

SECTION 2 ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Vectorscope
5. Audio oscillator
6. Audio voltmeter
7. Digital voltmeter
8. Signal generator: RF/IF sweep/marker
9. Signal generator: PAL color bar, stairstep, video sweeper
10. Signal generator: Audio multiplex TV signal generator
11. Recording tape
12. Alignment tape: MH-2, MH-2L, MH-2H
13. RCA-S adapter: PTU93001A
14. Presetting unit: PTU94008
15. Head resonance adapter : PTU94007B
16. Adjust coil : PTU94004A

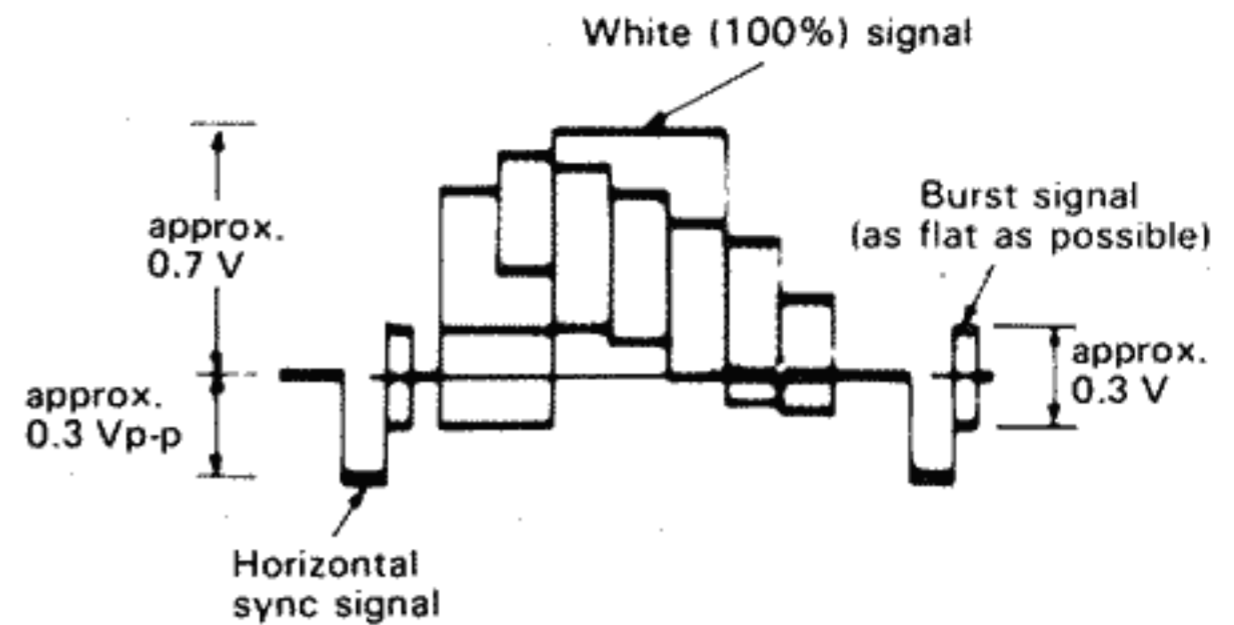


Fig. 2-1-1 Color bar signal of pattern generator

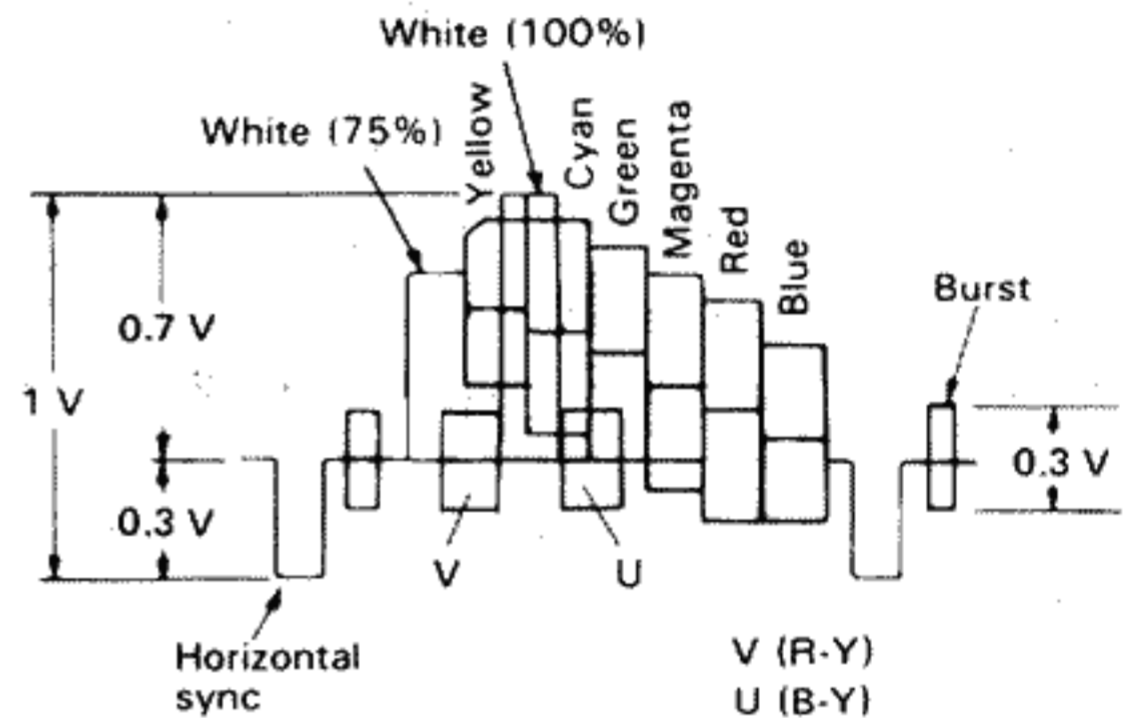


Fig. 2-1-2 Color bar signal waveform

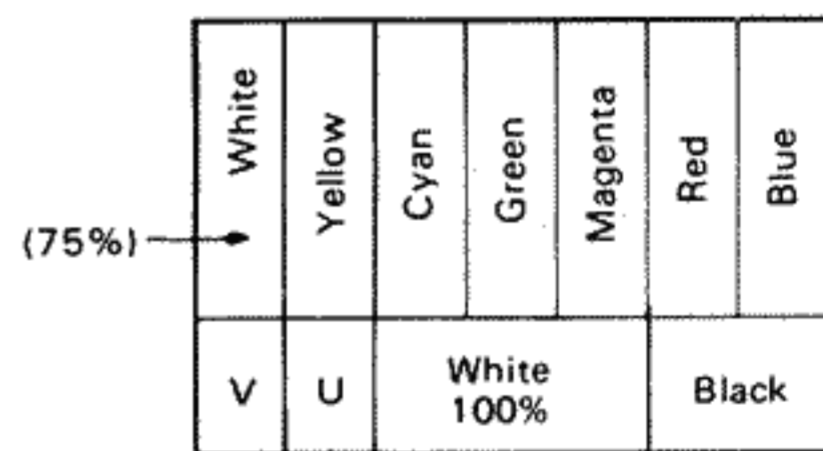


Fig. 2-1-3 Color bar pattern

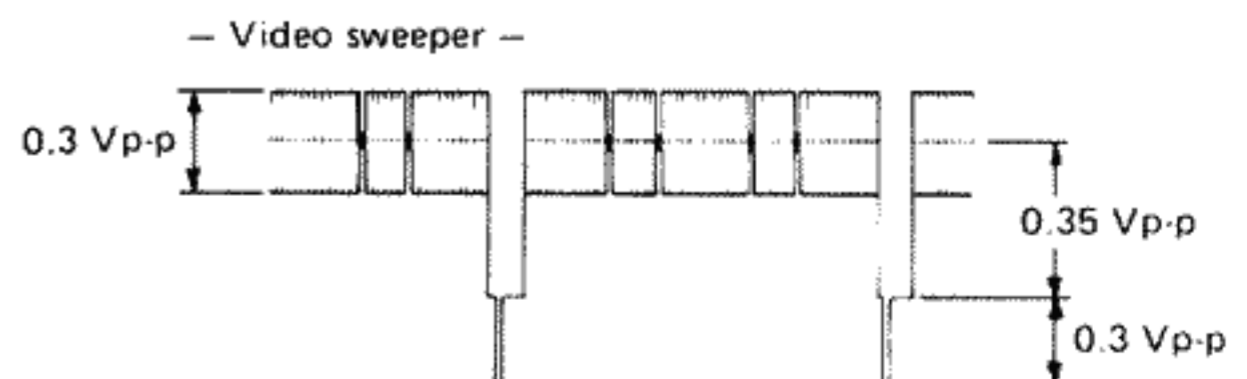


Fig. 2-1-4 Input signal level for video sweeper

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

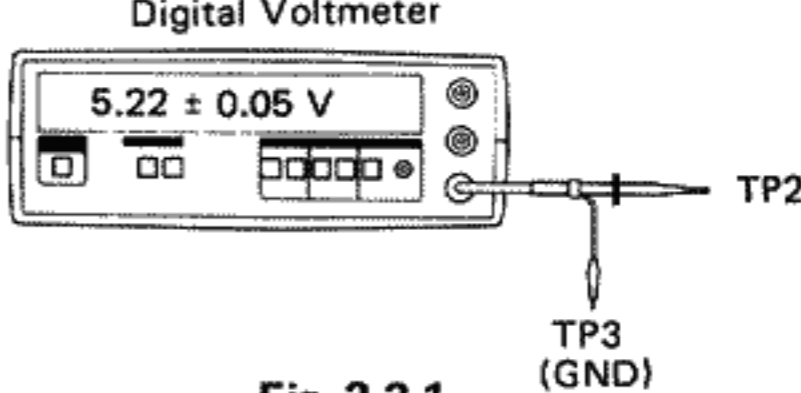
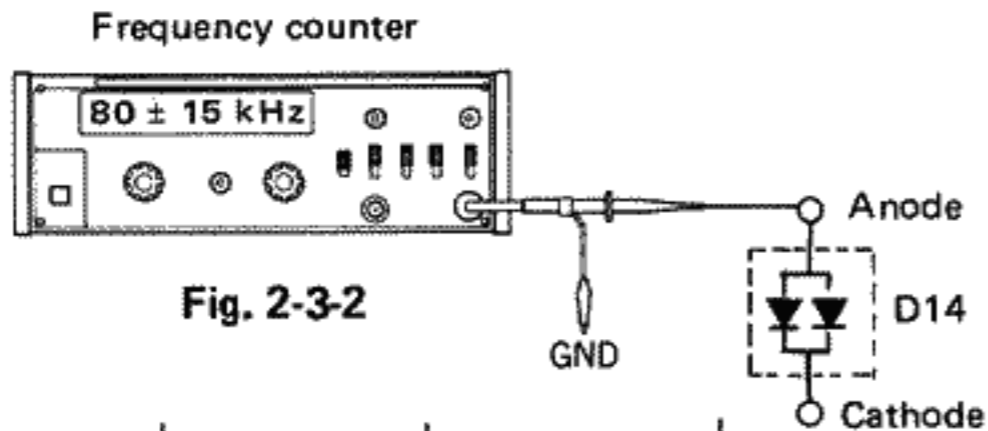
No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	<ul style="list-style-type: none"> • Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Color bars	Color bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 color bars	Color bars segment of MH-2 alignment tape.
MH-2 stairstep	Stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	RF sweep segment of MH-2 alignment tape.
MH-2L color bars	Color bars segment of MH-2L alignment tape.
MH-2L stairstep	Stairstep segment of MH-2L alignment tape.
MH-2L RF sweep	RF sweep segment of MH-2L alignment tape.
MH-2H color bars	Color bars segment of MH-2H alignment tape.
MH-F2 stairstep	Stairstep segment of MH-F2 alignment tape.
MH-F2 1 kHz	1 kHz FM audio signal segment of MH-F2 alignment tape.

E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
A DUB	Audio dubbing mode
SP mode	SP recording speed
EP mode	EP recording speed
LP mode	LP recording speed
S-VHS mode	Super-VHS recording mode
VHS mode	VHS recording mode

Description This column provides an explanation of the step, notes and adjustment values.

2.3 SWITCHING REGULATOR CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the REGULATOR (1) board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	5V DC output voltage	TP2 (INPUT) TP3 (GND) [REGULATOR(2) board]	R36 (SWD 5V)	<ul style="list-style-type: none"> • Tuner mode • REC • SP mode 	1) Set recording video cassette into the cassette housing and set for the REC mode. 2) Connect a digital voltmeter as shown in Fig. 2-3-1. 3) Adjust R36 for 5.22 ± 0.05 V. <div style="text-align: center;">  <p>Fig. 2-3-1</p> </div>
2	Confirmation of oscillation	Anode of D14 [SW REG board]		<ul style="list-style-type: none"> • Tuner mode • REC • SP mode 	1) Set recording video cassette into the cassette housing and set for the REC mode. 2) Connect a digital voltmeter as shown in Fig. 2-3-2. 3) Confirm that oscillator frequency is 80 ± 15 kHz. <div style="text-align: center;">  <p>Fig. 2-3-2</p> </div>

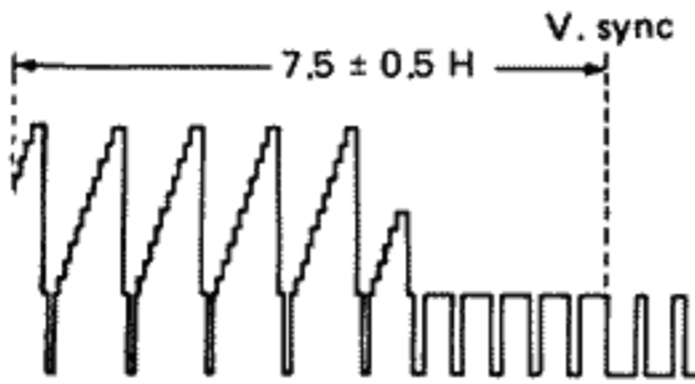
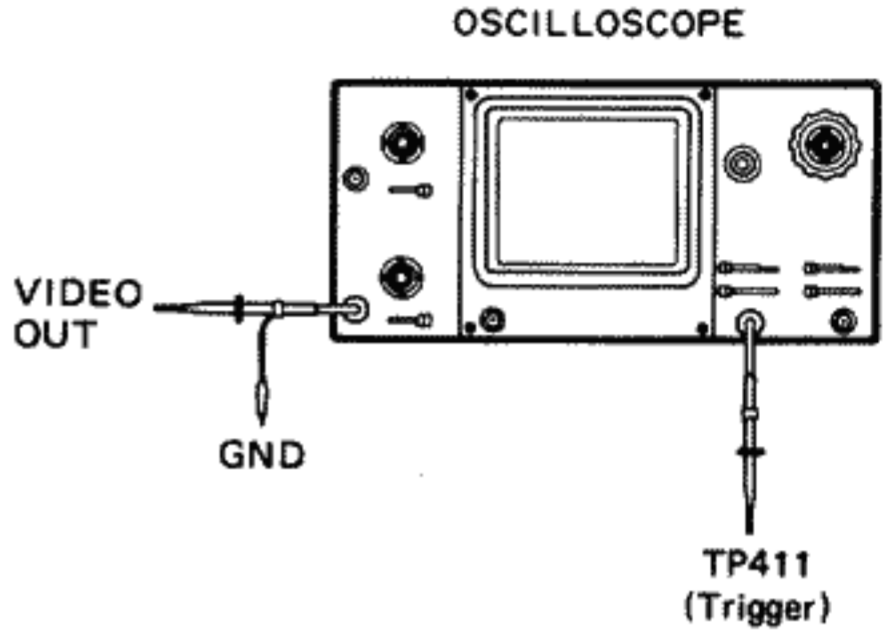
2.4 TIMER CIRCUIT

Note: Unless otherwise noted, all test points and adjustments are located on the TIMER board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Timer clock	IC1-16	C6 (Clock)	• E-E	<p>Note: For below adjustments use 10:1 probe with input capacitance less than 100 pF.</p> 1) Disconnect VCR from AC. Connect a frequency counter between IC1-16 and GND. 2) Short TP1 to GND, then short the leads of capacitor C3 once in order to reset IC1. 3) Connect VCR to AC. All FDP Segments are on. 4) Adjust C6 for 2048.000 ± 0.002 Hz (488.2808 to 488.2818 μ s).

2.5 SERVO CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the VIDEO 1 board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	SP PB switching point	VIDEO OUT or TP110	R427	<ul style="list-style-type: none"> • PB • MH-2 (stairstep) • Trigger slope (—) • SP mode • AUTO TRACKING OFF 	<ol style="list-style-type: none"> 1) Connect an oscilloscope to VIDEO OUT. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (— slope) with the signal from TP411. 4) Adjust R427 to position the trigger point 7.5 ± 0.5 H from V. sync.
		 <p>Fig. 2-5-1</p>			 <p>Fig. 2-5-2</p>
2	SP slow tracking preset	Monitor-TV	Presetting unit (PTU 94008)	<ul style="list-style-type: none"> • SP mode • REC then PB (slow) 	<p>Note: Set VCR to A mode by remote controller.</p> <ol style="list-style-type: none"> 1) Set recording video cassette into the cassette housing. 2) Receive a colour broadcast on a VHF-HI channel or supply a colour bar signal to VIDEO IN. 3) Record a colour broadcast or colour bar signal in the SP mode. 4) Play back recorded signal in the FWD and REV slow mode and set the tracking control of the FRONT panel to the center position by simultaneously pressing the (+) and (—) tracking buttons. 5) Observe the display on a monitor-TV and adjust for optimum noise condition (best tracking) by depressing "B (—)" or "C (+)" buttons of presetting unit as required. 6) Depress the STOP button on the FRONT panel. 7) Confirm that the bar noise is not visible on the monitor in the slow mode.
3	LP slow tracking preset	Monitor-TV	Presetting unit	<ul style="list-style-type: none"> • LP mode • Slow PB 	<ol style="list-style-type: none"> 1) In the same manner as the above SP slow mode.

2.6 VIDEO CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the VIDEO 1 board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Y comb GAIN	TP225 TP226	R206	<ul style="list-style-type: none"> • S-VHS mode • SP • E-E • Color bar 	<ol style="list-style-type: none"> 1) Connect one channel of a dual trace oscilloscope to TP225 and the other channel to TP226. 2) Adjust R206 so that TP225 and TP226 become the same level.
2	2H delayed chroma	TP231 TP232	R234 L203	<ul style="list-style-type: none"> • S-VHS mode • SP • E-E • Color bar 	<ol style="list-style-type: none"> 1) Connect CH-1 of a dual trace oscilloscope to TP231 and CH-2 to TP232. 2) Set VOLT/DIV controls of both channels to the same range (e.g., 50 mV). 3) Invert CH-2 and use ADD mode. 4) Alternately adjust R234 and L203 for minimum level.
3	4H delayed chroma	TP231 TP233	R238 L205	<ul style="list-style-type: none"> • S-VHS mode • SP • E-E • Color bar 	<ol style="list-style-type: none"> 1) In the same manner, adjust R238 and L205 for minimum level.
4	Y-comb	TP225	R215 R219 R231	<ul style="list-style-type: none"> • VHS mode • SP • E-E • Color bar 	<ol style="list-style-type: none"> 1) Connect an oscilloscope to TP225. 2) Use the controls of the oscilloscope to expand portion A of the TP225 waveform. 3) Adjust R215, R216 and R231 alternately for minimum chromatic level (less than 40 mVp-p of the magenta portion).

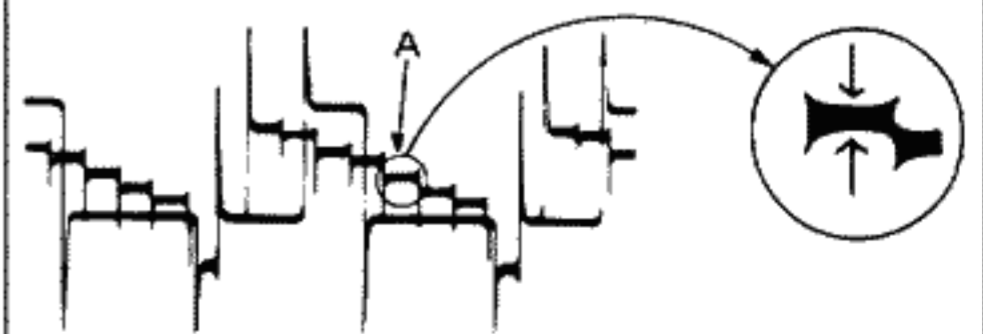

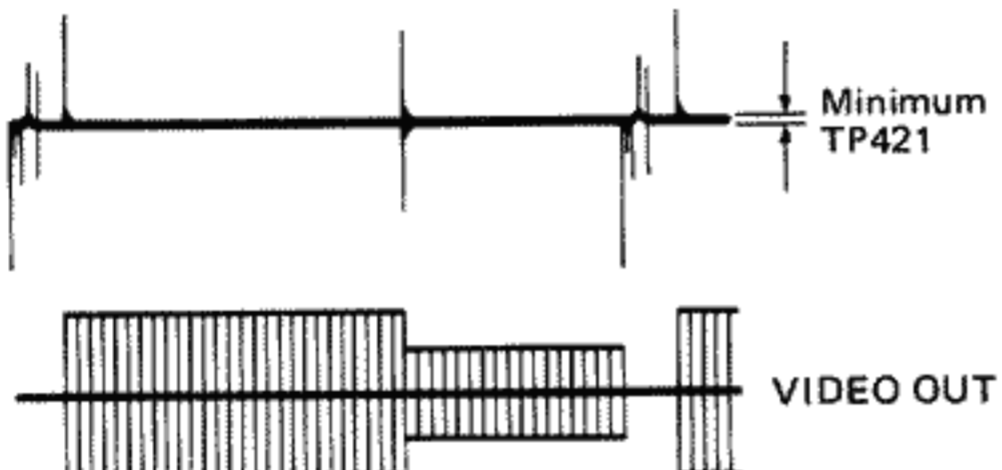
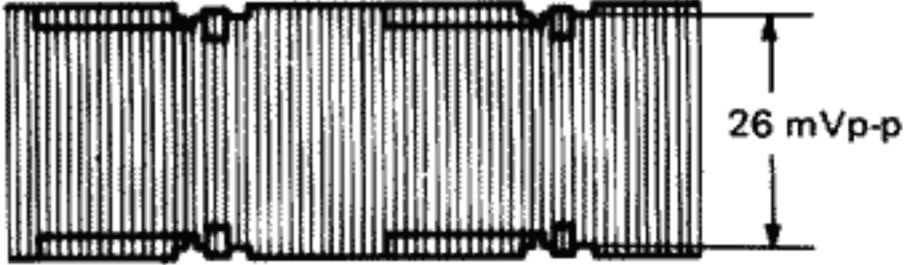
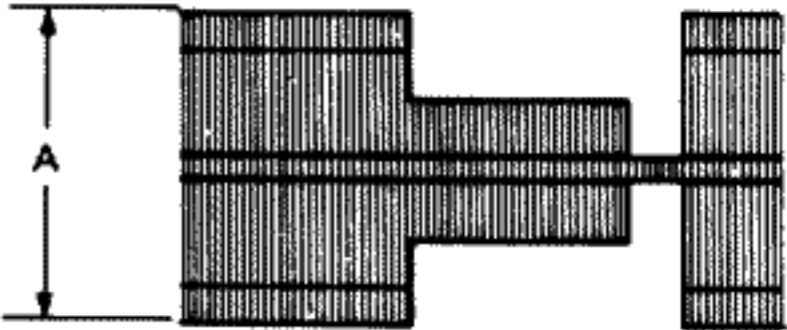
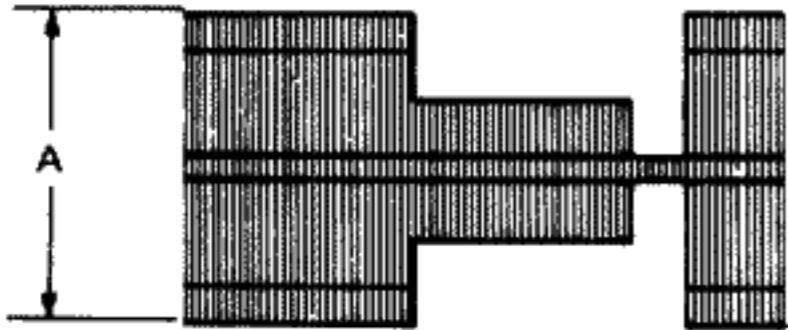
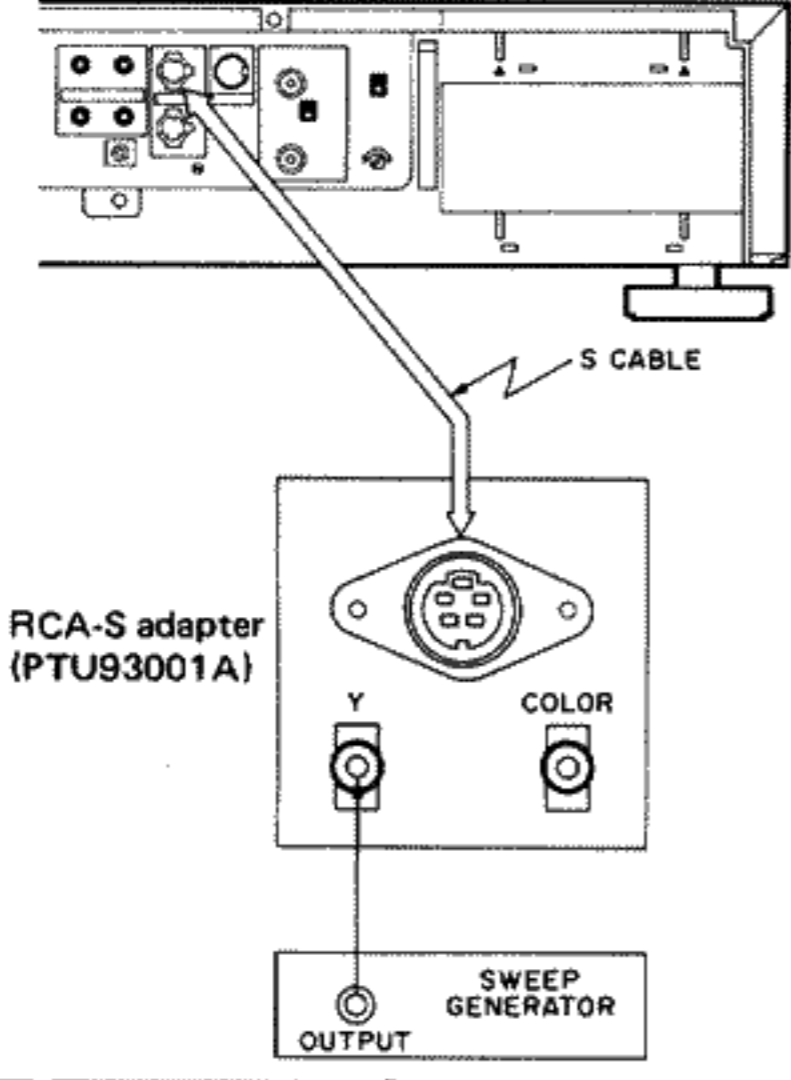
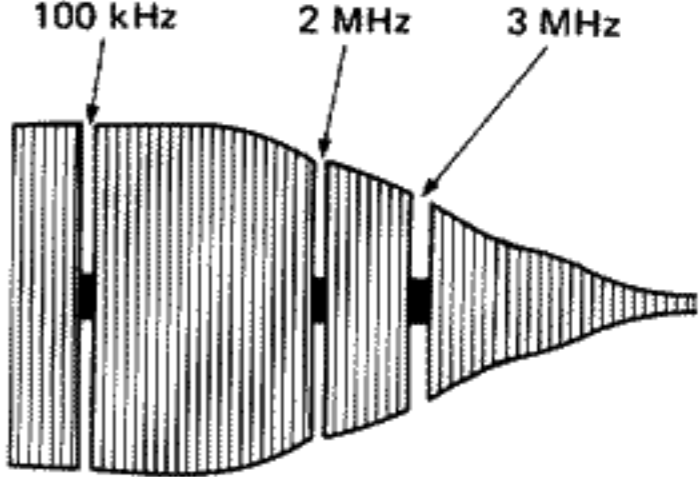
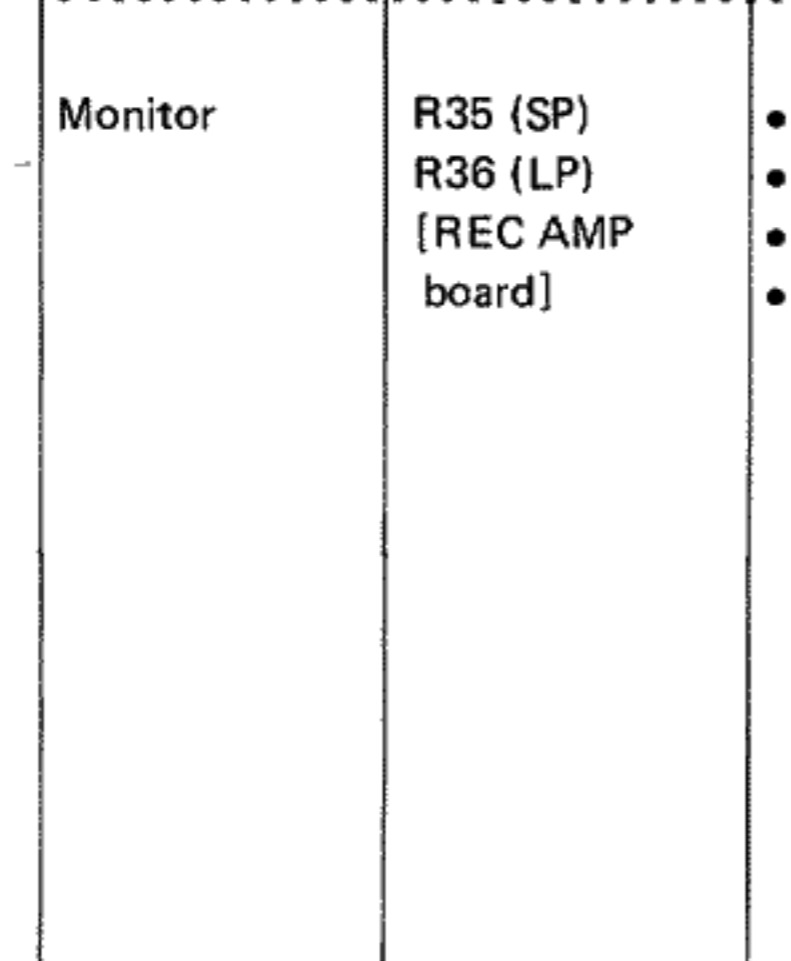
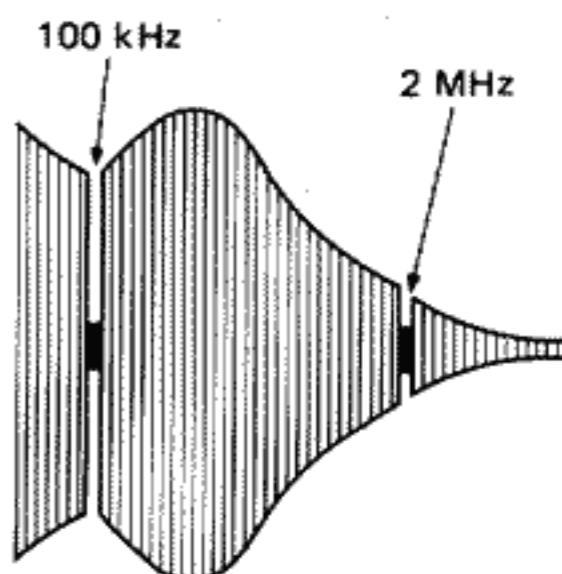


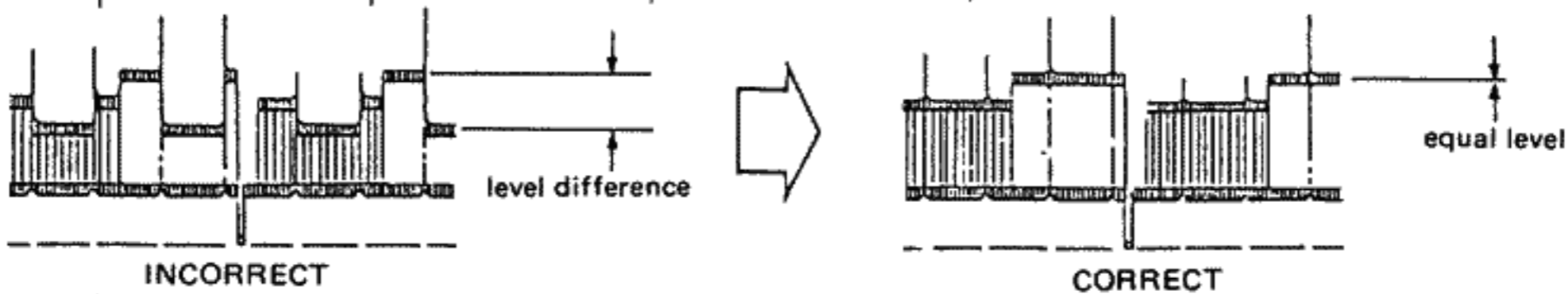
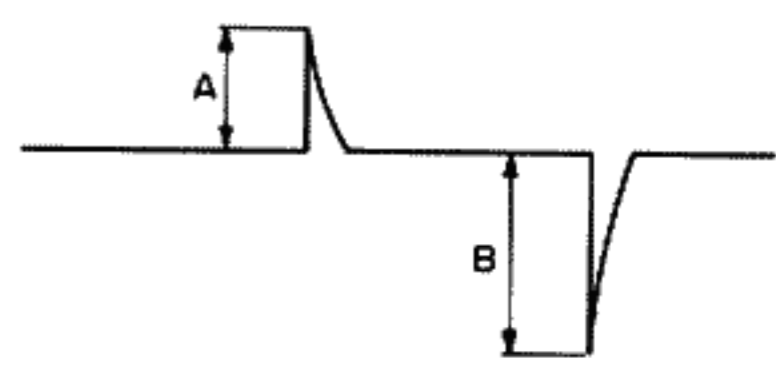
Fig. 2-6-1

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
5	E-E level	VIDEO OUT or TP110	R36	<ul style="list-style-type: none"> • S-VHS mode • SP • E-E • Color bar 	1) Connect an oscilloscope to TP110 or VIDEO OUT. 2) Adjust R36 for 0.97 ± 0.03 Vp-p (with 75Ω load).
6	Sub emph. input level	TP439 [VIDEO UNIT board]	R416 [VIDEO UNIT board]	<ul style="list-style-type: none"> • S-VHS mode • SP • E-E • Color bar 	1) Connect an oscilloscope to TP439. 2) Adjust R416 for 400 ± 20 mVp-p signal level in the SP mode. <div style="text-align: center;">  <p>400 mVp-p ± 20 mVp-p</p> </div> <p style="text-align: center;">Fig. 2-6-2</p>
7	YNR NC balance	TP421 [VIDEO UNIT board]	R444 [VIDEO UNIT board]	<ul style="list-style-type: none"> • S VHS mode • SP • E-E • Color bar 	1) Supply a color bar signal to VIDEO IN and connect an oscilloscope to TP421. 2) Adjust R444 for minimum DC step difference. <div style="text-align: center;">  <p>Minimum TP421</p> <p>VIDEO OUT</p> </div> <p style="text-align: center;">Fig. 2-6-3</p>
8	S-VHS mode REC FM level	TP1 [PRE AMP board]	R23 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • LP mode • REC • Color bar 	<p>Note: Connect an oscilloscope's GND terminal to TP-GND near the shield case of the PRE AMP board.</p> 1) Connect an oscilloscope to TP1 of the PRE AMP board and record a color bar signal in the LP mode. 2) Adjust R23 for 26 mVp-p pedestal level, between centers of the waveform outline at the pedestal portion. <div style="text-align: center;">  <p>26 mVp-p</p> </div> <p style="text-align: center;">Fig. 2-6-4</p>

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
9	SP REC color level and balance	IC501-19 [VIDEO UNIT board]	R91 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • PB mode • MH-2H color bars • SP mode • AUTO TRACKING OFF <hr style="width: 50%; margin: 5px auto;"/> <ul style="list-style-type: none"> • REC then PB • Color bars • SP mode • AUTO TRACKING OFF 	<p>Note: Use larger-level waveform for adjustment.</p> <ol style="list-style-type: none"> 1) Connect an oscilloscope to IC501-19. Play back the color bar segment of the MH-2H and observe color signal level. 2) Adjust by pressing the + and – TRACKING buttons of the FRONT panel for maximum level of the color waveform and make a note of the higher color level "A". 3) Set the TRACKING control of the FRONT panel to the preset position by simultaneously pressing the + and – TRACKING buttons. 4) Record and play back the color bar signal. If necessary, before recording, adjust R91 so that the higher level channel becomes 110% of the noted level "A" during playback. At this time, confirm that the channel difference is within 3 dB. <div style="text-align: center;">  <p>Fig. 2-6-5</p> </div>
10	LP REC color level and balance	IC501-19 [VIDEO UNIT board]	R90 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • PB mode • LP mode • MH-2H color bar • AUTO TRACKING OFF <hr style="width: 50%; margin: 5px auto;"/> <ul style="list-style-type: none"> • REC then PB • Color bar • LP mode • AUTO TRACKING OFF 	<p>Note: Perform the LP mode adjustment after completing that for the SP mode.</p> <ol style="list-style-type: none"> 1) Connect an oscilloscope to IC501-19. Play back the color bar segment of the MH-2H and observe color signal level. 2) Adjust by pressing the + and – TRACKING buttons of the FRONT panel for maximum level of the color waveform and make a note of the higher color level "A". 3) Set the TRACKING control of the FRONT panel to the preset position by simultaneously pressing the + and – TRACKING buttons. 4) Record and play back the color bar signal. If necessary, before recording, adjust R90 so that the higher level channel becomes 110% of the noted level "A" during playback. At this time, confirm that the channel difference is within 3 dB. <div style="text-align: center;">  <p>Fig. 2-6-6</p> </div>
11	S-VHS mode PB Y level	VIDEO OUT or TP110	R63 (S VHS PB Y LEVEL)	<ul style="list-style-type: none"> • S-VHS mode • SP mode • REC then PB • Color bars 	<ol style="list-style-type: none"> 1) Connect an oscilloscope to VIDEO OUT or TP110. 2) Record the color bar signal in the SP mode, then play it back. 3) Adjust R63 for 0.95 ± 0.03 Vp-p (with 75Ω load).

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
12	VHS mode PB Y level	VIDEO OUT or TP110	R64 (VHS PB Y LEVEL)	<ul style="list-style-type: none"> • VHS mode • SP mode • REC then PB • Color bars 	1) In the same manner as above (2.5.10), adjust R64 for 0.95 ± 0.03 Vp-p (with 75Ω load).
13	S-VHS mode SP frequency response and balance	Y OUT	R35 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • SP mode • REC then PB • Sweeper 	<p>1) Terminate Y OUT with a 75Ω load and set the SHARPNESS control to the center detent position.</p> <p>2) Connect a signal generator to S-IN and an oscilloscope to Y OUT.</p> <p>3) Record in the SP mode, then play back and set 100 kHz level to 3 scale divisions on X axis at CH-1 waveform.</p> <p>4) Adjust R35 (REC AMP board) so that the 3.0 MHz level becomes 2.5 to 2.8 scale divisions (-1 ± 0.5 dB).</p> <p>5) Confirm that the level difference between both channels is less than 2 dB.</p>
				Fig. 2-6-7	
14	S-VHS mode LP frequency response and balance	Y OUT	R36 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • LP mode • REC then PB • Sweeper 	<p>1) In the same manner as above (2.5.12), perform adjustment for LP mode.</p> <p>2) Record in the LP mode, then play back and set 100 kHz level to 3 scale divisions on X axis at CH-1 waveform.</p> <p>3) Adjust R36 so that the 3.0 MHz level becomes 2.0 to 2.3 scale divisions (-3 ± 0.5 dB).</p> <p>4) Confirm that the level difference between both channels is less than 2 dB.</p>
		Monitor	R35 (SP) R36 (LP) [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • SP and LP modes • REC then PB • Philips pattern 	<p>Alternate method:</p> <p>1) Record and playback a Philips pattern.</p> <p>2) During playback, observe the picture and adjust R35 (SP mode) and R36 (LP mode) for the best resolution, without impaired S/N, at about 250 lines (3 MHz region).</p> <p>3) So after this adjustment, confirm black or white spot on edges of playback picture in the Still mode.</p>

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
15	VHS mode SP frequency response and balance	Y OUT	R65 [REC AMP board]	<ul style="list-style-type: none"> • VHS mode • SP mode • REC then PB • Sweeper 	<ol style="list-style-type: none"> 1) Terminate Y OUT with a 75 Ω load and set the SHARPNESS control to the center detent position. 2) Connect a signal generator to S-IN and an oscilloscope to Y OUT. 3) Record in the SP mode, then play back and set 100 kHz level to 3 scale divisions on X axis at CH-1 waveform. 4) Adjust R65 (REC AMP board) so that the 2.0 MHz level becomes 2.4 to 3 scale divisions (-1 ± 1 dB). 5) Confirm that the level difference between both channels is less than 2 dB. <div style="text-align: center;">  <p>100 kHz</p> <p>2 MHz</p> <p>Fig. 2-6-8</p> </div>
16	VHS mode LP frequency response and balance	Y OUT	R66 [REC AMP board]	<ul style="list-style-type: none"> • VHS mode • LP mode • REC then PB • Sweeper 	<ol style="list-style-type: none"> 1) In the same manner as above (2.5.14), perform adjustment for LP mode. 2) Record in the LP mode, then play back and set 100 kHz level to 3 scale divisions on the screen at CH-1 waveform. 3) Adjust R66 (REC AMP board) so that the 2 MHz level becomes 1.5 to 2.4 scale divisions (-5_{-1}^{+3} dB). 4) Confirm that the level difference between both channels is less than 2 dB.
		Monitor	R65 (SP) R66 (LP) [REC AMP board]	<ul style="list-style-type: none"> • VHS mode • SP and LP modes • REC then PB • Philips pattern 	<p>Alternate method:</p> <ol style="list-style-type: none"> 1) Record and play back a Philips pattern. 2) During playback, observe the picture and adjust R65 (SP mode) and R66 (LP mode) for the best resolution, without impaired S/N, at about 160 lines (2 MHz region). 3) So after this adjustment, confirm black or white spot.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
17	0.5H delayed color level	VIDEO OUT or TP110	R709	<ul style="list-style-type: none"> • Color bar • LP mode • REC then PB <li style="text-align: center;">↓ • SEARCH FF 	<p>1) Connect an oscilloscope to VIDEO OUT or TP110 and set the time base of the oscilloscope to 2 ms/div. Trigger the oscilloscope externally (+ slope) with the signal from TP411 (DRUM FF) or the VIDEO 1 board.</p> <p>2) During Search, adjust R709 so that the Y level difference is uniform at VIDEO OUT as shown in the figure 2-6-9.</p>
					
Fig. 2-6-9					
18	SECAM DET.	TP601 [VIDEO UNIT board]	LC601 [VIDEO UNIT board]	<ul style="list-style-type: none"> • E-E • SECAM color bar 	<p>1) Connect an oscilloscope to TP601.</p> <p>2) Adjust LC601 so that A and B are related as follows: $A : B = 3 : 4$</p>
					
Fig. 2-6-10					

2.7 AUDIO CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the VIDEO 1 board.

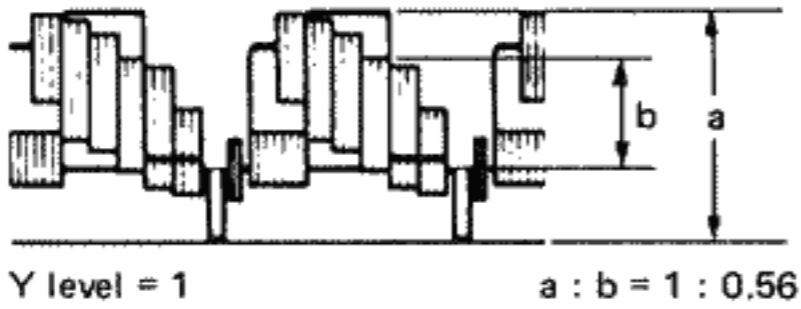
No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio bias level	TP331 TP332 (GND)	R304 (BIAS ADJ)	<ul style="list-style-type: none"> • VHS mode • SP mode • No signal 	<ol style="list-style-type: none"> 1) Connect a millivoltmeter between TP331 and TP332. 2) Set for REC mode without signal. 3) Adjust R304 for 2.5 mVrms.
2	Audio PB level	AUDIO OUT	R303 (PB LEVEL ADJ)	<ul style="list-style-type: none"> • REC then PB • SP and LP modes • VHS mode • Audio monitor to Normal 	<ol style="list-style-type: none"> 1) Connect an audio tester to AUDIO OUT. 2) Supply an audio signal (-8 dBs/1 kHz) to Peri. IN and record together with a video signal, then play back. 3) Adjust R303 so that the audio output level during playback becomes -6 ± 1 dBs.
3	REC FM level	TP53 [REC AMP board]	R216 [REC AMP board]	<ul style="list-style-type: none"> • S-VHS mode • LP mode • REC then PB • No signal 	<ol style="list-style-type: none"> 1) Connect an oscilloscope to TP53. 2) Record in the SP mode, without an audio signal, then play back. 3) Adjust R216 for 90 mVp-p \pm 10 mVp-p FM audio playback voltage.
4	E-E level	AUDIO OUT	R302 (E-E LEVEL) R301 (E-E BALANCE)	<ul style="list-style-type: none"> • ALC: OFF • REC mode • Audio monitor to Hi-Fi • REC LEVEL VR : CENTRE • REC BALANCE VR : CENTRE 	<ol style="list-style-type: none"> 1) Supply a 1 kHz, -8 dBs audio signal to Peri. IN and a video signal to Peri. IN. 2) Set Hi-Fi REC level and balance controls to center detent position. 3) Adjust R302 (E-E level) and R301 (E-E balance) so that audio output level becomes -6 ± 1 dBs at AUDIO OUT (both channels).

2.8 TUNER/IF CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the IF board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
	<ul style="list-style-type: none"> Equipment required: 1. Oscilloscope 2. IF sweep signal generator with suitable markers (PIF, SIF, etc.) 3. Sweeper probe (sweep signal supply cable) as shown on the right. 				<p style="text-align: center;">Fig. 2-8-1</p>
1	VCO	IC1 pin 28	T2 (VCO)	<ul style="list-style-type: none"> Sweep generator out: 70 dBμ (38.9 MHz) Tuner mode without antenna IN 	<p>1) Use a sweeper probe as shown in Fig. 2-8-1 and connect the sweep generator output to pin 1 of SAW 1. Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope. Connect the oscilloscope to pin 28 of IC1 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker as shown in Fig. 2-8-2.</p>
		<p style="text-align: center;">Fig. 2-8-2</p>		<ul style="list-style-type: none"> TV broadcast Tuner mode 	<p>Alternate method:</p> <ol style="list-style-type: none"> 1) Receive a color broadcast on a VHF-HI channel (7 to 13). 2) Adjust T2 to obtain a fine picture on the monitor.
		<ul style="list-style-type: none"> Before the following adjustments: 1. Connect a cable to ANT IN and terminate TV OUT at 75 Ω. 2. Set a TV channel signal generator as follows. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Video : 70 dBμ/75 Ω, color bar 87.5% modulation Audio : 62 dBμ/75 Ω, 1 kHz \pm 25 kHz deviation</p> </div>			
2	RF AGC	IF terminal of Front end	R21 (RF AGC)	<ul style="list-style-type: none"> TV signal Tuner mode 	<p>1) Connect the oscilloscope to IF terminal of U/V Tuner (Front end). Adjust R21 for maximum level, then again adjust R21 for -10 dB gain.</p>
		Monitor	R21 (RF AGC)	<ul style="list-style-type: none"> TV broadcast Tuner mode 	<p>Alternate method:</p> <p>Note: Adjust R21 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields.</p> <ol style="list-style-type: none"> 1) Adjust R21 to minimize noise or streaks on the TV screen. 2) Check for absence of abnormality on all channels.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	Color level	CN1-3	R40 (COLOR LEVEL)	<ul style="list-style-type: none"> • TV broadcast • Tuner mode • Color bar 	1) Receiving a color bar signal, set the Y level for 100% reference signal and then adjust R40 for a magenta level of 56% at CN1-3.

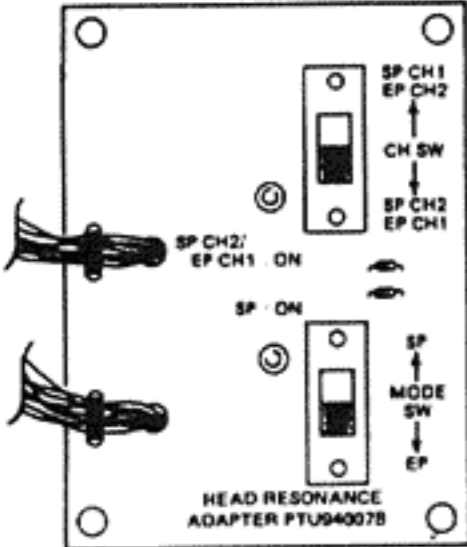
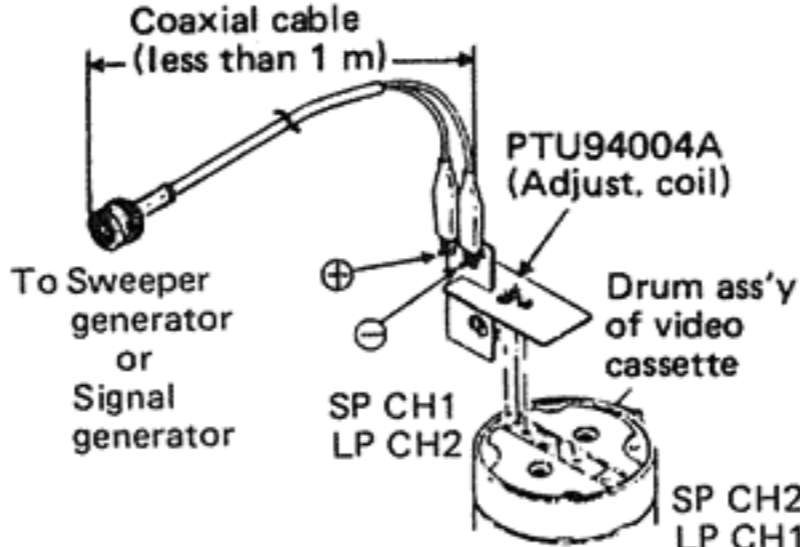


Y level = 1
Magenta level = 0.56
a : b = 1 : 0.56

Fig. 2-8-3

2.9 PRE AMP CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the PRE AMP board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	Head resonance & Q	• EE	<p>IMPORTANT: When switching mode SW and CH SW of the head resonance adapter (PTU94007B), turn power button of the front panel off state because of protection of CP5 of the REGULATOR board.</p> <p>Note: EP (LP)</p>  <p>Fig. 2-9-1 Fixture</p>	<p>• CN3-17 (Yellow wire) of the Fixture</p>  <p>Fig. 2-9-2 Adjust coil installation</p>	<p>• CH1 C14 (fo) R11 (Q)</p>	<p>Note: This adjustment is required only when flicker or black fringe noise appears after replacing the upper drum (video head).</p> <ol style="list-style-type: none"> 1) Disconnect connector of CN1 of the REC AMP board from the PRE/AMP board and connector of CN6 from the SWITCHING REGULATOR board. 2) Use the head resonance adapter (Fixture) PTU-94007B. Connect one connector (18-pin) of the Fixture to CN3 of the PRE AMP board and other connector (3-pin) to CN6 of the SWITCHING REGULATOR board. 3) Set the adjust coil (PTU94004A) onto the upper drum as shown in Fig. 2-9-2. 4) Connect an oscilloscope to CN3-17 (Yellow wire) of the Fixture and shield case (GND) of the PRE AMP board. 5) Supply a sweeper generator output to the adjust coil as shown in Fig. 2-9-2, then adjust the sweeper generator gain so that the waveform does not distort at CN3-17 of the Fixture. 6) Trigger the oscilloscope externally with the signal from V. SYNC of the sweeper generator. 7) Adjust C14 to set the CH1 resonance point to 8 MHz. Use the control of the oscilloscope to position the 1 MHz region at graduation 2 of the oscilloscope scale. 8) Adjust R11 to position the 8 MHz portion at 4 of the oscilloscope as shown in Fig. 2-9-3.
			<p>• CH SW of the Fixture: SP (CH2)/LP (CH1)</p>	<p>• CH2 C13 (fo) R17 (Q)</p>	<ol style="list-style-type: none"> 9) Change the adjust coil to SP (CH2)/LP (CH1) position opposite the SP (CH1)/LP (CH2) as shown in Fig. 2-9-4. 10) Repeat the above steps 7) and 8) for the CH2. Adjust resonance with C13 and Q with R17. 	

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
		• EE	<ul style="list-style-type: none"> • RF sweep • LP • Mode SW of the Fixture: LP • CH SW of the Fixture: SP (CH2)/LP (CH1) 	• CN3-16 (Orange wire) of the Fixture	• CH1 C12 (fo) R15 (Q)	11) In the same manner as above. Connect the oscilloscope to CN3-16 (orange wire) of the Fixture. 12) Repeat the above steps 7) and 8) for the LP mode. Adjust resonance with C12 and Q with R15.
			<ul style="list-style-type: none"> • CH SW of the Fixture: SP (CH1)/LP (CH2) 		• CH2 C11 (fo) R14 (Q)	13) Similarly, perform adjustment in the same manner as for CH1. 14) Change the adjust coil to SP (CH1)/LP (CH2) position opposite the SP (CH2)/LP (CH1) as shown in Fig. 2-9-4. 15) Adjust resonance with C11 and Q with R14.

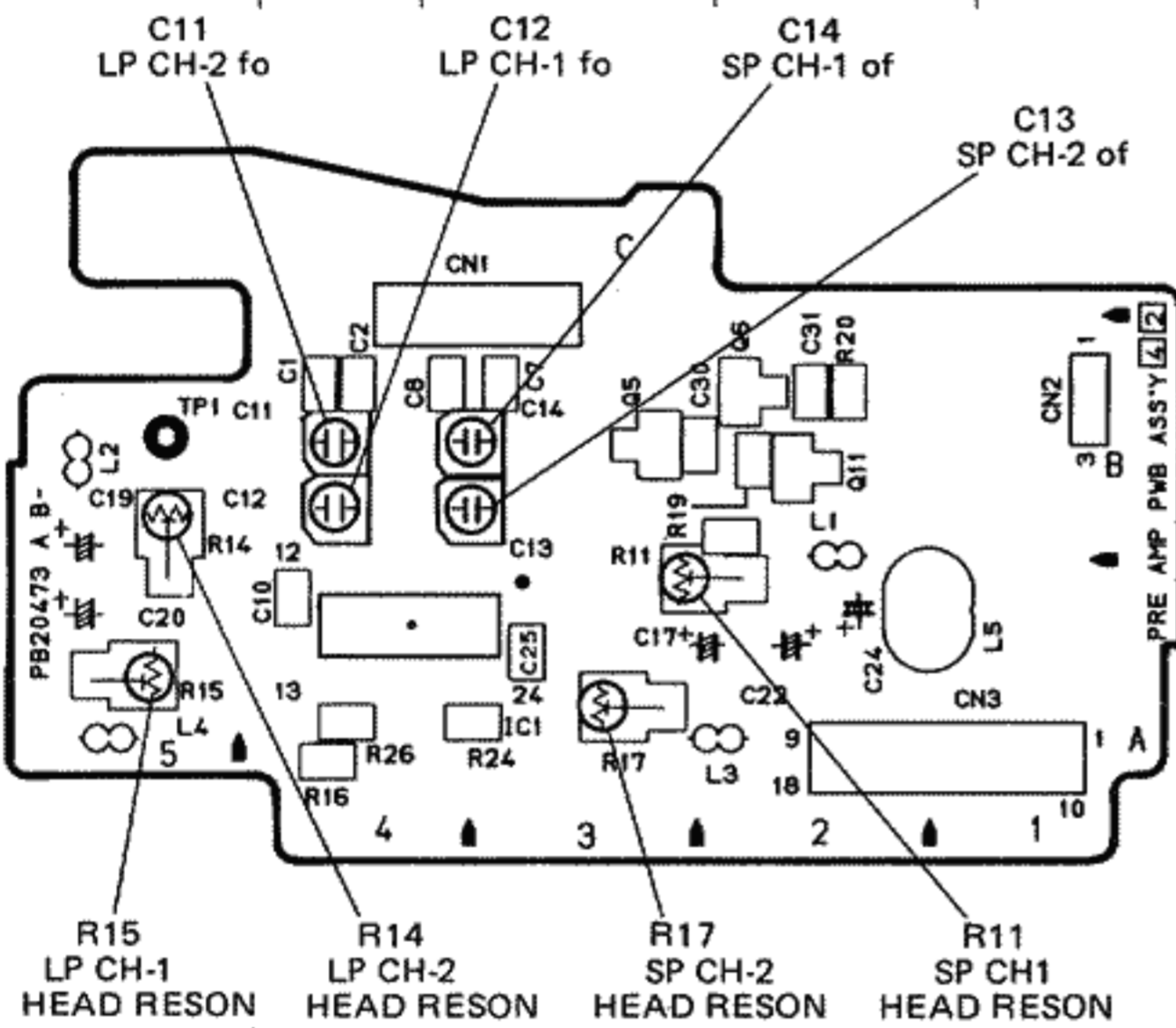




Fig. 2-9-5 Adjustment element location

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
		• EE	<ul style="list-style-type: none"> • 1 MHz signal • SP • Mode SW of the Fixture: SP • CH SW of the Fixture: SP (CH1)/LP (CH2)  <p>Fig. 2-9-6 1 MHz signal</p>	• CN3-17 (Yellow wire) of the Fixture	<ul style="list-style-type: none"> • CH1 C14 (fo) R11 (Q) 	<p>Alternate method:</p> <ol style="list-style-type: none"> 1) Repeat the above steps 1) to 4). 2) Supply 1 MHz signal to the adjust coil as shown in Fig. 2-9-2, then adjust the signal generator gain so that the waveform does not distort at CN3-17 (yellow wire) of the Fixture. 3) Use the control of the oscilloscope to position the 1 MHz region at graduation 2 of the oscilloscope scale as shown in Fig. 2-9-6. 4) Set signal generator for 8.0 MHz. 5) Adjust C14 (CH1 resonance) for maximum signal amplitude. 6) Adjust R11 (CH1 Q) so that amplitude of the signal (8 MHz) is 2 times (6 dB) that of the 1 MHz signal as shown in Fig. 2-9-7.
			<ul style="list-style-type: none"> • CH SW of the Fixture: SP (CH2)/LP (CH1)  <p>Fig. 2-9-7 8 MHz signal</p>		<ul style="list-style-type: none"> • CH2 C13 (fo) R17 (Q) 	<ol style="list-style-type: none"> 7) Change the adjust coil to SP (CH2)/LP (CH1) position opposite the SP (CH1)/LP (CH2) as shown in Fig. 2-9-4. 8) Repeat the above steps 3), 4), 5) and 6) for the CH2.
		• EE	<ul style="list-style-type: none"> • 1 MHz signal • EP • Mode SW of the Fixture: EP • CH SW of the Fixture: SP (CH2)/LP (CH1) 	• CH3-16 (Orange wire) of the Fixture	<ul style="list-style-type: none"> • CH1 C12 (fo) R15 (Q) 	<ol style="list-style-type: none"> 9) In the same manner as above. Connect the oscilloscope to CN3-16 (orange wire) of the Fixture. 10) Repeat the above steps 3), 4), 5) and 6) for the LP mode. Adjust resonance with C12 and Q with R15.
			<ul style="list-style-type: none"> • CH SW of the Fixture: SP (CH1)/LP (CH2) 		<ul style="list-style-type: none"> • CH2 C11 (fo) R14 (Q) 	<ol style="list-style-type: none"> 11) Similarly, perform adjustment in the same manner as for CH1. 12) Change the adjust coil to SP (CH1)/LP (CH2) position opposite the SP (CH2)/LP (CH1) as shown in Fig. 2-9-4. 13) Adjust resonance with C11 and Q with R14.

2.10 DEMODULATOR CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the DEMODULATOR board.

Audio Multiplex TV Signal Generator

Recommended Specifications

1. Signal Format	Based on CCIR-B	9. Sound Modulation Modes	S ₁	S ₂
2. Frequency		Mono	Mono 1	Mono 2
Video Carrier F _v	38.9 MHz	Stereo	(L + R)/2	R
1st Sound Carrier f _{s1}	33.4 MHz	Dual	Mono 1	Mono 2
2nd Sound Carrier f _{s2}	33.1578125 MHz	10. Functions	S ₁	S ₂
3. Modulator		Mono (M)	100%	100%
Video	Crosshatch (black on white) V: 50 Hz, H: 15.625 kHz	Stereo (L, R)	(L + R)/2	R
Audio	Sinewave 1 kHz; CH1 and CH-2 outputs switchable	(L)	L/2	—
4. Output	97 dB/μV (open) ± 2 dB fixed, BNC-R 75 Ω	(R)	R/2	R
5. P-S Ratio	S ₁ P - 13 dB ± 2 fixed S ₂ P - 20 dB ± 2 fixed	(OFF)	—	—
6. Modulation		Mult (S ₁ , S ₂)	100%	100%
Video	87.5% ± 3%	(S ₁)	100%	0
Audio	±30 kHz ± 2 kHz	(S ₂)	0	100%
7. Stereo Separation	Less than -40 dB	(OFF)	0	0
8. Pilot Signal		V. MOD (ON/OFF)		
Carrier Frequency	54.6875 kHz ± 5 Hz synchro- nized type	11. Frequency Accuracy	Within ±5 × 10 ⁻⁵	
Stereo	117.5 Hz AM 50%	12. Spurious	Less than -50 dB	
Dual	274.1 Hz AM 50%	13. Saw Filter	Self-contained	

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	First audio detector coil	IC201 pin 3	T4 [IF board]	<ul style="list-style-type: none"> • BILING mode • SUB: unmod. • MAIN: mod. 	1) Apply Main audio modulated signal to the front end IF terminal. 2) Connect a distortion meter to IC201 pin 3. 3) Adjust T4 of the IF board for minimum distortion. Note: Audio multiplex TV signal generator connection is the same for the following adjustments.
2	Second audio detector coil	IC201 pin 2	T201	<ul style="list-style-type: none"> • BILING mode • SUB: mod. • MAIN: unmod. 	1) Connect a distortion meter to IC201 pin 2. 2) Adjust T201 of the IF board for minimum distortion.
3	Stereo separation	IC201 pin 5	R202	<ul style="list-style-type: none"> • STEREO mode • R : mod. • L : unmod. 	1) Set a signal generator to Stereo mode, but adjust only the R channel. 2) Connect an oscilloscope to IC201 pin 5. 3) Adjust R202 for minimum output level.
4	Buzz	IC201 pin 1	T8, T2 [IF board]	<ul style="list-style-type: none"> • STEREO mode • R/L : unmod. 	1) Connect a noise meter to CN201 pin 1 and an oscilloscope to AC output of the noise meter. 2) Adjust T8 of the IF board for minimum Philips pattern noise. 3) Adjust T2 of the IF board for minimum crosshatch noise.
5	Audio output level	CN201 pin 1 (L) CN201 pin 3 (R)	R221 (L) R224 (R)	<ul style="list-style-type: none"> • STEREO mode • R: mod./unmod. • L: unmod./mod. 	1) Set a signal generator for Stereo mode. 2) Connect an audio meter to CN201 pin 1. 3) Adjust R221 (L channel) for 18.0 dBs ± 0.5 dB. 4) Similarly, connect an audio meter to pin 3 of CN201 and adjust R224 for the R channel.

2.11 ON SCREEN CIRCUIT

Note: Unless otherwise specified, all test points and adjustments are located on the VIDEO 1 board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Charactor position	TP901	C905	• E-E mode	<p>1) Connect a frequency counter to TP901 and GND. 2) Short IC901-3 pin to GND. 3) Adjust C905 for 7.30 ± 0.05 MHz.</p> <p>Note: If incorrectly the above adjustment, slip out the on screen display. For adjustment of above steps (2) to (4), looking for Menu on the monitor-TV and rough adjustment C905 preparation.</p>
2	Back ground colour	TP902	C916	• E-E mode	<p>1) Connect a frequency counter to TP902 and GND. 2) Adjust C916 for 17.73447 ± 0.00030 MHz.</p> <p>Note: If incorrectly the above adjuatment, blue back picture is not appear on the monitor-TV. For adjustment of above steps (1) to (2), looking for Menu on the monitor-TV and rough adjustment C916 preparation.</p>