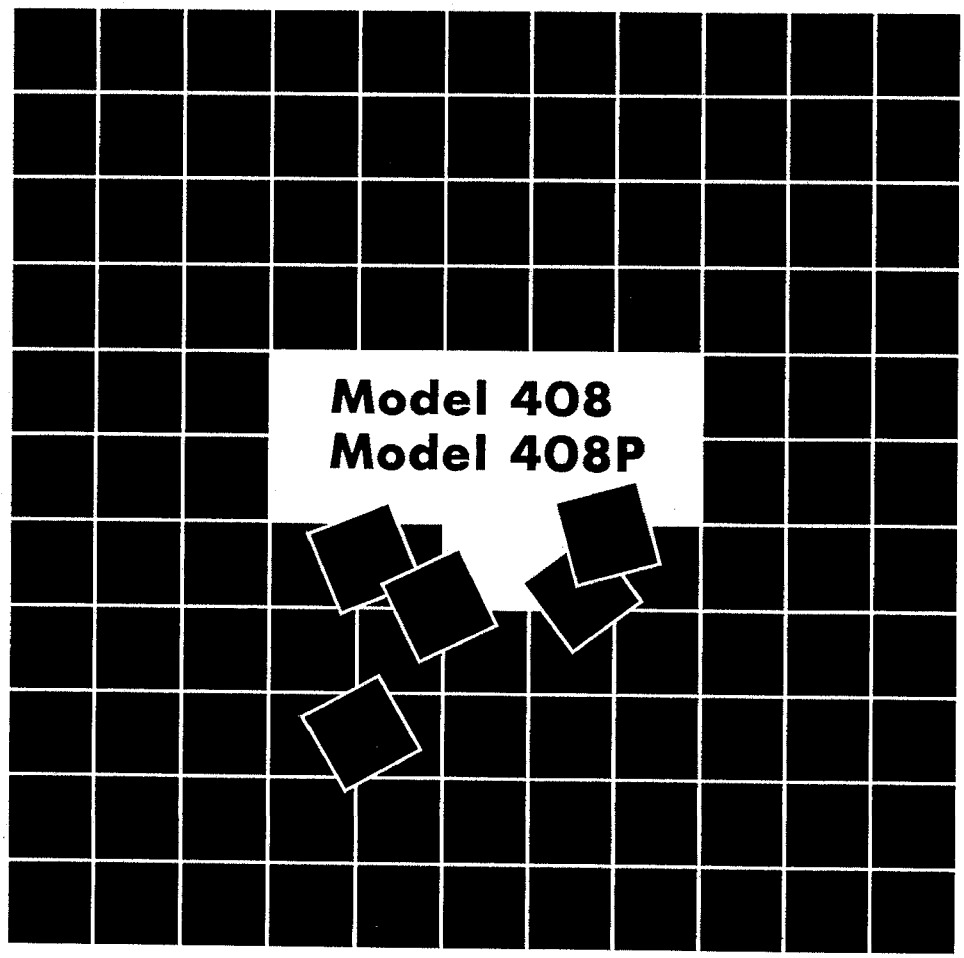
LEADER

PATTERN GENERATOR

INSTRUCTION MANUAL



LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. INTRODUCTION

Model 408/408P is a universal pattern generator that can provide various types of pattern. The built-in video sweep and multiburst signal functions are used to check the frequency characteristics of video equipment. In addition, all-channel RF output allows the generator to adjust and check TV and VTR sets with built-in TV-band tuners. The GENLOCK and black burst functions make the universal pattern generator a synchronizing signal source for various types of video equipment.

The generator contains a synthesized RF output. A frequency can be set directly from the panel, or a country name, band, and channel (VHF, UHF, or CATV) can be selected from internal data. The Model 408 is based on the NTSC system; the Model 408P is based on the PAL system.

2. FEATURES

- Channel data is preset for VHF, UHF, and CATV.
- The GENLOCK function enables generator synchronization with another pattern generator.
- Audio signals of 1kHz and 400Hz can be output from internal sources.
- The video sweep function can be switched from 100kHz to 15MHz in two bands.
- The RF modulation function can modulate external video signals.
- The RGB output connector (8-pin square TTL output connector) is provided as standard.
- The 21-pin multi-connector is provided as standard.
- The Y/C separation terminal (S terminal or BNC) is provided as standard.
- Up to 100 addresses can be programmed. (The address range can also be set.)
- The remote function provides memory address control.
- The GPIB interface is optionally available.

3. SPECIFICATIONS

3.1 Color Systems

408:	NTSC-M
408P:	PAL-B, C, D, G, H, I, K, and L

3.2 Patterns

(1) Crosshatch — White line (100%, 15 (V) × 11 (H)) on black background and white corner marker (100%) at upper-left corner of the screen.

(2) Convergence — Synthesized pattern of white line (100%, 15 (V) × 11 (H))on black background and white spot (100%, 14 (V) × 10 (H))

(3) Window — White (100%) window on black background

(4) Checker — 8 (V) × 6 (H) white (100%) and black checker pattern

(5) 5-step — Stair case luminance signal consisting of 5 equal steps
40% modulation on/off (Chroma on/off selection)
408 : 286mVp-p
408P: 280mVp-p

(6) 10-step — Stair case luminance signal consisting of 10 equal steps
40% modulation on/off (Chroma on/off selection)
408 : 286mVp-p
408P: 280mVp-p

(7) Others — Several patterns selectable

(8) Demodulation patterns (DEM)

Chroma phase

408:

Upper half of screen	
n lines:	R-Y, −(R-Y), B-Y, −(B-Y), R-Y, −(R-Y), B-Y, and −(B-Y)
n+1 lines:	−(R-Y), R-Y, B-Y, −(B-Y), R-Y, −(R-Y), −(B-Y), and B-Y
Lower half of screen	
n lines:	I, −I, Q, −Q, I, −I, Q, and −Q
n+1 lines:	−I, I, Q, −Q, I, −I, −Q, and Q

408P:

n lines:	R-Y, −(R-Y), −(B-Y), R-Y, −(R-Y), B-Y, and −(B-Y)
n+1 lines:	−(R-Y), R-Y, B-Y, −(B-Y), R-Y, −(B-Y), and B-Y

(9) Full-field color bars — 75% amplitude color bar
The eight colors on screen from left to right are white, yellow, cyan, green, magenta, red, blue, and black. White can be switched to 75% or 100%.

(10) SMPTE color bars — Conforms to SMPTE ECR standard (1-1978).

(11) Rasters — 8 colors in RGB combinations

(12) Multiburst

Frequencies:	408: 0.5, 1, 2, 3, 3.58, and 4.2MHz fixed or variable (1MHz to 15MHz) 408P: 0.5, 1, 2, 4, 4.8, and 5.8MHz fixed or variable (1MHz to 15MHz)
Amplitude:	50% or 100% selectable
Flatness:	±0.5dB (0.5 to 10MHz) ±1.0dB (10.1 to 15MHz)

(13) Video sweep

Sweep frequency range:	NARROW: 0.1 to 5MHz WIDE: 0.3 to 15MHz * Two band selection
Sweep speed:	Synchronous with field scan
Amplitude:	50% or 100%
Flatness:	±0.5dB (0.1 to 10.0MHz) ±1.0dB (10.1 to 15.0MHz)
Marker	
NARROW:	408: 0.5, 1, 2, 3, 3.58, and 4.2MHz 408P: 0.5, 1, 2, 3, 4, and 5MHz
WIDE:	2, 4, 6, 8, 10, 12, and 14MHz

3.3 Sync Signal

No. of scanning lines:	408: 525 lines (interlaced scanning) 408P: 625 lines (interlaced scanning)
Line frequency:	408: 15.734kHz 408P: 15.625kHz
Field frequency:	408: 59.94Hz 408P: 50Hz

3.4 Mode Control

(1) White	White color bar/raster level selection (75% or 100%)
(2) Red	Red color bar/raster on/off
(3) Green	Green color bar/raster on/off
(4) Blue	Blue color bar/raster on/off
(5) Burst	Burst signal on/off
(6) Luminance	Luminance signal on/off
(7) Chrominance	Chrominance signal on/off
(8) Invert	Black-and-white inversion of crosshatch, convergence, window, and checker patterns
(9) Circle	Synthesis of circle for crosshatch, convergence, window, and checker patterns
(10) Moving marker	Synthesis of moving markers for all patterns

3.5 Amplitude Preset

Sync signal variable range:	408: 0 to 200% (286mV=100%) 408P: 0 to 200% (300mV=100%)
Burst signal variable range:	408: 0 to 200% (286mV=100%) 408P: 0 to 200% (300mV=100%)
Luminance signal variable range:	408: 0 to 200% (660mV=100%) 408P: 0 to 200% (706mV=100%)
Chrominance signal variable range:	408: 0 to 200% (627mV=100%) 408P: 0 to 200% (664mV=100%)
Setup signal variable range (Model 408 only):	0 to 20.0% (54mV=7.5%)

3.6 Front Panel Output

- Composite video signal output

Polarity:	Positive (sync: negative)
Voltage:	1Vp-p fixed (into 75Ω load) 0 to 1 Vp-p continuously variable (into 75Ω load)
Impedance:	75Ω

- Trigger output

Mode:	HD or VD selectable with panel switch
Output:	TTL

- RF output: Synthesizer type

Frequency range:	30 to 900MHz
Frequency preset resolution:	10kHz Δf function available in CH mode (±10.00MHz)
Frequency switching time:	2 s or less
Frequency characteristic:	±5 dB
Spurious:	−10dBc
Voltage:	Approx. 10μV to 10mV continuously variable
Impedance:	75Ω
Modulation polarity:	Negative, Positive (According to country.)

- Sound output — Overlaid on RF output (ON/OFF possible)

System:	Intercarrier system
Frequency:	408: 4.5MHz 408P: 5.5, 6.0, and 6.5MHz selectable (According to country.)
Modulation signal:	400Hz, 1kHz, or external input
Modulation system:	408: FM 408P: AM and FM (According to country.)
Frequency characteristic:	50Hz to 50kHz: ±1dB 50kHz to 100kHz: ±3dB

3.7 Rear Panel Output

- Composite video output
  - Polarity: Positive (sync: negative)
  - Voltage: 1Vp-p fixed (into 75Ω load)
    0 to 1Vp-p continuously variable (into 75Ω load)
  - Impedance: 75Ω

- Black burst output
  - Polarity: Positive (sync: negative)
  - Burst: 408: 0.286Vp-p (into 75Ω load)
    408P: 0.3Vp-p (into 75Ω load)
  - Sync signal: 408: 0.286Vp-p (into 75Ω load)
    408P: 0.3Vp-p (into 75Ω load)
  - Impedance: 75Ω
  - Output: Two BNC systems

- Subcarrier output
  - Frequency: 408: 3.579545MHz ± 50Hz
    408P: 4.43361875MHz ± 50Hz
  - Voltage: 2Vp-p (into 75Ω load)
  - Impedance: 75Ω

- Composite sync output
  - Polarity: Negative
  - Voltage: 4Vp-p (into 75Ω load)
  - Impedance: 75Ω

- Composite blanking output:
  - Polarity: Negative
  - Voltage: 4Vp-p (into 75Ω load)
  - Impedance: 75Ω

- Burst flag output:
  - Polarity: Negative
  - Voltage: 4Vp-p (into 75Ω load)
    0 to 1Vp-p continuously variable (into 75Ω load)
  - Impedance: 75Ω

- V.DRIVE output
  - Polarity: Negative
  - Voltage: 4Vp-p (into 75Ω load)
  - Impedance: 75Ω

- H.DRIVE output
  - Polarity: Negative
  - Voltage: 4Vp-p (into 75Ω load)
  - Impedance: 75Ω

- Sound output
  - Frequency: 400Hz and 1kHz
  - Voltage: 1Vp-p (into 1kΩ load)
  - Impedance: 75Ω
  - No. of outputs: One each (total of two)

- R-Y output
  - Voltage: 0.7Vp-p (into 75Ω load)
  - Impedance: 75Ω

- B-Y output
  Voltage: 0.7Vp-p (into 75Ω load)
  Impedance: 75Ω

- Y output
  Voltage: 1Vp-p with SYNC (into 1kΩ load)
  Impedance: 75Ω

- TTL output
  RGB output: Fan out 1 (positive logic)
  SYNC output: Fan out 1 (negative logic)
  H.SYNC and V.SYNC
  Connector: 8-pin square connector

- Y/C
  Voltage: Y: 1Vp-p (into 75Ω load)
  (between sync and white signals)
  C: 408: 0.286Vp-p (into 75Ω load)
  408P: 0.3Vp-p (into 75Ω load)
  Impedance: Y: 75Ω
  C: 75Ω
  Connector: Two systems: Round miniature connector (S connector) and BNC connector (Y output and C output)

- RGB multiple output
  408:

	Polarity	Voltage	Impedance
VIDEO	Positive (sync: negative)	1Vp-p (into 75Ω load)	75Ω
RGB	Positive	0.7Vp-p (into 75Ω load)	75Ω
VOICE		284mVrms	10kΩ
Ys		L 0 to 0.4V H 1 to 3V	75Ω
Ym		L 0 to 0.4V H 1 to 3V	75Ω
AV		L 0 to 0.4V H 3 to 5V	22kΩ

408P:

	Polarity	Voltage	Impedance
VIDEO	Positive (sync: negative)	1Vp-p (into 75Ω load)	75Ω
RGB	Positive	0.7Vp-p (into 75Ω load)	75Ω
VOICE		500mVrms	10kΩ
Ys		L 0 to 0.4V H 1 to 3V	75Ω
SLOW SW		L 0 to 2V H 9.5 to 12V	10Ω

Connector: 21-pin connector (EIAJ21P)

* The composite sync, composite blanking, burst flag, V. DRIVE, and H.DRIVE can be changed to [TTL OUT] by using an option.

3.8 Rear Panel Input

- EXT VIDEO input

Polarity:	Positive (sync: negative)
Input voltage:	1Vp-p (into 75Ω load)
Input impedance:	75Ω

- GENLOCK input

Input type:	75Ω loop-through
Operating input range:	408: 286mV ±3dB (sync signal amplitude) 408P: 300mV ±3dB sync signal
Horizontal delay:	Input signal ±2μs variable
Subcarrier lock range:	408: 3.57945MHz ±50Hz 408P: 4.43361875MHz ±50Hz
Subcarrier phase:	0° to 360°C continuously variable

- EXT SOUND

Frequency range:	50Hz to 100kHz
Input range:	1Vp-p (into 10kΩ load)
Input impedance:	10kΩ

3.9 Presettings

Up to 100 sets of pattern, mode, level, and RF frequency or channel can be stored in internal memory.

3.10 Others

Power supply:	100, 120, 220, or 240VAC ±10% (changeable, maximum input voltage: 250V by internal tapping)
Frequency:	50/60Hz
Power consumption:	55VA
Operating ambient temperature:	0° to 40°C
Dimensions:	426 (W) x 88 (H) x 400 (D) mm
Weight:	Approx. 9kg
Accessories:	BNC-BNC (3C-2V, 1m) cable ..... 1 Spare fuse ..... 1 Instruction Manual 1

* The specifications may be subject to change without prior notice.

4. PRECAUTIONS

(1) Check the power supply voltage.
The power supply voltage must be the rated voltage ±10%. If the voltage is too low, the unit may not operate correctly. If the voltage is too high, the power supply section may overheat. The power transformer has series-parallel 100 and 120V windings. The unit can be used in the four voltage ranges listed in Table 4.1 by changing the wiring.

Table 4.1

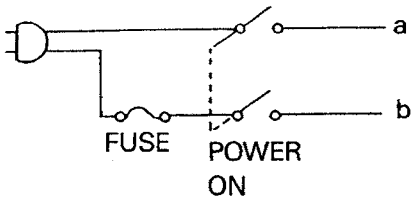
Rated voltage	Operating voltage range	Fuse rating
100V 120V	90 to 110V 108 to 132V	2A Time lag
220V 240V	198 to 242V 216 to 250V	1.25A Time lag

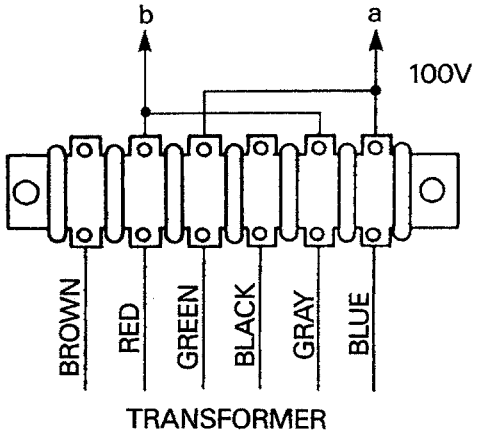
See Figure 4.1 for how to change the primary wiring.

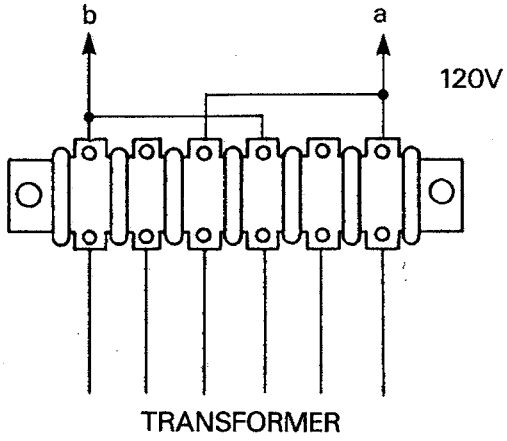
(2) The operating temperature range is 0° to 40°C.
When the unit is mounted in a rack, make sure that the internal temperature of the rack does not exceed 40°C. If necessary, install a fan on the rack or place the heat-generating equipment on top of the system.

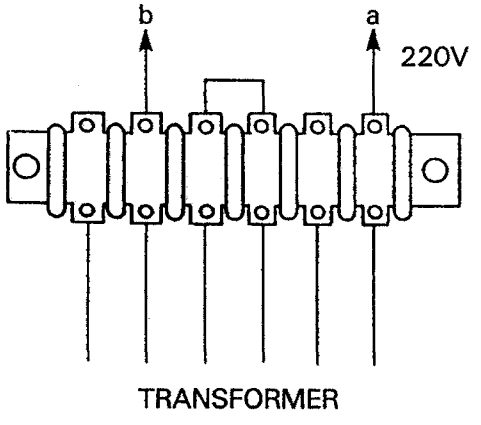
(3) Note the following when the unit is not used for a long time.
The settings of the Model 408/408P are backed up for about one month. If the unit is not turned on for more than one month, the data stored in memory may be lost.

(4) Do not apply an external voltage to the output connectors.
This may cause a problem. If a bias voltage is being imposed on the circuit to be connected, remove the DC component with a capacitor before connecting the circuit. Do not apply a DC voltage exceeding ±15V to an input connector.


a
b
FUSE
POWER
ON


b
a
100V
BROWN
RED
GREEN
BLACK
GRAY
BLUE
TRANSFORMER


b
a
120V
TRANSFORMER


b
a
220V
TRANSFORMER

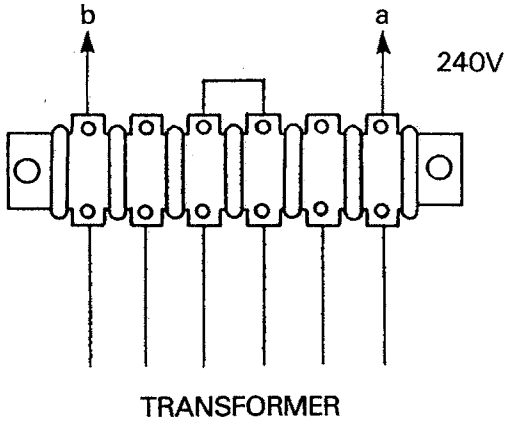
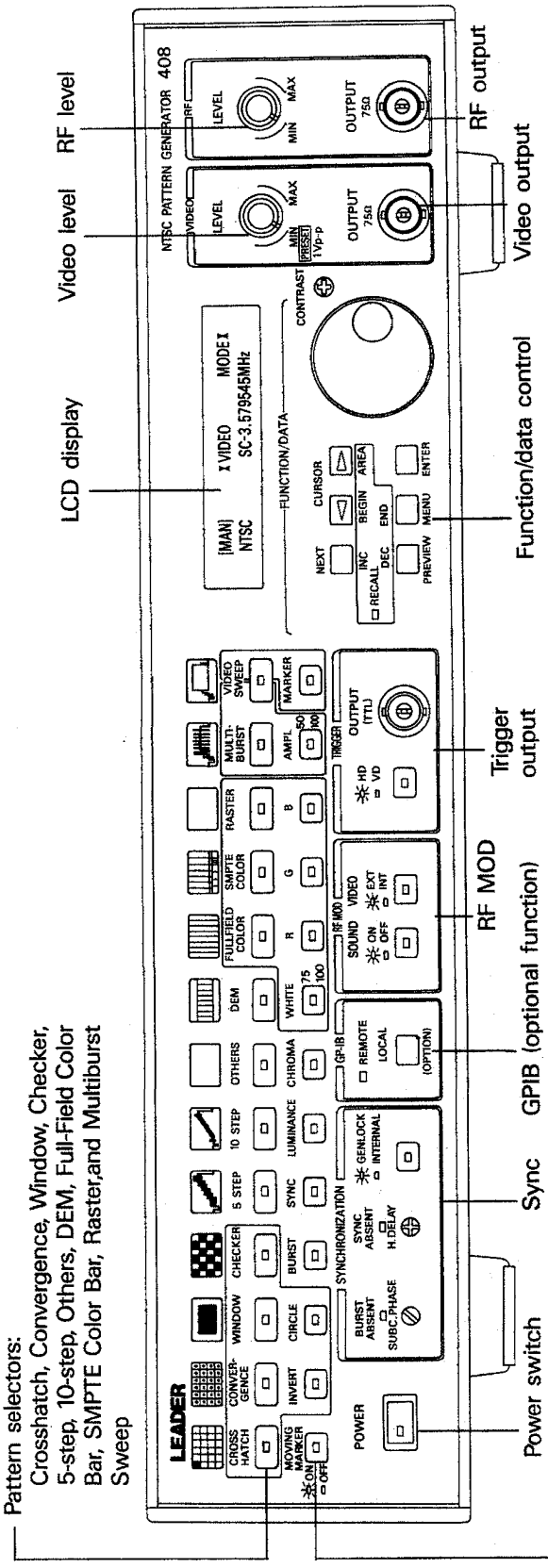

b
a
240V
TRANSFORMER

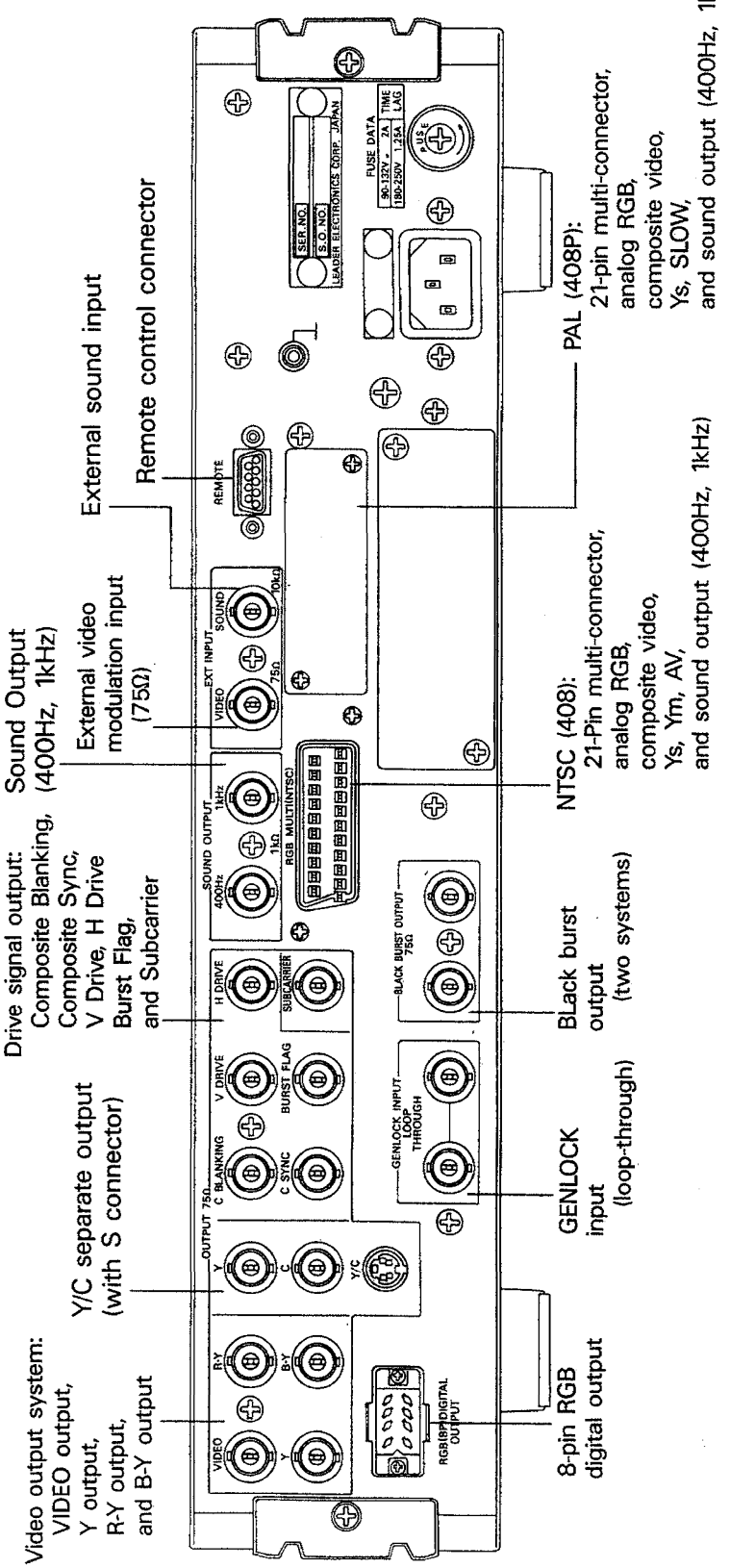
Figure 4.1

5.1 Front Panel



This figure shows the Model 408.

5.2 Rear Panel



This figure shows the Model 408.

The operation functions are indicated by arrows.

6.1 Power Supply

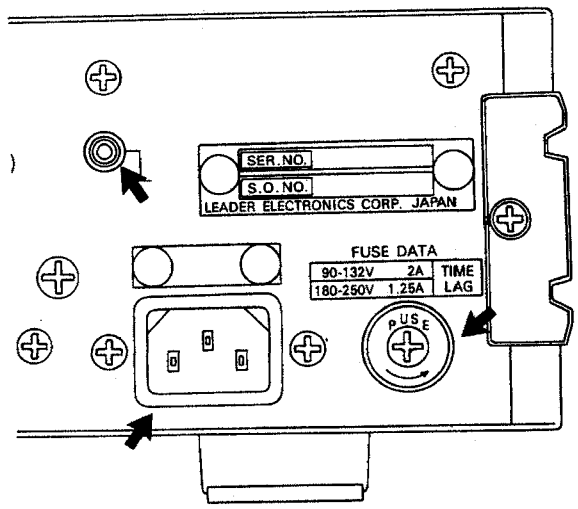


Figure 6.1

Use a fuse of the rated voltage as specified on the rear panel. The unit is equipped with a fuse when shipped from the factory.

Connect the accessory power cord to the inlet on the rear panel. Apply power of the voltage specified above the connector.

This is the cabinet ground terminal. Connect a ground wire here for safety's sake.

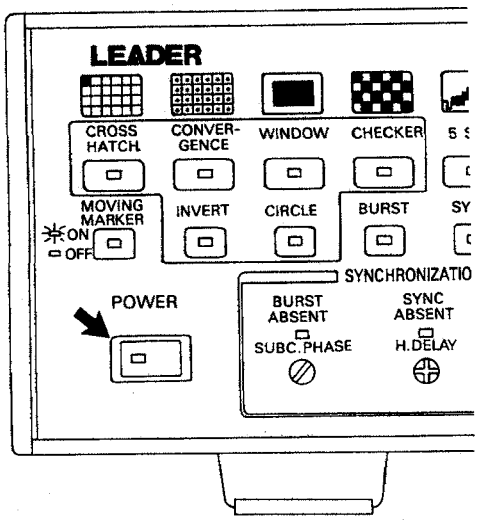


Figure 6.2

Press the switch in to turn on the power. The power lamp goes on. Press (release) the switch again to turn and the power off.

6.2 Pattern Selection

6.2.1 Pattern types

The following pattern selectors are arranged from the left side of the panel: Crosshatch, Convergence, Window, Checker, 5-step, 10-step, Others (Checker Color Bar, Horizontal Color Bar, Split Color, Bar, APL 10%, APL 90%, and Center Cross), Demodulator, Full-Field Color Bar, SMPTE Color Bar, Raster, Multiburst, and Video Sweep. In addition, circle patterns and moving markers can be overlaid on specified patterns.
See Section 6.2.2 for how to select patterns.

6.2.2 Selecting patterns

Pressing a pattern selection key turns on its lamp and outputs the specified pattern from the video and RF output connectors. Seven patterns belong to OTHERS: checker color bar, center cross, APL 10%, APL 90%, matrix, split color bar, and horizontal color bar. Pressing the Key displays a pattern name. The pattern can be changed sequentially by pressing the NEXT or PREVIEW key.

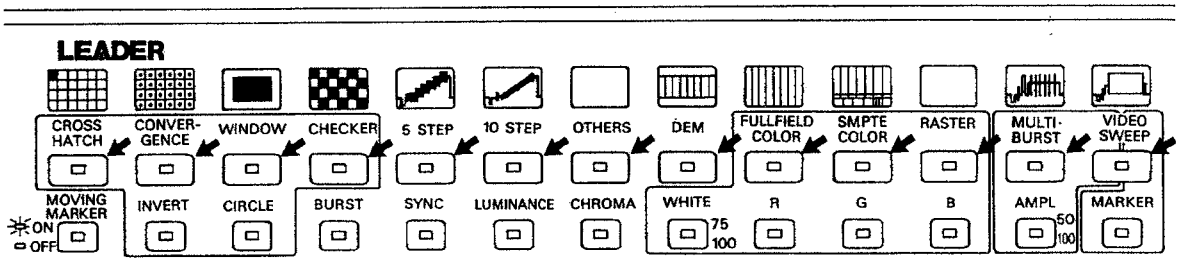


Figure 6.3

6.2.3 Black-and-white inversion of crosshatch, convergence, window, and checker patterns

Pressing the INVERT key turns on its lamp and inverts the pattern from black to white and white to black. Only the crosshatch, convergence, window, and checker patterns can be inverted.

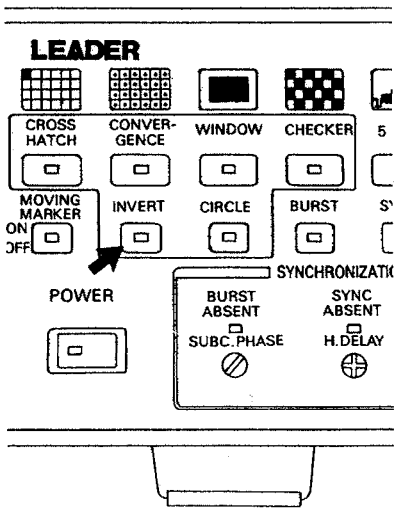


Figure 6.4

6.2.4 Outputting circle patterns

Pressing the CIRCLE key turns on its lamp and overlays a circle on the specified pattern.
The INVERT key is not effective for the circle pattern. There are two circle pattern modes: one is to overlay circles only on crosshatch, convergence, window, and checker patterns; the other is to overlay circles on all patterns.

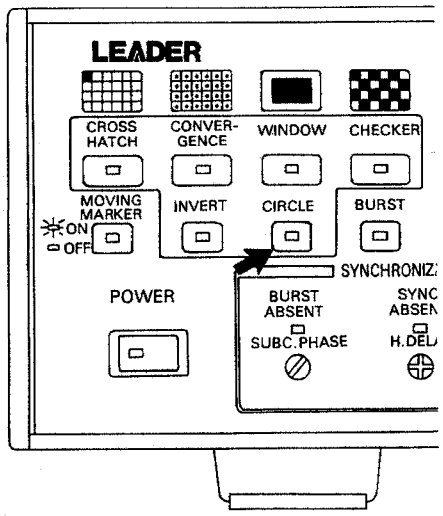


Figure 6.5

6.2.5 Outputing moving markers

Pressing the MOVING MARKER key turns on its lamp and displays a white moving marker below any pattern. The marker can be shifted from right to left and inverted by using the INVERT key.

Turn on the power switch while pressing the CIRCLE key. The following is displayed on the LCD panel:
[CIRCLE ON PATTERN]
■ NORMAL □ ALL
Select NORMAL to overlay circle patterns only on crosshatch, convergence, window, and checker patterns; select ALL to overlay circles on all patterns. When ALL is selected, the output may exceed the specified level due to multiburst, sweep, and color bar pattern selection.
Turn [□] of the desired mode to black by using the cursor keys, then press the ENTER key.

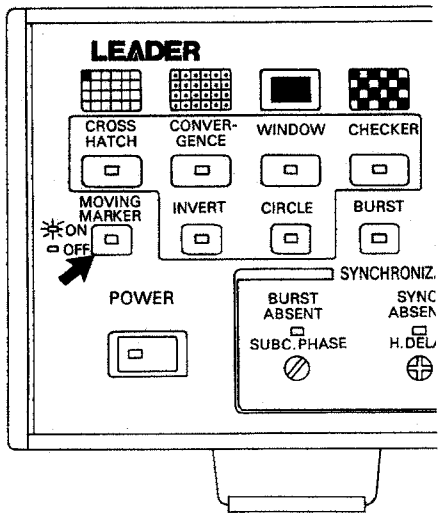


Figure 6.6

6.2.6 Selecting 100% or 50% level for multiburst or sweep output and sweep signal frequency

The multiburst or sweep output level can be set to 50% or 100% by using the AMPL key. Pressing the AMPL key turns on its lamp and sets the output level to 50%. When the lamp is off, the output level is 100%.

Pressing the MARKER key turns on its lamp and inserts a sweep marker to the sweep signal. The marker can be seen on a waveform or picture monitor by turning off the sweep signal to make the display dark (50% level).

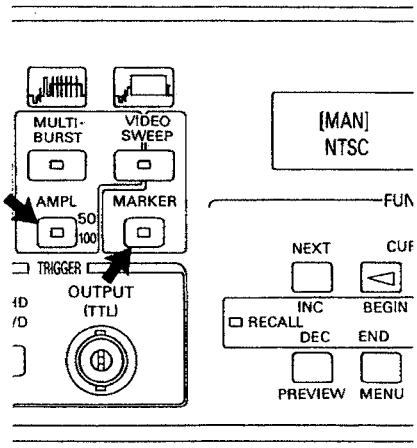


Figure 6.7

6.2.7 Setting last burst of multiburst pattern

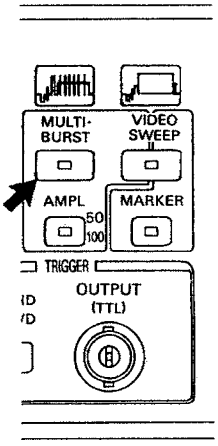


Figure 6.8

Pressing the MULTIBURST key displays either of the following screens on the LCD panel.

① (LAST BURST MODE)
FIXED 4.2MHz

② (LAST BURST MODE)
VAR 5MHz

Screen ① shows that the multiburst frequency is fixed to 4.2MHz (5.8MHz for model 408P). The last burst frequency displayed on Screen ② can be varied from 1 to 16MHz by using the jog dial. Pressing the NEXT or PREVIEW key alternately displays Screens ① and ②.

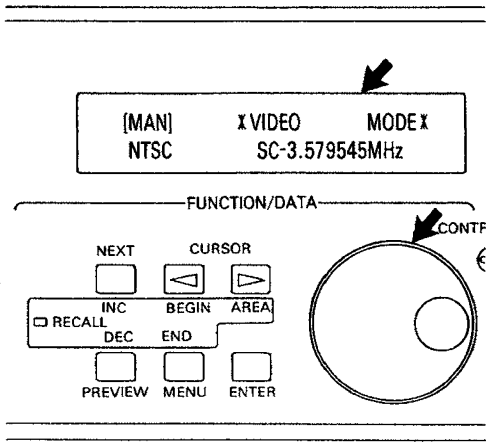


Figure 6.9

6.2.8 Selecting the sweep width

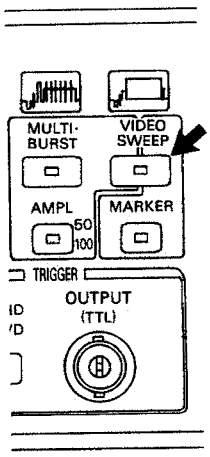


Figure 6.10

Pressing the VIDEO SWEEP key displays either of the following screens on the LCD panel.

(SWEEP WIDTH)
NARROW

(SWEEP WIDTH)
WIDE

The NARROW sweep width is from 100kHz to 5MHz.
The WIDE sweep width is from 300kHz to 15MHz. Use the NEXT or PREVIEW key to alternate the sweep width. This changes the marker at the same time.

6.2.9 Turning color bar or raster RGB on/off and selecting 100% or 75% white level

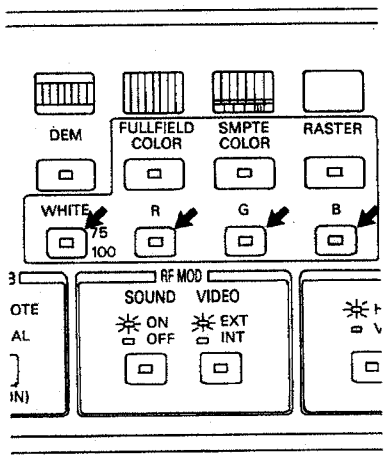


Figure 6.11

Pressing the RGB buttons turn the red, green, and blue colors of full-field, SMPTE color bar, and raster patterns on/off. When the colors are turned on, their lamps light. Eight colors (white, yellow, cyan, green, magenta, blue, and black) can be displayed by turning the RGB in raster patterns on/off.
When the FULLFIELD COLOR, SMPTE COLOR, or RASTER switch is turned on, SET UP LEVEL is displayed on the LCD panel. (The Model 408P does not display this message because it does not have a function to change the setup level.) To change the setup level to 0%, turn it off by using the NEXT or PREVIEW key. To use the setup level, turn it on. The video level is 1Vp-p when the setup level is 7.5%.
When all RGB switches are on, the white level can be changed to 50% or 100% by using the WHITE button.
The white level is 75% when the lamp is on and 100% when off. The key setting does not affect the next signal. The 100% white signal level below SMPTE and the white signal of analog and digital RGB output do not change.

6.2.10 Turning Chroma and luminance signals on/off

Pressing the CHROMA key turns the chroma signal for each pattern on/off. The chroma signal is output when the lamp is on, but not when the lamp is off. However, analog and digital RGB output does not change.

The luminance signal of each pattern can be turned on/off by pressing the LUMINANCE key. However, the color bar setup signal does not change.

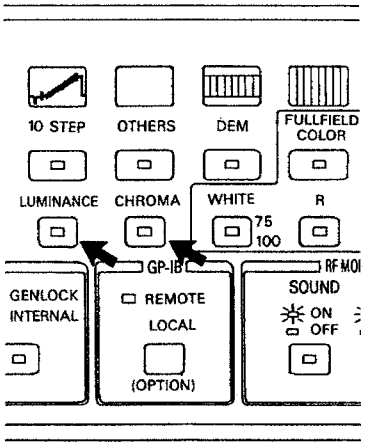


Figure 6.12

6.2.11 Patterns and mode settings

Table 6.1

Pattern	Mode						
	INVERT	MOVING MARKER	WHITE 75,100	RGB	AMPL 50,100	SWEEP MARKER	CIRCLE
Sweep	—	○	—	—	○	○	* ○
Multiburst	—	○	—	—	○	—	* ○
Raster	—	○	○	○	—	—	* ○
SMPTE color bar	—	○	○	○	—	—	* ○
Full-field color bar	—	○	○	○	—	—	* ○
DEM	—	○	—	—	—	—	* ○
Checker color bar	—	○	—	—	—	—	* ○
Vertical color bar	—	○	—	—	—	—	* ○
Reverse color bar	—	○	—	—	—	—	* ○
APL 10%	—	○	—	—	—	—	* ○
APL 90%	—	○	—	—	—	—	* ○
Center cross	—	○	—	—	—	—	* ○
Checker	○	○	—	—	—	—	○
Window	○	○	—	—	—	—	○
Convergence	○	○	—	—	—	—	○
Crosshatch	○	○	—	—	—	—	○

○: Applicable patterns
*: Modes that can be set at power-on (See 6.2.4.)

6.2.12 Output and Patterns

Table 6.2

Pattern	Output				
	Composite video	Component video	TTL RGB	Analog RGB	Y/C
Sweep	○	○	—	—	Y ○
Multiburst	○	○	—	—	Y ○
Raster	○	○	○	○	○
SMPTE color bar	○	○	○	○	○
Full-field color bar	○	○	○	○	○
DEM	○	○	—	—	○
Checker color bar	○	○	○	○	○
Vertical color bar	○	○	○	○	○
Reverse color bar	○	○	○	○	○
APL 10%	○	○	—	—	○
APL 90%	○	○	—	—	○
Center cross	○	○	○	○	○
10 STEP	○	○	—	○	○
5 STEP	○	○	—	○	○
Checker	○	○	○	○	○
Window	○	○	○	○	○
Convergence	○	○	○	○	○
Crosshatch	○	○	○	○	○
Circle	○	○	○	○	○
Moving marker	○	○	○	○	○

○: Output pattern

6.3 Turning Sync and Burst Signals On/Off

Pressing the BURST key turns the burst signal for a composite video signal, Y/C output, or component signal on/off.
The burst signal is on when the lamp is on, and off when the lamps is off.
Analog, digital, and RGB output do not change.

Pressing the SYNC key turns the sync signal for a composite video and component signals on/off.
The sync signal is on when the lamp is on, and off when the lamp is off.
The sync signal for analog, digital, and RGB output does not change.

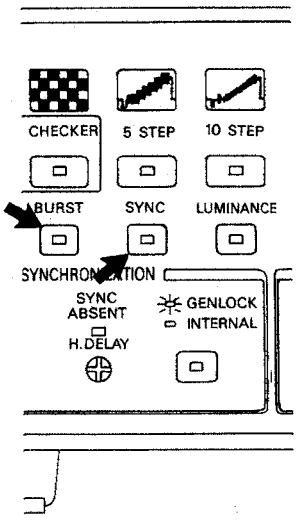


Figure 6.13

6.4 Setting Luminance Chroma, Burst, and Sync, Signal Levels

6.4.1 Changing General Level or Composite Video Signal

The general composite video output level can be changed as follows. Turn the knob fully counter-clockwise to set the level to the standard value of 1Vp-p. The level varies within the range from 0 to 1Vp-p. Note that 1Vp-p is the standard value when the luminance and sync signal levels are set to 100%. When the levels set to 200%, the standard value is doubled to 2Vp-p.

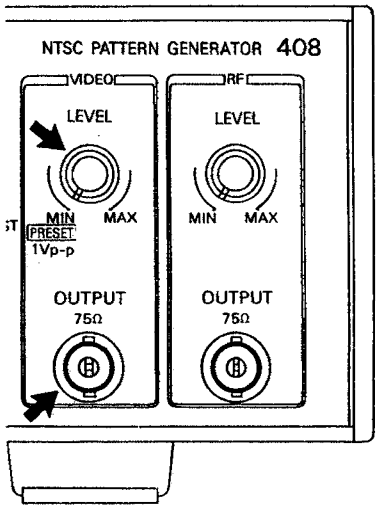


Figure 6.14

This is the composite video signal output connector with an output impedance of 75Ω. This connector is located on the front and rear panels.

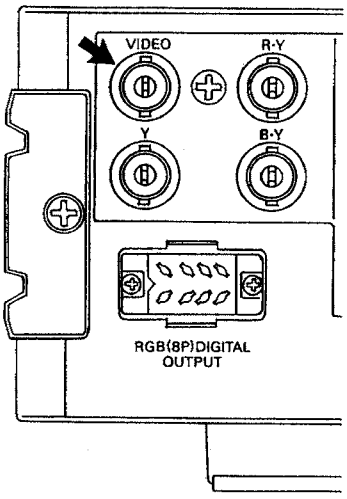


Figure 6.15

6.4.2 Changing luminance, chroma, burst, sync signal setup levels

The luminance chroma, burst, and sync signal levels of Models 408/408P can be varied independently or at the same time in a range from 0 to 200% by using the jog dial.
This mode applies to composite video and component output. To change the level, set one of the following modes by using the function keys.

(1) MANUAL MENU → VIDEO → VIDEO MODE

This temporarily changes the level.

(2) MANUAL MENU → RF FREQUENCY → FREQ → VIDEO AMPLITUDE

This temporarily changes the video level when the RF frequency is set.

(3) MAIN MENU → PROGRAM MENU → ADDRESS PROGRAM → VIDEO → VIDEO MODE

This programs the video level.

(4) MAIN MENU → PROGRAM MENU → ADDRESS PROGRAM → RF FREQUENCY → FREQ → VIDEO AMPLITUDE

This programs the video level with the RF frequency. The above four modes can be used to change the signal levels. To enter each mode, see Section 6.8 for how to use each function key.

6.5 Setting RF Channel Frequency

The RF output signal frequency of Models 408/408P can be varied within the range from 30 to 900MHz. The frequency can be set directly or by using the channels of each country.
To change the RF frequency, set one of the following modes by using the function keys.

(1) MANUAL MENU → TV CHANNEL

This temporarily sets a channel of the country.

(2) MANUAL MENU → RF FREQUENCY

This mode temporarily sets the RF frequency.

(3) PROGRAM MENU → ADDRESS PROGRAM → TV CHANNEL

This mode programs the RF channel for each country.

(4) PROGRAM MENU → RF FREQUENCY

This mode directly programs the RF frequency.

(5) PRESET MENU → COUNTRY CHANNEL

This mode presets only the desired channels of the country.

The above five modes can be used to set the frequency.

The countries which use settings 408 and 408P are as shown in Table 6-3.

Refer to the Quick Reference Manual for the channel frequencies. The above four modes can be used to change the signal levels.
To enter each mode, see Section 6.8 for how to use each function key.

Table 6-3

408		408P	
JAPAN	VHF	CCIR	V (B)
	UHF	CCIR	V (C)
	CATV	CCIR	U (G)
USA	VHF	CCIR	U (H)
	UHF	CCIR	U (I)
	CATV	CCIR	CV (B)
TAIWAN	V	CCIR	CU (G)
		INDONESIA	V
		UNITED KDM	V
		ANGOLA	V
		IRELAND	V
		ITARY	V
		AUSTRALIA	V
		NEW ZEALAND	V
		S AFRICA	V
		CHINA	V
		CHINA	U

6.6 Setting Analog RGB Output of 21-pin Multi connector

Models 408/408P have a 21-pin connector whose control pins can be set freely. The control connectors are Ys, Ym, and Av for Model 408, and Ys and SLOW for Model 408P. Their functions are as follows:

- Model 408

  Ys on: Switches the output to analog RGB signals.
  off: Switches the output to internal signals of the TV.

  Ym on: Sets internal signals of the TV to the half-tone mode.
  off: Sets internal signals of the TV to the full-tone mode.

  Av on: Displays a signal from the 21-pin connector on the monitor.
  off: Switches the output to internal signals of the TV.

The internal signals refer to video and RF input signals of the TV. The above functions can be set in the following two modes:

(1) MANUAL MENU → MULTI RGB CONTROL

The Ys, Ym, and Av functions are temporarily controlled in this mode.

(2) PROGRAM MENU → ADDRESS PROGRAM

The Ys, Ym, and Av functions are programmed in this mode. To enter each mode, see Section 6.8 for how to use the function key.

- Model 408P
  - Ys
    This function selects the 21-pin RGB signal or broadcast/video signal. To select the broadcast or video signal, use the SLOW function.

Ys	OFF	Broadcast/video signal
	ON	21-pin RGB signal

  - SLOW
    This function selects the broadcast signal or video signal.

SLOW	OFF	Broadcast signal
	ON	Video signal

Note: The video signal is input from an external source through the external video connector when the "Peritelevision" switch of the TV set is on and the video signal output of the RGB 21-pin connector is off.

6.7 Setting the RF Mode

6.7.1 Video and sound signal modulation

This key selects the internal or an external video signal source for modulation into an RF signal. When the lamp is on, an external video signal is used. The input voltage of the signal must be 1Vp-p. The external video signal input terminal is located on the rear panel.

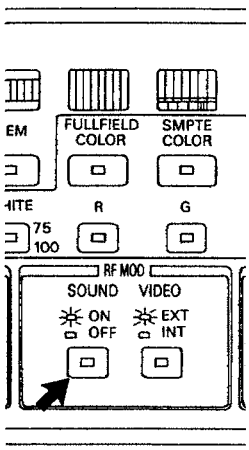


Figure 6.16

This key is used to modulate a sound signal into an RF signal. Press the key to display the current modulation mode on the LCD panel. Then press the [NEXT] or [PREVIEW] to sequentially change the mode and select the desired setting: INT, 1kHz, INT 400Hz, EXT SIGNAL, SIF CARRIER ONLY, or SIF CARRIER OFF.
The meanings of the messages are as follows:

INT 1kHz:	Internal oscillator (1kHz signal)
INT 400Hz:	Internal oscillator (400Hz signal)
EXT SIGNAL:	Signal through external input connector on rear panel
SIF CARRIER ONLY:	Non-modulated carrier signal only
SIF CARRIER OFF:	No carrier signal

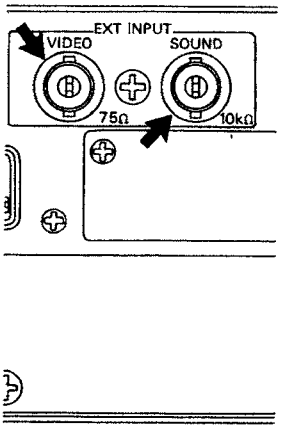


Figure 6.17

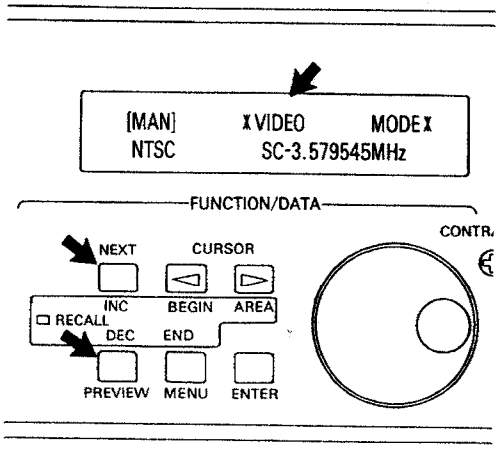


Figure 6.18

6.8 Function Keys and Setting Items

6.8.1 Function Key Usages

The unit has six types of function keys: NEXT, PREVIEW, CURSOR22, ENTER, MENU, and jog dial.
The buzzer, channel, RF frequency, and program reset functions can be used freely with the basic keys and LCD panel. This section explains the basic key usages and control items.
Figure 6.19 shows the items in a tree structure. The MAIN MENU comes first in the directory and the level deepens from left to right (the numbers become larger). To advance to deeper levels, use the ENTER key. Pressing the ENTER key displays the next item in the directory. When there are multiple items, the NEXT or PREVIEW key sequentially displays the items. At the bottom level, set your desired function by using the ENTER, MENU, jog dial, and CURSOR keys.
To return to higher levels, press the MENU key. Each time the key is pressed, the unit control returns to the higher level. Also refer to the Quick Reference Manual for the function key usages.

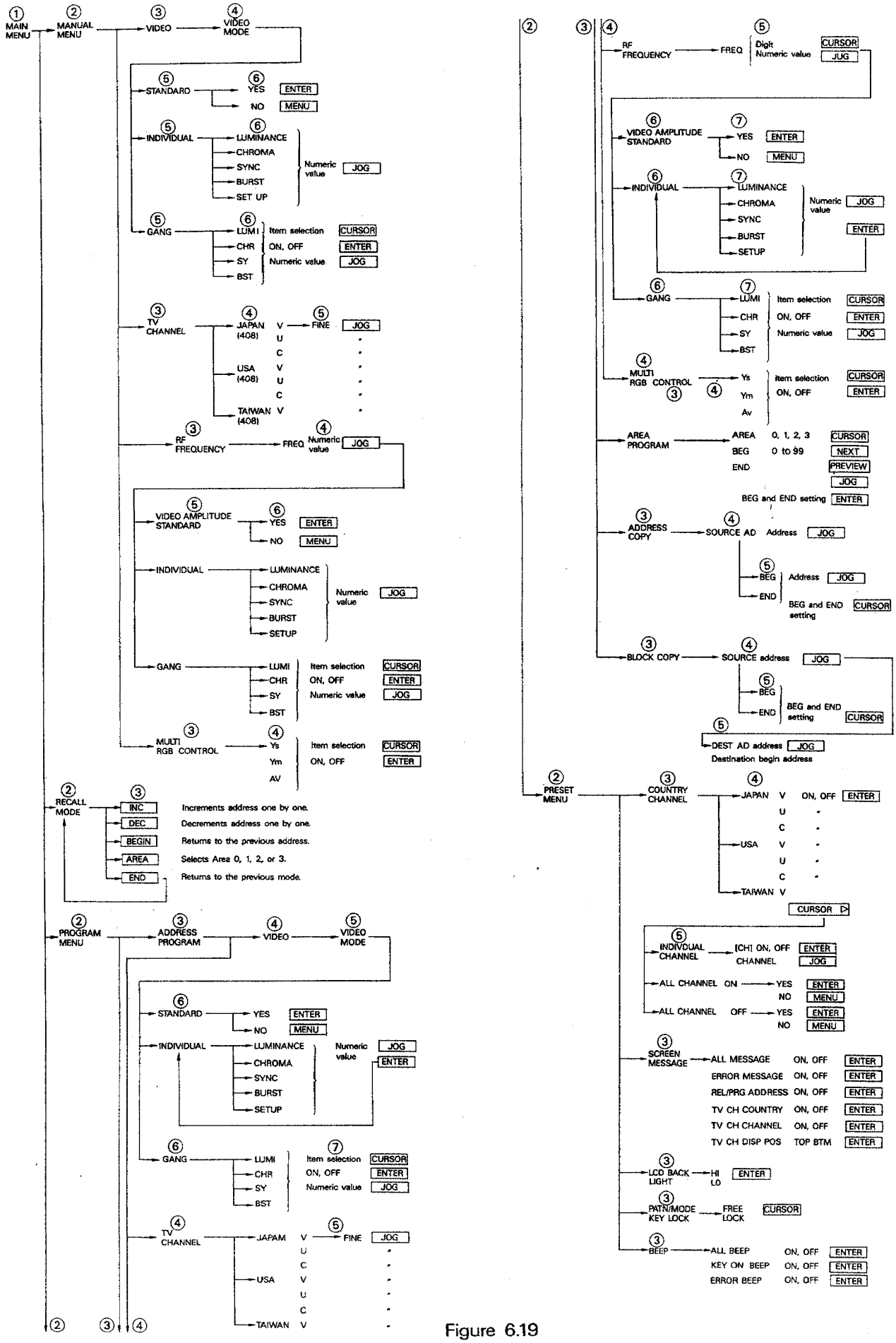

MAIN MENU
MANUAL MENU
VIDEO
VIDEO MODE
STANDARD
YES
ENTER
NO
MENU
INDIVIDUAL
LUMINANCE
CHROMA
SYNC
BURST
SET UP
Numeric value
JOG
GANG
LUMI
CHR
SY
BST
Item selection
CURSOR
ON, OFF
ENTER
Numeric value
JOG
TV CHANNEL
JAPAN (408)
USA (408)
TAIWAN (408)
V
U
C
FINE
RF FREQUENCY
FREQ
VIDEO AMPLITUDE STANDARD
MULTI RGB CONTROL
Ys
Ym
Av
RECALL MODE
INC
Increments address one by one.
DEC
Decrements address one by one.
BEGIN
Returns to the previous address.
AREA
Selects Area 0, 1, 2, or 3.
END
Returns to the previous mode.
PROGRAM MENU
ADDRESS PROGRAM
PRESET MENU
COUNTRY CHANNEL
CURSOR
INDIVIDUAL CHANNEL
CH ON, OFF
CHANNEL
ALL CHANNEL ON
ALL CHANNEL OFF
SCREEN MESSAGE
ALL MESSAGE
ERROR MESSAGE
REL/PRG ADDRESS
TV CH COUNTRY
TV CH CHANNEL
TV CH DISP POS
TOP BTM
LCD BACK LIGHT
HI
LO
PATN/MODE KEY LOCK
FREE
LOCK
BEEP
ALL BEEP
KEY ON BEEP
ERROR BEEP
Digit
Numeric value
JUG
AREA PROGRAM
AREA
BEG
END
0, 1, 2, 3
0 to 99
NEXT
PREVIEW
BEG and END setting
ADDRESS COPY
SOURCE AD
Address
BLOCK COPY
SOURCE address
DEST AD address
Destination begin address

Figure 6.19

6.8.2 Explanation of each item

(1) MANUAL MENU

The video level, RF channel, and MULTI RGB CONTROL settings can be changed temporarily in this mode.

(2) RECALL MODE

Programmed settings can be recalled in this mode.

(3) PROGRAM MENU

The pattern, video level, RF channel, frequency, MULTI RGB CONTROL, and program area can be set in this mode.

(4) PRESET MENU

The RF channel recall conditions, message display on the monitor, LCD backlight brightness, pattern key lock, and beep on/off can be set in this mode.

(5) VIDEO MODE

Only video signals without RF signals can be used in this mode. From this mode, the video level change mode can be easily activated. The following items can be set.

STANDARD:	The internal standard level is set. The value is prescribed in the specifications manual.
INDIVIDUAL:	The LUMINANCE, CHROMA, SYNC, BURST, and SETUP levels can be set by using the jog dial in the range from 0% to 200% (0% to 20% for the SETUP level).
GANG:	The LUMINANCE and SYNC BURST levels can be changed at the same time with the jog dial.

(6) TV CHANNEL

This mode is used to set RF frequencies according to the TV channels of each country by using the jog dial.
See Section 5.5 for the names of countries whose TV channels can be set. A set frequency can be adjusted in the range of ±10MHz by using the FINE function.

(7) RF frequency

RF frequencies can be set directly in this mode. The VIDEO AMPLITUDE mode is attached to this mode to enable video levels to be set without activating the VIDEO mode.

(8) MULTI RGB CONTROL

The Ys, Ym, and Av (Ys and SLOW for Model 408P) can be controlled in this mode by using the CURSOR and ENTER keys.

(9) ADDRESS PROGRAM

The VIDEO MODE, TV CHANNEL, RF FREQUENCY, and MULTI RGB CONTROL can be programmed in this mode.

(10) AREA PROGRAM

Four areas can eb set by specifying their BEGIN and END addresses.

(11) ADDRESS COPY

The programmed contents can be copied from one address to another. If part of the contents should be changed, copy only the necessary part for quicker programming.

(12) BLOCK COPY

This mode is used to copy the programmed contents from an address to another in units of blocks.

(13) COUNTRY CHANNEL

This is used to set an RF channel. The Models 408/408P can accept the channels of various countries, but it is also possible to specify a country or channel. To specify a channel, use the INDIVIDUAL CHANNEL mode.

(14) SCREEN MESSAGE

The Models 408/408P display a function on the LCD panel. Characters can be overlaid on composite signals and checked on the monitor. ALL MESSAGE can be used to turn all characters on/off. ERROR MESSAGE outputs a message in case of an incorrect key operation.
RCL/PRG ADRES turns the recall and program address display on/off. TVCH COUNTRY turns the RF channel and country display on/off.

(15) LCD BACK LIGHT

This is function is used to change the backlight brightness of the LCD display panel in two steps.

(16) PATN/MODE KEY LOCK

This function is used to lock the pattern keys on the panel so that the pattern cannot be changed by mistake. All keys (except the function keys) are locked.

(17) BEEP

When a panel key is pressed, a beep sound may be generated. ALL BEEP turns all beep functions on/off. KEY IN BEEP turns the function that generated a beep sound on/off when a key is pressed. ERROR BEEP turns the function that generated a beep sound in case of an error.

6.9 Trigger Output Signal Selection

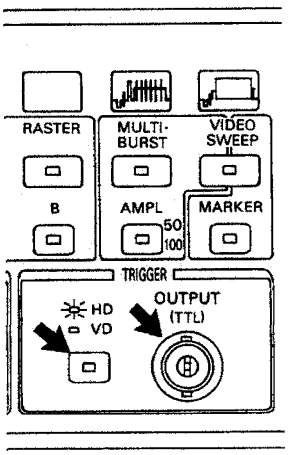


Figure 6.20

The trigger output connector is used to monitor a waveform on an oscilloscope. It outputs negative HD and VD timing signals at a TTL level. Select HD or VD by using the key. The lamp goes on in the HD output mode and off in the VD output mode.

6.10 RF Output

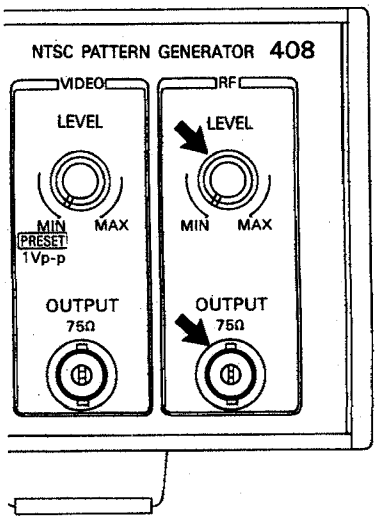


Figure 6.21

The RF output frequency range is from 30 to 900MHz. (See Section 5.5 for how to set the channel.) The output level can be varied from 10mV to 100μV by using the level control knob. The setting range differs slightly depending on the frequency.

6.11 GENLOCK Method

The GENLOCK function synchronizes Models 408/408P with an external black burst signal. Apply a 0.44Vp-p burst signal to the GENLOCK INPUT connector.
The burst signal frequency error (fsc) of the Model 408 is 3.579545MHz ± 50Hz. The sync signal frequency (f_H) must have a ratio of $4f_{SC}/910$.
The burst signal frequency error (f_{SC}) of the Model 408P is 4.43361875MHz ± 50Hz. Sync signal frequencies f_H and f_{SC} must have the following relationship:

$$fsc = \frac{1135}{4} f_H + 25Hz$$

Because loop-through input connectors are used, the one not being used must be terminated with a 75Ω.

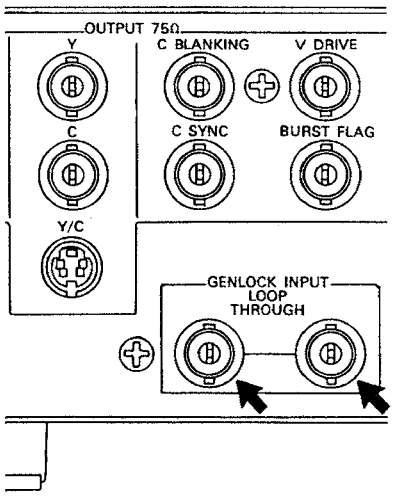


Figure 6.22

To activate the GENLOCK mode, press the GENLOCK/INTERNAL key until the lamp comes on. When a normal-level black burst signal is input, the SYNC ABSENT and BURST ABSENT lamps remain off. When there is no black burst signal or the signal level is insufficient, the lamps light.

Adjust the chroma phase difference with the input burst signal by using the SUBC PHASE adjustment; adjust the sync signal phase difference by using the H DELAY adjustment. The chroma phase adjustment range is 360° and the H DELAY adjustment range is ± 2μs.

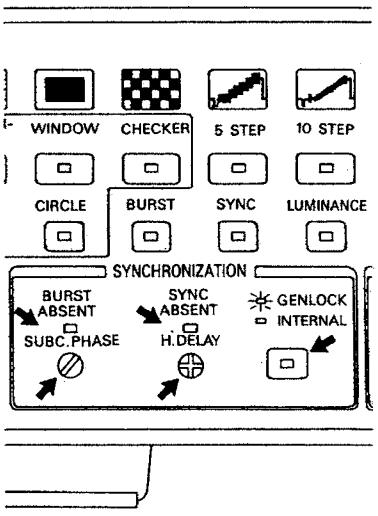


Figure 6.23

6.12 Video Signal Output

6.12.1 Types of Composite Video, Component Video, and Y/C Signal Output Signals

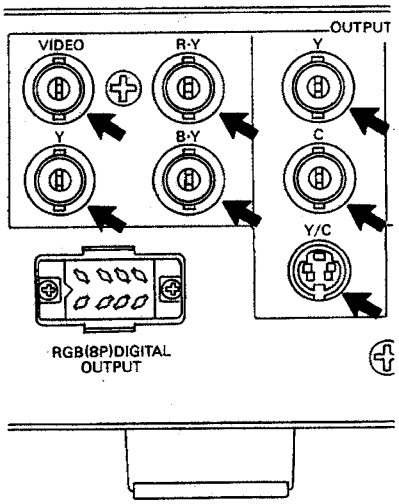


Figure 6.24

Y : Luminance signal
C : Chroma signal
S : Sync signal
B : Burst signal
R-Y : Color difference signal
B-Y : Color difference signal

Table 6.3

Signal		Output Level	
Name	Type	Preset value	Variable range
Composite video	Y, C, S, B	1Vp-p	YCSB simultaneous variable: 0% to 100% YCSB independent variable: 0% to 200%
Component Y	Y, S	1Vp-p	YS independent variable: 0% to 200%
Component R-Y	R-Y	0.7Vp-p	R-Y and B-Y simultaneous variable: 0 to 200%
Component B-Y	B-Y	0.7Vp-p	
Y of Y/C output	Y, S	1Vp-p	YS independent variable
C of Y/C output	C, B	(408: 0% setup) 0.678Vp-p (408: 75% setup) 0.627Vp-p (408P) 0.644Vp-p	CB independent variable: 0% to 200%

6.12.2 TTL RGB signal output

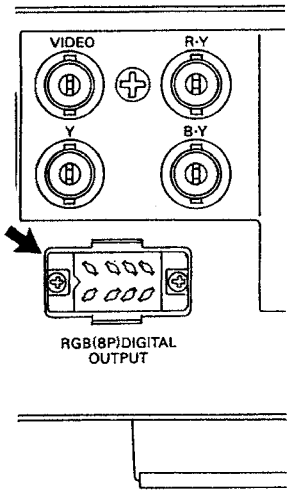
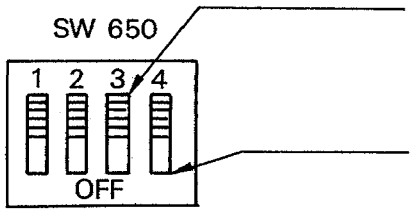


Figure 6.25

This TTL-level RGB digital signal output connector is used to inspect a computer monitor. The connector has eight pins.

Table 6.4

Pin. No.	Signal name	Polarity
1	NC	–
2	R	Positive
3	G	Positive
4	B	Positive
5	GND	–
6	GND	–
7	H sync	Negative
8	V sync	Negative



PCB T-4606

Figure 6.26

Although the standard sync signal polarity is negative, it can be changed to positive by using an internal DIP switch.

①The switch sets the polarity of the H sync signal. The lever is normally set upward. Set the lever down to change the polarity to positive.

②The switch sets the polarity of the V sync signal. The level is normally set upward. Set the lever down to change the polarity to positive.

6.12.3 21-pin multiconnector

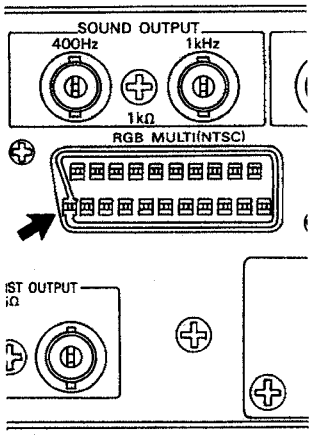


Figure 6.27

This 21-pin multiconnector is compatible with TV sets. The terminal outputs analog RGB, voice, and composite video signals. The Ys, Ym, and Av (Ys and SLOW) signals are also output as control signals. The connector is the same as that attached to new media monitors, and can be used for character broadcast or computer display. See Section 6.6 for details on controlling the Ys, Ym, and Av (Ys and SLOW) signals.

Table 6.5

Pin No.	Signal name	Output level
1	NC	
2	AUDIO OUT (L) 1kHz	284mVrms
3, 4	GND	
5	NC	
6	AUDIO OUT (R) 400Hz	284mVrms
7, 8	GND	
9	NC	
10	VIDEO OUT	1Vp-p composite
11	AV CONT	TTL level
12	Ym	
13, 14	GND	
15	R	0.7Vp-p
16	Ys	TTL level
17, 18	GND	
19	G	0.7Vp-p
20	B	0.7Vp-p
21	GND	

a) Model 408

Pin No.	Signal name	I/O
1	AUDIO OUT (RIGHT)	500mVrms/1kΩ
2	AUDIO IN (RIGHT)	500mVrms/10kΩ
3	AUDIO OUT (LEFT)	500mVrms/1kΩ
4	GND	
5	GND	
6	AUDIO IN (LEFT)	500mVrms/10kΩ
7	BULE IN	700mVp-p/75kΩ
8	SLOW SW	0/12V/10kΩ
9	GND	
10	NC	
11	GREEN IN	700mVp-p/75Ω
12	NC	
13	GND	
14	GND	
15	RED IN	700mVp-p/75Ω
16	Ys	0/3V
17	GND	
18	GND	
19	VIDEO OUT	1Vp-p/75Ω
20	VIDEO OUT	1Vp-p/75Ω
21	GND	

b) Model 408P

6.13 Sync Signal

6.13.1 Blanking, sync, VH, HD, burst flag, and subcarrier signal output

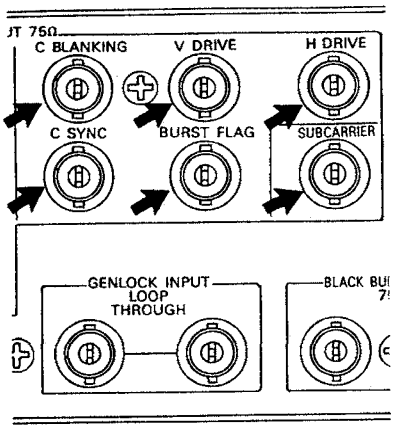


Figure 6.28

These connectors output signals needed to generate video signals. The signals are also used to synchronize other equipmemt. The subcarrier signal is used to carry color signals.

Table 6.6 Signal names, output levels, and polarities

Signal name	Output level	Polarity
H DRIVE	−4V	Negative
V DRIVE	−4V	Negative
Composite sync	−4V	Negative
Composite blanking	−4V	Negative
Burst flag	−4V	Negative
Subcarrier	2Vp-p	Positive and negative

The output levels are set when the connectors are terminated with 75Ω.

6.13.2 Black burst signal

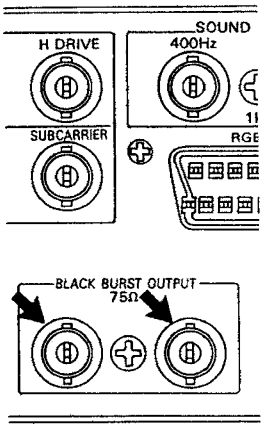


Figure 6.29

The black burst signal is a sync signal consisting of sync and burst signals. It enables the GEN LOCK function to be used with other equipment. There are two output systems, and the output level is 0.44Vp-p.

6.14 Sound signal output

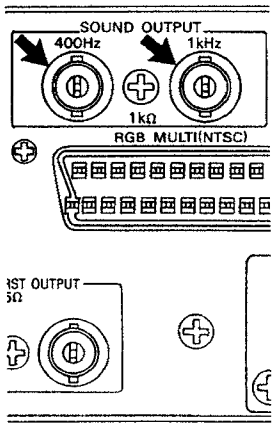


Figure 6.30

These are the sound output signal connectors. To simplify the inspection of stereo systems 1kHz and 400Hz signals are simultaneously output. The output level is 1Vp-p.

6.15 Remote Control

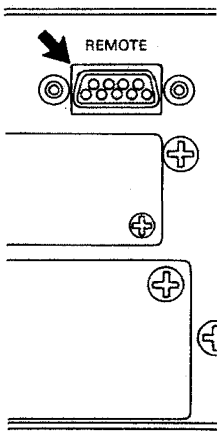


Figure 6.31

This is the remote control connector. External patterns can be input through this connector for remote control.

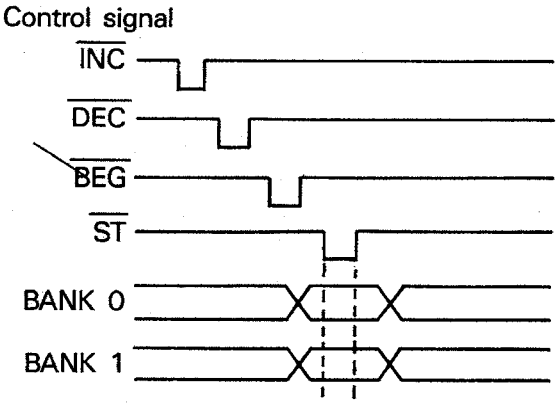


Figure 6.32

Table 6.7 lists the pin numbers and names of the control connector.

Table 6.7

Pin No.	Name
1	GND
2	$\overline{\text{INC}}$
3	$\overline{\text{DEC}}$
4	$\overline{\text{BEG}}$
5	Connect to GND.
6	$\overline{\text{ST}}$
7	BANK 0
8	BANK 1

The Models 408/408P must first be set to the RECALL mode to enable remote control. Turn the remote connector input in this state on and off to set the RECALL mode.
The control functions are as follows (TTL signal level):

INC : Increments the RECALL mode address one by one.
DEC : Decrements the RECALL mode address one by one.
BEG : Returns the RECALL mode address to the start point.
ST : Sets the area specified by BANKs 0 and 1.
BANKs 0 and 1 : Specifies an area. Table 5.8 lists the relationships between the areas and BANKs.
The INC, DEC, BEG, and ST signals must not go low at the same time.

Table 6.8

BANK 1	BANK 0	Area
0	0	0
0	1	1
1	1	1
1	0	2
1	1	3

7.1 Color Bar Patterns

7.1.1 Full-field color bar pattern

The full-field color bar pattern consists of eight-color vertical bars. The figures below show the pattern and video waveform.

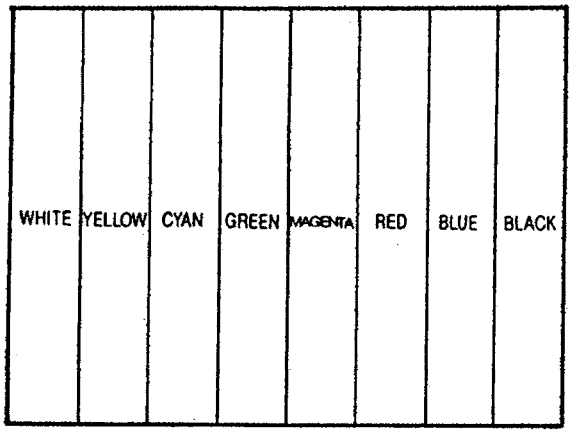
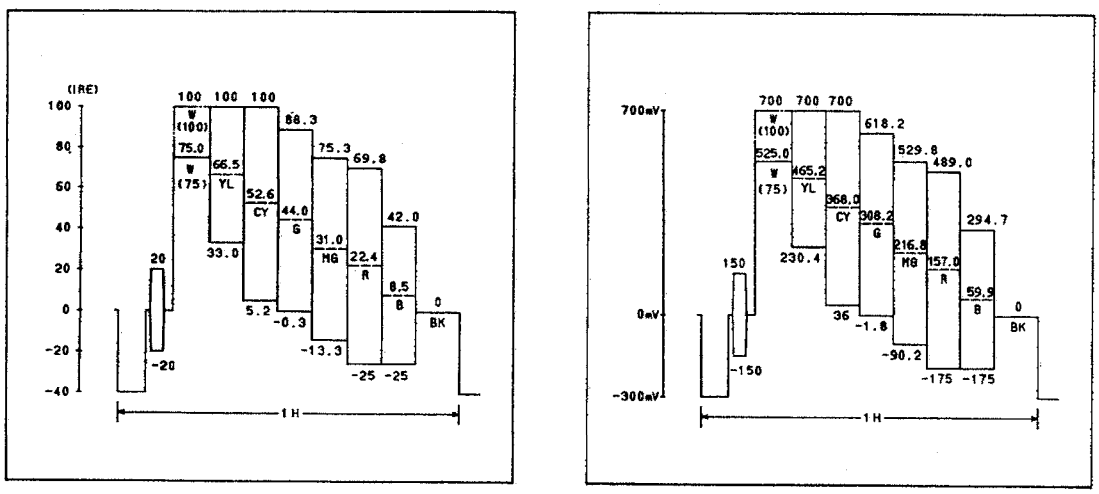


Figure 7.1



408 408P

Figure 7.2

This pattern is commonly used to inspect the characteristics of video equipment.

7.1.2 SMPTE color bar pattern

The SMPTE color bar pattern is based on the SMPTE ECR-1-1978 standard color bars. The figures below show the pattern and video waveform.
The color bar is generated by adding a chroma set signal (reverse blue bar) and black set signal to the EIA color bars. The chroma set signal consists of four color bars containing blue (with an arrangement opposite that of the EIA color bar) and black sections. The black set signal has a setup level of 7.5 IRE ±4 IRE (408), pedestal level ±4% (408P). The first bar is slightly darker; the third bar is slightly lighter than standard black.

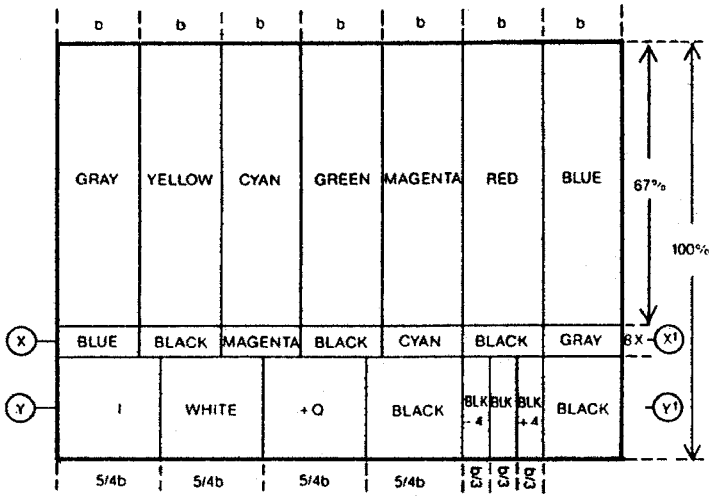
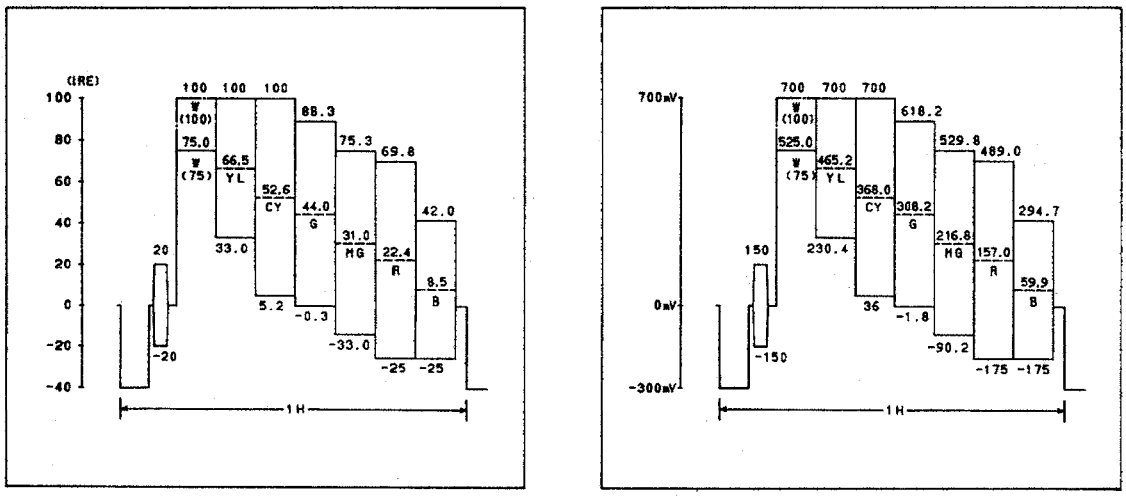


Figure 7.3

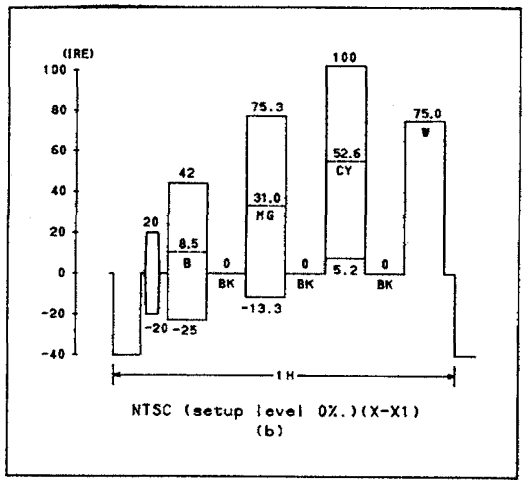


408

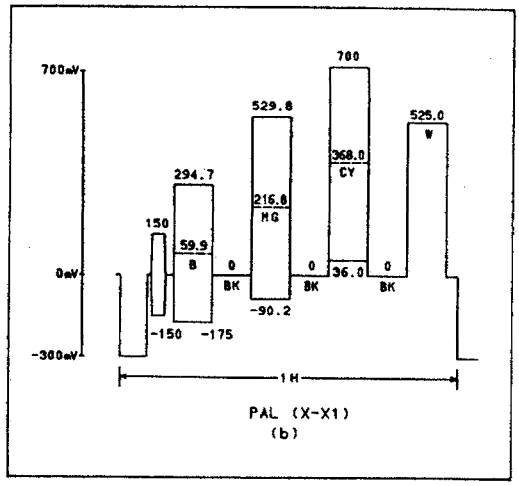
408P

Figure 7.4

X-X1 section:



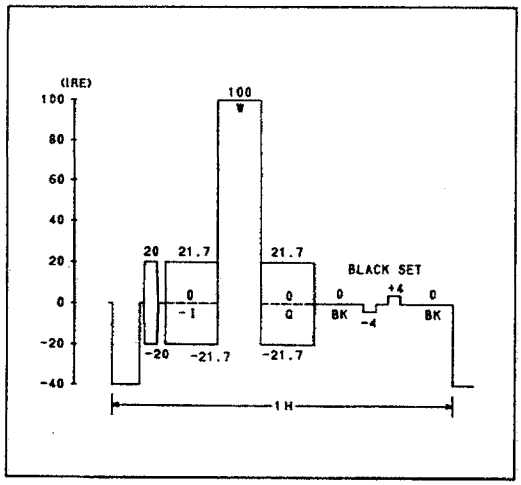
408



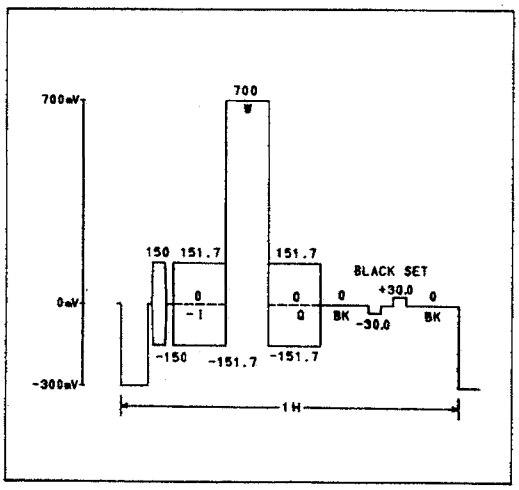
408P

Figure 7.5

Y-Y1 section:



408



408P

Figure 7.6

7.1.3 Vertical color bar pattern

The vertical color bar pattern consists of vertical color bars lined horizontally. The figure below shows the pattern.

The vertical color bar pattern is used to inspect changes in the vertical color bars and the characteristics of color transition points.

YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE

Table 7.7

7.1.4 Split reverse color bar pattern

The split reverse color bar pattern can be divided into upper and lower sections. The upper half consists of the same color bars as the full-field color bar pattern; the lower half consists of reverse color bars. The figures below show the pattern and video waveform.

The reverse color bar pattern is used to check the phase difference between luminance and chroma signals. Video equipment should be adjusted to match the line and magenta transition points.

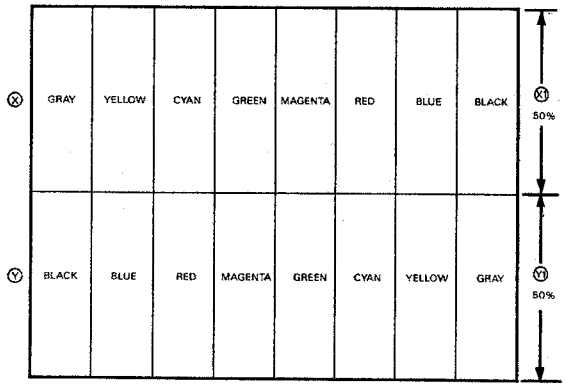
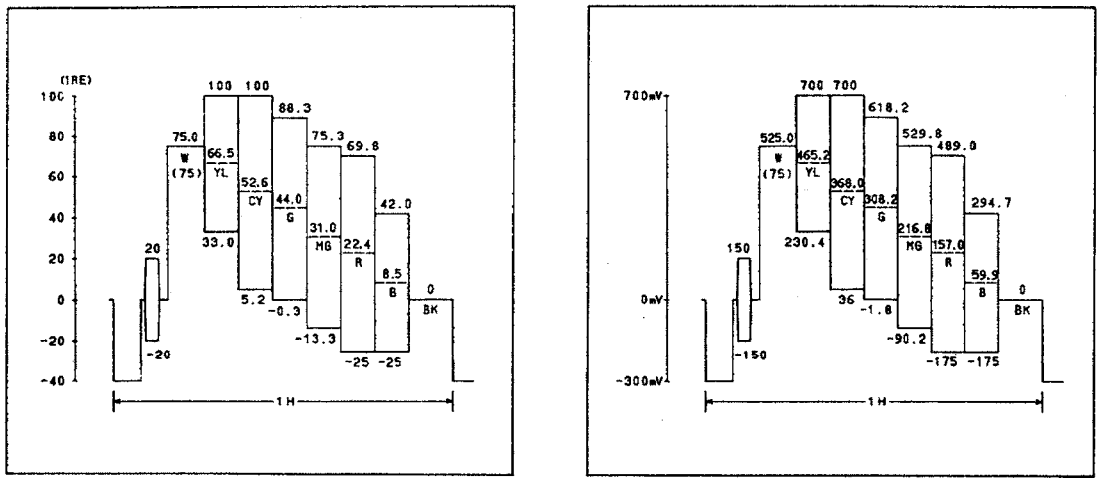


Figure 7.8

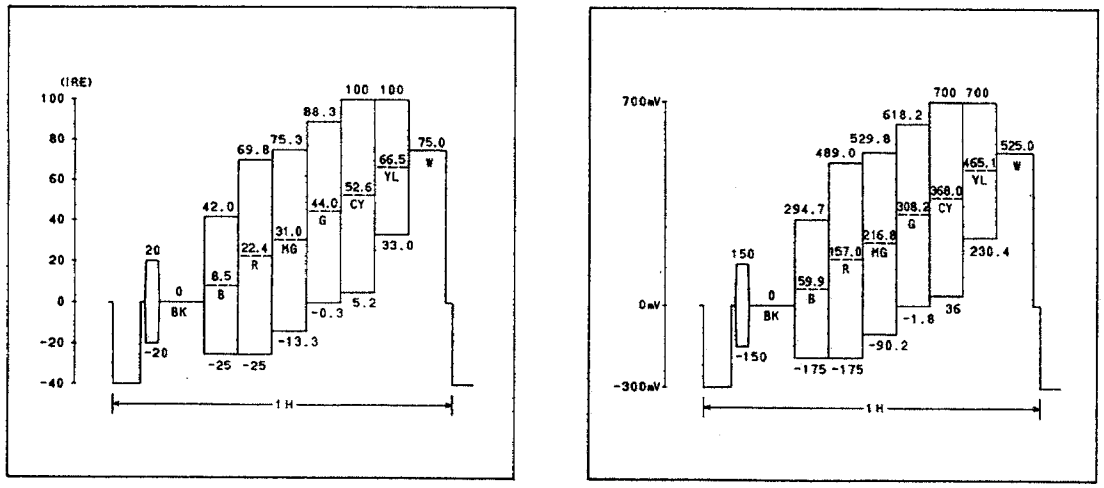
X—X1 section:



408 408P

Figure 7.9

Y-Y1 section:



408 408P

Figure 7.10

7.1.5 Checker color bar pattern

The checker color bar pattern consists of vertical color bars divided into six horizontal sections. Each horizontal section is shifted sequentially from right to left. The pattern is as folows:

W	YL	CY	G	MG	R	B	BL
BL	W	YL	CY	G	MG	R	B
B	BL	W	YL	CY	G	MG	R
R	B	BL	W	YL	CY	G	MG
MG	R	B	BL	W	YL	CY	G
G	MG	R	B	BL	W	YL	CY

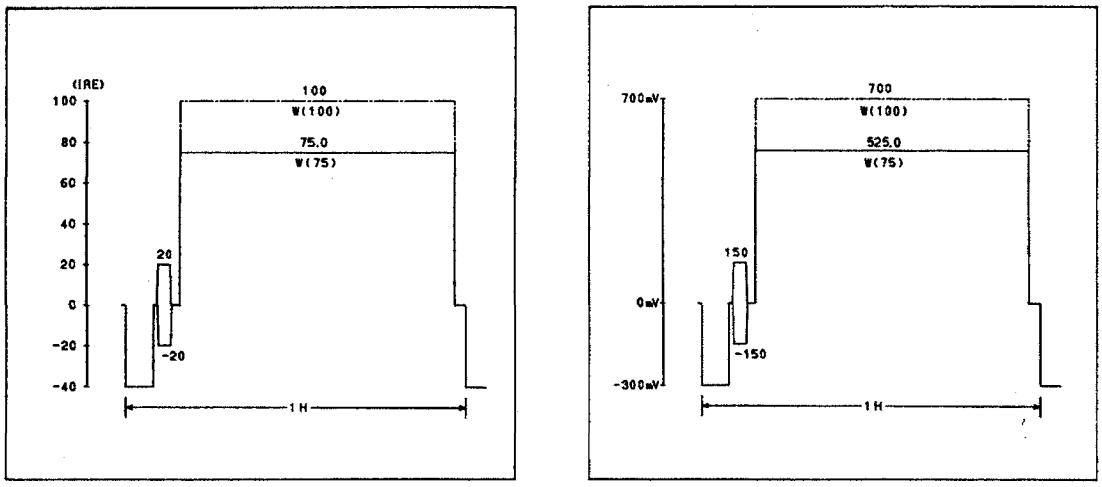
W : White (Gray)
YL : Yellow
CY : Cyan
G : Green
MG : Magenta
R : Red
B : Blue
BL : Black

Figure 7.11

This pattern is used to check the horizontal and vertical linearity of a monitor.

7.2 Raster Pattern

Each raster pattern has one color. By using the RGB and WHITE buttons, 100% or 50% white, yellow, cyan, green, magenta, red, blue, and black patterns can be created. The patterns are used to adjust the display purity of a monitor. The representative signal waveforms are as follows:

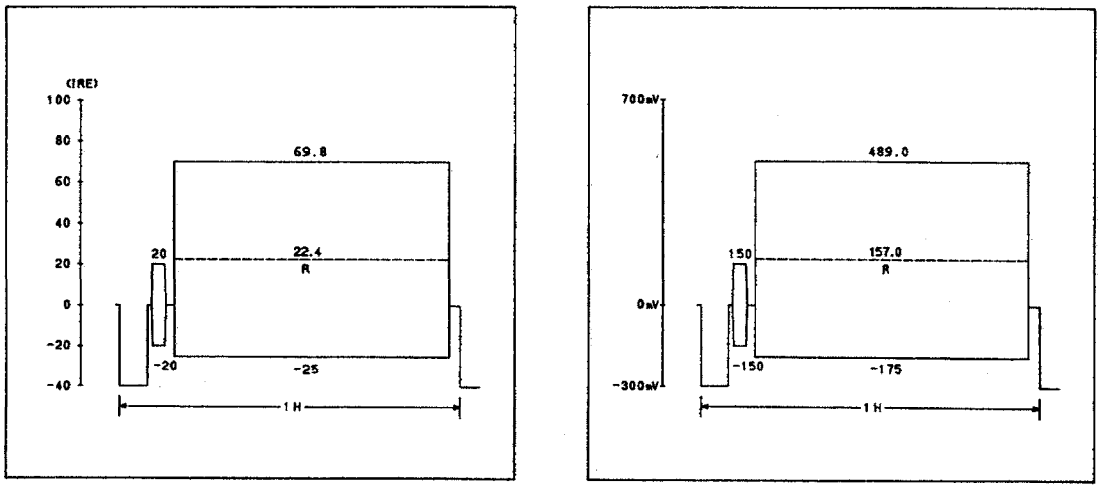


408 408P

White raster (dot line: 50 IRE)

Figure 7.12

Color raster



408 408P

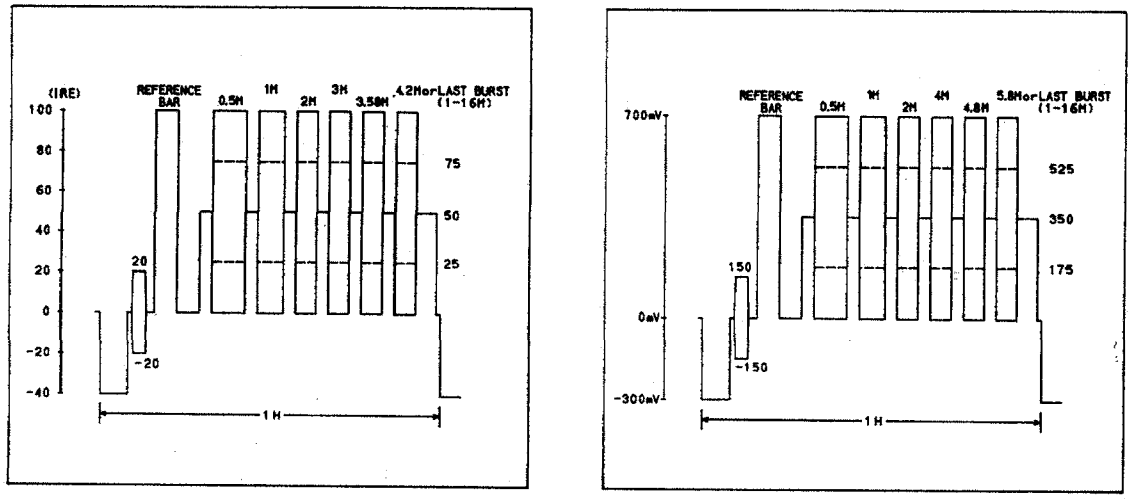
Red raster (dot line: Y level)

Figure 7.13

7.3 Multiburst Sweep Patterns

7.3.1 Multiburst pattern

The multiburst pattern consists of 100% white vertical bars with six types of frequency. This pattern is used to check frequency characteristics. The signal waveform is as follows:



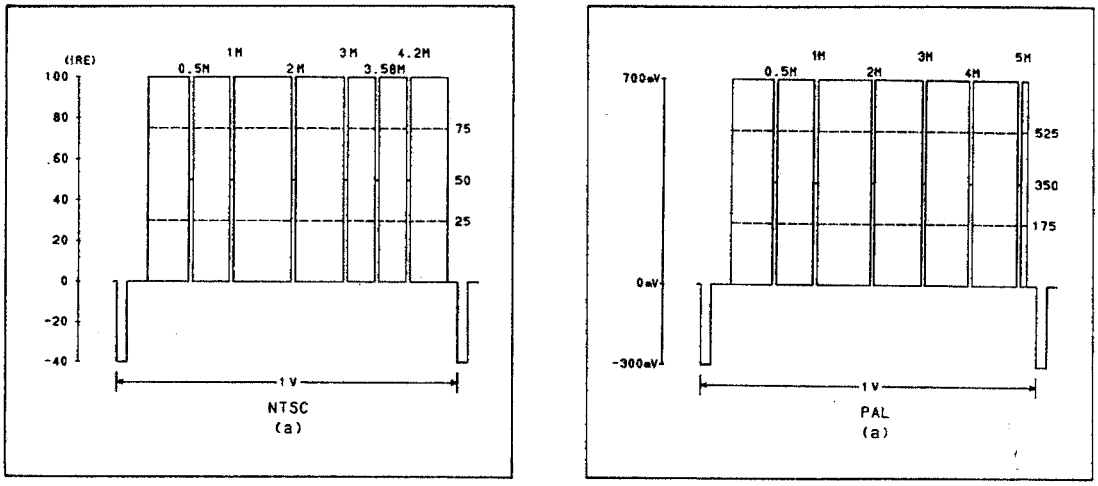
408 408P

Figure 7.14

The burst signal level can be changed to 50% or 100%. The reference bar does not change. The multiburst pattern is also used to check the resolution of a monitor. For example, when the 4.2MHz multiburst pattern can be displayed on the screen, the frequency (MHz) should be multiplied by 80 to calculate the resolution.
Here, 4.2 × 80 = 336.

7.3.2 Sweep signal pattern

The sweep signal is available in two frequency bands: 100kHz to 5MHz and 300kHz to 15MHz. The sync mode is V. The figure below shows the waveform. The marker is displayed when the waveform is notched (with the marker switch set on).



408 408P

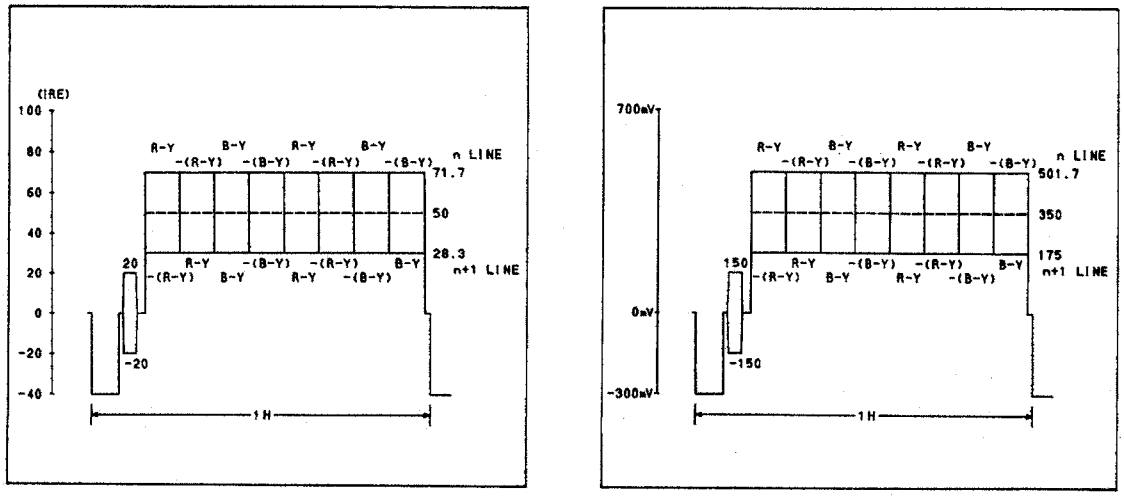
Figure 7.15

Table 7.1 Marker frequency

Position	NARROW (100kHz to 5MHz)		WIDE (0.3MHz to 15MHz)
	408	408P	
a	0.5MHz	0.5MHz	2MHz
b	1MHz	1MHz	4MHz
c	2MHz	2MHz	6MHz
d	3MHz	3MHz	8MHz
e	3.58MHz	4MHz	10MHz
f	4.2MHz	5MHz	12MHz
g	—	—	14MHz

7.4 DEM

The demodulator pattern consists of two signals: one signal has a chroma signal whose phases of the R-Y, B-Y, I, and Q axes (Model 408) or the R-Y and B-Y axes (Model 408P) are alternately inverted, the other has a non-inverted chroma signal. This pattern is used to adjust a Y/C separation circuit using a delay line. The figure below shows the signal waveform.

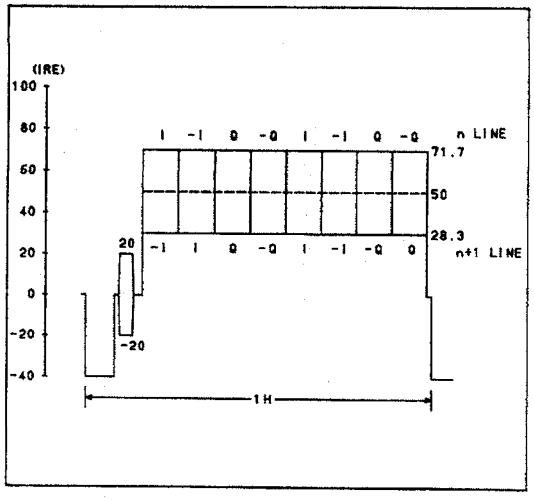


408 408P

Figure 7.16A

When the circuit is fully adjusted, the A, B, G, and H bars on both sides are gray. Otherwise the bars are colored.

The I and Q signals are displayed on the lower half of the screen for the Model 408 only.



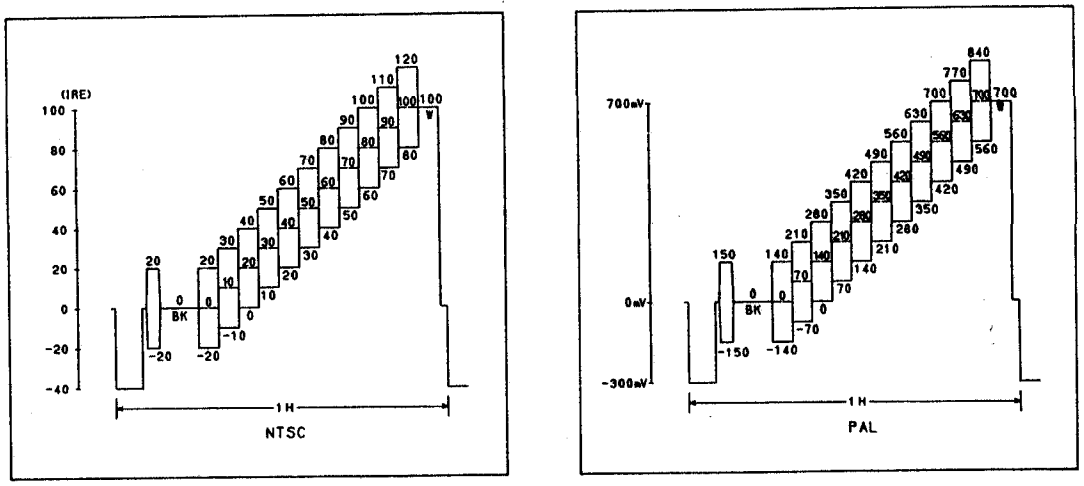
408

Figure 7.16B

7.5 5 STEP, 10 STEP, and APL (Model 408: 10% or 90%; Model 408P: 12.5% or 87.5%) Patterns

7.5.1 5 STEP/10 STEP

The 5 STEP/10 STEP pattern has a luminance signal that expands in 5 or 10 equal steps from left to right. This pattern is used to check the linearity of a transmission system. The modulated staircase wave, consisting of this signal overlaid with the chroma component of the same amplitude and phase, is used for DG or DP measurements. The figure below shows an example of a modulalted 10 STEP waveform. Use the CHROMA key to turn the chroma signal on/off.



408
286mVp-p

408P
280mVp-p

Figure 7.17 Chroma level

7.5.2 APL 10% and 90% (Model 408) or 12.5% and 87.5% (Model 408P)

The APL signal alternately outputs one 10 STEP staircase wave and 100% white or 0% black waves (four waves the Model 408 or three waves for the Model 408P).
The APL 90% pattern consists of four white waves and four 10% black waves. The APL 87.5% pattern consists of three white waves and three 12.5% black waves. The APL patterns are used to measure the DG and DP values caused by fluctuation in the flat level of a video signal. These patterns are effective when measuring the dynamic range of video equipment.

Model 408

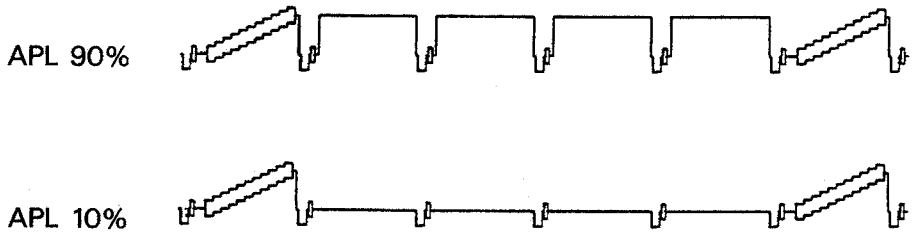


Figure 7.18A

Model 408P

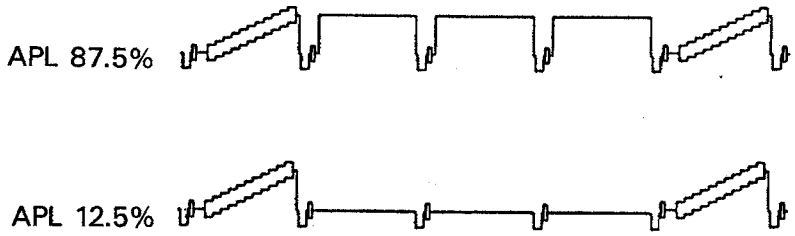


Figure 7.18B

7.6 Checker Pattern

The checker pattern consists of 48 black and white squares alternately arranged on the screen. This pattern is used to adjust focusing and vertical and horizontal linearities of video equipment. The pattern is as follows:

W	BL	W	BL	W	BL	W	BL
BL	W	BL	W	BL	W	BL	W
W	BL	W	BL	W	BL	W	BL
BL	W	BL	W	BL	W	BL	W
W	BL	W	BL	W	BL	W	BL
BL	W	BL	W	BL	W	BL	W

W : White
BL : Black

Figure 7.19

7.7 Window

The window pattern has a 100% white window at its center. The pattern and video waveform are as follows:

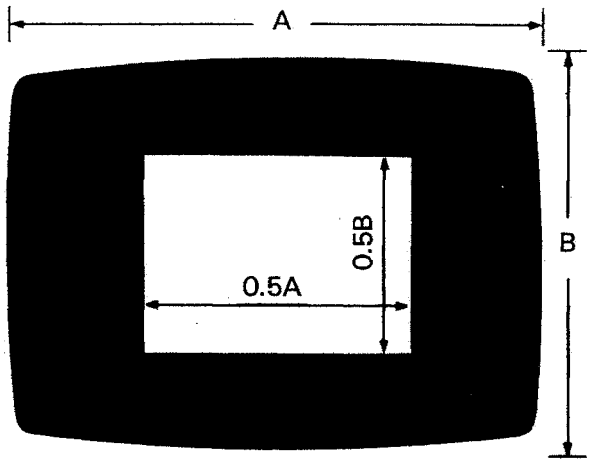


Figure 7.20

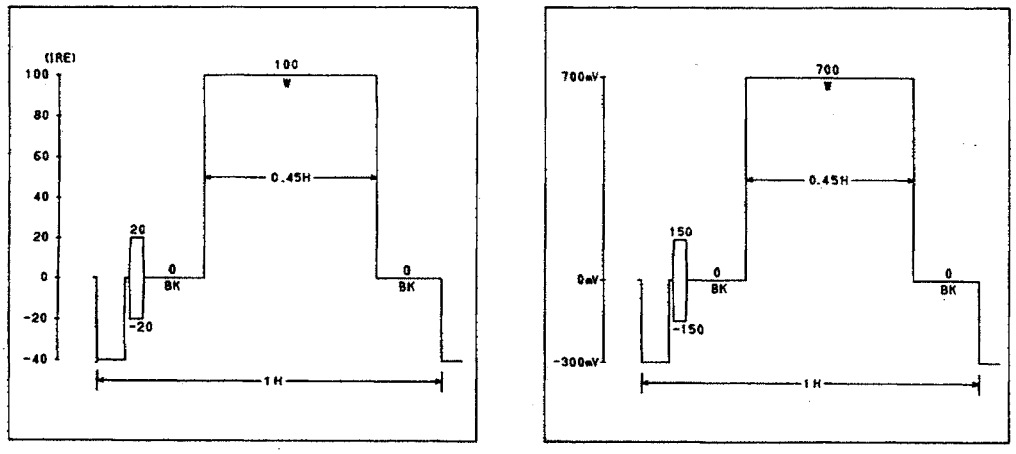


Figure 7.21

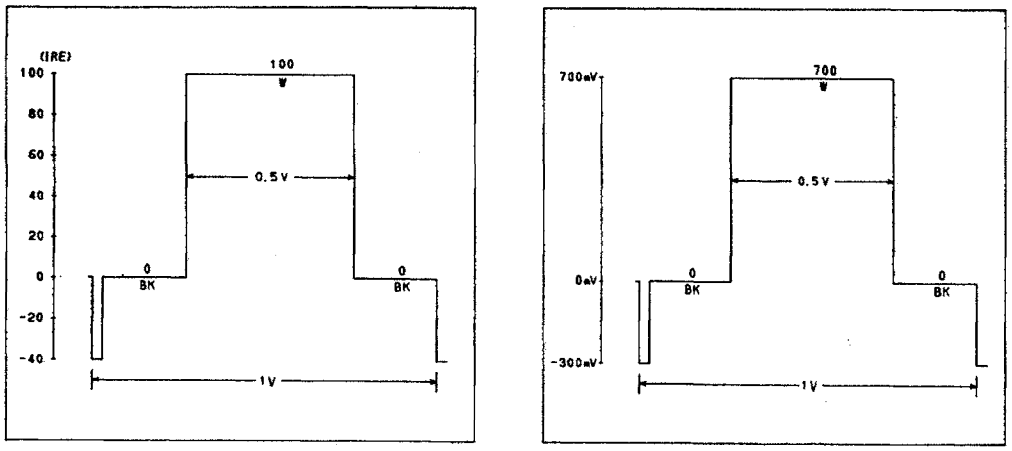


Figure 7.22

7.8 Convergence and Alignment Patterns

The convergence and alignment patterns are used to adjust the convergence and alignment of a TV set or picture monitor. The alignment pattern has a corner marker at its upper-left portion to check deflection yoke polarity. The figures below show the convergence and alignment patterns.

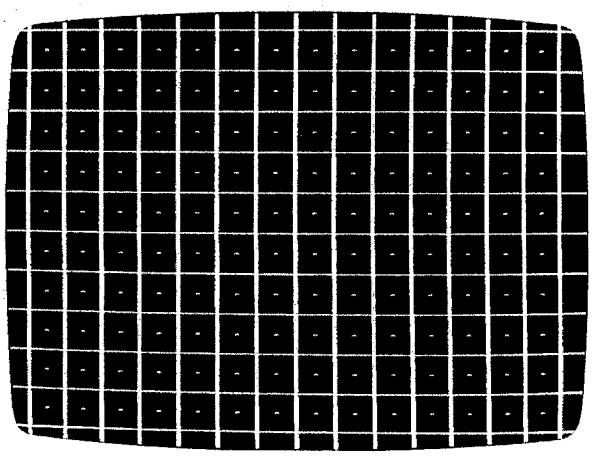


Figure 7.23

Convergence pattern

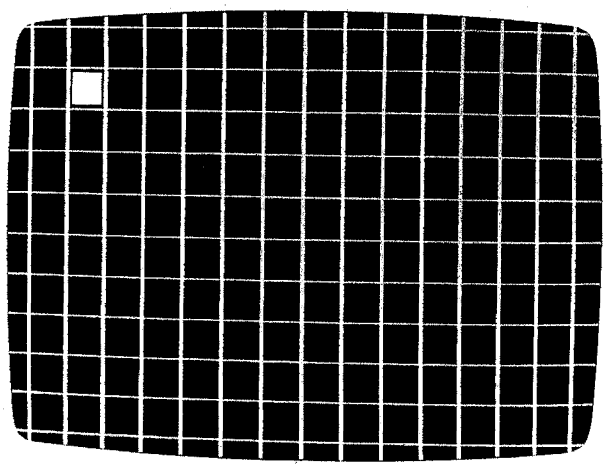


Figure 7.24

Alignment pattern

7.9 Circle Pattern

The circle pattern can be overlaid on a different type of pattern. This pattern is mainly used to align a CRT. The crosshatch pattern is commonly used to check the linearity of a CRT. Using the circle pattern with the crosshatch pattern makes such checking easier.

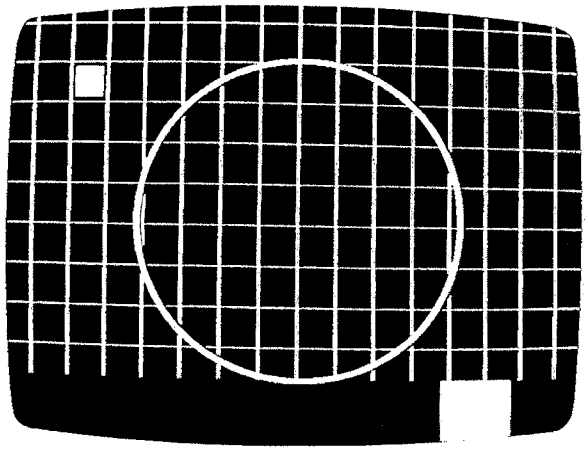
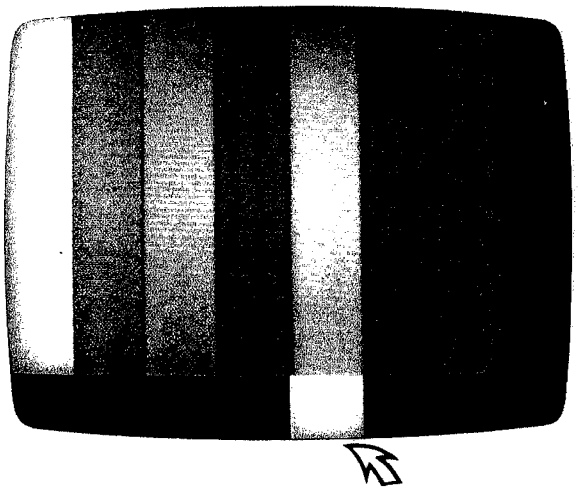


Figure 7.25

Circle pattern

7.10 Moving Marker

The moving marker is a small square that moves from right to left at the bottom of the screen. This pattern can be inserted below any pattern to check the recording/playback test of a VTR.



This pattern sequentially moves to the left.

Figure 7.26

7.11 Pattern Uses

Optimum patterns can be selected according to the purpose of sound equipment inspection.

Table 7.2

Pattern	Subject equipment	Inspection and adjustment item
Sweep	VTR, PM	Resolution
Multiburst	VTR, other	Frequency characteristic
Raster	TV, PM	Purity
	VTR	Noise
SMPTE color bar Full-field color bar Checker color bar	TV, PM	Brightness, color adjustment, and overall check
	VTR, other	Overall performance check
DEM	TV, PM, VTR	Delay line amplitude and phase adjustment
Vertical color bar	TV, PM	Vertical dot disturbance
Reverse color bar	TV, PM	Luminance and chroma phase adjustment
APL 10%, 90% 10 STEP 5 STEP	TV, PM	Tone
	VTR, other	DG and DB measurement
Checker	TV, PM	Focusing and H and V linearity
Window	TV, PM, VTR	Medium and low-wave frequency characteristic
	Other	
Convergence Crosshatch Circle	TV, PM	H and V linearity, focusing, convergence, and alignment
Moving marker	VTR	Double-speed check

PM : Picture monitor
TV : TV set
VTR : Video tape recorder

8. PRINCIPLES OF OPERATION

8.1 Block Diagram

The figure below shows the block diagram.

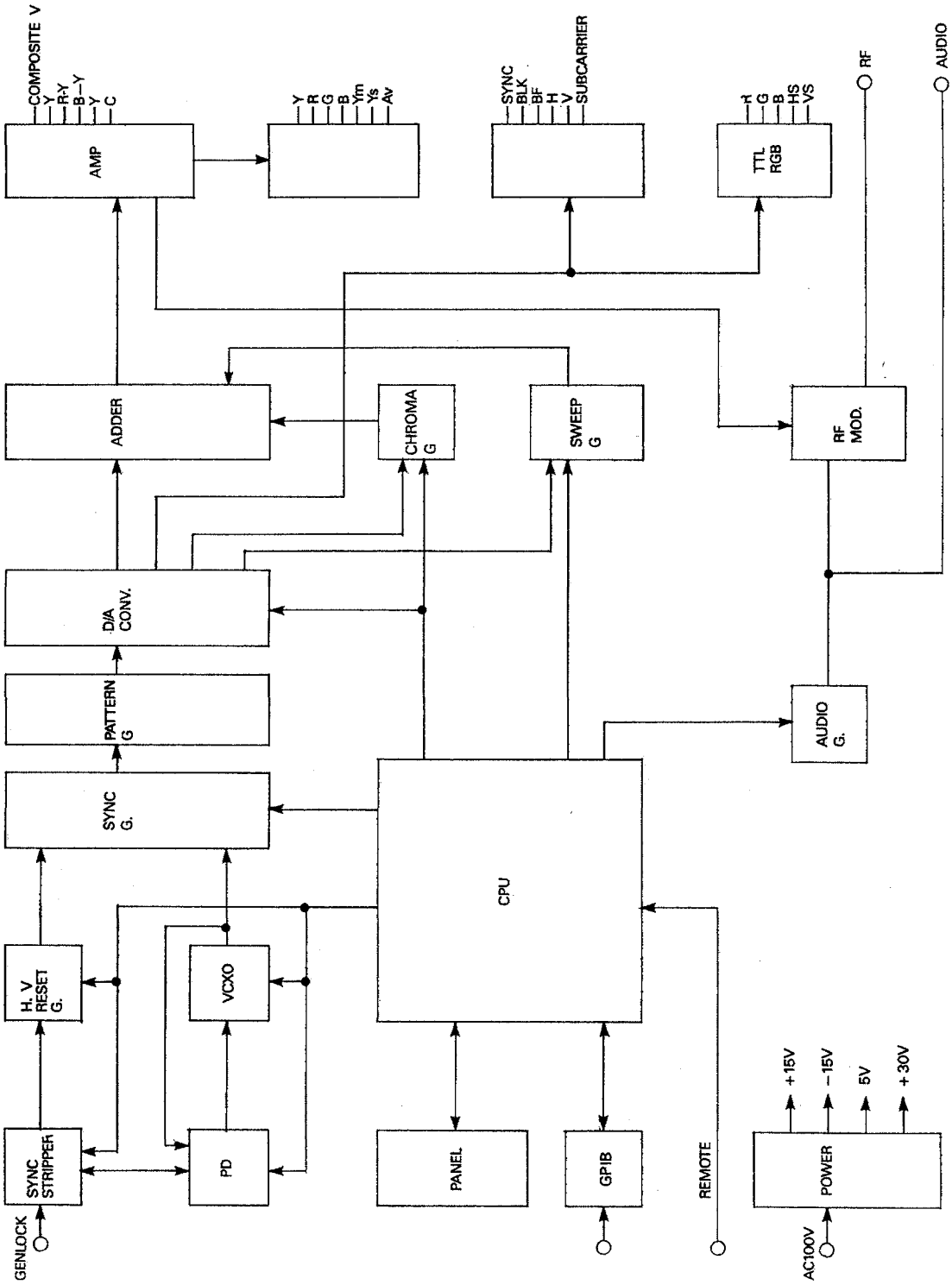


Figure 8.1

8.2 Operation of Each Section

8.2.1 GENLOCK section

The GENLOCK circuit synchronizes the Models 408/408P with an external black burst signal. The subcarrier frequency (fSC) lock range of the Model 408 is 3.579545MHz ± 50Hz.
The sync signal frequency (fH) and subcarrier frequency (fSC) must have the following relationship: $f_H = 4f_{SC}/910$.
The subcarrier frequency (fsc) lock range of the Model 408 is 4.43361875MHz ± 50Hz.
The sync signal frequency (fH) and subcarrier frequency (fSC) must have the following relationship:
$f_{SC} = 1135f_H/4 + 25Hz$.
The circuit samples a sync signal from the input black burst signal and synchronizes the sync regenerator by PLL. Then, the sync signal is regenerated from the sync regenerator. In addition, a burst signal is sampled and PLL based on this signal is applied to the subcarrier oscillator to regenerate the subcarrier signal.

8.2.2 SYnc signal generator section (SYNC G.)

Horizontal and vertical sync signals are generated by dividing the the sync regenerator signal. The sync signal generator also generates a blanking signal burst flag signals by using sync regenerator. All image timing signals are generated based on these signals.

8.2.3 Pattern timing signal generator section (PATTEN G.)

The pattern timing signal generator generates pattern timing signals. The timing patterns are written in ROM. There are two types of ROM; one is for horizontal timing, the other is for vertical timing. The timings are combined to create optimum patterns.

8.2.4 D/A converter section (D/A CONV.)

The D/A converter generates a pattern signal according to the signal generated by the timing generator.
The following signals can be generated:
1. Y signal
2. Color difference signal

8.2.5 Chroma generator section (CHROMA G.)

The chroma generator generates a chroma signal from the color difference signals generated by the D/A converter. The chroma signal is a subcarrier signal modulated by a color difference signal.

8.2.6 Sweep multiburst signal generator (SWEEP G.)

The sweep multiburst signal generator produces sweep and multiburst signals of 100kHz to 15MHz.

8.2.7 Adder sction (ADDER)

The adder section adds a Y signal generated by the D/A converter, a chroma signal generated by the chroma signal generator, and a signal generated by the sweep multiburst signal generator.

8.2.8 Amplifier section (AMP)

The amplifier section amplifies and outputs the composite video, component, Y/C, and RGB signals generated by the adder.

8.2.9 Panel control section (PANEL)

Data set by the panel keys and jog dial is sent to the CPU to enable pattern selections and level settings.

8.2.10 GPIB section (GPIB)

This input connector is used to externally control patterns and functions. The GPIB section (option) can be built into your unit as specifies when placing your order.

8.2.11 Remote control section (REMOTE)

This input connector is used to externally control patterns. Only a simple interface is needed for pattern control.

8.2.12 CPU section (CPU)

Each section us controlled according to data entered from the panel, GPIB connector, and remote control connector.

8.2.13 Audio generator section (AUDIO G.)

This oscillator is used to output 1kHz and 400Hz signals. The signals are used as modulation signals for the RF modulator or Output to external equipment.

8.2.14 RF Modulator section (RF MOD.)

The RF modulator modulates 30 to 900MHz signals with video and sound signals. The polarity of each signal is automatically changed by AM modulation. The SIF frequency of each sound signal is also set automatically. The synthesizer system ensures accurate frequency setting and sets the SIF frequency in the same way.

8.2.15 Power section (POWER)

The power section supplies four types of voltage: +15, −15, +5, and +30V. The power supplies are atable and hardly effected by drift in the primary power.

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92070.5K(D)1 B63-0143-00

Printed in Japan.