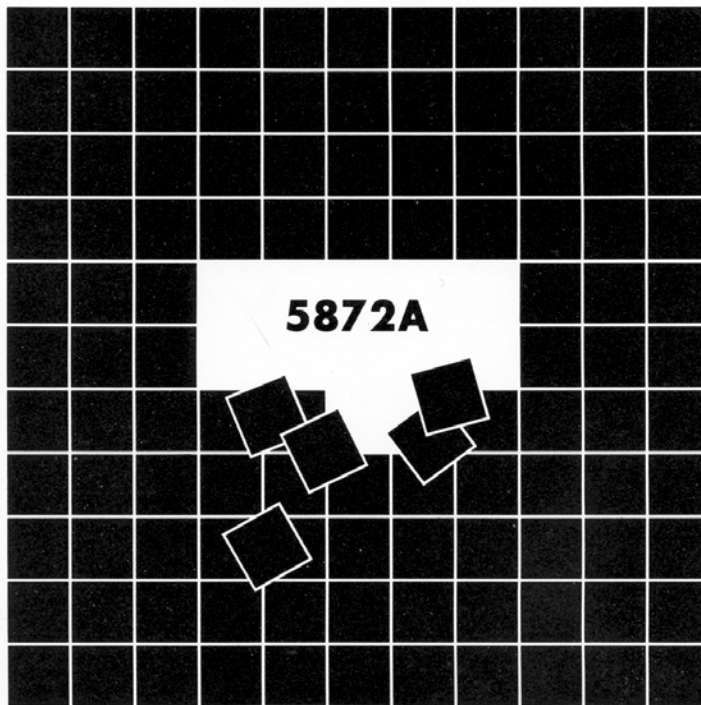


**LEADER**

**VECTOR/WAVEFORM MONITOR**

INSTRUCTION MANUAL



LEADER ELECTRONICS CORP.

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## GENERAL SAFETY SUMMARY

### ■ To Avoid Personal Injury

It is recommended that only qualified personnel with technical knowledge use this instrument only after reading and fully understanding all functions of the instrument described in this instruction manual.

This instrument is not designed and manufactured for consumers.




If you do not have enough knowledge on electricity, to avoid personal injury and prevent damage to this product, please be sure to use this product only under the supervision of an engineer who has sufficient knowledge about electronics.

### ■ Precautions on Contents

Should you find the contents in this manual and any of its technical terms confusing, please feel free to contact your local Leader agent.

### ■ Symbols and Terms

Following terms and symbols indicate necessary warnings and cautions used in this manual and on the product are there for safe operation.

<p>&lt;Symbol&gt;</p> 	<p>The sections where this symbol is marked in this manual or instrument, if not correctly performed or practiced, could result in personal injury or cause serious danger to the instrument. Misuse could also produce unintentional movement to create an operational impediment on the instrument or other products that might be connected to it.</p> <p>Be sure to refer to the safety precautions in this manual to safely use the part of the instrument where the symbol is marked.</p>
<p>&lt;Term&gt;</p>  <b>WARNING</b>	<p>Warning statements identify warning conditions that if disregarded or not correctly performed or adhered to, could result in serious personal injury or even loss of life.</p>
<p>&lt;Term&gt;</p>  <b>CAUTION</b>	<p>Caution statements identify warning conditions if disregarded or not correctly performed or adhered to, could result in personal injury or damage to the instrument.</p>

## GENERAL SAFETY SUMMARY

Review the following safety precautions to avoid operator's injury and loss of life and prevent damage and deterioration to this instrument. To avoid potential hazards, use this product as specified.



### WARNING

#### ■ Warnings on the Cases and Panels of the Instrument

Operator should not remove any cases or panel for any reasons. If you touch inside the instrument it could result personal shock or fire hazard. Refrain from spilling any liquid on or inserting anything flammables or piece of metal into the ventilation of the instrument. Such actions could cause fire, shock, malfunction and be an accident hazard while the power is on.

#### ■ Warnings on Power Line

- **Make sure to connect only to the rated power line voltage. Excess voltage may cause fire.**

Confirm the voltage of the commercial power line before connecting the AC power cord. The power frequency of the power line should be 48 to 440 Hz.

- **Warning on the Power Cord**

Use only the optional power cord that is attached to this instrument. The use of the power cord other than that attached could cause fire hazard.

If the attached cord is damaged stop using it and contact your local Leader agent. Should you use a damaged cord, it could cause a shock or create a fire hazard. When you pull out the cord be sure to hold it by plug and pull from the socket not by holding the cord wire.

#### ■ Warning on Fuse

When the fuse is melted the instrument stops operation. If the fuse melted, turn off the power switch and disconnect the power plug from the socket. If you change the fuse while the cord is connected to the socket, it could cause a shock hazard. Only use the specified type and rated current and voltage fuses.

If the cause for melting fuse is unclear or if you suspect there is damage to the instrument or if you have no proper fuse at hand please contact your local LEADER agent.

## GENERAL SAFETY SUMMARY



### WARNING

#### ■ Warning on Installation Environments

- **About the Guaranteed Operating Temperature Range**

Operate the instrument between the temperature range of 0 to 40 °C . Operating the instrument at higher temperatures could cause a fire hazard.

Rapid changes of temperatures from cold to warm can create internal moisture or condensation and could damage the instrument. If there is a possibility of moisture condensation allow the instrument to sit for 30 minutes without the power on.

- **About the Guaranteed Operating Humidity Range**

Operating humidity range is  $\leq 85\%$  RH.

Do not operate the instrument with wet hands, This could cause a shock and fire hazard.

- **About the Operation in the Presence of Gasses**

Operating the instrument in and near the presence or storage locations of flammable, explosive gasses or fumes could create an explosion and fire hazard. Do not operate the instrument anywhere near such environments.

- **Avoid Insertions**

Do not insert metals or flammable objects or drop liquid on or into the instrument. To do so could cause fire, shock, malfunction and create a dangerous accident hazard.

#### ■ Warning while Operating

While operating the instrument in smoke, fire, or a bad smell, occurs, turn off the instrument at once for it could cause a fire hazard. When such a case occurs, turn off the power switch and pull the plug of the cord from the plug socket. Contact your local Leader agent after confirming there is no fire.

#### ■ Warning about Ground

The instrument has a ground terminal to avoid electric shock hazard and to protect the instrument from damage. Ensure that the product is properly grounded for safe operation.

## GENERAL SAFETY SUMMARY



### CAUTION

#### ■ Caution on Input/Output Terminals

Input Terminals are rated with a maximum input. Do not supply an input over the specified rating in the standard section of the instruction manual. Also, do not supply external power to Output terminal, this could cause the instrument to malfunction.

#### ■ Caution when Not to Using Instrument the for a Long Time

Make sure to disconnect the power cord from the socket when you do not use the instrument for a long time.

---

Please conform to the above warnings and cautions for safe operation. There are cautions in each area of in this instruction manual, so please conform to each caution. If you have any questions about this manual, please feel free to contact your local Leader agent.

## INTRODUCTION

Thank you for purchasing Leader's measuring instruments.

Please read this instruction manual carefully to ensure correct and safe operation.

If you have any difficulties or questions on how to use the instrument after you have read this manual, please feel free to contact your local Leader agent.

### A. Scope of Warranty

This Leader instrument has been manufactured under the strictest quality control guidelines.

Leader shall not be obligated to furnish free service during the warranty period under the following conditions:

1. Repair of malfunction or damages resulting from fire, natural calamity, or improper voltage applied by the user.
2. Repair of an instrument that has been improperly repaired, adjusted, or modified by personnel other than a factory-trained Leader representative.
3. Repair of malfunctions or damages resulting from improper use.
4. Repair of malfunctions caused by devices other than this instrument.
5. Repair of malfunctions or damages without the presentation of a proof of purchase or receipt bill for the instrument.

### B. Operating Precautions

#### WARNING

#### 1. Line Voltage and Fuse

Confirm that the power line voltage is correct before connecting the power cord.

The voltage range and fuse rating are indicated on the rear panel.

The instrument must be connected to the rated line voltage and line frequency of 48 Hz to 440 Hz.

When replacing the fuse, turn the power switch off and disconnect the power cord from the mains.

Voltage Range	Fuse Rating	Leader Parts Number
AC 90 to 250V	T1.6AL, time-lag, ST4N1	436 3775 018
DC 11 to 20V	T5AL, time-lag, ST4N1	436 3800 011

**⚠ CAUTION**

**2. Maximum Allowable Input Voltage**

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

Refer to Installation Category I (IEC 1010-1, Annex J).

Input Connector	Maximum Allowable Input Voltage
INPUT A, B	$\pm 2$ V (DC + peak AC)
EXT REF	$\pm 12$ V (DC + peak AC)

The maximum input voltage of " $\pm 12$  V (DC + peak AC)" is as shown Figure 1-1.

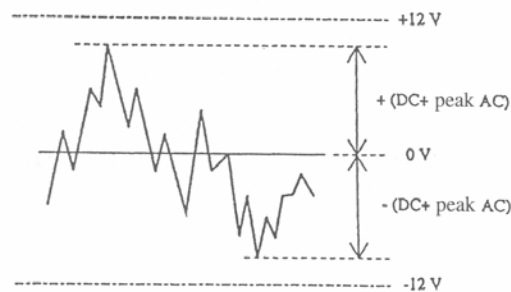


Figure 1-1

**⚠ CAUTION**

**3. Installation**

Do not use the instrument in the following environments.

- High temperature environments  
Do not place the instrument under direct sunlight or near a heater (e.g., stove).  
Avoid using the instrument in a way that leads to drastic changes in temperature such as moving the instrument from a cold environment to a hot environment; this may cause condensation.  
Operating temperature range : 0 to 40 °C
- High humidity environments  
Do not place the instrument in a high humidity environment (e.g., bathroom, near a humidifier).  
Operating humidity range :  $\leq 85$  % RH (without condensation)
- Dusty environments



 **CAUTION**

**4. CRT**

Do not leave the instrument with the intensity set too high or displaying sharp spots. This can cause burn-in on the CRT or shorten its life.

In addition, do not apply strong shock to the instrument. A strong shock can damage the CRT or degrade the accuracy.

**5. Excessive Magnetic Fields**

Waveform distortion or tilt may occur when the instrument is operated in proximity to such strong magnetic field as a speaker system. Use the magnetic shield in such case.

**6. Last Memory**

The last memory function retains the panel settings immediately before turning the power off is retained.

When the instrument is first powered on after purchase or left for longer than one month without supplying power, the stored data may be lost with the instrument assuming the default settings. Therefore, leave the instrument powered on at least eight hours to charge the backup battery.

**7. Calibration**

This instrument is produced under the strictest quality controls at the factory, but accuracy may gradually deteriorate due to worn components.

Therefore, periodic calibration should be performed. When service or calibration is required, contact your local Leader agent.

**8. Mechanical Shock**

To prevent damage to the crystal oscillator or reduce accuracy, be careful not to expose the instrument to other forms of severe mechanical shock.

**9. Routine Maintenance**

When cleaning the instrument, do not use such solvents as thinner or benzol which will remove paint or damage the plastic surface. Use a soft cloth dampened with neutral detergent.

Do not drop water or detergent, or insert metal objects into the instrument while cleaning.

Otherwise, you run the risk of electrical shock or fire.

## 1. GENERAL

The 5872A(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.

## 2. FEATURES

- **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. Moreover, 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:	150mm rectangular
Accelerating potential:	16.5kV
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: 0.7 to 2V MAG × 5: 0.14 to 0.4V
Maximum input voltage:	±2V (DC+peak AC)
Frequency response:	
FLAT:	25Hz to 6MHz ± 2% 6MHz to 8MHz +2% or - 5% at 50kHz reference - 35dB or less at 3.58MHz. Flatness between FLAT and LUM: 1% or less at 15kHz
LUM:	3.58MHz bandpass filter Bandwidth: Approx. 2MHz
CHROMA:	Level difference between FLAT and CHROMA: 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 sweep
Sweep time accuracy:	1 μs/div: ± 3% 0.2 μs/div: ± 3%
Sweep trace length:	Approx. 12.5 div
Linearity:	Within ± 3%

**RGB/YRGB:** Selectable (RGB at shipment)  
 Staircase input:  $10V \pm 15\%$  for 9-div display  
 Maximum input:  $\pm 12V$  (DC+peak AC)  
 Timebase: RGB: Approx. 30% of standard length (1H sweep)  
 Timebase: YRGB: Approx. 22% of standard length (1H sweep)  
 Control signal: Apply TTL LOW active signal to rear panel Remote connector.

**CAL:** Amplitude:  $1V \pm 1\%$   
 Frequency:  $100kHz \pm 0.1kHz$

### 3.2.3 DG and DP display

**DG measurement:** Range:  $\pm 10\%$   
 Accuracy:  $\pm 1\%$

**DP measurement:** Range:  $\pm 10^\circ$   
 Accuracy:  $\pm 1^\circ$

## 3.3 Vectorscope Section

### 3.3.1 Chrominance processing

**Bandwidth:** NTSC:  $F_{sc} = 3.579545MHz$   
 High frequency:  $F_{sc} + \text{approx. } 500kHz$   
 Low frequency:  $F_{sc} - \text{approx. } 500kHz$

**Phase accuracy:**  $\pm 2^\circ$   
**Amplitude accuracy:**  $\pm 3\%$   
**Differential phase:**  $\pm 1^\circ$   
**Differential gain:**  $\pm 1\%$   
**Subcarrier regenerator:** Sync capture range:  $\pm 50Hz$   
**Phase adjustment range:**  $360^\circ$

### 3.3.2 Indications

**GAIN variable range:**  $\times 1$  MAG input: 210 mV to 1.05V  
 $\times 5$  MAG input: 43.2 to 210 mV

## 3.4 Required Input Voltages

### 3.4.1 INPUT A, B

Sync and burst of composite video or black burst signal:  $286mV \pm 6dB$

### 3.4.2 EXT REF

**Sync amplitude:** Synchronization with 143mV to 4V  
**Input impedance:**  $15k\Omega$  or higher  
**Return loss:** 40dB or more (at 50kHz to 6MHz)  
**Maximum input voltage:**  $\pm 12V$  (DC+peak AC)

### 3.5 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: FD1,3, FD2,4 or ALL  
Line No.: 1 to 263

### 3.6 Remote Control

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

### 3.7 General

Environmental conditions  
Operating : Temperature : 0 to 40°C  
Humidity :  $\leq 85\%$  RH (without condensation)

Operating Environment : Indoor use  
Operating Altitude : up to 2,000m  
Overvoltage Category : II  
Pollution degree : 2  
Power requirements : AC : 90 to 250V, 48 to 440 Hz  
no switching required  
DC : 11 to 20 V (12V) no range selection  
45Wmax. (AC), 2.4A (DC12V)

Power consumption :  
Dimensions and weight : 215 (W)  $\times$  132 (H)  $\times$  429 (D) mm, 7.0 kg  
Accessories : Lamp ..... 5  
D-sub 25-PIN connector ..... 1  
D-sub 9-PIN connector ..... 1  
Cannon connector ..... 1  
Screw lock ..... 2  
Power cord ..... 1  
Cover, inlet stopper ..... 1  
E-ring ..... 1  
Set up label ..... 1  
Screw, rack mounting (inch size) ... 2  
Instruction manual ..... 1

## 4. PANEL DESCRIPTIONS

### 4.1 Front Panel

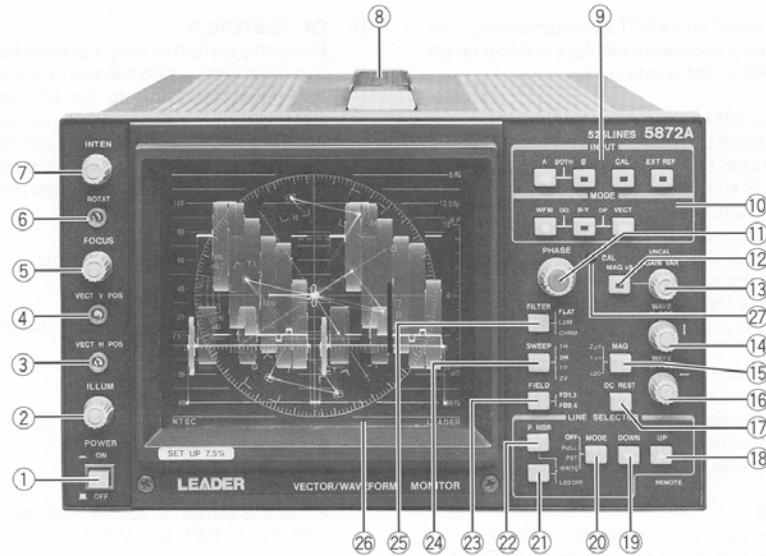


Figure 4-1

- 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 clock-wise 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 **FOCUS**  
Controls for properly focusing waveforms for clearer display.
- ⑥ **ROTAT (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 to  $10\mu\text{s}$ , 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 WFM and VECT simultaneously. The waveform and vector displays will appear on the CRT at the same time.

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  $360^\circ$ . Use this control to rotate the vector for matching the scale.

- ⑫ **MAG  $\times 5$**   
Switches the input sensitivity between  $\times 1$  and  $\times 5$ .  $\times 5$  is effective while the lamp is lit. When this button is pressed in the waveform and vector simultaneous display mode, both waveform and vector are magnified five times. Pressing this button repeatedly will first magnify the vector five times, magnify the waveform five times, then will return the magnification factor to 1 in the end.

- 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  $\times 1$  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  $0.2 \mu\text{s}/\text{div}$  when the SWEEP ⑳ is 1H ( $1 \mu\text{s}/\text{div}$  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.

- ㉑ **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 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.

- ⑳ **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.
- ㉑ **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.
- ㉒ **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.
- ㉓ **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.

4.2 Rear Panel

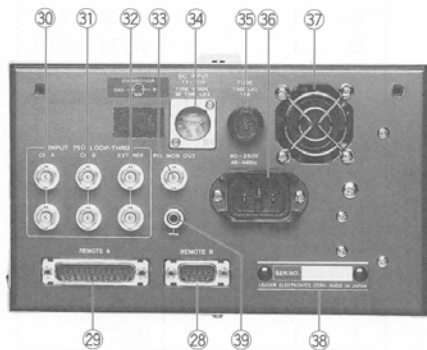


Figure 4-2

㉔ **REMOTE B**

**CAUTION**

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.

- ㉕ **FILTER**  
Selects the frequency characteristics in the WFM mode.  
The FLAT indicates the frequency response is flat.  
LUM indicates the characteristics of the low pass filter (with an attenuated CHROMA component). 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 FILTER.
- 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.
- ㉗ **CAL**  
Use this control to vary vertical axis sensitivity within a range of  $\pm 5\%$ . Do not use this control except for calibration.

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

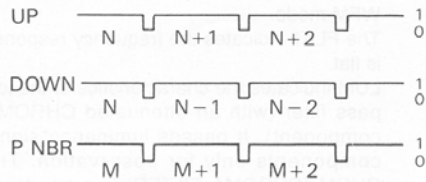


Figure 4-3

Control pulses are switched according to pulse input.

d) Field control



Figure 4-4

29 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	LUM	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 x 5
10	*	23	R-Y
11	VECT	24	1H
12	DG•DP	25	RGB EN
13	REMOTE	26	

Table 4-3

a) Selecting CH A, CH B or CAL

CH B	CAL	Pin / Function
0	0	CH A + CH B
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, or R-Y

WFM	R-Y	VECT	DG•DP	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+VECT
0	1	0	1	WFM+VECT
0	1	1	0	WFM
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
1	1	0	1	VECT
1	1	1	0	VECT
1	1	1	1	VECT

Table 4-6

d) Switching MAG x 5

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

Table 4-7

e) Selecting FLAT, LUM, or CHRM

CHRM	LUM	Pin	Function
0	0		FLAT+LUM
0	1		CHROMA
1	0		LUM
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

30 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 4-7.

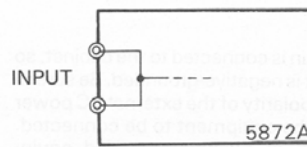


Figure 4-7

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

- ③1 **CH B**  
Set of loop-through-type input connectors for composite video signals to be measured. See Item ③0 for details on how to connect the signal.
- ③2 **EXT REF**  
Set of loop-through-type input connectors for external Sync signals. See Item ③0 for details on how to connect the signal.
- ③3 **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.
- ③4 **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. 2.4A with a voltage of 12V.  
The fuse is housed inside.  
Figure 4-8 shows the connector pin arrangement.

- ③5 **Fuse for AC power input**  
When replacing the fuse, only use the specified fuse.
- ③6 **AC power input connector**  
The input voltage must be from 90 to 250V.
- ③7 **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.)
- ③8 **Serial number plate**
- ③9 **Ground terminal**

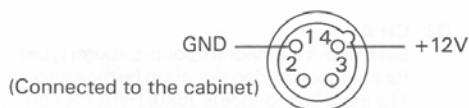


Figure 4-8

**CAUTION**  
The GND pin is connected to the cabinet, so the cabinet is negative-grounded. Be sure to check the polarity of the external DC power supply or the equipment to be connected. Connection of positive-grounded equipment may damage the instrument.

## 5. USING THE 5872A

Precautions and the method of operating the 5872A are explained as follows:

### 5.1 Precautions

#### ⚠ CAUTION

- (1) Use the instrument with the rated AC or DC power. Applying excessive power may damage the 5872A or cause it to malfunction.
- (2) Do not apply excessive voltage to each input connector. The maximum input voltage is  $\pm 12V$  (DC + peak AC)
- (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 5872A in a rack, place it to a well-ventilated place to maintain an internal rack temperature under  $40^{\circ}C$ . Mount a fan on the instrument for air cooling where temperatures above  $40^{\circ}C$  are expected.
- (5) When testing or adjusting a TV receiver, VTR, or other TV equipment, refer to the Service Manual prepared by the manufacturer. Before connecting the input connector inside the 5872A, be sure to disconnect the power cord from the AC line to prevent accidents due to electrical 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

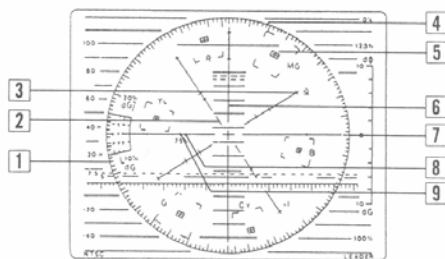


Figure 5-1

- 1 Circle of the graticule with a fixed amplitude. To set up this amplitude, the chrominance amplitude of inputs A or B must be  $0.752mVp-p$ . The two scales on the circle are the main scale in  $10^{\circ}$ , and the subscale in  $2^{\circ}$ . 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  $123^{\circ}$  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  $33^{\circ}$  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  $\pm 10^{\circ}$  and that of the amplitude is  $\pm 20\%$ . 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  $\pm 2.5^{\circ}$  and the amplitude tolerance is  $\pm 2.5$  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  $90^{\circ}$  from the B-Y axis.
- 7 B-Y axis. The angle is  $0^{\circ}$ . 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 5872A, the R-Y and B-Y axes are used as the demodulation axis.
- 8 9 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  $\pm 5^{\circ}$  or  $\pm 10^{\circ}$  of the phase, and  $\pm 5\%$  or  $\pm 10\%$  of the amplitude.

Figure 5-2-1 shows the angles for each hue, and Fig. 5-2-2 shows an of hue tolerance.

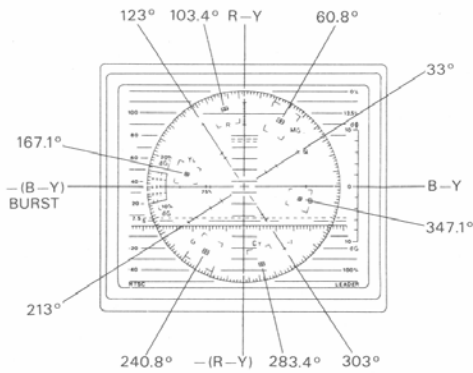


Figure 5-2-1

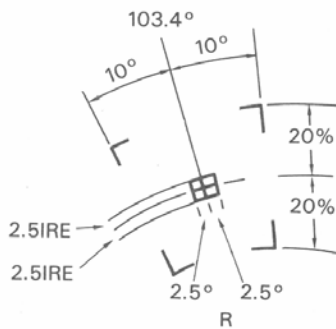


Figure 5-2-2

### 5.2.2 Waveform monitor scale



Figure 5-3

10 - 40 IRE scale to adjust sync levels.

- 11 0 IRE scale with 5 subdivisions further divided horizontally from each of 13 main divisions.
- 12 Setup scale selectable from 7.5 IRE or 5 IRE.
- 13 100 IRE scale.
- 14 2 IRE scale (10 IRE scale divided into 5 equal parts).
- 15 77 IRE scale to indicate white level with setup of 7.5 IRE.
- 16 75 IRE scale to indicate white level with setup of 0 IRE.
- 17 0% scale to indicate zero position of CW during negative amplitude modulation of RF signal.
- 18 dG, dφ scale for DG and DP measurements. A differential gain of up to  $\pm 10\%$  and a differential phase of up to  $\pm 10^\circ$  can be measured. The minor divisions are 2% and  $2^\circ$ , 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  $\times 5$  (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 SMPTE color bar  
 Waveform SMPTE color bar

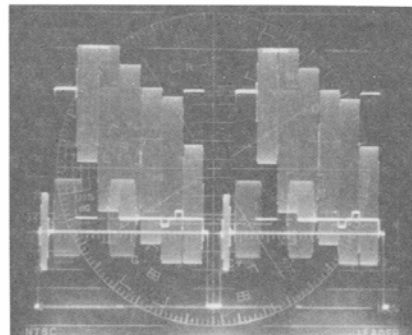


Figure 5-4

### 5.3.3 Waveform LUM display

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

The LUM 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.

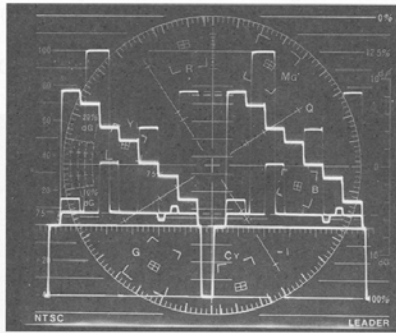


Figure 5-5

### 5.3.5 Waveform FLAT LUM display

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

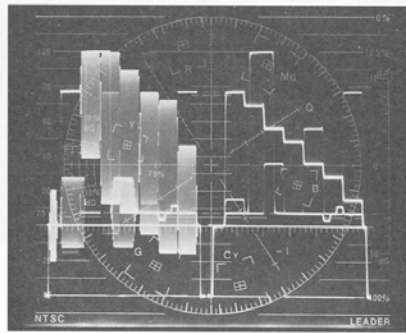


Figure 5-7

### 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.

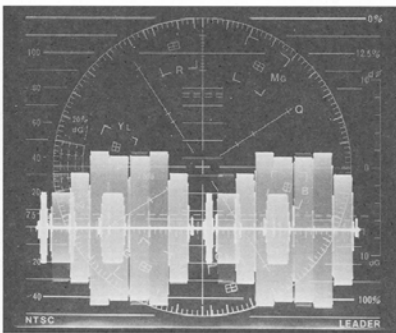


Figure 5-6

### 5.3.6 Vector measurements

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

Central settings  
Mode VECT  
FIELD FD1,3, FD2,4

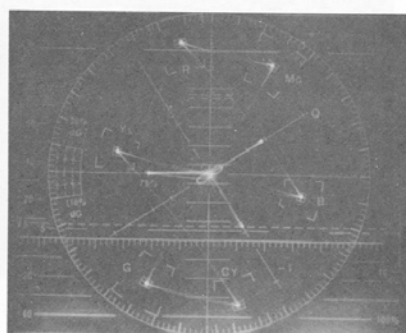


Figure 5-8

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.

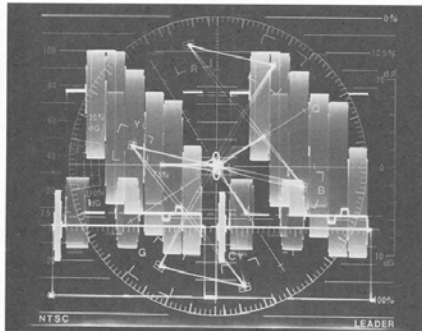


Figure 5-9

### 5.3.8 R-Y display

The R-Y mode displays the R-Y component of the vector in the horizontal direction.

Set MODE to VECT to display the vector waveform.

Select R-Y.

Figure 5-10 shows an example of waveform monitoring.

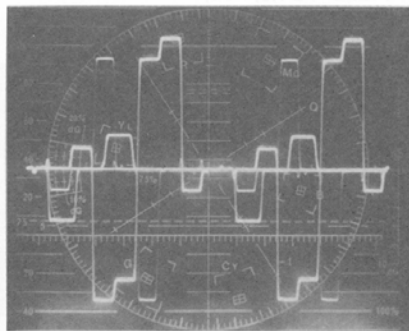


Figure 5-10

Signal SMPTE color bar  
SWEEP 2H display

## 5.4 DG DP Measurements

### 5.4.1 Signals required for measurement

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

### 5.4.2 Measurement method

- To measure a staircase or modulated ramp signal, connect it to channel A or B of the 5872A.
- Set the 5872A into the VECT mode. Adjust the level and phase by using MAG x 5, GAIN VAR, and PHASE as shown in Fig. 5-11. When the DG and DP value are large, measure them using the scale on the lower-left of the -(B-Y) axis. DG values from 2 to 10 % and DP values 2 to 10° can be measured. For DG and DP under 2% and 2°, perform the following.

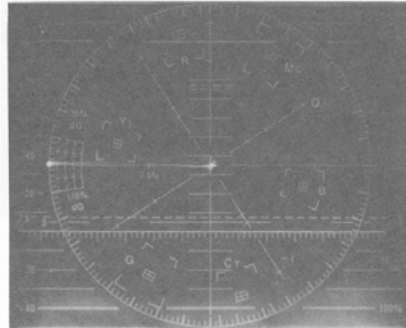


Figure 5-11

- 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 5-12 shows an example of the waveform.

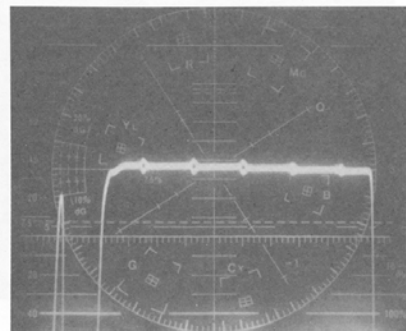


Figure 5-12

Use the dG scale on the right side. One minor division is 2%. Measure the horizontal 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 5-13 shows an example of the waveform.

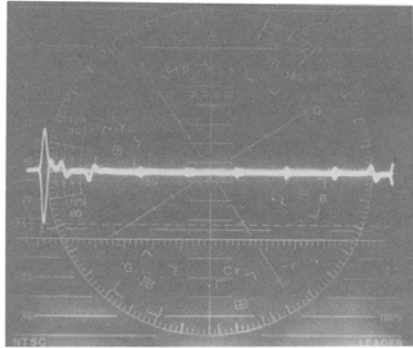


Figure 5-13

Use the  $d\theta$  scale to read the waveform. One minor division is 2°. Measure the waveform in the 1H or 2H display mode. The DP value is the difference between the maximum and minimum vertical differential phases.

### 5.5 External synchronization

The 5872A 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.

### 5.6 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.

### 5.7 RGB/YRGB Display

The 5872A is capable of parade-displaying the RGB signals used by cameras.

The signals required for RGB display are listed under "Item ㉔ j)" in Section 4.2.

Set Pin 25 of the REMOTE A connector on the rear panel for RGB display. A staircase signal should be applied to Pin 19. The unit is set for RGB display when shipped from the factory. For YRGB display, the setting must be changed. (See Figure 5.14). Remove the case of the unit to expose the window on the right side as shown in the figure.

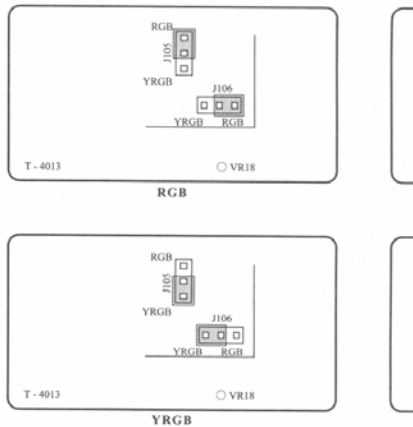


Figure 5-14

### ⚠ WARNING

This operation is for qualified personnel only. To avoid electrical shock, disconnect AC power cord from the AC inlet before changing connectors.



### 5.8 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 5-15 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 (2). Then, the LED lamp will go off and the REF A or REF B display will no longer be displayed on the CRT.

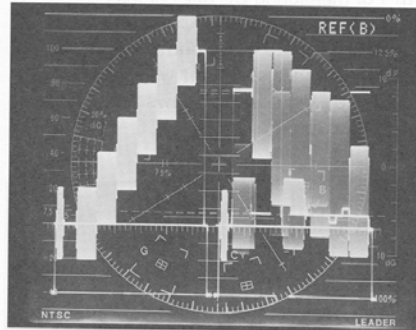


Figure 5-15

### 5.9 Setup Selection

When the 5872A is shipped from the factory, the setup level is set to 0%. If a user requires to change to 7.5%, set the setup switch J109 on the PCB T-4013 shown in Figure 5-16.

#### Procedure is as follows.

1. Press (release) the POWER switch to turn the power off.
2. Disconnect the power cord plug from the AC receptacle.
3. Open the top cover by removing 7 screws.
4. Set the switch J109 to SETUP 7.5% position.
5. Close the top cover, and tighten 7 screws.
6. Connect the power cord plug to the AC receptacle.
7. Press the POWER switch to turn the power on.

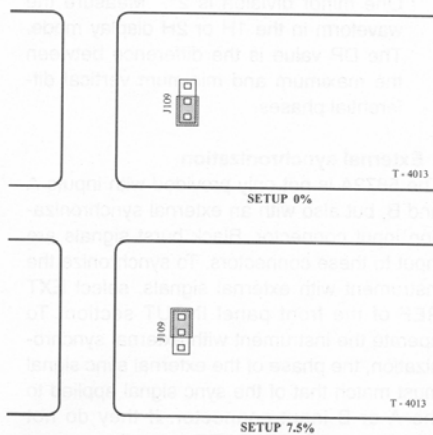


Figure 5-16

#### ⚠ WARNING

This operation is for qualified personnel only. To avoid electrical shock, disconnect AC power cord from the AC inlet before changing connector.

## 6. MAINTENANCE

The Model 5872A is designed to provide stable performance when used properly. If the instrument requires adjustment or calibration after extended use, be sure to contact your nearest LEADER agent.

### 6.1 Lamp Replacement

If the scale ILLUMI 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.

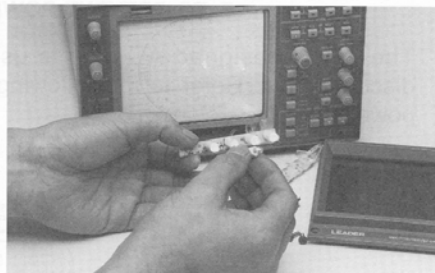


Figure 6-1

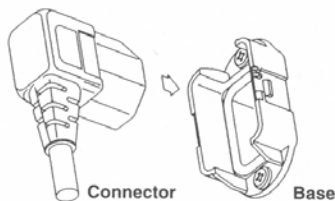
### 7. TO PREVENT POWER CORD DISCONNECTION

The newly designed AC inlet is used for this model to prevent power cord disconnection. Refer to the following procedure when connecting the supplied power cord.

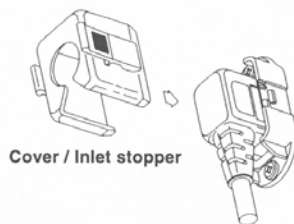


#### 7.1 Connecting the Power Cord

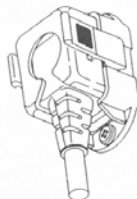
- (1) Insert the power cord connector into the AC inlet.



- (2) Place the Cover / Inlet stopper on top of the connector as shown in the Figure below.



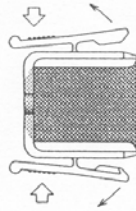
- (3) Press the cover until it clicks into place.



- (4) Confirm that the Cover / Inlet stopper is locked to the base.

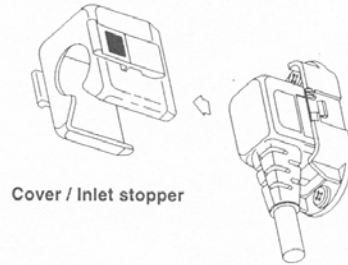
## 7.2 Disconnecting the Power Cord

- (1) Press the levers on the Cover / Inlet stopper with your fingers to release.



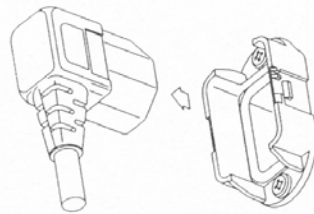
Cover / Inlet stopper (side view)

- (2) Remove the Cover / Inlet stopper from the base.



Cover / Inlet stopper

- (3) Disconnect the power cord connector from the AC inlet.



Connector

Base



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