



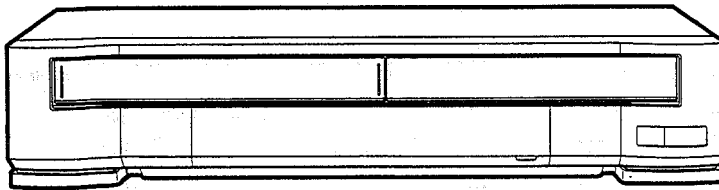
# Service Manual

VIDEO CASSETTE RECORDER



MODEL

**HS-M16(Y)**  
**HS-M16(E)**  
**HS-M16(IR)**  
**HS-M16(S)**  
**HS-M16(B)**



Only cassettes marked VHS can be used with this video cassette recorder.

## SPECIFICATION

<b>Dimensions</b>	: 425mm(W)×85mm(H)×342mm(D)
<b>Video recording system</b>	: VHS standard
<b>Luminance signal</b>	: Frequency modulation recording
<b>Colour signal</b>	: Low frequency conversion subcarrier phase shift recording
<b>Tape speed</b>	: 23.39mm/sec (SP mode)
<b>Record/playback time</b>	: 4 hours (with E240 cassette)
<b>Video input</b>	: 0.75~1.5 V <sub>pp</sub> 75Ω
<b>Video output</b>	: 1.0 V <sub>pp</sub> 75Ω
<b>Audio input (line)</b>	: -8dBs 50kΩ unbalanced
<b>Audio output (line)</b>	: -6dBs 1kΩ unbalanced
<b>Weight</b>	: approx. 5.1kg
<b>Acceptable operating temperature</b>	: 5~40°C
<b>Acceptable operating humidity</b>	: 30~80% RH

ITEM	MODEL				
	HS-M16(Y)	HS-M16(E)	HS-M16(IR)	HS-M16(S)	HS-M16(B)
Power source	AC240V, 50Hz	AC230V, 50Hz	AC220V, 50Hz	AC230V, 50Hz	AC240V, 50Hz
Television system	CCIR-B&G	CCIR-B&G	CCIR-I	CCIR-B&G	CCIR-I
Receiving channel					
VHF	X1~S2 E2~E12 S3~S20	S1~S3 E2~E12 M1~M10	IRA~S3 -- M1~M10	E2~E12 --	
UHF	E21~E69	E21~E69	E21~E69	E21~E69	E21~E69
HYPER	--	U1~U31	--		
RF Output channel	E32~E40ch	E32~E40ch	I32~I40ch	E32~E40ch	I32~I40ch

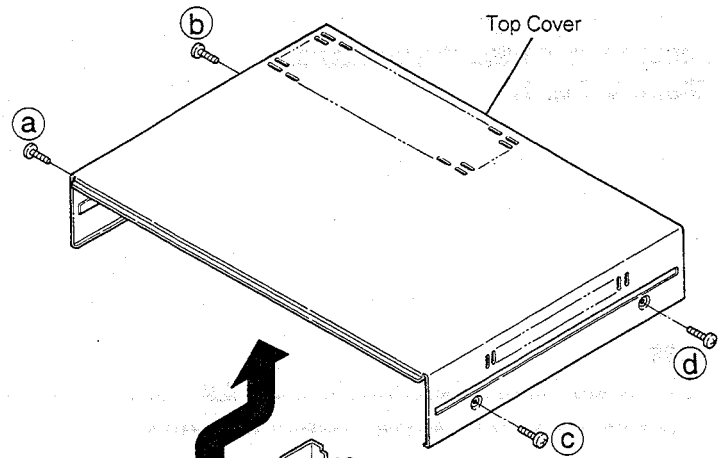
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# DISASSEMBLY

## 1. Removal of Top Cover

- A. Remove four screws (a ~ d) retaining the top cover.
- B. Gently expand the bottom edges of the top cover, pivot cover forward, then slide toward rear in the direction of the arrows.

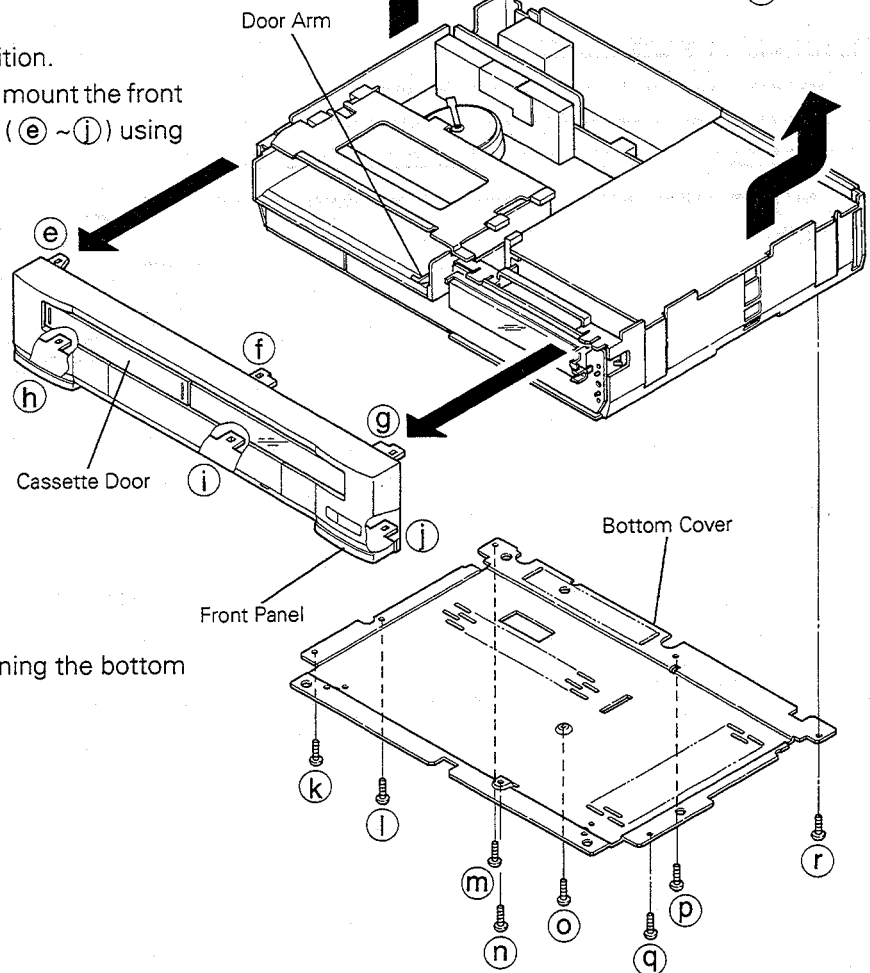


## 2. Removal of Front Panel

- A. Remove the top cover.
- B. Unfasten six snaps (e ~ j), and remove the front panel in the direction shown by the arrows.

## 3. Installation of Front Panel

- A. Check that the door arm is in low position.
- B. While holding the Cassette door open, mount the front panel to the VCR and fasten six snaps (e ~ j) using gentle pressure to the front panel.



## 4. Removal of Bottom Cover

- A. Remove eight screws (k ~ r) retaining the bottom cover.
- B. Remove the bottom cover.

Fig.1

# SERVICING THE PRINTED CIRCUIT BOARDS

**CAUTION: BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE A.C. SOURCE.**

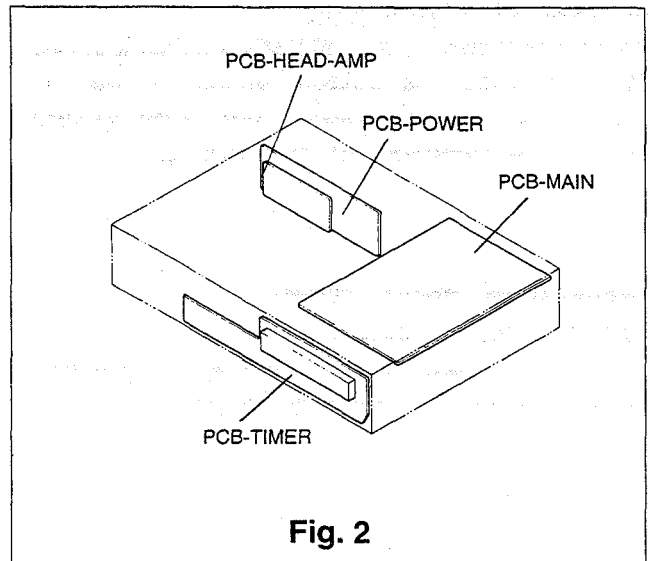
Location of Printed Circuit Boards  
(Refer to Fig. 2)

**Note:**

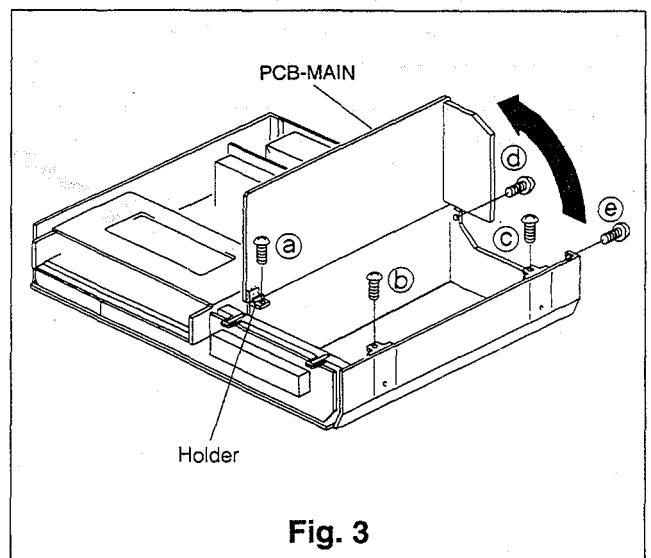
Be careful when disconnecting the flat cable connectors to avoid possible contact problems.

## 1. Removal of PCB-MAIN

- A. Remove the top cover. (Page 1, Item 1)
- B. Remove five screws (a~e), as shown in Fig.3.
- C. Pivot the PCB-MAIN in the direction of the arrow.
- D. Hang the edge of PCB-MAIN to the holder on the frame.



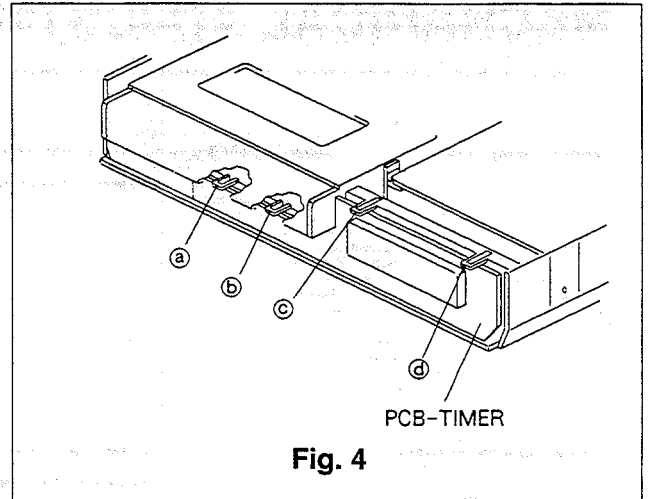
**Fig. 2**



**Fig. 3**

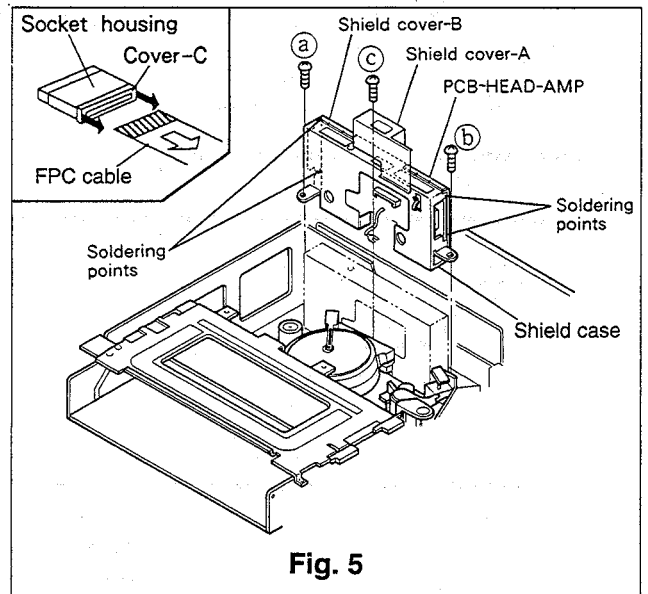
## 2. Removal of PCB-TIMER

- A. Remove the front panel. (Page 1, Item 2)
- B. Unfasten four stoppers (a~d), and remove the PCB-TIMER, as shown in Fig. 4.



## 3. Removal of PCB-HEAD-AMP

- A. Remove the top cover. (Page 1, Item 1)
- B. Lift the shield cover-A upward to remove it.
- C. Disconnect the FPC cable by gently pulling cover-C of the connector GB, as shown in Fig. 5.
- D. Remove three screws (a~c) retaining the lead wire and the PCB-HEAD-AMP.
- E. To service the solder side, remove the shield cover-B, use the extension cord (859C344O40) and ground the lead wire, as removed in above para. D.
- F. To service the component side, unsolder four soldering points of the shield case and remove the shield case.

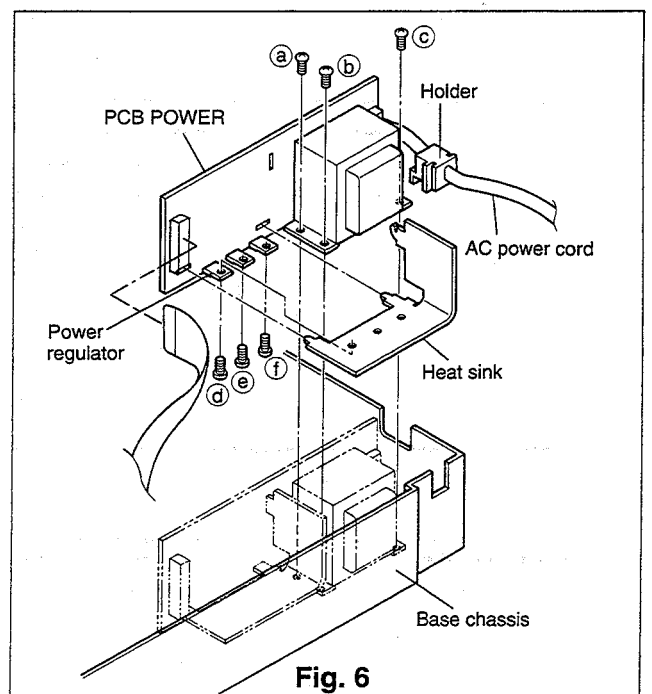


## 4. Removal of PCB POWER

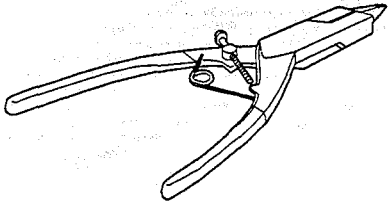
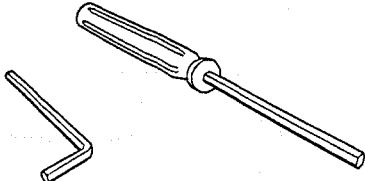
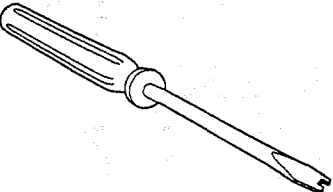
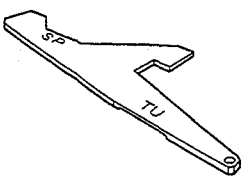
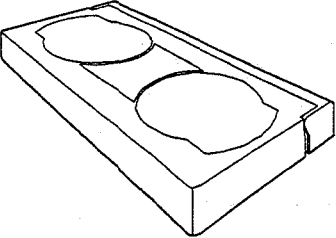
- A. Remove the top cover. (Page 1, Item 1)
- B. Remove three screws (a~c) retaining the PCB POWER, as shown in Fig. 6.
- C. Remove the holder of AC power cord from the base chassis and lift the PCB POWER upward.
- D. To service the component side, remove three screws (d~f) retaining the heat sink.

### CAUTION:

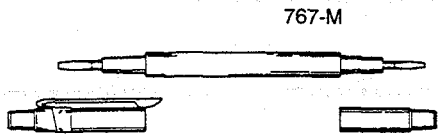
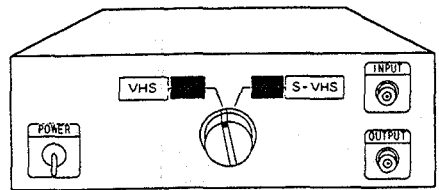
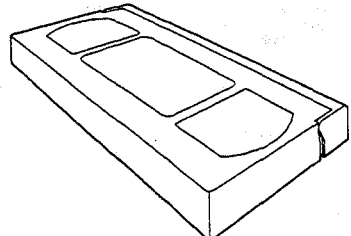
Power regulators are damaged if power supply is turned on without installing the heat sink.



# MECHANICAL ADJUSTMENT TOOLS

	PURPOSE	METHOD
<b>Grip ring fixer (859C347O50)</b> 	A tool for preventing the grip ring from opening excessively.	While opening the grip ring with the tips of this tool, install the grip ring on to the shaft.
<b>Hex Keys(1.5mm)</b>  <b>(859C259O20) (859C259O50)</b>	The hex keys are used for tightening or removing hexagonal socket head screws which fasten the guide rollers.	Insert the given size(1.5mm) hexagonal socket and turn.
<b>Adjustment Driver (859C259O80)</b> 	For adjustment of guide rollers.	Carefully insert and adjust guide rollers.
<b>Reel disk Adj. Jig (859C342O20)</b> 	The height gauge is used for measuring height and perpendicularity of the reel disk and Take up guide arm.	The gauge is applied to the part being measured.
<b>BackTension Gauge (859C345O80)</b> 	The back tension gauge is used for measuring the tension of the tape on the supply side.	Load this gauge in the cassette housing and run in the play mode. Read the gauge indicator.
<b>Extension Cord (859C344O40)</b>	For PCB-HEAD AMP service.	Use when repair of the PCB-Head Amp is necessary.
<b>Cotton gloves</b>	For changing, cleaning and handling of drum, heads and guides.	Use when handling all parts in the tape path.

# ELECTRICAL ADJUSTMENT TOOLS

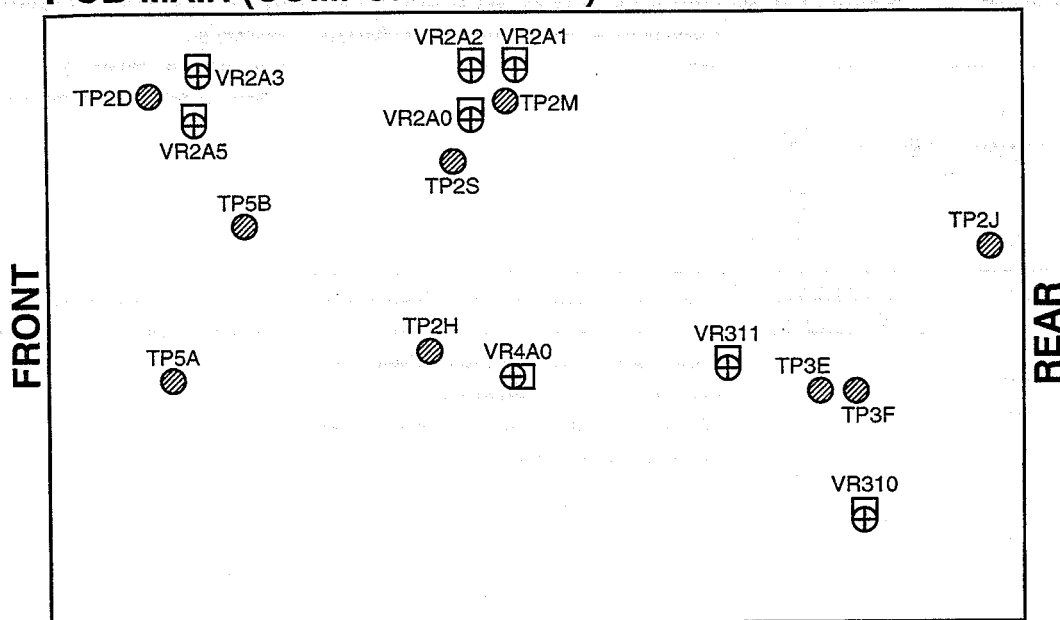
	PURPOSE	METHOD
<b>Adjustment Driver (859C338000)</b>   <p>767-M</p>	The adjustment driver is intended to adjust variable resistors, trimmers, transformers etc. in the circuitry.	Select a tip suitable for the particular head of the component concerned and adjust.
<b>Carrier Checker (859C346050)</b>  	Used for the adjustment or inspection of the carrier set deviation.	Use in conjunction with the oscilloscope. For detail refer to the service manual or the attached data.
<b>Alignment Tape (PAL:859C339010) (NTSC:859C339000)</b>  	Standard signals(VHS Standard) are recorded on the alignment tape and reproduced when required in the adjustment of Y/C circuit, audio circuit and interchangeability alignment.	Install and run in the play mode, the same as for an ordinary tape.
<b>Record Current Adjustment Jig (859C347080)</b>	For Y/C Recording Level adjust .	For Y/C Recording Level adjustment.

## ELECTRICAL ADJUSTMENT

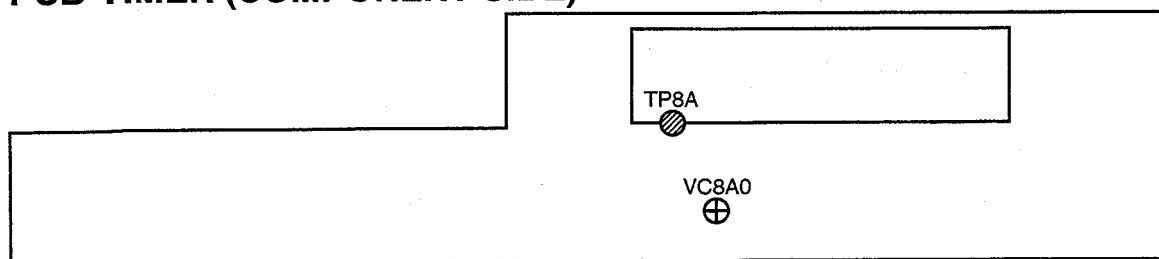
Circuit adjustments become necessary, in most cases, due to the wear of mechanical parts or following the replacement of critical components such as the video-head. Certain circuit defects can often cause circuit adjustments to vary considerably. Should this occur, be sure to determine the nature of the defect and repair prior to proceeding with adjustments.

Always use the test equipment recommended for a given adjustment procedure. If the appropriate test equipment is not available, it is recommended that adjustments NOT be attempted. Refrain from the indiscreet adjustment of circuit adjustment controls unless properly equipped to do so.

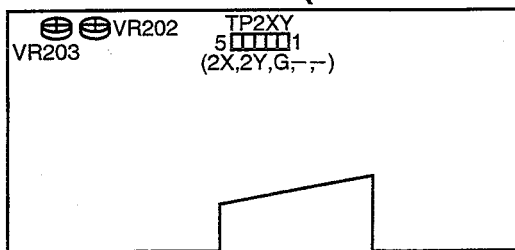
### PCB-MAIN (COMPONENT SIDE)



### PCB-TIMER (COMPONENT SIDE)



### PCB-HEAD-AMP (COMPONENT SIDE)





<b>[Servo Circuit]</b> 1. Playback Switching Point		<b>Adjustment purpose:</b> Video switch over timing during playback.	
		<b>Symptom when incorrectly adjusted:</b> Switching noise or jitter on the reproduced picture.	
<b>Measuring instrument and condition</b>		<b>VCR setup condition</b>	
Oscilloscope (Probe 10:1)		Input signal	---
Test point	TP2J	Using tape	Alignment tape (grey scale step signal)
EXT trigger	TP2H	VCR condition	Playback
Measurement range	DIV 20mV TIM 50μ s	Using Jig.	---

**PCB-MAIN (COMPONENT SIDE)**

<b>[Y/C Signal Circuit]</b> 2. EE Output Level		<b>Adjustment purpose:</b> Output level of video signal at Stop mode.	
		<b>Symptom when incorrectly adjusted:</b> Too bright or too dark image: colour signal is produced incorrectly.	
<b>Measuring instrument and condition</b>		<b>VCR setup condition</b>	
Oscilloscope (Probe 10:1)		Input signal	RF signal (colour bar)
Test point	TP2J	Using tape	---
EXT trigger	---	VCR condition	Stop
Measurement range	DIV 20mV TIM 10μ s	Using Jig.	---

**PCB-MAIN (COMPONENT SIDE)**

<b>3.Clamp</b>		<b>Adjustment purpose:</b> Set the level of video signal.	
		<b>Symptom when incorrectly adjusted:</b> Blur image, white streaking, black streaking.	
<b>Measuring instrument and condition</b>		<b>VCR setup condition</b>	
Oscilloscope (Probe 10:1)		Input signal	RF signal (colour bar)
Test point	TP2D	Using tape	---
EXT trigger	---	VCR condition	Stop
Measurement range	DIV 10mV TIM 10 $\mu$ s	Using Jig.	---

1. Observe TP2D.  
2. Adjust VR2A3 so that the amplitude of the waveform is 490mVp-p.

**PCB-MAIN (COMPONENT SIDE)**

490mVp-p

<b>4.Carrier set, Deviation</b>		<b>Adjustment purpose:</b> FM carrier frequency and frequency deviations.	
		<b>Symptom when incorrectly adjusted:</b> Too bright or too dark image: colour signal is reproduced correctly. Horizontal noise or out of sync.	
<b>Measuring instrument and condition</b>		<b>VCR setup condition</b>	
Oscilloscope (Probe 1:1)		Input signal	RF signal (colour bar)
Test point	TP2M	Using tape	---
EXT trigger	TP2S	VCR condition	Stop
Measurement range	DIV 0.2V TIM 10 $\mu$ s	Using Jig.	Carrier checker

1. Observe TP2M via the carrier checker.  
2. Adjust VR2A2 and VR2A1 so that the response waveform 3.8MHz line and 4.8MHz just touch each of white lines on the oscilloscope.

**PCB-MAIN (COMPONENT SIDE)**

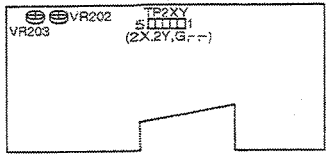
4.8MHz

3.8MHz

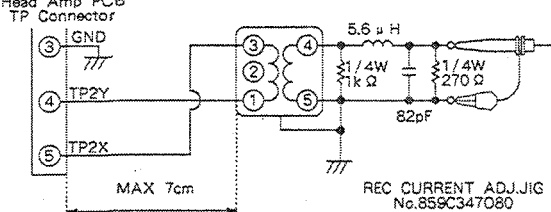
5.Y/C Recording Level		<b>Adjustment purpose:</b> Level of video signal just before recording on tape.	
		<b>Symptom when incorrectly adjusted:</b> Low luminance signal S/N ratio, beats, colour bounding of chrominance signal or flicker.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 1:1)		Input signal	RF signal (colour bar)
Test point	TP connector pin ⑤ and pin ④	Using tape	A tape
EXT trigger	TP2S	VCR condition	Record
Measurement range	DIV 10mV TIM 10 $\mu$ s	Using Jig.	REC Current ADJ. JIG

**PCB-HEAD-AMP (COMPONENT SIDE)**



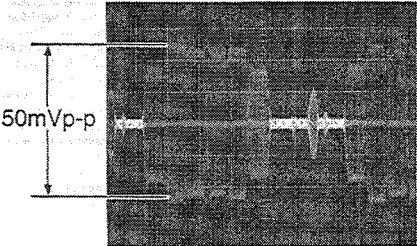
Head Amp PCB  
TP Connector



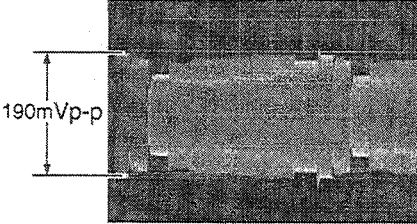
MAX 7cm

REC CURRENT ADJ.JIG  
No.859C347080

1. Observes TP connector pin ⑤ and pin ④ via the REC current ADJ. JIG.
2. Turn VR203 fully counter clockwise as seen from the top side.
3. Adjust VR202 so that the amplitude of cyan level is 50mVp-p.



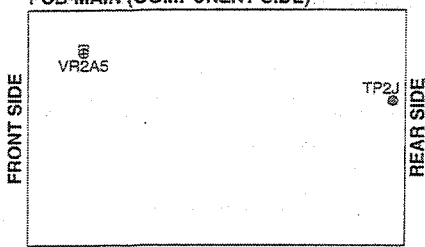
4. Set the oscilloscope's probe to 10:1.
5. Set the oscilloscope's volt range to 5mV/div.
6. Adjust VR203 so that the amplitude of horizontal sync is 190mVp-p.



6. Playback Video Output Level		<b>Adjustment purpose:</b> Video output level during playback.	
		<b>Symptom when incorrectly adjusted:</b> Colour signal is not correctly reproduced.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 10:1)		Input signal	---
Test point	TP2J	Using tape	Alignment tape (colour bar)
EXT trigger	---	VCR condition	Playback
Measurement range	DIV 20mV TIM 10 $\mu$ s	Using Jig.	---

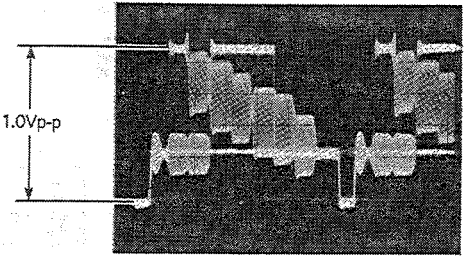
**PCB-MAIN (COMPONENT SIDE)**



FRONT SIDE

REAR SIDE

1. Be certain that nothing is connected to the EURO AV socket
2. Observe TP2J.
3. Adjust VR2A5 so that the amplitude of waveform is 1.0Vp-p.



**[Audio Circuit]**  
**7. Playback Audio Level**

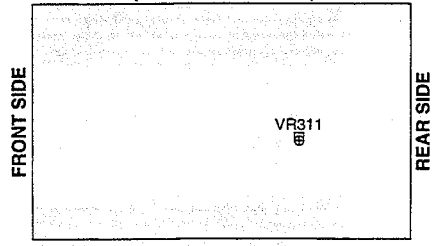
**Adjustment purpose:** Audio level during playback.

**Symptom when incorrectly adjusted:** Too loud or too low audio level during playback.

Measuring instrument and condition		VCR setup condition	
Audio Tester		Input signal	EXT signal (colour bar)
Test point	EURO AV socket pin ①	Using tape	Alignment tape (1kHz audio signal)
EXT trigger	---	VCR condition	Playback
Measurement range	---	Using Jig.	---

1. Observe EURO AV socket pin ①.
2. Adjust VR311 so that the audio output level is -6dBs (388mVr.m.s.). (0dBs=1mW600Ω:0.775Vr.m.s.)
3. Check that the level fluctuation is less than ±1dBs. If the level fluctuation is over ± 1 dBs then check that the mechanical adjustment of A/C HEAD slant.

PCB-MAIN (COMPONENT SIDE)



**8. Audio Bias Level**

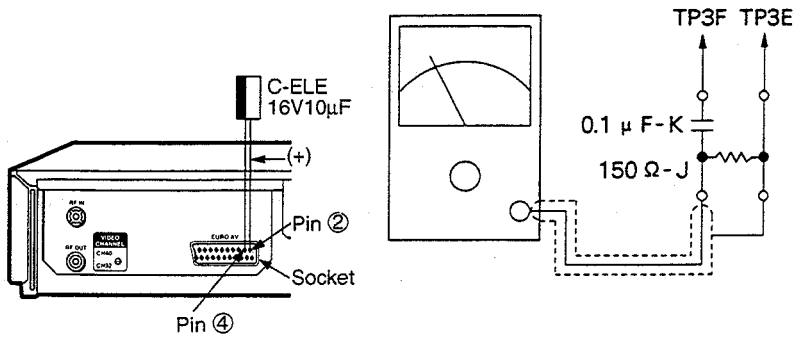
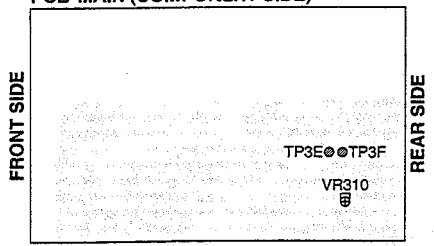
**Adjustment purpose:** Audio bias level setting for playback.

**Symptom when incorrectly adjusted:** Poor audio response in high frequency area.

Measuring instrument and condition		VCR setup condition	
Audio tester		Input signal	---
Test point	TP3E TP3F	Using tape	A tape
EXT trigger	---	VCR condition	Record
Measurement range	---	Using Jig.	High pass filter

1. Short circuit EURO A/V socket pin ② (AUDIO IN) and pin ④ (GND) electrolytic capacitor (16V or more 10μF).
  2. Observes TP3E and TP3F via high pass filter.
  3. Confirm that the monitor TV etc. does not affect the indication of the audio tester, and then adjust VR310 so that the level to be 2.6mVr.m.s.
- Note 1:  
Be careful that the audio tester housing does not touch the VCR chassis.
- Note 2:  
Do not set the VCR to PLAY mode when the audio tester is connected.  
(The audio amplifier will be overloaded.)

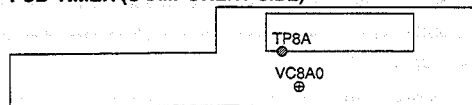
PCB-MAIN (COMPONENT SIDE)



<b>[Timer Circuit]</b> 9.Clock OSC Frequency	<b>Adjustment purpose:</b> Accuracy of clock. <b>Symptom when incorrectly adjusted:</b> Poor clock accuracy.
---	---

Measuring instrument and condition		VCR setup condition		1. Observe TP8A. 2. Adjust VC8A0 so that the period is $5.859375 \pm 0.000024$ msec.
Frequency counter		Input signal	---	
Test point	TP8A	Using tape	---	
EXT trigger	---	VCR condition	Stand by	
Measurement range	PERIOD mode	Using Jig.	---	

**PCB-TIMER (COMPONENT SIDE)**



# MECHANICAL ADJUSTMENT AND REPLACEMENT

## 1. Cleaning of Deck

The following parts require cleaning whenever serviced to maintain satisfactory performance.

### 1-1 Video Head

A. Clean the video heads in the following method if dust and other foreign objects on the video heads disturb the normal playback of images:

Dampen video head cleaning cloth with alcohol. Hold the cloth against the drum and turn the drum slowly counterclockwise to clean.

#### Note:

Do not directly touch the head attached to the upper drum. The head is very hard but brittle to impact, especially in the vertical direction.

Do not apply force in the vertical direction.

B. Allow residual alcohol to dry thoroughly before running tape. Otherwise, the liquid may stick to and damage the tape.

### 1-2 Tape Transport(Refer to Fig. 1-1.)

Clean the following parts of the tape transport.

1. Tension regulation arm S
2. Tension arm
3. Supply guide pole
4. FE head
5. Impedance roller
6. Supply guide roller
7. Supply slant pole
8. Upper and lower drum

9. Takeup slant pole
10. Takeup guide roller
11. A/C head
12. Takeup guide pole
13. Pinch roller
14. Capstan shaft
15. Takeup guide arm
16. Tension regulation arm T

A. Clean the tape transport with gauze dampened with alcohol, except the supply guide roller, takeup guide roller and pinch roller. If Guide rollers and pinch roller are stained with dust, clean them with dry gauze or exchange them for new parts.

B. Allow residual alcohol to dry thoroughly before running a tape. Otherwise the liquid may stick to and damage the tape.

### 1-3 Reel Disk Drive System

Clean the reel disk braking surfaces and the reel belt.

A. Clean the reel disk braking surfaces with gauze dampened alcohol.

- After the alcohol dries up completely, perform "Adjustment to Back Tension and Tension Position" (Item 3-1).

B. Reel belt is stained with dust, clean it with dry gauze or exchange it for new part.

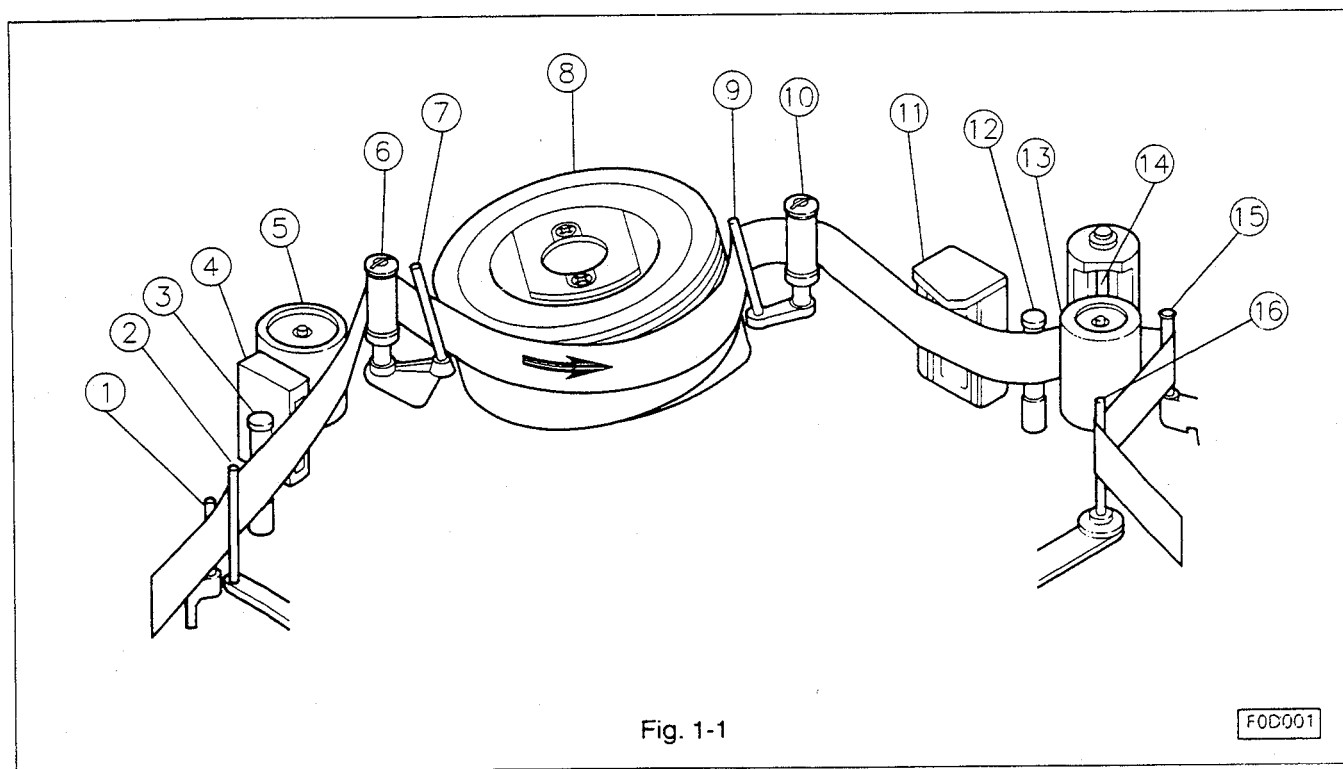


Fig. 1-1

F0C001

## 2. Replacement of Major Parts

### 2-1 Cassette Housing

#### 2-1-1 Removal(Refer to Fig. 2-1-1~2-1-2.)

- Set the VCR to the eject mode.
- Remove the top panel, bottom panel, and front panel.
- Unfasten the snap of the cable holder and remove the cable holder from the cassette housing as shown in Fig.2-1-1.
- Unscrew four cassette housing fastening screws (a ~ d). Raise the cassette housing slowly in the direction shown by the arrow.(Refer to Fig. 2-1-2.)

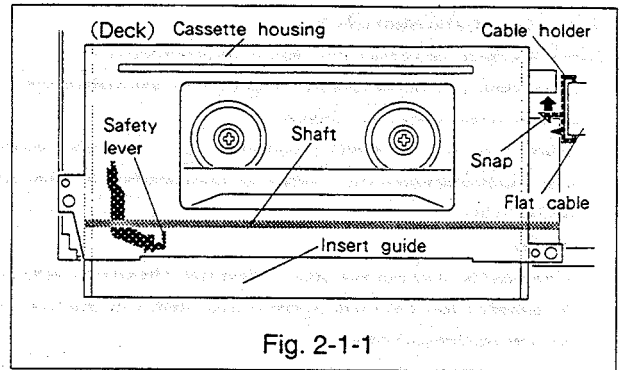


Fig. 2-1-1

#### 2-1-2 Installation(Refer to Fig.2-1-1~2-1-3.)

- Slowly lower the cassette housing onto the main plate of the deck so that the safety lever enters between the insert guide and the shaft as shown in Fig. 2-1-1. Align the two positioning holes (e, f) and the two U holes (g, h) located on the cassette housing with the matching holes in the deck.
- In step A above, if the front loading gear of the cassette housing does NOT engage the boss on the main plate, carefully push the gear toward the front of the VCR using a small-diameter screwdriver, as illustrated in Fig. 2-1-3. If the gear still will not engage, rotate the Front Loading Gear a few degrees from below the deck until the gear engages the boss correctly.
- Fasten the housing to the deck with the four screws (a ~ d).(Refer to Fig. 2-1-2.)

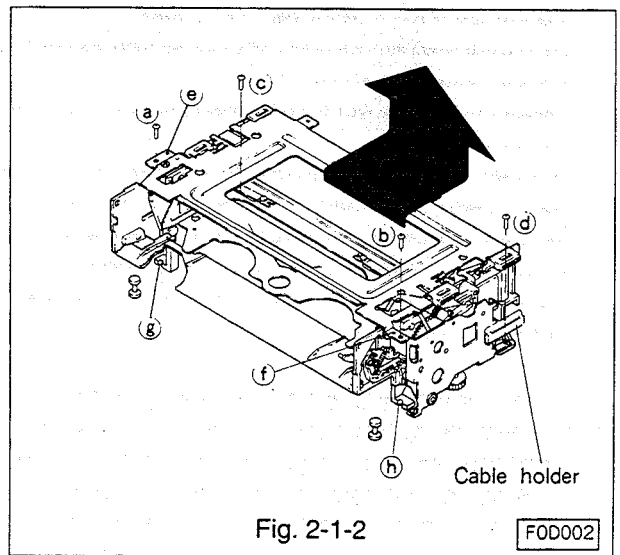


Fig. 2-1-2

F0D002

### 2-2 Lock arm and Drive gear

#### 2-2-1 Removal(Refer to Fig. 2-1-3~2-2.)

- Unfasten four snaps (a ~ d) as shown in Fig. 2-1-3, and remove the side plate TU.
- Turn the FL SW lever clockwise to separate the FL SW lever from the drive gear, and pull the lock arm and drive gear to remove them from the shaft as shown in Fig. 2-2.

#### 2-2-2 Installation(Refer to Fig. 2-1-3~2-2.)

- Install the drive gear on the shaft as shown in Fig. 2-2.
- Line the matching mark on the drive gear and beginning of gear section on the lock arm as shown in Fig. 2-2, and install the lock arm.
- Install the side plate TU to the cassette housing, and secure it with four snaps (a ~ d) as shown in Fig. 2-1-3.

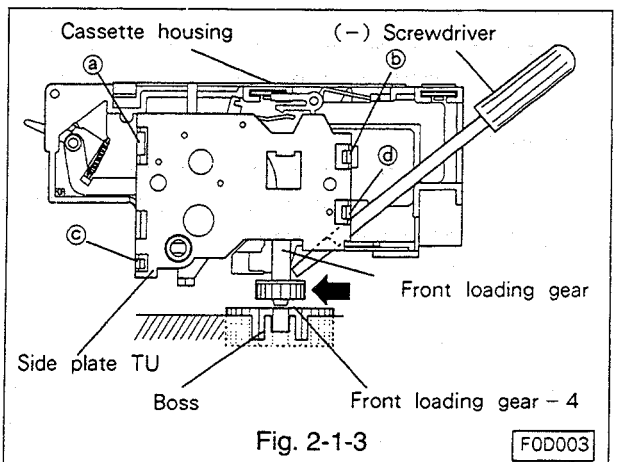


Fig. 2-1-3

F0D003

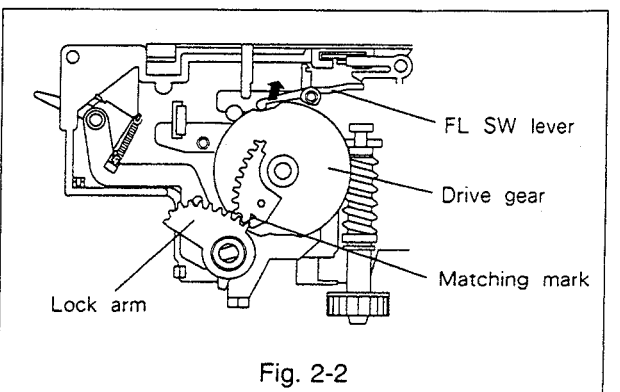


Fig. 2-2

## 2-3 Drum Assembly

### 2-3-1 Removal(Refer to Fig. 2-3-1~2-3-3.)

- A. Unscrew the brush fastening screw and remove the brush.(Refer to Fig. 2-3-1.)
- B. Unscrew two fastening screws ( a , b ) and remove the PCB-HEAD AMP which is connected to the drum assembly.

**Note:**

The cable and connector between the drum and head amplifier may be damaged if the cable is pulled strongly, as the cable is short.

Remove the shield cap of the PCB, raise the PCB slightly and disconnect the FPC cable.

(Removal method for the FPC cable connector and stopper is shown in Fig. 2-3-3.)

Disconnect the ground wire and remove the PCB-HEAD AMP.

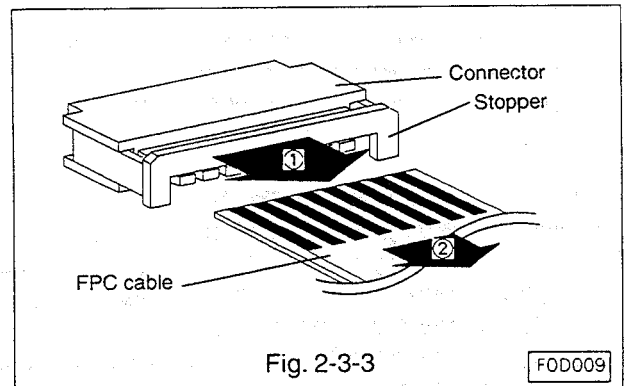
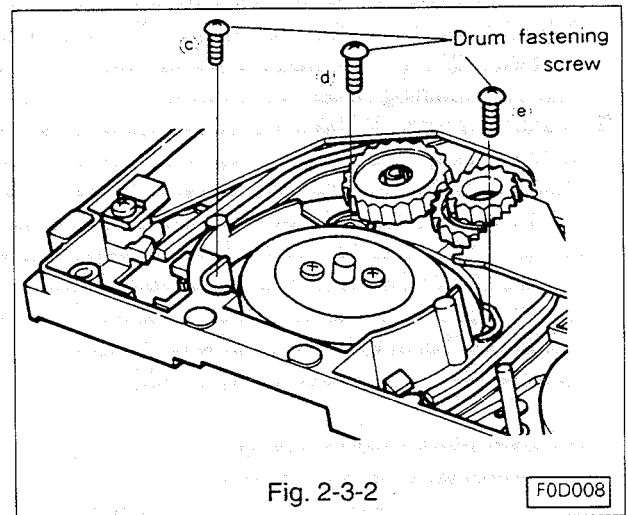
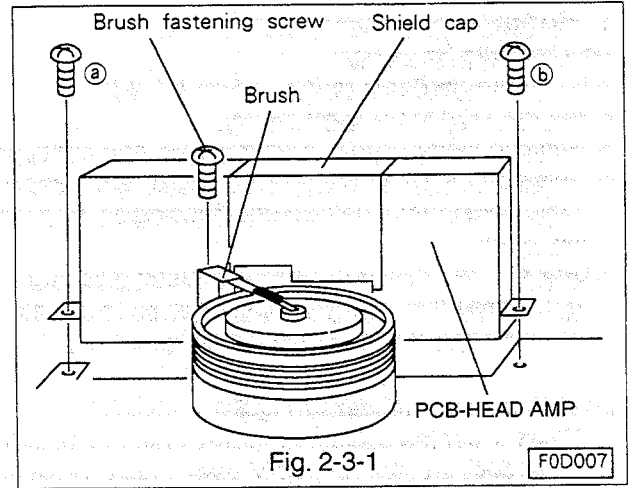
- C. Unscrew three drum fastening screws ( c ~ e ) from the reverse side of the deck.(Refer to Fig. 2-3-2.)
- D. Remove the drum assembly by raising it with care not to touch other parts around the drum assembly.
- E. Disconnect the connectors from the drum assembly. (Refer to Fig. 2-3-3.)

### 2-3-2 Installation (Refer to Fig. 2-3-1,2-3-2.)

- A. Connect the connectors to a new drum assembly.
- B. Place the new drum assembly on the main plate of the deck slowly with care not to touch other parts.
- C. Fasten the drum assembly with three fastening screws ( c ~ e ) on the reverse side of the deck. (Refer to Fig. 2-3-2.)
- D. Connect the PCB-HEAD AMP to the drum assembly and fasten the PCB with two screws ( a , b ).(Refer to Fig. 2-3-1.)

**Note:**

Conduct the mechanism interchangeability adjustment outlined in Para.3 to give optimum performance when the drum assembly is replaced.





## 2-4 Upper Drum

### 2-4-1 Removal(Refer to Fig. 2-4-1.)

- Unscrew the brush fastening screw and remove the brush.
- Unsolder two inside soldered terminals of each head on the upper drum.
- Unscrew the upper drum fastening screws.
- Remove the upper drum slowly and carefully.

**Note:**

If the upper drum is difficult to remove, heat the upper drum fastening screw holes with a soldering iron, and the drum can be easily removed.

### 2-4-2 Installation(Refer to Fig. 2-4-1.)

**Note:**

Handle the upper drum carefully as the video heads are fragile.

- Position the lower drum so that the hole in the shaft faces the operator. Align the upper drum with the lower drum so that the CH1 mark on the upper drum is on the right side, and couple the drums.
- Fasten the upper drum with two screws.(Tighten the screws alternately.)
- Solder the terminals not soldered on the upper drum.
- Clean the video heads as outlined in Para. 1-1.

## 2-5 Reel Belt(Refer to Fig. 2-5)

- Remove the reel belt from the capstan motor and the belt pulley.
- Install a new reel belt.

**Note:**

Make certain that the new belt is free from grease, before installing.

## 2-6 Capstan Motor

### 2-6-1 Removal(Refer to Fig. 2-5, 2-6)

- Disconnect the flat cable.
- Remove the reel belt.(Refer to Fig. 2-5.)
- Remove three fastening screws shown in Fig. 2-6 and remove the capstan motor.

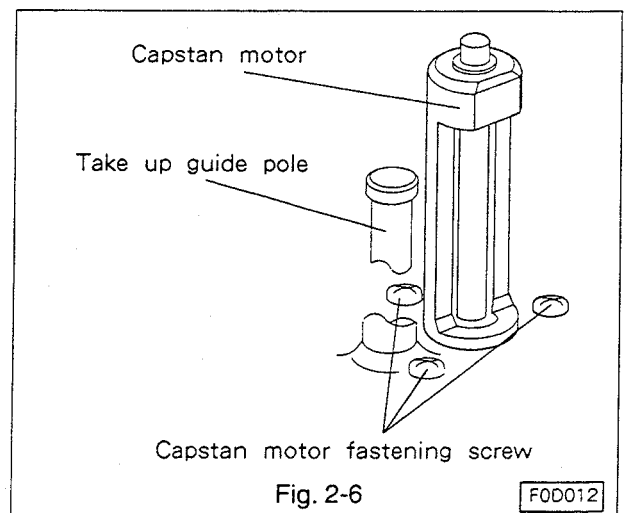
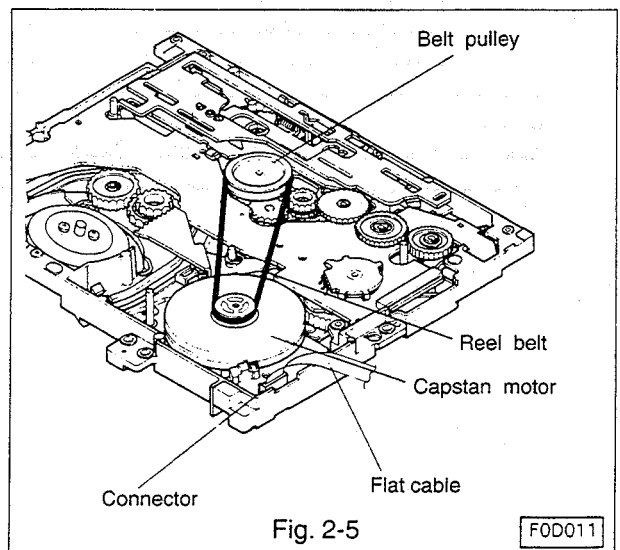
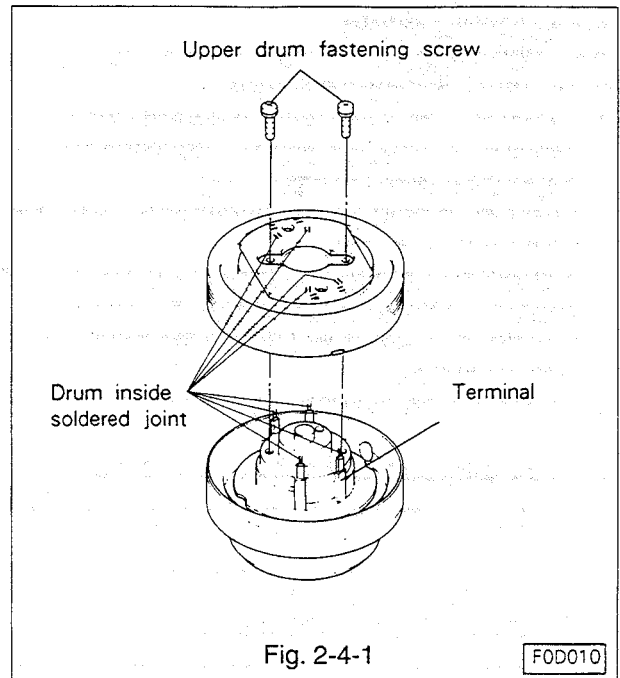
**CAUTION:**

Restrain the capstan motor as the three screws are removed, since an un-restrained motor may damage other parts of the deck.

When performing removal or installation of the capstan motor, take care that the outside of the rotor's rim is not greased.(Refer to Fig.2-5.) If greasy components are attached on the outside of the rotor's rim, wipe them off with a dry cloth because they may cause defects during special effects playback.

### 2-6-2 Installation(Refer to Fig. 2-5, 2-6.)

- Fasten the motor with three fastening screws.(Refer to Fig. 2-6.)
- Install the reel belt.
- Connect the flat cable.



## 2-7 Loading Motor

### 2-7-1 Removal(Refer to Fig. 2-7-1, 2-7-2.)

- Set the VCR to the eject mode.
- Disconnect the wires from the loading motor.
- Remove two stoppers securing the motor and the motor holder plate.(Refer to Fig. 2-7-2.)
- Slide the motor and motor holder plate away, and then raise them to remove.
- Remove the belt-LM from the loading motor and the pulley-L.(TYPE-B only)(Refer to Fig. 2-7-1.)
- Unscrew two screws and detach the motor holder plate from the motor.
- Disconnect the coupling from the motor.

### 2-7-2 Installation(Refer to Fig. 2-7-1~2-7-3.)

- Fasten the coupling to a new loading motor.(Refer to Fig. 2-7-3.)
- Fasten the motor holder plate to the motor with two screws.(Refer to Fig. 2-7-1.)
- Install the belt-LM.(TYPE-B only)
- Place the motor and motor holder plate in the motor holder to the rest of the deck.
- Turn the motor shaft so that the coupling on the loading motors matches the worm gear of the motor holder. Slide the loading motor forward and secure it with the stoppers.
- Solder the leads to the loading motor. (Brown lead wire to the positive terminal and red lead wire to the negative terminal.)

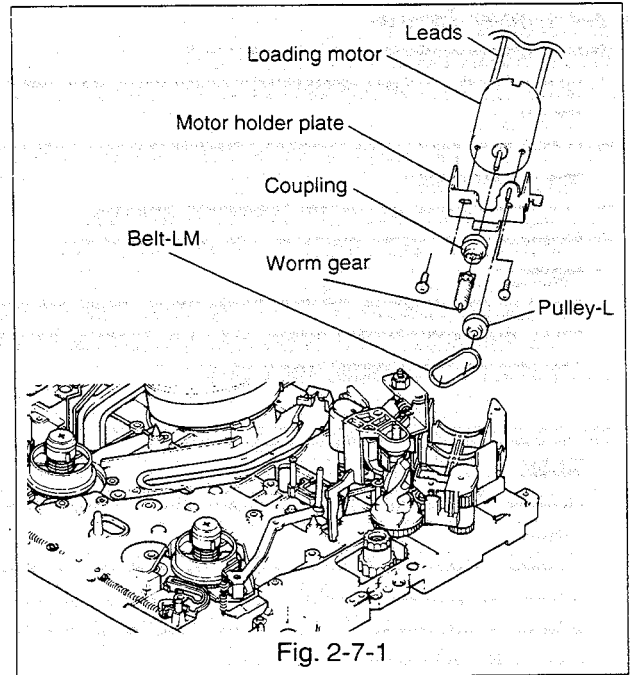


Fig. 2-7-1

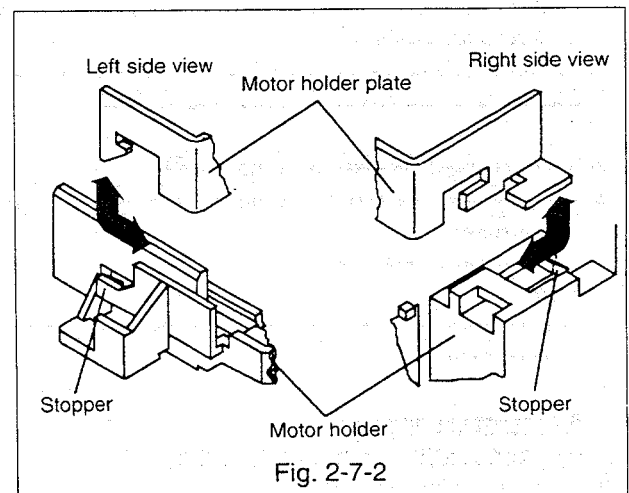


Fig. 2-7-2

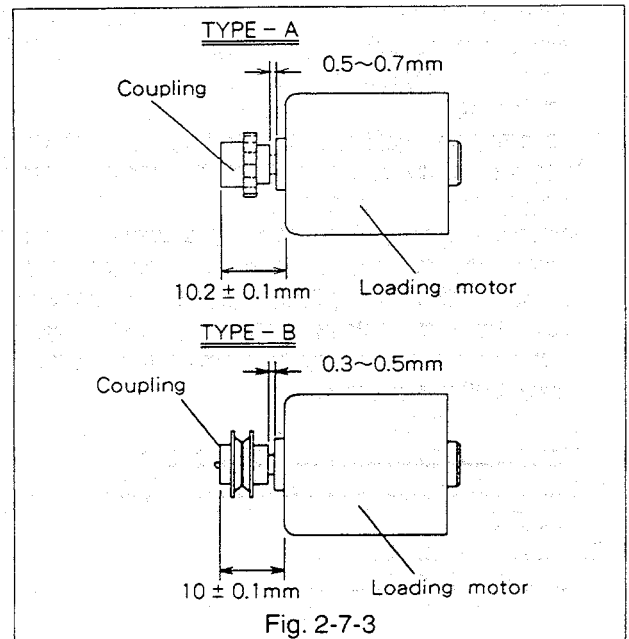


Fig. 2-7-3

## 2-8 Pinch Roller

### 2-8-1 Removal(Refer to Fig. 2-8-1, 2-8-2.)

- A. Set the VCR to the eject mode.
- B. Remove the pinch roller arm cap and the grip ring which secures the pinch roller arm assembly. (Refer to Fig. 2-8-1.)
- C. Pull the pinch roller arm assembly upwards to remove.
- D. Remove the pinch roller cap from the pinch roller arm, and remove the pinch roller. (Refer to Fig. 2-8-2.)

### 2-8-2 Installation(Refer to Fig. 2-8-1,2-8-2.)

- A. Assemble the pinch roller cap and the pinch roller to the pinch roller arm by exercising care with the installation angle of the pinch roller cap and the marking of the Pinch Roller. (Refer to Fig. 2-8-2.)
- B. Assemble the pinch roller assembly to the shaft on the main plate.(Refer to Fig. 2-8-1.)
- C. Secure the pinch roller arm assembly with the pinch roller arm cap and the grip ring.

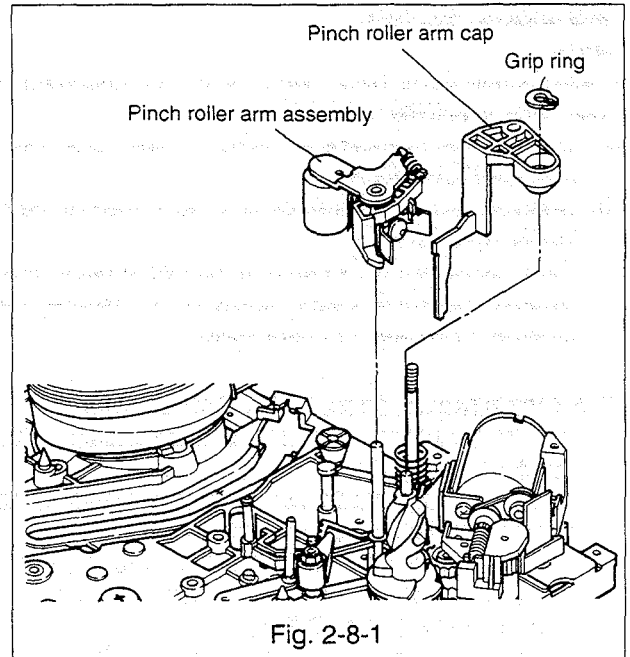


Fig. 2-8-1

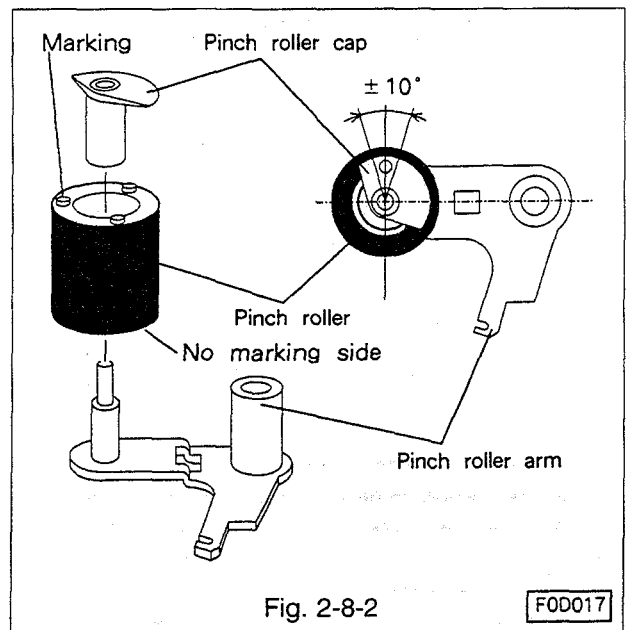


Fig. 2-8-2

F0D017

## 2-9 Mode Switch

### Note:

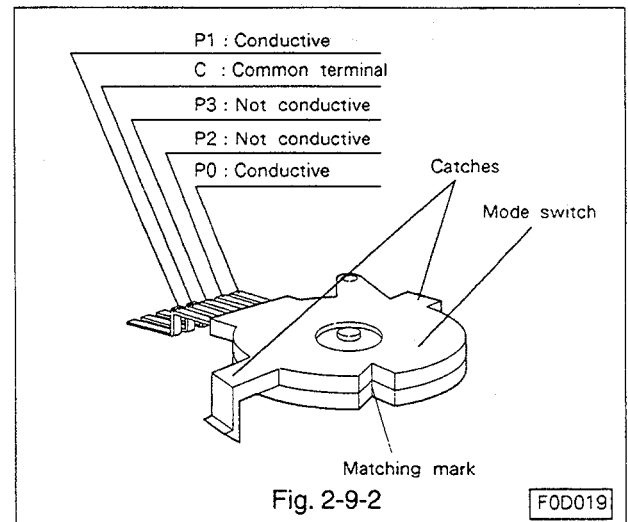
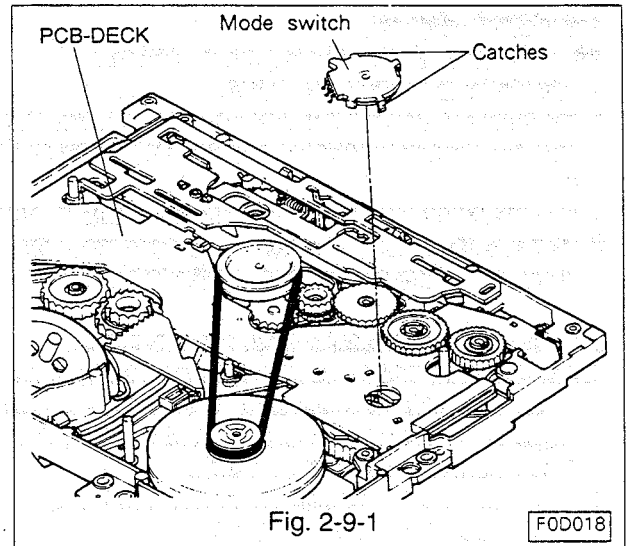
Replace the mode switch with the VCR in the eject mode.

### 2-9-1 Removal(Refer to Fig. 2-9-1)

- Unsolder the five soldered joints of the mode switch from the PCB-DECK.
- Unfasten two catches fastening the switch to the PCB-DECK assembly.  
(Exercise care as the catches may be broken off.)
- Remove the mode switch slowly while insuring that the soldered joints are all unsoldered.

### 2-9-2 Installation( Refer to Fig. 2-9-1,2-9-2.)

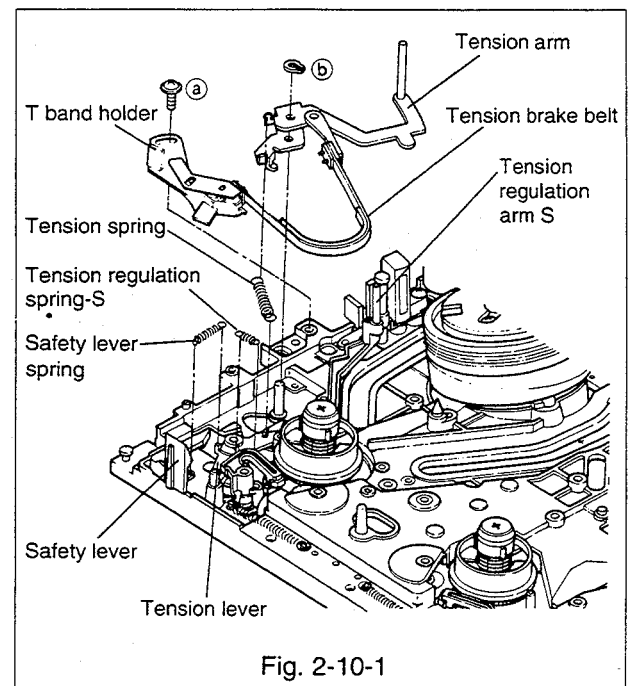
- Line the matching marks of the mode switch. (Refer to Fig. 2-9-2.)
- Finely adjust the mode switch so that continuity at each terminal shall be as given in the illustration.
- Fasten the switch to the PCB-DECK with care so that the switch does not turn, and secure with two catches.(Refer to Fig. 2-9-1.)
- Solder the five terminals which connect the mode switch to the PCB-DECK assembly.



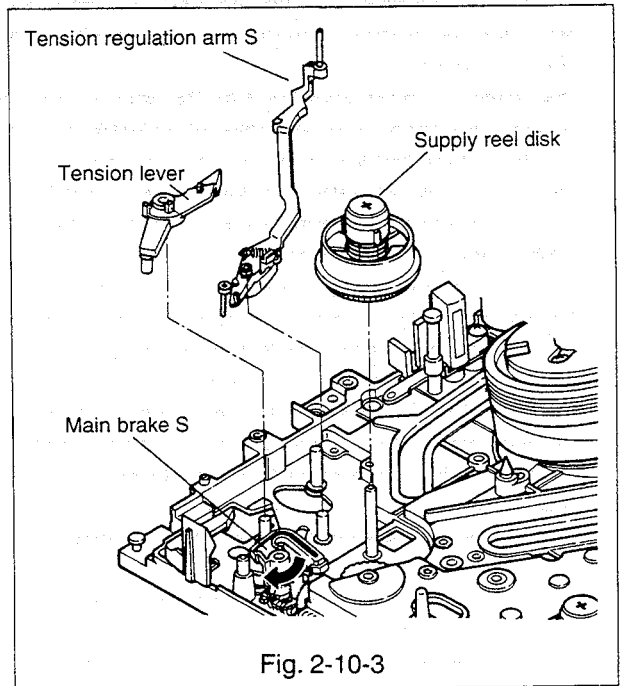
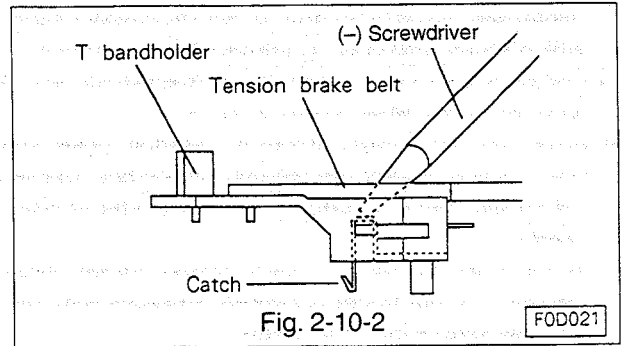
## 2-10 Supply Reel Disk

### 2-10-1 Removal (Refer to Fig. 2-10-1~2-10-3.)

- Remove the cassette housing as in Para. 2-1-1.
- Unscrew the screw (a) which fastens the T band holder. (Refer to Fig. 2-10-1.)
- Unfasten the catch of the T band holder from the main plate with a small screw driver etc. as shown in Fig. 2-10-2. Raise and remove the T band holder with care not to score or dirty the tension brake belt.
- Detach the tension spring from the tension arm and the tension lever.(Refer to Fig. 2-10-1.)
- Remove the grip ring (b) which secures the tension arm. Raise the tension arm upward to remove it from the shaft.
- Detach the tension regulation spring S from the tension regulating arm S and the tension lever.
- Detach the safety lever spring from the safety lever and the tension lever.

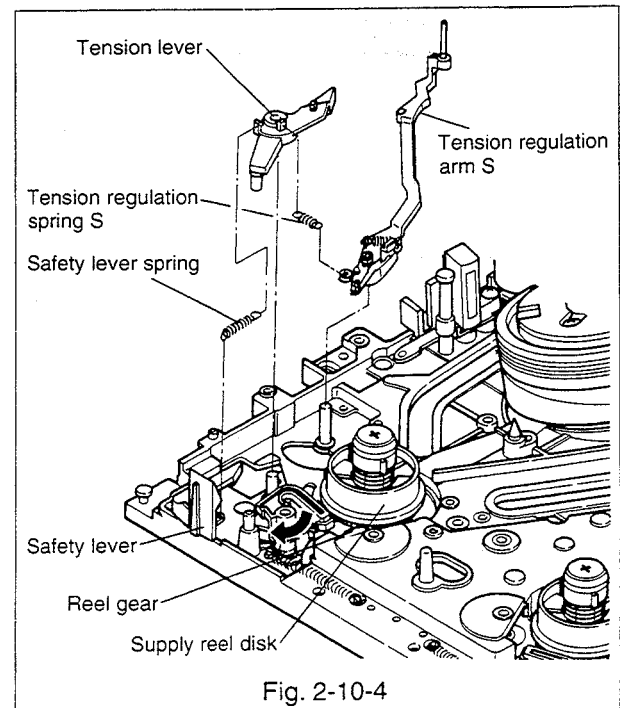


- H. Raise the tension lever avoiding the main brake S and remove the lever from the shaft. (Refer to Fig. 2-10-3.)
- I. Raise the tension regulation arm S and remove it from the shaft.
- J. While turning the main brake S slightly clockwise to separate the brake from the supply reel disk, and raise the supply reel disk to remove it from the shaft. (Refer to Fig. 2-10-3.)



**2-10-2 Installation (Refer to Fig. 2-10-4~2-10-7.)**

- A. Turn the main brake S slightly clockwise to separate it from the supply reel disk shaft, and mount the supply reel disk on the shaft so that the reel gear meshes with the gear of the supply reel disk.
  - B. Assemble the tension regulation arm S to the shaft.
  - C. Assemble the tension lever to the shaft avoiding the main brake S.
- Note:**  
Install the tension lever so that the pin at the lower part of the lever shall be in front of the slot in the main plate (viewing the front).
- D. Fasten the safety lever spring to the safety lever and the tension lever.
  - E. Fasten the tension regulation spring S to the tension regulation arm S and the tension lever.



- F. Assemble the tension arm to the shaft and secure the arm with the grip ring (b). (Refer to Fig. 2-10-5.)
- G. Fasten the tension spring to the tension arm and the tension lever. (Refer to Fig. 2-10-5.)
- H. Assemble the T band holder to the main plate with care not to score or dirty the tension brake belt, and secure the holder with the screw (a) lightly. (Refer to Fig. 2-10-5.)

**Note:**

In the assembly of the T band holder, make certain that the hook of the holder positively engages with the reverse side of the main plate.

If the hook is difficult to engage with the main plate, push the hook lightly with a small screw driver etc. (Refer to Fig. 2-10-2.)

- I. Separate the main brake S and the tension regulation arm S from the supply reel disk and make certain that the disk turns freely. (Refer to Fig. 2-10-3.)
- J. Place the reel disk height adjusting jig (Part Number 859C342O20) in the reference position on the main plate. (Refer to Fig. 2-10-6.)
- K. Slowly turn the jig about point A and make sure that the height of the supply reel disk flange agrees with the point B on the supply disk adjusting side of the jig (marked SP). (Refer to Fig. 2-10-7.)
- L. If the height of the disk is not satisfactory, hold the disk so that it does not turn, and turn the height adjusting screw at the top of the disk to adjust the height. (Refer to Fig. 2-11-3.)
  - A) Turn the screw clockwise if the measured height is low.
  - B) Turn the screw counterclockwise if the measured height is high.
- M. On completion of adjustment, lock the height adjusting screw by burning it with the tip of a hot iron.
- N. Install the cassette housing as in Para. 2-1-2.
- O. Adjust back tension and tension pole position as outlined in Para. 3-1.

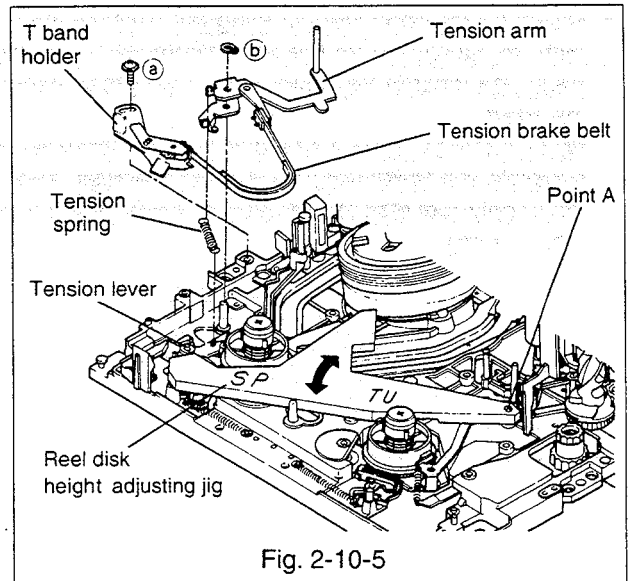


Fig. 2-10-5

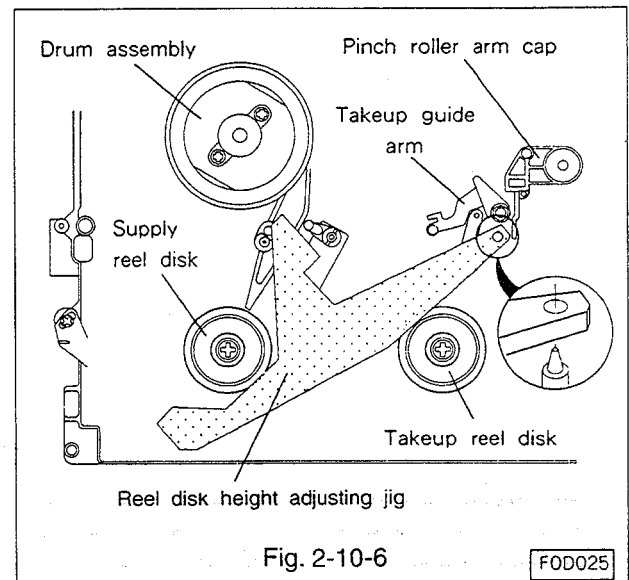


Fig. 2-10-6

FOD025

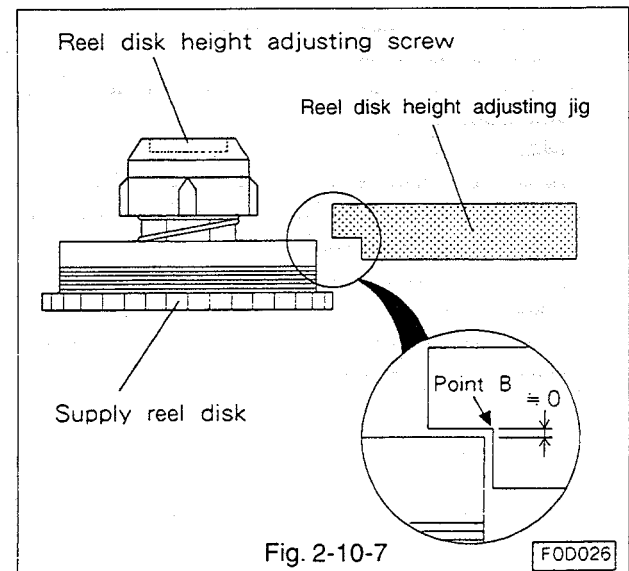


Fig. 2-10-7

FOD026

## 2-11 Takeup Reel Disk

### 2-11-1 Removal(Refer to Fig. 2-11-1.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Detach the spring RS and the tension regulation spring T from the tension regulation arm T and the lever RS.
- C. Remove the cut washer which fastens the tension regulation arm T.
- D. Turn the takeup guide arm slightly clockwise and raise the tension regulation arm T to remove it from the shaft.
- E. Turn the main brake slightly counter-clockwise to separate the brake from the takeup reel disk and raise the disk upwards to remove it from the shaft.

### 2-11-2 Installation(Refer to Fig. 2-11-2, 2-11-3.)

- A. Turn the main brake T slightly counter-clockwise to release the takeup reel disk shaft. Slip the takeup reel disk onto the shaft so that the gear of the takeup reel shall mesh with the reel gear. (Refer to Fig. 2-11-2.)
- B. Turn the takeup guide arm slightly clockwise and install the tension regulation arm T to the shaft. Secure the arm with a cut washer.
- C. Fasten the tension regulation spring T and the spring RS to the tension regulation arm T and the lever RS.
- D. Separate the main brake T and the tension regulation arm T from the takeup reel disk and make certain that the takeup reel disk turns freely.
- E. Place the reel disk height adjusting jig (Part Number 859C342O20) in the reference position on the main plate. (Refer to Fig. 2-10-6.)
- F. Turn the jig slowly about the point A towards the takeup reel disk to make certain that the height of the disk flange agrees with the point B on the takeup side of the jig (marked TU). (Refer to Fig. 2-11-3.)
- G. If the height of the disk is not satisfactory, hold the disk so that it shall not turn, and turn the height adjusting screw at the top of the disk to adjust the height.
  - A) Turn the screw clockwise if the measured height is low.
  - B) Turn the screw counterclockwise if the measured height is high.
- H. On completion of height adjustment, lock the adjusting screw by burning it with the tip of a hot iron.
- I. Install the cassette housing as in Para. 2-1-2.

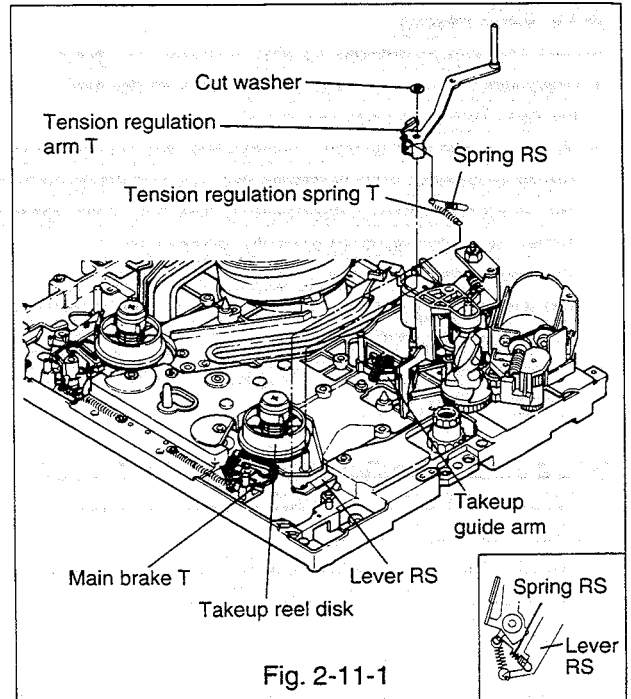


Fig. 2-11-1

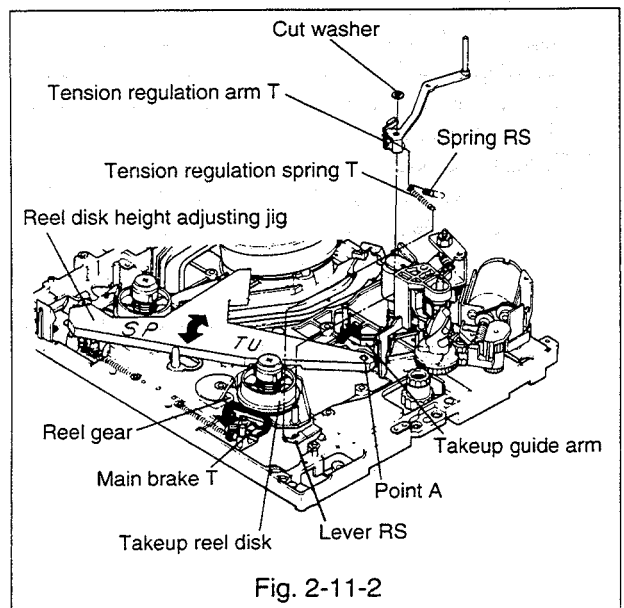


Fig. 2-11-2

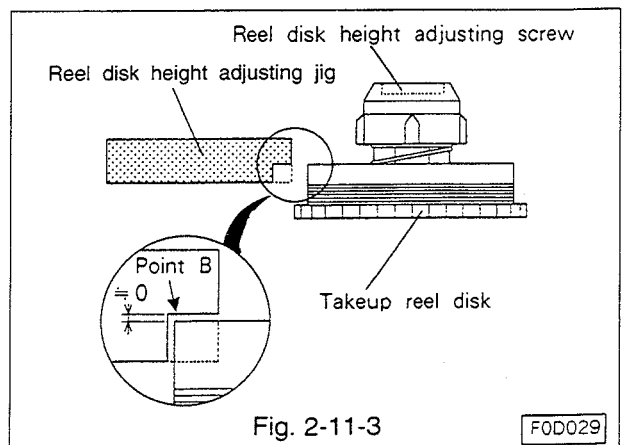


Fig. 2-11-3

F0D029

## 2-12 A/C Head

### 2-12-1 Removal (Refer to Fig. 2-12-1, 2-12-2.)

- Disconnect the connector from the PCB-A/C HEAD.(Refer to Fig. 2-12-1.)
- Remove the nut which fastens the A/C head assembly.
- Raise upwards and remove the A/C head assembly from the shaft by paying attention to the A/C arm spring which turns the A/C head assembly clockwise.
- Remove three A/C head fastening screws (a) ~ (c) and the A/C spring shown in Fig. 2-12-2, and remove the A/C head from the A/C arm.
- Unsolder the PCB-A/C HEAD from the A/C head.(Refer to Fig. 2-12-2.)

### 2-12-2 Installation(Refer to Fig. 2-12-1~2-12-3.)

- Solder the PCB A/C HEAD to the A/C head.  
(Refer to Fig. 2-12-2.)
- Fasten the A/C head to the A/C arm with three screws (a) ~ (c) and the A/C spring.  
**Note:**  
Install the A/C head to the A/C arm so that the base surface of the A/C head shall be parallel to the A/C arm, and their spacing and the A/C head installation screw (c) height shall be as specified in Fig. 2-12-3.
- Assemble the A/C head assembly to the shaft while turning the A/C arm spring counter-clockwise about 60°  
(Refer to Fig. 2-12-1.)
- Tighten the A/C head assembly fastening nut so that the base surface of the A/C head shall be about 7mm above the main plate surface.(Refer to Fig. 2-12-3.)
- Plug in the connector to the PCB-A/C HEAD.  
(Refer to Fig. 2-12-1.)
- Conduct the A/C head adjustment and the phase adjustment as outlined in Para. 3-3 and 3-4.

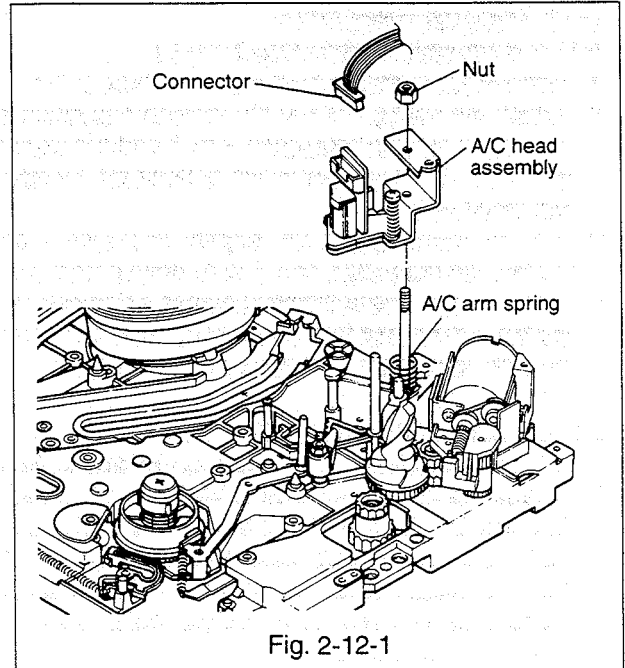


Fig. 2-12-1

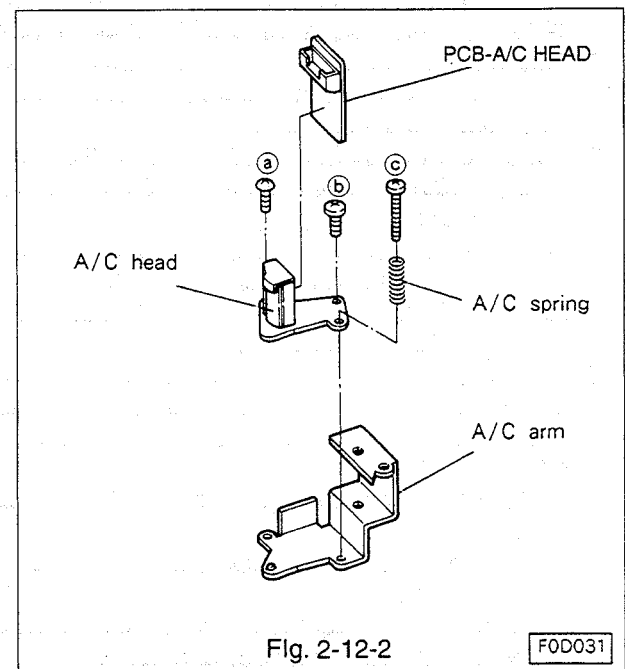


Fig. 2-12-2

F0D031

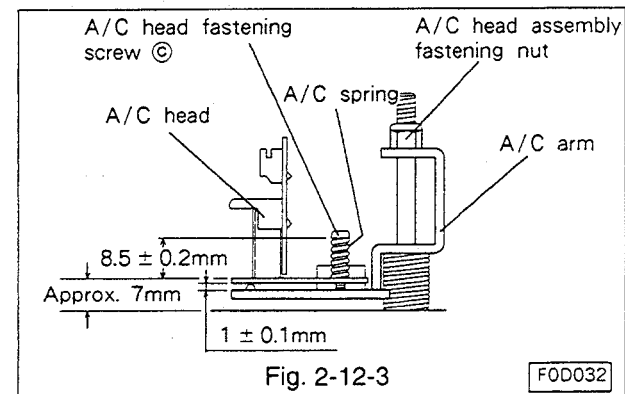


Fig. 2-12-3

F0D032



## 2-13 Take Up Guide Arm

### 2-13-1 Removal(Refer to Fig. 2-13-1.)

- A. Set the VCR in the eject mode.
- B. Remove the pinch roller arm assembly.  
(Refer to Para. 2-8 "Pinch Roller")
- C. Raise and separate the pinch roller cam and the TU-G gear arm from the shaft at the same time.
- D. Remove the takeup guide arm fastening nut. Raise and separate the takeup guide arm from the shaft with care not to lose the TU-G spring.

### 2-13-2 Installation(Refer to Fig. 2-13-1~2-13-3.)

- A. Install the TU-G spring and the takeup guide arm so that one end of the TU-G spring is fastened to the takeup guide arm and the other end is fastened to the hook of the main plate. Secure them with the fastening nut temporarily.
- B. Place the reel disk height adjusting jig(for the F deck) in the reference position on the main plate(Refer to Fig. 2-10-6). Insure the takeup guide arm is level with point B of the height adjusting jig(for the E deck). (Refer to Fig. 2-13-2.)
- C. Turn the takeup tension lever fully clockwise as shown in Fig. 2-13-1.
- D. Line the matching mark on the TU-G gear arm and beginning of gear section on the takeup guide arm, and line the matching mark on the pinch roller cam and center of gear on the joint gear as shown in Fig. 2-13-3, and install the pinch roller cam and the TU-G gear to the shaft at the same time.
- E. Assemble the pinch roller arm assembly to the shaft on the main plate.(Refer to Fig. 2-13-1.)
- F. Secure the pinch roller arm assembly with the pinch roller arm cap and the grip ring.

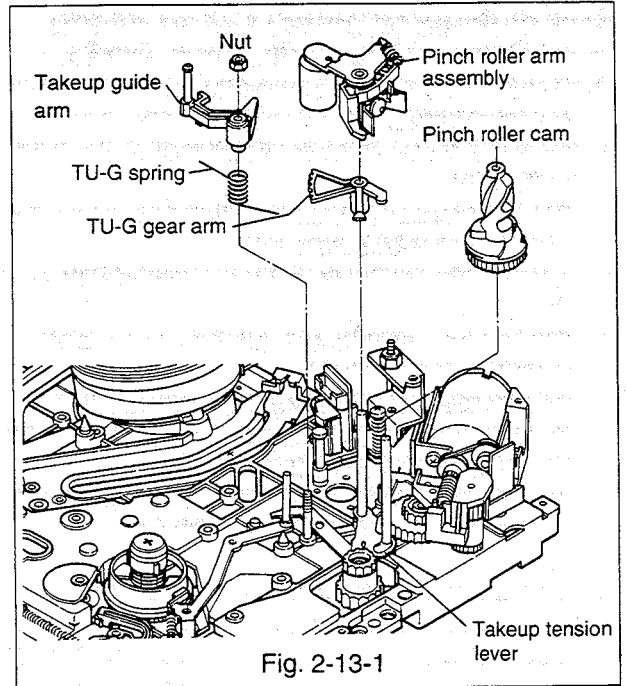


Fig. 2-13-1

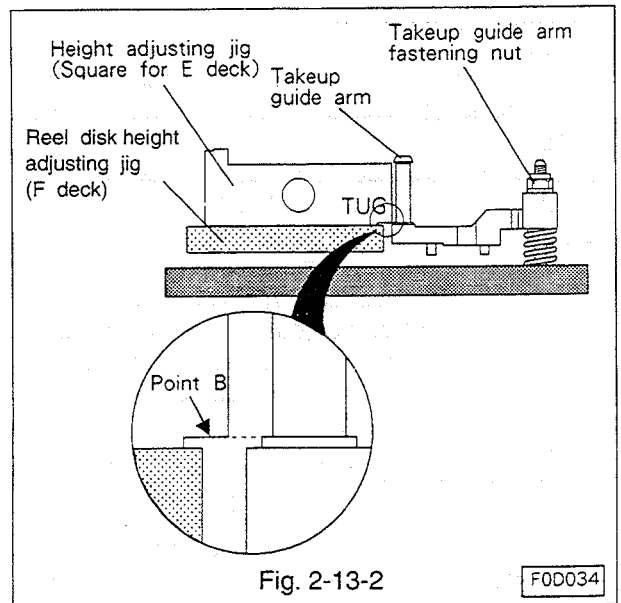


Fig. 2-13-2

F0D034

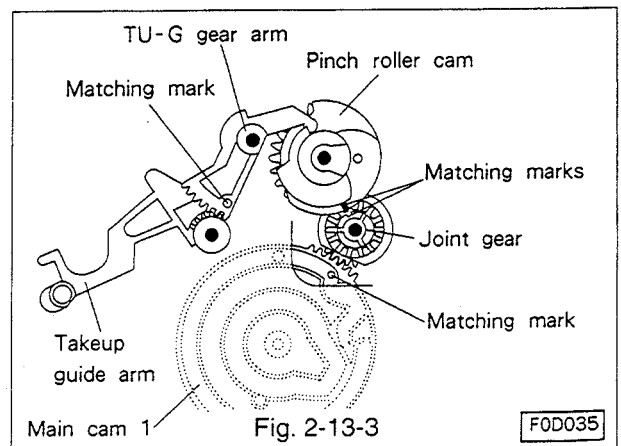


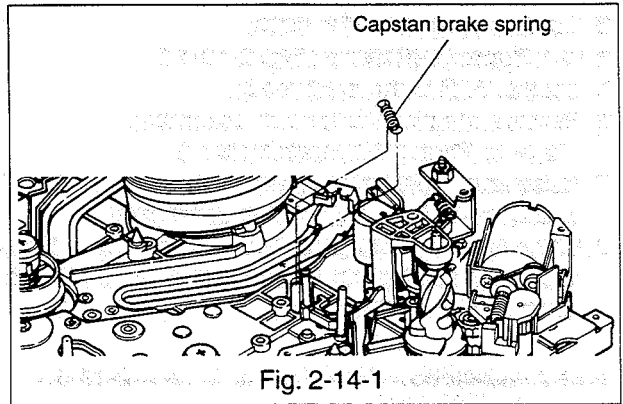
Fig. 2-13-3

F0D035

## 2-14 PCB-Deck(Printed Circuit Board)

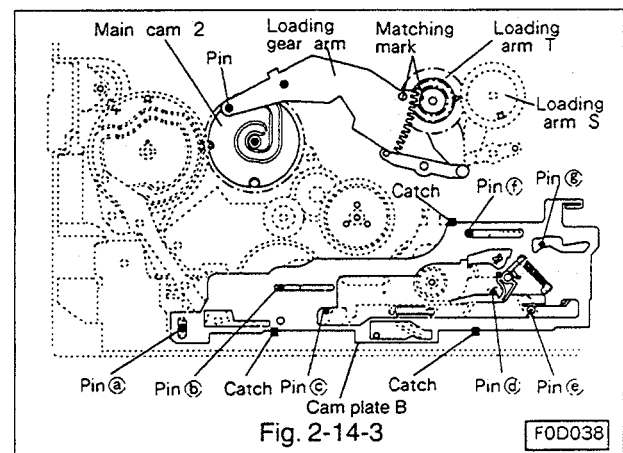
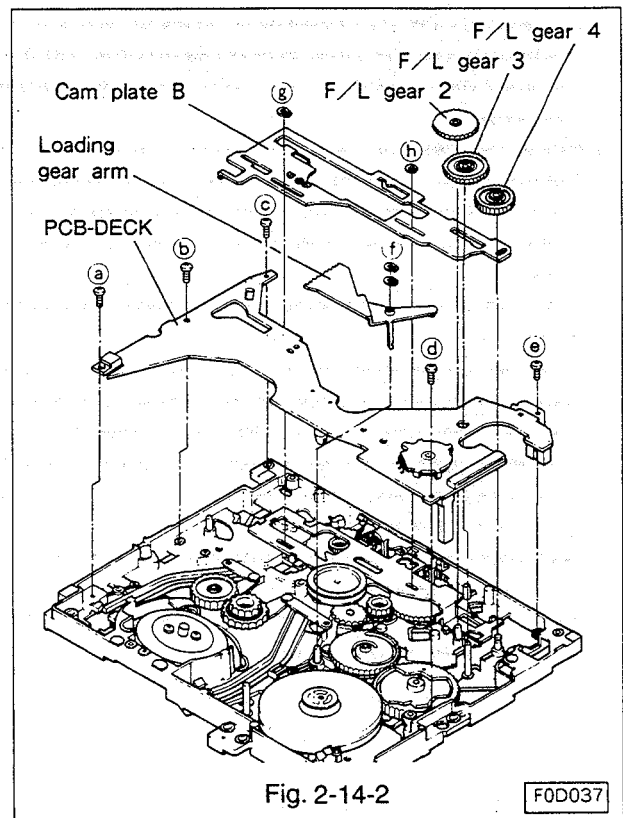
### 2-14-1 Removal(Refer to Fig. 2-14-1, 2-14-2.)

- A. Detach the capstan brake spring from the capstan brake and the loading gear arm.(Refer to Fig. 2-14-1.)
- B. Remove the reel belt from the bottom of the deck.(Refer to Fig. 2-5.)
- C. Detach two grip rings (f) shown in Fig. 2-14-2 and remove the loading gear arm.
- D. Unsolder the terminals of the FE head.(Refer to Fig. 2-14-1.)
- E. Unfasten the catches and remove the F/L gear 2, 3 and 4.(Refer to Fig. 2-14-2.)
- F. Remove grip ring (g) and cut washer (h), and unfasten three catches shown in Fig. 2-14-3 to remove the cam plate B.(Refer to Fig. 2-14-2.)
- G. Unscrew five fastening screws( a ~ e )and remove the PCB-DECK.(Refer to Fig. 2-14-2.)



### 2-14-2 Installation(Refer to Fig. 2-14-1~2-14-3.)

- A. Make certain that the mode switch is set to the eject position.(Refer to section 2-9.) Fasten the PCB DECK with five screws and solder the FE head terminals.(Refer to Fig. 2-14-1.)
- Note:**  
The safety lever is normally held leftward with a spring. Pull the safety lever forwards and install the PCB DECK.
- B. Install the cam plate B by paying attention to the pin( a ~ g ) positions shown in Fig. 2-14-3, and secure the plate with three catches, grip ring (g) and cut washer (h).
  - C. Line the matching mark on the loading arm T and that on the loading gear arm as shown in Fig. 2-14-3, and assemble the loading gear arm so that the pin of the loading gear arm shall enter the groove of the main cam 2. Secure the loading gear arm with two grip rings (f).
  - D. Assemble the F/L gear 2, 3, and 4 to the shafts.(Refer to Fig. 2-14-2.)
  - E. Install the reel belt.(Refer to Fig. 2-5.)
  - F. Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck.(Refer to Fig. 2-14-1.)



## 2-15 Positioning and Installation Sequence of Parts Around Main Cam 1 (Bottom Side of Deck) (Refer to Fig. 2-15-1~2-15-6.)

### Note:

Set the VCR to the eject mode to install the main cam 1 and its peripheral parts.

- A. Line the positioning hole in lever RS to that of the main plate, and assemble lever RS to the shaft. (Refer to Fig. 2-15-1.)
- B. Line the positioning hole in lever C with that of the main plate, and assemble lever C to the shaft.
- C. Take care not to move the lever RS and lever C, assemble the main cam 1 to the shaft by lining the matching mark of the joint gear with the positioning hole of main plate. Secure the main cam 1 with the grip ring. (Refer to Fig. 2-15-2.)

### Note:

The pins of the lever RS and the lever C enter the groove of the main cam 1 when the levers are lined with the positioning holes.

Make certain that the pins of the levers enter the groove of the main cam 1.

- D. Assemble the thrust washer to the pin (c) shown in Fig. 2-15-2, and install the cam plate C so that the corresponding positions of the plate match the pins (a ~ g).
- E. Fasten cam spring C to cam plate C and the cam plate holder. (Refer to Fig. 2-15-2.)
- F. Assemble lever B to the shaft so that the pin of the lever shown in Fig. 2-15-3 enters the groove of the main cam 1. Secure the lever with a grip ring.
- G. Line the positioning hole of the F/L idler lever with that of the main plate. (Refer to Fig. 2-15-3.)

### Note:

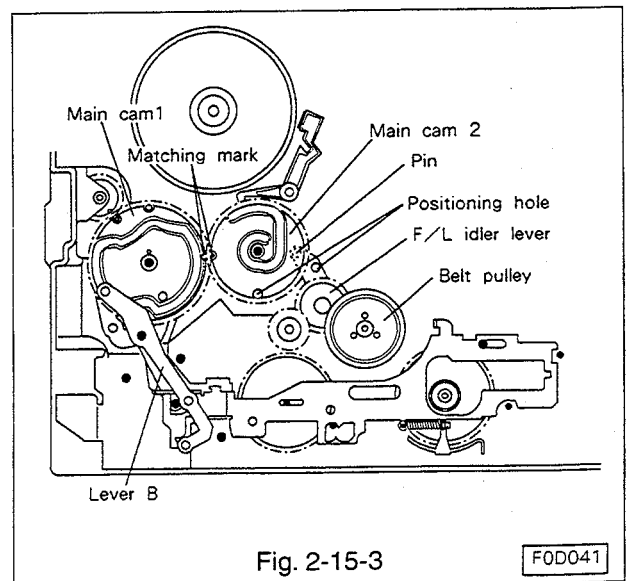
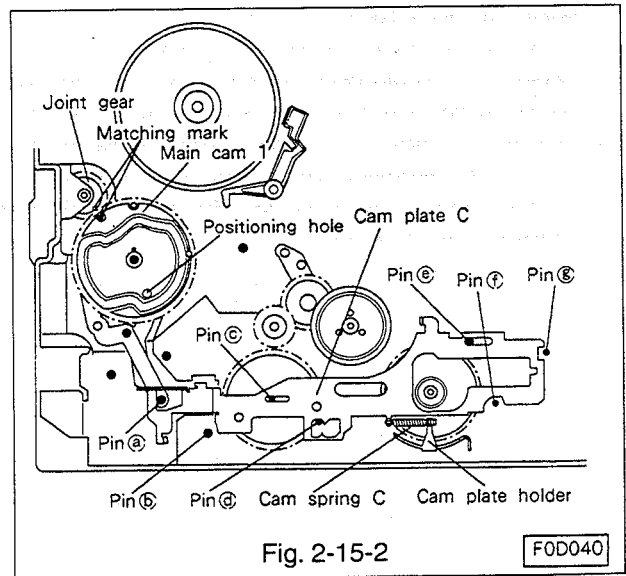
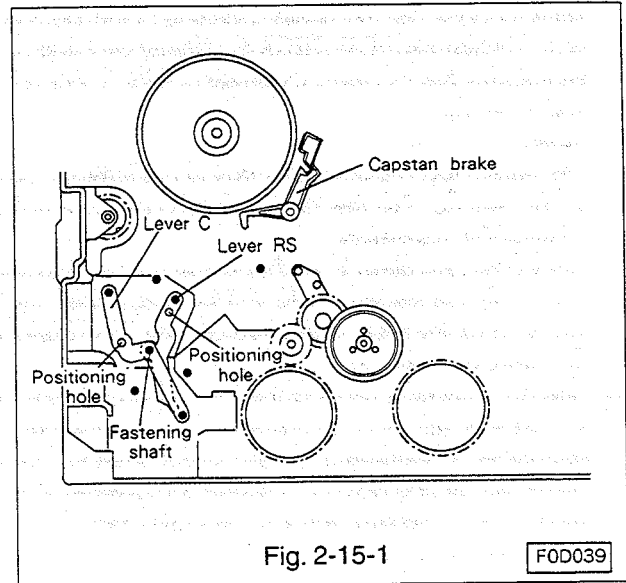
The pin of the F/L idler lever enters the groove of the main cam 2 when the positioning hole of the F/L idler lever is aligned.

Make certain that the pin of the lever enters the groove of the main cam 2.

- H. Line the matching mark of main cam 2 with that of main cam 1, and also the positioning hole of main cam 2, and assemble the main cam 2 to the shaft. (Refer to Fig. 2-15-3.)

### Note:

Make certain that the pin of the F/L idler lever correctly enters in the groove of the main cam 2.



- I. Make certain that the mode switch is in the eject position. Fasten the PCB-DECK assembly with five screws and solder the FE head terminals. (Refer to Fig. 2-14-2 and 2-14-1.)

**Note:**

The safety lever is normally held in the leftward position by the spring. Pull the lever forwards and install the PCB DECK assembly.

- J. Install the cam plate B so that the plate matches pins (a ~ g) as shown in Fig. 2-15-4, especially pin e, and secure the plate with three clamps, cut washer (pin b) and grip ring (pin f).
- K. Line the matching mark of the loading arm T with that of the loading gear arm as shown in Fig. 2-15-4, and assemble the loading gear arm to the shaft so that the pin of the loading gear arm enters the groove of the main cam 2. Secure arm with two grip rings (f). (Refer to Fig. 2-15-5.)
- L. Assemble the F/L gear 2, 3, and 4 to the shafts as shown in Fig. 2-15-5.
- M. Install the reel belt. (Refer to Fig. 2-5.)
- N. Fasten the tension regulation spring T and the spring RS to the tension regulation arm T and the lever RS from the top side of the deck. (Refer to Fig. 2-11-1.)
- O. Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck. (Refer to Fig. 2-15-6.)

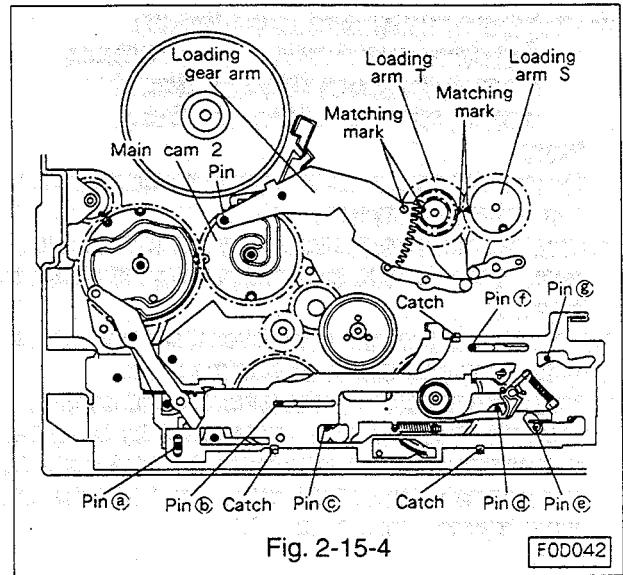


Fig. 2-15-4

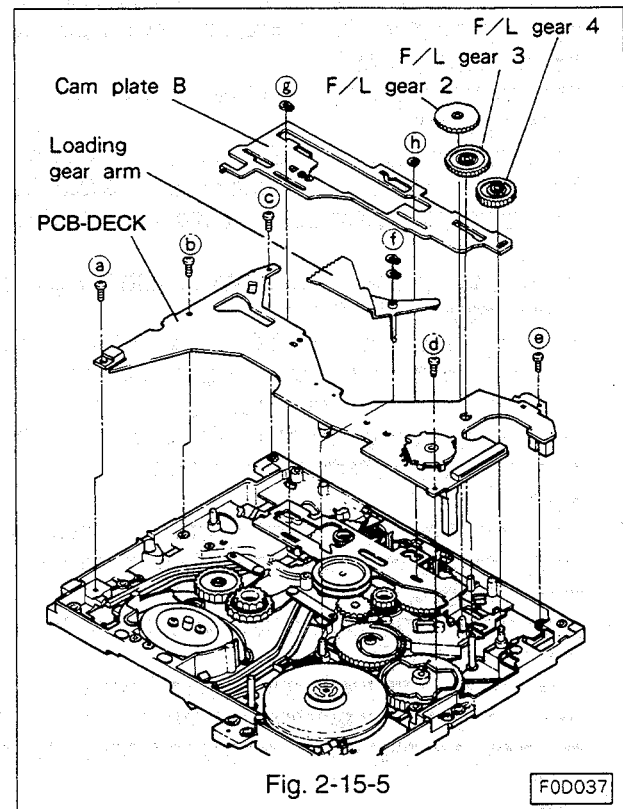


Fig. 2-15-5

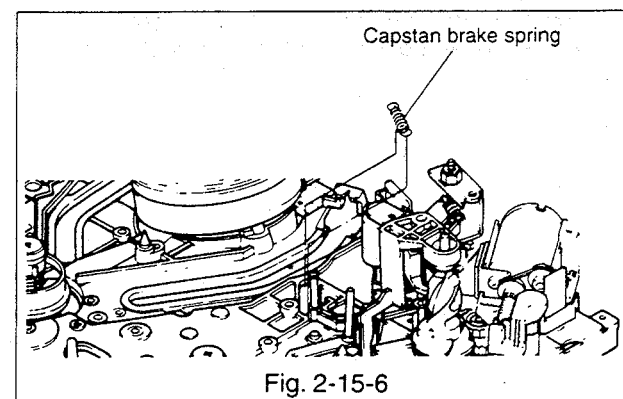


Fig. 2-15-6

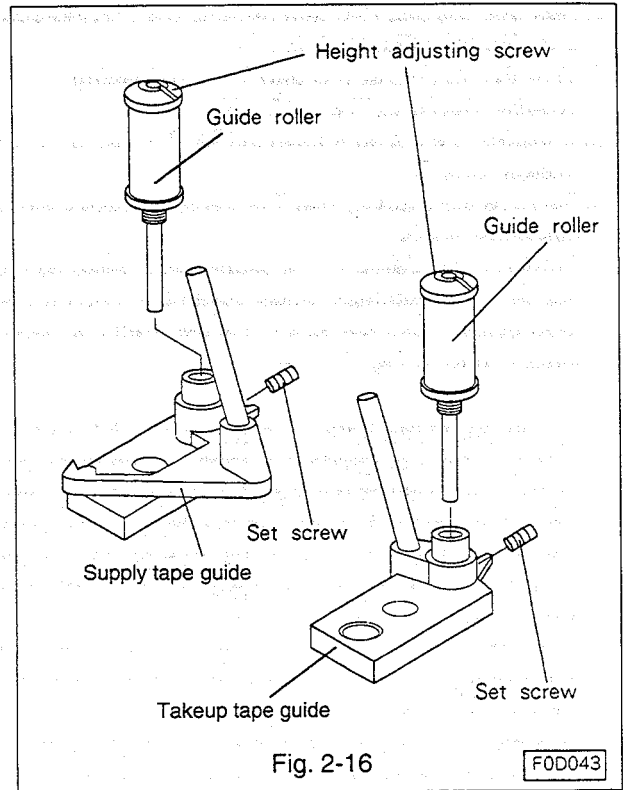
## 2-16 Supply and Takeup Guide Rollers

### 2-16-1 Removal(Refer to Fig. 2-16.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Loosen the set screw so the guide roller turns freely.
- C. Loosen the guide roller height adjusting screw located at the top of the guide roller by turning counterclockwise with the height adjusting screwdriver. Raise and remove the roller from the tape guide.

### 2-16-2 Installation(Refer to Fig. 2-16.)

- A. Make certain that the fastening thread section of a new guide roller is provided with a rubber ring.
- B. Set the new guide roller in the tape guide fastening hole.
- C. Turn the guide roller slowly clockwise till it becomes heavy.
- D. Turn further about 1/6 turn from the point where the guide roller becomes heavy, and return the roller about one turn counter-clockwise.
- E. Again turn the guide roller slowly clockwise till it becomes heavy. Turn the roller further about 1/6 turn from the point where the roller becomes heavy.
- F. Secure the guide roller lightly with the set screw. Check and adjust the envelope as in Para. 3-2.



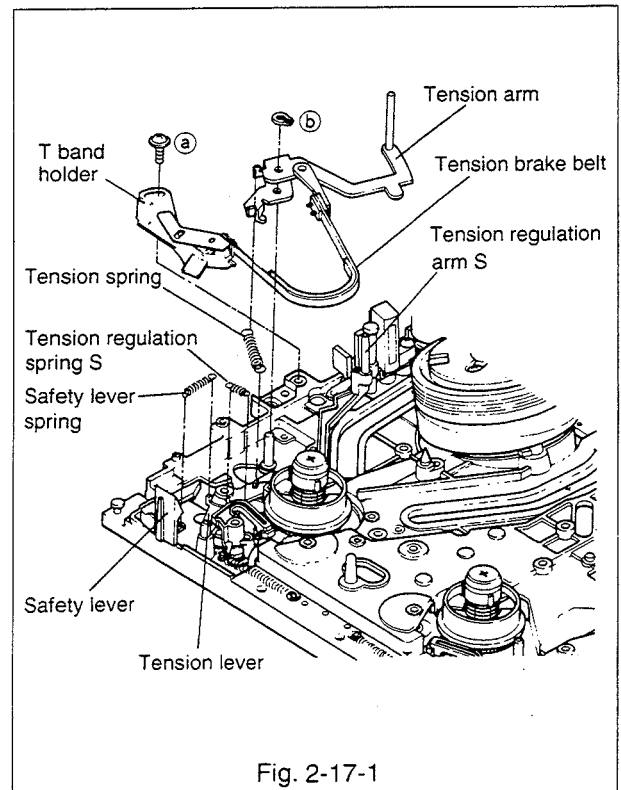
## 2-17 Supply and Takeup Tape Guide Assemblies

### Note:

Refer to section 3-2-7 and 3-3-3 before replacing the supply or takeup tape guide assemblies.

### 2-17-1 Removal(Refer to Fig. 2-17-1-2-17-4.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Detach the capstan brake spring from the capstan brake and the loading gear arm.(Refer to Fig. 2-15-6.)
- C. Remove the reel belt. (Refer to Fig. 2-5.)
- D. Secure the tension arm and the tension regulation arm S with a rubber band etc. so as to separate them from the supply guide roller.(Refer to Fig. 2-17-1.)



- E. Remove the grip ring and remove the loading gear arm.(Refer to Fig. 2-17-2.)
- F. Turn the loading arm S and T to the loading position.(Refer to Fig. 2-17-2.)
- G. Unfasten the clamp shown in Fig. 2-17-3, and remove loading arm S.
- H. Remove the loading arm T is being replaced the takeup guide assembly.
- I. Unfasten the clamp of the slider which secures the supply or takeup tape guide assembly, and remove the tape guide assembly and the slider from the main plate.(Refer to Fig. 2-17-4.)

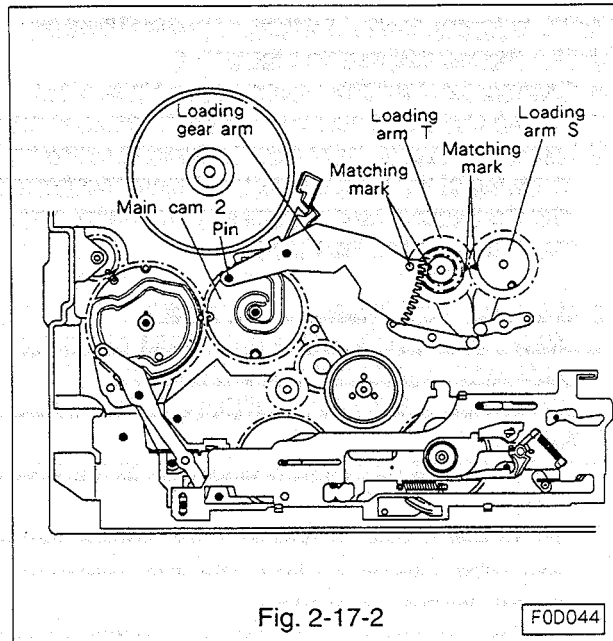


Fig. 2-17-2

F0D044

**2-17-2 Installation(Refer to Fig. 2-17-1~2-17-4.)**

- A. Place a new tape guide assembly on the installation rail of the main plate and install the slider on the reverse side of the main plate so that the catch of the slider enters the fastening hole of the tape guide assembly.
- B. If the takeup tape guide is replaced, install the loading arm T first.(Refer to Fig. 2-17-2.)
- C. Install the loading arm S so that the matching mark of the loading arm S is lined with the matching mark of the loading arm T as illustrated in Fig. 2-17-2.
- D. Line the matching mark of the loading gear arm with that of the loading arm T, and assemble the loading gear arm to the shaft so that the pin of the loading gear arm enters the groove of the main cam 2. Secure the loading gear arm with two grip rings.
- E. Install the reel belt.(Refer to Fig. 2-5.)
- F. Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck.(Refer to Fig. 2-17-1.)
- G. Install the cassette housing as in Para. 2-1-2.

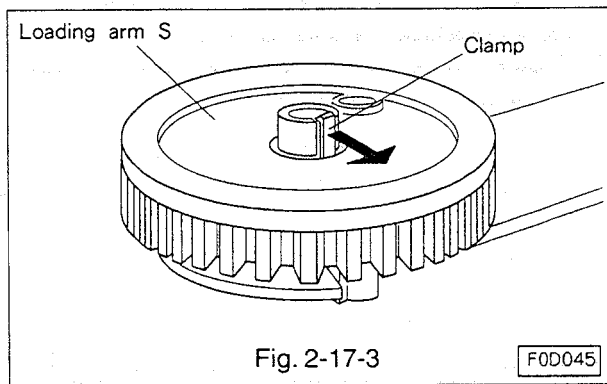


Fig. 2-17-3

F0D045

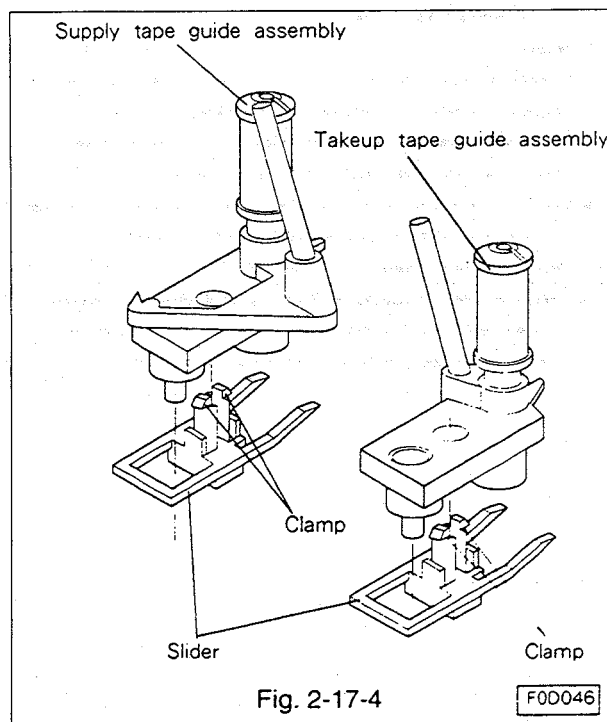


Fig. 2-17-4

F0D046

### 3. Interchangeability Adjustment of Mechanism

**Note:**

Tracking may need to be preset in the inter-changeability adjustment of the mechanism.

Digital tracking should be preset. To preset, short circuit TP5A and TP5B on the PCB-MAIN

**Note:**

The adjustment is conducted in the playback mode, using the stair step signal of the alignment tape, connect an oscilloscope to TP2A and external Trig. to TP2H, unless other-wise specified.

#### 3-1 Adjustment of Back Tension and Tension Pole Position(Refer to Fig. 3-1.)

Run a blank tape for several minutes to break in the reel disks and the transport before beginning the adjustment.

- A. Set the back tension measuring jig and set the VCR to the playback mode.
- B. When the running of the tape becomes steady, make certain that the tension arm check hole is within the M/P hole of the main plate( $0\pm 0.5\text{mm}$ ) or the interval between the centre of tension pole and the centre of Supply guide pole is  $2.0\pm 0.5\text{mm}$ .
- C. If neither the centre of Tension pole nor the tension arm check hole is in position, loosen the T band holder fastening screw lightly and move the T band holder so that the condition specified by the para.B is satisfied.
- D. On completion of adjustment, tighten the T band fastening screw.
- E. Make certain that the reading of the back tension measuring jig is  $50\pm 6\text{g-cm}$ .
- F. When the running of the tape is steady, check visually to make certain that the deflection of the Tension pole is 1mm or less.

**Note:**

Slight fluctuation of back tension may be tolerated, however if fluctuation exceeds 5g-cm, the reel disk etc. may be defective. Examine and correct the defect.

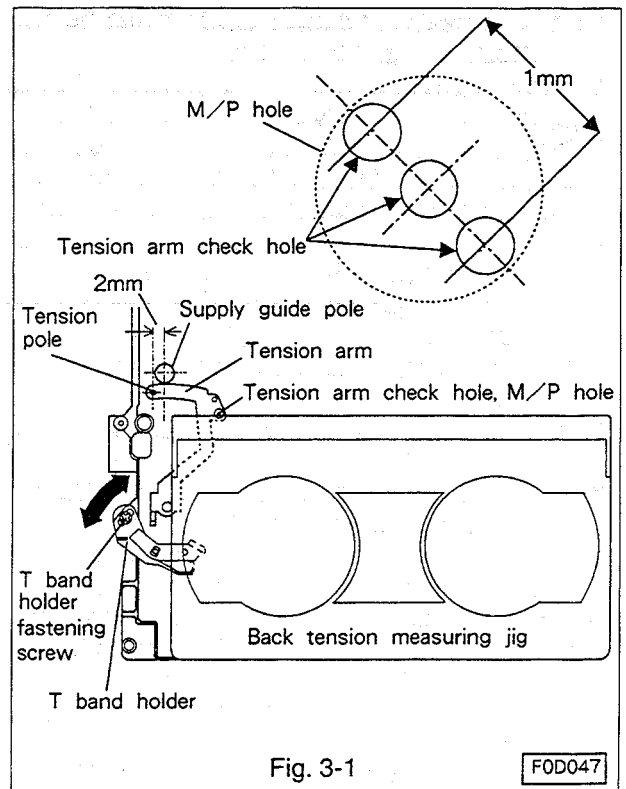


Fig. 3-1

F0D047

### 3-2 Check and Adjustment of FM Envelope

#### 3-2-1 Guide Roller Adjustment(Refer to Fig. 3-2-1.)

- A. Set the VCR to the playback mode.
  - B. Preset tracking.
  - C. Check if the FM waveform is flat like A shown in Fig. 3-2-1.
  - D. Adjust the height of the supply guide roller as in 3-2-2 if the leading portion (the entry side of the drum)of the FM waveform is not flat like B or C.
- Adjust the height of the takeup guide roller as in 3-2-3 if the trailing portion (the exit side of the drum)is not flat like D or E.

#### 3-2-2 Adjustment of Supply Guide Roller Height (Refer to Fig. 3-2-1, 3-2-2.)

- A. Loosen the set screw to such a degree so the supply guide roller turns lightly.(Refer to Fig. 3-2-2.)
- B. The supply guide roller is low if the leading portion(the entry side of the drum) of the FM waveform is like B, and high if like C. Adjust the height of the roller by turning the adjusting screw at the top of the roller so that the FM waveform shall be flat like A.

  - Turn the adjusting screw counterclockwise if the roller is low.
  - Turn the adjusting screw clockwise if the roller is high.

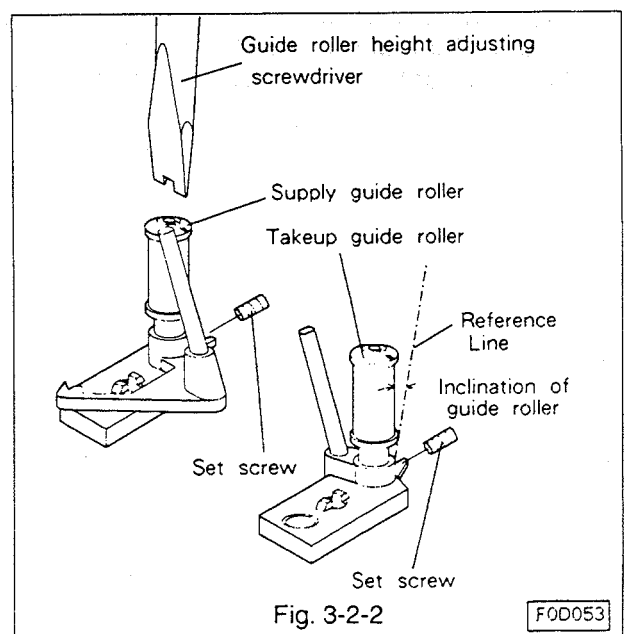
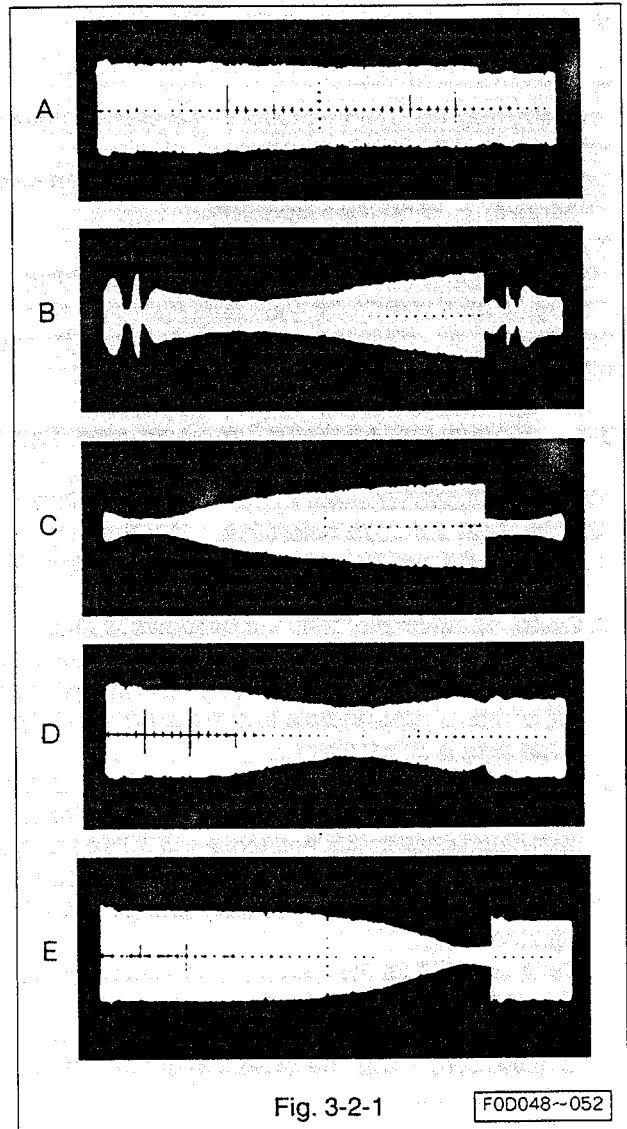
- C. Carry out the coarse adjustment of phase as in 3-2-4.

#### 3-2-3 Adjustment of Takeup Guide Roller Height (Refer to Fig. 3-2-1, 3-2-2.)

- A. Loosen the set screw to such a degree as the takeup guide roller turns lightly.(Refer to Fig. 3-2-2.)
- B. The takeup guide roller is low if the trailing portion(the exit side of the drum) of the FM waveform is like D, and high if like E. Adjust the height of the roller by turning the adjusting screw at the top of the roller so that the FM waveform shall be flat like A.

  - Turn the adjusting screw counterclockwise if the roller is low.
  - Turn the adjusting screw clockwise if the roller is high.

- C. On completion of height adjustment, adjust the azimuth and height of the A/C head as in 3-3-2.
- D. Coarsely adjust the phase as in 3-2-4.





**3-2-4 Coarse Phase Adjustment**  
**(Refer to Fig. 3-2-3, 3-2-4.)**

- A. Set the VCR to the playback mode.
- B. Preset tracking.
- C. Check the FM waveform after checking and adjusting the guide rollers.
- D. If the amplitude of the FM waveform is narrow like F because of out of phase, adjust the phase adjusting nut so that the amplitude of the FM waveform is maximum.

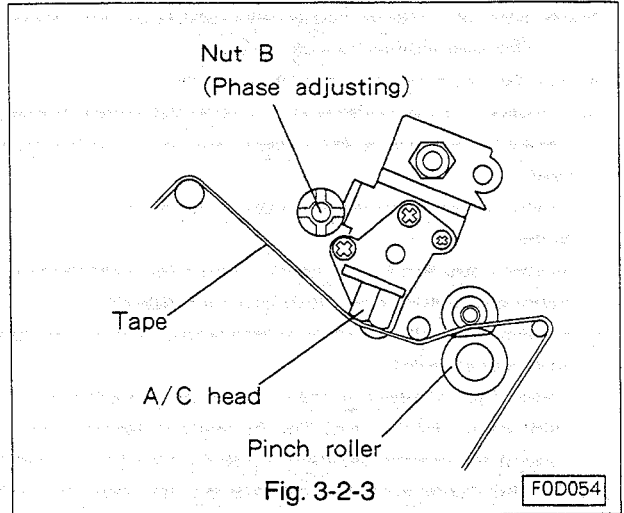


Fig. 3-2-3

FOD054

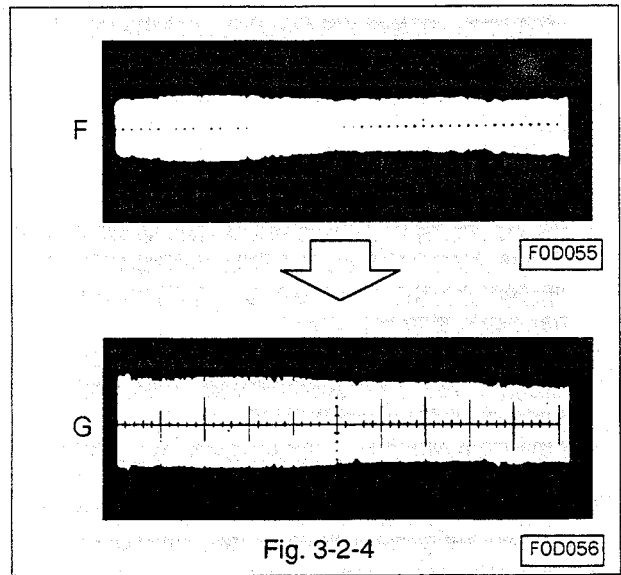


Fig. 3-2-4

FOD056

**3-2-5 Check of FM Waveform Flatness**  
**(Refer to Fig. 3-2-5.)**

- A. Set the VCR to the playback mode.
- B. Set the tracking switch to the manual mode. Vary tracking and check if the amplitude changes and the waveform remains flat.
- C. Adjust tracking in the manual mode so that the amplitude is maximum, and adjust the oscilloscope so that the amplitude is '5' on the scale of the oscilloscope.
- D. Adjust tracking so that the amplitude at the middle (around the point 'b') of the FM waveform is about 80% ('4' on the scale of the scope) of the maximum amplitude. Make certain that the amplitudes at points 'a' and 'c' satisfy the requirements given in Fig. 3-2-5.
- E. If deviating from the requirements, conduct the check and adjustment of the FM envelope beginning with 3-2.

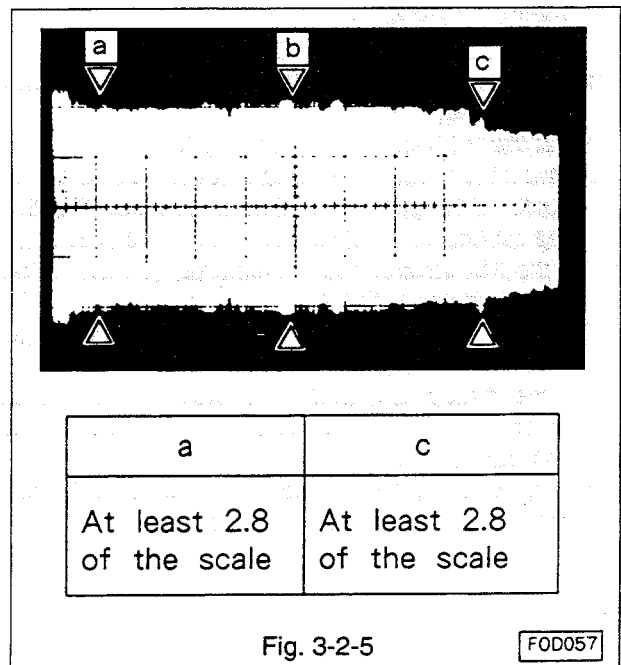


Fig. 3-2-5

FOD057

### 3-2-6 Check 1: Tape Running Condition on Guide Rollers (Refer to Fig. 3-2-6.)

- A. Set the VCR to the playback mode.
- B. Visually check if there is a space between the tape and the lower flange of the supply and the take up guide rollers.

C. If not, replace the tape guide as in 3-2-7.

#### Note:

In this case the tape guide should be replaced with the tape guide which has a larger inclination.

- D. If the supply tape guide is replaced, check the guide roller as in 3-2-1.  
If the take up tape guide is replaced, check the guide roller as in 3-2-3, and the waveform flatness as in 3-2-5
- E. Load and unload the tape several times to make certain that the flatness of the FM waveform does not change.
- F. If changes occur, check the A/C arm shaft for looseness. If not free, replace the A/C arm and adjust the audio/control head as in 3-3.

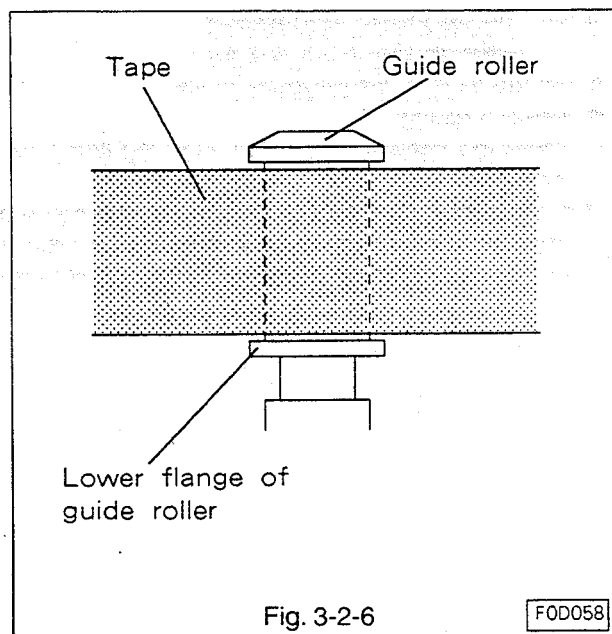


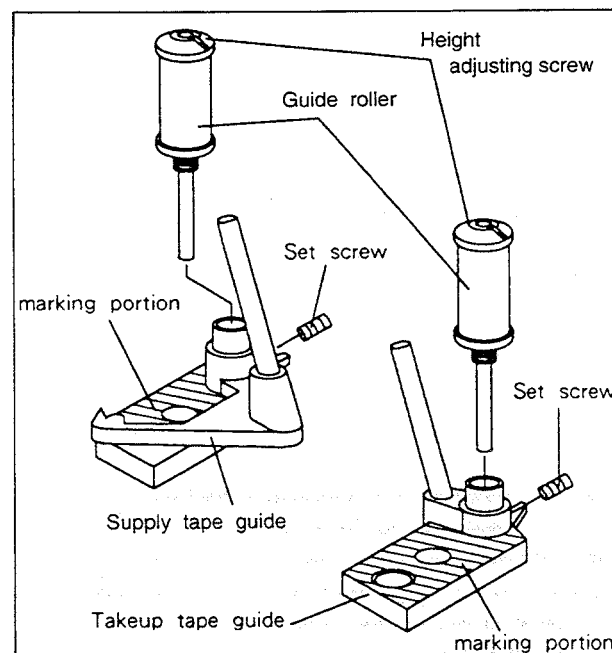
Fig. 3-2-6

### 3-2-7 Replacement of Tape Guides

- A. Identify the Item Number of the tape guide to be replaced. This is done by observing the marking present on the die-cast portion of the tape guide base, and comparing that marking to Fig. 3-2-7.
- B. If the Item Number of the tape guide presently installed is a '2', replace the guide with an Item Number '1' guide. (Part No. 635B059010)
- C. If the Item Number of the present tape guide is a '1', replace the guide with an Item Number '3' guide.
- D. If the Item Number of the present tape guide is a '3', replace the guide with other Item Number '3' guide.
- E. Once the tape guide is replaced, resume alignment starting with 3-2-1.

### 3-2-8 Check 2: Tape Running Condition on Guide Rollers

- A. Set the VCR to the playback mode.
- B. Press the head of the supply guide roller and the take up guide roller lightly, and release the roller. Check if the FM waveform is quickly restored to the previous level.
- C. If the FM waveform is not restored quickly, replace the tape guide as in 3-2-7.
- D. If the supply tape guide is replaced, check the guide roller as in 3-2-1.  
If the takeup tape guide is replaced, check the guide roller as in 3-2-1, and check the FM waveform as flatness as in 3-2-5
- E. If satisfactory, tighten the set screw of the guide roller on the supply side and the take up side.



Identification of Tape Guide Item Number  
(Example ; Parts No. 635B059010)  
Item No. 10

Item No.1	No marking
Item No.2	Marked with black magic marker
Item No.3	Marked with red magic marker

※ The marking point is marked in the oblique line portion shown in figure above.

Fig. 3-2-7

### 3-3 Adjustment of Audio/Control Head

#### 3-3-1 Adjustment of A/C Head Slant

(Refer to Fig. 3-3-1.)

- Play back a blank tape.
- Turn the screw C slowly clockwise to crease the bottom edge of the tape slightly by the lower flange of the takeup guide pole.
- Turn the screw C slowly counterclockwise to eliminate the crease of the bottom edge of the tape.
- Turn the screw C slowly clockwise again and stop turning just before the tape is creased.

#### 3-3-2 Adjustment of A/C Head Azimuth and Height(Refer to Fig. 3-3-1~3-3-3.)

- Using stair step signal of alignment tape, connect an oscilloscope to the audio output terminal and set the VCR to the playback mode.
- Turn the nut A (height adjusting) and the screw B (azimuth adjusting) so that the audio output level is maximum.
- Turn the A/C head counterclockwise and release it to make certain that the audio output level does not change.
- If the level changes, check if the A/C arm shaft is loose. If not free, replace the A/C arm and adjust the slant of the A/C head as in 3-3-1 and the azimuth and height of the A/C head from beginning.
- Apply a force lightly to the A/C head shaft in the direction of A and A' of the arrow shown in Fig. 3-3-3, to make certain that the audio output level remains at maximum level and does not change.
- If the level changes, turn the nut A (height adjusting) so that the audio output level is maximum. Apply a force lightly to the A/C head shaft in the direction of B and B' of the arrow shown in Fig. 3-3-3 and adjust so that the sound output level is maximum.
- Check the sound output level in the playback mode to make sure that the fluctuation of the level is less than 2dBp-p.
- If the fluctuation exceeds 2dBp-p, adjust the slant of the A/C head and the azimuth and height of the head.
- If this is still not satisfactory, replace the takeup tape guide as outlined in 3-3-3.

**Note:**

In this case the tape guide should be replaced with a guide which has less inclination.

- On completion of the above adjustment, adjust phase as in 3-4.

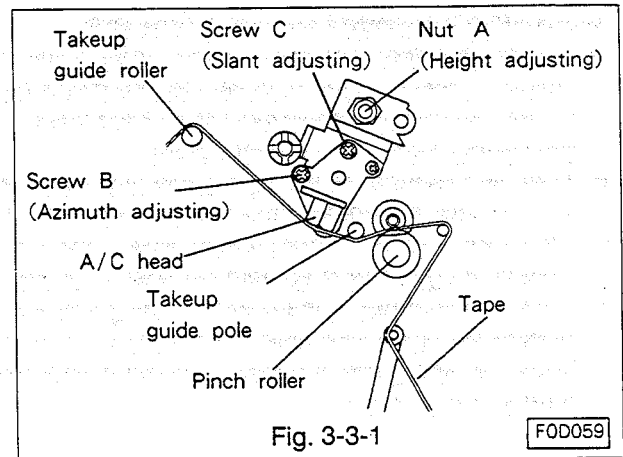


Fig. 3-3-1

F0D059

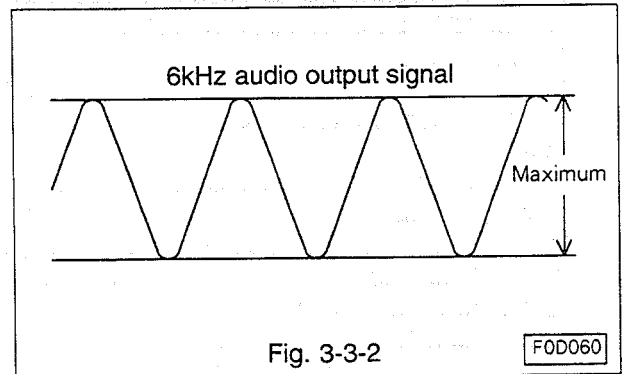


Fig. 3-3-2

F0D060

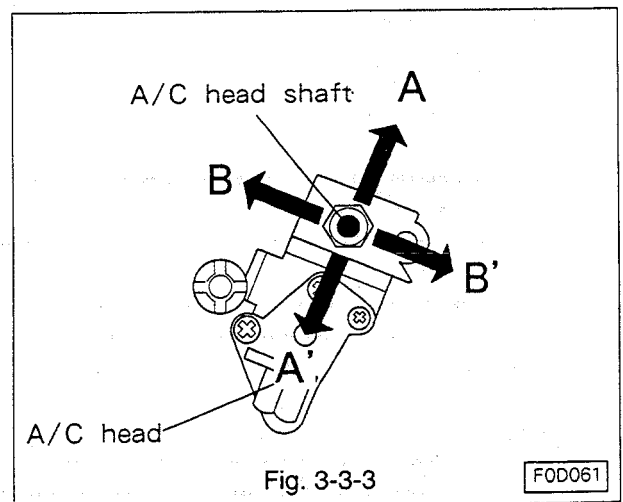


Fig. 3-3-3

F0D061

Identification of Tape Guide Item Number  
(Example ; Parts No. 635B060010)

Item No. 10

Item No.1	No marking
Item No.2	Marked with black magic marker
Item No.3	Marked with red magic marker

※The marking points are marked in the tops of the Takeup and Supply tape guides.(Refer to Fig. 3-2-7)

Fig.3-3-4

### 3-3-3 Replacement of Tape Guides

- A. Identify the Item Number of the Tape Guide to be replaced. This is done by observing the marking present on the die-cast portion of the Tape Guide base, and comparing that marking to Fig. 3-3-4.
- B. If the Item Number of the tape guide presently installed is a '3', replace the guide with an Item Number '1' guide.
- C. If the Item Number of the present tape guide is a '1', replace the guide with an Item Number '2' guide.
- D. If the Item Number of the present tape guide is a '2', replace the guide with other Item Number '2' guide.
- E. Once the tape guide is replaced, resume alignment starting with 3-2-1.

### 3-4 Phase Adjustment(Refer to Fig. 3-4.)

- A. Set the VCR to the playback mode.
- B. Preset tracking.
- C. Turn the phase adjusting nuts to make the amplitude of the FM waveform maximum.

**Note:**

Do not turn the phase adjusting nut more than one turn in either direction.

- D. Turn the A/C head counterclockwise and return to make sure that the amplitude of the FM waveform is the same as that before turning the head.
- E. If the amplitude changes, check the A/C arm shaft if loose. If not free, replace the A/C arm and adjust the A/C head as in 3-3 and the phase as in this section from beginning.
- F. Load and unload the tape several times to make certain that the amplitude of the FM waveform does not change.

### 3-5 Adjustment of Takeup Guide Arm Height (Refer to Fig. 3-5.)

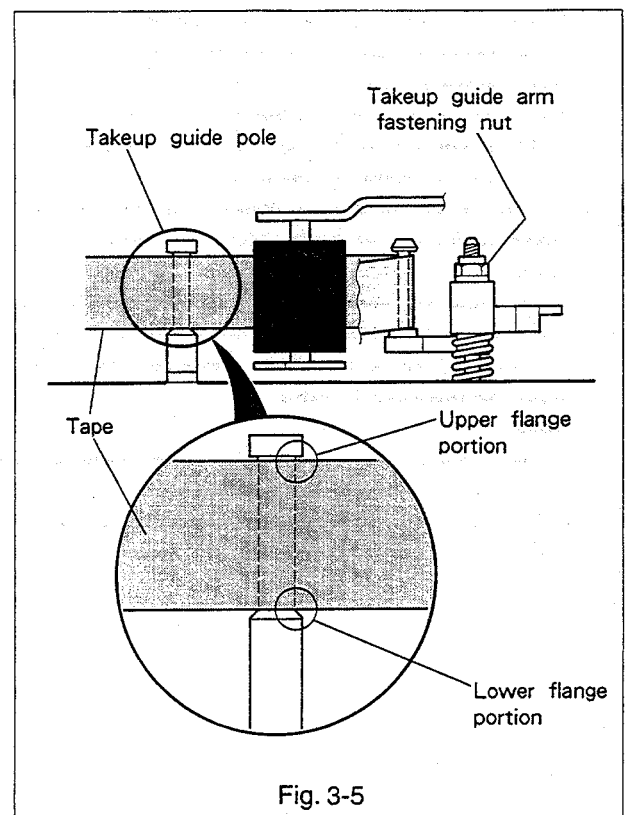
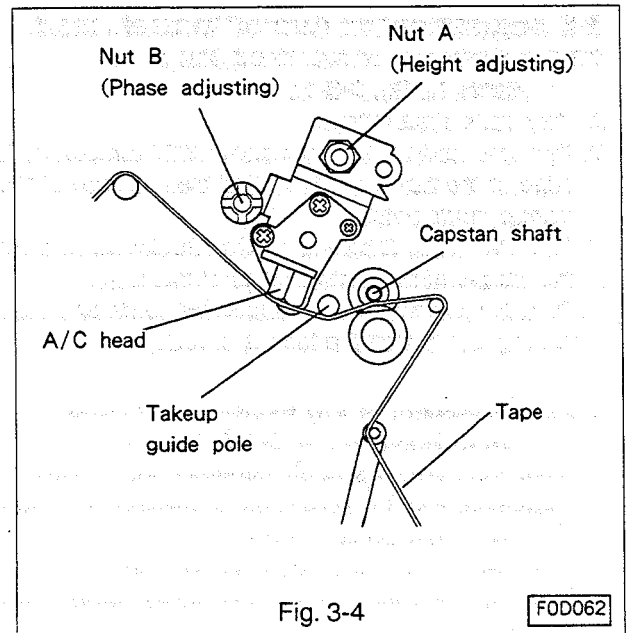
- A. Run a final portion of E-240 blank tape in the reverse search mode.
- B. Adjust the height of the takeup guide pole by turning the height adjusting nut so that the tape shall not be creased at the upper and the lower flange portion of the take up guide pole.

**Note:**

Set the adjusting nut in the screwing-in direction.

Do not turn the nut more than one turn in either direction.

- C. Eject the cassette tape and set to the reverse search mode again to make certain that the tape is not creased at the upper and the lower flange portion of the takeup guide pole.
- D. Set to the playback mode and be sure that the tape is not creased at the upper and the lower flange portion of the takeup guide pole.

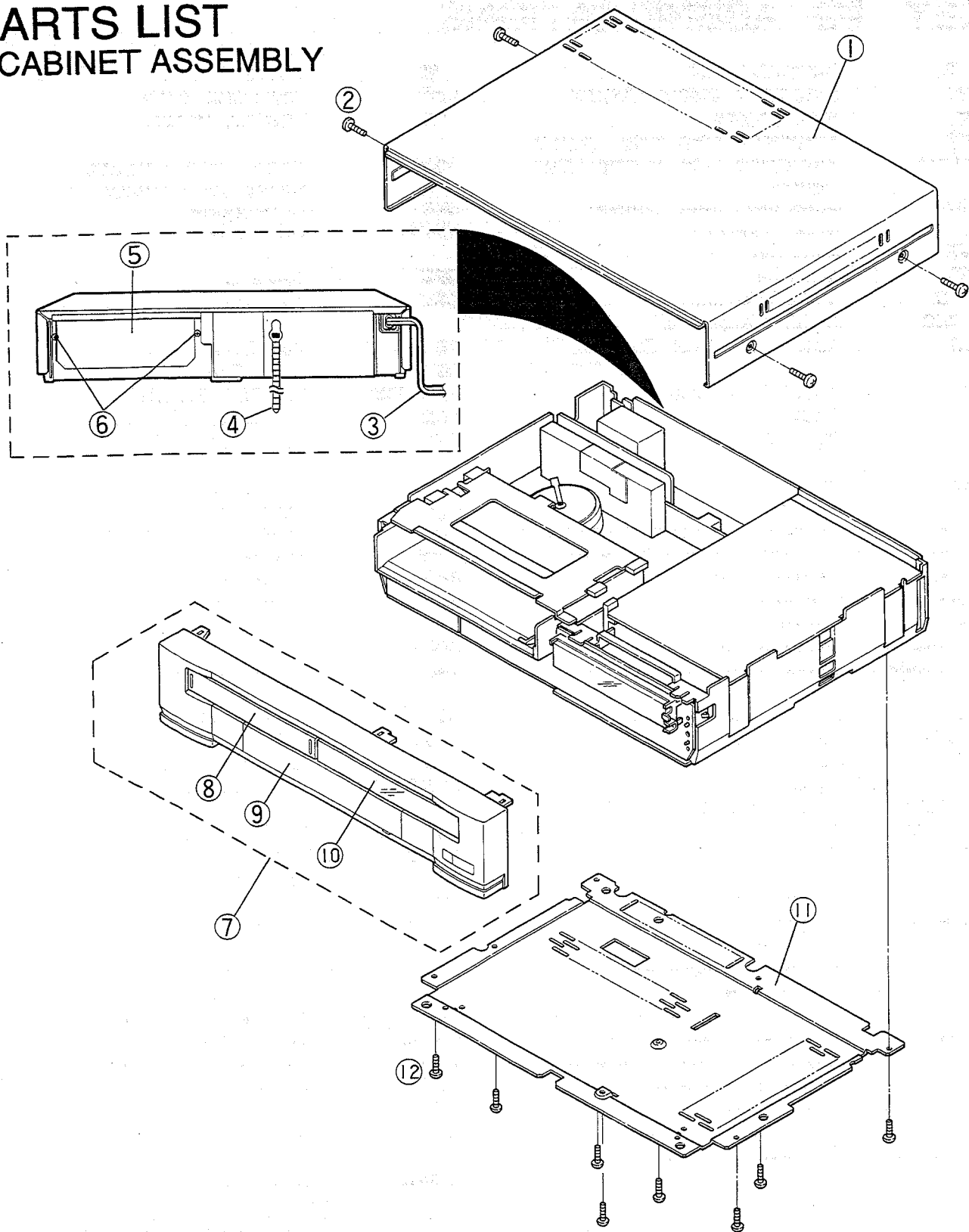


# KEY TO ABBREVIATIONS

<b>A/C</b>	: Audio/Control	<b>LIM</b>	: Limiter
<b>ACC</b>	: Automatic Colour Control	<b>LPF</b>	: Low-Pass Filter
<b>A.E</b>	: Audio Erase	<b>LM</b>	: Loading Motor
<b>AFC</b>	: Automatic Frequency Control	<b>MDA</b>	: Motor Drive Amplifier
<b>AFT-D</b>	: Automatic Fine Tuning Door Switch	<b>MC</b>	: Mechanical Control
<b>AGC</b>	: Automatic Gain Control	<b>MIC</b>	: Microphone
<b>AL</b>	: After Loading	<b>MOD</b>	: Modulator
<b>AMP</b>	: Amplifier	<b>OPE</b>	: Operation
<b>ANT</b>	: Antenna	<b>OSC</b>	: Oscillator
<b>A-PB</b>	: Audio-Playback	<b>PB</b>	: Play Back
<b>A-REC</b>	: Audio-Recording	<b>PG</b>	: Pulse Generator
<b>ALC</b>	: Automatic Level Control	<b>P/R-SW</b>	: P.B/REC-Switch
<b>BPF</b>	: Band-Pass Filter	<b>PCB</b>	: Printed Circuit Board
<b>B/W</b>	: Black and White	<b>PIC</b>	: Picture Control
<b>BS</b>	: Band Switch	<b>REC</b>	: Recording
<b>CASS</b>	: Cassette	<b>REF</b>	: Reference
<b>CP</b>	: Capstan	<b>RIS</b>	: Record Inhibit Switch
<b>CP-FG</b>	: Capstan-Frequency Generator	<b>REW</b>	: Rewind
<b>CP-F/R</b>	: Capstan-Forward/Reverse	<b>REG</b>	: Regulator
<b>CP-M</b>	: Capstan-Motor	<b>RS</b>	: Reverse Search
<b>CONV</b>	: Converter	<b>SENS</b>	: Sensor
<b>CTL</b>	: Control	<b>SM</b>	: Supply Motor
<b>C-LAMP</b>	: Cassette Lamp	<b>S/P</b>	: Still/Pause
<b>C-I LAMP</b>	: Cassette Indicator Lamp	<b>SS</b>	: Speed Search
<b>DAL</b>	: Delay-After Loading	<b>STBY</b>	: Stand By
<b>DEMOD</b>	: Demodulator	<b>S &amp; H</b>	: Sample & Hold
<b>DET</b>	: Detector	<b>SYNC SEP</b>	: Sync Separator
<b>DL</b>	: Delay Line	<b>TM</b>	: Take up Motor
<b>DL-REV</b>	: Delay Reverse	<b>T-REC</b>	: Timer-Recording
<b>DL-FWD</b>	: Delay Forward	<b>T.P</b>	: Test Point
<b>DOC</b>	: Drop Out Compensator	<b>TR</b>	: Transistor
<b>EF</b>	: Emitter Follower	<b>TU-P</b>	: Tuner-Power
<b>EMPHA</b>	: Emphasis	<b>UL</b>	: Unloading
<b>EQ</b>	: Equalizer	<b>VS</b>	: Voltage Synthesizer
<b>EE</b>	: Electronic-Electronic	<b>V.SYNC</b>	: Vertical Sync
<b>ES</b>	: End Sensor	<b>VCO</b>	: Voltage Controlled Oscillator
<b>FE-H</b>	: Full Erase Head	<b>VXO</b>	: Variable Crystal Oscillator
<b>FF</b>	: Flip Flop or Fast Forward	<b>W/D</b>	: White/Dark
<b>FG</b>	: Frequency generator	<b>X'OSC</b>	: Crystal Oscillator
<b>FL-SW</b>	: Front Loading Switch	<b>Y/C</b>	: Luminance/Chrominance
<b>FLM</b>	: Front Loading Motor		
<b>F/R-SW</b>	: FF/Rewind Switch		
<b>G</b>	: Ground		
<b>HE-1</b>	: Hall Element-1		
<b>HE-2</b>	: Hall Element-2		
<b>H-LED</b>	: Humidity-LED		
<b>H-SENS</b>	: Humidity-Sensor		
<b>HPF</b>	: High-Pass Filter		

# PARTS LIST

## 1. CABINET ASSEMBLY

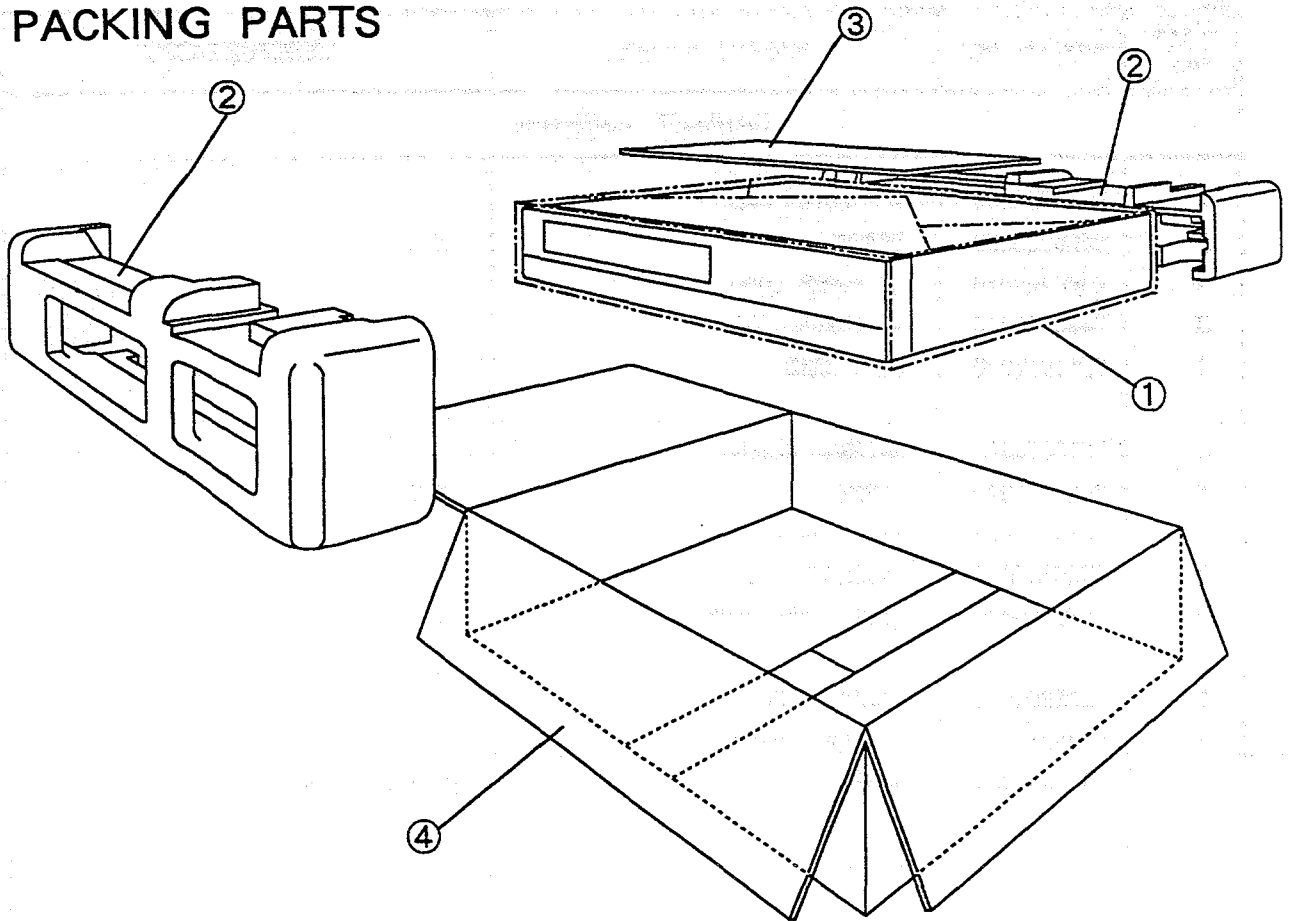


**Note:**

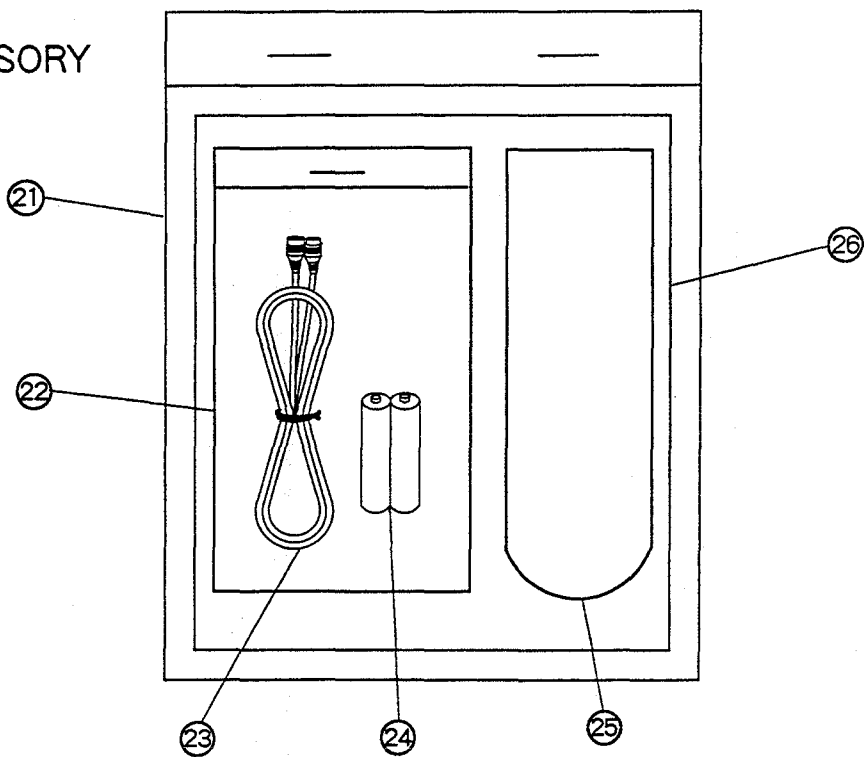
Broken AC power cord must be exchanged with a new original power cord.

ITEM NO.	PARTS NO.	PARTS NAME	DESCRIPTION
CABINET ASSEMBLY			
1	968C020090	TOP COVER ASSY	
2	669D223080	SCREW	3X10
3	246C101020	AC POWER CORD	[B, IR]
3	246C101010	AC POWER CORD	[E, S, Y]
4	621C027010	CORD BAND	
5	761B170010	ANTENNA COVER	
6	669D359040	SCREW	3X12
7	701B262030	FRONT UNIT	
8	702B855010	CASSETTE DOOR	
9	752C009030	DOOR PANEL ASSY	
10	702B854010	TIMER PANEL	
11	590A267010	BOTTOM PANEL	
12	669D220030	SCREW	3X10 46LA005

## 2. PACKING PARTS



## ACCESSORY





ITEM NO.	PARTS NO.	PARTS NAME	DESCRIPTION
PACKING PARTS			
1	831D190030	PACKING SHEET	800X800
2	803A319010	PACKING CUSHION	
3	-----	ACCESSORY	
4	802B389020	PACKING CASE	[B]
4	802B389010	PACKING CASE	[E]
4	802B389030	PACKING CASE	[IR]
4	802B389040	PACKING CASE	[S]
4	802B389060	PACKING CASE	[Y]
ACCESSORY			
21	831D181020	PACKING BAG	375X250X0.06
22	831D198020	PACKING BAG	
23	242D231030	CABLE	1.5m
24	-----	BATTERY	
25	939P477010	REMOTE HAND UNIT	
26	872C056060	INSTRUCTION BOOK	[B, IR]
26	872C056050	INSTRUCTION BOOK	[E]
26	872C059000	INSTRUCTION BOOK	[S]
26	872C056040	INSTRUCTION BOOK	[Y]

### 3. ELECTRICAL PARTS

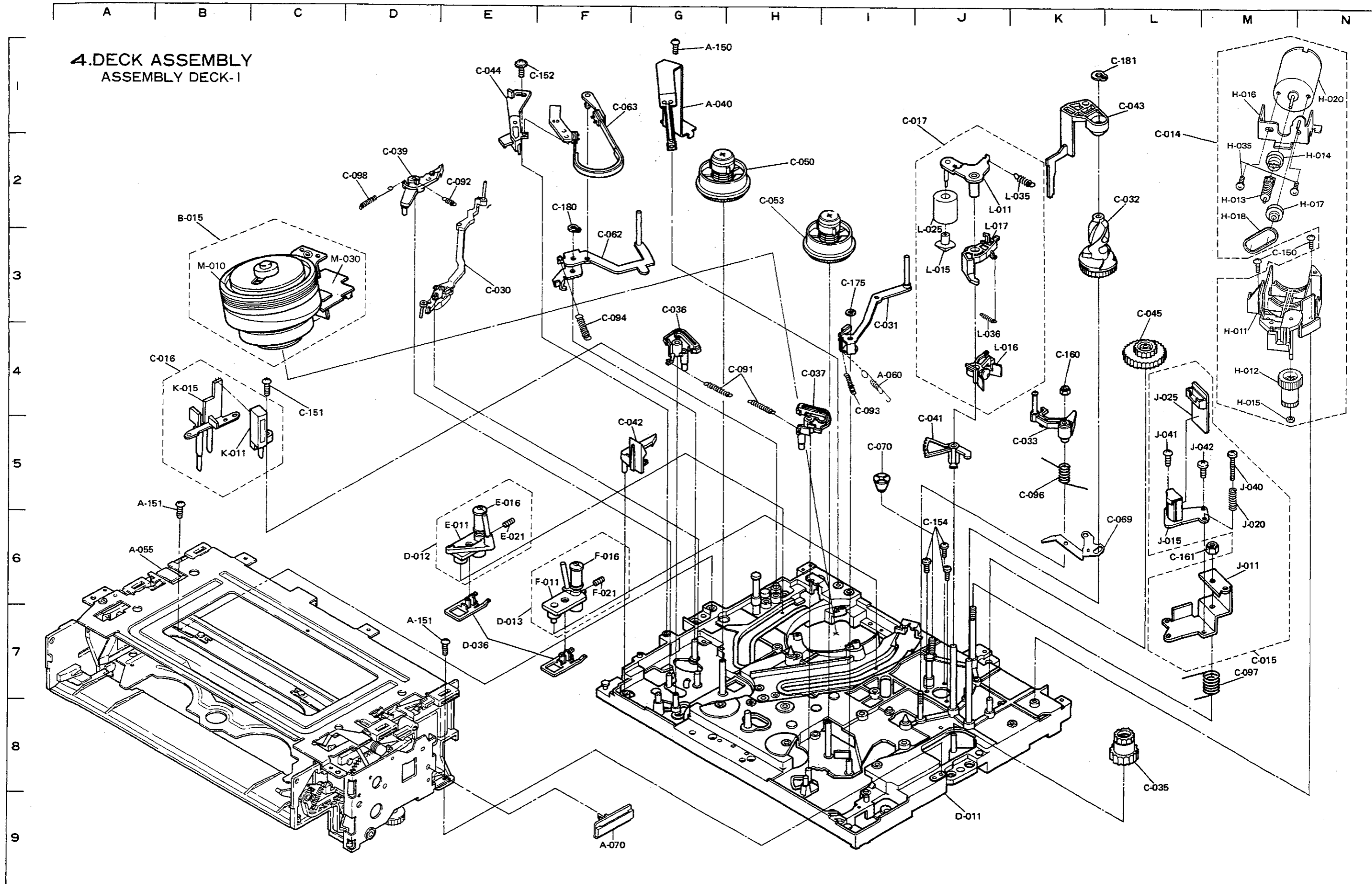
SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
<b>INTEGRATED CIRCUITS</b>							
IC101	272P150010	IC	M51496P	Q 4A0	260P543010	TRANSISTOR	JC501-P, Q
IC102	266P192010	IC	LA7910	Q 4A2	260P543010	TRANSISTOR	JC501-P, Q
IC201	272P221020	IC	XRA7254S	Q 4A3	260P559060	TRANSISTOR	2SC1740S-S, E
IC2A0	272P701020	IC	LA7393A	Q 4A4	260P560040	TRANSISTOR	2SA933S-S
IC2A1	272P702010	IC	LC8992	Q 4A7	260P544010	TRANSISTOR	JA101-P, Q
IC2A3	272P265010	IC	BA7021	Q 4A8	260P544010	TRANSISTOR	JA101-P, Q
IC310	272P234010	IC	LA7295	Q 501	260P544010	TRANSISTOR	JA101-P, Q
IC311	272P400010	IC	NJM2233BL	Q 502	260P632010	TRANSISTOR	DTC124ES
IC4A0	274P162020	IC	MN67492MSK	Q 503	260P544010	TRANSISTOR	JA101-P, Q
IC4A1	272P237010	IC	LA6324N	Q 504	260P559060	TRANSISTOR	2SC1740S-S, E
IC4A2	272P235010	IC	TA7291S	Q 506	260P544010	TRANSISTOR	JA101-P, Q
IC501	274P163010	IC	M35010-051SP	Q 508	260P632010	TRANSISTOR	DTC124ES
IC5A0	274P161010	IC	M37420M6-490SP	Q 571	268P014020	PHOTO TRANSISTOR	PN205L-(NC)
IC8A0	274P167020	IC	μ PD75216AGF-669-3BE	Q 572	268P014020	PHOTO TRANSISTOR	PN205L-(NC)
IC8A0	274P168010	IC	μ PD75217GF-608-3BE	Q 574	268P044010	PHOTO INTERRUPTER	ON2270-(LZ). MI
IC8A0	274P167010	IC	μ PD75216AGF-670-3BE	Q 575	268P045010	PHOTO INTERRUPTER	GP1L52V
IC8A1	263P170020	IC	CAT35C102P/	Q 5A7	260P559060	TRANSISTOR	2SC1740S-S, E
IC8A2	266P010020	IC	μ PC574J-K	Q 5A8	260P419030	TRANSISTOR	2SC2724-D
IC901	272P237010	IC	LA6324N	Q 5B4	260P543010	TRANSISTOR	JC501-P, Q
<b>TRANSISTORS</b>				Q 5B8	260P543010	TRANSISTOR	JC501-P, Q
Q 02	260P544010	TRANSISTOR	JA101-P, Q	Q 5C0	260P632010	TRANSISTOR	DTC124ES
Q 101	260P419030	TRANSISTOR	2SC2724-D	Q 5C1	260P603010	TRANSISTOR	DTA124ES/UN4112
Q 102	260P544010	TRANSISTOR	JA101-P, Q	Q 8A0	260P543010	TRANSISTOR	JC501-P, Q
Q 107	260P419030	TRANSISTOR	2SC2724-D	Q 8A1	260P544010	TRANSISTOR	JA101-P, Q
Q 116	260P632010	TRANSISTOR	DTC124ES	Q 8A2	260P544010	TRANSISTOR	JA101-P, Q
Q 208	260P560010	TRANSISTOR	2SA933S-R, S	Q 8A5	260P544010	TRANSISTOR	JA101-P, Q
Q 210	260P419030	TRANSISTOR	2SC2724-D	Q 8A8	260P559060	TRANSISTOR	2SC1740S-S, E
Q 231	260P560010	TRANSISTOR	2SA933S-R, S	Q 8A9	260P559060	TRANSISTOR	2SC1740S-S, E
Q 233	260P419030	TRANSISTOR	2SC2724-D	Q 901	260P560010	TRANSISTOR	2SA933S-R, S
Q 271	260P560010	TRANSISTOR	2SA933S-R, S	Q 902	260P628060	TRANSISTOR	2SA1619A-Q, R, S
Q 275	260P419030	TRANSISTOR	2SC2724-D	Q 903	260P560030	TRANSISTOR	2SA933S
Q 2B1	260P654020	TRANSISTOR	2SC2058S-P	Q 906	260P630010	TRANSISTOR	2SD2012
Q 2B5	260P632010	TRANSISTOR	DTC124ES	Q 907	260P630010	TRANSISTOR	2SD2012
Q 2B6	260P654020	TRANSISTOR	2SC2058S-P	Q 908	260P630010	TRANSISTOR	2SD2012
Q 2C5	260P632010	TRANSISTOR	DTC124ES	Q 971	260P630010	TRANSISTOR	2SD2012
Q 2C6	260P544010	TRANSISTOR	JA101-P, Q	<b>DIODES</b>			
Q 2C8	260P654020	TRANSISTOR	2SC2058S-P	D 204	264P568010	DIODE	1SS252
Q 2D0	260P654020	TRANSISTOR	2SC2058S-P	D 2A3	264P568010	DIODE	1SS252
Q 2D4	260P560010	TRANSISTOR	2SA933S-R, S	D 2A6	264P568010	DIODE	1SS252
Q 2D5	260P654020	TRANSISTOR	2SC2058S-P	D 2A9	264P568010	DIODE	1SS252
Q 2D6	260P255040	TRANSISTOR	2SA950-Y	D 2B0	264P568010	DIODE	1SS252
Q 2D9	260P559040	TRANSISTOR	2SC1740S-R, S	D 2B1	264P568010	DIODE	1SS252
Q 2E0	260P559040	TRANSISTOR	2SC1740S-R, S	D 2B2	264P568010	DIODE	1SS252
Q 2E1	260P562040	TRANSISTOR	2SA952-K	D 2B3	264P568010	DIODE	1SS252
Q 2E3	260P560010	TRANSISTOR	2SA933S-R, S	D 4A0	264P568010	DIODE	1SS252
Q 2M0	260P559040	TRANSISTOR	2SC1740S-R, S	D 4A6	264P568010	DIODE	1SS252
Q 2P0	260P560010	TRANSISTOR	2SA933S-R, S	D 501	264P568010	DIODE	1SS252
Q 2P1	260P654020	TRANSISTOR	2SC2058S-P	D 570	264P307020	LIGHT EMITTING DIODE	GL-451
Q 2P2	260P654020	TRANSISTOR	2SC2058S-P	D 571	264P515010	DIODE	MA165
Q 310	260P629060	TRANSISTOR	2SC3331-S, T, U	D 5A0	264P568010	DIODE	1SS252
				D 5A3	264P568010	DIODE	1SS252
				D 5A4	264P568010	DIODE	1SS252
				D 5A6	264P568010	DIODE	1SS252
				D 5B9	264P452030	DIODE	HZ5C3
				D 5C0	264P568010	DIODE	1SS252

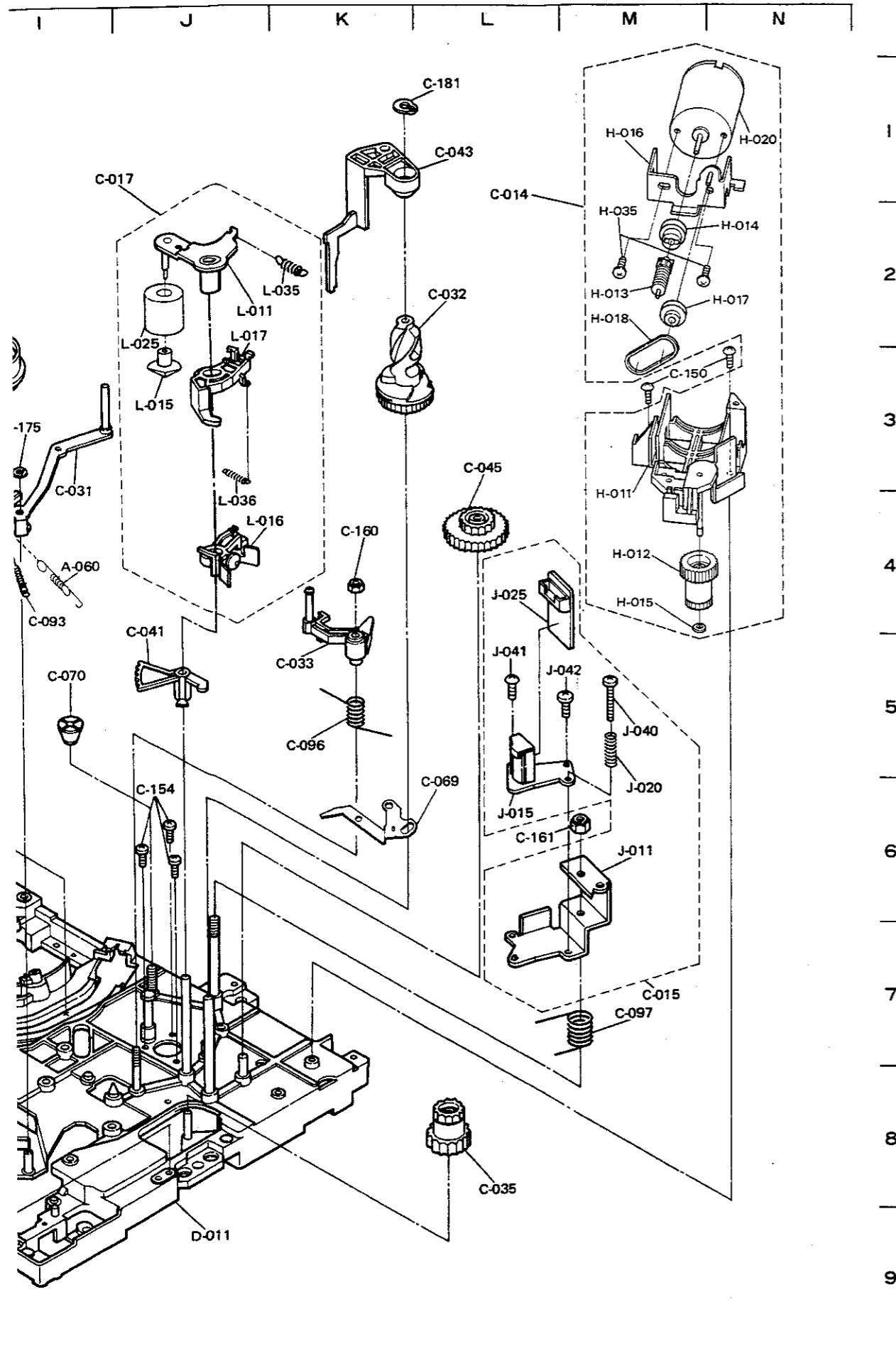
SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION		SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	
D 5C1	264P568010	DIODE	1SS252		L 102	323P175010	VIF COIL	LLD-TANK	
D 5C9	264P568010	DIODE	1SS252		L 103	323P175090	VIF COIL	AFT 38. 9/39. 5MHz	
D 5D2	264P568010	DIODE	1SS252		L 107	325C170040	PEAKING COIL	1. 8 μH-K	[B, E]
D 8A3	264P568010	DIODE	1SS252		L 107	325C170050	PEAKING COIL	2. 2 μH-K	[IR, S, Y]
D 8A5	264P568010	DIODE	1SS252		L 108	325C166040	PEAKING COIL	12 μH-J	[B, IR]
D 8A6	264P568010	DIODE	1SS252		L 108	325C166030	PEAKING COIL	10 μH-J	[E]
D 8A7	264P568010	DIODE	1SS252		L 108	325C166050	PEAKING COIL	15 μH-J	[S]
D 8A8	264P568010	DIODE	1SS252		L 108	325C166000	PEAKING COIL	5. 6 μH-J	[Y]
D 8B0	264P568010	DIODE	1SS252		L 109	325C166060	PEAKING COIL	18 μH-J	
D 8B1	264P568010	DIODE	1SS252		L 110	325C120070	PEAKING COIL	3. 3 μH-K	[Y]
D 8B2	264P568010	DIODE	1SS252		L 113	325C165020	PEAKING COIL	1. 2 μH-J	[B]
D 8B3	264P568010	DIODE	1SS252		L 113	325C165030	PEAKING COIL	1. 5 μH-J	[E, IR, Y]
D 8J1	264P568010	DIODE	1SS252	[Y]	L 113	325C165040	PEAKING COIL	1. 8 μH-J	[S]
D 8J3	264P568010	DIODE	1SS252	[B, E, S, Y]	L 152	325C166090	PEAKING COIL	33 μH-J	[B, IR]
D 8J4	264P568010	DIODE	1SS252	[B]	L 152	325C167010	PEAKING COIL	47 μH-J	[E, S, Y]
D 8J5	264P568010	DIODE	1SS252	[E]	L 153	325C121040	PEAKING COIL	12 μH-K	
D 8J7	264P568010	DIODE	1SS252	[E, S]	L 154	325C166090	PEAKING COIL	33 μH-J	
D 8Z0	264P501040	DIODE	HZ3ALL		L 201	325C122050	PEAKING COIL	100 μH-K	
D 8Z1	264P485050	DIODE	RD7. 5FB1		L 202	325C122050	PEAKING COIL	100 μH-K	
D 8Z2	264P193080	DIODE	MZ309B2/HZ9B24		L 203	325C168010	PEAKING COIL	330 μH-J	
D 8Z3	264P342070	DIODE	HZ4C2		L 206	325C166070	PEAKING COIL	22 μH-J	
D 901	264P101050	DIODE	RM 1B		L 210	325C166070	PEAKING COIL	22 μH-J	
D 902	264P101050	DIODE	RM 1B		L 211	325C166000	PEAKING COIL	5. 6 μH-J	
D 903	264P101050	DIODE	RM 1B		L 213	325C122050	PEAKING COIL	100 μH-K	
D 904	264P101050	DIODE	RM 1B		L 218	325C167070	PEAKING COIL	150 μH-J	
D 905	264P500020	DIODE	EM01Z		L 219	325C167040	PEAKING COIL	82 μH-J	
D 906	264P500020	DIODE	EM01Z		L 220	325C167010	PEAKING COIL	47 μH-J	
D 907	264P500020	DIODE	EM01Z		L 2A8	325C166060	PEAKING COIL	18 μH-J	
D 908	264P500020	DIODE	EM01Z		L 2A9	325C167080	PEAKING COIL	180 μH-J	
D 913	264P500020	DIODE	EM01Z		L 2B0	325C167030	PEAKING COIL	68 μH-J	
D 914	264P500020	DIODE	EM01Z		L 2B1	325C166060	PEAKING COIL	18 μH-J	
D 915	264P568010	DIODE	1SS252		L 2B4	325C165070	PEAKING COIL	3. 3 μH-J	
D 916	264P568010	DIODE	1SS252		L 2B5	325C166020	PEAKING COIL	8. 2 μH-J	
D 917	264P104040	DIODE	HZ30-2		L 2B8	321C112050	RF COIL	100 μH-K	
<b>FILTERS</b>					L 2B9	321C112050	RF COIL	100 μH-K	
CF101	296P024040	CERAMIC TRAP	TPS6. 0MB	[B, IR]	L 2C0	325C122050	PEAKING COIL	100 μH-K	
CF101	296P076010	CERAMIC TRAP		[E]	L 2C1	325C167010	PEAKING COIL	47 μH-J	
CF101	296P024030	CERAMIC TRAP	TPS5. 5MB	[S]	L 2C2	325C166090	PEAKING COIL	33 μH-J	
CF101	296P104010	CERAMIC TRAP	EFC-S3F01W3A	[Y]	L 2C3	325C122050	PEAKING COIL	100 μH-K	
CF151	296P014030	CERAMIC FILTER	SFE-6. 0MHz	[B, IR]	L 2P1	325C166090	PEAKING COIL	33 μH-J	
CF151	296P014090	CERAMIC FILTER	SFE-5. 5MC2	[E, S, Y]	L 2P5	325C166090	PEAKING COIL	33 μH-J	
CF152	296P121020	CERAMIC FILTER	CDA6. 0ME23	[B, IR]	L 310	321C113070	RF COIL	1000 μH-K	
CF152	296P121010	CERAMIC FILTER		[E, S, Y]	L 311	321C114080	RF COIL	8200 μH-J	
CF5A0	299P118070	CERAMIC RESONATOR	CST8. 00MTW		L 312	321C114080	RF COIL	8200 μH-J	
SF101	296P119040	SAW FILTER	SAF39. 5MZG81Z	[B, IR]	L 501	325C262050	PEAKING COIL	100 μH-K	
SF101	296P119030	SAW FILTER		[E, S]	L 502	325C266050	PEAKING COIL	15 μH-J	
SF101	296P119010	SAW FILTER		[Y]	L 503	325C262050	PEAKING COIL	100 μH-K	
<b>DELAY LINES</b>					L 507	325C266080	PEAKING COIL	27 μH-J	[E, S, Y]
DL2A0	337P081010	DELAY LINE			L 570	299P124010	LATCH MAGNET		
<b>COILS</b>					L 5A1	325C262050	PEAKING COIL	100 μH-K	
L 11	325C111030	PEAKING COIL	10 μH-K		L 5A2	325C266070	PEAKING COIL	22 μH-J SO	
					L 5A4	325C124080	PEAKING COIL	0. 56 μH-M	
					L 5A5	325C124050	PEAKING COIL	0. 33 μH-M	
					L 5A6	325C124050	PEAKING COIL	0. 33 μH-M	

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	
<b>TRANSFORMERS</b>				
T 310	409P423010	AUDIO BIAS OSC	705720044D	
T 901	350P576020	POWER	PRI	[B]
T 901	350P576010	POWER	PRI	[E, IR, S, Y]
<b>VARIABLE RESISTORS</b>				
VR101	127C080090	VR-SEMIFIXED	1/5W B20kΩ-M	
VR202	127C290040	VR-SEMIFIXED	1/10W B1kΩ-N	
VR203	127C290080	VR-SEMIFIXED	1/10W B10kΩ-N	
VR2A0	127C080090	VR-SEMIFIXED	1/5W B20kΩ-M	
VR2A1	127C090090	VR-SEMIFIXED	1/5W B20kΩ-M	
VR2A2	127C080080	VR-SEMIFIXED	1/5W B10kΩ-M	
VR2A3	127C080050	VR-SEMIFIXED	1/5W B2kΩ-M	
VR2A5	127C080090	VR-SEMIFIXED	1/5W B20kΩ-M	
VR310	127C381020	VR-SEMIFIXED	1/5W B100kΩ-M	
VR311	127C380080	VR-SEMIFIXED	1/5W B10kΩ-M	
VR4A0	127C081020	VR-SEMIFIXED	1/5W B100kΩ-M	
<b>RESISTORS</b>				
R 5K3	103P398090	FUSE	1/2W 5.6Ω-J	[B]
R 904	109P052010	FUSE	1/4W 100Ω-J	
R 920	109P052050	FUSE	1/4W 6.8Ω-J	
<b>CAPACITORS AND TRIMMERS</b>				
VC8A0	202P109020	TRIMMER CAPACITOR	4.2pF-20pF	
<b>SWITCHES</b>				
S 8A3	432P089020	KEY BOARD SWITCH	CH-UP	
S 8A6	432P089020	KEY BOARD SWITCH	PB	
S 8A8	432P089040	KEY BOARD SWITCH	POWER	
S 8B3	432P089020	KEY BOARD SWITCH	CH-DOWN	
S 8B6	432P089020	KEY BOARD SWITCH	REC	
S 8B7	432P089020	KEY BOARD SWITCH	STOP	
S 8B8	432P089040	KEY BOARD SWITCH	EJECT	
S 8C6	432P089020	KEY BOARD SWITCH	FF	
S 8C7	432P089020	KEY BOARD SWITCH	STILL/PAUSE	
S 8C8	432P089020	KEY BOARD SWITCH	REW	
S 8D5	432P089020	KEY BOARD SWITCH	ONE KEY PROGRAM	
SW570	439P019010	MODE SELECT SWITCH		
SW571	439P020010	LIMIT SWITCH	SPPB-62	
<b>MISCELLANEOUS</b>				
CU 01	242D297020	IF CABLE		
CU 01	295P276020	RF CONVERTER	MDLK6B7	[B, IR]
CU 01	295P276010	RF CONVERTER		[E, S, Y]
DC CC	243C061020	CARD LEAD	9P	
DM CM	243C061070	CARD LEAD	21P	
F 901	283D046080	FUSE	0.63A-T	
F 902	283D047050	FUSE	2.5A-T	
F 903	283D047050	FUSE	2.5A-T	
J 3A0	451C058020	CONNECTOR	21P	
M 470	288P117010	CAPSTAN MOTOR		
M 570	288P088040	DRUM MOTOR		
M 571	288D025010	LOADING MOTOR		

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	
MF TF	243C072010	CARD LEAD	9P	
MK TK	243C048040	CARD LEAD	19P	
MS NS	243C050010	CARD LEAD	9P	
MX PX	243C065030	CARD LEAD	25P	
T 370	460P060050	HEAD		
T 371	460P061020	FE HEAD		
TU 01	295P194030	TUNER	TERB1-054A	[B]
TU 01	295P261020	TUNER	ENV-57819F1C	[E]
TU 01	295P260030	TUNER	ENV-59808F2	[IR]
TU 01	295P254010	TUNER	ENV-77818F2	[S]
TU 01	295P297010	TUNER	TERE1-0J9A	[Y]
V 8A0	253P093010	TUBE FLUOR	F1P9FM11	
X 2A0	285P083010	CRYSTAL RESONATOR	4.43362MHz	
X 501	285P084010	CRYSTAL RESONATOR	17.7345MHz	
X 8A0	285P063040	CRYSTAL RESONATOR	4.19430MHz	
Z 8A0	939P481020	PREAMP UNIT	HC-479M	
<b>PRINTED CIRCUIT BOARD ASSY'S</b>				
	928C510070	DECK PCB ASSY		
	927B444002	HEAD-AMP PCB ASSY		[B, IR]
	927B444001	HEAD-AMP PCB ASSY		[E, S, Y]
	928D056020	MAIN PCB ASSY		[B]
	928D056030	MAIN PCB ASSY		[E]
	928D056050	MAIN PCB ASSY		[IR]
	928D056040	MAIN PCB ASSY		[S]
	928D056010	MAIN PCB ASSY		[Y]
	928D057020	POWER PCB ASSY		[B]
	928D057030	POWER PCB ASSY		[E]
	928D057050	POWER PCB ASSY		[IR]
	928D057040	POWER PCB ASSY		[S]
	928D057010	POWER PCB ASSY		[Y]
	928D058020	TIMER PCB ASSY		[B]
	928D058030	TIMER PCB ASSY		[E]
	928D058050	TIMER PCB ASSY		[IR]
	928D058040	TIMER PCB ASSY		[S]
	928D058010	TIMER PCB ASSY		[Y]
	927B593012	VTR PCB ASSY		[B]
	927B593013	VTR PCB ASSY		[E]
	927B593015	VTR PCB ASSY		[IR]
	927B593014	VTR PCB ASSY		[S]
	927B593011	VTR PCB ASSY		[Y]

4.DECK ASSEMBLY  
ASSEMBLY DECK-I





\* Settled Service Parts

ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
B-015	9488328001	○ B-2	ASSY-DRUM		01
M-010	9278499021	○ B-3	ASSY-UPPER-DRUM		01
M-030	288P088040	○ C-3	MOTOR-DRUM	M570	01
D-011	948A071020	J-9	ASSY-MAIN-PLATE		01
D-012	948D018040	○ D-6	ASSY-TAPE-GUIDE-S		01
D-012	948D018050	○ D-6	ASSY-TAPE-GUIDE-S		01
D-012	948D018060	○ D-6	ASSY-TAPE-GUIDE-S		01
E-011	6358059010	○ E-6	TAPE-GUIDE-S		01
E-011	6358059020	○ E-6	TAPE-GUIDE-S		01
E-011	6358059030	○ E-6	TAPE-GUIDE-S		01
E-016	522D177010	○ E-5	GUIDE-ROLLER		01
E-021	669D197020	○ E-6	SET-SCREW-F	M3 × 0.5-4	01
D-013	948D019040	○ E-7	ASSY-TAPE-GUIDE-T		01
D-013	948D019050	○ E-7	ASSY-TAPE-GUIDE-T		01
D-013	948D019060	○ E-7	ASSY-TAPE-GUIDE-T		01
F-011	6358060010	○ F-6	TAPE-GUIDE-T		01
F-011	6358060020	○ F-6	TAPE-GUIDE-T		01
F-011	6358060030	○ F-6	TAPE-GUIDE-T		01
F-016	522D177010	○ F-6	GUIDE-ROLLER		01
F-021	669D197020	○ F-6	SET-SCREW-F	M3 × 0.5-4	01
D-036	621D522010	○ E-7	SLIDER		02
C-014	928D031010	○ N-5	ASSY-LOAD-MOTOR		01
H-011	641B313010	○ 0-4	HOLDER-MOTOR		01
H-012	641C783010	○ N-4	GEAR-WHEEL		01
H-013	641C801010	○ N-2	GEAR-WORM		01
H-014	621D784010	○ 0-2	CUPLING-2	2.5	01
H-015	552C007030	○ N-4	CUT-WASHER		01
H-016	593C059010	○ N-1	PLATE-HOLDER-M2		01
H-017	621D793010	○ 0-2	PULLEY-L		01
H-018	521D074010	○ N-2	BELT-LM		01
H-020	288D025010	○ 0-1	MOTOR-LOADING	M571	01
H-035	650P300030	○ N-2	SCREW-F-FE-PAN	M3 × 0.5-3	02
C-015	928D032030	○ M-7	ASSY-AC-HEAD		01
J-011	592C760010	○ M-6	ARM-AC		01
J-015	460P060050	○ L-6	HEAD-AC	T370	01
J-020	570D593010	○ M-6	SPRING-AC		01
J-025	215C393010	○ L-4	PWB-AC-AF		01
J-040	650P261040	○ M-5	SCREW-F-FE-PAN	M2.6 × 0.45-14	01
J-041	669D227010	○ L-5	SCREW-TS	M2.6 × 6	01
J-042	669D206030	○ L-5	SCREW		01
C-016	928D033010	○ B-4	ASSY-FE-HEAD		01
K-011	460P061020	○ B-5	HEAD-FE	T371	01
K-015	641C870010	○ B-4	HOLDER-FE		01
C-017	948D020010	○ I-1	ASSY-ARM-PINCH		01
L-011	591B536010	○ J-2	ARM-PINCH		01
L-015	621D523010	○ J-3	CAP-ROLLER		01
L-016	641C797010	○ J-4	LEVER-CAM-PINCH		01
L-017	641C798010	○ J-2	LEVER-ARM-PINCH		01
L-025	522D174010	○ J-2	ROLLER-PINCH		01
L-035	572D314010	○ K-2	SPRING-PINCH		01
L-036	572D315010	○ J-4	SPRING-CAM-PINCH		01
C-030	641B368010	○ E-3	ARM-TENS-REG-S2		01
C-031	591B551020	○ I-3	ARM-TENS-REG-T		01
C-032	641B314020	○ L-2	CAM-PINCH		01
C-033	635B068010	○ K-5	ARM-TU-G		01
C-035	641C782010	○ L-8	GEAR-JOINT		01
C-036	641C791010	○ G-3	BRAKE-MAIN-S		01
C-037	641C792010	○ H-4	BRAKE-MAIN-T		01

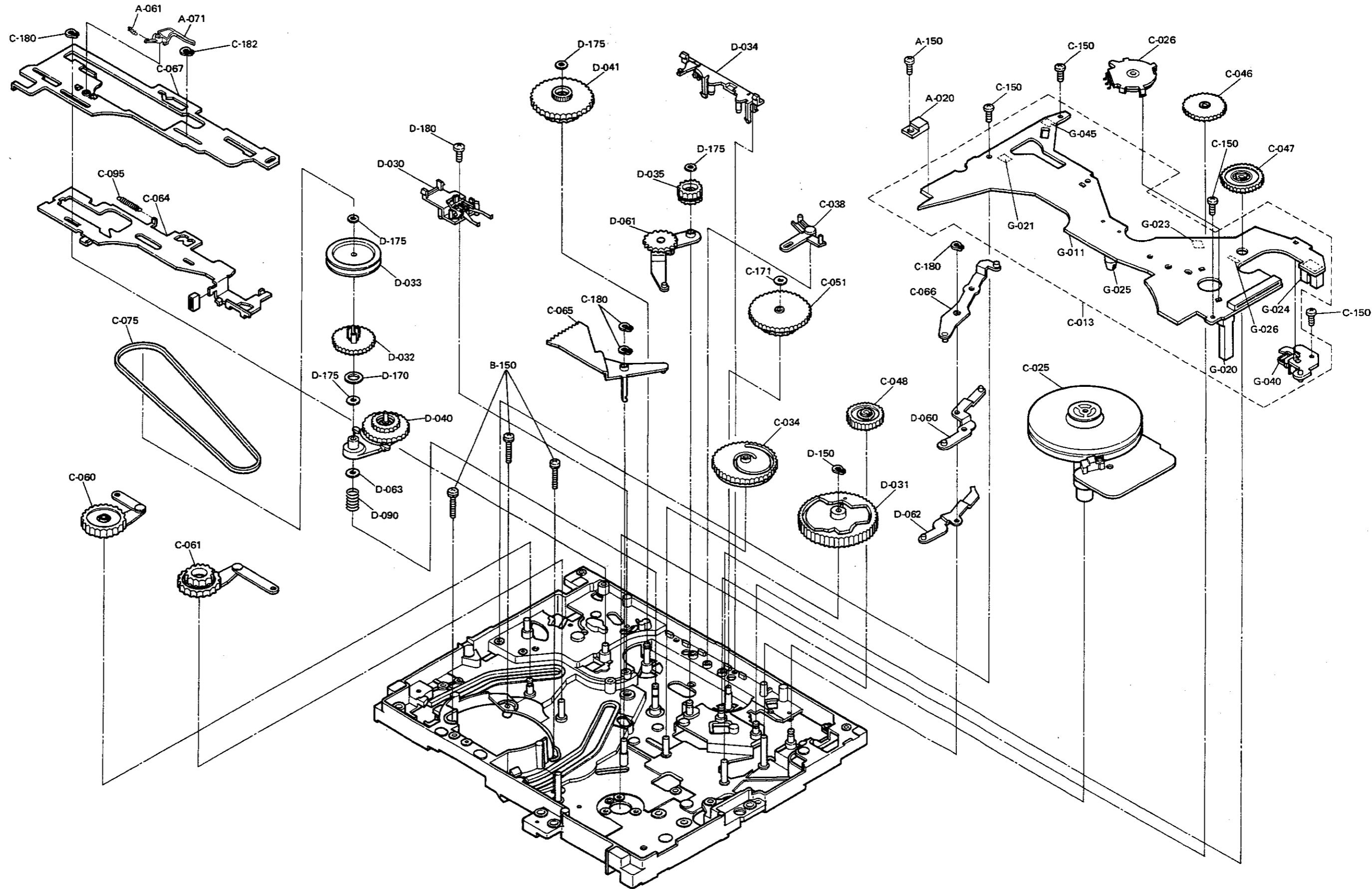
\* Settled Service Parts

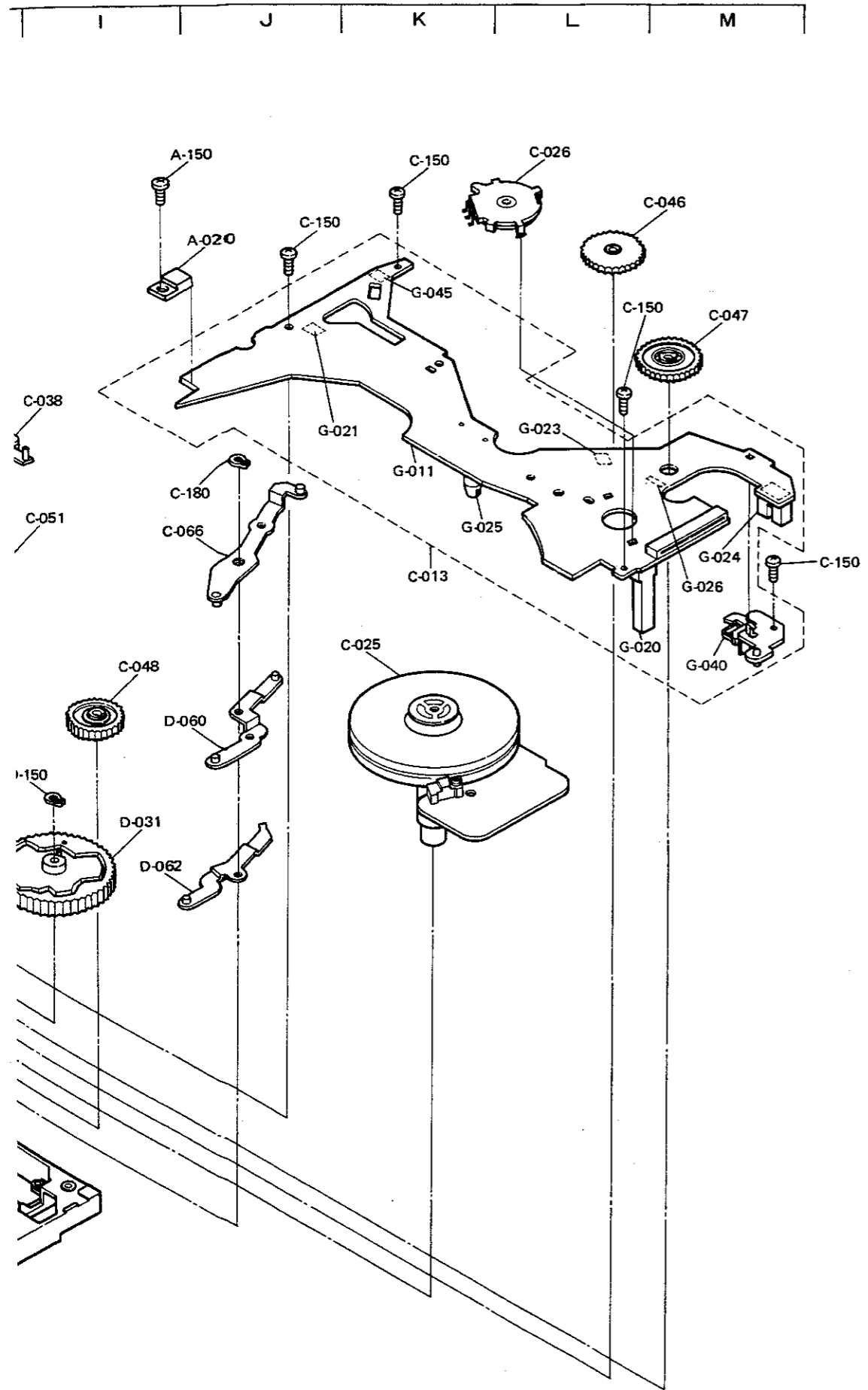
ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
C-039	641C796010	○ D-2	LEVER-TENS		01
C-041	641C991010	○ J-4	ARM-GEAR-TU-G2		01
C-042	641C804010	○ F-5	LEVER-REC-SAFETY		01
C-043	641C806010	○ L-1	CAP-ARM-PINCH		01
C-044	641C861010	○ E-1	HOLDER-T-BAND		01
C-045	621D509010	○ L-3	GEAR-1		01
C-050	522C076020	○ H-2	UNIT-REEL-DISK		01
C-053	522C076040	○ I-3	UNIT-REEL-DISK		01
C-062	591B547010	○ F-3	ARM-TENSION		01
C-063	591B552010	○ F-1	BELT-TENS-BRAKE		01
C-069	592C930010	○ L-6	LEVER-TENS-TU		01
C-070	635D063010	○ I-5	NUT-TAPER		01
C-091	572D309010	○ H-4	SPRING-M-B		02
C-092	572D391010	○ E-2	SPRING-TENS-REG-S2		01
C-093	572D390010	○ I-4	SPRING-TENS-REG-T2		01
C-094	572D312010	○ F-3	SPRING-TENS		01
C-096	572D317010	○ K-5	SPRING-TU-G		01
C-097	572D318010	○ M-7	SPRING-ARM-A/C		01
C-098	572D328010	○ D-2	SPRING-REC-SAFETY		01
C-150	669D227010	○ M-3	SCREW-TS	M2.6 × 6	02
C-151	669D227030	○ C-4	SCREW-TS	M2.6 × 10	01
C-152	669D228010	○ E-1	SCREW-TS-SEMS	M2.6 × 6	01
C-154	669D285040	○ J-6	SCREW-TB-PAN	M2.6 × 8	03
C-160	674D081020	○ K-4	NUT-NYLON	M3 × 0.5	01
C-161	674D100010	○ L-6	NUT-NYLON-S	M4 × 0.7	01
C-175	552C007030	○ I-3	CUT-WASHER	2.5	01
C-180	685C009010	○ F-2	GRIP-RING		01
C-181	685C009020	○ L-1	GRIP-RING		01
A-040	299C025010	○ G-1	BRUSH		01
A-055	590A256020	○ A-6	UNIT-F/L-F		01
A-060	572D401010	○ I-4	SPRING-RS		01
A-070	641C906010	○ F-9	HOLDER-CARD		01
A-150	669D227010	○ G-1	SCREW-TS	M2.6 × 6	01
A-151	669D227020	○ A-5	SCREW-TS	M2.6 × 8	02

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\* Settled Service Parts

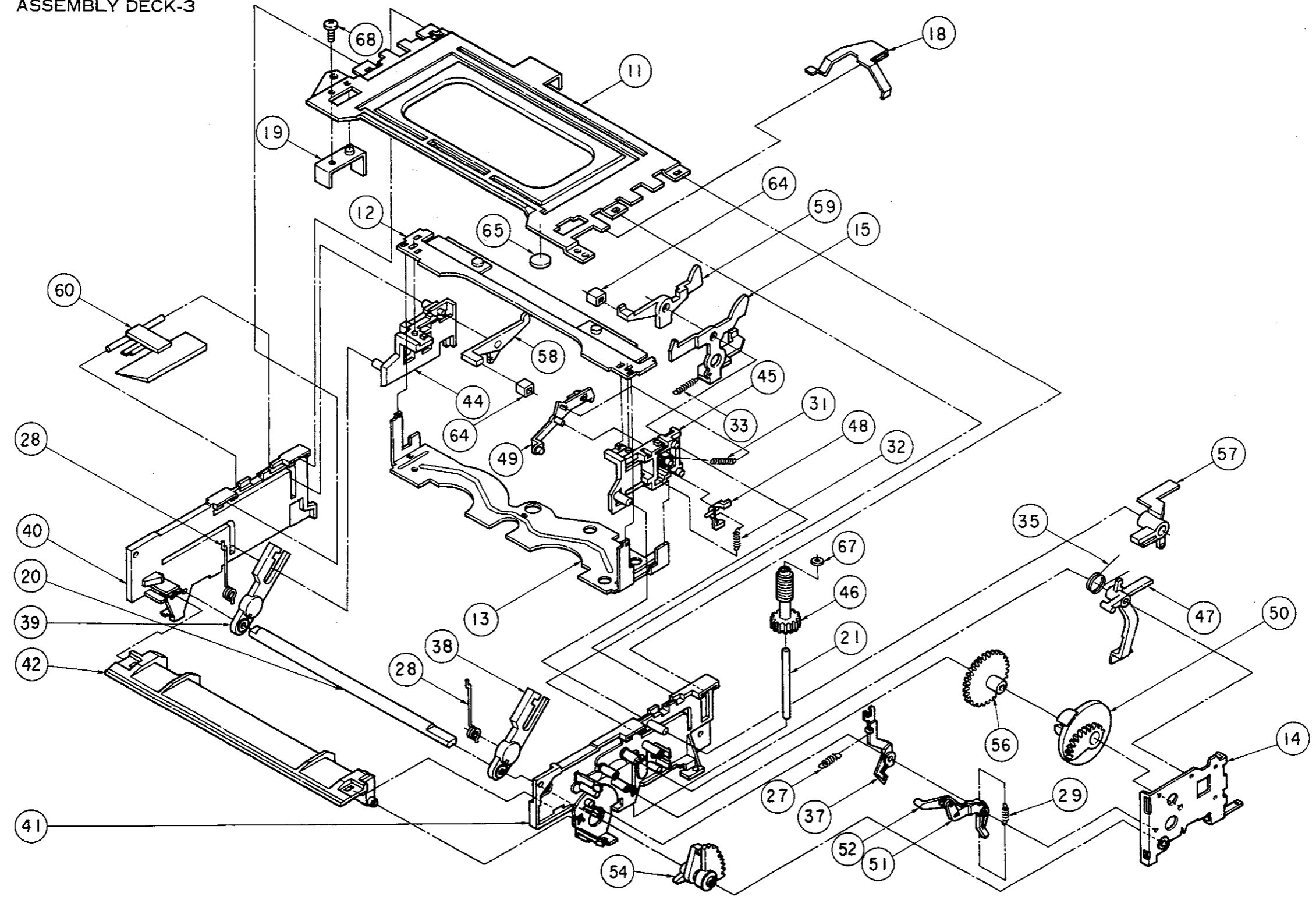
ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
B-150	669D431040	E-4	SCREW-SEMS	M2. 6×0. 45-10	03
D-030	641B310010	○ E-2	UNIT-LEVER-SHIFT		01
D-031	641B323010	○ I-5	CAM-MAIN-1		01
D-032	641C789020	○ D-4	PULLEY-GEAR		01
D-033	641C790020	○ D-3	PULLEY-BELT		01
D-034	641C815010	○ H-1	HOLDER-P-CAM		01
D-035	621D518010	○ G-2	GEAR-F/L-1		01
D-040	522C077020	○ E-5	UNIT-GEAR-IDLER		01
D-041	522C083010	○ F-1	UNIT-GEAR-REEL-S		01
D-060	591B559010	○ I-5	LEVER-C		01
D-061	591B567010	○ G-3	LEVER-F/L-ID		01
D-062	592C830010	○ I-6	LEVER-RS		01
D-063	596D057010	○ D-5	WASHER-R	T=0. 3	01
D-090	572D306010	○ D-6	SPRING-SHIFT		01
D-150	685C009010	○ H-5	GRIP-RING		01
D-170	552C010040	○ D-4	WASHER-THRUST	6. 7×12×0. 13	01
D-175	552C007030	○ D-3	CUT-WASHER	2. 5	04
D-180	669D227010	○ E-2	SCREW-TS	M2. 6×6	01
C-013	928C510070	○ K-4	ASSY-PWB-DECK		01
G-011	240A651010	○ K-3	PWB-DECK		01
G-020	268P014020	○ L-4	TRANSISTOR	0571 PN205L-(NC)	01
G-021	268P014020	○ J-3	TRANSISTOR	0572 PN205L-(NC)	01
G-023	268P044010	○ L-3	PHOTO-INTERRUPTER	0574 OM2270-R	01
G-024	268P045010	○ M-4	PHOTO-INTERRUPTER	0575 GP1L52	01
G-025	264P307020	○ K-4	DIODE-LE	D570 GL-451	01
G-026	264P515010	○ M-4	DIODE	D571 MA165	01
G-040	299P124010	○ M-4	LATCH-MAGNET	L570	01
G-045	439P020010	○ K-2	SW-LIMIT	SW571	01
C-025	288P117010	○ K-4	MOTOR-CP	M470	01
C-026	439P019010	○ L-1	SW-MODE-SELECT-F	SW570	01
C-034	641B324010	○ H-5	CAM-MAIN-2		01
C-038	641C795010	○ I-3	LEVER-IDLER-S		01
C-046	621D517010	○ M-1	GEAR-F/L-2		01
C-047	621D518010	○ M-2	GEAR-F/L-3		01
C-048	621D519010	○ I-4	GEAR-F/L-4		01
C-051	522C078040	○ I-3	UNIT-GEAR-REEL		01
C-060	591B543010	○ A-5	ARM-LOAD-S		01
C-061	591B544010	○ B-6	ARM-LOAD-T		01
C-064	591B554010	○ B-3	PLATE-CAM-C		01
C-065	591B557010	○ F-4	ARM-GEAR-LOAD		01
C-066	591B558010	○ J-4	LEVER-B		01
C-067	592C949010	○ B-1	UNIT-PLATE-CAM-B3		01
C-075	521D062010	○ B-4	BELT-REEL		01
C-095	572D313010	○ B-2	SPRING-CAM-C		01
C-150	669D227010	○ J-2	SCREW-TS	M2. 6×6	04
C-171	552C008020	○ L-2	WASHER-THRUST	2. 0×0. 13	01
C-180	685C009010	○ M-4	GRIP-RING		04
C-182	552C009050	○ F-4	CUT-WASHER		01
A-020	260P630010	○ J-2	TRANSISTOR	0971 2SD2012	01
A-061	572D404010	○ B-1	SPRING-B-RS		01
A-071	641C928010	○ B-1	LEVER-B-RS		01
A-150	669D227010	○ I-1	SCREW-TS	M2. 6×6	01



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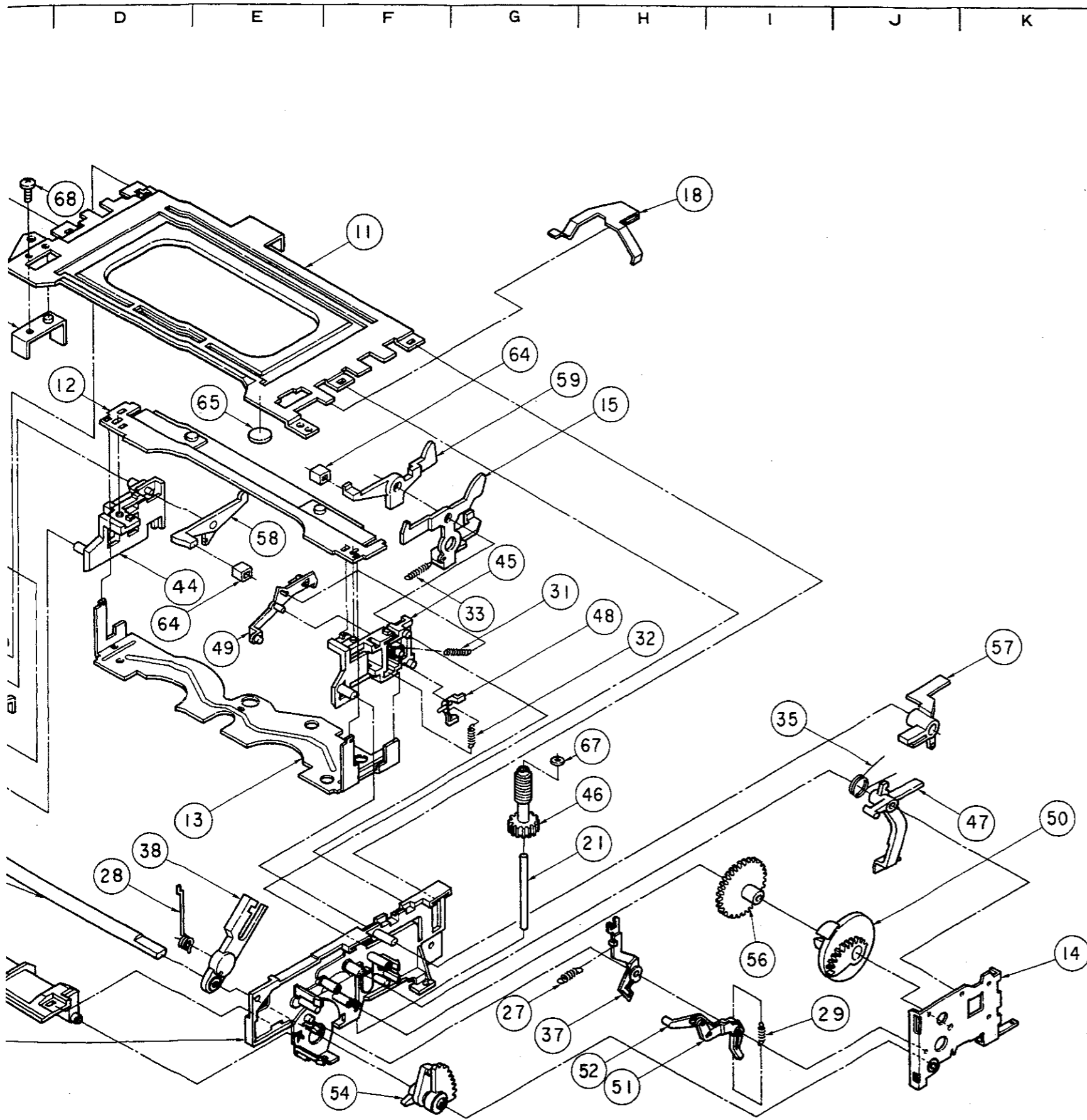
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ASSEMBLY DECK-3



\* Settled Service

ITEM	PARTS No.
11	591B545010
12	592C758010
13	591B546010
14	591B542010
15	592C851010
18	596D150010
19	596D217010
20	631D134010
21	631D135010
27	(not used)
28	572D301010
29	572D389010
31	572D304010
32	572D305010
33	572D380010
35	572D367010
37	(not used)
38	641B315010
39	641B315020
40	641A110010
41	641A109010
42	641B306010
44	641B309010
45	641B307010
46	621D513010
47	621D514010
48	621D515010
49	641C794010
50	641C793010
51	641C897010
52	641C898010
54	641C858010
56	641C814010
57	641C857010
58	621D585010
59	621D586010
60	641C878010
64	642D494010
65	(not used)
67	552C001040
68	-----



\* Settled Service Parts

ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
11	591B545010	F-2	PLATE-ROOF		01
12	592C758010	D-3	PLATE-UPPER		01
13	591B546010	E-7	PLATE-BOTTOM		01
14	591B542010	K-8	PLATE-SIDE-TU		01
15	592C851010	H-3	LEVER-LOCK-FL		01
18	596D150010	H-2	PLATE-EARTH		01
19	596D217010	C-3	PLATE-GUARD		01
20	631D134010	A-6	SHAFT-FL		01
21	631D135010	H-7	SHAFT-WORM		01
27	(not used)	G-8			
28	572D301010	A-5	D-7 SPRING-FL		02
29	572D389010	J-8	SPRING-DOOR-SUB		01
31	572D304010	G-5	SPRING-OPENER-LID		01
32	572D305010	H-5	SPRING-JUT-FL		01
33	572D380010	G-5	SPRING-LEVER-LOCK		01
35	572D367010	I-6	SPRING-LEVER-SW		01
37	(not used)	G-8			
38	641B315010	D-7	ARM-FL		01
39	641B315020	A-7	ARM-FL		01
40	641A110010	A-6	HOLDER-SIDE-SP		01
41	641A109010	A-8	HOLDER-SIDE-TU		01
42	641B306010	A-7	GUIDE-INSERT		01
44	641B309010	D-5	HOUSING-CASSETTE-SP		01
45	641B307010	G-5	HOUSING-CASSETTE-TU		01
46	621D513010	H-6	GEAR-WORM-FL		01
47	621D514010	K-7	LEVER-SW-FL		01
48	621D515010	H-5	JUT		01
49	641C794010	E-5	OPENER-LID-CAS		01
50	641C793010	K-7	GEAR-DRIVE		01
51	641C897010	H-9	ARM-FL-DOOR-A		01
52	641C898010	H-9	ARM-FL-DOOR-B		01
54	641C858010	F-9	ARM-LOCK		01
56	641C814010	I-8	GEAR-W-H-F/L		01
57	641C857010	K-5	LEVER-PICK-CAS		01
58	621D585010	E-4	LEVER-CAS-SP		01
59	621D586010	G-3	LEVER-CAS-TU		01
60	641C878010	A-4	STOPPER-SP-FL		01
64	642D494010	D-5	G-3 RUBBER-FL		02
65	(not used)	E-3			
67	552C001040	H-6	WASHER-THRUST	3 TO. 25	01
68	-----	D-2	SCREW	2. 6-5	01

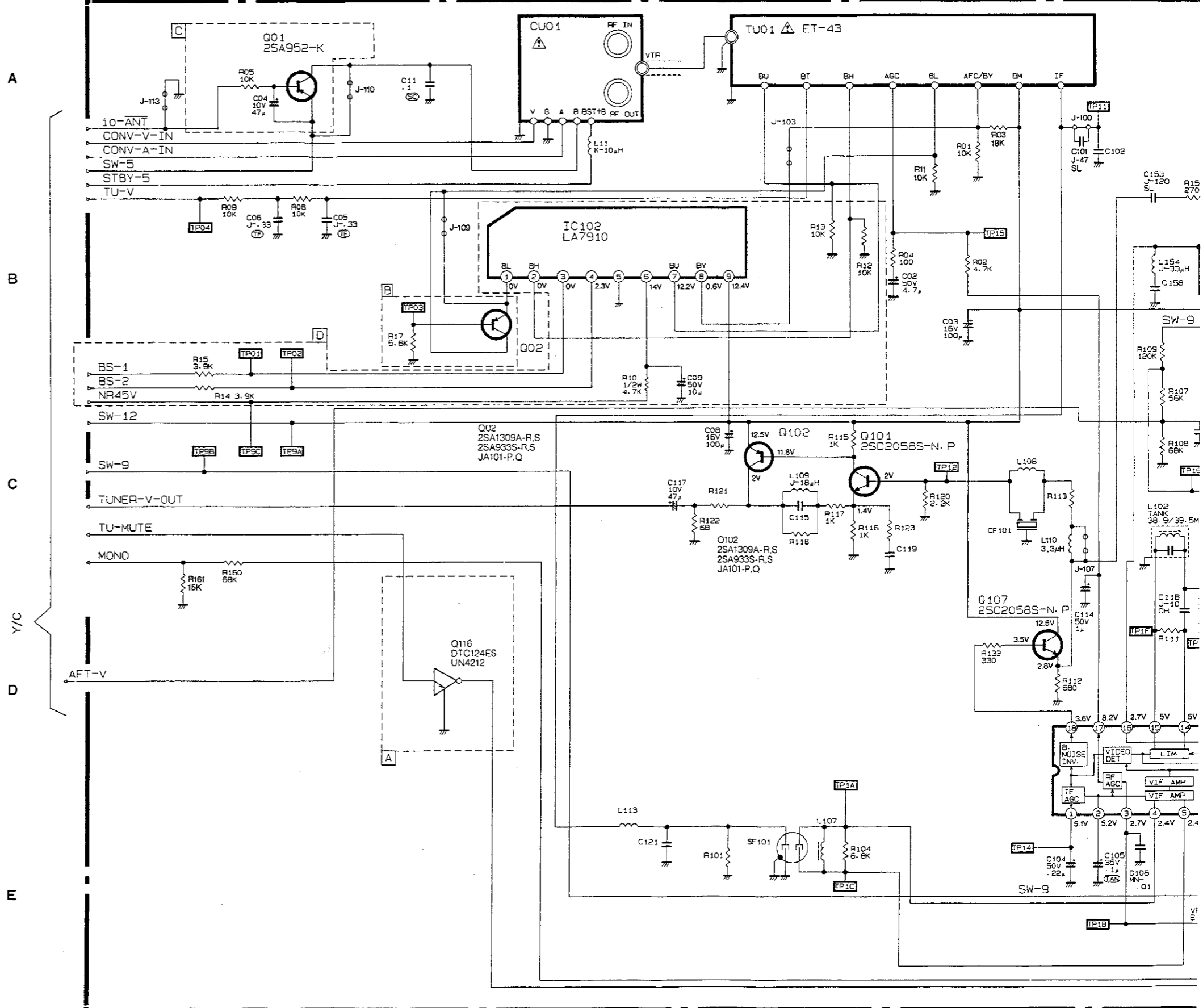


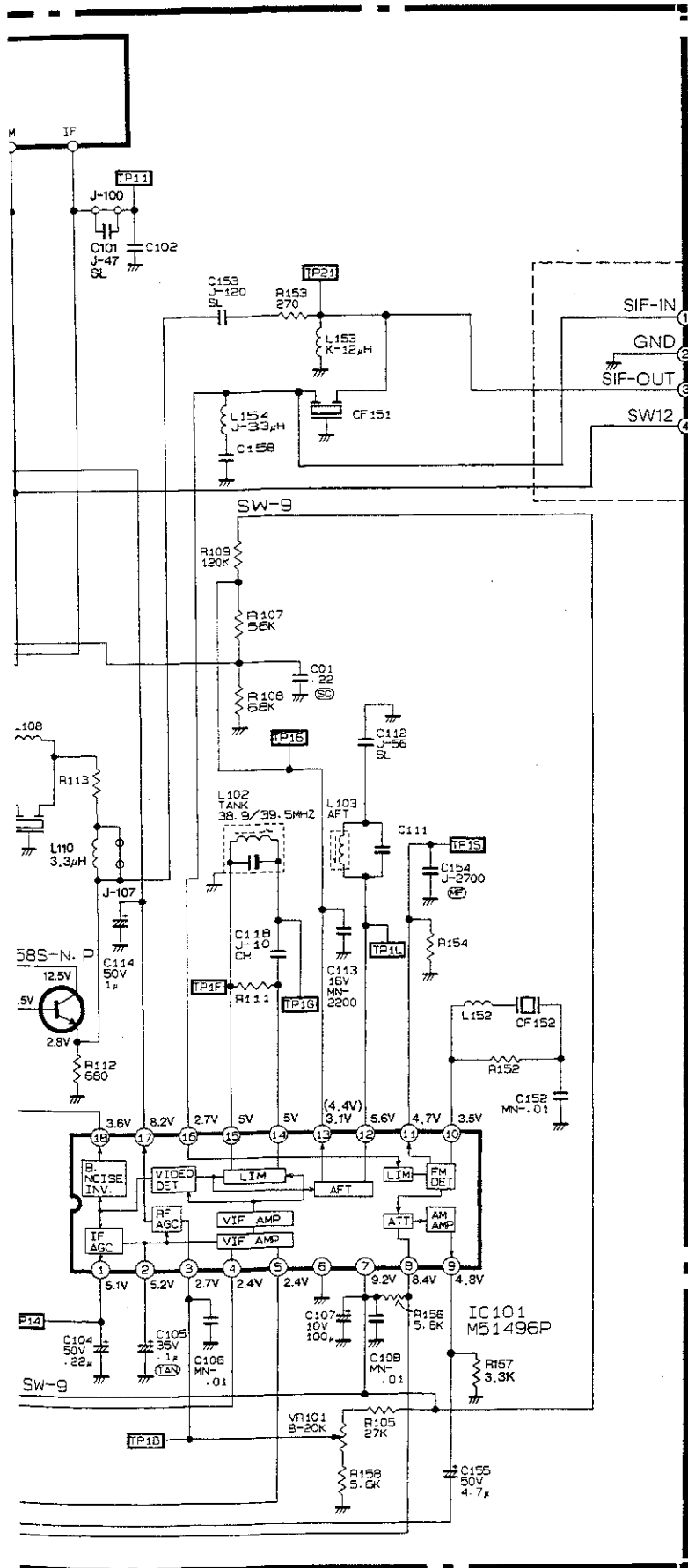


(TUNER/VIF) ○: Employed ×: Not employed

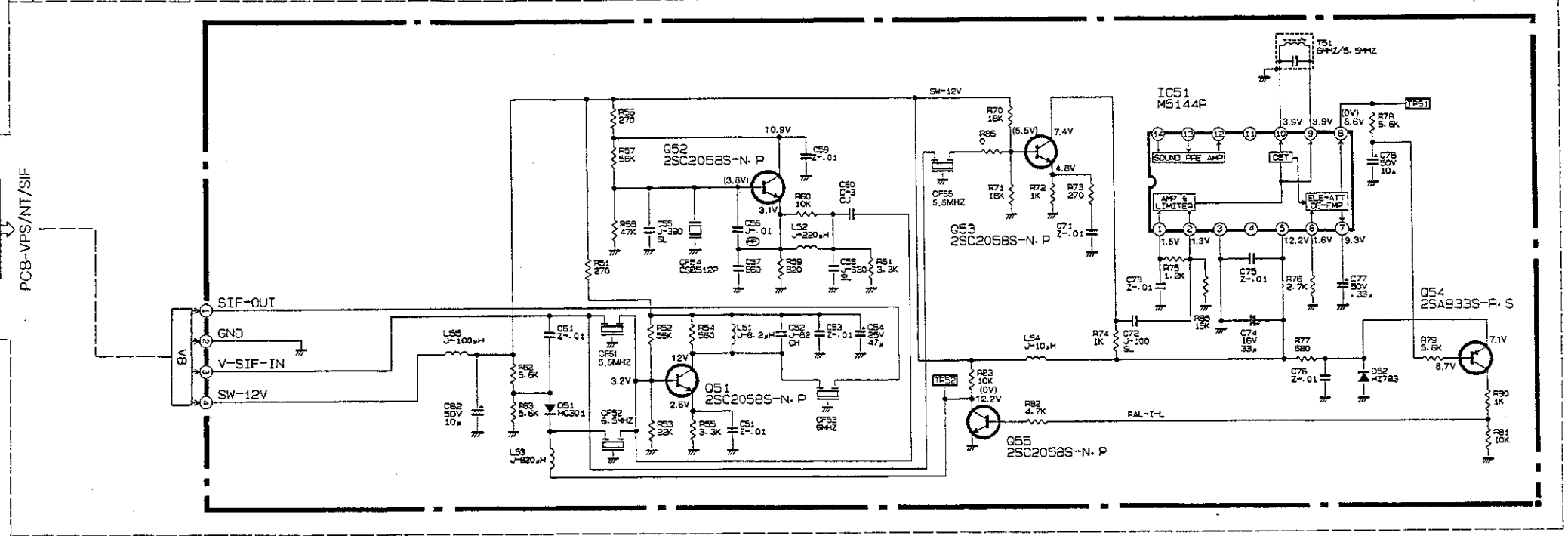
MODELS SYMBOLS	HS-M16							HS-MX2	MX1	
	(Y)	(E)	(P)/(S)	(IR)	(T)/(M)	(B)	(G)	(A)	(NZ)	(MKII)
A AREA	○	○	×	×	×	×	○	×	×	×
B AREA	×	○	×	×	×	×	×	×	×	×
C AREA	×	×	×	×	○	×	×	○	○	×
D AREA	○	○	○	○	○	×	○	○	○	○
E AREA	×	×	×	×	×	×	×	×	×	○
J-100	×	×	○	×	○	×	×	○	○	×
J-103	×	○	×	×	×	×	×	×	×	×
J-107	×	○	○	○	○	○	×	○	○	×
J-109	○	×	○	○	○	×	○	○	○	○
J-110	○	○	○	○	×	○	○	×	×	○
J-113	○	○	○	○	×	○	○	×	×	○
C101	J-47SL	J-47SL	×	J-47SL	×	J-47SL	J-47SL	×	×	J-47SL
C102	J-47SL	J-47SL	J-33SL	J-47SL	J-33SL	J-47SL	J-47SL	×	J-33SL	J-47SL
C111	J-68RH	J-68RH	J-68RH	J-68RH	J-68RH	J-68RH	J-68RH	J-82RH	J-68RH	J-68RH
C115	J-39SL	J-39SL	J-47SL	J-33SL	J-47SL	J-33SL	J-39SL	J-39SL	J-47SL	J-39SL
C119	J-82SL	×	J-120SL	J-82SL	J-120SL	J-47SL	J-82SL	J-47SL	J-120SL	J-82SL
C121	J-5PCH	C-8PCH	C-4PCH	C-4PCH	C-4PCH	C-8PCH	J-5PCH	C-5PCH	C-4PCH	J-5PCH
C158	J-100SL	J-100SL	J-100SL	J-82SL	J-100SL	J-82SL	J-100SL	J-100SL	J-100SL	J-82SL
CF101	5.5/5.74/6.5	5.5/5.74MHz	5.5MHz	6.0MHz	5.5MHz	6.0MHz	5.5/5.74/6.5	5.5/5.74MHz	5.5MHz	5.5/5.74/6.5
CF151	5.5MHz	5.5MHz	5.5MHz	6.0MHz	5.5MHz	6.0MHz	5.5MHz	5.5MHz	5.5MHz	×
CF152	5.5MHz	5.5MHz	5.5MHz	6.0MHz	5.5MHz	6.0MHz	5.5MHz	5.5MHz	5.5MHz	6.0MHz
L107	K-2.2μH SHIELD	K-1.8μH SHIELD	K-2.2μH SHIELD	K-2.2μH SHIELD	K-2.2μH SHIELD	K-1.8μH SHIELD	K-2.2μH SHIELD	K-2.2μH SHIELD	K-2.2μH SHIELD	K-2.2μH SHIELD
L108	J-5.6μH	J-10μH	J-15μH	J-12μH	J-15μH	J-12μH	J-5.6μH	J-10μH	J-15μH	J-5.6μH
L110	○	×	×	×	×	×	○	×	×	○
L113	J-1.5μH	J-1.5μH	J-1.8μH	J-1.5μH	J-1.8μH	J-1.2μH	J-1.5μH	J-1.8μH	J-1.8μH	J-1.8μH
L152	J-47μH	J-47μH	J-47μH	J-33μH	J-47μH	J-33μH	J-47μH	J-47μH	J-47μH	J-33μH
R03	18K	×	18K	18K	18K	18K	18K	18K	18K	18K
R11	10K	10K	10K	10K	10K	×	10K	10K	10K	10K
R101	1.8K-F	3.9K-F	2.7K-F	1.5K-F	2.7K-F	1.5K-F	1.8K-F	2.2K	2.7K-F	1.8K-F
R111	6.8K	6.8K	2.2K	6.8K	2.2K	6.8K	6.8K	6.8K	2.2K	6.8K
R113	220	360-F	820	680	820	820	220	270	820	220
R118	3.3K	1.2K	820	3.9K	820	3.9K	3.3K	3.3K	820	3.3K
R121	150	120	120	150	120	120	150	150	120	150
R123	470	×	1.5K	470	1.5K	1.5K	470	2.7K	1.5K	470
R152	5.6K	5.6K	5.6K	2.7K	5.6K	2.7K	5.6K	5.6K	5.6K	2.7K
R154	47K	47K	47K	82K	47K	82K	47K	47K	47K	82K

(TUNER/VIF) PCB-MAIN HS-M16





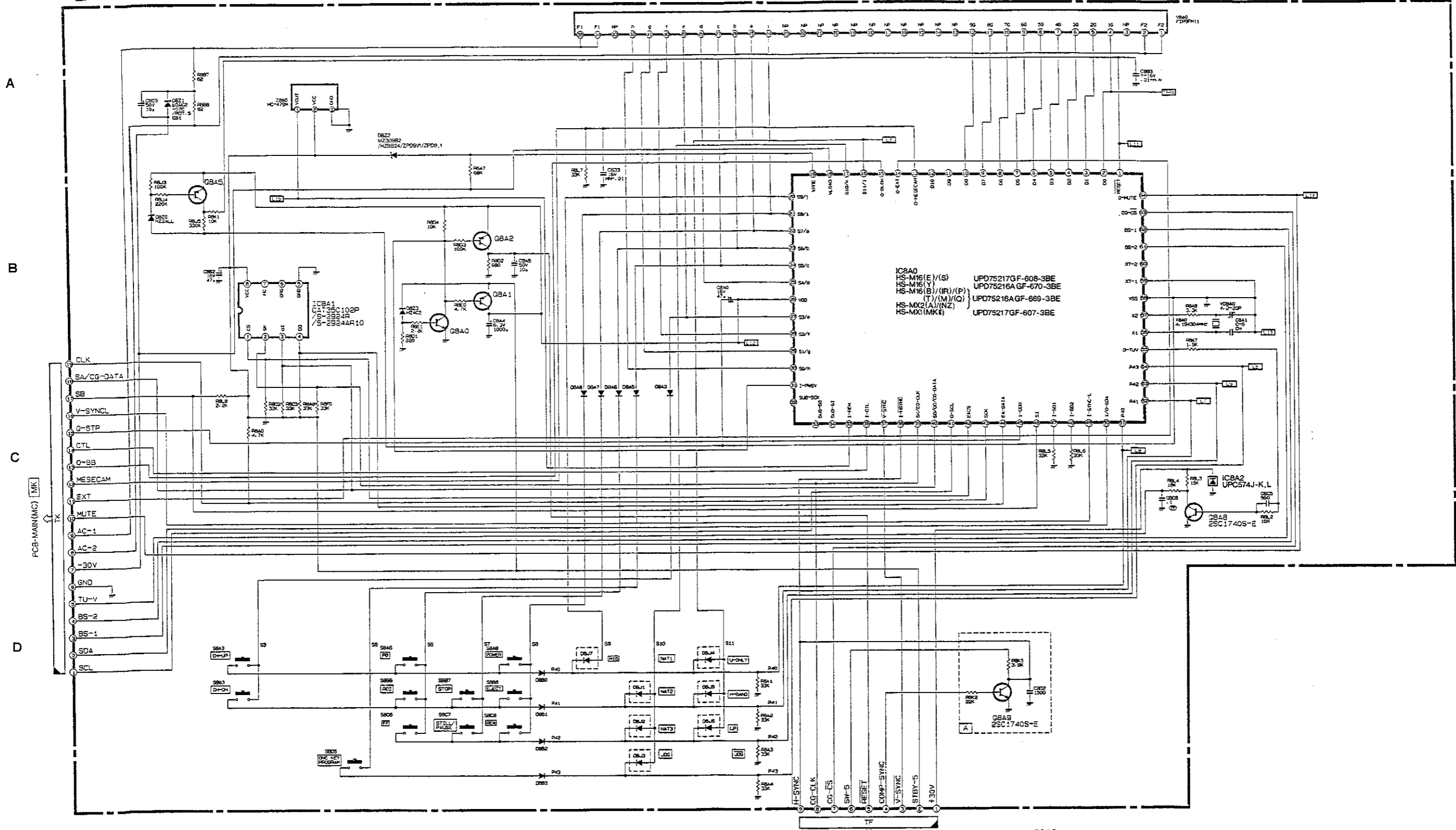
(SIF) PCB-VPS/NT/SIF



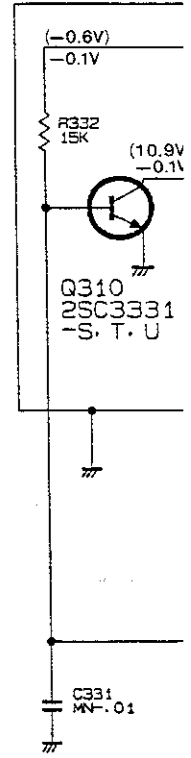
TU01 TERMINAL

TERMINAL	HS-M16							HS-MX2		MX1
	(Y)	(E)	(S)/(P) (Q)	(IR)	(G)	(T)/(M)	(B)	(A)	(NZ)	(MKII)
BY	x	o	x	x	x	x	x	x	x	x
BL	o	o	o	o	o	o	x	o	o	o
AFC	o	x	o	o	o	o	o	o	o	o
BH	o	o	o	o	o	o	x	o	o	o
BU	o	o	o	o	o	o	x	o	o	o

PCB-TIMER



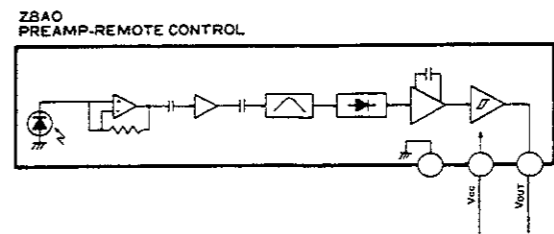
(AUDIO)



MODELS	HS-M16					HS-MX2	HS-MX1			
SYMBOL	(Y)	(B)	(G)	(IR)	(E)	(T),(M)	(S)	(P),(Q)	(A),(NZ)	(MK II)
D8J1	○	x	x	x	x	○	x	○	x	x
D8J2	x	x	x	x	x	○	x	x	○	x
D8J3	x	x	○	x	○	x	x	x	x	x
D8J4	x	○	x	x	x	x	x	x	x	x
D8J5	x	x	x	x	x	x	x	x	x	x
D8J6	x	x	x	x	x	x	x	x	x	x
D8J7	x	x	x	x	○	x	x	x	x	x
A AREA	○	○	x	○	○	x	○	x	x	x

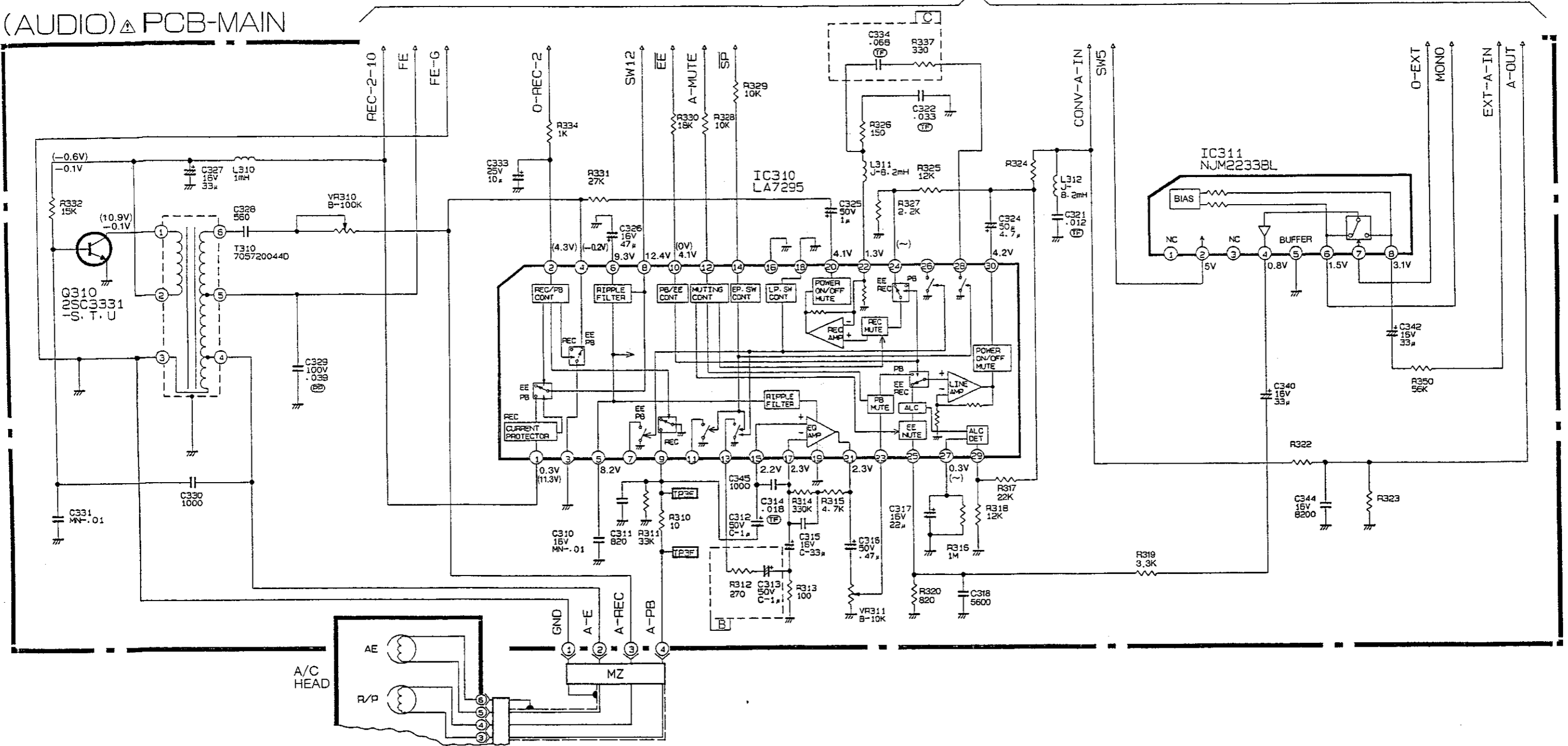
○ : Employed  
x : Not employed

All diodes are 1SS252/1N4531 unless otherwise specified.  
All PNP transistors are 2SA1309A-R/S/2SA833S-R/S/JA101-P,Q unless otherwise specified.  
All NPN transistors are 2SC3311A-R/S/2SC1740S-R/S/JCS01-P,Q unless otherwise specified.



MODELS	(Y),(E),(C)
SYMBOL	(Y),(E),(C)
C345	
R329	
B AREA	
C AREA	
R322	
R323	
R324	

(AUDIO) PCB-MAIN

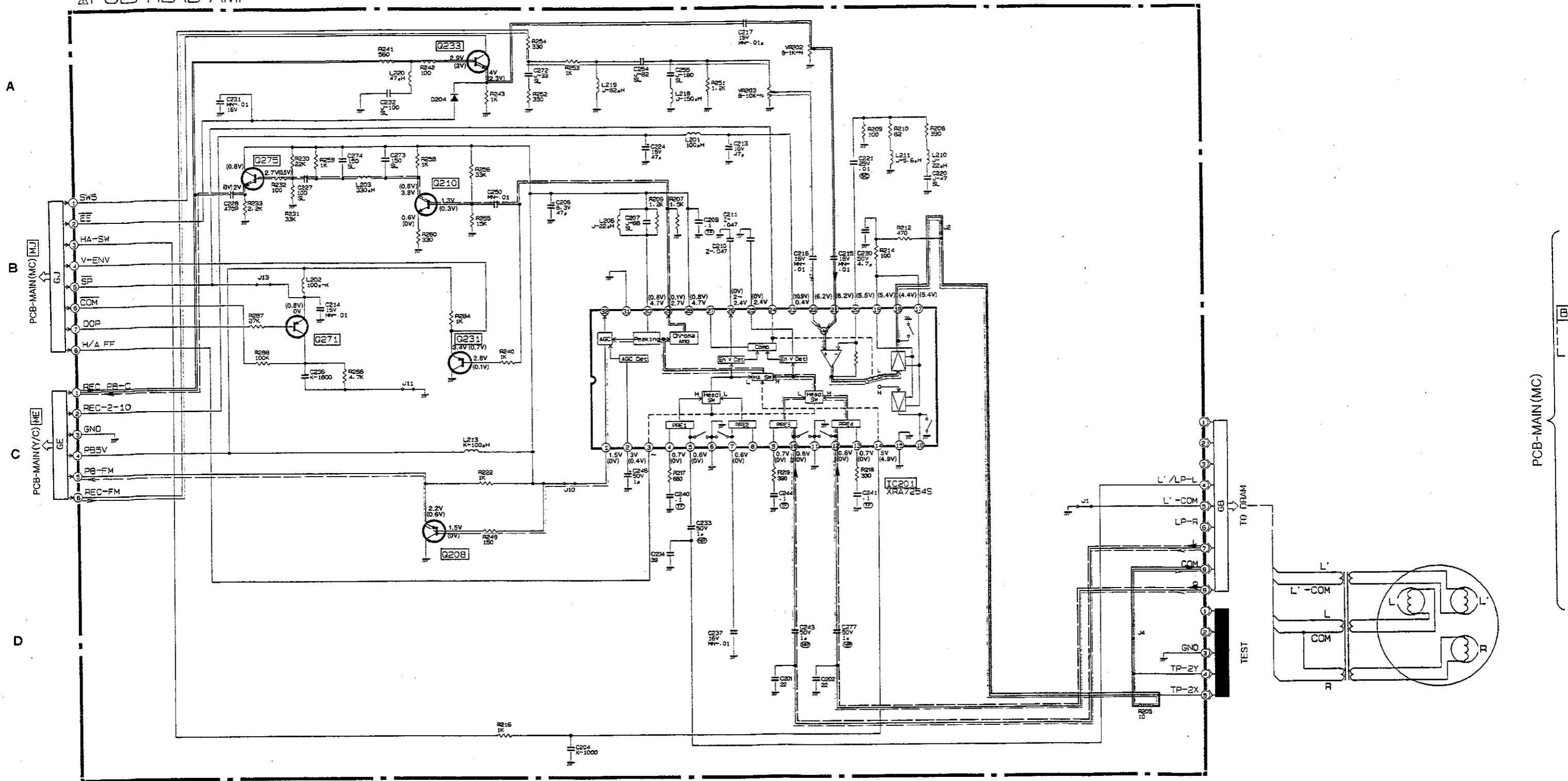


○ : Employed  
 × : Not employed

MODELS	HS-M16			HS-MX2	HS-MX1
SYMBOL	(Y),(E),(S),(P),(T),(O),(M)	(B),(IR)	(G)	(A),(NZ)	(MK II)
C345	x	x	○	x	x
R329	x	x	x	x	x
B AREA	x	x	x	x	x
C AREA	x	x	x	x	x
R322	1K	270	1K	1K	1K
R323	3.9K	4.7K	3.9K	3.9K	3.9K
R324	680	1K	680	680	680



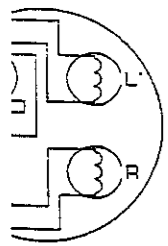
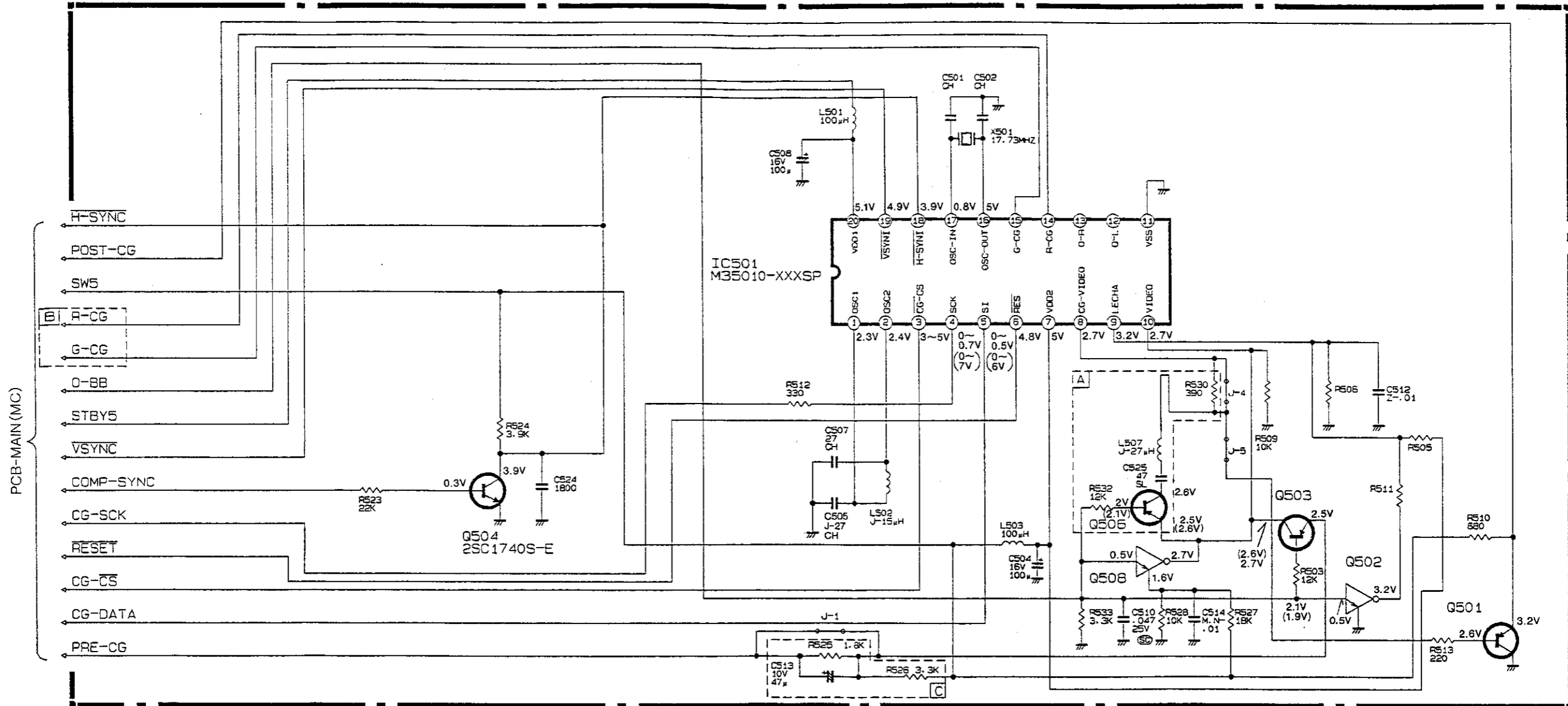
PCB-HEAD AMP



All NPN transistors are 2SC2058S-N.P unless otherwise specified.  
 All PNP transistors are 2SA9335-R.S/2SA1309A-R.S unless otherwise specified.  
 All diodes are 1SS252 unless otherwise specified.

E

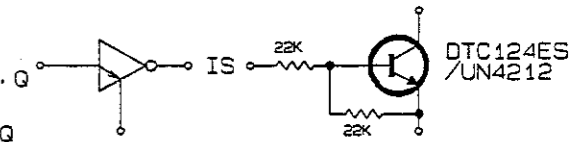
(CG) PCB-MAIN



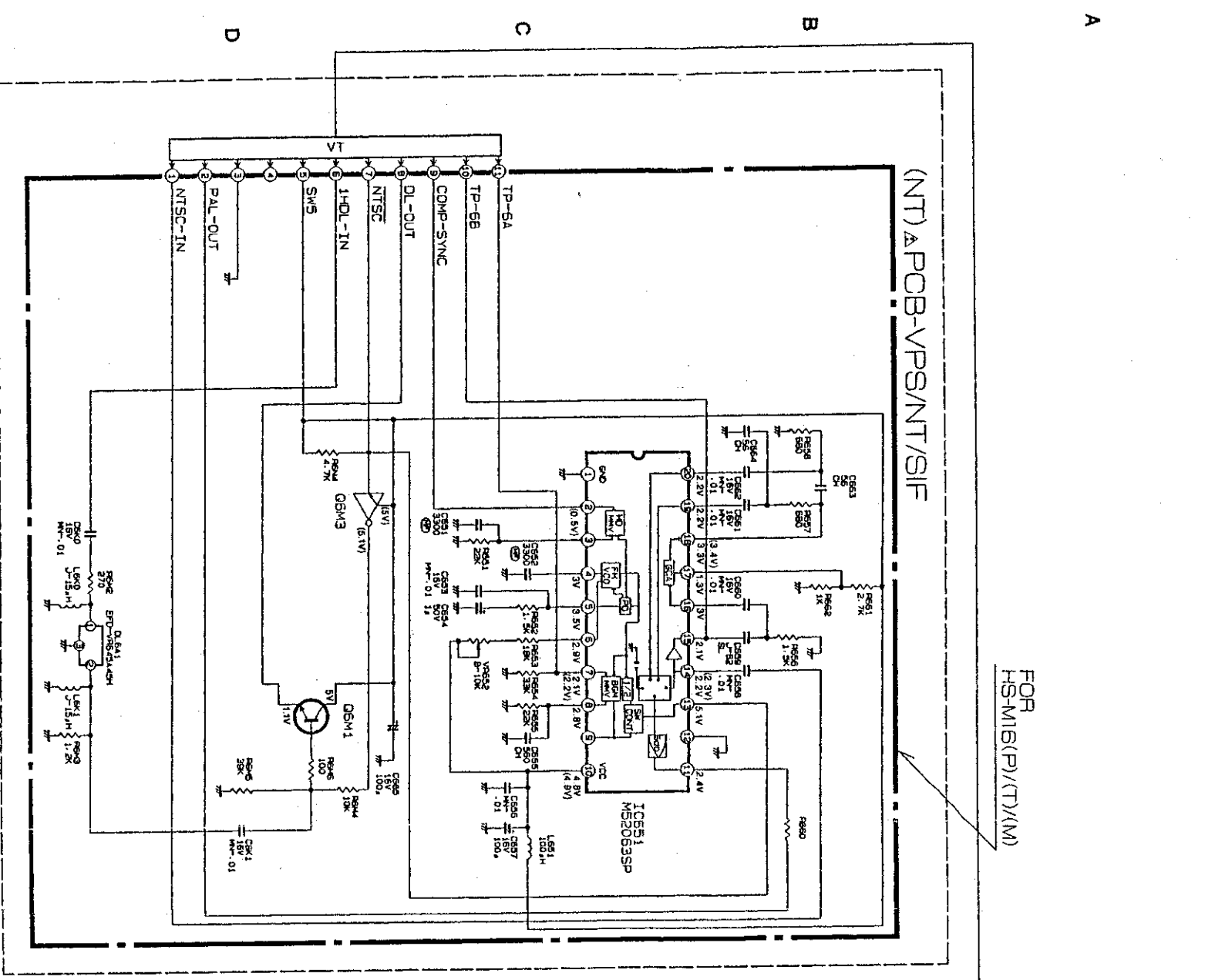
(CG) ○: Employed ×: Not employed

MODELS	SYMBOL No.	A AREA	B AREA	C AREA	J-1	J-4	C512	IC501	R505	R506	R511
HS-M16(Y)/(E)/(S)/(P)/(M)/(Q)		○	×	×	○	×	○	051SP	680	1.2K	22K
HS-M16(B)/(IR)/(T)		×	×	×	○	○	×	051SP	680	1.2K	22K
HS-MX2(A)/(NZ)		×	×	×	○	○	×	051SP	680	1.2K	22K
HS-M16(G)		○	×	×	○	×	○	051SP	680	1.2K	22K
HS-MX1(MKII)		○	×	×	○	×	○	052SP	680	1.2K	22K

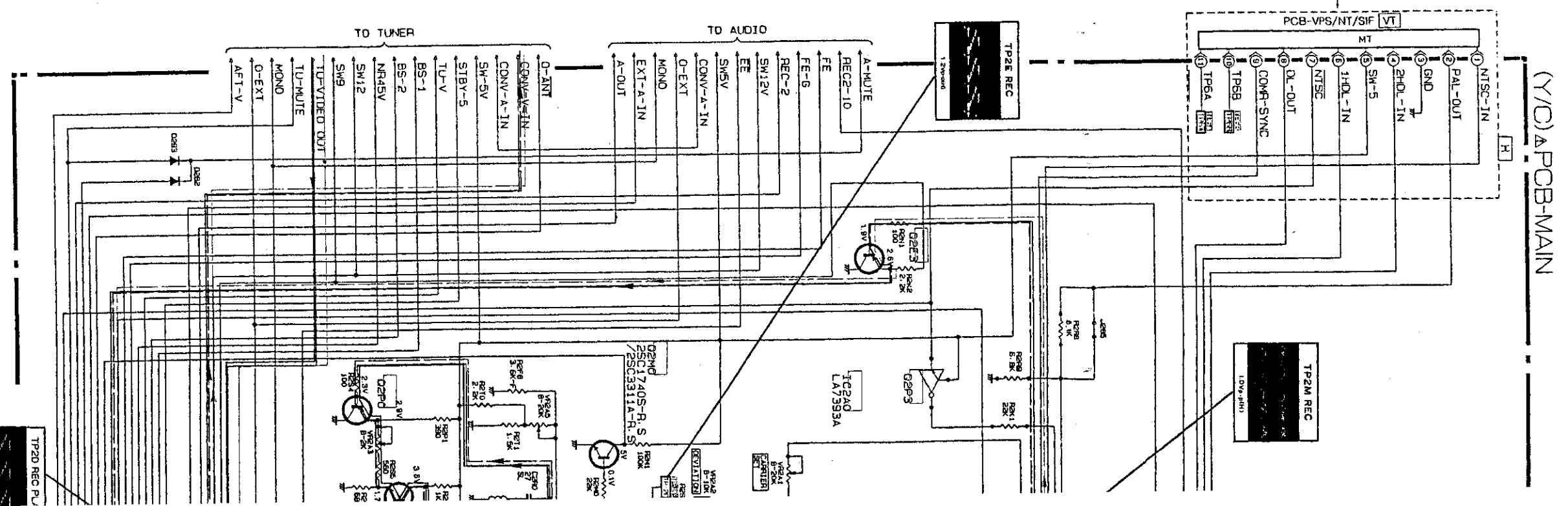
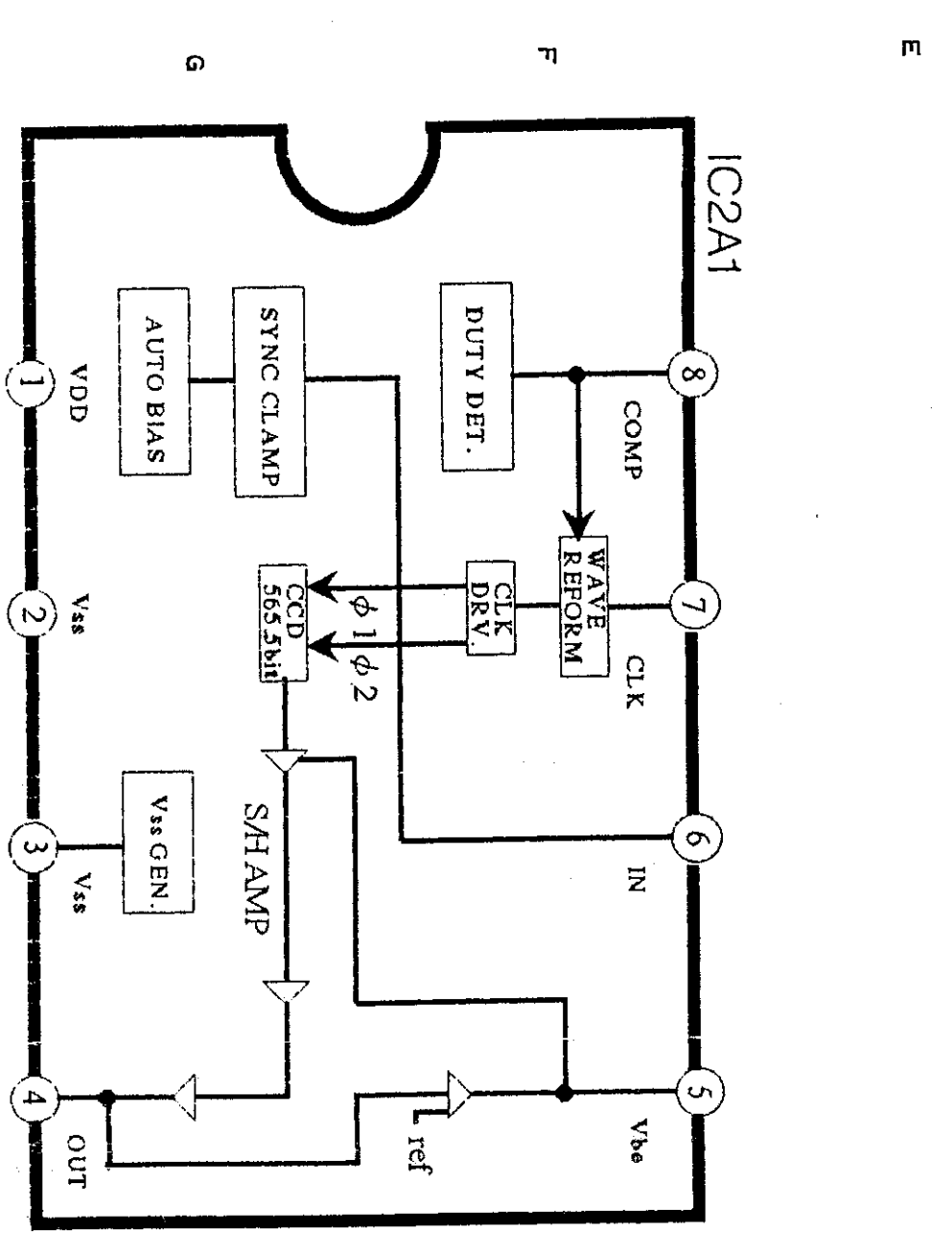
All NPN transistors are 2SC3311A-R, S/2SC1740S-R, S/JC501-P, Q unless otherwise specified.  
 All PNP transistors are 2SA1309A-R, S/2SA933S-R, S/JA101-P, Q unless otherwise specified.



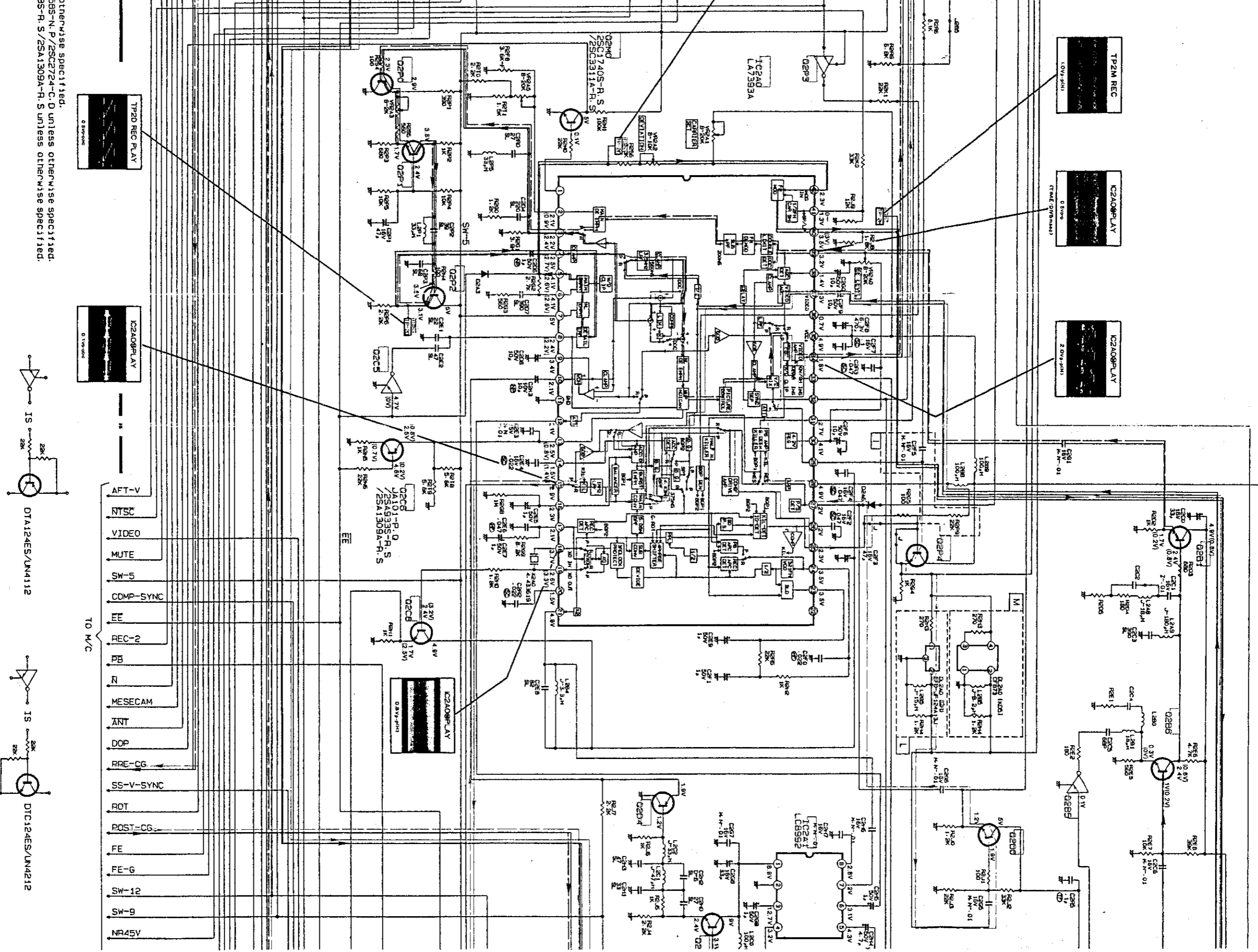
DTC124ES / UN4212



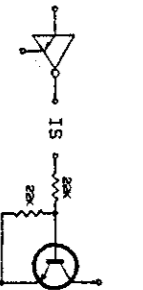
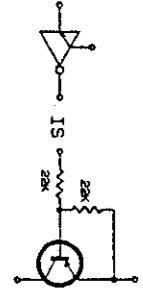
FOR HS-M16(P)/(T)/(M)



A1) Diodes are 1SS252 unless otherwise specified.  
 A2) NPN transistors are 2SC2058S-N/P/2SC2724-C-D unless c  
 A3) PNP transistors are 2SA933S-R-S/2SA1305A-R-S unless c

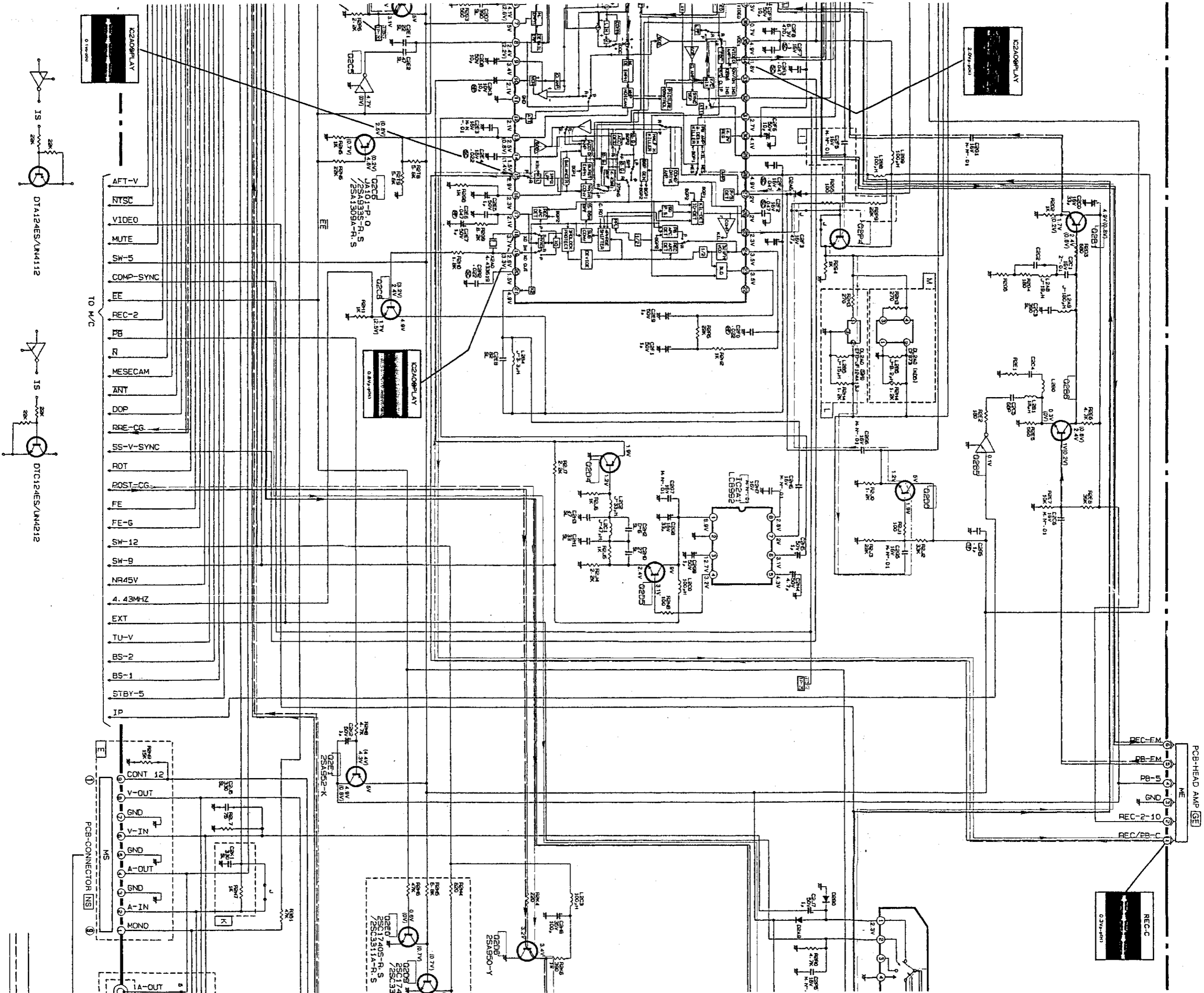


otherwise specified.  
 P/2SC724-C, D unless otherwise specified.  
 S-R, S/2SA1309A-R, S unless otherwise specified.



- AFT-V
- NTSC
- VIDEO
- MUTE
- SW-5
- COMP-SYNC
- FF
- REC-2
- PB
- R
- MESECAM
- ANT
- DOP
- PPE-CG
- SS-V-SYNC
- ROT
- POST-CG
- FE
- FE-G
- SW-12
- SW-9
- NR45V

TO M/C



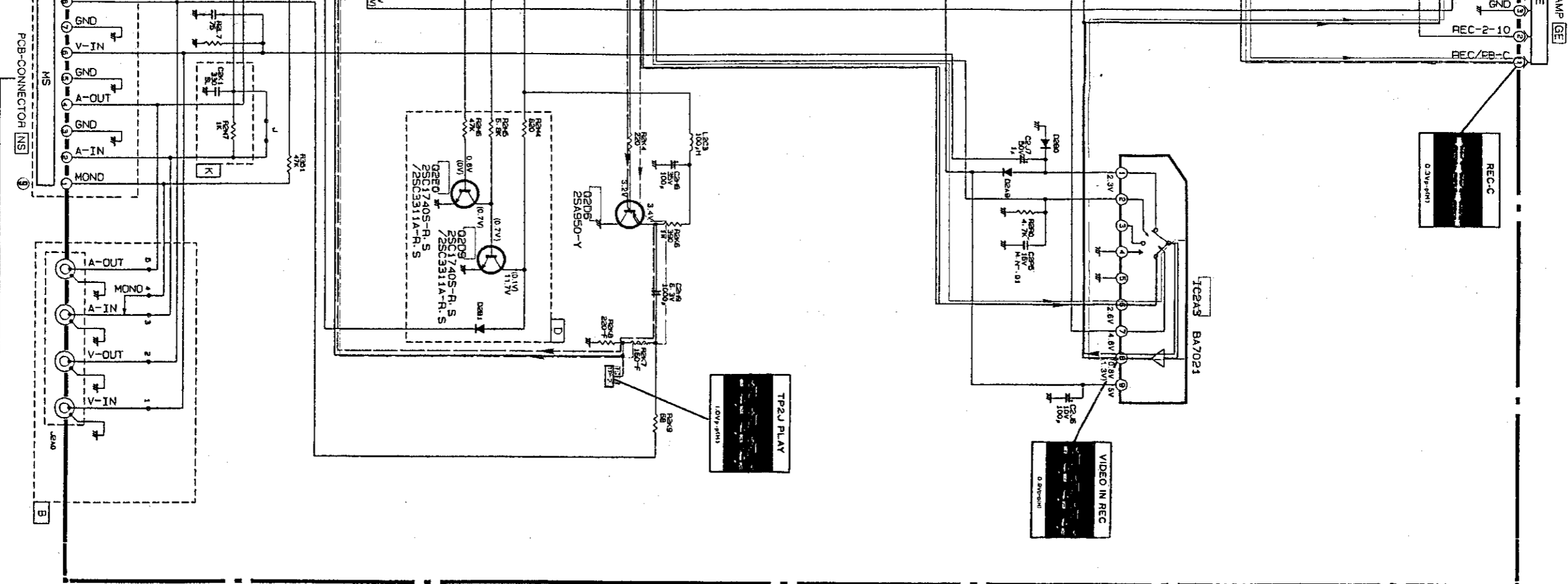
DTA124ES/UM4112

DTC124ES/UM4212

TO M/C

PCB-HEAD AMP

PCB-CONNECTOR

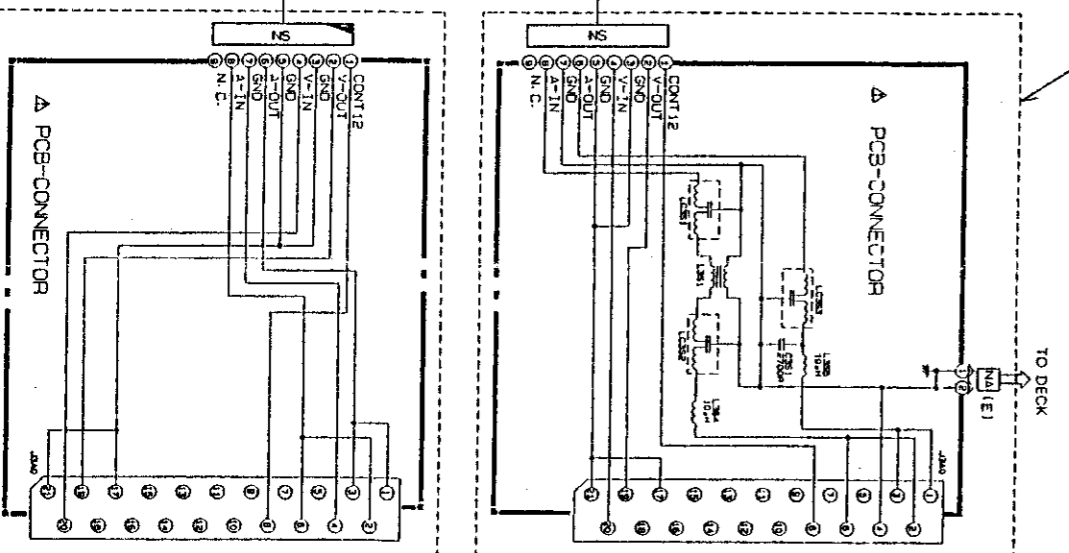


Recording of Luminance Signal  
 Playback of Luminance Signal  
 Recording of Color Signal  
 Playback of Color Signal

(Y/C) O: Employed x: Not employed

MODELS	HS-M16						MX2	MX1
	(Y) <sup>(S)</sup>	(E)	(B)/(IR)	(G)	(P)/(Q)	(T)/(M)		
B AREA	x		x	x				
D AREA							x	x
E AREA							x	x
H AREA	x		x	x			x	
I AREA	x		x	x			x	
K AREA							x	
L AREA	x		x	x				
M AREA							x	
N AREA							x	
J1							x	
J2							x	
J3							x	
J253								
J652								
C2C2	39SL	39SL	33SL	33SL	39SL	39SL		
C2C4	180	180	470	180	180	180		
D2A6			x				x	
L2B0	68	68	33	68	68	68		
Q2P3	x	x	x				x	
Q2P4	x	x	x				x	
R2D4	180	180	180	180	180	180		
R2D5	1.2K	1.2K	1K	1.2K	1.2K	1.2K		
R2E1	1.2K	1.2K	1K	1.2K	1.2K	1.2K		
R2G4	x	x	x				x	
R2G5	x	x	x				x	
R2K1	x	x	x				x	
R2R8	x	x	x				x	
R2R9	x	x	x				x	
R2N9							x	
R351	x	x	x				x	

FOR HS-M16(G)



1

2

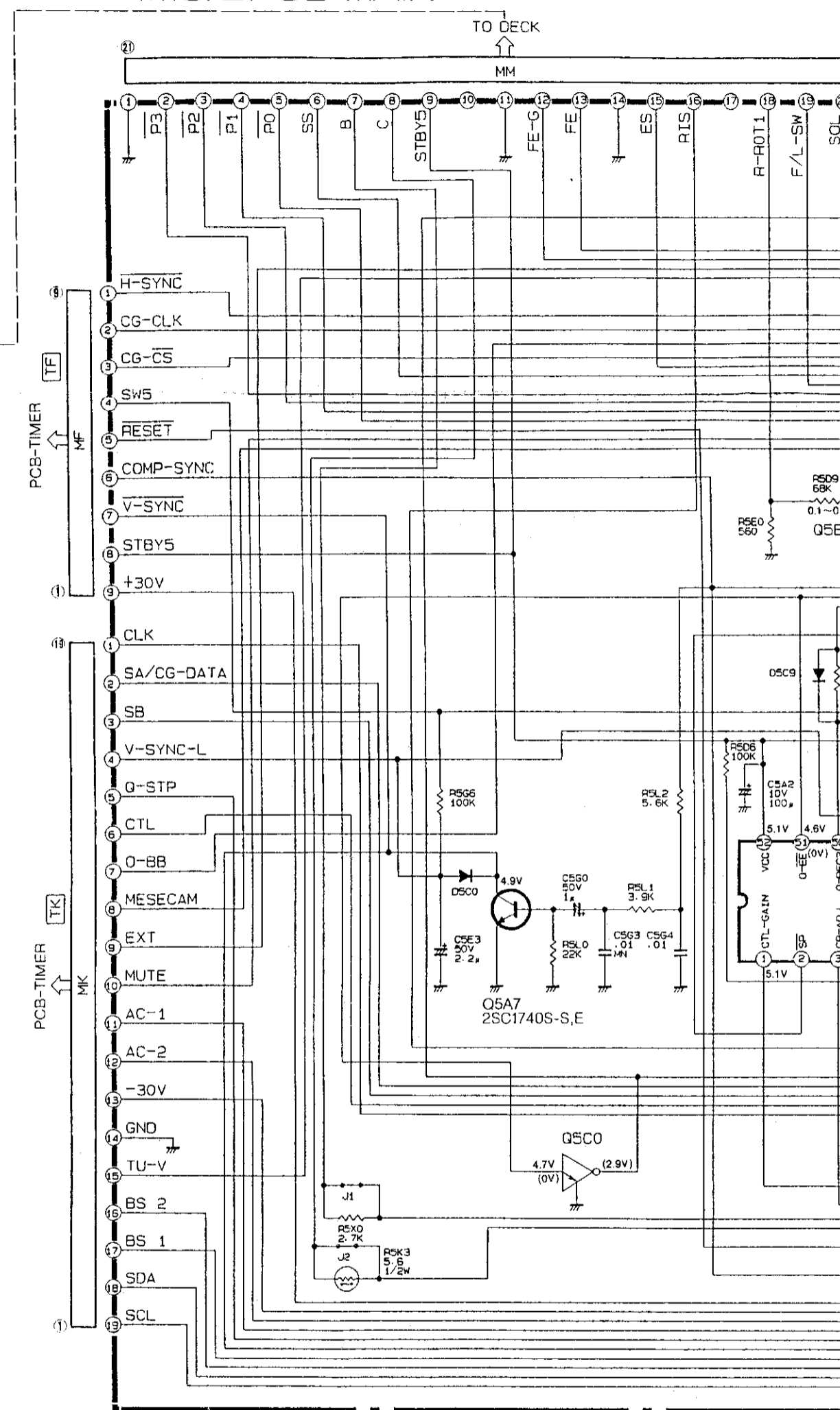
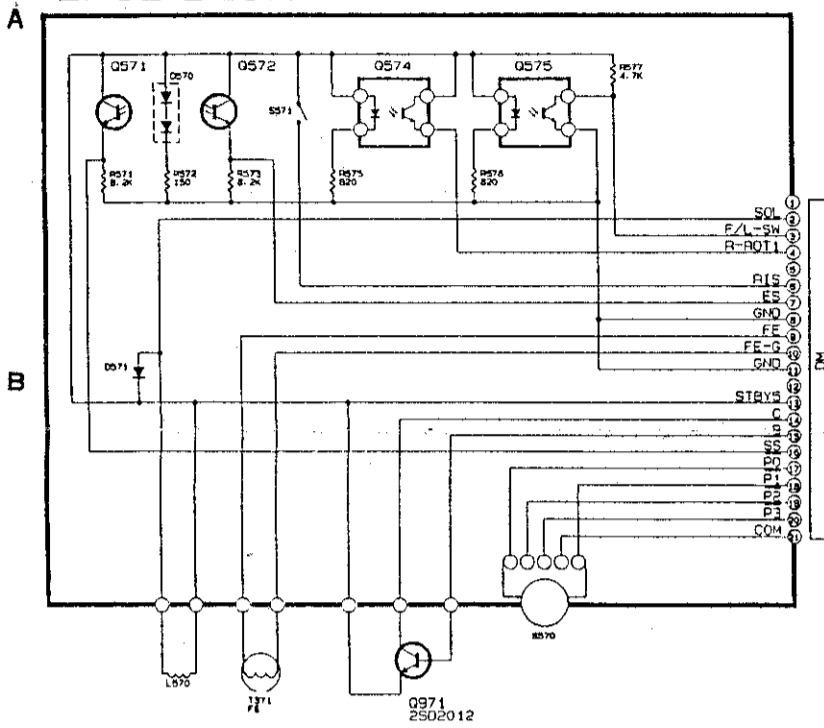
3

4

5

(MC) PCB-MAIN

PCB-DECK



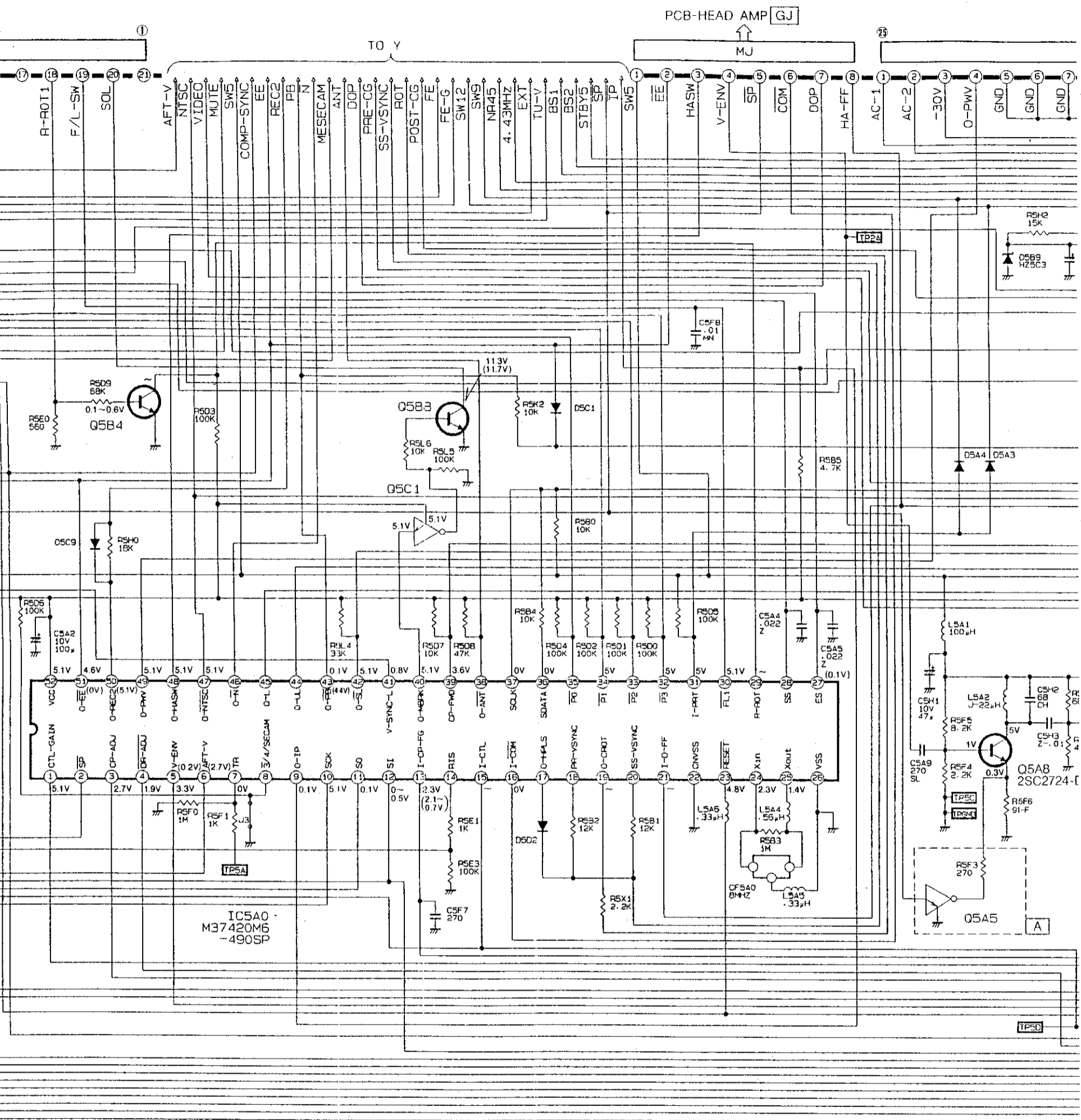
C

D

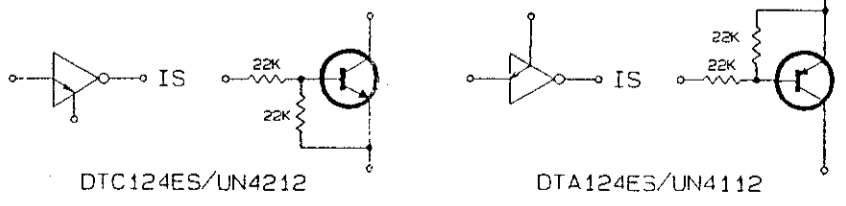
E

F

G



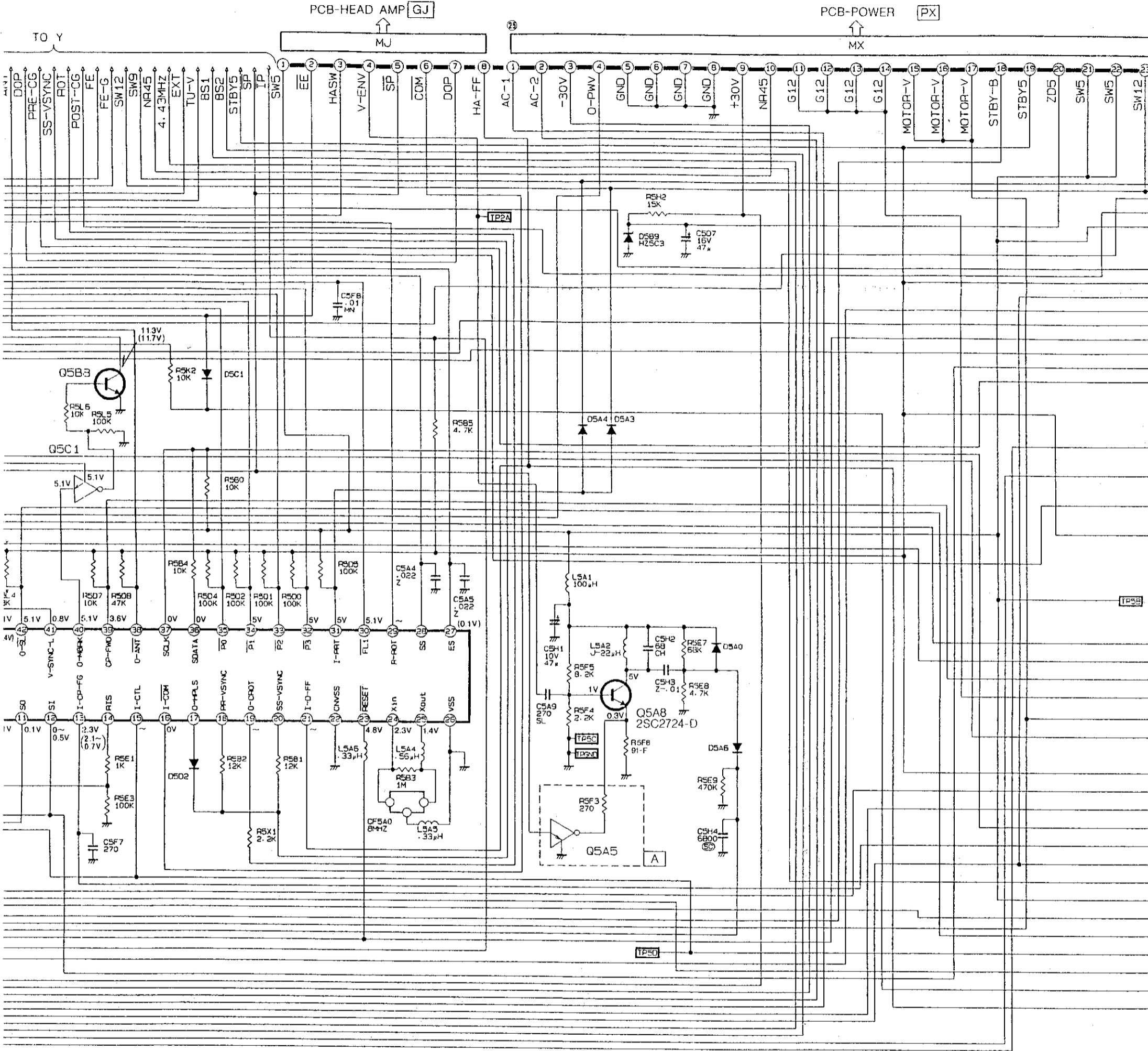
All diodes are 1SS252 unless otherwise specified  
 All NPN transistors are 2SC3311A-R. S/2SC1740S-R. S/JC501-P. G unless otherwise specified  
 All PNP transistors are 2SA1309A-R. S/2SA933S-R. S/JA101-P. Q unless otherwise specified



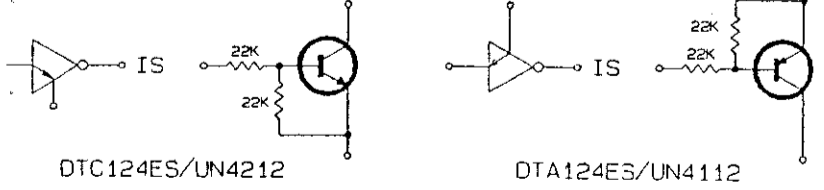
(MC) ○: Employer SY

MODELS	
HS-M16(Y)/(E)/(S)/(IF)	
HS-M16(B)	
HS-M16(G)	
HS-M16(T) (M)	
HS-MX2(A)/(NZ)	
HS-MX1 (MK II)	





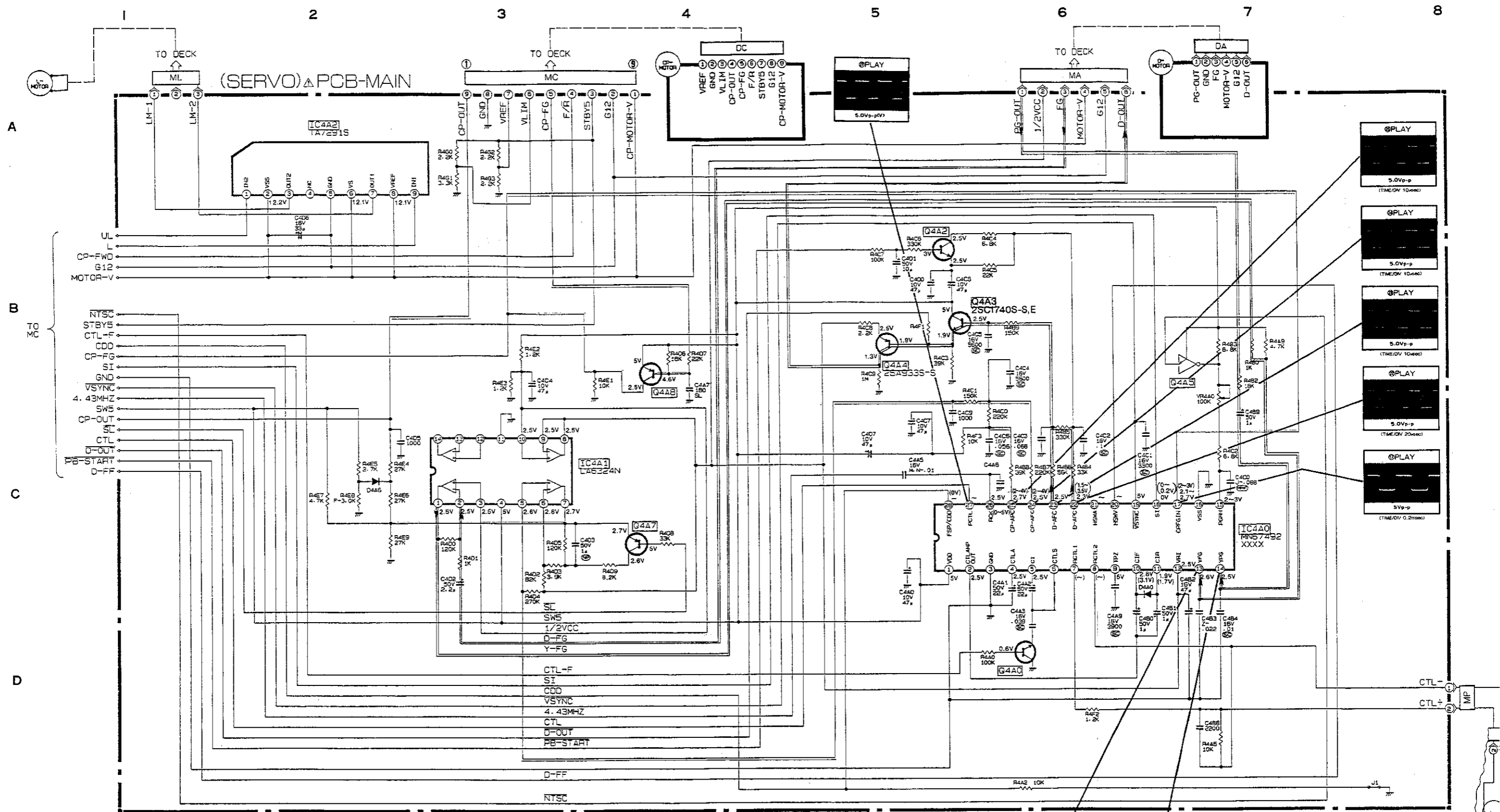
252 unless otherwise specified  
 s are 25C3311A-R. S/25C1740S-R. S/JC501-P. G unless  
 fied  
 s are 25A1309A-R. S/25A933S-R. S /JA101-P. G unless  
 fied



(MC) O:Employed x:Not employed

MODELS	SYMBOL	A AREA	C AREA	J1	J2	J3	R5D6	R5D8	R5K3	R5X0
HS-M16(Y)/(E)/(S)/(IR)/(P)/(Q)		x	x	x	o	o	x	x	x	o
HS-M16(B)		x	x	o	x	o	x	x	o	x
HS-M16(G)		x	o	x	o	o	x	x	x	o
HS-M16(T) (M)		x	x	x	o	o	x	o	x	o
HS-MX2(A)/(NZ)		x	x	x	o	o	x	o	x	o
HS-MX1(MKII)		x	x	x	o	o	x	x	x	o

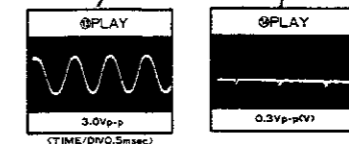
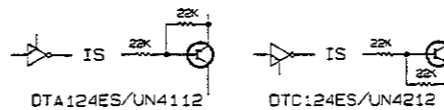




(SERVO) ○: Employed ×: Not employed

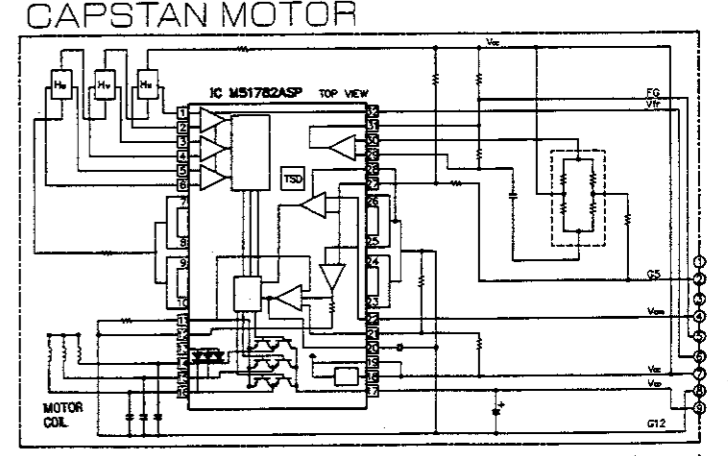
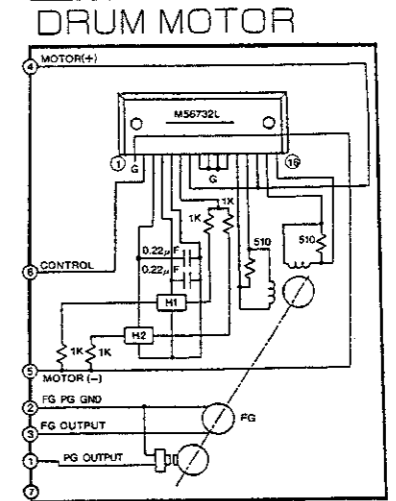
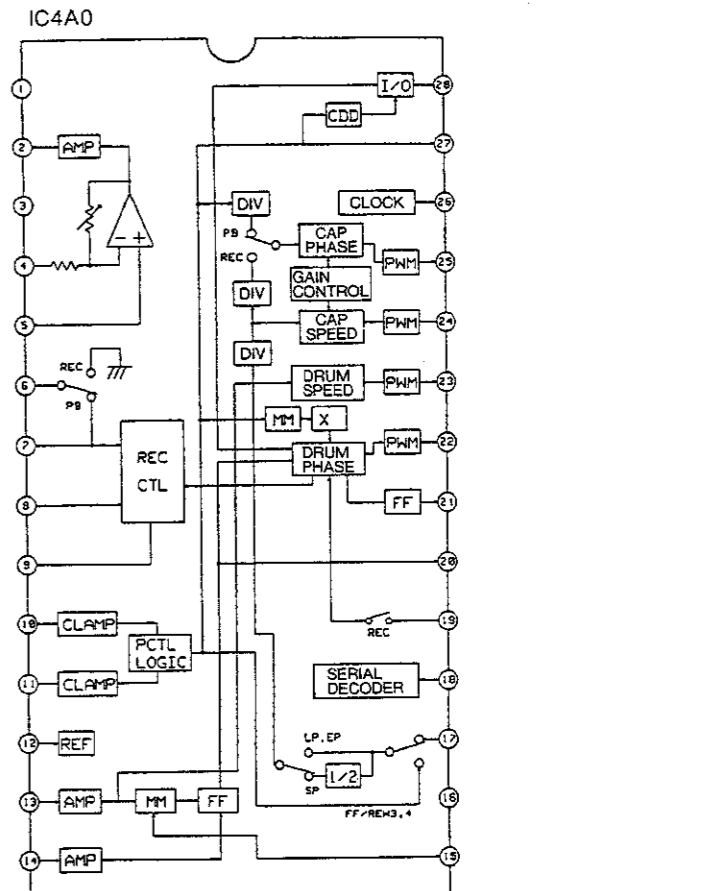
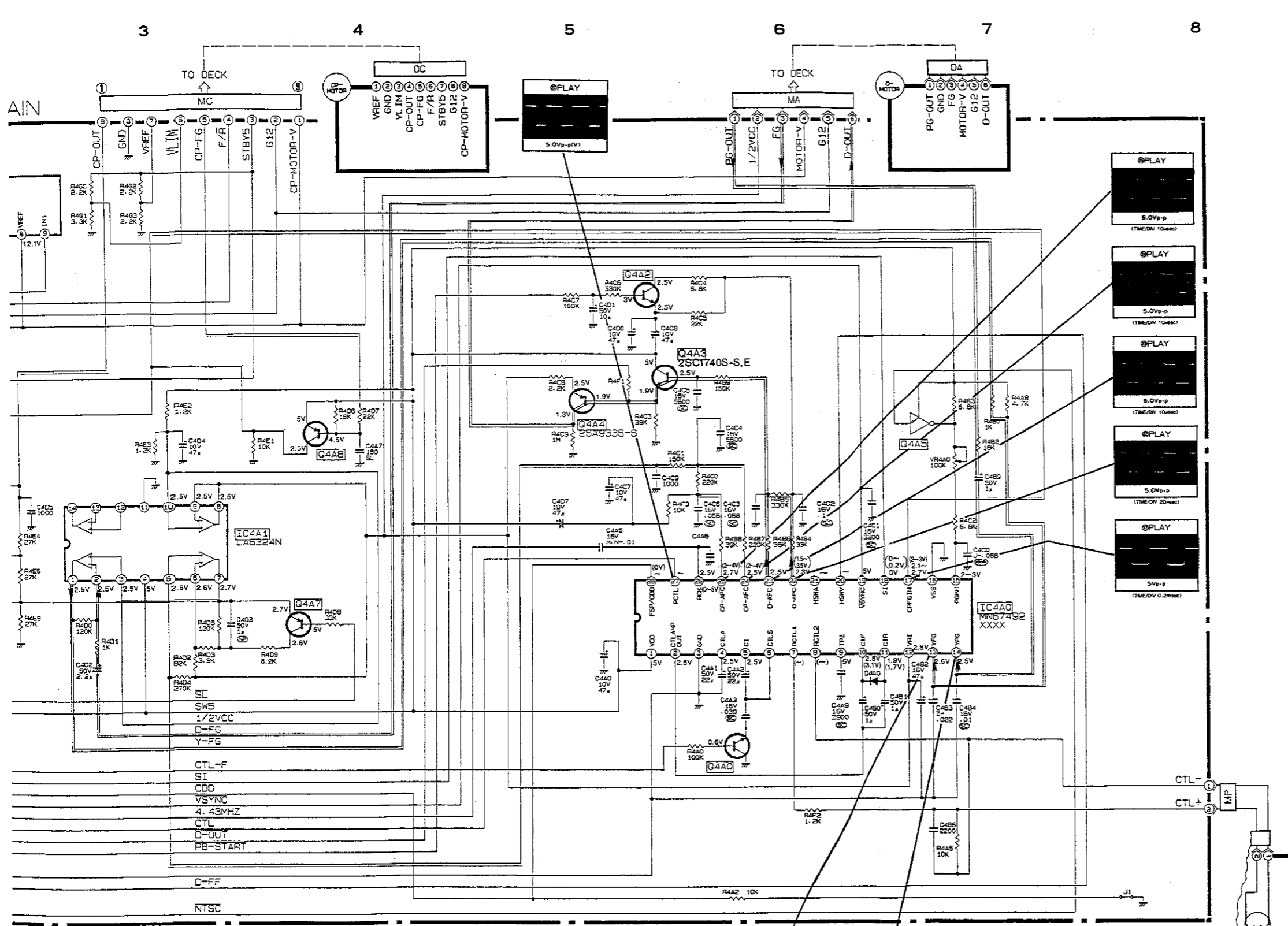
MODELS	SYMBOL	C4A6	IC4A0	Q4A5	R4F1
HS-M16(Y)/(B)/(E)/(S)/(IR)/(G)/(Q)	○	×	MSK	×	39K
HS-M16(P)/(T)/(M)	○	×	MSK	○	39K
HS-MX2(A)/(NZ)	○	×	MSK	×	39K
HS-MX1(MXII)	○	×	MSK	×	39K

All diodes are 1SS252 unless otherwise specified.  
 All NPN transistors are 2SC3311A-R, S/2SC1740S-R, S/JC501-P, Q unless otherwise specified.  
 All PNP transistors are 2SA1309A-R, S/2SA933S-R, S/JA101-P, Q unless otherwise specified.



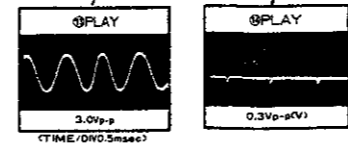
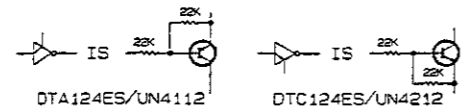
— Drum Servo System  
 --- Capstan Servo System

E



- 4F1
- 9K
- 9K
- 9K
- 9K

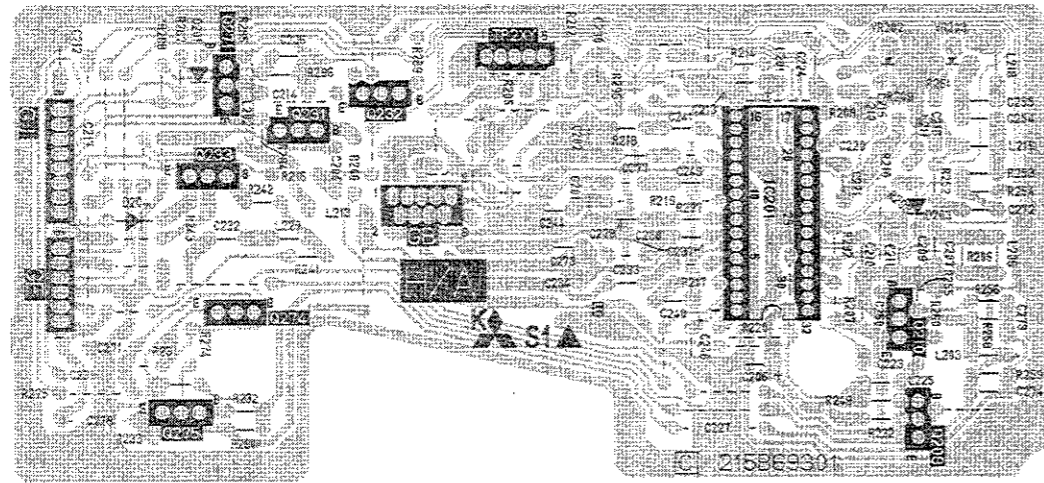
All diodes are 1SS252 unless otherwise specified.  
 All NPN transistors are 2N3311A-P, V/2SCT740S-P, S/JC501-P, Q unless otherwise specified.  
 All PNP transistors are 2SA1309A-R, S/2SA933S-R, S/JA101-P, Q unless otherwise specified.



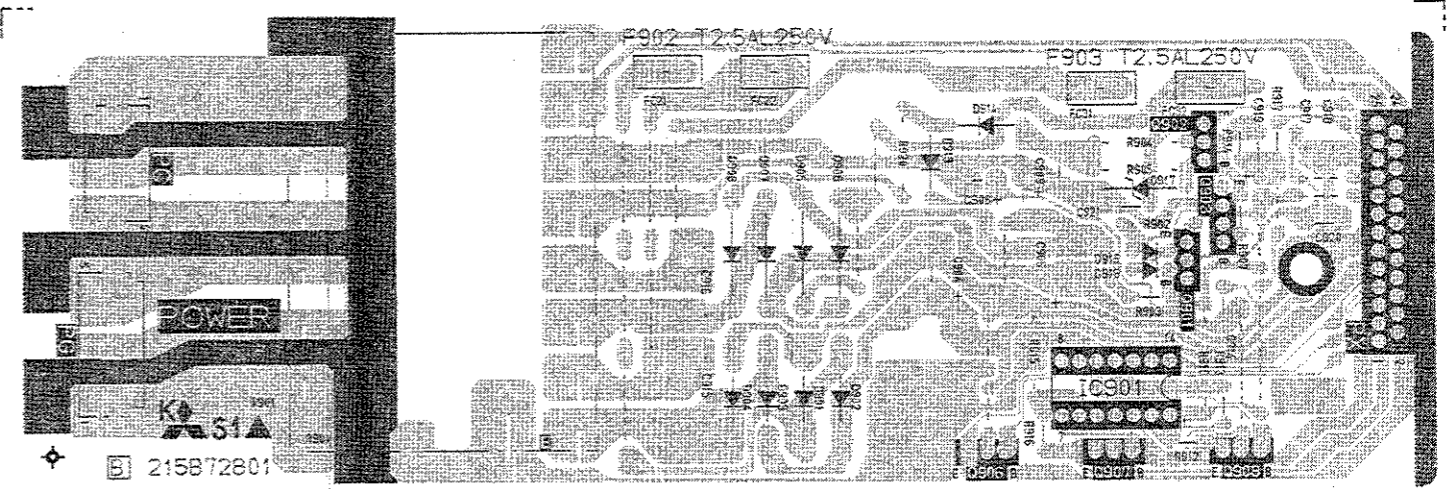
— Drum Servo System  
 — Capstan Servo System

MBOL NO.	ADDRESS
P9B	B-3
P9C	C-3
P9ND	D-7
R101	B-3
R2A0	A-4
R2A1	A-4
R2A2	A-4
R2A3	A-6
R2A5	A-6
R310	D-2
R311	C-3
R4A0	C-4

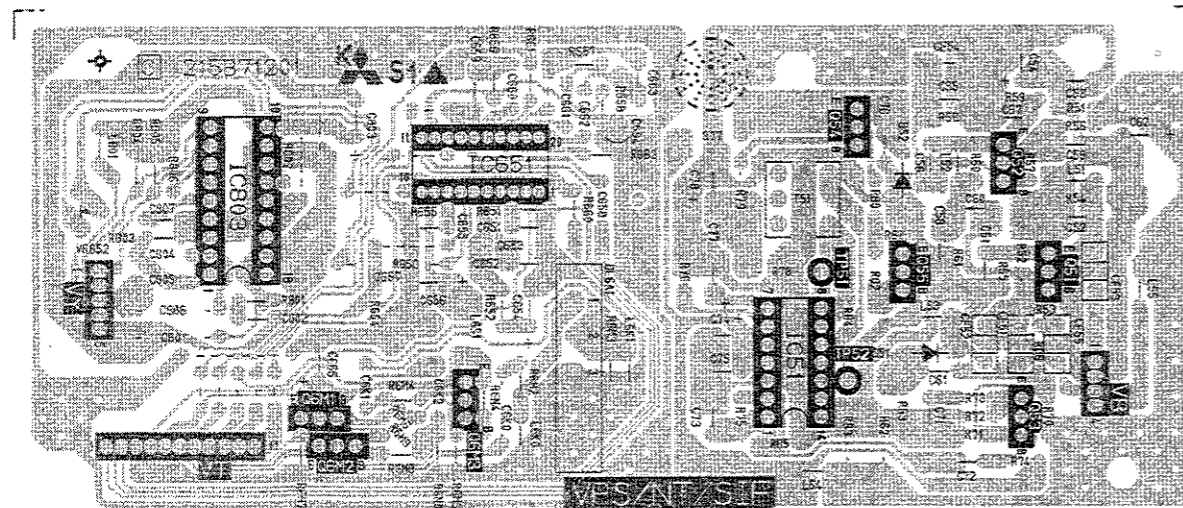
PCB-HEAD AMP



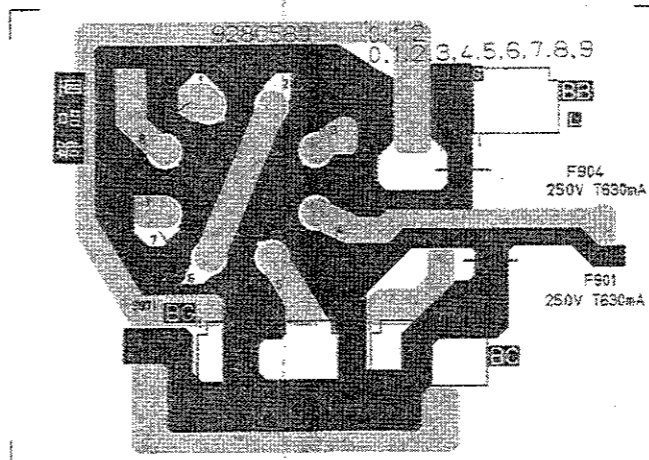
PCB-POWER  
[HS-M16(P) only]



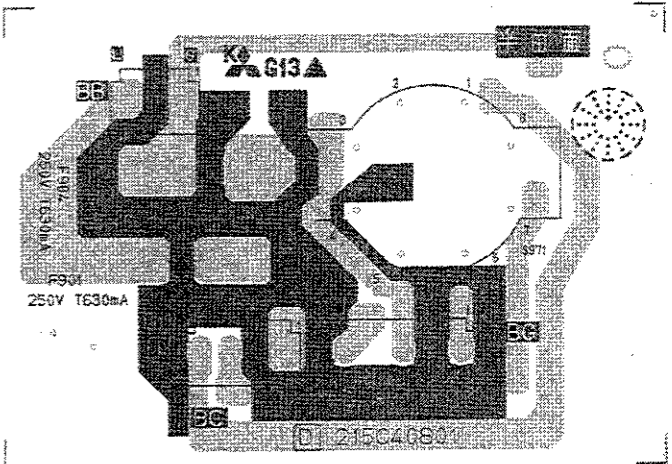
PCB-VPS/NT/SIF  
[HS-M16(T),(P),(M), HS-MX1(MKII) only]



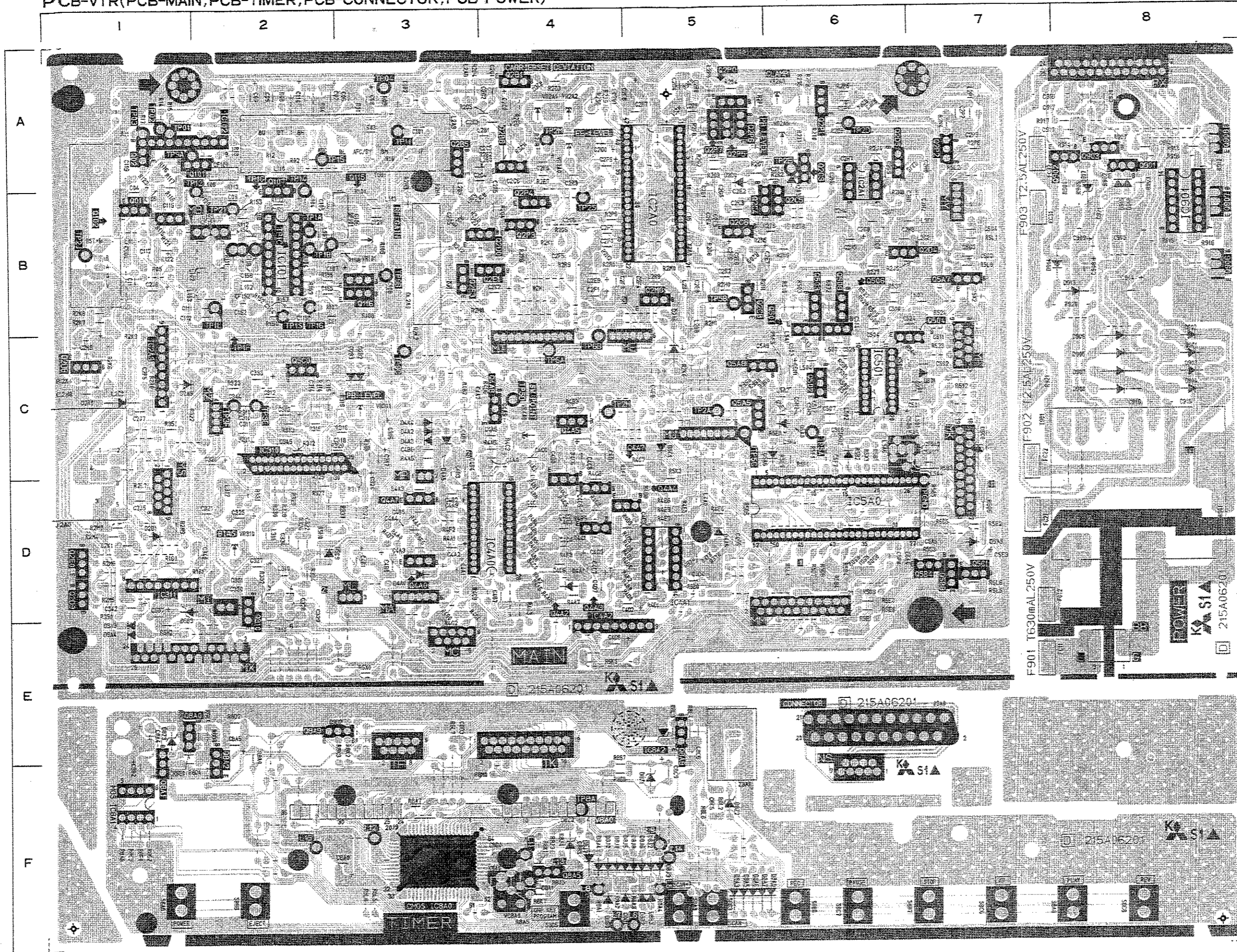
PCB-VOLTAGE SELECTOR  
[HS-M16(P) only]  
(COMPONENT SIDE)



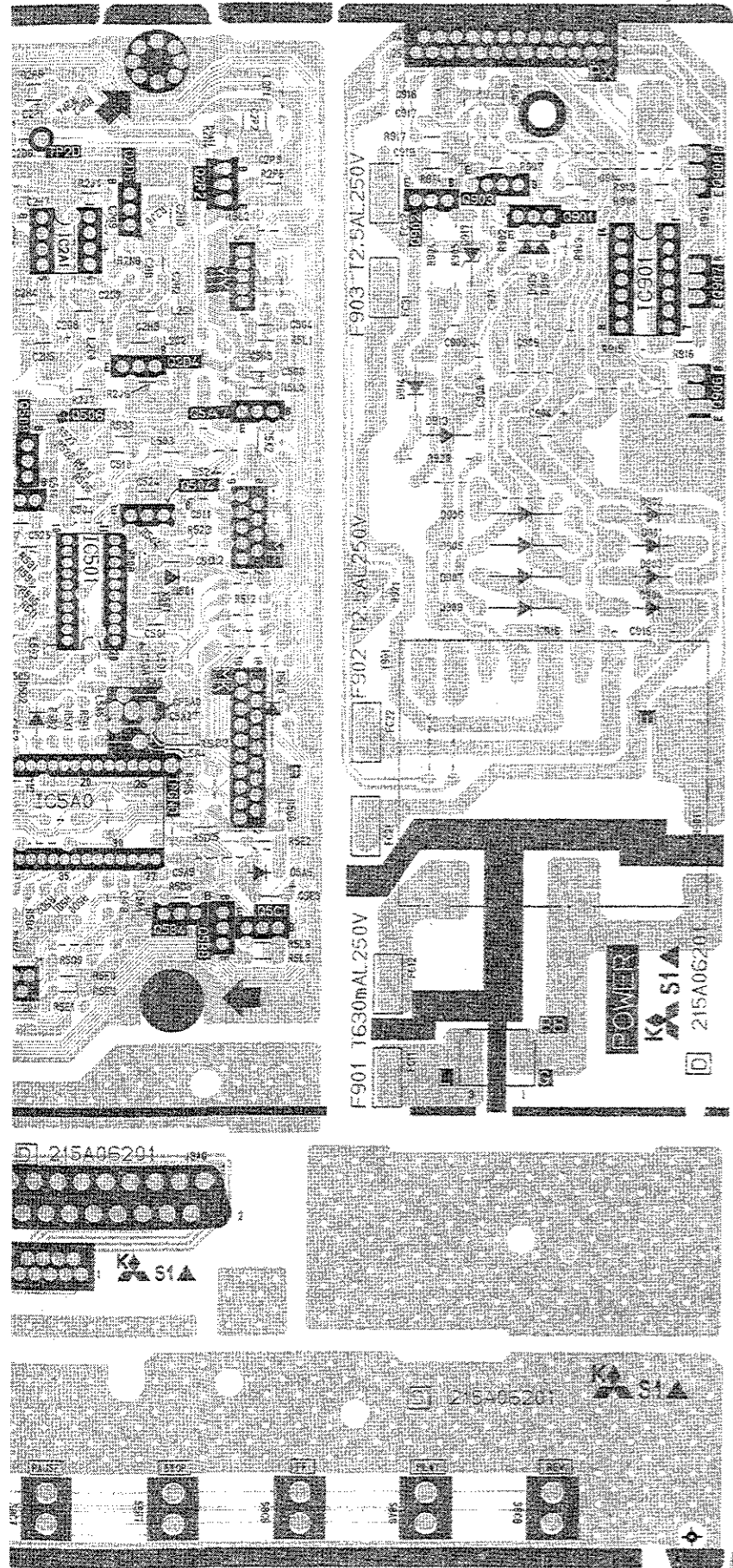
(COPPER SIDE)



P CB-VTR(PCB-MAIN,PCB-TIMER,PCB-CONNECTOR,PCB-POWER)



SYMBOL NO.	ADDRESS	SYM NO.
D2A3	A - 6	D9
D2A6	C - 5	
D2A9	C - 1	IC1
D2B0	C - 1	IC1
D2B1	D - 1	IC2
D2B2	C - 3	IC2
D2B3	C - 3	IC2
D2D0	A - 5	IC3
D4A0	D - 3	IC3
D4A1	D - 4	IC4
D4A2	C - 3	IC4
D4A3	C - 3	IC4
D4A4	C - 3	IC5
D4A5	C - 3	IC5
D4A6	D - 5	IC8
D501	C - 7	IC8
D5A0	C - 6	IC8
D5A3	E - 1	IC9
D5A4	E - 1	
D5A5	D - 7	Q0
D5A6	C - 5	Q0
D5B9	D - 1	Q1
D5C0	C - 7	Q1
D5C1	C - 5	Q1
D5C9	D - 2	Q1
D5D2	C - 6	Q1
D8A3	F - 5	Q2
D8A5	F - 5	Q2
D8A6	F - 5	Q2
D8A7	F - 5	Q2
D8A8	F - 5	Q2
D8B0	F - 4	Q2
D8B1	F - 4	Q2
D8B2	F - 5	Q2
D8B3	F - 5	Q2
D8J0	F - 4	Q2
D8J1	F - 4	Q2
D8J2	F - 5	Q2
D8J3	F - 5	Q2
D8J4	F - 4	Q2
D8J5	F - 4	Q2
D8J6	F - 5	Q2
D8J7	F - 4	Q2
D8J8	F - 4	Q2
D8Z0	F - 4	Q2
D8Z1	F - 5	Q2
D8Z2	F - 5	Q2
D8Z3	E - 1	Q2
D901	C - 8	Q2
D902	C - 8	Q2
D903	C - 8	Q2
D904	C - 8	Q3
D905	C - 8	Q4
D906	C - 8	Q4
D907	C - 8	Q4
D908	C - 8	Q4
D913	B - 8	Q4
D914	B - 7	Q4
D915	A - 8	Q4
D916	A - 8	Q4



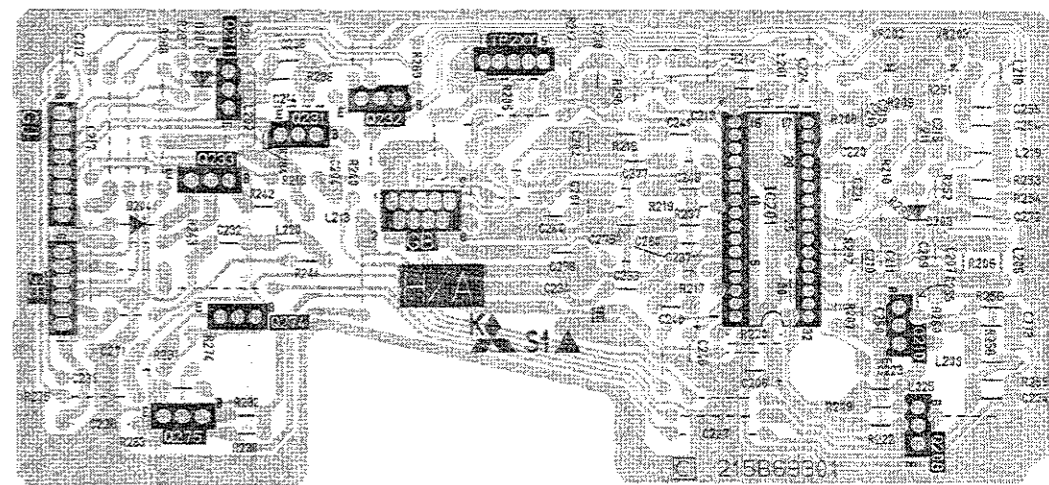
SYMBOL NO.	ADDRESS
D2A3	A-6
D2A6	C-5
D2A9	C-1
D2B0	C-1
D2B1	D-1
D2B2	C-3
D2B3	C-3
D2D0	A-5
D4A0	D-3
D4A1	D-4
D4A2	C-3
D4A3	C-3
D4A4	C-3
D4A5	C-3
D4A6	D-5
D501	C-7
D5A0	C-6
D5A3	E-1
D5A4	E-1
D5A5	D-7
D5A6	C-5
D5B9	D-1
D5C0	C-7
D5C1	C-5
D5C9	D-2
D5D2	C-6
D8A3	F-5
D8A5	F-5
D8A6	F-5
D8A7	F-5
D8A8	F-5
D8B0	F-4
D8B1	F-4
D8B2	F-5
D8B3	F-5
D8J0	F-4
D8J1	F-4
D8J2	F-5
D8J3	F-5
D8J4	F-4
D8J5	F-4
D8J6	F-5
D8J7	F-4
D8J8	F-4
D8Z0	F-4
D8Z1	F-5
D8Z2	F-5
D8Z3	E-1
D901	C-8
D902	C-8
D903	C-8
D904	C-8
D905	C-8
D906	C-8
D907	C-8
D908	C-8
D913	B-8
D914	B-7
D915	A-8
D916	A-8

SYMBOL NO.	ADDRESS
D917	A-8
IC101	B-2
IC102	A-1
IC2A0	B-5
IC2A1	A-6
IC2A3	C-1
IC310	C-2
IC311	D-1
IC4A0	D-4
IC4A1	D-5
IC4A2	E-4
IC501	C-6
IC5A0	D-6
IC8A0	F-3
IC8A1	F-1
IC8A2	E-5
IC901	B-8
Q01	B-1
Q02	A-1
Q101	A-1
Q102	B-1
Q107	A-2
Q115	B-3
Q116	B-3
Q2B1	A-4
Q2B5	A-3
Q2B6	A-4
Q2C3	A-6
Q2C4	B-5
Q2C5	B-6
Q2C6	B-5
Q2C8	B-5
Q2D0	B-3
Q2D4	B-6
Q2D5	A-6
Q2D6	C-1
Q2D9	D-1
Q2E0	D-1
Q2E1	B-4
Q2E3	B-3
Q2M0	B-5
Q2P0	A-5
Q2P1	A-6
Q2P2	A-7
Q2P3	B-4
Q2P4	B-4
Q2P5	A-5
Q2P6	A-5
Q2P7	A-5
Q310	D-2
Q4A0	D-3
Q4A1	D-3
Q4A2	D-4
Q4A3	D-4
Q4A4	D-4
Q4A5	C-4
Q4A7	D-4
Q4A8	C-4

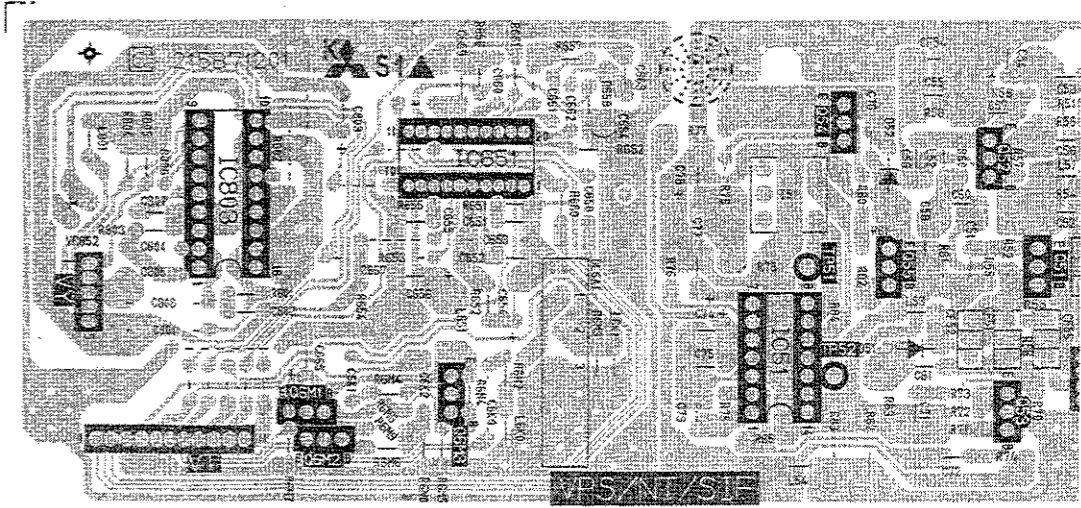
SYMBOL NO.	ADDRESS
Q501	B-6
Q502	C-6
Q503	B-6
Q504	C-6
Q506	B-6
Q508	B-6
Q5A5	C-5
Q5A7	B-7
Q5A8	C-5
Q5B4	D-7
Q5B8	D-7
Q5C0	C-2
Q5C1	D-7
Q8A0	E-1
Q8A1	F-1
Q8A2	E-2
Q8A5	F-4
Q8A8	E-5
Q8A9	E-2
Q901	A-8
Q902	A-8
Q903	A-8
Q906	B-8
Q907	B-8
Q908	A-8
TP01	A-1
TP02	A-1
TP03	A-1
TP04	A-3
TP11	A-3
TP12	A-1
TP14	A-2
TP15	A-2
TP16	B-2
TP1A	B-2
TP1B	B-2
TP1C	B-2
TP1F	B-2
TP1G	B-2
TP1L	B-2
TP1S	B-2
TP21	B-2
TP2A	C-5
TP2D	A-6
TP2E	A-6
TP2H	C-4
TP2J	B-1
TP2M	A-4
TP2S	B-4
TP3E	C-2
TP3F	C-2
TP5A	C-6
TP5B	B-5
TP5C	C-5
TP5D	C-4
TP6A	C-4
TP6B	C-4
TP8A	F-4
TP9A	A-1

SYMBOL NO.	ADDRESS
TP9B	B-3
TP9C	C-3
TPGND	D-7
VR101	B-3
VR2A0	A-4
VR2A1	A-4
VR2A2	A-4
VR2A3	A-6
VR2A5	A-6
VR310	D-2
VR311	C-3
VR4A0	C-4

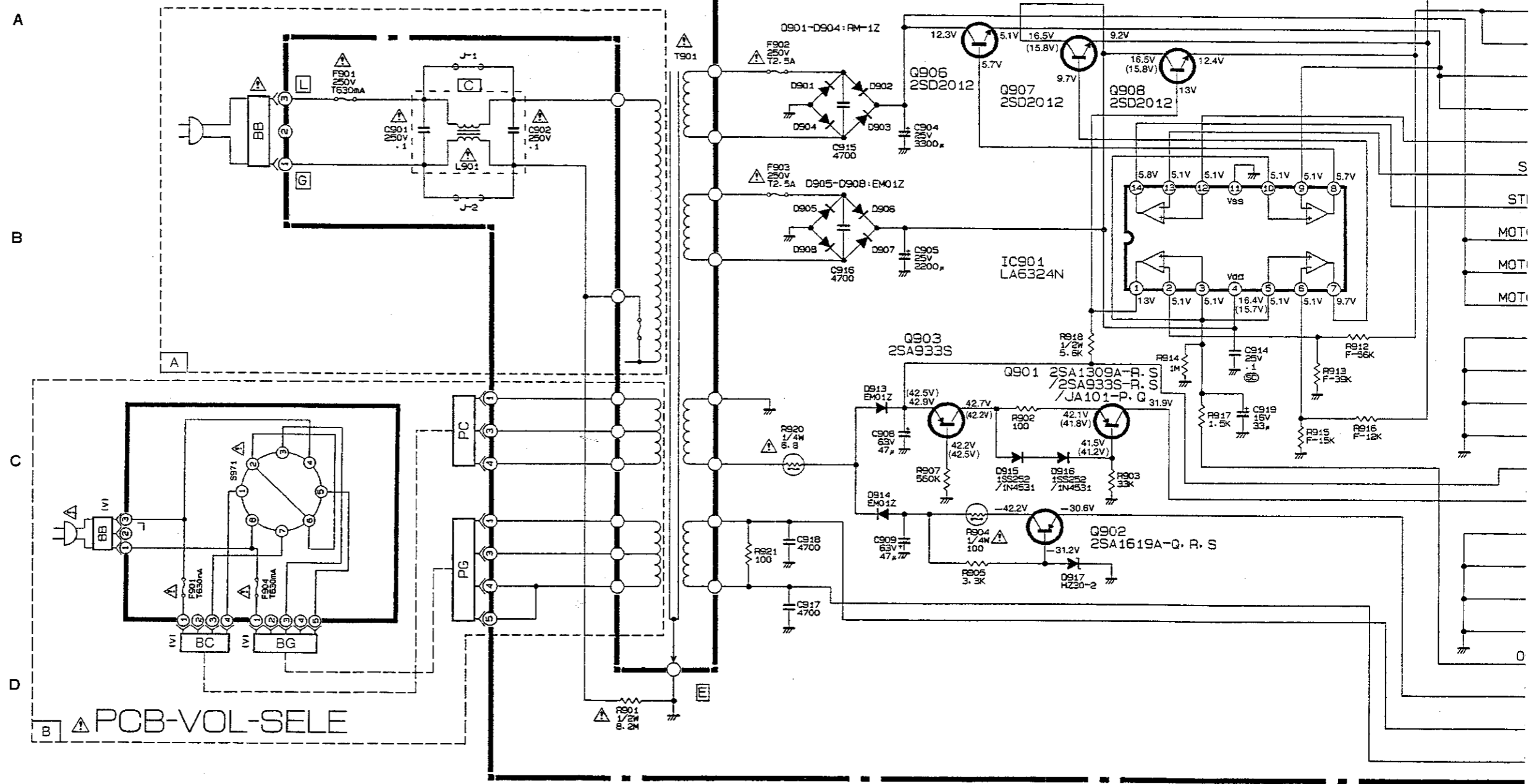
PCB-HEAD AMP



PCB-VPS/NT/SIF (HS-M16(T),(P),(M), HS-MX1(MKII) only)



PCB-POWER



PCB-VOL-SELE

(POWER) ○: Employed ×: Not employed

MODELS	SYMBOL No.	A AREA	B AREA	C AREA	J-1	J-2	R921
HS-M16(Y)/(E)/(S)/(IR)/(T)/(M)		○	×	×	○	○	○
HS-MX2(A)/(NZ)		○	×	×	○	○	○
HS-MX1(MXII)		○	×	×	○	○	○
HS-M16(B)		○	×	×	○	○	○
HS-M16(G)		○	×	○	×	×	○
HS-M16(P)		×	○	×	×	×	×

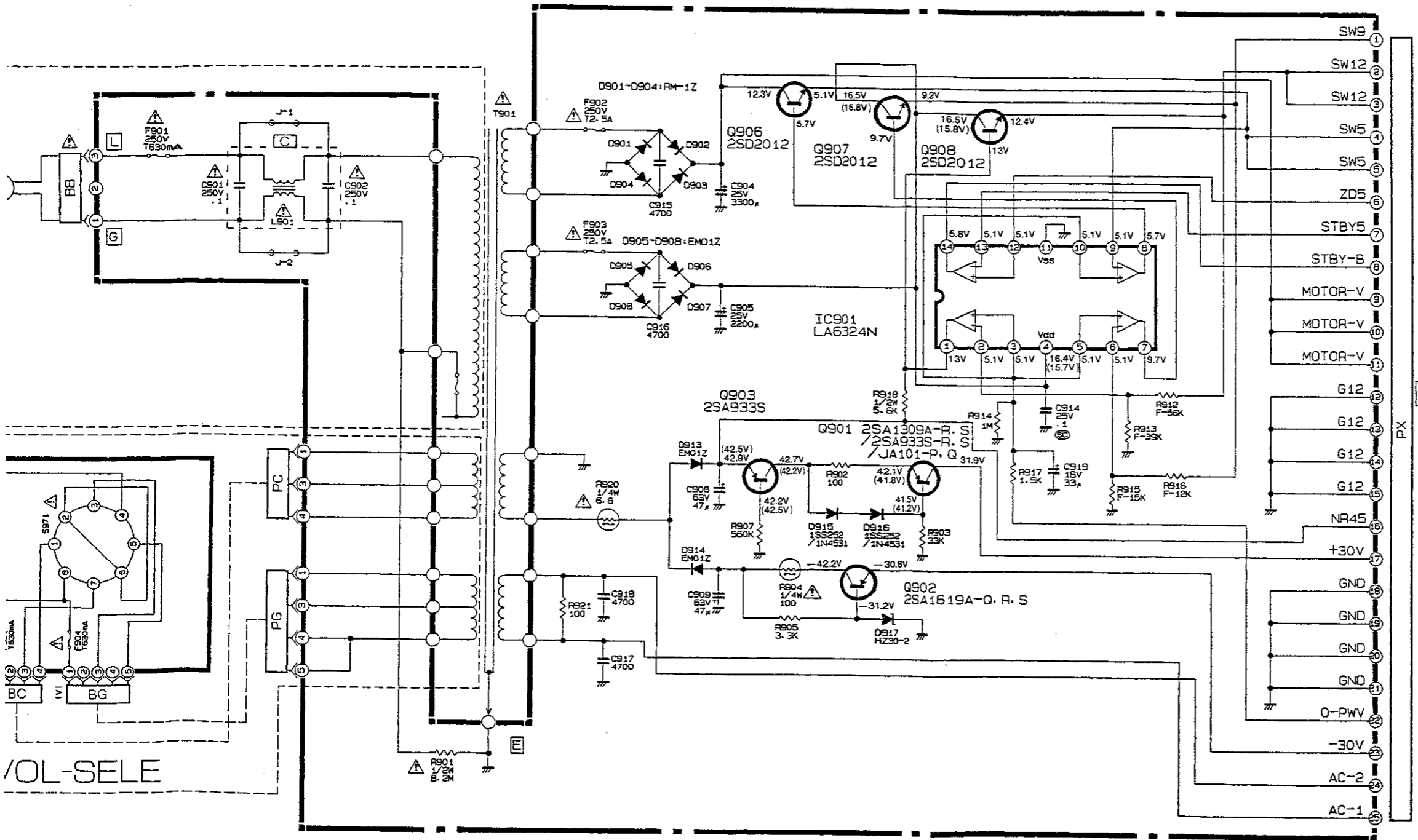
**⚠** **SERVICING PRECAUTION**

SYMBOLS INDICATE COMPONENTS HAVING SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY AND PERFORMANCE. THEREFOR REPLACEMENT OF ANY SAFETY PARTS SHOULD BE IDENTICAL IN VALUE AND CHARACTERISTICS.

DON'T DEGRADE THE SAFETY OF THE VCR THROUGH IMPROPER SERVICING.



# PCB-POWER



(ER) ○:Employed ×:Not employed

S	SYMBOL No.	A AREA	B AREA	C AREA	J-1	J-2	R921
i(Y)/(E)/(S)/(IR)/(T)/(M)		○	×	×	○	○	○
X2(A)/(NZ)		○	×	×	○	○	○
X1(MXII)		○	×	×	○	○	○
16(B)		○	×	×	○	○	○
16(G)		○	×	○	×	×	○
16(P)		×	○	×	×	×	×

**⚠**  
**SERVICING PRECAUTION**  
 SYMBOLS INDICATE COMPONENTS HAVING SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY AND PERFORMANCE. THEREFOR REPLACEMENT OF ANY SAFETY PARTS SHOULD BE IDENTICAL IN VALUE AND CHARACTERISTICS.  
 DON'T DEGRADE THE SAFETY OF THE VCR THROUGH IMPROPER SERVICING.