MP2100A BERTWave /
MP2101A BERTWave PE/
MP2102A BERTWave SS
Remote Control
Operation Manual
(Native)

Third Edition

- **For safety and warning information, please read this manual before attempting to use the equipment.**
- **Additional safety and warning information is provided within the MP2100A BERTWave Operation Manual. Please also refer to this document before using the equipment.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

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Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

WARNING This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

MP2100A/MP2101A/MP2102A
BERTWave
Remote Control Operation Manual (Native)

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Notes On Export Management

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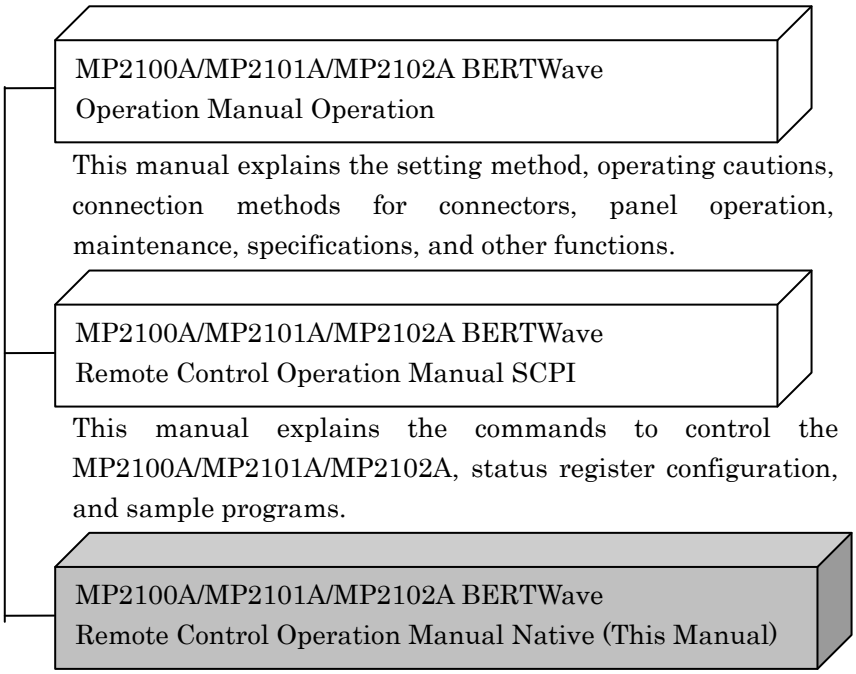
About This Manual

The manuals for the MP2100A/MP2101A/MP2102A BERTWave are configured in three parts.



This manual explains the setting method, operating cautions, connection methods for connectors, panel operation, maintenance, specifications, and other functions.

This manual explains the commands to control the MP2100A/MP2101A/MP2102A, status register configuration, and sample programs.

This manual explains the commands which allow the use of remote interface software for previous Anritsu pulse pattern generator and error detector models with the MP2100A/MP2101A/MP2102A BERTWave.

This manual explains the remote control commands. The remote control commands explained in this manual are the commands compatible with the previous Anritsu products (this command calls the Native command.).

This operation manual assumes the reader has the following information:

- MP2100A/MP2101A/MP2102A BERTWave Operation Manual Operation and Chapter 2 of the MP2100A/MP2101A/MP2102A BERT Wave Remote Control Operation Manual SCPI

For the connection of the power source and peripheral devices, panel operation, and maintenace, refer to the following manual:

MP2100A/MP2101A/MP2102A BERTWave Operation Manual Operation (M-W3349AE)

Table of Contents

Table of Command

Chapter 1 Outline

This section explains the usage and format of the Native command.

Introduction of Native Command

Native Command Usage Purpose

The purpose of the Native command is to allow use of remote interface software for previous Anritsu pulse pattern generator and error detector models with the MP2100A/MP2101A/MP2102A BERTWave.

Native Command Format

The Native command is configured by the string of ASCII code.
For the Native command format, refer to 2.5 Message Format in the MP2100A/MP2101A/MP2102A BERTWave Remote Control Operation Manual for SCPI.

Channel Setting Method

When using the pulse pattern generator/ error detector with two channels, the channel to be controlled is set using :MODule:ID command before executing the Native command.

Example of Use

When controlling the PPG/ED_1ch:
```
:MOD:ID 1
```
When controlling the PPG/ED_2ch:
```
:MOD:ID 2
```
When querying the currently controlled channel:
```
:MOD:ID?
```

For details on :MODule:ID, refer to the MP2100A/MP2101A/MP2102A BERTWave Remote Control Operation Manual for SCPI.

Chapter 2 Message Details

This chapter describes the message details of remote control commands for MP2100A/MP2101A/MP2102A.

2.1 Description of Message Explanation

The following table shows the rules for describing messages.

Table 2.1-1 Symbols for Describing Messages

Symbols	Usage
<>	Parameters in angled bracket are input by the programmer.
[]	Messages or parameters in square brackets can be omitted.
|	One of several choices can be chosen. For example, if A|B|C|D are choices, select one of them.
{}	Group the choices. When A|B({C|D}) can be chosen, select one of them.
<character>	Alphabet or numeric characters
<file_name>	The character strings indicates file name and path. The double quotation marks or single quotation marks are needed at the beginning and end of the data. ¥,/,:,*,?,",<,>,| are not used in the file name. Example: "PATTERN005"
<integer>	Decimal integer value Example: –100, 12500000
<numeric>	Decimal integer value Example:0, 1.2E–6, 2.35
<string>	Character string data The double quotation marks or single quotation marks are needed at the beginning and end of the data.
<version>	Numeric value indicating version Multiple decimal points may be included.

2.2 Correspondence between Panel Operation and Message

This section explains correspondence between panel operation and message.

2.2.1 Panel Keys for Main Application

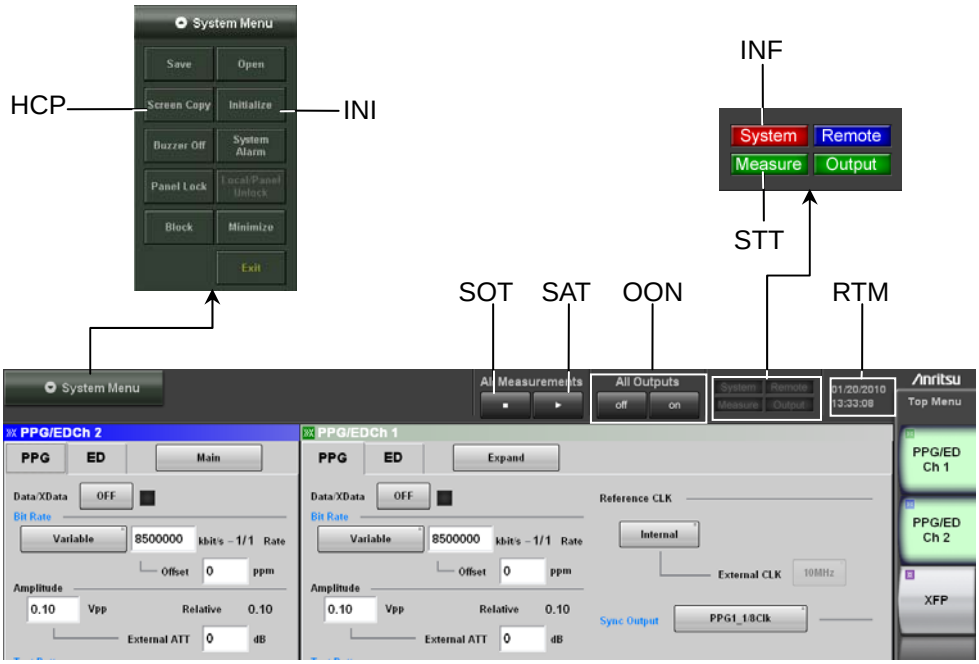


Figure 2.2.1-1 Message Corresponding to Common Operation

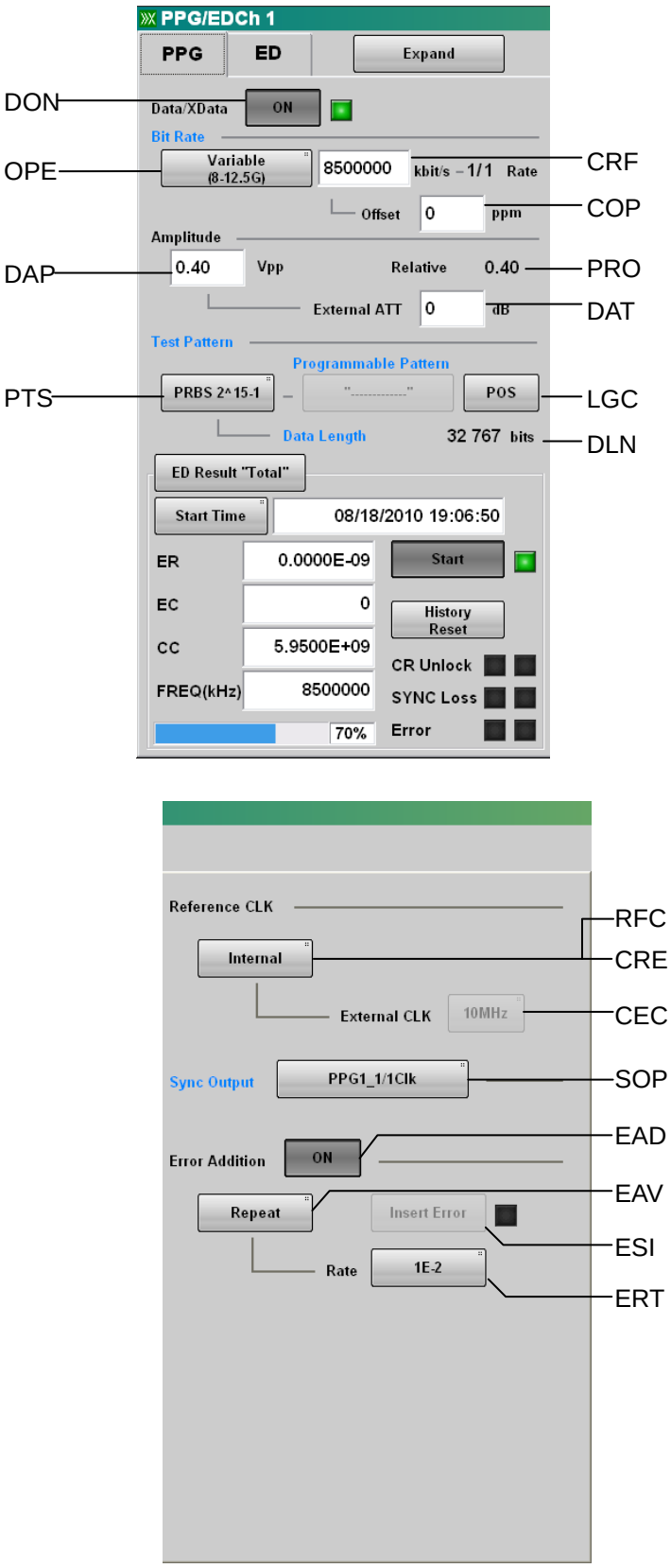


Figure 2.2.1-2 Message Corresponding to PPG Panel

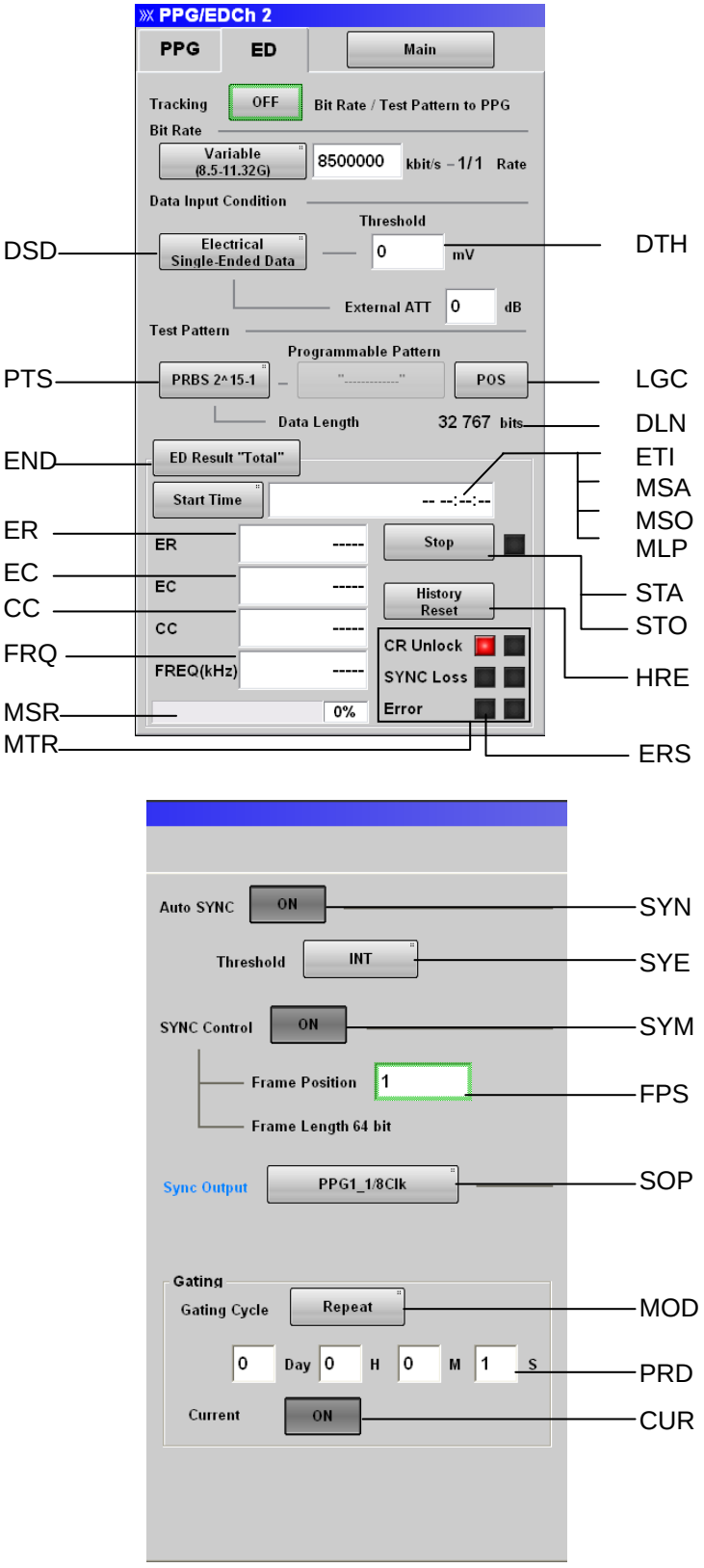


Figure 2.2.1-3 Message Corresponding to ED Panel

2.2.2 Messages with No Corresponding Panel Operation

The messages with no corresponding panel operation are as follows:

Table 2.2.2-1 Messages with No Corresponding Panel Operation

Message	Explanation
CRS	Sets and queries the frequency unit for the message parameter.
TRM	Sets and queries the message terminator.

2.3 Explanation of Device Dependant Command (Native Command)

CC

Function

This command queries the clock count out of the ED measurement result.

Syntax

CC?

Response Data

CC <numeric>|-------
<numeric>:0 ~ 999---
-------:No data

Example of Use

To query the clock count:
CC?
>CC 1.0000E-09

CEC

Function

This sets and queries the input connector for the reference clock when the external reference signal is used for the PPG/ED.

Syntax

```
CEC 0|1
CEC?
```

0 External 10 MHz Input connector for rear panel
1 Ext. Clk In connector for front panel

Response Data

CEC 0|1

Example of Use

To query the connector settings when using the external reference signal:

```
CEC 1

CEC?
>CEC 1
```

COP

Function

This command sets and queries the bit rate offset for the PPG.

Syntax

```
COP <integer>
COP?
```

<integer>:Range: –100~100 Unit: ppm, 1 ppm Step

Response Data

COP <integer>
<integer>: –100~100

Example of Use

To set bit rate offset to 100 ppm:

```
COP 100

COP?
>COP 100
```

CRE

Function

This command sets either internal or external clock for the PPG/ED.
Also, this command queries the clock (external or internal) set for the PPG/ED.

Syntax

```
CRE 0|1
CRE?
```

0 Uses internal clock
1 Uses external clock

Response Data

CRE 0|1

Example of Use

To set reference clock to internal clock:

```
CRE 0
```

```
CRE?
>CRE 0
```

CRF

Function

This command sets the frequency corresponding to the bit rate when the PPG settings are as follows:

- Bit rate specifications:Variable, Variable-1/2, Variable-1/4, Variable-1/8, Variable-1/16, Variable-1/32, or Variable-1/64
- Reference CLK:Internal or External CLK 10 MHz

Also, this command queries the frequency corresponding to the PPG bit rate.

Syntax

```
CRF <numeric>
CRF?
```

The setting range of <numeric> is as shown in the below table.

Table 2.3-1 CRF parameter Setting Range (With Option 090)

Bit rate specifications	MHz	kHz
Variable	8000~12500	8500000~12500000
Variable-1/2	4000~6250	4250000~6250000
Variable-1/4	2000~3125	2125000~3125000
Variable-1/8	1000~1565.25	1062500~1565250
Variable-1/16	500~781.25	531250~781250
Variable-1/32	250~390.625	265625~390625
Variable-1/64	125~195.312	132813~195312

Table 2.3-2 CRF parameter Setting Range (Without Option 090)

Bit rate specifications	MHz	kHz
Variable	8500~11320	8500000~11320000
Variable-1/2	4250~5660	4250000~5660000
Variable-1/4	2125~2830	2125000~2830000
Variable-1/8	1062.5~1415	1062500~1415000
Variable-1/16	531.25~707.5	531250~707500
Variable-1/32	265.625~353.75	265625~353750
Variable-1/64	132.813~176.875	132813~176875

The unit is expressed as CRS.

Response Data

CRF <numeric>
The setting range of <numeric> is as shown in Table 2.3-1 and Table 2.3-2.

Example of Use

To set frequency to 11320000 kHz:

```
CRF 11320000

CRF?
>CRF 11320000
```

CRS

Function

This command sets and queries the frequency unit for the CRF message parameter.

Syntax

```
CRS 0|1
CRS?
```

0 Sets the unit to kHz
1 Sets the unit to MHz

Response Data

CRS 0|1

Example of Use

To set frequency unit to MHz:

```
CRS 1

CRS?
>CRS 1
```

CUR

Function

This command sets whether to update the measurement result data of the ED immediately. Also, this command queries the displayed update settings for the measurement result data.

Syntax

```
CUR 0|1
CUR?
```

0 Immediately not update the displayed measurement result data: OFF
1 Immediately update the displayed measurement result data: ON

Response Data

CUR 0|1

Example of Use

To update the displayed measurement result data immediately:

```
CUR 1
```

```
CUR?
>CUR 1
```

DAP

Function

This command sets the signal amplitude to the PPG $\overline{\text{Data}}$ Out and Data Out connectors in V unit.
Also, this command queries the PPG data output amplitude.

Syntax

```
DAP <numeric>
DAP?
```

<numeric> Range 0.10~0.80 Unit V, 0.01V Step

Response Data

DAP <numeric>
<numeric> Range 0.10~0.80

Example of Use

To set the PPG amplitude to 0.5V:

```
DAP 0.5
```

```
DAP?
>DAP 0.5
```

DAT

Function

This command sets the PPG external attenuation in dB unit.
Also, this command queries the PPG external attenuation.

Syntax

```
DAT <integer>
DAT?
```

<integer>: Range 0~30 dB, 1 dB Step

Response Data

DAT <integer>
<integer>: Range 0~30 Unit: dB

Example of Use

To set the PPG external attenuation to 20 dB:

```
DAT 20
```

```
DAT?
>DAT 20
```

DLN

Function

This command queries the pattern length.

Syntax

```
DLN? 0|1
```

0 Pulse pattern generator (PPG)
1 Error detector (ED)

Response Data

DLN <integer>
<integer>:2~2147483647

Example of Use

To query the ED pattern length:

```
DLN? 1
>16384
```

DON

Function

This command sets whether to output the PPG data connectors.
Also, the outputs of the $\overline{\text{Data}}$ Out and Data Out on the front panel are set to On/Off.
Furthermore, this command queries the PPG data output.

Syntax

```
DON 0|1
DON?
```

0 Data output OFF
1 Data output ON

Response Data

DON 0|1

Example of Use

To set the data output to ON:

```
DON 1
```

```
DON?
>DON 1
```

DSD

Function

This command sets and queries the ED input interface.

Syntax

```
DSD 0|1|2|3
DSD?
```

0 Single Ended Data
1 Single Ended XData
2 Differential 50 Ω
3 Optical

Response Data

DSD 0|1|2|3

0 Single Ended Data
1 Single Ended XData
2 Differential 50 Ω
3 Optical

Example of Use

To set the data input interface to Single Ended XData :

```
DSD 1

DSD?
>DSD 1
```

DTH

Function

This command sets the input threshold value of the ED in mV unit. Also, this command queries the input threshold value of the ED.

Syntax

```
DTH <integer>
DTH?
```

When the external attenuation is set to ATT (dB), the maximum and minimum values of `<integer>` and resolution are as follows:

Maximum value: 85×10^(ATT/20) : Figures under decimals truncated
Minimum value:–85×10^(ATT/20) : Figures under decimals truncated
Resolution: 10^(ATT/20): Figures under decimals truncated

Response Data

DTH <integer>

Example of Use

To set the data input threshold value to –300 mV:

```
DTH -300

DTH?
>DTH -300
```

EAD

Function

This command sets whether to generate errors for the PPG test pattern. This command queries the error generation settings for the PPG test pattern.

Syntax

```
EAD 0|1|7
EAD?
```

0 Does not generate error
1 Generates error
7 Sets to generate single error

Response Data

EAD 0|1

Example of Use

To generate the error for the test pattern:

```
EAD 1

EAD?
>EAD 1
```

EAV

Function

This command sets and queries the error generating method of the PPG.

Syntax

```
EAV 0|1
EAV?
```

0 Repeat: Inserts Repeat errors continuously.
1 Single: Inserts Single error

Response Data

EAV 0|1

Example of Use

To set the bit error addition to Repeat:

```
EAV 0

EAV?
>EAV 0
```

EC

Function

This command queries the error count out of the ED measurement results.

Syntax

```
EC?
```

Response Data

EC <numeric>|-------

<numeric>: 0~9999999|1.0000E07~9.9999E17
-------:No data exists

Example of Use

```
EC?
>EC 1.9469E+08
```

END

Function

This command queries the ED measurement data corresponding to the parameter.

Syntax

```
END? {0|1|2},{1|2|3|4}
```

The combination of the parameter numbers are as shown in Table 2.3-3.

Table 2.3-3 Parameter for END Message

First Parameter	Second Parameter	Query Item	Response Format
0	1	Measurement Start Time	Time type
	2	Measurement End Time	Time type
	3	Measurement elapsed time	Time type
	4	Measurement remaining time	Time type
1	3	Sync Loss interval count	Integer type
	4	CR Unlock interval count	Integer type
2	1	Error rate(sum total)	Decimal point type
	2	Error count (sum total)	Integer type
	3	Clock count	Integer type
	6	Error rate (insertion)	Decimal point type
	7	Error rate (loss)	Decimal point type
	8	Error count (insertion)	Integer type
	9	Error count (loss)	Integer type

Response Data

END <character>

The format of the < character> character strings is as shown in Table 2.3-4.

Table 2.3-4 Response Format for END Message

Form	Format	Description
Integer type	XXXXXXX	For 0 to 9999999
	X.XXXXE+XX	For 1.0000E+07 to 9.9999E+17
	ERR	When no data corresponds to the query
Decimal point type	X.XXXXE−XX	For 0.0000E−18 to 1.0000E−00
	ERR	When no data corresponds to the query
Time type	XX − XX − XX XX:XX:XX	For year-month-day hour:minute:second
	X XX:XX:XX	For day hour:minute:second
	ERR	When no data corresponds to the query

Example of Use

To query the measurement elapsed time:

```
END? 0,3
>END 0 00:00:25
```

To query the error rate:

```
END? 2,1
>END 1.0253E−06
```

ER

Function

This command queries the error rate out of the ED measurement results.

Syntax

ER?

Response Data

ER <numeric>|-------
<numeric>: 0.0000E−18~1.0000E−00
-------: No data exists

Example of Use

ER?
>ER 3.8938E−02

ERS

Function

This command queries the error generating alarm status from the measurement results of the ED.

Syntax

ERS?

Response Data

ERS 0|1
0 No alarm is raised.
1 Alarm is raised. (Alarm indicator on screen is red)

Example of Use

ERS?
>ERS 0

ERT

Function

This command sets and queries the error generating ratio when the PPG error generating method is REPEAT.

Syntax

```
ERT 1,<integer>
ERT?
```

1: Mantissa of the error insertion ratio

<integer>:In the integer part of the error insertion ratio, the setting range is 2 to 12. The minus can be omitted.

Response Data

ERT 1,<integer>

<integer>:2~12

Example of Use

To set the added bit error rate to 1E−9:

```
ERT 1,9
```

```
ERT?
>ERT 1,9
```

ESI

Function

This command generates single error for the test pattern when the PPG error generating method is SINGLE.

Syntax

```
ESI
```

ETI

Function

This command queries the remaining time until the measurement for the error detector ends.

Syntax

```
ETI?
```

Response Data

ETI <integer>,<integer>,<integer>,<integer>

The remaining time is output in the following order: <day>,<hour>, <min>,<second>.

The range of <integer> is as follows:

Item	Range
day	0~9
hour	0~23
min	0~59
second	0~59

Example of Use

To query the remaining time until the measurement ends

```
ETI?
>ETI 00,00,00,19
```

FPS

Function

This command sets and queries the start position of the frame decting the pattern synchronization when the ED test pattern is User Data.

Syntax

```
FPS <numeric>
FPS?
```

<numeric> 1~ Pattern length – 63

Response Data

<integer>=0~9999999

Example of Use

To set the start position of the frame detecting the pattern synchronization to 1:

```
FPS 1

FPS?
>FPS 1
```

FRQ

Function

This command queries the clock frequency out of the ED measurement results.

Syntax

```
FRQ?
```

Response Data

FRQ <integer>

<integer>
With Option 090: 8500000~12500000 kHz
Without Option 090: 8500000~11320000 kHz

Example of Use

```
FRQ?
>FRQ  8500000
```

HCP

Function

This command saves the screen display in the graphic file with the jpeg format. The saving destination is as follows:
C:\Program Files\Anritsu\MP2100A\MX210000A\UserData\Screen Copy

Syntax

```
HCP
```

HRE

Function

This command performs the history reset for the alarm displayed in the ED measurement results.

Syntax

```
HRE
```

INF

Function

This command queries the generating system alarm details.

Syntax

```
INF?
```

Response Data

INF 0|1|2|3|4|5|6|7

0 Does not occur system alarm

1 Internal temperature error in the Pulse pattern generator/error detector (PPG/ED Fatal Temperature)

2 Request for the calibration of the EYE/Pulse (EYE/Pulse Scope Temperature)

3 Clock error (PPG/ED PLL Unlock)

4 Power voltage error (Power)

5 Internal temperature error in the EYE/Pulse scope (EYE/Pulse Scope Fatal Temperature)

6 Illegal mode (PPG/ED Illegal Mode)

7 Trigger Clock error in the EYE/Pulse Scope (PLL Unlock)

Example of Use

To query the system error status:

```
INF?
>INF 1
```

INI

Function

This command sets the measurement parameter to the value set at the factory shipment.

Syntax

```
INI
```

LGC

Function

This command sets and queries the test pattern logic (positive/negative logic) for the PPG/ED.

Syntax

```
LGC {0|1},{0|1}
LGC? 0|1
```

First parameter

0	Pulse pattern generator (PPG)
1	Error detector (ED)

Second parameter

0	POS (Positive logic)
1	NEG (Negative logic)

Response Data

LGC {0|1}

0	POS (Positive logic)
1	NEG (Negative logic)

Example of Use

To set the test pattern logic of the PPG to the negative logic:

```
LGC 0,1

LGC? 0
>LGC 1
```

MLP

Function

This command queries the elapsed time after the ED measurement starts.

Syntax

MLP?

Response Data

MLP <integer>,<integer>,<integer>,<integer>
The elapsed time is output in the following order: <day>,<hour>, <min>, <second>.

The double digits of <integer> is as follows:

Item	Range
day	00~09
hour	00~23
min	00~59
second	00~59

Example of Use

MLP?
>MLP 00,00,00,00

MOD

Function

This command sets and queries the measurement method of the ED.

Syntax

MOD 0|1|2
MOD?

0	Repeat
1	Single
2	Untimed

Response Data

MOD 0|1|2

Example of Use

To set the measurement processing mode of the bit error and the alarm measurement to Repeat:

```
MOD 0

MOD?
>MOD 0
```

MSA

Function

This command queries the measurement start time of the ED.

Syntax

```
MSA?
```

Response Data

MSA <integer>,<integer>,<integer>,<integer>,<integer>,<integer>

The measurement start time is output in the following order: <year>, <month>, <day>, <hour>, <min>, <seconds>.

The range of <integer> is as follows:

Item	Range
year	0000|2009~2036
month	00~12
day	00~31
hour	00~23
min	00~59
seconds	00~59

When the measurement start time data is not found, Response Data is 0000, 00, 00, 00, 00, 00.

Example of Use

```
MSA?
>MSA 2009,10,20,13,58,40
```

MSO

Function

This command queries the measurement end time of the ED.

Syntax

MSO?

Response Data

MSO <integer>,<integer>,<integer>,<integer>,<integer>,<integer>

The measurement end time is output in the following order :< year>, <month>, <day>, <hour>, <min>, <seconds>.

Everything is set to 0 when Gated Cycle is Untimed.
The <integer> range is as follows:

Item	Range
year	0000|2009~2036
month	00~12
day	00~31
hour	00~23
min	00~59
seconds	00~59

When the measurement end time data is not found, the response data is 0000, 00, 00, 00, 00, 00.

Example of Use

```
MSO?
>MSO 2009,10,20,13,58,50
```

MSR

Function

This command queries the measurement progressing status of the ED.

Syntax

MSR?

Response Data

MSR 0|1

0 Measurement stops
1 During measurement

Example of Use

```
MSR?
>MSR 1
```

MTR

Function

This command queries the next alarm status out of the ED measurement results.

- CR Unlock
- Bit Error
- SYNC Loss

Syntax

```
MTR? 0|3|4
```

0	Bit Error: Bit Error
3	CR Unlock: Alarm for signal detection loss
4	SYNC Loss: Pattern sync loss

Response Data

MTR 0|1|2

0	When an alarm occurs
1	When no alarm occurs
2	When no data corresponds to the query

Example of Use

```
MTR? 0
>MTR 0
```

OON

Function

This command sets and queries the signal output of the PPG Channel 1 and 2 and the optical output of the optical transceiver (XFP/SFP+) simultaneously.

Syntax

```
OON 0|1
OON?
```

0	PPG output and optical output OFF
1	PPG output and optical output ON

Response Data

OON 0|1

Example of Use

To set the signal output of the PPG Channel 1 and 2 and the optical output of the optical transceiver (XFP/SFP+) to ON simultaneously:

```
OON 1

OON?
>OON 1
```

OPE

Function

This command sets and queries the bit rate standard of the PPG.

Syntax

```
OPE <integer>
OPE?
```

<integer>:Range 0~38 The bit rate standard is as follows:

Table 2.3-5 Setting Number for Bit Rate Standard

< integer >	Standard
0	Variable
1	1GFC (1.0625G)
2	2GFC (2.125G)
3	4GFC (4.25G)
4	8GFC (8.5G)
5	10GFC (10.518G)
6	10GFC FEC (11.3168G)
7	1GbE (1.25G)
8	2GbE (2.5G)
9	Infiniband (2.5G)
10	10GbE WAN (9.95328G)
11	10GbE LAN/PHY (10.3125G)
12	10GbE OTU1e (11.049G)
13	10 GbE OTU2e (11.095G)
14	OC-3/STM-1 (155.22M)
15	OC-12/STM-4 (622.08M)
16	OC-48/STM16- (2.488G)
17	OTU-1 (2.666057G)
18	OC-192/STM-64 (9.95328G)
19	G.975 FEC (10.664G)
20	OTU-2 (10.709G)

Table 2.3-5 Setting Number for Bit Rate Standard (Cont'd)

< integer >	Standard
21	Variable-1/2
22	Variable-1/4
23	Variable-1/8
24	Variable-1/16
25	Variable-1/32
26	Variable-1/64
27	Infiniband×2 (5G)
28	Infiniband×4 (10G)
29	OC-24 (1.244G)
30	CPRI (614.4M)
31	CPRI×2 (1.288G)
32	CPRI×4 (2.4576G)
33	CPRI×5 (3.072G)
34	CPRI×10 (6.144G)
35	OBSAIRP3 (768M)
36	OBSAIRP3×2 (1.536G)
37	OBSAIRP3×4 (3.072G)
38	OBSAIRP3×8 (6.144G)

Response Data

OPE <integer>

<integer>:0~38

Example of Use

To set the bit rate standard to 4GFC

```
OPE 3
```

```
OPE?
>OPE 3
```

PRD

Function

This command sets and queries the measurement period for the ED.

Syntax

```
PRD <integer>,<integer>,<integer>,<integer>
PRD?
```

The measurement period parameter is set in the following order :< day count>, <hour>, <min>, <seconds>.
The setting range of the double digits <integer> is as follows:

Item	Range
day count	00~09
hour	00~23
min	00~59
seconds	00~59

However, all values cannot be set to 0.

Response Data

PRD <integer>,<integer>,<integer>,<integer>
The double digits of the numeric value is output in the following order: < day count>, <hour>, <min>, <seconds>.

Example of Use

To set the measurement period to 0 day 1 hour 0 min 0 seconds:

```
PRD 0,1,0,0
```

```
PRD?
>PRD 00,01,00,00
```

PRO

Function

This command queries the output amplitude correcting the PPG external attenuation.

Syntax

```
PRO?
```

Response Data

PRO <numeric>

<numeric>:0.00~0.80 Unit: Vp-p

Example of Use

```
PRO?
>PRO 0.05
```

PTS

Function

This command sets and queries the PPG/ED test pattern.

Syntax

```
PTS {0|1},(0|1|2|3|4|5)
PTS? 0|1
```

First parameter

0	Pulse Pattern Generator (PPG)
1	Error Detector (ED)

Second parameter

0	PRBS 2^7−1
1	PRBS 2^9−1
2	PRBS 2^15−1
3	PRBS 2^23−1
4	PRBS 2^31−1
5	Programmable Pattern

Response Data

PTS 0|1|2|3|4|5

0	PRBS 2^7−1
1	PRBS 2^9−1
2	PRBS 2^15−1
3	PRBS 2^23−1
4	PRBS 2^31−1
5	Programmable Pattern

Example of Use

To set the ED test pattern to PRBS 2^15−1:

```
PTS 1, 2

PTS? 1
>PTS 2
```

RFC

Function

This command sets and queries whether the PPG/ED reference clock of is set to either internal or external clock.

Syntax

`RFC 0|1`

`RFC?`

0 Uses internal clock

1 Uses external clock

Response Data

RFC 0|1

Example of Use

To set the reference clock to the internal clock:

```
RFC 0
```

```
RFC?
>RFC 0
```

RTM

Function

This command queries the day and time set in the MP2100A/MP2101A/MP2102A.

Syntax

```
RTM?
```

Response Data

The response data is output in the following order RTM <integer>,<integer>,<integer>,<integer>,<integer>,<integer>.

Item	Range	Details
Year	00~99	Last two digits of the year
Month	01~12	Month
Day	01~31	Day
Hour	00~23	Hour
Minute	00~59	Minute
Second	00~59	Second

Example of Use

To query the date and time:

```
RTM?
>RTM 09,10,24,09,51,13
```

SAT

Function

This command starts the measurement for all modules (ED_1Ch, ED_2Ch, EYE/Pulse Scope).

Syntax

```
SAT
```

SOP

Function

This command sets and queries the signal output to the Sync Output connector on the front panel.

Syntax

```
SOP <integer>
SOP?
```

The numeric values regarded as the clock signal source and divide ratio are as follows:

<integer>	Clock Signal Source	Divide Ratio
0	PPG Channel 1	1
1		2
2		4
3		8
4		16
5		64
16		Value of Data Length
6	PPG Channel 2	1
7		2
8		4
9		8
10		16
11		64
17		Value of Data Length
19	ED Channel 1	4
20		8
13		16
22	ED Channel 2	4
23		8
15		16

Response Data

SOP <integer>

Example of Use

To set the 1/16 divide clock synchronized with the data output of the PPG Channel 1 to the output signal to the Sync Output connector.

```
SOP 4

SOP?
>SOP 4
```

SOT

Function

This command stops the measurement for all modules (ED_1Ch, ED_2Ch EYE/Pulse Scope).

Syntax

SOT

STA

Function

This command starts the ED measurement.
While the ED measurement is in progress, clear the measuring data and restart the measurement.

Syntax

STA

STO

Function

This command stops the ED measurement.

Syntax

STO

STT

Function

This command queries the measurement status for all modules (ED_1Ch, ED_2Ch, EYE/Pulse Scope).

Syntax

STT?

Response Data

STT 0|1

0 No measuring modules
1 One or more measuring modules

Example of Use

STT?
>STT 1

SYE

Function

This command sets and queries the bit error rate (synchronization detection threshold value) for the ED pattern resynchronization.

Syntax

SYE <numeric>
SYE?
The correspondence between the number set to <numeric> and the Sync Threshold displayed on the screen.

<numeric>

0	E−2
1	E−3
2	E−4
3	E−5
4	E−6
5	E−7
6	E−8
8	Internal

Response Data

SYE 0|1|2|3|4|5|6|8

Example of Use

To set the synchronization detection threshold value for the ED pattern resynchronization to E−2:

```
SYE 0

SYE?
>SYE 0
```

SYM

Function

This command sets the synchronization mode using the frame detection when the ED test pattern is User Data

Syntax

```
SYM 0|1
SYM?
```

0 Sync Control OFF: Does not synchronize using the frame detection
1 Sync Control ON: Synchronize using the frame detection

Response Data

SYM 0|1

Example of Use

To set the settings that the synchronization using the frame detection is not performed when the ED test pattern is User Data:

```
SYM 0

SYM?
>SYM 0
```

SYN

Function

This command sets and queries whether to perform the pattern re-synchronization processing automatically when the ED measurement value of the bit error rate is over the synchronized threshold value.

Syntax

```
SYN 0|1
SYN?
```

0 Auto Sync OFF: Does not perform the re-synchronization processing automatically

1 Auto Sync ON: Perform the re-synchronization processing automatically

Response Data

SYN 0|1

Example of Use

To set the pattern re-synchronization processing automatically when the measurement value of the bit error rate for the error detector is over the synchronized threshold value:

```
SYN 1

SYN?
>SYN 1
```

TRM

Function

This command sets the response data terminal sent to the control PC from the MP2100A/MP2101A/MP2102A.
Also, this command queries the current terminator settings.

Syntax

```
TRM 0|1
TRM?
```

0 LF+EOI
1 CR+LF+EOI

LF: Line Field ASCII code 10
CR: Carriage Return ASCII code 13
EOI: Detects the data end using the End or Identify GPIB hardware signal.

Response Data

TRM 0|1

0 Terminator LF+EOI
1 Terminator CR+LF+EOI

Example of Use

To set the terminator types to LF+EOI:

```
TRM 0

TRM?
>TRM 0
```