ANALOG output module

OM-593

User's Manual

Ver.1.01

ANALOG output module

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User's Manual

2005.10

Ver.1.01

ASTRODESIGN,Inc

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Introduction

Thank you for purchasing the OM-593 ANALOG output module.
This document describes the functions and operating method of the OM-593, as well as the precautions to observe when using it. Be sure to read this document before using the OM-593 since improper use may result in accidents.
After reading, please retain this document in a safe place for future reference.

Safety Precautions

⚠ Warning

Avoid contact with foreign substances

- **Do not spill liquid or drop a flammable substance or metal inside the module. Usage under such conditions may result in fire, electrical shock, or malfunction.**

Do not disassemble

- **Do not attempt to disassemble this module. To avoid the risk of electrical shock or injury to the user, or malfunction of the module, do not open the case or remove/reinstall the internal board.**

⚠ Caution

Handling of the module

- **The module consists of precision components ; handle it with extreme care.**
- **To avoid the risk of electrical shock, injury, or breakdown, do not remove or add a module while the power is on.**
- **When removing the module, be careful to avoid brushing your hand against the connectors.**

Avoid mechanical shock and impact

- **The module is a precision instrument that may be damaged by mechanical shock and impact. Be extremely careful when transporting the module.**
- **Do not drop the module.**

In case of an abnormality or malfunction

- **If an abnormality or malfunction occurs, unplug the power cord and then contact your local dealer or the ASTRODESIGN sales group.**

Concerning the use of this unit

Notice: Concerning copyrights

- **The copying or reproduction in any way of copyrighted materials for purposes other than personal use without the written consent of the holders of the copyrights for the materials and other holders of rights is prohibited by copyright laws and by the stipulations of international treaties. Astrodesign disclaims all liability in the event that this product is used in a manner which fails to observe the above-stated notice concerning copyrights.**

1 Edition revision history

Ver.	Date	Page	Item no.	Description
1.00	2005/08/15			Initial edition
1.01	2005/08/29	4	2.2	Limitations due to the specifications (2) Addition made to description of lock range
		5	3.1	Errors in OM-593 rear panel view and parts names corrected.

2 About the OM-593

2.1 Overview

- The OM-593 is an ANALOG output module that can be installed in the SC-2055 Series (2 inputs, 2 outputs).
- This unit supports HS/VS input and CS input signals for the external reference signals. (75-ohm termination fixed, no through-out facility)
- TTL level H/V and binary CS signals with a 0.3 Vp-p level (or 0.6 Vp-p for tri-level CS signals) are output as the output sync signals, and the same output connector is shared by the HS and CS signals.

2.2 Limitations to the specifications

The SC-2055 has certain limitations, which when exceeded may cause the image of the output video signal to appear distorted.

Because there are also some limitations to the functionality, please take appropriate precautions when using the device.

(1) External Sync Signal

If the external sync signal that is input does not contain a serration pulse, a correct lock will not be achieved, even if the front LED indicates a locked state. If a signal of poor quality, such as from a VTR, is input, a correct lock may not be achieved in some cases.

When 1/2H serration pulses are present in progressive timing signals, locking operations may not be possible depending on the horizontal frequency (75 kHz and up).
Since the signals supplied as the external sync signals are analog signals, an error equivalent to several dots may occur in the output phase with respect to the external sync signals although this will depend on the signals which are input.
If the phase difference between the HSYNC and VSYNC signals which are input is great, the unit may not be able to track the input timing signals, the image on the output screen may be disturbed and the unit may not operate properly in other ways.

(2) Limitation on locking operations

Locking operations cannot be performed if the horizontal total width of the output timing signals is greater than 4096.

(3) Lock Range

If the ratio between the input and output vertical frequencies is 1:1, 1:2, 2:5 or 4:5, frame locking operations can be performed. Bear in mind that a phase difference of several H will occur each time a locking operation is undertaken. (This difference can be eliminated by adjusting the locking phase.)
Depending on the timing signals, it may not be possible for the unit to perform locking operations even when the ratio between the input and output vertical frequencies is in the locking range.

3 Names and Functions of Individual Components

3.1 OM-593 rear panel view and component names

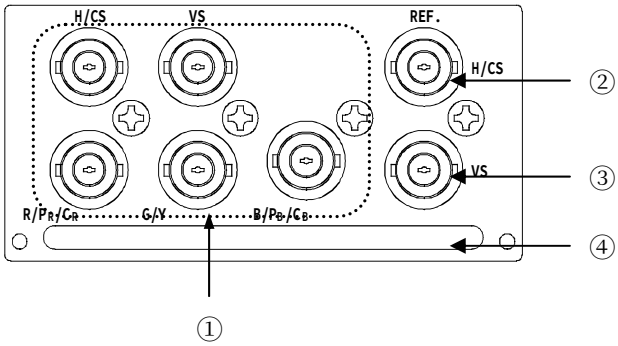


Fig. 3.1 OM-593 Rear Panel View

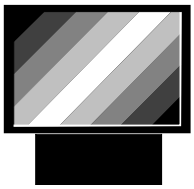
Table 3.1 Names of Rear Panel Components

No.	Name of part		Description
①	ANALOG Output connectors		These are the analog output connectors (BNC connectors).
		R/Pr/Cr	BNC connector for R/Pr/Cr image output (75-ohm termination fixed)
		G/Y	BNC connector for G/Y image output (75-ohm termination fixed) Use this channel as the reference for OnSYNC.
		B/Pb/Cb	BNC connector for B/Pb/Cb image output (75-ohm termination fixed)
		HS/CS	BNC connector for HS/CS sync output; the CS signal, or the HS signal when separate H and V signals are input, is output from here.
		VS	BNC connector for VS sync output; the VS signal is output from here when separate H and V signals are input.
②	HS/CS input connector		This is the HS/CS sync signal input connector (BNC connector).
③	VS input connector		This is the VS sync signal input connector (BNC connector)
④	Handle		This is used when plugging in or unplugging the modules.

4 Connecting the Module

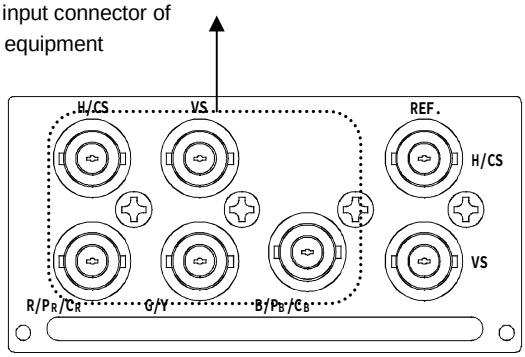
4.1 Connecting the output signal

As shown in the figure, appropriately connect the SD-SDI output signal from the OM-593's SD-SDI output connector to the input of a peripheral device.



Projector

To analog input connector of peripheral equipment



5 Adjustments and Settings

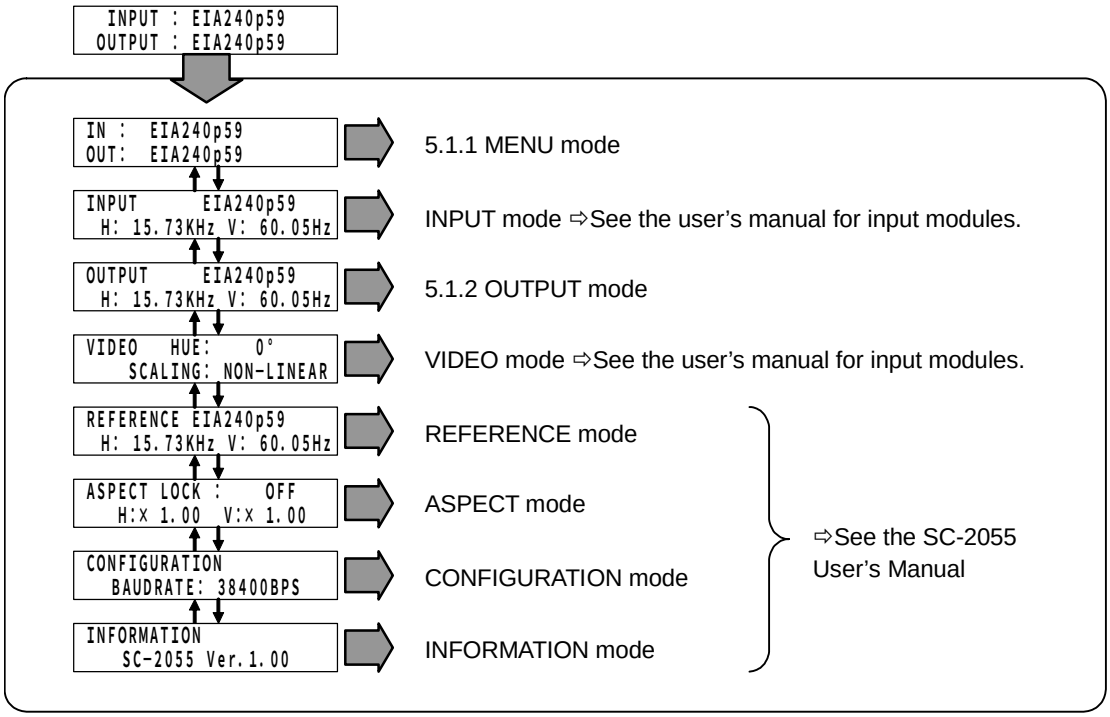
5.1 Menu structure

From the default screen, push the rotary encoder to enter the menu structure described below.
For the operation method, see the SC-2055 User's Manual.

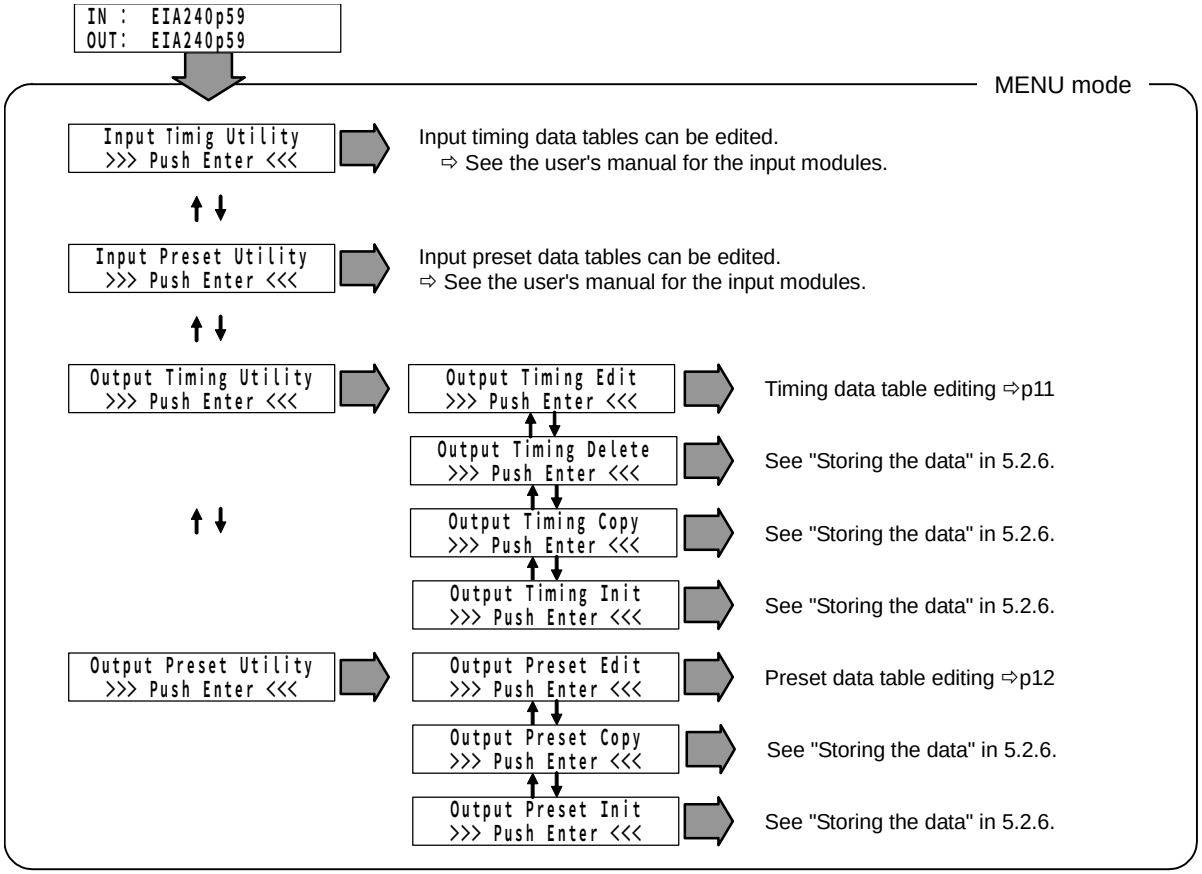
Symbols are defined below.

⇩ ⇨	PUSH operation
↑ ↓	Rotate operation

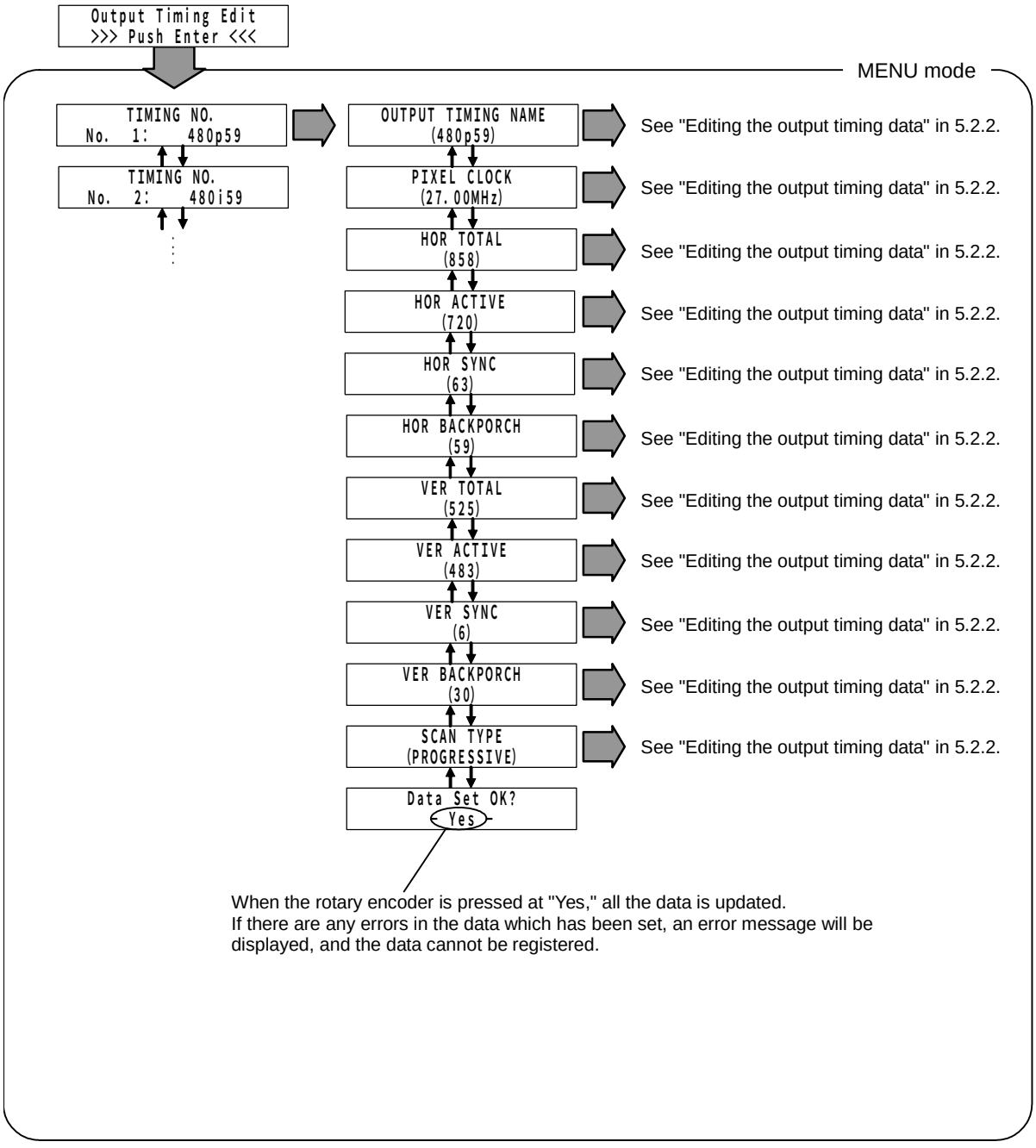
Default screen



5.1.1 MENU mode

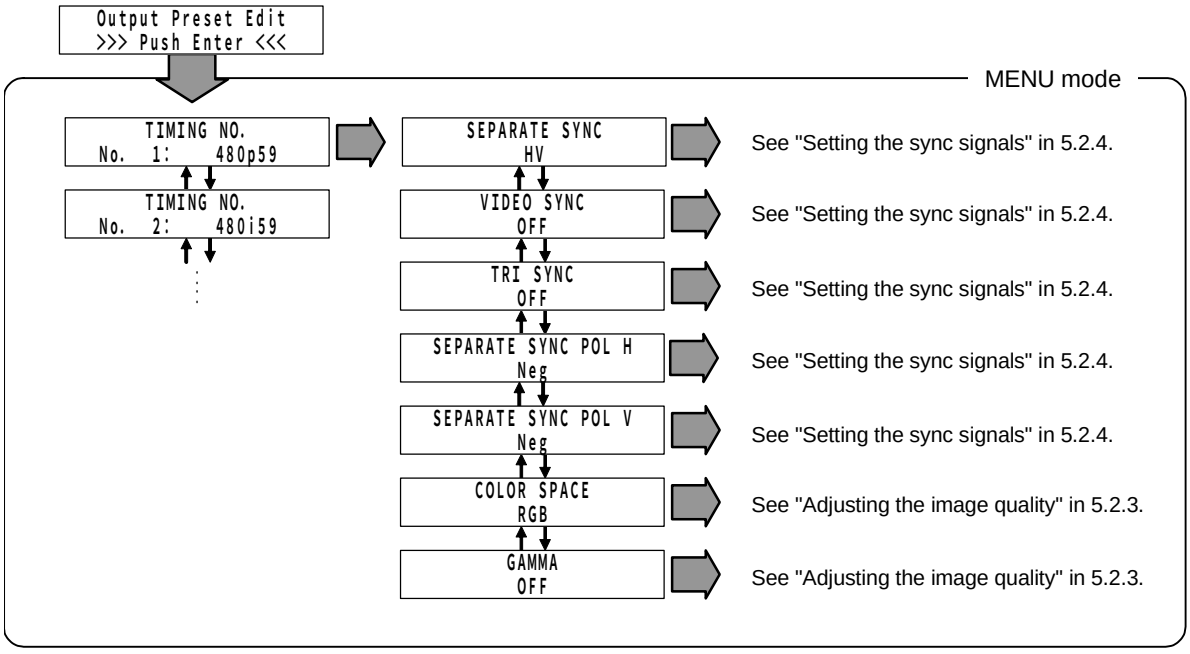


Timing data table editing



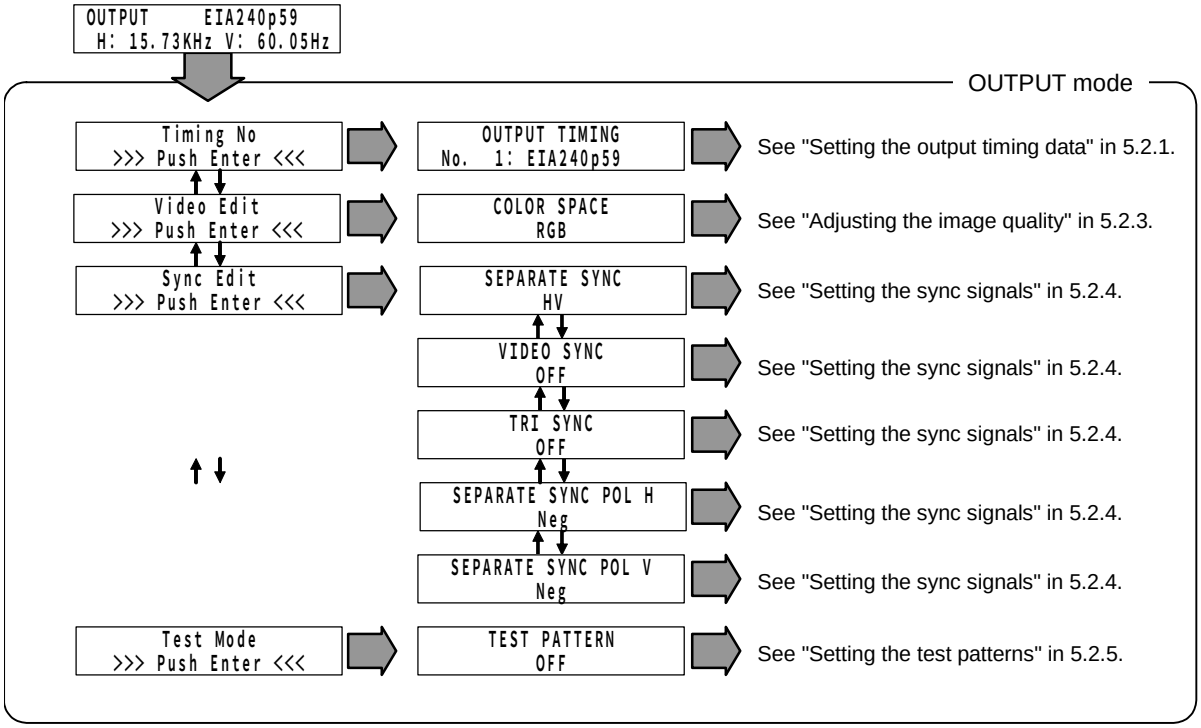
When the rotary encoder is pressed at "Yes," all the data is updated.
If there are any errors in the data which has been set, an error message will be displayed, and the data cannot be registered.

Preset data table editing



5.1.2 OUTPUT mode

The default screen of the OUTPUT mode displays the selected output timing.



5.2 Setting parameters

5.2.1 Setting the output timing

Sets the output timing.

Parameter	Description	Setting Value	Comments
OUTPUT TIMING	Output timing data	Timing data name *1 SLAVE *2	This parameter is used to select the output timing data.

*1:The number of timing data names which can be selected differs depending on the type of output module installed.

*2:When SLAVE is set, the same timing data as the timing data output by the other output channel is output. SLAVE can be selected only when modules have been installed in both output channels. SLAVE cannot be set for both channels at once.

5.2.2 Editing the output timing data

The parameters in this section are used to edit the output timing data which has been selected. However, the standard timing data cannot be edited. If data cannot be edited, its setting is enclosed in parentheses.

Setting item	Setting description	Setting value	Remarks
OUTPUT TIMING NAME	Output timing data name	14 characters	This parameter is used to display the name of the selected output timing data.
PIXEL CLOCK	Pixel clock	13.50 - 165.00 (in 10 kHz increments)	This parameter is used to adjust the pixel clock.
HOR TOTAL	Horizontal total width	512 - 4608 (in 1-dot increments)	This parameter is used to adjust the brightness so that it is made uniform throughout if light and dark vertical stripes have appeared on the screen. *1
HOR SYNC	Horizontal sync width	16 - 1024 (in 1-dot increments)	This parameter is used to adjust the sync width when the image is shifted horizontally on the display. *1
HOR BACKPORCH	Horizontal back porch	0 - 2048 (in 1-dot increments)	This parameter is used to adjust the back porch when the image is shifted horizontally on the display. *1
HOR ACTIVE	Horizontal active width	256 - 2560 (in 1-dot increments)	This parameter is used to adjust the horizontal display period (size). *1
VER TOTAL	Vertical total width	256 - 2560 (in 1-line increments)	This parameter is used to adjust the brightness so that it is made uniform throughout if light and dark vertical stripes have appeared on the screen. *2
VER SYNC	Vertical sync width	1 - 64 (in 1-line increments)	This parameter is used to adjust the sync width when the image is shifted vertically on the display.
VER BACKPORCH	Vertical back porch	0 - 1024 (in 1-line increments)	This parameter is used to adjust the back porch when the image is shifted vertically on the display.
VER ACTIVE	Vertical active width	128 - 1580 (in 1-line increments)	This parameter is used to adjust the vertical display period (size).
SCAN TYPE	Scanning system	PROGRESSIVE/ INTERLACE/ SEGMENTFRAME	This parameter is used to select the scanning system.

*1: Set this parameter in 2-dot increments if the output pixel clock frequency is higher than 74.25 MHz.

*2: Set this parameter in odd-numbered increments when the interlace system is used.

5.2.3 Adjusting the image quality

Adjusts the image quality and sets parameters related to the video display.

Parameter	Description	Setting Value	Comments
COLOR SPACE	Color space setting	RGB/SDTV/HDTV/ HDTV1035	This parameter is used to set the color space system.
GAMMA	Gamma	OFF/ USER1/USER2	This parameter is used to set the gamma mode.

5.2.4 Setting the sync signals

The parameters in this section are used to set the sync signals.

Parameter	Description	Setting Value	Comments
SEPARATE SYNC	Output sync setting	OFF/CS/HV	This parameter is used to set the output sync signal.
VIDEO SYNC	Output video sync setting	OFF/G/RGB	This parameter is used to set the output video sync signal.
TRI SYNC	Output tri-level sync setting	OFF/ON	This parameter is used to set the output tri-level sync signal. *1
SEPARATE SYNC POL H	Output sync polarity setting	Neg/Pos	This parameter is used to set the polarity of the horizontal output sync signal.
SEPARATE SYNC POL V	Output sync polarity setting	Neg/Pos	This parameter is used to set the polarity of the vertical output sync signal.

*1: This parameter can be set only for the HDTV timing data registered as the defaults.

5.2.5 Setting the test pattern

Outputs a test pattern. Use this function for adjusting the display device.

Parameter	Description	Comments
TEST PATTERN	OFF	Normal screen display
	BRIGHT	Step-up pattern with black as the reference
	CONTRAST	Step-down pattern with white as the reference
	HUE&COLOR	Color signal RGB pattern in which the white level is attenuated to 75% and the black level is attenuated to 25%
	COLORBAR	100% colorbar display
	CROSSHATCH	1 dot, 1 line crosshatch pattern
	BURST	White/ black horizontal 1-dot repeated pattern
	FRAME	Frame display for the full video display interval
	WHITE	Displays WHITE on the entire screen
	RED	Displays RED on the entire screen
	GREEN	Displays GREEN on the entire screen
	BLUE	Displays BLUE on the entire screen

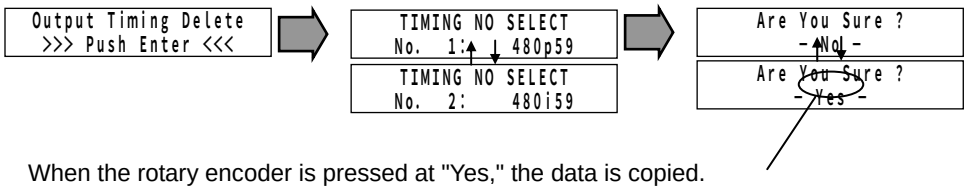
5.2.6 Storing the data

The parameters in this section enable data to be copied, initialized or deleted.

Parameter	Description	Comments
Output Timing Delete	Timing data deletion	This parameter is used to delete the output timing data. However, output timing data or the timing data specified as the external reference sync timing data cannot be deleted.
Output Timing Copy	Timing data copying	This parameter is used to copy output timing data into empty tables. Data cannot be copied if it involves overwriting already existing data in a table.
Output Timing Init	Timing data initialization	This parameter is used to initialize the output timing data to the factory data.

Example: Deleting timing data

Select deletion menu.→ Select timing data to be deleted.→ Confirm and enter.



When the rotary encoder is pressed at "Yes," the data is copied.

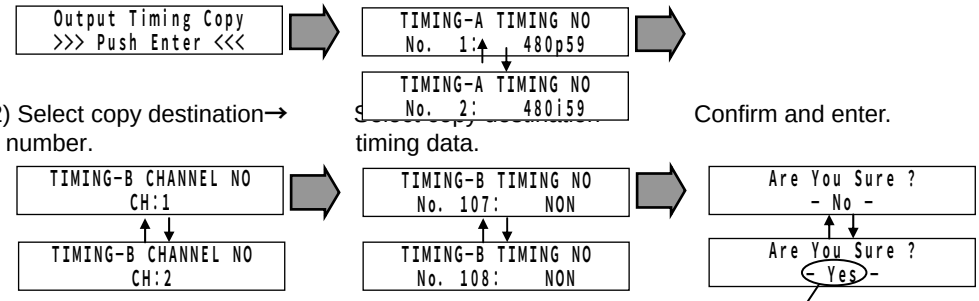
⇨ See "MENU mode" in 5.1.1 on page 10.

Example: Copying timing data

In this example, the TIMING-A timing data is copied to the TIMING-B timing data.

(1) Select copy menu.→ Select copy source timing data.

(2) Select copy destination channel number.→ Select copy destination timing data.→ Confirm and enter.



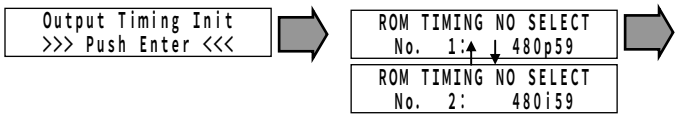
When the rotary encoder is pressed at "Yes," the data is copied.

⇨ See "MENU mode" in 5.1.1 on page 10.

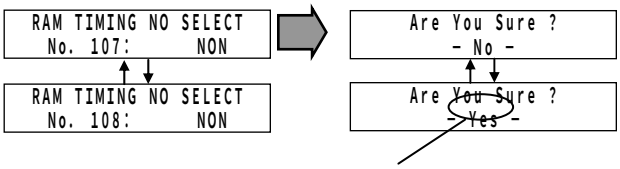
Example: Initializing timing data

In this example, the RAM timing data is initialized by the ROM timing data.

(1) Select initialization menu→ Select factory timing data.



(2) Select operation timing data.→ Confirm and enter.

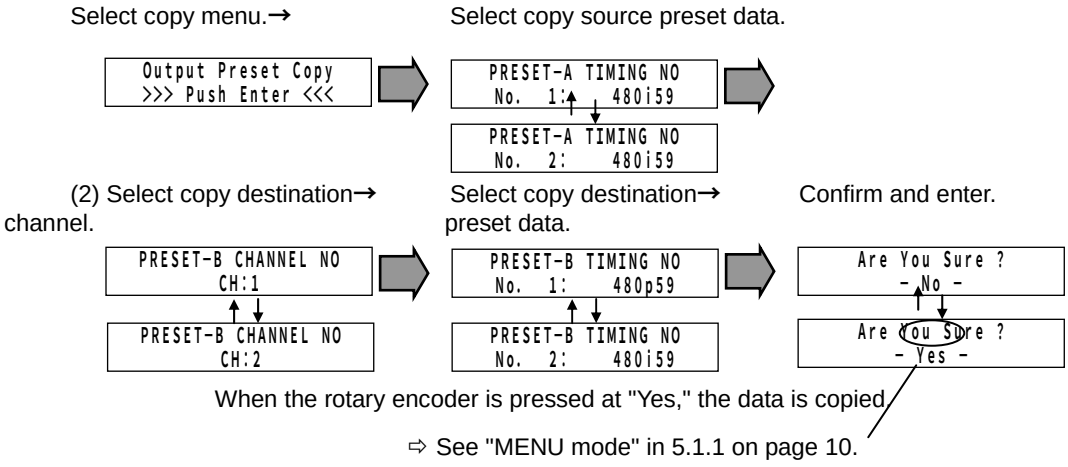


When the rotary encoder is pressed at "Yes," the data is initialized.

⇨ See "MENU mode" in 5.1.1 on page 10.

Parameter	Description	Comments
Output Preset Copy	Preset data copy	This parameter is used to copy preset data into empty tables. Data cannot be copied if it involves overwriting already existing data in a table.
Output Preset Init	Preset data initialization	This parameter is used to initialize the preset data to the factory data.

Example: Copying preset data



When the rotary encoder is pressed at "Yes," the data is copied.

⇨ See "MENU mode" in 5.1.1 on page 10.

6 Timing Table List

6.1 Output reference timing data table

No	Format	Clock (MHz)	Htotal (dot)	Hactive (dot)	Hsync (dot)	Hbp (dot)	Vtotal (line)	Vactive (line)	Vsync (line)	Vbp (line)	Scan
1	480p59	27.00	858	720	63	59	525	483	6	30	Progressive
2	480i59	13.50	858	720	63	59	525	483	6	30	Interlace
3	576p50	27.00	864	720	63	69	625	576	5	39	Progressive
4	576i50	13.50	864	720	63	69	625	576	5	39	Interlace
5	720p23	74.18	4125	1280	40	260	750	720	5	20	Progressive
6	720p24	74.25	4125	1280	40	260	750	720	5	20	Progressive
7	720p25	74.25	3960	1280	40	260	750	720	5	20	Progressive
8	720p29	74.18	3300	1280	40	260	750	720	5	20	Progressive
9	720p30	74.25	3300	1280	40	260	750	720	5	20	Progressive
10	720p50	74.25	1980	1280	40	260	750	720	5	20	Progressive
11	720p59	74.18	1650	1280	40	260	750	720	5	20	Progressive
12	720p60	74.25	1650	1280	40	260	750	720	5	20	Progressive
13	1035i59	74.18	2200	1920	44	192	1125	1035	10	69	Interlace
14	1035i60	74.25	2200	1920	44	192	1125	1035	10	69	Interlace
15	1080p23	74.18	2750	1920	44	192	1125	1080	5	36	Progressive
16	1080sF23	74.18	2750	1920	44	192	1125	1080	10	30	Progressive(sF)
17	1080p24	74.25	2750	1920	44	192	1125	1080	5	36	Progressive
18	1080sF24	74.25	2750	1920	44	192	1125	1080	10	30	Progressive(sF)
19	1080p25	74.25	2640	1920	44	192	1125	1080	5	36	Progressive
20	1080sF25	74.25	2640	1920	44	192	1125	1080	10	30	Progressive(sF)
21	1080p29	74.18	2200	1920	44	192	1125	1080	5	36	Progressive
22	1080sF29	74.18	2200	1920	44	192	1125	1080	10	30	Progressive(sF)
23	1080p30	74.25	2200	1920	44	192	1125	1080	5	36	Progressive
24	1080sF30	74.25	2200	1920	44	192	1125	1080	10	30	Progressive(sF)
25	1080p50	148.50	2640	1920	44	192	1125	1080	5	36	Progressive
26	1080i50	74.25	2640	1920	44	192	1125	1080	10	30	Interlace
27	1080p59	148.35	2200	1920	44	192	1125	1080	5	36	Progressive
28	1080i59	74.18	2200	1920	44	192	1125	1080	10	30	Interlace
29	1080p60	148.50	2200	1920	44	192	1125	1080	5	36	Progressive
30	1080i60	74.25	2200	1920	44	192	1125	1080	10	30	Interlace
31	EIA240p59	13.50	858	720	62	57	262	240	3	15	Progressive
32	EIA240p59A	13.50	858	720	62	57	263	240	3	15	Progressive
33	EIA240pW59	13.50	858	720	62	57	262	240	3	15	Progressive
34	EIA240pW59A	13.50	858	720	62	57	263	240	3	15	Progressive
35	EIA240p60	13.51	858	720	62	57	262	240	3	15	Progressive
36	EIA240p60A	13.51	858	720	62	57	263	240	3	15	Progressive
37	EIA240pW60	13.51	858	720	62	57	262	240	3	15	Progressive
38	EIA240pW60A	13.51	858	720	62	57	263	240	3	15	Progressive
39	EIA288p50	13.50	864	720	63	69	312	288	3	19	Progressive
40	EIA288p50A	13.50	864	720	63	69	313	288	3	19	Progressive

No	Format	Clock (MHz)	Htotal (dot)	Hactive (dot)	Hsync (dot)	Hbp (dot)	Vtotal (line)	Vactive (line)	Vsync (line)	Vbp (line)	Scan
41	EIA288p50B	13.50	864	720	63	69	314	288	3	19	Progressive
42	EIA288pW50	13.50	864	720	63	69	312	288	3	19	Progressive
43	EIA288pW50A	13.50	864	720	63	69	313	288	3	19	Progressive
44	EIA288pW50B	13.50	864	720	63	69	314	288	3	19	Progressive
45	EIA480p59	27.00	858	720	62	60	525	480	6	30	Progressive
46	EIA480p59A	25.17	800	640	96	48	525	480	2	33	Progressive
47	EIA480pW59	27.00	858	720	62	60	525	480	6	30	Progressive
48	EIA480i59	13.50	858	720	62	57	525	480	6	30	Interlace
49	EIA480iW59	13.50	858	720	62	57	525	480	6	30	Interlace
50	EIA480p60	27.02	858	720	62	60	525	480	6	30	Progressive
51	EIA480p60A	25.20	800	640	96	48	525	480	2	33	Progressive
52	EIA480pW60	27.02	858	720	62	60	525	480	6	30	Progressive
53	EIA480i60	13.51	858	720	62	57	525	480	6	30	Interlace
54	EIA480iW60	13.51	858	720	62	57	525	480	6	30	Interlace
55	EIA576p50	27.00	864	720	64	68	625	576	5	39	Progressive
56	EIA576pW50	27.00	864	720	64	68	625	576	5	39	Progressive
57	EIA576i50	13.50	864	720	63	69	625	576	5	39	Interlace
58	EIA576iW50	13.50	864	720	63	69	625	576	5	39	Interlace
59	EIA720p50	74.25	1980	1280	40	220	750	720	5	20	Progressive
60	EIA720p59	74.17	1650	1280	40	220	750	720	5	20	Progressive
61	EIA720p60	74.25	1650	1280	40	220	750	720	5	20	Progressive
62	EIA1080p23	74.17	2750	1920	44	148	1125	1080	5	36	Progressive
63	EIA1080p24	74.25	2750	1920	44	148	1125	1080	5	36	Progressive
64	EIA1080p25	74.25	2640	1920	44	148	1125	1080	5	36	Progressive
65	EIA1080p29	74.17	2200	1920	44	148	1125	1080	5	36	Progressive
66	EIA1080p30	74.25	2200	1920	44	148	1125	1080	5	36	Progressive
67	EIA1080p50	148.50	2640	1920	44	148	1125	1080	5	36	Progressive
68	EIA1080i50	74.25	2640	1920	44	148	1125	1080	10	30	Interlace
69	EIA1080p59	148.35	2200	1920	44	148	1125	1080	5	36	Progressive
70	EIA1080i59	74.17	2200	1920	44	148	1125	1080	10	30	Interlace
71	EIA1080p60	148.50	2200	1920	44	148	1125	1080	5	36	Progressive
72	EIA1080i60	74.25	2200	1920	44	148	1125	1080	10	30	Interlace
73	VESA350p85	31.50	832	640	64	96	445	350	3	60	Progressive
74	VESA400p85	31.50	832	640	64	96	445	400	3	41	Progressive
75	VESA400p85A	35.50	936	720	72	108	446	400	3	42	Progressive
76	VESA480p60	25.17	800	640	96	48	525	480	2	33	Progressive
77	VESA480p60A	33.75	1088	848	112	112	517	480	8	23	Progressive
78	VESA480p72	31.50	832	640	40	128	520	480	3	28	Progressive
79	VESA480p75	31.50	840	640	64	120	500	480	3	16	Progressive
80	VESA480p85	36.00	832	640	56	80	509	480	3	25	Progressive
81	VESA600p56	36.00	1024	800	72	128	625	600	2	22	Progressive
82	VESA600p60	40.00	1056	800	128	88	628	600	4	23	Progressive
83	VESA600p72	50.00	1040	800	120	64	666	600	6	23	Progressive
84	VESA600p75	49.50	1056	800	80	160	625	600	3	21	Progressive
85	VESA600p85	56.25	1048	800	64	152	631	600	3	27	Progressive
86	VESA768i43	44.90	1264	1024	176	56	817	768	4	20	Interlace

No	Format	Clock (MHz)	Htotal (dot)	Hactive (dot)	Hsync (dot)	Hbp (dot)	Vtotal (line)	Vactive (line)	Vsync (line)	Vbp (line)	Scan
87	VESA768p60	65.00	1344	1024	136	160	806	768	6	29	Progressive
88	VESA768p70	75.00	1328	1024	136	144	806	768	6	29	Progressive
89	VESA768p75	78.75	1312	1024	96	176	800	768	3	28	Progressive
90	VESA768p85	94.50	1376	1024	96	208	808	768	3	36	Progressive
91	VESA768pW60	68.25	1440	1280	32	80	790	768	7	12	Progressive
92	VESA768pW60A	79.50	1664	1280	128	192	798	768	7	20	Progressive
93	VESA768pW60B	85.50	1792	1360	112	256	795	768	6	18	Progressive
94	VESA768pW75	102.25	1696	1280	128	208	805	768	7	27	Progressive
95	VESA768pW85	117.50	1712	1280	136	216	809	768	7	31	Progressive
96	VESA864p75	108.00	1600	1152	128	256	900	864	3	32	Progressive
97	VESA960p60	108.00	1800	1280	112	312	1000	960	3	36	Progressive
98	VESA960p85	148.50	1728	1280	160	224	1011	960	3	47	Progressive
99	VESA1024p60	108.00	1688	1280	112	248	1066	1024	3	38	Progressive
100	VESA1024p75	135.00	1688	1280	144	248	1066	1024	3	38	Progressive
101	VESA1024p85	157.50	1728	1280	160	224	1072	1024	3	44	Progressive
102	VESA1050p60	101.00	1560	1400	32	80	1080	1050	1	23	Progressive
103	VESA1050p60A	121.75	1864	1400	144	232	1089	1050	1	32	Progressive
104	VESA1050p75	156.00	1896	1400	144	248	1099	1050	1	42	Progressive
105	VESA1200p60	162.00	2160	1600	192	304	1250	1200	3	46	Progressive
106	VESA1200p60A	154.00	2080	1920	32	80	1235	1200	6	26	Progressive

7 Main Specifications

7.1 Specifications

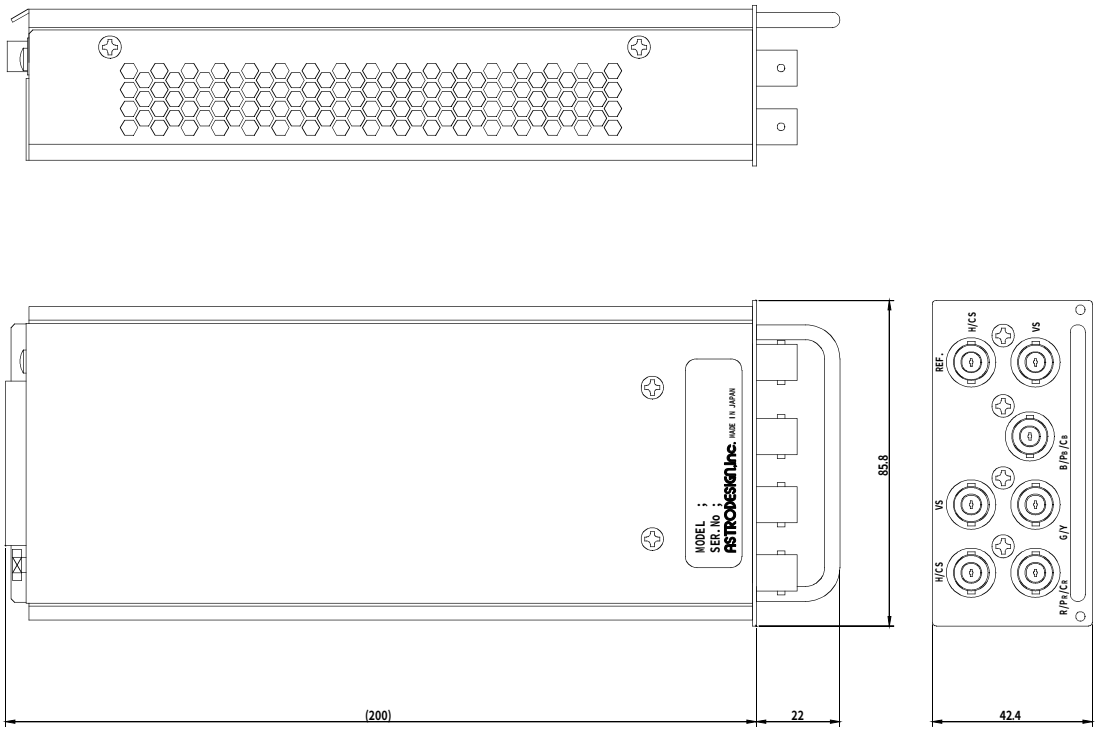
Table 7.1 OM-593 Specifications

Item		Specifications
Scanning system		Progressive, interlace
A/D conversion frequency		13.5 to 165 MHz (max. 74.25 MHz for interlace)
Horizontal frequency		15 to 150 kHz
Vertical frequency		24 to 150 Hz (differs depending on resolution of input/output)
Video signal	Color format	Analog RGB Analog YPbPr/YCbCr
	Image data resolution	10 bits
	Video level	0.7 Vp-p/75-ohm termination fixed for all signals (excluding sync signals)
	Number of pixels displayed	Max. 2560 x 1580
	Number of channels	1 system (BNC)
Sync signals	G(Y)-ON/OFF RGB(YPbPr)-ON/ OFF	Binary (0.3 Vp-p/75-ohm termination)/tri-level sync (±-0.3 Vp-p/75-ohm termination)
	CS	Binary (0.3 Vp-p/75-ohm termination)/tri-level sync (±-0.3 Vp-p/75-ohm termination)
	HS/VS	TTL level (negative polarity)
	Number of channels	1 system (BNC)
External sync signals	CS	Binary (0.3 Vp-p/75-ohm termination)/tri-level sync (±-0.3 Vp-p/75-ohm termination)
	HS/VS	TTL level (negative polarity/75-ohm termination)
	Number of input channels	1 system (BNC)
	Through-out	None

7.2 Accessory

User's Manual	1 copy

7.3 Outline drawing



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ASTRODESIGN, INC.

URL http://WWW.astrodesign.co.jp

First Sales Division
2-6-17 Haramachi, Meguro-ku, Tokyo, Japan 152-0011
Tel: (03) 5720-5838, Fax: (03) 5720-6353

Osaka Sales Office
1-18-27-1010 Higashi-Nakajima, Higashi-Yodogawa-ku,
Osaka, Japan 533-0033
Tel: (06) 6328-8558, Fax: (06) 6328-5058