LEADER

VECTOR/WAVEFORM MONITOR

INSTRUCTION MANUAL

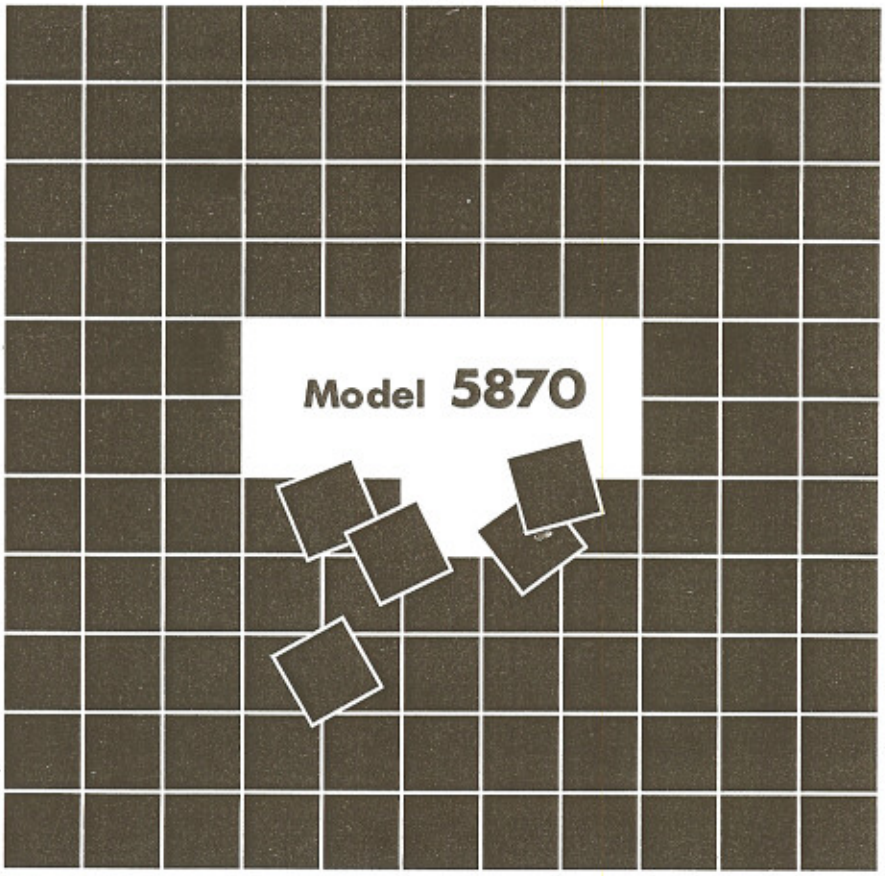


TABLE OF CONTENTS

1. GENERAL 1
2. FEATURES 1
3. SPECIFICATIONS 2
3.1 CRT 2
3.2 Waveform Monitor Section 2
3.2.1 Vertical axis 2
3.2.2 Horizontal axis 2
3.2.3 DG and DP display 3
3.3 Vectorscope Section 3
3.3.1 Chrominance processing 3
3.3.2 Indications 3
3.4 SCH Mode 3
3.5 Required Input Voltages 3
3.5.1 SCH mode 3
3.5.2 Other modes 3
3.5.3 EXT REF 3
3.6 Line Selector 4
3.7 Remote Control 4
3.8 General 4
4. PANEL DESCRIPTIONS 5
4.1 Front Panel 5
4.2 Rear Panel 7
5. USING THE 5870 11
5.1 Precautions 11
5.2 CRT Scale 11
5.2.1 Vector scale 11
5.2.2 Waveform scale 12
5.3 Method of Observing Waveforms 12
5.3.1 Input signals 12
5.3.2 Waveform observation 12
5.3.3 Waveform IRE display 13
5.3.4 Waveform CHROMA display 13
5.3.5 Waveform FLAT IRE display 13
5.3.6 Vector measurements 13
5.3.7 Waveform/vector simultaneous display 14
5.3.8 R-Y display 14
5.4 SCH Measurements 14
5.4.1 SCH value 14
5.4.2 SCH variation 15
5.4.3 Inter-signal SCH 15
5.5 DG DP Measurements 15
5.5.1 Signals required for measurement 15
5.5.2 Measurement method 15
5.6 External synchronization 16
5.7 PIX OUT 16
5.8 RGB/YRG Display 16
5.9 A/B Simultaneous Display 17
6. MAINTENANCE 17
6.1 Lamp Replacement 17

1. GENERAL

The Model 5870 (NTSC) is TV signal measurement monitors that feature built-in vectorscope and waveform monitor functions in one unit. Two waveforms may be switched for display or both may be simultaneously displayed on the CRT. The provided CRT readout function digitally displays the measured SCH phase (i.e., burst and H SYNC phase) data required for video editing.

2. FEATURES

- **SCH phase measurement**
  The Models 5870 can measure SCH phase data for digital display with its phase shifting (e.g., jitter) expressed in a waveform.
  Because this SCH phase can be compared with external signals, the SCH function is suitable for inserting one screen onto another screen (called picture-in-picture) by mixing signals after tuning them to the proper phases.

- **Full line selector**
  The full line selector not only checks the vertical interval test signal (VITS), vertical interval reference (VIR), teletext, and insert test signal (ITS), but also checks for video camera characteristics and any flaws.
  Here, the selected line number, fields 1 and 3, fields 2 and 4, or ALL are displayed in alphanumeric characters on the CRT.
  The preset line numbers are very useful on camera production where specific line numbers and fields are used repeatedly. To preset the line number and fields, just press the memory write buttons on the front panel. Then, up to nine points can be preset and stored in memory; the data will be retained by the back-up battery even after the power is turned off.

- **High-luminance, high-resolution CRT**
  A large 6-inch rectangular CRT with an internal graticule driven by a high acceleration voltage of 16kV ensures a bright display during line selection. Moveover, a newly-developed high-resolution CRT for data readout is used for clear entire screen display.

- **Remote control**
  All front-panel switches (including all line selectors) can be remotely controlled via the rear panel connectors (except for the power switch).

- **Dual channel display**
  Channels A-CH and B-CH can both be displayed by using an electronic switch to accurately compare their phases and characteristics while superposing one display onto another.

- **DP/DG measurement**
  When the DP and DG keys are pressed at the same time, screen data is measured at one time.

- **RGB/YRGB parade display**
  To display data in a parade, apply the color camera RGB signal sequence to the rear connector and a staircase signal to the Remote connector. For YRGB signal display, just replace the jumper connector inside the instrument.

- **Power AC/DC free voltage**
  The newly-developed switching regulator circuit accepts power voltages of 90 VAC to 250 VAC or 11 VDC to 20 VDC without range selection (this is called "free voltage").

3. SPECIFICATIONS

3.1 CRT

Type	150-mm rectangular
Acceleration voltage	16.5kV/2kV
Effective display area	100 mm × 80 mm (H × V)
Scale	Internal graticule (for both waveform and vector) with scale illumination

3.2 Waveform Monitor Section

3.2.1 Vertical axis

Deflection sensitivity	1V full scale: 140 IRE ± 1% MAG × 5: 140 IRE ± 3%
Variable range	×1 full scale: 0.7V to 2V MAG x5: 0.14V to 0.4V
Maximum input voltage	± 2V DC+ACp-p
Frequency response	
FLAT	25Hz to 6MHz ± 2% 6MHz to 8MHz +2% or −5% at 50kHz reference
IRE	Conforms to IEEE STD 205 of 1972. Flatness between FLAT and IRE: 1% or less at 15kHz
LUM	Attenuation: −3dB or less at 1MHz, 40dB or more at 4.43MHz Flatness between FLAT and IRE: 1% or less at 15kHz
CHROMA	3.58MHz bandpass filter Bandwidth: Approx. 2MHz Flatness between FLAT and IRE: 1% or less at 3.58MHz
Transient response	1V full scale (2T pulse and 2T bar for FLAT) Overshooting: ±2 IRE Preshooting: ±2 IRE Ringing: ±2 IRE Pulse-to-bar ratio: Within ±1% Vertical window signal tilting: Within ±2%
Input impedance	15kΩ or higher
Return loss	40dB or more (at 50kHz to 6MHz)
Video output	1V ± 5% at 140 IRE deflection Frequency response: 25Hz to 6MHz ± 5% Output impedance: 75Ω
DC restorer	Clamped on the back porch.

3.2.2 Horizontal axis

1H sweep	Displays 1H waveform.
2H sweep	Displays 2H waveform.
1 μs/div	10 times of 2H sweep
0.2 μs/div	25 times 1H sweep
1V sweep	Displays 1V waveform.
2V sweep	Displays 2V waveform.
V.MAG	Approx. 20 times 1V and 2V sweeps
Sweep time accuracy	1 μs/div: ±3% 0.2 μs/div: ±3%
Sweep trace length	Approx. 12.5 divs
Linearity	Within ±3%

RGB/YRGB	Selectable (RGB at shipment) Staircase input: 10V ± 15% for 9-div display Maximum input: ±12 VDC+ACp-p Timebase: RGB: Approx. 30% of standard length (1H sweep) YRGB: Approx. 22% of standard length (1H sweep) Control signal: Apply TTL LOW active signal to rear panel Remote connector.
CAL	Amplitude: 1V ± 1% Frequency: 100kHz ± 0.1kHz

3.2.3 DG and DP display

DG measurement	Range: ±10% Accuracy: ±1%
DP measurement	Range: ±10° Accuracy: ±1°

3.3 Vectorscope Section

3.3.1 Chrominance processing

Bandwidth	NTSC: Fsc=3.579545MHz High frequency: Fsc + approx. 500kHz Low frequency: Fsc − approx. 500kHz
Phase accuracy	±2°
Amplitude accuracy	±3%
Differential phase	±1°
Differential gain	±1%
Subcarrier regenerator	Sync capture range: ±50Hz
Phase adjustment range	360°

3.3.2 Indications

GAIN variable range	×1 MAG input: 210 mV to 1.05V ×5 MAG input: 43.2 mV to 210 mV

3.4 SCH Mode

Absolute accuracy	±5° at ambient of 25°C
Relative accuracy	±2°
Display range	External reference: 360° Internal reference: ±80°
CRT readout	SCH +80° to SCH −80°

3.5 Required Input Voltages

3.5.1 SCH mode

Sync and burst of composite video or black burst signal: 286 mV ± 3dB [300mV ± 3dB]

3.5.2 Other modes

Sync and burst of composite video or black burst signal: 286mV ± 6dB [300mV ± 6dB]

3.5.3 EXT REF

Sync amplitude	Synchronization with 143mV to 4V
Input impedance	15kΩ or higher
Return loss	40dB or more (at 50kHz to 6MHz)
Maximum input voltage	±12V DC + ACp-p

3.6 Line Selector

NTSC	1,3 field: 1 to 263 lines 2,4 field: 1 to 262 lines Field selection: FD1,3, FD2,4 or both Preset: 1 to 9; 9 points
CRT readout	Preset No.: P1 to P9 Field: FD13, FD24, or ALL Line No.: 1 to 263

3.7 Remote Control

Controllable section	All front-panel functions
Control signal	TTL (active low)
Control input connectors	Rear panel: D-sub 25-pin (Remote A) D-sub 9-pin (Remote B)

3.8 General

Power voltage	AC: 90V to 250V (at 48Hz to 440Hz) no range switching DC: 11V to 20V [12V] no range selection
Power consumption	Approx. 40W (AC)
Size and weight	215 (W) × 132 (H) × 423 (D) mm, 5.5kg
Operating temperature	0 to 40°C
Accessories	Fuse (AC): 1 Fuse (DC): 1 Lamp: 5 Instruction manual: 1

4. PANEL DESCRIPTIONS

4.1 Front Panel

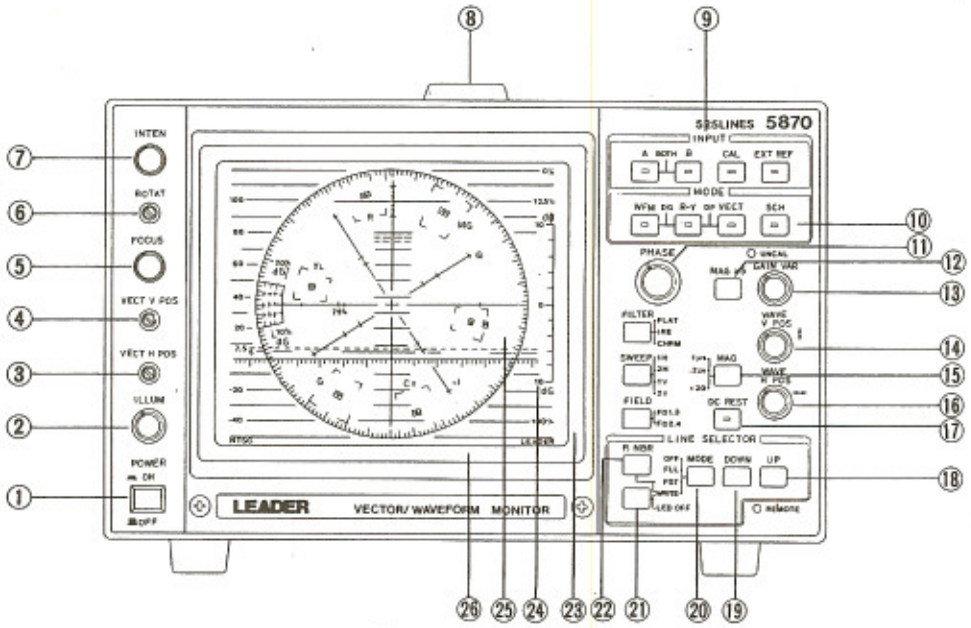


Figure 4-1

① **POWER ON/OFF**
Power switch. Push this switch in to supply power. Each control switch lamp on the panel will light. Push it out to turn the power off.

② **ILLUM.**
Brightness control for scale. Turn it to clockwise for a brighter.

③ **VECT H POS**
Screwdriver adjustment for horizontal vector waveform display movement.

④ **VECT V POS**
Screwdriver adjustment for vertical vector waveform display movement.

⑤ ⑯ **FOCUS**
Controls for properly focusing waveforms for clearer display.

⑥ **ROTATE C ⊘ TRACE ROTATION**
Screwdriver adjustment for keeping the trace parallel with the horizontal scale when affected by the terrestrial magnetic field.

⑦ **INTEN (intensity control)**
Intensity control to adjust the brightness of waveforms.

⑧ **Grip**
Used to carrying the instrument.

⑨ **INPUT section**
The A and B buttons switch the signal input from the rear BNC connector. Press A to turn on lamp A. Then, waveform A will be displayed on the CRT. Press B to turn on lamp B. Then, waveform B will be displayed on the CRT.
The CAL button switches the level and horizontal time reference signal. Press this button to set the horizontal sweep mode to 2H, the square wave repetition rate to 10 μs, and the level to 1 Vp-p.
The EXT REF button selects the rear-panel EXT REF input Sync signal or A/B input Sync signal. Note, here, that these signals must be synchronized.

⑩ **MODE section**
Press WFM. The lamp will light and a waveform display will appear on the CRT.

Press VECT. The lamp will light and a vector display will on the CRT. While the vector display is on screen, press R-Y. Then, the R-Y component will be displayed with the time base over the horizontal axis.

Press SCH. The lamp will light and SCH measurement will start regardless of the display mode (e.g., WFM or VECT). The measurement results can be read in alphanumeric characters at the upper-right corner of the CRT.
Press the R-Y button in the SCH measurement mode to display the SCH variation in a waveform with the angle set vertically and the time base set horizontally. This feature is useful for observing the amount of Sync signal jitter.

Press WFM and VECT simultaneously. The waveform and vector displays will appear on the CRT at the same time. Then, press SCH to add SCH on the display.

For DG-DP measurements, first the input modulated staircase to the instrument. In the vector mode, adjust the MAG ⑫ and GAIN ⑬ so that the level of the modulation signal matches that of the circle.
To measure DG, press the VECT and R-Y the buttons at the same time. Then, the respective lamps will light and the instrument will enter the DG mode. Read the DG variation using the scale on the right side of the CRT.

To measure DP, press the R—Y and VECT buttons at the same time. The respective lamps will light to indicate that the DP mode has been entered. Read the DP variations by using the scale on the right side of the CRT

⑪ **PHASE**
Control used to vary the vector phase. A full rotation will change the phase by 360°. Use this control to rotate the vector for matching the scale.

⑫ **MAGx5**
Switches the input sensitivity between x1 and x5. x5 is effective while the lamp is lit.

⑬ **GAIN VAR**
Changes the input sensitivity from 0.5-times up to 1.3-times. In the variable mode, the UN CAL lamp lights. Turn this control fully clockwise until it clicks. Then, it will be position at CAL. Note the CAL gain is x1 magnification.

⑭ **WAVE POS**
In the WFM DG mode, moves waveforms vertically.

⑮ **MAG**
Magnifies waveforms in the horizontal direction. Press MAG. Then, the magnification lamp for the SWEEP mode will light. The horizontal axis is set to 0.2 μs/div when the SWEEP ㉔ is 1H (1 μs/div when 2H, and 20-time magnification for 1V or 2V).

⑯ **WAVE H POS**
In the WFM DG DP R-Y mode, moves waveforms in the horizontal direction.

⑰ **DC RESTORER**
Press this switch to keep the back porch set to a fixed level when a waveform moves up and down according to the APL (average picture level) variation and use or nonuse of burst signals. Also, this feature can eliminate any hum component included in a video signal. Leave this switch off unless the above measures are necessary.

⑱ **to ㉒ LINE SELECTOR section**

⑱ **UP**
Press this button to increment the line number by one.

⑲ **DOWN**
Press this button to decrement the line number by one.

⑳ **MODE**
Press this button to sequentially set modes OFF, FULL, PST, and WRITE.

Because the OFF mode displays all lines, the line selector function need not be used.

The FULL mode selects one line by using the UP and DOWN keys, and displays it on CRT. The line number and field are displayed in the upper-left corner of the CRT.

The PST (PRESET) displays the preset line number. Up to nine points (1 to 9) may be preset. Press the P NBR button ㉒ to change the preset number (1 to 9).
Here, the waveform, preset number, and line number fields are displayed on the CRT.

The WRITE mode is used to write the preset value. Select the desired preset value by using the P NBR ㉒ button.
Then, set the desired field and line number by using the UP, DOWN keys and FIELD ㉓.
After making this setting, press the WRITE key ㉑ to initiate writing.

Write the desired preset numbers one-by-one. The number(s) written will be held in the internal backup RAM. To retain the RAM contents as they are, supply power to the instrument at least once every three weeks.

㉑ WRITE, LED OFF
In the WRITE mode, this button functions as a write key. In other modes, however, it functions as the LED OFF key.
Press this key to turn off all lamps other than LED OFF.

㉒ P NBR (preset number)
Changes the preset numbers. Press this key to change the preset numbers one-by-one in the range of 1 to 9.

㉓ FIELD
Selects fields 1 and 3 or fields 2 and 4. The field corresponding to the lit lamp will be displayed on the CRT as a waveform. This key is also effective in the LINE SELECTOR mode.

㉔ SWEEP
Switches the horizontal scan cycle for the WFM, R-Y, DG and DP display modes. Cycles of 1H, 2H, 1V and 2V can be selected. Each time this key is pressed, the cycle is changed sequentially. The field corresponding to the lit lamp indicates the selected cycle.

㉕ FILTER
Selects the frequency characteristics in the WFM mode.
The FLAT indicates the frequency response is flat.
IRE indicates the characteristics of the IEEE STD205-conformed low pass filter (with an attenuated CHROMA component) thats conforms to IEEE STD205. It passes luminance signal components only for observation.
The CHRM (CHROMA FILTER) is a bandpass filter for the 2MHz bandwidth with a center frequency of 3.58MHz. It passes CHROMA components only for observation. Each time the FILTER key is pressed, the frequency characteristics are changed. The field corresponding to the lit lamp is the selected cycle.

㉖ Graticule
The graticule can be illuminated by using lamps. The graticule is switched for waveform and vector measurements, and for DG and DP measurements.

4.2 Rear Panel

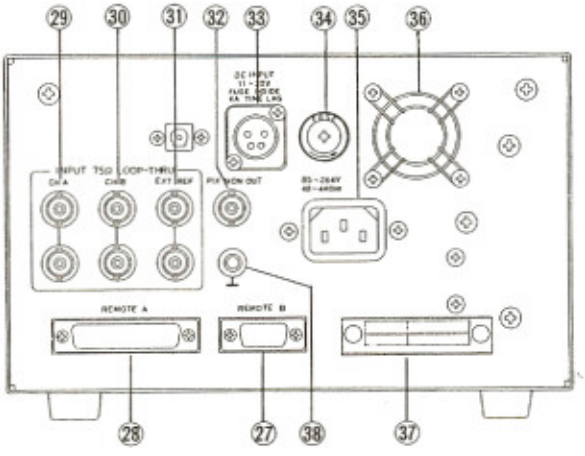


Figure 4-2

㉗ REMOTE B
Controls the MODE, UP, DOWN, FIELD, and P NBR switches on the front panel. The input level is TTL. At level 1, apply an input voltage of 2.4V to 5V; apply 0.8V or less at level 0. To prevent any trouble, do not apply 5V or more or a negative voltage.

a) Pin assignment

Pin No.	Function
1	GND
2	MODE1
3	MODE2
4	UP
5	DOWN
6	FIELD
7	P NBR
8	NC
9	NC

Table 4-1

b) Selecting WRITE, PST, FULL or OFF

MODE1	MODE2	Pin / Function
0	0	WRITE
0	1	PST
1	0	FULL
1	1	OFF

Table 4-2

c) Control pulses for UP, DOWN and P NBR

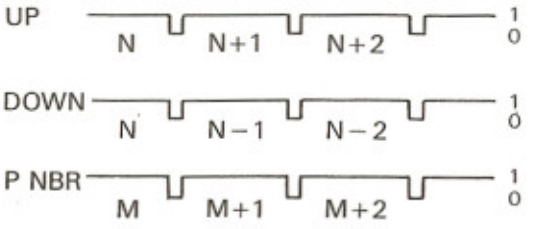


Figure 4-3

Control pulses are switched according to pulse input.

d) Field control

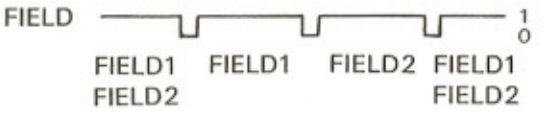


Figure 4-4

㉘ **REMOTE A**
External control connector for the front panel.

Table 4-3 lists the pin numbers and their functions.

Pin No.	Function	Pin No.	Function
1	GND	14	CH B
2	CHROMA	15	CAL
3	IRE	16	DC REST
4	2H	17	MAG
5	*	18	EXT REF
6	EXT BLANK	19	RGB ST
7	WFM	20	−12V
8	*	21	1V
9	GND	22	MAG × 5
10	*	23	R−Y
11	VECT	24	1H
12	SCH	25	RGB EN
13	REMOTE	26	

Table 4-3

a) Selecting CH-A, CH-B or CAL

CH B	CAL	Pin / Function
0	0	*
0	1	CH-B
1	0	CAL
1	1	CH-A

Table 4-4

b) Switching EXT REF

EXT REF	Pin / Function
0	EXT REF ON
1	EXT REF OFF

Table 4-5

c) Selecting WFM, DG, DP, VECT, SCH, or R-Y

WFM	R-Y	VECT	SCH	Pin / Function
0	0	0	0	WFM
0	0	0	1	WFM
0	0	1	0	WFM
0	0	1	1	DG
0	1	0	0	WFM
0	1	0	1	WFM+VECT
0	1	1	0	WFM+SCH
0	1	1	1	WFM
1	0	0	0	R−Y
1	0	0	1	DP
1	0	1	0	R−Y
1	0	1	1	R−Y
1	1	0	0	VECT+SCH
1	1	0	1	VECT
1	1	1	0	SCHT
1	1	1	1	VECT

Table 4-6

d) Switching MAG × 5

MAG × 5	Pin / Function
0	MAG × 5 ON
1	MAG × 5 OFF

Table 4-7

e) Selecting FLAT, IRE, or CHRM

CHRM	IRE	Pin / Function
0	0	FLAT+IRE
0	1	CHROMA
1	0	IRE
1	1	FLAT

Table 4-8

f) Selecting 1H, 2H, 1V or 2V

2H	1V	1H	Pin / Function
0	0	0	1H
0	0	1	1H
0	1	0	1H
0	1	1	2H
1	0	0	1H
1	0	1	1V
1	1	0	1H
1	1	1	2V

Table 4-9

g) Switching MAG

MAG	Pin / Function
0	MAG ON
1	MAG OFF

Table 4-10

h) Switching DC REST

DC REST	Pin / Function
0	DC REST ON
1	DC REST OFF

Table 4-11

i) Switching REMOTE

REMOTE	Pin / Function
0	REMOTE ON
1	REMOTE OFF

Table 4-12

j) Switching RGB

RGB EN	Pin / Function
0	RGB ON
1	RGB OFF

Table 4-13

Waveform for RGB ST signal input (pin 19)

RGB display

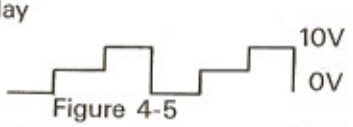


Figure 4-5

YRGB display

Figure 4-6

k) EXT BLANK function

EXT BLANK	Pin / Function
0	Brighter CRT
1	Darker CRT

Table 4-14

(29) CH A

Set of input connectors (loop-through type) for composite video signals to be measured. The input impedance is 15kΩ. Here, the connectors are connected as shown in Figure 4-6.

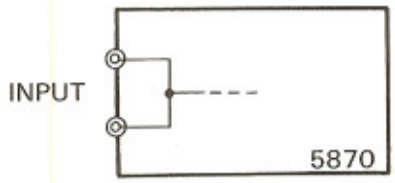


Figure 4-7

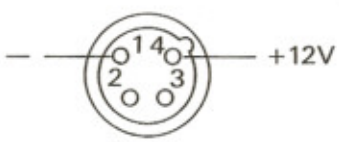
Connect the signal to either of the two input connectors. The other terminal must be terminated with 75Ω termination or connected to other equipment (of 75Ω impedance). Be sure to use the cable for a characteristic impedance of 75Ω.

㉚ **CH B**
Set of loop-through-type input connectors for composite video signals to be measured. See Item ㉙ for details on how to connect the signal.

㉛ **EXT REF**
Set of loop-through-type input connectors for external Sync signals. See Item ㉙ for details on how to connect the signal.

㉜ **PIX MON OUT**
Outputs the signal input to the CH-A or CH-B. When the CH-A is selected at the front panel, the CH-A signal is output. For CH-B, the CH-B signal is output. The output amplitude is the same as the input signal. In the line selector mode, the marker signal of the selected line is added.

㉝ **DC INPUT**
An input connector for driving the instrument using DC power source.
The applicable DC voltages range from 11V to 20V. The current must be approx. 3.5A with a voltage of 12V.
The connector pin arrangement is as follows:



The fuse is housed inside.

㉞ **Fuse for AC power input**
When replacing the fuse, only use the specified fuse.

㉟ **AC power input connector**
The input voltage must be from 90V to 250V.

㊱ **Air-cooling fan**
Do not shut the air inlet. Never try to stop the fan with your fingers. (This is dangerous and may cause other trouble is the instrument.)

㊲ **Serial number plate**

㊳ **Ground terminal**

5. USING THE 5870

Precautions and the method of operating the 5870 are explained as follows:

5.1 Precautions

(1) Use the instrument with the rated AC or DC power. Applying excessive power may damage the Model 5870 or cause it to malfunction.

(2) Do not apply excessive voltage to each input connector. For inputs A, B, and EXT REF, use a signal voltage of 5Vp-p and a DC voltage within ±20V of the rated voltage.

(3) To prevent damage to the CRT and crystal oscillator, be careful not to subject these units to extreme mechanical shock.

(4) When mounting the Model 5870 in a rack, place it to a well-ventilated place to maintain an internal rack temperature under 40°C. Mount a fan on the instrument for air cooling where temperatures above 40°C are expected.

(5) When testing or adjusting a TV receiver, VTR, or other TV equipment, refer to the Service Manual prepared by the manufacture. Before connecting the input connector inside the Model 5870, be sure to disconnect the power cord from the AC line to prevent accidents due to electrical a shock. In particular be sure to wear anti-voltage protective gloves when handling the high-voltage circuit of the TV receiver.

(6) For more accurate measurements, supply power to the instrument about 20 minutes before operation to stabilize the internal temperature.

5.2 CRT Scale

5.2.1 Vector scale

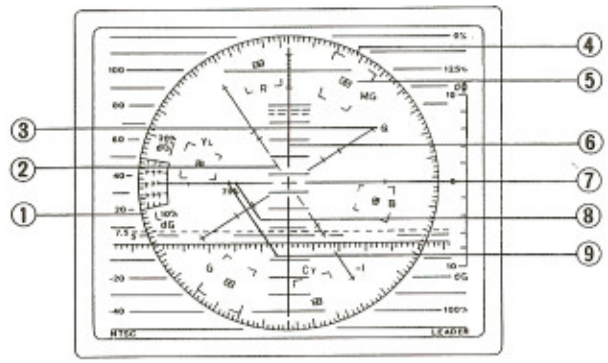


Figure 5-1

① Circle of the graticule with a fixed amplitude. To set up this amplitude, the chrominance amplitude of inputs A or B must be 0.752 mVp-p. The two scales on the circle are the main scale in 10°, and the subscale in 2°. These scales are used to measure the vector phase difference.

② Indicates the angle of IN PHASE on the I axis. The I axis is a broad-band color difference axis, and its angle is 123° from the B-Y axis.

③ Indicates the angle of QUADRATURE PHASE on the Q axis. The Q axis is a narrow-band color difference axis, and its angle is 33° from the B—Y axis. The Q axis intersects the I axis at a perpendicular angle. These axes are used as modulation and demodulation axes for color difference signals.

④ Indicates the tolerance of angle and amplitude of magenta in the standard color bar. The angle tolerance is ±10° and that of the amplitude is ±20%. Other color bar signals are displayed in the same way.

⑤ Indicates the angle of magenta (of the standard color bar) and the tolerance of the amplitude. The angle tolerance is ±2.5° and the amplitude tolerance is ±2.5 IRE. Other colors are displayed here in the same way. These include R (red), B (blue), CY (cyan), G (green) and YL (yellow).
Burst signals are also displayed.

⑥ R-Y axis. The angle is 90° from the B-Y axis.

⑦ B-Y axis. The angle is 0°. This axis intersects the R-Y axis at a perpendicular angle. The R-Y and B-Y axes are only used to measure color differences. The Q and I axes are actually used to show the color differences. For a chrominance signal band less than 500kHz, either case will make no difference. For the Model 5870, the R-Y and B-Y axes are used as the demodulation axis.

⑧⑨ Indicates the burst phase and amplitude. Line ⑨ indicates a 75% color bar burst amplitude with a 7.5% setup, and line ⑧ shows a 75% color bar burst amplitude with a 0% setup.
These lines are used to measure differential phases and gains. The phase and gain are measured with a staircase signal (on which a chrominance signal is superposed). The respective scales show ±5° or ±10° of the phase, and ±5% or ±10% of the amplitude.

Figure 5-2 shows the angles for each hue, and Fig. 5-3 shows an of hue tolerance.

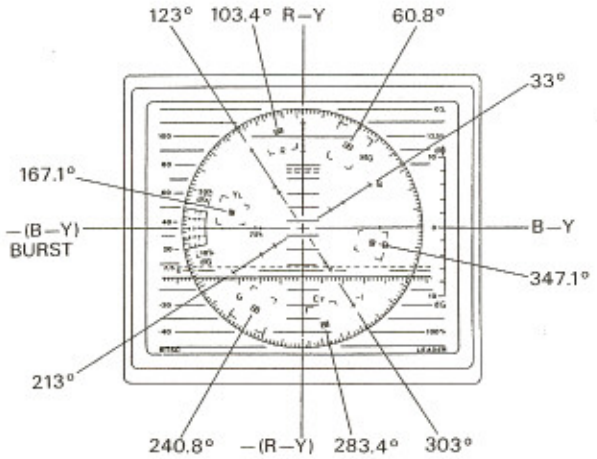


Figure 5-2

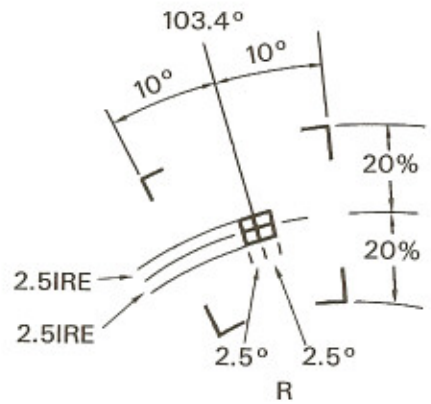
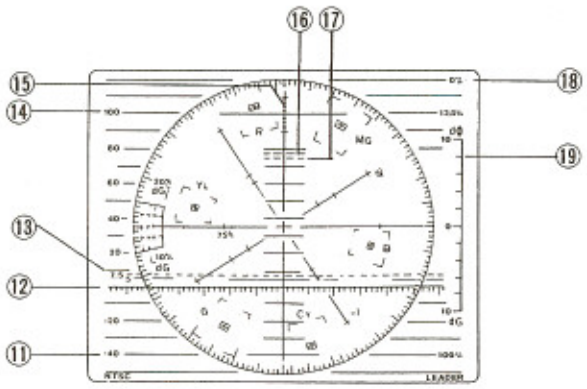


Figure 5-3

5.2.2 Waveform monitor scale



⑪ –40 IRE scale to adjust sync levels.

⑫ 0 IRE scale with 5 subdivisions further divided horizontally from each of 13 main divisions.

⑬ Setup scale selectable from 7.5 IRE or 5 IRE.

⑭ 100 IRE scale.

⑮ 2 IRE scale (10 IRE scale divided into 5 equal parts).

⑯ 77 IRE scale to indicate white level with setup of 7.5 IRE.

⑰ 75 IRE scale to indicate white level with setup of 0 IRE.

⑱ 0% scale to indicate zero position of CW during negative amplitude modulation of RF signal.

⑲ dG, dϕ scale for DG and DP measurements. A differential gain of up to ±10° and a differential phase of up to ±10° can be measured. The minor divisions are 2% and 2°, respectively.

5.3 Method of Observing Waveforms

5.3.1 Input signals

Input signal Video signal to be measured
Input connector INPUT CH-A on the rear panel
Control settings
① Set INPUT to A.
② Turn GAIN VAR fully clockwise for CAL'D.
③ Turn off MAG × 5 (the lamp is off).

5.3.2 Waveform observation

Figure 5-4 shows an example of waveform monitoring. Here, set the mode to WFM.
Control settings

FILTER	FLAT
SWEEP	2H
MAG	OFF
FIELD	FD1,3, FD2,4
Input signal	
Waveform	SMPTE color bar

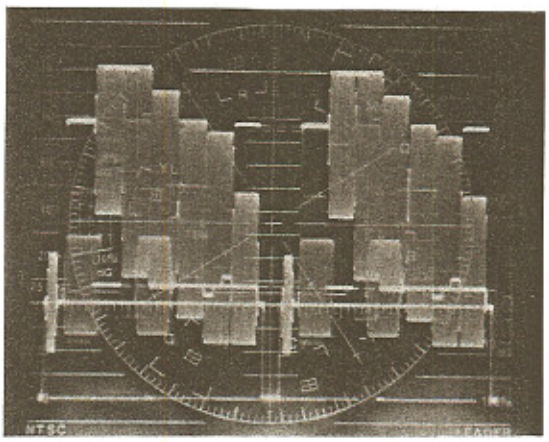


Figure 5-4

5.3.3 Waveform IRE display

Set FILTER to IRE. Figure 5-5 shows an example of waveform monitoring.

The IRE display mode feeds the video signal through a low-pass filter to display the chroma component in a smaller size, and only monitors the luminance component.

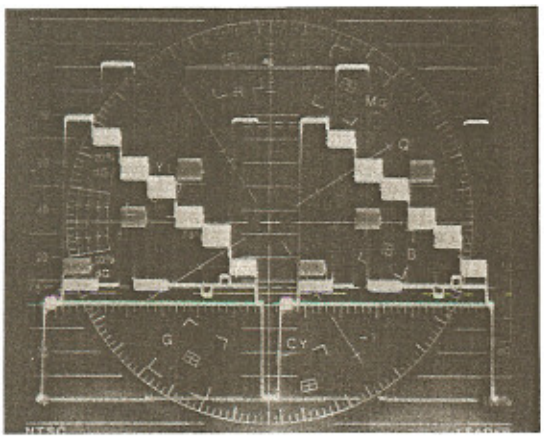


Figure 5-5

5.3.4 Waveform CHROMA display

Set FILTER to CHRM. Figure 5-6 shows an example of waveform monitoring.

The CHROMA display mode only displays the CHROMA component, while eliminating the luminance component.

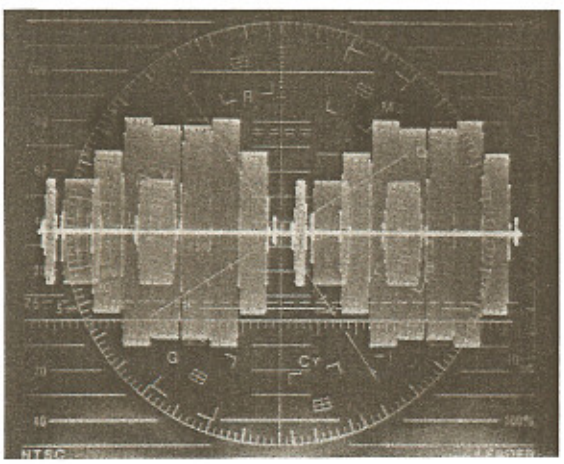


Figure 5-6

5.3.5 Waveform FLAT IRE display

This mode displays the FLAT and IRE waveforms at the same time. Set FILTER to FLAT IRE. Figure 5-7 shows an example of waveform monitoring. The display shows the 2H mode.

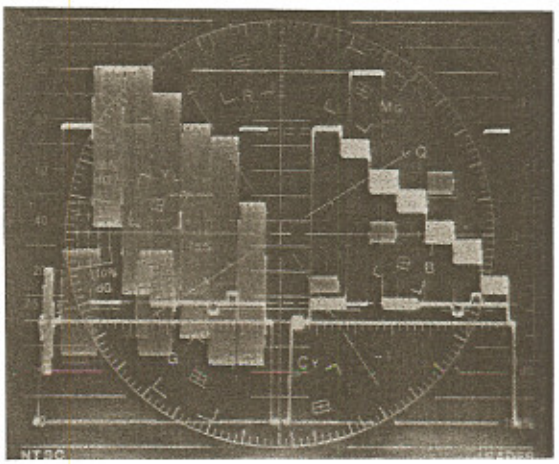


Figure 5-7

5.3.6 Vector measurements

Figure 5-8 shows an example of vector waveform monitoring.

Central settings

Mode VECT

FIELD FD1,3, FD2,4

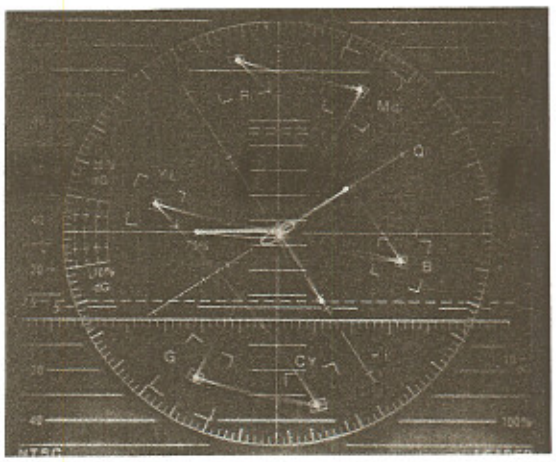


Figure 5-8

Use PHASE to adjust the phase. The vector waveform can be rotated 360° by using PHASE. Adjust the center of the waveform to the circle origin by using VECT V POS and VECT H POS.

5.3.7 Waveform/vector simultaneous display

Figure 5-9 shows an example of simultaneous waveform and vector display.
Press WFM and VECT at the same time.

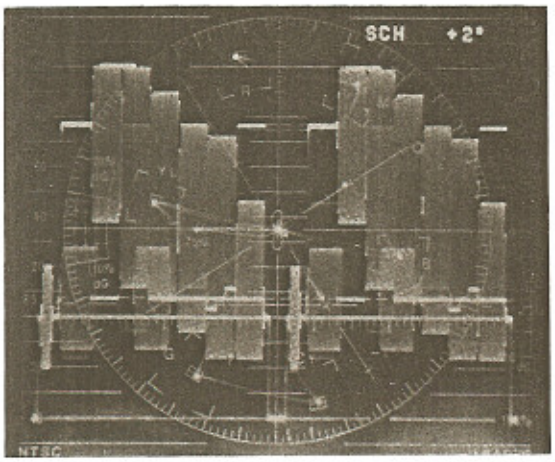


Figure 5-9

5.3.8 R—Y display

The R—Y mode displays the R—Y component of the vector in the horizontal direction.
This mode also displays SCH phase variations.

a) Vector R—Y display
Set MODE to VECT to display the vector waveform.
Select R—Y.
Figure 5-10 shows an example of waveform monitoring.

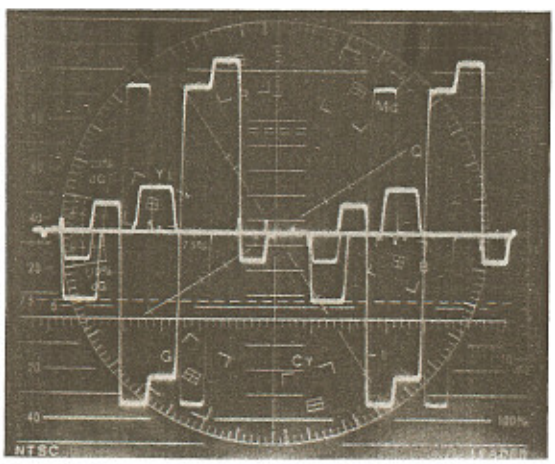


Figure 5-10

Signal	SMPTE color bar
SWEEP	2H display

b) SCH R—Y display
The horizontal axis is in the 2V display mode.
Monitors the SCH jitter component and phase.
The jitter component can be moved vertically by rotating the PHASE control. To monitor the jitter component, move the waveform to the center of the display. Then, the enlarged jitter waveform will be displayed on the CRT. Use the limb of the circle to measure the angle. Measure the SCH phase by calculating the distance from the center. The measured phase value can be read at the upper-right corner. It can also be measured on the CRT.

The SCH phase is indicated by the angle of dots intersecting the circle. Figure 5-11 shows an example of the waveform.

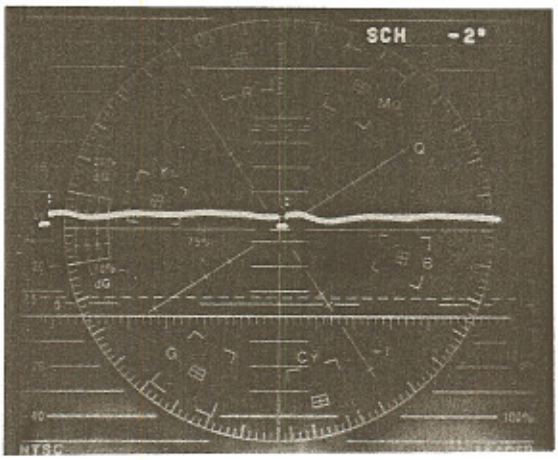


Figure 5-11

5.4 SCH Measurements

The Model 5870 enables SCH measurements by simply pressing the SCH key while monitoring each waveform on the CRT.

5.4.1 SCH value

For the Model 5870, the SCH measurement range should be 0° ± 80°.
When the SCH value reaches about ±90°, the phase is inverted by 180° for display on the CRT. This means that the field order has changed. The digital readout of SCH indicates the average value of one field; it shows the average of fluctuating SCH values within that field. The absolute accuracy is ±5°.

5.4.2 SCH variation

To observe the angle of SCH variation, use the R—Y axis of SCH as explained in Item b (R—Y display) of Section 5.3.7.

As shown in Fig. 5-8, the variation indicates SCH differences. The angle is measured by the limb along with the circle. To measure the difference, turn the PHASE control to split the wave into two lines; one is fixed and the other can be moved vertically by using PHASE. Set this waveform over the B—Y line to read the difference. Figure 5-2 shows an example of the waveform.

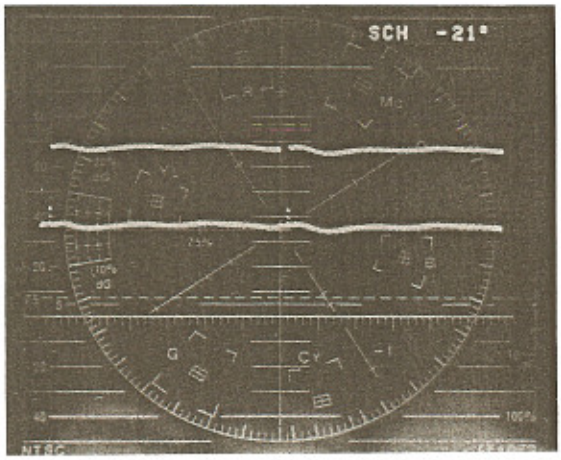


Figure 5-12

5.4.3 Inter-signal SCH

The Model 5870 displays the phase difference between the horizontal sync signal (applied to inputs A or B) and the burst signal (applied to the EXT REF) at ±180°.

5.5 DG DP Measurements

5.5.1 Signals required for measurement

A modulated staircase signal or modulated ramp signal is used for DG/DP measurements.

5.5.2 Measurement method

a) To measure a staircase or modulated ramp signal, connect it to channel A or B of the Model 5870.

b) Set the Model 5870 into the VECT mode. Adjust the level and phase by using MAG × 5, GAIN VAR, and PHASE as shown in Fig. 5-13. When the DG and DP values are large, measure them using the scale on the lower-left of the —(B—Y) axis. DG values from 2% to 20% and DP values 2° to 10° can be measured. For DG and DP under 2% and 2°, perform the following.

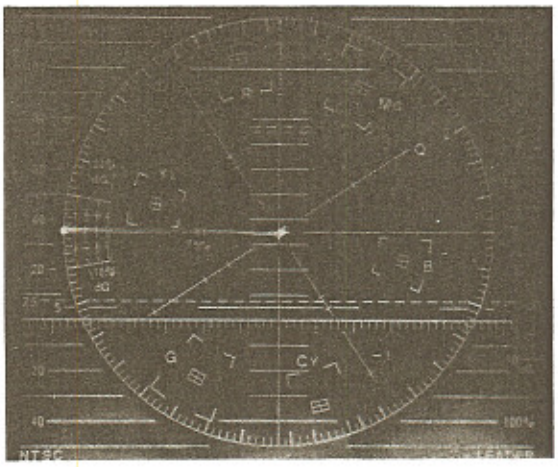


Figure 5-13

c) For measuring DG of 2% or less
Press the WFM and R—Y buttons at the same time under condition b). Then, the instrument will enter the DG mode. Figure 5-14 shows an example of the waveform.

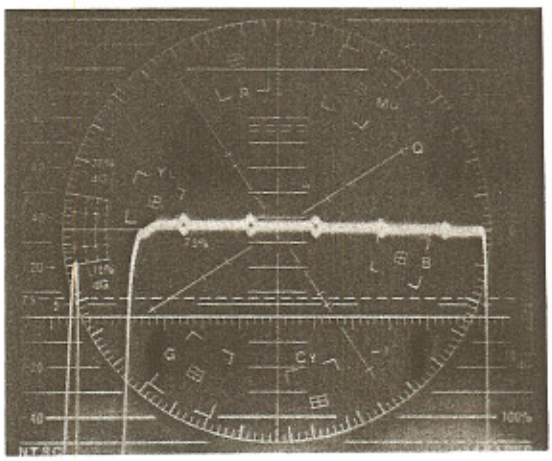


Figure 5-14

Use the dG scale on the right side. One minor division is 2%. Measure the horizontal DB in the 1H or 2H display mode. The DG value is the difference between the maximum and minimum vertical differential gains.

d) For measuring DP of 2° or less
Press the MODE VECT and R—Y buttons at the same time under condition b). Then, the instrument will enter the DP mode. Figure 5-15 shows an example of the waveform.

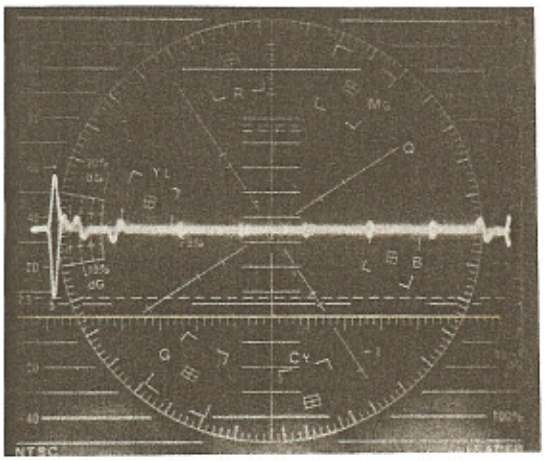


Figure 5-15

Use the dϕ scale to read the waveform. One minor division is 2°. Measure the waveform in the 1H or 2H display mode. The DG value is the difference between the maximum and minimum vertical differential gains.

5.6 External synchronization

The Model 5870 is not only provided with inputs A and B, but also with an external synchronization input connector. Black burst signals are input to these connectors. To synchronize the instrument with external signals, select EXT REF of the front panel INPUT section. To operate the instrument with external synchronization, the phase of the external sync signal must match that of the sync signal applied to the A or B input connector. If they do not match, the DC RESTORE operation cannot be done completely, which will cause waveform distortion.

5.7 PIX OUT

The PIX OUT function outputs the video signal input to input connector A or B. Select input connector A to output the signal A, or select input connector B to output the signal B. When in the A/B simultaneous display mode, signals are alternately output A and B. The output level is the same as the input level. In the LINE SELECT mode, the selected line signal is added to the PIX signal and displayed in white on the picture monitor.

5.8 RGB/YRG Display

The RGB/YRG display mode displays camera RGB signals in parade. For the RGB display signals, see Item j) in Section 4.2. Set pin 25 of the rear-panel REMOTE A connector to GND to enable the RGB display mode. Apply a staircase waveform signal to pin 19. To change RGB (set at shipment) to YRG: Remove the PCB T-4013 from the main frame and change the J105 and J106 jumper settings as shown in Fig. 5-16.

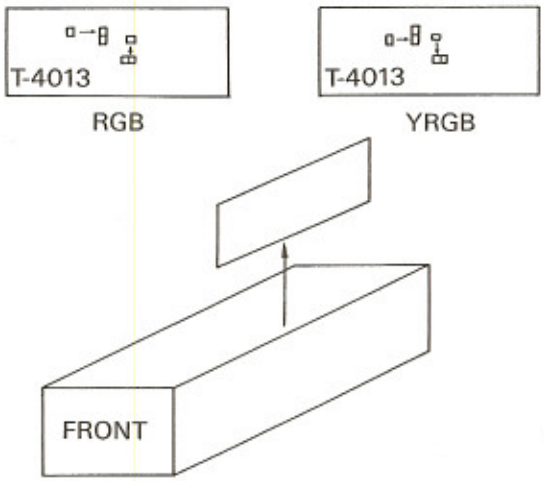


Figure 5-16

5.9 A/B Simultaneous Display

This mode displays the waveforms from inputs A and B simultaneously on the CRT. Press buttons INPUT A and B at the same time. Then, lamps A and B will light and the instrument will enter the A/B simultaneous display mode. Here, the signals from A and B must be synchronized. To tune the pedestal level, turn on DC RESTORE. Figure 5-17 shows an example of the waveform.

To synchronize the instrument with input A, press button INPUT A, then press A and B at the same time. To synchronize the instrument with input B, press button INPUT B, then press A and B at the same time.

The synchronized input signal is displayed on the CRT. REF A is displayed for INPUT A; REF B for INPUT B.

Press LED OFF. Then, the LED lamp will go off and the REF A or REF B display will no longer be displayed on the CRT.

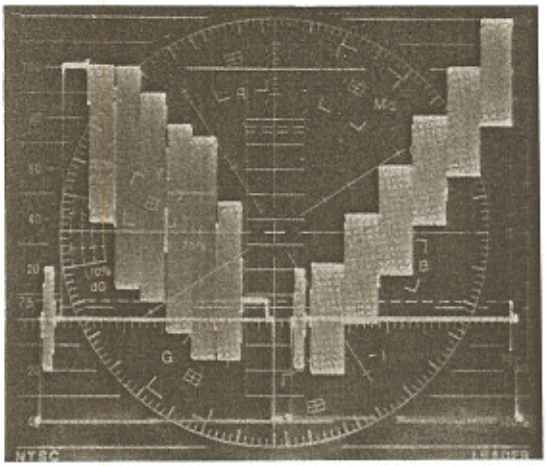


Figure 5-17

6. MAINTENANCE

The Model 5870 adopts a ''high-density mounting'' configuration for incorporating many integrated features in a single unit.

Accordingly, if the instrument malfunctions, contact your nearest Leader sales office or service section. We will repair it.

6.1 Lamp Replacement

If the scale ILUMI lamp goes out, replace it with a new one as follows: First, remove the two setscrews of the hood. Remove the hood and extract the PCB where the lamp is mounted. Remove the optical guide and replace the burnt-out lamp. Because this is a socket type of lamp, no soldering is required. When you complete these steps, reinstall the PCB, optical guide, and hood in reverse order of the replacement procedure.

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