



## SERVICE MANUAL



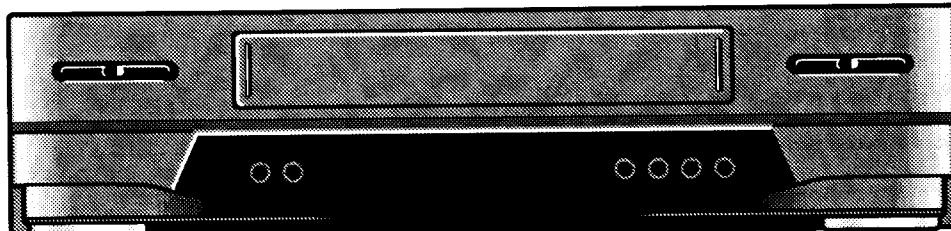
### Video Cassette Recorder

**VHR 9413A<sub>(U.S.A.)</sub>**  
**FVH 4909S<sub>(U.S.A.)</sub>**

#### NOTICE

The internal circuit/mechanism of the VHR 9413A and FVH 4909S are completely different than the VHR-9413 and FVH-4909.

Please check MODEL number carefully.



(VHR 9413A)



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CIRCUIT DIAGRAMS(Refer to the separate volume)	

Please see other materials with Reference No.given in table below.

	Model No.	Reference No.
Mechanism Manual	P90 Mechanism	WM-530596 or WM-530597
	92 Midi Mid-Mount Mechanism	MS531167 or MS531142

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

2. Substitute parts maybe supplied us the service parts.

3. N.S.P. :Not available as service parts.

VHR-9413A 1-143-140-74

1-143-815-98

TA4H/U, U-F2 FVH-4909S 1-143-140-73

1-143-815-99

REFERENCE No.SM531292

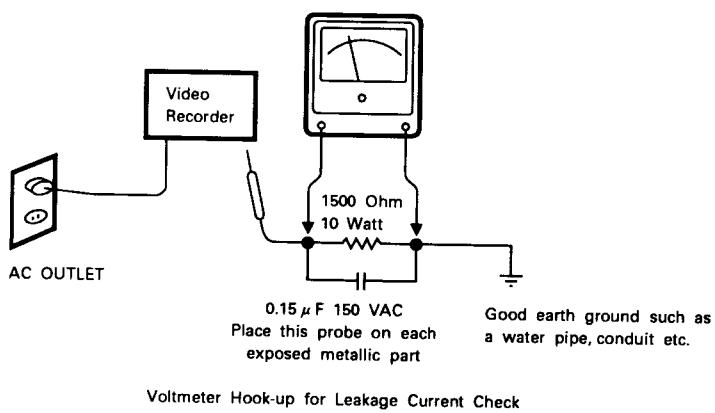
## SAFETY PRECAUTIONS

### **WARNING:**

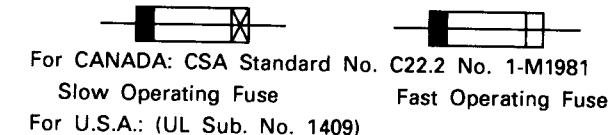
Service should not be attempted by anyone unfamiliar with the necessary precautions for this recorder. The following precautions are necessary during servicing:

1. Many electrical and mechanical parts in this recorder have special safety-related characteristics for providing protection against shock, fire and other hazards. These characteristics often go unnoticed in a visual inspection, and the protection afforded by them cannot necessarily be obtained by using replacement components with higher ratings (voltage,wattage,etc.).
2. Replacement parts having special safety-related characteristics are identified in this manual, and in the schematic diagrams, by the symbol  $\Delta$ . These components have values that are of special significance to product safety. Should any component (identified by the symbol  $\Delta$ ) need to be replaced, use only the part designated in the Parts List. Do not deviate from the specified resistance, wattage and voltage ratings.
3. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as terminals, screwheads, metal overlays, etc. to be sure that the set is safe to operate without the danger of electrical shock. Plug the AC line cord directly into a 120 VAC outlet (do not use a line isolation transformer during this check.) Use an AC voltmeter with a sensitivity of 5000 ohms per volt (or more) as follows: Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15 mfd, 150 VAC capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the 1500 ohm resistor and 0.15 mfd capacitor combination. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part. The measured voltage must not exceed 300 mVrms. This corresponds to 200 mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

**AC VOLTMETER**  
(5000 ohms per volt or more sensitivity)  
Reading should not exceed 300 mVrms



4. Fuse symbol marks.



# 1. DISASSEMBLY

## 1-1. REMOVAL OF CABINET, MECHANISM UNIT AND MAIN BOARD

### REMOVING THE CABINET PARTS (Fig. 1-1)

1. Remove the cabinet and bottom cover by removing the four screws (A) and five screws (B).
2. Remove the front panel by removing the locks of the clamps (C) using a screwdriver, etc. and slightly rotating the bottom part in the direction of the arrow.

**NOTES:**

- Electrical adjustments for the this model can be performed with only the cabinet removed.
- When replacing the bottom cover, do not tighten the screws (B) too much. Excess tightness may damage the screws taps on the chassis.

### REMOVING THE MECHANISM MAIN UNIT (Fig. 1-2 and Fig. 1-3)

#### After removing the cabinet parts:

1. Remove the 12-pin connector from CN511 and the two screws (D), and then remove the PW-1 PWB Ass'y.
2. Remove the 6-pin connector from the ACE head, and the 2-pin connector and 24-wire flat cable from the MC-2 PWB.

3. Remove the flat cable from the Cylinder Ass'y, then the two screws (E), and finally the VM-1 PWB Ass'y. It is not necessary to remove a couple of flat cables connected between the VM-1 PWB Ass'y and CP-1 PWB Ass'y.
4. Remove the mechanism main unit by removing the two screws (F) and two screws (G). Remove, as well, the two screws (H) at the cassette tray side while pressing the tray lock lever as shown in the enlarged view and pushing the cassette tray to the position where the two screws (H) appear.

### REMOVING THE CP-1 PWB ASS'Y (Fig. 1-3)

After removing the cabinet parts and the mechanism unit:

1. Pull out the TM-1 PWB Ass'y from CN301 and CN302 while pressing and spreading out the four clamps (J) as shown by the arrows.
2. Remove the two red screws (L). Next, remove the CP-1 PWB Ass'y by lifting it straight up while pressing and spreading out the two clamps (M) as shown by the arrows.

M-TA4H/U2 1

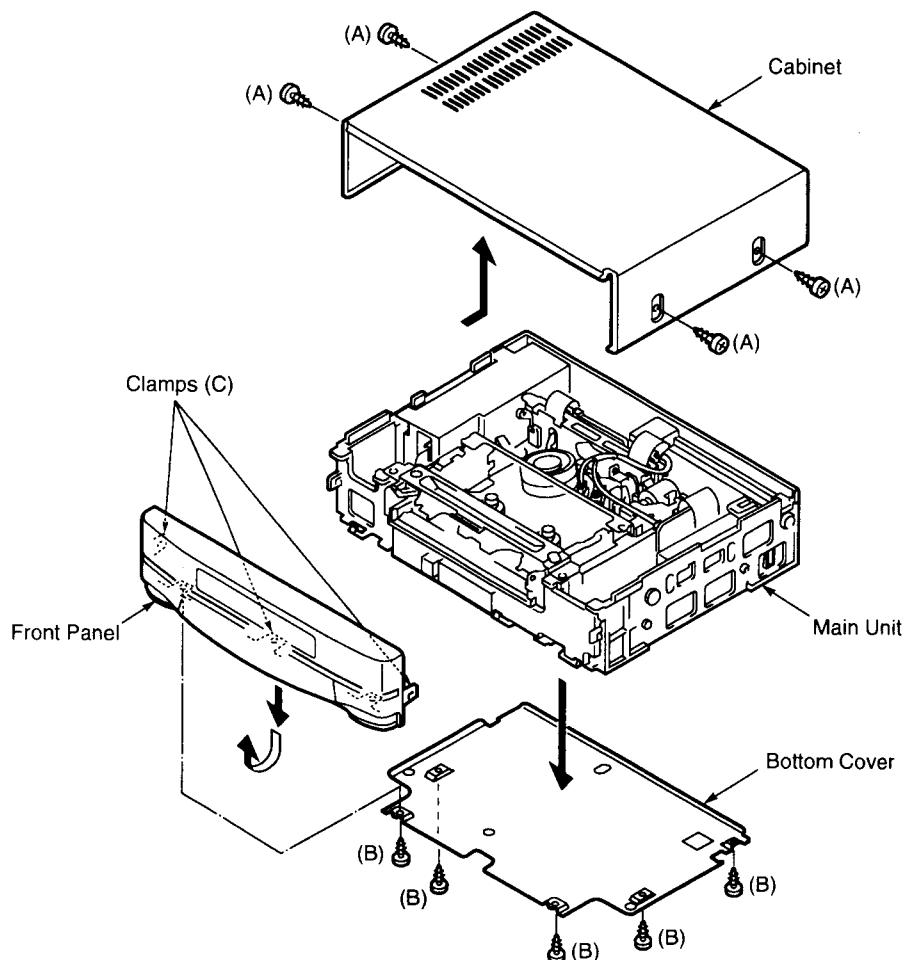


Fig. 1.1

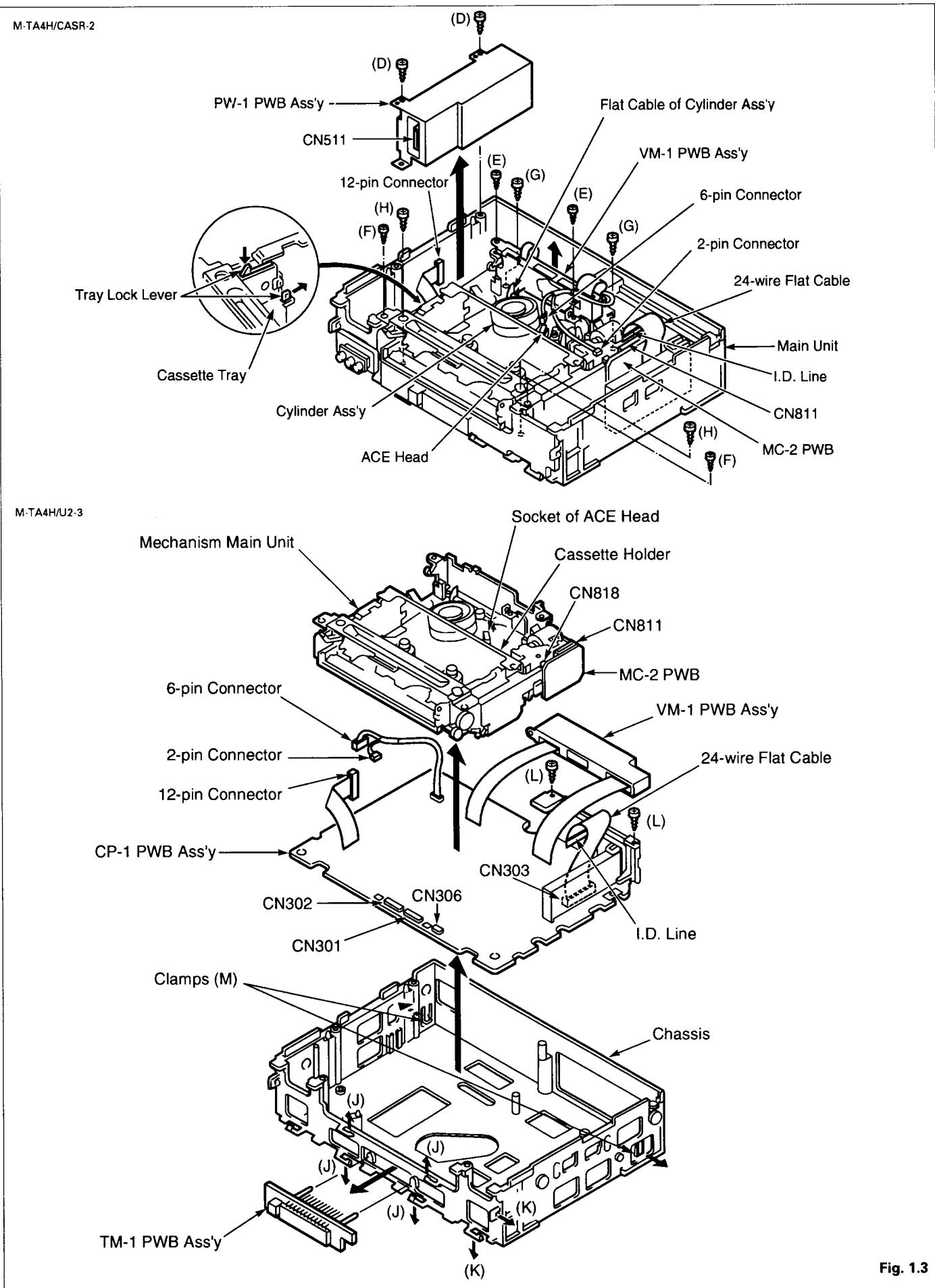


Fig. 1.3

## TEMPORARILY SETTING UP AND CONNECTING CP-1 PWB ASS'Y (Fig. 1-4)

The following is an example of how to place and connect the main board not requiring a jig, when repairing the CP-1 PWB Ass'y.

1. Place the mechanism main unit at the fixed position on the chassis.
2. Insert the VM-1 PWB Ass'y at the fixed position of the mechanism unit and connect the flat cable of the Cylinder Ass'y.
3. Connect the 24-wire flat cable to MC-2 PWB on the mechanism unit. Connect the TM-1 PWB Ass'y to operate the VCR by using the remote control.
4. Place the CP-1 PWB Ass'y above the mechanism main unit along the cassette holder. Insert the tip (N) of the terminal board into the opening (O) at the side of the chassis, as shown in the enlarge view.

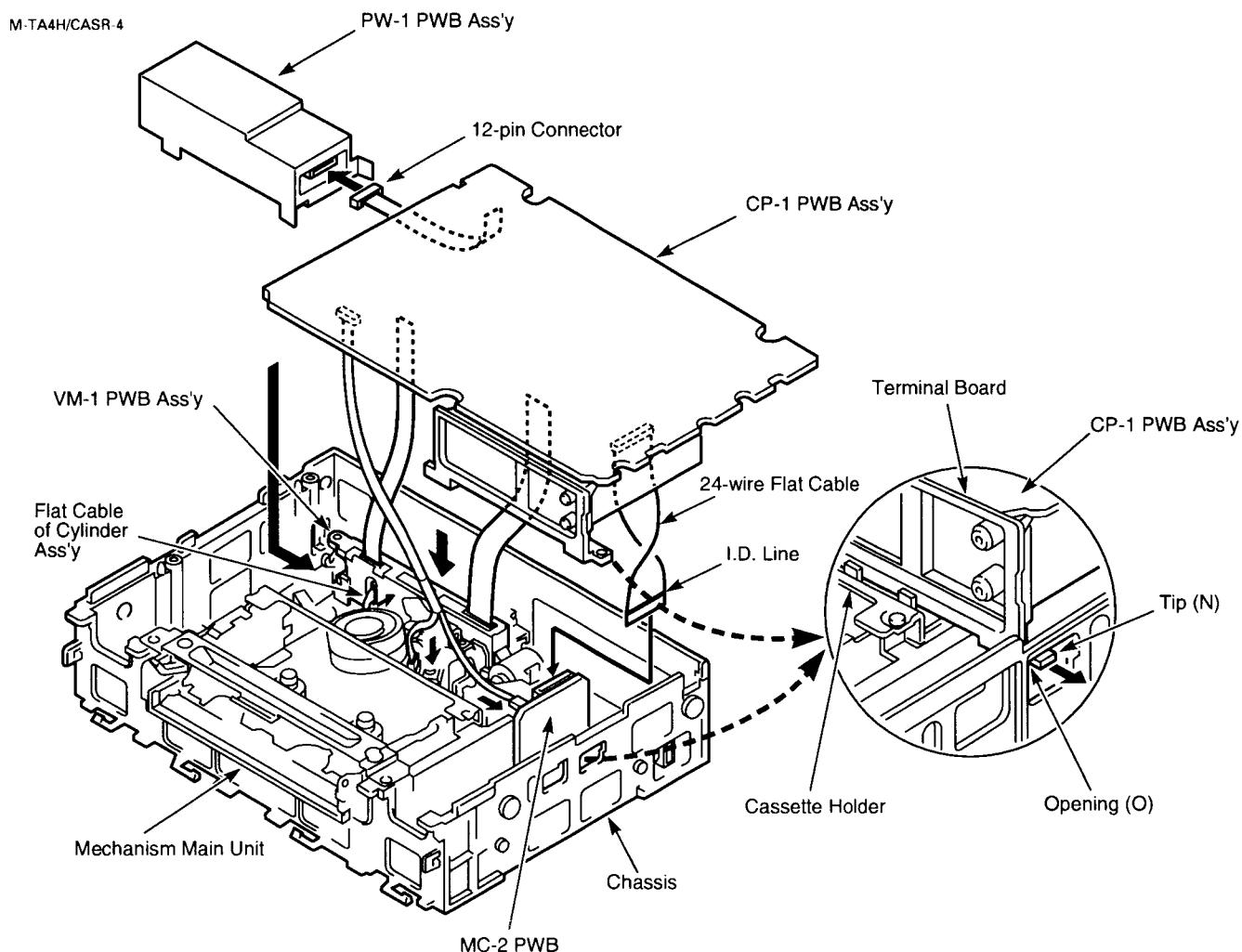


Fig. 1.4

## 1-2. CIRCUIT BOARD LOCATIONS

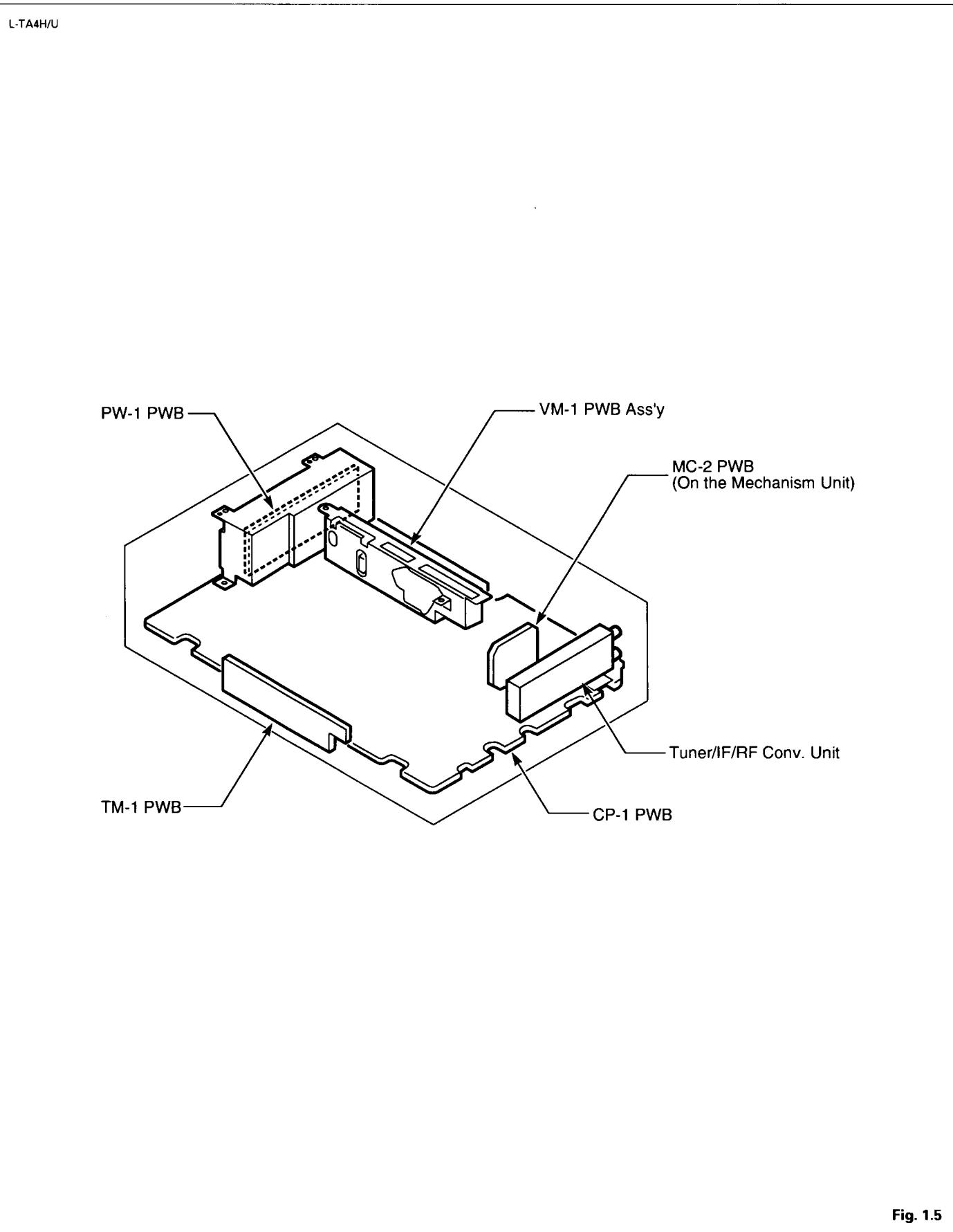


Fig. 1.5

## 2. ELECTRICAL ADJUSTMENT

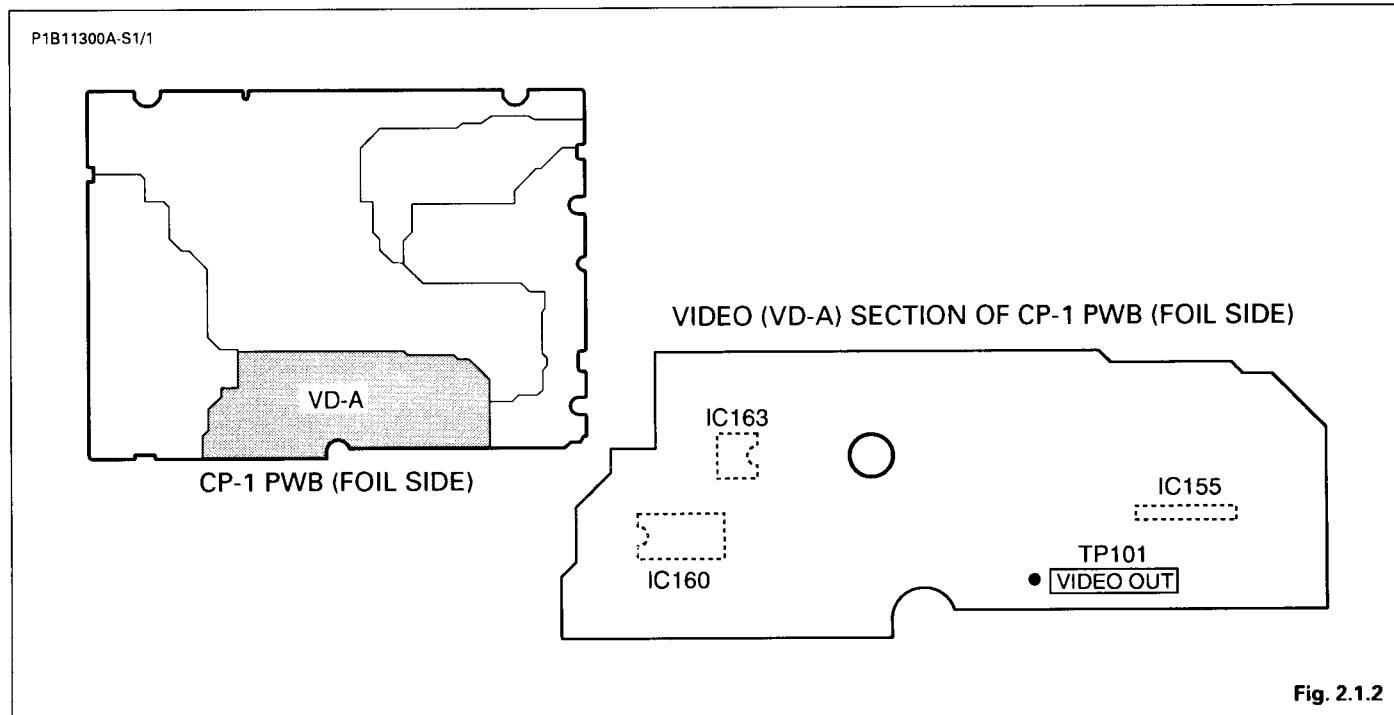
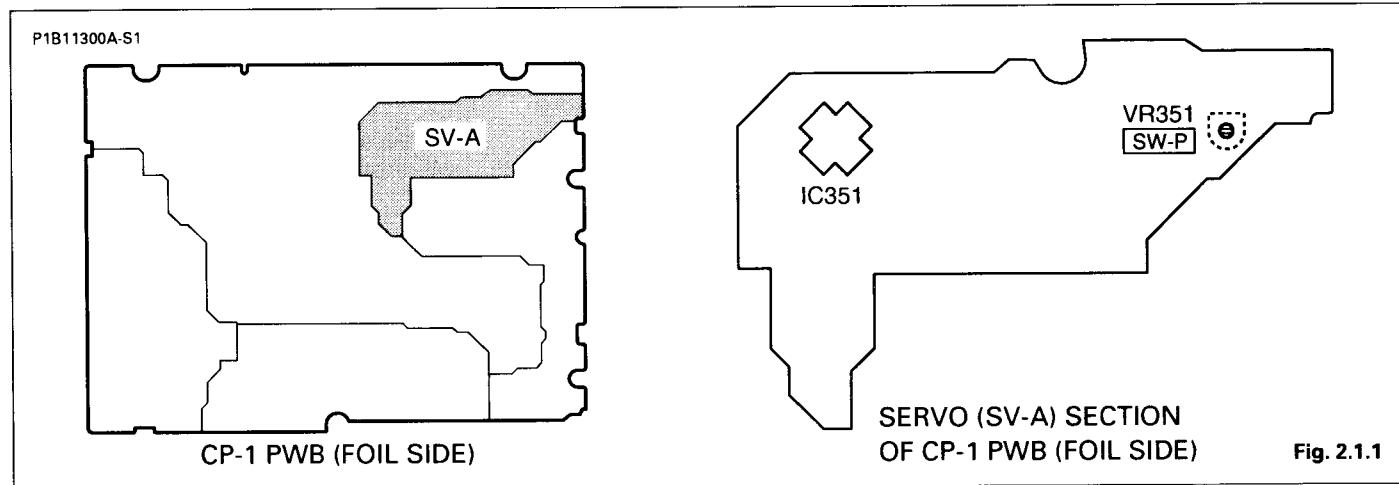
### 2-1. SERVO CIRCUIT ADJUSTMENT

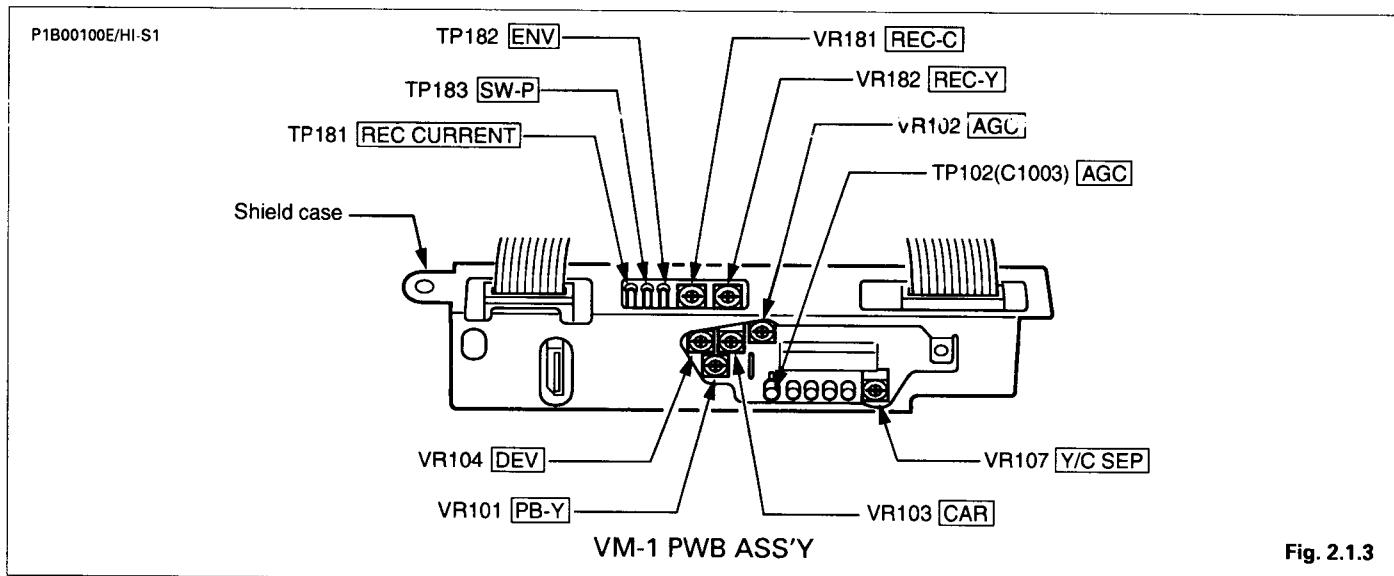
- These adjustments should be carried out upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustments) are carried out after these adjustments, follow the procedures again in Section 2-1-3. SWITCHING POSITION ADJ.

#### 2-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Oscilloscope	Vertical sensitivity: 5 mV/DIV, external trigger Band width: mode than 10 MHz
Test Tape	SP mode: VNM-7 (SVJ-00027) or NM-S7 (VHJ-0006)
Blank Tape	VHS-type cassette tape
Monitor TV	

#### 2-1-2. LOCATION OF ADJUSTMENT POINTS



**NOTES:**

- Self-recording means "Record any broadcasting or video signal and play back the just-recorded portion."
- It is possible to use the SLOW function only with remote control operation.

**2-1-3. SWITCHING POSITION ADJ.**

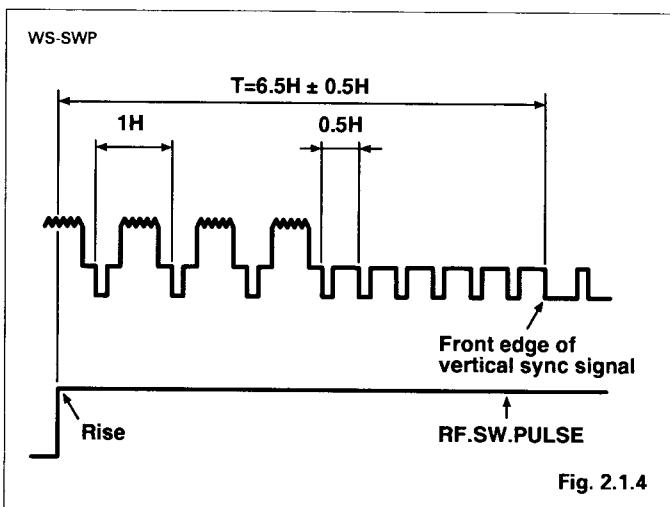
Measuring Point	Measuring Equipment	ADJ. Condition
TP101 TP183 (SW-P)	Oscilloscope	PLAY (SP) mode Test tape (VNM-7 or NM-S7)
ADJ. Location	ADJ. Value	
VR351 (SW-P)	$6.5H \pm 0.5H$	

1. Set the tracking control position to the center by pressing CHANNEL buttons ( $\blacktriangle$ ) and ( $\blacktriangledown$ ) simultaneously.  
(Tracking center position display in the indicator panel "T —")
2. Adjust VR351 (SW-P) so that the width "T" becomes  $6.5H \pm 0.5H$  as shown in Fig. 2.1.4

**2-1-4. STILL V-LOCK ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
Picture of monitor TV	Color bar generator or Broadcasting Monitor	Self-recording (SP mode) STILL mode Blank tape
		Self-recording (EP mode) STILL mode Blank tape
ADJ. Location	ADJ. Value	
CHANNEL UP ( $\blacktriangle$ ) button CHANNEL DOWN ( $\blacktriangledown$ ) button	The minimum vertical shake	

1. Play back the just-recorded portion and then set the VCR in the STILL mode.
2. Press the CHANNEL UP ( $\blacktriangle$ ) button or the CHANNEL DOWN ( $\blacktriangledown$ ) button so that vertical shake of the picture is brought to its minimum.



## 2-1-5. SLOW TRACKING ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
Picture of monitor TV	Color bar generator or Broadcasting Monitor	Self-recording (SP mode) SLOW mode Blank tape
		Self-recording (EP mode) SLOW mode Blank tape
ADJ. Location		ADJ. Value
CHANNEL UP (▲) button CHANNEL DOWN(▼)button		—

1. Set the tracking control to the center position by pressing CHANNEL buttons (▲) and (▼) simultaneously.  
(Tracking center position is displayed on the indicator panel as shown "T —:-".)
2. Play back the self-recorded portion and set the VCR in the SLOW mode with the remote control unit.
3. Confirm that there is no noise on the slow playback display.
4. Press the CHANNEL UP button (▲) about three times and check that noise dose not appear at the upper part of the display.
5. Adjust the tracking control to the center again.
6. Press the CHANNEL DOWN button (▼) the same number of times as in the step 4 (about three times) and check that noise dose not appear at the lower part of the display.

### NOTES:

- CHANNEL button also servers as a TRACKING button.
- When the CHANNEL button is released, after a few seconds, the display on the indicator is turned to time display.

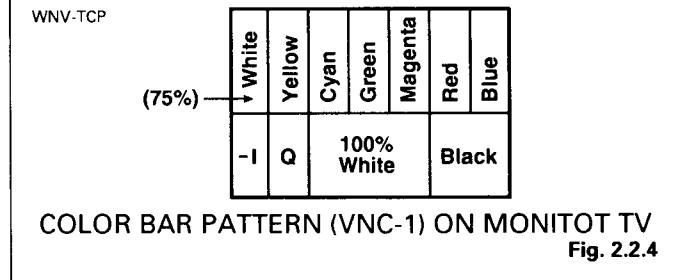
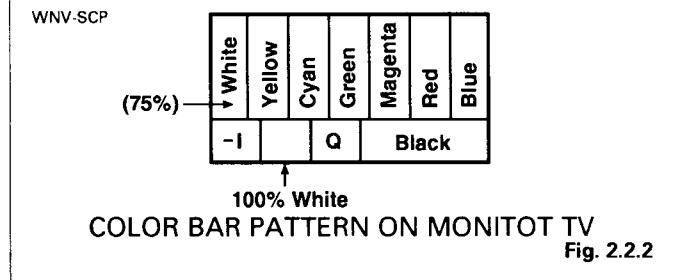
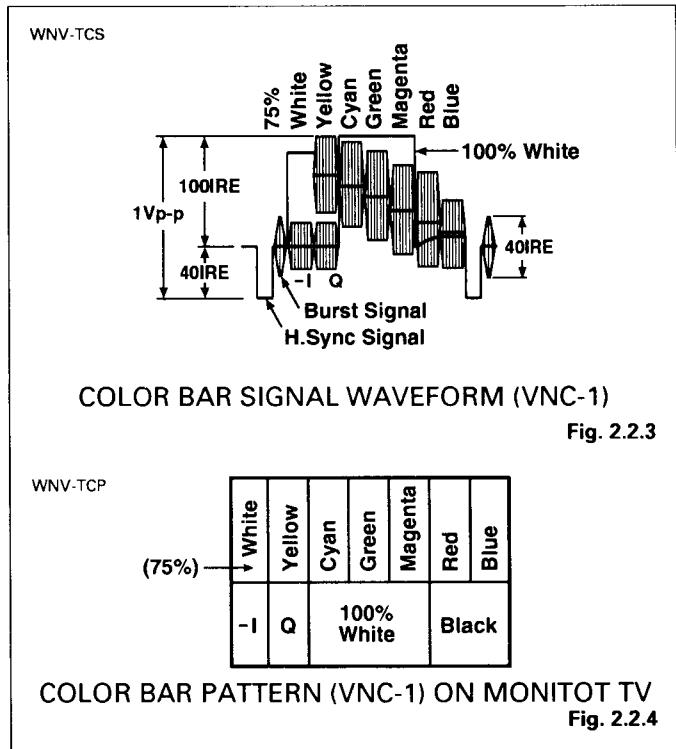
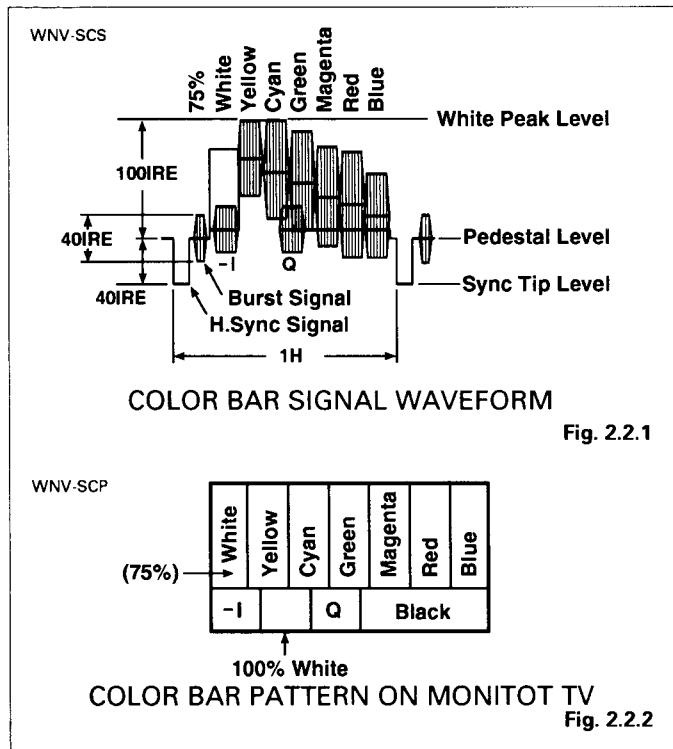
## 2-2. VIDEO CIRCUIT ADJUSTMENT

Before making the following adjustments, Section 2-1. SERVO CIRCUIT ADJUSTMENT should be completed.

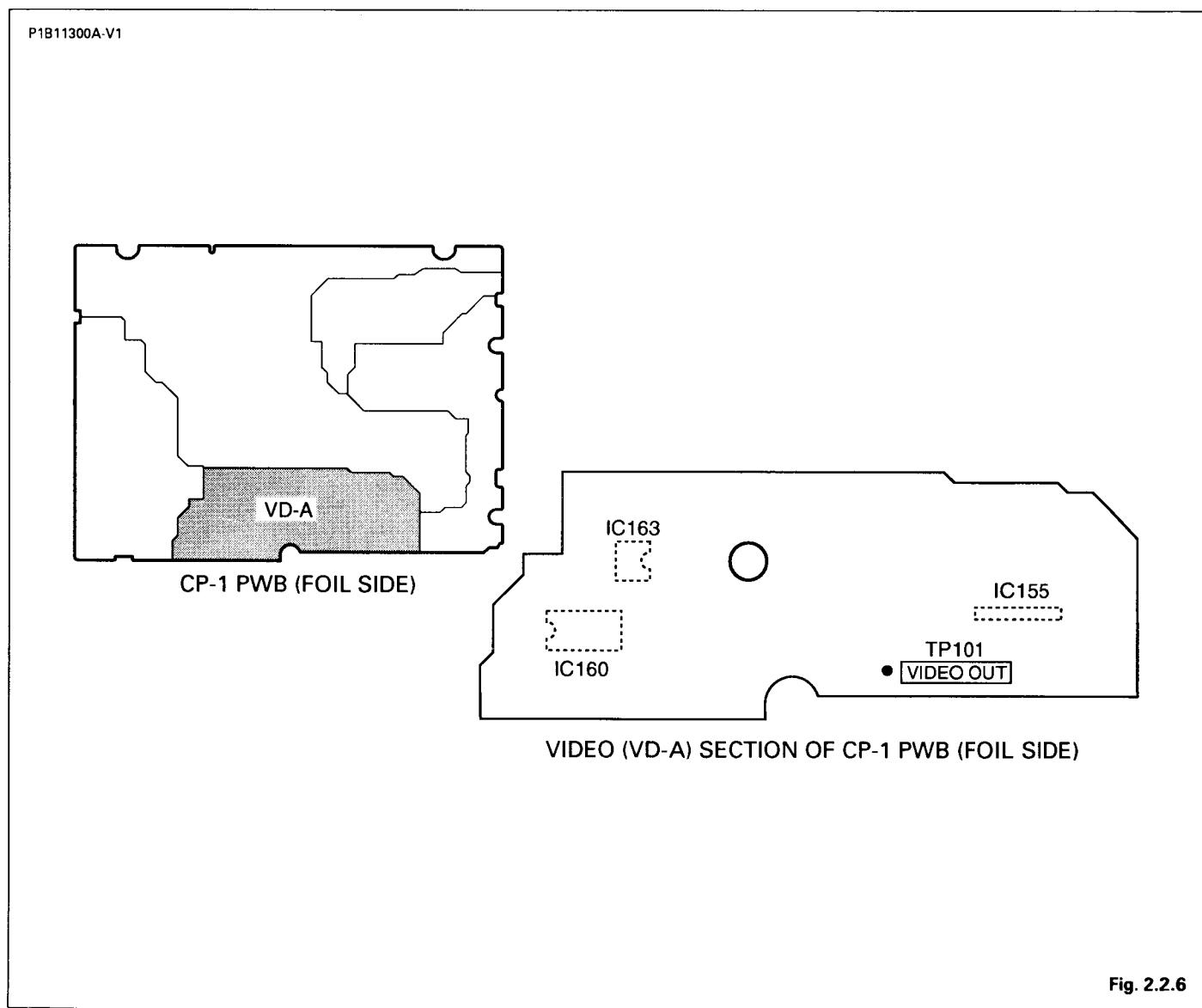
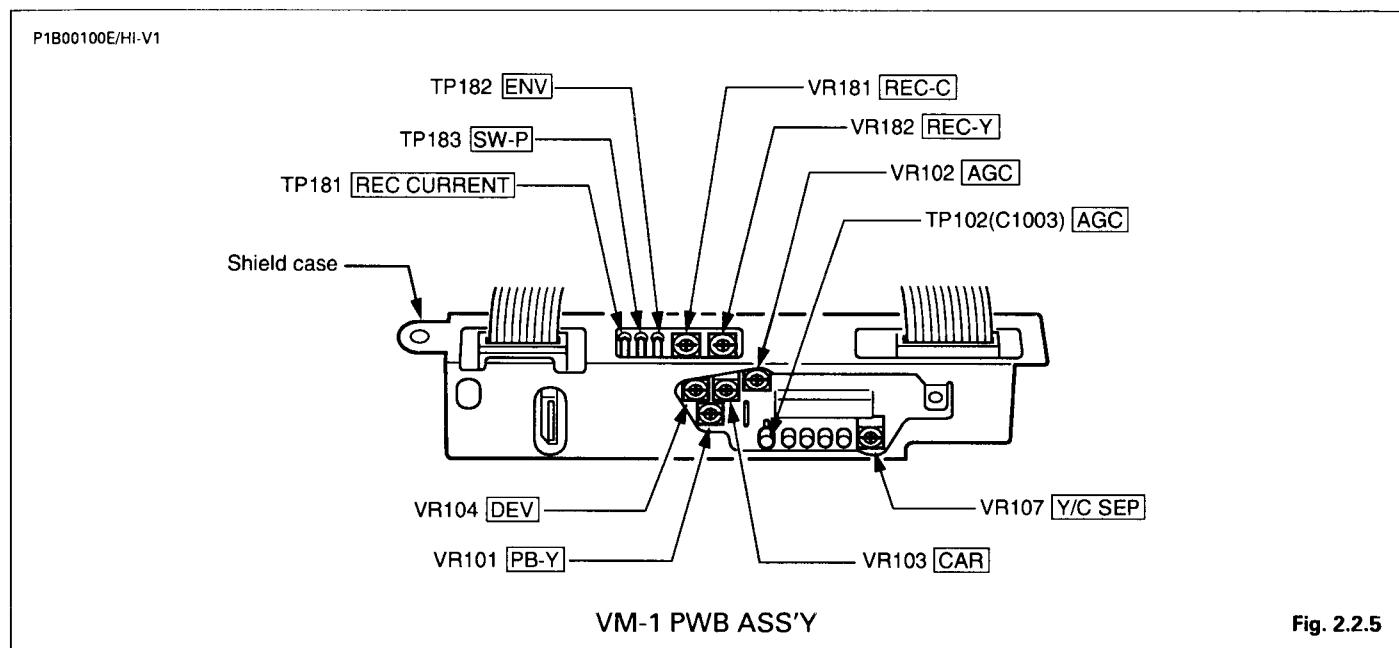
### 2-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	Color bar signal with 100% white level (EIA color bar signal) (Signal waveform is described below. Refer to Fig. 2.2.1.)
Oscilloscope	Vertical sensitivity: 5 mV/DIV, external trigger Band width: more than 10 MHz
Test Tape	VNC-1 (SVJ-00028) or NC-S1 (VHJ-0005): SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 2.2.3.)
Blank Tape	VHS-type cassette tape
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency: DC ~ 40 MHz (10:1) DC ~ 30 MHz (1:1)
Frequency Counter	8 significant digits
Signal Generator	3.58 MHz CW signal

#### NTSC TV TEST SIGNAL



## 2-2-2. LOCATION OF ADJUSTMENT POINTS



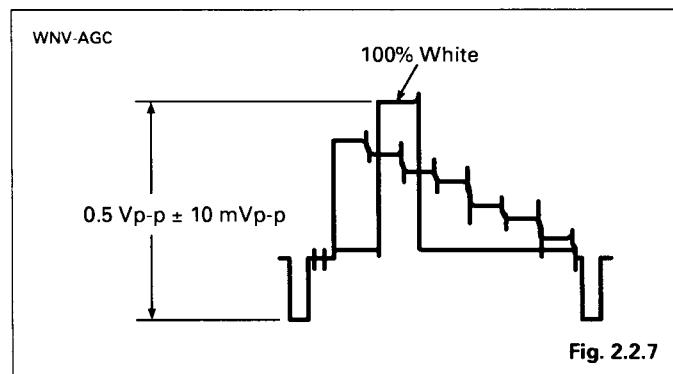
**NOTES:**

- Set the INPUT SELECT to the "A/V" position.
- Self-recording means "Record the video signal and play back the just-recorded portion".

**2-2-3. AGC LEVEL ADJ.**

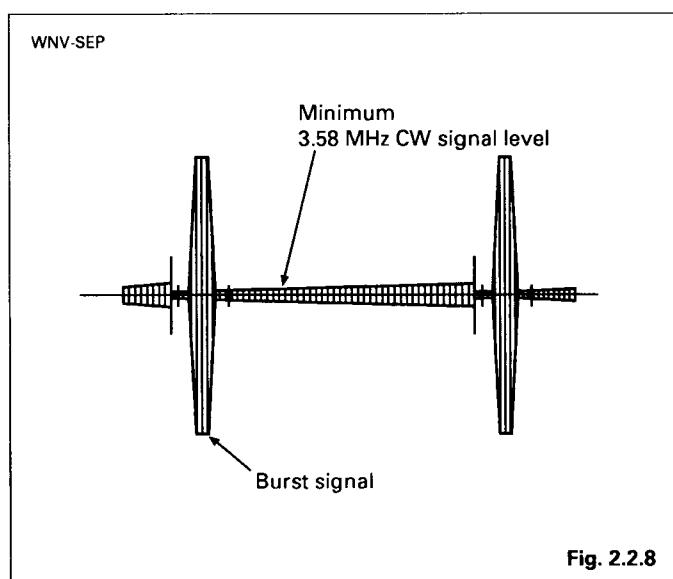
Measuring Point	Measuring Equipment	ADJ. Condition
TP102 (Body of C1003)	Color bar generator Oscilloscope (10:1 probe)	E-E mode
ADJ. Location	ADJ. Value	
VR102 (AGC)	$0.5 \text{ Vp-p} \pm 10 \text{ mVp-p}$	

1. Connect the color bar generator to the VIDEO INPUT (REAR) terminal.
2. Adjust VR102 (AGC) for  $0.5 \text{ Vp-p} \pm 10 \text{ mVp-p}$  as shown in Fig. 2.2.7.

**2-2-4. Y/C SEP. ADJ.**

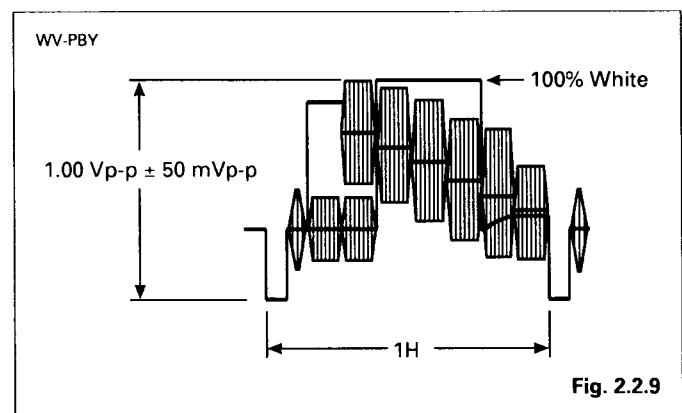
Measuring Point	Measuring Equipment	ADJ. Condition
TP182 (on VM-1 PWB)	3.58 MHz CW signal generator Oscilloscope (10:1 probe)	REC (EP) mode Blank tape
ADJ. Location	ADJ. Value	
VR107 (Y/C SEP)	—	

1. Input the 3.58 MHz CW signal to the VIDEO INPUT (REAR) terminal.
2. Adjust VR107 (Y/C SEP) for the minimum 3.58 MHz CW signal level as shown in Fig. 2.2.8.

**2-2-5. PB-Y LEVEL ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
TP101	Oscilloscope	PLAY (SP) mode Test tape (VNC-1 or NC-S1)
ADJ. Location	ADJ. Value	
VR101 (PB-Y)	$1.00 \text{ Vp-p} \pm 50 \text{ mVp-p}$	

1. Terminate the VIDEO OUTPUT terminal with a  $75\Omega$  resistor.
2. Adjust VR101 (PB-Y) for the video luminance signal level of  $1.00 \text{ Vp-p} \pm 50 \text{ mVp-p}$ . (Refer to Fig. 2.2.9.)



## 2-2-6. CARRIER SET ADJ.

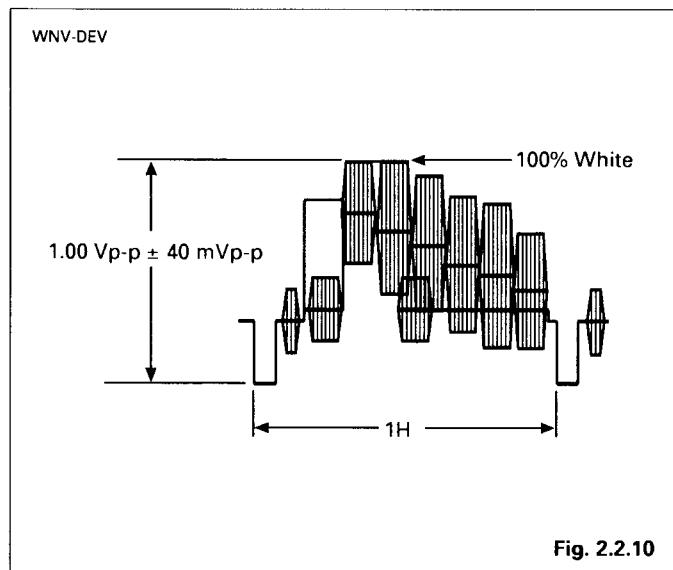
Measuring Point	Measuring Equipment	ADJ. Condition
TP181 (on VM-1 PWB)	Frequency counter	E-E mode
ADJ. Location	ADJ. Value	
VR103 (CAR)	$3.44 \text{ MHz} \pm 30 \text{ kHz}$	

1. Disconnect the power cord of VCR unit from AC outlet.
2. Disconnect every input signal from VIDEO INPUT terminal.
3. Connect the power cord of VCR unit to AC outlet.
4. Press the power switch to ON and adjust VR103 (CAR) so that in the zero level signal status the frequency at TP181 becomes  $3.44 \text{ MHz} \pm 30 \text{ kHz}$ .

## 2-2-7. DEVIATION ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
TP101	Color bar generator Oscilloscope (1:1 probe)	Self-recording (EP) mode Blank tape
ADJ. Location	ADJ. Value	
VR104 (DEV)	$1.00 \text{ Vp-p} \pm 40 \text{ mVp-p}$	

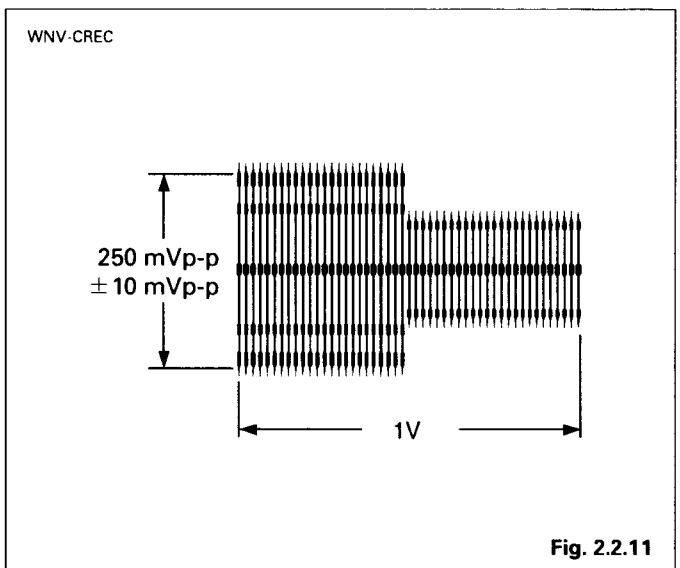
1. Connect the color bar generator to the VIDEO INPUT (REAR) terminal.
2. Terminate the VIDEO OUTPUT terminal with a  $75\Omega$  resistor.
3. Play back of the just-recorded portion.
4. Adjust VR104 (DEV) for  $1.00 \text{ Vp-p} \pm 40 \text{ mVp-p}$  as shown in Fig. 2.2.10.
5. If the adjustment value is not satisfactory, adjust VR104 and repeat steps 3 to 4.



## 2-2-8. C REC CURRENT ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
TP181 (on VM-1 PWB)	Color bar generator Oscilloscope (1:1 probe)	REC (EP) mode Blank tape
ADJ. Location	ADJ. Value	
VR181 (REC-C)	$250 \text{ mVp-p} \pm 10 \text{ mVp-p}$	

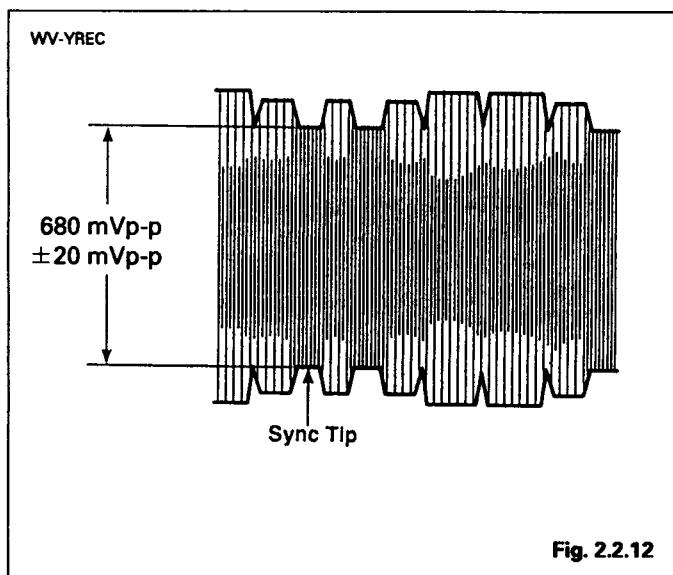
1. Connect the color bar generator to the VIDEO INPUT terminal.
2. Adjust VR182 (REC-Y) for the minimum video luminance signal level.
3. Adjust VR181 (REC-C) so that the video chrominance signal level is  $250 \text{ mVp-p} \pm 10 \text{ mVp-p}$ . (Refer to Fig. 2.2.11)



**2-2-9. Y REC CURRENT ADJ.**

<b>Measuring Point</b>	<b>Measuring Equipment</b>	<b>ADJ. Condition</b>
TP181 (on VM-1 PWB)	Color bar generator Oscilloscope (1:1 probe)	REC (EP) mode Blank tape
<b>ADJ. Location</b>		<b>ADJ. Value</b>
VR182 (REC-Y)		680 mVp-p $\pm$ 20 mVp-p

1. Connect the color bar generator to the VIDEO INPUT terminal.
2. Adjust VR182 (REC-Y) so that the video luminance signal level at the sync tip is **680 mVp-p  $\pm$  20 mVp-p**. (Refer to Fig. 2.2.12.)



## 2-3. AUDIO CIRCUIT ADJUSTMENT

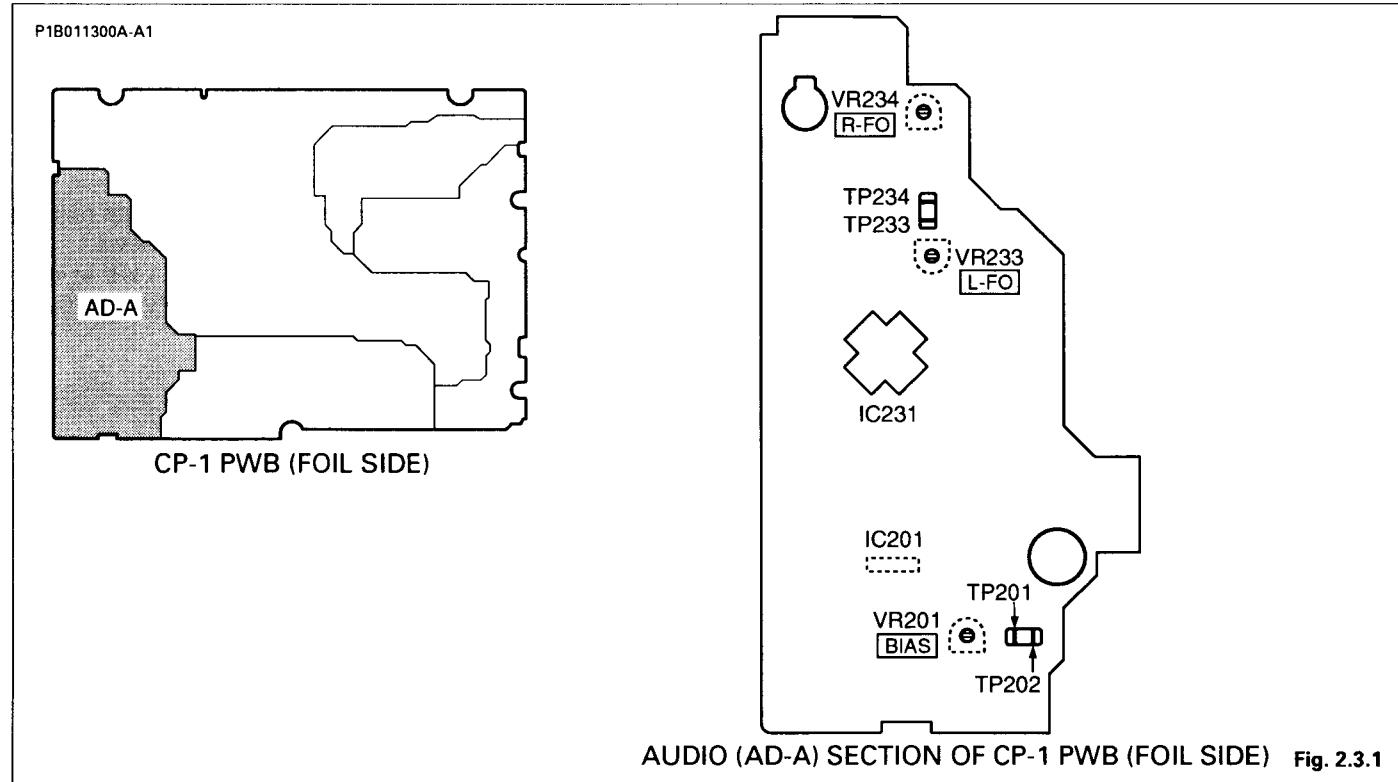
### AUDIO NORMAL CIRCUIT

- Prior to making these adjustments, especially, the tape guide height and audio control erase head height adjustments should be carried out, so that the tape traveling between the loading guide pole and the audio control erase head runs without fluttering, twisting curling.
- Prior to making these adjustments, (except the audio control erase head adjustments), Section 2-1. SERVO and Section 2-2. VIDEO circuit adjustments should be carried out.

### 2-3-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Standard Audio Signal Generator (SG)	Output frequency : 10 Hz ~ 100 kHz Output level : more than 1 Vrms Output impedance : 600 Ω Distortion ratio : less than 0.1 % Output in use SG : Frequency: ..... 1 kHz, 10 kHz (switchable) Output level: ..... -28 dBs ± 0.5 dB
Color Bar Generator	Color bar signal with 100% white level. (Signal waveform is described before. Refer to Fig. 2.2.1)
Oscilloscope	Vertical sensitivity : 5 mV/DIV Band width : more than 30 MHz
AC Voltmeter	Effective value indication Input frequency : 10 Hz ~ 20 kHz Input impedance : more than 1 MΩ Measurement level : 1 mV (full scale)
Blank Tape	VHS-type cassette tape
Dummy Plug	RCA plug, Shorting type

### 2-3-2. LOCATION OF ADJUSTMENT POINTS



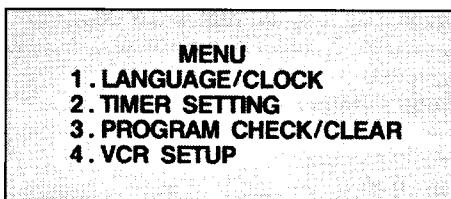
**NOTES:**

- Set the following switch or On-screen menu to the positions indicator below, before making following adjustments.

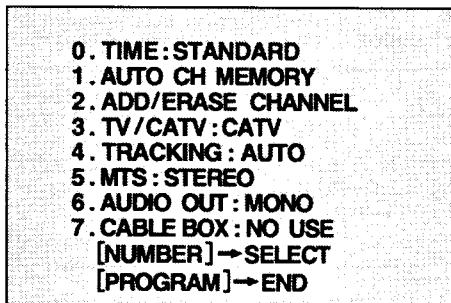
SWITCH or ON-SCREEN MENU	POSITION
TAPE SPEED	SP
INPUT	AV
AUDIO OUT MODE	MONO

**To select the AUDIO OUT mode:**

- Press the PROGRAM button on the remote control. The main MENU appears. (If the clock has not yet been set, the LANGUAGE/CLOCK menu will appear. In that case, select the language and set the clock, see Instructions book.)



- Select to 4. VCR SETUP menu.  
The VCR SETUP menu appears.



- Select to "6. AUDIO OUT: MONO" mode.
- Self-recording means "Record the audio signal and play back the just-recorded position".

**2-3-3. BIAS LEVEL ADJ.****[A]**

Measuring Point	Measuring Equipment	ADJ. Condition
TP201 (HOT) TP202 (EARTH)	Color bar generator Oscilloscope AC voltmeter Dummy plug	REC (SP) mode Blank tape
ADJ. Location	ADJ. Value	
VR201 (BIAS)	21 mVrms	

- Connect the color bar generator to the VIDEO INPUT (REAR) terminal.
- Insert the dummy plug into the AUDIO INPUT (REAR) terminal.
- After confirming on the oscilloscope that a 70 kHz sine wave is being output, adjust VR201 (BIAS) so that the AC voltmeter's reading is 21 mVrms.

**[B]**

Measuring Point	Measuring Equipment	ADJ. Condition
AUDIO OUTPUT terminal	Oscilloscope AC voltmeter Standard audio signal generator (SG)	Self-recording (SP mode) Blank tape
ADJ. Location	ADJ. Value	
VR201 (BIAS)	-3 dB ~ +2 dB between 1 kHz and 10 kHz	

- Connect the standard audio signal generator to the AUDIO INPUT (REAR) terminal.
- Set the standard audio signal generator's output level to -28 dBs.
- Set the standard audio signal generator's frequency to 1kHz and then 10 kHz. Record each of these frequency signals.
- Play back each of the just-recorded portion.
- Confirm that the 10 kHz level on AC voltmeter's reading is from -3 dB to +2 dB, compared with 1 kHz level.
- If the 10 kHz level is less than -3 dB below 1 kHz level or more than + 2dB above 1 kHz level, rotate VR201 (BIAS) slightly to adjust it.
- Repeat steps 3 through 6 if necessary.

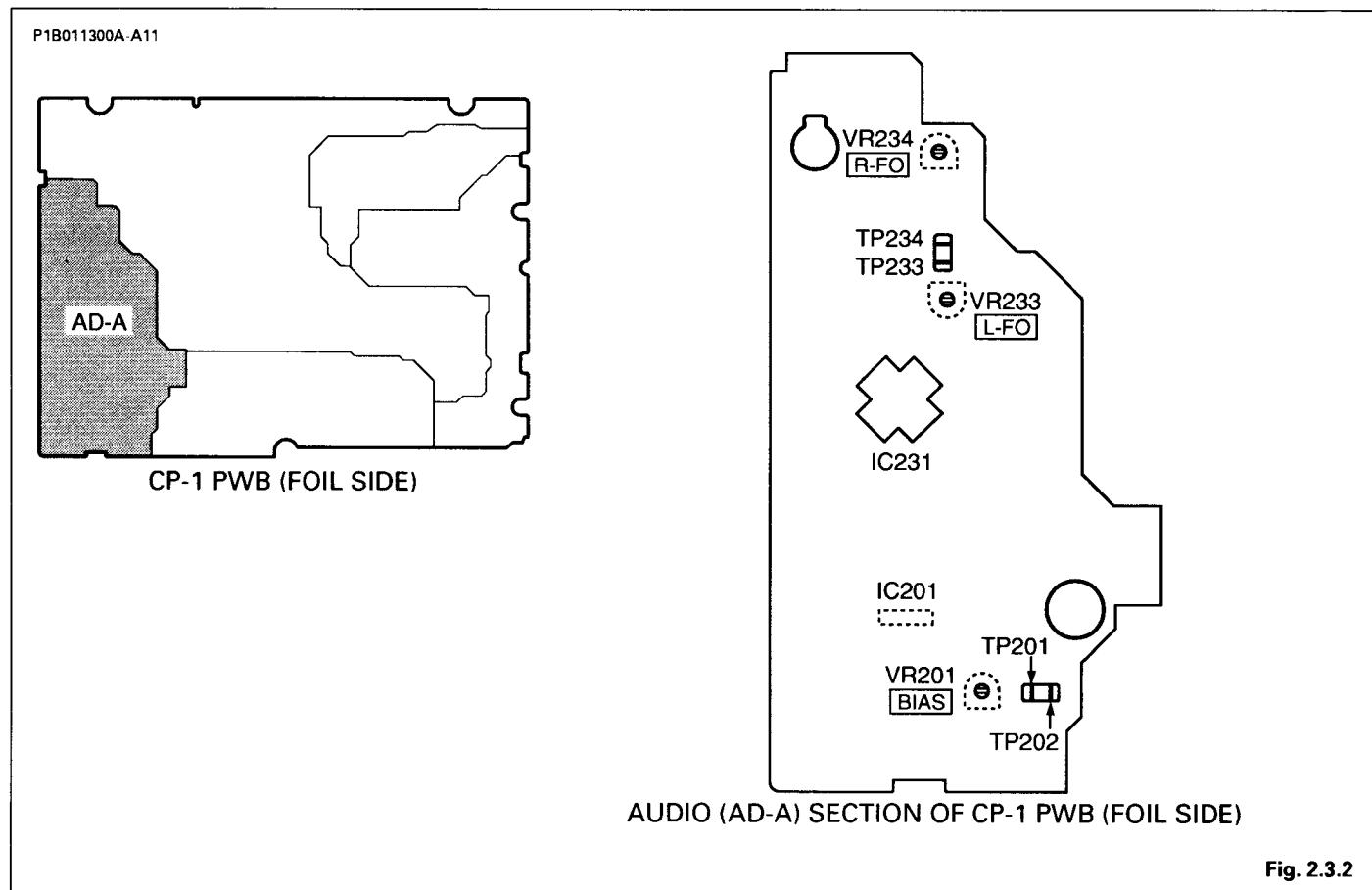
## AUDIO FM CIRCUIT

- Prior to making these adjustments, especially, the tape guide height and audio control erase head height adjustments should be carried out, so that the tape traveling between the loading guide pole and the audio control erase head runs without fluttering, twisting or curling.
- Prior to making these adjustments, Section 2-1. SERVO, Section 2-2. VIDEO and Section 2-3. AUDIO NORMAL circuit adjustments should be carried out.

### 2-3-4. TEST EQUIPMENT AND STANDARDS REQUIRED

Frequency Counter	Input frequency : 20 Hz ~ 10 MHz
Blank Tape	VHS-type cassette tape
Dummy Plug	RCA plug, Shorting type

### 2-3-5. LOCATION OF ADJUSTMENT POINTS



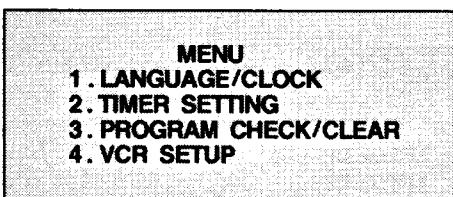
**NOTES:**

- Before making these adjustments, check that the surface of the parts touching the tape such as the A-FM head or guides are clean.
- Set the following switch or On-screen menu to the positions indicated below, before making following adjustments.

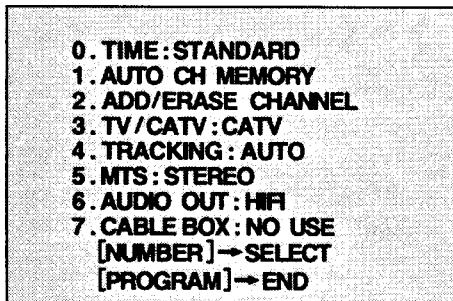
**To select the AUDIO OUT mode:**

SWITCH or ON-SCREEN MENU	POSITION
TAPE SPEED	SP
INPUT	AV
AUDIO OUT MODE	HIFI

- Press the PROGRAM button on the remote control. The main MENU appears. (If the clock has not yet been set, the LANGUAGE/CLOCK menu will appear. In that case, select the language and set the clock, see Instructions book.)



- Select to 4. VCR SETUP menu.  
The VCR SETUP menu appears.



- Select to "6 AUDIO OUT: HIFI" mode.
- Self-recording means "Record the audio signal and play back the just-recorded position".

**2-3-6. A-FM CARRIED FREQUENCY ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
TP233 (1.3 MHz) TP234 (1.7 MHz)	Frequency counter Dummy plug	REC (SP) mode Blank tape
ADJ. Location	ADJ. Value	
VR233 (L-FO)	1.298 MHz ± 5 kHz	
VR234 (R-FO)	1.699 MHz ± 5 kHz	

- Insert the dummy plug into the AUDIO INPUT REAR terminals (L,R).
- Adjust VR233 (L-FO) so that in the zero level signal status the frequency at TP233 becomes **1.298 MHz ± 5 kHz**.
- Adjust VR234 (R-FO) so that in the zero level signal status the frequency at TP234 becomes **1.699 MHz ± 5 kHz**.

## 2-4. IF (RF AGC) CIRCUIT ADJUSTMENT

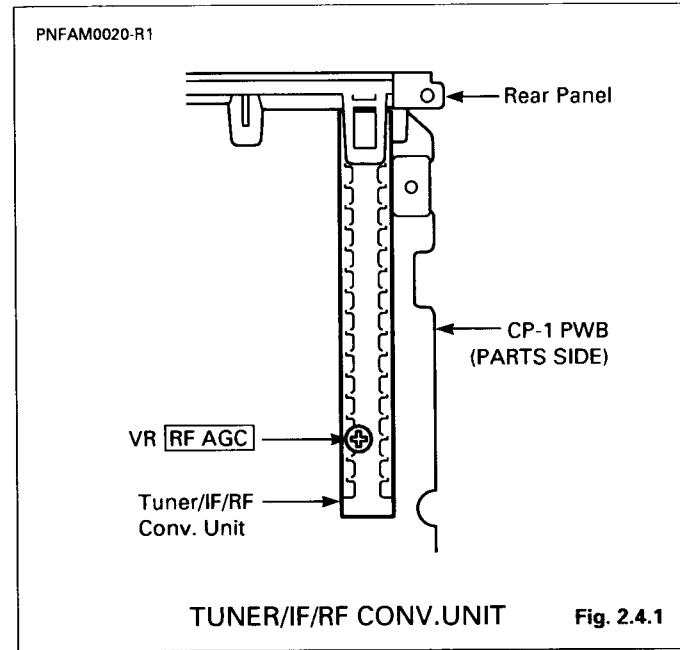
- In this model, the circuits of the TUNER, IF and RF converter have been made into one. Therefore, should one circuit malfunction, the whole unit must be replaced.
- The adjustments for the IF (RF AGC) circuit of the TUNER/IF/RF CONV. unit are described below.

**NOTE:** The TUNER/IF/RF CONV. unit dose not need any adjustments, because precise adjustments have been down before shipment.

### 2-4-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Monitor TV	
------------	--

### 2-4-2. LOCATION OF ADJUSTMENT POINT



### 2-4-3. RF AGC ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
Picture of monitor TV	Monitor TV	E-E mode
ADJ. Location	ADJ. Value	
VR (RF AGC) (on the IF circuit)	S/N is best point	

- Connect the monitor TV to VHF/UHF ANTENNA OUTPUT terminal.
- Connect the VHF antenna to VHF/UHF ANTENNA INPUT terminal.
- Receive the middle electrical field ( $70\text{dB}\mu \sim 90\text{dB}\mu$ ) of the VHF high channel, and slowly turn VR (RF AGC) from the point where snow-noise is present to the point where it just disappears from the monitor TV.
- Confirm by monitor TV that there is no beat and saturation (S/N is best point) when receiving any TV channel.

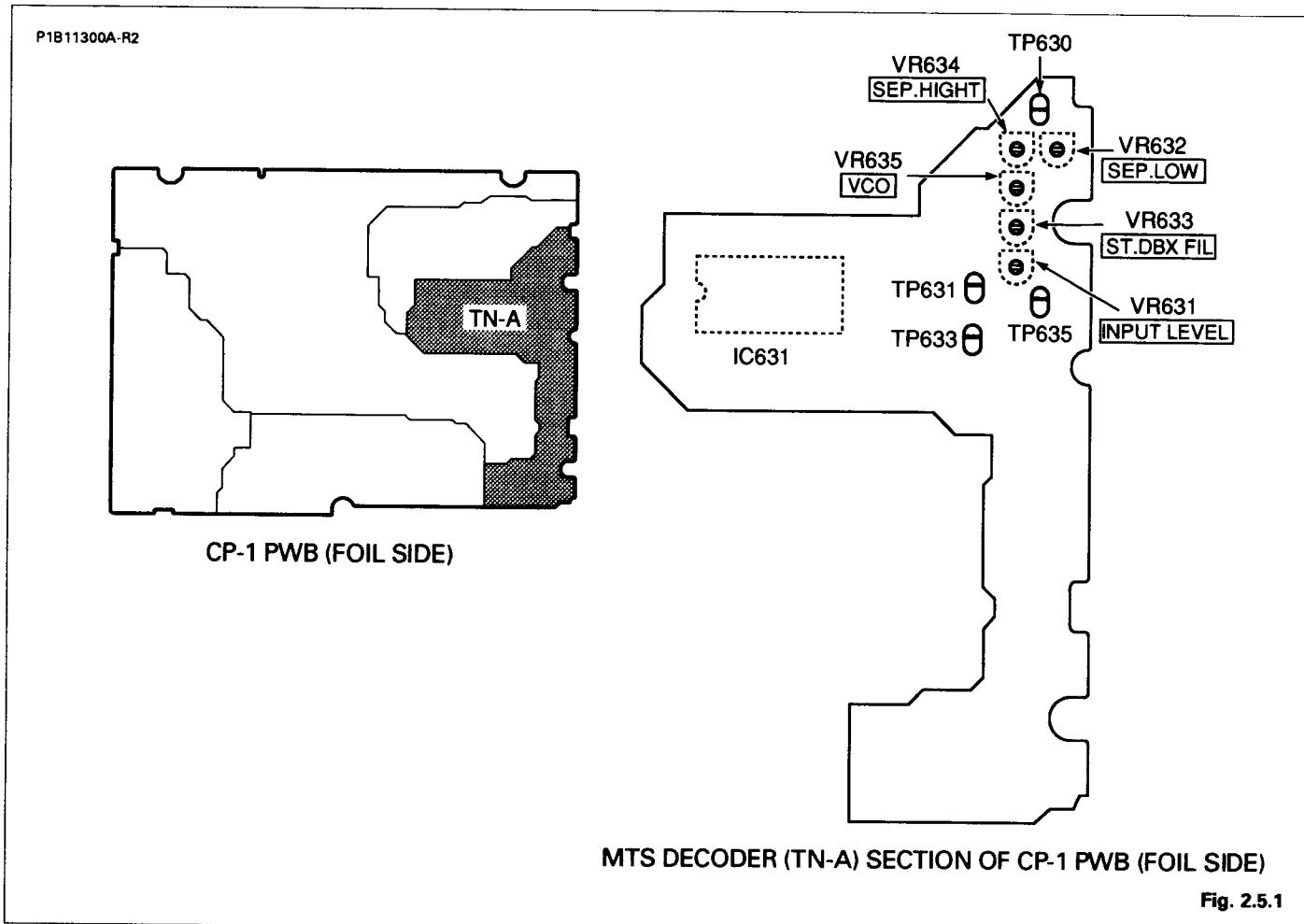
## 2-5. MTS DECODER CIRCUIT ADJUSTMENT

- If adjusting the MTS Decoder circuit, special equipment shown in section 2-5-1. is necessary.
- Improper adjustment will cause loss of performance of Stereo Sound and Bilingual Sound detection.
- Prior to making these adjustments, the other adjustments except the MTS Decoder should be completed.

### 2-5-1. TEST EQUIPMENT AND STANDARDS REQUIRED

TV Multichannel Sound Generator	LMS-238 (Produced by Leader Electronics Corp.)
Oscilloscope	
Standard Audio Signal Generator (SG)	
Frequency Counter	
AC Voltmeter	
DC Voltmeter	
DC Power Supply Unit	Voltage: 0 ~ 15 V (DC)
Band Path Filter	200 Hz ~ 15 kHz

### 2-5-2. LOCATION OF ADJUSTMENT POINTS



**NOTES:**

- Set the INPUT SELECT switch on the VCR to TUNER.
- Set the VIF/RF OUTPUT switch on the TV Multichannel Sound Generator to CH-3 or CH-4. And LEVEL volume control to push (locked the RF output level).

**2-5-3. STEREO/SAP FILTER ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
TP633	Standard audio signal generator(SG) Oscilloscope Frequency counter DC power supply unit	Disconnected Power cord of VCR
<b>ADJ. Location</b>		<b>ADJ. Value</b>
VR633 (ST. DBX FIL)		Minimum level (Less than 10 mVp-p)

- Temporary disconnect the power cord of the VCR to set the power OFF.
- Apply 5 V(DC) to TP630 from the DC power supply unit.
- Connect the standard audio signal generator and frequency counter to TP631, and input  $22.9\text{ kHz} \pm 50\text{ Hz}$ ,  $-10 \pm 1\text{ dBm}$  sine wave.
- After confirming TP633 output on the oscilloscope, adjust VR633 (ST. DBX FIL) so that the output is brought to its minimum level (less than 10 mVp-p).

**2-5-4. STEREO VCO ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
TP635	TV Multichannel sound generator DC voltmeter	E-E mode
<b>ADJ. Location</b>		<b>ADJ. Value</b>
VR635 (VCO)		—

- Input the output signal of the TV multichannel sound generator into the VCR ANT input terminal.
- Set the TV multichannel sound generator as follows. SAP switch : OFF, INT FREQ switch : 300 Hz, STEREO switch : L+R.
- Set OFF the pilot switch of the TV multichannel sound generator, then measure the DC output voltage of TP635 and write the value down.
- Set ON the pilot switch and confirm that "ST" within the indicator panel lights. If not, adjust VR635 (VCO) until "ST" lights.
- Measure the output voltage of TP635, and adjust VR635 (VCO) so that the output voltage agree with the value (within  $\pm 0.03\text{ V}$ ) measured in step 3.

**2-5-5. INPUT LEVEL ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
TP631	TV multichannel sound generator Standard audio signal generator AC voltmeter	E-E mode
<b>ADJ. Location</b>		<b>ADJ. Value</b>
VR631 (INPUT LEVEL)		$100 \pm 5\text{ mVrms}$

- Input the output signal of the TV multichannel sound generator into the VCR ANT input terminal.
- Set the TV multichannel sound generator as follows. SAP switch : OFF, EXT (MONO) switch : ON.
- Input  $300 \pm 50\text{ Hz}$  sine wave into the EXT INPUT terminal of the TV multichannel sound generator from the standard audio signal generator.
- connect the AC voltmeter to the EXT INPUT terminal, and adjust the output level of the standard audio signal generator so that the input voltage becomes  $343.7 \pm 1\text{ mVrms}$  (Terminated at  $600\Omega$ ).
- Adjust the VR631 (INPUT LEVEL) so that the AC voltmeter connected to TP631 becomes  $100 \pm 5\text{ mVrms}$ .

**2-5-6. SEPARATION ADJ.**

Measuring Point	Measuring Equipment	ADJ. Condition
CH1: AUDIO OUTPUT terminal (L) CH2: AUDIO OUTPUT terminal (R)	TV multichannel sound generator Oscilloscope Band path filter (200 Hz ~ 15 kHz)	E-E mode
<b>ADJ. Location</b>		<b>ADJ. Value</b>
VR632 (SEP. LOW) VR634 (SEP. HIGHT)		Minimum level (less than 15 mVp-p)

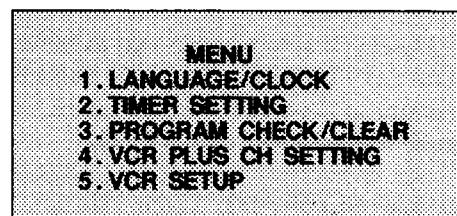
- Input the output signal of the TV multichannel sound generator into the VCR ANT input terminal.
- Connect the oscilloscope to the AUDIO OUTPUT terminal (L) and (R) of the VCR via the BPF.
- Set the TV multichannel sound generator as follows. SAP switch : OFF, PILOT switch : ON.
- Set the TV multichannel sound generator (STEREO switch : Rch, INT FREQ switch : 3 kHz), and adjust VR632 (SEP. HIGHT) so that the output of the AUDIO OUTPUT terminal (L) is brought to its minimum level (less than 15 mVp-p) during Rch modulation.
- Set the TV multichannel sound generator (STEREO switch : Lch, INT FREQ switch : 300 Hz), and adjust VR634 (SEP. LOW) so that the output of the AUDIO OUTPUT terminal (R) is brought to its minimum level (less than 15 mVp-p) during Lch modulation.

6. Set the TV multichannel sound generator (STEREO switch : Lch, INT FREQ switch: 3 kHz), and confirm that the difference between the AUDIO OUTPUT terminal (L) and (R) is more than 25 dB.
7. Set the TV multichannel sound generator (STEREO switch : Rch, INT FREQ switch: 300 Hz), and confirm that the difference between the AUDIO OUTPUT terminal (L) and (R) is more than 20 dB. If not, repeat steps 4 to 7.

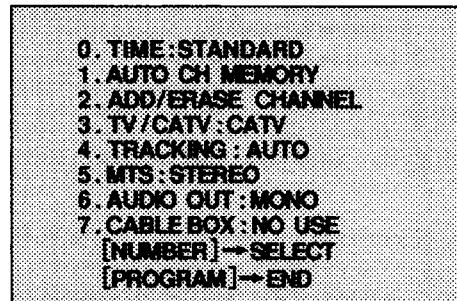
### 2-5-7. AUDIO OUTPUT MODE AND OUTPUT SIGNAL CHECK

Measuring Point	Measuring Equipment	ADJ. Condition
CH1: AUDIO OUTPUT terminal (L) CH2: AUDIO OUTPUT terminal (R)	TV multichannel sound generator Oscilloscope	E-E mode
ADJ. Location	ADJ. Value	
—	—	

1. Input the output signal of the TV multichannel sound generator into VCR ANT input terminal. Set the TV multichannel sound generator (INT FREQ switch : 300 Hz).
2. Confirm "ST" and "SAP" within the VCR indicator panel lights.
3. Confirm the waveform of the AUDIO OUTPUT terminal (L) and (R) on the oscilloscope.
4. Set the TV multichannel sound generator as follows.  
PILOT switch : ON, STEREO switch : Lch.
5. Press the VCR PROGRAM button to set ON-SCREEN MENU, and select "5. VCR SETUP" menu.



6. Confirm that the waveforms of the AUDIO OUTPUT terminal (L) and (R) become "No. 1 to 3" in the table below when selecting "5. MTS" mode on the next screen, "MONO" → "STEREO" → "SAP" sequentially.



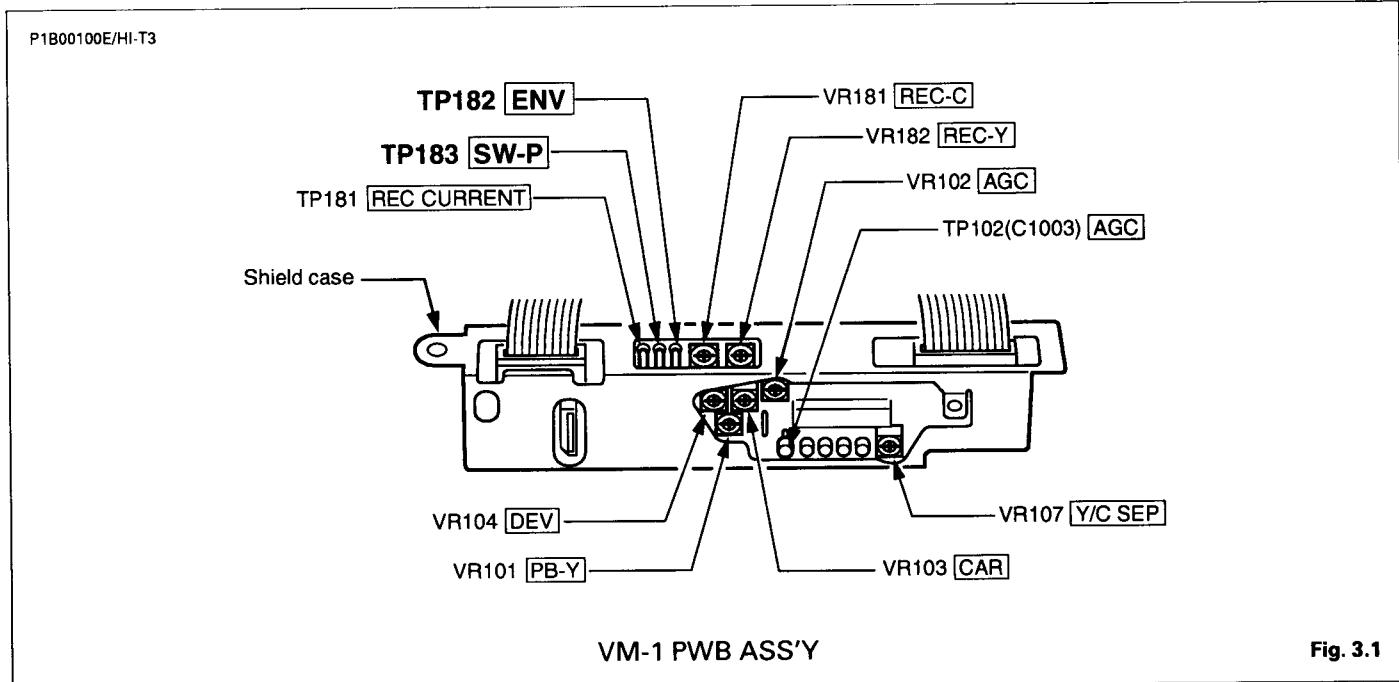
7. Set the TV multichannel sound generator (EXT terminal: no input, EXT (MONO) switch: ON).
8. Confirm that the waveforms of the AUDIO OUTPUT terminal (L) and (R) become "No. 4" in the table below when selecting the VCR "5. VCR SETUP" menu then setting "5. MTS" mode to "SAP".

No.	Mode of VCR (Indicator Panel)	AUDIO OUTPUT Lch	AUDIO OUTPUT Rch
1	STEREO ("ST" indicator lights)	300 Hz sine wave	300 Hz sine wave
2	MONO (No indicators)	300 Hz sine wave	300 Hz sine wave
3	SAP ("SAP" indicator lights)	300 Hz sine wave	300 Hz sine wave
4	SAP ("SAP" indicator lights)	—	300 Hz sine wave

### 3. TEST POINT FOR TAPE PATH ADJUSTMENT

Test point TP182 (ENV) and TP183 (SW-P) for tape path adjustment is shown in Figure below.

For adjustment, refer to the Mechanism Service Technical Information (WM-530596 and MS531167 for SANYO model, WM-530597 and MS531142 for FISHER model).



## 4.PARTS LIST

### ACCESSORIES

LOCATION	PARTS NO.	DESCRIPTION
OR	645 002 8106	REMOCON(FVH4909S ONLY) (WITH COVER BATTERY)
OR	645 000 2076	REMOCON,IR-9413(VHR9413A ONLY) (WITH LID BATTERY)
	613 147 8923	COVER BATTERY(FOR REMOCON) (FVH4909S ONLY)
OR	613 136 4820	LID,BATTERY(FOR REMOCON) (VHR9413A ONLY)
OR	613 151 7332	INSTRUCTION MANUAL(FVH4909S ONLY)
OR	613 150 8705	INSTRUCTION MANUAL(VHR9413A ONLY)
OR	621 006 9226	CONNECTOR CABLE 75
OR	621 006 9240	CONNECTOR CABLE 75
OR	621 006 9257	CONNECTOR CABLE 75
OR	621 006 9271	CONNECTOR CABLE 75
△	613 152 1032	CORD,POWER
OR △	645 002 9264	CORD,POWER
OR △	645 003 3353	CORD,POWER
OR △	613 124 3194	CORD,POWER US

### PACKING MATERIALS

LOCATION	PARTS NO.	DESCRIPTION
OR	613 150 7876	CARTON CASE(FVH4909S ONLY)
OR	613 150 7869	CARTON CASE(VHR9413A ONLY)
OR	613 146 5466	CUSHION,FRONT(FVH4909S ONLY)
OR	613 144 5802	CUSHION,FRONT(VHR9413A ONLY)
OR	613 146 5473	CUSHION,BACK(FVH4909S ONLY)
OR	613 144 5819	CUSHION,BACK(VHR9413A ONLY)
	613 099 1768	POLYE COVER,INNER-K

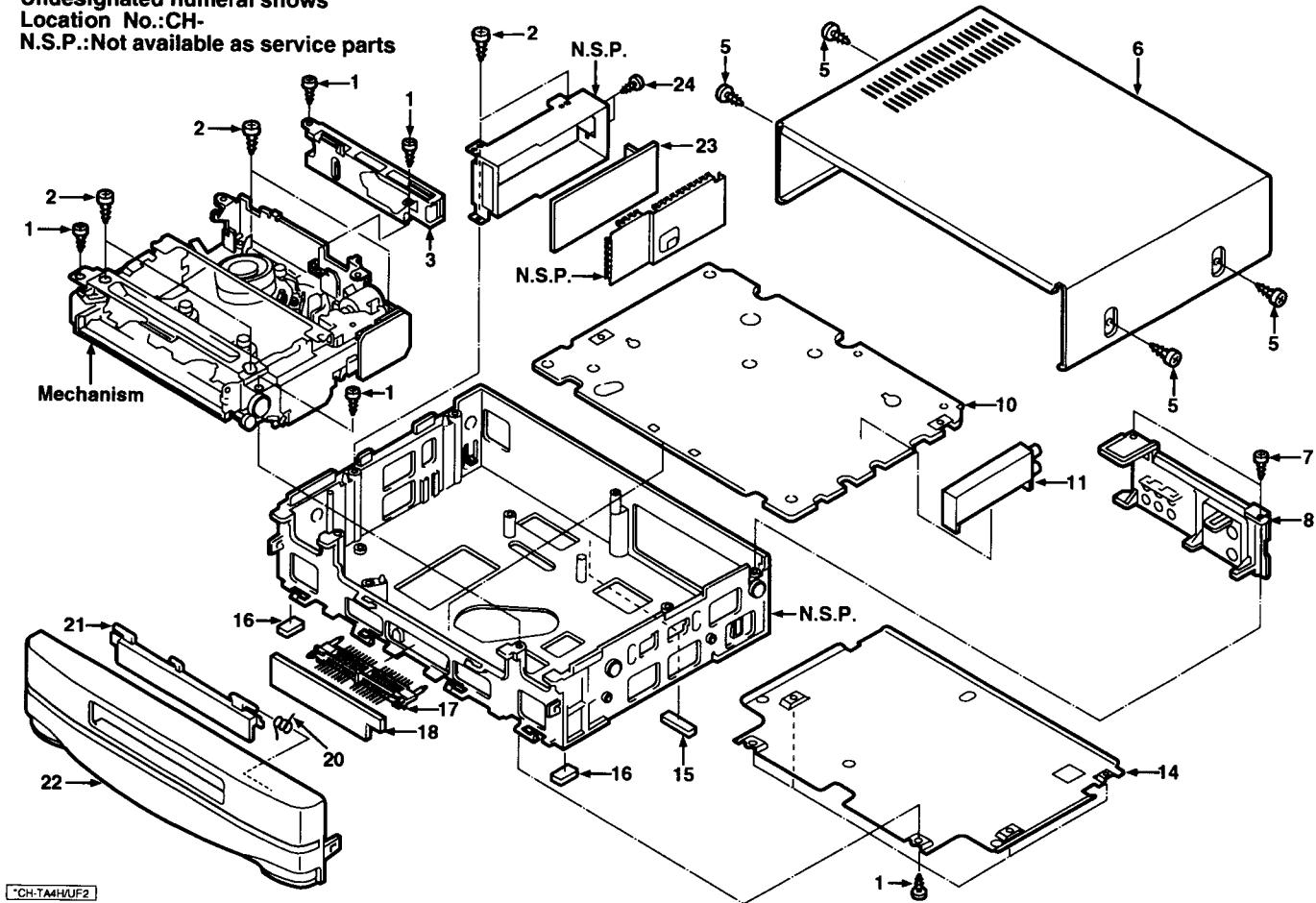
### CABINET & CHASSIS PARTS

LOCATION	PARTS NO.	DESCRIPTION
CH-1	411 137 0007	SCR L-TPG BIN 3X10
CH-2	411 021 7907	SCR S-TPG BIN 4X12
CH-3	613 145 9779	COMPL PWB,VM-1(N.S.P.)
CH-5	412 028 9406	SPECIAL SCREW
CH-6	613 140 7411	COMPL,COVER TOP(FVH4909S ONLY)
OR	613 143 4288	COMPL,COVER TOP(VHR9413A ONLY)
CH-7	411 021 3800	SCR S-TPG BIN 3X10
CH-8	613 148 3453	TERMINAL
CH-10	613 150 9382	COMPL PWB,CP-1-A(N.S.P.) (FVH4909S ONLY)
OR	613 148 8939	COMPL PWB,CP-1-A(N.S.P.) (VHR9413A ONLY)
CH-11	645 000 2724	TUNER,RF/TU/IF
CH-14	613 139 2182	COVER BOTTOM
CH-15	613 145 0707	STAND,BACK
CH-16	613 121 1001	STAND,FELT,FRONT
CH-17	613 141 1395	PLUG,26P(CN301,302-CN711,712)
CH-18	613 139 4162	COMPL PWB,TM-1(N.S.P.)
CH-20	613 140 7459	SPRING
CH-21	613 140 9163	DOOR CASSETTE(FVH4909S ONLY)
OR	613 146 1284	DOOR CASSETTE(VHR9413A ONLY)
CH-22	613 149 5425	ASSY,CABINET FRONT(FVH4909S ONLY)
OR	613 150 7500	ASSY,CABINET FRONT(VHR9413A ONLY)
CH-23	613 139 4155	COMPL PWB,PW-1(N.S.P.)
CH-24	411 021 6405	SCR S-TPG BIN 3X8

Undesignated numeral shows

Location No.:CH-

N.S.P.:Not available as service parts



CH-TAH/UF2

# MECHANISM PARTS

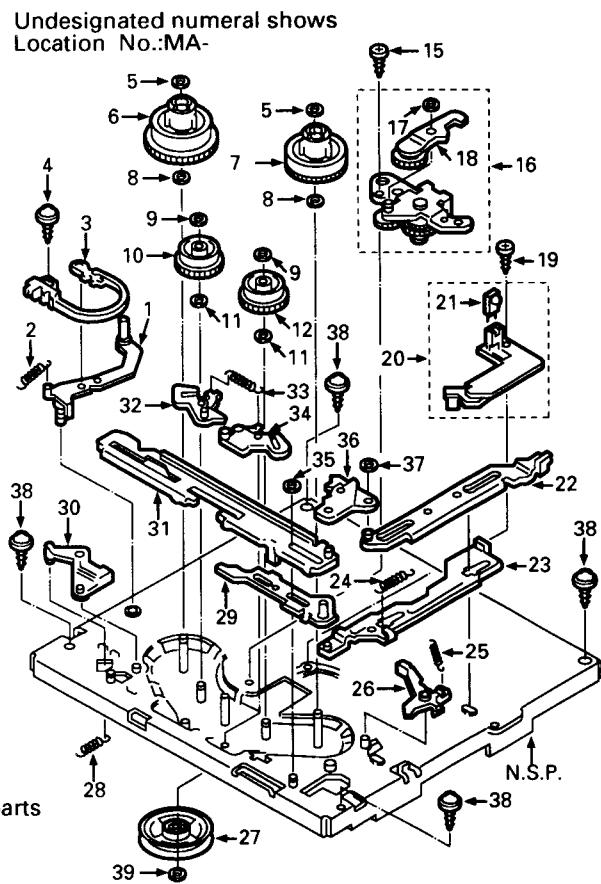
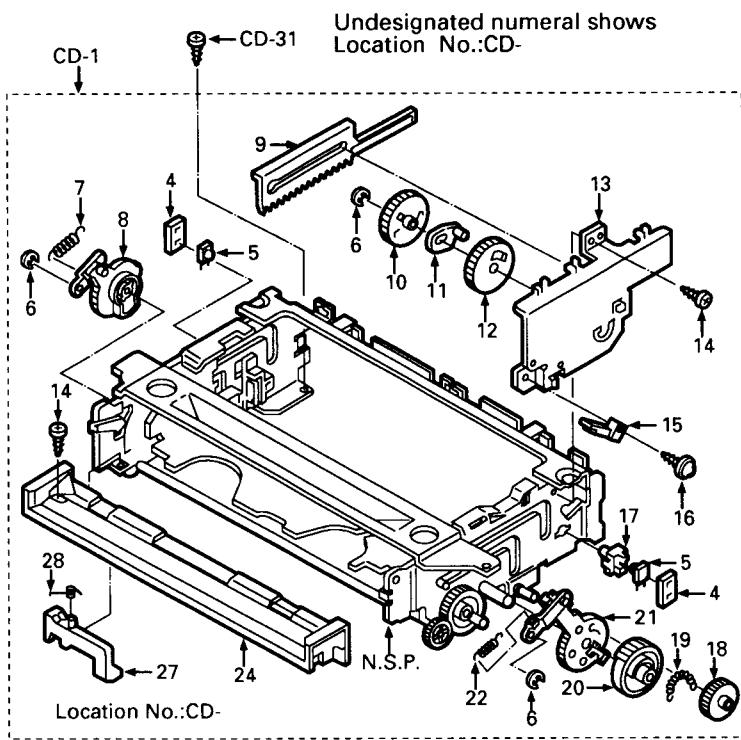
CB602700  
MB0035ZZ

LOCATION	PARTS NO.	DESCRIPTION
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## MECHANISM PARTS 1

CD-1	613 142 9581	COMPL,CASSETTE MECHA
CD-4	613 022 0585	LID
CD-5	407 098 3201	PHOTO COUPLE PN150SAN
CD-6	411 015 9801	RING E 2.3
CD-7	613 022 1643	SPRING,LINK L
CD-8	613 022 0073	ASSY,GEAR,LEVER L
CD-9	613 022 2695	RACK
CD-10	613 141 6109	GEAR,LOCK
CD-11	613 139 8962	ASSY,LEVER,PINION
CD-12	613 022 2626	GEAR,PINION
CD-13	613 021 9657	ASSY,BRACKET,GEAR
CD-14	411 027 1305	SCR S-TPG BIN 2.6X4
CD-15	613 095 0949	SW,SPECIAL
CD-16	411 106 9208	SCR PAN+SW+W 2X9
CD-17	613 022 0943	HOLDER,TRANSISTOR
CD-18	613 022 2619	GEAR,IDLER
CD-19	613 022 1667	SPRING,GEAR MAIN
CD-20	613 022 2596	GEAR,MAIN
CD-21	613 022 0097	ASSY,GEAR,LEVER R
CD-22	613 022 1674	SPRING,LINK R
CD-24	613 022 4064	BOARD,UNDER
CD-27	613 124 5006	LEVER,SAFETY SW
CD-28	613 125 6149	SPRING,SAFETY SW
CD-31	411 001 8702	SCR BIN 3X6
MA-1	613 100 0391	ASSY,LEVER,TENSION
MA-2	613 085 7996	SPRING,LEVER TENSION
MA-3	613 021 9701	ASSY,HOLDER,BAND
MA-4	411 144 2803	SCR PAN+SW+W 2.6X6
MA-5	411 109 1605	WASHER Y 2.6X6X0.25
MA-6	613 135 7068	ASSY,REEL,SUPPLY
OR	613 135 7549	ASSY,REEL,SUPPLY
MA-7	613 135 7075	ASSY,REEL,TAKE UP
OR	613 143 2963	ASSY,REEL,TAKE UP

LOCATION	PARTS NO.	DESCRIPTION
MA-8	412 021 5306	SPECIAL WASHER 3.1X6X0.3
OR	412 015 8900	SPECIAL WASHER 3.1X6X0.4
OR	412 015 8504	SPECIAL WASHER 3.1X6X0.5
MA-9	411 109 1407	WASHER Y 2.1X5X0.25
OR	411 109 1506	WASHER Y 2.1X6X0.25
MA-10	613 135 7150	GEAR,REEL SUPPLY
OR	613 142 9116	GEAR,REEL SUPPLY
MA-11	412 026 7305	SPECIAL WASHER 2.6X6X0.25
MA-12	613 135 7167	GEAR,REEL TAKE UP
OR	613 142 9109	GEAR,REEL TAKE UP
MA-15	412 042 4302	SPECIAL SCREW 2.6X4
MA-16	613 135 7099	COMPL,IDLER,CLUTCH
MA-17	411 120 1301	WASHER Y 2.1X4X0.25
MA-18	613 135 7082	ASSY,IDLER
MA-19	411 021 3107	SCR S-TPG BIN 2.6X8
MA-20	613 120 9053	COMPL PCB,MC-4
MA-21	407 016 7205	LED LN59
MA-22	613 021 9985	ASSY,SLIDE,ACT PLATE
MA-23	613 142 9086	SLIDE,C BRAKE
MA-24	613 022 1612	SPRING,RETURN SLIDE
MA-25	613 022 1506	SPRING,SUB T
MA-26	613 098 0106	ASSY,BRAKE SUB T
MA-27	613 077 3647	PULLEY,REEL
MA-28	613 022 1490	SPRING,SUB SUPPLY
MA-29	613 022 2374	SLIDE,ACT BRAKE
MA-30	613 084 8871	BRAKE,SUB SUPPLY
MA-31	613 022 0004	ASSY,SLIDE,M PLATE
MA-32	613 080 9216	ASSY,BRAKE,SUPPLY
MA-33	613 086 2914	SPRING,MAIN BRAKE
MA-34	613 080 9209	ASSY,BRAKE,TAKE UP
MA-35	411 109 3005	WASHER Y 2.6X5X0.5
MA-36	613 022 2015	LEVER,CONT PLATE
MA-37	412 015 9501	SPECIAL WASHER
MA-38	411 021 7907	SCR S-TPG BIN 4X12
MA-39	412 045 4606	SPECIAL WASHER 2.4X6X0.25



N.S.P.:Not available as service parts

92EP1/MA-1

LOCATION	PARTS NO.	DESCRIPTION
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**MECHANISM PARTS 2**

DR-1	613 095 9874	COMPL,CYLINDER,4H6N-2
DR-2	411 038 1608	SCR PAN+W 3X8
DR-3	613 082 6527	ASSY,CYLINDER,UPR 4H6N
DR-4	613 095 9881	ASSY,CYLINDER,LWR 6K
DR-5	613 107 0509	SPACER,MOTOR 0.5T
DR-6	613 022 1001	BASE,CYLINDER
OR	613 088 9072	BASE,CYLINDER
DR-7	411 047 7509	SCR PAN+FLG 3X6
DR-8	411 047 5000	SCR PAN+FLG 2.6X8
DR-9	613 085 7279	STATOR,MOTOR CYL
OR	613 132 3520	STATOR,MOTOR CYL
DR-10	411 044 8301	SCR PAN+SW 2.3X10
OR	411 044 9209	SCR PAN+SW 2.3X8
DR-11	613 022 4019	ROTOR,MOTOR CYL
DR-12	411 044 9001	SCR PAN+SW 2.3X6

MB-1	613 123 4802	SLEEVE
MB-2	613 053 3227	SPECIAL WASHER
MB-3	613 123 4970	TAPE GUIDE
MB-4	411 004 5302	NUT HEX (3)
MB-5	613 123 9418	CAP
MB-6	613 021 9961	ASSY,SLIDE,ACT PINCH
MB-7	613 021 9800	ASSY,LEVER,CAM PINCH
MB-8	411 109 2008	WASHER Y 3.1X8X0.5
MB-9	613 022 1797	SPRING,ACE HEAD
MB-10	613 021 9640	COMPL,BRACKET,HEAD
MB-11	613 110 1692	SLEEVE,ACE HEAD
MB-12	412 015 8207	SPECIAL NUT (M5)
MB-13	411 120 0007	SCR PAN+SW+W 2.6X5
MB-14	613 120 3631	BRACKET,STOPPER
MB-15	613 022 1582	SPRING,SLIDE BRAKE
MB-16	613 094 9240	COMPL,SLIDE,CAM
MB-17	613 022 1575	SPRING,LINK LOCK
MB-18	613 022 2725	DAMPER
MB-19	613 022 2534	GEAR,FRONT LOAD
MB-20	613 094 1206	ASSY,LEVER,FRONT
MB-21	613 134 2910	GEAR,HELICAL FRONT
MB-22	411 046 8002	SCR PAN+SW+W 2.6X6
MB-23	411 023 2801	SCR S-TPG PAN 2.6X6
MB-24	411 021 3107	SCR S-TPG BIN 2.6X8
OR	411 023 3303	SCR S-TPG PAN 2.6X8
MB-28	613 077 3227	HOLDER,WORM
MB-29	613 027 0382	WASHER
MB-30	613 078 8320	ASSY,WORM,FRONT
MB-31	613 117 0599	BRACKET,HOLDER
MB-32	613 093 9159	PLATE,NUT
MB-33	613 093 8374	DAMPER,MOTOR
MB-34	613 077 3616	DAMPER,WORM
MB-35	613 121 9960	ASSY,LOADING MOTOR
MB-36	613 092 9945	DAMPER,MOTOR
MB-37	613 132 8075	COMPL PCB,MC-3(N.S.P.)
MB-38	613 144 0678	COMPL PWB,MC-2(N.S.P.)
MB-39	613 110 0374	ROTARY SWITCH
MB-40	411 126 5303	SCR PAN 2.6X13
MB-41	613 092 9921	ASSY,SLIDE,FRONT
MB-42	613 092 5985	SPRING,LEVER LOAD
MB-43	613 092 5992	SPRING,LEVER ACT
MB-44	613 092 5886	HOLDER,WORM
OR	613 138 8628	HOLDER,WORM
MB-45	613 027 0627	WASHER 2.1X6X0.5
MB-46	613 092 9938	ASSY,WORM,LOAD
MB-47	613 022 2985	BELT,LOADING
MB-48	412 033 4106	WASHER SLIT 2.6X5X0.50
MB-49	613 077 3579	GEAR,HELICAL
MB-50	613 102 9293	ASSY,LEVER,REV GUIDE
MB-51	613 022 1568	SPRING,REVIEW LEVER
MB-52	613 022 0158	COMPL,PINCH ROLLER
MB-53	613 147 9951	SPRING,PINCH ROLLER
MB-54	411 109 2107	WASHER Y 3.6X6X0.5
MB-55	613 078 8160	COMPL,LEVER,ACT BRAKE
MB-57	613 135 7655	PLATE,BGR

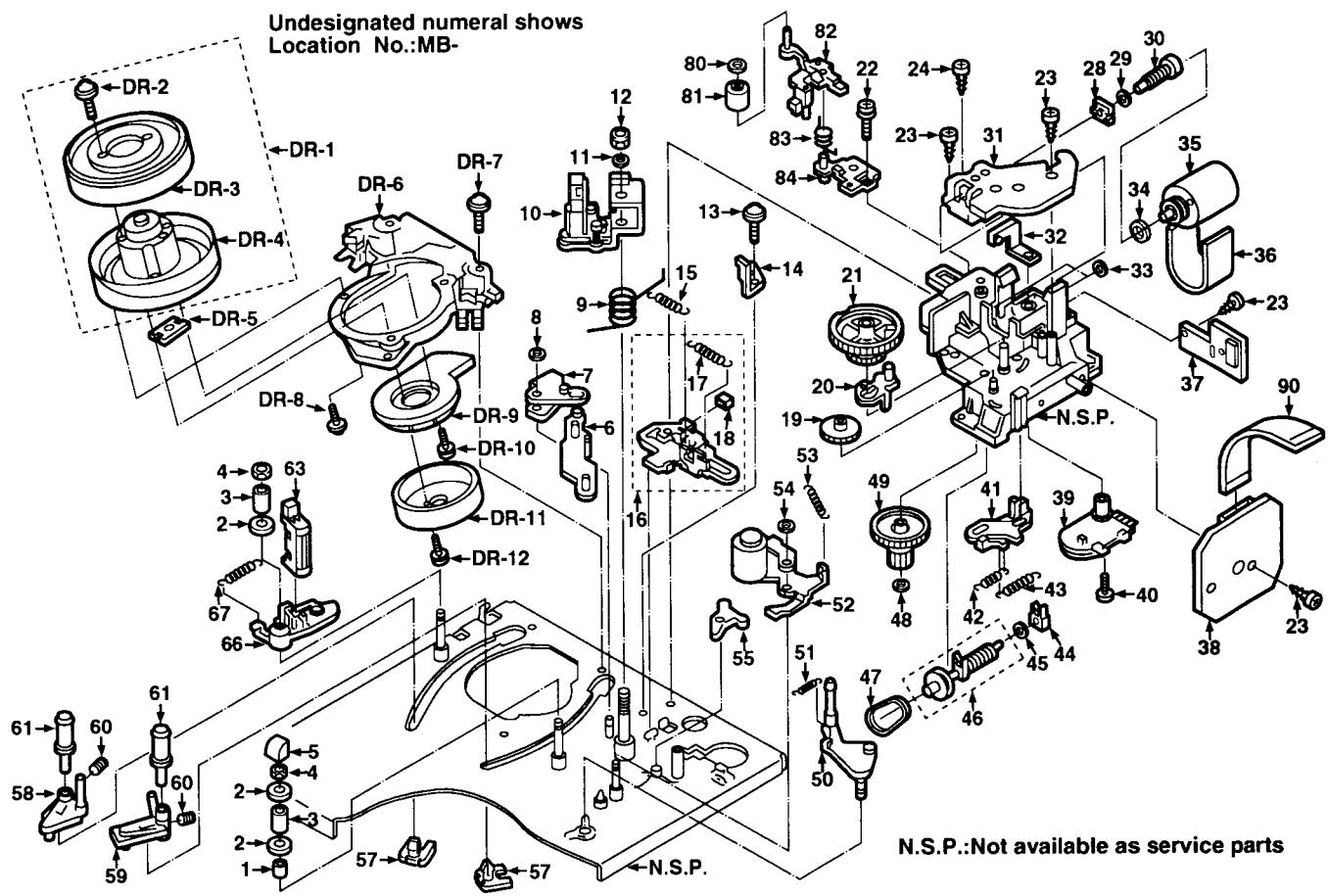
LOCATION	PARTS NO.	DESCRIPTION
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MB-58	613 145 5009	ASSY,MOUNTING,ROLLER S
MB-59	613 145 5016	ASSY,MOUNTING,ROLLER T
MB-60	411 063 0904	SCR SET HEX-SCT 2X3
MB-61	613 022 0233	ASSY,GUIDE,ROLLER
MB-63	645 000 2533	HEAD,ERASE FULL
MB-66	613 136 0532	LEVER,FE HEAD
MB-67	613 022 1698	SPRING,ERASE HEAD
MB-80	411 109 1803	WASHER Y 2.6X6X0.5
MB-81	613 119 8562	ASSY,ROLLER,CLEANER
MB-82	613 143 1881	ASSY,LEVER,CLEANER
MB-83	613 119 8593	SPRING
MB-84	613 142 9055	BRACKET,CLEANER
MB-90	613 142 7846	FLEXIBLE FLAT CABLE SCN811-CN302

**MECHANISM PARTS 3**

MC-1	645 000 5053	MOTOR,CAPSTAN DC 3W
MC-2	613 022 2978	BELT,REEL DRIVE
MC-3	613 135 4609	COMPL,LEVER,CLUTCH
MC-6	613 022 1520	SPRING,LEVER CLUTCH
MC-7	613 082 3434	LEVER,CHANGE CLUTCH
MC-8	613 022 1711	SPRING,CHANGE CLUTCH
MC-9	613 081 7518	ASSY,BRAKE,CAPSTAN
MC-10	613 098 2285	SPRING,CAPSTAN
MC-12	411 021 3107	SCR S-TPG BIN 2.6X8
MC-13	411 109 2008	WASHER Y 3.1X8X0.5
MC-14	613 142 9093	SLIDE,CAM PLATE
MC-15	613 022 2701	CAM,MODE
MC-16	411 109 1902	WASHER Y 3.1X6X0.5
MC-17	613 135 7686	CAM,MAIN
MC-18	613 135 7532	ASSY,RACK,LOAD
MC-19	411 109 1803	WASHER Y 2.6X6X0.5
MC-20	613 135 7648	SPACER,RACK LOAD
MC-22	411 047 6809	SCR PAN+FLG 3X4
MC-23	613 021 9763	ASSY,EARTH,CYL
MC-24	613 135 7662	GEAR,LOAD TAKE UP
MC-25	613 022 1551	SPRING,GEAR LOAD T
MC-26	613 021 9879	ASSY,LEVER,LOAD T
MC-27	613 090 6373	GEAR,LOAD S
MC-28	613 022 1704	SPRING,GEAR LOAD S
MC-29	613 021 9862	ASSY,LEVER,LOAD S
MC-30	613 022 2039	LEVER,RETURN TENSION
MC-31	613 091 3104	ASSY,LEVER CONTROL
MC-34	411 028 6309	SCR S-TPG PAN 2.6X6
MC-35	412 015 8603	SPECIAL WASHER 3.1X6X0.25
MC-36	613 130 9890	ASSY,GEAR,FRICITION
MC-37	412 045 4606	SPECIAL WASHER 2.4X6X0.25
MC-38	411 092 0906	WASHER Z 2.6X10X0.5
MC-40	411 100 0300	SCR S-TPG BIN 2.6X5
MC-41	613 120 9060	COMPL,MC-1(N.S.P.)

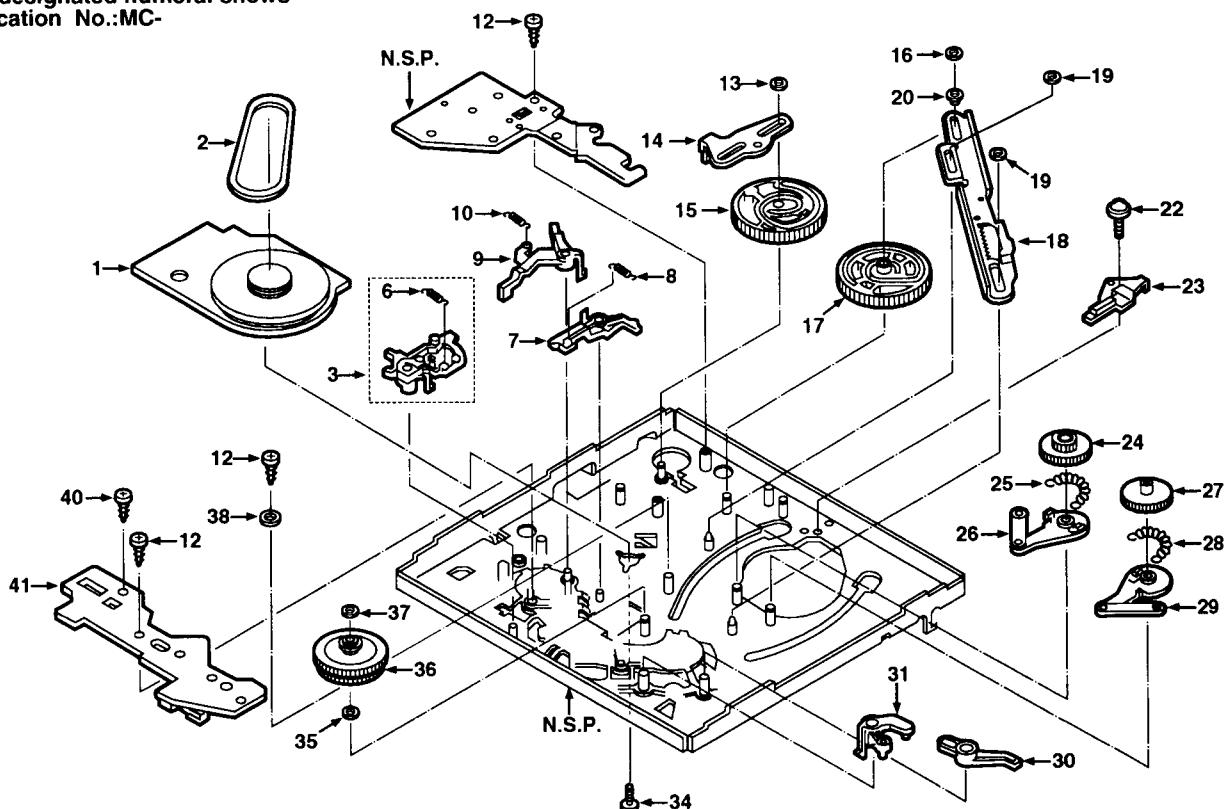
## EXPLODED VIEW OF MECHANISM PARTS 2



92TP1/MB-1

## EXPLODED VIEW OF MECHANISM PARTS 3

Undesignated numeral shows  
Location No.:MC-



93TP1/MC-1

# ELECTRICAL PARTS

NOTE-2

## NOTE:

### 1. Materials of Capacitors and Resistors are abbreviated as follows;

#### Resistors

<b>MT-FILM</b>	<b>Metalized Film Resistor</b>
<b>MT-GLAZE</b>	<b>Metalized Glaze Resistor</b>
<b>OXIDE-MT</b>	<b>Oxide Metallized film Resistor</b>

<b>TA-SOLID</b>	<b>Tantalum Solid Capacitor</b>
<b>AL-SOLID</b>	<b>Aluminium Solid Capacitor</b>
<b>NP-ELECT</b>	<b>Non-Polarized Electrolytic Capacitor</b>
<b>OS-SOLID</b>	<b>Aluminum Solid Capacitors with Organic Semiconductive Electrolytic Capacitor</b>
<b>DL-ELECT</b>	<b>Double Layered Electrolytic Capacitor</b>

#### Capacitors

<b>MT-POLYEST</b>	<b>Metalized Polyester capacitor</b>
<b>MT-COMPO</b>	<b>Metalized Composite capacitor</b>

### 2. Tolerance of Capacitor(10pF over) and Resistor are noted with follow symbols.

<b>F</b>	<b>±1%</b>	<b>G</b>	<b>±2%</b>	<b>J</b>	<b>±5%</b>	<b>K</b>	<b>±10%</b>
<b>M</b>	<b>±20%</b>	<b>N</b>	<b>±30%</b>	<b>Z</b>	<b>+80%~ -20%</b>		

### 3. Capacitors

**U:μF P:pF**

### 4. Inductors

**UH:μH MH:mH**

### 5. N.S.P.:Not available as service parts.

#### LOCATION PARTS NO. DESCRIPTION

## ELECTRICAL PARTS

### COMPL PWB,CP-1-A(N.S.P.)

COMPL.NO.613 148 8939(VHR9413A ONLY)

COMPL.NO.613 150 9382(FVH4909S ONLY)

#### Note:

The ceramic capacitors and resistors mounted on the COMPL PWB, CP-1-A may be two different types of parts, chip (leadless) type or discrete (with lead wire) type. Therefore, even though the location number is the same, you may encounter either chip or discrete parts on the PWB. This parts list contains only the discrete parts. Please order discrete type parts to substitute for any chip type parts.

NOTE-E1

#### (SEMICONDUCTORS)

Q1501	405 013 6801	TR 2SC2274-E-AA
OR	405 013 7006	TR 2SC2274-F-AA
Q1502	405 006 6504	TR 2SA984-E-AA
OR	405 006 6702	TR 2SA984-F-AA
OR	405 006 7006	TR 2SA984K-E-AA
OR	405 006 7204	TR 2SA984K-F-AA
Q1503	405 003 5609	TR 2SA1318-S-AA
OR	405 003 5708	TR 2SA1318-T-AA
OR	405 003 5807	TR 2SA1318-U-AA
Q1504	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q1506	405 019 1909	TR 2SC536-E-NP-AA
OR	405 019 2708	TR 2SC536-F-NP-AA
Q1601	405 004 3901	TR 2SA608-E-NP-AA
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4502	TR 2SA608-F-NP-AA
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q2001	405 018 0002	TR 2SC3331-S-AA
OR	405 018 0101	TR 2SC3331-T-AA
OR	405 018 0200	TR 2SC3331-U-AA
Q2002	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2003	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2004	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2008	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2301	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 1909	TR 2SC536-E-NP-AA
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2708	TR 2SC536-F-NP-AA
OR	405 019 2807	TR 2SC536-F-SPA-AC

#### LOCATION PARTS NO. DESCRIPTION

Q2302	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 1909	TR 2SC536-E-NP-AA
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2708	TR 2SC536-F-NP-AA
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q2303	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2304	405 000 2205	TR DTA144ES-DCTP
OR	405 003 7603	TR 2SA1345-AC
Q2306	405 013 6801	TR 2SC2274-E-AA
OR	405 013 7006	TR 2SC2274-F-AA
Q2308	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2309	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q2310	405 011 8401	TR 2SC1740S-DCTP-Q
OR	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 019 1909	TR 2SC536-E-NP-AA
OR	405 019 2005	TR 2SC536-E-SPA-AC
OR	405 019 2708	TR 2SC536-F-NP-AA
OR	405 019 2807	TR 2SC536-F-SPA-AC
Q3002	405 063 8404	TR DTC114EL-TL2
Q3003	405 063 8404	TR DTC114EL-TL2
Q3504	405 000 6104	TR DTC144ES-DCTP
OR	405 018 2501	TR 2SC3399-AC
Q3507	405 057 6409	TR 2SC4038-R-TL2
OR	405 057 6300	TR 2SC4038-S-TL2
Q3551	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 011 8609	TR 2SC1740S-DCTP-S
OR	405 019 2708	TR 2SC536-F-NP-AA
OR	405 019 2807	TR 2SC536-F-SPA-AC
OR	405 019 3804	TR 2SC536-G-NP-AA
OR	405 019 3903	TR 2SC536-G-SPA-AC
Q3552	405 011 8500	TR 2SC1740S-DCTP-R
OR	405 011 8609	TR 2SC1740S-DCTP-S
OR	405 019 2708	TR 2SC536-F-NP-AA
OR	405 019 2807	TR 2SC536-F-SPA-AC
OR	405 019 3804	TR 2SC536-G-NP-AA
OR	405 019 3903	TR 2SC536-G-SPA-AC
Q6021	405 004 3901	TR 2SA608-E-NP-AA
OR	405 004 4007	TR 2SA608-E-SPA-AC
OR	405 004 4502	TR 2SA608-F-NP-AA
OR	405 004 4601	TR 2SA608-F-SPA-AC
OR	405 006 1707	TR 2SA933S-TP-Q
OR	405 006 1806	TR 2SA933S-T93-R
Q6022	405 004 3901	TR 2SA608-E-NP-AA(FVH4909S ONLY)
OR	405 004 4007	TR 2SA608-E-SPA-AC(FVH4909S ONLY)
OR	405 004 4502	TR 2SA608-F-NP-AA(FVH4909S ONLY)
OR	405 004 4601	TR 2SA608-F-SPA-AC(FVH4909S ONLY)

LOCATION	PARTS NO.	DESCRIPTION	LOCATION	PARTS NO.	DESCRIPTION			
<b>(INTEGRATED CIRCUITS)</b>								
IC155	409 120 3401	IC LA7221	VR234	645 002 7710	VR,SEMI 5K S			
IC160	409 292 5906	IC LC7471-8776	VR351	613 001 9110	SEMI VR 220KB			
IC163	409 225 6109	IC BA7046(FVH4909S ONLY)	OR	613 097 7953	VR,SEMI 220KB			
IC201	409 189 3404	IC BA7755A	VR631	613 001 9035	SEMI VR 10KB			
IC231	409 301 3602	IC AN3961NFBP-A	OR	613 097 7908	VR,SEMI 10KB			
IC301	410 175 0000	IC LC866636V-5394	VR632	613 001 9011	SEMI VR 4.7KB			
OR	410 179 3007	IC LC866636V-5423	OR	613 097 7991	VR,SEMI 4.7KB			
IC302	409 114 4803	IC LB1641	VR633	613 001 9059	SEMI VR 22KB			
IC303	409 032 3308	IC MN1280-L	OR	613 097 7946	VR,SEMI 22KB			
OR	409 243 4101	IC MN1380-L	VR634	613 001 9011	SEMI VR 4.7KB			
IC351	409 306 0705	IC BU2891BK	OR	613 097 7991	VR,SEMI 4.7KB			
OR	409 311 9502	IC BU2891DK	VR635	613 001 9059	SEMI VR 22KB			
OR	409 306 0606	IC XRU2891BK	OR	613 097 7946	VR,SEMI 22KB			
IC631	409 272 3205	IC CXA1534S	<b>(INDUCTORS)</b>					
D1501	407 007 9904	DIODE GMA01-BT	L1601	613 015 6204	COIL,INDUCTOR 100UHJ			
OR	407 012 4406	DIODE 1SS133-T-77	OR	613 014 8254	HF CHOKE 100UHJ			
D1502	407 099 5204	ZENER DIODE MTZJ5.1B-T-77	L1603	613 014 1149	COIL,INDUCTOR 33UHJ(FVH4909S ONLY)			
D1503	407 063 8903	ZENER DIODE MTZJ5.6C-T-77	OR	613 014 4669	HF CHOKE 33UH J (FVH4909S ONLY)			
D2002	407 007 9904	DIODE GMA01-BT	L2001	613 014 3259	HF CHOKE 560UHK			
OR	407 012 4406	DIODE 1SS133-T-77	L2002	613 015 5443	HF CHOKE 27MH			
D2301	407 053 6803	ZENER DIODE MTZ5.6C-T-77	L2003	613 014 3518	HF CHOKE 6800UHJ			
D3002	407 051 6904	ZENER DIODE GZS5.6Y-BT	L2004	613 015 6204	COIL,INDUCTOR 100UHJ			
OR	407 099 5303	ZENER DIODE MTZJ5.6B-T-77	OR	613 014 8254	HF CHOKE 100UHJ			
D3003	407 070 8101	ZENER DIODE GZS8.2Y-BT	L3001	613 014 0760	COIL,INDUCTOR 1.8UHM			
OR	407 063 9504	ZENER DIODE MTZJ8.2B-T-77	OR	613 014 4287	HF CHOKE 1.8UHK			
D3004	407 078 2705	DIODE 1SS244-T-77	L3002	613 107 6884	FERRITE CORE			
D3005	407 007 9904	DIODE GMA01-BT	L6001	613 014 0944	COIL,INDUCTOR 56UHK			
OR	407 012 4406	DIODE 1SS133-T-77	OR	613 014 4461	HF CHOKE 56UHK			
D3103	407 007 9904	DIODE GMA01-BT(VHR9413A ONLY)	L6002	613 015 6174	COIL,INDUCTOR 56UHJ			
OR	407 012 4406	DIODE 1SS133-T-77(VHR9413A ONLY)	OR	613 014 8223	HF CHOKE 56UHJ			
D3105	407 007 9904	DIODE GMA01-BT	<b>(TRANSFORMER)</b>					
OR	407 012 4406	DIODE 1SS133-T-77	T2001	621 019 9596	70KHZ OSC TRANS			
D3121	407 007 9904	DIODE GMA01-BT	<b>(CAPACITORS)</b>					
OR	407 012 4406	DIODE 1SS133-T-77	C1501	403 248 1905	ELECT 10U M 16V			
D3122	407 007 9904	DIODE GMA01-BT	C1504	403 248 1905	ELECT 10U M 16V			
OR	407 012 4406	DIODE 1SS133-T-77	C1551	403 248 2803	ELECT 2.2U M 50V			
D3123	407 007 9904	DIODE GMA01-BT	C1556	403 139 2905	ELECT 2.2U M 50V			
OR	407 012 4406	DIODE 1SS133-T-77	C1557	403 248 2902	ELECT 47U M 6.3V			
D3124	407 007 9904	DIODE GMA01-BT	C1558	403 248 1905	ELECT 10U M 16V			
OR	407 012 4406	DIODE 1SS133-T-77	C1559	403 001 1906	CERAMIC 0.01U M 16V			
D3125	407 007 9904	DIODE GMA01-BT	C1602	403 017 0108	CERAMIC 20P J 50V			
OR	407 012 4406	DIODE 1SS133-T-77	C1603	403 012 5900	CERAMIC 15P J 50V			
			OR	403 017 0108	CERAMIC 20P J 50V (FVH4909S ONLY)			
D3502	407 007 9904	DIODE GMA01-BT	C1605	403 191 8709	ELECT 1U M 50V			
OR	407 012 4406	DIODE 1SS133-T-77	C1610	403 248 2902	ELECT 47U M 6.3V			
D3554	407 007 9904	DIODE GMA01-BT	C1611	403 001 1906	CERAMIC 0.01U M 16V			
OR	407 012 4406	DIODE 1SS133-T-77	C1614	403 020 4902	CERAMIC 270P J 50V (VHR9413A ONLY)			
D6001	407 078 2705	DIODE 1SS244-T-77	C1615	403 001 1906	CERAMIC 0.01U M 16V			
D6002	407 078 1203	ZENER DIODE MTZ33B-T-77	C1616	403 217 5507	CERAMIC 0.1U J 16V (VHR9413A ONLY)			
<b>(CRYSTAL DEVICES)</b>								
X1601	645 000 4636	OSC,CRYSTAL 7.15909MHZ	C1617	403 069 0309	CERAMIC 1000P J 50V			
OR	645 001 7155	OSC,CRYSTAL 7.15909MHZ	C1620	403 017 0108	CERAMIC 20P J 50V (FVH4909S ONLY)			
OR	613 122 9020	OSC,CRYSTAL 7.16MHZ	C1621	403 017 0108	CERAMIC 20P J 50V (FVH4909S ONLY)			
OR	613 135 2766	OSC,CRYSTAL 7.16MHZ	C1622	403 001 1906	CERAMIC 0.01U M 16V			
X3001	613 132 8242	RESONATOR,CERAMIC13.92MHZ	C1623	403 248 2902	ELECT 47U M 6.3V			
X3002	613 123 6387	OSC,CRYSTAL 32.768KHZ	C1634	403 248 2902	ELECT 47U M 6.3V (FVH4909S ONLY)			
OR	613 109 0972	OSC,CRYSTAL 32KHZ	C1635	403 248 1400	ELECT 1U M 50V (FVH4909S ONLY)			
<b>(VARIABLE RESISTORS)</b>								
VR201	613 001 9097	SEMI VR 100KB						
OR	613 097 7915	VR,SEMI 100KB						
VR233	645 002 7703	VR,SEMI 10K S						

LOCATION	PARTS NO.	DESCRIPTION					LOCATION	PARTS NO.	DESCRIPTION				
C1636	403 071 5408	CERAMIC	220P	J	50V	(FVH4909S ONLY)	C3003	403 121 9509	CERAMIC	0.1U	Z	50V	
C1637	403 001 1906	CERAMIC	0.01U	M	16V	(FVH4909S ONLY)	C3004	403 001 1906	CERAMIC	0.01U	M	16V	
C1638	403 059 3709	POLYESTER	2200P	K	50V	(FVH4909S ONLY)	C3005	403 001 1906	CERAMIC	0.01U	M	16V	
C1639	403 248 1400	ELECT	1U	M	50V	(FVH4909S ONLY)	C3008	403 248 1905	ELECT	10U	M	16V	
C1643	403 001 1906	CERAMIC	0.01U	M	16V		C3009	403 001 1906	CERAMIC	0.01U	M	16V	
C1646	403 068 8801	CERAMIC	100P	J	50V		C3010	403 017 0108	CERAMIC	20P	J	50V	
C1651	403 223 9308	ELECT	470U	M	6.3V		C3011	403 012 0400	CERAMIC	13P	J	50V	
C1663	403 248 2902	ELECT	47U	M	6.3V		C3012	403 001 1906	CERAMIC	0.01U	M	16V	
C1664	403 073 2702	CERAMIC	390P	J	50V		C3017	403 206 9004	ELECT	1000U	M	6.3V	
C2001	403 193 8400	ELECT	0.22U	M	50V		C3023	403 009 1700	CERAMIC	10P	J	50V	
C2002	403 120 8206	CERAMIC	0.012U	K	16V		C3024	403 069 1207	CERAMIC	1000P	K	50V	
C2003	403 189 2405	ELECT	10U	M	16V		C3031	403 121 9509	CERAMIC	0.1U	Z	50V	
C2004	403 001 3306	CERAMIC	1200P	M	16V		C3033	403 001 1906	CERAMIC	0.01U	M	16V	
C2005	403 193 6703	ELECT	1U	M	50V		C3501	403 129 9709	CERAMIC	0.015U	K	16V	
C2006	403 129 0409	CERAMIC	0.01U	K	16V		C3502	403 001 8806	CERAMIC	6800P	K	16V	
C2007	403 189 2405	ELECT	10U	M	16V		C3503	403 129 0409	CERAMIC	0.01U	K	16V	
C2008	403 138 2500	CERAMIC	0.022U	K	16V		C3504	403 265 4903	ELECT	22U	M	16V	
C2009	403 071 5408	CERAMIC	220P	J	50V		C3505	403 265 4903	ELECT	22U	M	16V	
C2019	403 163 8409	ELECT	47U	M	16V		C3506	403 001 8806	CERAMIC	6800P	K	16V	
C2021	403 001 1906	CERAMIC	0.01U	M	16V		C3507	403 265 4903	ELECT	22U	M	16V	
C2022	403 001 1906	CERAMIC	0.01U	M	16V		C3508	403 265 4903	ELECT	22U	M	16V	
C2023	403 071 6207	CERAMIC	220P	K	50V		C3509	403 163 7907	ELECT	47U	M	6.3V	
C2024	403 082 4209	POLYPRO	6800P	J	100V		C3510	403 001 1906	CERAMIC	0.01U	M	16V	
C2025	403 213 1107	CERAMIC	8200P	K	16V		C3511	403 071 6207	CERAMIC	220P	K	50V	
C2027	403 213 1206	CERAMIC	0.027U	K	16V		C3512	403 061 4107	POLYESTER	0.039U	K	50V	
C2303	403 189 2405	ELECT	10U	M	16V		C3513	403 119 6701	CERAMIC	0.068U	K	16V	
C2304	403 189 2405	ELECT	10U	M	16V		C3514	403 175 0903	MT-POLYEST	0.12U	J	50V	
C2305	403 189 2405	ELECT	10U	M	16V		C3515	403 063 0107	POLYESTER	6800P	K	50V	
C2306	403 189 2405	ELECT	10U	M	16V		C3516	403 001 5003	CERAMIC	2200P	K	16V	
C2310	403 189 2405	ELECT	10U	M	16V		C3517	403 001 3801	CERAMIC	1500P	K	16V	
C2311	403 167 6500	ELECT	33U	M	6.3V		C3518	403 121 9509	CERAMIC	0.1U	Z	50V	
C2312	403 167 6500	ELECT	33U	M	6.3V		C3519	403 121 9509	CERAMIC	0.1U	Z	50V	
C2313	403 001 7908	CERAMIC	0.047U	K	16V		C3522	403 069 1207	CERAMIC	1000P	K	50V	
C2314	403 001 7908	CERAMIC	0.047U	K	16V		C3523	403 193 6703	ELECT	1U	M	50V	
C2315	403 191 8808	ELECT	2.2U	M	50V		C3524	403 001 1906	CERAMIC	0.01U	M	16V	
C2316	403 191 8808	ELECT	2.2U	M	50V		C3525	403 193 8400	ELECT	0.22U	M	50V	
C2317	403 159 8109	ELECT	100U	M	6.3V		C3526	403 138 2500	CERAMIC	0.022U	K	16V	
C2318	403 159 8109	ELECT	100U	M	6.3V		C3529	403 167 6500	ELECT	33U	M	6.3V	
C2319	403 129 9709	CERAMIC	0.015U	K	16V		C3530	403 163 7907	ELECT	47U	M	6.3V	
C2320	403 129 9709	CERAMIC	0.015U	K	16V		C3536	403 193 7601	ELECT	220U	M	6.3V	
C2321	403 129 0300	CERAMIC	0.01U	J	16V		C3540	403 068 9402	CERAMIC	100P	K	50V	
C2322	403 129 0300	CERAMIC	0.01U	J	16V		C3551	403 175 0903	MT-POLYEST	0.12U	J	50V	
C2323	403 001 1609	CERAMIC	0.01U	K	16V		C3552	403 026 2209	CERAMIC	47P	J	50V	
C2324	403 001 1609	CERAMIC	0.01U	K	16V		C3553	403 193 6703	ELECT	1U	M	50V	
C2325	403 001 1906	CERAMIC	0.01U	M	16V		C3554	403 070 7205	CERAMIC	150P	J	50V	
C2326	403 001 1906	CERAMIC	0.01U	M	16V		C3555	403 001 1906	CERAMIC	0.01U	M	16V	
C2327	403 163 7907	ELECT	47U	M	6.3V		C3556	403 069 1207	CERAMIC	1000P	K	50V	
C2328	403 163 7907	ELECT	47U	M	6.3V		C6002	403 001 1906	CERAMIC	0.01U	M	16V	
C2329	403 001 1906	CERAMIC	0.01U	M	16V		C6003	403 258 2701	ELECT	33U	M	6.3V	
C2330	403 001 1906	CERAMIC	0.01U	M	16V		C6004	403 001 1906	CERAMIC	0.01U	M	16V	
C2331	403 189 2405	ELECT	10U	M	16V		C6005	403 233 1101	ELECT	22U	M	50V	
C2332	403 189 2405	ELECT	10U	M	16V		C6007	403 248 1608	ELECT	47U	M	16V	
C2333	403 189 2405	ELECT	10U	M	16V		C6008	403 001 1906	CERAMIC	0.01U	M	16V	
C2343	403 189 2405	ELECT	10U	M	16V		C6009	403 069 0309	CERAMIC	1000P	J	50V	
C2344	403 184 9805	MT-POLYEST	0.22U	J	50V		C6011	403 121 9509	CERAMIC	0.1U	Z	50V	
C2345	403 072 4202	CERAMIC	270P	J	50V		C6021	403 001 6604	CERAMIC	3300P	M	16V	
C2350	403 001 1906	CERAMIC	0.01U	M	16V		C6022	403 248 1400	ELECT	1U	M	50V	
C2351	403 001 1906	CERAMIC	0.01U	M	16V		C6023	403 001 7908	CERAMIC	0.047U	K	16V	
C2352	403 189 2405	ELECT	10U	M	16V		C6301	403 139 2608	ELECT	0.47U	M	50V	
C2353	403 193 7502	ELECT	22U	M	6.3V		C6302	403 139 2202	ELECT	4.7U	M	25V	
C2354	403 248 1905	ELECT	10U	M	16V		C6303	403 248 2001	ELECT	4.7U	M	25V	
C2361	403 163 7907	ELECT	47U	M	6.3V		C6304	403 248 2001	ELECT	4.7U	M	25V	
C2368	403 001 1906	CERAMIC	0.01U	M	16V		C6305	403 248 2001	ELECT	4.7U	M	25V	
C2371	403 001 1906	CERAMIC	0.01U	M	16V		C6306	403 001 7908	CERAMIC	0.047U	K	16V	
C2380	403 191 8808	ELECT	2.2U	M	50V		C6307	403 248 2001	ELECT	4.7U	M	25V	
C3001	403 191 8808	ELECT	2.2U	M	50V		C6308	403 248 2001	ELECT	4.7U	M	25V	
C3002	403 001 1906	CERAMIC	0.01U	M	16V		C6309	403 094 1401	OS-SOLID	3.3U	K	16V	
							C6311	403 191 8709	ELECT	1U	M	50V	

LOCATION	PARTS NO.	DESCRIPTION			
C6312	403 093 6001	OS-SOLID	10U	K	10V
C6313	403 191 8600	ELECT	4.7U	M	25V
C6314	403 179 2309	POLYESTER	2700P	J	50V
C6315	403 159 8109	ELECT	100U	M	6.3V
C6316	403 001 1906	CERAMIC	0.01U	M	16V
C6317	403 139 1007	ELECT	47U	M	6.3V
C6318	403 139 2608	ELECT	0.47U	M	50V
C6319	403 139 2707	ELECT	1U	M	50V
C6321	403 248 1509	ELECT	47U	M	10V
C6322	403 115 1601	CERAMIC	5600P	K	16V
C6323	403 249 8903	MT-COMPO	0.012U	J	50V

(RESISTORS)

R1501	401 021 1807	CARBON	560	JA	1/4W
R1502	401 012 6903	CARBON	10K	JA	1/4W
R1503	401 019 1802	CARBON	3.9K	JA	1/4W
R1504	401 012 6903	CARBON	10K	JA	1/4W
R1505	401 016 3700	CARBON	2.2K	JA	1/4W
R1506	401 016 4707	CARBON	22K	JA	1/4W
R1507	401 012 6903	CARBON	10K	JA	1/4W
R1552	401 012 5609	CARBON	1K	JA	1/4W
R1557	401 012 5609	CARBON	1K	JA	1/4W
R1611	401 018 1506	CARBON	33	JA	1/4W
R1612	401 018 1506	CARBON	33	JA	1/4W
R1618	401 016 3700	CARBON	2.2K	JA	1/4W

(VHR9413A ONLY)

R1631	401 107 8003	MT-FILM	130K	FD	1/4W
		(FVH4909S ONLY)			
R1633	401 020 3802	CARBON	470K	JA	1/4W
		(FVH4909S ONLY)			
R1635	401 021 4907	CARBON	560K	JA	1/4W
		(FVH4909S ONLY)			
R1636	401 016 3700	CARBON	2.2K	JA	1/4W
		(FVH4909S ONLY)			

R1638	401 012 6903	CARBON	10K	JA	1/4W
		(FVH4909S ONLY)			

R1651	401 022 6702	CARBON	75	JA	1/4W
R1652	401 022 6702	CARBON	75	JA	1/4W

R2001	401 015 2605	CARBON	1.8K	JA	1/4W
R2002	401 021 2903	CARBON	5.6K	JA	1/4W
R2003	401 018 5702	CARBON	330K	JA	1/4W
R2004	401 019 0904	CARBON	390	JA	1/4W
R2005	401 016 4707	CARBON	22K	JA	1/4W
R2006	401 012 5609	CARBON	1K	JA	1/4W
R2007	401 012 6903	CARBON	10K	JA	1/4W
R2008	401 014 5102	CARBON	15K	JA	1/4W
R2009	401 016 4707	CARBON	22K	JA	1/4W
R2010	401 018 3708	CARBON	3.3K	JA	1/4W

R2011	401 012 6903	CARBON	10K	JA	1/4W
R2012	401 018 4804	CARBON	33K	JA	1/4W
R2013	401 154 4904	CARBON	33	JB	1/4W
R2015	401 019 6104	CARBON	4.7	JA	1/4W
R2035	401 014 5102	CARBON	15K	JA	1/4W
R2036	401 019 9501	CARBON	47	JA	1/4W
R2038	401 012 4404	CARBON	100	JA	1/4W

R2301	401 020 2805	CARBON	47K	JA	1/4W
R2302	401 020 2805	CARBON	47K	JA	1/4W
R2303	401 017 2702	CARBON	27K	JA	1/4W
R2304	401 017 2702	CARBON	27K	JA	1/4W
R2309	401 018 4804	CARBON	33K	JA	1/4W

R2310	401 018 4804	CARBON	33K	JA	1/4W
R2311	401 015 3701	CARBON	18K	JA	1/4W
R2312	401 015 3701	CARBON	18K	JA	1/4W
R2313	401 020 7800	CARBON	510	JA	1/4W
R2314	401 020 7800	CARBON	510	JA	1/4W

R2315	401 020 1907	CARBON	4.7K	JA	1/4W
R2316	401 020 1907	CARBON	4.7K	JA	1/4W
R2317	401 013 6308	CARBON	12K	JA	1/4W
R2318	401 013 6308	CARBON	12K	JA	1/4W
R2319	401 019 1802	CARBON	3.9K	JA	1/4W

R2320	401 019 1802	CARBON	3.9K	JA	1/4W
R2321	401 014 5102	CARBON	15K	JA	1/4W

LOCATION	PARTS NO.	DESCRIPTION			
R2322	401 013 6308	CARBON	12K	JA	1/4W
R2323	401 017 1705	CARBON	2.7K	JA	1/4W
R2324	401 012 5609	CARBON	1K	JA	1/4W
R2325	401 020 1907	CARBON	4.7K	JA	1/4W
R2326	401 020 1907	CARBON	4.7K	JA	1/4W
R2327	401 023 1607	CARBON	820	JA	1/4W
R2328	401 023 1607	CARBON	820	JA	1/4W
R2329	401 019 0904	CARBON	390	JA	1/4W
R2330	401 019 0904	CARBON	390	JA	1/4W
R2331	401 018 4804	CARBON	33K	JA	1/4W
R2332	401 018 4804	CARBON	33K	JA	1/4W
R2333	401 012 6903	CARBON	10K	JA	1/4W

R2334	401 012 6903	CARBON	10K	JA	1/4W
R2336	401 016 4707	CARBON	22K	JA	1/4W
R2338	401 016 6404	CARBON	2.2M	JA	1/4W
R2339	401 012 6903	CARBON	10K	JA	1/4W
R2340	401 013 6308	CARBON	12K	JA	1/4W
R2343	401 019 3905	CARBON	390K	JA	1/4W
R2344	401 012 6903	CARBON	10K	JA	1/4W
R2345	401 012 6903	CARBON	10K	JA	1/4W
R2346	401 022 3008	CARBON	6.8K	JA	1/4W
R2347	401 012 6903	CARBON	10K	JA	1/4W
R2348	401 012 6903	CARBON	10K	JA	1/4W
R2349	401 012 6903	CARBON	10K	JA	1/4W
R2355	401 016 4707	CARBON	22K	JA	1/4W
R2368	401 012 5609	CARBON	1K	JA	1/4W

R2370	401 012 4404	CARBON	100	JA	1/4W
R2371	401 015 2605	CARBON	1.8K	JA	1/4W
R2372	401 012 5609	CARBON	1K	JA	1/4W
R2373	401 012 5609	CARBON	1K	JA	1/4W
R2374	401 016 2505	CARBON	220	JA	1/4W
R2375	401 016 3700	CARBON	2.2K	JA	1/4W
R2378	401 016 0402	CARBON	200K	JA	1/4W

R3001	▲ 402 036 3701	FUSIBLE RES	3.3	JA	1/2W
R3002	401 022 7105	CARBON	750	JA	1/4W
R3008	401 020 1907	CARBON	4.7K	JA	1/4W
R3009	401 020 1907	CARBON	4.7K	JA	1/4W
R3010	401 020 1907	CARBON	4.7K	JA	1/4W

R3011	401 020 2805	CARBON	47K	JA	1/4W
R3012	401 020 1907	CARBON	4.7K	JA	1/4W
R3013	401 020 1907	CARBON	4.7K	JA	1/4W
R3014	401 016 0402	CARBON	200K	JA	1/4W
R3015	401 016 0402	CARBON	200K	JA	1/4W
R3016	401 014 4006	CARBON	1.5K	JA	1/4W
R3017	401 012 5609	CARBON	1K	JA	1/4W

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LOCATION	PARTS NO.	DESCRIPTION	LOCATION	PARTS NO.	DESCRIPTION
R3520	401 019 3905	CARBON 390K JA 1/4W	S3105	613 139 4308	SW,PUSH,CH UP
R3521	401 012 6903	CARBON 10K JA 1/4W	OR	645 000 3363	SWITCH,PUSH,CH UP
R3525	401 012 5609	CARBON 1K JA 1/4W	S3106	613 139 4308	SW,PUSH,CH DOWN
R3526	401 016 3700	CARBON 2.2K JA 1/4W	OR	645 000 3363	SWITCH,PUSH,CH DOWN
R3527	401 012 5609	CARBON 1K JA 1/4W	S3107	613 139 4308	SW,PUSH,REW
R3528	401 020 7800	CARBON 510 JA 1/4W	OR	645 000 3363	SWITCH,PUSH,REW
R3529	401 020 7800	CARBON 510 JA 1/4W	S3108	613 139 4308	SW,PUSH,PLAY
R3537	401 023 2703	CARBON 8.2K JA 1/4W	OR	645 000 3363	SWITCH,PUSH,PLAY
R3539	401 012 4404	CARBON 100 JA 1/4W	S3109	613 139 4308	SW,PUSH,FF
R3546	401 020 1907	CARBON 4.7K JA 1/4W	OR	645 000 3363	SWITCH,PUSH,FF
R3547	401 014 5102	CARBON 15K JA 1/4W	S3110	613 139 4308	SW,PUSH,STOP
R3549	401 012 6903	CARBON 10K JA 1/4W	OR	645 000 3363	SWITCH,PUSH,STOP
R3550	401 023 2703	CARBON 8.2K JA 1/4W	S6001	645 001 8350	SWITCH,SLIDE 1P-2T,RF/MODUL.SW
R3551	401 019 3905	CARBON 390K JA 1/4W	(JACKS)		
R3552	401 012 8006	CARBON 100K JA 1/4W	JK101	613 100 3651	JACK,RCA,VIDEO I/O
R3553	401 019 3905	CARBON 390K JA 1/4W	JK201	613 100 3644	JACK,RCA,AUDIO-L I/O
R3555	401 012 8006	CARBON 100K JA 1/4W	JK202	645 002 1077	JACK,RCA-2,AUDIO-R I/O
R3556	401 012 6903	CARBON 10K JA 1/4W	(MISCELLANEOUS)		
R3557	401 018 5702	CARBON 330K JA 1/4W	613 053 8055	FIXER	
R3558	401 020 0702	CARBON 470 JA 1/4W			
R3560	401 012 5609	CARBON 1K JA 1/4W			
R6001 △	402 067 8706	FUSIBLE RES 680 JA 1/6W			
R6002	401 022 5002	CARBON 680K JA 1/4W			
R6003	401 021 4907	CARBON 560K JA 1/4W			
R6011	401 017 1705	CARBON 2.7K JA 1/4W			
R6012	401 017 1705	CARBON 2.7K JA 1/4W			
R6021	401 017 1705	CARBON 2.7K JA 1/4W			
R6022	401 012 5609	CARBON 1K JA 1/4W			
R6023	401 016 3700	CARBON 2.2K JA 1/4W			
		(VHR9413A ONLY)			
R6024	401 016 2505	CARBON 220 JA 1/4W			
		(FVH4909S ONLY)			
R6025	401 017 3709	CARBON 270K JA 1/4W			
		(FVH4909S ONLY)			
R6026	401 018 4804	CARBON 33K JA 1/4W			
		(FVH4909S ONLY)			
R6027	401 019 3905	CARBON 390K JA 1/4W			
		(FVH4909S ONLY)			
R6029	401 021 2903	CARBON 5.6K JA 1/4W			
		(FVH4909S ONLY)			
R6031	401 019 1802	CARBON 3.9K JA 1/4W			
		(FVH4909S ONLY)			
R6301	401 012 6903	CARBON 10K JA 1/4W			
R6302	401 012 8006	CARBON 100K JA 1/4W			
R6304	401 012 6903	CARBON 10K JA 1/4W			
R6305	401 012 6903	CARBON 10K JA 1/4W			
R6307	401 091 3404	MT-FILM 47K FD 1/4W			
R6308	401 022 8508	CARBON 750K JA 1/4W			
R6309	401 091 3404	MT-FILM 47K FD 1/4W			
R6311	401 021 4006	CARBON 56K JA 1/4W			
R6312	401 021 2903	CARBON 5.6K JA 1/4W			
R6313	401 017 1705	CARBON 2.7K JA 1/4W			
R6314	401 019 1802	CARBON 3.9K JA 1/4W			
R6315	401 018 3708	CARBON 3.3K JA 1/4W			
R6316	401 107 8904	MT-FILM 43K FD 1/4W			
R6317	401 020 1907	CARBON 4.7K JA 1/4W			
R6318	401 014 5102	CARBON 15K JA 1/4W			
R6319	401 012 9201	CARBON 1M JA 1/4W			
R6321	401 012 8006	CARBON 100K JA 1/4W			
R6322	401 012 6903	CARBON 10K JA 1/4W			
R6323	401 012 6903	CARBON 10K JA 1/4W			
(SWITCHES)					
S3101	613 139 4308	SW,PUSH,REC	IC100	409 271 8201	IC LA7387A
OR	645 000 3363	SWITCH,PUSH,REC	OR	409 283 0200	IC LA7387B
S3102	613 139 4308	SW,PUSH,EJECT	IC110	409 276 2808	IC LC8996
OR	645 000 3363	SWITCH,PUSH,EJECT	OR	409 296 6503	IC LC89960
S3103	613 139 4308	SW,PUSH,PAUSE	IC130	409 212 8109	IC BA7274S
OR	645 000 3363	SWITCH,PUSH,PAUSE			
S3104	613 139 4308	SW,PUSH,POWER			
OR	645 000 3363	SWITCH,PUSH,POWER			
			IC291	409 132 0801	IC LA7270
			(DIODES)		
			D1004	407 007 9904	DIODE GMA01-BT
			OR	407 012 4406	DIODE 1SS133-T-77
			D1006	407 007 9904	DIODE GMA01-BT
			OR	407 012 4406	DIODE 1SS133-T-77

LOCATION	PARTS NO.	DESCRIPTION	LOCATION	PARTS NO.	DESCRIPTION
(CRYSTAL DEVICES)			C1022	403 130 3604	CERAMIC 0.047U K 25V
X1001	645 000 4643	OSC,CRYSTAL 3.579545MHZ	C1024	403 193 7502	ELECT 22U M 6.3V
OR	645 000 5305	OSC,CRYSTAL 3.579545MHZ	C1025	403 193 7502	ELECT 22U M 6.3V
OR	645 002 4245	OSC,CRYSTAL 3.579545MHZ	C1029	403 068 0409	CERAMIC 0.1U Z 25V
(CERAMIC RESONATORS)			C1030	403 189 2405	ELECT 10U M 16V
XF101	645 000 4544	FILTER,L.P 6.5MHZ	C1032	403 189 2405	ELECT 10U M 16V
OR	613 136 0549	FILTER,6.5MHZ L.P.F	C1033	403 069 5601	CERAMIC 0.01U K 50V
(VARIABLE RESISTORS)			C1046	403 069 5601	CERAMIC 0.01U K 50V
VR101	613 001 9011	SEMI VR 4.7KB	C1051	403 030 7009	CERAMIC 68P J 50V
OR	613 097 7991	VR,SEMI 4.7KB	C1052	403 014 9302	CERAMIC 180P J 50V
VR102	613 001 9035	SEMI VR 10KB	C1053	403 022 8304	CERAMIC 33P J 50V
OR	613 097 7908	VR,SEMI 10KB	C1102	403 069 5601	CERAMIC 0.01U K 50V
VR103	613 001 9059	SEMI VR 22KB	C1103	403 069 5601	CERAMIC 0.01U K 50V
OR	613 097 7946	VR,SEMI 22KB	C1108	403 069 5601	CERAMIC 0.01U K 50V
VR104	613 001 9042	SEMI VR 15KB	C1109	403 193 7502	ELECT 22U M 6.3V
OR	613 105 3779	VR,SEMI 15KB	C1110	403 068 0409	CERAMIC 0.1U Z 25V
VR107	613 001 8991	SEMI VR 2.2KB	C1111	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 097 7939	VR,SEMI 2.2KB	C1113	403 191 8709	ELECT 1U M 50V
VR181	613 002 0307	SEMI VR 220B	C1122	403 012 6907	CERAMIC 15P J 50V
OR	613 117 1701	VR,SEMI 220B	C1123	403 022 8304	CERAMIC 33P J 50V
VR182	613 002 0345	SEMI VR 1KB	C1125	403 011 5000	CERAMIC 120P J 50V
OR	613 117 1664	VR,SEMI 1KB	C1303	403 069 5601	CERAMIC 0.01U K 50V
(INDUCTORS)			C1304	403 068 0409	CERAMIC 0.1U Z 25V
L1001	613 014 1231	COIL,INDUCTOR 180UHJ	C1305	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 4751	HF CHOKE 180UHJ	C1307	403 068 0409	CERAMIC 0.1U Z 25V
L1051	613 015 6303	COIL,INDUCTOR 680UHJ	C1308	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 8353	HF CHOKE 680UHJ	C1309	403 068 0409	CERAMIC 0.1U Z 25V
L1052	613 014 1248	COIL,INDUCTOR 220UHJ	C1310	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 4768	HF CHOKE 220UHJ	C1312	403 068 0409	CERAMIC 0.1U Z 25V
L1101	613 014 0913	COIL,INDUCTOR 33UHK	C1313	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 4430	HF CHOKE 33UHK	C1314	403 010 1102	CERAMIC 1000P J 50V
L1318	613 014 1125	COIL,INDUCTOR 22UHJ	C1315	403 028 4201	CERAMIC 56P J 50V
OR	613 014 4645	HF CHOKE 22UHJ	C1316	403 030 7009	CERAMIC 68P J 50V
L1329	613 015 6204	COIL,INDUCTOR 100UHJ	C1317	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 8254	HF CHOKE 100UHJ	C1319	403 068 0409	CERAMIC 0.1U Z 25V
L1331	613 014 1156	COIL,INDUCTOR 39UHJ	C1321	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 4676	HF CHOKE 39UHJ	C1322	403 069 5601	CERAMIC 0.01U K 50V
L1333	613 014 1248	COIL,INDUCTOR 220UHJ	C1323	403 069 5601	CERAMIC 0.01U K 50V
OR	613 014 4768	HF CHOKE 220UHJ	C1324	403 189 2405	ELECT 10U M 16V
L1335	613 014 1132	COIL,INDUCTOR 27UHJ	C1325	403 068 0409	CERAMIC 0.1U Z 25V
OR	613 014 4652	HF CHOKE 27UHJ	C1327	403 069 5601	CERAMIC 0.01U K 50V
L1336	613 014 1149	COIL,INDUCTOR 33UHJ	C1329	403 193 7502	ELECT 22U M 6.3V
OR	613 014 4669	HF CHOKE 33UHJ	C1330	403 191 8709	ELECT 1U M 50V
L1351	613 014 1231	COIL,INDUCTOR 180UHJ	C1331	403 022 8304	CERAMIC 33P J 50V
OR	613 014 4751	HF CHOKE 180UHJ	C1332	403 026 2902	CERAMIC 47P J 50V
L2902	613 015 6204	COIL,INDUCTOR 100UHJ	C1333	403 018 7502	CERAMIC 220P J 50V
OR	613 014 8254	HF CHOKE 100UHJ	C1335	403 022 8304	CERAMIC 33P J 50V
(CAPACITORS)			C1336	403 068 0409	CERAMIC 0.1U Z 25V
C1001	403 020 0508	CERAMIC 27P J 50V	C1351	403 023 4503	CERAMIC 330P J 50V
C1003	403 191 8709	ELECT 1U M 50V	C1352	403 028 4201	CERAMIC 56P J 50V
C1004	403 030 7009	CERAMIC 68P J 50V	C1353	403 030 7009	CERAMIC 68P J 50V
C1005	403 024 7206	CERAMIC 390P J 50V	C1354	403 069 5601	CERAMIC 0.01U K 50V
C1006	403 010 8606	CERAMIC 12P J 50V	C2903	403 068 0409	CERAMIC 0.1U Z 25V
C1007	403 022 8304	CERAMIC 33P J 50V	C2904	403 068 0409	CERAMIC 0.1U Z 25V
C1008	403 189 2405	ELECT 10U M 16V	C2905	403 068 0409	CERAMIC 0.1U Z 25V
C1009	403 189 2405	ELECT 10U M 16V	C2906	403 068 0409	CERAMIC 0.1U Z 25V
C1010	403 017 5004	CERAMIC 200P J 50V	C2907	403 191 8709	ELECT 1U M 50V
C1011	403 191 8709	ELECT 1U M 50V	C2908	403 069 5601	CERAMIC 0.01U K 50V
C1012	403 069 5601	CERAMIC 0.01U K 50V	C2909	403 069 5601	CERAMIC 0.01U K 50V
C1013	403 073 1200	CERAMIC 0.033U K 50V	C2911	403 068 0409	CERAMIC 0.1U Z 25V
C1014	403 069 5601	CERAMIC 0.01U K 50V	C2912	403 163 8409	ELECT 47U M 16V
C1015	403 191 8709	ELECT 1U M 50V	C2913	403 163 7907	ELECT 47U M 6.3V
C1016	403 069 5601	CERAMIC 0.01U K 50V	C2914	403 068 0409	CERAMIC 0.1U Z 25V
C1017	403 191 8709	ELECT 1U M 50V	C2915	403 069 5601	CERAMIC 0.01U K 50V
C1018	403 009 5807	CERAMIC 100P J 50V	C2916	403 069 5601	CERAMIC 0.01U K 50V
C1019	403 191 8709	ELECT 1U M 50V	(RESISTORS)		
C1020	403 191 8709	ELECT 1U M 50V	R1001	401 039 0403	MT-GLAZE 8.2K JA 1/10W
C1021	403 072 1607	CERAMIC 0.022U K 50V	R1002	401 038 6406	MT-GLAZE 4.7K JA 1/10W
			R1003	401 038 0701	MT-GLAZE 2.2K JA 1/10W
			R1004	401 038 2101	MT-GLAZE 2.7K JA 1/10W
			R1005	401 038 8509	MT-GLAZE 620 JA 1/10W

LOCATION	PARTS NO.	DESCRIPTION				
R1006	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1015	401 037 5806	MT-GLAZE	1M	JA	1/10W	
R1016	401 039 0403	MT-GLAZE	8.2K	JA	1/10W	
R1017	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1018	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1020	401 037 6704	MT-GLAZE	1.2K	JA	1/10W	
R1028	401 038 3405	MT-GLAZE	33	JA	1/10W	
R1030	401 038 3702	MT-GLAZE	33K	JA	1/10W	
R1032	401 037 6803	MT-GLAZE	12K	JA	1/10W	
R1033	401 037 6704	MT-GLAZE	1.2K	JA	1/10W	
R1034	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1035	401 037 5608	MT-GLAZE	10K	JA	1/10W	
R1051	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1052	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1101	401 037 5806	MT-GLAZE	1M	JA	1/10W	
R1102	401 038 3504	MT-GLAZE	330	JA	1/10W	
R1107	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1110	401 039 0502	MT-GLAZE	82K	JA	1/10W	
R1111	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1121	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1125	401 038 6307	MT-GLAZE	470	JA	1/10W	
R1126	401 038 6307	MT-GLAZE	470	JA	1/10W	
R1128	401 038 7601	MT-GLAZE	560	JA	1/10W	
R1302	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1303	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1304	401 039 0304	MT-GLAZE	820	JA	1/10W	
R1308	401 039 0304	MT-GLAZE	820	JA	1/10W	
R1309	401 038 9001	MT-GLAZE	680	JA	1/10W	
R1313	401 038 9001	MT-GLAZE	680	JA	1/10W	
R1316	401 037 6704	MT-GLAZE	1.2K	JA	1/10W	
R1317	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1318	401 037 5202	MT-GLAZE	100	JA	1/10W	
R1319	401 038 3405	MT-GLAZE	33	JA	1/10W	
R1325	401 037 5608	MT-GLAZE	10K	JA	1/10W	
R1332	401 037 5400	MT-GLAZE	1K	JA	1/10W	
R1334	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1335	401 038 2101	MT-GLAZE	2.7K	JA	1/10W	
R1336	401 037 6704	MT-GLAZE	1.2K	JA	1/10W	
R1337	401 037 6704	MT-GLAZE	1.2K	JA	1/10W	
R1351	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1352	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R1355	401 037 9200	MT-GLAZE	1.8K	JA	1/10W	
R1356	401 038 0701	MT-GLAZE	2.2K	JA	1/10W	
R2901	401 038 5508	MT-GLAZE	4.7	JA	1/10W	
R2902	401 037 5103	MT-GLAZE	10	JA	1/10W	
R2903	401 037 9101	MT-GLAZE	180	JA	1/10W	
R2904	401 037 6605	MT-GLAZE	120	JA	1/10W	
<b>(JUMPERS)</b>						
J1051	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1053	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1054	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1055	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1056	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1059	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1061	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1101	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J1102	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J2902	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
J2904	401 037 5004	MT-GLAZE	0.000	ZA	1/10W	
<b>COMPL PWB, TM-1(N.S.P.)</b>						
COMPL.NO.613 139 4162						
<b>(REMOTE RECEIVERS)</b>						
RR711	613 129 0938	IR RECEIVER	PACK UNIT			
OR	613 134 9087	IR RECEIVER	PACK UNIT			
<b>(DISPLAYS)</b>						
A7101	613 140 3987	FLUORESCENT TUBE				
OR	613 140 3994	FLUORESCENT TUBE				

LOCATION	PARTS NO.	DESCRIPTION				
<b>(MISCELLANEOUS)</b>						
613 139 2267 HOLDER FL						
<b>COMPL PWB,PW-1(N.S.P.)</b>						
COMPL.NO.613 139 4155						
<b>(SEMICONDUCTORS)</b>						
Q5001	405 108 4804	TR 2SK1691-FA13				
Q5002	405 013 7006	TR 2SC2274-F-AA				
Q5003	405 006 6702	TR 2SA984-F-AA				
Q5004	405 013 7006	TR 2SC2274-F-AA				
Q5101	405 000 6104	TR DTC144ES-DCTP				
OR	405 018 2501	TR 2SC3399-AC				
Q5102	405 013 7006	TR 2SC2274-F-AA				
Q5103	405 043 6000	TR 2SC3807				
<b>(INTEGRATED CIRCUITS)</b>						
IC511	409 067 7203	IC L5431-AA				
IC512	409 214 4307	IC L88MS12T-FA				
<b>(DIODES)</b>						
D5001	407 134 8801	DIODE DBC10E				
D5002	407 100 6909	DIODE AG01-V2				
OR	407 091 6902	DIODE ERA38-04-V5				
D5003	407 078 2705	DIODE 1SS244-T-77				
D5004	407 078 2705	DIODE 1SS244-T-77				
D5013	△ 407 129 5907	PHOTO COUPLE ON3131-R				
OR	△ 407 149 9404	PHOTO COUPLE PS2501-1D				
D5101	407 160 9308	DIODE ERB93-02L3				
OR	407 129 2005	DIODE RL2Z-LF-B1				
D5104	407 160 9308	DIODE ERB93-02L3				
OR	407 129 2005	DIODE RL2Z-LF-B1				
D5105	407 078 2705	DIODE 1SS244-T-77				
D5106	407 078 2705	DIODE 1SS244-T-77				
D5107	407 100 6909	DIODE AG01-V2				
OR	407 091 6902	DIODE ERA38-04-V5				
D5108	407 063 8903	ZENER DIODE MTZJ5.6C-T-77				
D5109	407 063 8903	ZENER DIODE MTZJ5.6C-T-77				
D5111	407 099 6805	ZENER DIODE MTZJ13B-T-77				
<b>(INDUCTORS)</b>						
L5001	△ 613 126 3352	COIL,LINE FILTER				
OR	△ 645 000 3264	LINE FILTER				
L5101	613 110 4198	COIL,INDUCTOR 10UH K				
L5102	613 017 0354	CORE				
<b>(TRANSFORMER)</b>						
T5001	△ 613 140 6421	TRANS,SW				
<b>(CAPACITORS)</b>						
C5001	△ 404 052 2102	MT-POLYEST 0.033U M 250V				
C5002	△ 404 052 2102	MT-POLYEST 0.033U M 250V				
C5005	△ 404 032 6304	CERAMIC 2200P M 400V				
C5007	△ 404 034 6302	CERAMIC 1000P K 400V				
C5010	403 249 1201	ELECT 47U M 200V				
C5011	403 057 2902	POLYESTER 0.1U K 50V				
C5012	403 137 4604	MT-POLYEST 0.047U K 630V				
C5013	403 026 2209	CERAMIC 47P J 50V				
C5014	403 061 8204	POLYESTER 4700P K 50V				
C5015	403 071 5408	CERAMIC 220P J 50V				
C5017	403 071 1509	CERAMIC 180P J 50V				
C5018	403 068 8801	CERAMIC 100P J 50V				
C5021	403 076 0507	CERAMIC 2200P K 500V				
C5101	403 243 8008	ELECT 470U M 6.3V				
C5102	403 135 3302	ELECT 1000U M 6.3V				
C5105	403 212 9807	ELECT 470U M 25V				
C5106	403 125 5507	ELECT 1000U M 16V				
C5108	403 209 4709	ELECT 22U M 50V				
C5109	403 228 9501	ELECT 33U M 35V				
C5110	403 243 7803	ELECT 220U M 6.3V				
C5111	403 057 2902	POLYESTER 0.1U K 50V				
C5113	403 125 5606	ELECT 100U M 16V				
C5115	403 135 4002	ELECT 47U M 6.3V				
C5116	403 135 7805	ELECT 3.3U M 50V				

<u>LOCATION</u>	<u>PARTS NO.</u>	<u>DESCRIPTION</u>				<u>LOCATION</u>	<u>PARTS NO.</u>	<u>DESCRIPTION</u>				
C5117	403 134 6007	ELECT	330U	M	16V							
C5124	403 108 0000	ELECT	0.22U	M	50V							
<b>(RESISTORS)</b>												
R5001	402 064 1502	CARBON	2.7M	KA	1/2W							
R5002	401 019 3905	CARBON	390K	JA	1/4W							
R5003	401 018 4804	CARBON	33K	JA	1/4W							
R5004	401 016 4707	CARBON	22K	JA	1/4W							
R5005	401 016 1409	CARBON	22	JA	1/4W							
R5006	401 012 6903	CARBON	10K	JA	1/4W							
R5007	401 012 6903	CARBON	10K	JA	1/4W							
R5008	401 022 4005	CARBON	68K	JA	1/4W							
R5009	401 021 2903	CARBON	5.6K	JA	1/4W							
R5010	401 178 3402	OXIDE-MT	15K	JA	3W							
R5101	401 018 2701	CARBON	330	JA	1/4W							
R5102	401 020 0702	CARBON	470	JA	1/4W							
R5103	401 021 1807	CARBON	560	JA	1/4W							
R5104	401 017 1705	CARBON	2.7K	JA	1/4W							
R5111	401 021 1807	CARBON	560	JA	1/4W							
R5112	401 019 1802	CARBON	3.9K	JA	1/4W							
R5113	401 022 7600	CARBON	7.5K	JA	1/4W							
R5114	401 019 9501	CARBON	47	JA	1/4W							
R5115	401 016 3700	CARBON	2.2K	JA	1/4W							
R5116	401 016 8408	CARBON	24K	JA	1/4W							
R5117	401 021 7007	CARBON	6.8	JA	1/4W							
R5123	401 015 2605	CARBON	1.8K	JA	1/4W							
<b>(FUSES)</b>												
F5001	△ 423 006 0803	FUSE125V2A										
OR	△ 423 022 4403	FUSE250V2A										
OR	△ 423 023 6406	FUSE250V2A										
<b>(CONNECTORS)</b>												
CN501	△ 613 124 3583	CONNECTOR,INLET										
OR	△ 645 000 4568	SOCKET,INLET AC										
<b>(MISCELLANEOUS)</b>												
	613 136 4547	HOLDER,FUSE,F5001										

**COMPL,MC-1(N.S.P.)**

COMPL.NO. 613 120 9060

**(DIODE)**

D8001 407 094 1300 PHOTO COUPLE SPI-315-04-C  
 OR 407 043 0101 PHOTO DIODE ON2170-R

**(RESISTOR)**

R8001 401 017 0708 CARBON 270 JA 1/4W  
 OR 401 026 0607 CARBON 270 JA 1/6W  
 R8002 401 012 4404 CARBON 100 JA 1/4W  
 OR 401 024 6700 CARBON 100 JA 1/6W

**(SWITCH)**

S8001 613 022 4545 SPECIAL SWITCH

**FLEXIBLE FLAT CABLE**

613 142 7846 FLEXIBLE FLAT CABLES,SCN811-S303

For parts or service contact



SFS Corporation: 1200 West Artesia Blvd., Compton, California 90220

# VHR 9413A

# FVH 4909S

## BLOCK DIAGRAMS,CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS

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**PRODUCT SAFETY NOTICE**

PRODUCT SAFETY SHOULD BE CONSIDERED WHEN COMPONENT REPLACEMENT IS MADE IN ANY AREA OF A UNIT COMPONENTS INDICATED BY THE SYMBOL  IN THIS SCHEMATIC DIAGRAM SHOW COMPONENTS WHOSE VALUE HAVE SPECIAL SIGNIFICANCE TO PRODUCT SAFETY IT IS PARTICULARLY RECOMMENDED THAT ONLY PARTS SPECIFIED ON THE ATTACHED PARTS LIST BE USED TO COMPONENTS REPLACE DESIGNATED BY THE SYMBOL .

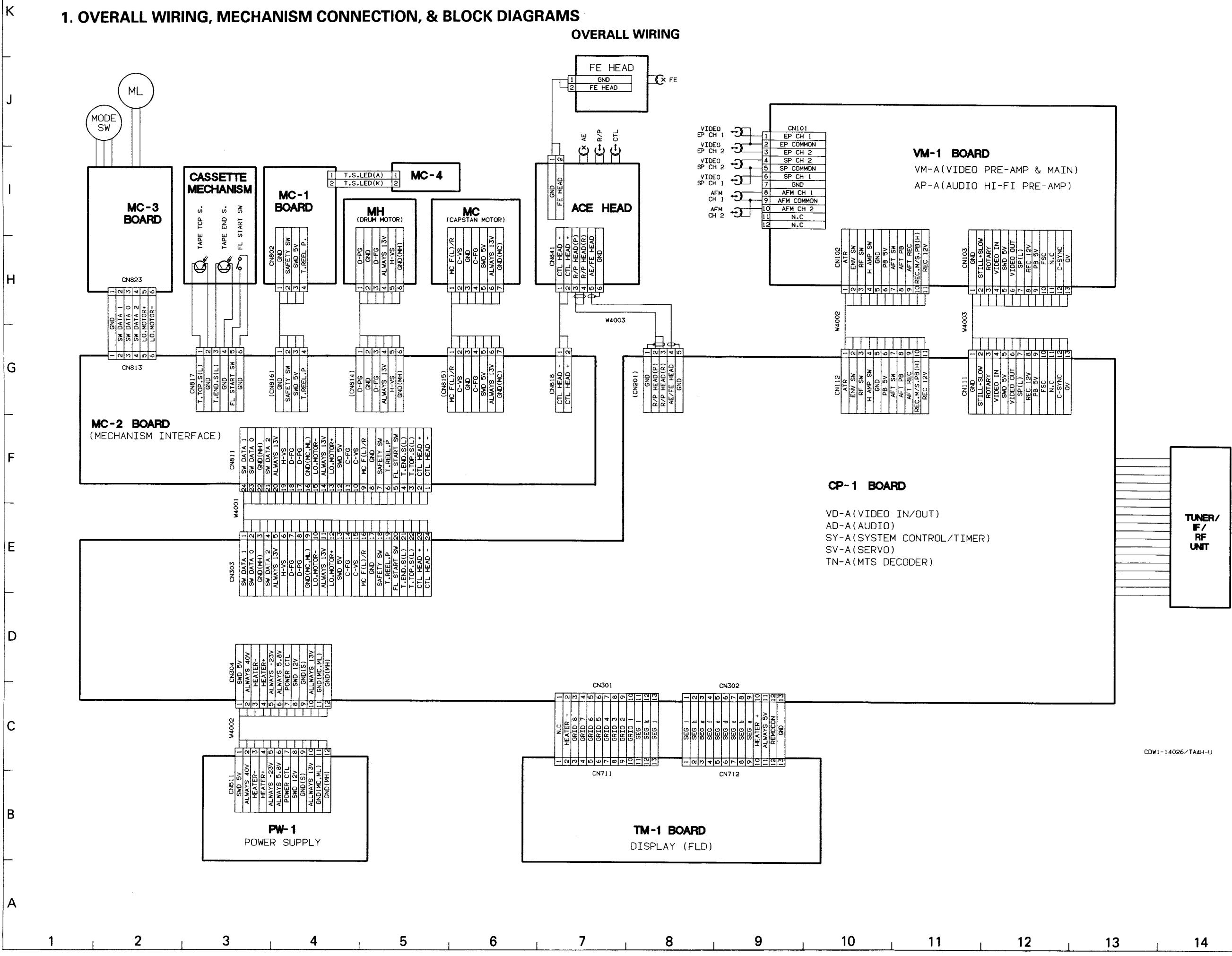
**NOTE:**

1. N.S.P.: Not available as service parts.
2. All resistance values in "OHMS" unless otherwise noted.  
(K=1,000 M=1,000,000)
3. All inductance values in "μH" unless otherwise noted.  
m=milli henry.
4. All capacitance values in "μfd" unless otherwise noted.  
p=pico farad
5. Voltage reading may vary ± 20%.
6. This is a fundamental circuit diagram, some production changes may be made without revision of the diagram.

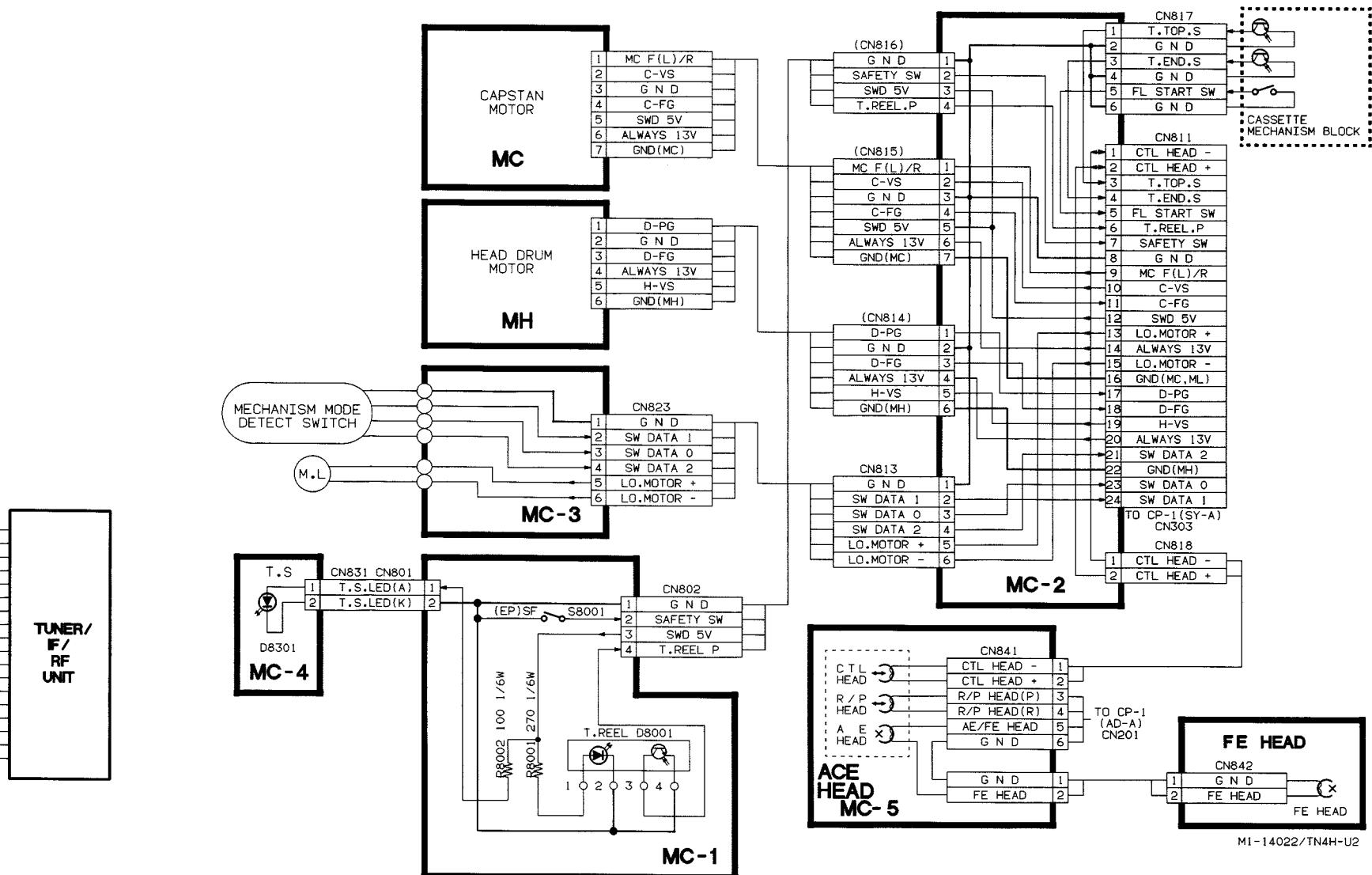
NA92

# 1. OVERALL WIRING, MECHANISM CONNECTION, & BLOCK DIAGRAMS

## OVERALL WIRING

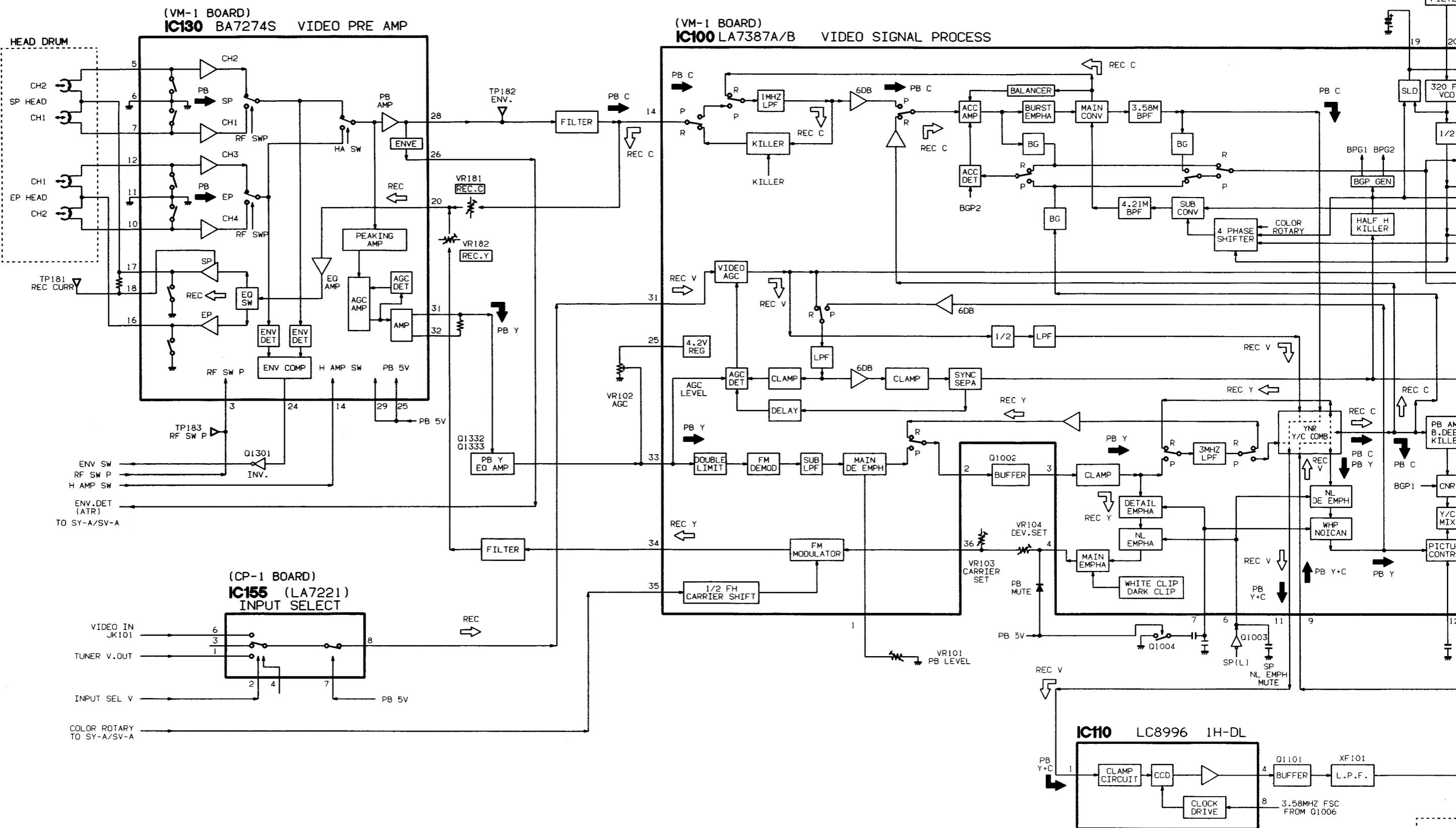


## MECHANISM CONNECTION



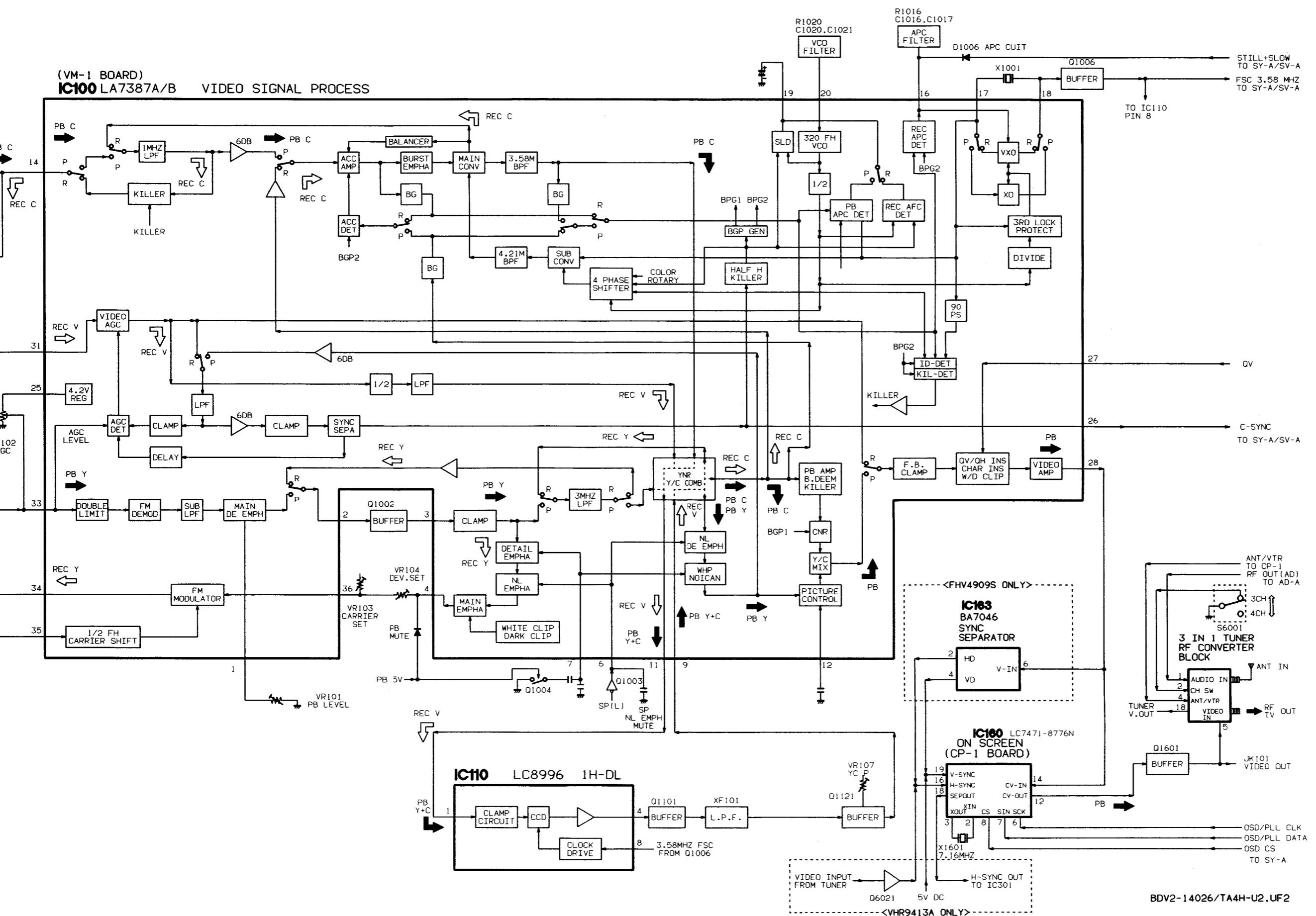
CDW1-14026/TA4H-U

## VIDEO CIRCUIT

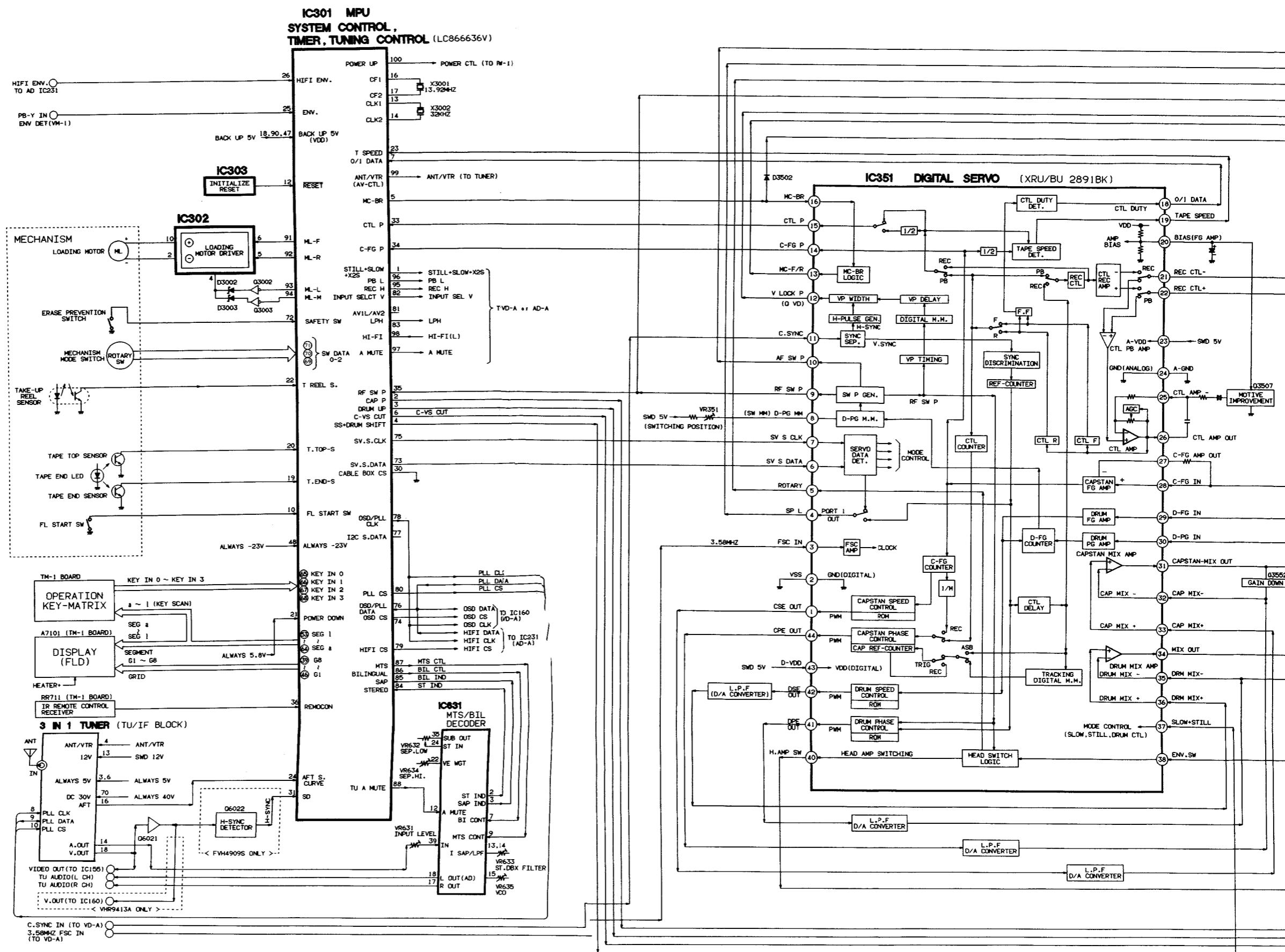


VIDEO CIRCUIT

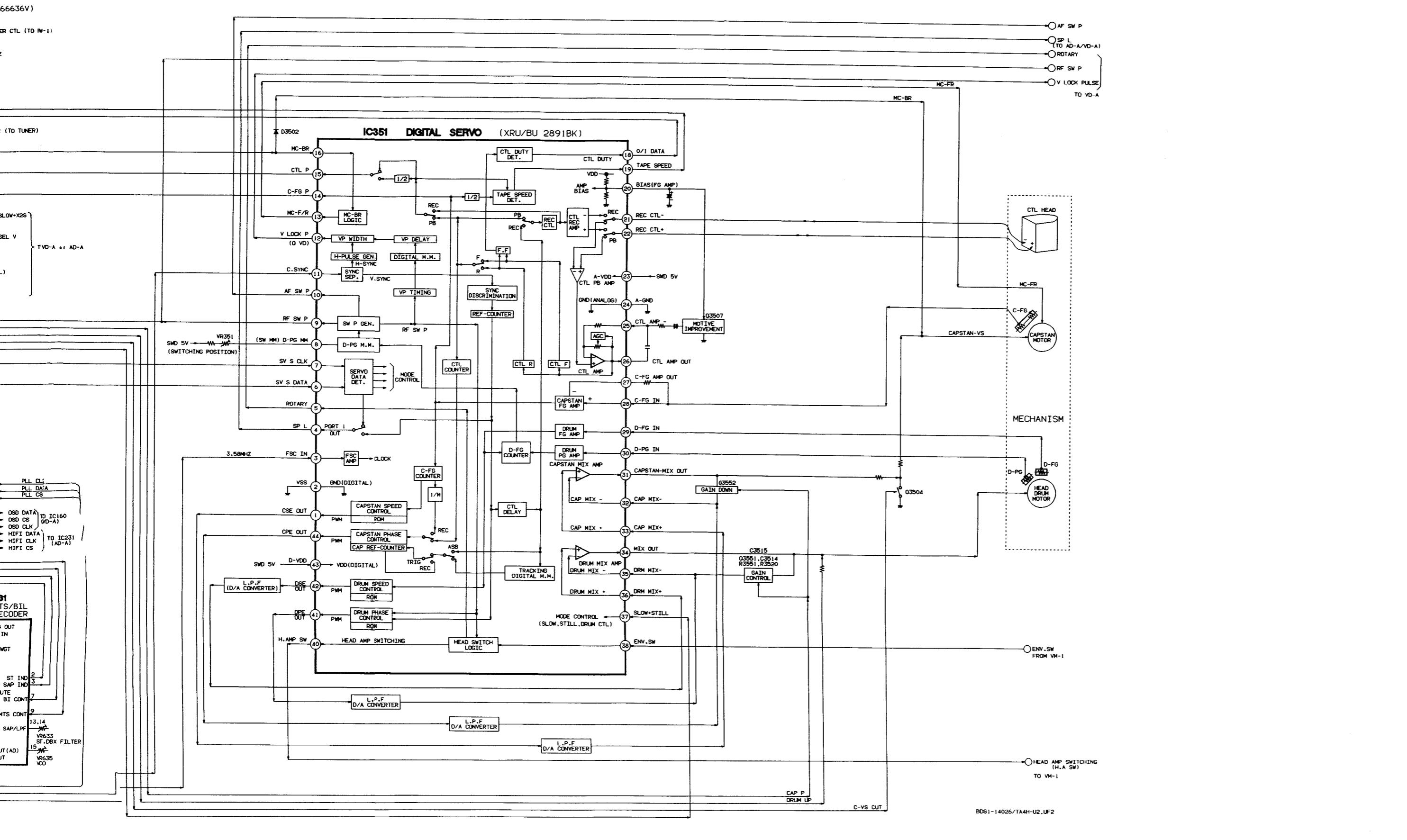
(VM-1 BOARD)  
**IC100** LA7387A/B VIDEO SIGNAL PROCESS



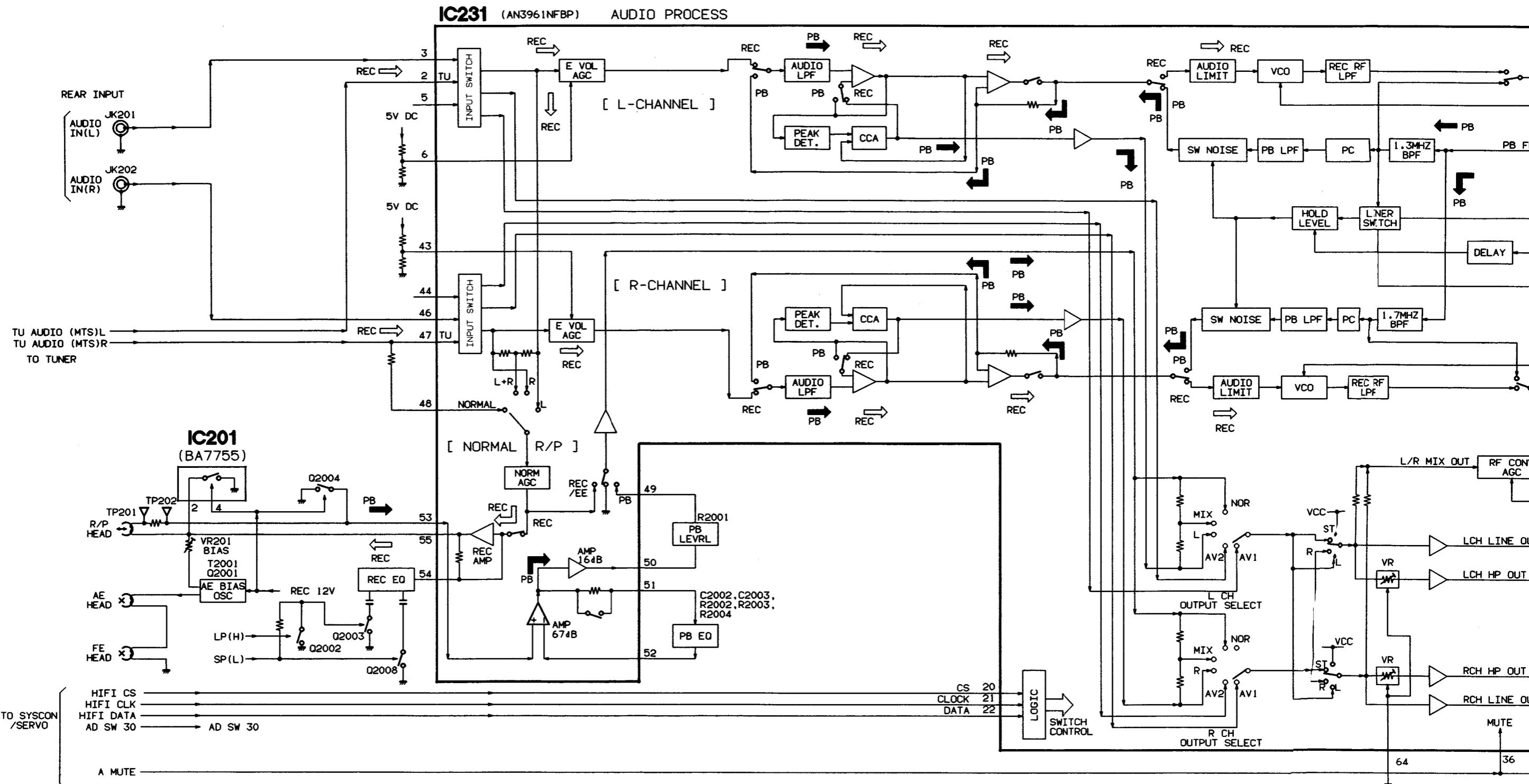
# SYSTEM CONTROL & SERVO CIRCUIT



## **SYSTEM CONTROL & SERVO CIRCUIT**



## AUDIO CIRCUIT



K

J

I

H

G

F

E

D

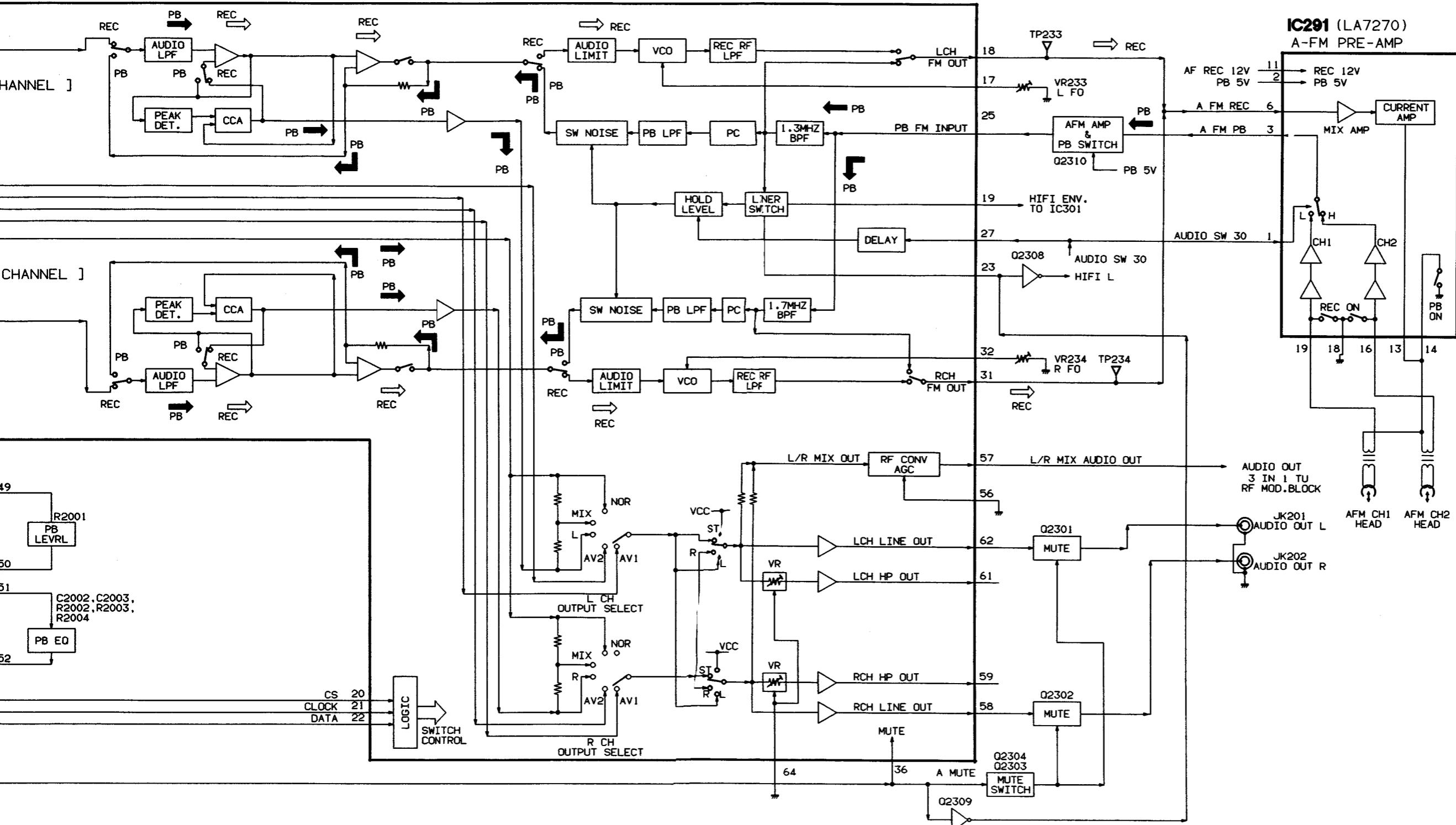
C

B

A

## AUDIO CIRCUIT

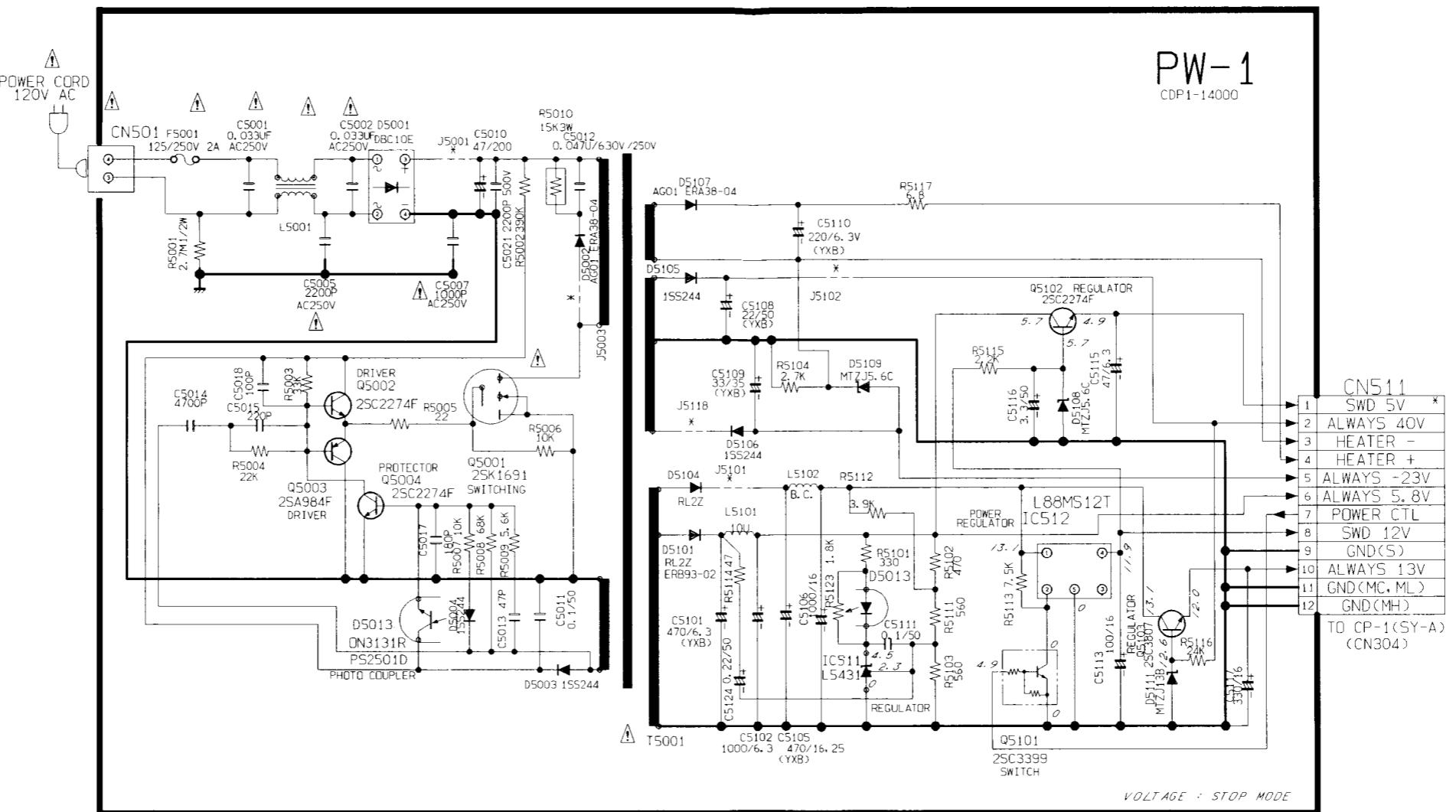
O PROCESS



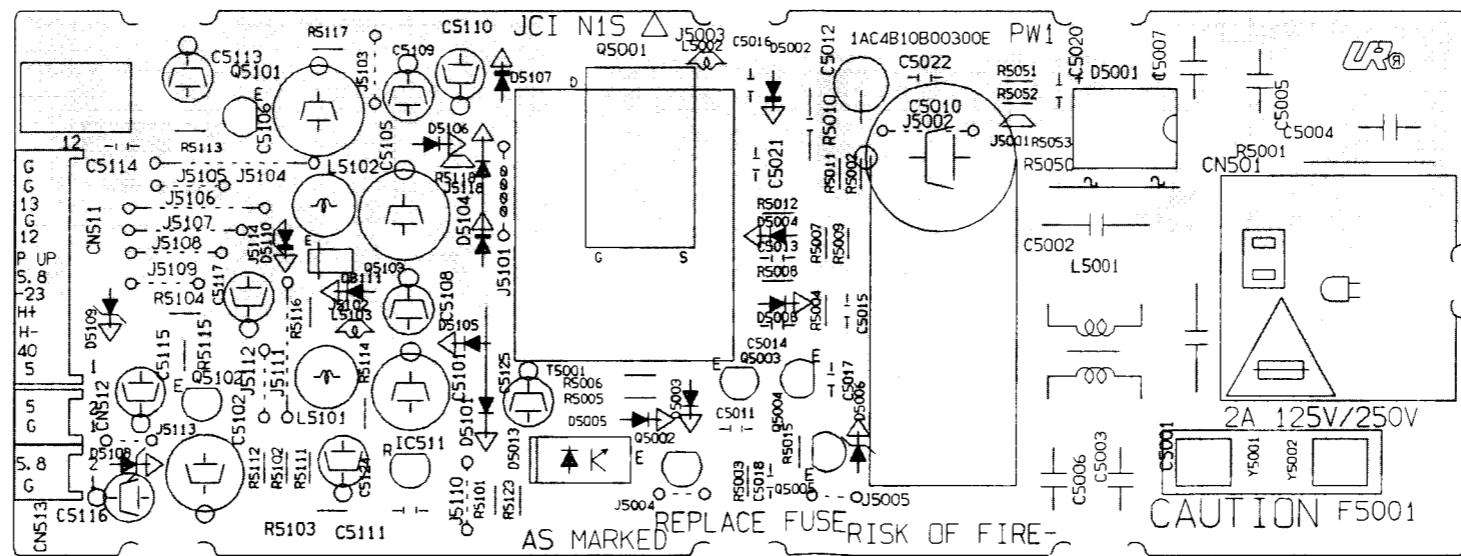
BDA1 - 14026/TA4H-U2, UF2

## 2. CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS (P.W.B.)

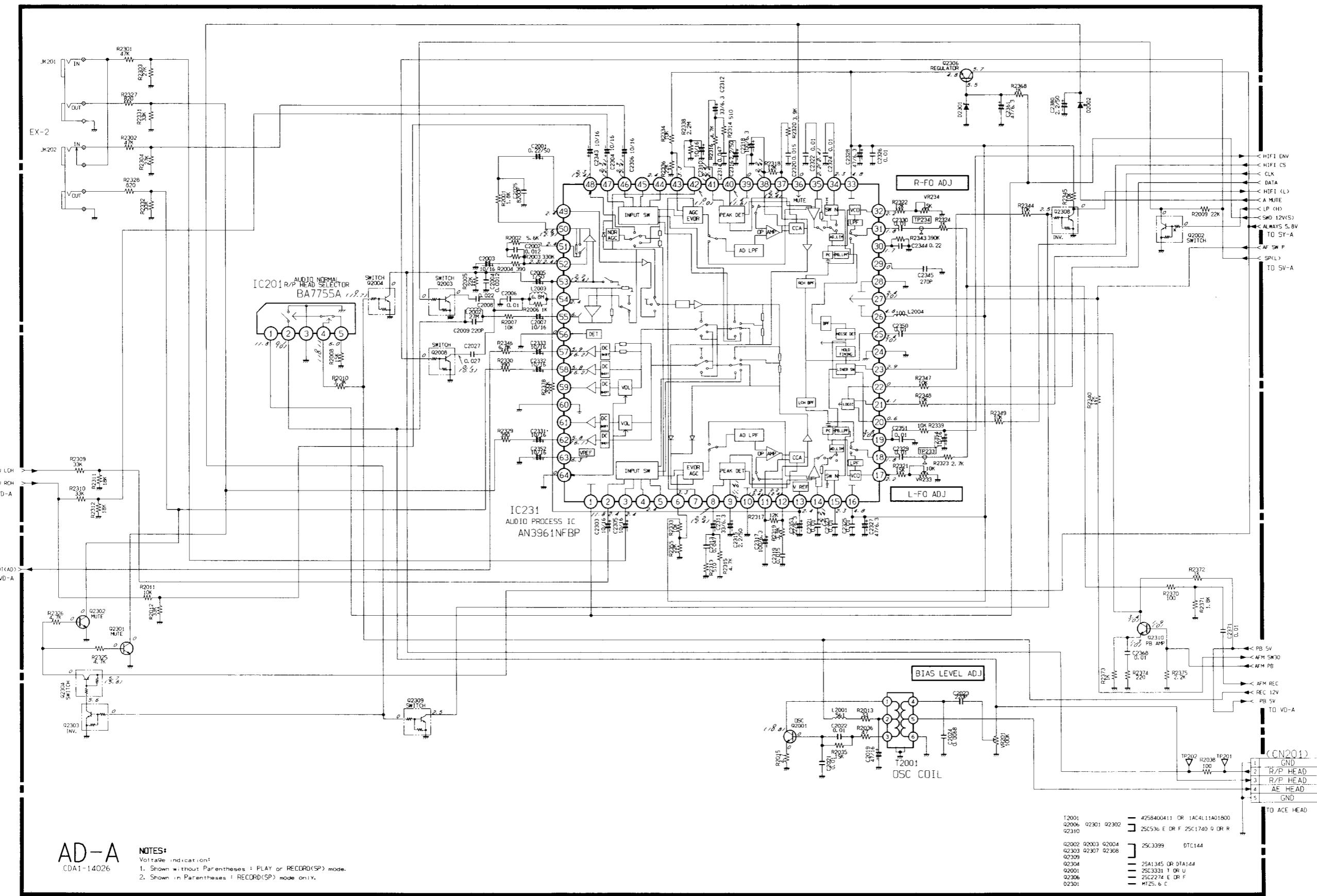
### PW-1 BOARD POWER SUPPLY



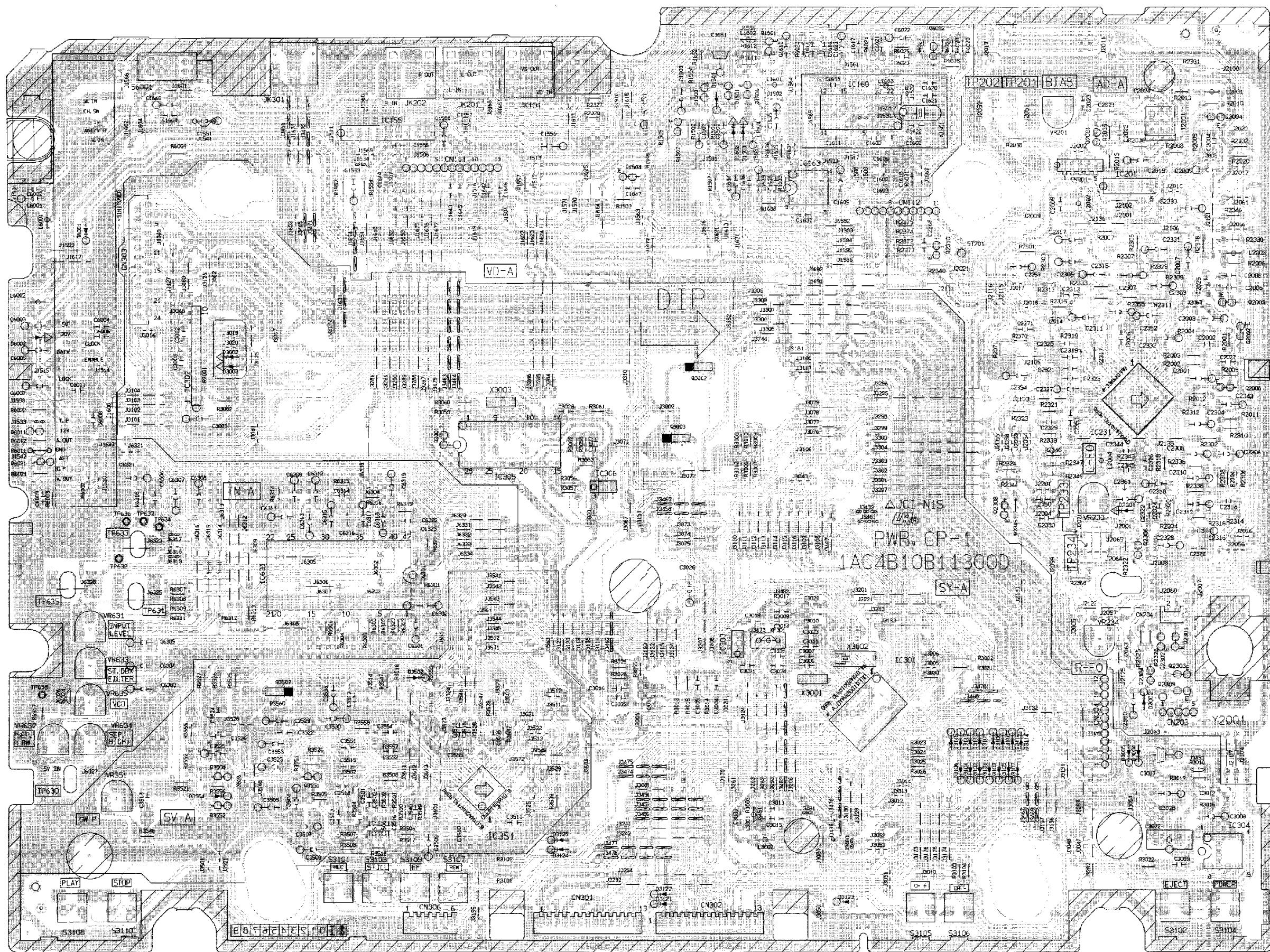
PW-1 P.W.B. (N.S.P)



## CP-1 BOARD (AD-A) AUDIO



**CP-1 P.W.B. (N.S.P)**



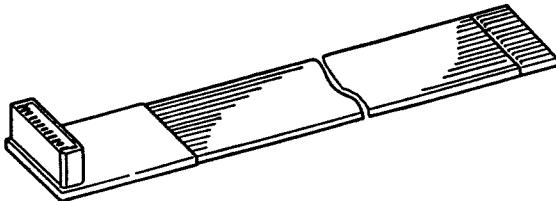
2 3 4 5 6 7 8 9 10 11 12 13 14

## RELAY JIG (VHJ-0067) 12-WIRE CABLE FOR PRE-AMP UNIT

Connect the Flat cable end from the Cylinder assembly to the Pre-amp unit using the Relay jig to provide simple repairing and adjustment of the Pre-amp unit, as shown in Fig. 2. Further, when repairing or adjusting the Pre-amp unit, be sure to make contact an end of Shield case with Bracket of the Pre-amp unit to maintain the shield effect. If the Pre-amp unit does not contact, there is insufficient ground and no proper play back image can be obtained.

### CAUTION:

Be sure that the Relay jig does not have touch with video head or the upper cylinder assembly.



RELAY JIG (VHJ-0067) 12-WIRE CABLE FOR PRE-AMP UNIT

Fig. 1

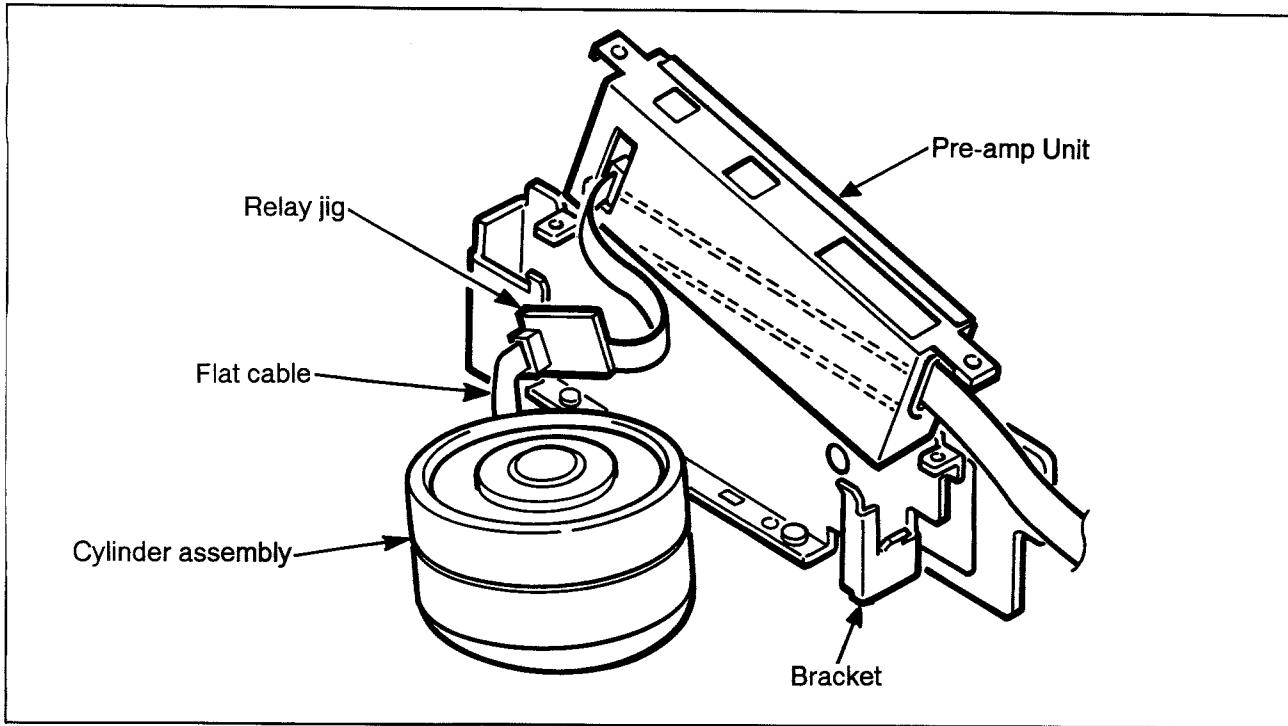
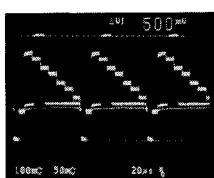
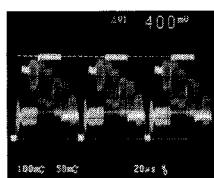
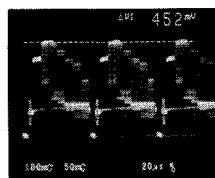
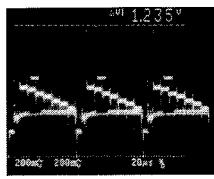
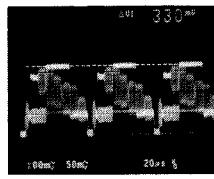
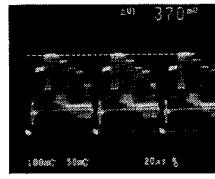
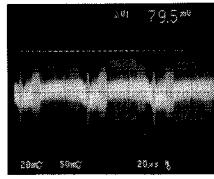
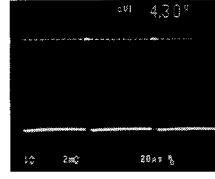
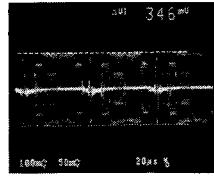
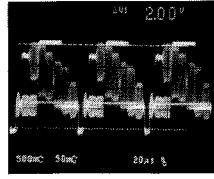
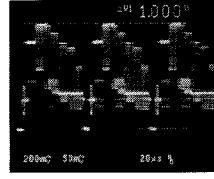
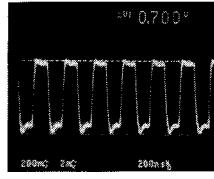
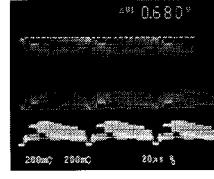
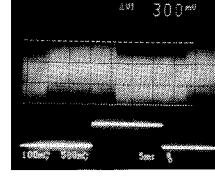


Fig. 2

## VIDEO CIRCUIT WAVEFORMS

PIN	IC100		
3	REC (SP)/EE mode 	9	PB (SP) mode 
			REC (SP) mode 
4	REC (SP) mode 	11	PB (SP) mode 
			REC (SP)/EE mode 
14	PB (SP) mode 	26	PB /REC (SP) mode 
			REC (SP) mode 
28	PB (SP) mode 	31	REC (SP)/EE mode 
PIN	Q1006	PIN	TP181
E	PB/REC (SP) mode 		REC (EP) mode 
			PB (SP) mode 

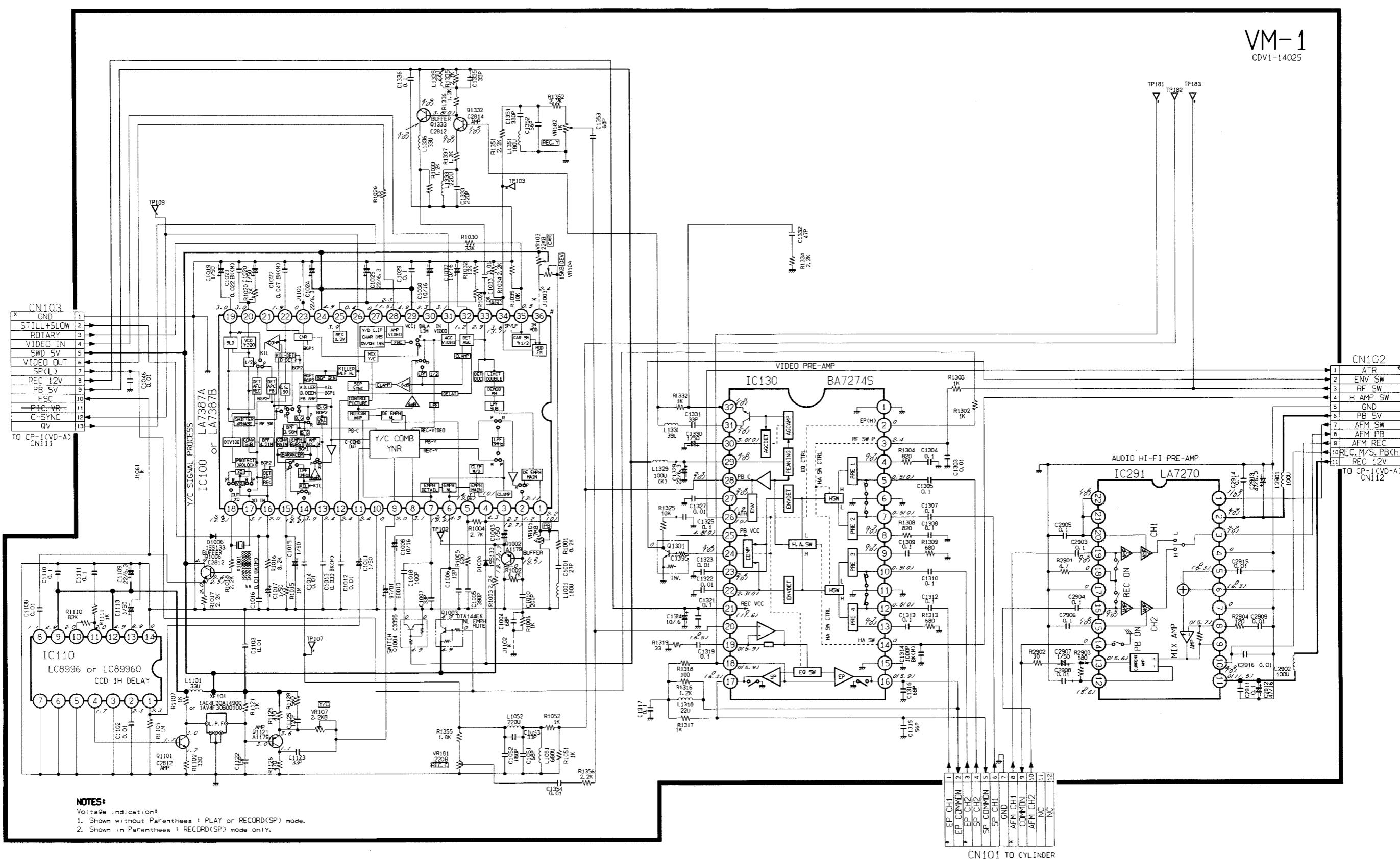
WF-V-TN4H-A

CN1  
 \* GN  
 STILL  
 ROT  
 VIDEO  
 SWD  
 VIDEO  
 SP  
 REC  
 PR  
 FS  
 PIC  
 C-S  
 D  
 TO CP-1  
 CN1

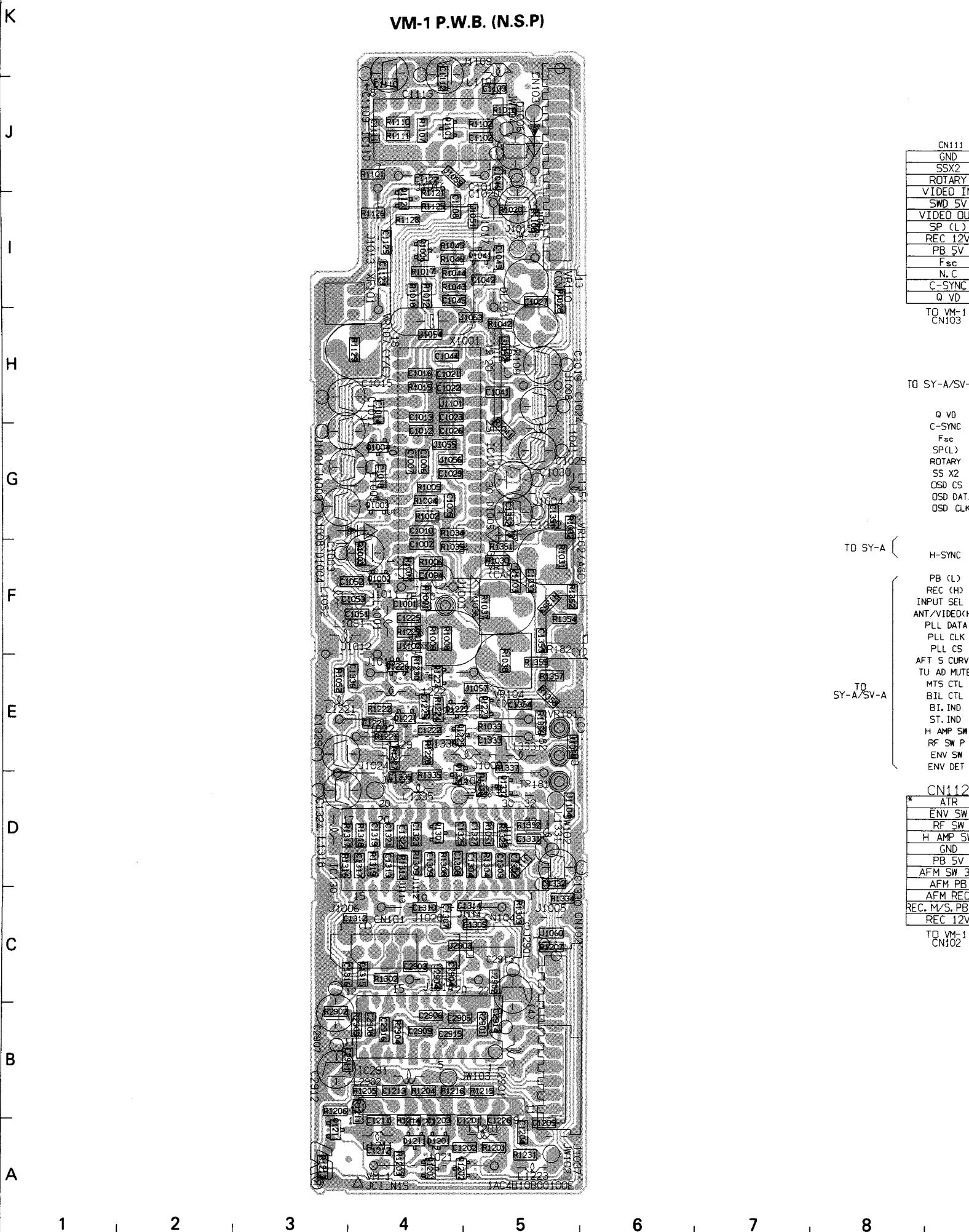


# VM-1 BOARD HEAD PRE-AMP & VIDEO MAIN

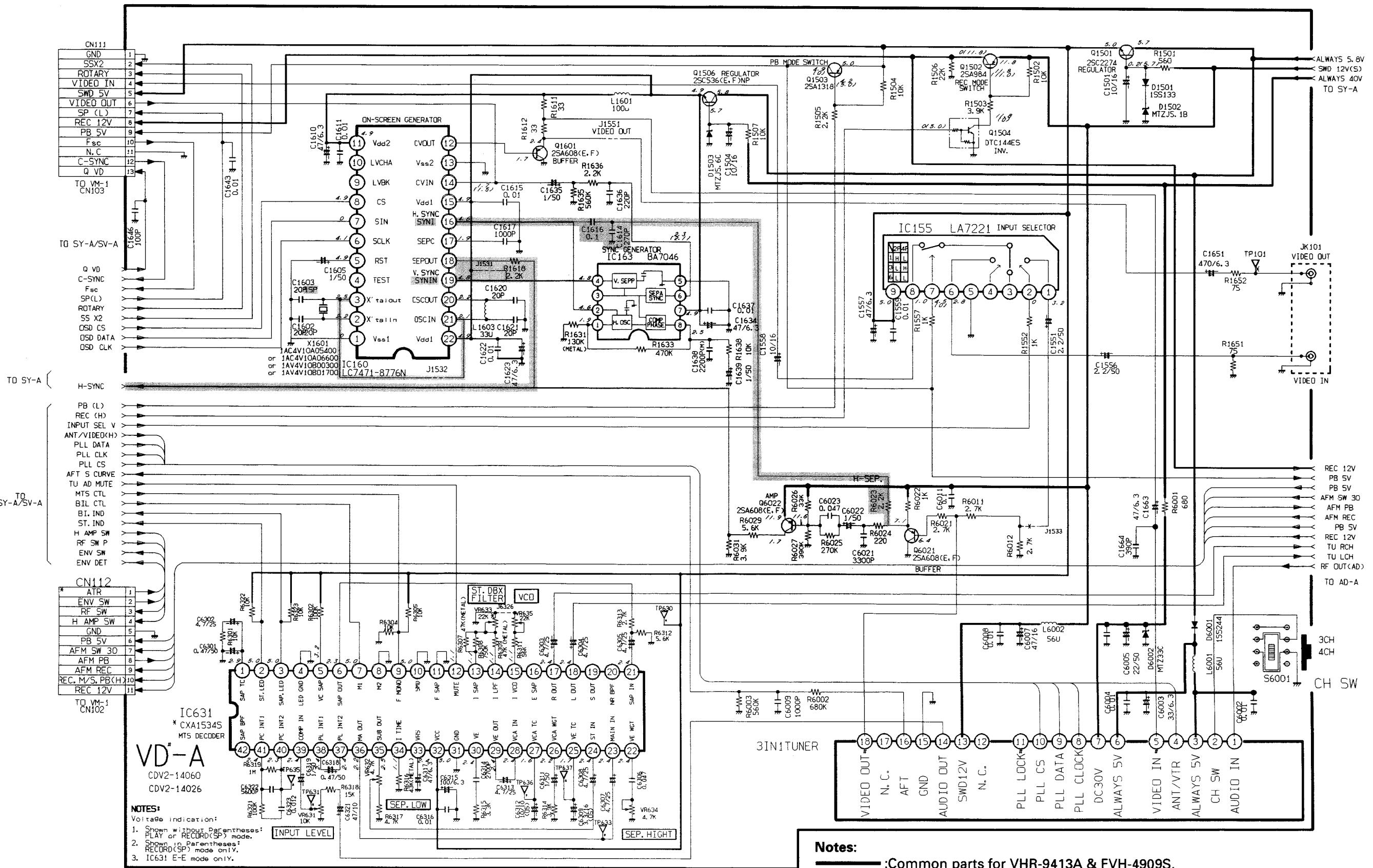
VM-1  
CDV1-14025



# VM-1 P.W.B. (N.S.P)



**CP-1 BOARD (VD-A,TN-A) VIDEO IN/OUT & MTS DECODER**

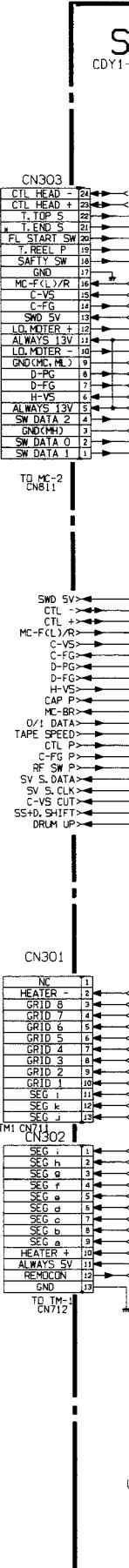


**Notes:**  
— :Common parts for VHR-9413A & FVH-4909S.  
— :The parts for FVH-4909S only.  
The part marked ■ is VHR-9413A only.

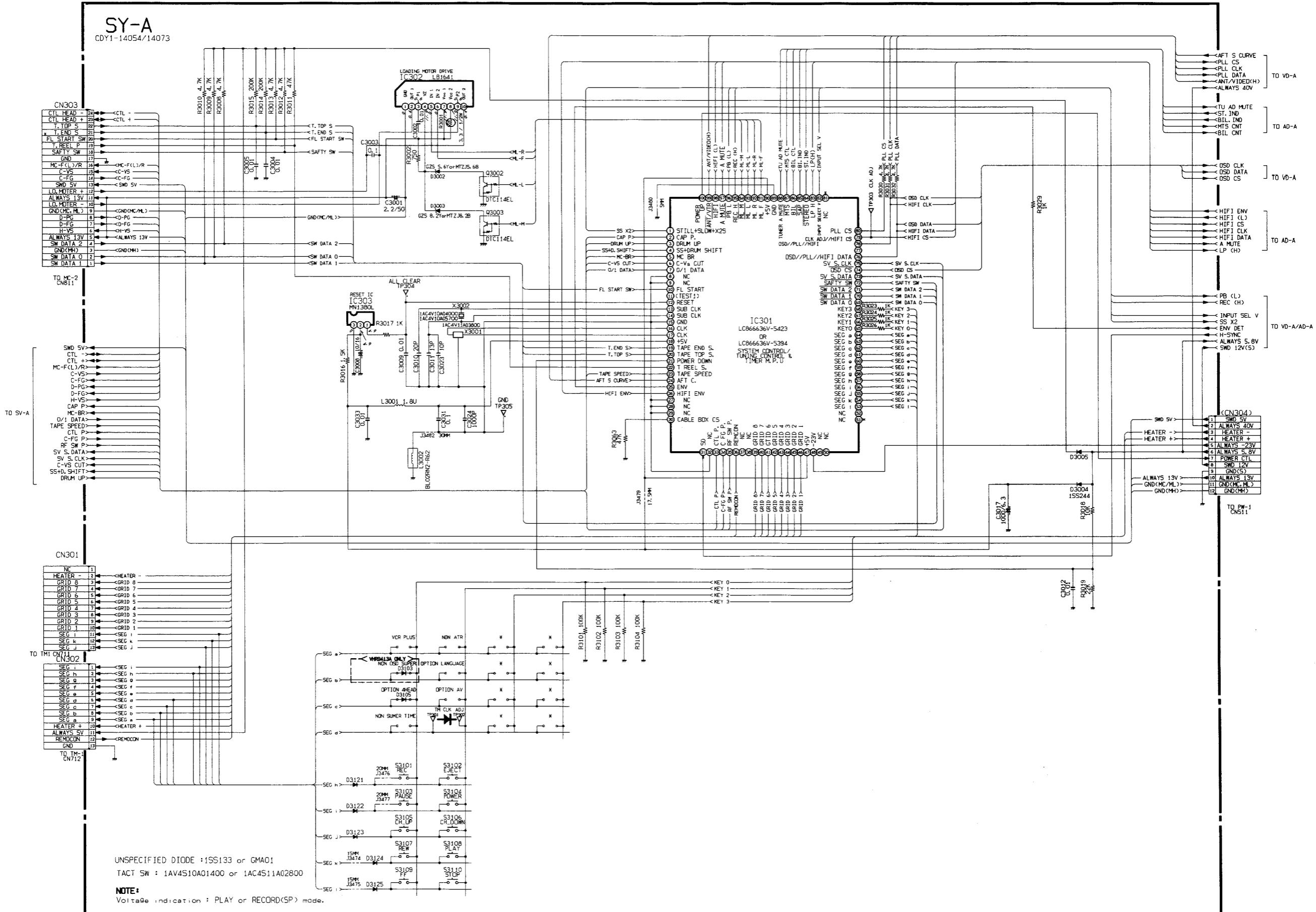
## **IC301 SYSTEM CONTROL-TIMER, & TUNING CONTROL MPU PIN FUNCTIONS TABLE**

No.	Name	I/O	I/O Signal Function
1	STILL + SLOW + X2	O	Signal for indicating STILL, SLOW, and X2 - speed modes.
2	CAP P.	O	Amplitude control for head motor drive amplifier at SLOW mode.
3	DRUM UP	O	Head drum motor rotation speed up signal.
4	SS + DRUM SHIFT	O	Signal for indicating SLOW/STILL modes and alternation of drum motor control data. (3 value voltage)
5	MC - BR	O	Brake signal for capstan motor.
6	C - Vs CUT	O	Cut off for capstan motor control voltage in SLOW / STILL modes.
7	0 / 1 DATA	I	CTL pulse duty detection signal input. Used for VISS detection.
8	-	-	-
9	-	-	-
10	FL- START SW	I	Switch input indicating start of cassette loading or discharge by cassette mechanism.
11	-	-	-
12	RESET	I	Initial reset terminal for this IC.
13	XT1	-	Clock OSC during power failures.
14	XT2	-	Frequency is 32.672kHz.
15	VSS	-	Ground terminal
16	CF1	-	IC clock OSC terminal.
17	CF2	-	Frequency is 13.92MHz.
18	VDD	-	IC power supply terminal.(5Vdc)
19	T. END S.	I	Sensor signal input for tape end detection.
20	T. TOP S.	I	Sensor signal input for tape beginning detection.
21	POWER DOWN	I	Power failure detection terminal.
22	T. REEL S.	I	Pulse input for detection of take-up reel table rotation.
23	TAPE SPEED	I	Input of result of tape speed discrimination by digital servo IC.
24	AFT- C	I	Tuner AFT S-curve signal input for tuner AFT function.
25	ENV.	I	Video head envelope detection signal input for ATR function.
26	HIFI ENV	I	HiFi audio head envelope detection signal input for ATR function.
27	-	-	-
28	-	-	-
29	-	-	-
30	CABLE BOX CS	I/O	Chip enable (access) signal to control the cable box.
31	H SYNC ( SD )	I	Sync. detecton signal input for existing channel discrimination.
32	-	-	-
33	CTL P.	I	CTL head recording / playback pulse signal input.
34	C - FG P.	I	FG signal input of capstan motor.
35	RF SW P.	I	Input of RF switching pulse created by head drum PG.
36	REMOCON	I	Remote control signal input.
37	-	-	-
38	-	-	-
39	G8	O	Display grid outputs (FLD).
40	G7	O	
41	G6	O	
42	G5	O	
43	G4	O	
44	G3	O	
45	G2	O	
46	G1	O	
47	VDD	-	IC power supply input for back up.(5Vdc)
48	V LOAD	O	-23V input for FLD drive.

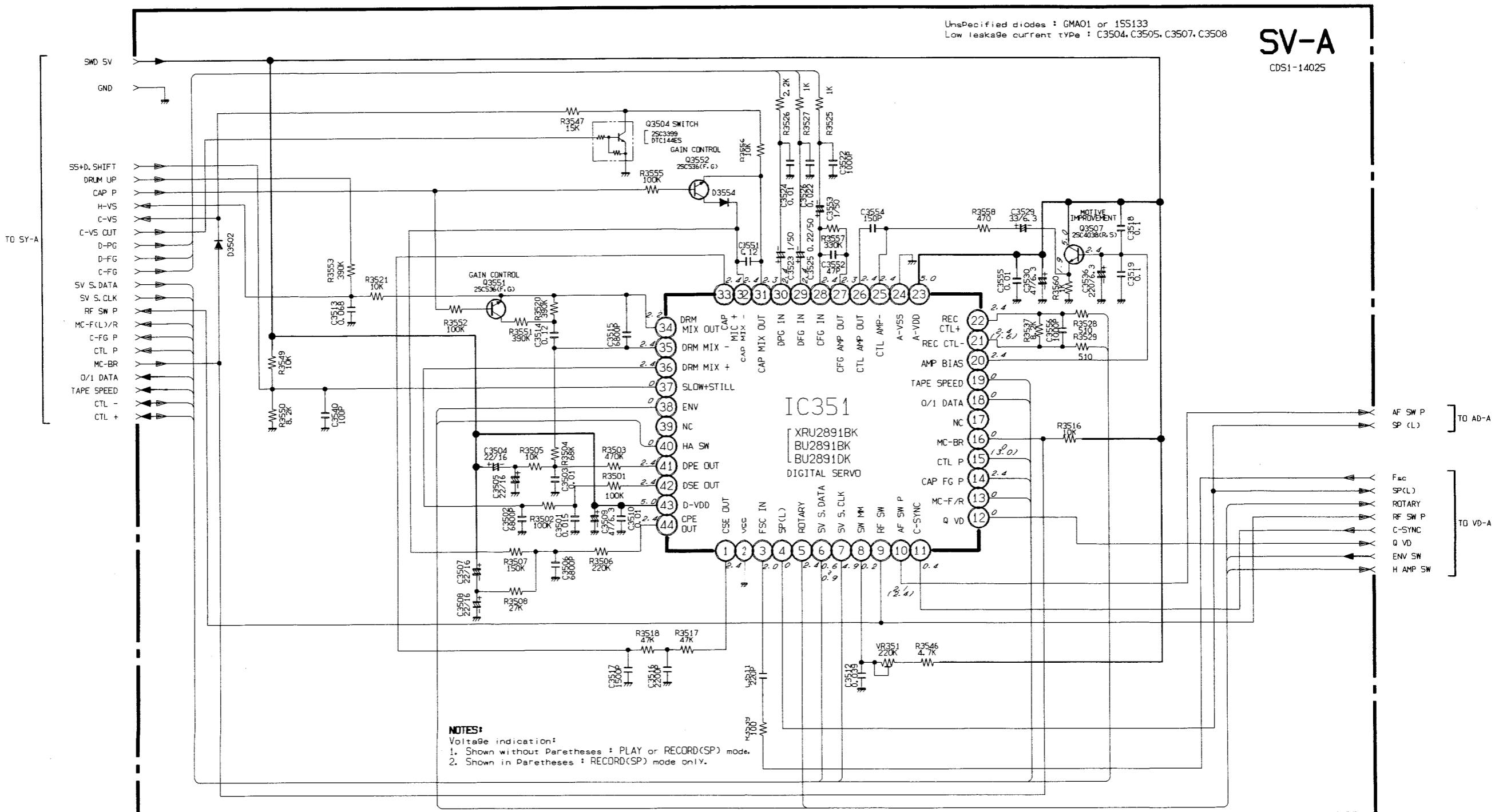
No.	Name	I/O	I/O Signal Function
49	-	-	-
50	-	-	-
51	-	-	-
52	-	-	-
53	SEG I	O	
54	SEG K	O	
55	SEG j	O	
56	SEG i	O	
57	SEG h	O	
58	SEG g	O	Display segment outputs (FLD). (Includes key-scan output)
59	SEG f	O	
60	SEG e	O	
61	SEG d	O	
62	SEG c	O	
63	SEG b	O	
64	SEG a	O	
65	KEY IN 0	I	
66	KEY IN 1	I	Operation key data inputs.
67	KEY IN 2	I	
68	KEY IN 3	I	
69	SW DATA 0	I	
70	SW DATA 1	I	3-bit data indicating operation position of mechanism.
71	SW DATA 2	I	
72	SAFETY SW	I	Terminal for accidental erasure prevention switch. No operation to record mode while "HIGH" is input.
73	SV S. DATA	O	Output 8-bit X 4 serial data giving operation mode and tracking data,etc., to digital servo IC.
74	OSD CS	O	Chip enable (access) signal output to OSD IC.
75	SV S CLK	O	The clock pulse for digital servo IC.
76	COMMON DATA	I/O	Terminal for communication of respective data with OSD IC, AUDIO IC, PLL tuning IC, and cable box.
77	I2C DATA	I/O	Data exchange with the VCR+ data memory (I2C) IC.
78	COMMON CLK	O	Clock pulse for OSD, PLL, AUDIO, and cable box.
79	HiFi CS	O	Chip enable (access) signal output to AUDIO IC.
80	PLL CS	O	Chip enable signal output to PLL tuning system IC.
81	AV 1 / AV 2	O	External input source ( AV 1/2 ) selection.
82	INPUT SEL V	O	Video input source ( TU / AV ) selection.
83	LP H	O	Signal for indicating LP mode tape speed.
84	STEREO	I	Stereo mode indicating signal input from decoder.
85	SAP	I	SAP mode indicating signal input from decoder.
86	BIL	O	Bilingual mode indicating signal output to decoder.
87	MTS	O	MTS / MONO selection signal output to decoder.
88	TUNER A MUTE	O	Signal for disable tuner-IF audio signal.
89	VSS	-	IC ground terminal.
90	VDD	-	IC power supply input.(5Vdc)
91	ML- F	O	Loading motor rotation direction (FWD) indication signal.
92	ML- R	O	Loading motor rotation direction (REV) indication signal.
93	ML- L	O	Loading motor rotation speed (low speed) indication signal.
94	ML- M	O	Loading motor rotation speed (medium speed) indication signal.
95	REC H	O	Signal for indicating recording mode.
96	PB (L)	O	Signal for indicating playback mode.
97	A MUTE	O	Signal for disable audio output signal.
98	HiFi	I	Hi-Fi mode indicating signal input from audio circuit.
99	ANT / VTR	O	Signal for selecting ANTENNA or VTR.
100	POWER UP	O	"HIGH" output except when power is off. Indicating that power is ON



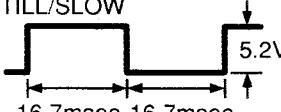
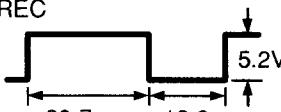
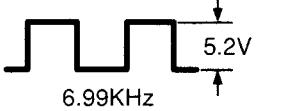
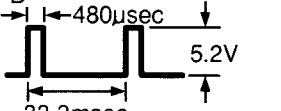
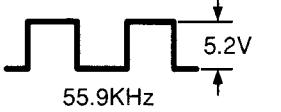
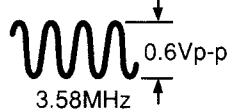
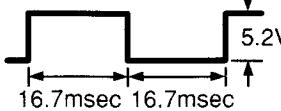
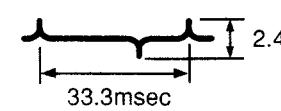
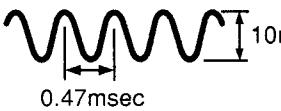
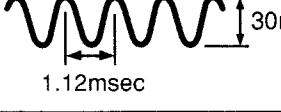
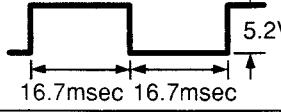
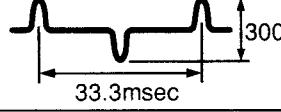
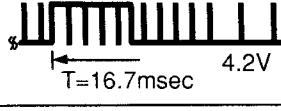
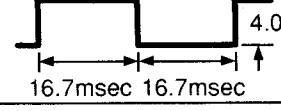
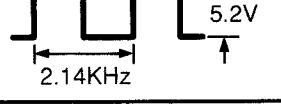
**CP-1 BOARD (SY-A) SYSTEM CONTROL, TUNING CONTROL, & TIMER**



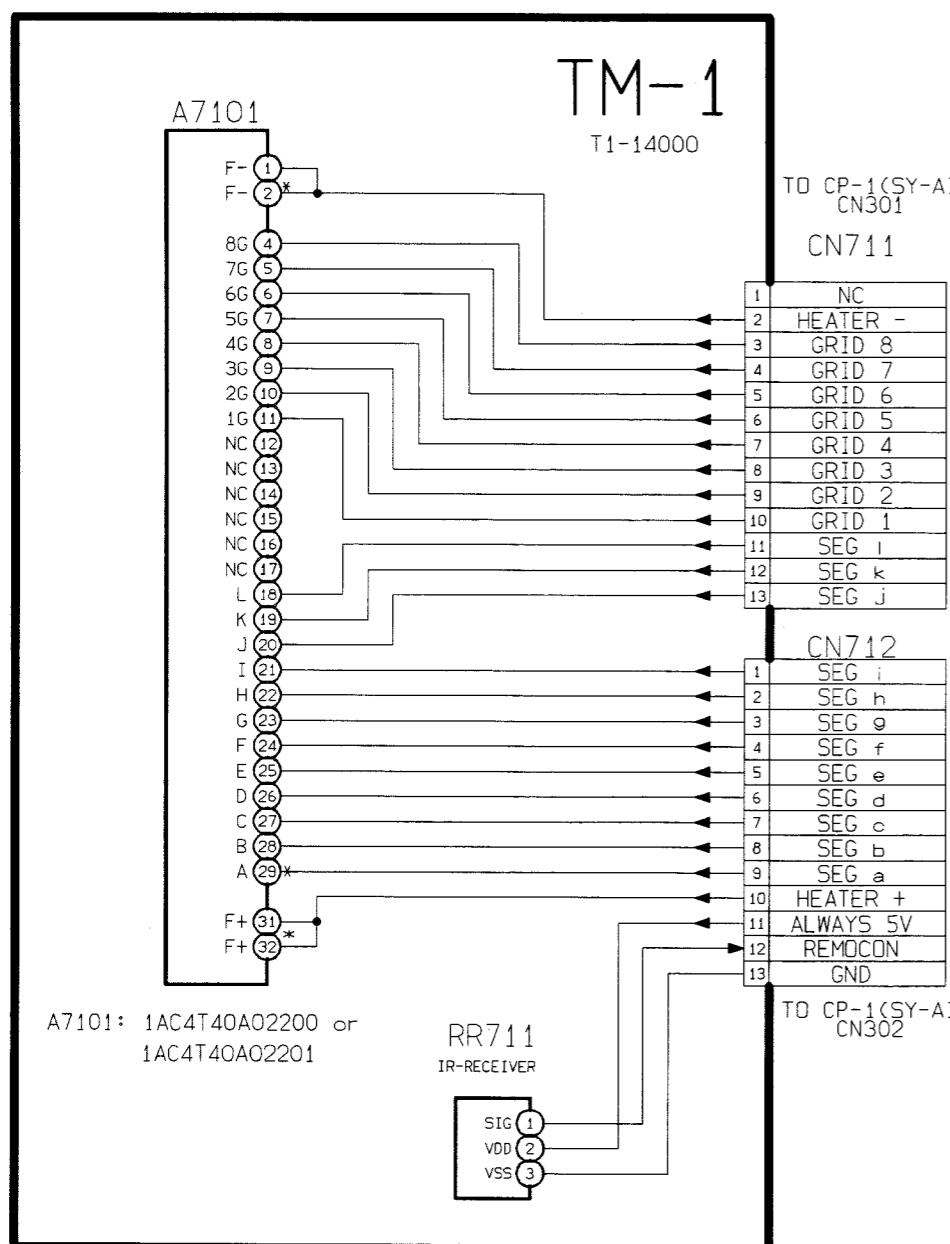
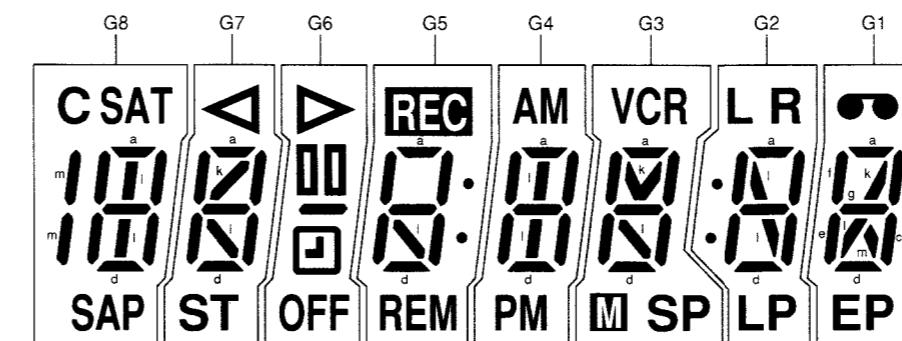
CP-1 BOARD (SV-A) SERVO



## SERVO CIRCUIT WAVEFORMS

TEST LOCATION	WAVEFORM & MODE/LEVEL	TEST LOCATION	WAVEFORM & MODE/LEVEL
Pin 40 (H.A.SWITCHING)	STILL/SLOW  16.7msec 16.7msec	Pin 15 (CTL PULSE)	REC  20.7msec 12.6msec
Pin 42 (PWM)	 6.99KHz	Pin 15 (CTL PULSE)	PB  33.3msec
Pin 41,44,1 (PWM)	 55.9KHz	Pin 21 (CTL HEAD-)	REC  20.7msec 12.6msec
Pin 3 (FSC INPUT)	 0.6Vp-p 3.58MHz	Pin 22 (CTL HEAD+)	REC  20.7msec 12.6msec
Pin 5 (ROTARY)	PB  16.7msec 16.7msec	Pin 26 (CTL AMP OUT)	PB  33.3msec
Pin 8 (D-PG MM)	1.5msec  5.6msec	Pin 28 (C-FG INPUT)	 0.47msec
Pin 9 (RF SW PULSE)	 16.7msec 16.7msec	Pin 29 (D-FG INPUT)	 1.12msec
Pin 10 (AF SW PULSE)	PB  16.7msec 16.7msec	Pin 30 (D-PG INPUT)	 33.3msec
Pin 11 (COMPOSITE SYNC INPUT)	 T=16.7msec 4.2V	Pin 38 (ENV.SW INPUT)	SLOW PB  16.7msec 4.0V
Pin 14 (C-FG PULSE)	 2.14KHz		

WF-S-TA4

**TM-1 BOARD DISPLAY (FLD)**
**A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE**

**GRID & SEGMENT ASSIGNMENT**

**ANODE CONNECTION**

GRID	G8	G7	G6	G5	G4	G3	G2	G1
SEGMENTS	C	◀	▶	REC	AM	VCR	L	●
a	C	◀	▶	REC	AM	VCR	L	●
b	SAT	K	■	—	—	k	R	k
c	a	a	—	a	a	a	a	a
d	b	b	■	b	b	b	b	b
e	c	c	—	c	c	c	c	c
f	d	d	—	d	d	d	d	d
g	e	e	—	e	e	e	e	e
h	f	f	—	f	f	f	f	f
i	g	g	—	g	g	g	g	g
j	l	l	—	l	l	l	l	l
k	m	—	—	•	—	M	•	m
l	SAP	ST	OFF	REM	PM	M	SP	LP
m	EP							

GR/TN4H

**TM-1 P.W.B. (N.S.P)**
