OPERATION MANUAL

DATA TRANSMISSION ANALYZER

MD6420A

VOLUME 2

(REFERENCE)

1992.04
Ver. II

ANRITSU CORPORATION

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2001

CERTIFICATION

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PREFACE

Operation Manual Composition:

The MD6420A operation manual is divided into VOLUME 1 and VOLUME 2. VOLUME 1 contains the information necessary to operate and make measurements with the MD6420A.

VOLUME 2 explains the menus and remote control commands in detail. Refer to it as required.

Both volumes are for the MD6420A main frame. For detailed information regarding the plug-in units, refer to the manual for each unit.

VOLUME 1 and VOLUME 2 consist of the following sections:

VOLUME 1 (OPERATION)
SECTION 1 GENERAL
SECTION 2 OPERATION
SECTION 3 MEASUREMENT
SECTION 4 APPLICATION
SECTION 5 REMOTE CONTROL
SECTION 6 PRINCIPLE OF OPERATION
SECTION 7 SIMPLE OPERATION CHECKS
SECTION 8 STORAGE AND TRANSPORTATION
APPENDIX A ABBREVIATIONS
APPENDIX B TABLE FOR DATA CODE

VOLUME 2 (REFERENCE)
SECTION 1 REMOTE CONTROL COMMAND REFERENCE
SECTION 2 RESPONSE DATA REFERENCE
SECTION 3 MENU REFERENCE
APPENDIX A ABBREVIATIONS

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WARNING

NO OPERATOR SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.

CAUTION

FOR CONTINUED FIRE PROTECTION REPLACE
ONLY WITH SPECIFIED TYPE AND RATED FUSE.

Note :

WARNINGs, ***CAUTION***s, ***Note***s, and Explanatory footnotes are used in this manual. Their meanings are given below:

WARNING:	***WARNING is used when there is a personal injury hazard.***
CAUTION:	***CAUTION is used when the equipment may be damaged.***
Note:	Note is used to provide information about exceptions, corrections, and restrictions.
Explanatory footnote:	Explanatory footnotes provide comments on the same page as the text, figure or table. They are referenced by either an asterisk (*) or by combination of an asterisk and numeral.

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SECTION 1

REMOTE CONTROL

COMMAND REFERENCE

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1.1 Comments on Command Reference Explanation

<Example>

CUN ①	CONDITION OF COLLECT Screen ②	Enabled only when MD0633A Error Analyze Units are inserted ③	
Setting for MD0633A Error Analyze Unit No. ④			
Format	CUN n ⑤	Parameter range	1 ~ 5 ⑥
< Details > ⑦ Set error analyze unit to be used. When a number of error analyze units are inserted, this screen is used to select the object error analyze unit. When there is only one error analyze unit, that unit is automatically selected. n: Unit No. (1 to 5)			

① Command name : Program message command issued from controller

② Mode : Indicates mode of the command screen

③ Note : Describes notes and restrictions for the command

④ Explanation : Describes basic meaning of command

⑤ Command format : Describes setting method and parameter types
n, m, and ℓ indicate first to third parameters, respectively.

⑥ Parameter range : The range of each parameter is indicated. When there are no parameters, "none" is indicated.

⑦ Details : Explains details of command setting method, conditions, and meaning of each parameter.

1.2 Command Reference

1.2.1 IEEE488.2 common commands

Commands in this paragraph can be used at any time regardless of the screen state.

＊CLS	Common to IEEE 488.2	

Clears all summary-display event registers via STB register

Format	＊CLS	Parmaeter range	None

<Details>

The following summary-display event registers can be cleared via the STB status byte:

- Standard event status register (ESR)
- EDN event status register (ESAR)
- Error event status register (ESBR)

When the appropriate bits of the STB byte are set, these event status registers are cleared to 0. In addition, the corresponding summary-message bit for each event status register in STB is set to OFF.

- ESR summary message (STB bit-5)
- ESAR summary message (STB bit-2)
- ESBR summary message (STB bit-3)

The output queue is never cleared. Consequently, the MAV bit (STB bit-4) is never set to OFF.

Status byte register (STB)

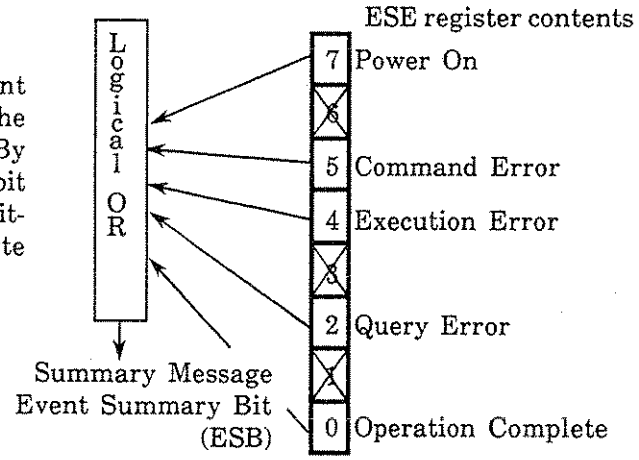
* ESE	Common to IEEE 488.2	

Sets ESE register

Format	* ESE n	Parameter range	0 ~ 255 (decimal number)

<Details>

The 8-bit binary numeral of the standard event status enable register (ESE register) is set to the specified parameter value with a decimal value. By setting the ESE register, when the corresponding bit of the standard event status register (ESR) is ON, bit-5 (ESR summary message bit) of the status byte register (STB) is set to ON.



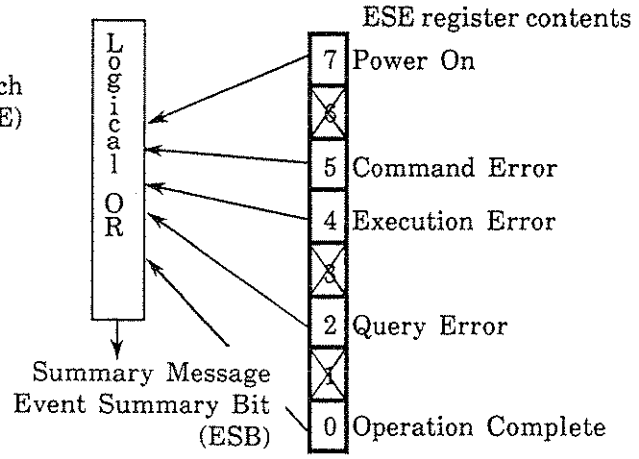
* ESE ?	Common to IEEE 488.2	

Requests current value of ESE register

Format	* ESE ?	Parameter range	None

<Details>

After the *ESE? command is sent, the value of each bit of the standard event status enable register (ESE) can be read with a decimal numeral.



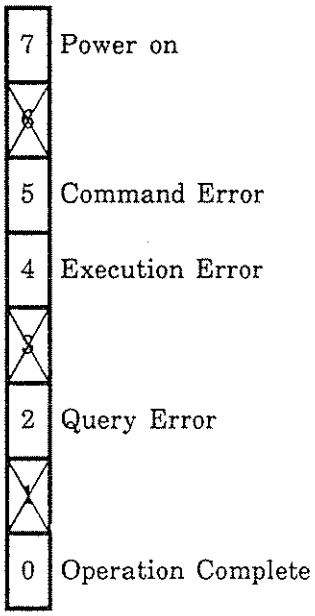
* ESR ?	Common to IEEE 488.2	
Requests current ESR register		

Format	* ESR ?	Parameter range	None

<Details>

After the *ESR? command is sent, the value of each bit of the standard event status register (ESR) can be read with a decimal value.

After the standard event status register is read, it is cleared.



ESR register

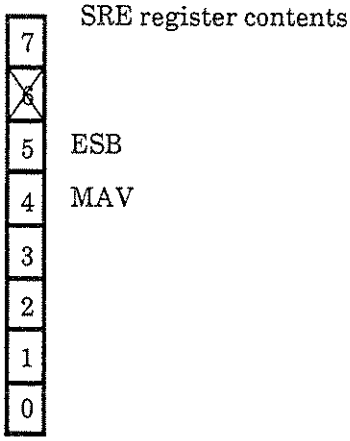
* SRE	Common to IEEE 488.2	

Sets SRE register

Format	* SRE n	Parameter range	0 to 63 , 128 to 191 (decimal numeral)

<Details>

The 8-bit binary numerical of the service request enable register (SRE) is set to the specified parameter value with a decimal value. By setting the SRE register, when the corresponding bit of the status byte register (STB) is ON, STB bit-6 (master summary message bit) is set to ON.



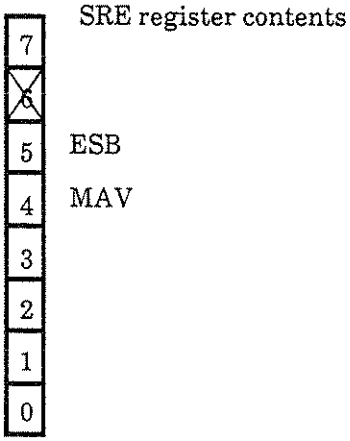
* SRE ?	Common to IEEE 488.2	

Requests current SRE register

Format	* SRE ?	Parameter range	None

<Details>

The 8-bit binary numerical of the service request enable register (SRE) is set to the specified parameter value with a decimal value. By setting the SRE register, when the corresponding bit of the status byte register (STB) is ON, STB bit-6 (master summary message bit) is set to ON.



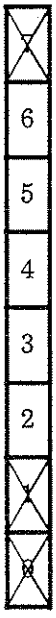
＊STB ?	Common to IEEE 488.2	
Requests current STB register		

Format	＊STB ?	Parameter range	None

<Details>

After the *STB? command is sent, the value of each bit of the status byte register (STB) can be read with a decimal numeral.

STB register contents



6 MSS master summary message

5 ESR summary message

4 MAV

3 ESBR summary message

2 ESAR summary message

＊IDN ?	Common to IEEE 488.2	

Requests device ID

Format	＊IDN ?	Parameter range	None

<Details>

After the *IDN? command is sent, the device ID can be read.

＊RST ?	Common to IEEE 488.2	

Resets MD6420A

Format	＊RST	Parameter range	None

<Details>

When the *RST? command is sent, the instrument is reset as shown below:

Item	Reset condition
Screen	MODE screen
SRE register	bits 4 and 5 →ON
Other enabled registers	All OFF
Event condition registers	All OFF
Items to be monitored	Unchanged
When measurement is in progress	Measurement aborts

* TST ?	Common to IEEE 488.2	

Resuests self test and current conditions

Format	* TST ?	Parameter range	None

<Details>

The MD6420A does not execute a self-test procedure.

When this command is received, "0" is output, which means "operation in progress".

* SAV	Common to IEEE 488.2	Only measurement function screens can be saved.

Saves current interface and measurement conditions in preset memory

Format	* SAV n	Parameter range	1 ~ 10

<Details>

When the *SAV command is sent, the current setting conditions for that measurement screen are saved. Saved setting conditions in the preset memory can be recalled via the *RCL command.

This command is valid for the measurement function screens. Also, saving can be performed during measurement. The previous memory contents are overwritten with the new conditions.

＊RCL	Common to IEEE 488.2	Valid for all screen modes

Recalls saved contents from preset memory

Format	＊RCL n	Parameter range	1 to 10

<Details>

When the *RCL command is sent, the previous contents of the specified preset memory are recalled and set.

If nothing is saved in the specified memory location, an error occurs.

This command is valid for all screen modes.

＊WAI	Common to IEEE 488.2	

WAIT command (IEEE 488.2 specification)

Format	＊WAI	Parameter range	None

<Details>

The MD6420A does not execute any operation.

＊OPC	Common to IEEE 488.2	

Waits for end of program message processing (method by ESR)

Sets bit 0 (Operation Complete) of the standard event status register to ON

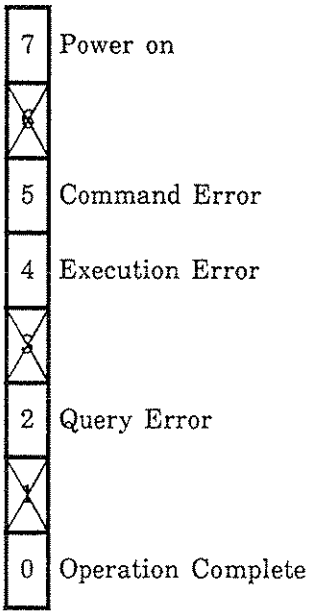
Format	＊OPC	Parameter range	None

<Details>

When the *OPC command is executed, bit 0 of the standard event status register (ESR) is set to ON.

However, after the standard event status register is read, it is cleared.

An SRQ is generated by the MD6420A at the end of *OPC command processing by setting bit 0 of the ESE register and bit 5 (ESR summary message) of the SRE register.



ESR register contents

＊OPC ?	Common to IEEE 488.2	

Waits for end of program message processing (method by response data)

Format	＊OPC ?	Parameter range	None

<Details>

When the *OPC? command is executed, "1" is output to the OUTPUT QUEUE thereby causing the MAV summary message to be generated.

(This program message (command) is used to confirm whether or not processing of the previous command has been completed.)

1.2.2 MD6420A commom commands

Commands in this paragraph can be used at any time regardless of the screen state.

RAL	Common to MD6420A	MD6401A compatible command

Resets error bit

Format	RAL	Parameter range	None

< Details >

This is a compatible command to the MD6401A.

OUT	Common to MD6420A	MD6401A compatible command

Specifies output destination

Format	OUT	Parameter range	None

< Details >

This is a compatible command to the MD6401A.
Nothing executed.

PRT	Common to MD6420A	

Switches printer output ON/OFF

Format	PRT n	Parameter range	0 to 1

< Details >

When PRT1 is sent, printer output is enabled; when PRT0 is sent, it is disabled.

Note: When there is no paper in the printer, it cannot be set to ON.

ESAE	Common to MD6420A	

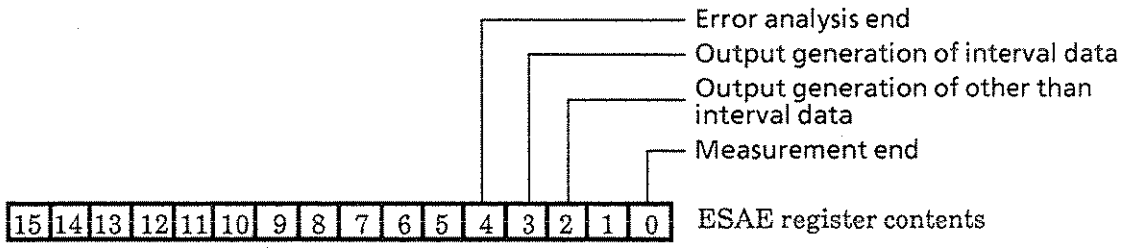
Sets ESAE register

Format	ESAE n	Parameter range	0 to 65535

< Details >

The 16-bit binary numeral of the END-ERS enable register (ESAE register) is set with a decimal numeral.

If the corresponding bit of the END-ERS register (ESAR register) is set to ON while setting the ESAE register, bit 2 (ESAR summary message bit) of the status byte regiser (STB register) is also set.



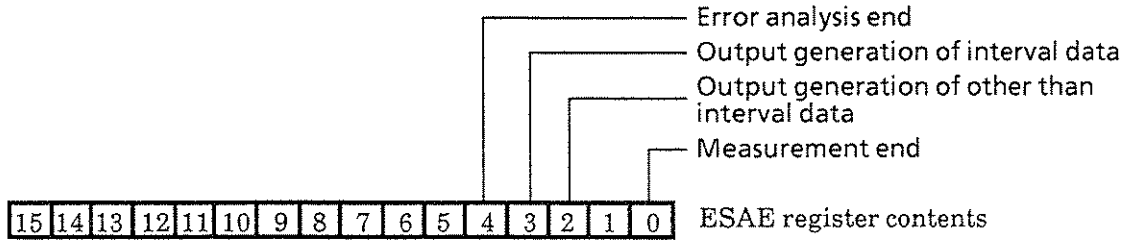
ESAE ?	Common to IEEE 488.2	

Requests current ESAE register

Format	ESAE ?	Parameter range	None

< Details >

After the ESAE? command is sent, the value of each bit of the END-ERS enable register (ESAE register) can be read with a decimal numeral.



ESAR ?	Common to MD6420A	

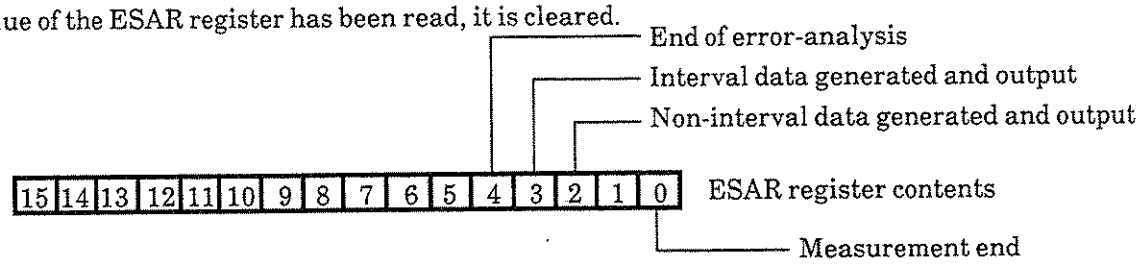
Requests current ESAR register

Format	ESAR ?	Parameter range	None

< Details >

After the ESAR? command is sent, the value of the END-ERS register (ESAR register) can be read with a decimal numeral.

After the value of the ESAR register has been read, it is cleared.



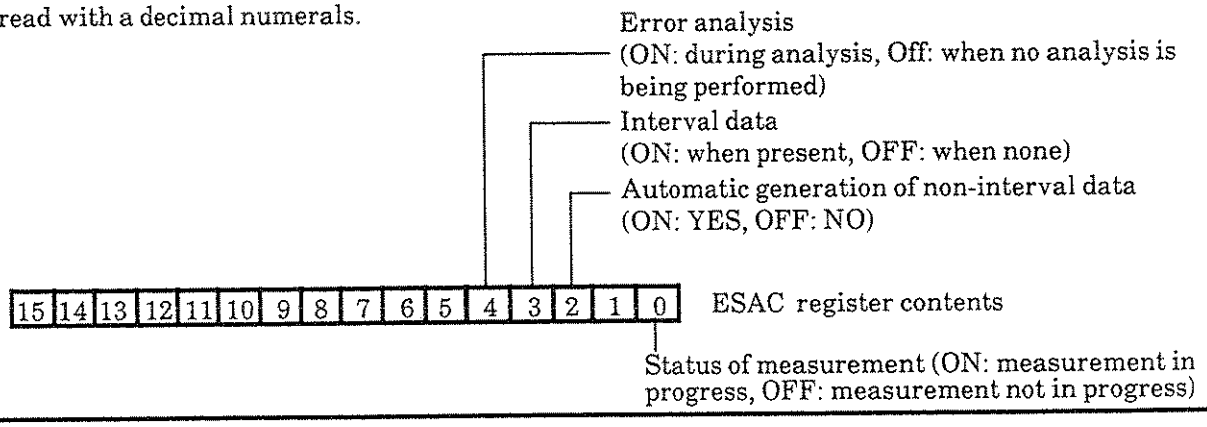
ESAC ?	Common to MD6420A	

Requests current ESAC register

Format	ESAC ?	Parameter range	None

< Details >

After the ESAC? command is sent, the value of each bit of the END-CONDITION register (ESAC register) can be read with a decimal numerals.



ESBE	Common to MD6420A	

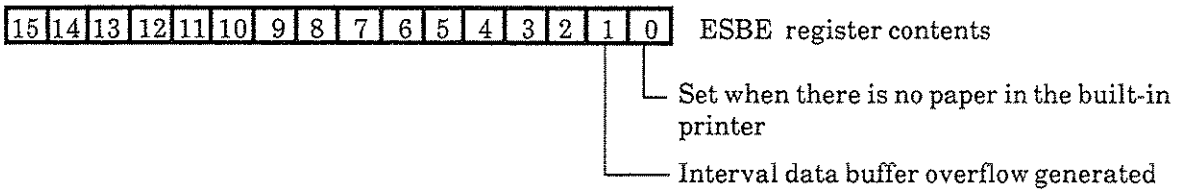
Sets ESBE register

Format	ESBE n	Parameter range	0 to 65535

< Details >

The 16-bit binary value of the error-ERS enable register (ESBE register) is set with a decimal value.

By setting the ESBE register, when the corresponding bits of the error-ERS register (ESBR register) is ON, bit 3 (ESBR summary message bit) of the status byte register (STB register) is set.



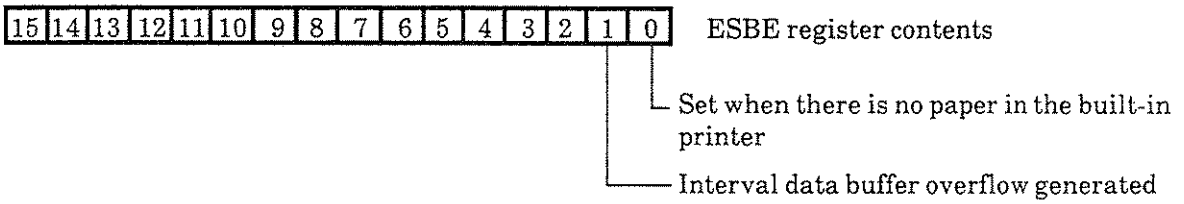
ESBE ?	Common to MD6420A	

Requests current ESBE register

Format	ESBE ?	Parameter range	None

< Details >

When the ESBE? command is sent, the value of each bit of the error-ERS enable register (ESBE register) can be read with a decimal value. After the ESBE regiister is read, it is cleared.



ESBR ?	Common to MD6420A	

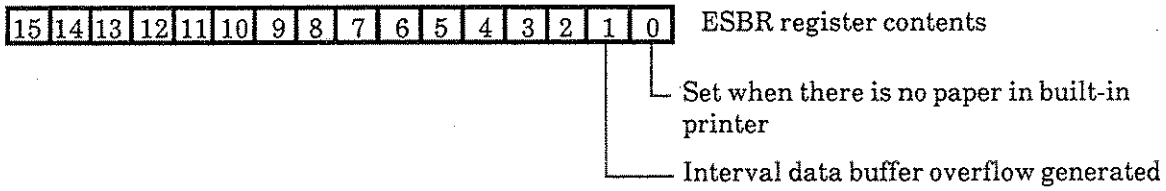
Requests current ESBR register

Format	ESBR ?	Parameter range	None

< Details >

After the ESBR? command is sent, the value of the error-ERS register (ESBR register) can be read with a decimal value.

After the ESBR register is read, it is cleared.



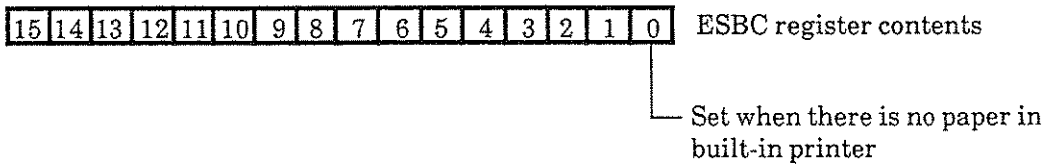
ESBC ?	Common to MD6420A	

Requests current ESBE register

Format	ESBC ?	Parameter range	None

< Details >

After ESBC? is sent, the value of each bit of the error-CONDITION register (ESBC register) can be read with a decimal value.



DIC	Common to MD6420A	

Clears interval supervisory print data buffer

Format	DIC	Parameter range	None

< Details >

When the DIC command is sent, the interval supervisory print data buffer is cleared and bit 3 of the ESAC register is set to OFF.

DAC	Common to MD6420A	

Clears buffer for automatically-generated data other than interval supervisory data

Format	DAC	Parameter range	None

< Details >

When the DAC command is sent, the buffer for automatically-generated data, other than interval supervisory data, is cleared and bit 2 of the ESAC register is set to OFF.

TRM	Common to MD6420A	

Specifies the terminater of response data

Format	TRM	Parameter range	0, 1

< Details >

The terminater of response data is specified, as follows:

0: LF + EOI

1: CR + LF + EOI

The default is 0: LF + EOI.

1.2.3 Screen switching commands

Commands in this paragraph switch the screens on the front panel of the MD6420A.

Each command described in the paragraphs from 1.2.4 to 1.2.12 can be used in a state displaying a respective screen.

To use these commands, it is necessary to move the screen to an appropriate screen in advance using each command in the paragraph.

MD	For switching measurement modes	

Switches to MODE screen

Format	MD	Parameter range	None

<Details>

Selects the MODE screen.

AL	For switching measurement modes	

Switches to ERROR ANALYSIS screen

Format	AL	Parameter range	None

<Details>

Selects the ERROR ANALYSIS screen.

UV	For switching measurement modes	

Switches to TABLE OF UNITS screen

Format	UV	Parameter range	None

<Details>

Selects the TABLE OF UNITS screen.

PL	For switching measurement modes	

Switches to PRESET MEMORIES screen

Format	PL	Parameter range	None

<Details>

Sets the PRESET MEMORIES screen.

IF	For switching measurement modes	

Switches to INTERFACE screen

Format	IF	Parameter range	None

<Details>

Selects the INTERFACE screen.

ED	For switching measurement modes	

Switches to ERROR screen

Format	ED	Parameter range	None

<Details>

Selects the ERROR screen.

VF	For switching measurement modes	

Switches to VOLT/FREQUENCY screen

Format	VF	Parameter range	None

<Details>

Selects the VOLT/FREQUENCY screen.

DL	For switching measurement modes	

Switches to DELAY TIME screen

Format	DL	Parameter range	None

<Details>

Selects the DELAY TIME screen.

WT	For switching measurement modes	

Switches to WORD TRACE screen

Format	WT	Parameter range	None

<Details>

Selects the WORD TRACE screen.

WE	For switching measurement modes	

Switches to EDIT PATTERN DATA screen

Format	WE	Parameter range	None

<Details>

Selects the EDIT PATTERN DATA screen.

TD	For switching measurement modes	

Switches to DISPALY PATTERN TRACE screen

Format	TD	Parameter range	None

<Details>

Selects the DISPLAY PATTERN TRACE screen.

BP	For switching measurement modes	

Switches to the previous screen in the hierarchy

Format	BP	Parameter range	None

<Details>

The previous screen in the screen hierarchy is displayed.

NP	For switching measurement modes	Measurement continues even if the screen is switched while a measurement is in progress

Switches to the next higher screen in the hierarchy

Format	NP	Parameter range	None

<Details>

If the BP command has been used to display the next higher screen in the screen hierarchy, this command can be used to recall the original (slave) screen.

If the BP command has not been previously executed, this command has no function. Also, at the final mode screen, this function is disabled.

1.2.4 MODE screen (initial screen immediately after power-on)

Commands in this paragraph are effective for the MODE screen.

To use these commands, it is necessary to move the screen to the MODE screen in advance using " MD " command.

TM	MODE screen	

Sets time and date

Format	TM Y,M,D,H,M,S	Parameter range	Y:00 to 99 M:01 to 12 D:01 to 31 H:00 to 23 M:00 to 59 S:00 to 59

<Details>

Used to set the time and date of the MD6420A internal clock.

Y = Year
M = Month
D = Day
H = Hour
M = Minute
S = Second

Each set as 2 digits

(The year is set according to the Gregorian calendar.)

LTS	MODE screen	

Tests LEDs

Format	LTS	Parameter range	None

<Details>

Causes all MD6420A LEDs and the EL display to light.

PTS	MODE screen	Valid while PRINTER is ON

Tests printer

Format	PTS	Parameter range	None

<Details>

Used to test the printer.

- Output a test pattern of characters and figures.

INI	MODE screen	Executed immmediately after command is sent (not confirmed)

Initializes the MD6420A settings

Format	INI	Parameter range	None

<Details>

Initializes the MD6420A settings to the default values.

- When this command is executed, the interface and measurement conditions are reset to their default values.

  Also, the MODE screen is displayed.

- The contents of all the preset memories are cleared.
- The default interface conditions vary with the plug-in unit. Refer to the operation manual of each unit.
- Refer to the following tables for the default values of each measurement condition.
- Confirm manually whether or not parameters have been initialized correctly, this cannot be done for GP-IB operations.
- All data collected by the MD0633A Error Analyze Unit will also be deleted.

<Interface> Items

No.	Item	Item label	Default value set by INI command
①	Sending interface unit conditions	INTERFACE	Interface unit mounted in lowest numbered slot
②	Send electrical signal code type	CODE	B8ZS
③	Send frame format	FRAME	24MPF (CCITT)
④	Send signal clock type	CLOCK	INT
⑤	Internal-clock slave signal type for sending	INT FREQ SOURCE	SELF
⑥	External-clock input interface type for sending	EXTERNAL INTERFACE	TTL
⑦	Parity of send short frame pattern	PARITY	NON
⑧	Send time slot	TIME SLOT	CHAN1
⑨	Send data bit rate	DATA BIT RATE	64 kb / s
⑩	Send data frame	DATA FRAME	X.50
⑪	Send X.50 data channel number	DATA CHANNEL	1
⑫	Send 1st bit	1st BIT	0
⑬	Send 8th bit	8th BIT	0
⑭	Send signaling bit enabled/ disabled	BIT STEAL	OFF
⑮	Receive interface unit conditions	INTERFACE	Same as send interface unit ①
⑯	Receive input level	INPUT LEVEL	MAIN
⑰	Receive electrical signal code type	CODE	B8ZS
⑱	Receive frame format	FRAME	24MPF (CCITT)
⑲	Parity of receive short frame pattern	PARITY	NON
⑳	Receive time slot	TIME SLOT	CH1
㉑	Receive data bit rate	DATA BIT RATE	64 kb / s
㉒	Receive signaling bit enabled/ disabled	BIT STEAL	OFF
㉓	Receive data frame	DATA FRAME	X.50
㉔	Receive X.50 data channel number	DATA CHANNEL	1

<Error Measurement> Items

No.	Item	Default value set by INI command
①	Measurement display item	① ERROR , ② ERR - RATIO , ③ ES , ④ SES , ⑤ CLOCK SLIP
②	Display data mode	ELAPS
③	Single error insertion start/stop	STOP
④	Cyclic error insertion start/stop	STOP
⑤	Measurement start/stop	STOP
⑥	Buzzer ON/OFF	OFF
⑦	Send data pattern Receive data pattern	$2^6 - 1$
⑧	8-bit set pattern	ALL 0
⑨	Normal/inverted & reversed	NORMAL
⑩	Zero suppression enabled/ disabled	NO - SUP
⑪	No. of pattern sync-loss protection stages	AUTO
⑫	Cyclie error insertion rate	1.0E - 1
⑬	Single error insertion method	SINGLE
⑭	Insertion error type	BIT
⑮	Error detection count item	BIT
⑯	Block-error-detection block length	1.0E - 1
⑰	Measurement type	MANUAL
⑱	No. of measurement bits	1.0E - 2
⑲	Measurement time, Repeat measurement time	000 : 01 : 00 (denotes 1 minute)

<Voltage/Frequency Measurement> Items

No.	Item	Default value set by INI command
①	Frequency count measurement start/stop	STOP
②	Voltage measurement line name	Line name for signal represented by LED on leftmost side of display monitor.
③	Send data pattern	$2^6 - 1$
④	8-bit set pattern	ALL 0
⑤	Normal/inverted & reversed	NORMAL
⑥	Zero suppression enabled/disabled	NO - SUP
⑦	Frequency-measurement line name/count signal name	Line name for signal represented by LED on leftmost side of display monitor.
⑧	Frequency-measurement gate time	100 ms
⑨	Frequency-measurement interval time	0.5 s

<Delay time measurement> Items

No.	Item	Default value set by INI command
①	Measurement start/stop	STOP
②	Repeat measurement start/stop	STOP
③	Delay time measurement mode	L - INTERVAL
④	Send/Receive	RECV
⑤	Measurement-start trigger signal line name	Line name for signal represented by LED on leftmost side of display monitor.
⑥	Measurement-start trigger signal condition	OFF → ON
⑦	Measurement-stop trigger signal line name	Line name for signal represented by LED on leftmost side of display monitor.
⑧	Measurement-stop trigger signal condition	ON → OFF
⑨	Loop-back measurement repetition interval	0.5 s

<Word Tracing/Pattern Sending> Items

No.	Item	Default value set by INI command
①	Measurement start/stop	STOP
②	Trace start/stop	STOP
③	Send idle pattern	ALL 0
④	Send pattern data type	PRGM
⑤	Bit-pattern address setting	0
⑥	Set bit pattern	(Not changed)
⑦	Send data top address	0
⑧	Send data last address	1
⑨	Send pattern	MANUAL
⑩	Trace sync pattern	×× ~ ××
⑪	Trace-stop conditions	MANUAL
⑫	Trace-stop conditions code	ALL 0
⑬	Trace-stop delay byte	0
⑭	Send/Receive	RECV
⑮	Trace-stop trigger line	Varies with Interface Unit
⑯	Trace-stop trigger conditions	OFF → ON
⑰	No. of trace bytes	10
⑱	Trigger condition for each trigger line	L → H

<Word Pattern Setting> Items

No.	Item	Default value set by INI command
①	Edit address	0
②	Display mode	BYTE
③	Display character code	HEX
④	Display boundary	8 bits
⑤	Trace data copy top address	0
⑥	Trace data copy top bit	8

<Trace Display> Items

No.	Item	Default value set by INI command
①	Display address	0
②	Display mode	BYTE
③	Display character code	HEX
④	Display boundary	8 bits
⑤	Shift location	0
⑥	Inverse/reverse	NORMAL
⑦	Comparison indication for the send data	OFF
⑧	Send-data comparison top address	0

1.2.5 PRESET MEMORIES screen

Commands in this paragraph are effective for PRESET MEMORY screen.

To use these commands, it is necessary to move the screen to PRESET MEMORIES screen in advance using "PL" command.

DO ?	Preset memory	

Used to request specific output from plug-in units

Format	DO ?	Parameter range	None

< Details >

When the DO? command is sent, the specified contents of the plug-in unit are output.

Also, refer to the response data reference in Section 2 for the output contents.

PRI	Preset memory	Disabled when preset memory has already been cleared

Clears preset memory

Format	PRI n	Parameter range	1 to 10

< Details >

The specified preset memory contents are cleared.

n : Memory number

- If the specified memory contents have already been cleared, a parameter error occurs.

1.2.6 TABLE OF UNITS screen

Commands in this paragraph are effective for the TABLE OF UNITS screen.

To use these commands, it is necessary to move the screen to the TABLE OF UNITS screen in advance using " UV " command.

DO ?	TABLE OF UNITS screen	
Requests contents of specified table of units screen		

Format	DO ?	Parameter range	None

< Details >

When the DO? command is sent, the contents of the specified unit is output.

Refer to the response data reference material in Section 2 for a description of the contents.

1.2.7 ERROR screen

Commands in this paragraph are effective for the ERROR screen.

To use these command, it is necessary to move the screen to the ERROR screen in advance using "ED" command.

SCT	ERROR screen	

Sets signal line to be monitored

Format	SCT n , m	Parameter range	n : 0 to 12 m : 0 to 2

<Details>

Changes the control-signal condition to be monitored.

*The signal-line contents vary with the Interface Unit. For details, refer to the operation manual for the Interface Unit and to the command reference.

n : Signal line number

m :

0 = OFF, 1 = ON, 2 = open or through

- Swtches state of signal line to be displayed.

MSL	ERROR screen	

Selects line to be monitored

Format	MSL n	Parameter range	0 to 4

<Details>

Displays the signal line conditions being monitored.

n : Condition of line being monitored

0 = Send signal condition

1 = Receive signal condition

2 = Receive data condition

3 = Send alarm condition

4 = Receive alarm condition

SA	ERROR screen	

Starts error meausrement

Format	SA	Parameter range	None

<Details>

Starts error measurement.

SO	ERROR screen	

Stops error measurement

Format	SO	Parameter range	None

<Details>

Stops error measurement.

EA	ERROR screen	

Starts cyclic error insertion

Format	EA	Parameter range	None

<Details>

Starts insertion of cyclic error in the send signal.

- Cyclic errors are inserted into the send signal in accordance with the cyclic error rate specified by the EC command.
- Cyclic error insertion continues until an EO command is executed or the mode is changed to a mode other than the error measurement mode.

EO	ERROR screen	

Stops cyclic error insertion

Format	EO	Parameter range	None

<Details>

Stops cyclic error insertion.

This command is ignored if it is sent when errors are not being inserted.

EI	ERROR screen	

Channel error insertion (starts insertion)

Format	EI	Parameter range	None

<Details>

Channel errors are inserted.

- When the channel error insertion mode (specified with EIM command) is SINGLE, only one error is inserted into the send signal for every EI command. When it is REPEAT, one error is inserted each second. In REPEAT mode, error insertion stops when the EIO command is executed or when the mode is changed to a mode other than the error measurement mode.

EIO	ERROR screen	

Stops channel error insertion

Format	EIO	Parameter range	None

<Details>

- When the channel error insertion mode is REPEAT, insertion is stopped.

EC	ERROR screen	

Specifies cyclic error insertion rate

Format	EC n , m	Parameter range	n : Specify value between 10 and 90, m: 1 to 7

<Details>

The cyclic error insertion rate is specified by n, m ($n \times 10^{-m}$).

Parameter list

n	10	11	13	15	17	20	25
Mantissa	1.0	1.1	1.3	1.5	1.7	2.0	2.5

n	30	40	50	60	70	80	90
Mantissa	3.0	4.0	5.0	6.0	7.0	8.0	9.0

m	1	2	3	4	5	6	7
Exponent	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}

The insertion rate can also be changed during cyclic error insertion.

EIM	ERROR screen	

Sets channel error insertion mode

Format	EIM n	Parameter range	0 , 1

<Details>

The channel error insertion mode is set.

n : Insertion mode

0 = SINGLE (1-bit error inserted)

1 = REPEAT (1-bit error inserted each second)

When the channel error insertion mode is changed from REPEAT to SINGLE, channel error insertion stops.

EIC	ERROR screen	

Sets channel error insertion code

Format	EIC n	Parameter range	0 , 1

<Details>

Sets the channel error insertion code.

n : Code type

0 = BIT,

1 = BIT+CODE

CSA	ERROR screen	Valid only when the MD0633A Error Analyze Unit is inserted

Starts collection of error analysis data

Format	CSA	Parameter range	None

<Details>

Starts collection of error analysis data.

- Data is collected according to the set error analysis collection conditions.

CSO	ERROR screen	Valid only when the MD0633A Error Analyze Unit is inserted

Stops collection of error analysis data

Format	CSO	Parameter range	None

<Details>

This command is invalid when error analysis data are not being collected.

DS	ERROR screen	

Selects measurement results to be displayed

Format	DS n m	Parameter range	0 to 34

<Details>

Specifies the items to be displayed on the error measurement results screen.

n : Specifies location of each display item

Command	DSA	DSB	DSC	DSD	DSE
Display position	Upper-left	Upper-right	Middle-left	Middle-right	Lower-left

m : Display contents

m	0	1	2	3	4	5	6
Display contents	ERROR COUNT	ERROR RATIO	BLK-ERR COUNT	BLK-ERR RATIO	ES	% ES	DM

m	7	8	9	10	11	12	13
Display contents	% DM	SES	% SES	US	% US	AT	% AT

m	14	15	16	17	18	19	20
Display contents	SLIP-SEC	EFS	% EFS	CLOCK SLIP	PSL COUNT	Alarm 0	Alarm 1

m	21	22	23	24	25	26	27
Display contents	Alarm 2	Alarm 3	Alarm 4	Alarm 5	Alarm 6	Alarm 7	Alarm 8

m	28	29	30	31	32	33	34
Display contents	Alarm 9	Alarm 10	Alarm 11	Alarm 12	Alarm 13	BBE	BBER

DMS	ERROR screen	

Specifies measurement results display mode

Format	DMS n	Parameter range	0 , 1

<Details>

Specifies the ERROR-screen display mode.
n : Mode
0 = Displays results from start of measurement
1 = Displays data every period

- The specified data are output for the DOP? or DOA? command.

ME	ERROR screen	

Specifies the error to be detected

Format	ME n	Parameter range	0 , 1 , 2 , 3 , 4

<Details>

Specifies the error to be detected.
n : Item to be detected

0	1	2	3	4
BIT	CODE	PARITY	CRC	F - NG

MM	ERROR screen	

Sets error measurement mode to MANUAL MEASUREMENT

Format	MM	Parameter range	None

<Details>

Sets the error measurement mode to manual.

MB	ERROR screen	

Sets error measurement mode for bit-length measurements

Format	MB n	Parameter range	2 to 10

<Details>

n : Bit length

n	2	3	4	5	6	7	8	9	10
Bit length	10^2	10^3	10^4	10^5	10^6	10^7	10^8	10^9	2500

MT	ERROR screen	

Sets error measurement mode for timed measurement

Format	MT ℓ , m , n	Parameter range	ℓ : 0 to 999 , m : 0 to 59 , n : 0 to 59

<Details>

The timed error measurement mode and measurement time are set.

ℓ : Hour
m : Minute
n : Second

MRT	ERROR screen	

Sets periodic measurement error measurement mode

Format	MRT ℓ , m , n	Parameter range	ℓ : 0 to 999 , m : 0 to 59 , n : 0 to 59

<Details>

The periodic error measurement mode and measurement period are set.

ℓ : Hour
m : Minute
n : Second

PN	ERROR screen	

Sets send/receive pattern type to PRBS pattern

Format	PN n	Parameter range	6, 7, 9, 11, 15, 19, 20, 23

<Details>

There are three settings for PRBS pattern (pseudorandom pattern): PRBS pattern type, normal/inverted & reversed type, and zero suppression type.

This command is used to select the PRBS pattern type as shown below:

Parameter n	PRBS pattern type
6	$2^6 - 1$ (63)
7	$2^7 - 1$ (127)
9	$2^9 - 1$ (511)
11	$2^{11} - 1$ (2047)
15	$2^{15} - 1$ (32767)
19	$2^{19} - 1$
20	$2^{20} - 1$
23	$2^{23} - 1$

PNI	ERROR screen	

Sets send pattern to PRBS pattern (invert)

Format	PNI n	Parameter range	6, 7, 9, 11, 15, 19, 20, 23

<Details>

Sets the send pattern to PRBS pattern (invert). Also, specifies the pattern to be sent.

n : Same as that of "PN" command

- This command performs the same function as "PNn, INV1".

INV	ERROR screen	Enabled only when send/receive pattern type is PRBS pattern

Sets normal/inverted & reversed type

Format	INV n	Parameter range	0 to 3

<Details>

Sets the PRBS ormal/inverted & reversed type.

There are three settings for PRBS pattern: the PRBS pattern type, the normal/inverted & reversed type, and the zero suppression type.

This commands is used to select normal/inverted & reversed type. The relationship between the parameter n and the normal/inverted & reversed type is shown below:

Parameter n	Normal/inverted & reversed type
0	NORMAL
1	INVERT
2	N - RVRS
3	I - RVRS

ZSP	ERROR screen	Enabled only when send/receive pattern is PRBS type

Sets zero suppression

Format	ZSP n	Parameter range	0 to 2

<Details>

Enables zero suppression.

There are three settings for PRBS pattern: the PRBS pattern type, the normal/inverted & reversed type, and the zero suppression type. This command is used to select zero suppression type as shown below:

Parameter n	Zero suppression type
0	NO - SUP
1	ZERO - 7
2	ZERO - 14

PR or PRB	ERROR screen	

Sets send/receive pattern to programmable binary pattern type

Format	PR or PRB n	Parameter range	00 000 000 to 11 111 111

<Details>

Sets the programmable pattern.

n : Pattern (8-bit binary)

PRD	ERROR screen	

Sets send/receive pattern to programmable decimal pattern type

Format	PRD n	Parameter range	0 to 255

<Details>

Sets the decimal programmable pattern.

n : Pattern (integer)

PA	ERROR screen	

Sets send/receive pattern to ALL 0s.

Format	PA	Parameter range	None

<Details>

Sets all bits of the send/receive pattern to 0.

PZ	ERROR screen	

Sets send/receive pattern to ALL 1s.

Format	PZ	Parameter range	None

<Details>

Sets all bits of the send/receive patterns to 1.

PC	ERROR screen	

Sets programmable pattern code

Format	PC n	Parameter range	0 to 6

<Details>

The programmable pattern is coded and set.

n : (a : b) pattern

n	0	1	2	(3) *	(4) *	5	6
a : b pattern	1 : 1	3 : 1	1 : 3	(1 : 1)	(1 : 1)	7 : 1	1 : 7

* (3), (4): For deleting MD6401A compatible commands (4:1, 1:4)

SYN	ERROR screen	

Sets PRBS pattern pattern-sync-loss detection conditions

Format	SYN n , m	Parameter range	n : 10 to 100000 m : 100 to 300000

<Details>

Sets the pattern-sync-loss detection conditions for PRBS send/receive patterns.

- Specify parameters n and m as shown below:

n , m	10 , 100	20 , 100	25 , 100	100 , 300	100 , 1 000	200 , 1 000
Detection conditions	10 / 100	20 / 100	25 / 100	100 / 300	100 / 1 000	200 / 1 000

n , m	250 , 1 000	1 000, 3 000	1 000, 10 000	2 000, 10 000	2 500, 10 000	10 000, 30 000	10 000 , 100 000
Detection conditions	250 /1 000	1E3 /3 000	1 000 /1E4	2 000 /1E4	2500 /1E4	1E4/3E4	1E4/1E5

n , m	20 000 , 100 000	100 000 , 300 000
Detection conditions	2E4/1E5	100 000/3E5

SYND	ERROR screen	

Sets PRBS pattern pattern-sync-loss detection conditions

Format	SYND n	Parameter range	0 to 16

<Details>

Sets the pattern-sync-loss detection conditions for PRBS send/receive patterns.

n	0	1	2	3	4	5	6
Detection condition	AUTO	10 / 100	20 / 100	25 / 100	100 / 300	100 / 1 000	200 / 1 000

n	7	8	9	10	11	12	13
Detection condition	250 /1 000	1E3 /3 000	1 000 /1E4	2 000 /1E4	2 500 /1E4	1E4/1E5	2E4/1E5

n	15	16
Detection condition	25 000/100 000	100 000/3E5

BL	ERROR screen	

Specifies measurement block length

Format	BL n	Parameter range	0 to 17

<Details>

The measurement block length is specified when block errors are to be detected.

n : Block length

n	0	1	2	3	4	5	6
Block length	10	100	1 000	10 000	100 000	1 000 000	32

n	7	8	9	10	11	12	13
Block length	64	128	256	512	1 024	2 048	4 096

n	14	15	16	17
Block length	8 192	16 384	32 768	65 536

BZ	ERROR screen	

Specifies buzzer ON/OFF

Format	BZ n	Parameter range	0 , 1

<Details>

The buzzer is specified as ON/OFF.

n : ON/OFF specification

0 = OFF

1 = ON

IOT	ERROR screen	

Specifies interval data output timing

Format	IOT n	Parameter range	0 , 1

<Details>

The Output timing is specified for interval data (read out by DRI?)

n : Output timing

0 = Outputs at each interval period

1 = Outputs only at the period over the check threshold value.

OFP	ERROR screen	

Specifies error performance output data format

Format	OFP m, m ··· m (Total 18)	Parameter range	0 to 18 , 33 to 34

<Details>

The error performance output data format (output data/data sequence) is specified.

- Any parameter from 1 to 18 can be specified (Max. 18)
- Data output by the "DOP?" and "DRP?" commands are output in the format and sequence specified by this command.
- Parameter n: Display contents

m	0	1	2	3	4	5	6
Display contents	ERROR COUNT	ERROR RATIO	BLK-ERR COUNT	BLK-ERR RATIO	ES	% ES	DM

m	7	8	9	10	11	12	13
Display contents	% DM	SES	% SES	US	% US	AT	% AT

m	14	15	16	17	18	33	34
Display contents	SLIP-SEC	EFS	% EFS	CLOCK SLIP	PSL COUNT	BBE	BBER

OFA	ERROR screen	

Specifies alarm output data format

Format	OFA n , n , n ··· (Total 14)	Parameter range	0 to 13

<Details>

Specifies the alarm output data format (output data, data sequence).

- Any parameters from 1 to 14 can be specified.
- Data output by the "DOA?" and "DRA?" commands are output in the format and sequence specified by this command.
- n: Output contents

Contents of 2 to 13 vary with the Interface Unit. This table shows the MD0622B 1.5 MBPL Unit.

0	1	2	3	4	5
POWER LOSS	P - SYNC - LOSS	INPUT LOSS	F-SYNC LOSS	AIS	XL

Note: The output contents vary with the INTERFACE UNIT. For details, refer to the operation manual for each INTERFACE UNIT and the command reference.

DRI ?	ERROR screen	

Requests read-out of start of measurement data and interval data

Format	DRI ?	Parameter range	None

<Details>

Requests start of measurement and interval data.

1. Requests read-out of start of error-measurement data (ED0) and the interval data (ED1). After this command is sent, the appropriate data can be read.
2. When there are no data, "ED9" is output.
3. Refer to the response data reference (in Section 2) for the data output format.

DRP ?	ERROR screen	

Requests read-out of the end-of-period data and end-of-measurement data (error performance data)

Format	DRP ?	Parameter range	None

<Details>

Requests a read-out of the end-of-period and end-of-measurement error performance data.

1. Requests period-end (ED2) and measurement-end error performance data (ED6). After this command is sent, the output data should be read.
2. When there are no data, "ED9" is output.
3. Refer to the response data reference in Section 2 for the data output format.

DRA ?	ERROR screen	

Requests read-out of end-of-period and end-of-measurement alarm data.

Format	DRA ?	Parameter range	None

<Details>

Requests a read-out of the end-of-period and end-of-measurement alarm data.

1. Requests read-out of period-end (ED3) and measurement-end alarm data (ED7). After this command is sent, the output data should be read.
2. When there are no data, "ED9" is output.
3. Refer to the response data reference in Section 2 for the output data format.

DOP ?	ERROR screen	

Requests a read-out of intermediate or final error performance data

Format	DOP ?	Parameter range	None

<Details>

Requests a read-out of the intermediate or final error performance data.

1. Requests a read-out of the following data according to whether or not error measurement is in progress.
   (a) When a measurement is in progress ...
   If the ERROR screen results display mode is PERIOD, error performance data from the previous period (ED2) are output.
   On the other hand, if the results display mode is ELAPSED, the intermediate cumulative error performance results (ED4) are output.
   (b) When measurement is not in progress ...
   If the results display mode is PERIOD, error performance data (ED2) for the most recent period are output.
   On the other hand, if the results display mode is ELAPSED, the end-of-measurement error performance data (ED6) are output.
2. After sending this command, the output data should be read.
3. Refer to the response data reference in Section 2 for the format of data output by this command.
4. If there are no measured data, the response data (ED9) are output.

DOA ?	ERROR screen	

Requests a read-out of intermediate or final alarm data

Format	DOA ?	Parameter range	None

<Details>

Requests a read-out of the intermediate or final error performance data.

1. Requests a read-out of the following data according to whether or not error measurement is in progress.
   (a) When a measurement is in progress ...
   If the ERROR screen results display mode is PERIOD, alarm data from the previous period (ED3) are output.
   On the other hand, if the results display mode is ELAPSED, the intermediate cumulative alarm results (ED5) are output.
   (b) When measurement is not in progress ...
   If the results display mode is PERIOD, alarm data (ED3) for the most recent period are output.
   On the other hand, if the results display mode is ELAPSED, the end-of-measurement alarm data (ED7) are output.
2. After sending this command, the output data should be read.
3. If there are no measured data, the response data (ED9) are output.

PIC	ERROR screen	

Switches to CONDITION OF PRINT (INTERVAL) screen

Format	PIC	Parameter range	None

<Details>

Causes the CONDITION OF PRINT (INTERVAL) screen to be displayed.

PPC	ERROR screen	

Switches to CONDITION OF PRINT (PERIODIC) screen

Format	PPC	Parameter range	None

<Details>

Causes the CONDITION OF PRINT (PERIODIC) screen to be displayed.

CC	ERROR screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Switches to CONDITION OF COLLECT screen

Format	CC	Parameter range	None

<Details>

Causes the CONDITION OF COLLECT screen to be displayed.

DPR	ERROR screen	

Switches to DISPLAY OF RESULTS screen

Format	DPR	Parameter range	None

<Details>

Causes the DISPLAY OF RESULTS screen to be displayed.

MSL	DISPLAY OF RESULTS screen	

Selects line to be monitored

Format	MSL n	Parameter range	0 to 4

<Details>

Displays the signal line conditions.

n : Signal condition status

0 = Send signal condition
1 = Receive signal condition
2 = Receive data condition
3 = Send alarm condition
4 = Receive alarm condition

SCT	DISPLAY OF RESULTS screen	

Sets signal line while monitoring is in progress

Format	SCT n , m	Parameter range	n : 0 to 12 m : 0 to 2

<Details>

Switches the control signal condition while monitoring is in progress.

n : Signal line number to be switched

m :

0 = OFF, 1 = ON, 2 = open or through

* The value of the signal line parameter varies with the Interface Unit. For details, refer to the operation manual for the Interface Unit and the command reference.

SA	DISPLAY OF RESULTS screen	

Starts error measurement

Format	SA	Parameter range	None

<Details>

Starts error measurement.

SO	DISPLAY OF RESULTS screen	

Stops error measurement

Format	SO	Parameter range	None

<Details>

Stops error measurement.

EA	DISPLAY OF RESULTS screen	

Starts cyclic error insertion

Format	EA	Parameter range	None

<Details>

Starts cyclic error insertion into the send signal.

- Cyclic errors are inserted into the send signal according to the cyclic error insertion rate specified by the EC command.
- Cyclic error insertion is stopped by the EO command or when the mode is changed to a mode other than the error measurement mode.

EO	DISPLAY OF RESULTS screen	

Stops insertion of cyclic errors

Format	EO	Parameter range	None

<Details>

Stops insertion of cyclic errors.

EI	DISPLAY OF RESULTS screen	

Starts channel error insertion

Format	EI	Parameter range	None

<Details>

Starts insertion of channel errors.

- When the channel error insertion mode specified by EIM command is SINGLE, this command causes a single error to be inserted into the send signal. When it is REPEAT, one error is inserted every second. When it is REPEAT, error insertion is stopped by the EIO command or when the mode is changed to a mode other than the error insertion mode.

EIO	DISPLAY OF RESULTS screen	

Stops channel error insertion

Format	EIO	Parameter range	None

<Details>

Stops the insertion of channel errors.

- Stops REPEAT insertion of channel errors only.

CSA	DISPLAY OF RESULTS screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Starts error analysis of collected data

Format	CSA	Parameter range	None

<Details>

Starts collection of error analysis data.

CSO	DISPLAY OF RESULTS screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Stops error-analysis data collection

Format	CSO	Parameter range	None

<Details>

Stops collection of error analysis data.

DMS	DISPLAY OF RESULTS screen	

Enables the measurement results display mode

Format	DMS n	Parameter range	0, 1

<Details>

Enables the ERROR screen display mode.
n : Display mode
0 = Displays results from start of measurement
1 = Displays data for each period

- The data output by the DOP? and DOA? commands are output as specified by this command.

ARC	DISPLAY OF RESULTS screen	

Switches alarm results display

Format	ARC n	Parameter range	0 , 1

<Details>

Causes the alarm results display to be switched.
This command causes the alarm number to be switched to 1 to 8 or 9 to 13.
n : 0 = Alarm number 1 to 18
1 = Alarm number 9 to 13

The significance of each alarm number dipends on the plug-in unit. For further details, refer to the operation manual of each unit.

DRI ?	DISPLAY OF RESULTS screen	

Requests read-out of start of measurement and interval data

Format	DRI ?	Parameter range	None

<Details>

Requests a read-out of the measurement-start and interval data.
1. Requests a read-out of the error-measurement start data (ED0) and interval data (ED1). After sending this command, output data should be read.
2. When there are no data, ED9 is output.
3. Refer to the Section 2 for the format of the data output by this command.

DRP ?	DISPLAY OF RESULTS screen	

Requests read-out of end-of-period and end-of-measurement data (error perfomrance data)

Format	DRP ?	Parameter range	None

<Details>

Requests a read-out of the end-of-period and end-of-measurement error performance data.
1. Requests a read-out of the period-end (ED2) and measurement-end (ED6) error performance data. After sending this command, output data should be read.
2. When there are no data, ED9 is output.
3. Refer to Section 2 for the format of the data output by this command.

DRA ?	DISPLAY OF RESULTS screen	

Requests read-out of end-of-period or end-of-meaurement data

Format	DRA ?	Parameter range	None

<Details>

Requests a read-out of the end-of-period (ED3) or end-of-measurement (ED7) data.

1. Requests a read-out of the end-of-period (ED3) or end-of-measurement (ED7) alrm data. After sending this command, output data must be read.
2. When there are no data, ED9 is output.
3. Refer to the respone data reference in Section 2 for the format of data output by this command.

DOP ?	DISPLAY OF RESULTS screen	

Requests a read-out of intermediate or final error performance data

Format	DOP ?	Parameter range	None

<Details>

Requests a read-out of the intermediate or final error performance data.

1. Requests a read-out of the following data according to whether or not error measurement is in progress.
   (a) When a measurement is in progress ...
   If the ERROR screen results display mode is PERIOD, error performance data from the previous period (ED2) are output.
   On the other hand, if the results display mode is ELAPSED, the intermediate cumulative error performance results (ED4) are output.
   (b) When measurement is not in progress ...
   If the results display mode is PERIOD, error performance data (ED2) for the most recent period are output.
   On the other hand, if the results display mode is ELAPSED, the end-of-measurement error performance data (ED6) are output.
2. After sending this command, the output data should be read.
3. Refer to the response data reference in Section 2 for the format of data output by this command.

DOA ?	DISPLAY OF RESULTS screen	

Requests read-out of measurement results or intermediate or final alarm data

Format	DOA ?	Parameter range	None

<Details>

Requests a read-out of the intermediate or final measurement results alarm data.

1. The following data are output in accordance with whether or not an error measurement is in progress.
   (a) When a measurement is in progress ...
   If the ERROR screen results display mode is PERIOD, the alarm data (ED3) for the previous period are output.

   On the other hand, if the results display mode id ELAPSED, the cumulative intermediate alarm data (ED5) are output.

   (b) When a measurement is not in progress ...
   If the results display mode is PERIOD, the alarm data (ED2) for the most recent period are output.

   On the other hand, if the results display mode is ELAPSED, the end-of-measurement alarm data (ED7) are output.
2. After sending this command, the output data should be read.
3. Refer to the response data reference in Section 2 for the format of the data output by this command.

IDP	CONDITION OF PRINT (INTERVAL) screen	

Specifies whether of not interval-data are printed when an error is detected

Format	IDP n	Parameter range	0 , 1

<Details>

Print interval data when an error is detected.

n : 0=No 1=Yes

IPT	CONDITION OF PRINT (INTERVAL) screen	

Sets print interval time

Format	IPT n	Parameter range	0 to 6

<Details>

n : Interval time

n	0	1	2	3	4	5	6
Interval	1 second	10 seconds	30 seconds	1 minute	2 minutes	5 minutes	10 minutes

ICP	CONDITION OF PRINT (INTERVAL) screen	

Used to enable continuous printing

Format	ICP n	Parameter range	0 , 1

<Details>

Controls continuous printing
n : 0 = Enable continuous printing
1 = Disable continuous printing (Intermediate data are not printed for more than 10 consecutive intervals.)

IAP	CONDITION OF PRINT (INTERVAL) screen	

Specifies whether or not alarm data will be printed

Format	IAP m , n	Parameter range	m = 0 to 12 (Varies with plug-in unit), n = 0 , 1

<Details>

Specifies whether or not the alarm data will be printed.
m : Alarm item number (0~12) – vary with the plug-in unit (For further details, refer to the command reference for each unit)
n : 0 = Alarm data not printed
1 = Alarm data printed

IES	CONDITION OF PRINT (INTERVAL) screen	Enabled only when interval data are detected

Sets error count threshold for printing

Format	IES n	Parameter range	0 to 999

<Details>

n : Specifies number of error bits (0 to 999). When more than n errors are generated within the specified time period, data are printed.

EDP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not error data will be printed

Format	EDP n	Parameter range	0 , 1

<Details>

Specifies whether or not error data will be printed.

n : 0 = Error data not printed

1 = Error data printed

BDP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not block data will be printed

Format	BDP n	Parameter range	0 , 1

<Details>

Specifies whether or not block data will be printed.

n : 0 = Block data not printed

1 = Block data printed

BBP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not BBE, BBER data will be printed

Format	BBP n	Parameter range	0 , 1

<Details>

Specifies whether or not BBE, BBER data will be printed.

n : 0 = BBE, BBER data not printed

1 = BBE, BBER data printed

ESP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not ES and %ES data will be printed

Format	ESP n	Parameter range	0 , 1

<Details>

Specifies whether or not ES and %ES data will be printed.

n : 0 = ES and %ES data not printed

1 = ES and %ES data printed

USP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not US and %US data will be printed

Format	USP n	Parameter range	0 , 1

<Details>

Specifies whether or not US and %US data will be printed.

n : 0 = US and %US data not printed

1 = US and %US data printed

SEP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not SES and %SES data will be printed

Format	SEP n	Parameter range	0 , 1

<Details>

Specifies whether or not SES and %SES data will be printed.

n : 0 = SES and %SES data not printed

1 = SES and %SES data printed

DMP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or ot DM and %DM data will be printed

Format	DMP n	Parameter range	0 , 1

<Details>

Specifies whether or not DM and %DM data will be printed.

n : 0 = DM and %DM data not printed

1 = DM and %DM data printed

EFP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or ot EFS and %EFS data will be printed

Format	EFP n	Parameter range	0 , 1

<Details>

Specifies whether or not EFS and %EFS data will be printed.

n : 0 = EFS and %EFS data not printed

1 = EFS and %EFS data printed

PCP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not PSL COUNT data will be printed

Format	PCP n	Parameter range	0 , 1

<Details>

Specifies whether or not PSL COUNT data will be printed.

n : 0= PSL COUNT data not printed

1= PSL COUNT data printed

Note: PSL denotes Pattern sync loss.

CSP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not clock slip data will be printed

Format	CSP n	Parameter range	0 , 1

<Details>

Specifies whether or not clock slip data will be printed.

n : 0 = Clock slip data not printed
1 = Clock slip data printed

DDP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not distortion data will be printed

Format	DDP n	Parameter range	0 , 1

<Details>

Specifies whether or not distortion data will be printed.

n : 0 = Distortion data not printed
1 = Distortion data printed

PAP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not alarm data will be printed

Format	PAP m , n	Parameter range	m = 0 to 12 (Varies with plug-in unit), n = 0 , 1

<Details>

Specifies whether or not alarm data will be printed.

m : Alarm item number (0 to 12) — varies with plug-in unit (For further details, refer to the command reference for each unit.)
n : 0 = Alarm data not printed
1 = Alarm data printed

ATP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not AT, % AT data will be printed

Format	ATP n	Parameter range	0 , 1

<Details>

Specifies whether or not AT, % AT data will be printed.

n : 0= AT, % AT data not printed

1= AT, % AT data printed

SSP	CONDITION OF PRINT (PERIOD) screen	

Specifies whether or not SLIP-SEC data will be printed

Format	SSP	Parameter range	0 , 1

<Details>

Specifies whether or not SLIP-SEC data will be printed.

CUN	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Sets Error Analyze Unit number

Format	CUN n	Parameter range	1 to 5

<Details>

Specifies the error analysis unit to be used.
This command is used to select one of several Error Analyze Units.
When there is only one unit, it is automatically selected.
n : Unit No. (1 to 5)

CAN	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Sets the location number for data collection

Format	CAN n	Parameter range	1 to 8

<Details>

Specifies the number of the location to be used for data collection. The number can be set for any location into which data has not yet been collected.
n : Number of location (1 to 8)

CED	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Specifies whetther or not error in the interval data will be collected

Format	CED n	Parameter range	0 , 1

<Details>

Specifies whether or not error data will be collected.
0 = Error data not collected
1 = Error data collected

CIT	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Sets collection interval time

Format	CIT n	Parameter range	0 to 6

<Details>

Used to set the collection interval time. Interval data are collected whenever more than 1 error occurs within the specified interval time or when the alarm conditions are changed.
n : Interval time

n	0	1	2	3	4	5	6
Interval	1 second	10 seconds	30 seconds	1 minute	2 minutes	5 minutes	10 minutes

CPD	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Specifies whether or not periodic data will be collected

Format	CPD n	Parameter range	0 , 1

<Details>

Specifies whether or not periodic data will be collected.
n : 0 = Periodic data not collected
1 = Periodic data collected

CAD	CONDITION OF COLLECT screen	Enabled only when the MD0633A Error Analyze Unit is inserted

Specifies whether or not alarm generation/recovery data will be collected with the interval data

Format	CAD m , n	Parameter range	m = 0 to 12 (Varies with each plug-in unit) , n = 0 , 1

<Details>

Specifies whether or not alarm generation/recovery data will be collected.
m : Alarm item number (0 to 12) vary with each plug-in unit
n : 0 = Alarm generation/recovery error data not collected
1 = Alarm generation/recovery error data collected

1.2.8 VOLT/FREQUENCY screen

Commands in this paragraph are effective for the VOLT/FREQUENCY screen.

To use these commands, it is necessary to move the screen to the VOLT/FREQUENCY screen in advance using " VF " command.

PN	VOLT/FREQUENCY screen	

Sets PRBS pattern type

Format	PN n	Parameter range	6 , 7 , 9 , 11 , 15 , 19 , 20 , 23

< Details >

Used to specify the type of a PRBS pattern.

The PRBS pattern which is actually output depends on three settings types: PRBS pattern type, Normal/Inverted & Reversed type, and zero suppression type.

The PN command is used to set the PRBS pattern type.

The relationship between n and the PRBS pattern type is shown below:

n	PRBS pattern
6	2^{6}-1
7	2^{7}-1
9	2^{8}-1
11	2^{11}-1
15	2^{15}-1
19	2^{19}-1
20	2^{20}-1
23	2^{23}-1

INV	VOLT/FREQUENCY screen	

Selects Normal/Inverted & Reversed type PRBS patterns

Format	INV n	Parameter range	0 to 3

<Details>

Used to set Normal/Inverted & Reversed type PRBS patterns.

The PRBS pattern actually output depends on three setting type: PRBS pattern type, Normal/Inverted & Reserved type and the Zero suppression type.

The INV command is used to select a Normal/Inverted & Reversed type PRBS pattern.

The relationship between n and the pattern type is shown below:

n	Normal/Inveted & Reversed type
0	NORMAL
1	INVERT
2	N – RVRS
3	I – RVRS

ZSP	VOLT/FREQUENCY screen	

Sets Zero suppression

Format	ZSP n	Parameter range	0 to 2

<Details>

Used to set the zero suppression type.
The PRBS pattern actually output depends on three setting type: PRBS pattern type, Normal/Inverted & Reserved type and the Zero suppression type.

The ZSP command is used to specify the zero suppression setting.

The range of valid settings change in accordance with the setting conditions.

The relationship between n and the zero suppression setting is shown below:

n	Zero suppression type
0	NO – S U P
1	ZERO – 7
2	ZERO – 14

SCS	VOLT/FREQUENCY screen	

Identifies the sending-side signal and alarm lines

Format	SCS m,n	Parameter range	m = 0 to 12 (Signal line, alarm line), n=0 to 2 (Setting condition)

<Details>

Identifies the sending-side signal and alarm lines.

- The signal lines vary with the Interface Unit. For further details, refer to the operation manual and the command reference for each Interface Unit.

FM	VOLT/FREQUENCY screen	

Selects frequency measurement line

Format	FM n	Parameter range	0,1,2,3,4,6,7,9,11,12,13

<Details>

Specifies the line whose frequency is to be measured.

Parameter n and the line whose frequency is to be measured depend on the Interface Unit. For further details, refer to the operation manual and command reference for each Interface Unit.

GT	VOLT/FREQUENCY screen	

Sets frequency-measurement gate time

Format	GT n	Parameter range	0 to 3

<Details>

Sets the gate time over which the frequency will be measured.
The relationship between n and the frequency-measurement gate time is shown in the table below:

n	Gate time
0	100 ms
1	1 s
2	10 s
3	MANUAL

IT	VOLT/FREQUENCY screen	

Sets frequency-measurement interval time

Format	IT n	Parameter range	0 to 3

<Details>

Sets the time interval which determines how often the frequency is measured.

The relationship between n and the frequency-measurement interval time is shown in the table below:

n	Interval time
0	0.5 s
1	1 s
2	5 s
3	MANUAL

PNI	VOLT/FREQUENCY screen	

Sets the type of an inverted PRBS pattern

Format	PNI n	Parameter range	6 , 7 , 9 , 11 , 15 , 19 , 20 , 23

<Details>

This command specifies the type of an inverted PRBS pattern. The PRBS pattern actually output depends on three setting types: PRBS pattern type, Normal/Inverted & Reversed type and the Zero suppression type. The PNI command specifies both the pattern and Normal/Inverted & Reversed types.

The relationship between the n and the inverted PRBS pattern type, is shown below:

n	PRBS pattern type	Normal/Inverted & Reversed type
6	PRBS 2^6-1	INVERT
7	PRBS 2^7-1	INVERT
9	PRBS 2^9-1	INVERT
11	PRBS 2^{11}-1	INVERT
15	PRBS 2^{15}-1	INVERT
19	PRBS 2^{19}-1	INVERT
20	PRBS 2^{20}-1	INVERT
23	PRBS 2^{23}-1	INVERT

PR	VOLT/FREQUENCY screen	

Sets program pattern (Binary)

Format	PR n	Parameter range	00000000 to 11111111

<Details>

Specifies the program pattern as a sequence of 8-bit binary values.

n : Pattern

n	Program Pattern
00000000 ⟩ 11111111	00000000 ⟩ 11111111

PRB	VOLT/FREQUENCY screen	

Sets program pattern (Binary)

Format	PRB n	Parameter range	00000000 to 11111111

<Details>

Specifies the program pattern as a sequence of 8-bit binary values.

n : Pattern

n	Program Pattern
00000000 ⟩ 11111111	00000000 ⟩ 11111111

PRD	VOLT/FREQUENCY screen	

Sets program pattern (Decimal)

Format	PRD n	Parameter range	0 to 255

< Details >

Specifies the program pattern as a sequence of decimal values.

n : Pattern (integer)

n	Program pattern
0	00000000
1	00000001
2	00000010
⋮	⋮
254	11111110
255	11111111

PA	VOLT/FREQUENCY screen	

Specifies all 0 pattern

Format	PA	Parameter range	None

< Details >

Sets the fixed pattern to All 0s.

PZ	VOLT/FREQUENCY screen	

Specifies All 1 pattern

Format	PZ	Parameter range	None

< Details >

Specifies all 1 pattern.

PC	VOLT/FREQUENCY screen	

Sets alternating pattern of m 1s and n 0s

Format	PC n	Parameter range	0 to 6

< Details >

Sets an alternating pattern of m 1s and n 0s.

n	Fixed (min) pattern
0	10101010 (1 : 1)
1	11101110 (3 : 1)
2	10001000 (1 :3)
3	10101010 (1 : 1)
4	10101010 (1 : 1)
5	11111110 (7 : 1)
6	10000000 (1 : 7)

MSL	VOLT/FREQUENCY screen	

Select line to be monitored

Format	MSL n	Parameter range	1 , 2 ,4

< Details >

Used to select the line to be monitored.

n : Monitor type number

n	Line to be monitored
1	Displays condition of the receive signal and alarm lines
2	Displays receive data as 8-bit parallel data

SCT	VOLT/FREQUENCY screen	

Switches signal line to be monitored while monitoring is in progress

Format	SCT n , m	Parameter range	n = 0 to 12, m = 0 to 2

< Details >

Changes the status of the control signal while monitoring is in progress.

* The identify of the signal-line depends on the Interface Unit. For further details, refer to the operation manual and the command reference for each Interface Unit.

n: Signal line number

m: 0 = OFF

1 = ON

2 = Open or through

- Change the status of the signal line currently being displayed.

VM	VOLT/FREQUENCY screen	

Selects voltage measurement line

Format	VM n	Parameter range	0 to 12

< Details >

Selects the line whose voltage is to be meaured.

n: Type of line to be meaured

- The type of line to be measured varies with the Interface Unit. For further details, refer to the operation manual and the command reference for each Interface Unit.

SA	VOLT/FREQUENCY screen	

Starts frequency measurement

Format	SA	Parameter range	None

< Details >

Initiates frequency measurement.

SO	VOLT/FREQUENCY screen	

Stops frequency measurement

Format	SO	Parameter range	None

< Details >

Terminates frequency measurement.

DO?	VOLT/FREQUENCY screen	

Outputs data

Format	DO?	Parameter range	None

< Details >

Requests output of volt/frequency measurement data.

Note: Refer to the response data reference in Section 2 for the format of output data.

1.2.9 DELAY TIME screen

Commands in this paragraph are effective for the DELAY TIME screen.

To use these commands, it is necessary to move the screen to the DELAY TIME screen in advance using " DL " command.

DM	DELAY TIME screen	

Sets measurement mode

Format	DM n	Parameter range	0 , 1

<Details>

Used to set the measurement mode.

n : Measurement mode specification

n	Measurement mode
0	LINE INTERVAL measurement
1	TRANSMIT DELAY measurement

LSL	DELAY TIME screen	

Selects the send/receive as the start/stop signal

Format	LSL n	Parameter range	0 , 1, 3, 4

<Details>

Selects the send/receive signal as the start/stop signal.

When the measurement mode is LINE INTERVAL, either the send or receive signal line can be designated as the start/stop signal.

n : Line type

n	Start/stop-signal designation
0	Sets send signal as the start/stop signal
1	Sets receive signal as the start/stop signal
3	Sets send alarm signal as the start/stop signal
4	Sets receive alarm signal as the start/stop signal

SAL	DELAY TIME screen	
Sets the start signal line and trigger conditions		

Format	SAL m , n	Parameter range	m = 0 to 13 n = 0 , 1

<Details>

Sets the start signal line and trigger conditions for the LINE INTERVAL measurement mode.

m : 0 to 12 = Signal lines within each Interface Unit

13 = External input signal line

n	Trigger condition
0	1 → 0 ON → OFF H → L
1	1 → 0 OFF → ON L → H

The identity of the signal-lines depends on the Interface Unit.

For further details, refer to the operation manual and command reference for each plug-in unit.

SOL	DELAY TIME screen	

Sets stop signal line and trigger conditions

Format	SOL m , n	Parameter range	m = 0 to 13 n = 0 , 1

<Details>

Sets the stop line and trigger conditions for the LINE INTERVAL measurement mode.

m : 0 to 12 = Signal lines within each Interface Unit

13 = External input signal line

n	Trigger condition
0	1 → 0 ON → OFF H → L
1	0 → 1 OFF → ON L → H

The identify of the signal lines depends on the Interface Unit.

For further details, refer to the operation manual and command reference for each unit.

MSL	DELAY TIME screen	

Selects monitor line

Format	MSL n	Parameter range	0 to 4

<Details>

Displays the identity of the signal line being monitored.

n : Identity of line being monitored

0 = Send signal

1 = Receive signal

2 = Receive data

3 = Send alarm

4 = Receive alarm

SCT	DELAY TIME screen	

Switches signal line while monitoring is in progress

Format	SCT n , m	Parameter range	n : 0 to 12 m : 0 to 2

<Details>

Used to change the state of the control signal while monitoring is in progress.

* The identity of the signal-lines depends on the Interface Unit. For further details, refer to the operation manual and command reference for each Interface Unit.

n : Signal line number

m : 0 = OFF

1 = ON

2 = open or through

- The condition of the signal line being displayed is switched.

IT	DELAY TIME screen	

Sets interval time

Format	IT n	Parameter range	0 to 3

<Details>

Sets the interval time for the TRANSMIT DELAY measurement mode.

n: Interval time

n	Interval time
0	0.5 s
1	1 s
2	5 s
3	MANUAL

RSA	DELAY TIME screen	

Starts repeated delay-time measurements

Format	RSA	Parameter range	None

<Details>

Used to initiate repeated delay-time measurements in the LINE INTERVAL measurement mode.

RSO	DELAY TIME screen	

Terminates repeated delay-time measurements

Format	RSO	Parameter range	None

<Details>

Terminates repeated delay-time measurements in the LINE INTERVAL measurement mode.

SA	DELAY TIME screen	

Starts delay-time measurements

Format	SA	Parameter range	None

<Details>

Initiates delay time measurements.

- Initiates measurements in either the TRANSMIT DELAY or LINE INTERVAL mode. When the LINE INTERVAL mode is specified, single meaurements are started.

SO	DELAY TIME screen	

Stops delay-time measurements

Format	SO	Parameter range	None

<Details>

Terminates delay time measurements.

Both single and repeated measurements are terminated in the LINE INTERVAL measurement mode.

DO?	DELAY TIME screen	

Requests output of delay-time measurement results

Format	DO?	Parameter range	None

<Details>

Causes the measurement-results in the DELAY TIME screen to be output.

Note: Refer to the response data reference in Section 2 for the output format.

1.2.10 WORD TRACE screen

Commands in this paragraph are effective for the WORD TRACE screen.

To use these commands, it is necessary to move the screen to the WORD TRACE screen in advance using "WT" command.

SA	WORD TRACE screen	

Starts sending of word-pattern data

Format	SA	Parameter range	None

<Details>

Initiates data transmission.

SO	WORD TRACE screen	

Terminates sending of word-pattern data

Format	SO	Parameter range	None

<Details>

Terminates data transmission.

SS	WORD TRACE screen	

Sets sending method

Format	SS n	Parameter range	0 , 1

<Details>

Specifies the method for sending data.

n : Data sending method

Parameter	Sending method
0	MANUAL (The output pattern is sent continuously.)
1	1 SHOT (Only a single output pattern is sent by 1 pattern)

IP , IPB	WORD TRACE screen	

Sets idle code (Binary)

Format	IP n , IPB n	Parameter range	00000000 to 11111111

<Details>

Sets the value of the 8-bit binary idle code. When word pattern data are not being sent, the idle code is sent.

n	Idle code
00000000	00000000
⌇	⌇
11111111	11111111

IPD	WORD TRACE screen	

Sets idle code (Decimal)

Format	IPD n	Parameter range	0 to 255

<Details>

Set the idle code with a decimal value.

n	Idle code
0	0
⌇	⌇
255	255

WPA	WORD TRACE screen	

Sets send-data address

Format	WPA n	Parameter range	0 to 8191

<Details>

Sets the send-data address with a decimal value.

n : Address (0 to 8191)

WP , WPB	WORD TRACE screen	

Sets send-data pattern (Binary)

Format	WP n,WPB n	Parameter range	00000000 to 11111111

<Details>

Sets the send-data pattern as a sequence of 8-bit binary data.

n	Pattern
00000000 〉 11111111	00000000 〉 11111111

WPD	WORD TRACE screen	

Sets send-data pattern (Decimal)

Format	WPD n	Parameter range	0 to 255

<Details>

Sets the send-data pattern with a decimal value.

n	Pattern
0	00000000
⟩	⟩
255	11111111

WPF	WORD TRACE screen	

Sets send-data pattern to FOX pattern

Format	WPF	Parameter range	None

<Details>

Sets the send-data pattern to FOX pattern.

WPM	WORD TRACE screen	Enabled when the MD0610D Word Memory Unit is inserted

Copies word-pattern from the memory board

Format	WPM n	Parameter range	0 to 7

<Details>

Copies the pattern from the memory board as the word pattern.

n	ROM number
0	ROM 0
1	ROM 1
2	ROM 2
3	ROM 3
4	ROM 4
5	ROM 5
6	ROM 6
7	ROM 7

WTD	WORD TRACE screen	

Sets word-pattern send-data top address

Format	WTD n	Parameter range	0 to 32766

<Details>

Sets the top address of the word-pattern send-data.

n : top address (0 to 32766)

- When the word pattern is a FOX pattern, the top address cannot be set.
- If it is not Option 02, it can be only set from 0 to 8191.

WL	WORD TRACE screen	

Sets word-pattern send-data last address

Format	WL n	Parameter range	1 to 32767

<Details>

Sets the last address of the word-pattern send-data.

n : last address (1 to 32767)

last address ≧ top address + 1

- When the word pattern is a FOX pattern, the last address cannot be set.
- If it is not Option 02, it can be only set from 0 to 8191.

SYCX	WORD TRACE screen	

No sync code

Format	SYCX	Parameter range	None

<Details>

Indicates that synchronization pattern is none.

SYC , SYCB	WORD TRACE screen	

SYNC code (Binary)

Format	SYC n ,SYCB n	Parameter range	00000000 to 11111111

<Details>

Sets the 8-bit binary value of the trace sync pattern.

n	Trace sync pattern
00000000 〈 11111111	00000000 〈 11111111

SYCD	WORD TRACE screen	

SYNC code (Decimal)

Format	SYCD n	Parameter range	0 to 255

<Details>

Sets the trace sync binary pattern with a decimal value.

Parameter	Trace sync pattern
0 ≀ 255	00000000 ≀ 11111111

TA	WORD TRACE screen	

Starts trace

Format	TA	Parameter range	None

<Details>

After the TA command is sent, the trace is started subject to the trace-start conditions.

TO	WORD TRACE screen	

Stops trace

Format	TO	Parameter range	None

<Details>

Sets the trace.
(Executed irrespective of trace-stop conditions)

SM	WORD TRACE screen	

TRACE STOP=MANUAL

Sets manual trace-stop condition

Format	SM	Parameter range	None

<Details>

Enables manual setting of trace stop condition.

SC ,SCB	WORD TRACE screen	

Determines whether a trace is stopped when a value equal to the trace stop byte is received or not received. Also specifies binary value of trace stop byte.

Format	SC m, n, ℓ SCB m, n, ℓ	Parameter range	m=0 , 1; n=00000000 to 11111111; ℓ=00000000 to 11111111

<Details>

Determines whether the trace is stopped when a value equal to the trace stop byte is received or not received. Also specifies binary value of trace stop byte.

This command also sets the 8-bit binary value of this trace stop code as shown below:

m	Trace stop condition
0	Halt trace when a value equal to the trace stop byte is received.
1	Halt trace when a value not equal to the trace stop byte is received.

n	Trace-stop byte value
00000000	00000000
⟩	⟩
11111111	11111111

Note: To specify a "Don't care" bit (X) value, set the specified bit in byte ℓ to 1.

Example: When SC0 (m) , 00001111 (n) and 01010101 (ℓ) are used, the trace will be stopped for any value equal to 0X0X1X1X.

SCD	WORD TRACE screen	

Specifies stop trace byte with a decimal value and determines whether a trace is stopped when this value is received or not received.

Format	SCD m, n, ℓ	Parameter range	m=0, 1 n=0 to 255

<Details>

Specifies stop trace byte with a decimal value and determines whether a trace is stopped when this value is received or not received.

m	Trace stop condition
0	Halt trace when data equal to trace stop byte are received.
1	Halt trace when data not equal to trace stop byte are received.

n	Trace-stop-byte value
0	00000000
⟩	⟩
255	11111111

Note: To specify a "Don't care" bit (X) value, set the specified bit in byte ℓ to 1.

Example: When SC0 (m), 00001111 (n) and 01010101 (ℓ) are used, the trace will be stopped for any value equal to 0X0X1X1X.

SL	WORD TRACE screen	

Stops trace when specified signal line changes in indicated manner

Format	SL m , n	Parameter range	m = 0 to 12, n = 0 , 1

<Details>

This command simultaneously sets the trace-stop-trigger signal line and the trace stop trigger condition as shown below:

m: 0 ~ 12 Indicates signal line whose transition will halt the trace.

n	Trace-stop-trigger condition
0	1 → 0 ON → OFF H → L
1	0 → 1 OFF → ON L → H

The identities of the signal lines varies with the Interface Unit.

For further details, refer to the appropriate operation manual and command reference.

SB	WORD TRACE screen	

Sets the number of bytes to be received before the trace halts.

Format	SB n	Parameter range	0 to 32764

<Details>

Sets the number of trace bytes to be received from the start of measurement until measurement is terminated.

n : Number of trace bytes(0 to 32764)

SE	WORD TRACE screen	

Stops trace when external input signal line changes in specified manner.

Format	SE n	Parameter range	0 , 1

<Details>

Sets the stop-trigger condition for an EXT input signal.

- When an EXT signal is to be used as the stop trigger, the trigger condition must also be set.

n : Condition

n	Trigger condition
0	H → L
1	L → H

SD	WORD TRACE screen	Can be used when the trace-stop trigger is either an internal signal line or an externally input signal line

Sets number of bytes to be traced after a trace stop trigger occurs.

Format	SD n	Parameter range	0 to 8000

<Details>

Sets the number of bytes (n) to be traced after the trace stop trigger occurs. When the MANUAL or BYTE trace stop trigger mode is used, this command is disabled.

n : No. of bytes (0 to 8000)

LSL	WORD TRACE screen	

Sets send/receive signal as trace-stop signal

Format	LSL n	Parameter range	0 , 1

<Details>

Sets the send/receive line as the trace-stop trigger.

This command is used to select the send/receive signal as the trace-stop trigger.

When this command is used, the following sequence of commands should be used: LSL n → SL m , n.

n : Send/Receive type

Parameter	Setting
0	The send signal line is used as the trace stop trigger.
1	The receive signal line is used as the trace stop trigger.
3	The send alarm signal is used as the trace stop trigger.
4	The receive alarm signal is used as the trace stop trigger.

DO ?	WORD TRACE screen	

Outputs setting value data

Format	DO ?	Parameter range	None

<Details>

Requests output of the WORD TRACE screen settings.

Note: Refer to the response data reference in Section 2 for the format of the output data.

DRQ?	WORD TRACE screen	
Requests data at end of trace		

Format	DRQ?	Parameter range	None

<Details>

Requests output of end of trace data. This command is used to output data after a trace has been completed.

Note: Refer to the response data reference in Section 2 for the format at the output data.

MSL	WORD TRACE screen	

Indicates line being monitored

Format	MSL n	Parameter range	0 to 4

<Details>

Displays the signal-line condition.

n : Line condition being monitored

0 = Send signal condition

1 = Receive signal condition

3 = Send alarm condition

4 = Receive alarm condition

SCT	WORD TRACE screen	

Sets value of signal line while monitoring is in progress

Format	SCT n , m	Parameter range	n : 0 to 12 m : 0 to 2

<Details>

Switches the condition of the control signal while monitoring is in progress.

* The identities of the signal lines vary with the Interface Unit.
  For further details, refer to the appropriate operation manual and command reference.

n : Signal-line number

m : 0 = OFF

1 = ON

2 = open or through

- Used to switch the condition of the displayed signal line.

1.2.11 EDIT PATTERN DATA screen

Commands in this paragraph are effective for the EDIT PATTERN DATA screen.

To use these commands, it is necessary to move the screen to the EDIT PATTERN DATA screen in advance using " WE " command.

WPA	EDIT PATTERN DATA screen	

Sets edit address

Format	WPA n	Parameter range	0 to 32767

< Details >

Sets the displayed top address of edit data.

n : Top address (0 to 32767)

- If it is not Option 02, it can be only set from 0 to 8192.

DSP	EDIT PATTERN DATA screen	

Specifies the display mode

Format	DSP n	Parameter range	0 , 1

< Details >

Specifies the display mode of edit data.

n : Mode specification

0 = BYTE mode

1 = BIT mode

CD	EDIT PATTERN DATA screen	

Specifies the display character code

Format	CD n	Parameter range	0 to 6

< Details >

Specifies the display character code of edit data.

n : Type of code

n	Type of cade
0	HEX
1	ASCII
2	EBCDIC
3	EBCDIK
4	JIS8
5	EBCD
6	Baudot

BDR	EDIT PATTERN DATA screen	

Specifies the display boundary

Format	BDR n	Parameter range	4 to 8

< Details >

Specifies the bit boundary when the edit data are displayed.

n : Bit boundary

n	Bit boundary
4	4 bits
5	5 bits
6	6 bits
7	7 bits
8	8 bits

SH	EDIT PATTERN DATA screen	

EDIT FUNCTION-Indicates execution of shift

Format	SH n , m	Parameter range	n : 0 to 7 , m : 0 , 1

< Details >

EDIT FUNCTION-Indicates execution of shift.

n : Indication of direction and bit to be shifted

n	Bit shift
0	+ 4
1	+ 3
2	+ 2
3	+ 1
4	− 1
5	− 2
6	− 3
7	− 4

m : Range of data to be shifted

0 = Displayed data, 1 = All data

INV	EDIT PATTERN DATA screen	

EDIT FUNCTION-Indicates execution of inverse

Format	INV n	Parameter range	0 , 1

<Details>

EDIT FUNCTION-Indicates execution of inverse.

n : Range of data to be inversed

0 = Displayed data, 1 = All data

REV	EDIT PATTERN DATA screen	

EDIT FUNCTION-Indicates execution of reverse

Format	REV n	Parameter range	0 , 1

<Details>

EDIT FUNCTION-Indicates execution of reverse.

n : Range of data to be reversed

0 = Displayed data, 1 = All data

MSV	EDIT PATTERN DATA screen	

Indicates saving to word-memory unit

Format	MSV n	Parameter range	0 to 7

<Details>

Performs an indication to save the pattern data to E^2 PROM of the word-memory unit.

n : E^2 PROM ROM No. to be saved (0 to 7)

MRC	EDIT PATTERN DATA screen	

Indicates read-out from the word-memory unit

Format	MRC n	Parameter range	0 to 7

< Details >

Performs an indication to read out the pattern data from PROM/E^2 PROM of the word-memory unit.

n : ROM No. (0 to 7) of PROM/E^2 PROM from which pattern data is read.

CPY	EDIT PATTERN DATA screen	

Indicates traced data copy

Format	CPY n , m	Parameter range	n : 0 to 32767 , m : 1 to 8

< Details >

Performs an indication to copy the traced data to the word-pattern data.

n : Top address of traced data to be copied (0 to 32767)

※ If it is not Option 02, it can be only set from 0 to 8191.

m : Top bit of traced data to be copied (1 to 8 ; MSB = 8, LSB = 1)

1.2.12 DISPLAY PATTERN TRACE screen

Commands in this paragraph are effective for the DISPLAY PATTERN TRACE screen.

To use these commands, it is necessary to move the screen to the DISPLAY PATTERN TRACE screen in advance using " TD " command.

CD	DISPLAY PATTERN TRACE screen	

Selects the type of code to be used for tracing data

Format	CD n	Parameter range	0 to 6

< Details >

Sets the type of code to be used for tracing data.

n : Type of code

n	Type of code
0	HEX
1	ASCII
2	EBCDIC
3	EBCDIK
4	JIS8
5	EBCD
6	Baudot

DA	DISPLAY PATTERN TRACE screen	

Sets display address

Format	DA n	Parameter range	0 to 32767

< Details >

The data of the address specified by the parameter is displayed on the MD6420A display.

n : Start address for data to be displayed (0 to 32767)

SH	DISPLAY PATTERN TRACE screen	

Sets the number of bits to be shifted

Format	SH n	Parameter range	0 to 7

< Details >

Sets the number of bits to be shifted.

This command shifts the binary values of the displayed code by the number of specified bits.

n : Number of bits to be shifted

n	No. of bits to be shifted
0	+ 4
1	+ 3
2	+ 2
3	+ 1
4	0
5	− 1
6	− 2
7	− 3

DO ?	DISPLAY PATTERN TRACE screen	

Requests output of trace results

Format	DO ? n	Parameter range	0 to 32768

< Details >

Requests output of the trace results. Data is output from the specified start address in HEX format.

However, the least significant digit (unit value) of the output data is truncated. 40 data are output at one time.

n : Trace start address (0 to 32768)

Note: Refer to the response data reference in Section 2 for the format of the output data.

INV	DISPLAY PATTERN TRACE screen	

Specifies inverse/reverse display

Format	INV n	Parameter range	0 to 3

< Details >

Specifies inverse/reverse processing when the trace data are displayed.

n : Type of inverse/reverse

n	Type
0	NORMAL
1	INVERT
2	NORMAL-REVERSE
3	INVERT-REVERSE

CMP	DISPLAY PATTERN TRACE screen	

Specifies comparison processing for the send data

Format	CMP n , m	Parameter range	n : 0 to 1 , m : 0 to 32767

< Details >

Specifies comparison processing for the send data when the trace data are displayed.

n : Whether or not comparison processing is specified

0 = Not specified, 1 = Specified

m : Top address of the send data to be compared (0 to 32767) m is not required for n = 0.

DSP	DISPLAY PATTERN TRACE screen	

Sets display mode

Format	DSP n	Parameter range	0 , 1

< Details >

Sets the display mode of trace data.

n : Type of display mode

0 = BYTE mode

1 = BIT mode

BDR	DISPLAY PATTERN TRACE screen	

Specifies display boundary

Format	BDR n	Parameter range	4 to 8

< Details >

Specifies the bit boundary when the trace data are displayed.

n : Bit boundary

n	Bit boundary
4	4 bits
5	5 bits
6	6 bits
7	7 bits
8	8 bits

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(Blank)

SECTION 2

RESPONSE DATA REFERENCE

(Blank)

2.1 IEEE488.2 Common Commands

Output contents	Command name	Explanation
ESE register request	*ESE?	The contents of the ESE register are output as a decimal number whose value is 0 to 255. (Note)
ESR register request	*ESR?	The contents of the ESR register are output as a decimal number whose value is 0 to 255. (Note)
SRE register request	*SRE?	The contents of the SRE register are output as a decimal number whose value is either 0 to 255. (Note)
STB register request	*STB?	The contents of the STB register are output as a decimal number whose value is 0 to 255. (Note)
Device ID request	*IDN?	Refer to page 2-3.
Device test and status request	*TST?	0 is output when the device test and status contents are requested. (Note)
Operation status request	*OPC?	1 is output when the operation status is requested. (Note)

MD6420A Common Commands

Output contents	Command name	Explanation
END-ERS enable register request	ESAE?	The contents of the END-ESR enable register contents are output as a decimal number whose value is 0 to 65535. (Note)
END-ERS request	ESAR?	The contents of the END-ESR register are output as a decimal number whose value is 0 to 65535. (Note)
END-CONDITION register request	ESAC?	The contents of the END-CONDITION register are output as a decimal number whose value is 0 to 65535. (Note)
error-ERS enable register request	ESBE?	The contents of the error-ERS enable register are output as a decimal number whose value is 0 to 65535. (Note)
error-ERS request	ESBR?	The contents of the error-ERS are output as a decimal number whose value is 0 to 65535. (Note)
error-CONDITION register request	ESBC?	The contents of the error-CONDITION register are output as a decimal number whose value is 0 to 65535. (Note)

Note: These response data are sent with 5-digit character string (ASCII) without the header. They are sent placing the lowest digit to right-justify and replacing 0 at the upper digits by a space.

<Example>
When output data are 0 ····· ␣␣␣␣0
When output data are 128 ····· ␣␣128
␣: Space

Screen			
Command name	*IDN	Explanation	Requests device ID

Output format and explanation

ANRITSU, MD6420A△, 0, 0100
1 2 3 4

No	Output	Column	Number of columns	Range	Remarks
1	Anritsu (manufacturer)	1 to 7	7	Constant (No range)	
2	Model No.	9 to 16	8	Constant (No range)	
3	(Spare)	18	1	Constant (No range)	
4	Version No. (main frame)	20 to 23	4	0000 to 9999	

2.2 PRESET MEMORIES Screen

Screen	PRESET MEMORY screen		
Command name	DO?	Explanation	Requests data output

Output format and explanation

PR0△88, 06, 19, 11, 22, 33, 01, 02, 03, 880610, 112233,
1 2 3 4 5 6 7 8 9 10 11 12 13

Contents of memory 1

~ 01, 02, 03, 880610, 112233
251

Continue to output contents up to contents of memory 10

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	Constant (No range)	
3 to 5	Year, month, and day of data output	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hours, minutes, and seconds of data output	14 to 21	8	00,00,00 to 23,59,59	
9	Sending Interface Unit type No.	23,24	2	Varies with type of Interface Unit (See List for No. of Unit Type at the end of this Section 2.)	'99' when not preset
10	Receiving Interface Unit Type No.	26,27	2	Varies with type of Interface Unit (See List for No. of Unit Type at the end of this Section 2.)	'99' when not preset
11	Measurement type No.	29,30	2	Varies with measurement type (See the following table)	'99' when not preset
12	Year, month, and day on which data were preset	32 to 37	6	000101 to 991231	'999999' when not preset
13	Hours, minutes, and seconds at which data were preset	39 to 44	6	000000 to 235959	'999999' when not preset

Table of Measurement Type

Measurement	Measurement type No.
Error measurement	48
Voltage/frequency measurement	49
Delay time measurement	50
Word trace	51
Analog measurement	53
CODEC measurement	54

Measurement	Measurement type No.
Distortion measurement	55
64 kb/s Jitter measurement	80
1.544 Mb/s Jitter measuremnet	81
2.048 Mb/s Jitter measurement	82

2.3 TABLE OF UNITS Screen

Screen	TABLE OF UNITS screen		
Command name	DO ?	Explanation	Requests data output

Output format and explanation

UV0△90, 04, 05, 16, 48, 56, 255, MD6420A△, MAIN△△△△,
1 2 3 4 5 6 7 8 9 10 11

Name of Plug-in Unit 1

~ 008, MD0623A△, 2.0MBPL△

Continue up to name of the last Plug-in Unit inserted

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	Constant (No range)	
3 to 5	Year, month, and day of data output	5 to 12	8	00,01,01 to 99,12,13	
6 to 8	Hours, minutes, and seconds of data output	14 to 21	8	00,00,00 to 23,59,59	
9	Unit type No.	23 to 25	3	Varies with unit (See List for No. of Unit Type at the end of this Section 2.)	'999' when unit is not inserted
10	Unit model number	27 to 34	8	Displayed as 8 characers (See List for No. of Unit Type at the end of this Section 2.)	Blank when no unit are inserted
11	Unit name	36 to 43	8	Displayed as 8 characters (See List for No. of Unit Type at the end of this Section 2.)	Blank when no unit is inserted

2.4 INTERFACE Screen

Screen	INTERFACE screen		
Command name	DO ?	Explanation	Requests data output

Output format and explanation

IF0△90, 01, 05, 11, 48, 13, 1, △5, △△5, 1, 1, 0, 0, 0, 1, △1,
1 2 3 4 5 6 7 8 9 10 11
△△64000, △, 0, △1, 0, 1, 11111, 0101, 01, △△△△△△△△△△△△△△

△△△△△△△△△△△△△

2.5 ERROR Screen

Screen	ERROR screen		
Command name	DRI ?	Explanation	Requests output of interval data

Output format and explanation

ED1△89, 06, 11, 12, 00, 00, 1, 8191, 0, 0, △△△△1234, 1,
1.△23E−02, 0, △△△△△123, 1, 1.23E−01, 0, 1, 0, 9, 9, 0, 1,
0, 0, 0, 0, 9, 9, 9, 99

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	0: Measurement start data 1: Interval data	
3 to 5	Year, month, and day	5 to 12	8	00,01,01 to 99,12,31	Count start time when item-2 is 0. Interval start time when item-2 is 1
6 to 8	Hour, minute, and second	14 to 21	8	00,00,00 to 23,59,59	
9	Item to be monitored	23	1	0: Send 1: Receive (or send/receive) 2: Data	
10	Contents of monitored item	25 to 28	4	0 to 8191	See Note 1 below.
11	PSL during occurance/recovery data	30	1	0: Rcovery data 1: PSL during occurance	
12	Data type	32	1	Refer to table of numerical data formats, below.	Data not defined for item-2 equal to 0.
13	Error count value	34 to41	8		
14	Data type	43	1		
15	Error rate	45 to 53	8		
16	Data type	55	1		
17	Block count value	57 to 64	8		
18	Data type	66	1		
19	Block rate	68 to 75	8		
20	Alarm 0	77	1	0: Output during alarm recovery or when supervisory mode is not set 1: Output when alarm is generated 2: Output on recovery from alarm 3: Output when alarms are being continuously generated 9: Not used	Not used when item-2 is 0.
21	Alarm 1	79	1		
22	Alarm 2	81	1		
23	Alarm 3	83	1		
24	Alarm 4	85	1		
25	Alarm 5	87	1		
26	Alarm 6	89	1		
27	Alarm 7	91	1		
28	Alarm 8	93	1		
29	Alarm 9	95	1		
30	Alarm 10	97	1		
31	Alarm 11	99	1		
32	Alarm 12	101	1		
33	Alarm 13	103	1		
34	Number of remaining interval data	105	2	0 to 10	No remaining data in interval data buffer for 0.

Numerical Data Format

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1234567
Floating	1	0.00E+00 to 99.9E+00	1, 1.23E−01
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△−10.5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△52.83
Overflow	8	99999999	8, 99999999
No data	9	99999999	9, 99999999

Note 1 Monitor contents

- Monitor LED display contents are indicated at each state of the error measurement. The LED display contents are the line state which has been currently displayed with selection of the monitor line.

<Example 1>

When the monitor line selection is " SIGNAL " and displays are as follows:

1111 0001001 00 (Binary display)

1E24 (Hexadecimal display)

7716 (Output data: Decimal display)

<Example 2>

When the monitor line selection is " DATA " and displays are as follows:

0100101100000 (Binary display)

0960 (Hexadecimal display)

2400 (Output data:Decimal display)

- The monitor LED displays a current state at a real time. Since these data are displayed as the monitor contents after reading, it may be different from visual display contents.
- Reads the monitor LED contents of each data with the following timing and outputs them as the monitor contents.

Data type	Data name	Timing
ED 0	Counting start data	Counting-start time
ED 1	Interval data	Interval-period completion time
ED2	Performance data (period completion)	Period-completion time
ED3	Alarm data (period completion)	Period-completion time
ED4	Performance data (ELAPSED indication output)	Data-output request time
ED5	Alarm data (ELAPSED indication output)	Data-output request time
ED6	Performance data (TOTAL output)	Measurement-completion time
ED7	Alarm data (TOTAL output)	Measurement-completion time

Screen	ERROR screen		
Command name	DRP ?	Explanation	Request output of performance data (In PERIODIC mode)

Output format and explanation

```
ED2△89, 06, 20, 12, 01, 05, 89, 06, 20, 12, 02, 00, 1, 8191,
1  2  3   4   5   6   7   8   9   10  11  12  13  14  15  16
0, 0, 12345678, 1, 1.23E-05, 0, △1234567, 1, 1.09E+0.1,
17 18    19    20    21      22    23     24    25
0, 12345678, 1, 1.23E-05, 0, △1234567, 2, △△△234.5,
26    27     28    29      30    31     32    33
3, △△567.23, 9, 99999999, 9, 99999999, 0, 12345678,
34    35     36    37     38    39     40    41
1, 1.23E-05, 0, △1234567, 1, 1.09E+01, 0, 12345678,
42    43     44    45     46    47     48    49
1, 1.23E-05, 0, △1234567
50    51     52    53
```

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	2: Performance data (Output in PERIODIC mode) 6: Performance data (Output in TOTAL mode)	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to 23,59,59	
9 to 11	Year, month, and day on which data was output	23 to 30	8	00,01,01 to 99,12,31	
12 to 14	Hour, minute, and second at which data was output	32 to 39	8	00,00,00 to 23,59,59	
15	Item to be monitored	41	1	0: Send 1: Receive (or send/receive) 2: Data	
16	Contents of monitored item	43 to 46	4	0 to 8191	See Note 1 on the previous page.
17	PSL during occurrence/recovery data	48	1	0: Recovery data 1: PSL during occurrance	
18	Data type	50	1	Refer to table of numerical data formats, below.	
19	Sppecified data 0	52 to 59	8		
20	Data type	61	1		
21	Specified data1	63 to 70	8		
22	Data type	72	1		
23	Specified data 2	74 to 81	8		
24	Data type	83	1		

(Cont.)

No.	Output	Column	Number of columns	Range	Remarks
25	Specified data 3	85 to 92	8	Refer to table of numerical data formats, below.	
26	Data type	94	1		
27	Specified data 4	96 to 103	8		
28	Data type	105	1		
29	Specified data 5	107 to 114	8		
30	Data type	116	1		
31	Specified data 6	118 to 125	8		
32	Data type	127	1		
33	Specified data 7	129 to 136	8		
34	Data type	138	1		
35	Specified data 8	140 to 147	8		
36	Data type	149	1		
37	Specified data 9	151 to 158	8		
38	Data type	160	1		
39	Specified data 10	162 to 169	8		
40	Data type	171	1		
41	Specified data 11	173 to 180	8		
42	Data type	182	1		
43	Specified data 12	184 to 191	8		
44	Data type	193	1		
45	Specified data 13	195 to 202	8		
46	Data type	204	1		
47	Specified data 14	206 to 213	8		
48	Data type	215	1		
49	Specified data 15	217 to 224	8		
50	Data type	226	1		
51	Specified data 16	228 to 235	8		
52	Data type	237	1		
53	Specified data 17	239 to 246	8		

Numerical data formats

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△123456
Floating	1	0.00E+00 to 99.9E+00	1, 1.23E-01
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△-10.5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△52.83
Overflow	8	99999999	8, 99999999
No data	9	99999999	9, 99999999

Screen	ERROR screen		
Command name	DRA ?	Explanation	Requests output of alarm data (In PERIODIC mode)

Output format and explanation

```
ED3△89, 06, 20, 12, 01, 05, 89, 06, 20, 12, 02, 00, 1, 8191,
1  2  3   4   5   6   7   8   9   10  11  12  13  14  15  16
0, 0, 12345678, 1, 1.23E-05, 0, △1234567, 1, 1.09E+0.1,
17 18    19     20    21      22    23     24    25
0, 12345678, 1, 1.23E-05, 0, △1234567, 2, △△△234.5,
26    27     28    29      30    31     32    33
3, △△567.23, 9, 999999999, 9, 999999999, 0, 12345678,
34    35     36    37      38    39      40    41
1, 1.23E-05, 0, △1234567, 1, 1.09E+01, 0, 12345678,
42    43     44    45     46    47     48    49
1, 1.23E-05, 0, △1234567
50    51     52    53
```

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	3 : Alarm data (Output in PERIODIC mode) 7 : Alarm data (Output in TOTAL mode)	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to 23,59,59	
9 to 11	Year, month, and day on which data were output	23 to 30	8	00,01,01 to 99,12,31	
12 to 14	Hour, minute, and second at which data were output	32 to 39	8	00,00,00 to 23,59,59	
15	Item to be monitored	41	1	0 : Send 1 : Receive (or send/receive) 2 : Data	
16	Contents of monitored item	43 to 46	4	0 to 8191	See Note 1 on the page 2-8
17	PSL during occurrence/recovery data	48	1	0 : Recovery data 1 : PSL during occurrance	
18	Data type	50	1	Refer to table of numerical data formats, below.	
19	Sppecified data 0	52 to 59	8		
20	Data type	61	1		
21	Specified data1	63 to 70	8		
22	Data type	72	1		
23	Specified data 2	74 to 81	8		
24	Data type	83	1		

(Cont.)

No.	Output	Column	Number of columns	Range	Remarks
25	Specified data 3	85 to 92	8	Refer to table of numerical data formats, below.	
26	Data type	94	1		
27	Specified data 4	96 to 103	8		
28	Data type	105	1		
29	Specified data 5	107 to 114	8		
30	Data type	116	1		
31	Specified data 6	118 to 125	8		
32	Data type	127	1		
33	Specified data 7	129 to 136	8		
34	Data type	138	1		
35	Specified data 8	140 to 147	8		
36	Data type	149	1		
37	Specified data 9	151 to 158	8		
38	Data type	160	1		
39	Specified data 10	162 to 169	8		
40	Data type	171	1		
41	Specified data 11	173 to 180	8		
42	Data type	182	1		
43	Specified data 12	184 to 191	8		
44	Data type	193	1		
45	Specified data 13	195 to 202	8		
46	Data type	204	1		
47	Specified data 14	206 to 213	8		
48	Data type	215	1		
49	Specified data 15	217 to 224	8		
50	Data type	226	1		
51	Specified data 16	228 to 235	8		
52	Data type	237	1		
53	Specified data 17	239 to 246	8		

Numerical Data Formats

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1 2 3 4 5 6
Floating	1	0.00E+00 to 99.9E+00	1, 1. 2 3 E−0 1
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△−1 0. 5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△5 2. 8 3
Overflow	8	99999999	8, 9 9 9 9 9 9 9 9
No data	9	99999999	9, 9 9 9 9 9 9 9 9

Screen	ERROR screen		
Command name	DOP ?	Explanation	Request output of performance data

Output format and explanation

```
ED6△89, 06, 20, 12, 01, 05, 89, 06, 20, 12, 02, 00, 1, 8191,
1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
0, 0, 12345678, 1, 1.23E-05, 0, △1234567, 1, 1.09E+0.1,
17 18 19       20 21        22 23       24 25
0, 12345678, 1, 1.23E-05, 0, △1234567, 2, △△△234.5,
26 27       28 29        30 31       32 33
3, △△567.23, 9, 999999999, 9, 999999999, 0, 12345678,
34 35        36 37        38 39        40 41
1, 1.23E-05, 0, △1234567, 1, 1.09E+01, 0, 12345678
42 43        44 45        46 47        48 49
1, 1.23E-05, 0, △1234567
50 51        52 53
```

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	2: Performance data (Output in PERIODIC mode) 4: Performance data (Output when specified data are output) 6: Performance data (Output in TOTAL mode)	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to 23,59,59	
9 to 11	Year, month, and day on which data were output	23 to 30	8	00,01,01 to 99,12,31	
12 to 14	Hour, minute, and second at which data were output	32 to 39	8	00,00,00 to 23,59,59	
15	Item to be monitored	41	1	0: Send 1: Receiver (or send/receive) 2: Data	
16	Contents of monitored item	43 to 46	4	0 to 8191	See Note 1 on the page 2-8
17	PSL during occurrence/recovery data	48	1	0: Recovery data 1: PSL during occurrance	
18	Data type	50	1	Refer to table of numerical data formats, below.	
19	Sppecified data 0	52 to 59	8		
20	Data type	61	1		
21	Specified data1	63 to 70	8		
22	Data type	72	1		

(Cont.)

No.	Output	Column	Number of columns	Range	Remarks
23	Specified data 2	74 to 81	8	Refer to table of numerical data formats, below.	
24	Data type	83	1		
25	Specified data 3	85 to 92	8		
26	Data type	94	1		
27	Specified data 4	96 to 103	8		
28	Data type	105	1		
29	Specified data 5	107 to 114	8		
30	Data type	116	1		
31	Specified data 6	118 to 125	8		
32	Data type	127	1		
33	Specified data 7	129 to 136	8		
34	Data type	138	1		
35	Specified data 8	140 to 147	8		
36	Data type	149	1		
37	Specified data 9	151 to 158	8		
38	Data type	160	1		
39	Specified data 10	162 to 169	8		
40	Data type	171	1		
41	Specified data 11	173 to 180	8		
42	Data type	182	1		
43	Specified data 12	184 to 191	8		
44	Data type	193	1		
45	Specified data 13	195 to 202	8		
46	Data type	204	1		
47	Specified data 14	206 to 213	8		
48	Data type	215	1		
49	Specified data 15	217 to 224	8		
50	Data type	226	1		
51	Specified data 16	228 to 235	8		
52	Data type	237	1		
53	Specified data 17	239 to 246	8		

Numerical data formats

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1234567
Floating	1	0.00E+00 to 99.9E+00	1, 1.23E-01
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△-10.5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△52.83
Overflow	8	99999999	8, 99999999
No data	9	99999999	9, 99999999

Screen	ERROR screen		
Command name	DOA ?	Explanation	Request output of alarm data

Output format and explanation

```
ED7△89, 06, 20, 12, 01, 05, 89, 06, 20, 12, 02, 00, 1, 8191,
1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
0, 0, 12345678, 1, 1.23E-05, 0, △1234567, 1, 1.09E+0.1,
17 18 19       20 21        22 23       24 25
0, 12345678, 1, 1.23E-05, 0, △1234567, 2, △△△234.5,
26 27       28 29        30 31       32 33
3, △△567.23, 9, 999999999, 9, 999999999, 0, 12345678,
34 35        36 37        38 39        40 41
1, 1.23E-05, 0, △1234567, 1, 1.09E+01, 0, 12345678
42 43        44 45        46 47        48 49
1, 1.23E-05, 0, △1234567
50 51        52 53
```

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	3: Alarm data (Output in PERIODIC mode) 5: Alarm (Output when specified data are output) 7: Alarm data (Output in TOTAL mode)	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to23,59,59	
9 to 11	Year, month, and day on which data were output	23 to 30	8	00,01,01 to 99,12,31	
12 to 14	Hour, minute, and second at which data were output	32 to 39	8	00,00,00 to 23,59,59	
15	Item to be monitored	41	1	0: Send 1: Receive (or send/receive) 2: Data	
16	Contents of monitored item	43 to 46	4	0 to 8191	See Note 1 on the page 2-8
17	PSL during occurrence/recovery data	48	1	0: Recovery data 1: PSL during occurrance	
18	Data type	50	1	Refer to table of numerical data formats, below.	
19	Sppecified data 0	52 to 59	8		
20	Data type	61	1		
21	Specified data1	63 to 70	8		
22	Data type	72	1		

(Cont.)

No.	Output	Column	Number of columns	Range	Remarks
23	Specified data 2	74 to 81	8	Refer to the table of numerical data formats, below.	
24	Data type	83	1		
25	Specified data 3	85 to 92	8		
26	Data type	94	1		
27	Specified data 4	96 to 103	8		
28	Data type	105	1		
29	Specified data 5	107 to 114	8		
30	Data type	116	1		
31	Specified data 6	118 to 125	8		
32	Data type	127	1		
33	Specified data 7	129 to 136	8		
34	Data type	138	1		
35	Specified data 8	140 to 147	8		
36	Data type	149	1		
37	Specified data 9	151 to 158	8		
38	Data type	160	1		
39	Specified data 10	162 to 169	8		
40	Data type	171	1		
41	Specified data 11	173 to 180	8		
42	Data type	182	1		
43	Specified data 12	184 to 191	8		
44	Data type	193	1		
45	Specified data 13	195 to 202	8		
46	Data type	204	1		
47	Specified data 14	206 to 213	8		
48	Data type	215	1		
49	Specified data 15	217 to 224	8		
50	Data type	226	1		
51	Specified data 16	228 to 235	8		
52	Data type	237	1		
53	Specified data 17	239 to 246	8		

Numerical Data Format

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1 2 3 4 5 6
Floating	1	0.00E+00 to 99.9E+00	1, 1. 2 3 E − 0 1
Reslution of 0.1	2	-99999.9 to 999999.9	2, △△△−1 0. 5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△5 2. 8 3
Overflow	8	99999999	8, 9 9 9 9 9 9 9 9
No data	9	99999999	9, 9 9 9 9 9 9 9 9

2.6 VOLT/FREQUENCY Screen

Screen	VOLTAGE/FREQUENCY screen		
Command name	DO ?	Explanation	Request data output

Output format and explanation

VF0△88, 12, 25, 17, 12, 30, 1, 8191, 0, 1, △0, 3,
1 2 3 4 5 6 7 8 9 10 11 12 13 14
△1234.56, △3, 2, △△△−10.5, 2, △△△△△5.0, 2, △△△△−5.5
15 16 17 18 19 20 21 22

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	Constant (No range)	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to 23,59,59	
9	Item to be monitored	23	1	0: Send 1: Reeive (or send/receive) 2: Data	
10	Contents of monitored item	25 to 28	4	0 to 8191	
11	GATE TIME	30	1	0: 100ms 1: 1sec 2: 10sec 3: MANUAL	
12	Measurement line to be switched	32	1	1: Signal line 2: Alarm line	
13	Line whose frequency is being measured.	34,35	2	0 to 12: Line Number 13: EXT	
14	Data type	37	1	Refer to the table of numerical data formats below.	
15	Results of frequency measurement	39 to 46	8		
16	Line whose voltage is being measured	48,49	2	0 to 12: Line number	'99' when no voltage is being measured
17	Data type	51	1	Refer to the table of numerical data formats below.	When the voltage is not being measured, there are no data.
18	Results of voltage measurement	53 to 60	8		
19	Data type	62	1	Refer to the table of numerical data formats below.	When the voltage of neither line A or B not any other line are being measured, there are no data.
20	Results of voltage measurement for Line A	64 to 71	8		
21	Data type	73	1	Refer to the table of numerical data formats below.	
22	Results of voltage measurement for Line B	75 to 82	8		

Numerical Data Formats

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1234567
Floating	1	0.00E+00 to 99.9E+00	1, 1.23E−01
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△−10.5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△52.83
Overflow	8	99999999	8, 99999999
No data	9	99999999	9, 99999999

2.7 DELAY TIME Screen

Screen	DELAY TIME screen		
Command name	DO ?	Explanation	Request data output

Output format and explanation

DL0△90, 04, 05, 16, 54, 56, 0, 7168, 0, △1, 1, △1, 0, 3,
△△△△0.13

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	0: LINE INTERVAL 1: TRANSMIT DELAY	
3 to 5	Year, month, and day of start of measurement	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of start of measurement	14 to 21	8	00,00,00 to 23,59,59	
9	Item to be monitored	23	1	0: Send 1: Receive (or send/receive) 2: Data	
10	Contents of monitored item	25 to 28	4	0 to 8191	
11	LINE SELECT	30	1	0: Send side 1: Receive side	In TRANSMIT DELAY mode: 9
12	START LINE	32,33	2	0 to 12: Line number 13: EXT	In TRANSMIT DELAY mode: 99
13	START EVENT	35	1	0: →0/OFF/L 1: →1/ON/H	In TRANSMIT DELAY mode: 9
14	STOP LINE	37,38	2	0 to 12: Line number 13: EXT	In TRANSMIT DELAY mode: 99
15	STOP EVENT	40	1	0: →0/OFF/L 1: →1/ON/H	In TRANSMIT DELAY mode: 9
16	Data type	42	1	Refer to the table of numerical data formats	
17	Measurement result	44 to 51	8		

Numerical Data Formats

Data format	Data type	Range of numerical values	Example
Binary	0	-9999999 to 99999999	0, △△1234567
Floating	1	0.00E+00 to 99.9E+00	1, 1.23E−01
Resolution of 0.1	2	-99999.9 to 999999.9	2, △△△−10.5
Resolution of 0.01	3	-9999.99 to 99999.99	3, △△△52.83
Overflow	8	99999999	8, 99999999
No data	9	99999999	9, 99999999

2.8 WORD TRACE Screen

Screen	WORD TRACE screen		
Command name	DO ?	Explanation	Request output of settings

Output format and explanation

WT0△88, 12, 25, 17, 12, 30, 1, 8191, 0, △△1, 30000, 5, 255,
5000, 11110099, 0, △1, 1, 10000

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1,2	2	Constant (No range)	
2	Data type	3	1	Constant (No range)	
3 to 5	Year, month, and day on which data were output	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of which data were output	14 to 21	8	00,00,00 to 23,59,59	
9	Item to be monitored	23	1	0: Send 1: Receive (or send/receive) 2: Data	
10	Contents of monitored item	25 to 28	4	0 to 8191	
11	SEND METHOD	30	1	0: MANUAL 1 : 1SHOT	
12	IDLE CODE	32 to 34	3	0 to 255	
13	WORD LENGTH	36 to 40	5	2 to 32768	
14	TRACE STOP	42	1	0: MANUAL 1 : CODE 2: NOT CODE 3 : LINE 4: BYTE 5: EXTERNAL	
15	SYNC CODE	44 to 46	3	0 to 255	DONT CARE 999
16	STOP DELAY	48 to 51	4	0 to 8000	9999 when item-14 is not 1, 2, 3, or 5
17	STOP CODE	53 to 60	8	Number where digits are all 0, 1 or 9	9 indicates a DON'T CARE condition. 99999999 is output when item-14 is not 1 or 2.
18	STOP LINE SELECT	62	1	0: Send 1: Receive	9 when item-14 is not 3.
19	STOP LINE	64,65	2	0 to 12: Line Number 13: EXT	99 when item-14 is not 3 or 5.
20	STOP EVENT	67	1	0: 0,OFF,L 1: 1,ON,H	9 when item-14 is not 3 or 5.
21	TRACE BYTE	69 to 73	5	0 to 32768	99999 when item-14 is not 4.

Screen	WORD TRACE screen		
Command name	DRQ ?	Explanation	Requests data at end of trace

Output format and explanation

WT 1△88, 12, 25, 17, 12, 30, 12345, 12345,
1 2 3 4 5 6 7 8 9 10

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1, 2	2	Constant (No range)	
2	Data type	3	1	Constant (No range)	
3 to 5	Year, month, and day on which the trace was stopped	5 to 12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second of at which the trace was stopped	14 to 21	8	00,00,00 to 23,59,59	
9	Data address at which trigger was detected	23 to 27	5	0 to 32767	
10	Address at which trace was stopped	29 to 33	5	0 to 32767	

Screen	DISPLAY PATTERN TRACE screen		
Command name	DO ?	Explanation	Requests data output

Output format and explanation

```
TD0△88, 12, 25, 17, 12, 30, 12345, 12345, 4, 32730,
1  2  3   4   5   6   7   8     9      10    11  12
41, 42, 43, 44, 45, 46, 47, 30, 31, 33, 41, 42, 43, 44, 45,
                                                      13
46, 47, 30, 30, 30, 41, 42, 43, 44, 45, 46, 47, 30, 30, 30,
                                                      13
41, 42, 43, 44, 45, 46, 47, **, --, --
                                   13          161
```

No.	Output	Column	Number of columns	Range	Remarks
1	Screen symbol	1, 2	2	Constant (No range)	
2	Data type	3	1	0: HEX Constant (No range)	
3 to 5	Year, month, and day on which trace was stopped.	5 to12	8	00,01,01 to 99,12,31	
6 to 8	Hour, minute, and second at which trace was stopped.	14 to 21	8	00,00,00 to 23,59,59	
9	Address of which trigger was detected.	23 to 27	5	0 to 32767	
10	Address at which trace was stopped.	29 to 33	5	0 to 32767	
11	Number of bits by which the display pattern will be shifted.	35	1	0 : +4 1 : +3 2 : +2 3 : +1 4 : 0 5 : −1 6 : −2 7 : −3	
12	Shift address	37 to 41	5	0 to 32760	Specify with DO command
13	Trace data	43 to161	119	Data is output as 2 (HEX) digits whose values range from 00 to FF	40 data words are output

List for No. of Unit Type

No.	Model No.	Unit name
1	MD0621A	V. 24/V. 28 Interface Unit
2	MD0621B	V. 35 Interface Unit
3	MD0621C	V. 36 Interface Unit
4	MD0621D	X. 20/X. 21 Interface Unit
5	MD0622B	1.5 M BPL Interface Unit
6	MD0622D	6.3 M BPL Interface Unit
7	MD0622E	64 k G. 703 Interface Unit
8	MD0623A	2 M BPL Interface Unit
9	MD0623B	8 M BPL Interface Unit
10	MD0626A	TTL Interface Unit
11	MD0625B	I. 431 1.5 M Interface Unit
12	MD0625C	I. 431 2 M Interface Unit
13	MD0628B	DS1 Interface Unit
14	MD0628C	DS1C Interface Unit
15	MD0629A	1.5 M ST Interface Unit
16	MD0629B	6.3 M ST Interface Unit
17	MD0624A	80 k CMI Interface Unit
18	MD0624B	1.5 M CMI Interface Unit
19	MD0624C	2 M CMI Interface Unit
20	MD0624D	6.3 M CMI Interface Unit
21	MD0625A	I. 430 192 k Interface Unit
22	MD0623C	2 M CEPT Interface Unit
101	MD0630A	Distortion Measurement Unit
102	MD0633A	Error Analyze Unit
103	MD0627A	Analog Unit
104	MD0630B	CODEC Unit
109	MD0632A	64 k Jitter Unit
110	MD0632B	1.5 M Jitter Unit
111	MD0632C	2 M Jitter Unit
119	MD0610D	Word Memory Unit

(Blank)

SECTION 3

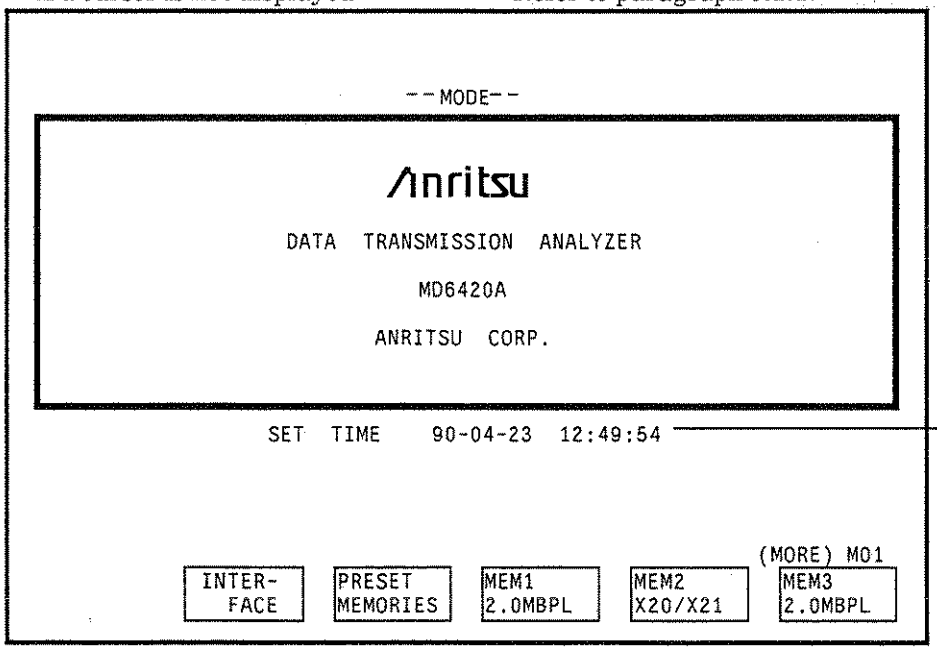
MENU REFERENCE

(Blank)

3.1 MODE Screen

The MODE screen is displayed immmediately after power-on.

◦ If a cursor is not displayed ——→ Refer to paragraph 3.1.1.



→Refer to paragraph 3.1.2.

3.1.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function select menu displayed on MODE screen		

Function key label and explanations:

BEFORE PWR-OFF
- When pressed, the screen that was displayed immediately before the power was turned off is recalled. However, MODE screen is displayed at power on if it is the last screen that was displayed prior to turning the power off or if the unit configuration has been changed.

INTER- FACE
- When pressed, the INTERFACE screen is fetched.

PRESET MEMORIES
- When pressed, the PRESET MEMORIES screen is fetched.

MEM1 XXXXXXXX ~ **MEM10 XXXXXXXX**
- When pressed, the measurement screen and measurement conditions saved in preset memory are recalled and set.

  The lower part of menu displays the name of the receive interface unit used at that time.

TABLE OF UNITS
- When pressed, the TABLE OF UNITS screen is fetched.

PRINTER TEST
- When pressed, the front-panel built-in printer is tested.

LAMP TEST
- When pressed ,the front-panel LEDs and electroluminescent (EL) display are tested.

INITIA- LIZE
- When pressed, the current settings are reinitialized.

YES
- When pressed, initialization commences.

NO
- Initialization is aborted.

3.1.2 Setting the internal clock and calendar

Cursor position	Clock setting fields (Year, month, day, hour, minute, and second)	Label	SET TIME
Outline	Menu for setting time		

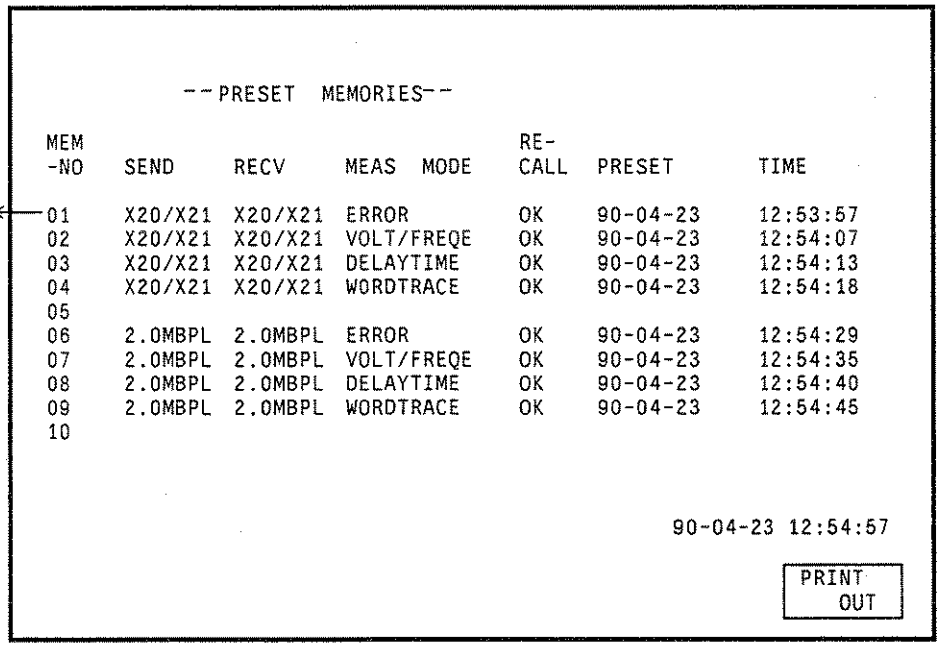
Function key label and explanations:

SET	° Move the cursor and use the MODIFY keys to set the correct time and date. Press [F]6 to accept this setting.

3.2 PRESET MEMORIES Screen

Up to 10 sets of interface conditions and measurement conditions can be stored in preset memories. The contents of these 10 memories can also be viewed on this screen.

◦ If no cursor is displayed ——→ Refer to paragraph 3.2.1.



--PRESET MEMORIES--

MEM -NO	SEND	RECV	MEAS MODE	RE-CALL	PRESET	TIME
01	X20/X21	X20/X21	ERROR	OK	90-04-23	12:53:57
02	X20/X21	X20/X21	VOLT/FREQE	OK	90-04-23	12:54:07
03	X20/X21	X20/X21	DELAYTIME	OK	90-04-23	12:54:13
04	X20/X21	X20/X21	WORDTRACE	OK	90-04-23	12:54:18
05						
06	2.0MBPL	2.0MBPL	ERROR	OK	90-04-23	12:54:29
07	2.0MBPL	2.0MBPL	VOLT/FREQE	OK	90-04-23	12:54:35
08	2.0MBPL	2.0MBPL	DELAYTIME	OK	90-04-23	12:54:40
09	2.0MBPL	2.0MBPL	WORDTRACE	OK	90-04-23	12:54:45
10						

90-04-23 12:54:57

PRINT OUT

Refer to paragraph 3.2.2.

3.2.1 Print-out

Cursor position	No cursor displayed	Label	None
Outline	Printout selection menu		

Function key label and explanations:

PRINT OUT	° The current contents of the preset memories are printed.

3.2.2 Recall/Initial

Cursor position	Memory area No.	Label	MEM - NO
Outline	Function selection menu for memory area No. indicated by cursor		

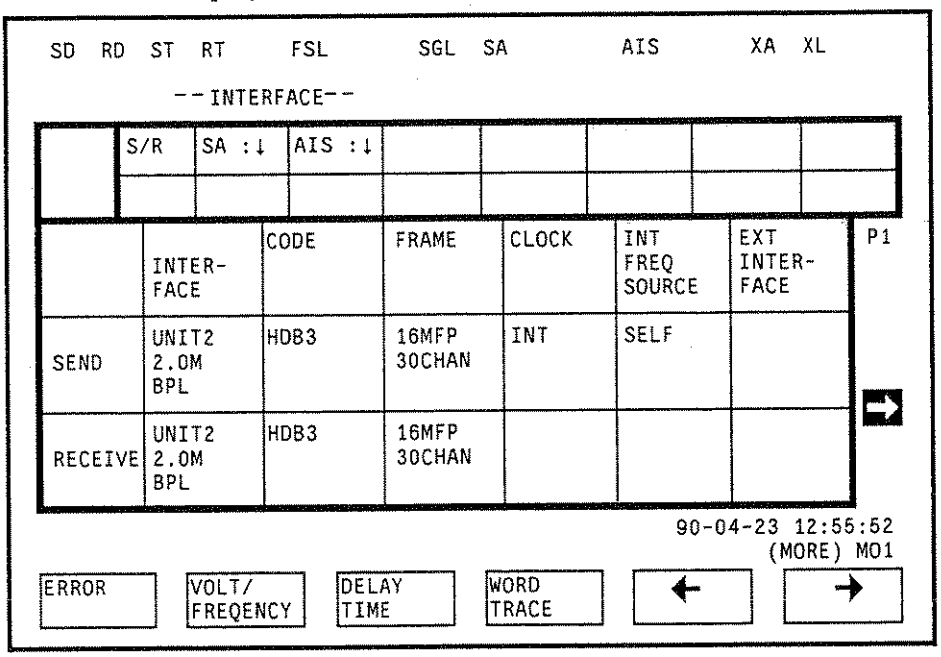
Function key label and explanation:

RECALL	° The memory area No. indicated by the cursor can be recalled and displayed provided that data exist.
INITIA-LIZE	° The contents of memory area No. indicated by the cursor is initialized.

3.3 INTERFACE Screen

This screen is used to set the interface send and receive conditions.

- If no cursor is displayed ——→ Refer to paragraph 3.3.1.



Note: When setting the signal line and interface items, refer to the appropriate interface unit operation manual.

3.3.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu on INTERFACE screen		

Function key labels and explanations:

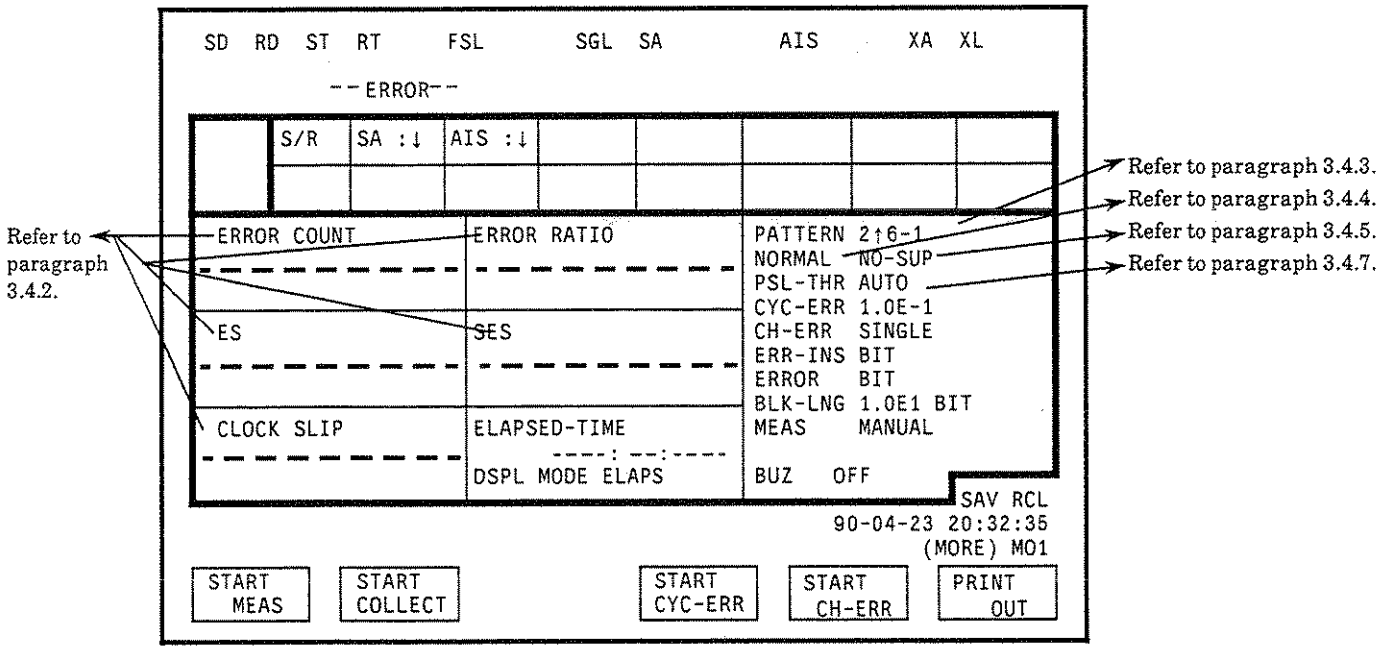
ERROR	° When pressed, the ERROR screen is fetched. Error measurement is performed via the ERROR screen.
VOLT/ FREQENCY	° When pressed, the VOLT/FREQUENCY screen is fetched. The voltage and frequency of each signal line on the receive side are measured via the VOLT/ FREQUENCY screen.
DELAY TIME	° When pressed, the DELAY TIME screen is fetched. The time difference between transitions in the levels of 2 signal lines or the transmission delay time can be measured via the DELAY TIME screen.
WORD TRACE	° When pressed, the WORD TRACE screen is fetched. The send pattern is set and receive data are traced via the WORD TRACE screen.
	° When pressed, the screen scrolls to the left (previous page).
	° When pressed, the screen scrolls to the right (next page).
PRINT OUT	° When pressed, the INTERFACE screen settings are printed.

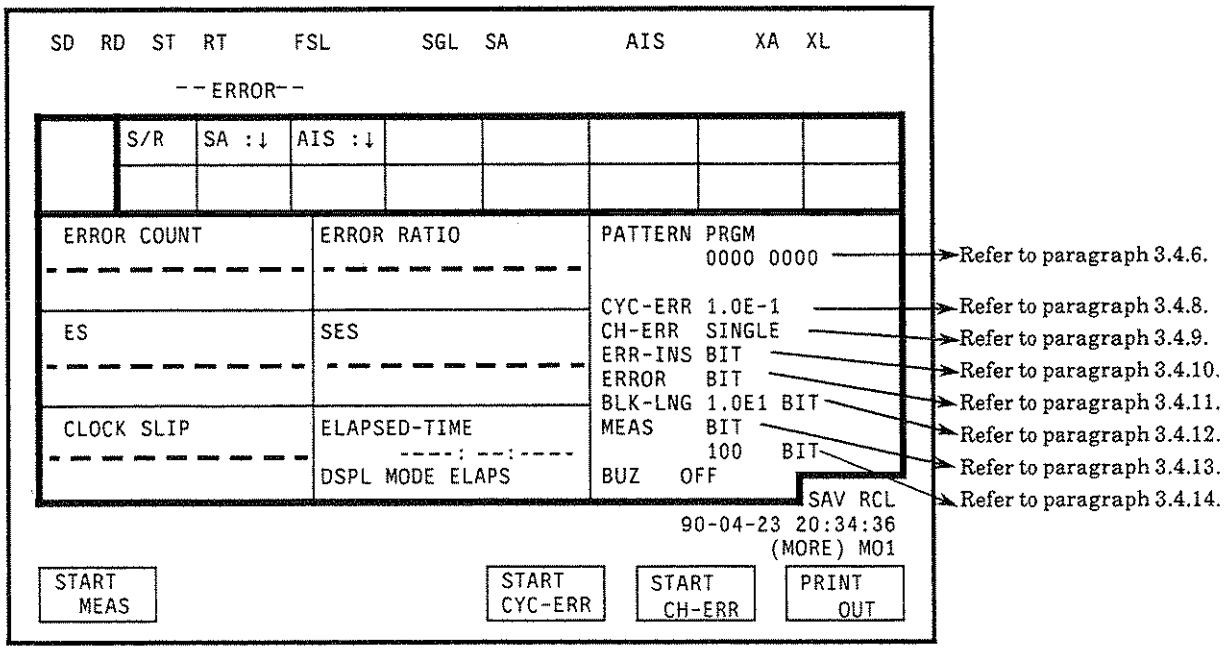
Note: When setting the signal line and interface items, refer to the appropriate interface unit operation manual.

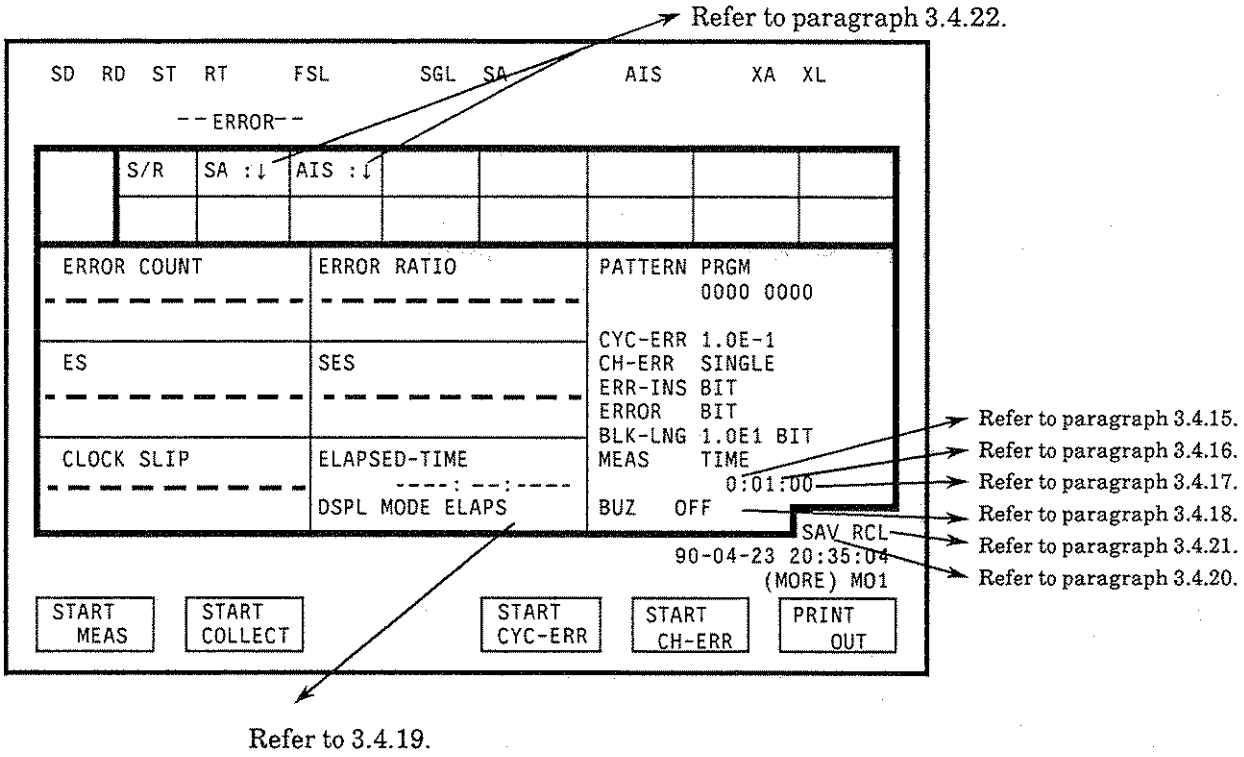
3.4 ERROR screen

Error measurement is performed via the ERROR screen.

- If no cursor is displayed ——→ Refer to paragraph 3.4.1.






Refer to paragraph 3.4.22.
SD RD ST RT FSL SGL SA AIS XA XL
--ERROR--
S/R
SA :↓
AIS :↓
ERROR COUNT
ERROR RATIO
PATTERN PRGM
0000 0000
CYC-ERR 1.0E-1
CH-ERR SINGLE
ERR-INS BIT
ERROR BIT
BLK-LNG 1.0E1 BIT
MEAS TIME
0:01:00
BUZ OFF
ES
SES
CLOCK SLIP
ELAPSED-TIME
----: --:----
DSPL MODE ELAPS
SAV RCL
90-04-23 20:35:04
(MORE) MO1
START MEAS
START COLLECT
START CYC-ERR
START CH-ERR
PRINT OUT
Refer to paragraph 3.4.15.
Refer to paragraph 3.4.16.
Refer to paragraph 3.4.17.
Refer to paragraph 3.4.18.
Refer to paragraph 3.4.21.
Refer to paragraph 3.4.20.
Refer to 3.4.19.

3.4.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu on ERROR screen		

Function key labels and explanations:

START MEAS	① This label is displayed while measurement is not in progress. When pressed, the results are cleared, measurement starts and the label changes to ②.
STOP MEAS	② This lebel is displayed during measurement or during measurement WAIT. When pressed, measurement stops and the label changed to ①.
START COLLECT	③ When the MD0633A Error Analyze Unit is insertd and this key is pressed, data is collected. When pressed, the label changes to ④.
STOP COLLECT	④ This label is displayed during data collection. Press the key to stop data collection; when pressed, the label changes to ③.
START CYC-ERR	⑤ When pressed, cyclic error insertion is started at the specified rate and the label changes to ⑥.
STOP CYC-ERR	⑥ When pressed, error insertion is stopped and the label changes to ⑤.
START CH-ERR	⑦ If the channel error insertion condition is SINGLE when pressed, a single bit error is inserted. If the channel error insertion condition is REPEAT when this key is pressed, one bit error is inserted every second and the label changes to ⑧.
STOP CH-ERR	⑧ When pressed, error insertion is stopped and the label changes to ⑦.
PRINT OUT	⑨ When pressed, all the displayed measurement results is printed.
DSPL OF RESULTS	⑩ When pressed, the DISPLAY OF RESULT screen is displayed.

3.4.1 Menu for function selection (continued)

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu on ERROR screen		

Function key labels and explanations:

COND.OF PRINT-I	⑪ When pressed, the CONDITION OF PRINT (INTERVAL) screen is fetched.
COND.OF PRINT-P	⑫ When pressed, the CONDITION OF PRINT (PERIOD) screen is fetched.
COND.OF COLLECT	⑬ When pressed, the CONDITION OF COLLECT screen is fetched. However, when an MD0633A Error Analyze Unit is not inserted, this label is not displayed.
SEND-XXX ON/OFF	⑭ XXX indicates the control signal line name When the send and receive interfaces are different, this key is displayed for the send side. When pressed, ON and OFF are alternately selected.
RECV-XXX ON/OFF	⑮ XXX indicates the control signal line name When the send and receive interfaces are different, this key is displayed for the receive side. When pressed, ON and OFF are alternately selected.
XXX ON/OFF	⑯ XXX indicates the control signal line name When the same send and receive interface is used, this label is displayed. When pressed, ON and OFF are alternately selected.

3.4.2 DISPLAY OF RESULTS screen menu

Cursor position	Measurement result item display	Label	None
Outline	Displays measurement item result		

Function key labels and explanations:

ERROR COUNT	◦ When pressed, the error count result is displayed.
ERROR RATIO	◦ When pressed, the error ratio is displayed.
BLK-ERR COUNT	◦ When pressed, the block error count is displayed.
BBE COUNT	◦ When pressed, the number of BBE counts, is displayed.
BBER	◦ When pressed, the BBER result is displayed.
AT	◦ When pressed, the AT measurement result is displayed.
%AT	◦ When pressed, the %AT measurement result is displayed.
BLK-ERR RATIO	◦ When pressed, the block error ratio is displayed.
US	◦ When pressed, the US measurement result is displayed.
%US	◦ When pressed, the %US measurement result is displayed.
SES	◦ When pressed, the SES measurement result is displayed.
%SES	◦ When pressed, the %SES measurement result is displayed.

3.4.2 DISPLAY OF RESULTS screen menu (continued)

Cursor position	Measurement result item display	Label	None
Outline	Displays measurement result item		

Function key labels and explanations:

DM	◦ When pressed, the DM measurement result is displayed.
%DM	◦ When pressed, the %DM measurement result is displayed.
ES	◦ When pressed, the ES measurement result is displayed.
%ES	◦ When pressed, the %ES measurement result is displayed.
EFS	◦ When pressed, the EFS measurement result is displayed.
%EFS	◦ When pressed, the %EFS measurement result is displayed.
CLOCK SLIP	◦ When pressed, the CLOCK SLIP count is displayed.
SLIP SEC	◦ When pressed, the SLIP-SEC measurement result is displayed.
PSL COUNT	◦ When pressed, the PSL COUNT is displayed.
xxx(sec)	◦ When pressed, the xxx (sec) measurement result is displayed. The alarm item (xxx) varies with the interface unit.

3.4.3 Menu for setting the send and bit-error-detection pattern

Cursor position	Set send and bit-error-detection patterns	Label	PATTERN
Outline	Sets the send and bit-error-detection patterns		

Function key labels and explanations:

2↑6-1	◦ When pressed, the 2^6-1 bit PRBS pattern is set.
2↑7-1	◦ When pressed, the 2^7-1 bit PRBS pattern is set.
2↑9-1	◦ When pressed, the 2^9-1 bit PRBS pattern is set.
2↑11-1	◦ When pressed, the 2^{11}-1 bit PRBS pattern is set.
2↑15-1	◦ When pressed, the 2^{15}-1 bit PRBS pattern is set.
2↑19-1	◦ When pressed, the 2^{19}-1 bit PRBS pattern is set.
2↑20-1	◦ When pressed, the 2^{20}-1 bit PRBS pattern is set.
2↑23-1	◦ When pressed, the 2^{23}-1 bit PRBS pattern is set.
PRGM	◦ When pressed, the programmable pattern is set.
A(0)	◦ When pressed, the all 0s pattern is set.
Z(1)	◦ When pressed, the all 1s pattern is set.
1:1	◦ When pressed, the 10101010 pattern is set.

3.4.3 Menu for setting the send and bit-error-detection pattern (continued)

Cursor position	Set send and bit-error-detection patterns	Label	PATTERN
Outline	Sets the send and bit-error-detection patterns		

Function key labels and explanations:

3:1	◦ When pressed, the 11101110 pattern is set.
1:3	◦ When pressed, the 10001000 pattern is set.
7:1	◦ When pressed, the 11111110 pattern is set.
1:7	◦ When pressed, the 10000000 pattern is set.

3.4.4 Menu for setting the PRBS pattern

Cursor position	Set output mode of PRBS send pattern identified in paragraph 3.4.3 and move cursor to lower left of the item	Label	None
Outline	Sets output mode for PRBS patterns		

Function key labels and explanations:

NORMAL	◦ A normal CCITT PRBS pattern is sent.
INVERT	◦ An inverted CCITT PRBS pattern is sent.
N-RVRS	◦ A reversed normal CCITT PRBS pattern is sent.
I-RVRS	◦ An inverted reversed CCITT PRBS pattern is sent.

3.4.5 Menu for setting the zero suppression for PRBS patterns

Cursor position	Set zero suppression forPRBS send pattern specified in paragraph 3.4.3 and move cursor to lower right of the item	Label	None
Outline	Sets zero suppression for PRBS patterns		

Function key labels and explanations:

NO-SUP	◦ Zero suppression disabled.
ZERO-7	◦ A maximum of 7 consecutive zeros are output.
ZERO-14	◦ A maximum of 14 consecutive zeros are output.

3.4.6 Menu for setting the PROGRAM pattern

Cursor position	Set programmable (PRGM) pattern specified in paragraph 3.4.3 and moves cursor to the bottom of the item	Label	None
Outline	Sets programmable pattern		

Function key labels and explanations:

0	◦ Sets the bit highlighted by the cursor to 0.
1	◦ Sets the bit highlighted by the cursor to 1.
ALL BIT	◦ When [ALL BIT] is pressed while [0] or [1] is held, all bits are set to either 0 or 1, respectively.
←	◦ The cursor moves to the left.
→	◦ The cursor moves to the right.

3.4.7 Menu for setting the PRBS-pattern sync-loss detection conditions

Cursor position	Set the PRBS-pattern sync-loss detection conditons	Label	PSL - THR
Outline	Sets the PRBS-pattern sync-loss detection conditions		

Function key labels and explanations:

AUTO	◦ When pressed, the PRBS-pattern sync-loss detection condition is automatically set.
10/100	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 10/100.
20/100	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 20/100.
25/100	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 25/100.
100/300	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 100/300.
100 /1000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 100/1000.
200 /1000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 200/1000.
250 /1000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 250/1000.
1000 /3000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 1000/3000.
1000 /10000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 1000/1E4.
2000 /10000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 2000/IE4.
2500 /10000	◦ When pressed, the PRBS-pattern sync-loss detection condition is set to 2500/1E4.

3.4.7 Menu for setting the PRBS-pattern sync-loss detection conditions (continued)

Cursor position	Set the PRBS-pattern sync-loss detection conditons	Label	PSL - THR
Outline	Sets the PRBS-pattern sync-loss detection conditions		

Function key labels and explanations:

10000 /30000	° When pressed, the PRBS-pattern sync-loss detection condition is set to 10000/3E4.
10000 /100000	° When pressed, the PRBS-pattern sync-loss detection condition is set to 10000/1E5.
20000 /100000	° When pressed, the PRBS-pattern sync-loss detection condition is set to 20000/1E5.
25000 /100000	° When pressed, the PRBS-pattern sync-loss detection condition is set to 25000/1E5.
100000 /300000	° When pressed, the PRBS-pattern sync-loss detection condition is set to 1E5/3E5.

3.4.8 Menu for setting the cyclic-error insertion rate

Cursor position	Set the cyclic-error insertion rate	Label	CYC - ERR
Outline	Sets the cyclic-error insertion-rate		

Function key labels and explanations:

1.0E-1	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-1.
1.0E-2	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-2.
1.0E-3	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-3.
1.0E-4	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-4.
1.0E-5	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-5.
1.0E-6	◦ When pressed, the cyclic-error insertion rate is set to 1.0E-6.

◎ The cyclic-error insertion rate can be set from 2.5×10^{-1} to 1.7×10^{-7} via the data MODIFY keys.

3.4.9 Menu for setting the channel-error insertion conditions

Cursor position	Set the conditions for inserting channel errors	Label	CH-ERR
Outline	Sets the channel error insertion conditions		

Function key labels and explanations:

SINGLE	◦ When selected, a single bit error is inserted when the [CH-ERR] key is pressed.
REPEAT	◦ When selected, bit errors are inserted once every second from the time that the [CH-ERR] key is pressed.

3.4.10 Menu for setting the error insertion conditions

Cursor position	Set the error insertion conditions	Label	ERR - INS
Outline	Sets the error insertion conditions		

Function key labels and explanations:

BIT	◦ When pressed, only BIT error insertion is enabled.
BIT+ CODE	◦ When pressed, both BIT and CODE errors may be inserted depending on the interface unit.

◎ The available settings depend on the interface unit.

3.4.11 Menu for setting the error detection items

Cursor position	Set the error item to be detected	Label	ERROR
Outline	Sets the error detection items		

Function key labels and explanations:

BIT	◦ When pressed, the error detection item is set to BIT.
CODE	◦ When pressed, the error detection item is set to CODE.
PARITY	◦ When pressed, the error detection item is set to PARITY.
CRC	◦ When pressed, the error detection item is set to CRC.
F-NG	◦ When pressed, the error detection item is set to F-NG.

◎ The available settings depend on the interface unit.

3.4.12 Menu for setting the block length used for block error detection

Cursor position	Set the block length	Label	BLK - LNG
Outline	Sets the block length		

Function key labels and explanations:

1.0E1 BIT	° When pressed, the block length is set to 1.0E1 BITs.
1.0E2 BIT	° When pressed, the block length is set to 1.0E2 BITs.
1.0E3 BIT	° When pressed, the block length is set to 1.0E3 BITs.
1.0E4 BIT	° When pressed, the block length is set to 1.0E4 BITs.
1.0E5 BIT	° When pressed, the block length is set to 1.0E5 BITs.
1.0E6 BIT	° When pressed, the block length is set to 1.0E6 BITs.
32 BIT	° When pressed, the block length is set to 32 BITs.
64 BIT	° When pressed, the block length is set to 64 BITs.
128 BIT	° When pressed, the block length is set to 128 BITs.
256 BIT	° When pressed, the block length is set to 256 BITs.
512 BIT	° When pressed, the block length is set to 512 BITs.
1024 BIT	° When pressed, the block length is set to 1024 BITs.

3.4.12 Menu for setting the block length used for block error detection (continued)

Cursor position	Set the block length	Label	BLK - LNG
Outline	Sets the block length		

Function key labels and explanations:

2048 BIT	° When pressed, the block length is set to 2048 BITs.
4096 BIT	° When pressed, the block length is set to 4096 BITs.
8192 BIT	° When pressed, the block length is set to 8192 BITs.
16384 BIT	° When pressed, the block length is set to 16384 BITs.
32768 BIT	° When pressed, the block length is set to 32768 BITs.
65536 BIT	° When pressed, the block length is set to 65536 BITs.

3.4.13 Menu for setting the type of measurement

Cursor position	Specify type of measurement	Label	MEAS
Outliner	Specifies the measurement type		

Function key labels and explanations:

MANUAL	◦ When pressed, the measurement type is set to MANUAL.
BIT	◦ When pressed, the measurement type is set to BIT.
TIME	◦ When pressed, the measurement type is set to TIME.
REPEAT	◦ When pressed, the measurement type is set to REPEAT.

3.4.14 Menu for setting the bit length

Cursor position	Specify BIT measurement (para. 3.4.13) and move cursor to the lower of the item	Label	None
Outline	Sets the BIT length		

Function key labels and explanations:

100 BIT	◦ When pressed, the BIT length is set to 100 BITs.
1000 BIT	◦ When pressed, the BIT length is set to 1000 BITs.
2500 BIT	◦ When pressed, the BIT length is set to 2500 BITs.
10000 BIT	◦ When pressed, the BIT length is set to 10000 BITs.
1.0E5 BIT	◦ When pressed, the BIT length is set to 1.0E5 BITs.
1.0E6 BIT	◦ When pressed, the BIT length is set to 1.0E6 BITs.
1.0E7 BIT	◦ When pressed, the BIT length is set to 1.0E7 BITs.
1.0E8 BIT	◦ When pressed, the BIT length is set to 1.0E8 BITs.
1.0E9 BIT	◦ When pressed, the BIT length is set to 1.0E9 BITs.

3.4.15 Menu for setting the number of hours over which a measurement is to be conducted

Cursor position	Set MEAS in paragraph 3.4.13 to REPEAT or TIME and move the cursor to the hour portion of the measurement time setting	Label	None
Outline	Sets the number of hours over which the measurement is to be conducted		

Function key labels and explanations:

0 hour	° When pressed, the number of hours over which meaurement is performed is set to 0 hours.
10 hour	° When pressed, the number of hours over which meaurement is performed is set to 10 hours.
50 hour	° When pressed, the number of hours over which meaurement is performed is set to 50 hours.
100 hour	° When pressed, the number of hours over which meaurement is performed is set to 100 hours.
200 hour	° When pressed, the number of hours over which meaurement is performed is set to 200 hours.
500 hour	° When pressed, the number of hours over which meaurement is performed is set to 500 hours.

◎ The number of hours can be set from 0 to 999 via the MODIFY keys.

3.4.16 Menu for setting the number of minutes over which the measurement is conducted

Cursor position	Set MEAS in paragraph 3.4.13 to REPEAT or TIME and move the cursor to the minute portion of the measurement time setting	Label	None
Outline	Sets the number of minutes over which the measurement is to be conducted		

Function key labels and explanations:

0 min	◦ When pressed, the number of minutes over which measurement is performed is set to 0 minutes.
10 min	◦ When pressed, the number of minutes over which measurement is performed is set to 10 minutes.
20 min	◦ When pressed, the number of minutes over which measurement is performed is set to 20 minutes.
30 min	◦ When pressed, the number of minutes over which measurement is performed is set to 30 minutes.
40 min	◦ When pressed, the number of minutes over which measurement is performed is set to 40 minutes.
50 min	◦ When pressed, the number of minutes over which measurement is performed is set to 50 minutes.

◎ The number of minutes can be set from 0 to 59 minutes via the MODIFY keys.

3.4.17 Menu for setting the number of seconds over which measurement is to be conducted

Cursor position	Sets MEAS in paragraph 3.4.13 to REPEAT or TIME and move cursor to the lower of the item	Label	None
Outline	Sets the number of seconds over which the measurement is to be performed		

Function key labels and explanations:

0 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 0 seconds.
10 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 10 seconds.
20 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 20 seconds.
30 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 30 seconds.
40 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 40 seconds.
50 sec	◦ When pressed, the number of seconds over which measurement is performed is set to 50 seconds.

◎ The number of seconds can be set from 0 to 59 seconds via the MODIFY keys.

3.4.18 Menu for enabling/disabling the buzzer

Cursor position	Set the buzzer	Label	BUZ
Outline	Turns the buzzer ON/OFF		

Function key labels and explanations:

BUZZER OFF	◦ When pressed, the buzzer is set to OFF.
BUZZER ON	◦ When pressed, the buzzer is set to ON.

3.4.19 Menu for switching display modes

Cursor position	Set measurement type in paragraph 3.4.13 to REPEAT and move cursor to the DSPL MODE setting	Label	DSPL MODE
Outline	Switches the display mode		

Function key labels and explanations:

ELAPS	◦ When pressed, the intermediate measurement results and the elapsed meaasurement time are displayed.
PERIOD	◦ When REPEAT measurements (para. 3.4.13) are being performed, the measurement results from each period are displayed with the elapsed measurement time.

3.4.20 Menu for invoking the SAVE operation

Cuursor position	Set SAVE	Label	SAV
Outline	Causes the SAVE operation to be executed		

Function key labels and explanations:

MEM1 XXXXXXXX
∫
MEM10 XXXXXXXX

- Causes the interface and measurement conditions to be saved to the preset memories. XXXXXXXX indicates the name of the receive interface unit whose interface conditions were saved.

3.4.21 Menu for invoking RECALL operation

Cursor position	Set RECALL operation	Label	RCL
Outline	Causes the RECALL operation to be executed		

Function key labels and explanations:

MEM1 XXXXXXXX
∫
MEM10 XXXXXXXX

- Recalls the saved conditions from preset memory and fetches the saved measurement screen. (XXXXXXXX) indicates the name of the receive interface unit whose interface conditions have been recalled.

3.4.22 Menu for setting the value of the signal-line

Cursor position	Set the value of the signal-line	Label	Each signal-line
Outline	Sets the value of the signal-line		

Function key labels and explanations:

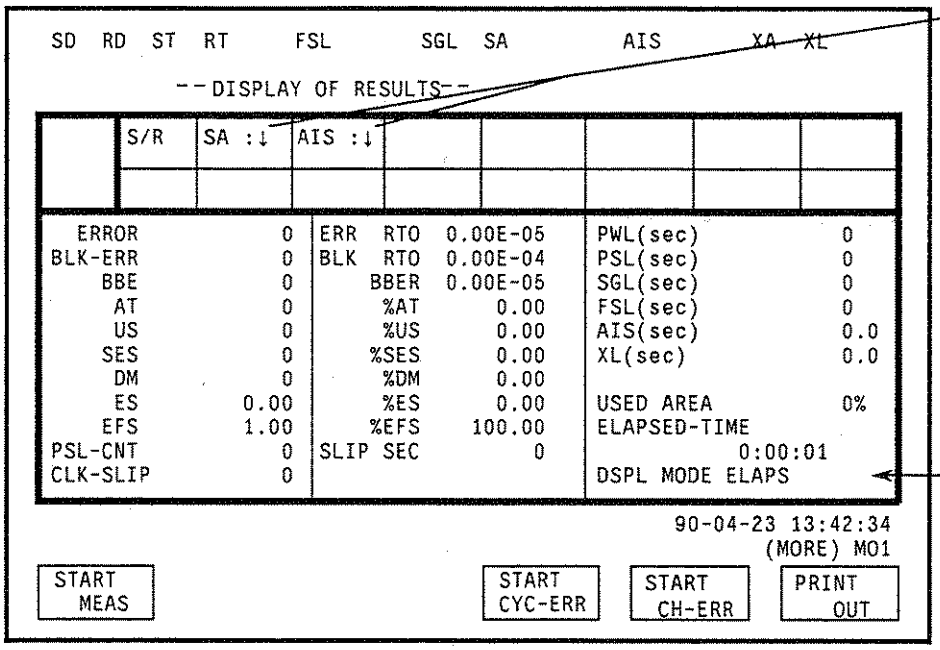
↑ (ON)	◦ When pressed, the signal-line value is set to ON.
↓ (OFF)	◦ When pressed, the signal-line value is set to OFF.
(THROU)	◦ When pressed, the signal-line value is set to THROUGH.
(OPEN)	◦ When pressed, the signal-line value is set to OPEN.

◎ The names and allowable values of the signal-lines depend on the interface unit.

3.5 DISPLAY OF RESULTS Screen

When this screen is selected, all the measurement results are displayed on a single screen.

- If no cursor is displayed ——→ Refer to paragraph 3.5.1.



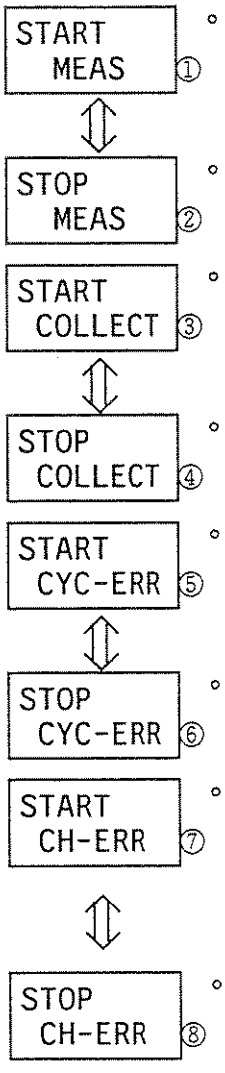
Refer to paragraph 3.5.3.

Refer to paragraph 3.5.2.

3.5.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu on DISPLAY OF RESULT screen		

Function key labels and explanations:



- This label is displayed when measurement is not in progress. When this key is pressed; the results are cleared, measurement starts and the label changes to ②.
- This label is displayed during measurement or during measurement WAIT. When this key is pressed, measurement stops and the label changes to ①.
- If the MD0633A Error Analyze Unit is inserted when this key is pressed, data are collected and the label changes to ④.
- This label is displayed during data collection. When this key is pressed, data collection stops and the label changes to ③.
- When this key is pressed, errors are cyclically inserted at the set rate and the label changes to ⑥.
- When this key is pressed, error insertion is stopped at the label changes to ⑤.
- If the channel error insertion condition is SINGLE when this key is pressed , only a single bit error is inserted.

  If the channel error insertion condition is REPEAT when this key is pressed, bit errors are inserted once every seconds and the label changes to ⑧.
- When this key is pressed, error insertion is stopped and the label changes to ⑦.

3.5.1 Menu for function selection (continued)

Cursor position	Cursor not displayed	Label	None
Outline	Funtion selection menu on ERROR screen		

Function key labels and explanations:

PRINT OUT ⑨

- When this key is pressed, all displayed measurement results are printed.

SEND-XXX ON/OFF ⑩

- XXX indicates the control signal line name

When the send and receive interfaces are different, this key is displayed for the send side. When pressed, ON and OFF are alternately selected.

RECV-XXX ON/OFF

⑪ XXX indicates the control signal line name

When the send and receive interfaces are different, this key is displayed for the receive side.

When pressed, ON and OFF are alternately selected.

XXX ON/OFF

⑫ XXX indicates the control signal line name

When the send and receive intrfaces are the same, this key is displayed.

When pressed, ON and OFF are alternately selected.

3.5.2 Menu for switching display mode

Cursor position	Set measurement type in paragraph 3.4.13 to REPEAT and move the cursor to the DSPL MODE setting	Label	DSPL MODE
Outline	Switches the display modes		

Function key labels and explanations:

ELAPS

- Displays the intermediate measurement results and the elapsed measurement time.

PERIOD

- When the REPEAT measurement mode described in paragraph 3.4.13 is being used, the measurement results from each period are displayed with the elapsed measurement time.

3.5.3 Menu for setting the value of the signal line

Cursor position	Set the value of the signal line	Label	Signal line name
Outline	Sets the value of the signal line		

Function key labels and explanations:

↑ (ON)	◦ When pressed, the signal-line value is set to ON.
↓ (OFF)	◦ When pressed, the signal-line value is set to OFF.
(THROU)	◦ When pressed, the signal-line value is set to THROUGH.
(OPEN)	◦ When pressed, the signal-line value is set to OPEN.

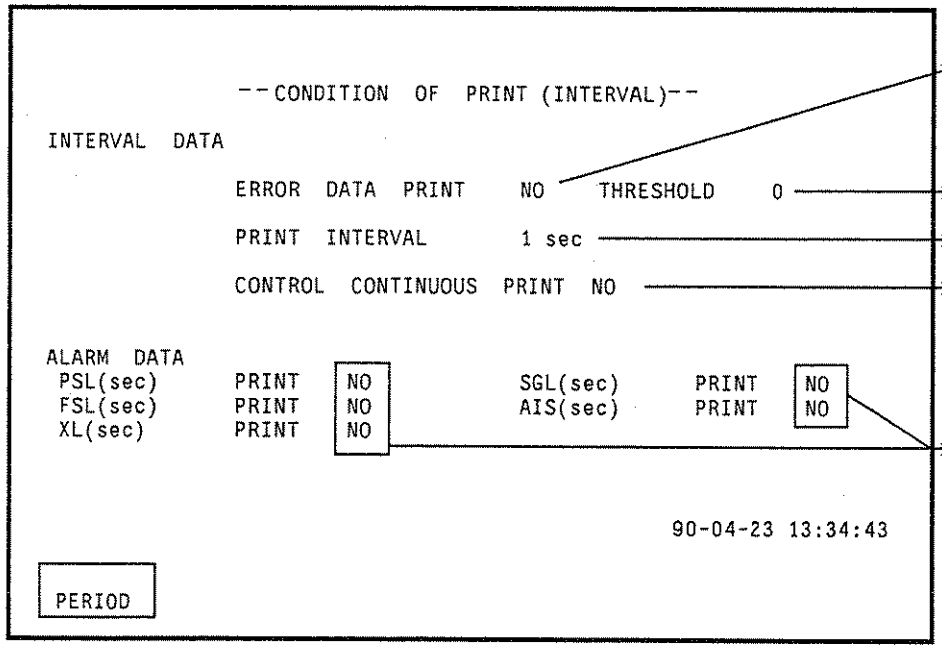
◎ The names and allowable values of the signal lines vary with each interface unit.

3.6 CONDITION OF PRINT Screen

Sets the printing conditions.

◎ INTERVAL mode

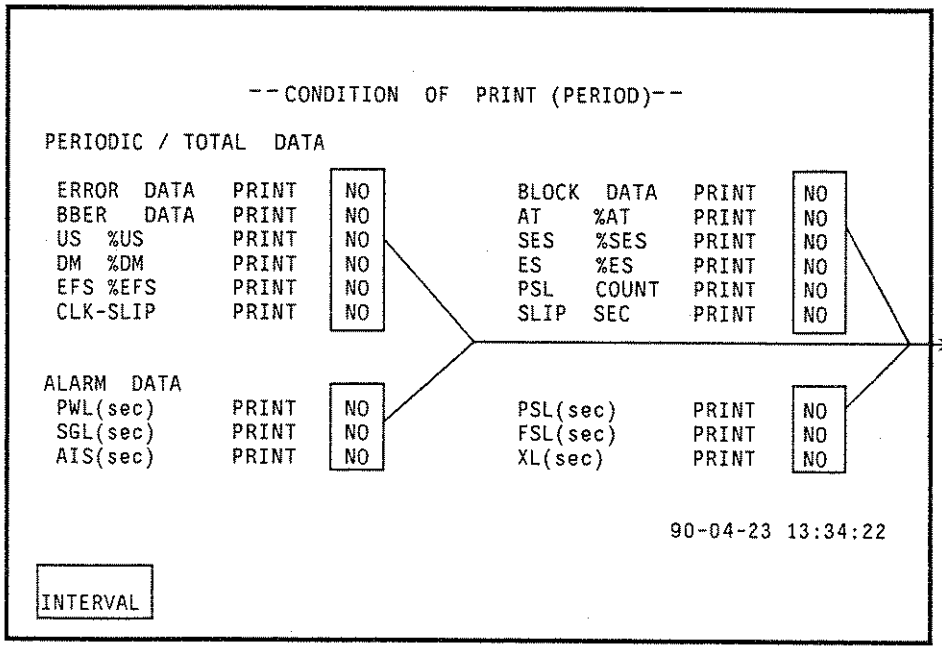
◦ If no cursor is displayed ——→ Refer to paragraph 3.6.1.



Refer to paragraph 3.6.2.
Refer to paragraph 3.6.3.
Refer to paragraph 3.6.4.
Refer to paragraph 3.6.5.
Refer to paragraph 3.6.6.

◎ PERIODIC mode

◦ If no cursor is displayed ——→ Refer to paragraph 3.6.1.



Refer to paragraph 3.6.7.

3.6.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu for CONDITION OF PRINT screen		

Function key labels and explanations:

INTERVAL ①

- When this key is pressed, the CONDITION OF PRINT (INTERVAL) scren is fetched and label ② is displayed.

PERIOD ②

- When this key is pressed, the CONDTION OF PRINT (PERIOD) screen is fetched and label ① is displayed.

3.6.2 Menu for printing error data

Cursor position	Error data print	Label	ERROR DATA PRIINT
Outline	Enables/disables error data printing		

Function key labels and explanations:

PRINT YES

- When pressed, error data are periodically printed.

PRINT NO

- When pressed, error data printing is disabled.

3.6.3 Menu for setting the error printing threshold

Cursor position	Error printing threshold	Label	THRESHOLD
Outline	Sets the value of the error printing threshold		

Function key labels and explanations:

0 BIT	◦ When pressed, the error printing threshold is set to 0 BITs.
10 BIT	◦ When pressed, the error printing threshold is set to 10 BITs.
50 BIT	◦ When pressed, the error printing threshold is set to 50 BITs.
100 BIT	◦ When pressed, the error printing threshold is set to 100 BITs.
200 BIT	◦ When pressed, the error printing threshold is set to 200 BITs.
500 BIT	◦ When pressed, the error printing threshold is set to 500 BITs.

◎ The error threshold can be set from 0 to 999 bits via the MODIFY keys.

3.6.4 Menu for setting the print interval

Cursor position	Print interval	Label	PRINT INTERVAL
Outline	Sets the print interval		

Function key labels and explanations:

1 sec	◦ When pressed, the print interval is set to 1 second.
10 sec	◦ When pressed, the print interval is set to 10 seconds.
30 sec	◦ When pressed, the print interval is set to 30 seconds.
1 min	◦ When pressed, the print interval is set to 1 minute.
2 min	◦ When pressed, the print interval is set to 2 minutes.
5 min	◦ When pressed, the print interval is set to 5 minutes.
10 min	◦ When pressed, the print interval is set to 10 minutes.

3.6.5 Menu for controlling continuous printing

Cursor position	Continuous printing control	Label	CONTROL CONTINUOUS PRINT
Outline	Enables/disalbes continuous printing		

Function key labels and explanations:

YES	◦ Enables continuous printing.
NO	◦ Disables continuous printing.

◎ In the continuous printing mode, only the first 10 consecutive interval print is performed.

3.6.6 Menu for printing alarm items

Cursor position	Alarm item	Label	Alarm name PRINT
Outline	Enables/disables interval printing of alarm data		

Function key labels and explanations:

PRINT YES	◦ Enables interval printing of alarm data.
PRINT NO	◦ Disalbes inteval printing of alarm data.

3.6.7 Menu for setting the PERIOD print conditions

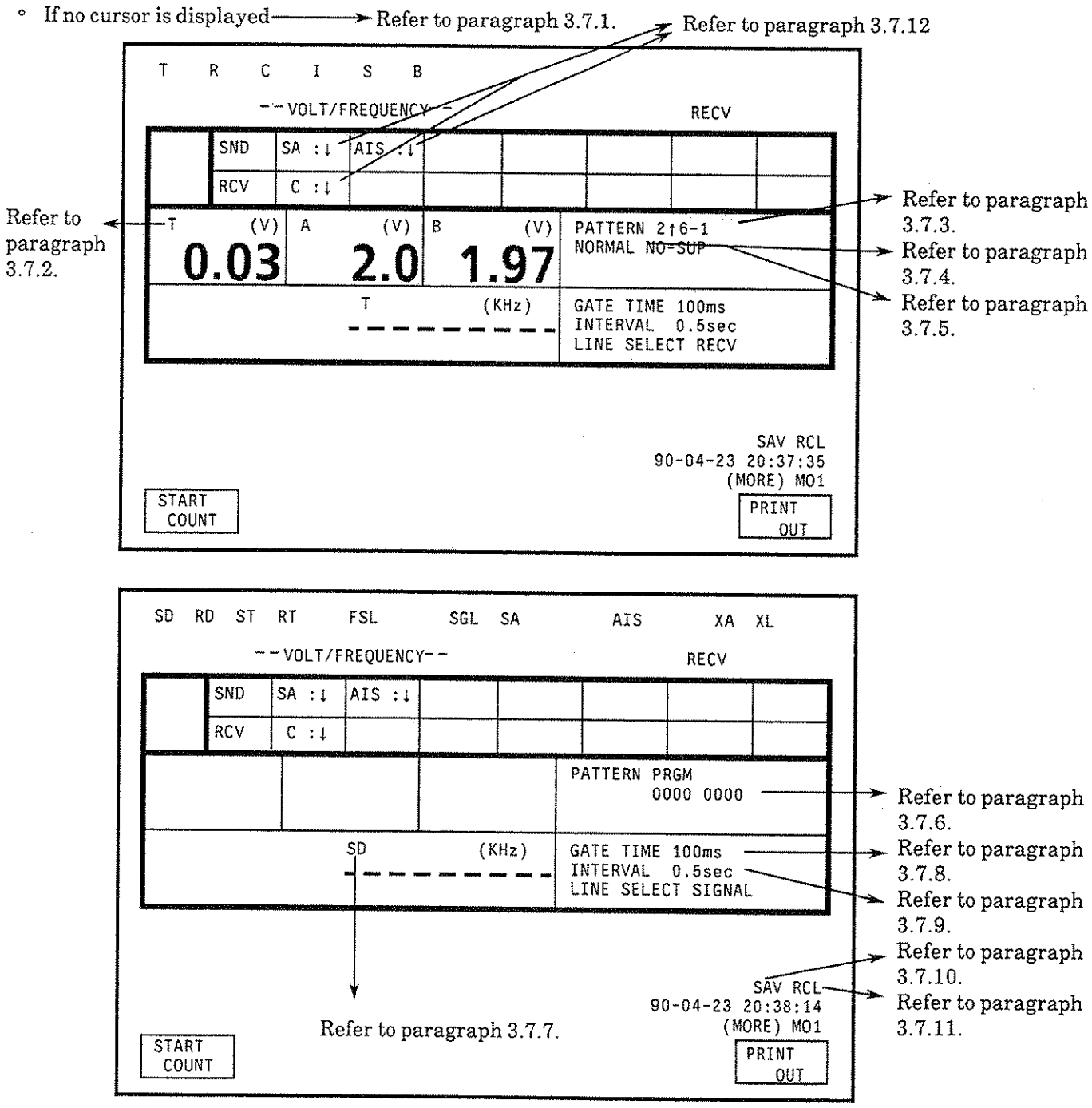
Cursor position	Output item	Label	Output name PRINT
Outline	This screen specifies the items to be output by the printer during error measurement		

Function key labels and explanations:

PRINT YES	◦ Enables printing of each output item.
PRINT NO	◦ Disables printing of each output item.

3.7 Voltage/Frequency Measurement

The voltage and frequency of a receive signal line can be measured via the VOLT/FREQUENCY screen.



3.7.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu for VOLT/FREQUENCY screen		

Function key labels and explanations:

START COUNT ①

⇕

STOP COUNT ②

- When this key is pressed frequency measurement starts and the label changes to that shown in ②.
- When this key is pressed, frequency measurement stops and the label changes to that shown in ①.

PRINT OUT

- When this key is pressed, the measurement results are printed out.

SEND-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the send side. When pressed, ON and OFF are alternately selected.

RECV-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the receive side.

  When pressed, ON and OFF are alternately selected.

XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are the same, this key is displayed.

  When this key is pressed, ON and OFF are alternately selected.

3.7.2 Menu for selecting voltage-measurement signal lines

Cursor position	Select voltage-measurement signal line	Label	None
Outline	Selects the signal line whose voltage is to be measured		

Function key labels and explanations:

XXX

- Selects the signal line whose voltage is to be measured.
  xxx changes according to the interface unit.

3.7.3 Menu for setting the send pattern

Cursor position	Set the send pattern	Label	PATTERN
Outline	Sets the send pattern		

Function key labels and explanations:

2↑6-1	◦ When pressed, the 2^6-1 bit PRBS pattern is set.
2↑7-1	◦ When pressed, the 2^7-1 bit PRBS pattern is set.
2↑9-1	◦ When pressed, the 2^9-1 bit PRBS pattern is set.
2↑11-1	◦ When pressed, the 2^{11}-1 bit PRBS pattern is set.
2↑15-1	◦ When pressed, the 2^{15}-1 bit PRBS pattern is set.
2↑19-1	◦ When pressed, the 2^{19}-1 bit PRBS pattern is set.
2↑20-1	◦ When pressed, the 2^{20}-1 bit PRBS pattern is set.
2↑23-1	◦ When pressed, the 2^{23}-1 bit PRBS pattern is set.
PRGM	◦ When pressed, the programmable pattern is set.
A(0)	◦ When pressed, the ALL 0s pattern is set.
Z(1)	◦ When pressed, the ALL 1s pattern is set.
1:1	◦ When pressed, the 10101010 pattern is set.

3.7.3 Menu for setting the send pattern (continued)

Cursor position	Set the send pattern	Label	PATTERN
Outline	Sets the send pattern		

Function key labels and explanations:

3:1	◦ When pressed, the 11101110 pattern is set.
1:3	◦ When pressed, the 10001000 pattern is set.
7:1	◦ When pressed, the 11111110 pattern is set.
1:7	◦ When pressed, the 10000000 pattern is set.

3.7.4 Menu for setting the PRBS pattern

Cursor position	Set send pattern of paragraph 3.7.3 to PRBS and move the cursor to lower left of the item	Label	None
Outline	Sets the PRBS send pattern		

Function key labels and explanations:

NORMAL	° Sends a normal CCITT PRBS pattern.
INVERT	° Sends an inverted CCITT PRBS pattern.
N-RVRS	° Sends a reversed-normal CCITT PRBS pattern.
I-RVRS	° Sends an inverted reversed CCITT PRBS pattern.

3.7.5 Menu for setting zero suppression for PRBS patterns

Cursor position	Set send pattern of paragraph 3.7.3 to PRBS and move cursor to lower right of the item	Label	None
Outline	Sets zero suppression for PRBS send patterns		

Function key labels and explanations:

NO-SUP	° When pressed, zero suppression is disabled.
ZERO-7	° When pressed, a maximum of 7 consecutive zeros are output.
ZERO-14	° When pressed, a maximum of 14 consecutive zeros are output.

3.7.6 Menu for setting programmable (PROGRAM) patterns

Cursor position	Set send pattern of paragraph 3.7.3 to PROGRAM and move cursor to lower of the item	Label	None
Outline	Sets programmable patterns		

Function key labels and explanations:

0	° When pressed, the bit highlighted by the cursor is set to 0.
1	° When pressed, the bit highlighted by the cursor is set to 1.
ALL BIT	° When [ALL BIT] is pressed while [0] or [1] is held, all the bits ar set to 0 or 1, respectively.
←	° When pressed, the cursor moves to the left.
→	° When pressed, the cursor moves to the right.

3.7.7 Menu for selecting the signal line whose frequency is to be measured

Cursor position	Select the signal line whose frequency is to be measured	Label	None
Outline	Selects the signal line whose frequency is to be measured		

Function key labels and explanations:

xxx	° Selects the signal line whose frequency is to be measured. xxx indicates the name of the signal line and depends on the interface unit.
EXT INPUT	° Selects an external input signal line for frequency measurement.

3.7.8 Menu for setting the GATE TIME

Cursor position	Set the GATE TIME	Label	GATE TIME
Outline	Sets the gate time over which the frequency is measured		

Function key labels and explanations:

100 ms	◦ When pressed, the GATE TIME is set to 100 ms.
1 sec	◦ When pressed, the GATE TIME is set to 1 second.
10 sec	◦ When pressed, the GATE TIME is set to 10 seconds.
MANUAL	◦ When pressed, the GATE TIME is set manually.

3.7.9 Menu for setting the INTERVAL time

Cursor position	Set GATE TIME to MANUAL and move the cursor to INTERVAL setting	Label	INTERVAL
Outline	Sets the interval at which frequency is periodially measured		

Function key labels and explanations:

0.5sec	◦ When pressed, INTERVAL is set to 0.5 seconds.
1 sec	◦ When pressed, INTERVAL is set to 1 second.
5 sec	◦ When pressed, INTERVAL is set to 5 seconds.
MANUAL	◦ INTERVAL is set to MANUAL. In MANUAL mode, the end of measurement results are saved until [COUNT START] is pressed.

3.7.10 Menu for invoking the SAVE operation

Cursor position	Set the SAVE operation	Label	SAV
Outline	Causes the SAVE operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX
↓
MEM10
XXXXXXXX

- When pressed, the interface and measurement conditions etc. are saved in the preset memories. XXXXXXXX indicates the name of the receive interface unit whose interface conditions are saved.

3.7.11 Menu for invoking the RECALL operation

Cursor position	Set the RECALL operation	Label	RCL
Outline	Causes the RECALL operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX
↓
MEM10
XXXXXXXX

- When pressed, the saved conditions are recalled from the preset memory and the saved measurement screen is fetched. XXXXXXXX indicates the name of the receive interface unit whose interface conditions have been recalled.

3.7.12 Menu for setting the value of the signal line

Cursor position	Set the value of the signal line	Label	Signal line
Outline	Sets the value of the signal line		

Function key labels and explanations:

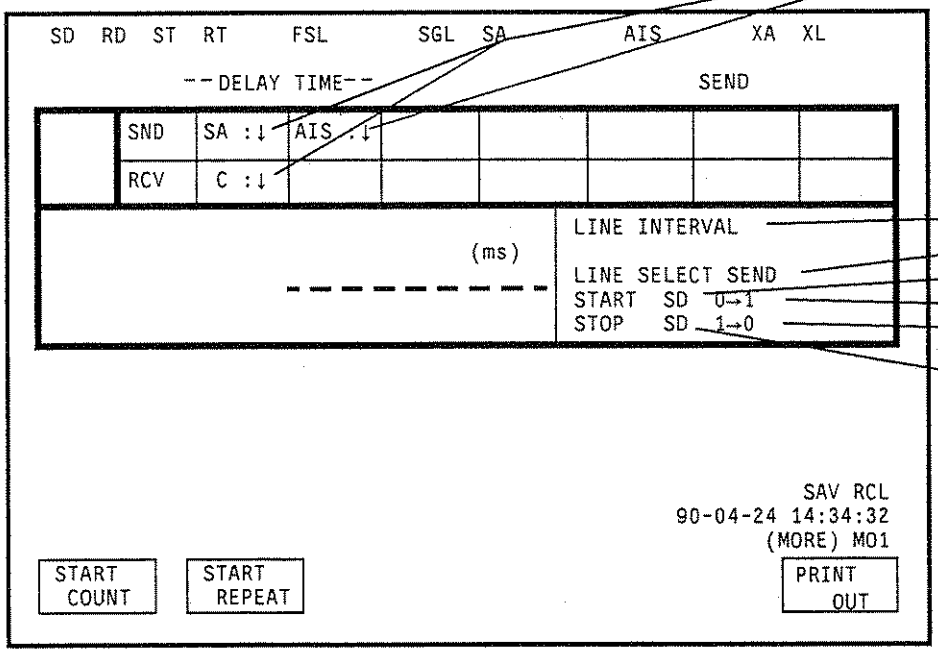
↑ (ON)	◦ When pressed, the signal-line value is set to ON.
↓ (OFF)	◦ When pressed, the signal-line value is set to OFF.
(THROU)	◦ When pressed, the signal-line value is set to THROUGH.
(OPEN)	◦ When pressed, the signal-line value is set to OPEN.

◎ The names and values of the signal lines depend on the interface unit.

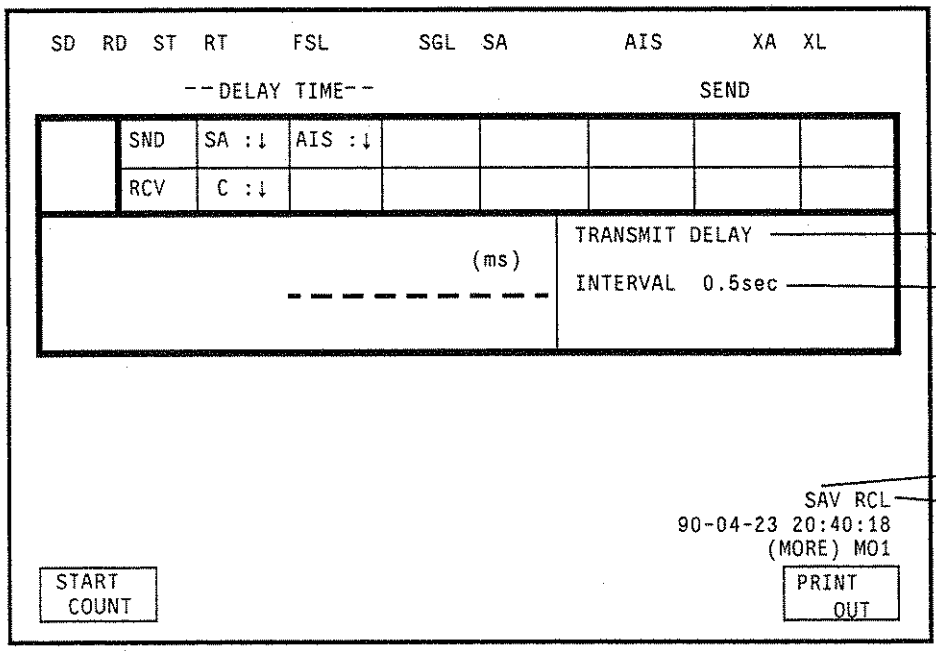
3.8 DELAY TIME Screen

The time differences between transitions of signal lines and transmission delay times can be measured via the DELAY TIME screen.

- If no cursor is displayed → Refer to paragraph 3.8.1.



Refer to paragraph 3.8.11.
Refer to paragraph 3.8.2.
Refer to paragraph 3.8.3.
Refer to paragraph 3.8.4.
Refer to paragraph 3.8.5.
Refer to paragraph 3.8.7.
Refer to paragraph 3.8.6.



Refer to paragraph 3.8.2.
Refer to paragraph 3.8.8.
Refer to paragraph 3.8.9.
Refer to paragraph 3.8.10.

3.8.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu on DELAY TIME screen		

Function key labels and explanations:

COUNT START ①

⇕

COUNT STOP ②

- When pressed, measurement is started and the label changes to that shown in ②.
- When pressed, measurement stops and the label changes to that shown in ①.

REPEAT START ③

⇕

REPEAT STOP ④

- When pressed, repeat measurement is started and the label changes to that shown in ④.
- When pressed, repeat measurement is stopped and the label changes to that shown in ③.

PRINT OUT

- When pressed, the measurement results are printed out.

SEND-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the send side.
  When pressed, ON and OFF are alternately selected.

RECV-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the receive side.

  When pressed, ON and OFF are alternately selected.

XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are the same, this key is displayed.

  When pressed, ON and OFF are alternately selected.

3.8.2 Menu for setting the delay time measurement items

Cursor position	Set the delay-time measurement items	Label	None
Outline	Sets the delay-time measurement items		

Function key labels and explanations:

LINE INTERVAL	° When pressed, the delay-time measurement item is set to LINE INTERVAL. In this mode, the time difference between transitions in signal lines is measured.
TRANSMIT DELAY	° When pressed, the delay-time measurement item is set to TRANSMIT DELAY. In this mode, after the data is sent, the time until the data returns (transmission delay time) is measured.

3.8.3 Menu for setting a send/receive line as a start/stop trigger

Cursor position	Select a send/reeive line as a start/stop trigger	Label	LINE SELECT
Outline	Selects either the send or receive signal line as the start/stop trigger		

Function key labels and explanations:

SEND	° Selects the send signal line as the start/stop trigger.
RECV	° Selects the receive signal line as the start/stop trigger.

3.8.4 Menu for identifying the signal line to be used as the start trigger in line-transition delay measurements

Cursor position	Select the signal line to be used as the start-point when measuring the time difference between signal transitions	Label	START
Outline	Selects the signal line to be used as the start-point trigger when measuring the time difference between signal transitions		

Function key labels and explanations:

xxx	° Used to select the start-point when measuring the time difference between signal transitions. xxx indicates the set signal-line name and varies with the interface unit.
EXT INPUT	° Selects an external input signal-line for use as the start trigger.

3.8.5 Menu for defining the transition to be used as the start trigger in line transition delay measurements

Cursor position	Specifies the transition in the selected signal line which will be used as the start trigger	Label	START
Outline	Specifies the transition in the selected signal line which will be used as the start trigger		

Function key labels and explanations:

1→0 0→1	° This is displayed when the selected signal line is SD or RD (T or R for X.20/X.21). The transition designated as the start trigger for delay time measurements may be set as either 1→0 or 0→1.
H→L L→H	° This is displayed when the selected signal line is an EXT INPUT. In this case, the transition designted as the start trigger for delay time measurements may be set as either H→L or L→H.
ON→OFF OFF→ON	° This is displayed when the selected signal line is neither of the above. In this case, the transition designated as the start trigger for delay time measurements may be set as either ON→OFF or OFF→ON.

3.8.6 Menu for identifying the signal line to be used as the stop trigger in line transition delay measurements

Cursor position	Select the signal line to be used as the stop trigger in signal line transition measurements	Label	STOP
Outline	Selects the signal line to be used as the stop trigger when measuring the time difference between signal transitions		

Function key labels and explanations:

xxx	° Selects the signal line to be used as the stop trigger when measuring the time difference between signal transitions. xxx indicates the signal-line name and depends on the interface unit.
EXT INPUT	° Selects an external input signal line as the stop trigger.

3.8.7 Menu for defining the trasition to be used as the stop trigger in line transition delay measurements

Cursor position	Specifies the transition in the selected signal line which will be used as the stop trigger	Label	STOP
Outline	Specifies the transition in the selected signal line which will be used as the stop trigger		

Function key labels and explanations:

1→0 0→1	° This is displayed when the selected signal line is SD or RD (T or R for X.20/X.21). The transition designated as the stop trigger for delay time measurements may be set as either 1→0 or 0→1.
H→L L→H	° This is displayed when the selected signal line is an EXT INPUT. The transition designated as the stop trigger for delay time measurements may be set as either H→L or L→H.
ON→OFF OFF→ON	° This is displayed when the selected signal line is neither of the above. The transition designated as the stop trigger for delay time measurements may be set as either ON→OFF or OFF→ON.

3.8.8 Menu for INTERVAL setting

Cursor position	Set INTERVAL	Label	INTERVAL
Outline	Sets the INTERVAL time		

Function key labels and explanations:

◎ In the TRANSMIT DELAY mode, the following keys are displayed.

0.5sec	◦ When pressed, INTERVAL is set to 0.5 seconds.
1 sec	◦ When pressed, INTERVAL is set to 1 second.
5 sec	◦ When pressed, INTERVAL is set to 5 seconds.
MANUAL	◦ When presseed, INTERVAL is set manually. In MANUAL mode, the end of measurement results are saved until [COUNT START] is pressed.

3.8.9 Menu for invoking SAVE operation

Cursor position	Set the SAVE operation	Label	SAV
Outline	Causes the SAVE operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX
〉
MEM10
XXXXXXXX

- When pressed, the interface and measurement conditions etc. are saved to the preset memories. XXXXXXXX indicates the name of the receive interface unit whose interface conditions are saved.

3.8.10 Menu for invoking the RECALL operation

Cursor position	Set the RECALL operation	Label	RCL
Outline	Causes the RECALL operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX
〉
MEM10
XXXXXXXX

- When pressed, the saved conditions are recalled from the preset memory and the saved measurement screen is fetched. XXXXXXXX indicates the name of the receive interface unit whose interface conditions have been recalled.

3.8.11 Menu for setting the value of the signal line

Cursor position	Set the value of the signal line	Label	Signal line
Outline	Sets the value of the signal line		

Function key labels and explanations:

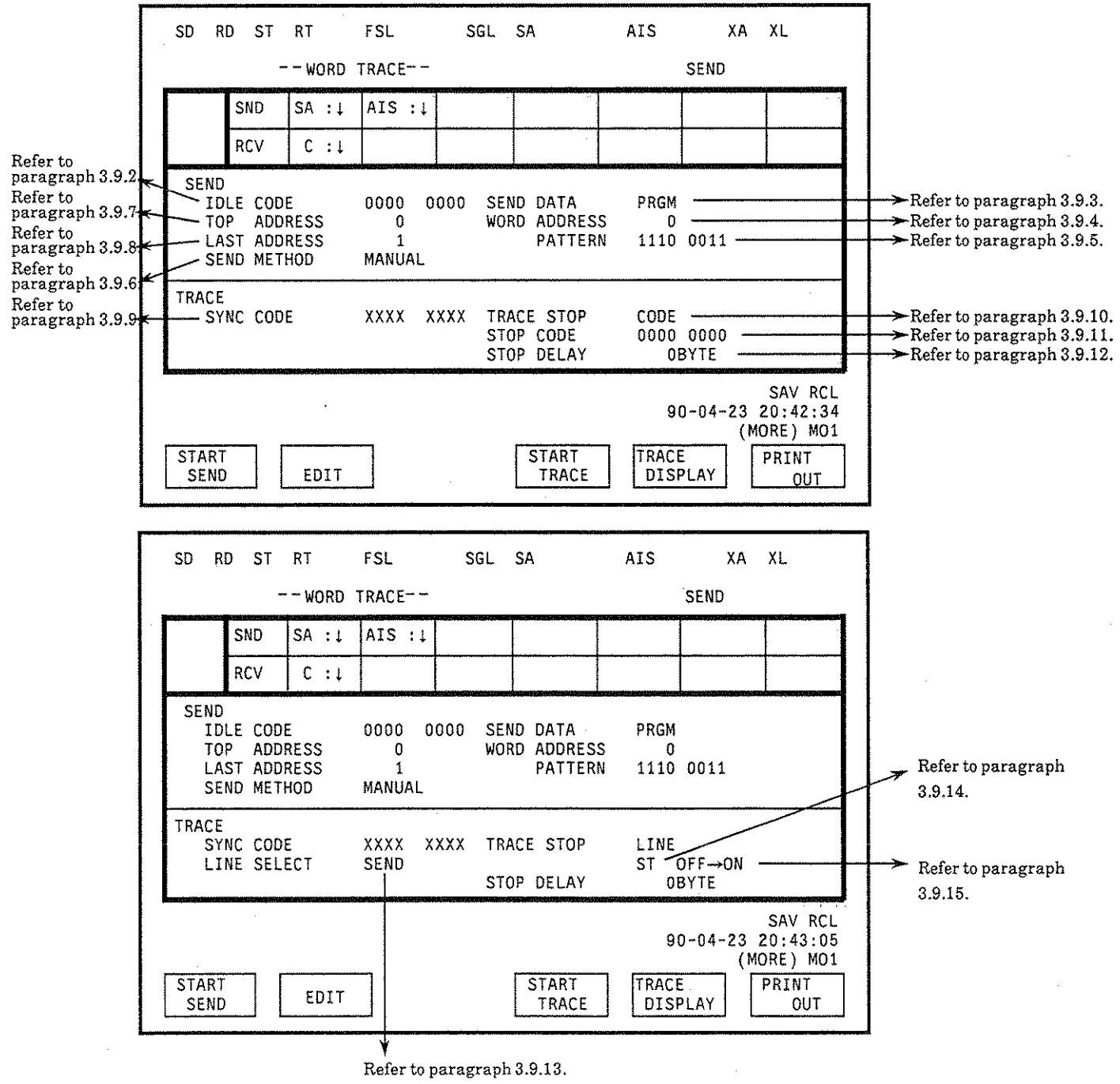
↑ (ON)	◦ When pressed, the signal-line value is set to ON.
↓ (OFF)	◦ When pressed, the signal-line value is set to OFF.
(THROU)	◦ When pressed, the signal-line value is set to THROUGH.
(OPEN)	◦ When pressed, the signal-line value is set to OPEN.

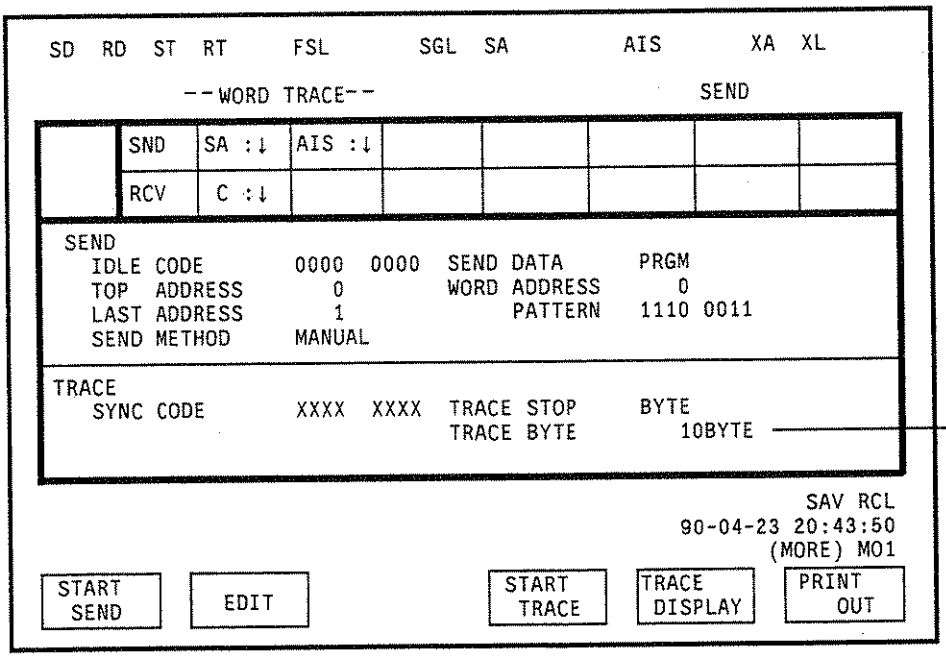
◎ The names and allowable values of the signal lines vary with each interface unit.

3.9 WORD TRACE Screen

Send patterns can be set and receive data can be traced via the WORD TRACE screen.

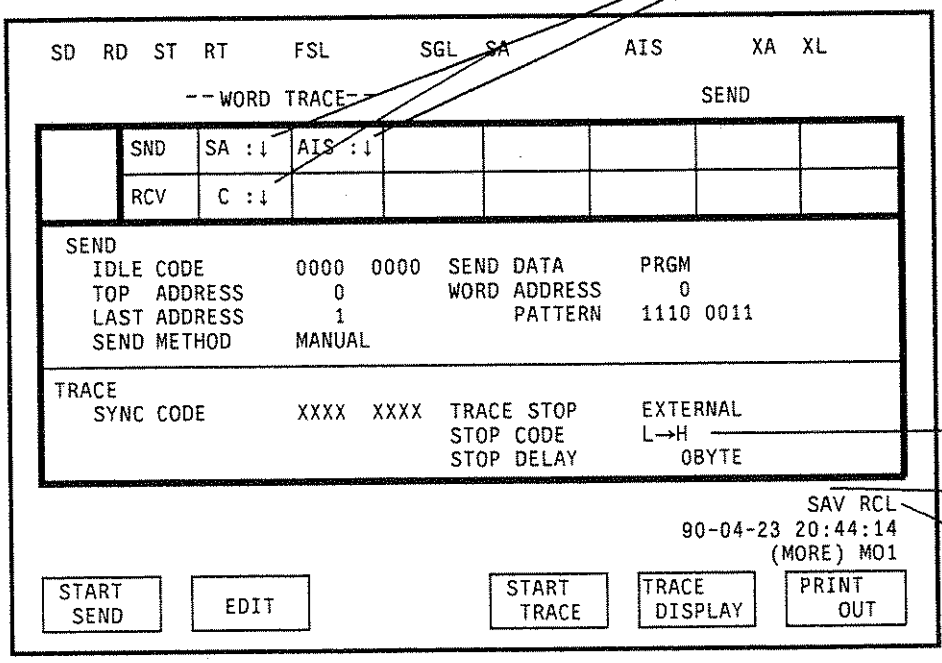
- If no cursor is displayed ——→ Refer to paragraph 3.9.1.





Refer to paragraph 3.9.16.

Refer to paragraph 3.9.20.



Refer to paragraph 3.9.17.

Refer to paragraph 3.9.18.

Refer to paragraph 3.9.19.

3.9.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection menu for WORD TRACE screen		

Function key labels and explanations:

START SEND ①

STOP SEND ②

- When pressed, sending of the word pattern is started and the label changes to that shown in ②.
- When pressed, transmission of the word pattern is stopped and the label changes to that shown in ①.

START TRACE ③

STOP TRACE ④

- When pressed, the trace is started and the label changes to that shown in ④.
- When pressed, the trace is stopped and the label changes to that shown in ③.

EDIT

- When pressed, the word-pattern setting screen (EDIT PATTERN DATA) is fetched.

TRACE DISPLAY

- When pressed, the trace display screen is fetched.

PRINT OUT

- When pressed, the screen settings are printed out.

SEND-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the send side.
  When pressed, ON and OFF are alternately selected.

RECV-XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive interfaces are different, this key is displayed for the receive side.
  When pressed, ON and OFF are alternately selected.

XXX ON/OFF

- XXX indicates the control signal line name

  When the send and receive intrfaces are the same, this key is displayed.
  When pressed, ON and OFF are alternately selected.

3.9.2 Menu for setting the IDLE CODE

Cursor position	Set the IDLE CODE	Label	IDLE CODE
Outline	Sets the data which is sent as the idle code		

Function key labels and explanations:

0	◦ When pressed, the bit highlighted by the cursur is set to 0.
1	◦ When pressed, the bit highlighted by the cursur is set to 1.
ALL BIT	◦ When [ALL BIT] is pressed while [0] or [1] is held, all the bit are set to 0 or 1, respectively.
←	◦ When presssed, the cursor moves to the left.
→	◦ When pressed, the cursor moves to the right.

3.9.3 Menu for setting the type of data pattern to be sent

Cursor position	Set send data pattern type	Label	SEND DATA
Outline	Sets the type of data pattern to be sent		

Function key labels and explanations:

FOX	◦ A FOX data pattern is sent.
PRGM	◦ A programmable [PRGM] data pattern is sent.

3.9.4 Menu for setting WORD ADDRESSes

Cursor position	Set WORD ADDRESS	Label	WORD ADDRESS
Outline	Sets the buffer address of the pattern data to be sent		

Function key labels and explanations:

MEMORY DUMP	◦ This key is displayed when the MD0610D WORD MEM unit is inserted. When pressed, the bit pattern written into the ROM of the WORD MEM unit is used as the buffer address.
0	◦ When pressed, the buffer address of the pattern data to be sent is set to 0.
100	◦ When pressed, the buffer address of the pattern data to be sent is set to 100.
200	◦ When pressed, the buffer address of the pattern data to be sent is set to 200.
300	◦ When pressed, the buffer address of the pattern data to be sent is set to 300.
400	◦ When pressed, the buffer address of the pattern data to be sent is set to 400.
500	◦ When pressed, the buffer address of the pattern data to be sent is set to 500.
600	◦ When pressed, the buffer address of the pattern data to be sent is set to 600.
700	◦ When pressed, the buffer address of the pattern data to be sent is set to 700.
800	◦ When pressed, the buffer address of the pattern data to be sent is set to 800.
900	◦ When pressed, the buffer address of the pattern data to be sent is set to 900.
1000	◦ When pressed, the buffer address of the pattern data to be sent is set to 1000.

3.9.4 Menu for setting WORD ADDRESSes (continued)

Cursor position	Set WORD ADDRESS	Label	WORD ADDRESS
Outline	Sets the buffer address of the pattern data to be sent		

Function key labels and explanations:

1200	◦ When pressed, the buffer address of the pattern data to be sent is set to 1200.
1400	◦ When pressed, the buffer address of the pattern data to be sent is set to 1400.
1600	◦ When pressed, the buffer address of the pattern data to be sent is set to 1600.
1800	◦ When pressed, the buffer address of the pattern data to be sent is set to 1800.
2000	◦ When pressed, the buffer address of the pattern data to be sent is set to 2000.
3000	◦ When pressed, the buffer address of the pattern data to be sent is set to 3000.
4000	◦ When pressed, the buffer address of the pattern data to be sent is set to 4000.
5000	◦ When pressed, the buffer address of the pattern data to be sent is set to 5000.
6000	◦ When pressed, the buffer address of the pattern data to be sent is set to 6000.
7000	◦ When pressed, the buffer address of the pattern data to be sent is set to 7000.
8000	◦ When pressed, the buffer address of the pattern data to be sent is set to 8000.

◎ The buffer address can be set from 0 to 8191 via the MODIFY keys.

3.9.5 Menu for setting WORD PATTERNs

Cursor position	Set WORD PATTERNs	Label	WORD PATTERN
Outline	Sets the send pattern		

Function key labels and explanations:

ENTER	◦ When pressed, the displayed data are entered and the next ADDRESS WORD is displayed.
0	◦ The bit highlighted by the cursor is set to 0.
1	◦ The bit highlighted by the cursor is set to 1.
ALL BIT	◦ When [ALL BIT] is pressed while [0] or [1] is held, ALL 0s or ALL 1s, respectively, are set.
→	◦ When pressed, the cursor moves to the right.
RECALL	◦ Recalls the previous data value.

3.9.6 Menu for setting the SEND METHOD

Cursor position	Set END METHOD	Label	SEND METHOD
Outline	Sets the pattern-send ending method		

Function key labels and explanations:

MANUAL	◦ When pressed, the set pattern is repeatedly sent until [SEND STOP] is pressed.
1 SHOT	◦ When pressed, the set pattern is sent only once.

3.9.7 Menu for setting the TOP ADDRESS

Cursor position	Set TOP ADDRESS	Label	TOP ADDRESS
Outline	Sets the top address of the data pattern to be sent		

Function key labels and explanations:

0	◦ When pressed, the top address of the data pattern to be sent is set to 0 bytes.
50	◦ When pressed, the top address of the data pattern to be sent is set to 50 bytes.
100	◦ When pressed, the top address of the data pattern to be sent is set to 100 bytes.
200	◦ When pressed, the top address of the data pattern to be sent is set to 200 bytes.
300	◦ When pressed, the top address of the data pattern to be sent is set to 300 bytes.
400	◦ When pressed, the top address of the data pattern to be sent is set to 400 bytes.
500	◦ When pressed, the top address of the data pattern to be sent is set to 500 bytes.
600	◦ When pressed, the top address of the data pattern to be sent is set to 600 bytes.
700	◦ When pressed, the top address of the data pattern to be sent is set to 700 bytes.
800	◦ When pressed, the top address of the data pattern to be sent is set to 800 bytes.
900	◦ When pressed, the top address of the data pattern to be sent is set to 900 bytes.
1000	◦ When pressed, the top address of the data pattern to be sent is set to 1000 bytes.

3.9.7 Menu for setting the TOP ADDRESS (continued)

Cursor position	Set TOP ADDRESS	Label	TOP ADDRESS
Outline	Sets the top address of the data pattern to be sent		

Function key labels and explanations:

1200	◦ When pressed, the top address of the data pattern to be sent is set to 1200 bytes.
1400	◦ When pressed, the top address of the data pattern to be sent is set to 1400 bytes.
1600	◦ When presssed, the top address of the data pattern to be sent is set to 1600 bytes.
1800	◦ When presssed, the top address of the data pattern to be sent is set to 1800 bytes.
2000	◦ When presssed, the top address of the data pattern to be sent is set to 2000 bytes.
3000	◦ When presssed, the top address of the data pattern to be sent is set to 3000 bytes.
4000	◦ When presssed, the top address of the data pattern to be sent is set to 4000 bytes.
5000	◦ When presssed, the top address of the data pattern to be sent is set to 5000 bytes.
6000	◦ When presssed, the top address of the data pattern to be sent is set to 6000 bytes.
7000	◦ When presssed, the top address of the data pattern to be sent is set to 7000 bytes.
8000	◦ When presssed, the top address of the data pattern to be sent is set to 8000 bytes.
9000	◦ When presssed, the top address of the data pattern to be sent is set to 9000 bytes.

3.9.7 Menu for setting the TOP ADDRESS (continued)

Cursor position	Set TOP ADDRESS	Label	TOP ADDRESS
Outline	Sets the top address of the data pattern to be sent		

Function key labels and explanations:

10000	◦ When presssed, the top address of the data pattern to be sent is set to 10000 bytes.
15000	◦ When presssed, the top address of the data pattern to be sent is set to 15000 bytes.
20000	◦ When presssed, the top address of the data pattern to be sent is set to 20000 bytes.
25000	◦ When presssed, the top address of the data pattern to be sent is set to 25000 bytes.
30000	◦ When presssed, the top address of the data pattern to be sent is set to 30000 bytes.
32766	◦ When presssed, the top address of the data pattern to be sent is set to 32766 bytes.

◎ The address of the data pattern to be sent can be set from 0 to 32766 bytes via the MODIFY keys.

3.9.8 Menu for setting the LAST ADDRESS

Cursor position	Set LAST ADDRESS	Label	LAST ADDRESS
Outline	Sets the last address of the data pattern to be sent		

Function key labels and explanations:

50	◦ When pressed, the last address of the data pattern to be sent is set to 50 bytes.
100	◦ When pressed, the last address of the data pattern to be sent is set to 100 bytes.
200	◦ When pressed, the last address of the data pattern to be sent is set to 200 bytes.
300	◦ When pressed, the last address of the data pattern to be sent is set to 300 bytes.
400	◦ When pressed, the last address of the data pattern to be sent is set to 400 bytes.
500	◦ When pressed, the last address of the data pattern to be sent is set to 500 bytes.
600	◦ When pressed, the last address of the data pattern to be sent is set to 600 bytes.
700	◦ When pressed, the last address of the data pattern to be sent is set to 700 bytes.
800	◦ When pressed, the last address of the data pattern to be sent is set to 800 bytes.
900	◦ When pressed, the last address of the data pattern to be sent is set to 900 bytes.
1000	◦ When pressed, the last address of the data pattern to be sent is set to 1000 bytes.
1200	◦ When pressed, the last address of the data pattern to be sent is set to 1200 bytes.

3.9.8 Menu for setting the LAST ADDRESS (continued)

Cursor position	Set LAST ADDRESS	Label	LAST ADDRESS
Outline	Sets the last address of the data pattern to be sent		

Function key labels and explanations:

1400	◦ When pressed, the last address of the data pattern to be sent is set to 1400 bytes.
1600	◦ When presssed, the last address of the data pattern to be sent is set to 1600 bytes.
1800	◦ When presssed, the last address of the data pattern to be sent is set to 1800 bytes.
2000	◦ When presssed, the last address of the data pattern to be sent is set to 2000 bytes.
3000	◦ When presssed, the last address of the data pattern to be sent is set to 3000 bytes.
5000	◦ When presssed, the last address of the data pattern to be sent is set to 5000 bytes.
6000	◦ When presssed, the last address of the data pattern to be sent is set to 6000 bytes.
7000	◦ When presssed, the last address of the data pattern to be sent is set to 7000 bytes.
8000	◦ When presssed, the last address of the data pattern to be sent is set to 8000 bytes.
8191	◦ When presssed, the last address to be sent is set to 8191 bytes.
9000	◦ When presssed, the last address to be sent is set to 9000 bytes.
10000	◦ When presssed, the last address to be sent is set to 10000 bytes.

3.9.8 Menu for setting the LAST ADDRESS (continued)

Cursor position	Set LAST ADDRESS	Label	LAST ADDRESS
Outline	Sets the last address of the data pattern to be sent		

Function key labels and explanations:

15000	◦ When presssed, the last address to be sent is set to 15000 bytes.
20000	◦ When presssed, the last address to be sent is set to 20000 bytes.
25000	◦ When presssed, the last address to be sent is set to 25000 bytes.
30000	◦ When presssed, the last address to be sent is set to 30000 bytes.
32766	◦ When presssed, the last address to be sent is set to 32766 bytes.

◎ The address of the data pattern to be sent can be set from 0 to 32766 bytes via the MODIFY keys.

3.9.9 Menu for setting the SYNC CODE

Cursor position	Set SYNC CODE	Label	SYNC CODE
Outline	Sets the pattern by which tracing is synchronized		

Function key labels and explanations:

ALL X	◦ When pressed, no sync patter code is set.
0	◦ When pressed, the bit highlighted by the cursor is set to 0.
1	◦ When pressed, the bit highlighted by the cursor is set to 1.
ALL BIT	◦ When [ALL BIT] is pressed while [0] or [1] is held, ALL 0s or ALL 1s, respectively, are set.
←	◦ When pressed, the cursor moves to the left.
→	◦ When pressed, the cursor moves to the right.

3.9.10 Menu for setting the TRACE STOP byte

Cursor position	Set TRACE STOP	Label	TRACE STOP
Outline	Sets the method whereby the trace will be ended		

Function key labels and explanations:

MANUAL	◦ When pressed, the trace is stopped manually by pressing the [TRACE STOP] key.
CODE	◦ When pressed, the trace is stopped when the received data matches the STOP CODE.
NOT CODE	◦ When pressed, the trace is stopped when the received data differs from the STOP CODE.
LINE	◦ When pressed, the trace is stopped when the specified signal-line turns ON/OFF.
BYTE	◦ When pressed, the trace is stopped when the specified number of bytes is received.
EXTERNAL	◦ When pressed, the trace is stopped when the specified EXT INPUT signal changes HI/LO.

3.9.11 Menu for setting the STOP CODE

Cursor position	Set STOP CODE	Label	STOP CODE
Outline	Sets the end-of-trace-bit-pattern trigger code		

Function key labels and explanations:

x	◦ x indicates a Don't care condition. When pressed, x is set for the specified bit.
0	◦ When pressed, the bit highlighted by cursor is set to 0.
1	◦ When pressed, the bit highlighted by cursor is set to 1.
ALL BIT	◦ When [ALL BIT] is pressed while [0] or [1] is held, ALL 0s or ALL 1s, respectively, are set.
←	◦ When pressed, the cursor moves to the left.
→	◦ When pressed, the cursor moves to the right.

3.9.12 Menu for setting the number of STOP DELAY bytes

Cursor position	Set number of STOP DELAY bytes	Label	STOP DELAY
Outline	Sets the number of DELAY bytes to be traced after the TRACE STOP trigger is received		

Function key labels and explanations:

0 BYTE	° When pressed, the number of DELAY bytes is set to 0 bytes.
50 BYTE	° When pressed, the number of DELAY bytes is set to 50 bytes.
100 BYTE	° When pressed, the number of DELAY bytes is set to 100 bytes.
200 BYTE	° When pressed, the number of DELAY bytes is set to 200 bytes.
300 BYTE	° When pressed, the number of DELAY bytes is set to 300 bytes.
400 BYTE	° When pressed, the number of DELAY bytes is set to 400 bytes.
500 BYTE	° When pressed, the number of DELAY bytes is set to 500 bytes.
600 BYTE	° When pressed, the number of DELAY bytes is set to 600 bytes.
700 BYTE	° When pressed, the number of DELAY bytes is set to 700 bytes.
800 BYTE	° When pressed, the number of DELAY bytes is set to 800 bytes.
900 BYTE	° When pressed, the number of DELAY bytes is set to 900 bytes.
1000 BYTE	° When pressed, the number of DELAY bytes is set to 1000 bytes.

3.9.12 Menu for setting the number of STOP DELAY bytes (continued)

Cursor position	Set the number of STOP DELAY bytes	Label	STOP DELAY
Outline	Sets the number of DELAY bytes to be traced after the TRACE STOP trigger is received		

Function key labels and explanations:

2000 BYTE	◦ When pressed, the number of DELAY bytes is set to 2000 bytes.
3000 BYTE	◦ When pressed, the number of DELAY bytes is set to 3000 bytes.
4000 BYTE	◦ When pressed, the number of DELAY bytes is set to 4000 bytes.
5000 BYTE	◦ When pressed, the number of DELAY bytes is set to 5000 bytes.
6000 BYTE	◦ When pressed, the number of DELAY bytes is set to 6000 bytes.
7000 BYTE	◦ When pressed, the number of DELAY bytes is set to 7000 bytes.

◎ The number of DELAY bytes can be set from 0 to 8000 bytes via the MODIFY keys.

3.9.13 Menu for selecting the send/receive line as the stop trigger

Cursor position	Select send/receive as stop trigger	Label	LINE SELECT
Oueline	Used to set either the send or receive signal as the end of trace signal		

Function key labels and explanations:

SEND	◦ Sets the send signal as the end of trace trigger.
RECV	◦ Sets the receive signal as the end of trace trigger.

3.9.14 Menu for selecting an arbitrary signal line as the end of trace signal

Cursor position	Set the TRACE STOP as in paragraph 3.9.9 to LINE and move the cursor to lower of the item	Label	None
Outline	Used to identify the signal line to be used as the end of trace signal		

Function key labels and explanations:

XXX	◦ When pressed, the xxx signal line is selected as the end of trace trigger. The identities of the signal lines xxx change with the interface unit.

3.9.15 Menu for setting the end of trace trigger

Cursor position	Set the TRACE STOP as in paragraph 3.9.9 to LINE and move cursor to the lower right of the item	Label	None
Outline	Used to set the edge of the specified signal line to be used as the stop trigger		

Function key labels and explanations:

1→0
0→1

- This is displayed when the selected signal line is set to SD or RD (T or R for X.20/X.21).

  The transition designated as the start trigger for delay-time measurements may be set as either 1→0 or 0→1.

ON→OFF
OFF→ON

- This is displayed when the selected signal line is neither SD or RD.

  The transition designated as the start trigger for delay-time measurements may be set as either ON→OFF or OFF→ON.

3.9.16 Menu for setting the number of TRACE BYTEs

Cursor position	Set the number of TRACE BYTEs	Label	TRACE BYTE
Outline	Sets the number of bytes to be traced		

Function key labels and explanations:

10 BYTE	° When pressed, the number of bytes to be traced is set to 10 bytes.
50 BYTE	° When pressed, the number of bytes to be traced is set to 50 bytes.
100 BYTE	° When pressed, the number of bytes to be traced is set to 100 bytes.
200 BYTE	° When pressed, the number of bytes to be traced is set to 200 bytes.
300 BYTE	° When pressed, the number of bytes to be traced is set to 300 bytes.
400 BYTE	° When pressed, the number of bytes to be traced is set to 400 bytes.
500 BYTE	° When pressed, the number of bytes to be traced is set to 500 bytes.
600 BYTE	° When pressed, the number of bytes to be traced is set to 600 bytes.
700 BYTE	° When pressed, the number of bytes to be traced is set to 700 bytes.
800 BYTE	° When pressed, the number of bytes to be traced is set to 800 bytes.
900 BYTE	° When pressed, the number of bytes to be traced is set to 900 bytes.
1000 BYTE	° When pressed, the number of bytes to be traced is set to 1000 bytes.

3.9.16 Menu for setting the number of TRACE BYTEs (continued)

Cursor position	Set the number of TRACE BYTEs	Label	TRACE BYTE
Outline	Sets the number of bytes to be traced		

Function key labels and explanations:

1200 BYTE	◦ When pressed, the number of bytes to be traced is set to 1200 bytes.
1400 BYTE	◦ When pressed, the number of bytes to be traced is set to 1400 bytes.
1600 BYTE	◦ When pressed, the number of bytes to be traced is set to 1600 bytes.
1800 BYTE	◦ When pressed, the number of bytes to be traced is set to 1800 bytes.
2000 BYTE	◦ When pressed, the number of bytes to be traced is set to 2000 bytes.
2500 BYTE	◦ When pressed, the number of bytes to be traced is set to 2500 bytes.
3000 BYTE	◦ When pressed, the number of bytes to be traced is set to 3000 bytes.
4000 BYTE	◦ When pressed, the number of bytes to be traced is set to 4000 bytes.
5000 BYTE	◦ When pressed, the number of bytes to be traced is set to 5000 bytes.
6000 BYTE	◦ When pressed, the number of bytes to be traced is set to 6000 bytes.
7000 BYTE	◦ When pressed, the number of bytes to be traced is set to 7000 bytes.
8000 BYTE	◦ When pressed, the number of bytes to be traced is set to 8000 bytes.

3.9.16 Menu for setting the number of TRACE BYTEs (continued)

Cursor position	Set the number of TRACE BYTEs	Label	TRACE BYTE
Outline	Sets the number of bytes to be traced		

Function key labels and explanations:

9000 BYTE	◦ When pressed, the number of bytes to be traced is set to 9000 bytes.
10000 BYTE	◦ When pressed, the number of bytes to be traced is set to 10000 bytes.
15000 BYTE	◦ When pressed, the number of bytes to be traced is set to 15000 bytes.
20000 BYTE	◦ When pressed, the number of bytes to be traced is set to 20000 bytes.
25000 BYTE	◦ When pressed, the number of bytes to be traced is set to 25000 bytes.
32764 BYTE	◦ When pressed, the number of bytes to be traced is set to 32764 bytes.

◎ The number of bytes to be traced can be set from 0 to 32764 via the MODIFY keys.

3.9.17 Menu for setting the EXT INPUT trigger

Cursor position	Set the EXT INPUT	Label	EXT INPUT
Outline	Sets the transition in the EXT INPUT which will be used as the external trigger		

Function key labels and explanations:

L→H

- When pressed, the [L→H] transition is selected as the external trigger.

H→L

- When pressed, the [H→L] transition is selected as the external trigger.

3.9.18 Menu for invoking the SAVE operation

Cursor position	Set the SAVE operation	Label	SAV
Outline	Causes the SAVE operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX

MEM10
XXXXXXXX

- When pressed, the interface and measurement conditions etc. are saved to the preset memories. XXXXXXXX indicates the name of the receive interface unit whose interface conditions are save.

3.9.19 Menu for invoking the RECALL operation

Cursor position	Set the RECALL operation	Label	RCL
Outline	Causes the RECALL operation to be executed		

Function key labels and explanations:

MEM1
XXXXXXXX
↕
MEM10
XXXXXXXX

When pressed, the saved conditions are recalled from the preset memory and the saved measurement screen is fetched. XXXXXXXX indicates the name of the receive interface unit whose interface conditions have been recalled.

3.9.20 Menu for setting the value of the single-line

Cursor position	Set the value of the signal-line	Label	Signal line
Outline	Sets the value of the signal-line		

Function key labels and explanations:

↑ (ON)
- When pressed, the signal-line value is set to ON.

↓ (OFF)
- When pressed, the signal-line value is set to OFF.

(THROU)
- When pressed, the signal-line value is set to THROUGH.

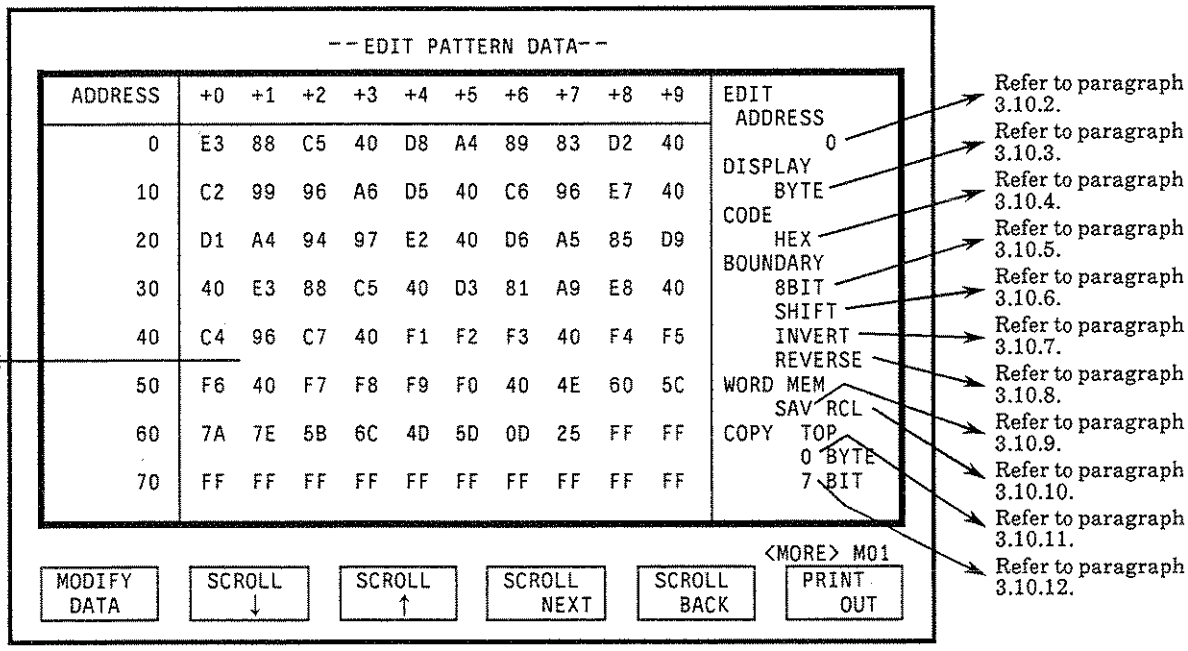
(OPEN)
- When pressed, the signal-line value is set to OPEN.

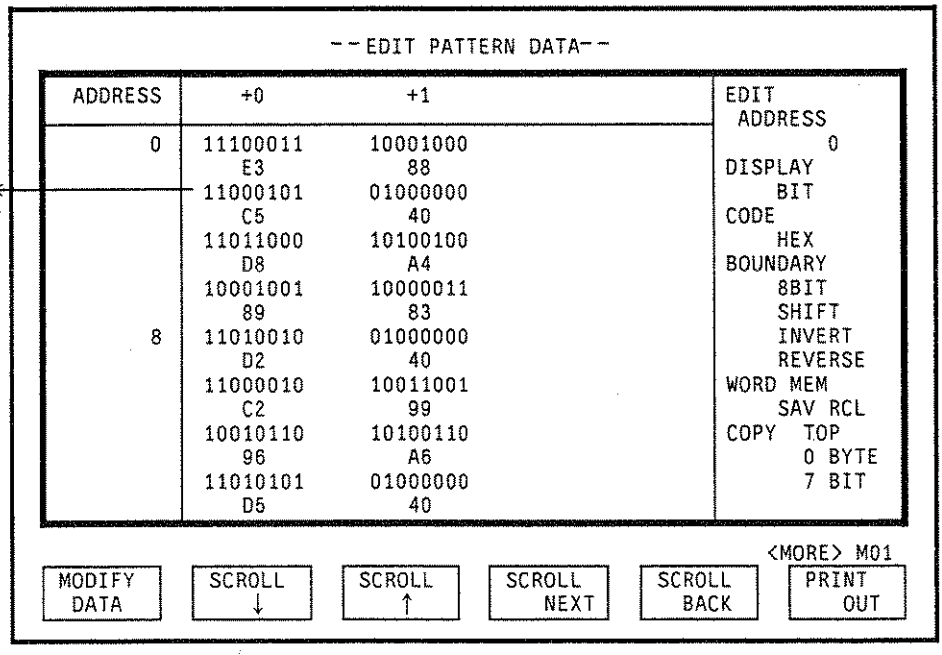
◎ The names and allowable values of the signal line vary with each interface unit.

3.10 EDIT PATTERN DATA Screen

The EDIT PATTERN DATA screen is used to create and change the send-data word pattern.

- If no cursor is displayed ——→ Refer to paragraph 3.10.1.





3.10.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection used to scroll through trace data and print measurement results in EDIT PATTERN DATA screen		

Function key labels and explanations:

MODIFY DATA	◦ When pressed, the cursor is displayed in the data edit area.
SCROLL ↓	◦ When pressed, the address is scrolled by 1 line.
SCROLL ↑	◦ When pressed, the address is scrolled by 1 line.
SCROLL NEXT	◦ When pressed, the address is scrolled by 1 page.
SCROLL BACK	◦ When pressed, the address is scrolled by 1 page.
PRINT OUT	◦ When pressed, the measurement results are printed out.
COPY FROM TRC	◦ When pressed, the trace data are copied in the word pattern data area.

3.10.2 Menu for setting the EDIT ADDRESS

Cursor position	Set EDIT ADDRESS	Label	EDIT ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

0	◦ When pressed, address 0 is displayed at the top of screen.
100	◦ When pressed, address 100 is displayed at the top of screen.
200	◦ When pressed, address 200 is displayed at the top of screen.
300	◦ When pressed, address 300 is displayed at the top of screen.
400	◦ When pressed, address 400 is displayed at the top of screen.
500	◦ When pressed, address 500 is displayed at the top of screen.
600	◦ When pressed, address 600 is displayed at the top of screen.
700	◦ When pressed, address 700 is displayed at the top of screen.
800	◦ When pressed, address 800 is displayed at the top of screen.
900	◦ When pressed, address 900 is displayed at the top of screen.
1000	◦ When pressed, address 1000 is displayed at the top of screen.
1200	◦ When pressed, address 1200 is displayed at the top of screen.

3.10.2 Menu for setting the EDIT ADDRESS (continued)

Cursor position	Set EDIT ADDRESS	Label	EDIT ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

1400	◦ When pressed, address 1400 is displayed at the top of screen.
1600	◦ When pressed, address 1600 is displayed at the top of screen.
1800	◦ When pressed, address 1800 is displayed at the top of screen.
2000	◦ When pressed, address 2000 is displayed at the top of screen.
3000	◦ When pressed, address 3000 is displayed at the top of screen.
5000	◦ When pressed, address 5000 is displayed at the top of screen.
6000	◦ When pressed, address 6000 is displayed at the top of screen.
7000	◦ When pressed, address 7000 is displayed at the top of screen.
8000	◦ When pressed, address 8000 is displayed at the top of screen.
9000	◦ When pressed, address 9000 is displayed at the top of screen.
10000	◦ When pressed, address 10000 is displayed at the top of screen.
15000	◦ When pressed, address 15000 is displayed at the top of screen.

3.10.2 Menu for setting the EDIT ADDRESS (continued)

Cursor position	Set EDIT ADDRESS	Label	EDIT ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

20000	◦ When pressed, address 20000 is displayed at the top of screen.
25000	◦ When pressed, address 25000 is displayed at the top of screen.
30000	◦ When pressed, address 30000 is displayed at the top of screen.
32760	◦ When pressed, address 32760 is displayed at the top of screen.

◎ The address whose data is to be displayed can be set from 0 to 32767 via the MODIFY keys.

3.10.3 Menu for setting the display mode

Cursor position	Set type of mode to be used when displaying data	Label	DISPLAY
Outline	Sets the type of mode to be used when editing data.		

Function key labels and explanations:

BYTE	◦ When pressed, display mode is BYTE.
BIT	◦ When pressed, display mode is BIT.

3.10.4 Menu for setting the display code

Cursor position	Set type of mode to be used when displaying data	Label	CODE
Outline	Sets the type of code to be used when displaying edit data.		

Function key labels and explanations:

HEX	◦ When pressed, trace data are displayed in HEX.
ASCII	◦ When pressed, trace data are displayed in ASCII.
EBCDIC	◦ When pressed, trace data are displayed in EBCDIC.
EBCDIK	◦ When pressed, trace data are displayed in EBCDIK.
JIS8	◦ When pressed, trace data are displayed in JIS8.
EBCD	◦ When pressed, trace data are displayed in EBCD.
Baudot	◦ When pressed, trace data are displayed in Baudot.

3.10.5 Menu for setting the display boundary

Cursor position	Set display boundary	Label	BOUNDARY
Outline	Sets the bit boundary when displaying edit data.		

Function key labels and explanations:

4BIT	◦ When pressed, the bit boundary is set in 4-BIT.
5BIT	◦ When pressed, the bit boundary is set in 5-BIT.
6BIT	◦ When pressed, the bit boundary is set in 6-BIT.
7BIT	◦ When pressed, the bit boundary is set in 7-BIT.
8BIT	◦ When pressed, the bit boundary is set in 8-BIT.

3.10.6 EDIT FUNCTION-Menu for indication shift execution

Cursor position	Indicate shift execution	Label	SHIFT
Outline	Indicates shift processing for the edit data.		

Function key labels and explanations:

+4	◦ When pressed, +4 bit shift (4 bit shifts to the left) processing is executed to data for 1 page under displaying.
+3	◦ When pressed, +3 bit shift (3 bit shifts to the left) processing is executed to data for 1 page under displaying.
+2	◦ When pressed, +2 bit shift (2 bit shifts to the left) processing is executed to data for 1 page under displaying.
+1	◦ When pressed, +1 bit shift (1 bit shifts to the left) processing is executed to data for 1 page under displaying.
−1	◦ When pressed, −1 bit shift (1 bit shifts to the right) processing is executed to data for 1 page under displaying.
−2	◦ When pressed, −2 bit shift (2 bit shifts to the right) processing is executed to data for 1 page under displaying.
−3	◦ When pressed, −3 bit shift (3 bit shifts to the right) processing is executed to data for 1 page under displaying.
−4	◦ When pressed, −4 bit shift (4 bit shifts to the right) processing is executed to data for 1 page under displaying.
ALL DATA	◦ When pressed, shift processing is executed to all the data (32768 bytes) by selecting this menu simultaneously with any one of the menus from the " +4 " to " −4 " above.

3.10.7 EDIT FUNCTION-Menu for indicating inverse execution

Cursor position	Indicate inverse execution	Label	INVERT
Outline	Indicates an inverse processing (1 ⇆ 0) for the edit data.		

Function key labels and explanations:

DISPLAY DATA	° When pressed, an inverse processing (bit 0/1 inverse processing) is executed to data for 1 page under displaying.
ALL DATA	° When pressed, an inverse processing (bit 0/1 inverse processing) is executed to all data (32768 bytes).

3.10.8 EDIT FUNCTION-Menu for indicating reverse execution

Cursor position	Indicate reverse execution	Label	REVERSE
Outline	Indicates a reverse execution for the edit data.		

Function key labels and explanations:

DISPLAY DATA	° When pressed, a reverse processing (processing to reverse the upper bits with the lower bits) is executed to data for 1 page under displaying.
ALL DATA	° When pressed, the reverse processing (processing to reverse the upper bits with the lower bits) is executed to all the data (32768 bytes).

3.10.9 Menu for indicating saving to word-memory unit

Cursor position	Indicate saving to word-memory unit	Label	SAV
Outline	Indicates to save the pattern data to E^2 PROM of the word-memory unit.		

Function key labels and explanations:

ROM0	◦ When pressed, the pattern data are saved in ROM 0 of the word-memory unit.
ROM1	◦ When pressed, the pattern data are saved in ROM 1 of the word-memory unit.
ROM2	◦ When pressed, the pattern data are saved in ROM 2 of the word-memory unit.
ROM3	◦ When pressed, the pattern data are saved in ROM 3 of the word-memory unit.
ROM4	◦ When pressed, the pattern data are saved in ROM 4 of the word-memory unit.
ROM5	◦ When pressed, the pattern data are saved in ROM 5 of the word-memory unit.
ROM6	◦ When pressed, the pattern data are saved in ROM 6 of the word-memory unit.
ROM7	◦ When pressed, the pattern data are saved in ROM 7 of the word-memory unit.

3.10.10 Menu for indicating read out from word-memory unit

Cursor position	Indicate read out from word-memory unit	Label	RCL
Outline	Indicates to read out the pattern data from ROM of the word-memory unit.		

Function key labels and explanations:

ROM0	◦ When pressed, the pattern data is read out from ROM 0 of the word-memory unit.
ROM1	◦ When pressed, the pattern data is read out from ROM 1 of the word-memory unit.
ROM2	◦ When pressed, the pattern data is read out from ROM 2 of the word-memory unit.
ROM3	◦ When pressed, the pattern data is read out from ROM 3 of the word-memory unit.
ROM4	◦ When pressed, the pattern data is read out from ROM 4 of the word-memory unit.
ROM5	◦ When pressed, the pattern data is read out from ROM 5 of the word-memory unit.
ROM6	◦ When pressed, the pattern data is read out from ROM 6 of the word-memory unit.
ROM7	◦ When pressed, the pattern data is read out from ROM 7 of the word-memory unit.

3.10.11 Menu for setting the TRACE DATA COPY TOP ADDRESS

Cursor position	Set the TRACE DATA COPY TOP ADDRESS	Label	COPY TOP
Outline	Sets the top address for copying the trace data.		

Function key labels and explanations:

0	◦ When pressed, the copy top address is set to 0.
100	◦ When pressed, the copy top address is set to 100.
200	◦ When pressed, the copy top address is set to 200.
300	◦ When pressed, the copy top address is set to 300.
400	◦ When pressed, the copy top address is set to 400.
500	◦ When pressed, the copy top address is set to 500.
600	◦ When pressed, the copy top address is set to 600.
700	◦ When pressed, the copy top address is set to 700.
800	◦ When pressed, the copy top address is set to 800.
1000	◦ When pressed, the copy top address is set to 1000.
1200	◦ When pressed, the copy top address is set to 1200.
1400	◦ When pressed, the copy top address is set to 1400.

3.10.11 Menu for setting the TRACE DATA COPY TOP ADDRESS (continued)

Cursor position	Set the TRACE DATA COPY TOP ADDRESS	Label	COPY TOP
Outline	Sets the top address for copying the trace data.		

Function key labels and explanations:

1600	◦ When pressed, the copy top address is set to 1600.
1800	◦ When pressed, the copy top address is set to 1800.
2000	◦ When pressed, the copy top address is set to 2000.
3000	◦ When pressed, the copy top address is set to 3000.
5000	◦ When pressed, the copy top address is set to 5000.
10000	◦ When pressed, the copy top address is set to 10000.
15000	◦ When pressed, the copy top address is set to 15000.
20000	◦ When pressed, the copy top address is set to 20000.
25000	◦ When pressed, the copy top address is set to 25000.
30000	◦ When pressed, the copy top address is set to 30000.

◎ The copy top address can be set from 0 to 32767 using the MODIFY keys.

3.10.12 Menu for setting the TRACE DATA COPY TOP BIT

Cursor position	Set the TRACE DATA COPY TOP BIT	Label	COPY TOP
Outline	Sets the TOP BIT for copying the trace data.		

Function key labels and explanations:

◎ The COPY TOP BIT can be set in the range from 0 to 7 using the MODIFY keys.

3.10.13 Menu for setting the DISPLAY DATA in BYTE

Cursor position	Set DISPLAY DATA in BYTE	Label	None
Outline	Sets the data displayed in the byte display mode.		

Function key labels and explanations:

ENTER	◦ When pressed, the data input by the MODIFY keys etc. are confirmed for setting.
RECALL	◦ When pressed, the data entered previously are read out and the data are input to data where the cursor has been currently positioned.
INVERT	◦ When pressed, the data where the cursor has been currently positioned are invertedly processed. (0 ⇆ 1).
REVERSE	◦ When pressed, the data where the cursor has been currently positioned are reversely processed. (upper bits ⇆ lower bits).
UNDO	◦ When pressed, the data currently entered are returned to the previous data.

3.10.14 Menu for setting the DISPLAY DATA in BIT

Cursor position	Set DISPLAY DATA in BIT	Label	None
Outline	Sets the data displayed in the bit display mode.		

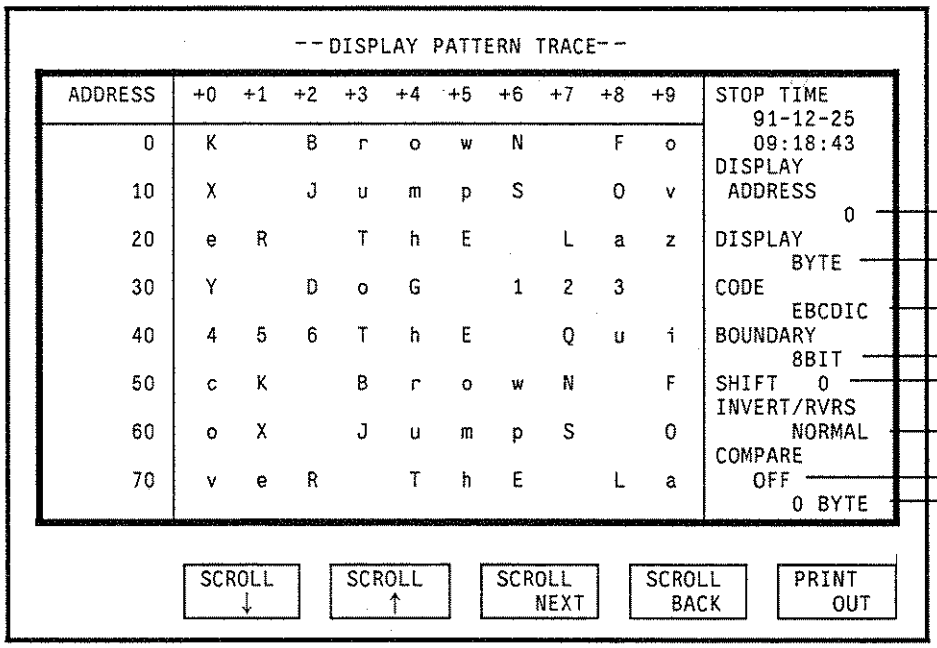
Function key labels and explanations:

ENTER	◦ When pressed, the data input with the " 0 " or " 1 " key are confirmed for setting.
0	◦ When pressed, 0 is input in the bit where the cursor is currently positioned.
1	◦ When pressed, 1 is input in the bit where the cursor is currently positioned.
ALL BIT	◦ When pressed, 0 or 1 is input in all the data bits of the data field where the cursor is currently positioned using this menu and " 0 " or " 1 " key above simultaneously.
→	◦ When pressed, the cursor is moved to the left for 1 bit.
RECALL	◦ When pressed, the data entered previously are recalled and its data is input to the data of data field where the cursor is currently positioned.
INVERT	◦ When pressed, the data of data field where the cursor is currently positioned are invertedly processed. (0 ⇆ 1).
REVERSE	◦ When pressed, the data of data field where the cursor is currently positioned are reversely processed (upper bits ⇆ lower bits).
UNDO	◦ When pressed, the data currently entered are returned to the previous data.

3.11 DISPLAY PATTERN TRACE Screen

The WORD TRACE screen is used to display trace data.

- If no cursor is displayed ——→ Refer to paragraph 3.11.1.



→ Refer to paragraph 3.11.2.
→ Refer to paragraph 3.11.3.
→ Refer to paragraph 3.11.4.
→ Refer to paragraph 3.11.5.
→ Refer to paragraph 3.11.6.
→ Refer to paragraph 3.11.7.
→ Refer to paragraph 3.11.8.
→ Refer to paragraph 3.11.9.

3.11.1 Menu for function selection

Cursor position	Cursor not displayed	Label	None
Outline	Function selection used to scroll through trace data and print measurement results in PATTERN TRACE screen		

Function key labels and explanations:

SCROLL ↓	◦ When pressed, the address is scrolled by 1 line.
SCROLL ↑	◦ When pressed, the address is scrolled by 1 line.
SCROLL NEXT	◦ When pressed, the address is scrolled by 1 page.
SCROLL BACK	◦ When pressed, the address is scrolled by 1 page.
PRINT OUT	◦ When pressed, the measurement results are printed out.

3.11.2 Menu for setting the DISPLAY ADDRESS

Cursor position	Set DISPLAY ADDRESS	Label	DISPLAY ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

TRG	◦ When pressed, the line which contains the trigger code is displayed at the bottom of the page (screen).
STOP	◦ When pressed, the last line is displayed at the bottom of the page (screen).
0	◦ When pressed, address 0 is displayed at the top of screen.
100	◦ When pressed, address 100 is displayed at the top of screen.
200	◦ When pressed, address 200 is displayed at the top of screen.
300	◦ When pressed, address 300 is displayed at the top of screen.
400	◦ When pressed, address 400 is displayed at the top of screen.
500	◦ When pressed, address 500 is displayed at the top of screen.
600	◦ When pressed, address 600 is displayed at the top of screen.
700	◦ When pressed, address 700 is displayed at the top of screen.
800	◦ When pressed, address 800 is displayed at the top of screen.
900	◦ When pressed, address 900 is displayed at the top of screen.

3.11.2 Menu for setting the DISPLAY ADDRESS (continued)

Cursor position	Set DISPLAY ADDRESS	Label	DISPLAY ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

1000	◦ When pressed, address 1000 is displayed at the top of screen.
1200	◦ When pressed, address 1200 is displayed at the top of screen.
1400	◦ When pressed, address 1400 is displayed at the top of screen.
1600	◦ When pressed, address 1600 is displayed at the top of screen.
1800	◦ When pressed, address 1800 is displayed at the top of screen.
2000	◦ When pressed, address 2000 is displayed at the top of screen.
3000	◦ When pressed, address 3000 is displayed at the top of screen.
5000	◦ When pressed, address 5000 is displayed at the top of screen.
10000	◦ When pressed, address 10000 is displayed at the top of screen.
15000	◦ When pressed, address 15000 is displayed at the top of screen.
20000	◦ When pressed, address 20000 is displayed at the top of screen.
25000	◦ When pressed, address 25000 is displayed at the top of screen.

3.11.2 Menu for setting the EDIT ADDRESS (continued)

Cursor position	Set EDIT ADDRESS	Label	EDIT ADDRESS
Outline	Sets the address to be displayed at the top of screen		

Function key labels and explanations:

30000

- When pressed, address 30000 is displayed at the top of screen.

◎ The address whose data is to be displayed can be set from 0 to 32767 via the MODIFY keys.

3.11.3 Menu for setting the display mode

Cursor position	Set type of mode to be used for displaying data	Label	DISPLAY
Outline	Sets the type of mode to be used for displaying trace data.		

Function key labels and explanations:

BYTE

- When pressed, trace data are displayed in BYTE.

BIT

- When pressed, trace data are displayed in BIT.

3.11.4 Menu for setting the display code

Cursor position	Set type of code to be used when displaying data	Label	CODE
Outline	Sets the type of code to be used when displaying trace data.		

Function key labels and explanations:

HEX	◦ When pressed, trace data are displayed in HEX.
ASCII	◦ When pressed, trace data are displayed in ASCII.
EBCDIC	◦ When pressed, trace data are displayed in EBCDIC.
EBCDIK	◦ When pressed, trace data are displayed in EBCDIK.
JIS8	◦ When pressed, trace data are displayed in JIS8.
EBCD	◦ When pressed, trace data are displayed in EBCD.
Baudot	◦ When pressed, trace data are displayed in Baudot.

3.11.5 Menu for setting the display boundary

Cursor position	Set display boundary	Label	BOUNDARY
Outline	Sets the bit boundary for displaying the trace data.		

Function key labels and explanations:

4BIT	◦ When pressed, the bit boundary is set in 4BIT.
5BIT	◦ When pressed, the bit boundary is set in 5BIT.
6BIT	◦ When pressed, the bit boundary is set in 6BIT.
7BIT	◦ When pressed, the bit boundary is set in 7BIT.
8BIT	◦ When pressed, the bit boundary is set in 8EIT.

3.11.6 Menu for setting the number of bits by which displayed data are shifted

Cursor position	Set number of bits by which displayed data are shifted	Label	SHIFT
Outline	Sets the number of bits and the direction in which the display data are shifted		

Function key labels and explanations:

+3	◦ When pressed, the displayed trace data are shifted 3 bits to the left.
+2	◦ When pressed, the displayed trace data are shifted 2 bits to the left.
+1	◦ When pressed, the displayed trace data are shifted 1 bit to the left.
0	◦ When pressed, the displayed trace data are not shifted.
−1	◦ When pressed, the displayed trace data are shifted 1 bit to the right..
−2	◦ When pressed, the displayed trace data are shifted 2 bits to the right.
+4	◦ When pressed, the displayed trace data are shifted 4 bits to the left.
−3	◦ When pressed, the displayed trace data are shifted 3 bits to the right.

3.11.7 Menu for setting INVERSE/REVERSE

Cursor position	Set INVERSE/REVERSE	Label	INVERT/RVRS
Outline	Sets whether or not the inverse/reverse processing is existed for displaying the trace data.		

Function key labels and explanations:

NORMAL	◦ When pressed, both the inverse and reverse processings are not performed.
INVERT	◦ When pressed, the inverse processing is performed.
N-RVRS	◦ When pressed, the reverse processing is performed.
I-RVRS	◦ When pressed, both the inverse and reverse processings are performed.

3.11.8 Menu for setting the existence of comparison processing for send data

Cursor position	Set the existence of comparison processing for send data	Label	COMPARE
Outline	Sets whether or not comparison processing for the send data is performed.		

Function key labels and explanations:

ON	◦ Comparison processing is performed.
OFF	◦ Comparison processing is not performed.

3.11.9 Menu for setting the TOP ADDRESS for send-data comparison

Cursor position	Set TOP ADDRESS for send-data comparison	Label	COMPARE
Outline	Sets the TOP ADDRESS for comparison processing for the send data.		

Function key labels and explanations:

0	◦ When pressed, 0 is set in the TOP ADDRESS.
100	◦ When pressed, 100 is set in the TOP ADDRESS.
200	◦ When pressed, 200 is set in the TOP ADDRESS.
300	◦ When pressed, 300 is set in the TOP ADDRESS.
400	◦ When pressed, 400 is set in the TOP ADDRESS.
500	◦ When pressed, 500 is set in the TOP ADDRESS.
600	◦ When pressed, 600 is set in the TOP ADDRESS.
700	◦ When pressed, 700 is set in the TOP ADDRESS.
800	◦ When pressed, 800 is set in the TOP ADDRESS.
900	◦ When pressed, 900 is set in the TOP ADDRESS.
1000	◦ When pressed, 1000 is set in the TOP ADDRESS.
1200	◦ When pressed, 1200 is set in the TOP ADDRESS.

3.11.9 Menu for setting the TOP ADDRESS for send-data comparison (continued)

Cursor position	Set TOP ADDRESS for send-data comparison	Label	COMPARE
Outline	Sets the TOP ADDRESS for comparison processing for the send data.		

Function key labels and explanations:

1400	° When pressed, 1400 is set in the TOP ADDRESS.
1600	° When pressed, 1600 is set in the TOP ADDRESS.
1800	° When pressed, 1800 is set in the TOP ADDRESS.
2000	° When pressed, 2000 is set in the TOP ADDRESS.
3000	° When pressed, 3000 is set in the TOP ADDRESS.
5000	° When pressed, 5000 is set in the TOP ADDRESS.
6000	° When pressed, 6000 is set in the TOP ADDRESS.
7000	° When pressed, 7000 is set in the TOP ADDRESS.
8000	° When pressed, 8000 is set in the TOP ADDRESS.
9000	° When pressed, 9000 is set in the TOP ADDRESS.
10000	° When pressed, 10000 is set in the TOP ADDRESS.
15000	° When pressed, 15000 is set in the TOP ADDRESS.

3.11.9 Menu for setting the TOP ADDRESS for send-data comparison (continued)

Cursor position	Set TOP ADDRESS for send-data comparison	Label	COMPARE
Outline	Sets the TOP ADDRESS for comparison processing for the send data.		

Function key labels and explanations:

20000	◦ When pressed, 20000 is set in the TOP ADDRESS.
25000	◦ When pressed, 25000 is set in the TOP ADDRESS.
30000	◦ When pressed, 30000 is set in the TOP ADDRESS.

APPENDIX A

ABBREVIATIONS

(Blank)

1.5M BPL	1.544Mb / s Bipolar G. 703 Interface
1 : 1 (m : n)	Repeating pattern of "10" (repeating pattern of m ones (1s) followed by n zeros (0s))
12MFP (G.704)	12 multiframe pattern (G.704)
16MFP 30CHAN	16 multiframe pattern 30 channel
16MFP 31CHAN	16 multiframe pattern 31 channel
2.0M BPL	2.048Mb/s Bipolar G.703 Interface
2 ↑ 6-1 (2 ↑ n-1)	PRBS 2^6-1 bit pattern (2^n-1)
24MFP (G.704)	24 multiframe pattern (G.704)
24MFP (NTT)	24 multiframe pattern (NTT)
2MFP 30CHAN	2 multiframe pattern 30 channel
2MFP 31CHAN	2 multiframe pattern 31 channel

A (0)	All zero pattern
AIS	alarm indicator signal
AIS (sec)	AIS (alarm indicator signal) seconds
AMI	Alternate mark inversion
ASYNC	Asynchronous
AT	Available Time

B	Byte timing
B6ZS	Bipolar with six - zero substitution
B8ZS	Bipolar with eight - zero substitution
BBE	Background Bit Error
BBER	Background Bit Error Ratio
BEFORE PWR - OFF	Before power off
BLK RTO	Block error ratio
BLK - ERR	Block Error
BLK - LNG	Block Length
BSL	Byte sync loss

BUZ	Buzzer
BV (NTT)	Bipolar violation (NTT)
BYTE SYNC	Byte synchronization
C	Control
C - ON	C - line ON
CENTRA CLOCK	Centralized clock
CH - ERR	Channel error
CLK - SLIP	Clock slip count
CODIR	Co-directional
COND	Condition
CONTRA - DIR	Contra-directional
CRC	CRC (cyclic redundency check) code
CYC - ERR	Cyclic error
D1 ~ D8	Data 1 ~ 8
DL - BIT	Data link Bit
DM	Degraded Minutes
DSPL	Display
DSPL MODE	Display mode
EFS	Error free seconds
ELAPS	elapsed results
ERR RTO	Error ratio
ERR - INS	Error insert
ES	Errored seconds
EXT INPUT	External input
EXT	External
EXT	External clock

EXT INTERFACE	External clock interface
EXT1 8k	External clock 8kHz
EXT2 64k+8k	External clock 64kHz+8kHz
F-NG	Frame bit not good
FOX	FOX pattern
FREQ	Frequency
FREQE	Frequency
FSL	Frame sync loss
FSL (sec)	Frame sync loss sesconds
H→L (L→H)	High → Low (Low → High)
HDB3	High density bipolar with three zero substitution
I	Indication
I-RVRS	Invert reverse
INT	Internal clock
INT FREQ SOURCE	Internal frequency source
MEAS	Measure / Measurement
MEM1 ~ MEM10	Preset Memory No. 1 ~ No. 10
N-RVRS	Normal reverse
No-sup	No suppression
PERIOD	Periodic results
PRBS	Pseudo-random bit sequence
PRGM	Program pattern
PRINT-I	Print (interval)

PRINT - P	Print (periodic)
PSL count	PRBS pattern sync loss count
PSL (sec)	PRBS pattern sync loss seconds
PSL CNT	PRBS pattern sync loss count
PSL - THR	PRBS pattern sync loss threshold
PWL (sec)	Power loss seconds
R	Receive
R - clock	Receive clock
RCL	Recall
RCL	Receive clock loss
RD	Receive data
RD 8k	Receive data - 8k
RECV	Receive
RT	Receive timing
S	Signal element timing
SA	Send alarm
SAV	Save
SD	Send data
SES	Severely Errored Seconds
SFP (G.734 - 1)	Short frame pattern (G.734 - 1)
SFP (G.734 - 2)	Short frame pattern (G.734 - 2)
SGL	Signal loss
SGL (sec)	Signal loss seconds
SLIP-SEC	Clock Slip Second
SP BIT	Spare Bits
ST	Send timing
ST / SP	Start / stop

T	Transmit
THROU	Through
TS16 FRAME0. xyxx	Time slot 16 channel frame 0 xyxx pattern
TYPE OF - INT - F	Type of interface
US	Unavailable seconds
XA	X. 50 send alarm
XL	X. 50 frame sync loss
XL (sec)	X. 50 frame sync loss seconds
Z (1)	all '1s' pattern
ZERO - 14	14 zero - suppression
ZERO - 7	7 zero - suppression

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