Dual Link HD-SDI input module

IM-588

Instruction Manual

Ver.1.02

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Instruction Manual

2006.2

Ver.1.02

ASTRODESIGN,Inc

CONTENTS

INTRODUCTION

Thank you very much for purchasing this IM-588 Dual Link HD-SDI Input Module.

This manual contains details on the functions featured by the IM-588 and the procedures for operating this module as well as the checkpoints and precautions to be observed.

Since improper handling may result in malfunctioning, before using the IM-588, please read through these instructions to ensure that you will operate the module correctly.

After reading through the manual, keep it in a safe place for future reference.

SAFETY PRECAUTIONS

⚠ WARNING

Concerning foreign matter

- Do not spill liquids inside the module or drop inflammable objects or metal parts into it. Operating the module under these conditions may cause a fire, electric shocks and/or malfunctioning.

Concerning disassembly of the product

- Do not attempt to disassemble the module. Users run the risk of electric shocks or injury and of causing malfunctioning if they open the panels and plug or unplug the internal circuit boards themselves.

⚠CAUTION

Handling the module

- This module is composed of precision components. Take special care when handling it.
- Do not plug or unplug the module while the power is supplied to it. You run the risk of electric shocks or injury and of causing malfunctioning.
- Bear in mind that when removing the module, its connector may come into contact with your hands.

Concerning impact

- This is a precision instrument and, as such, subjecting it to impact may cause malfunctioning. Take special care when moving it.
- Do not drop the module.

If trouble or malfunctioning should occur

- In the unlikely event that trouble or malfunctioning should occur in the module, disconnect its power cord, and contact your dealer or an Astrodesign sales representative.

Concerning the use of this unit

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1 VERSION UPDATE HISTORY

Ver.	Date	Page	Section No.	Details of version update
1.00	2005/10/19			Initial version
1.01	2005/12/18	4	2.2	"(2) Concerning Dual Link 4:4:4 input" added to "Restrictions imposed by the specifications."
				New menus supported SC-2055A supported
1.02	2006/01/13			Final page changed
		19	5.2.4	In "Pull-down mode settings," timing systems which can be set listed.

2 CONCERNING THE IM-588

2.1 Introduction

- The IM-588 is a Dual Link HD-SDI input module which is incorporated into the model SC-2055A super scan converter (equipped with 2 inputs and 2 outputs).
- It comes with one Dual Link HD-SDI input channel and one monitor OUT output channel.
- The module receives the serial digital signals complying with the SMPTE-292M and SMPTE-372M standards.

2.2 Restrictions imposed by the specifications

(1) Concerning incorporation into the SC-2055 and SC-2055A

The IM-588 cannot be used in the SC-2055. It can be used only in the SC-2055A.

SUPPLEMENTARY NOTE	**How to identify SC-2055 and SC-2055A** **A super scan converter is identified by its product name which is displayed on the default screen in the Information mode.** ◀ [Information] SC-2055A Ver.3.00

(2) Concerning Dual Link 4:4:4 input

When Dual Link 4:4:4 is set as the input link mode and interlace/segment frame signals are input, the IM-588 performs the various processes after the signals have been cut back to YPBPR 4:2:2.

⇨ Refer to "5.2.1 Input link mode setting" on page ??.

(3) Concerning Dual Link 12-bit input

With 12-bit input, the lower 2 bits are rounded off, and processing is conducted using only 10 bits.

(4) 1080p50, p59 and p60 locking

When conducting locking operations with the input signals of the 1080p50, p59 or p60 system, the vertical phase of the input signals will be aligned with that of the output signals, but the sequence of the first field and second field may differ for the F flag under the SMPTE-372M standard upon each locking operation.

3 PARTS AND THEIR FUNCTIONS

3.1 IM-588 rear panel view and parts

Fig. 3.1 IM-588 rear panel view

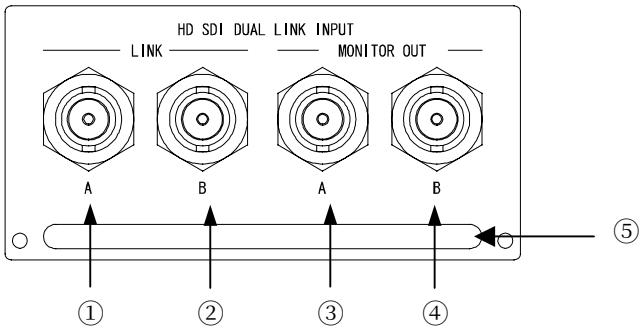


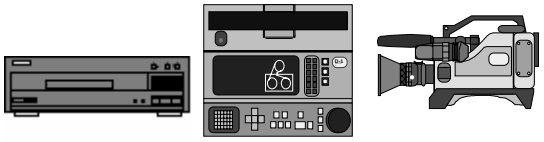
Table 3.1 Names of rear panel parts

No.	Name of part	Description
①	LINK A HD-SDI input connector	This is the HD-SDI input connector (BNC connector).
②	LINK B HD-SDI input connector	This is the HD-SDI input connector (BNC connector).
③	LINK A MONITOR output connector	This is the HD-SDI monitor output connector.
④	LINK B MONITOR output connector	This is the HD-SDI monitor output connector.
⑤	Handle	This is used when plugging in or unplugging the module.

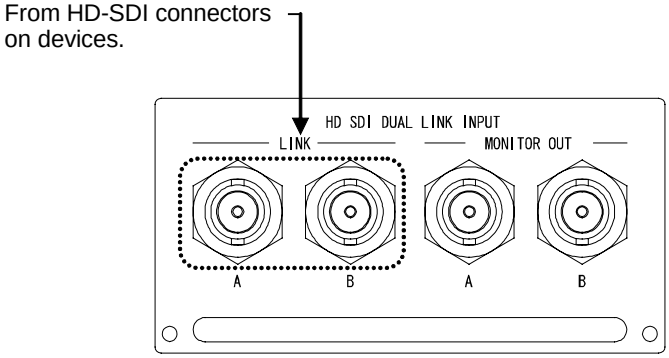
4 CONNECTIONS

4.1 Connecting the input signals

As shown in the figure below, connect the HD-SDI output signals from the VTR, DVD player or other device to the INPUT connectors on the IM-588.



DVD or LD player VTR Camera



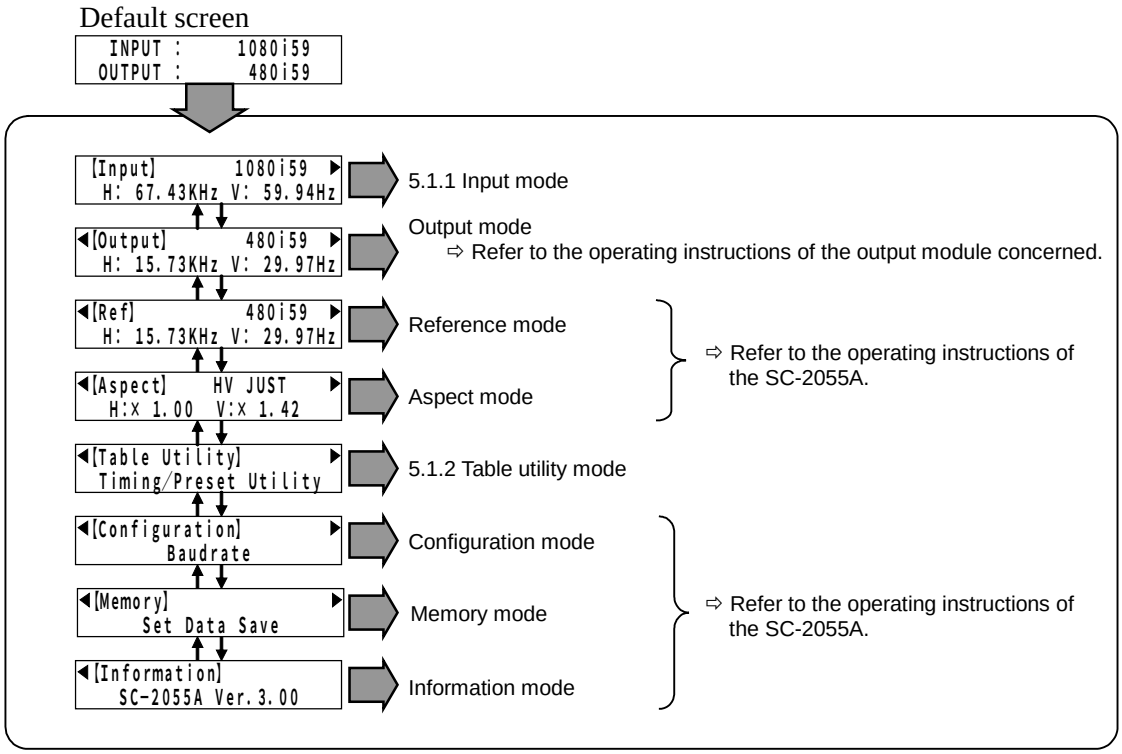
5 ADJUSTMENTS AND SETTINGS

5.1 Menu configuration

The menu is displayed in the configuration shown below by pushing the rotary encoder from the default screen. For details on the operation methods, refer to the operating instructions of the SC-2055A.

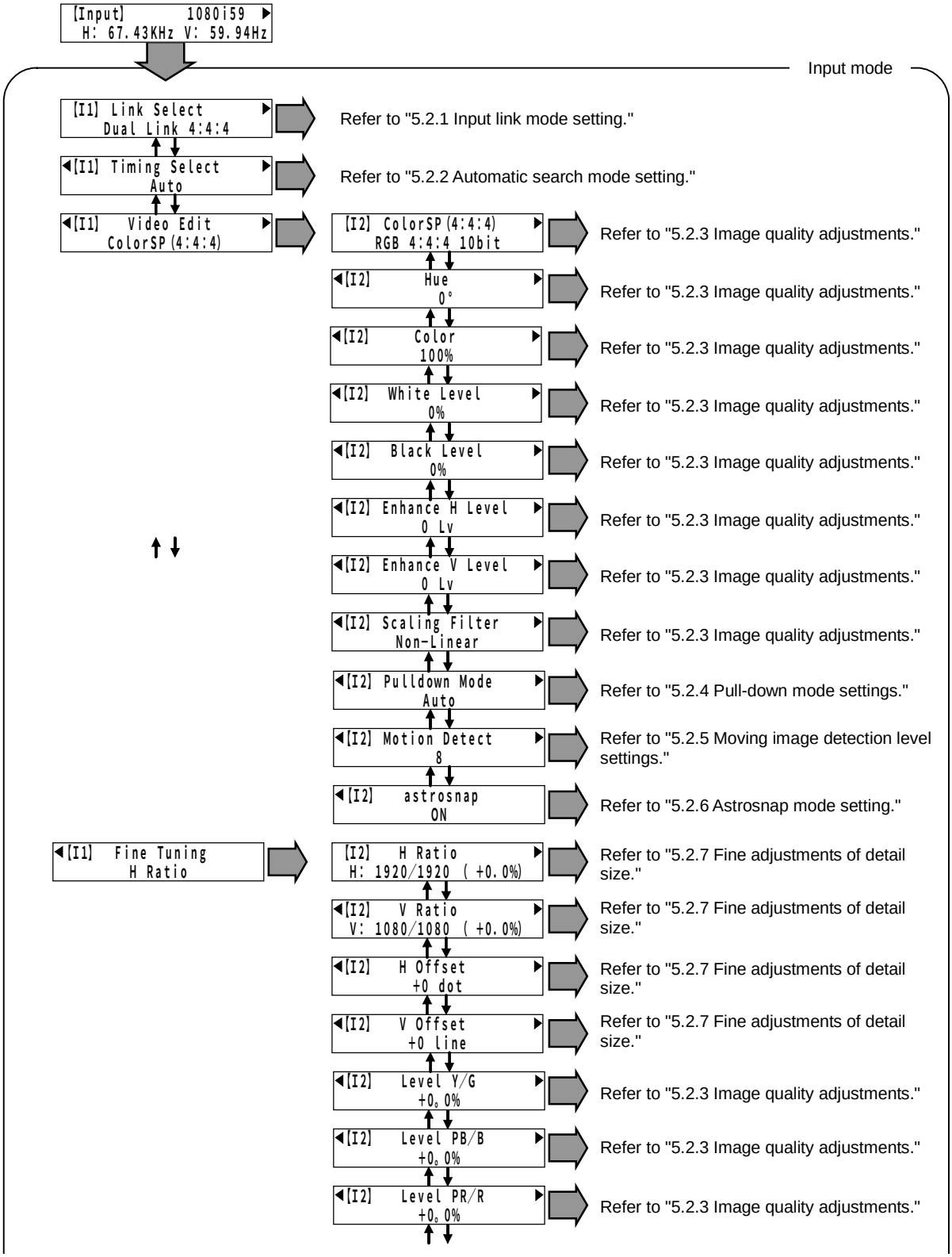
The symbols below signify the following.

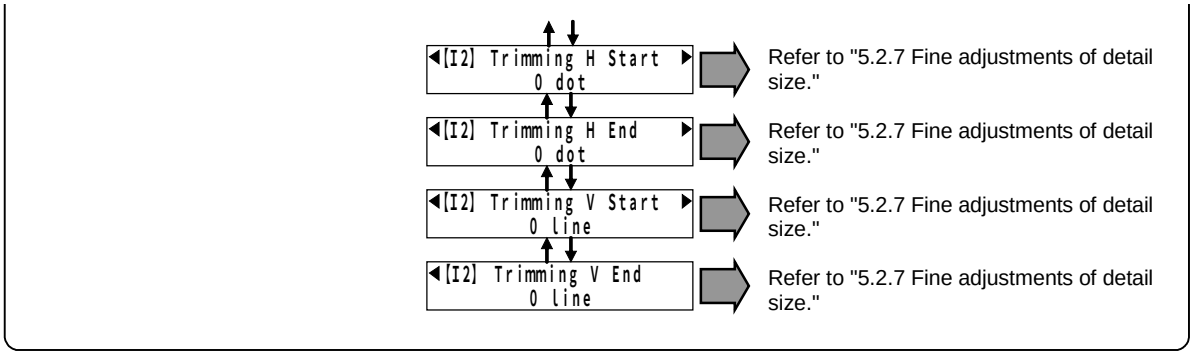
	Operations involving pushing the rotary encoder
	Operations involving turning the rotary encoder



5.1.1 Input mode

The selected input timing signals are displayed on the default screen of the input mode.

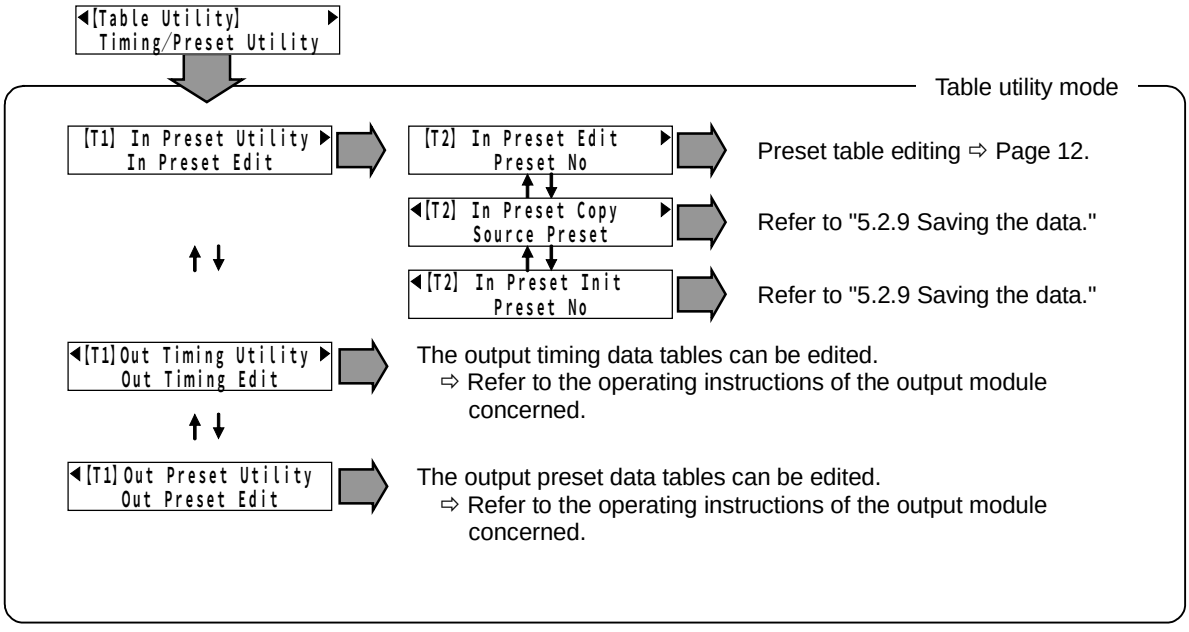




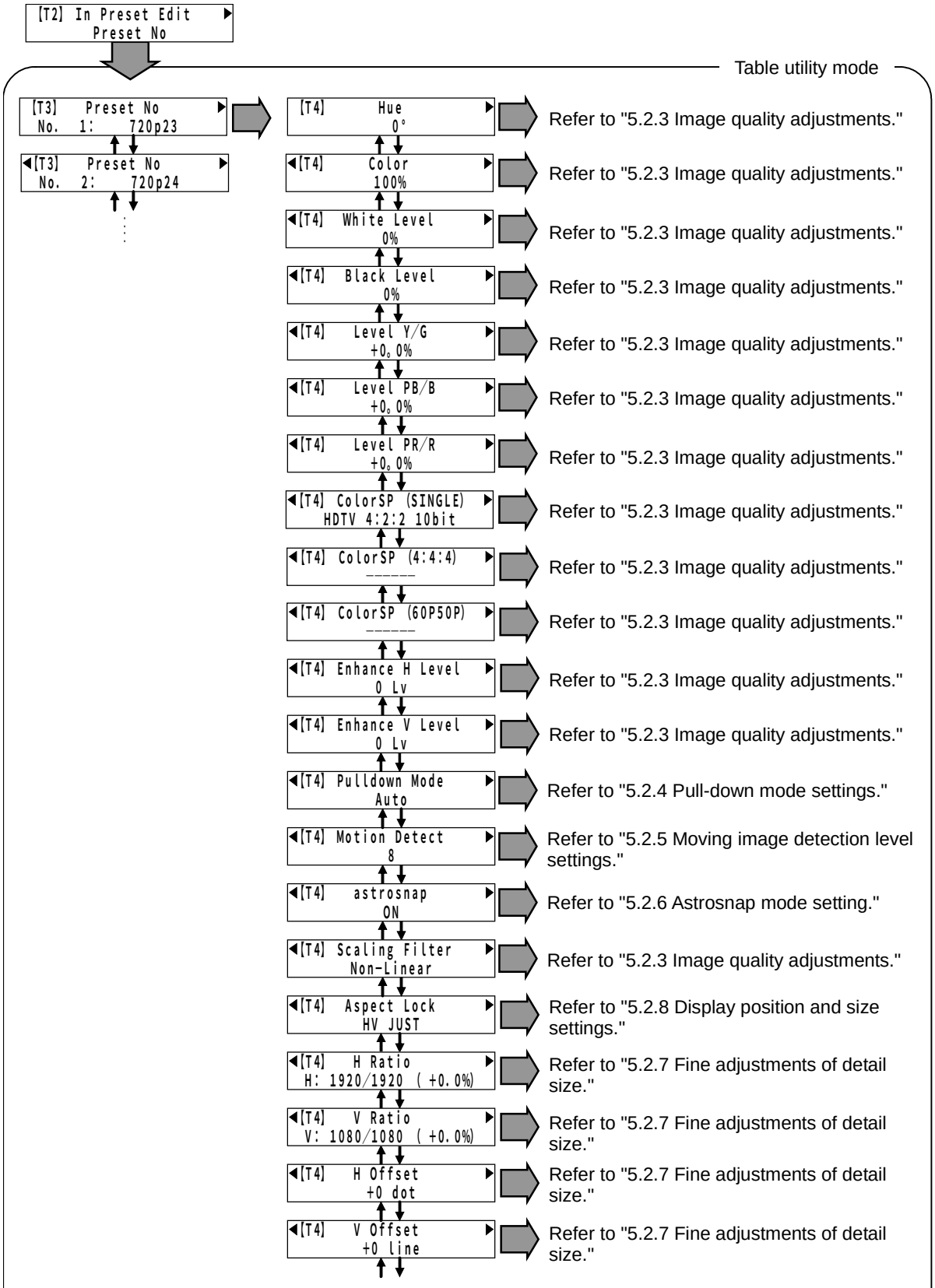
The ColorSP menu corresponding to the current input link mode is displayed for the ColorSP menu in Video Edit.

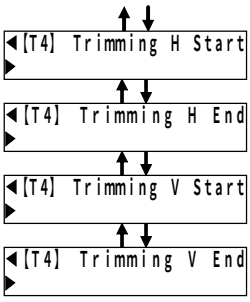
Example: When Single Link is the current input link mode, the ColorSP menu for Single Link is displayed, and the ColorSP menu for Dual Link 4:4:4 and for Dual Link 60P50P is not displayed.

5.1.2 Table utility mode



Preset table editing





Refer to "5.2.7 Fine adjustments of detail size."

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5.2 Setting items

5.2.1 Input link mode setting

The input link mode is set using the following item.

Setting item	Description of setting	Setting value	Remarks
Link Select	Input link mode	Single Link, Dual Link 4:4:4, Dual Link 60p50p	Sets the input link mode.

5.2.2 Automatic search mode setting

The input timing is set using the following item.

Setting item	Description of setting	Setting value	Remarks
Timing Select	Automatic search mode	Auto, timing system name *1	Sets the automatic search mode.

*1: The number of timing system names which can be selected differs depending on the input module type.

When the automatic search mode is fixed to a specific timing system, the input timing system which can be selected differs depending on the input link mode.

In the table below, "○" denotes an input timing system which can be selected and "×" denotes one which cannot be selected.

Input timing system		Input link mode		
		Single Link	Dual Link 4:4:4	Dual Link 60p50p
1	720p23	○	×	×
2	720p24	○	×	×
3	720p25	○	×	×
4	720p29	○	×	×
5	720p30	○	×	×
6	720p50	○	×	×
7	720p59	○	×	×
8	720p60	○	×	×
9	1080p23	○	○	○
10	1080p24	○	○	○
11	1080p25	○	○	○
12	1080p29	○	○	○
13	1080p30	○	○	○
14	1080p50	×	×	○
15	1080i50	○	○	×
16	1080p59	×	×	○
17	1080i59	○	○	×
18	1080p60	×	×	○
19	1080i60	○	○	×
20	1035i59	○	×	×
21	1035i60	○	×	×
22	1080sF23	○	○	○
23	1080sF24	○	○	○
24	1080sF25	○	○	×
25	1080sF29	○	○	×
26	1080sF30	○	○	×

5.2.3 Image quality adjustments

The settings related to the image quality adjustment and image display are selected using the following items.

Setting item	Description of setting	Setting value	Remarks
Hue	Hue adjustment	-180 to +180 deg. (in 1-degree increments)	Adjusts the hue.
Color	Color adjustment	0 to 150% (in 1% increments)	Adjusts the color intensity.
White Level	White level adjustment	-30 to +30% (in 1% increments)	Adjusts the white areas (white level) over the entire screen.
Black Level	Black level adjustment	-30 to +30% (in 1% increments)	Adjusts the reference level (black level) of the brightness over the entire screen.
Level Y/G	Video level (Y/G) adjustment	-30 to +30% (in 0.1% increments)	Adjusts the video level (Y/G).
Level PB/B	Video level (PB/B) adjustment	-30 to +30% (in 0.1% increments)	Adjusts the video level (PB/B).
Level PR/R	Video level (PR/R) adjustment	-30 to +30% (in 0.1% increments)	Adjusts the video level (PR/R).
ColorSP (Single)	Color space system setting	Refer to *1.	Sets the color space system for Single Link.
ColorSP (4:4:4)	Color space system setting	Refer to *1.	Sets the color space system for Dual Link 4:4:4.
ColorSP (60P50P)	Color space system setting	Refer to *1.	Sets the color space system for Dual Link 60P50P.
Enhance H Level	Enhance H setting	0 to 15 levels	Controls the frequency characteristics of the images and adjusts the emphasis of their contours.
Enhance V Level	Enhance V setting	0 to 15 levels	Controls the frequency characteristics of the images and adjusts the emphasis of their contours.
Scaling Filter	Scaling filter selection	Pixel, linear, non-linear	Sets the scaling filter.

*1: The color space system which can be selected differs depending on the input link mode and input timing system.

In the tables below, "○" denotes a color space system which can be selected and "×" denotes one which cannot be selected.

Data cannot be edited in the case of a timing system which is not supported by the input link mode concerned. (This is indicated by —— on the menu.)

Color space system setting	Input link mode setting		
	Single Link	Dual Link 4:4:4 / Dual Link 60p50p	
		Input timing systems A (note)	All other systems
RGB 4:4:4 10bit	×	×	○
RGB 4:4:4 12bit	×	×	○
HDTV 4:2:2 10bit	○	○	×
HDTV 4:2:2 12bit	×	×	○
HDTV 4:4:4 10bit	×	×	○
HDTV 4:4:4 12bit	×	×	○
HDTV1035 4:2:2 10bit	○	○	×
HDTV1035 4:2:2 12bit	×	×	○
HDTV1035 4:4:4 10bit	×	×	○
HDTV1035 4:4:4 12bit	×	×	○

Note: 1080p50, 1080p59, 1080p60

Color space system setting	Input link mode setting		
	Single Link	Dual Link 4:4:4 / Dual Link 60p50p	
		Input timing systems A (note)	All other systems
SDTV 4:2:2 10bit	○	○	×
SDTV 4:2:2 12bit	×	×	○
SDTV 4:4:4 10bit	×	×	○
SDTV 4:4:4 12bit	×	×	○

Note: 1080p50, 1080p59, 1080p60

5.2.4 Pull-down mode settings

How the image data of video sources such as film images, computer graphics images with a 24 or 30 frames per second rate is to be automatically identified is selected using the following items.

Setting item	Setting value	Remarks
Pulldown Mode	Auto	Video, 22Pulldown or 32Pulldown is automatically identified as the pull-down system which supports the video source.
	Video	In this mode, normal interlace moving images are converted into progressive images.
	22Pulldown	For still image sources with which a 1-frame image is reproduced in even- or odd-numbered fields, the interpolation pattern of 2-2/2-2 is automatically detected from the flow of the images and displayed.
	32Pulldown	For those sources of images obtained by converting film images (24 frames per second) into video images (60 frames per second), the interpolation pattern of 2-3/2-3/2-3 is automatically detected from the flow of the images and displayed.

* The pull-down mode can be set only for timing systems No.15 (1080i50), No.17 (1080i59), No.19 (1080i60), No.20 (1035i59) and No.21 (1035i60).

SUPPLEMENTARY NOTE	If, when the module is used in the 22Pulldown or 32Pulldown mode, the mode does not match the interpolation pattern of the input video source, the video signals may be disturbed. In a case like this, select the "Video" setting.

5.2.5 Moving image detection level setting

The moving image detection level is set using the following item. It can be set only for interlace timing signals.

Setting item	Description of setting	Setting value	Remarks
Motion Detect	Moving image detection level	Still, 1, 2 ... 13, 14, Motion	Still = complete still image; Motion = complete moving image With settings 1 to 14, the higher the value, the greater the motion in the images.

⇨ Refer to "8.1 Concerning the additional functions" on page 25.

5.2.6 Astrosnap mode setting

The "astrosnap" mode is set using the following item. It can be set only for interlace timing signals.

Setting item	Description of setting	Setting value	Remarks
astrosnap	astrosnap mode	ON, OFF	Sets the contour compensation mode.

⇨ Refer to "8.1 Concerning the additional functions" on page 25.

5.2.7 Fine adjustments of detail size

The size of the images displayed is finely adjusted using the following items.

Setting item	Description of setting	Setting value	Remarks
H Ratio	H zoom ratio	±30% of H Active of input timing signals	Adjusts the zoom ratio using the horizontal active width. *1
V Ratio	V zoom ratio	±30% of V Active of input timing signals	Adjusts the zoom ratio using the vertical active width. *1
H Offset	H offset	-127 to +127	Sets the offset in the horizontal direction.
V Offset	V offset	-31 to +31	Sets the offset in the vertical direction.
Trimming H Start	H trimming start position	0 to 128	Sets the trimming start position in the horizontal direction. *2
Trimming H End	H trimming end position	0 to 128	Sets the trimming end position in the horizontal direction. *2
Trimming V Start	V trimming start position	0 to 32	Sets the trimming start position in the vertical direction. *3
TRiMmng V End	V trimming end position	0 to 32	Sets the trimming end position in the vertical direction. *3

*1: The minimum and maximum values differ depending on the input timing system.

*2: This position is set in 1-dot increments when the scanning system of the input timing signals is progressive and the pixel clock frequency is equal to or less than 74.25 MHz; in all other cases, it is set in 2-dot increments.

*3: This position is set in 1-line increments when the scanning system of the input timing signals is progressive; it is set in 2-line increments when the scanning system is interlace or segment frame.

5.2.8 Display position and size settings

The image display size is changed and its display position is selected using the following item.

Setting item	Description of setting	Setting value	Remarks
Aspect Lock	Aspect ratio setting	HV JUST, JUST, ARIB 13:9, ARIB 14:9, ARIB 15:9, H JUST	Sets the detail size.

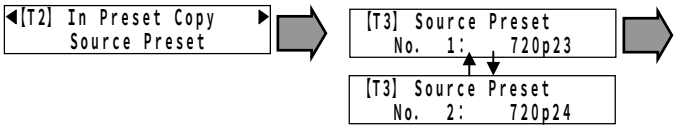
5.2.9 Saving the data

The data can be copied or initialized using the following items.

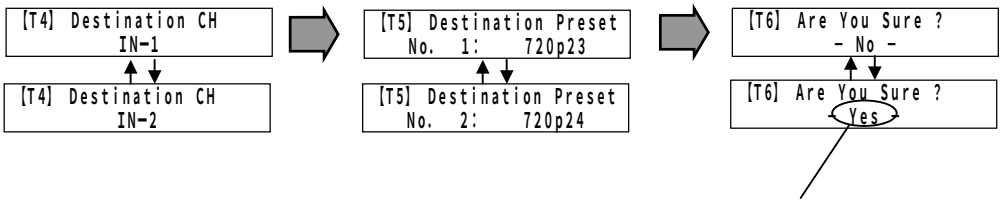
Setting item	Description of setting	Remarks
In Preset Copy	Preset data copy	The preset data is copied into an empty table. Data cannot be copied into a table by overwriting the existing data in that table.
In Preset Init	Preset data initialization	The preset data is initialized to the factory data.

Example: Copying preset data

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



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



As soon as the rotary encoder is pressed at "Yes," data copying is executed.

⇨ See "5.1.2 Table utility mode" on page 11.

6 TIMING SYSTEM TABLES

6.1 Input timing system table

No	System	Clock (MHz)	Hperiod (dot)	Hdisp (dot)	Hcync (dot)	Hbp (dot)	Vtotal (line)	Vdisp (line)	Vsync (line)	Vbp (line)	Scan
1	720p23	74.25 /1.001	4125	1280	40	260	750	720	5	20	Progressive
2	720p24	74.25	4125	1280	40	260	750	720	5	20	Progressive
3	720p25	74.25	3960	1280	40	260	750	720	5	20	Progressive
4	720p29	74.25 /1.001	3300	1280	40	260	750	720	5	20	Progressive
5	720p30	74.25	3300	1280	40	260	750	720	5	20	Progressive
6	720p50	74.25	1980	1280	40	260	750	720	5	20	Progressive
7	720p59	74.25 /1.001	1650	1280	40	260	750	720	5	20	Progressive
8	720p60	74.25	1650	1280	40	260	750	720	5	20	Progressive
9	1080p23	74.25 /1.001	2750	1920	44	192	1125	1080	5	36	Progressive
10	1080p24	74.25	2750	1920	44	192	1125	1080	5	36	Progressive
11	1080p25	74.25	2640	1920	44	192	1125	1080	5	36	Progressive
12	1080p29	74.25 /1.001	2200	1920	44	192	1125	1080	5	36	Progressive
13	1080p30	74.25	2200	1920	44	192	1125	1080	5	36	Progressive
14	1080p50	148.5	2640	1920	44	192	1125	1080	5	36	Progressive
15	1080i50	74.25	2640	1920	44	192	1125	1080	10	30	Interlace
16	1080p59	148.5 /1.001	2200	1920	44	192	1125	1080	5	36	Progressive
17	1080i59	74.25 /1.001	2200	1920	44	192	1125	1080	10	30	Interlace
18	1080p60	148.5	2200	1920	44	192	1125	1080	5	36	Progressive
19	1080i60	74.25	2200	1920	44	192	1125	1080	10	30	Interlace
20	1035i59	74.25 /1.001	2200	1920	44	192	1125	1035	10	69	Interlace
21	1035i60	74.25	2200	1920	44	192	1125	1035	10	69	Interlace
22	1080sF23	74.25 /1.001	2750	1920	44	192	1125	1080	10	30	Progressive (sF)
23	1080sF24	74.25	2750	1920	44	192	1125	1080	10	30	Progressive (sF)
24	1080sF25	74.25	2640	1920	44	192	1125	1080	10	30	Progressive (sF)
25	1080sF29	74.25 /1.001	2200	1920	44	192	1125	1080	10	30	Progressive (sF)
26	1080sF30	74.25	2200	1920	44	192	1125	1080	10	30	Progressive (sF)

7 MAIN SPECIFICATIONS

7.1 Specifications

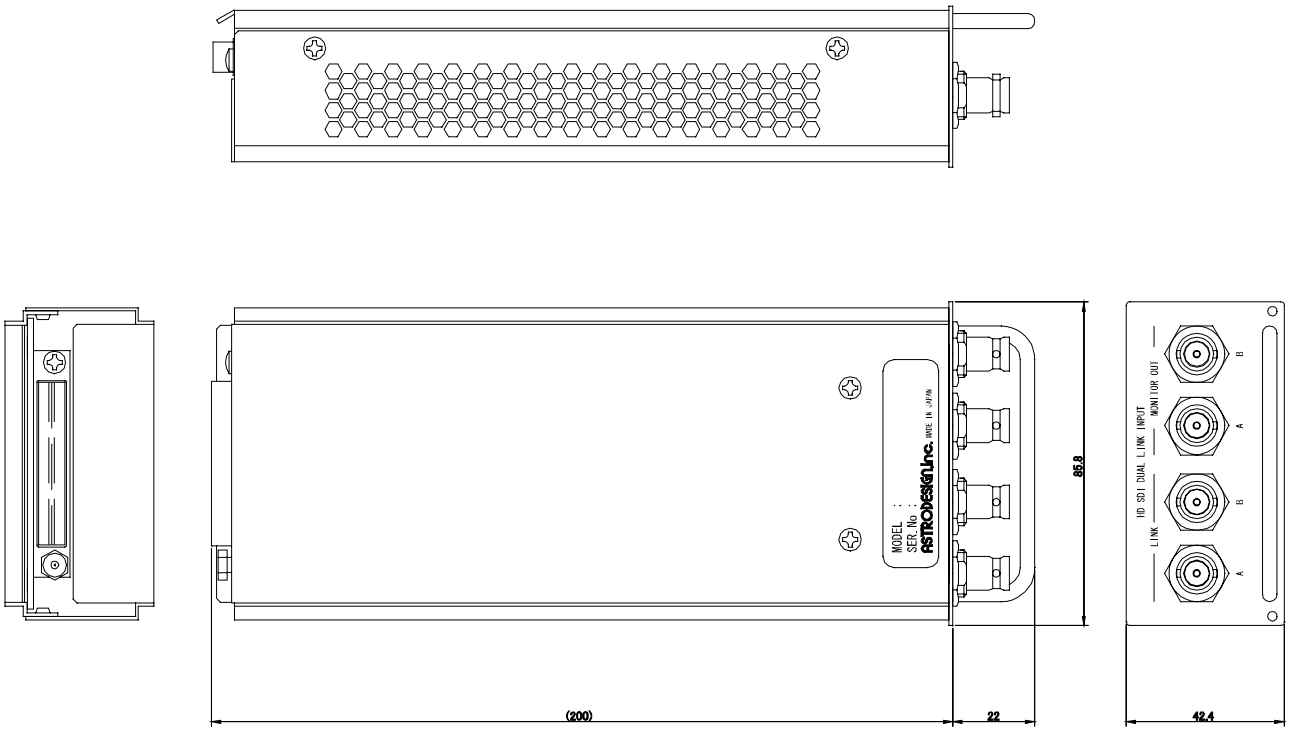
Table 7.1 IM-588 specifications

Item	Specification
Standards supported	SMPTE-292M、SMPTE-372M
Timing systems	1920×1080×60/59.94p 1920×1080×50p 1920×1080×60/59.94i 1920×1080×50i 1920×1080×30/29.97p 1920×1080×25p 1920×1080×24/23.98p 1920×1080×24/23.98sF 1920×1035×60/59.94i 1280× 720×60/59.94p 1280× 720×50p 1280× 720×30/29.97p 1280× 720×25p 1280× 720×24/23.98p
Color formats	YPbPr, RGB (SMPTE240M, SMPTE274M, SMPTE296M)
Video data resolution	10 bits (lower 2 bits rounded off when 12 bits are input)
Number of channels	1 (BNC connectors x 2)

7.2 Accessories

Operating instructions	1 copy

7.3 Outline drawings



8 APPENDIX

8.1 Concerning the additional functions

Version		Additional function
SC-2055 firmware	OM-593 FPGA	
3.00 and up		Moving image detection level setting supported. Astrosnap mode setting supported.

IM-588 Instruction Manual

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