Summary Message	No (always zero)
2	Device-Defined Summary Message	No (always zero)
1	Device-Defined Summary Message	No (always zero)
0	Trigger Event Status Bit (TESB) Summary Message	Yes

Service Request Enable Register

An application programmer can select which summary messages in the Status Byte Register may cause service requests.

Standard Event Status Register

Table 2-10. Model of Standard Event Status Register

Bit	Definition	Implemented?
7	Power On (PON)	Yes
6	User Request (URQ)	No (always zero)
5	Command ERROR (CME)	Yes
4	Execution ERROR (EXE)	Yes
3	Device-Specific Error (DDE)	Yes
2	Query ERROR (QYE)	Yes (only GPIB)
1	Request Control (RQC)	No (always zero)
0	Operation Complete (OPC)	Yes

Standard Event Status Enable Register

The Standard Event Status Enable Register allows one or more events in the Standard Event Status Register to be reflected in the ESB summary-message bit.

Trigger Event Status Register

Table 2-11. Model of Trigger Event Status Register

Bit	Definition	Implemented?
7	Always zero	No
6	Always zero	No
5	Always zero	No
4	Always zero	No
3	Always zero	No
2	Always zero	No
1	Always zero	No
0	Single Wave Enable (SWE)	Yes

Trigger Event Status Enable Register

The Trigger Event Status Enable Register allows one or more events in the Standard Event Status Register to be reflected in the TESB summary-message bit.

2.22 For each command, a statement describing whether it is overlapped or sequential

Overlapped commands are not provided.

2.23 For each command device, the documentation shall specify the functional criteria that are met when an operation complete message is generated in response to that command.

- Overlapped commands are not provided.

- The operation is completed on receipt of the command.

3. REMOTE MENU

If the option board is mounted, **Remote** can be selected from the **Utilities** menu.

The Remote menu is configured as follows.

- Communication is performed only through the interface selected.
- IP Address, Subnet Mask, and Default Gateway can be set for the IP Address Dialog.
- The IP Address Dialog displays the MAC Address.

Table 3-1. When Interface is set to Off

Menu	Function
Interface	Off
	Not used
	Not used
	Not used
	Not used

Table 3-2. When GPIB is selected as Interface

Menu	Function
Interface	GPIB
Address	GPIB Address
	Not used
	Not used
	Not used

Table 3-3. When TCP/IP is selected as Interface

Menu	Function
Interface	TCP/IP
IP Address	IP Address Menu display function
	IP Address Menu cursor down function
	Not used
Enter	Sets the current IP Address.

4. LIMITATIONS ON REMOTE FUNCTION

The following limitations are imposed when Remote Control is selected.

- Delimiters permit the following settings.

Table 4-1. Delimiters

State	Delimiter
Recv	EOI only
Recv	CR+EOI
Recv	LF+EOI
Recv	CR+LF+EOI
Send	LF+EOI

- Panel Lock mode is entered.
- The setting is changed to the following once Remote Control mode is entered.

Table 4-2. Setup in Remote Control mode

Item	Setup	Panel
Help display	Off	-
Offset Setting	Division	Utilities/Config. 1/2
Power Off	Never	Utilities/Config. 1/2/Power Management
Panel Lock	Lock	Utilities/Config. 2/2
Volts/div	Coarse	Channel Menu 2/2
Zoom	Off	ZOOM
Line Number (TV Standard = NTSC)	263/262	Trigger Menu/Type = TV/TV Setting
Line Number (TV Standard = PAL)	625	Trigger Menu/Type = TV/TV Setting

5. RESPONSE FORMATS

The following response formats are provided according to the settings of the DTFORM and DTBOARD commands. The number of data to be transferred may vary depending on the settings of the DTSTART and DTPOINTS commands.

(1) The DTFORM command is set to "BYTE/WORD" (binary transfer):

   #8 <byte-length> <binary-block>

- #8 shows that the response message is described in the format of <Definite Length Arbitrary Block Response Data> and that the content of the following <byte_length> is an 8-digit ASCII string.
- The contents of <byte_length> represents the number of bytes to be entered into <binary_block>. The byte length should always be a sign-free, 8-digit integer including zero.
- The contents of <binary_block> represents the waveform data stored in the product's internal memory in binary code.

[Example of data]

#	8	0	0	0	0	1	0	2	4	D0	D1	- - -	Dn

1024-byte binary data (D0, D1,..., Dn) is transferred.

  (a) The DTFORM command is set to "BYTE":

- Since one unit of data is transferred in one byte, the number of bytes meets the number of transfer data specified using the DTPOINTS command.

[Example of data]

#	8	0	0	0	0	1	0	2	4	D0	D1	- - -	Dn

1024-byte binary data is transferred, and Di (i = 1, 2,..., n) corresponds to one unit of data.

***Note 1:** For average waveforms, only upper bytes are transferred, even though these waveforms are word data.*

***Note 2:** For math waveforms, word (for ADD/SUB/FFT) or double word (for MULT) data is transferred even though the DTFORM setting is BYTE.*

  (b) The DTFORM command is set to "WORD":

- Since one unit of data is transferred in two bytes, the number of bytes to be transferred is twice as large as the number of transfer data specified using the DTPOINTS command.

[Example of data]

#	8	0	0	0	0	2	0	4	8	U0	L0	U1	L1	- - -	Un	Ln

- 2048-byte binary data (U0, L0, U1, L1,..., Un, Ln) is transferred.
- Two bytes Ui and Li (i = 1, 2,..., n) correspond to one unit of data.
- For channel waveforms other than averaged, Li (i = 0, 1, …, n) becomes 0.
- The DTBORD command is used to specify the byte order. When L/H is specified, the data is transferred in the order of Li, Ui (i = 0, 1,..., n).

(2) The DTFORM command is set to "ASCII":

   <ascii_block> <delimiter>

- <ascii_block> contains block data. The waveform data units stored in the product's internal memory are described in the format of <NR1 Numeric Response Data> one by one, and these data units are respectively separated by a comma.

[Example of data]

D0, D1,..., Dn

Di (i = 0, 1,..., n) is described in the format of <NR1 Numeric Response Data>.

6. REMOTE COMMANDS

This list of remote commands is alphabetized by short form.

Horizontal	ACQ
	Command/Query
DESCRIPTION	The ACQ command selects the acquisition mode. The ACQ? query returns the current selection of the acquisition mode.
COMMAND SYNTAX	ACQ <mode> <mode>:={NORMAL, PEAK, AVERAGE} (When XYDS is YT) <mode>:={NORMAL, AVERAGE} (When XYDS is XYTRG) <mode>:={NORMAL} (When XYDS is XY)
QUERY SYNTAX	ACQ?
RESPONSE FORMAT	<mode>
REMARKS	ACQ AVERAGE sets ROLL OFF automatically.

Acquisition	ASET
	Command
DESCRIPTION	The ASET command provides the auto setup.
COMMAND SYNTAX	ASET
QUERY SYNTAX	
RESPONSE FORMAT	

Horizontal	AVGCNT
	Command/Query
DESCRIPTION	The AVGCNT command sets the number of events to average. AVGCNT? query returns the number set.
COMMAND SYNTAX	AVGCNT <number> <number>:={2, 4, 8, 16, 32, 64, 128, 256}
QUERY SYNTAX	AVGCNT?
RESPONSE FORMAT	<number>
REMARKS	AVGCNT command reports device-specific error (DDE) and is not performed when ACQ is not AVERAGE.

Vertical	BWL
	Command/Query
DESCRIPTION	The BWL command enables or disables the bandwidth limit (low-pass filter) of the specified input channel. The BWL? query returns the selected status.

COMMAND SYNTAX	<channel>: BWL <mode>
	<channel>: = {C1, C2, C3, C4} (WJ354/334/324/314)
	              : = {C1, C2} (WJ352/332/322/312)
	<mode>: = {OFF, 100M, 20M} (WJ354/334/352/332)
	            : = {OFF, 20M} (WJ324/314/322/312)

QUERY SYNTAX	<channel>:BWL?
RESPONSE FORMAT	<mode> The current bandwidth limit status (low-pass filter)

	is identified in <mode>.
REMARKS	WJ 324, WJ314, WJ322 and WJ312 set the bandwidth limiter to 20 MHz when these scopes receive "BWL 100M".

Status	*CLS
	Command
DESCRIPTION	The *CLS command clears the entire status data register.
COMMAND SYNTAX	*CLS
QUERY SYNTAX	
RESPONSE FORMAT	

Cursor	CMSR?
	Query
DESCRIPTION	The CMSR? query returns the currently displayed cursor measurements.
COMMAND SYNTAX	
QUERY SYNTAX	CMSR?
RESPONSE FORMAT	<measure1>, <measure2>, <measure3>, <measure4>, <measure5>, <measure6>, <measure7> • Current cursor measurements are displayed in <measure1> to <measure7> in <NR3 Numeric Response Data> format. • When the cursor mode is disabled or the data cannot be measured, the query returns +9.91E+37. • Seven types of cursor measurement results are output, respectively separated by a comma, regardless of whether cursor mode has been selected. For items not covered by the measurement, the query returns +9.91E+37. • The table below shows the relationship between <measure1> to <measure7> and cursor mode. <measure1>:= CH1 <measure2>:= CH2 <measure3>:= CH3 <measure4>:= CH4 <measure5>:= MATH <measure6>:= delta t <measure7>:= 1 / delta t When MATH is FFT, M1:TRA is ON and CURM is VATH, CMSR? returns frequency at the cursor of the FFT waveform for <measure7>.
REMARKS	When calculating the cursor measurement values of the YT display Amplitude, Value at Cursor, and XY display ch Amplitude in the model WJ352/332/322/312, <measure3> and <measure4> return "+9.91E+37".

Hard Copy	COPY
	Command
DESCRIPTION	The COPY command copies the current screen data to USB Memory.
COMMAND SYNTAX	COPY
QUERY SYNTAX	
RESPONSE FORMAT	

Vertical	CPL
	Command/Query
DESCRIPTION	The CPL command sets the coupling mode of the specified input channel. The CPL? query returns the selected coupling mode.

COMMAND SYNTAX	<channel>:CPL <coupling>
	<channel>:={C1, C2, C3, C4} (for WJ354/334/324/314)
	    :={C1, C2} (for WJ352/332/322/312)
	<coupling>:={AC1M, GND, DC1M, DC50} (for WJ354/334/352/332)
	    :={AC1M, GND, DC1M} (for WJ324/314/322/312)

QUERY SYNTAX	<channel>:CPL?
RESPONSE FORMAT	<coupling> The current coupling mode is identified in <coupling>.

Cursor	CURM
	Command/Query
DESCRIPTION	The CURM command defines the cursor mode. The CURM? query returns the defined cursor mode.
COMMAND SYNTAX	CURM <mode> <mode>: = {OFF, DV, DH, DHDV, VATH}
QUERY SYNTAX	CURM?
RESPONSE FORMAT	<mode>

System	DATE
	Command/Query
DESCRIPTION	The DATE command defines the date and time. The DATE? query reads the defined date and time.
COMMAND SYNTAX	DATE <day>,<month>,<year>,<hour>,<minute>,<second> <day>:= a number from 1 to 31. <month>:= {JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC} <year>:= a number from 2000 to 2099. <hour>:= a number from 0 to 23. <minute>:= a number from 0 to 59. <second>:= a number from 0 to 59.
QUERY SYNTAX	DATE?
RESPONSE FORMAT	<day>,<month>,<year>,<hour>,<minute>,<second>

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Automatic Measurement	DIRM
	Command/Query
DESCRIPTION	The DIRM command sets the direction of automatic measurement from A, B, C, and D. The DIRM? query returns the currently selected direction.
COMMAND SYNTAX	DIRM <dir> <dir>:={A, B, C, D}
QUERY SYNTAX	DIRM?
RESPONSE FORMAT	<dir> The current direction status of the automatic measurement, A, B, C, or D, is identified in <dir>.

Data transfer	DTBORD
	Command/Query
DESCRIPTION	The DTBORD command defines the order of bytes for the WORD or DWORD waveform data transfer. (Do not affect ASCII and BYTE data transfer.) The DTBORD? query returns the defined byte order.
COMMAND SYNTAX	DTBORD <order> <form>:={H/L, L/H} H/L := transfer WORD or DWORD data in (most) upper byte first. L/H := transfer WORD or DWORD data in (most) lower byte first.
QUERY SYNTAX	DTBORD?
RESPONSE FORMAT	<order> The byte order is identified in <form>.
REMARKS	

Data transfer	DTFORM
	Command/Query
DESCRIPTION	The DTFORM command defines the format used to transfer waveform data. The DTWAVE? query transfers the waveform data. The DTFORM? query returns the defined waveform data transfer format. For more information on the waveform data transfer format, see the DTWAVE? query.
COMMAND SYNTAX	DTFORM <form> <form>:={ASCII, BYTE, WORD} ASCII := transfer waveform data in ASCII mode. BYTE := transfer waveform data in binary mode and use BYTE format. WORD := transfer waveform data in binary mode and use WORD format. Byte order in the word is able to be specified by DTBORD command.
QUERY SYNTAX	DTFORM?
RESPONSE FORMAT	<form> The waveform data transfer format is identified in <form>.
REMARKS	

In some cases, waveform transfer format is fixed in spite of DTFORM.
Following is the WAVESRC, ACQ and DTFORM matrix:

Source waveform (WAVESRC)	DTFORM = BYTE	DTFORM = WORD	DTFORM = ASCII
Channel Waveform, ACQ= NORMAL, PEAK. (data bits = 8)	Transferred in BYTE format	Transferred in WORD format (lower byte is filled with 0)	Transferred in ASCII format
Channel Waveform, ACQ= AVERAGE. (data bits = 16)	Transferred in BYTE format (lower 8bit is truncated)	Transferred in WORD format	Transferred in ASCII format
Math waveform, Operator = Add, SUB. (data bits = 16)	Transferred in WORD format	Transferred in WORD format	Transferred in ASCII format
Math waveform, Operator = MULT. (data bits = 32)	Transferred in DWORD format	Transferred in DWORD format	Transferred in ASCII format
Math waveform, Operator = FFT. (data bits = 16)	Transferred in WORD format	Transferred in WORD format	Transferred in ASCII format

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Data transfer	DTINF?
	Query
DESCRIPTION	The DTINF? query reads the waveform information.
COMMAND SYNTAX	
QUERY SYNTAX	DTINF?
RESPONSE FORMAT	See below
REMARKS	This command does not support the multi-command.

DTINF? result format

All following items are returned in one line, comma separated.

Item number (4ch/2ch)	Item (with result sample)	Explanation	Notes
1/1	ModelName = LeCroy WJ354	Scope model name	
2/2	FileVersion = 1	Version of this information format	
3/3	SaveTime = 2006/08/09 15:13:34	Date and time of this waveform information creation	
4/4	[Channel1]	Category name for Channel 1 vertical information	
5/5	Volts/div = 5.00V	Ch1 Volts/div when the last waveform was acquired	Probe ratio is not considered.
6/6	Offset = 7.50V	Ch1 offset when the last waveform was acquired	Probe ratio is not considered.
7/7	Waveform = Available	Ch1 waveform data availability	This could be [Unavailable] by some condition, for example: - Trace is off - Scope is not triggered yet
8/8	[Channel2]	Category name for Channel 2 vertical information	
9/9	Volts/div = 100mV	Ch2 Volts/div when the last waveform was acquired	Probe ratio is not considered.
10/10	Offset = -150mV	Ch2 offset when the last waveform was	Probe ratio is not considered.

		acquired	
11/11	Waveform = Unavailable	Ch2 waveform data availability	
12/-	[Channel3]	Category name for Channel 3 vertical information	This item and followed three items are appear only when the scope has channel 3. (WJ354/334/324/314)
13/-	Volts/div = 100mV	Ch3 Volts/div when the last waveform was acquired	Probe ratio is not considered.
14/-	Offset = 150mV	Ch3 offset when the last waveform was acquired	Probe ratio is not considered.
15/-	Waveform = Unavailable	Ch3 waveform data availability	
16/-	[Channel4]	Category name for Channel 4 vertical information	This item and followed three items are appear only when the scope has channel 4. (WJ354/334/324/314)
17/-	Volts/div = 100mV	Ch4 Volts/div when the last waveform was acquired	Probe ratio is not considered.
18/-	Offset = 150mV	Ch4 offset when the last waveform was acquired	Probe ratio is not considered.
19/-	Waveform = Unavailable	Ch4 waveform data availability	
20/12	[Horizontal]	Category name for horizontal information	
21/13	Time/div = 500ms	Time/div when the last waveform was acquired.	
22/14	Delay = +0.000000000000s	Trigger delay (Trigger position) when the last waveform was acquired	

23/15	[Acquisition]	Category name for acquisition information	
24/16	Memory Length = 500000	Actual memory length of acquired waveform	This is not the setting of Max Memory Length but the data record length of current waveform.
25/17	Average Count = 0	Number of averaged times of the last waveform.	This is the actual averaged times. The value could be any number between 0 and 256.
26/18	Wave Info = Peak Roll	Acquisition mode of the last waveform.	This is the acquired waveform information in combination of [Normal, Peak, Average, Roll, Equ, Interleave]
27/19	[Timebase Info]	Category name for timebase information	
28/20	Time Stamp = 15:13:34.7	Timestamp of the last waveform acquisition	
29/21	Sampling = 100kS	Sampling rate when the last waveform was acquired	

Data transfer	DTPOINTS
	Command/Query
DESCRIPTION	The DTPOINTS command defines the amount of waveform data to be transferred. The DTPOINTS? query returns the defined amount of waveform data to be transferred.
COMMAND SYNTAX	DTPOINTS <points> <points>:=1 to (waveform data length - DTSTART) Any values exceeding this range are rounded to the maximum or minimum permissible value, whichever is nearest.
QUERY SYNTAX	DTPOINTS?
RESPONSE FORMAT	<points> The defined amount of waveform data to be transferred is identified in <points>. The format is <NR1 Numeric Response Data>.
REMARKS	(Transfer start address) + (Amount of data to be transferred) > (Total amount of waveform data) When DTPOINTS command causes the above case, the transfer start address is rounded to a permissible value.

Data transfer	DTSTART
	Command/Query
DESCRIPTION	The DTSTART command defines the transfer start address for waveform data transfer. The DTSTART? query returns the defined transfer start address.
COMMAND SYNTAX	DTSTART <start> <start>:=0 to (waveform data length - 1) Any values exceeding this range are rounded to the maximum or minimum permissible value, whichever is nearest.
QUERY SYNTAX	DTSTART?
RESPONSE FORMAT	<start> The defined start address for waveform data transfer is identified in <start>. The format is <NR1 Numeric Response Data>.
REMARKS	(Transfer start address) + (Amount of data to be transferred) > (Total amount of waveform data) When DTSTART command causes the above case, the amount of data to be transferred is rounded to a permissible value.

Data transfer	DTSTUP
	Command/Query
DESCRIPTION	The DTSTUP command writes setup data for the product. The DTSTUP? query reads the setup data (the setup data found when the query is issued) from the product.
COMMAND SYNTAX	DTSTUP<LF+EOI>#8<byte-length><binary-block> DTSTUP command, unlike other commands, requires two steps. Step 1: Send DTSTUP command without parameter. Then the scope becomes ready to receive setup data block. Step 2: Send setup data block in #8<byte-length><binary-block> format. The contents of <byte_length> consists of an 8-digit ASCII string. This string must represent the number of bytes to be entered into <binary_block>. The byte length should always be a sign-free, 8-digit integer, and zero must not be deleted. The data transferred by the DTSTUP? query should be found in <binary_block>.
QUERY SYNTAX	DTSTUP?
RESPONSE FORMAT	#8<byte-length><binary-block> ・#8 shows that the response message is described in the format of <Definite Length Arbitrary Block Response Data> and the content of the following <byte_length> is a sign-free, 8-digit integer. ・The contents of <byte_length> represents the number of bytes to be entered into <binary_block>. The byte length should always be a sign-free, 8-digit integer including zero. ・The contents of <binary_block> represent the product's setup data in binary code.
REMARKS	This command does not support the multi-command.

Data transfer	DTWAVE?
	Query
DESCRIPTION	The DTWAVE? query reads the waveform data.
COMMAND SYNTAX	
QUERY SYNTAX	DTWAVE?
RESPONSE FORMAT	
REMARKS	This command does not support the multi-command.

Horizontal	EQU
	Command/Query
DESCRIPTION	The EQU command enables or disables the equivalent sample. The EQU? query returns the enabled or disabled equivalent sample status.
COMMAND SYNTAX	EQU <state> <state>:={ON, OFF}
QUERY SYNTAX	EQU?
RESPONSE FORMAT	<state>
REMARKS	When XYDS is XY, equivalent sample is turned off and EQU ON is ignored without error.

Status	*ESE
	Command/Query
DESCRIPTION	The *ESE command defines the standard event status enable (ESE) register. This command allows the user to connect multiple events in the ESR register to the ESB summary message bit (bit 5) of the STB register. The *ESE? query reads the contents of the ESE register.
COMMAND SYNTAX	*ESE <value> <value>:=0 to 255
QUERY SYNTAX	*ESE?
RESPONSE FORMAT	<value> The current contents of the ESE register are identified in <value>. The format is <NR1 Numeric Response Data>.

Status	*ESR?
	Query
DESCRIPTION	The *ESR? query reads and clears the event status register (ESR). The binary codes in register bits 0 to 7 are added together, and the sum is returned as a response to this query. The structure of the ESR register is outlined in "Remarks".
COMMAND SYNTAX	
QUERY SYNTAX	*ESR?
RESPONSE FORMAT	<value> The current contents of the ESR register are identified in <value>. The format is <NR1 Numeric Response Data>.
REMARKS	The table below shows the structure of the ESR register. Bit Weighting Description 7 128 PON: Power-on 6 64 URQ: This bit is not used in this product. 5 32 CME: Command error 4 16 EXE: Execution error 3 8 DDE: Device-specific error 2 4 QYE: Query error 1 2 RQC: This bit is not used in this product. 0 1 OPC: Operation complete

Horizontal	FDELTA?
	Query
DESCRIPTION	The FDELTA? query returns delta-f (frequency resolution) of the FFT results in Hz.
COMMAND SYNTAX	
QUERY SYNTAX	FDELTA?
RESPONSE FORMAT	<value> <value>:= <NR3 Numeric Response Data> format. <value> shows the frequency resolution of the FFT results.

Math	FHZPOS
	Command/Query
DESCRIPTION	The FHZPOS command sets the frequency at the center of the screen in Hz, to set horizontal position of FFT waveform. The FHZPOS? query returns the frequency at the center of the screen of FFT waveform in Hz.
COMMAND SYNTAX	FHZPOS <fft_hpos> <fft_hpos> is set in <DECIMAL NUMERIC PROGRAM DATA> format. A value beyond the setting range is rounded to a permissible closer value.
QUERY SYNTAX	FHZPOS?
RESPONSE FORMAT	<fft_hpos> <fft_hpos>:= <NR3 Numeric Response Data> format. <fft_hpos> shows the horizontal position (position) of the FFT waveform.
REMARKS	

Math	FHZZOOM
	Command/Query
DESCRIPTION	The FHZZOOM command sets the horizontal zoom factor of the FFT waveform. The FHZZOOM? query returns the horizontal zoom factor of the FFT waveform.
COMMAND SYNTAX	FHZZOOM <fft_hzoom> <fft_hzoom>:= {1, 2, 5, 10} A value other than previously specified is rounded to a permissible larger value.
QUERY SYNTAX	FHZZOOM?
RESPONSE FORMAT	<fft_hzoom> <fft_hzoom> shows the horizontal zoom factor of the FFT waveform.
REMARKS	When FFT trace is off, FHZZOOM command reports command-execution error (CME).

Horizontal	FRQCNT?
	Query
DESCRIPTION	The FRQCNT? query returns the trigger signal frequency result that is measured by internal trigger frequency counter.
COMMAND SYNTAX	
QUERY SYNTAX	FRQCNT?
RESPONSE FORMAT	<value> <value>:= <NR3 Numeric Response Data> format. <value> shows the frequency of trigger signal.

Math	FSRC
	Command/Query
DESCRIPTION	The FSRC command sets the signal source for FFT. The FSRC? query returns the currently set signal source for FFT.
COMMAND SYNTAX	FSRC <source> <source>: = {CH1, CH2, CH3, CH4} (WJ354/334/324/314) : = {CH1, CH2} (WJ352/332/322/312)
QUERY SYNTAX	FSRC?
RESPONSE FORMAT	<source> <source> shows the current signal source for FFT.
REMARKS	FSRC command/query reports Device-specific error (DDE) when math operator is not FFT. Use MATHS instead of FSRC to select source channels for math operation other than FFT.

Math	FWINDOW
	Command/Query
DESCRIPTION	The FWINDOW command sets the FFT window. The FWINDOW? query returns the FFT window.
COMMAND SYNTAX	FWINDOW <type> <type>:= {RECT, VONHANN, FLATTOP}
QUERY SYNTAX	FWINDOW?
RESPONSE FORMAT	<type>
REMARKS	FWINDOW command reports device-specific error (DDE) when MATH is not FFT.

DISPLAY	GRAT
	Command/Query
DESCRIPTION	The GRAT command selects the graticule type from Grid, Axis or Frame. The GRAT? query returns the current graticule type.
COMMAND SYNTAX	GRAT <type> <type> := {GRID, AXIS, FRAME} GRID := Select grid graticule type. AXIS := Select axis graticule type. FRAME := Select frame graticule type.
QUERY SYNTAX	GRAT?
RESPONSE FORMAT	<type>

IEEE 488.1 Emulation	GTL
	Command
DESCRIPTION	Go To Local Command
COMMAND SYNTAX	GTL
QUERY SYNTAX	
RESPONSE FORMAT	

Cursor	HCUR
	Command/Query
DESCRIPTION	The HCUR command defines the position of the time cursor in "div". The HCUR? query returns the defined position of the time cursor.
COMMAND SYNTAX	HCUR <Cursor1>, <Cursor2> <Cursor1>:=-5.00 to +4.98 (When CURM is DH or DHDV) <Cursor1>:=-5.00 to +4.99 (When CURM is VATH) <Cursor2>:=-5.00 to +4.98 (When CURM is DH or DHDV) <Cursor2>:=-5.00 to +4.99 (When CURM is VATH) <Cursor1> and <Cursor2> respectively represent positions of time cursors Cursor1 and Cursor2 on the screen, using the unit, "div". For how to round the value, see "Remarks". The left end of the screen corresponds to -5.00, the center to 0, the right end to +4.98 when CURM is DH or DHDV and +4.99 when CURM is VATH.
QUERY SYNTAX	HCUR?
RESPONSE FORMAT	<Cursor1>, <Cursor2> Current positions of the time cursors are identified in <Cursor1> and <Cursor2>. The format is <NR3 Numeric Response Data>.
REMARKS	When CURM is DH or DHDV, the resolution of <Cursor1> and <Cursor2> is 0.02. When CURM is VATH, the resolution of <Cursor1> and <Cursor2> is 0.01. If another value is input, it is rounded to a number having a small absolute value. If the cursor mode is set to "Value at Cursor", the setting of <Cursor1> is enabled. Although <Cursor2> is disabled, you should still set it. HCUR command reports Device-specific error (DDE) when CURM is not DH, DHDV or VATH.

Others	*IDN?
	Query
DESCRIPTION	The *IDN? query inquires about product information. The response consists of four fields and provides information on the manufacturer, oscilloscope model type, serial number, and firmware revision level.
COMMAND SYNTAX	
QUERY SYNTAX	*IDN?
RESPONSE FORMAT	LECROY,<model>,<serial_number>,<firmware-level> <model>: 5-digit model ID (e.g., WJ354) <serial_number>: 14-digit serial number (e.g., LCRY0101J00001) <firmware_level>: 1-digit number showing release level, followed by a period, and a 2-digit minor release level (i.e., the format is "x.yy".)

Math	MATH
	Command/Query
DESCRIPTION	The MATH command defines the type of mathematical operation for waveforms. The MATH? query returns the defined mathematical operation type.
COMMAND SYNTAX	MATH <operator> <operator>:={ADD, SUB, MULT, FFT}
QUERY SYNTAX	MATH?
RESPONSE FORMAT	<mode> The currently defined mathematical operation type is identified in <mode>.
REMARKS	Mathematical operations are stopped when XYDS is XY or XYTRG. The FFT waveform is not displayed while the roll mode data acquisition is ongoing. FFT will be displayed after each acquisition is done or STOP(TRMD STOP) command is sent.

Math	MATHS
	Command/Query
DESCRIPTION	The MATHS command sets the source channels for the calculation waveform. The MATHS? query returns the source channels set for the calculation waveform.

COMMAND SYNTAX	MATHS <source1>,<source2>
	<source1>: = {CH1, CH2, CH3, CH4} (WJ354/334/324/314)
	           : = {CH1, CH2} (WJ352/332/322/312)
	<source2>: = {CH1, CH2, CH3, CH4} (WJ354/334/324/314)
	           : = {CH1, CH2} (WJ352/332/322/312)

QUERY SYNTAX	MATHS?
RESPONSE FORMAT	<source1>,<source2> <source1> and <source2> show the currently set source channels for the calculation waveform.
REMARKS	Use FSRC instead of MATHS to specify FFT source channel.

MEASURE	MDSP
	Command/Query
DESCRIPTION	The MDSP command turns on or off parameter measurements. When the parameter measurements are turned on, the measurement results are displayed on the screen and are also available for readout by MSRA?, MSRB, MSRC? and MSRD? queries.
COMMAND SYNTAX	MDSP <function> <function>:={ON, OFF}
QUERY SYNTAX	MDSP?
RESPONSE FORMAT	<function>
REMARKS	MDSP is set to OFF when XYDS is XY or XYTRG.

MEASURE	MINMAX
	Command/Query
DESCRIPTION	The MINMAX command enables or disables Min/Max of Measure. The MINMAX? query reads the currently Min/Max of Measure status.
COMMAND SYNTAX	MINMAX <function> <function>:={ON, OFF}
QUERY SYNTAX	MINMAX?
RESPONSE FORMAT	<function>

Horizontal	MLEN
	Command/Query
DESCRIPTION	The MLEN command sets the maximum memory length. The MLEN? query returns the current maximum memory length.
COMMAND SYNTAX	MLEN <length> <length>:={500, 1K, 10K, 100K, 500K} (Time/div is 20s/div or faster) <length>:={1K, 10K, 100K, 500K} (Time/div is 50s/div) <length>:={1K} (XYDS is XY)
QUERY SYNTAX	MLEN?
RESPONSE FORMAT	<length>
REMARKS	Max memory length is fixed at 1K when XYDS is XY.

Automatic Measurement	**MSEL**
	Command/Query
DESCRIPTION	The MSEL command selects the measurement item of automatic measurement A, B, C or D defined using the automatic measurement direction command DIRM. The MSEL? query returns the selected measurement item.
COMMAND SYNTAX	MSEL <ch>, <mode> <ch>:={OFF, CH1, CH2, CH3, CH4, MATH} (WJ354/334/324/314) :={OFF, CH1, CH2, MATH} (WJ352/332/322/312) <mode>:= {MAX, MIN, P-P, VRMS, CVRMS, VMEAN, CVMEAN, TOP, BASE, T-B, +OSHOT, -OSHOT, TR20-80, TF80-20, TR10-90, TF 90-10, FREQ, PERIOD, +PULSE, -PULSE, +WIDTH, -WIDTH, DUTY, INTEGRAL, SKEW, DELTAT}
QUERY SYNTAX	MSEL?
RESPONSE FORMAT	<ch>, <mode> The selected automatic measurement channel is identified in <ch>. The automatic measurement item is identified in <mode>.
REMARKS	If <ch> is set to CH3 or CH4 in the model WJ352/332/322/312, it is rounded to CH1.

Automatic Measurement	**MSRA?, MSRB?, MSRC?, MSRD?**
	Query
DESCRIPTION	MSRA?, MSRB?, MSRC? and MSRD? queries respectively read automatic measurements A, B, C, and D.
COMMAND SYNTAX	
QUERY SYNTAX	MSRA? (or MSRB?, MSRC?, or MSRD?)
RESPONSE FORMAT	<measure> The result of automatic measurement A (or B, C, or D) is identified in <measure>. The indicated value is converted into <NR3 Numeric Response Data> and returned. If automatic measurement is not possible, +9.91E+37 is returned. <value> <value>, <maximum_value>, <minimum_value> If automatic measurement is not valid (in case measurement is turned off), the result becomes +9.91000E+37.

Vertical	OFST
	Command/Query
DESCRIPTION	The OFST command sets the vertical position (offset) of the specified input channel. The setting range depends on the vertical sensitivity. The OFST? query returns the defined vertical position (offset). Both command and query are always available regardless if the specified channel's trace is on or off. Probe ratio is considered in the vertical position (offset) value to set or query.
COMMAND SYNTAX	\<trace\>:OFST \<offset\> \<trace\>: = {C1, C2, C3, C4, M1} (WJ354/334/324/314) : = {C1, C2, M1} (WJ352/332/322/312) \<offset\>:= Offset voltage. The \<DECIMAL NUMERIC PROGRAM DATA\> format is basically used in \<offset\>, and the suffix is also valid. For the setting range and rounding rule, see "Remarks".
QUERY SYNTAX	\<trace\>:OFST?
RESPONSE FORMAT	\<offset\> The current offset is identified in \<offset\> in \<NR3 Numeric Response Data\> format.
REMARKS	

Setting range of OFST command. (when probe ratio is 1:1)

Trace	Vertical sensitivity	Offsetting range
C1,C2,C3,C4	2mV/div ~ 50mV/div	±1 V
	100mV/div ~ 500mV/div	±10 V
	1V/div ~ 10V/div	±100 V
M1 (+, -, X)		±500 div
M1 (FFT)		−100～+150 dBm

Any value outside the above range is rounded to the maximum or minimum permissible value, whichever is nearest. In addition, some value may be rounded to a permissible smaller value.

When the probe ratio is 10:1, 100:1, 1000:1or 2000:1, the above range is multiplied by 10, 100, 1000 or 2000.

When the probe ratio is set to "AUTO", the above range is multiplied by 1, 10, or 100, depending on the detected probe ratio.

WaveJet 300 Series

Status	*OPC
	Command/Query
DESCRIPTION	The *OPC (Operation Complete) command sets the OPC bit (bit 0) of the standard event status register (ESR) to "1" when all the preceding operations are completed. Since the *OPC? query issues the response after execution of all preceding commands, "1" is returned. For the *OPC? query, the OPC bit (bit 0) of the ESR register is not affected by other operations.
COMMAND SYNTAX	*OPC
QUERY SYNTAX	*OPC?
RESPONSE FORMAT	1

DISPLAY	PERS
	Command/Query
DESCRIPTION	The PERS command sets persistence display time. The PERS? query returns the current persistence display time.
COMMAND SYNTAX	PERS <time> <time> := {OFF, 100MS, 200MS, 500MS, 1S, 2S, 5S, 10S, INFINITE} OFF := Set persistence off. 100MS := Set persistence time to 100ms. 200MS := Set persistence time to 200ms. 500MS := Set persistence time to 500ms. 1S := Set persistence time to 1s. 2S := Set persistence time to 2s. 5S := Set persistence time to 5s. 10S := Set persistence time to 10s. INIFINITE := Set persistence time to infinity.
QUERY SYNTAX	PERS?
RESPONSE FORMAT	<time>

Vertical	PROBE
	Command/Query
DESCRIPTION	The PROBE command sets the probe ratio of the specified input channel. AUTO, 1, 10, 100, 1000, or 2000 can be selected. The PROBE? query returns the selected probe ratio.
COMMAND SYNTAX	<channel>:PROBE <probe_mode>, <probe> <channel>: = {C1, C2, C3, C4} (WJ354/334/324/314) : = {C1, C2} (WJ352/332/322/312) <probe_mode>: = {AUTO, MANUAL} <probe>: = {1, 10, 100, 1000, 2000} For the combination and meaning of set items in <probe_mode> and <probe>, see "Remarks".
QUERY SYNTAX	<channel>:PROBE?

RESPONSE FORMAT	`<probe_mode>,<probe>` When the probe ratio is 1:1, 10:1, 100:1, 1000:1, or 2000:1, a value equal to the PROBE command parameter is returned. When the probe ratio is set to "AUTO", the auto detected probe ratio is returned to `<probe>`.
REMARKS	

Selected probe ratio and PROBE query result

Set probe ratio	`<probe_mode>`	`<probe>`
AUTO	AUTO	1/10/100
1:1	MANUAL	1
10:1	MANUAL	10
100:1	MANUAL	100
1000:1	MANUAL	1000
2000:1	MANUAL	2000

The table shows settings for `<probe_mode>` and `<probe>`.

Save/Recall	*RCL
	Command
DESCRIPTION	The *RCL command recalls the oscilloscope front panel setup data from one of five internal memory areas.
COMMAND SYNTAX	*RCL <panel_setup> <panel_setup>:0, 1 to 5 0 := to recall default setup. 1 to 5 := to recall setup from one of five internal memory areas.
QUERY SYNTAX	
RESPONSE FORMAT	
REMARKS	

Horizontal	ROLL
	Command/Query
DESCRIPTION	The ROLL command enables or disables roll operations. The ROLL? query returns the current roll operation status.
COMMAND SYNTAX	ROLL <state> <state>:={ON, OFF}
QUERY SYNTAX	ROLL?
RESPONSE FORMAT	<state>
REMARKS	When roll operation is enabled while acquisition is average, the acquisition mode is set to normal. Roll operation is turned off when XYDS is XY or XYTRG.

Save/Recall	*RST
	Command
DESCRIPTION	The *RST command enables device reset. The *RST command recalls the default setups.
COMMAND SYNTAX	*RST
QUERY SYNTAX	
RESPONSE FORMAT	

Acquisition	RUN
	Command
DESCRIPTION	RUN sets the trigger mode to "AUTO" and starts waveform acquisitions. If the trigger mode is already "AUTO", this command is ignored. RUN acts same as "TRMD AUTO".
COMMAND SYNTAX	RUN
QUERY SYNTAX	
RESPONSE FORMAT	

Save/Recall	*SAV
	Command
DESCRIPTION	The *SAV command saves the front panel setup data of the oscilloscope to nonvolatile internal memory.
COMMAND SYNTAX	*SAV <panel_setup> <panel_setup>:0, 1 to 5 0 := do nothing.
QUERY SYNTAX	
RESPONSE FORMAT	

Automatic Measurement	SKLV
	Command/Query
DESCRIPTION	The SKLV command defines the measurement conditions of automatic measurement SKEW specified with the MSEL command. The SKLV? query returns the defined measurement conditions.
COMMAND SYNTAX	SKLV <level1>, <slope1>, <source2>, <level2>, <slope2> <level1> is set in a range of 10 to 90 in <DECIMAL NUMERIC PROGRAM DATA> format, assuming that P-P of the waveform is 100%. A value beyond the setting range is rounded to a permissible value. <slope1>:={RISE, FALL} <source2> :={CH1, CH2, CH3, CH4} (WJ354/334/324/314) :={CH1, CH2} (WJ352/332/322/312) <level2> is set in a range of 10 to 90 in <DECIMAL NUMERIC PROGRAM DATA> format, assuming that P-P of the waveform is 100%. A value beyond the setting range is rounded to a permissible value. <slope2>:={RISE, FALL}
QUERY SYNTAX	SKLV?
RESPONSE FORMAT	<level1>, <slope1>, <source2>, <level2>, <slope2> The parameter setting "Level1" of automatic measurement SKEW is identified in <level1>. The parameter setting "Slope1" of automatic measurement SKEW is identified in <slope1>. The parameter setting "Source2" of automatic measurement SKEW is identified in <source2>. The parameter setting "Level2" of automatic measurement SKEW is identified in <level2>. The parameter setting "Slope2" of automatic measurement SKEW is identified in <slope2>.
REMARKS	If <from ch> or <to ch>is set to CH3 or CH4 in the model WJ352/332/322/312, it is rounded to CH1. SKLV command reports device-specific error (DDE) when MSEL is not SKEW.

Status	*SRE
	Command/Query
DESCRIPTION	The *SRE command defines the service request enable (SRE) register. This command allows the user to specify what SBT register summary bit is used to create the service request (SRQ). If "1" is written to the associated bit location, the summary message bit is enabled. If "0" is written to the associated bit location, the service request is no longer created by the associated event. After the SRE register is cleared, the SRQ interrupt is disabled. When the value is converted into binary code, the *SRE? query returns the value that represents the bit setting in the SRE register.
COMMAND SYNTAX	*SRE \<value\> \<value\>:=0 to 255
QUERY SYNTAX	*SRE?
RESPONSE FORMAT	\<value\> The current SRE register settings are identified in \<value\> in \<NR1 Numeric Response Data\> format.

Status	*STB?
	Query
DESCRIPTION	The *STB? query reads the status register (STB) defined in IEEE 488.1 and the master summary status (MSS). The response includes those values specified in bits 0 to 7 of the status byte register. For details about structure of each bit, see Remarks. The response to the *STB? query is the same as that for series polling, except that bit 6 contains the MSS summary message instead of the RQS message.
COMMAND SYNTAX	
QUERY SYNTAX	*STB?
RESPONSE FORMAT	\<value\> The current STB register settings are identified in \<value\> in \<NR1 Numeric Response Data\> format.
Acquisition	STOP
	Command
DESCRIPTION	STOP sets the trigger mode to "STOP". If the trigger mode has already been "STOP", this command is ignored. STOP acts same as "TRMD STOP".
COMMAND SYNTAX	STOP
QUERY SYNTAX	
RESPONSE FORMAT	

Trigger	TCOUNT
	Command/Query
DESCRIPTION	The TCOUNT command defines the number of pulses for pulse count trigger (TTYP=COUNT). The TCOUNT? query returns the currently set number of pulses for pulse count trigger.
COMMAND SYNTAX	TCOUNT <number> <number> := 1 to 9999
QUERY SYNTAX	TCOUNT?
RESPONSE FORMAT	<number>
REMARKS	TCOUNT command reports device-specific error (DDE) when TTYP is not COUNT.

Trigger	TCPL
	Command/Query
DESCRIPTION	The TCPL command defines the trigger coupling mode. The TCPL? query returns the defined trigger coupling.
COMMAND SYNTAX	TCPL <tirg_coupling> <trig_coupling>:={AC, DC, HF, LF}
QUERY SYNTAX	TCPL?
RESPONSE FORMAT	<trig_coupling> The current trigger coupling is identified in <trig_coupling>.
REMARKS	When TSRC is LINE or TTYP is TV, TCPL command reports device-specific error (DDE) and TCPL? query returns DC.

Horizontal	TDIV
	Command/Query
DESCRIPTION	The TDIV command sets timebase. The timebase is specified using any of the following suffixes: NS (nanosecond), US (microsecond), MS (millisecond), or S (second). If the specified value exceeds the allowable range, it is rounded to a permissible value. The TDIV? query returns the currently set timebase.
COMMAND SYNTAX	TDIV <value> <value>:= Timebase setup parameter. The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid.
QUERY SYNTAX	TDIV?
RESPONSE FORMAT	<value> <value>:= The currently set timebase is identified in <NR3 NUMERIC RESPONSE DATA> format.
REMARKS	

The TDIV command rounds the figure in <value> as follows.

Rounding range	Set timebase	Note
		500 ps/div is available for
value <= 500E-12	500 ps/div	WJ354/352 only
		1 ns/div is available for
500E-12 < value <= 1E-9	1 ns/div	WJ354/352/334/332
		2 ns/div is available for
1E-9 < value <= 2E-9	2 ns/div	WJ354/352/334/332/324/322
2E-9 < value <= 5E-9	5 ns/div	5 ns/div is available for all models
: :		
10 < value <= 20	20 s/div	
20 < value	50 s/div	

Status	TESE
	Command/Query
DESCRIPTION	The TESE command sets the trigger event status enable register. In other words, it determines whether the summary message of the trigger event status register is connected to the status byte. The TESE? query reads the current setting of the trigger event status enable register.
COMMAND SYNTAX	TESE <value> <value>:=0 to 255
QUERY SYNTAX	TESE?
RESPONSE FORMAT	<value> The current setting of the trigger event status enable register is identified in <value>. The format is <NR1 Numeric Response Data>.

Status	TESR?
	Query
DESCRIPTION	The TESR? query reads the trigger event status register. In other words, it determines whether a single measurement is completed. After the status is read, the contents of the register are cleared.
COMMAND SYNTAX	
QUERY SYNTAX	TESR?
RESPONSE FORMAT	<status> Each bit of the trigger event status register is weighted by a power of 2. The format is <NR1 Numeric Response Data> and the value ranges from 0 to 255.

Trigger	THTM
	Command/Query
DESCRIPTION	The THTM command defines the trigger hold-off time. The THTM? query returns the defined trigger hold-off time.
COMMAND SYNTAX	THTM <holdoff> <holdoff>:= The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid. Available range is 0 to 50.0 s. If specified holdoff is < 200 ns, the trigger hold-off is turned off.

QUERY SYNTAX	THTM?
RESPONSE FORMAT	<holdoff> The currently set hold-off time is identified in <holdoff>. If the hold-off time is set to "OFF", 0 is input to <holdoff>. The format is <NR3 NUMERIC RESPONSE DATA>.
REMARKS	THTM command reports device-specific error (DDE) when TTYP is not EDGE..

Trigger	TLVL
	Command/Query
DESCRIPTION	The TLVL command sets the trigger level of the channel set by the trigger source. If a value beyond the setting range is specified, it is rounded to the maximum or minimum value. The TLVL? query returns the trigger level of the channel specified in the trigger source.
COMMAND SYNTAX	TLVL <trig_level> <trig_level>:= The <DECIMAL NUMERIC PROGRAM DATA> format is basically used, and the suffix is also valid. For the setting range and rounding rules, see "Remarks". Note: The TLVL command can be used without the suffix, V. The setting range and resolution of the <trig_level> is changed according to vertical sensitivity. (Trigger level range) = (-5div to +5div) (Trigger level resolution) = (1div / 50)
QUERY SYNTAX	TLVL?
RESPONSE FORMAT	<trig_level> <trig_level>:= The <NR3 NUMERIC RESPONSE DATA> format is used. The currently set trigger level is input here.
REMARKS	When TSRC is LINE or TTYP is TV, TLVL command reports device-specific error (DDE) and TLVL? query returns +0.00000E+00.

Automatic Measurement	TPRM
	Command/Query
DESCRIPTION	The TPRM command sets the measurement conditions for the automatic measurement item DELTAT set using the MSEL command. The TPRM? query returns the measurement conditions for the automatic measurement item DELTAT set using the MSEL command.

COMMAND SYNTAX	TPRM <from ch>, <from level>, <from edge>, <to ch>, <to level>, <to edge>
	<from ch>:={OFF, CH1, CH2, CH3, CH4, MATH} (WJ354/334/324/314)
	                :={OFF, CH1, CH2, MATH} (WJ352/332/322/312)
	<from edge>:= {RISE, FALL}
	<from level> is set in <DECIMAL NUMERIC PROGRAM DATA> format. A voltage value in a range of −5 div to +5 div from the center of the screen is set, assuming that the ground level is 0 V.
	<to ch>:={CH1, CH2, CH3, CH4, MATH} (WJ354/334/324/314)
	              :={CH1, CH2, MATH} (WJ352/332/322/312)
	<to edge>:= {RISE, FALL}
	<to level> is set in <DECIMAL NUMERIC PROGRAM DATA> format. A voltage value in a range of −5 div to +5 div from the center of the screen is set, assuming that the ground level is 0 V.

QUERY SYNTAX	TPRM?
RESPONSE FORMAT	<from ch>, <from level>, <from edge>, <to ch>, <to level>, <to edge> <from level> shows a voltage value in a range of −5 div to +5 div set in <NR3 Numeric Response Data> format, assuming that the ground level is 0 V. <to level> shows a voltage value in a range of −5 div to +5 div set in <NR3 Numeric Response Data> format, assuming that the ground level is 0 V. If <from ch> is OFF, <from level> is returned as <from ch> is CH1. If <from ch> or <to ch> is MATH and the MATH is FFT, <from level> or <to level> becomes +9.91000E+37 that shows it is invalid.
REMARKS	If <from ch> or <to ch> is set to CH3 or CH4 in models WJ352/332/322/312, it is rounded to CH1. TPRM command reports device-specific error (DDE) when MSEL is not DELTAT.

Trigger	TPTM
	Command/Query
DESCRIPTION	The TPTM command defines the parameters for period trigger (TTYP=PEIOD). The TPTM? query returns the current parameters of period trigger.
COMMAND SYNTAX	TPTM <when>,<m> <when>:= {M_T, T_M} M_T := Set period trigger interval time condition to "m <= t". T_M := Set period trigger interval time condition to "t <= m". <m>:= Set "m" time value. Available range is 40 ns to 50.0 s. The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid.
QUERY SYNTAX	TPTM?
RESPONSE FORMAT	<when>,<m> The currently set condition in <when>. The format is <CHARACTER RESPONSE DATA>. The currently set period time in <m>. The format is <NR3 NUMERIC RESPONSE DATA>.
REMARKS	TPTM command reports device-specific error (DDE) when TTYP is not PERIOD.

Vertical	TRA
	Command/Query
DESCRIPTION	The TRA command enables or disables the trace indication of the specified input channel. The TRA? query returns the display status of the specified trace.
COMMAND SYNTAX	<trace>:TRA <mode> <trace>:={C1, C2, C3, C4, M1} (for WJ354/334/324/314) :={C1, C2, M1} (for WJ352/332/322/312) <mode>:={ON, OFF}
QUERY SYNTAX	<trace>:TRA?
RESPONSE FORMAT	<mode> The current trace display status is identified in <mode>.
REMARKS	When XYDS is XY or XYTRG, C1 and C2 are not able to be turned off, and C3 and C4 are not able to be turned on.

Horizontal	TRDL
	Command/Query
DESCRIPTION	The TRDL command defines the horizontal position of the trigger point in time. With the screen center defined as zero, the time duration from this zero point to the trigger point is set. The setting range is determined by the timebase (TDIV). The TRDL? query returns the set horizontal position of the trigger point.
COMMAND SYNTAX	TRDL <value> <value>:= Trigger point setup parameter. The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid. The range of <value>: <value> := -500s to +5div (Time/div := 50s/div to 10ms/div) <value> := -5s to +5div (Time/div := 5ms/div to 10us/div) <value> := -5ms to +5div (Time/div := 5us/div to 500ps/div) <value> := -500s to +750s (Trigger mode is STOP) See Remarks for detail.
QUERY SYNTAX	TRDL?
RESPONSE FORMAT	<value> <value>:= The <NR3 NUMERIC RESPONSE DATA> format is used. The currently set trigger point is input here.
REMARKS	TRDL reports command-execution error (CME) when <value> is not a <DECIMAL NUMERIC PROGRAM DATA>. For more detail information see below.

1. Setting Range
The setting range and rounding method for the TRDL command are defined as follows, depending on the waveform acquisition and sweep time.

Trigger Mode	Sweep time	Setting range <value>
SINGLE, NORMAL or AUTO		-500s to
	50s/div to 10ms/div	+5div [*]
	5ms/div to 10us/div	-5s to +5div [*]
	5us/div to 500ps/div	-5ms to +5div [*]
STOP	-	-500s to +750s [*]

• The above division value in the setting range is calculated from the following equation.
(Setting range upper limit) = +5div × (Sweep time)
• Any value exceeding the above range is rounded to the maximum or minimum permissible value, whichever is nearest.

2. Set resolution
The resolution is changed according to the set sweep time. The resolution is calculated from the following equation.

(Delay value resolution) = (Sweep time) / 50
• When the specified resolution is not equal to the above value, it is rounded
to the permissible value of which the absolute value is smaller.

Acquisition	*TRG
	Command
DESCRIPTION	The *TRG command sets the trigger mode to "SINGLE" to start single waveform acquisition.
COMMAND SYNTAX	*TRG
QUERY SYNTAX	
RESPONSE FORMAT	
REMARKS	*TRG reports device-specific error (DDE) and is not performed when XYDS is XY.

Acquisition	TRMD
	Command/Query
DESCRIPTION	The TRMD command selects the trigger mode. The TRMD? query returns the currently selected trigger mode.
COMMAND SYNTAX	TRMD <mode> <mode> := {AUTO, NORMAL, SINGLE, STOP} AUTO := Set trigger mode to AUTO when scope is not in roll mode operation. If roll mode is on and scope is in roll mode operation range, AUTO initiates ENDLESS roll acquisition. NORMAL := Set trigger mode to NORMAL when scope is not in roll mode operation. If roll mode is on and scope is in roll mode operation range, NORMAL initiates repeated TRIG'D roll acquisitions. SINGLE := Set trigger mode to NORMAL when scope is not in roll mode operation. If roll mode is on and scope is in roll mode operation range, SINGLE initiates single TRIG'D roll acquisition.
QUERY SYNTAX	TRMD?
RESPONSE FORMAT	<mode> Not in roll mode operation: AUTO, NORMAL, SINGLE or STOP In roll mode operation: ENDLESS, TRIG'D, TRIG'D or STOP
REMARKS	TRMD SINGLE reports device-specific error (DDE) and is not performed when XYDS is XY.

Data transfer	TSCRN?
	Query
DESCRIPTION	The TSCRN? query transfers the screen data in TIFF, BMP or PNG graphic file format.
COMMAND SYNTAX	
QUERY SYNTAX	TSCRN? <type> <type>:={TIFF, BMP, PNG}
RESPONSE FORMAT	#8<byte_length><binary_block> • #8 shows that the response message is described in the format of <Definite Length Arbitrary Block Response Data> and the content of the following <byte_length> is 8-digit data. • The contents of <byte_length> represents the number of bytes to be entered into <binary_block>. The byte length is always sign-free, 8-digit integer without suppressing the leading zero. • The contents of <binary_block> represent the binary data described in the specified graphic file format.
REMARKS	This command does not support the multi-command.

Trigger	TSLP
	Command/Query
DESCRIPTION	The TSLP command defines the trigger slope. The TSLP? query returns the currently defined trigger slope.
COMMAND SYNTAX	TSLP <slope> <slope>:={POS, NEG}
QUERY SYNTAX	TSLP?
RESPONSE FORMAT	<slope> The currently defined trigger slope is identified in <slope>.
REMARKS	

Trigger	TSRC
	Command/Query
DESCRIPTION	The TSRC command defines the trigger signal source. The trigger type determines the trigger signal source setting. The TSRC? query returns the current trigger signal source setting.
COMMAND SYNTAX	TSRC <source> source> := {CH1, CH2, CH3, CH4, EXT, EXT10, LINE} (for WJ354/334/324/314) <source> := {CH1, CH2, EXT, EXT10, LINE} (for WJ352/332/322/312)
QUERY SYNTAX	TSRC?
RESPONSE FORMAT	<source> The current trigger signal setting is identified in <source>.
REMARKS	When TTYP is not EDGE, TSRC LINE command is not performed and reports device-specific error (DDE).

Others	*TST?
	Query
DESCRIPTION	The *TST? query implements the internal self-test and returns the response showing whether an error is detected in the test.
COMMAND SYNTAX	
QUERY SYNTAX	*TST?
RESPONSE FORMAT	<status> <status>:=+000000 No error occurred in the self test. <status>:=-000001 CH1 ACQ MEMORY CHECK ERROR <status>:=-000002 CH2 ACQ MEMORY CHECK ERROR <status>:=-000003 CH3 ACQ MEMORY CHECK ERROR <status>:=-000004 CH4 ACQ MEMORY CHECK ERROR

Trigger	TTYP
	Command/Query
DESCRIPTION	The TTYP command selects the trigger type. The TTYP? query returns the currently selected trigger type.
COMMAND SYNTAX	TTYP <type> <type> := {EDGE, PULSE, PERIOD, COUNT, TV}
QUERY SYNTAX	TTYP?
RESPONSE FORMAT	<type> <type>:= Set trigger type
REMARKS	

Trigger	TVCUST
	Command/Query
DESCRIPTION	The TVCUST command defines field frequency and number of scan line for custom TV trigger. The TVCUST query returns the currently defined field frequency and number of scan line.
COMMAND SYNTAX	TVCUST <field>,<line> <field> := 10 to 99. Then the field frequency is set to 1/<field>. <line> := 100 to 3000. Then the number of scan lines is set to <line>.
QUERY SYNTAX	TVCUST?
RESPONSE FORMAT	<field>,<line>
REMARKS	TVSTD command reports device-specific error (DDE) when TTYP is not TV or TVSTD is not CUSTOM.

Trigger	**TVSET**
	Command/Query
DESCRIPTION	The TVSET command sets field sequence, field number and line number for TV trigger. The TVSET query returns the currently set field sequence, field number, and line number.

COMMAND SYNTAX	TVSET <seq>,<field>,<line>
	<seq> := {1, 2, 4, 8} This specifies the field sequence to 1, 2, 4 or 8.
	<field> := 0, 1 to 8 (Specify 0 to selects "Any Fields")
	<line> := 1 to 263 (When TVSTD is NTSC and <field> is odd number)
	       := 1 to 262 (When TVSTD is NTSC and <field> is even number)
	       := 1 to 313 (When TVSTD is PAL and <field> is odd number)
	       := 314 to 625 (When TVSTD is PAL and <field> is even number)
	       := 0 (Specify 0 to selects "Any Lines")

QUERY SYNTAX	TVSET?
RESPONSE FORMAT	<seq>,<field>,<line>

REMARKS	TVSET command reports device-specific error (DDE) when TTYP is not TV.
	Line number selection is automatically set as follows.
	  NTSC : 263/262
	   PAL : 625

Trigger	**TVSTD**
	Command/Query
DESCRIPTION	The TVSTD command selects the TV standard for TV trigger (TTYP=TV). The TVSTD? query returns the currently selected TV standard.
COMMAND SYNTAX	TVSTD <type> <type> := {NTSC, PAL, CUSTOM}
QUERY SYNTAX	TVSTD?
RESPONSE FORMAT	<type>
REMARKS	TVSTD command reports device-specific error (DDE) when TTYP is not TV.

Trigger	TWTM
	Command/Query
DESCRIPTION	The TWTM command defines the parameters for pulse width trigger (TTYP=PULSE). The TWTM? query returns the current parameters of pulse width trigger.
COMMAND SYNTAX	TWTM <when>,<m>,<n> <when> := {M_T, T_M, M_T_N, T_M_N_T} M_T := Set pulse width trigger time condition to "m <= t". T_M := Set pulse width trigger time condition to "t <= m". M_T_N := Set pulse width trigger time condition to "m <= t <= n". T_M_N_T := Set pulse width trigger time condition to "t <= m, n<=t". <m>:= Set "m" time value. Available range is 15ns to 50.0s. The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid. <n>:= Set "n" time value. Available range is 15ns to 50.0s. The <DECIMAL NUMERIC PROGRAM DATA> format is used, and the suffix is also valid.
QUERY SYNTAX	TWTM?
RESPONSE FORMAT	<when>,<m>,<n> The currently set condition in <when>. The format is <CHARACTER RESPONSE DATA>. The currently set pulse width lower time in <m>. The format is <NR3 NUMERIC RESPONSE DATA>. The currently set pulse width upper time in <n>. The format is <NR3 NUMERIC RESPONSE DATA>.
REMARKS	TWTM command reports device-specific error (DDE) when TTYP is not PULSE. When condition M_T_N or T_M_N_T is used, time <m> and <n> take following range. (m) <= (n) <= (m * 500) If specified time value (m or n, or both) is out of this range, the value is rounded to fit the range.

Cursor	VCUR
	Command/Query
DESCRIPTION	The VCUR command defines the position of the voltage cursor. The VCUR? query returns the defined position.
COMMAND SYNTAX	VCUR <Cursor1>,<Cursor2> <Cursor1>:=-3.97 to +3.95 <Cursor2>:=-3.97 to +3.95 <Cursor1> and <Cursor2> respectively represent positions of voltage cursors Cursor1 and Cursor2 on the screen, using the unit "div". For information on how to round the value, see "Remarks". The bottom end of the screen corresponds to -3.97, the center to 0, and the top end to +3.95.
QUERY SYNTAX	VCUR?
RESPONSE FORMAT	<Cursor1>, <Cursor2> Current positions of the voltage cursors are identified in <Cursor1> and <Cursor2>. The format is <NR3 Numeric Response Data>.
REMARKS	The resolution of <Cursor1> and <Cursor2> is 0.02. If other value is input, it is rounded to the number having small absolute value. VCUR command reports Device-specific error (DDE) when CURM is not DV or DHDV.

Vertical	VDIV
	Command/Query
DESCRIPTION	The VDIV command sets the vertical sensitivity of the specified input channel in units of "V/div". When the specified value exceeds the allowable range, it is rounded according to the 1-2-5 step rule. The VDIV? query returns the defined vertical sensitivity. While the numerical value expressed in voltage is returned, the suffix is not returned.
COMMAND SYNTAX	\<trace\>:VDIV \<v_gain\> \<trace\>: = {C1, C2, C3, C4, M1} (WJ354/334/324/314) : = {C1, C2, M1} (WJ352/332/322/312) \<v_gain\>:= Vertical sensitivity. The \<DECIMAL NUMERIC PROGRAM DATA\> format is basically used, and the suffix is also valid. For rounding rules, see "Remarks".
QUERY SYNTAX	\<trace\>:VDIV?
RESPONSE FORMAT	\<v_gain\> The currently defined vertical sensitivity is identified in \<v_gain\> in \<NR3 Numeric Response Data\> format.
REMARKS	

Rounding the value in \<v_gain\>. (when probe ratio is 1:1)

Rounding range	Set vertical sensitivity
v_gain <= 2E-3	2mV/div
2E-3 < v_gain <= 5E-3	5mV/div
: :	
5 < v_gain	10V/div

When the probe ratio is 10:1, 100:1, 1000:1 or 2000:1, the above range is multiplied by 10, 100, 1000 or 2000.

• When the probe ratio is set to "AUTO", the above range is multiplied by 1, 10, or 100, depending on the detected probe ratio.

• Some value may be rounded to a permissible larger value.

DISPLAY	VECT
	Command/Query
DESCRIPTION	The VECT command enable or disable the interpolation between data points. The VECT? query returns the state of the interpolation.
COMMAND SYNTAX	VECT <state> <state> := {ON, OFF} ON := Displays waveform data in dots. OFF := Displays waveform data in interpolated line.
QUERY SYNTAX	VECT?
RESPONSE FORMAT	<state>
REMARKS	VECT ON is ignored when XYDS is XY or XYTRG.

Status	*WAI
	Command
DESCRIPTION	The *WAI (WAIt to continue) command rejects permission to execute the next command until the oscilloscope completes execution of all of its current commands. If the sweep method of the instrument is set to "SINGLE", the *WAI command is used to synchronize the application program with the completion of waveform data acquisition.
COMMAND SYNTAX	*WAI
QUERY SYNTAX	
RESPONSE FORMAT	

Data transfer	WAVESRC
	Command/Query
DESCRIPTION	The WAVESRC command selects the trace to which the waveform data is transferred. When transferring the waveform data (DTWAVE? query), it is necessary to set the trace using this command, to which the waveform data is transferred. The WAVESRC? query returns the selected channel.
COMMAND SYNTAX	WAVESRC <dir> <dir>:={CH1, CH2, CH3, CH4, MATH} (WJ354/334/324/314) :={CH1, CH2, MATH} (WJ352/332/322/312)
QUERY SYNTAX	WAVESRC?
RESPONSE FORMAT	<dir> The trace to which the waveform data is transferred is identified in <dir>.
REMARKS	

Acquisition	WSGL
	Command/Query
DESCRIPTION	WSGL sets the trigger mode to "SINGLE". WSGL? also sets the trigger mode to "SINGLE", and then waits the single measurement to be done. The WSGL? query is used to synchronize the application program with the completion of waveform data acquisition.
COMMAND SYNTAX	WSGL
QUERY SYNTAX	WSGL?
RESPONSE FORMAT	+000001
REMARKS	WSGL/WSGL? reports device-specific error (DDE) and does not performed when XYDS is XY.

DISPLAY	XYDS
	Command/Query
DESCRIPTION	The XYDS command selects YT, XY, or XY(Triggered) display type. The XYDS? query returns the current display type.
COMMAND SYNTAX	XYDS <type> <type> := {YT, XY, XYTRG} YT := Select display type YT XY := Select display type XY XYTRG := Select display type XY(Triggered)
QUERY SYNTAX	XYDS?
RESPONSE FORMAT	<type>

§ § §

部件名称	有毒有害物质和元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCBAs	X	O	X	X	X	X
机械硬件	O	O	X	O	O	O
金属片	O	O	X	O	O	O
塑料部件	O	O	O	O	X	X
电缆组件	X	O	X	O	X	X
显示器	X	O	X	X	X	X
电源	X	X	X	O	X	X
风扇	X	O	X	O	X	X
处理器电源	X	O	X	O	O	O
电源线	X	O	X	O	X	X
外部电源(如有)	X	X	X	O	X	X
探头(如有)	X	O	X	O	X	X
光驱(如有)	X	O	X	O	X	X
熔丝(如有)	X	O	X	O	O	O
产品外壳(如有)	O	O	O	O	X	X
适配器/模块(如有)	X	O	O	O	O	O
鼠标(如有)	X	O	X	O	X	X
O: 表明该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求之下。						
X: 表明该有毒有害物质至少在该部件的某一均质材料中的含量超过 SJ/T11363-2006 标准规定的限量要求。						

EFUP (对环境友好的使用时间) 使用条件：参阅本手册"规范"部分规定的环境条件。

电池 EFUP：5 年

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr^{6+})	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCBAs	X	O	X	X	X	X
Mechanical Hardware	O	O	X	O	O	O
Sheet Metal	O	O	X	O	O	O
Plastic Parts	O	O	O	O	X	X
Cable Assemblies	X	O	X	O	X	X
Display	X	O	X	X	X	X
Power Supply	X	X	X	O	X	X
Fans	X	O	X	O	X	X
Battery for Processor	X	O	X	O	O	O
Power Cord	X	O	X	O	X	X
Ext Power Supply (if present)	X	X	X	O	X	X
Probes (if present)	X	O	X	O	X	X
CD Drive (if present)	X	O	X	O	X	X
Fuse (if present)	X	O	X	O	O	O
Product Case (if present)	O	O	O	O	X	X
Adapters/Modules (if present)	X	O	O	O	O	O
Mouse (if present)	X	O	X	O	X	X

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement specified in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement specified in SJ/T11363-2006.

EFUP (Environmental Friendly Use Period) Use Conditions: refer to the environmental conditions stated in the specifications section of this Manual.

EFUP for Battery: 5 Years