

MW9076 Series
Optical Time Domain Reflectometer
Serial Interface
Operation Manual

Fifth Edition

To ensure that the equipment is used safely,
read the "For Safety" in the MW9076 Series
Optical Time Domain Reflectometer Opera-
tion Manual first.

Keep this manual with the equipment.

Measurement Solutions
ANRITSU CORPORATION

MW9076 Series
Optical Time Domain Reflectometer
Serial Interface
Operation Manual

18 August 1999 (First Edition)

24 June 2002 (Fifth Edition)

Copyright © 1999-2002, ANRITSU CORPORATION.

All rights reserved. No part of this manual may be reproduced without the prior written permission of the publisher.

The contents of this manual may be changed without prior notice.

Printed in Japan

About This Manual

This manual explains the interface for remote control of the MW9076 Series Optical Time Domains Reflectometer using a connected controller such as a computer.

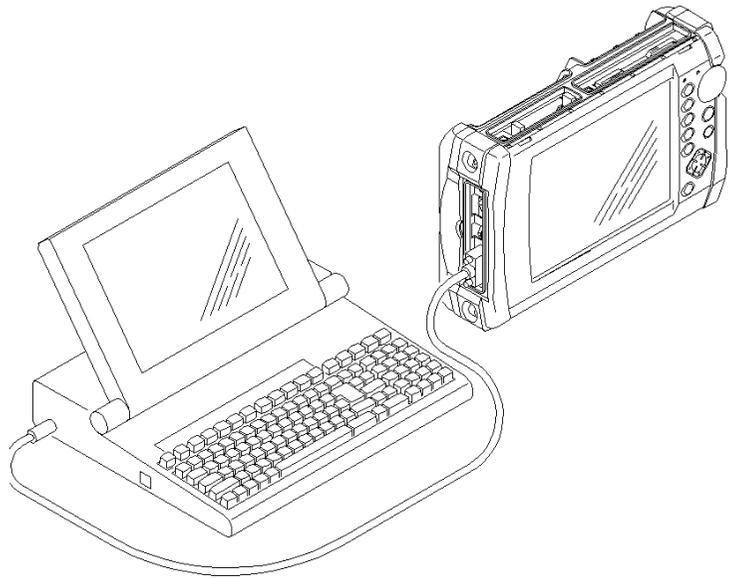
The interface is described in general terms first, and the commands are explained in alphabetical order in the latter half of this manual.

Table of Contents

	Introduction	III
	Section 1 Outline	1-1
	Section 2 Interface.....	2-1
2.1	Connection	2-2
2.2	Interface Specifications	2-3
2.2.1	Basic Items	2-3
2.2.2	Transmission Control Characters	2-3
2.2.3	Text Format	2-4
2.2.4	Transmission Sequence	2-6
	Section 3 Commands	3-1
3.1	Type	3-2
3.2	Command Details	3-7
A	.....	3-8
B	.....	3-14
C	.....	3-15
D	.....	3-27
E	.....	3-34
F	.....	3-38
H	.....	3-42
I	.....	3-47
L	.....	3-48
M	.....	3-54
O	.....	3-58
P	.....	3-59
R	.....	3-60
S	.....	3-63
T	.....	3-67
U	.....	3-71
V	.....	3-72
W	.....	3-76

1
2
3
A
B
C
D
E
F
H
I
L
M
O
P
R
S
T
U
V
W

When a computer, etc., is connected to the MW9076 Series Optical Time Domains Reflectometer (OTDR) via the RS-232C interface, the computer can be used to control most operations such as setting measurement conditions, executing measurement, and requesting measurement results. This function is called the remote control function.



Section 2 Interface

The interface is an RS-232C serial interface.

2.1	Connection	2-2
2.2	Interface Specifications	2-3
2.2.1	Basic Items	2-3
2.2.2	Transmission Control Characters	2-3
2.2.3	Text Format	2-4
2.2.4	Transmission Sequence	2-6

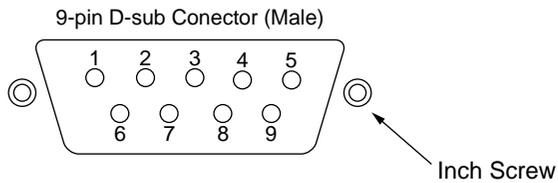
2.1 Connection

A cable is used to connect the OTDR to the computer RS-232C connector. The OTDR RS-232C connector is a 9-pin D-sub connector.

Name	Specification	Code
IBM-PC/AT series interface cable	RS232C cable	J0654A

The pin layout of the OTDR connector is shown below.

The connector fixing screws are inch screws.



Use 9-pin D-sub Connector with inch screws at the cable connector side.

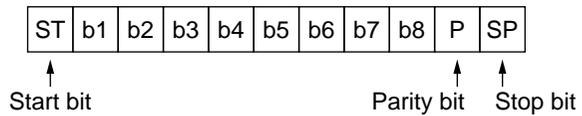
Pin No.	Signal	Remarks
1	CD	Carrier Detect
2	RD	Receive Data
3	SD	Send Data
4	ER	Equipment Ready
5	SG	Signal Ground
6	DR	Data set Ready
7	RS	Request to Send
8	CS	Clear to Send
9	(NC)	

2.2 Interface Specifications

2.2.1 Basic Items

The basic interface specifications are as follows :

Type	: RS-232C
Transmission speed	: 9600, 19200, 38400, 576000, 115200 bps
Communication method	: Full duplex
Synchronization method	: Start-stop system
Transmission control code	: JIS 8 bit + even parity
Transmission code composition	: A sequence of bits starting with start bit and ending with stop bit. Including 1 bit for parity check when parity is set.



Error control method	: Even, odd or none parity
Stop bit	: 1 or 2 bits
Transmission coding method	: Transparent mode
Response method	: ACK/NAK method, Direct method
Flow control	: Hardware or none

2.2.2 Transmission Control Characters

When using ACK/NAK method, the following four character strings are used as the “Transmission Control Characters” for controlling the control sequence.

STX	02H	Start of Text
ETX	03H	End of Text
ACK	06H	Acknowledge
NAK	15H	Not Acknowledge

2.2.3 Text Format

ACK/NAK method

The text sent from the computer side starts with STX and ends with BCC and has a maximum of 262 bytes. BCC is 1 byte for checking the horizontal parity.

S	Data	Type	Data	E	B
T				T	C
X	Length		Max. 256 bytes variable length	X	C

Data Length

The length of the data part is indicated as 2-byte binary data.

Type

The output data type is indicated as the following codes.

00H Send command (when continuous data)	(PC→OTDR)
01H Send command (when not continuous data)	(PC→OTDR)
03H Send query command	(PC→OTDR)
04H Request next message	(PC→OTDR)
06H Response message (when continuous data)	(OTDR→PC)
07H Response message end (final message)	(OTDR→PC)
08H Format response normal	(OTDR→PC)
09H Format response abnormal	(OTDR→PC)

Data Part

The data input to the data part varies according to the type of send data. The header and data are explained in Section 3.

- (a) At control and query commands
 - Only header
<header>
 - One data item with header
<header> <data>
 - Multiple data items with header
<header> <data>, <data>,, <data>
- (b) Response
 - Only binary data
<data (binary)>
 - One message with header
<header> <message>
 - Multiple messages with header
<header> <message>, <message>,, <message>

- (c) Format response
The data part is not sent.
- (d) Next data send
 - Only data <data>
- (e) Next data request
The data part is not sent.

Note :

One packet starting with STX and ending with BCC and EXT cannot include multiple commands.

BCC (Block Character Check) : This is the byte for checking the horizontal parity. It is set so that the exclusive OR becomes zero when the BCC byte is exclusive ORed with exclusive OR of bytes up to ETX excluding STX.

This is called the horizontal parity check because the BCC byte is fixed so that the number of 1 in the horizontal direction becomes even.

Direct method

The following indicates a message format when Response method is Direct method.

Data Area

All data are transmitted in a batch in Direct method without performing division transmission. The maximum value is 220,000 bytes, when transmitting a waveform file.

TRM

Indicates Terminator (\$0D0A) by a binary data of 2 bytes

Data	TRM
------	-----

2.2.4 Transmission Sequence

This section explains the commands and response sequence.

ACK/NAC method

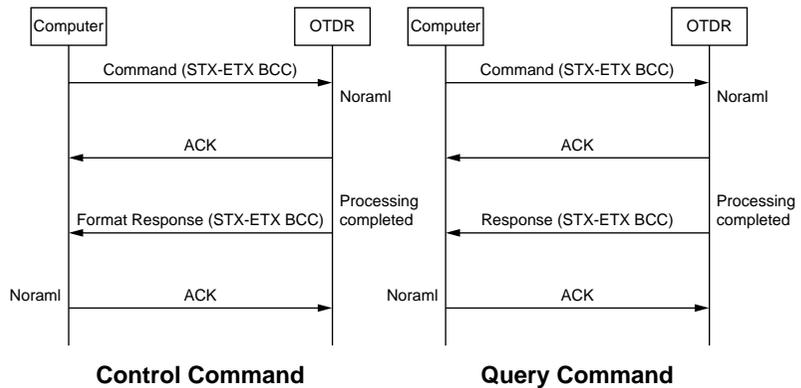
(1) **Different sequences when data sending normal and abnormal**

The tester performs the following checks when a packet is received.

- Vertical parity check
- Horizontal check
- Framing error
- Over-run error
- Receive buffer overflow
- ETX loss (30 s time-out)
- Abnormal data length

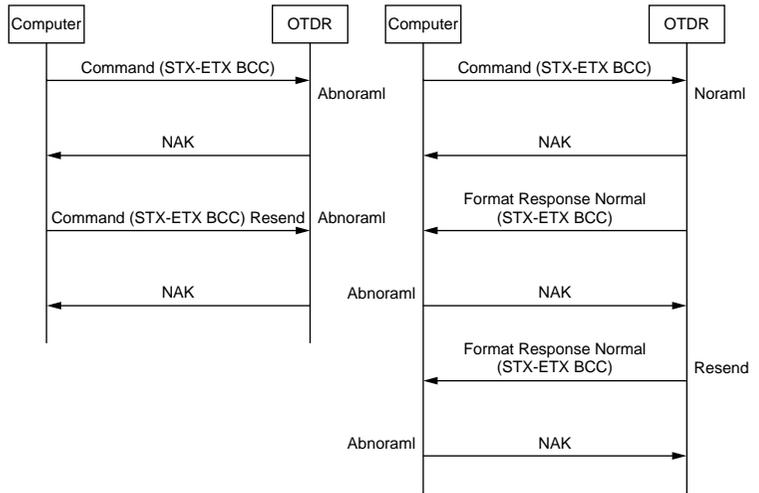
The OTDR evaluates whether or not the data transmission is normal or abnormal from the presence or absence of errors and then takes the following procedures.

- When normal
ACK is sent ; Format Response is returned after the Control command (diagram on left). When there is a Query command, the Response is returned (diagram on right).



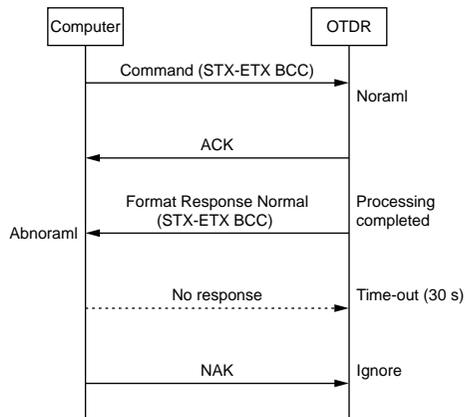
- When abnormal

When abnormal transmission is detected at the OTDR side, NAK is sent. The computer resends the command when NAK is received (diagram on left). When the computer side detects an abnormal transmission related to the response sent from the OTDR, it returns NAK and the OTDR resends the response when it receives NAK (diagram on right).



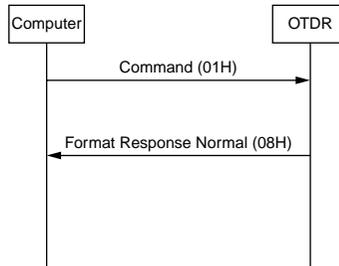
(2) When no response

When the OTDR does not return a response within 30 s after sending, the computer stops waiting for a response. Consequently, the text is evaluated as having been correctly received even if NAK is subsequently returned.



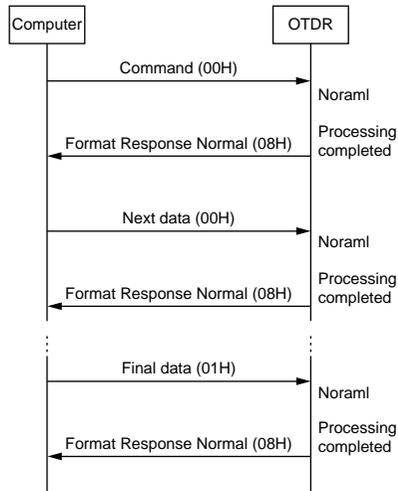
(3) Command (no next data)

The Type field of the command for completing transmission of all data in the text format is 01H. When the OTDR completes execution of this command it returns Format Response Normal.



(4) Command (next data)

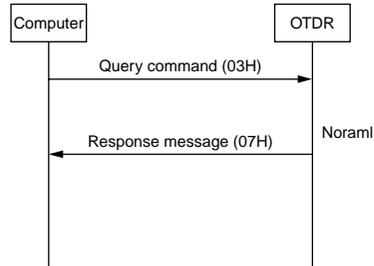
Then Type field of the command when all required data in the text format has not been sent is 00H. When the OTDR finishes receiving the data, it returns Format Response Normal. The computer sends the next when it receives Format Response Normal.



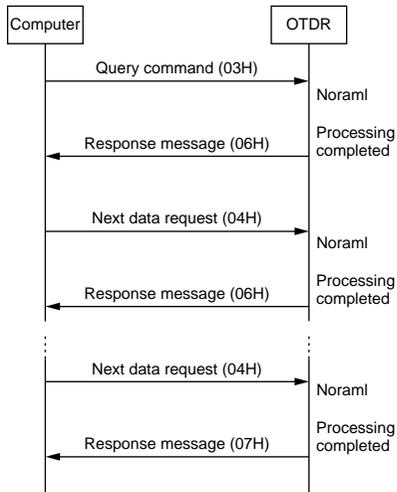
(5) Query Command

When the computer requests data, first, the Type field 03H command is sent.

When the OTDR response is completed within 256 bytes, the Type field returns the 07H response.



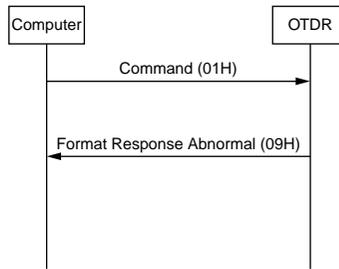
When the response is not completed within 256 bytes, the OTDR returns a response with the Type field set to 06H. When the remaining response data is less than 256 bytes, the 07H response is returned and the computer determines that the entire response has been received.



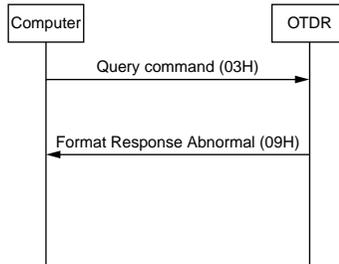
(6) **Format Response Abnormal**

When the OTDR detects the following abnormalities, it sends Format Response Abnormal.

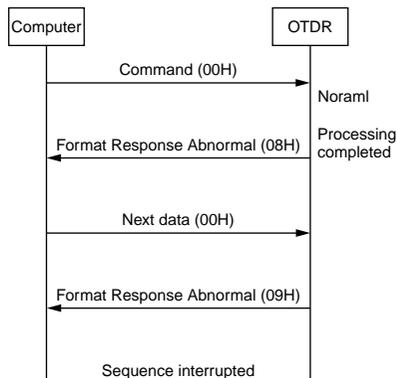
- Undefined command received
- Command syntax error is detected
- OTDR detected error when command executed



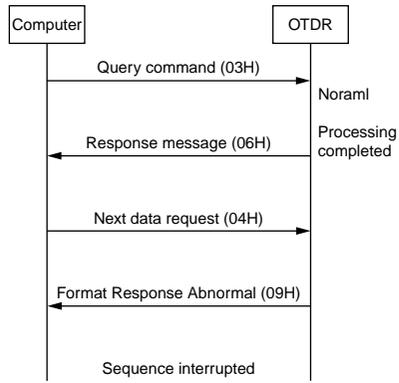
In addition to the above abnormal conditions, Format Response Abnormal is also sent when there is no response data in the case of the Query command.



During reception of data divided into several commands from the computer, if the OTDR detects an error as a result of executing the data that has been received so far, or if the computer sends a new command before sending of all the data is completed, the OTDR returns Format Response Abnormal.



In addition, the OTDR also returns Format Response Abnormal when a new command is sent from the computer while the OTDR is returning a response divided into several blocks after receiving the Query command.

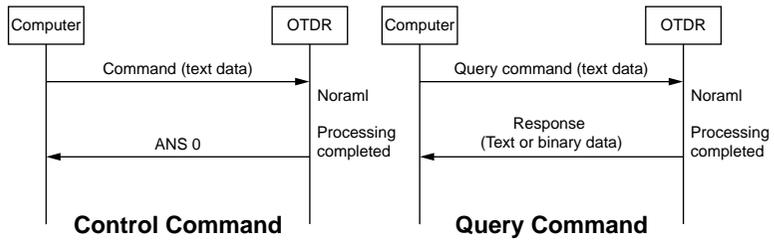


Direct method

(1) Difference of steps according to Normal/Abnormal of data transmission.

- When normal

A positive response (ANS0) is sent back after a Control command. (See the left diagram) A response is returned after a Query command. (See the right diagram.)

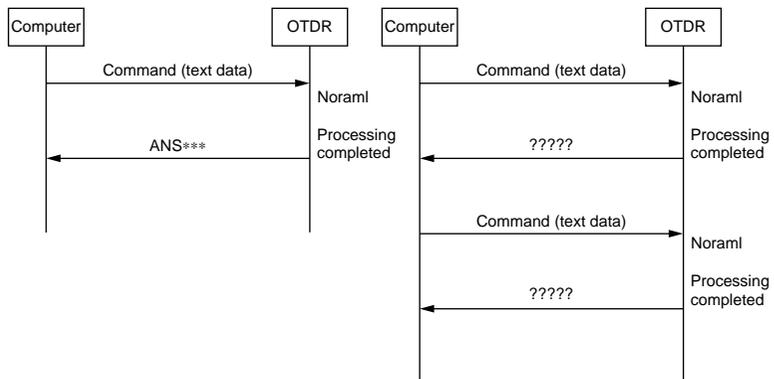


- When abnormal

A negative response (ANS***) is returned when OTDR detects abnormal communication. (See the left diagram.)

Refer "List of Error Codes for ERR Commands" for details of error codes.

When the computer detects abnormal, re-send the command from the computer.



Section 3 Commands

Each command is explained here.

3.1	Type	3-2
3.2	Command Details	3-7
	A	3-8
	B	3-14
	C	3-15
	D	3-27
	E	3-34
	F	3-38
	H	3-42
	I	3-47
	L	3-48
	M	3-54
	O	3-58
	P	3-59
	R	3-60
	S	3-63
	T	3-67
	U	3-71
	V	3-72
	W	3-76

3.1 Type

According to their functions, the commands are classified as follows.

(1) Functions that can be set with panel keys

No.	Function	Command	Query
1	Start sweep	STR LD	STR? LD?
2	Set averaging	AVG	AVG?
3	Select marker	MKS	MKS?
4	Move marker	MKP	MKP?
5	Vertical shift value	VSF	VSF?
6	Horizontal shift value	HSF	HSF?
7	Vertical scale value	VSC	VSC?
8	Horizontal scale value	HSC	HSC?
9	Vertical zoom	VZM	VZM?
10	Horizontal zoom	HZM	HZM?
11	Set measurement mode	MES	MES?
12	Set manual measurement type	FNC	FNC?

(2) Setup Screen settings

No.	Function	Command	Query
1	Set distance automatically	DSA	DSA?
2	Set distance range	DSR	DSR?
3	Set pulse width automatically	PLA	PLA?
4	Set pulse width	PLS	PLS?
5	Select wavelength	WLS	WLS?
6	Set CW mode ON/OFF	LIT	LIT?
7	Set all measurement conditions automatically	FUL	FUL?
8	Set linear approximation method	APR	APR?
9	Splice interval value	THS	THS?
10	Return loss interval value	THR	THR?
11	Fiber end interval value	THF	THF?
12	Warning threshold for non-reflection loss	WLSPN	WLSPN?
13	Warning threshold for reflection loss	WLSPR	WLSPR?
14	Warning threshold for return loss	WLRLS	WLRLS?
15	Warning threshold for Height	WLHGT	WLHGT?
16	Warning threshold for fiber loss	WLFLS	WLFLS?
17	Warning threshold for total loss	WLTLS	WLTLS?
18	Warning threshold for total return loss	WLTRL	WLTRL?
19	Warning threshold for average loss	WLAVL	WLAVL?
20	Back-scatter level value	-	BSL?
21	Back-scatter level calibration value	CAL	CAL?
22	Auto-measurement average limit	ALA	ALA?
23	Set IOR	IOR	IOR?
24	Active fiber check	AFCK	AFCK?
25	Connection check	CON	CON?
26	Fixed	FIX	FIX?
27	Attenuator Auto Setting	ATA	ATA?
28	Attenuator Setting	ATT	ATT?
29	Attenuator Selected Value	-	ATV?
30	Number of sampling data	RES	RES?
31	Channel number of optical channel	SOSW	SOSW?
32	Measurement function selection	LFNC	LFNC

(3) Display settings

No.	Function	Command	Query
1	Distance unit	UNL	UNL?
2	Horizontal offset setting	OFS	OFS?
3	Reflection type setting	RLS	RLS?
4	Title input	TIT	TIT?
5	Header input	HDR	HDR?
6	Data flag	HDFG	HDFG?

(4) File settings

No.	Function	Command	Query
1	Select media	MED	MED?
2	Save	SAV	-
3	Recall	RCL	RCL?
4	Delete file	FDL	-
5	Format	FMT	-
6	Read file data	-	FRD?
7	Save format	SVF	SVF?
8	Change directory	CDR	CDR?
9	Make directory	MKDR	-
10	Read all directory information	-	DIR?
11	Copy file	CPY	-
12	Move file/directory name	MOV	-
13	Write file data	FWT	-
14	File compression setting	CMPR	CMPR?

(5) System settings

No.	Function	Command	Query
1	Date display format	DAF	DAF?
2	Set date	DATE	DATE?
3	Set time	TIME	TIME?
4	Difference setting for the standard time	TDIF	TDIF?
5	Set auto-power off	APW	APW?
6	Selection of Optical channel selector	TOSW	TOSW?

(6) Measurement result requests

No.	Function	Command	Query
1	Splice and return loss measurement result	-	SRL?
2	Loss measurement result	-	LOS?
3	Auto-measurement result	-	AUT?
4	Event measurement result	-	EVN?
5	Waveform data (LOG)	-	DAT?
6	Total return loss measurement result	-	TRL?
7	Averaging result	-	AVE?

(7) Status readout

No.	Function	Command	Query
1	Status	-	STS?
2	Error information	-	ERR?
3	Connection check result	-	CCO?
4	Active fiber check result	-	AFWK?
5	Waveform data existence	-	WAV?

(8) Waveform comparison settings

No.	Function	Command	Query
1	Reference waveform read	RRCL	RRCL?
2	Waveform comparison Off	CMP	CMP?
3	Level difference read	-	DIFF?
4	Differential waveform data	-	DFDAT?

(9) Settings relating to OLTS

No.	Function	Command	Query
1	Power-meter measurement result read	-	LPOW?
2	Loss value read	-	LLOS?
3	Light source wavelength	LLWL	LLWL?
4	Light source modulation frequency	LLMO	LLMO?
5	Light source ON/OFF	LLLD	LLLD?
6	Average count	LPAL	LPAL?
7	Averaging On/Off	LPAV	LPAV?
8	Wavelength sensitivity correction	LPWC	LPWC?
9	Reference value setting	LREF	LREF?
10	Offset	-	LPOF?

(10) CD settings

No.	Function	Command	Query
1	CD measurement start	CDLD	CDLD?
2	Measurement mode setting	CDFUL	CDFUL?
3	Approximate formula	CDAPR	CDAPR?
4	Reference wavelength	CDREF	CDREF?
5	IOR setting	CDIOR	CDIOR?
6	Average count setting	CDALA	CDALA?
7	Marker On/Off	CDMK	CDMK?
8	Waveform existence	-	CDWAV?
9	Fiber end position read	-	CDMKP?
10	CD calculation	CDMES	CDMES?
11	Calculation result read	-	CDRSLT?
12	Zero-dispersion wavelength read	-	CDDPN?
13	Approximate formula coefficient read	-	CDCOF?
14	Graph data read	-	CDDAT?
15	Status query	-	CDSTS?

(11) Other settings

No.	Function	Command	Query
1	Reset	RST	-
2	Initialize	INI	-
3	Remote/Local	REN	REN?
4	Visible light source control	VIS	VIS?
5	Backlight control	BLC	BLC?
6	Serial number	-	SNO?
7	Data format, version of the firmware	-	VER?
8	Format name	-	ID?

3.2 Command Details

This section explains the details of each command in alphabetical order.

Sometimes, a command cannot be executed depending on the status of the main unit. The status of the main unit is indicated in the explanation of each command by the following codes to indicate this; the status when a command cannot be executed is indicated by × and the status when a command can be executed is indicated by ○.

During OTDR measurement

Status code	Condition
AS	During auto-setting
AA	During averaging
ES	During auto-search (Event search)
ET	During event table display
AZ	During auto-zoom
MS	During manual sweep
SP	During manual stop
EE	During event editing

During CD measurement

Status code	Condition
EDS	Detecting the fiber end
EDP	Stopping end detection
CDS	Detecting CD
CDP	Stopping CD detection
CDC	CD calculation screen

For example, an AVG command that can be executed only when manual sweep or manual stop is performed during OTDR measurement is indicated as shown below:

AS	AA	ES	ET	AZ	MS	SP	EE
×	×	×	×	×	○	○	×

This command is disabled during OLTS or CD measurement.

Note :

It becomes effective when manual sweeping is started.

AFCK $\{ 0 | 1 \}$

Sets active fiber check function On/Off.

0 : active fiber check Off

1 : active fiber check On

Query : AFCK?

Response : AFCK { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
AFCK	×	×	×	○	○	○	○	×
AFCK?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
AFCK	×	○	×	○	○
AFCK?	○	○	○	○	○

This command is disabled during OLTS measurement.

AFWK?

Reads the result for active fiber check.

Response : AFWK { 0 | 1 }

0 : OK

1 : NG

Execution prohibitions : This command is disabled during OLTS measurement.

ALA \square <Mode>, <Setting>

Sets averaging limit.

<Mode>

- 0 : No. of times
- 1 : Elapsed time
- 2 : Auto

Auto can not be selected when the measurement mode is in Manual.

<Setting>

- No. of times : Unit : 1 time (1 to 9999 times)
- Elapsed time : Unit : 1 second (1 to 9999 seconds)
- Auto : Disabled

Query : ALA?

Response : ALA <Mode>, <Setting (No. of times)>,
<Setting (Elapsed time)>

<Setting>

In the Auto mode, the limit value found from the auto-measurement time is found. When auto-measurement is not being performed, ALA2, ***, *** is returned.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
ALA	×	×	×	①	①	①	①	×
ALA?	○	○	○	○	○	○	○	○

① Valid from next auto-measurement

This command is disabled during OLTS or CD measurement.

APR \square { 0 | 1 }

Sets linear approximation method.

- 0 : 2PA
- 1 : LSA

Query : APR?

Response : APR { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
APR	×	×	×	×	×	○	○	×
APR?	①	①	①	①	①	○	○	①

① The response is (APR***).

This command is disabled during OLTS or CD measurement.

APW $\{ 0 | 1 | 2 | 3 | 4 \}$

Sets auto-power off time. However, the power cannot be switched off automatically during remote control.

- 0 : Not switched off
- 1 : After 3 minutes
- 2 : After 5 minutes
- 3 : After 15 minutes
- 4 : After 30 minutes

Query : APW?

Response : APW { 0 | 1 | 2 | 3 | 4 }

Execution prohibitions : None

ATA

Sets automatic attenuator setting mode.

Query : ATA?

Response : ATA { 0 | 1 }

0 : Manual attenuation mode.

1 : Automatic attenuation mode.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
ATA	×	×	×	×	×	○	○	×
ATA?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

ATT \square **<Attenuation>**

Sets attenuation at attenuator.

<Attenuation>

1 = 1 dB

The attenuation value is selected among the specific values determined by the pulse width used.

Available attenuation values can be obtained using the ATV? command.

Query : ATT?

Response : ATT <Attenuation>

<Attenuation>

When the Automatic Attenuation Mode is set but the attenuator is not yet stabilizer, ATT *** is returned as the response because the attenuation is invalid.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
ATT	×	×	×	×	×	○	○	×
ATT?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

ATV? \square **<Pulse Width>**

Reads attenuation values available at specified pulse width.

<Pulse Width> is specified as one of the following values. This field is in 1 = 1 ns. Available pulse widths depend on the OTDR units.

5, 10, 20, 50, 100, 500, 1000, 2000, 4000, 10000, 20000 ns

Response : ATV <Attenuation> {, <Attenuation>}

<Attenuation>

All available attenuation values are output for the specified pulse width.

When the unit has no attenuator, ATT *** is returned as the response.

Execution prohibitions : This command is disabled during OLTS or CD measurement.

AUT?

Reads auto-measurement results.

Response : AUT <Event total>, <Fiber length>, <Total Return Loss>

<Event total>

0 to 99

<Fiber length>

Distance units, IOR correction distance data

- (1) km and m distance units
The numeric value in meters is rounded to the three decimal point.
- (2) kft and ft distance units
The numeric value in meters is converted to feet at 1 m = 3.2808399 ft and the feet value is rounded to the three decimal point.
- (3) mile units
The numeric value in meters is converted to miles at 1 m = 0.0006213711922 miles and the mile value is rounded to six decimal places.
*** is output when measurement is impossible.

<Total Loss>

The units are dB. The value is output to the third decimal place.
*** is output when measurement is impossible.

<Total Return Loss>

Total return loss value from zero cursor distance to sampling end.
The first character indicates information on the saturation.
“<” indicates that it is saturated.
“ ” (space) indicates that it isn't saturated.
"@” indicates that it isn't saturated, but it is over the warning level.
The unit are dB. 1 = 1 dB and the value is output to three decimal places.
*** is output when measurement is impossible.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
AUT?	×	×	×	○	○	×	×	○

This command is disabled during OLTS or CD measurement.

AVE?

Reads current average count/time.

Response : AVE <Measurement mode>, <Count value (Count)>, <Count value (Time)>

<Measurement mode>

0 : Manual
1 : Auto/FullAuto

<Count value>

Count : in number-of-times unit
Time : in second unit

	AS	AA	ES	ET	AZ	MS	SP	EE
AVE?	×	○	○	○	○	○	○	×

This command is disabled during OLTS or CD measurement.

AVG { 0 | 1 }

Sets whether or not to execute averaging at manual measurement.

0 : No averaging (real time)
1 : Averaging

Valid from next start of next manual sweep

Query : AVG?

Response : AVG { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
AVG	×	×	×	×	×	○	①	×
AVG?	○	○	○	○	○	○	○	○

① Valid from next manual sweep start

This command is disabled during OLTS or CD measurement.

BLC $\{ 0 | 1 | 2 \}$

Switches the brightness of the screen backlight.

- 0 : Off (MU250000A is set to Low.)
- 1 : Low
- 2 : High

Query : BLC?

Response : BLC { 0 | 1 | 2 }

The response is "BLC 1" even when "BLC 0" is send to MU250000A.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
BLC	×	×	×	○	○	×	○	×
BLC?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
BLC	×	○	×	○	○
BLC?	○	○	○	○	○

BSL?

Reads backscatter level.

Response : BSL <Backscatter level>

Level at current pulse width. The returned value should be prefixed with a minus sign to give the true level.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
BSL?	①	○	○	①	○	○	①	○

- ① The response is (BSL***) when the pulse width cannot be set (In case "Auto" is set, but "auto setting" isn't executed, the pulse width isn't specified).

This command is disabled during OLTS or CD measurement.

CAL □ **<Calibration value>**

Sets backscatter-level calibration value.

<Calibration value>

The setting range is -9.99 to +9.99.

Query: CAL?

Response: CAL <Calibration value>

Execution prohibitions:

	AS	AA	ES	ET	AZ	MS	SP	EE
CAL	×	×	×	○	○	○	○	×
CAL?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

CCO?

Reads connection check result.

Response : CCO { 0 | 1 }
 0 : NG
 1 : OK

Execution prohibitions :

This command is disabled during OLTS measurement.

CDALA \square <Mode>, <Wavelength>, <Set value>

Sets the average limit for CD measurement.

<Mode>

- 0 : Count
- 1 : Time
- 2 : Auto

<Wavelength>

Numeric value up to the third decimal point in μm unit.
This is invalid when the mode is set to auto.

<Set value>

- Count : in number-of-times unit (1 to 9999)
- Time : in second unit (1 to 9999)
- Auto : Invalid

Query : CDALA? <Wavelength>

Response : CDALA <Mode>, <Set value (Count)>, <Set value (Time)>

<Set value>

When set to Auto mode, returns the limit value obtained during automatic measurement.

When automatic measurement has not been performed, "CDALA 2, ***, ***" is returned.

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDALA	×	×	×	○	×
CDALA?	×	×	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDAPR \square { 0 | 1 | 2 }

Selects the approximate formula for CD calculation.

- 0 : SMF
- 1 : DSF
- 2 : Any

Query : CDAPR?

Response : CDAPR_{ 0 | 1 | 2 }

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDAPR	×	○	×	○	×
CDAPR?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDCOF?

Reads the approximate formula coefficient calculated by using the CDMES command.

Response : CDCOF { 0 | 1 | 2 }, <a>, , <c>, <d>, <e>
 0 : SMF
 1 : DSF
 2 : Any
 <a>, , <c>, <d>, <e>

Values fixed to the 15th decimal point digits in coded index expression

Ex.: -1.123456789012345e+020

When the approximate formula is set to SMF or DSF, "***" is output for <d> and <e>.

When calculation cannot be performed, "***" is output.

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDCOF?	×	×	×	×	○

This command is disabled during OTDR or OLTS measurement.

3
A
B
C
D
E
F
H
I
L
M
O
P
R
S
T
U
V
W

CDDAT?_{ 0 | 1 | 2 }

Reads the graph data calculated by using the CDMES command.

- 0 : Delay
- 1 : Dispersion
- 2 : Slope

Response : 2 bytes 4 bytes 4 bytes
 OO OOOO..... OOOO
 Number of data The first data The n-th data
 The number of data and data are expressed in binary
 format.

<Number of data>
 Fixed to 451 points.

<Data>
 Data with wavelength of 1300 to 1660 nm and interval of 0.8 nm.
 One data is expressed in coded 32 bits (4 bytes.) Each 4 bytes of one
 data are transmitted from upper to lower.
 The data units are as shown below:

- 1) Delay
 One digit is equivalent to 0.001 ps/km.
- 2) Wavelength dispersion
 One digit is equivalent to 0.01 ps/(nm/km).
- 3) Dispersion slope
 One digit is equivalent to 0.00001 ps/(nm²/km).

[Ex.] For -123.456 ps/km delay:
 -123.456 x 1000 = -123456 (Dec) R FFFE1DC0 (Hex)
 The first byte: FF (Hex)
 The second byte: FE (Hex)
 The third byte: 1D (Hex)
 The fourth byte: C0 (Hex)

The maximum values for plus and minus are 7FFFFFFF (Hex) and 80000000 (Hex) respectively, while a value exceeding this range is rounded to the individual limit.

Execution prohibitions :

\	EDS	EDP	CDS	CDP	CDC
CDDAT?	×	×	×	×	○

This command is disabled during OTDR or OLTS measurement.

CDDPN?

Reads the result for zero-dispersion wavelength calculation performed by using the CDMES command.

Response : CDDPN <Zero-dispersion wavelength>

<Zero-dispersion wavelength>

A value up to the fourth decimal point in μm unit.

When measurement cannot be performed, "****" is output.

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDDPN?	×	×	×	×	○

This command is disabled during OTDR or OLTS measurement.

CDFUL

Sets the CD measurement mode to full-auto.

Query : CDFUL?

Response : CDFUL { 0 | 1 }

0 : Auto/Manual
1 : Full-auto

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDFUL	×	○	×	○	○
CDFUL?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDIOR \square <Wavelength>, <IOR value>

Sets the IOR for CD calculation.

<Wavelength>

Numeric value up to the third decimal point in μm unit.

<IOR value>

Valid up to the sixth decimal point. 1.400000 to 1.699999

Query : CDIOR? <Wavelength>

Response : CDIOR <IOR value>

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDIOR	×	○	×	○	×
CDIOR?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDLD [{ 0 | 1 } [, <Fiber end position>]

Performs CD measurement.

- 0 : Stop measurement
- 1 : Start measurement

<Fiber end position>

Performs CD measurement using the set position as the fiber end.

The distance range varies according to this value.

When this is omitted in full auto mode, performs CD measurement after detecting the fiber end.

When measurement is stopped (0 is set for the CDLD command), this is invalid.

Note: Units for distance are as shown below:

- 1) When the unit is kilometer or meter
Value rounded off to the third decimal point in m unit.
- 2) When the unit is kilo-feet or feet
3.2808399 feet converted to one meter and rounded off to the third decimal point.
- 3) When the distance unit is mile
0.0006213711922 miles converted to one meter and rounded off to the sixth decimal point.

Query : CDLD?

Response : CDLD { 0 | 1 }, <Fiber end position>
 0 : Sweep is stopped
 1 : Sweeping

<Fiber end position>

When the fiber end position is not available, "****" is output.

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDLD	○	○	○	○	○
CDLD?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDMES \square { 0 | 1 }

Performs CD calculation using the approximate formula selected by the CDAPR command and the reference wavelength set by the CDREF command.

- 0 : Return to the OTDR screen.
- 1 : CD calculation

Note: When there are 3 or more wavelengths with markers set to off, CD calculation is not performed.

Query : CDMES?

Response : CDMES { 0 | 1 }

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDMES	×	×	×	○	○
CDMES?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDMK \square <Wavelength>, { 0 | 1 }

Sets the CD measurement marker On/Off.

<Wavelength>

Numeric value up to the third decimal point in μm unit.

- 0 : Off
- 1 : On

Query : CDMK? <Wavelength>

Response : CDMK { 0 | 1 }

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDMK	×	×	×	○	×
CDMK?	×	×	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDMKP? \square <Wavelength>

Reads the fiber end position during CD measurement.

<Wavelength>

Numeric value up to the third decimal point in μm unit.

Response : CDMKP <Fiber end position>

<Fiber end position>

A value rounded off to the third decimal point of a numeric value in m unit.

Outputs "CDMKP ***" when the marker is set to off or there is no waveform.

Execution prohibitions :

\diagdown	EDS	EDP	CDS	CDP	CDC
CDMKP?	×	×	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDR \square <Path>

Changes the current directory.

<Path>

- 1) /fullpath
Specify the absolute path in media already selected with MED command.
- 2) Subdirectory
Specify the sub directory under the current directory

Query :CDR?

Response :CDR </full path>

Execution prohibitions

\diagdown	AS	AA	ES	ET	AZ	MS	SP	EE
CDR	×	×	×	○	○	×	○	×
CDR?	○	○	○	○	○	○	○	○

\diagdown	EDS	EDP	CDS	CDP	CDC
CDR	×	○	×	○	○
CDR?	×	○	×	○	○

This command is disabled during OLTS measurement.

<Restriction>

"./" cannot be described.

Only "/" can be used for separation between the directory and the sub-directory. "\" can not be used for it.

CDREF \square <Reference wavelength>

Sets the reference wavelength for CD calculation.

<Reference wavelength>

Numeric value up to the third decimal point in μm unit.

Query : CDREF?

Response : CDREF <Reference wavelength>

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDREF	×	○	×	○	×
CDREF?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDRSLT? \square <Wavelength>

Reads the result for CD calculation performed by using the CDMES command.

<Wavelength>

Numeric value up to the fourth decimal point in μm unit (1.3000 to 1.6600)

Response : CDRSLT <Delay>, <Dispersion>, <Slope>, <Total dispersion>

<Delay>

A value up to the sixth decimal point in ps/km unit.

When measurement cannot be performed, "****" is output.

<Dispersion>

A value up to the second decimal point in ps/(nm · km) unit.

When measurement cannot be performed, "****" is output.

<Slope>

A value up to the fifth decimal point in ps/(nm² · km) unit.

When measurement cannot be performed, "****" is output.

<Total dispersion>

A value up to the second decimal point in ps/nm unit.

When measurement cannot be performed, "****" is output.

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDRSLT?	×	×	×	×	○

This command is disabled during OTDR or OLTS measurement.

CDSTS?

Reads the status during CD measurement mode.

Response : CDSTS { 1 | 2 | 3 | 4 | 5 }

- 1 : Fiber end detection is stopped (EDP)
- 2 : Detecting fiber end (EDS)
- 3 : CD measurement is stopped (CDP)
- 4 : Measuring CD (CDS)
- 5 : CD calculation screen (CDC)

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDSTS?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CDWAV? \square <Wavelength>

Reads the existence of waveform data during CD measurement.

<Wavelength>

Numeric value up to the third decimal point in μm unit.

Response : CDWAV { 0 | 1 }

- 0 : No waveform data
- 1 : Waveform data exists

Execution prohibitions :

	EDS	EDP	CDS	CDP	CDC
CDWAV?	○	○	○	○	○

This command is disabled during OTDR or OLTS measurement.

CMP \square { 0 }

Terminates waveform comparison.

Read the reference waveform by using the RRCL command to use the waveform comparison function.

0 : Waveform comparison Off

Query : CMP?

Response : CMP { 0 | 1 }

- 0 : Waveform comparison Off
- 1 : Waveform comparison On

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
CMP	×	×	×	○	○	×	○	×
CMP?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

CMPR $\{ 0 | 1 \}$

Sets file compression On/Off.

0 : File compression Off

1 : File compression On

Query : CMPR?

Response : CMPR { 0 | 1 }

Execution prohibitions : This command is disabled during OLTS measurement.

CON $\{ 0 | 1 \}$

Sets connection check function ON/OFF.

0 : Check OFF

1 : Check ON

Query : CON?

Response : CON { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
CON	×	×	×	○	○	○	○	×
CON?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
CON	×	○	×	○	○
CON?	○	○	○	○	○

This command is disabled during OLTS measurement.

CPY <ms, fs, md, fd>

Copies specified file.

<ms>: Media that original file exists.

0=Internal Memory

1=PCMCIA Drv1

2=FD

3=PCMCIA Drv2

<fs>: /full_path or sub_dir/file of the original file

<md>: Media to send copy.

Refer to "ms"

<fd>: /full_path or sub_dir/file to send copy.

fs, fd: Differentiate "directory/" and "file" with "/".

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
CPY	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
CPY	×	○	×	○	○

This command is disabled during OLTS measurement.

DAF $\lfloor \{ 0 | 1 | 2 \}$

Sets date display format.

0 : Day-month-year

1 : Month-day-year

2 : Year-month-day

Query : DAF?

Response : DAF { 0 | 1 | 2 }

Execution prohibitions : None

DATE

Set date. The date parameters (year, month and day) are set in the same sequence as the display format specified by the DAF command.

DATE <Day>, <Month>, <Year>

DATE <Month>, <Day>, <Year>

DATE <Year>, <Month>, <Day>

<Year> 1970 to 2038

<Month> 1 to 12

<Day> 1 to 31

Query : DATE?

Response : DATE <Day>, <Month>, <Year>

DATE <Month>, <Day>, <Year>

DATE <Year>, <Month>, <Day>

Execution prohibitions : None

3

A

B

C

D

E

F

H

I

L

M

O

P

R

S

T

U

V

W

DAT? [[<Data start distance>, <Data end distance>[,<Read skipping interval>]]

Reads waveform data.

<Data start distance>

Specify the distance value where the first data to be sent is.

<Data end distance>

Specify the distance value where the end data to be sent is.

Notes :

Distance unit is as follows :

(1) km and m distance units

The numeric value in meters is rounded to the three decimal point.

(2) kft and ft distance units

The numeric value in meters is converted to the feet at 1 m = 3.2808399 ft and the feet value is rounded to the three decimal point

(3) mile units

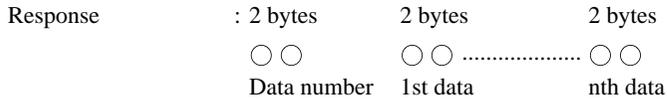
The numeric value in meters is converted to miles at 1 m = 0.0006213711922 miles and the mile value is rounded to six decimal places.

<Read skipping interval>

Designates Read skipping interval of output data with the number of points. No Read skipping exists (0), when omitted.

<Omitted form>

When a part which follows <Data start interval> is omitted, reads out the data from sampling start to the end.



<Data number>, <Data>

Both the data number and data are binary numbers.

One data item is expressed at 16 bits (2 bytes). One data item is divided into the 8 most significant bits and the 8 least significant bits. Which are output in sequence.

1 digit is equivalent to 0.001 dB.

[Example] 37.580 dB is expressed as 92CC (Hex).

$$37.580 \times 1000 = 37580$$

$$37580 \text{ (Dec)} \rightarrow 92CC \text{ (Hex)}$$

1st byte : 92 (Hex)

2nd byte : CC (Hex)

[Ex.] For -28.765 dB:
 $-28.765 \times 1000 = -28765$ (Dec) \rightarrow 8FA3 (Hex)
 The first byte : 8F (Hex)
 The second byte : A3 (Hex)
 The maximum values for plus and minus are 7FFF (Hex) and 8000 (Hex) respectively, while value exceeding this range is rounded to the individual limit.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
DFDAT?	×	×	×	①	①	×	①	×

- ① When the waveform comparison function is Off, an error occurs.
 When current waveform is not available while the waveform comparison function is On, an error occurs.

This command is disabled during OLTS or CD measurement.

DIFF? \square [**<Distance>**]

Reads the difference between the reference and current waveforms while the waveform comparison function is On.

<Distance>

Units for distance are as shown below:

- 1) When the unit is kilometer or meter
 Value rounded off the third decimal point in m unit.
- 2) When the unit is kilo-feet or feet
 3.2808399 feet converted to one meter and rounded off to the third decimal point.
- 3) When the unit is mile
 0.0006213711922 miles converted to one meter and rounded off to the sixth decimal point.

When this is omitted, the level difference at current marker position is returned.

Response : DIFF <Distance>, <Level difference>

<Level difference>

Output to the third decimal point in dB unit.

When measurement cannot be performed, "****" is output.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
DIFF?	×	×	×	①	×	×	①	×

- ① When the waveform comparison function is Off, "****" is output.

This command is disabled during OLTS or CD measurement.

DIR?

Reads directory information.

Response: DIR <File No.>
 [<File name>, <Size>, <Date>, <Time>,
 |
 | By number of files, up to 1100.
 |
 [, <File name>, <Size>, <Date>, <Time>,
]

<File name>

File name in MS-DOS format

<Size>

Unit: Byte

<Date>

Output in following format.

YY-MM-DD

<Time>

Output in following format

HH:MM

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
DIR?	×	×	×	○	○	×	○	×
	EDS	EDP	CDS	CDP	CDC			
DIR?	×	○	×	○	○			

This command is disabled during OLTS measurement.

DSA

Sets auto distance range.

This command sets the distance range automatically.

Query : DSA?

Response : DSA { 0 | 1 }
 0 : Not set automatically
 1 : Set automatically

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
DSA	×	×	×	○	○	○	○	×
DSA?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

DSR \square <Distance range>

Sets distance range.

<Distance range>

(a) km and m distance range units

1000 m
2500 m
5000 m
10000 m
25000 m
50000 m
100000 m
200000 m
250000 m
400000 m

(b) kft and ft distance range units

3280 ft
8200 ft
16400 ft
32800 ft
82000 ft
164000 ft
328100 ft
656200 ft
820000 ft
1312000 ft

(c) mile distance range units

0.62100 mile
1.55300 mile
3.10700 mile
6.21400 mile
15.53000 mile
31.07000 mile
62.14000 mile
124.28000 mile
155.34000 mile
248.54000 mile

Any of the above can be specified.

The settable distance range depends on the OTDR unit.

Some setting may not be possible depending on the combination with pulse width and the number of sampling data.

Query : DSR?

Response : DSR <Distance range>

DSR *** is output when the distance range is not valid.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
DSR	×	×	×	○	○	○	○	×
DSR?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

ERR?

Reads error information.

Response : ERR <Error information>

<Error information>

0 : No error

1 to 255 : Error number (See Error List.)

Execution prohibitions : None

Error List

Type	Contents	Error Code
Mismatching errors ERROR 1-19	Query does not match measurement conditions Example : LOS? (Loss measurement results query) at Auto measurement mode	1
	Received non-executable query when no waveform	15
Command errors ERROR 20-39	Received command or query in illegal format	20
	Command error	21
Execution errors ERROR 40-59	Abnormal parameter value	40
	Out-of-range (integer, negative value)	41
	Abnormal parameter data type (Specified real value in data that can only handle integer value)	42
	Specified other value that cannot be processed	43
Status errors ERROR 60-79	Command OK but does not match MW9076 status	60
	Received an invalid command during the OTDR mode.	61
	Received an invalid command during the OLTS mode.	62
	Received an invalid command during the light source mode.	63
	Received an invalid command during offset processing.	65
	Received the LD ON command when ALL is set for wavelength.	66
Unit errors ERROR 80-99	Received an invalid command during the CD mode.	67
	Plug-in unit not installed	80
	Received command or query not handled by unit	81
	Not supported parameters (distance range, pulse width, etc.)	82
	Received VIS command at system without Visible LD	83
Setting errors ERROR 100-119	Received an invalid command by a system without an optical switch.	84
	Received command that does not match setting conditions Example : HSF (Horizontal shift command) at full scale	100
	Received distance range that does not match the current pulse width	101
	Received pulse width that does not match the current distance range	102
	The attenuator cannot be set at the current pulse width	103
Special errors ERROR 120-139	Received non-executable when no waveform	115
	Printer not ready or cables not connected	120
	Received invalid command while printing	121
	Received invalid command in CW mode	122
	Received invalid command while accessing media	123
	Received invalid command while Visible LD ON	124
	Received Visible LD ON command during thermo alarm	125
	Received invalid command while recalling Print mode waveform	126
Received an invalid command during differential waveform display.	127	
Sequence errors ERROR 140-159	Received new command while waiting for next data request	140
	Received next data request after starting sequence	141
	Go to local] key pressed during sequence	142
Media errors ERROR160-179	Media not found	160
	Media unformatted	161
	File not found	162
	Media write protected	163
	Write error	164
	Read error	165
	Cannot format media	166
	File type incorrect in saving or in recalling	167
	Unit unable command	168
	Copy destination media same as copy origin media	168
FD specified at system without FD	170	

EVN?

Reads event measurement results.

EVN? <Event No.>

<Event No.>

Specifies event table No. from 1 to event No.

When omitted, the data for the currently-selected event No. is output.

Response : EVN <Event No.>, <Position>, <Splice loss value> ,
<Return loss value>, <Total loss value>, <Event type>,
<Fiber loss value>, <Error>

<Event No.>

Event table No. from 1 to event No.

<Position value>

Distance unit is as follows :

- (1) km and m distance units
The numeric value in meters is rounded to the three decimal point.
- (2) kft and ft distance units
The numeric value in meters is converted to feet at 1 m = 3.2808399 ft and the feet value is rounded to the three decimal point.
- (3) mile units
The numeric value in meters is converted to miles at 1 m = 0.0006213711922 miles and the mile value is rounded to six decimal places.

<Splice loss value>

The first character is the threshold information, and shown as the following table.

	Auto search	Fixed
A value that exceeds both warning level and threshold value	@	@
A value that exceeds warning level and below threshold value	@	@
A value that is below warning level but exceeds threshold value	“ ”	!
A value that is below both warning level and threshold value	(“ ”

The units are dB. 1 = 1 dB and the Value is output to 3 decimal places.

*** is output when measurement is impossible.

If the selected event is regarded as the far end, “END” is output.

<Return loss value>

- At return loss value :

Byte 1 is the saturation data, and shown as the following table.

	Auto search	Fixed
Exceeding warning level, and saturated	<	<
Exceeding warning level and threshold value, and not saturated	@	@
Exceeding warning level but below threshold value	@	@
Below warning level, and saturated	<	<
Below warning level and exceeds threshold value, and not saturated	“ ”	!
Below both warning level and threshold value	(“ ”

The units are dB. 1 = 1 dB and the value is output to 3 decimal places.
*** is output when measurement is impossible.

<Total loss value>

The units are dB and the value is output to the third decimal place.
*** is output when measurement is impossible.

<Event type>

Outputs Event type by following marks.

- N: Fusion event
- R: Reflection event
- E: Fiber end
- C: Group event
- S: Saturated event

<Fiber loss>

- 1) When distance unit is kilometer or meter;
Numeric value in dB/km as the unit should be rounded to three decimal places.
- 2) When distance unit is kilo-feet or feet;
Numeric value in dB/kft as the unit should be rounded to three decimal places.
- 3) When distance unit is mile;
Numeric value in dB/mi as the unit should be rounded to three decimal places.

Exceeding warning level, “ @ ”.

Below warning level, “ ”.

<Error>

Unit is dB and outputs to three decimal places.

“***” is output in case measurement is impossible.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
EVN?	×	×	×	○	○	×	×	×

This command is disabled during OLTS or CD measurement

FDL \square <File name>

Deletes file.

<File name>

File name in MS-DOS format

Note :

An error is returned when the specified file is not found at the media specified by MED. It may be necessary to wait some times before the format response is returned.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FDL	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
FDL	×	○	×	○	○

This command is disabled during OLTS measurement.

FIX \square { 0 | 1 }

Sets event table event search method.

0 : Auto search

1 : Fixed

Query : FIX?

Response : FIX { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FIX	×	×	×	○	○	×	①	×
FIX?	○	○	○	○	○	○	○	○

① (FIX 1) → (FIX 0) only

This command is disabled during OLTS or CD measurement

FMT \square [{ 0 | 1 | 2 | 3 }]

Formats media.

- 0 : INT memory
- 1 : PCMCIA Drv1
- 2 : FD
- 3 : PCMCIA Drv2

When the media is omitted, the media selected by MED becomes the target media.

While formatting in progress, the response is not returned before the formatting completion. Take care of the time out.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FMT	×	×	×	○	○	×	○	×
	EDS	EDP	CDS	CDP	CDC			
FMT	×	○	×	○	○			

This command is disabled during OLTS measurement.

FNC \square { 0 | 1 }

Sets manual measurement type.

- 0 : Splice & Return Loss
- 1 : Loss & Total Return Loss

Query : FNC?

Response : FNC { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FNC	×	×	×	×	×	○	○	×
FNC?	①	②	②	②	②	○	○	②

① The response is (FNC ***) when the measurement mode is Auto.

② The response is (FNC ***) .

This command is disabled during OLTS or CD measurement

FRD?

Reads file data.

Query: FRD? <File name>

<File name>

File name is in MS-DOS format.

2-byte code cannot be used.

Response: <Size (4-byte indication)> <File data>

<File data>

Binary data of the file specified to be read.

[Example] When 256 bytes file data transported.

1 st byte	2 nd byte	3 rd byte	4 th	5 th	6 th ...
00h	00h	01h	00h	??	?? ...

File size

File data

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FRD?	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
FRD?	×	○	×	○	○

This command is disabled during OLTS measurement.

<Restriction>

Valid only in ACK/NAC method.

FUL

Sets measurement mode, distance range, pulse width and auto-measurement averaging limits automatically.

Query : FUL?

Response : FUL { 0 | 1 }

0 : Not full auto

1 : Full auto

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FUL	×	×	×	○	○	○	○	×
FUL?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

FWT □ <m, f, data>

Sends file data.

<m>: media

0=Internal Memory

1=PCMCIA Drv1

2=FD

3=PCMCIA Drv2

<f>: /full_path or sub_dir/file

<data>

Binary data of the file specified to be sent.

[Example] When 256 bytes file data sent.

1 st byte	2 nd byte	3 rd byte	4 th	5 th	6 th ...
00h	00h	01h	00h	??	?? ...

File size

File data

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
FWT	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
FWT	×	○	×	○	○

This command is disabled during OLTS measurement.

<Restriction>

Only one file data can be sent at once.

Valid only in ACK/NAC method.

HDFG \lfloor { 0 | 1 | 2 }

Inputs the data flag of the header.

Use the HDR command to input other parts of the header.

0: BC (Installation)

1: RC (Repair)

2: OT (Other)

Query : HDFG?

Response : HDFG { 0 | 1 | 2 }

Execution prohibitions : This command is disabled during OLTS measurement.

HDR \lfloor [<Line No.>] '<Comment>'

Inputs the header.

Use the HDFG command to input the data flag..

<Line No.>

Specify the line number to be set with Comment (1 to 10).

When this is omitted, the next line to the one that set most previously.

<Comment>

A character string of up to 32 characters.

To input " " in Comment, type "\".

When this is omitted, Comment is cleared.

Query : HDR? [<Line No.>]

Response : HDR '<Comment>'

Execution prohibitions : This command is disabled during OLTS measurement.

HSC \lfloor <Horizontal scale value>

<Horizontal scale value>

Inputs value displayed at Distance Range/Horizontal Scale table.

Query : HSC?

Response : HSC <Horizontal scale value>

Distance Range/Horizontal Scale table

<Distance units km, m>

Distance	Horizontal Scale [m/div]
400 km	40000/25000/20000/10000/5000/2500/1000/500/250/100/50/25/10/5/2.5/1
250 km	25000/20000/10000/5000/2500/1000/500/250/100/50/25/10/5/2.5/1
200 km	20000/10000/5000/2500/1000/500/250/100/50/25/10/5/2.5/1
100 km	10000/5000/2500/1000/500/250/100/50/25/10/5/2.5/1
50 km	5000/2500/1000/500/250/100/50/25/10/5/2.5/1
25 km	2500/1000/500/250/100/50/25/10/5/2.5/1
10 km	1000/500/250/100/50/25/10/5/2.5/1
5 km	500/250/100/50/25/10/5/2.5/1
2.5 km	250/100/50/25/10/5/2.5/1
1 km	100/50/25/10/5/2.5/1

<Distance units kft, ft>

Distance	Horizontal Scale [ft/div]
1312400 ft	131200/82000/65600/32800/16400/8200/3280/1640/820/328/ 164/82/32.80/16.40/8.20/3.28
820520 ft	82000/65600/32800/16400/8200/3280/1640/820/328/164/82 /32.80/16.40/8.20/3.28
656200 ft	65600/32800/16400/8200/3280/1640/820/328/164/82/32.80/16.40/ 8.20/3.28
328100 ft	32800/16400/8200/3280/1640/820/328/164/82/32.80/16.40/8.20/3.28
164000 ft	16400/8200/3280/1640/820/328/164/82/32.80/16.40/8.20/3.28
82000 ft	8200/3280/1640/820/328/164/82/32.80/16.40/8.20/3.28
32800 ft	3280/1640/820/328/164/82/32.80/16.40/8.20/3.28
16400 ft	1640/820/328/164/82/32.80/16.40/8.20/3.28
8200 ft	820/328/164/82/32.80/16.40/8.20/3.28
3280 ft	328/164/82/32.80/16.40/8.20/3.28

3

A
B
C
D
E
F
H
I
L
M
O
P
R
S
T
U
V
W

Section 3 Commands

<Distance unit mi>

Distance	Horizontal Scale [mile/div]
248.5 mi	24.85400/15.53400/12.42800/6.21400/3.10690/1.55340/0.62140/0.31070/ 0.15530/0.06210/0.03110/0.01550/0.00620/0.00310/0.00155/0.00062
155.3 mi	15.53400/12.42800/6.21400/3.10690/1.55340/0.62140/0.31070/0.15530/ 0.06210/0.03110/0.01550/0.00620/0.00310/0.00155/0.00062
124.2 mi	12.42800/6.21400/3.10690/1.55340/0.62140/0.31070/0.15530/0.06210/ 0.03110/0.01550/0.00620/0.00310/0.00155/0.00062
62.14 mi	6.21400/3.10690/1.55340/0.62140/0.31070/0.15530/0.06210/0.03110/ 0.01550/0.00620/0.00310/0.00155/0.00062
31.07 mi	3.10690/1.55340/0.62140/0.31070/0.15530/0.06210/0.03110/0.01550/ 0.00620/0.00310/0.00155/0.00062
15.53 mi	1.55340/0.62140/0.31070/0.15530/0.06210/0.03110/0.01550/0.00620/ 0.00310/0.00155/0.00062
6.214 mi	0.62140/0.31070/0.15530/0.06210/0.03110/0.01550/0.00620/0.00310/ 0.00155/0.00062
3.107 mi	0.31070/0.15530/0.06210/0.03110/0.01550/0.00620/0.00310/0.00155/ 0.00062
1.553 mi	0.15530/0.06210/0.03110/0.01550/0.00620/0.00310/0.00155/0.00062
0.621 mi	0.06210/0.03110/0.01550/0.00620/0.00310/0.00155/0.00062

Executing prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
HSC	×	×	×	②	○	○	②	○
HSC?	①	○	○	③	○	○	③	○

- ① When Distance is Auto, the response becomes horizontal scale non-specifiable (HSC***).
- ② An execution error is returned when Distance is non-specifiable.
- ③ When Distance is unspecifiable, the response becomes horizontal scale unspecifiable (HSC***).

This command is disabled during OLTS or CD measurement.

HSF \square <Horizontal shift value>

<Horizontal shift value>

Distance units, IOR calibration distance data

- (1) km and m distance units
After correcting the data for the current IOR value, the numeric value in meters is truncated to three decimal place.
- (2) kft and ft distance units
After correcting the data for the current IOR value, the numeric value in meters is converted to feet at 1 m = 3.2808399 ft and the feet value is truncated to three decimal places.
- (3) mile units
After correcting the data for the current IOR value, the numeric value in meters is converted to miles at 1 m = 0.0006213711922 miles and the mile value is truncated to six decimal places.

The set value is calibrated according to the horizontal scale display resolution.

The Available range value of the horizontal shift is calculated in the following formula :

$$0 \text{ to } ((\text{Distance Range} - (\text{H-SCALE} \times 10)) \times 1.5 / (\text{IOR Value}))$$

Query : HSF?

Response : HSF <Horizontal shift value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
HSF	×	×	×	②	○	○	②	○
HSF?	①	○	○	③	○	○	③	○

- ① When Distance is Auto, the response becomes horizontal shift non-specifiable (HSF ***).
- ② An execution error is returned when Distance is non-specifiable.
- ③ When Distance is unspecifiable, the response becomes horizontal shift unspecifiable (HSF ***).

This command is disabled during OLTS or CD measurement.

HZM \square <zoom code>

Zooms horizontal axis. The <Zoom code> for each distance range is as shown below.

Zoom code Distance Range	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400 km	40 k	25 k	20 k	10 k	5 k	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1
250 km	25 k	20 k	10 k	5 k	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1	-
200 km	20 k	10 k	5 k	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1	-	-
100km	10 k	5 k	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1	-	-	-
50 km	5 k	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1	-	-	-	-
25 km	2.5 k	1 k	500	250	100	50	25	10	5	2.5	1	-	-	-	-	-
10 km	1 k	500	250	100	50	25	10	5	2.5	1	-	-	-	-	-	-
5 km	500	250	100	50	25	10	5	2.5	1	-	-	-	-	-	-	-
2.5 km	250	100	50	25	10	5	2.5	1	-	-	-	-	-	-	-	-
1 km	100	50	25	10	5	2.5	1	-	-	-	-	-	-	-	-	-

Query : HZM?

Response : HZM <Zoom code>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
HZM	×	×	×	②	○	○	②	○
HZM?	①	○	○	③	○	○	③	○

- ① When Distance is Auto, the response becomes horizontal scale non-specifiable (HZM***).
- ② An execution error is returned when Distance is non-specifiable.
- ③ When Distance is unspecifiable, the response becomes horizontal scale unspecifiable (HZM***).

This command is disabled during OLTS or CD measurement.

ID? □ { 0 | 1 | 2 }

Reads out model name of a unit designated by the parameter.

- 0 : Model name of OTDR main frame.
- 1 : Model name of display unit.
- 2 : Model name of internal Optical Channel Selector.

Response: : ID <Model Name>

<Model name> : A model name consists of 12 characters in maximum.

Execution Prohibitions : None

INI

Initialization :

Recalls the first DFN information, and sets system condition to the last power-on.

The RS232C and Remote/Local status are not initialized.

Execution prohibitions : None

IOR □ <IOR value>

Sets IOR (Index of Refraction).

<IOR value>

Valid up to six decimal places from 1.400000 to 1.699999

Query : IOR?

Response : IOR <IOR value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
IOR	×	×	×	○	○	○	○	○
IOR?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

3
A
B
C
D
E
F
H
I
L
M
O
P
R
S
T
U
V
W

LD \square { 0 | 1 }

Starts sweep.

- 0 : Stops sweep (LD OFF)
- 1 : Starts sweep (LD ON)

Query : LD?

Response : LD { 0 | 1 }
 0 : Sweeping Off (LD OFF)
 1 : Sweeping On (LD ON)

Execution prohibitions : This command is disabled during OLTS or CD measurement.

LFNC \square { 0 | 1 | 2 }

Selects the OTDR/OLTS/CD measurement functions.

- 0 : OTDR measurement
- 1 : OLTS measurement
- 2 : CD measurement

Query : LFNC?

Response : LFNC { 0 | 1 | 2 }

Execution prohibitions : None

LIT \square { 0 | 1 }, <Distance range>, <Pulse width>

Sets CW light mode ON/OFF.

- 0 : Sets CW mode OFF
 <Distance range> and <Pulse width> parameters not appended
- 1 : Sets CW light mode ON

Query : LIT?

Response : LIT 0 CW mode OFF
 LIT 1, <Distance range>, <Pulse width> CW mode ON

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
LIT	×	×	×	○	○	×	○	×
LIT?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

<Restrictions>

Commands other than CW mode OFF (LIT0) and CW Mode query (LIT?) are invalid during the CW mode.

LLLD □ { 0 | 1 }

Switches the light source ON/OFF.

0: Sets the light source Off.

1: Sets the light source On.

Query : LLLD?

Response : LLLD { 0 | 1 }

Execution prohibitions : This command is invalid during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the light source results in an error.

LLMO □ <Modulation>

Sets the light source and the power meter modulation frequency.

<Modulation>

0 : Continuous light emission (CW)

270 : 270 Hz

1000 : 1 kHz

2000 : 2 kHz

Query : LLMO?

Response : LLMO <Modulation frequency>

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the light source or the power meter results in an error.

LLOS?

Reads the loss value for the power meter.

Response : LLOS <Loss value>

<Loss value>

A value to the second decimal point in dB unit.

When the value is out of the measurement range, "***" is output.

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LLWL \square <Wavelength>

Switches the light source and the power meter wavelength.

<Wavelength>

Numeric value in μm unit.

Numeric value rounded to three decimal points.

Query : LLWL?

Response : LLWL <Wavelength>

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the light source or the power meter results in an error.

LOS?

Reads loss measurement results.

Response : LOS <loss value>, <Distance value>, <Fiber loss value>

<Loss value>

The result is output in dB units to the third decimal place.

*** is output when measurement is not possible.

<Distance value>

Distance units, IOR calibration distance data

(1) km and m distance units

After correcting the data for the current IOR value, the numeric value in meters is truncated to four decimal places.

(2) kft and ft distance units

After correcting the data for the current IOR value, the numeric value in meters is converted to feet at $1\text{ m} = 3.2808399\text{ ft}$ and the feet value is truncated to four decimal places.

(3) mile units

After correcting the data for the current IOR value, the numeric value in meters is converted to miles at $1\text{ m} = 0.0006213711922\text{ miles}$ and the mile value is truncated to four decimal places.

<Fiber loss value>

(a) The units are dB/km when the distance units are km and m.

(b) The units are dB/kft when the distance units are kft and ft.

(c) When the distance unit is mile

Unit: dB/mi

The result output to three decimal places. *** is output when measurement is impossible.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
LOS?	×	×	×	×	×	①	①	×

- ① When the manual measurement type (FNC) is not Loss, and "***" is returned.

This command is disabled during OLTS or CD measurement.

LPAL \square <Average count>

Sets the average count for the power meter.

<Average count>

Unit : count (2 to 100)

Query : LPAL?

Response : LPAL <Average count>

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LPAV \square { 0 | 1 }

Sets averaging for the power meter On/Off.

0 : Averaging Off

1 : Averaging On

Query : LPAV?

Response : LPAV { 0 | 1 }

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LPOF?

Performs offset correction of the power meter.

Response : LPOF { 0 | 1 }
0 : Offset is terminated normally.
1 : An error occurred during offset.

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LPOW?

Reads out the absolute value of the power meter.

Response : LPOW <level>

<level>

Value up to the second decimal point in dBm unit.

When power exceeds the specified range, OVER returns.

When power is under the range, UNDER returns.

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LPWC □ <Wavelength>

Sets the wavelength for wavelength sensitivity correction of the power meter.
Sets the wavelength for each wavelength set by using the LLWL command.

<Wavelength>

A value in 0.005 μm step.

- Before software version 4.3
 - 1310 nm: 1.250 to 1.350 μm
 - 1550 nm: 1.450 to 1.650 μm
 - 1625 nm: 1.450 to 1.650 μm
- From software version 4.4
 - 1.250 to 1.350 μm, 1.450 to 1.650 μm

Query : LPWC?

Response : LPWC <Wavelength>

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

LREF □ <Reference value>

Sets the reference level for the power meter.

<Reference value>

A value up to the second decimal point in dBm unit.
(-99.99 to 99.99 dBm)

Query : LREF?

Response : LREF <Reference value>

Execution prohibitions : This command is disabled during OTDR or CD measurement.

<Restriction>

Executing this command on a system without the power meter results in an error.

MED \lfloor { 0 | 1 | 2 | 3 }

Selects the media.

- 0 : INT memory
- 1 : PCMCIA Drv1
- 2 : FD
- 3 : PCMCIA Drv2

Query : MED?

Response : MED { 0 | 1 | 2 | 3 }

Execution prohibitions : This command is disabled during OLTS measurement.

MES \lfloor { 0 | 1 }

Sets measurement mode.

- 0 : Manual measurement mode
- 1 : Auto measurement mode

Query : MES?

Response : MES { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
MES	×	×	×	○	○	○	○	×
MES?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

MKDR \lfloor <Path>

Creates directory.

<Path>

- 1) /full_path
Specify the absolute path in media already selected with MED command.
- 2) Sub directory
Specify the sub directory under the current directory.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
MKDR	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
MKDR	×	○	×	○	○

This command is disabled during OLTS measurement.

MKP \square **<Marker No.>**, **<Distance>**

Moves marker.

<Marker No.>

(a) LOSS

- 0 : * marker
- 1 : X marker

(b) Splice & Return LOSS or Event Editing

- 0 : * marker
- 1 : X1 marker
- 2 : X2 marker
- 3 : X3 marker
- 4 : X4 marker
- 5 : ∇ marker

<Distance>

Distance units, IOR calibration distance data

(1) km and m distance units

After correcting the data for the current IOR value, the numeric value in the meters is truncated to three decimal places.

(2) kft and ft distance units

After correcting the data for the current IOR value, the numeric value in meter is converted to feet at $1\text{ m} = 3.2808399\text{ ft}$ and the feet value is truncated to three decimal places.

(3) mile units

After correcting the data for the current IOR value, the numeric value in meters is converted to miles at $1\text{ m} = 0.0006213711922\text{ miles}$ and the mile value is truncated to six decimal places.

Set values are corrected using display resolution for the display scale.

The X and ∇ markers cannot be set to overtake the * marker during Splice&Return Loss or event editing.

Query : MKP? [<Marker No.>]

<Marker No.>

(a) LOSS

- 0 : * marker
- 1 : \times marker

(b) Splice & Return Loss or Auto zoom or Event Editing

- 0 : * marker
- 1 : \times 1 marker
- 2 : \times 2 marker
- 3 : \times 3 marker
- 4 : \times 4 marker
- 5 : ∇ marker

When the marker No. is omitted, the position of all markers is returned.

Response :

- (a) Marker No. omitted
MKP <Marker No. n>, <1st marker distance>,<nth marker distance>
- (b) Marker No. specification
MKP <Specified marker distance>, <Specified marker level>

<Specified marker level value>

The units are dB

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
MKP	×	×	×	×	×	○	②	○
MKP?	①	①	①	①	○	○	③	○

- ① The response is No. Marker (MKP ***).
- ② An execution error is returned when the distance cannot be set.
- ③ The response is No Marker (MKP***) when the distance cannot be set.

This command is disabled during OLTS or CD measurement.

MKS \square <Marker No.>

Selects marker.

<Marker No.>

- (a) LOSS
 - 0 : * marker
 - 1 : X marker
- (b) Splice & Return Loss or Event edit
 - 0 : * marker
 - 1 : X1 marker
 - 2 : X2 marker
 - 3 : X3 marker
 - 4 : X4 marker
 - 5 : ∇ marker

Query : MKS?

Response : MKS <Marker No.>

Execution prohibition :

	AS	AA	ES	ET	AZ	MS	SP	EE
MKS	×	×	×	×	×	○	②	○
MKS?	①	①	①	①	①	○	③	○

- ① The response is No Selected Marker (MKS***).
- ② An execution error is returned when the distance cannot be set.
- ③ The response is No Selected Marker (MKS***) when the distance cannot be set.

This command is disabled during OLTS or CD measurement.

MOV \square **<m, fs, fd>**

Changes name of the file or directory.

<m>: select media

0=Internal Memory

1=PCMCIA Drv1

2=FD

3=PCMCIA Drv2

<fs>: /full_path or sub_dir/file of the original file/directory.

<fd>: /full_path or sub_dir/file of the new file/directory.

fs, fd: Differentiate "directory/" and "file" with "/".

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
MOV	×	×	×	○	○	×	○	×

	EDS	EDP	CDS	CDP	CDC
MOV	×	○	×	○	○

This command is disabled during OLTS measurement.

OFS \square <Relative distance>

Sets the relative distance.

<Relative distance>

Units for distance are as shown below:

- 1) When the unit is kilometer or meter
Value rounded off to the third decimal point in m unit.
- 2) When the unit is kilo-feet or feet
3.2808399 feet converted to one meter and rounded off to the third decimal point.
- 3) When the distance unit is mile
0.0006213711922 miles converted to one meter and rounded off to the sixth decimal point.

Query : OFS?

Response : OFS <Relative distance>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
OFS	×	×	×	②	○	○	②	×
OFS?	①	○	○	③	○	○	③	○

- ① Response : "OFS ***"
- ② When the distance is not fixed, an execution error occurs.
- ③ Response for when the distance is not fixed is "OFS ***".

This command is disabled during OLTS or CD measurement.

PLA

Sets pulse width automatically.

Automatically sets the pulse width.

Query : PLA?

Response : PLA { 0 | 1 }

0: Automatic setting Off.

1: Automatic setting On.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
PLA	×	×	×	○	○	○	○	×
PLA?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

PLS □ <Pulse width>

Sets pulse width.

<Pulse width>

5 ns

10 ns

20 ns

50 ns

100 ns

500 ns

1000 ns

2000 ns

4000 ns

10000 ns

20000 ns

The pulse width setting depends on the OTDR unit. There may be some combinations of pulse width and distance range that cannot be set.

Query : PLS?

Response : PLS <Pulse width>

PLS □ ***is output when the pulse width is not valid.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
PLS	×	×	×	○	○	○	○	×
PLS?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

RCL \square <File name>

Reads files on media previously selected with the MED command.

Query : RCL?

Response : RCL <File name>

Note:

An error is returned when the specified file is not found on the media selected by MED.

The subject directory is a current directory.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
RCL	×	×	×	○	○	×	○	×
RCL?	①	①	①	①	①	①	①	①

	EDS	EDP	CDS	CDP	CDC
RCL	×	○	×	○	○
RCL?	×	①	×	①	①

① Response for non-recall waveform is "RCL ***".

This command is disabled during OLTS measurement.

REN \square { 0 | 1 }

Sets remote/local control.

0 : Sets Local status

1 : Remote status

Query : REN?

Response : REN { 0 | 1 }

0 : Local status

1 : Remote status

After receiving "REN?", the remote status is always set.

Accordingly, only 1 is returned.

Execution prohibitions : None

RES $\{ 0 | 1 | 2 \}$

Sets up the number of sampling data.

0: Quick (Approx. 5,000 points)

1: Normal (Approx. 25,000 points)

2: High (Approx. 50,000 points)

Query : RES?

Response : RES { 0 | 1 | 2 }

Execution prohibitions:

	AS	AA	ES	ET	AZ	MS	SP	EE
RES	×	×	×	○	○	×	○	×
RES?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

<Restrictions>

- Setting to High is not available when distance range is 1km.

RLS $\{ 0 | 1 \}$

Sets the reflection type.

0: Return loss

1: Height

Query : RLS?

Response : RLS { 0 | 1 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
RLS	×	×	×	○	○	○	○	×
RLS?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.

RRCL \square <File name>

Reads a file in the media selected by using the MED command in advance as the reference waveform and sets the waveform comparison function On.

Use the CMP command to set the waveform comparison function Off.

Query : RRCL?

Response : RRCL <File name>

Note:

When the specified file is not exists on the media selected by using the MED command, an error occurs.

The current directory is the target directory for this command.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
RRCL	×	×	×	○	○	×	○	×
RRCL?	①	①	①	①	①	①	①	①

① Response when waveform comparison is not performed is "RRCL ***".

This command is disabled during OLTS or CD measurement.

RST

Resets MW9076.

Execution prohibitions : None

SAV <File name>

Saves file to media selected previously with MED. If a file of the same name exist, and overwrites the file.

<File name>

MS-DOS format file name

However, 2-byte code and katakana cannot be used.

The lower case characters specified will be changed into upper case characters.

When the extension after the is omitted, the extension becomes on the file type set in the data save format.

The extension entered will be ignored, because the extension is fixed depending on the file type, as follows.

In case it's the analysis type, is appended.

In case it's the standard, and standardV2 type, is appended.

In case it's the CD type, is appended.

Note:

It may take some times until the Format Response is returned.

The object directory is the current directory.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
SAV	×	×	×	○	○	×	○	×
	EDS	EDP	CDS	CDP	CDC			
SAV	×	×	×	○	○			

This command is disabled during OLTS measurement.

SNO? { 0 | 1 | 2 }

Reads out Serial number of a unit designated by the parameter.

0: Serial number of OTDR main frame

1: Serial number of display unit

2: Serial number of internal Optical channel selector

Response : SNO <Serial number>
 <Serial number>: Serial number consists of 12 characters in maximum.
 SNO 0 is returned when Serial number is not indicated.

Execution Prohibitions : None

SOSW \square <Channel number>

<Channel number>

Sets up Channel number of the selected Optical channel selector.

<Channel number>: Number of the channel that can be selected by Optical channel selector connected.

Query: : SOSW?

Response : SOSW \square <Channel number>

Execution Prohibitions

	AS	AA	ES	ET	AZ	MS	SP	EE
SOSW	×	×	×	○	○	○	○	×
SOSW?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
SOSW	×	○	×	○	○
SOSW?	○	○	○	○	○

SRL?

Splice & Return Loss Measurement Results

Response : SRL <Splice loss value>, <Return loss value>,
<Fiber loss (X1-X2) value>,
<Fiber loss (X3-X4) value>

<Splice loss value>

This result is output to the third decimal place in dB units.

*** is output when measurement is impossible.

<Return loss value>

The 1st character indicates the saturation information. The '<' symbol indicates that it is saturated. A space prefix indicates that it is unsaturated.

The value is output to the third decimal place in dB units.

*** is output when measurement is impossible.

Example : Saturate "<15.873"
Unsaturated " 45.952"

<Fiber loss (X1-X2) value>, <Fiber loss (X3-X4) value>

(a) The units are dB/km when the distance units are km and m.

(b) The units are dB/kf when the distance units are kf and ft.

(c) When the distance unit is mile

Unit: dB/mi

The result is output to three decimal places. *** is output when measurement is impossible.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
SRL?	×	×	×	×	×	①	①	○

① "***" is returned when the manual measurement type (FNC) is Loss & Total Return Loss.

This command is disabled during OLTS or CD measurement.

STR $\{ 0 | 1 \}$

Starts sweep.

0 : Stop sweep (LD OFF)

1 : Start sweep (LD ON)

Query : STR?

Response : STR { 0 | 1 }

0 : Sweep stopped (LD OFF)

1 : Sweeping (LD ON)

Execution prohibitions : This command is disabled during OLTS or CD measurement.

STS?

Status

Reads MW9076 status.

Response : STS <Status>

1 : Auto setting, Active fiber checking, Connection checking

2 : Auto measurement sweeping

3 : Auto searching

4 : Displaying event table

5 : Displaying Auto zoom

6 : Manual measurement sweeping

7 : Manual measurement stopped

8 : ---

9 : Editing event

Execution prohibitions : This command is disabled during OLTS or CD measurement.

SVF $\{ 0 | 2 | 3 | 4 \}$

File save format

0: Analysis format

2: Standard format

3: Standard V2 format

4: CD format

Query : SVF?

Response : SVF { 0 | 2 | 3 | 4 }

Execution prohibitions : This command is disabled during OLTS measurement.

TDIF \square **<Hour>**

Sets the difference to the standard time.

<Hour>

-12 to 12

Query : TDIF?

Response : TDIF <Hour>

Execution prohibitions : None

THF \square **<Threshold value>**

Sets fiber end threshold values.

<Threshold value>

The Units are dB and the setting range is 1 to 99 dB (1 dB step)

Query : THF?

Response : THF <threshold value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
THF	×	×	×	○	○	①	①	×
THF?	○	○	○	○	○	○	○	○

① When Event is not fixed, the setting becomes valid from the next Auto measurement.

This command is disabled during OLTS or CD measurement.

THR \square **<Threshold value>**

Sets return loss threshold value.

<Threshold value>

dB units

The setting range is 20.0 to 60.0 dB. (0.1 dB step)

Query : THR?

Response : THR <Threshold value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
THR	×	×	×	○	○	①	①	×
THR?	○	○	○	○	○	○	○	○

① The setting is valid from the next Auto measurement.

This command is disabled during OLTS or CD measurement.

THS \square <Threshold value>

Sets slice loss threshold value.

<Threshold value>

dB units

The setting range is 0.01 to 9.99 dB (0.01 dB step)

Query :THS?

Response : THS <Threshold value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
THS	×	×	×	○	○	①	①	×
THS?	○	○	○	○	○	○	○	○

① When Event is not fixed, the setting becomes valid from the next Auto measurement.

This command is disabled during OLTS or CD measurement.

TIME \square <Hour>, <Minute>

Sets time.

<Hour> 0 to 23, (24-hour display)

<Minute> 0 to 59

Query : TIME?

Response : TIME <Hour>, <Minute>

Execution prohibitions : None

TIT \square <Title>

Inputs the title.

<Title>

A character string of up to 32 characters.

When this is omitted, the title is cleared.

Query : TIT?

Response : TIT <Title>

Execution prohibitions : This command is disabled during OLTS measurement.

TOSW □ <Optical channel selector>

Sets up Optical channel selector in connection.

<Optical channel selector>: Describes the number that corresponds to the following formats.

- 0 : MU960001A
- 1 : MU960002A
- 11 : MN9662A
- 12 : MN9664A
- 13 : MN9668A

Query : TOSW?

Response : TOSW<Optical channel selector>
 A number corresponding to the above formats is applied to <Optical channel selector>.
 When the optical channel selector is not connected, "99" is output.

Execution Prohibitions

	AS	AA	ES	ET	AZ	MS	SP	EE
TOSW	×	×	×	○	○	×	○	×
TOSW?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
TOSW	×	○	×	○	○
TOSW?	○	○	○	○	○

TRL?

Reads total return loss measurement results.

Response : TRL <Total return loss value>
 <Total return loss value>

The first character indicates the saturation information.

The saturation is indicated by the following symbols.

'<' Saturated

' ' (space) Unsaturated

In the measurement result, the value is output to three decimal places in unit of dB.

*** is output when measurement is impossible.

Example

Saturated data “< 15.870”

Unsaturated data “ 45.955”

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
TRL?	×	×	×	×	×	×	①	×

① An error is returned when the manual measurement type (FNC) is not Loss and Total return loss.

This command is disabled during OLTS or CD measurement.

UNL $\{ 0 | 1 | 2 | 3 | 4 \}$

Sets distance units.

- 0 : Kilometers
- 1 : Meter
- 2 : Kilofeet
- 3 : Feet
- 4 : Miles

Query : UNL?

Response : UNL { 0 | 1 | 2 | 3 | 4 }

Execution prohibitions : This command is disabled during OLTS or CD measurement.

3

A

B

C

D

E

F

H

I

L

M

O

P

R

S

T

U

V

W

VER? [0 | 1 | 2 | 3]

Reads out data format and firmware version of the unit designated by the parameter.

- 0 : Data format version of OTDR main frame
- 1 : Data format version of display unit.
- 2 : Data format version of internal Optical channel selector.
- 3 : OTDR firmware version

Response : <Version>

<Version>: **.xx

** indicates a major version consisting of within 2 characters.
 XX indicates a minor version consisting of within 2 characters.

Execution Prohibitions : None

VIS [0 | 1 | 3]

Controls visible light source.

- 0 : OFF
- 1 : ON
- 3 : Blinking

Query : VIS?

Response : VIS { 0 | 1 | 2 | 3 }

- 0 : OFF
- 1 : ON
- 2 : Thermo-alarm
- 3 : Blinking

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
VIS	×	×	×	○	○	×	○	×
VIS?	○	○	○	○	○	○	○	○

	EDS	EDP	CDS	CDP	CDC
VIS	×	○	×	○	○
VIS?	○	○	○	○	○

<Restrictions>

- 1) An error is returned when the system has no visible light source.

VSC □ <Vertical scale value>

Sets vertical scale value.

<Vertical scale Value>

dB units

15.0 dB/div

10.0 dB/div

5.0 dB/div

2.5 dB/div

1.0 dB/div

0.5 dB/div

0.25 dB/div

Any of the above value can be set.

15.0 dB/div can be selected only when the measuring mode is Auto.

Query : VSC?

Response : VSC <Vertical scale value>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
VSC	×	×	×	②	○	○	②	○
VSC?	①	○	○	③	○	○	③	○

- ① The response is Vertical Scale Unsettable (VSC ***) when Distance is Auto.
- ② An execution error is returned when Distance is unsettingtable.
- ③ The response is Vertical Scale Unsettable (VSC ***) when Distance is unsettingtable.

This command is disabled during OLTS or CD measurement.

VSF \square <Vertical shift value>

Sets vertical shift value.

<Vertical shift value>

dB units (Numeric value rounded to three decimal points.)

The setting is calibrated according to the vertical scale movement resolution.

See (Vertical scale/movement response table).

The shift range available is as follows.

Manual mode : 0 to (65 dB – (Vertical Scale) × 5)

Auto mode : 0 to (65 dB – (Vertical Scale) × 4)

Query : VSF?

Response : VSF <Vertical shift>

Vertical scale/movement response table

V-scale (dB/div)	Movement (dB)
15.0	0.3
10.0	0.2
5.0	0.1
2.5	0.05
1.0	0.02
0.5	0.01
0.25	0.005

15.0 dB/div can be selected only when the measuring mode is Auto.

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
VSF	×	×	×	②	○	○	②	○
VSF?	①	○	○	③	○	○	③	○

- ① The response is vertical shift Unsettable (VSF ***) when Display is Auto.
- ② An execution error is returned when Distance is unsettable.
- ③ The response is Vertical shift Unsettable (VSF ***) when Distance is Unsettable.

This command is disabled during OLTS or CD measurement.

VZM \square { 0 | 1 | 2 | 3 | 4 | 5 | 6 }

Zooms vertical scale.

0	: 10.0	dB/div
1	: 5.0	dB/div
2	: 2.5	dB/div
3	: 1.0	dB/div
4	: 0.5	dB/div
5	: 0.25	dB/div
6	: 15.0	dB/div

15.0 dB/div can be selected only when the measuring mode is Auto.

Query : VZM?

Response : VZM { 0 | 1 | 2 | 3 | 4 | 5 | 6 }

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
VZM	×	×	×	②	○	○	②	○
VZM?	①	○	○	③	○	○	③	○

- ① The response is vertical shift Unsettable (VZM ***) when Display is Auto.
- ② An execution error is returned when Distance is unsettable.
- ③ The response is Vertical shift Unsettable (VZM ***) when Distance is Unsettable.

This command is disabled during OLTS or CD measurement.

WAV?

Reads existence of waveform data during OTDR measurement.

Response : WAV { 0 | 1 }
 0 : No waveform data
 1 : Waveform data exists

Execution prohibitions : This command is disabled during OLTS or CD measurement.

WLAVL \square { 0 | 1 }, <Warning level>

Sets the warning threshold for average loss of the wavelength currently selected.

0 : Warning level Off
 1 : Warning level On

<Warning level>

Unit : dB
 Setting range : 0.01 to 10.00 dB (in 0.01 dB step)

Query : WLAVL?

Response : WLAVL { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLAVL	×	×	×	○	○	①	①	×
WLAVL?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLFLS \square { 0 | 1 }, <Warning level>

Sets the warning threshold for fiber loss of the wavelength currently selected.

0 : Warning level Off
 1 : Warning level On

<Warning level>

Unit : dB
 Setting range : 0.01 to 10.00 dB (in 0.01 dB step)

Query : WLFLS?

Response: WLFLS { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLFLS	×	×	×	○	○	①	①	×
WLFLS?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLHGT \square { 0 | 1 }, <Warning level>

Sets the warning threshold for height of the wavelength currently selected.

0 : Warning level Off

1 : Warning level On

<Warning level>

Unit: dB

Setting range: 1.0 to 20.0 dB (in 0.1 dB step)

Query : WLHGT?

Response : WLHGT { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLHGT	×	×	×	○	○	①	①	×
WLHGT?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLRLS \square { 0 | 1 }, <Warning level>

Sets the warning threshold for return loss of the wavelength currently selected.

0 : Warning level Off

1 : Warning level On

<Warning level>

Unit: dB

Setting range: 10.0 to 50.0 dB (in 0.1 dB step)

Query : WLRLS?

Response : WLRLS { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLRLS	×	×	×	○	○	①	①	×
WLRLS?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLS \square <Wavelength>

Selects wavelength.

<Wavelength>

μm units (Numeric value rounded to three decimal points.)

Query : WLS? { [0] | 1 }
 0 : Request current wavelength
 1 : Request all select wavelengths

Response : WLS <Wavelength>
 WLS <Wavelength NO. n>, <Wavelength 1>, ..., <Wavelength n>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLS	×	×	×	○	○	○	○	×
WLS?	○	○	○	○	○	○	○	○

This command is disabled during OLTS or CD measurement.
 However, "WLS? 1" can be executed during OLTS measurement.

WLSPN \square { 0 | 1 }, <Warning level>

Sets the warning threshold for non-reflection splice loss of the wavelength currently selected.

0 : Warning level Off
 1 : Warning level On

<Warning level>

Unit: dB

Setting range: 0.10 to 10.00 dB (in 0.01 dB step)

Query : WLSPN?
 Response : WLSPN { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLSPN	×	×	×	○	○	①	①	×
WLSPN?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.
 This command is disabled during OLTS or CD measurement.

WLSPR \square { 0 | 1 }, <Warning level>

Sets the warning threshold for reflection splice loss of the wavelength currently selected.

0 : Warning level Off

1 : Warning level On

<Warning level>

Unit: dB

Setting range: 0.10 to 10.00 dB (in 0.01 dB step)

Query: WLSPR?

Response: WLSPR { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLSPR	×	×	×	○	○	①	①	×
WLSPR?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLTLS \square { 0 | 1 }, <Warning level>

Sets the warning threshold for total loss of the wavelength currently selected.

0 : Warning level Off

1 : Warning level On

<Warning level>

Unit : dB

Setting range: 0.1 to 60.0 dB (in 0.1 dB step)

Query : WLTLS?

Response : WLTLS { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLTSL	×	×	×	○	○	①	①	×
WLTLS?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

WLTRL [{ 0 | 1 }, <Warning level>

Sets the warning threshold for total return loss of the wavelength currently selected.

- 0 : Warning level Off
- 1 : Warning level On

<Warning level>

Unit : dB

Setting range: 10.0 to 50.0 dB (in 0.1 dB step)

Query : WLTRL?

Response : WLTRL { 0 | 1 }, <Warning level>

Execution prohibitions :

	AS	AA	ES	ET	AZ	MS	SP	EE
WLTRL	×	×	×	○	○	①	①	×
WLTRS?	○	○	○	○	○	○	○	○

① This setting is enabled after the next automatic measurement.

This command is disabled during OLTS or CD measurement.

MW9076 Series

Optical Time Domain Reflectometer
Serial Interface

Operation Manual



MW9076 Series **Optical Time Domain Reflectometer Serial Interface Operation Manual**



ANRITSU CORPORATION 5-10-27, Minamiazabu, Minato-ku, Tokyo 106-8570 Japan / Phone: 81-3-3446-1111