TERA

FLEXIBLE SCAN CONVERTER

SC-2040/SC-2040T/SC-2040B/SC-2040W

Operating Manual

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ASTRO

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Introduction

Thank you very much for selecting the Flexible Scan Converter SC-2040/2040B/2040T/2040W.

This manual explains the functions of the SC-2040/2040B/2040T/2040W and provides operating and safety instructions that should be followed when using it.

In order to avoid improper handling that may result in a safety hazard, please be sure to read this manual thoroughly before using the SC-2040 to learn the proper method of operation.

After reading this manual, please keep it in a safe place for future reference.

Safety Instruction

⚠ WARNING

Power Cable

- When disconnecting the power cable from the receptacle, be sure to grasp the plug of the cable.
- Do not bend the power cable forcefully or fold it while in use. Doing so may result in a fire hazard.
- Do not place a heavy item on the power cable. Doing so may damage the cable and result in a fire or an electric shock hazard.

Foreign Matters

- Do not allow any liquid to be spilled or any flammable or metal objects to be dropped inside the equipment. Using the equipment under such conditions may result in damage to the equipment, a fire hazard, or an electric shock hazard.

Disassembly of Product

- Do not disassemble the equipment. If a customer tries to open the enclosure, remove or replace internal boards, it may cause electrical shocks, personal injuries or malfunction of the equipment.

⚠ CAUTION

Power Supply and Grounding

Use this equipment with a power supply of 100 to 120VAC or 200 to 240VAC. Grounding of this equipment is achieved through a two-pole, three-wire grounded power cable. Be sure to connect the power cable to a two-pole, three-wire grounded AC power outlet for safe use of the equipment.

Where to Install and Use the Equipment

No special care is necessary for use in a normal room. Avoid installing and using the equipment in places or areas as listed below, because doing so may result in damage to the equipment, or other safety hazards:

- Where ambient temperature falls outside the range between 5 and 40ºC;
- Where ambient humidity falls outside the range between 30 and 80 %RH;
- Near an air conditioning blowout where rapid changes in temperature or condensing can occur;
- Where corrosive gas or excessive dust and/or dirt exists;
- Where direct sunlight may reach the equipment;
- Where sprays or drops of water, oil, and/or other chemicals can reach the equipment;
- Where vibrations are mediated by the floor;
- Where stable installation of the equipment can not be achieved; or
- Where the ventilation holes on the sides of the equipment may be covered, preventing proper airflow. These holes are provided to avoid an excessive internal temperature increase in the equipment. Be sure to avoid covering these holes. Doing so may result in damage to the equipment.

Shocks to the Equipment

- This is precision equipment. Sudden jolts to it may result in malfunctions or damage to the equipment. Be sure to take care when moving it.

In Case of an Error or Malfunction

- If an error or malfunction occurs, unplug the power cable and then contact your dealer or the Astrodesign, Inc. sales group.

1 SC-2040

1.1 Overview

The SC-2040, covering nearly all video frequencies currently available, is a series of flexible scan converters which allow freely setting up/down conversion (frequency conversion) and inputting/outputting of the signals.

Each unit contains a newly developed scan conversion chip (NYD001). These products deliver high video quality and high resolution at a low price.

The series conforms to YPbPr input and output, takes input from an HDTV source, and is capable of converting signals from a PC/WS and outputting to an HDTV target. Two models of the series are equipped with a simplified base display function which is used in compositing two images.

In addition, the SC-2040 is able to support multivision by solving the problems with motion pictures typically caused by the passing control function.

The series of flexible scan converters, with its fully developed product lineup, supports various types of input/output and usages.

1.2 Features

The following are some of the features of SC –2040:

- Fully developed product lineup to support different input and output formats
  - SC-2040 : analog RGB/YPbPr input and output
  - SC-2040B : analog RGB/YPbPr input and output with simplified base display function
  - SC-2040T : analog RGB/YPbPr input and digital TMDS output
  - SC-2040W : analog RGB/YPbPr input and digital TMDS output with simplified base display function
- Support for high-resolution formats such as UXGA, HDTV, and 1080p60
- Simple setting of window position calculation for multivision by using virtual coordinates
- Availability of equivalent sampling adjustment via a navigation program
- Improved accuracy for automatic input search and automatic image outline setting functions
- Improved operability with a wired remote control (optional) and on-screen menus
- Compact size (1U) and low price

1.3 Main Functions

Input-Related Functions

- Sampling phase adjustment (Window/Base)

  Fine adjustment of the sampling clock phase of input signals is available within the range of 1/32 ~ 64/32 of the clock signal. It is also possible to set an appropriate amount of adjustment.

- Input level (Window/Base)

  Input video levels can be adjusted for each of the R, G, and B signals within the range 0.7 V ±10% at a 1% step. This allows very fine adjustment in accordance with the video source.

- Operation when input sync signal is lost (Window only)

  A display method in case no input sync signal can be detected can be selected from <8 colors and Window Display OFF> that are available.

- Automatic input search and automatic measurement (Window only)

  For those input signals whose video timings are registered, automatic search for a timing setting is executed very accurately every time input signals are changed in order to automatically convert the video signal. In addition, for input video timings that are not registered, anticipations are made based on the result of automatic timing measurement to provide optimal conditions for converting and displaying the video signal.

- Automatic measurement of input display period (Window only)

  By measuring the effective display periods for horizontal input and vertical input and estimating the number of periods from the aspect ratio and the resolution, input signals can be automatically taken in starting at an appropriate position.

- Scan convert OFF function (Window only) (SC-2040/SC-2040B)

  Input video signals and input sync signals are fed to the output terminals without performing scan conversion on them.

  Output sync signals are converted to TTL levels (bi-level).

- TBC control (Window only)

  Images from signals with unstable synchronization such as VCR signals can be displayed without disturbances.

- Multicolor formats and multiscan (Window only)

  Automatic recognition of scan method between progressive and interlaced and selecting either color difference input or RGB input make support for a wide range of video sources available.

  The color format for the base input needs to be the same format as for the output.

- Setting for input colors and input levels (Window only)

  Adjustments are available for brightness (black level), contrast , color, and hue.

- Input gamma correction (Window only)

  When the output color format is set to RGB, input gamma correction is available.

Output-Related Functions

- Frame lock (external lock) function

  HS and VS can be output in sync with external sync signals input through the terminals for which the frame rate is locked by adjusting the position of HS by two dots and the position of VS by one line (two lines when interlaced) against the external sync signals.

- Setting for output colors and output levels

  Adjustments are available for brightness (black level), contrast, color, and hue.

  Color adjustment is available with SC-2040/SC-2040B (analog output).

- Output gamma correction

  When the output color format is set to RGB, gamma correction is available.

- Window frame output

  A frame (color selectable from eight colors) can be displayed in the window on the output screen.

- Test pattern output

  Test patterns can be output for display adjustment.

- On-screen menu display (only when using an optional wired remote control)

  The same menus as displayed on the vacuum fluorescent display can be displayed on the screen for easy verification of settings made with an optional wired remote control.

Scan Conversion Functions

- Passing control function (Window only)

  This function is to automatically control passing caused by differences between input and output frame rates.

- Flicker control function (Window only)

  Flickers in interlaced output can be suppressed with this function.

- Enhancement effect (Window only)

  Nine levels of enhancing effect (edge enhancement) can be applied simultaneously horizontally and vertically.

- Freeze function (Window only)

  This function can freeze a video image.

- Horizontal and vertical zoom (Window only)

  One of four types of zooming modes, a type of pixel zoom and three types of interpolation zoom, can be chosen to cause automatic selection of an optimal interpolation method according to the zoom ratio. The zoom ratio can be set in the range from 3.2% to 2000%. Additionally, the zoom mode can be set differently for horizontal zoom and vertical zoom.

- Window image input

  The starting and ending positions to take in window image input can be set in percentage (by 0.001%) or in dots (by one dot). (Setting in dots is available only when commands are used for setting.)

- Window image output

  The starting and ending positions to display window image output can be set in percentage (by 0.001%) or in dots (by two dots). (Setting in dots is available only when commands are used for setting.)

- Base image output

  The effective display area of base image output can be set in percentage (by 0.001%) or in dots (by two dots). (Setting in dots is available only when commands are used for setting.)

  In the effective display area for output images, models SC-2040 and SC-2040T (without base input function) display a base color (selected from eight available colors) and models SC-2040B and SC-2040W (with base input function) display a base input image.

Controls

- RS-232C/RS-422

  Baud rates 9600, 19200, and 38400 bps are supported.

- Serial bus

  The serial bus allows multiple devices to be controlled simultaneously by using a cascade connection.

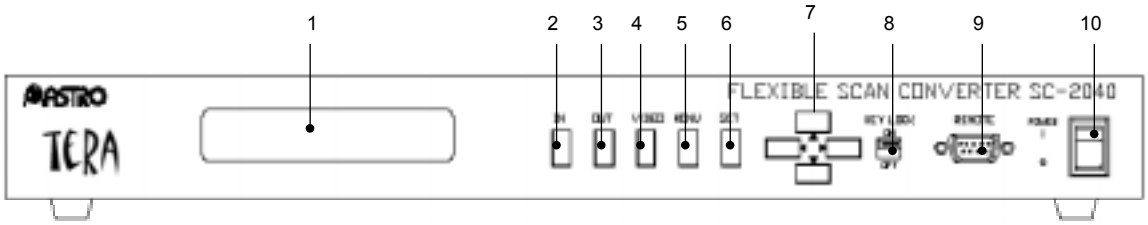
- Wired remote control (optional)

  The use of an optional wired remote control provides control on the device from a distance through a similar operation as using the front keys.

1.4 Name and Function of Each Part

Front of Main Body

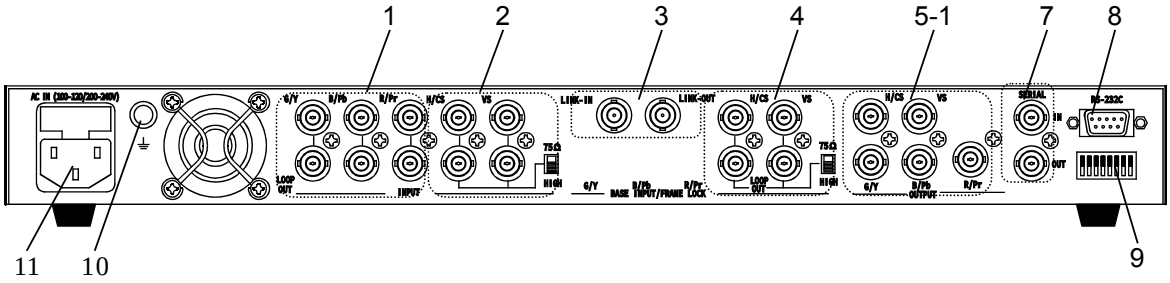
Common to All Four Models SC-2040/ B/ T/ W



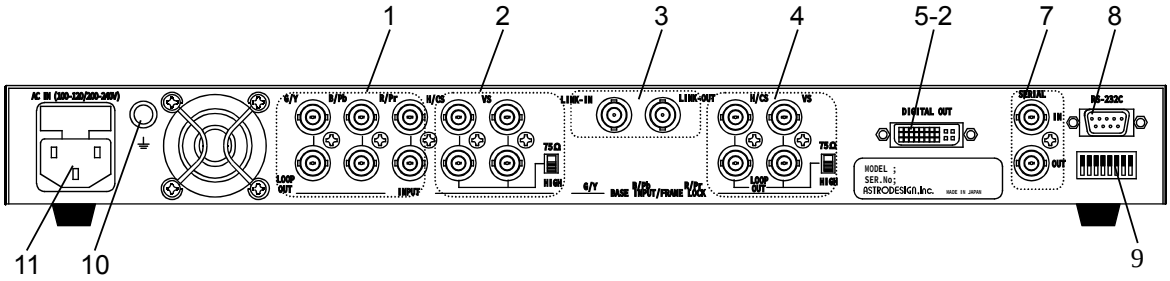
No.	Name	Description
1	Display	● Input timing, preset table number, output timing, and mask table number are indicated on this display during a normal operation. ⇨ Refer to "1.5 Display Indications." ● While changing the settings, pressing the IN, OUT, VIDEO, and MENU mode setting keys can display settings menus. ⇨ Refer to "1.6 Settings Menu."
2	IN Key	This key causes the display to change to the "IN" mode menu.
3	OUT Key	This key causes the display to change to the "OUT" mode menu.
4	VIDEO Key	This key causes the display to change to the "VIDEO" mode menu.
5	MENU Key	This key causes the display to change to the "MENU" mode menu.
6	SET Key	This key is used for maneuvering the layers of menus and setting values.
7	UP/DOWN Keys	These keys are used to select items to be set.
	LEFT/RIGHT Keys	These keys are used to select values to be set.
8	KEY LOCK Switch	This switch is used to lock all keys except for the POWER switch. When it is in the lock position (ON), the LED embedded in the switch knob is lit up.
9	REMOTE Connector	An optional wired remote control can be connected to remotely control the unit.
10	POWER Switch	This is the power switch. The interval between turning the power ON and OFF should be at least 30 seconds.

Rear of Main Body

SC-2040

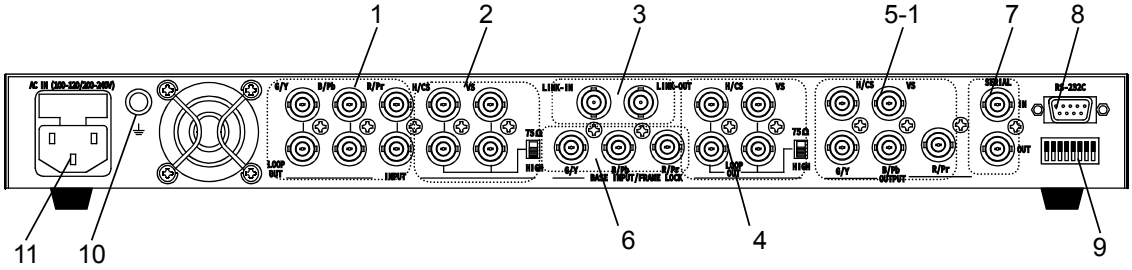


SC-2040T

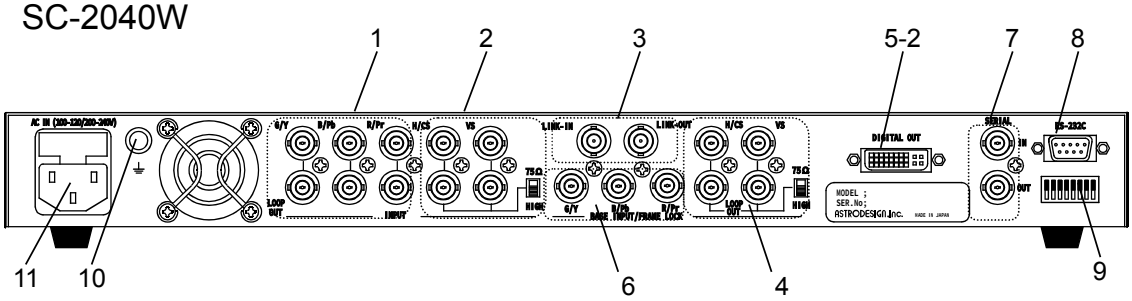


No.	Name			Description
1	Video Input Terminals	G/Y	IN	BNC connector for G or Y signal input. In OnSYNC mode, this channel will provide the reference signal. It is terminated at 75Ω if loop out is not used.
			OUT	BNC connector for outputting through (loop out) G or Y signal input. When connection is made here, the G or Y signal input will be a high impedance input.
		B/Pb	IN	BNC connector for B or Pb signal input. It is terminated at 75Ω if loop out is not used.
			OUT	BNC connector for outputting through (loop out) B or Pb signal input. When connection is made here, the B or Pb signal input will be a high impedance input.
		R/Pr	IN	BNC connector for R or Pr signal input. It is terminated at 75Ω if loop out is not used.
			OUT	BNC connector for outputting through (loop out) R or Pr signal input. When connection is made here, the R or Pr signal input will be a high impedance input.
2	Sync Input Terminals	H/CS	IN	BNC connector for H or CS sync input. It takes input of CS or H in H/V separation mode.
			OUT	BNC connector for outputting through (loop out) H or CS sync input. When connection is made here, the H or CS sync input will be high impedance.
		V	IN	BNC connector for V sync input. It takes input of V in H/V separation mode.
			OUT	BNC connector for outputting through (loop out) V sync input. When connection is made here, the V sync input will be high impedance.
		75Ω/HIGH Switch		This changes the impedance for sync signal input (H/CS, V). While loop out is not used, setting it to 75Ω will terminate the sync signal input (H/CS, V) at 75Ω, and setting it to HIGH will cause high impedance.
3	LINK Input/Output Terminals	LINK-IN		This connector is for connecting with the LINK-OUT terminal of another device which together forms multi-screen.
		LINK-OUT		This connector is for connecting with the LINK-IN terminal of another device which together forms multi-screen.

SC-2040B



SC-2040W

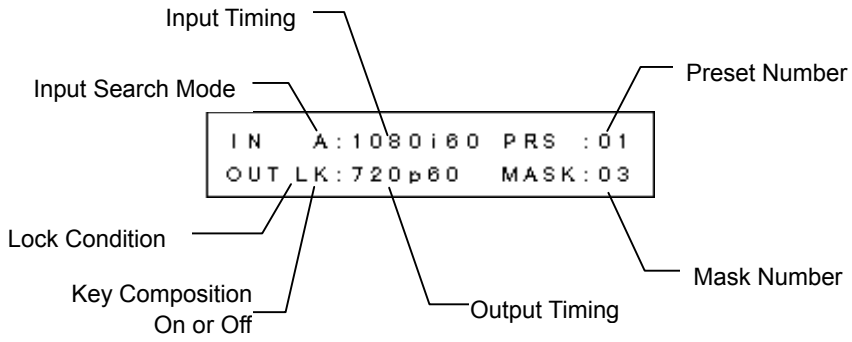


No.	Name			Description
4	(SC-2040/T) Reference Input Terminals (SC-2040B/W) Base Sync Input Terminals	H/CS	IN	BNC connector for H or CS sync input. It takes input of CS or H in H/V separation mode.
			OUT	BNC connector for outputting through (loop out) H or CS sync input. When connection is made here, the H or CS sync input will be high impedance.
		VS	IN	BNC connector for V sync input. It takes input of V in H/V separation mode.
			OUT	BNC connector for outputting through (loop out) V sync input. When connection is made here, the V sync input will be high impedance.
		75Ω/HIGH Switch		This changes the impedance for sync signal input (H/CS, V). While loop out is not used, setting it to 75Ω will terminate the sync signal input (H/CS, V) at 75Ω, and setting it to HIGH will cause high impedance.
5-1	Analog Output Terminals	G/Y		This terminal is for G or Y signal output.
		B/Pb		This terminal is for B or Pb signal output.
		R/Pr		This terminal is for R or Pr signal output.
		H/CS		This terminal is for H or CS sync signal output.
		VS		This terminal is for VS sync signal output.
5-2	Digital Output Terminal			This terminal is for TMDS video signal output. (DVI-I29pin)*
6	Base Image Input Terminals	G/Y		This terminal is for G or Y signal input for base images.
		B/Pb		This terminal is for B or Pb signal input for base images.
		R/Pr		This terminal is for R or Pr signal input for base images.
7	Serial Bus Input/Output Terminals	IN		This is to connect with the OUT terminal of a device compatible with Astrodesign serial bus.
		OUT		This is to connect with the IN terminal of a device compatible with Astrodesign serial bus.
				When cables are connected to both IN and OUT terminals, the signal level will be high impedance. If only one of the terminals is connected, the remaining terminal will be terminated at 75Ω.
8	RS-232C (RS-422) Port			This port is for serial control operation. All devices connected on the serial bus can be controlled through this port.
9	DIP Switch			This switch can be used to turn ON or OFF demo display of the setting menus.
10	FG Terminal			This is the frame ground terminal.
11	AC Power Receptacle			The enclosed AC power cable is connected here.

* Insertion-removal cycles (manufacturer's guarantee): 100 cycles

1.5 Display Indications

During a normal operation the display located in the front of the main body indicates status of setting as shown below. (default screen)



IN	This section shows input timing. “A” indicates automatic input search mode. “F” indicates fixed input mode.
	Automatic Input Search Mode (A:) If the input signal has a registered timing, the timing name will be displayed. If the input timing is not registered, the word ”NEW” will be displayed.
	Fixed Input Mode (F:) The timing name that is set as a fixed timing will be displayed.
	When no sync signal is input: “No Sync" will be displayed.
	When input signal has an error: “SyncErr” will be displayed.
PRS	This section shows the preset table number that is used for the current display. Use the [▲] [▼] keys to select another preset table. When the preset number is changed to another one, video display is switched according to the preset information (picture quality adjustment values, zoom modes, sampling phase adjustment values, input video level adjustment values, etc.) stored in the preset table.
OUT	This section shows the current output timing. “L” indicates status of external lock condition. If it is lit up, the output is locked to external reference. If it is blinking, the output is not locked to external reference. “K” is shown when key composition is set up. (“K” display is available in SC-2040B and SC-2040W only.)
MASK	This section shows the mask table number that is used for the current display. Use the [◀] [▶] keys to select another mask table. When the mask number is changed to another one, video display is switched according to the mask information (display positions of window images, widow frames, display positions of base images, key composition setting, etc.) stored in the mask table.

- How to the change input signal search modes?

⇨Refer to page 42.

- How can output timings be changed?

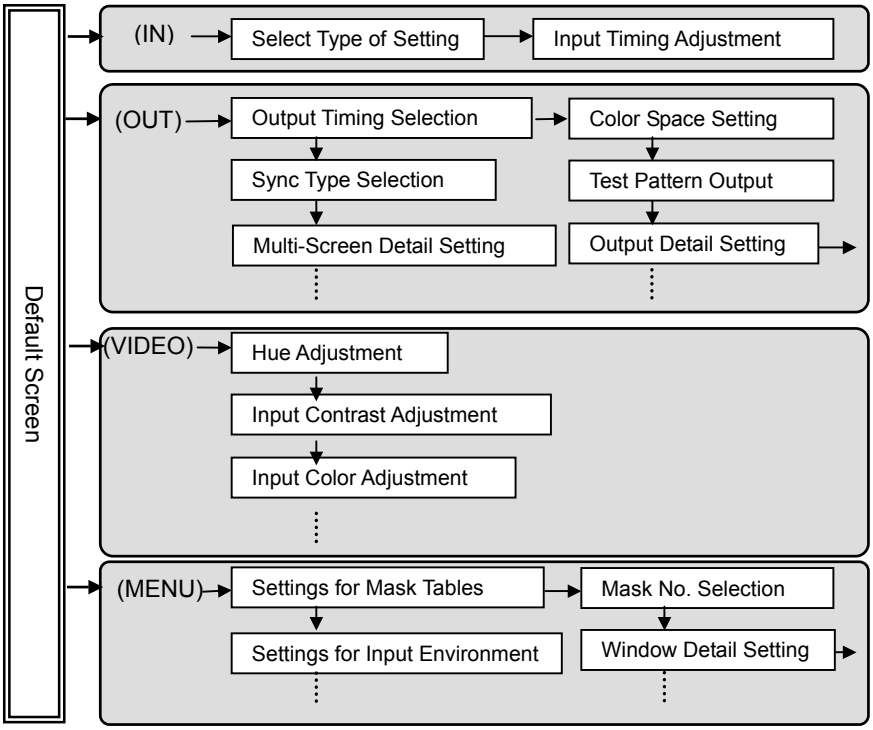
⇨ Refer to page 16.

1.6 Settings Menu

Settings for adjustments and functions are performed following the settings menus that appear on the front display.

1.6.1 Menu Structure

Settings menus are separated into four modes of setting each of which has a multilayered structure.



- The menu structures are shown with screen images.
⇨Refer to page 61.

- Menus that appear on the display vary according to the model.
(Those shown in the left are only examples.)

Modes of Setting

Modes "IN", "OUT", and "VIDEO" are so structured that basic adjustments concerning the current input and output settings are possible.

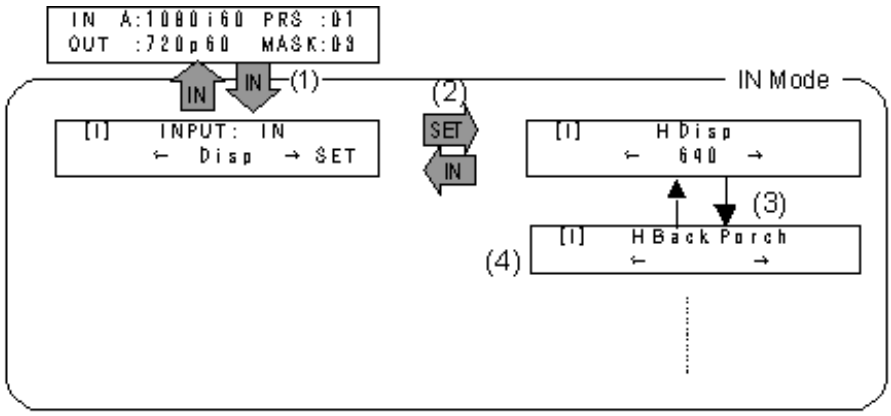
The "MENU" mode provides access to detailed adjustments of the SC-2040 functions.

- IN Mode — Adjustments for window input and base input*
- OUT Mode — Output timing selection, test pattern output, output picture quality adjustment, and output gamma correction, and other output related settings.
- VIDEO Mode — Input picture quality adjustment, zoom modes, video level adjustment, etc.
- MENU Mode — Setting of image display position and size, input environment, output environment, etc. In addition, editing of registered input and output timings and preset data, setting of communications environment, saving of settings data, etc.

* Base input adjustment is only available for models SC-2040B and SC-2040W.

1.6.2 Menu Setting Method

An Example of Menu Operation



(1) Entering a mode of setting

Enter the desired mode of setting by pressing the corresponding mode selection key.

The mode selection keys are also used to move up the menu layers in the relevant modes.

IN : Use this key to enter and move up the layers of the "IN" mode.

OUT : Use this key to enter and move up the layers of the "OUT" mode.

VIDEO : Use this key to enter and move up the layers of the "VIDEO" mode.

MENU : Use this key to enter and move up the layers of the "MENU" mode.

(2) Maneuvering through the layers

Once in a mode of setting, use the SET key to move down the layers.

Use the corresponding mode selection key to move up the layers.

(Ex.: While in the IN mode, the IN key can be used.)

(3) Selecting an item for setting

Use the ▲ ▼ keys to select an item for setting.

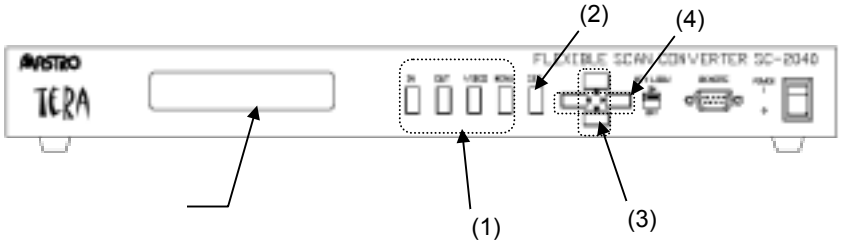
(4) Setting a value

Use the ◀ ▶ keys to set a value.

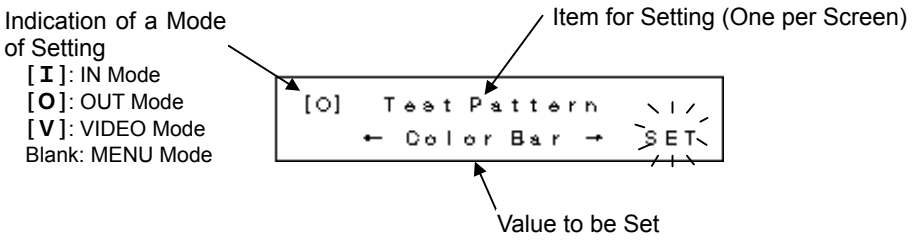
- If a lower layer exists under a menu item, the letters “SET” blink or the message <<Press SET Key>> appears.

- Some values require pressing the SET key to be set.

⇨Refer to the following page.



1.6.3 Display on the Settings Screens



When SET Blinks

When the letters of the word "SET" blink in the lower right corner of the screen, it means either "a lower layer in the menu structure exists," or "the selected value needs to be confirmed with the SET key."

If "SET" blinks after a value has been changed, the new value will not be set and reflected in the video display or the data table until the SET key is pressed. On the other hand, if these letters do not blink when a change has been made, the new setting for such an item is reflected in real time in the video display or the data table. (It is not necessary to press the SET key in this case.)

2 Installation and Adjustment

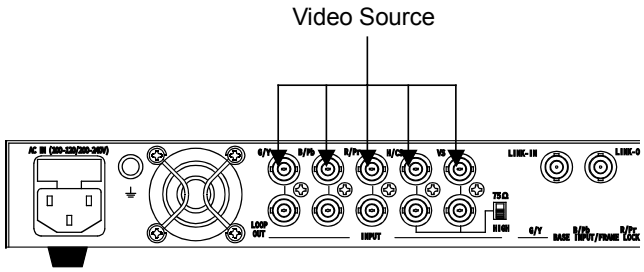
In this part of the document, basic methods of installation and adjustments are described.

When connecting multiple units of the SC-2040 to configure a multi-screen setting, please also refer to "3 Multi-Screen Installation and Adjustment" which describes methods of installation and adjustments for multi-screen configuration.

2.1 Connection

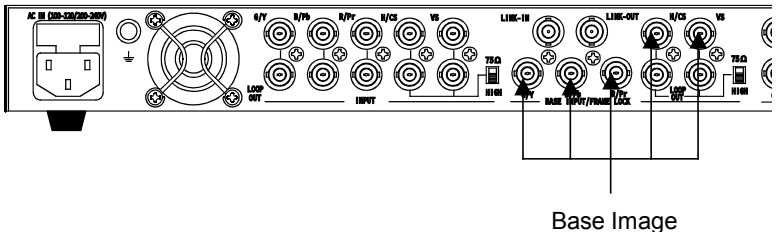
(1) Connection of Window Image Input

Use a BNC cable to connect between the video source on which resolution conversion will be performed and the window input terminals of the SC-2040.



(2) Connection of Base Image Input (SC-2040B/SC-2040W Only)

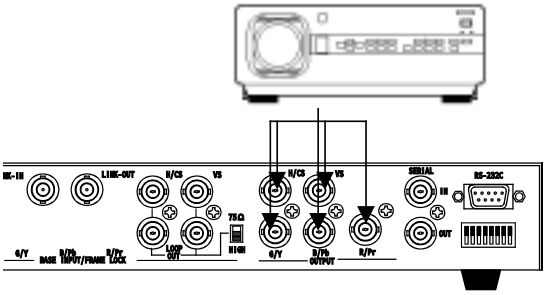
For the models SC-2040B and SC-2040W to combine displays with base images, connect a BNC cable to carry base images to the base input terminals,



(3) Connection with a Display Device

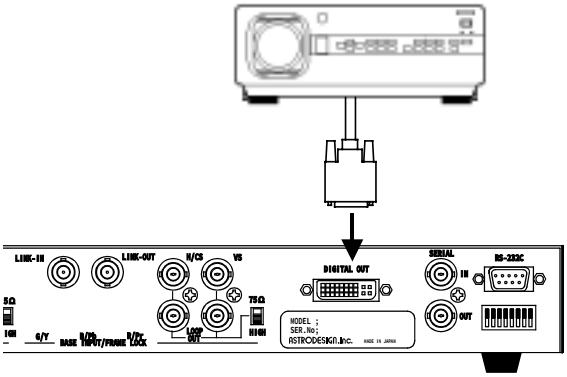
Analog Output (SC-2040/SC-2040B)

Use a BNC cable to connect between the input terminals of a display device and the output terminals of a unit of the SC-2040 or the SC-2040B.



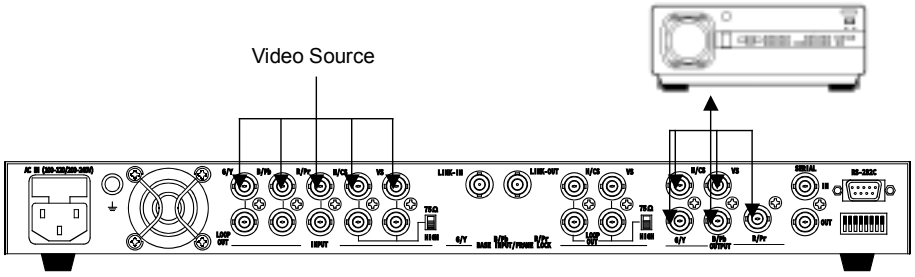
Digital Output (SC-2040T/SC-2040W)

Use a DVI cable to connect between the input terminal(s) of a display device and the output terminal of a unit of the SC-2040T or SC-2040W. (The length of the DVI should be 5 m max.)

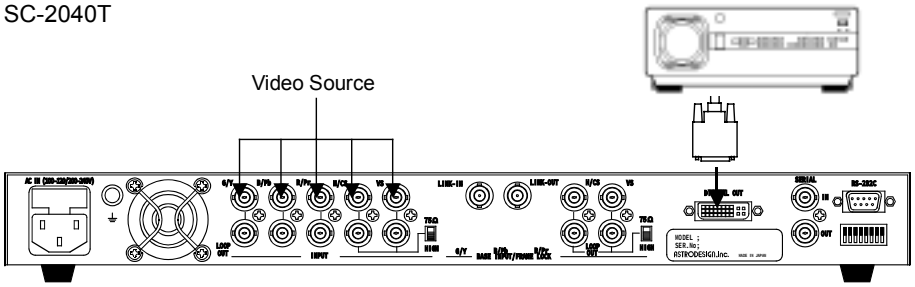


Examples of Connections

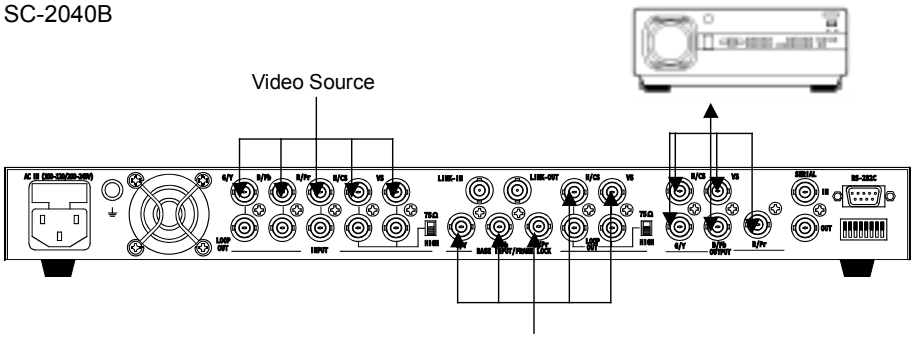
SC-2040



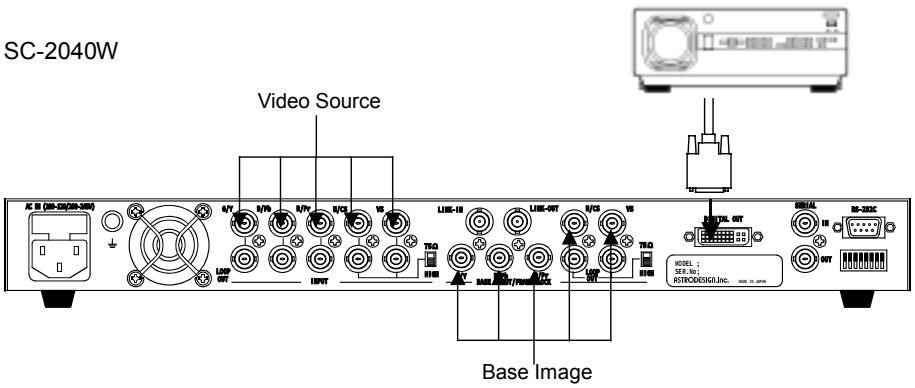
SC-2040T



SC-2040B



SC-2040W



2.2 Basic Adjustment

After completing connections with input and output devices, turn on the power to each of the devices.

When using a unit with TMDS output (SC-2040T/SC-2040W), be sure to follow the sequence below upon powering on or off.

Powering on

(1) Turn power on to SC-2040T/W ➔ (2) Turn power on to CRT/projector

Powering off

(1) Turn power off to CRT/projector ➔ (2) Turn power off to SC-2040T/W

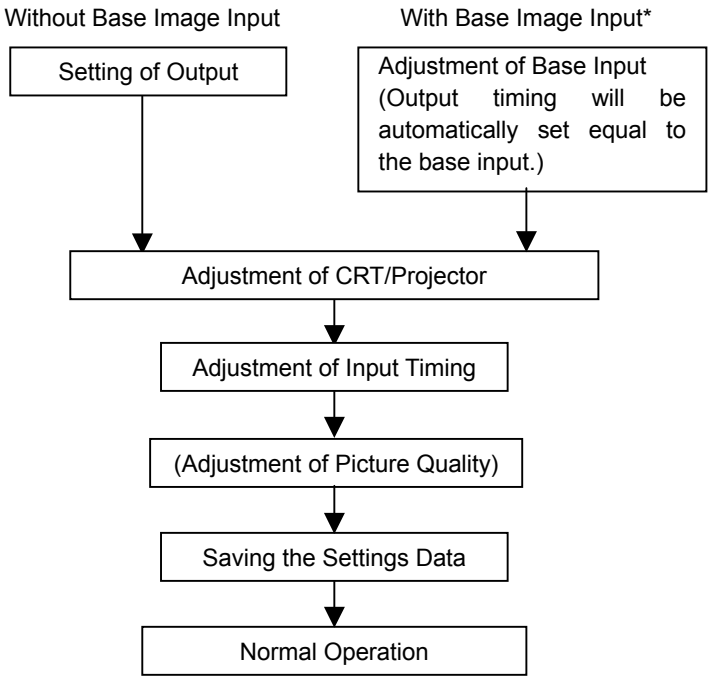
Next, make necessary adjustments on units of the SC-2040 and devices connected to the SC-2040 as well to further improve the video quality.

Please ensure to save adjustment data before turning off the SC-2040 units because data will be lost when power is turned off.

● Data Saving
⇨Refer to page 56.

2.2.1 Procedure of Adjustment

Follow the procedure described below to make adjustments.

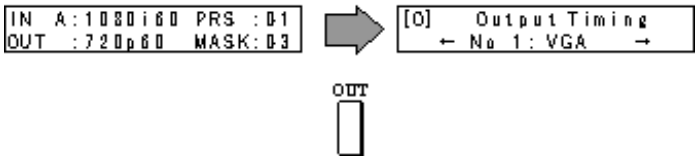


* If base image input is supplied to a unit of the SC-2040B or SC-2040W, output timing can be automatically set equal to the base input timing.

2.2.2 Setting of Output

(1) Selecting Output Timing

For a unit of the SC-2040/SC-2040T or a unit of the SC-2040B/SC-2040W without base image input, select an output timing optimal to the display device in the "OUT" mode.



Select a timing from those registered in the output timing table of the unit using the ◀ ▶ keys.

<Factory Default Registered Timings>

No.	Name	DotClk (MHz)	Scan	Hperiod (dot)	Hdisp (dot)	Vtotal (line)	Vdisp (line)
1	NTSC*2	28.64	Progressive	910	746	525	471
2	480p60-2	25.18	Progressive	800	640	525	480
3	600p60	50.00	Progressive	1056	800	628	600
4	768p60	65.10	Progressive	1344	1024	806	768
5	1024p60	108.50	Progressive	1696	1280	1066	1024
6	NTSC	28.63	Interlace	1820	1508	525	485
7	PAL*	17.73	Interlace	1136	920	625	575
8	1080i60	74.25	Interlace	2200	1920	1125	1080
9	720p59	74.18	Progressive	1650	1280	750	720
10	720p60	74.25	Progressive	1650	1280	750	720
11	1080p60	148.50	Progressive	2200	1920	1125	1080
12	OV-ML	58.75	Progressive	1216	1024	806	768

* 7: PAL is available in SC-2040 and SC-2040B only.

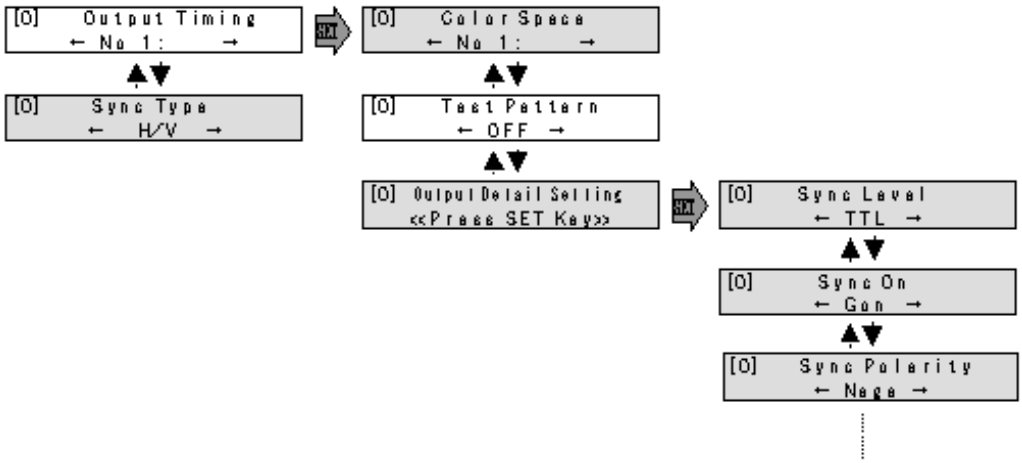
- If the unit of the SC-2040B or SC-2040W uses base image input, the output timing will be set by adjusting the base input image.

⇨Refer to page 18.

(2) Setting of Output Sync (SC-2040/SC-2040B Only)

Select a sync signal type and its level.

This shall be done in the "OUT" mode similarly to selecting output timing.



Item for Setting	Content of Setting	Values Set
Sync Type	Output Sync Type	H/V, CS, 3s
Color Space	Output Color Space	RGB, YPbPr
Sync Level	Output Sync Level	0.3V, TTL (used for CS)
Sync On	Output Sync on Video	OFF, Gon, RGBon
Sync Polarity	Output Sync Polarity	Nega, Posi

When output settings are complete, adjust any display device connected to the SC-2040 by displaying test patterns on the screen. Output settings of test patterns can be made in the OUT mode. Proceed to "2.2.4 Adjustment of CRT/Projector."

● Adjustment of CRT or Projector
⇨Refer to page 22.

2.2.3 Adjustment of Base Input (SC-2040B/SC-2040W Only)

Methods to adjust a unit of the SC-2040B or SC-2040W when base images are input are explained here.

When base image input is used with a unit of the SC-2040B or SC-2040W, no base image can be correctly displayed unless timings of base input and output are the same.
By following the adjustment procedure below, an output timing appropriate to a base image input can be selected.

Confirm the base image timing to be used can display an image directly on a display device before feeding it to the SC-2040. Any video timing that cannot correctly reproduce images directly on a display device will not work on a unit of the SC-2040B or SC-2040W.

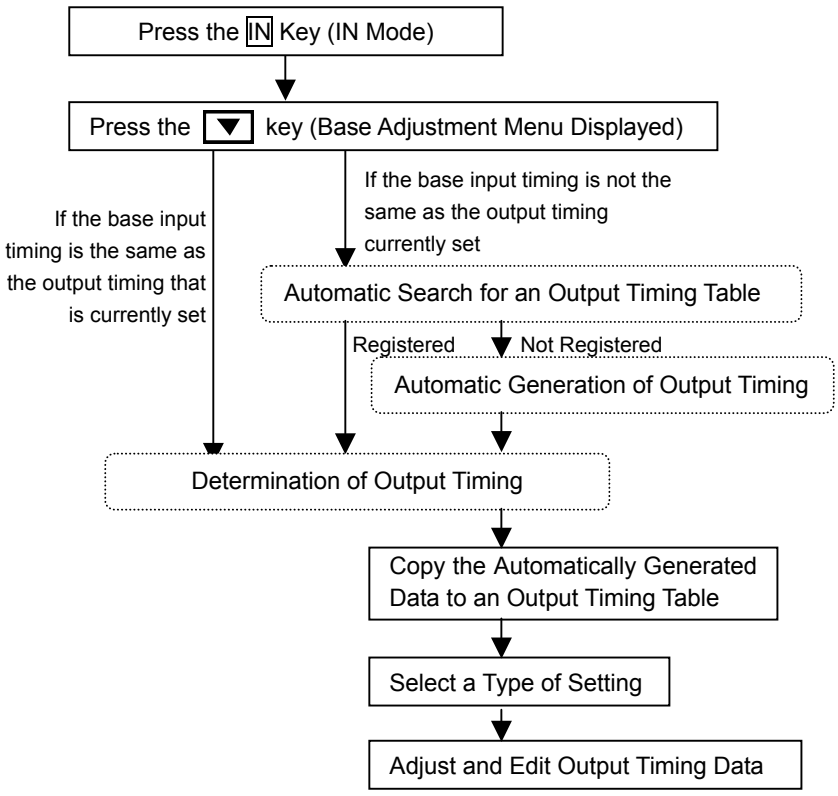
If the timing of a base input is known beforehand, registering the timing in an output timing table will help ease the adjustment.

● The base adjustment menus will not be displayed in the SC-2040 or SC-204T.

● Registration of an output timing is made with the Output Timing Utility in the MENU mode.
⇨Refer to page 49.

Base Input Adjustment Procedure (Only When Base Input Is Used)

Base input adjustment is performed in the "IN" mode.

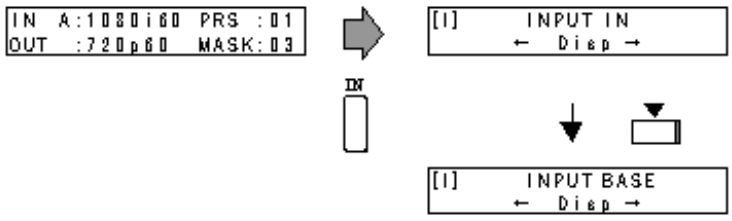


1. Determination of Output Timing

Entering the IN mode with the IN key and then pressing the ▼ key will display the base input adjustment menus. At this time, the output video only has a base image and no window image will be displayed.

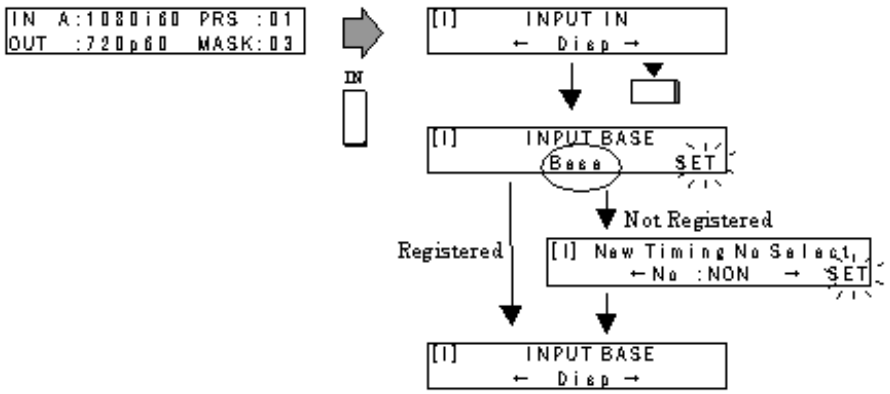
If the Base Input Timing Matches with the Current Output Timing

The first menu of the base adjustment menus will be displayed immediately.
In this case, no adjustment is necessary since the timing is already registered.
Proceed to the adjustment of display device.



If the Base Input Timing Does Not Match with the Current Output Timing

In this case, the word "Base" will be shown on the display as in the diagram below and the letters of the word ”SET” will blink.



At this time, pressing the SET key will start an automatic search for a timing to match with the base input from the registered output timings.

If a matching timing is registered, the current timing will be switched automatically to that output timing and the base image will be displayed. In this case as well, no timing adjustment is necessary.

If the Base Input Has a New Timing

If the base input has a new timing that is not registered, a timing will be automatically generated from the measurement result of the base input to display the base image.

When the display shows the menu for copying the generated data, press the SET key to copy the new timing data to an empty table.

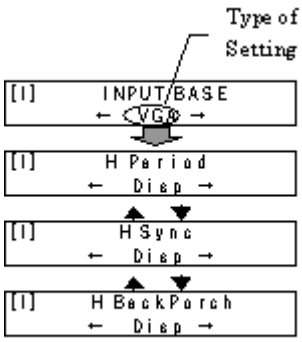
When a base adjustment menu is displayed after copying is complete, adjust the output timing by following the procedure below.

2. Adjustment of Base Timings

When a top level menu of the base adjustment menus appears on the screen, use the ◀ ▶ keys to select a type of setting and press the SET key.

Use the ▲ ▼ keys to display items for setting the output timing in a sequence.

Referring to the tables below, select a type of setting and adjust parameters of the output timing.



<Types of Setting and Items for Setting>

Type of Setting	Description	Items for Setting
Disp	For adjusting image display period	H Disp, H Back Porch, V Disp, V Back Porch
VGA	For image outline known to be VGA	H Period, H Sync, H Back Porch, V Back Porch, Sampling Phase
SVGA	For image outline known to be SVGA	
XGA	For image outline known to be XGA	
SXGA	For image outline known to be SXGA	
UXGA	For image outline known to be UXGA	

<Range of Setting>

Item Name	Content	Range of Setting
H Period	Horizontal period	200 ~ 3000 dots (by 2 dots)
H Disp	Horizontal display period	128 ~ 2000 dots (by 2 dots)
H Sync	Horizontal sync	6 ~ 500 dots (by 2 dots)*1 *2
H Back Porch	Horizontal back porch	0 ~ 1/2 H Period dots (by 2 dots)*2
V Disp	Vertical display period	128 ~ 1320 lines (by 1 line)*3
V Back Porch	Vertical back porch	0 ~ 1/2 V Total lines (by 1 line) *3,*4

*1: H Sync ≤ 1/2 H Period *2: H Sync + H Back Porch ≤ 96

*3: By 2 lines when interlaced *4: V Sync + V Back Porch ≥ 12

Adjustments made so far should cause the output timing to match with a base image input.

This is followed by adjustments of display using test patterns that are shown on the display device. Proceed to "2.2.4 Adjustment of CRT/Projector."

If sampling phase or video level of the base image needs to be adjusted after display device adjustments are complete, either adjustment can be done in the IN mode.

Note that even if sampling phase adjustment is set to "Auto", images may show some instability depending on the base image input. Further adjustment is necessary for an optimal result whenever this occurs.

Type of Setting	Description	Values Set
S.Phase	Base sampling phase adjustment	0 ~ 63 steps, Auto
Video LV	Base video level adjustment R, G, and B signals individually	±10% (0.7±10% V)

If adjustments thus far do not provide a matched image outline:

Changing values of the menus "Line Lock H Phase" and "Line Lock V Phase" under "Output Condition" in the MENU mode can adjust the image outline.

- Line lock phase can be adjusted in the menus under "Output Condition" in the MENU mode.

⇨Refer to page 46.

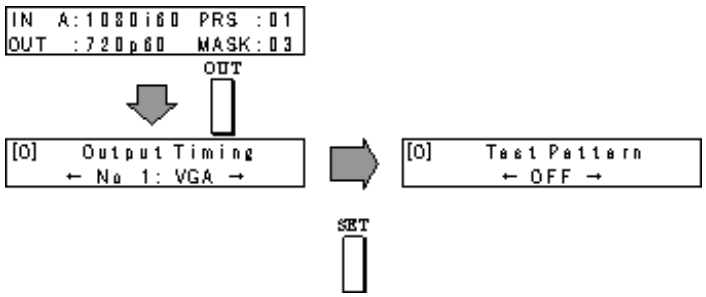
2.2.4 Adjustment of CRT/Projector

Make necessary adjustment of the display device.

Display position and picture quality can be adjusted by outputting test patterns from the SC-2040.

1. Outputting Test Patterns

Output of test patterns can be initiated in the "OUT" mode.



Use the ◀ ▶ keys to select a pattern to output.

Nine test patterns are available for output from the SC-2040 as shown below.

Pattern Name	Description
CROSS HATCH	Grid pattern of lines with 1 dot width and 1 line height
BURST	Repeated pattern of black and white bars
COLOR BAR	Bars of different colors
CIRCLE	True circles shown in the center and four corners of the image display period
CROSS	Two diagonal lines each connecting corners facing each other in the image display period
RAMP	Display of video levels from 0 to 255
FRAME	Frame displayed to the full limit of the image display period
COMP	Display of "CROSS", "CIRCLE", and "FRAME"

- Test pattern output can be activated in the Test Pattern menu under "Output Condition" in the MENU mode.

⇨Refer to page 45.

2. Adjustment of Display Device

(1) Displaying the BURST pattern

Adjust the horizontal display period and the sampling phase of the projector.

(2) Displaying the FRAME pattern

Adjust the image display area of the projector so that the entire frame can be shown.

(3) Perform further adjustments by displaying more patterns as necessary.

When adjustments of the CRT/projector are complete, turn off the test pattern display from the SC-2040. Use the OUT key to climb back up the menu layers to the default screen.

2.2.5 Adjustment of Input Timing

Next, adjust the timing of window input.

If the window input has a registered timing, basically no adjustment is necessary. Adjust the display period and the sampling phase as needed.
On the other hand, if the input timing is one that is not registered, an estimation of the timing is made based on the result of the automatic measurement to display images. However, the display position may need adjustment.
At this time, if the input resolution is known to be one of VGA, XGA, ... etc., that resolution can be selected as the setting type so that the display period can be automatically set, which makes the adjustment so much easier. Among other types of settings available are: "Disp" for adjusting the display period, "S.Phase" for adjusting the sampling phase, and "NON" for adjusting all data.
Note that even if the sampling phase adjustment is set to "Auto", images may show some instability depending on the image input. Further adjustment is necessary for an optimal result whenever this occurs.

- Whether an input timing is one that is registered or not can be determined by indication in the "IN" section on the default screen.
  Registered: Timing name is shown.
  Not registered: ”NEW” is shown.

⇨Refer to page 9.

1. How to Separate the Contents of Adjustment

If the Input Timing is One That is Registered:

In the case where a timing name is indicated in the section of "IN" on the default screen, the timing is automatically set to a video timing which is registered in the unit of SC-2040.

- If no abnormality or unpleasant effect is seen in the image:

  No particular adjustment is required.

- If the image shows some instability:

  The timing is automatically set to a video timing that is registered in the unit of SC-2040, but the sampling phase is off.

  In such a case, select "S.Phase" as the type of setting and adjust the sampling phase.

- If a part of the image is cut off or if the display turns black:

  In some cases timing is automatically set to a video timing that is registered in the unit of SC-2040 but the video input device being used (such as a VCR) may cause a slight offset in the display position.

  If this happens, select "Disp" as the type of setting and adjust the display period.

If the Input Timing is Not One That is Registered:

In the case where the word ”NEW” is indicated in the section of "IN" on the default screen, the timing of the current input is a new timing and not one of those already registered. Here, timing adjustment is required.

- If the resolution is known for the "NEW" timing

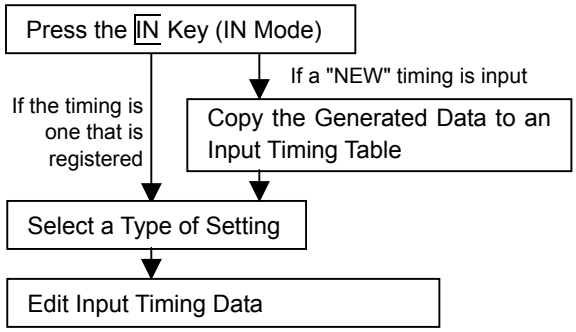
  Select one from VGA, SVGA, XGA, SXGA, and UXGA as the type of setting, and proceed to the adjustment of Hperiod.

- If the resolution is not known or the input timing matches with none that is registered for the "NEW" timing:

  It is necessary to select "NON" as the type of input and make adjustments and settings of all timing data.

Window Input Adjustment Procedure

Timing adjustment for window input is performed in the "IN" mode.



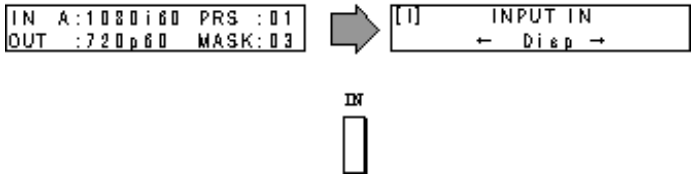
1. Displaying the Window Input Adjustment Menus

Upon entering the IN mode with the IN key, the window adjustment menus are displayed. Ootput images displayed in the window are justified horizontally and vertically (HV Just).

● Even if the window display is set to OFF, the display will be ON during the IN mode.

For Timing That is Registered

Pressing the IN key displays immediately the first of the type of setting selection menus

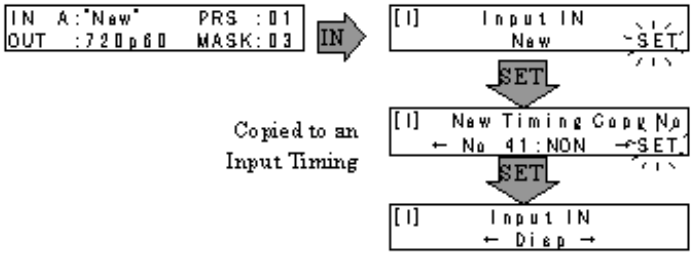


For New Timing

When the IN key is pressed, "NEW" is displayed and then pressing the SET key brings up a menu to copy the input timing data. After pressing the SET key again to copy the new timing table in an empty table, the first of the normal menus from which to select a type of input is displayed.

● If there is no empty timing table available, the copying menu will not be displayed. In this case it is still possible to adjust the input, but edited data cannot be saved. It is necessary to delete un-necessary timing data to make a table available for copying.

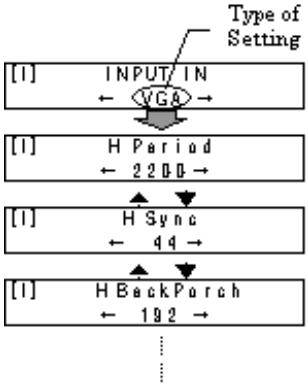
⇨Refer to page 47.



2. Selecting a Type of Setting and Editing Input Timing Data

When a top level menu of the window adjustment menus appears on the screen, use the ◀ ▶ keys to select a type of setting and press the SET key. Use the ▲ ▼ keys to display items for setting the output timing in a sequence.

Note that different menus will be displayed depending on the selected type of setting. Adjust the timing data so that window Input images are displayed fully from end to end with minimal noise.



<Types of Setting and Items for Setting>

Type of Setting	Description	Items for Setting
Disp	For adjusting image display period	H Disp, H Back Porch, V Disp, V Back Porch
VGA	For image outline known to be VGA	H Period, H Sync, H Back Porch, V Back Porch, Sampling Phase
SVGA	For image outline known to be SVGA	
XGA	For image outline known to be XGA	
SXGA	For image outline known to be SXGA	
UXGA	For image outline known to be UXGA	
NON	When the image outline matches with none of the above types requires adjusting of all timing data	H Period, H Disp, H Sync, H Back Porch, V Disp, V Back Porch, Sampling Phase
S.Phase	When adjustments of sampling phase and back porch delay are required	Sampling Phase Backp Delay
ColorSP	When setting for color space is made	Color Space
SchMode	When setting for input signal search mode is made	Search Mode
AT Disp	For performing Auto Disp (automatic display measurement)	None

<Range of Setting>

Item Name	Content	Range of Setting
H Period	Horizontal period	200 ~ 3000 dots (by 2 dots)
H Disp	Horizontal display period	128 ~ 2000 dots (by 2 dots)
H Sync	Horizontal sync	6 ~ 500 dots (by 2 dots)*1 *2
H Back Porch	Horizontal back porch	0 ~ 1/2 H Period dots (by 2 dots)*2
V Disp	Vertical display period	128 ~ 1320 lines (by 1 line)*3
V Back Porch	Vertical back porch	0 ~ 1/2 V Total lines (by 1 line) *3,*4
Sampling Phase	Sampling phase	0 ~ 63 Steps,Auto
Backp Delay	Back porch delay	±4 dots (set in %)
Color Space	Color space	RGB, SMPTE-125M, SMPTE-240M, SMPTE-274M, SMPTE-296M
Search Mode	Input signal search mode	Auto, Fix

*1: H Sync ≤ 1/2 H Period *2: H Sync + H Back Porch ≤ 96
*3: By 2 lines when interlaced *4: V Sync + V Back Porch ≥ 12

When a type of input is selected from VGA to UXGA, images are displayed at 100% horizontal zoom ratio (input dots: output dots = 1:1) to allow setting without scale differences.

If it is difficult to make adjustments:

If input signals are supplied from a PC, drawing "black and white vertical lines" in the entire screen with a graphics editor makes adjustments easier.
In this case, if the H Period value of the SC-2040 is offset, the screen will have a moiré pattern.

When adjustments are complete, use the IN key to go back up the menu layers to the default screen.

2.2.6 Adjustment of Picture Quality

Adjustment of picture quality can be performed independently on input and output video signals.

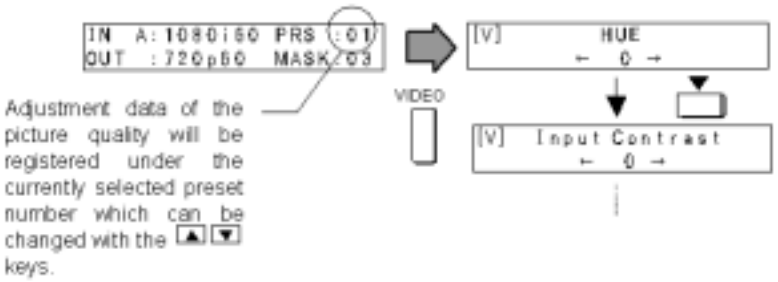
Make necessary adjustments to achieve the desired picture quality.

Adjustment of Input Picture Quality

Picture quality adjustment on window input images is performed in the "Video" mode. Adjustment data can be registered as presets of up to 10 patterns based on differences of input timings.

The number of the preset to be used for display is indicated in the section of "PRS" on the default screen and can be changed with the ▲ ▼ keys.

Adjustments made in the "Video" mode are registered in the preset data that is currently selected.



Adjustment Item	Content of Adjustment	Values Set
HUE	Hue adjustment	0 ~ 360°
Input Contrast	Contrast adjustment	±10%
Input Color	Color adjustment	±10%
Input Brightness	Brightness adjustment	±15Step
Enhance level	Enhancement effect in horizontal and vertical directions	OFF, Lv±1 ~ 4
TBC Mode	Used for input signal with unstable sync (such as from a VCR)	ON/OFF
Zoom Mode (H)	Selection of zoom algorithm, which can be set for H and V individually	Auto1 ~ Auto3, Pixel
Zoom Mode (V)		Auto1 ~ Auto3, Pixel
In Video level (R)	Input video level adjustment	±10% (0.7±10% V)
In Video level (G)		±10% (0.7±10% V)
In Video level (B)		±10% (0.7±10% V)
Flicker Control	Flicker control	OFF, Lv1 ~ 3
Motion Disposal	Motion picture processing mode	OFF, 2:2 pull

Adjustment of Output Picture Quality

Picture quality adjustment on output images is performed in the "OUT" mode.

Adjustment Item	Content of Adjustment	Values Set
Out Video level (R)*	Output video level adjustment	±10% (0.7±10% V)
Out Video level (G)*		±10% (0.7±10% V)
Out Video level (B)*		±10% (0.7±10% V)
Output Contrast	Contrast adjustment	±10%
Output Color*	Color adjustment	±10%
Output Brightness	Brightness adjustment	±15
Out Gamma Mode	Output gamma setting mode	OFF, Gamma, 1/Gamma, User1
Out Gamma Data (R)	Output gamma correction value (R)	1.0 ~ 3.0
Out Gamma Data (G)	Output gamma correction value (G)	1.0 ~ 3.0
Out Gamma Data (B)	Output gamma correction value (B)	1.0 ~ 3.0

* Adjustments of video level and color are available for models SC-2040 and SC-2040B (analog output) only.
Also, color adjustment is effective only when color space is set to YPbPr.

This concludes the basic adjustment.

Once this part of the operation is completed, other functions may be utilized including changing the image display position and size, key composition with a base image and a window image, and more.

Please refer to "4 Setting of Functions" for details.

Note that adjustment data may be saved. IMPORTANT: Save newly adjusted data before turning SC-2040 off. Failure to do so will result in loss of data.

- Saving data is performed under "Memory Operation" in the "MENU" mode.

⇨Refer to page 56.

3 Multi-Screen Installation and Adjustment

This part of the document describes installation and adjustment methods for connecting multiple units of the SC-2040 to configure a multi-screen setting.

3.1 Connection in a Multi-Screen Configuration

Line Lock Connection

When multiple units of the SC-2040 are connected to set up a multi-screen configuration, output timing between all units must be synchronized.

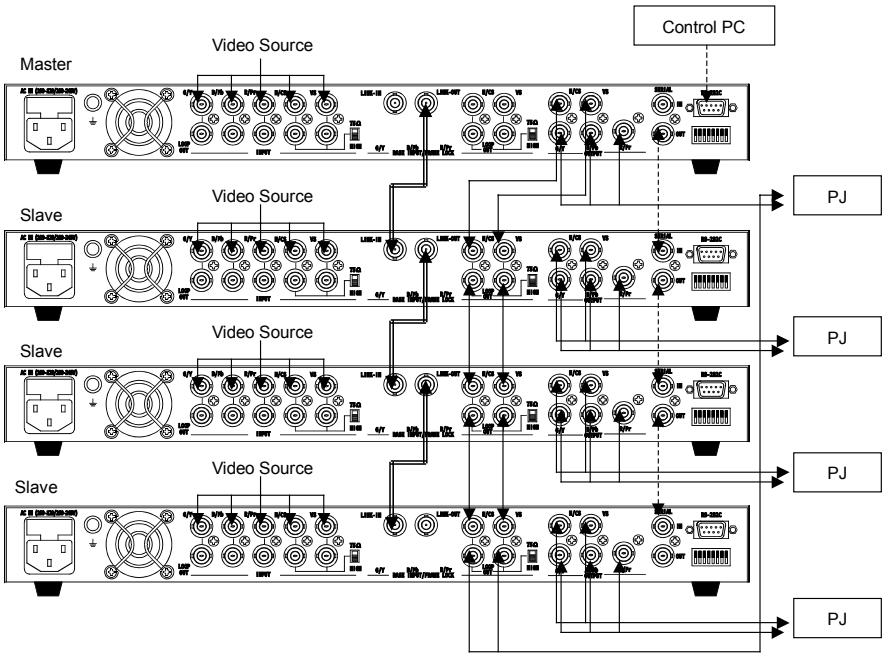
Use the line lock function to synchronize output timing when using models SC-2040 and SC-2040T without base input, and models SC-2040B and SC-2040W when not using base input

For models SC-2040B and SC-2040W, when using base input, all units require base timing signal input having the same timing and the same phase, since output needs to be synchronized with the base input timing.

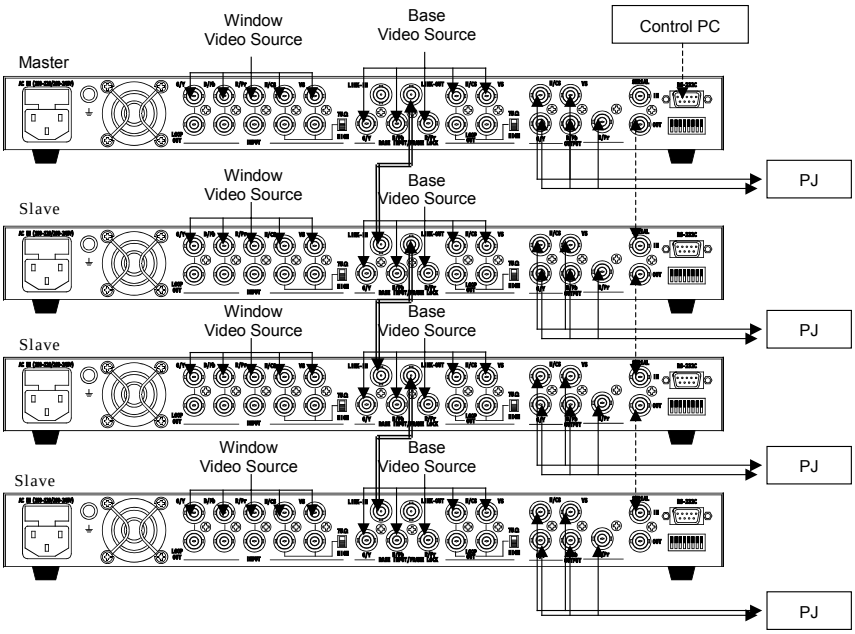
Link Connection

Connecting the Link terminals of the master unit and the slave units to set up the link mode allows correction of motion offsets between individual screens.

Examples of Connections (without Base Input)



Examples of Connections (with Base Input)



When operating multiple units that are connected together, a control PC can be connected to the master unit and all units can be connected on the serial bus. This will provide for centralized control of all units through the serial bus.

- Serial bus setting may be performed under "Configuration" in the "MENU" mode.

⇨Refer to page 54.

3.2 Adjustment in a Multi-Screen Configuration

Even in a multi-screen configuration, individual adjustments on units of the SC-2040 are necessary.

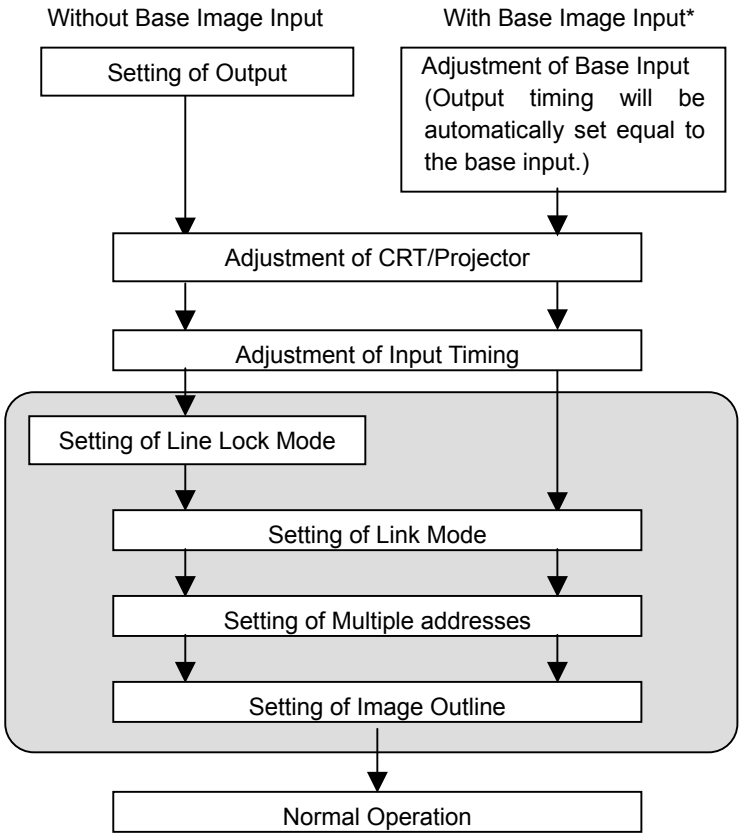
Adjustment methods for "setting of output", "adjustment of base input", "adjustment of CRT/projector", and "adjustment of input timing" are the same as performed in a single unit configuration.

Refer to "2.2 Basic Adjustment" to make adjustments on multiple units of the SC-2040. (Number of units corresponding to number of screens)

When adjustments on individual units are complete, proceed to adjustments on the multi-screen configuration.

Additional required steps are: "setting of line lock mode" (without base image input), "setting of link mode", "setting of multiple addresses", and "adjustment of image outline".

Adjustment Procedures in a Multi-Screen Configuration



(1) Setting of Line Lock

When no base input is supplied (or used), line lock should be set up to synchronize the output timing of the multiple units of the SC-2040.

Provide setting of lock mode to each unit in the relevant menu under "Output Condition" in the "MENU" mode.

	Values Set for Lock Mode
SC-2040 Master*	OFF
SC-2040 Slave	LineLock

* One unit must be set as the master in both the line lock settings and the link mode settings.

(2) Setting of Link Mode

Link mode may be set up to correct for motion offsets between individual screens.

Provide setting of link mode to each unit in the relevant menu under "Output Condition" in the "MENU" mode.

	Values Set for Link Mode
SC-2040 Master*	Master
SC-2040 Slave	Slave

* One same unit needs to be set as the master in both the line lock settings and the link mode settings.

- Attention required on line lock phase when link mode is used

⇨Refer to page 46.

(3) Setting of Multiple Addresses

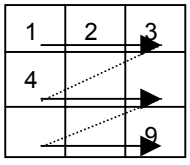
Multiple addresses are set up for recognition of the number of screens and their relative positions under a multi-screen configuration.

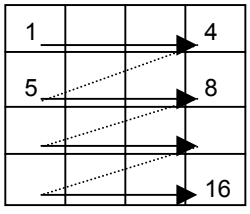
Provide settings of multiple addresses to each unit in the relevant menus under "Configuration" in the "OUT" mode or the "MENU" mode.

Item for Setting	Description
Multi Compose (H)	Number of screens in horizontal direction [1~20]
Multi Compose (V)	Number of screens in vertical direction [1~20]
Multiple addresses	Address under multi-screen setting [0~100]

The number of screens configurable is within the range H x V ≤100.

Settings of multiple addresses (see diagrams below)

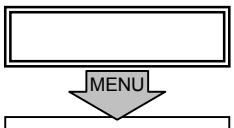




4 Setting of Functions

Detailed settings of functions can be made in the "MENU" mode.

When the MENU key is pressed while the default screen is displayed, the first menu that appears on the screen is the "Mask Create" (mask table editing) menu. Make further changes on the menu display using the ▲ ▼ keys. Eight functional menus can be displayed in sequence as shown below.



Mask Create
Set display position of window images and base images.
⇨ Refer to "4.1 Setting of Display Position and Size".

Input Condition
Set input environment.
⇨ Refer to "4.2 Setting of Input Environment".

Output Condition
Set output environment.
⇨ Refer to "4.3 Setting of Output Environment".

Input Timing Table Utility
Edit, copy, delete, replace, and initialize registered input timing data.
⇨ Refer to "4.4 Editing of Input Timing Table".

Output Timing Table Utility
Edit, copy, delete, and initialize registered output timing data.
⇨ Refer to "4.5 Editing of Output Timing Table".

Preset Table Utility
Edit, copy, delete, and initialize preset data saved for each input timing.
⇨ Refer to "4.6 Editing of Preset Table".

Configuration
Set communications speed and divide ID when remotely controlling the SC-2040 and conditions for multi-screen configuration.
⇨ Refer to "4.7 Setting of Other Items".

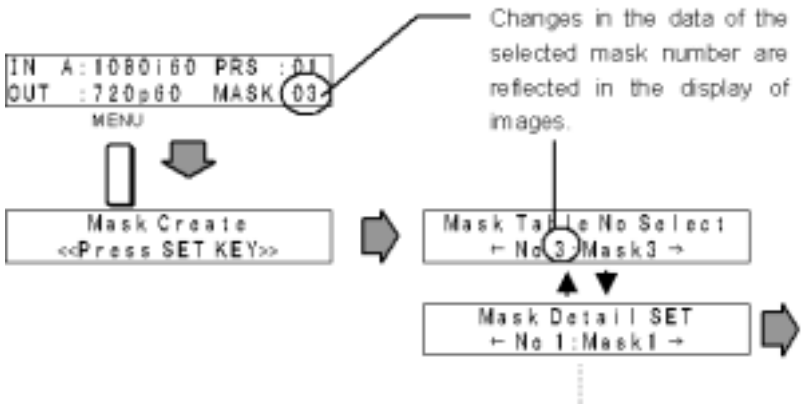
Memory Operation
Save and load settings data and initialize it to the factory default.
⇨ Refer to "4.8 Data Saving".

4.1 Setting of Display Position and Size

Available settings in the menus under "Mask Create" in the "MENU" mode concerns display positions, the window frame of window images and base images. Settings data is saved in a mask table.

- Window image display position can be quickly set with the SET and IN keys.

⇨Refer to page 39.



<Menu Overview>

Mask Create	⇨	Set Mask Table Number		
		Set Mask Table Detail	⇨	Set Window Display ON
		Set Display Rate		Set Frame Display ON
		Set Frame Color		Set Input Crop Position
		Set Base Display ON		Set Output Position
		Set Base Color		Set Display Position
		Set Base Display Position		
		Set Key Composition		

(1) Set Window Display ON or OFF

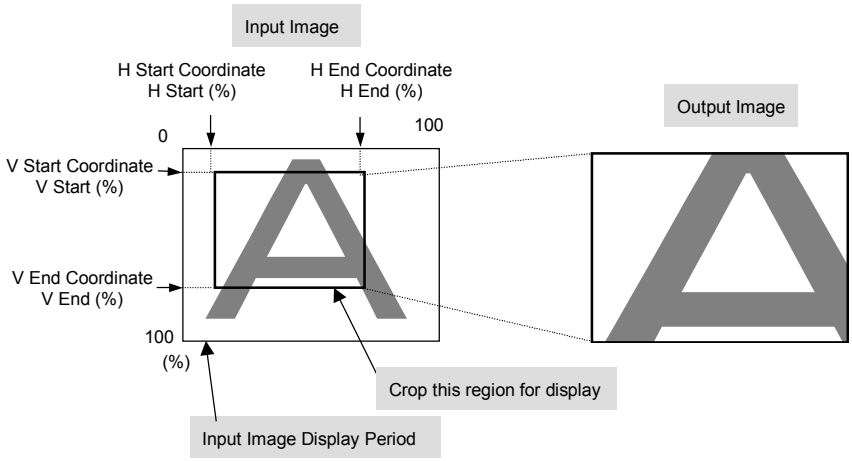
Item for Setting	Content of Adjustment/Values Set
Display	Display or not display window. [ON] [OFF]

(2) Display Window Frame

Item for Setting	Content of Adjustment/Values Set
Frame	Display or not display window frame. [ON] [OFF]
Frame Color	Set frame color to be displayed in the window. Select from the eight colors available. [Black] [Red] [Green] [Yellow] [Blue] [Magenta] [Cyan] [White]

(3) Set Crop Position of Window Image

Item for Setting	Content of Adjustment/Values Set
Window Input H Start	Set coordinates to crop the window input image. Select ratios against the input display period. [0.000 ~ 100.000%]
Window Input H End	
Window Input V Start	
Window Input V End	

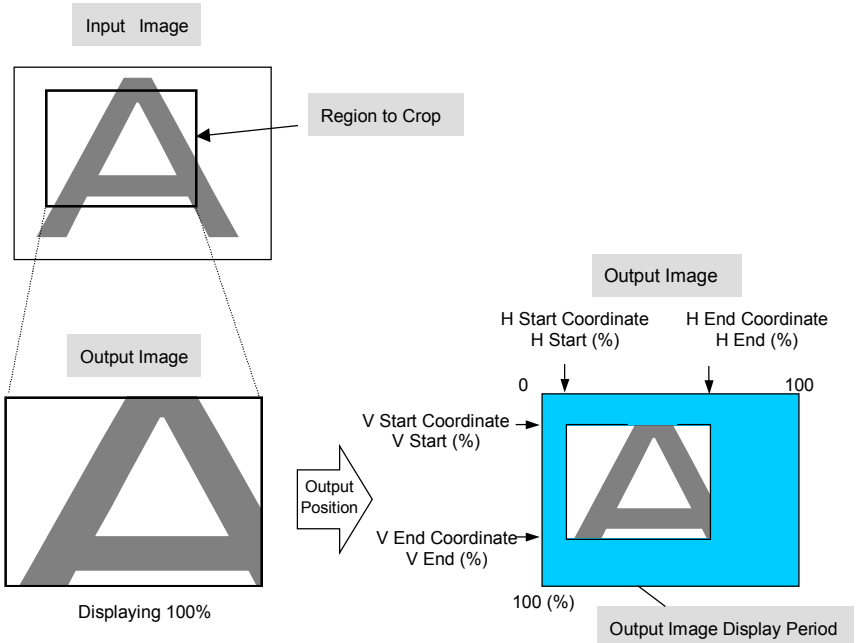


- Window image display position can be quickly set with the SET and IN keys.

⇨Refer to page 39.

(4) Set Output Position of Window Image

Item for Setting	Content of Adjustment/Values Set
Window Output H Start	Set coordinates to output the window output image. Select ratios against the output display period. [0.000 ~ 100.000%]
Window Output H End	
Window Output V Start	
Window Output V End	

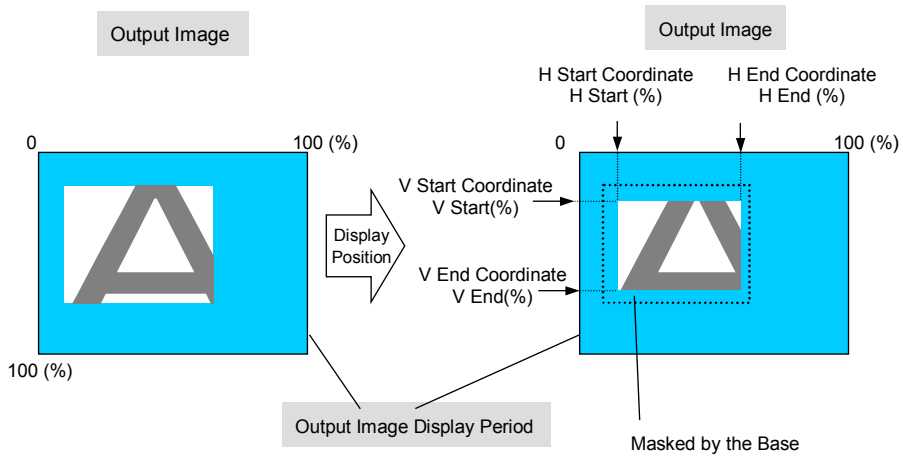


- Window image display position can be quickly set with the SET and the IN keys.

⇨Refer to page 39.

(5) Set Display Position of Window Image

Item for Setting	Content of Adjustment/Values Set
Window Mask H Start	Set coordinates to display the window output image. Select ratios against the output display period. [0.000 ~ 100.000%]
Window Mask H End	
Window Mask V Start	
Window Mask V End	

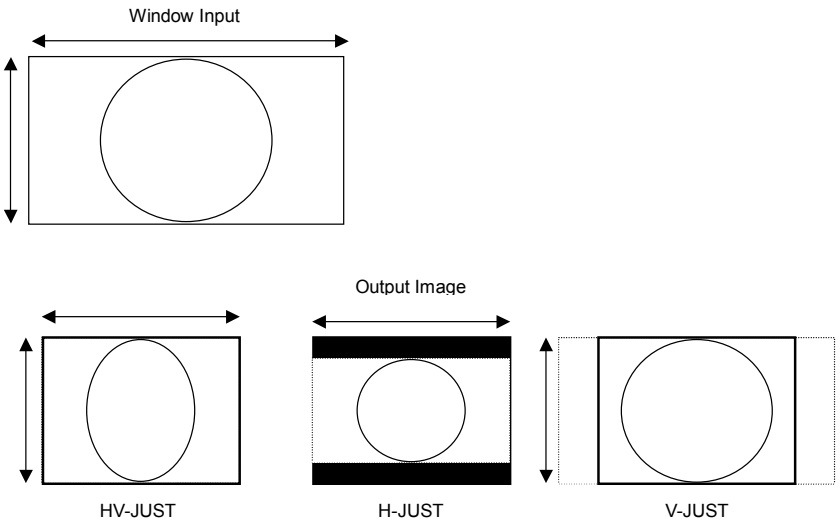


●Conditions for Setting Output and Display Coordinates

Output H Start ≤ Mask H Start, Output H End ≥ Mask H End
Output V Start ≤ Mask V Start, Output V End ≥ Mask V End

(6) Set Display Rate of Window Image

Item for Setting	Content of Adjustment/Values Set
Display Rate	[HV Just] Display full window input image from edge to edge of the output screen horizontally and vertically.
	[H Just] Display the horizontal full length of window input image from edge to edge horizontally of the output screen keeping the aspect ratio.
	[V Just] Display the vertical full length of the window input image from edge to edge vertically of the output screen keeping the aspect ratio.



(7) Set Base Display ON or OFF

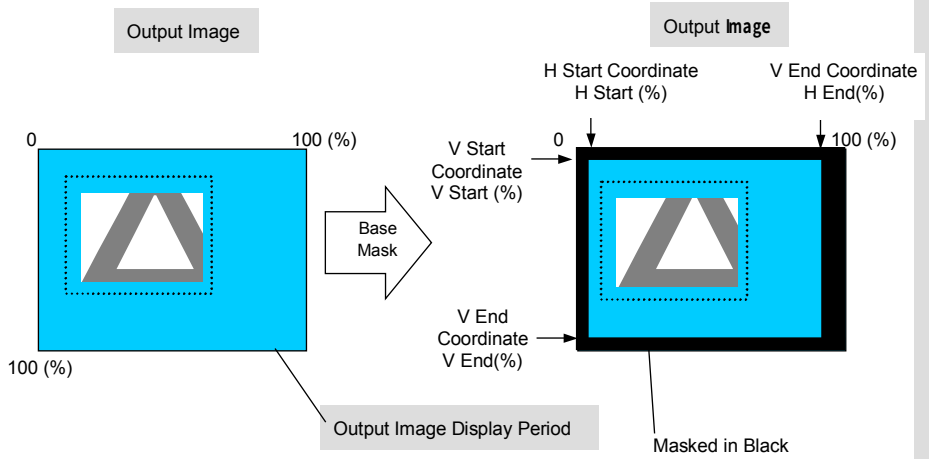
Item for Setting	Content of Adjustment/Values Set
Base Indicate	Display or not display base. [ON] [OFF]

(8) Change Base Color

Item for Setting	Content of Adjustment/Values Set
Base Color	Set base color for the case without base image. Select from the eight colors available. [Black] [Red] [Green] [Yellow] [Blue] [Magenta] [Cyan] [White]

(9) Set Display Position of Base

Item for Setting	Content of Adjustment/Values Set
Base Mask H Start	Set effective display position for base. Select ratios against the output display period. [0.000 ~ 100.000%]
Base Mask H End	
Base Mask V Start	
Base Mask V End	

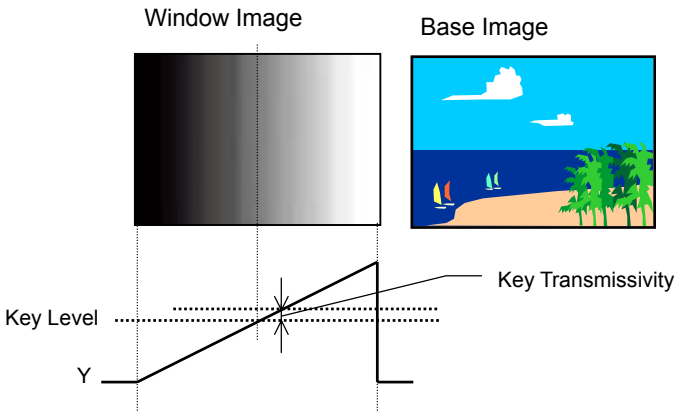


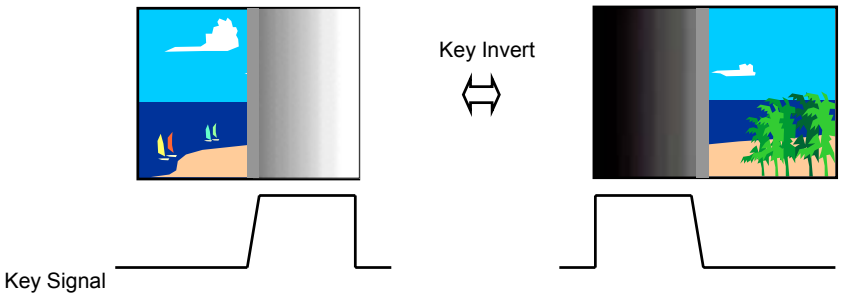
(10) Execute Key Composition

A base image and a window image are brought into key composition with the Y signal as the key.

Item for Setting	Content of Setting/Values Set
Key Composition	Set key composition on or off. [ON] [OFF]
Key Level	Display window image if window image level is greater than the key level set; display base image if less. [0 ~ 100%]
Key Transmissivity	Set transmissivity of overlapping area of window image and base image in key composition. [0 ~ 100%]
Key Invert	Invert the display of window image and base image in key composition. [ON] [OFF]

* Key composition is available only with the models SC-2040B and SC-2040W.



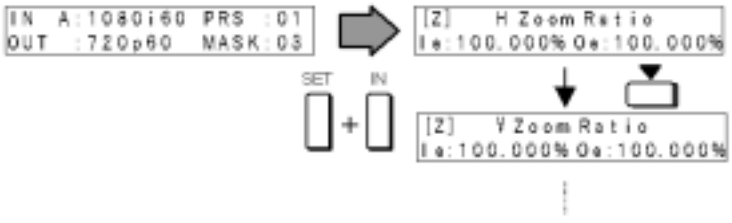


- If the value of Key Transmissivity is large, some noise may be seen on the screen.
- If ringing distortion and/or enhanced components are present in the image, an abnormality or unpleasant effect may be seen in the outline area of the resulting image of key composition. If this occurs, changing the parameters of "Zoom Mode (H)", "Zoom Mode (V)", and "Enhance level" may improve the situation as described in "4.6(1) Edit Preset Data".

4.1.1 Quick Setting Method of Image Outline

In the menus under "Mask Create" in the "MENU" mode, coordinates of H Start, H End, V Start, and V End for input crop position of window images as well as for window image output positions need to be individually specified to adjust image display position and size. However, image outlines can be easily adjusted by using the simplified function for setting image outlines.

Pressing the IN key while depressing the SET key when the default screen is displayed brings up the first menu of the simple adjustment of images outline.

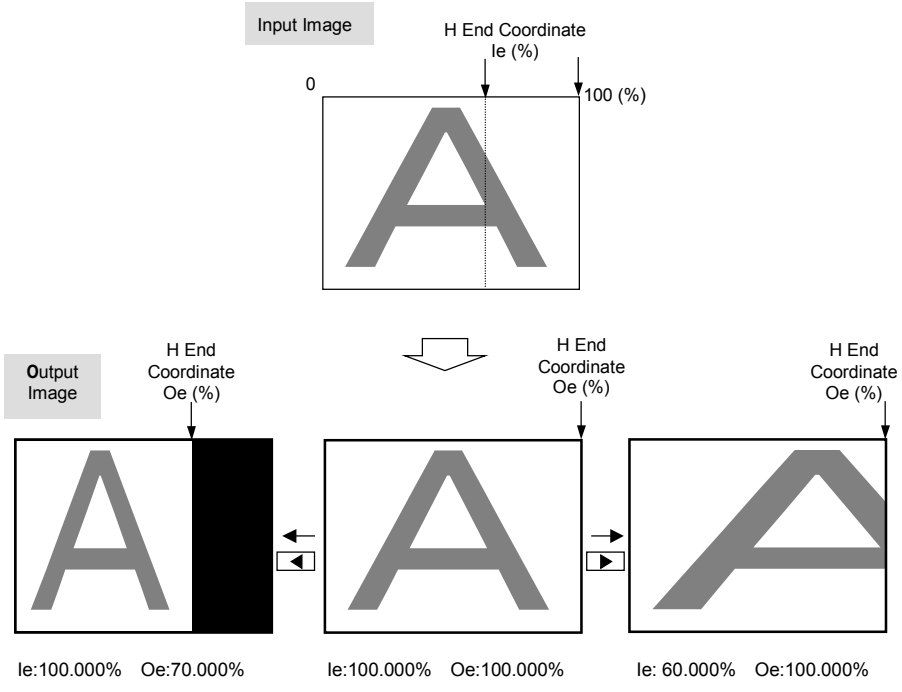


(1) Zoom In and Out on the Image to Set Image Outline

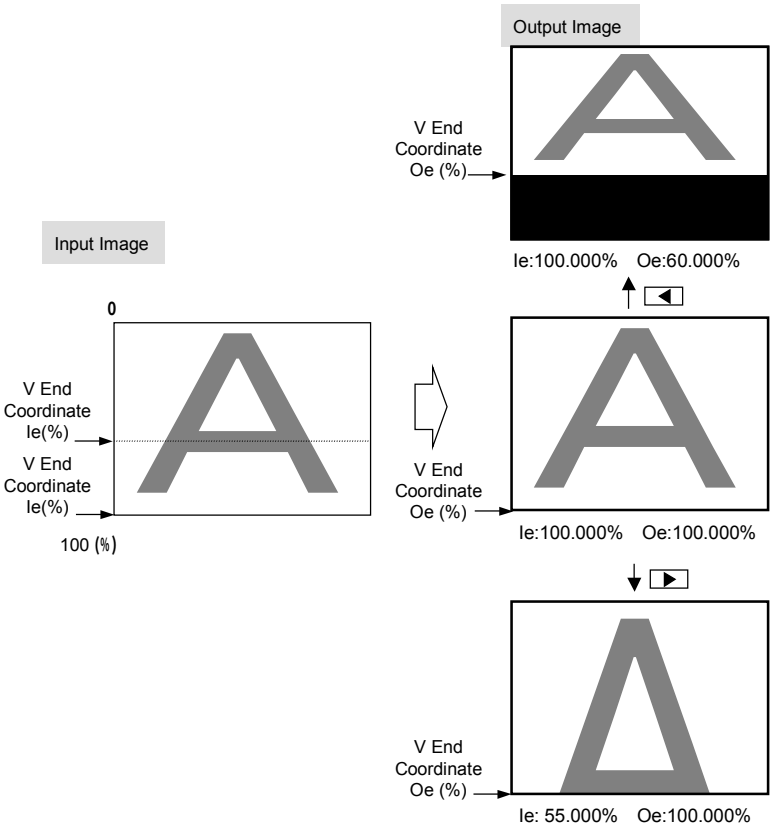
By zooming in and out on the actual display image to set the desired image outline, input crop coordinates and output coordinates of the window image can be set automatically.

Zooming is available independently in horizontal and vertical directions.

Item for Setting	Content of Adjustment/Values Set
H Zoom Ratio	Use the ◀ key to shrink the image horizontally, and the ▶ key to enlarge. H End coordinate for input crop (Ie) and H End coordinate for output (Oe) are set automatically. [0.001 ~ 100.000%]



Item for Setting	Content of Adjustment/Values Set
V Zoom Ratio	Use the ◀ key to shrink the image vertically, and the ▶ key to enlarge. V End coordinate for input crop (Ie) and V End coordinate for output (Oe) are set automatically. [0.001 ~ 100.000%]

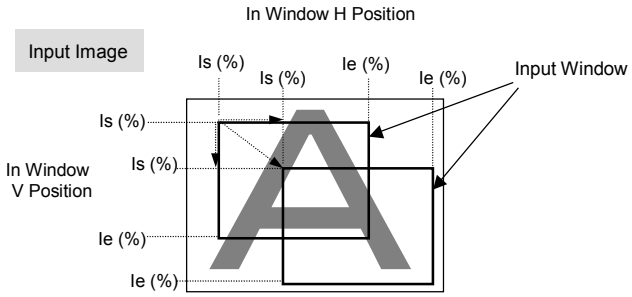


(2) Adjust Input Window Position

The position of crop image area (input window) determined by the coordinates H Start, H End, V Start, and V End for input crop can be easily adjusted while viewing the status of actual display image.

Position adjustment can be performed on the window image keeping the relative positions of coordinates.

Item for Setting	Content of Adjustment/Values Set
In Window H Position	Input window moves in the negative horizontal direction with the ◀ key and in the positive horizontal direction with the ▶ key. Input H Start coordinate (Is) and Input H End coordinate (Ie) are automatically set. [0.000 ~ 100.000%]
In Window V Position	Input window moves in the negative vertical direction with the ◀ key and in the positive vertical direction with the ▶ key. Input V Start coordinate (Is) and Input V End coordinate (Ie) are automatically set. [0.000 ~ 100.000%]

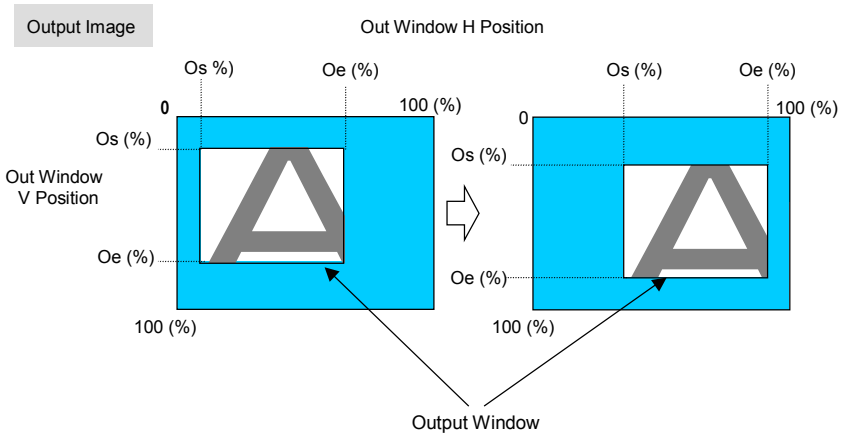


(3) Adjust Output Window Position

The position of output image area (output window) determined by the coordinates H Start, H End, V Start, and V End for output can be easily adjusted while viewing the status of actual display image.

Position adjustment can be performed on the window image keeping the relative positions of coordinates.

Item for Setting	Content of Adjustment/Values Set
Out Window H Position	Output window moves in the negative horizontal direction with the ◀ key and in the positive horizontal direction with the ▶ key. Output H Start coordinate (Os) and Output H End coordinate (Oe) are automatically set. [0.000 ~ 100.000%]
Out Window V Position	Output window moves in the negative vertical direction with the ◀ key and in the positive vertical direction with the ▶ key. Output V Start coordinate (Os) and Output V End coordinate (Oe) are automatically set. [0.000 ~ 100.000%]



4.2 Setting of Input Environment

Environment setting for input can be prepared in the menus of "Input Condition".

<Menu Overview>

Input Condition	⇨	Set Preset Number
		Set Input Search Mode
		Set Fixed Timing
		Freeze
		Set Operation in Sync Loss State
		Input Gamma Correction
		Adjust Base Sampling (only SC-2040B/W)
		Adjust Base Video Level (only SC-2040B/W)

(1) Select a Preset Number

Item for Setting	Content of Setting/Values Set
Preset No Select Set	Select a preset number to be used for the current display. Procedure is the same as changing presets by pressing the up and down keys in the default screen.

- Procedure to change presets in the default screen.

⇨Refer to page 8.

(2) Change Input Search Mode

If window input is too unstable to cause errors in automatic input search, input timing can be fixed.

Item for Setting	Content of Setting/Values Set
Input Search Mode	Set whether to automatically search input or fix the timing upon change of input sync signals. [Auto] [Fix]
Input Fix Timing	Select a fixed timing number for fixed input mode.

If sync is lost during fixed input mode, displayed image may be disturbed for an instant.

(3) Freeze the Image

Item for Setting	Content of Setting/Values Set
Freeze	Freeze the display image. [OFF] [ON] [EX1-ON] [EX2-ON]

EX-ON settings are used to freeze images for smooth switching of the display when input signals are changed. In a normal freeze ON state, sync loss color is displayed when sync is lost, whereas in an EX-ON state, the frozen picture is kept on display.

EX1-ON is cancelled manually and EX2-ON is cancelled automatically.

(4) Change Setting for Operation in Sync Loss State

Item for Setting	Content of Setting/Values Set
Sync Loss Mode	Select operation upon loss of input sync. [Black] [Red] [Green] [Yellow] [Blue] [Magenta] [Cyan] [White] [Win OFF] (Window display OFF)

(5) Correct Input Gamma

Item for Setting	Content of Setting/Values Set
Input Gamma Mode	Select setting of input gamma. [OFF] [Gamma] [1/Gamma] [User1 ~ 4]
In Gamma Data (R)	Input Gamma Correction Value (R) [1.0 ~ 3.0]
In Gamma Data (G)	Input Gamma Correction Value (G) [1.0 ~ 3.0]
In Gamma Data (B)	Input Gamma Correction Value (B) [1.0 ~ 3.0]

(6) Adjust Sampling Phase and Video Level of Base Input (SC-2040B/W Only)

Item for Setting	Content of Setting/Values Set
Base Sampling Phase	Adjust the sampling phase of base image. [0 ~ 63] [Auto]
Base Video level (R)	Adjust the video level of base input. (0.7±10% V) [±10%]
Base Video level (G)	
Base Video level (B)	

4.3 Setting of Output Environment

Environment setting for output can be set in the menus under "Output Condition".

<Menu Overview>

Output Condition ⇨	Select Output Mask Number
	Select Output Timing
	Adjust Output Video Level (SC-2040/B only)
	Set Scan Conversion OFF (SC-2040/B only)
	Set Output Sync (SC-2040/B only)
	Set Polarity of Output Sync
	Output Test Patterns
	Adjust Output Picture Quality
	Set Output Color Space (SC-2040/B only)
	Output Gamma Correction
	Set Link Mode
	Set External Sync
	Display Arbitrary Characters on OSD

(1) Select an Output Mask Number

Item for Setting	Content of Setting/Values Set
Mask Table Select Set	Select a mask number to be used for the current display. Procedure is the same as changing masks by pressing the left and right keys in the default screen.

- Procedure to change masks in the default screen.

⇨Refer to page 8.

(2) Change Output Timings

Item for Setting	Content of Setting/Values Set
Output Timing	Change output timings. This is also possible in the OUT mode.

(3) Adjust Output Video Level (SC-2040/B Only)

Item for Setting	Content of Setting/Values Set
Out Video level (R)	Adjust the video level of output (0.7±10% V) [±10%]
Out Video level (G)	
Out Video level (B)	

(4) Set Scan Conversion OFF (SC-2040/B Only)

Item for Setting	Content of Setting/Values Set
Scan Convert	[OFF] Select this to feed input signals to the output terminals without scan conversion. [ON] Select this to scan convert input signals.

(5) Set Output Sync

Item for Setting	Content of Setting/Values Set
Output Sync Type*1	Select an output sync type. [H/V] [CS] [3s]
Output Sync Level*2	Select an output sync level. [TTL] [0.3V]
Output Sync On*3	Select an output sync-on-video. [Gon] [RGBon] [OFF]
Output Sync Polarity	Select an output sync polarity. [Nega] [Posi]

*1 Sync Type: For models SC-2040 and SC-2040B only

*2 Sync Level: For models SC-2040 and SC-2040B only

*3 Sync On: For models SC-2040 and SC-2040B only

(6) Output Test Patterns

Item for Setting	Content of Setting/Values Set
Test Pattern	Output test patterns. This setting is also possible in the OUT mode. [OFF] [CROSS HATCH] [BURST] [COLOR BAR] [CIRCLE] [CROSS] [RAMP] [FRAME] [COMP]

(7) Adjust Output Picture Quality

Item for Setting	Content of Setting/Values Set
Output Contrast	Adjust contrast. [±10%]
Output Color*	Adjust colors. [±10%]
Output Brightness	Adjust brightness. [±15]

* Color: For models SC-2040 and SC-2040B only

(8) Change Output Color Space (SC-2040/B Only)

Item for Setting	Content of Setting/Values Set
Output Color Space	Select output color space. [RGB] [SMPTE-125M] [SMPTE-240M] [SMPTE-274M] [SMPTE-296M]

(9) Correct Output Gamma

Item for Setting	Content of Setting/Values Set
Out Gamma Mode	Select setting of output gamma. [OFF] [Gamma] [1/Gamma] [User1]
Out Gamma Data (R)	Output Gamma Correction Value. [1.0 ~ 3.0]
Out Gamma Data (G)	
Out Gamma Data (B)	

(10) Select Setting for Link Mode (in Multi-Screen Configuration)

Item for Setting	Content of Setting/Values Set
Link Mode	Select a setting in a multi-screen configuration. [OFF] Link mode not used. [Master] Set as the master unit in link connection. [Slave] Set as a slave unit in link connection.

(11) Select Setting of External Lock Function

Item for Setting	Content of Setting/Values Set
Lock Mode	[OFF] External sync not used. [LineLock] Line lock. [FrameLock] Frame lock.
Line Lock H Phase Set	Adjust line lock output phase (H) [±999 dot]
Line Lock V Phase Set	Adjust line lock output phase (V) [±2048 line]
Frame Lock H Phase Set	Frame line lock output phase (H) [±999 dot]
Frame Lock V Phase Set	Frame line lock output phase (V) [±2048 line]

Adjustment of Line Lock Phase When Link Mode is Used

If [Slave] is selected as the link mode setting, change the phase settings as below:

Line Lock H Phase Set = 0

Line Lock V Phase Set = 0

Frame Lock H Phase Set = 0

Frame Lock V Phase Set = 0

NOTE: Any setting deviating from above may not provide proper function or operation.

Adjustment of Frame Lock Phase for Interlaced Input and Output

Upon using interlaced timing for both input and output, if adjustment value of the frame lock phase (V) falls within the range below, the input and output fields match:

- Vtotal / 4 ≤ Frame Lock V Phase ≤ 0

NOTE: Any adjustment value outside the above range may not result in matched input and output fields.

(12) Display Arbitrary Characters on OSD

Item for Setting	Content of Setting/Values Set
OSD Text Dsp	Display OSD arbitrary characters in the upper left area of the screen. [OFF] [ON]
OSD Text Edit	Edit arbitrary characters displayed on OSD. [Not more than 8 ASCII characters]

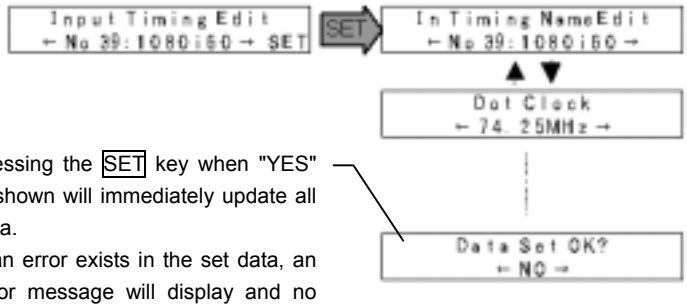
4.4 Editing of Input Timing Table

Menus under "Input Timing Table Utility" can be used to edit, copy, swap, initialize, and delete all data registered in input timing tables.

- Editing the timing data used for the current input causes the changes reflected in displayed images.

Item for Setting	Description
Input Timing Edit	Edit any of the input timing data that are registered.
Input Timing Delete	Delete input timing data. Note that input timing used for the current input and timing data assigned as the FIX timing cannot be deleted.
Input Timing Copy	Copy input timing data to an empty table. Overwriting is not possible.
Input Timing Swap	Swap input timing data. Note that input timing used for the current input and timing data assigned as the FIX timing cannot be swapped
Input Timing Init	Initialize input timing data to the factory default.
Input Timing Search	Set a table(s) as subject for automatic input search.

(1) Edit Input Timing Data



Pressing the SET key when "YES" is shown will immediately update all data.
If an error exists in the set data, an error message will display and no data can be registered.

Item for Setting	Description	
Name	Timing Name	Arbitrary name within 8 ASCII characters
Dot Clock	Dot Clock	17.00 ~ 162.00 (by 0.01MHz)*1
H Period	Horizontal Period	200 ~ 3000 dots (by 2 dots)
H Disp	Horizontal Display Period	128 ~ 2000 dots (by 2 dots)
H Sync	Horizontal Sync	6 ~ 500 dots (by 2 dots)*2 *3
H Back Porch	Horizontal Back Porch	0 ~ 1/2 H Period dot (by 2 dots)*3
V Total	Vertical Total Lines	200 ~ 2000 lines (by 1 line)
V Disp	Vertical Display Period	128 ~ 1320 lines (by 1 line)*4
V Sync	Vertical Sync	2 ~ 60 lines (by 1 line)*4 *5
V Back Porch	Vertical Back Porch	0 ~ 1/2 V Total lines (by 1 line)*4 *5
Scan	Scan Method	Interlace/Progressive

*1 17.00 ~ 81.00 MHz when interlaced
*2 H Sync ≤ 1/2 H Period
*3 H Sync + H Back Porch ≥ 96
*4 By 2 lines when interlaced
*5 V Sync + V Back Porch ≥ 12

(2) Copy Input Timing Data

Item for Setting	Description
Copy Timing No Select	Set a table number as the source of copy.
New Timing No Select	Set a table number as the target of copy.

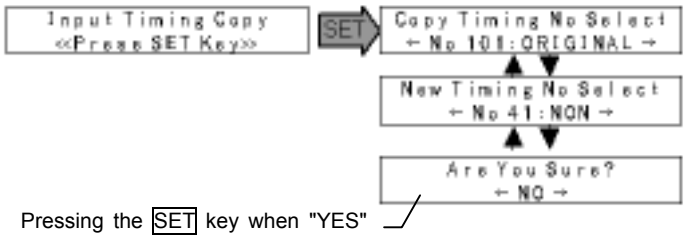
(3) Swap Input Timing Data

Item for Setting	Description
Swap Timing No Select1	Select the first table number for swapping.
New Timing No Select2	Select the second table number for swapping.

(4) Initialize Input Timing Data

Item for Setting	Description
ROM Timing No Select	Select the default data table number.
RAM Timing No Select	Select a data table number for operation.

Common to (2) ~ (4) above



Pressing the SET key when "YES" is shown will immediately update all data.

(5) Set Table as Subject for Automatic Input Search

Item for Setting	Description
Input Timing No Select	[Table No.] Set the selected table as subject for search. [ALL] Set all the table as subject for search.
Window Search	[ON] Activate as subject for automatic search. [OFF] Deactivate as subject for search.

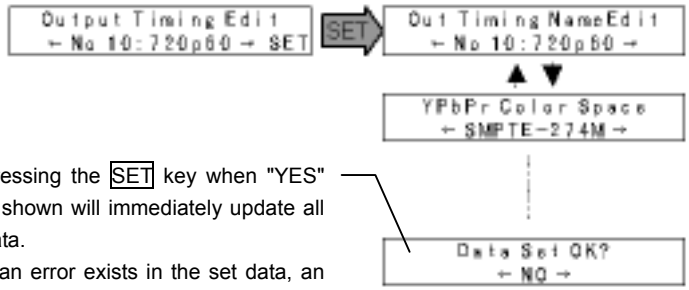
4.5 Editing of Output Timing Table

Menus under "Output Timing Table Utility" can be used to edit, copy, initialize, and delete all data registered in output timing tables.

● Editing the current timing data causes the changes to be reflected in displayed images.

Item for Setting	Description
Output Timing Edit	Edit any output timing data that is registered.
Output Timing Delete	Delete output timing data. Note that output timing used for the current input cannot be deleted.
Output Timing Copy	Copy output timing data to an empty table. Overwriting is not possible.
Output Timing Init	Initialize output timing data to the factory default.

(1) Edit Output Timing Data



Pressing the SET key when "YES" is shown will immediately update all data.
If an error exists in the set data, an error message will display and no data can be registered.

Item for Setting	Description	
Name	Timing Name	Arbitrary name within 8 ASCII characters
Dot Clock	Dot Clock	17.00 ~ 162.00 (by 0.01MHz)*1
H Period	Horizontal Period	200 ~ 3000 dots (by 2 dots)
H Disp	Horizontal Display Period	128 ~ 2000 dots (by 2 dots)
H Sync	Horizontal Sync	6 ~ 500 dots (by 2 dots)*2 *3
H Back Porch	Horizontal Back Porch	0 ~ 1/2 H Period dot (by 2 dots)*3
V Total	Vertical Total Lines	200 ~ 2000 lines (by 1 line)
V Disp	Vertical Display Period	128 ~ 1320 lines (by 1 line)*4
V Sync	Vertical Sync	2 ~ 60 lines (by 1 line)*4 *5
V Back Porch	Vertical Back Porch	0 ~ 1/2 V Total lines (by 1 line)*4 *5
Scan	Scan Method	Interlace/Progressive

*1 17.00 ~ 81.00 MHz when interlaced
*2 H Sync ≤ 1/2 H Period
*3 H Sync + H Back Porch ≥ 96
*4 By 2 lines when interlaced
*5 V Sync + V Back Porch ≥ 12

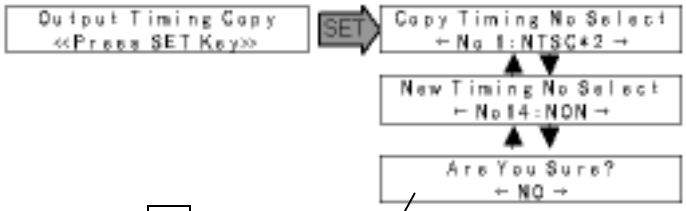
(2) Copy Output Timing Data

Item for Setting	Description
Copy Timing No Select	Set a table number as the source of copy.
New Timing No Select	Set a table number as the target of copy.

(3) Initialize Output Timing Data

Item for Setting	Description
ROM Timing No Select	Select the default data table number.
RAM Timing No Select	Select a data table number for operation.

Common to (2) ~ (3) above



Pressing the SET key when "YES" is shown will immediately update all data.

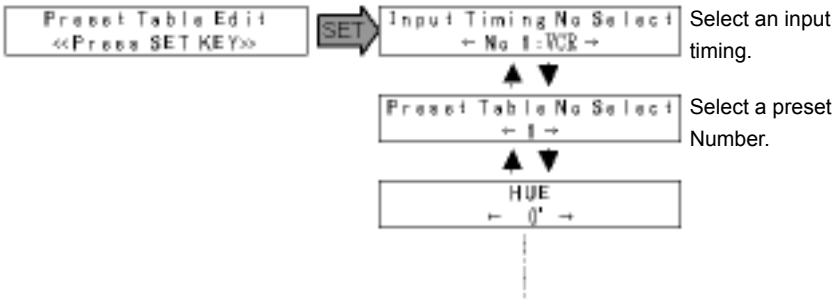
4.6 Editing of Preset Table

Menus under "Preset Table Utility" can be used to edit, copy, and initialize all data registered in preset tables.

- Editing the preset data that is currently selected causes the changes to be reflected in displayed images.

Item for Setting	Description
Preset Table Edit	Edit any preset data that is registered.
Preset Table Copy	Copy preset data to an empty table. Overwriting is not possible.
Preset Table Init	Initialize preset data to the factory default.

Preset data is included in each input timing. First select an input timing and then select a preset number to edit.



(1) Edit Preset Data

Preset data that is used for the current display can be adjusted in "VIDEO" mode. (Sampling phase and back porch delay can be edited in the "IN" mode.)

Item for Setting	Description	
HUE	Hue adjustment	0 ~ 360°
Input Contrast	Contrast adjustment	±10%
Input Color	Color adjustment	±10%
Input Brightness	Brightness adjustment	±15Step
Enhance level	Enhancement effect in horizontal and vertical directions	OFF, Lv±1 ~ 4
TBC Mode	Used for input signal with unstable sync (such as from a VCR)	ON/OFF
Zoom Mode (H)	Selection of zoom algorithm, which can be set for H and V individually	Auto1 ~ Auto3, Pixel
Zoom Mode (V)		Auto1 ~ Auto3, Pixel
Sampling Phase	Sampling phase	0 ~ 63,Auto
Backp Delay	Back porch delay	±4 dots (set in %)
Input Color Space	Input color space	RGB,SMPTE-125M SMPTE-240M, SMPTE-274M SMPTE-296M
In Video level (R)	Input video level adjustment	±10% (0.7±10% V)
In Video level (G)		±10% (0.7±10% V)
In Video level (B)		±10% (0.7±10% V)
Flicker Control	Flicker control	OFF, Lv1 ~ 3
Motion Disposal	Motion picture processing mode	OFF, 2:2 pull

(2) Copy Preset Data

Item for Setting	Description
Copy Preset No Select	Set a table number as the source of copy.
New Preset No Select	Set a table number as the target of copy.

(3) Initialize Preset Data

Item for Setting	Description
Init Preset No Select	Select a preset table number to be initialized.

<Preset Table Initialization Values>

Item for Setting	Initial Values
HUE	0°
Input Contrast	0%
Input Color	0%
Input Brightness	0
Enhance level	OFF
TBC Mode	OFF
Zoom Mode (H)	Auto1
Zoom Mode (V)	Auto1
Sampling Phase	Auto
Backp Delay	0.000%
Input Color Space	RGB
In Video level (R)	0%
In Video level (G)	0%
In Video level (B)	0%
Flicker Control	OFF
Motion Disposal	OFF

4.7 Setting of Other Items

Menus under "Configuration" can be used to set the communications environment for remote controlling the SC-2040 from a PC and a configuration of screens in multi-screen setting.

(1) Set Communications Environment

Connecting a PC to the RE-232C (RS-422) port of the SC-2040 allows the PC to remotely control the unit with commands.

Please refer to the "SC-2040 Command Manual" for detailed information on communications commands.

Item for Setting	Description
Baud-Rate	Set a transfer speed. [9600] [19200] [38400] (bps)
Equipment ID	Set an equipment ID. [00] Master, [01~99] Slave
Set Command Response	Set a method of response when a configuration command is received. [ON] Respond with ACK [OFF] Do not respond with ACK

Equipment ID Setting (When Using the Serial Bus)

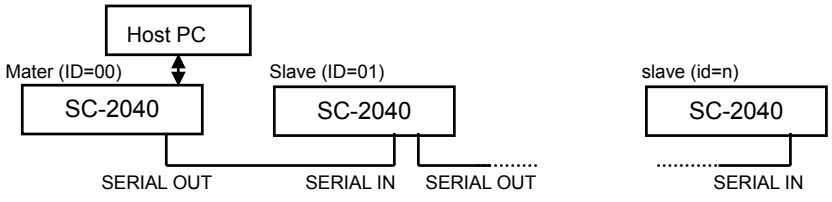
When controlling multiple units such as in a multi-screen configuration, a control PC can be connected to a unit to be the master and all slave units can be connected with BNC cables for centralized control of all units.

If the serial bus interface is used, all the units connected on the bus should be set up with a unique ID within the bus. To communicate with a unit on the bus, the equipment ID of that unit must be specified.

The unit connected with the host through the RS-232C port is called the master which will be given the ID "0". The other units are slaves which will be assigned a unique ID from 1 to 99. (Equipment IDs are not necessarily assigned in sequence according to the order of connection on the bus.)

<Serial Bus Connection and Equipment ID>

Connect the SERIAL IN and OUT terminals of the units with BNC cables to be on the same bus.



<Issues Requiring Attention When Using the Serial Bus>

The serial bus needs to be configured in a daisy chain type connection whose first terminal (the "master" in above diagram) and the last terminal (the "slave n" above) must be properly terminated.

The serial bus connector is fitted with automatic terminator circuitry. If cables are connected to both IN and OUT connectors, the terminating resistor is disconnected to yield high impedance.

To make a unit a "master" and place it as the first terminal:

connect a cable to the OUT connector of the SERIAL BUS on the unit and leave the IN connector unconnected.

To make a unit a "slave" and place it as the last terminal:

connect a cable to the IN connector of the SERIAL BUS on the unit and leave the OUT connector unconnected.

The first and the last terminal units on the bus need to be always powered on for proper bus communication to take place.

(2) Set a Multi-Screen Configuration

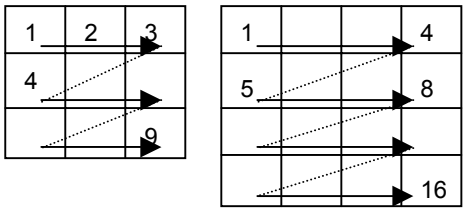
These settings are required when connecting multiple units of the SC-2040 to configure a multi-screen setting.

Please refer to "3 Multi-Screen Installation and Adjustment" for details.

Item for Setting	Description
Multi Compose (H)	Number of screens in horizontal direction [1~20]
Multi Compose (V)	Number of screens in vertical direction [1~20]
Multiple addresses	Address under multi-screen setting [0~100]

The number of screens configurable is within the range H x V ≤100.

Settings of multiple addresses (see diagrams below)

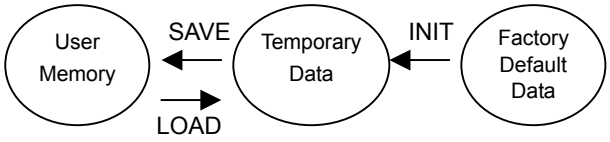


4.8 Data Saving

Adjustment data resulting from configuring a unit of the SC-2040 will be lost when the power to the unit is turned OFF. Be sure to save the data before powering OFF.

The menus under "Memory Operation" help save all data to the user memory, load data saved in the user memory, and initialize data to factory default.

Memory Structure of the SC-2040



(1) Save All Data

Item for Setting	Description
Temporary Data Save	All temporary data is overwritten to the user memory.

(2) Initialize to Factory Default Data

Item for Setting	Description
Temporary Data Init	Temporary data is overwritten with factory default data.

(3) Load Saved Data

Item for Setting	Description
Temporary Data Load	Temporary data is overwritten with data that is saved.

Common to (1) ~ (3) above

Pressing the SET key when "YES" is shown will immediately save, initialize, or load data.

5 What to Do If Something Goes Wrong

See if any of the following cases may apply.

Phenomenon	Verification and Counter Measure	Page
"SyncErr" is indicated even though video signals are being input.	(1) Is the "75Ω/HIGH" switch on the rear panel set correctly?	5
	(2) Is the control value for the input timing correct?	58
Normal picture and a color to indicate "no sync" are alternately displayed.	(1) Set TBC mode to ON. (Note) Setting must be done with input signals disconnected.	27
	(2) Set the Input Search Mode to "FIX". (Note) If this setting is made, automatic input search will be turned off.	42
Colors and levels between the base image and the window image are not matched.	Adjust hue, contrast, and brightness of the window image in "Video" mode.	27
The image is distorted or disturbed.	(1) Is either or both of input and timing data set with a value exceeding the limit?	58
	(2) In case of inputting signal source with copy guard, image may be not displaying correctly according to the type of copy guard.	
	(3) According to quality of input signal source, image may be not displaying correctly (like VTR signal).	
The image is distorted or disturbed.	Is either or both of input and timing data set with a value exceeding the limit?	58
The image shakes.	(1) Adjust the sampling phase for window input.	23
	(2) Adjust the sampling phase for base input.	18
The image is doubled.	Images may be doubled on the screen when both input and output timings are interlaced.	
	(1) Set the frame lock for input/output timings.	46
	(2) Set the Motion Disposal mode to ”2-2pull”.	27/51
Adjustments are not reflected in the displayed image.	(1) Are the mask number and the preset number correct?	34 51
	(2) Was the adjustment data saved?	56
Command communication does not take place.	(1) Is the baud rate set correctly?	54
	(2) Are the connections correct for the use of serial bus?	54
	(3) Is there any double-assigned ID when using the serial bus?	54
The front keys do not work.	(1) Is the Key Lock key turned ON?	5

6 Reference Information

6.1 Limits on Input and Output Timings

There are certain limits for timing values that can be set for input and output signals in the SC-2040.

If any signal with timing exceeding such limits is input or output timing exceeding the limits are set up, output images on the screen may be distorted or disturbed.

(1) Limiting Values for Input Image Timing

Image timing to satisfy all of the conditions (1) to (7) below can be input:

(1) Dot clock limitation (WCLK): 162 MHz max.

(2) Horizontal frequency limitation range

15 KHz to 125 KHz (Note that the horizontal blanking period conditions must be satisfied.)

(3) Horizontal blanking period conditions (WBL)

The equation on the right must be satisfied: WBL[S] – 20 / WCLK[S] > 1.0μ[S]

(4) Vertical frequency limitation range

24 Hz to 100 Hz

(5) For G-on input, vertical frequency ≥ 30Hz and horizontal front porch ≥ 0.15μsec

(6) Horizontal sync ≥ 0.25μsec

(7) Horizontal back porch ≥ 0.5μsec

*Display period estimation

If vertical front porch = 0, the display period is occasionally difficult to measure accurately.

(2) Limiting Values for Output Image Timing

Image timing to satisfy all of the conditions (1) to (4) below can be output:

(1) Dot clock limitation (RCLK): 162 MHz max.

(Note that the setting of dot clock should not exceed the maximum vertical frequency limitation range described in (4) below.)

(2) Horizontal frequency limitation range

15 KHz to 125 KHz (Note that the horizontal blanking period conditions must be satisfied.)

(3) Horizontal blanking period l conditions (RBL)

The equation on the right must be satisfied: RBL[S] – 20 / RCLK[S] > 1.0μ[S]

(4) Maximum vertical frequency limitation range

24 Hz to 100 Hz (Note that the following conditions must be satisfied.)

Resolution at which internal process is carried out in the SC-2040 is determined according to resolution of input and output image timings. This processing resolution limits the maximum vertical frequency that can be output.

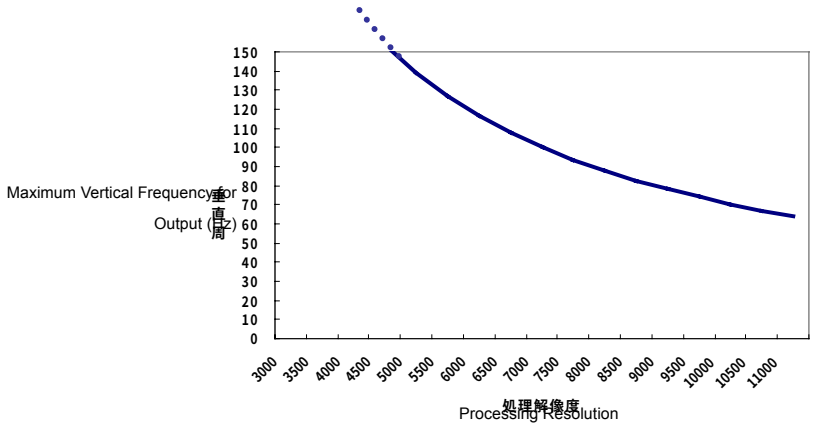
HD = input Hdisp or output Hdisp, whichever has the larger value (dots)

VD = input Vdisp or output Vdisp, whichever has the larger value (lines)

HDB = (HD + 14dot)/ 256 (rounded off at the first decimal)

Processing resolution = HDB x (VD + 25 lines)

With the result of above calculation, the maximum vertical frequency for output is determined from the graph shown here.



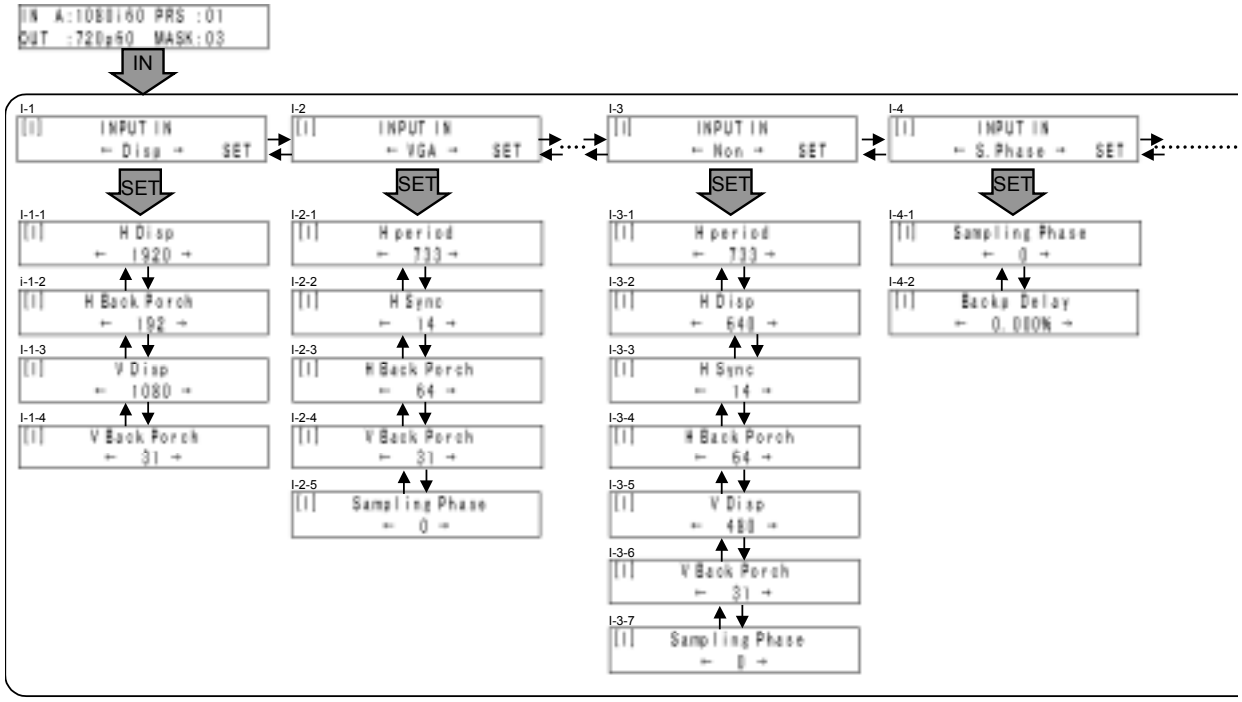
Eg.: Maximum vertical frequency values that can be output as obtained by calculating the processing resolution through the above described method.

HD	VD	Max. Vertical Frequency
2000	1320	57.9 Hz
1920	1280	67.1 Hz
1920	1200	71.4 Hz
1920	1080	79.0 Hz
1600	1200	81.4 Hz
1280	1024	100.0 Hz

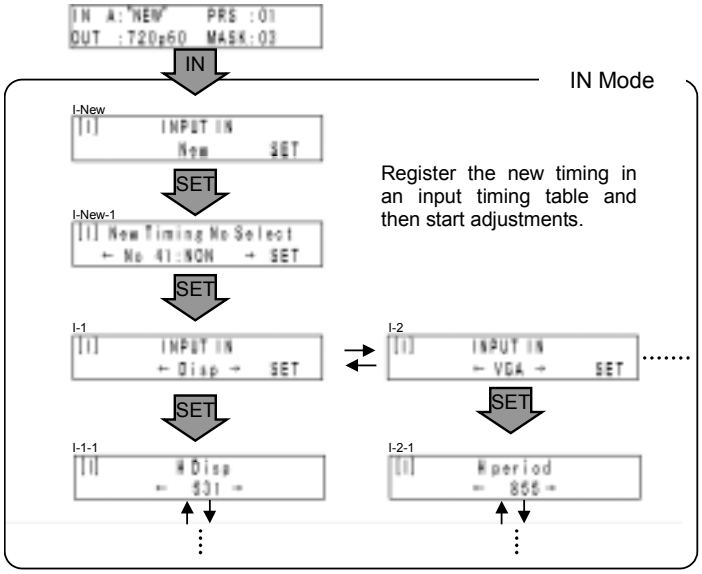
6.2 List of Settings Menus

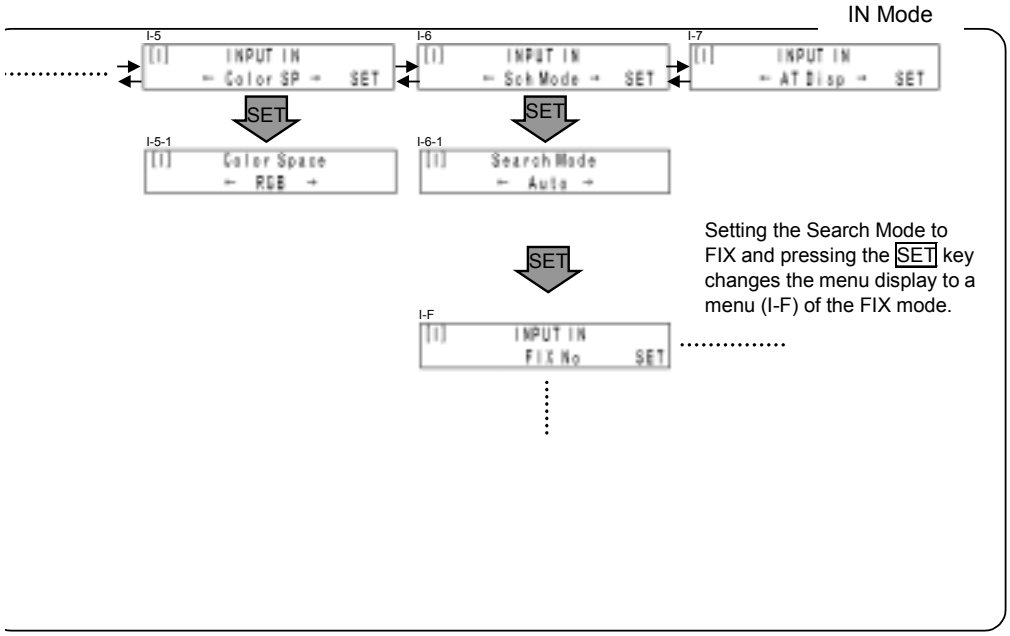
(1) IN Mode (Window Adjustment)

- Input search mode is set to AUTO and input timing is registered

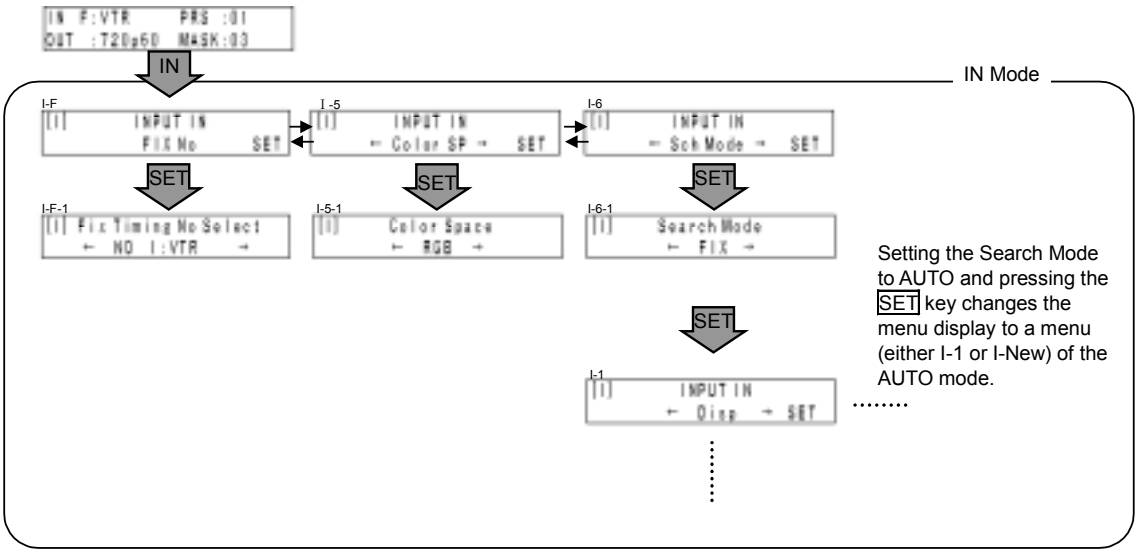


- Input search mode is set to AUTO and "NEW" timing is detected as input timing

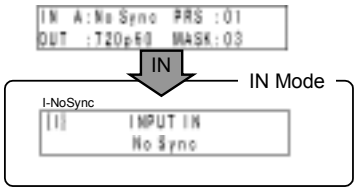




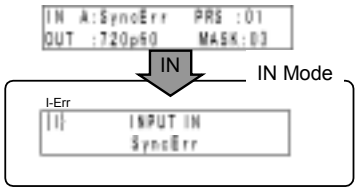
- Input search mode is set to FIX



● No Input Sync Fed or Detected

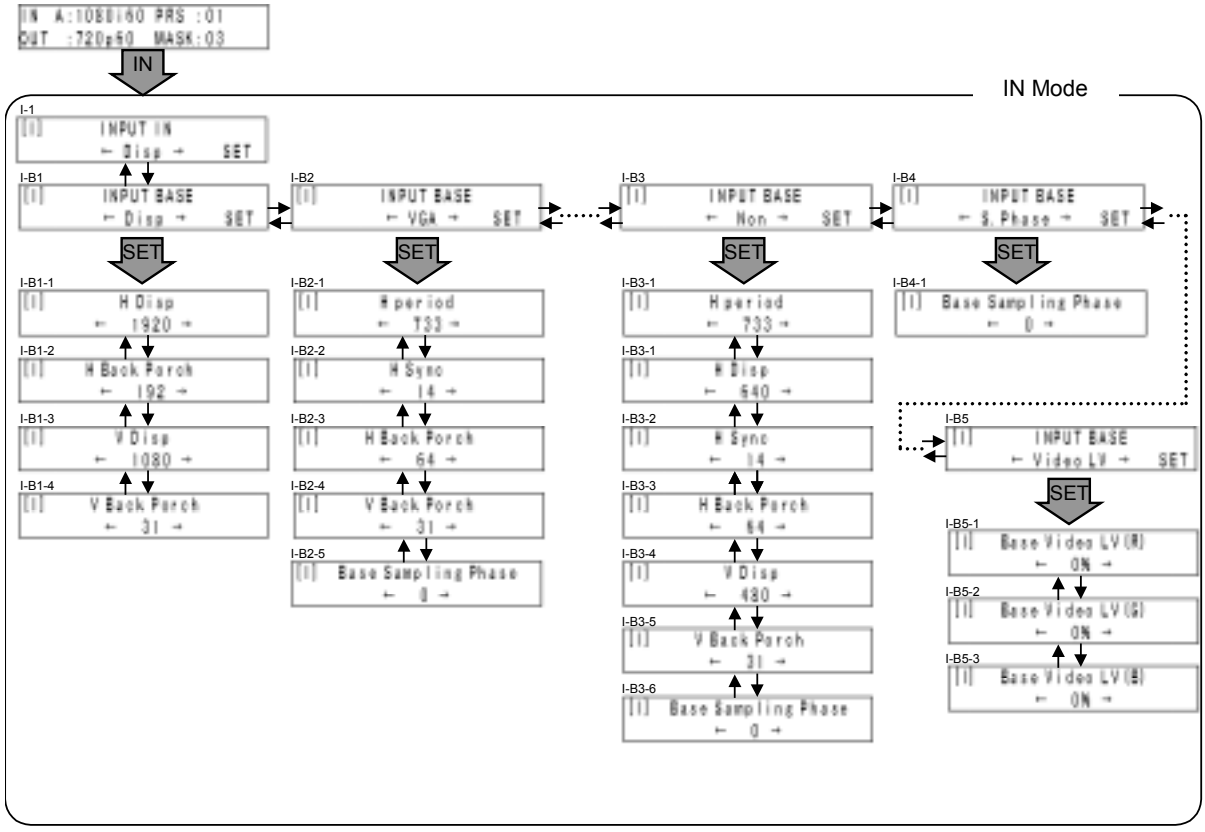


● Input Error

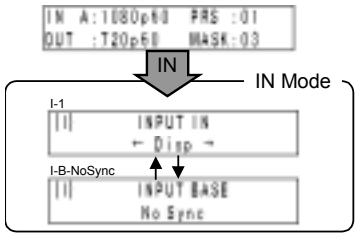


(2) IN Mode (Base Adjustment) SC-2040B/SC-2040W Only

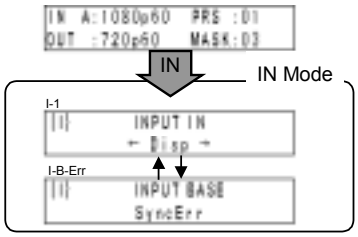
● Base Input is Available



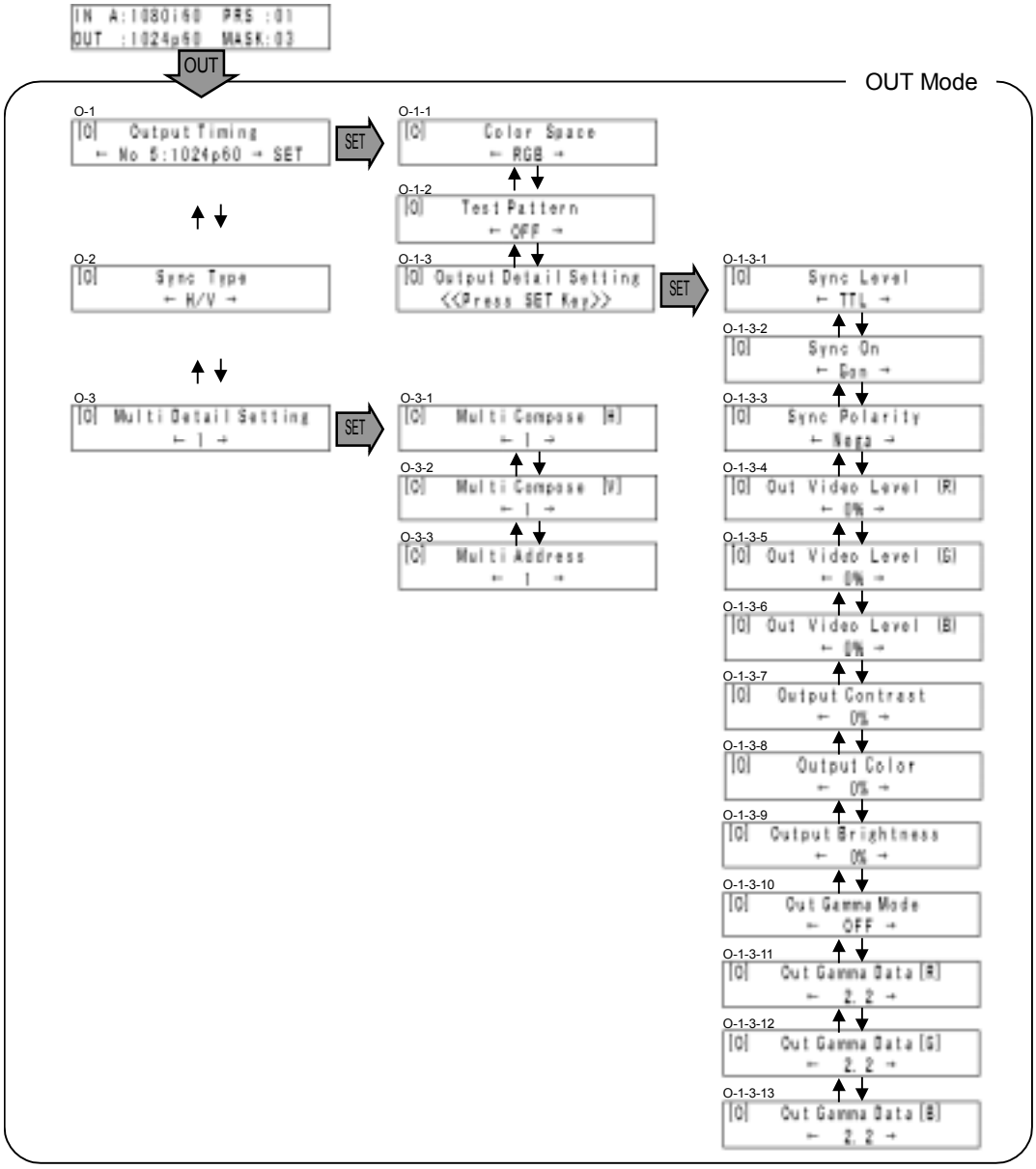
● No Base Input Sync Fed or Detected



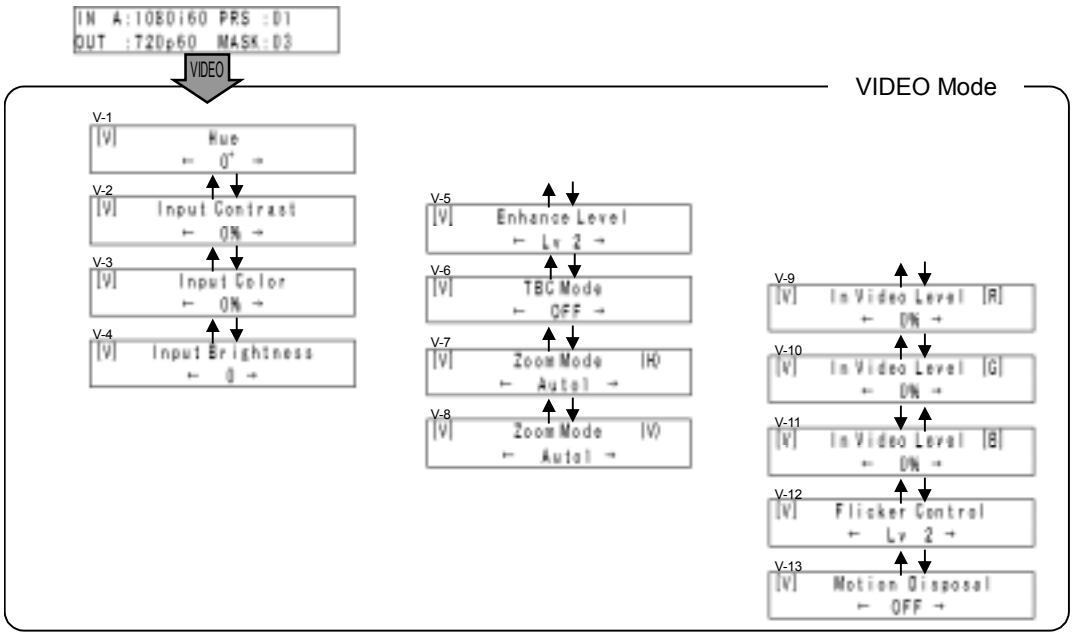
● Base Input Error



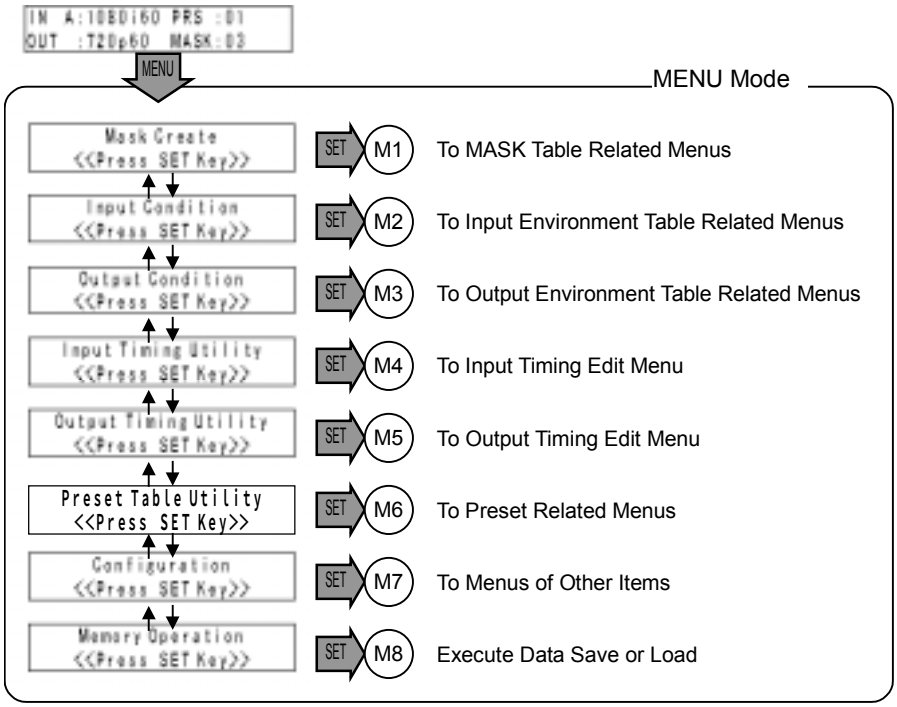
(3) OUT Mode

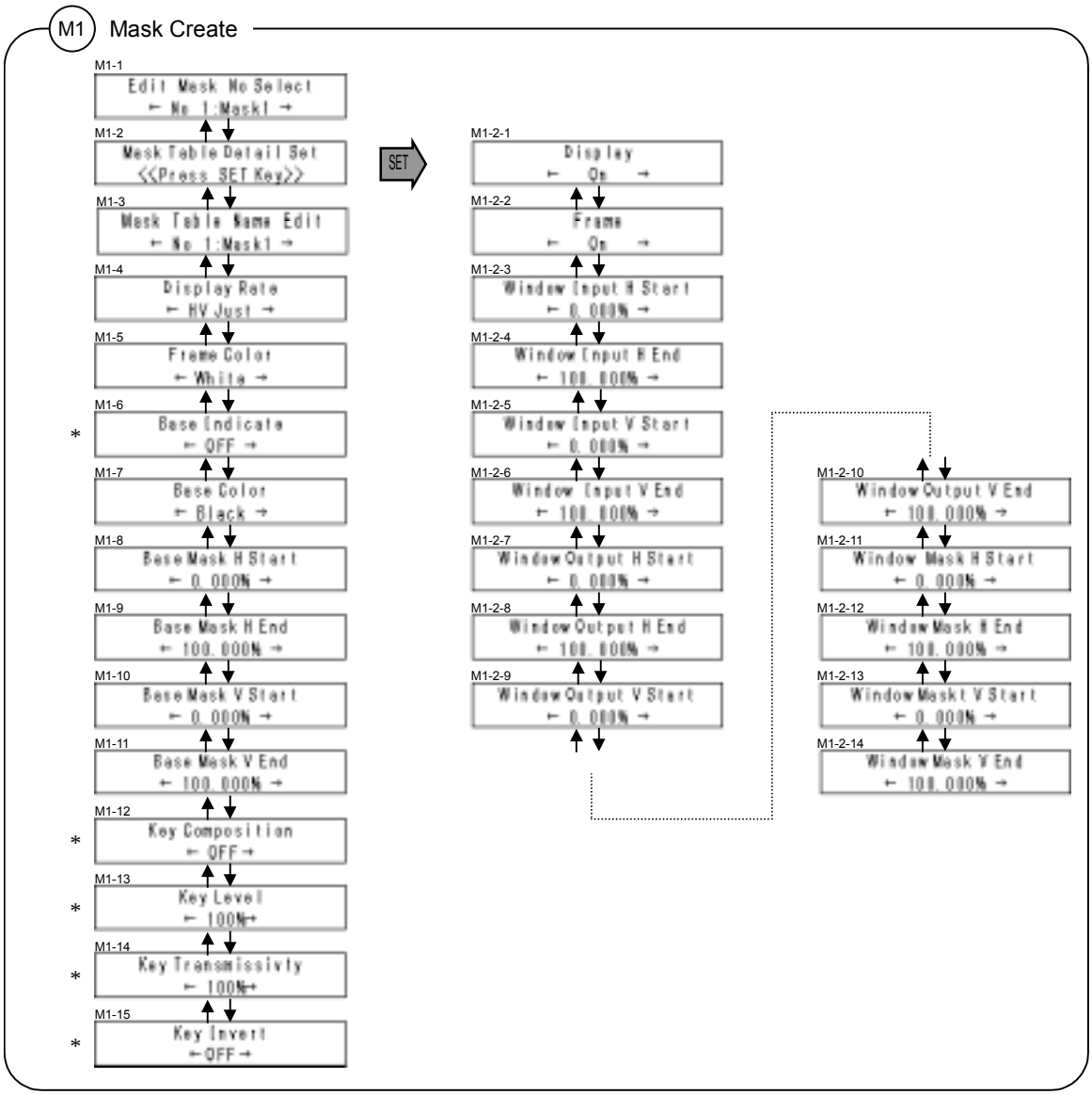

IN A:1080i60 PRS :01
OUT :1024p60 MASK:03
OUT
OUT Mode
O-1
[0] Output Timing
← No 5:1024p60 → SET
SET
O-1-1
[0] Color Space
← RGB →
O-1-2
[0] Test Pattern
← OFF →
O-1-3
[0] Output Detail Setting
<<Press SET Key>>
SET
O-1-3-1
[0] Sync Level
← TTL →
O-1-3-2
[0] Sync On
← Gen →
O-1-3-3
[0] Sync Polarity
← Nega →
O-1-3-4
[0] Out Video Level [R]
← 0% →
O-1-3-5
[0] Out Video Level [G]
← 0% →
O-1-3-6
[0] Out Video Level [B]
← 0% →
O-1-3-7
[0] Output Contrast
← 0% →
O-1-3-8
[0] Output Color
← 0% →
O-1-3-9
[0] Output Brightness
← 0% →
O-1-3-10
[0] Out Gamma Mode
← OFF →
O-1-3-11
[0] Out Gamma Data [R]
← 2.2 →
O-1-3-12
[0] Out Gamma Data [G]
← 2.2 →
O-1-3-13
[0] Out Gamma Data [B]
← 2.2 →
O-2
[0] Sync Type
← H/V →
O-3
[0] Multi Detail Setting
← 1 →
SET
O-3-1
[0] Multi Compose [H]
← 1 →
O-3-2
[0] Multi Compose [V]
← 1 →
O-3-3
[0] Multi Address
← 1 →

(4) VIDEO Mode



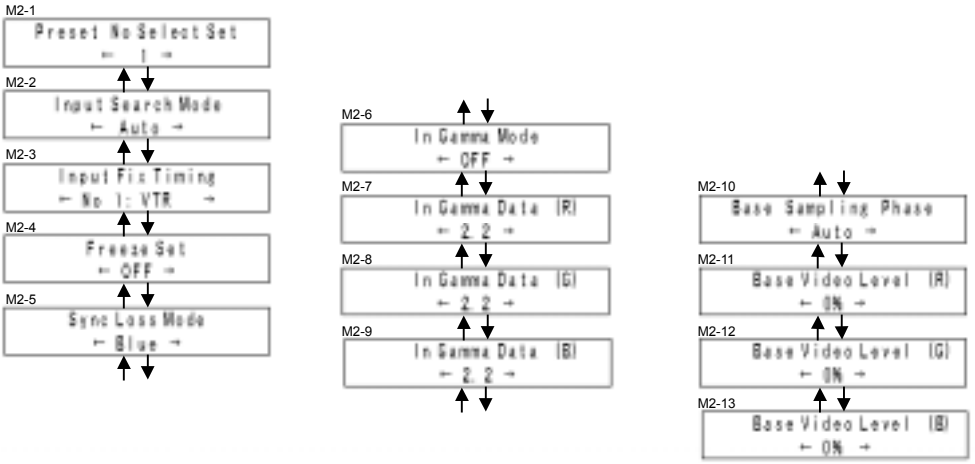
(5) MENU Mode



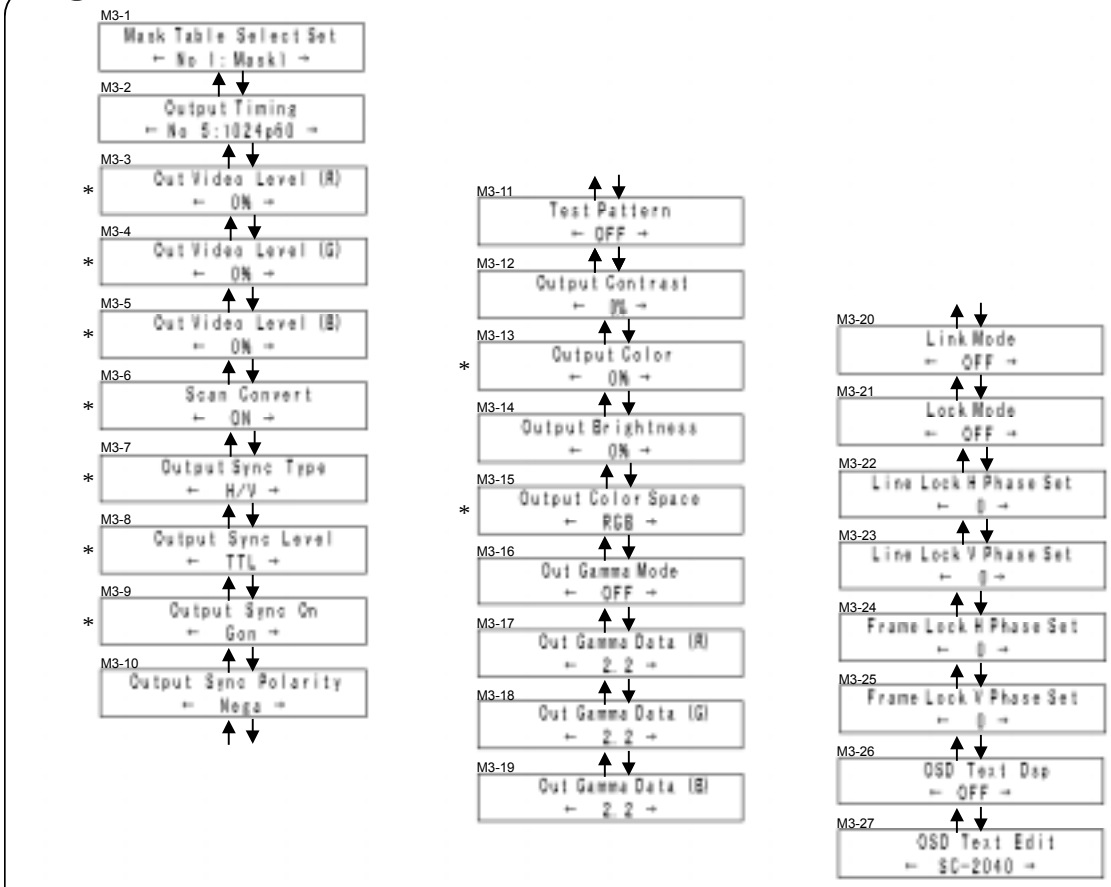


* Available only for SC-2040B and SC-2040W

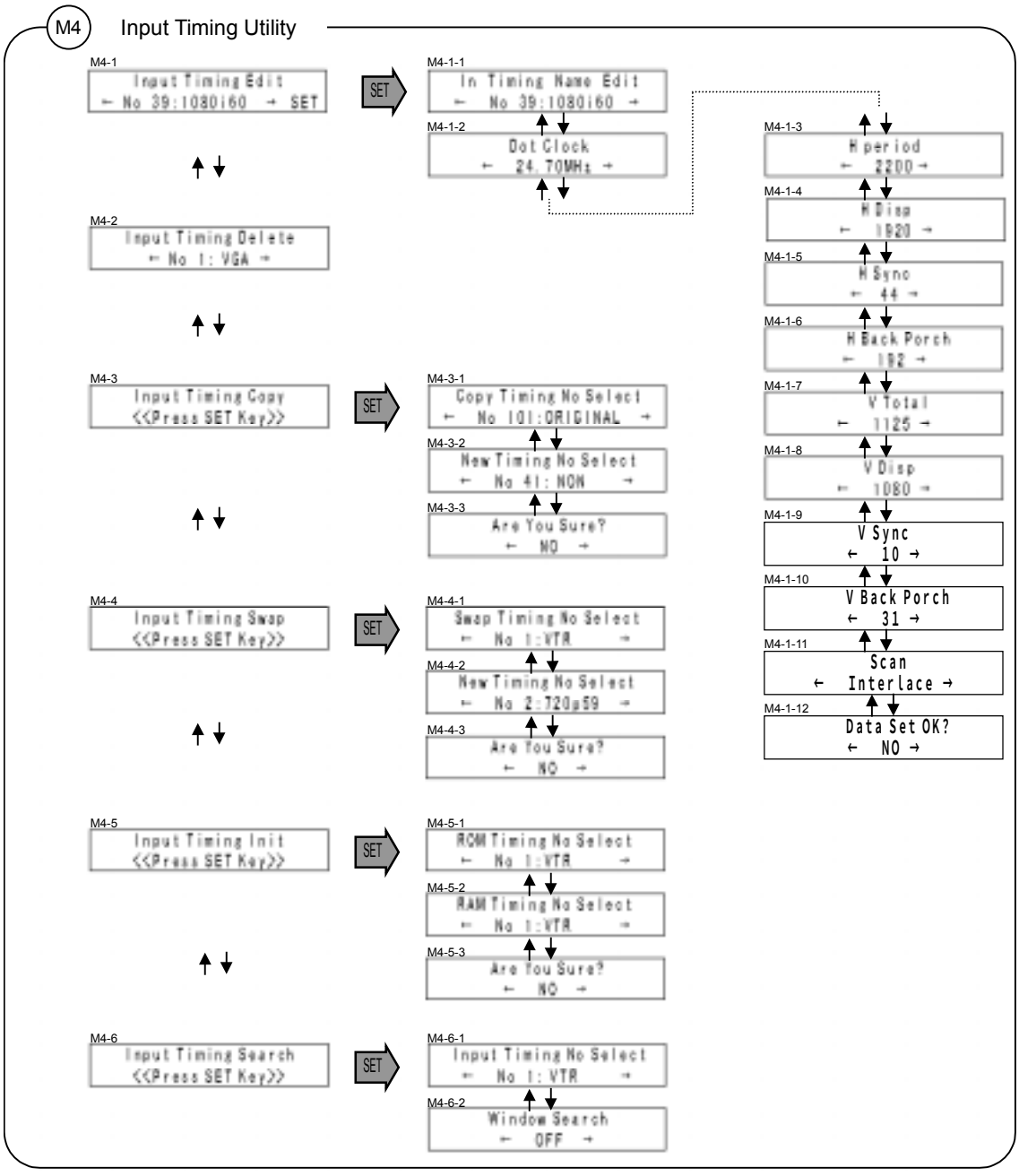
M2 Input Condition

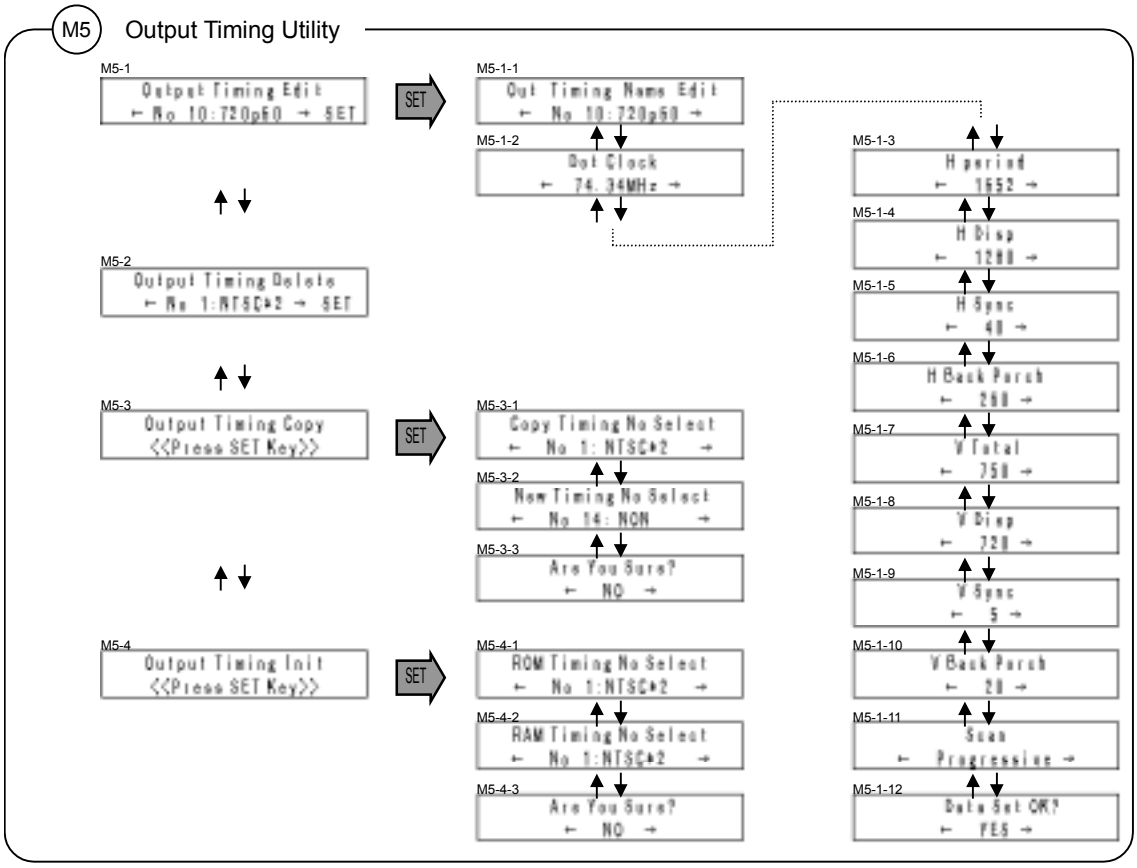


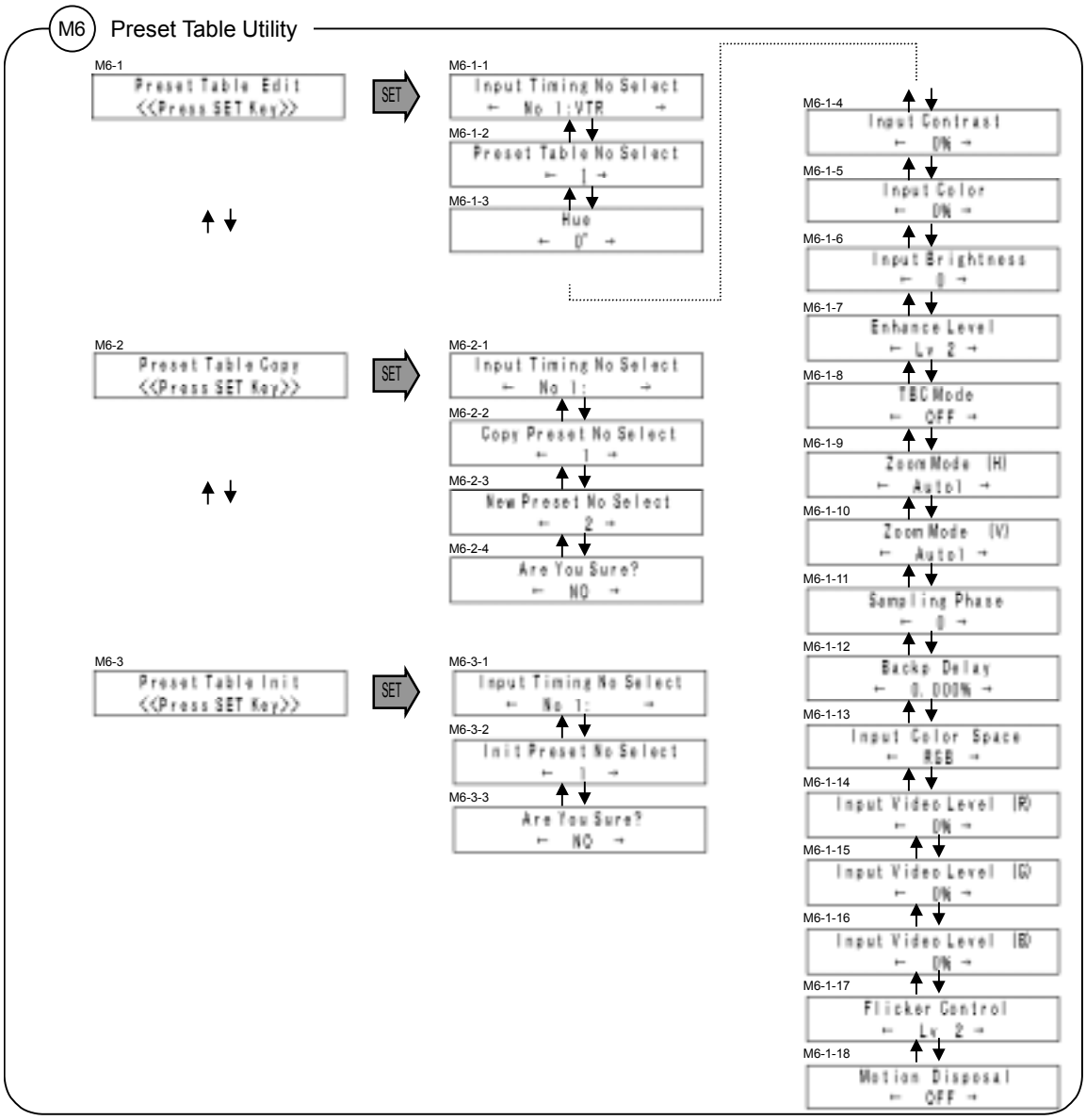
M3 Output Condition

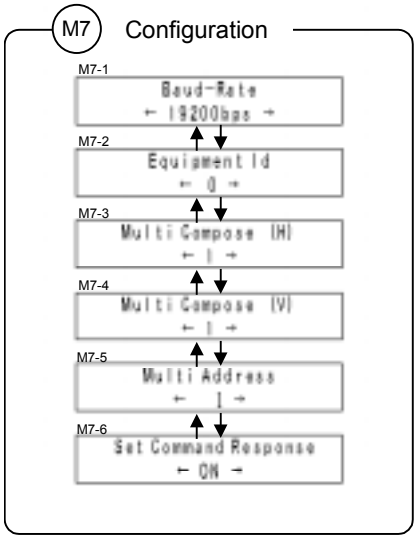


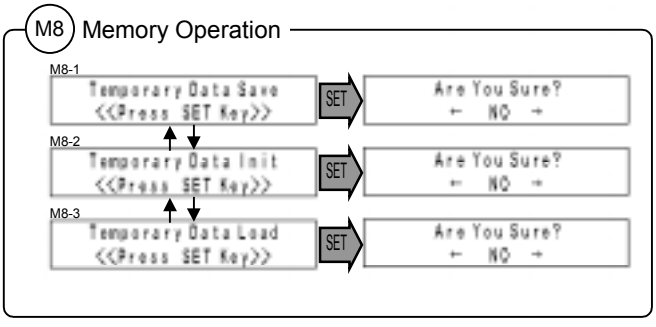
* Available only for SC-2040B and SC-2040W


M4
Input Timing Utility
M4-1
Input Timing Edit
← No 39:1080i60 → SET
SET
M4-1-1
In Timing Name Edit
← No 39:1080i60 →
M4-1-2
Dot Clock
← 24.70MHz →
M4-1-3
H period
← 2200 →
M4-1-4
H Disp
← 1920 →
M4-1-5
H Sync
← 44 →
M4-1-6
H Back Porch
← 192 →
M4-1-7
V Total
← 1125 →
M4-1-8
V Disp
← 1080 →
M4-1-9
V Sync
← 10 →
M4-1-10
V Back Porch
← 31 →
M4-1-11
Scan
← Interlace →
M4-1-12
Data Set OK?
← NO →
M4-2
Input Timing Delete
← No 1: VGA →
M4-3
Input Timing Copy
<<Press SET Key>>
SET
M4-3-1
Copy Timing No Select
← No 101:ORIGINAL →
M4-3-2
New Timing No Select
← No 41: NON →
M4-3-3
Are You Sure?
← NO →
M4-4
Input Timing Swap
<<Press SET Key>>
SET
M4-4-1
Swap Timing No Select
← No 1:VTR →
M4-4-2
New Timing No Select
← No 2:720p59 →
M4-4-3
Are You Sure?
← NO →
M4-5
Input Timing Init
<<Press SET Key>>
SET
M4-5-1
ROM Timing No Select
← No 1:VTR →
M4-5-2
RAM Timing No Select
← No 1:VTR →
M4-5-3
Are You Sure?
← NO →
M4-6
Input Timing Search
<<Press SET Key>>
SET
M4-6-1
Input Timing No Select
← No 1: VTR →
M4-6-2
Window Search
← OFF →

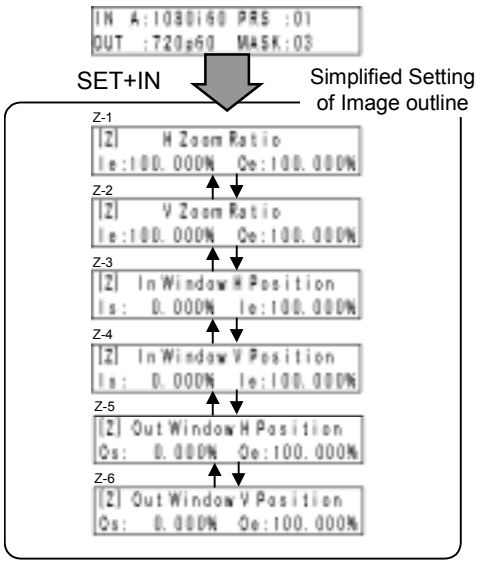

M5
Output Timing Utility
M5-1
Output Timing Edit
← No 10:720p60 → SET
SET
M5-1-1
Out Timing Name Edit
← No 10:720p60 →
M5-1-2
Dot Clock
← 74.34MHz →
M5-1-3
H period
← 1652 →
M5-1-4
H Disp
← 1280 →
M5-1-5
H Sync
← 40 →
M5-1-6
H Back Porch
← 260 →
M5-1-7
V Total
← 750 →
M5-1-8
V Disp
← 720 →
M5-1-9
V Sync
← 5 →
M5-1-10
V Back Porch
← 20 →
M5-1-11
Scan
← Progressive →
M5-1-12
Data Set OK?
← YES →
M5-2
Output Timing Delete
← No 1:NTSC▸2 → SET
M5-3
Output Timing Copy
<<Press SET Key>>
SET
M5-3-1
Copy Timing No Select
← No 1: NTSC▸2 →
M5-3-2
New Timing No Select
← No 14: NON →
M5-3-3
Are You Sure?
← NO →
M5-4
Output Timing Init
<<Press SET Key>>
SET
M5-4-1
ROM Timing No Select
← No 1:NTSC▸2 →
M5-4-2
RAM Timing No Select
← No 1:NTSC▸2 →
M5-4-3
Are You Sure?
← NO →


M6 Preset Table Utility
M6-1
Preset Table Edit
<<Press SET Key>>
SET
M6-1-1
Input Timing No Select
← No 1:VTR →
M6-1-2
Preset Table No Select
← 1 →
M6-1-3
Hue
← 0° →
M6-1-4
Input Contrast
← 0% →
M6-1-5
Input Color
← 0% →
M6-1-6
Input Brightness
← 0 →
M6-1-7
Enhance Level
← Lv 2 →
M6-1-8
TBC Mode
← OFF →
M6-1-9
Zoom Mode (H)
← Auto1 →
M6-1-10
Zoom Mode (V)
← Auto1 →
M6-1-11
Sampling Phase
← 0 →
M6-1-12
Backp Delay
← 0.000% →
M6-1-13
Input Color Space
← RGB →
M6-1-14
Input Video Level (R)
← 0% →
M6-1-15
Input Video Level (G)
← 0% →
M6-1-16
Input Video Level (B)
← 0% →
M6-1-17
Flicker Control
← Lv 2 →
M6-1-18
Motion Disposal
← OFF →
M6-2
Preset Table Copy
<<Press SET Key>>
SET
M6-2-1
Input Timing No Select
← No 1: →
M6-2-2
Copy Preset No Select
← 1 →
M6-2-3
New Preset No Select
← 2 →
M6-2-4
Are You Sure?
← NO →
M6-3
Preset Table Init
<<Press SET Key>>
SET
M6-3-1
Input Timing No Select
← No 1: →
M6-3-2
Init Preset No Select
← 1 →
M6-3-3
Are You Sure?
← NO →


M7 Configuration
M7-1
Baud-Rate
← 19200bps →
M7-2
Equipment Id
← 0 →
M7-3
Multi Compose (H)
← 1 →
M7-4
Multi Compose (V)
← 1 →
M7-5
Multi Address
← 1 →
M7-6
Set Command Response
← ON →


M8 Memory Operation
M8-1
Temporary Data Save
<<Press SET Key>>
SET
Are You Sure?
← NO →
M8-2
Temporary Data Init
<<Press SET Key>>
SET
Are You Sure?
← NO →
M8-3
Temporary Data Load
<<Press SET Key>>
SET
Are You Sure?
← NO →

(6) Simplified Setting of Image Outline



6.2.2 List of Items to Be Set

(1) Items to Be Set in Input Timing Table

Item Name	Content	Values Set	Menu Number
Name	Timing Name	Within 8 ASCII characters	M4-1-1
Search	Auto Input Search	ON/OFF	M4-6-2
Dot Clock	Dot Clock	200 ~ 3000 dots (by 2 dots)	M4-1-2
H Period	Horizontal Period	128 ~ 2000 dots (by 2 dots)	M4-1-3 I-2-1 I-3-1
H Disp	Horizontal Display Period	6 ~ 500 dots (by 2 dots)*2 *3	M4-1-4 I-1-1 I-3-2
H Sync	Horizontal Sync	0 ~ 1/2 H Period dot (by 2 dots)*3	M4-1-5 I-2-2 I-3-3
H Back Porch	Horizontal Back Porch	200 ~ 2000 lines (by 1 line)	M4-1-6 I-1-2 I-2-3 I-3-4
V Total	Vertical Total Lines	128 ~ 1320 lines (by 1 line)*4	M4-1-7
V Disp	Vertical Display Period	2 ~ 60 lines (by 1 line)*4 *5	M4-1-8 I-1-3 I-3-5
V Sync	Vertical Sync	0 ~ 1/2 V Total lines (by 1 line)*4 *5	M4-1-9
V Back Porch	Vertical Back Porch	Interlace/Progressive	M4-1-10 I-1-4 I-2-4 I-3-6
Scan	Scan Method	200 ~ 3000 dots (by 2 dots)	M4-1-11

*1 17.00 ~ 81.00 MHz when interlaced
*2 H Sync ≤ 1/2 H Period
*3 H Sync + H Back Porch ≥ 96
*4 By 2 lines when interlaced
*5 V Sync + V Back Porch ≥ 12

(2) Items to Be Set in Output Timing Table

Item Name	Content	Values Set	Menu Number
Name	Timing Name	Within 8 ASCII characters	M5-1-1
Dot Clock	Dot Clock	17.00 ~ 162.00 (by 0.01MHz)*1	M5-1-2
H Period	Horizontal Period	200 ~ 3000 dots (by 2 dots)	M5-1-3
H Disp	Horizontal Display Period	128 ~ 2000 dots (by 2 dots)	M5-1-4
H Sync	Horizontal Sync	6 ~ 500 dots (by 2 dots)*2 *3	M5-1-5
H Back Porch	Horizontal Back Porch	0 ~ 1/2 H Period dot (by 2 dots)*3	M5-1-6
V Total	Vertical Total Lines	200 ~ 2000 lines (by 1 line)	M5-1-7
V Disp	Vertical Display Period	128 ~ 1320 lines (by 1 line)*4	M5-1-8
V Sync	Vertical Sync	2 ~ 60 lines (by 1 line)*4 *5	M5-1-9
V Back Porch	Vertical Back Porch	0 ~ 1/2 V Total lines (by 1 line)*4 *5	M5-1-10
Scan	Scan Method	Interlace/Progressive	M5-1-11

*1 17.00 ~ 81.00 MHz when interlaced
*2 H Sync ≤ 1/2 H Period
*3 H Sync + H Back Porch ≥ 96
*4 By 2 lines when interlaced
*5 V Sync + V Back Porch ≥ 12

(3) Items to Be Set in Preset Table

Item Name	Content	Values Set	Menu Number
HUE	Hue	0 ~ 360°	M6-1-3 V-1
Input Contrast	Contrast	±10%	M6-1-4 V-2
Input Color	Color	±10%	M6-1-5 V-3
Input Brightness	Brightness	±15Step	M6-1-6 V-4
Enhance level	Enhance	OFF, Lv±1 ~ 4	M6-1-7 V-5
TBC Mode	TBC mode	ON/OFF	M6-1-8 V-6
Zoom Mode (H)	Zoom mode (H)	Auto1 ~ Auto3, Pixel	M6-1-9 V-7
Zoom Mode (V)	Zoom mode (V)	Auto1 ~ Auto3, Pixel	M6-1-10 V-8
Sampling Phase	Sampling phase	0 ~ 63,Auto	M6-1-11 I-2-5 I-3-7 I-4-1
Backp Delay	Back porch delay	±4 dots (set in %)	M6-1-12 I-4-2
Input Color Space	Input color space	RGB, SMPTE-125M, SMPTE-240M, SMPTE-274M SMPTE-296M	M6-1-13 I-5-1

Item Name	Content	Values Set	Menu Number
In Video level (R)	Input video level (R)	±10% (0.7±10% V)	M6-1-14 V-9
In Video level (G)	Input video level (G)	±10% (0.7±10% V)	M6-1-15 V-10
In Video level (B)	Input video level (B)	±10% (0.7±10% V)	M6-1-16 V-11
Flicker Control	Flicker control	OFF, Lv1 ~ 3	M6-1-17 V-12
Motion Disposal	Motion picture processing mode	OFF, 2:2 pull	M6-1-18 V-13

(4) Items to Be Set in Input Environment Table

Item Name	Content	Values Set	Menu Number
Preset Table	Preset Number	1 ~ 10	M2-1
Input Search Mode	Input Signal Search Mode	Auto/Fix	M2-2 I-6-1
Input Fix Timing	Select an Input Timing for Fixed Mode.	Registered input timing number	M2-3 I-F-1
Freeze	Freeze	OFF, ON, EX1-ON, EX2-ON	M2-4
Sync Loss Mode	Operation in Sync Loss State	Black, Red, Green, Yellow, Blue, Magenta, Cyan, White, WinOFF	M2-5
In Gamma Mode	Input Gamma Setting	OFF,Gamma,1/Gamma, User1 ~ 4	M2-6
In Gamma Data (R)	Input Gamma Correction (R)	1.0 ~ 3.0	M2-7
In Gamma Data (G)	Input Gamma Correction (G)	1.0 ~ 3.0	M2-8
In Gamma Data (B)	Input Gamma Correction (B)	1.0 ~ 3.0	M2-9
Base Sampling Phase	Base Sampling Phase	0 ~ 63, Auto	M2-10 I-B4-1
Base Video level (R)	Base Input Video Level (R)	±10% (0.7±10% V)	M2-11 I-B5-1
Base Video level (G)	Base Input Video Level (G)	±10% (0.7±10% V)	M2-12 I-B5-2
Base Video level (B)	Base Input Video Level (B)	±10% (0.7±10% V)	M2-13 I-B5-3

(5) Items to Be Set in Output Environment Table

Item Name	Content	Values Set	Menu Number
Mask Table	Mask Table Number	1 ~ 50	M3-1
Output Timing	Output Timing	Registered Output Timing Number	M3-2 O-1
Out Video level (R)*[1]	Output Video level (R)	±10% (0.7±10% V)	M3-3 O-1-3-4
Out Video level (G) *[1]	Output Video level (G)	±10% (0.7±10% V)	M3-4 O-1-3-5
Out Video level (B) *[1]	Output Video level (B)	±10% (0.7±10% V)	M3-5 O-1-3-6
Scan Convert *[1]	Scan Conversion	ON,OFF	M3-6
Out Sync Type*[1]	Output Sync Type	H/V,CS,3s	M3-7 O-2
Out Sync Level*[1]	Output Sync Level	0.3V,TTL	M3-8 O-1-3-1
Out Sync On*[1]	Output Sync On	OFF,Gon,RGBon	M3-9 O-1-3-2
Out Sync Polarity	Output Sync Polarity	Nega,Posi	M3-10 O-1-3-3
Test Pattern	Test Pattern	OFF, CROSS HATCH, BURST, COLOR BAR, CIRCLE, RAMP, CROSS, FRAME, COMP	M3-11 O-1-2
Output Contrast	Contrast	±10%	M3-12 O-1-3-7
Output Color*[1] *[2]	Color	±10%	M3-13 O-1-3-8
Output Brightness	Brightness	±15	M3-14 O-1-3-9
Output Color Space*[1]	Output Color Space	RGB, SMPTE-125M, SMPTE-240M, SMPTE-274M SMPTE-296M	M3-15 O-1-1
Out Gamma Mode	Output Gamma Setting	OFF, Gamma, 1/Gamma, User1	M3-16 O-1-3-10
Out Gamma Data (R)	Output Gamma Correction (R)	1.0 ~ 3.0	M3-17 O-1-3-11
Out Gamma Data (G)	Output Gamma Correction (G)	1.0 ~ 3.0	M3-18 O-1-3-12
Out Gamma Data (B)	Output Gamma Correction (B)	1.0 ~ 3.0	M3-19 O-1-2-13

*[1] Set for SC-2040 and SC-2040B (analog output) only.

*[2] Color adjustment is effective only when color space is set to YPbPr.

Item Name	Content	Values Set	Menu Number
Link Mode	Link Mode	OFF, Master, Slave	M3-20
Lock Mode	Sync Lock Mode	OFF, Line Lock, Frame Lock	M3-21
Line Lock H Phase	Adjust Line Lock H Phase	±999 dots	M3-22
Line Lock V Phase	Adjust Line Lock V Phase	±2048 lines	M3-23
Frame Lock H Phase	Adjust Frame Lock H Phase	±999 dots	M3-24
Frame Lock V Phase	Adjust Frame Lock V Phase	±2048 lines	M3-25
OSD Text Dsp	Display OSD Arbitrary Character	ON/OFF	M3-26
OSD Text Edit	Edit OSD Arbitrary Character	Within 8 ASCII Characters	M3-27

(6) Items to Be Set in Mask Table

Item Name	Content	Values Set	Menu Number
Mask Table Name Edit	Mask Table Name	Within 8 ASCII Characters	M1-3
Display Rate	Justified Display Setting	HVJust, HJust, VJust,	M1-4
Frame Color	Frame Color	Black, Red, Green, Yellow, Blue, Magenta, Cyan,White	M1-5
Base Indicate *	Base Display ON/OFF	ON/OFF	M1-6
Base Color	Base Color	Black, Red, Green, Yellow, Blue, Magenta, Cyan,White	M1-7
Base Mask H Start	Base Display H Start Coord	0.000 ~ 99.999%	M1-8
Base Mask H End	Base Display H End Coord	0.001 ~ 100.000%	M1-9
Base Mask V Start	Base Display V Start Coord	0.000 ~ 99.999%	M1-10
Base Mask V End	Base Display V End Coord	0.001 ~ 100.000%	M1-11
Key Composition *	Key Composition ON/OFF	ON/OFF	M1-12
Key Level *	Level	0 ~ 100%	M1-13
Key Transmissivity *	Transmissivity	0 ~ 100%	M1-14
Key Invert *	Inverted Display	ON/OFF	M1-15
<<Mask Detail>>			
Display	Window Display ON/OFF	ON/OFF	M1-2-1
Frame	Frame Display ON/OFF	ON/OFF	M1-2-2
Window Input H Start	Input H Start Coordinate	0.000 ~ 99.999%	M1-2-3
Window Input H End	Input H End Coordinate	0.001 ~ 100.000%	M1-2-4
Window Input V Start	Input V Start Coordinate	0.000 ~ 99.999%	M1-2-5
Window Input V End	Input V End Coordinate	0.001 ~ 100.000%	M1-2-6
Window Output H Start	Output H Start Coordinate	0.000 ~ 99.999%	M1-2-7
Window Output H End	Output H End Coordinate	0.001 ~ 100.000%	M1-2-8
Window Output V Start	Output V Start Coordinate	0.000 ~ 99.999%	M1-2-9
Window Output V End	Output V End Coordinate	0.001 ~ 100.000%	M1-2-10
Window Mask H Start	Display H Start Coordinate	0.000 ~ 99.999%	M1-2-11
Window Mask H End	Display H End Coordinate	0.001 ~ 100.000%	M1-2-12
Window Mask V Start	Display V Start Coordinate	0.000 ~ 99.999%	M1-2-13
Window Mask V End	Display V End Coordinate	0.001 ~ 100.000%	M1-2-14

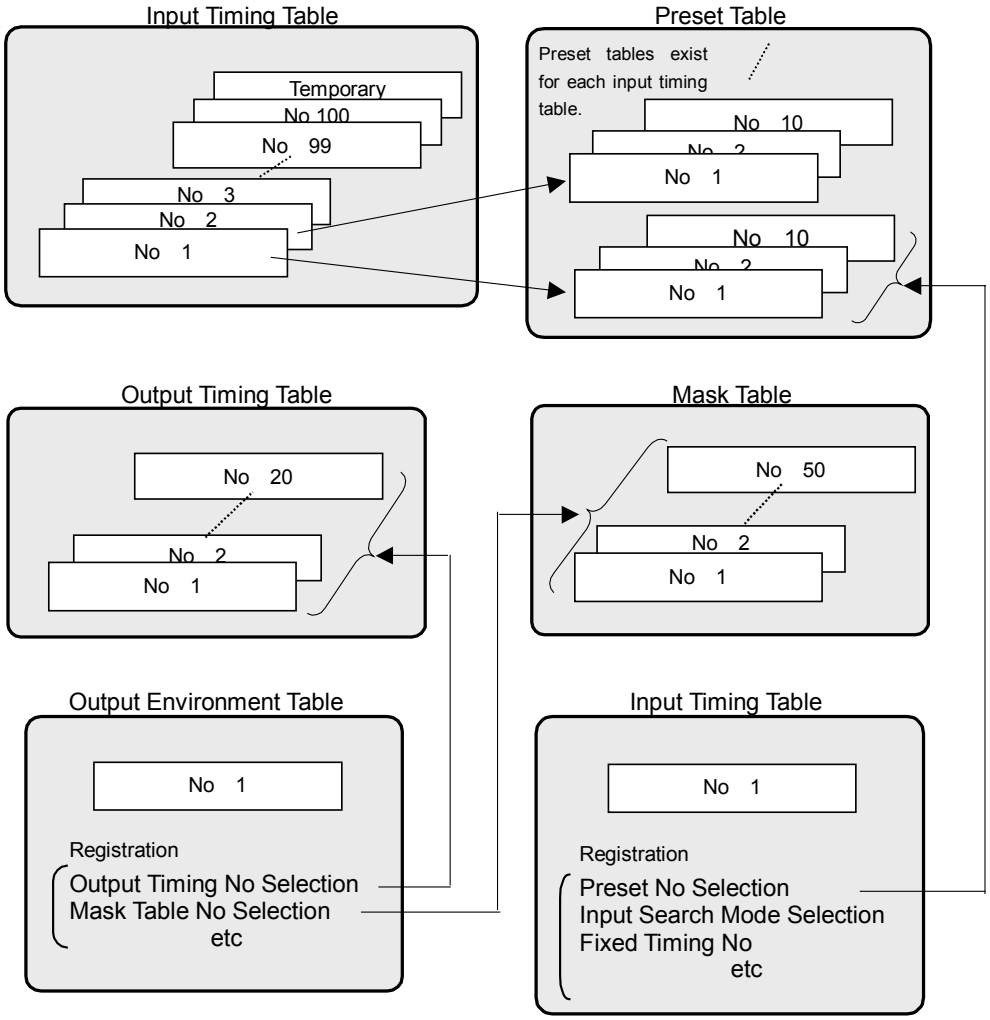
* Set for SC-2040B and SC-2040W only.

(7) Items to Be Configured

Item Name	Content	Values Set	Menu Number
Baud-Rate	Baud Rate	9600,19200,38400 (bps)	M7-1
Equipment ID	Equipment ID	0 ~ 99	M7-2
Multi Compose (H)	Multi-Screen Configuration (H)	1 ~ 20*	M7-3 O-3-1
Multi Compose (V)	Multi-Screen Configuration (V)	1 ~ 20*	M7-4 O-3-2
Multiple addresses	Multiple addresses	1 ~ 100	M7-5 O-3-3
Set Command Response	Response to Set Commands	ON/OFF	M7-6

* Values set must satisfy the equation: Multi Compose (H) x Multi Compose (V) ≤ 100.

6.3 Structural Diagram of Data Tables



6.4 DIP Switch on the Rear Panel

The eight-bit DIP switch on the rear panel can be used to turn on or off demo displays while operating the setting menus.

Each bit of the DIP switch has the following meaning. (Turned the bit down for OFF state.)

Bit	Content	Values Set	Content of Setting
8	Reserve	OFF	
7	Demo Display Setting of Menus	OFF	Display demo of menus
		ON	Do not display demo of menus
6	Reserve	OFF	
5	Reserve	OFF	
4	Remote Mode Setting	OFF	Remote Mode: Normal
		ON	Remote Mode: Mask
3	Setting of TMDS Forced Output Mode	OFF	TMDS Forced Output Mode: OFF
		ON	TMDS Forced Output Mode: ON
2	Reserve	OFF	
1	Reserve	OFF	

6.4.1 To Customers Using the Models SC-2040T and SC-2040W

The models SC-2040T and SC-2040W are shipped with setting for the TMDS forced output mode in ON state.

Some TMDS monitors support the hot plug detect function.

When using a monitor that supports the hot plug detect function, it is recommended to use the scan converter with the TMDS forced output mode set in OFF state. While the TMDS forced output mode is turned OFF, the unit of the SC-2040T or SC2040W watches the connection with the monitor to output signals only when connection is made. Whether the user's TDMS monitor supports the hot plug detect function can be verified by using the scan converter with its TMDS forced output mode set in OFF state. If images appear properly, the monitor supports this function. (When the setting of the TMDS forced output mode is changed, ensure to turn the power OFF once and turn it back ON.)

Please note that using the scan converter with the TMDS forced output mode turned ON may result in damage to the equipment since signals are output all the time.

7 Main Specification

[SC-2040 Series Product Specification Overview]

Item	SC-2040	SC-2040B	SC-2040T	SC-2040W
[1. Analog Input]	●	●	●	●
[2. Analog Output]	●	●	x	x
[3. Digital Output]	x	x	●	●
[4. Analog Base Input]	x	●	x	●
[5. Control]	●	●	●	●
[6. General Specification]	●	●	●	●
[7. Option]	●	●	●	●

[1. Analog Input]

Item		Specification
Scan Method		Progressive/Interlace
A/D Conversion Frequency		17 ~ 162 MHz
Horizontal Frequency		15 ~ 125 KHz
Vertical Frequency		24 ~ 100 Hz (varies depending on input and output resolution)
Video Signal	Color Format	Analog RGB/ Analog Color Difference
	Input Level	0.7 Vpp (fine-adjustable at 1% step over the range of ±10%)
	Pixel Count	1920 x 1280 Max.
	Input Channel	1 Channel (BNC)
	Through Out (BNC)	Available
Sync Signal	G-on	0.3 Vpp, HDTV Tri-Level
	CS	Analog Level, TTL Level, HDTV Tri-Level
	HS/VS	Analog Level, TTL Level
	Input Channel	1 Channel (BNC)
	Through Out (BNC)	Available
	Termination	75Ω Automatic Termination (Through Out Connection HI-Z)/Slide Switch
Frame Lock (External Clock)	G-on	0.3 Vpp, HDTV Tri-Level
	CS	Analog Level, TTL Level, HDTV Tri-Level
	HS/VS	Analog Level, TTL Level
	Input Channel	1 Channel (BNC)
	Through Out (BNC)	Available
	Termination	75Ω Automatic Termination (Through Out Connection HI-Z)/Slide Switch

[2. Analog Output]

Item		Specification
Scan Method		Progressive/Interlace
D/A Conversion Frequency		17 ~ 162 MHz
Horizontal Frequency		15 ~ 125 KHz
Vertical Frequency		24 ~ 100 Hz (varies depending on input and output resolution)
Video Signal	Color Format	Analog RGB/ Analog Color Difference
	Output Level	0.7Vpp (±10%)
	Pixel Count	1920 x 1280 Max.
	Output Channel	1 Channel (BNC)
Sync Signal	G-on	0.3 Vpp, HDTV Tri-Level
	CS	Analog Level, TTL Level, HDTV Tri-Level
	HS/VS	Analog Level, TTL Level
	Output Channel	1 Channel (BNC)

[3. Digital Output]

Item		Specification
TMDS Output	Data Format	TMDS
	Pixel Clock	25 ~ 162 MHz (according to Astrodesign inspection criteria)
	Horizontal Frequency	15 ~ 125 KHz
	Vertical Frequency	24 ~ 100 Hz (varies depending on input and output resolution)
	Pixel Count	1920 x 1280 Max.
	Color Format	RGB
	Sync Signal	HS/VS
	Connector	DVI-I

[4. Analog Base Input]

Item		Specification
Base Input	A/D Conversion Frequency	Same as Output Timing
	Horizontal Frequency	
	Vertical Frequency	
	Pixel Count	
	Color Format	
	Input Level	0.7 Vpp (fine-adjustable at 1% step over the range of ±10%)
	Input Channel	1 Channel (BNC)
	Through Out	Not Available
	Termination	75Ω Automatic Termination
	Sync Signal	Shared with Frame Lock (External Lock)

[5. Control]

Item		Specification
Remote Control	Communication Type	RS-232C/RS-422 (factory option)
	Transfer Rate	9600, 19200, 38400 bps
	Data Format	Start Bit: 1 bit, Data: 8 bits, Stop Bit: 1 bit
	Connector	Dsub 9pin
Display Device		Vacuum Fluorescent Display
Control Operation		Front Switch/Command Communication
Wired Remote Control (Optional)		Dsub 9pin

[6. General Specification]

Item		Specification
Power	Effective Power	75 W Max.
	Apparent Power	140 VA Max.
	Power Factor	0.53 Typical
Head Dissipation		65 Kcal Max.
Supply Voltage		100-120/200-240 VAC (50/60Hz)
Operating Temperature		5 ~ 40° C (non-condensing)
Operating Humidity		30 ~ 80%RH (non-condensing)
External Measurement		430 (W) x 44 (H) x 350 (D) mm (excluding protrusions)
Weight		Approx. 5 kg

[7. Accessories]

AC Cable	1 piece	EIA Rack-Mount Brackets	1 set
3p -2p Plug Adapter	1 piece	Instructions (Operating Manual/Command Reference)	1 set

Separately Sold Option: Remote Box

[8. RS-232C Port]

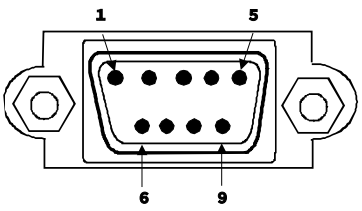
The SC-2040 is equipped with an RS-232C port on the rear panel as a control interface for a PC.

[RS-232CSpecification]

Transfer Rate	9600/19200/38400 bps
Communication Method	Full-Duplex Communication
Type	DCE
Start Bit	1 bit
Data Length	8 bits
Stop Bit	1 bit

[RS-232C Connector Specification]

Type: D-Sub 9-Pin (Male)



As seen on SC-2040

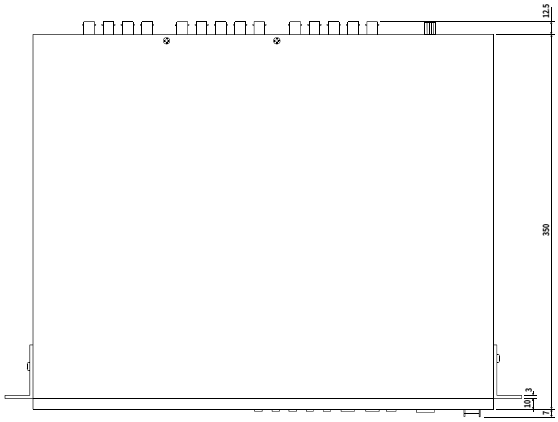
Pin	SC-2040 Signal		PC Signal	Pin
2	SD	→	RD	2
3	RD	←	SD	3
5	FG	—	FG	5
8	RS	→	CS	8

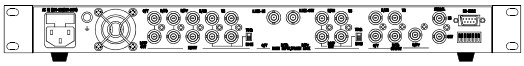
All the pins that are not shown here are not connected, however, pins 4 and 6 are connected together internally.

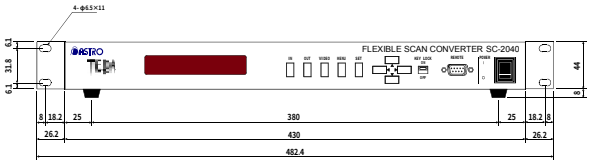
Please refer to the command reference for the details of communications protocol.

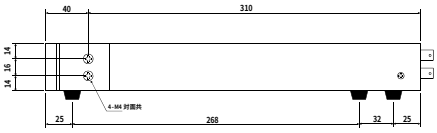
[9. External Drawing]

SC-2040

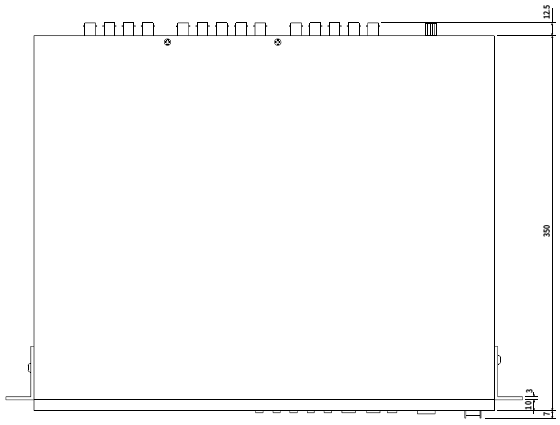


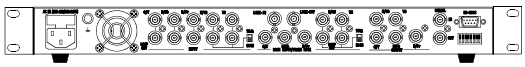


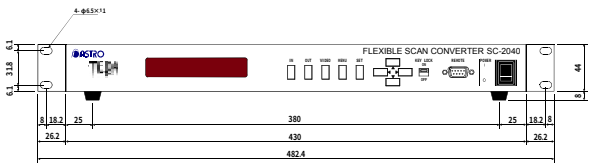


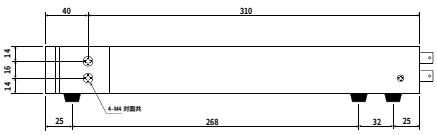


SC-2040B

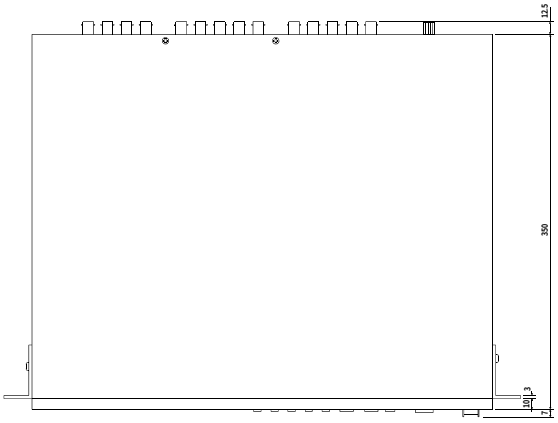


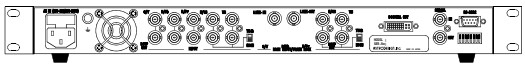


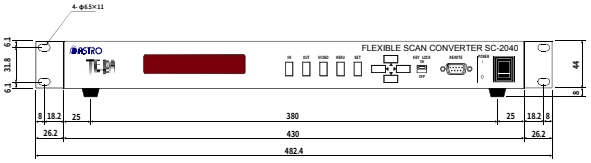


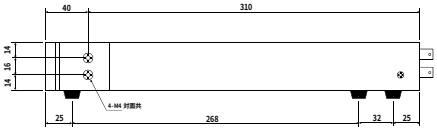


SC-2040T

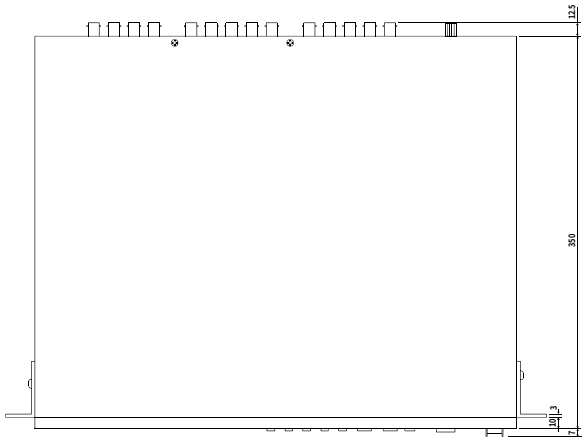


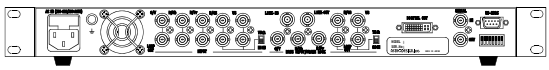


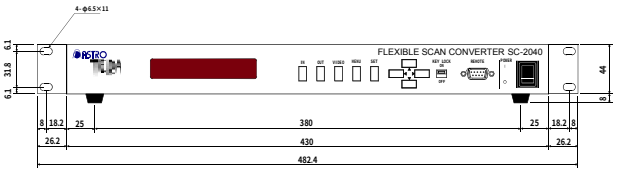


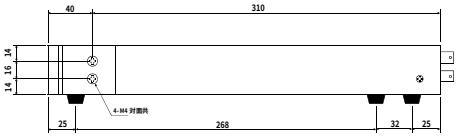


SC-2040W









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