User's Manual

AQ2200 Series
Multi Application Test System
Communication Interface

YOKOGAWA

Yokogawa Test & Measurement Corporation

IM 735101-17EN

16th Edition

Thank you for purchasing this AQ2200 Series Multi Application Test System. This user's manual explains the features, operating procedures, and handling precautions of the AQ2200 Series. To ensure correct use, please read this manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event a question arises.

List of Manuals

The following manuals, including this one, are provided as manuals for the AQ2200 Series. Please read all manuals.

Manual Title	Manual No.	Description
AQ2200 Series Multi Application Test System User's Manual Startup Guide	IM 735101-01EN	The supplied CD contains the PDF file of this manual. This manual describes the handling precautions for, the names and functions of all parts of, and the firmware upgrade procedure for the AQ2200 Series.
AQ2200 Series Multi Application Test System Frame and Module Operation User's Manual	IM 735101-03EN	The supplied CD contains the PDF file of this manual. This manual describes all the features of the AQ2200 Series and how to use them, with the exception of some of the application and communication features.
AQ2200 Series Multi Application Test System Application Operation User's Manual	IM 735101-04EN	The supplied CD contains the PDF file of this manual. This manual describes the AQ2200 Series application features and how to use them.
AQ2200 Series Multi Application Test System Communication Interface User's Manual	IM735101-17EN	This manual. The supplied CD contains the PDF file of this manual. This manual describes the AQ2200 Series communication interface features and how to use them.
64 Mbit Program Pattern Option User's Manual	IM 810518801-61E	This manual describes how to create program patterns for the AQ2200-601 10 Gbit/s BERT module with the /M option.
SDH/SONET Frame Option User's Manual	IM 810518801-62E	This manual describes how to create SDH/SONET patterns for the AQ2200-601 10 Gbit/s BERT module with the /P1 option.
AQ2200 Series Modules Checking the Contents of the Package and Handling Precautions of the Modules	IM 810518901-04E	This is included with AQ2200 Series modules. It explains the handling precautions of the module and lists the package contents.
Connector Adapter for Multi-Fiber Cable User's Manual	IM AQ9340-01EN	This manual explains the handling precautions of the connector adapters and how to use them.
Safety Instruction Manual	IM 00C01C01-01Z1	Safety manual (European languages)

The "EN" and "E" in the manual numbers are the language codes.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

Manual No.	Description
PIM 113-01Z2	List of worldwide contacts

16th Edition: June 2022 (YMI)
All Rights Reserved, Copyright © 2009, Yokogawa Electric Corporation
All Rights Reserved, Copyright © 2012, Yokogawa Test & Measurement Corporation

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
  The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing all or any part of the contents of this manual without the permission of YOKOGAWA is strictly prohibited.

Trademarks

- LabVIEW is a registered trademark or trademarks of National Instruments Corporation.
- Adobe, Acrobat, and PostScript are trademarks of Adobe Systems Incorporated.
- Microsoft, Windows, and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- For purposes of this manual, the TM and ® symbols do not accompany their respective trademark names or registered trademark names.
- Other company and product names are trademarks or registered trademarks of their respective holders.

Revisions

- 1st Edition: August 2009
- 2nd Edition: November 2009
- 3rd Edition: January 2010
- 4th Edition: March 2010
- 5th Edition: November 2012
- 6th Edition: September 2014
- 7th Edition: December 2014
- 8th Edition: May 2015
- 9th Edition: November 2015
- 10th Edition: May 2017
- 11th Edition: October 2017
- 12th Edition: February 2018
- 13th Edition: September 2018
- 14th Edition: February 2019
- 15th Edition: September 2020
- 16th Edition: June 2022

Compatibility between the AQ2211/AQ2212 Software Version and AQ2200 Series Modules

Some modules cannot be used with older versions of the AQ2211/AQ2212 software. Refer to the table below for version requirements. If your AQ2211/AQ2212 requires a newer version of the software, download from our website.
To determine the software version, press the SYSTEM soft key and then the “Information“. The version number is displayed under “FIRM VER” in the Overview screen.

Model	Modile Name\Application Name		AQ2201\AQ2202 Version (FIRM VER)
810518901	AQ2200-111	DFB-LD Module	1.01 and later
AQ2200112	AQ2200-112	LS Module	3.08 and later
810518902	AQ2200-141	FP-LD Module	1.01 and later
810518903	AQ2200-142	DUAL FP-LD Module	1.01 and later
AQ2200131	AQ2200-131	Grid TLS Module	3.00 and later
AQ2200132	AQ2200-132	Grid TLS Module	3.00 and later
810518904	AQ2200-136	TLS Module	2.20 and later
810518905	AQ2200-201	Interface Module	1.01 and later
AQ2200202	AQ2200-202	Interface Module (Dual)	3.05 and later
810518906	AQ2200-231	Optical Sensor Head (Long-Wavelength Sensor)	1.01 and later
AQ2200232	AQ2200-232	Optical Sensor Head (Long-Wavelength Sensor)	3.05 and later
810518907	AQ2200-241	Optical Sensor Head (Short-Wavelength Sensor)	1.01 and later
AQ2200242	AQ2200-242	Optical Sensor Head (Short-Wavelength Sensor)	3.06 and later
810518908	AQ2200-211	Sensor Module (High-Sensitivity Sensor)	1.01 and later
735125	AQ2200-215	Sensor Module (High Power Sensor)	1.01 and later
735122	AQ2200-221	Sensor Module (Dual)	1.01 and later
AQ2200212	AQ2200-212	Sensor Module	3.10 and later
AQ2200222	AQ2200-222	Dual Sensor Module	3.10 and later
735185	AQ2200-271	ORL Module	1.01 and later
810518915	AQ2200-311	ATTN Module	1.01 and later
735131	AQ2200-311A	ATTN Module	1.01 and later
AQ2200312	AQ2200-312	ATTN Module	3.04 and later
735133	AQ2200-331	ATTN Module (Built-in Monitor Power Meter)	1.01 and later
AQ2200332	AQ2200-332	ATTN Module (Built-in Monitor Power Meter)	3.04 and later
AQ2200342	AQ2200-342	DUAL ATTN Module (Built-in Monitor Power Meters)	3.01 and later
735141	AQ2200-411	OSW Module	1.01 and later
735143	AQ2200-412	OSW Module (1 x 16)	1.01 and later
735142	AQ2200-421	OSW Module (Dual)	1.01 and later
810518801	AQ2200-601	BERT Module	2.01 and later
810518802	AQ2200-621	10 Gbit/s Optical Modulator (Wavelength 1.55 μm)	2.01 and later
810518804	AQ2200-622	10 Gbit/s Optical Modulator (Wavelength 1.31 μm)	2.01 and later
810518803	AQ2200-631	10 Gbit/s Optical Receiver	2.01 and later
735161	AQ2200-641	XFP Interface Module	2.01 and later
735162	AQ2200-642	Transceiver I/F Module	2.01 and later
735163	AQ2200-651	SG Module	2.01 and later
–	STABILITY		1.01 and later
–	LOGGING		1.01 and later
–	ORL		2.20 and later
–	SWEPT		2.20 and later

Structure of the Manual

This User's Manual consists of the following sections:

Chapter 1 USB Interface
Describes the functions and specifications of the USB interface.

Chapter 2 GP-IB Interface
Describes the functions and specifications of the GP-IB interface.

Chapter 3 Ethernet Interface
Describes the functions and specifications of the Ethernet interface.

Chapter 4 Before Programming
Describes the syntax used to transmit commands.

Chapter 5 Commands
Describes all the commands one by one.

Chapter 6 Status Reports
Describes the status byte, various registers, queues, and other information.

Chapter 7 Sample Programs
Describes the sample programs.

Chapter 8 Troubleshooting
Describes the troubleshooting procedures.

Appendix 1 Various Detailed Information Forms
Describes the detailed information on unit specific response commands.

Appendix 2 SDH/SONET Frame Overhead Pattern Default Values
Describes the SDH/SONET Frame Overhead information.

Appendix 3 List of Commands for the Frame and Modules
Contains all the commands that are listed in alphabetical order in chapter 5 grouped into separate lists of commands for the frame controller, modules, and application features.

Index

Contents

List of Manuals i
Structure of the Manual iv

Chapter 1 USB Interface
1.1 Names of Parts 1-1
1.2 USB Interface Functions and Specifications 1-2
1.3 Connection via the USB Interface 1-3

Chapter 2 GP-IB Interface
2.1 Names and Functions of Parts 2-1
2.2 GP-IB Interface Functions 2-2
2.3 GP-IB Interface Specifications 2-3
2.4 Connecting the GP-IB Cable 2-4
2.5 Responses to Interface Messages 2-6

Chapter 3 Ethernet Interface
3.1 Names and Functions of Parts 3-1
3.2 Ethernet Interface Functions and Specifications 3-2

Chapter 4 Before Programming
4.1 Messages 4-1
4.2 Commands 4-3
4.3 Responses 4-5
4.4 Data 4-6
4.5 Synchronization with the Controller 4-8

Chapter 5 Commands
5.1 List of Commands 5-1
5.2 ABORt Group 5-17
5.3 APPLication Group 5-18
5.4 BEEP Group 5-46
5.5 DISPlay Group 5-47
5.6 FETCh Group 5-54
5.7 INITiate Group 5-55
5.8 INPut Group 5-56
5.9 INSTrument Group 5-60
5.10 MMEMory Group 5-61
5.11 OUTPut Group 5-62
5.12 READ Group 5-76
5.13 ROUTe Group 5-85
5.14 SENSe Group 5-86
5.15 SLOT Group 5-101
5.16 SOURce Group 5-104
5.17 STATus Group 5-126
5.18 SYSTem Group 5-129
5.19 TRIGger Group 5-133
5.20 WRITe Group 5-135
5.21 Common Command Group 5-137

Chapter 6 Status Reports

6.1 Status Reports 6-1
6.2 Status Byte 6-7
6.3 Standard Event Register 6-9
6.4 Extended Event Register 6-11
6.5 Input Queue and Output Queue 6-16

Chapter 7 Sample Programs

7.1 BERT 7-1

Chapter 8 Troubleshooting

8.1 Command Error 8-1
8.2 Error Messages 8-2

Appendix 1 Various Detailed Information Forms

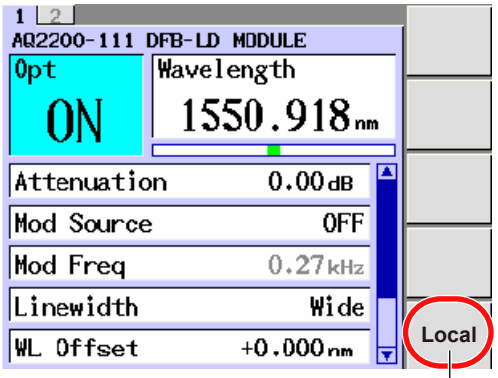
Appendix 2 SDH/SONET Frame Overhead Pattern Default Values

Appendix 3 List of Commands for the Frame and Modules

Index

1.1 Names of Parts

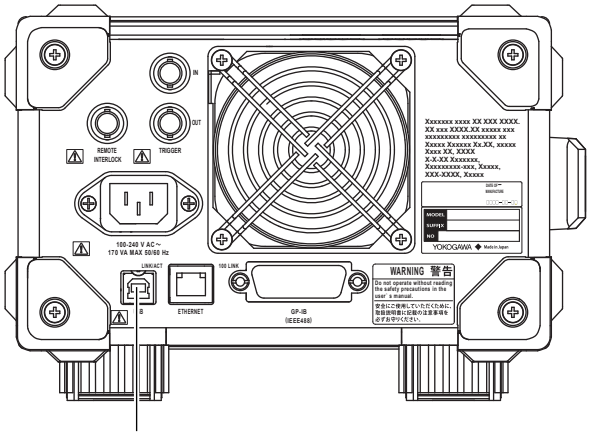
Display Screen



Local soft key
Appears when the instrument is being controlled remotely through communication commands.
If you press this soft key, the instrument switches from remote mode to local mode, in which you can perform key operations.

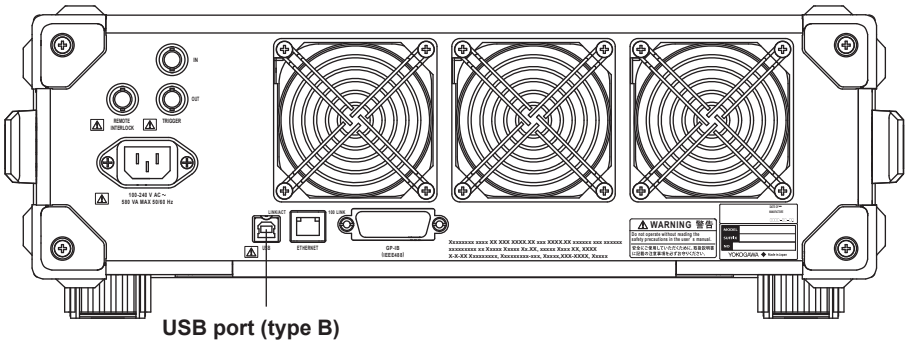
Rear Panel

3-slot type



USB port (type B)
This port is for connecting the instrument to a controller (such as a PC) using a USB cable.
For instructions on how to connect USB cables, see section 1.3.

9-slot type



USB port (type B)
This port is for connecting the instrument to a controller (such as a PC) using a USB cable. For instructions on how to connect USB cables, see section 1.3.

1.2 USB Interface Functions and Specifications

You can control the instrument from a PC using the USB interface. YOKOGAWA's dedicated USB connection device driver and library software (TMCTL) must be installed on the PC.

Reception Function

You can specify the same settings as those specified by front panel key operations.
Receives output requests for measured and computed data, setup data, and error codes.

Transmission Function

Outputs measured and computed data.
Outputs panel setup parameters and the status byte.
Outputs error codes that have occurred.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

Remote mode is activated when the `:SYSTem:COMMunicate:NETWork:REMote ON` command is received from a controller while local mode is active.

- The Local soft key appears at the bottom of the soft keys.
- Only the Local soft key is active; pressing any other keys has no effect.
- Settings entered in local mode are retained even when the Instrument switches to remote mode.

When Switching from Remote to Local Mode

Pressing the Local key when the Instrument is in the remote mode causes the instrument to switch to the local mode. However, this is not possible when the `:SYSTem:COMMunicate:NETWork:LOCKout ON` command is received from the PC while Local Lockout mode is active. Local mode is activated when the `:SYSTem:COMMunicate:NETWork:REMote OFF` command is received regardless of Local Lockout.

- The Local soft key disappears, and the menu appears in its place.
- Key operations are enabled.
- Settings entered in remote mode are retained even when the Instrument switches to local mode.

USB Interface Specifications

Electrical and mechanical specifications: Conforms to USB Rev.1.1

Connector:	Type B connector (receptacle)
Number of ports:	1
Power supply:	Self-powered
Protocol:	USB-TMC
PC system supported:	A PC with a standard USB port and with the YKMUSB communication driver installed. (Download the YMKUSB communication driver and TMCTL from the YOKOGAWA Web page.)

1.3 Connection via the USB Interface

CAUTION

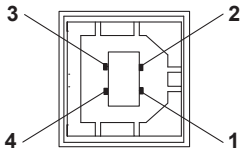
Do not connect or disconnect the USB cable after the power is turned ON until the Instrument boots up completely (until the Instrument is ready for operation, approximately 20 to 30 s). If you do, the Instrument may malfunction.

French

ATTENTION

Ne pas brancher ou débrancher le câble USB après la mise sous tension tant que l'instrument n'a pas complètement démarré (tant qu'il n'est pas prêt à fonctionner, soit environ 20 à 30 s). Cela pourrait provoquer des dysfonctionnements de l'instrument.

Connector and Signal Names



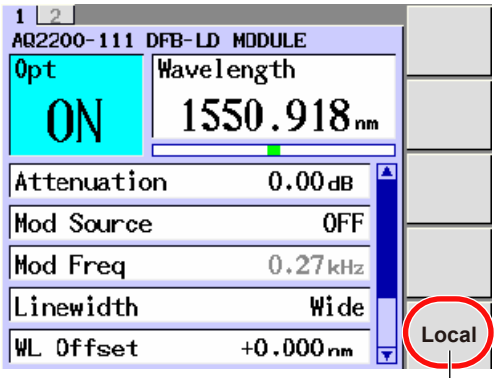
Pin No.	Signal Name	
1	V_{BUS}:	+5 V
2	D–:	–Data
3	D+:	+Data
4	GND:	Ground

Precautions to Be Taken When Making Connections

- Connect the USB cable by inserting the connector firmly into the USB connector.
- When connecting multiple devices using USB hubs, connect the Instrument to the USB hub that is closest to the controller.

2.1 Names and Functions of Parts

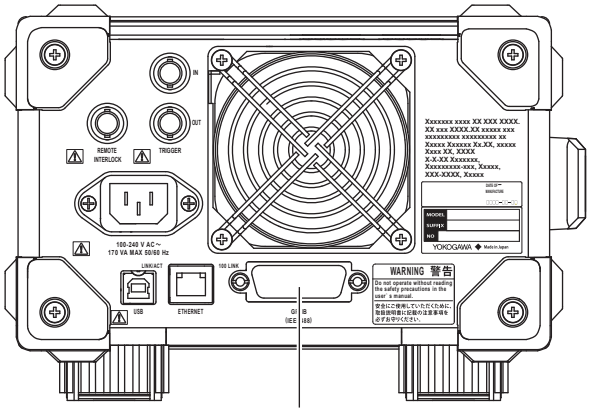
Display Screen



Local soft key
Appears when the instrument is being controlled remotely through communication commands.
If you press this soft key, the instrument switches from remote mode to local mode, in which you can perform key operations.

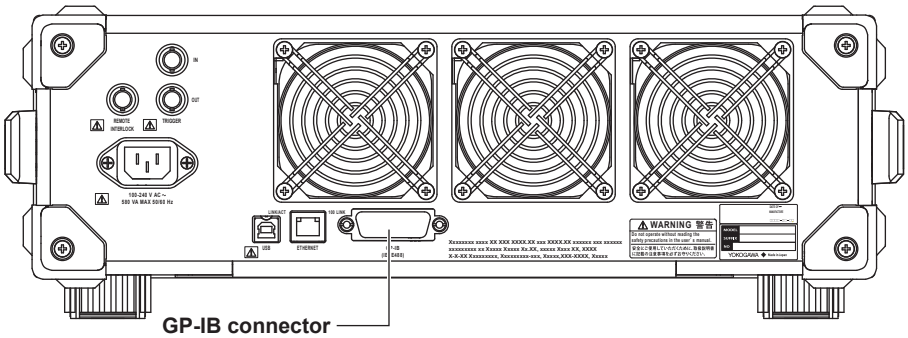
Rear Panel

3-slot type



GP-IB connector
This connector is for connecting the instrument to a controller (a PC) using a GP-IB cable.
For instructions on how to connect GP-IB cables, see section 2.4.

9-slot type



GP-IB connector
This connector is for connecting the instrument to a controller (a PC) using a GP-IB cable. For instructions on how to connect GP-IB cables, see section 2.4.

2.2 GP-IB Interface Functions

GP-IB Interface Functions

Listener Capability

- Receives commands from a controller requesting the output of setup parameters, measured/computed data, waveform data, and other information.
- Also receives status report commands.

Talker Capability

- Outputs setup parameters, measured/computed data, waveform data, and other information.

Note

Talk-only, listen-only, and controller functions are not available on this instrument.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

The instrument switches to remote mode when it is in local mode, a listener address is specified, and it receives a REN (Remote Enable) message from the controller.

- The Local soft key appears at the bottom of the soft keys.
- Only the Local soft key is active; pressing any other keys has no effect.
- Settings entered in local mode are retained even when the Instrument switches to remote mode.

When Switching from Remote to Local Mode

Pressing Local key in remote mode puts the instrument in local mode. However, this act is invalid if the instrument has been set to Local Lockout mode (see page 2-5) by the controller.

- The Local soft key disappears, and the menu appears in its place.
- Key operations are enabled.
- Settings entered in remote mode are retained even when the Instrument switches to local mode.

2.3 GP-IB Interface Specifications

GP-IB Interface Specifications

Supported device:	National Instruments • AT-GPIB • PCI-GPIB and PCI-GPIB+ • PCMCIA-GPIB and PCMCIA-GPIB + NI-488.2M driver version 1.60 or later
Electrical and mechanical specifications:	Conforms to IEEE St'd 488-1978
Functional specifications:	See table below.
Protocol:	Conforms to IEEE St'd 488.2-1992
Code used:	ISO (ASCII) code
Mode:	Addressable mode
Address setting:	The address can be set in the range from 0 to 30.
Clear remote mode:	Remote mode can be cleared by pressing Local key except when the instrument has been set to Local Lockout mode by the controller.

Functional specifications

Function	Subset Name	Description
Source handshaking	SH1	Full source handshaking capability.
Acceptor handshaking	AH1	Full acceptor handshaking capability.
Talker	T6	Basic talker capability, serial polling, untalk on MLA (My Listen Address), and no talk-only capability.
Listener	L4	Basic listener capability, unlisten on MTA (My Talk Address), and no listen-only capability.
Service request	SR1	Full service request capability
Remote local	RL1	Full remote/local capability
Parallel polling	PP0	No parallel polling capability
Device clear	DC1	Full device clear capability
Device trigger	DT0	No device trigger capability
Controller	C0	No controller capability
Electrical characteristics	E1	Open collector

Configuring GP-IB Settings

Before using the GP-IB interface to control this instrument from a PC, you must configure the GP-IB address settings. For instructions on how to configure the GP-IB address, see section 13.2 in the user's manual, IM 735101-03EN.

2.4 Connecting the GP-IB Cable

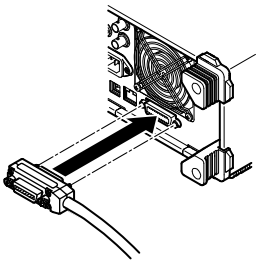
GP-IB Cable

The GP-IB connector used on this instrument is a 24-pin connector that conforms to the IEEE St'd 488-1978. Use a GP-IB cable that conforms to this standard.

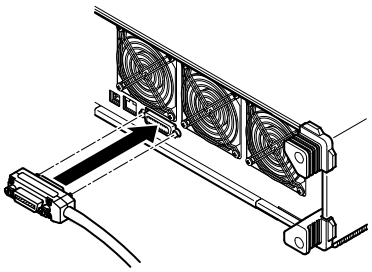
Connection Procedure

Connect the cable as shown below.

AQ2211 Frame Controller

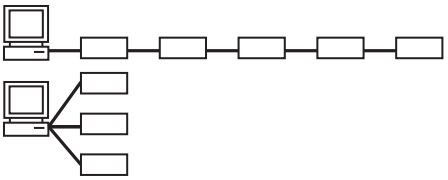


AQ2212 Frame Controller



Precautions to Be Taken When Making Connections

- Firmly tighten the screws on the GP-IB cable connector.
- Use an NI (National Instruments) model GP-IB port (or card) on the PC side. For details, see section 2.3.
- If a converter is used along the communication cable connecting the WT and PC (for example, a GP-IB-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.
- Multiple cables can be used to connect multiple devices. However, no more than 15 devices including the controller can be connected on a single bus.
- When connecting multiple devices, each device must have its own unique address.
- Use a cable of length 2 m or less for connecting the devices.
- Make sure the total cable length does not exceed 20 m.
- When communicating, have at least two-thirds of the devices turned ON.
- To connect multiple devices, wire them in a daisy-chain or star configuration as shown below. You can also mix these configurations. Loop configuration is not allowed.



- To connect a BNC cable to the external start signal output connector (TRIGGER IN, TRIGGER OUT) when a GP-IB cable is connected to the GP-IB connector, first remove the GP-IB cable. Then connect the BNC cable. Finally, reconnect the GP-IB cable.

CAUTION

When connecting or disconnecting communication cables, make sure to turn OFF the PC and the Instrument. Otherwise, erroneous operation or damage to the internal circuitry may result.

French

ATTENTION

Veillez à mettre le PC et contrôleur AQ2211 ou AQ2212 hors tension lorsque vous branchez ou débranchez les câbles de communication, car cela risquerait de provoquer des dysfonctionnements ou des courts-circuits internes.

2.5 Responses to Interface Messages

Responses to Interface Messages

Responses to a Uni-Line Message

- **IFC (Interface Clear)**
  Clears the talker and listener functions. Stops output if data are being output.

- **REN (Remote Enable)**
  Switches between the remote and local modes.

  IDY (Identify) is not supported.

Responses to a Multi-Line Message (Address Command)

- **GTL (Go To Local)**
  Switches to the local mode.

- **SDC (Selected Device Clear)**
  - Clears the program message (command) being received and the output queue (see section 6.5).
  - *OPC and *OPC? commands in execution are void.
  - The *WAI are immediately terminated.

Responses to a Multi-Line Message (Universal Command)

- **LLO (Local Lockout)**
  Disables Local on the front panel to prohibit switching to the local mode.

- **DCL (Device Clear)**
  Same operation as the SDC message.

- **SPE (Serial Poll Enable)**
  Sets the talker function on all devices on the bus to serial polling mode. The controller polls the devices in order.

- **SPD (Serial Poll Disable)**
  Clears the serial polling mode of the talker function on all devices on the bus.

  PPU (Parallel Poll Unconfigure) is not supported.

What Is an Interface Message

Interface messages are also referred to as interface commands or bus commands. They are commands that are issued by the controller. They are classified as follows:

Uni-Line Messages

A single control line is used to transmit uni-line messages. The following three types are available.

- IFC (Interface Clear)
- REN (Remote Enable)
- IDY (Identify)

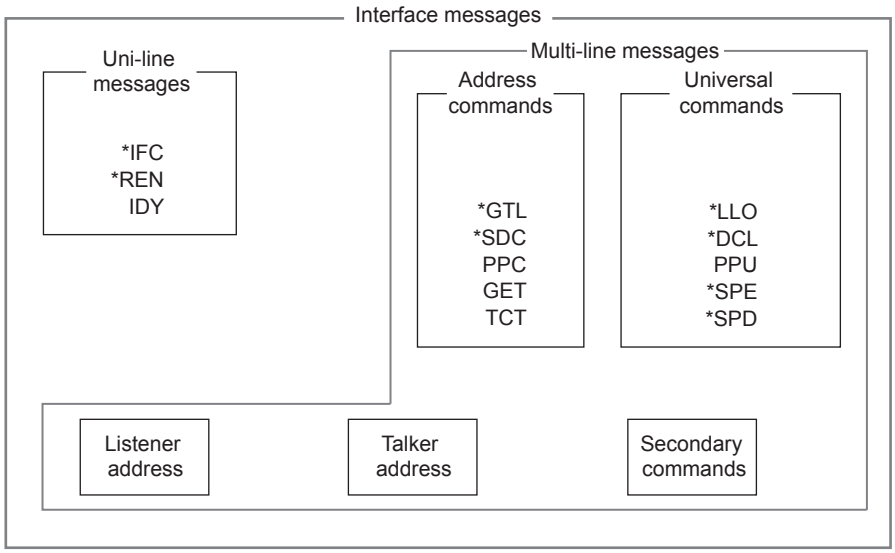
Multi-Line Messages

Eight data lines are used to transmit multi-line messages. The messages are classified as follows:

- **Address Commands**
  These commands are valid when the instrument is designated as a listener or as a talker. The following five types are available.
  - Commands that are valid on an instrument that is designated as a listener
    - GTL (Go To Local)
    - SDC (Selected Device Clear)
    - PPC (Parallel Poll Configure)
    - GET (Group Execute Trigger)
  - Commands that are valid on an instrument that is designated as a talker
    TCT (Take Control)

- **Universal Commands**
  These commands are valid on all instruments regardless of the listener and talker designations. The following five types are available.
  - LLO (Local Lockout)
  - DCL (Device Clear)
  - PPU (Parallel Poll Unconfigure)
  - SPE (Serial Poll Enable)
  - SPD (Serial Poll Disable)

In addition, listener address, talker address, and secondary commands are also considered interface messages.



Interface messages that Instrument supports are indicated with * marks.

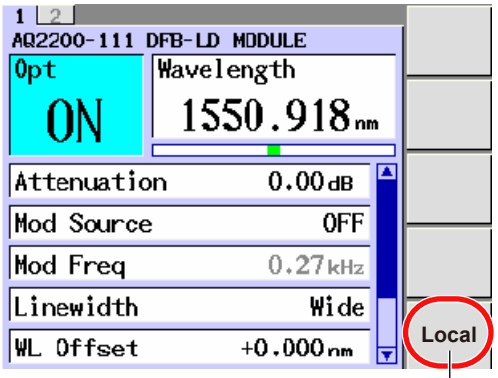
Note

The differences between SDC and DCL

In multi-line messages, SDC messages are those that require talker or listener designation and DCL messages are those that do not require the designation. Therefore, SDC messages are directed at a particular instrument while DCL messages are directed at all instruments on the bus.

3.1 Names and Functions of Parts

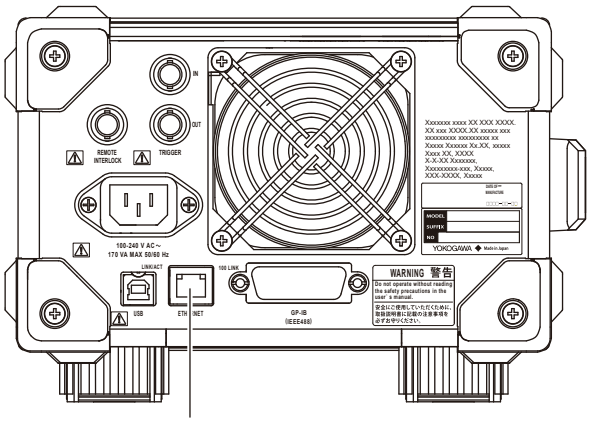
Display Screen



Local soft key
Appears when the instrument is being controlled remotely through communication commands.
If you press this soft key, the instrument switches from remote mode to local mode, in which you can perform key operations.

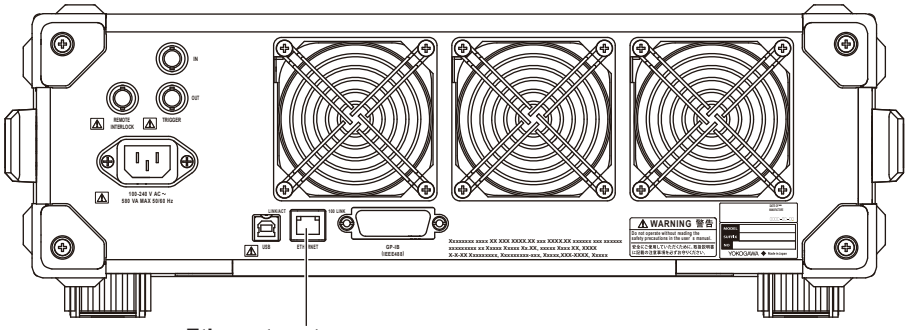
Rear Panel

3-slot type



Ethernet port
This port is used to connect the instrument to a controller (PC) or to a network.
For instructions on how to connect Ethernet cables, see section 1.1 in the user's manual, IM 735101-03EN.

9-slot type



Ethernet port
This port is used to connect the instrument to a controller (PC) or to a network.
For instructions on how to connect Ethernet cables, see section 1.1 in the user's manual, IM 735101-03EN.

3.2 Ethernet Interface Functions and Specifications

You can use the Ethernet interface to control this instrument from a PC.
However, if you have specified port 10001, you must install the YOKOGAWA proprietary library software (TMCTL) on the PC.

Receiving Function

You can specify the same settings as those specified by front panel key operations.
Receives output requests for measured and computed data, setup parameters of the panel, and error codes.

Sending Function

Outputs measured and computed data.
Outputs panel setup parameters and the status byte.
Outputs error codes that have occurred.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

If the Instrument receives a "`:SYSTem:COMMunicate:NETWork:REMote ON`" command from the PC when it is in the local mode, it switches to the remote mode.

- The Local soft key appears at the bottom of the soft keys.
- Only the Local soft key is active; pressing any other keys has no effect.
- Settings entered in local mode are retained even when the Instrument switches to remote mode.

When Switching from Remote to Local Mode

Pressing Local key in remote mode puts the instrument in local mode. However, this is void when the Instrument has received a "`:SYSTem:COMMunicate:NETWork:LOCKout ON`" command from the PC (local lockout condition). When the Instrument receives a "`:SYSTem:COMMunicate:NETWork:REMote OFF`" command from the PC, the Instrument switches to the local mode regardless of the local lockout condition.

- The Local soft key disappears, and the menu appears in its place.
- Key operations are enabled.
- Settings entered in remote mode are retained even when the Instrument switches to local mode.

Ethernet Interface Specifications

Electrical and mechanical specifications: Conforms to IEEE 802.3.
Number of simultaneous connections: 5
For details on other specifications, see chapter 5 in the *User's Manual IM 735101-03EN*.

Connecting the Instrument and the PC

For the procedure of connecting the Instrument to a PC, see section 1.1 in the *User's Manual IM 735101-03EN*.

Entering TCP/IP Settings

You must enter TCP/IP settings to control the Instrument from a PC using the Ethernet interface. For the setup procedure, see section 13.3 in the *User's Manual IM 735101-03EN*.

4.1 Messages

Messages and Queries

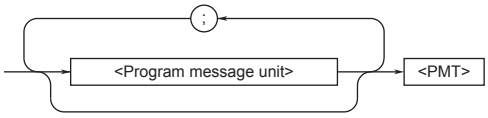
Messages are used to exchange information between the controller and the instrument. Messages sent from the controller to the Instruments are called program messages. Program messages that request a response to be sent from the Instruments to the controller are called queries. Messages that the controller receives from the Instruments are called response messages.
If a query is included in a program message, the Instruments sends a response message after receiving the program message. A single response message is always returned in response to a single program message.

Note

This instrument's messages are compatible with the messages from the previous generation of instruments (AQ2201/AQ2202).

Program Messages

The program message format is shown below.



<Program Message Unit>

A program message consists of one or more program message units; each unit corresponds to one command. The instrument executes the received commands in order.
Each program message unit is separated by a semicolon (`;`).
For details regarding the format of the program message unit, see the next section.

Example

```
:DISPlay:BACKlight 5;:BEEP:VOLume 5
```

Unit Unit

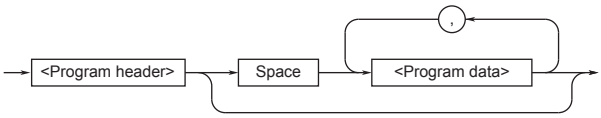
<PMT>

PMT is a program message terminator. The following three types are available.

- **NL (New Line)**
  Same as LF (Line Feed). ASCII code “0AH.”
- **^END**
  The END message (EOI signal) as defined in the IEEE488.1. (The data byte that is sent with the END message is the last data of the program message.)
- **NL^END**
  NL with an END message attached. (NL is not included in the program message.)

Program Message Unit Format

The program message unit format is shown below.



<Program Header>

The program header indicates the command type. For details, see page 4-3.

<Program Data>

If certain conditions are required in executing a command, program data is added. A space (ASCII code “20H”) separates the program data from the header. If there are multiple sets of program data, they are separated by commas (`,`).
For details, see page 4-5.

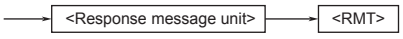
Example

```
:INPut:CFACtor 3<PMT>
```

Header Data

Response Message

The response message format is shown below.

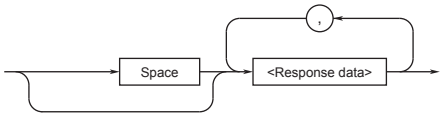


<RMT>

A response message terminator.

Response Message Unit Format

The response message unit format is shown below.



<Response Data>

Response data contains the content of the response. If there are multiple sets of response data, they are separated by commas (,). For details, see page 4-5.

If there are multiple queries in a program message, responses are made in the same order as the queries. In most cases, a single query returns a single response message unit, but there are a few queries that return multiple units. The first response message unit always corresponds to the first query, but the nth response unit may not necessarily correspond to the nth query. Therefore, if you want to make sure that every response is retrieved, divide the program messages into individual messages.

Precautions to Be Taken when Transferring Messages

- If a program message that does not contain a query is sent, the next program message can be sent at any time.
- If a program message that contains a query is sent, a response message must be received before the next program message can be sent. If the next program message is sent before the response message is received in its entirety, an error occurs. The response message that was not received is discarded.
- If the controller tries to receive a response message when there is none, an error occurs. If the controller tries to receive a response message before the transmission of the program message is complete, an error occurs.
- If a program message containing multiple message units is sent, and the message contains incomplete units, the instrument attempts to execute the ones that are believed to be complete. However, these attempts may not always be successful. In addition, if the message contains queries, the responses may not be returned.

Deadlock

The instrument can store in its buffer program and response messages of length 1024 bytes or more (The number of available bytes varies depending on the operating conditions). When both the transmit and receive buffers become full at the same time, the instrument can no longer continue its communication operation. This state is called a deadlock. In this case, operation can be resumed by discarding the program message.
Deadlock will not occur if the program message (including the <PMT>) is kept below 1024 bytes. Furthermore, deadlock never occurs if a program message does not contain a query.

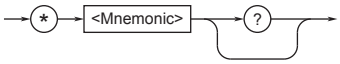
4.2 Commands

Commands

There are three types of commands (program headers) that are sent from the controller to the instrument. They differ in their program header formats.

Common Command Header

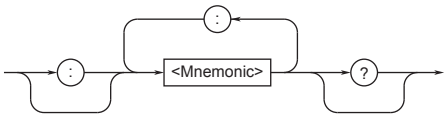
Commands that are defined in the IEEE 488.2-1992 are called common commands. The header format of a common command is shown below. An asterisk (*) is always placed in the beginning of a command.



Common command example `*CLS`

Compound Header

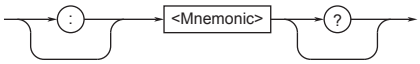
Dedicated commands used by the instrument are classified and arranged in a hierarchy according to their functions. The format of a compound header is shown below. A colon (:) must be used to specify a lower hierarchy.



Compound header example `:BEEP:VOLume`

Simple Header

These commands are functionally independent and do not have a hierarchy. The format of a simple header is shown below.



Simple header example `:ABOrt`

Note

A <mnemonic> is a character string made up of alphanumeric characters.

When Concatenating Commands

Command Group

A command group is a group of commands that have common compound headers arranged in a hierarchy. A command group may contain sub-groups.

Example Group of commands related to system

```
:SYSTem:DATE
:SYSTem:TIME
:SYSTem:ERRor?
:SYSTem:PRESet
:SYSTem:CONDition
:SYSTem:COMMunicate:GPIB:ADDRess
:SYSTem:COMMunicate:GPIB:TERMinator
:SYSTem:COMMunicate:NETWork:DHCP
:SYSTem:COMMunicate:NETWork:IPADdress
:SYSTem:COMMunicate:NETWork:SUBNetmask
:SYSTem:COMMunicate:NETWork:GATeway
:SYSTem:COMMunicate:NETWork:REMote
:SYSTem:COMMunicate:NETWork:PORT:
```

When Concatenating Commands of the Same Group

The instrument stores the hierarchical level of the command that is currently being executed, and performs analysis on the assumption that the next command sent will also belong to the same level. Therefore, common header sections can be omitted for commands belonging to the same group.

Example `:SYSTem:DATE 2009,`
`7,31;TIME13,30,50<PMT>`

When Concatenating Commands of Different Groups

If the following command does not belong to the same group, a colon (:) is placed in front of the header.

Example `:BEEP:VOLum`
`5;:DISPlay:BACKlight 5<PMT>`

When Concatenating Simple Headers

If a simple header follows another command, a colon (:) is placed in front of the simple header.

Example `:BEEP:VOLum 5;:ABORt<PMT>`

When Concatenating Common Commands

Common commands that are defined in the IEEE 488.2-1992 are independent of hierarchy. Colons (:) are not needed before a common command.

Example `:INPut:ATTenuation`
`10DB;*WAI<PMT>`

When Separating Commands with <PMT>

If a terminator is used to separate two commands, each command is a separate message. Therefore, the common header must be specified for each command even when commands belonging to the same command group are being concatenated.

Example
```
:SYSTem:DATE 2009, 7,31<PMT>
:SYSTem:TIME 13,30,50<PMT>
```

Header Interpretation Rules

The instrument interprets the header that is received according to the rules below.

- Mnemonics are not case sensitive.
  Example "`SENSe`" can also be written as "`sense`" or "`SEnse`."
- The lower-case section of the header can be omitted.
  Example "`INPut`" can also be written as "`INPU`" or "`INP`."
- The question mark (`?`) at the end of a header indicates that it is a query. The question mark (`?`) cannot be omitted.
  Example: The shortest abbreviation for "`:SENSe:CHANnel:POWer:ATIMe?`" is "`:SENS:POW:ATIM?`".
- If the <m> (value) or <d> (value) at the end of a mnemonic is omitted, it is interpreted as a 1.
  Example If "`SENSe<m>`" is written as "`SENS`," it means "`SENSe1`." (However, this does not apply to the STATus group.)
  <m> : 1 to 3 if you are using an AQ2211
  1 to 9 if you are using an AQ2212
  <d> : The device number.
- The section enclosed by braces ([ ]) can be omitted.
  Example "`[:SOURce[m]] [:CHANnel[d]]:WAVelength 1550NM`" can be written as "`:WAV 1550NM`".
  The slot number can only be omitted when it is 1.
  You cannot omit the slot number for numbers 2 to 9.

4.3 Responses

When the controller sends a query with a question mark, the instrument returns only data as the response message to the query.

4.4 Data

Data

Data contains conditions and values that are written after the header. A space separates the data from the header.

- <wsp> indicates a space.
  Example: `:SENSe:OVER -10 ->`
  `:SENSe:OVER<wsp>-10`
- When one option is to be selected from multiple character strings (mnemonics), a | is written to separate each option. The data interpretation rules are the same as those described in “Header Interpretation Rules” on page 4-4.

Example: `:SENSe:AM:`
`FREQuency<wsp>270HZ|1KHZ`
(270HZ or 1KHZ)

- User-defined data is grouped as follows:

Data	Description
<value>	Numeric data There are the following three data formats: • Integer (Example: 0, 320) • Decimal (Example: 50.32) • Floating-point number (Example: 1.00000000E-003)
<unsigned value>	Unsigned value data This is an unsigned integer.
<Register>	A register value displayed in hexadecimal (Example: Page number, password ->:OUTP1:PAG #H20F0DE23,#H05)
<“string”>	User-defined string (Example: File name including the path ->:MMEM:LOAD PROG64M, “/USB0-0/PN15_1block.dat”)
<Block>	Block data displayed in hexadecimal (Example: Program pattern, 32-bit single-precision floating point format ->:SENS:DATA:PATT:PROG:DATA 1, #2101A2B3C4D5E
<Field>	Detailed information that the frame controller, module, or sensor head hasFor details, see appendix 1.

<Value>

- This instrument can receive values that are written in a variety of formats.
- This instrument only uses floating-point numbers in the basic form when transmitting numeric values. For floating point data, the number of digits that constitute the real part are as follows: one digit for the sign, one digit for the integer, and eight digits for the decimal places.The number of digits for the exponent is fixed to three digits.

Example: The following values can all be received as 1550 nm
-> 1550nm, 1.55um, 1550E-9, 1.55E-6, etc.
Transmitting the numeric value 1550 nm
-> +1.55000000E-006 (The number of decimal places is fixed to eight.)

Multipliers which can be used are indicated below.

Symbol	Word	Multiplier
EX	Exa	10^{18}
PE	Peta	10^{15}
T	Tera	10^{12}
G	Giga	10^{9}
MA	Mega	10^{6}
K	Kilo	10^{3}
M	Milli	10^{-3}
U	Micro	10^{-6}
N	Nano	10^{-9}
P	Pico	10^{-12}
F	Femto	10^{-15}

Units that can be used are indicated below.

Symbol	Word	Description
m	Meter	Wavelength
mm	Millimeter	Wavelength
µm	Micrometer	Wavelength
nm	Nanometer	Wavelength
pm	Picometer	Wavelength
HZ	Hertz	Frequency
KHZ	Kilohertz	Frequency
MAHZ	Megahertz	Frequency
GHZ	Gigahertz	Frequency
THZ	Terahertz	Frequency
DB	Decibel	Magnitude
DBM	Decibel per milliwatt	Magnitude
SEC	Second	Time
MSEC	Millisecond	Time
USEC	Microsecond	Time

- <Multiplier> and <Unit> are not case sensitive.
- “U” is used to indicate micro “µ”.
- “MA” is used for Mega to distinguish it from Milli. However, “MA” is interpreted as milliampere for current. In addition, megahertz is expressed as “MHZ.” Therefore, the “M (Milli)” multiplier cannot be used for frequencies.
- If both Multiplier and Unit are omitted, the default unit (m, Hz, dB/DBM, or SEC) is used.
- Response messages are always expressed in floating-point numbers. Additionally, they are returned in the basic form, without a multiplier or unit attached.

<Register>

This is used when each bit of the value has a particular meaning. The following types of expressions are possible.

Form	Example
#H<Hexadecimal value made up of the digits 0 to 9 and A to F>	#H0F

- <Register> is not case sensitive.

<“string”>

<“string”> is not a predefined character string (mnemonic). It can be any character string. The character string must be enclosed in double quotation marks (“).

Form	Example
<"String">	"123ABC"

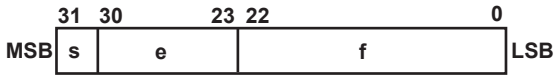
- If a character string contains a double quotation mark ("), the double quotation mark is replaced by two concatenated double quotation marks (""). This rule also applies to a single quotation mark within a character string.
- A response message is always enclosed in double quotation marks (").
- Because <“string”> can be any character string, if you do not include the closing double quotation mark (“), the instrument will interpret the remainder of the program message unit as part of <“string”>, and you may not be able to properly detect errors.

<Block>

<Block> is arbitrary 8-bit data.
The syntax is as follows:

Form	Example
#N<N-digit decimal number><Data byte sequence>	#212010A020B030C040D050E060F

- #N
  Indicates that the data is <Block>. “N” indicates the number of digits in the value that represents the number of succeeding data bytes.
  (Example: 12 = 2 digits -> 2)
- <N-digit decimal number>
  Indicates the number of bytes of data
  (example: 12 = 12 bytes).
- <Data byte sequence>
  The actual data. The data is written in hexadecimal.
  (Example: 010A020B030C040D050E060F)
- Data is comprised of 8-bit values (0 to 255). This means that the ASCII code “0AH,” which stands for “NL,” can also be included in the data. Hence, care must be taken when programming the controller.
- If the data bytes are in 32-bit single-precision floating-point format, the data is packed into units of 4-bytes in length. Therefore, when the data byte sequence is eight bytes long, it contains two units of data, each of which is written in little-endian notation.



s: Sign (1 bit). 0 is positive, 1 is negative.
e: Exponent (8 bits). Written in binary.
f: Mantissa (23 bits). Written as a binary fraction.

Data = $(-1)^5 \times (1 + f)\ x2^{e-127}$

Example: “1036A53A”
In little-endian notation, this is “3AA53610.”
When written in binary:
“00111010101001010011011000010000.”
Assigning this data byte sequence to the bits described above gives the following:
s = 0
e = 0110101 (117 when written in decimal)
f = 01001010011011000010000
(0.290712357 when written in decimal)
Therefore,
$(-1)^0 \times (1 + 0.290712357) \times 2^{117-127}$
$= 1.260461 \times 10^{-3}$

4.5 Synchronization with the Controller

Overlap Commands and Sequential Commands

There are two types of commands, overlap commands and sequential commands. In the case of overlap commands, the execution of the next command may start before the execution of the previous command is completed.

If you specify the averaging time and send the next program message to query the result, the instrument always returns the most recent setting.

```
:SENSe2:CHANnel1:POWer:ATIMe 50MS;:
SENSe2:CHANnel1:POWer:ATIMe?<PMT>
```

This is because the next command is forced to wait until the processing of "`:SENSe2:CHANnel1:POWer:ATIMe`" itself is completed. This type of command is called a sequential command.

Now, let's assume that you send the next program message in hopes to specify the attenuation of an attenuator and read the measured value of the sensor after the process that sets the attenuation is completed.

```
:INPut1:CHANnel1:ATTenuation 35DB;:
READ2:CHANnel1:POWer?<PMT>
```

Here, `:READ2:CHANnel1:POWer?` is executed before the process that sets the attenuation completes, and the measured value that is returned is measured during the attenuation setting process.

The act of executing the next command before the processing of itself is completed such as with "`:INPut1:CHANnel1:ATTenuation`" is called an overlap operation. A command that operates in this way is called an overlap command.

In such case, the overlap operation can be prevented by using the methods below.

Synchronizing with Overlap Commands

Using the *WAI Command

The `*WAI` command holds the subsequent commands until the overlap command is completed.

Example
```
:INPut1:CHANnel1:ATTenuation
35DB;*WAI;:READ2:CHANnel1:POWer?
<PMT>
```

Because `*WAI` is executed just before `:READ2:CHANnel1:POWer?`, `:READ2:CHANnel1:POWer?` is not executed until the process that sets the attenuation of the attenuator completes.

Using the *OPC Command

The `*OPC` command sets the OPC bit, bit 0 of the standard event register (see page 6-8), to 1 when the overlap operation is completed.

Example
```
*ESE 1;ESR?;*SRE
32;:INPut1:CHANnel1:ATTenuation
35DB;*OPC<PMT>
```
(Read the response to `*ESR?`)
(Wait for a service request)
```
:READ2:CHANnel1:POWer?<PMT>
```

"`*OPC`" target. Here, media access is specified. "`*ESE 1`" and "`*SRE 32`" indicate that a service request is generated only when the OPC bit is 1."`*ESR?`" clears the standard event register.In the example above, "`:READ2:CHANnel1:POWer?`" is not executed until a service request is generated.

Using the *OPC? Query

The `*OPC?` query generates a response when an overlap operation is completed.

Example
```
:INPut1:CHANnel1:ATTenuation
35DB;*OPC?<PMT>
```
(Read the response to `*OPC?`)
```
:READ2:CHANnel1:POWer?<PMT>
```

Because "`*OPC?`" does not generate a response until the overlap operation is completed, the loading of the file will have been completed by the time the response to "`*OPC?`" is read.

Because *OPC? does not generate a response until the overlapping operation is completed, the process that sets the attenuation will have been completed by the time the response to *OPC? is read.

Note

Most commands are sequential commands. Overlap commands are indicated as overlap commands in chapter 5. All other commands are sequential commands.

Achieving Synchronization without Using Overlap Commands

Even when using sequential commands, there are times when it is necessary to achieve synchronization to properly query the measured data. For example, when you want to query the stability measurement results, if you transmit the "`:APPLication:STABility:MEASure:RESult?<wsp>S1D1`" command with some arbitrary timing, the current measured data will be returned, regardless of whether the measured data has been updated or not. Therefore, there is a chance that you will receive the same data as the previous time.
If this happens, you must use the following method to synchronize with the end of measured data updating.

Querying the State of Each Measurement

In the above example, you can query the state of the stability measurement.
"`:APPLication:STABility:MEASure:STATe?`"
This command will query the state of the stability measurement. By reading the response data, the controller can determine whether the measurement is ongoing or not. If the response data is "PROGRESS," the measurement is still ongoing. If the response data is "COMPLETE," the measurement has completed, and this represents that the data can be queried.

5.1 List of Commands

Command	Function	Page
ABORt Group		
:ABORt[m]	Stops measurement.	5-17
APPLication Group		
:APPLication:LOGGing:MEASure:RESult?	Queries the measured result in logging mode.	5-18
:APPLication:LOGGing:MEASure:STATe	Starts, stops, or queries the logging measurement.	5-18
:APPLication:MDSelect:LOGGing	Sets or queries the sensors that are used in the logging measurement.	5-18
:APPLication:MDSelect:ORL	Sets or queries modules that are used for ORL measurements.	5-19
:APPLication:MDSelect:ORL:CONDition	Sets or queries the ORL measurement's module configuration and measurement conditions. (Selects tabs.)	5-19
:APPLication:MDSelect:ORL:LS	Sets or queries the light source modules that are used for ORL measurements.	5-19
:APPLication:MDSelect:ORL:OPM1	Sets or queries the sensors that are used in the return loss measurement.	5-20
:APPLication:MDSelect:ORL:OPM2	Sets or queries the sensors that are used in the insertion loss measurement.	5-20
:APPLication:MDSelect:ORL:OPM3	Sets or queries the monitor sensors.	5-20
:APPLication:MDSelect:STABility	Sets or queries the sensors that are used in the stability measurement.	5-21
:APPLication:MDSelect:TLS:SWEPt[:SENSe]	Sets or queries the sensor modules that are used in the SWEPT measurement.	5-21
:APPLication:MDSelect:TLS:SWEPt:TLS	Sets or queries the TLS modules that are used in the SWEPT measurement.	5-22
:APPLication:ORL:IL:RESult?	Queries the measured insertion loss value. (The value that is currently displayed.)	5-22
:APPLication:ORL:MASMeasure:RESult?	Queries the measured master reference value (calibration value).	5-22
:APPLication:ORL:MASMeasure:STATe	Starts, stops, or queries the master reference measurement.	5-22
:APPLication:ORL[:ORL]:RESult?	Queries the measured return loss value. (The value that is currently displayed.)	5-23
:APPLication:ORL:REFMeasure:RESult?	Queries the measured reference reflection value (calibration value).	5-23
:APPLication:ORL:REFMeasure:STATe	Starts, stops, or queries the reference reflection measurement.	5-23
:APPLication:ORL:STOP	Closes the ORL application.	5-23
:APPLication:ORL:TMEasure:RESult?	Queries the measured terminal value (calibration value).	5-24
:APPLication:ORL:TMEasure:STATe	Starts, stops, or queries the terminal measurement.	5-24
:APPLication:PARameter:LOGGing:ATIMe	Sets or queries the averaging time of the sensors that are used in the logging measurement.	5-24
:APPLication:PARameter:LOGGing:INTrigger	Sets or queries the logging measurement's trigger mode.	5-25
:APPLication:PARameter:LOGGing:RANGe:MODE	Sets or queries the logging measurement's range mode.	5-25
:APPLication:PARameter:LOGGing:RANGe:SET:COMM	Sets or queries the measurement range when logging measurement is in common mode.	5-26
:APPLication:PARameter:LOGGing:RANGe:SET:INDividual	Sets or queries each measurement range when logging measurement range is in individual mode.	5-26
:APPLication:PARameter:LOGGing:REFerence	Sets or queries the logging measurement's reference value.	5-27
:APPLication:PARameter:LOGGing:REFMode	Sets or queries the logging measurement's reference mode.	5-27
:APPLication:PARameter:LOGGing:SAMPle	Sets or queries the logging measurement's number of data points.	5-28
:APPLication:PARameter:LOGGing:UNIT	Sets or queries the logging measurement's unit and measurement mode.	5-28

5.1 List of Commands

Command	Function	Page
:APPLication:PARameter:LOGGing:WAVelength:MODE	Sets or queries the logging measurement's wavelength mode.	5-28
:APPLication:PARameter:LOGGing:WAVelength:SET:COMM	Sets or queries the wavelength when the logging measurement's wavelength mode is common.	5-29
:APPLication:PARameter:LOGGing:WAVelength:SET:INDividual	Sets or queries each wavelength when the logging measurement's wavelength mode is individual.	5-29
:APPLication:PARameter:ORL:ATIMe	Sets or queries the averaging time of the sensors that are used in the return loss or insertion loss measurements.	5-30
:APPLication:PARameter:ORL:OPT	Sets or queries the OPT mode that is used in the return loss and insertion loss measurements.	5-30
:APPLication:PARameter:ORL:REF	Sets or queries the return loss measurement's reference reflection quantity.	5-30
:APPLication:PARameter:ORL:WAVelength	Sets or queries the wavelength that is used in the return loss and insertion loss measurements.	5-31
:APPLication:PARameter:STABility:ATIMe	Sets or queries the averaging time of the sensors that are used in the stability measurement.	5-31
:APPLication:PARameter:STABility:INTrigger	Sets or queries the stability measurement's trigger mode.	5-32
:APPLication:PARameter:STABility:OPT	Sets or queries the stability measurement's OPT mode.	5-32
:APPLication:PARameter:STABility:RANGe:MODE	Sets or queries the stability measurement's range mode.	5-33
:APPLication:PARameter:STABility:RANGe:SET:COMM	Sets or queries the range when the stability measurement's range mode is common.	5-33
:APPLication:PARameter:STABility:RANGe:SET:INDividual	Sets or queries the range when the stability measurement's range mode is individual.	5-34
:APPLication:PARameter:STABility:REFerence	Sets or queries the stability measurement's reference value.	5-34
:APPLication:PARameter:STABility:REFMode	Sets or queries the stability measurement's reference mode.	5-35
:APPLication:PARameter:STABility:SAMPle	Sets or queries the stability measurement's number of data points.	5-35
:APPLication:PARameter:STABility:TIME	Sets or queries the stability measurement's measurement time.	5-36
:APPLication:PARameter:STABility:UNIT	Sets or queries the stability measurement's unit and measurement mode.	5-36
:APPLication:PARameter:STABility:WAVelength:MODE	Sets or queries the stability measurement's wavelength mode.	5-37
:APPLication:PARameter:STABility:WAVelength:SET:COMM	Sets or queries the wavelength when the stability measurement's wavelength mode is common.	5-37
:APPLication:PARameter:STABility:WAVelength:SET:INDividual	Sets or queries each wavelength when the stability measurement's wavelength mode is individual.	5-38
:APPLication:PARameter:TLS:SWEPt:ATIMe	Sets or queries the averaging time of the sweep input.	5-38
:APPLication:PARameter:TLS:SWEPt:AUTO:SAVE	Sets or queries the automatic data save feature.	5-38
:APPLication:PARameter:TLS:SWEPt:CENTer	Sets or queries the sweep center wavelength.	5-39
:APPLication:PARameter:TLS:SWEPt:INPut:SNCTrl	Sets or queries whether the serial number feature is used or not.	5-39
:APPLication:PARameter:TLS:SWEPt:INPut:SNUMber	Sets or queries the serial number.	5-39
:APPLication:PARameter:TLS:SWEPt:LINewidth	Sets or queries the line width of the sweep output.	5-39
:APPLication:PARameter:TLS:SWEPt:MODE	Sets or queries the sweep mode.	5-40
:APPLication:PARameter:TLS:SWEPt:PMAX	Sets or queries the optical output to the maximum output level within the sweep range.	5-40
:APPLication:PARameter:TLS:SWEPt:POWer	Sets or queries the sweep output level.	5-40
:APPLication:PARameter:TLS:SWEPt:RANGe	Sets or queries the sweep range.	5-40
:APPLication:PARameter:TLS:SWEPt:SAMPle	Sets or queries the number of sweep samples.	5-41

Command	Function	Page
:APPLication:PARameter:TLS:SWEPt:SPAN	Sets or queries the sweep width.	5-41
:APPLication:PARameter:TLS:SWEPt:STARt	Sets or queries the sweep start wavelength.	5-41
:APPLication:PARameter:TLS:SWEPt:STEP	Sets or queries the sweep step wavelength.	5-41
:APPLication:PARameter:TLS:SWEPt:STOP	Sets or queries the sweep stop wavelength.	5-42
:APPLication:STABility:MEASure:RESult?	Queries the measured stability mode result.	5-42
:APPLication:STABility:MEASure:STATe	Starts, stops, or queries the stability measurement.	5-42
:APPLication:TLS:SWEPt[:MEASurement]:NEXT	Move to the next sweep wavelength in the measurement. (When in manual mode.)	5-42
:APPLication:TLS:SWEPt[:MEASurement]:RESult?	Queries the measured result.	5-43
:APPLication:TLS:SWEPt[:MEASurement]:STATe	Starts or queries the measurement.	5-43
:APPLication:TLS:SWEPt:REFMeasure:CLEar	Clears the reference measurement data.	5-43
:APPLication:TLS:SWEPt:REFMeasure:MODE	Sets or queries the reference measurement method.	5-43
:APPLication:TLS:SWEPt:REFMeasure:RESult?	Queries the result of the reference measurement.	5-44
:APPLication:TLS:SWEPt:REFMeasure:STATe	Starts or queries the reference measurement.	5-44
:APPLication:TLS:SWEPt:STOP	Stops the Swept feature.	5-44

BEEP Group

:BEEP:VOLume	Sets or queries the beep volume.	5-46

Command	Function	Page
DISPlay Group		
:DISPlay:BACKlight	Sets or queries the backlight setting.	5-47
:DISPlay[m]:NAME:AIN01	Sets or queries the name of the AIN01 status signal on the transceiver I/F module.	5-47
:DISPlay[m]:NAME:AIN02	Sets or queries the name of the AIN02 status signal on the transceiver I/F module.	5-47
:DISPlay[m]:NAME:AIN03	Sets or queries the name of the AIN03 status signal on the transceiver I/F module.	5-47
:DISPlay[m]:NAME:AIN04	Sets or queries the name of the AIN04 status signal on the transceiver I/F module.	5-48
:DISPlay[m]:NAME:AIN05	Sets or queries the name of the AIN05 status signal on the transceiver I/F module.	5-48
:DISPlay[m]:NAME:AIN06	Sets or queries the name of the AIN06 status signal on the transceiver I/F module.	5-48
:DISPlay[m]:NAME:CTRL01	Sets or queries the name of the CTRL01 transceiver I/F module control signal.	5-48
:DISPlay[m]:NAME:CTRL02	Sets or queries the name of the CTRL02 transceiver I/F module control signal.	5-49
:DISPlay[m]:NAME:CTRL03	Sets or queries the name of the CTRL03 transceiver I/F module control signal.	5-49
:DISPlay[m]:NAME:CTRL04	Sets or queries the name of the CTRL04 transceiver I/F module control signal.	5-49
:DISPlay[m]:NAME:CTRL05	Sets or queries the name of the CTRL05 transceiver I/F module control signal.	5-49
:DISPlay[m]:NAME:CTRL06	Sets or queries the name of the CTRL06 transceiver I/F module control signal.	5-50
:DISPlay[m]:NAME:CTRL07	Sets or queries the name of the CTRL07 transceiver I/F module control signal.	5-50
:DISPlay[m]:NAME:CTRL08	Sets or queries the name of the CTRL08 transceiver I/F module control signal.	5-50
:DISPlay[m]:NAME:CTRL09	Sets or queries the name of the CTRL09 transceiver I/F module control signal.	5-50
:DISPlay[m]:NAME:CTRL10	Sets or queries the name of the CTRL10 transceiver I/F module control signal.	5-51
:DISPlay[m]:NAME:CTRL11	Sets or queries the name of the CTRL11 transceiver I/F module control signal.	5-51
:DISPlay[m]:NAME:CTRL12	Sets or queries the name of the CTRL12 transceiver I/F module control signal.	5-51
:DISPlay[m]:NAME:CTRL13	Sets or queries the name of the CTRL13 transceiver I/F module control signal.	5-51
:DISPlay[m]:NAME:CTRL14	Sets or queries the name of the CTRL14 transceiver I/F module control signal.	5-52
:DISPlay[m]:NAME:CTRL15	Sets or queries the name of the CTRL15 transceiver I/F module control signal.	5-52
:DISPlay[m]:NAME:CTRL16	Sets or queries the name of the CTRL16 transceiver I/F module control signal.	5-52
:DISPlay[m]:NAME:CTRL17	Sets or queries the name of the CTRL17 transceiver I/F module control signal.	5-52
:DISPlay[m]:NAME:LOAD[:ALL]	Sets the transceiver I/F module signal names according to the specified value.	5-53
:DISPlay[m]:NAME:LOAD:AIN	Sets the transceiver I/F module AIN signal names according to the specified value.	5-53
:DISPlay[m]:NAME:LOAD:CTRL	Sets the transceiver I/F module CTRL signal names according to the specified value.	5-53
:DISPlay[m]:NAME:SAVE	Writes the transceiver I/F module AIN and CTRL signal names to the transceiver I/F module flash ROM.	5-53

Command	Function	Page
FETCh Group		
:FETCh[m][:CHANnel[d]]:POWer?	Queries the currently displayed measured value. The measured value includes the power offset.	5-54
INITiate Group		
:INITiate[m][:CHANnel[d]]	Performs a single measurement.	5-55
:INITiate[m] [:CHANnel[d]]:CONTinuous	Executes or queries continuous measurements or single measurements.	5-55
:INITiate[m]:CONTinuous	Executes or queries continuous measurements through the trigger system.	5-55
INPut Group		
:INPut[m] [:CHANnel[d]]:ATTenuation	Sets or queries the optical attenuation.	5-56
:INPut[m] [:CHANnel[d]]:ATTenuation: AONCe	Sets the attenuation values of channels 1 and 2 simultaneously.	5-56
:INPut[m] [:CHANnel[d]]:ATTenuation: SPEed	Sets or queries the attenuation change speed.	5-56
:INPut[m][:CHANnel[d]]:ATTenuation:SPEed:ENABle	Sets or queries whether the attenuation change speed is enabled or disabled.	5-57
:INPut[m][:CHANnel[d]]:OFFSet	Sets or queries the optical attenuation offset value.	5-57
:INPut[m] [:CHANnel[d]]:OFFSet:DISPlay	Sets the current optical attenuation to the attenuation offset value.	5-57
:INPut[m] [:CHANnel[d]]:WAVelength	Sets or queries the wavelength (all ATTN modules).	5-57
:INPut[m] [:CHANnel[d]]:WAVelength	Sets or queries the optical input signal wavelength band (10 Gbit/s optical receivers).	5-58
:INPut[m]:DATA:SOURce	Sets or queries the data input source.	5-58
:INPut[m]:DATA:THReshold	Sets or queries the data determination threshold.	5-58
:INPut[m]:EFREquency:RATio	Sets or queries the external input clock's division ratio.	5-58
:INPut[m]:POWer?	Queries the average optical input power.	5-58
:INPut[m]:STATus:THReshold:AIN01	Sets or queries the threshold of the AIN01 status signal on the transceiver I/F module.	5-58
:INPut[m]:STATus:THReshold:AIN02	Sets or queries the threshold of the AIN02 status signal on the transceiver I/F module.	5-59
:INPut[m]:STATus:THReshold:AIN03	Sets or queries the threshold of the AIN03 status signal on the transceiver I/F module.	5-59
:INPut[m]:STATus:THReshold:AIN04	Sets or queries the threshold of the AIN04 status signal on the transceiver I/F module.	5-59
:INPut[m]:STATus:THReshold:AIN05	Sets or queries the threshold of the AIN05 status signal on the transceiver I/F module.	5-59
:INPut[m]:STATus:THReshold:AIN06	Sets or queries the threshold of the AIN06 status signal on the transceiver I/F module.	5-59

Command	Function	Page
INSTrument Group		
:INSTrument[m]:COUPle	Sets or queries the couple mode.	5-60
MMEMory Group		
:MMEMory[m]:LOAD	Loads the output data's long program pattern file or overhead pattern file.	5-61
OUTPut Group		
:OUTPut[m]:AMPLitude	Sets or queries the output amplitude (0.6 Vp-p or 1.1 Vp-p) of the SG module RF OUT signal.	5-62
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.	5-62
:OUTPut[m][:CHANnel[d]] [:STATe]:AONCe	Turns on or off the optical output of channels 1 and 2 simultaneously.	5-63
:OUTPut[m][:CHANnel[d]] [:STATe]:APOWeron	Sets or queries the startup optical output's on/off status.	5-63
:OUTPut[m][:CHANnel[d]]:ATIMe	Sets or queries the averaging time.	5-63
:OUTPut[m][:CHANnel[d]]:CORRect ion:COLLect:ZERO	Executes or queries the zero-set procedure.	5-63
:OUTPut[m][:CHANnel[d]]:CORRect ion:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.	5-64
:OUTPut[m] [:CHANnel[d]]:PAGeselect	Sets the XFP transceiver's upper table page.	5-64
:OUTPut[m][:CHANnel[d]]:POWer	Sets or queries the optical output power.	5-64
:OUTPut[m] [:CHANnel[d]]:POWer:AONCe	Sets the optical output power of channels 1 and 2 simultaneously.	5-65
:OUTPut[m] [:CHANnel[d]]:POWer:CONTrol	Sets or queries the function that attenuates the output power according to the changes in the input light.	5-65
:OUTPut[m][:CHANnel[d]]:POWer:C ONTrol:AONCe	Sets the function that attenuates the output power according to the changes in the input light of channels 1 and 2 simultaneously.	5-65
:OUTPut[m] [:CHANnel[d]]:POWer:ECOunter?	Queries the number of times the measured value goes outside the power setting range of the optical output monitor.	5-65
:OUTPut[m][:CHANnel[d]]:POWer:E COunter:CLEar	Clears the number of times the measured value goes outside the power setting range of the optical output monitor.	5-65
:OUTPut[m] [:CHANnel[d]]:POWer:MINMax:MODE	Sets or queries the maximum and minimum measurement mode of the optical output monitor.	5-66
:OUTPut[m][:CHANnel[d]]:POWer:M INMax:RESet	Clears the maximum and minimum measured values of the optical output monitor.	5-66
:OUTPut[m] [:CHANnel[d]]:POWer:OFFSet	Sets or queries the power offset value.	5-66
:OUTPut[m] [:CHANnel[d]]:POWer:STATus	Queries the optical output status.	5-66
:OUTPut[m] [:CHANnel[d]]:POWer:THReshold	Sets or queries the threshold value for determining the optical output status.	5-67
:OUTPut[m] [:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit (dBm or W).	5-67
:OUTPut[m] [:CHANnel[d]]:VCC5:VOLTage	Sets or queries the VCC5 voltage.	5-67
:OUTPut[m] [:CHANnel[d]]:VCC3:VOLTage	Sets or queries the VCC3 voltage.	5-67
:OUTPut[m] [:CHANnel[d]]:VCC2:VOLTage	Sets or queries the VCC2 voltage.	5-67
:OUTPut[m] [:CHANnel[d]]:VEE5:VOLTage	Sets or queries the VEE5 voltage.	5-67
:OUTPut[m]:CLOCk:OFFSet	Sets or queries the clock output offset voltage.	5-68
:OUTPut[m]:CTRL01	Sets or queries the logic of the CTRL01 transceiver I/F module control signal.	5-68
:OUTPut[m]:CTRL02	Sets or queries the logic of the CTRL02 transceiver I/F module control signal.	5-68
:OUTPut[m]:CTRL03	Sets or queries the logic of the CTRL03 transceiver I/F module control signal.	5-68
:OUTPut[m]:CTRL04	Sets or queries the logic of the CTRL04 transceiver I/F module control signal.	5-68
:OUTPut[m]:CTRL05	Sets or queries the logic of the CTRL05 transceiver I/F module control signal.	5-68
:OUTPut[m]:CTRL06	Sets or queries the logic of the CTRL06 transceiver I/F module control signal.	5-69
:OUTPut[m]:CTRL07	Sets or queries the logic of the CTRL07 transceiver I/F module control signal.	5-69

Command	Function	Page
:OUTPut[m]:CTRL08	Sets or queries the logic of the CTRL08 transceiver I/F module control signal.	5-69
:OUTPut[m]:CTRL09	Sets or queries the logic of the CTRL09 transceiver I/F module control signal.	5-69
:OUTPut[m]:CTRL10	Sets or queries the logic of the CTRL10 transceiver I/F module control signal.	5-69
:OUTPut[m]:CTRL11	Sets or queries the logic of the CTRL11 transceiver I/F module control signal.	5-69
:OUTPut[m]:CTRL12	Sets or queries the logic of the CTRL12 transceiver I/F module control signal.	5-70
:OUTPut[m]:CTRL13	Sets or queries the logic of the CTRL13 transceiver I/F module control signal.	5-70
:OUTPut[m]:CTRL14	Sets or queries the logic of the CTRL14 transceiver I/F module control signal.	5-70
:OUTPut[m]:CTRL15	Sets or queries the logic of the CTRL15 transceiver I/F module control signal.	5-70
:OUTPut[m]:CTRL16	Sets or queries the logic of the CTRL16 transceiver I/F module control signal.	5-70
:OUTPut[m]:CTRL17	Sets or queries the logic of the CTRL17 transceiver I/F module control signal.	5-70
:OUTPut[m]:CURRent:LIMit:PS1	Sets or queries the current limit of PS1 on the transceiver I/F module.	5-71
:OUTPut[m]:CURRent:LIMit:PS2	Sets or queries the current limit of PS2 on the transceiver I/F module.	5-71
:OUTPut[m]:CURRent:LIMit:PS3	Sets or queries the current limit of PS3 on the transceiver I/F module.	5-71
:OUTPut[m]:CURRent:LIMit:PS4	Sets or queries the current limit of PS4 on the transceiver I/F module.	5-71
:OUTPut[m]:CURRent:LIMit:PS5 :V3_3	Sets or queries the current limit of PS5 (when +3.3 V is selected) on the transceiver I/F module.	5-71
:OUTPut[m]:CURRent:LIMit:PS5 :V5_0	Sets or queries the current limit of PS5 (when +5.0 V is selected) on the transceiver I/F module.	5-71
:OUTPut[m]:DATA:AMPLitude	Sets or queries the data output amplitude.	5-72
:OUTPut[m]:DATA:CROSs	Sets or queries the data output cross point.	5-72
:OUTPut[m]:DATA:OFFSet	Sets or queries the data output offset voltage.	5-72
:OUTPut[m]:FREQuency:OFFSet	Sets or queries the RF OUT frequency offset.	5-72
:OUTPut[m]:FREQuency:RATE1	Sets the SG module rate to 1/1 and sets or queries the frequency.	5-72
:OUTPut[m]:FREQuency:RATE4	Sets the SG module rate to 1/4 and sets or queries the frequency.	5-72
:OUTPut[m]:FREQuency:RATE:SELect	Sets or queries the output rate of the SG module RF OUT signal.	5-73
:OUTPut[m]:I2C:CLOCk:FREQuency	Sets or queries the transceiver I/F module I2C communication clock frequency.	5-73
:OUTPut[m]:I2C:MODE	Sets or queries the transceiver I/F module I2C communication mode.	5-73
:OUTPut[m]:I2C:RESet	Resets the transceiver I/F module I2C bus.	5-73
:OUTPut[m]:MDIO:CLOCk:FREQuency	Sets or queries the transceiver I/F module MDIO communication clock frequency.	5-73
:OUTPut[m]:RFOut:ENABle:PORT1	Sets or queries the Disable/Enable status of RF OUT CH1 on the SG module.	5-73
:OUTPut[m]:RFOut:ENABle:PORT2	Sets or queries the Disable/Enable status of RF OUT CH2 on the SG module.	5-74
:OUTPut[m]:RFOut:ENABle:PORT3	Sets or queries the Disable/Enable status of RF OUT CH3 on the SG module.	5-74
:OUTPut[m]:RFOut:ENABle:PORT4	Sets or queries the Disable/Enable status of RF OUT CH4 on the SG module.	5-74
:OUTPut[m]:RFOut:ENABle:PORT5	Sets or queries the Disable/Enable status of RF OUT CH5 on the SG module.	5-74
:OUTPut[m]:SOURce	Sets or queries the output interface.	5-74
:OUTPut[m]:TRIGger	Sets or queries the trigger output.	5-74
:OUTPut[m]:VOLTage:PS1	Sets or queries the power supply voltage of PS1 on the transceiver I/F module.	5-75
:OUTPut[m]:VOLTage:PS2	Sets or queries the power supply voltage of PS2 on the transceiver I/F module.	5-75
:OUTPut[m]:VOLTage:PS3	Sets or queries the power supply voltage of PS3 on the transceiver I/F module.	5-75
:OUTPut[m]:VOLTage:PS4	Sets or queries the power supply voltage of PS4 on the transceiver I/F module.	5-75
:OUTPut[m]:VOLTage:PS5	Sets or queries the power supply voltage of PS5 on the transceiver I/F module.	5-75

Command	Function	Page
READ Group		
:READ[m][:CHANnel[d]]:ALARm?	Queries the alarm state.	5-76
:READ[m][:CHANnel[d]]:AUX1?	Queries the AUX1 value.	5-76
:READ[m][:CHANnel[d]]:AUX2?	Queries the AUX2 value.	5-76
:READ[m][:CHANnel[d]]:AUX:TYPE?	Queries the AUX types.	5-76
:READ[m] [:CHANnel[d]]:INTerrupt:ALARm?	Queries the interrupt alarm information.	5-76
:READ[m][:CHANnel[d]]:POWer?	Performs a single measurement and queries the measured value.	5-77
:READ[m] [:CHANnel[d]]:POWer:ALL?	Performs a single measurement with all the installed sensor modules and queries that measurement's measured value.	5-77
:READ[m] [:CHANnel[d]]:POWer:ALL:CONFig?	Queries the slot and device numbers of all the sensor modules that can be used.	5-77
:READ[m] [:CHANnel[d]]:POWer:PS[:VALue]?	Queries the transceiver I/F module power consumption.	5-78
:READ[m][:CHANnel[d]]:RX:POWer?	Queries the receive power.	5-78
:READ[m] [:CHANnel[d]]:TEMPerature?	Queries the temperature of the XFP transceiver.	5-78
:READ[m] [:CHANnel[d]]:TX:CURRent?	Queries the transmit bias current.	5-78
:READ[m][:CHANnel[d]]:TX:POWer?	Queries the transmit power value.	5-78
:READ[m] [:CHANnel[d]]:VCC5:VOLTage?	Queries the VCC5 monitor voltage.	5-78
:READ[m] [:CHANnel[d]]:VCC3:VOLTage?	Queries the VCC3 monitor voltage.	5-78
:READ[m] [:CHANnel[d]]:VCC2:VOLTage?	Queries the VCC2 monitor voltage.	5-78
:READ[m] [:CHANnel[d]]:VEE5:VOLTage?	Queries the VEE5 monitor voltage.	5-78
:READ[m] [:CHANnel[d]]:XFP:INFormation?	Queries the XFP transceiver information.	5-78
:READ[m]:CURRent:PS1?	Queries the monitored current value of PS1 on the transceiver I/F module.	5-79
:READ[m]:CURRent:PS2?	Queries the monitored current value of PS2 on the transceiver I/F module.	5-79
:READ[m]:CURRent:PS3?	Queries the monitored current value of PS3 on the transceiver I/F module.	5-79
:READ[m]:CURRent:PS4?	Queries the monitored current value of PS4 on the transceiver I/F module.	5-79
:READ[m]:CURRent:PS5?	Queries the monitored current value of PS5 on the transceiver I/F module.	5-79
:READ[m]:I2C:DATA[:BYTE]?	Reads a byte from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.	5-79
:READ[m]:I2C:DATA:BLOCk?	Reads data from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.	5-80
:READ[m]:MDIO:DATA:WORD?	Reads a word from the XENPAK internal ROM through MDIO communication using the transceiver I/F module.	5-80
:READ[m]:RESistance:R1[:VALue]?	Queries the monitored resistance value on the transceiver I/F module.	5-80
:READ[m]:RESistance:R1:STATe?	Queries the state of the monitored resistance value on the transceiver I/F module.	5-80
:READ[m]:STATus:AIN01[:VALue]?	Queries the AIN01 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN02[:VALue]?	Queries the AIN02 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN03[:VALue]?	Queries the AIN03 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN04[:VALue]?	Queries the AIN04 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN05[:VALue]?	Queries the AIN05 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN06[:VALue]?	Queries the AIN06 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN01:LEVel?	Queries the level (LOW/HIGH) of the AIN01 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN02:LEVel?	Queries the level (LOW/HIGH) of the AIN02 status signal on the transceiver I/F module.	5-81
:READ[m]:STATus:AIN03:LEVel?	Queries the level (LOW/HIGH) of the AIN03 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN04:LEVel?	Queries the level (LOW/HIGH) of the AIN04 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN05:LEVel?	Queries the level (LOW/HIGH) of the AIN05 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN06:LEVel?	Queries the level (LOW/HIGH) of the AIN06 status signal on the transceiver I/F module.	5-82

Command	Function	Page
:READ[m]:STATus:AIN01:STATe?	Queries the state of the AIN01 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN02:STATe?	Queries the state of the AIN02 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN03:STATe?	Queries the state of the AIN03 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN04:STATe?	Queries the state of the AIN04 status signal on the transceiver I/F module.	5-82
:READ[m]:STATus:AIN05:STATe?	Queries the state of the AIN05 status signal on the transceiver I/F module.	5-83
:READ[m]:STATus:AIN06:STATe?	Queries the state of the AIN06 status signal on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS1:STATe?	Queries the state of PS1 on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS2:STATe?	Queries the state of PS2 on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS3:STATe?	Queries the state of PS3 on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS4:STATe?	Queries the state of PS4 on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS5:STATe?	Queries the state of PS5 on the transceiver I/F module.	5-83
:READ[m]:VOLTage:PS1[:VALue]?	Queries the monitored voltage of PS1 on the transceiver I/F module.	5-84
:READ[m]:VOLTage:PS2[:VALue]?	Queries the monitored voltage of PS2 on the transceiver I/F module.	5-84
:READ[m]:VOLTage:PS3[:VALue]?	Queries the monitored voltage of PS3 on the transceiver I/F module.	5-84
:READ[m]:VOLTage:PS4[:VALue]?	Queries the monitored voltage of PS4 on the transceiver I/F module.	5-84
:READ[m]:VOLTage:PS5[:VALue]?	Queries the monitored voltage of PS5 on the transceiver I/F module.	5-84

ROUTe Group

:ROUTe[m][:CHANnel[d]]	Sets or queries the connection port of an optical switch. (This command only sets the connections on one side of a 2 × 2 switch.)	5-85
:ROUTe[m][:CHANnel[d]]:CONFig?	Queries the switch configuration.	5-85
:ROUTe[m] [:CHANnel[d]]:CONFig:ROUTe?	Queries the entire connected switch configuration.	5-85

Command	Function	Page
SENSe Group		
:SENSe[m][:CHANnel[d]]:AM:FREQuency	Sets or queries the CHOP frequency.	5-86
:SENSe[m][:CHANnel[d]]:AM:STATe	Sets or queries the optical signal modulation method.	5-86
:SENSe[m][:CHANnel[d]]:AOUT:LOG:MLEVel	Sets or queries the maximum power level of analog output log mode.	5-86
:SENSe[m][:CHANnel[d]]:AOUT:LOG:RANGe	Sets or queries the power range of analog output log mode.	5-86
:SENSe[m][:CHANnel[d]]:AOUT:MLEVel	Sets or queries the maximum power level of analog output linear mode.	5-87
:SENSe[m][:CHANnel[d]]:AOUT:MODE	Sets or queries the analog output mode.	5-87
:SENSe[m][:CHANnel[d]]:AOUT:MVOLtage	Sets or queries the analog output's maximum voltage.	5-87
:SENSe[m][:CHANnel[d]]:AOUT:TRIGger:OUTPut	Sets or queries the trigger output mode of the analog output port.	5-87
:SENSe[m][:CHANnel[d]]:AOUT:RANGe	Sets or queries the power range of analog output linear mode.	5-88
:SENSe[m][:CHANnel[d]]:CORRection	Sets or queries the power offset value.	5-88
:SENSe[m][:CHANnel[d]]:CORRection:COLLect[:ZERO]	Executes or queries the zero-set procedure.	5-88
:SENSe[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.	5-88
:SENSe[m][:CHANnel[d]]:EVENt:THResh	Sets or queries the threshold value of the event detection condition.	5-88
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:DATA?	Queries time series power data in the measurement range of Max/Min measurement.	5-89
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:STATe?	Queries the event detection state of Event Trigger mode in Max/Min measurement.	5-89
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:POSition	Sets or queries the trigger position of Event Trigger mode in Max/Min measurement.	5-89
:SENSe[m][:CHANnel[d]]:FUNCtion:PARameter:MINMax	Sets or queries the Min/Max measurement mode and the number of data points.	5-90
:SENSe[m][:CHANnel[d]]:FUNCtion:STATe	Sets or queries the start and end of the Min/Max measurement.	5-90
:SENSe[m][:CHANnel[d]]:POWer:ATIMe	Sets or queries the averaging time.	5-91
:SENSe[m][:CHANnel[d]]:POWer:RANGe	Sets or queries the range.	5-91
:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO	Sets or queries the range switch mode.	5-92
:SENSe[m][:CHANnel[d]]:POWer:RANGe:STATe?	Queries the state of the input light within the range.	5-92
:SENSe[m][:CHANnel[d]]:POWer:REFerence	Sets or queries the relative measurement's reference value.	5-92
:SENSe[m][:CHANnel[d]]:POWer:REFerence:DISPlay	Sets the reference value to the current measured value.	5-92
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe	Sets or queries the relative measurement mode.	5-92
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio	Sets or queries the relative measurement mode parameters.	5-93
:SENSe[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the unit (dBm or W).	5-93
:SENSe[m][:CHANnel[d]]:POWer:WAVelength	Sets or queries the measurement wavelength.	5-93
:SENSe[m]:DATA:ALL?	Queries the measured results.	5-94
:SENSe[m]:DATA:ALL:SFRAMe?	Queries the measured result (including the results for SDH/SONET frames).	5-94
:SENSe[m]:DATA:ECOunt:BIT?	Queries the bit error count.	5-95
:SENSe[m]:DATA:ELAPsed?	Queries the elapsed measurement time in units of 100 ms.	5-95

Command	Function	Page
:SENSe[m]:DATA:ERATio:BIT?	Queries the bit error rate.	5-95
:SENSe[m]:DATA:FREQ?	Queries the frequency monitor value.	5-95
:SENSe[m]:DATA:IPERiod:ECOunt:BIT?	Queries the bit error count for a single period.	5-95
:SENSe[m]:DATA:IPERiod:ERATio:BIT?	Queries the bit error rate for a single period.	5-95
:SENSe[m]:DATA:IPERiod:ALL?	Queries the measured value for a single period.	5-95
:SENSe[m]:DATA:IPERiod:ALL:SFRAMe?	Queries the measured value (including the measured values for SDH/SONET frames) for a single period.	5-96
:SENSe[m]:DATA:PATTern	Sets or queries the input data pattern.	5-97
:SENSe[m]:DATA:PATTern:PRBS:LENgth	Sets or queries the number of PRBS steps of the input data.	5-97
:SENSe[m]:DATA:PATTern:PROGram:DATA	Sets or queries the short program pattern of the input data.	5-97
:SENSe[m]:DATA:PATTern:PROGram:DATA:PRESet	Sets the short program pattern of the input data to the default value.	5-98
:SENSe[m]:DATA:PATTern:PROGram:LENgth	Sets or queries the input data's program pattern length.	5-98
:SENSe[m]:DATA:PATTern:SFRAMe:PRBS:LENgth	Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the input data.	5-98
:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA	Sets or queries the overhead pattern within the SDH/SONET frame of the input data.	5-99
:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA:PRESet	Sets the overhead pattern within the SDH/SONET frame of the input data to the default value.	5-99
:SENSe[m]:DATA:POLarity	Sets or queries the data input logic.	5-99
:SENSe[m]:DATA:TEST:MODE	Sets or queries the measurement mode.	5-99
:SENSe[m]:DATA:TEST:TIME	Sets or queries the measurement time.	5-100
:SENSe[m]:LOS[:LEVel]	Sets or queries the LOS detection level.	5-100
:SENSe[m]:OVER[:LEVel]	Sets or queries the OVERLOAD detection level.	5-100
:SENSe[m]:SYNC:AUTO	Sets or queries the automatic synchronization operation.	5-100
:SENSe[m]:THReshold:DATA	Sets or queries the data threshold level.	5-100

SLOT Group

:SLOT[m]:EMPTy?	Queries the installation state of the frame controller's slots.	5-101
:SLOT[m]:HEAD[d]:EMPTy?	Queries the sensor head's connection state.	5-101
:SLOT[m]:HEAD[d]:IDN?	Queries the sensor head's information.	5-101
:SLOT[m]:HEAD[d]:OPTions?	Queries the sensor head's detailed information.	5-101
:SLOT[m]:HEAD[d]:TST?	Queries the sensor head's self-test result.	5-101
:SLOT[m]:IDN?	Queries the module information.	5-102
:SLOT[m]:OPC?	Queries the command's process state.	5-102
:SLOT[m]:OPTions?	Queries the module's detailed information.	5-102
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.	5-102
:SLOT[m]:TST?	Queries the self-test result.	5-103

Command	Function	Page
SOURce Group		
:SOURce[m]:ABC:RESet	Resets the auto bias control.	5-104
:SOURce[m]:ABC:SLOPe	Sets the auto bias control's slope.	5-104
:SOURce[m]:ABC:STATe	Sets or queries the auto bias control's on/off status.	5-104
:SOURce[m]:AMPLitude	Sets or queries the driver output amplitude.	5-104
:SOURce[m]:BIAS	Sets or queries the DC bias of the LN modulator.	5-104
:SOURce[m] [:CHANnel[d]]:AM:FREQuency	Sets or queries the internal modulation frequency.	5-105
:SOURce[m] [:CHANnel[d]]:AM:SOURce	Sets or queries the modulation mode.	5-105
:SOURce[m] [:CHANnel[d]]:AM:STATe	Sets or queries the modulation feature's on/off status.	5-105
:SOURce[m] [:CHANnel[d]]:FREQuency[/]	Sets or queries the optical frequency.	5-106
:SOURce[m] [:CHANnel[d]]:FREQuency:AONCe	Sets the optical frequencies of channels 1 and 2 simultaneously.	5-106
:SOURce[m] [:CHANnel[d]]:FREQuency:CHANnel	Sets or queries the grid number.	5-106
:SOURce[m][:CHANnel[d]]:FREQuency:CHANnel:AONCe	Sets the grid numbers of channels 1 and 2 simultaneously.	5-107
:SOURce[m][:CHANnel[d]]:FREQuency:DISPlay:OFFSet	Sets or queries the frequency display offset.	5-107
:SOURce[m] [:CHANnel[d]]:FREQuency:GRID	Sets or queries the frequency spacing of each grid.	5-107
:SOURce[m][:CHANnel[d]]:FREQuency:GRID:AONCe	Sets the frequency spacing of each grid for channels 1 and 2 simultaneously.	5-108
:SOURce[m] [:CHANnel[d]]:FREQuency:OFFSet	Sets or queries the fine tuning value of the frequency.	5-108
:SOURce[m][:CHANnel[d]]:FREQuency:OFFSet:AONCe	Sets the frequency fine tuning values of channels 1 and 2 simultaneously.	5-108
:SOURce[m][:CHANnel[d]]:FREQuency:REFerence	Sets or queries reference frequency of the grid number.	5-109
:SOURce[m] [:CHANnel[d]]:FREQuency:TOGRid	Sets the frequency to the grid frequency closest to the specified optical frequency.	5-109
:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid:AONCe	Sets the frequencies of channels 1 and 2 simultaneously to the grid frequency closest to the specified optical frequency.	5-109
:SOURce[m] [:CHANnel[d]]:GRIDmode	Sets or queries the grid mode on/off status.	5-109
:SOURce[m] [:CHANnel[d]]:LINewidth	Sets or queries the spectrum line width.	5-110
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude	Sets or queries the AM amplitude of the dither feature.	5-110
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude:AONCe	Sets the AM amplitudes of the dither feature for channels 1 and 2 simultaneously.	5-110
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]	Sets or queries the SBS suppression dither frequency.	5-110
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]:AONCe	Sets the SBS suppression dither frequencies for channels 1 and 2 simultaneously.	5-111
:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]	Sets or queries the on/off status of the dither feature.	5-111
:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]:AONCe	Sets the on/off status of the dither feature for channels 1 and 2 simultaneously.	5-111
:SOURce[m][:CHANnel[d]]:OSASync	Sets or queries the OSA synchronization sweep feature's on/off status.	5-111
:SOURce[m] [:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.	5-112
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude]:AONCe	Sets the optical output powers of channels 1 and 2 simultaneously.	5-112
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]	Sets or queries the optical attenuation.	5-113
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:AONCe	Sets the optical attenuations of channels 1 and 2 simultaneously.	5-113

Command	Function	Page
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]	Clears the optical attenuation setting (sets the optical output power to maximum).	5-113
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar:AONCe	Clears the optical attenuation settings (sets the optical output power to maximum) of channels 1 and 2 simultaneously.	5-113
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]	Sets or queries the optical output offset.	5-114
:SOURce[m][:CHANnel[d]]:POWer:STATe	Sets or queries the optical output's on/off status.	5-114
:SOURce[m][:CHANnel[d]]:POWer:STATe:AONCe	Sets the on/off status of the optical output for channels 1 and 2 simultaneously.	5-114
:SOURce[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit.	5-114
:SOURce[m][:CHANnel[d]]:POWer:WAVelength	Sets or queries the laser output wavelength.	5-115
:SOURce[m][:CHANnel[d]]:WAVelength[/]	Sets or queries the wavelength.	5-115
:SOURce[m][:CHANnel[d]]:WAVelength:AONCe	Sets the wavelengths of channels 1 and 2 simultaneously.	5-116
:SOURce[m][:CHANnel[d]]:WAVelength:CORRection:ZERO	Executes, stops, or queries the wavelength correction procedure.	5-116
:SOURce[m][:CHANnel[d]]:WAVelength[:CW|FIXed]	Sets or queries the wavelength.	5-116
:SOURce[m][:CHANnel[d]]:WAVelength:FREQuency	Sets or queries the Δf. (The offset setting.)	5-116
:SOURce[m][:CHANnel[d]]:WAVelength:OFFSet	Sets or queries the wavelength offset.	5-117
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence?	Queries the wavelength value. (The offset setting.)	5-117
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence:DISPlay	Sets the wavelength to the WL Ref value. (The offset setting.)	5-117
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep[:STATe]	Starts, stops, or queries the sweep.	5-117
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:CYCLes	Sets or queries the number of sweep cycles.	5-118
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:DWELl	Sets or queries the lock time per wavelength setting.	5-118
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:INTerval	Sets or queries the sweep cycle interval.	5-119
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:MODE	Sets or queries the sweep mode.	5-119
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:PMAX?	Queries the optimal value from the sweep (this value is detected automatically).	5-119
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:SPEed:SPSec	Sets or queries the sweep speed (distance).	5-119
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STARt	Sets or queries the sweep start wavelength.	5-120
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP	Sets or queries the sweep step wavelength.	5-120
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP:NEXT	Sets the sweep wavelength to the next sweep wavelength.	5-120
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STOP	Sets or queries the sweep stop wavelength.	5-120
:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid	Sets the wavelength to the grid wavelength closest to the specified frequency.	5-120
:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid:AONCe	Sets the wavelengths of channels 1 and 2 simultaneously to the grid wavelength closest to the specified grid value.	5-121
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT	Sets or queries the wavelength unit.	5-121
:SOURce[m]:CLOCk:SOURce	Sets the input clock source.	5-121
:SOURce[m]:CLOCk:OFFSet	Sets or queries the internal clock offset frequency.	5-121
:SOURce[m]:CLOCk:RATE	Sets or queries the internal clock's bit rate.	5-122
:SOURce[m]:CROSs	Sets or queries the driver cross point.	5-122
:SOURce[m]:DATA:PATTern	Sets or queries the output data pattern.	5-122
:SOURce[m]:DATA:ERRor	Sets or queries the error adding feature's on/off status.	5-122

Command	Function	Page
:SOURce[m]:DATA:ERRor:MODE	Sets or queries the error addition mode.	5-122
:SOURce[m]:DATA:ERRor:RATE	Sets or queries the rate value of the error adding feature.	5-122
:SOURce[m]:DATA:POLarity	Sets or queries the data output logic.	5-123
:SOURce[m]:DATA:PATTern:PRBS:LENgth	Sets or queries the number of PRBS steps of the output data.	5-123
:SOURce[m]:DATA:PATTern:PROGram:LENgth	Sets or queries the output data's program pattern length.	5-123
:SOURce[m]:DATA:PATTern:PROGram:DATA	Sets or queries the output data's program pattern.	5-124
:SOURce[m]:DATA:PATTern:PROGram:DATA:PRESet	Sets the program pattern of the output data to the default value.	5-124
:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA	Sets or queries the overhead pattern within the SDH/SONET frame of the output data.	5-125
:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA:PRESet	Sets the overhead pattern within the SDH/SONET frame of the output data to the default value.	5-125
:SOURce[m]:DATA:PATTern:SFRAMe:PRBS:LENgth	Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the output data.	5-125

STATus Group

:STATus[m]?	Queries the alarm information.	5-126
:STATus[m]:ALARm?	Queries the alarm information.	5-126
:STATus[m]:OPERation:CONDition[:LEVel0]?	Queries the value of the operational status condition summary register (OSCSR) if the "m" suffix is omitted. Queries the bit values that apply to the slot number that is specified by the OSCSR if the "m" suffix is specified.	5-126
:STATus[m]:OPERation:ENABle[:LEVel0]	Sets or queries the value of the operational status enable summary mask (OSESM) if the "m" suffix is omitted. Sets or queries the bit values that apply to the slot number that is specified by the OSESM if the "m" suffix is specified.	5-127
:STATus[m]:OPERation[:EVENt][:LEVel0]?	Queries the value of the operational status event summary register (OSESR) if the "m" suffix is omitted. The register (OSESR) is cleared when it is queried. Queries the bit values that apply to the slot number that is specified by the OSESR if the "m" suffix is specified.	5-127
:STATus[m]:OPERation:NTRansition	Sets or queries the transition filter (change in the negative direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1. Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the "m" suffix is specified.	5-127
:STATus[m]:OPERation:PTRansition	Sets or queries the transition filter (change in the positive direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1. Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the "m" suffix is specified.	5-127
:STATus[m]:QUEStionable:CONDition[:LEVel0]?	Queries the value of the questionable status condition summary register (QSCSR) if the "m" suffix is omitted. Queries the bit values that apply to the slot number that is specified by the QSCSR if the "m" suffix is specified.	5-128
:STATus[m]:QUEStionable:ENABle[:LEVel0]	Sets or queries the value of the questionable status enable summary mask (QSESM) if the "m" suffix is omitted. Queries the bit values that apply to the slot number that is specified by the QSESM if the "m" suffix is specified.	5-128
:STATus[m]:QUEStionable[:EVENt][:LEVel0]?	Queries the value of the questionable status event summary register (QSESR) if the "m" suffix is omitted. The register (QSESR) is cleared when it is queried. Queries the bit values that apply to the slot number that is specified by the QSESR if the "m" suffix is specified.	5-128

Command	Function	Page
:STATus[m]:QUEStionable:NTRansition	Sets or queries the transition filter (change in the negative direction) if the “m” suffix is omitted. If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1. Queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the “m” suffix is specified.	5-128
:STATus[m]:QUEStionable:PTRansition	Sets or queries the transition filter (change in the positive direction) if the “m” suffix is omitted. If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1. Queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the “m” suffix is specified.	5-128

SYSTem Group

:SYSTem[m]:BEEP	Sets or queries the buzzer volume.	5-129
:SYSTem:COMMunicate:GPIB:ADDRess	Sets or queries the GP-IB address.	5-129
:SYSTem:COMMunicate:GPIB:TERMinator	Sets or queries the response message terminator.	5-129
:SYSTem:COMMunicate:NETWork:DHCP	Sets or queries the DHCP’s on/off status.	5-129
:SYSTem:COMMunicate:NETWork:GATeway	Sets or queries the gateway address.	5-130
:SYSTem:COMMunicate:NETWork:IPADdress	Sets or queries the IP address.	5-130
:SYSTem:COMMunicate:NETWork:PORT	Sets or queries the network setting’s port number.	5-130
:SYSTem:COMMunicate:NETWork:REMote	Enables, disables, or queries all the panel key operations during LAN/USB remote control (excluding <Local>).	5-130
:SYSTem:COMMunicate:NETWork:LOCKout	Imposes or clears the local lockout state during LAN/USB remote control.	5-130
:SYSTem:COMMunicate:NETWork:SUBNetmask	Sets or queries the subnet mask.	5-131
:SYSTem:CONDition	Executes or queries the frame controller’s status check feature.	5-131
:SYSTem:DATE	Sets or queries the system date.	5-131
:SYSTem:ERRor?	Queries the error queue.	5-131
:SYSTem:ERRor:VIEW:CLEar		
:SYSTem:PRESet	Sets all the parameters of the frame controller and all of its installed modules to their default values.	5-132
:SYSTem:TIME	Sets or queries the time.	5-132

TRIGger Group

:TRIGger[m][:IMMediate]	Starts measurement.	5-133
:TRIGger[m][:CHANnel[d]]:INPut	Sets or queries the trigger input.	5-133
:TRIGger[m][:CHANnel[d]]:OUTPut	Sets or queries the trigger output mode.	5-133
:TRIGger:CONFig	Sets system triggers.	5-134

WRITe Group

:WRITe[m]:I2C:DATA[:BYTE]	Writes a byte of data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.	5-135
:WRITe[m]:I2C:DATA:BLOCk	Writes data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.	5-135
:WRITe[m]:MDIO:DATA:WORD	Writes a word to the XENPAK internal ROM through MDIO communication using the transceiver I/F module.	5-136

Command	Function	Page
Common Command Group		
`*CLS (CLear Status)`	Clears all the event registers in the status byte register that are reflected by the summary, and the queues (excluding the output queue).	5-137
`*ESE (standard Event Status Enable register)`	Sets or queries the standard event enable register value.	5-137
`*ESR? (standard Event Status Register)`	Queries and clears the standard event status register.	5-137
`*IDN? (IDeNtify)`	Queries the instrument model.	5-137
`*OPC (OPeration Complete)`	Sets bit 0 (the OPC bit) of the standard event register to 1 upon the completion of the overlap command.	5-137
`*OPC? (OPeration Complete)`	The command returns ASCII code 1 if the overlap command is completed.	5-137
`*OPT? (OPTion)`	Queries the installed options.	5-137
`*RST (ReSeT)`	Initializes the settings. All ongoing processes are stopped.	5-138
`*SRE (Service Request Enable register)`	Sets or queries the service request enable register value.	5-138
`*STB? (STatus Byte)`	Queries the status byte register value.	5-138
`*TST? (TeST)`	Executes a self-test and queries the result.	5-138
`*WAI (WAIt)`	Holds the execution of the subsequent command until the completion of the overlap command.	5-138

5.2 ABORt Group

:ABORt[m]

Function Stops measurement.

Syntax `:ABORt[m]`

Example `:ABOR1`

Description Sets the `:INIT:CONT` setting to OFF.

Target BERT modules

5.3 APPLication Group

:APPLication:LOGGing:MEASure:RESult?

Function Queries the measured result in logging mode.

Syntax
```
:APPLication:LOGGing:MEASure:RESult?
<wsp>S<value1>D<value2>
```

Example
```
:APPL:LOGG:MEAS:RES? S2D1
-> +1.23400000E+000,+1.11570000E+000
<END>
```

Description
- Settings
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
- Queries
  The command returns the measured result in logging mode for the sensor module specified by the parameters. The returned value is a signed floating point number.
  The returned data contains comma-separated measured values from the start of the measurement in the unit specified by the `:APPL:PAR:LOGG:UNIT` command.
  If there is no data, “NO DATA” is returned.

Target LOGGING application

:APPLication:LOGGing:MEASure:STATe

Function Starts, stops, or queries the logging measurement.

Syntax
```
:APPLication:LOGGing:MEASure:STATe
<wsp>STARt|STOP
:APPLication:LOGGing:MEASure:STATe?
```

Example
```
:APPL:LOGG:MEAS:STAT STAR
:APPL:LOGG:MEAS:STAT?->
COMPLETE<END>
```

Description
- Settings
  Set the following parameters:
  STARt: Start the measurement
  STOP: Stop the application
- Queries
  The state of the logging measurement is returned as a character string.
  COMPLETE: The logging measurement has completed.
  PROGRESS: The logging measurement is ongoing.
  SETUP: Sensor selection or measurement parameter setup is ongoing.
  NONE: The instrument is not in logging mode.
- When the instrument receives this command, the display switches to the stability mode’s parameter setting screen.

Target LOGGING application

:APPLication:MDSelect:LOGGing

Function Sets or queries the sensors that are used in the logging measurement.

Syntax
```
:APPLication:MDSelect:LOGGing<wsp>
[S<value1>D<value2>,S<value1>
D<value2>,...|ALL]
:APPLication:MDSelect:LOGGing?
```

Example
```
:APPL:MDS:LOGG S1D1,S3D1
:APPL:MDS:LOGG? -> S1D1,S3D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  Separate multiple sequences of S<value1>D<value2> with commas.
  ALL: Select all sensors that are installed in the frame controller.
  NONE: Do not select a sensor.
- Queries
  The command returns the sensor modules that are being used in the logging measurement in the following format:
  S<value1>D<value2>
  If multiple sensors are being used, they are separated by commas.
  S1D1,S3D1
- When the instrument receives this command, the display switches to the logging mode’s module select screen.
  If a module that is not a sensor module is selected, a "Parameter Error" occurs.

Target LOGGING application

:APPLication:MDSelect:ORL

Function Sets or queries modules that are used for ORL measurements.

Syntax
```
:APPLication:MDSelect:ORL
[<wsp>S<value1>D<value2>]
:APPLication:MDSelect:ORL?
```

Example
```
:APPL:MDS:ORL S1D1
:APPL:MDS:ORL? -> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  NONE: Clear the ORL module selection.
- Queries
  The command returns the modules that are being used in the ORL measurement in the following format:
  S<value1>D<value2>
  Example S1D1
  NONE: No module is selected.

Target ORL application

:APPLication:MDSelect:ORL:CONDition

Function Sets or queries the ORL measurement's module configuration and measurement conditions. (Selects tabs.)

Syntax
```
:APPLication:MDSelect:ORL:CONDition<
wsp><value>
:APPLication:MDSelect:ORL:CONDition?
```

Example
```
:APPL:MDS:ORL:COND 1
:APPL:MDS:ORL:COND? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  Tab number
- Queries
  The command returns the number of the tab that is set with the ORL measurement's module configuration and measurement conditions as an unsigned integer.

Target ORL application

:APPLication:MDSelect:ORL:LS

Function Sets or queries the light source modules that are used for ORL measurements.

Syntax
```
:APPLication:MDSelect:ORL:LS
[<wsp>S<value1>D<value2>[LOW|UPPer]]
:APPLication:MDSelect:ORL:LS?
```

Example
```
:APPL:MDS:ORL:LS S1D1
:APPL:MDS:ORL:LS? -> S1D1<END>
:APPL:MDS:ORL:LS? -> S1D1,LOW<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  LOW|UPPer:
  If you are using an AQ2200-142, select low wavelength (LOW) or high wavelength (UPPer).
  This parameter is invalid for all modules other than the AQ2200-142.
  NONE: Clear the light source module selection.
- Queries
  The command returns the light source modules that are being used in the ORL measurement in the following format:
  S<value1>D<value2>[,LOW|UPP]
  Example S1D1,LOW
  LOW|UPP:
  If you are using an AQ2200-142, the command returns low wavelength (LOW) or high wavelength (UPPer).
  NONE: No light source module is selected.

Target ORL application

:APPLication:MDSelect:ORL:OPM1

Function Sets or queries the sensors that are used in the return loss measurement.

Syntax
```
:APPLication:MDSelect:ORL:
OPM1<wsp>S<value1>D<value2>
:APPLication:MDSelect:ORL:OPM1?
```

Example
```
:APPL:MDS:ORL:OPM1 S1D1
:APPL:MDS:ORL:OPM1? -> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
- Queries
  The command returns the sensor modules that are being used in the return loss measurement in the following format:
  S<value1>D<value2>
  Example S1D1

Target ORL application

:APPLication:MDSelect:ORL:OPM2

Function Sets or queries the sensors that are used in the insertion loss measurement.

Syntax
```
:APPLication:MDSelect:ORL:
OPM2[<wsp>S<value1>D<value2>]
:APPLication:MDSelect:ORL:OPM2?
```

Example
```
:APPL:MDS:ORL:OPM2 S1D1
:APPL:MDS:ORL:OPM2? -> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  NONE: Clear the sensor module selection.
  If a sensor that has already been selected through the OPM1 command is selected, a “Device Already In Use” occurs.
- Queries
  The command returns the sensor modules that are being used in the insertion loss measurement in the following format:
  S<value1>D<value2>
  Example S1D1
  NONE: No insertion loss measurement sensor is selected.

Target ORL application

:APPLication:MDSelect:ORL:OPM3

Function Sets or queries the monitor sensors.

Syntax
```
:APPLication:MDSelect:ORL:
OPM3[<wsp>S<value1>D<value2>]
:APPLication:MDSelect:ORL:OPM3?
```

Example
```
:APPL:MDS:ORL:OPM3 S1D1
:APPL:MDS:ORL:OPM3? -> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  NONE: Clear the sensor module selection.
  If a sensor that has already been selected through the OPM1 command is selected, a “Device Already In Use” occurs.
  If an ORL module has been selected, you cannot select OPM3. Doing so will cause an “Execution Error” to occur.
- Queries
  The command returns the monitor sensor modules in the following format:
  S<value1>D<value2>
  Example S1D1
  NONE: No monitor sensor is selected.

Target ORL application

:APPLication:MDSelect:STABility

Function Sets or queries the sensors that are used in the stability measurement.

Syntax
```
:APPLication:MDSelect:
STABility<wsp>[S<value1>D<value2>,
S<value1>D<value2>,...|ALL]
:APPLication:MDSelect:STABility?
```

Example
```
:APPL:MDS:STAB S1D1,S3D1
:APPL:MDS:STAB? -> S1D1,S3D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  Separate multiple sequences of S<value1>D<value2> with commas.
  ALL: Select all sensors that are installed in the frame controller.
  NONE: Do not select a sensor.
- Queries
  The command returns the sensor modules that are being used in the stability measurement in the following format:
  S<value1>D<value2>
  If multiple sensors are being used, they are separated by commas.
  S1D1,S3D1
  NONE: No stability measurement sensor is selected.
- When the instrument receives this command, the display switches to the stability mode's module select screen.
  If a module that is not a sensor module is selected, a "Parameter Error" occurs.

Target STABILITY application

:APPLication:MDSelect:TLS:SWEPt[:SENSe]

Function Sets or queries the sensor modules that are used in the SWEPT measurement.

Syntax
```
:APPLication:MDSelect:TLS:SWEPt
[:SENSe][<wsp>S<value1>D<value2>,
S<value1>D<value2>,...|ALL]
:APPLication:MDSelect:TLS:SWEPt
[:SENSe]?
```

Example
```
:APPL:MDS:TLS:SWEP S1D1,S2D1,S3D1
:APPL:MDS:TLS:SWEP?
-> S1D1,S2D1,S3D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  Separate multiple sequences of S<value1>D<value2> with commas.
  ALL: Select all sensors that are installed in theframe controller.
  NONE: Do not select a sensor.
- Queries
  The command returns the sensor modules that are being used in the SWEPT measurement in the following format:
  S<value1>D<value2>
  If multiple sensors are being used, they are separated by commas.
  S1D1,S3D1
  NONE: No SWEPT measurement sensor is selected.
- When the instrument receives this command, the display switches to the "MODULE SELECT for SWEPT" screen.
  If a module that is not a sensor module is selected, a "Parameter Error" occurs.

Target SWEPT application

:APPLication:MDSelect:TLS:SWEPt:TLS

Function Sets or queries the TLS modules that are used in the SWEPT measurement.

Syntax
```
:APPLication:MDSelect:TLS:SWEPt:TLS
<wsp>S<value1>D<value2>
:APPLication:MDSelect:TLS:SWEPt:TLS?
```

Example
```
:APPL:MDS:TLS:SWEP:TLS S1D1
:APPL:MDS:TLS:SWEP:TLS? -> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 8 (in single steps)
  The slot number (module number).
  1 or 2 if you are using an AQ2211.
  <value2> = 1 (fixed)
  The device number.
- Queries
  The command returns the TLS modules that are being used in the SWEPT measurement in the following format:
  S<value1>D<value2>
- When the instrument receives this command, the display switches to the “MODULE SELECT for SWEPT” screen.
  If a module that is not a TLS module is selected, a “Parameter Error” occurs.

Target SWEPT application

:APPLication:ORL:IL:RESult?

Function Queries the measured insertion loss value. (The value that is currently displayed.)

Syntax
```
:APPLication:ORL:IL:RESult?
```

Example
```
:APPL:ORL:IL:RES?
-> +5.00000000E-001<END>
```

Description The command returns the measured insertion loss value as a floating-point number in units of dB.
If no sensors for the insertion loss measurement are selected, the character string “NO DATA” is returned.

Target ORL application

:APPLication:ORL:MASMeasure:RESult?

Function Queries the measured master reference value (calibration value).

Syntax
```
:APPLication:ORL:MASMeasure:RESult?
[<wsp>DEFault]
```

Example
```
:APPL:ORL:MASM:RES?
-> -3.00000000E-001<END>
```

Description
- The command returns the measured master reference value that you specify with the parameters. The returned value is a floating-point number in units of dBm.
  NONE: The current measured master reference value
  DEFault: The default value
- If the instrument has not performed the master reference measurement, the character string “NO DATA” is returned.

Target ORL application

:APPLication:ORL:MASMeasure:STATe

Function Starts, stops, or queries the master reference measurement.

Syntax
```
:APPLication:ORL:MASMeasure:STATe<wsp>STARt|STOP
:APPLication:ORL:MASMeasure:STATe?
```

Example
```
:APPL:ORL:MASM:STAT STAR
:APPL:ORL:MASM:STAT? -> PROGRESS<END>
```

Description
- The result of the master reference measurement is stored as the calibration value for the insertion loss measurement.
  If you stop the measurement, the calibration value is not updated.
- Settings
  Set the following parameters:
  STARt: Start the master reference measurement.
  STOP: Stop the master reference measurement. (The calibration value is not updated.)
- Queries
  The command returns the state of the master reference measurement as a character string.
  PROGRESS: The master reference measurement is ongoing.
  COMPLETE: The master reference measurement has completed. (The calibration value has been acquired.)
  NOCAL: The master reference calibration value has not been acquired.
  SETUP: Module selection screen
  NONE: The ORL application is not running.

Target ORL application

:APPLication:ORL[:ORL]:RESult?

Function Queries the measured return loss value. (The value that is currently displayed.)

Syntax `:APPLication:ORL[:ORL]:RESult?`

Example
```
:APPL:ORL:RES?
-> +5.50000000E+001<END>
```

Description The command returns the measured return loss value as a floating-point number in units of dB.

Target ORL application

:APPLication:ORL:REFMeasure:RESult?

Function Queries the measured reference reflection value (calibration value).

Syntax
```
:APPLication:ORL:REFMeasure:RESult?
[<wsp>DEFault]
```

Example
```
:APPL:ORL:REFM:RES?
-> -2.50000000E+001<END>
```

Description
- The command returns the measured reference reflection value that you specify with the parameters. The returned value is a floating-point number in units of dBm.
  NONE: Measured reference reflection value
  DEFault: The default value
- If the instrument has not performed the reference reflection measurement, the character string “NO DATA” is returned.

Target ORL application

:APPLication:ORL:REFMeasure:STATe

Function Starts, stops, or queries the reference reflection measurement.

Syntax
```
:APPLication:ORL:REFMeasure:STATe
<wsp>STARt|STOP
:APPLication:ORL:REFMeasure:STATe?
```

Example
```
:APPL:ORL:REFM:STAT STAR
:APPL:ORL:REFM:STAT? -> PROGRESS<END>
```

Description
- The result of the reference reflection measurement is stored as the calibration value for the return loss measurement. If you stop the measurement, the calibration value is not updated.
- Settings
  Set the following parameters:
  STARt: Start the reference reflection measurement.
  STOP: Stop the reference reflection measurement. (The calibration value is not updated.)
- Queries
  The command returns the state of the reference reflection measurement as a character string.
  PROGRESS: The reference reflection measurement is ongoing.
  COMPLETE: The reference reflection measurement has completed. (The calibration value has been acquired.)
  NOCAL: The reference reflection calibration value has not been acquired.
  SETUP: Module selection screen
  NONE: The ORL application is not running.

Target ORL application

:APPLication:ORL:STOP

Function Closes the ORL application.

Syntax `:APPLication:ORL:STOP`

Example `:APPL:ORL:STOP`

Target ORL application

:APPLication:ORL:TMEasure:RESult?

Function Queries the measured terminal value (calibration value).

Syntax
```
:APPLication:ORL:TMEasure:RESult?
[<wsp>DEFault]
```

Example
```
:APPL:ORL:TME:RES?
-> -5.50000000E+001<END>
```

Description
- The command returns the measured terminal value that you specify with the parameters. The returned value is a floating-point number in units of dBm.
  NONE: Measured terminal value
  DEFault: The default value
- If the instrument has not performed the terminal measurement, the character string “NO DATA” is returned.

Target ORL application

:APPLication:ORL:TMEasure:STATe

Function Starts, stops, or queries the terminal measurement.
The result of the terminal measurement is stored as the calibration value for the return loss measurement. If you stop the measurement, the calibration value is not updated.

Syntax
```
:APPLication:ORL:TMEasure:STATe<wsp>
STARt|STOP
:APPLication:ORL:TMEasure:STATe?
```

Example
```
:APPL:ORL:TME:STAT STAR
:APPL:ORL:TME:STAT? -> PROGRESS<END>
```

Description
- Settings
  Set the following parameters:
  STARt: Start the terminal measurement.
  STOP: Stop the terminal measurement.
  (The calibration value is not updated.)
- Queries
  The command returns the state of the terminal measurement as a character string.
  PROGRESS: The terminal measurement is ongoing.
  COMPLETE: The terminal measurement has completed (the calibration value has been acquired).
  NOCAL: The terminal calibration value has not been acquired.
  SETUP: Module selection screen
  NONE: The ORL application is not running.

Target ORL application

:APPLication:PARameter:LOGGing:ATIMe

Function Sets or queries the averaging time of the sensors that are used in the logging measurement.

Syntax
```
:APPLication:PARameter:LOGGing:
ATIMe<wsp>1|2|5|10|100|200|500[US|MS
|S]
:APPLication:PARameter:LOGGing:ATI
Me?
```

Example
```
:APPL:PAR:LOGG:ATIM 100US
:APPL:PAR:LOGG:ATIM?
-> +1.00000000E-003<END>
```

Description
- Settings
  Set the following parameters:
  1|2|5|10|100|200|500:
  The numeric data of the averaging time.
  Specify the averaging time with a unit of measurement.
  The unit is “s” (seconds) if it is omitted.
  For more details on what averaging times are supported, see the “Table of Supported Averaging Times” on page 5-91.
- Queries
  The command returns the averaging time as a floating-point number in units of s.
- This command is only valid when the instrument is displaying the logging mode’s sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode’s parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:INTrigger

Function Sets or queries the logging measurement's trigger mode.

Syntax
```
:APPLication:PARameter:LOGGing:INTrigger<wsp>IGNore|SMEasure|CMEasure
:APPLication:PARameter:LOGGing:INTrigger?
```

Example
```
:APPL:PAR:LOGG:INT CME
:APPL:PAR:LOGG:INT? -> IGN<END>
```

Description
- Settings
  Set the following parameters:
  IGNore: Ignore external trigger input
  SMEasure: Perform a single measurement for each external trigger that is received
  CMEasure: Start the logging measurement based on an external trigger that is received
- Queries
  The command returns the logging measurement's trigger mode setting as a character string.
  GN: Ignore external trigger input
  SME: Perform a single measurement for each external trigger that is received
  CME: Start the logging measurement based on an external trigger that is received

Target LOGGING application

:APPLication:PARameter:LOGGing:RANGe:MODE

Function Sets or queries the logging measurement's range mode.

Syntax
```
:APPLication:PARameter:LOGGing:RANGe:MODE<wsp>COMMon|INDividual
:APPLication:PARameter:LOGGing:RANGe:MODE?
```

Example
```
:APPL:PAR:LOGG:RANG:MODE COMM
:APPL:PAR:LOGG:RANG:MODE?
-> COMM<END>
```

Description
- Settings
  Set the following parameters:
  COMMon: Set all the sensors to the same measurement range (this is the default value)
  INDividual: Set each sensor's measurement range separately
- Queries
  The command returns the logging measurement's range mode as a character string.
  COMM: All the sensors are set to the same measurement range.
  IND: The measurement range for each sensor is set separately.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.
- After using this command to set the range mode, set the ranges.
  If the range mode is common,
  `:APPL:PAR:LOGG:RANGE:SET:COMM` command to set the range.
  If the range mode is individual,
  `:APPL:PAR:LOGG:RANG:SET:IND` command to set the ranges.

Target LOGGING application

:APPLication:PARameter:LOGGing:RANGe:SET:COMM

Function Sets or queries the measurement range when logging measurement is in common mode.

Syntax
```
:APPLication:PARameter:LOGGing:
RANGe:SET::COMM<wsp><value>[DBM]
:APPLication:PARameter:LOGGing:
RANGe:SET:[:COMM]?
```

Example
```
:APPL:PAR:LOGG:RANG:SET 10DBM
:APPL:PAR:LOGG:RANG:SET?
-> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified measurement range
  The measurement range is different according to the sensor type.
- Queries
  The command returns the measurement range setting as a floating-point number in units of dBm.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:RANGe:SET:INDividual

Function Sets or queries each measurement range when logging measurement range is in individual mode.

Syntax
```
:APPLication:PARameter:LOGGing:
RANGe:SET:INDividual<wsp>S<value1>
D<value2>,<value3>[DBM]
:APPLication:PARameter:LOGGing:
RANGe:SET:INDividual?<wsp>S<value1>
D<value2>
```

Example
```
:APPL:PAR:LOGG:RANG:SET:IND
S2D1,10DBM
:APPL:PAR:LOGG:RANG:SET:IND? S2D1
-> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  <value3>: The user-specified measurement range
  The measurement range is different according to the sensor type.
- Queries
  The command returns the measurement range setting as a floating-point number in units of dBm.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:REFerence

Function Sets or queries the logging measurement's reference value.

Syntax
```
:APPLication:PARameter:LOGGing:REFerence<wsp><value>PW|NW|UW|MW|W|DBM
:APPLication:PARameter:LOGGing:REFerence?
```

Example
```
:APPL:PAR:LOGG:REF -30DBM
:APPL:PAR:LOGG:REF?
-> -3.00000000+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –180.0000 to +200.0000 (in units of dBm)
  The logging measurement's reference value. You can also set it in units of W, which is equivalent to the dBm unit.
- Queries
  The command returns the logging measurement's reference value as a floating-point number.
  If the unit used for the measurement is dBm or dB, the returned value is in units of dBm.
  If the unit used for the measurement is W or Wrel, the returned value is in units of W.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.
- The reference value that is set or queried through the use of this command is the reference value when the reference mode is set to VALUE.

Target LOGGING application

:APPLication:PARameter:LOGGing:REFMode

Function Sets or queries the logging measurement's reference mode.

Syntax
```
:APPLication:PARameter:LOGGing:REFMode<wsp>VALue|S<value1>D<value2>|FIRSt
:APPLication:PARameter:LOGGing:REFMode?
```

Example
```
:APPL:PAR:LOGG:REFM S2D1
:APPL:PAR:LOGG:REFM? -> S2D1<END>
```

Description
- Settings
  Set the following parameters:
  VALue: The measurement reference value is the reference.
  S<value1>D<value2>:
  The specified sensor's measurement value is the reference.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  FIRSt: The first measured value is the reference.
- Queries
  The command returns the logging measurement's reference mode setting as a character string.
  VAL: The measurement reference value is the reference.
  S<value1>D<value2> syntax:
  The specified sensor's measurement value is the reference.
  FIRS: The first measured value is the reference.

Target LOGGING application

:APPLication:PARameter:LOGGing:SAMPle

Function Sets or queries the logging measurement's number of data points.

Syntax
```
:APPLication:PARameter:LOGGing:SAMPle<wsp><value>
:APPLication:PARameter:LOGGing:SAMPle?
```

Example
```
:APPL:PAR:LOGG:SAMP 1000
:APPL:PAR:LOGG:SAMP? -> +1000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1 to 20000
  (If an AQ2200-221 is installed, 1 to 10000.)
  The number of data points.
- Queries
  The command returns the logging measurement's number of data points as a signed integer.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:UNIT

Function Sets or queries the logging measurement's unit and measurement mode.

Syntax
```
:APPLication:PARameter:LOGGing:UNIT<wsp>DBM|W|DB|WREL
:APPLication:PARameter:LOGGing:UNIT?
```

Example
```
:APPL:PAR:LOGG:UNIT DBM
:APPL:PAR:LOGG:UNIT? -> DBM<END>
```

Description
- Settings
  Set the following parameters:
  DBM: Absolute value measurement. The unit is dBm (this is the default value).
  W: Absolute value measurement. The unit is W.
  DB: Relative value measurement (relative to the reference value), the unit is dB.
  WREL: Relative value measurement (relative to the reference value), no unit
- Queries
  The command returns the logging measurement's unit and measurement mode as a character string.
  DBM|W|DB|WREL
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:WAVelength:MODE

Function Sets or queries the logging measurement's wavelength mode.

Syntax
```
:APPLication:PARameter:LOGGing:WAVelength:MODE<wsp>COMMon|INDividual
:APPLication:PARameter:LOGGing:WAVelength:MODE?
```

Example
```
:APPL:PAR:LOGG:WAV:MODE COMM
:APPL:PAR:LOGG:WAV:MODE? -> COMM<END>
```

Description
- Settings
  Set the following parameters:
  COMMon: Common mode.
  Set all the sensors to the same wavelength (this is the default value).
  INDividual: Individual mode.
  Set each sensor's wavelength separately.
- Queries
  The command returns the logging measurement's wavelength mode as a character string.
  COMM: Common mode.
  All sensors are set to the same wavelength.
  IND: Individual mode.
  Each sensor's wavelength is set separately.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.
- After using this command to set the wavelength mode, set the wavelengths.
  If the wavelength mode is common, use the `:APPLI:PAR:LOGG:WAV:SET:COMM` command to set the wavelength.
  If the wavelength mode is individual, `:APPL:PAR:LOGG:WAV:SET:IND` command to set the wavelengths.

Target LOGGING application

:APPLication:PARameter:LOGGing:WAVelength:SET:COMM

Function Sets or queries the wavelength when the logging measurement's wavelength mode is common.

Syntax
```
:APPLication:PARameter:LOGGing:WAVelength:SET:COMM<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:LOGGing:WAVelength:SET[:COMM]?
```

Example
```
:APPL:PAR:LOGG:WAV:SET:COMM 1550NM
:APPL:PAR:LOGG:WAV:SET:COMM?
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified wavelength
  This value differs according to the sensor type. You can specify a value that is within the range that is specified by all the selected sensors.
- Queries
  The command returns the wavelength value as a floating-point number in units of m.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:LOGGing:WAVelength:SET:INDividual

Function Sets or queries each wavelength when the logging measurement's wavelength mode is individual.

Syntax
```
:APPLication:PARameter:LOGGing:WAVelength:INDividual<wsp>S<value1>D<value2>,<value3>[PM|NM|UM|MM|M]
:APPLication:PARameter:LOGGing:WAVelength:INDividua?<wsp>S<value1>D<value2>
```

Example
```
:APPL:PAR:LOGG:WAV:SET:IND S2D1,1550NM
:APPL:PAR:LOGG:WAV:SET:IND? S2D1
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  S<value1>D<value2>:
  The sensor module.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  <value3>: The user-specified wavelength
  This value differs according to the sensor type.
- Queries
  The command returns the wavelength that is set for the module that you specify with the parameters. The returned value is a floating-point number in units of m.
- This command is only valid when the instrument is displaying the logging mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the logging mode's parameter setting screen.

Target LOGGING application

:APPLication:PARameter:ORL:ATIMe

Function Sets or queries the averaging time of the sensors that are used in the return loss or insertion loss measurements.

Syntax
```
:APPLication:PARameter:ORL:
ATIMe<wsp>1|2|5|10|100|200|500[MS|S]
:APPLication:PARameter:ORL:ATIMe?
[<wsp>MAX|MIN]
```

Example
```
:APPL:PAR:ORL:ATIM 2S
:APPL:PAR:ORL:ATIM?
-> +2.00000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  1|2|5|10|100|200|500:
  The numeric data of the averaging time.
  Specify the averaging time with a unit of measurement.
  The unit is “s” (seconds) if it is omitted.
  For more details on what averaging times are supported, see the “Table of Supported Averaging Times” on page 5-91.
- Queries
  The command returns the averaging time that you specify with the parameters. The returned value is a floating-point number in units of s.
  NONE: The current averaging time value
  MAX: The maximum value in the settable range of averaging times
  MIN: The minimum value in the settable range of averaging times

Target ORL application

:APPLication:PARameter:ORL:OPT

Function Sets or queries the OPT mode that is used in the return loss and insertion loss measurements.

Syntax
```
:APPLication:PARameter:ORL:OPT<wsp>
CW|270HZ|1KHZ|2KHZ
:APPLication:PARameter:ORL:OPT?
```

Example
```
:APPL:PAR:ORL:OPT CW
:APPL:PAR:ORL:OPT? -> CW<END>
```

Description
- Settings
  Set the following parameters:
  CW: Use CW light as the measurement light
  270HZ: Use 270 Hz modulated light as the measurement light
  1KHZ: Use 1 kHz modulated light as the measurement light
  2KHZ: Use 2 kHz modulated light as the measurement light
  Each of the following cases produces an “Execution Error.”
  - The selected sensor modules include an AQ2200-215, -221, -212, -222, -232 or AQ2200-242.
  - The selected light source module includes an AQ2200-112, -131, -132 or AQ2200-136.
- Queries
  The command returns the measurement state of the OPT mode as a character string.
  CW|270HZ|1KHZ|2KHZ

Target ORL application

:APPLication:PARameter:ORL:REF

Function Sets or queries the return loss measurement’s reference reflection quantity.

Syntax
```
:APPLication:PARameter:ORL:REF<wsp>
0.2DB|14.7DB
:APPLication:PARameter:ORL:REF?
```

Example
```
:APPL:PAR:ORL:REF 14.7DB
:APPL:PAR:ORL:REF?
-> +1.47000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  0.2DB: Full reflection
  14.7DB: Fresnel reflection
- Queries
  The command returns the return loss measurement’s reference reflection quantity as a floating-point number in units of dB.

Target ORL application

:APPLication:PARameter:ORL:WAVelength

Function Sets or queries the wavelength that is used in the return loss and insertion loss measurements.

Syntax
```
:APPLication:PARameter:ORL:
WAVelength<wsp><value>NM|UM|MM|[M]
:APPLication:PARameter:ORL:
WAVelength?[<wsp>MAX|MIN]
```

Example
```
:APPL:PAR:ORL:WAV 1550NM
:APPL:PAR:ORL:WAV?
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified wavelength
  This value differs according to the sensor type.
  You can specify a value that is within the range that is specified by all the selected sensors.
  The unit is “m” (meters) if it is omitted.
  If you have selected a light source module, you can specify a wavelength that is within the selectable range that is specified by all the selected sensors and the light source.
  If the light source module is an AQ2200-112, -141 or AQ2200-142, you cannot specify the wavelength.
- Queries
  The command returns the wavelength value that you specify with the parameters. The returned value is a floating-point number in units of m.
  NONE: The current wavelength setting
  MAX: The maximum value in the settable range of wavelengths
  MIN: The minimum value in the settable range of wavelengths

Target ORL application

:APPLication:PARameter:STABility:ATIMe

Function Sets or queries the averaging time of the sensors that are used in the stability measurement.

Syntax
```
:APPLication:PARameter:STABility:
ATIMe<wsp>1|2|5|10|100|200|500[US|MS
|S]
:APPLication:PARameter:STABility:
ATIMe?
```

Example
```
:APPL:PAR:STAB:ATIM 100US
:APPL:PAR:STAB:ATIM?
-> +1.00000000E-003<END>
```

Description
- Settings
  Set the following parameters:
  1|2|5|10|100|200|500:
  The numeric data of the averaging time.
  Specify the averaging time with a unit of measurement.
  The unit is “s” (seconds) if it is omitted.
  For more details on what averaging times are supported, see the "Table of Supported Averaging Times" on page 5-91.
- Queries
  The command returns the averaging time as a floating-point number in units of s.
- This command is only valid when the instrument is displaying the stability mode’s sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode’s parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:INTrigger

Function Sets or queries the stability measurement's trigger mode.

Syntax
```
:APPLication:PARameter:STABility:INTrigger<wsp>IGNore|CMEasure
:APPLication:PARameter:STABility:INTrigger?
```

Example
```
:APPL:PAR:STAB:INT CME
:APPL:PAR:STAB:INT? -> IGN<END>
```

Description
- Settings
  Set the following parameters:
  IGNore: Ignore external trigger input
  CMEasure: Start the stability measurement based on an external trigger that is received
- Queries
  The command returns the stability measurement's trigger mode as a character string.
  IGN: Ignore external trigger input
  CME: Start the stability measurement based on an external trigger that is received
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:OPT

Function Sets or queries the stability measurement's OPT mode.

Syntax
```
:APPLication:PARameter:STABility:OPT<wsp>CW|270HZ|1KHZ|2KHZ
:APPLication:PARameter:STABility:OPT?
```

Example
```
:APPL:PAR:STAB:OPT CW
:APPL:PAR:STAB:OPT? -> CW<END>
```

Description
- Settings
  Set the following parameters:
  CW: Use CW light as the measurement light
  270Hz: Use 270 Hz modulated light as the measurement light
  1KHz: Use 1 kHz modulated light as the measurement light
  2KHz: Use 2 kHz modulated light as the measurement light
- Queries
  The command returns the stability measurement's OPT mode as a character string.
  CW|270HZ|1KHZ|2KHZ
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.
- AQ2200-215, -221, -212, -222, -232 and AQ2200-242 modules are not supported.

Target STABILITY application

:APPLication:PARameter:STABility:RANGe:MODE

Function Sets or queries the stability measurement's range mode.

Syntax
```
:APPLication:PARameter:STABility:RANGe:MODE<wsp>AUTO|COMMon|INDividual
:APPLication:PARameter:STABility:RANGe:MODE?
```

Example
```
:APPL:PAR:STAB:RANG:MODE COMM
:APPL:PAR:STAB:RANG:MODE?
-> COMM<END>
```

Description
- Settings
  Set the following parameters:
  AUTO: Set all the sensors to use an automatic measurement range (The default value.)
  COMMon:Common mode
  Set all the sensors to the same measurement range
  INDividual: Individual mode
  Set each sensor's measurement range separately
- Queries
  The command returns the stability measurement's range mode as a character string.
  AUTO: All sensors use an automatic measurement range.
  COMM: Common mode
  All the sensors are set to the same measurement range.
  IND: Individual mode
  The measurement range for each sensor is set separately.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.
- After using this command to set the range mode, set the ranges. If the range mode is common,
  `:APPL:PAR:STAB:RANG:SET:COMM`
  command to set the range.
  If the range mode is individual,
  `:APPL:PAR:STAB:RANG:SET:IND` command to set the ranges.
  In AUTO mode, you do not have to set the ranges.

Target STABILITY application

:APPLication:PARameter:STABility:RANGe:SET:COMM

Function Sets or queries the range when the stability measurement's range mode is common.

Syntax
```
:APPLication:PARameter:STABility:RANGe:SET:COMM<wsp><value>[DBM]
:APPLication:PARameter:STABility:RANGe:SET[:COMM]?
```

Example
```
:APPL:PAR:STAB:RANG:SET:COMM 10DBM
:APPL:PAR:STAB:RANG:SET:COMM?
-> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified measurement range
  The measurement range is different according to the sensor type.
- Queries
  The command returns the measurement range setting as a floating-point number in units of dBm.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:RANGe:SET:INDividual

Function Sets or queries the range when the stability measurement's range mode is individual.

Syntax
```
:APPLication:PARameter:STABility:
RANGe:SET:INDividual<wsp>S<value1>
D<value2>,<value3>[DBM]
:APPLication:PARameter:STABility:
RANGe:SET:INDividual?<wsp>S<value1>
D<value2>
```

Example
```
:APPL:PAR:STAB:RANG:SET:IND
S2D1,10DBM
:APPL:PAR:STAB:RANG:SET:IND? S2D1
-> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  S<value1>D<value2>:
  The sensor module.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  <value3>: The user-specified measurement range
  The measurement range is different according to the sensor type.
- Queries
  The command returns the measurement range setting as a floating-point number in units of dBm.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:REFerence

Function Sets or queries the stability measurement's reference value.

Syntax
```
:APPLication:PARameter:STABility:
REFerence<wsp><value>PW|NW|UW|MW|W|
DBM
:APPLication:PARameter:STABility:
REFerence?
```

Example
```
:APPL:PAR:STAB:REF -30DBM
:APPL:PAR:STAB:REF?
-> -3.00000000+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –180.0000 to +200.0000 (in units of dBm)
  The reference value.
  You can also set it in units of W, which is equivalent to the dBm unit.
- Queries
  The command returns the reference value as a floating-point number in units of dBm.
  Unit: If the measurement unit is dBm or dB, the unit is dBm. If the measurement unit is W or Wrel, the unit is W.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.
- The reference value that is set through the use of this command is the reference value when the reference mode is set to VALUE.

Target STABILITY application

:APPLication:PARameter:STABility:REFMode

Function Sets or queries the stability measurement's reference mode.

Syntax
```
:APPLication:PARameter:STABility:REFMode<wsp>VALue|S<value1>D<value2>|FIRSt
:APPLication:PARameter:STABility:REFMode?
```

Example
```
:APPL:PAR:STAB:REFM S2D1
:APPL:PAR:STAB:REFM? -> S2D1<END>
```

Description
- Settings
  Set the following parameters:
  VALue: The measurement reference value is the reference.
  S<value1>D<value2>:
  The specified sensor's measurement value is the reference.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  FIRSt: The first measured value is the reference.
- Queries
  The command returns the stability measurement's reference mode setting as a character string.
  VAL: The measurement reference value is the reference.
  S<value1>D<value2> syntax:
  The specified sensor's measurement value is the reference.
  FIRS: The first measured value is the reference.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.
- After using this command to set the reference mode to VALUE, use the `:APPL:PAR:STAB:REF` command to set the reference value.

Target STABILITY application

:APPLication:PARameter:STABility:SAMPle

Function Sets or queries the stability measurement's number of data points.

Syntax
```
:APPLication:PARameter:STABility:SAMPle<wsp><value>
:APPLication:PARameter:STABility:SAMPle?
```

Example
```
:APPL:PAR:STAB:SAMP 1000
:APPL:PAR:STAB:SAMP? -> +1000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1 to 20000
  (If an AQ2200-221 is installed, 1 to 10000.)
  The number of data points.
- Queries
  The command returns the number of data points as a signed integer.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:TIME

Function Sets or queries the stability measurement's measurement time.

Syntax
```
:APPLication:PARameter:STABility:
TIME<wsp><value>[S]|Days
:APPLication:PARameter:STABility:
TIME?
```

Example
```
:APPL:PAR:STAB:TIME 600S
:APPL:PAR:STAB:TIME?
-> +6.00000000+002<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1 to 86399
  (23 hours, 59 minutes, and 59 seconds converted to seconds)
  1 to 99 (days)
  The measurement time (in units of seconds or days).
  S: The unit is seconds.
  Days: The unit is days.
- Queries
  The command returns the measurement time setting in one of the following formats:
  If the unit is days: An unsigned integer
  If the unit is seconds: A floating-point number in units of s (seconds)
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:UNIT

Function Sets or queries the stability measurement's unit and measurement mode.

Syntax
```
:APPLication:PARameter:STABility:
UNIT<wsp>DBM|W|DB|WREL
:APPLication:PARameter:STABility:
UNIT?
```

Example
```
:APPL:PAR:STAB:UNIT DBM
:APPL:PAR:STAB:UNIT? -> DBM<END>
```

Description
- Settings
  Set the following parameters:
  DBM: Absolute value measurement. The unit is dBm (this is the default value).
  W: Absolute value measurement. The unit is W.
  DB: Relative value measurement (relative to the reference value), the unit is dB.
  WREL: Relative value measurement (relative to the reference value), no unit
- Queries
  The command returns the unit and measurement mode as a character string.
  DBM|W|DB|WREL
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:WAVelength:MODE

Function Sets or queries the stability measurement's wavelength mode.

Syntax
```
:APPLication:PARameter:STABility:WAVelength:MODE<wsp>COMMon|INDividual
:APPLication:PARameter:STABility:WAVelength:MODE?
```

Example
```
:APPL:PAR:STAB:WAV:MODE COMM
:APPL:PAR:STAB:WAV:MODE? -> COMM<END>
```

Description
- Settings
  Set the following parameters:
  COMMon: Common mode
  Set all the sensors to the same wavelength (this is the default value).
  INDividual: Individual mode
  Set each sensor's wavelength separately.
- Queries
  The command returns the wavelength mode as a character string.
  COMM: Common mode
  All sensors are set to the same wavelength.
  IND: Individual mode
  Each sensor's wavelength is set separately.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.
- After using this command to set the wavelength mode, set the wavelengths. If the wavelength mode is common,
  use the `:APPL:PAR:STAB:WAV:SET:COMM` command to set the wavelength.
  If the wavelength mode is individual,
  `:APPL:PAR:STAB:WAV:SET:IND` command to set the wavelengths.

Target STABILITY application

:APPLication:PARameter:STABility:WAVelength:SET:COMM

Function Sets or queries the wavelength when the stability measurement's wavelength mode is common.

Syntax
```
:APPLication:PARameter:STABility:WAVelength:SET:COMM<wsp><value>
:APPLication:PARameter:STABility:WAVelength:SET[:COMM]?
```

Example
```
:APPL:PAR:STAB:WAV:SET:COMM 1550NM
:APPL:PAR:STAB:WAV:SET:COMM?
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified wavelength
  This value differs according to the sensor type. You can specify a value that is within the range that is specified by all the selected sensors.
- Queries
  The command returns the wavelength value as a floating-point number in units of m.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:STABility:WAVelength:SET:INDividual

Function Sets or queries each wavelength when the stability measurement's wavelength mode is individual.

Syntax
```
:APPLication:PARameter:STABility:
WAVelength:SET:INDividual<wsp>
S<value1>D<value2>,<value3>[PM|NM|UM
|MM|M]
:APPLication:PARameter:STABility:
WAVelength:SET:INDividual?<wsp>
S<value1>D<value2>
```

Example
```
:APPL:PAR:STAB:WAV:SET:IND
S2D1,1550NM
:APPL:PAR:STAB:WAV:SET:IND? S2D1
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  S<value1>D<value2>:
  The sensor module.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  <value3>: The user-specified wavelength
  This value differs according to the sensor type.
- Queries
  The command returns the wavelength that is set for the module that you specify with the parameters. The returned value is a floating-point number in units of m.
- This command is only valid when the instrument is displaying the stability mode's sensor selection screen (with sensor selection completed) or parameter setting screen.
- When the instrument receives this command, the display switches to the stability mode's parameter setting screen.

Target STABILITY application

:APPLication:PARameter:TLS:SWEPt:ATIMe

Function Sets or queries the averaging time of the sweep input.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
ATIMe<wsp>1|2|5|10|100|200|500[US|MS
|S]
:APPLication:PARameter:TLS:SWEPt:
ATIMe?
```

Example
```
:APPL:PAR:TLS:SWEP:ATIM 100us
:APPL:PAR:TLS:SWEP:ATIM?
-> +1.00000000E-004<END>
```

Description
- Settings
  Set the following parameters:
  1|2|5|10|100|200|500:
  The numeric data of the averaging time.
  Specify the averaging time with a unit of measurement.
  The unit is "s" (seconds) if it is omitted.
  For more details on what averaging times are supported, see the "Table of Supported Averaging Times" on page 5-91.
  If the sweep mode is continuous, you cannot set the averaging time.
- Queries
  The command returns the averaging time as a floating-point number in units of s.
  Example: 100us -> +1.00000000E–004

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:AUTO:SAVE

Function Sets or queries the automatic data save feature.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
AUTO:SAVE<wsp>OFF|0|ON|1
:APPLication:PARameter:TLS:SWEPt:
AUTO:SAVE?
```

Example
```
:APPL:PAR:TLS:SWEP:AUTO:SAVE ON
:APPL:PAR:TLS:SWEP:AUTO:SAVE?
-> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Turn the automatic data save feature off
  1|ON: Turn the automatic data save feature on
- Queries
  The command returns the state of the automatic data save feature as an unsigned integer.
  0: The automatic data save feature is off.
  1: The automatic data save feature is on.

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:CENTer

Function Sets or queries the sweep center wavelength.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
CENTer<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:TLS:SWEPt:
CENTer?
```

Example
```
:APPL:PAR:TLS:SWEP:CENT 1540NM
:APPL:PAR:TLS:SWEP:CENT?
-> +1.54000000E-006<END>
```

Description – Settings
Set the following parameters:
<value> = 1410.000 to 1640.000 (the unit is nm)
The sweep center wavelength.
PM|NM|UM|MM|M: Units
• Queries
The command returns the sweep center wavelength value as a floating-point number in units of m.
Example: 1540 nm -> +1.54000000E–006

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:INPut:SNCTrl

Function Sets or queries whether the serial number feature is used or not.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
INPut:SNCTrl<wsp>OFF|0|ON|1
:APPLication:PARameter:TLS:SWEPt:
INPut:SNCTrl?
```

Example
```
:APPL:PAR:TLS:SWEP:INP:SNCT ON
:APPL:PAR:TLS:SWEP:INP:SNCT?
-> 1<END>
```

Description • Settings
Set the following parameters:
0|OFF: The serial number feature is not used
1|ON: The serial number feature is used
The serial number that was set with "`:APPLication:PARameter:TLS:SWEPt:INPut:SNUMber`" is entered.
• Queries
The command returns the setting of the serial number feature as an unsigned integer.
0: The serial number feature is not being used
1: The serial number feature is being used

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:INPut:SNUMber

Function Sets or queries the serial number.

Syntax
```
APPLication:PARameter:TLS:SWEPt:
INPut:SNUMber<wsp><"string">
APPLication:PARameter:TLS:SWEPt:
INPut:SNUMber?
```

Example
```
:APPL:PAR:TLS:SWEP:INP:SNUM "123ABC"
:APPL:PAR:TLS:SWEP:INP:SNUM?
-> "123ABC"<END>
```

Description • Settings
Set the following parameters:
<"string"> = 0-9|A-Z
Specify the serial number using up to 13 alphanumeric characters.
Enclose the character string in double quotation marks (").
The default value is "----------" (13 characters).
• Queries
The command returns the serial number as a string of up to 13 alphanumeric characters that is enclosed in double quotation marks.

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:LINewidth

Function Sets or queries the line width of the sweep output.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
LINewidth<wsp>NARRow|0|WIDE|1
:APPLication:PARameter:TLS:SWEPt:
LINewidth?
```

Example
```
:APPL:PAR:TLS:SWEP:LIN NARR
:APPL:PAR:TLS:SWEP:LIN? -> +0<END>
```

Description • Settings
Set the following parameters:
0|NARRow: Set the spectrum line width to narrow
1|WIDE: Set the spectrum line width to wide
• Queries
The command returns the line width of the sweep output as a signed integer.
+0: The spectrum line width is narrow.
+1: The spectrum line width is wide.

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:MODE

Function Sets or queries the sweep mode.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
MODE<wsp>STEPped|MANual|CONTinuous
:APPLication:PARameter:TLS:SWEPt:
MODE?
```

Example
```
:APPL:PAR:TLS:SWEP:MODE STEP
:APPL:PAR:TLS:SWEP:MODE? -> STEP<END>
```

Description
- Settings
  Set the following parameters:
  STEPped: Step sweep mode
  MANual: Manual sweep mode
  CONTinuous: Continuous sweep mode
- Queries
  The command returns the state of the sweep mode as a character string.
  STEP: Step sweep mode
  MAN: Manual sweep mode
  CONT: Continuous sweep mode

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:PMAX

Function Sets or queries the optical output to the maximum output level within the sweep range.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
PMAX
:APPLication:PARameter:TLS:SWEPt:
PMAX?
-> +3.00000000E+000<END>
```

Example
```
:APPL:PAR:TLS:SWEP:PMAX
:APPL:PAR:TLS:SWEP:PMAX?
```

Description
- Settings
  Set the maximum output level value of the sweep range to Power.
- Queries
  The command returns the maximum output level value of the sweep range as a floating-point number in units of dBm.
  Example: 3 dBm -> +3.00000000E+000

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:POWer

Function Sets or queries the sweep output level.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
POWer<wsp><value>DBM|MIN|MAX|DEF
:APPLication:PARameter:TLS:SWEPt:
POWer?[<wsp>MIN|MAX|DEF]
```

Example
```
:APPL:PAR:TLS:SWEP:POW MAX
:APPL:PAR:TLS:SWEP:POW?
-> +3.00000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The power level in units of dBm
  (In 0.1 dB steps)
  MIN: The minimum power level
  MAX: The maximum power level
  DEF: The default power level
- Queries
  The command returns the output level that you specify with the parameters. The returned value is a floating-point number in units of dBm.
  Example: 3 dBm -> +3.00000000E+000
  NONE: The current power level value
  MIN: The minimum power level value
  MAX: The maximum power level value
  DEF: The default power level value

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:RANGe

Function Sets or queries the sweep range.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
RANGe<wsp>0|1|2|3|4
:APPLication:PARameter:TLS:SWEPt:
RANGe?
```

Example
```
:APPL:PAR:TLS:SWEP:RANG 1
:APPL:PAR:TLS:SWEP:RANG? -> +1<END>
```

Description
- Settings
  Set the following parameters:
  0: Automatic range 1 (full range)
  1: Automatic range 2 (middle range)
  2: High range
  3: Middle range
  4: Low range
- Queries
  The command returns the sweep range setting as a signed integer.
  +0: Automatic range 1 (full range)
  +1: Automatic range 2 (middle range)
  +2: High range
  +3: Middle range
  +4: Low range

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:SAMPle

Function Sets or queries the number of sweep samples.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:SAMPle<wsp><value>
:APPLication:PARameter:TLS:SWEPt:SAMPle?
```

Example
```
:APPL:PAR:TLS:SWEP:SAMP 10000
:APPL:PAR:TLS:SWEP:SAMP?
-> +10000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1 to 20000
  (1 to 10000 when the AQ2200-221 is selected)
  The number of sweep samples.
- Queries
  The command returns the number of sweep samples as a signed integer.

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:SPAN

Function Sets or queries the sweep width.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:SPAN<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:TLS:SWEPt:SPAN?
```

Example
```
:APPL:PAR:TLS:SWEP:SPAN 200nm
:APPL:PAR:TLS:SWEP:SPAN?
-> +2.00000000E-007<END>
```

Description
- Settings
  Set the following parameters:
  <value>:
  The wavelength value in units of pm, nm, µm, mm, or m.
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep width as a floating-point number in units of m.
  Example: 200 nm -> +2.00000000E–007

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:STARt

Function Sets or queries the sweep start wavelength.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:STARt<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:TLS:SWEPt:STARt?
```

Example
```
:APPL:PAR:TLS:SWEP:STAR 1440nm
:APPL:PAR:TLS:SWEP:STAR?
-> +1.44000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1440.000 to 1640.000 (the unit is nm)
  The sweep start wavelength value.
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep start wavelength value as a floating-point number in units of m.
  Example: 1440 nm -> +1.44000000E–006

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:STEP

Function Sets or queries the sweep step wavelength.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:STEP<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:TLS:SWEPt:STEP?
```

Example
```
:APPL:PAR:TLS:SWEP:STEP 0.5nm
:APPL:PAR:TLS:SWEP:STEP?
-> +5.00000000E-010<END>
```

Description
- Settings
  Set the following parameters:
  <value>:
  The wavelength value in units of pm, nm, µm, mm, or m.
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep step wavelength value as a floating-point number in units of m.
  Example: 0.5 nm -> +5.00000000E–010

Target SWEPT application

:APPLication:PARameter:TLS:SWEPt:STOP

Function Sets or queries the sweep stop wavelength.

Syntax
```
:APPLication:PARameter:TLS:SWEPt:
STOP<wsp><value>[PM|NM|UM|MM|M]
:APPLication:PARameter:TLS:SWEPt:
STOP?
```

Example
```
:APPL:PAR:TLS:SWEP:STOP 1640NM
:APPL:PAR:TLS:SWEP:STOP?
-> +1.64000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>:
  The wavelength value in units of pm, nm, µm, mm, or m.
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep stop wavelength value as a floating-point number in units of m.
  Example: 1640 nm -> +1.64000000E–006

Target SWEPT application

:APPLication:STABility:MEASure:RESult?

Function Queries the measured stability mode result.

Syntax
```
:APPLication:STABility:MEASure:
RESult?<wsp>S<value1>D<value2>
```

Example
```
:APPL:STAB:MEAS:RES? S2D1
-> +1.23400000E+000,+1.11570000E+000
<END>
```

Description
S<value1>D<value2>:
The sensor module.
<value1> = 1 to 9 (in single steps)
The slot number (module number).
1 to 3 if you are using an AQ2211.
<value2> = 1 or 2 (in a single step)
The device number.
The command returns the measured result for the module specified by the parameters. The returned value is a floating point number.
The returned data contains comma-separated measured values from the start of the measurement in the unit specified by the `:APPL:PAR:STAB:UNIT` command.
If there is no data, “NO DATA” is returned.

Target STABILITY application

:APPLication:STABility:MEASure:STATe

Function Starts, stops, or queries the stability measurement.

Syntax
```
:APPLication:STABility:MEASure:STATe
<wsp>STARt|STOP
:APPLication:STABility:MEASure:
STATe?
```

Example
```
:APPL:STAB:MEAS:STAT STAR
:APPL:STAB:MEAS:STAT?
-> COMPLETE<END>
```

Description
- Settings
  Set the following parameters:
  STARt: Start the measurement
  STOP: Stop the measurement
- Queries
  The command returns the state of the stability measurement as a character string.
  COMPLETE: The stability measurement has completed.
  PROGRESS: The stability measurement is ongoing.
  SETUP: Sensor selection or measurement parameter setup is ongoing.
  NONE: The instrument is not in stability mode.
- The measurement start command is only valid when the instrument is displaying the parameter setup screen in stability mode.
  When the instrument receives this command, the display switches to the stability mode’s measurement screen.
- The measurement stop command is only valid when the instrument is in stability mode.
  When the instrument receives this command, the display switches to the SUMMARY screen.
  When the instrument receives this command, it stops running the STABILITY application, and the display changes to the SUMMARY screen.

Target STABILITY application

:APPLication:TLS:SWEPt[:MEASurement]:NEXT

Function Move to the next sweep wavelength in the measurement. (When in manual mode.)

Syntax
```
:APPLication:TLS:SWEPt[:MEASurement]:
NEXT
```

Example
```
:APPL:TLS:SWEP:NEXT
```

Target SWEPT application

:APPLication:TLS:SWEPt[:MEASurement]:RESult?

Function Queries the measured result.

Syntax
```
:APPLication:TLS:SWEPt[:MEASurement]:
RESult?<wsp>S
<value1>D<value2>
```

Example
```
:APPL:TLS:SWEP:MEAS:RES? S1D1
-> +3.00000000E+000,+3.10000000E+000
<END>
```

Description
S<value1>D<value2>:
The sensor module.
<value1> = 1 to 9 (in single steps)
The slot number (module number).
1 to 3 if you are using an AQ2211.
<value2> = 1 or 2 (in a single step)
The device number.
The command returns as much data as is specified by the number of data points. The data consists of comma-separated floating-point numbers that are in units of dBm.
If there is no measured data, “NO DATA” is returned.

Target SWEPT application

:APPLication:TLS:SWEPt[:MEASurement]:STATe

Function Starts or queries the measurement.

Syntax
```
:APPLication:TLS:SWEPt[:MEASurement]:
STATe<wsp>STARt
:APPLication:TLS:SWEPt[:MEASurement]:
STATe?
```

Example
```
:APPL:TLS:SWEP:STAT STAR
:APPL:TLS:SWEP:STAT? -> COMPLETE<END>
```

Description
- Settings
  Set the following parameters:
  STARt: Start the measurement
  You cannot start this measurement until after the reference measurement has completed.
- Queries
  The command returns the state of the measurement as a character string.
  COMPLETE: The measurement has completed.
  PROGRESS: The measurement is ongoing.
  SETUP: Module selection or parameter setup is ongoing.
  NONE: The Swept feature is not running.

Target SWEPT application

:APPLication:TLS:SWEPt:REFMeasure:CLEar

Function Clears the reference measurement data.

Syntax
```
:APPLication:TLS:SWEPt:REFMeasure:
CLEar
```

Example
```
:APPL:TLS:SWEP:REFM:CLE
```

Target SWEPT application

:APPLication:TLS:SWEPt:REFMeasure:MODE

Function Sets or queries the reference measurement method.

Syntax
```
:APPLication:TLS:SWEPt:REFMeasure:
MODE<wsp>S<value1>D<value2>|
INDividual
:APPLication:TLS:SWEPt:REFMeasure:
MODE?
```

Example
```
:APPL:TLS:SWEP:REFM:MODE S1D1
:APPL:TLS:SWEP:REFM:MODE?
-> S1D1<END>
```

Description
- Settings
  Set the following parameters:
  S<value1>D<value2>:
  Select the module that will perform the reference measurement.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
  INDividual: Perform an individual reference measurement for the sensor module that you selected on the MODULE SELECT for SWEPT screen.
- Queries
  The command returns the reference measurement method in one of the following formats:
  S1D1 to S9D2:
  The number of the module that will perform the reference measurement.
  IND: An individual reference measurement is ongoing.

Target SWEPT application

:APPLication:TLS:SWEPt:REFMeasure:RESult?

Function Queries the result of the reference measurement.

Syntax
```
:APPLication:TLS:SWEPt:REFMeasure:
RESult?<wsp>S<value1>D<value2>
```

Example
```
:APPL:TLS:SWEP:REFM:RES? S1D1
-> +3.00000000E+000,+3.10000000E+000<END>
```

Description
S<value1>D<value2>:
The module that will query the results of the reference measurement.
<value1> = 1 to 9 (in single steps)
The slot number (module number).
1 to 3 if you are using an AQ2211.
<value2> = 1 or 2 (in a single step)
The device number.
The command returns as much data as is specified by the number of data points. The data consists of comma-separated floating-point numbers that are in units of dBm.
If there is no reference measurement data, “NO DATA” is returned.

Target SWEPT application

:APPLication:TLS:SWEPt:REFMeasure:STATe

Function Starts or queries the reference measurement.

Syntax
```
:APPLication:TLS:SWEPt:REFMeasure:
STATe<wsp>S<value1>D<value2>,STARt
:APPLication:TLS:SWEPt:REFMeasure:
STATe?<wsp>S<value1>D<value2>
```

Example
```
:APPL:TLS:SWEP:REFM:STAT S1D1,STAR
:APPL:TLS:SWEP:REFM:STAT?S1D
-> COMPLETE<END>
```

Description
- Settings
  Set the following parameters:
  S<value1>D<value2>:
  The module that will query the state of the reference measurement.
  <value1> = 1 to 9 (in single steps)
  The slot number (module number).
  1 to 3 if you are using an AQ2211.
  <value2> = 1 or 2 (in a single step)
  The device number.
- Queries
  The command returns the state of the reference measurement for the module specified by the parameters. The returned value is a character string.
  COMPLETE: The reference measurement has completed (reference data is available).
  PROGRESS: The reference measurement is ongoing.
  SETUP: Module selection or parameter setup is ongoing.
  NONE: There is no reference data.

Target SWEPT application

:APPLication:TLS:SWEPt:STOP

Function Stops the Swept feature.

Syntax
```
:APPLication:TLS:SWEPt:STOP
```

Example
```
:APPL:TLS:SWEP:STOP
```

Description If you use this command, the Swept feature stops running.

Target SWEPT application

Commands That Are Valid or Invalid in Application Features

Stability and Logging Measurements

Invalid under All Conditions

TRIGger Group	
:TRIGger[m][:CHANnel][d]]:INPut/?	Sets or queries the input trigger mode.
:TRIGger[m][:CHANnel][d]]:OUTPut/?	Sets or queries the output trigger mode.
:TRIGger:CONFig	Sets system triggers.

Other Application Feature Commands

Invalid for the Selected Sensor Module

SENSe Group	
:SENSe[m][:CHANnel[d]]:POWer:ATIMe/?	Sets or queries the averaging time.
:SENSe[m][:CHANnel[d]]:POWer:RANGe/?	Sets or queries the range.
:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO/?	Sets or queries the mode used to switch ranges.
:SENSe[m][:CHANnel[d]]:POWer:RANGe:STATe?	Sets or queries the state of the input light within the range.
:SENSe[m][:CHANnel[d]]:POWer:REFerence/?	Sets or queries the measured relative value.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:DISPlay	Sets the currently displayed measured value to the reference value.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe/?	Sets or queries the relative measurement mode.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio/?	Sets or queries the relative measurement mode parameters.
:SENSe[m][:CHANnel[d]]:POWer:UNIT/?	Sets or queries the unit (dBm or W).
:SENSe[m][:CHANnel[d]]:POWer:WAVelength/?	Sets or queries the measurement wavelength.
:SENSe[m][:CHANnel[d]]:AM:STATe/?	Sets or queries the optical signal modulation format.
:SENSe[m][:CHANnel[d]]:AM:FREQuency/?	Sets or queries the CHOP frequency.
:SENSe[m][:CHANnel[d]]:FUNCtion:PARameter:MINMax/?	Sets or queries the Min/Max measurement mode and the number of data points.
:SENSe[m][:CHANnel[d]]:FUNCtion:STATe/?	Sets or queries the start or stop of the Min/Max measurement.

Valid during Stability and Logging Measurements

APPLication Group	
:APPLication:LOGGing:MEASure:STATe/?	Queries the measurement start and stop settings and the operational state.
:APPLication:STABility:MEASure:STATe/?	Queries the measurement start and stop settings and the operational state.

SYSTem Group	
:SYSTem:ERRor?	Queries the error queue.
:SYSTem:PRESet	Sets the parameters of the frame controller and all the installed modules to their default configurations.

Swept Measurement

Valid While the Swept Feature Is Running

SYSTem Group	
:SYSTem:ERRor?	Queries the error queue.
:SYSTem:PRESet	Sets the parameters of the frame controller and all the installed modules to their default configurations.

Note

The instrument will generate an “Execution Error” if it receives an invalid command.

5.4 BEEP Group

:BEEP:VOLume

Function Sets or queries the beep volume.

Syntax
```
:BEEP:VOLume<wsp><value>
:BEEP:VOLume?
```

Example
```
:BEEP:VOL 0
:BEEP:VOL? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 9 (in single steps)
  0: Mute
  1 (low) to 9 (high)
- Queries
  The command returns the beep volume as a signed integer.
  +0 to +9

Target Frame controller

5.5 DISPlay Group

:DISPlay:BACKlight

Function Sets or queries the backlight setting.

Syntax
```
:DISPlay:BACKlight<wsp><value>
:DISPlay:BACKlight?
```

Example
```
:DISP3:BACK 8
:DISP3:BACK? -> +8<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1 to 8 (in single steps)
  1 (dark) to 8 (bright)
- Queries
  The command returns the backlight setting as a signed integer.
  +1 to +8

Target Frame controller

:DISPlay[m]:NAME:AIN01

Function Sets or queries the name of the AIN01 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN01<wsp><"string">
:DISPlay[m]:NAME:AIN01?
```

Example
```
:DISP3:NAME:AIN01 "ABC_01"
:DISP3:NAME:AIN01? -> "ABC_01"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:AIN02

Function Sets or queries the name of the AIN02 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN02<wsp><"string">
:DISPlay[m]:NAME:AIN02?
```

Example
```
:DISP3:NAME:AIN02 "ABC_02"
:DISP3:NAME:AIN02? -> "ABC_02"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:AIN03

Function Sets or queries the name of the AIN03 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN03<wsp><"string">
:DISPlay[m]:NAME:AIN03?
```

Example
```
:DISP3:NAME:AIN03 "ABC_03"
:DISP3:NAME:AIN03? -> "ABC_03"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:AIN04

Function Sets or queries the name of the AIN04 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN04<wsp><"string">
:DISPlay[m]:NAME:AIN04?
```

Example
```
:DISP3:NAME:AIN04 "ABC_04"
:DISP3:NAME:AIN04? -> "ABC_04"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:AIN05

Function Sets or queries the name of the AIN05 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN05<wsp><"string">
:DISPlay[m]:NAME:AIN05?
```

Example
```
:DISP3:NAME:AIN05 "ABC_05"
:DISP3:NAME:AIN05? -> "ABC_05"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:AIN06

Function Sets or queries the name of the AIN06 status signal on the transceiver I/F module.

Syntax
```
:DISPlay[m]:NAME:AIN06<wsp><"string">
:DISPlay[m]:NAME:AIN06?
```

Example
```
:DISP3:NAME:AIN06 "ABC_06"
:DISP3:NAME:AIN06? -> "ABC_06"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL01

Function Sets or queries the name of the CTRL01 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL01<wsp>
<"string">
:DISPlay[m]:NAME:CTRL01?
```

Example
```
:DISP3:NAME:CTRL01 "ABC_01"
:DISP3:NAME:CTRL01? -> "ABC_01"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL02

Function Sets or queries the name of the CTRL02 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL02<wsp>
<"string">
:DISPlay[m]:NAME:CTRL02?
```

Example
```
:DISP3:NAME:CTRL02 "ABC_02"
:DISP3:NAME:CTRL02? -> "ABC_02"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL03

Function Sets or queries the name of the CTRL03 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL03<wsp>
<"string">
:DISPlay[m]:NAME:CTRL03?
```

Example
```
:DISP3:NAME:CTRL03 "ABC_03"
:DISP3:NAME:CTRL03? -> "ABC_03"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL04

Function Sets or queries the name of the CTRL04 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL04<wsp>
<"string">
:DISPlay[m]:NAME:CTRL04?
```

Example
```
:DISP3:NAME:CTRL04 "ABC_04"
:DISP3:NAME:CTRL04? -> "ABC_04"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL05

Function Sets or queries the name of the CTRL05 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL05<wsp>
<"string">
:DISPlay[m]:NAME:CTRL05?
```

Example
```
:DISP3:NAME:CTRL05 "ABC_05"
:DISP3:NAME:CTRL05? -> "ABC_05"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL06

Function Sets or queries the name of the CTRL06 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL06<wsp>
<"string">
:DISPlay[m]:NAME:CTRL06?
```

Example
```
:DISP3:NAME:CTRL06 "ABC_06"
:DISP3:NAME:CTRL06? -> "ABC_06"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL07

Function Sets or queries the name of the CTRL07 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL07<wsp>
<"string">
:DISPlay[m]:NAME:CTRL07?
```

Example
```
:DISP3:NAME:CTRL07 "ABC_07"
:DISP3:NAME:CTRL07? -> "ABC_07"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL08

Function Sets or queries the name of the CTRL08 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL08<wsp>
<"string">
:DISPlay[m]:NAME:CTRL08?
```

Example
```
:DISP3:NAME:CTRL08 "ABC_08"
:DISP3:NAME:CTRL08? -> "ABC_08"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL09

Function Sets or queries the name of the CTRL09 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL09<wsp>
<"string">
:DISPlay[m]:NAME:CTRL09?
```

Example
```
:DISP3:NAME:CTRL09 "ABC_09"
:DISP3:NAME:CTRL09? -> "ABC_09"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL10

Function Sets or queries the name of the CTRL10 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL10<wsp>
<"string">
:DISPlay[m]:NAME:CTRL10?
```

Example
```
:DISP3:NAME:CTRL10 "ABC_10"
:DISP3:NAME:CTRL10? -> "ABC_10"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL11

Function Sets or queries the name of the CTRL11 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL11<wsp>
<"string">
:DISPlay[m]:NAME:CTRL11?
```

Example
```
:DISP3:NAME:CTRL11 "ABC_11"
:DISP3:NAME:CTRL11? -> "ABC_11"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL12

Function Sets or queries the name of the CTRL12 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL12<wsp>
<"string">
:DISPlay[m]:NAME:CTRL12?
```

Example
```
:DISP3:NAME:CTRL12 "ABC_12"
:DISP3:NAME:CTRL12? -> "ABC_12"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL13

Function Sets or queries the name of the CTRL13 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL13<wsp>
<"string">
:DISPlay[m]:NAME:CTRL13?
```

Example
```
:DISP3:NAME:CTRL13 "ABC_13"
:DISP3:NAME:CTRL13? -> "ABC_13"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL14

Function Sets or queries the name of the CTRL14 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL14<wsp>
<"string">
:DISPlay[m]:NAME:CTRL14?
```

Example
```
:DISP3:NAME:CTRL14 "ABC_14"
:DISP3:NAME:CTRL14? -> "ABC_14"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL15

Function Sets or queries the name of the CTRL15 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL15<wsp>
<"string">
:DISPlay[m]:NAME:CTRL15?
```

Example
```
:DISP3:NAME:CTRL15 "ABC_15"
:DISP3:NAME:CTRL15? -> "ABC_15"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL16

Function Sets or queries the name of the CTRL16 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL16<wsp>
<"string">
:DISPlay[m]:NAME:CTRL16?
```

Example
```
:DISP3:NAME:CTRL16 "ABC_16"
:DISP3:NAME:CTRL16? -> "ABC_16"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:CTRL17

Function Sets or queries the name of the CTRL17 transceiver I/F module control signal.

Syntax
```
:DISPlay[m]:NAME:CTRL17<wsp>
<"string">
:DISPlay[m]:NAME:CTRL17?
```

Example
```
:DISP3:NAME:CTRL17 "ABC_17"
:DISP3:NAME:CTRL17? -> "ABC_17"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = 0-9|A-Z|_|.|/|(|)|space
  Specify the signal name using up to 12 alphanumeric characters.
  Enclose the character string in double quotation marks (").
- Queries
  The command returns the signal name as a string of up to 12 alphanumeric characters that is enclosed in double quotation marks.

Target Transceiver I/F modules

:DISPlay[m]:NAME:LOAD[:ALL]

Function Sets the transceiver I/F module signal names according to the specified value.

Syntax `:DISPlay[m]:NAME:LOAD[:ALL]<wsp>DEFault|XENPak|XFP|SFP`

Example `:DISP3:NAME:LOAD DEF`

Description The CTRL and AIN signal names are all set to the names for the specified transceiver.
DEFault: The default signal names
XENPak: The signal names for a XENPAK transceiver
XFP: The signal names for an XFP transceiver
SFP: The signal names for an SFP+ transceiver
For a table of the CTRL signal names for each option, see the description for `:DISPlay[m]:NAME:LOAD:CTRL`.
For a table of the AIN signal names for each option, see the description for `:DISPlay[m]:NAME:LOAD:AIN`.

Target Transceiver I/F modules

:DISPlay[m]:NAME:LOAD:AIN

Function Sets the transceiver I/F module AIN signal names according to the specified value.

Syntax `:DISPlay[m]:NAME:LOAD:AIN<wsp>DEFault|XENPak|XFP|SFP`

Example `:DISP3:NAME:LOAD:AIN DEF`

Description The AIN signal names are set to the names for the specified transceiver.
DEFault: The default signal names
XENPak: The signal names for a XENPAK transceiver
XFP: The signal names for an XFP transceiver
SFP: The signal names for an SFP+ transceiver
The names that correspond to each transceiver type are listed below.

Signal	DEFault	XENPak	XFP	SFP
AIN01	AIN01	LASI	MOD_NR	TX_FAULT
AIN02	AIN02	AIN02	RX_LOS	RX_LOS
AIN03	AIN03	AIN03	B_INTERRUPT	AIN03
AIN04	AIN04	MOD_DET	AIN04	AIN04
AIN05	AIN05	AIN05	MOD_ABS	AIN05
AIN06	AIN06	AIN06	AIN06	MOD_ABS

Target Transceiver I/F modules

:DISPlay[m]:NAME:LOAD:CTRL

Function Sets the transceiver I/F module CTRL signal names according to the specified value.

Syntax `:DISPlay[m]:NAME:LOAD:CTRL<wsp>DEFault|XENPak|XFP|SFP`

Example `:DISP3:NAME:LOAD:CTRL DEF`

Description The CTRL signal names are set to the names for the specified transceiver.
DEFault: The default signal names
XENPak: The signal names for a XENPAK transceiver
XFP: The signal names for an XFP transceiver
SFP: The signal names for an SFP+ transceiver
The names that correspond to each transceiver type are listed below.

Signal	DEFault	XENPak	XFP	SFP
Ctrl01	CTRL01 (1.2V)	TX ON/OFF	CTRL01 (1.2V)	CTRL01 (1.2V)
Ctrl02	CTRL02 (1.2V)	RESET	CTRL02 (1.2V)	CTRL02 (1.2V)
Ctrl03	CTRL03 (1.2V)	PRTAD4	CTRL03 (1.2V)	CTRL03 (1.2V)
Ctrl04	CTRL04 (1.2V)	PRTAD3	CTRL04 (1.2V)	CTRL04 (1.2V)
Ctrl05	CTRL05 (1.2V)	PRTAD2	CTRL05 (1.2V)	CTRL05 (1.2V)
Ctrl06	CTRL06 (1.2V)	PRTAD1	CTRL06 (1.2V)	CTRL06 (1.2V)
Ctrl07	CTRL07 (1.2V)	PRTAD0	CTRL07 (1.2V)	CTRL07 (1.2V)
Ctrl08	CTRL08 (3.3V)	CTRL08(3.3V)	TX_DIS	TX_ DISABLE
Ctrl09	CTRL09 (3.3V)	CTRL09(3.3V)	P_DOWN /RST	CTRL09 (3.3V)
Ctrl10	CTRL10 (3.3V)	CTRL10(3.3V)	MOD_ DESEL	RS0
Ctrl11	CTRL11 (3.3V)	CTRL11(3.3V)	CTRL11 (3.3V)	RS1
Ctrl12	CTRL12 (3.3V)	CTRL12(3.3V)	CTRL12 (3.3V)	CTRL12 (3.3V)
Ctrl13	CTRL13 (3.3V)	CTRL13(3.3V)	CTRL13 (3.3V)	CTRL13 (3.3V)
Ctrl14	CTRL14 (3.3V)	CTRL14(3.3V)	CTRL14 (3.3V)	CTRL14 (3.3V)
Ctrl15	CTRL15 (3.3V)	CTRL15(3.3V)	CTRL15 (3.3V)	CTRL15 (3.3V)
Ctrl16	CTRL16 (3.3V)	CTRL16(3.3V)	CTRL16 (3.3V)	CTRL16 (3.3V)
Ctrl17	CTRL17 (3.3V)	CTRL17(3.3V)	CTRL17 (3.3V)	CTRL17 (3.3V)

Target Transceiver I/F modules

:DISPlay[m]:NAME:SAVE

Function Writes the transceiver I/F module AIN and CTRL signal names to the transceiver I/F module flash ROM.

Syntax `:DISPlay[m]:NAME:SAVE`

Example `:DISP3:NAME:SAVE`

Target Transceiver I/F modules

5.6 FETCh Group

:FETCh[m][:CHANnel[d]]:POWer?

Function Queries the currently displayed measured value. The measured value includes the power offset.

Syntax `:FETCh[m][:CHANnel[d]]:POWer?[<wsp>MAX|MIN]`

Example `:FETC1:POW? -> +1.23005500E-000<END>`

Description
- The command returns the measured value that is specified by the parameters. The returned value is a floating-point number.
  In absolute value mode, the unit is dBm or W.
  In relative value mode, the unit is dB, or there is no unit.
  NONE: The current measured value
  MAX: The maximum value
  MIN: The minimum value
- The measured value includes the power offset.
  <Absolute Value Mode>
  Measured value (dBm) = the actual measured value (dBm) + power offset (dB)
  The measured values in relative value mode are also calculated using the measured values in absolute value mode.
  <Relative Value Mode>
  Measured value (dB) = the measured value from absolute value mode (dBm) – the reference value (dBm)

Target All sensor modules and the ATTN modules with a built-in monitor power meter

5.7 INITiate Group

:INITiate[m][:CHANnel[d]]

Function Performs a single measurement.

Syntax `:INITiate[m][:CHANnel[d]]`

Example `:INIT`

Description When the instrument receives this command, it performs a measurement for the time specified by the averaging time and then stops.

Target All sensor modules

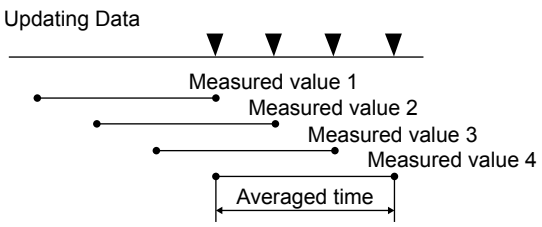
:INITiate[m][:CHANnel[d]]:CONTinuous

Function Executes or queries continuous measurements or single measurements.

Syntax `:INITiate[m][:CHANnel[d]]:CONTinuous <wsp>ON|OFF|1|0`
`:INITiate[m] [:CHANnel[d]]:CONTinuous?`

Example `:INIT1:CONT 0`
`:INIT1:CONT? -> 0<END>`

Description
- Settings
  Set the following parameters:
  1|ON: Continuous measurement
  0|OFF: Single measurement
- Queries
  The command returns the measurement state as an unsigned integer.
  0: Single measurement
  1: Continuous measurement
- For continuous measurements, the value that is measured over the averaging time is updated at a fixed interval.
  <Continuous Measurements>



Target All sensor modules

:INITiate[m]:CONTinuous

Function Executes or queries continuous measurements through the trigger system.

Syntax `:INITiate[m]:CONTinuous<wsp>ON|OFF|1|0`
`:INITiate[m]:CONTinuous?`

Example `:INIT2:CONT 0`
`:INIT2:CONT? -> ON<END>`

Description
- Settings
  Set the following parameters:
  1|ON: Change to the wait-for-trigger state.
  0|OFF: The idle state (initiated state).
  If the instrument is in the wait-for-trigger state, you can start measurements by sending the `:TRIG:IMM` command.
- Queries
  The command returns the state of the measurement as a character string.
  ON: The instrument is switching to the wait-for- trigger state.
  OFF: The instrument is in the idle state (initiated state).

Target BERT modules (ED)

5.8 INPut Group

:INPut[m][:CHANnel[d]]:ATTenuation

Function Sets or queries the optical attenuation.

Syntax
```
:INPut[m][:CHANnel[d]]:ATTenuation
<wsp><value>[DB]|MIN|MAX
:INPut[m][:CHANnel[d]]:ATTenuation?
[<wsp>MIN|MAX]
```

Example
```
:INP1:ATT 30.02
:INP1:ATT? -> +1.00000000E+001<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: The optical attenuation value
  0.001 dB steps (other than AQ2200-342)
  0.01 dB steps (AQ2200-342)
  (0 dB + the optical attenuation offset value (dB)) to (the maximum attenuation + the optical attenuation offset value (dB))
  The maximum attenuation:
  45dB (MMF)
  60dB (SMF)
  40dB (AQ2200-342)
  MAX: The maximum settable attenuation
  The maximum attenuation + the optical attenuation offset value (dB)
  MIN: The minimum settable attenuation
  0 dB + the optical attenuation offset value (dB)
- If this command is executed when the AQ2200-342's APC is enabled, APC will be disabled.
- Queries
  The command returns the optical attenuation that you specify with the parameters. The returned value is a floating-point number in units of dB.
  NONE: The optical attenuation that is currently set
  MAX: The maximum settable attenuation
  MIN: The minimum settable attenuation

Target All ATTN modules

:INPut[m][:CHANnel[d]]:ATTenuation:AONCe

Function Sets the attenuation values of channels 1 and 2 simultaneously.

Syntax
```
:INPut[m][:CHANnel[d]]:ATTenuation:
AONCe<wsp><value>[DB]|MIN|MAX,
<value>[DB]|MIN|MAX
```

Example
```
INP1:ATT:AONC 30,20
```

Description
- This command is an overlap command.
- Sets the attenuation values of channels 1 and 2 simultaneously on the DUAL ATTN module.
  Set the following parameters:
  <value>: Attenuation value (in 0.01 dB steps)
  MIN: Minimum attenuation + attenuation offset
  MAX: Maximum attenuation + attenuation offset
- If this command is executed when APC is enabled, APC will be disabled.
- Available in firmware versions 3.01 and later

:INPut[m][:CHANnel[d]]:ATTenuation:SPEed

Function Sets or queries the attenuation change speed.

Syntax
```
:INPut[m][:CHANnel[d]]:ATTenuation:
SPEed<wsp><speed>
:INPut[m][:CHANnel[d]]:ATTenuation:
SPEed?
```

Example
```
:INP1:ATT:SPE 40
:INP1:ATT:SPE?
-> +4.00000000E+001<END>
```

Explanation
- Settings
  Set the following parameters:
  <speed>: Attenuation change speed
  Settable range: 4.00 to 80.00
  The unit is dB/s.
- Queries
  The command returns the attenuation change speed as a floating-point number in units of dB/s.
- Available in firmware versions 3.02 and later

Target DUAL ATTN Modules (AQ2200-342)

:INPut[m][:CHANnel[d]]:ATTenuation:SPEed:ENABle

Function Sets or queries whether the attenuation change speed is enabled or disabled.

Syntax
```
:INPut[m][:CHANnel[d]]:ATTenuation:SPEed:ENABle<wsp>0|OFF|1|ON
:INPut[m][:CHANnel[d]]:ATTenuation:SPEed:ENABle?
```

Example
```
:INP1:ATT:SPE:ENAB 1
:INP1:ATT:SPE:ENAB? -> 1<END>
```

Explanation
- Settings
  Set the following parameters:
  0|OFF: Disable the attenuation change speed (change at the maximum speed)
  1|ON: Enable the attenuation change speed.
- Queries
  The command returns whether the attenuation change speed is enabled or disabled as an unsigned integer.
  0: Attenuation change speed is disabled.
  1: Attenuation change speed is enabled.
- Available in firmware versions 3.02 and later

Target DUAL ATTN Modules (AQ2200-342)

:INPut[m][:CHANnel[d]]:OFFSet

Function Sets or queries the optical attenuation offset value.

Syntax
```
:INPut[m][:CHANnel[d]]:OFFSet<wsp><value>[DB]|MIN|MAX
:INPut[m][:CHANnel[d]]:OFFSet?[<wsp>MIN|MAX]
```

Example
```
:INP1:OFFS 0.012
:INP1:OFFS? -> +1.50000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The optical attenuation offset value (in 0.001 dB steps)
  –200 to +200 dB
  MAX: The maximum optical attenuation offset value
  Set the optical attenuation offset value to +200 dB.
  MIN: The minimum optical attenuation offset value
  Set the optical attenuation offset value to –200 dB.
- Queries
  The command returns the offset value that you specify with the parameters. The returned value is a floating-point number in units of dB.
  NONE: The optical attenuation offset value that is currently set
  MAX: The maximum attenuation offset value
  MIN: The minimum attenuation offset value

Target All ATTN modules

:INPut[m][:CHANnel[d]]:OFFSet:DISPlay

Function Sets the current optical attenuation to the attenuation offset value.

Syntax
```
:INPut[m][:CHANnel[d]]:OFFSet:DISPlay
```

Example
```
:INP1:OFFS:DISP
```

Target All ATTN modules

:INPut[m][:CHANnel[d]]:WAVelength

Function Sets or queries the wavelength (all ATTN modules).

Syntax
```
:INPut[m][:CHANnel[d]]:WAVelength<wsp><value>[PM|NM|UM|MM|M]|MIN|MAX
:INPut[m][:CHANnel[d]]:WAVelength?[<wsp>MIN|MAX]
```

Example
```
:INP1:WAV 1550NM
:INP1:WAV? -> +1.55000000E-006<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: The wavelength
  0.1 nm steps (other than AQ2200-342)
  1 nm steps (AQ2200-342)
  Minimum settable wavelength to maximum settable wavelength
  The unit can be pm, nm, µm, mm, or m.
  The unit is “m” (meters) if it is omitted.
  MAX: The maximum settable wavelength
  MIN: The minimum settable wavelength
  If the ATTN module supports SMF:
  Other than AQ2200-342
  Maximum settable wavelength: 1700.0 nm
  Minimum settable wavelength: 1200.0 nm
  AQ2200-342
  Maximum settable wavelength: 1640 nm
  Minimum settable wavelength: 1260 nm
  If the ATTN module supports MMF:
  Maximum settable wavelength: 1370.0 nm
  Minimum settable wavelength: 800.0 nm
- Queries
  The command returns the wavelength that you specify with the parameters. The returned value is a floating-point number in units of m.
  NONE: The wavelength that is currently set
  MAX: The maximum settable wavelength
  MIN: The minimum settable wavelength

Target All ATTN modules

:INPut[m][:CHANnel[d]]:WAVelength

Function Sets or queries the optical input signal wavelength band (10 Gbit/s optical receivers).

Syntax
```
:INPut[m][:CHANnel[d]]:WAVelength
<wsp>1500NM|1300NM
:INPut[m][:CHANnel[d]]:WAVelength?
```

Example
```
:INP1:WAV 1500NM
:INP1:WAV? -> +1.50000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  1500NM: 1500 nm
  1300NM: 1300 nm
  Default: 1500NM

Target 10 Gbit/s optical receivers

:INPut[m]:DATA:SOURce

Function Sets or queries the data input source.

Syntax
```
:INPut[m]:DATA:SOURce<wsp>CDR|NOR
:INPut[m]:DATA:SOURce?
```

Example
```
:INP2:DATA:SOUR CDR
:INP2:DATA:SOUR? -> CDR<END>
```

Description
- Settings
  Set the following parameters:
  CDR: CDR (DATA IN 1)
  NOR: Normal (DATA IN 2)
  Default: CDR
- Queries
  The command returns the data input source as a character string.
  CDR|NOR

Target BERT modules (ED)

:INPut[m]:DATA:THReshold

Function Sets or queries the data determination threshold.

Syntax
```
:INPut[m]:DATA:THReshold<wsp><value>
:INPut[m]:DATA:THReshold?
```

Example
```
:INP2:DATA:THR 100
:INP2:DATA:THR? -> 100<END>
```

Description
- Settings
  Set the following parameters:
  If the data source is CDR:
  <value> = –350 to 350 (in 1 mV steps)
  If the data source is Normal:
  <value> = –300 to 300 (in 1 mV steps)
  Default: 0
- Queries
  The command returns the threshold value as an integer.
  If the data source is CDR:
  –350 to 350 (in 1 mV steps)
  If the data source is Normal:
  –300 to 300 (in 1 mV steps)

Target BERT modules (ED)

:INPut[m]:EFREquency:RATio

Function Sets or queries the external input clock's division ratio.

Syntax
```
:INPut[m]:EFREquency:RATio<wsp>16|64
:INPut[m]:EFREquency:RATio?
```

Example
```
:INP1:EFRE:RAT 16
:INP1:EFRE:RAT? -> 16<END>
```

Description
- Settings
  Set the following parameters:
  16: 1/16 division ratio
  64: 1/64 division ratio
  Default: 16
- Queries
  The command returns the division ratio as an unsigned integer.
  16: 1/16 division ratio
  64: 1/64 division ratio

Target BERT modules (PPG)

:INPut[m]:POWer?

Function Queries the average optical input power.

Syntax
```
:INPut[m]:POWer?
```

Example
```
:INP1:POW? -> 2.0<END>
```

Description The command returns the average optical input power as a number.

Target 10 Gbit/s optical receivers

:INPut[m]:STATus:THReshold:AIN01

Function Sets or queries the threshold of the AIN01 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN01
<value>
:INPut[m]:STATus:THReshold:AIN01?
```

Example
```
:INP3:STAT:THR:AIN01 0.10
:INP3:STAT:THR:AIN01?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN01 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

:INPut[m]:STATus:THReshold:AIN02

Function Sets or queries the threshold of the AIN02 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN02
<value>
:INPut[m]:STATus:THReshold:AIN02?
```

Example
```
:INP3:STAT:THR:AIN02 0.10
:INP3:STAT:THR:AIN02?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN02 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

:INPut[m]:STATus:THReshold:AIN03

Function Sets or queries the threshold of the AIN03 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN03
<value>
:INPut[m]:STATus:THReshold:AIN03?
```

Example
```
:INP3:STAT:THR:AIN03 0.10
:INP3:STAT:THR:AIN03?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN03 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

:INPut[m]:STATus:THReshold:AIN04

Function Sets or queries the threshold of the AIN04 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN04
<value>
:INPut[m]:STATus:THReshold:AIN04?
```

Example
```
:INP3:STAT:THR:AIN04 0.10
:INP3:STAT:THR:AIN04?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN04 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

:INPut[m]:STATus:THReshold:AIN05

Function Sets or queries the threshold of the AIN05 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN05
<value>
:INPut[m]:STATus:THReshold:AIN05?
```

Example
```
:INP3:STAT:THR:AIN05 0.10
:INP3:STAT:THR:AIN05?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN05 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

:INPut[m]:STATus:THReshold:AIN06

Function Sets or queries the threshold of the AIN06 status signal on the transceiver I/F module.

Syntax
```
:INPut[m]:STATus:THReshold:AIN06
<value>
:INPut[m]:STATus:THReshold:AIN06?
```

Example
```
:INP3:STAT:THR:AIN06 0.10
:INP3:STAT:THR:AIN06?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: V
- Queries
  The command returns the threshold of the AIN06 status signal as a floating-point number in units of V.

Target Transceiver I/F modules

5.9 INSTrument Group

:INSTrument[m]:COUPle

Function Sets or queries the couple mode.

Syntax
```
:INSTrument[m]:COUPle<wsp>OFF|PPG|ED
:INSTrument[m]:COUPle?
```

Example
```
:INST2:COUP PPG
:INST2:COUP? -> OFF<END>
```

Description
- Settings
  Set the following parameters:
  OFF: Disable couple mode
  PPG: Apply the PPG DATA settings to the ED, and set the BERT module to couple mode
  ED: Apply the ED DATA settings to the PPG, and set the BERT module to couple mode
  Default: PPG
- Queries
  The command returns the state of the mode as a character string.
  OFF: Couple mode is disabled.
  ON: Couple mode is valid.

Target BERT modules (PPG and ED)

5.10 MMEMory Group

:MMEMory[m]:LOAD

Function Loads the output data's long program pattern file or overhead pattern file.

Syntax `:MMEMory[m]:LOAD<wsp>PROGRAM64M|SOH/TOH,<"string">`

Example `:MMEM1:LOAD PROG64M,"/USB0-0/PN15_1block.dat"`

Description
- Set the following parameters:
  PROG64M|SOH/TOH: The file identifier
  <"string"> = 0-9|a-z|A-Z|_|.
  The file name. The maximum length of the file name, including the extension, is 25 characters.
  The maximum length of the file name, including the absolute path, is 155 characters.
  Enclose the character string in double quotation marks (").
  The file name must include the absolute path. Enter "/USB0-0/" at the start of the path, and then specify the file name.
  The example given above loads the "/USB0-0/PN15_1block.dat" long program pattern file.
- If the file identifier is PROG64M, the following limitations exist:
  - If you transmit this command while an application is running, a "Sequence Conflict" error will occur.
  - If a remote command (other than the one command shown below) is received while this command is being processed, an error will occur.
    `:SLOT[m]:OPC?`

Target BERT modules (PPG and ED) with the /M option
-> The file identifier: PROG64M
BERT modules (PPG and ED) with the /P1 option
-> The file identifier: SOH/TOH

5.11 OUTPut Group

:OUTPut[m]:AMPLitude

Function Sets or queries the output amplitude (0.6 Vp-p or 1.1 Vp-p) of the SG module RF OUT signal.

Syntax
```
:OUTPut[m]:AMPLitude<wsp>V0_6|V1_1
:OUTPut[m]:AMPLitude?
```

Example
```
:OUTP1:AMPL V0_6
:OUTP1:AMPL? -> V0_6<END>
```

Description
- Settings
  Set the following parameters:
  V0_6: Set the amplitude to 0.6 Vp-p
  V1_1: Set the amplitude to 1.1 Vp-p
- Queries
  The command returns the RF OUT amplitude as a character string.

V0_6|V1_1

Target SG modules

:OUTPut[m][:CHANnel[d]][:STATe]

Function Sets or queries the output's on/off status.

Syntax
```
:OUTPut[m][:CHANnel[d]][:STATe]<wsp>
OFF|ON|0|1
:OUTPut[m][:CHANnel[d]][:STATe]?
```

Example
```
:OUTP1 0
:OUTP? -> 0<END>
```

Description
- On the Grid TLS module, this command operates as an overlap command.
- The output signal for each module is as follows.
  All ATTN modules, DFB-LD modules, LS modules (AQ2200-112), all FP-LD modules, TLS modules, Grid TLS modules, and 10 Gbit/s optical modulators:
  -> Optical signal
  XFP interface modules:
  -> XFP transceiver communication
  BERT modules:
  -> Data and clock signals
  SG modules:
  -> RF OUT and 10 MHz REF OUT signals
  Transceiver I/F modules:
  -> Power supply and control signals
- Settings
  Set the following parameters:
  0|OFF: Turn the output off
  1|ON: Turn the output on
- Queries
  The command returns the output setting as an unsigned integer.
  0: The output is off.
  1: The output is on.
- Repeatedly turning the ATTN module's output on and off may damage the instrument. Wait at least 4 seconds between turning the output on or off.

Target All ATTN modules, XFP interface modules, BERT modules, DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, TLS modules, Grid TLS modules (available in firmware versions 3.00 and later), 10 Gbit/s optical receivers, SG Modules, and Transceiver I/F Modules

:OUTPut[m][:CHANnel[d]][:STATe]:AONCe

Function Turns on or off the optical output of channels 1 and 2 simultaneously.

Syntax
```
:OUTPut[m][:CHANnel[d]][:STATe]:
AONCe<wsp>OFF|ON|0|1,OFF|ON|0|1
```

Example
```
:OUTP1:AONC 0
```

Description
- This command is an overlap command.
- Set the following parameters:
  0|OFF (first parameter):
  Turn off the optical output of channel 1
  0|OFF (second parameter):
  Turn off the optical output of channel 2
  1|ON (first parameter):
  Turn on the optical output of channel 1
  1|ON (second parameter):
  Turn on the optical output of channel 2

Target Grid TLS Modules (AQ2200-132)
Available in firmware versions 3.00 and later
DUAL ATTN Modules (AQ2200-342)
Available in firmware versions 3.01 and later

:OUTPut[m][:CHANnel[d]][:STATe]:APOWeron

Function Sets or queries the startup optical output's on/off status.

Syntax
```
:OUTPut[m][:CHANnel[d]][:STATe]:
APOWeron<wsp>OFF|ON|0|1
:OUTPut[m][:CHANnel[d]][:STATe]:
APOWeron?
```

Example
```
:OUTP1:APOW 1
:OUTP1:APOW? -> 1<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  0|OFF: Turn the startup optical output off
  1|ON: Turn the startup optical output on
- Queries
  The command returns the startup optical output setting as an unsigned integer.
  0: The startup optical output is off.
  1: The startup optical output is on.

Target All ATTN modules

:OUTPut[m][:CHANnel[d]]:ATIMe

Function Sets or queries the averaging time.

Syntax
```
:OUTPut[m][:CHANnel[d]]:ATIMe<wsp>
<value>[MS|S]
:OUTPut[m][:CHANnel[d]]:ATIMe?
```

Example
```
:OUTP1:ATIM 100MS
:OUTP1:ATIM? -> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The averaging time
  Settable range: 10 ms to 10 s
  The unit is ms or s.
  The unit is "s" (seconds) if it is omitted.
- Queries
  The command returns the averaging time as a floating-point number in units of s.

Target The ATTN module with a built-in monitor power meter

:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO

Function Executes or queries the zero-set procedure.

Syntax
```
:OUTPut[m][:CHANnel[d]]:CORRection:
COLLect:ZERO[<wsp>OFF|ON|0|1]
:OUTPut[m][:CHANnel[d]]:CORRection:
COLLect:ZERO?
```

Example
```
:OUTP1:CORR:COLL:ZERO
:OUTP1:CORR:COLL:ZERO? -> +0<END>
```

Description
- This command is an overlap command.
- Execution
  Set the following parameters:
  NONE: Execute the zero-set procedure
  0|OFF: Pause the zero-set procedure
  1|ON: Execute the zero-set procedure
- Queries
  The command returns the state of the zero-set procedure as a signed integer.
  +0: The zero-set procedure completed without any problems (or it has not been executed).
  +1: The zero-set procedure is ongoing.
  +2: A zero-set error has occurred.

Target The ATTN module with a built-in monitor power meter

:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL

Function Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.

Syntax `:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL[<wsp>OFF|ON|0|1]`

Example `:OUTP1:CORR:COLL:ZERO:ALL`

Description
- This command is an overlap command.
- Set the following parameters:
  NONE: Execute the zero-set procedure
  0|OFF: Pause the zero-set procedure
  1|ON: Execute the zero-set procedure

Target The ATTN module with a built-in monitor power meter

:OUTPut[m][:CHANnel[d]]:PAGeselect

Function Sets the XFP transceiver's upper table page.

Syntax `:OUTPut[m][:CHANnel[d]]:PAGeselect <wsp><Register1>,<Register2>`

Example `:OUTP1:PAG #H20F0DE23,#H05`

Description Set the following parameters:
<Register1>: Set the password in 8 hexadecimal characters
<Register2>: Set the page number in 2 hexadecimal characters
Enter "#H" at the start of a string of hexadecimal characters.

Target XFP interface modules

:OUTPut[m][:CHANnel[d]]:POWer

Function Sets or queries the optical output power.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer<wsp><value>|MIN|MAX|DEF`
`:OUTPut[m][:CHANnel[d]]:POWer?<wsp>[MIN|MAX|DEF]`

Example `:OUTP1:POW 3DBM`
`:OUTP1:POW? -> -4.00000000E+001<END>`

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value> = –50.000 to +19.000 (AQ2200-331/332)
  –50.000 to +20.000 (AQ2200-342)
  The optical output power value.
  The unit is dBm or W (pW, nW, µW, or mW).
  The unit is the unit that is currently set if it is omitted.
  The default unit is the unit that is set in the UNIT settings.
  AQ2200-331/332
  MIN: The optical output power value from the time when the maximum attenuation was set
  MAX: The optical output power value from the time when the minimum attenuation was set
  DEF: The optical output power value from the time when the minimum attenuation was set
  AQ2200-342
  MIN: The optical output power value from the time when the optical output power value was set to -50 dBm
  MAX: The optical output power value from the time when the optical output power value was set to +20 dBm
  DEF: The optical output power value from the time when the optical output power value was set to +20 dBm
- Queries
  AQ2200-331/332
  The command returns the optical output power setting that is specified by the parameters. The returned value is a floating-point number.
  NONE: The optical output power that is currently set
  MIN: The optical output power value from the time when the maximum attenuation was set
  MAX: The optical output power value from the time when the minimum attenuation was set
  DEF: The optical output power value from the time when the minimum attenuation was set

Target The ATTN module with a built-in monitor power meter

:OUTPut[m][:CHANnel[d]]:POWer:AONCe

Function Sets the optical output power of channels 1 and 2 simultaneously.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer:AONCe <wsp><value>,<value>`

Example `:OUTP1:POW:AONC 0,-10`

Description
- This command is an overlap command.
- Setting
  <value>: Set the optical output power in dBm or W (pW, nW, uW, mW, W).
- Available in firmware versions 3.01 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:CONTrol

Function Sets or queries the function that attenuates the output power according to the changes in the input light.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer:CONTrol<wsp>OFF|ON|0|1`
`:OUTPut[m][:CHANnel[d]]:POWer:CONTrol?`

Example `:OUTP1:POW:CONT 1`
`:OUTP1:POW:CONT? -> 1<END>`

Description
- This command is an overlap command.
- Setting
  0|OFF: Turn off the function
  1|ON: Turn on the function
- Return value
  0: OFF
  1: ON
- Available in firmware versions 3.01 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:CONTrol:AONCe

Function Sets the function that attenuates the output power according to the changes in the input light of channels 1 and 2 simultaneously.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer:CONTrol:AONCe<wsp>OFF|ON|0|1,OFF|ON|0|1`

Example `:OUTP1:POW:CONT 1,1`

Description
- This command is an overlap command.
- Setting
  0|OFF (first parameter): Turn off the channel 1 setting
  0|OFF (second parameter): Turn off the channel 2 setting
  1|ON (first parameter): Turn on the channel 1 setting
  1|ON (second parameter): Turn on the channel 2 setting
- Available in firmware versions 3.01 and later

Target DUAL ATTN Modules (AQ2200-342)

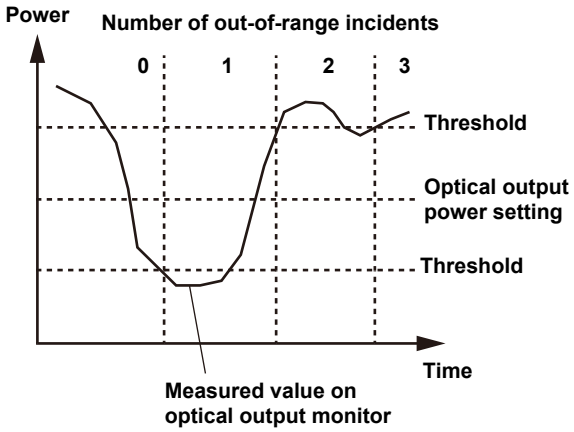
:OUTPut[m][:CHANnel[d]]:POWer:ECOunter?

Function Queries the number of times the measured value goes outside the power setting range of the optical output monitor.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer:ECOunter?`

Example `:OUTP1:POW:ECO? -> 3<END>`

Explanation
- The number of times the measured value goes outside the power setting range
  This number indicates the number of times the measured value of the optical output monitor goes outside the threshold limits for determining the optical output condition.
  Set the thresholds using the `:OUTPut[m][:CHANnel[d]]:POWer:THReshold` command.



- Queries
  The command returns the number of times the measured value goes outside the power setting range as an unsigned integer.
- Available in firmware versions 3.02 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:ECOunter:CLEar

Function Clears the number of times the measured value goes outside the power setting range of the optical output monitor.

Syntax `:OUTPut[m][:CHANnel[d]]:POWer:ECOunter:CLEar`

Example `:OUTP1:POW:ECO:CLE`

Target DUAL ATTN Modules (AQ2200-342)
Available in firmware versions 3.02 and later

:OUTPut[m][:CHANnel[d]]:POWer:MINMax:MODE

Function Sets or queries the maximum and minimum measurement mode of the optical output monitor.

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:MINMax
:MODE<wsp>OFF|CONTinuous
:OUTPut[m][:CHANnel[d]]:POWer:MINMax
:MODE?
```

Example
```
:OUTP1:POW:MINM:MODE CONT
:OUTP1:POW:MINM:MODE? -> CONT<END>
```

Explanation
- Settings
  Set the following parameters:
  Off: Stop the maximum and minimum measurement of the optical output monitor.
  CONT: Start the maximum and minimum measurement of the optical output monitor.
- Queries
  The command returns the maximum and minimum measurement stop or start state of the optical output monitor.
  Off: The maximum and minimum measurement of the optical output monitor is stopped.
  CONT: The maximum and minimum measurement of the optical output monitor is started.
- Available in firmware versions 3.02 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:MINMax:RESet

Function Clears the maximum and minimum measured values of the optical output monitor.

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:MINMax
:RESet
```

Example
```
:OUTP1:POW:MINM:RES
```

Target DUAL ATTN Modules (AQ2200-342)
Available in firmware versions 3.02 and later

:OUTPut[m][:CHANnel[d]]:POWer:OFFSet

Function Sets or queries the power offset value.

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:OFFSet
<wsp><value>[DB]|MIN|MAX|DEF
:OUTPut[m][:CHANnel[d]]:POWer:
OFFSet?[<wsp>MIN|MAX|DEF]
```

Example
```
:OUTP1:POW:OFFS 3DB
:OUTP1:POW:OFFS?
-> +3.00000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –200 to +200
  0.001 dB steps (AQ2200-331/332)
  0.01 dB steps (AQ2200-342)
  The power offset value.
  The unit is dB (it is possible to omit the unit).
  MIN: The maximum power offset value
  MAX: The minimum power offset value
  DEF: The default power offset value (0 dB)
- Queries
  The command returns the power offset value that you specify with the parameters. The returned value is a floating-point number in units of dB.
  The unit is the unit that is currently set.
  NONE: The power offset value that is currently set
  IN: The maximum power offset value
  MAX: The minimum power offset value

Target The ATTN module with a built-in monitor power meter

:OUTPut[m][:CHANnel[d]]:POWer:STATus

Function Queries the optical output status.

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:
STATus?
```

Example
```
:OUTP:POW:STAT? -> 0<END>
```

Description
- Query
  0: PowerSet and the measured power are matched.
  1: PowerSet and the measured power are not matched.
  2: Power is being set.
  3: The output is off.
- Whether the PowerSet and the measured power are matched is determined by using the threshold value of the `:OUT:POW:THR` command.
  PowerSet – threshold ≤ Measured power ≤ PowerSet + threshold value
  If the above relationship hold true, they are determined to be matched.
- Available in firmware versions 3.01 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:THReshold

Function Sets or queries the threshold value for determining the optical output status.

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:
THReshold<wsp><value>[DB]
:OUTPut[m][:CHANnel[d]]:POWer:
THReshold?
```

Example
```
:OUTP:POW:THR 3DB
:OUTP:POW:THR?
-> 3.00000000E+000<END>
```

Description
- Setting
  <value>: Set half the span of the threshold; set in the range of 0.1 to 3.0 dB.
- Query
  Returns half the span of the threshold in unit of dB.
- Available in firmware versions 3.01 and later

Target DUAL ATTN Modules (AQ2200-342)

:OUTPut[m][:CHANnel[d]]:POWer:UNIT

Function Sets or queries the power unit (dBm or W).

Syntax
```
:OUTPut[m][:CHANnel[d]]:POWer:UNIT
<wsp>DBM|Watt|0|1
:OUTPut[m][:CHANnel[d]]:POWer:UNIT?
```

Example
```
:OUTP1:POW:UNIT 1
:OUTP1:POW:UNIT? -> +1<END>
```

Description
- Settings
  Set the following parameters:
  0|DBM: Set the power unit to dBm
  1|Watt: Set the power unit to W
- Queries
  The command returns the power unit setting as a signed integer.
  +0: The power unit is dBm.
  +1: The power unit is W.

Target The ATTN module with a built-in monitor power meter and XFP interface modules

:OUTPut[m][:CHANnel[d]]:VCC5:VOLTage

Function Sets or queries the VCC5 voltage.

Syntax
```
:OUTPut[m][:CHANnel[d]]:VCC5:VOLTage
<wsp><value>V
:OUTPut[m][:CHANnel[d]]:VCC5:
VOLTage?
```

Example
```
:OUTP1:VCC5:VOLT 5.0V
:OUTP1:VCC5:VOLT?
-> +4.99900000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 4.70 to 5.30
  The voltage (the unit is V).
- Queries
  The command returns the VCC5 voltage as a floating-point number in units of V.
  Example: 4.999 V -> +4.99900000E+000

Target XFP interface modules

:OUTPut[m][:CHANnel[d]]:VCC3:VOLTage

Function Sets or queries the VCC3 voltage.

Syntax
```
:OUTPut[m][:CHANnel[d]]:VCC3:VOLTage
<wsp><value>V
:OUTPut[m][:CHANnel[d]]:VCC3:
VOLTage?
```

Example
```
:OUTP1:VCC3:VOLT 3.3V
:OUTP1:VCC3:VOLT?
-> +3.29900000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 3.10 to 3.50
  The voltage (the unit is V).
- Queries
  The command returns the VCC3 voltage as a floating-point number in units of V.
  Example: 3.299 V -> +3.29900000E+000

Target XFP interface modules

:OUTPut[m][:CHANnel[d]]:VCC2:VOLTage

Function Sets or queries the VCC2 voltage.

Syntax
```
:OUTPut[m][:CHANnel[d]]:VCC2:VOLTage
<wsp><value>V
:OUTPut[m][:CHANnel[d]]:VCC2:
VOLTage?
```

Example
```
:OUTP1:VCC2:VOLT 1.8V
:OUTP1:VCC2:VOLT?
-> +1.79900000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 1.70 to 1.90
  The voltage (the unit is V).
- Queries
  The command returns the VCC2 voltage as a floating-point number in units of V.
  Example: 1.799 V -> +1.79900000E+000

Target XFP interface modules

:OUTPut[m][:CHANnel[d]]:VEE5:VOLTage

Function Sets or queries the VEE5 voltage.

Syntax
```
:OUTPut[m][:CHANnel[d]]:VEE5:VOLTage
<wsp><value>V
:OUTPut[m][:CHANnel[d]]:VEE5:
VOLTage?
```

Example
```
:OUTP1:VEE5:VOLT -5.2V
:OUTP1:VEE5:VOLT?
-> -5.19900000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –5.50 to –4.90
  The voltage (the unit is V).
- Queries
  The command returns the VEE5 voltage as a floating-point number in units of V.
  Example: –5.199 V -> –5.19900000E+000

Target XFP interface modules

:OUTPut[m]:CLOCk:OFFSet

Function Sets or queries the clock output offset voltage.

Syntax
```
:OUTPut[m]:CLOCk:OFFSet<wsp><value>
:OUTPut[m]:CLOCk:OFFSet?
```

Example
```
:OUTP1:CLOC:OFFS 1.0
:OUTP1:CLOC:OFFS? -> 1.0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –2.0 to 3.0 (in 0.01 V steps)
  Default: 0.0
- Queries
  The command returns the offset voltage as a number.

Target BERT modules (PPG)

:OUTPut[m]:CTRL01

Function Sets or queries the logic of the CTRL01 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL01<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL01?
```

Example
```
:OUTP1:CTRL01 LOW
:OUTP1:CTRL01? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL01 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL02

Function Sets or queries the logic of the CTRL02 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL02<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL02?
```

Example
```
:OUTP1:CTRL02 LOW
:OUTP1:CTRL02? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL02 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL03

Function Sets or queries the logic of the CTRL03 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL03<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL03?
```

Example
```
:OUTP1:CTRL03 LOW
:OUTP1:CTRL03? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL03 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL04

Function Sets or queries the logic of the CTRL04 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL04<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL04?
```

Example
```
:OUTP1:CTRL04 LOW
:OUTP1:CTRL04? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL04 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL05

Function Sets or queries the logic of the CTRL05 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL05<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL05?
```

Example
```
:OUTP1:CTRL05 LOW
:OUTP1:CTRL05? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL05 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL06

Function Sets or queries the logic of the CTRL06 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL06<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL06?
```

Example
```
:OUTP1:CTRL06 LOW
:OUTP1:CTRL06? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL06 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL07

Function Sets or queries the logic of the CTRL07 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL07<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL07?
```

Example
```
:OUTP1:CTRL07 LOW
:OUTP1:CTRL07? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL07 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL08

Function Sets or queries the logic of the CTRL08 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL08<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL08?
```

Example
```
:OUTP1:CTRL08 LOW
:OUTP1:CTRL08? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL08 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL09

Function Sets or queries the logic of the CTRL09 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL09<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL09?
```

Example
```
:OUTP1:CTRL09 LOW
:OUTP1:CTRL09? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL09 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL10

Function Sets or queries the logic of the CTRL10 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL10<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL10?
```

Example
```
:OUTP1:CTRL10 LOW
:OUTP1:CTRL10? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL10 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL11

Function Sets or queries the logic of the CTRL11 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL11<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL11?
```

Example
```
:OUTP1:CTRL11 LOW
:OUTP1:CTRL11? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL11 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL12

Function Sets or queries the logic of the CTRL12 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL12<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL12?
```

Example
```
:OUTP1:CTRL12 LOW
:OUTP1:CTRL12? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL12 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL13

Function Sets or queries the logic of the CTRL13 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL13<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL13?
```

Example
```
:OUTP1:CTRL13 LOW
:OUTP1:CTRL13? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL13 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL14

Function Sets or queries the logic of the CTRL14 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL14<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL14?
```

Example
```
:OUTP1:CTRL14 LOW
:OUTP1:CTRL14? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL14 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL15

Function Sets or queries the logic of the CTRL15 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL15<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL15?
```

Example
```
:OUTP1:CTRL15 LOW
:OUTP1:CTRL15? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL15 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL16

Function Sets or queries the logic of the CTRL16 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL16<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL16?
```

Example
```
:OUTP1:CTRL16 LOW
:OUTP1:CTRL16? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL16 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CTRL17

Function Sets or queries the logic of the CTRL17 transceiver I/F module control signal.

Syntax
```
:OUTPut[m]:CTRL17<wsp>LOW|HIGH|0|1
:OUTPut[m]:CTRL17?
```

Example
```
:OUTP1:CTRL17 LOW
:OUTP1:CTRL17? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|LOW: Set the logic to LOW.
  1|HIGH: Set the logic to HIGH.
- Queries
  The command returns the logic of the CTRL17 control signal as a signed integer.
  +0: LOW
  +1: HIGH

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS1

Function Sets or queries the current limit of PS1 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS1<wsp>
<value>
:OUTPut[m]:CURRent:LIMit:PS1?
```

Example
```
:OUTP1:CURR:LIM:PS1 0.100
:OUTP1:CURR:LIM:PS1?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 1.80 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS1 as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS2

Function Sets or queries the current limit of PS2 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS2<wsp>
<value>
:OUTPut[m]:CURRent:LIMit:PS2?
```

Example
```
:OUTP1:CURR:LIM:PS2 0.100
:OUTP1:CURR:LIM:PS2?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS2 as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS3

Function Sets or queries the current limit of PS3 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS3<wsp>
<value>
:OUTPut[m]:CURRent:LIMit:PS3?
```

Example
```
:OUTP1:CURR:LIM:PS3 0.100
:OUTP1:CURR:LIM:PS3?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 1.80 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS3 as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS4

Function Sets or queries the current limit of PS4 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS4<wsp>
<value>
:OUTPut[m]:CURRent:LIMit:PS4?
```

Example
```
:OUTP1:CURR:LIM:PS4 0.100
:OUTP1:CURR:LIM:PS4?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 3.00 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS4 as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS5:V3_3

Function Sets or queries the current limit of PS5 (when +3.3 V is selected) on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS5:V3_3
<wsp><value>
:OUTPut[m]:CURRent:LIMit:PS5:V3_3?
```

Example
```
:OUTP1:CURR:LIM:PS5:V3_3 0.100
:OUTP1:CURR:LIM:PS5:V3_3?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 2.00 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS5 (when +3.3 V is selected) as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:CURRent:LIMit:PS5:V5_0

Function Sets or queries the current limit of PS5 (when +5.0 V is selected) on the transceiver I/F module.

Syntax
```
:OUTPut[m]:CURRent:LIMit:PS5:V5_0
<wsp><value>
:OUTPut[m]:CURRent:LIMit:PS5:V5_0?
```

Example
```
:OUTP1:CURR:LIM:PS5:V5_0 0.100
:OUTP1:CURR:LIM:PS5:V5_0?
-> +1.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.100 to 1.00 (in 0.01 steps)
  Unit: A
- Queries
  The command returns the current limit of PS5 (when +5.0 V is selected) as a floating-point number in units of A.

Target Transceiver I/F modules

:OUTPut[m]:DATA:AMPLitude

Function Sets or queries the data output amplitude.

Syntax
```
:OUTPut[m]:DATA:AMPLitude<wsp>
<value>
:OUTPut[m]:DATA:AMPLitude?
```

Example
```
:OUTP1:DATA:AMPL 0.5
:OUTP1:DATA:AMPL? -> 0.5<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.5 to 2.0 (in 0.01 Vp-p steps)
  Default: 0.5
- Queries
  The command returns the data output amplitude as a number.
  0.5 to 2.0 (in 0.01 Vp-p steps)

Target BERT modules (PPG)

:OUTPut[m]:DATA:CROSs

Function Sets or queries the data output cross point.

Syntax
```
:OUTPut[m]:DATA:CROSs<wsp><value>
:OUTPut[m]:DATA:CROSs?
```

Example
```
:OUTP1:DATA:CROS 50
:OUTP1:DATA:CROS? -> 50<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 30 to 70 (in 1% steps)
  Default: 50
- Queries
  The command returns the cross point value as an integer.
  30 to 70 (in 1% steps)

Target BERT modules (PPG)

:OUTPut[m]:DATA:OFFSet

Function Sets or queries the data output offset voltage.

Syntax
```
:OUTPut[m]:DATA:OFFSet<wsp><value>
:OUTPut[m]:DATA:OFFSet?
```

Example
```
:OUTP1:DATA:OFFS 1.0
:OUTP1:DATA:OFFS? -> 1.0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –2.0 to 3.0 (in 0.01 V steps)
  Default: 0.0
- Queries
  The command returns the offset voltage as a number.
  –2.0 to 3.0 (in 0.01 V steps)

Target BERT modules (PPG)

:OUTPut[m]:FREQuency:OFFSet

Function Sets or queries the RF OUT frequency offset.

Syntax
```
:OUTPut[m]:FREQuency:OFFSet<wsp>
<value>
:OUTPut[m]:FREQuency:OFFSet?
```

Example
```
:OUTP1:FREQ:OFFS -500
:OUTP1:FREQ:OFFS? -> -500<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –500 to 500 (in single steps)
  Unit: ppm
- Queries
  The command returns the offset as a signed integer in units of ppm.

Target SG modules

:OUTPut[m]:FREQuency:RATE1

Function Sets the SG module rate to 1/1 and sets or queries the frequency.

Syntax
```
:OUTPut[m]:FREQuency:RATE1<wsp>
<value>[HZ|KHZ|MHZ]
:OUTPut[m]:FREQuency:RATE1?
```

Example
```
:OUTP1:FREQ:RATE1 622.08MHZ
:OUTP1:FREQ:RATE1?
->+6.22080000E+008<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 620.000000 to 720.000000 [MHZ] (in 0.000001[MHz] steps)
  Unit: Hz, KHz, or MHz. When a unit is not specified, the unit is set to Hz.
- Queries
  The command returns the frequency as a floating-point number in units of Hz.

Target SG modules

:OUTPut[m]:FREQuency:RATE4

Function Sets the SG module rate to 1/4 and sets or queries the frequency.

Syntax
```
:OUTPut[m]:FREQuency:RATE4<wsp>
<value>[HZ|KHZ|MHZ]
:OUTPut[m]:FREQuency:RATE4?
```

Example
```
:OUTP1:FREQ:RATE4 155.52MHZ
:OUTP1:FREQ:RATE4?
-> +1.55520000E+008<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 150.000000 to 180.000000 [MHz] (in 0.000001[MHz] steps)
  Unit: Hz, KHz, or MHz. When a unit is not specified, the unit is set to Hz.
- Queries
  The command returns the frequency as a floating-point number in units of Hz.

Target SG modules

:OUTPut[m]:FREQuency:RATE:SELect

Function Sets or queries the output rate of the SG module RF OUT signal.

Syntax
```
:OUTPut[m]:FREQuency:RATE:SELect
<wsp>1|4
:OUTPut[m]:FREQuency:RATE:SELect?
```

Example
```
:OUTP1:FREQ:RATE:SEL 1
:OUTP1:FREQ:RATE:SEL? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  1: Set the rate to 1/1.
  4: Set the rate to 1/4.
- Queries
  The command returns the rate setting as an unsigned integer.
  1|4

Target SG modules

:OUTPut[m]:I2C:CLOCk:FREQuency

Function Sets or queries the transceiver I/F module I2C communication clock frequency.

Syntax
```
:OUTPut[m]:I2C:CLOCk:FREQuency<wsp>
100KHZ|400KHZ
:OUTPut[m]:I2C:CLOCk:FREQuency?
```

Example
```
:OUTP1:I2C:CLOC:FREQ 100KHZ
:OUTP1:I2C:CLOC:FREQ?->100KHZ<END>
```

Description
- Settings
  Set the following parameters:
  100KHZ: Set the frequency to 100 kHz
  400KHZ: Set the frequency to 400 kHz
- Queries
  The command returns the clock frequency as a character string.
  100KHZ|400KHZ

Target Transceiver I/F modules

:OUTPut[m]:I2C:MODE

Function Sets or queries the transceiver I/F module I2C communication mode.

Syntax
```
:OUTPut[m]:I2C:MODE<wsp>COFF|CON|0|1
:OUTPut[m]:I2C:MODE?
```

Example
```
:OUTP1:I2C:MODE 0
:OUTP1:I2C:MODE? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|COFF: Set the mode to CRC-8 OFF
  1|CON: Set the mode to CRC-8 ON
- Queries
  The command returns the I2C communication mode as a signed integer.
  +0: The mode is set to CRC-8 OFF.
  +1: The mode is set to CRC-8 ON.

Target Transceiver I/F modules

:OUTPut[m]:I2C:RESet

Function Resets the transceiver I/F module I2C bus.

Syntax
```
:OUTPut[m]:I2C:RESet
```

Example
```
:OUTP1:I2C:RES
```

Target Transceiver I/F modules

:OUTPut[m]:MDIO:CLOCk:FREQuency

Function Sets or queries the transceiver I/F module MDIO communication clock frequency.

Syntax
```
:OUTPut[m]:MDIO:CLOCk:FREQuency<wsp>
F2_5M|F1_25M|F625K
:OUTPut[m]:MDIO:CLOCk:FREQuency?
```

Example
```
:OUTP1:MDIO:CLOC:FREQ F2_5M
:OUTP1:MDIO:CLOC:FREQ? -> F2_5M<END>
```

Description
- Settings
  Set the following parameters:
  F2_5M: Set the frequency to 2.5 MHz.
  F1_25M: Set the frequency to 1.25 MHz.
  F625K: Set the frequency to 625 KHz.
- Queries
  The command returns the MDIO communication clock frequency as a character string.
  F2_5M|F1_25M|F625K

Target Transceiver I/F modules

:OUTPut[m]:RFOut:ENABle:PORT1

Function Sets or queries the Disable/Enable status of RF OUT CH1 on the SG module.

Syntax
```
:OUTPut[m]:RFOut:ENABle:PORT1<wsp>
OFF|ON|0|1
:OUTPut[m]:RFOut:ENABle:PORT1?
```

Example
```
:OUTP1:RFO:ENAB:PORT1 0
:OUTP1:RFO:ENAB:PORT1? -> 0<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the channel.
  1|ON: Enable the channel.
- Queries
  The command returns the RF OUT CH1 setting as an unsigned integer.
  0|1

Target SG modules

:OUTPut[m]:RFOut:ENABle:PORT2

Function Sets or queries the Disable/Enable status of RF OUT CH2 on the SG module.

Syntax
```
:OUTPut[m]:RFOut:ENABle:PORT2<wsp>OFF|ON|0|1
:OUTPut[m]:RFOut:ENABle:PORT2?
```

Example
```
:OUTP1:RFO:ENAB:PORT2 0
:OUTP1:RFO:ENAB:PORT2? -> 0<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the channel.
  1|ON: Enable the channel.
- Queries
  The command returns the RF OUT CH2 setting as an unsigned integer.
  0|1

Target SG modules

:OUTPut[m]:RFOut:ENABle:PORT3

Function Sets or queries the Disable/Enable status of RF OUT CH3 on the SG module.

Syntax
```
:OUTPut[m]:RFOut:ENABle:PORT3<wsp>OFF|ON|0|1
:OUTPut[m]:RFOut:ENABle:PORT3?
```

Example
```
:OUTP1:RFO:ENAB:PORT3 0
:OUTP1:RFO:ENAB:PORT3? -> 0<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the channel.
  1|ON: Enable the channel.
- Queries
  The command returns the RF OUT CH3 setting as an unsigned integer.
  0|1

Target SG modules

:OUTPut[m]:RFOut:ENABle:PORT4

Function Sets or queries the Disable/Enable status of RF OUT CH4 on the SG module.

Syntax
```
:OUTPut[m]:RFOut:ENABle:PORT4<wsp>OFF|ON|0|1
:OUTPut[m]:RFOut:ENABle:PORT4?
```

Example
```
:OUTP1:RFO:ENAB:PORT4 0
:OUTP1:RFO:ENAB:PORT4? -> 0<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the channel.
  1|ON: Enable the channel.
- Queries
  The command returns the RF OUT CH4 setting as an unsigned integer.
  0|1

Target SG modules

:OUTPut[m]:RFOut:ENABle:PORT5

Function Sets or queries the Disable/Enable status of RF OUT CH5 on the SG module.

Syntax
```
:OUTPut[m]:RFOut:ENABle:PORT5<wsp>OFF|ON|0|1
:OUTPut[m]:RFOut:ENABle:PORT5?
```

Example
```
:OUTP1:RFO:ENAB:PORT5 0
:OUTP1:RFO:ENAB:PORT5? -> 0<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the channel.
  1|ON: Enable the channel.
- Queries
  The command returns the RF OUT CH5 setting as an unsigned integer.
  0|1

Target SG modules

:OUTPut[m]:SOURce

Function Sets or queries the output interface.

Syntax
```
:OUTPut[m]:SOURce<wsp>ELEC|OPTI
:OUTPut[m]:SOURce?
```

Example
```
:OUTP1:SOUR ELEC
:OUTP1:SOUR? -> ELEC<END>
```

Description
- Settings
  Set the following parameters:
  ELEC: The electric interface
  OPTI: The optical interface
  Default: ELEC
- Queries
  The command returns the output interface setting as a character string.
  ELEC|OPTI

Target BERT modules (PPG)

:OUTPut[m]:TRIGger

Function Sets or queries the trigger output.

Syntax
```
:OUTPut[m]:TRIGger<wsp>PPG16|PPG64|PPGPAT|PPGERR|ED16|ED64|EDPAT|EDERR
:OUTPut[m]:TRIGger?
```

Example
```
:OUTP1:TRIG PPG16
:OUTP1:TRIG? -> PPG16<END>
```

Description
- Settings
  Set the following parameters:
  PPG16: The PPG 1/16 clock
  PPG64: The PPG 1/64 clock
  PPGPAT: The PPG pattern trigger
  PPGERR: The PPG trigger that includes errors
  ED16: The ED 1/16 clock
  ED64: The ED 1/64 clock
  EDPAT: The ED pattern trigger
  EDERR: The ED error detection trigger
  Default: PPG16
- Queries
  The command returns the trigger output setting as a character string.
  PPG16|PPG64|PPGPAT|PPGERR|ED16|ED64|EDPAT|EDERR

Target BERT modules (PPG and ED)

:OUTPut[m]:VOLTage:PS1

Function Sets or queries the power supply voltage of PS1 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:VOLTage:PS1<wsp><value>
:OUTPut[m]:VOLTage:PS1?
```

Example
```
:OUTP1:VOLT:PS1 4.75
:OUTP1:VOLT:PS1?
-> 4.75000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 4.750 to 5.250 (in 0.001 steps)
  Unit: V
- Queries
  The command returns the power supply voltage setting of PS1 as a floating-point number.

Target Transceiver I/F modules

:OUTPut[m]:VOLTage:PS2

Function Sets or queries the power supply voltage of PS2 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:VOLTage:PS2<wsp><value>
:OUTPut[m]:VOLTage:PS2?
```

Example
```
:OUTP1:VOLT:PS2 3.135
:OUTP1:VOLT:PS2?
-> 3.13500000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 3.135 to 3.465 (in 0.001 steps)
  Unit: V
- Queries
  The command returns the power supply voltage setting of PS2 as a floating-point number.

Target Transceiver I/F modules

:OUTPut[m]:VOLTage:PS3

Function Sets or queries the power supply voltage of PS3 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:VOLTage:PS3<wsp><value>
:OUTPut[m]:VOLTage:PS3?
```

Example
```
:OUTP1:VOLT:PS3 0.8
:OUTP1:VOLT:PS3?
-> 8.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.800 to 1.890 (in 0.001 steps)
  Unit: V
- Queries
  The command returns the power supply voltage setting of PS3 as a floating-point number.

Target Transceiver I/F modules

:OUTPut[m]:VOLTage:PS4

Function Sets or queries the power supply voltage of PS4 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:VOLTage:PS4<wsp><value>
:OUTPut[m]:VOLTage:PS4?
```

Example
```
:OUTP1:VOLT:PS4 -5.46
:OUTP1:VOLT:PS4?
-> -5.46000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 5.460 to -4.940 (in 0.001 steps)
  Unit: V
- Queries
  The command returns the power supply voltage setting of PS4 as a floating-point number.

Target Transceiver I/F modules

:OUTPut[m]:VOLTage:PS5

Function Sets or queries the power supply voltage of PS5 on the transceiver I/F module.

Syntax
```
:OUTPut[m]:VOLTage:PS5<wsp>V3_3|V5_0
:OUTPut[m]:VOLTage:PS5?
```

Example
```
:OUTP1:VOLT:PS5 V3_3
:OUTP1:VOLT:PS5? -> V3_3<END>
```

Description
- Settings
  Set the following parameters:
  V3_3: Set the voltage to +3.3 V
  V5_0: Set the voltage to +5.0 V.
- Queries
  The command returns the power supply voltage setting of PS5 as a character string.

V3_3|V5_0

Target Transceiver I/F modules

5.12 READ Group

:READ[m][:CHANnel[d]]:ALARm?

Function Queries the alarm state.

Syntax `:READ[n][:CHANnel[d]]:ALARm?`

Example `:READ1:ALAR? -> 0,2,1,2<END>`

Description The command returns the alarm state as an unsigned integer.
<unsigned value1>, <unsignedvalue2>, <unsigned value3>, <unsignedvalue4>
unsigned value1: MOD_Abs alarm
0: An XFP transceiver is installed.
1: An XFP transceiver is not installed.
unsigned value2: MOD_NR alarm
0: An XFP transceiver is not installed.
1: Normal
2: Error
unsigned value3: RX_LOS alarm
0: An XFP transceiver is not installed.
1: Normal
2: Error
unsigned value4: INTERRUPT alarm
0: An XFP transceiver is not installed.
1: Normal
2: Error

Target XFP interface modules

:READ[m][:CHANnel[d]]:AUX1?

Function Queries the AUX1 value.

Syntax `:READ[m][:CHANnel[d]]:AUX1?`

Example `:READ1:AUX1? -> +5.50000000E+000<END>`

Description The command returns the AUX1 value as a floating-point number.
Voltage: The unit is V.
Current: The unit is A.
Temperature: The unit is °C.
Wavelength: The unit is m.
Example: –5.5 V -> –5.50000000E+000

Target XFP interface modules

:READ[m][:CHANnel[d]]:AUX2?

Function Queries the AUX2 value.

Syntax `:READ[m][:CHANnel[d]]:AUX2?`

Example `:READ1:AUX2? -> +5.50000000E+000<END>`

Description The command returns the AUX2 value as a floating-point number.
Voltage: The unit is V.
Current: The unit is A.
Temperature: The unit is °C.
Wavelength: The unit is m.
Example: –5.5 V -> –5.50000000E+000

Target XFP interface modules

:READ[m][:CHANnel[d]]:AUX:TYPE?

Function Queries the AUX types.

Syntax `:READ[m][:CHANnel[d]]:AUX:TYPE?`

Example `:READ1:AUX:TYPE? -> +1,+15<END>`

Description The command returns the AUX types in the following order as signed decimal numbers.
<value1>, <value2>
value1: The AUX1 type
value2: The AUX2 type
+1: APD bias voltage of the XFP optical transceiver
+3: The TEC current of the XFP optical transceiver
+4: The internal temperature of the XFP optical transceiver
+5: The laser output wavelength of the XFP optical transceiver
+6: The VCC5 supply voltage of the XFP optical transceiver
+7: The VCC3 supply voltage of the XFP optical transceiver
+8: The VCC2 supply voltage of the XFP optical transceiver
+9: The VEE5 supply voltage of the XFP optical transceiver
+10: The VCC5 supply current of the XFP optical transceiver
+13: The VCC3 supply current of the XFP optical transceiver
+14: The VCC2 supply current of the XFP optical transceiver
+15: The VEE5 supply current of the XFP optical transceiver
+0: AUX input is not supported.

Target XFP interface modules

:READ[m][:CHANnel[d]]:INTerrupt:ALARm?

Function Queries the interrupt alarm information.

Syntax `:READ[m]`
`[:CHANnel[d]]:INTerrupt:ALARm?`

Example `:READ1:INT:ALAR?`
`-> 00,01,05,00,03,F0,80,73<END>`

Description The command returns the alarm cause information (AL1 to AL8) of addresses 50H to 57H in a comma-separated list.
The single byte of data that is made up of each alarm cause is written in two hexadecimal characters.

Target XFP interface modules

:READ[m][:CHANnel[d]]:POWer?

Function Performs a single measurement and queries the measured value.

Syntax `:READ[m][:CHANnel[d]]:POWer?<wsp>[MAX|MIN]`

Example `:READ1:POW? -> +1.23005500E-000<END>`

Description
- The command returns the measured value that is specified by the parameters. The returned value is a floating-point number.
  In absolute value mode, the unit is dBm or W.
  In relative value mode, the unit is dB, or there is no unit.
  Parameter Settings:
  NONE: The current measured value
  MAX: The maximum value
  MIN: The minimum value
  MIN and MAX are enabled when the Min/Max measurement is on.
  The ATTN module with a built-in monitor power meter does not support MAX and MIN.
- Regardless of the measurement mode when this command is received, the instrument performs the measurement for the time specified by the averaging time and then stops.
  <Absolute Value Mode>
  Measure value (dBm) =
  the actual measured value (dBm) + power offset (dB)
  The measured values in relative value mode are also calculated using the measured values in absolute value mode.
  <Relative Value Mode>
  Measured value (dB) =
  the measured value from absolute value mode (dBm) – the reference value (dBm)
- For information on the power offset value, "`:SENSe[m][:CHANnel[d]]:CORRection`," on page 5-88.
- For information on the reference value, see "`:SENSe[m][:CHANnel[d]]:POWer:REFerence`," on page 5-92.
- The ATTN module with a built-in monitor power meter does not support relative value mode.

Target The ATTN that is built into the monitor power meter and all sensor modules

:READ[m][:CHANnel[d]]:POWer:ALL?

Function Performs a single measurement with all the installed sensor modules and queries that measurement's measured value.

Syntax `:READ[m][:CHANnel[d]]:POWer:ALL?[<wsp>MAX|MIN]`

Example `:READ1:POW:ALL?`
`-> 23 31 38 10 36 A5 3A 8C 94 9B 3A 0A <END>`

Description
- The command returns the measured value as a binary block.
  The measured values are stored in sequential order starting with the lowest number of the most important entry. In descending importance, the entries are frame controller, slot, and device.
  The unit is fixed to W.
  NONE: The current measured value
  MAX: The maximum value
  MIN: The minimum value
  MIN and MAX are enabled when the Min/Max measurement is on for all the sensors.
- In the above example, the contents of the binary data are +1.26046128E–003 W, +1.18698319E–003 W.

Target All sensor modules

:READ[m][:CHANnel[d]]:POWer:ALL:CONFig?

Function Queries the slot and device numbers of all the sensor modules that can be used.

Syntax `:READ[m][:CHANnel[d]]:POWer:ALL:CONFig?`

Example `:READ:POW:ALL:CONF?`
`-> 23 31 38 01 00 01 00 02 00 01 00 0A <END>`

Description
- The command returns the module and device numbers of all the sensor modules that can be used. The return value is binary blocks.
- In the above example, applicable sensor modules are installed in slots 1 and 2.
  The binary data contains the measured data from the sensor modules that are installed in slots 1 and 2.
  The "23 31 38" that appears at the beginning of the data is the ASCII code for "#18." This means that there is 1 digit for the number of data values and there are 8 bits of binary data. Therefore, "01 00 01 00" means the module installed in slot 1, device 1, and "02 00 01 00" means the module installed in slot 2, device 1.

Target All sensor modules

:READ[m][:CHANnel[d]]:POWer:MDSelect?

Function Performs a single measurement with the specified sensor and queries the measured value.

Syntax `:READ[m][:CHANnel[d]]:POWer:MDS?<wsp>S<slot>D<device>{[,S<slot>D<device>]}`

Example `:READ1:POW:MDS?S1D1,S2D1`
`-> +1.23400000E+000,-1.23400000E-001<END>`

Description
- Setting parameter
  <slot>: The slot number of 1 to 9
  <device>: The device number of 1 or 2
- The command makes a single measurement with the sensor specified by the parameters and returns the measured value. The sensor is specified by the slot and device numbers in `S<slot>D<device>` format, and up to 10 sensors can be specified.
- Similar to `:READ:POW?` command, the response data is returned in dBm, dB, W, or no unit according to the unit setting of the sensor.

Target All sensor modules

:READ[m][:CHANnel[d]]:POWer:PS[:VALue]?

Function Queries the transceiver I/F module power consumption.

Syntax `:READ[m][:CHANnel[d]]:POWer:PS[:VALue]?`

Example `:READ1:POW:PS?`
`-> +0.00000000E+000<END>`

Description The command returns the measured power consumption value (that is currently displayed on the instrument) as a floating-point number in units of W.

Target Transceiver I/F modules

:READ[m][:CHANnel[d]]:RX:POWer?

Function Queries the receive power.

Syntax `:READ[m][:CHANnel[d]]:RX:POWer?`

Example `:READ1:RX:POW?`
`-> +1.23400000E-003<END>`

Description The command returns the receive power value as a floating-point number in units that you specified with the `:OUTP:POW:UNIT` command.
Example: 1.234 mW -> +1.23400000E–003

Target XFP interface modules

:READ[m][:CHANnel[d]]:TEMPerature?

Function Queries the temperature of the XFP transceiver.

Syntax `:READ[m][:CHANnel[d]]:TEMPerature?`

Example `:READ1TEMP? -> +3.56000000E+001<END>`

Description The command returns the module's temperature as a floating-point number in units of °C.
Example: 35.6°C -> +3.56000000E+001

Target XFP interface modules

:READ[m][:CHANnel[d]]:TX:CURRent?

Function Queries the transmit bias current.

Syntax `:READ[n][:CHANnel[d]]:TX:CURRent?`

Example `:READ1:TX:CURR?`
`-> +1.23400000E+000<END>`

Description The command returns the transmit bias current as a floating-point number in units of A.
Example: 1.234 A -> +1.23400000E+000

Target XFP interface modules

:READ[m][:CHANnel[d]]:TX:POWer?

Function Queries the transmit power value.

Syntax `:READ[m][:CHANnel[d]]:TX:POWer?`

Example `:READ1:TX:POW?`
`-> +1.23400000E-003<END>`

Description The command returns the transmit power value as a floating-point number in units that you specified with the `:OUTP:POW:UNIT` command.
Example: 1.234 mW -> +1.23400000E–003

Target XFP interface modules

:READ[m][:CHANnel[d]]:VCC5:VOLTage?

Function Queries the VCC5 monitor voltage.

Syntax `:READ[m][:CHANnel[d]]:VCC5:VOLTage?`

Example `:READ1:VCC5:VOLT?`
`-> +5.50000000E+000<END>`

Description The command returns the VCC5 monitor voltage as a floating-point number in units of V.

Target XFP interface modules

:READ[m][:CHANnel[d]]:VCC3:VOLTage?

Function Queries the VCC3 monitor voltage.

Syntax `:READ[m][:CHANnel[d]]:VCC3:VOLTage?`

Example `:READ1:VCC3:VOLT?`
`-> +3.30000000E+000<END>`

Description The command returns the VCC3 monitor voltage as a floating-point number in units of V.

Target XFP interface modules

:READ[m][:CHANnel[d]]:VCC2:VOLTage?

Function Queries the VCC2 monitor voltage.

Syntax `:READ[m][:CHANnel[d]]:VCC2:VOLTage?`

Example `:READ1:VCC2:VOLT?`
`-> +1.80000000E+000<END>`

Description The command returns the VCC2 monitor voltage as a floating-point number in units of V.

Target XFP interface modules

:READ[m][:CHANnel[d]]:VEE5:VOLTage?

Function Queries the VEE5 monitor voltage.

Syntax `:READ[m][:CHANnel[d]]:VEE5:VOLTage?`

Example `:READ1:VEE5:VOLT?`
`-> -5.20000000E+000<END>`

Description The command returns the VEE5 monitor voltage as a floating-point number in units of V.

Target XFP interface modules

:READ[m][:CHANnel[d]]:XFP:INFormation?

Function Queries the XFP transceiver information.

Syntax
```
:READ[n]
[:CHANnel[d]]:XFP:INFormation?
```

Example
```
:READ1:XFP:INF?
-> XXXX,XXX,XX,XX,XXX<END>
```

Description The command returns the XFP information (VNM, VPN, VRV, VSN, and DCD).
VNM: Vendor name
VPN: Vendor part number
VRV: Vendor revision
VSN: Vendor serial number
DCD: Data code

Target XFP interface modules

:READ[m]:CURRent:PS1?

Function Queries the monitored current value of PS1 on the transceiver I/F module.

Syntax
```
:READ[m]:CURRent:PS1?
```

Example
```
:READ1:CURR:PS1?
-> +0.00000000E+000<END>
```

Description The command returns the monitored current value of PS1 (that is currently displayed on the instrument) as a floating-point number in units of A.

Target Transceiver I/F modules

:READ[m]:CURRent:PS2?

Function Queries the monitored current value of PS2 on the transceiver I/F module.

Syntax
```
:READ[m]:CURRent:PS2?
```

Example
```
:READ1:CURR:PS2?
-> +0.00000000E+000<END>
```

Description The command returns the monitored current value of PS2 (that is currently displayed on the instrument) as a floating-point number in units of A.

Target Transceiver I/F modules

:READ[m]:CURRent:PS3?

Function Queries the monitored current value of PS3 on the transceiver I/F module.

Syntax
```
:READ[m]:CURRent:PS3?
```

Example
```
:READ1:CURR:PS3?
-> +0.00000000E+000<END>
```

Description The command returns the monitored current value of PS3 (that is currently displayed on the instrument) as a floating-point number in units of A.

Target Transceiver I/F modules

:READ[m]:CURRent:PS4?

Function Queries the monitored current value of PS4 on the transceiver I/F module.

Syntax
```
:READ[m]:CURRent:PS4?
```

Example
```
:READ1:CURR:PS4?
-> +0.00000000E+000<END>
```

Description The command returns the monitored current value of PS4 that is currently displayed on the instrument as a floating-point number in units of A.

Target Transceiver I/F modules

:READ[m]:CURRent:PS5?

Function Queries the monitored current value of PS5 on the transceiver I/F module.

Syntax
```
:READ[m]:CURRent:PS5?
```

Example
```
:READ1:CURR:PS5?
-> +0.00000000E+000<END>
```

Description The command returns the monitored current value of PS5 (that is currently displayed on the instrument) as a floating-point number in units of A.

Target Transceiver I/F modules

:READ[m]:I2C:DATA[:BYTE]?

Function Reads a byte from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.

Syntax
```
:READ[m]:I2C:DATA:BYTE?<wsp><value1>
|<Register1>,<value2>|<Register2>
```

Example
```
:READ1:I2C:DATA? #H00,#H00
-> #H00<END>
```

Description Through I2C communication, the command returns 1 byte of XFP or SFP+ internal ROM data in hexadecimal.
<value1> = 0 to 255
The device address specified in decimal.
<Register1> = #H00 to #H7F
The device address specified in hexadecimal.
<value2> = 0 to 255
The read start address specified in decimal.
<Register2> = #H00 to #HFF
The read start address specified in hexadecimal.

Target Transceiver I/F modules

:READ[m]:I2C:DATA:BLOCk?

Function Reads data from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.

Syntax
```
:READ[m]:I2C:DATA:BLOCk?<wsp>
<value1>|<Register1>,<value2>|
<Register2>,<value3>|<Register3>
```

Example
```
:READ1:I2C:DATA:BLOC? #H00,#H00,8
-> #2160102030405060708<END>
```

The example is for when the device address is 00, the read start address is 00, the number of read bytes is 8, and the read data is 01H, 02H, 03H, 04H, 05H, 06H, 07H, 08H.

Description
- Through I2C communication, the command reads multiple bytes of data from the XFP or SFP+ internal ROM.
  <value1> = 0 to 255
  The device address specified in decimal.
  <Register1> = #H00 to #H7F
  The device address specified in hexadecimal.
  <value2> = 0 to 255
  The read start address specified in decimal.
  <Register2> = #H00 to #HFF
  The read start address specified in hexadecimal.
  <value3> = 1 to 64
  The number of bytes to read specified in decimal.
  <Register3> = #H01 to #H40
  The number of bytes to read specified in hexadecimal.
- The command returns the ROM data in blocks.
  #N<N-digit decimal number><data byte sequence>

Target Transceiver I/F modules

:READ[m]:MDIO:DATA:WORD?

Function Reads a word from the XENPAK internal ROM through MDIO communication using the transceiver I/F module.

Syntax
```
:READ[m]:MDIO:DATA:WORD?<wsp>|
<value1><Register1>,<value2>|
<Register2>,<value3>|<Register3>
```

Example
```
:READ1:MDIO:DATA:WORD? #H00,#H00,
#H0000
-> #H0123<END>
```

Description Through MDIO communication, the command returns 1 word of XENPAK internal ROM data in hexadecimal.
<value1> = 0 to 31
The port address specified in decimal.
<Register1> = #H00 to #H1F
The port address specified in hexadecimal.
<value2> = 0 to 31
The device address specified in decimal.
<Register2> = #H00 to #H1F
The device address specified in hexadecimal.
<value3> = 0 to 65535
The read start address specified in decimal.
<Register3> = #H0000 to #HFFFF

Target Transceiver I/F modules

:READ[m]:RESistance:R1[:VALue]?

Function Queries the monitored resistance value on the transceiver I/F module.

Syntax
```
:READ[m]:RESistance:R1[:VALue]?
```

Example
```
:READ1:RES:R1?
-> +0.00000000E+000<END>
```

Description The command returns the monitored resistance value (that is currently displayed on the instrument) as a floating-point number in units of Ω.

Target Transceiver I/F modules

:READ[m]:RESistance:R1:STATe?

Function Queries the state of the monitored resistance value on the transceiver I/F module.

Syntax
```
:READ[m]:RESistance:R1:STATe?
```

Example
```
:READ1:RES:R1? -> +0<END>
```

Description The command returns the state of the monitored resistance value as a signed integer.
+0: The value is within the display range.
+1: The value is above the display range.
+2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN01[:VALue]?

Function Queries the AIN01 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN01[:VALue]?`

Example `:READ1:STAT:AIN01?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN01 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN02[:VALue]?

Function Queries the AIN02 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN02[:VALue]?`

Example `:READ1:STAT:AIN02?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN02 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN03[:VALue]?

Function Queries the AIN03 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN03[:VALue]?`

Example `:READ1:STAT:AIN03?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN03 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN04[:VALue]?

Function Queries the AIN04 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN04[:VALue]?`

Example `:READ1:STAT:AIN04?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN04 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN05[:VALue]?

Function Queries the AIN05 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN05[:VALue]?`

Example `:READ1:STAT:AIN05?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN05 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN06[:VALue]?

Function Queries the AIN06 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN06[:VALue]?`

Example `:READ1:STAT:AIN06?`
`-> +0.00000000E+000<END>`

Description The command returns the current measured AIN06 status signal value (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:STATus:AIN01:LEVel?

Function Queries the level (LOW/HIGH) of the AIN01 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN01:LEVel?`

Example `:READ1:STAT:AIN01:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN01 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN02:LEVel?

Function Queries the level (LOW/HIGH) of the AIN02 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN02:LEVel?`

Example `:READ1:STAT:AIN02:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN02 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN03:LEVel?

Function Queries the level (LOW/HIGH) of the AIN03 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN03:LEVel?`

Example `:READ1:STAT:AIN03:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN03 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN04:LEVel?

Function Queries the level (LOW/HIGH) of the AIN04 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN04:LEVel?`

Example `:READ1:STAT:AIN04:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN04 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN05:LEVel?

Function Queries the level (LOW/HIGH) of the AIN05 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN05:LEVel?`

Example `:READ1:STAT:AIN05:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN05 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN06:LEVel?

Function Queries the level (LOW/HIGH) of the AIN06 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN06:LEVel?`

Example `:READ1:STAT:AIN06:LEVel? -> +0<END>`

Description The command returns the current level (less than or equal to or greater than the threshold) of the AIN06 status signal as a signed integer.
+0: Less than or equal to the threshold (LOW)
+1: Greater than the threshold (HIGH)

Target Transceiver I/F modules

:READ[m]:STATus:AIN01:STATe?

Function Queries the state of the AIN01 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN01:STATe?`

Example `:READ1:STAT:AIN01:STATe? -> +0<END>`

Description The command returns the current state of the AIN01 status signal as a signed integer.
+0: The value is within the display range.
+1: The value is above the display range.
+2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN02:STATe?

Function Queries the state of the AIN02 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN02:STATe?`

Example `:READ1:STAT:AIN02:STATe? -> +0<END>`

Description The command returns the current state of the AIN02 status signal as a signed integer.
+0: The value is within the display range.
+1: The value is above the display range.
+2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN03:STATe?

Function Queries the state of the AIN03 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN03:STATe?`

Example `:READ1:STAT:AIN03:STATe? -> +0<END>`

Description The command returns the current state of the AIN03 status signal as a signed integer.
+0: The value is within the display range.
+1: The value is above the display range.
+2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN04:STATe?

Function Queries the state of the AIN04 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN04:STATe?`

Example `:READ1:STAT:AIN04:STATe? -> +0<END>`

Description The command returns the current state of the AIN04 status signal as a signed integer.
+0: The value is within the display range.
+1: The value is above the display range.
+2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN05:STATe?

Function Queries the state of the AIN05 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN05:STATe?`

Example `:READ1:STAT:AIN05:STATe? -> +0<END>`

Description The command returns the current state of the AIN05 status signal as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:STATus:AIN06:STATe?

Function Queries the state of the AIN06 status signal on the transceiver I/F module.

Syntax `:READ[m]:STATus:AIN06:STATe?`

Example `:READ1:STAT:AIN06:STATe? -> +0<END>`

Description The command returns the current state of the AIN06 status signal as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS1:STATe?

Function Queries the state of PS1 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS1:STATe?`

Example `:READ1:VOLT:PS1:STAT? -> +0<END>`

Description The command returns the state of the monitored PS1 power supply voltage as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.
- +4: There is a monitor value error and the value is within the range.
- +5: There is a monitor value error and the value is above the display range.
- +6: There is a monitor value error and the value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS2:STATe?

Function Queries the state of PS2 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS2:STATe?`

Example `:READ1:VOLT:PS2:STAT? -> +0<END>`

Description The command returns the state of the monitored PS2 power supply voltage as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.
- +4: There is a monitor value error and the value is within the range.
- +5: There is a monitor value error and the value is above the display range.
- +6: There is a monitor value error and the value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS3:STATe?

Function Queries the state of PS3 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS3:STATe?`

Example `:READ1:VOLT:PS3:STAT? -> +0<END>`

Description The command returns the state of the monitored PS3 power supply voltage as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.
- +4: There is a monitor value error and the value is within the range.
- +5: There is a monitor value error and the value is above the display range.
- +6: There is a monitor value error and the value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS4:STATe?

Function Queries the state of PS4 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS4:STATe?`

Example `:READ1:VOLT:PS4:STAT? -> +0<END>`

Description The command returns the state of the monitored PS4 power supply voltage as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.
- +4: There is a monitor value error and the value is within the range.
- +5: There is a monitor value error and the value is above the display range.
- +6: There is a monitor value error and the value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS5:STATe?

Function Queries the state of PS5 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS5:STATe?`

Example `:READ1:VOLT:PS5:STAT? -> +0<END>`

Description The command returns the state of the monitored PS5 power supply voltage as a signed integer.

- +0: The value is within the display range.
- +1: The value is above the display range.
- +2: The value is below the display range.
- +4: There is a monitor value error and the value is within the range.
- +5: There is a monitor value error and the value is above the display range.
- +6: There is a monitor value error and the value is below the display range.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS1[:VALue]?

Function Queries the monitored voltage of PS1 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS1[:VALue]?`

Example
```
:READ1:VOLT:PS1?
-> +0.00000000E+000<END>
```

Description The command returns the monitored voltage of PS1 (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS2[:VALue]?

Function Queries the monitored voltage of PS2 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS2[:VALue]?`

Example
```
:READ1:VOLT:PS2?
-> +0.00000000E+000<END>
```

Description The command returns the monitored voltage of PS2 (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS3[:VALue]?

Function Queries the monitored voltage of PS3 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS3[:VALue]?`

Example
```
:READ1:VOLT:PS3?
-> +0.00000000E+000<END>
```

Description The command returns the monitored voltage of PS3 (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS4[:VALue]?

Function Queries the monitored voltage of PS4 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS4[:VALue]?`

Example
```
:READ1:VOLT:PS4?
-> +0.00000000E+000<END>
```

Description The command returns the monitored voltage of PS4 (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

:READ[m]:VOLTage:PS5[:VALue]?

Function Queries the monitored voltage of PS5 on the transceiver I/F module.

Syntax `:READ[m]:VOLTage:PS5[:VALue]?`

Example
```
:READ1:VOLT:PS5?
-> +0.00000000E+000<END>
```

Description The command returns the monitored voltage of PS5 (that is currently displayed on the instrument) as a floating-point number in units of V.

Target Transceiver I/F modules

5.13 ROUTe Group

:ROUTe[m][:CHANnel[d]]

Function Sets or queries the connection port of an optical switch. (This command only sets the connections on one side of a 2 × 2 switch.)
This command is an overlap command.

Syntax
```
:ROUTe[m][:CHANnel[d]]<wsp>A|B,
<value>
:ROUTe[m][:CHANnel[d]]?
```

Example
```
:ROUT3 A,2
:ROUT3? -> A,2;B,1<END>
```

Description
- Settings
  Set the following parameters:
  A: Common port
  B: Common port (only in the case of a 2 × 2 switch)
  <value> = 1 to 16
  Port to select
  1 × 2 switch: 1 or 2
  2 × 2 switch: 1 or 2
  1 × 4 switch: 1 to 4
  1 × 8 switch: 1 to 8
  1 × 16 switch: 1 to 16
  Set the connection port as follows:
  [A],[1....n]:[B],[1....2].
  (This command only sets the connections on one side of a 2 × 2 switch.)
- Queries
  The command returns the connection port values as follows: [A],[1....n]:[B],[1....2].
  A comma (,) is used to separate the common port and selected port. A semicolon (;) is used to separate individual common ports.

Target All OSW modules

:ROUTe[m][:CHANnel[d]]:CONFig?

Function Queries the switch configuration.
This command reads the minimum and maximum number of common and selected ports.

Syntax
```
:ROUTe[m][:CHANnel[d]]:CONFig[:GET]?
```

Example
```
:ROUT3:CONF? -> A;1,2<END>
```

Description The command returns the switch configuration as follows: [A],[1....n];[B],[1....2].
A comma (,) is used to separate the minimum and maximum number of common and selected ports.
A semicolon (;) is used to separate the common and selected ports.

Target All OSW modules

:ROUTe[m][:CHANnel[d]]:CONFig:ROUTe?

Function Queries the entire connected switch configuration.

Syntax
```
:ROUTe[m][:CHANnel[d]]:CONFig:ROUTe?
```

Example
```
:ROUT3:CONF:ROUT? -> A,1.A,2<END>
```

Description The command returns the fully connected switch configuration as follows: [A],[1....n];[B],[1....2].
A comma (,) is used to separate the common port and selected port. A semicolon (;) is used to separate the input port connections for a 2 × 2 switch. A period (.) is used to separate connection configurations.

Target All OSW modules

5.14 SENSe Group

:SENSe[m][:CHANnel[d]]:AM:FREQuency

Function Sets or queries the CHOP frequency.

Syntax
```
:SENSe[m][:CHANnel[d]]:AM:FREQuency
<wsp>270HZ|1KHZ|2KHZ
:SENSe[m][:CHANnel[d]]:AM:FREQuency?
```

Example
```
:SENS1:AM:FREQ 270HZ
:SENS1:AM:FREQ? -> 270HZ<END>
```

Description
- Settings
  Set the following parameters:
  270HZ: The frequency is 270 Hz.
  1KHZ: The frequency is 1 kHz.
  2KHZ: The frequency is 2 kHz.
- Queries
  The command returns the CHOP frequency as a character string.
  270HZ|1KHZ|2KHZ

Target All sensor modules (excluding AQ2200-215/221/212/222/232/242)

:SENSe[m][:CHANnel[d]]:AM:STATe

Function Sets or queries the optical signal modulation method.

Syntax
```
:SENSe[m][:CHANnel[d]]:AM:STATe<wsp>
OFF|ON|0|1
:SENSe[m][:CHANnel[d]]:AM:STATe?
```

Example
```
:SENS1:AM:STAT ON
:SENS1:AM:STAT? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: CW
  1|ON: CHOP
- Queries
  The command returns the modulation method as an unsigned integer.

Target All sensor modules (excluding AQ2200-215/221/212/222/232/242)

:SENSe[m][:CHANnel[d]]:AOUT:LOG:MLEVel

Function Sets or queries the maximum power level of analog output log mode.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:LOG:
MLEVel<wsp><value>DBM
:SENSe[m][:CHANnel[d]]:AOUT:LOG:
MLEVel?
```

Example
```
:SENS1:AOUT:LOG:MLEV 13DBM
:SENS1:AOUT:LOG:MLEV?
-> +1.30000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The maximum power level
  Setting range: (The typical value of the sensor's minimum range + 3 dB) to (the typical value of the sensor's maximum range + 3 dB)
  0.1 dB steps; the unit is dBm.
- Queries
  The command returns the maximum power level value as a floating-point number in units of dBm.

Target All sensor modules (excluding AQ2200-221/222)

:SENSe[m][:CHANnel[d]]:AOUT:LOG:RANGe

Function Sets or queries the power range of analog output log mode.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:LOG:
RANGe<wsp><value>DB
:SENSe[m][:CHANnel[d]]:AOUT:LOG:
RANGe?
```

Example
```
:SENS1:AOUT:LOG:RANG 21DB
:SENS1:AOUT:LOG:RANG?
-> +2.10000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 3 to 60
  Power range: 3 to 60 dB (in 1 dB steps)
  The lower limit of the power range must not be lower than the measurement range's lower limit.
- Queries
  The command returns the power range value as a floating-point number in units of dB.

Target All sensor modules (excluding AQ2200-221/222)

:SENSe[m][:CHANnel[d]]:AOUT:MLEVel

Function Sets or queries the maximum power level of analog output linear mode.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:MLEVel
<wsp><value>DBM
:SENSe[m][:CHANnel[d]]:AOUT:MLEVel?
```

Example
```
:SENS1:AOUT:MLEV 13DBM
:SENS1:AOUT:MLEV?
-> +1.30000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The maximum power level
  Setting range: (The typical value of the sensor's minimum range + 3 dB) to (the typical value of the sensor's maximum range + 3 dB)
  0.1 dB steps; the unit is dBm.
- Queries
  The command returns the maximum power level value as a floating-point number in units of dBm.

Target All sensor modules (excluding AQ2200-221/222)

:SENSe[m][:CHANnel[d]]:AOUT:MODE

Function Sets or queries the analog output mode.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:MODE<wsp
>AUTO|LIN|LOG|TRIG|0|1|2|3
:SENSe[m][:CHANnel[d]]:AOUT:MODE?
```

Example
```
:SENS1:AOUT:MODE 0
:SENS1:AOUT:MODE? -> 0
```

Description
- Settings
  Set the following parameters:
  0|AUTO: Analog output mode
  Generate a voltage (approximately 0 to 2 V or approximately 0 to 5 V) that is proportional to the measured value (in W) for each range.
  1|LIN: Analog output linear mode
  Generate a voltage (approximately 0 to 2 V or approximately 0 to 5 V) that is proportional to the measured value (in W) for the user-defined power range.
  2|LOG: Analog output log mode
  Generate a voltage (approximately 0 to 2 or approximately 0 to 5 V) that is proportional to the measured value (in dBm) for the user-defined power range.
  3|TRIG: Trigger output mode (AQ2200-202/212)
  Generate triggers from the analog output port.
- Queries
  The command returns the analog output mode as a character string.
  AUTO: Analog output auto mode
  LIN: Analog output linear mode
  LOG: Analog output log mode
  TRIG: Trigger output mode (AQ2200-202/212)

Target All sensor modules (excluding AQ2200-221/222)

:SENSe[m][:CHANnel[d]]:AOUT:MVOLtage

Function Sets or queries the analog output's maximum voltage.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:MVOLtage
<wsp>V2|V5
:SENSe[m][:CHANnel[d]]:AOUT:
MVOLtage?
```

Example
```
:SENS1:AOUT:MVOL V2
:SENS1:AOUT:MVOL? -> V2<END>
```

Description
- Settings
  Set the following parameters:
  V2: Sets the analog output port's maximum voltage to 2 V.
  V5: Sets the analog output port's maximum voltage to 5 V.
  The trigger output is output to the analog output port.
- Queries
  The command returns the maximum voltage as a character string.
  V2: Maximum voltage 2 V
  V5: Maximum voltage 5 V

Target AQ2200-202/212

:SENSe[m][:CHANnel[d]]:AOUT:TRIGger:OUTPut

Function Sets or queries the trigger output mode of the analog output port.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:TRIGger:
OUTPut<wsp>AVGover|MEASure|EVENt
:SENSe[m][:CHANnel[d]]:AOUT:TRIGger:
OUTPut?
```

Example
```
:SENS1:AOUT:TRIG:OUTP AVG
:SENS1:AOUT:TRIG:OUTP? -> AVG<END>
```

Description
- Settings
  Set the following parameters:
  AVGover: Generate a trigger when the averaged measurement is completed
  MEASure: Generate a trigger when the averaged measurement begins
  EVENt: Generate a trigger when an event is detected
- Queries
  The command returns the trigger output mode as a character string.
  AVG: The trigger will be generated when the averaged measurement is completed.
  MEAS: The trigger will be generated when the averaged measurement begins.
  EVEN: Generate a trigger when an event is detected
- This setting is valid only when TRIG has been specified with the :SENS:AOUT:MODE command.

Target AQ2200-202/212

:SENSe[m][:CHANnel[d]]:AOUT:RANGe

Function Sets or queries the power range of analog output linear mode.

Syntax
```
:SENSe[m][:CHANnel[d]]:AOUT:RANGe
<wsp><value>DB
:SENSe[m][:CHANnel[d]]:AOUT:RANGe?
```

Example
```
:SENS1:AOUT:RANG 21DB
:SENS1:AOUT:RANG?
-> +2.10000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 3 to 24
  Power range: 3 to 24 dB (in 3 dB steps)
- Queries
  The command returns the power range value as a floating-point number in units of dB.

Target All sensor modules (excluding AQ2200-221/222)

:SENSe[m][:CHANnel[d]]:CORRection

Function Sets or queries the power offset value.

Syntax
```
:SENSe[m][:CHANnel[d]]:CORRection
<wsp><value>[DB]
:SENSe[m][:CHANnel[d]]:CORRection?
```

Example
```
:SENS1:CORR 10DB
:SENS1:CORR? -> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –180.0000 to 200.0000
  (In 0.0001 steps)
  The unit is "dB" (decibels) if it is omitted.
- Queries
  The command returns the power offset value as a floating-point number in units of dB.
  For details on the relationship between the offset and the measured value, see the :FETCh[n][:CHANnel[d]]:POWer? command.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:CORRection:COLLect[:ZERO]

Function Executes or queries the zero-set procedure.

Syntax
```
:SENSe[m][:CHANnel[d]]:CORRection:
COLLect[:ZERO]<wsp>OFF|ON|0|1
:SENSe[m][:CHANnel[d]]:CORRection:
COLLect[:ZERO]?
```

Example
```
:SENS1:CORR:COLL ON
:SENS1:CORR:COLL? -> 1<END>
```

Description
- This command is an overlap command.
- Execution
  Set the following parameters:
  0|OFF: Pause the zero-set procedure
  1|ON: Execute the zero-set procedure
- Queries
  The command returns the state of the zero-set procedure as a signed integer.
  +0: The zero-set procedure completed without any problems.
  +1: The zero-set procedure is ongoing.
  +2: An error occurred.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL

Function Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.

Syntax
```
:SENSe[m][:CHANnel[d]]:CORRection:
COLLect:ZERO:ALL[<wsp>OFF|ON|0|1]
```

Example
```
:SENS1:CORR:COLL:ZERO:ALL
```

Description
- This command is an overlap command.
- Set the following parameters:
  NONE: Execute the zero-set procedure
  0|OFF: Pause the zero-set procedure
  1|ON: Execute the zero-set procedure

Target All sensor modules and the ATTN module with a built-in monitor power meter

:SENSe[m][:CHANnel[d]]:EVENt:THResh

Function Sets or queries the threshold value of the event detection condition.

Syntax
```
:SENSe[m][:CHANnel[d]]:EVENt:THResh
<wsp><thresh>[dBm]
:SENSe[m][:CHANnel[d]]:EVENt:THResh?
```

Example
```
:SENS1:EVEN:THR -20
:SENS1:EVEN:THR?
-> -2.00000000E+0001<END>
```

Description
- Settings
  <thresh>: Set the threshold value in the range of +20 to -100 dBm.
- Queries
  The command returns the threshold in dBm.

Target AQ2200-202/212/222

:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:DATA?

Function Queries time series power data in the measurement range of Max/Min measurement.

Syntax
```
:SENSe[m][:CHANnel[d]]:FUNCtion:
MINMax:DATA?[<wsp>POWer|STATus]
```

Example
```
:SENS1:FUNC:MINM:DATA?
-> +1.23400000E+000,+1.11570000E+000
<END>
```

Description
- When the parameter is set to POWer or none, the measured data in the measurement range is returned in CSV format. The maximum number of data points is specified by Data Points.
  <Measured value 1>,<Measured value 2>,…, <Measured value n>
  <Measured value x>: Power in exponential format (unit depends on the unit setting)
- When the parameter is set to STATus
  The status of the measured data in the measurement range is returned in CSV format. The maximum number of data points is specified by Data Points.
  <Status1>,<Status2>,…,<Status n>
  <Status x>: Status of measured value x. 0 is normal data. 1 is range over. 2 is range under. 3 is range switching.
- When this command is sent, Max/Min measurement is stopped, and Measure Mode is set to Single.
- This function can be used when Max/Min mode is set to Refresh, Windows, or EventStop.

Target AQ2200-202/212/222

:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:STATe?

Function Queries the event detection state of Event Trigger mode in Max/Min measurement.

Syntax
```
:SENSe[m][:CHANnel[d]]:FUNCtion:
MINMax:EVENt:STATe?
```

Example
```
:SENS1:FUNC:MINM:EVEN:STAT?
-> 0<END>
```

Description
0: Event not detected
1: Event detected but measurement not complete
2: Event detected and measurement complete

Target AQ2200-202/212/222

:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:POSition

Function Sets or queries the trigger position of Event Trigger mode in Max/Min measurement.

Syntax
```
:SENSe[m][:CHANnel[d]]:FUNCtion:
MINMax:EVENt:POSition<wsp>CENTer|END
|TOP
:SENSe[m][:CHANnel[d]]:FUNCtion:
MINMax:EVENt:POSition?
```

Example
```
:SENS1:FUNC:MINM:EVEN:POS CENT
:SENS1:FUNC:MINM:EVEN:POS?
-> CENT<END>
```

Description
- Settings
  CENTer: Sets the event position to Center (50%).
  END: Sets the event position to End (100%).
  TOP: Sets the event position to Top (0%).
- Queries
  CENT: The event position is Center (50%).
  END: The event position is End (100%).
  TOP: The event position is Top (0%).

Target AQ2200-202/212/222

:SENSe[m][:CHANnel[d]]:FUNCtion:PARameter:MINMax

Function Sets or queries the Min/Max measurement mode and the number of data points.
In Min/Max mode, the maximum and minimum of the measured values from the start of the measurement are updated and recorded when they change.

Syntax
```
:SENSe[m][:CHANnel[d]]:FUNCtion:
PARameter:MINMax<wsp>CONTinuous|
WINDow|REFResh,<value>
:SENSe[m][:CHANnel[d]]:FUNCtion:P
ARameter:MINMax?
```

Example
```
:SENS1:FUNC:PAR:MINM CONT
:SENS1:FUNC:PAR:MINM?
-> CONT,+1000<END>
```

Description
- Settings
  Set the following parameters:
  CONTinuous|WINDow|REFResh:
  Measurement modes
  CONTinuous: Continuous measurement mode
  WINDow: Window mode
  REFResh: Refresh mode
  EVENt: Event Trigger mode(AQ2200-202/212/222)
  <value> = 1 to 20000
  1 to 10000 if you are using an AQ2200-221
  The number of data points.
  Default: 1000
  In continuous mode, you do not need to specify <value>.
- Queries
  The command returns the measurement mode as a character string and the number of data points as a signed integer.
  CONT|WIND|REFR,<value>
  CONT|WIND|REFR: Measurement modes
  CONT: Continuous measurement mode
  WIND: Window mode
  REFR: Refresh mode
  EVENt: Event Trigger mode(AQ2200-202/212/222)
  <value>: The number of data points.
  Default: 1000
  In continuous mode, the command returns the number that was previously specified for the <value> parameter.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:FUNCtion:STATe

Function Sets or queries the start and end of the Min/Max measurement.

Syntax
```
:SENSe[m][:CHANnel[d]]:FUNCtion:
STATe<wsp>MINMax,STARt|STOP
:SENSe[m][:CHANnel[d]]:FUNCtion:
STATe?
```

Example
```
:SENS1:FUNC:STAT MINM,STAR
:SENS1:FUNC:STAT?
-> MINMAX,COMPLETE<END>
```

Description
- Settings
  Set the following parameters:
  MINMax: Min/Max measurement mode
  STARt|STOP: Start or stop the measurement
  STARt: Start the measurement
  STOP: Stop the measurement
- Queries
  The command returns the state of the Min/Max measurement and whether the measurement is ongoing or has completed as a character string.
  MINMAX|NONE: The measurement state
  MINMAX: Min/Max measurement mode
  NONE: A state other than Min/Max measurement mode
  PROGRESS|COMPLETE:
  Whether the measurement is ongoing or has completed
  PROGRESS: The Min/Max measurement is ongoing, or the measurement state is NONE.
  COMPLETE: If the Min/Max measurement mode is set to refresh, and all the specified measurement cycles have completed.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:ATIMe

Function Sets or queries the averaging time.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:ATIMe
<wsp>1|2|5|10|100|200|500[US|MS|S]
:SENSe[m][:CHANnel[d]]:POWer:ATIMe?
```

Example
```
:SENS1:POW:ATIM 100MS
:SENS1:POW:ATIM?
-> +1.00000000E-003<END>
```

Description
- Settings
  Set the following parameters:
  1|2|5|10|100|200|500:
  Refer to the table below to specify a number and unit for the averaging time.
  The unit is “s” (seconds) if it is omitted.

Table of Supported Averaging Times

Averaging Time	CW Setting	CHOP Setting
100 us	Yes	
200 us	Yes	
500 us	Yes	
1 ms	Yes	
2 ms	Yes	
5 ms	Yes	
10 ms	Yes	
20 ms	Yes	
50 ms	Yes	Yes
100 ms	Yes	Yes
200 ms	Yes	Yes
500 ms	Yes	Yes
1 s	Yes	Yes
2 s	Yes	Yes
5 s	Yes	Yes
10 s	Yes	Yes

- Queries
  The command returns the averaging time as a floating-point number in units of s.
  Default: 100 MS

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:RANGe

Function Sets or queries the range.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:RANGe
<wsp><value>[DBM]
:SENSe[m][:CHANnel[d]]:POWer:RANGe?
```

Example
```
:SENS1:POW:RANG -30DBM
:SENS1:POW:RANG?
-> -3.00000000E+001<END>
```

Description
- Settings
  Sets the 10 dB step range with numeric data in units of dBm. The settable range depends on the type of sensor.
  AQ2200-211 Sensor Module:
  <value> = +10 to –80
  AQ2200-215 Sensor Module:
  <value> = +30 to –50
  AQ2200-221 Sensor Module:
  <value> = +10 to –60
  AQ2200-212/222 Sensor Module:
  <value> = +10 to –50, or +13
  AQ2200-231/241 Optical Sensor Head:
  <value> = +10 to –70
  AQ2200-232 Optical Sensor Head:
  <value> = +10 to –50, or +13
  AQ2200-242 Optical Sensor Head:
  <value> = +10 to –50
  If the input light does not fall within the measurement range, a range over or range under error will occur.
  For details, see the :SENS1:POW:RANG:STAT? command.
- Queries
  The command returns the range setting as a floating-point number in units of dBm.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO

Function Sets or queries the range switch mode.
If the range is fixed and the input light does not fall within the measurement range, a range over or range under error will occur.
For details, see the `:SENS1:POW:RANG:STAT?` command.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO<wsp>OFF|ON|0|1
:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO?
```

Example
```
:SENS1:POW:RANG:AUTO ON
:SENS1:POW:RANG:AUTO? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Fix the range
  1|ON: Automatically switch the range
- Queries
  The command returns the range switch mode as an unsigned integer.
  0: The range is fixed.
  1: The range switches automatically.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:RANGe:STATe?

Function Queries the state of the input light within the range.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:RANGe:STATe?
```

Example
```
:SENS1:POW:RANG:STAT? -> +0<END>
```

Description The command returns the state of the input light within the range as a signed integer.
+0: Within the range
+1: Range over
+2: Range under
+3: The range is being switched.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:REFerence

Function Sets or queries the relative measurement's reference value.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:REFerence<wsp>TOREF,<value>[PW|NW|UW|MW|Watt|DBM]|DISPlay
:SENSe[m][:CHANnel[d]]:POWer:REFerence?<wsp>TOREF
```

Example
```
:SENS1:POW:REF TOREF,-3DBM
:SENS1:POW:REF? TOREF
-> -3.00000000E+001<END>
```

Description
- Settings
  <value> = –180.0000 to +200.0000
  Enter a value for the relative measurement's reference value in the range of –180.0000 to +200.0000 dBm.
  The unit is pW, nW, µW, mW, W, or dBm.
- Queries
  The command returns the relative measurement's reference value as a floating-point number in units of dBm or W.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:REFerence:DISPlay

Function Sets the reference value to the current measured value.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:REFerence:DISPlay
```

Example
```
:SENS1:POW:REF:DISP
```

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe

Function Sets or queries the relative measurement mode.
If the absolute value's unit is dBm, the displayed unit is dB. If the absolute value's unit is W (abs), the displayed unit is W (rel).

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe<wsp>OFF|ON0|1
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe?
```

Example
```
:SENS1:POW:REF:STAT 1
:SENS1:POW:REF:STAT? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Absolute value measurement mode
  1|ON: Relative value measurement mode
- Queries
  The command returns the relative measurement mode as an unsigned integer.
  0: Absolute value measurement mode
  1: Relative value measurement mode

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio

Function Sets or queries the relative measurement mode parameters.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio<wsp><value1>,<value2>
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio?
```

Example
```
:SENS1:POW:REF:RAT 2,1
```
(Use the measured value from the sensor module of device 1 in slot 2 as the reference and perform a relative measurement.)
```
:SENS1:POW:REF:STAT:RAT TOREF,1
```
(Use the reference value as the reference and perform a relative measurement.)
```
:SENS1:POW:REF:RAT? -> +0,+2,+1<END>
```
(Set the measured value from the sensor module of device 1 in slot 2 as the reference value.)
```
:SENS1:POW:REF:STAT:RAT?
-> +255,+0<END>
```
(The set reference value is the reference.)

Description
- Settings
  Set the following parameters:
  If another device is being used as the reference for relative measurement mode:
  <value1> = 1 to 3 if you are using an AQ2211
  1 to 9 if you are using an AQ2212
  The slot number of the other device.
  <value2> = 1 or 2
  The device number for the device to compare.
  If an absolute value is being used as the reference for relative measurement mode:
  <value1> = 255|TOREF
  <value2> = 1
- Queries
  If another device is being used as the reference for relative measurement mode:
  <value1>,<value2>,<value3>
  <value1> = +0 (fixed)
  <value2> = +1 to +9
  <value3> = +1 or +2
  If an absolute value is being used as the reference for relative measurement mode:
  <value1>,<value2>
  <value1> = +255 (fixed)
  <value2> = +0 (fixed)

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:UNIT

Function Sets or queries the unit (dBm or W).

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:UNIT<wsp>DBM|Watt|0|1
:SENSe[m][:CHANnel[d]]:POWer:UNIT?
```

Example
```
:SENS1:POW:UNIT 1
:SENS1:POW:UNIT? -> +1<END>
```

Description
- Settings
  Set the following parameters:
  0|DBM: Set the unit to dBm
  1|Watt: Set the unit to W
- Queries
  The command returns the unit setting as a signed integer.
  +0: The unit is dBm.
  +1: The unit is W.

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:WAVelength

Function Sets or queries the measurement wavelength.

Syntax
```
:SENSe[m][:CHANnel[d]]:POWer:WAVelength<wsp><value>[NM]
:SENSe[m][:CHANnel[d]]:POWer:WAVelength?[<wsp>MIN|MAX]
```

Example
```
:SENS1:POW:WAV 1550NM
:SENS1:POW:WAV?
-> +1.55000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The user-specified wavelength as a floating-point number
  The wavelength range depends on the sensor type.
  `:SENS:POW:WAV? MAX?` command and `:SENS:POW:WAV? MIN?` command to check the setting range.
  Example: AQ2200-211
  Minimum value: 700.0 nm
  Maximum value: 1700.0 nm
  Unit: pm, nm, µm, mm, or m
  The unit is “m” (meters) if it is omitted.
  MAX: Set to the maximum settable wavelength
  MIN: Set to the minimum settable wavelength
  DEF: Set to the default wavelength
- Queries
  The command returns the measurement wavelength value as a floating-point number in units of m.
  NONE: The current setting
  MIN: The minimum settable wavelength
  MAX: The maximum settable wavelength

Target All sensor modules

:SENSe[m][:CHANnel[d]]:POWer:WAVelength:MDSelect

Function Selects the wavelength setting from the light sources.

Syntax `:SENSe[m][:CHANnel[d]]:POWer:WAVelength:MDSelect<wsp>S<slot>D<device>`

Example `:SENS1:POW:WAV:MDS S2D1`

Description
- Settings
  - <slot>: The slot number of 1 to 9 in which the target light souce is installed.
  - <device>:The device number of 1 or 2 of the target light source.
  - For AQ2200-142, 1 is short wavelength and 2 is long wavelength.
  - Set the wavelength of the specified light source when executing the command as the averaging time of the sensor module.

Target All sensor modules

:SENSe[m]:DATA:ALL?

Function Queries the measured results.

Syntax `:SENSe[m]:DATA:ALL?`

Example `:SENS2:DATA:ALL?`
`-> 0,0,2,75,0.000000E+00,4.000000E+00,5.284299E-11<END>`
history status: There is a bit error.
elapsed time: 7.5 seconds
error count: 4.000000E+00
error rate: 5.284299E–11

Description
- The pieces of information for the measured result are separated by commas.
- The command returns the measured result as a list of integers and floating-point numbers.
  <value1>,<value2>,<value3>,<value4>,<value5>,<value6>,<value7>
  <value1> = 0 to 7
  The current alarm status as an integer.
  bit1: ED CDR unlock alarm
  bit2: System clock error
  (0: None; 1: An error occurred)
  <value2> = 0 to 3
  The current status as an integer.
  bit0: Sync loss
  bit1: Bit error
  (0: None; 1: An error occurred)
  <value3> = 0 to 3
  The history status as an integer.
  bit0: Sync loss
  bit1: Bit error
  (0: None; 1: An error occurred)
  <value4> = 0 to 8640000
  The elapsed time:
  The elapsed measurement time as an integer in units of 100 ms.
  <value5>: Sync loss time as a floating-point number
  Unit: μs
  <value6>: The bit error count as an exponent
  <value7>: The bit error rate as a floating-point number

Target BERT modules (ED)

:SENSe[m]:DATA:ALL:SFRAMe?

Function Queries the measured result (including the results for SDH/SONET frames).

Syntax `:SENSe[m]:DATA:ALL:SFRAMe?`

Example `:SENS2:DATA:ALL:SFRAM?`
`-> 0,0,2,75,0.000000E+00,4.000000E+00,5.284299E-11,1.000000E+00,2.500000E-01<END>`
history status: There is a bit error.
elapsed time: 7.5 seconds
error count: 4.000000E+00
error rate: 5.284299E–11
overhead error count: 1.000000E+00
overhead error rate: 2.500000E–01

Description
- The pieces of information for the measured result are separated by commas.
- The command returns the measured result as a list of integers and floating-point numbers.
  <value1>,<value2>,<value3>,<value4>,<value5>,<value6>,<value7>,<value8>,<value9>
  <value1> = 0 to 7
  The current alarm status as an integer.
  bit1: ED CDR unlock alarm
  bit2: System clock error
  (0: None; 1: An error occurred)
  <value2> = 0 to 7
  The current status as an integer.
  bit0: Sync loss
  bit1: Bit error
  bit2: Overhead bit error
  (0: None; 1: An error occurred)
  <value3> = 0 to 7
  The history status as an integer.
  bit0: Sync loss
  bit1: Bit error
  bit2: Overhead bit error
  (0: None; 1: An error occurred)
  <value4> = 0 to 8640000
  The elapsed measurement time as an integer in units of 100 ms.
  <value5>: Sync loss time as a floating-point number
  Unit: μs
  <value6>: The bit error count as a floating-point number
  <value7>: The bit error rate as a floating-point number
  <value8>: The overhead bit error count

<value9>: The overhead bit error count divided by the bit error count

Target BERT modules (ED)

:SENSe[m]:DATA:ECOunt:BIT?

Function Queries the bit error count.

Syntax `:SENSe[m]:DATA:ECOunt:BIT?`

Example `:SENS2:DATA:ECO:BIT?`
`-> 4.000000E+00<END>`

Description The command returns the bit error count as a floating-point number.
<value>: The bit error count

Target BERT modules (ED)

:SENSe[m]:DATA:ELAPsed?

Function Queries the elapsed measurement time in units of 100 ms.

Syntax `:SENSe[m]:DATA:ELAPsed?`

Example `:SENS2:DATA:ELAP? -> 75<END>`

Description The command returns the elapsed measurement time as an integer.
<value> = 0 to 8640000
The elapsed measurement time in units of 100 ms.

Target BERT modules (ED)

:SENSe[m]:DATA:ERATio:BIT?

Function Queries the bit error rate.

Syntax `:SENSe[m]:DATA:ERATio:BIT?`

Example `:SENS2:DATA:ERAT:BIT?`
`-> 5.284299E-11<END>`

Description The command returns the bit error rate as a floating-point number.
<value>: The bit error rate

Target BERT modules (ED)

:SENSe[m]:DATA:FREQ?

Function Queries the frequency monitor value.

Syntax `:SENSe[m]:DATA:FREQ?`

Example `:SENS2:DATA:FREQ?`
`-> 9.953268,9.955698<END>`

Description The command returns the frequency monitor value as a number.
<value1>,<value2>
<value1> = 9.940000 to 11.330000
PPG clock monitor
Unit: Gbit/s
<value2> = 9.940000 to 11.330000
ED clock monitor
Unit: Gbit/s
0.000000 (if the frequency monitor value is outside of the range)

Target BERT modules (ED)

:SENSe[m]:DATA:IPERiod:ECOunt:BIT?

Function Queries the bit error count for a single period.

Syntax `:SENSe[m]:DATA:IPERiod:ECOunt:BIT?`

Example `:SENS2:DATA:IPER:ECO:BIT?`
`-> 4.000000E-00<END>`

Description The command returns the bit error rate as a floating-point number.
<value>: The bit error count

Target BERT modules (ED)

:SENSe[m]:DATA:IPERiod:ERATio:BIT?

Function Queries the bit error rate for a single period.

Syntax `:SENSe[m]:DATA:IPERiod:ERATio:BIT?`

Example `:SENS2:DATA:IPER:ERAT:BIT?`
`-> 5.284299E-11<END>`

Description The command returns the bit error rate as a floating-point number.
<value>: The bit error rate

Target BERT modules (ED)

:SENSe[m]:DATA:IPERiod:ALL?

Function Queries the measured value for a single period.

Syntax `:SENSe[m]:DATA:IPERiod:ALL?`

Example `:SENS2:DATA:IPER:ALL?`
`-> 0,0,2,75,0.000000E+00,4.000000E+00,`
`5.284299E-11<END>`
history status: There is a bit error.
elapsed time: 7.5 sec
error count: 4.000000E+00
error rate: 5.284299E–11

Description
- The measured value for a single period differs depending on the measurement mode.
  Single: From the start of measurement to the point when the measurement time expires
  Manual: From the start of measurement to the point when measurement is terminated (after 10 days if the measurement is not manually terminated)
  Repeat: From the start of the measurement cycle to the point when one measurement cycle finishes. The pieces of information for the measured result are separated by commas.
- The command returns the measured result as a list of integers and floating-point numbers.
  <value1>,<value2>,<value3>,<value4>,
  <value5>,<value6>,<value7>
  <value1> = 0 to 7
  The current alarm status as an integer.
  bit1: ED CDR unlock alarm
  bit2: System clock error
  (0: None; 1: An error occurred)

<value2> = 0 to 3
The last status as an integer.
bit0: Sync loss
bit1: Bit error
(0: None; 1: An error occurred)
<value3> = 0 to 3
The history status as an integer.
bit0: Sync loss
bit1: Bit error
(0: None; 1: An error occurred)
<value4> = 0 to 8640000
The measurement time as an integer in units of 100 ms.
<value5>: Sync loss time as a floating-point number
Unit: μs
<value6>: The bit error count as a floating-point number
<value7>: The bit error rate as a floating-point number
During measurement or if the measurement is stopped through an operation that the user performs (a screen operation or a remote command), when the measurement mode is single or manual, the elapsed time, sync loss, and error rate all are set to 0 or 0.000000E+00.
If the measurement mode is repeat, you can query the measured result from the previous cycle.
Until the measurement for the cycle completes, the elapsed time, sync loss, and error rate are all 0 or 0.000000E+00.

Target BERT modules (ED)

:SENSe[m]:DATA:IPERiod:ALL:SFRAMe?

Function Queries the measured value (including the measured values for SDH/SONET frames) for a single period.

Syntax `:SENSe[m]:DATA:IPERiod:ALL:SFRAMe?`

Example
```
:SENS2:DATA:IPER:ALL:SFRAM?
-> 0,0,2,75,0.000000E+00,4.000000E+00,
5.284299E-11, 1.000000E+00,
2.500000E-01<END>
```
history status: There is a bit error.
elapsed time: 7.5 seconds
error count: 4.000000E+00
error rate: 5.284299E–11
overhead error count: 1.000000E+00
overhead error rate: 2.500000E–01

Description
- The measured value for a single period differs depending on the measurement mode.
  Single: From the start of measurement to the point when the measurement time expires
  Manual: From the start of measurement to the point when measurement is terminated (after 10 days if the measurement is not manually terminated)
  Repeat: From the start of the measurement cycle to the point when one measurement cycle finishes. The pieces of information for the measured result are separated by commas.
- The command returns the measured result as a list of integers and floating-point numbers.
  <value1>,<value2>,<value3>,<value4>,<value5>,<value6>,<value7>,<value8>,<value9>
  <value1> = 0 to 7
  The current alarm status as an integer.
  bit1: ED CDR unlock alarm
  bit2: System clock error
  (0: None; 1: An error occurred)
  <value2> = 0 to 7
  The last status as an integer.
  bit0: Sync loss
  bit1: Bit error
  bit2: Overhead bit error
  (0: None; 1: An error occurred)
  <value3> = 0 to 7
  The history status as an integer.
  <value4> = 0 to 8640000
  The measurement time as an integer in units of 100 ms.
  <value5>: Sync loss time as a floating-point number
  Unit: μs
  <value6>: The bit error count as a floating-point number
  <value7>: The bit error rate as a floating-point
  <value8>: The overhead bit error count as a floating-point number
  <value9>: The overhead bit error count divided by the bit error count as a floating-point number

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern

Function Sets or queries the input data pattern.

Syntax
```
:SENSe[m]:DATA:PATTern<wsp>
PRBS|PROG256|PROG64M|SFRAM
:SENSe[m]:DATA:PATTern?
```

Example
```
:SENS2:DATA:PATT PRBS
:SENS2:DATA:PATT? -> PRBS<END>
```

Description
- Settings
  Set the following parameters:
  PRBS: The pseudo random bit sequence
  PROG256: The short program pattern (256 bits maximum)
  PROG64M: The long program pattern (64 Mbits maximum; /M option)
  SFRAM: The SDH/SONET frame pattern (/P1 option)
  Default: PRBS
- Queries
  The command returns the input data pattern as a character string.
  PRBS|PROG256|PROG64M|SFRAM

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern:PRBS:LENgth

Function Sets or queries the number of PRBS steps of the input data.

Syntax
```
:SENSe[m]:DATA:PATTern:PRBS:LENgth
<wsp>PRBS7|PRBS9|PRBS10|PRBS11|
PRBS15|PRBS23|PRBS31
:SENSe[m]:DATA:PATTern:PRBS:LENgth?
```

Example
```
:SENS2:DATA:PATT:PRBS:LEN PRBS7
:SENS2:DATA:PATT:PRBS:LEN?
-> PRBS7<END>
```

Description
- Settings
  Set the following parameters:
  PRBS7: The generated polynomial is a 1 + X6 + X7 pseudo-random pattern.
  PRBS9: The generated polynomial is a 1 + X5 + X9 pseudo-random pattern.
  PRBS10: The generated polynomial is a 1 + X7 + X10 pseudo-random pattern.
  PRBS11: The generated polynomial is a 1 + X9 + X11 pseudo-random pattern.
  PRBS15: The generated polynomial is a 1 + X14 + X15 pseudo-random pattern.
  PRBS23: The generated polynomial is a 1 + X18 + X23 pseudo-random pattern.
  PRBS31: The generated polynomial is a 1 + X28 + X31 pseudo-random pattern.
  Default: PRBS9
- Queries
  The command returns the number of PRBS steps as a character string.
  PRBS7|PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern:PROGram:DATA

Function Sets or queries the short program pattern of the input data.

Syntax
```
:SENSe[m]:DATA:PATTern:PROGram:DATA
<wsp><value>,<Block>
:SENSe[m]:DATA:PATTern:PROGram:DATA?
<wsp><value>
```

Example
```
:SENS2:DATA:PATT:PROG:DATA 1,
#2101A2B3C4D5E
```
This example sets the 5 bytes 1A 2B 3C 4D 5E into position1.
```
:SENS2:DATA:PATT:PROG:DATA? 1
-> #2640102030405060708091011121314151
6171819202122232425262728293031 32<END>
```
This example queries position1, and the command returns the following 32 bytes:
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Description
- When you are using the long program pattern, `:SOURce:DATA:PATTern:PROGram:DATA` command is applied, so there is no need to use this command to set the short program pattern.
- Settings
  Set the following parameters:
  <value1> = 1 (fixed to 1 byte)
  The position (position1).
  <Block>: Data that contains 8-bit values
  The syntax is as follows:
  #N<N-digit decimal number><data byte sequence>
  #N = 1 or 2
  The number of digits in the <N-digit decimal number>.
  <N-digit decimal number> = 1 to 64
  <Data Byte Sequence> Character String
  <data byte sequence> = 0 to 9|A|B|C|D|E|F
  Hexadecimal numbers
  When you are using the long program pattern, :SOURce:DATA:PATTern:PROGram:DATA command is applied, so there is no need to use this command to set the short program pattern.
- Queries
  The command returns the 32-byte short program pattern that you specify with the parameters.
  #N<N-digit decimal number><data byte sequence>

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern:PROGram:DATA:PRESet

Function Sets the short program pattern of the input data to the default value.

Syntax `:SENSe[m]:DATA:PATTern:PROGram:DATA:PRESet`

Example `:SENS2:DATA:PATT:PROG:DATA:PRES`

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern:PROGram:LENgth

Function Sets or queries the input data's program pattern length.

Syntax
```
:SENSe[m]:DATA:PATTern:PROGram:LENgth<wsp><value>
:SENSe[m]:DATA:PATTern:PROGram:LENgth?
```

Example
```
:SENS2:DATA:PATT:PROG:LEN 16
:SENS2:DATA:PATT:PROG:LEN?
-> 16<END>
```

Description
- Settings
  Set the following parameters:
  `:SENS1:DATA:PATT:` is PROG256:
  <value> = 16 to 256 (in 1-bit steps)
  `:SENS1:DATA:PATT:` is PROG64M:
  <value> = 256 to 67108864 (in 128-bit steps)
- Queries
  The command returns the program pattern length as an unsigned integer.
  `:SENS1:DATA:PATT:` is PROG256:
  16 to 256 (in 1-bit steps)
  `:SENS1:DATA:PATT:` is PROG64M:
  256 to 67108864 (in 128-bit steps)

Target BERT modules (ED) with the /P1 option

:SENSe[m]:DATA:PATTern:SFRAMe:PRBS:LENgth

Function Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the input data.

Syntax
```
:SENSe[m]:DATA:PATTern:SFRAMe:PRBS:LENgth<wsp>PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31
:SENSe[m]:DATA:PATTern:SFRAMe:PRBS:LENgth?
```

Example
```
:SENS2:DATA:PATT:SFRAM:PRBS:LEN PRBS9
:SENS2:DATA:PATT:SFRAM:PRBS:LEN?
-> PRBS9<END>
```

Description
- Settings
  Set the following parameters:
  PRBS9: The generated polynomial is a 1 + X5 + X9 pseudo-random pattern.
  PRBS10: The generated polynomial is a 1 + X7 + X10 pseudo-random pattern.
  PRBS11: The generated polynomial is a 1 + X9 + X11 pseudo-random pattern.
  PRBS15: The generated polynomial is a 1 + X14 + X15 pseudo-random pattern.
  PRBS23: The generated polynomial is a 1 + X18 + X23 pseudo-random pattern.
  PRBS31: The generated polynomial is a 1 + X28 + X31 pseudo-random pattern.
  Default: PRBS9
- Queries
  The command returns the number of PRBS steps as a character string.
  PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31

Target BERT modules (ED)

:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead :SOH:DATA

Function Sets or queries the overhead pattern within the SDH/SONET frame of the input data.

Syntax
```
:SENSe[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA<wsp>PRBS9|PRBS10|
PRBS11|PRBS15|PRBS23|PRBS31
:SENSe[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA?
```

Example
```
:SENS2:DATA:PATT:SFRAM:OVER:SOH:
DATA PRBS9
:SENS2:DATA:PATT:SFRAM:OVER:SOH:
DATA?
-> PRBS9<END>
```

Description
- Settings
  Set the following parameters:
  PRBS9: The generated polynomial is a 1 + X5 + X9 pseudo-random pattern.
  PRBS10: The generated polynomial is a 1 + X7 + X10 pseudo-random pattern.
  PRBS11: The generated polynomial is a 1 + X9 + X11 pseudo-random pattern.
  PRBS15: The generated polynomial is a 1 + X14 + X15 pseudo-random pattern.
  PRBS23: The generated polynomial is a 1 + X18 + X23 pseudo-random pattern.
  PRBS31: The generated polynomial is a 1 + X28 + X31 pseudo-random pattern.
  Default: PRBS9
- Queries
  The command returns the overhead pattern setting as a character string.
  PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31

Target BERT modules (ED) with the /P1 option

:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead :SOH:DATA:PRESet

Function Sets the overhead pattern within the SDH/SONET frame of the input data to the default value.

Syntax
```
:SENSe[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA:PRESet
```

Example
```
:SENS2:DATA:PATT:SFRAM:OVER:SOH:
DATA:PRES
```

Target BERT modules (ED) with the /P1 option

:SENSe[m]:DATA:POLarity

Function Sets or queries the data input logic.

Syntax
```
:SENSe[m]:DATA:POLarity<wsp>POS|NEG
:SENSe[m]:DATA:POLarity?
```

Example
```
:SENS2:DATA:POL POS
:SENS2:DATA:POL? -> POS<END>
```

Description
- Settings
  Set the following parameters:
  POS: Positive logic
  NEG: Negative logic
  Default: POS
- Queries
  The command returns the data input logic as a character string.
  POS|NEG

Target BERT modules (ED)

:SENSe[m]:DATA:TEST:MODE

Function Sets or queries the measurement mode.

Syntax
```
:SENSe[m]:DATA:TEST:MODE<wsp>SING|
MANU|REP
:SENSe[m]:DATA:TEST:MODE?
```

Example
```
:SENS2:DATA:TEST:MODE SING
:SENS2:DATA:TEST:MODE? -> SING<END>
```

Description
- Settings
  Set the following parameters:
  SING: Single mode
  MANU: Manual mode
  REP: Repeat mode
  Default: SING
- Queries
  The command returns the measurement mode as a character string.
  SING|MANU|REP

Target BERT modules (ED)

:SENSe[m]:DATA:TEST:TIME

Function Sets or queries the measurement time.

Syntax
```
:SENSe[m]:DATA:TEST:TIME<wsp>
<value1>,<value2>,<value3>,<value4>
:SENSe[m]:DATA:TEST:TIME?
```

Example
```
:SENS2:DATA:TEST:TIME 2,15,10,30
:SENS2:DATA:TEST:TIME?
-> 2,15,10,30<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 0 to 10
  The days
  <value2> = 0 to 23
  The hours
  <value3> = 0 to 59
  The minutes
  <value4> = 0 to 59
  The seconds
  You cannot specify 0 seconds ("0,0,0,0").
  The maximum time that you can specify is 10 days.
- Queries
  The command returns the measurement time as an integer.

Target BERT modules (ED)

:SENSe[m]:LOS[:LEVel]

Function Sets or queries the LOS detection level.

Syntax
```
:SENSe[m]:LOS[:LEVel]<wsp><value>
:SENSe[m]:LOS[:LEVel]?
```

Example
```
:SENS1:LOS -10.0
:SENS1:LOS? -> -10.0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –19.0 to 2.0 (in 0.1 dBm steps)
  Default: –16.0 (if the wavelength is set to 1500NM)
  –15.0 (if the wavelength is set to 1300NM)
- Queries
  The command returns the LOS detection level as a number.
  –19.0 to 2.0 (in 0.1 dBm steps)

Target 10 Gbit/s optical receivers

:SENSe[m]:OVER[:LEVel]

Function Sets or queries the OVERLOAD detection level.

Syntax
```
:SENSe[m]:OVER[:LEVel]<wsp><value>
:SENSe[m]:OVER[:LEVel]?
```

Example
```
:SENS1:OVER -10.0
:SENS1:OVER? -> -10.0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –19.0 to 2.0 (in 0.1 dBm steps)
  Default: –1.0
- Queries
  The command returns the OVERLOAD detection level as a number.
  –19.0 to 2.0 (in 0.1 dBm steps)

Target 10 Gbit/s optical receivers

:SENSe[m]:SYNC:AUTO

Function Sets or queries the automatic synchronization operation.

Syntax
```
:SENSe[m]:SYNC:AUTO<wsp>OFF|ON
:SENSe[m]:SYNC:AUTO?
```

Example
```
:SENS2:SYNC:AUTO ON
:SENS2:SYNC:AUTO? -> ON<END>
```

Description
- Settings
  Set the following parameters:
  OFF: Do not use the automatic synchronization operation
  ON: Use the automatic synchronization operation
  Default: ON
- Queries
  The command returns the automatic synchronization operation setting as a character string.
  OFF|ON

Target BERT modules (ED)

:SENSe[m]:THReshold:DATA

Function Sets or queries the data threshold level.

Syntax
```
:SENSe[m]:THReshold:DATA<wsp><value>
:SENSe[m]:THReshold:DATA?
```

Example
```
:SENS1:THR:DATA 150
:SENS1:THR:DATA? -> 150<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –364 to 273 (in single steps)
  Default: 0
- Queries
  The command returns the data threshold level as an integer.
  –364 to 273 (in single steps)

Target 10 Gbit/s optical receivers

5.15 SLOT Group

:SLOT[m]:EMPTy?

Function Queries the installation state of the frame controller's slots.

Syntax `:SLOT[m]:EMPTy?`

Example `:SLOT1:EMPT? -> 0<END>`

Description The command returns the installation state of the specified frame controller slot as an unsigned integer.
0: A module is installed in the slot.
1: The slot is vacant.

Target Frame controller

:SLOT[m]:HEAD[d]:EMPTy?

Function Queries the sensor head's connection state.

Syntax `:SLOT[m]:HEAD[d]:EMPTy?`

Example `:SLOT1:HEAD:EMPT? -> 0<END>`

Description The command returns the connection state of the sensor head as an unsigned integer.
0: A sensor head is connected.
1: No sensor head is connected.

Target AQ2200-201 and A2200-202

:SLOT[m]:HEAD[d]:IDN?

Function Queries the sensor head's information.

Syntax `:SLOT[m]:HEAD[d]:IDN?`

Example `:SLOT1:HEAD:IDN?`
`-> YOKOGAWA,AQ2200-231 OPTICAL HEAD, 123456789,01.01<END>`

Description
- The pieces of information for the measured result are separated by commas.
  If you send this command to a module that is not a sensor head, the command will return the same module information as the `:SLOT1:IDN?` command.
- The command returns the following sensor head information in the following format.
  <Company name>,<product name>,<serial number>,<software version>

Target All sensor heads

:SLOT[m]:HEAD[d]:OPTions?

Function Queries the sensor head's detailed information.

Syntax `:SLOT[m]:HEAD[d]:OPTions?`

Example `:SLOT1:HEAD:OPT?`
`-> MS-810518907/SCC,NONE,1.00,01.00, 0,0,400NM-1100NM,0,0<END>`

Description
- The pieces of information for the measured result are separated by commas.
  If you send this command to a module that is not a sensor head, the command will return the same module information as the `:SLOT1:OPT?` command.
- The command returns the sensor head's detailed information.
  <Field1>,<Field2>,<Field3>,<Field4>,<Field5>, <Field6>,<Field7>,<Field8>,<Field9>
  For details, see appendix 1.

Target All sensor heads

:SLOT[m]:HEAD[d]:TST?

Function Queries the sensor head's self-test result.

Syntax `:SLOT[m]:HEAD[d]:TST?`

Example `:SLOT1:HEAD:TST?`
`-> +0,"self-test OK"<END>`

Description The command returns the self-test result in the following format.
<value>,<"string">
<value>: Error number as a signed integer
However, +0 indicates that there were no errors during the self-test.
<"string">: The error information
For more details on the error information, see section 8.2.

Target All sensor heads

:SLOT[m]:IDN?

Function Queries the module information.

Syntax `:SLOT[m]:IDN?`

Example `:SLOT1:IDN?`
`-> YOKOGAWA,AQ2200-211 SENSORMODULE, 123456789,01.01<END>`

Description
- The pieces of information for the measured result are separated by commas.
- The command returns the module information in the following format.
  <Company name>,<product name>,<serial number>,<software version>
  If you use this command with an interface module that is combined with an optical sensor head (such as an AQ2200-201 combined with an AQ2200-231), you can only query the interface module information.
  To query the optical sensor head information, see the `:SLOT[m]:HEAD[d]:IDN?` command.

Target All modules

:SLOT[m]:OPC?

Function Queries the command's process state.

Syntax `:SLOT[m]:OPC?`

Example `:SLOT1:OPC? -> 0<END>`

Description This command returns the command's process state as an integer.
0: The command is in process.
1: The command has finished processing.

Target BERT modules, 10 Gbit/s optical modulators, and 10 Gbit/s optical receivers

:SLOT[m]:OPTions?

Function Queries the module's detailed information.

Syntax `:SLOT[m]:OPTions?`

Example `:SLOT1:OPT?`
`-> MS-123456789-M,NONE,1.00,1.00,0, 0,700NM-1700NM,NONE,0<END>`
(For all modules except for BERT modules, 10 Gbit/s optical modulators, and 10 Gbit/s optical receivers)
`:SLOT1:OPT? -> 65539<END>`
(For BERT modules)
`:SLOT1:OPT? -> 4<END>`
(For 10 Gbit/s optical modulators and 10 Gbit/s optical receivers)

Description
- The pieces of information for the measured result are separated by commas.
- The command returns the module's detailed information in the following format.
  For all modules except for BERT modules, 10 Gbit/s optical modulators, and 10 Gbit/s optical receivers:
  <Field1>,<Field2>,<Field3>,<Field4>,<Field5>,<Field6>,<Field7>,<Field8>,<Field9>
  For details, see appendix 1.

For BERT modules:

Bit	31	30	29	...	1	0

Module	Bit	Item	Acquired Value
PPG/ED	1-0	ATT	11 (fixed)
	15 to 2	Unused	All 0
	16	Long program pattern feature	1: Present 0: Not present
	17	SDH/SONET frame pattern feature	1: Present 0: Not present
	31 to 17	Unused	All 0
SG	31 to 0	Not used	All 0

For 10 Gbit/s optical modulators:

Bit	7	6	5	4	3	2	1	0

Bit	Item	Acquired Value
1 to 0	Wavelength	00: 1.5 µm 01: 1.3 µm
2	LN type	0: Z-cut 1: X-cut
3	Unused	0
4	ABC bias point	0: Center
7 to 5	Unused	0

For 10 Gbit/s optical receivers:

Bit	7	6	5	4	3	2	1	0

Bit	Item	Acquired Value
2 to 0	Wavelength	011: 1.3 µm/1.5 µm
3	PD type	0: PIN-PD
4	Unused	0
5	Option2	1: Limiting amp
6	Bitrate	0: 10 Gbit/s
7	Logic	0: Normal

Target All modules

:SLOT[m]:PRESet

Function Sets all the modules' parameters to their default values.
This command is an overlap command.

Syntax `:SLOT[m]:PRESet`

Example `:SLOT1:PRES`

Target All modules

:SLOT[m]:TST?

Function Queries the self-test result.

Syntax :SLOT[m]:TST?

Example `:SLOT1:TST? -> +0,"self-test OK"<END>`

Description The command returns the self-test result in the following format.

For all modules except for BERT modules, 10 Gbit/s optical modulators, and 10 Gbit/s optical receivers:

<value>,<"string">

<value>: Error number as a signed integer
However, +0 indicates that there were no errors during the self-test.

<"string">: The error information as a character string
For more details on the error information, see section 8.2.

For BERT modules:

Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Module	Bit	Item
SG	0	Upgrade memory error
	1	ID data memory error
	2	Temperature alarm
	7-3	Not used
PPG/ED	0	Upgrade memory error
	1	ID data memory error
	2	Temperature alarm
	6-3	Not used
	7	FPGA configuration error

For 10 Gbit/s optical modulators:

Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Bit	Item
0	Upgrade memory error
1	ID data memory error
2	Temperature alarm
6-3	Not used
7	A/D error

For 10 Gbit/s optical receivers:

Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Bit	Item
0	Upgrade memory error
1	ID data memory error
2	Temperature alarm
6-3	Not used
7	A/D error

For SG modules

Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Bit	Item
0	Upgrade memory error
1	ID data memory error
7-2	Not used

For Transceiver I/F modules

Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Bit	Item
0	Upgrade memory error
1	ID data memory error
7-2	Not used

Target All modules

5.16 SOURce Group

:SOURce[m]:ABC:RESet

Function Resets the auto bias control.

Syntax `:SOURce[m]:ABC:RESet`

Example `:SOUR1:ABC:RES`

Target 10 Gbit/s optical modulators

:SOURce[m]:ABC:SLOPe

Function Sets the auto bias control's slope.

Syntax `:SOURce[m]:ABC:SLOPe<wsp>POS|NEG`
`:SOURce[m]:ABC:SLOPe?`

Example `:SOUR1:ABC:SLOP POS`
`:SOUR1:ABC:SLOP? -> POS<END>`

Description
- However, if :SOUR:ABC:STAT is off, you cannot set the slope.
- Settings
  Set the following parameters:
  POS: Lock the auto bias control to the positive side
  NEG: Lock the auto bias control to the negative side
  Default: POS
- Queries
  The command returns the auto bias control's slope as a character string.
  POS|NEG

Target 10 Gbit/s optical modulators

:SOURce[m]:ABC:STATe

Function Sets or queries the auto bias control's on/off status.

Syntax `:SOURce[m]:ABC:STATe<wsp>OFF|ON`
`:SOURce[m]:ABC:STATe?`

Example `:SOUR1:ABC:STAT OFF`
`:SOUR1:ABC:STAT? -> OFF<END>`

Description
- Settings
  Set the following parameters:
  OFF: Turn the auto bias control off
  ON: Turn the auto bias control on
  Default: ON
- Queries
  The command returns the auto bias control's on/off status as a character string.
  OFF|ON

Target 10 Gbit/s optical modulators

:SOURce[m]:AMPLitude

Function Sets or queries the driver output amplitude.

Syntax `:SOURce[m]:AMPLitude<wsp><value>`
`:SOURce[m]:AMPLitude?`

Example `:SOUR1:AMPL 0`
`:SOUR1:AMPL? -> 0<END>`

Description
- Settings
  Set the following parameters:
  <value> = 0 to 255 (in single steps)
  Default:
  180 (If the wavelength is 1.55 μm and the crystal orientation of the LN modulator is X-cut.)
  160 (If the wavelength is 1.55 μm and the crystal orientation of the LN modulator is Z-cut.)
  150 (If the wavelength is 1.33 μm and the crystal orientation of the LN modulator is X-cut.)
  130 (If the wavelength is 1.33 μm and the crystal orientation of the LN modulator is Z-cut.)
- Queries
  The command returns the driver output amplitude as an integer.
  0 to 255 (in single steps)

Target 10 Gbit/s optical modulators

:SOURce[m]:BIAS

Function Sets or queries the DC bias of the LN modulator.

Syntax `:SOURce[m]:BIAS<wsp><value>`
`:SOURce[m]:BIAS?`

Example `:SOUR1:BIAS -10`
`:SOUR1:BIAS? -> -10<END>`

Description
- If `:SOUR:ABC:STAT` is on, you cannot set the DC bias.
- Settings
  Set the following parameters:
  <value> = –10.00 to 9.90 (in 0.01 steps)
  Unit: V
  Default: 0.00
- Queries
  The command returns the DC bias value of the LN modulator as a number.
  –10.000000 to 9.900000 (in 0.010000 V steps)

Target 10 Gbit/s optical modulators

:SOURce[m][:CHANnel[d]]:AM:FREQuency

Function Sets or queries the internal modulation frequency.

Syntax
```
:SOURce[m][:CHANnel[d]]:AM:
FREQuency<wsp><value>[HZ|KHZ]
:SOURce[m][:CHANnel[d]]:AM:
FREQuency?
```

Example
```
:SOUR1:AM:FREQ 270HZ
:SOUR1:AM:FREQ?
-> +2.70000000E+002<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.10 to 300.00 (in 0.01 kHz steps)
  Settable range: 0.10 to 300.00 kHz
  The unit is "Hz" (hertz) if it is omitted.
  Unit: Hz or kHz
- Queries
  The command returns the internal modulation frequency as a floating-point number in units of Hz.

Target DFB-LD modules and all FP-LD modules

:SOURce[m][:CHANnel[d]]:AM:SOURce

Function Sets or queries the modulation mode.

Syntax
```
:SOURce[m][:CHANnel[d]]:AM:SOURce
<wsp>INT|AEXT|DEXT|0|2|3
:SOURce[m][:CHANnel[d]]:AM:SOURce?
```

Example
```
:SOUR1:AM:SOUR 0
:SOUR1:AM:SOUR? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|INT: Internal modulation
  2|AEXT: External SINE modulation
  3|DEXT: External CHOP modulation
  For all FP-LD modules, you can only specify 0|INT.
  Any other modulation modes will generate an error.
  If the DFB-LD does not have options for external CHOP or SINE modulation, you cannot use these modulations.
- Queries
  The command returns the modulation mode setting as a signed integer.
  +0: Internal modulation
  +2: External SINE modulation
  +3: External CHOP modulation

Target DFB-LD modules and all FP-LD modules

:SOURce[m][:CHANnel[d]]:AM:STATe

Function Sets or queries the modulation feature's on/off status.

Syntax
```
:SOURce[m][:CHANnel[d]]:AM:STATe
<wsp>OFF|ON|0|1
:SOURce[m][:CHANnel[d]]:AM:STATe?
```

Example
```
:SOUR1:AM:STAT ON
:SOUR1:AM:STAT? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Turn the modulation feature off
  1|ON: Turn the modulation feature on
- Queries
  The command returns the state of the modulation feature as an unsigned integer.
  0: The modulation feature is off.
  1: The modulation feature is on.

Target DFB-LD modules and all FP-LD modules

:SOURce[m][:CHANnel[d]]:FREQuency[/]

Function Sets or queries the optical frequency.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency[/]
<wsp><value>[THZ|GHZ]|MAX|MIN|DEF
:SOURce[m][:CHANnel[d]]:FREQuency[/]?
[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:FREQ 192.500THZ
:SOUR1:FREQ? -> 1.92000000E+014<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: The user-specified optical frequency
  Unit: THz or GHz
  MAX: Set to the maximum settable optical frequency
  MIN: Set to the minimum settable optical frequency
  DEF: Set to the default optical frequency
- Queries
  The command returns the optical frequency that you specify with the parameters. The returned value is a floating-point number in units of Hz.
  NONE: The optical frequency that is currently set
  MIN: The minimum settable optical frequency
  MAX: The maximum settable optical frequency
  DEF: The default optical frequency
- If you are using an AQ2200-111, AQ2200-136, AQ2200-131, AQ2200-132 or AQ2200-141, omit the "/" or enter 1.
  If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the "/."
  If the "/" is omitted, these values will both be set to 1.
  Because the AQ2200-141 and AQ2200-142 modules do not have features that enable you to set their optical frequencies, the command will return the same value for queries of these modules' MAX, MIN, and DEF values.

Target DFB-LD modules, all FP-LD modules, TLS modules, and Grid TLS modules (Available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:FREQuency:AONCe

Function Sets the optical frequencies of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
AONCe<wsp><value1>[THZ|GHZ]|MAX|MIN|
DEF,<value2>[THZ|GHZ]|MAX|MIN|DEF
```

Example
```
:SOUR1:FREQ:AONC 227.600THZ,
227.600THZ
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Optical frequency of channel 1
  <value2>: Optical frequency of channel 2
  Unit: THz or GHz
  MAX: The maximum settable optical frequency
  MIN: The minimum settable optical frequency
  DEF: The default optical frequency
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m] [:CHANnel[d]]:FREQuency:CHANnel

Function Sets or queries the grid number.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
CHANnel<wsp><value>|MIN|MAX|DEF
:SOURce[m][:CHANnel[d]]:FREQuency:
CHANnel?<wsp>[MIN|MAX|DEF]
```

Example
```
:SOUR1:FREQ:CHAN +2
:SOUR1:FREQ:CHAN? -> +2<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: Grid number
  MAX: The maximum settable grid number
  MIN: The minimum settable grid number
  DEF: The default grid number
- Queries
  The command returns the grid number as a signed integer.
- If the grid mode is off, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:FREQuency:CHANnel:AONCe

Function Sets the grid numbers of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
CHANnel:AONCe<wsp><value1>|MIN|MAX|
DEF,<value2>|MIN|MAX|DEF
```

Example
```
:SOUR1:FREQ:CHAN:AONC +2,+2
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Grid number of channel 1
  <value2>: Grid number of channel 2
  MAX: The maximum settable grid number
  MIN: The minimum settable grid number
  DEF: The default grid number
- If the grid mode is off, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:FREQuency:DISPlay:OFFSet

Function Sets or queries the frequency display offset.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
DISPlay:OFFSet<wsp><value>[HZ|KHZ|
MHZ|GHZ|THZ]
:SOURce[m][:CHANnel[d]]:FREQuency:
DISPlay:OFFSet?
```

Example
```
:SOUR1:FREQ:DISP:OFFS -5.1GHZ
:SOUR1:FREQ:DISP:OFFS?
-> -5.10000000E+009<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –10.0 GHz to +10.0 GHz
  Frequency offset
  Unit: Hz, kHz, MHz, GHz, or THz
  The unit is set to “Hz” (hertz) if the unit is omitted.
- Queries
  The command returns the frequency offset as a signed floating-point number in units of Hz.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:FREQuency:GRID

Function Sets or queries the frequency spacing of each grid.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
GRID<wsp>25GHZ|50GHZ|100GHZ|<value>
[HZ|KHZ|MHZ|GHZ|THZ]|MIN|MAX|DEF
:SOURce[m][:CHANnel[d]]:FREQuency:
GRID?<wsp>[MIN|MAX|DEF]
```

Example
```
:SOUR1:FREQ:GRID 25GHZ
:SOUR1:FREQ:GRID?
-> 2.50000000E+010<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  25GHZ|50GHZ|100GHZ:
  Grid frequency spacing
  <value> = 0.1 GHz to 400.0 GHz
  Grid frequency spacing when the grid spacing is set to Manual.
  MAX: The maximum settable grid frequency spacing
  MIN: The minimum settable grid frequency spacing
  DEF: The default grid frequency spacing
- Queries
  The command returns the grid frequency spacing as a floating-point number in units of Hz.
- If the grid mode is off, an error will occur.
- If the suffix code is -T4, you cannot set 25 GHz or <value>.
- If the optical output is on and the grid frequency spacing is changed in the following manner, an error will occur.
  When the spacing is changed from <value> to 25GHz|50GHz|100GHz.
  When the spacing is changed from 25GHz|50GHz|100GHz to <value>.
- When the grid frequency spacing is 25GHz|50GHz|100GHz, this command does not operate as an overlap command.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:FREQuency:GRID:AONCe

Function Sets the frequency spacing of each grid for channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
GRID:AONCe<wsp>25GHZ|50GHZ|100GHZ|
<value1>[HZ|KHZ|MHZ|GHZ|THZ]|MIN|MAX
|DEF,25GHZ|50GHZ|100GHZ|<value2>[HZ|
KHZ|MHZ|GHZ|THZ]|MIN|MAX|DEF
```

Example
```
:SOUR1:FREQ:GRID:AONC 25GHz,25GHz
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1> = 0.1 GHz to 400.0 GHz
  Grid frequency spacing of channel 1 when the grid spacing is set to Manual.
  <value2> = 0.1 GHz to 400.0 GHz
  Grid frequency spacing of channel 2 when the grid spacing is set to Manual.
  MAX: The maximum settable grid frequency spacing
  MIN: The minimum settable grid frequency spacing
  DEF: The default grid frequency spacing
- If the grid mode is off, an error will occur.
- If the suffix code is -T4, you cannot set 25 GHz, <value1>, or <value2>.
- If the optical output is on and the grid frequency spacing is changed in the following manner, an error will occur.
  When the spacing is changed from <value1> or <value2> to 25GHz|50GHz|100GHz.
  When the spacing is changed from 25GHz|50GHz|100GHz to <value1> or <value2>.
- When the grid frequency spacing is 25GHz|50GHz|100GHz, this command does not operate as an overlap command.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:FREQuency:OFFSet

Function Sets or queries the fine tuning value of the frequency.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
OFFSet<wsp><value>[HZ|KHZ|MHZ|GHZ|
THZ]|MIN|MAX|DEF
:SOURce[m][:CHANnel[d]]:FREQuency:
OFFSet?<wsp>[MIN|MAX|DEF]
```

Example
```
:SOUR1:FREQ:OFFS +0.001GHZ
:SOUR1:FREQ:OFFS?
-> +1.00000000E+006<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: Frequency fine tuning value
  MAX: The maximum settable frequency fine tuning value
  MIN: The minimum settable frequency fine tuning value
  DEF: The default frequency fine tuning value
- Queries
  The command returns the frequency fine tuning value as a signed floating-point number in units of Hz.
- If the optical output is off, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (suffix code: -T2 and -T6)

:SOURce[m][:CHANnel[d]]:FREQuency:OFFSet:AONCe

Function Sets the frequency fine tuning values of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:
OFFSet:AONCe<wsp><value1>[HZ|KHZ|MHZ
|GHZ|THZ]|MIN|MAX|DEF,<value2>[HZ|
KHZ|MHZ|GHZ|THZ]|MIN|MAX|DEF
```

Example
```
:SOUR1:FREQ:OFFS:
AONC +0.001GHZ,+0.001GHZ
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Frequency fine tuning value of channel 1
  <value2>: Frequency fine tuning value of channel 2
  MAX: The maximum settable frequency fine tuning value
  MIN: The minimum settable frequency fine tuning value
  DEF: The default frequency fine tuning value
- If the optical output is off, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132 suffix code: -T2 and -T6)

:SOURce[m][:CHANnel[d]]:FREQuency:REFerence

Function Sets or queries reference frequency of the grid number.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:REFerence<wsp><value>[HZ|KHZ|MHZ|GHZ|THZ]
:SOURce[m][:CHANnel[d]]:FREQuency:REFerence?
```

Example
```
:SOUR1:FREQ:REF 193.600THZ
:SOUR1:FREQ:REF?
-> 1.93600000E+014<END>
```

Description
- Settings
  Set the following parameters:
  <value>: Reference frequency
- Queries
  The command returns the reference frequency as a floating-point number in units of Hz.
- If the grid mode is off, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid

Function Sets the frequency to the grid frequency closest to the specified optical frequency.
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid<wsp><value>[THZ|GHZ]
```

Example
```
:SOUR1:FREQ:TOGR 193.600THZ
```

Description
- Set the following parameters:
  <value>: Optical frequency
  Unit: THz or GHz
- If the grid mode is off, an error will occur.
- If the suffix code is -T4, this command functions in the same manner as the :SOURce[m][:CHANnel[d]]:FREQuency[/] command.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (suffix code: -T2 and -T6)

:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid:AONCe

Function Sets the frequencies of channels 1 and 2 simultaneously to the grid frequency closest to the specified optical frequency.

Syntax
```
:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid:AONCe<wsp><value1>[THZ|GHZ],<value2>[THZ|GHZ]
```

Example
```
:SOUR1:FREQ:TOGR:AONC 193.600THZ,193.600THZ
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Optical frequency of channel 1
  <value2>: Optical frequency of channel 2
  Unit: THz or GHz
- If the grid mode is off, an error will occur.
- If the suffix code is -T4, this command functions in the same manner as the :SOURce[m][:CHANnel[d]]:FREQuency[/] command.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132 suffix code: -T2 and -T6)

:SOURce[m][:CHANnel[d]]:GRIDmode

Function Sets or queries the grid mode on/off status.

Syntax
```
:SOURce[m][:CHANnel[d]]:GRIDmode<wsp>OFF|0|ON|1
:SOURce[m][:CHANnel[d]]:GRIDmode?
```

Example
```
:SOUR1:GRID ON
:SOUR1:GRID? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Disable the grid feature (grid mode off)
  1|ON: Enable the grid feature (grid mode on)
- Queries
  The command returns the grid mode on/off status as an unsigned integer.
  0: Grid feature disabled
  1: Grid feature enabled
- If the optical output is on, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:LINewidth

Function Sets or queries the spectrum line width.

Syntax
```
:SOURce[m][:CHANnel[d]]:LINewidth
<wsp>NARRow|WIDE|0|1
:SOURce[m][:CHANnel[d]]:LINewidth?
```

Example
```
:SOUR1:LIN 0
:SOUR1:LIN? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|NARRow: Set the line width to narrow
  1|WIDE: Set the line width to wide
- Queries
  The command returns the spectrum line width setting as a signed integer.
  +0: The line width is narrow.
  +1: The line width is wide.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), and TLS modules

:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude

Function Sets or queries the AM amplitude of the dither feature.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernalAMPLitude<wsp><value>
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal:AMPLitude?
```

Example
```
:SOUR1:MOD:INT:AMPL 1.0
:SOUR1:MOD:INT:AMPL? -> 1.0<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: AM amplitude as a percentage
  0.0 to 2.0
- Queries
  The command returns the AM amplitude as a percentage using an unsigned floating-point number.
- If the optical output is on, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (suffix code: -T2)

:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude:AONCe

Function Sets the AM amplitudes of the dither feature for channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal:AMPLitude:AONCe<wsp>
<value1>,<value2>
```

Example
```
:SOUR1:MOD:INT:AMPL:AONC 1.0,1.0
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: AM amplitude of channel 1 as a percentage
  <value2>: AM amplitude of channel 2 as a percentage
- If the optical output is on, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132 suffix code: -T2)

:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]

Function Sets or queries the SBS suppression dither frequency.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal:SBSControl[:LEVel]<wsp>
<value>[KHZ|MHZ|GHZ]
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal:SBSControl[:LEVel]?
```

Example
```
:SOUR1:MOD:INT:SBSC 500MHZ
:SOUR1:MOD:INT:SBSC?
-> +5.00000000E+008<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  <value>: SBS suppression dither frequency
  0 to 1000 MHz
- Queries
  The command returns the SBS suppression dither frequency as a floating-point number in units of Hz.
- If the optical output is on, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (suffix code: -T2)

:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]:AONCe

Function Sets the SBS suppression dither frequencies for channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal:SBSControl[:LEVel]:
AONCe<wsp><value1>[KHZ|MHZ|GHZ],
<value2>[KHZ|MHZ|GHZ]
```

Example
```
:SOUR1:MOD:INT:SBSC:
AONC 500MHZ,500MHZ
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Frequency of channel 1
  0 to 1000 MHz
  <value2>: Frequency of channel 2
  0 to 1000 MHz
- If the optical output is on, an error will occur.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132 suffix code: -T2)

:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]

Function Sets or queries the on/off status of the dither feature.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal[:STATe]<wsp>OFF|0|ON|1
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal[:STATe]?
```

Example
```
:SOUR1:MOD:INT ON
:SOUR1:MOD:INT? -> 1<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  0|OFF: Disable the dither feature
  1|ON: Enable the dither feature
- Queries
  The command returns the dither feature on/off status as an unsigned integer.
  0: Dither feature disabled
  1: Dither feature enabled
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (suffix code: -T2)

:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]:AONCe

Function Sets the on/off status of the dither feature for channels 1 and 2 simultaneously.
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:MODulation:
INTernal[:STATe]:AONCe<wsp>OFF|0|ON|
1,OFF|0|ON|1
```

Example
```
:SOUR1:MOD:INT:AONC ON,ON
```

Description
- Set the following parameters:
  0|OFF (first parameter):
  Disable the dither function of channel 1
  0|OFF (second parameter):
  Disable the dither function of channel 2
  1|ON (first parameter):
  Enable the dither function of channel 1
  1|ON (second parameter):
  Enable the dither function of channel 2
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132 suffix code: -T2)

:SOURce[m][:CHANnel[d]]:OSASync

Function Sets or queries the OSA synchronization sweep feature's on/off status.

Syntax
```
:SOURce[m][:CHANnel[d]]:OSASync<wsp>
OFF|ON|0|1
:SOURce[m][:CHANnel[d]]:OSASync?
```

Example
```
:SOUR1:OSAS ON
:SOUR1:OSAS? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Turn the OSA synchronization feature off
  1|ON: Turn the OSA synchronization feature on
- Queries
  The command returns the state of the OSA synchronization sweep feature as an unsigned integer.
- If a TLS module is installed in an AQ2211 frame controller, this feature is fixed to on, you cannot turn it off.
- When you turn the OSA synchronization feature on for a TLS module, synchronization turns off for all other TLS modules that had it turned on.
- Commands that come from the OSA are transmitted to all TLS modules that have the OSA synchronization feature turned on.

Target TLS modules

:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]

Function Sets or queries the optical output power.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer
[:AMPLitude[/]]<wsp><value>DBM
:SOURce[m][:CHANnel[d]]:POWer
[:AMPLitude[/]]?[<wsp>MIN|DEF|MAX]
```

Example
```
:SOUR1:POW 0
:SOUR1:POW? -> +0.00000000E+000<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The optical output value
  The optical output value is calculated as follows:
  <Calculation>
  Optical output value (dBm) = maximum optical output value (dBm) – optical attenuation (dB)
  Therefore, set the optical output value after querying each setting value against its settable range.
- Queries
  The command returns the optical output power that you specify with the parameters. The returned value is a floating-point number in units of dBm or W.
  Use the `:SOUR:POW:UNIT?` command to check the unit.
  NONE: The current optical output value
  (The default optical output value – the optical attenuation)
  MIN: The minimum optical output value
  (The default optical output value – the maximum optical attenuation)
  MAX: The maximum optical output value
  (The default optical output value – the minimum optical attenuation)
  Default optical output value:
  The optical output value (in dBm) when both the optical attenuation and optical output offset value are 0 dB
- If you are using an AQ2200-111, AQ2200-112, AQ2200-136, or AQ2200-141, omit the “/” or enter 1.
  If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the “/.”
  If the “/” is omitted, these values will both be set to 1.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, TLS modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude]:AONCe

Function Sets the optical output powers of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer
[:AMPLitude]:AONCe<wsp><value1>DBM|
MIN|DEF|MAX,<value2>DBM|MIN|DEF|MAX
```

Example
```
:SOUR1:POW:AONC 0DBM,0DBM
```

Description
- Set the following parameters:
  <value1>: Optical output value of channel 1
  <value2>: Optical output value of channel 2
  The optical output value is calculated as follows:
  <Calculation>
  Optical output value (dBm) = maximum optical output value (dBm) – optical attenuation (dB)
  Therefore, set the optical output value after querying each setting value against its settable range.
  MAX: The maximum settable output power
  MIN: The minimum settable output power
  DEF: The default output power
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]

Function Sets or queries the optical attenuation.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]<wsp><value>[DB]
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]?[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:POW:ATT 10DB
:SOUR1:POW:ATT? MAX
-> +1.00000000E+001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to the maximum attenuation setting (in 0.01 steps)
  The optical attenuation.
  Unit: dB
  You can use the :SOUR:POW:ATT?MAX command to retrieve the maximum attenuation setting.
- Queries
  The command returns the optical attenuation that you specify with the parameters. The returned value is a floating-point number in units of dB.
  NONE: The optical attenuation that is currently set
  MIN: The minimum attenuation
  DEF: The default attenuation (0 dB)
  MAX: The maximum attenuation
- If you are using an AQ2200-111, AQ2200-112, AQ2200-136, AQ2200-131, AQ2200-132 or AQ2200-141, omit the "/" or enter 1.
  If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the "/."
  If the "/" is omitted, these values will both be set to 1.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:AONCe

Function Sets the optical attenuations of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:AONCe<wsp><value1>[DB]|MIN|MAX|DEF,<value2>[DB]|MIN|MAX|DEF
```

Example
```
:SOUR1:POW:ATT:AONC 10,10
```

Description
- Set the following parameters:
  <value1>: Optical attenuation of channel 1
  0 to the maximum attenuation setting (in 0.01 steps)
  <value2>: Optical attenuation of channel 2
  0 to the maximum attenuation setting (in 0.01 steps)
  Unit: dB
  You can use the :SOUR:POW:ATT? MAX command to retrieve the maximum attenuation setting.
  MAX: The maximum settable optical attenuation
  MIN: The minimum settable optical attenuation
  DEF: The default optical attenuation
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]

Function Clears the optical attenuation setting (sets the optical output power to maximum).

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]
```

Example
```
:SOUR1:POW:ATT:CLE
```

Description If you are using an AQ2200-111, AQ2200-131, AQ2200-132 or AQ2200-141, omit the "/" or enter 1.
If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the "/."
If the "/" is omitted, these values will both be set to 1.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar:AONCe

Function Clears the optical attenuation settings (sets the optical output power to maximum) of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar:AONCe
```

Example
```
:SOUR1:POW:ATT:CLE:AONC
```

Description Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]

Function Sets or queries the optical output offset.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]<wsp><value>[DB]
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]?
```

Example
```
:SOUR1:POW:OFFS -80
:SOUR1:POW:OFFS? -> -80<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –80.00 to +80.00
  The optical output offset.
  Unit: dB
- Queries
  The command returns the optical output offset as a floating-point number in units of dB.
- If you are using an AQ2200-111, AQ2200-131, AQ2200-132 or AQ2200-141, omit the "/" or enter 1.
  If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the "/."
  If the "/" is omitted, these values will both be set to 1.

Target DFB-LD modules, all FP-LD modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer:STATe

Function Sets or queries the optical output's on/off status. On the Grid TLS module, this command operates as an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:STATe<wsp>OFF|ON|0|1
:SOURce[m][:CHANnel[d]]:POWer:STATe?
```

Example
```
:SOUR1:POW:STAT ON
:SOUR1:POW:STAT? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Turn optical output off
  1|ON: Turn optical output on
- Queries
  The command returns the optical output's on/off status as an unsigned integer.
  0: The optical output is off.
  1: The optical output is on.
  The overlap feature is available in firmware versions 3.00 and later.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, TLS modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer:STATe:AONCe

Function Sets the on/off status of the optical output for channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:STATe:AONCe<wsp>OFF|ON|0|1,OFF|ON|0|1
```

Example
```
:SOUR1:POW:STAT:AONC ON
```

Description
- This command is an overlap command.
- Set the following parameters:
  0|OFF (first parameter):
  Turn off the optical output of channel 1
  0|OFF (second parameter):
  Turn off the optical output of channel 2
  1|ON (first parameter):
  Turn on the optical output of channel 1
  1|ON (second parameter):
  Turn on the optical output of channel 2
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:POWer:UNIT

Function Sets or queries the power unit.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:UNIT<wsp>DBM|W|0|1
:SOURce[m][:CHANnel[d]]:POWer:UNIT?
```

Example
```
:SOUR1:POW:UNIT 0
:SOUR1:POW:UNIT? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|DBM: Set the unit to dBm
  1W: Set the unit to W
- Queries
  The command returns the power unit as a signed integer.
  +0: The unit is dBm.
  +1: The unit is W.
  Default: dBm

Target DFB-LD modules, all FP-LD modules, TLS modules, and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:POWer:WAVelength

Function Sets or queries the laser output wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:POWer:WAVelength<wsp>LOW|UPPer|BOTH
```

Example
```
:SOUR1:POW:WAV LOW
:SOUR1:POW:WAV? -> LOW<END>
```

Description
- Settings
  Set the following parameters:
  LOW: Use the 1310 nm wavelength light source
  UPPer: Use the 1550 nm wavelength light source
  BOTH: Use both the 1310 nm and 1550 nm wavelength light sources
- Queries
  The command returns the laser output wavelength as a character string.
  LOW: 1310 nm
  UPP: 1550 nm
  BOTH: Both 1310 nm and 1550 nm

Target DUAL FP-LD modules

:SOURce[m][:CHANnel[d]]:WAVelength[/]

Function Sets or queries the wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength<wsp><value>[PM|NM|UM|MM|M]
:SOURce[m][:CHANnel[d]]:WAVelength[/]?[<wsp>MIN|DEF|MAX]
```

Example
```
:SOUR1:WAV 1550NM
:SOUR1:WAV? -> +1.5500000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The wavelength
  Unit: pm, nm, µm, mm, or m
  The unit is “m” (meters) if it is omitted.
  This setting is only enabled for DFB-LD modules.
  You cannot set the optical wavelength for AQ2200-112, AQ2200-141, and AQ2200-142 modules.
- Queries
  The command returns the wavelength value that you specify with the parameters. The returned value is a floating-point number in units of m.
  NONE: The optical wavelength that is currently set
  MIN: The minimum settable wavelength
  MAX: The maximum settable wavelength
  DEF: The default wavelength
- If you are using an AQ2200-111, AQ2200-112, AQ2200-131, AQ2200-132 or AQ2200-141, omit the “/” or enter 1.
  If you are using an AQ2200-142, enter 1 for the 1310 nm optical output and enter 2 for the 1550 nm optical output at the “/.”
  If the “/” is omitted, these values will both be set to 1.
  Because the AQ2200-112, AQ2200-141, and AQ2200-142 modules do not have features that enable you to set their optical wavelengths, the command will return the same value for queries of these modules’ MAX, MIN, and DEF values.

Target DFB-LD modules, LS modules (AQ2200-112, available in firmware versions 3.08 and later), all FP-LD modules, and and Grid TLS modules (available in firmware versions 3.00 and later)

:SOURce[m][:CHANnel[d]]:WAVelength:AONCe

Function Sets the wavelengths of channels 1 and 2 simultaneously.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:AONCe<wsp><value1>[PM|NM|UM|MM|M],<value2>[PM|NM|UM|MM|M]
```

Example
```
:SOUR1:WAV:AONC 1550NM,1550NM
```

Description
- This command is an overlap command.
- Set the following parameters:
  <value1>: Wavelength of channel 1
  <value2>: Wavelength of channel 2
  Unit: pm, nm, um, mm, or m
  The unit is “m” (meters) if it is omitted.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:WAVelength:CORRection:ZERO

Function Executes, stops, or queries the wavelength correction procedure.
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:CORRection:ZERO[<wsp>ON|OFF]
:SOURce[m][:CHANnel[d]]:WAVelength:CORRection:ZERO?
```

Example
```
:SOUR1:WAV:CORR:ZERO ON
:SOUR1:WAV:CORR:ZERO? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  ON: Execute the wavelength correction procedure
  OFF: Stop the wavelength correction procedure
- Queries
  The command returns the state of the wavelength correction procedure as a signed integer.
  +0: The correction procedure has completed.
  +1: The correction procedure is ongoing.
  +2: An error occurred during the procedure (the error is stored in the queue.)

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength[:CW|FIXed]

Function Sets or queries the wavelength.
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength[:CW|FIXed]<wsp><value>[PM|NM|UM|MM|M]|MIN|MAX|DEF
:SOURce[m][:CHANnel[d]]:WAVelength[:CW|FIXed]?[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:WAV 1500NM
:SOUR1:WAV? -> +1.50000000E-006<END>
:SOUR1:WAV? MIN
-> +1.44000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: PM, NM, MM, MM, or M
  The wavelength setting in units of m.
  MIN: Set to the minimum wavelength
  MAX: Set to the maximum wavelength
  DEF: Set to the default wavelength
- Queries
  The command returns the wavelength value that you specify with the parameters. The returned value is a floating-point number in units of m.
  Example: 1500 nm -> +1.50000000E–006

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:FREQuency

Function Sets or queries the Δf. (The offset setting.)
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:FREQuency<wsp><value>[THZ|GHZ]
:SOURce[m][:CHANnel[d]]:WAVelength:FREQuency?
```

Example
```
:SOUR1:WAV:FREQ -1.2GHZ
:SOUR1:WAV:FREQ?
-> -1.20000000E+009<END>
```

Description
- Settings
  Set the following parameters:
  <value>: Depends on the minimum and maximum wavelengths
  (This parameter can be set in 0.1 GHz steps.)
  Example: –1.2 GHz
- Queries
  The command returns the Δf value as a floating-point number in units of Hz.
  Example: “–1.2 GHz” -> –1.20000000E+009

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:OFFSet

Function Sets or queries the wavelength offset.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:OFFSet<wsp><value>[PM|NM|UM|MM|M]
:SOURce[m][:CHANnel[d]]:WAVelength:OFFSet?
```

Example
```
:SOUR1:WAV:OFFS -10
:SOUR1:WAV:OFFS? -> -10<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –10.000 to +10.000
  The wavelength offset.
  Unit: pm, nm, µm, mm, or m
  The unit is “m” (meters) if it is omitted.
- Queries
  The command returns the wavelength offset as a floating-point number in units of m.
  Default: 0.000 nm

Target DFB-LD modules

:SOURce[m][:CHANnel[d]]:WAVelength:REFerence?

Function Queries the wavelength value. (The offset setting.)

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence?
```

Example
```
:SOUR1:WAV:REF?
-> +1.55012300E-006<END>
```

Description The command returns the WL Ref value as a floating-point number in units of m.
Example: 1550.123 nm -> +1.55012300E–006

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:REFerence:DISPlay

Function Sets the wavelength to the WL Ref value. (The offset setting.)

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence:DISPlay
```

Example
```
:SOUR1:WAV:REF:DISP
```

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep[:STATe]

Function Starts, stops, or queries the sweep.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep[:STATe]<wsp>STOP|0|STARt|1|PAUSe|2|CONTinue|3
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep[:STATe]?
```

Example
```
:SOUR1:WAV:SWE 0
:SOUR1:WAV:SWE? -> +0<END>
```

Description
- This command is an overlap command.
- Settings
  Set the following parameters:
  0|STOP: Stop the sweep
  1|STARt: Start the sweep
  2|PAUSe: Pause the sweep
  (If the sweep mode is “Stepped.”)
  3|CONTinue: Start the paused sweep
  (If the sweep mode is “Stepped.”)
- Queries
  The command returns the state of the sweep as a signed integer.
  +0: The sweep has completed.
  +1: The sweep is ongoing.

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:CYCLes

Function Sets or queries the number of sweep cycles.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:CYCLes<wsp><value>|MIN|MAX|DEF|0
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:CYCLes?[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:WAV:SWE:CYCL 0
:SOUR1:WAV:SWE:CYCL? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 99999 (in single steps)
  The number of sweep cycles.
  MIN: Set to the minimum number of sweep cycles (1)
  MAX: Set to the maximum number of sweep cycles (99999)
  DEF: Set to the default number of sweep cycles (1)
  0: Perform continuous sweeps
- Queries
  The command returns the number of sweep cycles that you specify with the parameters. The returned value is a signed integer.
  NONE: The current setting
  MIN: The minimum number of sweep cycles
  MAX: The maximum number of sweep cycles
  DEF: The default number of sweep cycles
  Example: 10 cycles -> +10
  Continuous sweeps -> +0

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:DWELl

Function Sets or queries the lock time per wavelength setting.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:DWELl<wsp><value>[S|MS|MIN|MAX|DEF]
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:DWELl?[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:WAV:SWE:DWEL 0.1
:SOUR1:WAV:SWE:DWEL?
-> +5.00000000E-001<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.1 to 999.9 s (in 0.1 s steps)
  The lock time per cycle setting (the dwell time).
  Unit: s or ms
  MIN: Set to the minimum dwell time (0.1 s)
  MAX: Set to the maximum dwell time (999.9 s)
  DEF: Set to the default dwell time (0.1 s)
- Queries
  The command returns the dwell time that you specify with the parameters. The returned value is a floating-point number in units of s.
  Example: 0.5 seconds -> +5.00000000E–001
  NONE: The current setting
  MIN: The minimum dwell time
  MAX: The maximum dwell time
  DEF: The default dwell time

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:INTerval

Function Sets or queries the sweep cycle interval.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:INTerval<wsp><value>[S]|MIN|MAX|DEF
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:INTerval?[<wsp>MIN|MAX|DEF]
```

Example
```
:SOUR1:WAV:SWE:INT 100S
:SOUR1:WAV:SWE:INT? -> +10<END>
:SOUR1:WAV:SWE:INT? MIN -> +0<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 99999 (in single steps)
  The sweep interval time.
  Unit: s (seconds)
  MIN: Set to the minimum sweep interval time (0 seconds)
  MAX: Set to the maximum sweep interval time (99999 seconds)
  DEF: Set to the default sweep interval time (0 seconds)
- Queries
  The command returns the sweep interval time that you specify with the parameters. The returned value is a signed integer in units of s.
  Example: 10 seconds -> +10
  NONE: The current setting
  MIN: The minimum sweep interval time
  MAX: The maximum interval time
  DEF: The default sweep interval time

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:MODE

Function Sets or queries the sweep mode.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:MODE<wsp>STEPped|MANual|CONTinuous
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:MODE?
```

Example
```
:SOUR1:WAV:SWE:MODE STEP
:SOUR1:WAV:SWE:MODE? -> STEP<END>
```

Description
- Settings
  Set the following parameters:
  STEPped: Set to step sweep mode
  MANual: Set to manual sweep mode
  CONTinuous: Set to continuous sweep mode
- Queries
  The command returns the state of the sweep mode as a character string.
  STEP: Step sweep mode
  MAN: Manual sweep mode
  CONT: Continuous sweep mode

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:PMAX?

Function Queries the optimal value from the sweep (this value is detected automatically).

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:PMAX?<wsp><value1>,<value2>
```

Example
```
:SOUR1:WAV:SWE:PMAX? 1550NM,1640NM
-> +1.23400000E-003<END>
```

Description <value1>: The sweep start wavelength
Unit: nm
Example: 1550NM
<value2>: The sweep stop wavelength
Unit: nm
Example: 1640NM
The command returns the power value within the wavelength range that you specified as a floating-point number in units of W.
Example: 1.234 mW -> +1.23400000E–003

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:SPEed:SPSec

Function Sets or queries the sweep speed (distance).

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:SPEed:SPSec<wsp><value>[NM|UM]
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:SPEed:SPSec?[<wsp>MIN|MAX]
```

Example
```
:SOUR1:WAV:SWE:SPE:SPS 3NM
:SOUR1:WAV:SWE:SPE:SPS?
-> +3.00000000E-009<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.2 to 50.0 nm (in 0.1 nm steps)
  The sweep speed.
  NM|UM: The unit (nm or µm)
- Queries
  The command returns the speed (meters per second) that you specify with the parameters. The returned value is a floating-point number in units of m.
  Example: 3 nm/s -> +3.00000000E–009
  NONE: The sweep speed that is currently set
  MAX: The maximum setting
  MIN: The minimum setting

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STARt

Function Sets or queries the sweep start wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STARt<wsp><value>[PM|NM|UM|MM|M]
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STARt?
```

Example
```
:SOUR1:WAV:SWE:STAR 1500NM
:SOUR1:WAV:SWE:STAR?
-> +1.50000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The sweep start wavelength
  This must be a value within the range bounded by the minimum wavelength and the maximum wavelength that are queried with the `:SLOT:IDN?` command (in 0.001 nm steps).
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep start wavelength value as a floating-point number in units of m.
  Example: 1500 nm -> +1.50000000E–006

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP

Function Sets or queries the sweep step wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP<wsp><value>[PM|NM|UM|MM|M]
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP?[<wsp>MIN|MAX]
```

Example
```
:SOUR1:WAV:SWE:STEP 0.5NM
:SOUR1:WAV:SWE:STEP? MIN
-> +5.00000000E-010<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0.001 to 100.000 nm
  (In 0.001 nm steps.)
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep step wavelength that you specify with the parameters. The returned value is a floating-point number in units of m.
  Example: 0.5 nm -> +5.00000000E–010
  NONE: The current setting
  MIN: The minimum sweep step wavelength
  MAX: The maximum sweep step wavelength

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP:NEXT

Function Sets the sweep wavelength to the next sweep wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP:NEXT
```

Example
```
:SOUR1:WAV:SWE:STEP:NEXT
```

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STOP

Function Sets or queries the sweep stop wavelength.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STOP<wsp><value>[PM|NM|UM|MM|M]
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STOP?
```

Example
```
:SOUR1:WAV:SWE:STOP 1640NM
:SOUR1:WAV:SWE:STOP?
-> +1.64000000E-006<END>
```

Description
- Settings
  Set the following parameters:
  <value>: The sweep start wavelength
  This must be a value within the range bounded by the minimum wavelength and the maximum wavelength that are queried with the SLOT:IDN? command (in 0.001 nm steps).
  PM|NM|UM|MM|M: Units
- Queries
  The command returns the sweep stop wavelength value as a floating-point number in units of m.
  Example: 1640 nm -> +1.64000000E–006

Target TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid

Function Sets the wavelength to the grid wavelength closest to the specified frequency.
This command is an overlap command.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid<wsp><value>[PM|NM|UM|MM|M]
```

Example
```
:SOUR1:WAV:TOGR 1552.52NM
```

Description
- Set the following parameters:
  <value>: Wavelength
  Unit: pm, nm, um, mm, or m
  The unit is “m” (meters) if it is omitted.
- Available in firmware versions 3.00 and later

Target Grid TLS modules

:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid:AONCe

Function Sets the wavelengths of channels 1 and 2 simultaneously to the grid wavelength closest to the specified grid value.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid:AONCe<wsp><value1>[PM|NM|UM|MM|M],<value2>[PM|NM|UM|MM|M]
```

Example
```
:SOUR1:WAV:TOGR:AONC 1552.52NM,1552.52NM
```

Description
- Set the following parameters:
  <value1>: Wavelength of channel 1
  <value2>: Wavelength of channel 2
  Unit: pm, nm, um, mm, or m
  The unit is “m” (meters) if it is omitted.
- Available in firmware versions 3.00 and later

Target Grid TLS Modules (AQ2200-132)

:SOURce[m][:CHANnel[d]]:WAVelength:UNIT

Function Sets or queries the wavelength unit.

Syntax
```
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT<wsp>NM|THZ|0|1
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT?
```

Example
```
:SOUR1:WAV:UNIT NM
:SOUR1:WAV:UNIT? -> +0<END>
```

Description
- Settings
  Set the following parameters:
  0|NM: Set the unit to nm
  1|THZ: Set the unit to THz
- Queries
  The command returns the wavelength unit as a signed integer.
  +0: The unit is nm.
  +1: The unit is THz.
  Default: The unit is nm.

Target DFB-LD modules, all FP-LD modules, TLS modules, and Grid TLS modules (Available in firmware versions 3.00 and later)

:SOURce[m]:CLOCk:SOURce

Function Sets the input clock source.

Syntax
```
:SOURce[m]:CLOCk:SOURce<wsp>INT|REF|EXT
:SOURce[m]:CLOCk:SOURce?
```

Example
```
:SOUR1:CLOC:SOUR INT
:SOUR1:CLOC:SOUR? -> INT<END>
```

Description
- Settings
  Set the following parameters:
  INT: Use the internal clock (SG)
  REF: Use an external synchronization clock
  EXT: Use an external 10 G clock
  Default: INT
- Queries
  The command returns the input clock source as a character string.
  INT|REF|EXT

Target BERT modules (PPG)

:SOURce[m]:CLOCk:OFFSet

Function Sets or queries the internal clock offset frequency.

Syntax
```
:SOURce[m]:CLOCk:OFFSet<wsp><value>
:SOURce[m]:CLOCk:OFFSet?
```

Example
```
:SOUR3:CLOC:OFFS 50
:SOUR3:CLOC:OFFS? -> 50<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –100 to 100 (in 1 ppm steps)
  Default: 0
  Unit: ppm
- Queries
  The command returns the offset frequency as a number.
  –100 to 100 (in 1 ppm steps)

Target BERT modules (SG)

:SOURce[m]:CLOCk:RATE

Function Sets or queries the internal clock's bit rate.

Syntax
```
:SOURce[m]:CLOCk:RATE<wsp><value>
:SOURce[m]:CLOCk:RATE?
```

Example
```
:SOUR3:CLOC:RATE 9.953200
:SOUR3:CLOC:RATE? -> 9.953200<END>
```

Description
- Settings
  Set the following parameters:
  <value> = |9.950000 to 11.320000
  (in 0.000001 steps)
  Default: 9.953280
  Unit: Gbit/s
- Queries
  The command returns the internal clock's bit rate as a number.
  9.950000 to 11.320000 (in 0.000001 steps)

Target BERT modules (SG)

:SOURce[m]:CROSs

Function Sets or queries the driver cross point.

Syntax
```
:SOURce[m]:CROSs<wsp><value>
:SOURce[m]:CROSs?
```

Example
```
:SOUR1:CROS -31
:SOUR1:CROS? -> -31<END>
```

Description
- Settings
  Set the following parameters:
  <value> = –31 to 32 (in single steps)
  Default: 0
- Queries
  The command returns the driver cross point value as an integer.
  –31 to 32 (in single steps)

Target 10 Gbit/s optical modulators

:SOURce[m]:DATA:PATTern

Function Sets or queries the output data pattern.

Syntax
```
:SOURce[m]:DATA:PATTern<wsp>PRBS|
PROG256|PROG64M|SFRAM
:SOURce[m]:DATA:PATTern?
```

Example
```
:SOUR1:DATA:PATT PRBS
:SOUR1:DATA:PATT? -> PRBS<END>
```

Description
- Settings
  Set the following parameters:
  PRBS: The pseudo random bit sequence
  PROG256: The short program pattern (256 bits maximum)
  PROG64M: The long program pattern (64 Mbits maximum; /M option)
  SFRAM: The SDH/SONET frame pattern (/P1 option)
  Default: PRBS
- Queries
  The command returns the output data pattern setting as a character string.
  PRBS|PROG256|PROG64M|SFRAM

Target BERT modules (PPG)

:SOURce[m]:DATA:ERRor

Function Sets or queries the error adding feature's on/off status.

Syntax
```
:SOURce[m]:DATA:ERRor<wsp>OFF|ON
:SOURce[m]:DATA:ERRor?
```

Example
```
:SOUR1:DATA:ERR ON
:SOUR1:DATA:ERR? -> ON<END>
```

Description
- Settings
  Set the following parameters:
  OFF: Do not add errors
  ON: Add errors
- Queries
  The command returns the on/off state of the error addition feature as a character string.
  OFF|ON

Target BERT modules (PPG)

:SOURce[m]:DATA:ERRor:MODE

Function Sets or queries the error addition mode.

Syntax
```
:SOURce[m]:DATA:ERRor:MODE<wsp>SING|
RATE
:SOURce[m]:DATA:ERRor:MODE?
```

Example
```
:SOUR1:DATA:ERR:MODE SING
:SOUR1:DATA:ERR:MODE? -> SING<END>
```

Description
- Settings
  Set the following parameters:
  SING: Use single mode
  RATE: Use rate mode
- Queries
  The command returns the error adding mode setting as a character string.
  SING|RATE

Target BERT modules (PPG)

:SOURce[m]:DATA:ERRor:RATE

Function Sets or queries the rate value of the error adding feature.

Syntax
```
:SOURce[m]:DATA:ERRor:RATE<wsp>
1E-3|1E-4|1E-5|1E-6|1E-7|1E-8|
1E-9|1E-10|1E-11|1E-12
:SOURce[m]:DATA:ERRor:RATE?
```

Example
```
:SOUR1:DATA:ERR:RATE 1E-3
:SOUR1:DATA:ERR:RATE? -> 1E-3<END>
```

Description
- Settings
  Set the following parameters:
  1E–3|1E–4|1E–5|1E–6|1E–7|1E–8|1E–9|
  1E–10|1E–11|1E–12: The rate value
  Default: 1E–3
- Queries
  The command returns the rate of the error adding feature setting as a character string.
  1E–3|1E–4|1E–5|1E–6|1E–7|1E–8|1E–9|
  1E–10|1E–11|1E–12

Target BERT modules (PPG)

:SOURce[m]:DATA:POLarity

Function Sets or queries the data output logic.

Syntax
```
:SOURce[m]:DATA:POLarity<wsp>POS|NEG
:SOURce[m]:DATA:POLarity?
```

Example
```
:SOUR1:DATA:POL POS
:SOUR1:DATA:POL? -> POS<END>
```

Description
- Settings
  Set the following parameters:
  POS: Positive logic
  NEG: Negative logic
  Default: POS
- Queries
  The command returns the data output logic setting as a character string.
  POS|NEG

Target BERT modules (PPG)

:SOURce[m]:DATA:PATTern:PRBS:LENgth

Function Sets or queries the number of PRBS steps of the output data.

Syntax
```
:SOURce[m]:DATA:PATTern:PRBS:
LENgth<wsp>PRBS7|PRBS9|PRBS10|PRBS11
|PRBS15|PRBS23|PRBS31
:SOURce[m]:DATA:PATTern:PRBS:LENgth?
```

Example
```
:SOUR1:DATA:PATT:PRBS:LEN PRBS7
:SOUR1:DATA:PATT:PRBS:LEN? -> PRBS7
```

Description
- Settings
  Set the following parameters:
  PRBS7: The generated polynomial is a 1 + X6 + X7 pseudo-random pattern.
  PRBS9: The generated polynomial is a 1 + X5 + X9 pseudo-random pattern.
  PRBS10: The generated polynomial is a 1 + X7 + X10 pseudo-random pattern.
  PRBS11: The generated polynomial is a 1 + X9 + X11 pseudo-random pattern.
  PRBS15: The generated polynomial is a 1 + X14 + X15 pseudo-random pattern.
  PRBS23: The generated polynomial is a 1 + X18 + X23 pseudo-random pattern.
  PRBS31: The generated polynomial is a 1 + X28 + X31 pseudo-random pattern.
  Default: PRBS9
- Queries
  The command returns the number of PRBS steps as a character string.
  PRBS7|PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31

Target BERT modules (PPG)

:SOURce[m]:DATA:PATTern:PROGram:LENgth

Function Sets or queries the output data's program pattern length.

Syntax
```
:SOURce[m]:DATA:PATTern:PROGram:
LENgth<wsp><value>
:SOURce[m]:DATA:PATTern:PROGram:
LENgth?
```

Example
```
:SOUR1:DATA:PATT:PROG:LEN 16
:SOUR1:DATA:PATT:PROG:LEN? -> 16<END>
```

Description
- Settings
  Set the following parameters:
  `:SOUR:DATA:PATT:` is PROG256:
  <value> = 16 to 256 (in 1-bit steps)
  Default: 16
  `:SOUR:DATA:PATT:` is PROG64M:
  <value> = 256 to 67108864 (in 128-bit steps)
  Default: 256
- Queries
  The command returns the program pattern length as an integer.
  `:SOUR:DATA:PATT:` is PROG256:
  16 to 256 (in 1-bit steps)
  `:SOUR:DATA:PATT:` is PROG64M:
  256 to 67108864 (in 128-bit steps)

Target BERT modules (PPG)

:SOURce[m]:DATA:PATTern:PROGram:DATA

Function Sets or queries the output data's program pattern.

Syntax
```
:SOURce[m]:DATA:PATTern:PROGram:DATA
<wsp><value>,<Block>
:SOURce[m]:DATA:PATTern:PROGram:
DATA?<wsp><value>
```

Example
```
:SOUR1:DATA:PATT:PROG:DATA 1,
#2105A6B7C8D9E
```
This example sets the 5 bytes 5A 6B 7C 8D 9E into position1.
```
:SOUR1:DATA:PATT:PROG:DATA?
-> #26401AB23CD4501AB23CD4501AB23CD450
1AB23CD4501AB23CD4501AB23CD4501AB<END>
```
This example queries position1, and the command returns the following 32 bytes:
01 AB 23 CD 45 01 AB 23 CD 45 01 AB 23 CD 45 01 AB 23 CD 45 01 AB 23 CD 45 01 AB 23 CD 45 01 AB

Description
- Settings

  Set the following parameters:

  If the program is PROG256:

  <value> = 1 (fixed)
  The position (position1).

  <Block>: Data that contains 8-bit values
  The syntax is as follows:
  #N<N-digit decimal number><data byte sequence>

  #N = 1 or 2
  The number of digits in the <N-digit decimal number>.

  <N-digit decimal number> = 1 to 64
  <Data Byte Sequence> Character String

  <data byte sequence> = 0 to 9|A|B|C|D|E|F
  Hexadecimal numbers
  Default: All values are "55"

  If the program is PROG64M:

  <value> = 1 to 8388545 (in 64-byte steps)
  The position (position1).

  #N = 1 to 3
  The number of digits in the <N-digit decimal number>.

  <N-digit decimal number> = 1 to 128
  <Data Byte Sequence> Character String

  <data byte sequence> = 0 to 9|A|B|C|D|E|F
  Hexadecimal numbers
  Default: All values are "55"
- Queries

  The command returns program pattern that you specify with the parameters.
  #N<N-digit decimal number><data byte sequence>

Target BERT modules (PPG)

:SOURce[m]:DATA:PATTern:PROGram:DATA:PRESet

Function Sets the program pattern of the output data to the default value.
If the program pattern is the short program pattern, all the values are set to "55."
If the program pattern is the long program pattern, just the first 256 bytes are set to "55," the remaining bytes of data are not set to the default value.

Syntax
```
:SOURce[m]:DATA:PATTern:PROGram:DATA
:PRESet
```

Example
```
:SOUR1:DATA:PATT:PROG:DATA:PRES
```

Target BERT modules (PPG)

:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA

Function Sets or queries the overhead pattern within the SDH/SONET frame of the output data.

Syntax
```
:SOURce[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA<wsp><value>,<Block>
:SOURce[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA?<wsp><value>
```

Example
```
:SOUR1:DATA:PATT:SFRAM:OVER:SOH:
DATA 1,#3128000102030405060708090A0B
0C0D0E0F101112131415161718191A1B1C1D
1E1F202122232425262728292A2B2C2D2E2F
303132333435363738393A3B3C3D3E3F
```

This example sets the following 64 bytes into position1: 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F

```
:SOUR1:DATA:PATT:SFRAM:OVER:SOH:
DATA? 1
-> #3128F6F6F6F6F6F6F6F6F6F6F6F6F6
F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6
F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6F6
F6F6F6F6F6F6F6F6F6F6F6F6F6<END>
```

This example queries position1, and the command returns a 64-byte pattern that consists entirely of “F6.”

Description
- Settings
  Set the following parameters:
  <value> = 1 to 5121 (in 64-byte steps)
  The position.
  <Block>: Data that contains 8-bit values
  The syntax is as follows:
  #N<N-digit decimal number><data byte sequence>
  #N = 3, the number of digits in the <N-digit decimal number>.
  <N-digit decimal number> = 128
  <Data Byte Sequence> Character String
  <data byte sequence> = 0 to 9|A|B|C|D|E|F
  Hexadecimal numbers
- Queries
  The command returns the 64-byte short program pattern that you specify with the parameters.
  #N<N-digit decimal number><data byte sequence>

Target BERT modules (PPG) with the /P1 option

:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA:PRESet

Function Sets the overhead pattern within the SDH/SONET frame of the output data to the default value.

Syntax
```
:SOURce[m]:DATA:PATTern:SFRAMe:
OVERhead:SOH:DATA:PRESet
```

Example
```
:SOUR1:DATA:PATT:SFRAM:OVER:SOH:
DATA:PRES
```

Target BERT modules (PPG) with the /P1 option

:SOURce[m]:DATA:PATTern:SFRAMe:PRBS:LENgth

Function Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the output data.

Syntax
```
:SOURce[m]:DATA:PATTern:SFRAMe:PRBS:
LENgth<wsp>PRBS9|PRBS10|PRBS11|
PRBS15|PRBS23|PRBS31
:SOURce[m]:DATA:PATTern:SFRAMe:PRBS:
LENgth?
```

Example
```
:SOUR1:DATA:PATT:SFRAM:PRBS:LEN
PRBS9
:SOUR1:DATA:PATT:SFRAM:PRBS:LEN?
-> PRBS9<END>
```

Description
- Settings
  Set the following parameters:
  PRBS9: The generated polynomial is a 1 + X5 + X9 pseudo-random pattern.
  PRBS10: The generated polynomial is a 1 + X7 + X10 pseudo-random pattern.
  PRBS11: The generated polynomial is a 1 + X9 + X11 pseudo-random pattern.
  PRBS15: The generated polynomial is a 1 + X14 + X15 pseudo-random pattern.
  PRBS23: The generated polynomial is a 1 + X18 + X23 pseudo-random pattern.
  PRBS31: The generated polynomial is a 1 + X28 + X31 pseudo-random pattern.
  Default: PRBS9
- Queries
  The command returns the number of PRBS steps as a character string.
  PRBS9|PRBS10|PRBS11|PRBS15|PRBS23|PRBS31

Target BERT modules (PPG) with the /P1 option

5.17 STATus Group

:STATus[m]?

Function Queries the alarm information.

Syntax `:STATus[m]?`

Example `:STAT1? -> 0<END>`

Description For 10 Gbit/s optical modulators:

Bit | 2 | 1 | 0 |

Bit	Item	Acquired Value
1 and 0	Temperature alarm	00: Normal status. 01: The upper limit of the operational temperature has been exceeded. An operation error may occur.
2	ABC alarm	0: Normal 1: Abnormal

For 10 Gbit/s optical receivers:

Bit | 3 | 2 | 1 | 0 |

Bit	Item	Acquired Value
1 and 0	Temperature alarm	00: Normal status. 01: The upper limit of the operational temperature has been exceeded. An operation error may occur.
2	LOS alarm	0: Normal 1: Abnormal
3	OVERLOAD alarm	0: Normal 1: Abnormal

Target 10 Gbit/s optical modulators and 10 Gbit/s optical receivers

:STATus[m]:ALARm?

Function Queries the alarm information.

Syntax `:STATus[m]:ALARm?`

Example `:STAT1:ALAR? -> 0<END>`

Description For transceiver I/F modules:

Bit | 4 | 3 | 2 | 1 | 0 |

Bit	Item	Acquired Value
4	Current error	0: Normal 1: Abnormal
3	Voltage error	0: Normal 1: Abnormal
2	Temperature error	0: Normal 1: Error
1	Temperature alarm	0: Normal 1: Alarm
0	OUTPUT state	0: OFF 1: ON

For SG modules:

Bit | 3 | 2 | 1 | 0 |

Bit	Item	Acquired Value
3	Temperature error	0: Normal 1: Error
2	Temperature alarm	0: Normal 1: Alarm
1	OUTPUT state	0: OFF 1: ON
0	SG unlock	0: No alarm 1: Alarm

Target Transceiver I/F modules, SG Modules

:STATus[m]:OPERation:CONDition[:LEVel0]?

Function Queries the value of the operational status condition summary register (OSCSR) if the “m” suffix is omitted.
Queries the bit values that apply to the slot number that is specified by the OSCSR if the “m” suffix is specified.

Syntax `:STATus:OPERation:CONDition[:LEVel0]?`

Example `:STAT1:OPER:COND? -> +0<END>`

Description The command returns the value of the operational status condition summary register as a signed integer.
+0 to +65535
The value that is returned is the sum of the decimal numbers that correspond to the enabled bits of the operational status condition summary register.

Target Frame controller

:STATus[m]:OPERation:ENABle[:LEVel0]

Function Sets or queries the value of the operational status enable summary mask (OSESM) if the “m” suffix is omitted.
Sets or queries the bit values that apply to the slot number that is specified by the OSESM if the “m” suffix is specified.

Syntax
```
:STATus:OPERation:ENABle[:LEVel0]
<wsp><value>
:STATus:OPERation:ENABle[:LEVel0]?
```

Example
```
:STAT1:OPER:ENAB 128
:STAT1:OPER:ENAB? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the value of the operational status enable summary mask as a signed integer.
  +0 to +65535

Target Frame controller

:STATus[m]:OPERation[:EVENt][:LEVel0]?

Function Queries the value of the operational status event summary register (OSESR) if the “m” suffix is omitted. The register (OSESR) is cleared when it is queried.
Queries the bit values that apply to the slot number that is specified by the OSESR if the “m” suffix is specified.

Syntax
```
:STATus:OPERation[:EVENt][:LEVel0]?
```

Example
```
:STAT1:OPER? -> +0<END>
```

Description The command returns the value of the operational status event summary register as a signed integer.
+0 to +65535
The value that is returned is the sum of the decimal numbers that correspond to the enabled bits of the operational status event summary register.

Target Frame controller

:STATus[m]:OPERation:NTRansition

Function Sets or queries the transition filter (change in the negative direction) if the “m” suffix is omitted.
If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1.
Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the “m” suffix is specified.

Syntax
```
:STATus[m]:OPERation:NTRansition
<wsp><value>
:STATus[m]:OPERation:NTRansition?
```

Example
```
:STAT1:OPER:NTR 128
:STAT1:OPER:NTR? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the transition filter (specified in the negative direction) set-up value as a signed integer.
  +0 to +65535

Target Frame controller

:STATus[m]:OPERation:PTRansition

Function Sets or queries the transition filter (change in the positive direction) if the “m” suffix is omitted.
If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1.
Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the “m” suffix is specified.

Syntax
```
:STATus[m]:OPERation:PTRansition
<wsp><value>
:STATus[m]:OPERation:PTRansition?
```

Example
```
:STAT1:OPER:PTR 128
:STAT1:OPER:PTR? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the transition filter (specified in the positive direction) set-up value as a signed integer.
  +0 to +65535

Target Frame controller

:STATus[m]:QUEStionable:CONDition[:LEVel0]?

Function Queries the value of the questionable status condition summary register (QSCSR) if the “m” suffix is omitted.
Queries the bit values that apply to the slot number that is specified by the QSCSR if the “m” suffix is specified.

Syntax
```
:STATus[m]:QUEStionable:CONDition
[:LEVel0]?
```

Example
```
:STAT1:QUES:COND? -> +0<END>
```

Description The command returns the value of the questionable status condition summary register as a signed integer.
+0 to +65535

Target Frame controller

:STATus[m]:QUEStionable:ENABle[:LEVel0]

Function Sets or queries the value of the questionable status enable summary mask (QSESM) if the “m” suffix is omitted.
Queries the bit values that apply to the slot number that is specified by the QSESM if the “m” suffix is specified.

Syntax
```
:STATus[m]:QUEStionable:ENABle
[:LEVel0]<wsp><value>
:STATus[m]:QUEStionable:ENABle
[:LEVel0]?
```

Example
```
:STAT1:QUES:ENAB 128
:STAT1:QUES:ENAB? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the value of the questionable status enable summary mask as a signed integer.
  +0 to +65535

Target Frame controller

:STATus[m]:QUEStionable[:EVENt][:LEVel0]?

Function Queries the value of the questionable status event summary register (QSESR) if the “m” suffix is omitted.
The register (QSESR) is cleared when it is queried.
Queries the bit values that apply to the slot number that is specified by the QSESR if the “m” suffix is specified.

Syntax
```
:STATus[m]:QUEStionable[:EVENt]
[:LEVel0]?
```

Example
```
:STAT1:QUES? -> +0<END>
```

Description The command returns the value of the questionable status event summary register as a signed integer.
+0 to +65535

Target Frame controller

:STATus[m]:QUEStionable:NTRansition

Function Sets or queries the transition filter (change in the negative direction) if the “m” suffix is omitted.
If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1.
Queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the “m” suffix is specified.

Syntax
```
:STATus[m]:QUEStionable:NTRansition
<wsp><value>
:STATus[m]:QUEStionable:NTRansition?
```

Example
```
:STAT1:QUES:NTR 128
:STAT1:QUES:NTR? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the transition filter (change in the negative direction) set-up value as a signed integer.
  +0 to +65535

Target Frame controller

:STATus[m]:QUEStionable:PTRansition

Function Sets or queries the transition filter (change in the positive direction) if the “m” suffix is omitted.
If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1.
Queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the “m” suffix is specified.

Syntax
```
:STATus[m]:QUEStionable:PTRansition
<wsp><value>
:STATus[m]:QUEStionable:PTRansition?
```

Example
```
:STAT1:QUES:PTR 128
:STAT1:QUES:PTR? -> +128<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535
- Queries
  The command returns the transition filter (change in the positive direction) set-up value as a signed integer.
  +0 to +65535

Target Frame controller

5.18 SYSTem Group

:SYSTem[m]:BEEP

Function Sets or queries the buzzer volume.

Syntax
```
:SYSTem[m]:BEEP<wsp>OFF|SOFT|MEDI|LOUD
:SYSTem[m]:BEEP?
```

Example
```
:SYST1:BEEP OFF
:SYST1:BEEP? -> OFF<END>
```

Description
- Settings
  Set the following parameters:
  OFF: Mute the buzzer
  SOFT: Low volume
  MEDI: Medium-level volume
  LOUD: High volume
- Queries
  The command returns the buzzer volume setting as a character string.
  OFF|SOFT|MEDI|LOUD

Target BERT modules (ED)

:SYSTem:COMMunicate:GPIB:ADDRess

Function Sets or queries the GP-IB address.

Syntax
```
:SYSTem:COMMunicate:GPIB:ADDRess<wsp><value>
:SYSTem:COMMunicate:GPIB:ADDRess?
```

Example
```
:SYST:COMM:GPIB:ADDR 20
:SYST:COMM:GPIB:ADDR? -> +20<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 30
- Queries
  The command returns the GP-IB address as a signed integer.
  +0 to +30

Target Frame controller

:SYSTem:COMMunicate:GPIB:TERMinator

Function Sets or queries the response message terminator.

Syntax
```
:SYSTem:COMMunicate:GPIB:TERMinator<wsp>0|1|2
:SYSTem:COMMunicate:GPIB:TERMinator?
```

Example
```
:SYST:COMM:GPIB:TERM 2
:SYST:COMM:GPIB:TERM? -> +2<END>
```

Description
- Settings
  Set the following parameters:
  0: EOI (default)
  1: LF + EOI
  2: CR + LF + EOI
- Queries
  The command returns the reply message terminator setting as a signed integer.
  +0: EOI
  +1: LF + EOI
  +2: CR + LF + EOI
- When you turn the instrument off, the reply message terminator is reset to the default value.
  Make sure that you set the terminator that you want to use before you begin using the instrument.
  (This setting cannot be changed through presets and other such operations.)

Target Frame controller

:SYSTem:COMMunicate:NETWork:DHCP

Function Sets or queries the DHCP's on/off status.

Syntax
```
:SYSTem:COMMunicate:NETWork:DHCP<wsp>0|1|OFF|ON
:SYSTem:COMMunicate:NETWork:DHCP?
```

Example
```
:SYST:COMM:NETW:DHCP ON
:SYST:COMM:NETW:DHCP? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Turn the DHCP off
  1|ON: Turn the DHCP on
- Queries
  The command returns the DCHP's on/off status as an unsigned integer.
  0: The DHCP is off.
  1: The DHCP is on.

Target Frame controller

:SYSTem:COMMunicate:NETWork:GATeway

Function Sets or queries the gateway address.

Syntax
```
:SYSTem:COMMunicate:NETWork:GATeway
<wsp><"string">
:SYSTem:COMMunicate:NETWork:GATeway?
```

Example
```
:SYST:COMM:NETW:GAT "192.168.0.254"
:SYST:COMM:NETW:GAT?
-> "192.168.0.254"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = "0.0.0.0" to "255.255.255.255"
  The gateway address. The decimal numbers are separated by periods (.).
  Enclose the gateway address string in double quotation marks (").
- Queries
  The command returns the gateway address value as a character string that is enclosed in double quotation marks.
  "192.168.0.254"

Target Frame controller

:SYSTem:COMMunicate:NETWork:IPADdress

Function Sets or queries the IP address.

Syntax
```
:SYSTem:COMMunicate:NETWork:
IPADdress<wsp><"string">
:SYSTem:COMMunicate:NETWork:
IPADdress?
```

Example
```
:SYST:COMM:NETW:IPAD "192.168.0.1"
:SYST:COMM:NETW:IPAD?
-> "192.168.0.1"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = "0.0.0.0" to "255.255.255.255"
  The IP address. The decimal numbers are separated by periods (.).
  Enclose the IP address string in double quotation marks (").
- Queries
  The command returns the IP address value as a character string that is enclosed in double quotation marks.
  "192.168.0.1"

Target Frame controller

:SYSTem:COMMunicate:NETWork:PORT

Function Sets or queries the network setting's port number.

Syntax
```
:SYSTem:COMMunicate:NETWork:PORT
<wsp><value>
:SYSTem:COMMunicate:NETWork:PORT?
```

Example
```
:SYST:COMM:NETW:PORT 100
:SYST:COMM:NETW:PORT? -> 100<END>
```

Description
- Settings
  Set the following parameters:
  <value> = 0 to 65535 (in single steps)
  The port number.
  Default: 50000
- Queries
  The command returns the network setting's port number as an unsigned integer.

Target Frame controller

:SYSTem:COMMunicate:NETWork:REMote

Function Enables, disables, or queries all the panel key operations during LAN/USB remote control (excluding <Local>).

Syntax
```
:SYSTem:COMMunicate:NETWork:REMote
<wsp>0|1|OFF|ON
```

Example
```
:SYST:COMM:NETW:REM 1
:SYST:COMM:NETW:REM? -> 1<END>
```

Description
- Settings
  Set the following parameters:
  0|OFF: Enable panel key operations
  1|ON: Disable panel key operations
- Queries
  The command returns whether the panel key operations are enabled or disabled as an unsigned integer.
- This command is only valid when the instrument is being controlled remotely over a LAN.
  If the instrument receives this command through GP-IB, an "Execution Error" will occur.

Target Frame controller

:SYSTem:COMMunicate:NETWork:LOCKout

Function Imposes or clears the local lockout state during LAN/USB remote control.

Syntax
```
:SYSTem:COMMunicate:NETWork:
LOCKout<wsp>0|1|OFF|ON
:SYSTem:COMMunicate:NETWork:LOCKout?
```

Example
```
:SYST:COMM:NETW:LOCK ON
:SYST:COMM:NETW:LOCK? -> 1
```

Description
- Settings
  Set the following parameters:
  0|OFF: Clears the local lockout state.
  1|ON: Imposes the local lockout state.
- Queries
  The command returns the state of the lockout as a unsigned integer.

Target Frame controller

:SYSTem:COMMunicate:NETWork:SUBNetmask

Function Sets or queries the subnet mask.

Syntax
```
:SYSTem:COMMunicate:NETWork:SUBNetmask<wsp><"string">
:SYSTem:COMMunicate:NETWork:SUBNetmask?
```

Example
```
:SYST:COMM:NETW:SUBN "255.255.255.0"
:SYST:COMM:NETW:SUBN?
-> "255.255.255.0"<END>
```

Description
- Settings
  Set the following parameters:
  <"string"> = "0.0.0.0" to "255.255.255.255"
  The subnet mask. The decimal numbers are separated by periods (.).
  Enclose the subnet mask string in double quotation marks (").
- Queries
  The command returns the subnet mask value as a character string that is enclosed in double quotation marks.
  "255.255.255.0"

Target Frame controller

:SYSTem:CONDition

Function Executes or queries the frame controller's status check feature.
This checks the fan, voltage, and internal temperature.

Syntax
```
:SYSTem:CONDition
:SYSTem:CONDition?
```

Example
```
:SYST:COND
:SYST:COND? -> +1<END>
```

Description
- The command returns the result of the frame controller's status check as a signed integer.
  +0: OK
  +1: Fan error
  If the returned value corresponds to the status of multiple items, it is returned as a comma-separated list of character strings.
- The `:SYST1:COND?` query command queries the result of executing the `:SYST:COND` command.
  Therefore, if you want to check the instrument's current status, be sure to execute the `:SYST1:COND?` query command after you execute the `:SYST:COND` command.
- If you execute the `:SYST:COND?` query command without first executing the `:SYST:COND` command, the returned value will be +0.

Target Frame controller

:SYSTem:DATE

Function Sets or queries the system date.

Syntax
```
:SYSTem:DATE<wsp><value1>,<value2>,<value3>
:SYSTem:DATE?
```

Example
```
:SYST:DATE 2009,6,1
:SYST:DATE? -> +2009,+6,+1<END>
```

Description
- Settings
  Set the following parameters:
  <value1> = 2009 to 2038 (in single steps)
  AD
  <value2> = 1 to 12 (in single steps)
  The month
  <value3> = 1 to 31 (in single steps)
  The day
- Queries
  The command returns the system date as a comma-separated list of signed integers.
  +2009,+6,+1 (June 1, 2009)

Target Frame controller

:SYSTem:ERRor?

Function Queries the error queue.

Syntax
```
SYSTem:ERRor?
```

Example
```
:SYST:ERR?
-> +1030,"Command Error"<END>
```

Description The command returns the contents of the error queue in the following format:
<value>,<"string">
<value>: Error number as a signed integer
<"string">: The error information as a character string
For error details, see section 8.2.

Target Frame controller

:SYSTem:ERRor:VIEW:CLEar

Function Clears the errors in the error view.

Syntax
```
:SYSTem:ERRor:VIEW:CLEar
```

Example
```
:SYST:ERR:VIEW:CLE
```

Target Frame controller

:SYSTem:PRESet

Function Sets all the parameters of the frame controller and all of its installed modules to their default values.

Syntax `:SYSTem:PRESet`

Example `:SYST:PRES`

Description
- This command is an overlap command.
- This command has no effect on:
  GP-IB conditions,
  Interface addresses,
  Output and error queues,
  The service request enable register (SRE),
  The event status enable register (ESE),
  The standard event status register (ESR),
  The status byte register (STB).
- For details on the default values, see section 10.8 in the user's manual (Frame and Module Operation), IM 735101-03EN.

Target Frame controller

:SYSTem:TIME

Function Sets or queries the time.

Syntax `:SYSTem:TIME<wsp><value1>,<value2>,<value3>`
`:SYSTem:TIME?`

Example `:SYST:TIME 13,30,50`
`:SYST:TIME? -> +13,+30,+50<END>`

Description
- Settings
  Set the following parameters:
  <value1> = 0 to 23 (in single steps)
  Hours
  <value2> = 0 to 59 (in single steps)
  Minutes
  <value3> = 0 to 59 (in single steps)
  Seconds
- Queries
  The command returns the time as a comma-separated list of signed integers.
  +13,+30,+50 (13:30:50)

Target Frame controller

5.19 TRIGger Group

:TRIGger[m][:IMMediate]

Function Starts measurement.

Syntax `:TRIGger[m][:IMMediate]`

Example `:TRIG1`

Target BERT modules (ED)

:TRIGger[m][:CHANnel[d]]:INPut

Function Sets or queries the trigger input.

Syntax
```
:TRIGger[m][:CHANnel[d]]:INPut<wsp>
IGNore|SMEasure|SWStart
:TRIGger[m][:CHANnel[d]]:INPut?
```

Example
```
:TRIG1:INP IGN
:TRIG1:INP? -> IGN<END>
```

Description
- Settings
  Set the following parameters:
  For all sensor modules:
  IGNore: The instrument ignores received triggers.
  SMEasure:
  When a trigger is received, the instrument begins a single measurement.
  The sensor's measurement mode is set to Input Trigger.
  For TLS modules:
  IGNore: The instrument ignores received triggers.
  SWStart: When a trigger is received, the instrument starts the sweep.
- Queries
  The command returns the trigger input setting as a character string.
  IGN: Ignore received triggers
  SME: When a trigger is received, begin a single measurement
  SWS: When a trigger is received, start the sweep
- For the AQ2200-221, if both device 1 and device 2 are set to SME, the averaging time setting is changed to the time from device 1 or device 2, whichever is longer.

Target All sensor modules and TLS modules

:TRIGger[m][:CHANnel[d]]:OUTPut

Function Sets or queries the trigger output mode.

Syntax
```
:TRIGger[m][:CHANnel[d]]:OUTPut<wsp>
DISabled|AVGover|MEASure|STFinished|
SWFinished|SWSTarted
:TRIGger[m][:CHANnel[d]]:OUTPut?
```

Example
```
:TRIG:OUTP DIS
:TRIG:OUTP? -> DIS<END>
```

Description
- Settings
  Set the following parameters:
  For all sensor modules:
  DISabled: Do not generate triggers
  AVGover: Generate a trigger when the averaged measurement is completed
  MEASure: Generate a trigger when the averaged measurement begins
  For TLS modules:
  DISabled: Do not generate triggers
  STFinished: Generate a trigger when the wavelength step movement is completed
  SWFinished: Generate a trigger when the sweep-completion wavelength movement finishes
  SWSTarted: Generate a trigger when the sweep-start wavelength movement finishes
  EVENt: Generate a trigger when an event is detected (AQ2200-202/212/222)
- Queries
  The command returns the trigger output mode as a character string.
  DIS: No triggers will be generated.
  AVG: The trigger will be generated when the averaged measurement is completed.
  MEAS: The trigger will be generated when the averaged measurement begins.
  STF: The trigger will be generated when the wavelength step movement is completed.
  SWF: The trigger will be generated when the sweep-completion wavelength movement finishes.
  SWST: The trigger will be generated when the sweep-start wavelength movement finishes.
  EVENt: Generate a trigger when an event is detected (AQ2200-202/212/222)

Target All sensor modules and TLS modules

:TRIGger:CONFig

Function Sets system triggers.

Syntax
```
:TRIGger:CONFig<wsp>INTernal|
ENEGative|EPOSitive
:TRIGger:CONFig?
```

Example
```
:TRIG:CONF INT
:TRIG:CONF? -> INT<END>
```

Description Set the following parameters:
INTernal: Set the trigger to internal
ENEGative: Set the trigger to external-negative
EPOSitive: Set the trigger to external-positive

Target Frame controller

5.20 WRITe Group

:WRITe[m]:I2C:DATA[:BYTE]

Function Writes a byte of data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.

Syntax
```
:WRITe[m]:I2C:DATA[:BYTE]<wsp>
<value1>|<Register1>,<value2>|
<Register2>,<value3>|<Register3>
```

Example
```
:WRIT1:I2C:DATA:BYTE #H00,#H00,#H00
```

Description Writes the specified byte of data to the specified device and write addresses on an XFP or SFP+ internal ROM through I2C communication.
To specify values in hexadecimal, precede them with #H.

<value1> = 0 to 255
The device address specified in decimal.

<Register1> = #H00 to #H7F
The device address specified in hexadecimal.

<value2> = 0 to 255
The write address specified in decimal.

<Register2> = #H00 to #HFF
The write address specified in hexadecimal.

<value3> = 0 to 255
The write data specified in decimal.

<Register3> = #H00 to #HFF
The write data specified in hexadecimal.

Target Transceiver I/F modules

:WRITe[m]:I2C:DATA:BLOCk

Function Writes data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.

Syntax
```
:WRITe[m]:I2C:DATA:BLOCk<wsp>
<value1>|<Register1>,<value2>|
<Register2>,<Block>
```

Example
```
:WRIT1:I2C:DATA:BLOC #H00,#H00,
#2160102030405060708
```

Description Writes the specified bytes of data to the specified device and write addresses on an XFP or SFP+ internal ROM through I2C communication.

<value1> = 0 to 255
The device address specified in decimal.

<Register1> = #H00 to #H7F
The device address specified in hexadecimal.

<value2> = 0 to 255
The write address specified in decimal.

<Register2> = #H00 to #HFF
The write address specified in hexadecimal.

<Block>: Data that contains 8-bit values
The syntax is as follows:
#N<N-digit decimal number><data byte sequence>

#N = 1 or 2
The number of digits in the <N-digit decimal number>.

<N-digit decimal number> = 1 to 64
The number of characers in the <data byte sequence>.

<data byte sequence> = 0 to 9|A|B|C|D|E|F
Hexadecimal

Target Transceiver I/F modules

:WRITe[m]:MDIO:DATA:WORD

Function Writes a word to the XENPAK internal ROM through MDIO communication using the transceiver I/F module.

Syntax
```
:WRITe[m]:MDIO:DATA:WORD<wsp>
<value1>|<Register1>,<value2>|
<Register2>,<value3>|<Register3>,
<value4>|<Register4>
```

Example
```
:WRIT1:MDIO:DATA:WORD #H00,#H00,
#H0000,#H0123
```

Description Writes the specified word of data to the specified port, device, and write addresses on a XENPAK internal ROM through MDIO communication.
To specify values in hexadecimal, precede them with #H.
<value1> = 0 to 31
The port address specified in decimal.
<Register1> = #H00 to #H1F
The port address specified in hexadecimal.
<value2> = 0 to 31
The device address specified in decimal.
<Register2> = #H00 to #H1F
The device address specified in hexadecimal.
<value3> = 0 to 65535
The write address specified in decimal.
<Register3> = #H0000 to #HFFFF
<value4> = 0 to 65535
The write data specified in decimal.
<Register3> = #H0000 to #HFFFF
The write data specified in hexadecimal.

Target Transceiver I/F modules

5.21 Common Command Group

The commands in this group are defined in IEEE488.2-1992 and are independent from the instrument's individual functions. There are no front panel keys that correspond to the commands in this group.

*CLS (CLear Status)

Function Clears all the event registers in the status byte register that are reflected by the summary, and the queues (excluding the output queue).

Syntax `*CLS`

Example `*CLS`

Description This command clears:
- The error queue.
- The standard event status register.
- The status byte register (excluding the 4th bit).

*ESE (standard Event Status Enable register)

Function Sets or queries the standard event enable register value.

Syntax `*ESE<wsp><value>`
`*ESE?`

Example `*ESE 255`
`*ESE? -> 255<END>`

Description
- Settings
  Set the following parameters:
  <value> = 0 to 255
  Enter the sum of the decimal numbers that correspond to the enabled bits of the standard event enable register.
  The bits that you set in the standard event status register become enabled.
  The ESE is set to its default value when:
  - The power is turned on.
  - This register is set to 0.
- Queries
  The command returns the value of the standard event enable register as an unsigned integer.

*ESR? (standard Event Status Register)

Function Queries and clears the standard event status register.

Syntax `*ESR?`

Example `*ESR? -> 255<END>`

Description
- Querying does not affect the ESE value.
- The command returns the value of the standard event status register as an unsigned integer. The value that is returned is the sum of the decimal numbers that correspond to the enabled bits of the standard event status register.

*IDN? (IDeNtify)

Function Queries the instrument model.

Syntax `*IDN?`

Example `*IDN?`
`-> YOKOGAWA,AQ2211,000000001,01.01`
`<END>`

Description The command returns the instrument model information in the following format:
<Manufacturer>,<Model>,<Serial no.>
<Firmware version>

*OPC (OPeration Complete)

Function Sets bit 0 (the OPC bit) of the standard event register to 1 upon the completion of the overlap command.

Syntax `*OPC`

Example `*OPC`

Description This command will be disabled due to the instrument powering on, the reception of a device clear command (DCL), *CLS, or *RST.

*OPC? (OPeration Complete)

Function The command returns ASCII code 1 if the overlap command is completed.

Syntax `*OPC?`

Example `*OPC? -> 1<END>`

Description The command returns the state of the overlap command operation as an unsigned integer. This command will be disabled due to the instrument powering on or the reception of a device clear command (DCL).

*OPT? (OPTion)

Function Queries the installed options.

Syntax `*OPT?`

Example `*OPT?`
`-> 810518900-M,NONE,03.33,1.00,0,0,`
`0,NONE,NONE<END>`

Description The command returns the option information in the following format. The pieces of information are separated by commas.
<Field1>,<Field2>,<Field3>,<Field4>,<Field5>,
<Field6>,<Field7>,<Field8>,<Field9>
For details, see appendix 1.

*RST (ReSeT)

Function Initializes the settings. All ongoing processes are stopped.

Syntax `*RST`

Example `*RST`

Description
- This command is an overlap command.
- The following settings are initialized:
  Display mode,
  Display settings,
  Module settings,
  Application settings.
- The following settings are not changed:
  GP-IB interface,
  GP-IB address,
  The status byte register (STB),
  The standard event status register (ESR),
  The service request enable register (SRE),
  The standard event enable register (ESE),
  The I/O queue,
  The error queue.

*SRE (Service Request Enable register)

Function Sets or queries the service request enable register value.

Syntax `*SRE<wsp><value>`
`*SRE?`

Example `*SRE 255`
`*SRE? -> 255<END>`

Description
- Settings
  Set the following parameters:
  <value> = 0 to 255
  The bits that are set to 1 are enabled.
  The SRE is set to its default value when:
  - The power is turned on.
  - This register is set to 0.

  Enter the sum of the decimal numbers that correspond to the enabled bits of the service request enable register.
- Queries
  The command returns the value of the service request enable register as an unsigned integer.

*STB? (STatus Byte)

Function Queries the status byte register value.

Syntax `*STB?`

Example `*STB? -> 255<END>`

Description
- The command returns the value of the status byte register as an unsigned integer.
  0 to 255:
  The value that is returned is the sum of the decimal numbers that correspond to the enabled bits of the status byte register.
- Even if you query the register value, the STB is not cleared.
  Example: ESR bit 5:
  In this case, a command error has occurred. (ESE = 255)
  STB bit 5 is 1 because it is the logical sum of the ESE and ESR. To clear this bit, you need to clear the ESR by reading it.

*TST? (TeST)

Function Executes a self-test and queries the result.

Syntax `*TST?`

Example `*TST? -> +0<END>`

Description The command returns the self-test result in the following format:
<value>,<"string">
<value>: Error number as a signed integer
However, +0 indicates that there were no errors during the self-test.
<"string">: The error information
For details, see section 8.2.

*WAI (WAIt)

Function Holds the execution of the subsequent command until the completion of the overlap command.

Syntax `*WAI`

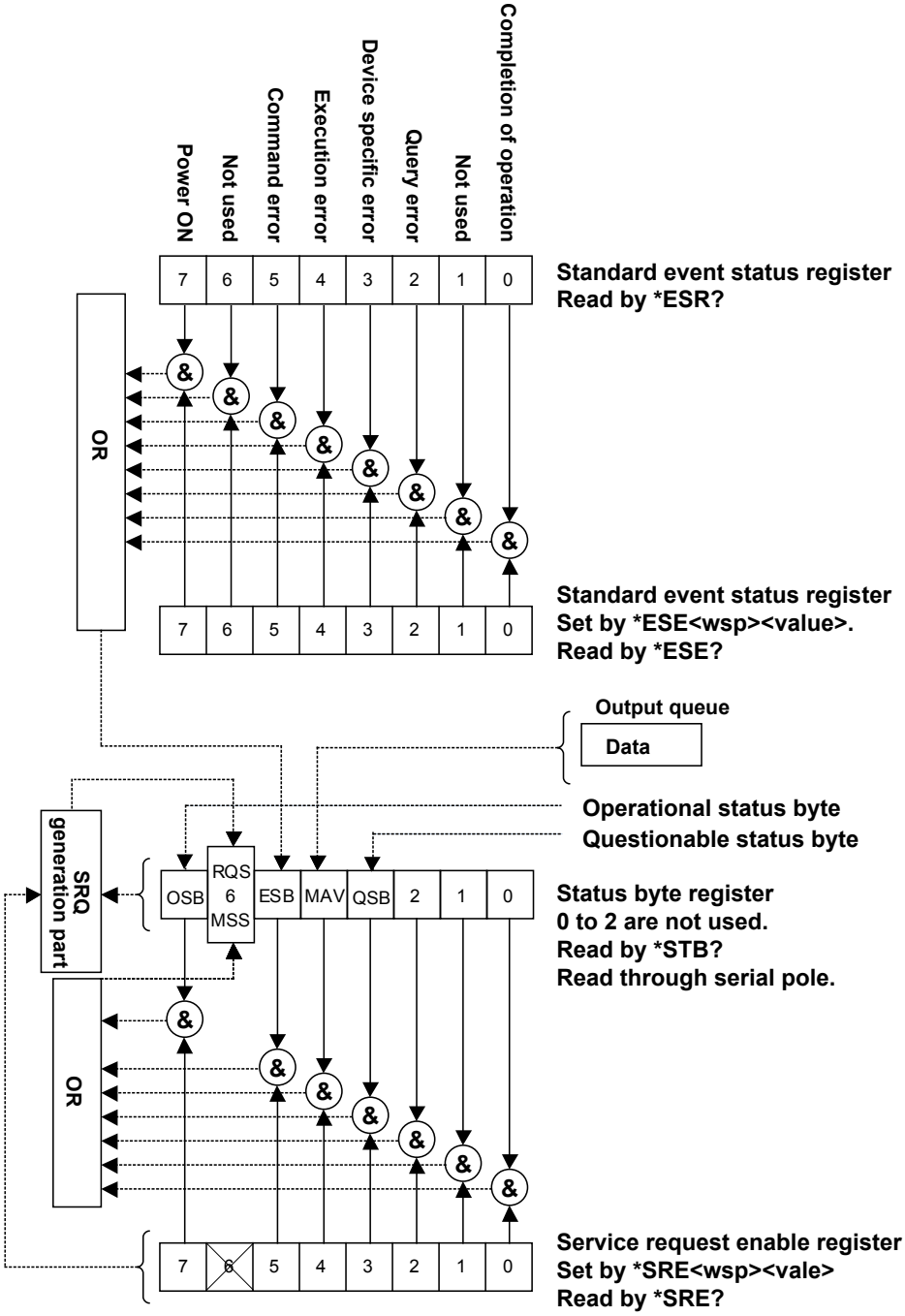
Example `*WAI`

Description This command will be disabled due to the instrument receiving a device clear command (DCL).

6.1 Status Reports

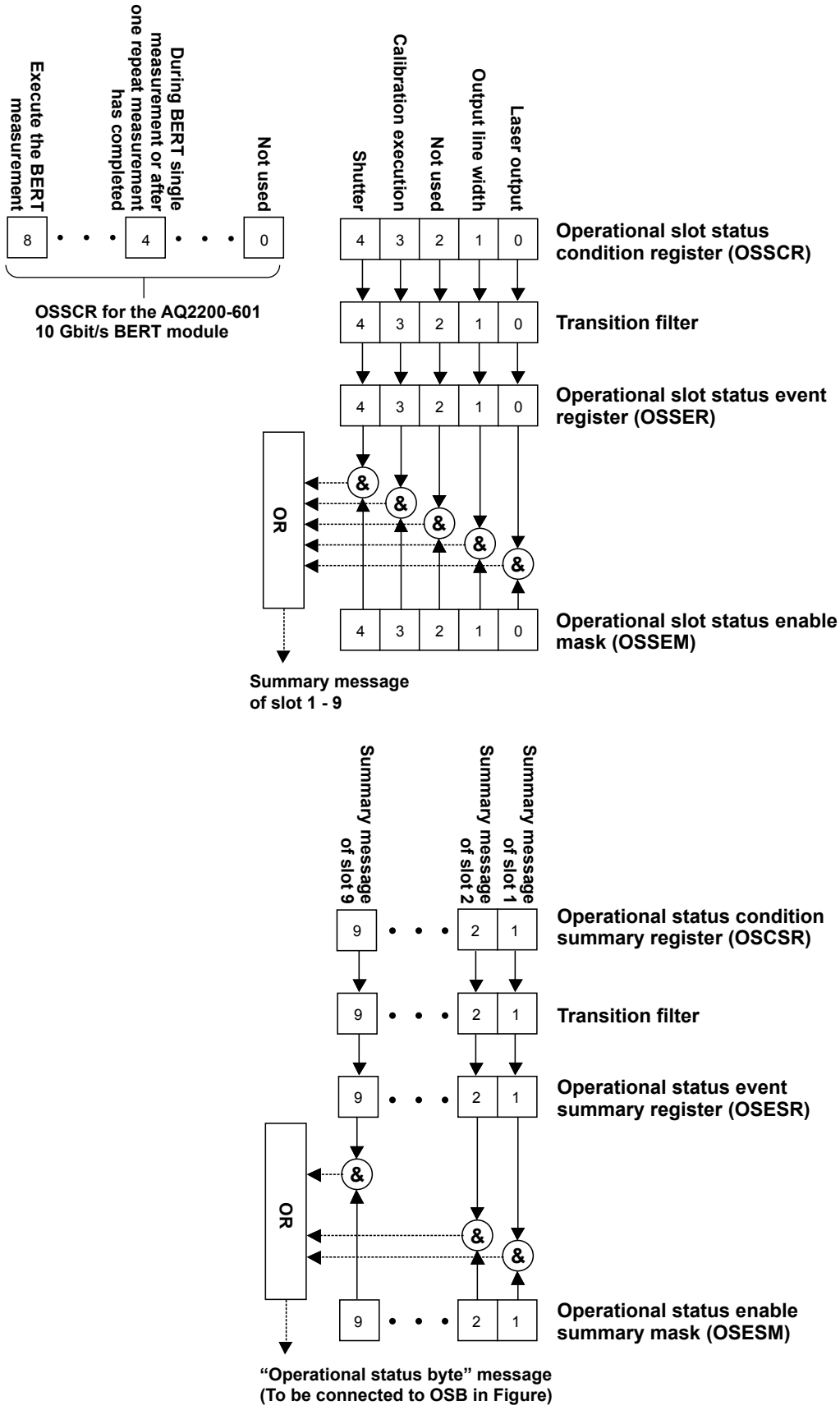
Outline of Standard Status Data Structure

- Figure describes the outline of the standard status data structure.



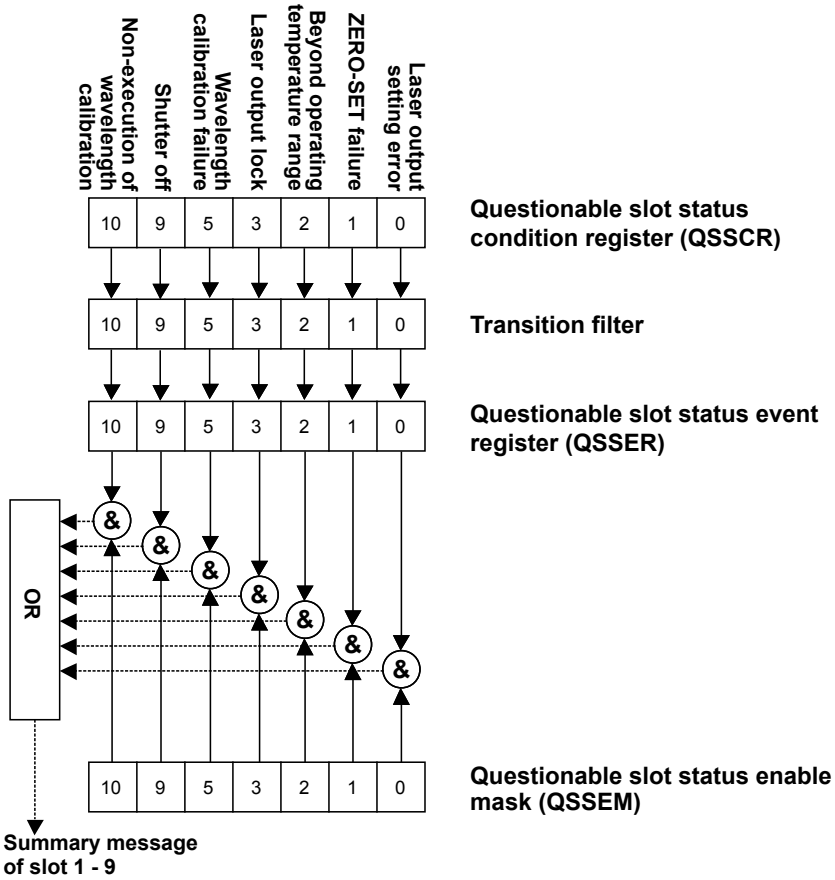
Outline of Extended Status Data Structure (OSB)

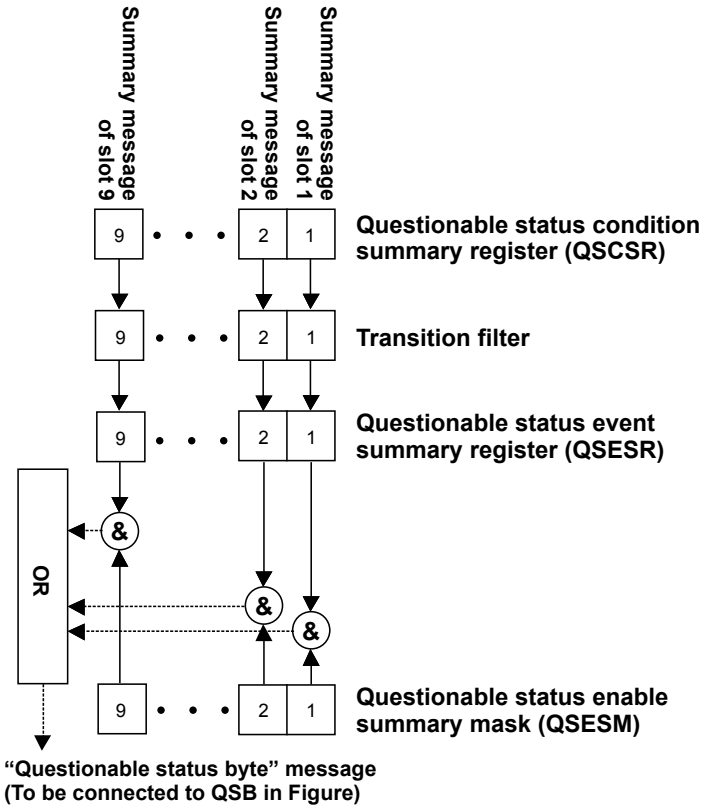
- Figure describes the data structure of the OSB (Operational Status Byte).



Outline of Extended Status Data Structure (QSB)

- Figure describes the data structure of the QSB (Questionable Status Byte).





Overview of the Registers and Queues

Name (Function)	Writing	Reading
Status byte regoster	–	Serial polling (RQS) `*STB?(MSS)`
Service request enable register (Status byte mask)	`*SRE`	`*SRE?`
Standard event status register (Indicates device status changes)	–	`*ESR?`
Standard event status enable register (Mask of the standard event status register)	`*ESE`	`*ESE?`

Operational slot status event register
(Indicates device operation status changes)
	–	`:STATusM:OPERation:EVENt?`
		Specify the slot number in the M of
		`":STATusM"`

Operational slot status enablemask
(Mask of the operational slot status event register mask)
	`:STATusM:OPERation:ENABle<wsp><value>`
	Specify the slot number in the M of
	`":STATusM"`
		`:STATusM:OPERation:ENABle?`
		Specify the slot number in the M of
		`":STATusM"`

Operational slot status condition register
(Indicates current device operation status)
	–	`:STATusM:OPERation:CONDition?`
		Specify the slot number in the M of
		`":STATusM"`

Transition filter
(Indicates conditions for operational slot status event register changes)
	`:STATusM:OPERation:NTRansition<wsp><value>`
	(Change in negative direction)
	`:STATusM:OPERation:PTRansition<wsp><value>`
	(Change in positive direction)
	Specify the slot number in the M of
	`":STATusM"`
		`:STATusM:OPERation:NTRansition?`
		(Change in negative direction)
		`:STATusM:OPERation:PTRansition?`
		(Change in positive direction)
		Specify the slot number in the M of
		`":STATusM"`

Operational status event summary register (Indicates changes to the summary messages for slot 1 to slot 9's operation statuses)	–	`:STATus:OPERation:EVENt?`
Operational status enable summary mask (Mask of the operational status event summary register)	`:STATus:OPERation:ENABle<wsp><value>`	`:STATus:OPERation:ENABle?`
Operational status condition summary register (The current summary message for slot 1 to slot 9's operation statuses)	–	`:STATus:OPERation:CONDition?`

Transition filter
(Indicates conditions for operational status event summary register changes)
	`:STATus:OPERation:NTRansition<wsp><value>`
	(Change in negative direction)
	:STATus:OPERation:PTRansition<wsp><value>
	(Change in positive direction)
		`:STATus:OPERation:NTRansition?`
		(Change in negative direction)
		`:STATus:OPERation:PTRansition?`
		(Change in positive direction)

Questionable slot status event register
(Indicates device running status changes)
	–	`:STATusM:QUEStionable:EVENt?`
		Specify the slot number in the M of
		`":STATusM"`

Questionable slot status enable mask
(Mask of the questionable slot status event register)
	`:STATusM:QUEStionable:ENABle<wsp><value>`
	Specify the slot number in the M of
	`":STATusM"`
		`:STATusM:QUEStionable:ENABle?`
		Specify the slot number in the M of
		`":STATusM"`

Questionable slot status condition register
(Indicates current device running status)
	–	`:STATusM:QUEStionable:CONDition?`
		Specify the slot number in the M of
		`":STATusM"`

Name (Function)	Writing	Reading
Transition filter (Indicates conditions for questionable slot status event register changes)	:STATusM:QUEStionable:NTRansition<wsp><value> (Change in negative direction) :STATusM:QUEStionable:PTRansition<wsp><value> (Change in positive direction) Specify the slot number in the M of ":STATusM"	:STATusM:QUEStionable:NTRansition? (Change in negative direction) :STATusM:QUEStionable:PTRansition? (Change in positive direction) Specify the slot number in the M of ":STATusM"
Questionable status event summary register (Indicates changes to the summary messages for slot 1 to slot 9's running statuses)	–	:STATus:QUEStionable:EVENt?
Questionable status enable summary mask (Mask of the questionable status event summary register)	:STATus:QUEStionable:ENABle<wsp><value>	:STATus:QUEStionable:ENABle?
Questionable status condition summary register (The current summary message for slot 1 to slot 9's running statuses)	–	:STATus:QUEStionable:CONDition?
Transition filter (Indicates conditions for qustionable status event summary register changes)	:STATus:QUEStionable:NTRansition<wsp><value> (Change in negative direction) :STATus:QUEStionable:PTRansition<wsp><value> (Change in positive direction)	:STATus:QUEStionable:NTRansition? (Change in negative direction) :STATus:QUEStionable:PTRansition? (Change in positive direction)
Output queue (Stores a response message to a query)	All query commands	–

Registers and Queues That Affect the Status Byte

Registers that affect the bits of the status byte are shown below.

Standard Event Register

Sets bit 5 (ESB) of the status byte to 1 or 0.

Output Queue

Sets bit 4 (MAV) of the status byte to 1 or 0.

Questionable Status Byte (QSB of Extended Status Report)

Sets bit 3 (QSB) of the status byte to 1 or 0.

Operational Status Byte (OSB of Extended Status Report)

Sets bit 7 (OSB) of the status byte to 1 or 0.

Feature of the Registers

Condition Register

The laser output status or operating temperature status is reflected on this register.

Event Register

If a change occurs in the condition register, this register shows that a specific changeoccurs in relevant bit.

Transition Filter

This register specifies a specific change to be reflected on the event register.Three kinds of changes can be specified.

- Change in positive direction (0 -> 1)
- Change in negative direction (1 -> 0)
- Change in both directions (0 <--> 1)

Event Enable Register

This register specifies whether or not the status of the event register is reflected on the status register in units of bits.

6.2 Status Byte

Status Byte

OSB	RQS 6 MSS	ESB	MAV	QSB	2	1	0

Bit	Item	Decimal Value
7(MSB)	OSB(Operational Status Byte) Indicates that there was a change in the operational status of each module.	128
6	RQS (Request Service)/MSS (Master Status Summary) Set to 1 when the logical AND of the status byte excluding Bit 6 and the service request enable register is not 0. In other words, this bit is set to 1 when the instrument is requesting service from the controller. RQS is set to 1 when the MSS bit changes from 0 to 1, and cleared when serial polling is carried out or when the MSS bit changes to 0.	64
5	ESB (Event Summary Bit) Set to 0 when the logical product of the standard event register and the corresponding enable register is 1. In other words, this bit is set to 1 when an event takes place inside the instrument. See the page 6-5.	32
4	MAV (Message Available) Set to 1 when the output queue is not empty. In other words, this bit is set to 1 when there are data to be transmitted. See the page 6-9.	16
3	QSB(Questionable Status Byte) Indicates that there was a change in the running status of each module.	8
2	Not used.	0
1	Not used.	0
0(LSB)	Not used.	0

Bit Masking

If you wish to mask a certain bit of the status byte so that it does not cause a SRQ, set the corresponding bit of the service request enable register to 0. For example, to mask bit 2 (EAV) so that service is not requested when an error occurs, set bit 2 of the service request enable register to 0. This can be done using the *SRE command. To query whether each bit of the service request enable register is 1 or 0, use *SRE?. For details on the *SRE command, see chapter 5.

Operation of the Status Byte

A service request is issued when bit 6 of the status byte becomes 1. Bit 6 is set to 1 when any of the other bits becomes a 1 (when the corresponding bit of the service request enable register is also set to 1).For example, if an event occurs and any of the bits of the logical AND of the standard event register and the corresponding enable register becomes a 1, then bit 5 (ESB) is set to 1. In this case, if bit 5 of the service request enable register is 1, bit 6 (MSS) is set to 1, thus requesting service from the controller. It is also possible to check what type of event has occurred by reading the contents of the status byte.

Reading from the Status Byte

The following two methods are provided for reading the status byte.

Inquiry Using the *STB? Query

Making an inquiry using the *STB? query sets bit 6 to MSS. This causes the MSS to be read. After completion of the read-out, none of the bits in the status byte will be cleared.

Serial Polling

Execution of a serial polling changes bit 6 to RQS. This causes RQS to be read. After completion of the read-out, only RQS is cleared. It is not possible to read MSS using serial polling.

Clearing the Status Byte

No method is provided for forcibly clearing all the bits in the status byte. The bits that are cleared for each operation are shown below.

When a Query Is Made Using the *STB? Command

No bits are cleared.

When a Serial Polling Is Executed

Only the RQS bit is cleared.

When a *CLS Command Is Received

When the *CLS command is received, the status byte itself is not cleared, but the contents of the standard event register (which affects the bits in the status byte) are cleared. As a result, the corresponding bits in the status byte are cleared, except bit 4 (MAV), since the output queue cannot be emptied by the *CLS command. However, the output queue is also cleared if the *CLS command is received just after a program message terminator.

6.3 Standard Event Register

Standard Event Register

Power ON	Not used	Command error	Execution error	Device specific error	Query error	Not used	Completion of operation
7	6	5	4	3	2	1	0

Bit	Item	Decimal Value
7(MSB)	Power ON This bit is set when the first *ESR? is received after the power to this unit has been turned from OFF ->ON.	128
6	Not used.	0
5	Command error Syntax error, such as incorrect format occurs or command, which cannot be recognized, such as incorrect command or not applicable common command is received.	32
4	Execution error Data is beyond the input range or valid command message cannot be executed in a certain operation mode.	16
3	Device specific error Error not depending on the remote command occurs. (For example, temperature error occurs in the module.)	8
2	Query error This bit is set if an output does not exist or if it is attempted to read the data from the output queue in a status other than the holding status.	4
1	Not used.	0
0(LSB)	Completion of operation This bit is set as response corresponding to the *OPC command. (This shows that all pending operations are completed.)	1

Bit Masking

If you wish to mask a certain bit of the standard event status register so that it does not cause bit 5 (ESB) of the status byte to change, set the corresponding bit of the standard event status enable register to 0. For example, to mask bit 2 (QYE) so that ESB is not set to 1, even if a query error occurs, set bit 2 of the standard event status enable register to 0. This can be done using the *ESE command. To query whether each bit of the standard event status enable register is 1 or 0, use the *ESE?. For details on the *ESE command, see chapter 5.

Operation of the Standard Event Status Register

The standard event status register is provided for eight different kinds of event which can occur inside the instrument. Bit 5 (ESB) of the status byte is set to 1 when any of the bits in this register becomes 1 (or when the corresponding bit of the standard event status enable register becomes 1).

Example

1. A query error occurs.
2. Bit 2 (QYE) is set to 1.
3. Bit 5 (ESB) of the status byte is set to 1 if bit 2 of the standard event status enable register is 1.

It is also possible to check what type of event has occurred inside the instrument by reading the contents of the standard event status register.

Reading from the Standard Event Status Register

The contents of the standard event status register can be read by the *ESR? command. After the register is read, it is cleared.

Clearing the Standard Event Status Register

The standard event status register is cleared in the following three cases.

- When the contents of the standard event status register are read using the *ESR? command.
- When a *CLS Command Is Received
- When the instrument is power cycled.

6.4 Extended Event Register

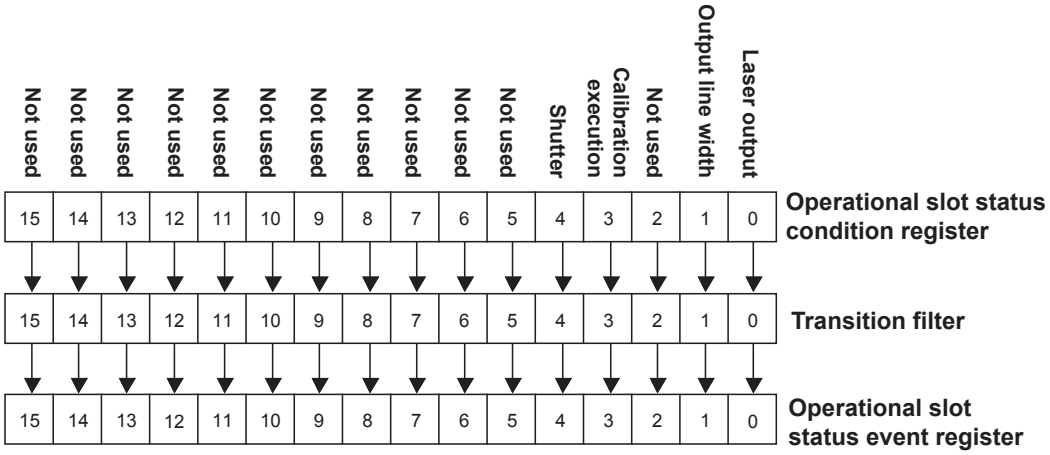
The expansion event register contains the expansion status report data.
There is both an OSB (operational status byte) and QSB (questionable status byte).
Both the OSB and QSB have the following registers:

- Condition register (status)
- Event register (status changes)
- Transition filter (change conditions)
- Enable mask (whether notification is carried out or not)

For information on each register's functions, see section 6.1.

OSB (If a module other than a 10 Gbit/s BERT module is installed in the slot)

The OSB contains operational information from all of the modules that are installed in the frame controller (excluding AQ2200-601 10 Gbit/s BERT modules).



Operational slot status condition register

The meaning of each bit of the operational slot status condition register is as follows:

Bit	Item	Decimal Value
15(MSB)	Not used.	0
14	Not used.	0
13	Not used.	0
12	Not used.	0
11	Not used.	0
10	Not used.	0
9	Not used.	0
8	Not used.	0
7	Not used.	0
6	Not used.	0
5	Not used.	0
4	Shutter (Information on shutter ON)	16
3	Calibration execution (Information on executing status)	8
2	Not used.	0
1	Output line width	2
0(LSB)	Laser output (Information on laser output ON)	1

Transition Filter

The transition filter extracts the changes to the corresponding bits in the condition register in the following manner, and rewrites the event register.

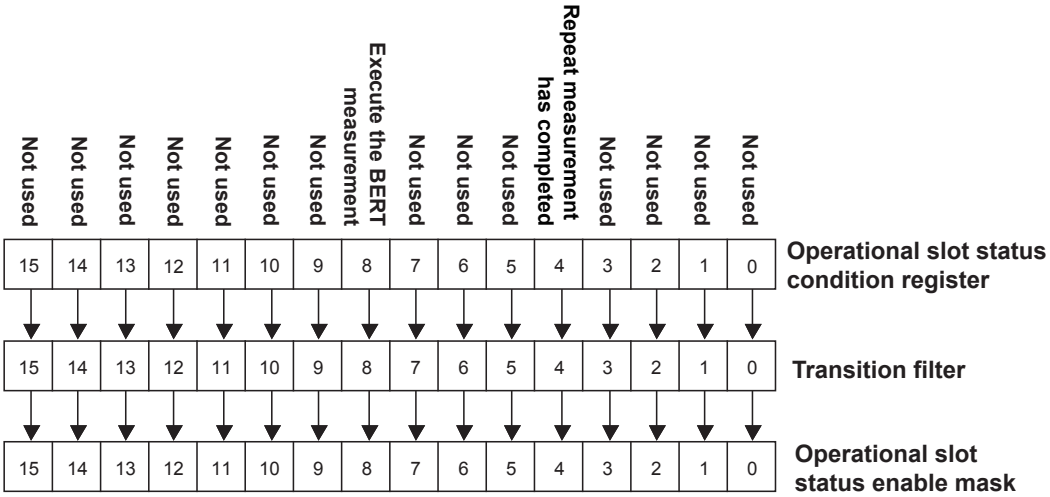
Change in the positive direction	**The corresponding event register bit is set to 1 when the matching condition register bit changes from 0 to 1.**
Change in the negative direction	The corresponding event register bit is set to 1 when the matching condition register bit changes from 1 to 0.
Change in both directions	The corresponding event register bit is set to 1 when the matching condition register bit changes from 0 to 1 or from 1 to 0.
No change	The bit remains 0.

Note

If you specify change in both directions, specify both change in the positive direction and change in the negative direction.

OSB (If a 10 Gbit/s BERT module is installed in the slot)

The OSB contains operational information from an AQ2200-601 10 Gbit/s BERT module that is installed in the frame controller.



Operational slot status condition register

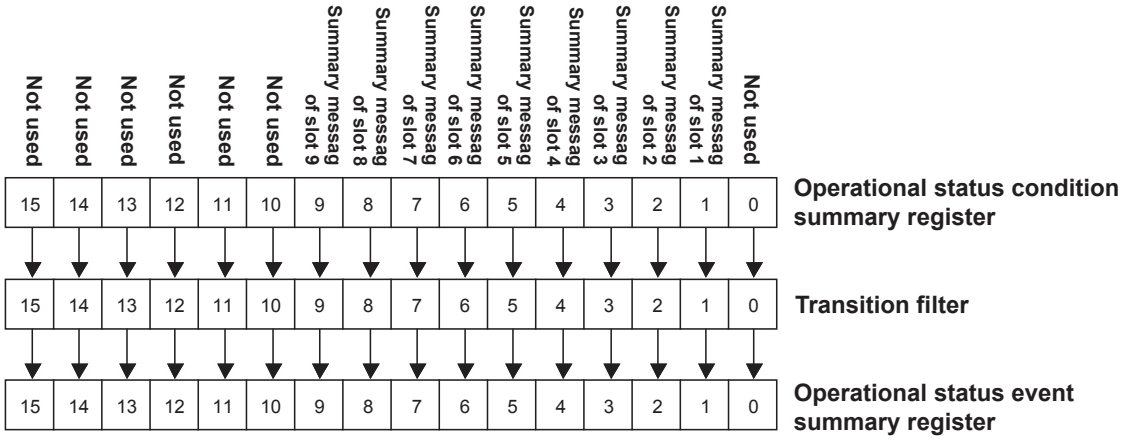
The meaning of each bit of the operational slot status condition register is as follows:

Bit	Item	Decimal Value
15(MSB)	Not used.	0
14	Not used.	0
13	Not used.	0
12	Not used.	0
11	Not used.	0
10	Not used.	0
9	Not used.	0
8	Execute the BERT measurement	256
7	Not used.	0
6	Not used.	0
5	Not used.	0
4	During BERT single measurement or after one repeat measurement has completed	16
3	Not used.	0
2	Not used.	0
1	Not used.	0
0(LSB)	Not used.	0

The transition filter details are the same as they are for the OSB for slots.

OSB (Summary)

The summary contains the logical sum of the operational information of each of the modules that are installed in the frame controller.



Operational status condition summary register

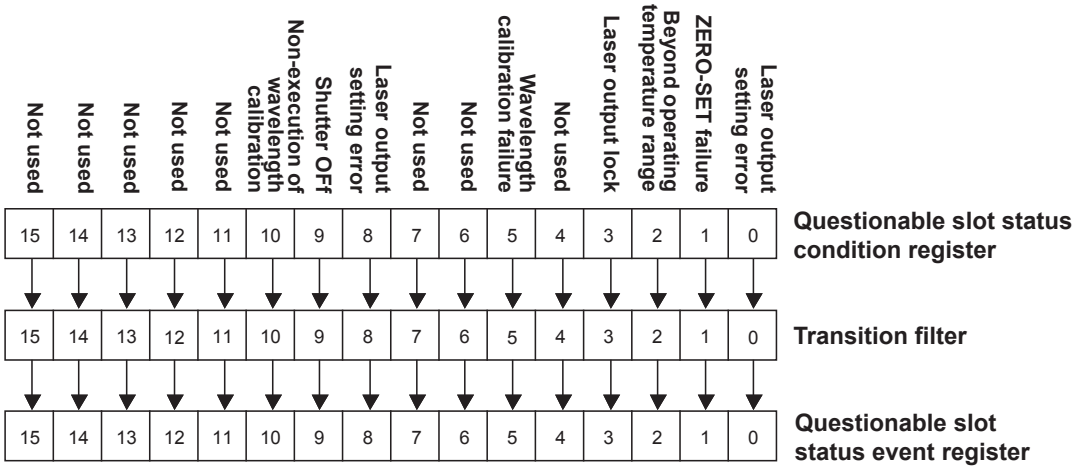
The meaning of each bit of the operational status condition summary register is as follows:

Bit	Item	Decimal Value
15(MSB)	Not used.	0
14	Not used.	0
13	Not used.	0
12	Not used.	0
11	Not used.	0
10	Not used.	0
9	Status of slot No. 9	512
8	Status of slot No. 8	256
7	Status of slot No. 7	128
6	Status of slot No. 6	64
5	Status of slot No. 5	32
4	Status of slot No. 4	16
3	Status of slot No. 3	8
2	Status of slot No. 2	4
1	Status of slot No. 1	2
0(LSB)	Not used.	0

The transition filter details are the same as they are for the OSB for slots.

QSB (Slot)

The QSB contains the running information for each of the modules that are installed in the frame controller.



Questionable slot status condition register

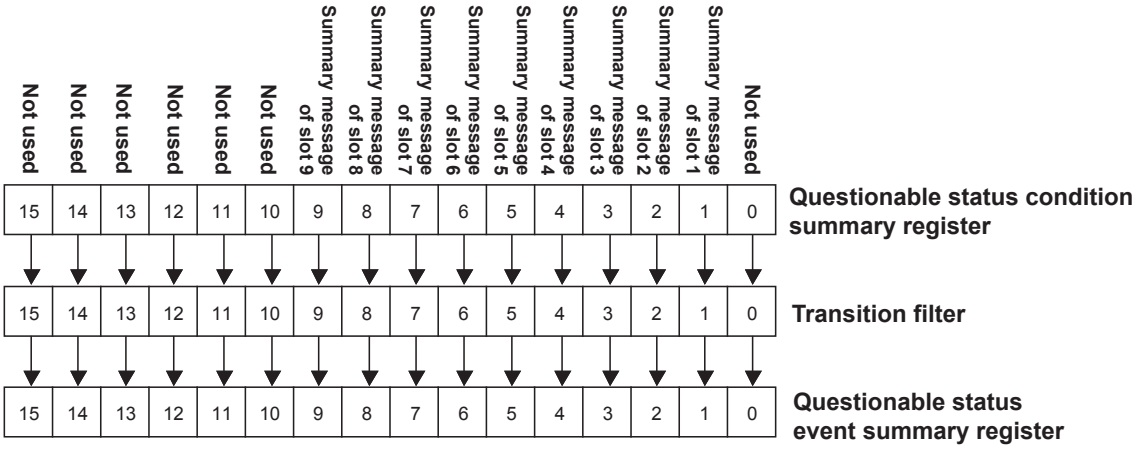
The meaning of each bit of the questionable slot status condition register is as follows:

Bit	Item	Decimal Value
15(MSB)	Not used.	0
14	Not used.	0
13	Not used.	0
12	Not used.	0
11	Not used.	0
10	Non-execution of wavelength calibration	1024
9	Shutter OFF	512
8	Not used.	0
7	Not used.	0
6	Not used.	0
5	Wavelength calibration failure	32
4	Not used.	0
3	Laser output lock	8
2	Beyond operating temperature range	4
1	ZERO-SET failure	2
0(LSB)	Laser output setting error	1

The transition filter details are the same as they are for the OSB for slots. For more details, see page 6-12.

QSB (Summary)

The summary contains the logical sum of the running information of each of the modules that are installed in the frame controller.



Questionable status condition summary register

The meaning of each bit of the questionable status condition summary register is as follows:

Bit	Item	Decimal Value
15(MSB)	Not used.	0
14	Not used.	0
13	Not used.	0
12	Not used.	0
11	Not used.	0
10	Not used.	0
9	Status of slot No. 9	512
8	Status of slot No. 8	256
7	Status of slot No. 7	128
6	Status of slot No. 6	64
5	Status of slot No. 5	32
4	Status of slot No. 4	16
3	Status of slot No. 3	8
2	Status of slot No. 2	4
1	Status of slot No. 1	2
0(LSB)	Not used.	0

The transition filter details are the same as they are for the OSB for slots. For more details, see page 6-12.

6.5 Input Queue and Output Queue

Input Queue

- This unit uses 1-stage input queue.

-> Therefore, up to next command can be taken while other command is beingexecuted.

- The size is 1Kbytes.

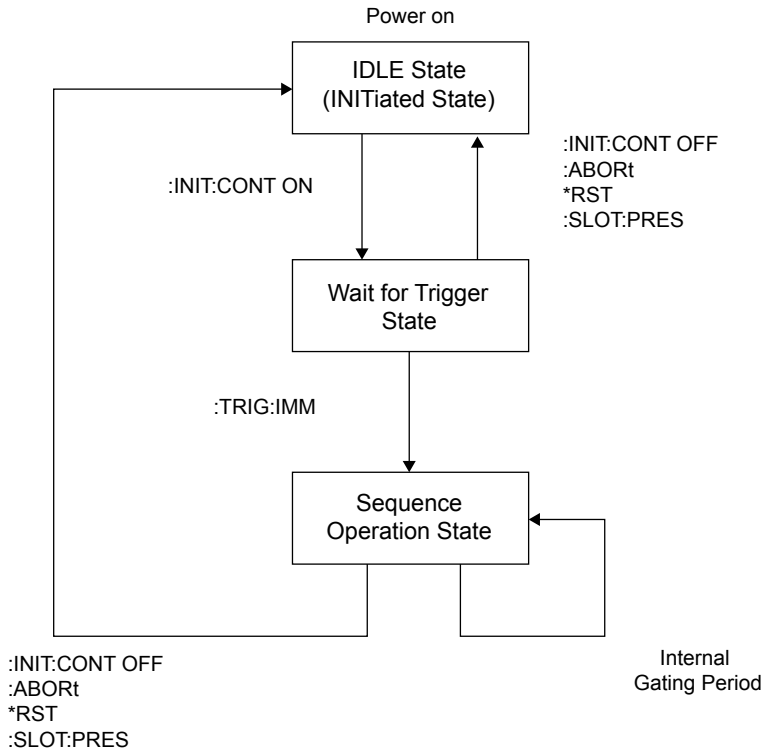
Output Queue

- This unit uses 1-stage output queue.
- The output queue holds only the latest data.

7.1 BERT

Trigger System

The measurement related commands of the BERT module use the command system based on the Trigger system model used in the SCPI (Standard Commands for Programmable Instrumentation).
The following Fig. shows the outline of the Trigger system model.



Online of Trigger System Model

IDLE State

Measurement stop status when the power is turned ON.

When `:INIT:CONT` is ON, the operation is transited to Wait for Trigger State.

Wait for Trigger State

`:TRIG:IMM` becomes the measurement start trigger and the operation is transited to the Sequence Operation State.

Sequence Operation State

The measurement is executed at internal measurement cycle timing.

BERT Starting and Stopping Procedures

The following shows an example when the BERT module is mounted on the 1-3 slot.

```
> :SENS2:DATA:TEST:MODE SING
> :SENS2:DATA:TEST:TIME 0,0,0,20
> :INIT2:CONT ON
> :TRIG2:IMM
> :SENS2:DATA:ALL?
< 0,0,0,36,0.000000E+00,0.000000E+00,0.000000E+00
  .
  .
> :SENS2:DATA:ALL?
< 0,0,0,50,0.000000E+00,0.000000E+00,0.000000E+00

> :ABOR2
```

Note

- 20sec.-Single measurement is started.
- The measurement results are obtained with `:SENS:DATA:ALL?` command.
- The measurement is stopped with `:ABOR` command.

Waiting for Completion of Single Measurement Using the Operation Status Condition Register

The measurement results are obtained after the completion of Single measurement.

```
> :SENS2:DATA:TEST:MODE SING
> :SENS2:DATA:TEST:TIME 0,0,0,20
> :INIT2:CONT ON
> :TRIG2:IMM

> :STAT2:OPER:COND?
< 16
> :STAT2:OPER:COND?
< 16
  .
  .
> :STAT2:OPER:COND?
< 0
> :SENS2:DATA:ALL?
< 0,0,2,200,0.000000E+00,4.000000E+00,5.284299E-11
```

(Description)

- The condition register of the operation status is periodically read. If the MEAS bit (bit 4) becomes 0, it is judged that the measurement is completed.

Obtaining the Repeat Measurement Results Using the Operation Status Event Register

The measurement results are obtained every time when one cycle of Repeat measurement is completed.

```
> :STAT2:OPER:EVEN?
> :SENS2:DATA:TEST:MODE REPE
> :SENS2:DATA:TEST:TIME 0,0,0,20
> :INIT2:CONT ON
> :TRIG2:IMM

> :STAT2:OPER:EVEN?
< 16
> :STAT2:OPER:EVEN?
< 0
> :STAT2:OPER:EVEN?
< 0
  .
  .
> :STAT2:OPER:EVEN?
< 256
> :SENS2:DATA:IPERiod:ALL?
< 0,0,2,200,0.000000E+00,4.000000E+00,5.284299E-11


> :STAT2:OPER:EVEN?
< 0
>  :STAT2:OPER:EVEN?
< 0
  .
  .
> :STAT2:OPER:EVEN?
< 256
> :SENS2:DATA:IPER:ALL?
< 0,0,2,200,0.000000E+00,4.000000E+00,5.284299E-11
```

(Description)

- The event register of the operation status is used.
- Before the measurement starts, the event register is read with the `:STAT:OPER:EVEN?` command and the value is cleared.
- During Repeat measurement, the event register is periodically read. If the EIPER bit (bit 8) becomes 1, the results of measurement is captured with the `:SENS:DATA:IPER:ALL?` command. The event register is zero-cleared after it is read; it is set to 1 when the measurement completion event of the next cycle occurs.

8.1 Command Error

The Setting Does not Become Valid Even Though the Setting Command is Sent.

Send "`:SYST:ERR?`" command to check the error contents. After that, send the correct command.

(Example) Parameter value beyond the setting range is specified.

```
> :SOUR3:CLOC:RATE 8.88 (Parameter value beyond the range is set.)
> :SYST:ERR?
< +1034, "Data out of range"


> :SOUR3:CLOC:RATE 9.95 (Parameter value within the range is set.)
> :SYST:ERR?
< +0, "No Error"
```

Command Process Time

According to the command, it takes a long time to make the setting, causing "Timeout Error" to occur.
If this occurs, wait for enough time after the command has been sent and send the next command or send the next command after the command has been completed by the OPC command.

(Example) The completion of the command is checked with :SLOT:OPC command.

(When BERT module, 10Gbit/s optical modulater, and 10Gbit/s optical receiver)

```
> :SOUR3:CLOC:RATE 9.95
> :SLOT3:OPC?
< 0
.
.
> :SLOT3:OPC?
< 1
> :SOUR3:CLOC:RATE 9.96
```

- The following shows the response of `:SLOT:OPC?` command.
  0: Command is being processed.
  1: Command process is completed.

8.2 Error Messages

Error Message Syntax

syntax <error code>,<error message>

<error code>	Signed integer value
<error message>	String “error message”
	If no error occurs, +0, “No Error” is returned.
example	If ZERO-SET error occurs,
	`:SYST:ERR? -> +1263, "Zero set Error1" <END>`
	If command error occurs in the frame controller:
	`:SYST:ERR? -> +1030, "Command Error" <END>`

Error Queue

Errors that have occurred are stored into the error queue in the error message syntax format. These errors can be read out with “`:SYStem:ERRor?`”.
If no error exists in response to the command “`:SYStem:ERRor?`”, “+0, “No Error”” is returned. However, when multiple errors are stored in the error queue, the errors are read out from the error queue in the chronological order.
(FIFO (First In First Out) operation having storage area containing 64 error messages.)
Additionally, if 64th error occurs even though the errors are not read out from the error queue, the error queue overflow error occurs and “+1036,Queue Overflow” is overwritten into the 64th area. The error message cannot be stored unless the errors are read out. Therefore, it is recommended to always monitor the error status.

Furthermore, the error queue is cleared by power ON, or *CLS, in addition to reading out of all error messages by “`:SYStem:ERRor?`”.

Remote Error Messages

Messages may appear on the screen while you are using this instrument. This section describes the error messages and the corrective action to take. If the corrective action states that serving is required, contact your nearest YOKOGAWA dealer. In addition to the messages listed here, other error messages may also appear.
These error messages are described in the *User's Manual (IM 735101-01EN).*

Code	Error Message	Description	Corrective Action
1010	No Media	No Media	Check whether the media is mounted correctly and send it again.
1020	LAN communication Error	LAN communication error	Check the following items and restart the operation. If the same message continues to appear, servicing is required. • Cable is connected correctly. • Network address or other data is set correctly.
1021	GP-IB Communication Error	GP-IB communication error	Check the cable is connected correctly. If the same message continues to appear, servicing is required.
1030	Command Error	Commend error	Check the command and send it again.
1031	Syntax Error	Syntax error	Check the syntax and send the command again.
1032	Parameter Error	Parameter error	Check the command parameters and send the command again.
1033	Execution Error	Execution error	Check the command and send it again.
1034	Data out of range	Data is beyond the setting range.	Check the setting range and send the command again.
1035	Command support Error	Unsupported command error	Check the command and send it again.
1036	Queue Overflow	Error queue overflow	Read out the errors or clear the error queue.
1037	Query Error	Query error	Check the command and send it again.

Appendix 1 Various Detailed Information Forms

You can read out the detailed information held by the frame, module, or optical sensor head with the commands, `OPT?`, `:SLOT[n]:OPTions?`, and `:SLOT[n]:HEAD[d]:OPTions?`.
The detailed information is written in the following formats and consists of nine fields.
These fields are separated by “,”.
The format and meaning of the field may vary depending on the model of the unit.
If a field has two or more information, they are separated by “/”.

Response Format:
<Field1>,<Field2>,<Field3>,<Field4>,<Field5>,<Field6>,<Field7>,<Field8>,<Field9>

<Field1>:	Order code	(Up to 50 characters)
<Field2>:	Special order code	(Up to 16 characters)
<Field3>:	Hardware code	(Up to 10 characters)
<Field4>:	FPGA VERSION CODE	(Up to 10 characters)
<Field5>:	Connector code	(Up to 20 characters)
<Field6>:	Fiber code	(Up to 10 characters)
<Field7>:	Wavelength code	(Up to 40 characters)
<Field8>:	Option	(Up to 30 characters)
<Field9>:	Remarks	(Up to 50 characters)

If the specified module is not applicable to each field, "0", "", or "NONE" is set.

<AQ2201 or AQ2202>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: “0”
<Field8>: “0”
<Field9>: “0”

<AQ2200-111>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: “0”
<Field5>: FCAPC or SCAPC
FCAPC: FC/Angled PC
SCAPC: SC/Angled PC
<Field6>: SMF or PMF
SMF: Single mode fiber
PMF: Polarization Maintaining Fiber
<Field7>: aaa/bbb/ccc
aaa: Minimum settable wavelength
bbb: Center wavelength
ccc: Maximum settable wavelength
<Field8>: MODE:xxx
MODE:EXT-SINE: External modulation (sine)
MODE:EXT-CHOP: External modulation (CHOP)
POWER: +13DBM: 20mW-output
<Field9>: “0”

<AQ2200-112>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: “0”
<Field5>: FCPC or FCAPC
FCPC: FC/PC
FCAPC: FC/Angled PC
<Field6>: SMF/50GI/62.5GI
<Field7>: <wl1> or <wl1>/<wl2>
<wl1>: Ch1 wavelength
<wl2>: Ch2 wavelength
<Field8>: “0”
<Field9>: “0”

<AQ2200-131>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: Connector code FCPC/FCAPC
FCPC: FC/PC
FCAPC: FC/Angled PC
<Field6>: Fiber code PMF
<Field7>: Wavelength code C-C/L-L/C-L
<Field8>: "0"
<Field9>: "0"

<AQ2200-132>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: Connector code FCPC/FCAPC
FCPC: FC/PC
FCAPC: FC/Angled PC
<Field6>: Fiber code PMF
<Field7>: Wavelength code C-C/L-L/C-L
<Field8>: "0"
<Field9>: "0"

<AQ2200-141>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: “0”
<Field5>: “0”
<Field6>: SMF
<Field7>: aaa: Output wavelength
<Field8>: “0”
<Field9>: “0”

<AQ2200-142>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: “0”
<Field5>: “0”
<Field6>: SMF
<Field7>: aaa/bbb
aaa: Device 1 output wavelength
bbb: Device 2 output wavelength
<Field8>: “0”
<Field9>: “0”

<AQ2200-201/AQ2200-202>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: “0”
<Field8>: NONE
<Field9>: “0”

<AQ2200-211>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-215>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-221>

<Field1>:
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-212/AQ2200-222>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-231/AQ2200-241>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-232/AQ2200-242>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: “0”
<Field5>: “0”
<Field6>: “0”
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-311>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC or FCAPC or SCPC or SCAPC
FCPC: FC/PC
FCAPC: FC/Angled PC
SCPC: SC/PC
SCAPC: SC/Angled PC
<Field6>: SMF
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-311A/AQ2200-312>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC or SCPC
FCPC: FC/PC
SCPC: SC/PC
<Field6>: SMF or 50GI or 62.5GI
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-331/AQ2200-332>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC or SCPC
FCPC: FC/PC
SCPC: SC/PC
<Field6>: SMF or 50GI or 62.5GI
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-342>

<Field1>: Order code
<Field2>: Special order code
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: Connector code FCPC/FCAPC
<Field6>: Fiber code SMF
<Field7>: Wavelength code 1260-1640
<Field8>: "0"
<Field9>: "0"

<AQ2200-411>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC
<Field6>: SMF or 62.5GI
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-412>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC
<Field6>: SMF
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: ”0”

<AQ2200-421>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: FCPC
<Field6>: SMF or 62.5GI
<Field7>: aaa-bbb
aaa: Minimum set wavelength
bbb: Maximum set wavelength
<Field8>: NONE
<Field9>: “0”

<AQ2200-641>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: FPGA VERSION CODE
<Field5>: ”0”
<Field6>: ”0”
<Field7>: ”0”
<Field8>: ”0”
<Field9>: “0”

<AQ2200-642>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: ”0”
<Field5>: ”0”
<Field6>: ”0”
<Field7>: ”0”
<Field8>: ”0”
<Field9>: “0”

<AQ2200-651>

<Field1>: Order code
<Field2>: NONE
<Field3>: Hardware code
<Field4>: ”0”
<Field5>: ”0”
<Field6>: ”0”
<Field7>: ”0”
<Field8>: ”0”
<Field9>: “0”

Appendix 2 SDH/SONET Frame Overhead Pattern Default Values

The following explanation uses units of 64 byte blocks.
Numbered squares in the diagram are data blocks (of 64 bytes).
Note that values other than 00 are placed in the darkened blocks.

Structure of Overhead Data

1	2	3	4	5	6	7	8	9
10			…			…		18
19								27
28	29	30	31	32	33			36
37			…			…		45
46								54
55			…			…		63
64								72
73			…			…		81

Block 1	F6 (all 64 Bytes)
Block 2	F6 (all 64 Bytes)
Block 3	F6 (all 64 Bytes)
Block 4	28 (all 64 Bytes)
Block 5	28 (all 64 Bytes)
Block 6	28 (all 64 Bytes)
Block 7	01-40
Block 8	AA (SDH)/41 to 80 (SONET)
Block 9	AA (SDH)/81 to C0 (SONET)
Block 10-27	00 (all in this range)
Block 28	68 (SDH) (first byte only)
	9B (SDH) (remaining 63 bytes)
	/60 (SONET) (first byte only)
	93 (SONET) (remaining 63 bytes)
Block 29	9B (SDH)/93 (SONET) (all 64 bytes)
Block 30	9B (SDH)/93 (SONET) (all 64 bytes)
Block 31	FF (all 64 Bytes)
Block 32	FF (all 64 Bytes)
Block 33	FF (all 64 Bytes)
Block 34-81	00 (all in this range)

Appendix 3 List of Commands for the Frame and Modules

This appendix contains all the commands that are listed in alphabetical order in chapter 5 grouped into separate lists of commands for the frame controller, modules, and application features.

Command	Function
Frame Controller	
:BEEP:VOLume	Sets or queries the beep volume.
:DISPlay:BACKlight	Sets or queries the backlight setting.
:SLOT[m]:EMPTy?	Queries the installation state of the frame controller's slots.
:STATus[m]:OPERation:CONDition[:LEVel0]?	Queries the value of the operational status condition summary register (OSCSR) if the "m" suffix is omitted.
:STATus[m]:OPERation:ENABle[:LEVel0]	Sets or queries the value of the operational status enable summary mask (OSESM) if the "m" suffix is omitted. Sets or queries the bit values that apply to the slot number that is specified by the OSESM if the "m" suffix is specified.
:STATus[m]:OPERation[:EVENt][:LEVel0]?	Queries the value of the operational status event summary register (OSESR) if the "m" suffix is omitted. The register (OSESR) is cleared when it is queried. Queries the bit values that apply to the slot number that is specified by the OSESR if the "m" suffix is specified.
:STATus[m]:OPERation:NTRansition	Sets or queries the transition filter (change in the negative direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1. Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the "m" suffix is specified.
:STATus[m]:OPERation:PTRansition	Sets or queries the transition filter (change in the positive direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1. Sets or queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the "m" suffix is specified.
:STATus[m]:QUEStionable:CONDition[:LEVel0]?	Queries the value of the questionable status condition summary register (QSCSR) if the "m" suffix is omitted. Queries the bit values that apply to the slot number that is specified by the QSCSR if the "m" suffix is specified.
:STATus[m]:QUEStionable:ENABle[:LEVel0]	Sets or queries the value of the questionable status enable summary mask (QSESM) if the "m" suffix is omitted. Queries the bit values that apply to the slot number that is specified by the QSESM if the "m" suffix is specified.
:STATus[m]:QUEStionable[:EVENt][:LEVel0]?	Queries the value of the questionable status event summary register (QSESR) if the "m" suffix is omitted. The register (QSESR) is cleared when it is queried. Queries the bit values that apply to the slot number that is specified by the QSESR if the "m" suffix is specified.
:STATus[m]:QUEStionable:NTRansition	Sets or queries the transition filter (change in the negative direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 1 to 0, the corresponding event bits are set to 1. Queries the bit values that apply to the slot number that is specified by the transition filter (change in the negative direction) if the "m" suffix is specified.
:STATus[m]:QUEStionable:PTRansition	Sets or queries the transition filter (change in the positive direction) if the "m" suffix is omitted. If you set a filter, when the condition bits change from 0 to 1, the corresponding event bits are set to 1. Queries the bit values that apply to the slot number that is specified by the transition filter (change in the positive direction) if the "m" suffix is specified.
:SYSTem:COMMunicate:GPIB:ADDRess	Sets or queries the GP-IB address.
:SYSTem:COMMunicate:GPIB:TERMinator	Sets or queries the response message terminator.
:SYSTem:COMMunicate:NETWork:DHCP	Sets or queries the DHCP's on/off status.
:SYSTem:COMMunicate:NETWork:GATeway	Sets or queries the gateway address.
:SYSTem:COMMunicate:NETWork:IPADdress	Sets or queries the IP address.
:SYSTem:COMMunicate:NETWork:PORT	Sets or queries the network setting's port number.
:SYSTem:COMMunicate:NETWork:REMote	Enables, disables, or queries all the panel key operations during LAN remote control (excluding the LAN Local soft key>).

Command	Function
:SYSTem:COMMunicate:NETWork:LOCKout	Sets or clears local lockout.
:SYSTem:COMMunicate:NETWork:SUBNetmask	Sets or queries the subnet mask.
:SYSTem:CONDition	Executes or queries the frame controller's status check feature.
:SYSTem:DATE	Sets or queries the system date.
:SYSTem:ERRor?	Queries the error queue.
:SYSTem:ERRor:VIEW:CLEar	Clears the errors in the error view.
:SYSTem:PRESet	Sets all the parameters of the frame controller and all of its installed modules to their default values.
:SYSTem:TIME	Sets or queries the time.
:TRIGger:CONFig	Sets system triggers.

DFB-LD Module

:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m][:CHANnel[d]]:AM:STATe	Sets or queries the modulation feature's on/off status.
:SOURce[m][:CHANnel[d]]:AM:FREQuency	Sets or queries the internal modulation frequency.
:SOURce[m][:CHANnel[d]]:AM:SOURce	Sets or queries the modulation mode.
:SOURce[m][:CHANnel[d]]:FREQuency[/]	Sets or queries the optical frequency.
:SOURce[m][:CHANnel[d]]:LINewidth	Sets or queries the spectrum line width.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]	Sets or queries the optical attenuation.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]	Clears the optical attenuation setting (sets the optical output power to maximum).
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]	Sets or queries the optical output offset.
:SOURce[m][:CHANnel[d]]:POWer:STATe	Sets or queries the optical output's on/off status.
:SOURce[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit.
:SOURce[m][:CHANnel[d]]:WAVelength[/]	Sets or queries the laser output wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT	Sets or queries the wavelength unit.
:SOURce[m][:CHANnel[d]]:WAVelength:OFFSet	Sets or queries the wavelength offset.

LS Module (AQ2200-112)

:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m][:CHANnel[d]]:LINewidth	Sets or queries the spectrum line width.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]	Sets or queries the optical attenuation.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]	Clears the optical attenuation setting (sets the optical output power to maximum).
:SOURce[m][:CHANnel[d]]:POWer:STATe	Sets or queries the optical output's on/off status.
:SOURce[m][:CHANnel[d]]:WAVelength?	Queries the wavelength.

Command	Function
FP-LD Module	
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m][:CHANnel[d]]:AM:STATe	Sets or queries the modulation feature's on/off status.
:SOURce[m][:CHANnel[d]]:AM:FREQuency	Sets or queries the internal modulation frequency.
:SOURce[m][:CHANnel[d]]:AM:SOURce	Sets or queries the modulation mode.
:SOURce[m][:CHANnel[d]]:FREQuency[/]	Sets or queries the optical frequency.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]	Sets or queries the optical attenuation.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]	Clears the optical attenuation setting (sets the optical output power to maximum).
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]	Sets or queries the optical output offset.
:SOURce[m][:CHANnel[d]]:POWer:STATe	Sets or queries the optical output's on/off status.
:SOURce[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit.
:SOURce[m][:CHANnel[d]]:POWer:WAVelength	Sets or queries the laser output wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength[/]	Sets or queries the wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT	Sets or queries the wavelength unit.

Command	Function
Grid TLS Module	
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m][:CHANnel[d]][:STATe]:AONCe	Turns on or off the optical output of channels 1 and 2 simultaneously.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m][:CHANnel[d]]:FREQuency[/]	Sets or queries the optical frequency.
:SOURce[m][:CHANnel[d]]:FREQuency:AONCe	Sets the optical frequencies of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:FREQuency:CHANnel	Sets or queries the grid number.
:SOURce[m][:CHANnel[d]]:FREQuency:CHANnel:AONCe	Sets the grid numbers of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:FREQuency:DISPlay:OFFSet	Sets or queries the frequency display offset.
:SOURce[m][:CHANnel[d]]:FREQuency:GRID	Sets or queries the frequency spacing of each grid.
:SOURce[m][:CHANnel[d]]:FREQuency:GRID:AONCe	Sets the frequency spacing of each grid for channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:FREQuency:OFFSet	Sets or queries the fine tuning value of the frequency.
:SOURce[m][:CHANnel[d]]:FREQuency:OFFSet:AONCe	Sets the frequency fine tuning values of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:FREQuency:REFerence	Sets or queries reference frequency of the grid number.
:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid	Sets the frequency to the grid frequency closest to the specified optical frequency.
:SOURce[m][:CHANnel[d]]:FREQuency:TOGRid:AONCe	Sets the frequencies of channels 1 and 2 simultaneously to the grid frequency closest to the specified optical frequency.
:SOURce[m][:CHANnel[d]]:GRIDmode	Sets or queries the grid mode on/off status.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude	Sets or queries the AM amplitude of the dither feature.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:AMPLitude:AONCe	Sets the AM amplitudes of the dither feature for channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]	Sets or queries the SBS suppression dither frequency.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal:SBSControl[:LEVel]:AONCe	Sets the SBS suppression dither frequencies for channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]	Sets or queries the on/off status of the dither feature.
:SOURce[m][:CHANnel[d]]:MODulation:INTernal[:STATe]:AONCe	Sets the on/off status of the dither feature for channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude]:AONCe	Sets the optical output powers of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation[/]	Sets or queries the optical attenuation.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:AONCe	Sets the optical attenuations of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar[/]	Clears the optical attenuation setting (sets the optical output power to maximum).
:SOURce[m][:CHANnel[d]]:POWer:ATTenuation:CLEar:AONCe	Clears the optical attenuation settings (sets the optical output power to maximum) of channels 1 and 2 simultaneously.
:SOURce[m][:CHANnel[d]]:POWer:OFFSet[/]	Sets or queries the optical output offset.

Command	Function
`:SOURce[m][:CHANnel[d]]:POWer:STATe`	Sets or queries the optical output's on/off status.
`:SOURce[m][:CHANnel[d]]:POWer:STATe:AONCe`	Sets the on/off status of the optical output for channels 1 and 2 simultaneously.
`:SOURce[m][:CHANnel[d]]:POWer:UNIT`	Sets or queries the power unit.
`:SOURce[m][:CHANnel[d]]:WAVelength[/]`	Sets or queries the laser output wavelength.
`:SOURce[m][:CHANnel[d]]:WAVelength:AONCe`	Sets the wavelengths of channels 1 and 2 simultaneously.
`:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid`	Sets the wavelength to the grid wavelength closest to the specified frequency.
`:SOURce[m][:CHANnel[d]]:WAVelength:TOGRid:AONCe`	Sets the wavelengths of channels 1 and 2 simultaneously to the grid wavelength closest to the specified grid value.
`:SOURce[m][:CHANnel[d]]:WAVelength:UNIT`	Sets or queries the wavelength unit.

Command	Function
TLS Module	
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m][:CHANnel[d]]:FREQuency[/]	Sets or queries the optical frequency.
:SOURce[m][:CHANnel[d]]:LINewidth	Sets or queries the spectrum line width.
:SOURce[m][:CHANnel[d]]:POWer[:AMPLitude][/]	Sets or queries the optical output power.
:SOURce[m][:CHANnel[d]]:POWer:STATe	Sets or queries the optical output's on/off status.
:SOURce[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit.
:SOURce[m][:CHANnel[d]]:WAVelength:UNIT	Sets or queries the wavelength unit.
:SOURce[m][:CHANnel[d]]:WAVelength:CORRection:ZERO	Executes, stops, or queries the wavelength correction procedure.
:SOURce[m][:CHANnel[d]]:WAVelength[:CW|FIXed]	Sets or queries the wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:FREQuency	Sets or queries the Δf. (The offset setting.)
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence	Queries the wavelength value. (The offset setting.)
:SOURce[m][:CHANnel[d]]:WAVelength:REFerence:DISPlay	Sets the wavelength to the WL Ref value. (The offset setting.)
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:PMAX?	Queries the optimal value from the sweep (this value is detected automatically).
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STARt	Sets or queries the sweep start wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STOP	Sets or queries the sweep stop wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP	Sets or queries the sweep step wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:STEP:NEXT	Sets the sweep wavelength to the next sweep wavelength.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:CYCLes	Sets or queries the number of sweep cycles.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:DWELl	Sets or queries the lock time per wavelength setting.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:INTerval	Sets or queries the sweep cycle interval.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:SPEed:SPSec	Sets or queries the sweep speed (distance).
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep:MODE	Sets or queries the sweep mode.
:SOURce[m][:CHANnel[d]]:WAVelength:SWEep[:STATe]	Starts, stops, or queries the sweep.
:SOURce[m][:CHANnel[d]]:OSASync	Sets or queries the OSA synchronization sweep feature's on/off status.
:TRIGger[m][:CHANnel[d]]:INPut	Sets or queries the trigger input.
:TRIGger[m][:CHANnel[d]]:OUTPut	Sets or queries the trigger output mode.

Command	Function
Sensor Module	
:FETCh[m][:CHANnel[d]]:POWer?	Queries the currently displayed measured value. The measured value includes the power offset.
:INITiate[m][:CHANnel[d]]	Performs a single measurement.
:INITiate[m][:CHANnel[d]]:CONTinuous	Executes or queries continuous measurements or single measurements.
:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.
:READ[m][:CHANnel[d]]:POWer?	Performs a single measurement and queries the measured value.
:READ[m][:CHANnel[d]]:POWer:ALL?	Performs a single measurement with all the installed sensor modules and queries that measurement's measured value.
:READ[m][:CHANnel[d]]:POWer:ALL:CONFig?	Queries the slot and device numbers of all the sensor modules that can be used.
:READ[m][:CHANnel[d]]:POWer:MDSelect?	Performs a single measurement with the specified sensor and queries the measured value.
:SENSe[m][:CHANnel[d]]:CORRection	Sets or queries the power offset value.
:SENSe[m][:CHANnel[d]]:CORRection:COLLect[:ZERO]	Executes or queries the zero-set procedure.
:SENSe[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.
:SENSe[m][:CHANnel[d]]:EVENt:THResh	Sets or queries the threshold value of the event detection condition.
:SENSe[m][:CHANnel[d]]:POWer:ATIMe	Sets or queries the averaging time.
:SENSe[m][:CHANnel[d]]:POWer:RANGe	Sets or queries the range.
:SENSe[m][:CHANnel[d]]:POWer:RANGe:AUTO	Sets or queries the range switch mode.
:SENSe[m][:CHANnel[d]]:POWer:RANGe:STATe?	Queries the state of the input light within the range.
:SENSe[m][:CHANnel[d]]:POWer:REFerence	Sets or queries the relative measurement's reference value.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe	Sets or queries the relative measurement mode.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:DISPlay	Sets the reference value to the current measured value.
:SENSe[m][:CHANnel[d]]:POWer:REFerence:STATe:RATio	Sets or queries the relative measurement mode parameters.
:SENSe[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the unit (dBm or W).
:SENSe[m][:CHANnel[d]]:POWer:WAVelength	Sets or queries the measurement wavelength.
:SENSe[m][:CHANnel[d]]:POWer:WAVelength:MDSelect	Selects the wavelength setting from the light source.
:SENSe[m][:CHANnel[d]]:AM:FREQuency	Sets or queries the CHOP frequency.
:SENSe[m][:CHANnel[d]]:AM:STATe	Sets or queries the optical signal modulation method.
:SENSe[m][:CHANnel[d]]:AOUT:LOG:MLEVel	Sets or queries the maximum power level of analog output log mode.
:SENSe[m][:CHANnel[d]]:AOUT:LOG:RANGe	Sets or queries the power range of analog output log mode.
:SENSe[m][:CHANnel[d]]:AOUT:MLEVel	Sets or queries the maximum power level of analog output linear mode.
:SENSe[m][:CHANnel[d]]:AOUT:MVOLtage	Sets or queries the analog output's maximum voltage.
:SENSe[m][:CHANnel[d]]:AOUT:TRIGger:OUTPut	Sets or queries the trigger output mode of the analog output port.
:SENSe[m][:CHANnel[d]]:AOUT:MODE	Sets or queries the analog output mode.
:SENSe[m][:CHANnel[d]]:AOUT:RANGe	Sets or queries the power range of analog output linear mode.
:SENSe[m][:CHANnel[d]]:FUNCtion:PARameter:MINMax	Sets or queries the Min/Max measurement mode and the number of data points.
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:DATA?	Queries time series power data in the measurement range of Max/Min measurement.

Command	Function
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:STATe?	Queries the event detection state of Event Trigger mode in Max/Min measurement.
:SENSe[m][:CHANnel[d]]:FUNCtion:MINMax:EVENt:POSition	Sets or queries the trigger position of Event Trigger mode in Max/Min measurement.
:SENSe[m][:CHANnel[d]]:FUNCtion:STATe	Sets or queries the start and end of the Min/Max measurement.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SLOT[m]:HEAD[d]:EMPTy?	Queries the sensor head's connection state.
:SLOT[m]:HEAD[d]:IDN?	Queries the sensor head's information.
:SLOT[m]:HEAD[d]:OPTions?	Queries the sensor head's detailed information.
:SLOT[m]:HEAD[d]:TST?	Queries the sensor head's self-test result.
:TRIGger[m][:CHANnel[d]]:INPut	Sets or queries the trigger input.
:TRIGger[m][:CHANnel[d]]:OUTPut	Sets or queries the trigger output mode.

ORL Module

:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.

ATTN Module

:FETCh[m][:CHANnel[d]]:POWer?	Queries the currently displayed measured value. The measured value includes the power offset.
:INPut[m][:CHANnel[d]]:ATTenuation	Sets or queries the optical attenuation.
:INPut[m][:CHANnel[d]]:ATTenuation:AONCe	Sets the attenuation values of channels 1 and 2 simultaneously.
:INPut[m][:CHANnel[d]]:ATTenuation:SPEed	Sets or queries the attenuation change speed.
:INPut[m][:CHANnel[d]]:ATTenuation:SPEed:ENABle	Sets or queries whether the attenuation change speed is enabled or disabled.
:INPut[m][:CHANnel[d]]:OFFSet	Sets or queries the optical attenuation offset value.
:INPut[m][:CHANnel[d]]:OFFSet:DISPlay	Sets the current optical attenuation to the attenuation offset value.
:INPut[m][:CHANnel[d]]:WAVelength	Sets or queries the wavelength.
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m][:CHANnel[d]][:STATe]:AONCe	Turns on or off the optical output of channels 1 and 2 simultaneously.
:OUTPut[m][:CHANnel[d]][:STATe]:APOWeron	Sets or queries the startup optical output's on/off status.
:OUTPut[m][:CHANnel[d]]:POWer	Sets or queries the optical output power.
:OUTPut[m][:CHANnel[d]]:POWer:AONCe	Sets the optical output power of channels 1 and 2 simultaneously. This command is an overlap command.
:OUTPut[m][:CHANnel[d]]:POWer:CONTrol	Sets or queries the function that attenuates the output power according to the changes in the input light. This command is an overlap command.
:OUTPut[m][:CHANnel[d]]:POWer:CONTrol:AONCe	Sets the function that attenuates the output power according to the changes in the input light of channels 1 and 2 simultaneously. This command is an overlap command.
:OUTPut[m][:CHANnel[d]]:POWer:ECOunter?	Queries the number of times the measured value goes outside the power setting range of the optical output monitor.
:OUTPut[m][:CHANnel[d]]:POWer:ECOunter:CLEar	Clears the number of times the measured value goes outside the power setting range of the optical output monitor.
:OUTPut[m][:CHANnel[d]]:POWer:MINMax:MODE	Sets or queries the maximum and minimum measurement mode of the optical output monitor.
:OUTPut[m][:CHANnel[d]]:POWer:MINMax:RESet	Clears the maximum and minimum measured values of the optical output monitor.
:OUTPut[m][:CHANnel[d]]:POWer:OFFSet	Sets or queries the power offset value.
:OUTPut[m][:CHANnel[d]]:POWer:STATus	Queries the optical output status.

Command	Function
:OUTPut[m][:CHANnel[d]]:POWer:THReshold	Sets or queries the threshold value for determining the optical output status.
:OUTPut[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit (dBm or W).
:OUTPut[m][:CHANnel[d]]:ATIMe	Sets or queries the averaging time.
:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO	Executes or queries the zero-set procedure. This command is an overlap command.
:OUTPut[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.
:READ[m][:CHANnel[d]]:POWer?	Performs a single measurement and queries the measured value.
:SENSe[m][:CHANnel[d]]:CORRection:COLLect:ZERO:ALL	Executes or aborts the zero-set procedure for all sensor modules and the monitor power meter section of the ATTN that is built into the monitor.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:TST?	Queries the self-test result.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.

OSW Module

:ROUTe[m][:CHANnel[d]]	Sets or queries the connection port of an optical switch. (This command only sets the connections on one side of a 2 × 2 switch.)
:ROUTe[m][:CHANnel[d]]:CONFig?	Queries the switch configuration.
:ROUTe[m][:CHANnel[d]]:CONFig:ROUTe?	Queries the entire connected switch configuration.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.

BERT Module

:ABORt[m]	Stops measurement.
:INITiate[m]:CONTinuous	Executes or queries continuous measurements through the trigger system.
:INPut[m]:EFREquency:RATio	Sets or queries the external input clock's division ratio.
:INPut[m]:DATA:SOURce	Sets or queries the data input source.
:INPut[m]:DATA:THReshold	Sets or queries the data determination threshold.
:INSTrument[m]:COUPle	Sets or queries the couple mode.
:MMEMory[m]:LOAD	Loads the output data's long program pattern file or overhead pattern file.
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m]:CLOCk:OFFSet	Sets or queries the clock output offset voltage.
:OUTPut[m]:DATA:AMPLitude	Sets or queries the data output amplitude.
:OUTPut[m]:DATA:OFFSet	Sets or queries the data output offset voltage.
:OUTPut[m]:DATA:CROSs	Sets or queries the data output cross point.
:OUTPut[m]:SOURce	Sets or queries the output interface.
:OUTPut[m]:TRIGger	Sets or queries the trigger output.
:SENSe[m]:SYNC:AUTO	Sets or queries the automatic synchronization operation.
:SENSe[m]:DATA:POLarity	Sets or queries the data input logic.
:SENSe[m]:DATA:PATTern	Sets or queries the input data pattern.
:SENSe[m]:DATA:PATTern:PRBS:LENgth	Sets or queries the number of PRBS steps of the input data.
:SENSe[m]:DATA:PATTern:PROGram:DATA	Sets or queries the short program pattern of the input data.
:SENSe[m]:DATA:PATTern:PROGram:DATA:PRESet	Sets the short program pattern of the input data to the default value.
:SENSe[m]:DATA:PATTern:PROGram:LENgth	Sets or queries the input data's program pattern length.
:SENSe[m]:DATA:PATTern:SFRAMe:PRBS:LENgth	Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the input data.
:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA	Sets or queries the overhead pattern within the SDH/SONET frame of the input data.
:SENSe[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA:PRESet	Sets the overhead pattern within the SDH/SONET frame of the input data to the default value.
:SENSe[m]:DATA:TEST:MODE	Sets or queries the measurement mode.
:SENSe[m]:DATA:TEST:TIME	Sets or queries the measurement time.
:SENSe[m]:DATA:ALL?	Queries the measured results.

Command	Function
:SENSe[m]:DATA:ALL:SFRAMe?	Queries the measured result (including the results for SDH/SONET frames).
:SENSe[m]:DATA:FREQ?	Queries the frequency monitor value.
:SENSe[m]:DATA:ECOunt:BIT?	Queries the bit error count.
:SENSe[m]:DATA:ERATio:BIT?	Queries the bit error rate.
:SENSe[m]:DATA:IPERiod:ECOunt:BIT?	Queries the bit error count for a single period.
:SENSe[m]:DATA:IPERiod:ERATio:BIT?	Queries the bit error rate for a single period.
:SENSe[m]:DATA:IPERiod:ALL?	Queries the measured value for a single period.
:SENSe[m]:DATA:IPERiod:ALL:SFRAMe?	Queries the measured value for a single period.
:SENSe[m]:DATA:ELAPsed?	Queries the elapsed measurement time in units of 100 ms.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPC?	Queries the command's process state.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m]:CLOCk:SOURce	Sets the input clock source.
:SOURce[m]:DATA:POLarity	Sets or queries the data output logic.
:SOURce[m]:DATA:ERRor	Sets or queries the error adding feature's on/off status.
:SOURce[m]:DATA:ERRor:MODE	Sets or queries the error addition mode.
:SOURce[m]:DATA:ERRor:RATE	Sets or queries the rate value of the error adding feature.
:SOURce[m]:DATA:PATTern	Sets or queries the output data pattern.
:SOURce[m]:DATA:PATTern:PRBS:LENgth	Sets or queries the number of PRBS steps of the output data.
:SOURce[m]:DATA:PATTern:PROGram:LENgth	Sets or queries the output data's program pattern length.
:SOURce[m]:DATA:PATTern:PROGram:DATA	Sets or queries the output data's program pattern.
:SOURce[m]:DATA:PATTern:PROGram:DATA:PRESet	Sets the program pattern of the output data to the default value.
:SOURce[m]:DATA:PATTern:SFRAMe:PRBS:LENgth	Sets or queries the number of PRBS steps of the payload within the SDH/SONET frame of the output data.
:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA	Sets or queries the overhead pattern within the SDH/SONET frame of the output data.
:SOURce[m]:DATA:PATTern:SFRAMe:OVERhead:SOH:DATA:PRESet	Sets the overhead pattern within the SDH/SONET frame of the output data to the default value.
:SYSTem[m]:BEEP	Sets or queries the buzzer volume.
:TRIGger[m][:IMMediate]	Starts measurement.

10 Gbit/s Optical Receiver

:INPut[m]:POWer?	Queries the average optical input power.
:INPut[m][:CHANnel[d]]:WAVelength	Sets or queries the optical input signal wavelength band.
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:SENSe[m]:THReshold:DATA	Sets or queries the data threshold level.
:SENSe[m]:LOS[:LEVel]	Sets or queries the LOS detection level.
:SENSe[m]:OVER[:LEVel]	Sets or queries the OVERLOAD detection level.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPC?	Queries the command's process state.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.

Command	Function
:SLOT[m]:TST?	Queries the self-test result.
:STATus[m]?	Queries the alarm information.

10 Gbit/s Optical Modulater

:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPC?	Queries the command's process state.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.
:SLOT[m]:TST?	Queries the self-test result.
:SOURce[m]:ABC:RESet	Resets the auto bias control.
:SOURce[m]:ABC:SLOPe	Sets the auto bias control's slope.
:SOURce[m]:ABC:STATe	Sets or queries the auto bias control's on/off status.
:SOURce[m]:AMPLitude	Sets or queries the driver output amplitude.
:SOURce[m]:BIAS	Sets or queries the DC bias of the LN modulator.
:SOURce[m]:CROSs	Sets or queries the driver cross point.
:STATus[m]?	Queries the alarm information.

XFP Interface Module

:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m][:CHANnel[d]]:POWer:UNIT	Sets or queries the power unit (dBm or W).
:OUTPut[m][:CHANnel[d]]:PAGeselect	Sets the XFP transceiver's upper table page.
:OUTPut[m][:CHANnel[d]]:VCC5:VOLTage	Sets or queries the VCC5 voltage.
:OUTPut[m][:CHANnel[d]]:VCC3:VOLTage	Sets or queries the VCC3 voltage.
:OUTPut[m][:CHANnel[d]]:VCC2:VOLTage	Sets or queries the VCC2 voltage.
:OUTPut[m][:CHANnel[d]]:VEE5:VOLTage	Sets or queries the VEE5 voltage.
:READ[m][:CHANnel[d]]:ALARm?	Queries the alarm state.
:READ[m][:CHANnel[d]]:AUX1?	Queries the AUX1 value.
:READ[m][:CHANnel[d]]:AUX2?	Queries the AUX2 value.
:READ[m][:CHANnel[d]]:AUX:TYPE?	Queries the AUX types.
:READ[m][:CHANnel[d]]:TEMPerature?	Queries the temperature of the XFP transceiver.
:READ[m][:CHANnel[d]]:TX:CURRent?	Queries the transmit bias current.
:READ[m][:CHANnel[d]]:TX:POWer?	Queries the transmit power value.
:READ[m][:CHANnel[d]]:RX:POWer?	Queries the receive power.
:READ[m][:CHANnel[d]]:XFP:INFormation?	Queries the XFP transceiver information.
:READ[m][:CHANnel[d]]:INTerrupt:ALARm?	Queries the interrupt alarm information.
:READ[m][:CHANnel[d]]:VCC5:VOLTage?	Queries the VCC5 monitor voltage.
:READ[m][:CHANnel[d]]:VCC3:VOLTage?	Queries the VCC3 monitor voltage.
:READ[m][:CHANnel[d]]:VCC2:VOLTage?	Queries the VCC2 monitor voltage.
:READ[m][:CHANnel[d]]:VEE5:VOLTage?	Queries the VEE5 monitor voltage.
:SLOT[m]:IDN?	Queries the module information.
:SLOT[m]:OPTions?	Queries the module's detailed information.
:SLOT[m]:PRESet	Sets all the modules' parameters to their default values.

Command	Function
:SLOT[m]:TST?	Queries the self-test result.

Transceiver I/F Module

:DISPlay[m]:NAME:AIN01	Sets or queries the name of the AIN01 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:AIN02	Sets or queries the name of the AIN02 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:AIN03	Sets or queries the name of the AIN03 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:AIN04	Sets or queries the name of the AIN04 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:AIN05	Sets or queries the name of the AIN05 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:AIN06	Sets or queries the name of the AIN06 status signal on the transceiver I/F module.
:DISPlay[m]:NAME:CTRL01	Sets or queries the name of the CTRL01 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL02	Sets or queries the name of the CTRL02 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL03	Sets or queries the name of the CTRL03 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL04	Sets or queries the name of the CTRL04 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL05	Sets or queries the name of the CTRL05 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL06	Sets or queries the name of the CTRL06 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL07	Sets or queries the name of the CTRL07 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL08	Sets or queries the name of the CTRL08 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL09	Sets or queries the name of the CTRL09 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL10	Sets or queries the name of the CTRL10 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL11	Sets or queries the name of the CTRL11 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL12	Sets or queries the name of the CTRL12 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL13	Sets or queries the name of the CTRL13 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL14	Sets or queries the name of the CTRL14 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL15	Sets or queries the name of the CTRL15 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL16	Sets or queries the name of the CTRL16 transceiver I/F module control signal.
:DISPlay[m]:NAME:CTRL17	Sets or queries the name of the CTRL17 transceiver I/F module control signal.
:DISPlay[m]:NAME:LOAD[:ALL]	Sets the transceiver I/F module signal names according to the specified value.
:DISPlay[m]:NAME:LOAD:AIN	Sets the transceiver I/F module AIN signal names according to the specified value.
:DISPlay[m]:NAME:LOAD:CTRL	Sets the transceiver I/F module CTRL signal names according to the specified value.
:DISPlay[m]:NAME:SAVE	Writes the transceiver I/F module AIN and CTRL signal names to the transceiver I/F module flash ROM.
:INPut[m]:STATus:THReshold:AIN01	Sets or queries the threshold of the AIN01 status signal on the transceiver I/F module.
:INPut[m]:STATus:THReshold:AIN02	Sets or queries the threshold of the AIN02 status signal on the transceiver I/F module.
:INPut[m]:STATus:THReshold:AIN03	Sets or queries the threshold of the AIN03 status signal on the transceiver I/F module.
:INPut[m]:STATus:THReshold:AIN04	Sets or queries the threshold of the AIN04 status signal on the transceiver I/F module.
:INPut[m]:STATus:THReshold:AIN05	Sets or queries the threshold of the AIN05 status signal on the transceiver I/F module.
:INPut[m]:STATus:THReshold:AIN06	Sets or queries the threshold of the AIN06 status signal on the transceiver I/F module.
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m]:CTRL01	Sets or queries the logic of the CTRL01 transceiver I/F module control signal.
:OUTPut[m]:CTRL02	Sets or queries the logic of the CTRL02 transceiver I/F module control signal.
:OUTPut[m]:CTRL03	Sets or queries the logic of the CTRL03 transceiver I/F module control signal.
:OUTPut[m]:CTRL04	Sets or queries the logic of the CTRL04 transceiver I/F module control signal.
:OUTPut[m]:CTRL05	Sets or queries the logic of the CTRL05 transceiver I/F module control signal.
:OUTPut[m]:CTRL06	Sets or queries the logic of the CTRL06 transceiver I/F module control signal.
:OUTPut[m]:CTRL07	Sets or queries the logic of the CTRL07 transceiver I/F module control signal.
:OUTPut[m]:CTRL08	Sets or queries the logic of the CTRL08 transceiver I/F module control signal.
:OUTPut[m]:CTRL09	Sets or queries the logic of the CTRL09 transceiver I/F module control signal.
:OUTPut[m]:CTRL10	Sets or queries the logic of the CTRL10 transceiver I/F module control signal.
:OUTPut[m]:CTRL11	Sets or queries the logic of the CTRL11 transceiver I/F module control signal.
:OUTPut[m]:CTRL12	Sets or queries the logic of the CTRL12 transceiver I/F module control signal.
:OUTPut[m]:CTRL13	Sets or queries the logic of the CTRL13 transceiver I/F module control signal.
:OUTPut[m]:CTRL14	Sets or queries the logic of the CTRL14 transceiver I/F module control signal.
:OUTPut[m]:CTRL15	Sets or queries the logic of the CTRL15 transceiver I/F module control signal.
:OUTPut[m]:CTRL16	Sets or queries the logic of the CTRL16 transceiver I/F module control signal.

Command	Function
:OUTPut[m]:CTRL17	Sets or queries the logic of the CTRL17 transceiver I/F module control signal.
:OUTPut[m]:CURRent:LIMit:PS1	Sets or queries the current limit of PS1 on the transceiver I/F module.
:OUTPut[m]:CURRent:LIMit:PS2	Sets or queries the current limit of PS2 on the transceiver I/F module.
:OUTPut[m]:CURRent:LIMit:PS3	Sets or queries the current limit of PS3 on the transceiver I/F module.
:OUTPut[m]:CURRent:LIMit:PS4	Sets or queries the current limit of PS4 on the transceiver I/F module.
:OUTPut[m]:CURRent:LIMit:PS5:V3_3	Sets or queries the current limit of PS5 (when +3.3 V is selected) on the transceiver I/F module.
:OUTPut[m]:CURRent:LIMit:PS5:V5_0	Sets or queries the current limit of PS5 (when +5.0 V is selected) on the transceiver I/F module.
:OUTPut[m]:I2C:CLOCk:FREQuency	Sets or queries the transceiver I/F module I2C communication clock frequency.
:OUTPut[m]:I2C:MODE	Sets or queries the transceiver I/F module I2C communication mode.
:OUTPut[m]:I2C:RESet	Resets the transceiver I/F module I2C bus.
:OUTPut[m]:MDIO:CLOCk:FREQuency	Sets or queries the transceiver I/F module MDIO communication clock frequency.
:OUTPut[m]:VOLTage:PS1	Sets or queries the power supply voltage of PS1 on the transceiver I/F module.
:OUTPut[m]:VOLTage:PS2	Sets or queries the power supply voltage of PS2 on the transceiver I/F module.
:OUTPut[m]:VOLTage:PS3	Sets or queries the power supply voltage of PS3 on the transceiver I/F module.
:OUTPut[m]:VOLTage:PS4	Sets or queries the power supply voltage of PS4 on the transceiver I/F module.
:OUTPut[m]:VOLTage:PS5	Sets or queries the power supply voltage of PS5 on the transceiver I/F module.
:READ[m][:CHANnel[d]]:POWer:PS[:VALue]?	Queries the transceiver I/F module power consumption.
:READ[m]:CURRent:PS1?	Queries the monitored current value of PS1 on the transceiver I/F module.
:READ[m]:CURRent:PS2?	Queries the monitored current value of PS2 on the transceiver I/F module.
:READ[m]:CURRent:PS3?	Queries the monitored current value of PS3 on the transceiver I/F module.
:READ[m]:CURRent:PS4?	Queries the monitored current value of PS4 on the transceiver I/F module.
:READ[m]:CURRent:PS5?	Queries the monitored current value of PS5 on the transceiver I/F module.
:READ[m]:I2C:DATA[:BYTE]?	Reads a byte from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.
:READ[m]:I2C:DATA:BLOCk?	Reads data from the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.
:READ[m]:MDIO:DATA:WORD?	Reads a word from the XENPAK internal ROM through MDIO communication using the transceiver I/F module.
:READ[m]:RESistance:R1[:VALue]?	Queries the monitored resistance value on the transceiver I/F module.
:READ[m]:RESistance:R1:STATe?	Queries the state of the monitored resistance value on the transceiver I/F
:READ[m]:STATus:AIN01:VALue?	Queries the AIN01 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN02:VALue?	Queries the AIN02 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN03:VALue?	Queries the AIN03 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN04:VALue?	Queries the AIN04 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN05:VALue?	Queries the AIN05 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN06:VALue?	Queries the AIN06 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN01:LEVel?	Queries the level (LOW/HIGH) of the AIN01 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN02:LEVel?	Queries the level (LOW/HIGH) of the AIN02 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN03:LEVel?	Queries the level (LOW/HIGH) of the AIN03 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN04:LEVel?	Queries the level (LOW/HIGH) of the AIN04 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN05:LEVel?	Queries the level (LOW/HIGH) of the AIN05 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN06:LEVel?	Queries the level (LOW/HIGH) of the AIN06 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN01:STATe?	Queries the state of the AIN01 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN02:STATe?	Queries the state of the AIN02 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN03:STATe?	Queries the state of the AIN03 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN04:STATe?	Queries the state of the AIN04 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN05:STATe?	Queries the state of the AIN05 status signal on the transceiver I/F module.
:READ[m]:STATus:AIN06:STATe?	Queries the state of the AIN06 status signal on the transceiver I/F module.
:READ[m]:VOLTage:PS1:STATe?	Queries the state of PS1 on the transceiver I/F module.
:READ[m]:VOLTage:PS2:STATe?	Queries the state of PS2 on the transceiver I/F module.
:READ[m]:VOLTage:PS3:STATe?	Queries the state of PS3 on the transceiver I/F module.
:READ[m]:VOLTage:PS4:STATe?	Queries the state of PS4 on the transceiver I/F module.
:READ[m]:VOLTage:PS5:STATe?	Queries the state of PS5 on the transceiver I/F module.

Command	Function
:READ[m]:VOLTage:PS1[:VALue]?	Queries the monitored voltage of PS1 on the transceiver I/F module.
:READ[m]:VOLTage:PS2[:VALue]?	Queries the monitored voltage of PS2 on the transceiver I/F module.
:READ[m]:VOLTage:PS3[:VALue]?	Queries the monitored voltage of PS3 on the transceiver I/F module.
:READ[m]:VOLTage:PS4[:VALue]?	Queries the monitored voltage of PS4 on the transceiver I/F module.
:READ[m]:VOLTage:PS5[:VALue]?	Queries the monitored voltage of PS5 on the transceiver I/F module.
:STATus[m]:ALARm?	Queries the alarm information.
:WRITe[m]:I2C:DATA[:BYTE]	Writes a byte of data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.
:WRITe[m]:I2C:DATA:BLOCk	Writes data to the XFP or SFP+ internal ROM through I2C communication using the transceiver I/F module.
:WRITe[m]:MDIO:DATA:WORD	Writes a word to the XENPAK internal ROM through MDIO communication using the transceiver I/F module.

SG Module

:OUTPut[m]:AMPLitude	Sets or queries the output amplitude (0.6 Vp-p or 1.1 Vp-p) of the SG module RF OUT signal.
:OUTPut[m][:CHANnel[d]][:STATe]	Sets or queries the output's on/off status.
:OUTPut[m]:FREQuency:OFFSet	Sets or queries the RF OUT frequency offset.
:OUTPut[m]:FREQuency:RATE1	Sets the SG module rate to 1/1 and sets or queries the frequency.
:OUTPut[m]:FREQuency:RATE4	Sets the SG module rate to 1/4 and sets or queries the frequency.
:OUTPut[m]:FREQuency:RATE:SELect	Sets or queries the output rate of the SG module RF OUT signal.
:OUTPut[m]:RFOut:ENABle:PORT1	Sets or queries the Disable/Enable status of RF OUT CH1 on the SG module.
:OUTPut[m]:RFOut:ENABle:PORT2	Sets or queries the Disable/Enable status of RF OUT CH2 on the SG module.
:OUTPut[m]:RFOut:ENABle:PORT3	Sets or queries the Disable/Enable status of RF OUT CH3 on the SG module.
:OUTPut[m]:RFOut:ENABle:PORT4	Sets or queries the Disable/Enable status of RF OUT CH4 on the SG module.
:OUTPut[m]:RFOut:ENABle:PORT5	Sets or queries the Disable/Enable status of RF OUT CH5 on the SG module.
:STATus[m]:ALARm?	Queries the alarm information.

LOGGING Application

:APPLication:LOGGing:MEASure:RESult?	Queries the measured result in logging mode.
:APPLication:LOGGing:MEASure:STATe	Starts, stops, or queries the logging measurement.
:APPLication:MDSelect:LOGGing	Sets or queries the sensors that are used in the logging measurement.
:APPLication:PARameter:LOGGing:ATIMe	Sets or queries the averaging time of the sensors that are used in the logging measurement.
:APPLication:PARameter:LOGGing:INTrigger	Sets or queries the logging measurement's trigger mode.
:APPLication:PARameter:LOGGing:RANGe:SET:COMM	Sets or queries the measurement range when logging measurement is in common mode.
:APPLication:PARameter:LOGGing:RANGe:SET:INDividual	Sets or queries each measurement range when logging measurement range is in individual mode.
:APPLication:PARameter:LOGGing:RANGe:MODE	Sets or queries the logging measurement's range mode.
:APPLication:PARameter:LOGGing:REFerence	Sets or queries the logging measurement's reference value.
:APPLication:PARameter:LOGGing:REFMode	Sets or queries the logging measurement's reference mode.
:APPLication:PARameter:LOGGing:SAMPle	Sets or queries the logging measurement's number of data points.
:APPLication:PARameter:LOGGing:UNIT	Sets or queries the logging measurement's unit and measurement mode.
:APPLication:PARameter:LOGGing:WAVelength:MODE	Sets or queries the logging measurement's wavelength mode.
:APPLication:PARameter:LOGGing:WAVelength:SET:COMM	Sets or queries the wavelength when the logging measurement's wavelength mode is common.
:APPLication:PARameter:LOGGing:WAVelength:SET:INDividual	Sets or queries each wavelength when the logging measurement's wavelength mode is individual.

Command	Function

ORL Application

:APPLication:MDSelect:ORL	Sets or queries modules that are used for ORL measurements.
:APPLication:MDSelect:ORL:CONDition	Sets or queries the ORL measurement's module configuration and measurement conditions. (Selects tabs.)
:APPLication:MDSelect:ORL:LS	Sets or queries the light source modules that are used for ORL measurements.
:APPLication:MDSelect:ORL:OPM1	Sets or queries the sensors that are used in the return loss measurement.
:APPLication:MDSelect:ORL:OPM2	Sets or queries the sensors that are used in the insertion loss measurement.
:APPLication:MDSelect:ORL:OPM3	Sets or queries the monitor sensors.
:APPLication:ORL:IL:RESult?	Queries the measured insertion loss value. (The value that is currently displayed.)
:APPLication:ORL:MASMeasure:RESult?	Queries the measured master reference value (calibration value).
:APPLication:ORL:MASMeasure:STATe	Starts, stops, or queries the master reference measurement.
:APPLication:ORL:REFMeasure:RESult?	Queries the measured reference reflection value (calibration value).
:APPLication:ORL:REFMeasure:STATe	Starts, stops, or queries the reference reflection measurement.
:APPLication:ORL[:ORL]:RESult?	Queries the measured return loss value. (The value that is currently displayed.)
:APPLication:ORL:STOP	Closes the ORL application.
:APPLication:ORL:TMEasure:RESult?	Queries the measured terminal value (calibration value).
:APPLication:ORL:TMEasure:STATe	Starts, stops, or queries the terminal measurement.
:APPLication:PARameter:ORL:ATIMe	Sets or queries the averaging time of the sensors that are used in the return loss or insertion loss measurements.
:APPLication:PARameter:ORL:OPT	Sets or queries the OPT mode that is used in the return loss and insertion loss measurements.
:APPLication:PARameter:ORL:REF	Sets or queries the return loss measurement's reference reflection quantity.
:APPLication:PARameter:ORL:WAVelength	Sets or queries the wavelength that is used in the return loss and insertion loss measurements.

STABILITY Application

:APPLication:MDSelect:STABility	Sets or queries the sensors that are used in the stability measurement.
:APPLication:PARameter:STABility:ATIMe	Sets or queries the averaging time of the sensors that are used in the stability measurement.
:APPLication:PARameter:STABility:INTrigger	Sets or queries the stability measurement's trigger mode.
:APPLication:PARameter:STABility:OPT	Sets or queries the stability measurement's OPT mode.
:APPLication:PARameter:STABility:RANGe:MODE	Sets or queries the stability measurement's range mode.
:APPLication:PARameter:STABility:RANGe:SET:COMM	Sets or queries the range when the stability measurement's range mode is common.
:APPLication:PARameter:STABility:RANGe:SET:INDividual	Sets or queries the range when the stability measurement's range mode is individual.
:APPLication:PARameter:STABility:REFMode	Sets or queries the stability measurement's reference mode.
:APPLication:PARameter:STABility:REFerence	Sets or queries the stability measurement's reference value.
:APPLication:PARameter:STABility:SAMPle	Sets or queries the stability measurement's number of data points.
:APPLication:PARameter:STABility:TIME	Sets or queries the stability measurement's measurement time.
:APPLication:PARameter:STABility:UNIT	Sets or queries the stability measurement's unit and measurement mode.
:APPLication:PARameter:STABility:WAVelength:MODE	Sets or queries the stability measurement's wavelength mode.
:APPLication:PARameter:STABility:WAVelength:SET:COMM	Sets or queries the wavelength when the stability measurement's wavelength mode is common.
:APPLication:PARameter:STABility:WAVelength:SET:INDividual	Sets or queries each wavelength when the stability measurement's wavelength mode is individual.
:APPLication:STABility:MEASure:RESult?	Queries the measured stability mode result.
:APPLication:STABility:MEASure:STATe	Starts, stops, or queries the stability measurement.

Command	Function
SWEPT Application	
:APPLication:MDSelect:TLS:SWEPt[:SENSe]	Sets or queries the sensor modules that are used in the SWEPT measurement.
:APPLication:MDSelect:TLS:SWEPt:TLS	Sets or queries the TLS modules that are used in the SWEPT measurement.
:APPLication:PARameter:TLS:SWEPt:ATIMe	Sets or queries the averaging time of the sweep input.
:APPLication:PARameter:TLS:SWEPt:AUTO:SAVE	Sets or queries the automatic data save feature.
:APPLication:PARameter:TLS:SWEPt:CENTer	Sets or queries the sweep center wavelength.
:APPLication:PARameter:TLS:SWEPt:INPut:SNCTrl	Sets or queries whether the serial number feature is used or not.
:APPLication:PARameter:TLS:SWEPt:INPut:SNUMber	Sets or queries the serial number.
:APPLication:PARameter:TLS:SWEPt:LINewidth	Sets or queries the line width of the sweep output.
:APPLication:PARameter:TLS:SWEPt:MODE	Sets or queries the sweep mode.
:APPLication:PARameter:TLS:SWEPt:PMAX	Sets the optical output to the maximum output level within the sweep range.
:APPLication:PARameter:TLS:SWEPt:POWer	Sets or queries the sweep output level.
:APPLication:PARameter:TLS:SWEPt:RANGe	Sets or queries the sweep range.
:APPLication:PARameter:TLS:SWEPt:SAMPles	Sets or queries the number of sweep samples.
:APPLication:PARameter:TLS:SWEPt:SPAN	Sets or queries the sweep width.
:APPLication:PARameter:TLS:SWEPt:STARt	Sets or queries the sweep start wavelength.
:APPLication:PARameter:TLS:SWEPt:STEP	Sets or queries the sweep step wavelength.
:APPLication:PARameter:TLS:SWEPt:STOP	Sets or queries the sweep stop wavelength.
:APPLication:TLS:SWEPt[:MEASurement]:NEXT	Move to the next sweep wavelength in the measurement. (When in manual mode.)
:APPLication:TLS:SWEPt[:MEASurement]:RESult?	Queries the measured result.
:APPLication:TLS:SWEPt[:MEASurement]:STATe	Starts or queries the measurement.
:APPLication:TLS:SWEPt:REFMeasure:CLEar	Clears the reference measurement data.
:APPLication:TLS:SWEPt:REFMeasure:MODE	Sets or queries the reference measurement method.
:APPLication:TLS:SWEPt:REFMeasure:RESult?	Queries the result of the reference measurement.
:APPLication:TLS:SWEPt:REFMeasure:STATe	Starts or queries the reference measurement.
:APPLication:TLS:SWEPt:STOP	Stops the Swept feature.

Index

Symbols

Page

^END 4-1
Δf 5-116

A

Page

ABORt Group 5-17
Address Commands 2-7
alarm 5-76, 5-126
analog output mode 5-87
APPLication Group 5-18
auto bias control 5-104
automatically detect 5-119
automatic data save feature 5-38
automatic synchronization operation 5-100
AUX1 5-76
AUX2 5-76
AUX types 5-76
averaging 5-91
averaging time 5-24, 5-30, 5-31, 5-38, 5-63

B

Page

backlight 5-47
BEEP Group 5-46
beep volume 5-46
bit error count 5-95
bit error rate 5-95
Bit Masking 6-7, 6-9
bit rate 5-122
Block 4-7
buzzer volume 5-129

C

Page

calibration value 5-22
CHOP frequency 5-86
Clears 5-43
CLS 6-8
command's 5-102
common 5-29, 5-33, 5-37
Common Command Group 5-137
Common Command Header 4-3
common mode 5-26
Compound Header 4-3
Condition Register 6-6
Connection Procedure 2-4
continuous measurements 5-55
couple mode 5-60
cross point 5-72, 5-122
currently displayed measured value 5-54

D

Page

Data 4-6
data determination threshold 5-58
data input logic 5-99
data input source 5-58
data output amplitude 5-72
data points 5-28, 5-35
data threshold 5-100
date 5-131
dBm 5-67, 5-93
DC bias 5-104
DCL 2-6
Deadlock 4-2
DHCP 5-129
DISPlay Group 5-47
Display Screen 1-1, 2-1, 3-1
driver output amplitude 5-104
dwell time 5-118

E

Page

error adding 5-122
Error Messages 8-2
error queue 5-131
Error Queue 8-2
Ethernet Interface Specifications 3-2
Event Enable Register 6-6
Event Register 6-6
Extended Event Register 6-11
Extended Status 6-2, 6-3
external input clock's division ratio 5-58

F

Page

fan 5-131
FETCh Group 5-54
Field 4-6
frequency monitor value 5-95

G

Page

gateway 5-130
GP-IB address 5-129
GP-IB Cable 2-4
GP-IB Interface Functions 2-2
GP-IB Interface Specifications 2-3
GP-IB Settings 2-3

H

Page

Header Interpretation Rules 4-4

I

Page

IDY 2-6
IFC 2-6
individual 5-29, 5-34, 5-38
individual mode 5-26
INITiate Group 5-55
input clock source 5-121
input data pattern 5-97
INPut Group 5-56
Input Queue 6-16
insertion loss 5-20
INSTrument Group 5-60
instrument model information 5-137
Interface Messages 2-6
internal modulation frequency 5-105
internal temperature 5-131
interrupt 5-76
IP address 5-130

L

Page
line width ... 5-39
Listener Capability ... 2-2
LLO ... 2-6
LN modulator ... 5-104
Load ... 5-61
logging ... 5-18
logging mode ... 5-18
long program pattern ... 5-61, 5-124
LOS ... 5-100

M

Page
master reference ... 5-22
maximum output level ... 5-40
maximum power level ... 5-86, 5-87
measurement time ... 5-36
Messages ... 4-1
Min/Max measurement mode ... 5-90
MMEMory Group ... 5-61
mnemonic ... 4-3
modulation ... 5-105
modulation method ... 5-86
monitor voltage ... 5-78
Multi-Line Messages ... 2-7

N

Page
Names and Functions of Parts ... 2-1, 3-1
Names of Parts ... 1-1
negative direction ... 5-127
NL^END ... 4-1
NL (New Line) ... 4-1

O

Page
offset frequency ... 5-121
offset voltage ... 5-68, 5-72
optical attenuation ... 5-56, 5-113
optical attenuation offset value ... 5-57
optical frequency ... 5-106
optical input signal wavelength band ... 5-58
optical output offset ... 5-114
optical output power ... 5-64, 5-112
optical switch ... 5-85
OPTion ... 5-137
OPT mode ... 5-30, 5-32
OSA synchronization sweep ... 5-111
OSB ... 6-2, 6-11, 6-12, 6-13
OSCSR ... 5-126
OSESM ... 5-127
OSESR ... 5-127
output data pattern ... 5-122
OUTPut Group ... 5-62
output interface ... 5-74
Output Queue ... 6-16
overhead pattern ... 5-99
Overlap Commands ... 4-8
OVERLOAD ... 5-100

P

Page
PMT ... 4-1
port number ... 5-130
positive direction ... 5-127
power offset value ... 5-66, 5-67
power range ... 5-86, 5-88
power unit ... 5-67
PRBS steps ... 5-97, 5-98, 5-123
Program Data ... 4-1
Program Header ... 4-1
Program Messages ... 4-1
program pattern ... 5-124
program pattern length ... 5-98, 5-123

Q

Page
QSB ... 6-3, 6-14, 6-15
QSCSR ... 5-128
QSESM ... 5-128
QSESR ... 5-128
Queries ... 4-1

R

Page
range ... 5-91
range mode ... 5-25, 5-33
rate value ... 5-122
READ Group ... 5-76
receive power ... 5-78
Receiving Function ... 3-2
Reception Function ... 1-2
reference measurement ... 5-43
reference mode ... 5-27, 5-35
reference reflection ... 5-23
reference reflection quantity ... 5-30
reference value ... 5-27, 5-34
Register ... 4-7
relative measurement's ... 5-92
Remote and Local Modes, switching ... 1-2, 2-2, 3-2
REN ... 2-6
Response Data ... 4-2
Response Message ... 4-1
return loss ... 5-20
RMT ... 4-1
ROUTe Group ... 5-85

S

Page
SDC and DCL, differences ... 2-7
SDH/SONET frame ... 5-98, 5-125
self-test ... 5-101, 5-138
Sending Function ... 3-2
SENSe Group ... 5-86
Sequential Commands ... 4-8
serial number ... 5-39
Serial Polling ... 6-8
short program pattern ... 5-97, 5-124
Simple Header ... 4-3
single measurements ... 5-55
slope ... 5-104
Slot ... 6-14
slot and device numbers ... 5-77
SLOT Group ... 5-101
SOURce Group ... 5-104
SPD ... 2-6
SPE ... 2-6
spectrum line width ... 5-110
stability ... 5-21, 5-42
stability mode ... 5-42
Standard Event Register ... 6-9
Status Byte ... 6-7
STATus Group ... 5-126
Status Reports ... 6-1
STB? ... 6-8
string ... 4-7
subnet mask ... 5-131
Summary ... 6-13, 6-15

sweep 5-117
sweep center wavelength 5-39
sweep cycle interval 5-119
sweep cycles 5-118
sweep mode 5-40, 5-119
sweep output level 5-40
sweep range 5-40
sweep samples 5-41
sweep speed 5-119
sweep start wavelength 5-41, 5-120
sweep step wavelength 5-41, 5-120
sweep stop wavelength 5-42, 5-120
sweep wavelength 5-42
sweep width 5-41
Swept 5-44
SWEPT 5-21
SYSTem Group 5-129
system triggers 5-134

T

Page

Talker Capability 2-2
TCP/IP Settings 3-3
temperature 5-78
terminal 5-24
terminator 5-129
time 5-132
transition filter 5-127
Transition Filter 6-6
Transmission Function 1-2
transmit bias current 5-78
transmit power value 5-78
TRIGger Group 5-133
trigger input 5-133
trigger mode 5-25, 5-32
trigger output 5-74, 5-133

U

Page

Uni-Line Messages 2-6
unit 5-28, 5-36, 5-93, 5-114, 5-115
Universal Commands 2-7
unsigned value 4-6
upper table 5-64
USB Interface Specifications 1-2

V

Page

Value 4-6
VCC2 ..... 5-67, 5-78
VCC3 ..... 5-67, 5-78
VCC5 ..... 5-67, 5-78
VEE5 ..... 5-67, 5-78
voltage 5-67, 5-131

W

Page

W 5-67, 5-93
wavelength 5-31, 5-57, 5-115, 5-117
wavelength correction 5-116
wavelength mode 5-28, 5-37
wavelength offset 5-117
WRITe Group 5-135

X

Page

XFP transceiver 5-78

Z

Page

zero-set 5-63, 5-88