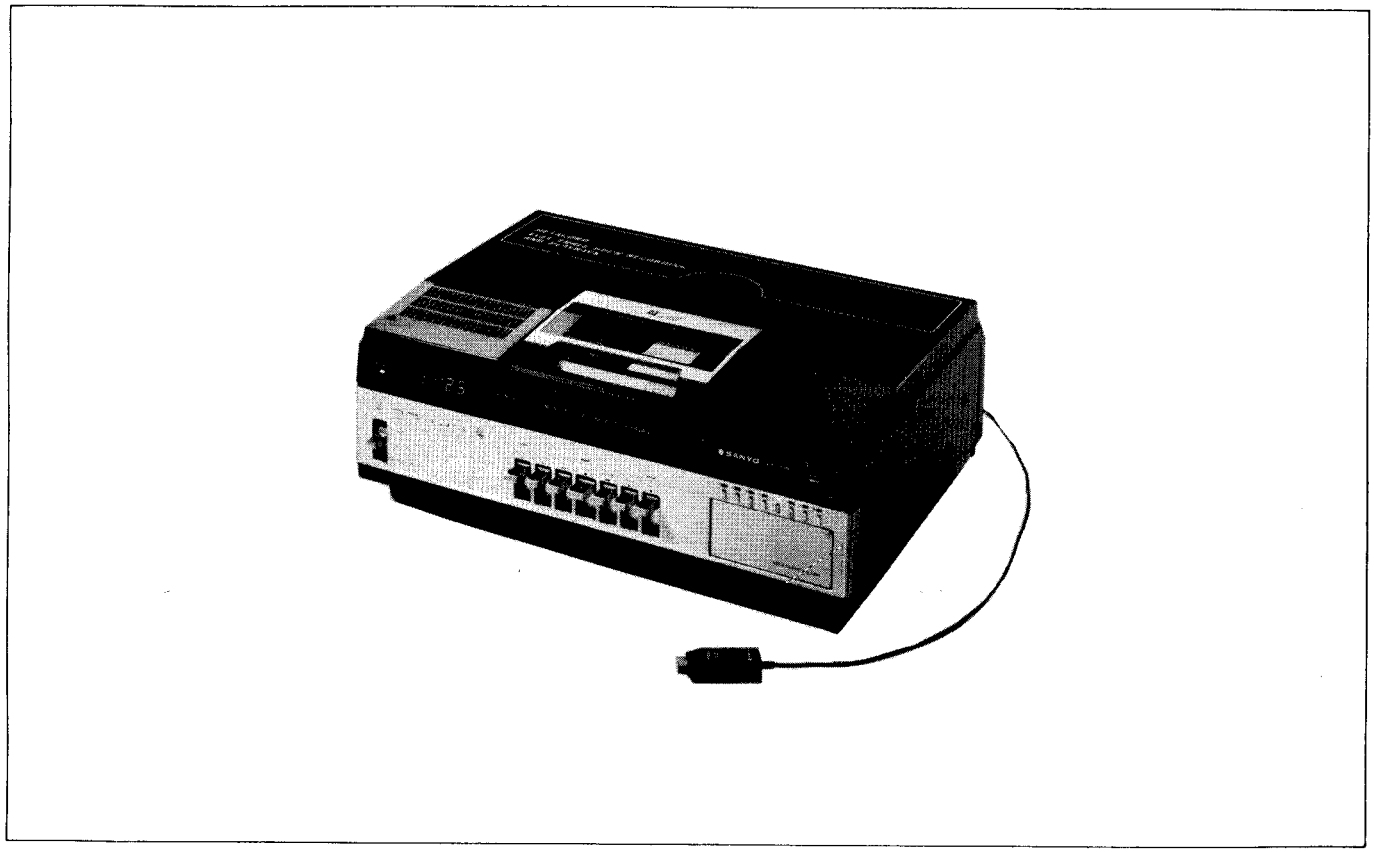
SERVICE MANUAL

SANYO

COLOR VIDEO CASSETTE RECORDER

VTC9300P



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The unauthorised recording of television programs, video tapes, films and other such material may involve infringement of copyright or the rights of third parties.

WM-3646

1. REMOVAL OF CABINET PARTS

1. Cabinet Top

Depress the EJECT button to raise Cassette Holder. Remove seven Screws (a) and carefully lift up the Cabinet Top. (See Fig. 1-1)

2. Side Panels

The Right and Left Side Panels are the same type. Remove two Screws (b) on each side as shown in Fig. 1-1.

3. Rear Panel

Remove five Screws (c) on the Rear Panel, and remove it backward. (See Fig. 1-1)

4. Bottom Plate

Place the unit with the right-hand side down on a soft surface, and remove four Screws (d) on the Bottom Plate. (See Fig. 1-1)

5. Front Panel Assembly

(1) Remove four Screws (e) securing the Front Panel. (See Fig. 1-1)

(2) Disconnect the two connectors (P1601 and P1602) from the W20 Circuit Board.

(3) Disconnect the three connectors (P1801, P1802 and P1803) from the W14 Circuit Board.

(4) Slightly lift up the Front Panel Assembly, and pull it toward you for removal.

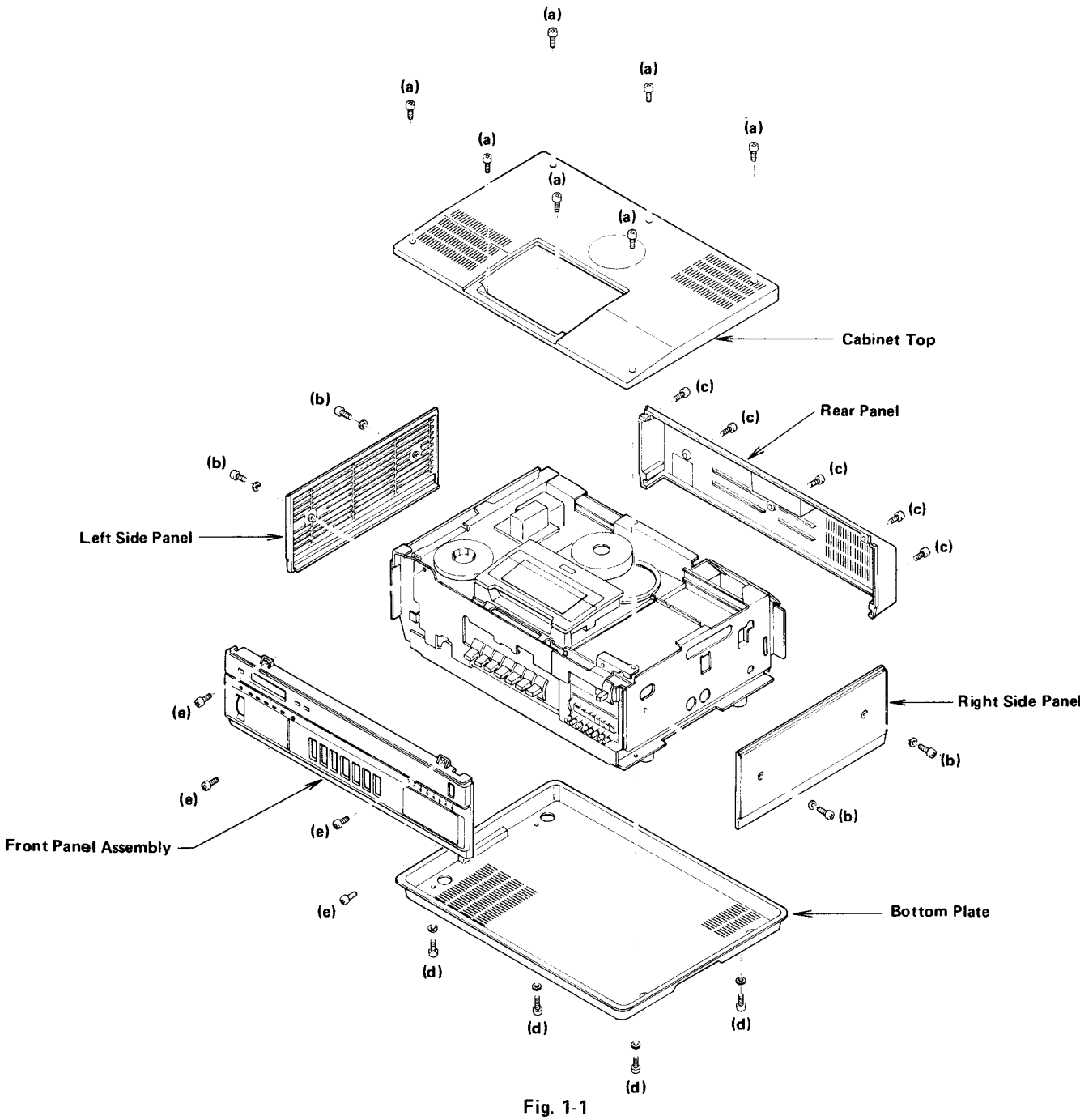


Fig. 1-1

2. DISASSEMBLY OF CIRCUIT BOARDS

1. W1 Circuit Board (For Head Amp and Servo Circuit) (See Fig. 2-1)

(1) Remove Cabinet Top, Rear Panel and Left Side Panel, referring to the instructions given in "Removal of Cabinet Parts".

(2) Remove two Screws (a) to take off the Protection Bracket.

(3) Disengage the plastic lock from the each top corner of the W1 Board. It is now ready for adjustment and parts replacement.

(4) Disconnect the nine connectors (P1, P2, P3, P101, P102 and P104 through P107) from the W1 Board to disassemble it from the chassis.

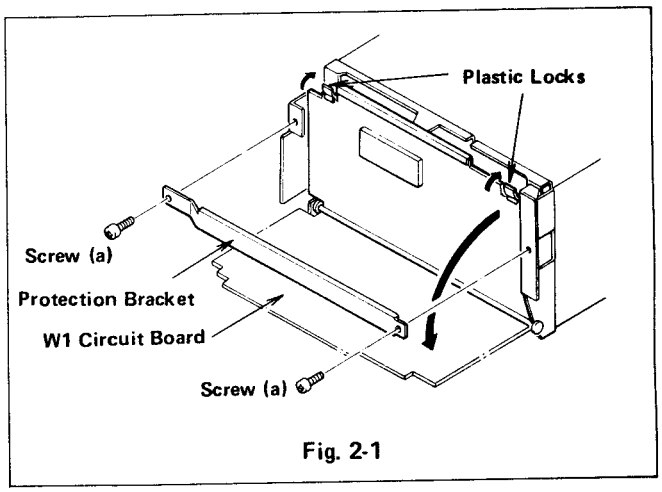


Fig. 2-1

2. W2 Circuit Board (For Video and Audio Circuits) (See Fig. 2-2)

(1) Place the unit with the right-hand side down on a soft surface, and remove the Bottom Plate, referring to the instructions given in "Removal of Cabinet Parts."

(2) Remove three Screws (a) to swing the W2 Circuit Board open. It is now ready for adjustment and parts replacement.

(3) Disconnect the seven connectors from the W2 Board to disassemble it from the chassis.

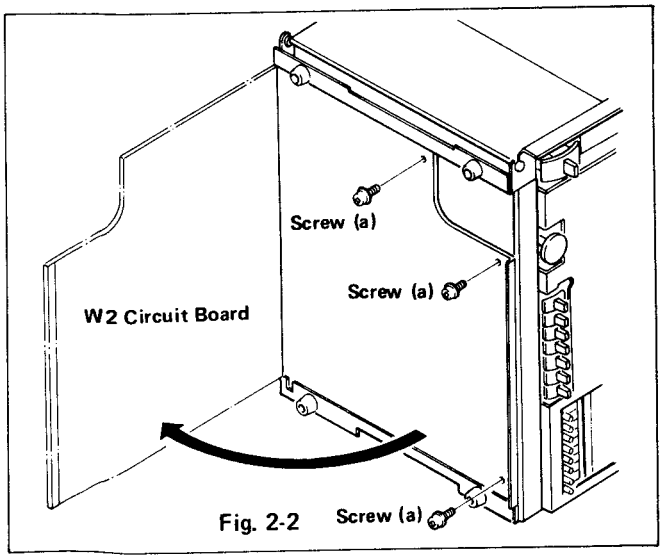


Fig. 2-2

3. W3 Circuit Board (For DC Power Supply Circuit) (See Fig. 2-3)

(1) Remove the Right Side Panel and Rear Panel, referring to the instructions given in "Removal of Cabinet Parts".

(2) Loosen two Screws (a) retaining the heat sink through the holes located at the right side of the chassis.

(3) Remove Screw (b) on the W3 Circuit Board, and cut or solder off each lead-wires (LW701 through LW715) to take out the W3 Board.

(4) Solder each lead-wires onto the Board for replacement.

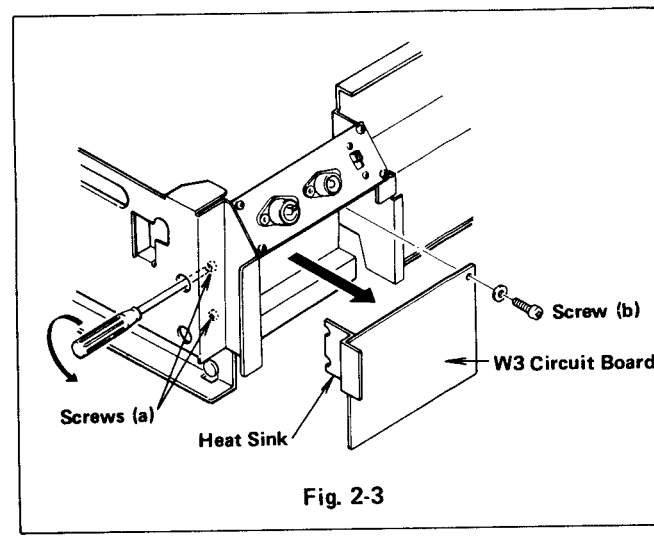


Fig. 2-3

4. W4 Circuit Board (For System Control Circuit) (See Fig. 2-4)

(1) Remove the Rear Panel and Bottom Plate, referring to the instructions given in "Removal of Cabinet Parts".

(2) Disengage the plastic lock from the each top corner of the W4 Circuit Board to swing it open. It is now ready for adjustment and part replacement.

(3) Disconnect the six connectors (P801 through P806) from the W4 Board to disassemble it from the chassis.

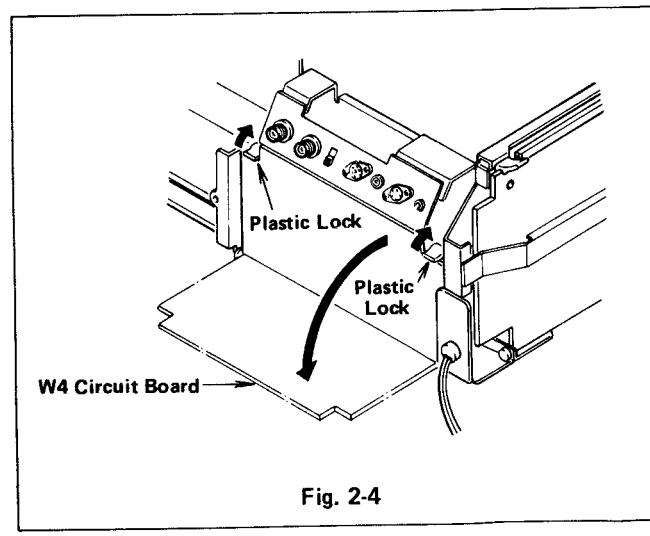


Fig. 2-4

5. W5 Circuit Board (For Tuner Circuit) (See Fig. 2-5)

(1) Remove the Cabinet Top, referring to the instructions given in "Removal of Cabinet Parts".

(2) Disengage the plastic lock from the each corner of the W5 Circuit Board to swing it open. It is now ready for

adjustment and part replacement.

(3) Disconnect the five connectors from the W5 Board to take it out from the chassis.

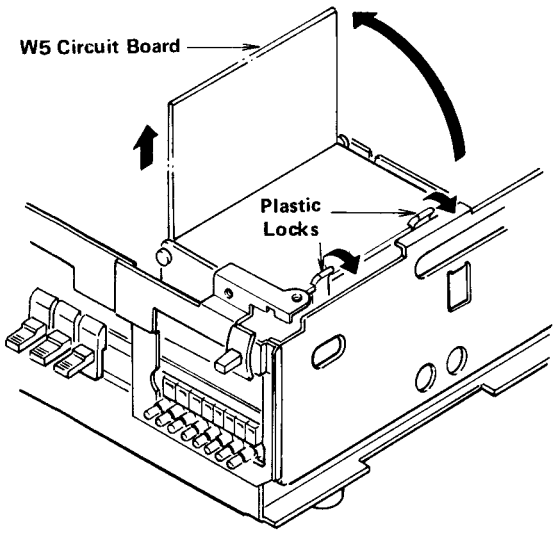


Fig. 2-5

6. W6 Circuit Board (For Leaf Switches) (See Fig. 2-6)

(1) Remove the Front Panel Assembly, referring to the instructions given in "Removal of Cabinet Parts".

(2) Open the W2 Circuit Board in reference to the previous instructions, and remove two Screws (a) fastening the Cover to take it out.

(3) Remove Screw (b) on the W6 Circuit Board, and cut or solder off each lead-wires, for the W6 Board disassembly.

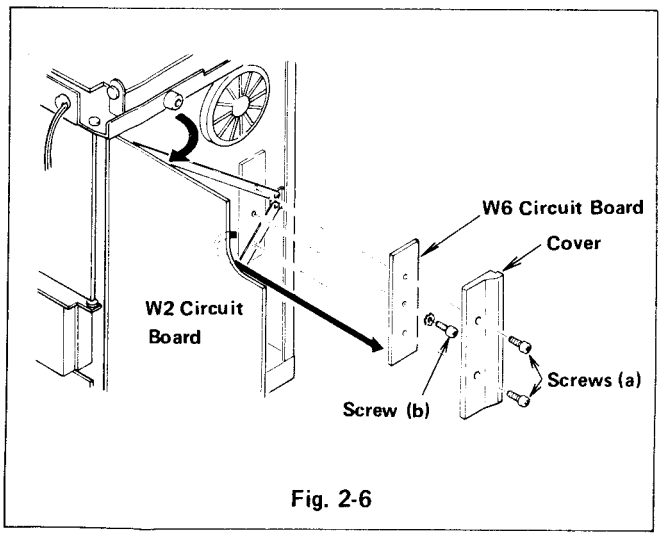


Fig. 2-6

7. W7 Circuit Board (For AC Power Supply Circuit) (See Fig. 2-7)

(1) Remove the Cabinet Top in reference to the instructions given in "Removal of Cabinet Parts".

(2) Remove Screw (a) for disassembly of the Insulation Cover.

(3) Remove two Screws (b) on the W7 Circuit Board, and cut or solder off each lead-wires for the W7 Board disassembly.

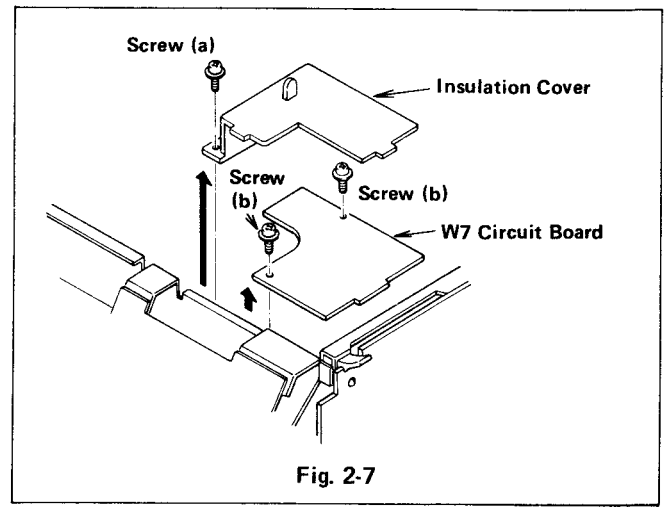


Fig. 2-7

8. W8 Circuit Board (For Timer and Counter Circuits) (See Fig. 2-8)

(1) The W8 Circuit Board is mounted on the Front Panel Assembly. Remove the Front Panel Assembly in reference to the instructions given in "Removal of Cabinet Parts".

(2) Remove two Screws (a) on the W8 Board and disconnect the two connectors (P1601 and P1602) from the Board. Lower it slightly and pull it out for disassembly.

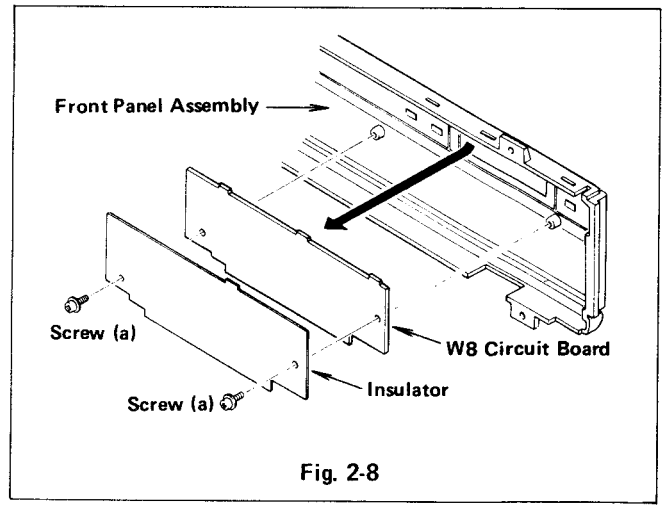


Fig. 2-8

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3. ELECTRICAL ADJUSTMENT PROCEDURES

1. Adjustment for Power Supply Circuit

(1) Power Supply Voltage

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR701	LW709, LW715	Digital voltmeter or multitester	STOP mode

1. Measure voltage between test points, LW709 (Black – Earth) and LW715 (Red – B+), with a digital voltmeter or multimeter and adjust VR701 to get 12V (+0.1V, –0V) meter reading.

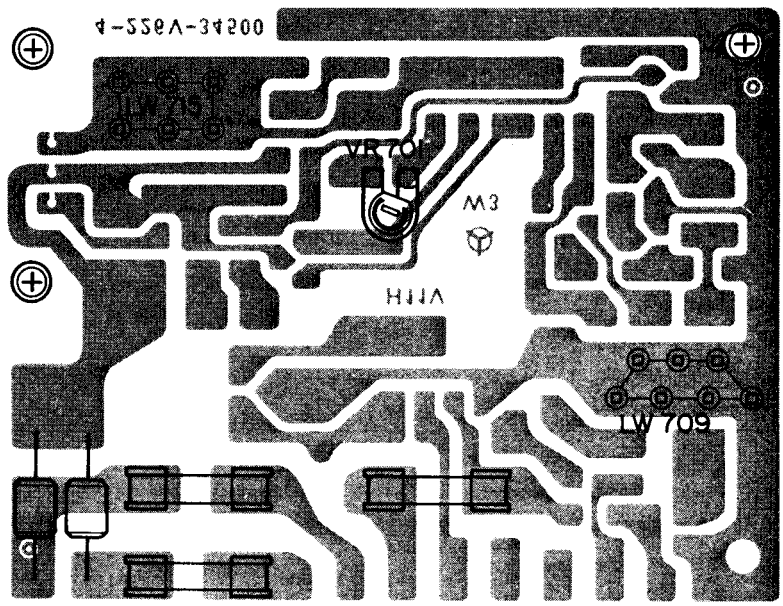


Fig. 3-1 Adjustment Location on W3 Circuit Board (Component Side View)

2. Adjustments for System Control Circuits

(1) Dew Sensor Check

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR801	Plunger Stand-by pilot	Measurement jig (VJ-0040)	STOP mode

1. Disconnect the plug P802 connecting the dew sensor and the W4 circuit board and connect the measurement jig (VJ-0040) to S802. (See Fig. 3-2)
2. Turn the VR801 fully to the left when viewing it from the pattern side, and then turn the power switch ON. The plunger is attracted in this state.
3. Slowly turn the VR801 to the right, and set it at the point where the plunger is just released.
4. Next, disconnect the measurement jig (VJ-0040), and connect the plug P802 as before. Lightly touch the dew sensor with a cotton swab moistened with a little alcohol. Then make sure that the plunger is attracted and that the stand-by pilot lights up. After the alcohol has dried, make sure again that the plunger is released and that the stand-by pilot goes out.

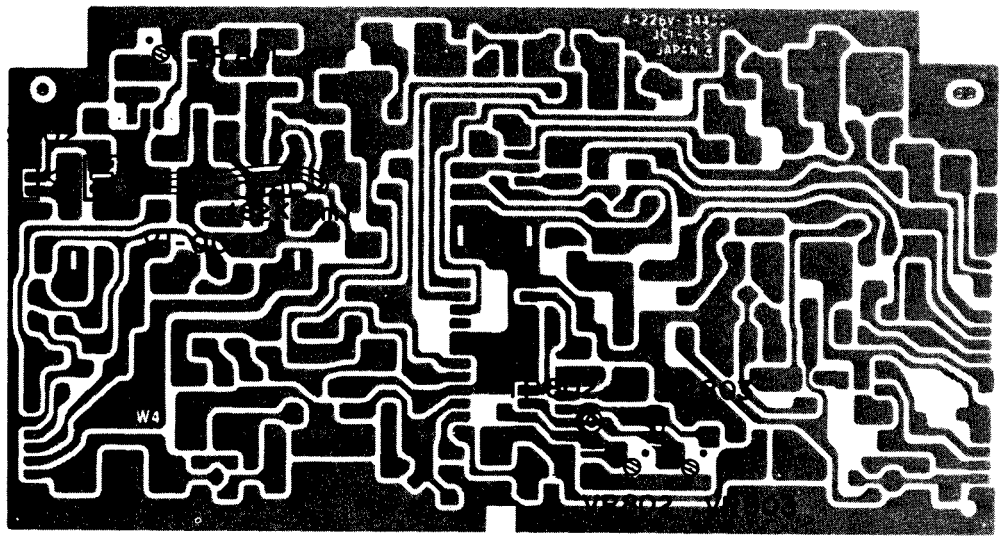


Fig. 3-2 Test Points and Adjustment Location on W4 Circuit Board (Foil-Side View)

(2) Tape End Sensor on PLAY or REC Mode

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR803	TP803	Oscilloscope	PLAY mode

1. Press the PLAY button after tape-loading is complete and make sure that the tape runs.
2. Observe with the oscilloscope the waveform at TP803. (See Fig. 3-2) Adjust VR803 until the wave amplitude becomes 3.8Vp-p.

* While adjusting the VR803, the PLAY button may be released by the activation of the plunger and so therefore keep the PLAY button pressed during the adjustment.

(3) Tape End Sensor on REW Mode

VR802	TP802	Oscilloscope	REW mode

1. Press the REW button and make sure that the tape rewinds.
2. Observe the oscillation waveform at TP802 with the oscilloscope, and rotate VR802 to the left to stop the oscillation. (See Fig. 3-2)
3. Observe with the oscilloscope the waveform at TP802. (See Fig. 3-2)
   Adjust VR802 until the amplitude becomes equal to 3.3Vp-p.

* While adjusting VR802, the REW button may be released by the activation of the plunger and so therefore keep the REW button depressed during the adjustment.

* After the adjustment, set the recorder to the PLAY mode as in check 2 and check that the wave peak (3.8Vp-p) at TP803 has not changed. If it has changed, perform the adjustment again.

(4) Counter Memory Check

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
			F.FWD/REW modes

1. Load the cassette tape.
2. Set the counter to '0000' and set the memory switch to ON.
3. Press the F.FWD button to advance the tape until the counter reads between 10 and 20. Then press the STOP button.
4. Now press the REW button and make sure that the stop plunger is attracted and the recorder is automatically set to the stop mode when the counter registers '0000 ± 1'. Check that, by pressing the REW key again, the plunger should remain unattracted, without key ejection.

* The memory switch does not work when the counter registers '0001' to '0004'.

(5) Tape End Sensor Check

			F.FWD/REW modes

1. Load the cassette tape, and set the memory switch to OFF.
2. Press the F.FWD button and check that the plunger is attracted and the recorder is set to the stop mode when the tape comes to the end.
3. Now press the REW button, and check that the plunger is attracted and the recorder is returned to the stop mode when the tape is completely wound up.

(6) Video Head Rotation Detection Check

			PLAY mode

1. After tape-loading has been completed, set the recorder to the PLAY mode and hold the AC motor fan so as to prevent it from rotating. Make sure that the plunger is attracted 3 to 5 seconds after the fan has stopped rotating, and that the recorder is set to the stop mode.

(7) Reel Base Rotation Detection Check

			REW mode

1. Do not load a cassette tape but instead press down on the cassette slide switch and set up for loading.
2. While pressing down on the cassette slide switch, make sure that the plunger is attracted 3 to 5 seconds after the REW button is pressed (the take-up reel does not move since no cassette tape is loaded) and that the recorder is set to the stop mode.

(8) Pause Mode Check

	Waiting lamp		PLAY/PAUSE modes

1. Press the PAUSE button while playing a prerecorded cassette. Check that the tape stops running. Make sure that the waiting lamp winks in every mode when the PAUSE button is depressed.

(9) Eject Mode Check

	Waiting lamp		EJECT mode

1. Load a cassette tape.
2. When the EJECT button is pressed, the AC motor starts rotating to carry out tape-unloading operation. As soon as the unloading is completed, the plunger is attracted and it lifts up the cassette holder to turn the

cassette SW1010 switch OFF, and the EJECT button is released. Unloading can be completed in less than about 3 to 5 seconds.
The stand-by pilot lamp remains on during the unloading operation. Check that the above operations are OK.

3. Adjustments for Servo Circuits

(1) Video Head Disk Rotation

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
Servo Pulley	TP101, TP103	Oscilloscope	REC mode

1. Disconnect the plug P104 (for the brake coil connection) from the W1 board. Load a cassette and set the unit into a recording mode to record a TV program.
2. Connect the trigger-in terminal of the oscilloscope to TP103 and the other terminal to TP101. Observe the switching pulse waveform with the oscilloscope set at "external sync" mode. (See Fig. 3-4)
3. The waveform moves from the right to the left on the screen. Measure a time of the single pulse travel across a pulse period with a stop watch.
4. Adjustment is not necessary if the pulse travel time is between 2.4 and 3.1 seconds. If the measured time is not within the above range, then proceed with the followings;
   (1) Check the servo belt, first. Replace it if deterioration or stretching is found on it.
   (2) If the servo belt is normal and the travel time is shorter than 2.4 seconds, replace the servo pulley with the one having a smaller diameter (i.e. one with a smaller number engraved.)
   (3) If the belt is normal and the travel time is longer than 3.1 seconds, replace the servo pulley with the one having a larger diameter (i.e. one with a larger number engraved.)
   ** For replacing the servo pulley, see "(21) AC Motor" under "4. MECHANICAL ADJUSTMENT" on page 56.
5. After the adjustment, connect the plug P101 as before.

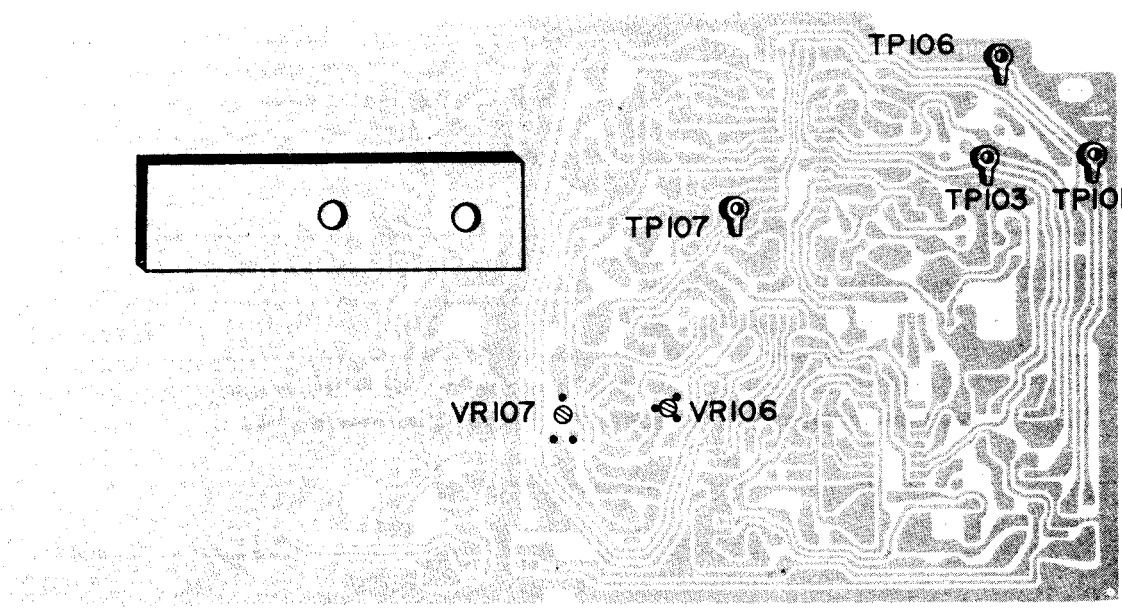


Fig. 3-4 Test Points and Adjustment Location on W1 Circuit Board (Foil-Side View)

(2) DC Bias

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR107	TP107	Oscilloscope	REC mode

1. Load a cassette, and set the unit into a REC mode to record a TV program.
2. Observe the level at TP107 with the oscilloscope (by using a 10:1 probe), and adjust VR107 so that the measured voltage of the level becomes 6.1V ±0.1V. In case the servo is unstable and the voltage fluctuates remarkably, adjust VR106 beforehand to stabilize the servo operation. (See Fig. 3-4)

(3) Hunting

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR106	TP101, TP106	Oscilloscope	REC mode

1. Observe the video signal waveform at TP106 with the oscilloscope set at "external triggering" mode and the switching pulse applied from TP101 to the trigger-in terminal. (See Fig. 3-4)
2. Load a cassette, and set the unit into a REC mode to record a TV program.
3. Adjust VR106 so that the rise time of the servo operation after the instance of pressing the REC button becomes less than 4 seconds.
   Also, adjust VR106 so that the rise time of the servo operation becomes less than 4 seconds when the TUNER/CAMERA switch is momentarily turned to the "CAMERA" position to cut off the video signal input and then switched back to the "TUNER" position (while the tape is running).
   The former is for adjustment of the servo rise time at a start of recording, while the latter is for adjustment of the servo rise time when a video signal is suddenly applied under "no signal recording state" – a situation that may occur when the channel selector is switched to a "blank" position while recording. (Servo rise time is the time necessary for a video signal, originally out of phase, to sync with the switching pulse.)

(4) Tape Speed

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
Capstan Pulley	"AUDIO OUT" TP601	Frequency Counter Alignment Cassette (VJ-0061)	PLAY mode

1. Load the alignment cassette (VJ-0061) and playback the pre-recorded audio signal at 3 kHz, –5 dB.
2. Connect the frequency counter to the AUDIO OUT terminal to measure the playback audio signal frequency.
3. When the frequency reads 2.994 through 3.006 kHz,no adjustment is necessary. If it measures any value other than the values given above, take one of the following steps according to the situation;
   (1) Replace the capstan belt if any deterioration or stretching is found on it.
   (2) Replace the capstan pulley with the one having a larger diameter (i.e. one with a larger number engraved) if the frequency is lower than 2.994 kHz.
   (3) Replace the capstan pulley with the one having a smaller diameter (i.e. one with a smaller number engraved) if the frequency is higher than 3.006 kHz.

(5) Switching Position

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR102 VR101	TP101 "VIDEO OUT"	Oscilloscope Alignment Cassette (VJ-0061)	PLAY mode

1. Load the alignment cassette (VJ-0061), and play it back.
2. Observe the video signal waveform at the VIDEO OUT connector with the oscilloscope set at the "external trigger" mode and the switching pulse applied from TP101 to the trigger-in terminal.
3. Adjust the tracking control so that the playback video signal has maximum amplitude.
4. Adjust VR102 so that the phase difference between the trailing edge of the switching pulse and the front edge of the vertical sync signal becomes 7H (±1H). (See Fig. 3-5.)
5. Adjust VR101 so that the phase difference between the leading edge of the switching pulse and the front edge of the vertical sync signal also becomes 7H (±1H). (See Fig. 3-6.)

** If the waveform does not stand still on the screen due to unstable servo operation, readjust the PLAY servo-lock phase referring to Item (8).



Horizontal: 0.1 ms/div.
Vertical: 0.5 V/div.

Fig. 3-5

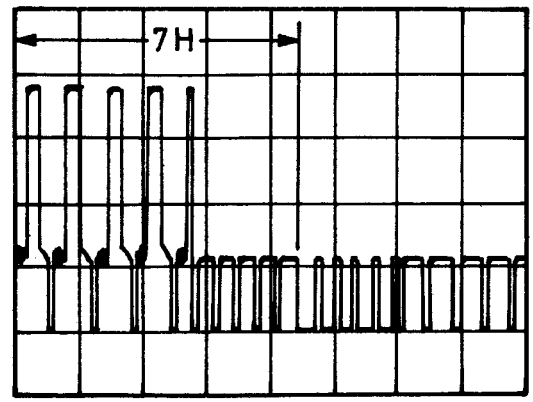


Fig. 3-6

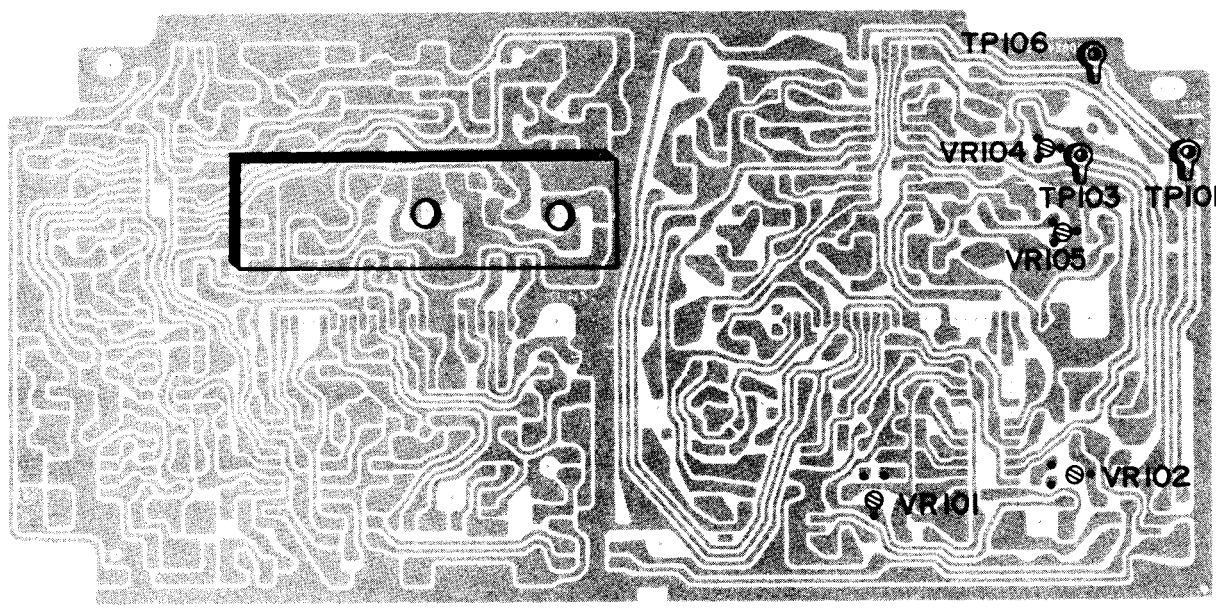


Fig. 3-7 Test Points and Adjustment Location on W1 Circuit Board
(Foil-Side View)

(6) Recording Servo Lock Phase

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR105	TP101, TP106	Oscilloscope	REC mode

1. Load a cassette, and set the unit into a REC mode to record a TV program.
2. Observe the video signal waveform at TP106 with the oscilloscope set at the "external trigger" mode and the switching pulse applied from TP101 to the trigger-in terminal.
3. Adjust VR105 so that the phase difference between the trailing edge of the switching pulse and the front edge of the vertical sync signal becomes 7H (±1H). (See Fig. 3-8.)

Horizontal: 0.1 ms/div.
Vertical: 0.5 V/div.

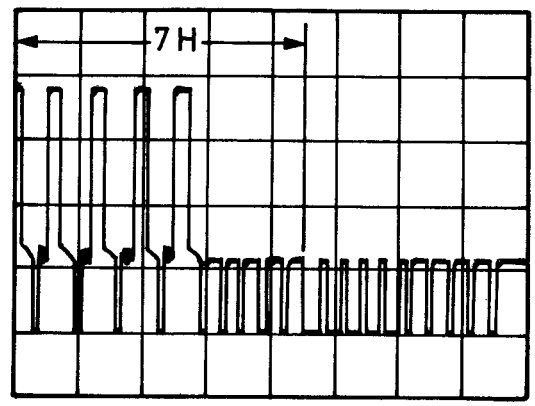


Fig. 3-8

(7) Tracking

VR104	TP103	Oscilloscope	REC/PLAY modes

1. Load a cassette, and set the unit into a REC mode to record a TV program. Then, play it back.
2. Place the tracking control at the center position (as a click stop is provided at the center,) and observe the square waveform (used as the gate pulse) at TP103 with the oscilloscope.
3. Adjust VR104 so that the pulse width of the square wave becomes 20 msec. (See Fig. 3-9.)
4. Turn the tracking control fully to the right, and then to the left, and make sure that the maximum change in the pulse width is greater than 7 msec. After this check, set the tracking control back to the center position.

Horizontal: 5 ms/div.
Vertical: 2 V/div.

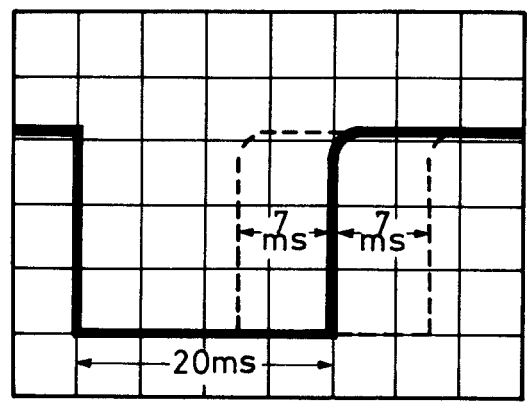


Fig. 3-9

(8) Play Servo Lock Phase

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR103	TP101, TP105, TP3	Oscilloscope	REC/PLAY modes

1. Load a cassette, and set the unit into a REC mode to record a TV program. Then, play it back.
2. With the oscilloscope, observe the phase difference between the switching pulse (which is applied to the trigger-in terminal with its trigger phase set at a "negative" position) at TP101 and the tracking delay (1) integrated waveform at TP105. (See Fig. 3-11)
3. Adjust VR103 so that this phase difference becomes 2.4 msec. Next, connect the oscilloscope to TP3, and make sure, by turning the tracking control, that maximum envelope can be obtained at the center position of the control. The tape path adjustment is necessary if the envelope is small and not flat. Please refer to the item "(12) Tape Path" on page 69.

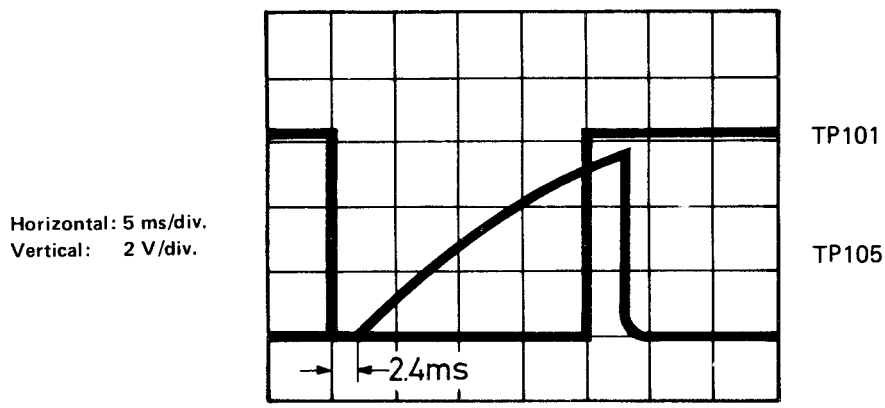


Fig. 3-10 Play Servo Lock Phase

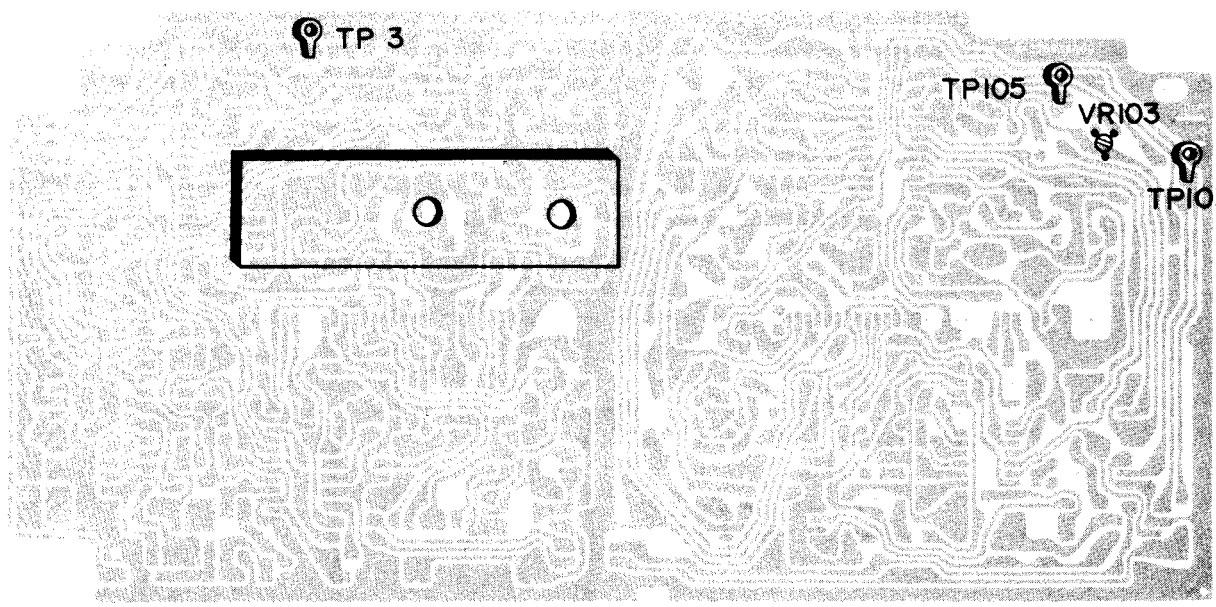


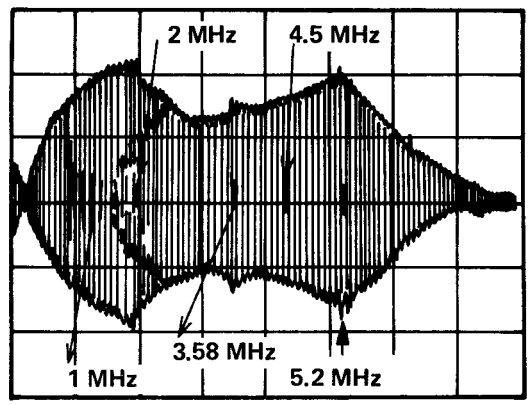
Fig. 3-11 Test Points and Adjustment Location on W1 Circuit Board
(Foil-Side View)

4. Adjustments for Video Circuits (on W1 and W2 Boards)

(1) Video Head Resonance

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VC1 VC2	TP3	Oscilloscope Alignment Cassette (VJ-0061)	PLAY mode

1. View the W1 circuit board from the pattern side, and turn VR7 to the center position, VR5, VR6 fully to the left, and VR3/VR4 fully to the right.
2. Load the alignment cassette (VJ-0061) and play it back to observe the FM video signal at TP3.
3. Adjust VC1 (channel B) and VC2 (channel A), respectively, so that each resonant frequency is found at 5.2 ± 0.1 MHz. (See Fig. 3-13)



Horizontal: 2 msec /div.
Vertical: 0.1 V/div.

Fig. 3-13

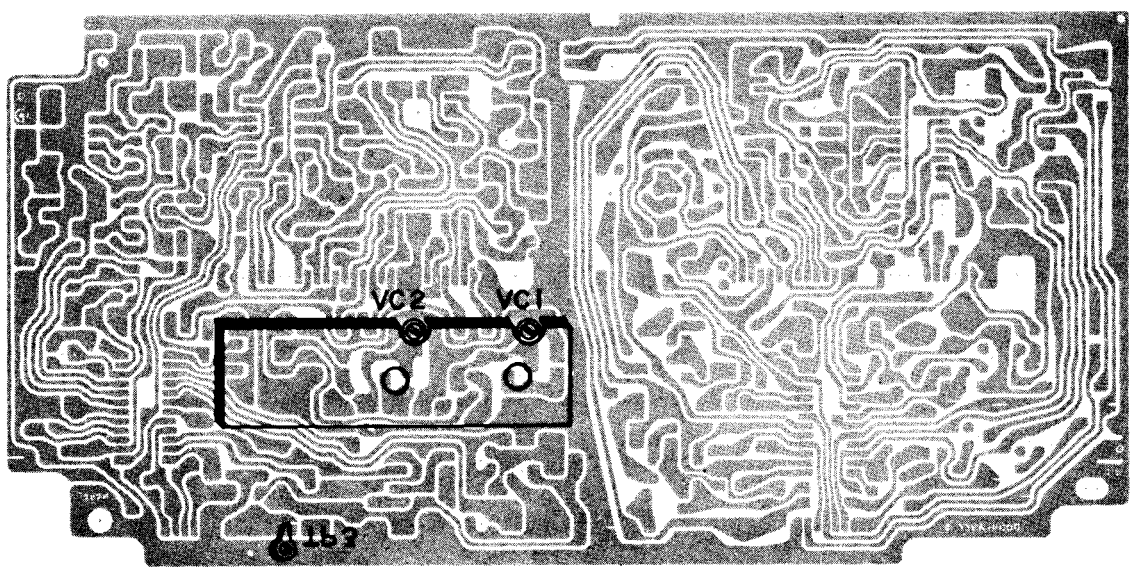
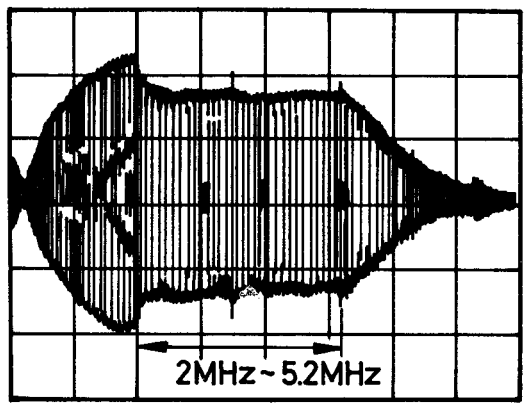


Fig. 3-12 Test Points and Adjustment Location on W1 Circuit Board (Component-Side View)

(2) Frequency Response of Playback Amplifier

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR3, VR4, VR5, VR6	TP3	Oscilloscope Alignment Cassette (VJ-0061)	PLAY mode

1. Load the alignment cassette (VJ-0061) and play it back to observe the FM video signal at TP3.
2. Adjust VR3/VR5 (channel B) and VR4/VR6 (channel A), respectively, so that each waveform has a flat response at a frequency range of 2 MHz through 5.2 MHz. (See Fig. 3-14)



Horizontal: 2 msec/div.
Vertical: 0.1 V/div.

Fig. 3-14

(3) Playback Balance Between Channels

VR7	TP3	Oscilloscope Alignment Cassette (VJ-0061)	PLAY mode

1. Load the alignment cassette (VJ-0061) and play it back to observe the FM video signal at TP3.
2. Adjust VR7 so that the each signal level at 4.5 MHz for channel A and channel B is equal to each other. (See Fig. 3-14)

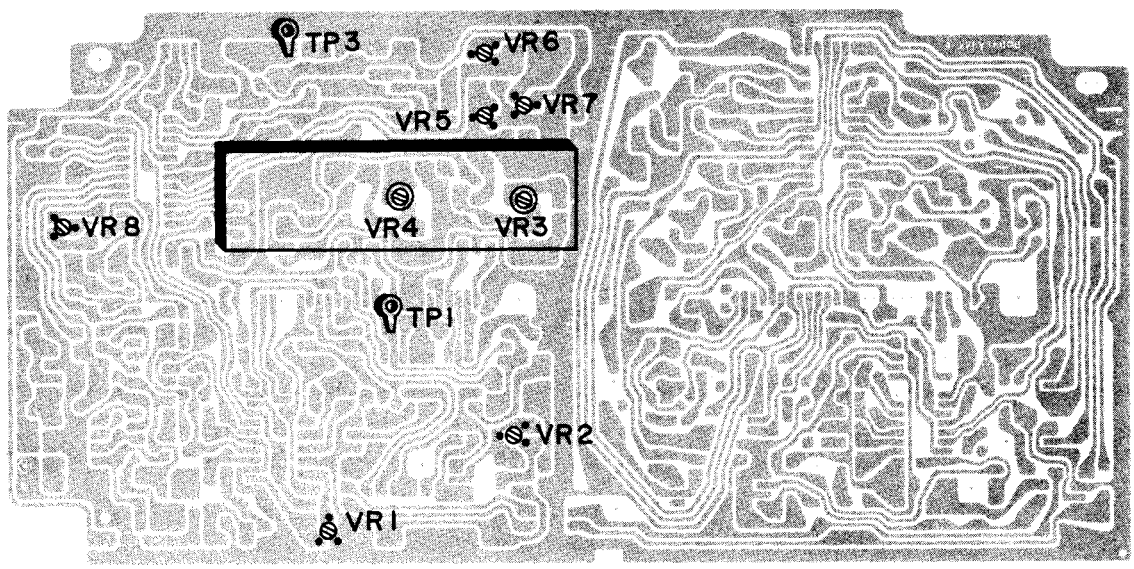


Fig. 3-15 Test Points and Adjustment Location on W1 Circuit Board (Foil-Side View)

(4) Frequency Response of Recording Signal Current

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR2	TP1	Oscilloscope, Color Bar Generator	REC mode

1. Set VR1 to the center position.
2. Connect the color bar generator (with the color signal switch turned off, and the B/W signal switch turned on) to the VIDEO IN connector of VCR. Then, load a cassette and set the unit in the recording mode.
3. Observe the waveform of the recording FM signal current at TP1.
4. Adjust VR2 so that the amplitudes of the overlapped waves become equal. (See Fig. 3-16)

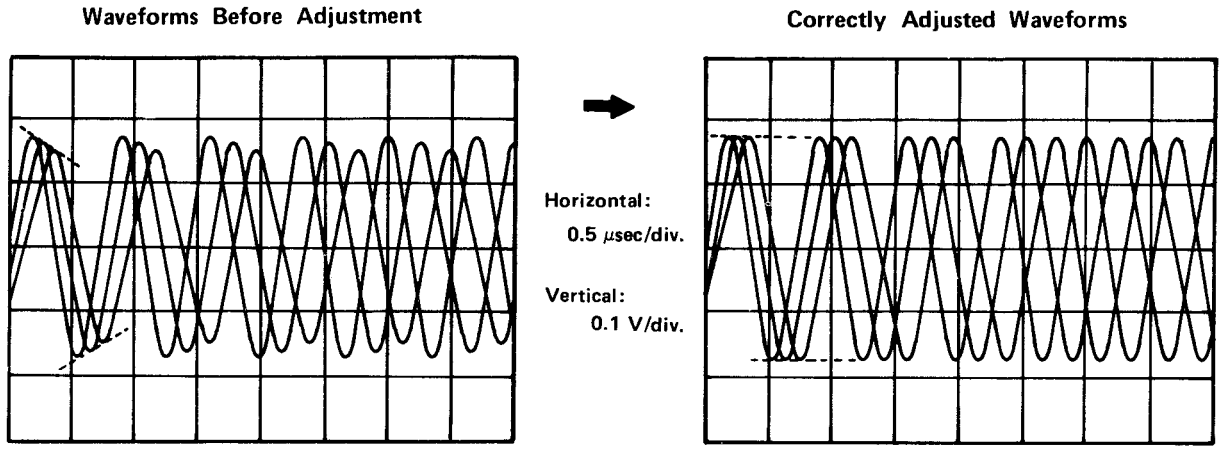


Fig. 3-16

(5) Luminance Recording Current

VR1	TP1	Oscilloscope, Color Bar Generator	REC mode

1. Connect the color bar generator (with the color bar signal switch turned off, and the B/W signal switch turned on) to the VIDEO IN connector of VCR. Then, load a cassette and set the unit in the recording mode.
2. Observe the waveform of the recording FM signal current at TP1.
3. Adjust VR1 so that the amplitude of the recording FM signal current becomes 300mVp-p. (An optimum amplitude may differ from that, depending on the video heads used in the VCR. A value between 250mVp-p and 300mVp-p may be allowed.) See Fig. 3-17.

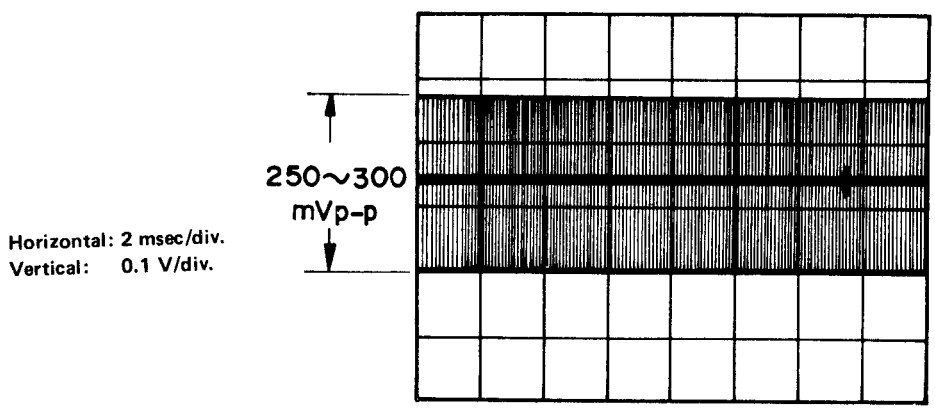


Fig. 3-17

(6) Sensitivity of Drop Out Compensator

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR8	VIDEO OUT	Video Monitor	PLAY mode

1. Turn the VR8 fully to the left when viewing it from the pattern side, and load a pre-recorded cassette with its signal content dropped out in some degree and play it back.
2. Turn VR8 to the right until drop-outs disappear from the play back picture on the monitor screen. Set VR8 at this position.

(7) Low Pass Filter for Recording Luminance (Y) Signal

T202	Q201 Pin (19) Q201 Pin (15)	Color Bar Generator Sweep Marker Generator Oscilloscope	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at Q201 pin (19) with the oscilloscope, and adjust T202 to reduce the chrominance signal component to a minimum. (See Fig. 3-19)
3. Connect the sweep marker generator to pin (15) of Q201 and provide a sweep range of nearly 0 to 7 MHz (0.5 IV).
4. Adjust T202 to locate the small peak of the waveform (at Q201 pin (19)) at 6.55 MHz. (See Fig. 3-20)

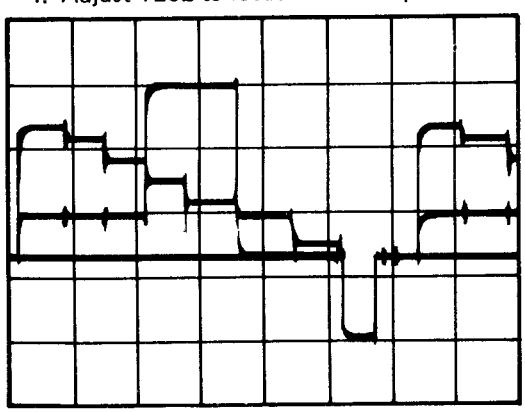
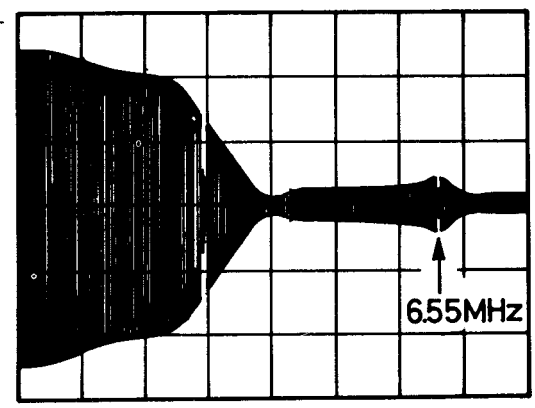


Fig. 3-19

Horizontal:
10 μsec/div.
Vertical:
0.1 V/div.



Horizontal:
0.5 msec/div.
Vertical:
0.05 V/div.

Fig. 3-20

(8) Non-linear Pre-emphasis

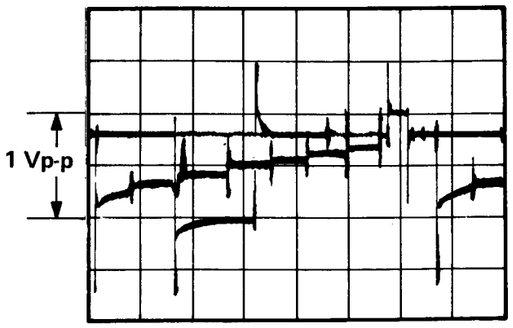
VR201, VR202 VR205	Q201 Pin (5) or Base of Q221 TP206	Oscilloscope Audio Signal Generator	STOP mode

1. COMPRESS Adjustment: Connect the VOM (Volt-Ohm-Meter) to the base of Q219 (TP207), and adjust VR202 for a VOM reading of 1.31 VDC 1.31V DC.
2. IMPEDANCE Adjustment: Connect the color bar generator to the VIDEO IN connector, and connect the oscilloscope CH1 probe to Q201 No. 5 pin and the CH2 probe to TP206. Adjust VR205 so that the TP206 signal is 1.15 times larger than the signal at Q201 No. 5 pin.

(9) Automatic Gain Control (AGC)/FM Deviation

VR204	TP206	Oscilloscope Color Bar Generator	STOP mode

1. Terminate the VIDEO OUT connector with a 75-ohm resistor, and connect an oscilloscope to TP230. Play back the alignment tape (VJ-0061) and adjust VR218 to get a waveform of 1Vp-p level on the oscilloscope.
2. Apply the color bar generator to the VIDEO IN terminal and record it on a cassette tape. Then, playback the recorded signal and adjust VR204 to get a 1Vp-p at TP206. (See Fig. 3-23)



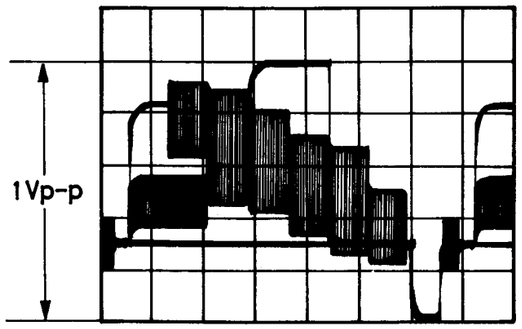
Horizontal: 10 μsec/div.
Vertical: 0.5 V/div.

Fig. 3-23

(10) Video Output Level (EE mode)

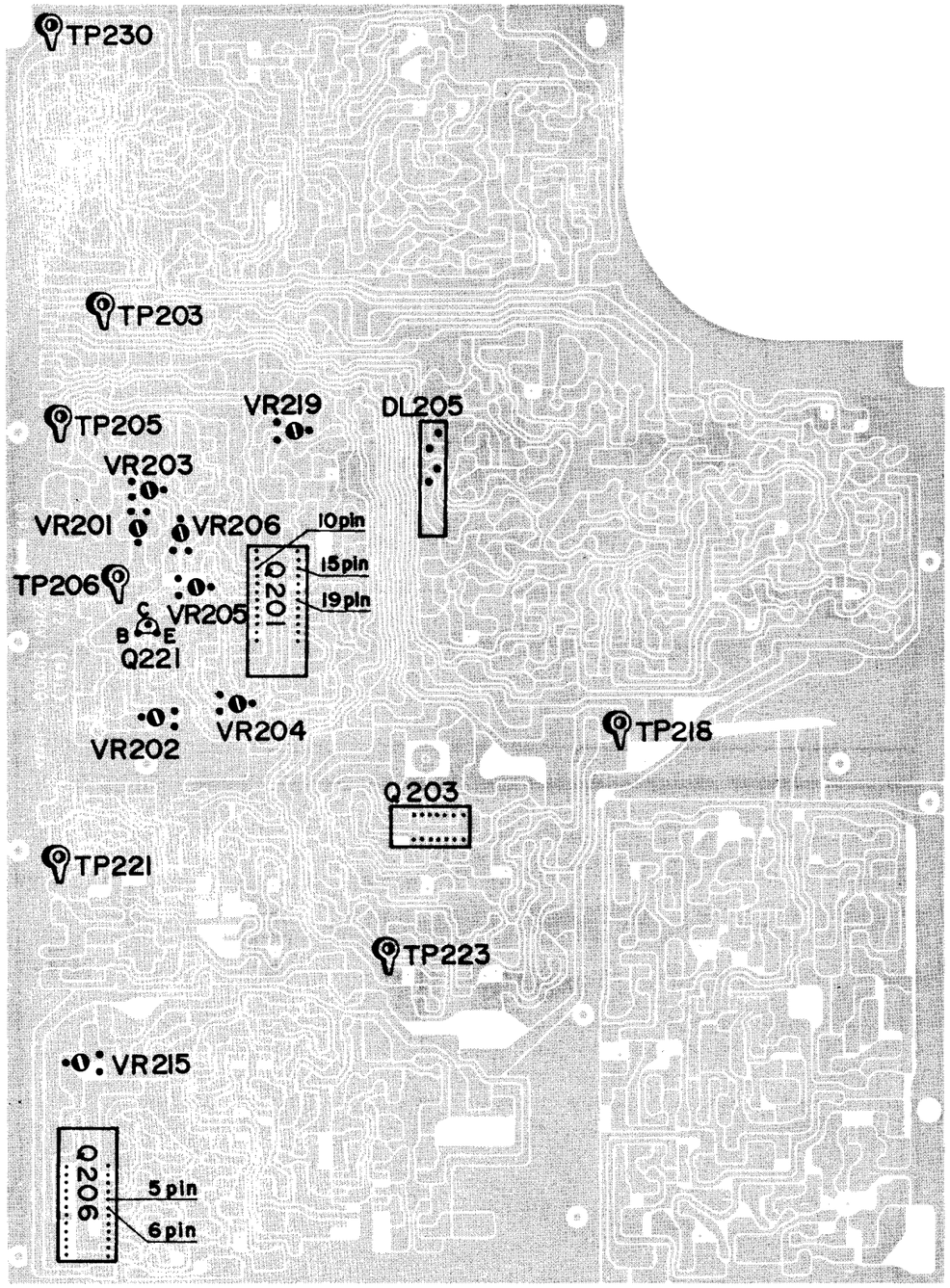
Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR219	TP230	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Terminate the VIDEO OUT connector with 75 ohms, and observe the waveform at TP230 for measurement of the luminance signal output level.
3. Adjust VR219 to provide a level of 1Vp-p for the luminance signal output waveform. (See Fig. 3-25)



Horizontal: 10 μsec/div.
Vertical: 0.2 V/div.

Fig. 3-25

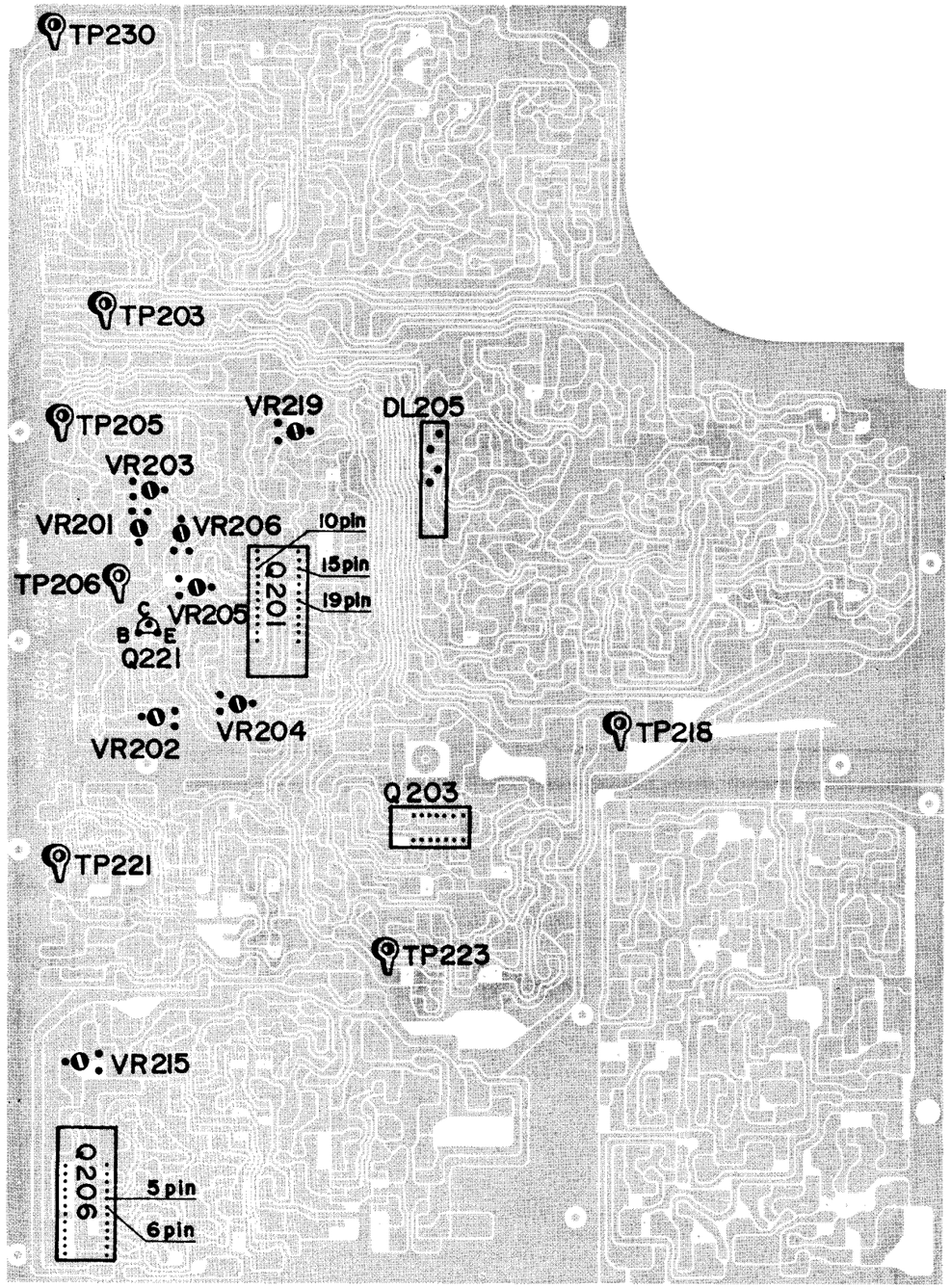


(Foil-Side View)

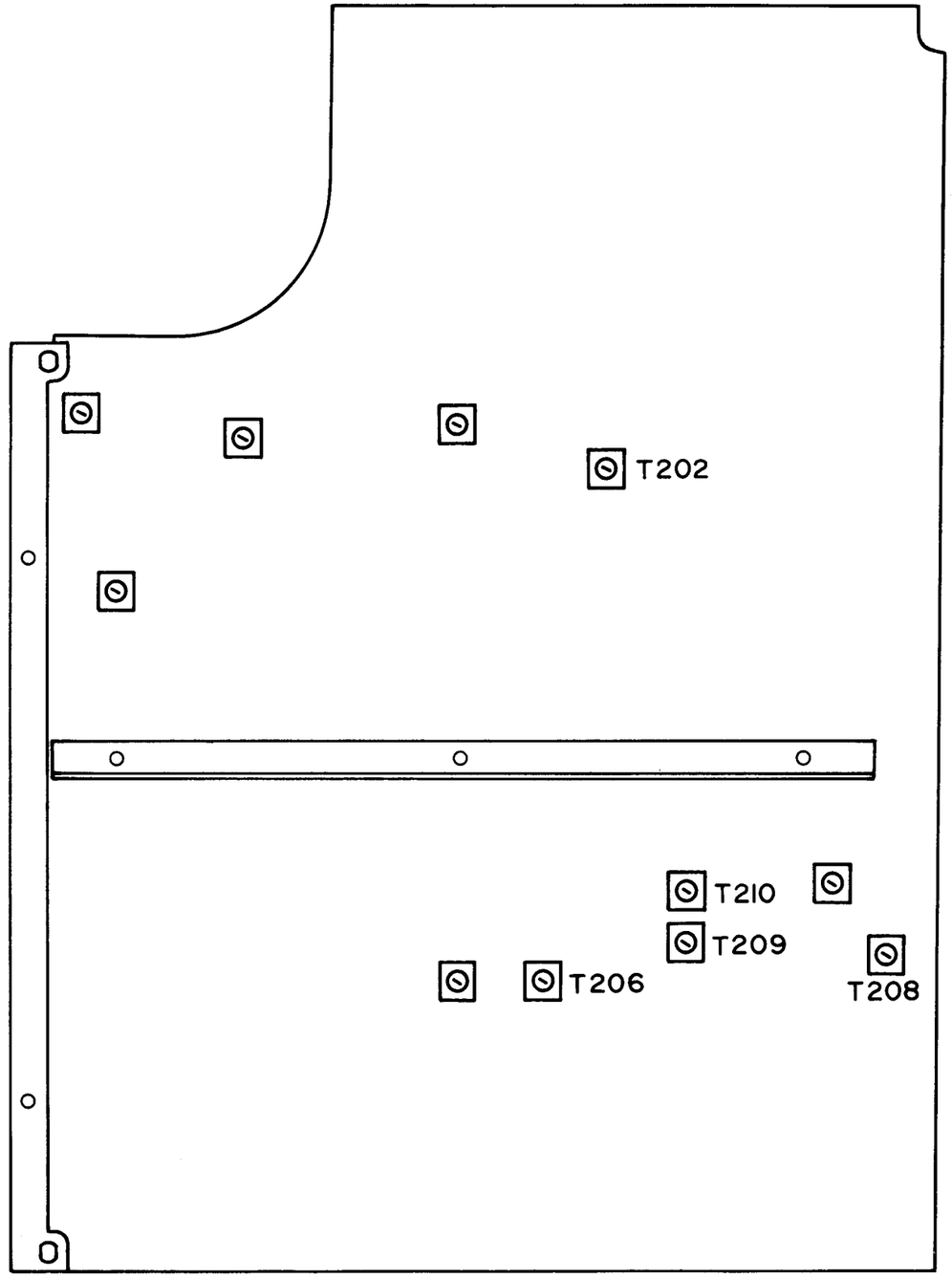
Fig. 3-21 (A) Test Points and Adjustment Locations on W2 Circ

	STOP mode
	oscilloscope to TP230. Play -p level on the oscilloscope. te tape. Then, playback the
	izontal: 10 μsec/div. tical: 0.5 V/div.
	3-23

	Adjustment Conditions
	STOP mode
	TP230 for measurement of n. (See Fig. 3-25)
	Horizontal: 10 μsec/div. Vertical: 0.2 V/div.

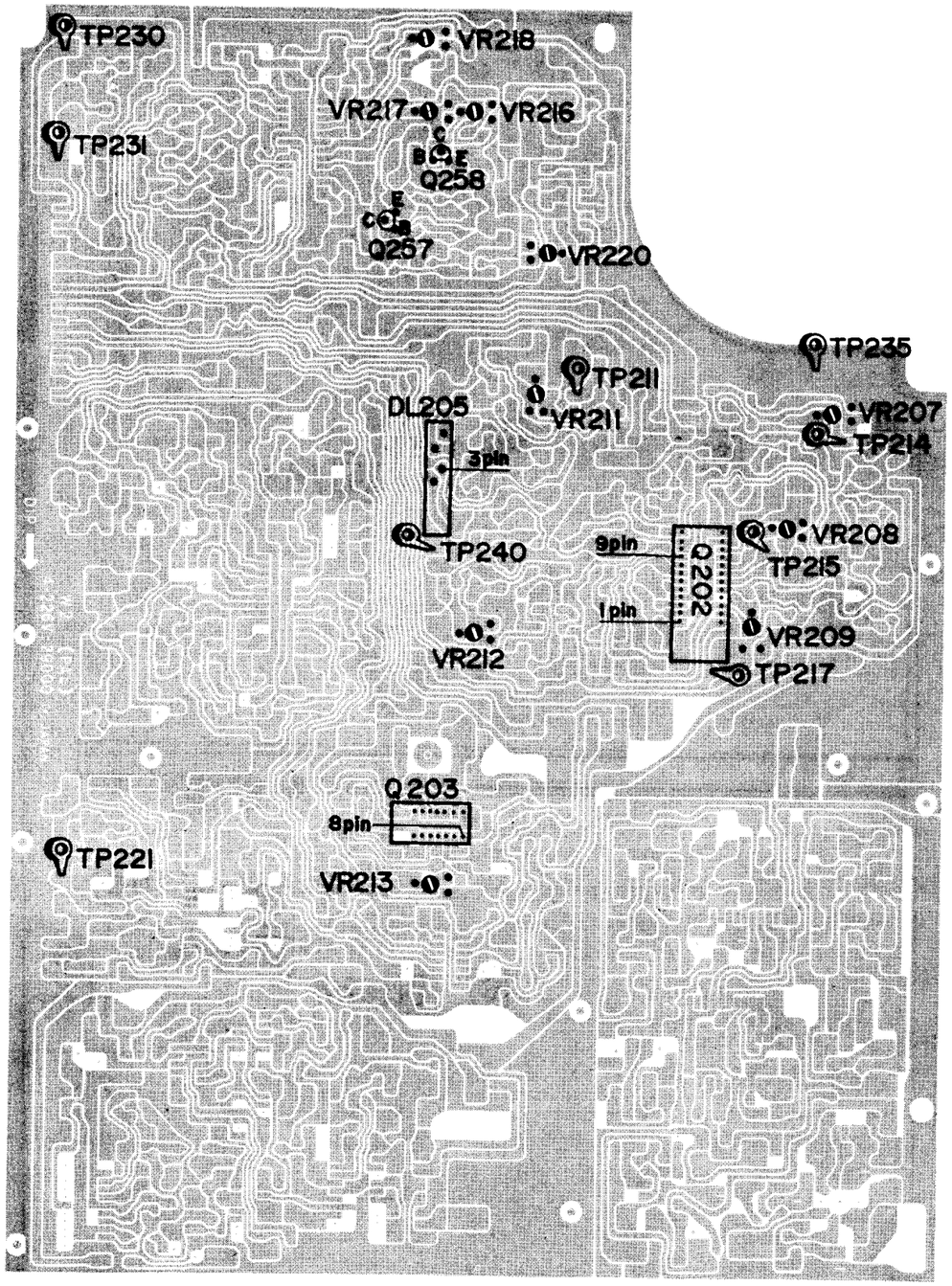


(Foil-Side View)

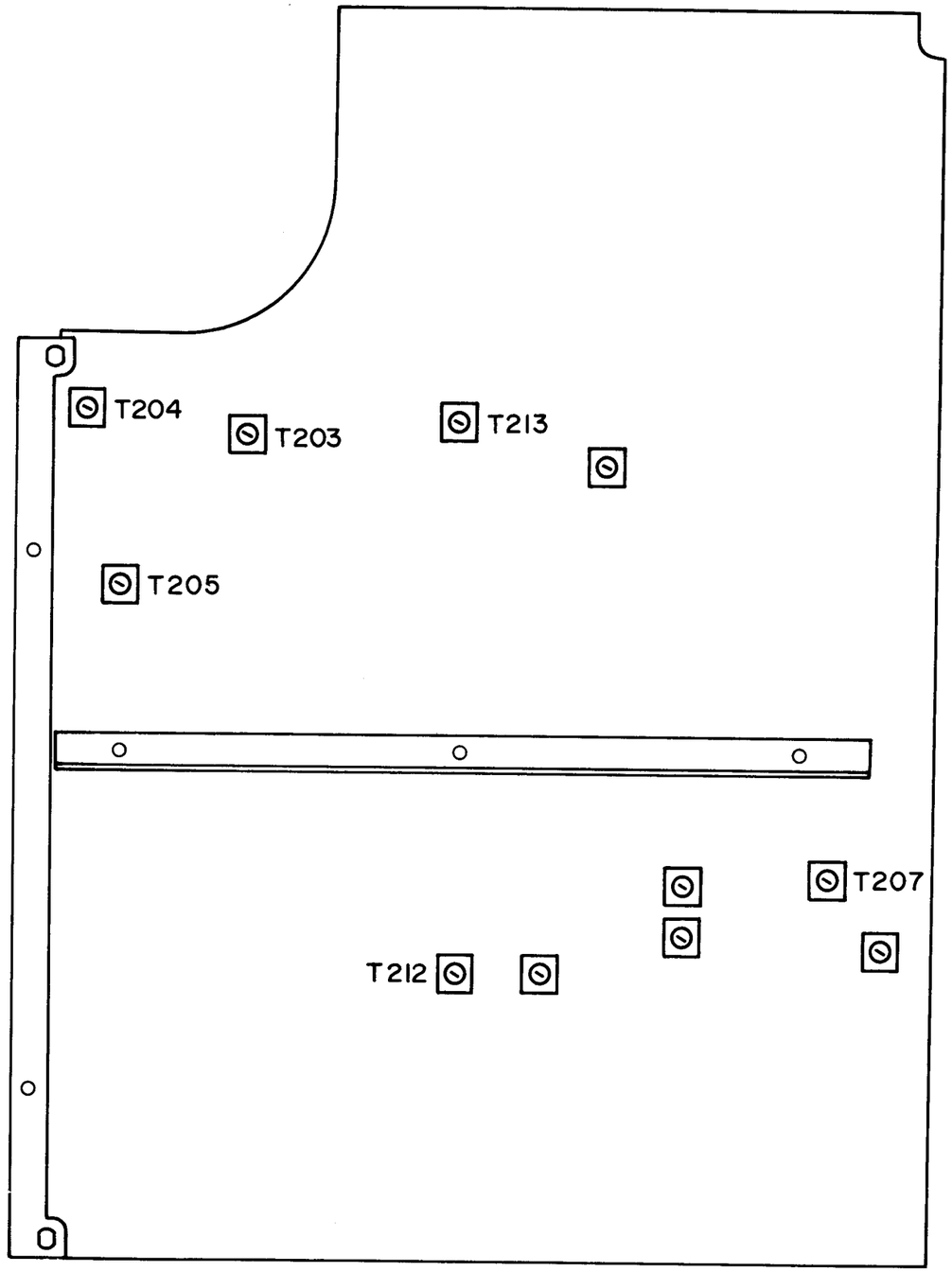


(Component-Side View)

Fig. 3-21 (A) Test Points and Adjustment Locations on W2 Circuit Board



(Foil-Side View)



(Component-Side View)

Fig. 3-21 (B) Test Points and Adjustment Locations on W2 Circuit Board

(11) White Clip

Adjustment Location	
VR201	

1. Apply a 100% luminanc
2. Observe the waveform a
3. Adjust VR201 to limit
   (See Fig. 3-24)

200

(12) Carrier Frequency

VR203	

1. Set the VCR under no s
   and no video signal input
2. Adjust VR203 for a read

(13) Carrier Balance

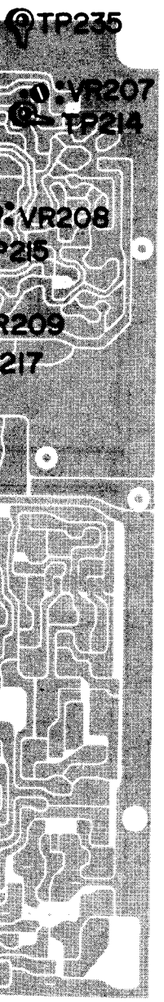
VR206	

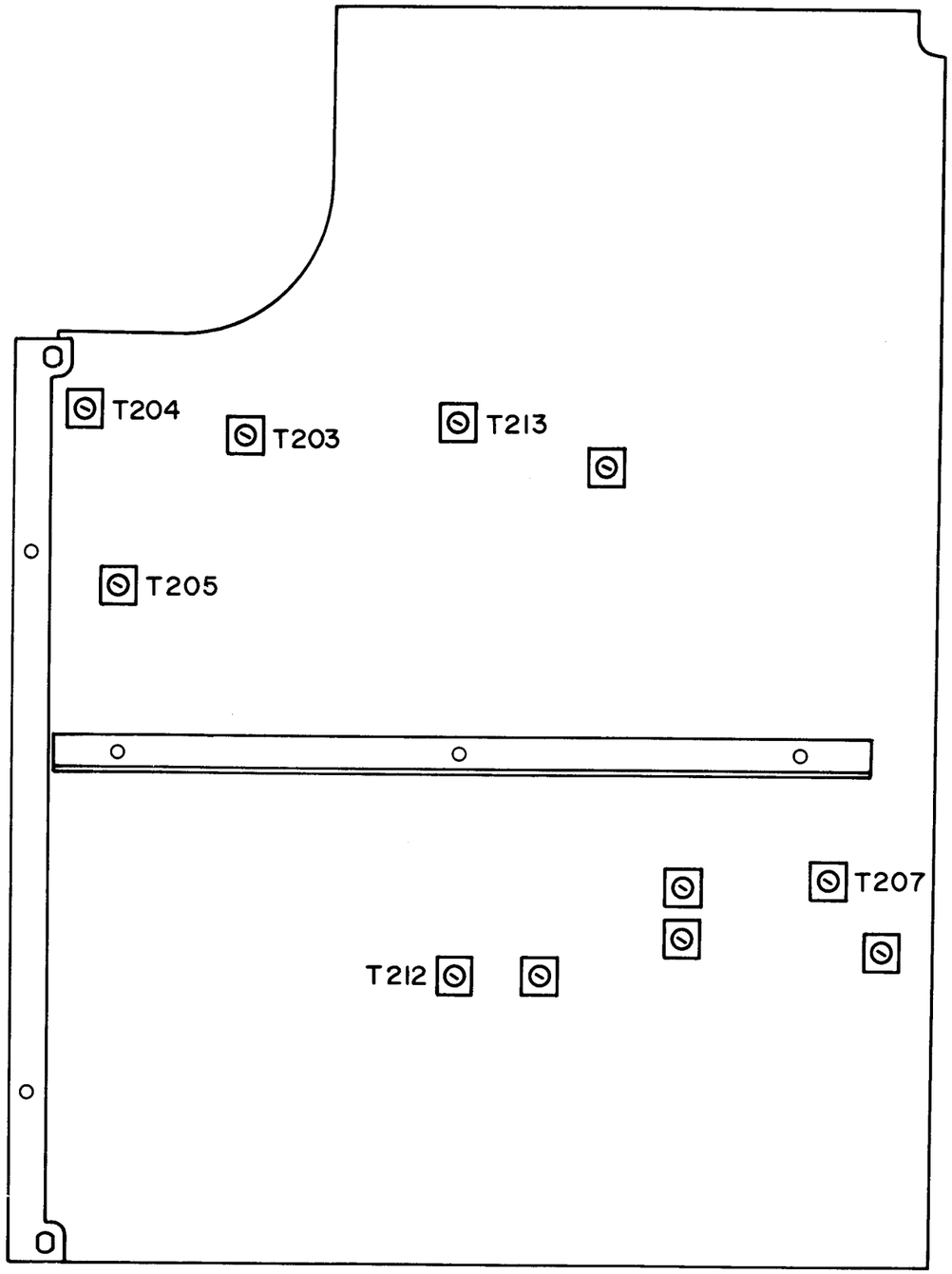
1. Set the VCR under no s
   and no video signal input
2. First, set the VR206 to
   waveform.

(14) Free Running Frequency of 4.

T208	

1. Apply B/W picture signal
2. Connect the frequency co





(Component-Side View)

(3) Test Points and Adjustment Locations on W2 Circuit Board

(11) White Clip

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR201	TP206	Oscilloscope Color Bar Generator	STOP mode PLAY mode

1. Apply a 100% luminance signal of 1Vp-p to the VIDEO IN connector with the color bar generator.
2. Observe the waveform at TP206 with the oscilloscope.
3. Adjust VR201 to limit the overshoot of peak-white signal within a range of +200% through +220%. (See Fig. 3-24)

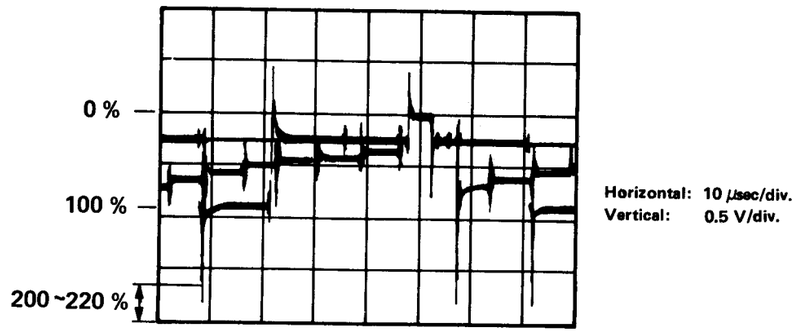


Fig. 3-24

(12) Carrier Frequency

VR203	Q201 Pin (10)	Frequency Counter	STOP mode

1. Set the VCR under no signal input condition (i.e. with the TUNER/CAMERA switch at "CAMERA" position and no video signal input to the VIDEO IN connector), and connect the frequency counter to Q201 No. 10 pin.
2. Adjust VR203 for a reading of 3.8 ± 0.1 MHz.

(13) Carrier Balance

VR206	Q201 Pin (10)	Oscilloscope	STOP mode

1. Set the VCR under no signal input condition (i.e. with the CAMERA/Tuner switch at "CAMERA" position and no video signal input to the VIDEO IN connector), and observe the carrier waveform at pin (10) of Q201.
2. First, set the VR206 to the center position, and adjust it around the center to get the symmetrical carrier waveform.

(14) Free Running Frequency of 4.43 MHz VXO

T208	TP221	Frequency Counter Color Bar Generator	STOP mode

1. Apply B/W picture signal to the VIDEO IN connector.
2. Connect the frequency counter to TP221, and adjust T208 for getting a reading of 4.433619 MHz ± 20 Hz.

(15) Free Running Frequency of (44 ± 1/8) x 8 VCO

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
	Q206 Pin (5)	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at pin (5) of Q206 and make sure that the gate noise appears at the center of the slanted section of the trapezoidal waveform. In this observation, at least 3 wave pulses (equal to 3 horizontal periods) must be displayed and the gate noise must be identified on all each trapezoidal waveform at its center of the slope. (See Fig. 3-26)
3. If the gate noise does not appear on the slope at first, adjust VR214 to get a 5.515625 MHz at TP225 and finally set VR214 to get a gate pulse on the center of the slope.

Horizontal: 20 μsec/div.
Vertical: 0.5 V/div.

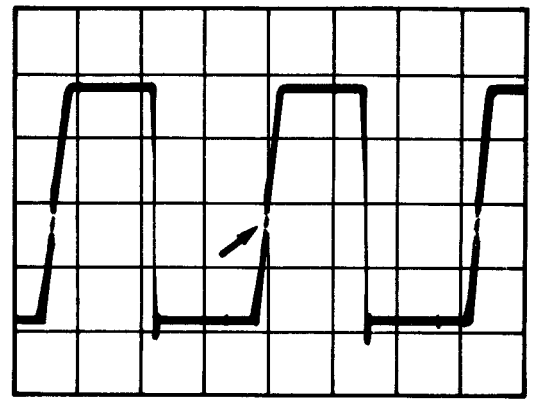


Fig. 3-26

(16) 5.12 MHz Band Pass Filter for Idler Frequency

T209, T210 T206	TP223 TP218	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Check the item (15) above before proceeding to the following steps.
3. Observe the waveform at TP223 with the oscilloscope.
4. Adjust T209 and T210 to make the waveform sinusoidal with the maximum amplitude.
5. Next, observe the waveform at TP218 with the oscilloscope, and adjust T206 for the maximum waveform amplitude. (Be careful not to screw out the core from T206.)

(17) AFC Offset

VR215	TP203 Q206 Pin (6)	Oscilloscope	REC mode

1. Connect the color bar generator to the VIDEO IN connector, and depress the REC button.
2. Connect the oscilloscope to TP203 and identify the presence of the recording signal switching pulse thereon.
3. Next connect the oscilloscope to pin (6) of Q206, and adjust VR215 to provide a flat waveform as shown in Fig. 3-27 for the error voltage.

Horizontal: 5 msec/div.
Vertical: 0.05 V/div.

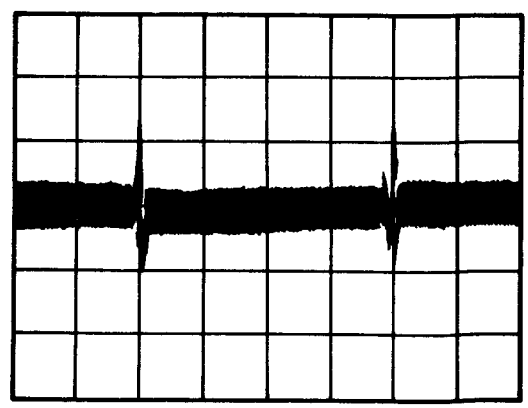


Fig. 3-27

(18) 4.43 MHz Band Pass Filter for Recording Chrominance Signal

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR207 T203, T204	TP214	Oscilloscope Sweep Marker Generator	STOP mode

1. Connect the sweep marker generator to the VIDEO IN connector.
2. Set VR207 to the center position, and observe the waveform at TP214 with the oscilloscope.
3. Adjust T204 to locate the 3.5 MHz marker (A) at a portion of the maximum amplitude on the waveform.
4. Align the 4.43 MHz marker (B) with a vertical graticule of the oscilloscope scale, and adjust T203 to have a minimum amplitude at a point 0.75 msec-spaced from the marker (B). (See Fig. 3-28)

Horizontal: 0.5 msec/div.
Vertical: 0.05 V/div.

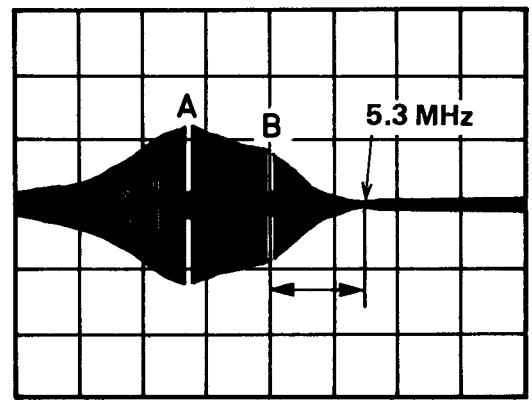
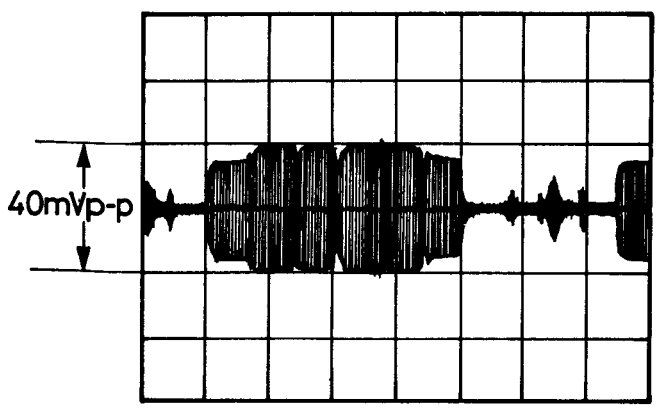


Fig. 3-28

(19) Resonance Transformer for Color Burst Signal

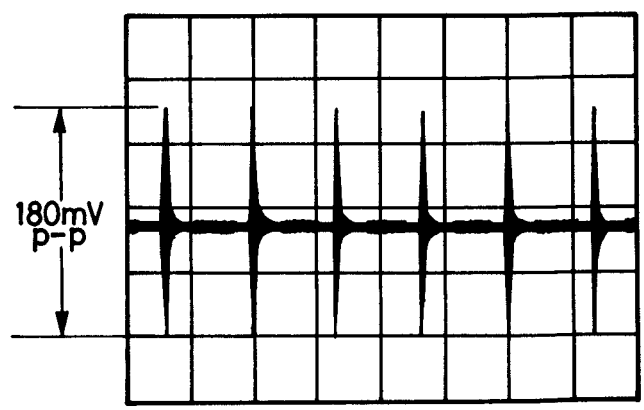
VR207, VR208 T205	TP214 TP215	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN terminal connector.
2. Observe the waveform at TP214 with the oscilloscope, and adjust VR207 to provide the 40mVp-p amplitude for the waveform. (See Fig. 3-29)
3. Set VR208 fully to the right when viewing from the pattern side. (This makes the loop of the automatic color level control (ACC) open-circuited.)
4. Next, connect the oscilloscope to TP215, and adjust T205 to provide maximal peak development for the waveform as shown in Fig. 3-30.
5. Adjust VR208 to make the color burst signal level (at TP215) 180mVp-p as shown in Fig. 3-30.



Horizontal: 10μsec/div.
Vertical: 0.02 V/div.

Fig. 3-29



Horizontal: 50 μsec/div.
Vertical: 0.05 V/div.

Fig. 3-30

(20) Automatic Color Killer (ACK) for Recording

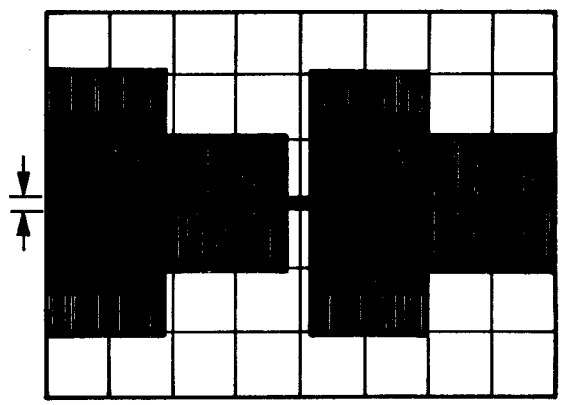
Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
	Q202 Pin (9)	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Check whether the amplitude of the waveform at TP214 is 40m Vp-p. If not, adjust VR207 for getting 40mV.
3. Check whether the high level (4.9 V) voltage develops at pin (9) of Q202.
4. Turn off the color signal switch of the color bar generator and apply the B/W signal thereto.
5. Check whether the low level (0.07 V) voltage now develops at the pin (9).

(21) 5.12 MHz Carrier Leakage

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR209	Q202 Pin (1)	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at pin (1) of Q202 with the oscilloscope.
3. Adjust VR209 to minimize the 5.12 MHz carrier leakage which appears on the base line of the waveform. (See Fig. 3-31)



Horizontal: 5 msec/div.
Vertical: 0.2 V/div.

Fig. 3-31

(22) Comb Filter

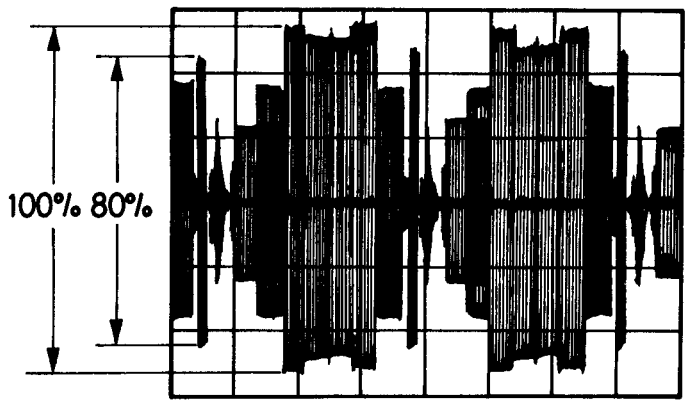
T213 VR211	TP211 DL205 Pin (3) TP235, TP236	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at TP211 with the oscilloscope and identify presence of the chrominance signal in it.
3. Connect the oscilloscope between pin (3) of DL205 (or the junction of R297 and R298) and TP235 (Earth Terminal).
4. Adjust T213 and VR211 so as to provide a minimum amplitude for the waveform at the pin (3) of DL205.

(23) Pilot Burst Signal Level

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR213	TP217	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at TP217 with the oscilloscope.
3. Adjust VR213 so that the pilot burst signal level becomes equal to 80% of the chrominance signal level. (See Fig. 3-32)



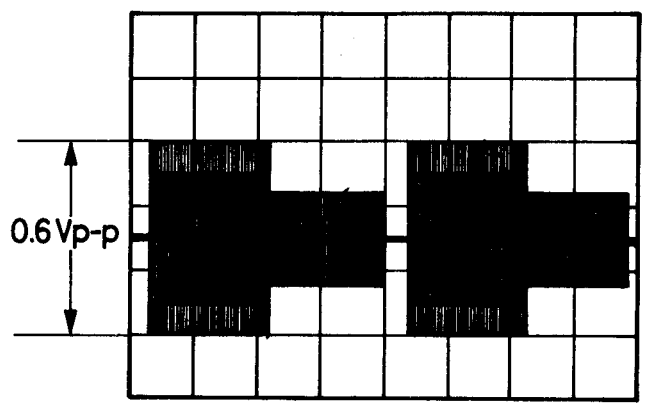
Horizontal: 20 μ sec/div.
Vertical: 0.05V/div.

Fig. 3-32

(24) Chrominance Signal Recording Current

VR212	TP240	Oscilloscope Color Bar Generator	STOP mode

1. Connect the color bar generator to the VIDEO IN connector.
2. Observe the waveform at TP240 with the oscilloscope.
3. Adjust VR212 so that the waveform develops 0.6Vp-p level. (See Fig. 3-33)



Horizontal: 5 msec/div.
Vertical: 0.2 V/div.

Fig. 3-33

(25) Non-linear De-emphasis

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR217 VR216	Q257 Collector Q258 Base	Oscilloscope Color Bar Generator	REC/PLAY modes

1. Connect the color bar generator to the VIDEO IN connector, record the color bar signal and play it back. (The signal to be recorded must be one with a 100% peak-white signal included.)
2. Observe the playback waveform at the collector of Q257 with the oscilloscope.
3. DEMO 0. Adjustment: Adjust and set the VR217 at a position where it provides 0.55Vp-p for the playback waveform amplitude.
4. EXPAND Adjustment: Connect the oscilloscope to the base of Q258, adjust and set VR216 at a position where it provides 1.35V ± 0.05V DC for the playback waveform amplitude.

(26) Playback Signal Level (Note: Deleted to avoid overlapping)

(27) 4.43 MHz Reference Frequency Generator

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T207	TP221	Color Bar Generator Frequency Counter	REC/PLAY modes

1. Connect the color bar generator to the VIDEO IN connector, record the color bar signal and play it back.
2. Connect the frequency counter to TP221, and adjust T207 for 4.433619 MHz reading with ±5 Hz Allowance.

(28) Playback Chrominance Signal Level

VR208	TP230	Oscilloscope Alignment Cassette (VJ-0061)	PLAY mode

1. Connect the oscilloscope to TP230.
2. Play back the alignment cassette (VR-0061) to observe the color bar signal recorded in it.
3. Make sure that the level of the 100% peak-white signal in the playback luminance signal is 1Vp-p.
4. Adjust and set the VR208 at a position where it makes the level of the chrominance peak signal equal to that of the 100% peak-white signal.

(29) 1H Delay Line for Still Picture Reproduction

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR210 T212	Q203 Pin (8) TP224	Still-Picture Test Cassette Oscilloscope (Dual Display)	PLAY mode

1. Play back the still-picture test cassette.
2. Connect the CH-1 prove of the oscilloscope to pin (8) of Q203 and the CH-2 prove to TP224.
3. Invert the CH-2 prove signal with the control provided on the oscilloscope, and locate the CH-2 waveform at the top of CH-1 waveform to sum up both waveform amplitudes. Adjust VR210 and T212 so as to minimize the total amplitude.

** When a dual display oscilloscope is not available, first reduce the amplitude of the waveform at the pin (8) to a minimum, then reduce the amplitude of the waveform at TP224 to a minimum. Finally, balance the both waveforms with VR210 and T212 to have such a same amplitude level as small as possible.

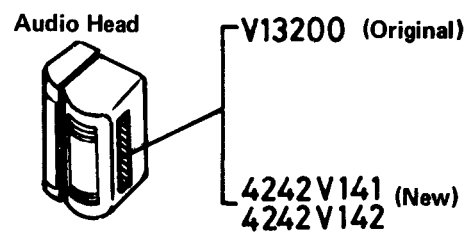
(30) Test Signal Oscillator Frequency

VR220	Q214 Pin (6)	Frequency Counter	

1. Turn on the test signal switch, and connect the frequency counter to Q214 No. 6 pin.
2. Adjust VR220 for a reading of 15.625 kHz ± 50 Hz.

MODIFICATION NOTE

In latest production, an audio head (a component of 'Audio/Control Head Assembly') has been changed from #4-242V-13200 to #4-242V-14100 or #4-242V-14200
The audio head can be identified by a part number printed on the side of head body.
Bias current adjustment must be made selectively, depending on the head used.



A. Original Audio Head (#4-242V-13200)
Bias current should show 28.3 mVp-p across 100-ohm resistor.
Capacitance of C630 Capacitor should be 1000 pF.

B. New Audio Head (#4-242V-14100 or #4-242V-14200)
Bias current should show 62.2 mVp-p across 100-ohm resistor.
Capacitance of C630 Capacitor should be 2200 pF.

5. Adjustments for Audio Circuits

(1) EE Level Adjustment (Audio Signal Level for Monitoring Use)

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR605	Audio Output terminal	Audio signal generator, VTVM	STOP mode

1. Apply a −20 dBm, 333 Hz signal to the "AUDIO" input terminal with an audio signal generator.
2. Connect a VTVM to the "AUDIO OUT" terminal, and adjust VR605 to get a −5 dBm reading.

(2) Bias Oscillator Frequency Adjustment

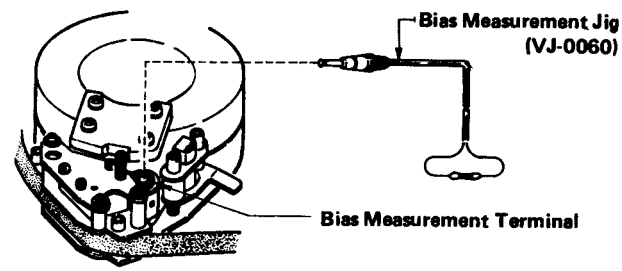
T601	TP603	Frequency counter	REC mode

1. Connect a frequency counter to the test point "TP603", and adjust T601 for a 71 ± 3 kHz reading.

(3) Bias Current Adjustment

VR602	Bias measurement terminal	Bias measurement jig (#VJ-0060) VTVM	REC mode

1. Load a cassette and set the unit in a recording mode without input signal application.
2. Insert the bias measurement jig (VJ-0060) into the bias measurement terminal and connect a VTVM across the 100-ohm resistor of the jig.
3. Adjust VR602 to get a reading of 10 mV on the VTVM.
4. Check, with oscilloscope, whether bias level is exactly 28.3 mVp-p. (See MODIFICATION NOTE on page 28)



Bias Measurement

(4) Bias Trap Adjustment

L603	TP609	Cathode-ray oscilloscope	REC mode

1. Any input signal should not be applied to both "AUDIO" and "VIDEO" input terminals.
2. Connect an oscilloscope to the test point "TP609", and adjust L603 for minimal waveform amplitude display on the screen.

(5) Recording Current Adjustment

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR604	Bias measurement terminal	Bias measurement jig (#VJ-0060), VTVM Audio generator	REC mode

1. Apply a −20 dBm, 333 Hz Signal to the "AUDIO" input terminal with an audio signal generator.
2. Insert the bias measurement jig into the bias measurement terminal, and connect a VTVM across a 100-ohm resistor of the jig.
3. Short-circuit between the test points TP605 and TP606.
4. Adjust VR604 to get a 2.6 mV reading on the VTVM. (It is equal to 7.4 mVp-p on the oscilloscope display.)

(6) Playback Frequency Response Adjustment

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR603	Audio Output terminal	Alignment tape (#VJ-0061) VTVM	PLAY mode

1. Connect a VTVM to the "AUDIO" output terminal, load the alignment tape, and play back a 333 Hz signal prerecorded on it, and measure a 333 Hz output signal level with the VTVM.
2. In the same way, playback a 5 kHz signal prerecorded on the alignment tape, and measure a 5 kHz output signal level.
3. Repeating the steps 1 and 2 three or four times, adjust VR603 until both output levels of 333 Hz and 5 kHz signals become equal to each other.

(7) Overall Frequency Response Adjustment

	Audio Output terminal	Audio signal generator Cathode-ray oscilloscope	REC/PLAY mode

1. Apply a 50 Hz, −40 dB (0.022Vp-p) signal to the "AUDIO" input terminal with an audio signal generator, and connect the oscilloscope to the "AUDIO" output terminal.
2. Load a cassette and record the 50 Hz signal for ten seconds. Likewise, change a generator signal frequency to 100 Hz, 333 Hz, 3 kHz and 7 kHz in succession, and record each signal for ten seconds.
3. Play back each of the recorded signals, observe it on the scope and make sure that each signal waveform has such a specified level (or amplitude) as shown in Fig. 3-34.
   If otherwise, repeat "(3) Bias Current Adjustment" for some increase in bias current and "(6) Playback Frequency Response Adjustment"
   When the 333 Hz signal level occupies three degrees on the oscilloscope scale, the other signal levels at 50 Hz through 7 kHz are judged satisfactory if they occupy more than 1.5 degrees on the scale.

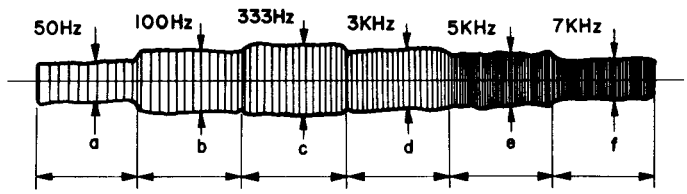


Fig. 3-34.

Frequency	Response in dB
333 Hz	0 dB
50 Hz	+ 3 dB − 13 dB
100 Hz	+ 3 dB − 4.5 dB
3 kHz	+ 3 dB − 4.5 dB
5 kHz	+ 3 dB − 4.5 dB
7 kHz	+ 3 dB − 8 dB

(8) Playback Output Level Adjustment

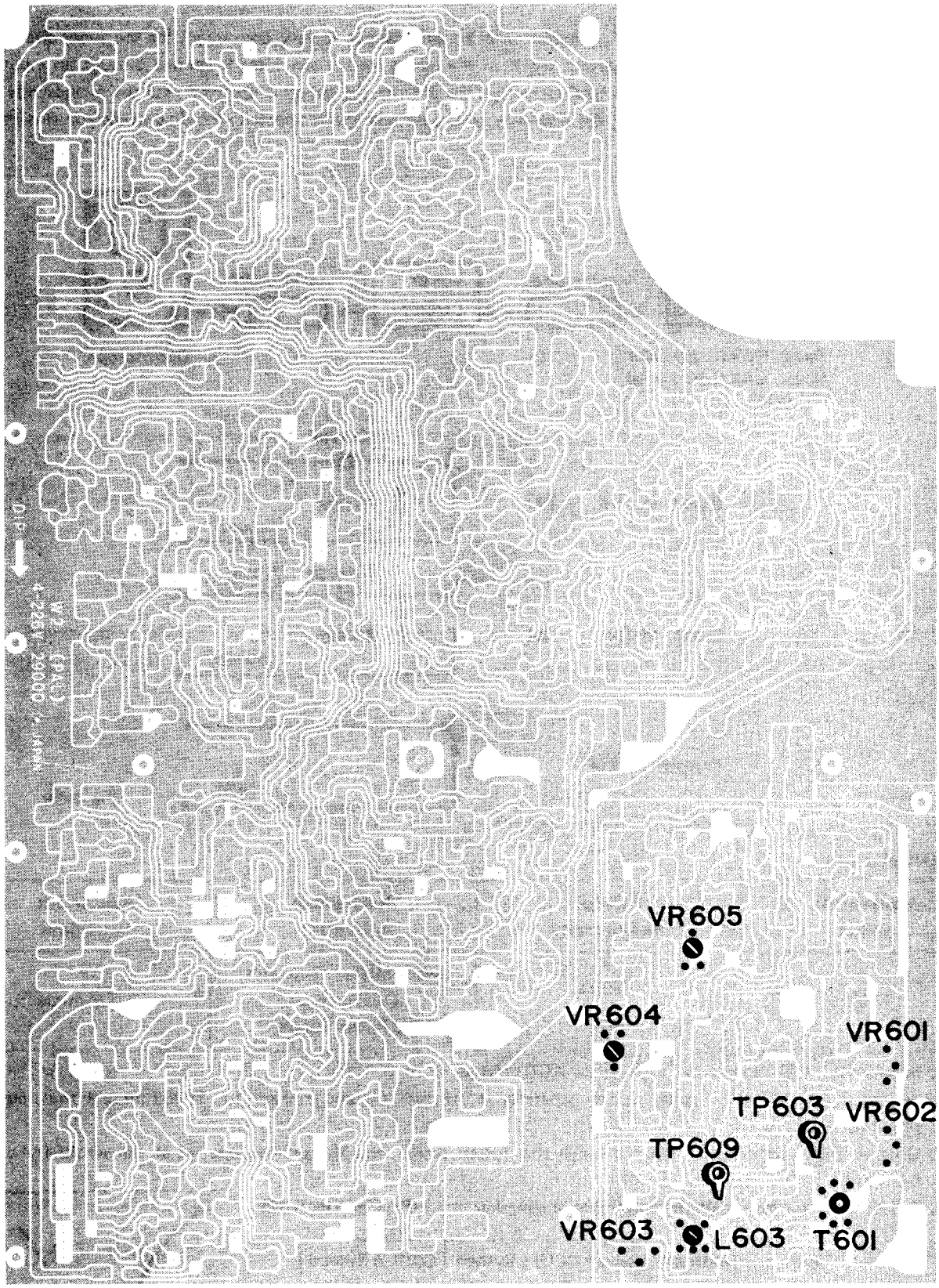
VR601	Audio Output terminal	Audio signal generator VTVM	REC/PLAY mode

1. Apply a −20 dBm, 333 Hz signal to the "AUDIO" input terminal with an audio signal generator, and connect a VTVM to the "AUDIO" output terminal.
2. Load a cassette and record the 333 Hz signal for about 10 seconds.
3. Play back the recorded 333 Hz signal and measure its output level with VTVM. Adjust VR601 to read −5 dBm on the meter.

(9) Overall S/N Check

	Audio Output terminal	VTVM	REC/PLAY mode

1. Load a cassette, and record for about 10 seconds without any signal application to the "AUDIO" input terminal.
2. Connect a VTVM to the "AUDIO" output terminal, and play back the cassette. Make sure that a noise output level of the recorded portion on the tape is lower than −45 dBm (12.3mVp-p).



(Foil-Side View)

Fig. 3-35 Test Point and Adjustment Location for Audio Circuitry on W2 Circuit Board

6. Adjustments for Tuner Circuitry

Combination usage of a sweep marker generator with an oscilloscope is very convenient for the tuner circuit adjustments. As illustrated below, an output signal of the sweep marker generator is applied through an input probe to the tuner circuit on W5 board, and an output signal from the circuit is observed with the oscilloscope. Two types of input probes, (a) and (b), are necessary, and a suitable one is selected according to the adjustment made.

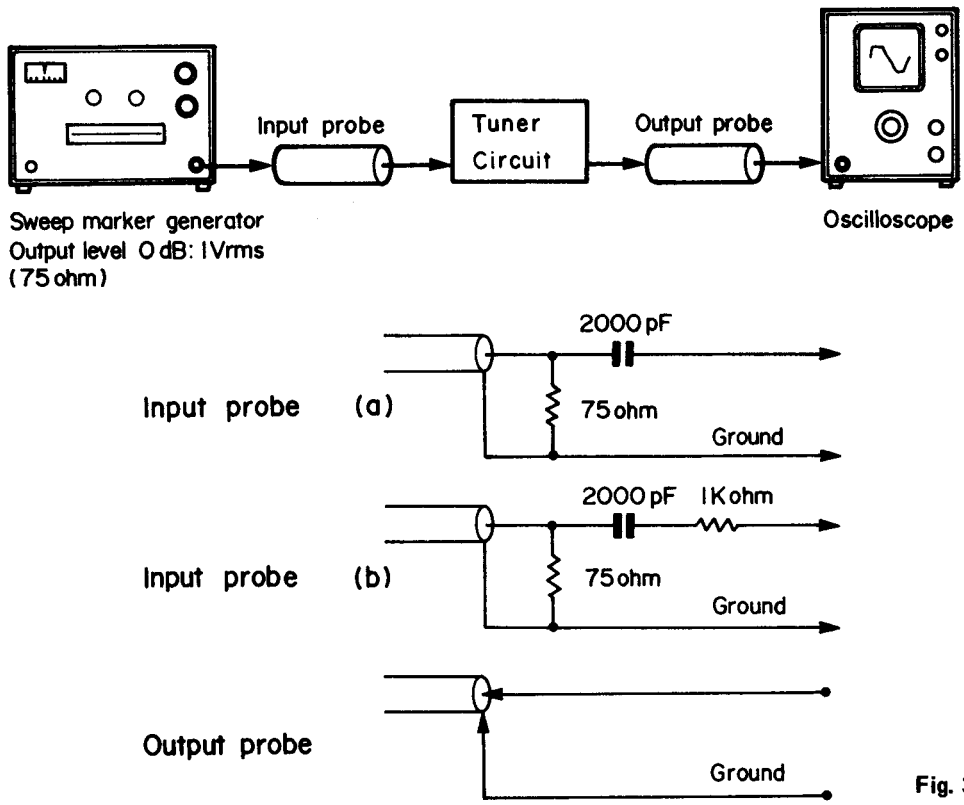


Fig. 3-36

(1) FM Detector Coil

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T907	TP903 TP908	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode

1. Supply +2.7 V DC source to TP904 as the AGC voltage.
2. Set the signal level of the sweep marker generator at VIF, −40 dB, and connect it to TP903 through the input probe (b).
3. Observe the waveform at TP908 through the output probe with the oscilloscope set at the sensitivity of 0.01 V/div.
4. Adjust T907 for the maximum amplitude at a marker point (P). (See Fig. 3-37)

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at P	38.9 MHz	39.5 MHz	36.875 MHz

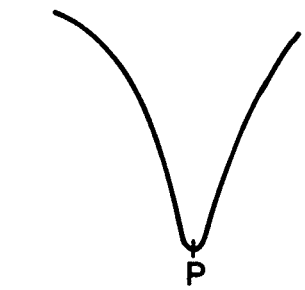


Fig. 3-37

(2) First Response Curve

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T906 T905	TP902 TP908	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode

1. Connect a 1.5 K ohm resistor (1/4 W) between TP905 and TP906.
2. Connect a 100,000 pF ceramic capacitor between TP901 and TP913.
3. Supply +2.7 V DC to TP904 as the AGC voltage.
4. Set the signal level of the sweep marker generator at VIF, −50 dB, and apply it to TP902 through the input probe (a).
5. Observe the waveform at TP908 through the output probe with the oscilloscope set at the sensitivity of 0.1 V/div.
6. Adjust T906 so that the absorption point of the response curve takes a location at a marker point (S). (See Fig. 3-39)
7. Adjust T905 so that a marker point (P) takes a location at a 70% (±5%) level of the maximum response curve amplitude. (See Fig. 3-39)
8. Disconnect the resistor and the capacitor after adjustment.

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at P	38.9 MHz	39.5 MHz	36.875 MHz
Marker Frequency at S	33.4 MHz	33.5 MHz	31.375 MHz

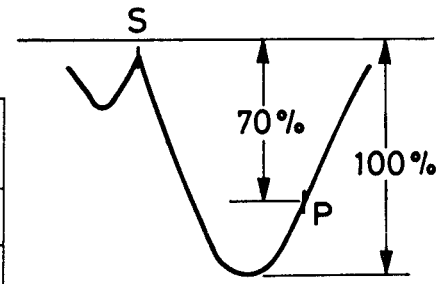


Fig. 3-39

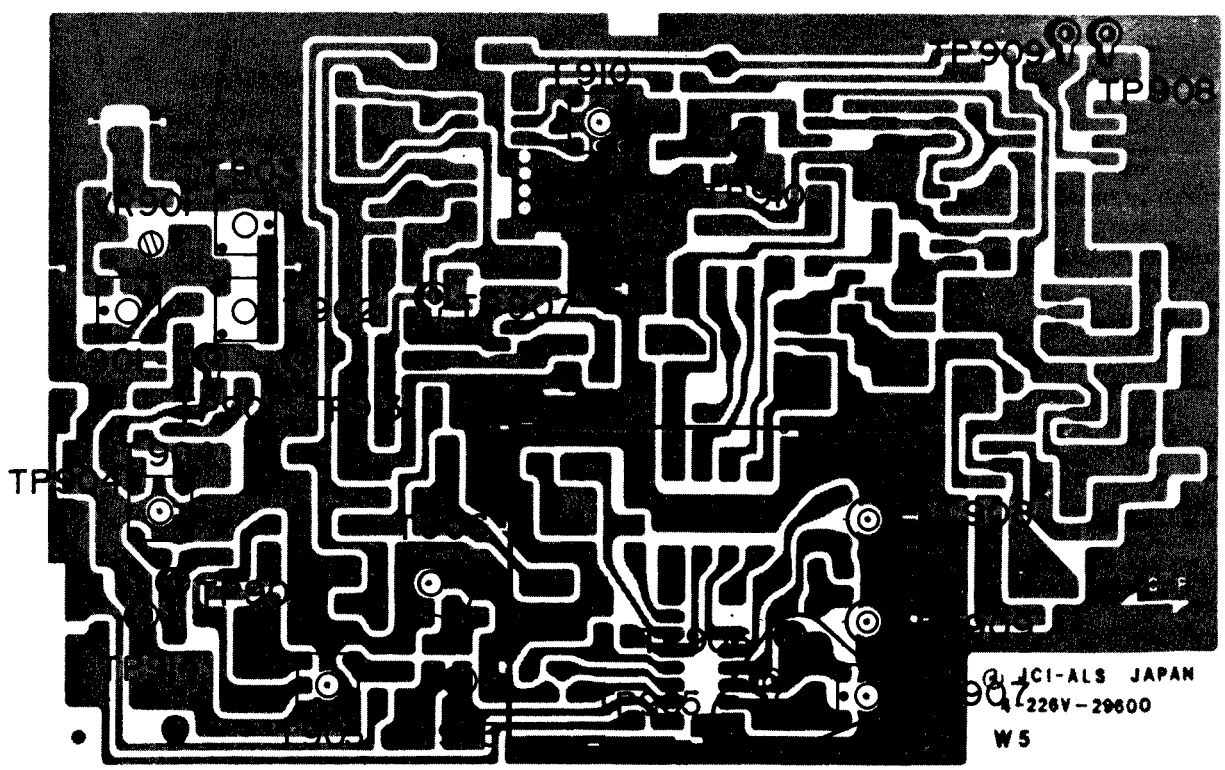


Fig. 3-38 Test Points and Adjustment Location on W5 Circuit Board (Component-Side View)

(3) Adjacent Channel Trap

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T902 T903 VR901	TP908 Test Point on Tuner	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode

1. Connect a 1.5 K ohm resistor (1/4 W) between TP905 and TP906.
2. Supply +2.7 V to TP904 as the AGC voltage.
3. Set the signal level of the sweep marker generator at VIF, −20 dB, and apply it to the test point terminal on the tuner through the input probe (b).
4. Observe the response curve at TP908 through the output probe with the oscilloscope set at the sensitivity of 1 V/div.
5. Adjust T902 so that the absorption point of the response curve takes a location at a marker point (P'). (See Fig. 3-41)
6. Adjust T903 so that the absorption point of the response curve takes a location at a marker point (S'). (See Fig. 3-41)
7. Adjust VR901 so as to provide maximum absorption at (S').
8. Disconnect the resistor after adjustment.

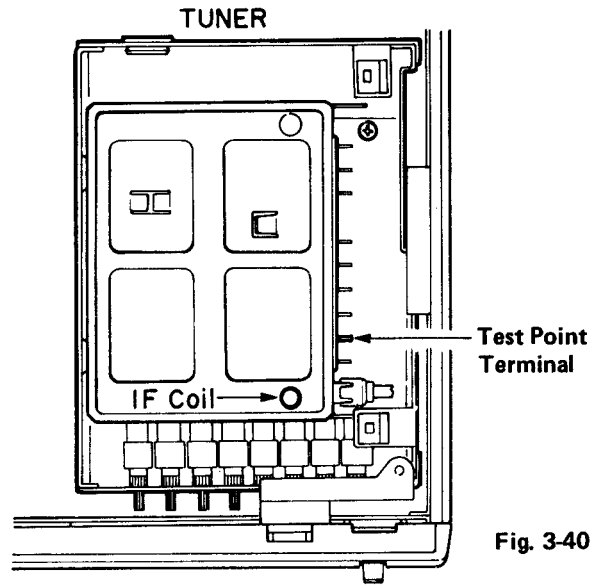


Fig. 3-40

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at P'	31.9 MHz	31.5 MHz	29.875 MHz
Marker Frequency at S	33.4 MHz	33.5 MHz	31.375 MHz
Marker Frequency at S'	40.4 MHz	41.5 MHz	38.375 MHz

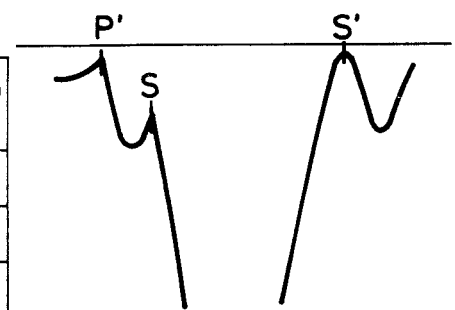


Fig. 3-41

(4) Overall Response Curve

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T901, T904 T905 IF Coil	TP908 Test Point on Tuner	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode

1. Connect a 1.5 K ohm resistor (1/4 W) between TP905 and TP906.
2. Set the signal level of the sweep marker generator at VIF, −40 dB, and apply it to the test point terminal on the tuner.
3. Observe the response curve at TP908 through the output probe with the oscilloscope set at the sensitivity of 0.1 V/div.
4. Supply an AGC voltage from the DC power supply to TP904, and adjust its voltage so that the response curve amplitude becomes nearly 1 Vp-p with no clipping at its waveform tips.
5. Adjust the IF coil of the tuner so that a marker point (P) shows a maximum height on the curve.
6. Adjust T904 so that a marker point (C) shows a maximum height on the curve.

7. Adjust T901 so that the summit of the response curve becomes round and symmetric. (See Fig. 3-42)
8. Adjust the IF coil so that the marker (P) is located at the 50% height of the response curve. (See Fig. 3-42)
9. Adjust T904 so that the marker (C) is located at the 60% (±5%) height of the response curve. (See Fig. 3-42) When adjustment of T904 can not provide good result, use T905.
10. Recheck the adjacent channel trap adjustment, referring to the item (3) above, as the T901 adjustment affects it.
11. Disconnect the resistor after adjustment.

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at C	34.47 MHz	35.07 MHz	32.445 MHz
Marker Frequency at P	38.9 MHz	39.5 MHz	36.875 MHz
Marker Frequency at P'	31.9 MHz	31.5 Mhz	29.875 MHz
Marker Frequency at S	33.4 MHz	33.5 MHz	31.375 MHz
Marker Frequency at S'	40.4 MHz	41.5 MHz	38.375 MHz

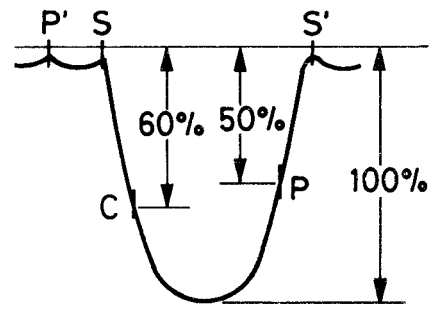


Fig. 3-42

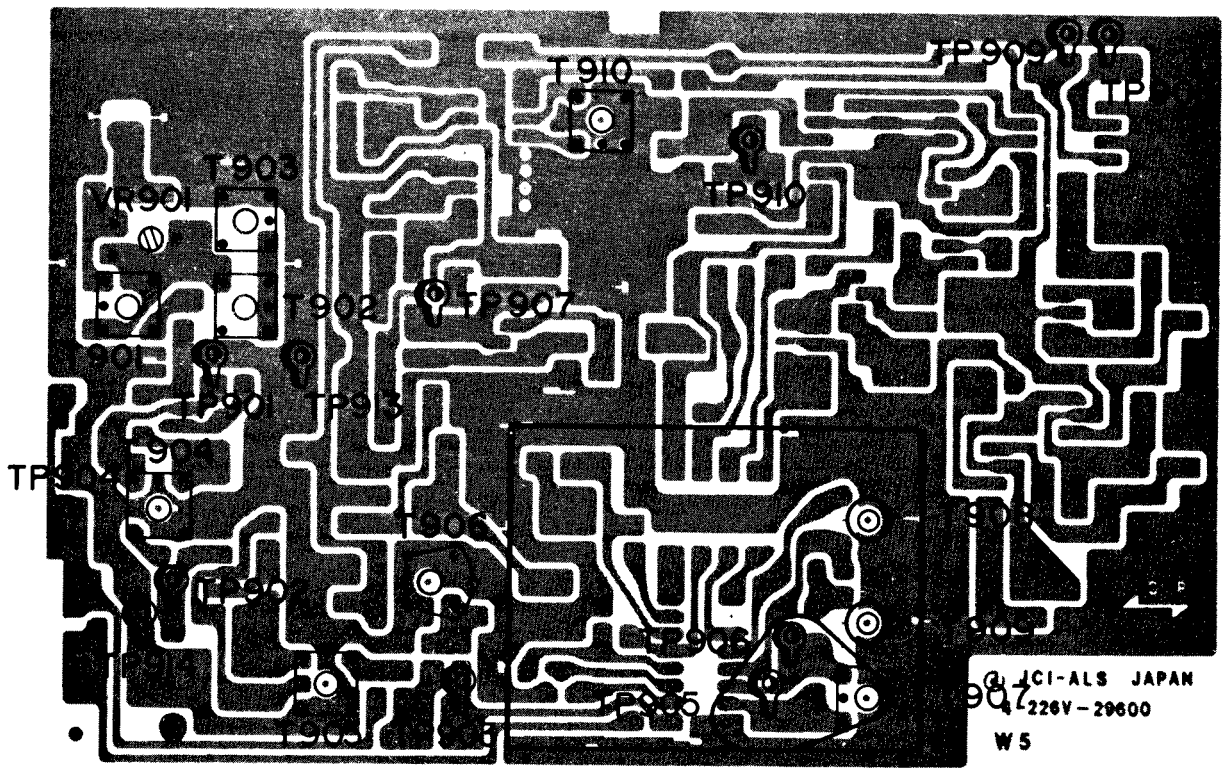


Fig. 3-44 Test Points and Adjustment Location on W5 Circuit Board (Component-Side View)

(5) AFT Trap

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T909	TP901 Test Point on Tuner	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode AFT at OFF

1. Supply +2.7 V DC source to TP904 as the AGC voltage.
2. Set the signal level of the sweep marker generator at VIF, −20 dB, and apply it to the test point terminal of the tuner through the input probe (b). (See Fig. 3-40)
3. Observe the response curve at TP910 through the output probe with the oscilloscope set at the sensitivity of 1 V/div.
4. Adjust T909 for locating the absorption point at a marker point (C). (See Fig. 3-43)

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at C	34.47 MHz	35.07 MHz	32.445 MHz

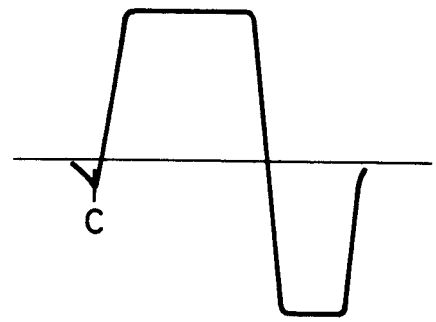


Fig. 3-43

(6) Automatic Frequency Tuning (AFT)

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
T908	TP910 Test Point of Tuner	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode AFT at ON

1. Supply +2.7 V DC source to TP904 as the AGC voltage.
2. Set the signal level of the sweep marker generator at VIF, −40 dB, and apply it to the test point terminal of the tuner through the input probe (b). (See Fig. 3-40)
3. Observe the response curve at TP910 through the output probe with the oscilloscope set at the sensitivity of 1 V/div.
4. Adjust T908 for locating a marker point (P) at the center on the base line. (See Fig. 3-45)

	CCIR B/G System (for Continent)	CCIR I System (for England)	CCIR B System (for Australia)
Marker Frequency at P	38.9 MHz	39.5 MHz	36.875 MHz

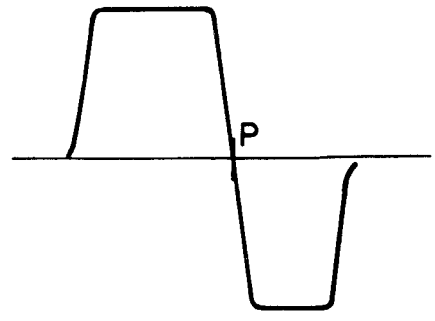


Fig. 3-45

(7) Sound Intermediate Frequency (SIF)

T910	TP907 TP909	Sweep Marker Generator Oscilloscope DC Power Supply	STOP mode

1. Supply +2.7 V DC source to TP904 as the AGC voltage.
2. Set the signal level of the sweep marker generator at SIF, −50 dB, and apply it to TP907 through the input probe (b).
3. Observe the response curve at TP909 through the output probe with the oscilloscope set at the sensitivity of 0.1 V/div.
4. Adjust T910 for locating a marker point (S) at the center on the base line. (See Fig. 3-46)

	Sound IF Frequency
CCIR B/G System (for Continent)	5.5 MHz
CCIR I System (for England)	6.0 MHz
CCIR B System (for Australia)	5.5 MHz

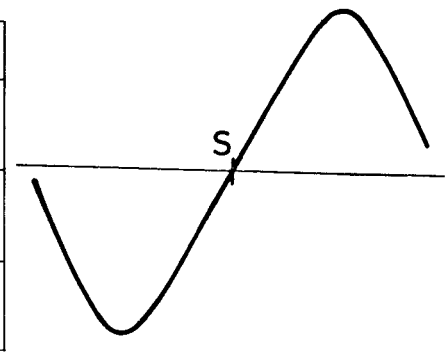


Fig. 3-46

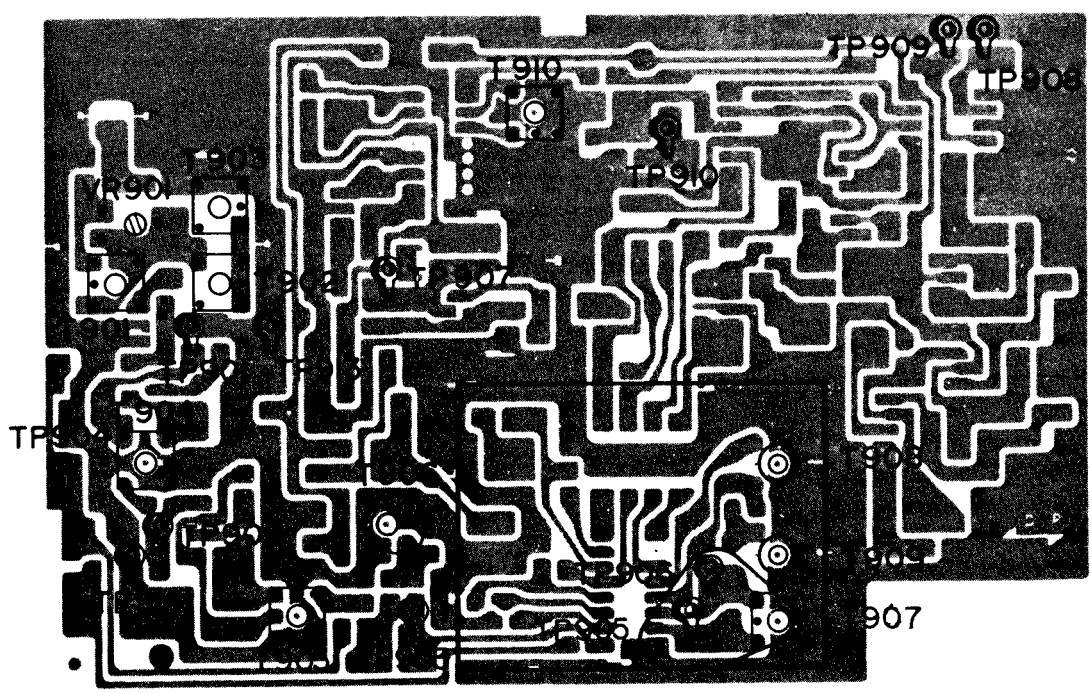


Fig. 3-47 Test Points and Adjustment Location on W5 Circuit Board (Component-Side View)

(8) Automatic Gain Control (AGC)

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR902	TP904	Digital Volt Meter	STOP mode

1. Receive either one of the VHF lower channel (#2 through #4) station signals and adjust the channel selector for optimum reception.
   (Input level of the VHF station signal must be at 69 ± 2 dB for this adjustment.)
2. Measure the AGC voltage at TP904 and adjust VR902 to get a reading of 2.80 V (± 0.05 V).

(9) Composite Video Signal Output Level

	TP908	Color Bar Generator Oscilloscope	STOP mode

1. Connect the color bar generator to the ANT IN terminal, and apply the signal at 80 ± 10 dBμ with 87.5% modulation.
2. Observe a picture on a monitor screen, and adjust the related controls for the optimum picture.
3. Observe the video output waveform at TP908 with the oscilloscope, and make sure that the output level is 1 V ± 0.15 V and that the burst signal level is 0.3 ± 0.15Vp-p.

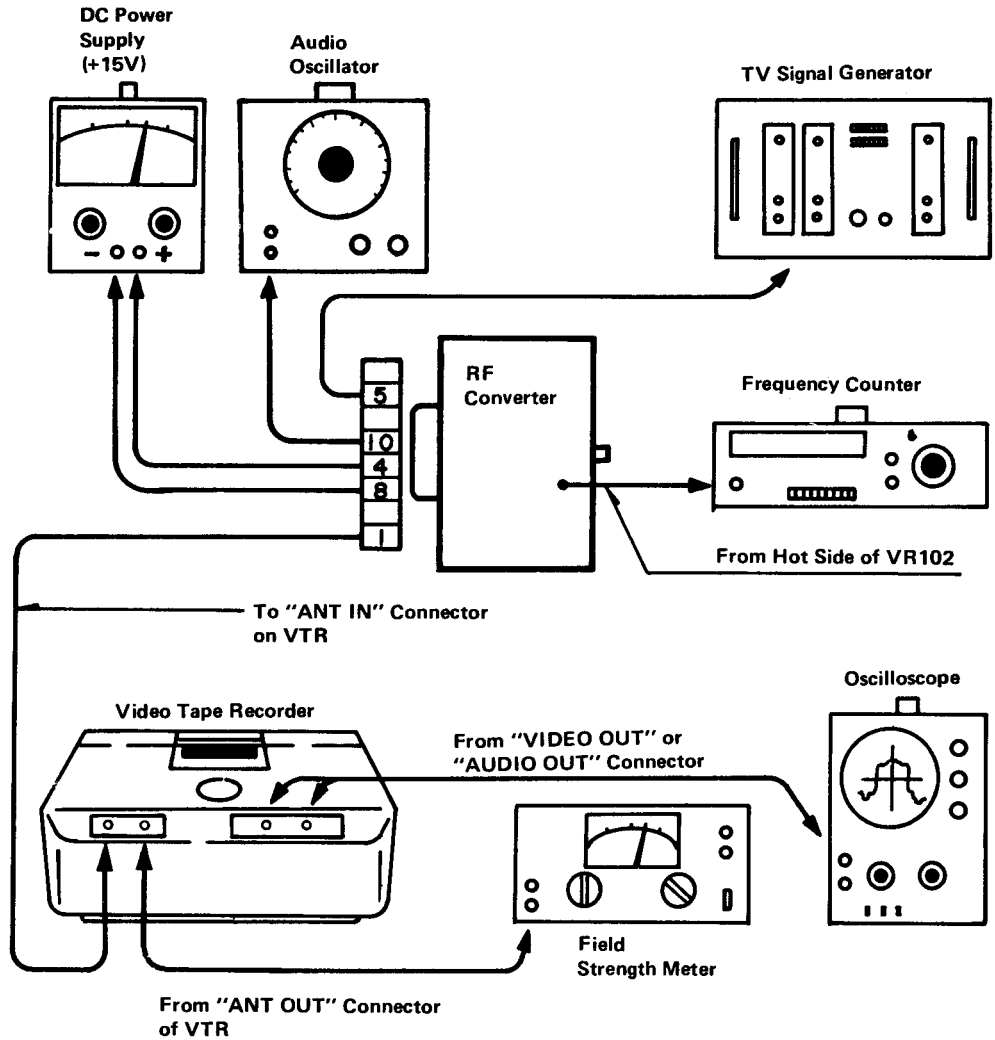
(10) Audio Signal Output Level

	TP909	TV Signal Generator Oscilloscope	STOP mode

1. Connect the TV signal generator to the ANT IN terminal, and apply the signal at 66 ± 10 dBμ with 60% modulation by the 400 Hz sinewave signal.
2. Observe a picture on a monitor screen, and adjust the related controls for the optimum picture.
3. Observe the audio signal output waveform at TP909 with the oscilloscope, and make sure that the output level is 0.74Vp-p ± 0.25Vp-p (or −40 dB ± 3 dBm).

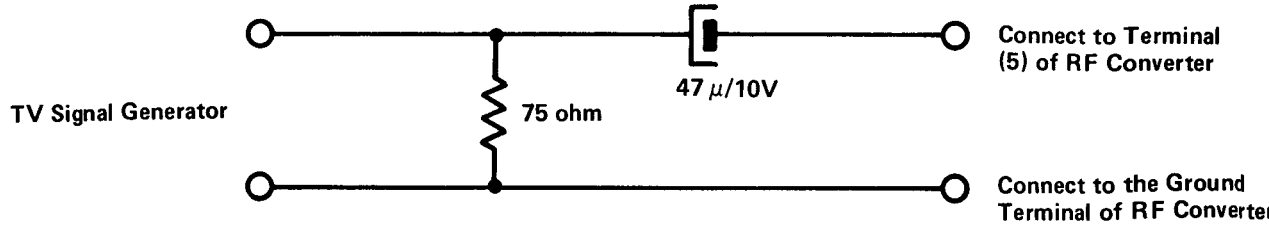
7. Adjustments for RF Converter

Special measuring instruments such as a spectrum analyzer and a vectorscope are used for the adjustment of the RF converter in our production line. The followings are given mainly for technician's convenience on the field adjustments so that it is possible to perform adjustments and checks without these special instruments. However, it should be borne in mind that the field adjustments are not complete, and so it is recommended that RF converters where it is not possible to confirm faults or adjustment deviations are not touched.



Connection Checkpoints

* Use 1 Vp-p color bar signals for the output of the TV signal generator, and connect the RF converter through the following network.



* Terminate the video output connector of the video recorder with a 75-ohm resistance.

(1) Sound Carrier Frequency

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
L102	VR102 hot side	Frequency Counter	STOP mode

1. Rotate the L101 core without the sound input (audio oscillator) connected, and adjust the oscillation frequency to 5.5 MHz (for CCIR G and A System) or 6.0 MHz (for CCIR E System).

(2) Video Carrier Frequency

VR104	"ANT OUT" connector of VTR	Field strength meter	STOP mode

1. Adjust finely the field strength meter so that its pointer deflects to the maximum.
2. Now rotate VR104 and adjust so that the meter pointer deflects to its maximum. (Perform this at channel 36.)

(3) Sound Modulation Depth

Adjustment Location	Point of Measurement	Measurement Instrument	Adjustment Conditions
VR101	"AUDIO IN/OUT" connector of VTR	Oscilloscope or Voltmeter	STOP mode

1. Set the audio oscillator output to 400 Hz, −5 dBm (0.45 Vrms).
2. Set the power switch on the video recorder to ON, and align the UHF channel with the channel (channel 36) of the RF converter.
3. Finely tune so that the waveforms on the oscilloscope are brought to their maximum.
4. Now adjust VR101 and set the audio output level to −5 dBm (0.45 Vrms, 1.27 Vp-p).

(4) Video Modulation Depth

VR103	"VIDEO OUT" connector of VTR	Oscilloscope	STOP mode

1. Supply 1.0 Vp-p color bar signals from the TV signal generator.
2. Finely tune so that the waveforms on the oscilloscope are brought to their maximum.
3. Now adjust VR103 and set the video output level to 0.95 Vp-p. (Terminate the video output connectors with a 75-ohm resistance.)

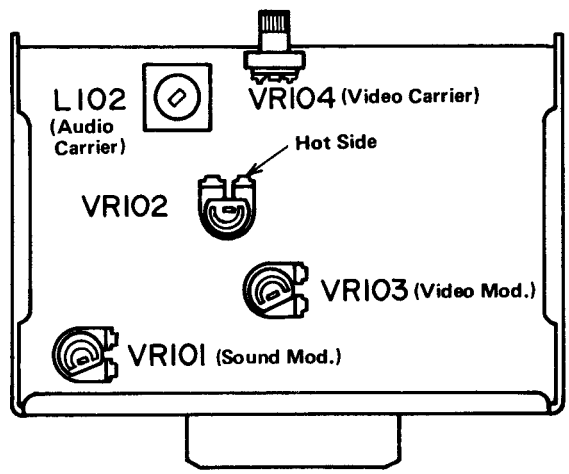


Fig. 3-49 Test Point and Adjustment Location on W22 Circuit Board (Component-Side View)

4. MECHANICAL ADJUSTMENT

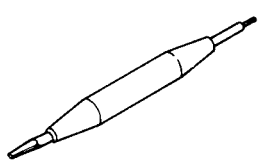
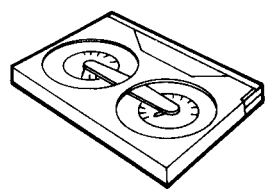
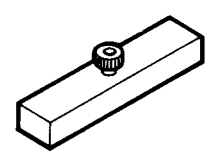
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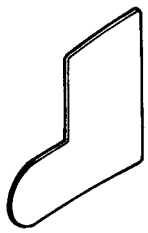
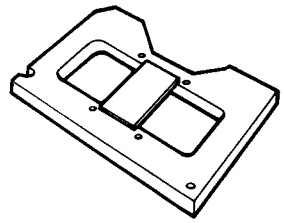
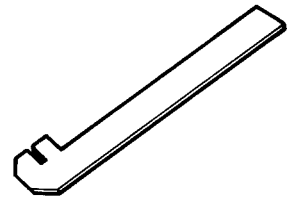
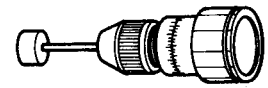
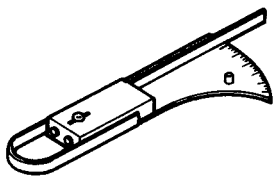
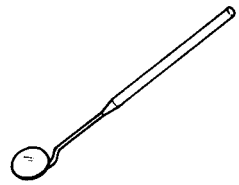
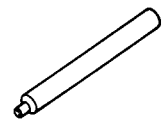
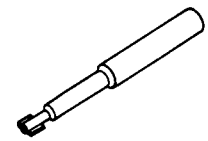
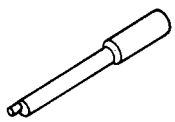
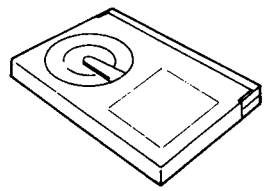
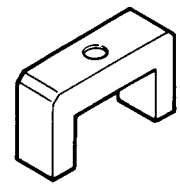
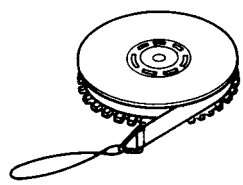
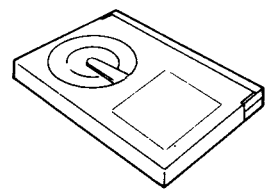
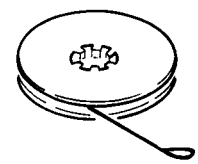
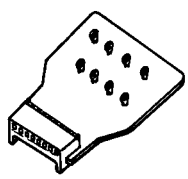
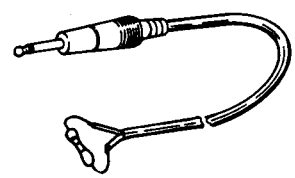
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4. MECHANICAL ADJUSTMENT

1. Jigs and Tools for Adjustment

No.	Names	Jig. No.	Quantity	Remarks
1	Special Driver	VJ-0002	1	
2	Cassette torque meter for REW/F. FWD	VJ-0004	1	
3	Back-tension lever location gauge	VJ-0005	1	
4	Loading-ring clearance gauge	VJ-0007	1	
5	Cassette standard plate gauge	VJ-0008	1	
6	Bending jig for back-tension lever	VJ-0009	1	
7	Torque meter	VJ-0010	1	150 g.cm
8	Sector tension gauge	VJ-0012	1	100 g
9	Sector tension gauge	VJ-0014	1	500 g
10	Dentist's mirror	VJ-0015	1	
11	Eccentric screwdriver	VJ-0016	1	
12	Eccentric screwdriver	VJ-0017	1	
13	Eccentric screwdriver	VJ-0018	1	
14	Video cassette test tape (for tracking / still picture and drop-out adjustment)	VJ-0080	1	
15	Tension gauge	VJ-0020	1	1 Kg
16	Capstan pulley clearance gauge	VJ-0021	1	
17	Hexagonal wrench	VJ-0022	1	M3
18	Hexagonal wrench	VJ-0023	1	M4
19	Hexagonal wrench	VJ-0024	1	M3 cap bolt
20	PLAY back-tension measurement jig	VJ-0025	1	
21	Alignment tape	VJ-0061	1	
22	Tension gauge for reel	VJ-0038	1	
23	Measurement terminal	VJ-0039	1	
24	Measurement terminal (82k ohms)	VJ-0040	1	
25	Bias current measurement jig	VJ-0060	1	

1 VJ-0002	2 VJ-0004	3 VJ-0005
		

4 VJ-0007 	5 VJ-0008 	6 VJ-0009 	7 VJ-0010 
8 VJ-0012 9 VJ-0014 	10 VJ-0015 	11 VJ-0016 	12 VJ-0017 
13 VJ-0018 	14 VJ-0080 	15 VJ-0020 	16 VJ-0021 
17 VJ-0022 18 VJ-0023 19 VJ-0024 	20 VJ-0025 	21 VJ-0061 	22 VJ-0038 
23 VJ-0039 	24 VJ-0040 	25. VJ-0060 	

2. Preparations for Adjustment

(1) Removal of Cassette Cover (See Fig. 4-1)

Push down the EJECT Button to let the Cassette Holder move up. Unfasten the two Screws (a), and remove the Cassette Cover.

(2) Removal of Cassette Guide (See Fig. 4-1)

Unfasten the two Screws (b) and remove the Cassette Guide.

(3) Removal of Sheet Cover (See Fig. 4-1)

Unfasten the Screw (c) and remove the Sheet Cover by lifting it up and moving toward you.

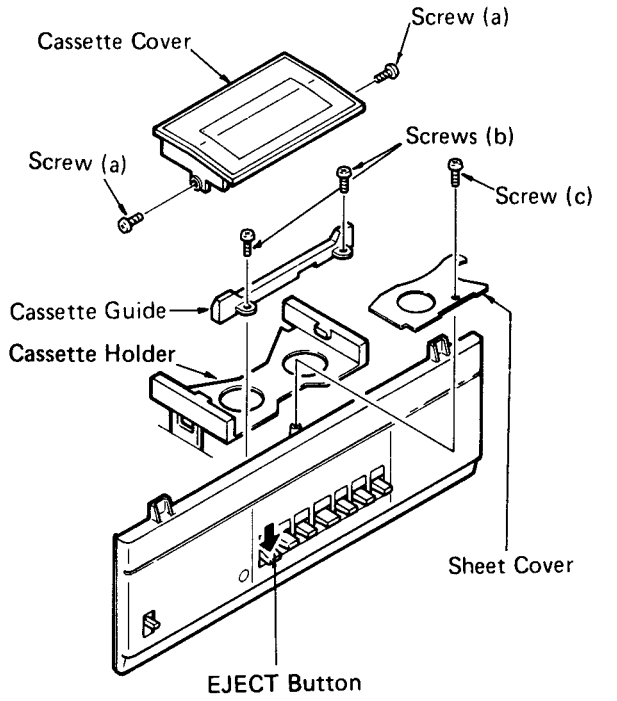


Fig. 4-1

(4) Removal of Cassette Holder Assembly (See Fig. 4-2)

1. Remove the Cassette Cover.
2. Disassemble the Motor Fan by removing the two Screws (a).
3. Disassemble the Idler Pulley Assembly by removing the Screw (b).
4. Take out the two Stoppers from the Cassette Holder Assembly with a long nose pliers. (See illustration "A" in Fig. 4-2)
5. Push the EJECT Button to lift the Cassette Holder Assembly up.
6. Disengage a hook end of the Spring Coil from the Gear.
7. Disassemble the Eject Lever Arm by removing the Screw (c).
8. Take out the Cassette Holder Assembly by holding it up.
9. When reinstalling the Cassette Holder Assembly, be sure to set the lowermost gear tooth of the Cassette Holder Stands (Right and Left) to the Carved Mark on the Gear periphery. (See illustration "B" in Fig. 4-2)
10. Reassemble all other components in the reverse order.
11. Make sure that the Cassette Holder Assembly is horizontal when it is in a lowered position. Also, check that the Cassette Holder Assembly rises smoothly when the EJECT Button is pressed.

* If the Cassette Holder Assembly is found to be not level, check again whether the lower most gear tooth of the Right and the Left Stands is correctly set to the Carved Mark on the respective Gear periphery.

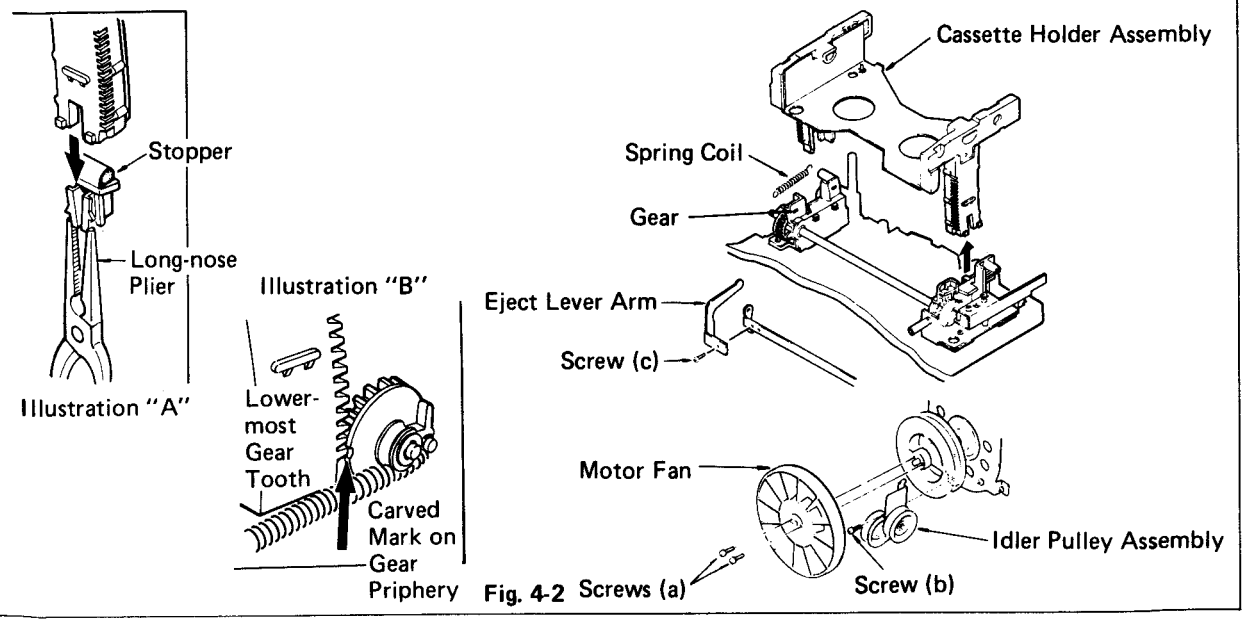


Fig. 4-2

3. Maintenance Timetable

Maintenance of the following components is necessary in order to keep the unit at its best quality and performance:

Intervals (Hours) / Names of components	500	1000	1500	2000	2500	3000	3500	4000	5000
Video Head		△		△		△		△	△
Audio/Control Head	△	△	△	△	△	△	△	△	△
Capstan		△ ▲		△ ▲		△ ▲	△ ▲		△ ▲
Capstan Bearings		△ ▲		△ ▲		△ ▲		△ ▲	△ ▲
Pinch Roller	△	△		△		△		△	△
Supply Reel				△ ▲				△ ▲	
Take-up Reel				△ ▲				△ ▲	
PLAY Roller				△ ▲				△ ▲	
REW Idler		△ ▲		△ ▲		△ ▲		△ ▲	△ ▲
F. FWD Roller		△ ▲		△ ▲		△ ▲		△ ▲	△ ▲
Idler Pulley				△				△	
Tape Guides	△	△	△	△	△	△	△	△	△

(Note) △ . . . Cleaning

▲ . . . Lubrication

4. Cleaners and Lubrications Oils

Use the following cleaners and lubricating Oils:

(1) Methyl Alcohol
(2) Oil (SANYO)
(3) Molybdenum coating

5. Maintenance, Checking, or/and Replacement

(1) Video Heads (See Fig. 4-3)

1. Turn the Power Switch OFF, or pull out the Power Cord from the outlet.
2. Rotate the Motor Fan by hand to a position convenient for cleaning the Video Head. Moisten the Cleaner Stick with Alcohol, lightly press the buckskin portion against the Video Head, and move it horizontally.
3. There is another Video Head on the opposite side. Clean it in the same way.

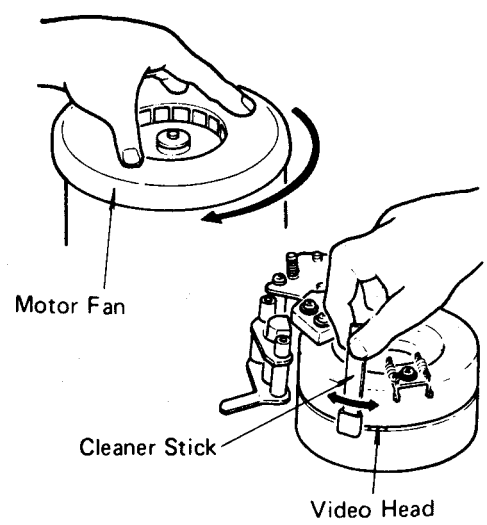


Fig. 4-3

(2) Audio/Control and Erase Heads (See Fig. 4-4)

Moisten the Cleaner Stick with Alcohol, press it against the Head surface, and clean the Head by moving the Stick horizontally.

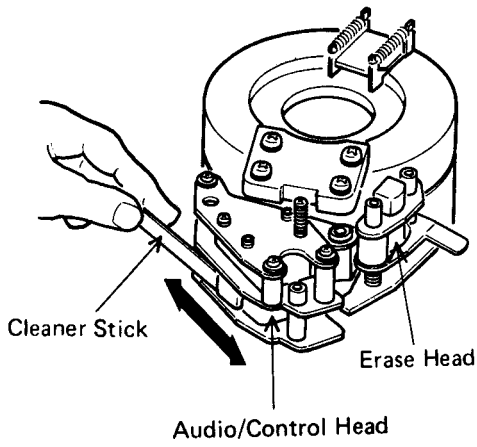


Fig. 4-4

(3) Pinch Roller (See Fig. 4-5)

1. Wipe off the surface of the Pinch Roller with a piece of soft cloth moistened with Alcohol.
2. In case scratches or other injuries are found on the Pinch Roller, unfasten the Screw (a) and replace the Pinch Roller.

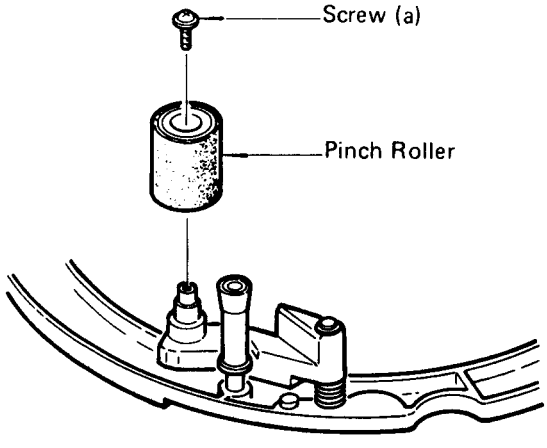


Fig. 4-5

(4) Tape Path

In a similar way, clean the Drum surface and the surface of tape guides with a piece of soft cloth moistened with Alcohol.

(Note)

When cleaning the Drum surface, turn the Motor Fan with your hand to a convenient position to prevent the cleaning cloth from touching the Video Heads. (See Item (1) "Video Heads", Paragraph "5. Maintenance, Checking, or/and Replacement).

(5) Supply Reel (See Fig. 4-6)

1. Remove the Cassette Holder.
2. Remove the Supply Reel by unfastening the fixing Screw (a). Be careful not to bend the Brake Band in doing so. In some cases, there may be Spacers for height adjustment under the bottom of the Supply Reel. Be careful not to lose the spacers. (Be sure to ascertain whether there is a Spacer or not.)
3. Using a piece of soft cloth moistened with Alcohol, clean off the old Oil adhering to the Reel Shaft, and apply a few drops of new Oil to the Reel Shaft.
4. Replace the Supply-Reel. When installing the Supply Reel, be careful not to bend the Brake Band.

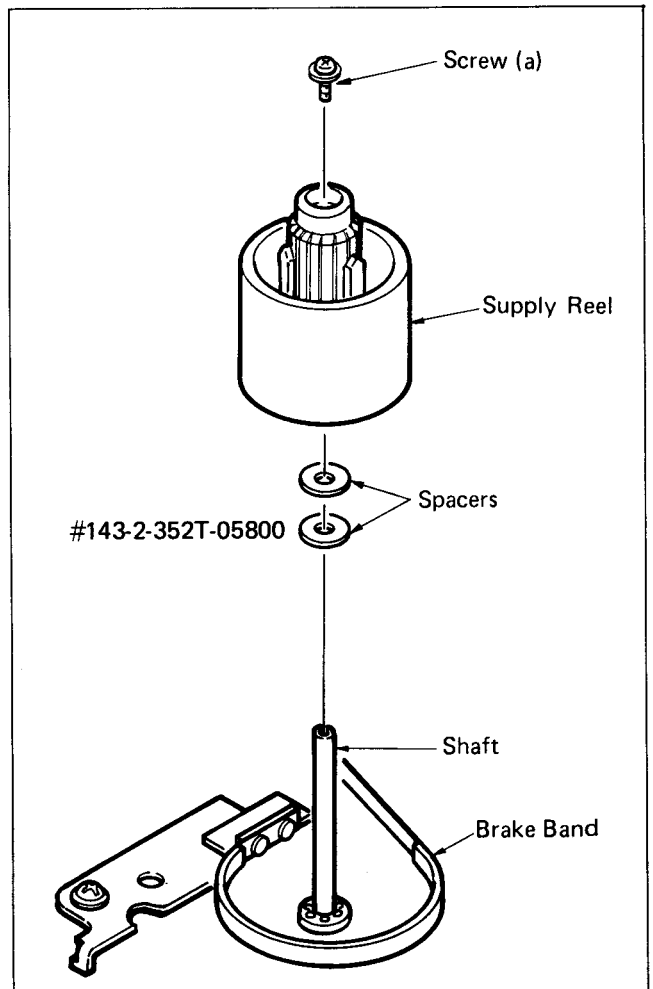


Fig. 4-6

5. Adjust the neight of the Reel if a new supply reel is used. (See Item "(1) Reel Height" in Paragraph "6. Adjustment.") ☞ Page 59
6. Reinstall the Cassette Holder, Sheet Cover, and Cassette Cover.

(6) Take-up Reel (See Fig. 4-7)

1. Remove the Cassette Holder Assembly.
2. Remove the Take-up Reel by unfastening the fixing Screw (a). In some cases, there may be a spacer for height adjustment under the bottom of the Take-up Reel. Be especially careful not to lose the spacers. (Be sure to ascertain whether there is a spacer or not.)
3. Using a piece of soft cloth moistened with Alcohol, clean off the old oil adhering to the Reel Shaft, and apply a few drops of new Oil to the Reel Shaft.
4. Replace the Take-up Reel.
5. Adjust the Reel Height, if a new one is used.
6. Reinstall the Cassette Holder, Sheet Cover, and Cassette Cover.

(7) F. FWD Roller (See Fig. 4-8)

1. Remove the Cassette Holder Assembly.
2. Remove the Unloading Stopper by unfastening the fixing Screw (a).
3. Remove the F. FWD Roller by unfastening, with a Hexagonal Wrench (M3), the Set Screw (b) fixing it. Be careful not to lose the Poly-washer in removing the Set Screw. Do not push down the Drive Shaft of the F. FWD Pulley, since it is supported only by the Drive Belt and the Reel Belt.
4. Clean the outer surface of the F. FWD Roller with a piece of soft cloth moistened with Alcohol, and apply one or two drops of lubricating Oil to the bearing.
5. Replace the F. FWD Roller. After installation, make sure that there is a thrust clearance of about 0.2 mm. When installing the F. FWD Roller, push up the Drive Shaft from the bottom.
6. Before installing the Unloading Stopper, turn the loading ring counterclockwise through an angle of 45 to 90 degrees.
7. Reinstall the components in the reverse order they were disassembled.

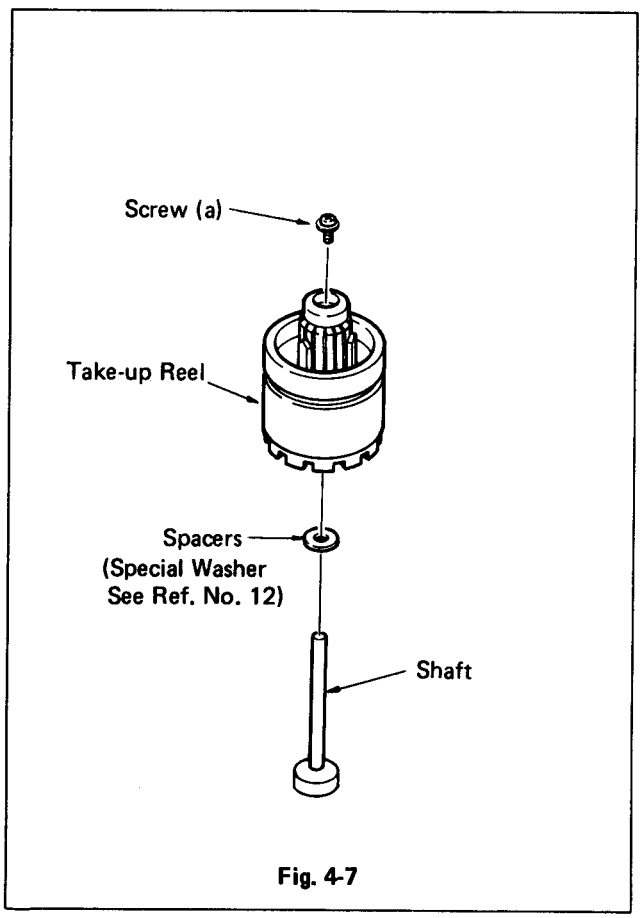


Fig. 4-7

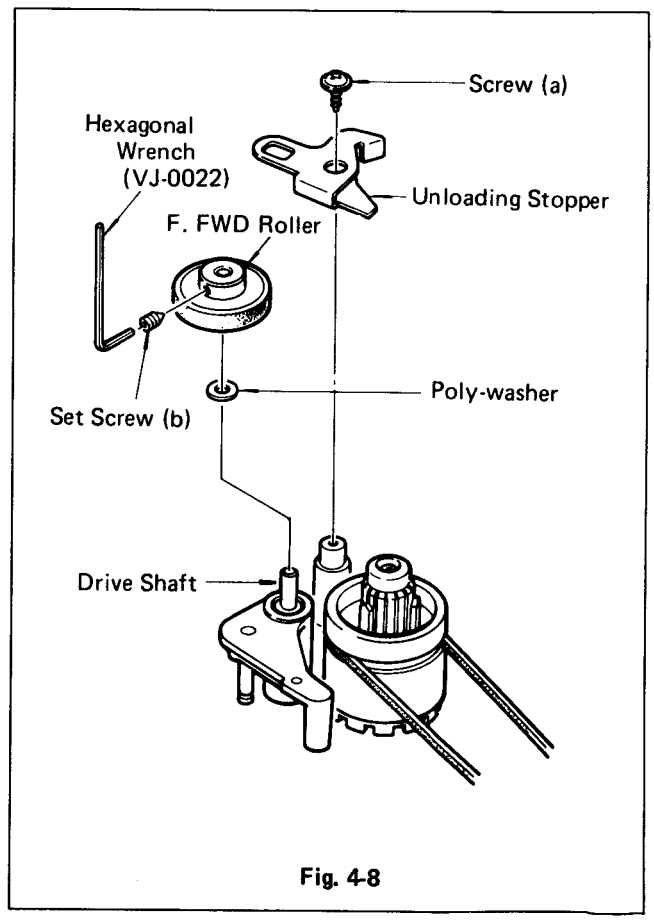


Fig. 4-8

(8) FWD Roller (Fig. 4-9)

1. Remove the Cassette Holder Assembly.
2. Detach the Coil Spring off the chassis, and remove the "E" Ring.
3. Open up the Circuit Board W2. (See Item "2. W2 Circuit Board" on Page 2.)
   Remove the Drive Belt and then remove the FWD Roller Assembly.
4. Clean the outer surface of the rubber roller with a piece of soft cloth moistened with Alcohol. Then apply two or three drops of lubricating Oil to the Shaft.
5. Replace the FWD Roller Assembly.
6. Reinstall the components in the reverse order they were disassembled.

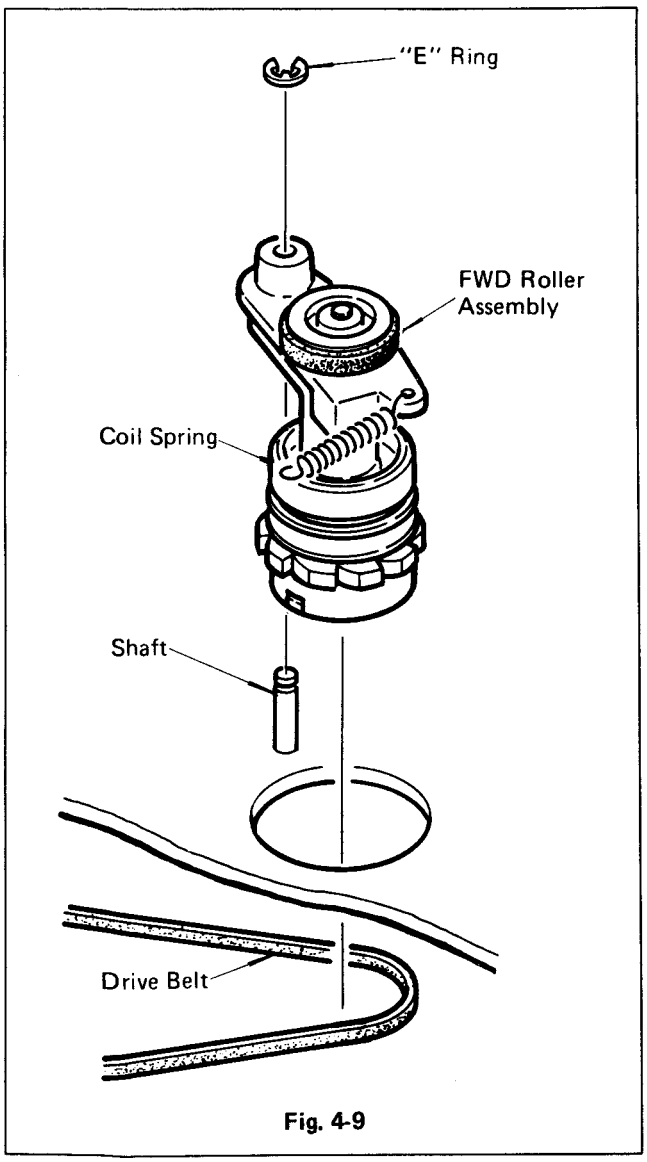


Fig. 4-9

(9) REW Idler (See Fig. 4-10)

1. Remove the Cassette Holder Assembly.
2. Remove the Supply-Reel by unfastening the Screw (a) fixing it.
3. Remove the Unloading Stopper by unfastening the Screw (b).
4. Detach Coil Springs (1) and (2) at one of the hook ends.
5. Unfasten the two Screws (c) fixing the Loading Brake Release Lever Bracket with the Brake Band attached. In doing so, be careful not to bend the Brake Band. The Loading Brake Release Lever Bracket will not come off completely because the Brake Band is fixed at one end, but this makes no difference for our present purposes.
6. Detach Coil Spring (3) at one end.
7. Remove the Loading Brake Release Lever.
8. Remove the "E" ring. Then, remove the REW Idler. Be careful not to lose the Poly Washer.
9. Clean the outer surface of the REW Idler with a piece of soft cloth moistened with Alcohol, and wipe off the old Oil adhering to the Shaft. Then, apply two or three drops of lubricating Oil to the Shaft.
10. Replace the REW Idler and install a new one.
11. Reinstall the components in the reverse order they were disassembled.

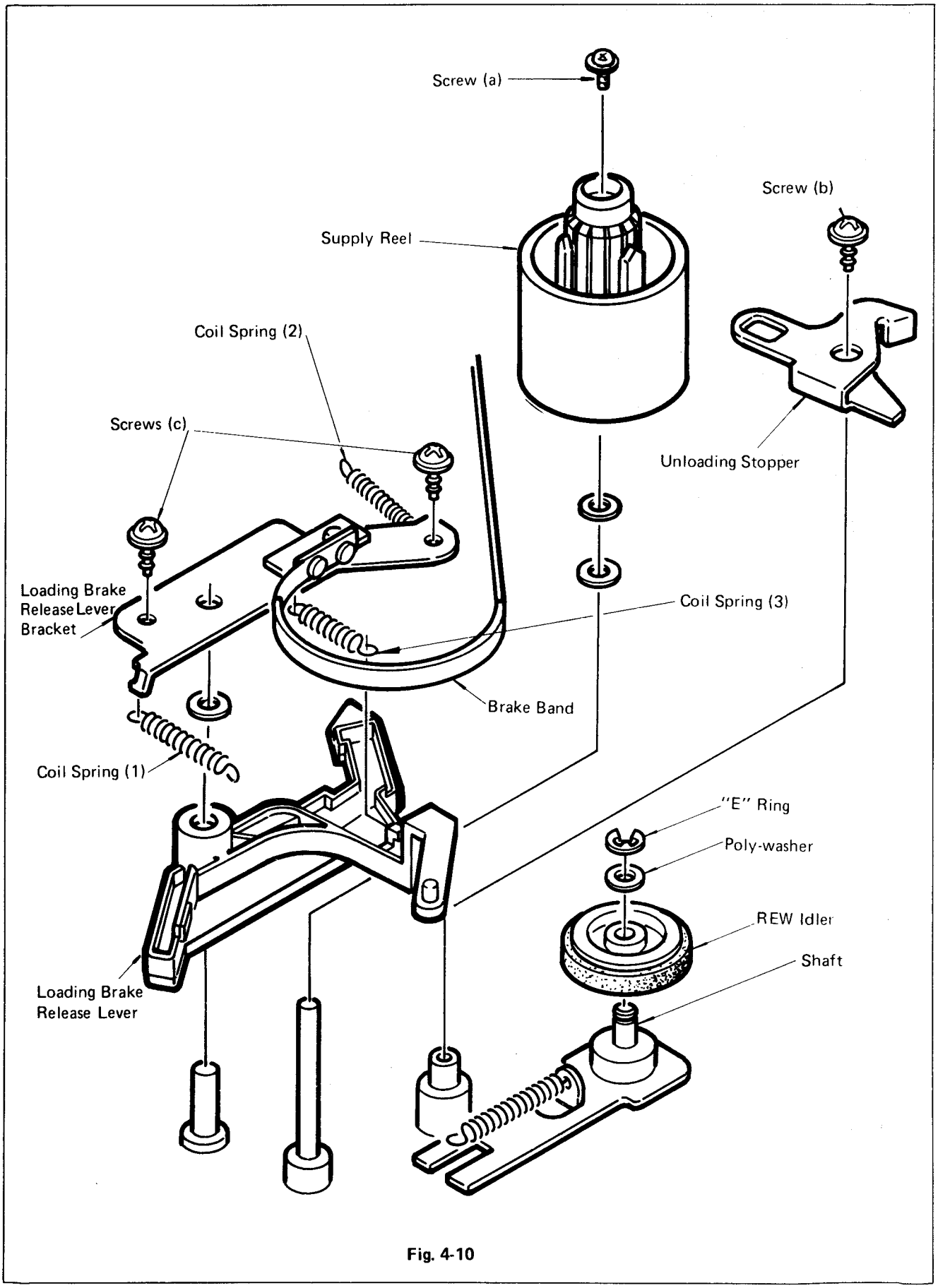

Screw (a)
Screw (b)
Supply Reel
Coil Spring (2)
Screws (c)
Unloading Stopper
Loading Brake Release Lever Bracket
Coil Spring (3)
Brake Band
Coil Spring (1)
"E" Ring
Poly-washer
REW Idler
Shaft
Loading Brake Release Lever

Fig. 4-10

(10) Capstan and Capstan Bracket (See Fig. 4-11)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board," Paragraph "2 Disassembly of Circuit Boards.")
2. Remove the Drum Flywheel by unfastening the two Screws (a) fixing it. Then, remove the Servo Belt.
3. Loosen the two Screws (b) fixing the Capstan Flywheel Bracket in the direction indicated by the arrow, and remove the Capstan Belt.
4. Slowly pull out the Capstan Flywheel. In so doing, be careful not to lose the Rubber Oil Ring on the top or the Poly-washer on the bottom at the top of the Capstan Bracket.
5. Clean the rubbered periphery of the capstan flywheel with a piece of soft cloth moistened with Alcohol.
6. With a piece of soft cloth moistened with Alcohol, wipe the old Oil adhering to the Capstan Flywheel Shaft, and apply one or two drops of lubricating Oil to the lower part of the Capstan Bracket. After inserting the Capstan Flywheel, apply one or two drops of lubricating Oil to the upper part of the Capstan Bearing, before installing the Rubber Oil Ring.
7. If it is desired to replace the Capstan Bracket, first remove the Capstan Flywheel, remove the Capstan Bracket by unfastening the three Screws (c), then replace the Capstan Bracket with a new one.
8. When reinstalling the Capstan Flywheel, be sure to do the followings:
   * Assure thrust clearance of about 0.2 mm to 0.3mm for the Capstan Flywheel Shaft.
   * Clean, with a piece of soft cloth moistened with Alcohol, the Capstan Flywheel Shaft above the Rubber Oil Ring, and wipe away all the Oil adhering to it.
9. Reinstall all the components in the reverse order they were disassembled.

(11) Idler Pulleys (See Fig. 4-12)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board," Paragraph "2 Disassembly of Circuit Boards.") ☞ Page 2
2. Remove the Idler Pulley Assembly by unfastening the Screw (a) fixing the Idler Pulley Assembly.
3. Remove the "E" Ring, and then remove the Idler Pulley. In so doing, be careful not to lose the Poly-washers at both sides of the Idler Pulley.
4. Clean the Idler Pulley Shaft with a piece of soft cloth moistened with Alcohol, and apply one or two drops of lubricating Oil to the Shaft.
5. Replace the original Idler Pulley or install a new one.
6. Set the Idler Pulley at the correct position as determined by the locating hole, and fasten the fixing Screw (a).
7. Attach the Reel Belt to the Idler Pulley.
8. Reinstall all the components in the reverse order they were disassembled.

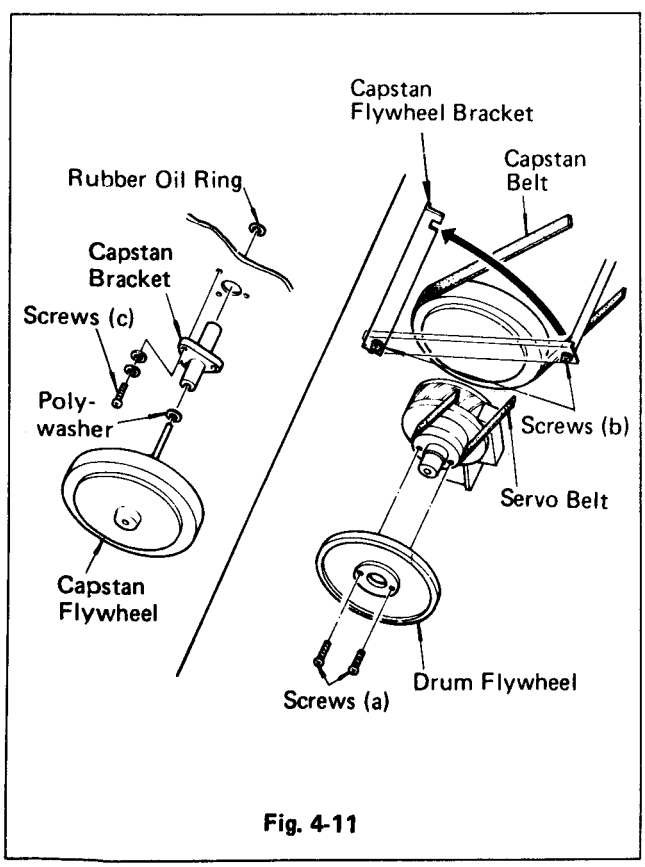


Fig. 4-11

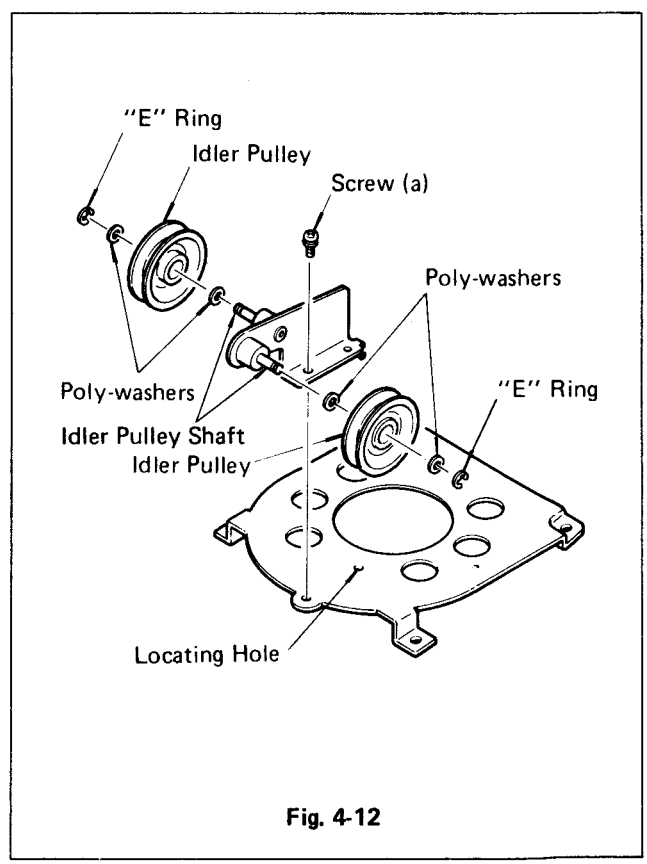


Fig. 4-12

(12) Loading Guide Rollers (See Fig. 4-13)

1. Remove the bracket by unfastening the Screw (a).
2. Remove the Loading Stopper by unfastening the Screw (b).
3. Loosen the Screw (c) fixing the Bracket and move the Loading Guide Roller in the arrow direction.
4. Rotate the Loading Ring counterclockwise with your hand until the "A" portion (the concave portion) of the Loading Ring faces the Pinch Roller Lock-out Lever as shown, and raise the Loading Ring up for its removal by pushing the Loading End Lever into the arrow direction.
5. Remove each "E" Ring for the three Loading Guide Rollers and detach them.
6. Clean the inner surface of each Loading Guide Roller and the each Shaft for it with a piece of soft cloth moistened with Alcohol. Then, apply one or two drops of lubricating Oil to the each Shaft.
7. Replace Loading Guide Rollers if necessary.
8. Reinstall all the components in the reverse order they were disassembled.
9. Locate the Loading Guide Roller at a correct position, referring to Item "(3) Loading Time and Unloading Time" on page 60.

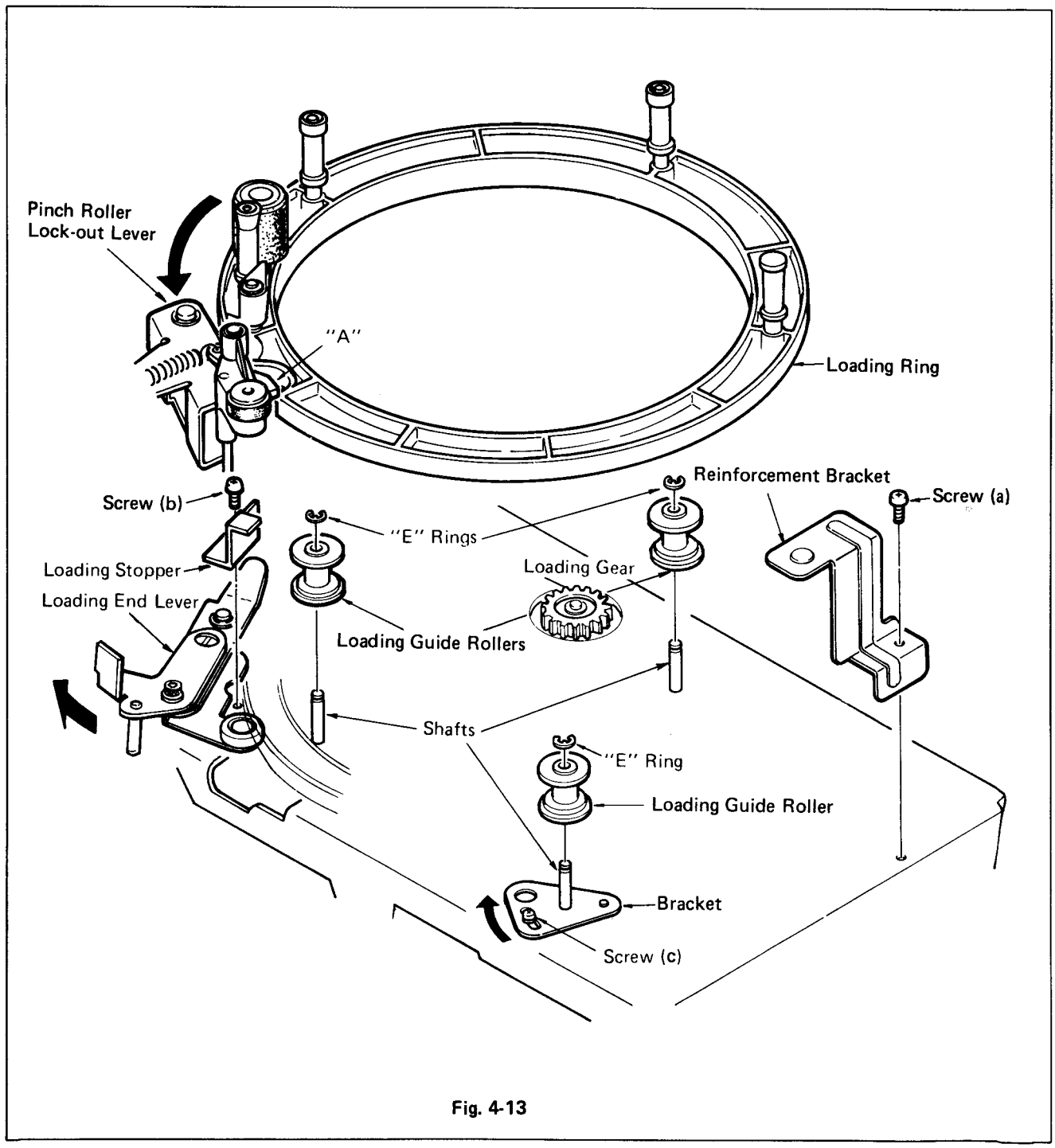


Fig. 4-13

(13) Loading Gear Assembly (See Fig. 4-14)

1. Open up the W2 Circuit Board.
2. First remove the Capstan Flywheel.
3. Remove the two Screws (a) fixing the Loading Gear Assembly.
4. Remove the Loading Gear Assembly after disengaging the shaft from the Loading Gear Arm.
5. Clean each periphery of the two rollers with a soft cloth moistened with Alcohol.
6. Mount the Loading Gear Assembly with the two Screws (a) and make sure that the Loading Gear is in a correct engagement with the Loading Ring.

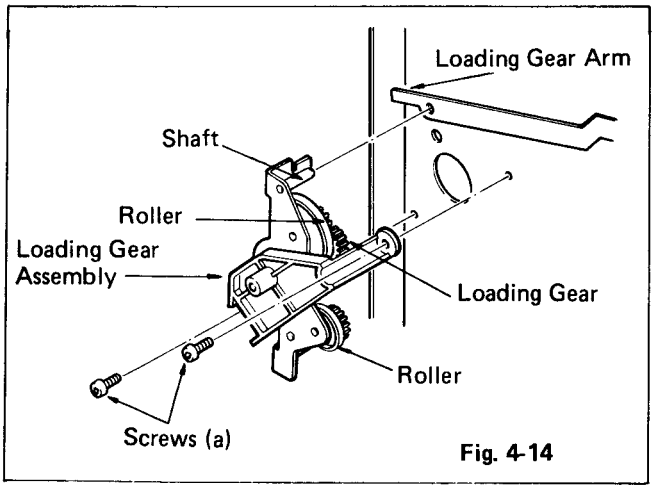


Fig. 4-14

(14) Audio/Control Head (See Fig. 4-15)

1. Unfasten the two Screws (a) fixing the Audio/Control Head, and remove the Lead Wires while lifting up the Audio/Control Head Assembly.
2. Replace the Audio/Control Head Assembly with a new one.
3. Connect the Lead Wires by soldering, and install the new Audio/Control Assembly.
4. Carry out the Tape Path adjustment. (See Item **"(12)** Tape Path", Paragraph "6. Adjustment.") ☞Page 69

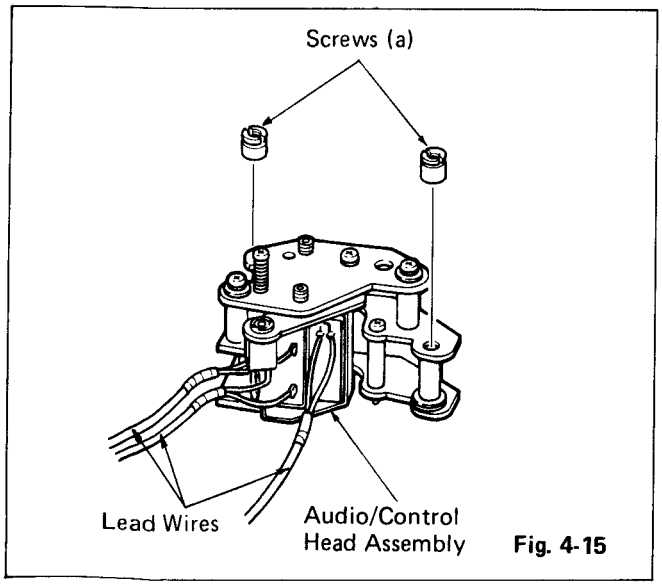


Fig. 4-15

(15) Video Head Disc. (See Fig. 4-16)

1. Remove two Screws (a), and loosen the Cap Bolt (b) with a Hexagonal Wrench (VJ-0024) while lifting up the Upper Drum. Then remove the Upper Drum.
2. Unfasten two Screws (c), disconnect Lead Wires (1), (2), (3) and (4), and remove the Video Head Disc. Before removing the Video Head Disc, the heads must first be located in a position as far as possible from the Connector on the Lower Drum. Otherwise, the head may be injured.
3. Replace the Video Head Disc with a new one, if necessary.
4. In installing the new Video Head Disc, be sure to locate "PG" on the opposite side of the letters "W17." Tighten the two Screws (c) with a torque of 6 kg. (Do not fasten the screws too tightly.)
5. The lead wires (1), (2), (3) and (4) should be laid out along the Video Head Disc so that they do not touch the Upper Drum.
6. Reinstall all the components in the reverse order they were disassembled.

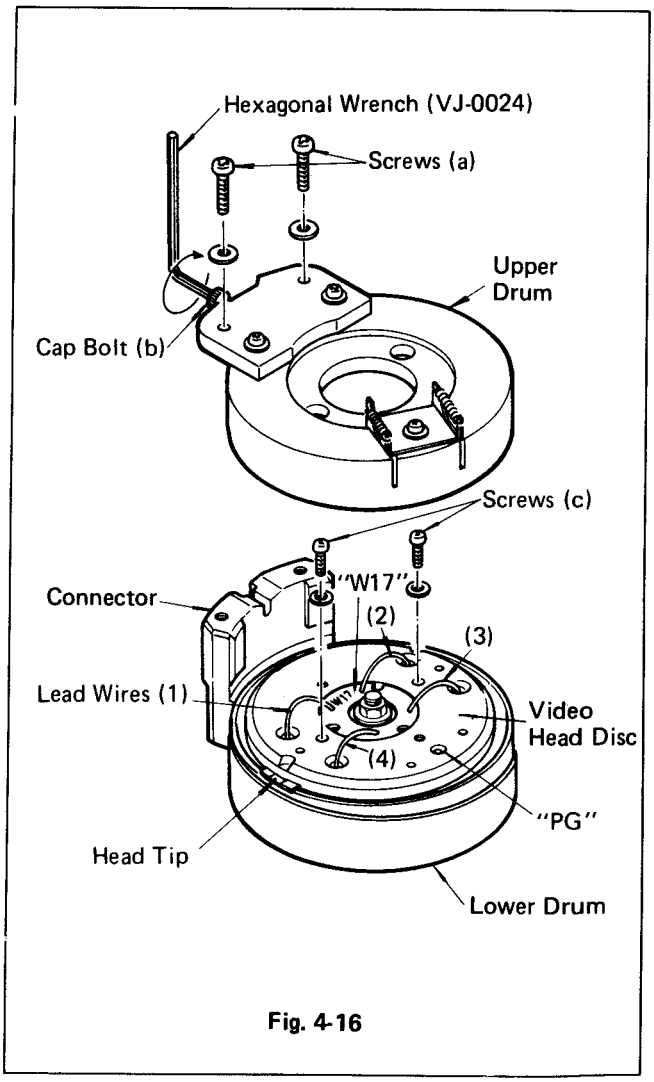


Fig. 4-16

(16) Servo Belt (See Fig. 4-17)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board" on Page 2.)
2. Remove the Drum Flywheel by unfastening the two Screws (a). Disengage the Servo Belt from the Drum Pulley and clean the contact surface on the Pulley.
3. Replace the Servo Belt with a new one, if necessary.
4. Reinstall all the components in the reverse order they were disassembled.

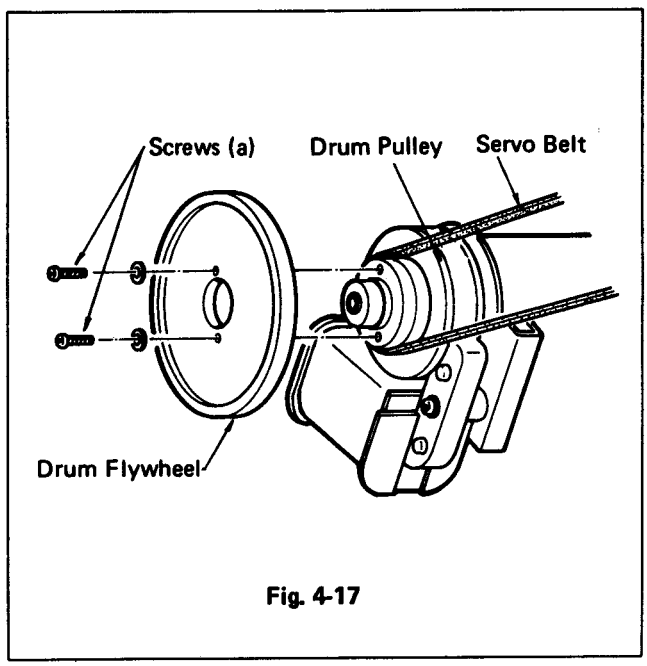


Fig. 4-17

(17) Cpastan Belt (See Fig. 4-18)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board," Paragraph "2 Disassembly of Circuit Boards.") ☞ Page 2
2. Remove the Motor Fan by unfastening the two Screws (a).
3. Remove the Drum Flywheel and the Servo Belt. (See Item "(16) Servo Belt.")
4. Loosen the two Screws (b) fixing the Capstan Flywheel Bracket and swing the Capstan Flywheel Bracket in the direction indicated by the arrow.
5. Replace the Capstan Belt with a new one, if necessary.
6. Reinstall all the components in the reverse order they were disassembled.

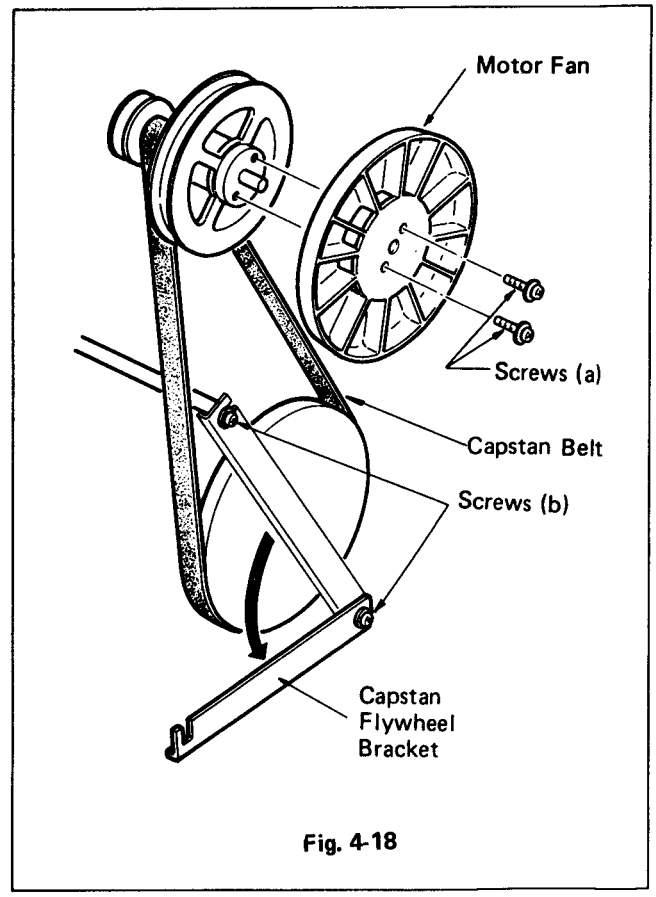


Fig. 4-18

(18) Reel Belt (See Fig. 4-19)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board," Paragraph "2 Disassembly of Circuit Boards.") ☞ Page 2
2. Remove the Servo Belt and the Capstan Belt. (See Item "(16) Servo Belt," and Item "(17) Capstan Belt" on Page 53.) Clean each contact surface on the related pulleies.
3. Replace the Reel Belt. Attach a new Reel Belt to the Idler Pulley (on the cassette holder side).
4. Reinstall all the components in the reverse order they were disassembled.

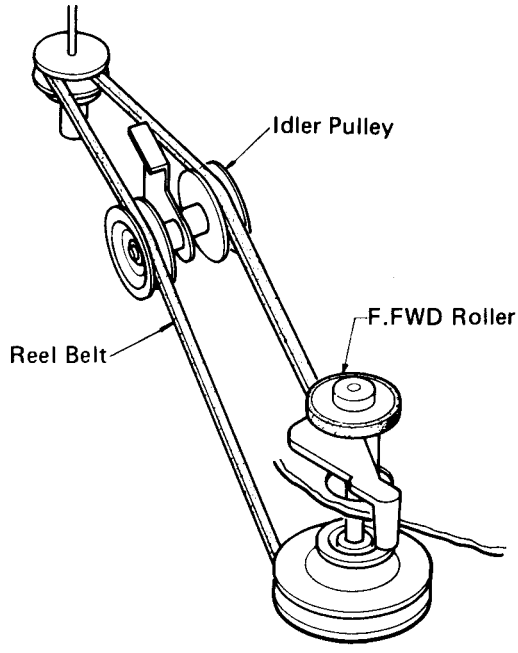


Fig. 4-19

(19) Servo Brake Stator Assembly (See Fig. 4-20)

1. Open up the Circuit Board W2. (See Item "2 W2 Circuit Board," Paragraph "2 Disassembly of Circuit Boards.") ☞ Page 2
2. Remove the Drum Flywheel and the Servo Belt. (See Item "(16) Servo Belt.")
3. Loosen the Set Screw (a) with a hexagonal wrench (VJ-0023), and remove the Drum Pulley.
4. Loosen the Set Screw (b) fixing the Servo Brake Rotor with a hexagonal wrench (VJ-0023), and remove the Rotor.
5. Open up the circuit board W1. (See Item "1 W1 Circuit Board" on Page 1.)
6. Remove the servo brake Stator Assembly by unfastening the three Screws (c). Pull out the Lead Wires from the Socket S104 together with the Stator Assembly.
7. Replace the Servo Brake Stator Assembly with a new one, if necessary.
8. Reinstall all the components in the reverse order they were disassembled.

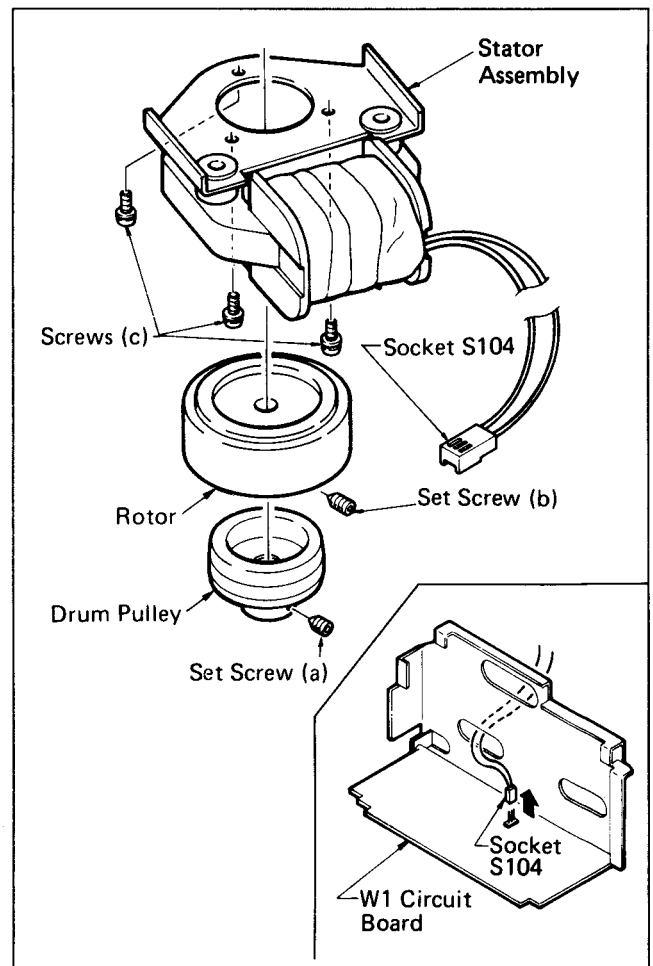


Fig. 4-20

(20) Push-Button Mechanism Parts (See Fig. 4-21)

1. Turn the Power Switch OFF with the Cassette Holder at the up position.
2. Remove the Cassette Guide. (See Item "(2) Removal of Casette Guide," Paragraph "2. Preparations for Adjustment.") ☞ Page 44
3. Unfasten the fixing Screw (a) and remove the Plate Spring.
4. Open up Circuit Board W2 on bottom of the unit. (See Item "2. W2 Circuit Board" on Page 2.)
5. Detach Coil Springs (1) and (2).
6. Unfasten the two Screws (b) fixing the Cover of the Circuit Board W6, and remove the Cover from the front of the VTR.
7. Move the Circuit Board W6 to an inside position convenient for removing the Push-Button Assembly.
8. Unfasten the fixing Screw (c) and remove the Eject Lever Arm.
9. Remove the "E" Ring (3) and remove the Lock Lever Plate.
10. Remove the "E" Ring (4) and remove the REC Lock Lever Plate.
11. Unfasten the four Screws (d) on the Plastic Chassis, move the Mechanism about a half inch toward the back of the Plastic Chassis, and remove the Push-Button Assembly by pulling it toward you.
12. Replace the defective button with a new one.
13. Reinstall all the components in the reverse order with the following points in mind: (Refer to "Push Button Mechanism and Cassette Holder Mechanism" in Parts Lists.)

* Install the Lock Lever Plate so that it comes inside the Solenoid Lever*.

* With the Cassette Holder at the lowered position, install the REC Lock Lever Plate while pressing the PLAY and the REC Buttons simultaneously. (Press the REC Button while holding the Erasure Prevention Slide.)

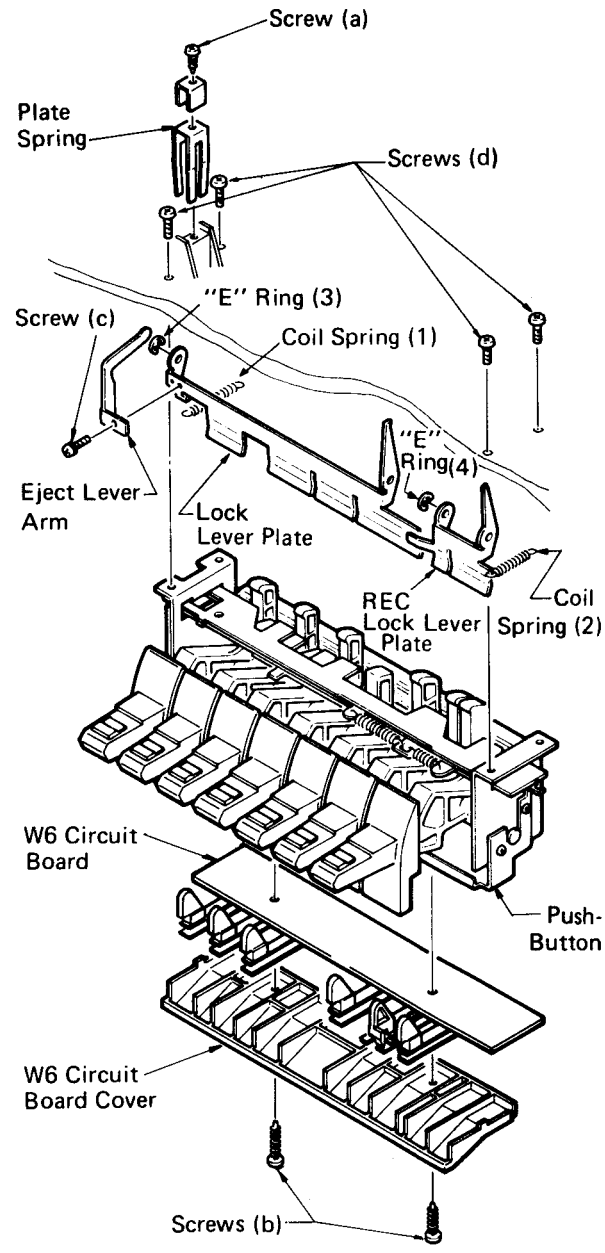


Fig. 4-21

(21) AC Motor (See Fig. 4-22 and 4-23)

* Be sure to pull out the Power Cord from the power outlet before starting the replacement.

1. Unfasten the Screw (a) fixing the Insulation Cover and remove the Insulation Cover from the Circuit Board W7.
2. Disconnect the three Lead Wires (blue, red and yellow) from the AC Motor, and remove the wire clamp dressing up the Lead Wires.
3. Open up the Circuit Board W2 (See "2 Circuit Boards Disassembly" if necessary.)
4. Remove the Motor Fan, Servo Belt, Capstan Belt, Reel Blet, Servo Pulley, and Capstan Pulley:
   (a) Remove the Motor Fan by unfastening the two Screws (b) fixing the Motor Fan.
   (b) Remove the Servo Belt.
   (c) Loosen, with a Hexagonal Wrench (VJ-0022), the Set Screws (c) fixing the Servo Pulley.
   (d) Remove the Capstan Belt and Reel Belt.
   (e) Loosen, with a Hexagonal Wrench (VJ-0023), the Set Screws (d) fixing the Capstan Pulley.
5. Remove the AC Motor by unfastening the four Screws (e) on bottom of the AC Motor.
6. Replace the AC Motor with a new one.
7. When installing the Capstan Pulley, use the clearance adjustment jig (VJ-0021) for Capstan Pulley.

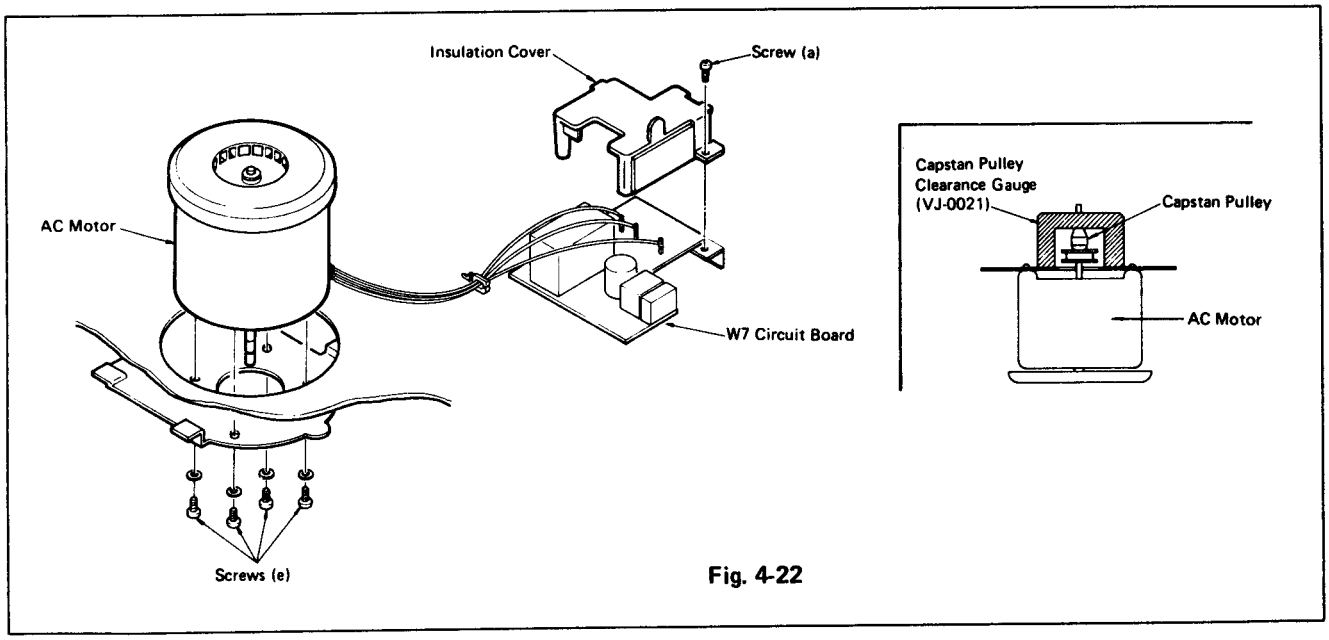


Fig. 4-22

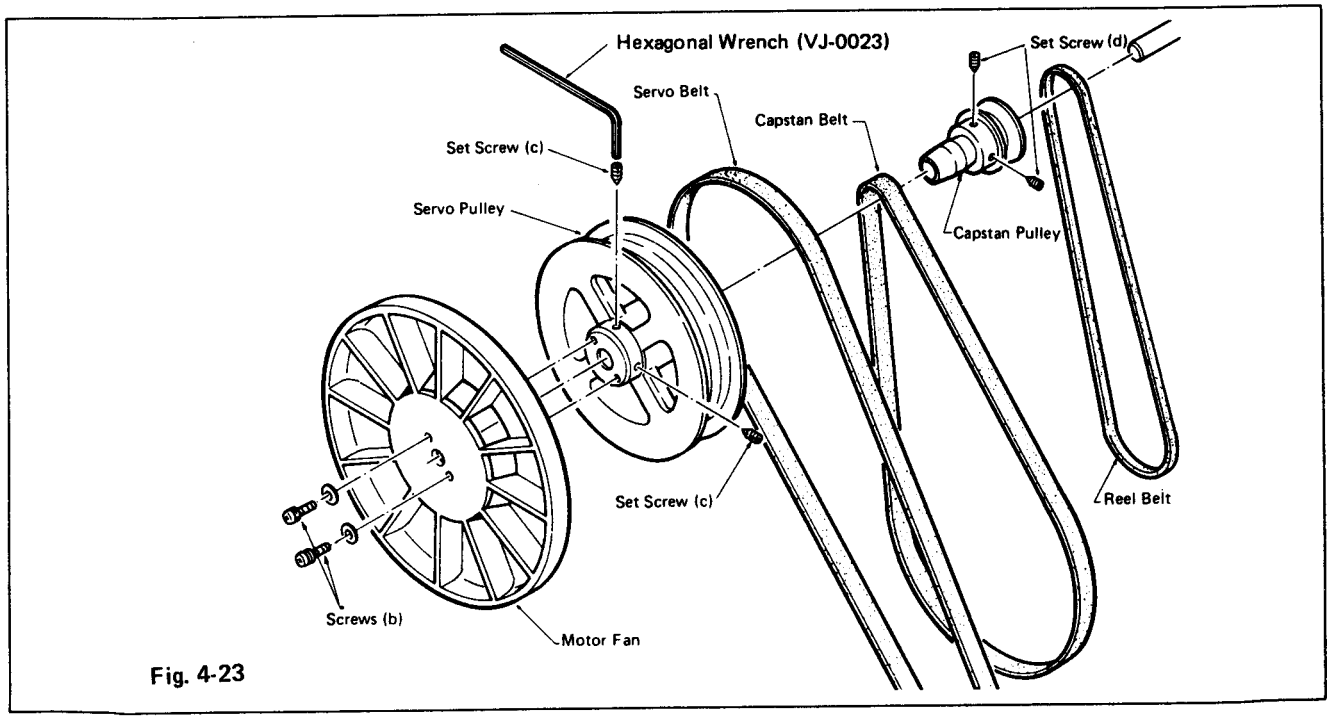


Fig. 4-23

(22) Brake Band Assembly (See Fig. 4-24)

1. Remove the Cassette Holder Assembly.
2. Unfasten Screw (a) and Screw (b).
3. Replace the Brake Band with a new one.
4. Reinstall all the components, reversing the steps above.
5. Make the PLAY Back-tension adjustment.
   (See Item "(2) PLAY Back-tension," Paragraph "6. Adjustment.") ☞ Page 60

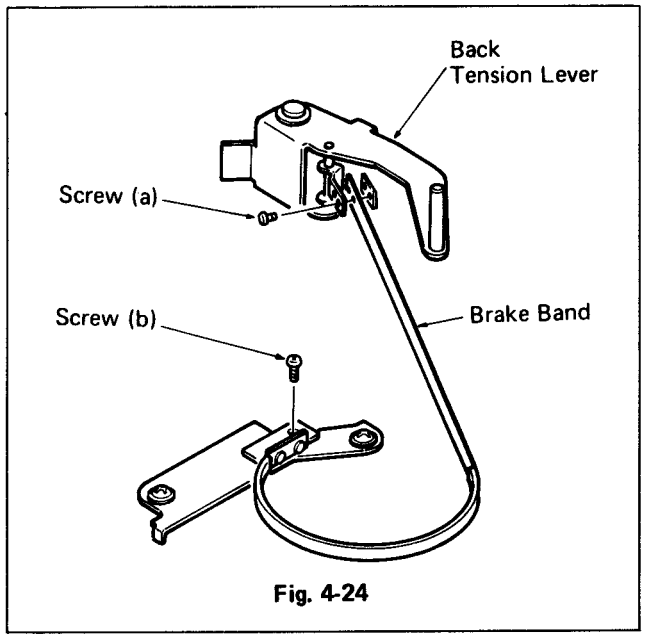


Fig. 4-24

(23) Reel Brakes (Loading Brake and Supply Reel Brake) (See Fig. 4-25)

1. Remove the Cassette Holder Assembly.
2. Remove the Unloading Stopper by unfastening the Screw (a).
3. Remove the Supply Reel by unfastening the Screw (b).
4. Disassemble the Main Brake by removing the "E" Ring.
5. Release each hook end of the three Coil Springs (1), (2) and (3) from a corresponding component, respectively.
6. Disassemble the Loading Brake Release Lever Bracket by removing two Screws (c). Be careful not to bend the Brake Band.
7. Disassemble the FWD Sensor Lever by removing the "E" Ring.
8. Remove the Loading Brake Release Lever.
9. Reinstall all the components, reversing the above steps.

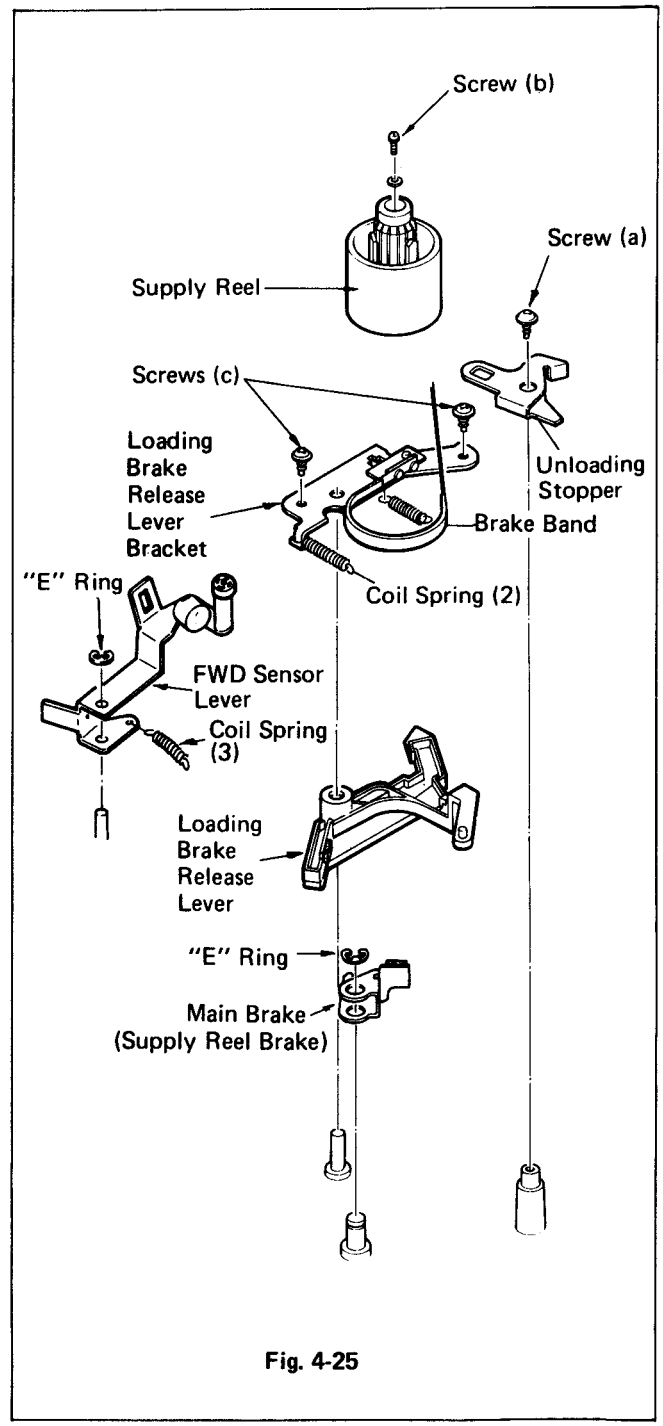


Fig. 4-25

(24) Stop Solenoid (See Fig. 4-26)

1. Remove the Cassette Cover. (See Item "(1) Removal of Cassette Cover.") ☞ Page 44
2. Remove the Cassette Guide. (See Item "(2) Removal of Cassette Guide.") ☞ Page 44
3. Remove the Cassette Guide Bracket by unfastening the two Screws (a).
4. Detach the Coil Spring.
5. Unfasten Screw (b) and Screw (c) fixing the Solenoid Switch Bracket. Remove the Lug together with Screw (b).
6. Remove the Solenoid Switch Bracket by lifting up the lead wires.
7. Unfasten the Screws (d) and (e) fixing the Stop Solenoid.
8. Disconnect the lead wires at the soldered portions, and remove the Stop Solenoid.
9. Replace the Stop Solenoid with a new one, if necessary.
10. Be careful not to confuse the wire colors, when connecting the lead wires to the Stop Solenoid, for correct polarity.

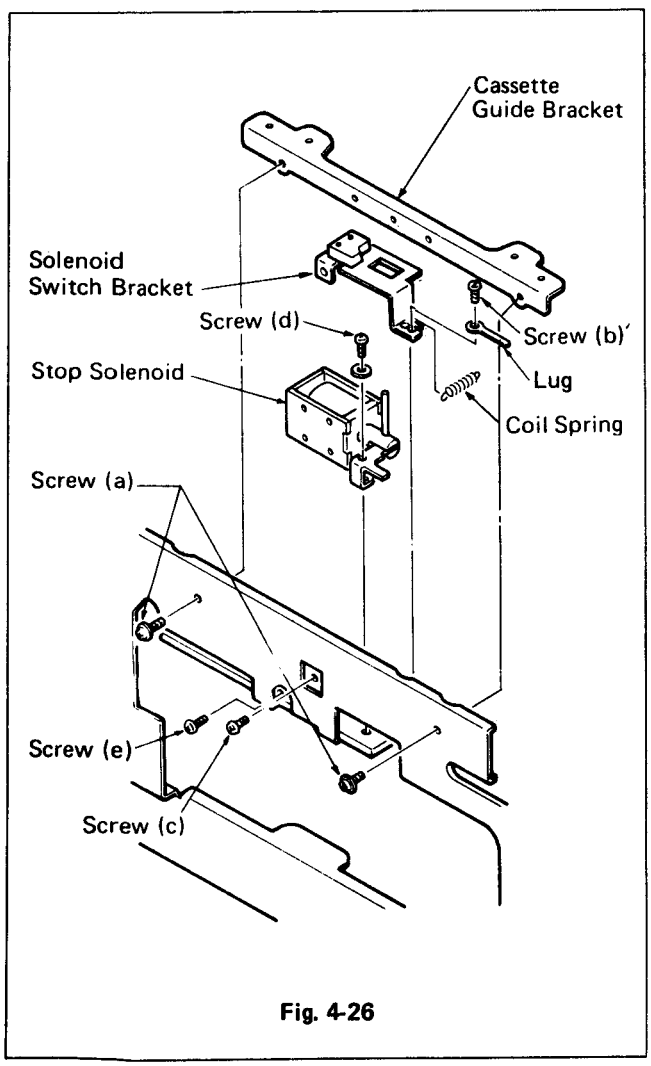


Fig. 4-26

(25) Remote Pause Solenoid (See Fig. 4-27)

1. Remove the W7 Circuit Board.
2. Disengage each one hook end of the two Spring Coils 1 and 2 from the corresponding component, respectively.
3. Remove the "E" Ring.
4. Open up the W2 Circuit Board.
5. Disassemble the Shield Plate by removing the Screw (a).
6. Pull the Link Shaft out of the Remote Pause Solenoid toward the unit bottom.
7. Disassemble the Remote Pause Solenoid by removing the four Screws (b).
8. Remove the two Screws (c) and the Bracket from the Solenoid.
9. Unsolder the W24 Circuit Board off the Solenoid.
10. Reassemble all the components in the reverse order given above.

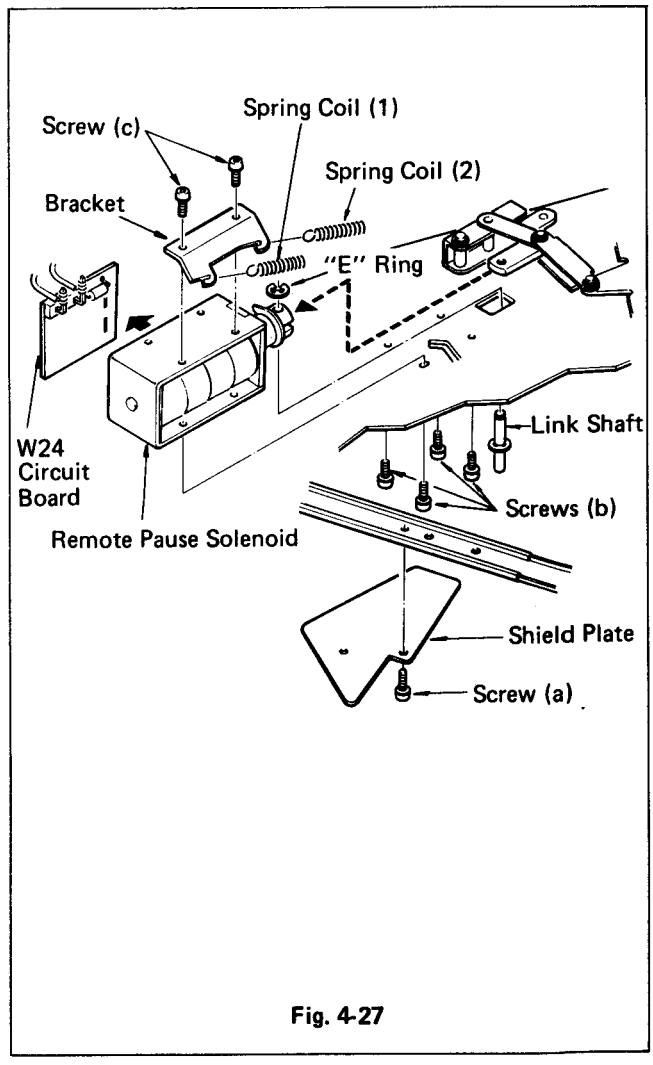


Fig. 4-27

6. Adjustments

(1) Reel Height (See Fig. 4-28)

* If the Reel height is different from a standard value, the Tape may be wound unevenly inside the Cassette. When this Tape is used again, the uneven winding may cause fluctuation in the tape tension, resulting in abnormal tape running. Therefore, the Reel height must be precisely adjusted.

1. Turn the Power Switch to "OFF".
2. Remove the Cassette Holder.
3. Mount the Cassette Standard Plate Gauge (VJ-0008), and slide the Gauge in the direction indicated by the arrow.
4. Adjust the height of Reel with Spacers (0.2T), so that the Gauge will be stopped by the "B" surface, but not by the "A" surface. (If the Gauge is stopped by the "A" surface, remove one Spacer and try again.)
5. After the adjustment is completed, install the Cassette Holder Assembly.

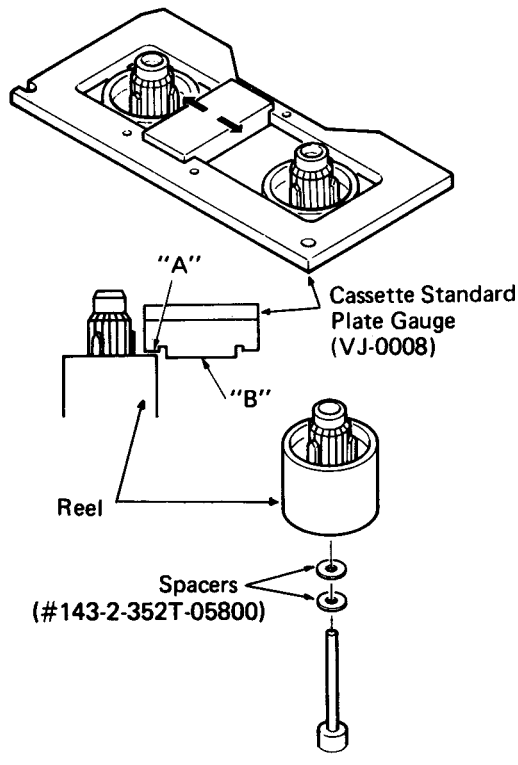


Fig. 4-28

(2) PLAY Back-tension

* The PLAY Back-tension always assures uniform tape tension so that the Tape can run stable through the Heads and Tape Guides in the PLAY mode. Excessive Back-tension may stretch the Tape, while insufficient Back-tension may cause hunting and make the Tape float away from the Heads. So, the PLAY Back-tension must be precisely adjusted.

[In the Unloading State] (See Fig. 4-29)

1. Remove the Cassette Cover. (See Item "(1) Removal of Casette Cover," Paragraph "2 Preparations for Adjustment".) ☞ Page 44
2. Place the Back-tension Lever Location Gauge (VJ-0005) between the Back-tension Lever and the Outer Periphery of the Supply Reel, and make sure that the clearance between them is 30 mm ± 1 mm.

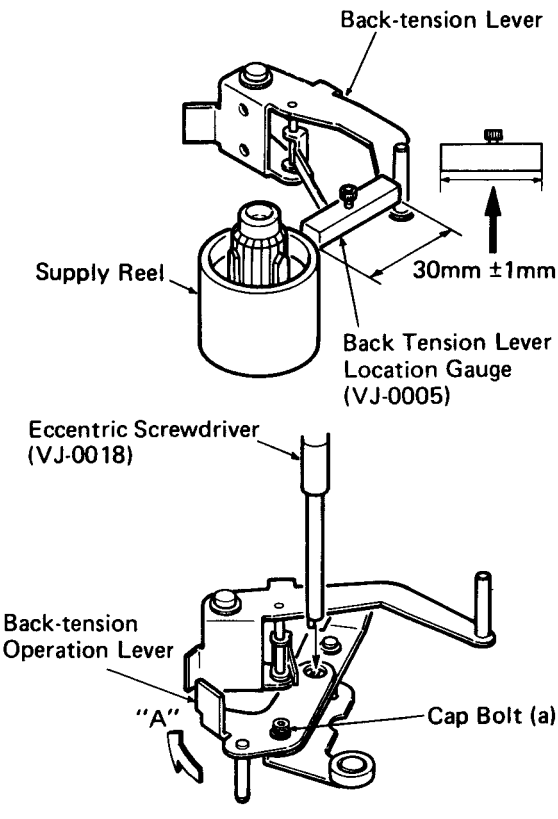


Fig. 4-29

3. If the clearance is not within the above range, loosen the Cap Bolt (a), insert the Eccentric Screwdriver (VJ-0018) into the hole designated by the arrow, and adjust the clearance by moving the Back-tension Operation Lever in the direction indicated by the bold arrow. (Clearance will decrease if the Lever is moved towards "A".) After the adjustment, be sure to fasten the Cap Bolt (a) tightly.

[In the Loading State] (See Fig. 4-30)

1. Turn the Power Switch "ON".
2. Start the loading operation while holding down the Cassette Switch Actuator with your finger tip.
3. Place the Back-tension Location Gauge (VJ-0005) between the Back-tension Lever and the Erase Head Bracket as shown, and make sure that the clearance between them is 7 mm ± 1 mm.
4. If the clearance is not within the above range, then turn the Power Switch "OFF" and remove the Cassette Holder Assembly and the Sheet Cover.
5. Loosen the Screw (b), and adjust the clearance by sliding the Brake Band Bracket in the direction indicated by the arrow "A". (Clearance will decrease if the Bracket is moved in the "A" direction.) After the adjustment, be sure to fasten the Screw (b) tightly.
6. Unfasten the two locks fixing the Circuit Board W5, and open up the Circuit Board W5.

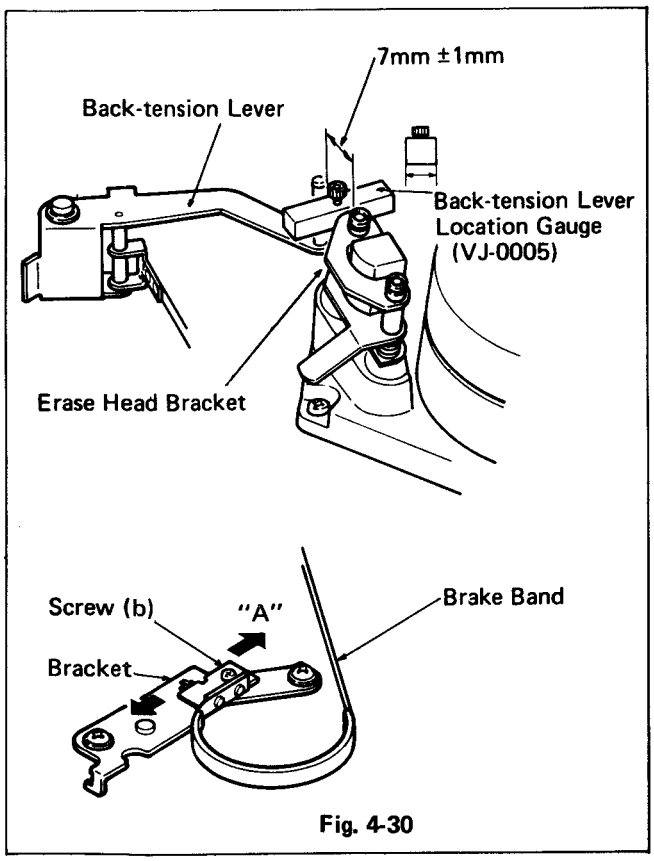


Fig. 4-30

7. Mount the PLAY Back-tension Measurement Jig (VJ-0025), press the PLAY Button to make the Tape run as shown in figure 4-30. Then, using the Sector Tension Gauge (VJ-0012), pull the Tape in the direction indicated by the arrow, at a speed of 20 mm/sec. Read the Tension Gauge and make sure that the reading is within a range of 45g ± 5g. (See Fig. 4-31.)
8. If the measured Back-tension is not within the above range, adjust it to 45g ± 5g by pressing with your finger the Back-tension Adjustment Metal in the direction indicated by the arrow. (Tension will be greater if you press the Metal in the "A" direction.)
9. After the adjustment is completed, reinstall the Cassette Holder Assembly, Sheet Cover, Cassette Cover, and the Circuit Board W5.

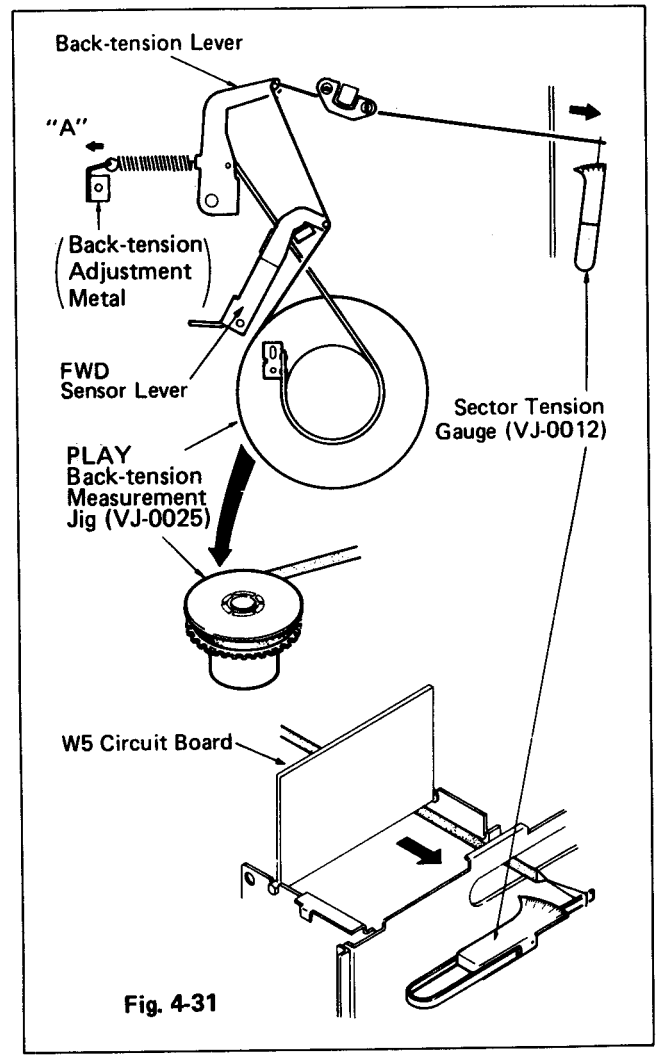


Fig. 4-31

(3) Loading Time and Unloading Time

[Locating Loading Guide Roller]

(See Fig. 4-32)

* During the loading or unloading operation, the Loading Ring must be properly supported by the three Guide Rollers. Otherwise, both the loading time and the unloading time will be longer than a respective standard, or abnormal operation may result. Therefore, the location of the Guide Rollers must be precisely adjusted.

1. Turn the Power Switch "ON".
2. Load a Cassette Tape, carry out the loading and the unloading operations, and measure the time necessary for each operation. Make sure that the loading time is less than 3 seconds, and the unloading time is less than 5 seconds.

3. If the measured times are not within the above limits, then loosen the Screw (a), insert the Loading Ring Clearance Gauge (VJ-0007) between the Loading Guide Roller and the Loading Ring, and adjust the clearance by sliding the Bracket in the direction indicated by the arrow. After the adjustment is completed, be sure to fasten the Screw (a) tightly.
4. Again carry out the loading and the unloading operations, and make sure the operation times are within the standard limits.

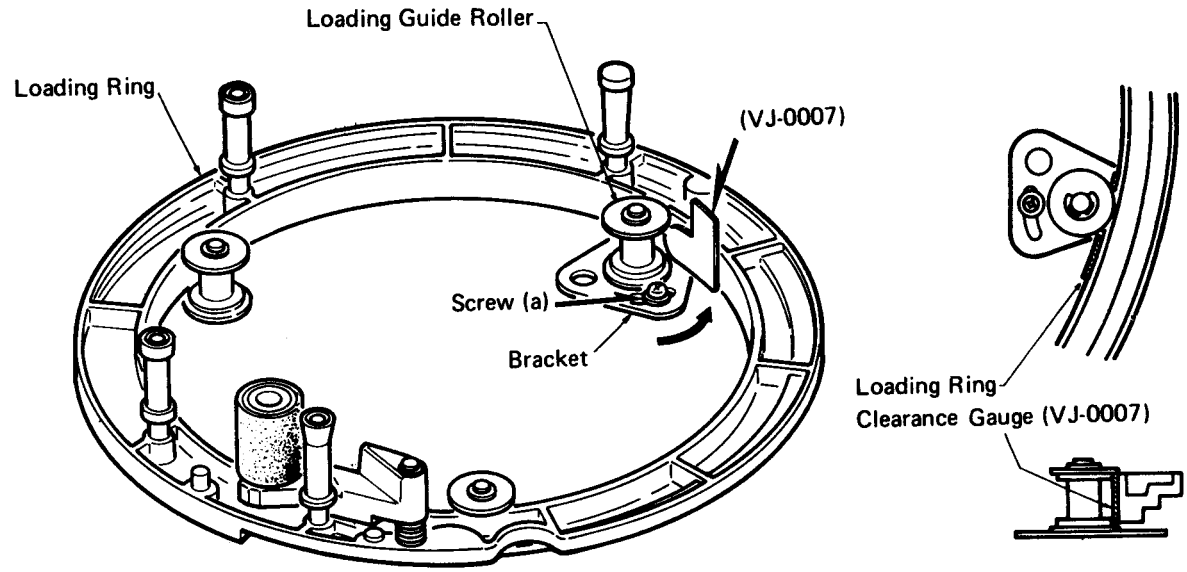


Fig. 4-32

(4) Stop Solenoid (Fig. 4-33)

* If the Stop Solenoid does not operate correctly, the unit can not be placed into the STOP mode when automatic stop takes place, and the Tape may be damaged. Therefore, the Stop Solenoid must be precisely adjusted.

1. Turn the Power Switch "OFF".
2. Remove the Cassette Guide. (See Item "(2) Removal of Casette Guide," Paragraph "2. Preparations for Adjustment".) ☞ Page 44
3. Turn the Power Switch "OFF", load a Cassette Tape, and carry out the loading operation.
4. With the Plunger of the Stop Solenoid pulled all the way in the direction of the arrow (by pressing "A" with your finger), press any Button other than the STOP and the PAUSE Button, and make sure that the Button will not be locked.
5. Remove your finger from the Plunger of Stop Solenoid, and make sure that the Plunger returns smoothly to the original position without binding.
6. If the binding is noticed, loosen the two Screws (a), and adjust the position of the Stop Solenoid so that the binding of the Plunger can be eliminated.
7. After the adjustment is completed, reinstall the Cassette Guide.

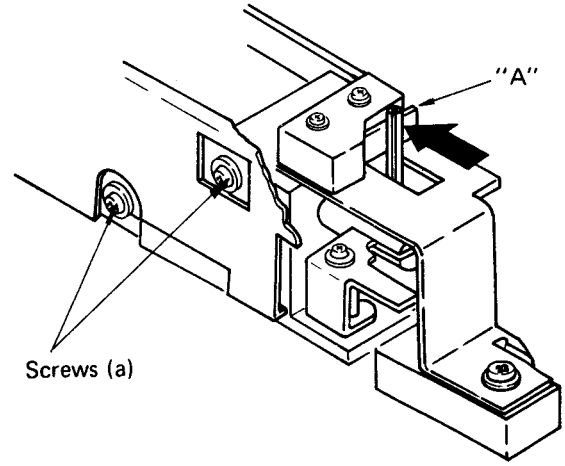


Fig. 4-33

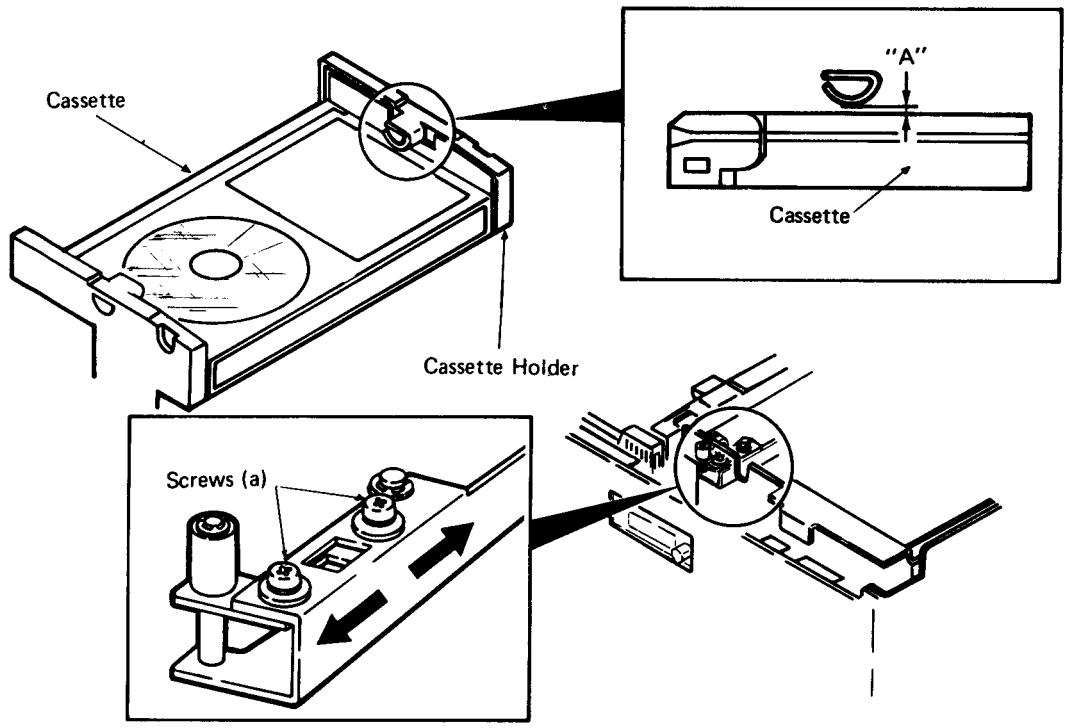


Fig. 4-34

(5) Cassette Holder Height (See Fig. 4-34)

1. Disassemble the Cassette Cover Assembly by removing the two screws.
2. Load a cassette tape, lightly press the top of the cassette tape at a top over the take-up reel and make sure that no spacing ("A" in the illustration) can be noted between the cassette top and an ear of the Cassette Holder.
3. If a spacing is noted, loosen the two Screws (a) and adjust positioning of the Bracket in such a manner as the spacing will be reduced to a null, pressing the cassette tape.
   Tighten the Screws after adjustment.

(6) Operation Check of the Push-button Mechanism

* The Push-button Mechanism is the most important mechanism that controls all the operation modes of the unit, and must be examined to assure the normal operation.

1. Turn the Power Switch "ON".
2. Load a Cassette Tape and start the loading operation.
3. Make sure that the EJECT Button is locked when it is pressed down, and also it is released when the Cassette is lifted up after the unloading operation.
4. Make sure that, when the PLAY Button is depressed after completion of the loading operation, the PLAY Button is locked, and the operation is changed into the PLAY mode to start taking up the Tape. Also, make sure that, in this state, both the PAUSE Button and the REC Button are locked when they are pressed down, and all the Buttons are released when the STOP Button is pressed.
5. Make sure that the F. FWD Button is locked when it is pressed down, and the operation is changed into the F. FWD mode to start taking up the Tape.
6. Make sure that the REW Button is locked when it is pressed down, and the operation is changed into the REW mode to start taking up the Tape.
7. Make sure the following operations:

a) When the REC Button is pressed down, the REC Button is locked, and the AC Motor, Capstan, and the Video Head Disc start to rotate.

b) When, in this state, the PLAY Button is pressed, the REC Button is released.

c) Both the REC and PLAY Buttons are locked when they are pressed down simultaneously.

d) When you press the REC Button and then the PAUSE Button the PAUSE Button is locked.

e) All the Buttons are released when you press the STOP Button.

(7) Solenoid Load (See Fig. 4-35)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Cover. (See Item "(1) Removal of Cassette Cover," Paragraph "2. Preparations for Adjustment.") ☞ Page 44
3. Turn the Power Switch "ON", and press the Cassette Switch Actuator to start the loading operation. Then, turn the Power Switch "OFF".
4. Press the PLAY Button and then the PAUSE Button. Then, press and lock the REC Button while pressing the Erasure Prevention Slide.
5. Make sure, by pressing the measurement point (the "A" portion) with the Tension Gauge (VJ-0020), that all of the REC, PLAY, and the PAUSE Buttons can be released at a tension less than 850g.
6. If the measured tension is not within the above limit, then adjust the Stop Solenoid. (See Item "(4) Stop Solenoid" on Page 61.)
7. Start unloading by pressing the EJECT Button. After unloading is finished, reinstall the Cassette Cover.

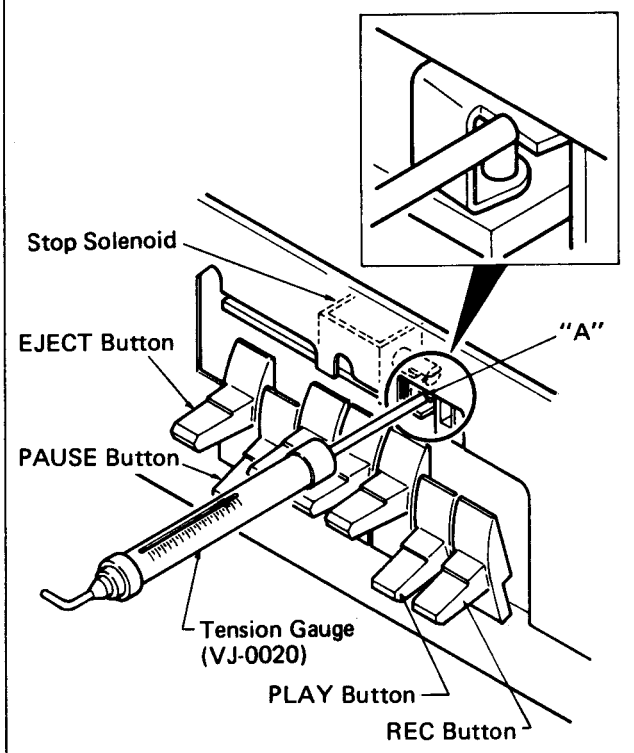


Fig. 4-35

(8) Braking Force (Supply Reel)
[Measurement using Torque Meter] (See Fig. 4-36)

1. Turn the Power Switch "ON". Press the EJECT Button to start unloading. Then, turn the Power Switch "OFF".
2. Remove the Cassette Cover. (See Item "(1) Removal of Cassette Cover." Paragraph "2. Preparations for Adjustment.")
3. Attach the Torque Meter (VJ-0010) to the Supply Reel, and measure the braking force while rotating the Torque Meter in the direction of the arrow. Make sure that the torque is within the range of 100g cm ± 20g cm.
4. If the measured braking force is not within the above range, then adjust the each position of the Supply Reel Brake and the Loading Brake. Replace the Brakes with new ones if necessary. (See Item "(23) Reel Brakes (Loading Brake and Supply Reel Brake)" on Page 57.)
5. After the adjustment is completed, reinstall the Cassette Cover.

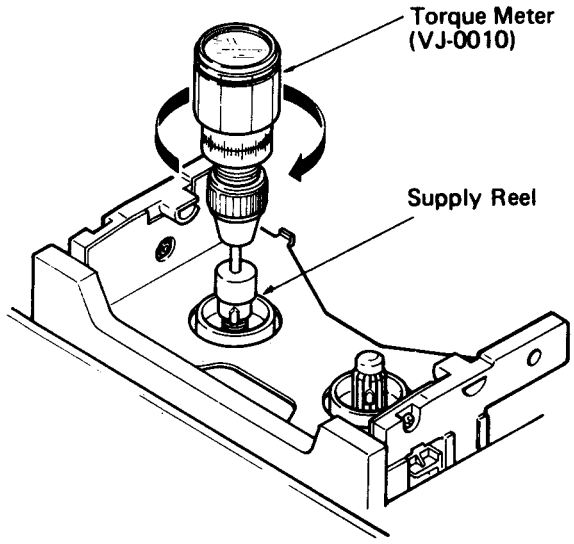


Fig. 4-36

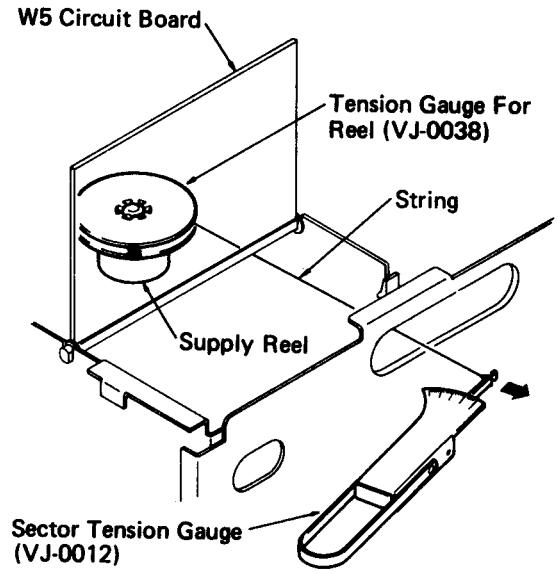


Fig. 4-37

[Measurement using Tension Gauge for Reel and Sector Tension Gauge] (See Fig. 4-37)

1. Turn the Power Switch "ON", and press the EJECT Button to start unloading. Then, turn the Power Switch "OFF".
2. Remove the Cassette Holder Assembly.
3. Turn the Power Switch "ON", press the Cassette Switch Actuator to make the Loading Ring rotate. Turn the Power Switch "OFF" when it has rotated about a quarter turn.
4. Unfasten the two locks fixing the circuit board W5, and open up the Circuit Board W5.
5. Attach the Tension Gauge for Reel (VJ-0038) to the Supply Reel. Put the string on the Sector Tension Gauge (VJ-0012), and drive the Supply Reel by pulling the string in the direction of the arrow. Measure the tension when the Supply Reel starts to rotate, and make sure that it is within the range of 5g ± 2g.
6. If the measured tension is still outside the range, then replace the Loading Brake with a new one. (See Item "(23) Reel Brakes (Loading Brake and Supply Reel Brake)" on Page 57.)
7. After the adjustment is completed, reinstall the Cassette Holder Assembly.

(9) Braking Force (Loading Back-tension)

[Measurement using Torque Meter] (See Fig. 4-38)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Cover. (See Item "(1) Removal of Cassette Cover" on Page 44.)
3. Turn the Power Switch "ON".
4. Drive the Loading Ring by pressing the Cassette Switch Actuator, and turn the Power Switch "OFF" when it has rotated about a quarter turn.
5. Attach the Torque Meter (VJ-0010) to the Supply Reel, and measure the torque by rotating it in the direction indicated by the arrow. Make sure that the measured torque is within the range of 20g cm ± 5g cm.

6. If, after the above adjustment, the measured torque is still outside the range, then replace the Loading Brake with a new one. (See Item "(23) Reel Brakes (Loading Brake and Supply Reel Brake)" on Page 57.)
7. After the adjustment is completed, reinstall the Cassette Cover.

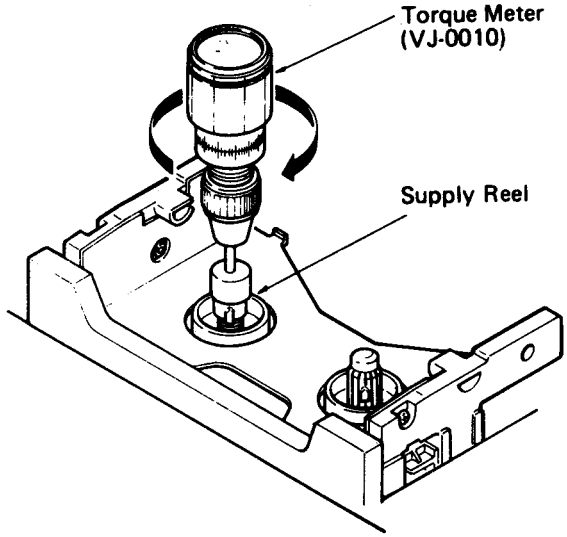


Fig. 4-38

[Measurement using Tension Gauge for Reel and Sector Tension Gauge] (See Fig. 4-39)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Holder Assembly.
3. Unfasten the two locks fixing the Circuit Board W5, and open up the Circuit Board W5.
4. Attach the Tension Gauge for Reel (VJ-0038) to the Supply Reel. Put .the string on the Sector Tension Gauge (VJ-0012), and drive the Supply Reel by pulling the string in the direction of the arrow. Measure the tension when the Supply Rel starts to rotate, and make sure that it is within the range of 40g ±10g.
5. If the measured tension is not within the above value, then replace the Supply Reel Brake with a new one. (See Item "(23) Reel Brakes (Loading Brake and Supply Reel Brake)" on Page 57.)
6. After the adjustment is completed, reinstall the Cassette Holder Assembly.

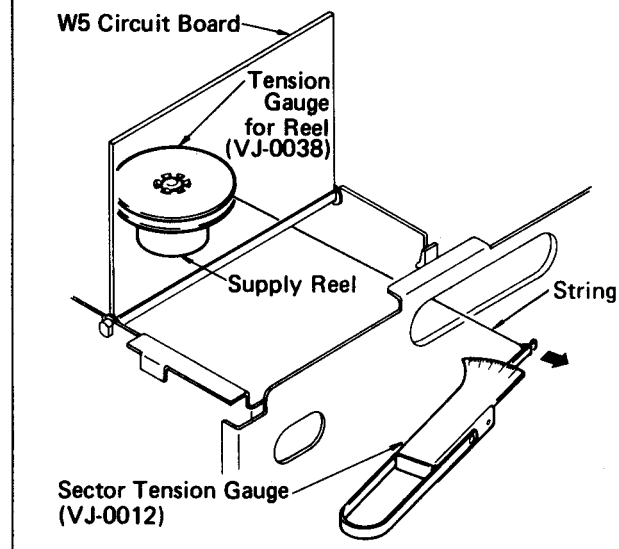


Fig. 4-39

(10) Take-up Torque (See Fig. 4-40)

[Measurement using Torque Meter]

1. Turn the Power Switch "OFF".
2. Remove the Cassette Cover.
3. Turn the Power Switch "ON", and start loading by pressing the Cassette Switch Actuator.
4. Place the Torque Meter (VJ-0010) on the Take-up Reel, press the PLAY Button, and measure the torque with the Toruqe Meter while pressing the Cassette Switch Actuator. Make sure that the measured torque is within the range of 100 g-cm ± 20 g-cm.

5. If the measured torque is not within the above range, then replace the FWD Roller Assembly with a new one. (See Item "(8) FWD Roller," Paragraph "5. Maintenance, Checking, or/and Replacement.") ☞ Page 48
6. After the adjustment is completed, reinstall the Cassette Cover.

* In the PLAY mode, the Tape is fed by the Supply Reel and taken up by the Take-up Reel. However, if the take-up torque of the Take-up Reel is not large enough, the Tape will not be taken up completely, thus resulting in tape slacking. On the other hand, if the take-up torque is excessively large, abnormal tension will be applied to the Tape to cause tape stretching. Therefore, the take-up torque must be precisely examined.

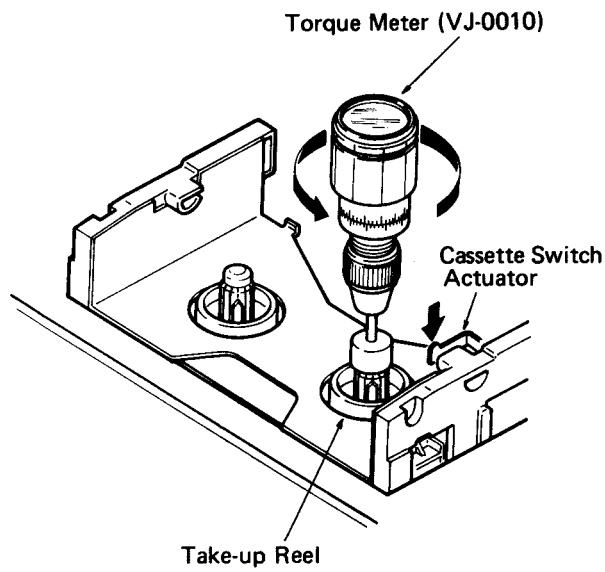


Fig. 4-40

[Measurement using Tension Gauge for Reel and Sector Tension Gauge] (See Fig. 4-41)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Holder Assembly.
3. Turn the Power Switch "ON", and press the Cassette Switch Actuator to start loading.
4. Unfasten the two locks fixing the Circuit Board W5, and open up the Circuit Board W5.
5. Place the Tension Gauge for Reel (VJ-0038) on the Take-up Reel. Put the string on the Sector Tension Gauge (VJ-0012).
6. Press the PLAY Button while pressing the Cassette Switch Actuator, and measure the tension when the Take-up Reel is in the slip condition. Make sure that the measured tension is within the range of 40 g ± 10 g.
7. If the measured tension is not within the above range, then replace the FWD Roller Assembly with a new one. (See Item "(8) FWD Roller" on Page 48.)
8. Reinstall the Cassette Holder Assembly.

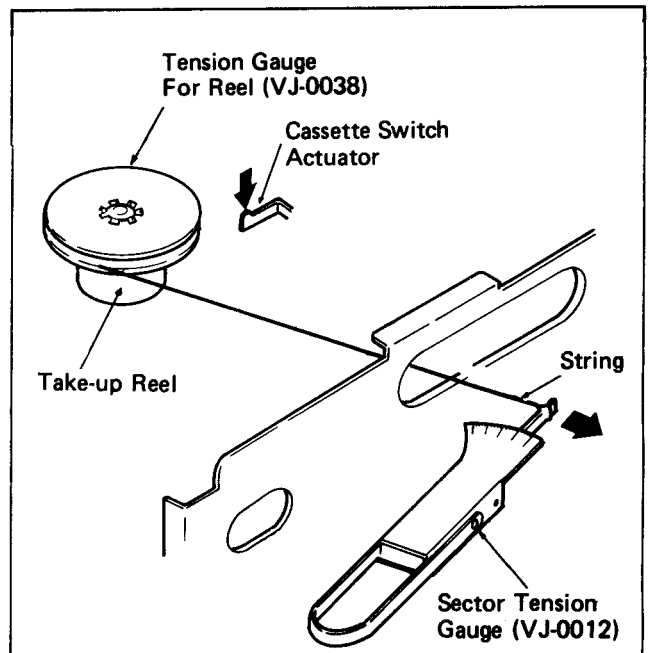


Fig. 4-41

(11) F.FWD and REW Torques

In the F. FWD or REW mode, the tape fed by the Supply Reel or the Take-up Reel is taken up by the other Reel. However, if the take-up torque is not large enough, the Tape will not be taken up completely, thus resulting in tape slacking. On the other hand, if the take-up torque is excessively large, abnormal tension will be applied to the Tape to cause tape stretching.

* **[F. FWD Torque]**

[Measurement using Cassette Torque Meter]
(See Fig. 4-42)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Cover.
3. Turn the Power Switch "ON". Place the Cassette Torque Meter (VJ-0004) as shown. Press the F. FWD Button, and measure the torque with the Cassette Torque Meter. Make sure that the measured torque is greater than 400 g-cm.
4. If the measured torque is less than the above value, then replace the F. FWD Roller Assembly with a new one. (See Item "(7) F. FWD Roller" on Page 47.)

[Measurement using Reel Tension Gauge and Sector Tension Gauge] (See Fig. 4-43)

1. Turn the Power Switch "OFF"
2. Remove the Cassette Holder Assembly.
3. Turn the Power Switch "OFF" and start the loading operation by pressing the Cassette Switch Actuator.
4. Unfasten the two locks fixing the circuit board W5, and open up the Circuit Board W5.
5. Place the Tension Gauge for Reel (VJ-0038) on the Take-up Reel, and put the string on the Sector Tension Gauge (VJ-0014) as shown in Fig. 4-43.
6. Press the F. FWD Button by pressing the Cassette Switch Actuator. Measure the tension when the Take-up Reel is in the slipping condition. Make sure that the measured tension is within the range from 240 g to 340 g.
7. If the measured tension is not within the above range, then replace the F. FWD Roller Assembly with a new one. (See Item "(7) F. FWD Roller" on Page 47.)
8. Reinstall the Cassette Holder Assembly.

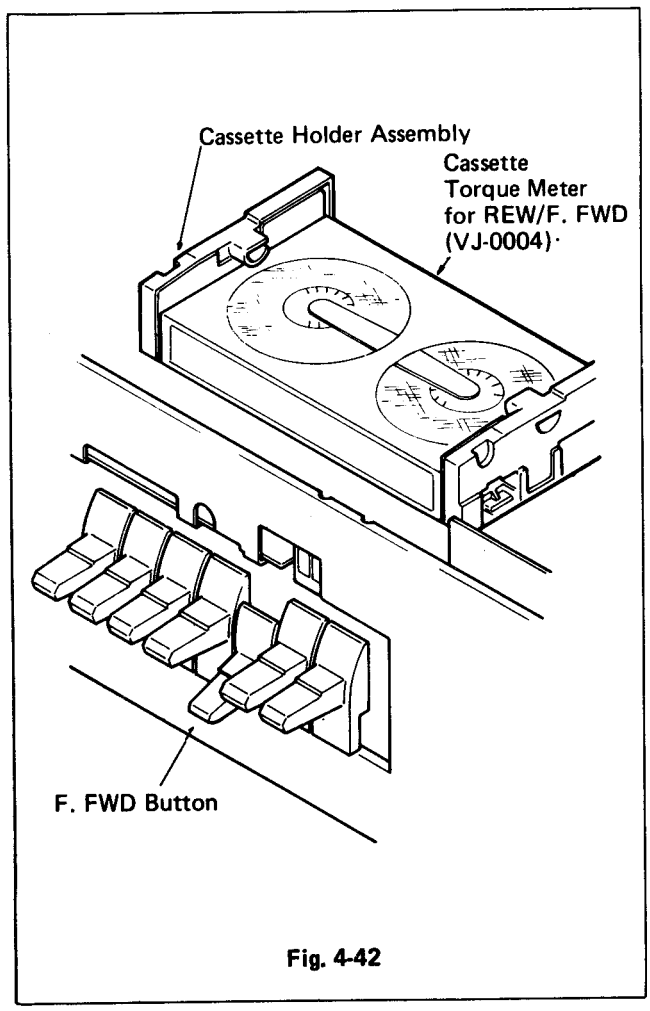


Fig. 4-42

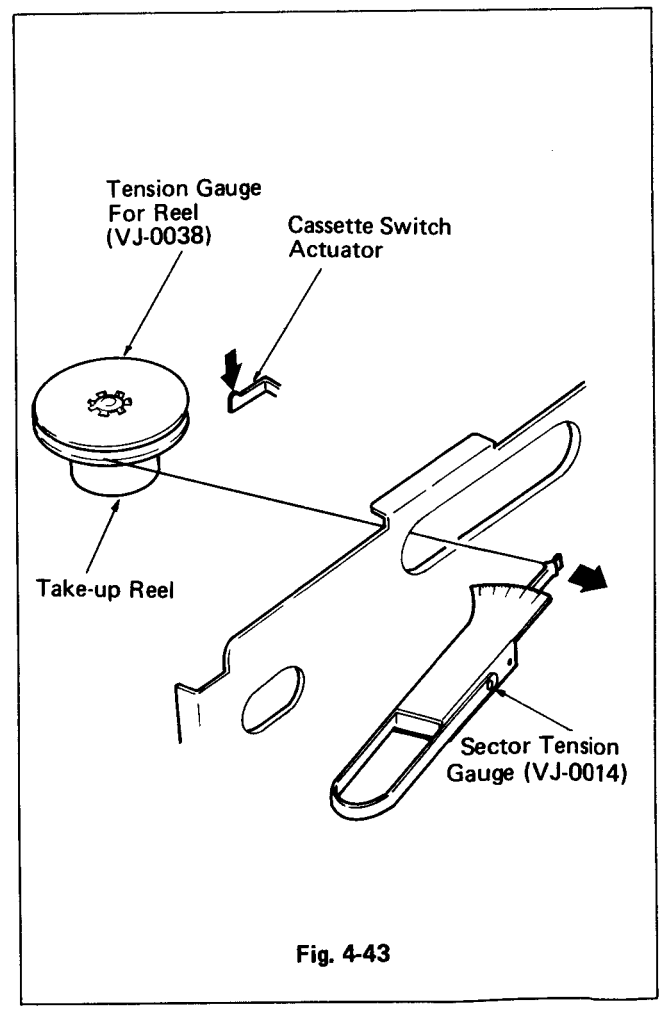


Fig. 4-43

* [REW Torque]

[Measurement using Cassette Torque Meter]
(See Fig. 4-44)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Cover. (See Item "(1) Removal of Casette Cover," Paragraph "2. Preparations for Adjustment.") ☞ Page 44
3. Turn the Power Switch "ON". Place the Cassette Torque Meter (VJ-0004), as shown in Fig. 4-44. Press the REW Button, and measure the torque with the Cassette Torque Meter. Make sure that the measured torque is greater than 500 g-cm.
4. If the measured torque is less than the above value, then replace the REW Idler Assembly with a new one. (See Item "(9) REW Idler.. on Page 48.)
5. Reinstall the Cassette Cover.

[Measurement using Reel Tension Gauge and Sector Tension Gauge] (See Fig. 4-45)

1. Turn the Power Switch "OFF".
2. Remove the Cassette Holder Assembly.
3. Turn the Power Switch "ON", and start the loading operation by pressing the Cassette Switch Actuator.
4. Unfasten the two locks fixing the Circuit Board W5, and open up the Circuit Board W5.
5. Place the Tension Gauge for Reel (VJ-0038) on the Supply Reel, and put the string on the Sector Tension Guage (VJ-0014) as shown in Fig. 4-45.
6. Press the REW Button while pressing the Cassette Switch Actuator, and measure the tension when the Supply Reel is in the slipping condition. Make sure that the measured tension is greater than 300 g.
7. If the measured tension is less than the above value, then replace the REW Idler Assembly with a new one. (See Item "(9) REW Idler" on Page 48.)
8. Reinstall the Cassette Holder Assembly.

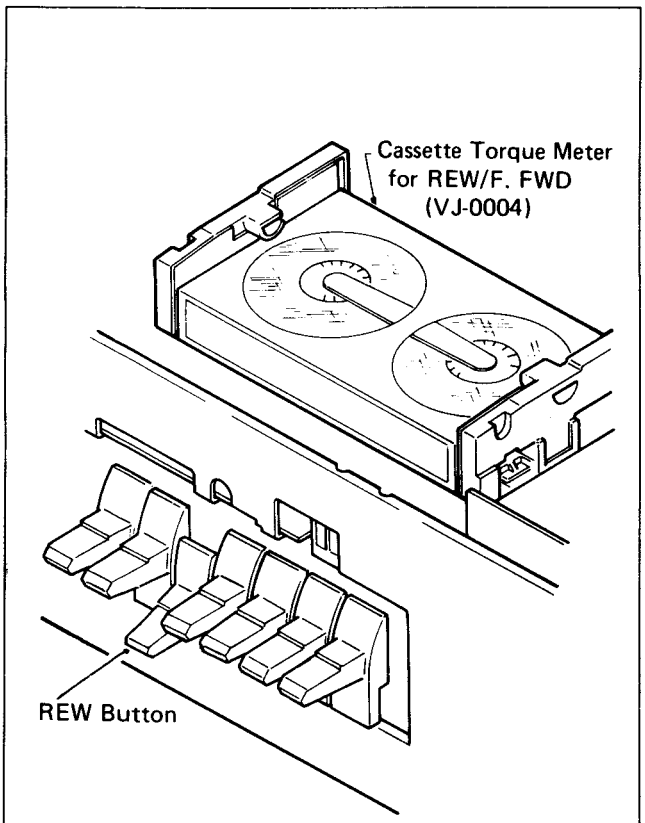


Fig. 4-44

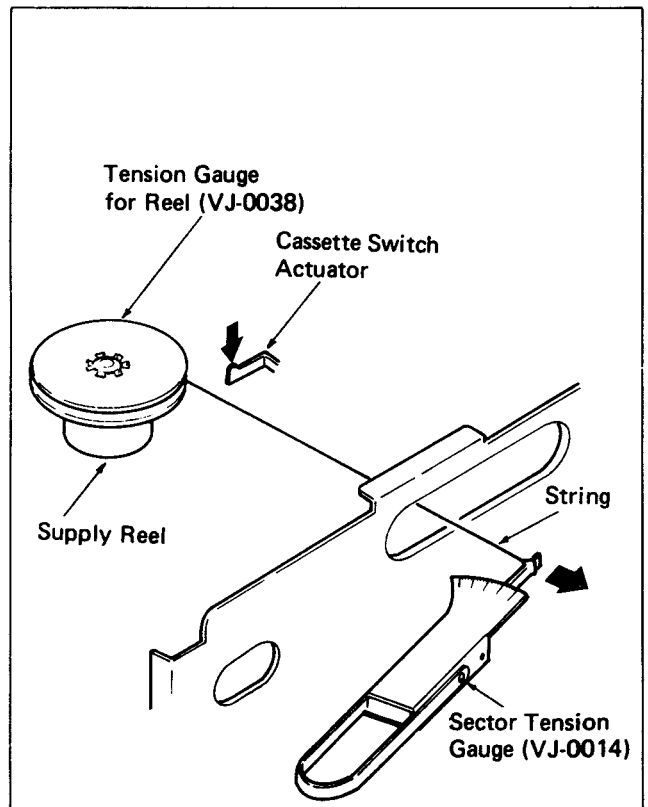


Fig. 4-45

(12) Tape Path (See Fig. 4-46, 4-47 and 4-48)

The position and height of the Tape Guides and Heads have been precisely adjusted in the factory. Since these greatly affect normal tape running, never touch these components unless necessary. If, after replacement of the Drum, etc., an Alignment Tape or a good quality recorded tape can not reproduce a good picture and the trouble can not be eliminated by adjustment of the Tracking Control, then make the following adjustment:

1. Turn the Power Siwtch "ON".
2. Connect a Monitor Television to the VIDEO OUT terminal of the VTR.
3. Connect an Oscilloscope to TP-3 on the Circuit Board W1. Playback an Alignment Tape (VJ-0061) or Tracking Tape (VJ-0080) and observe the waveform (envelope) on the Oscilloscope. Adjust the Tracking Control so that the waveform (envelope) on the oscilloscope has a maximum amplitude.
4. Adjust with the Eccentric Screwdriver (VJ-0017), the Screws (a), (b), (c) and (d) designated in Fig. 4-46. Make sure with the Dentist's Mirror (VJ-0015), that the Tape does not float away from or run into the lead slot of the Drum, or that the Tape does not get crumpled. Slightly bend, using the Jig (VJ-009), the Back-tension Lever to prevent the Tape from getting crumpled only if the tape is crumpled at the input guide when the wave-form (envelope) on the Oscilloscope is flat.

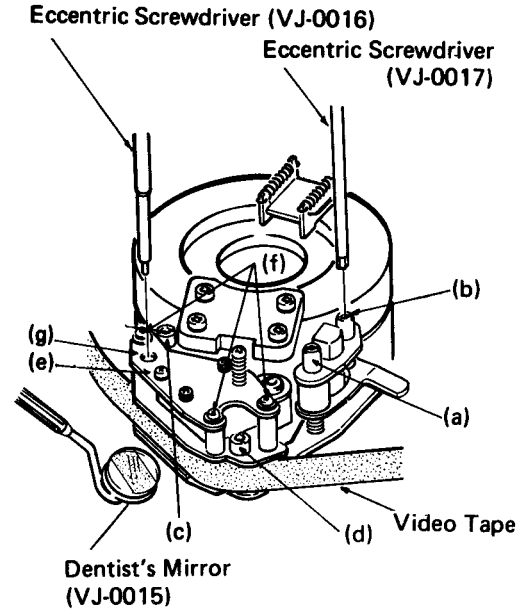


Fig. 4-46

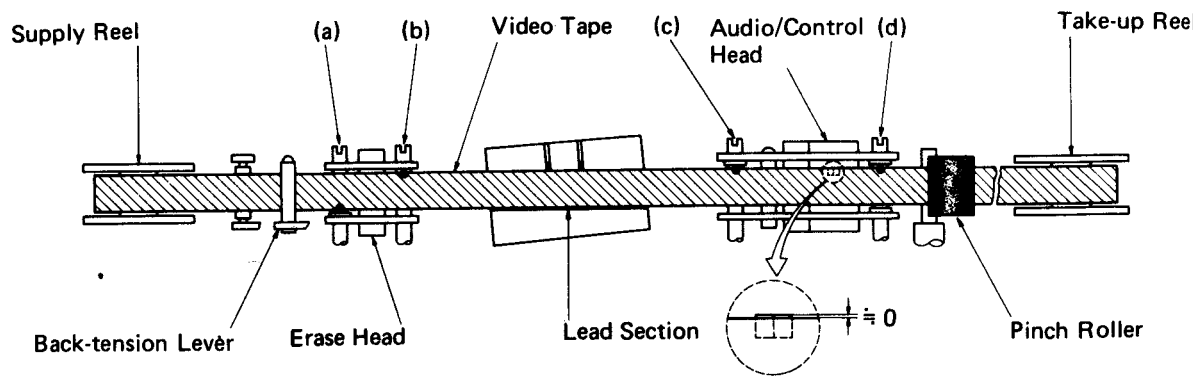
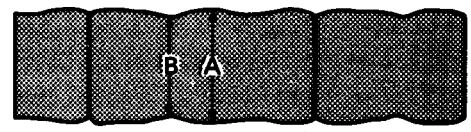
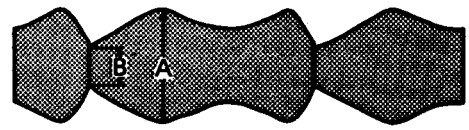


Fig. 4-47

5. Observe the waveform (envelope) on the Oscilloscope.
a. If B $\geqq$ 0.6A as shown in Fig. 4-48, the Video Heads are good.
b. If B $<$ 0.6A as shown in Fig. 4-48, then replace the Video Head Disc with a new one. (See Item "(15) Video Head Disc" on Page 52.)
6. Make sure that the waveform (envelope) on the oscilloscope is nearly flat.
7. Disconnect the Oscilloscope from TP-3, and connect it to the AUDIO OUT Terminal of the VTR.
8. Observe the AUDIO OUT waveform on the Oscilloscope, and adjust (e) to obtain maximum output. (See Fig. 4-46)
9. Disconnect the Oscilloscope from the AUDIO OUT terminal, and connect it to TP-3 on W1 Circuit Board.
10. Set the Tracking Control at the center position.
11. Slightly loosen the three Screws (f). (Do not loosen them too much.) Put the Eccentric Screwdriver (VJ-0016) into (g), and adjust it to obtain maximum waveform (envelope) on the Oscillscope. After the adjustment is completed, fasten the three Screws (f) tightly.
12. Turn the Tracking Control to the right or left, and make sure that the waveform (envelope) on the Oscilloscope symmetrically changes.
13. Operate the unit in the REC and PLAY modes, and make sure that the picture is OK.



B $\geqq$ 0.6A ..... Good



B $<$ 0.6A ..... No Good

Fig. 4-48

PRODUCT SAFETY NOTICE

The components designated by a symbol(⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the Parts List. Do not deviate from the resistance, wattage and voltage ratings shown.

5. PARTS LIST

ACCESSORIES

Ref. No.	Part No.	Description
	143-6-411T-06500	Owner's Manual (for Continent)
	143-6-411T-06700	Owner's Manual (for England)
	143-6-411T-06800	Owner's Manual (for Australia)
	143-6-252T-01100	Dust Cover
	143-6-451T-04200	Operating Instructions
	4-243V-33100	Antenna Output Cable
	143-6-322T-25350	Polyethylene Cover, 250 x 350 x 0.05 mm

PACKING MATERIALS

Ref. No.	Part No.	Description
	143-6-132T-00400	Individual Carton (for Continent)
	143-6-132T-04700	Individual Carton (for England)
	143-6-132T-05000	Individual Carton (for Australia)
	143-6-144T-01501	Top Pad, Right Side
	143-6-144T-01601	Top Pad, Left Side
	143-6-144T-01701	Bottom Pad, Right Side
	143-6-144T-01801	Bottom Pad, Left Side
	143-6-251T-01200	Individual Form-polyethylene Cover

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

2. In Continental Market, Owner's Manuals of the following laguages are available on request:

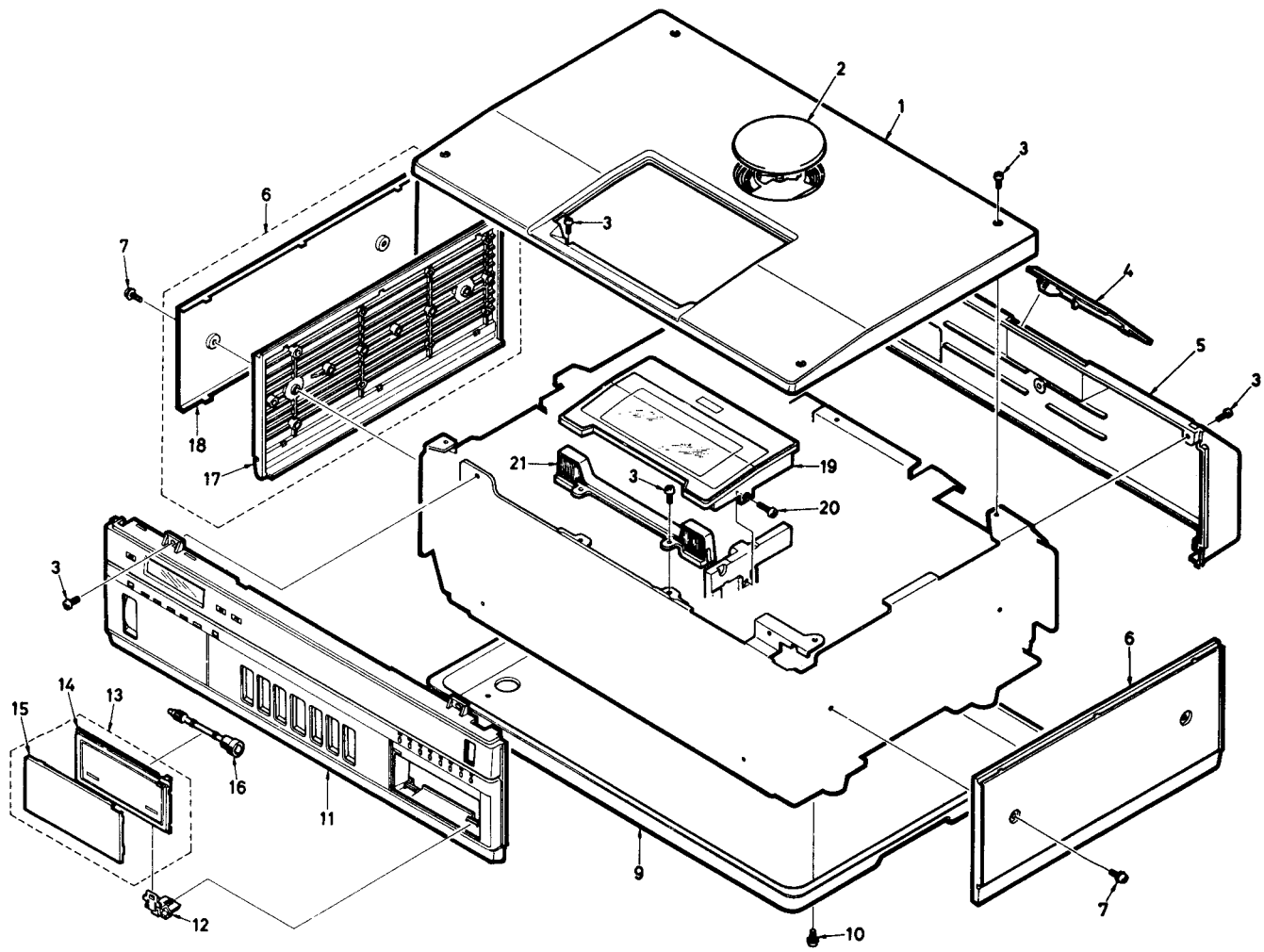
143-6-411T-06500 Owner's Manual, German
143-6-411T-06501 Owner's Manual, English
143-6-411T-06502 Owner's Manual, Dutch
143-6-411T-06503 Owners Manual, Swedish
143-6-411T-06504 Owner's Manual, French

CABINET PARTS

Ref. No.	Part No.	Description
1	143-2-124T-02500	Top Lid (for Continent)
1	143-2-124T-03000	Top Lid (for England/Australia)
2	143-2-135T-06500	Circular Lid
3		Screw, Bind Hd. Machine, 3 x 8 mm, B1
4	143-2-133T-00200	RF Cover
5	143-2-126T-01500	Back Panel
6	143-0-123T-00900	Side Panel Assembly
7		Screw with Lock Washer (External Tooth), Bind Hd. Machine, 4 x 10 mm, B1
9	143-2-125T-01003	Bottom Lid
10		Screw with Lock Washer (External Tooth), Bind Hd. Machine, 4 x 8 mm, B1

Ref. No.	Part No.	Description
11	143-9-4200-12400	Front Panel
12	143-2-251T-00600	Hinge
13	143-9-4200-12500	Tuning Panel Assembly, Channel Pre-set
14	143-2-135T-06400	Marking Plate, Tuning Panel
15	143-2-129T-00700	Tuning Panel
16	143-2-566T-00100	Driver, Channel Pre-set
17	143-2-123T-02602	Side Panel
18	143-2-129T-00800	Side Plate
19	143-0-135T-01200	Cover, Cassette
20		Screw, Bind Hd. Machine, 3 x 12 mm
21	143-2-241T-00603	Cassette Guide

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

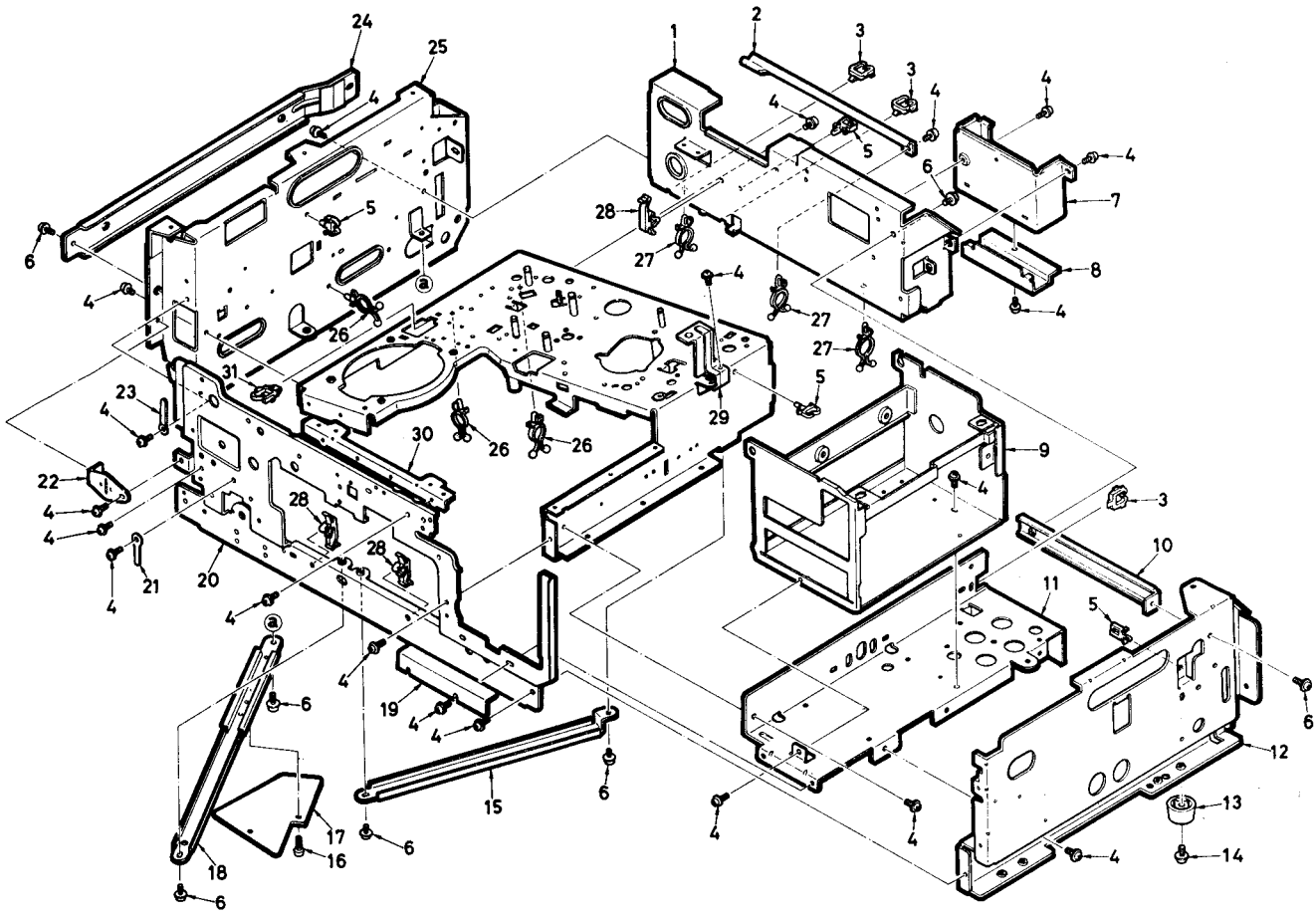


FRAME PARTS

Ref. No.	Part No.	Description
1	143-0-312T-00501	Rear Frame
2	143-2-367T-02000	Bracket, Terminal Board
3	143-2-464T-01900	Wire Protector
4		Screw, Washer Hd. Machine (TP Screw), 3 x 6 mm, Z1
5	143-2-464T-02400	Wire Clamper, Square Middle Type
6		Screw with Spring & Flange Washer, Pan Hd. Machine, 4 x 8 mm, Z1
7	143-2-181T-00800	RF Case
8	143-2-351T-30300	Bracket, RF Converter Socket
9	143-0-312T-01100	Tuner Box
10	143-2-351T-29001	Reinforcement Bracket, Right Frame
11	143-0-312T-01200	Frame, Power Transformer
12	143-0-312T-01300	Right Frame
13	111-2-1730-10800	Foot (4 used)
14		Screw with Bolt Washer, Pan Hd. Machine, 3 x 10 mm, Z1

Ref. No.	Part No.	Description
15	143-2-316T-00501	Reinforcement Bracket, Right
16		Screw, Bind Hd. Tapping, 3 x 6 mm, Z1
17	143-2-322T-07300	Shield Plate
18	143-2-316T-00600	Reinforcement Bracket, Left
19	143-2-135T-07200	Decorative Sheet
20	143-0-312T-01400	Front Frame
21	123-2-472R-00600	Lug, Wire Holder
22	143-2-365T-06902	Bracket, Power ON/OFF Switch
23	141-2-472T-01001	Wire Clamp
24	143-2-351T-28151	Protection Bracket
25	143-0-312T-01000	Left Frame
26	143-2-464T-03100	Wire Clamper, Round Middle Type
27	143-2-464T-02300	Wire Clamper, Round Large Type
28	143-2-464T-04300	Wire Holder
29	143-2-315T-01401	Reinforcement, Cabinet Top
30	143-2-224T-00301	Bracket, Cassette Guide
31	143-2-464T-03200	Wire Protecter

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

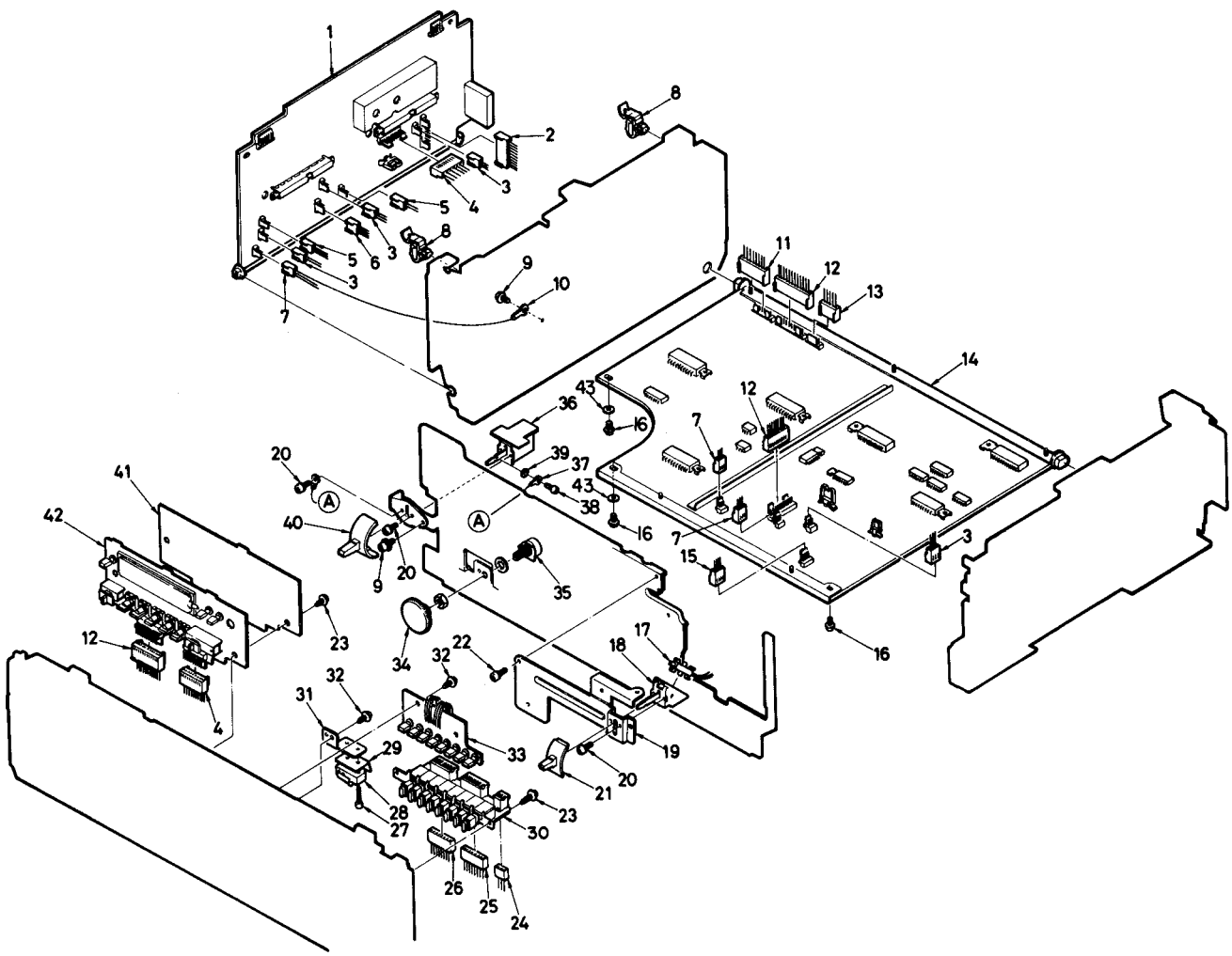


FRONT CONTROL PARTS

Ref. No.	Part No.	Description
1	143-9-0100-01000	W1 Circuit Board Assembly
2	4-236V-19012	Connector, Female 12-pin (Black)
3	4-236V-18803	Connector, Female 3-pin (Natural)
4	4-236V-18810	Connector, Female 10-pin (Natural)
5	4-236V-19003	Connector, Female 3-pin (Black)
6	4-236V-18904	Connector, Female 4-pin (Red)
7	4-236V-18903	Connector, Female 3-pin (Red)
8	143-2-377T-03900	Stopper, W1 Circuit Board Assembly
9		Screw, Washer Hd. Machine (TP Screw), 3 x 6 mm, Z1
10	123-2-472R-00400	Lug, Grounding
11	4-236V-18808	Connector, Female 8-pin (Natural)
12	4-236V-18812	Connector, Female 12-pin (Natural)
13	4-236V-19005	Connector, Female 5-pin (Black)
14	143-9-0200-01600	W2 Circuit Board Assembly
15	4-236V-19004	Connector, Female 4-pin (Black)
16		Screw, Washer Hd. Machine (TP Screw)
17	143-2-253T-04200	Cable, VIDEO/ANT Select
18	4-231V-92000	Lever, VIDEO/ANT Select
19	143-2-365T-07200	Bracket, VIDEO/ANT Select Lever
20		Screw with Spring Washer, Pan Hd. Machine, 3 x 6 mm, Z1
21	143-9-4300-16800	Lever Knob, VIDEO/ANT Select
22		Screw, Pan Hd. Machine, 3 x 6 mm, Z1
23		Screw, Washer Hd. Tapping (B-tight), 3 x 8 mm, Z1

Ref. No.	Part No.	Description
24	4-236V-18503	Connector, Female 3-pin (Natural)
25	4-236V-18608	Connector, Female 8-pin (Natural)
26	4-236V-18608	Connector, Female 8-pin (Natural)
27		Screw, Pan Hd. Machine, 2.3 x 8 mm, Z1
28	4-231T-11903	Micro Switch, AFT ON/OFF
29	143-2-246T-01200	Insulation Sheet, Micro Switch
30	143-9-1400-00500	W14 Circuit Board Assembly, Pre-set
31	143-2-365T-07300	Bracket, Switch
32		Screw, Washer Hd. Tapping (B-tight), 3 x 6 mm, Z1
33	143-9-1500-00300	W15 Circuit Board Assembly, Channel Indicator
34	143-2-163T-01501	Rotaly Knob, Tracking Control
35	4-222V-61800	Variable Resistor (Tracking Control)
36	143-9-1900-00600	W19 Circuit Board Assembly, Power ON/OFF Switch
37	4-243V-52300	Grounding Wire
38		Screw, Pan Hd. Machine, 2 x 4 mm, Z1
39		Lock Washer, 2 mm (External Tooth)
40	143-2-162T-01900	Knob, Power ON/OFF
41	143-2-327T-01800	Insulator, W20 Circuit Board
42	143-9-2000-00600	W20 Circuit Board Assembly, Timer (for Continent and England)
42	143-9-2000-00601	W20 Circuit Board Assembly, Timer (for Australia only)
43		Fiber Washer, 3 x 10 x 1 mm

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

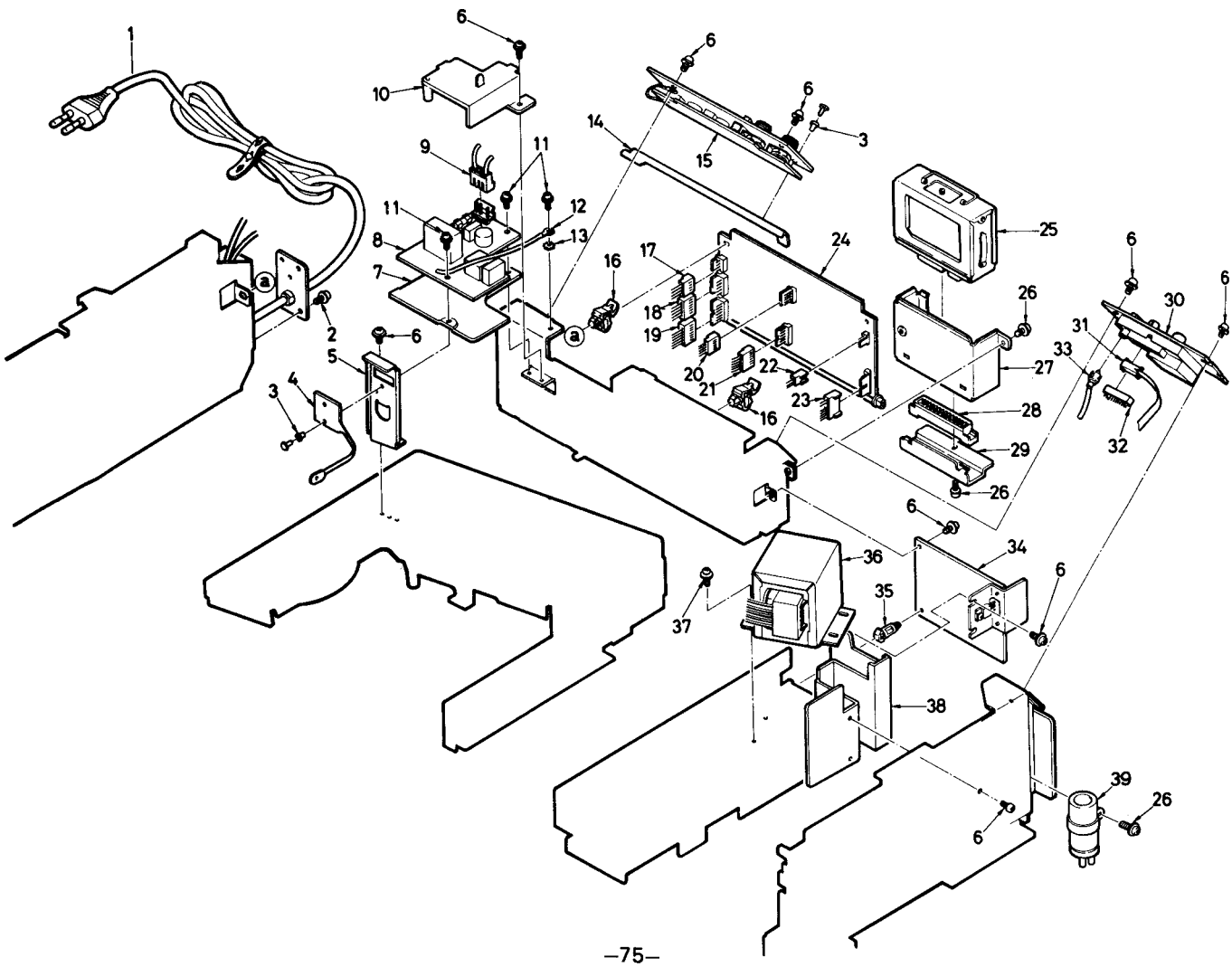


REAR TERMINAL PARTS

Ref. No.	Part No.	Description
1	⚠ 143-9-4300-16600	Power Cord with Fixer & Bracket (for Continent)
1	⚠ 143-9-4300-19500	Power Cord with Fixer & Bracket (for England)
1	⚠ 143-9-4300-19400	Power Cord with Fixer & Bracket (for Australia)
2		Screw, Binding Hd. Machine, 3 x 8 mm, B1
3	143-2-464T-01800	Plastic Pin
4	4-226V-28200	W10 Printed Wire
5	143-2-351T-26902	Bracket, W10 Printed Wire
6		Screw, Washer Hd. Machine (TP Screw), 3 x 8 mm, Z1
7	143-2-246T-00402	Insulation Sheet, W7 Circuit Board
8	143-9-0700-01300	W7 Circuit Board Assembly
9	4-236V-18703	Connector, Female 3-pin
10	143-2-135T-06900	Insulation Cover, W7 Circuit Board
11		Screw with Spring & Flange Washer, Pan Hd. Machine, 3 x 10 mm, Z1
12	4-243V-52000	Groudning Lug with Lead Wire
13		Lock Washer, 3mm (External Tooth)
14	143-2-367T-02000	Bracket, Terminal Board
15	143-9-4300-16700	Terminal Board, with W8 Circuit Board Assembly
16	143-2-377T-03900	Stopper, W4 Circuit Board
17	4-236V-18804	Connector, Female 4-pin (Natural)

Ref. No.	Part No.	Description
18	4-236V-18805	Connector, Female 5-pin (Natural)
19	4-236V-18807	Connector, Female 7-pin (Natural)
20	4-236V-19005	Connector, Female 5-pin (Black)
21	4-236V-18806	Connector, Female 6-pin (Natural)
22	4-236V-18803	Connector, Female 3-pin (Natural)
23	4-236V-18808	Connector, Female 8-pin (Natural)
24	143-9-0400-01000	W4 Circuit Board Assembly, System Control
25	143-9-4100-08400	RF Converter
26		Screw, Washer Hd. Machine (TP Screw), 3 x 6 mm, Z1
27	143-2-181T-00800	RF Case
28	4-235V-20200	RF Socket
29	143-2-351T-30300	Bracket, RF Socket
30	4-237V-12200	ANT Terminal Board
31	143-2-253T-04200	Cable, VIDEO/ANT Select
32	143-9-2500-00100	W25 Circuit Board Assembly, RF Select
33	143-0-236V-01900	RCA Pin Connector, with Lead Wire
34	143-9-0300-01300	W3 Circuit Board Assembly, DC Power Supply
35	143-2-464T-02101	Fixer, W3 Circuit Board
36	⚠ 4-251V-16501	Power Transformer
37		Screw with Spring & Flange Washer, Pan Hd. Machine, 4 x 10 mm, Z1
38	143-2-368T-02900	Heat Sink
39	⚠ 4-223V-16200	Electrolytic Capacitor, 10000 mfd. 25V

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

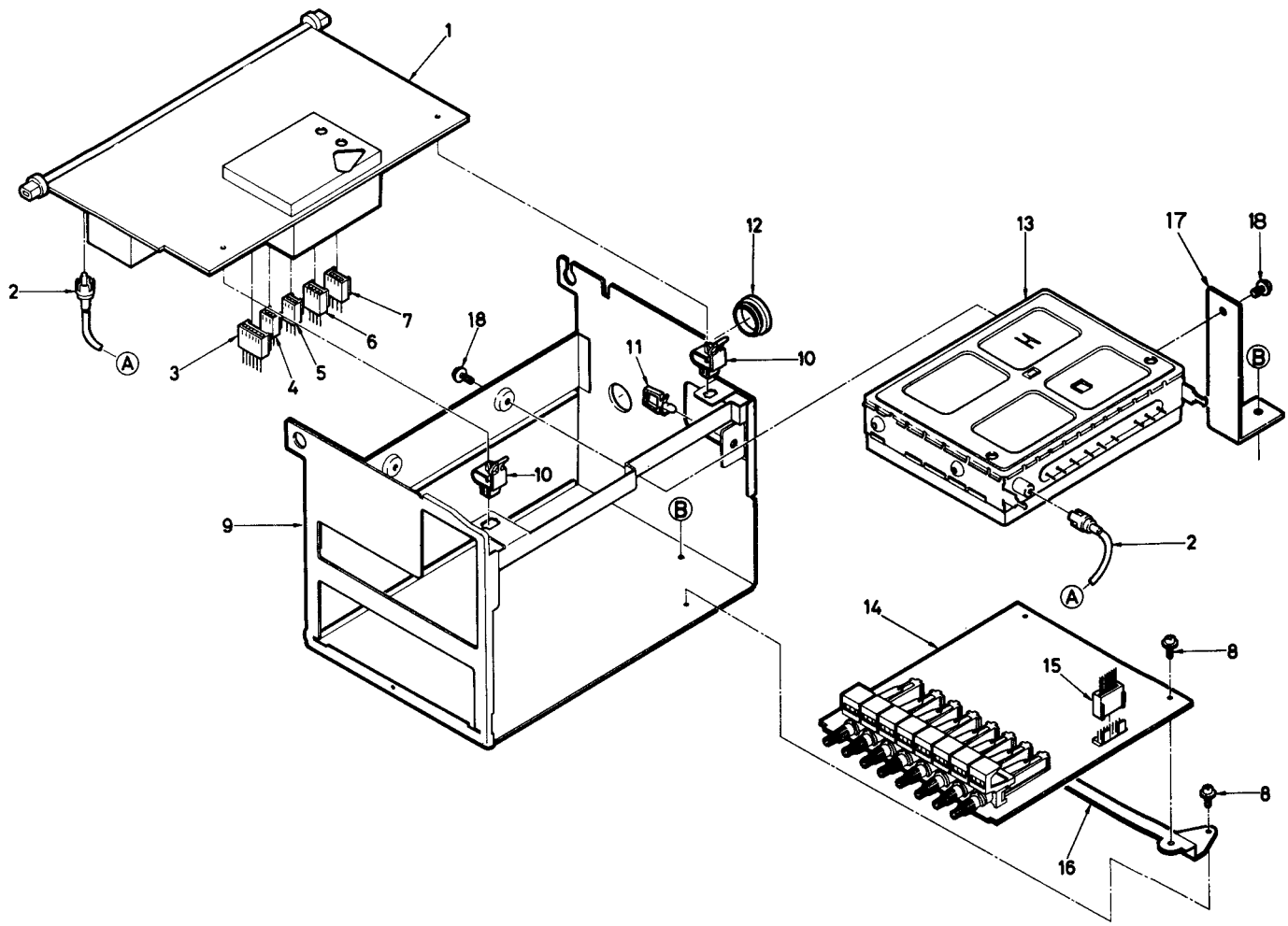


TUNER BLOCK PARTS

Ref. No.	Part No.	Description
1	143-9-0500-01000	W5 Circuit Board Assembly, Tuner (for Continent)
1	143-9-0500-01300	W5 Circuit Board Assembly, Tuner (for England)
1	143-9-0500-01200	W5 Circuit Board Assembly, Tuner (for Australia)
2	143-0-236V-07800	Coaxial Cable, with RCA-RCA Pin
3	4-236V-18806	Connector, Female 6-pin (Natural)
4	4-236V-18903	Connector, Female 3-pin (Red)
5	4-236V-19003	Connector, Female 3-pin (Black)
6	4-236V-18904	Connector, Female 4-pin (Red)
7	4-236V-18804	Connector, Female 4-pin (Natural)
8		Screw, Washer Hd. Machine (TP Screw), 3 x 6 mm, Z1
9	143-0-312T-01100	Tuner Box
10	143-2-377T-03900	Stopper, W5 Circuit Board

Ref. No.	Part No.	Description
11	143-2-464T-02400	Wire Clamper, Square Middle Type
12	143-2-464T-02900	Wire Protector, Tuner Box
13	4-115V-12000	Tuner (for Continent/England)
13	4-115V-12100	Tuner (for Australia)
14	143-9-1200-00500	W12 Circuit Board Assembly, Pre-set
15	143-0-236V-07700	Connector with Lead Wire, Female 8-pin (Natural)
16	143-2-377T-06100	Bracket, W12 Circuit Board
17	143-2-359T-00200	Reinforcement, Tuner (for Continent/England)
17	143-2-359T-00300	Reinforcement, Tuner (for Australia)
18		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x6 mm, Z1 (for Continent/England)
18		Screw with Spring Washer, Pan Hd. Machine, 3x6 mm, Z1 (for Australia)

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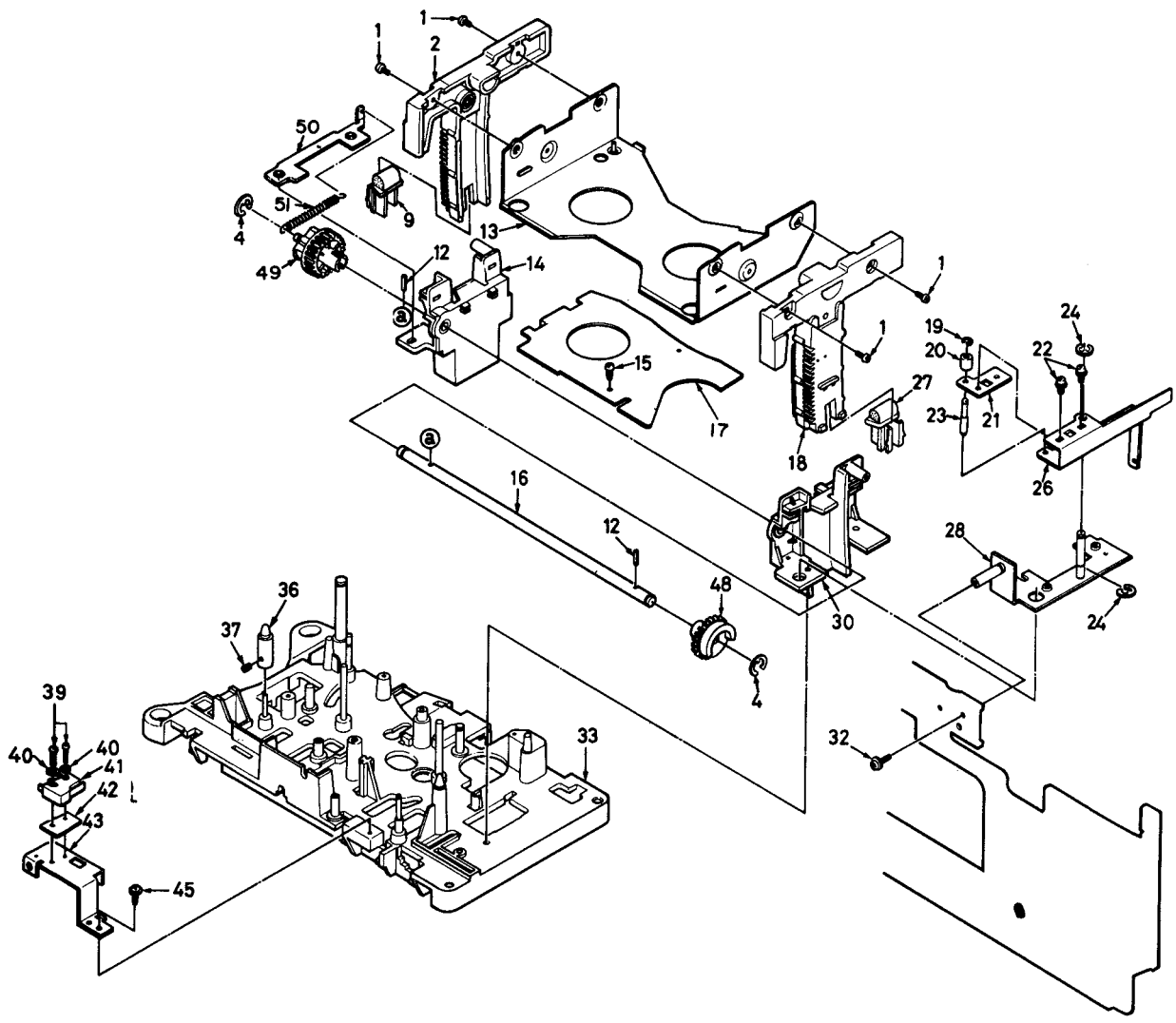


CASSETTE HOLDER MECHANISMS PARTS

Ref. No.	Part No.	Description
1		Screw, Bind Hd. Machine, 3 x 6 mm, B1
2	143-2-823T-01302	Cassette Holder Stand, Left Side
4		"E" Ring, 5 mm
9	143-0-465T-00301	Stopper with Cushion, Left Stand
12		Spring Pin, 3 x 10 mm
13	143-0-351T-03704	Cassette Holder
14	143-2-174T-01003	Left Holder, Cassette Holder Stand
15		Screw, Pan Hd. Tapping, 3 x 8 mm, B1
16	143-2-751T-36801	Shaft, Gear
17	143-2-246T-01100	Sheet Cover
18	143-2-823T-01202	Cassette Holder Stand, Right Side
19		"E" Ring, 2 mm
20	143-2-547T-02301	Cassette Lock Sleeve
21	143-2-352T-06600	Cassette Lock Bracket
22		Screw with Spring & Flange Washer, Pan Hd. Machine, 3 x 6 mm, Z1
23	143-2-751T-35201	Shaft, Cassette Lock Sleeve
24		"E" Ring, 4 mm
26	143-2-741T-24300	Cassette Lock Lever
27	143-0-465T-00400	Stopper with Cushion, Right Stand

Ref. No.	Part No.	Description
28	143-0-274T-00300	Bracket, Stand Holder
30	143-2-174T-00902	Right Holder, Cassette Holder Stand
32		Screw, Washer Hd. Machine (TP Screw), 3 x 6 mm, Z1
33	143-2-311T-01706	Reel Chassis
36	143-2-751T-31501	Pin, Cassette Position
37		Set Screw, Hex. Socket Hd. "W" Point, 3 x 6 mm, CP
39		Screw, Pan Hd. Machine, 2 x 10 mm, Z1
40		Washer, 2 x 4.5 x 0.4 mm
41	4-231V-92600	Switch, Solenoid
42	143-2-352T-06000	Switch Spacer
43	143-2-365T-07100	Bracket, Switch
45		Screw, Washer Hd. Tapping (B-tight), 3 x 6 mm, Z1
48	143-2-581T-01700	Cassette-up Gear, Right Side
49	143-2-581T-01800	Cassette-up Gear, Left Side
50	143-2-274T-00401	Bracket, Cassette-up Spring Coil
51	143-2-851T-47700	Spring Coil, Cassette-up

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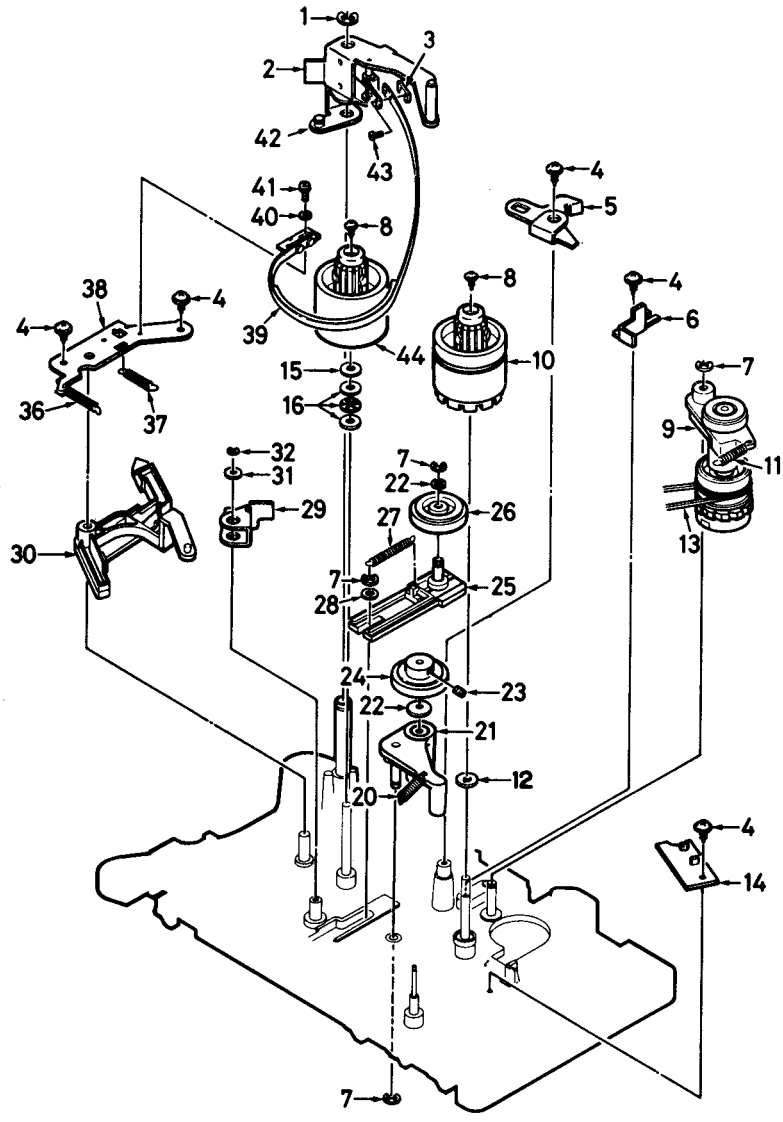


REEL DRIVE MECHANISM PARTS

Ref. No.	Part No.	Description
1		"E" ring, 4 mm
2	143-0-741T-13552	Back Tension Lever
3	143-2-351T-29500	Bracket, Brake Band
4		Screw, Washer Hd. Tapping (B-tight), 3x6mm, Z1
5	143-2-741T-21700	Lever, Unloading Stopper
6	143-2-465T-07900	Unloading Stopper
7		"E" Ring, 3mm
8		Screw, Washer Hd. Machine, 2.6x6 mm, Z1
9	143-0-741T-11101	FWD Roller with Spring Coil
10	143-0-531T-02000	Take-up Reel
11	143-2-851T-42800	Spring Coil, FWD Roller
12	143-2-457T-04300	Special Washer, Take-up Reel Height Adj.
or	143-2-457T-04400	Special Washer, Take-up Reel Height Adj.
or	143-2-457T-04500	Special Washer, Take-up Reel Height Adj.
13	143-2-564T-01301	Square Belt, Drive Belt
14	143-9-1300-00100	W13 Circuit Board Assembly, Take-up Reel Revolution Detector
15	143-2-352T-05800	Spacer (0 ~ 2 pcs. used), Supply Reel
16	143-2-574T-02101	Ball Bearing, Supply Reel
20	143-2-851T-44902	Spring Coil, F.FWD Roller Lever
21	143-0-741T-11504	Lever with Spring Coil, F.FWD Roller
22		Poly Washer, 4.1x6.5x0.5 mm

Ref. No.	Part No.	Description
23		Set Screw, Hex Socket Hd. "W" Point, 3x6mm, CP
24	143-0-547T-00200	F.FWD Roller
25	143-2-731T-07000	Slide, REW Idler
26	143-0-551T-01400	REW Idler
27	143-2-851T-44800	Spring Coil, REW Idler
28		Washer, 4x8x0.5 mm
29	143-0-741T-12501	Supply Reel Brake
30	143-0-741T-14300	Brake Release Lever
31		Bolt Washer, 3x8x0.5 mm
32		"E" Ring, 2 mm
36	143-2-851T-44701	Spring Coil, Supply Reel Brake
37	143-2-851T-46200	Spring Coil, Brake Release Lever
38	143-2-351T-25203	Bracket, Brake Band
39	143-0-711T-00200	Brake Band, Back Tension
40		Washer, 3 mm
41		Screw with Spring Washer, Pan Hd. Machine, 3x6mm, Z1
42	143-0-741T-11900	Lever, Back Tension
43		Screw with Spring Washer, Pan Hd. Machine, 2x4 mm, Z1
44	143-0-531T-01900	Supply Reel

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

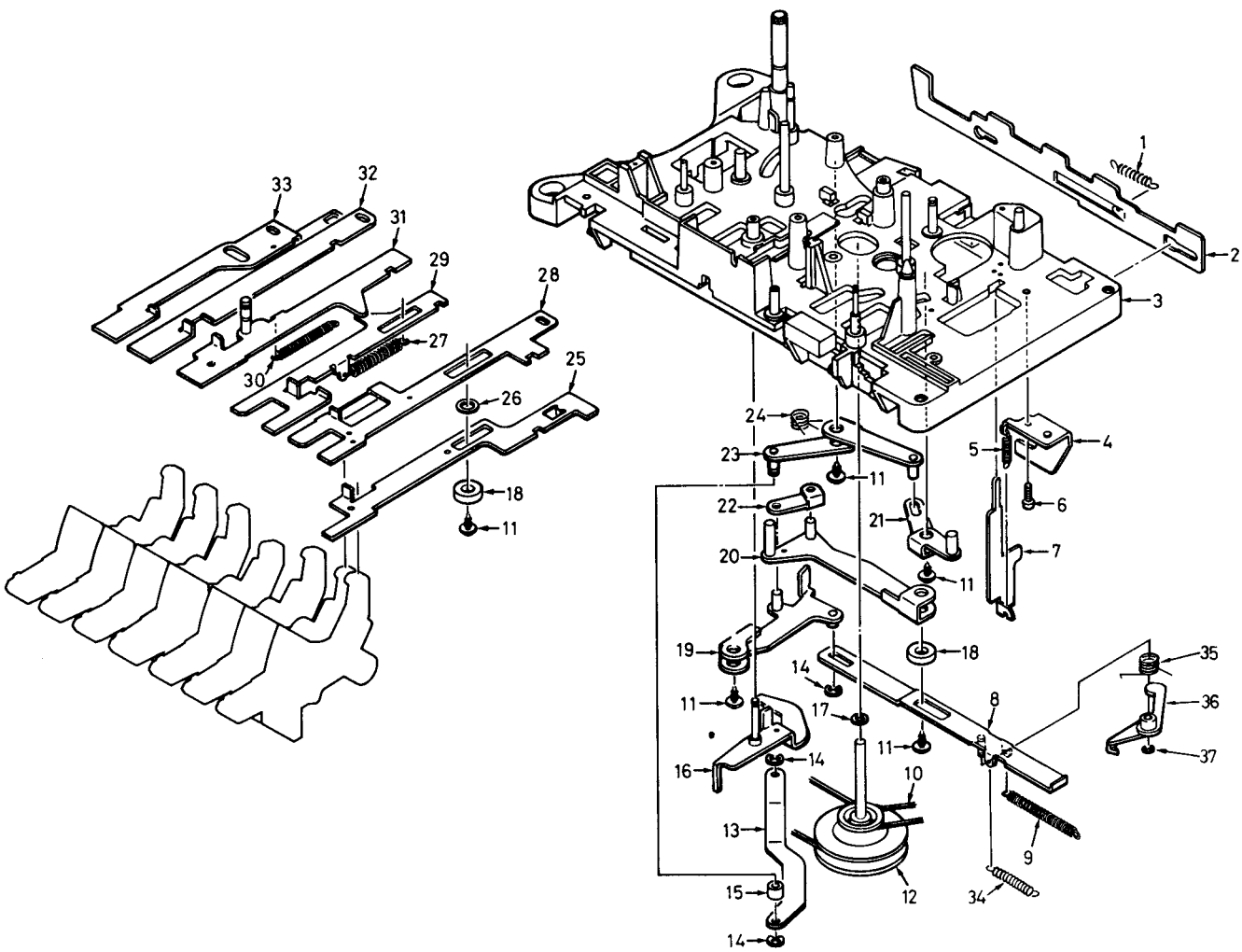


SLIDE MECHANISM PARTS

Ref. No.	Part No.	Description
1	143-0-851T-43901	Spring Coil, Slide Stopper
2	143-2-731T-07200	Slide Stopper
3	143-2-311T-01706	Reel Chassis
4	143-2-465T-08000	Slide Stopper, Erase Prevention Slide
5	143-2-851T-44501	Spring Coil, Erase Prevention Slide
6		Screw, Pan Hd. Machine, 3x12mm, Z1
7	143-2-731T-06800	Slide, Erase Prevention
8	143-9-5100-14600	Slide, Cassette Lock
9	143-2-851T-45300	Spring Coil, Cassette Lock Slide
10	143-2-564T-01301	Square Belt, FWD Belt
11		Screw, Washer Hd., Tapping (B-tite) 3x6mm, Z1
12	143-0-661T-02900	Pulley, F.FWD Roller
13	143-2-253T-02902	Joint, Back Tension Lever
14		"E" Ring, 3 mm
15	143-2-681T-07301	Sleeve Joint
16	143-0-741T-13600	Lever, Supply Reel
17		Poly Washer, 4.1x6.5x0.5 mm
18	143-2-683T-07501	Slide Spacer

Ref. No.	Part No.	Description
19	143-0-741T-12201	EJECT Lever, Lower
20	143-0-741T-12303	EJECT Lever, Upper
21	143-0-741T-12001	Lever, FWD Roller
22	143-2-741T-19600	EJECT Link
23	143-0-741T-12101	F.FWD-REW Lever Arm
24	143-2-851T-43800	Spring Coil, F.FWD-REW Lever
25	143-2-731T-05902	REC Slide
26		Nylon Washer, 6.2x9.5x0.8 mm
27	143-2-851T-45101	Spring Coil, F.FWD Slide
28	143-2-731T-07100	FWD Slide
29	143-2-731T-05401	F.FWD Slide
30	143-2-851T-45000	Spring Coil, REW Slide
31	143-0-731T-00801	REW Slide
32	143-2-731T-05602	PAUSE Slide
33	143-2-731T-05703	EJECT Slide
34	143-2-851T-47300	Spring Coil, Cassette Lock Slide
35	143-2-851T-47400	Spring Coil, Pawl Lever
36	143-2-741T-05100	Pawl Lever
37		"E" Ring, 2.3 mm

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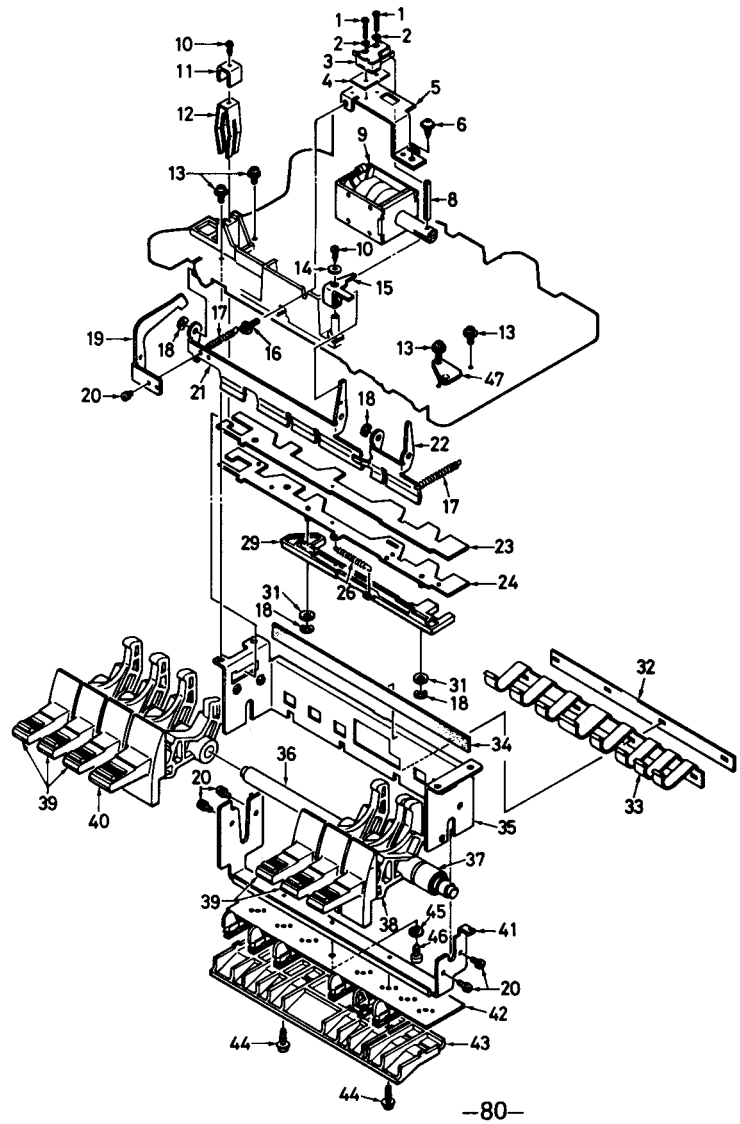


PUSH BUTTON MECHANISM PARTS

Ref. No.	Part No.	Description
1		Screw, Pan Hd. Machine, 2x10 mm, Z1
2		Washer, 2x4.5x0.4 mm
3	4-231V-92600	Solenoid Switch
4	143-2-352T-06000	Switch Spacer
5	143-2-365T-07100	Bracket, Switch
6		Screw, Washer Hd. Tapping (B-tite), 3x6mm, Z1
8		Spring Pin, 3x25mm, Solenoid
9	4-264V-10800	Solenoid (Diode not Included)
or	4-264V-11400	Solenoid (Diode not Included)
10		Screw, Pan Hd. Tapping, 2.3x6 mm, Z1
11	143-2-858T-01901	Bracket, Spring Plate
12	143-2-483T-01003	Spring Plate
13		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x8mm, Z1
14		Bolt Washer, 2.5x7.5x0.5 mm
15	143-2-741T-18304	Solenoid Lever
16		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x6mm, Z1
17	143-2-851T-42901	Spring Coil, Lock Lever
18		"E" Ring, 3 mm
19	143-2-741T-23601	EJECT Lever Arm
20		Screw with Spring Washer, Pan Hd. Machine, 3x6 mm, Z1

Ref. No.	Part No.	Description
21	143-2-741T-18403	Lock Lever Plate, Push Button
22	143-2-741T-18504	Lock Lever Plate, REC Button
23	143-2-673T-01200	Push Button Slide, Upper
24	143-0-671T-00700	Push Button Slide, Lower
26	143-2-851T-46501	Spring Coil, Plastic Slide
29	143-2-673T-00800	Plastic Slide
31		Washer, 4 mm
32	143-2-858T-01802	Bracket, Spring Plate
33	143-2-483T-01100	Spring Plate, Push Button
34	143-2-445T-01600	Button Cushion
35	143-2-613T-01300	Push Button Frame
36	143-2-612T-00401	Shaft, Push Button
37	143-2-462T-12901	Spacer, Push Button
38	143-9-5100-09800	REC Button
39	143-9-5100-09700	Button, EJECT/PAUSE/REW/F.FWD/ PLAY
40	143-9-5100-09600	STOP Button
41	143-2-365T-06401	Sub Frame, Push Button
42	143-9-0600-00700	W6 Circuit Board Assembly
43	143-2-135T-05903	Cover, W6 Circuit Board
44		Screw, Pan Hd. Tapping, 3x12mm, Z1
45		Lock Washer (External Tooth), 3 mm
46		Screw, Pan Hd. Tapping, 3x6 mm, Z1
47	143-2-472T-62400	Bracket, Grounding

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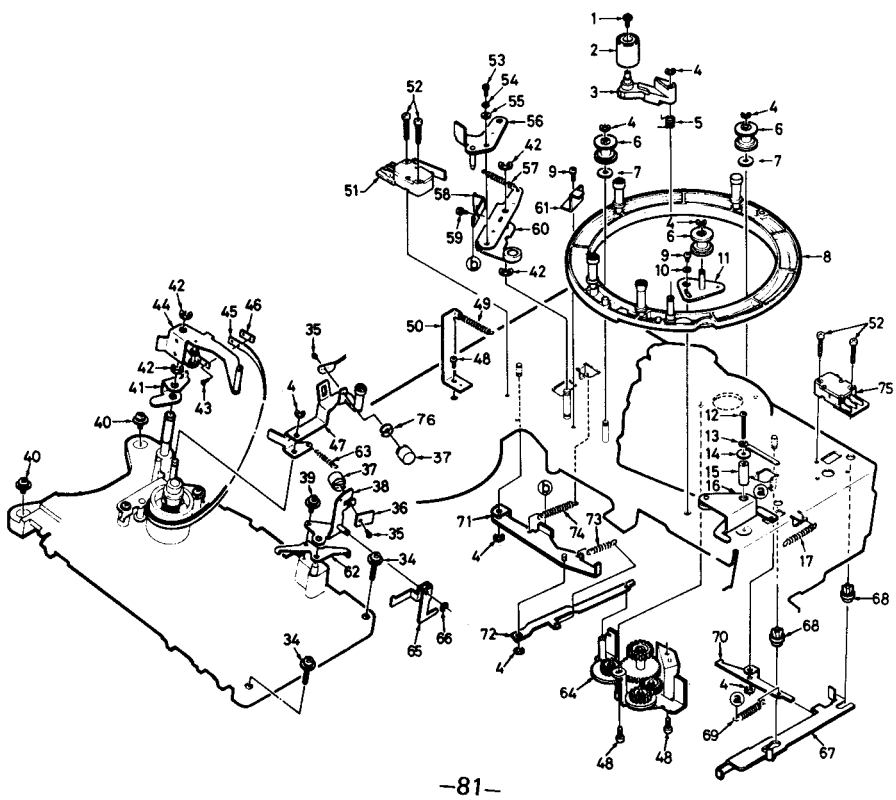


LOADING MECHANISM PARTS

Ref. No.	Part No.	Description
1		Screw, Washer Hd. Machine (TP Screw), 2.6x6 mm, Z1
2	143-0-541T-00300	Pinch Roller
3	143-0-545T-01400	Pinch Roller Arm
4		"E" Ring, 3 mm
5	143-2-851T-42600	Spring Coil, Pinch Roller Arm
6	143-2-662T-06801	Loading Guide Roller
7	143-2-457T-04100	Special Washer
8	143-0-351T-04602	Loading Ring
9		Screw with Spring Washer, Pan Hd. Machine, 3x6 mm, Z1
10		Washer, 3 mm
11	143-0-351T-04400	Bracket, Loading Guide Roller
12		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x20 mm, Z1
13	123-2-472R-00401	Wire Clamp
14		Bolt Washer, 3.4x10x0.5 mm
15	143-2-462T-14601	Shaft, Loading Ring Stop Lever
16	143-0-741T-12900	Stop Lever, Loading Ring
17	143-2-851T-46300	Spring Coil, Stop Lever
34		Screw with Flange Washer, Pan Hd. Machine, 4x20 mm
35		Plastic Screw, Pan Hd. Machine, 2.6x4 mm
36	4-226V-28500	W23 Circuit Board, REW Sensor
37	4-258V-11101	OSC Coil, REW & FWD Sensor
38	143-0-351T-04900	REW Sensor Bracket
39		Screw, Washer Hd. Tapping (B-tite), 3x6 mm, Z1
40		Screw with Flange Wahser, Pan Hd. Machine, 4x12 mm, Z1
41	143-0-741T-11900	Lever, Back Tension
42		"E" Ring, 4 mm
43		Screw with Spring Washer, Pan Hd. Machine, 2x4 mm, Z1
44	143-0-741T-13552	Back Tension Lever

Ref. No.	Part No.	Description
45	143-0-711T-00200	Brake Band, Back Tension
46	143-2-351T-29500	Bracket, Brake Band
47	143-0-741T-11805	FWD Sensor Lever
48		Screw, Washer Hd. Machine (TP Screw), 3x6 mm, Z1
49	143-2-851T-43101	Spring Coil, Back Tension
50	143-2-858T-02000	Bracket, Back Tension Spring Coil
51	4-231V-93300	Loading Switch
52		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x14 mm, Z1
53		Bolt, Hex Socket Hd., 3x6 mm, CP
54		Spring Washer, 3 mm
55		Washer, 3 mm
56	143-0-741T-13401	Loading Lock Lever
57	143-2-851T-47101	Spring Coil, Loading Lock Lever
58	143-2-741T-24600	Bracket, Loading Switch
59		Screw with Spring Washer, Pan Hd. Machine, 3x4 mm, Z1
60	143-0-741T-13001	Loading End Lever
61	143-2-465T-02800	Loading Ring Stopper
62	143-2-853T-03600	Spring Plate, Grounding
63	143-2-851T-44601	Spring Coil, FWD Sensor Lever
64	143-0-581T-00601	Loading Gear Assembly
65	143-2-741T-24500	Cassette Switch Actuator
66		"E" Ring, 2.3 mm
67	143-2-731T-06901	Slide, Cassette Switch
68	143-2-462T-14200	Slide Shaft
69	143-2-851T-47000	Spring Coil, Operation Lever
70	143-2-741T-24400	Operation Lever, Loading Gear
71	143-0-741T-14000	Unloading Lever
72	143-2-253T-03401	Loading Gear Arm
73	143-2-851T-47201	Spring Coil, Unloading
74	143-2-851T-46901	Spring Coil, Loading
75	4-231V-93400	Cassette Switch
76	143-2-352T-06700	Rubber Spacer, FWD Sensor

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

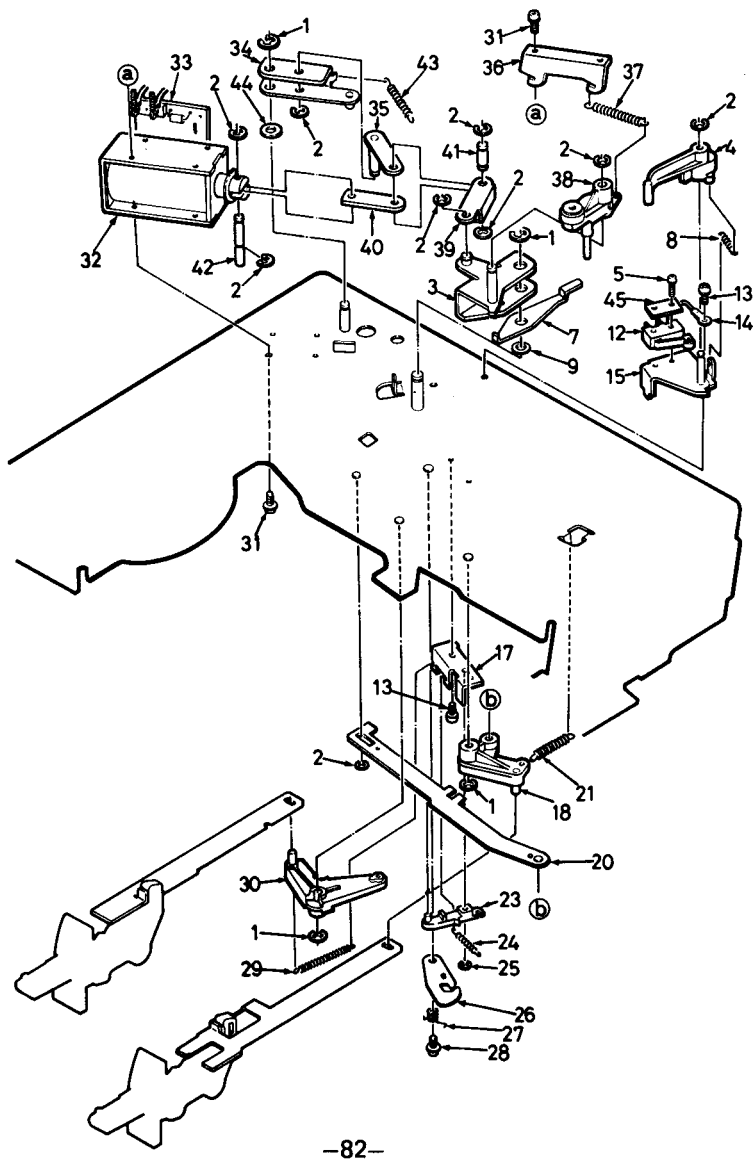


PLAY & PAUSE MECHANISMS PARTS

Ref. No.	Part No.	Description
1		"E" Ring, 4 mm
2		"E" Ring, 3 mm
3	143-0-741T-13700	Pressure Lever, Pinch Roller
4	143-2-741T-18201	Tape Slack Sensor Lever
5		Screw with Spring Washer, Pan Hd. Machine, 2x10 mm, Z1
7	143-2-741T-24000	Lever, Slack Sensor Lever
8	143-2-851T-43401	Spring Coil, Tape Slack Sensor Lever
9		Poly Washer, 6x9.5x0.5 mm
12	4-231V-93100	Slack Switch
or	4-231V-92700	Slack Switch
or	4-231V-92200	
13		Screw, Washer Hd. Machine (TP Screw), 3x6 mm, Z1
14	123-2-472R-00400	Grounding Lug
15	143-0-747T-00801	Bracket, Tape Slack Sensor Lever
17	143-0-351T-04702	Bracket, Self Lock Lever
18	143-2-741T-05300	Release Arm, Take Brake
20	143-0-253T-00200	Link, Release Arm
21	143-2-851T-46600	Spring Coil, Release Arm
23	143-2-741T-20700	Cancel Lever, Self Lock
24	143-2-851T-43501	Spring Coil, Cancel Lever
25		"E" Ring, 2.3 mm

Ref. No.	Part No.	Description
26	143-2-671T-00900	Lock Plate
27	143-2-851T-42500	Spring Coil, Lock Plate
28		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x6 mm, Z1
29	143-2-851T-47500	Spring Coil, Pause Lever
30	143-2-741T-05000	Pause Lever Arm
31		Screw with Spring Washer, Pan Hd. Machine, 3x6mm, Z1
32	4-264V-11300	Solenoid, Remote Pause
33	143-9-2400-00100	W24 Circuit Board Assembly
34	143-0-741T-14200	Lever, Remote Pause
35	143-0-253T-00300	Bracket, Remote Pause
36	143-2-858T-02200	Bracket, Spring Coil
37	143-2-851T-46700	Spring Coil, Take Brake Lever
38	143-0-741T-14100	Take Brake Lever
39	143-2-253T-03300	Bracket, Pressure Lever
40	143-2-253T-03600	Bracket, Remote Pause Solenoid
41	143-2-751T-36500	Shaft, Remote Pause
42	143-2-751T-36200	Shaft, Remote Pause Solenoid
43	143-2-851T-46800	Spring Coil, Pinch Roller Pressure
44		Poly Washer, 5.2x8x0.5 mm
45	143-2-365T-07000	Slack Switch Holder

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

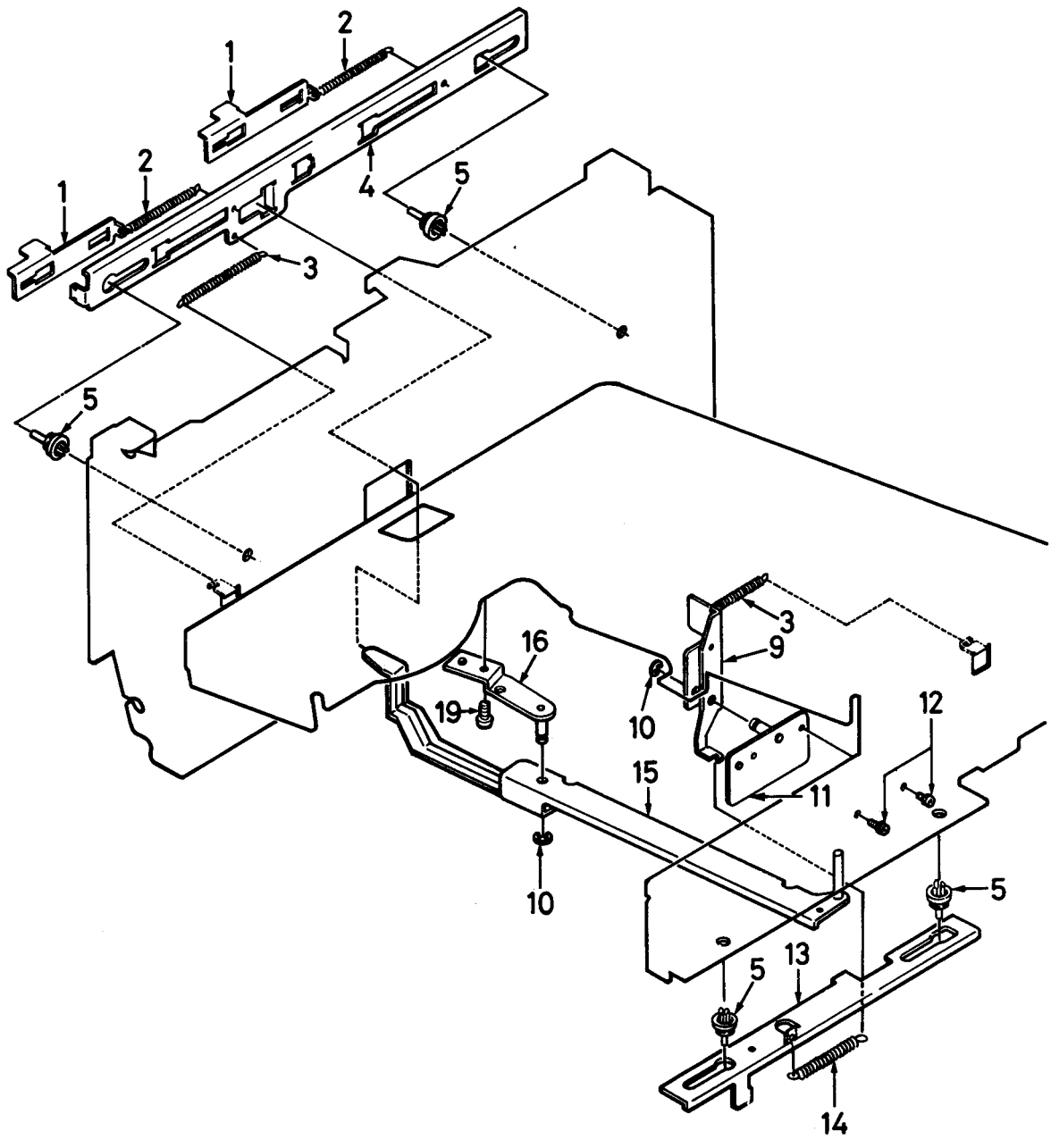


EJECT AND R/P SWITCHES OPERATING MECHANISM PARTS

Ref. No.	Part No.	Description
1	143-2-741T-22403	Operation Lever, W1 R/P Switch
2	143-2-851T-44300	Spring Coil, Operation Lever
3	143-2-851T-44401	Spring Coil, Slide
4	143-2-741T-22802	Slide, Operation Lever
5	143-2-462T-14200	Slide Shaft
9	143-2-741T-22701	Lever, W2 R/P Switch
10		"E" Ring, 4 mm
11	143-0-747T-00901	Bracket, R/P Switch Lever

Ref. No.	Part No.	Description
12		Screw withSpring Washer, Pan Hd. Machine, 3x6 mm, Z1
13	143-2-731T-06403	Slide, W2 R/P Switch
14	143-2-851T-44202	Spring Coil, W2 R/P Switch
15	143-0-741T-11600	Operation Lever
16	143-0-747T-01000	Bracket, Operation Lever
19		Screw, Washer Hd. Machine (TP Screw), 3x6 mm, Z1

NOTE: 1. Parts order must contain Model Number, Part Number and Description.



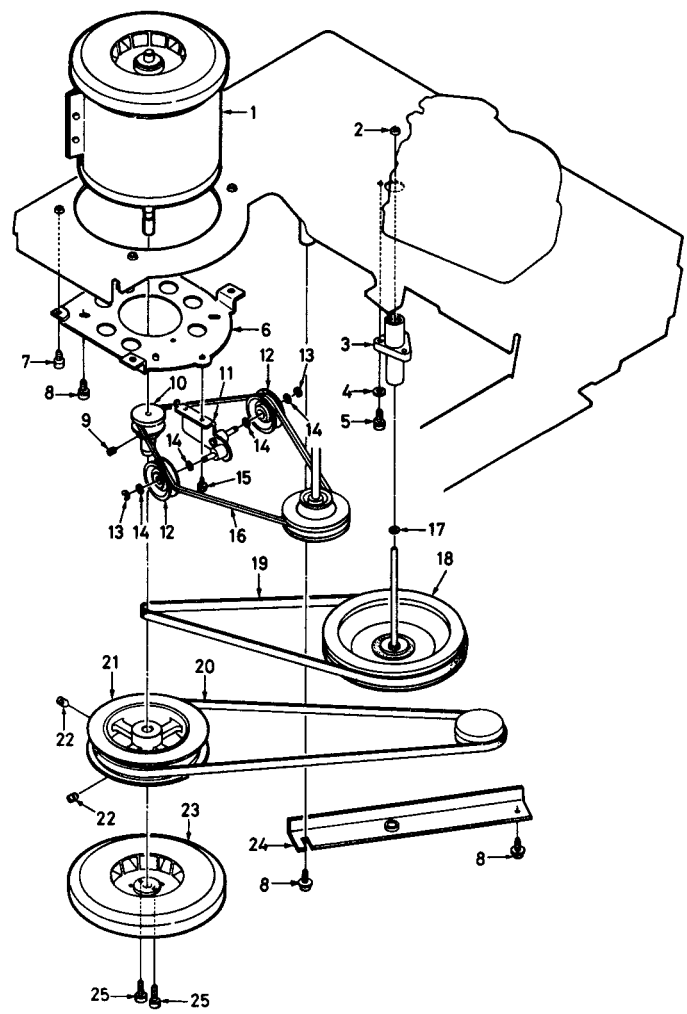
BELT DRIVE MECHANISM PARTS

Ref. No.	Part No.	Description
1	⚠ 4-528V-10801	AC. Motor
or	⚠ 4-528V-10900	AC. Motor
2	143-2-683T-07200	Rubber Oil Ring
3	143-0-572T-00100	Bracket, Capstan
4		Washer, 3 mm
5		Screw, Pan Hd. Machine, 3x8 mm, Z1
6	143-2-378T-01002	Bracket, AC Motor
7		Screw with Spring & Flange Washer, Pan Hd. Machine, 4x6 mm, Z1
8		Screw with Spring & Flange Washer, Pan Hd. Machine, 4x8mm, Z1
9		Set Screw, Hex Socket Hd. "W" Point, 3x6 mm, CP
10	143-2-661T-65310	Capstan Pulley, Carved No. "1"
	143-2-661T-65320	Capstan Pulley, Carved No. "2"
	143-2-661T-65330	Capstan Pulley, Carved No. "3"
	143-2-661T-65340	Capstan Pulley, Carved No. "4"
	143-2-661T-65350	Capstan Pulley, Carved No. "5"
11	143-0-351T-04201	Bracket, Idler Pulley
12	143-0-661T-02602	Idler Pulley

Ref. No.	Part No.	Description
13		"E" Ring, 2 mm
14		Poly Washer, 3.1x5.4x0.5 mm
15		Screw with Spring Washer, Pan Hd. Machine, 3x6mm, Z1
16	143-2-564T-01201	Square Belt, Reel Belt
17		Poly Washer, 4x6.5x0.5mm
★18	143-0-521T-01501	Capstan Flywheel
★19	143-2-561T-01802	Flat Belt, Capstan Belt
★20	143-2-561T-02000	Flat Belt, Servo Belt
21	143-2-661T-00513	Servo Pulley, 61.31±0.03 Dia., Carved Number "1"
	143-2-661T-00523	Servo Pulley, 61.50±0.03 Dia., Carved Number "2"
	143-2-661T-00533	Servo Pulley, 61.62±0.03 Dia., Carved Number "3"
22		Set Screw, Hex. Socket Hd. "W" Point 4x6 mm, CP
23	143-2-379T-00601	Motor Fan
24	143-0-524T-00101	Retaining Bracket, Capstan Flywheel
25		Screw, Pan Hd. Machine, 2.6x10 mm, Z1

Note: The Capstan Pulley (#10) and the Servo Pulley (#21) have been selectively used dependent on the individual mechanism performance. For these parts replacement, be sure to use one of the same diameter as the original used in a unit under problem. Each diameter category of these parts can be identified with a number impressed on them.

★ Additionally, replacement of either original Servo Pulley or original Capstan Pulley or both may be required when either one of Capstan Flywheel (#18), Flat Belt (#19) and Flat Belt (#20) is replaced.

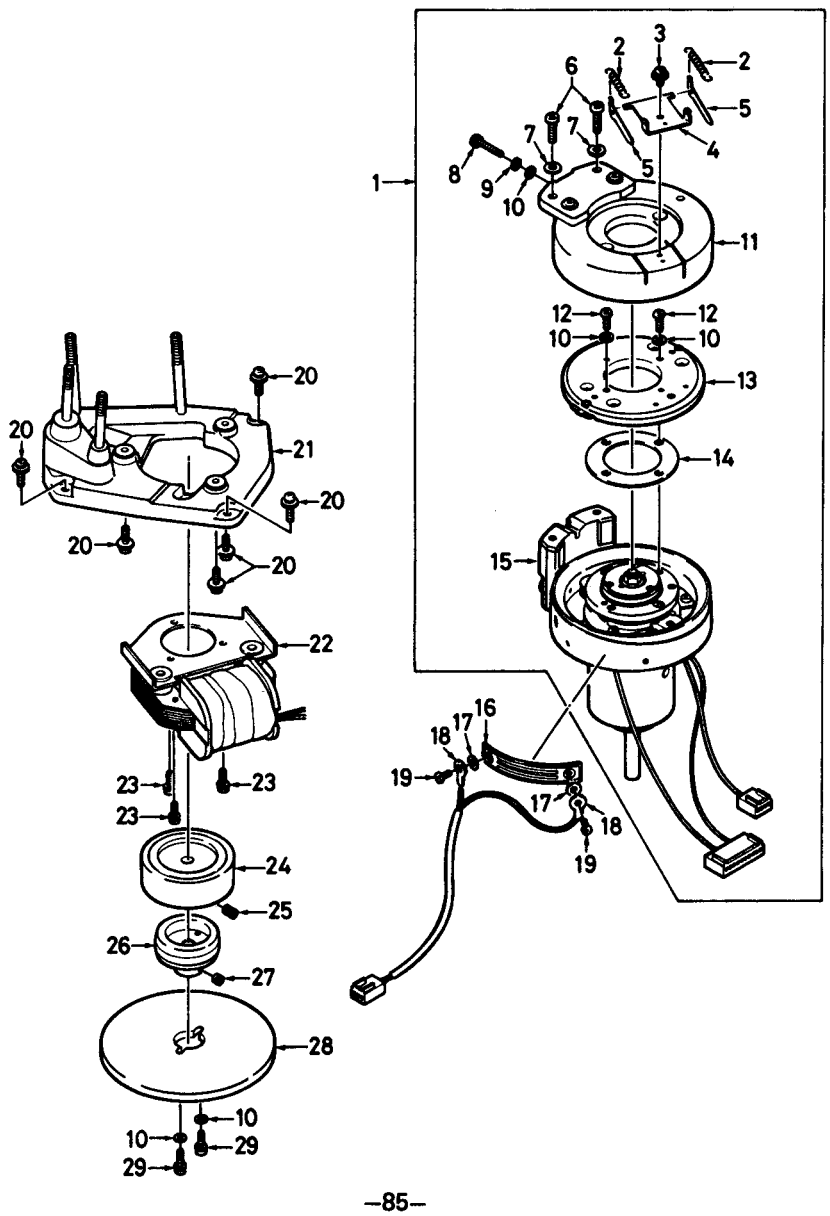


NOTE: 1. Parts order must contain Model Number, Part Number and Description.

DRUM PARTS

Ref. No.	Part No.	Description
1	143-9-5100-15600	Drum Complete
2	143-2-851T-36800	Spring Coil, Tape Path Lever
3		Screw with Spring & Flange Washer, Pan Hd. Machine, 3x6 mm, Z1
4	143-2-747T-05400	Bracket, Tape Path Lever
5	143-2-741T-15900	Tape Path Lever
6		Screw with Washer, Pan Hd. Machine, 4x12 mm, Z1
7		Washer, 3 mm
8		Bolt, Hex Socket Hd., 3x14 mm, CP
9		Spring Washer, 3 mm
10		Washer, 3 mm
11	143-9-5100-10750	Upper Drum
12		Screw, Pan Hd. Machine, 3x8 mm, Z1
13	143-0-762T-02000	Video Head Disk
14	143-2-772T-02400	Spacer, V-Hd. Height Adj., 0.02 mm Dia. (1 Used)
or	143-2-772T-02500	Spacer, V-Hd. Height Adj., 0.04 mm Dia. (1 Used)
or		Spacer, not used
15	143-0-771T-01503	Lower Drum with Connectors
16	4-226V-24500	Dew Sensor
17	143-2-457T-02800	Special Washer, Dew Sensor
18	143-2-472T-01500	Lug, Dew Sensor
19		Plastic Screw, Pan Hd. Machine, 3x6 mm
20		Screw, Washer Hd. Machine (TP Screw), 3x10 mm, Z1
21	143-0-776T-00201	Drum Base
22	143-9-5100-13300	Stator Assembly with Connector
23		Screw with Spring Washer, Pan Hd. Machine, 3x8 mm, Z1
24	143-2-774T-01100	Rotator, Servo Brake
25		Set Screw, Hex Socket Hd. "W" Point, 4x6 mm, CP
26	143-2-661T-64900	Drum Pulley
27		Set Screw, Hex Socket Hd. "W" Point, 4x4 mm, CP
28	143-2-523T-02500	Drum Flywheel
or	143-2-523T-02302	Drum Flywheel
29		Screw with Washer, Pan Hd. Machine, 3x10 mm, Z1

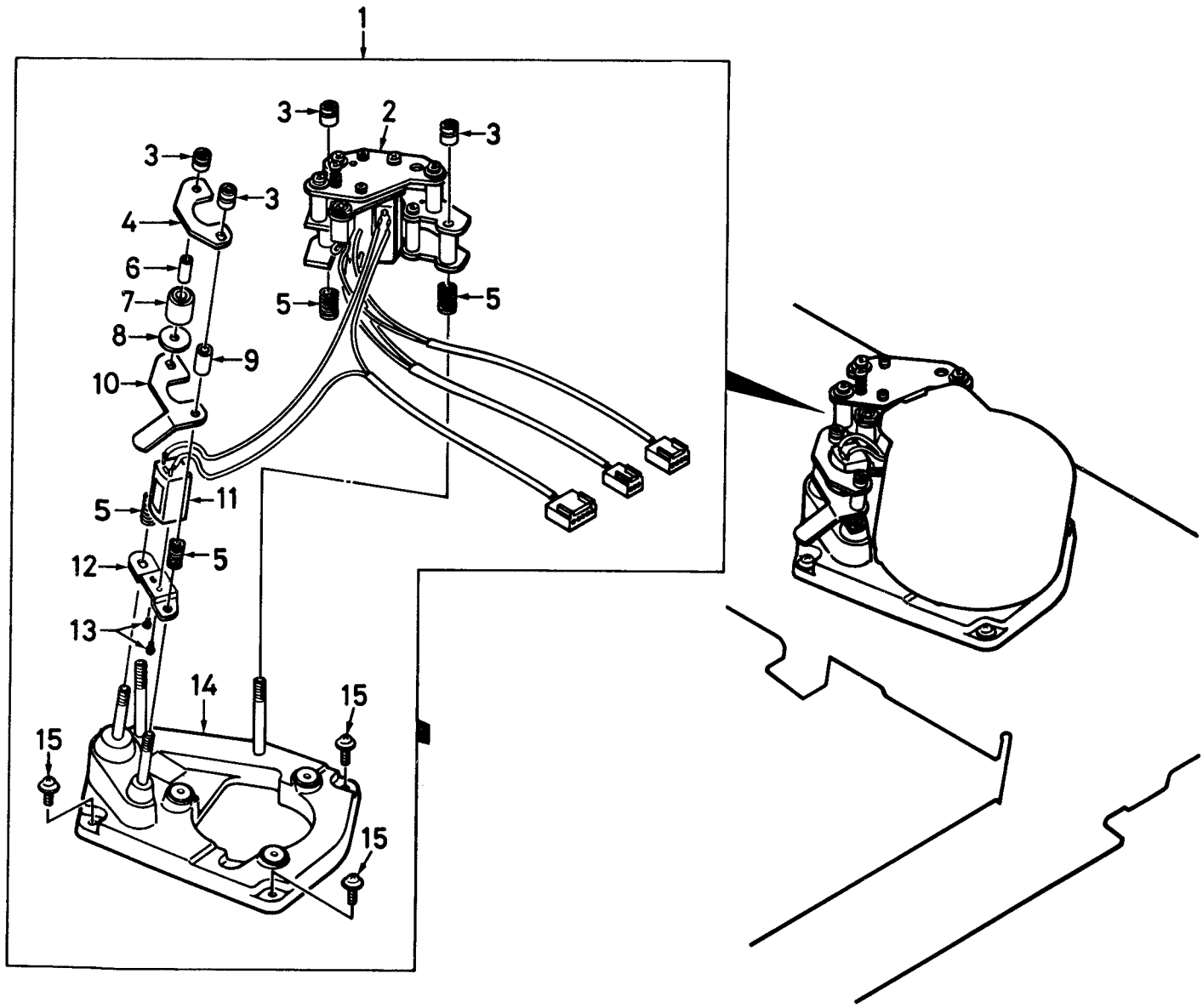
NOTE: 1. Parts order must contain Model Number, Part Number and Description.



DRUM BASE PARTS

Ref. No.	Part No.	Description
1	143-0-776T-00400	Drum Base Complete with Connectors
2	143-0-242T-00200	Audio/Control Head Assembly
3	143-2-421T-03200	Special Nut, Tape Path Adjustment
4	143-2-821T-05001	Upper Tape Guide, Erase Head
5	143-2-851T-42201	Spring Coil
6	143-2-681T-07201	Sleeve, Erase Head
7	143-2-662T-07001	Roller, Erase Head
8	143-2-457T-03500	Special Washer
9	143-2-821T-05600	Tape Guide Shaft
10	143-2-821T-05201	Lower Tape Guide, Erase Head
11	4-242V-13300	Erase Head
12	143-2-375T-05501	Bracket, Erase Head
13		Screw, Pan Hd. Machine, 2x4 mm, Z1
14	143-0-776T-00201	Drum Base
15		Screw Washer Hd. Machine (TP Screw), 3x10 mm, Z1

NOTE: 1. Parts order must contain Model Number, Part Number and Description.



TRANSFORMERS

Schematic Location	Part No.	Description
T1	4-259V-13700	HF Coil Trans.
T2	4-288V-10500	Step-up Trans.
	or 4-288V-10600	Step-up Trans.
T3	4-288V-10500	Step-up Trans.
	or 4-288V-10600	Step-up Trans.
T201	4-259V-15100	HF Coil Trans.
T202	4-259V-15200	HF Coil Trans.
T203	4-259V-15300	HF Coil Trans.
T204	4-259V-15400	HF Coil Trans.
T205	4-259V-15500	HF Coil Trans.
T206	4-259V-15600	HF Coil Trans.
T207	4-259V-15700	HF Coil Trans.
T208	4-259V-15800	HF Coil Trans.
T209	4-259V-15900	HF Coil Trans.
T210	4-259V-16000	HF Coil Trans.
T212	4-259V-16200	HF Coil Trans.
T213	4-259V-16200	HF Coil Trans.
T601	4-258V-11301	OSC Coil Trans.
T901	4-256V-18700	IF Trans.
	or 4-256V-19800	IF Trans.
T902	4-256V-18800	IF Trans.
	or 4-256V-19900	IF Trans.
T903	4-256V-18900	IF Trans.
	or 4-256V-20000	IF Trans.
T904	4-256V-19000	IF Trans.
	or 4-256V-20100	IF Trans.
T905	4-256V-19100	IF Trans.
T906	4-256V-19200	IF Trans. (for Continent and England)
T906	4-256V-20400	IF Trans. (for Australia)
T907	4-256V-19300	IF Trans.
	or 4-256V-20200	IF Trans.
T908	4-256V-19300	IF Trans.
	or 4-256V-20200	IF Trans.
T909	4-256V-19400	IF Trans.
	or 4-256V-20300	IF Trans.
T910	4-256V-19500	IF Trans. (for Continent/Australia)
T910	4-256V-19700	IF Trans. (for England)

VARIABLE CAPACITORS

Schematic Location	Part No.	Description
VC1	4-224V-30600	20 pF
VC2	4-224V-30600	20 pF

DELAY LINES

Schematic Location	Part No.	Description
DL1	4-225V-15000	Delay Line
DL201	4-284V-11800	Delay Line, 0.2 micro-S
DL202	4-284V-11900	Delay Line, 0.6 micro-S
DL203	4-225V-15400	Delay Line
DL204	4-225V-15400	Delay Line
DL205	4-225V-15500	Delay Line

CRYSTALS

Schematic Location	Part No.	Description
X201	4-225V-15200	4.433619 MHz/16 pF
X202	4-225V-15300	4.433619 MHz/47 pF

VARIABLE RESISTORS

Schematic Location	Part No.	Description
VR1	4-222T-15800	470 ohms
VR2	4-222V-61704	500 ohms
VR3	4-222T-16000	47k ohms
VR4	4-222T-16000	47k ohms
VR5	4-222T-18800	1k ohms
VR6	4-222T-18800	1k ohms
VR7	4-222T-18900	2.2k ohms
VR8	4-222T-19300	4.7k ohms
VR101	4-222V-61710	50k ohms
VR102	4-222V-61710	50k ohms
VR103	4-222T-16100	100k ohms
VR104	4-222T-16000	47k ohms
VR105	4-222T-16000	47k ohms
VR106	4-222V-60200	470k ohms
VR107	4-222V-61708	10k ohms
VR201	4-222V-61707	5k ohms
VR202	4-222V-61706	2k ohms
VR203	4-222V-61707	5k ohms
VR204	4-222V-61715	3k ohms
VR205	4-222V-61705	1k ohms
VR206	4-222V-61707	5k ohms
VR207	4-222V-61707	5k ohms
VR208	4-222V-61709	20k ohms
VR209	4-222V-61708	10k ohms
VR210	4-222V-61706	2k ohms
VR211	4-222V-61704	500 ohms
VR212	4-222V-61705	1k ohms
VR213	4-222V-61705	1k ohms
VR214	4-222V-61705	1k ohms
VR215	4-222V-61713	500k ohms
VR216	4-222V-61706	2k ohms
VR217	4-222V-61705	1k ohms
VR218	4-222V-61705	1k ohms
VR219	4-222V-61705	1k ohms
VR220	4-222V-61708	10k ohms
VR601	4-222V-62201	22k ohms
	or 4-222V-61902	20k ohms
VR602	4-222V-62202	330k ohms
	or 4-222V-62100	200k ohms
VR603	4-222V-62201	22k ohms
	or 4-222V-61902	20k ohms
VR604	4-222V-61708	10k ohms
VR605	4-222V-61706	2k ohms
VR701	4-222V-61704	500 ohms
VR801	4-222T-16000	47k ohms
VR802	4-222T-24200	22k ohms
VR803	4-222T-24200	22k ohms
VR901	4-222V-61706	2k ohms
VR902	4-222V-61704	500 ohms
VR2001	4-222V-11800	Pre-set VR
VR2002	4-222V-11800	Pre-set VR
VR2003	4-222V-11800	Pre-set VR
VR2004	4-222V-11800	Pre-set VR
VR2005	4-222V-11800	Pre-set VR
VR2006	4-222V-11800	Pre-set VR
VR2007	4-222V-11800	Pre-set VR
VR2008	4-222V-11800	Pre-set VR

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

COILS

Schematic Location	Part No.	Description
L1	4-253V-83311	HF Choke, 6.8 micro-H, 10%
	or 4-253V-83211	HF Choke, 6.8 micro-H, 5%
L2	4-253V-83238	HF Choke, 1.2 milli-H, 5%
L3	4-253V-83226	HF Choke, 120 micro-H, 5%
L4	4-253V-83214	HF Choke, 12 micro-H, 5%
L5	4-253V-83214	HF Choke, 12 micro-H, 5%
L6	4-253V-84400	HF Choke, 10 milli-H, 5%
L7	4-253V-84400	HF Choke, 10 milli-H, 5%
L8	4-253V-83226	HF Choke, 120 micro-H, 5%
L9	4-253V-80700	HF Choke, 1.5 milli-H, 5%
L10	4-253V-83237	HF Choke, 1 milli-H, 5%
L11	4-253V-83309	HF Choke, 4.7 micro-H, 10%
	or 4-253V-83209	HF Choke, 4.7 micro-H, 5%
L12	4-253V-83213	HF Choke, 10 micro-H, 5%
L13	4-253V-83226	HF Choke, 120 micro-H, 5%
L14	4-253V-83237	HF Choke, 1 milli-H, 5%
L21	4-253V-83211	HF Choke, 82 micro-H, 5%
L201	4-253V-83210	HF Choke, 5.6 micro-H, 5%
L202	4-253V-83217	HF Choke, 22 micro-H, 5%
L204	4-253V-83227	HF Choke, 150 micro-H, 5%
L205	4-253V-83216	HF Choke, 18 micro-H, 5%
L207	4-253V-83233	HF Choke, 470 micro-H, 5%
L208	4-253V-83222	HF Choke, 56 micro-H, 5%
L209	4-253V-83209	HF Choke, 4.7 micro-H, 5%
L210	4-253V-83226	HF Choke, 120 micro-H, 5%
L211	4-253V-83226	HF Choke, 120 micro-H, 5%
L212	4-253V-83224	HF Choke, 82 micro-H, 5%
L213	4-253V-83211	HF Choke, 6.8 micro-H, 5%
L215	4-253V-83221	HF Choke, 47 micro-H, 5%
L216	4-253V-83212	HF Choke, 8.2 micro-H, 5%
L218	4-253V-83212	HF Choke, 8.2 micro-H, 5%
L219	4-253V-83212	HF Choke, 8.2 micro-H, 5%
L220	4-253V-83212	HF Choke, 8.2 micro-H, 5%
L221	4-253V-83223	HF Choke, 68 micro-H, 5%
L222	4-253V-83223	HF Choke, 68 micro-H, 5%
L223	4-253V-83218	HF Choke, 27 micro-H, 5%
L224	4-253V-83237	HF Choke, 1 milli-H, 5%
L225	4-253V-83223	HF Choke, 68 micro-H, 5%
L226	4-253V-83233	HF Choke, 470 micro-H, 5%
L227	4-253V-83233	HF Choke, 470 micro-H, 5%
L228	4-253V-83233	HF Choke, 470 micro-H, 5%
L229	4-253V-83233	HF Choke, 470 micro-H, 5%
L230	4-253V-89700	HF Choke, 4.7 milli-H
L231	4-253V-83227	HF Choke, 150 micro-H, 5%
L232	4-253V-83216	HF Choke, 18 micro-H, 5%
L233	4-253V-83219	HF Choke, 33 micro-H, 5%
L234	4-253V-83222	HF Choke, 56 micro-H, 5%
L235	4-253V-83216	HF Choke, 18 micro-H, 5%
L236	4-253V-83229	HF Choke, 220 micro-H, 5%
L237	4-253V-83228	HF Choke, 180 micro-H, 5%
L240	4-253V-83217	HF Choke, 22 micro-H, 5%
L241	4-253V-83233	HF Choke, 470 micro-H, 5%
L242	4-253V-83237	HF Choke, 1 milli-H, 5%
L248	4-253V-83223	HF Choke, 68 micro-H, 5%
L250	4-253V-83223	HF Choke, 68 micro-H, 5%
L601	4-253V-89303	HF Choke, 39 milli-H
L602	4-253V-84110	HF Choke, 560 micro-H
	or 4-253V-88900	HF Choke, 560 micro-H
L603	4-253V-89406	HF Choke, 27 milli-H
	or 4-253V-89600	HF Choke, 27 milli-H
L901	4-253V-83215	HF Choke, 15 micro-H, 5%
L902	4-253V-83312	HF Choke, 8.2 micro-H, 10%
L903	4-253V-83212	HF Choke, 18 micro-H, 5%
L904	4-253V-83312	HF Choke, 8.2 micro-H, 10%
L905	4-253V-83317	HF Choke, 220 micro-H, 10%
L1101	4-252V-10400	LF Choke

MISCELLANEOUS

Schematic Location	Part No.	Description
	143-2-462T-12600	Shaft, Fixing Circuit Boards W1/W4/W5
	143-2-462T-12700	Shaft, Fixing Circuit Board W2
	143-2-161T-02500	Push Knob, W14 P.C.B, Channel Select
	143-2-681T-07800	Sleeve, for LED on W15 Circuit Board
	143-2-681T-07700	Sleeve, for LED on W20 Circuit Board
	143-2-164T-01200	Slide Knob, REC TIME & REC DAY Select
	143-2-161T-02600	Push Knob, CLOCK SET
DTN1601	4-202V-10900	Digital Display, W20 P.C.B.
F701	⚠ 4-234V-12510	Fuse 2.0A, W3 P.C.B.
F702	⚠ 4-234V-12510	Fuse 2.0A, W3 P.C.B.
F703	⚠ 4-234V-12503	Fuse 315 mA, W3 P.C.B.
	143-2-383T-01400	Fuse Holder, F701/F702/F703
F901	4-953V-00100	Trap, 5.5 MHz (for Continent and Australia)
F901	4-953V-00400	Trap, 6 MHz (for England)
F902	4-953V-00200	Filter, 5.5 MHz (for Continent and Australia)
	or 4-953V-00300	Filter, 5.5 MHz (for Continent and Australia)
F902	4-953V-00500	Filter, 6 MHz (for England)
F1101	⚠ 4-234V-12508	Fuse 1A, W7 P.C.B.
	143-2-383T-01400	Fuse Holder, F1101
F-1	4-228V-12600	Filter
RY601	4-232V-13700	Relay, W2 P.C.B.
RY1101	⚠ 4-232V-13601	Relay, W7 P.C.B.
CR1101	⚠ 4-227V-10900	CR Pack, 0.033mfd + 200 ohms

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

CONNECTORS (Mounted on Circuit Board)

Schematic Location	Part No.	Description
S1	4-235V-18212	Connector, Male 12-pin (Black)
S2	4-235V-12603	Connector, Male 3-pin (Natural)
S3	4-235V-13910	Connector, Male 10-pin (Natural)
S4	4-235V-12505	Connector, Male 5-pin (Natural)
S101	4-235V-12603	Connector, Male 3-pin (Natural)
S102	4-235V-18104	Connector, Male 4-pin (Red)
S103	4-235V-12507	Connector, Male 7-pin (Natural)
S104	4-235V-18003	Connector, Male 3-pin (Black)
S105	4-235V-12603	Connector, Male 3-pin (Natural)
S106	4-235V-18003	Connector, Male 3-pin (Black)
S107	4-235V-18103	Connector, Male 3-pin (Red)
S201	4-235V-13908	Connector, Male 8-pin (Natural)
S202	4-235V-13912	Connector, Male 12-pin (Natural)
S203	4-235V-18005	Connector, Male 5-pin (Black)
S601	4-235V-12603	Connector, Male 3-pin (Natural)
S602	4-235V-18003	Connector, Male 3-pin (Black)
S603	4-235V-13912	Connector, Male 12-pin (Natural)
S604	4-235V-18004	Connector, Male 4-pin (Black)
S605	4-235V-18103	Connector, Male 3-pin (Red)
S801	4-235V-13908	Connector, Male 8-pin (Natural)
S802	4-235V-12603	Connector, Male 3-pin (Natural)
S803	4-235V-18005	Connector, Male 5-pin (Black)
S804	4-235V-12606	Connector, Male 6-pin (Natural)
S805	4-235V-12605	Connector, Male 5-pin (Natural)
S806	4-235V-12604	Connector, Male 4-pin (Natural)
S807	4-235V-13907	Connector, Male 7-pin (Natural)
S901	4-235V-16200	RCA Pin Socket, Female
S902	4-235V-12603	Connector, Male 3-pin (Natural)
S903	4-235V-13906	Connector, Male 6-pin (Natural)
S904	4-235V-18104	Connector, Male 4-pin (Red)
S905	4-235V-12604	Connector, Male 4-pin (Natural)
S906	4-235V-18103	Connector, Male 3-pin (Red)
S907	4-235V-18003	Connector, Male 3-pin (Black)
S1101	⚠ 4-235V-20103	Connector, Male 3-pin
S1601	4-235V-12512	Connector, Male 12-pin
S1602	4-235V-12510	Connector, Male 10-pin
S1801	4-235V-19903	Connector, Male 3-pin
S1802	4-235V-20008	Connector, Male 8-pin
S1803	4-235V-20008	Connector, Male 8-pin
S2001	4-235V-13908	Connector, Male 8-pin

THERMISTORS

Schematic Location	Part No.	Description
TH101		TD5-C230, 3k ohms with Tube
TH201		TD5-C230D, 3k ohms
TH901		TD5-A110, 100 ohms

SWITCHES

Schematic Location	Part No.	Description
SW1	4-231V-13401	R-P Switch, Slide
SW101	4-231V-13401	R-P Switch, Slide
SW601	4-231V-14500	R-P Switch, Slide
SW1001	4-231V-91900	Leaf Switch, PAUSE
SW1002	4-231V-91900	Leaf Switch, REW
SW1003	4-231V-91900	Leaf Switch, F.FWD
SW1004	4-231V-93500	Leaf Switch, PLAY
SW1005	4-231V-91900	Leaf Switch, REC
SW1006	4-231V-91900	Leaf Switch, EJECT
SW1601	4-231V-14800	REC TIME Select Switch
SW1602	4-231V-91100	CLOCK SET Switch
SW1603	4-231V-91100	TIMER SET Switch
SW1604	4-231V-91100	HOUR SET Switch
SW1605	4-231V-91100	MIN. SET Switch
SW1606	4-231V-91100	CLOCK/COUNT Select Switch
SW1607	4-231V-14900	REC DAY Select Switch
SW1801	4-231V-61400	Channel Select Switch

NOTE: 1. Parts order must contain Model Number, Part Number and Description.

TRANSISTORS, INTEGRATED CIRCUITS & FET's

Schematic Location	Part No.	Description
Q1		2SC536E or 2SC536F
Q2		2SC2209R
Q3		2SC16347
Q4		FET, 2SK68A-M
Q5		FET, 2SK68A-M
Q7		2SC536E or 2SC536F
Q8		IC, CX-134A
Q9		2SC930E
Q10		2SC536E or 2SC536F
Q11		2SC536E or 2SC536F
Q12		2SC536E or 2SC536F
Q13		2SC536E
Q101		IC, CX-138
Q102		IC, CX-139A
Q103		2SC1740LNR or 2SC1470LNS
Q104		2SC536E or 2SC536F
Q105		2SC536E or 2SC536F
Q106		2SD330E
Q107		2SC536E
Q201		IC, CX-131A
Q202		IC, CX-136A
Q203		IC, CX-150
Q204		IC, CX-150
Q205		IC, CX-137A
Q206		IC, CX-137A
Q207		IC, CX-130
Q208		IC, SN74LS93N
Q209		IC, SN74LS74N
Q210		IC, SN74LS93N
Q211		IC, SN74LS10N or DM74LS10N
Q212		IC, CX-145
Q213		IC, CX-135
Q214		IC, TC4069P
Q215		IC, CX-130
Q216		2SA838C
Q217		2SA838C
Q218		2SC930E
Q219		2SC930E
Q220		2SC930E
Q221		2SA564 or 2SA838
Q222		2SC1634-8
Q223		2SC930E
Q224		2SC930E
Q225		2SC1634-8
Q226		2SC1634-8
Q227		2SC1634-8
Q228		2SC1634-8
Q229		2SC1634-8
Q230		2SC1634-8
Q231		2SC930E
Q232		2SC930E
Q233		2SC930E
Q234		2SC930E
Q235		2SC1634-8
Q236		2SC930E
Q237		2SC930E
Q238		2SC930E
Q240		2SC1634-8
Q241		2SC930E
Q242		2SC930E
Q243		2SC930E
Q244		2SC930E
Q245		2SA608E
Q246		2SC1634-8
Q247		2SA608E
Q248		2SA608E
Q249		2SA608E
Q250		2SC930E
Q251		2SC1634-8
Q252		2SC1634-8

Schematic Location	Part No.	Description
Q253		2SC1634-8
Q254		2SC930E
Q255		2SA719Q
Q256		2SC930E
Q257		2SA719Q
Q258		2SC930E
Q259		2SC930E
Q260		2SC930E
Q261		2SC1634-8
Q262		2SC1634-8
Q263		2SC1634-8
Q264		2SC1634-8
Q265		2SC930E
Q266		2SC1634-8
Q267		2SC930E
Q601		IC, LA3210
Q602		IC, TA7140
Q603		IC, μPC566H3
Q604		2SC536E
Q605		2SC536E
Q606		2SD438E
Q607		2SC536E
Q608		2SC536E
Q701		2SC1741R
Q702		2SC1826O or 2SC1826Y or 2SC1826G
Q703		2SC1741R
Q704		2SC1741R
Q705		2SC1741R
Q706		SCR, CR02AM
Q707		IC, FS7815M, Regulator or IC, μPC78M15H, Regulator
Q801		2SD313E
Q802		2SD400E
Q803		2SC536E
Q804		2SC536E
Q805		2SC536E
Q806		IC, TA7504S
Q807		2SD545E
Q808		2SA562Y
Q809		2SC536E
Q810		2SB507E
Q811		2SD545E
Q812		2SD545E
Q813		IC, CX-141
Q814		2SC545E
Q815		2SC536E
Q816		2SD313E
Q817		2SD545E
Q819		2SA562Y
Q901		2SC382W
Q902		2SC382W
Q903		IC, TA7174P
Q904		2SC945R or 2SC536E
Q905		2SC388A
Q906		IC, AN240P
Q907		2SC945R or 2SC536E
Q908		2SC945R or 2SC536E
Q909		2SC1634-8
Q910		2SC945R or 2SC536E
Q911		2SA509Y
Q1010		Photo Transistor, PN150
Q1601		2SA786R
Q1602		2SA786R
Q1603		2SA786R
Q1604		2SA786R
Q1605		2SC2021R
Q1606		2SC2021R
Q1607		2SC2021R
Q1608		2SA786R

TRANSISTORS, INTEGRATED CIRCUITS & FIT's

Schematic Location	Part No.	Description
Q1609		2SC2021R
Q1610		2SC2021R
Q1611		2SC2021R
Q1612		2SC2021R
Q1613		2SA786R
Q1614		2SC2021R
Q1615		2SC2021R
Q1617		IC, MP2721 (Micro Processor)
Q1618		IC, TP4013AN
Q1619		IC, μPC78L05, Regulator
Q1620		IC, SN7400N
Q1621		IC, SN74LS73
Q2001		2SC945Q
Q2002		2SC945Q
Q2003		2SA733Q

DIODES

Schematic Location	Part No.	Description
D1		1S1555
D2		1S1555
D3		1S1555
D4		1S2473
D101		1S1555
D102		1S1555
D201		1S1555
D202		1S1555
D203		1S1555
D204		1S1555
D205		1S1555
D206		1S1555
D207		1S1555
D208		1S1555
D209		1S1555
D210		1S1555
D211		1S1555
D212		1S1555
D213		1S1555
D214		1S1555
D215		1S1555
D216		1S1555
D217		1S1555
D218		1S1555
D219		1S1555
D220		1S1555
D222		1S1555
D601		1S1555
D602		1S1555
D701	⚠	ERC0102
D702	⚠	ERC0102
D703	⚠	1B4B41
D704	⚠	ERB12-01G
D705		ERB12-01G
D706		ERB12-01G
D707		Zener, RD3.3EB or WZ034
D708		ERB12-01G
D709		ERB12-01G
D710		ERB12-01G
D711		SIB0102
D712		Zener, RD6.2EB or WZ061
D801		1SR34-200 or ERB12-02
D802		1SR34-200 or ERB12-02
D803		1S2473
D804		1S2473
D805		1S2473
D806		1S2473
D807		1S2473
D808		1S2473
D809		1SR34-200 or ERB12-02
D810		1SR34-200 or ERB12-02
D811		Zener, RD6.2EB
D812		1SR34-200 or ERB-12-02
D813		1SR34-200 or ERB12-02
D814		ERB12-02 or 1SR34-200
D815		1SR34-200 or ERB12-02
D816		1S2473
D817		1SR34-200 or ERB12-02
D818		1S2473
D819		1S2473
D820		1SR34-200 or ERB12-02
D821		1SR34-200 or ERB12-02
D822		1S2473
D823		1S2473
D901		1S2473
D1001		1SR34-200 or ERB12-02
D1002		1SR34-200 or ERB12-02
D1003		1SR34-200 or ERB12-02
D1004		1SR34-200 or ERB12-02

DIODES

Schematic Location	Part No.	Description
D1005		1SR34-200 or ERB12-02
D1006		1SR34-200 or ERB12-02
D1007		1SR34-200 or ERB12-02
D1011		LED, LN55
D1101		RM1ZLF
D1601		1S2473
D1602		1S2473
D1603		1S2473
D1604		1S2473
D1605		1S2473
D1606		1S2473
D1607		1S2473
D1608		1S2473
D1609		1S2473
D1610		1S2473
D1611		1S2473
D1612		1S2473
D1613		1S2473
D1614		Zener, WZ030
D1615		Zener, XZ094
D1616		1S2473
D1617		1S2473
D1618		Zener, XZ084
D1619		LED, GL9PR2
D1620		1S2473
D1621		LED, GL9PR2
D1622		LED, GL9PR2
D1623		1S2473
D1624		1S2473
D1851		LED, GL9PR2
D1852		LED, GL9PR2
D1853		LED, GL9PR2
D1854		LED, GL9PR2
D1855		LED, GL9PR2
D1856		LED, GL9PR2
D1857		LED, GL9PR2
D1858		LED, GL9PR2
D2001		1S2473
D2002		1S2473
D2003		1S2473
D2004		1S2473
D2005		1S2473
D2006		1S2473
D2007		1S2473
D2008		1S2473
D2009		1S2473
D2010		1S2473
D2011		1S2473
D2012		Zener, μPC574J
D2051		ERB12-01G
D2052		ERB12-01G

RESISTORS

All resistors are of carbon type, ±5%, 1/4 watt unless otherwise noted.

Schematic Location	Part No.	Description
		All resistors are of carbon type, ±5%, 1/4W unless otherwise noted.
R1		10k ohms
R2		10k ohms
R3		620 ohms
R4		1k ohms
R5		3.9k ohms
R6		30 ohms
R7		100 ohms
R8		15 ohms
R9		18 ohms
R10		30 ohms
R11		330 ohms
R12		330 ohms
R13		300 ohms
R14		620 ohms
R15		2.2k ohms
R16		30 ohms
R17		10 ohms
R18		10 ohms
R19		Metal Glaze, 10 ohms, 1W
R20		470 ohms
R21		1.5k ohms
R22		3.3k ohms
R23		22k ohms
R24		470 ohms
R25		1.5k ohms
R26		220 ohms
R27		6.8 ohms
R28		680 ohms
R29		680 ohms
R30		560 ohms
R35		390 ohms
R36		1k ohms
R38		220 ohms
R39		470 ohms
R40		3.3k ohms
R41		1.2k ohms
R42		10k ohms
R43		33k ohms
R44		5.6k ohms
R45		27k ohms
R46		220 ohms
R47		1.2k ohms
R48		22 ohms
R49		680 ohms
R50		680 ohms
R51		100 ohms
R52		390 ohms
R53		2.2k ohms
R54		390 ohms
R55		100 ohms
R56		1k ohms
R57		100 ohms
R58		620 ohms
R59		1k ohms
R60		5.6k ohms
R62		1.5k ohms
R63		1.5k ohms
R64		100 ohms
R65		100 ohms
R67		750 ohms
R68		3.3k ohms
R72		1k ohms

RESISTORS

All resistors are of carbon type, ±5%, 1/4 watt unless otherwise noted.

Schematic Location	Part No.	Description
R73		220 ohms
R74		33k ohms
R101		82k ohms
R102		33k ohms
R103		33k ohms
R104		33k ohms
R105		47k ohms
R106		33k ohms
R107		5.6k ohms
R108		1k ohms
R109		120 ohms
R110		10k ohms
R111		3.3k ohms
R112		1.8k ohms
R113		1k ohms
R114		39k ohms
R115		51k ohms
R116		4.7k ohms
R117		4.7k ohms
R118		1k ohms
R119		27k ohms
R120		33k ohms
R121		5.6k ohms
R122		33k ohms
R123		62k ohms
R124		100k ohms
R125		2.2k ohms
R126		3.9k ohms
R127		8.2k ohms
R128		5.6k ohms
R129		56 ohms
R130		100k ohms
R131		82k ohms
R132		470k ohms
R133		6.8k ohms
R134		1.5k ohms
R135		2.2k ohms
R136		3.3m ohms
R137		33k ohms
R138		33k ohms
R139		330 ohms
R201		270 ohms
R202		1k ohms
R203		1k ohms
R204		100 ohms
R205		3.3k ohms
R206		1.5k ohms
R207		22k ohms
R208		8.2k ohms
R209		820 ohms
R210		390 ohms
R211		2.2k ohms
R212		22k ohms
R213		22k ohms
R214		330 ohms
R215		160 ohms
R216		10k ohms
R217		4.7k ohms
R218		470 ohms
R219		150 ohms
R220		270 ohms
R221		1.6k ohms
R222		10k ohms
R223		15k ohms
R224		1.5k ohms
R225		39k ohms
R226		6.8k ohms
R227		33 ohms
R228		24k ohms
R229		27k ohms

Schematic Location	Part No.	Description
R230		27k ohms
R231		3.3k ohms
R232		2.7k ohms
R233		68k ohms
R234		47k ohms
R235		560 ohms
R236		1.2k ohms
R237		1.5k ohms
R238		10k ohms
R239		1.5k ohms
R240		820 ohms
R241		3.3k ohms
R242		820 ohms
R243		220 ohms
R244		270 ohms
R245		10k ohms
R246		1k ohms
R247		220k ohms
R248		1k ohms
R249		1.2k ohms
R250		2.2k ohms
R251		22k ohms
R252		22k ohms
R253		22k ohms
R254		22k ohms
R255		22k ohms
R256		220k ohms
R257		27k ohms
R258		5.6k ohms
R259		33k ohms
R260		4.7k ohms
R261		100k ohms
R263		56k ohms
R264		5.6k ohms
R265		15k ohms
R266		15k ohms
R267		220k ohms
R268		4.7k ohms
R269		220k ohms
R271		1k ohms
R272		56k ohms
R273		10k ohms
R274		330 ohms
R275		220 ohms
R276		15k ohms
R277		10k ohms
R278		56 ohms
R279		390 ohms
R280		1.5k ohms
R281		1.2k ohms
R282		22k ohms
R283		10k ohms
R284		10k ohms
R285		22k ohms
R286		1.5k ohms
R287		470 ohms
R288		1k ohms
R289		22k ohms
R290		4.7k ohms
R291		390 ohms
R292		390 ohms
R293		390 ohms
R294		22k ohms
R295		4.7k ohms
R296		2.2k ohms
R297		390 ohms
R298		390 ohms
R299		390 ohms
R300		390 ohms
R301		2.2k ohms

RESISTORS

All resistors are of carbon type, ±5%, 1/4 watt unless otherwise noted.

Schematic Location	Part No.	Description
R302		390 ohms
R304		30k ohms
R305		18k ohms
R306		680 ohms
R307		510 ohms
R308		3.3k ohms
R309		10k ohms
R310		750 ohms
R311		4.7k ohms
R312		1.8k ohms
R313		330 ohms
R314		2.2k ohms
R315		22k ohms
R316		10k ohms
R317		470 ohms
R318		1.5k ohms
R319		4.7k ohms
R320		100 ohms
R321		1k ohms
R322		1.2k ohms
R323		820 ohms
R324		1k ohms
R325		56k ohms
R326		10k ohms
R327		8.2k ohms
R328		3.3k ohms
R329		10k ohms
R330		56k ohms
R331		680 ohms
R332		1k ohms
R333		6.8k ohms
R334		5.6k ohms
R335		2.2k ohms
R336		3.3k ohms
R337		39k ohms
R338		10k ohms
R339		5.1k ohms
R340		1.8k ohms
R341		10k ohms
R342		1k ohms
R343		22k ohms
R344		15k ohms
R345		6.8k ohms
R346		3.3k ohms
R347		3.3k ohms
R348		56 ohms
R350		7.5k ohms
R351		4.7k ohms
R352		100 ohms
R353		6.8k ohms
R354		100k ohms
R355		15k ohms
R356		15k ohms
R357		6.8k ohms
R358		3.3k ohms
R359		220k ohms
R360		470 ohms
R361		1k ohms
R362		150k ohms
R363		470 ohms
R364		18k ohms
R365		68k ohms
R367		3.3k ohms
R368		56k ohms
R369		1k ohms
R370		470 ohms
R371		270 ohms
R372		100 ohms
R373		15k ohms
R374		1k ohms

Schematic Location	Part No.	Description
R375		12k ohms
R376		10k ohms
R377		100k ohms
R378		1k ohms
R379		10k ohms
R380		33k ohms
R381		1.8m ohms
R382		1.5m ohms
R383		330 ohms
R384		2.2k ohms
R385		4.7k ohms
R386		4.7k ohms
R387		3.3k ohms
R388		560 ohms
R389		560 ohms
R390		330 ohms
R391		1k ohms
R392		100 ohms
R393		3.3k ohms
R394		1.8k ohms
R395		1.5k ohms
R396		270 ohms
R397		820 ohms
R398		150 ohms
R399		2.2k ohms
R400		390 ohms
R401		39k ohms
R402		15k ohms
R403		330 ohms
R404		160 ohms
R405		10k ohms
R406		22k ohms
R407		1k ohms
R408		1.5k ohms
R409		1.5k ohms
R410		3.9k ohms
R411		1.5k ohms
R412		3.3k ohms
R413		3.3k ohms
R414		3.3k ohms
R415		1k ohms
R416		2.2k ohms
R417		1.5k ohms
R418		4.7k ohms
R419		750 ohms
R420		240 ohms
R421		1k ohms
R422		1k ohms
R423		15k ohms
R424		47k ohms
R425		680 ohms
R426		2.2k ohms
R427		1k ohms
R428		68 ohms
R429		10k ohms
R432		240 ohms
R433		33k ohms
R434		33k ohms
R436		75 ohms
R437		750 ohms
R438		1.5k ohms
R439		7.5k ohms
R440		7.5k ohms
R441		820k ohms
R442		24k ohms
R443		5.1k ohms
R444		13k ohms
R445		220 ohms
R446		10k ohms
R447		4.7k ohms

RESISTORS

All resistors are of carbon type, ±5%, 1/4 watt unless otherwise noted.

Schematic Location	Part No.	Description
R448		1k ohms
R449		2.2k ohms
R450		3.3k ohms
R452		330 ohms
R453		560 ohms
R454		1.5k ohms
R455		12k ohms
R456		24k ohms
R457		10k ohms
R458		820 ohms
R459		1.5k ohms
R460		1k ohms
R461		1k ohms
R462		1.2k ohms
R464		22k ohms
R465		4.7k ohms
R466		1k ohms
R467		470 ohms
R468		1k ohms
R601		100k ohms
R602		39k ohms
R603		150k ohms
R604		12k ohms
R605		6.8k ohms
R606		150k ohms
R607		10k ohms
R608		2.2k ohms
R609		4.7k ohms
R610		1k ohms
R611		12k ohms
R612		56k ohms
R613		6.2k ohms
R614		120k ohms
R615		68k ohms
R616		10k ohms
R617		1k ohms
R618		100 ohms
R619		1k ohms
R620		100 ohms
R621		12k ohms
R623		270 ohms
R625		68k ohms
R626		27k ohms
R628		330k ohms
R629		68k ohms
R630		5.6k ohms
R631		1k ohms
R632		100 ohms
R633		18k ohms
R634		27k ohms
R635		56 ohms
R636		100 ohms
R637		10k ohms
R638		56k ohms
R639		Metal Glaze, 2.2 ohms, 1/2W
R640		15k ohms
R641		300k ohms
R642		10 ohms
R643		2.2k ohms
R644		680 ohms
R645		6.8k ohms
R701		100 ohms
R702		22 ohms
R703		2.2k ohms
R704		2.2k ohms
R705		100 ohms
R706		1k ohms
R707		1k ohms
R708		1.5k ohms

Schematic Location	Part No.	Description
R709		22k ohms
R710		47k ohms
R711		6.8k ohms
R712		6.8k ohms
R713		5.6k ohms
R714		5.6k ohms
R715		1k ohms
R716		820 ohms
R717		10k ohms
R718		5.6k ohms
R719		Metal Glaze, 18 ohms, 1W
R801		Wire-wound, 10 ohms, 10%, 10W
R802		1k ohms
R803		330 ohms
R804		1k ohms
R805		1k ohms
R806		5.6k ohms
R807		33k ohms
R808		33k ohms
R809		27k ohms
R810		12k ohms
R811		33k ohms
R812		120k ohms
R813		100k ohms
R814		6.8k ohms
R815		47k ohms
R816		1k ohms
R817		4.7k ohms
R818		47k ohms
R819		2.2k ohms
R820		10k ohms
R821		100k ohms
R822		220k ohms
R823		2.2k ohms
R824		22k ohms
R825		150k ohms
R826		150k ohms
R828		22k ohms
R829		100 ohms
R830		100k ohms
R831		330 ohms
R832		Metal Glaze, 30 ohms, 10%, 2W or Wire-wound, 30 ohms, 10%, 2W
R833		330 ohms
R834		33k ohms
R835		47k ohms
R836		33k ohms
R838		680 ohms
R840		4.7K ohms
R841		4.7k ohms
R842		3.3k ohms
R844		68k ohms
R845		33k ohms
R847		10k ohms
R848		3.3k ohms
R849		10k ohms
R850		390 ohms
R851		220 ohms
R852		4.7k ohms
R853		100k ohms
R856		10k ohms
R857		1k ohms
R901		1k ohms
R902		330 ohms
R903		1k ohms
R904		3.9k ohms
R905		1k ohms
R906		1k ohms
R907		820 ohms

RESISTORS

All resistors are of carbon type, ±5%, 1/4 watt unless otherwise noted.

Schematic Location	Part No.	Description
R908		1.8k ohms
R909		150 ohms
R910		4.7k ohms
R911		390 ohms
R912		1.8k ohms
R913		270k ohms
R914		6.8k ohms
R915		10k ohms
R916		150 ohms
R917		47k ohms
R918		150 ohms
R919		150 ohms
R920		1k ohms
R921		820 ohms
R922		100 ohms
R923		180 ohms
R924		100k ohms
R925		100k ohms
R926		68k ohms
R927		10k ohms
R928		3.9k ohms
R929		1k ohms
R930		6.8k ohms
R931		22k ohms
R932		1.1k ohms
R933		680 ohms
R934		3.3k ohms
R935		10k ohms
R936		6.8k ohms
R937		1.5k ohms
R938		3.3k ohms
R939		1.5k ohms
R940		100 ohms
R941		270 ohms
R942		56 ohms
R943		22k ohms
R944		3.3k ohms
R945		2.2k ohms
R946		10k ohms
R947		270 ohms
R948		3.3k ohms
R1001		2.7k ohms
R1004		2.7k ohms
R1005		390 ohms
R1201		22k ohms
R1202		47k ohms
R1204		68 ohms
R1205		470 ohms
R1206		110k ohms
R1208		75 ohms
R1209		82 ohms
R1210		1k ohms
R1601		10k ohms
R1602		10k ohms
R1603		22k ohms
R1604		100k ohms
R1605		10k ohms
R1606		100k ohms
R1607		10k ohms
R1608		5.6k ohms
R1609		68k ohms
R1610		100k ohms, 1/8W
R1611		100k ohms
R1612		100k ohms, 1/8W
R1613		100k ohms
R1614		22k ohms
R1615		10k ohms
R1616	4-227V-11100	
R1617	4-227V-11100	
R1618	4-227V-11100	

Schematic Location	Part No.	Description
R1619		10k ohms
R1620		33k ohms
R1621		6.8k ohms
R1622		5.6k ohms
R1623		680 ohms
R1624		68k ohms
R1625		10k ohms
R1626		5.6k ohms
R1627		10k ohms
R1628		100k ohms
R1629		1k ohms
R1630		5.6k ohms
R1631		330 ohms
R1632		10k ohms
R1633		10k ohms
R1634		5.1k ohms
R1635		100k ohms
R1636		15k ohms, 1/8W
R1637		150 ohms
R1638		47k ohms
R1639		10k ohms
R1640		10k ohms
R1641		10k ohms
R1642		10k ohms
R1643		10k ohms, 1/8W
R1644		680 ohms
R1645		680 ohms
R1646		12k ohms
R1647		10k ohms
R1648		100k ohms
R1649		10k ohms
R1650		5.6k ohms
R1651		10k ohms
R1652		10k ohms
R1653		3.3k ohms
R1654		3.3k ohms
R1655		3.3k ohms, 1/8W
R1656		10k ohms
R1657		100k ohms
R1658		100k ohms (for Australia only)
R2001		1.8k ohms
R2002		1.2k ohms
R2003		22k ohms
R2004		10k ohms
R2005		3.3k ohms
R2006		100k ohms
R2007		1M ohms
R2008		22k ohms
R2009		3.3k ohms
R2010		10k ohms
R2011		2.2k ohms
R2012		270k ohms
R2051		3.3k ohms, 1/2W

CAPACITORS

Schematic Location	Part No.	Description
C1		BL Ceramic, 0.047 mfd 20%, 25V
C2		BL Ceramic, 0.047 mfd 20%, 25V
C3		Electrolytic, 47 mfd, 16V
C4		BL Ceramic, 0.01 mfd 20%, 25V
C5		Electrolytic, 10 mfd, 16V
C6		BL Ceramic, 0.047 mfd 20%, 25V
C7		BL Ceramic, 0.047 mfd 20%, 25V
C8		Electrolytic, 10 mfd, 16V
C9		BL Ceramic, 0.047 mfd 20%, 25V
C10		BL Ceramic, 0.047 mfd 20%, 25V
C11		BL Ceramic, 0.01 mfd 20%, 25V
C12		BL Ceramic, 0.047 mfd 20%, 25V
C13		Electrolytic, 10 mfd, 16V
C14		BL Ceramic, 0.047 mfd 20%, 25V
C15		BL Ceramic, 0.01 mfd 20%, 25V
C16		BL Ceramic, 0.047 mfd 20%, 25V
C17		Ceramic, 120 pF 5%, 50V (SL)
C18		Ceramic, 120 pF 5%, 50V (SL)
C24		BL Ceramic, 0.047 mfd 20%, 25V
C25		Electrolytic, 10 mfd, 16V
C26		Ceramic, 5600 pF 10%, 50V (YB)
C27		Ceramic, 470 pF 10%, 50V (B)
C28		BL Ceramic, 0.01 mfd 20%, 25V
C29		BL Ceramic, 0.047 mfd 20%, 25V
C30		Ceramic, 330 pF 10%, 50V (B)
C32		Electrolytic, 10 mfd, 16V
C33		BL Ceramic, 0.047 mfd 20%, 25V
C34		BL Ceramic, 0.01 mfd 20%, 25V
C35		Electrolytic, 1 mfd, 25V
C36		BL Ceramic, 0.047 mfd 20%, 25V
C37		BL Ceramic, 0.01 mfd 20%, 25V
C38		Ceramic, 120 pF 5%, 50V (SL)
C39		BL Ceramic, 0.047 mfd 20%, 25V
C40		BL Ceramic, 0.047 mfd 20%, 25V
C41		Electrolytic, 1 mfd, 25V
C51		Ceramic, 56 pF 5%, 50V (SL)
C53		Ceramic, 680 pF 10%, 50V (B)
C54		Ceramic, 200 pF 5%, 50V (SL)
C55		Ceramic, 680 pF 5%, 50V (SL)
C101		Electrolytic (Small type), 47 mfd, 16V
C102		Mylar, 0.022 mfd 10%, 50V
C103		Mylar, 0.022 mfd 10%, 50V
C104		BL Ceramic, 0.047 mfd 10%, 25V
C105		Ceramic, 0.01 mfd 20%, 25V, (SL)
C106		Ceramic, 0.01 mfd 20%, 25V (SL)
C107		BL Ceramic, 0.047 mfd 10%, 25V
C108		Solid Aluminum, 0.47 mfd 20%, 16V
C109		Mylar, 0.022 mfd 10%, 50V
C110		Electrolytic, 47 mfd, 10V
C111		Ceramic, 0.01 mfd 20%, 25V (SL)
C112		Ceramic, 4700 pF 20%, 25V (SL)
C113		Electrolytic, 100 mfd, 10V
C114		Electrolytic, 47 mfd, 16V
C115		Electrolytic (Small type), 33 mfd, 25V
C116		Electrolytic, 220 mfd, 6.3V
C117		Solid Aluminum, 0.1 mfd 20%, 16V
C118		Electrolytic, 47 mfd, 16V
C119		Electrolytic, 10 mfd, 16V
C120		Mylar, 0.068 mfd 10%, 50V
C121		Ceramic, 0.01 mfd 20%, 25V (SL)
C122		Ceramic, 0.01 mfd 20%, 25V (SL)
C123		Electrolytic, 1 mfd, 25V
C124		Solid Aluminum, 0.33 mfd 20%, 16V
C125		Tantalum, 0.22 mfd 10%, 35V
C126		Mylar, 0.047 mfd 10%, 50V
C127		Mylar, 1000 pF 10%, 50V
C128		Solid Aluminum, 0.47 mfd 20%, 16V
C129		Mylar, 0.1 mfd 10%, 50V
C130		Solid Aluminum, 0.68 mfd 20%, 16V
C131		Electrolytic, 2.2 mfd 20%, 50V
C132		Electrolytic, 47 mfd, 16V
C133		BL Ceramic, 0.047 mfd 10%, 25V
C134		Non Polarized Electrolytic, 1 mfd 30%, 25V
C135		Mylar, 6800 pF 10%, 50V
C136		Mylar, 0.1 mfd 10%, 50V
C137		Mylar, 0.01 mfd 10%, 50V
C138		Mylar, 0.047 mfd 10%, 50V
C139		Mylar, 0.022 mfd 10%, 50V
C201		Ceramic, 24 pF 5%, 50V (SL)
C202		Ceramic, 820 pF 5%, 50V (SL)
C203		Ceramic, 91 pF 5%, 50V (SL)
C204		BL Ceramic, 0.047 mfd 20%, 50V
C205		BL Ceramic, 0.047 mfd 20%, 50V
C206		Ceramic, 180 pF 5%, 50V (SL)
C207		Ceramic, 430 pF 5%, 50V (SL)
C208		Ceramic, 1000 pF 5%, 50V (SL)
C209		Tantalum, 10 mfd 10%, 16V
C210		Ceramic, 100 pF 5%, 50V (SL)
C211		Electrolytic, 47 mfd, 16V
C213		Ceramic, 0.1 mfd 10%, 50V
C214		Electrolytic, 4.7 mfd, 25V
C215		Ceramic, 0.01 mfd 20%, 50V (SL)
C216		Ceramic, 470 pF 5%, 50V (SL)
C217		Electrolytic, 4.7 mfd, 25V
C218		Ceramic, 0.01 mfd 20%, 50V (SL)
C219		Electrolytic, 470 mfd, 6.3V
C220		Electrolytic, 100 mfd, 10V
C221		Ceramic, 120 pF 5%, 50V (SL)
C223		Ceramic, 240 pF 5%, 50V (SL)
C224		Ceramic, 56 pF 5%, 50V (SL)
C225		Ceramic, 390 pF 5%, 50V (SL)
C226		Ceramic, 18 pF 5%, 50V (SL)
C227		Ceramic, 0.01 mfd 20%, 50V (SL)
C228		Ceramic, 0.01 mfd 20%, 50V (SL)
C229		Electrolytic, 10 mfd, 10V
C230		Electrolytic, 4.7 mfd, 25V
C231		Electrolytic, 4.7 mfd, 25V
C232		BL Ceramic, 0.047 mfd 20%, 50V
C233		Electrolytic, 47 mfd, 16V
C234		BL Ceramic, 0.047 mfd 20%, 50V
C235		BL Ceramic, 0.047 mfd 20%, 50V
C236		Electrolytic, 10 mfd, 16V
C237		BL Ceramic, 0.022 mfd 30%, 16V (X)
C238		Tantalum, 1.5 mfd 10%, 20V
C239		Ceramic, 56 pF 5%, 50V (SL)
C240		Ceramic, 470 pF 5%, 50V (SL)
C241		Ceramic, 220 pF 5%, 50V (SL)
C242		Ceramic, 0.01 mfd 20%, 50V (SL)
C243		Tantalum, 2.2 mfd 10%, 20V
C244		BL Ceramic, 0.022 mfd 20%, 50V
C245		BL Ceramic, 0.047 mfd 20%, 50V
C246		Ceramic, 0.01 mfd 20%, 50V (SL)
C247		Electrolytic, 47 mfd, 16V
C248		BL Ceramic, 0.047 mfd 20%, 50V
C249		Ceramic, 0.01 mfd 20%, 50V (SL)
C250		Ceramic, 0.01 mfd 20%, 50V (SL)
C251		Ceramic, 0.01 mfd 20%, 50V (SL)
C252		Ceramic, 0.01 mfd 10%, 50V (SL)
C253		Ceramic, 0.01 mfd 20%, 50V (SL)
C254		Ceramic, 0.01 mfd 20%, 50V (SL)
C255		Ceramic, 0.01 mfd 20%, 50V (SL)

* **BL Ceramic stands for Boundary Layer Ceramic (or Semiconductive Ceramic).**

CAPACITORS

Schematic Location	Part No.	Description
C256		Ceramic, 0.01 mfd 20%, 50V (SL)
C257		BL Ceramic, 0.047 mfd 20%, 50V
C258		BL Ceramic, 0.047 mfd 20%, 50V
C259		Ceramic, 0.01 mfd 20%, 50V (SL)
C260		Electrolytic, 47 mfd, 16V
C261		Ceramic, 100 pF 5%, 50V (SL)
C262		Ceramic, 330 pF 5%, 50V (SL)
C263		Ceramic, 100 pF 5%, 50V (SL)
C264		Electrolytic, 47 mfd, 16V
C265		BL Ceramic, 0.047 mfd 20%, 50V
C266		Electrolytic, 1 mfd, 50V
C267		Electrolytic, 47 mfd, 16V
C268		Ceramic, 150 pF 5%, 50V (SL)
C269		Ceramic, 150 pF 5%, 50V (SL)
C270		Ceramic, 0.01 mfd 20%, 50V (SL)
C271		Ceramic, 27 pF 5%, 50V (SL)
C272		Ceramic, 27 pF 5%, 50V (SL)
C273		Ceramic, 0.01 mfd 20%, 50V (SL)
C274		Ceramic, 0.01 mfd 20%, 50V (SL)
C275		Ceramic, 0.01 mfd 20%, 50V (SL)
C276		Electrolytic, 47 mfd, 16V
C277		BL Ceramic, 0.047 mfd 20%, 50V
C278		Ceramic, 0.01 mfd 20%, 50V (SL)
C279		Electrolytic, 1 mfd, 50V
C280		Ceramic, 0.012 mfd 10%, 50V (SL)
C281		Electrolytic, 1 mfd, 50V
C282		Ceramic, 0.012 mfd 10%, 50V (SL)
C283		Ceramic, 15 pF 5%, 50V (SL)
C284		Ceramic, 47 pF 5%, 50V (SL)
C285		Ceramic, 0.01 mfd 20%, 50V (SL)
C286		Ceramic, 1000 pF 5%, 50V (SL)
C287		Ceramic, 120 pF 5%, 50V (SL)
C289		Ceramic, 0.01 mfd 20%, 50V (SL)
C290		BL Ceramic, 0.047 mfd 20%, 50V
C291		Electrolytic, 47 mfd, 16V
C292		Electrolytic, 10 mfd, 10V
C293		BL Ceramic, 0.047 mfd 20%, 50V
C294		Ceramic, 330 pF 5%, 50V (SL)
C295		Ceramic, 4700 pF 5%, 50V (SL)
C296		Electrolytic, 1 mfd, 50V
C297		Ceramic, 1000 pF 5%, 50V (SL)
C298		Ceramic, 27 pF 5%, 50V (SL)
C299		Ceramic, 0.01 mfd 20%, 50V (SL)
C300		Ceramic, 220 pF 5%, 50V (SL)
C301		Ceramic, 4700 pF 5%, 50V (SL)
C302		Electrolytic, 1 mfd, 50V
C303		Electrolytic, 10 mfd, 16V
C304		Ceramic, 100 pF 5%, 50V (SL)
C305		Electrolytic, 4.7 mfd, 25V
C306		Ceramic, 0.01 mfd 10%, 50V (SL)
C307		Ceramic, 470 pF 5%, 50V (SL)
C308		Ceramic, 470 pF 5%, 50V (SL)
C309		Ceramic, 220 pF 5%, 50V (SL)
C310		BL Ceramic, 0.047 mfd 20%, 50V
C311		Electrolytic, 4.7 mfd, 16V
C312		Ceramic, 0.01 mfd 20%, 50V (SL)
C313		Ceramic, 220 pF 5%, 50V (SL)
C314		Ceramic, 680 pF 5%, 50V (SL)
C315		Electrolytic, 1 mfd, 50V
C316		Electrolytic, 10 mfd, 16V
C317		Ceramic, 680 pF 5%, 50V (SL)
C318		Electrolytic, 4.7 mfd, 25V
C319		Ceramic, 0.01 mfd 20%, 50V (SL)
C320		Electrolytic, 4.7 mfd, 25V
C321		Ceramic, 1000 pF 10%, 50V (SL)
C322		Ceramic, 1000 pF 10%, 50V (SL)
C323		BL Ceramic, 0.047 mfd 20%, 50V
C324		Ceramic, 0.01 mfd 20%, 50V (SL)
C325		BL Ceramic, 0.047 mfd 20%, 50V
C326		Ceramic, 0.01 mfd 20%, 50V (SL)

Schematic Location	Part No.	Description
C328		Ceramic, 180 pF 5%, 50V (SL)
C329		Ceramic, 15 pF 5%, 50V (SL)
C330		Ceramic, 75 pF 5%, 50V (SL)
C331		Ceramic, 220 pF 5%, 50V (SL)
C332		Electrolytic, 220 mfd, 10V
C333		Electrolytic, 100 mfd, 10V
C334		Ceramic, 270 pF 5%, 50V (SL)
C335		Ceramic, 120 pF 5%, 50V (SL)
C336		Ceramic, 82 pF 5%, 50V (SL)
C337		Ceramic, 430 pF 5%, 50V (SL)
C338		Ceramic, 180 pF 5%, 50V (SL)
C339		Ceramic, 39 pF 5%, 50V (SL)
C340		Ceramic, 8 pF 5%, 50V (SL)
C341		Ceramic, 27 pF 5%, 50V (SL)
C342		Ceramic, 120 pF 5%, 50V (SL)
C343		Ceramic, 5 pF 5%, 50V (SL)
C344		Ceramic, 16 pF 5%, 50V (SL)
C345		Ceramic, 16 pF 5%, 50V (SL)
C346		Ceramic, 6 pF 5%, 50V (SL)
C347		Electrolytic, 4.7 mfd, 16V
C348		BL Ceramic, 0.047 mfd 20%, 50V
C349		Electrolytic, 100 mfd, 10V
C350		Ceramic, 1000 pF 10%, 50V (SL)
C351		Ceramic, 0.01 mfd 20%, 50V (SL)
C353		Electrolytic, 4.7 mfd, 16V
C354		Ceramic, 270 pF 5%, 50V (SL)
C355		Ceramic, 270 pF 5%, 50V (SL)
C356		Ceramic, 33 pF 5%, 50V (SL)
C357		BL Ceramic, 0.022 mfd 20%, 50V
C358		Ceramic, 1000 pF 5%, 50V (SL)
C359		Electrolytic, 47 mfd, 10V
C360		Electrolytic, 4.7 mfd, 16V
C361		BL Ceramic, 0.047 mfd 20%, 50V
C362		Electrolytic, 100 mfd, 10V
C363		Ceramic, 0.01 mfd 20%, 50V (SL)
C364		Ceramic, 82 pF 5%, 50V (SL)
C365		Ceramic, 0.01 mfd 20%, 50V (SL)
C366		Ceramic, 0.01 mfd 20%, 50V (SL)
C367		Ceramic, 510 pF 5%, 50V (SL)
C368		Ceramic, 510 pF 5%, 50V (SL)
C369		Ceramic, 510 pF 5%, 50V (SL)
C370		Electrolytic, 1 mfd, 50V
C371		Ceramic, 0.01 mfd 20%, 50V (SL)
C372		Ceramic, 0.01 mfd 20%, 50V (SL)
C373		Electrolytic, 1000 mfd, 10V
C374		Ceramic, 0.01 mfd 20%, 50V (SL)
C375		Electrolytic, 47 mfd, 16V
C376		BL Ceramic, 0.047 mfd 20%, 50V
C377		BL Ceramic, 0.022 mfd 30%, 16V (X)
C378		BL Ceramic, 0.047 mfd 20%, 50V
C380		BL Ceramic, 0.047 mfd 20%, 50V
C381		Ceramic, 120 pF 5%, 50V (SL)
C382		BL Ceramic, 0.047 mfd 20%, 50V
C383		Ceramic, 330 pF 5%, 50V (SL)
C384		Ceramic, 390 pF 5%, 50V (SL)
C385		Ceramic, 270 pF 5%, 50V (SL)
C386		BL Ceramic, 0.047 mfd 20%, 50V
C387		BL Ceramic, 0.022 mfd 30%, 16V (X)
C388		Ceramic, 0.01 mfd 10%, 50V (SL)
C389		Ceramic, 0.01 mfd 10%, 50V (SL)
C394		Ceramic, 680 pF 5%, 50V (SL)
C395		Electrolytic, 100 mfd, 10V
C396		BL Ceramic, 0.047 mfd 20%, 50V
C397		Mylar, 0.033 mfd 20%, 50V
C400		BL Ceramic, 0.047 mfd 20%, 50V
C401		Ceramic, 240 pF 5%, 50V (SL)
C402		Mylar, 0.15 mfd 20%, 50V
C403		BL Ceramic, 0.047 mfd 20%, 50V

* **BL Ceramic stands for Boundary Layer Ceramic (or Semiconductive Ceramic).**

CAPACITORS

Schematic Location	Part No.	Description
C404		Ceramic, 0.01 mfd 10%, 50V (SL)
C405		Electrolytic, 10 mfd, 16V
C406		Ceramic, 91 pF 5%, 50V (SL)
C601		Electrolytic, 100 mfd, 6.3V
C602		Ceramic, 1200 pF, 20%, 50V (D)
C603		Ceramic, 100 pF, 5%, 50V (SL)
C604		Electrolytic, 10 mfd, 10V
C605		Electrolytic, 100 mfd, 10V
C606		Electrolytic, 4.7 mfd, 16V
C607		Ceramic, 0.01 mfd 30%, 25V (X)
C608		BL Ceramic, 0.022 mfd 10%, 25V
C609		Electrolytic, 100 mfd, 10V
C610		Electrolytic, 4.7 mfd, 16V
C611		Electrolytic, 33 mfd, 16V
C612		Electrolytic, 4.7 mfd, 16V
C613		Electrolytic, 4.7 mfd, 16V
C614		BL Ceramic, 0.015 mfd 10%, 25V
C615		Electrolytic, 4.7 mfd, 16V
C616		Ceramic, 2200 pF 30%, 25V (X)
C617		Ceramic, 6800 pF 30%, 25V (X)
C618		Electrolytic, 4.7 mfd, 16V
C619		Electrolytic, 10 mfd, 10V
C620		Electrolytic, 100 mfd, 10V
C621		Ceramic, 4700 pF 30%, 25V (X)
C622		Electrolytic, 4.7 mfd, 16V
C623		Electrolytic, 100 mfd, 6.3V
C624		Electrolytic, 220 mfd, 6.3V
C626		Mylar, 0.1 mfd 10%, 50V
C627		Electrolytic, 4.7 mfd, 16V
C628		Electrolytic, 100 mfd, 16V
C629		Electrolytic, 4.7 mfd, 16V
C630		Ceramic, 1000 pF 20%, 50V (D)
C631		Ceramic, 180 pF 10%, 50V (B)
C632		Electrolytic, 100 mfd, 16V
C633		Electrolytic, 33 mfd, 16V
C634		Ceramic, 0.01 mfd 30%, 25V (X)
C635		BL Ceramic, 0.015 mfd 10%, 25V
C636		Ceramic, 220 pF 10%, 100V (SL)
C637		Poly. film, 0.01 mfd 10%, 400V
C638		Electrolytic, 4.7 mfd, 16V
C639		Ceramic, 47 pF 5%, 50V (SL)
C640		Electrolytic, 100 mfd, 16V
C701	⚠	Electrolytic, 10000 mfd, 25V
C702	⚠	Electrolytic, 33 mfd, 35V
C703	⚠	Electrolytic, 100 mfd, 35V
C704	⚠	Electrolytic, 470 mfd, 35V
C705	⚠	Electrolytic, 100 mfd, 63V
C706		Electrolytic, 22 mfd, 25V
C707		Electrolytic, 100 mfd, 25V
C708		Electrolytic, 33 mfd, 16V
C709		Electrolytic, 220 mfd, 16V
C710		Mylar, 1000 pF, 50V
C711		Electrolytic, 100 mfd, 16V
C712		Solid Aluminum, 0.1 mfd, 25V
C801		Electrolytic, 4700 mfd, 16V
C802		Electrolytic, 1000 mfd, 10V
C803		Electrolytic, 0.47 mfd, 25V
C804		Electrolytic, 2.2 mfd, 16V
C805		Non-Polarized Electrolytic, 33 mfd, 16V
C806		Ceramic, 150 pF 20%, 50V (SL)
C807		Electrolytic, 1 mfd, 16V
C808		Mylar, 0.01 mfd 20%, 50V
C809		Electrolytic, 1 mfd, 16V
C811		Electrolytic, 33 mfd, 16V
C812		Electrolytic, 47 mfd, 16V
C813		Electrolytic, 1 mfd, 16V
C814		Electrolytic, 22 mfd, 16V
C815		Tantalum, 22 mfd 20%, 16V

Schematic Location	Part No.	Description
C816		Solid Aluminum, 1.5 mfd 20%, 25V
C817		Electrolytic, 22 mfd, 16V
C818		Mylar, 3300 pF 20%, 50V
C819		Mylar, 3300 pF 20%, 50V
C820		Mylar 0.047 mfd 20%, 50V
C821		Mylar, 0.047 mfd 20%, 50V
C822		Electrolytic, 10 mfd, 16V
C823		Electrolytic, 33 mfd, 16V
C824		Electrolytic, 10 mfd, 16V
C825		Electrolytic, 220 mfd, 16V
C826		Electrolytic, 220 mfd, 16V
C827		Electrolytic, 33 mfd, 16V
C828		Electrolytic, 22 mfd, 16V
C829		Electrolytic, 47 mfd, 16V
C830		Electrolytic, 1000 mfd, 6.3V
C901		Ceramic, 47 pF 5%, 50V (RH)
C902		Ceramic, 39 pF 5%, 50V (RH)
C903		Ceramic, 20 pF 5%, 50V (RH)
C904		Ceramic, 4700 pF 10%, 50V (YB)
C905		Ceramic, 68 pF 5%, 50V (RH)
C906		Ceramic, 0.01 mfd +80—20%, 50V (YF)
C907		Ceramic, 120 pF 5%, 50V (RH)
C908		Ceramic, 4700 pF 10%, 50V (YB)
C909		Ceramic, 22 pF 5%, 50V (RH)
C910		Ceramic, 0.01 mfd, +80—20%, 50V (YF)
C911		Ceramic, 27 pF 5%, 50V (RH)
C912		Ceramic, 5 pF +0.25 pF, 50V (RH)
C913		Ceramic, 5 pF +0.25 pF, 50V (RH)
C915		Ceramic, 0.01 mfd +80—20%, 50V (YF)
C916		Electrolytic, 4.7 mfd 16V
C917		Ceramic, 0.01 mfd, +80—20%, 50V (YF)
C918		Electrolytic, 47 mfd, 16V
C919		Mylar, 0.01 mfd 5%, 50V
C920		Electrolytic, 4.7 mfd, 16V
C921		Electrolytic, 4.7 mfd, 16V
C922		Ceramic, 33 pF 5%, 50V (PH)
C923		Ceramic, 27 pF 5%, 50V (PH)
C924		Ceramic, 1 pF +0.25 pF, 50V (SL) (for Continent and England)
C924		Ceramic, 1.5 pF +0.25 pF, 50V (SL) (for Australia)
C925		Ceramic, 12 pF 5%, 50V (PH)
C926		Ceramic, 12 pF 5%, 50V (PH)
C927		Ceramic, 1000 pF 10%, 50V (YB)
C928		Electrolytic, 47 mfd, 16V
C929		Ceramic, 0.01 mfd, +80—20%, 50V (YF)
C930		Ceramic, 15 pF 5%, 50V (RH)
C931		Ceramic, 1000 pF 10%, 50V (YB)
C932		Ceramic, 100 pF 5%, 50V (RH)
C933		Ceramic, 18 pF 5%, 50V (RH)
C934		Ceramic, 0.047 mfd +80—20%, 50V (YF)
C935		Mylar, 0.01 mfd 5%, 50V
C936		Electrolytic, 10 mfd, 16V
C937		Electrolytic, 10 mfd, 16V
C938		Ceramic, 120 pF 10%, 50V (SL)
C939		Electrolytic, 470 mfd, 16V
C940		Ceramic, 0.01 mfd +80—20%, 50V (YF)
C942		Electrolytic, 47 mfd, 16V
C943		Ceramic, 0.01 mfd +80—20%, 50V (YF)
C944		Electrolytic, 220 mfd, 16V

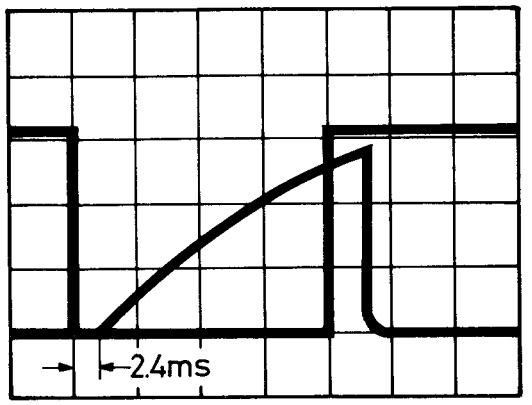
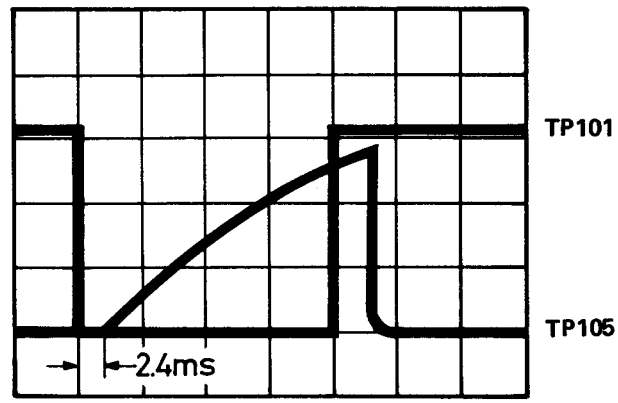
* **BL Ceramic stands for Boundary Layer Ceramic (or Semiconductive Ceramic).**

CAPACITORS

Schematic Location	Part No.	Description
C945		Ceramic, 0.01 mfd +80–20%, 50V (YF)
C946		Electrolytic, 47 mfd, 16V
C947		Ceramic, 180 pF 5%, 50V (SL)
C1101	⚠ 4-223V-16300	Metallized Polyestel, 0.1 mfd, 250VAC
C1102	⚠ 4-223V-15400	Metallized Polyestel, 3 mfd, 250VAC
	or ⚠ 4-223V-25900	Metallized Polyestel, 3 mfd, 250VAC
C1201		Ceramic, 1000 pF 10%, 50V (SL)
C1601		Electrolytic, 1 mfd, 16V
C1602		Electrolytic, 33 mfd, 16V
C1603		BL Ceramic, 0.01 mfd 20%, 50V
C1604		Electrolytic, 10 mfd, 16V
C1605		Electrolytic, 1000 mfd, 16V
C1606		BL Ceramic, 0.022 mfd 20%, 16V
C1607		Electrolytic, 10 mfd, 16V
C1608		Ceramic, 0.01 mfd +100–0%, 50V (E)
C1609		Electrolytic, 220 mfd, 10V
C1610		Electrolytic, 10 mfd, 16V
C1611		BL Ceramic, 0.022 mfd 20%, 16V
C1612		BL Ceramic, 47 pF 10%, 50V
C1613		Electrolytic, 220 mfd, 10V
C1614		Solid Aluminum, 2.2 mfd 20%, 16V
C1615		Electrolytic, 33 mfd, 16V
C1616		Electrolytic, 10 mfd, 16V
C1617		Electrolytic, 10 mfd, 16V
C1618		Solid Aluminum, 0.47 mfd 20%, 16V
C2001		Electrolytic, 22 mfd, 50V
C2002		Ceramic, 0.01 mfd +80–20%, 50V (YF)
C2051		Electrolytic, 100 mfd, 63V
C2052		Electrolytic, 100 mfd, 100V

* **BL Ceramic stands for Boundary Layer Ceramic (or Semiconductive Ceramic).**

CORRECTION SHEET FOR VTC 9300P

Page	MISPRINT	CORRECT
Page 8	**(1) Video Head Disk Rotation**	
	5. After the adjustment, connect the plug P101 as before.	5. After the adjustment, connect the plug P104 as before.
Page 12	Fig. 3-10 Play Servo Lock Phase  Fig. 3-10 Play Servo Lock Phase	Fig. 3-10 Play Servo Lock Phase  Fig. 3-10 Play Servo Lock Phase
Page 30	**(7) Overall Frequency Response Adjustment**	
	1. Apply a 50 Hz, –40 dB (0.022Vp-p) signal to the "AUDIO" input terminal	1. Apply a 50 Hz, –40 dBm (0.022Vp-p) signal to the "AUDIO" input terminal .....
Page 47	Fig. 4-7 Spacers (Special Washer: See Ref. No. 12)	Fig. 4-7 Spacers (Special Washer: See Ref. No. 12 on Page 78)

MODIFICATION NOTICE

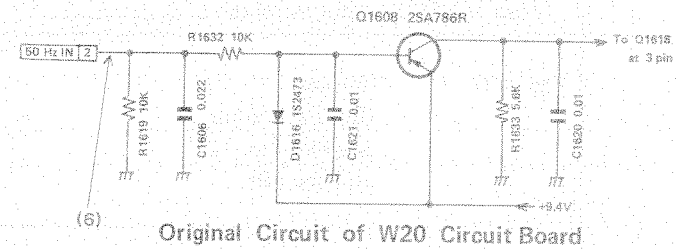
A modification of the timer circuit on W20 circuit board has been made in our latest production in order to make a clock performance accurate.

The following parts have been eliminated from the timer circuit;

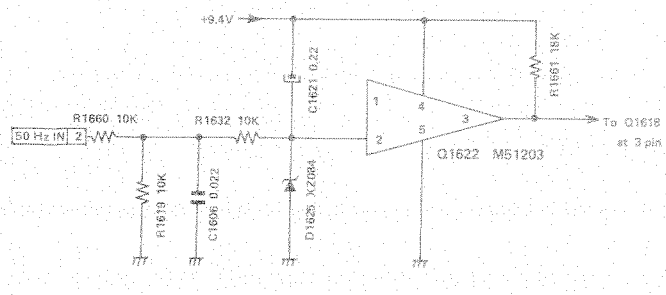
(1) Q1608 2SA786R
(2) D1616 1S2473
(3) R1633 5.6K ohms (or 10K ohms)
(4) C1620 0.01 micro-farads
(5) C1621 0.01 micro-farads) Note: Items (4) and (5) have not been used in initial production.
(6) Jumper-lead

and they have been superseded by the parts given below;

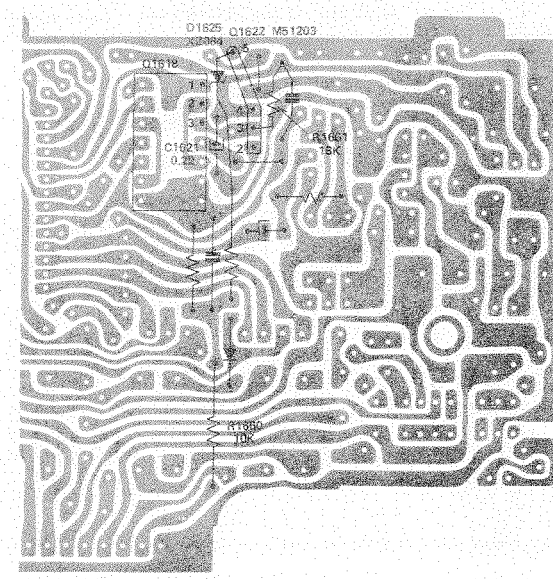
(1) Q1622 M51203
(2) D1625 XZ084
(3) R1660 10K ohms, ¼W
(4) R1661 18K ohms, ¼W
(5) C1621 0.22 micro-farads, 16V, Tantalum.



Original Circuit of W20 Circuit Board

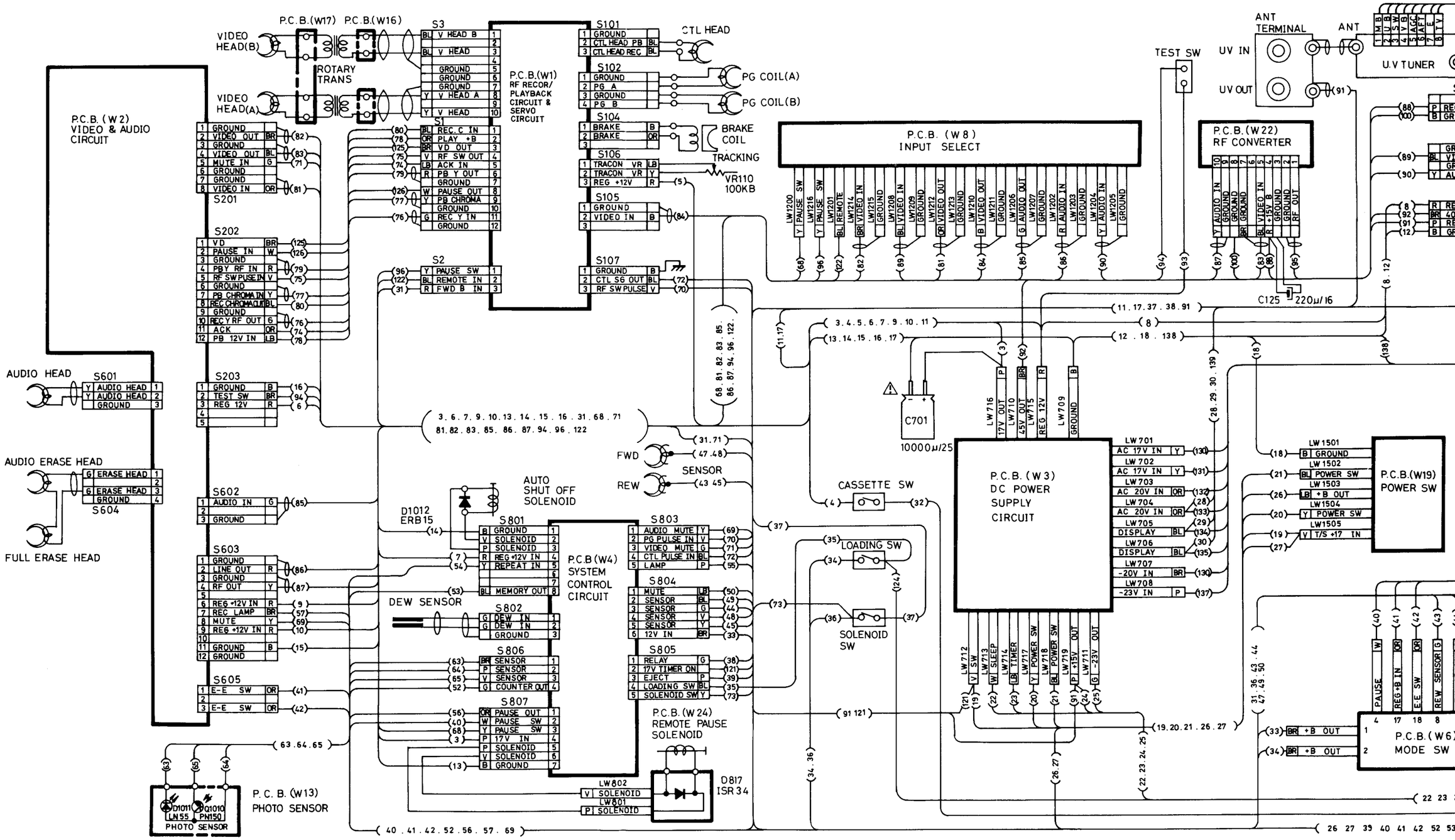


Modified Circuit of W20 Circuit Board

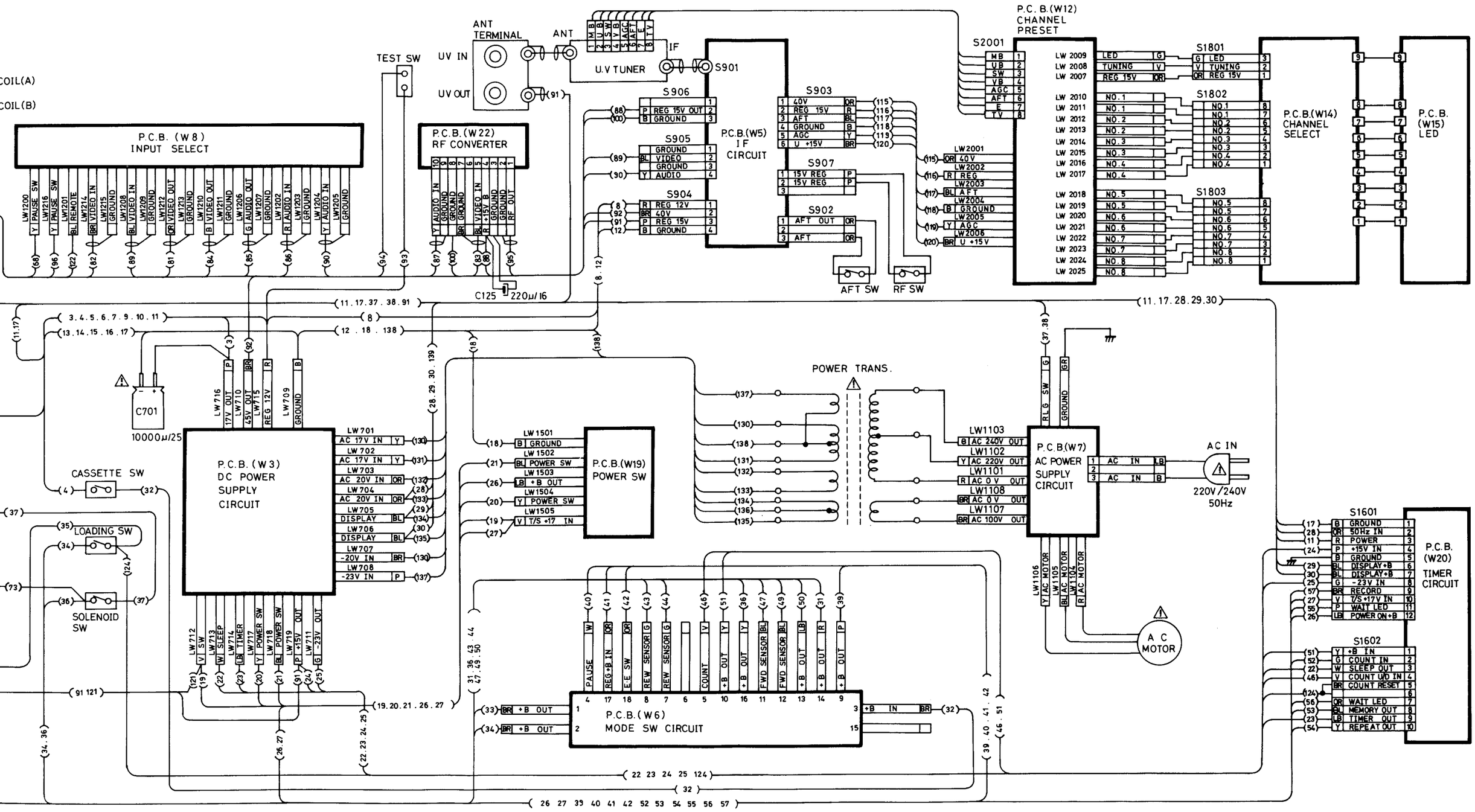


Simplified Illustration of W20 Circuit Board

INTER-CIRCUIT BOARD WIRING DIAGRAM



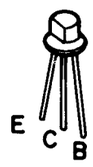
INTER-CIRCUIT BOARD WIRING DIAGRAM



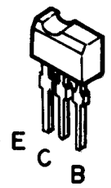
SEMICONDUCTOR'S TERMINAL IDENTIFICATION



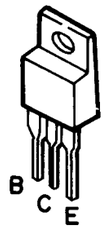
2SA608 2SA719
2SC536 2SC930
2SC1634 2SA733
2SC1740 2SC1741R
2SD545 2SK68AM
2SC945 2SA509
2SD400 2SD438



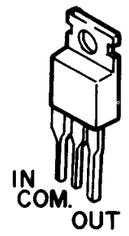
2SA562Y
2SC382W
2SC388A



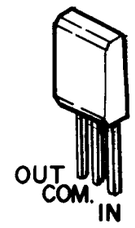
2SA786
2SC2021



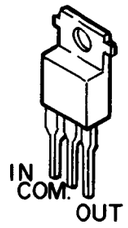
2SC1826
2SD313
2SD330
2SB507



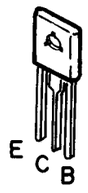
FS7815M



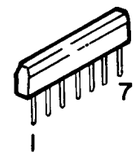
μPC78L05



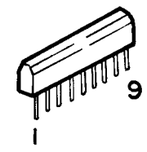
μPC78M15H



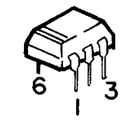
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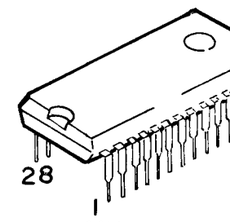
TA7504S
TA7174P
uPC566H3



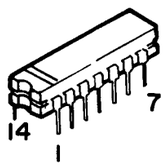
LA3210



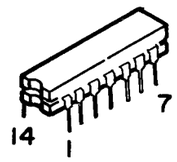
CX-130



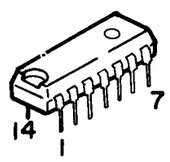
MP2721



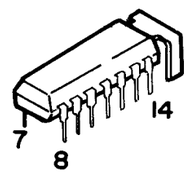
AN240P



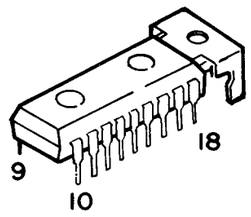
TC4069P



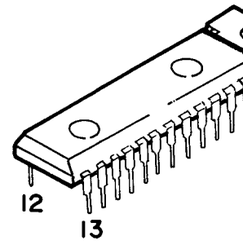
SN74LS93N SN74LS74AN
SN74LS10N SN7400N
SN74LS73AN



CX-150

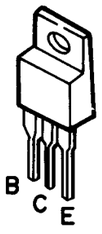


CX-145

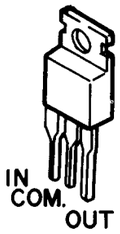


CX-136A CX
CX-131A CX
CX-135 CX
CX-137A CX

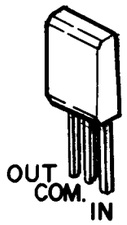
IAL IDENTIFICATION



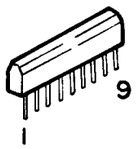
2SC1826
2SD313
2SD330
2SB507



FS7815M



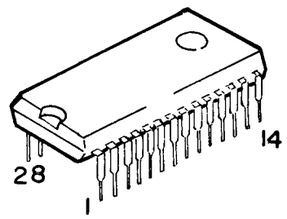
μPC78L05



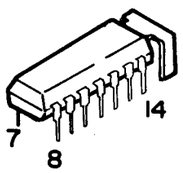
LA3210



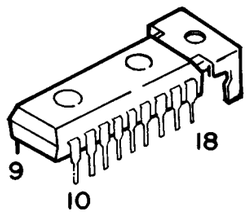
CX-130



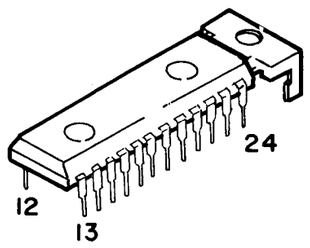
MP2721



CX-150



CX-145



CX-136A
CX-131A
CX-135
CX-137A
CX-141
CX-139A
CX-134A
CX-138

PRODUCT SAFETY NOTICE

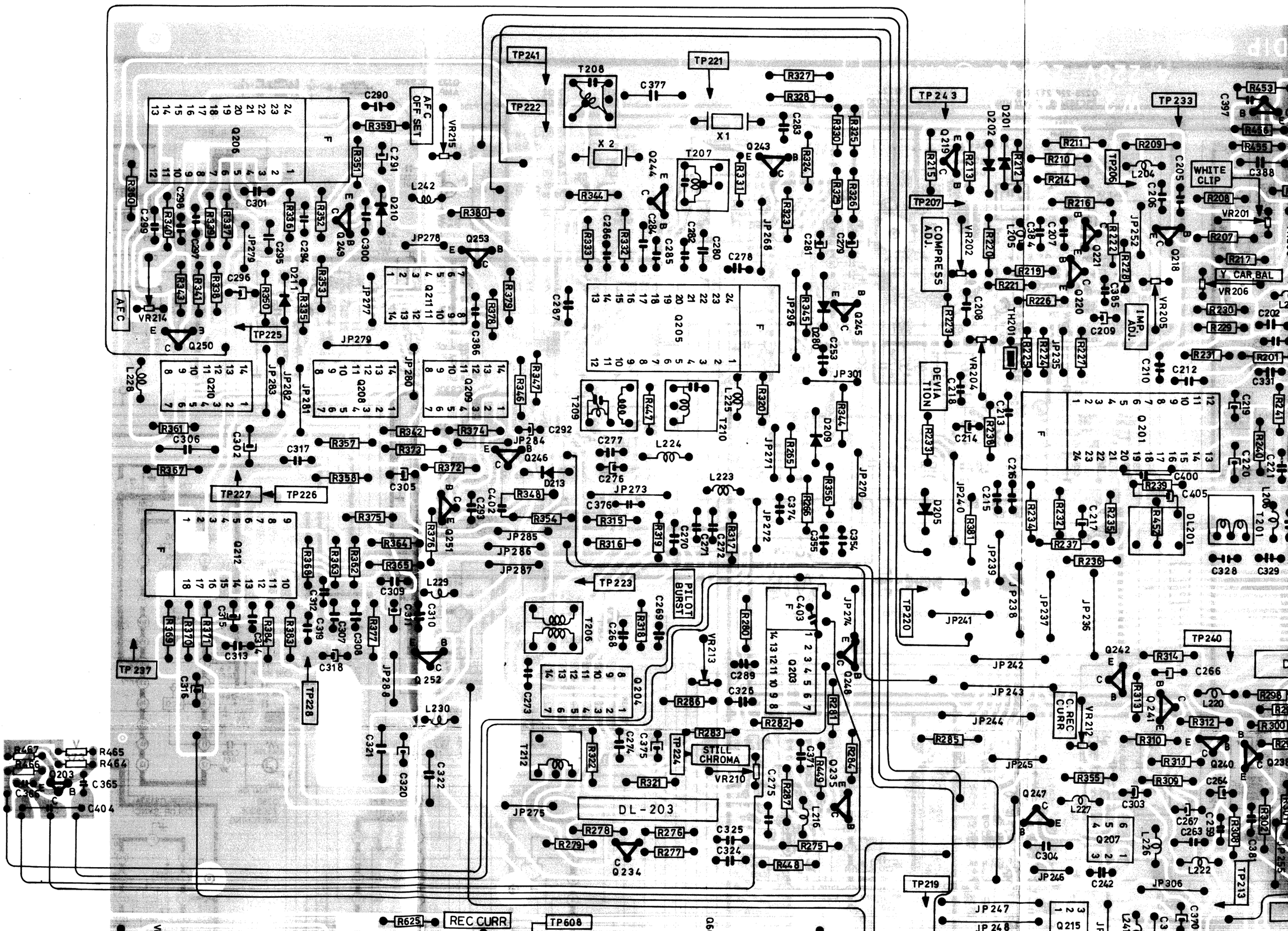
The components designated by a symbol(⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the Parts List. Do not deviate from the resistance, wattage and voltage ratings shown.

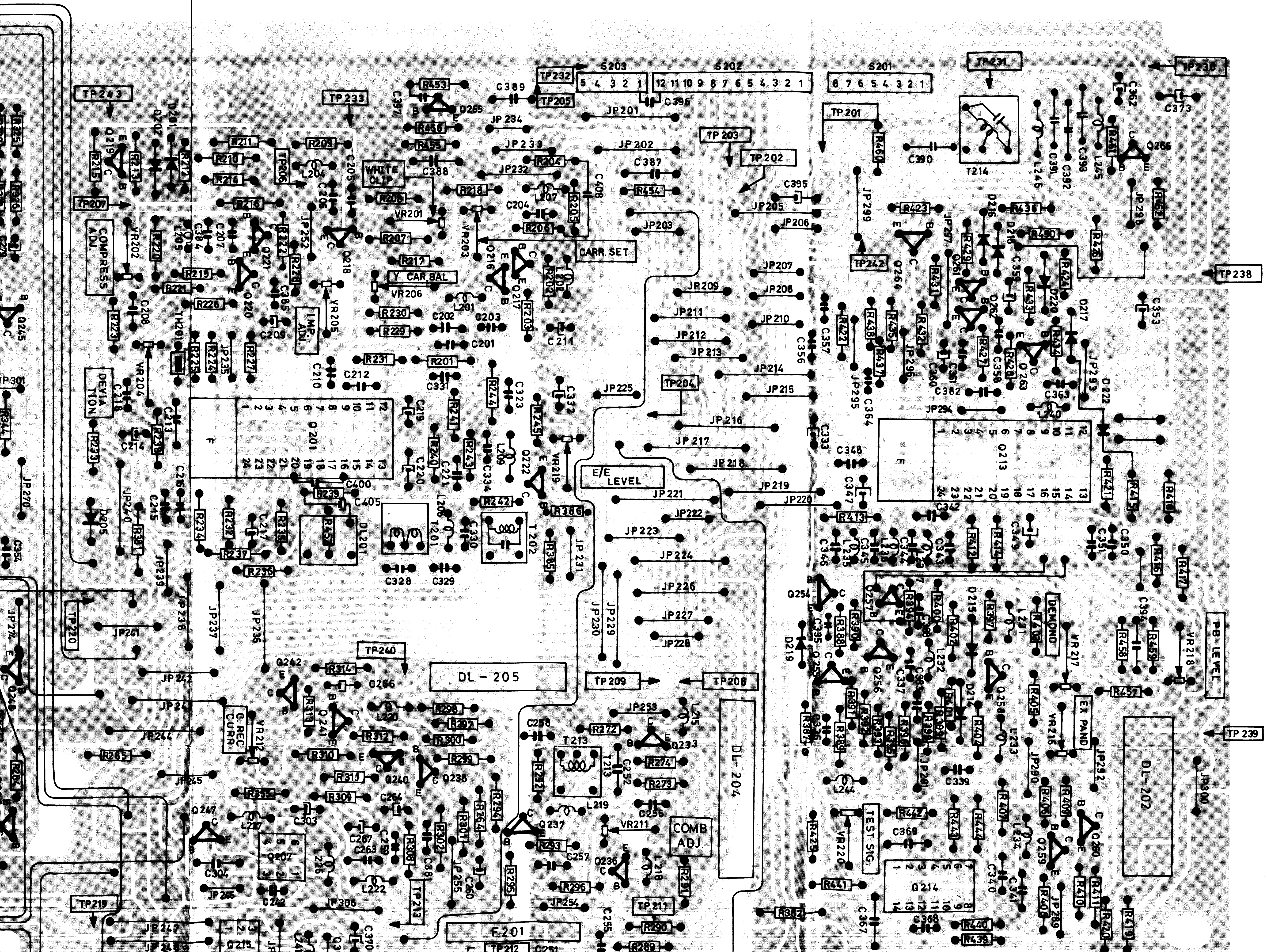
NOTE:

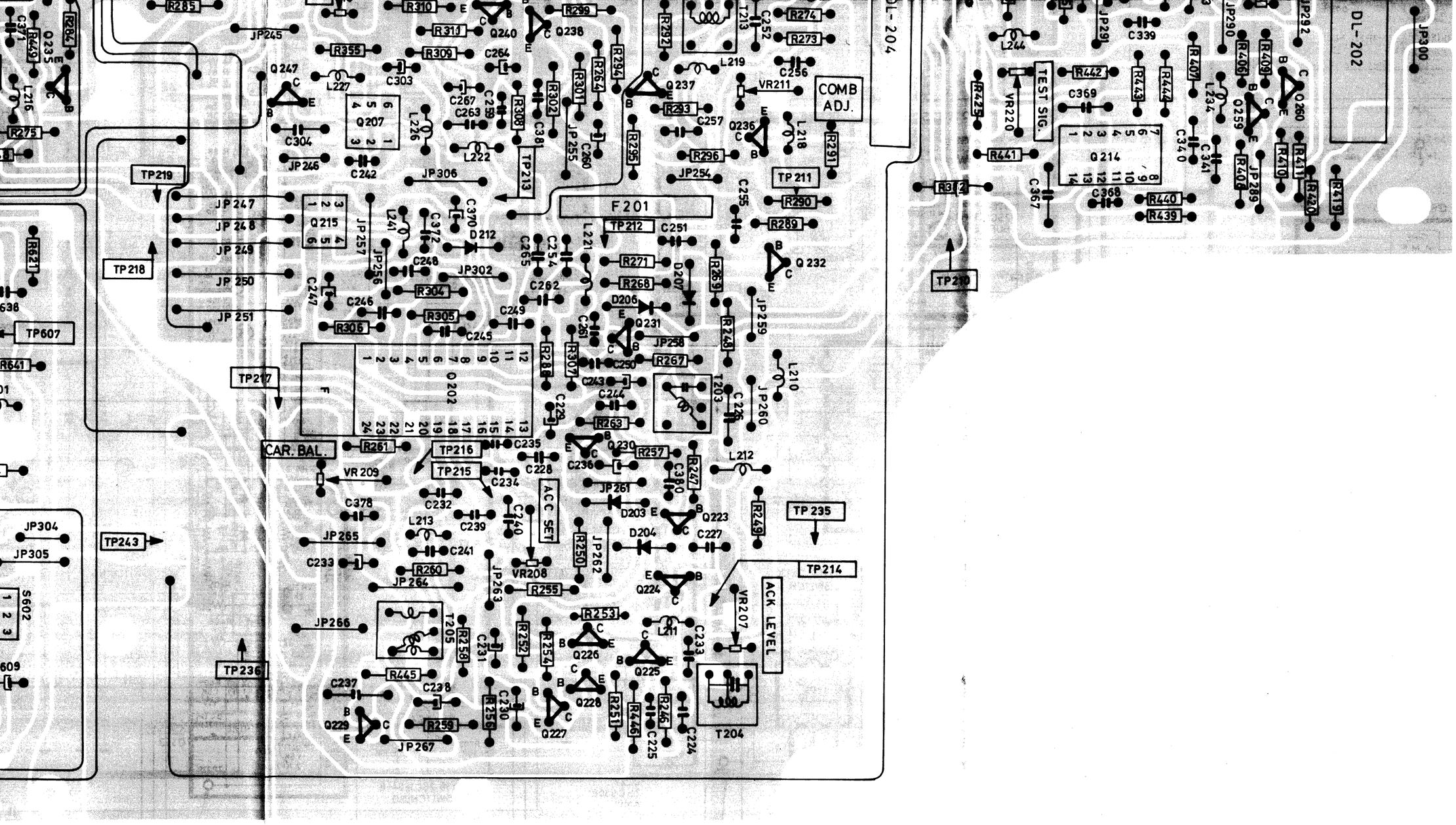
1. All resistance values in "OHMS" unless otherwise noted. (K = 1,000, M = 1,000,000)
2. All capacitance values in "mfd" unless otherwise noted. (P = micro-micro farad)
3. All inductance values in "mH" unless otherwise noted. (μ = micro henry)
4. Testers used for voltage measurement should have the following impedance.
   Digital multimeter: More than 10MΩ
   Multimeter: More than 5,000Ω/1V DC
5. Remarks on voltage chart.
   * All voltages are measured with digital multimeter.
   * Voltages indicated in ( ) are measured with multimeter.
   * If measurement values are same between digital multimeter and multimeter, values with digital multimeter are indicated.
   * Marks indicated in [ ] respectively indicate the following modes;
     (W1) P.C.B. VIDEO RECORD/PLAYBACK & SERVO circuit
     R: RECORD mode
     P: PLAY mode
     S: STILL mode
     B/W: BLACK & WHITE mode (otherwise, COLOR mode)
     (W2) P.C.B. -VIDEO Circuit-
     R: RECORD mode
     P: PLAY mode
     T: TEST SIGNAL Switch turned on
     B/W: BLACK & WHITE mode (otherwise, STOP/COLOR mode)
     (W2) P.C.B. -AUDIO Circuit-
     R: RECORD mode (333Hz standard input)
     P: PLAY mode (333Hz standard tape)
     S: STOP mode
     *: Alternating Current
     (W3) P.C.B. DC POWER SUPPLY circuit
     R: RECORD mode
     P: PLAY mode
     T: TIMER on
     (W4) P.C.B. SYSTEM CONTROL circuit
     P: PLAY/RECORD mode
     F: F. FWD mode
     R: REW mode
     S: STOP mode
     L: LOADING mode
     E: EJECT mode
     D: DEW condensation mode **(W5)** P.C.B. VIDEO/SOUND IF circuit, **(W12)** P.C.B. CHANNEL PRE-SET circuit
     "ANT IN" Input: Low channel signal at VHF (BAND I), 70dBμ
   * Voltage measurements on (W20) TIMER circuit board are made under the following condition:
     POWER Switch: ON
     ALL Mode Switches: OFF
     Time Display: 12:00
     REC DAY Selector: "1"
     REC TIME Selector: "END"
     AC values in root-mean-square.
6. Marks indicated in each connector indicate the following color of wire.

B: Black	**GR:** Gray	**R:** Red
BL: Blue	**LB:** Light Blue	**V:** Violet
BR: Brown	**OR:** Orange	**W:** White
G: Green	**P:** Pink	**Y:** Yellow

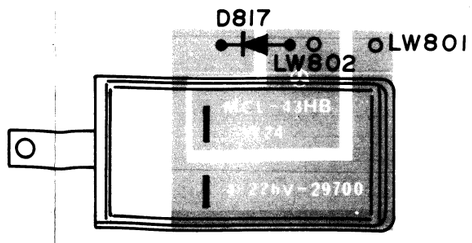
W2 CIRCUIT BOARD



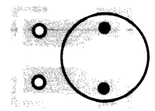

4-226V-2>00 © JAPAN
W2 (PAL)
TP243
TP233
TP232
TP205
S203
5 4 3 2 1
S202
12 11 10 9 8 7 6 5 4 3 2 1
S201
8 7 6 5 4 3 2 1
TP231
TP230
TP201
TP203
TP202
T214
TP207
WHITE CLIP
CARR. SET
COMPRESS ADJ.
Y CAR BAL
IMP. ADJ.
TP242
TP238
DEVIA TION
Q201
Q213
TP204
E/E LEVEL
DL201
T201
T202
TP220
DL-205
TP240
TP209
TP208
DL-204
C.REC CURR
DEMOND
PB LEVEL
EX PAND
TP239
DL-202
T213
COMB ADJ.
TEST SIG.
Q207
Q214
TP219
TP213
TP211
F201
TP212
Q215

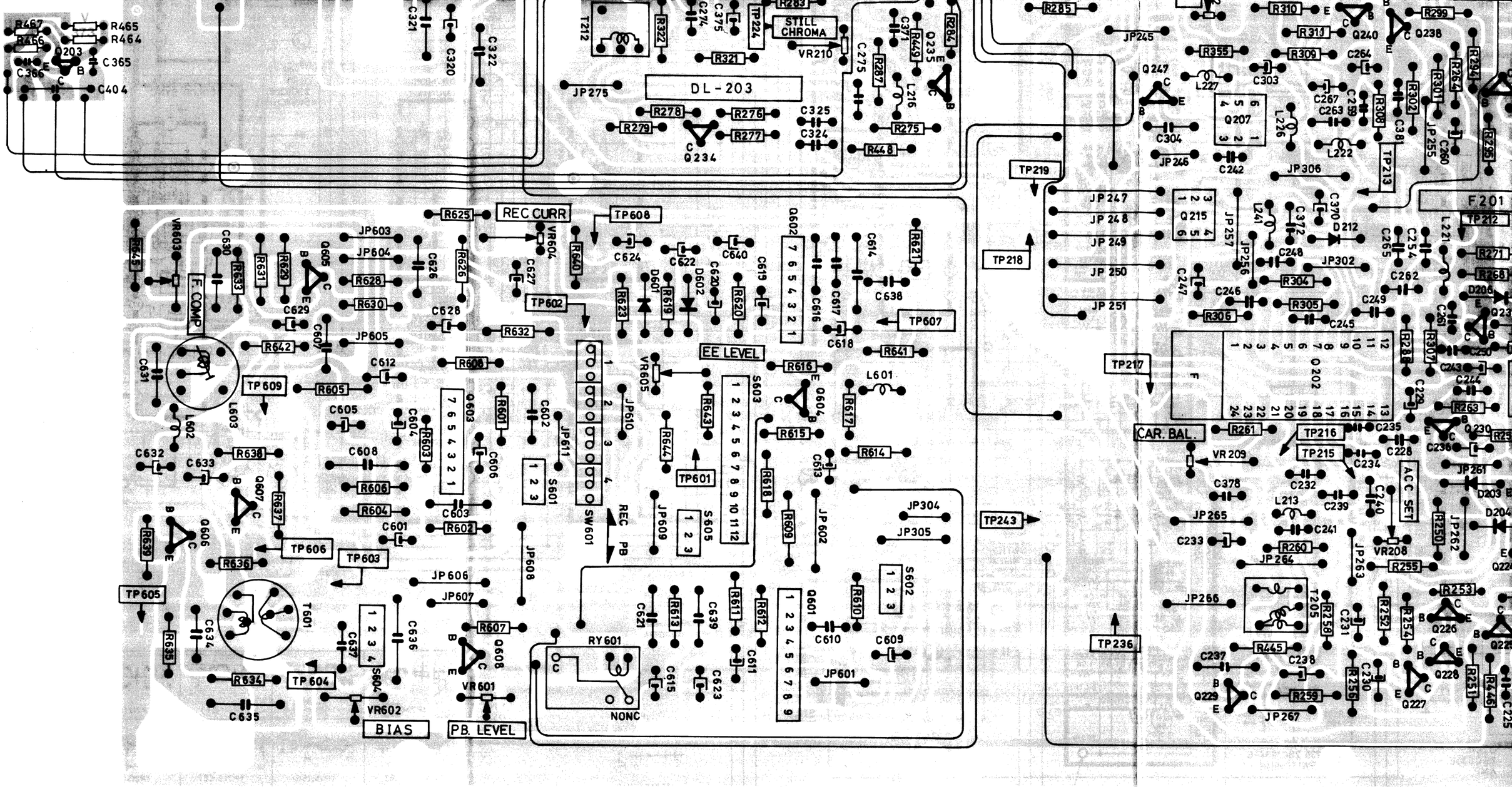


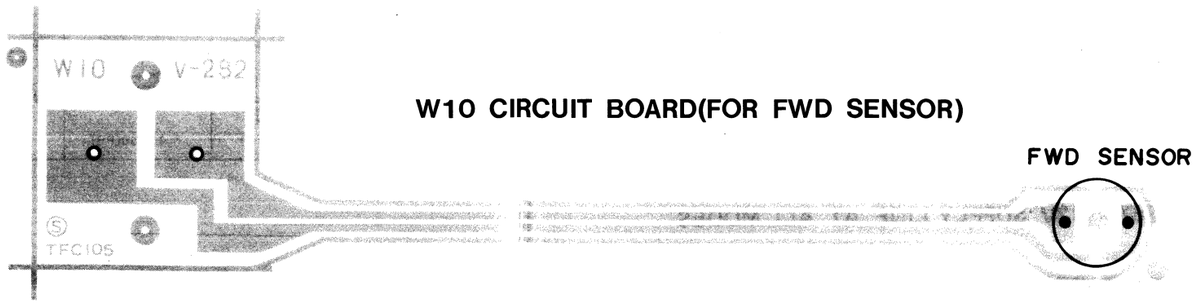
W24 CIRCUIT BOARD



W23 CIRCUIT BOARD

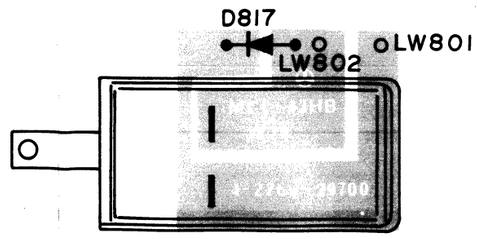






W10 CIRCUIT BOARD(FOR FWD SENSOR)

W24 CIRCUIT BOARD



SCHEMATIC DIAGRAM V VIDEO & SOUND CIRCITS (O

2V(DC) Q203-12	100mVpp CX136-19 (PB)
100m Vpp H Q206-6(REC)	2Vpp Q206-5 (EE)
1.9Vpp Q212-5(EE)	6Vpp H Q212-10(EE)
0.34Vpp Q213-9 (STILL)	16Vpp Q214-4 5(REC)

S203: GROUND 5, GROUND 4, R REG 12V 3, BR TEST 12V IN 2, B GROUND 1

S202: LB PB+12V IN 12, OR A C K 11, G REC YRF OUT 10, GROUND 9, BL REC CHROMA OUT 8, Y PB CHROMA IN 7, GROUND 6, V RF SW PULSE IN 5, R PB YRF IN 4, GROUND 3, W PAUSE 2, BR V D 1

S201: OR VIDEO IN 8, GROUND 7, GROUND 6, G MUTE IN 5, BL VIDEO OUT 4, GROUND 3, BR VIDEO OUT 2, GROUND 1

Q 601 LA 3210 PRE AMP

Q216, Q217 2SA719Q R453 1K ⟷ 2SA838C 560

Q216 2SA719Q (2SA838C) AMP

Q265 2SC930E BUFFER

Q266 2SC1634-8 BUFFER

Q217 2SA719Q (2SA838) AMP

Q218 2SC930E BUFFER

Q218 2SC930E COMPRESS ADJ

DEVIATION

Q201 CX131A MODULATOR

WHITE CLIP

IMP ADJ.

Y CAR. BAL.

CARR. SET

Q220 2SC930E AMP

Q221 2SA564 or 2SA838 BUFFER

Q225·226·227·228 2SC1634-8 SWITCHING

Q223 2SC930E SWITCHING

Q224 2SC930E SWITCHING

ACK LEVEL

Q226

Q227 ACC SET

Q228

Q229 2SC1634-8 BUFFER

Q230 2SC1634-8

Q222 2SC1634-8 SWITCHING

F/E LEVEL

Q213 CX-135 DEMODULATOR

DEMOD

NOISE CANCEL

Q254 2SC930E BUFFER

Q255 2SA719Q AMP

Q262 2SC1634-8 BUFFER

Q263 2SC1634-8 BUFFER

Q264 2SC1634-8 BUFFER

Q261 2SC1634-8 SWITCHING

PB LEVEL

CAR. BAL

TP232 TP205 (EE) 4.8Vpp 3.8MHz TP203 (REC) 6Vpp TP202 (PB) 1.4Vpp TP204 TP205 TP210 TP203 TP202 TP231 (EE) 0.68Vpp TP231 (REC) 0.7Vpp TP231 TP238 TP201 TP230 TP230 (EE) 1Vpp TP242 TP243 TP206 TP207 TP234 TP235 TP214 TP216 TP217 TP215 TP240 TP233 1.1Vpp CX131-10 0.2μS 0L TP240 (EE) 5Vpp Q202-15(PB) 100mVpp

SCHEMATIC DIAGRAM Ⅴ VIDEO & SOUND CIRCITS (ON V

2V(DC) Q203-12	100mVpp CX136-19 (PB)
100m Vpp H Q206-6(REC)	2Vpp Q206-5 (EE)
1.9Vpp Q212-5(EE)	6Vpp H Q212-10(EE)
0.34Vpp Q213-9 (STILL)	16Vpp Q214-4 5(REC)

Q216, Q217 2SA719Q ⟷ 2SA838C
R453 1K ⟷ 560

Q218 2SC930E BUFFER

Q225·226·227·228 2SC1634-8 SWITCHING

Q223 2SC930E SWITCHING

Q224 2SC930E SWITCHING

DEVIATION

WHITE CLIP

IMP ADJ.

Q219 2SC930E AMP COMPRESS ADJ.

Q201 CX131A MODULATOR

SYNC ADD DET

SYNC SEP

CLAMP

PRE EM

CLIP

F M MOD

AGC

Y CAR. BAL

CARR. SET

ACK LEVEL

Q226

Q227 ACC SET

Q225

Q228

CAR. BAL

Q216 2SA719Q (2SA838C) AMP

Q265 2SC930E BUFFER

Q266 2SC1634-8 BUFFER

Q217 2SA719Q (2SA838) AMP

Q220 2SC930E AMP

Q221 2SA564 or 2SA838 BUFFER

Q229 2SC1634-8 BUFFER

Q230 2SC1634-8

E/E LEVEL

Q222 2SC1634-8 SWITCHING

Q213 CX-135 DEMODULATOR

DEMOD

NOISE CANCEL

PB LEVEL

Q254 2SC930E BUFFER

Q255 2SA719Q AMP

Q212 CX145 TIMMING

Q262 2SC1634-8 BUFFER

Q263 2SC1634-8 BUFFER

Q264 2SC1634-8 BUFFER

Q261 2SC1634-8 SWITCHING

Q601 LA 3210

PRE

S 203

GROUND	5
GROUND	4
REG 12V	3
TEST 12V IN	2
GROUND	1

S 202

PB+12V IN	12
A C K	11
REC YRF OUT	10
GROUND	9
REC CHROMA OUT	8
PB CHROMA IN	7
GROUND	6
RF SW PULSE IN	5
PB YRF IN	4
GROUND	3
PAUSE	2
V D	1

S 201

VIDEO IN	8
GROUND	7
GROUND	6
MUTE IN	5
VIDEO OUT	4
GROUND	3
VIDEO OUT	2
GROUND	1

TP205 (EE) 4.8Vpp 3.8MHz

TP203 (REC) 6Vpp

TP202 (PB) 1.4Vpp

TP231 (EE) 0.68Vpp

TP231 (REC) 0.7Vpp

TP230 (EE) 1Vpp

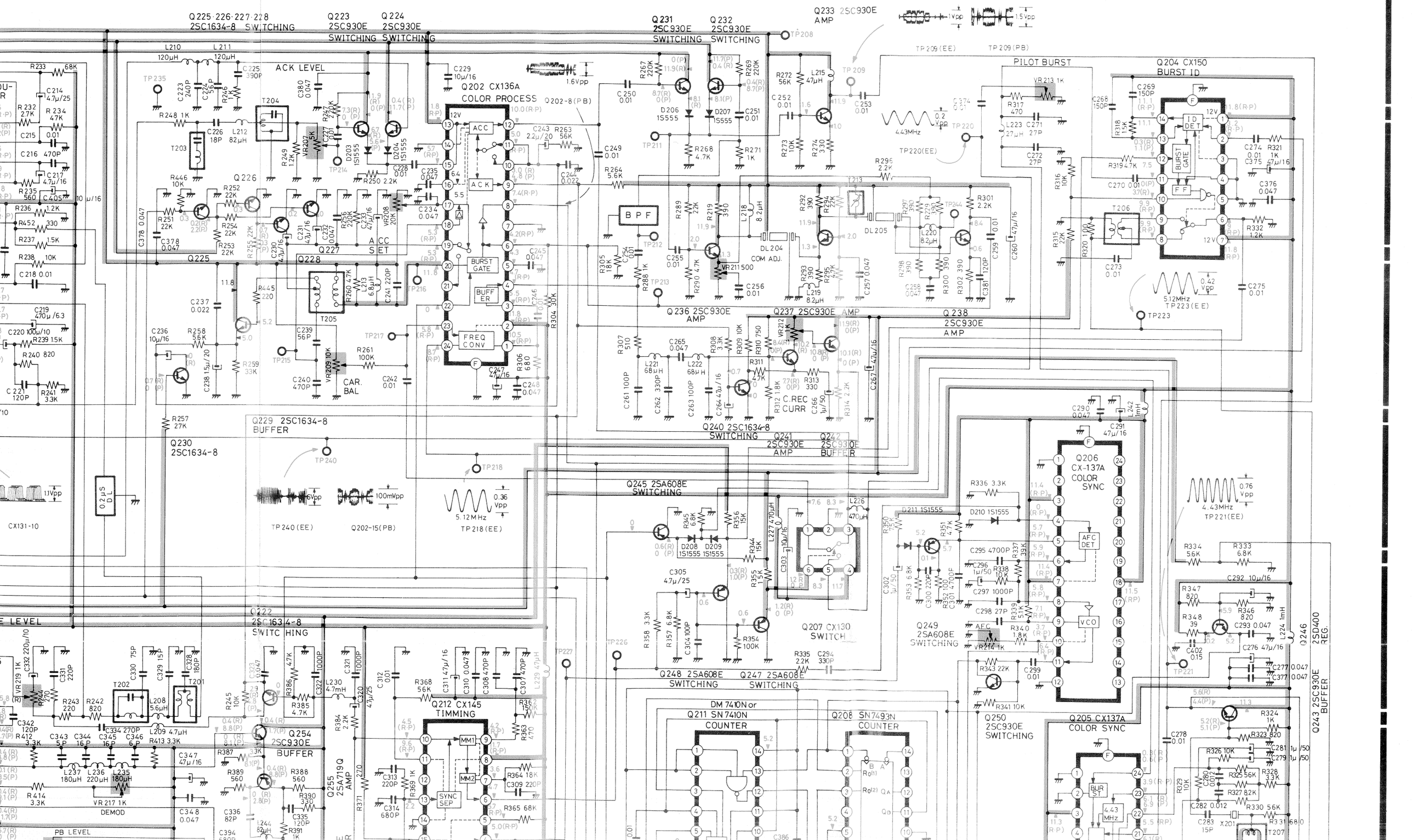
CX131-10 1.1Vpp 0.2μS DL

TP240 (EE) 6Vpp

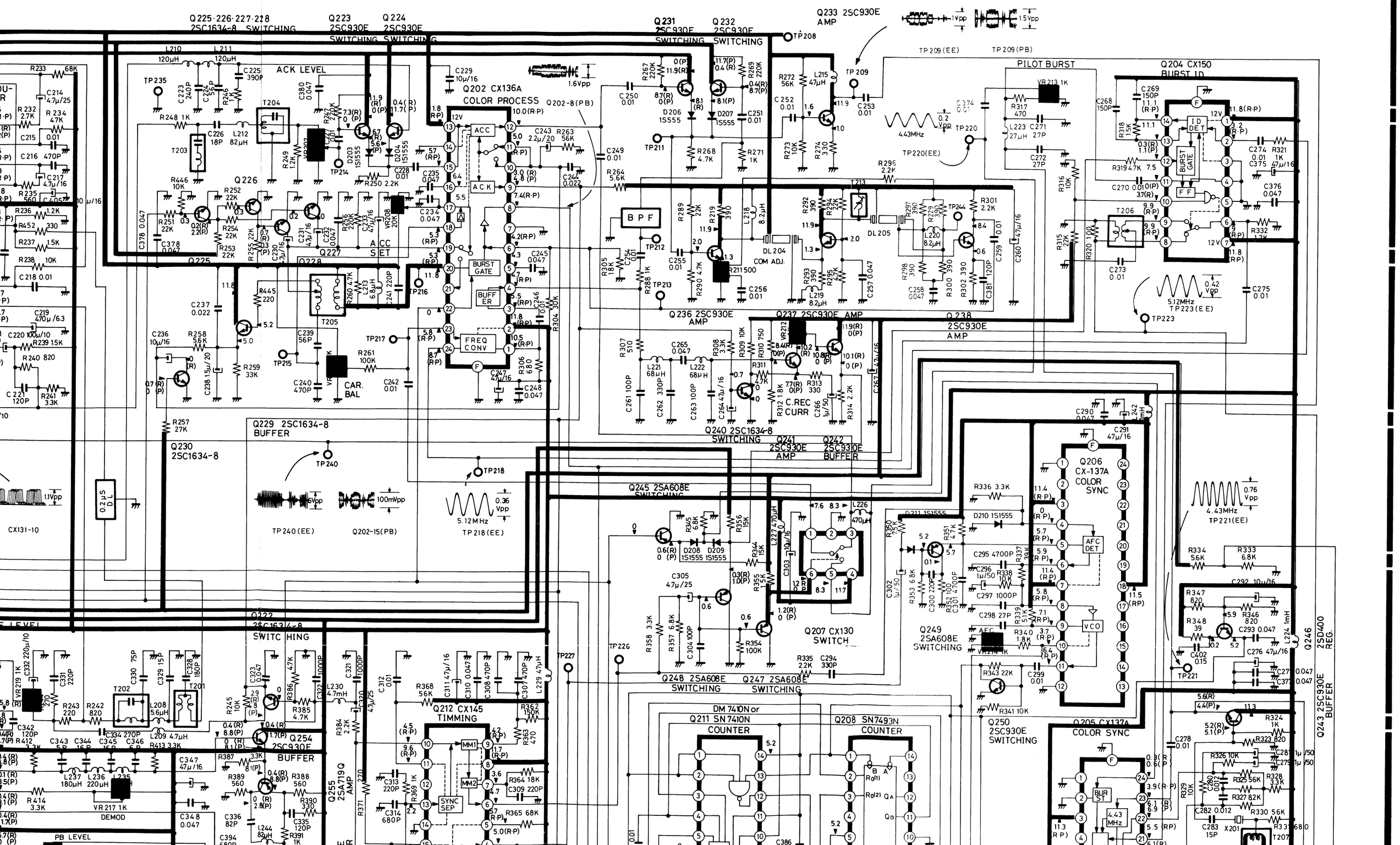
Q202-15 (PB) 100mVpp

5.12MHz

M V VIDEO & SOUND CIRCITS (ON W2 CIRCUIT BOARD)



M V VIDEO & SOUND CIRCITS (ON W2 CIRCUIT BOARD)



Q248 2SA608E SWITCHING

Q247 2SA608E SWITCHING

Q212 CX145 TIMMING

DM 7410N or Q211 SN7410N COUNTER

Q208 SN7493N COUNTER

Q209 SN7474N COUNTER

Q210 SN7493N COUNTER

AFC OFFSET

Q250 2SC930E SWITCHING

Q205 CX137A COLOR SYNC

Q255 2SA719Q AMP

Q256 2SC930E BUFFER

Q257 2SA719Q AMP

Q254 2SC930E BUFFER

Q243 2SC930E BUFFER

Q244 2SC930E BUFFER

Q252 2SC1634-8 SWITCHING

Q251 2SC1634-8 SWITCHING

Q253 2SC1634-8 SWITCHING

Q258 2SC930E AMP

Q259 2SC930E AMP

Q260 2SC930E AMP

Q234 2SC930E AMP

Q235 2SC1634-8 SWITCHING

DEMOD

PB LEVEL

D L 0.6 μS

-FREQ CONV

STILL CHROMA

TP239(PB)

TP222(EE)

TP224 (STILL)

TP219 (CH1) TP224(CH2)

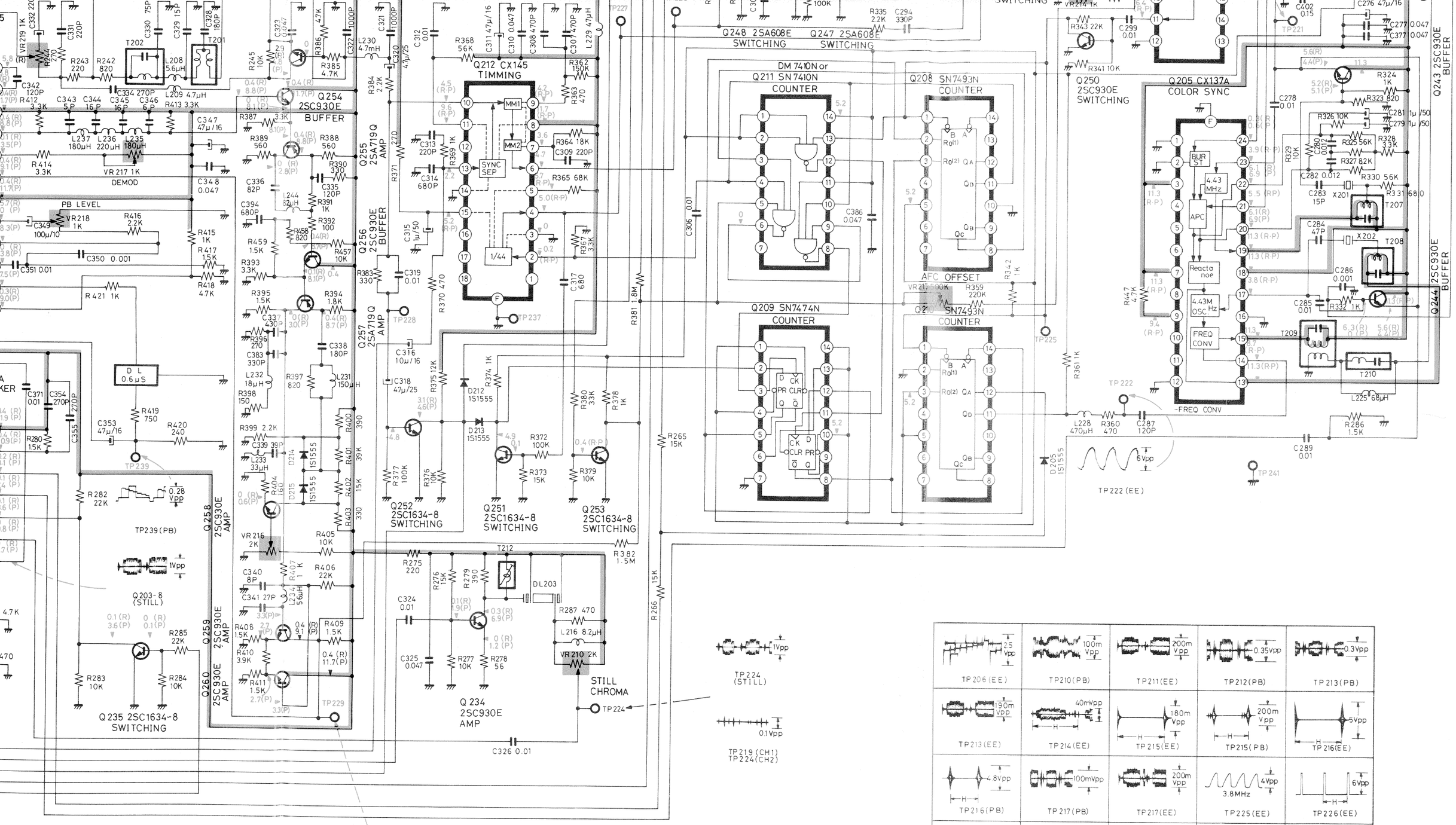
TP229(PB)

TP206(EE)	TP210(PB)	TP211(EE)	TP212(PB)	TP213(PB)
TP213(EE)	TP214(EE)	TP215(EE)	TP215(PB)	TP216(EE)
TP216(PB)	TP217(PB)	TP217(EE)	TP225(EE)	TP226(EE)
TP227(EE)	TP228(EE)	TP230(PB)	TP230(EE)	TP244(EE)

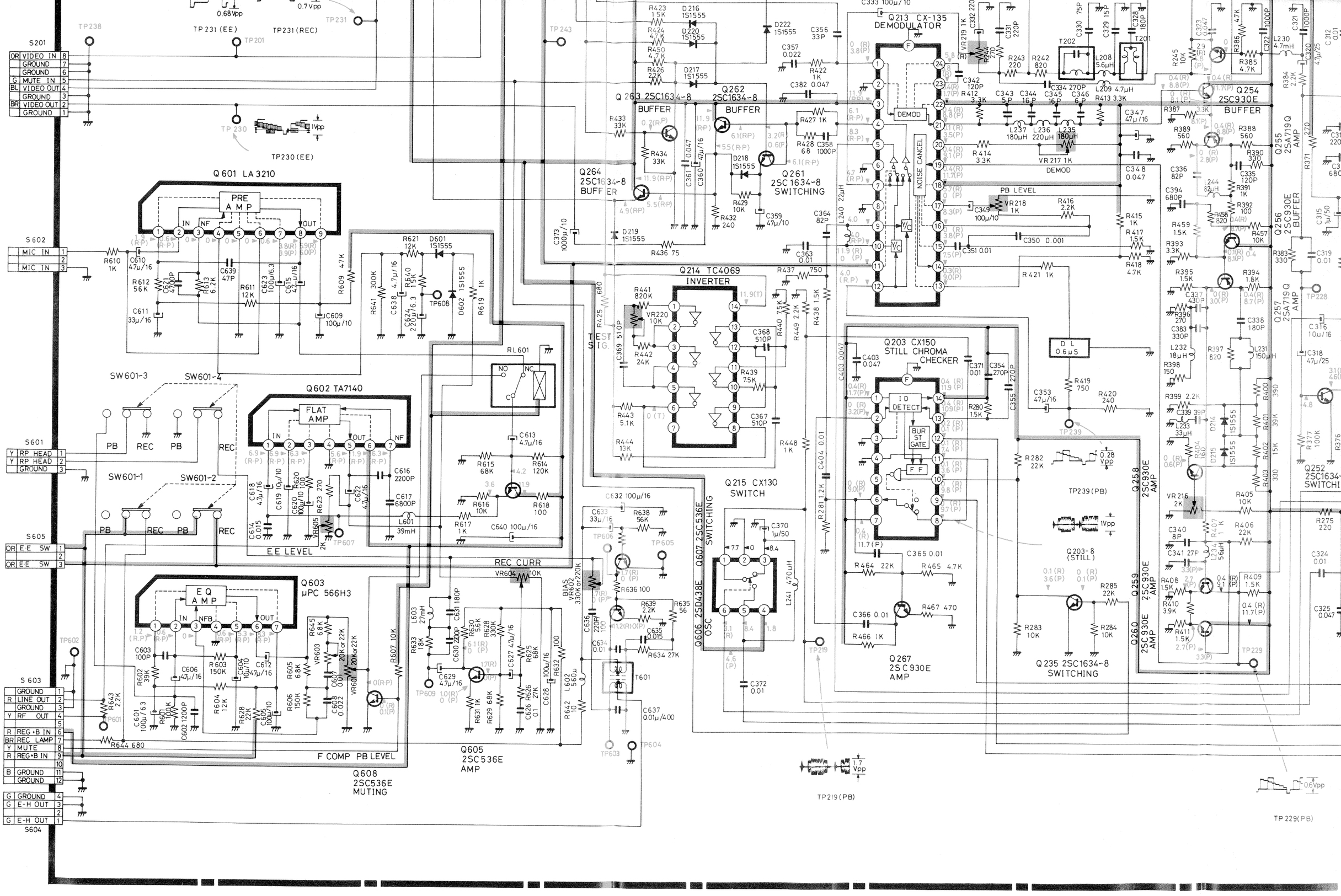
+12V LINE AT PLAY MODE

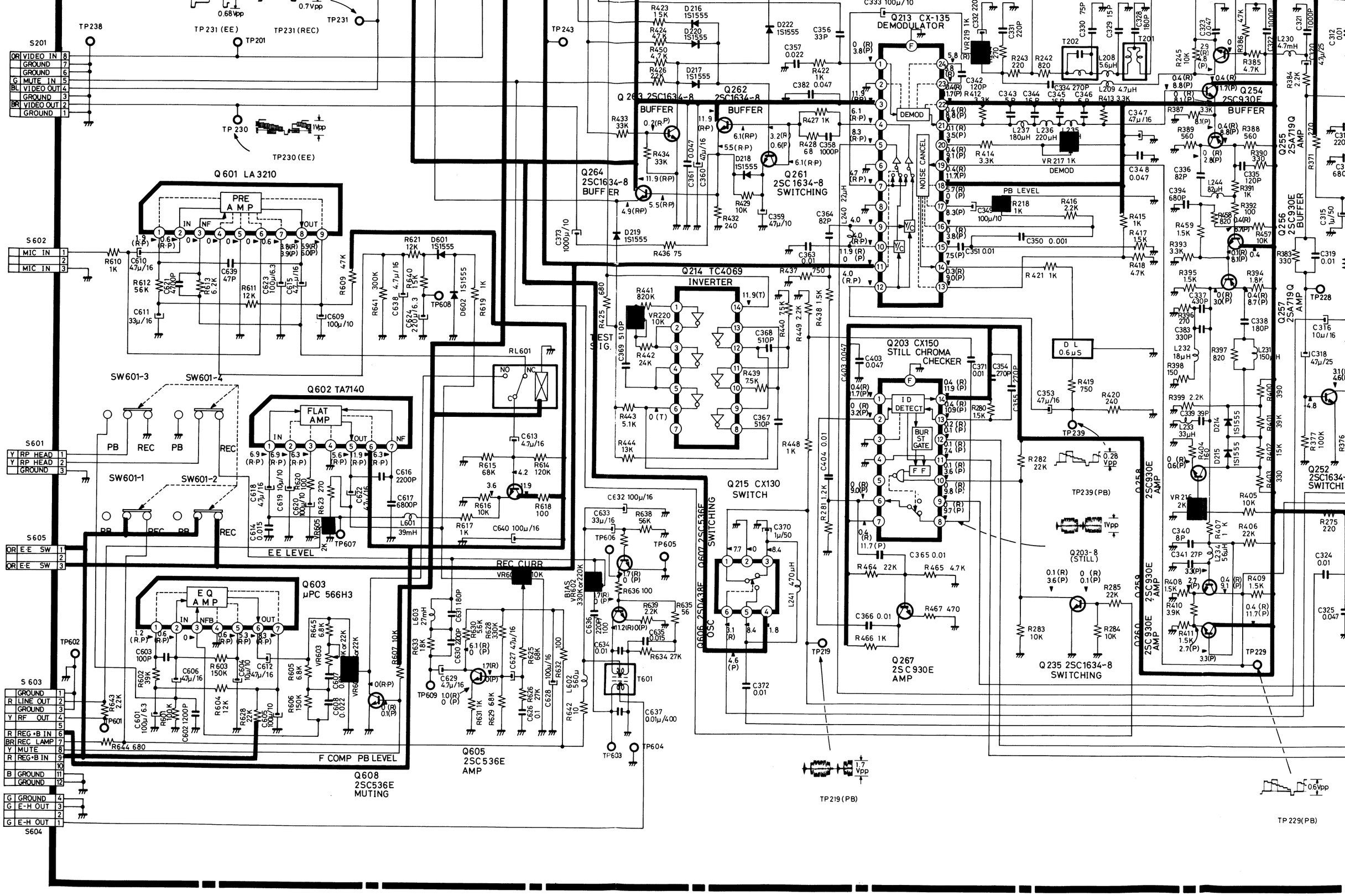
+12V LINE AT RECORD MODE

+12V SUPPLY LINE AT ALL MODES



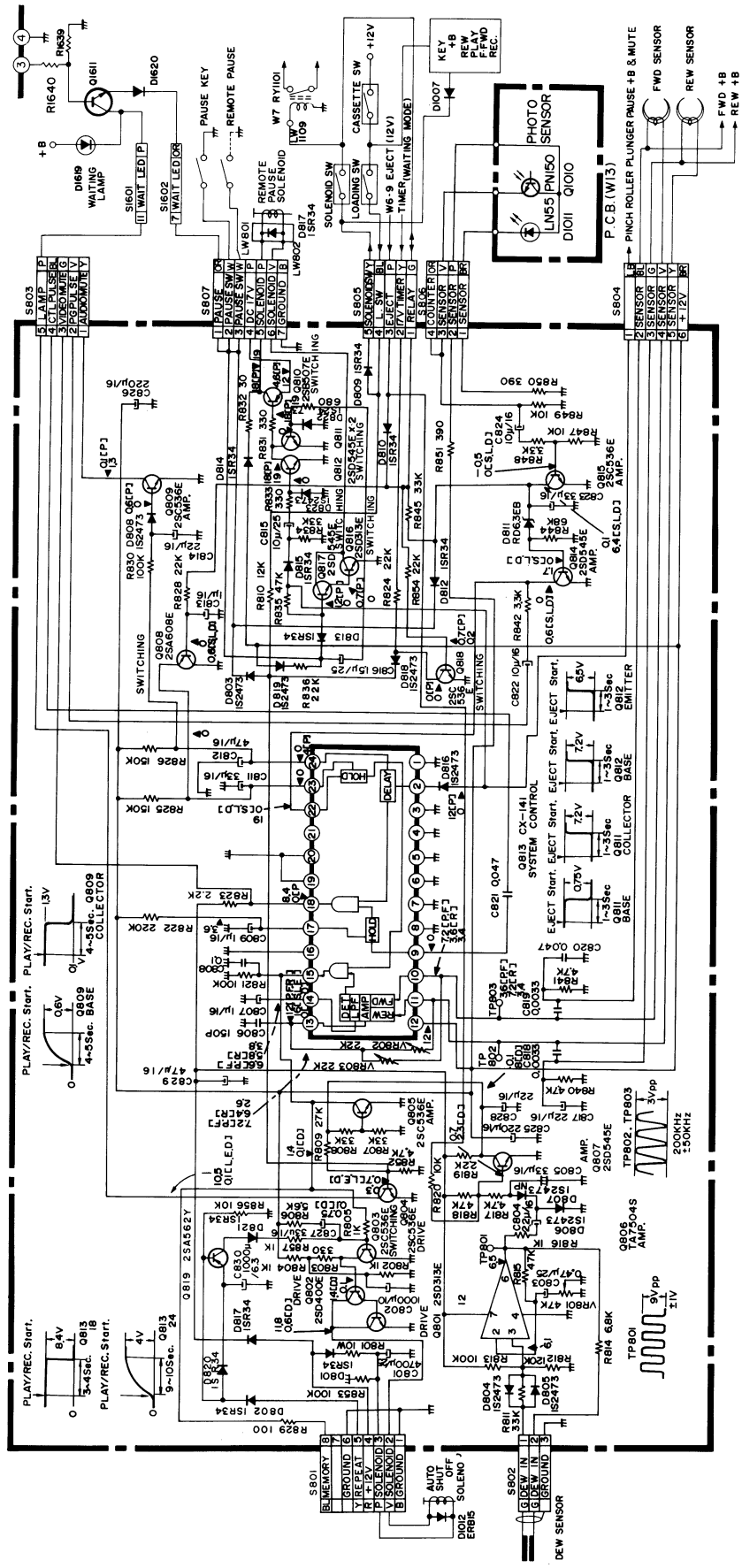
TP206 (EE)	TP210 (PB)	TP211 (EE)	TP212 (PB)	TP213 (PB)
TP213 (EE)	TP214 (EE)	TP215 (EE)	TP215 (PB)	TP216 (EE)
TP216 (PB)	TP217 (PB)	TP217 (EE)	TP225 (EE)	TP226 (EE)
TP227 (EE)	TP228 (EE)	TP230 (PB)	TP230 (EE)	TP244 (EE)

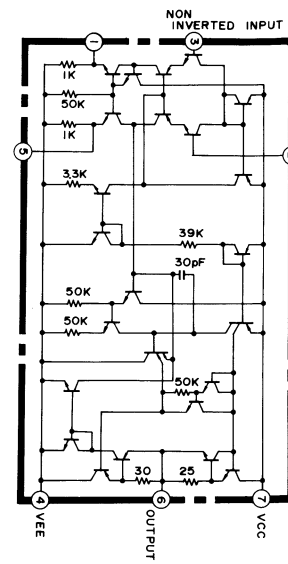

S201
OR VIDEO IN 8
GROUND 7
GROUND 6
G MUTE IN 5
BL VIDEO OUT 4
GROUND 3
BR VIDEO OUT 2
GROUND 1
TP238
TP231 (EE)
TP231 (REC)
TP231
TP201
TP230
TP230 (EE)
S602
MIC IN 1
2
MIC IN 3
Q601 LA 3210
PRE AMP
IN
NF
OUT
SW601-3
SW601-4
SW601-1
SW601-2
S601
Y RP HEAD 1
Y RP HEAD 2
GROUND 3
PB
REC
S605
OR E·E SW 1
2
OR E·E SW 3
EE LEVEL
Q602 TA7140
FLAT AMP
RL601
NO
NC
C
TP607
REC CURR
Q603
μPC 566H3
EQ AMP
NFB
F COMP PB LEVEL
Q608
2SC536E
MUTING
TP602
TP601
S603
GROUND 1
R LINE OUT 2
GROUND 3
Y RF OUT 4
5
R REG·B IN 6
BR REC LAMP 7
Y MUTE 8
R REG·B IN 9
10
B GROUND 11
GROUND 12
G GROUND 4
G E-H OUT 3
2
G E-H OUT 1
S604
TEST SIG.
Q605
2SC536E
AMP
TP608
TP609
TP603
TP604
Q606 2SD438E
OSC
Q607 2SC536E
SWITCHING
TP606
TP605
Q261
2SC1634-8
SWITCHING
Q262
2SC1634-8
BUFFER
Q263 2SC1634-8
BUFFER
Q264
2SC1634-8
BUFFER
Q214 TC4069
INVERTER
Q215 CX130
SWITCH
Q213 CX-135
DEMODULATOR
DEMOD
NOISE CANCEL
PB LEVEL
Q203 CX150
STILL CHROMA
CHECKER
ID DETECT
BURST GATE
F F
Q267
2SC930E
AMP
Q203-8
(STILL)
Q235 2SC1634-8
SWITCHING
TP239
TP239(PB)
TP219
TP219(PB)
Q254
2SC930E
BUFFER
Q255
2SA719Q
AMP
Q256
2SC930E
BUFFER
Q257
2SA719Q
AMP
Q258
2SC930E
AMP
Q259
2SC930E
AMP
Q260
2SC930E
AMP
Q252
2SC1634
SWITCHI
TP228
TP229
TP229(PB)


S201
TP238
TP231 (EE)
TP231 (REC)
TP201
TP231
TP230
TP230 (EE)
TP243
Q601 LA 3210
PRE AMP
S602
MIC IN
Q602 TA7140
FLAT AMP
RL601
SW601-3
SW601-4
SW601-1
SW601-2
S601
PB
REC
S605
E E LEVEL
REC CURR
Q603 µPC 566H3
EQ AMP
S 603
F COMP PB LEVEL
Q608 2SC536E MUTING
Q605 2SC536E AMP
Q264 2SC1634-8 BUFFER
Q262 2SC1634-8 BUFFER
Q261 2SC1634-8 SWITCHING
Q214 TC4069 INVERTER
Q213 CX-135 DEMODULATOR
DEMOD
NOISE CANCEL
PB LEVEL
Q203 CX150 STILL CHROMA CHECKER
ID DETECT
BUR ST GATE
F F
D L 0.6µS
Q215 CX130 SWITCH
Q267 2SC930E AMP
Q235 2SC1634-8 SWITCHING
Q203-8 (STILL)
TP239 (PB)
TP219
TP219 (PB)
Q254 2SC930E BUFFER
Q255 2SA719Q AMP
Q256 2SC930E BUFFER
Q257 2SA719Q AMP
Q258 2SC930E AMP
Q259 2SC930E AMP
Q260 2SC930E AMP
Q252 2SC1634-8 SWITCHING
TP228
TP229
TP229 (PB)
TP239
TP602
TP601
TP607
TP608
TP609
TP603
TP604
TP605
TP606
S604

SCHEMATIC DIAGRAM VIII

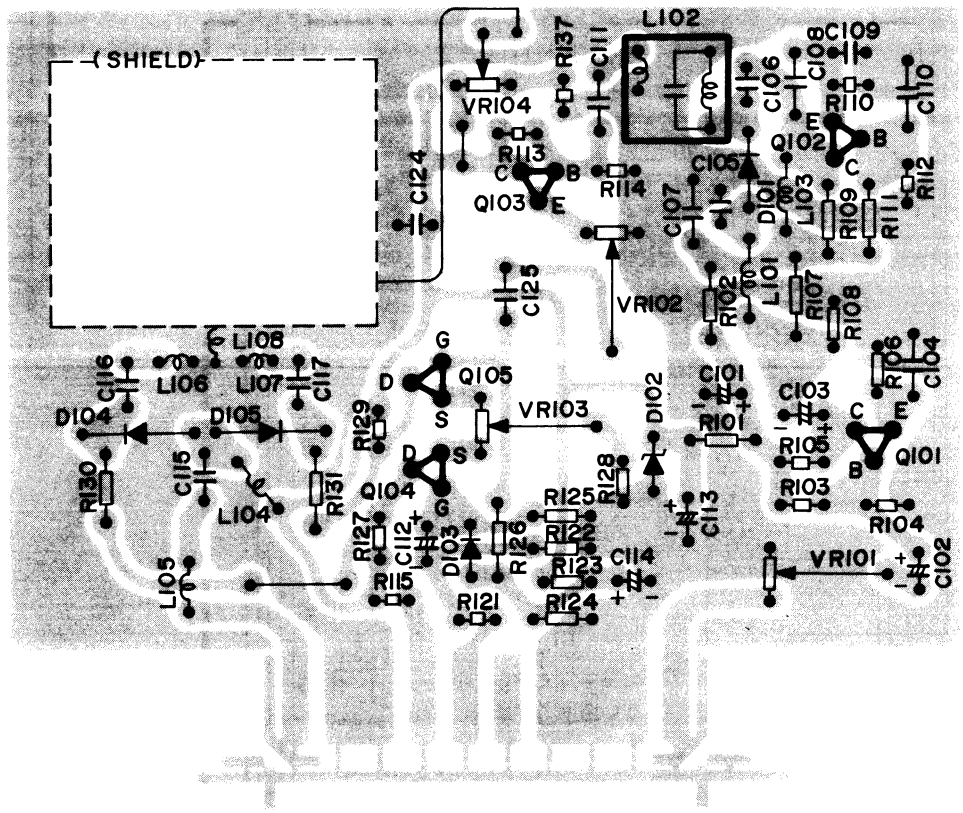
SYSTEM CONTROL CIRCUITRY (ON W4 CIRCUIT BOARD)





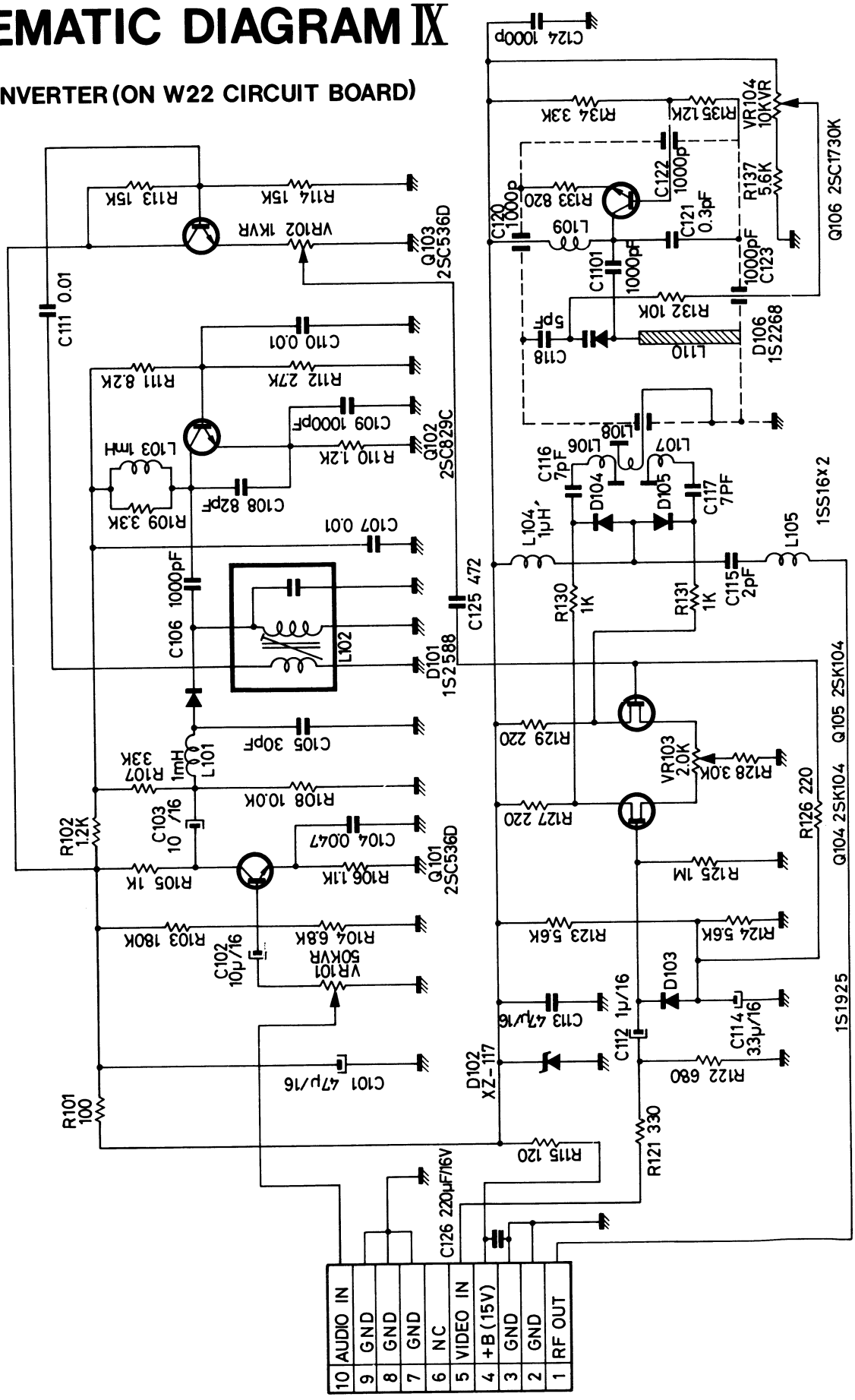
P.C.B.(W4) Q806(TA75045) CIRCUIT DIAGRAM

W22 CIRCUIT BOARD

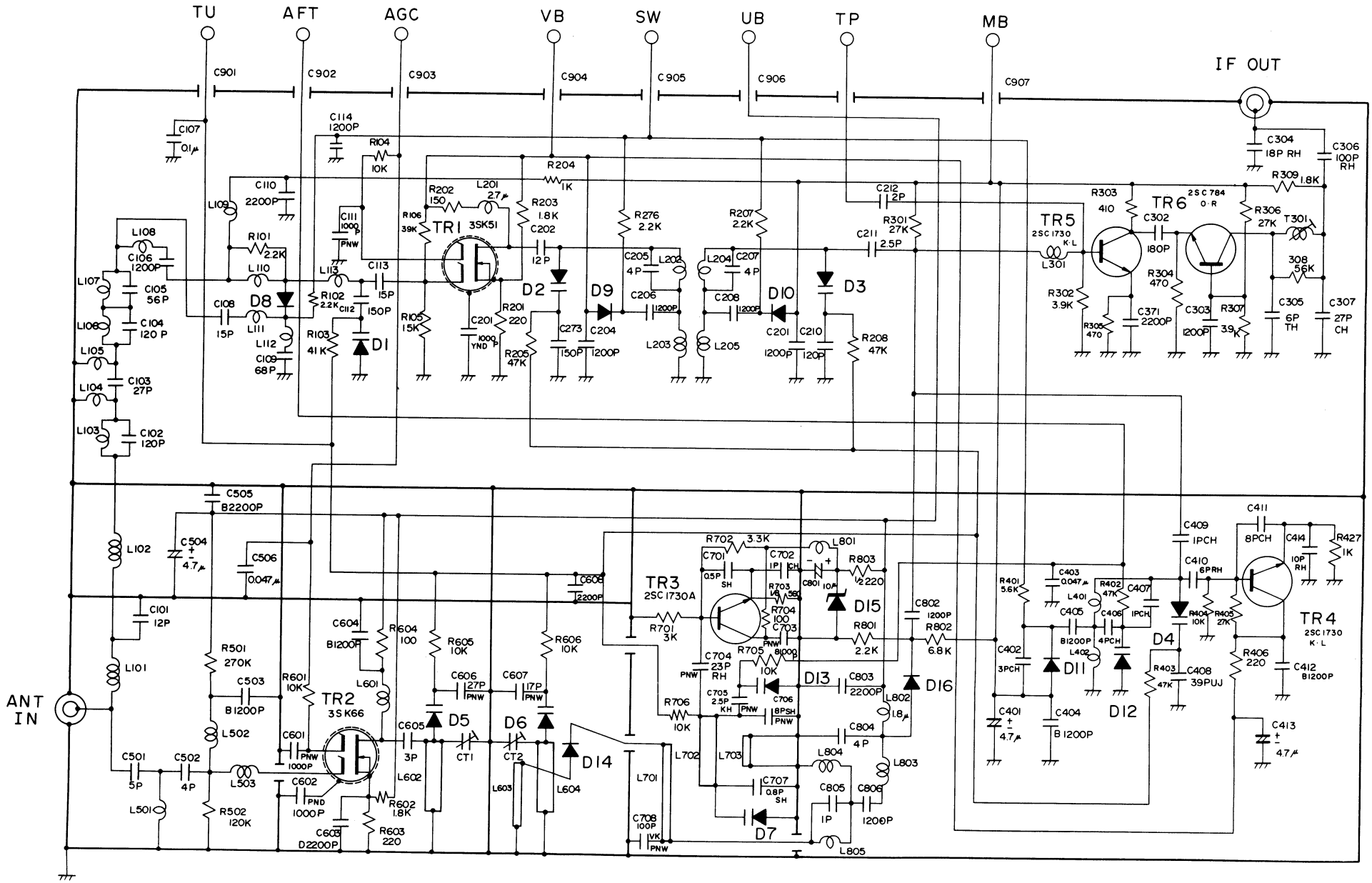


SCHEMATIC DIAGRAM Ⅸ

RF CONVERTER (ON W22 CIRCUIT BOARD)



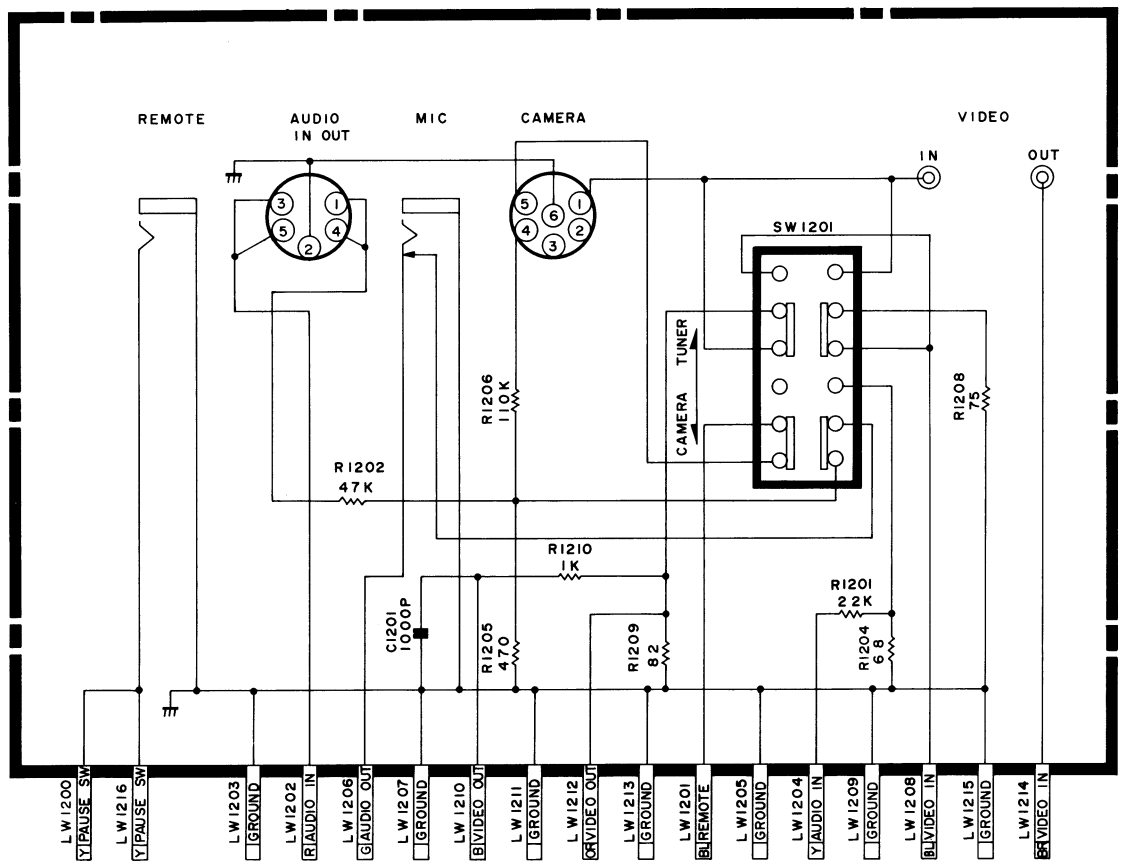
SCHEMATIC DIAGRAM X TUNER (#4-115V-12000)



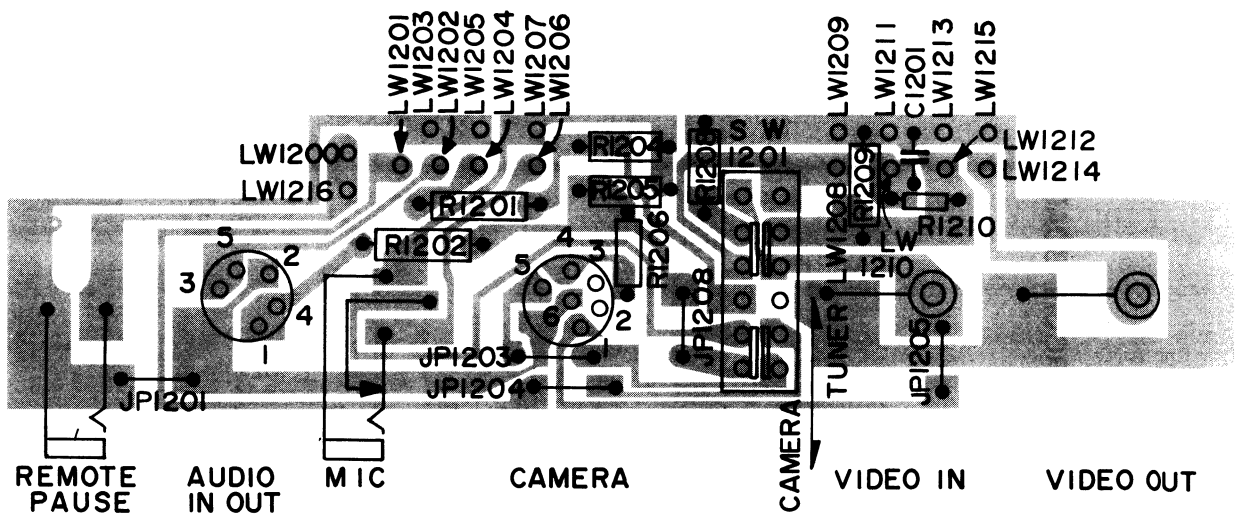
D1 , D2, D3 , D4 ,	IS 2208 ,	ISV59 , MA320, SVC-112
D5 , D6, D7,	IS 2208 ,	ISV59 , MA320, SVC-112
D8 , D9, D10, D11,	IS 2222 ,	IS2692,
D12 , D13,	IS 2268	
D14 ,	ISS16 ,	ISS90
D15 ,	RD 10E ,	HZ10
D16 ,	IS1555	

SCHEMATIC DIAGRAM Ⅶ

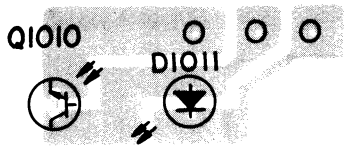
INPUT SELECTOR CONNECTION (ON W8 CIRCUIT BOARD)



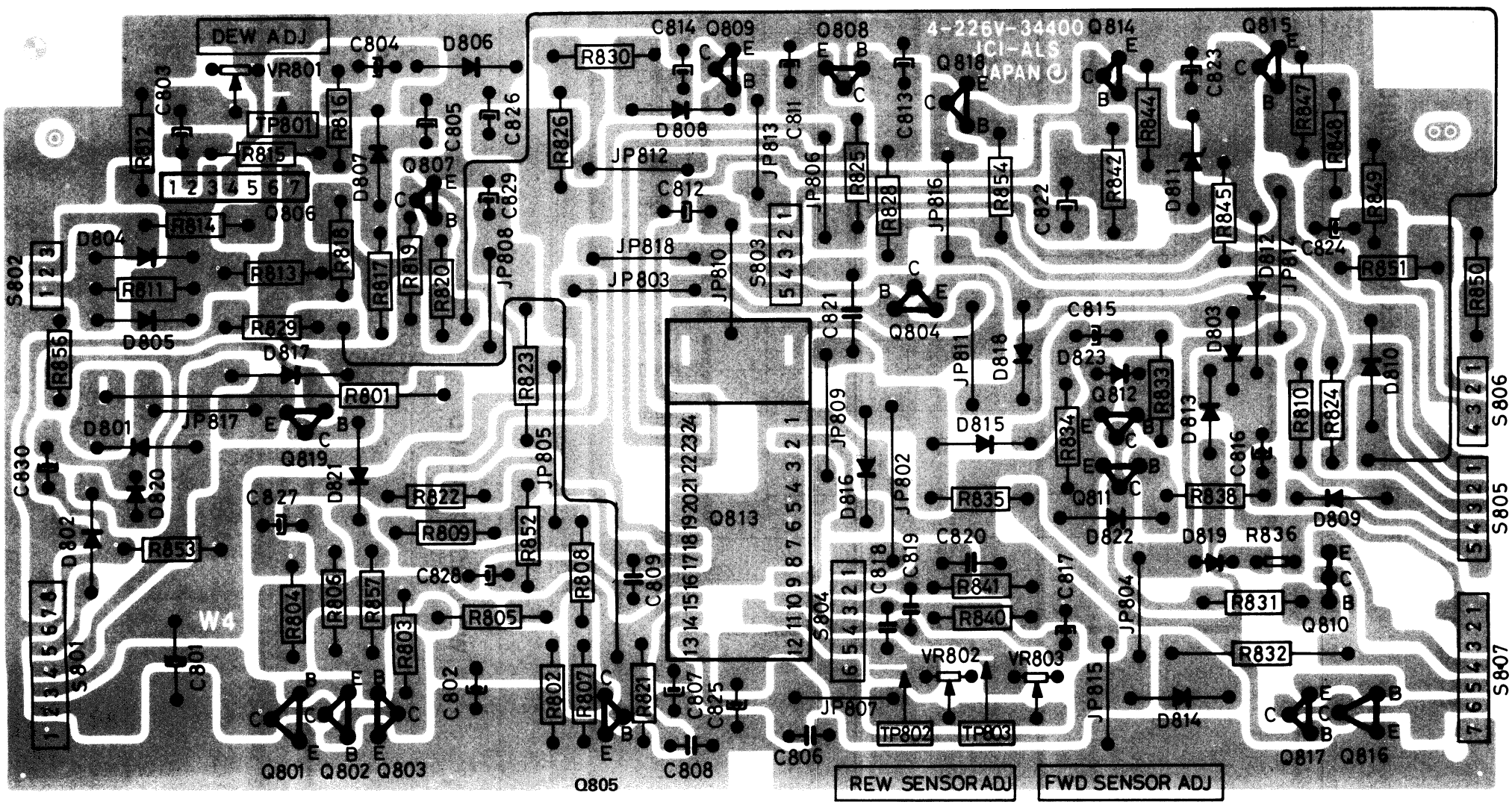
W8 CIRCUIT BOARD



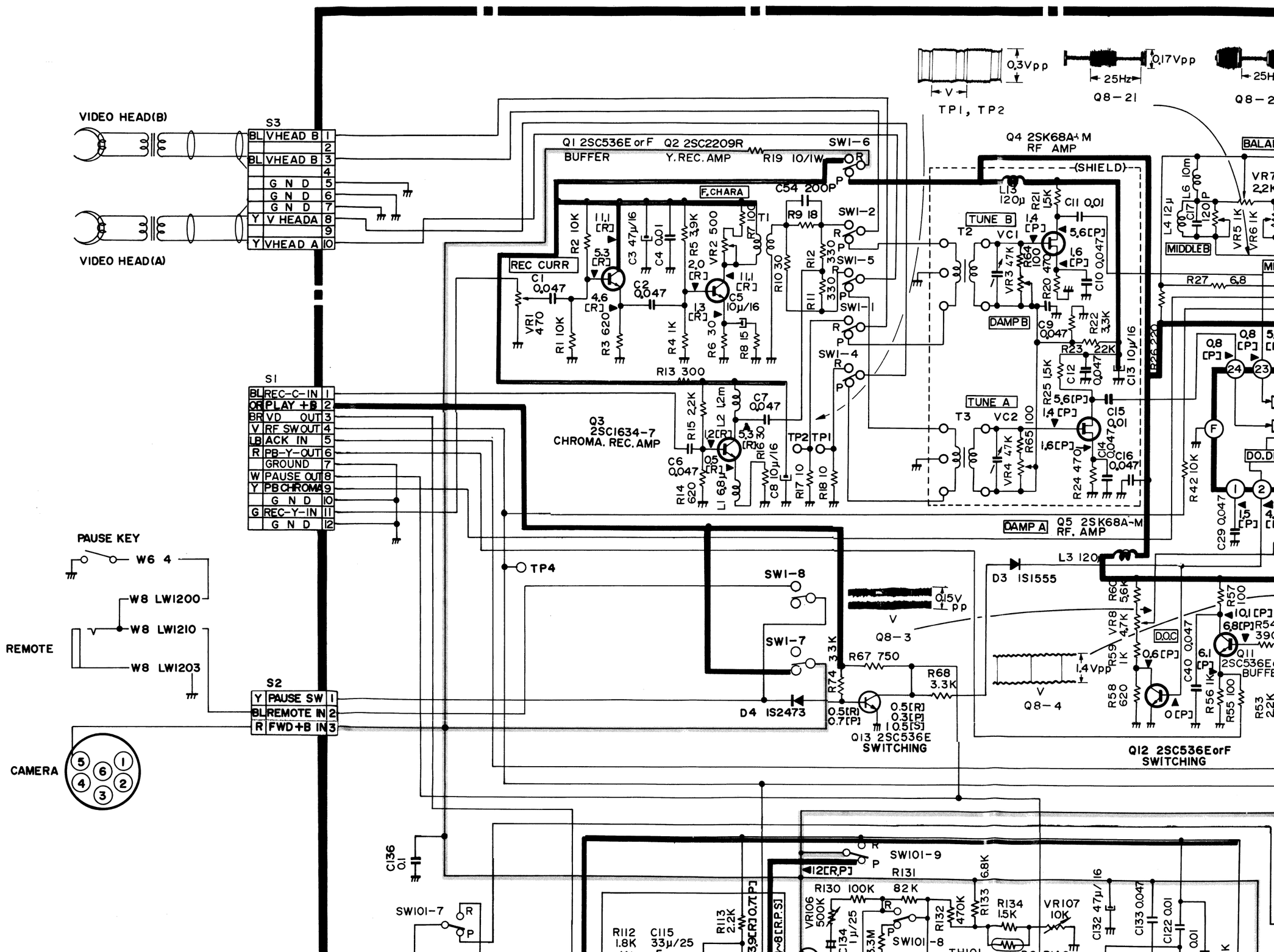
W13 CIRCUIT BOARD



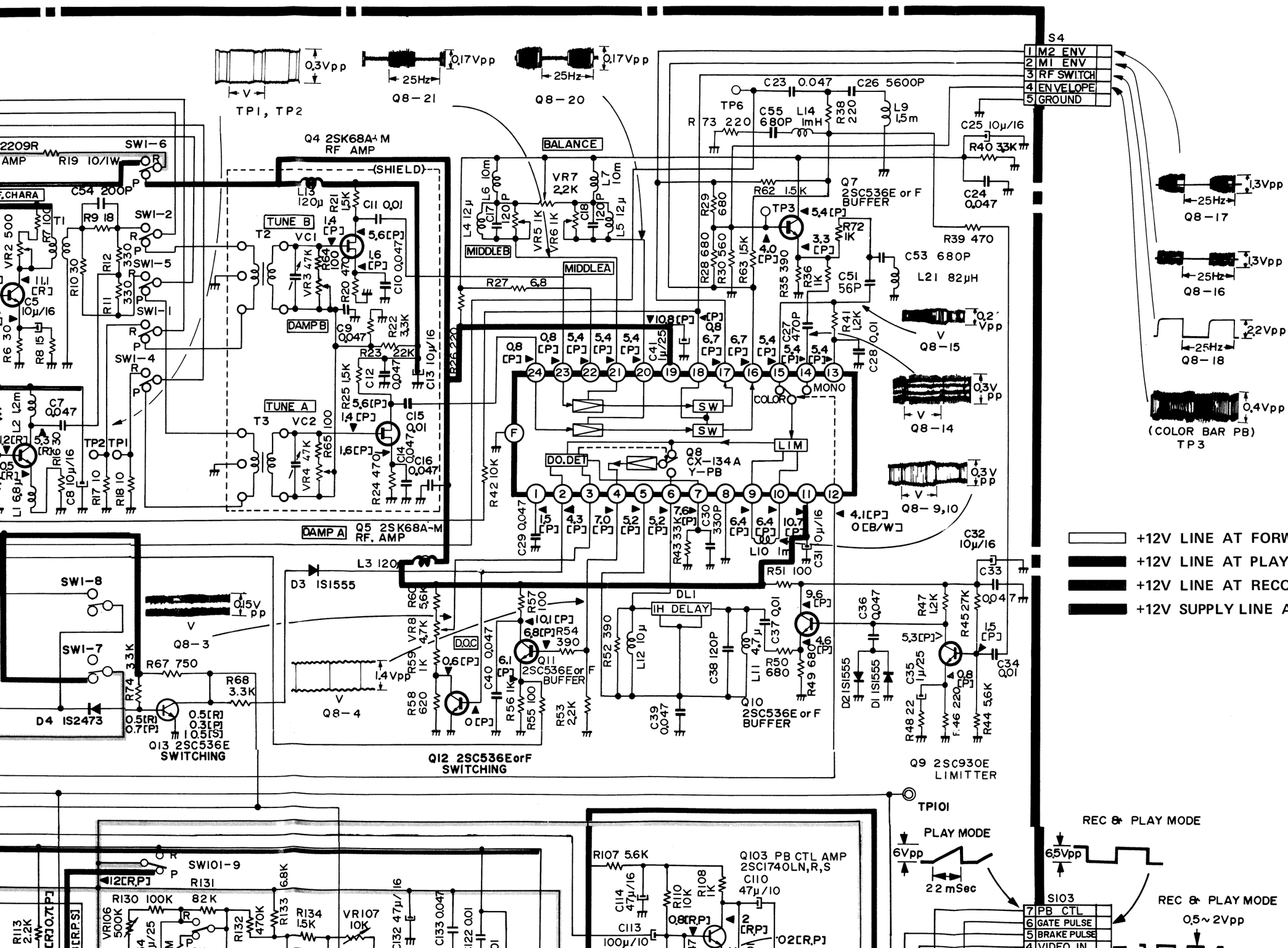
W4 CIRCUIT BOARD



SCHEMATIC DIAGRAM Ⅳ VIDEO CIRCUITRY (ON W1 CIR



RAM Ⅳ VIDEO CIRCUITRY (ON W1 CIRCUIT BOARD)



Q13 2SC536E
SWITCHING

Q12 2SC536EorF
SWITCHING

Q9 2SC930E
LIMITTER

TP101

PLAY MODE
6Vpp
22 mSec

REC & PLAY MODE
6.5Vpp

S103
7 PB CTL
6 GATE PULSE
5 BRAKE PULSE
4 VIDEO IN
3 (PB CTL)
2 RF SW PULSE
1 GROUND

REC & PLAY MODE
0.5~2Vpp

TP108

PLAY MODE
3~4Vpp

TP106

5Vpp REC MODE
5.5 Vpp PLAY MODE

S105
1 GROUND
2 VIDEO IN B

W8 LW1210

TP103

TP105

TRACKING

S106
1 TRACON VR LB
2 TRACON VR Y
3 +B R

VR110
100KB

W3 LW715
+12V REG.

S107
1 GROUND B
2 CTL OUT BL
3 RF SW PULSE V

W4 S803-4
W4 S803-2

SW101-9
SW101-8
SW101-1

R113 2.2K
R130 100K
R131 82K
R132 470K
R133 6.8K
R134 1.5K
R135 2.2K
R136 3.3M
R129 56
R139 330
R138 33K
R107 5.6K
R108 1K
R109 120
R110 10K
R111 3.3K
R112 0.0047
R115 51K
R116 4.7K
R117 4.7K
R118 1K
R119 27K
R121
R122
R123 62K
R124
R125 2.2K
R126 3.9K
R127 8.2K
R128
VR106 500K
VR107 10K
VR103 100K
VR104
VR105 47K

C101 47μ/16
C102 0.022
C103 0.022
C108 0.047μ/16
C109 0.022
C110 47μ/10
C111 0.01
C112 0.0047
C113 100μ/10
C114 47μ/16
C117 0.1μ/16
C118 47μ/16
C119 10μ/16
C120 0.068
C121 0.01
C122 0.01
C123 1μ/25
C124 0.33μ/16
C125 0.22μ/
C126 0.047
C127 0.001
C128
C129 0.1
C130 0.68μ/16
C131 2.2μ/25
C132 47μ/16
C133 0.047
C134 1μ/25
C135 0.0068
C136 330μ/6.3
C137 001
C138 0.047
C139 0.022

TH101
TD5-C230
DC BIAS

TP107
TP102
TP104

Q101
CX138
FF
1/2
MM

Q102
CX139A
SYNC SEP
DC AMP
CTLAMP
GETE GEN
GATE
OFF
ON

Q102-12
PLAY MODE
3~8mV

Q102-14
PLAY MODE
6Vpp
22 mSec

Q103 PB CTL AMP
2SC1740LN,R,S

Q105
2SC536E,F
INVERTOR

Q106
2SD330E
DRIVE

Q107
2SC536E
SWITCHING

D101
1S1555

D102
1S1555

REC MODE
6VPP
15.5mSec

REC MODE
4~5Vpp

PLAY MODE
3.5~4.5Vpp

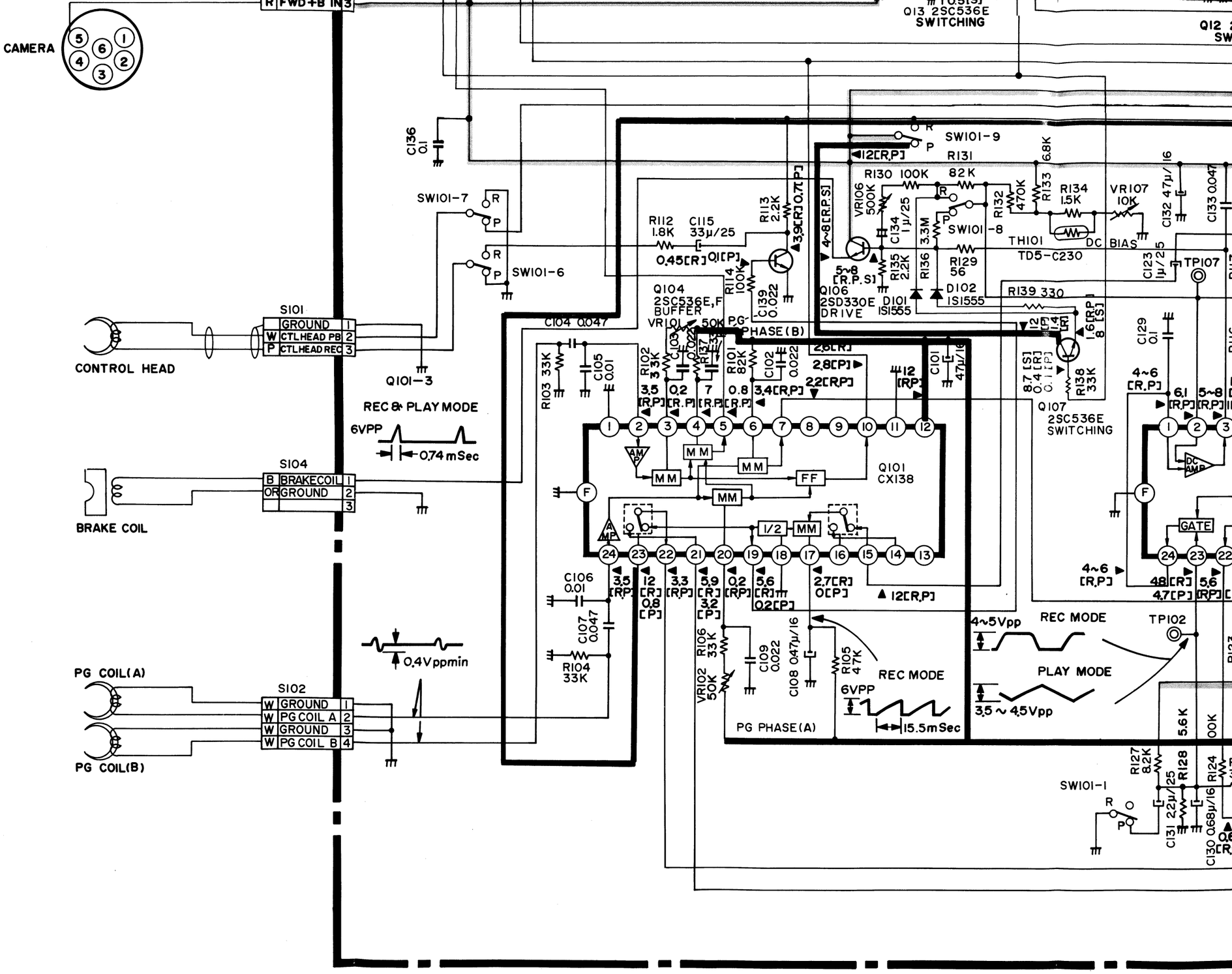
PB
LOCK
PHASE

REC
LOCK
PHASE

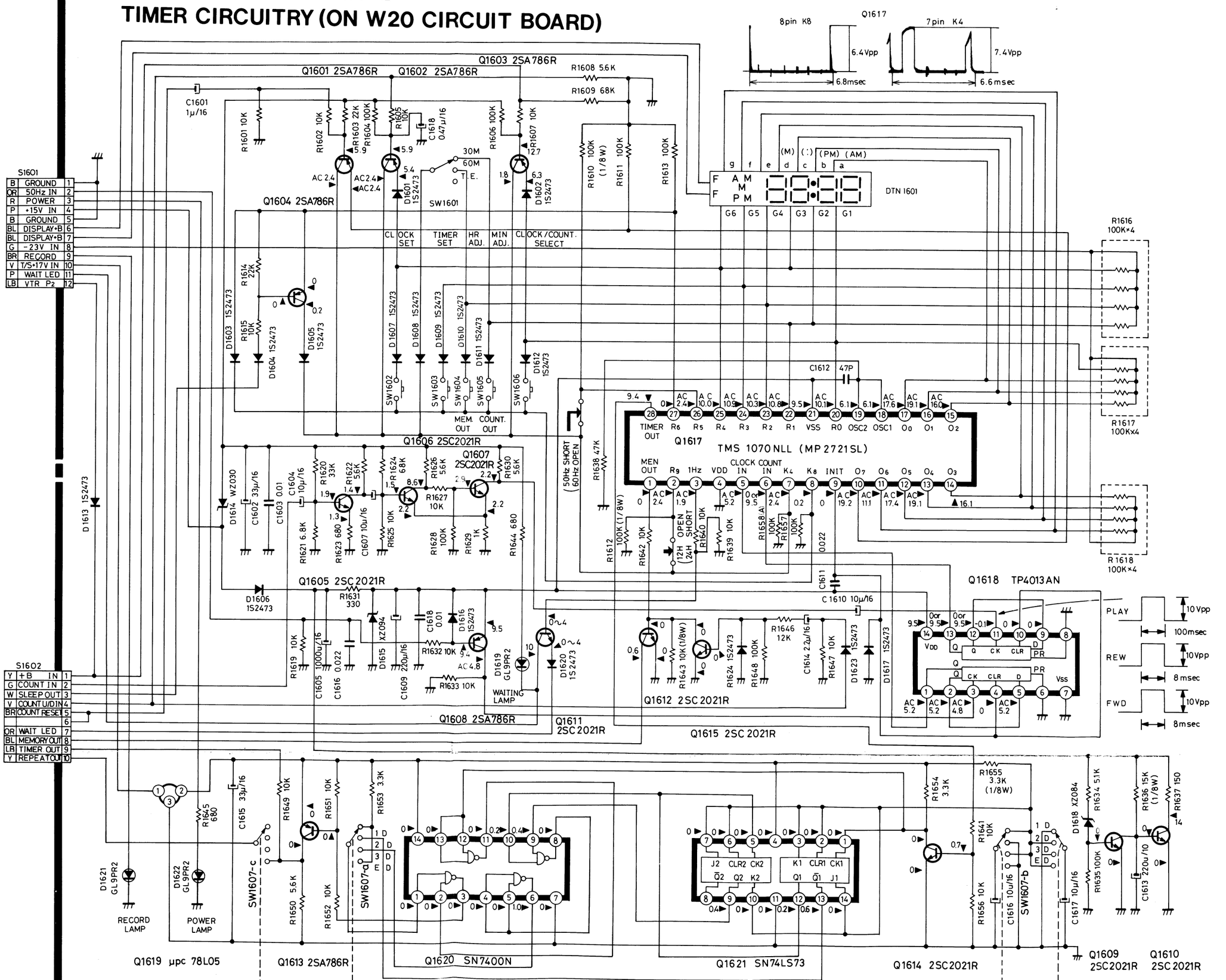
TRACON SET

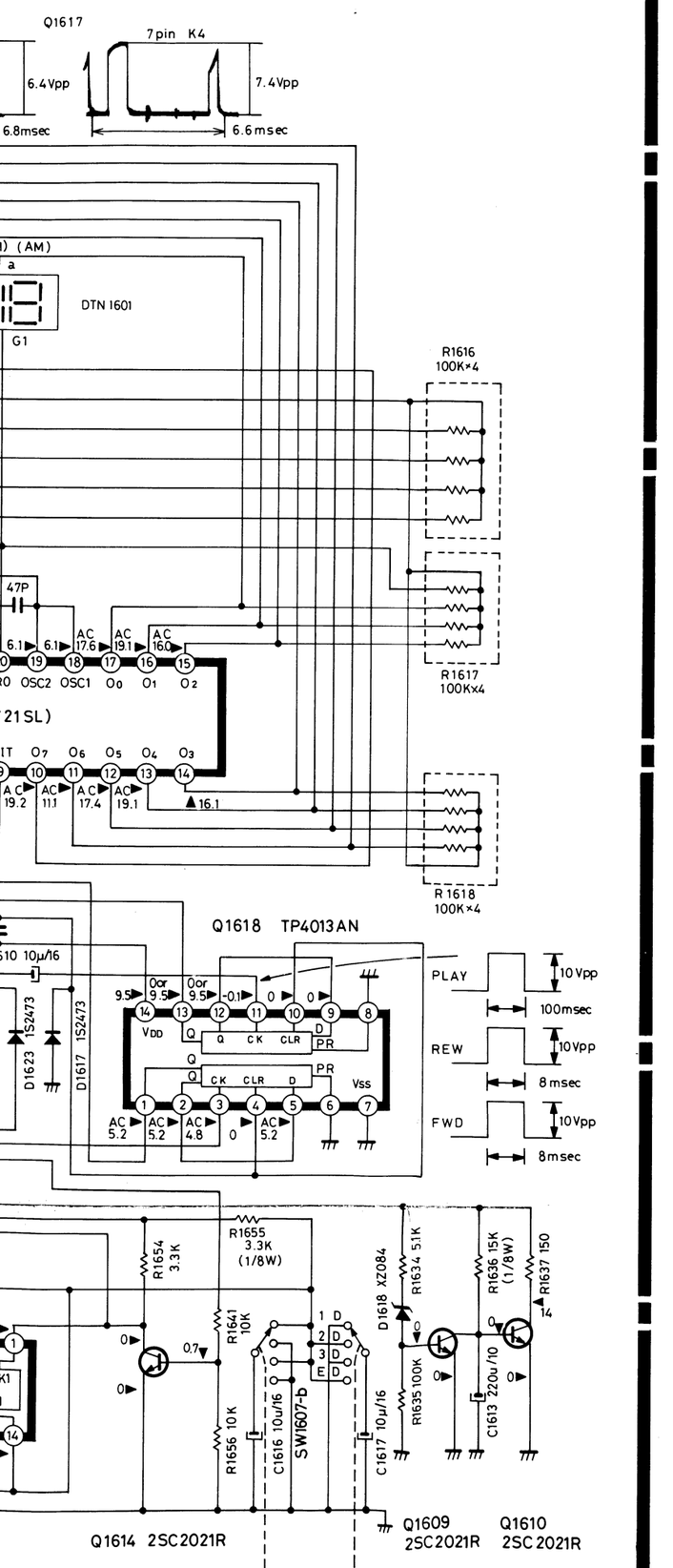
PHASE(B)

PHASE(A)

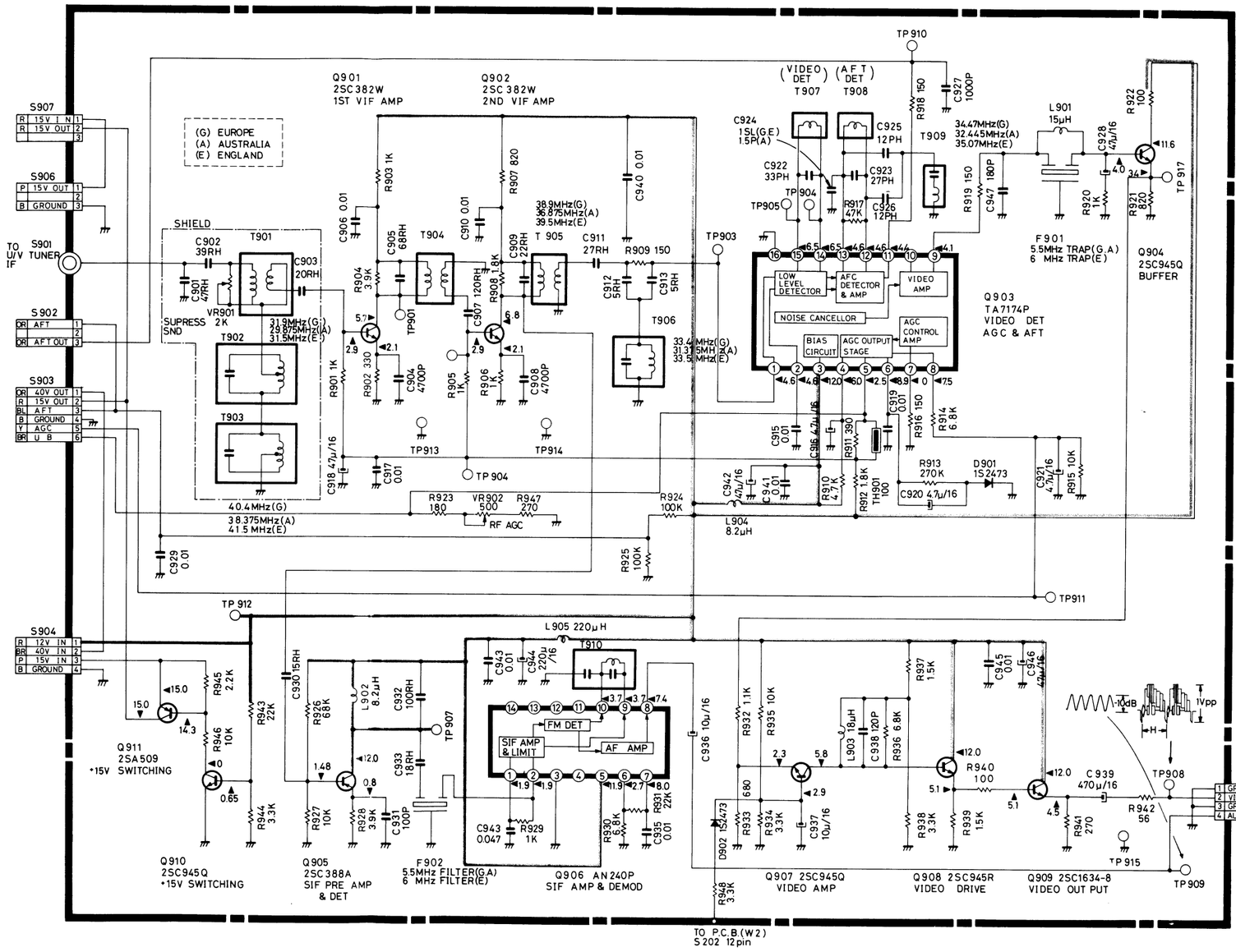

CAMERA
R FWD+B IN 3
Q13 2SC536E
SWITCHING
Q12
SW
C136 0.1
SW101-7
SW101-6
SW101-9
SW101-8
SW101-1
R131
R130 100K
82K
R132 470K
R133 6.8K
R134 1.5K
VR107 10K
VR106 500K
C134 1μ/25
C132 47μ/16
C133 0.047
C123 1μ/25
TP107
THI01
TD5-C230
DC BIAS
R135 2.2K
R136 3.3M
R129 56
D102 1S1555
D101 1S1555
Q106 2SD330E DRIVE
R139 330
R112 1.8K
C115 33μ/25
R113 2.2K
R114 100K
C139 0.022
Q104 2SC536E,F BUFFER
VR101 50K
PHASE(B)
C104 0.047
R103 33K
C105 0.01
R102 33K
R137 33K
C103 0.022
R101 82K
C102 0.022
C101 4.7μ/16
C129 0.1
R138 33K
Q107 2SC536E SWITCHING
S101
GROUND 1
W CTL HEAD PB 2
P CTL HEAD REC 3
CONTROL HEAD
Q101-3
REC & PLAY MODE
6VPP
0.74 mSec
S104
B BRAKE COIL 1
OR GROUND 2
3
BRAKE COIL
Q101 CX138
MM
FF
1/2
AMP
DC AMP
GATE
C106 0.01
C107 0.047
R104 33K
0.4Vppmin
PG COIL(A)
PG COIL(B)
S102
W GROUND 1
W PG COIL A 2
W GROUND 3
W PG COIL B 4
R106 33K
VR102 50K
C109 0.022
C108 0.047μ/16
R105 47K
REC MODE
6VPP
15.5mSec
PG PHASE(A)
4~5Vpp
REC MODE
PLAY MODE
3.5~4.5Vpp
TP102
R127 8.2K
R128
R124
C131 22μ/25
C130 0.68μ/16
5.6K
100K

SCHEMATIC DIAGRAMS Ⅵ
TIMER CIRCUITRY (ON W20 CIRCUIT BOARD)





VIDEO / SOUND IF CIRCUITRY (ON W5 CIRCUIT BOARD)

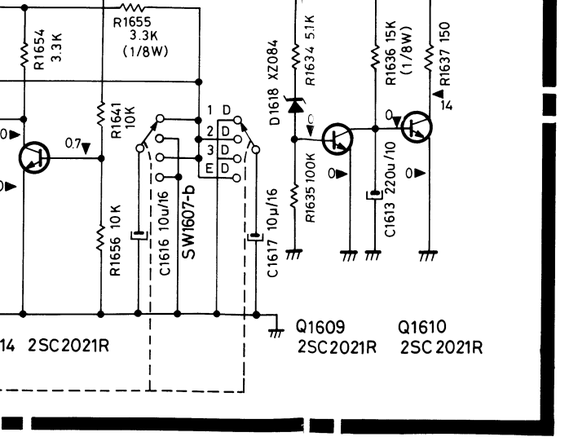


+12V LINE AT PLAY MODE

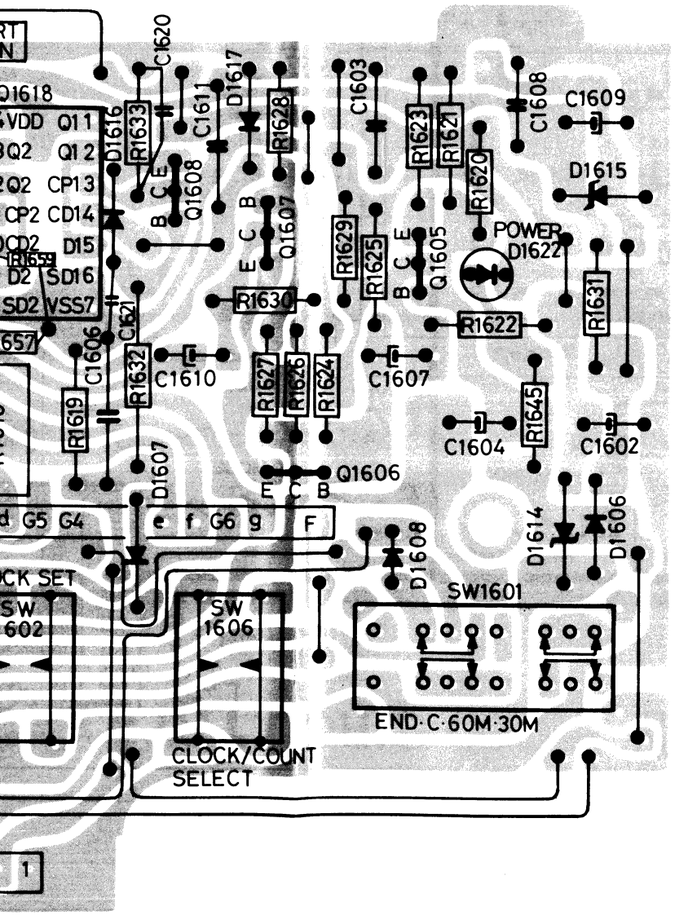
+12V SUPPLY LINE AT ALL MODES

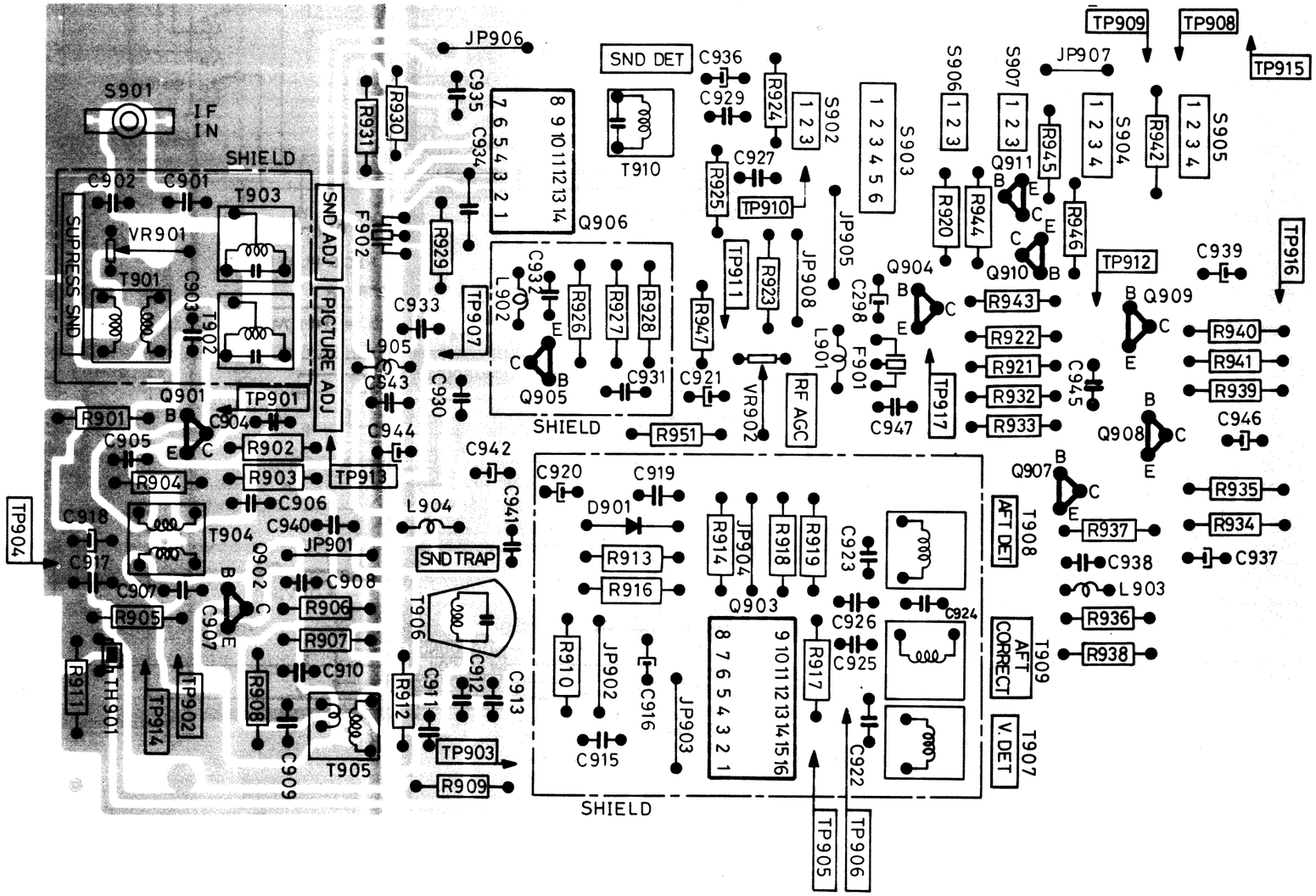
W5 CIRCUIT BOARD

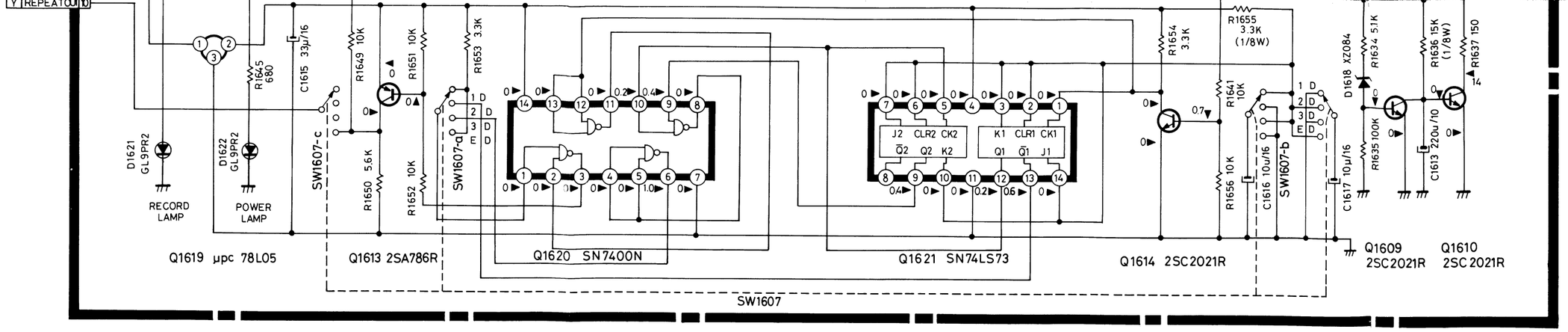




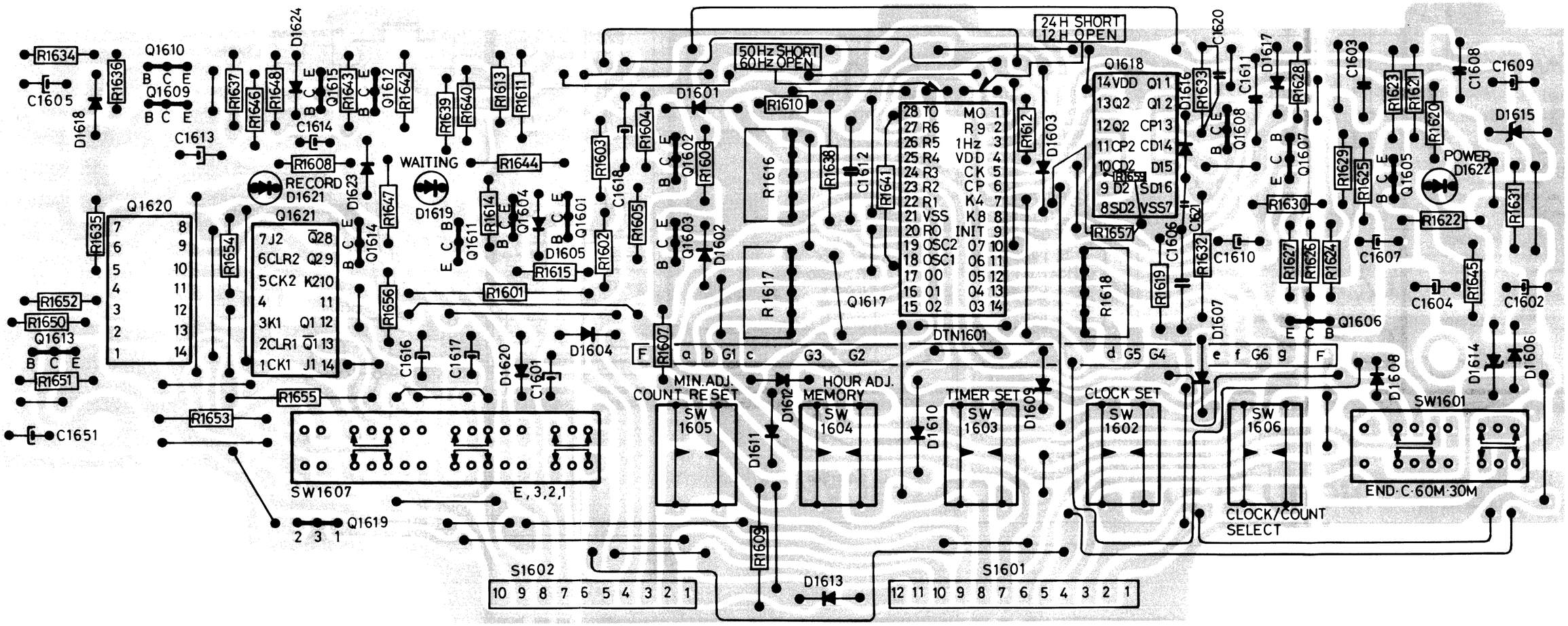
W5 CIRCUIT BOARD





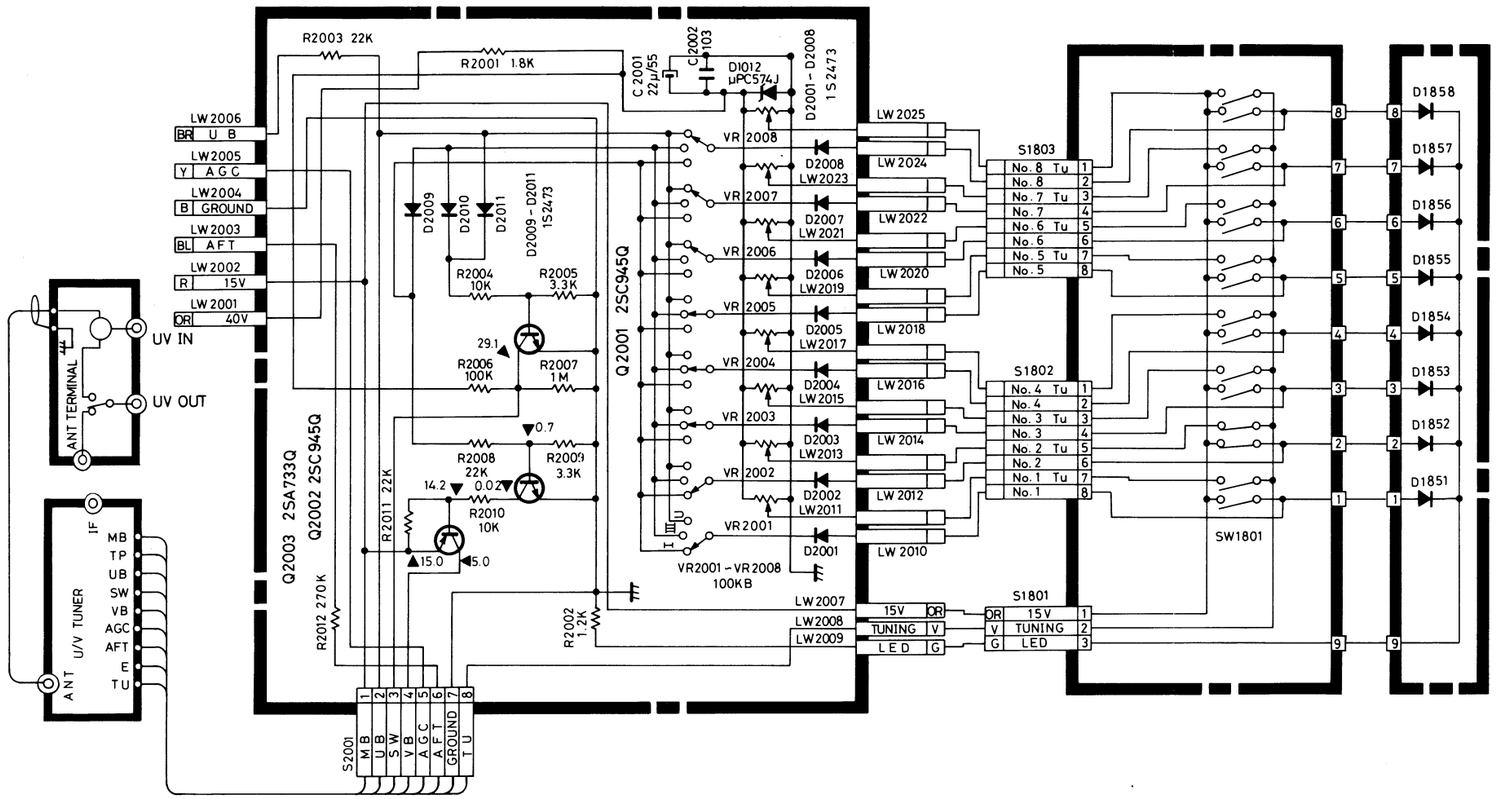


W20 CIRCUIT BOARD

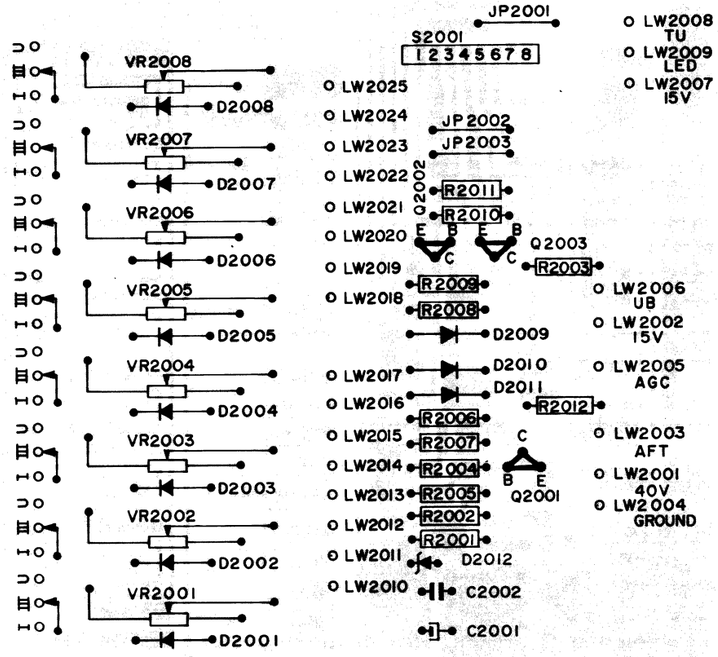


NOTE: R1658 100 kilo-ohm resistor is used exclusively for Australian model, but not used for European models.

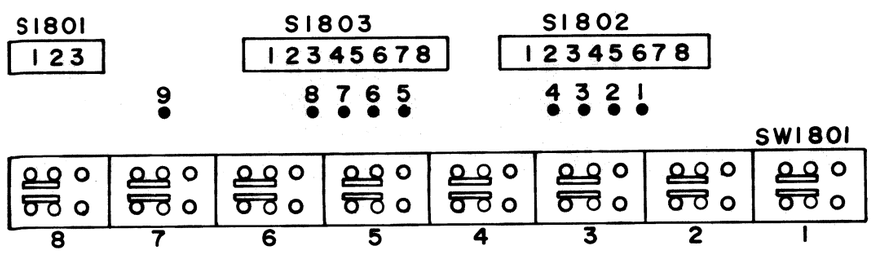
SCHEMATIC DIAGRAM Ⅲ
CHANNEL SELECTOR CIRCUIT
(ON W12 / W14 / W15 CIRCUIT BOARDS)



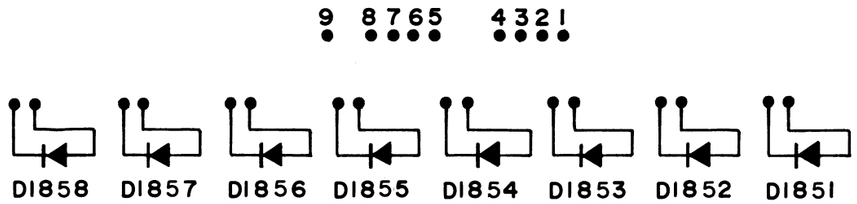
W12 CIRCUIT BOARD



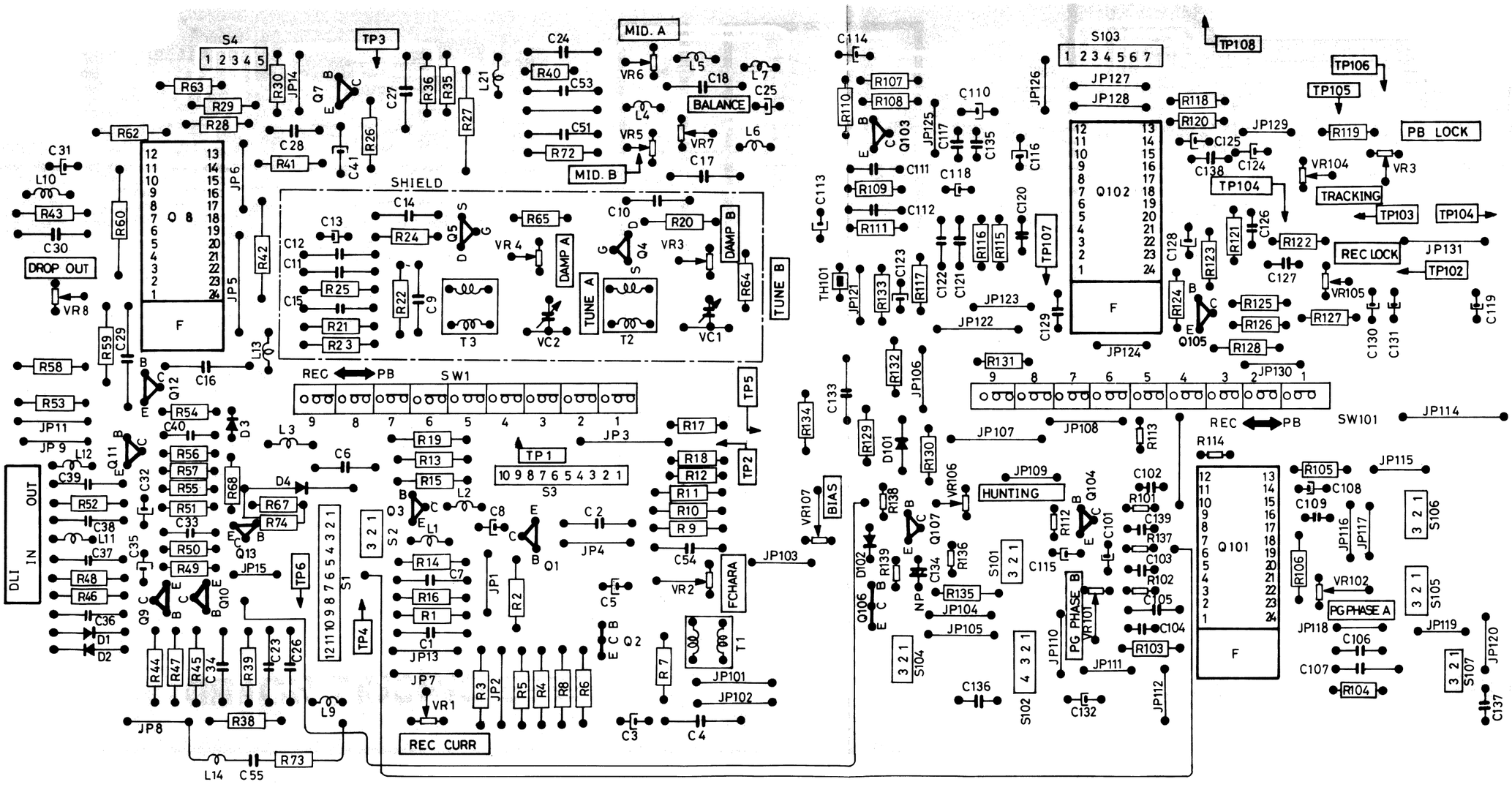
W14 CIRCUIT BOARD



W15 CIRCUIT BOARD



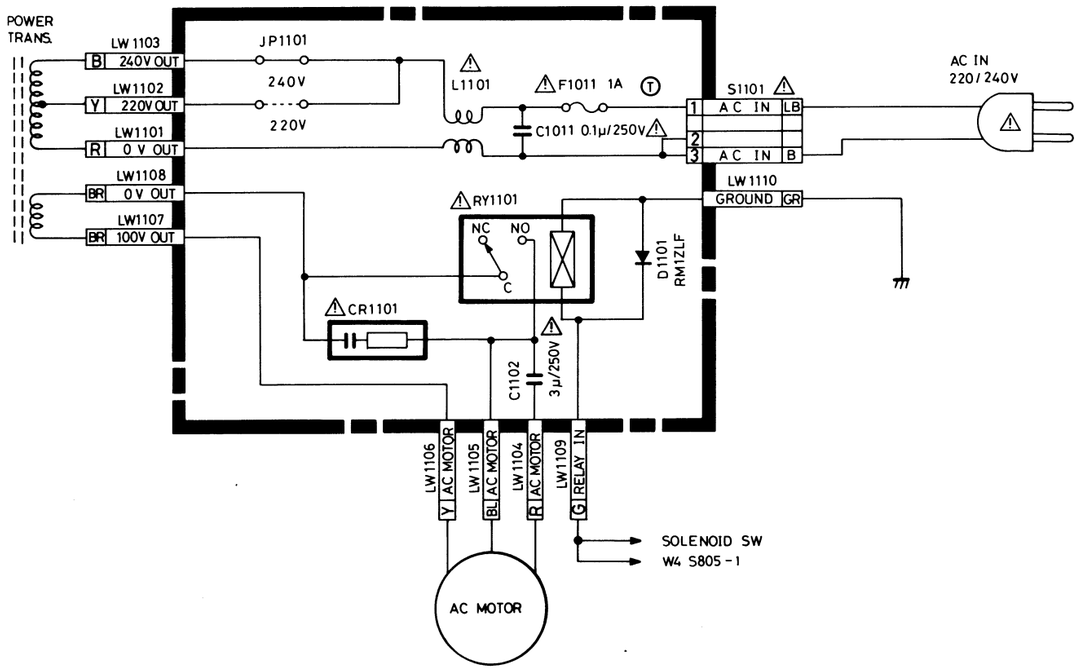
W1 CIRCUIT BOARD



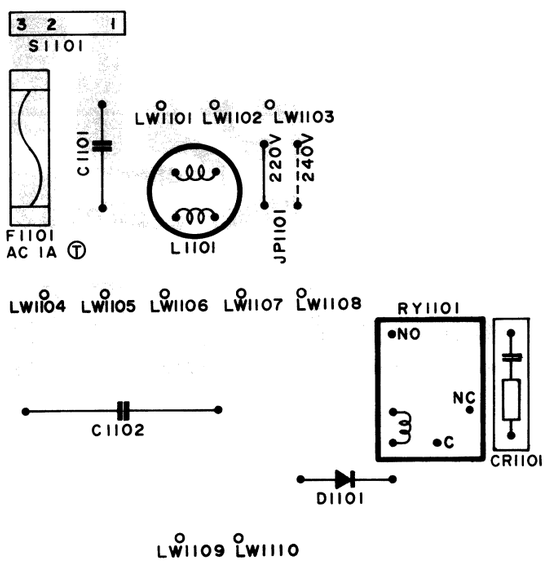
PRODUCT SAFETY NOTICE

The components designated by a symbol(⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the Parts List. Do not deviate from the resistance, wattage and voltage ratings shown.

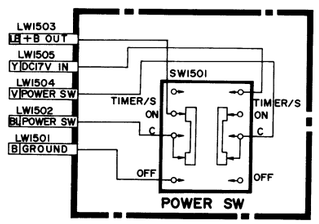
SCHEMATIC DIAGRAMS I AC POWER SUPPLY CIRCUIT (ON W7 CIRCUIT BOARD)



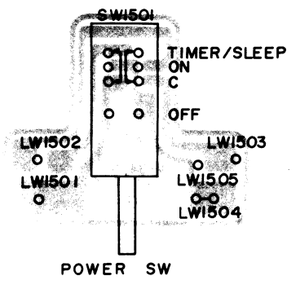
W7 CIRCUIT BOARD



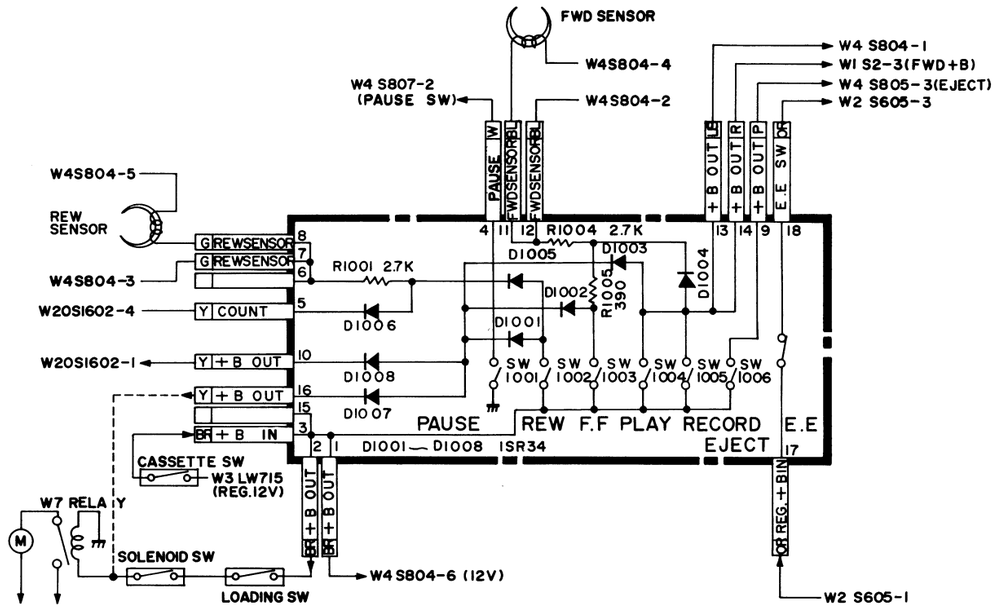
P.C.B. (W19) POWER SWITCH



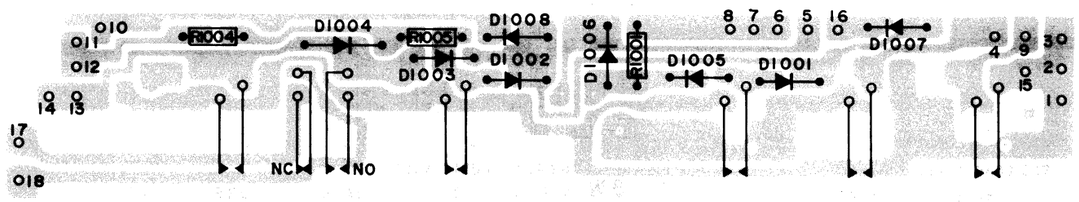
W19 CIRCUIT BOARD



MODE SWITCH CIRCUIT (ON W6 CIRCUIT BOARD)



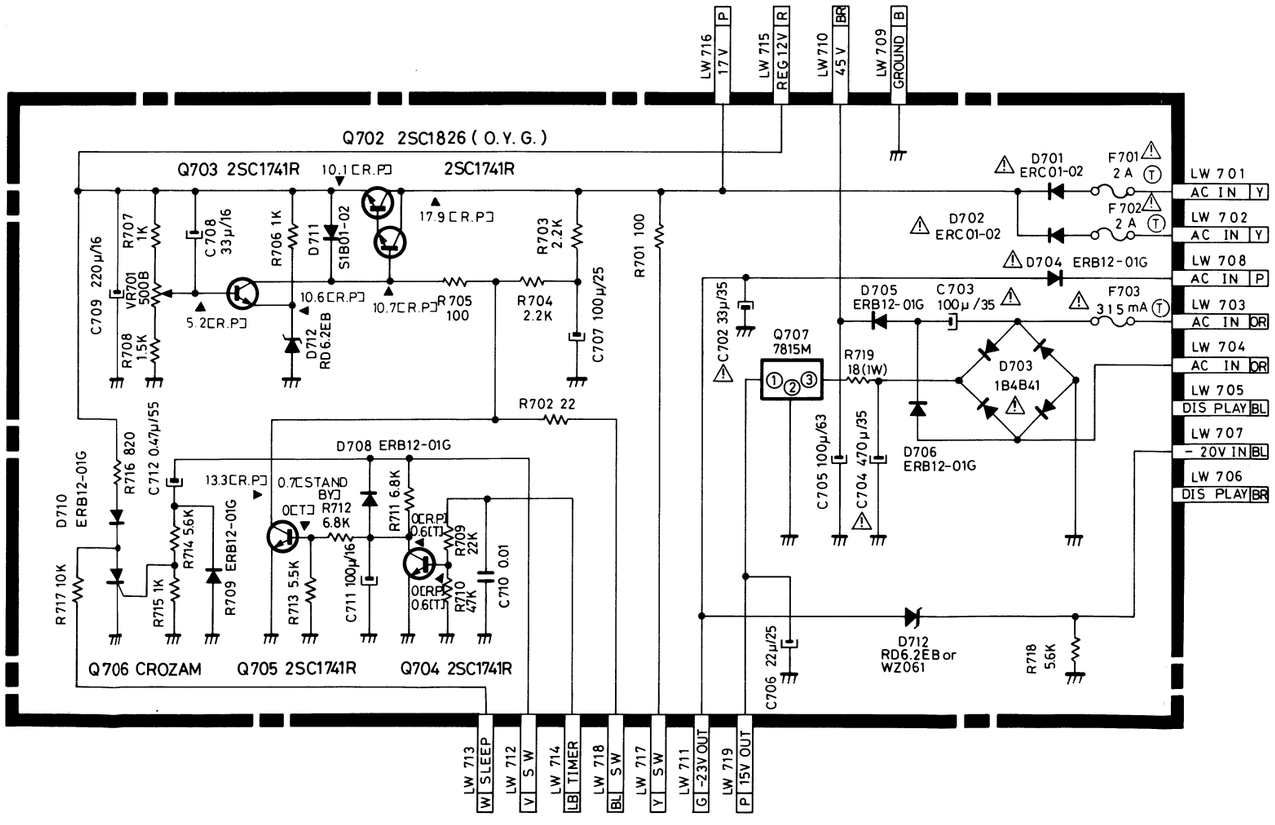
W6 CIRCUIT BOARD



PRODUCT SAFETY NOTICE

The components designated by a symbol(⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the Parts List. Do not deviate from the resistance, wattage and voltage ratings shown.

SCHEMATIC DIAGRAM Ⅱ
DC POWER SUPPLY CIRCUIT
(ON W3 CIRCUIT BOARD)



W3 CIRCUIT BOARD