

PATTERN GENERATOR

INSTRUCTION MANUAL

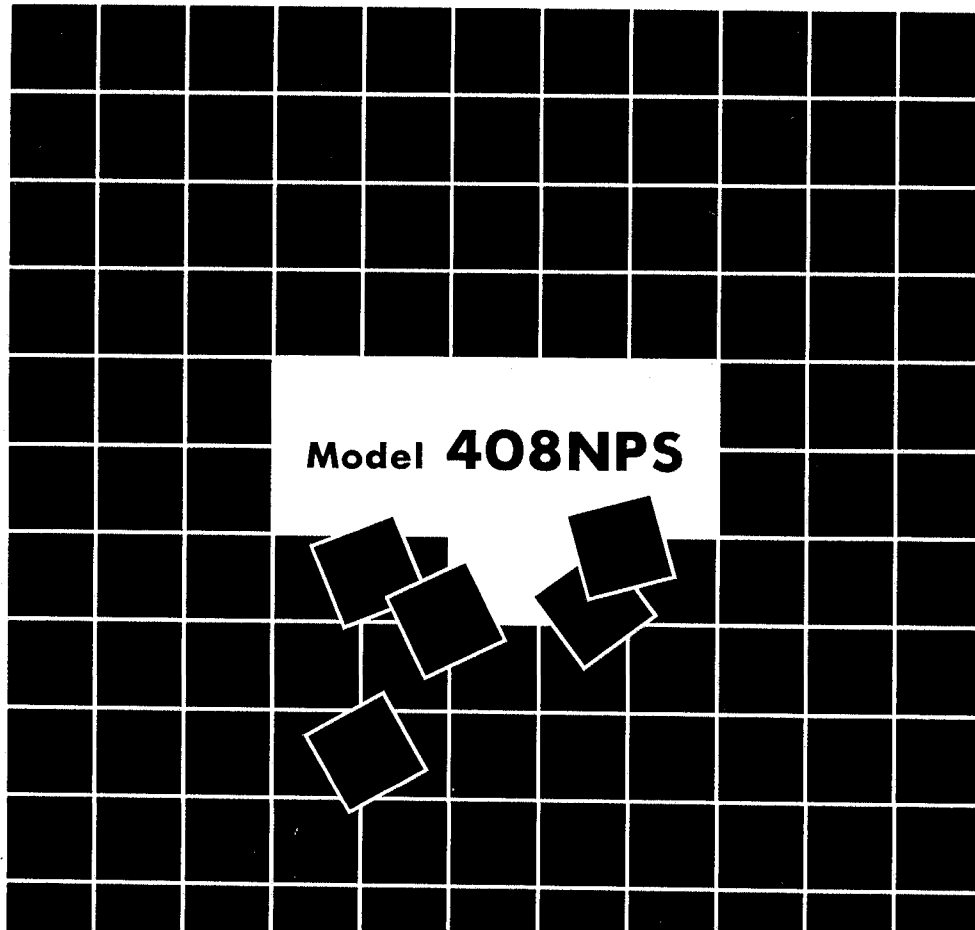


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1.1 INTRODUCTION

The Model 408NPS corresponds to NTSC, PAL and SECAM systems. The video sweep generator 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 having TV-band tuners. The GENLOCK and black burst functions make the universal pattern generator a synchronizing signal source for various types of video equipments.

The RF output using synthesizer technique can be set the frequency directly from the front panel or internal data according to country name, band (VHF, UHF and CATV) or channel.

1.2 FEATURES

- Conforms to NTSC, PAL and SECAM systems.
- Provision of VHF, UHF and CATV channels
- Enables GENLOCK function (Sync only for the SECAM).
- Sound signals, 1kHz and 400Hz, available.
- Provision of Video sweep (100kHz to 15MHz, 2 bands selectable).
- RF signal using synthesizer technique.
- RF modulation capability for EXT VIDEO.
- RGB output connector (rectangular, 8-pin, TTL level) provided as standard.
- 21-pin multiconnector provided as standard.
- Y/C separation connectors (S and BNC) provided as standard.
- Up to 100 addresses can be programmed (selectable address range).
- Remote control function permits address controls.
- The GPIB interface provided as an option.

1.3 SPECIFICATIONS

1.3.1 Color Systems

NTSC-M
PAL-B, C, D, G, H, I, K and L
SECAM-III, B, D, G, H, K and L

1.3.2 Patterns

- | | |
|-----------------|---|
| (1) Crosshatch | White lines (15 × 11) on black background with white corner marker (100%) at upper left corner of the screen. |
| (2) Convergence | Synthesized pattern of 100% white lines (15 × 11) on black backgrounds and white dots (14 × 10) |
| (3) Window | 100% white window on black background |
| (4) Checker | 8 × 6 white (100%) and black checker pattern |
| (5) 5 STEP | Staircase signal consisting of 5 equal luminance steps
B-Y axis, 40% (NTSC: 286mVp-p, PAL: 280mVp-p) chroma signal, on/off selectable
SECAM: White chroma signal on/off |

- (6) 10 STEP Staircase signal consisting of 10 equal luminance steps
B-Y axis: 40% (NTSC: 286mVp-p, PAL: 280mVp-p) chroma signal, on/off selectable
SECAM: White chroma signal on/off
- (7) Others Several patterns selectable
- (8) DEM (Demodulator pattern) Chroma phase
- NTSC:
- Upper half of the screen
n line R-Y, -(R-Y), B-Y, -(B-Y), R-Y, -(R-Y), B-Y, -(B-Y)
n+1 line -(R-Y), R-Y, B-Y, -(B-Y), R-Y, -(R-Y), -(B-Y), B-Y
- Lower half of the screen
n line I, -I, Q, -Q, I, -I, Q, -Q
n+1 line -I, I, Q, -Q, I, -I, -Q, Q
- PAL:
- Upper half of the screen
n line R-Y, -(R-Y), B-Y, -(B-Y), R-Y, -(R-Y), B-Y, -(B-Y)
n+1 line -(R-Y), R-Y, B-Y, -(B-Y), R-Y, -(R-Y), -(B-Y), B-Y
- Lower half of screen
SECAM: No DEM pattern
- (9) Full-field color bar 75% amplitude pattern
The eight color bars on the screen from left to right; white, yellow, cyan, green, magenta, red, blue and black. White can be selected to 75% or 100%.
- (10) SMPTE color bar
NTSC: Conform to SMPTE ECR 1-1978 specifications
PAL, SECAM: Applied NTSC test pattern specifications (SMPTE ECR 1-1978) for PAL and SECAM system.
- (11) Raster Eight colors in RGB combinations
- (12) Multiburst
NTSC: Frequency
0.5MHz, 1MHz, 2MHz, 3MHz, 3.58MHz, 4.2MHz fixed or variable (1 to 15MHz)
PAL, SECAM: 0.5MHz, 1MHz, 2MHz, 4MHz, 4.8MHz, 5.8MHz fixed or variable (1 to 15MHz)
Amplitude 50% or 100% selectable
Flatness Within $\pm 0.5\text{dB}$ (0.5 to 10.0MHz)
Within $\pm 1.0\text{dB}$ (10.1 to 15.0MHz)
- (13) Video sweep
Sweep frequency range NARROW: 0.1 to 5MHz
WIDE: 0.3 to 15MHz
* Two bands selectable
Sweep speed Synchronized with field scanning
Amplitude 50% or 100% selectable
Flatness Within $\pm 0.5\text{dB}$ (0.1 to 10.0MHz)
Within $\pm 0.1\text{dB}$ (10.1 to 15.0MHz)
- Marker NARROW
NTSC: 0.5MHz, 1MHz, 2MHz, 3MHz, 3.58MHz, 4.2MHz
PAL, SECAM: 0.5MHz, 1MHz, 2MHz, 3MHz, 4MHz, 5MHz
WIDE 2MHz, 4MHz, 6MHz, 8MHz, 10MHz, 12MHz, 14MHz
Accuracy $\pm (3\% + 50\text{kHz})$

1.3.3 Sync Signal

NTSC-M

Number of scanning line	525 (Interlace)
Line frequency	15.734kHz
Field frequency	59.94Hz

PAL-B, C, D, G, H, I, K and L

Number of scanning line	625 (Interlace)
Line frequency	15.625kHz
Field frequency	50Hz

SECAM-III, B, D, G, H, K, L

Number of scanning line	625 (Interlace)
Line frequency	15.625kHz
Field frequency	50Hz

1.3.4 Mode Control

- | | |
|--------------------|---|
| (1) White | White level selection of color bar/raster for (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) Sync | Sync signal on/off |
| (7) Luminance | Luminance signal on/off |
| (8) Chrominance | Chrominance signal on/off |
| (9) Invert | Black-and-white inversion of crosshatch, convergence, window and checker patterns |
| (10) Circle | Synthesis of circle for crosshatch, convergence, window and checker patterns |
| (11) Moving marker | Synthesis of moving markers for all patterns |

1.3.5 Amplitude Preset

Sync

NTSC: 0 to 200% (286mV = 100%)

PAL, SECAM: 0 to 200% (300mV = 100%)

Burst

NTSC: 0 to 200% (286mV = 100%)

PAL: 0 to 200% (300mV = 100%)

Luminance

NTSC: 0 to 200% (660mV = 100%)

PAL, SECAM: 0 to 200% (700mV = 100%)

Chrominance

NTSC: 0 to 200% (678mV = 100%)

PAL: 0 to 200% (664mV (CYAN) = 100%)

SECAM: 0 to 200% (476mV = 100%)

(*SECAM ID and chrominance: Variable carrier level instead of FM deviation factor)

Setup

NTSC: 0 to 20.0% (54mV = 7.5%)

PAL, SECAM: None

1.3.6 Front Panel Output

- Composite video output
 - Polarity Positive (sync negative)
 - Voltage Fixed output: $1V_{p-p} \pm 28mV_{p-p}$ (into 75Ω)
Variable output: 0 to $1V_{p-p}$ continuously variable (into 75Ω)
 - Impedance 75Ω
- Trigger
 - Mode HD or VD, selectable with the front panel switch
 - Output level TTL
- RF
 - Frequency range 30 to 900MHz
 - Frequency preset resolution 10kHz Δf function available in CH mode (up to $\pm 10.00MHz$)
 - Frequency switching time 2 sec. or less
 - Flatness $\pm 5dB$
 - Spurious $-10dBc$
 - Output voltage $100\mu V_{rms}$ to $10mV_{rms}$ approx (into 75Ω), continuously variable
 - Impedance 75Ω
 - Modulation polarity Positive or negative
 - Frequency accuracy $\pm 50ppm$ at setting value
- Sound output
 - System Superimposed to RF output, ON/OFF selectable
Intercarrier
 - Frequency
 - NTSC $4.5MHz \pm 225Hz$
 - PAL, SECAM $5.5MHz \pm 275Hz$, $6MHz \pm 300Hz$
 $6.5MHz \pm 325Hz$, selectable
 - Modulation signal 400Hz and 1kHz internal, or external source
 - Modulation system
 - NTSC: FM
 - PAL, SECAM: AM and FM
 - Frequency characteristics $50Hz$ to $50kHz$, $\pm 1dB$
 50 to $100kHz$, $\pm 3dB$

1.3.7 Rear Panel Output

- Composite video
 - Polarity Positive (sync negative)
 - Voltage Fixed output: $1V_{p-p} \pm 28mV_{p-p}$ (into 75Ω)
Variable output: 0 to $1V_{p-p}$ continuously variable (into 75Ω)
 - Impedance 75Ω
- Black burst
 - Polarity Positive (sync negative)
 - Burst
 - NTSC: $286mV_{p-p} \pm 20mV_{p-p}$ (into 75Ω)
 - PAL: $300mV_{p-p} \pm 20mV_{p-p}$ (into 75Ω)
 - SECAM: None
 - Impedance 75Ω
 - Sync signal
 - NTSC: $286mV_{p-p} \pm 20mV_{p-p}$ (into 75Ω)
 - PAL, SECAM: $300mV_{p-p} \pm 20mV_{p-p}$ (into 75Ω)
 - Impedance 75Ω
 - Output connector BNC, two systems

•Subcarrier	
Frequency	
NTSC:	3.579545MHz \pm 50Hz (\pm 2Hz is available with Option)
PAL:	4.43361875MHz 50Hz (\pm 2Hz is available with Option)
SECAM:	None
Voltage	2Vp-p \pm 0.3Vp-p (into 75 Ω)
Impedance	75 Ω
•Composite sync	
Polarity	Negative
Voltage	4Vp-p \pm 0.5Vp-p (into 75 Ω)
Impedance	75 Ω
•Composite blanking	
Polarity	Negative
Voltage	4Vp-p \pm 0.5Vp-p (into 75 Ω)
Impedance	75 Ω
•Burst flag/color blanking	
Polarity	Negative
Voltage	4Vp-p \pm 0.5Vp-p (into 75 Ω)
Impedance	75 Ω
•V DRIVE	
Polarity	Negative
Voltage	4Vp-p \pm 0.5Vp-p (into 75 Ω)
Impedance	75 Ω
•H DRIVE	
Polarity	Negative
Voltage	4Vp-p \pm 0.5Vp-p (into 75 Ω)
Impedance	75 Ω
•Sound	
Frequency	400Hz \pm 20Hz, 1kHz \pm 50Hz
Voltage	1Vp-p \pm 50mVp-p (into 1k Ω)
Impedance	1k Ω
Output connectors	2 (400Hz and 1kHz)
•R-Y	
Voltage	0.7Vp-p \pm 28mVp-p (into 75 Ω)
Impedance	75 Ω
•B-Y	
Voltage	0.7Vp-p \pm 28mVp-p (into 75 Ω)
Impedance	75 Ω
•Y	
Voltage	1Vp-p \pm 28mVp-p (into 75 Ω) (including SYNC signal)
Impedance	75 Ω

- TTL
 - R, G, B output Fan-out 1 (positive logic)
 - SYNC output Fan-out 1 (negative logic)
 - H SYNC, V SYNC
 - Connector 8-pin, Rectangular
- Y/C
 - Voltage
 - NTSC:
 - Y 1Vp-p \pm 20mVp-p (into 75 Ω)
(between sync and white signal)
 - C 678mVp-p \pm 24mVp-p (into 75 Ω)
Chroma level, setup 0%
 - PAL:
 - Y 1Vp-p \pm 20mVp-p (into 75 Ω)
(between sync and white signal)
 - C 664mVp-p \pm 24mVp-p (into 75 Ω)
Chroma level
 - SECAM:
 - Y 1Vp-p \pm 20mVp-p (into 75 Ω)
 - C 476mVp-p \pm 24mVp-p (into 75 Ω)
Chroma level
 - Impedance
 - Y 75 Ω
 - C 75 Ω
 - Connector Two systems: Round miniature connector (S connector) and BNC connector (Y output and C output).

- RGB multiple output
NTSC:

	Polarity	Voltage	Impedance
VIDEO	Positive (sync negative)	1Vp-p \pm 42mVp-p (into 75 Ω) 75 Ω	75 Ω
RGB	Positive	0.7Vp-p \pm 0.1Vp-p (into 75 Ω)	75 Ω
Sound		0.4Vp-p \pm 50mVp-p	10k Ω
Ys		L 0 to 0.4V H 1 to 3V	75 Ω
Ym		L 0 to 0.4V H 1 to 3V	75 Ω
AV		L 0 to 0.4V H 3 to 5V	22k Ω
Connector		21-pin (EIAJ21P)	

- RGB multiple output
PAL:

	Polarity	Voltage	Impedance
VIDEO	Positive (sync negative)	1Vp-p \pm 42mVp-p (into 75 Ω)	75 Ω
RGB	Positive	0.7Vp-p \pm 0.1Vp-p (into 75 Ω)	75 Ω
Sound		1.4Vp-p \pm 0.2Vp-p	10k Ω
Ys		L 0 to 0.4V H 1 to 3V	75 Ω
SLOW SW		L 0 to 2V H 9.5 to 12V	10k Ω
Connector		21-pin	

1.3.8 Rear Panel Input

•EXT VIDEO

Polarity	Positive (sync negative)
Input voltage	1Vp-p (into 75Ω)
Impedance	75Ω

•GENLOCK

Input system	75Ω loop-through
Input level range	
NTSC:	286mVp-p ± 3dB (sync negative)
PAL, SECAM:	300mVp-p ± 3dB (sync negative)
Horizontal delay	± 2μs, variable
Input voltage range	
NTSC:	286mVp-p ± 3dB
PAL:	300mVp-p ± 3dB
Subcarrier lockable range	
NTSC:	3.579545MHz ± 50Hz
PAL:	4.43361875MHz ± 50Hz
Subcarrier phase	0 to 360°, continuously variable

* SECAM V and H sync signals can only be variable.

•EXT SOUND

Frequency range	50Hz to 100kHz
Input voltage	1Vp-p (into 10kΩ)
Impedance	10kΩ

1.3.9 Presetting

Up to 100 sets of datas; color system, pattern, modes, levels, RF frequency and channel, can be stored into memory.

1.3.10 Others

Power supply	100V, 120V, 220V, 240V ±10% (changeable with rewiring) Maximum input voltage: 250V
Frequency	50/60Hz
Power consumption	60VA approx
Operating temperature range	0 to 40°C
Size	426(W) × 88(H) × 400(D)mm
Weight	9kg approx
Accessories	BNC-BNC 3C-2V cable, 1m 1
	Fuse 1
	Instruction manual 1

*All specifications in this manual subject to change without notice

(1) Check the power supply voltage. The power supply voltage must be the rated voltage within $\pm 10\%$. If the voltage is too low, the instrument may not operate correctly. If the voltage is too high, the instrument may overheat. The power transformer has series-parallel 100V and 120V windings. The instrument can be used in four voltage ranges listed in Table 2.1 by changing the wiring.

Table 2.1

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

See Figure 2.1 for how to change the primary wiring.

(2) The operating temperature range is 0° to 40°C . When the instrument is mounted in a rack, confirm that the internal temperature of the rack does not exceed 40°C . If necessary, install a fan on the rack or place a heat-source equipment on upper position of the system.

(3) Note the following when the instrument is not used for a long time.

The setting data stored in the memory of the Model 408NPS are held by backup battery for about one month even unpowered condition. If the instrument not turned on for more than one month, the data stored in the memory may be lost.

(4) Caution for input/output cable connection.

Do not apply external voltage to the output connectors. This may causes a problem.

Do not apply the voltage exceeding $\pm 15\text{Vdc}$ to the input connectors. If a bias voltage is being imposed on the sound circuit to be connected, block the dc component with a capacitor before connecting the circuit.

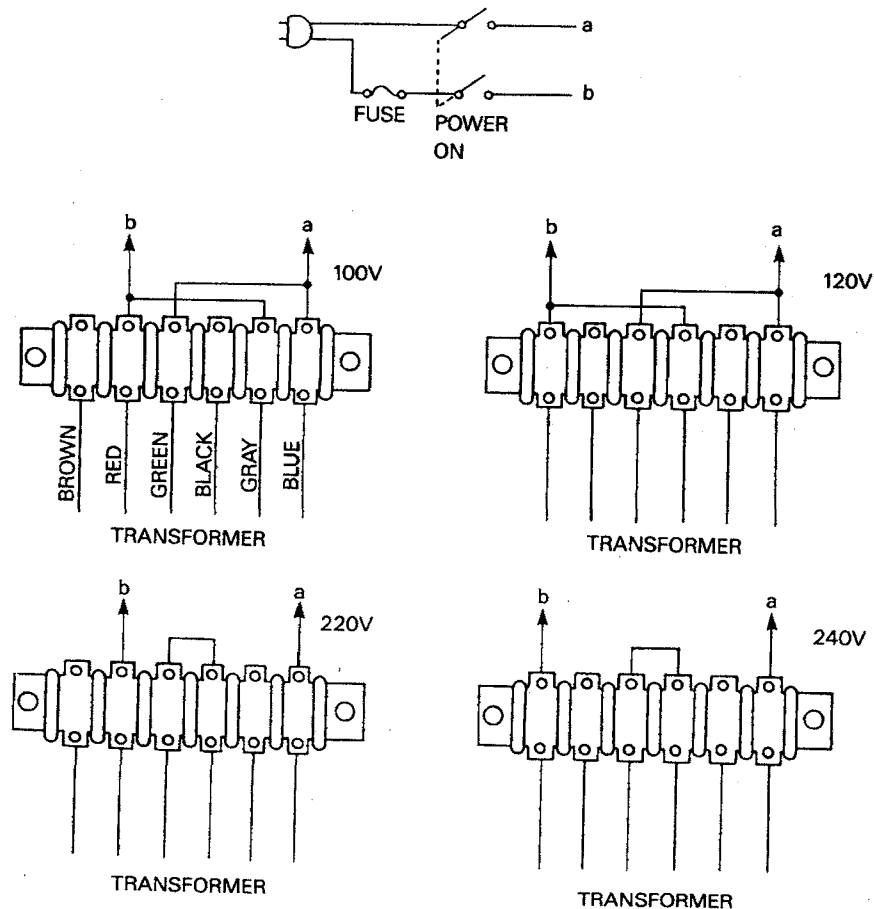


Figure 2.1

3.1 Front Panel

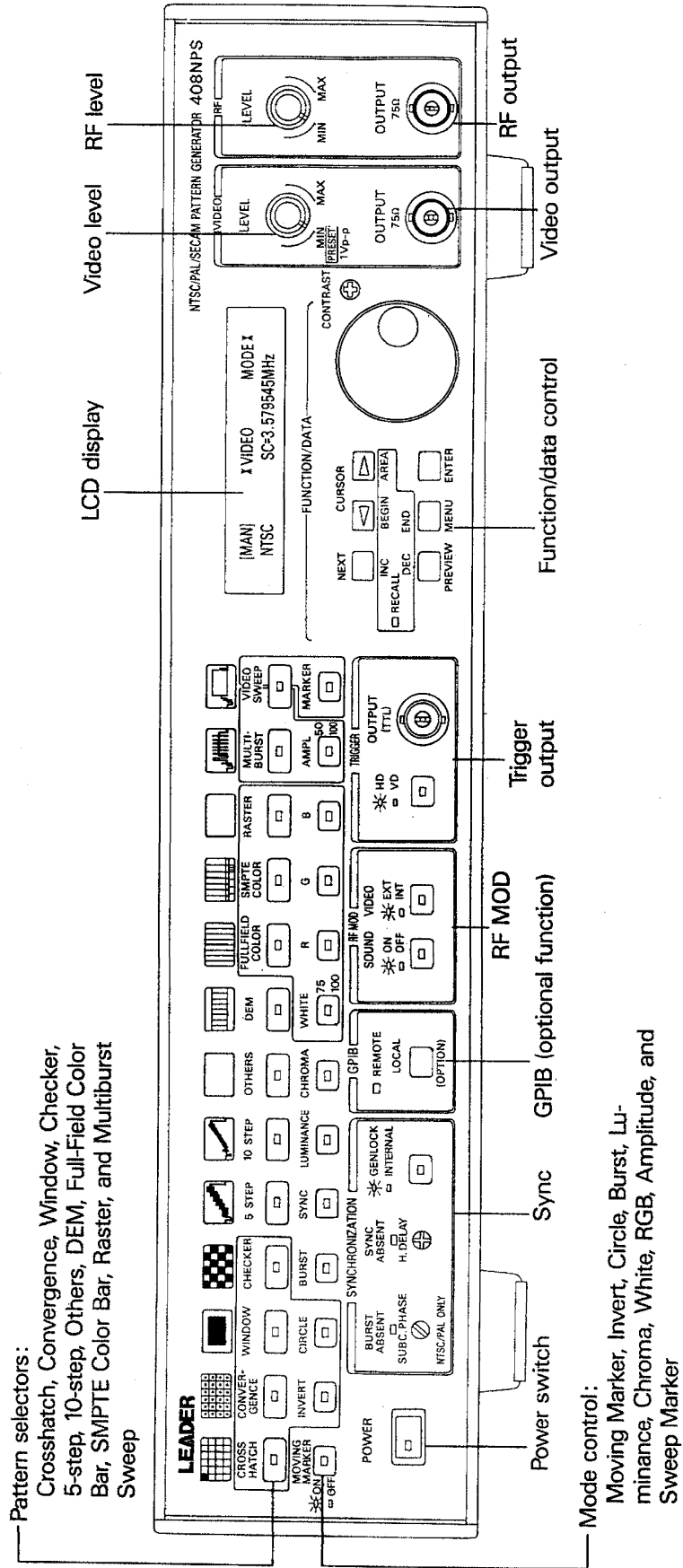


Figure 3.1

3.2 Rear Panel

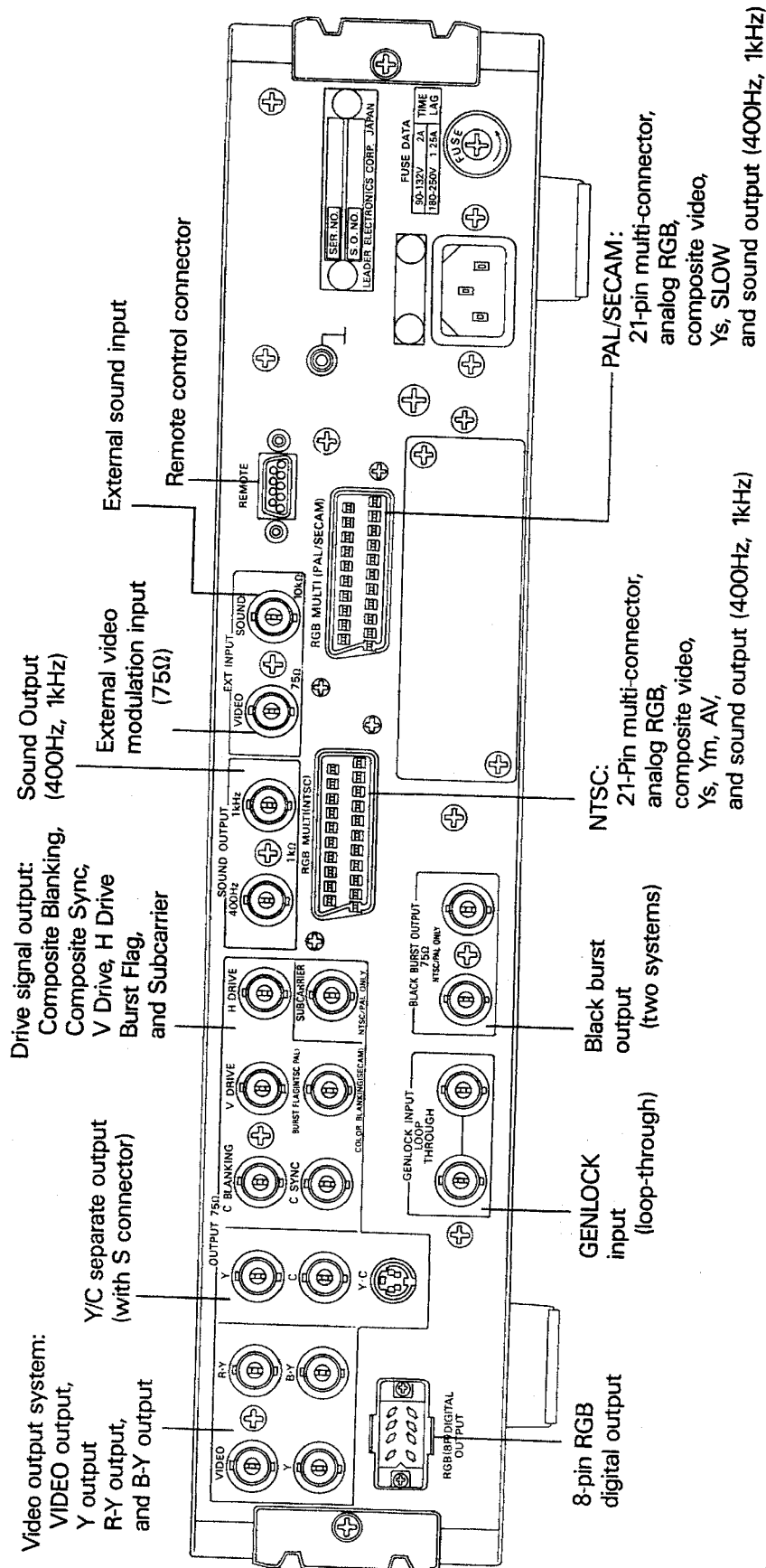


Figure 3.2

The operation functions are indicated by arrows.
 4.1 Power Supply (See Figure 4.1 and 4.2)

① Use specified fuse as designated on the rear panel when replace it.

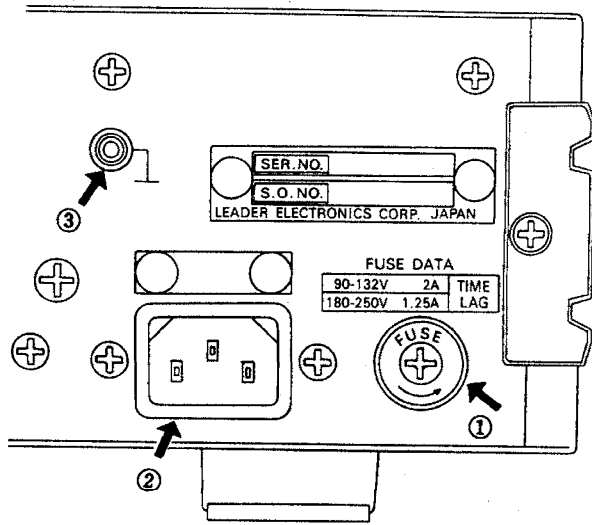


Figure 4.1

② Connect the accessory power cord to the inlet on the rear panel. Apply the voltage specified above the inlet.

③ This is the cabinet ground terminal. Connect a ground wire for safety's sake.

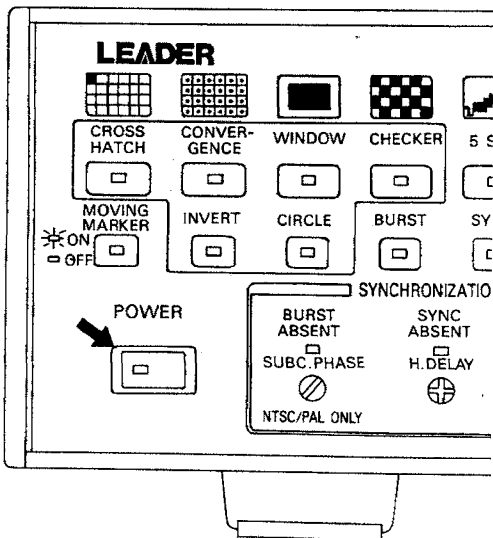


Figure 4.2

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

4.2.1 Pattern Types

The following pattern selectors are arranged from the left of the front panel; Crosshatch, Convergence, Window, Checker, 5 step, 10 step, Others (Checker Color Bar, Vertical Color Bar, Split Reverse Color Bar, Matrix, APL and Center Cross), Demodulator, Full-Field Color Bar, SMPTE Color Bar, Raster, Multiburst and Video Sweep. In addition, Circle Pattern and Moving Marker can be overlaid on specified pattern. See Section 4.2 for how to select the patterns.

The seven patterns are;
 Checker color bar
 Vertical color bar
 Split reverse color bar
 Matrix
 APL 10% (APL 12.5% for PAL and SECAM)
 APL 90% (APL 87.5% for PAL and SECAM)
 Center cross.

4.2.2 Selecting Patterns (See Figure 4.3)

Pressing the pattern selection key turns on its lamp and outputs the specified pattern from the video and RF output connectors. Seven types of patterns belong to OTHERS. The pattern name will display on the LCD panel by pressing the OTHERS key. The patterns can be selected with NEXT or PREVIEW key.

The seven patterns are;

- Checker color bar
- Vertical color bar
- Split reverse color bar
- Matrix
- APL 10% (APL 12.5% for PAL and SECAM)
- APL 90% (APL 87.5% for PAL and SECAM)
- Center cross.

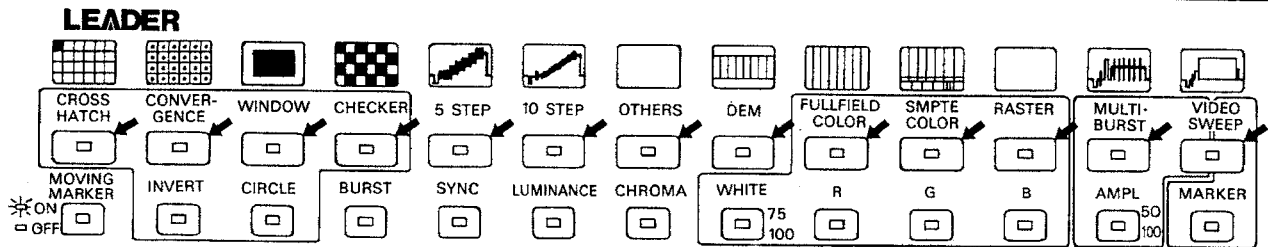


Figure 4.3

4.2.3 Black-and-White Inversion of Crosshatch, Convergence, Window and Checker Patterns (See Figure 4.4)

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

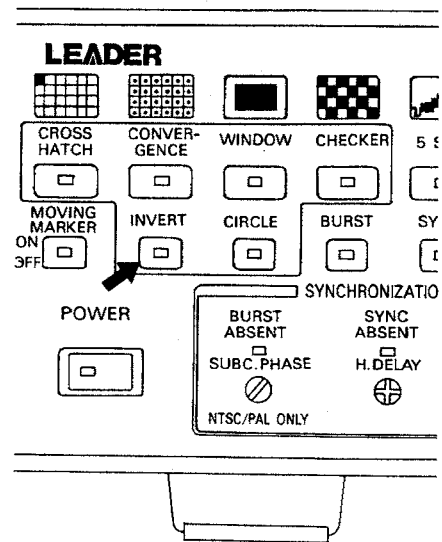


Figure 4.4

4.2.4 Circle Patterns (See Figure 4.5)

Pressing the CIRCLE key turns on its lamp and overlay the 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 the circle only on crosshatch, convergence, window and checker patterns; the other is to overlay the circles on all patterns. See Section 4.13.8 for how to select the patterns.

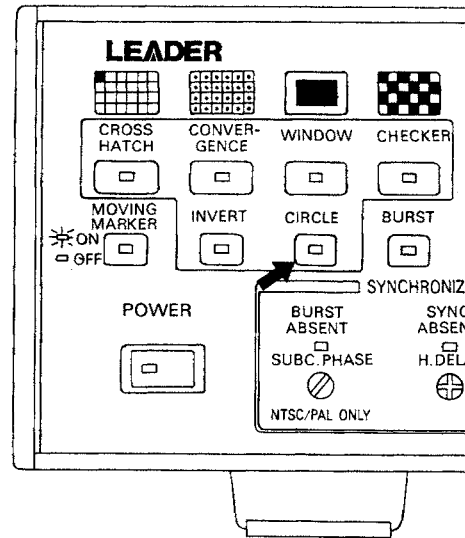


Figure 4.5

4.2.5 Moving Marker (See Figure 4.6)

Pressing the MOVING MARKER key turns on its lamp and display a white moving marker under part of any pattern. The marker can be moved from right to left, and inverted by using the INVERT key.

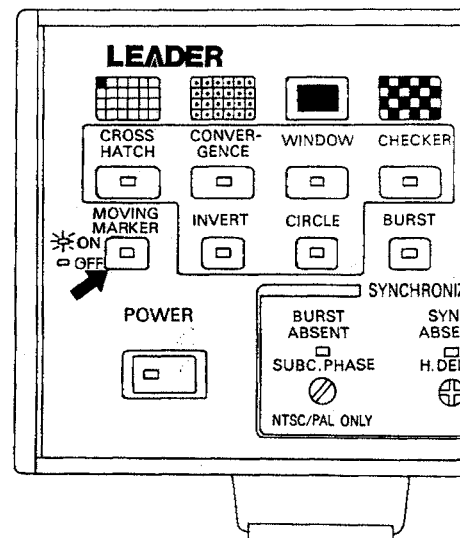


Figure 4.6

4.2.6 Setting 50% or 100% Level for Multiburst or Sweep Output, and Sweep Frequency (See Figure 4.7)

The multiburst and 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 displays the markers with serration.

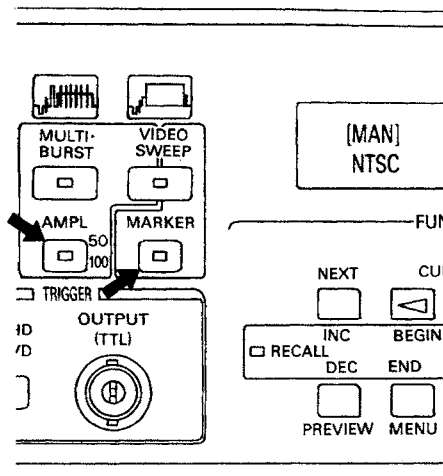


Figure 4.7

4.2.7 Setting Rightmost Burst of Multiburst Pattern (See Figure 4.8 and 4.9)

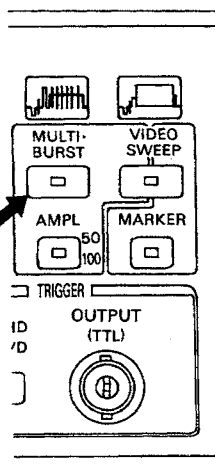


Figure 4.8

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

- ① [LAST BURST MODE]
FIXED 4.2 MHz
- ② [LAST BURST MODE]
VAR 5 MHz

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

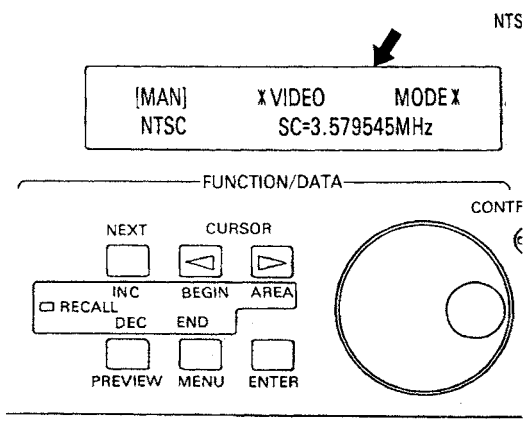


Figure 4.9

4.2.8 Selecting the sweep width (See Figure 4.10)

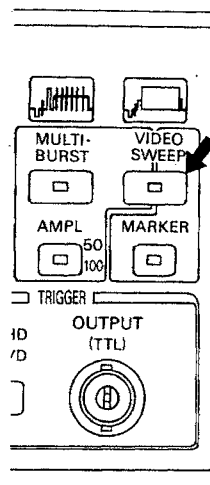


Figure 4.10

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

- ① [SWEEP WIDTH] NARROW
- ② [SWEEP WIDTH] WIDE

The NARROW sweep width is from 10kHz to 5MHz.

The WIDE sweep width is from 300kHz to 15MHz. Use the NEXT or PREVIEW key to change the sweep width. This changes the marker simultaneously.

4.2.9 Turning Color Bar or RGB of Raster On/Off, and Selecting 100% or 75% White Level (See Figure 4.11).

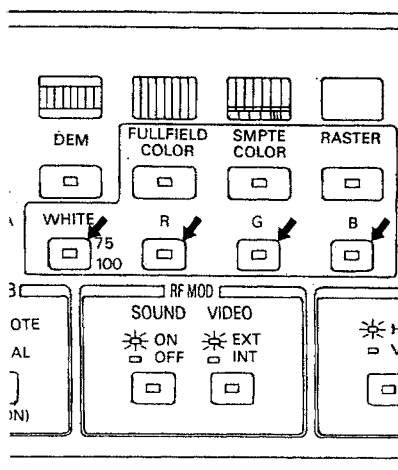


Figure 4.11

Pressing the RGB keys turns the red, green and blue 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. In SECAM system, lamps on the R, G and B keys light when SMPTE color bar is on, and R, G and B cannot be turned on or off.

When the FULLFIELD COLOR, SMPTE COLOR or RASTER switch is turned on, SET UP LEVEL is displayed on the LCD panel. The PAL and SECAM systems do not display this message because they do 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 75% or 100% by using WHITE key. The white level is 75% when the lamp is on, and 100% when it off. The key setting does not affect the following signals;

- Chroma set signal and 100% white of black set signal in SMPTE pattern
- R-Y, B-Y
- Analog RGB and digital RGB

4.2.10 Turning Chroma and Luminance Signals On/Off (See Figure 4.12)

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

In SECAM mode, the ID signal can be turned on/off by pressing the CHROMA key.

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

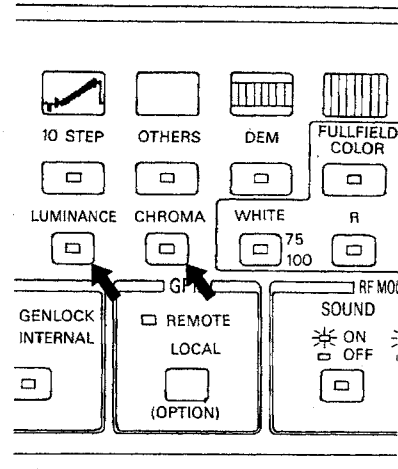


Figure 4.12

4.2.11 Pattern and Mode Settings

Table 4.1

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 12.5%)	—	○	—	—	—	—	* ○
APL 90% (APL 87.5%)	—	○	—	—	—	—	* ○
Center cross	—	○	—	—	—	—	* ○
Checker	○	○	—	—	—	—	○
Window	○	○	—	—	—	—	○
Convergence	○	○	—	—	—	—	○
Crosshatch	○	○	—	—	—	—	○

○ : Applicable patterns

* : Modes than can be set (See Section 4.2.4)

4.2.12 Output and Patterns

Table 4.2

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 12.5%)	○	○	—	—	○
APL 90% (APL 87.5%)	○	○	—	—	○
Center cross	○	○	○	○	○
10 STEP	○	○	—	○	○
5 STEP	○	○	—	○	○
Checker	○	○	○	○	○
Window	○	○	○	○	○
Convergence	○	○	○	○	○
Crosshatch	○	○	○	○	○
Circle	○	○	○	○	○
Moving marker	○	○	○	○	○

○ : Patterns that can be output

4.3 Turning Sync and Burst Signal On/Off (See Figure 4.13)

Pressing the BURST key turns the burst signal for a composite video signal, Y/C output, ID signal or component signal on/off.

The burst signal is on when the lamp is on, and off when the lamp is off.

Analog, digital and RGB output do not change.

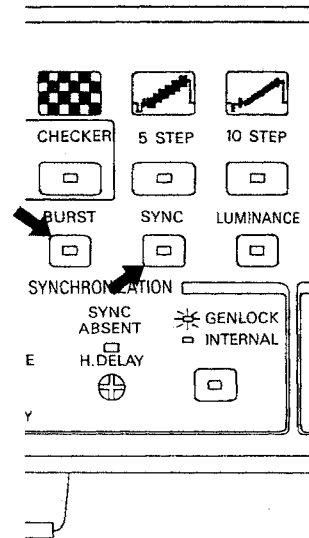


Figure 4.13

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 do not change.

4.4 Level Settings for Luminance, Chroma, Burst and Sync Signal (See Figure 4.14 and 4.15)

4.4.1 Changing Entire Level of Composite Video Signal

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

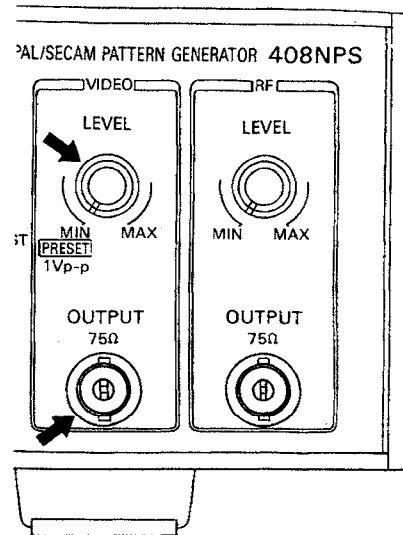


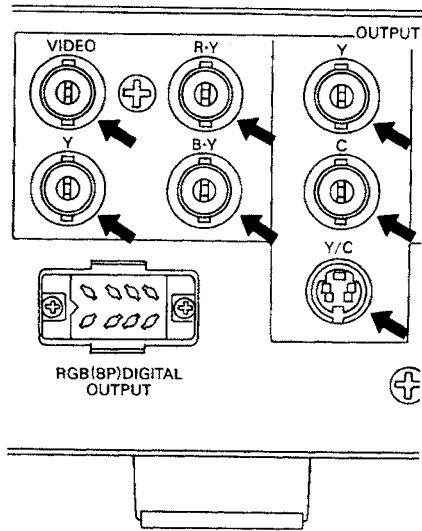
Figure 4.14

4.4.2 Changing Luminance, Chroma, Burst, Sync Signal Setup Level

The luminance, chroma, burst and sync signal levels can be varied independently or together in a range from 0 to 200% by using jog dial. This mode applies to composite video and component output. See section 4.13.3 for how to setting.

4.5 Video Signal Output

4.5.1 Composite Video, Component Video and Y/C Output (See Figure 4.15 and Table 4.3)



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

Figure 4.15

Table 4.3

Signal		Output Level	
Name	Type	Preset value	Variable range
Composite video Video signal	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	(0% setup) 0.678Vp-p (75% setup) 0.627Vp-p	C, B independent variable: 0 to 200%
PAL C of Y/C output	C, B	0.644Vp-p	C, B independent variable: 0 to 200%
SECAM C or Y/C output	C, ID	0.476Vp-p	C, ID continuous variable: 0 to 200%

4.5.2 21-pin Multiconnector (See Figure 4.16, Table 4.4 and 4.5)

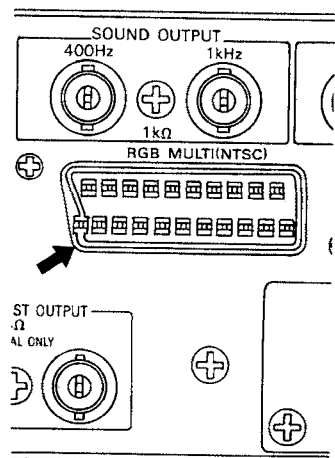


Figure 4.16

Output connector

This 21-pin multiconnector is compatible with TV sets. The connector outputs analog RGB, sound 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 teletext or computer display. Refer to Section 4.13.6 for the operations.

Table 4.4

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	TTL level
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) NTSC

Table 4.5

Pin No.	Signal name	Output level
1	AUDIO OUT (RIGHT)	500mVrms/1kΩ
2	NC	
3	AUDIO OUT (LEFT)	50mVrms/1kΩ
4	GND	
5	GND	
6	NC	
7	B	700mVp-p/75kΩ
8	SLOW SW	0/12V/10kΩ
9	GND	
10	NC	
11	G	700mVp-p/75Ω
12	NC	
13	GND	
14	GND	
15	R	700mVp-p/75Ω
16	Ys	0/3V
17	GND	
18	GND	
19	VIDEO OUT	1Vp-p/75Ω
20	NC	
21	GND	

b) PAL, SECAM

4.5.3 TTL RGB Signal Output (See Figure 4.17, 4.18 and Table 4.6)

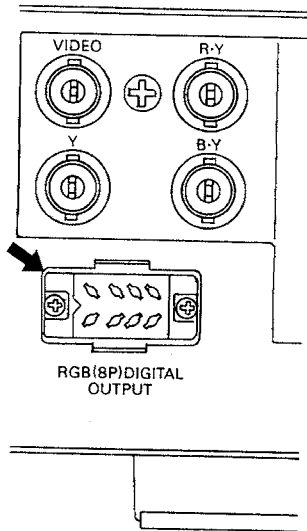


Figure 4.17

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

Table 4.6

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

Although the standard sync signal polarity is negative, it can be changed to the positive by using a DIP switch located inside the instrument.

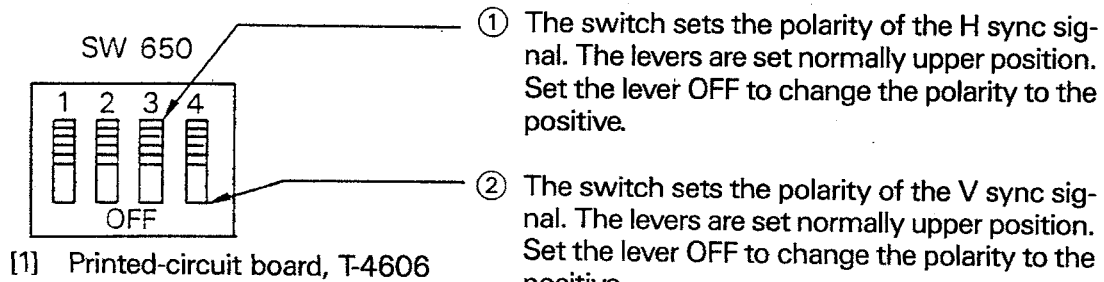


Figure 4.18

- ① The switch sets the polarity of the H sync signal. The levers are set normally upper position. Set the lever OFF to change the polarity to the positive.
- ② The switch sets the polarity of the V sync signal. The levers are set normally upper position. Set the lever OFF to change the polarity to the positive.

4.6 Sync Signal

4.6.1 Blanking, Sync, VH, HD, Burst Flag and Subcarrier Signal Output (See Figure 4.19 and Table 4.7)

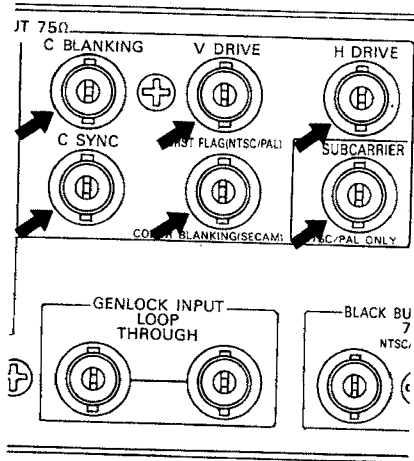


Figure 4.19

These output signals are timing signals required to generate the video signals, and also used to synchronize other equipment. The subcarrier signal is used to carry color signals.

Table 4.7 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

Output level: Into 75Ω load

4.6.2 Black Burst Signal (See Figure 4.20)

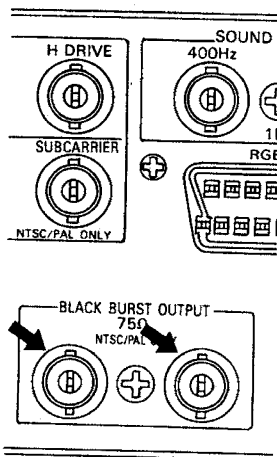


Figure 4.20

The black burst signal is a kind of synchronizing signal consisting of sync and burst signals. It enables the GENLOCK function to be used with other equipment. There are two output systems.

In SECAM system, only the sync signal is output.

Output level	Sync signal	Burst signal
NTSC	286mVp-p	286mVp-p
PAL	300mVp-p	300mVp-p
SECAM	300mVp-p	0V

4.6.3 Trigger Output Selection (See Figure 4.21)

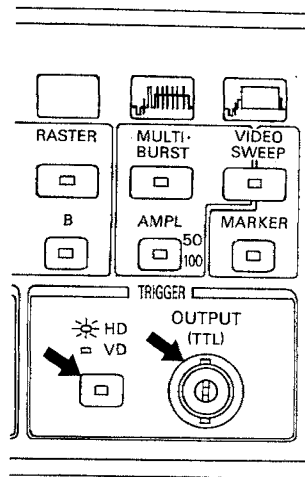


Figure 4.21

4.7 RF Output

4.7.1 Output Connector (See Figure 4.22)

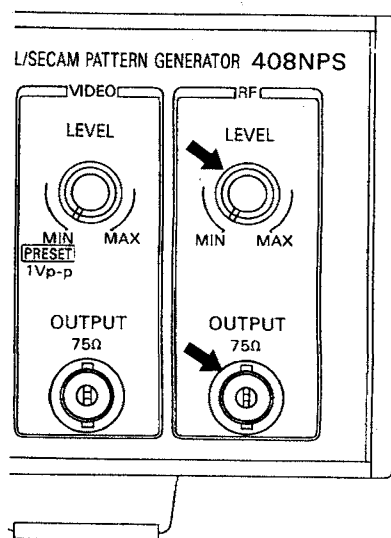


Figure 4.22

The trigger output connector is used to monitor a waveform with an oscilloscope. It outputs TTL level with negative polarity, and timing is HD and VD.

Select HD or VD by using the key. The lamp goes on in the HD output mode, and off in the VD output mode.

The RF frequency range is from 30 to 900MHz. (See Section 4.13.4 and 4.13.5 for how to set the frequency and the channel selection.) The output level can be varied from $100\mu\text{Vrms}$ to 10mVrms (into 75Ω) by using the LEVEL control knob. The output level range differs slightly depending on the frequency.

4.7.2 Video Modulation (See Figure 4.23 and 4.24)

RF MOD VIDEO key selects the internal or the external video signal source for modulation. 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 connector is located on the rear panel.

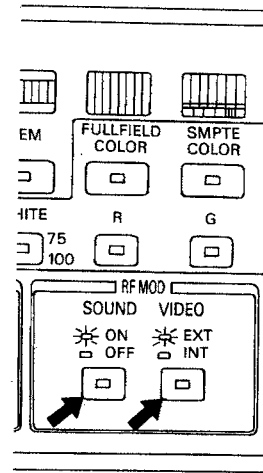


Figure 4.23

4.7.3 Sound Modulation (See Figure 4.23, 4.24 and 4.25)

RF MOD SOUND key is used to modulate the RF signal by the sound signal. Press the key to display the current modulation mode on the LCD panel. Then, press the [NEXT] or [PREVIEW] key to select the signal sources sequentially; 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
- INT 400Hz: Internal oscillator, 400Hz
- EXT SIGNAL: Signal through external input connector on the rear panel
- SIF CARRIER ONLY: Carrier signal only
- SIF CARRIER OFF: No carrier signal

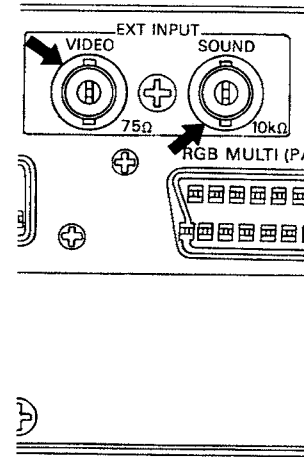


Figure 4.24

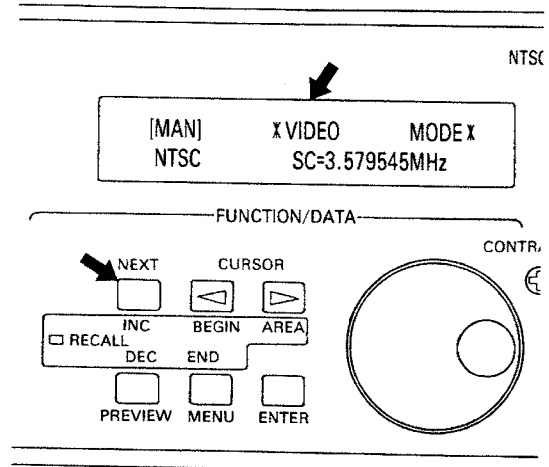


Figure 4.25

4.8 Sound Signal Output (See Figure 4.26)

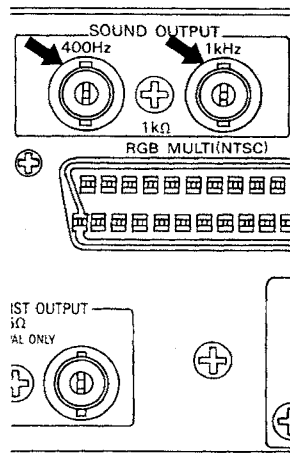


Figure 4.26

The sound output connectors are provided. To facilitate the inspection of stereo systems, 1kHz and 400Hz signals are simultaneously output. The output level is 1Vp-p (into 1kΩ).

4.9 GENLOCK (See Figure 4.27 and 4.28)

The GENLOCK function synchronizes the Model 408NPS with an external black burst or composite video signal. The signal to be applied to the GENLOCK INPUT connector should be satisfied following specifications.

① NTSC

Horizontal sync signal amplitude $286\text{mVp-p} \pm 3\text{dB}$
 Burst signal amplitude $286\text{mVp-p} \pm 3\text{dB}$
 Lock range of horizontal sync signal $15.73426\text{kHz} \pm 0.2\text{Hz}$
 Lock range of subcarrier signal $3.579545\text{MHz} \pm 50\text{Hz}$

② PAL

Horizontal sync signal amplitude $300\text{mVp-p} \pm 3\text{dB}$
 Burst signal amplitude $300\text{mVp-p} \pm 3\text{dB}$
 Lock range of horizontal sync signal $15.625\text{kHz} \pm 0.2\text{Hz}$

Lock range of subcarrier signal $4.43361875\text{MHz} \pm 50\text{Hz}$

③ SECAM

Horizontal sync signal amplitude $300\text{mVp-p} \pm 3\text{dB}$
 Lock range of horizontal sync signal $15.625\text{kHz} \pm 0.2\text{Hz}$

In SECAM system, horizontal and vertical sync signals can be synchronized.

Since the loop-through connectors are used, terminate the other connector with 75Ω .

To activate the GENLOCK mode, press the GENLOCK/INTERNAL key until the lamp comes on. When the normal-level black burst 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.

When input the composite signal in SECAM mode, SYNC ABSENT lamp goes off, and BURST ABSENT lamp comes on. Since the burst signal is not included in the composite sync signal, this is normal situation.

In NTSC and PAL systems, adjust the chroma phase difference against the input burst signal by using the SUBC PHASE adjustment, and adjust the sync signal phase difference by using the H DELAY adjustment. The chroma phase adjustable range is 360° , and the H DELAY adjustable range is $\pm 2\mu\text{s}$.

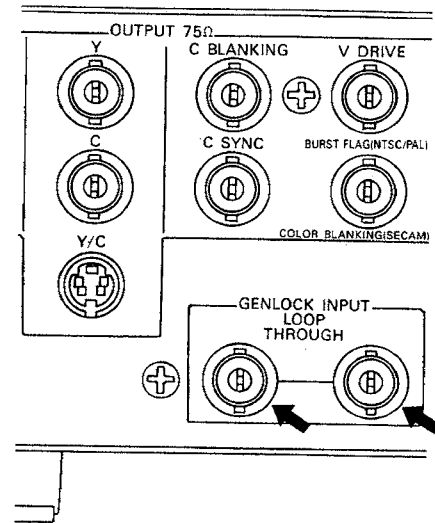


Figure 4.27

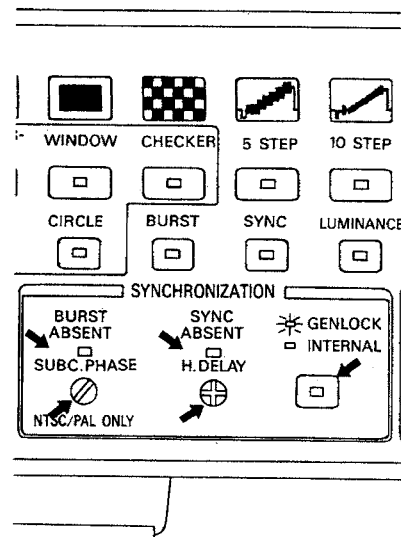


Figure 4.28

4.10 Remote Control (See Figure 4.29, 4.30, Table 4.8 and 4.9)

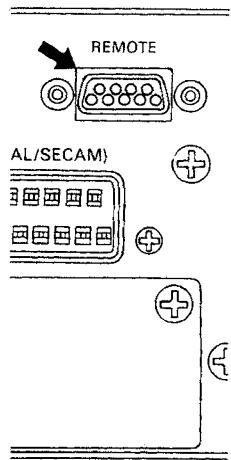


Figure 4.29

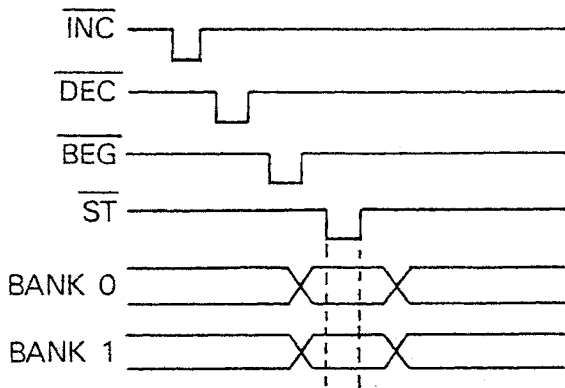


Figure 4.30

The Model 408NPS must first be set to the RECALL mode to enable remote control by using front panel key. Then, connect pin 5 of the REMOTE connector to ground for the remote control mode.

The following conditions can be controlled. Requires TTL level for the control.

- $\overline{\text{INC}}$: Increments the RECALL mode address one by one.
- $\overline{\text{DEC}}$: Decrements the RECALL mode address one by one.
- $\overline{\text{BEG}}$: Return the RECALL mode address to the start point.
- $\overline{\text{ST}}$: Sets the area specified by BANKs 0 and 1.
- BANKs 0 and 1 : Specifies an area. Table 4.9 lists the relationship between the BANK and area. The INC, DEC, BEG and ST signals must not go Low level at the same time.

This connector is used for the remote control. The pattern can be controlled through this connector.

Table 4.8 lists the pin numbers and assignment of the connector.

Table 4.8

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

Table 4.9

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

4.11 Function Keys and Setting Items

4.11.1 Function Keys Usages (See Figure 4.31)

The instrument has six types of function keys; NEXT, PREVIEW, CURSORS, ENTER, MENU and jog dial. These keys become INC, DEC, BEGIN, AREA and END key at RECALL MODE. The buzzer, channel, RF frequency and program reset functions can be controlled with the keys mentioned above and LCD panel. This section explains the basic key usages and controlled items.

4.11.2 Symbols Displayed on the LCD Panel (See Figure 4.31)

- NEXT/PREVIEW key operation
 - : When there are some selectable items, this symbol indicates that there are more items before and after the item being displayed. This symbol also means that the selected item can be toggled.
 - : When there are some selectable items exist, this symbol indicates that the item now being displayed is the last one. The [NEXT] key is effective when ▲ is displayed; the [PREVIEW] key is effective when ▼ is displayed.
- CURSOR key operation
 - : When both of these symbols are displayed, an item can be selected by using the [CURSOR] keys.
 - : When either of these symbols are displayed, the specified key can be used to display additional setting items.
- ENTER key operation
 - Et : This means the ENTER key can be used to turn operation on/off.

4.11.3 CRT Display

To simplify the use of the Model 408NPS functions, the menus and datas can be overlaid on the video signals for monitoring. The display contents are basically the same as those on the LCD panel. Multiple selections are all displayed (except the preset channel and country setting of the PAL and SECAM mode). A selected item is marked with ■ or *.

- ! The CRT display can be turned off if not required. See Section (Screen Messages) for the operations.

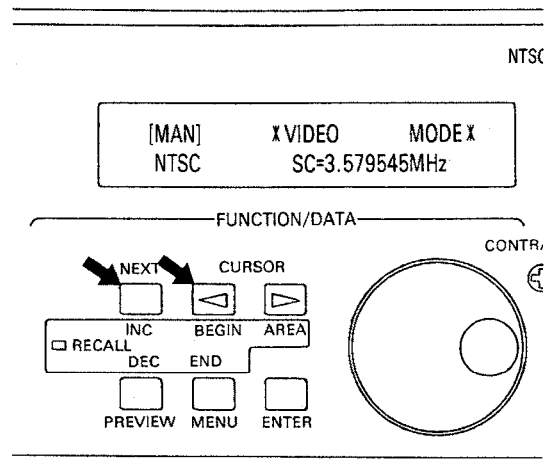


Figure 4.31

4.11.4 Basic Key operations

- ① Editor keys: NEXT, PREVIEW, CURSOR, ENTER, MENU and Jog Dial
The editor keys are outlined below. See the related section on each key for the details.
- NEXT and PREVIEW: These keys are used to select items. (Menu and country selections in the TVCH)
 - ! The [NEXT] and [PREVIEW] keys are respectively replaced by the [INC] and [DEC] keys in the RECALL MODE.
 - CURSOR: These keys are used for the following purposes.
 - A To specify a variable digit for the jog dial used to set the frequency.
 - B To select an item
(A Frequency setting in the FREQ, B RGB PRESET item selection)
 - ! The [◀] and [▶] keys are respectively replaced by the [BEGIN] and [AREA] keys in the RECALL MODE.
 - ENTER: This key is used for the following purposes.
 - A To set a selected item (moves to a lower directory level)
 - B To turn operation on/off.
(A Menu selection, B Channel preset)
 - MENU: This key is used to control to a higher directory level from the current mode. This is opposite the A function of the [ENTER] key.
 - ! Presetting the [MENU] key also returns control from the RECALL MODE to the MAIN MENU MODE.
 - Jog dial: This dial is used to change numeric settings. (Changing the frequency, video signal level, channel and address)
 - INC, DEC, BEGIN and AREA: These keys are used to change an address in the RECALL MODE.
 - ! These keys are effective when the [RECALL] LED on the front panel is on.
Note that [END] ([MENU]) does not mean the end address.
- ② Pattern keys
The pattern keys are used to select a necessary pattern.
The LED of the selected pattern lights. These keys are effective in any operation state. When a pattern is selected, some items may be displayed. Select and set necessary items, then press the [ENTER] key to return to the previous display.
- OTHERS: This mode contains seven different patterns.
 - Select one of patterns by using the [NEXT] or [PREVIEW] key.
 - FULLFIELD COLOR, SMPTE COLOR and RASTER: The setup levels of these patterns can be turns on or off by using the [NEXT] or [PREVIEW] key. To change the setup level, use the [AMPL PRESET MODE].
 - ! These keys effect when video system is NTSC.
 - MULTIBURST: FIXED (fixed) or VAR (variable) can be selected for the last burst by using the [NEXT] or [PREVIEW] key. When VAR is selected, the frequency can be varied by using the jog dial.
 - VIDEO SWEEP: WIDE and NARROW can be selected for the sweep width by using the [NEXT] or [PREVIEW] key.

③ Mode keys

These keys are used to set the necessary functions. A LED lights to indicate that the corresponding function was turned on.

- When the [RF MOD-SOUND] is turned on, the sound modulation selection mode is displayed on the LCD panel. Select an item with the [NEXT] or [PREVIEW] key, then press the [ENTER] key to return to the previous display.

! When the MODE key is pressed, the following error message may be displayed with beep.
Note that the key may not work.

WARNING! PATTERN MISMATCH!

This occurs if the key effective only a specific pattern is used without selecting the pattern. Example: When the [AMPL 50/100] key is used without selecting [MULTIBURST] and [VIDEO SWEEP].

WARNING! G.B.R OFF

This message is displayed if the [WHITE 75/100] key was pressed with the [R], [G] or [B] key off. Note that 75% or 100% can be switched only when [R], [G] and [B] are all on. If [R], [G] or [B] is off, 75% is set automatically.

?: "KEY LOCKED" means the patter/mode key is locked.

To release the key, set FREE to PATN/MODE KEY in the PRESET.

4.11.5 When Pattern or Mode Key is Pressed

Pressing the pattern or mode key selects its pattern or turns the mode on/off. However, when the following pattern is selected, LCD panel displays the particular settings on selected pattern.


1) [FULLFIELD COLOR], [SMPTE COLOR] and [RASTER]: NTSC only

For these three types of patterns, an inquiry to the operator is output asking whether the setup should be tuned on or off. The LCD panel displays the current setting. Specify ON to display the current setup level set at [AMPLITUDE].

- Change the settings by using the [NEXT] or [PREVIEW] key ( is displayed on the LCD panel).
- Press the [ENTER] key after making the setting.


2) [MULTIBURST]

When the [MULTIBURST] key is pressed, the system requests the last burst frequency setting. The LCD panel displays the current setting. FIXED (4.2MHz for NTSC, 5.8MHz for PAL and SECAM) or VAR (1MHz to 16MHz) can be selected for the last burst frequency.

- Change the setting by using the [NEXT] or [PREVIEW] key ( is displayed on the LCD panel).
- Press the [ENTER] key after making the setting.

When the mode is on, change the frequency with the jog dial.

3) [VIDEO SWEEP] When the [VIDEO SWEEP] key is pressed, the system requests the sweep width setting. The LCD panel displays the current setting. WIDE or NARROW can be selected.

- Change the setting by using the [NEXT] or [PREVIEW] key ( is displayed on the LCD panel).
- Press the [ENTER] key after making the setting.

4) [INVERT], [CIRCLE] The [INVERT] and [CIRCLE] keys are effective only when [CROSSHATCH], [CONVERGENCE], [WINDOW] or [CHECKER] is selected. If a different pattern is selected, an error message is displayed with the beep.

! If the circle pattern is set to ALL, pressing the [CIRCLE] key does not cause result in a beep or error message. See Section 4.13.8 "Presetting" for the detail on ALL.

5) [WHITE], [R], [G], [B] The [WHITE] (white level), [R], [G] and [B] keys are effective only when [FULL-FIELD COLOR], [SMPTE COLOR] or [RASTER] is selected.

If a different pattern is selected, an error message is displayed with the beep.

6) [AMPL] The [AMPL] (amplitude) key is effective only when [MULTIBURST] or [VIDEO SWEEP] is selected.

If a different pattern is selected, an error message is displayed with the beep.

7) [MARKER] The [MARKER] key is effective only when [VIDEO SWEEP] is selected.

If a different pattern is selected, an error message is displayed with the beep.

8) [GPIB] The [GPIB] key is effective only with the GPIB option.

! The sounding alarm and error message displayed on the CRT are only output when the functions are turned on beforehand with the [BEEP] and [SCREEN MESSAGE].

MAIN MENU

- COLOR MODE ————— ■ NTSC □ PAL □ SECAM : Color system setting
- VIDEO
 - AMPL STANDARD ————— SET: ENTER EXIT: MENU : Standard level setting
 - AMPL INDIVIDUAL
 - BURST : Burst level setting
 - SYNC : Sync level setting
 - CHROMA : Chrominance level setting
 - LUMINANCE : Luminance level setting
 - SETUP : Setup level setting
 - AMPL GANG ————— ■ BST □ SY ■ CCHR □ KUMI : Ganged level setting
- TV-CH MODE ————— [NEXT], [PREV] key : Country and band changing
 - [JOG-DIAL] : Channel setting
 - [ENTER] key : Channel frequency fine adjustment
- RF FREQ MODE ————— [JOG-DAIL], [CURSOR] key : RF frequency setting
 - [NEXT], [PREV] key : RF system setting
- MULTI RGB MODE
 - [CURSOR] key ————— Ys: HI Ym: HI AV: HI : Multi RGB setting

SUB MENU

- RECALL MODE —————
 - [INC] key : Address 1 increment
 - [DEC] key : Address 1 decrement
 - [BEGIN] : Return, begin address
 - [END] key : Return, main menu
 - [AREA] key : Area 1 increment
 - [ENTER] key : Pattern, mode key lock

PROGRAM MODE

- ADDRESS PROGRAM
 - COLOR: : Color system setting
 - VIDEO
 - AMPL STANDARD : Standard level setting
 - AMPL INDIVIDUAL : Individual level setting
 - AMPL GANG : Ganged level setting
 - TV-CH : TV-CH setting
 - RF FREQ : RF frequency setting
 - MULTI RGB : Multi RGB setting
- AREA PROGRAM : Area setting
- ADDRESS COPY : Address copy
- BLOCK COPY : Block copy

PRESET MODE

- TV-CH SKIP SET : TV-CH skip setting
- LCD BACK LIGHT ————— ■ HI □ LOW : LCD back light setting
- PATTERN/MODE KEY ————— ■ FREE □ LOCK : Pattern, mode key lock
- BEEP SET
 - ALL BEEP ————— ■ ON □ OFF : Key-in error beep
 - KEY IN BEEP ————— ■ ON □ OFF : Key-in beep
 - ERROR BEEP ————— ■ ON □ OFF : Error beep
- CIRCLE ON ————— ■ ON □ OFF : Circle pattern setting

SCREEN MODE

- ALL MESSAGE ————— ■ ON □ OFF : Message, all items display
- ERROR MESSAGE ————— ■ ON □ OFF : Error message display
- RCL/PRG ADDR ————— ■ ON □ OFF : Address display
- TV-CH COUNTRY ————— ■ ON □ OFF : Country display
- TV-CH CHANNEL ————— ■ ON □ OFF : Channel display
- TV-CH POSITION ————— ■ ON □ : Channel display position

4.12.1 Explanation of Each Item

1) COLOR MODE

This mode is used to select the color system; NTSC, PAL or SECAM. Use cursor key (◀ ▶) for the setting.

2) VIDEO MODE

Use this mode when RF and RGB outputs do not use. Also, use the mode to change the composite video output level.

The video level can be set as following items.

STANDARD The level is specified value. Refer to the Specifications for the setting value.

INDIVIDUAL The LUMINANCE, CHROMINANCE (ID), SYNC, BURST and SETUP levels can be set individually from 0 to 200% by using jog dial. The SETUP level can be set from 0 to 20% by using jog dial.

GANG The LUMINANCE, CHROMINANCE (ID), SYNC AND BURST levels can be set simultaneously by using jog dial.

3) TV-CH MODE

This mode can be set the RF frequency using TV channel of each country. Set the color system prior to the channel setting. Refer to Section for the settable countries. The fine frequency adjustment can be performed up to 10kHz by using jog dial.

4) RF FREQ MODE

By using this mode, the RF frequency can be set directly from the front panel. Select the color system prior to the frequency setting.

5) MULTI RGB MODE

This mode is used to control the signals of 21-pin connector; Ys, Ym and AV for NTSC system, and Ys, SLOW for PAL and SECAM systems. Use CURSOR and ENTER key for the control.

* The following items are sub-menu.

6) PROGRAM MODE

This mode is used to set the pattern, color system, video level, RF channel, RF frequency, MULTI RGB CONTROL and program area.

7) RECALL MODE

This mode is used to recall the programmed settings.

8) PRESET MODE

This mode is used to set the limiting of RF channel recall, brightness of LCD back light, pattern key locking, beeper on/off and circle pattern.

9) SCREEN MODE

The Model 408NPS displays the functions on the LCD panel. The other hand, these informations are also displayed on the monitor. ALL MESSAGE enables the all letters to on/off. ERROR MESSAGE displays the message for mis-keying.

RCL/PRG ADRES enables the address display of recall and program to on/off. TV-CH COUNTRY enables the country and channel display to on/off. TV-CH CHANNEL displays the channel. TV-CH POSITION enables to change the CH display position.

4.13 Setting Method of Each Item in the Menu

Setting of the items in the menu is achieved by using the LCD panel and function keys. In following explanations, "Display" denotes the contents of the LCD panel, and "Operation" denotes the function key operations. The operation begins from the [MAIN MENU].

* When ON SCREEN is ON, the contents of the LCD panel are also displayed on the monitor.

4.13.1 Video System Selection

• Display
[MAIN MENU] NTSC-M
▼ COLOR MODE

COLOR ? NTSC-M
■ NTSC □ PAL □ SECAM

• Operation

○ Select the display as shown left by using [PREVIEW] key, then press [ENTER] key.

○ The display will change as shown left by pressing [ENTER] key. Select the video system by using (◀ ▶) of the CURSOR key.

4.13.2 Using the Video Output and Digital RGB

When use the video output and digital RGB output, all settings can be ignored. However, to avoid the confusion about LCD panel display and function key operation, [VIDEO] menu of the [MAIN MENU] should be selected. Also, to avoid the confusion about recall function when making program, [VIDEO] menu of the [MAIN MENU] should be selected.

4.13.3 Video Level Changing

The video level changing is performed by using [AMPLITUDE] key. There are three methods to change the level as follows.

[STANDARD] : Sets each video level for 100%. (Setup level: 0%)

[INDIVIDUAL] : Enables to change the video level individually.

[GANG] : One to four levels out of four kinds of video levels except setup level can be changed together.

! Setup level can be changed only for the NTSC system.

① [AMPLITUDE] setting

○ Display
[MAIN MENU] NTSC-M
▲ ▼ VIDEO MODE

○ Operation

○ Select the display as shown left by using [PREVIEW] key, then press [ENTER] key.

② STANDARD

[VIDEO] NTSC-M
▼ AMPL STANDARD

○ After pressing the [ENTER] key at step ①, select the display as shown left by using [PREVIEW] key, then press [ENTER] key.

SET OK? NTSC-M
SET: ENTER EXIT: MENU

○ Press [ENTER] key to confirm the display as shown left. When the display shows OK, press [ENTER] key.

VIDEO AMPL NTSC-M
STANDARD SET !

○ The menu as shown left is displayed by pressing [ENTER] key.

- ③ INDIVIDUAL
[VIDEO] NTSC-M
▲ AMPL INDIVIDUAL

INDIVIDUAL NTSC-M
▲ CHROMA: 100%

○ After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

○ The menu as shown left is displayed by pressing [ENTER] key. Select the item to be changed by using [NEXT/PREVIEW] key.

The selectable items are [BURST], [SYNC], [CHROMA], [LUMINANCE] and [SETUP] (only for NTSC system).

After selection is made, set the chroma level by using the jog dial. Settable level range is 0 to 200% for [BURST], [SYNC], [CHROMA] and [LUMINANCE], and 0 to 20% for [SETUP].

- ④ GANG
[VIDEO] NTSC-M
▲ AMPL GANG

GANG: 100% NTSC-M
■ BST □ SY ■ CHR □ LUMI

○ After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT] key, then press [ENTER] key.

○ The menu as shown left is displayed by pressing [ENTER] key. Select the item to be changed as ganged by using [CURSOR] (◀ ▶) key, then press [ENTER] key. (The burst and chroma signals are changed simultaneously for example shown left). The jog dial is used to vary the level. Settable range is 0 to 200%.

* The meaning of the 100% is shown in Table below.

Terminated with 75Ω

	NTSC	PAL/SECAM
CHROMA, LUMINANCE, SETUP (NTSC only)	714mV	700mV
SYNC, BURST	286mV	300mV

4.13.4 Using RF Output Signal with Continuous Variable

To change the RF output frequency continuously, set the menu to [RF FREQ].

1) Menu setting for [RF FREQ]

○ Display

○ Operation

[MAIN MENU] NTSC-M

▲ RF FREQ MODE

○ Select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

RF FREQ NTSC-M

123.45MHz

○ The display will change as shown left by pressing [ENTER] key.

2) Frequency changing

Use the jog dial to change the frequency. By turning the jog dial, the frequency indicated by cursor can be changed.

Use [CURSOR] keys to move the cursor position.

- Frequency changing Jog dial
- Cursor positioning [CURSOR]

3) RF system changing (PAL and SECAM)

In PAL and SECAM, the RF system can be changed.

Select the color system prior to the RF system changing.

Eight types of systems are settable as follows. Use [NEXT] or and [PREVIEW] key keys.

B, C, G, H, I, L, D and K

- RF system selection [NEXT] or and [PREVIEW].

4.13.5 Using Channel Mode (See Table 4.10 to 4.25)

The Model 408NPS has the channel frequency data of the each country. Use this mode for the RF adjustment of TV sets. Refer to the Table 4.10 to 4.25 for the stored datas. If the channel frequency suitable for your country is not existed, find the table correspond to your country. (See Table 4.26 to 4.28) In PAL and SECAM, RF system is selected automatically by setting the country. Select the color system prior to the country setting.

1) TV channel mode setting

Set the TV channels by using LCD panel and key operation.

○ Display
[MAIN MENU] NTSC-M
▲ TV-CH MODE

TV-CH NTSC-M
▲ JAPAN V: CH1

* Display contents ○ Symbol of the band

JAPAN:	V	12ch
↑	↑	↑
Country	Band	Channel

○ Operation

○ Select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

○ The display will change as shown left by pressing [ENTER] key.

V: VHF
V(B): VHF RF system = B
V(C): VHF RF system = C
U: UHF
U(G): UHF RF system = G
U(H): UHF RF system = H
U(I): UHF RF system = I
C: CATV
CV(B): CATV-VHF RF system = B
CU(G): CATV-UHF RF system = G

2) Frequency fine adjustment

In TV channel mode, the RF frequency can be varied within the range of 10MHz in 10kHz step. Press [ENTER] key to enter fine adjustment mode.

○ Display
FINE + 00.MHz
JAPAN V: CH1

○ Operation

○ The display as shown left comes out by pressing the [ENTER] key.

! On the CRT, "Δ" is displayed on the right side of the band display.

Use the jog dial to change the frequency.

Use [CURSOR] keys to move the cursor.

- Frequency changing Jog dial
- Cursor positioning [CURSOR]

3) Escaping from the fine adjustment mode

There are four methods to escape from the fine adjustment mode.

① Pressing [ENTER] key

By pressing [ENTER] key, the mode returns previous condition. When entering to the fine adjustment mode again, previous fine frequency setting will cancel.

② Changing the country

The previous fine frequency setting of the country will cancel.

③ Changing the channel

The previous fine frequency setting of the channel will cancel.

④ Pressing [MENU] key

By pressing [ENTER] key, the mode returns previous condition. When entering to the TV channel mode again, previous fine frequency setting will come out.

TV Frequency Table JAPAN Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
1	91.25	95.75	32	585.25	589.75
2	97.25	101.75	33	591.25	595.75
3	103.25	107.75	34	597.25	601.75
4	171.25	175.75	35	603.25	607.75
5	177.25	181.75	36	609.25	613.75
6	183.25	187.75	37	615.25	619.75
7	189.25	193.75	38	621.25	625.75
8	193.25	197.75	39	627.75	631.75
9	199.25	203.75	40	633.25	637.75
10	205.25	209.75	41	639.25	643.75
11	211.25	215.75	42	645.25	649.75
12	217.75	221.75	43	651.25	655.75
13	471.25	475.75	44	657.25	661.75
14	477.25	481.75	45	663.25	667.75
15	483.25	487.75	46	669.25	673.75
16	489.25	493.75	47	675.25	679.75
17	495.25	499.75	48	681.25	685.75
18	501.25	505.75	49	687.25	691.75
19	507.25	511.75	50	693.25	697.75
20	513.25	517.75	51	699.25	703.75
21	519.25	523.75	52	705.25	709.75
22	525.25	529.75	53	711.25	715.75
23	531.25	535.75	54	717.25	721.75
24	537.25	541.775	55	723.25	727.75
25	543.25	547.75	56	729.25	733.75
26	549.25	553.75	57	735.25	739.75
27	555.25	559.75	58	741.25	745.75
28	561.25	565.75	59	747.25	751.75
29	567.25	571.75	60	753.25	757.75
30	573.25	577.75	61	759.25	763.75
31	579.25	583.75	62	765.25	769.75

(Note) fv: Video frequency
fs: Sound frequency

Table 4.10

CATV Frequency Table JAPAN Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
1	91.25	95.75	S17	319.25	323.75
2	97.25	101.75	S18	325.25	329.75
3	103.25	107.75	S19	331.25	335.75
M1	109.25	113.75	S20	337.25	341.75
M2	115.25	119.75	S21	343.25	347.75
M3	121.25	125.75	S22	349.25	353.75
M4	127.25	131.75	S23	355.25	359.75
M5	133.25	137.75	S24	361.25	365.75
M6	139.25	143.75	S25	367.25	371.75
M7	145.25	149.75	S26	373.25	377.75
M8	151.25	155.75	S27	379.25	383.75
M10	165.25	169.75	S29	391.25	395.75
4	171.25	175.75	S30	397.25	401.75
5	177.25	181.75	S31	403.25	407.75
6	183.25	187.75	S32	409.25	413.75
7	189.25	193.75	S33	415.25	419.75
8	193.25	197.75	S34	421.25	425.75
9	199.25	203.75	S35	427.25	431.75
10	205.25	209.75	S36	433.25	437.75
11	211.25	215.75	S37	439.25	443.75
12	217.25	221.75	S38	445.25	449.75
S1	223.25	227.75	S39	451.25	455.75
S2	231.25	235.75	S40	457.25	461.75
S3	237.25	241.75	S41	463.25	467.25
S4	243.25	247.75	13	471.25	475.75
S5	249.25	253.75	14	477.25	481.75
S6	253.25	259.75	15	483.25	487.75
S7	259.25	263.75	16	489.25	493.75
S8	265.25	269.75	17	495.25	499.75
S9	271.25	275.75	18	501.25	505.75
S10	277.25	281.75	19	507.25	511.75
S11	283.25	287.75	20	513.25	517.75
S12	289.25	293.75	21	519.25	523.75
S13	295.25	299.75	22	525.25	529.75
S14	301.25	305.75	23	531.25	535.75
S15	307.25	311.75	24	537.25	541.75
S16	313.25	317.75	25	543.25	547.75

Table 4.11

TV Frequency Table US Channel Frequency Assignments

ch. No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
2	55.25	59.75	43	645.25	649.75
3	61.25	65.75	44	651.75	655.75
4	67.25	71.75	45	657.25	661.75
5	77.25	81.75	46	663.25	667.75
6	83.25	87.75	47	669.25	673.75
7	175.25	179.75	48	675.25	679.75
8	181.25	185.75	49	681.25	685.75
9	187.25	191.75	50	687.25	691.75
10	193.25	197.75	51	693.25	697.75
11	199.25	203.75	52	699.25	703.75
12	205.25	209.75	53	705.25	709.75
13	211.25	215.75	54	711.25	715.75
14	471.25	475.75	55	717.25	721.75
15	477.25	481.75	56	723.25	727.75
16	483.25	487.775	57	729.25	733.75
17	489.25	493.75	58	735.25	739.75
18	495.25	499.75	59	741.25	745.75
19	501.25	505.75	60	747.25	751.75
20	507.25	511.75	61	753.25	757.75
21	513.25	517.75	62	759.25	763.75
22	519.25	523.75	63	765.25	769.775
23	525.25	529.75	64	771.25	775.75
24	531.25	535.75	65	777.25	781.75
25	537.25	541.75	66	783.25	787.75
26	543.25	547.75	67	789.25	793.75
27	549.25	553.75	68	795.25	799.75
28	555.25	559.75	69	801.25	805.75
29	561.25	565.75	70	807.25	811.75
30	567.25	571.75	71	813.25	817.75
31	573.25	577.75	72	819.25	823.75
32	579.25	583.75	73	825.25	829.75
33	585.25	589.75	74	831.25	835.75
34	591.25	595.75	75	837.25	841.75
35	597.25	601.75	76	843.25	847.75
36	603.25	607.75	77	849.25	853.75
37	609.25	613.75	78	855.25	859.75
38	615.75	619.75	79	861.25	865.75
39	621.25	625.75	80	867.25	871.75
40	627.25	631.75	81	873.25	877.75
41	633.25	637.75	82	879.75	883.75
42	639.25	643.75	83	885.25	889.75

Table 4.12

CATV Frequency Table US Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
2	55.25	59.75	R	265.25	269.75
3	61.25	65.75	S	271.25	275.75
4	67.25	71.75	T	277.25	281.75
5	77.25	81.75	U	283.25	287.75
6	83.25	87.75	V	289.25	293.75
A-6	85.25	89.75	W	295.25	299.75
A-5	91.25	95.75	AA	301.25	305.75
A-4	97.25	101.75	BB	307.25	311.75
A-3	103.25	107.75	CC	313.25	317.75
A-2	109.25	113.75	DD	319.25	323.75
A-1	115.25	119.75	EE	325.25	329.75
A	121.25	125.75	FF	331.25	335.75
B	127.25	131.75	GG	337.25	341.75
C	133.25	137.75	HH	343.25	347.75
D	139.25	143.75	II	349.25	353.75
E	145.25	149.775	JJ	355.25	359.75
F	151.25	155.75	KK	361.25	365.75
G	157.25	161.75	LL	367.25	371.75
H	163.25	167.75	MM	373.25	377.75
I	169.25	173.75	NN	379.25	383.75
7	175.25	179.75	OO	385.25	389.75
8	181.25	185.75	PP	391.25	395.75
9	187.25	191.75	QQ	397.25	401.75
10	193.25	197.75	RR	403.25	407.75
11	199.25	203.75	SS	409.25	413.75
12	205.25	209.75	TT	415.25	419.75
13	211.25	215.75	UU	421.25	425.75
J	217.25	221.75	VV	427.25	431.75
K	223.25	227.75	WW	433.25	437.75
L	229.25	223.75	XX	439.25	443.75
M	235.25	239.75	YY	445.25	449.75
N	241.25	245.75	ZZ	451.25	455.75
O	247.25	251.75	AAA	457.25	461.75
P	253.25	257.75	BBB	463.25	467.75
Q	259.25	263.75	CCC	469.25	473.75

Table 4.13

TV Frequency Table TAIWAN Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]
7	175.25	179.75
8	181.75	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75

Table 4.14

TV Frequency Table CHINA Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
1	49.75	56.25	30	647.25	653.75
2	57.75	64.25	31	655.25	661.75
3	65.75	72.25	32	663.25	669.75
4	77.25	83.75	33	671.25	677.75
5	85.25	91.75	34	679.25	685.75
6	168.25	174.75	35	687.25	693.75
7	176.25	182.75	36	695.25	701.75
8	184.25	190.75	37	703.25	709.75
9	192.25	198.75	38	711.25	717.75
10	200.25	206.75	39	719.25	725.75
11	208.25	214.75	40	727.25	733.75
12	216.25	222.75	41	735.25	741.75
13	471.25	477.75	42	743.25	749.75
14	479.25	485.75	43	751.25	757.75
15	487.25	493.75	44	759.25	765.75
16	495.25	501.75	45	767.25	773.75
17	503.25	509.75	46	775.25	781.75
18	511.25	517.75	47	783.25	789.75
19	519.25	525.75	48	791.25	797.75
20	527.25	533.75	49	799.25	805.75
21	535.25	541.75	50	807.25	813.75
22	543.25	549.75	51	815.25	821.75
23	551.25	557.75	52	823.25	829.75
24	559.25	565.75	53	831.25	837.75
25	607.25	613.75	54	839.25	845.75
26	615.25	621.75	55	847.25	853.75
27	623.25	629.75	56	855.25	861.75
28	631.25	637.75	57	863.25	869.75
29	639.25	645.75			

Table 4.5

TV Frequency Table CCIR Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
2	48.25	53.75	40	623.25	628.75
3	55.25	60.75	41	631.25	636.75
4	62.25	67.75	42	639.25	644.75
5	175.25	180.75	43	647.25	652.75
6	182.25	187.75	44	655.25	660.75
7	189.25	194.75	45	663.25	668.75
8	196.25	201.75	46	671.25	676.75
9	203.25	208.75	47	679.25	684.75
10	210.25	215.75	48	687.25	692.75
11	217.25	222.75	49	695.25	700.75
12	224.25	229.75	50	703.25	708.75
21	471.25	476.75	51	711.25	716.75
22	479.25	484.75	52	719.25	724.75
23	487.25	492.75	53	727.25	732.75
24	495.25	500.75	54	735.25	740.75
25	503.25	508.75	55	743.25	748.75
26	511.25	516.75	56	751.25	756.75
27	519.25	524.75	57	759.25	764.75
28	527.25	532.75	58	767.25	772.75
29	535.25	540.75	59	775.25	780.75
30	543.25	548.25	60	783.25	788.75
31	551.25	556.75	61	791.25	796.75
32	559.25	564.75	62	799.25	804.75
33	567.25	572.75	63	807.25	812.75
34	575.25	580.75	64	815.25	820.75
35	583.25	588.75	65	823.25	828.75
36	591.25	596.75	66	831.25	836.75
37	599.25	604.75	67	839.25	844.75
38	607.25	612.75	68	847.25	852.75
39	615.25	620.75	69	855.25	860.75

Table 4.16

CATV Frequency Table CCIR Channel Frequency Assignments

ch No.	fv [MHz]	fs [MHz]	ch No.	fv [MHz]	fs [MHz]
E2	48.25	53.75	E5	175.25	180.75
E3	55.25	60.75	E6	182.25	187.75
E4	62.25	67.75	E7	189.25	194.75
X	69.25	74.75	E8	196.25	201.75
Y	76.25	81.75	E9	203.25	208.75
Z	83.25	88.75	E10	210.25	215.75
Z+1	90.25	95.75	E11	217.25	222.25
Z+2	97.25	102.75	E12	224.25	229.75
S1	105.25	110.75	S11	231.25	236.75
S2	112.25	117.75	S12	238.25	243.75
S3	119.25	124.75	S13	245.25	250.75
S4	126.25	131.75	S14	252.25	257.75
S5	133.25	138.75	S15	259.25	264.75
S6	140.25	145.75	S16	266.25	271.75
S7	147.25	152.75	S17	273.25	278.75
S8	154.25	159.75	S18	280.25	285.75
S9	161.25	166.75	S19	287.25	292.75
S10	168.25	173.75	S20	294.25	299.75

Table 4.17

**TV Frequency Table
ANGORA Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
1	43.25	49.25
2	52.25	58.25
3	60.25	66.25
4	175.25	181.25
5	183.25	189.25
6	191.25	197.25
7	199.25	205.25
8	207.25	213.25
9	215.25	221.25
10	223.25	229.25

Table 4.22

**TV Frequency Table
IRELAND Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
A	45.75	51.75
B	53.75	59.75
C	61.75	67.75
D	175.25	181.25
E	183.25	189.25
F	191.25	197.25
G	199.25	205.25
H	207.25	213.25
J	215.25	221.25

Table 4.23

**TV Frequency Table
ITALY Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
A	53.75	59.25
B	62.25	67.75
C	82.25	87.75
D	175.25	180.75
E	183.75	189.25
F	192.25	197.75
G	201.25	206.25
H	210.25	215.75
H1	217.25	222.75
H2	224.25	229.75

Table 4.24

**TV Frequency Table
AUSTRALIA Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
0	46.25	51.75
1	57.25	62.75
2	64.25	69.75
3	86.25	91.75
4	95.25	100.75
5	102.25	107.75
5A	138.25	143.75
6	175.25	180.75
7	182.25	187.75
8	189.25	194.75
9	196.25	201.75
10	209.25	214.75
11	216.25	221.75

Table 4.25

**TV Frequency Table
OIRT Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
1	49.75	56.25
2	59.25	65.75
3	77.25	83.75
4	85.25	91.75
5	93.25	99.75
6	175.25	181.75
7	183.25	189.75
8	191.25	197.75
9	199.25	205.75
10	207.25	213.75
11	215.25	221.75
12	223.25	229.75

Table 4.26

**TV Frequency Table
MO Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
4	163.25	168.75
5	171.25	176.75
6	179.25	184.75
7	187.25	192.75
8	195.25	200.75
9	203.25	208.75
10	211.25	216.75

Table 4.29

**TV Frequency Table
F Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
A	47.75	41.25
B	55.75	49.25
C1	60.50	54.00
C	63.75	57.25
1	176.00	182.50
2	184.00	190.50
3	192.00	198.50
4	200.00	206.50
5	208.00	214.50
6	216.00	222.50

Table 4.27

**TV Frequency Table
I.C Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
1	43.25	49.25
2	52.25	58.25
3	60.25	66.25
4	175.25	181.25
5	183.25	189.25
6	191.25	197.25
7	199.25	205.25
8	207.25	213.25
9	215.25	221.25

Table 4.30

**TV Frequency Table
FOT Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
4	175.25	181.75
5	183.25	189.75
6	191.25	197.75
7	199.25	205.75
8	207.25	213.75
9	215.25	221.75

Table 4.28

Country	System			
	V H F	U H F	Color	Channel
Asia				
Afghanistan	B		PAL	CCIR
United Arab Emirates			PAL	CCIR
Yemen Arab Republic	B		PAL	CCIR
Israel	B	G		CCIR
Iraq	B		SECAM	CCIR
Islamic Republic of Iran	B		SEAM	CCIR
India	B			CCIR
Indonesia	B	G	PAL	IN
Oman	B	G	PAL	CCIR
Qatar	B		PAL	CCIR
Republic of Korea	M	M	NTSC	US
Khmer Republic	M		NTSC	US
Democratic People's Republic of Korea	D		SECAM	OIRT
Cyprus	B B	B G	PAL	CCIR
Kuwait	B		PAL	CCIR
Saudi Arabia	B	G	SEAM	CCIR
Syrian Arab Republic	B		SEAM	CCIR
Singapore	B		PAL	CCIR
Sri Lanka	B		PAL	CCIR
Thailand	B		PAL	CCIR
China	D	D	PAL	CHINA
Turkey	B		(PAL)	CCIR
Nepal	—	—	—	—
Pakistan	B		PAL	CCIR

Country	System			
	V H F	U H F	Color	Channel
Barhrain	B		PAL	CCIR
Bangladesh	B			CCIR
Myanmar (Union of)	M		NTSC	US*
Philippines	M	M	NTSC	US
Bhutan	--	--	--	--
Viet-Nam	D M			
Malaysia	B		PAL	CCIR
People's Democratic Republic of Yemen	B			CCIR
Moldives	B		PAL	CCIR
Monglia	D			OIRT*
Jordan	B		PAL	CCIR
Laos People's Democratic Republic	--	--	--	--
Lebanon	B		SECAM	CCIR
Brunei	B		PAL	CCIR
Hong Kong		I	PAL	UK
Macao	--	--	--	--
Taiwan	M		NTSC	US
Oceania				
Australia	B	B	PAL	Australia
Kiribati	--	--	--	--
Solomon Islands	--	--	--	--
Tuvalu	--	--	--	--
Tonga	--	--	--	--
Nauru	--	--	--	--

Country	System			
	V H F	U H F	Color	Channel
Western Samoa	(M)		(NTSC)	(US)
New Zealand	B		PAL	NZ
Vanuatu	—	—	—	—
Papua New Guinea	—	—	—	—
Fiji	—	—	—	—
Guam	M		NTSC	US
New Caledonia	K ₁		SECAM	FOT
Hawai	M		NTSC	US
French Polynesia	K ₁			FOT
American Samoa	M		NTSC	US
Micronesia	M		NTSC	US
Africa				
Algeria	B	(G)	PAL	CCIR
Angola	I			ANGOLA
Uganda	B		PAL	CCIR
Egypt	B		SECAM	CCIR
Ethiopia	B			CCIR
Upper Volta	K ₁			OIRT
Ghana	B		PAL	CCIR
Cape Verde	—	—	—	—
Gabob	K ₁		SECAM	FOT
United Republic of Cameroon	—	—	—	—
Gambia	(K ₁)			(FOT)
Guinia	—	—	—	—

Country	System			
	V H F	U H F	Color	Channel
Guinea-Bissau	—	—	—	—
Kenya	B			CCIR
Ivory Coast	K ₁		SECAM	IC
Comoros	—	—	—	—
Congo	D			FOT*
Zaire	K ₁		SECAM	FOT
Sao Tome and Principe	—	—	—	—
Zambia	B		PAL	CCIR
Sierra Leone	B		PAL	CCIR
Djibouti	K ₁		SEAM	FOT
Zimbabwe	B			CCIR
Sudan	B			CCIR
Swaziland	G		PAL	
Equatorial Guinea	B			
Seychelles	—	—	—	—
Senegal	K ₁			FOT
Somalia	—	—	—	—
United Republic of Tanzania	B I	I	PAL	CCIR
Chad	—	—	—	—
Central African Republic	B			
Tunisia	B		SECAM	CCIR*
Togo	K ₁		SEAM	FOT*
Nigeria	B		PAL	CCIR
Niger	K ₁			FOT*
Burundi	—	—	—	—

Country	System			
	V H F	U H F	Color	Channel
Benin	K ₁			FOT*
Botswana	—	—	—	—
Madagascar	K ₁			FOT*
Marawi	—	—	—	—
Mari	—	—	—	—
Republic of South Africa	I	I	PAL	SA
Mozambique	B			
Mauritus	B		SECAM	CCIR
Mauritania	B			
Morocco	B		SECAM	MO
Libyan Arab Jamahiriya	B		SECAM	CCIR
Liberia	B		PAL	CCIR
Rwanda		—	—	—
Lesotho	—	—	—	—
Europe				
Iceland	B		PAL	CCIR
Ireland	A I	I	PAL	IR
Albania	B			IT*
Andorra				
United Kingdom	A	I	PAL	UK
Italy	B	G	PAL	IT
Austria	B	G	PAL	CCIR
Netherlands	B	G	PAL	CCIR
Greece	B	G	SECAM	CCIR*

Country	System			
	V H F	U H F	Color	Channel
San Marino	B	G	PAL	IT
Switzerland	B	G	PAL	CCIR
Sweden	B	G	PAL	CCIR
Spain	B	G	PAL	CCIR
Union of Soviet Socialist Republics	D	K	SECAM	OIRT
Czechoslovakia	D	K	SECAM	OIRT
Denmark	B	G	PAL	CCIR
Federal Republic of Germany	B	G	PAL	CCIR
Norway	B	G	PAL	CCIR
Vatican City State	—	—	—	—
Hungary	D	K	SECAM	OIRT
German Democratic Republic	B	G	SECAM	CCIR
Finland	B	G	PAL	CCIR
France		L	SECAM	F
Bulgaria	D	K	SECAM	OIRT
Belgium	B	H	PAL	CCIR
Poland	D	K	SECAM	OIRT
Portugal	B	G	PAL	CCIR*
Malta	B			CCIR
Principality of Monaco	G	L G	SECAM PAL	CCIR
Yugoslavia	B	G	PAL	CCIR
Liechtenstein	—	—	—	—
Grand Duchy of Luxembourg	C	L G	SECAM PAL	CCIR*
Rumania	D	D		OIRT

Country	System			
	V H F	U H F	Color	Channel
South and North America				
United States of America	M	M	NTSC	US
Argentina	N		PAL	US
Uruguay	N			US*
Ecuador	M		NTSC	US
E1 Salvador	M		NTSC	US*
Guyana	K _i		FOT	
Canada	M	M	NTSC	US
Cuab	M		NTSC	US*
Guatemala	M		NTSC	US
Grenada	--	--	--	--
Costa Rica	M		NTSC	US
Colombia	M		NTSC	US*
Jamaica	M			US
Surinam	M		NTSC	US
St. Vincent	--	--	--	--
Saint Lucia	M		NTSC	US*
Chile	M		NTSC	US
Dominican Republic	M		NTSC	US
Commonwealth of Dominica	--	--	--	--
Trinidad and Tobago	M		NTSC	US
Nicaragua	M		NTSC	US
Haiti	M		NTSC	US*
Panama	M		NTSC	US
Bahamas	M		NTSC	US*

Country	System			
	V H F	U H F	Color	Channel
Paraguay	N			US*
Barbados	M		NTSC	US
Brazil	M	M	PAL	US
Venezuela	M		NTSC	US
Peru	M		NTSC	US
Bolivia	N		PAL	US
Honduras	M			US
Mexico	M	M	NTSC	US
Others				
Greenland	M		NTSC	US
Bermuda	M		NTSC	US
Puerto Rico	M	M	NTSC	US
St. Pierre et Miquelon	K ₁		SECAM	FOT
Antigua	M			US
Guadalupe	K ₁		SECAM	FOT
Martinique	K ₁		SECAM	FOT
Netherlands	M		NTSC	US
St Kits	M			US
Turks & Caicos Is.	M		NTSC	US
Virginia Is. (American)	M		NTSC	US
Virginia Is. (British)	K ₁		NTSC	US
Guiana (French)	K ₁			FOT
Azores Is.				CCIR US

Country	System			
	V H F	U H F	Color	Channel
Gibraltar	B		PAL	CCIR
Canarias Is.	B			CCIR
Madeira Is.	B		CCIR	
Reunion	K ₁		SECAM	FOT
Diego Garcia	M		NTSC	US
Johnstone Is. (American)	M		NTSC	US
Midway Is. (American)	M		NTSC	US
Tahiti Is.	K ₁		FOT	

Note: Abbreviations used in the Channel section are as shown in the following table.

FOT	French overseas territories
IC	Ivory Coast
IR	Ireland
IT	Italy
MO	Morocco
NZ	New Zealand
SA	South Africa
UK	United Kingdom

- * Estimated
 - () There is no own broadcasting station, but one can receive a broadcasting program from the neighboring countries.
 - There is no broadcasting station.
- No marking: Unknown

4.13.6 Output Signal Setting of 21-pin multiconnector

- ① Setting conditions of Ys, Ym and AV for NTSC system, and Ys, SLOW for PAL and SECAM systems
The Model 408NPS can be set these signals on 21-pin connector as follows.

Setting conditions of Ys, Ym and AV for NTSC system

- Ys : HI Switches to analog RGB signal.
LO Switches to internal signal of TV set.
Ym : HI Makes internal signal of TV set for half-tone.
LO Makes internal signal of TV set for full-tone.
AV : HI Displays the signal of the 21-pin RGB connector on the monitor.
LO Switched to internal signal of TV set.

Setting conditions of Ys, SLOW for PAL and SECAM systems

- Ys : HI Displays the signal of the 21-pin connector on the monitor.
LO Switches to internal signal (broadcasting or video) of TV set.
SLOW : HI Switches to video signal.
LO Switches to broadcasting.

- ② Setting methods of Ys, Ym and AV for NTSC system, and Ys, SLOW for PAL and SECAM systems
Proceed as follows.

○ Display

[MAIN MENU] NTSC-M
◆ MULTI RGB MODE

RGB PRESET NTSC-M
Ys: HI Ym: HI AV: HI

RGB PRESET PAL-B
Ys: LO SLOW: LO

○ Operation

- Select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

- The display will change as shown left by pressing [ENTER] key.
(Upper: NTSC, Lower: PAL and SECAM)

- Use [ENTER] key to select HI/LO.
Use [CURSOR] keys to select the item.
After setting is made, press [MENU] key to return [MAIN MENU].

4.13.7 Using Programmed Condition

The Model 408NPS can be stored or recalled the key setting conditions. Up to 100 conditions can be set with address of 0 to 99. The 100 addresses can be divided into four overlapable areas.

1) Programming

There are four kinds of modes in [PROGRAM].

- ADDRESS PROGRAM Programmes each address.
- AREA PROGRAM Determines the address recall area.
- ADDRESS COPY Copies designated address to arbitrary address area.
- BLOCK COPY Copies arbitrary address to designated address area.

① Program mode setting

○ Display
NTSC-M [MAIN MENU]
▲ SUB MENU

[SUB MENU] NTSC-M
◆ PROGRAM MODE

- Operation
- Select the display as shown left by using [NEXT] key, then press [ENTER] key.
 - By pressing [ENTER] key, the display becomes [SUB MENU]. Select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

② Programmes for each address

○ Display
[PROGRAM] NTSC-M
▼ ADDRESS PROGRAM

PROG ADDR = 100
▼ COLOR SYSTEM

- Operation
- After pressing the [ENTER] key at step ①, select the display as shown left by using [PREVIEW] key, then press [ENTER] key.
 - The display will change as shown left by pressing [ENTER] key.

This mode recalls the program contents of the displayed address and sets the instrument according to the contents, then becomes waiting conditions. The contents are the same contents as [MAIN MENU] setting.

When the mode returns to address changing or menu, the current setting contents are written into the address being displayed.

Proceed following operation for the programming.

- ① Select address to be programmed by using the jog dial.
- ② Apply the same procedure as the [MAIN MENU].
- ③ Press [MENU] key to return for the mode selection.
- ④ Repeat step ① to ③ as required for the programming. Press [MENU] key when program is completed.

③ Address area designation to recall

○ Display
[PROGRAM] NTSC-M
◆ AREA PROGRAM

PROG AREA = 0
BEG: 0 END: 3

Select the area number (0 to 3) by using (◀ ▶) of the [CURSOR] key.

Use [ENTER] key to select BEG and END.

Use the jog dial to set the address.

The BEG address number must be lower than the END address.

- Operation
- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key.

- The display will change as shown left by pressing press [ENTER] key.

④ Program copy mode

When repeat the programming with similar contents, use copy mode.

① [ADDRESS COPY] Repeated use of the contents in the specified address

○ Display
[PROGRAM] NTSC-M
▲ ADDRESS COPY

○ Operation

○ After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

PROG ADDR COPY
SOURCE ADDR=00

○ The display will change as shown left by pressing [ENTER] key. Select source address in this condition. Use the jog dial to select the source address, then press [ENTER] key.

PROG DEST ADDR
BEG: 02 END: 10

○ The display will change as shown left by pressing [ENTER] key. Set address area to be transferred. Use (◀ ▶) of the [CURSOR] key to select BEG/END, and jog dial to select the address.

PROG ADDR COPY
COMPLETED!

○ Press [ENTER] key after the address selection is made. When transfer is completed, the menu as shown left will display. In this example, the contents of the address 00 are transferred to the address 02 to 10. When the address of destination is only one, set the BEG and END addresses are the same.

② [BLOCK COPY] Copying the contents of some address area to other address area

[PROGRAM] NTSC-M
▲ BLOCK COPY

○ After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT] key, then press [ENTER] key.

BLOCK COPY SOURCE
BEG: 00 END: 00

○ The display will change as shown left by pressing [ENTER] key. Select source address area in this condition. Use (◀ ▶) of the [CURSOR] key to select BEG/END, and jog dial to select the address, then press [ENTER] key.

BLOCK COPY DEST
DEST ADDR = 00

○ The display will change as shown left by pressing [ENTER] key. Select the address of destination by using jog dial.

BLOCK COPY
COMPLETED!

○ Press the [ENTER] key after the address selection is made. When transfer is completed, the menu as shown left will display.

! Transfer is impossible in following conditions;

- Number of source address area exceeds 50.
- The source and destination areas have the same address number.
- End of the destination address exceeds 99.

2) RECALL mode

Use RECALL mode to recall the stored contents. Select [RECALL] from the [SUB MENU].

○ Display
[MAIM MENU] NTSC-M
▲ SUB MENU

[SUB MENU] NTSC-M
▼ RECALL MODE

[R1-02] NTSC-M
▲ JAPAN V: 12ch
▼

○ Operation

- Select [SUB MENU] by using [NEXT] key, then press [ENTER] key.
- Select the display as shown left by using [PREVIEW] key, then press [ENTER] key.
- The display will change to Recall mode as shown left by pressing [ENTER] key. The RECALL lamp goes on.

In Recall mode, the function of editor key is changed as follows.

- ▶ : [AREA]. Area change
- ◀ : [BEGIN]. Begin address setting
- [NEXT] : [INC]. Address increment
- [PREVIEW] : [DEC]. Address decrement
- [MENU] : [END]. Recall mode end (to main menu)
- Jog dial : Address increment/decrement
- [ENTER] : To [PATTERN/MODE KEY LOCK MODE]

! Pattern and mode keys operation in Recall mode

When the keys are not locked, the pattern and mode can be changed temporarily. Once the address is changed, however, the programmed contents are restored.

! Key lock

Pressing the [ENTER] key activates the [PATTERN/MODE KEY] mode. Select [FREE] or [LOCK] by using [CURSOR] keys.

4.13.8 Presettings

The Model 408NPS has the preset functions for easier operation. The presettable items are described below.

- Country: A desired country can be selected at [TV-CH] mode.
- Channel: A desired channel can be selected at [TV-CH] mode.
- LCD back-light: Brightness of the LCD back-light can be selected in 2 steps.
- Pattern/mode key lock: The pattern and mode keys can be locked to avoid mis-operation.
- Beep: The beeper can be set on/off.
- Circle: Selects the pattern to be superimposed on the circle pattern.

① Preset mode settings

○ Display
[MAIM MENU] NTSC-M
▲ SUB MENU

[SUB MENU] NTSC-M
▲ PRESET MODE

- Operation
- Select the display as shown left by using [NEXT] key, then press [ENTER] key.
 - The display will change as shown left by pressing [ENTER] key.
 - Select [PRESET] by using [NEXT/PREVIEW] key.

② Country preset/channel preset

This setting should be made as following order; Country selection → Channel to be used in selected country.

The channel in undesignated country cannot be set.

1) Country preset

○ Display
[PRESET] NTSC-M
▼ COUNTRY/CHANNEL

[COUNTRY] ON/OFF = ENT
▲ JAPAN: V (ON) ▶

- Operation
- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.
 - The display will change as shown left by pressing [ENTER] key. Select the country by using [NEXT/PREVIEW] key. Select the country to be used by pressing [ENTER] key for ON or OFF. The ▶ mark at ON denotes that the current mode can be moved to channel preset mode by pressing [◀] of [Cursor] key.

2) Channel preset

There are three channel presetting methods; [INDIVIDUAL]: Sets the channel individually. [ALL CHANNEL ON]: All channel on [ALL CHANNEL OFF]: All channel off

- Individual

○ Display
[CHANNEL PRESET]
▼ INDIVIDUAL

[CH] ON/OFF = ET (*ON)
◀ JAPAN: V* 1CH

- Operation
- Set the desired country to ON, then press ▶ key. Select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.
 - The display will change as shown left by pressing [ENTER] key. [*] mark of the channel number denotes that the designated channel is ON. Set address area to transfer. Use [ENTER] key to select ON/OFF, and jog dial to select the channel.

- All channel on/all channel off
[CHANNEL PRESET] NTSC-M
▲ ALL CHANNEL ON
or
[CHANNEL PRESET] NTSC-M
ALL CHANNEL OFF

ALL CHANNEL ON?
YES: ENTER NO: MENU

or
ALL CHANNEL OFF?
YES: ENTER NO: MENU

[CH PRESET]
SET ALL CH ON!
or
SET ALL CH OFF!

- Select either display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

- The display will change as shown left by pressing [ENTER] key.

- When ON (or OFF) is OK, press the [ENTER] key. The display will change as shown left by pressing [ENTER] key.

③ LCD back-light

○ Display
[PRESET] NTSC-M
▲ LCD BACK LIGHT

LCD BACK LIGHT
■ HI □ LOW

○ Operation

- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

- The display will change as shown left by pressing [ENTER] key.
Select HI/LOW by using [ENTER] key.

④ Pattern/mode key lock

○ Display
[PRESET] NTSC-M
▲ PATTERN/MODE KEY

PATTERN/MODE KEY
■ FREE □ LOCK

○ Operation

- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

- The display will change as shown left by pressing [ENTER] key.
Select FREE/LOCK by using [ENTER] key.

⑤ Beeper

The beeper can be set as follows

- ALL BEEP: Sets beeper ON/OFF.
- KEY-IN BEEP: Sets key-in beep ON/OFF. (ALL BEEP should be ON)
- ERROR BEEP: Sets error beep ON/OFF. (ALL BEEP should be ON)

○ Display
[PRESET] NTSC-M
▲ BEEP SET

[BEEP]
▼ ALL BEEP OFF

or
[BEEP]
▲ KEY-ON BEEP OFF

or
[BEEP]
▲ ERROR BEEP OFF

○ Operation

- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.

- The display will change as shown left by pressing [ENTER] key.
Select desired item by using [NEXT/PREVIEW] key.
Select ON/OFF by using [ENTER] key.

⑥ Circle

○ Display
[PRESET] NTSC-M
▲ CIRCLE ON

CIRCLE ON
■ NORMAL □ ALL

- Operation
- After pressing the [ENTER] key at step ①, select the display as shown left by using [NEXT/PREVIEW] key, then press [ENTER] key.
 - The display will change as shown left by pressing [ENTER] key.
Select NORMAL/ALL by using [◀ ▶] keys.

- * NORMAL: The circle pattern is superimposed on the crosshatch, convergence, window and checker patterns.
- * ALL: The circle pattern is superimposed on the all patterns.

**TV Frequency Table
NEW ZEALAND Channel
Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
1	42.25	50.75
2	55.25	60.75
3	62.25	67.75
4	175.25	180.75
5	182.25	187.75
6	189.25	194.75
7	196.25	201.75
8	203.25	208.75
9	210.25	215.75
10	217.25	222.75
11	224.25	229.75

Table 4.18

**TV Frequency Table
SOUTH AFRICA Channel
Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
4	175.25	181.25
5	183.25	189.25
6	191.25	197.25
7	199.25	205.25
8	207.25	213.25
9	215.25	221.25
10	223.25	229.25
11	231.25	237.25
12	—	—
13	247.43	253.43

Table 4.19

**TV Frequency Table
INDONESIA Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
1A	44.25	49.75
2	55.25	60.75
3	62.25	67.75
4	175.25	180.75
5	182.25	187.75
6	189.25	194.75
7	196.25	201.75
8	203.25	208.75
9	210.25	215.75
10	217.25	222.75
11	224.25	229.75

Table 4.20

**TV Frequency Table
UK Channel Frequency Assignments**

ch No.	fv [MHz]	fs [MHz]
B1	45.00	41.50
B2	51.75	48.25
B3	56.75	53.25
B4	61.75	58.25
B5	66.75	63.25
B6	179.75	176.25
B7	184.75	181.25
B8	189.75	186.25
B9	194.75	191.25
B10	199.75	196.25
B11	204.75	201.25
B12	209.75	206.25
B13	214.75	211.25
B14	219.75	216.25

Table 4.21

4.13.9 Screen Message

The Model 408NPS can be displayed the messages such as menu contents on the monitor. The following items can be turned on/off.

- * ALL MESSAGE: Displays all messages
- * ERROR MESSAGE: Error message
- * RCL/PRG ADDR: Address display of recall and program modes
- * TV-CH COUNTRY: Country display of TV channel mode
- * TV-CH CHANNEL: Channel display of TV channel mode
- * TV-CH DISP POS: Display position of TV channel mode (TOP: Top BTM: Bottom)

○ Display
[MAIN MENU] NTSC-M
▲ SUB MENU

[SUB MENU] NTSC-M
SCREEN MODE

[SCREEN]

[SCREEN]

▼ ALL MESSAGE: ET ON
or

[SCREEN]

◆ ERROR MESSAGE: ET OFF
or

[SCREEN]

◆ RCL/PRG ADDR: ET ON
or

[SCREEN]

◆ TV-CH COUNTRY: ET ON
or

[SCREEN]

◆ TV-CH CHANNEL: ET ON
or

[SCREEN]

▲ TV-CH DISP POS: ET TOP

○ Operation

○ Select the display as shown left by using [NEXT] key, then press [ENTER] key.

○ After pressing the [ENTER] key, select the display as shown left by using [NEXT] key, then press [ENTER] key.

○ By pressing [ENTER] key, one of the menus as shown left will display. Select desired item by using [NEXT/PREVIEW] key. Select ON/OFF, or TOP/BTM for [TV-CH DISP POS] by using [ENTER] key.

4.14 Others

1) Checking the Software Version

The software version is checked as follows

- ① Turn the power off.
- ② Turn the power on again while pressing the [ENTER] key.

2) Battery Backup

The settings and program contents of the Model 408NPS are backed up by a battery. The battery works for about 10 days when fully charged. The battery is charged automatically when the power is on.

5.1 Color Bar Patterns

5.1.1 Full-field Color Bar Pattern (See Figure 5.1 and 5.2)

The full-field color bar pattern has eight-vertical bars. The full-field color bar is used widely to inspect the video equipments.

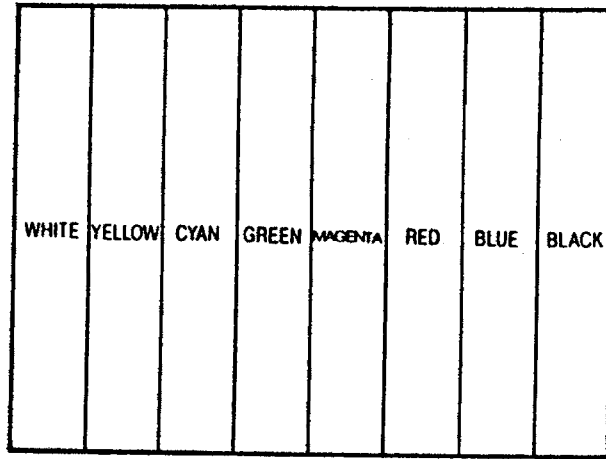
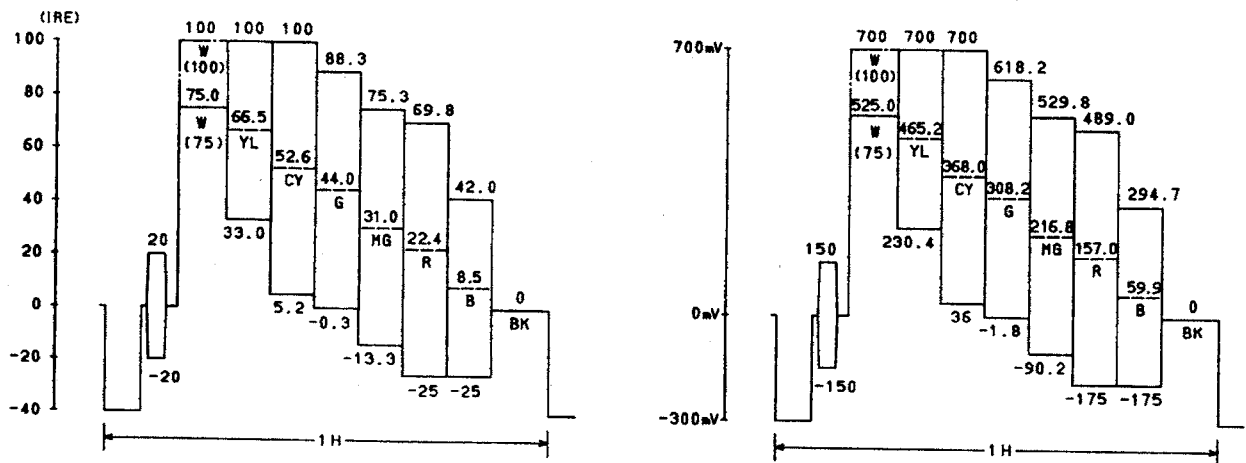
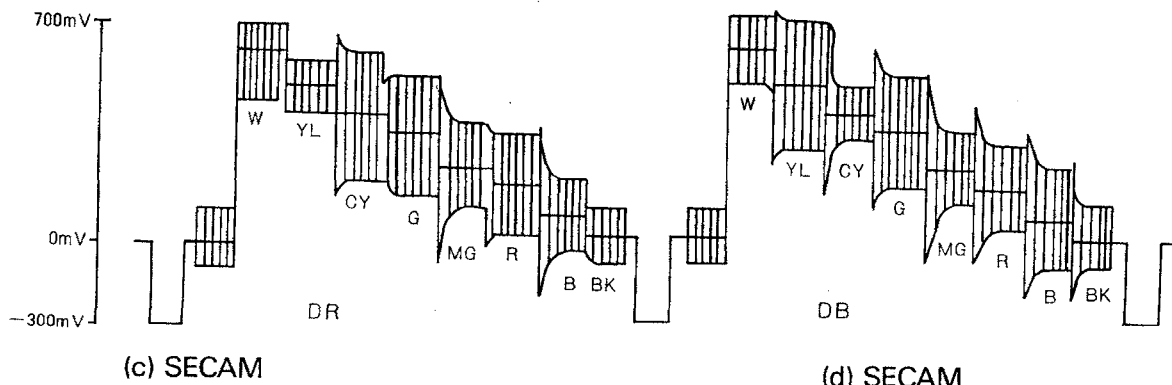


Figure 5.1



(a) NTSC

(b) PAL



(c) SECAM

(d) SECAM

Figure 5.2

5.1.2 SMPTE Color Bar Pattern (See Figure 5.3, 5.4, 5.5 and 5.6)

The SMPTE color bar pattern conforms to SMPTE ECR-1-1978 standards. The figures below show the pattern and waveform. The color bar is generated by adding a chroma set signal (reverse blue bar) and blank set signal to the EIA color bar. The chroma set signal consists of four color bars containing blue

component (with an arrangement opposite that of the EIA color bar) and black sections. The black set signal has 7.5IRE \pm 4% setup level for NTSC, pedestal level \pm 4% for PAL and SECAM systems. The first bar (BLK-4) is slightly darker; the third bar (BLK + 4) is slightly lighter than standard black (BLK).

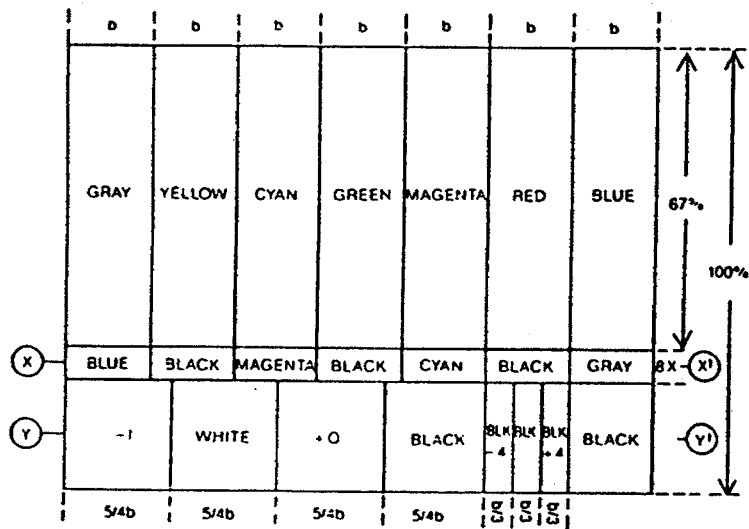


Figure 5.3

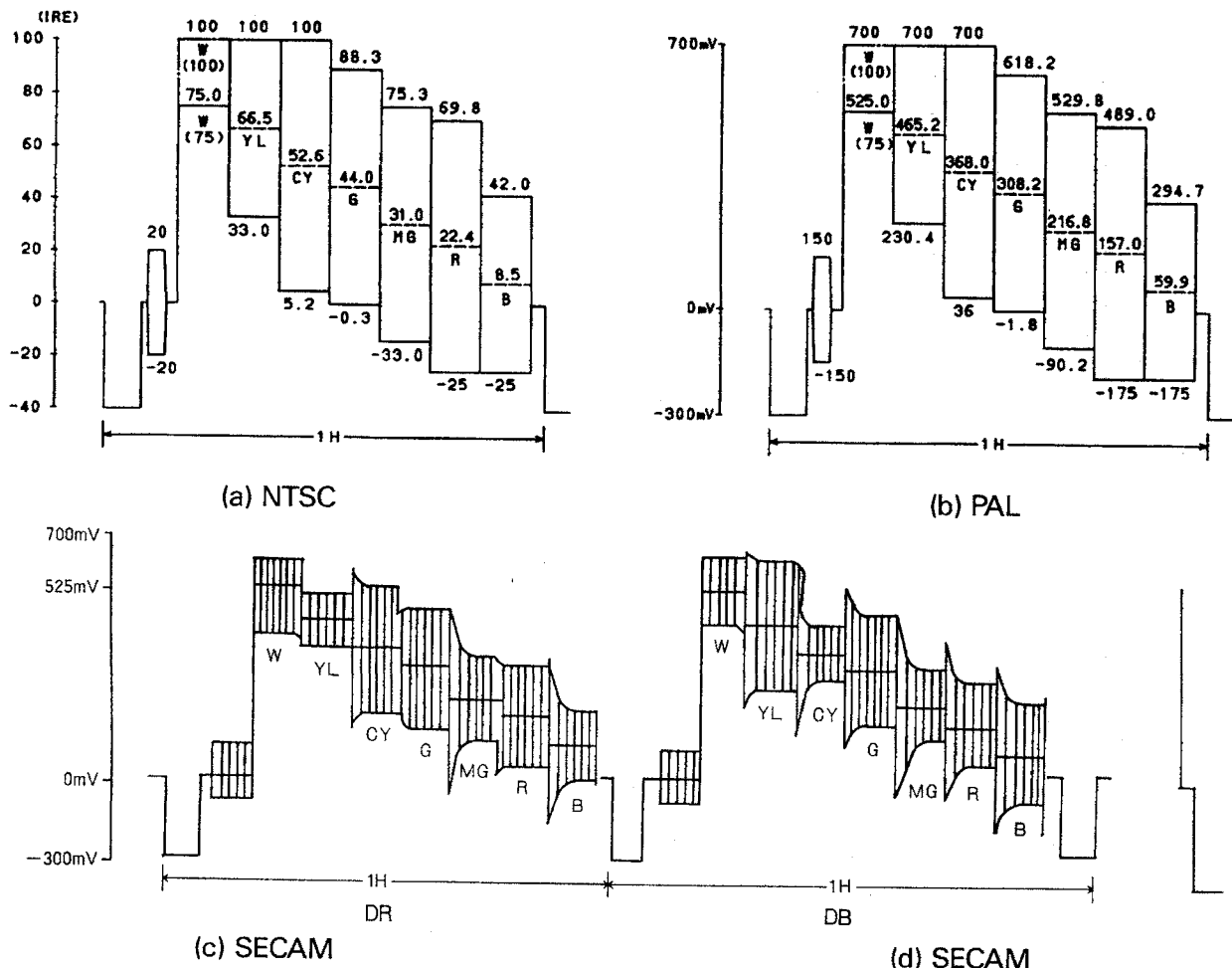
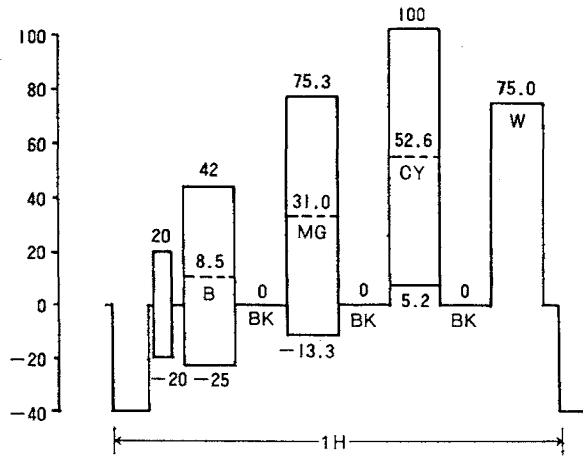
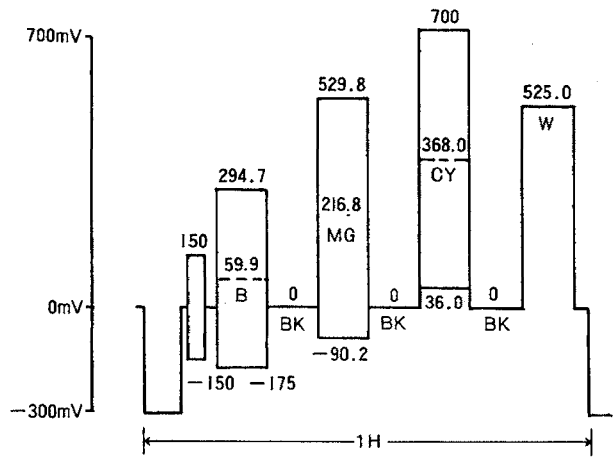


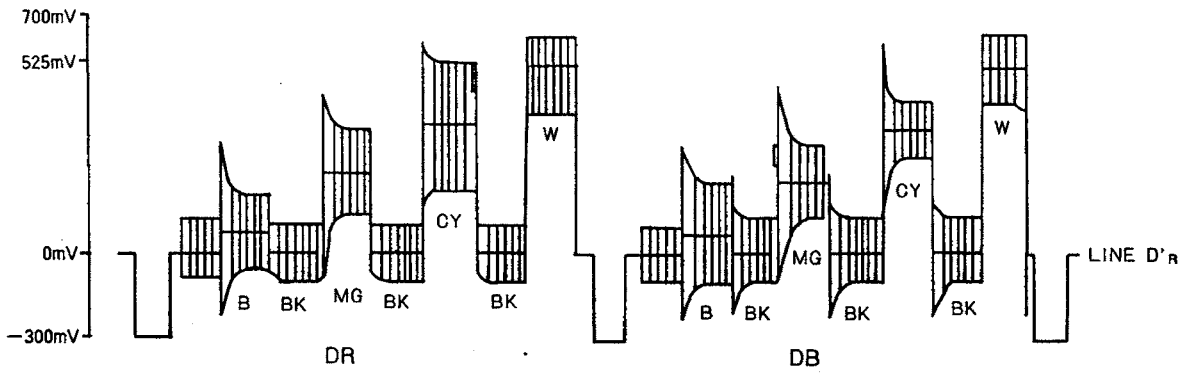
Figure 5.4



(a) NTSC



(b) PAL



(c) SECAM

(d) SECAM

Figure 5.5

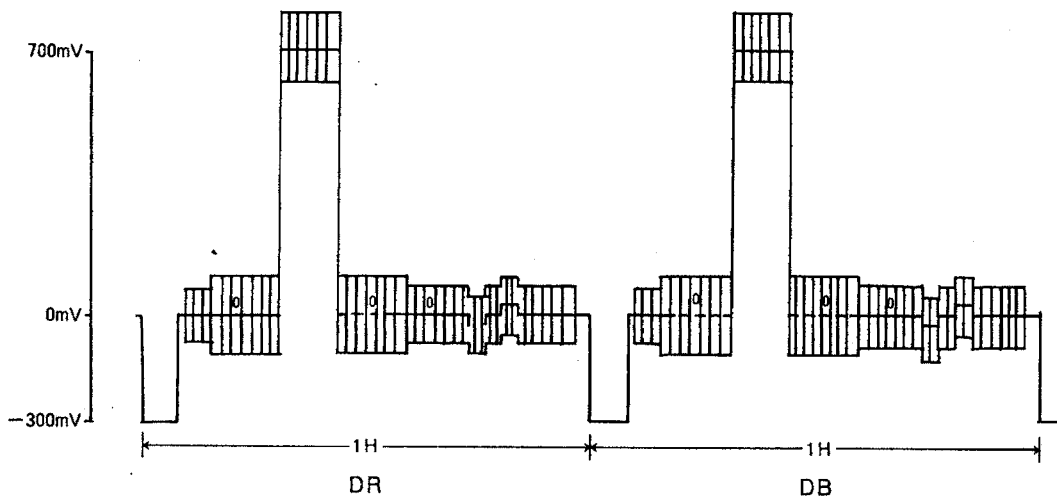
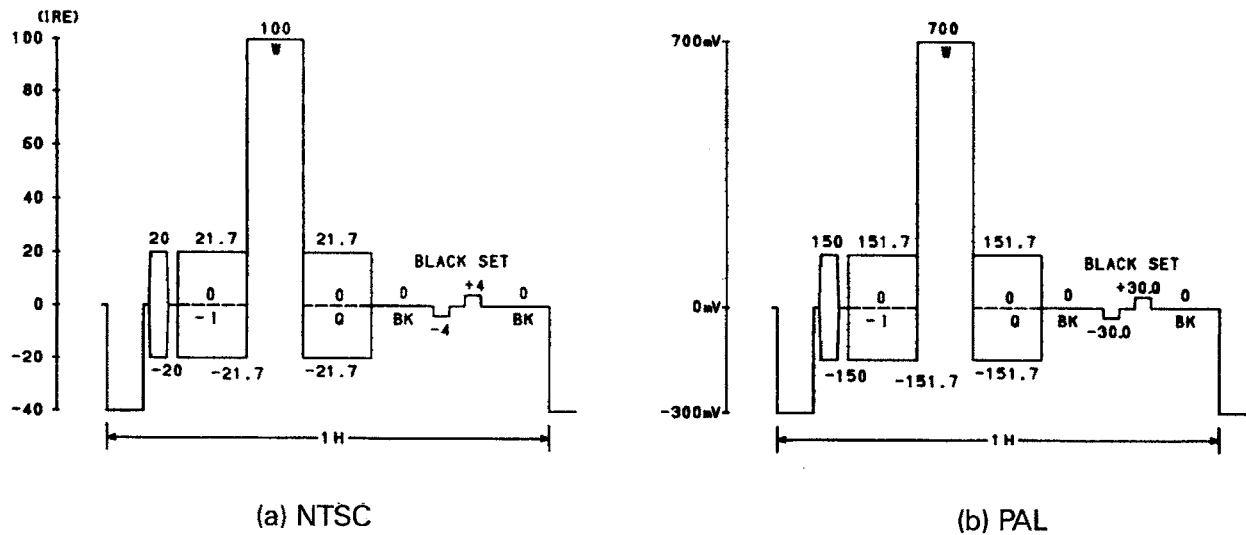


Figure 5.6

5.1.3 Vertical Color Bar Pattern (See Figure 5.7)

The vertical color bar consists of vertical color bars arranged horizontally. The vertical color bar pattern is used to inspect

color changes in vertical direction and the transient characteristics of color boundary.

YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE

Figure 5.7

5.1.4 Split Reverse Color Bar Pattern (See Figure 5.8)

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 waveform.

The reverse color bar is used to check the phase difference between chroma and luminance signals. Video equipment should be adjusted to match the boundary of green and magenta.

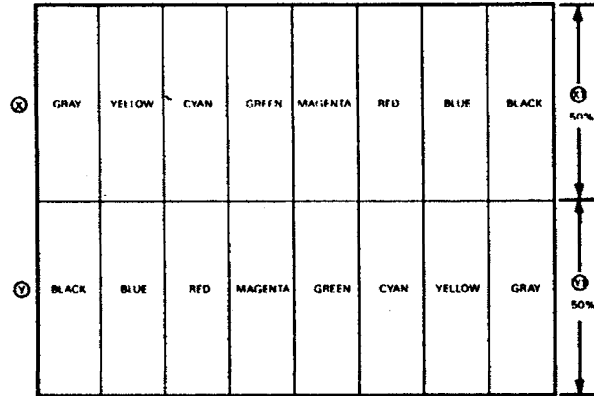


Figure 5.8

5.1.5 Checker Color Bar Pattern (See Figure 5.9)

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.

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 5.9

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

5.2 Raster Patterns (See Figure 5.10)

Each raster pattern has one color. By using the RGB and WHITE keys, 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. Figure 5.10 shows waveforms of the white raster signal.

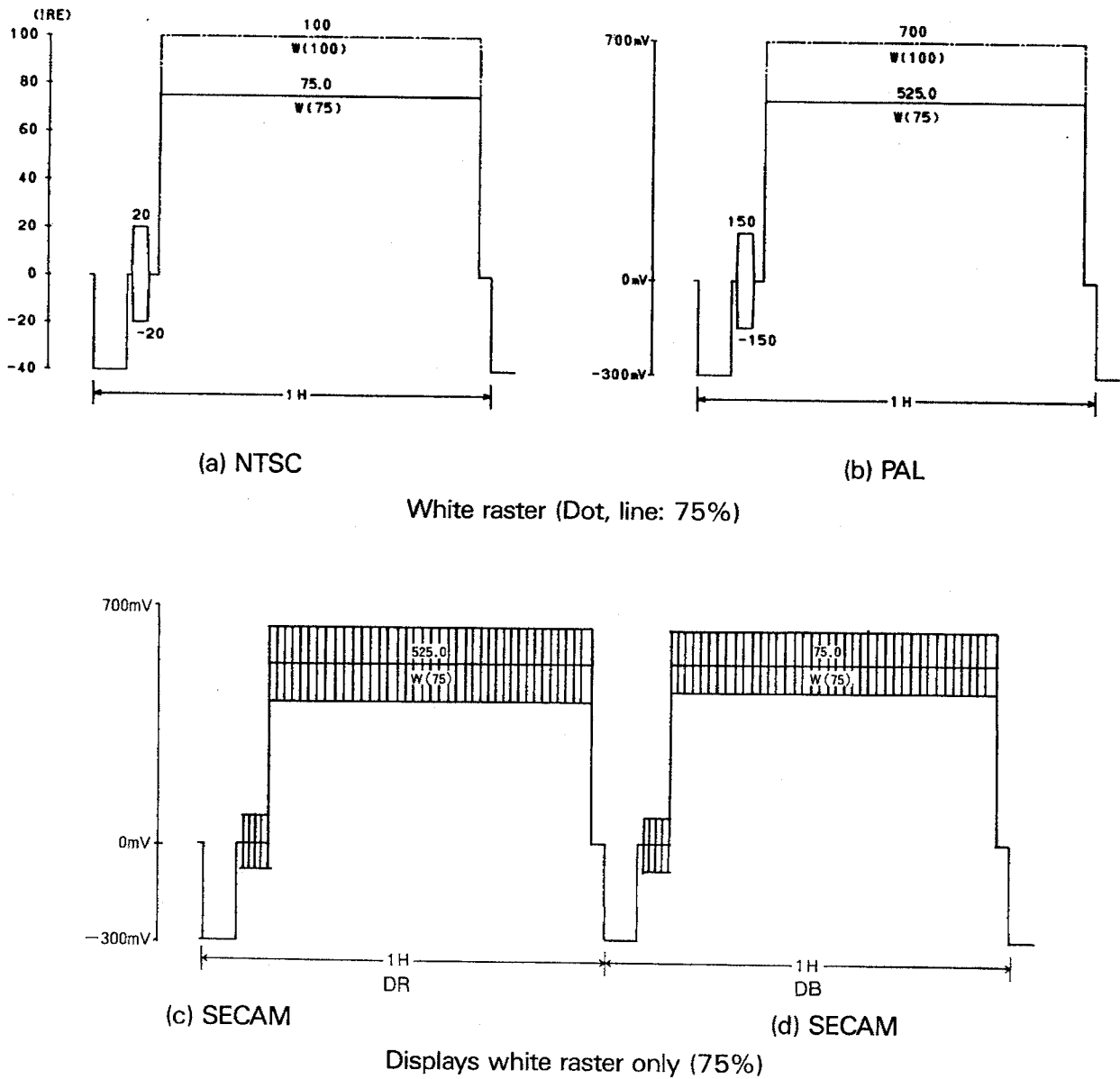


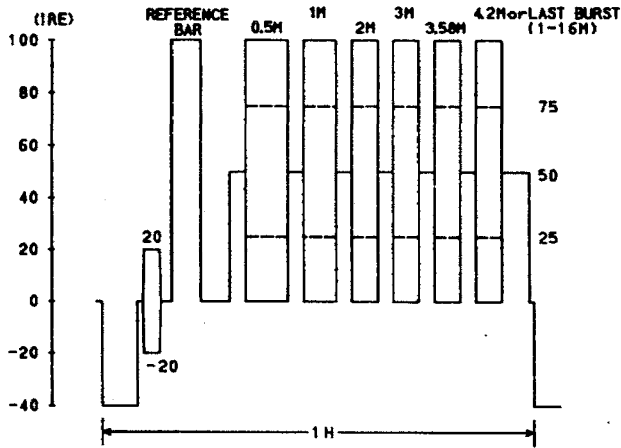
Figure 5.10

5.3 Multiburst and Sweep Patterns

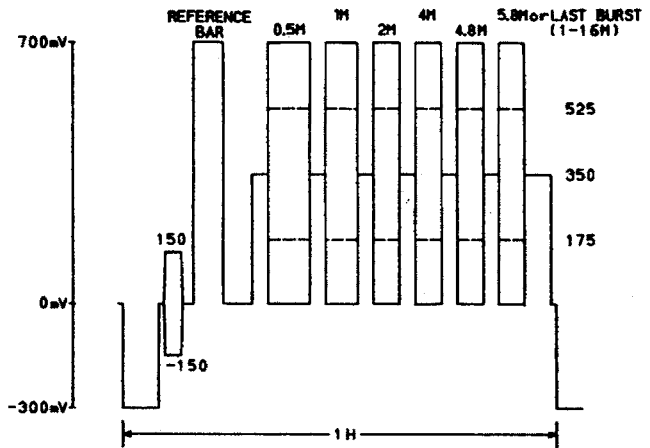
5.3.1 Multiburst Pattern (Figure 5.11)

The multiburst pattern has 100% white vertical bar (reference bar) with six bars consisting of difference frequencies. This pattern is used

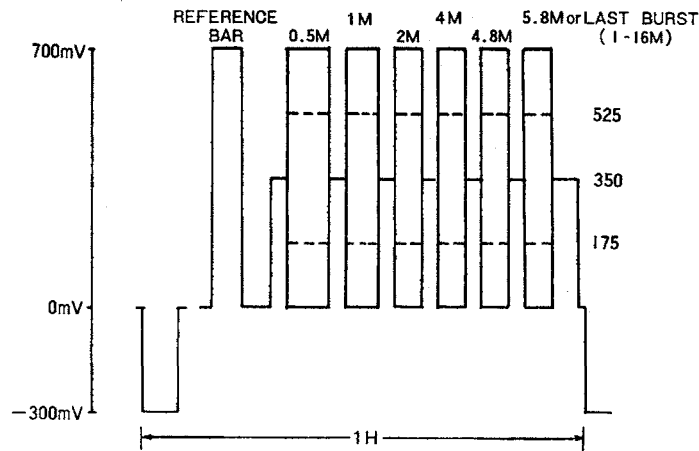
to check frequency response of the video system. Figure 5.11 shows the waveforms.



(a) NTSC



(b) PAL



(c) SECAM

Figure 5.11

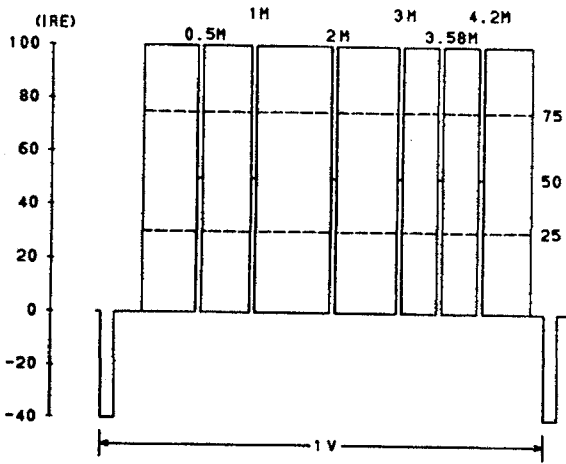
The burst signal level can be changed to 50% or 100%. The reference bar does not change. The multiburst pattern is also used to check the resolution of a monitor. For example, when the

4.2MHz multiburst pattern can be observed on the screen, the resolution is given as follows. Here, $4.2 \text{ (MHz)} \times 80 = 336$

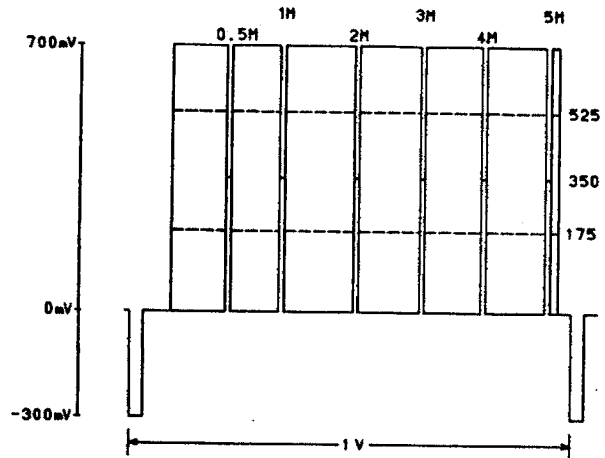
5.3.2 Sweep signal (See Figure 5.12 and Table 5.1)

The frequency range of the sweep signal is 100kHz to 15MHz divided into 2 bands; 100kHz to 5MHz and 300kHz to 15MHz. The sweep rate is synchronized with V sync. Figure

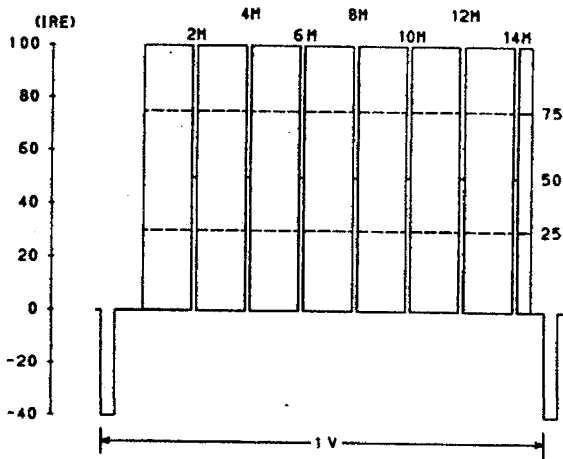
5.13 shows the waveforms. By setting the marker switch on, the marker is displayed with serration.



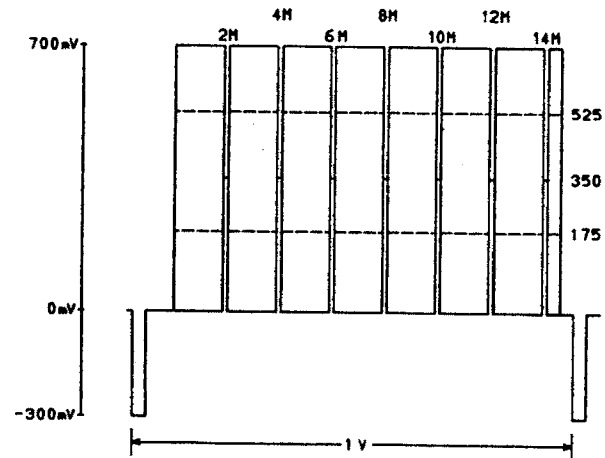
① NTSC 100kHz to 5MHz



③ PAL and SECAM 100kHz to 5MHz



② NTSC 300kHz to 15MHz



④ PAL and SECAM 300kHz to 15MHz

Figure 5.12

Table 5.11 Marker frequency

Position	NARROW (100kHz to 5MHz)		WIDE (0.3 to 15MHz)
	NTSC	PAL SECAM	
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

5.4 DEM Pattern (See Figure 5.13 and 5.14)

The demodulator patterns are described in the Figures below.

This pattern is used to adjust a Y/C separation

circuit with a delay line. Figure 5.13 and 5.14 shows the waveforms.

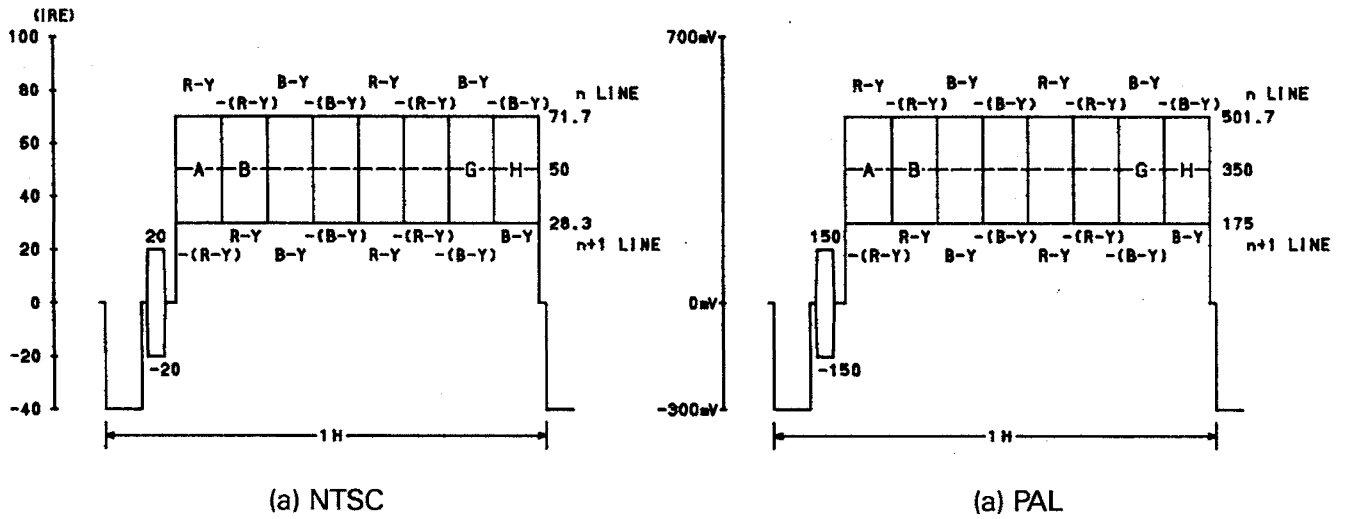


Figure 5.13

When the circuit is adjusted properly, the A, B, G and H bars on both sides are gray. Otherwise the bars are colored. For the NTSC system, I

and Q signals are displayed on the lower half of the screen.

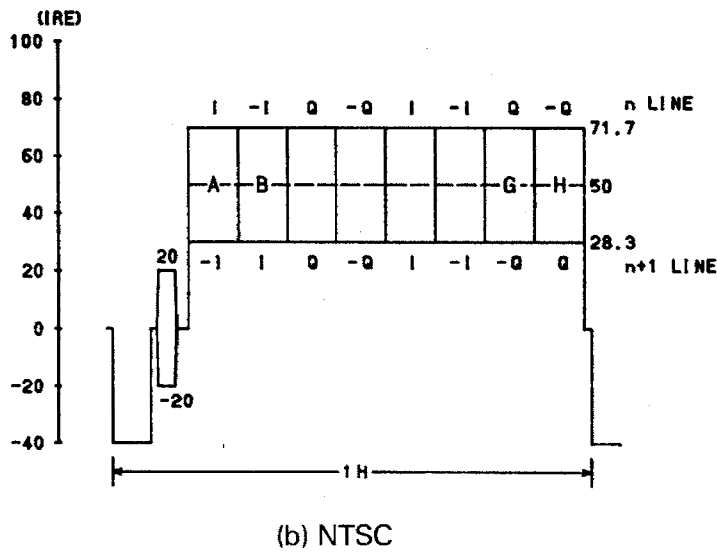


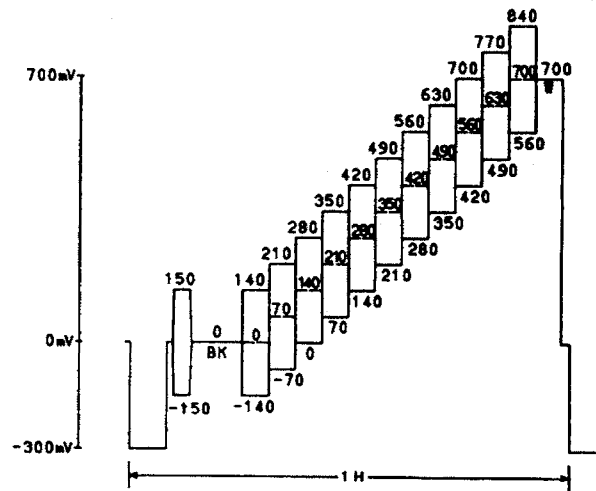
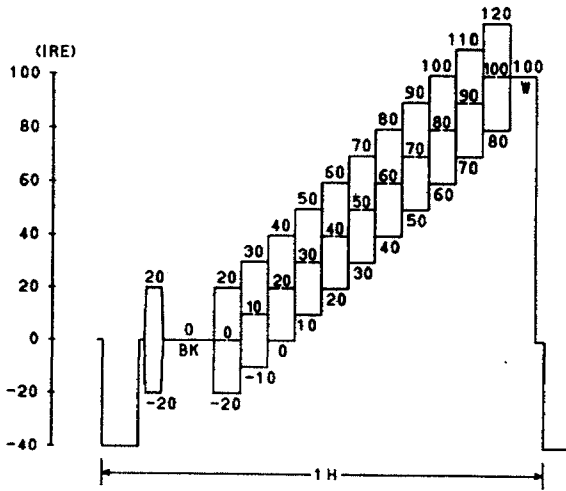
Figure 5.14

5.5 5 STEP, 10 STEP and APL Patterns

5.5.1 5 STEP and 10 STEP Pattern (See Figure 5.15)

The 5 STEP and 10 STEP patterns have a luminance signal that rising in 5 or 10 equal increments from left to right. These patterns are used to check the linearity of a transmission system. The modulated staircase, chroma

components composed of the same amplitude and phase are added to the step, is used for DG and DP measurements. Use the CHROMA key to turn the chroma signal on/off.



Chroma level: NTSC 286mVp-p
 PAL 280mVp-p
 SECAM 0V

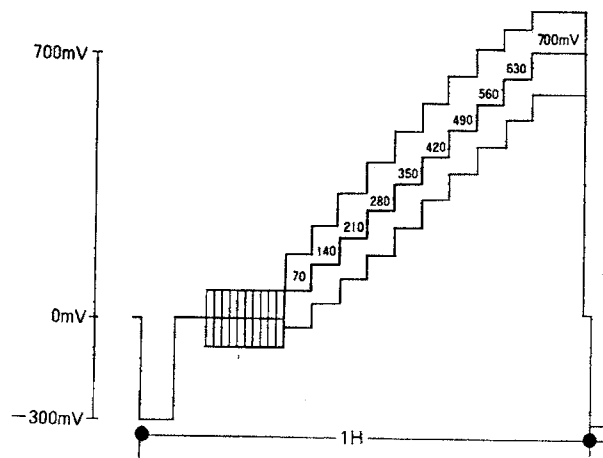


Figure 5.15

5.5.2 APL (See Figure 5.16 and 5.17)

The APL signal outputs one 10 STEP staircase and 100% white or 0% black components alternately.

NTSC: Four waves

PAL and SECAM: Three waves

The APL 90% pattern consists of four white components, and the APL 10% pattern consists of four black components.

The APL 87.5% pattern consists of three white components, and the APL 12.5% pattern consists of three black components.

The APL patterns are used to measure the DG and DP values. These patterns are effective when measuring the dynamic range of video equipment.

NTSC

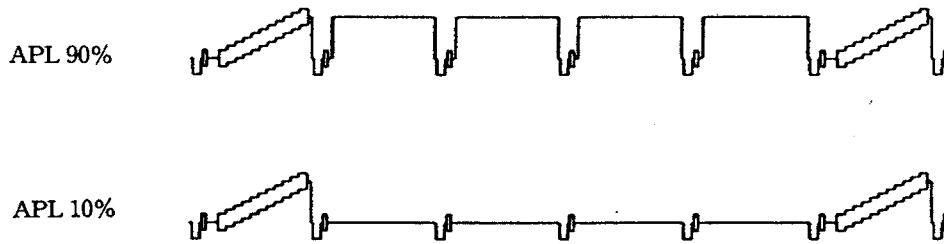


Figure 5.16

PAL and SECAM (No chroma signal added)

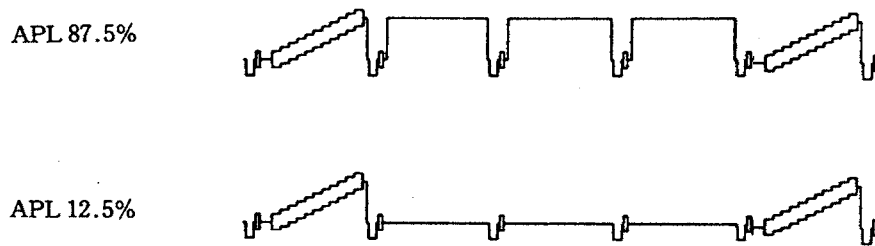


Figure 5.17

5.6 Checker Pattern (See Figure 5.18)

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 lineality of video equipment. Figure 5.18 shows the pattern.

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 5.18

5.7 Window Pattern (See Figure 5.19, 5.20 and 5.21)

The window pattern has a 100% white window at its center.

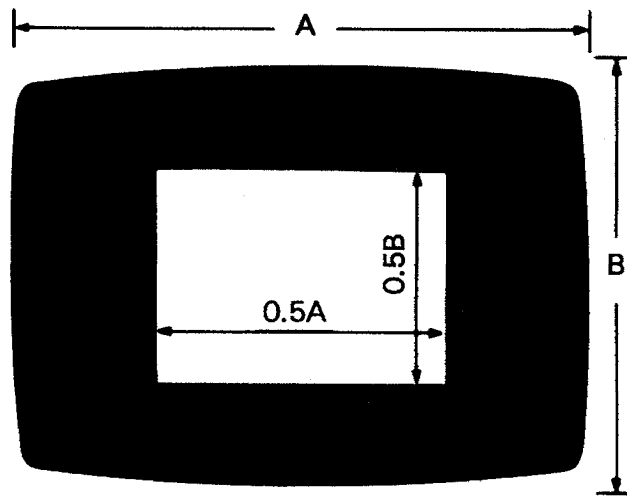


Figure 5.19
Window pattern

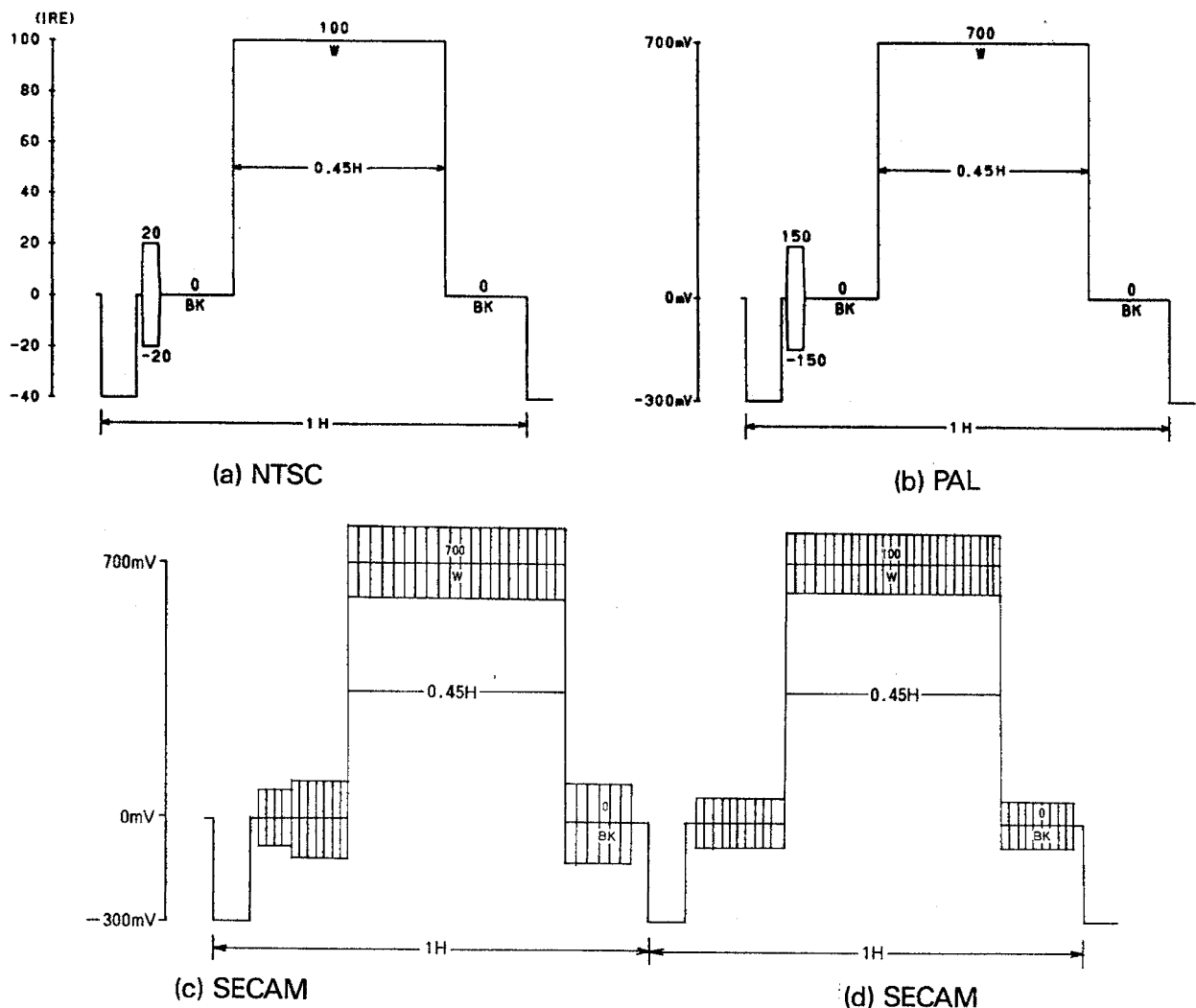
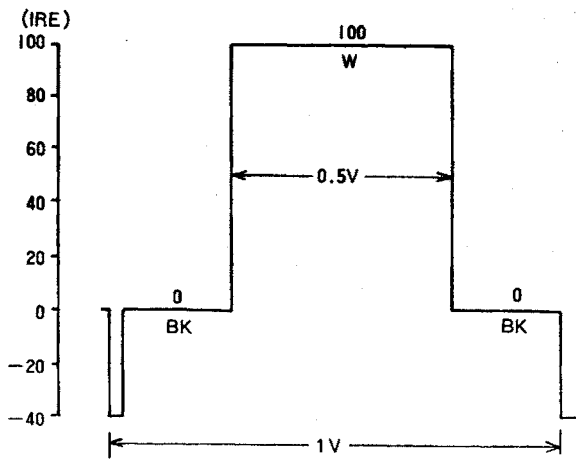
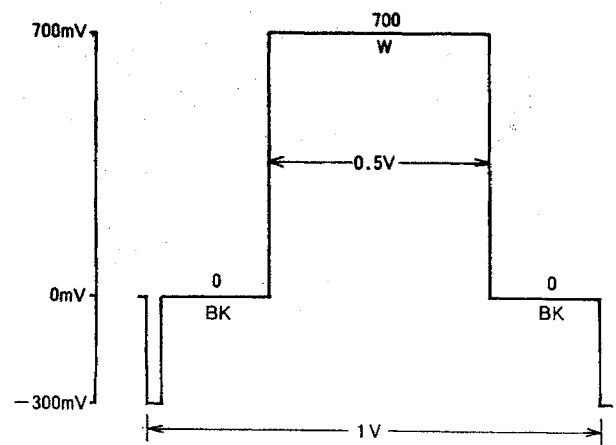


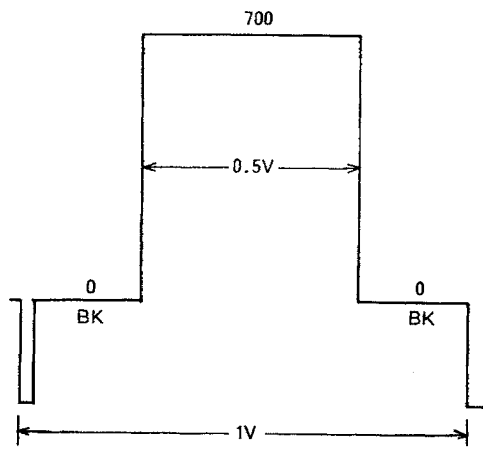
Figure 5.20



(a) NTSC



(b) PAL



(c) SECAM

Figure 5.21

5.8 Convergence and Alignment Patterns (See Figure 5.22 and 5.23)

These patterns are used to adjust the convergence and alignment of a TV set or picture monitor. The alignment pattern has a corner

marker at upper-left portion to check deflection yoke polarity.

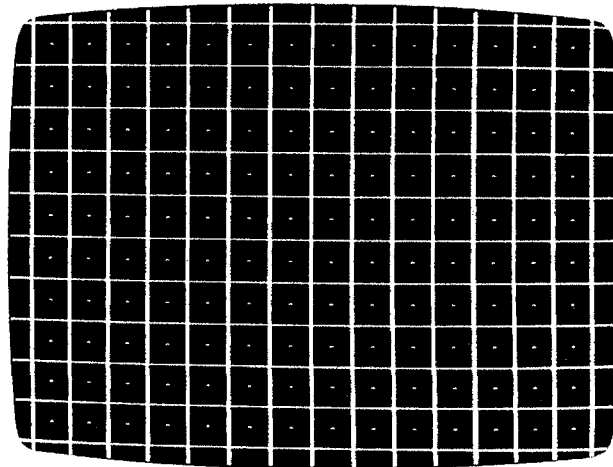


Figure 5.22

Convergence pattern

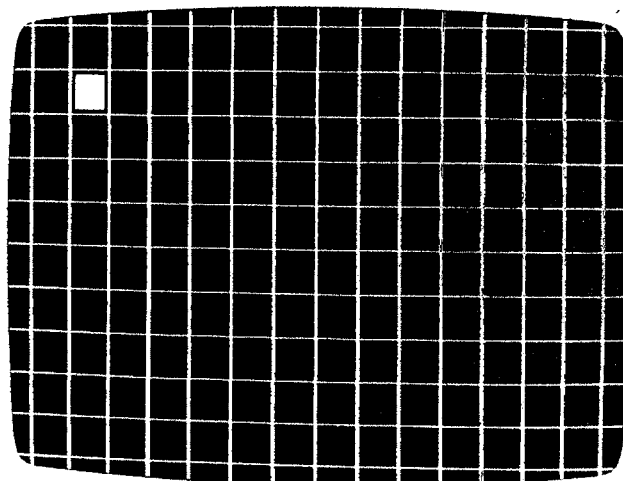


Figure 5.23

Alignment pattern

5.9 Circle Pattern (See Figure 5.24)

The circle pattern can be overlaid on other patterns. This pattern is mainly used to align a CRT. The crosshatch pattern is used to check the

linearity of a CRT. Using the circle pattern with the crosshatch pattern makes such checking easier.

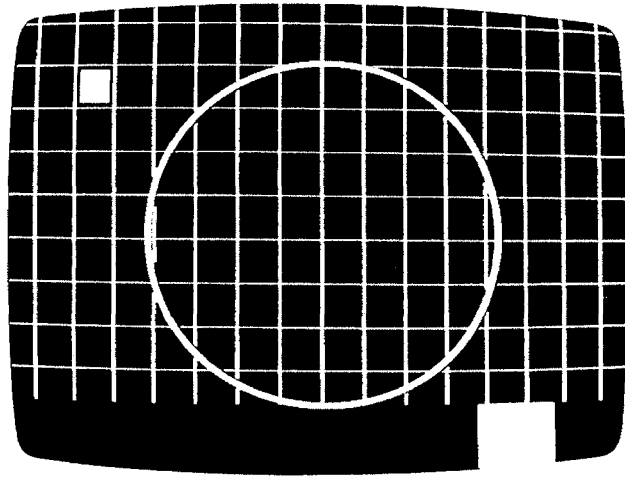


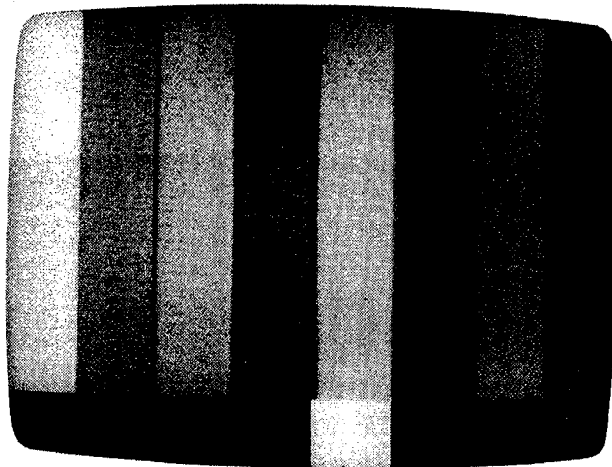
Figure 5.24

Circle Pattern

5.10 Moving Marker (See Figure 5.25)

The moving marker is a small square that moves from right to left at under part of the screen. This pattern can be inserted under parts

of any patterns to check the recording/playback test of a VTR.



↑
This pattern sequentially moves to the left.

Figure 5.25

5.11 Applications of the Patterns (See Table 5.2)

Refer to Table 5.2 to select the suitable pattern for the video equipment inspection.

Table 5.2

Pattern	Subject equipment	Inspection and adjustment item
Sweep Multiburst	TV, PM	Resolution
	VTR, other	Frequency characteristic
Raster	TV, PM	Purity
	VTR	Noise
SMPTE color bar	TV, PM	Brightness, color adjustment, and overall check
Full-field color bar	VTR, other	Overall performance check
Checker color bar		
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/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

6.1 Block Diagram

Figure 6.1 shows the block diagram.

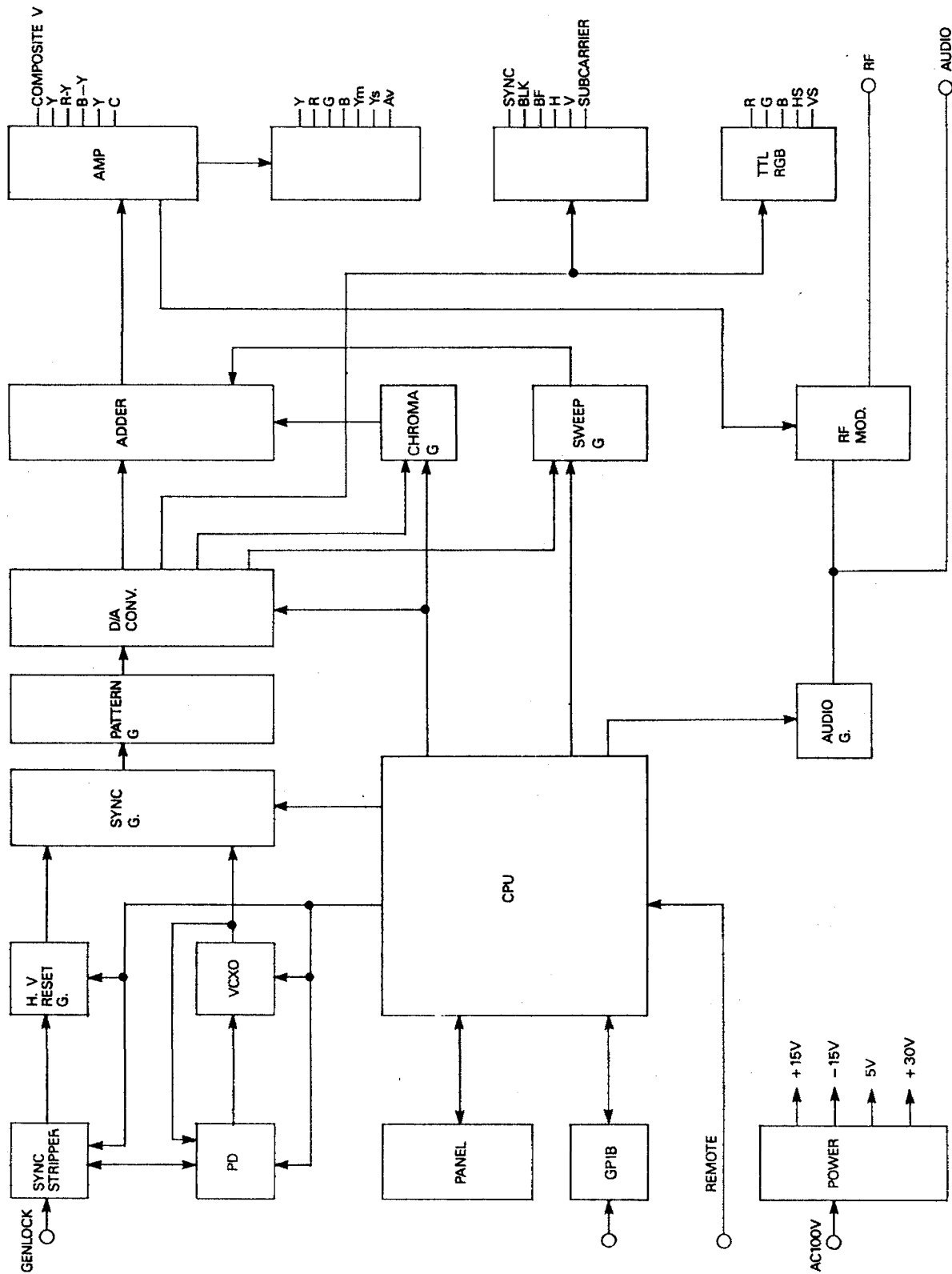


Figure 6.1

6.2 Operation of Each Block

Refer to Figure 6.1

6.2.1 GENLOCK Block

The GENLOCK circuit synchronizes the Model 408NPS with the black burst signal from an external equipment.

In NTSC system, the subcarrier frequency (fSC) lock range is 3.579545MHz within ± 50 Hz. The sync signal frequency (fH) and subcarrier frequency (fSC) must have the following relationship; $fH = 4fSC/910$

In PAL system, the subcarrier frequency (fSC) lock range is 4.43361875MHz within ± 50 Hz. The sync signal frequency (fH) and subcarrier frequency (fSC) must have the following relationship; $fSC = 1135fH/4 + 25$ Hz

In SECAM system, the sync signal can only be locked. The lock range is 15.625kHz within ± 0.17 Hz.

To lock the sync signal in NTSC system, the circuit samples the sync signal from the black burst signal, then synchronizes the 4fSC generator with PLL. The 4fSC generator reproduces the sync signal.

To lock the sync signal in PAL and SECAM systems, the circuit samples the sync signal from the black burst signal, then synchronizes the 908fH generator with PLL. The 908fH generator reproduces the sync signal.

To lock the subcarrier signal in NTSC and PAL systems, the circuit samples the burst signal from the black burst signal, then synchronizes the subcarrier generator with PLL. The subcarrier generator reproduces the subcarrier signal.

6.2.2 Sync Signal Generator (SYNC G.)

In NTSC system, the horizontal and vertical sync signals are produced from the 4fSC signal by using dividing circuit.

In PAL and SECAM systems, the horizontal and vertical sync signals are produced from the 908fH signal by using dividing circuit.

The sync signal generator also produces a subcarrier, blanking, and burst flag signals by using sync generator. All timing signals to create the video signals are generated from these signals.

6.2.3 Pattern Timing Signal Generator Block (PATTERN G.)

This generator produces the pattern timing signals. The timing signals are stored in the ROM. There are two ROMs; for the horizontal timing and for the vertical timing.

These timing signals are combined to create the video signals.

6.2.4 D/A Converter Block (D/A CONV)

The D/A converter generates a video signal according to the signal generated by the timing generator.

The following signals can be generated;

1. Y signal level
2. Color difference signal level

6.2.5 Chroma Generator Block (CHROMA G.)

To generate the chroma signal in NTSC and PAL systems, the DSB modulator is used to modulate the subcarrier signal with color difference signal generated by D/A converter.

To generate the chroma signal in SECAM system, D/A converter converts the stored data in the ROM to the chroma signal.

6.2.6 Sweep and Multiburst Signal Generator Block (SWEEP G.)

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

6.2.7 Adder Block (ADDER)

This block adds a Y signal, a chroma signal and a sweep/multiburst signals.

6.2.8 Amplifier Block (AMP)

This block amplifies the output signal of the adder for usable level. The output impedance is 75 Ω .

6.2.9 Panel Control Block (PANEL)

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

6.2.10 GPIB Block (GPIB)

This input connector is used to externally control the patterns and functions. The GPIB block (option) can be installed as specified when placing order.

6.2.11 Remote Control Block (REMOTE)

This input connector is used to externally control the patterns.

6.2.12 CPU Block (CPU)

Controls each block by using the data from the front panel controls, GPIB connector and remote control connector.

6.2.13 Audio Generator Block (AUDIO G.)

This oscillator generates 1kHz and 400Hz signals. The signals are used as modulation signals for the RF modulator, or output to other equipment.

6.2.14 RF Modulator Block (RF MOD.)

This block, RF modulator, modulates 30 MHz to 900MHz signals with video and sound signals. The polarity of each signal is changed automatically according to the country selected. The SIF frequency of each sound signal is also set automatically according to the country selected. The synthesizer system ensures accurate frequency setting of sound and SIF signals.

6.2.15 Power Supply Block (POWER)

The regulated DC power supply has four systems; +15V, -15V, +5V and +30V.