RM1100

Omnilight II

Communication Command User's MANUAL

A&D Company, Limited

1WMPD4003456

RM1100
Communication Command
User's Manual

A&D Company, Limited

Introduction

We thank you for your purchase of our product OMNILIGT II RM1100. Please read this manual before operating this instrument. Refer to this manual to operate the LAN interface which is provided as standard in the RM1100 and the RS-232C interface included in the optional RS-232C unit (RA23-142). This manual provides the information necessary to operate the RM1100 recorder safely. Place this manual within reach of the RM1100.

For basic operations, please refer to the RM1100 Recorder Manual. Please read the user's manual of the PC or modem before connecting the RM1100 to a PC or modem. If you encounter any problems in the manuals, please contact our sales representative.

This manual covers handling precautions and basic command operations of the RM1100 communication interface. For operation of basic functions, please refer to the separate-volume manuals listed below.

<Separate-volume manuals>

Manual	Contents
Instruction Manual MAINFRAME for RM1100	This manual explains functions and how to operate the RM1100.

1.1.Before Using

► When opening package

If opening the package in a warm room during the cold season, open the package after it has reached room temperature to avoid any operational failure due to condensation on the surface of the product.

► Examining contents in package

This instrument is delivered after a thorough examination at the factory prior to shipment. However, please examine the product's condition and verify that no obvious shipping damage has occurred after opening the package. Also, examine the specifications of the input units and accessories. If there are any missing or damaged items, please contact our sales representative.

- Turn off the power when the operation is abnormal.
- If it is impossible to trace the cause of an abnormal operation, please contact our sales representative. In this case, let us know in what way the unit was operating incorrectly and what the environmental conditions are.
- The contents of this manual are subject to change without notice.
- This manual is copyrighted with all rights reserved. No parts of this manual may be transcribed or reproduced without written permission.
- Please let us know if there are any points that are unclear or missing in this manual.

1.2.Safety Measures - Warnings and Cautions

► To safely use the product

The RA2300A is a product conforming to the IEC standard safety class I. The recorder is manufactured with safety in mind, however, accidents may occur due to misuse by the user. To avoid such accidents, read this manual carefully before use. Observe the following warnings and cautions when using the interface and remote control functions. To safely use the input units, the following statements are used in this manual to call the readers' attention.

⚠ WARNING This indicates a condition or practice that could result in personal injury or loss of life, or may result in light injury or physical damage if this equipment is misused due to neglect of a Warning.

⚠ CAUTION This indicates a condition or practice that could result in light injury or damage to the equipment or other property if this equipment is misused due to neglect of a Caution.

Be sure to observe the following instructions when using this recorder. The warranty does not cover damages resulting from actions contrary to the instructions, cautions, or warnings appearing in this manual.

⚠ WARNING

► When connecting the LAN/RS-232C cable to the recorder

Always observe the following points. If not observed, the recorder and the devices connected to the recorder may be destroyed.

- **Check to be sure the cable is one specified by A&D.**
  Use shield-type LAN cable.
- **Turn off the power of the recorder before connecting the cable.**
  When connecting the RM1100 and another instrument, make sure that there is no potential difference between the RM1100 and the instrument. If there is a potential difference, determine the cause of the potential difference. Cable connection under a potential difference may cause damage to the recorder.
- **Do not insert the connector with more force than necessary.**
  Insert the connector at the right angle and in the right direction. Inserting the connector more forcefully than necessary may lead to damage.

1.3.Warranty - General

We ship our products after conducting quality control, which covers from design to manufacturing. It is, however, possible that failures may occur in products. If the product does not operate correctly, please make a check of the power supply, cable connections, or other conditions before returning this product to us. For repair or calibration, contact our sales agency. Before returning, be sure to inform us of the model, serial number, and problematic points. The following is our warranty.

1.4.Limited Warranty

① Warranty period

One year from our shipment.

② Warranty limit

We will repair the defects of our product free of charge within the warranty period; however, this warranty does not apply in the following cases.

1） Damage or faults caused by incorrect use.

2） Damage or faults caused by fire, earthquake, traffic accident, or other natural disasters.

3） Damage or faults caused by a repair or modification that is carried out by someone other than a service representative of A&D.

4） Damage or faults caused by use or storage in environmental conditions that should be avoided.

5） Periodical calibration.

6） Damage or faults caused during transportation.

③ Liability

We do not assume any liabilities for equipment other than A&D.

1.5.Terms and Symbols in This Manual

The terms and symbols used in this manual denote the following.

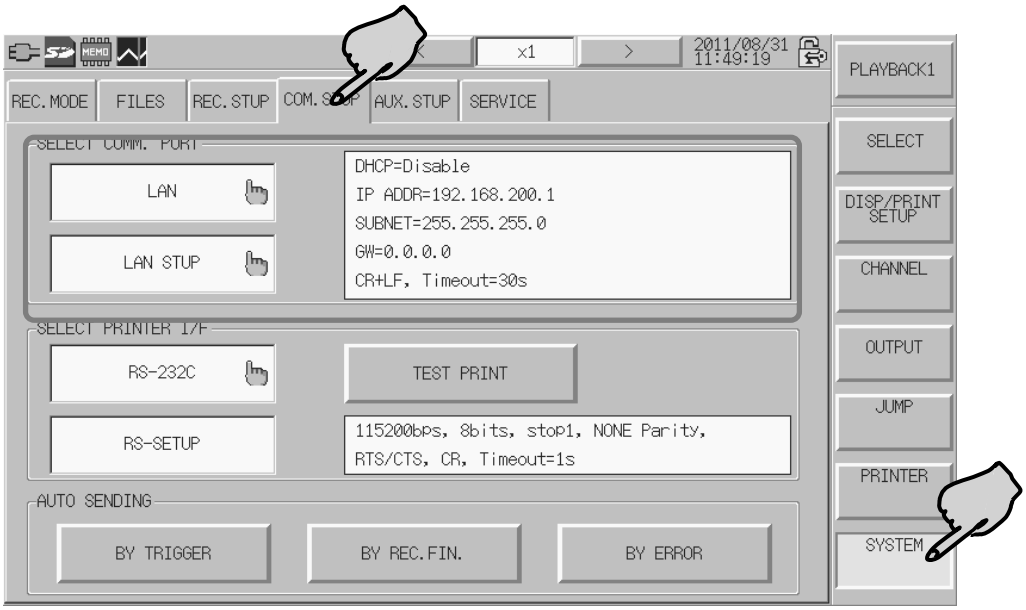
Term or Symbol	Description
WARNING	This indicates a condition or practice that could result in personal injury or loss of life, or may result in light injury or physical damage if this equipment is misused due to neglect of a Warning.
CAUTION	This indicates a condition or practice that could result in light injury or damage to the equipment or other property if this equipment is misused due to neglect of a Caution.
NOTE	This indicates a condition or practice that could result in incorrect operation or damage to data if this equipment is misused due to neglect of a Note.
TIPS	This symbol gives setting restrictions and additional descriptions.
☞	Reference page
This recorder	RM1100 recorder
Memory	Internal memory of RM1100 When measuring with a Memory Recorder measured data is recorded in this memory.
k (lower case) K (upper case)	A unit of numerical value "k" is used to represent 1000 such as "10 kg". "K" is used to represent 1024 such as "4 K data"

CONTENTS

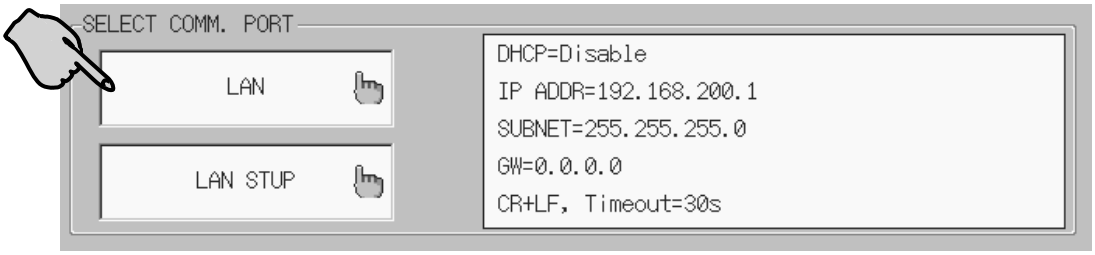
1. Selection of Communication Interface

1.1. RM1100 Communication Interface Setup

◆ To control the RM1100 using an instrument such as a personal computer via a communication interface, you must allow RM1100 to conform to the specifications of the communication interface to be used in advance.



1.1.1. Overview of communication functions and how to select them



①Communication Port Selection

Select the communication port for remote-control of this recorder.

①None

Reception of the RS-232C and LAN interfaces are neglected and commands are rejected.

②LAN

The LAN interface is used.

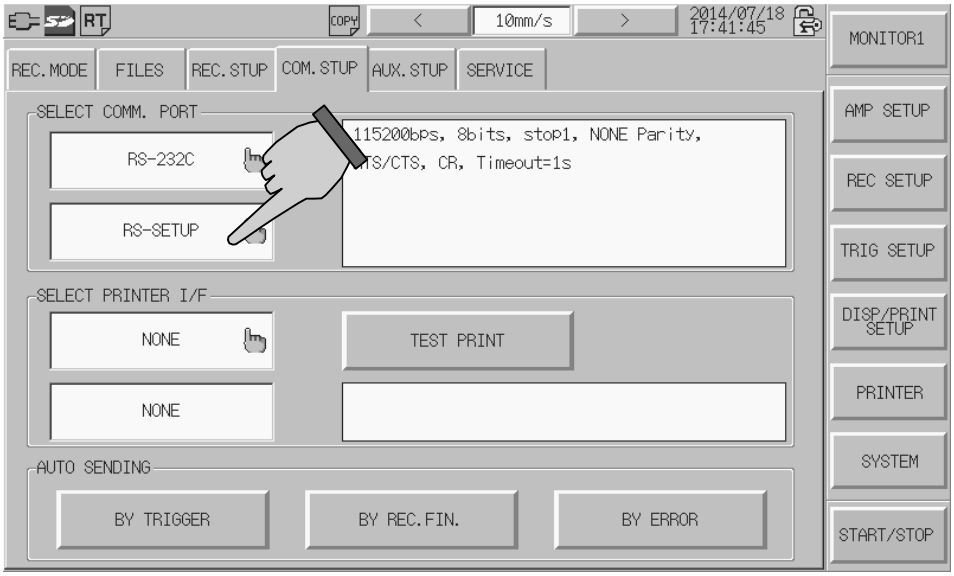
③RS-232C

The RS-232C interface is used.

1.2. How to Control RM1100 Using RS-232C

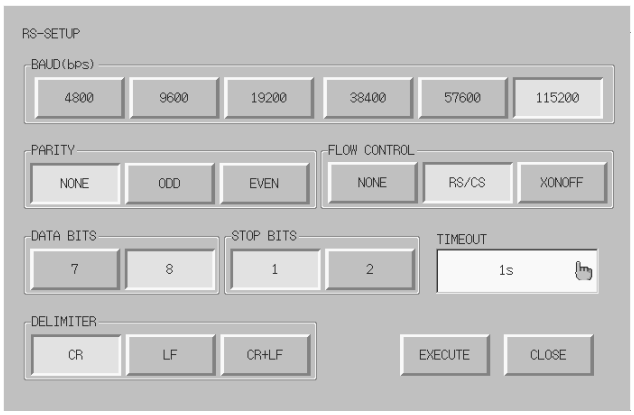
◆ By using the RS-232C interface, it is possible for the host computer to directly control the RM1100.

Select RS-232C and then RS-232C Setup Change, make settings for RS-232C.



① RS-232C setup

RS-232C communication protocol is set on the following screen.

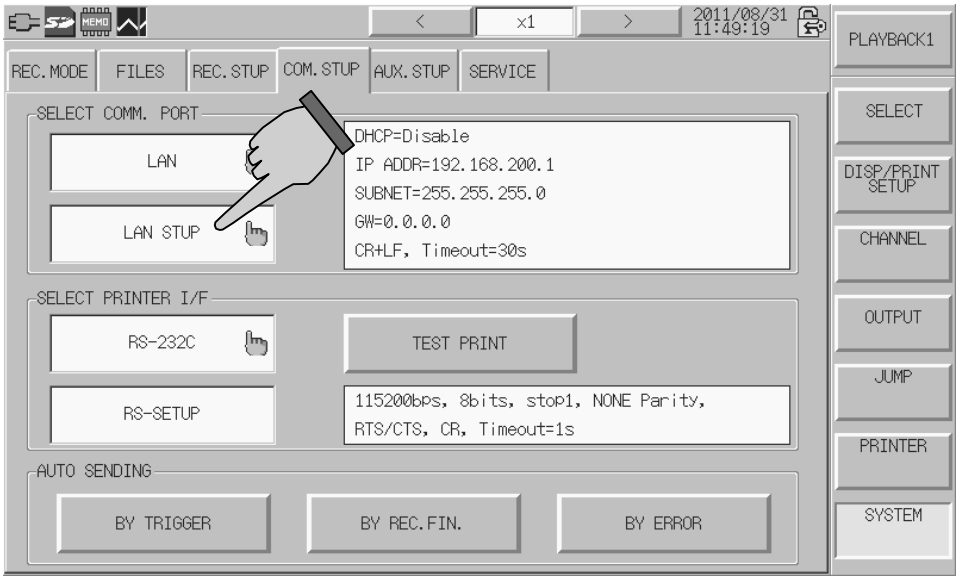


Communication speed, data bit, stop bit, parity, flow control, and delimiter are set.

1.3. How to Operate RM1100 by Remote Control Using LAN

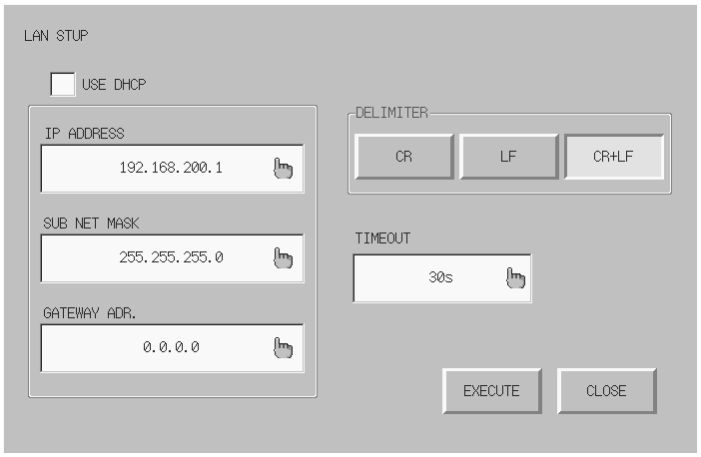
► The RM1100 can be controlled by the host computer directly through the LAN interface.

Select LAN and then LAN Setup Change to make the LAN settings.



① LAN settings

Communication protocol for LAN is set.



IP address, subnet mask, gateway address, delimiter, and timeout are set. Pressing a key opens the window for settings.

TIPS The reboot of this device is necessary to validate setting of the communication protocol. In the protocol that set when did not reboot may not communicate. The TCP port number of this device becomes "2300".

2. Overview of Communication Control

2.1. Local/Remote Control

◆ The RM1100 has two control modes: 1) a local mode that allows control through the touch panel, and 2) a remote control mode that allows control only through the communication port.

2.1.1.Local Mode

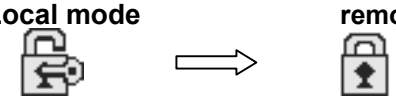
This is the default state after the power is turned on. Control can be performed either by the touch panel, or by input from the remote terminal.

2.1.2. Remote Control Mode

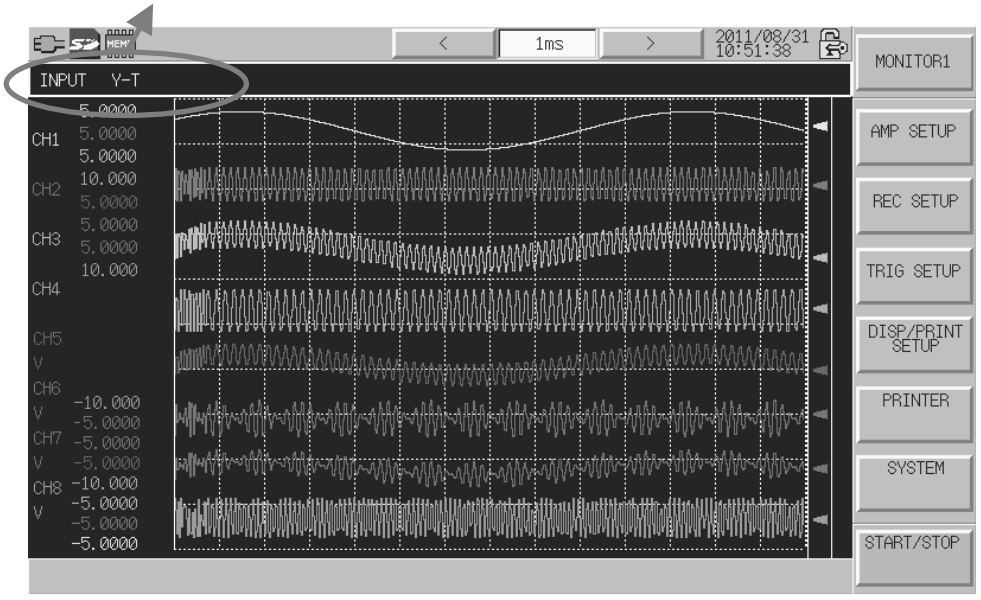
If data is received when a communication function is selected, the RM1100 goes into the remote control mode. Moreover, when a specified auto-transmission cause is generated, the mode enters into the remote control mode. At this time, it is possible to control the RM1100 from the communication interface.

When the RM1100 is switched to remote control mode, **recording continues** and the **remote control mode screen** is displayed. In the remote control mode, **all controls performed via the control/touch are ignored.**

Local mode ⇨ **remote control mode**



"INPUT Y-T" ⇨ "INPUT Y-T REMOTE"



2.1.3. Returning to Local Mode

The mode returns to the Local mode upon the reception of escape sequence command **[ESC]-Z**.
Please click the above icon of "Keylock" to return manually to local mode.

2.2. Overview of the Communication Commands

► Communication commands to control the RM1100 remotely are categorized into three types.

● **Character string command**

Controls such as settings and recordings are basically performed by string commands. The string commands consist of a 3-character command and parameter string following the command.

● **Escape Sequence Commands**

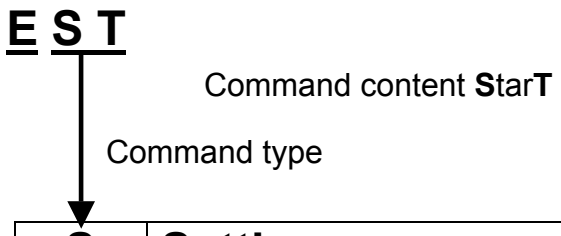
The [ESC]+1 character is used as a command. By using these commands, operation/error information. This command cannot control settings and operation of the RM1100.

● **1 Byte Control Command**

Execution is possible by sending a 1-byte control code alone, but functions are limited. The above-mentioned character string commands and escape sequence commands have functions of equal or higher quality.

2.2.1. Format of String Command

The string command consists of a 3-character command and a parameter string following the command. The initial character of the command represents the command type, and the second and third characters represent the contents of the command. The **EST command, which** starts recording, stands for **E**xecute **S**tar**T.**



S	**Setting**
I	**Read Setting**
E	**Execute**
F	**File/Data Control**
T	**Text**

Input a parameter following the 3-character command. Insert a separator (comma "," or space " ") between parameters. When it is possible to omit parameters, it is necessary to insert commas in sequence instead of parameters in order to clearly indicate that the parameters are omitted. Lastly input a delimiter and operation is complete. Available delimiter s are **[CR+LF], [CR], [LF]** and it is necessary to use the same delimiter as that set in the RM1100.

Format Examples of SFT Command (Set Filing Time)

SFT 10,10,0,0(Delimiter)	Sets recording time to 10days and 10hours
SFT ,,,1(Delimiter)	Sets recording time to 1second
SFT ,,10,30(Delimiter)	Sets recording time to 10minuts and 30seconds
SFT 10,10,0,0(Delimiter)	Sets recording time to 10days and 10hours

● **Omitting the parameter**

When the parameter can be omitted, "**Can be omitted**" is specified in the command description. In other cases, parameters cannot be omitted.

2.3. 1-Byte Control Command

◆ Execution is possible by sending a 1-byte control code alone, but functions are limited. The string commands and escape sequence command, mentioned in the preceding section, have functions of equal or higher quality. Note that usable commands are restricted depending on the communication interface.

[ENQ] Outputting the status of RM1100

Function	Outputs the status of the RM1100.
Input Format	[ENQ](05h)
Output Format	[NAK](15h): The RM1100 is operating. [ACK](06h): The RM1100 stops and is waiting command.
Description	When the RM1100 is operating, [NAK](15h) is returned. When the RM1100 is stopped and waiting for a command, [ACK](06) is returned. To see the status of the RM1100 in detail, use the **[ESC]+C command**.

[CAN] Command cancel

Function	Cancels the command that is operating now.
Input Format	[CAN](18h)
Output Format	None
Description	Command that has the same meaning as the ESP command that stops recording. When receiving a command, the command is canceled.

2.4.Escape Sequence

◆ The [ESC]+1 character is used as a command. By using this command the RM1100's operation/error information can be obtained. This command cannot control settings and operation of the RM1100.

[ESC]+'Z' Go to Local

Function	Returns to the local state. The key control on the panel becomes valid.
Input Format	[ESC]+'Z' <1Bh> <5Ah>
Output Format	None
Description	Note that, if a delimiter is added (CR, LF, or others), the mode returns to the remote again after going back to the local because of the delimiter detection.

[ESC]+'C' Status output

Function	Outputs status (present status of the RM1100)
Input Format	[ESC]+'C'
Output Format	A1 (Delimiter)

A1	Outputs status (present status of the RA1000)
0	The RM1100 is not operating
1	Recording or measurement is in progress (includes real-time filing)
2	Memory copy is in progress (includes file save and load)
3	Paper feed is in progress
4	reserved
5	Test print is in progress
6	Other operation is in progress (includes amp auto balance, etc.)

Description	

[ESC]+'E' Outputs error information

<table>
<tr><td>Function</td><td>Outputs error information of the RM1100.</td></tr>
<tr><td>Input Format</td><td>[ESC]+'E'</td></tr>
<tr><td>Output Format</td><td>A1,A2 (Delimiter)
A1: RM1100 hardware error
<table>
<tr><th>A1</th><th>RM1100 hardware information</th></tr>
<tr><td>0</td><td>Normal</td></tr>
<tr><td>2</td><td>No chart</td></tr>
<tr><td>4</td><td>Abnormal increase of thermal head temperature</td></tr>
<tr><td>8</td><td>device error of SD card</td></tr>
</table>
If an error in two or more items is generated, the logical OR of each error number is output. The error information of answer A1 is not cleared until the error status is canceled.
A2: Command processing error
<table>
<tr><th>A2</th><th colspan="2">Command processing error information</th></tr>
<tr><td>0</td><td colspan="2">Normal</td></tr>
<tr><td>1</td><td>Command grammar error</td><td>(Syntax error upon command reception)</td></tr>
<tr><td>2</td><td>Parameter error</td><td>(Parameter exceeding the specifications)</td></tr>
<tr><td>3</td><td>Mode error</td><td>(Impossible to operate in this mode)</td></tr>
<tr><td>4</td><td>Execution error</td><td>(Restricted because of the status of RM1100)</td></tr>
</table></td></tr>
<tr><td>Description</td><td>Error information of answer A1 is not cleared until the error state is cleared. If an error is generated in answer A2, command generating an error with "IES Error Status readout" can be read out. After the details are checked with the IES command, the answer A2 is cleared.</td></tr>
</table>

3. Setting Command – S**

3.1. Measurement Mode

SMM (Set Measure Mode)　Setting measurement mode

Function	Sets measurement mode.
Input Format	SMM P1 (Delimiter)
	P1: Measurement Mode

P1	Measurement Mode
1	Pen Recorder
2	Memory Recorder
3	Filing Recorder

Output Format	None
Description	These settings are recording basics. For details of each recording type, see the RM1100 User's Manual. While the RM1100 is operating, an execution error occurs.

3.2. Recording in General

SSS (Set filing Save Setting)　Setting place where to save files

Function	Sets place where to save files.
Input Format	SSS P1, P2, P3, P4, P5 (Delimiter)
	P1: Drive selection ([A-I] Excludes OS drives are excluded and external drives are available.) P2: Using user folder (0=OFF, 1=ON) P3: Using Day folder (0=OFF, 1=ON) P4: User folder name (String available for folder name) (Can be omitted.) P5: File name (first 3 characters) (Maximum 3 alphanumeric letters) (Can be omitted.)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

3.3. Waveform Chart Recording

SPT (Set Pen-recorer Type) Setting recording mode

Function	Sets recoding mode at Pen Recorder.
Input Format	SPT P1（Delimiter）
	P1：0=Wave pattern record、1= Digital record
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SCS (Set Chart Speed) Setting paper feed speed of waveform chart printing

Function	Sets paper feeding speed of waveform chart recording.
Input Format	SCS P1, P2 (Delimiter)

P1: Setting speed

P1	Speed value
1-50	Speed numerical value Recording unit is set by P2.
E	External synchronization recording External synchronization pulse is set by P2.

P2: Speed unit (When P1=1 to 50) (Can be omitted.)

P2	Speed unit
1	[mm/s]
2	[mm/min]
Omitted	[mm/s]

P2: External synchronization pulse ratio (When P1=E) (Can be omitted.)

P2	Sets speed value
1	0.125mm/pulse
2	0.03125mm/pulse
Omitted	0.125mm/pulse

Output Format	None
Description	While any action other than a chart printing is operating, an execution error occurs

3.4. Memory Recording

NOTE *If a setting command related to memory recording is set while the RM1100 is operating, an execution error occurs*

SSC (Set Sampling Clock) Setting memory sampling speed

Function	Sets memory sampling speed.
Input Format	SSC P1, P2 (Delimiter)
	P1: Setting speed

P1	Speed value
1-500	Speed numerical value Recording unit is set by P2.

P2: Speed unit

P2	Speed unit
1	[μs]
2	[ms]
3	[s]

Output Format	None
Description	While the RM1100 is operating, an execution error occurs. Speed value is set for User2.

SBS (Set Block Size) Setting block size

Function	Sets block size.
Input Format	SBS P1 (Delimiter)
	P1: Block Size

P1	Block size	Setting condition
5	2,000,000data	Memory Block_=1/1
6	1,000,000data	Memory Block =1/2
7	500,000data	Memory Block =1/4
8	200,000data	Memory Block =1/10
9	100,000data	Memory Block =1/20
10	50,000data	Memory Block =1/40
11	20,000data	Memory Block =1/100
12	10,000data	Memory Block =1/100
13	5,000data	Memory Block =1/100
14	2,000data	Memory Block =1/100
15	1,000data	Memory Block =1/100

Output Format	None
Description	While the RM1100 is operating, an execution error occurs. The RM1100 does not support P1=1-4; therefore, a parameter error occurs when selecting it.

SMB (Set Memory Block)　Setting block No.

Function	Setting block No..
Input Format	SMB P1 (Delimiter)
	P1: Block No.　([1 - 100])
Output Format	None
Description	While theRM1100 is operating, an execution error occurs. The range varies depending on the segmentation number. (Example: 8 segmentation, [1-8])

STD (Set Trigger Delay)　Setting pre-trigger

Function	Sets pre-trigger.
Input Format	STD P1 (Delimiter)
	P1: Pre-trigger　([0-100]%:10% step)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. Becomes valid when recording in a memory block.

STE (Set Trigger Execution)　Setting trigger execution

Function	Sets trigger execution.
Input Format	STE P1 (Delimiter)
	P1: Trigger execution　(1=Once, 3=Endless)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. Be reflected only in memory recording. The RM1100 does not support P1=2; therefore, a parameter error occurs when selecting it.

SMC(Set Memory Copy) Sets the readout amount

Function	Sets the readout amount of the internal memory when copying
Input Format	SMC P1(Delimiter)
	P1: readout amount([10-100]%:10% step)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

3.5. Filing Recording

SRF (Set Realtime Filing) Setting Filing mode basics

Function	Sets recording speed, recording length, and recording method.
Input Format	SRF P1, P2, P3, P4, P5 (Delimiter)
	P1: Recording speed numeric value ([1-500, E]) P2: Recording speed Unit (1=[μs], 2=[ms], 3=[s]) P3: Data format (1=Peak, 2=Sampling) P4: Recording method (1=Normal, 2=Ringing) P5: Recording data number (Selecting 0 enables the whole "Free Disk Space")
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. The recording speed settings with P1 and P2 are limited from 1us to 10s.

SFT (Set Filing Time) Setting recording time

Function	Sets recording time.
Input Format	SFT P1, P2, P3, P4 (Delimiter)
	P1: Day number (0 or higher numeric value) (To be omitted, select 0) P2: Hour number (0 or higher numeric value) (To be omitted, select 0) P3: Minute number (0 or higher numeric value) (To be omitted, select 0) P4: Second number (0 or higher numeric value) (To be omitted, select 0)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. If the time is set at 0 hour, a parameter error occurs.

SRT (Set Real-Time filing Trigger) Setting Filing recording operation

Function	Sets real-time recording operation.
Input Format	SRT P1, P2 (Delimiter)
	P1: Starting execution of recording with detecting trigger. P2: Mark printing with trigger (1=ON)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. The repeat execution with P1=2 is valid only when a recording length is limited.

P1	Starting execution of recording with detecting trigger
0	Pressing "START" key initiates recording soon.
1	Detecting trigger initiates recording.
2	Detecting trigger initiates and repeats recording.

3.6. X-Y Recording

SXA (Set X-Axis) Sets X axis channel

Function	Sets X axis channel in X-Y recording
Input Format	SXA P1,P2(Delimiter)
	P1: X axis No. ([1-3]) P1: Sets channel ([1-8])
Output Format	None
Description	Registering is possible even if the specified channel is invalid. In this case, it doesn't draw in X-Y form.

SYC (Set Y-Ch) Sets Y axis channels

Function	Sets Y axis channels in X-Y recording
Input Format	SYC P1,P2 (Delimiter)
	P1: Y axis No. ([1-3]) P2: Sets channel.([1-8])
Output Format	None
Description	Registering is possible even if the specified channel is invalid. In this case, it doesn't draw in X-Y form.

3.7. Trigger

STM (Set Trigger Mode) Setting trigger mode

Function	Sets trigger mode.
Input Format	STM P1, P2 (Delimiter)
	P1: Trigger mode 0=OFF, 1=OR, 2=AND, 4=WINDOW

P1	Trigger mode
0	OFF (memory block=1 block)
1	OR
2	AND
3	<Reserved> A parameter error occurs.
4	WINDOW

	P2: <Reserved>
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. The RM1100 does not support P1=3, therefore, a parameter error occurs when selecting it.

STC (Set Trigger mode OR, AND Channel) Setting OR, AND trigger condition

Function	Sets OR, AND trigger condition.
Input Format	STC P1, P2, P3, P4 (Delimiter)
	P1: Channel number [1-9] P2: Detecting ON/OFF 0=OFF, 1=ON P3: Trigger level Selecting with measured value (within the dynamic range) P4: Slope 1=Rising edge, 2=Falling edge)
	----- For Logic amp(case of P1=9) ----- P3: Detecting logic 1=AND, 2=OR P4: Detecting pattern 0=X, 1=H, 2=L Example: For HHLL XXHL, “11220012”.
Output Format	None
Description	P1=9 is for an Logic amp. While the RM1100 is operating, an execution error occurs. When the selected channel is an invalid amp, a parameter error occurs.

STW (Set Trigger Window) Setting WINDOW trigger condition

Function	Sets WINDOW trigger condition.
Input Format	STW P1, P2, P3, P4, P5,P6 (Delimiter)
	P1: Channel number [1-8] P2: Detecting ON/OFF 0=OFF, 1=ON P3: <Reserved> P4: Maximum trigger level Selecting with measured value (within the dynamic range). P5: Minimum trigger level Selecting with measured value (within the dynamic range). P6: Trigger occurrence direction 1=IN, 2=OUT
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. When the selected channel is the amp other than an analog type of amp, a parameter error occurs.

STF (Set Trigger Filter) Sets trigger filter

Function	Sets trigger filter
Input Format	STF P1(Delimiter)
	P1: Trigger Filter [0-65534] 0=OFF
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

3.8. Amp Unit

Names of input units are represented by the following symbols.

Name of Amp Unit	Symbol
TC/DC amp unit	***HSTD***
Logic amp unit	***LOGIC***

SCH (Set CHannel) Setting HSTD amp

Function	Sets HSTD amp.
Input Format	SCH P1, P2, P3, P4, P5, P6, P7, P8 (Delimiter)
	P1: Selecting channel — [1-8, A] A means a batch setting. P2: Amp type — 12 Fixed P3: Input — 0=OFF, 1=ON, 2=GND P4: Setting range — The content varies depending on the P7 measurement mode. **P7=1 Temperature measurement mode with thermocouple** 1=R1760℃, 2=T400℃, 3=J1100℃, 4=K1370℃, 5=K500℃, 6=W2300℃, 7=R3200°F, 8=T800°F, 9=J2000°F, 10=K2500°F, 11=K1000°F, 12=W4200°F **P7=2 Voltage measurement mode** 1=500V, 2=200V, 3=100V, 4=50V, 5=20V, 6=10V, 7=5V, 8=2V, 9=1V, 10=500mV, 11=200mV, 12=100mV P5: Filter — 0=OFF, 1=50kHz, 2=500Hz, 3=50Hz, 4=5Hz P6: Position — [-100.00 to 200.00] Step 0.05 P7: Measurement mode — 1= Thermocouple, 2=Voltage measurement P8: Reference junction temperature compensation **P7=1 Temperature measurement mode with thermocouple** 1＝EXT、2＝INT **P7=2 Voltage measurement mode** 1＝AC、2＝DC
Output Format	None
Description	When P1 = A, the other selections apply to all the channels corresponding to the selected type with P2. When the amp type of selected channel does not correspond to P2, a parameter error occurs. While any action other than a chart recording is executing, an execution error occurs.

SCH (Set CHannel) Setting Logic amp

Function	Sets Logic amp.
Input Format	SCH P1, P2, P3, P4, P5, P6, P7, P8, P9 (Delimiter)
	P1: Selecting channel [1-16, A] A means a batch setting. P2: Amp type 5 fixed P3: Input 0=OFF, 1=ON P4: Signal type 1=V, 2=C The order of all 8 signals is sig1, 2, 3, to 8 from left . P5: Signal ON/OFF 0=OFF, 1=ON The order of all 8 signals is sig1, 2, 3, to 8 from left. P6: Signal number [1-8] P7: Wavelength position 0.0 to 99.0 [mm] P8: Vibration 2.0 to 12.5 [mm] P9: Width of base line 0.5 to 2.0 [mm]
Output Format	None
Description	When P1 = A, the other selections apply to all the channels corresponding to the selected type with P2. When the amp type of selected channel does not correspond to P2, a parameter error occurs. While any action other than a chart recording is executing, an execution error occurs.

SUS (Set User Scale) Sets user-scale

Function	Sets user-scale
Input Format	SUS P1, P2, P3, P4, P5, P6, P7, P8, P9,P10(Delimiter)
	P1: Selecting channel [1-16] P2: ON,OFF for physical conversion(0=OFF, 1=ON) P3: maximum input value(Can be omitted) P4:minimum input value (Can be omitted) P5:maximum output value (Can be omitted) P6:minimum output value (Can be omitted) P7:upper limit of recording full scale. (Can be omitted) P8:lower limit of recording full scale. (Can be omitted) P9:Unit setting(Can be omitted) 0= Standard, 2=N, 3=Pa, 4=mm, 5=με, 6= m/s^2, 7=°C, 8=Ω, 9= kg, 10= kgf, 11= kgf/cm^2, 12= g P10: User-specified unit (character string of a maximum of 9 characters) (Can be omitted)
Output Format	None
Description	When the selected channel is the amp other than an analog type of amp, a parameter error occurs.

3.9. Setting for Display and Printing

SDM (Set Display Mode) Sets display mode

Function	Sets display mode
Input Format	SDM P1(Delimiter)
	P1: 0=Y-T, 1= Numerical, 2=X-Y
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SWD (Set Scale Wave Division) Set scale wave division

Function	Sets scale wave division
Input Format	SWD P1(Delimiter)
	P1:number of division [1,2,4,8]
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SWF (Set Scale Wave flame) Setting Waveform Frame size

Function	Sets Waveform Frame size
Input Format	SWF P1, P2, P3 (Delimiter)
	P1: Frame [1-8] P2: Size <Reserved> P3: Display channel [0-FF]ASCII-HEX format LSB=CH1
Output Format	None
Description	While any action is executing, an execution error occurs. The frame becomes the order from 1 to 8 from the uppermost part to the lower side. The range of the frame specification (P1) changes according to the wavy record number of partitions. (ex. in case of divide into four, range from 1 to 4)

* ON/OFF of the scale display and the digital display, etc. cannot be set by the communication command.

3.10. Output to File and Recording Paper (including Backup Filing)

SMF (Set Memory Filing) Setting Filing

Function	Sets memory backup filing and file output of playback data.
Input Format	SMF P1, P2 (Delimiter)
	P1: Date format (1=Binary) P2: 0(fixing)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SPS (Set Print Size) Sets copy scaling

Function	Sets copy scaling of memory recorder or HD recorder in memory copy
Input Format	SPS P1(Delimiter)

P1: Sets copy scaling

P1	Sets copy scaling	P1	Sets copy scaling
0	X10	8	1/50
1	x5	9	1/100
2	x2	10	1/200
3	1/1	11	1/500
4	1/2	12	1/1000
5	1/5	13	1/2000
6	1/10	14	1/5000
7	1/20	15	1/10000

Output Format	None
Description	X100, x50, x20, and x10 cannot be set by the communication command.

3.11. System - Recording Setting

SDN (Set Data No.) Setting Data No.

Function	Sets data No..
Input Format	SDN P1 (Delimiter)
	P1: Data No. ([1 - 9999])
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. Recording automatically increments data No. (Next number of 9999 is 1.)

SAS (Set Auto Scaling) Sets auto scaling (ON/OFF)

Function	Sets auto scaling for print
Input Format	SAS P1 (Delimiter)
	P1: scale recording (0=OFF,1= scale after recording, 2= scale before recording 3= before and after scale before recording)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SAN (Set Annotation ON/OFF) Setting annotation print

Function	Sets annotation print.
Input Format	SAN P1, P2, P3, P4, P5, P6 (Delimiter)
	P1: System annotation print (0=OFF, 1=ON) P2: System channel annotation print (0=OFF, 1=ON) P3: <Reserved> P4: User page annotation print (0=OFF, 1=ON) P5: <Reserved> P6: Annotation print interval 30[cm]fixing
Output Format	None
Description	**P3 and P5 are parameters for compatibility with the RA1000 series so that they are invalid for the RM1100.**

* “TIP”, “TOP”, or “TCP” command supports the string of a user annotation page.

SPA (Set Print Auxiliary) Setting measurement information and signal name print

Function	Sets measurement information and signal name print (ON/OFF).
Input Format	SPA P1, P2, P3, P4, P5, P6, P7, P8, P9 (Delimiter)
	P1: <Reserved> Invalid P2: <Reserved> Invalid P1: Print signal name (0=OFF, 1=ON) P4 to 9: <Reserved> Invalid
Output Format	None
Description	**<Reserved> is a parameter for compatibility with the RA1000 series so that it is invalid for the RM1100.**

* “TSN”, “TOS”, or “TCS” command supports the string of a signal name.

3.12. System - Maintenance

SDT (Set DaTe) Setting clock

Function	Sets the internal clock.
Input Format	SDT P1, P2, P3, P4, P5, P6 (Delimiter)
	P1: Year (A.D.) (0 – 99) Last two digits P2: Month (1-12) P3: Date (1-31) P4: Hour (0-23) P5: Minute (0-59) P6: Second (0-59)
Output Format	None
Description	The setting of display format of a clock is not supported. When an invalid date (such as Feb.31) is selected, a parameter error occurs.

3.13. Other Settings

STR (Set TRans CH.) Setting real-time transfer channel

Function	Sets real-time transfer channel.
Input Format	STR P1, P2 (Delimiter)
	P1: Specifying channel ([1-9, A] A=Batch) P2: ON/OFF (0=OFF, 1=ON)
Output Format	None
Description	Real-time transfer is executed with the “ETS Execute Real-time data trans”

SAT (Set Auto Transmit) Setting transmit function

Function	Sets transmit function.
Input Format	SAT P1, P2 (Delimiter)
	P1: Record error occurrence 0=No transmit 1=Transmit P2: Transmit during recording 0=No transmit, 1=Transmit after recording is finished, 2=Transmit when trigger is detected.
Output Format	None
Description	When the specified cause occurs, “!” is output from the RM1100. The detailed cause can be confirmed with the “ICA Inquire auto transmit CAtion”

SIS (Set Input monitor trigger Sync) Set input monitor trigger sync

Function	Sets input monitor trigger sync.
Input Format	SIS P1(Delimiter)
	P1:trigger sync （0=OFF, 1=ON）
Output Format	None
Description	While I display a reproduction monitor screen, RM1100 move to an input monitor screen when I receive this command.

SRI (Set Rec & acqulsition) Set Rec & acqulsition

Function	Sets Rec & acquisition
Input Format	SRI P1,P2,P3,P4,P5(Delimiter)
	P1:chart rec （0=OFF, 1=ON） P2:memory rec （0=OFF, 1=ON） P3:memory auto copy （0=OFF, 1=ON） P4:memory bakup filing （0=OFF, 1=ON） P5:filing rec （0=OFF, 1=ON）
Output Format	None
Description	a state of the ON/OFF setting of collecting in each recorder mode

Mode	chart rec	memory rec	auto copy	bakup filing	SD-card rec
Pen recoder	ON	OFF	OFF	OFF	OFF
Memory Recorder	OFF	ON	*	*	OFF
Filing recorder	OFF	OFF	OFF	OFF	ON

ON=ON Fixing、 OFF =OFF fixing、 *=ON/OFF by setting

SBR (Set Base Recorder) Set Base Recorder

Function	Sets Base Recorder
Input Format	SBR P1,P2,P3,P4(Delimiter)
	P1: <Reserved> P2:T-AXIS set up(1=DIGI,2=PERIOD,3=VALUE） P3:: <Reserved> P4:: <Reserved>
Output Format	None
Description	While the RM1100 is operating, an execution error occurs.

SCC (Set Ch Color) Set Ch Color

Function	Sets Ch Color
Input Format	SCC P1,P2,P3(Delimiter)
	P1: Selecting channel [1-8, A] P2:Amp type (HSTD=12) P3:Wave color[0-8]

P1	Wave color
0	Yellow
1	Red
2	Sky blue
3	Green
4	Blue
5	pink
6	violet
7	orange
8	yellow green

Onput Format	None
Description	LOGIC amp can`t setting.

SDU (Set Display Unit) Set Display Unit)

Function	Sets Display Unit.
Input Format	SDU P1,P2(Delimiter)
	P1:Temporal axes direction unit:0=**s、 1＝**/div P2:Amplitude axial uni 0=full scale,1=div
Onput Format	None
Description	While the RM1100 is operating, an execution error occurs.

SDB (Set Display Bright) Set Display Bright

Function	Sets Display Bright
Input Format	SDB P1(Delimiter)
	P1:0=low,1=middle,2=high
Onput Format	None
Description	While the RM1100 is operating, an execution error occurs.

SMA (Set Monitor A direction) Set Monitor A direction

Function	Set Monitor A direction
Input Format	SMA P1(Delimiter)
	P1:0=generally,1=invert
Onput Format	None
Description	While the RM1100 is operating, an execution error occurs.

4. Information Readout Command – I**

4.1. Measurement Mode

IMM (Inquire Measure Mode)　Reading measurement mode

Function	Outputs measurement mode setting.
Input Format	IMM (Delimiter)
Output Format	A1 (Delimiter)
	A1: Measurement mode

A1	Measurement mode
1	Pen recorder
2	Memory recorder
3	Filing recorder
4	<Reserved>
5	<Reserved>
6	<Reserved>

Description	When an error occurs, "?" is returned.

4.2. Recording in General

ISS (Inquire filing Save Setting)　Reading where to save files

Function	Outputs where to save files.
Input Format	ISS (Delimiter)
Output Format	P1, P2, P3, P4, P5 (Delimiter)
	P1: Selecting drive　[D]fixing P2: Using user folder　(0=OFF, 1=ON) P3: Using Day folder　(0=OFF, 1=ON) P4: Using folder name　(String available for folder name) P5: File name (first 4 letters)　(Maximum 4 letters and alphanumeric)
Description	Reads where to save files of a HD recorder, a multi recorder, and a memory recorder (backup filing).

ISP (Inquire filing Save Pss)　Reading path to save files

Function	Outputs the setting of a path to save files.
Input Format	ISP (Delimiter)
Output Format	A1 (Delimiter)
	A1: The string of a path to save files
Description	

Recorder mode	What to be output
Pen recorder	Outputs “” because no file is saved.
Memory recorder	Output the path for a backup filing.
HD Recorder	Outputs the file path for SD filing.

4.3. Waveform Chart Recording

IPT (Inquire Pen-recorer Type) Inquire recording mode

Function	Outputs the recoding mode at Pen Recorder.
Input Format	IPT（Delimiter）
	A1：0=Wave pattern record、1=Digital record
Output Format	None
Description	

ICS (Inquire Chart Speed) Reading paper feeding speed of wavelength chart recording

Function	Outputs the setting of paper feeding speed of the waveform chart recording.
Input Format	ICS (Delimiter)
Output Format	A1, A2 (Delimiter)
	A1: Selecting speed

A1	Speed value
1-100	Speed numeric value
E	External synchronization recording

A2: Speed unit (When A1=1 to 10)

A2	Speed unit
1	[mm/s]
2	[mm/min]

A2: External synchronization pulse ratio (When A1=E)

A2	Sets speed value
1	0.125mm/pulse
2	0.03125mm/pulse

Description	

4.4. Memory Recording

NOTE If the setting command related to a memory recording is set while the RM1100 is operating, an execution error occurs.

ISC (Inquire Sampling Clock) Reading memory sampling speed

Function	Outputs the setting of memory sampling speed.
Input Format	ISC (Delimiter)
Output Format	A1, A2 (Delimiter)
	A1: Selecting speed value

A1	Speed value
1-999	Speed numeric value

A2: Speed unit (When A1=n)

A2	Speed unit
1	[μs]
2	[ms]
3	[s]

Description	

IBS (Inquire Block Size) Reading block size

Function	Outputs block size setting.
Input Format	IBS (Delimiter)
Output Format	A1 (Delimiter)
	A1: Block size

A1	Block size	A1	Block size
5	2000000data	11	20000data
6	1000000data	12	10000data
7	500000data	13	5000data
8	200000data	14	2000data
9	100000data	15	1000data
10	50000data		

Description	

IML (Inquire Memory Length) Memory Length

Function	Outputs the Memory Length.
Input Format	IML（Delimiter）
Output Format	A1（Delimiter）
	A1：memory data length
Description	

IMB (Inquire Memory Block) Reading block No.

Function	Outputs block No. setting.
Input Format	IMB (Delimiter)
Output Format	A1 (Delimiter)
	A1: Block No. ([1 - 100)
Description	

ITD (Inquire Trigger Delay)　Reading pre-trigger

Function	Outputs pre-trigger setting.
Input Format	ITD (Delimiter)
Output Format	A1 (Delimiter)
	A1: Pre-trigger　　([0-100]%)
Description	

ITE (Inquire Trigger Execution)　Reading trigger execution

Function	Outputs trigger execution setting.
Input Format	ITE (Delimiter)
Output Format	A1 (Delimiter)
	A1: Trigger execution　　(1=Once,, 3=Endless)
Description	

IMC (Inquire Memory Copy) Reading amount of copying the memory

Function	Outputs the readout amount setting in copying the memory
Input Format	IMC (Delimiter)
Output Format	A1 (Delimiter)
	A1: Readout amount setting ([1 – 100]%)
Description	

IMC (Inquire Memory Copy) Reading amount of copying the memory

Function	Outputs the readout amount setting in copying the memory
Input Format	IMC (Delimiter)
Output Format	A1 (Delimiter)
	A1: Readout amount setting ([1 – 100]%)
Description	

IMS (Inquire Memory Status) Memory Status)

Function	Outputs Memory Status. A function, an output form vary according to a parameter. RM1100 output the information of set memory block by the setting with the screen or SMB command now.
Input Format	IMS P1(Delimiter) P1:appoint information division

P1	information division
0	Output having data or not *1
1	Output start/trigger/end *2
2	output having data or not about all 100 blocks *1
3	Output having data or not/start/trigger/end *2
4	Output torigger address/end address *2
5	Output maxblock No that data are effective. *1

Output Format	When P1=0:A1(Delimiter) 0=no data,1=data
	When P1=1:A1(Delimiter):A1,A2,A3(Delimiter) A1=start time,A2=trigger time,A3=end time Form of the time character string : YY/MM/DD HH:MM:SS When no trigger : A2="**/**/** **:**:**" When no data : A1=A2=A3="**/**/** **:**:**"
	When P1=2:A1,A2,A3,……,A100(Delimiter)

An	Block	Data
0	available	None
1	available	Available
*	None	None

	When P1=3:A1,A2,A3,A4 (Delimiter) When P1=0:A1:the same value of A1 When P1=1:A2,A3,A4:the same value of A1,A2,A3
	When P1=4:A1,A2(Delimiter) A1 outputs a trigger address (numerical value) when no tirgger,outputs"*" A2 outputs a end address (numerical value) when no data,outputs"*"
	When P1=5:A1(Delimiter) Output max block number that data are effective when no data,outputs"*"
Description	

4.5. Filing Recording

IRF (Inquire Realtime Filing) Reading basics of Filing recorder

Function	Outputs the settings of recording speed, recording length, and recording method.
Input Format	IRF (Delimiter)
Output Format	A1, A2, A3, A4, A5 (Delimiter)
	A1: Recording speed value ([1-1000] A2: Recording speed unit (1=[μs], 2=[ms], 3=[s]) A3: Data format (1=Peak, 2=Sampling) A4: Recording method (1=Normal, 2=Rnging) A5: Recording data number (Selecting 0 enables continuing execution until the “STOP” key is pressed.)
Description	

IFT (Inquire Filing TIme) Reading recording time

Function	Outputs recording time setting.
Input Format	IFT (Delimiter)
Output Format	A1, A2, A3, A4 (Delimiter)
	A1=Day number, A2=Time number, A3=Minute number, A4=Second number
Description	

IRT (Inquire Real-Time fling Trigger) Reading Filing-mode recording operation

Function	Outputs real-time recording operation setting.
Input Format	IRT (Delimiter)
Output Format	A1, A2 (Delimiter)
	A1: Starting execution of recording by detecting trigger. A2: Mark print with trigger (0=OFF, 1=ON)
Description	

A1	Starting execution of recording by detecting trigger
0	Pressing “START” key initiates recording soon.
1	Detecting trigger initiates recording.
2	Detecting trigger initiate and repeat recording.

4.6. X-Y

IXC (Inquire X-Ch) Reading X axis channels

Function	Outputs X axis channels in X-Y recording
Input Format	IXC P1 (Delimiter)
	P1: X axis No. ([1-3])
Output Format	A1: (Delimiter)
	A1: X axis channel ([1-8])
Description	

IYC (Inquire Y-Ch) Reading Y axis channels

Function	Outputs Y axis channels in X-Y recording
Input Format	IYC P1 (Delimiter)
	P1: Y axis No. ([1-3])
Output Format	A1: (Delimiter)
	A1: Y axis channel ([1-8])
Description	When an error occurs, "?" is returned.

4.7. Trigger

ITM (Inquire Trigger Mode) Reading trigger mode

Function	Outputs trigger mode setting.
Input Format	ITM (Delimiter)
Output Format	A1 (Delimiter)
	A1: Trigger Mode 0=OFF, 1=OR, 2=AND, 4=WINDOW
Description	The RM1100 does not support A1=3 because it has no appropriate function.

ITW (Inquire Trigger Window) Reading WINDOW trigger condition

Function	Outputs the setting of WINDOW trigger condition.
Input Format	ITW P1 (Delimiter)
	P1: Channel number [1-8]
Output Format	A1, A2, A3, A4, A5 (Delimiter)
	A1: Detecting ON/OFF 0=OFF, 1=ON A2: <Reserved> A3: Maximum trigger level Represents with the measurement value. A3: Minimum trigger level Represents with the measurement value. A5: Trigger occurrence direction 1=IN, 2=OUT
Description	When the selected channel is an invalid amp, a parameter error occurs.

ITC (Inquire Trigger mode OR,AND Channel) Reading OR, AND trigger condition

Function	Outputs the setting of OR, AND trigger condition.
Input Format	ITC P1 (Delimiter)
	P1: Channel number [1-9]
Output Format	A1, A2, A3 (Delimiter)
	A1: Detecting ON/OFF 0=OFF, 1=ON A2: Varies depending on amp type (see below). A3: Varies depending on amp type (see below).
	----- For HSTD amp ----- A2: Trigger level Represents with the measurement value. A3: Slope 1=Rising edge, 2=Falling edge
	----- For Logic amp ----- A2: Detecting logic 1=AND, 2=OR A3: Detecting pattern 0=X, 1=H, 2=L Outputs Sig1, Sig2, to Sig8 in the order from left. Example: For HHLL XXHL, “11220012”.
Description	When the selected channel is an invalid amp, a parameter error occurs. When an error occurs, "?,?,?" is returned.

ITF (Inquire Trigger Filter) Reading trigger filter

Function	Outputs trigger filter setting.
Input Format	ITM (Delimiter)
Output Format	A1 (Delimiter)
	A1: Trigger Filter [0-65534] 0=OFF
Description	

4.8. Amp Unit

Names of input units are represented by the following symbols.

Name of Amp Unit	Symbol
TC/DC amp unit	***HSTD***
Logic amp unit	***LOGIC***

ICH (Inquire CHannel) Reading HSTD amp setting

Function	Outputs HSTD amp setting.	
Input Format	ICH P1 (Delimiter)	
	P1: Selecting channel [1-8]	
Output Format	A1, A2, A3, A4, A5, A6, A7 (Delimiter)	
	A1: Amp type	12 fixed
	A2: Input	0=OFF, 1=ON, 2=GND
	A3: Setting range	The content varies depending on an A6 measurement mode. A6=1 Temperature measurement mode with thermocouple 1=R1760℃,2=T400℃,3=J1100℃, 4=K1370℃,5=K500℃,6=W2300℃ A6=2 Voltage measurement mode 1=500V, 2=200V, 3=100V, 4=50V, 5=20V, 6=10V,7=5V, 8=2V, 9=1V, 10=500mV, 11=200mV, 12=100mV
	A4: Filter	0=OFF, 1=50kHz, 2=500Hz, 3=50Hz, 4=5Hz
	A5: Position	[-100.00 to 200.00] Step 0.05
	A6: Measurement mode	1= Thermocouple, 2=Voltage measurement
	A7: Reference junction temperature compensation	When A6=1:1=EXT, 2=INT When A6=2:1=AC, 2=DC
Description		

ICH (Inquire CHannel) Reading Logic amp setting

Function	Outputs Logic amp setting.	
Input Format	ICH P1, P2 (Delimiter)	
	P1: Selecting channel [1-9] P2: Signal number [1-8] (To be omitted, select 8)	
Output Format	A1, A2, A3, A4, A5, A6, A7, A8 (Delimiter)	
	A1: Amp type	5 fixed
	A2: Input	0=OFF, 1=ON
	A3: Signal type	1=V, 2=C The order of all 8 signals is sig1, 2, 3, to 8 from left .
	A4: Signal ON/OFF	0=OFF, 1=ON The order of all 8 signals is sig1, 2, 3, to 8 from left.
	A5: Signal number	[1-8] The same as the setting with P2.
	A6: EV Wavelength position	0.0 to 99.0 [mm]
	A7: Vibration	2.0 to 12.5 [mm]
	A8: Width of base line	0.5 to 2.0 [mm]
Description		

ICH (Inquire CHannel) Reading invalid amp setting

Function	Outputs the value meaning that the selected channel is an invalid amp.
Input Format	ICH P1 (Delimiter)
	P1: Selecting channel [1-9]
Output Format	Outputs “0,0,0,0”.
Description	

IUS (Inquire User Scale) Reading user-scale

Function	Outputs user-scale
Input Format	IUS P1 (Delimiter)
	P1: Selecting channel [1-8]
Output Format	A1: ON,OFF for physical conversion(0=OFF, 1=ON) A2: maximum input value(Can be omitted) A3:minimum input value (Can be omitted) A4:maximum output value (Can be omitted) A5:minimum output value (Can be omitted) A6:upper limit of recording full scale. (Can be omitted) A7:lower limit of recording full scale. (Can be omitted) A8:Unit setting(Can be omitted) 0= Standard, 2=N, 3=Pa, 4=mm, 5=με, 6= m/s^2, 7=° C, 8=Ω, 9= kg, 10= kgf, 11= kgf/cm^2, 12= g U=User unit designation A9: User-specified unit (character string of a maximum of 9 characters) (Can be omitted)
Description	When the selected channel is the amp other than an analog type of amp, a parameter error occurs. When an error occurs, "?,?,?,?,?,?,?,?,?" is returned.

4.9.Output to File and Recording Paper (including Backup Filing)

IDM (Inquire Display Mode) Reading display mode

Function	Outputs display mode
Input Format	IDM(Delimiter)
Output Format	A1: 0=Y-T, 1= Numerical, 2=X-Y
Description	

IWD (Inquire Scale Wave Division) Reading scale wave division

Function	Outputs scale wave division
Input Format	IWD(Delimiter)
Output Format	A1:number of division [1,2,4,8]
Description	

IWF (Inquire Scale Wave flame) Reading Waveform Frame size

Function	Outputs Waveform Frame size	
Input Format	IWF P1 (Delimiter)	
	P1: Frame	[1-8]
Output Format	A1: Size A2: Display channel	[0]fixed [0-FFFF]ASCII-HEX format LSB=CH1
Description	The frame becomes the order from 1 to 8 from the uppermost part to the lower side.	

4.10. Output to File and Recording Paper (including Backup Filing)

IMF (Inquire Memory Filing) Reading Setting Filing

Function	Outputs memory backup filing and file output of playback data.
Input Format	IMF P1, P2 (Delimiter)
Output Format	A1: Date format (1=Binary) A2: 0(invalid)
Description	

IPS (Inquire Print Size) Reading copy scaling

Function	Outputs copy scaling of memory recorder or HD recorder in memory copy
Input Format	IPS (Delimiter)
Output Format	A1: Sets copy scaling

A1	Sets copy scaling	A1	Sets copy scaling
0	X10	8	1/50
1	x5	9	1/100
2	x2	10	1/200
3	1/1	11	1/500
4	1/2	12	1/1000
5	1/5	13	1/2000
6	1/10	14	1/5000
7	1/20	15	1/10000

Description	X100, x50, x20, and x10 cannot be set by the communication command.

4.11. System – Recording Setting

IDN (Inquire Data No.) Reading data No.

Function	Outputs data No. setting.
Input Format	IDN (Delimiter)
Output Format	A1 (Delimiter)
	A1: Data No. ([1 - 9999])
Description	

IAN (Inquire ANnotation) Reading annotation print setting

Function	Outputs annotation print setting.
Input Format	IAN (Delimiter)
Output Format	A1, A2, A3, A4, A5, A6 (Delimiter)
	A1: System annotation print (0=OFF, 1=ON) A2: System annotation print (0=OFF, 1=ON) A3: User channel annotation print (0=OFF fixed) A4: User page annotation print (0=OFF, 1=ON) A5: Printing device ID (1=ON fixed) A6: Annotation print interval (0=The first time only, 30-1000[cm])
Description	**A3 and A5 are answers for compatibility with the RA1000 series so that they output the fixed value in the RM1100.**

IPA (Inquire Print Auxiliary) Reading settings of measurement information and signal name printing.

Function	Outputs the settings of measurement information and signal name (ON/OFF).
Input Format	IPA (Delimiter)
Output Format	A1, A2, A3, A4, A5, A6, A7, A8, A9 (Delimiter)
	A1: 0 fixed A2: 31 fixed A3: Printing signal name (0=OFF, 1=ON) A4: 31 fixed A5-9: 0 fixed
Description	A2 and from A4 to A9 are parameters for compatibility with the RA1000 series.

IAS (Inquire Auto Scaling) Reading auto scaling (ON/OFF)

Function	Outputs auto scaling for print
Input Format	IAS (Delimiter)
Output Format	A1 (Delimiter) A1: scale recording (0=OFF,1= scale after recording, 2= scale before recording 3= before and after scale before recording)
Description	

4.12. System - Maintenance

IWH (Inquire WHo) Reading version information

Function	Outputs version information.
Input Format	IWH P1 (Delimiter)
	P1: Selecting item (0-2) Refer to the description. (Can be omitted, the same when P1=0)
Output Format	A1 (Delimiter)
Description	Relation between P1 and A1

P1	Output item	A1
0	Device type	“RM1100” fixed
1	Version of the RA2300	“V1.0” *
2	Device No.	“1234567”*

*A version and the equipment number vary according to a real device.

IDT (Inquire DaTe) Reading clock

Function	Outputs the internal clock setting.
Input Format	IDT (Delimiter)
Output Format	A1, A2, A3, A4, A5, A6 (Delimiter)
	A1: Year (A.D.) (0-99) Last two digits A2: Month (1-12) A3: Date (1-31) A4: Hour (0-23) A5: Minute (0-59) A6: Second (0-59)
Description	The setting of display format of a clock is not supported.

4.13. Other Settings

IES (Inquire Error Status)　Reading error status

Function	Outputs characters corresponding to the command type detecting an error.
Input Format	IES (Delimiter)
Output Format	A1 (Delimiter):
	For one bite control command Command / HEX / Content of process / A1 [ENQ] / 05 / Outputs the status of the RM1100. / ^E [CAN] / 18 / Suspends command execution. / ^X A code where 40h is added to "^" is output. For details of one bite command, see "One Bite Control Command".
	For escape sequence Command / Content of Process / A1 [ESC]+Z / Returns to a local status. / eZ [ESC]+R / Clears a send buffer. / eR [ESC]+C / Outputs a status. / eC [ESC]+E / Outputs error information. / eE A code where [ESC] and an additional character are added to "e" is output. For details of escape sequence, see "Escape Sequence".
	For string command A string received as a command string is output. For details of string command, see "String Command".
	When no error occurs, "*" is output.
Description	After the answer A1 is output, the detected error is cleared.

IAT (Inquire Auto Transmit)　Reading transmit function

Function	Outputs the transmit function setting.
Input Format	IAT (Delimiter)
Output Format	A1, A2 (Delimiter)
	A1: Record error occurrence 0=No transmit 1=Transmit A2: transmit during recording　0=No transmit, 1=Transmit after recording is finished,　2=Transmit when trigger is detected.
Description	

IDA (Inquire Input monitor DAta) Reading measurement value of input signal

Function	Outputs the current settings of measurement value of input signal.
Input Format	IDA P1 (Delimiter) P1: Selecting output P1 | Content of output [1-9] | Outputs a channel of measurement value. A | Outputs all channels of measurement values. [U1-U16] | Outputs amp information.
Output Format	When P1=[1-9] A1 (Delimiter) Outputs a channel of measurement value (ASCII string). When P1=A A1, A2 to A18 (Delimiter) Outputs all channels of measurement values including E1 (ASCII string). When P1=[U1-U16] A1, A2 (Delimiter) A1: Amp type A1 | Content of output 0 | ***None*** 5 | ***LOGIC*** 12 | ***HSTD*** A2: Unit string Example: “mV” etc. (A null character is output for EV amp.)
Description	The selected channel of the current measurement value is output in string.

ICA (Inquire Auto Transmit CAtion) Reading transmit factor

Function	Outputs the setting of the factor of transmit from the RM1100.
Input Format	ICA (Delimiter)
Output Format	A1 (Delimiter) A1: Transmit factor ΣA1 | Factor 1 | Printer error 2 | File error 4 | Measurement completed 8 | Trigger detection The logical OR of the number of factors is output for multiple factors. (in a decimal number) Example: When a printer error and a file error occur, A1=3.
Description	

IIS(Inquire Input monitor trigger Sync) Reading input monitor trigger sync

Function	Outputs input monitor trigger sync.
Input Format	IIS(Delimiter)
Output Format	A1:trigger sync（0=OFF, 1=ON）
Description	

IRI (Inquire Rec & acqulsition) Reading Rec & acqulsition

Function	Outputs Rec & acquisition
Input Format	IRI (Delimiter)
Output Format	A1:chart rec （0=OFF, 1=ON） A2:memory rec （0=OFF, 1=ON） A3:memory auto copy （0=OFF, 1=ON） A4:memory bakup filing （0=OFF, 1=ON） A5:filing rec （0=OFF, 1=ON）
Description	a state of the ON/OFF setting of collecting in each recorder mode ON=ON Fixing、 OFF =OFF fixing、 *=ON/OFF by setting

IBR (Inquire Base Recorder) Reading Base Recorder

Function	Outputs Base Recorder
Input Format	IBR (Delimiter)
Output Format	A1: 0 fixed A2:T-AXIS set up(1=DIGI,2=PERIOD,3=VALUE） A3::1 fixed A4::0 fixed
Description	

ICC (Inquire Ch Color) Reading Ch Color

Function	Outputs Ch Color
Input Format	ICC P1(Delimiter)
	P1:0=channel select
Onput Format	A1:Wave color

A1	Wave color
0	Yellow
1	Red
2	Sky blue
3	Green
4	Blue
5	pink
6	violet
7	orange
8	yellow green

Description	

IDU (Inquire Display Unit) Reading Display Unit)

Function	Outputs Display Unit.
Input Format	IDU(Delimiter)
Onput Format	P1:Temporal axes direction unit:0=**s、 1＝**/div P2:Amplitude axial uni 0=full scale,1=div
Description	

IDB (Inquire Display Bright) Reading Display Bright

Function	Outputs Display Bright
Input Format	IDB(Delimiter)
Onput Format	A1:0=low,1=middle,2=high
Description	

IMA (Inquire Monitor A direction) Reading Monitor A direction

Function	Outputs Monitor A direction
Input Format	IMA (Delimiter)
Onput Format	P1:0=generally,1=invert
Description	

5. Execution Command – E**

5.1. Storing and Printing Operations

EST (Execute StarT) Starting printing

Function	Starts printing and storing,
Input Format	EST P1 (Delimiter)
	P1: <Reserved> No selection is valid. (Can be omitted)
Output Format	None
Description	As in the case with pressing the “START” key on the operation panel, Storing and Printing are started according to the current setting of a recorder mode.

ESP (Execute StoP) Stopping the RM1100 execution

Function	Stop the RM1100 execution.
Input Format	ESP (Delimiter)
Output Format	None
Description	As in the case with pressing the “STOP” key on the operation panel, the process of an execution such as recording can be stopped.

ECP (Execute CoPy) Executing memory copy

Function	Executing memory copy.
Input Format	ECP P1,P2(Delimiter) P1:Start address 0 to (N – 1) (Can be omitted.) P2:Data count 1 to N (Can be omitted.)
Output Format	None
Description	The copy output is executed as well as the case to push "Copy" key on the replay screen When P1 and P2 are omitted, all data is copied. When only either is omitted, it becomes an error.

EMT (Execute Manual Trigger) Executing manual trigger

Function	Executes manual trigger.
Input Format	EMT (Delimiter)
Output Format	None
Description	As in the case with pressing the “M.TRIG” key on the operation panel, a trigger is generated.

EMK (Execute MarK) Executing prin

Function	Executes manual trigger.
Input Format	EMK (Delimiter)
Output Format	None
Description	As in the case with pressing the “M.TRIGT” key on the operation panel, prints an event mark.

5.2. Memory Clear

EMC (Execute Memory block data Clear) Clearing memory block data

Function	Clears the contents of a memory.
Input Format	EMC P1 (Delimiter)
Output Format	P1 (Delimiter)
	P1: Selecting the memory block number to be cleared. (Can be omitted.)

P1	Contents of Initializing
[1-100]	Clears the selected memory block. When the selected number is more than the current number of block divisions, a parameter error occurs.
A	Clears all blocks.
Omitted	Clears the current block.

Description	Valid only when the RM1100 is stopped. Otherwise, an execution error occurs.

5.3. Data Transfer

EIM (Execute Input Monitor data trans) Executing monitor transfer

Function	Transfers a screenful of data in the input wavelength monitor.
Input Format	EIM P1(Delimiter)
	P1=none P1=0:Clears two counters of the transmission counter and eight byte counter. P1=1
Output Format	A1 (Delimiter) <Binary data>
	When P1=0 A1: Outputs the number of transferred bytes of a line. When P1=1 A1: Adds an 8byte counter level before binary data "0" means no transmit channel. "?" means that transmit is disallowed during HD recording. "*" means that the selected transmit speed beyond the spec disallows transmission. When the other values are output, no binary data is output anymore. <Binary data>: Raw data of the current input signal (A/D value) Sample: [STX](D1.DAT)(D2.DAT)(D3.DAT)……(D16.DAT)[SUM] Peak: [STX](D1.MAX)(D1.MIN)(D2.MAX) ……(D16.MIN)[SUM] []: one byte, ():two bites
Description	A screenful of data on the input monitor without any restrictions is transferred from the RM1100 status. Monitoring signals at remote site with the communication during recording is enabled.

ETS (Execute Real time data trans)　Executing real-time transition

Function	Executes real-time transition
Input Format	ETS P1, P2, P3 (Delimiter)
	P1: Date format　(0=Sample, 1=Peak) P2: Transmit speed unit　(0=ms, 1=s) P3: Transmit speed numeric value　([1-1000])
Output Format	A1 (Delimiter) <Binary data>
	A1: Outputs the number of transferred bytes of a line. "0" means no transmit channel. "?" means that transmit is disallowed during HD recording. "*" means that the selected transmit speed beyond the spec disallows transmission. When the other values are output, no binary data is output anymore. <Binary data>: Raw data of the current input signal (A/D value) Sample: [STX](D1.DAT)(D2.DAT)(D3.DAT)……(D16.DAT)[SUM] Peak:　[STX](D1.MAX)(D1.MIN)(D2.MAX) ……(D16.MIN)[SUM] []:one byte, ():two bites
Description	A transmit channel is selected in "STR　Setting real-time transmit channel ". Exceptional process When something abnormal occurs during execution, the following error code is output instead of start code [STX] indicating the beginning of data. [EOT] (04ch) …The RM1100 received a command and then transmission was terminated. [CAN] (18ch) Since reception process on the host side was not done in time, it is judged that transmission is disallowed and then transmission was terminated. Terminating transmission To terminate transmission, execute the ESP command. When ESP is executed, the RM1100 outputs [EOT] to terminate transmission, and the normal state of receiving commands is entered

5.4. Others

EPA (Execute Page Annotation) Executing page annotation print

Function	Execute page annotation print.
Input Format	EPA (Delimiter)
Output Format	None
Description	When the RM1100 is not operating, a page annotation is printed. When waveforms are being recorded, a page annotation is printed over the waveforms. annotation is printed every 30cm. When a printer is unconnected, an execution error occurs.

EFD (Execute paper FeeD) Executing paper feed

Function	Execute page annotation print.
Input Format	EFD P1(Delimiter) P1: Sets recording paper feeding amount ([1-100])mm (Can be omitted.)
Output Format	None
Description	When P1 is set, paper is fed according to the set amount. When P1 is omitted, feeding continues until another command is received. The ESP command is used to stop feeding. When a printer is unconnected, an execution error occurs.

ESI (Execute System Initialize) Execute System Initialize

Function	Execute System Initialize
Input Format	ESI P1(Delimiter)
	P1:Initialization contents

P1	Setting of initialization contents
1	Initialize only main body configured data
2	Initialize only main body configured data and all memory block.

Output Format	None
Description	The communication setting is not initialized. When a printer is unconnected, an execution error occurs.
Caution	when P1=1.When block size varies with initialization, the memory data are lost.

ETP (Execute System Initialize) Execute System Initialize

Function	Execute System Initialize
Input Format	ETP(Delimiter)
Output Format	None
Description	While the RM1100 is operating, an execution error occurs. When a printer is unconnected, an execution error occurs.

6. File/Data Operation Command – F**

FDS (File Data file Save)　Saving memory recording data as file

<table>
<tr><td>Function</td><td>Saves memory recording data as a file.</td></tr>
<tr><td>Input Format</td><td>FDS P1 (Delimiter)
P1: Saved file name (without extension)</td></tr>
<tr><td>Output Format</td><td>A1, A2 (Delimiter)
A1: Current folder information
<table>
<tr><th>A1</th><th>Drive (folder) Information</th></tr>
<tr><td>0</td><td>All access possible</td></tr>
<tr><td>1</td><td>Read only</td></tr>
<tr><td>2</td><td><Reserved></td></tr>
<tr><td>3</td><td><Reserved></td></tr>
<tr><td>4</td><td>No media</td></tr>
<tr><td>5</td><td>No drive</td></tr>
<tr><td>6</td><td>Other error</td></tr>
</table>
A2: Execution information of file saving
<table>
<tr><th>A2</th><th>Execution Information of File Operation</th></tr>
<tr><td>0</td><td>Successful</td></tr>
<tr><td>1</td><td><Reserved></td></tr>
<tr><td>2</td><td>Write error</td></tr>
<tr><td>3</td><td><Reserved></td></tr>
<tr><td>4</td><td><Reserved></td></tr>
<tr><td>5</td><td><Reserved></td></tr>
<tr><td>6</td><td>Same file name</td></tr>
<tr><td>7</td><td>Other error</td></tr>
</table></td></tr>
<tr><td>Description</td><td>According to the current setting (block number and copy range), memory data is saved in a file.
The file is saved in the current folder with the file name selected with P1.
The extension is “FSD”. (Automatically added)
When a file name is selected with an extension:　A1=6, A2=7 A parameter error occurs.
When the block has no data:　A1=6, A2=7 An execution error occurs.
When the RM1100 is operating:　A1=6 A2=7 An execution error occurs.</td></tr>
</table>

*7. Text Operation Command – T***

7.1. Page Annotation String

TIP (Text Input Page)　Inputting page annotation string

Function	Inputs page annotation string.
Input Format	TIP (Delimiter) P: <Line number>:<String> (Delimiter) 　: E:: (Delimiter)
	<Line number> The line number from 1 to 52 can be selected. <String> S-SJIS code　Maximum 80 characters can be input. * An one-byte character can be input but is converted into S-JIS code to be registered.
Output Format	None
Description	Once the TIP command is received, an input mode becomes the mode where texts are input by line. From then on, it is possible to select a line to input string. Exit from the input mode with the reception of “E”.

TOP (Text Output Page)　Outputting page annotation string

Function	Outputs page annotation string.
Input Format	TOP P1 (Delimiter)
	P1: Selecting line　[1-52] or A When any number is selected:　Only a single line is output. When “A” is selected:　All lines are output.
Output Format	When P1=[1-52], only a single line of string is output. 　<String> (Delimiter) When P1=A, the output is given in the following format, which is the same as the input of TIP. 　P: <Line number>:<String> (Delimiter) 　　: 　E:: (Delimiter)
Description	When P1=A (all lines are selected), the output of lines including no string are omitted.

TCP (Text Clear Page)　Clearing page annotation string

Function	Clears page annotation string.
Input Format	TCP P1: Selecting line [1-52] or A
	When any number is selected:　Only string in a single line is cleared. When “A” is selected:　All lines are cleared.
Output Format	E:: (Delimiter)
Description	The selected line is cleared and then “E” is output as an ending code. When the selection of P1 has an error, “?” is output as a parameter error.

7.2. Signal Name String

TSN (Text input SigNal) Inputting signal name string

Function	Inputs signal name string.
Input Format	TSN (Delimiter) When HSTD amp S: <Channel number>:<String> (Delimiter) When LOGIC amp S: <Channel number>:<Signal number>:<String> (Delimiter)
	<Channel number> Selecting a channel number [1-9]. <Signal number> For an analog amp, "1" fixed. For an EV amp, select a signal number [1-8]. <String> Maximum 30 characters in JIS code * An one-byte character can be input. It is converted into S-JIS code to be registered. Example: For analog channel TSN (Delimiter) S:1:Vertical oscillation (Delimiter) Example: For an event channel (and E1) TSN (Delimiter) S:15:1:Water gate 1 (Delimiter) TSN (Delimiter) S:15:2:Water gate 2 (Delimiter)
Output Format	None
Description	In contrast to the TIP command, this command is input in just a single line.

TOS (Text Output Signal) Outputting signal name string

Function	Outputs signal name string.
Input Format	TOS P1, P2 (Delimiter)
	P1: Channel number [1-9, A] When a number is selected: Only a single line is output. When "A" is selected: All lines are output. P2: Selecting the signal number in an event. (To be omitted, select 1)
Output Format	For TOS 1 (Delimiter), the signal name of CH1 is output. S:1:<String> (Delimiter) For TOS 7.2 (Delimiter), the signal names of CH7 and the signal number 2 are output. S:15:2: <String> (Delimiter) For TOS A (Delimiter), the signal names of all channels are output. S:1:<String> (Delimiter) S:2:<String> (Delimiter) -- <omitted> -- S:9:1: <String> (Delimiter) S:9:2: <String> (Delimiter) -- <omitted> -- S:9:8: <String> (Delimiter) E:: (Delimiter)
Description	

TCS (Text Clear Signal)　Clearing signal name string

Function	Clears signal name string.
Input Format	TCS P1 (Delimiter)
	P1: Selecting channel　[1-9、A] When a number is selected: Only the signal name string in the selected channel is cleared. When [A] is selected: The signal name strings of all channels are cleared.
Output Format	E:: (Delimiter)
Description	The selected channel is cleared and then “E” is output as an ending code. When the selection of P1 has an error, “?” is output as a parameter error.

8. Reference

8.1. Character Code List

8 bits

Low-order 4 bits -- Hexadecimal representation	High-order 4 bits・・・Hexadecimal representation											
	0	1	2	3	4	5	6	7	A	B	C	D
0	NUL		SP	0	@	P	`	p		ー	タ	ミ
1	SOH	Xon	!	1	A	Q	a	q	。	ア	チ	ム
2	STX		“	2	B	R	b	r	「	イ	ツ	メ
3	ETX	Xoff	#	3	C	S	c	s	」	ウ	テ	モ
4	EOT	DC4	$	4	D	T	d	t	、	エ	ト	ヤ
5	ENQ	NAK	%	5	E	U	e	u	・	オ	ナ	ユ
6	ACK		&	6	F	V	f	v	ヲ	カ	ニ	ヨ
7	BEL		‘	7	G	W	g	e	ァ	キ	ヌ	ラ
8	BS	CAN	(	8	H	X	h	x	ィ	ク	ネ	リ
9	HT		)	9	I	Y	i	y	ゥ	ケ	ノ	ル
A	LF	EOF	*	:	J	Z	j	z	ェ	コ	ハ	レ
B	VT	ESC	+	;	K	[	k	{	ォ	サ	ヒ	ロ
C	FF		,	<	L	¥	l	|	ャ	シ	フ	ワ
D	CR		-	=	M	]	m	}	ュ	ス	ヘ	ン
E	SO		.	>	N	^	n	~	ョ	セ	ホ	゛
F	SI		/	?	O	_	o	DEL	ッ	ソ	マ	゜

To Ensure Prolonged Use

A&D Company, Limited.

Thank you for purchasing an A&D Company, Limited. product.

To ensure prolonged use of the product that you have purchased, we offer the following lineup of maintenance services.

1. Warranty Period

The warranty period for this product is one year from the date of purchase (or two years depending on the option). In case of a failure, the product will be repaired free of charge (only if the failure is ascribable to the responsibility of A&D).

2. Disclaimers

We take no responsibility for any damages caused by the following reasons;

(1) Consequential damages and production compensation caused by any accidents of our product;
(2) Damages of our product generated by other companies' equipments and their construction;
(3) When operation, proper maintenance, and regular inspection are not done;
(4) Troubles which are apparently not attributable to our company or those that cannot be decided clearly whether our company is responsible for those troubles;
(5) Exhaustion of consumptions and repair parts;
(6) Troubles attributed to third party's conflicts;
(7) Troubles caused by a force majeure such as natural disasters

---

A&D Company, Limited

Head Office 3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170-0013 Japan
TEL +81-3-5391-6132 FAX +81-3-5391-6129

Address inquiries to:

RM1100
Communication Commands (1WMPD4003456)

1st Edition : July, 2014
2nd Edition : May, 2015
3rd Edition : October, 2016

A&D Company, Limited

A&D Company, Limited
3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170-0013, JAPAN
Telephone: [81] (3) 5391-6132 Fax: [81] (3) 5391-6148