LEADER

LV 58SER03A

TRI SYNC / COMPOSITE

INSTRUCTION MANUAL

LEADER
ELECTRONIC MEASURING INSTRUMENTS

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Maximum Allowable Input Voltage

The maximum allowable input voltage to the input connectors is shown in the table below.
Do not apply excessive voltage to prevent damage to the instrument.

Input Connector	Maximum Allowable Input Voltage
TRI SYNC/COMPOSITE INPUT A, B	±5 V (DC + peak AC)

1.2 Notations Used in This Manual

The key and other operations explained in this manual apply to the LV 5800, but you can also perform similar operations on the LV 7800.

2. SPECIFICATIONS

2.1 General

This unit is installed in the LV 5800 (MULTI MONITOR) or LV 7800 (MULTI RASTERIZER), and used to display and measure the analog NTSC or PAL composite video signals and HD tri-level sync signals.
It has functions such as a waveform display, a vectorscope display, a picture display, and an EXT REF phase display (when the input is an HD tri-level sync signal, only the waveform display and EXT REF phase display functions are available).

2.2 Features

- **Input/Output**

  There are two input connectors: INPUT A and INPUT B.
  The selected channel is output from the PIX OUT connector on the rear panel.

- **Display**

  Waveform display, vectorscope display, picture display, and EXT REF phase display function are available (when the input is an HD tri-level sync signal, only the waveform display and EXT REF phase display functions are available).
  In addition, when the input is a composite video signal, a low pass filter can be used to display the luminance component as a waveform.

- **SCH Measurement Function**

  You can perform SCH measurements which are essential when editing the composite signal.

- **EXT REF Phase Display Function**

  Compares the input signal to the V.H sync signal of the external reference signal and displays the phase difference numerically and graphically.
  The external reference input is shared with the LV 5800 or LV 7800. This is available when the input is an NTSC/PAL black burst signal or an HD tri-level sync signal that is synchronized with and is the same format as the input signal.

- **Cursor Measurement**

  Cursors can be used to measure the amplitude, time, and phase with high accuracy.

2.3 Specifications

2.3.1 Input Terminal

Analog Input

Input Signal	NTSC/PAL composite video signal HD tri-level sync signal (*1)
Supported Standards	
Composite Video Signal	SMPTE 170M and ITU-R BT.470
HD Tri-level Sync Signal	SMPTE 274M
Input Connector	BNC connector 2 connectors (channels A and B are selectable)
Input Impedance	75 Ω
Input Return Loss	
Up to 6 MHz	≥ 30 dB
6 to 20 MHz	≥ 18 dB
Maximum Input Voltage	±5 V (DC + peak AC)

EXT REF (*2)

Input Signal	NTSC/PAL black burst signal HD tri-level sync signal

*1 The supported video signal formats are shown below.
- If a 1035i (not supported) signal is applied, it is detected as a 1080i signal.
- If a 1080PsF/30, 1080PsF/29.97, or 1080PsF/25 signal is applied, it is detected as a 1080i/60, 1080i/59.94, or 1080i/50 signal (respectively).

Scanning	Frame (Field) Rates
1080i	60 / 59.94 / 50
1080p	30 / 29.97 / 25 / 24 / 23.98
1080PsF	30 / 29.97 / 25 / 24 / 23.98

*2 Other specifications are the same as those of the LV 5800/7800.

2.3.2 Output Terminal

PIX Out

Output Signal	Active
Output Connector	BNC connector 1 connector
Output Impedance	75 Ω
Output Amplitude	1 Vp-p ± 5 %
Frequency Characteristics	
25 Hz to 5 MHz	±5 %
5 to 15 MHz	-10 to +5 %
15 to 20 MHz	±10 %

2.3.3 Waveform Display

Vertical Axis

Scale	
Composite Video Signal	
NTSC	−40 to 100 IRE
PAL	−0.3 to 0.7 V
HD Tri-level Sync Signal	-0.3 to 0.7 V, -43 to 100% (the unit is switchable between V and %)
Gain	×1 or ×5
Variable Gain	x0.2 to x2
Amplitude Accuracy	±1 %
Frequency Characteristics	
Composite Video Signal	
25 Hz to 5 MHz	±2 %
5 to 5.6 MHz	-7 to +3 %
HD Tri-level Sync Signal	
25 Hz to 15 MHz	±5 %
15 to 20 MHz	±10 %

Step Response (for 1 V full scale, flat, 2T pulse, and 2T bar)(when a composite video signal is applied)

Overshoot	±2 %
Preshoot	±1 %
Ringing	±2 %
Pulse/Bar Ratio	±1 %
Vertical Tilt	±1 %
Filter	Luminance filter
DC Restorer	Clamp to the back porch (fixed)

Horizontal Axis

Operation Mode	Displays a single waveform or 4 waveforms (when 4 units are installed)
Display Format	
Line Display	1H or 2H
Line Magnification	×1, ×10, or x20
Field Display	1V or 2V
Field Magnification	×1, ×20, or x40
Time Base Accuracy	±1 %

Line Select — Displays the selected line.

Cursor Measurement

Horizontal Cursors	2 cursors (REF, DELTA)
Time Measurement	Displayed in [SEC]
Frequency Measurement	Displays the frequency in which the time between cursors is considered a cycle.
Vertical Cursors	2 cursors (REF, DELTA)
Amplitude Measurement	Measure in terms of [%] or [V].

Image Quality Adjustment	Brightness adjustment

2.3.4 Vectorscope Display

Scale	75 % or 100 % Using a color bar
Gain	×1, ×5, or IQ-MAG
Variable Gain	x0.2 to x2
Phase Accuracy	±2°
Amplitude Accuracy	±3 %
Phase Adjustment Range Display	360°
Setup (NTSC)	0 % or 7.5 %
NTSC Display (PAL)	NTSC or PAL display
IQ Axis	Select show or hide.
SCH Display	Displays the SCH value numerically.
Line Select	Displays the selected line.
Image Quality Adjustment	Brightness adjustment

* The vectorscope display is only available when a composite video signal is applied.

2.3.5 Picture Display

Marker Display	16:9 marker display Safe action marker display Safe title marker display Center marker display
Display Size	Reduced display, full frame display, and actual size display
Line Select	Displays a marker for the selected line.
Image Quality Adjustment	Brightness adjustment, contrast adjustment, RGB level adjustment, and RGB bias adjustment

* The picture display is only available when a composite video signal is applied.

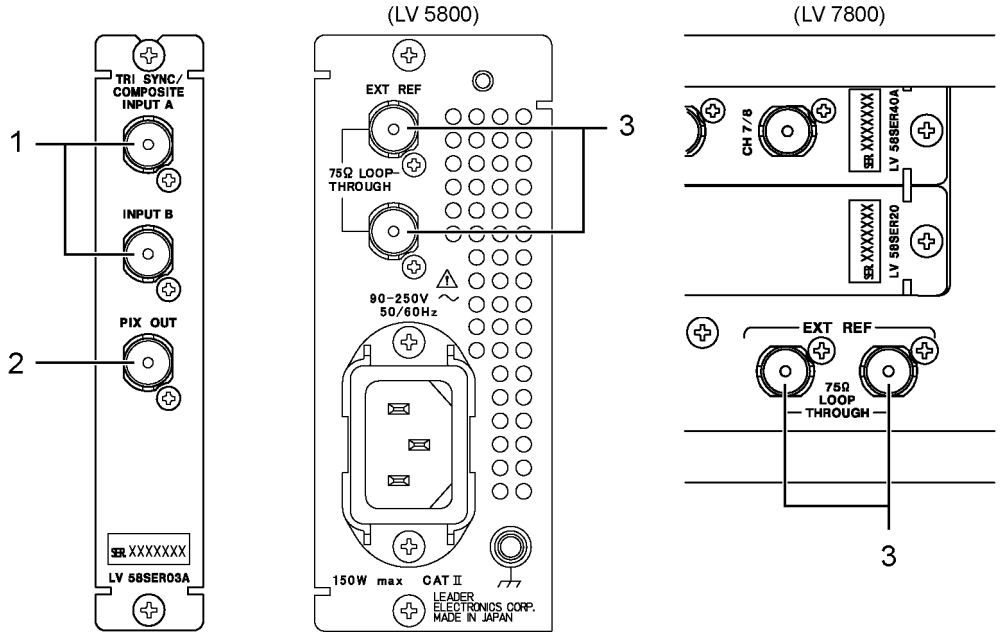
2.3.6 Status Display

Display	The phase difference between the composite video signal or the HD tri-level sync signal and the external reference signal is displayed numerically and graphically. Holds and displays eight phase difference values being measured.
Display Range	
V direction	1 frame
H direction	±1 line
Synchronization Signal	NTSC/PAL black burst signal HD tri-level sync signal (The same format as the input signal)

2.3.7 General Specifications

Environmental Conditions	Same as the LV 5800/7800
Power Consumption	Supplied from the LV 5800/7800 9 W max.
Weight	0.25 kg
Accessories	Instruction manual 1

3. NAMES AND FUNCTIONS OF PARTS



1 TRI SYNC/COMPOSITE INPUT A, INPUT B

These are the input connectors for the NTSC/PAL analog composite video signal and the HD tri-level sync signal. Terminated at 75 Ω.

* Do not apply a voltage exceeding ±5 V (DC + peak AC) to the SDI signal input connector. If you do, the instrument may malfunction.

2 PIX OUT

This is the output connector for monitoring the NTSC/PAL analog composite video signal and the HD tri-level sync signal. Active output.
The signal selected using the A/B input channel selection key on the front panel is output.

3 EXT REF（Rear panel of LV 5800/7800）

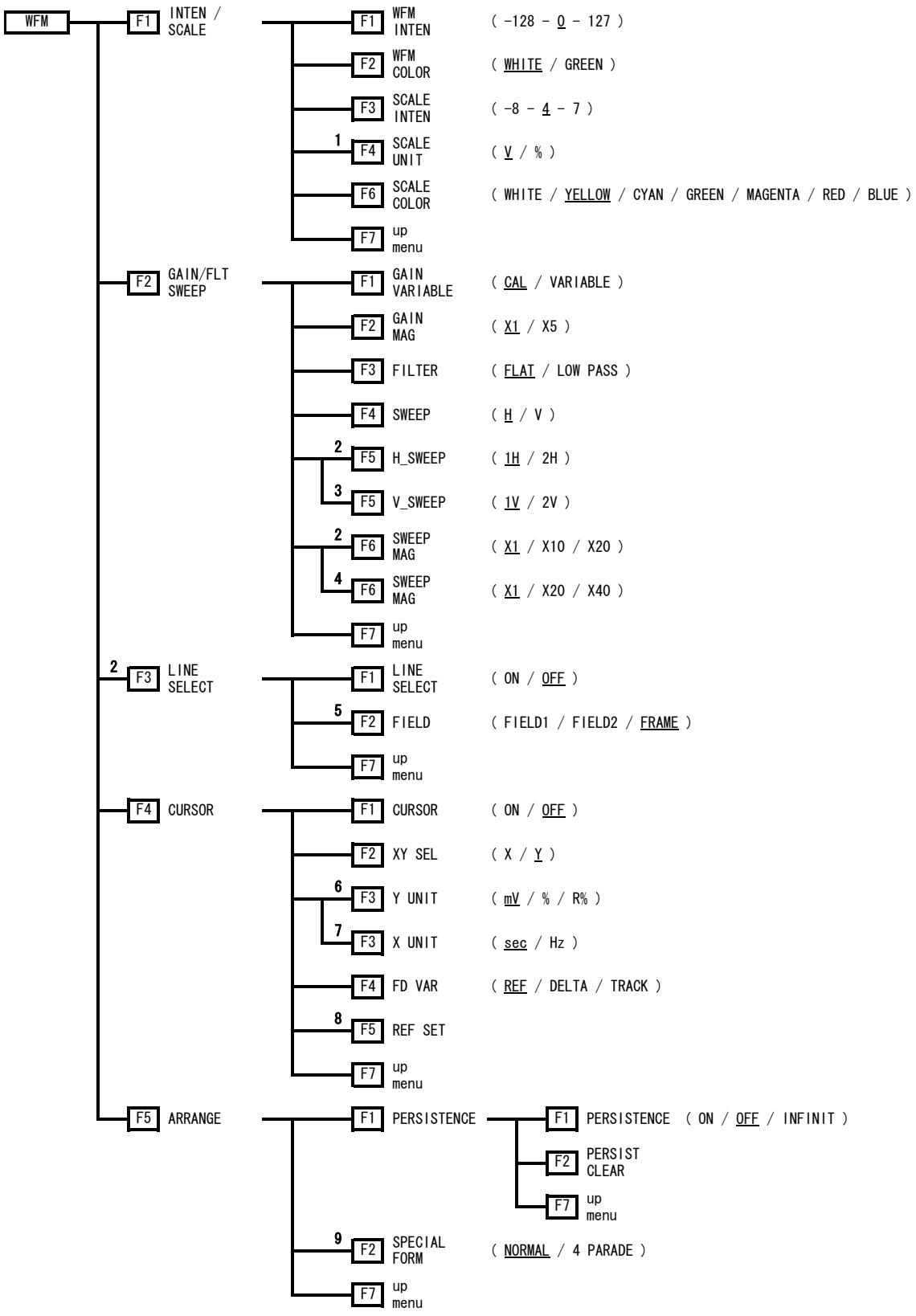
This is the external reference signal input connector. The input configuration is loop-through. Terminate the end of the cascade connection at 75 Ω.

The LV 5800/7800 supports NTSC/PAL black burst signals for composite video signals and HD tri-level sync signals for HD tri-level sync input signals. In either situation, apply signals that are synchronized with and are the same format as the input signal.

4. MENU STRUCTURE

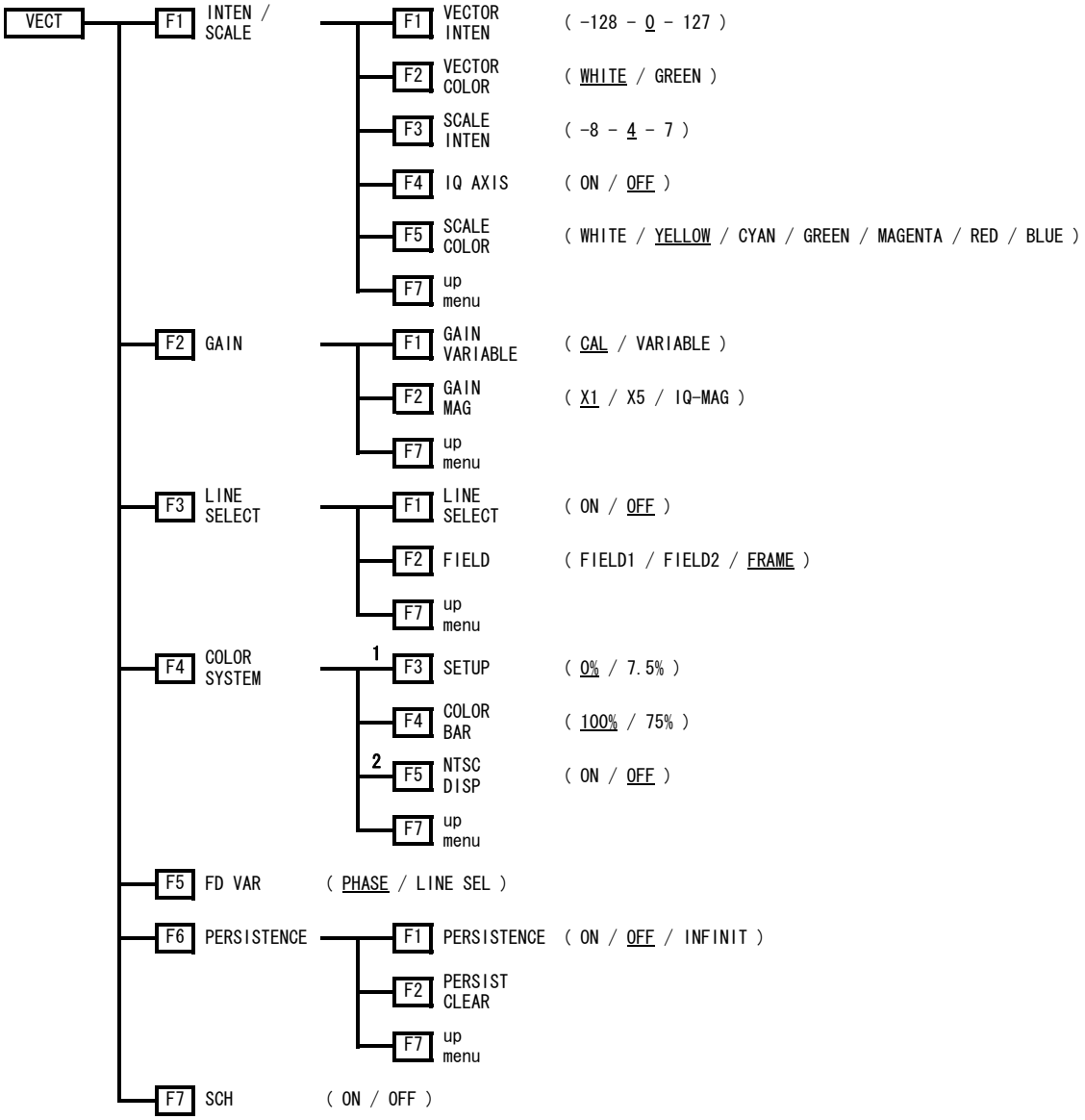
The structure of the menu of WFM, VECT, PIC, and STATUS is shown below.
Underlined sections indicate initial settings.

4.1 Waveform Display Menu



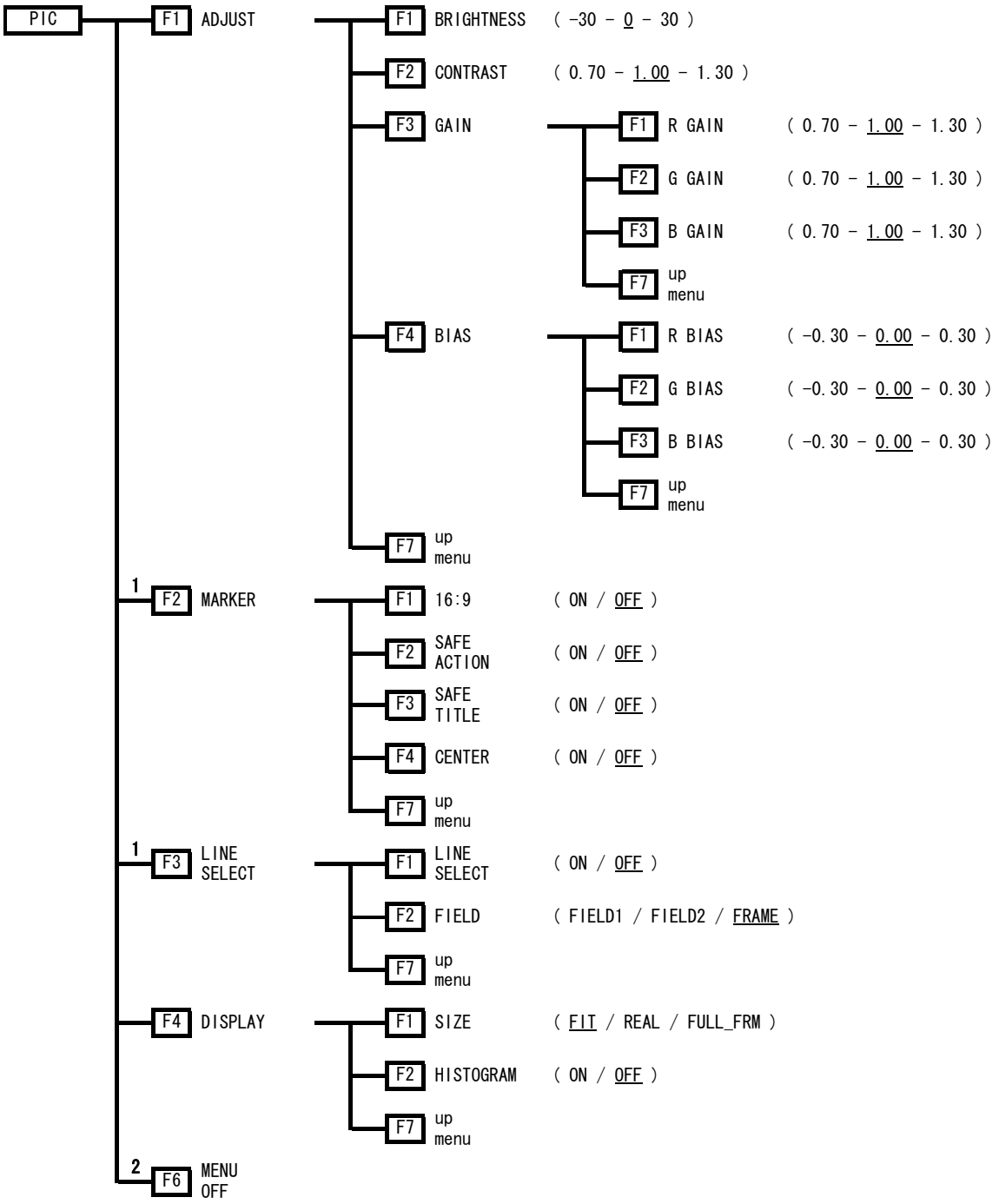
*1 Displayed if an HD tri-level sync signal is applied.
*2 Displayed if SWEEP is set to H.
*3 Displayed if SWEEP is set to V and a signal other than 1080p is applied.
*4 Displayed if SWEEP is set to V.
*5 Displayed if a signal other than 1080p is applied.
*6 Displayed if XY SEL is set to Y.
*7 Displayed if XY SEL is set to X.
*8 Displayed if Y UNIT is set to R%.
*9 Displayed if 1-screen display is enabled.

4.2 Vectorscope Display Menu



*1 Displayed if the input signal is NTSC.
*2 Displayed if the input signal is PAL.

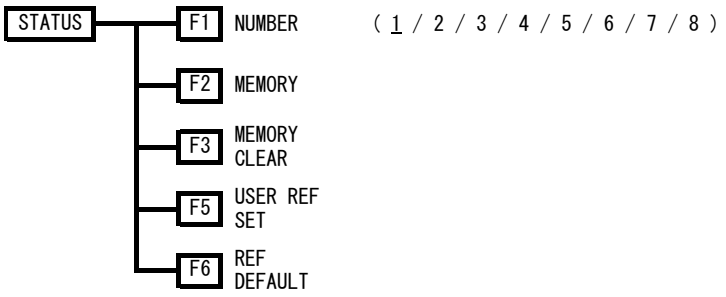
4.3 Picture Display Menu



*1 Displayed if the SIZE is set to FIT.

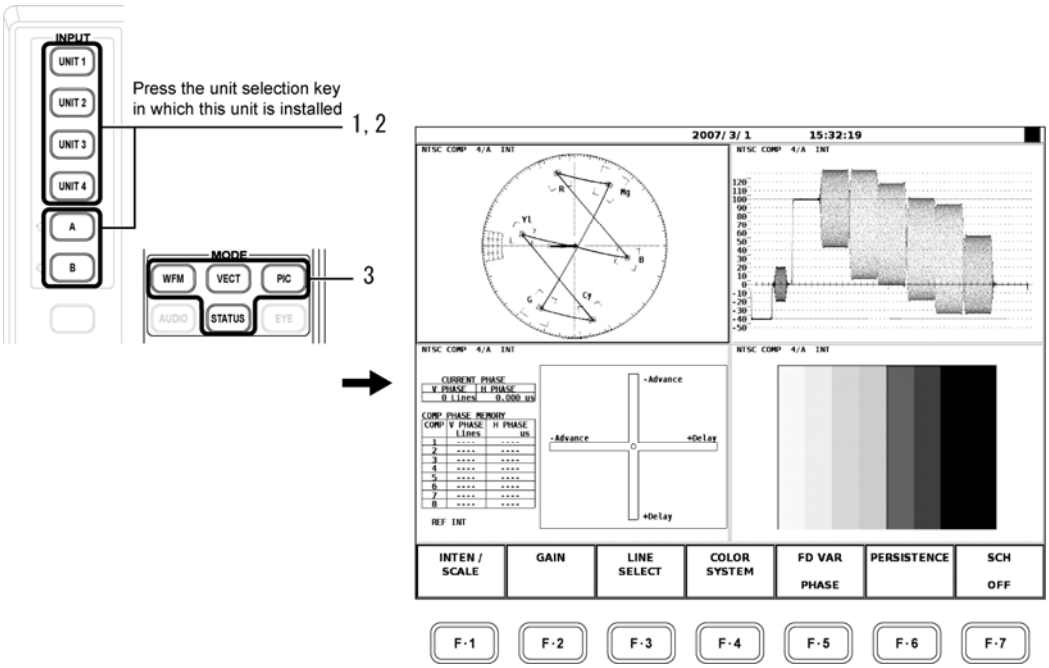
*2 Displayed if 1-screen display is enabled.

4.4 Status Display Menu



5. PROCEDURE

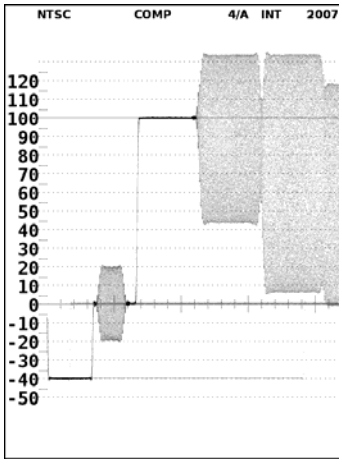
This unit displays and measures analog NTSC/PAL composite video signals and HD tri-level sync signals.
To display the signal, press the key corresponding to this unit from the front panel, press the A or B channel key, and press the WFM, VICT, PIC, or STATUS mode selection key (when an HD tri-level sync signal is applied, only WFM and STATUS are available).



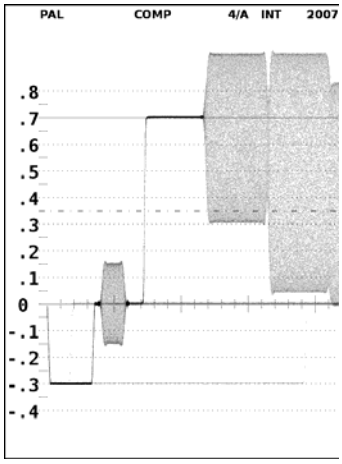
- **Display**

  The input format is determined automatically. The determined input format is displayed in the upper left of the screen.

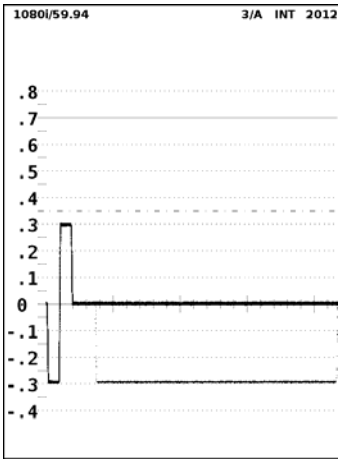
NTSC



PAL



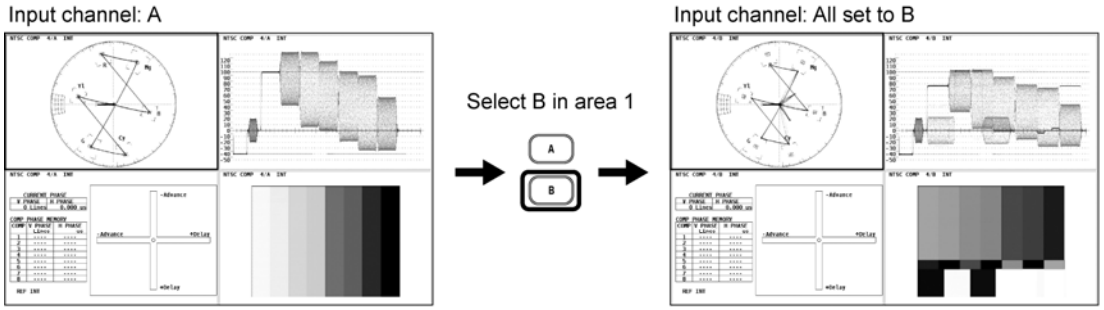
HD tri-level

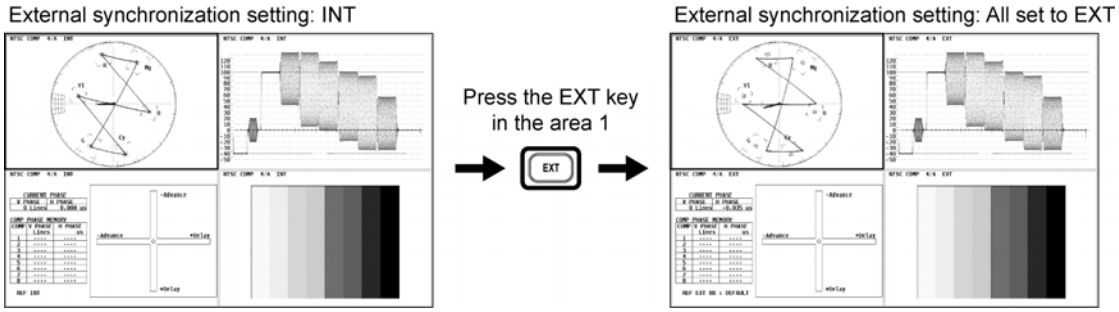


- **Multi Screen Display**

  Setting the Input Channel and External Synchronization

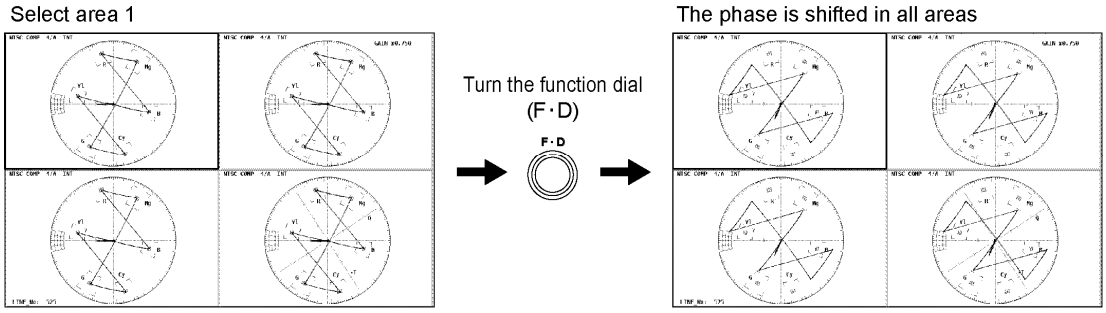
  If the vectorscope screen of the same unit is shown in the multi screen display, the input channel and external synchronization (INT/EXT) settings apply to all screens. Therefore, if you change the input channel or external synchronization of a selected screen, the change is also applied to the other screens, and the display changes accordingly.





Phase Display

If multiple vectorscope screens of the same unit are displayed in the multi screen display, the phase is common to all screens. If you change the phase by turning the function dial (F•D) in a selected area, the phase also changes in the other areas.

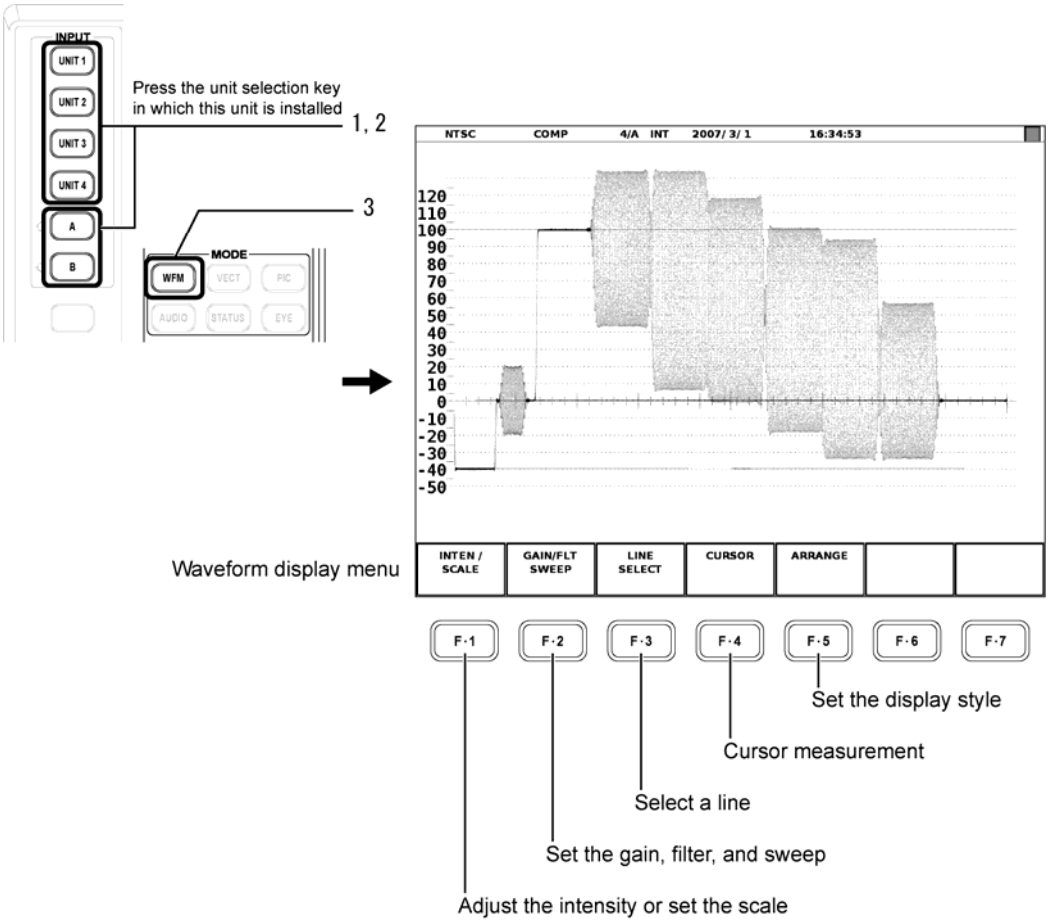


Note

You cannot display input channels A and B at the same time on the multi screen display. Therefore, to display four different input signals at the same time, you have to install four LV 58SER03A units into the LV 5800/7800.

6. VIDEO SIGNAL WAVEFORM DISPLAY

Press the WFM (video signal waveform display) key on the front panel to display the video signal waveform, scale, waveform display menu, and the like.

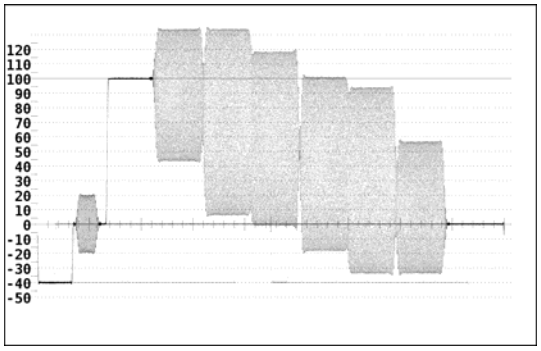


- **Displayed Scale**

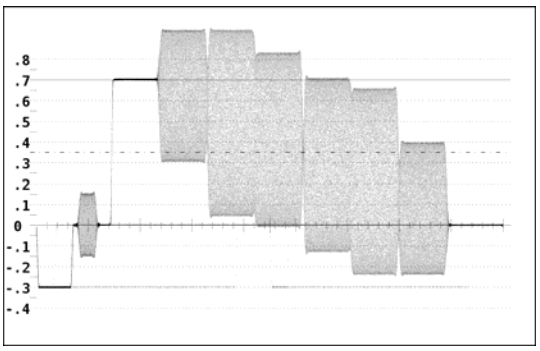
  When a composite video signal is applied:

  The scale varies depending on the input signal format. The scale is IRE for NTSC and V for PAL.

NTSC



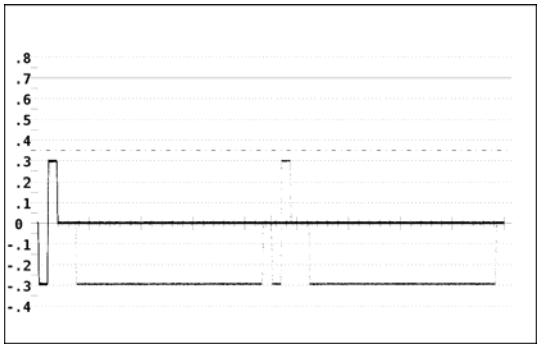
PAL



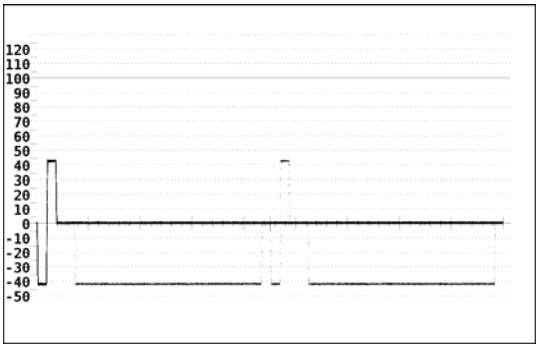
When an HD tri-level sync signal is applied:

You can use F•4 SCALE UNIT on the intensity adjustment menu to set the displayed scale to V or %. 700 mV is equivalent to 100 %.

V



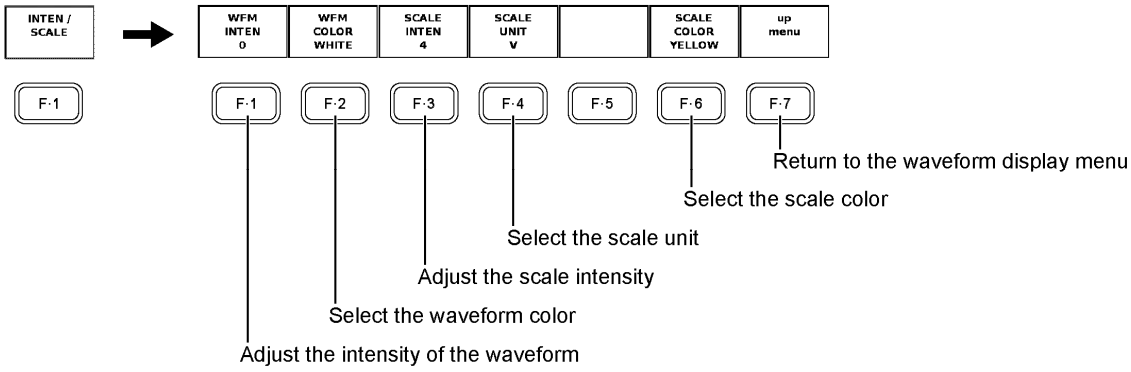
%



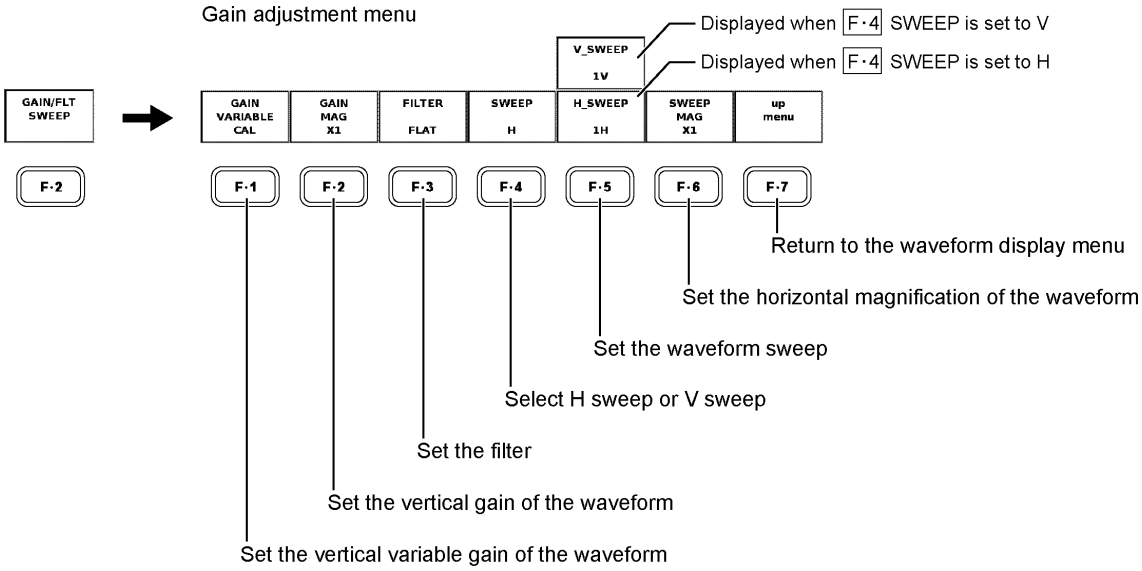
- **Menu Hierarchy**

This section describes the hierarchy and each menu of the waveform display menu.

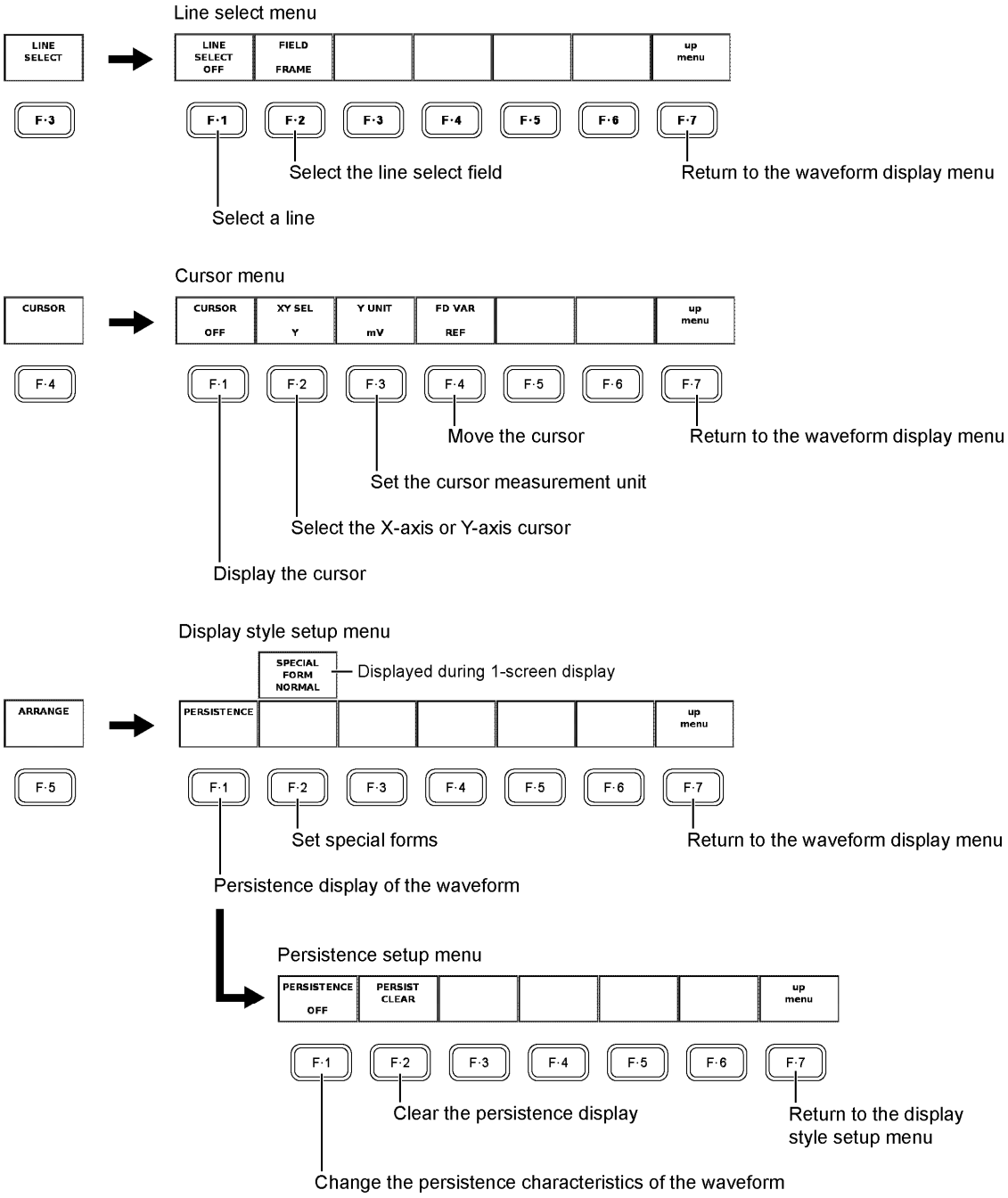
Intensity adjustment menu



Gain adjustment menu



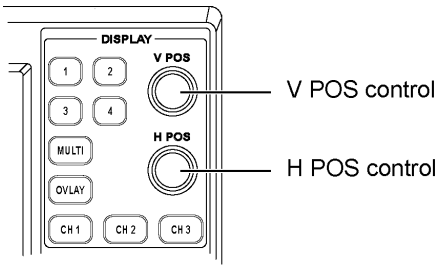
[See also] Setting the Filter → Section 6.2, “Setting the Filter”



[See also] 4 waveform display of the special form setting → Section 6.3, “4 Parade”

6.1 Setting the Waveform Display Position

Use the V POS (vertical position adjustment) control and H POS (horizontal position adjustment) control on the front panel to adjust the position of the waveform display in the selected display area.



- **V POS Control**

  Adjusts the vertical display position of the video signal waveform.
  Press the control to reset the vertical display position of the video signal waveform to the reference position.

- **H POS Control**

  Adjusts the horizontal display position of the video signal waveform.
  Press the control to reset the horizontal display position of the video signal waveform to the reference position.

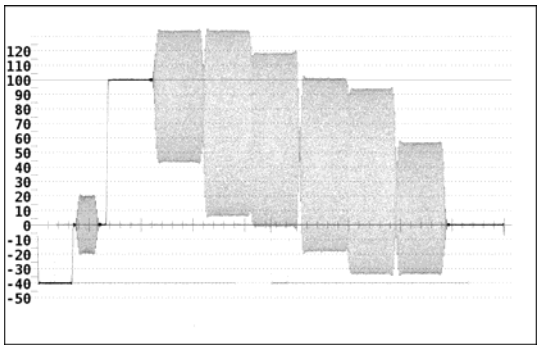
6.2 Setting the Filter

You can select the filter to be applied to the displayed video signal from the following list using F•3 FILTER in the gain adjustment menu.

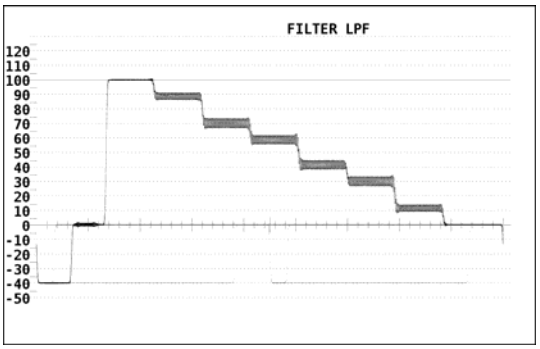
FLAT: Filter with flat frequency characteristics over the entire bandwidth of the input signal.

LOW PASS: Filter that displays the luminosity component of the input signal (when a composite video signal is applied).
This is a filter that has an attenuation of 20 dB or more at a frequency of 20 MHz (when an HD tri-level sync signal is applied).

FLAT



LOW PASS



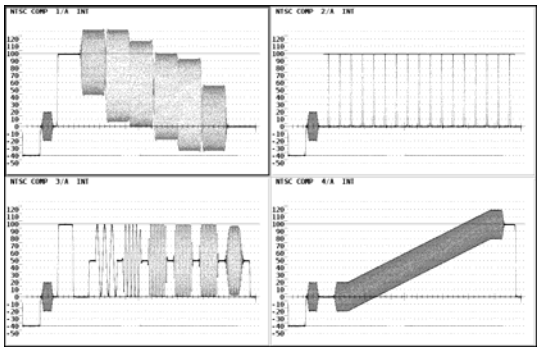
6.3 4 PARADE

If you set F•2 SPECIAL FORM in the display style setup menu to 4 PARADE, the WFM waveforms of different units are displayed side-by-side when multiple LV58SER03 units are installed.

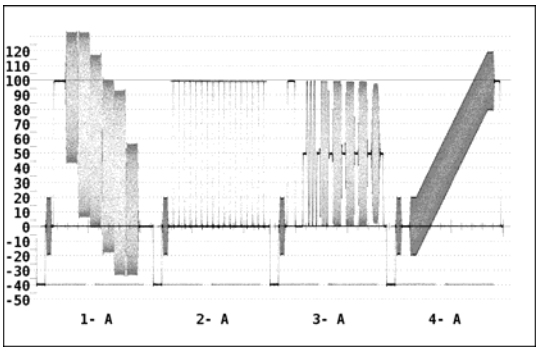
You can display the waveforms of up to 4 units in the 1-screen display by assigning each unit and INPUT A or B to areas 1 to 4 in the 4-screen multi display.

- All four inputs must be of the same format and must be synchronized.
- Valid only during 1-screen display. SPECIAL FORM is not displayed during multi screen display.
- If you set MODE to a mode other than WFM in areas 1 to 4, the waveform in the corresponding areas will not be displayed.
- Input channel A/B cannot be switched during 4 PARADE display.

NORMAL



4 PARADE

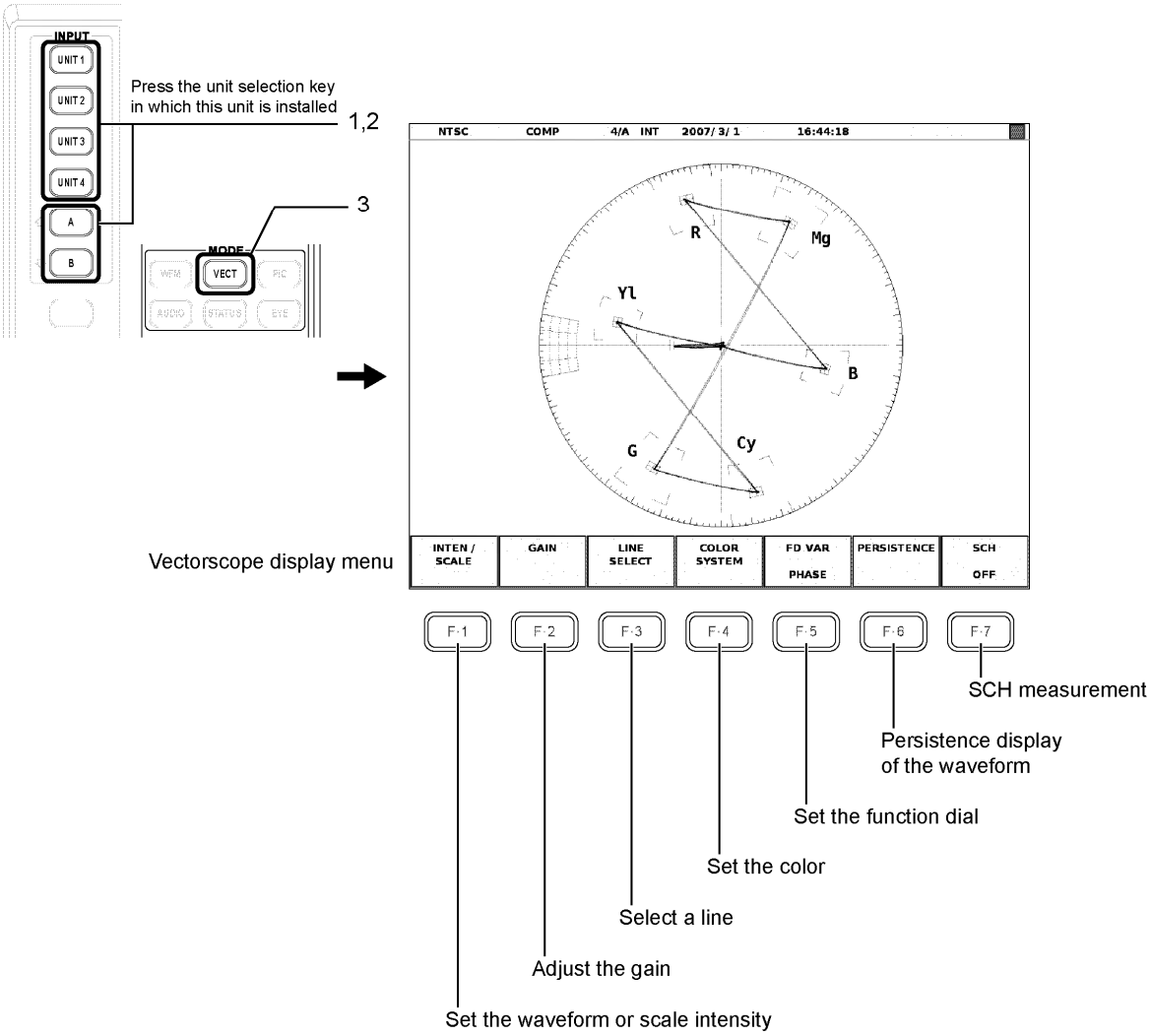


Note

You cannot display input channels A and B at the same time on the 4 PARADE screen. Therefore, to display four different input signals at the same time, you have to install four LV 58SER03A units into the LV 5800/7800.

7. VECTORSCOPE DISPLAY

Press the VECT (vector) key on the front panel to display the vector waveform, scale, vector display menu, and the like.
When an HD tri-level sync signal is applied, the vector waveform is not displayed.

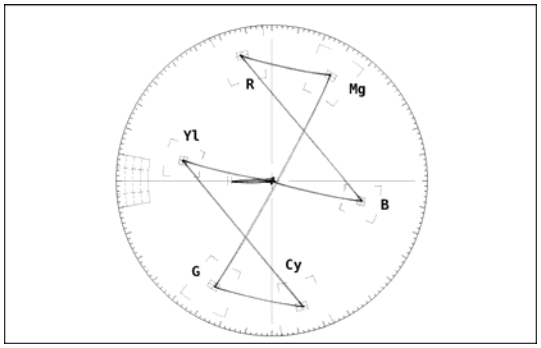


[See also] Function dial setting → Section 7.3, “Setting the Function Dial”
SCH measurement → Section 7.4, “SCH Measurement”

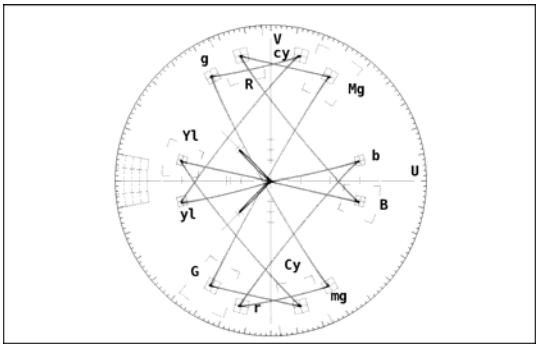
- **Displayed Scale**

  The scale varies depending on the input signal format.

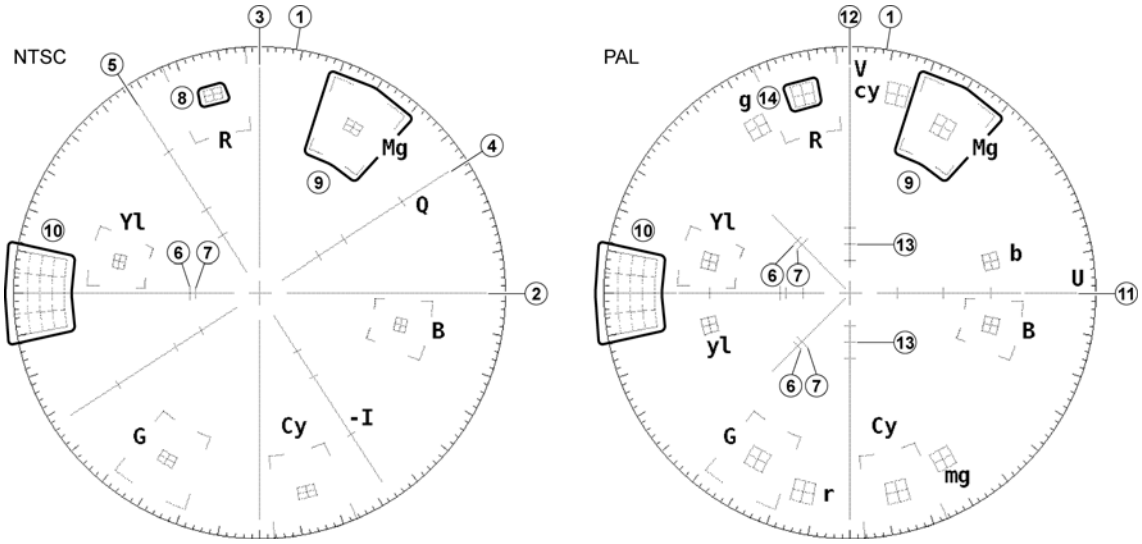
NTSC



PAL



- **Scale Explanation**

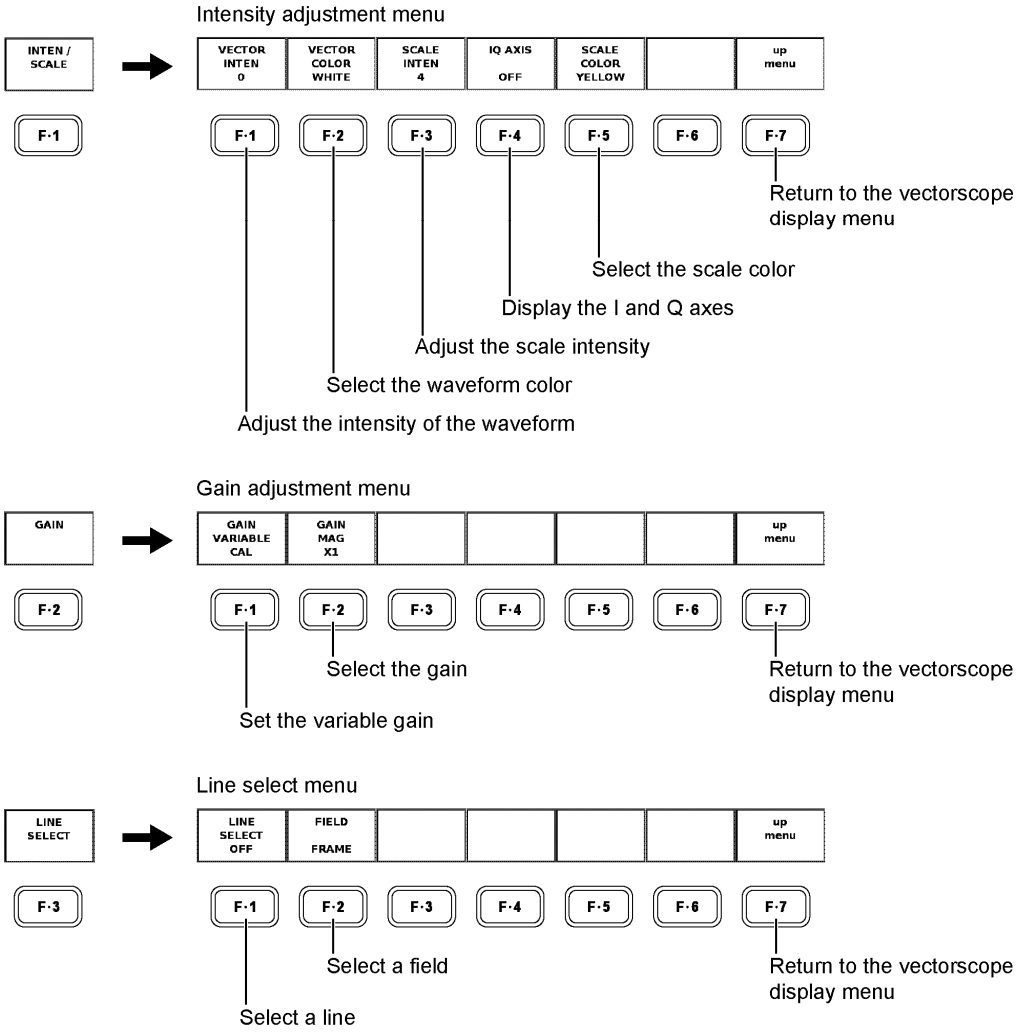


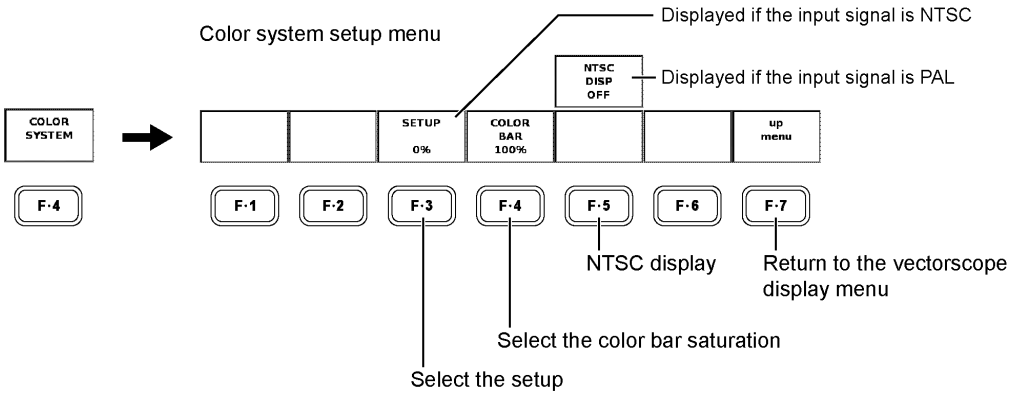
No.	Description
1	Fixed amplitude circle. This is the amplitude when the amplitude of the input chrominance signal is 0.883 Vp-p. Each major division is 10 °, and each minor division is 2 °. This is used during phase difference measurements.
2	The B-Y axis.
3	The R-Y axis.
4	The Q axis. Displayed when IQ AXIS on the intensity adjustment menu is set to ON. The scale on the axis represents vertical lines for each color.
5	The I axis. Displayed when IQ AXIS on the intensity adjustment menu is set to ON. The scale on the axis represents vertical lines for each color.
6	The burst level of a 100/7.5/100/7.5 color bar.
7	The burst level of a 100/0/100/0 color bar.
8	Tolerances of ±2.5 IRE units in amplitude and ±2.5 ° in phase are displayed for each color in the color bar. The phase of each color is as follows: Mg: 60.7 °. R: 103.5 °. Yl: 167.1 °. G: 240.7 °. Cy: 283.5 °. B: 347.1 °.
9	Tolerances of ±20 % in amplitude and ±10 ° in phase are displayed for each color in the color bar.

No.	Description
10	The scale used to measure differential gain (DG) and differential phase (DP). The differential gain and differential phase are measured using staircase signals that have chrominance signals superimposed. The scale is 0 to 20 % in the amplitude direction (the perimeter is 0%) and ±10 ° in the phase direction.
11	The U axis. The scale on the axis represents vertical lines for each color.
12	The V axis. The scale on the axis represents vertical lines for each color.
13	The vertical line for the burst level of a 100/0/100/0 color bar.
14	Tolerances of ±5 % in amplitude and ±3 ° in phase are displayed for each color in the color bar. The phase of each color is as follows: Mg: 60.7 °, R: 103.5 °, Yl: 167.1 °, G: 240.7 °, Cy: 283.5 °, and B: 347.1 °. mg: 299.3 °, r: 256.5 °, yl: 192.9 °, g: 119.3 °, cy: 76.5 °, and b: 12.9 °.

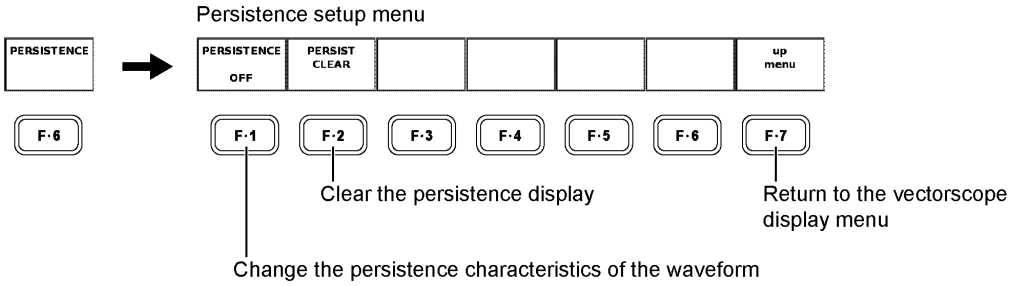
- **Menu Hierarchy**

This section describes the hierarchy and each menu of the vectorscope display menu.



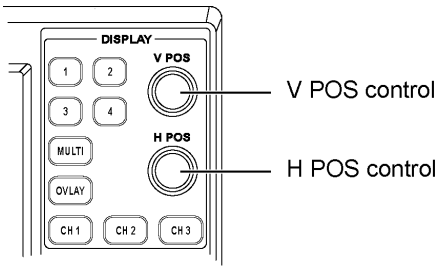


[See also] NTSC display → Section 7.5, “NTSC Display”



7.1 Setting the Waveform Display Position

Use the V POS (vertical position adjustment) control and H POS (horizontal position adjustment) control on the front panel to adjust the position of the waveform in the selected display area.



- **V POS Control**

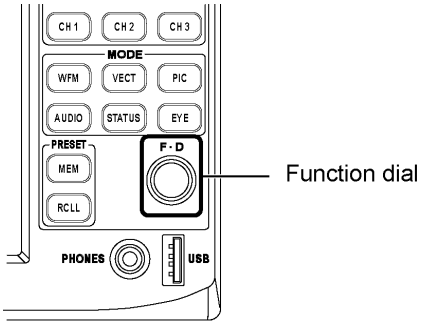
  Adjusts the vertical display position of the vector waveform.
  Press the control to reset the vertical display position of the vector waveform to the reference position.

- **H POS Control**

  Adjusts the horizontal display position of the vector waveform.
  Press the control to reset the horizontal display position of the vector waveform to the reference position.

7.2 Setting the Phase

You can adjust the phase of the vector waveform using the function dial (F•D) on the front panel.
Turn the function dial (F•D) to shift the phase or press it to reset the phase to the reference position.



When adjusting the phase, F·5 FD VAR in the vectorscope display menu must be set to PHASE.
If multiple vectorscope screens of the same unit are displayed in the multi screen display, the phase is common to all screens.

[See also] Notes concerning the phase display → Chapter 5, “PROCEDURE”
Setting the phase → Section 7.3, “Setting the Function Dial”

7.3 Setting the Function Dial

You can set how the unit operates when the function dial (F·D) is turned using F·5 FD VAR in the vectorscope display menu.

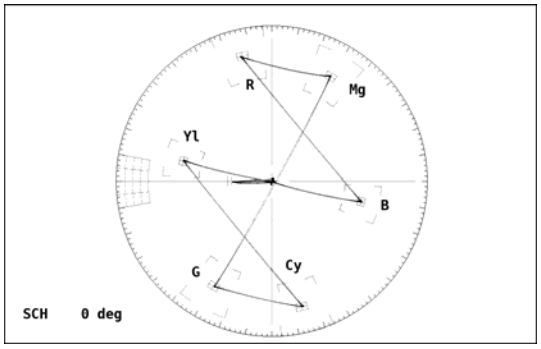
PHASE : Shift the vector phase.
LINE SEL : Select a line.

To select a line using F·1 LINE SELECT in the line select menu, F·5 FD VAR in the vectorscope display menu must be set to LINE SEL. If F·5 FD VAR is set to PHASE, you will not be able to select a line when you turn the function dial even if you press F·1 LINE SELECT to select ON. The phase will be shifted instead.

7.4 SCH Measurement

You can measure the phase difference between the horizontal sync signal and color burst signal by pressing F·7 SCH in the vectorscope display menu to select ON.
The measured value is displayed at the lower left of the screen.

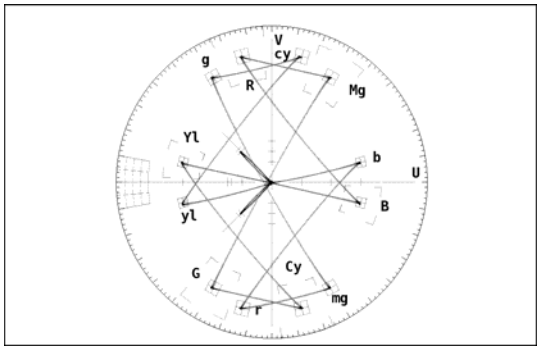
ON



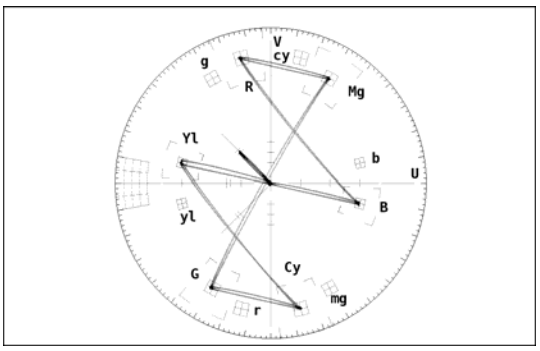
7.5 NTSC Display

If you press F·5 NTSC DISP in the color system setup menu to select ON when the input signal is PAL, the V-axis polarity is inverted every other line to produce NTSC display that does not alternate every other line.

OFF

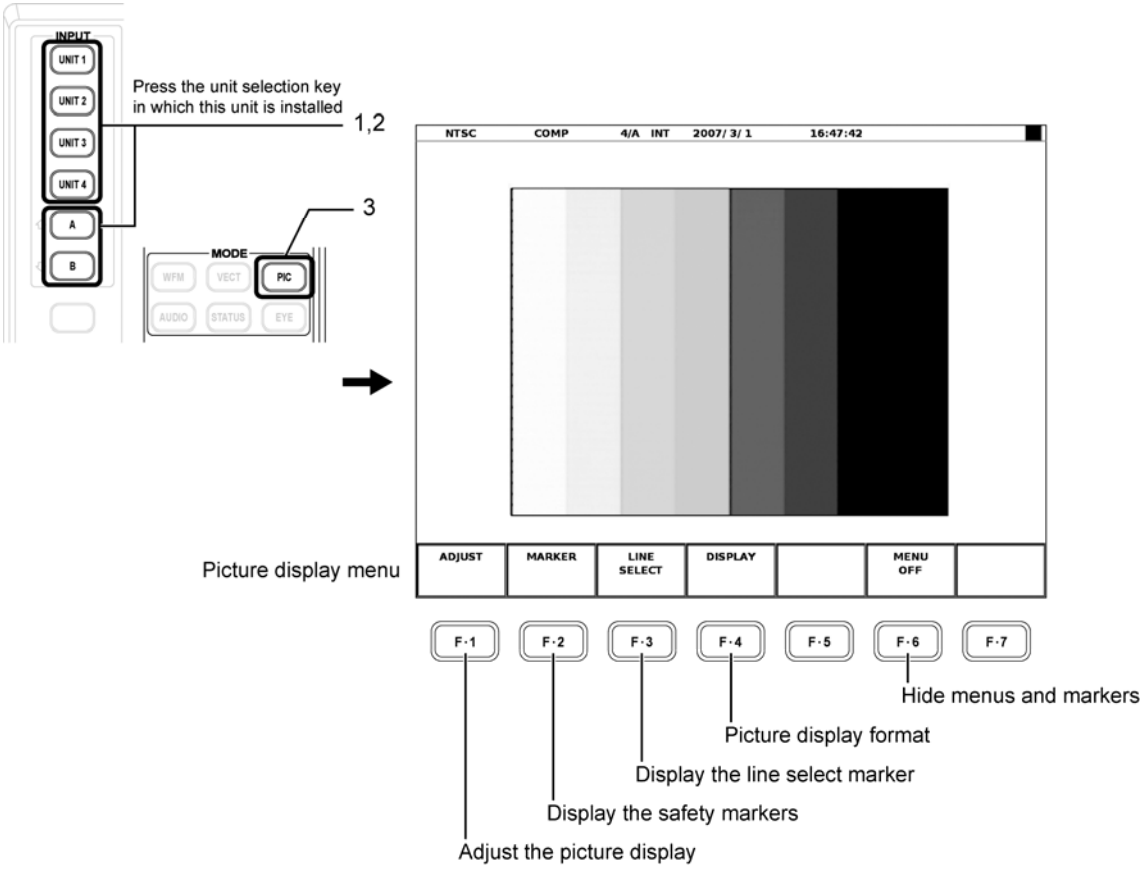


ON



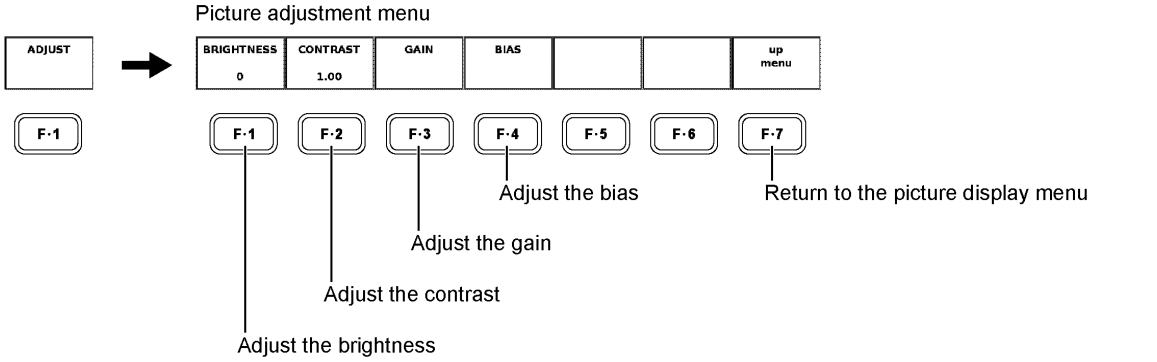
8. PICTURE DISPLAY

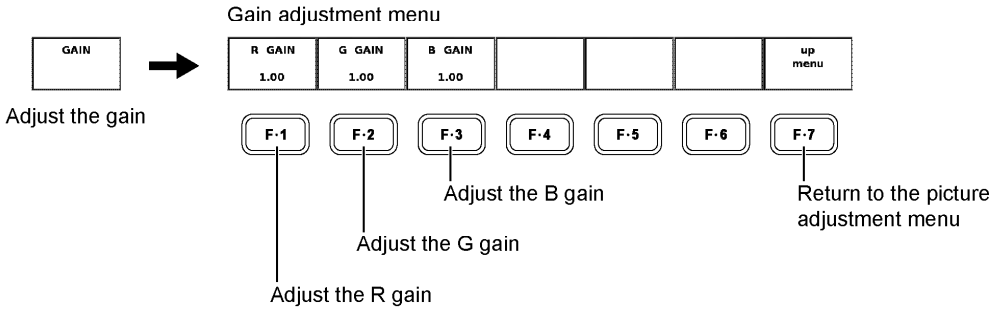
Press the PIC (picture display) key on the front panel to display the picture, picture display menu, and the like.
When an HD tri-level sync signal is applied, the picture is not displayed.

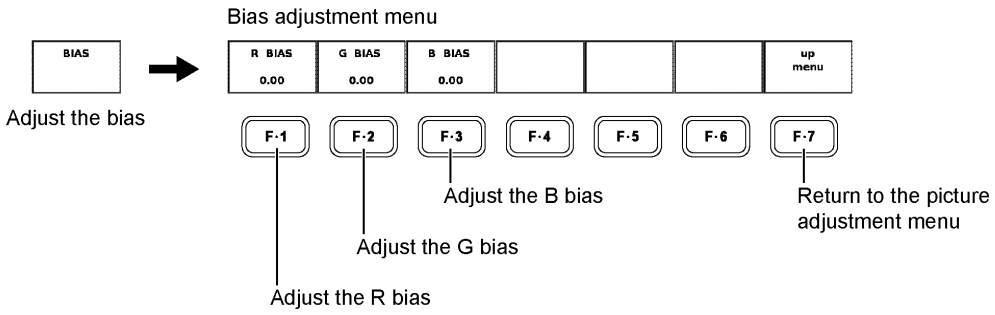


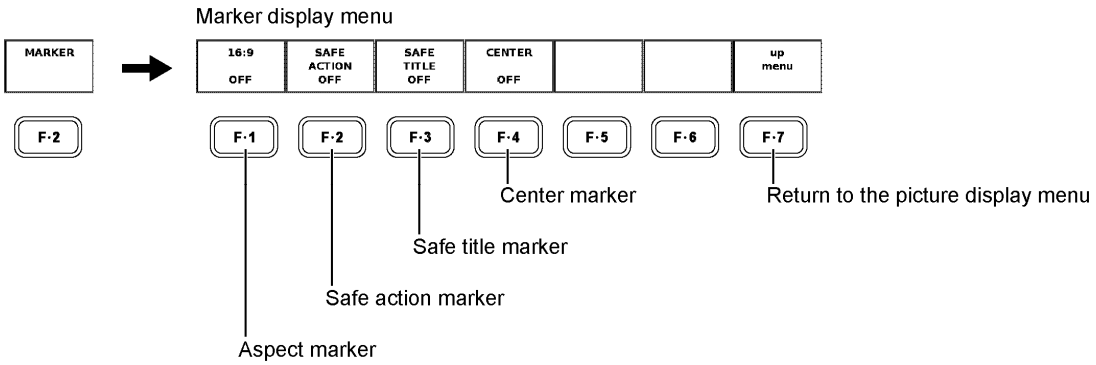
- **Menu Hierarchy**

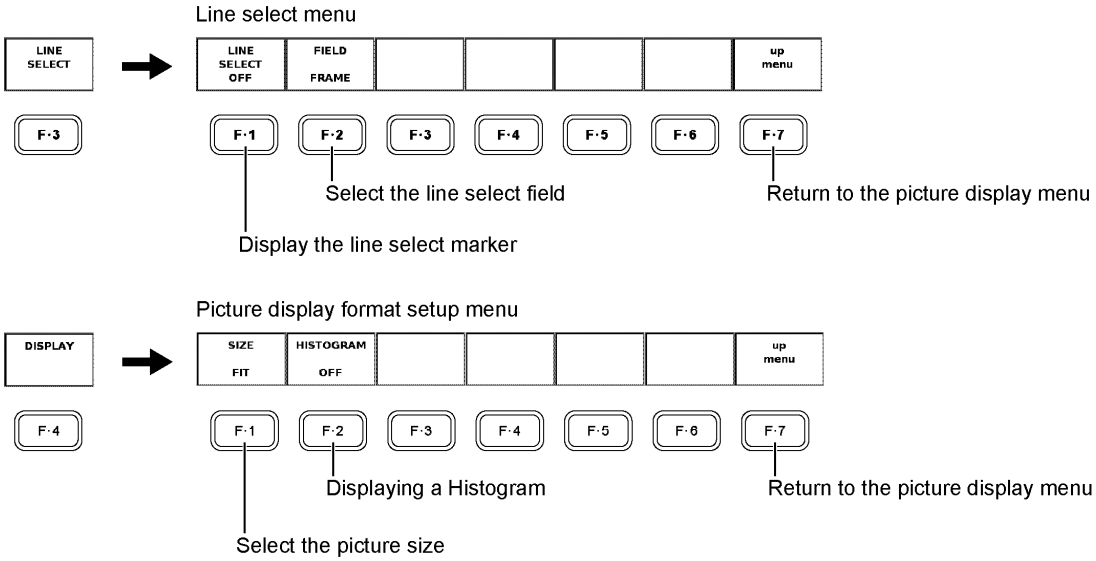
  This section describes the hierarchy and each menu of the picture display menu.










Line select menu
LINE SELECT
LINE SELECT OFF
FIELD FRAME
up menu
F·3
F·1
F·2
F·3
F·4
F·5
F·6
F·7
Select the line select field
Return to the picture display menu
Display the line select marker
Picture display format setup menu
DISPLAY
SIZE FIT
HISTOGRAM OFF
up menu
F·4
F·1
F·2
F·3
F·4
F·5
F·6
F·7
Displaying a Histogram
Return to the picture display menu
Select the picture size

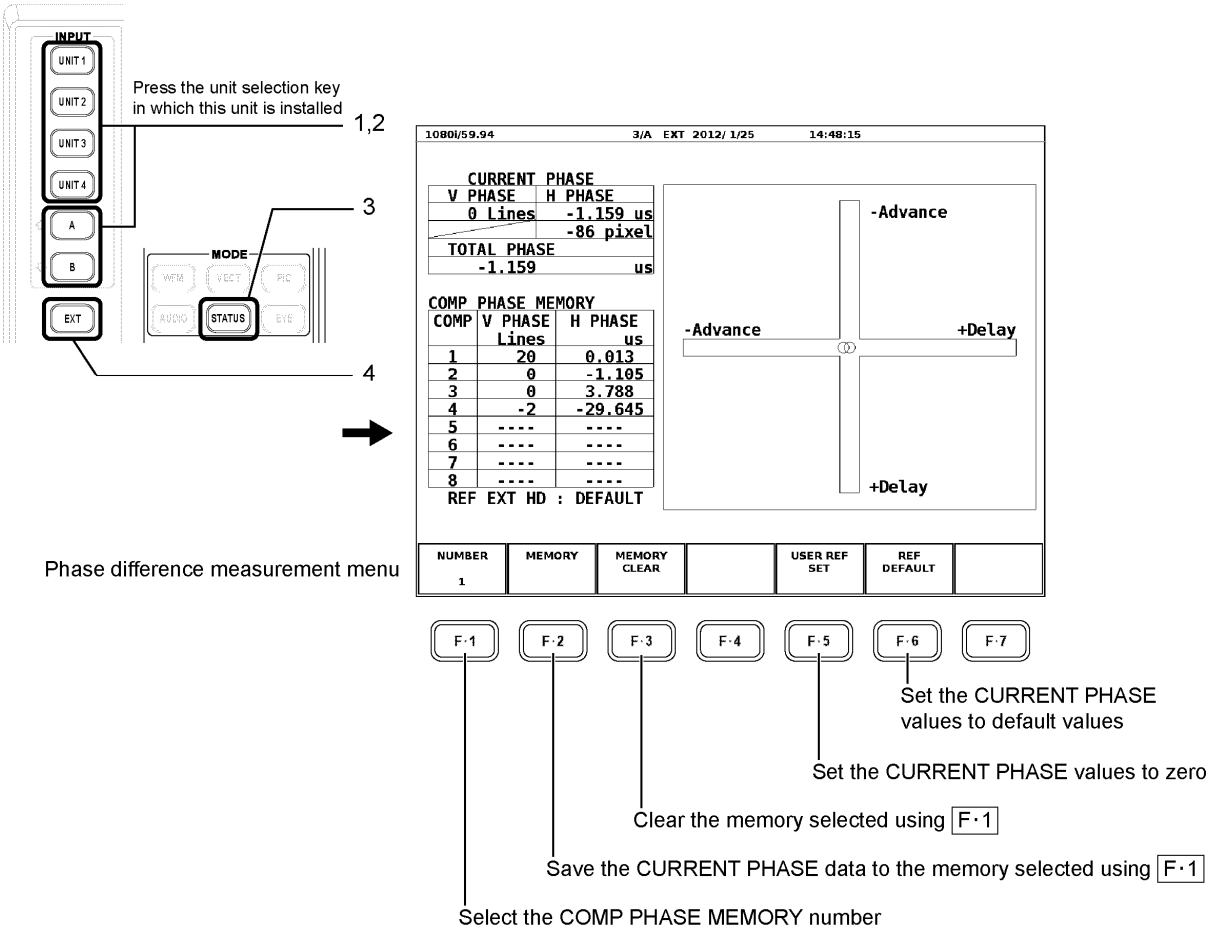
9. STATUS DISPLAY

To measure the phase difference between the composite video signal or the HD tri-level sync signal and the external reference signal, follow the procedure below.

1. **Apply an NTSC/PAL composite video signal or an HD tri-level sync signal to the TRI SYNC/COMPOSITE INPUT A connector or TRI SYNC/COMPOSITE INPUT B connector on the rear panel of this unit.**
2. **Apply an external sync signal to EXT REF on the rear panel of the LV 5800/7800.**

   For a composite video input signal, apply an NTSC/PAL black burst signal. For an HD tri-level sync input signal, apply an HD tri-level sync signal. In either situation, apply a signal that is synchronized with and is the same format as the input signal.

Press the STATUS key to display the phase difference measurement screen and the phase difference measurement menu.



* If you press the EXT key in the multi screen display, all the other screens will also be set to external synchronization.

- **Screen Description**
  - **CURRENT PHASE**

    Displays the phase difference between the input signal and the external sync signal.

    V PHASE: The phase difference is displayed in unit of lines.
    H PHASE: The phase difference is displayed in units of time (us) and units of pixels (pixel).
    TOTAL PHASE: The phase difference sum total of V PHASE and H PHASE is displayed in unit of time (us).

  - **COMP PHASE MEMORY**

    Up to eight points of the phase difference measured using CURRENT PHASE can be stored. This feature is used such as when synchronizing the phase while changing the system using a switcher or the like.

    Press F•2 MEMORY to store the current measured value to the number selected by F•1 NUMBER.
    Press F•3 MEMORY CLEAR to clear the measured value that is stored to the number selected by F•1 NUMBER.

  - **REF**

    Displays the status of the sync signal.

    REF INT: Internal synchronization.
    REF EXT BB : DEFAULT: Indicates that the external sync signal is BB and the phase difference is the default setting. (*1)
    REF EXT BB : USER REF: Indicates that the external sync signal is BB and the phase difference is a user-defined reference. (*2)
    REF EXT HD : DEFAULT: Indicates that the external sync signal is an HD tri-level sync signal and the phase difference is the default setting. (*1)
    REF EXT HD : USER REF: Indicates that the external sync signal is an HD tri-level sync signal and the phase difference is a user-defined reference. (*2)
    REF NO SIGNAL: External synchronization without an external sync signal.

    *1 Press F•6 REF DEFAULT to set the phase difference (CURRENT PHASE) to the default setting. The default setting is defined as the setting in which the phase difference is assumed to be zero when NTSC/PAL black burst signal is applied and cables of the same length are connected to TRI SYNC/COMPOSITE INPUT and EXT REF.
    *2 Press F•5 USER REF SET to set the phase difference (CURRENT PHASE) to the zero. This function allows the reference to be set arbitrarily to match your system environment.

- **Phase Difference Graphical Display**

  The phase difference is displayed graphically at the right of the screen. The vertical and horizontal axes represent V PHASE and H PHASE, respectively.

  When the input signal lags the external sync signal, the circle is displayed on the Delay side. When the input signal leads the external sync signal, the circle is displayed on the Advance side. Differences of up to approximately +1/2 frames from the center are displayed on the Delay axis and differences of up to approximately -1/2 frames from the center are displayed on the Advance axis.

  The measurement range of the Delay and Advance axes and the display range of V PHASE and H PHASE are shown below.
  For example, if the input signal is NTSC, -262 [Lines] -63.521 [us] to 0 [Lines] 0 [us] are displayed on the Advance axis, and 0 [Lines] 0 [us] to 262 [Lines] 0 [us] are displayed on the Delay axis. In addition, the vertical direction V PHASE displays ±262 [Lines], and the horizontal direction H PHASE displays ±63.521 [us].

Format	Measurement Range				Display Range	
	Measured on the Advance Axis		Measured on the Delay Axis		V PHASE [Lines]	H PHASE [us]
	V PHASE [Lines]	H PHASE [us]	V PHASE [Lines]	H PHASE [us]		
NTSC	-262	-63.521	262	0	±262	±63.521
PAL	-312	-63.971	312	0	±312	±63.971
1080i/59.94, 1080p/29.97, 1080PsF/29.97	-562	-29.645	562	0	±562	±29.645
1080i/60, 1080p/30, 1080PsF/30	-562	-29.616	562	0	±562	±29.616
1080i/50, 1080p/25, 1080PsF/25	-562	-35.542	562	0	±562	±35.542
1080p/23.98, 1080PsF/23.98	-562	-37.060	562	0	±562	±37.060
1080p/24, 1080PsF/24	-562	-37.023	562	0	±562	±37.023

  The phase difference is indicated using two circles. If the circle is at the center, this indicates no phase difference. The circle is displayed in green in this case. If there is a phase difference, the circle is displayed in white.
  The conditions in which the circle becomes green (indicating no phase difference) are as follows:

  V PHASE: 0 line
  H PHASE: ±3 pixel
  NTSC: ±0.105 us (1 pixel: 34.9 ns)
  PAL: ±0.085 us (1 pixel: 28.2 ns)
  HD tri-level: ±0.040 us (1 pixel: 13.5 ns)

10. FIRMWARE REVISION HISTORY

This manual was written for the following firmware versions:
• Ver. 9.3 on the LV 5800
• Ver. 3.9 on the LV 7800
To confirm the version, press a key in order of SYS → F·5 SYSTEM INFORMATION.

- **Ver. 9.0 on the LV 5800 / Ver. 3.6 on the LV 7800**
  - The LV 58SER03A can be used.
- **Ver. 5.9 on the LV 5800 / Ver. 1.1 on the LV 7800**
  - A histogram display feature has been added to the picture display of the LV 58SER03.
- **Ver. 4.7 on the LV 5800**
  - The video signal waveform and vectorscope displays were changed for the LV 58SER03. WHITE and GREEN are now selectable for the display color.
- **Ver. 3.7 on the LV 5800**
  - The phase difference display function is improved for the LV 58SER03. The horizontal sweep rate is changed to ±1H.
- **Ver. 1.7 on the LV 5800**
  - The LV 58SER03 can be used.

Following information is for Chinese RoHS only

所含有毒有害物质信息

部件号码：LV 58SER03A

此标志适用于在中国销售的电子信息产品,依据2006年2月28日公布的《电子信息产品污染控制管理办法》以及SJ/T11364-2006《电子信息产品污染控制标识要求》，表示该产品在使用完结后可再利用。数字表示的是环境保护使用期限，只要遵守与本产品有关的安全和使用上的注意事项，从制造日算起在数字所表示的年限内，产品不会产生环境污染和对人体、财产的影响。
产品适当使用后报废的方法请遵从电子信息产品的回收、再利用相关法令。
详细请咨询各级政府主管部门。

产品中有毒有害物质或元素的名称及含量

部件名称 Parts	有毒有害物质或元素 Hazardous Substances in each Part					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
实装基板	×	○	○	○	○	○
主体部	×	○	○	○	○	○
附件	○	○	○	○	○	○
包装材	○	○	○	○	○	○

备注）

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 规定的限量要求以下。

×：表示该有毒有害物质或元素至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

Ver.1

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May 16, 2012 Ver.2 (FW Ver.9.3)