

GRUNDIG SERVICE MANUAL



D Btx * 32700 #

Service Manual

GV 709 M
GV 729 M

Part No.
72010-527.55

Additionally required
Service Manuals for
the Complete Service:

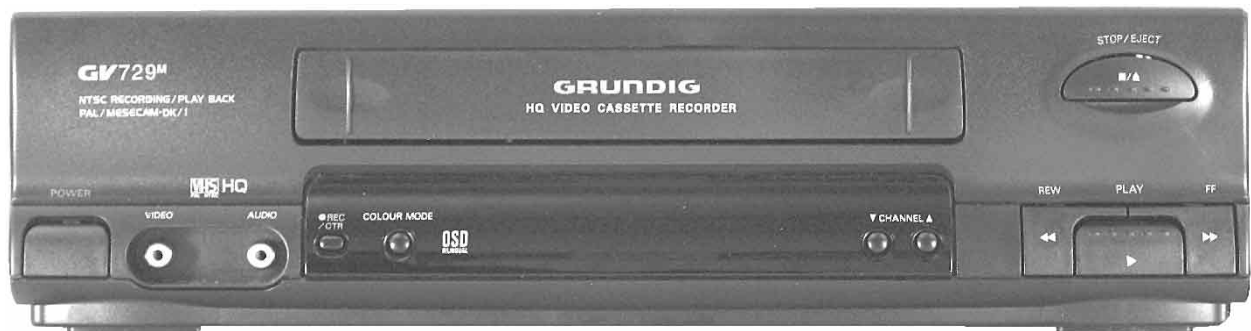
Service Manual

Safety

Part No.
72010-800.00

GV 709 M

GV 729 M



GV 709 M
GV 729 M

(758636-1000 / G.MF 6600)
(758637-1000 / G.MF 6700)



NTSC
PAL /ME/SECAM



Remote Control



The regulations and safety instructions shall be valid as provided by the "Safety" Service Manual, part number 72010-800.00, as well as the respective national deviations.

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General

Test Equipment / Aids

Variable isolating transformer	Colour generator
Dual channel oscilloscope	AF Generator
Digital multimeter	Stabilized power supply
Millivoltmeter	Frequency counter

Please note the Grundig Catalog "Test and Measuring Equipment" obtainable from:

Grundig electronics GmbH
Würzburger Str. 150
D-90766 Fürth/Bay.
Tel. 0911/703-0
Telefax 0911/703-4479

	Part no.
Presetting unit	75981-311.26
Test cassette	75981-311.27
Back tension cassette gauge	75981-311.33
A/C head positioning tool	75981-311.34
Roller driver	75981-311.35

You can order this test equipment from the Service organization. We refer to you that this test equipment is already obtainable on the market.

Specification

VHS-System

$\frac{1}{2}$ " video cassette recorder
 Tape speed 2.339cm/s (Standard play)
 Head to tape speed 4.84m/s (Standard play)

TV standard (GV 709 M)

CCIR, B/G, DK - PAL

TV standard (GV 729 M)

CCIR, DK, I - PAL

Record and playback of tapes with norm

PAL

MESECAM / NTSC (3,58) via A/V socket

Sound

Input via cinch socket -8dBs, 50k Ω (0dB = 0.775V_{rms})
 Output via cinch socket -6dBs, 1k Ω (0dB = 0.775V_{rms})

Video

Signal / noise ratio approx. 43dB (unweighted)
 Video resolution approx. 3MHz

Input via cinch socket 0.5...2V_{pp}, 75 Ω
 Output via cinch socket 1V_{pp}, 75 Ω

Mains voltage 110V~...240V~

Mains frequency 50 / 60Hz

Power consumption approx. 17W

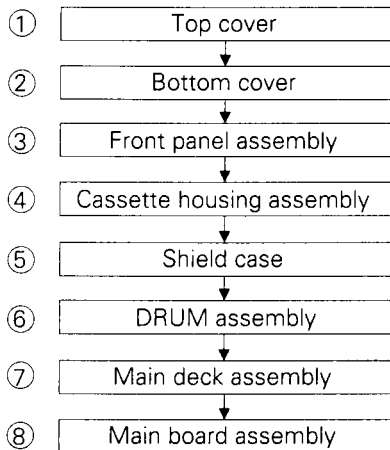
Ambient temperature +5°C ... +40°C

Operating position horizontal

SECTION 1 DISASSEMBLY

1.1 DISASSEMBLY FLOW CHART

This flowchart lists shows the disassembling steps for the cabinet parts and P.C. boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in reverse order. Bend, route and dress the flat cables as they were originally laid.



1.2 HOW TO READ THE DISASSEMBLY AND ASSEMBLY

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	3(S1)	
②	BOTTOM COVER	D2	2(L1),3(L2),7(L3)	<NOTE 1>
③	FRONT PANEL ASSEMBLY	D3	7(L4)	<NOTE 2>
④	CASSETTE HOUSING ASSEMBLY	D4	2(S2),2(S3)	<NOTE 3>
⑤	SHIELD CASE	D5	2(S4), *CN1	
⑥	DRUM ASSEMBLY	D6	3(S5),WR1	<NOTE 4>
⑦	MAIN DECK ASSEMBLY	D7	2(S6),WR2,WR3,WR4(CN703),2(L5)	<NOTE 5>
⑧	MAIN BOARD ASSEMBLY	D8	3(L6)	



- (1) Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order. These numbers are also used as the identification (location) NO. of parts Figures.
- (2) Part name to be removed or installed.
- (3) Fig.No. showing procedure or part location
- (4) Identification of part to be removed,unhooked,unlocked, released,unplugged,unclamped or unsoldered. P = Spring, W = Washer, S = Screw, L = Locking tab, * = Unhook,unlock, release,unplug or unsolder.
- (5) Adjustment information for installation

1.3 DISASSEMBLY/ASSEMBLY METHOD

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	3(S1)	
②	BOTTOM COVER	D2	2(L1),3(L2),7(L3)	<NOTE1>
③	FRONT PANEL ASSEMBLY	D3	7(L4)	<NOTE2>
④	CASSETTE HOUSING ASSEMBLY	D4	2(S2), 2(S3)	<NOTE3>
⑤	SHIELD CASE	D5	2(S4), *CN1	
⑥	DRUM ASSEMBLY	D6	3(S5),WR1,(L7) HEAD CLEANER	<NOTE4>
⑦	MAIN DECK ASSEMBLY	D7	2(S6),WR2,WR3,WR4(CN703),2(L5)	<NOTE5>
⑧	MAIN BOARD ASSEMBLY	D8	3(L6)	

<NOTE1>

Loosen the 4 screws (Mark :) first, then remove the bottom cover.

<NOTE2>

When reattaching the front panel assembly, make sure that the door opener of the cassette housing assembly is lowered in position prior to the reinstallation.

<NOTE3>

When reattaching the cassette housing assembly, pay careful attention to the switch lever not to make it touch the REC switch knob of the MAIN board assembly from the upside. (If the REC switch knob of the MAIN board assembly is damaged, cassette loading is impossible.)

<NOTE4>

When plugging the connector in, check that the flat wire is inserted properly and fully.

<NOTE5>

- When removing the Main deck assembly only, unhook the two spacers connecting it with the Main board assembly with pliers from the back side of the Main board assembly first, and then remove the Main deck assembly.
- When reattaching the Main deck assembly to the Main board assembly, make sure to set the spacers into the retaining slots respectively.

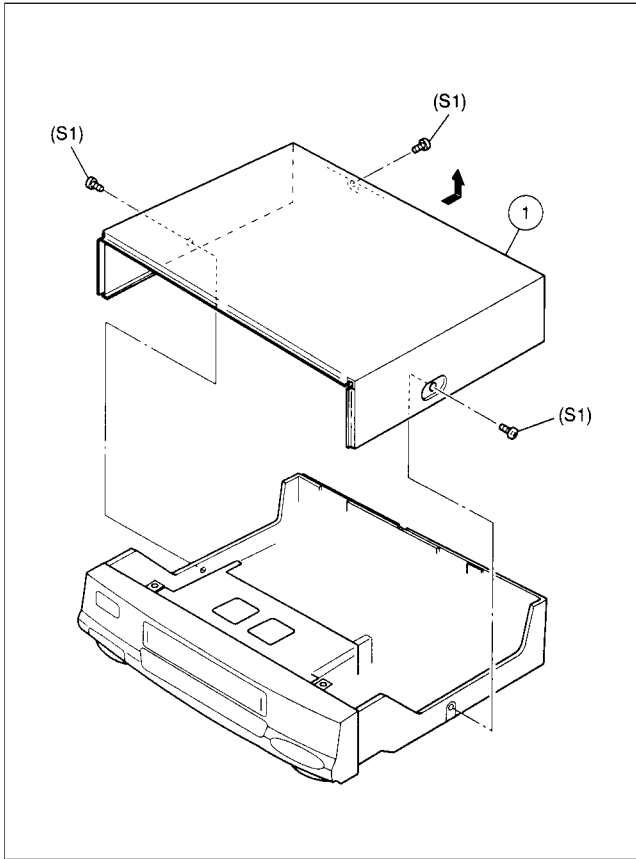


Fig. D1

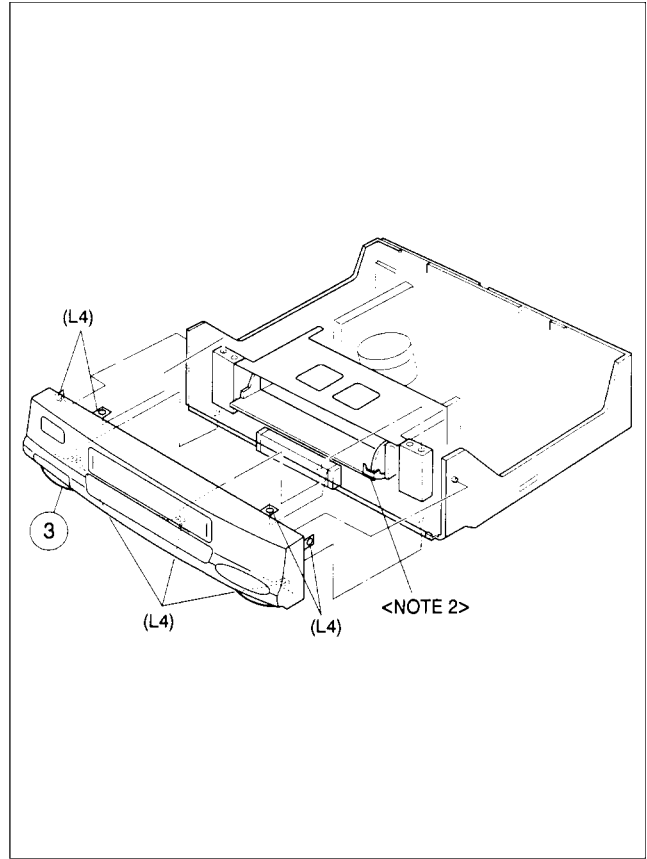


Fig. D3

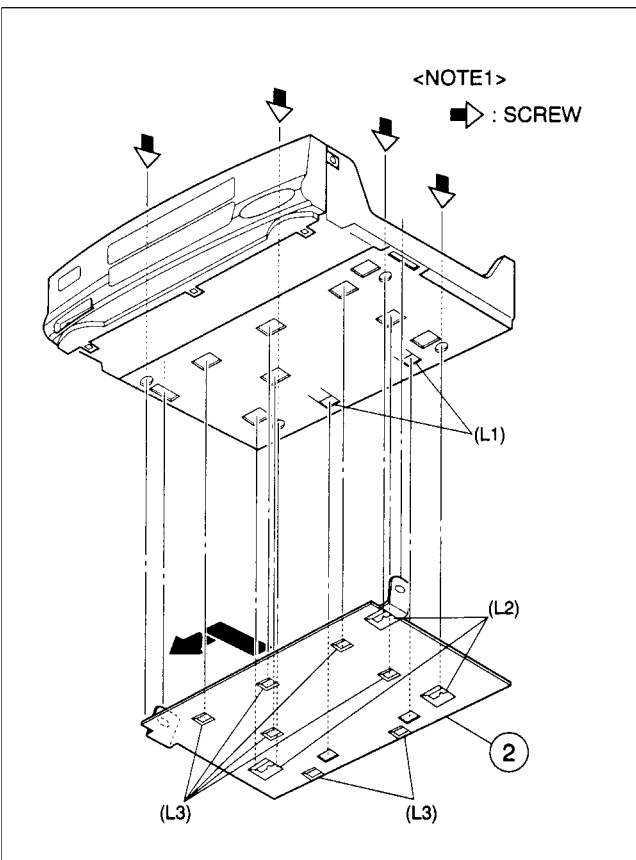


Fig. D2

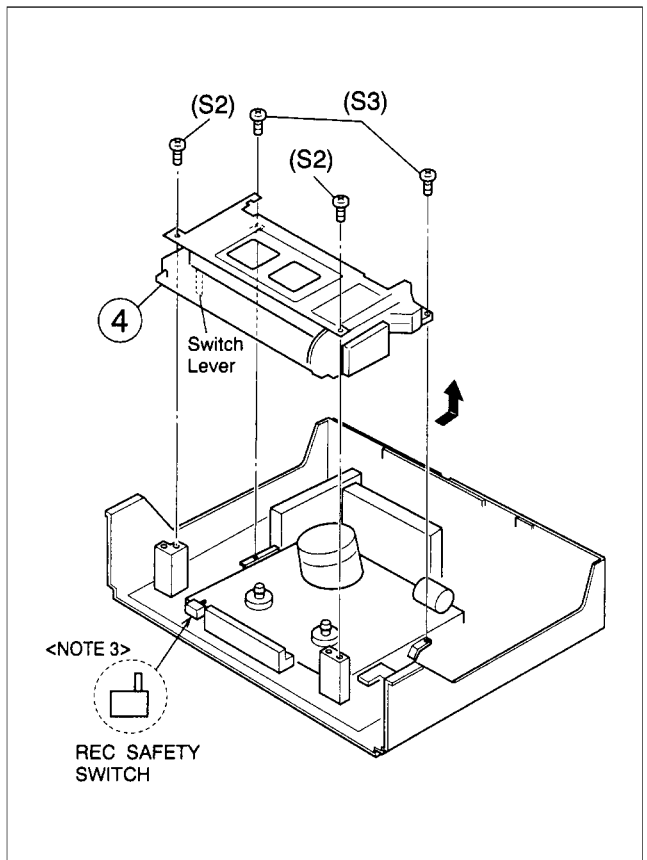


Fig. D4

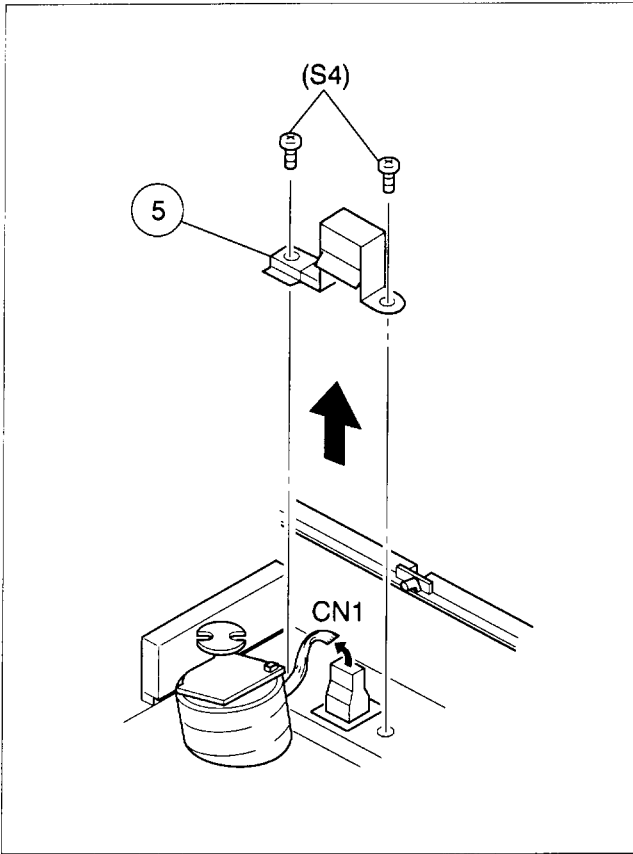


Fig. D5

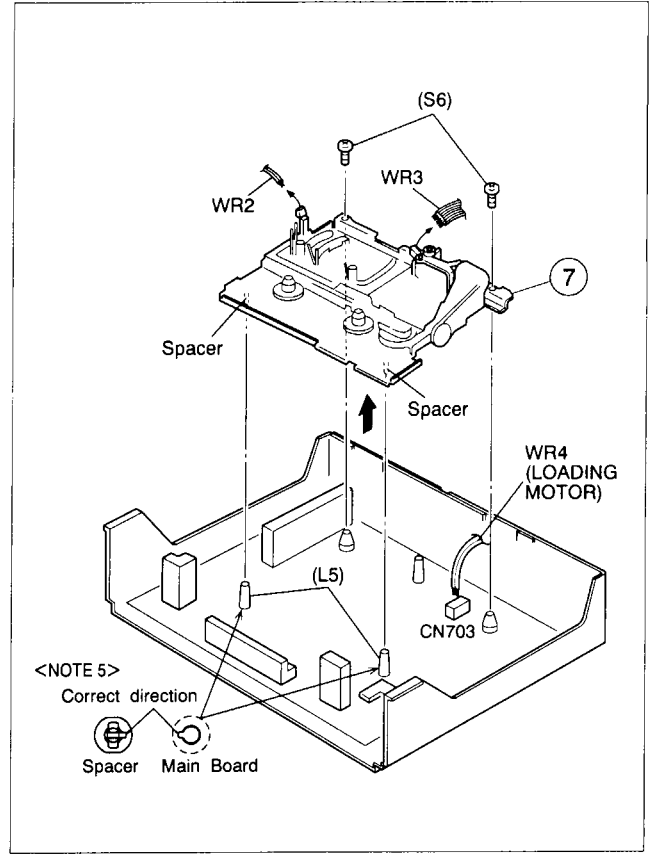


Fig. D7

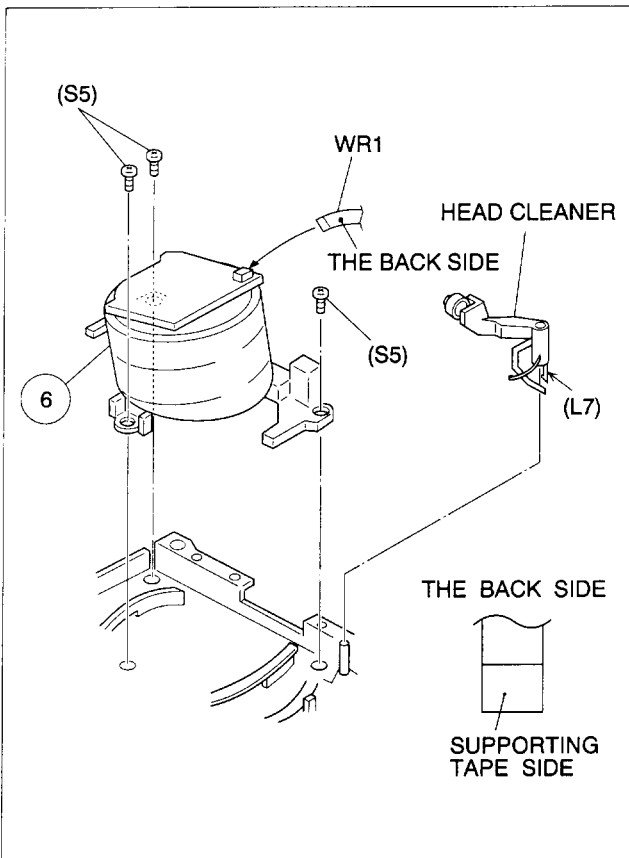


Fig. D6

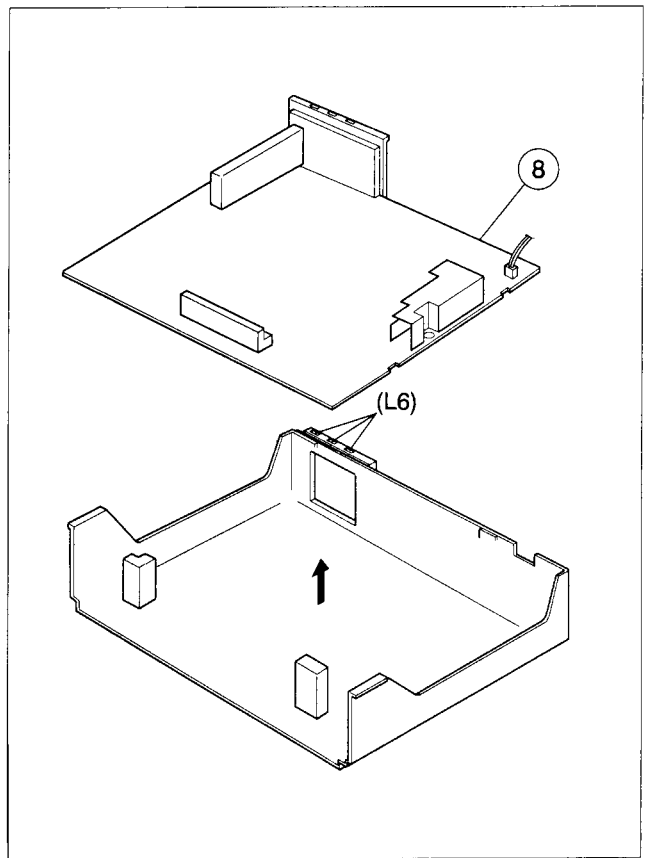


Fig. D8

1.4 CASSETTE HOUSING INSTALLATION

NOTE: Observe the mechanical phase and position (see figure) when installing the cassette housing assembly. If these are incorrect, the system will not operate properly even when tape is inserted.

- (1) Check that the hole of the control cam are aligned to the deck hole. If necessary, turn the mode motor belt by hand to adjust the position.

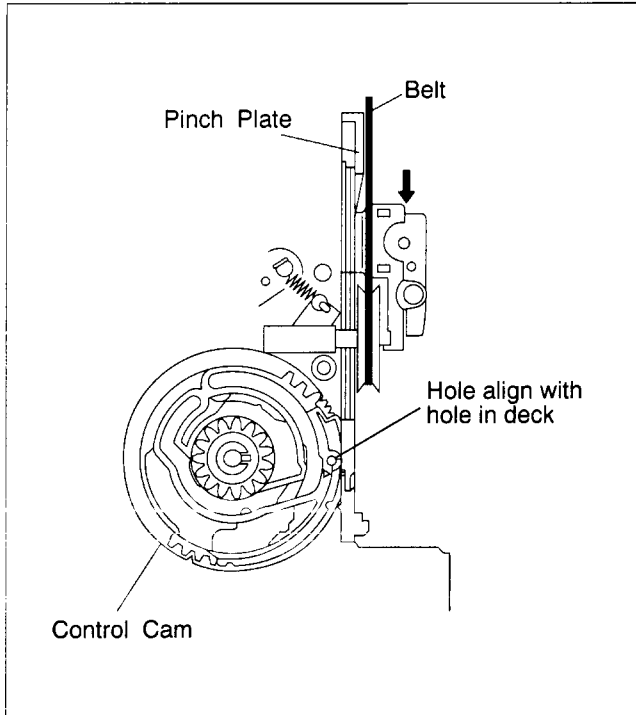


Fig. 1-4-1

1.5 SERVICE POSITION

1.5.1 How to take out the Mechanism and Main board assemblies.

- (1) Remove the Top cover and Front panel assembly.
- (2) Take out 2 screws (B) and 2 screws (C) as shown in Fig. 1-5-1.

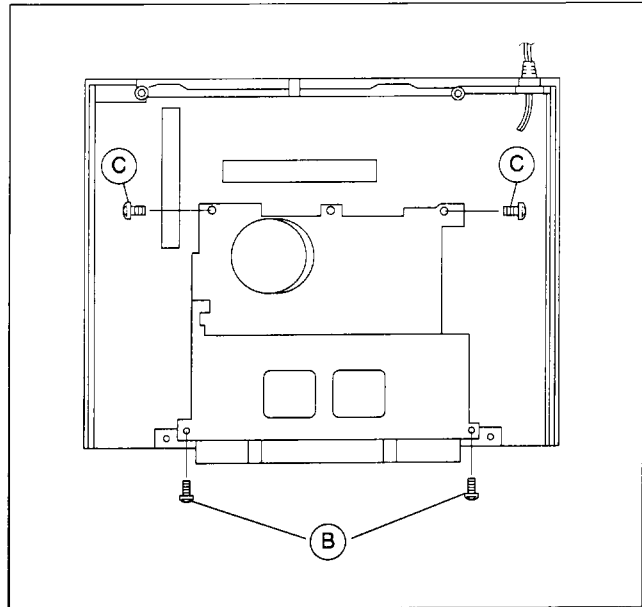


Fig. 1-5-1

- (3) Take out 4 screws (a).
- (4) Remove the Mechanism assembly (including Cassette housing) and Main board assembly out of the chassis as shown in Fig. 1-5-2.

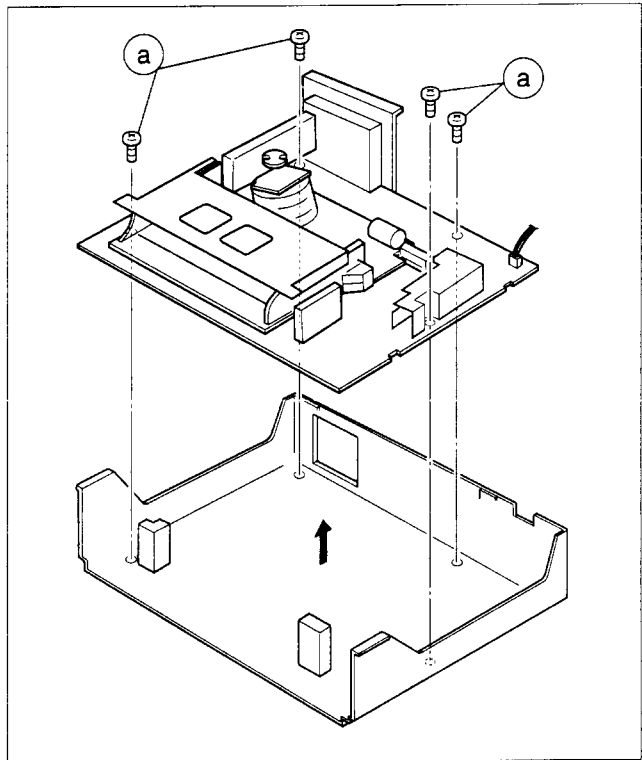


Fig. 1-5-2

- (5) Turn over the Mechanism assembly and Main board assembly.
- (6) Carry out checks & repairs as necessary as shown in Fig.1-5-3.

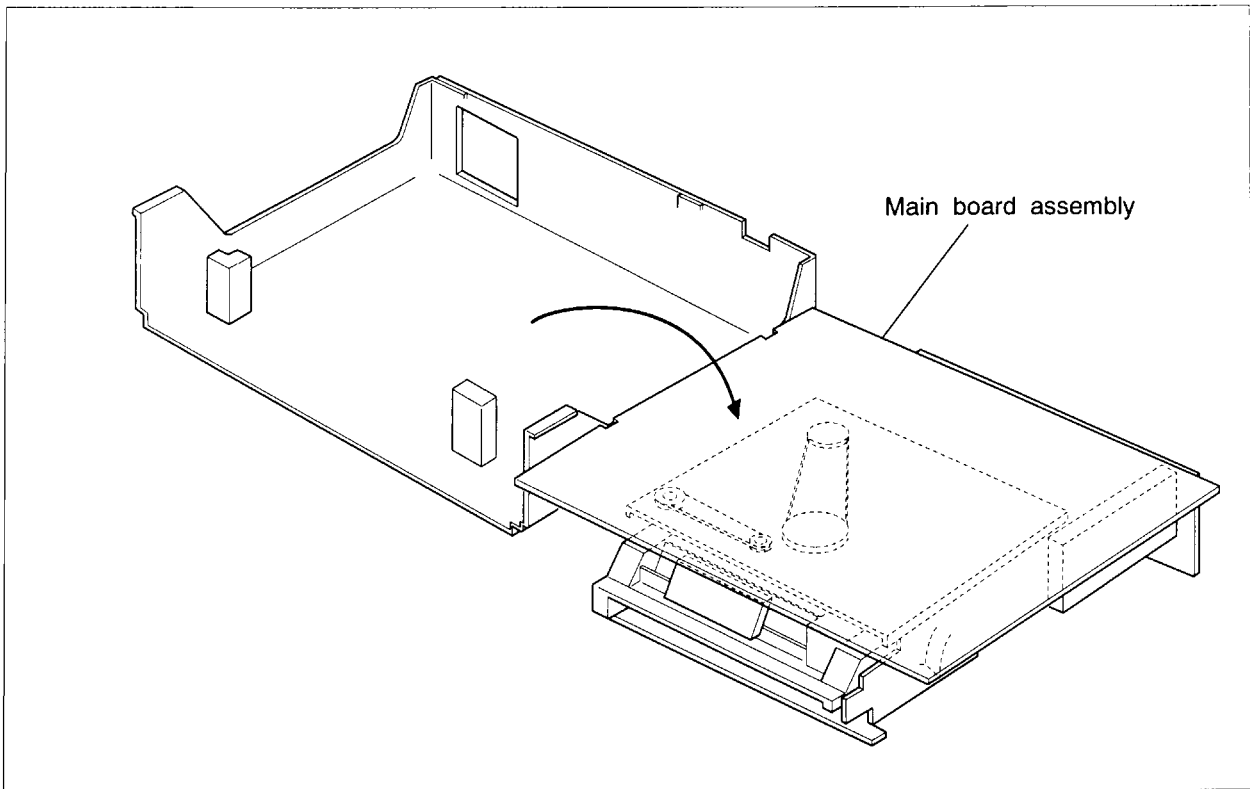


Fig. 1-5-3

1.5.2 Opening on the chassis.

The chassis assembly has openings for easy access to the checkpoints and connector pins as shown in Fig. 1-5-4.

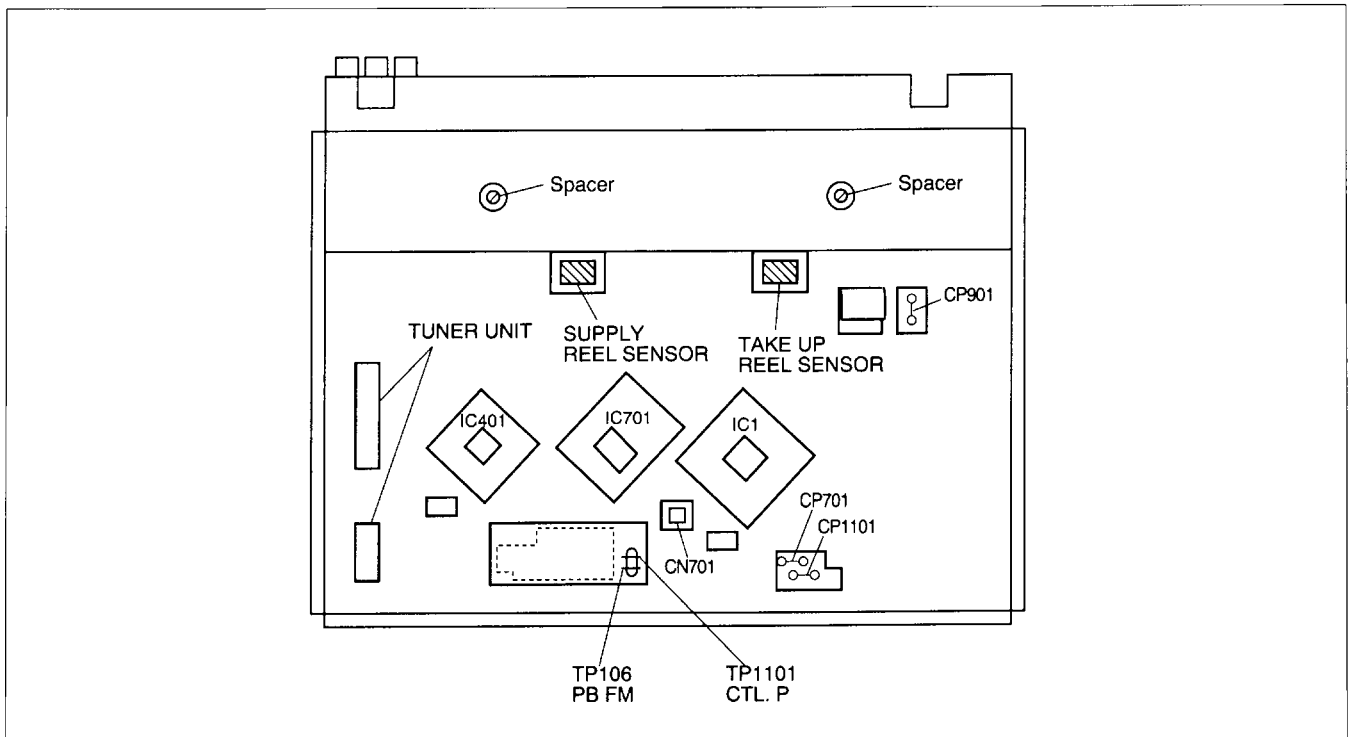


Fig. 1-5-4

1.6 MECHANISM SERVICE MODE

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "MECHANISM SERVICE MODE":

- (3) Connect TP1202 (GND) and TP1201 (TEST) on the Main board assembly with a jump wire.
- (4) Connect VCR to AC.
- (5) Press the Power button.
- (6) Select the desired operation modes with the operation buttons or remote controller.

1.6.1 How to set the "MECHANISM SERVICE MODE"

- (1) Disconnect VCR from AC.
- (2) Remove the Top cover, Front panel assembly and cassette housing assembly. (See Page 1-2, 1-3)

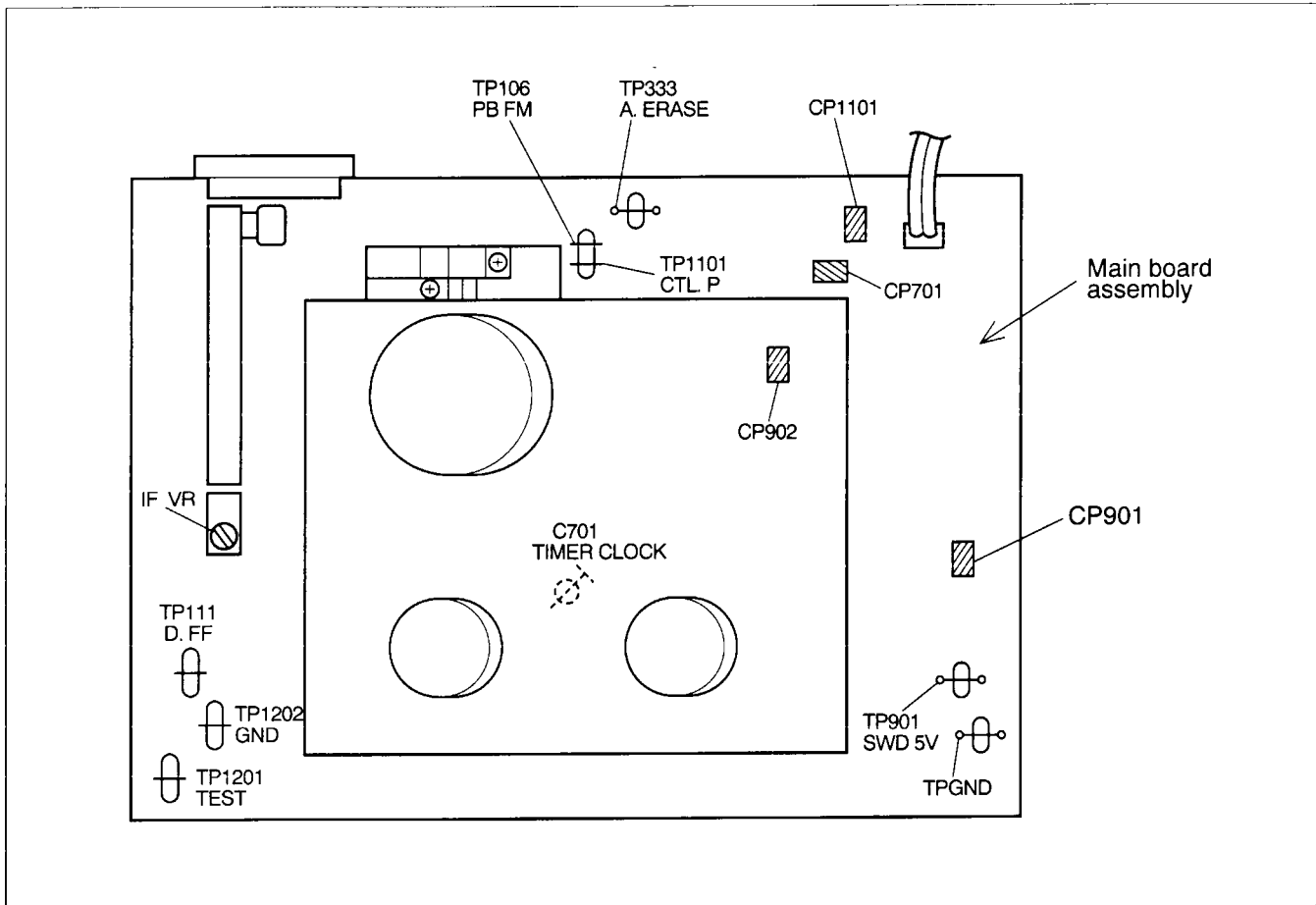


Fig. 1-6-1

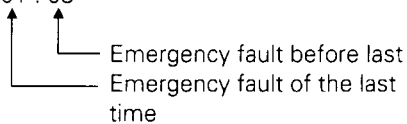
1.7 EMERGENCY DISPLAY FUNCTION

This product has the function to store the last two previous emergency faults which can be displayed in the FDP when servicing.

1.7.1 How to display record of an emergency faults

- (1) Press "A" button then "N" button of the presetting unit more than 2 seconds. and the two previous emergency faults are shown in the FDP.
- (2) Press "N" button of the presetting unit again when return the normal mode.

[Example] E : 01 : 03



[Example] E : — : — : — ← No record of emergency

1.7.2 Detail of emergency faults

FDP	Symptom	Detect mode	Resulting mode
E : 01	Loading motor rotates for more than 4 Sec without shift to next mode.	Loading	POWER OFF
E : 02	Loading motor rotates for more than 4 Sec without shift to next mode.	Unloading	POWER OFF
E : 03	TU REEL FG input is absent(for more 4 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 04	DRUM FF input is absent(for more 3 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP
E : 05	(NOT USED)	—	—
E : 06	CAPSTAN FG input is absent(for more 1 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 07	No SWD5V/12V	POWER ON	POWER OFF

Table 1-7-1 EMERGENCY FAULTS

SECTION 2 MECHANISM ADJUSTMENT

2.1 PREPARATION

2.1.1 Precautions

- (1) Disconnect VCR from AC power before soldering.
- (2) Avoid imparting stress to wires when disengaging connectors.
- (3) Determine and correct the cause of difficulty before proceeding to adjustments. Do not disturb settings unnecessarily.
- (4) Use care not to damage tabs, claws, etc during repairs.
- (5) Install the cassette housing assembly only when the mechanism is in the MECHANISM ASSEMBLING MODE position.
- (6) When installing the Front panel assembly, be sure to engage the housing door with the door opener of the cassette housing assembly.
If this is omitted, the cassette door will not open at Eject and the cassette can not be removed. (See SECTION 1 DISASSEMBLY.)

2.1.2 Check without cassette housing assembly.

Mechanism operations can be observed easily by removing the cassette housing assembly. Use the MECHANISM SERVICE MODE (See SECTION 1 DISASSEMBLY)

2.1.3 Manual removal of loaded tape

When the deck enters the emergency mode with cassette tape loaded and it can not be ejected by pressing the EJECT button, take out of the cassette tape according to the following procedure.

- (1) Disconnect the power cord from AC outlet then take out the Top cover and Front panel assembly.
- (2) Turn the loading motor on the Main deck assembly by hand in the unloading direction to where the pole base assembly (supply and take-up) is positioned below the cassette tape. At that time, pay careful attention to the tape not to get soiled with grease.
- (3) Take out 4 screws of the cassette housing assembly. (See SECTION 1 DISASSEMBLY)
- (4) Remove the cassette housing with slackened tape and guard panel of cassette.
- (5) Wind up the tape by turning the reel hub (either supply or take-up side for convenience) from the bottom of the cassette, and remove the cassette tape.

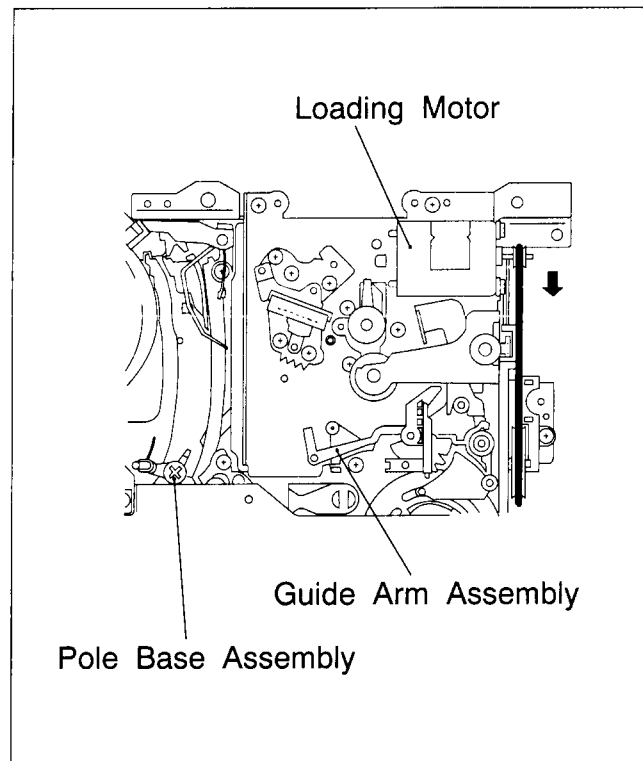


Fig. 2-1-1

2.1.4 Test equipment

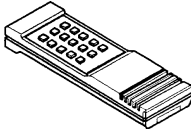
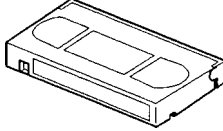
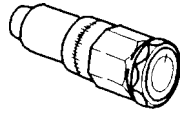

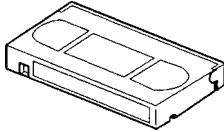

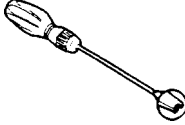
Presetting unit 75981-311.26 	Alignment tape 75981-311.27 	Torque gauge 75981-311.32 	Grease 75988-034.74 
Back tension cassette gauge 75981-311.33 	A/C head positioning tool 75981-311.34 	Roller driver 75981-311.35 	

Table 2-1-1 Test equipment

2.2 MAIN MECHANISM PARTS

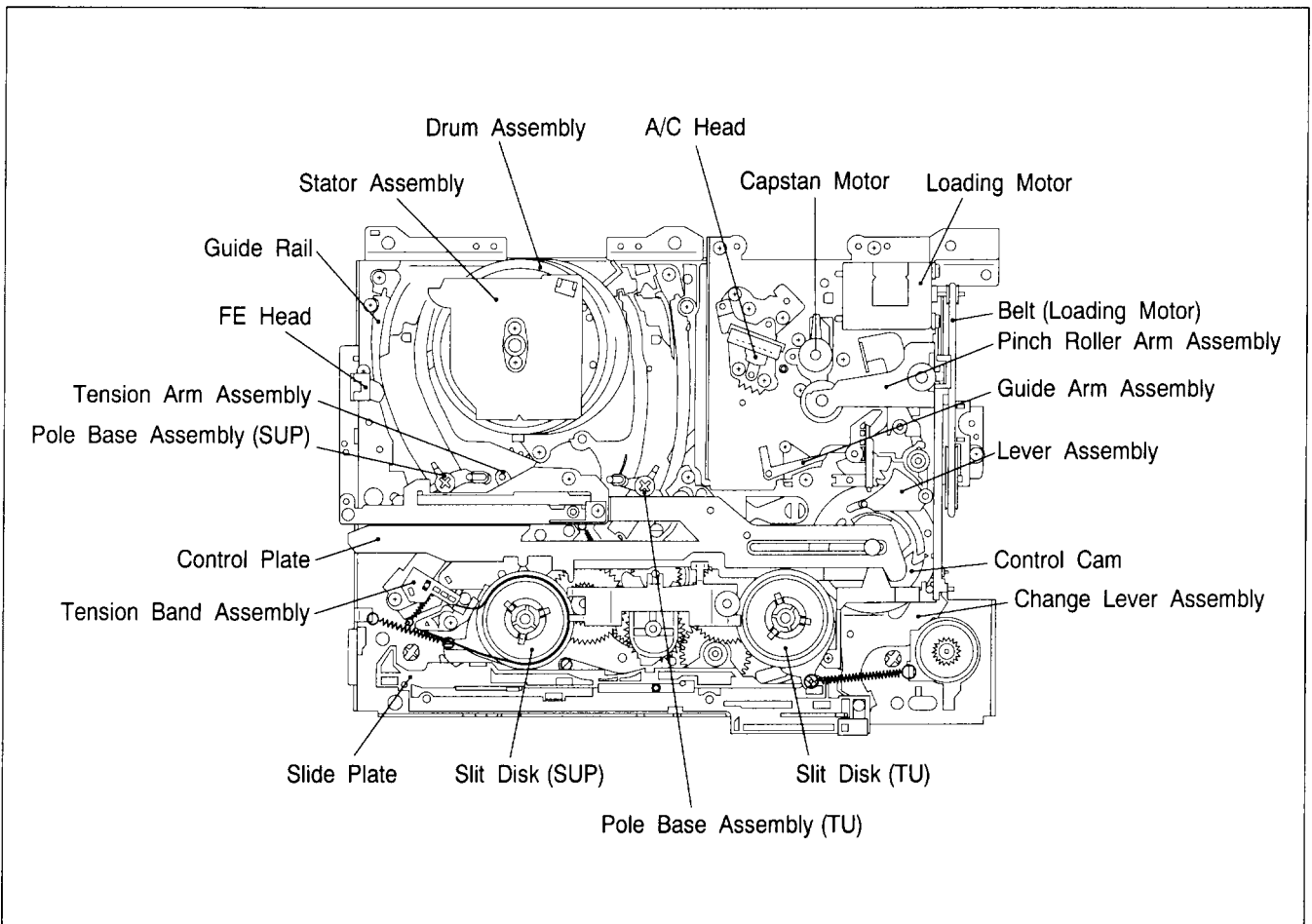


Fig. 2-2-1 Top view of main deck

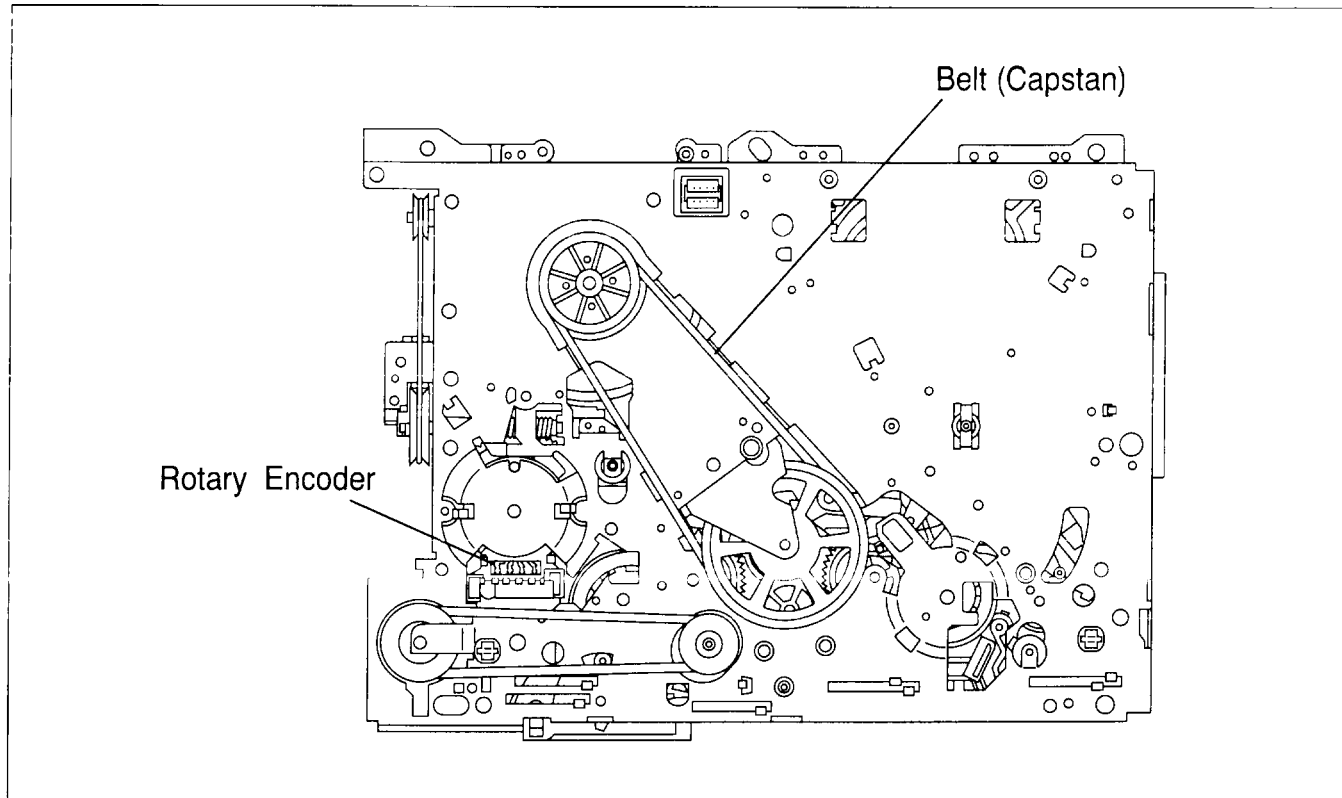


Fig. 2-2-2 Bottom view of main deck

2.2.1 Cleaning

Periodic cleaning of the tape transport system is desirable, but usually not feasible in practice. Therefore, perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads, tape guides and brush can detract from playback picture quality and in extreme cases, even damage the tape. For cleaning, use a finemesh cotton cloth (about the texture of a white dress-shirt) moistened in alcohol. It is recommended to also clean the tape tension posts and capstan.

- To clean the video heads, press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke, as this may damage the heads.

2.2.2 Lubrication

Oil and grease do not normally require periodic replenishing. Apply only when replacing lubricated parts (also clean and replace lubrication of mating parts if soiled). For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly. Before oiling, clean with alcohol. Apply one or two drops of oil. Avoid excess oil.

1. Table 2-2-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	75981-311.30
Grease	75988-034.74

Table 2-2-1

2. Grease is not required for a replacement cassette housing assembly, as this has been applied at the factory.

NOTE : *Stir grease that has been stored for an extended period.*

2.3 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage. Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced as and when required.

2.3.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time, even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assembly	★ ○	○
	A/C head	★ ○	★ ○
	Lower drum motor assembly	★	★ ○
	Pinch roller arm assembly	★	★
	Full erase head	★	★
	Tension arm assembly	★	★
	Guide arm assembly	★	★
Drive	Capstan motor		○
	Belt (Capstan)	○	○
	Belt (Loading motor)		○
	Loading motor		○
	Slit disk (supply, take-up)		○
	Clutch unit (supply, take-up)		○
	Worm gear assembly		○
	Control plate		○
	Slide plate		○
Other	Brush assembly	★ ○	★ ○
	Tension band assembly	○	○
	Rotary encoder		○

★ : Cleaning
 ○ : Inspection or Replacement if necessary

Table 2-3-1

2.4 DISASSEMBLY/ASSEMBLY PROCEDURE OF MECHANISM

2.4.1 Precaution before disassembling mechanism

This mechanism has an exclusive operation mode provided for disassembling and installation of the mechanism (MECHANISM ASSEMBLING MODE), and it is suggested to set the mechanism to this mode before disassembly and installation. The exclusive mechanism operation mode is not generally used and becomes available by manual setting only. Then this procedure starts with the condition that the cabinet parts and cassette housing assembly have been removed.

2.4.2 How to set the exclusive mechanism operation mode (MECHANISM ASSEMBLING MODE)

- (1) Turn the loading motor belt by hand.
- (2) Confirm that the hole of the control cam are aligned to the deck hole as shown in Fig.2-4-1.

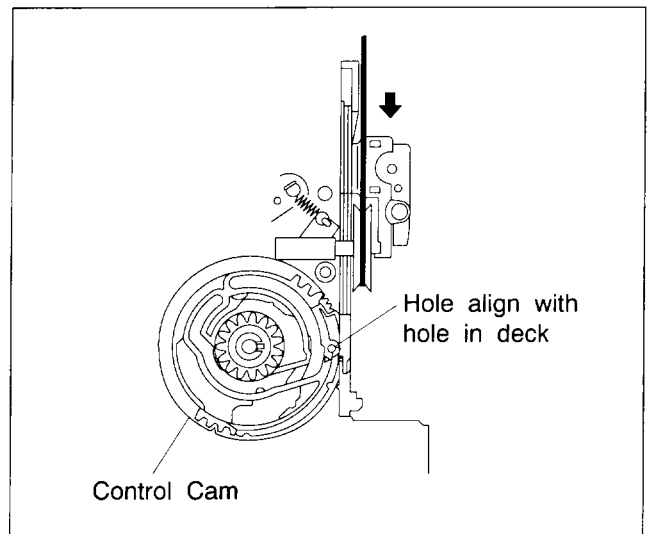


Fig. 2-4-1

2.5 MAIN PARTS REPLACEMENT OF MECHANISM

2.5.1 Pinch Roller Arm Assembly

- (1) Remove the slit washer.
- (2) Tilt up the pinch roller assembly in direction of arrow.

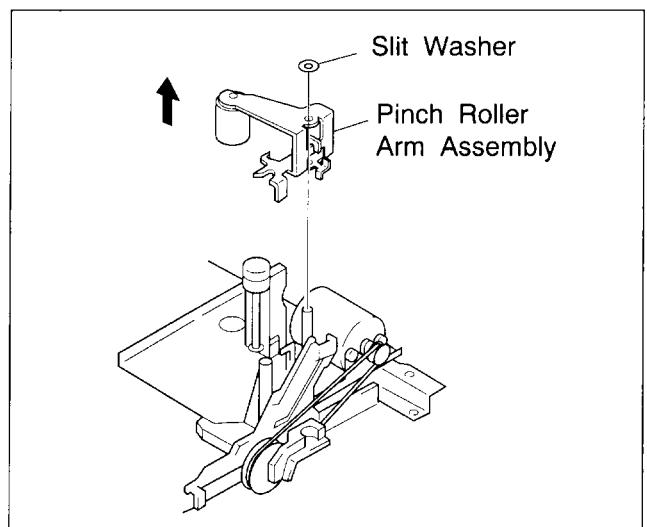


Fig.2-5-1

2.5.2 A/C Head

1. Removal

- (1) Take out 2 screws (A).
- (2) Remove the A/C head with head base.

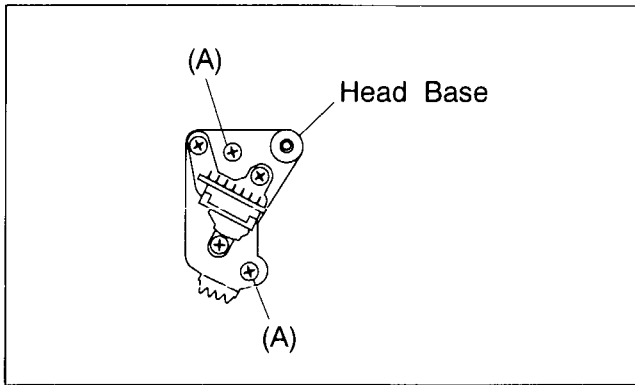


Fig.2-5-2

- (3) When replacing the A/C head only, remove 3 screws (B), use care not to misplace the 3 springs.

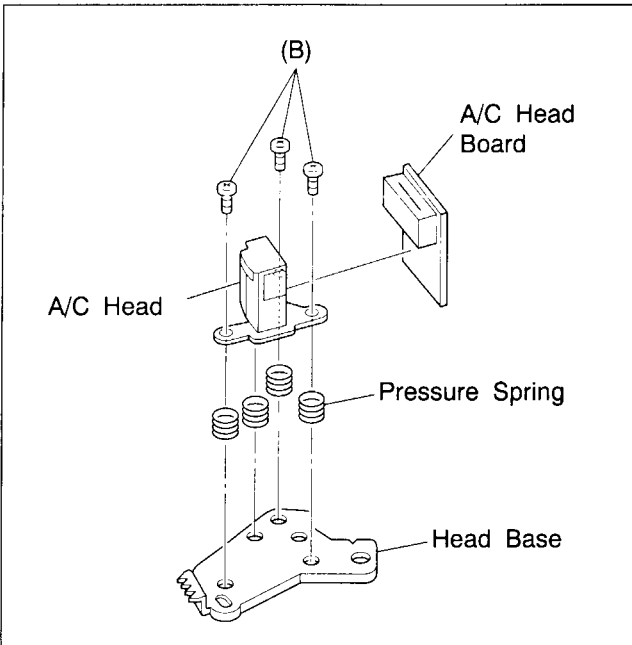


Fig.2-5-3

2. Installation

- (1) Temporarily set A/C head height as indicated in Fig. 2-5-4.

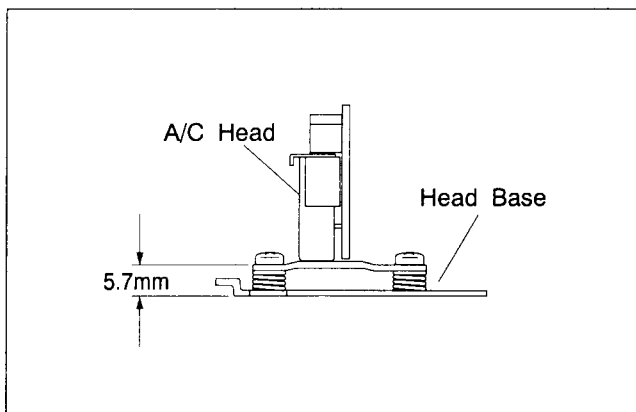


Fig.2-5-4

NOTES:

- It is very important to correctly adjust the control pulse and audio signal in addition to the mechanical tape path.
- Perform interchangeability adjustments after electrical adjustments.

2.5.3 Pinch Plate

1. Removal

- (1) Disengage 2 claws, then remove the pinch plate.

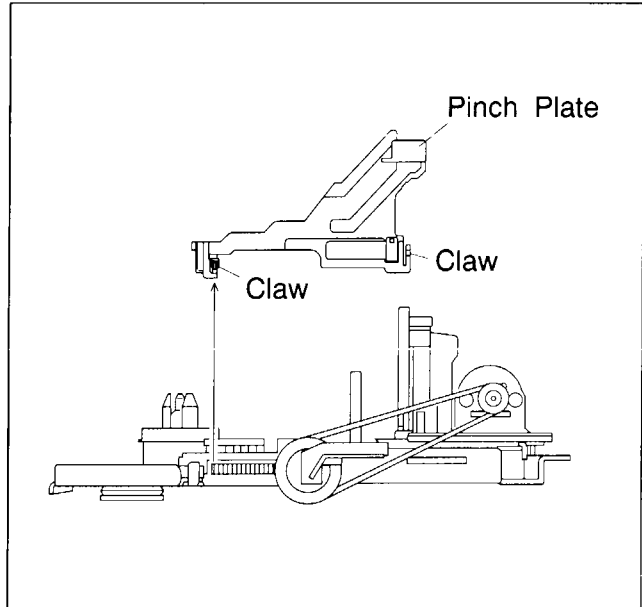


Fig.2-5-5

2. Installation

- (1) When installing pinch plate, align rack of pinch plate and triangle mark of control cam as indicated in Fig.2-5-6.

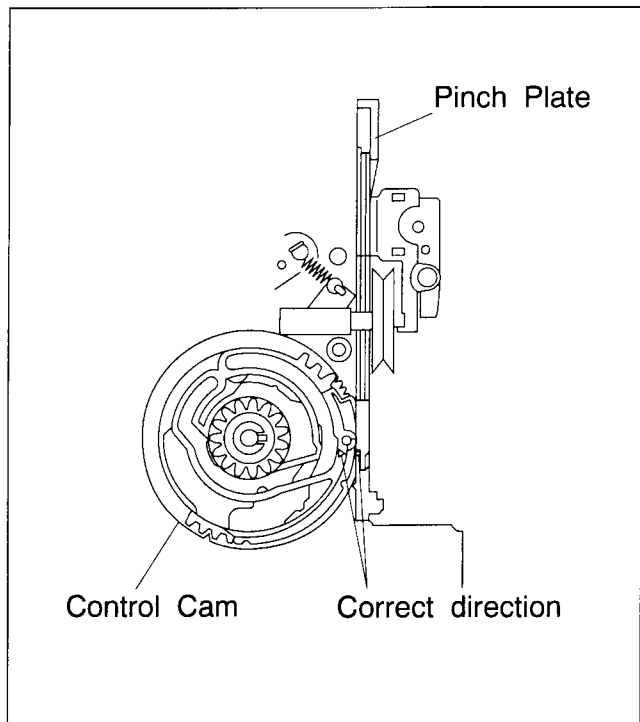


Fig. 2-5-6

2.5.4 Loading Motor

- (1) Disengage the belt between loading motor and worm gear.
- (2) Take out 2 screws (A) then remove the loading motor.

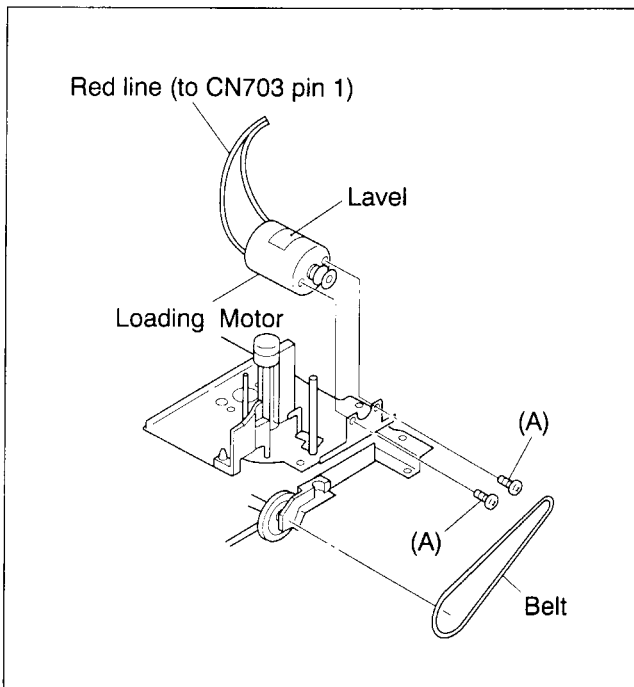


Fig.2-5-7

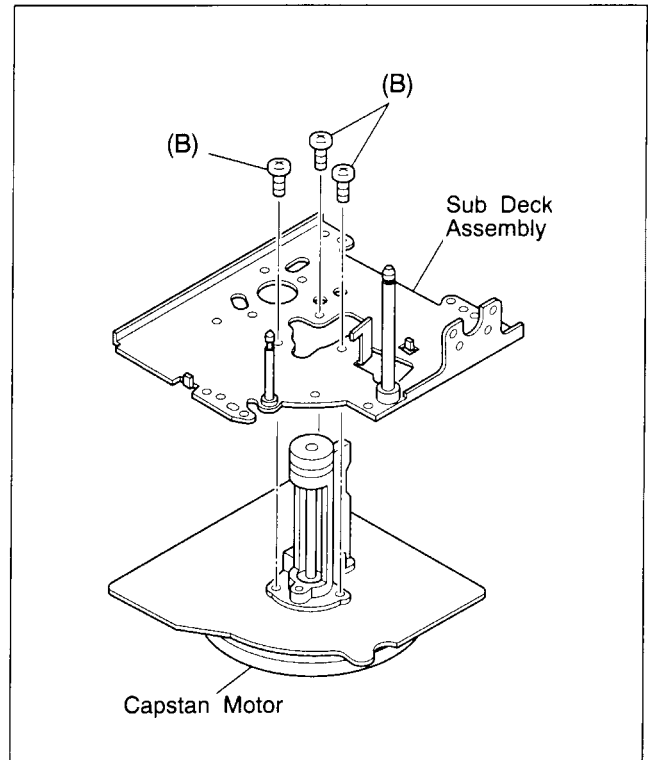


Fig.2-5-9

2.5.5 Lever Assmebly,Sub Deck Assembly,Capstan Motor

- (1) Take out 1 slit washer,then remove the lever assembly.
- (2) Disengage the belt(capstan motor) from bottom of mechanism assembly first as indicated in Fig.2-5-10.
- (3) Take out 3 screws (A) and remove the sub deck assembly as indicated in Fig.2-5-8.
- (4) Take out 3 screws (B) and remove the capstan motor from the sub deck assembly as indicated in Fig.2-5-9.

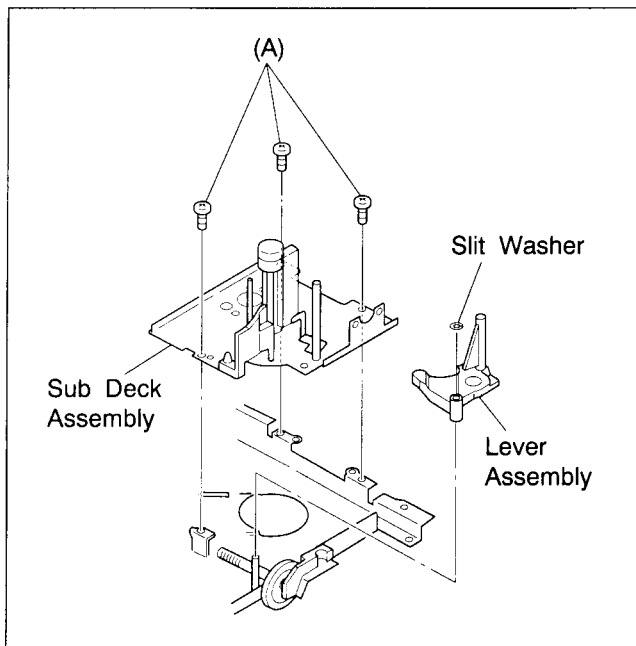


Fig.2-5-8

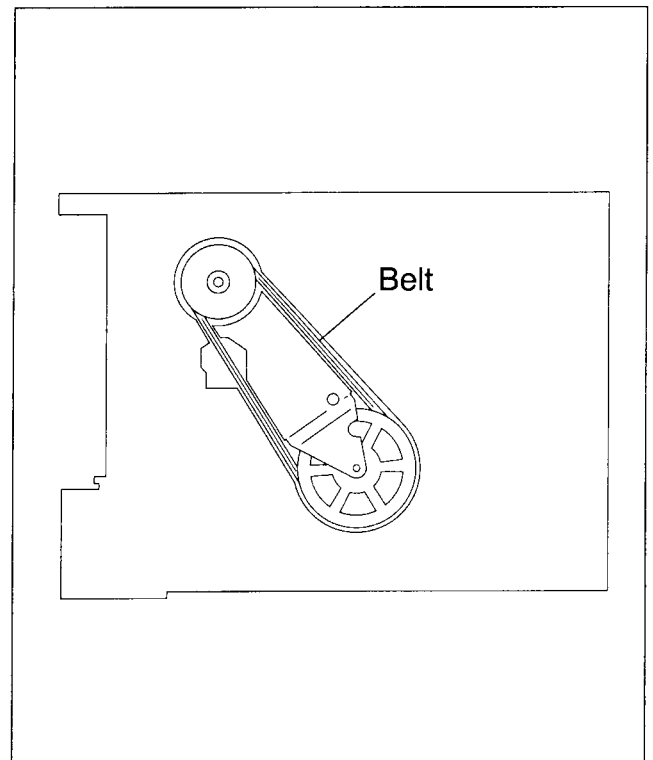


Fig.2-5-10

2.5.6 Control Bracket

- (1) Take out 1 screw (A) and 1 screw (B).
- (2) Remove the control bracket.

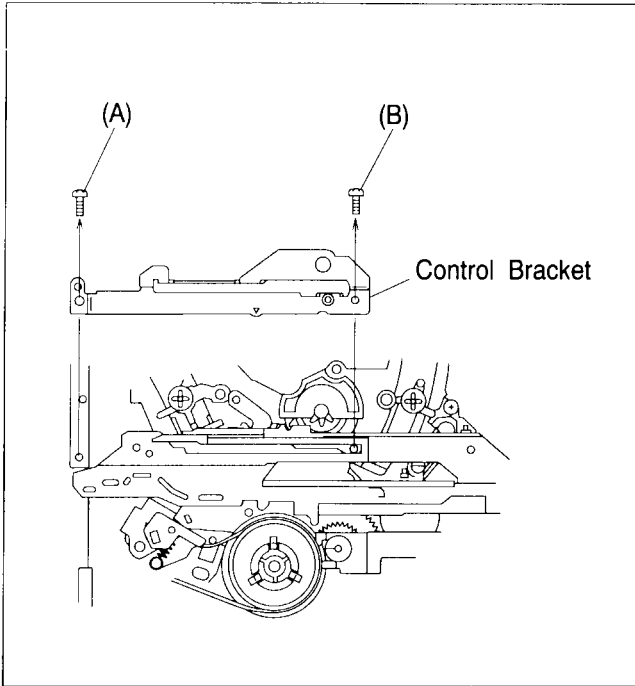


Fig.2-5-11

2.5.7 Reel Bracket, Slit disk (take-up), control Bracket-2

- (1) Take out 2 slit washers.
- (2) Remove the reel bracket and slit disk (take-up).
- (3) Take out 1 screw (A) and remove the control bracket-2.

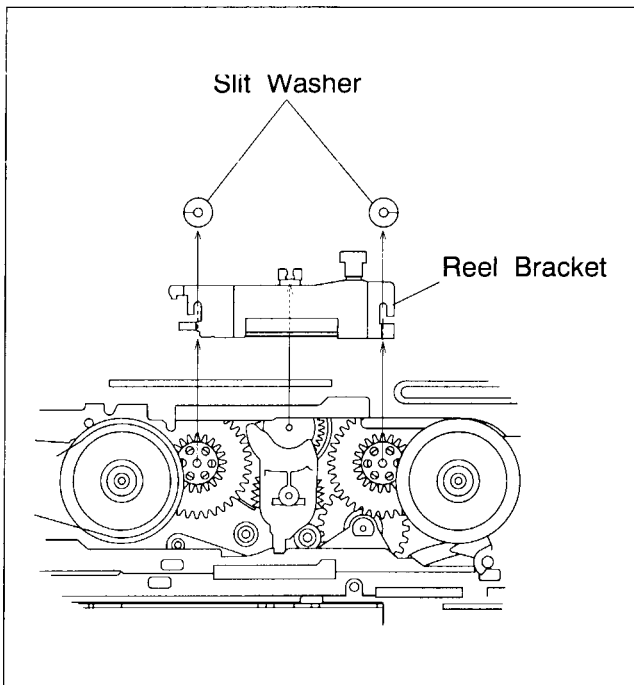


Fig.2-5-12

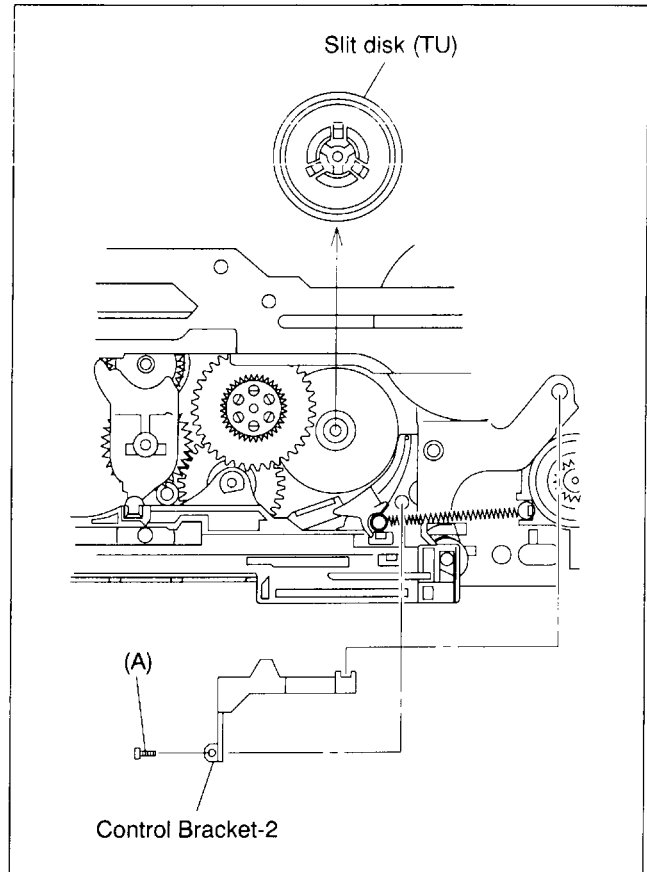


Fig.2-5-13

2.5.8 Control Plate

- (1) Take out 1 slit washer.
- (2) Disengage 2 claws and remove the control plate.

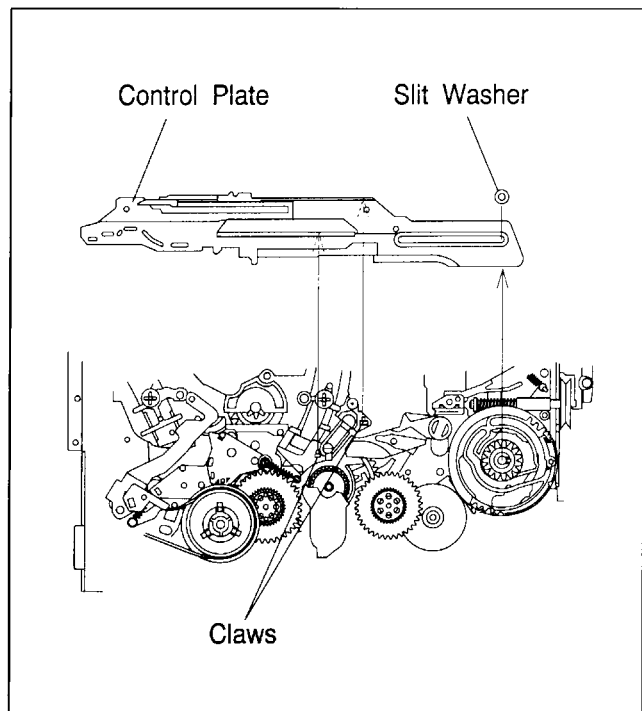


Fig.2-5-14

2.5.9 Sub Brake(take-up),Control Cam

- (1) Disengage 1 spring (a) and 1 claw then remove the sub brake (take-up).
- (2) Disengage 1 claw and remove the control cam.

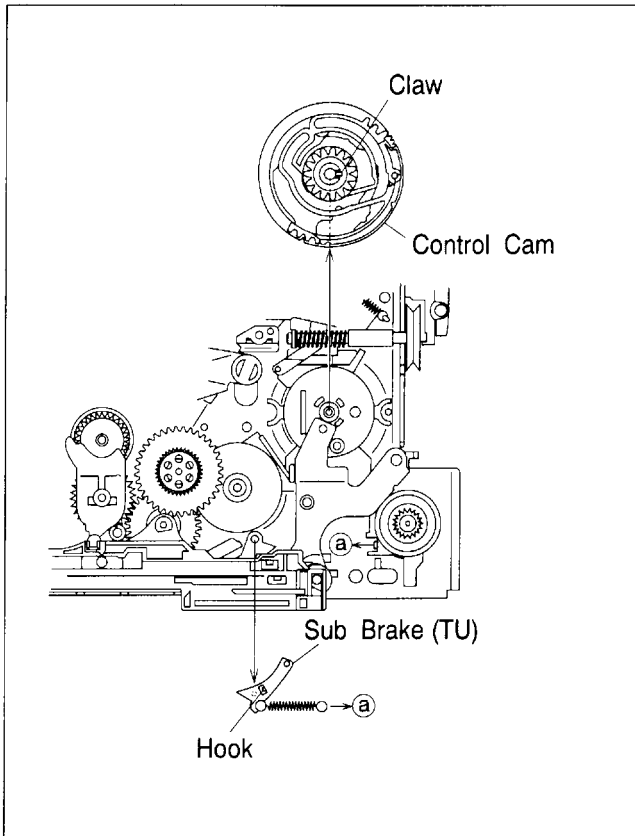


Fig.2-5-15

2.5.10 Slide Plate

- (1) Disengage 7 claws from bottom of the mechanism assembly and remove the slide plate.

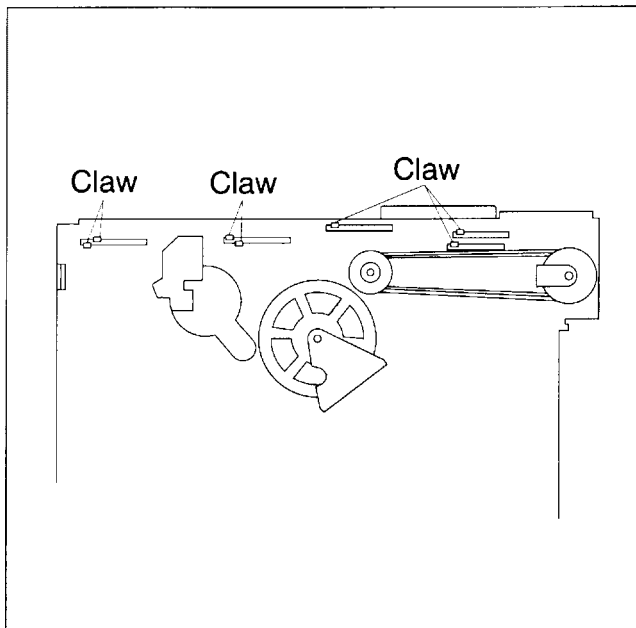


Fig. 2-5-16

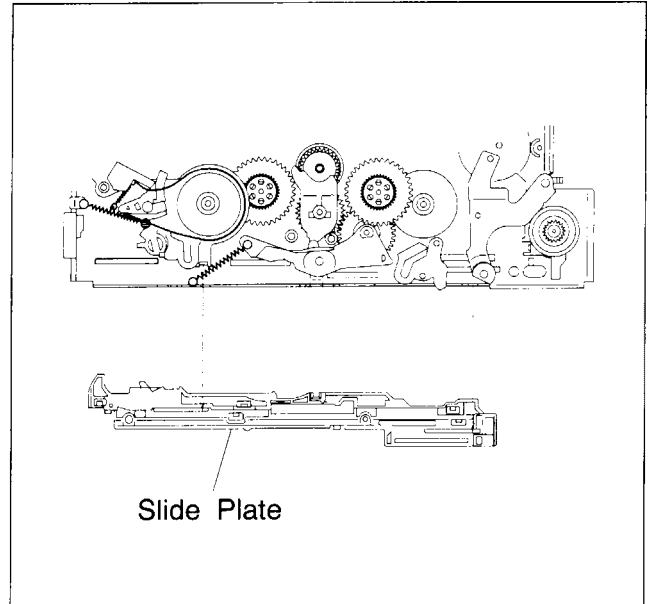


Fig. 2-5-17

2.5.11 Change Lever,Rotary Encoder

- (1) Remove the change lever.
- (2) Disengage 2 claws and remove the rotary encoder.

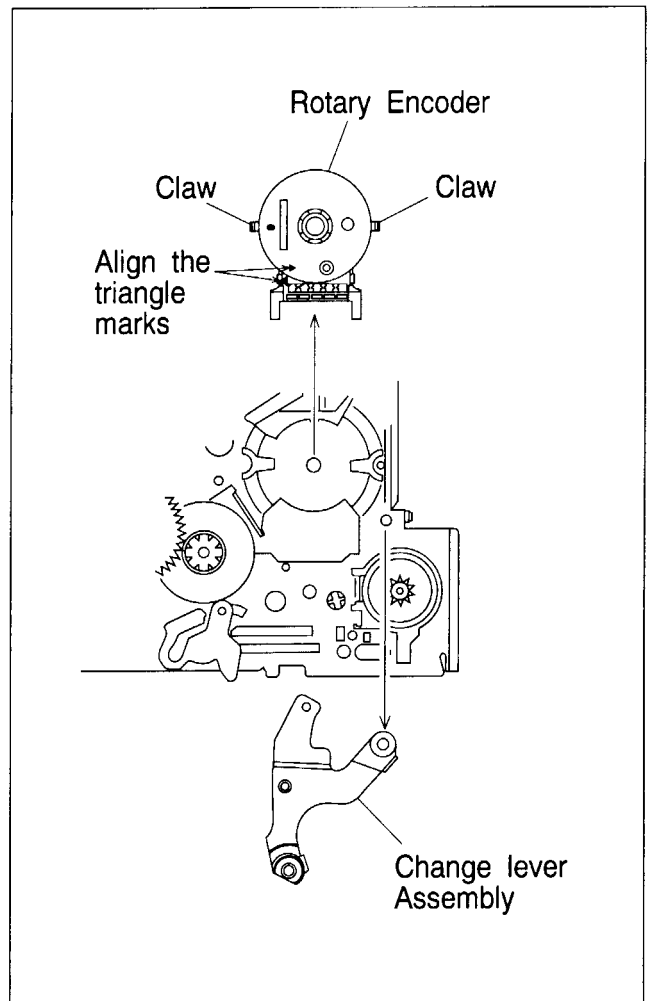


Fig. 2-5-18

2.5.12 Sub Brake (supply), Tension Band Assembly, Tension Arm Assembly, Take-up Lever Assembly, Slit Disk (supply)

- (1) Disengage 1 spring (a).
- (2) Disengage 1 claw and remove the sub brake (supply).
- (3) Take out 1 screw (A), spring (c) and slit washer.

- (4) Remove the tension arm assembly with tension band assembly.
- (5) Disengage 1 spring (b) and remove the take-up lever assembly.
- (6) Remove the slit disk (supply).

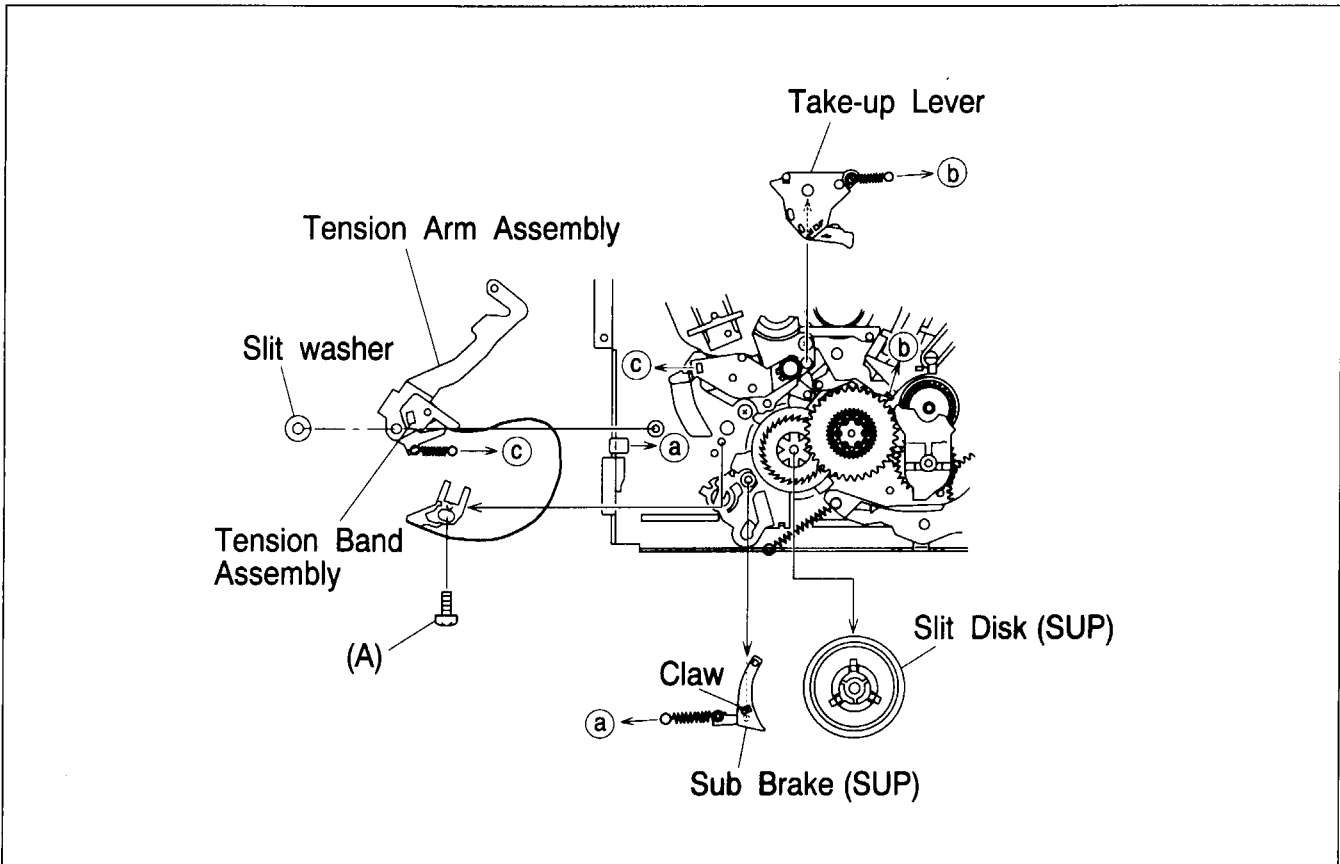


Fig. 2-5-19

2.5.13 Take-up Head, Tension Arm Lever

- (1) Remove the take-up head and tension arm lever.

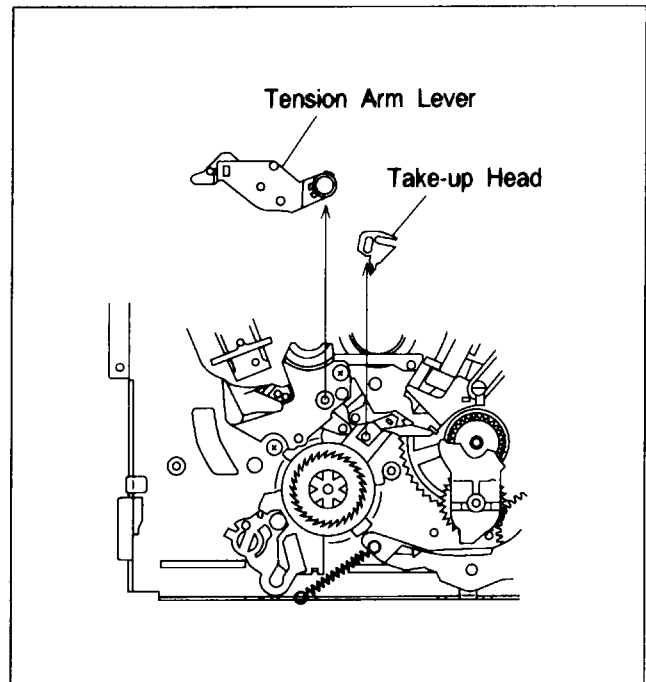


Fig.2-5-20

2.5.14 Guide Rail

- (1) Take out 5 screws (A) and 1 screw (B).
- (2) Disengage 4 claws and remove the guide rail.

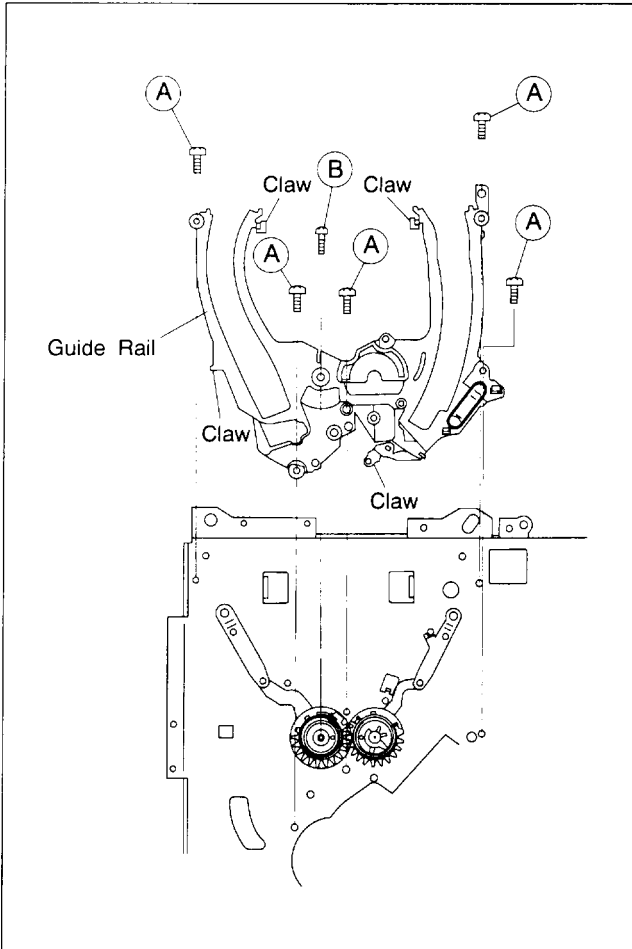


Fig. 2-5-21

2.5.15 Stator Assembly

- (1) Take out 2 screws (A).
- (2) Raise the stator assembly in the direction indicated by the arrow to remove it.
- (3) Remove the flat cable.
- (4) To reinstall, first secure the flat cable, then insert 2 screws (A).
- (5) After reinstalling, be sure to perform PB switching point adjustment (See SECTION 3 ELECTRICAL ADJUSTMENT).

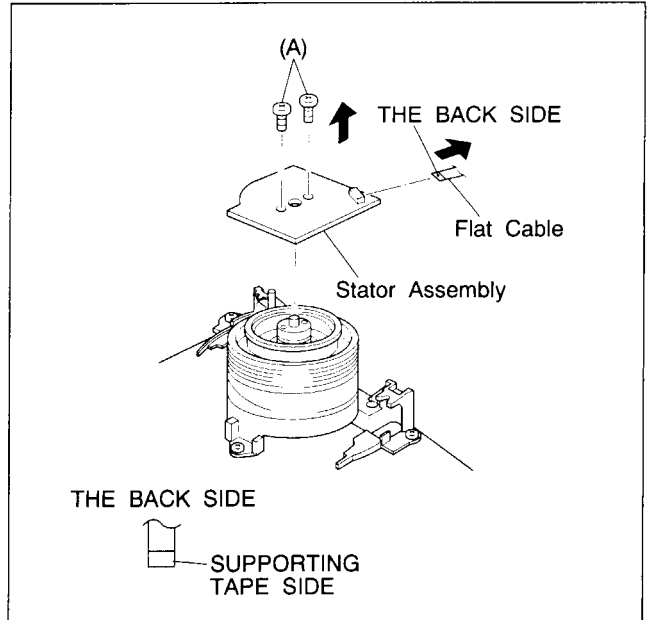


Fig. 2-5-22

NOTE : When refitting the connector, check that the flat wire is inserted correctly.

2.5.16 Rotor Assembly

- (1) Remove the stator assembly.
- (2) Take out 2 screws (B) and remove the rotor assembly.

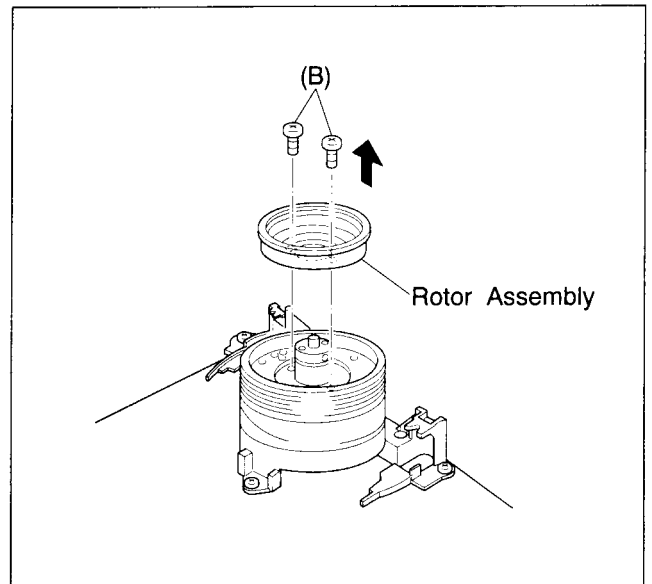


Fig. 2-5-23

- (3) Align the upper drum assembly and rotor assembly phase as indicated in Fig.2-5-24.
- (4) Overlap holes (a) of the upper drum assembly with holes (b) of the rotor assembly and secure with 2 screws (B) as indicated in Fig.2-5-23.

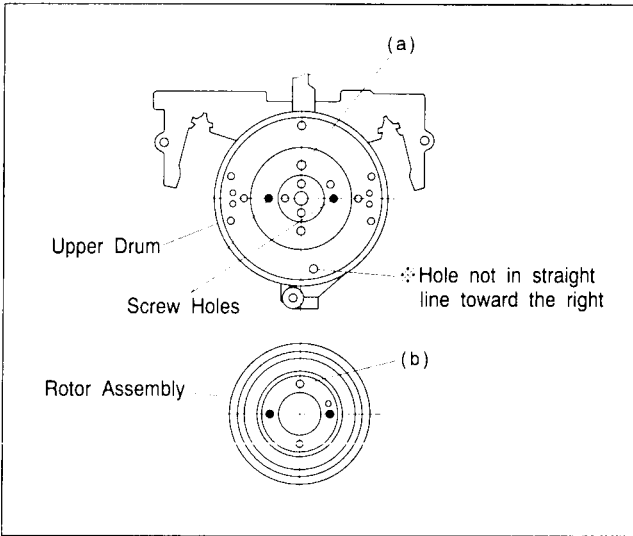


Fig. 2-5-24

2. Installation

- (1) Use an air brush to clean the lower drum assembly and the coil section of the new upper drum assembly.
- (2) Set a new washer on the drum shaft as indicated in Fig.2-5-25.

NOTE : Be sure to use the new washer when replace the upper drum assembly.

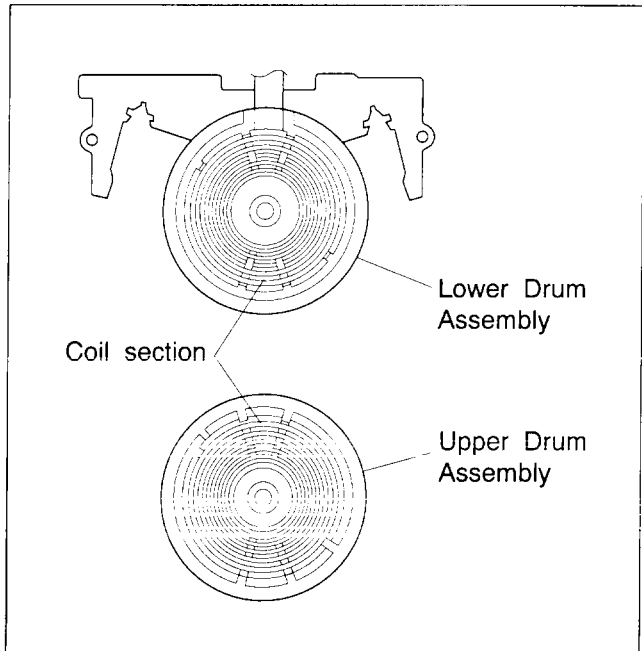


Fig.2-5-26

2.5.17 Upper Drum Assembly

1. Removal

- (1) Remove the stator assembly and rotor assembly.
- (2) Use a 1.5 mm hexagonal wrench to loosen the collar assembly screw and remove the collar assembly.
- (3) Remove the upper drum assembly and use tweezers to remove the washer.

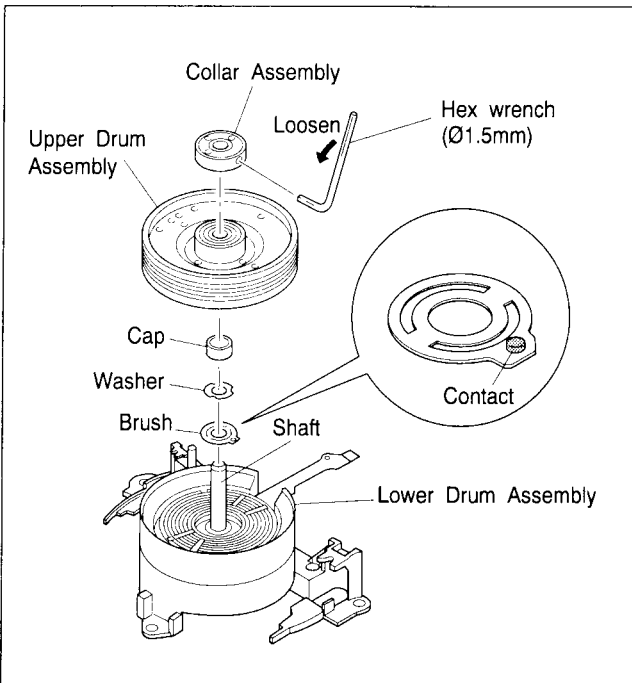


Fig. 2-5-25

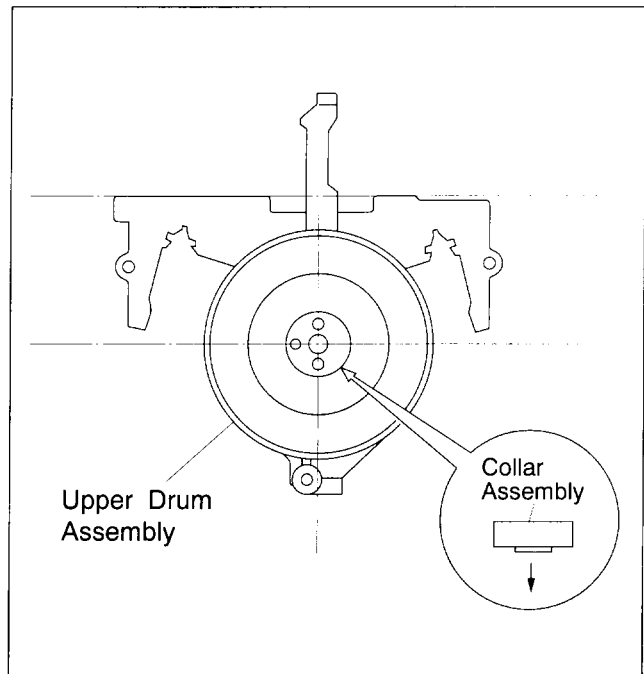


Fig.2-5-27

NOTE : When replacing the upper drum assembly, it is recommended to replace the brush.

(3) Note the top and bottom of the collar assembly and determine the position as indicated in Fig.2-5-27.

- (4) While pressing the collar assembly evenly from above with your fingertips, secure the hexagonal screw.

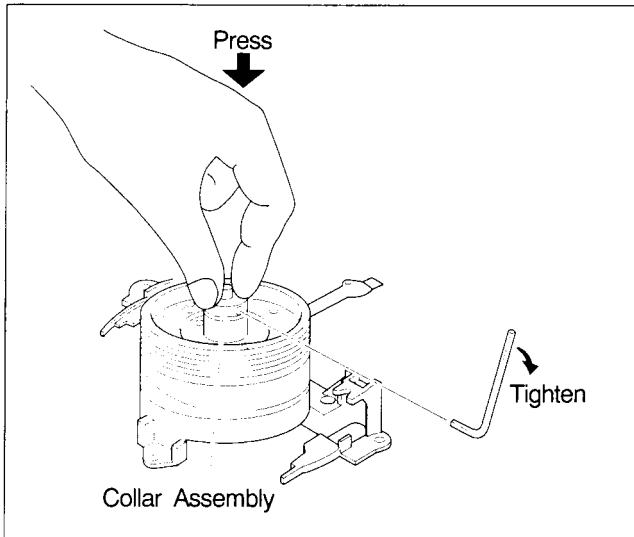


Fig.2-5-28

- (5) After installing, gently turn the upper drum by hand and confirm normal rotation.
- (6) Install the rotor assembly and stator assembly.
- (7) Clean the upper and lower drum assembly and perform the following adjustments:
- PB switching point adjustment
 - Slow tracking preset adjustment
 - Interchangeability adjustment (be sure to check EP mode)

2.6 CHECKUP AND ADJUSTMENT OF MECHANISM PHASE

2.6.1 Precaution

The rotary encoder and syscon circuit are closely interrelated. Therefore, the rotary encoder and control cam connection determines the operations of mechanical parts such as plates, gears, brakes, etc. Correct positioning of these parts is essential for smooth tape loading and mechanical operations.

2.6.2 Loading Arm Assembly (supply, take-up)

- (1) Install the supply loading arm assembly and the take-up loading arm assembly so that their positioning markings on the respective gear face each other and the holes of their arms correspond to the holes on the main deck assembly respectively.
- (2) After setting the guide rails, engage the pole base assemblies with the tip of the loading arms respectively. Then, enter the mechanism into the unloading mode to return the pole base assemblies to the front position.
- (3) Reassemble the peripheral parts of the guide rail to its original position.

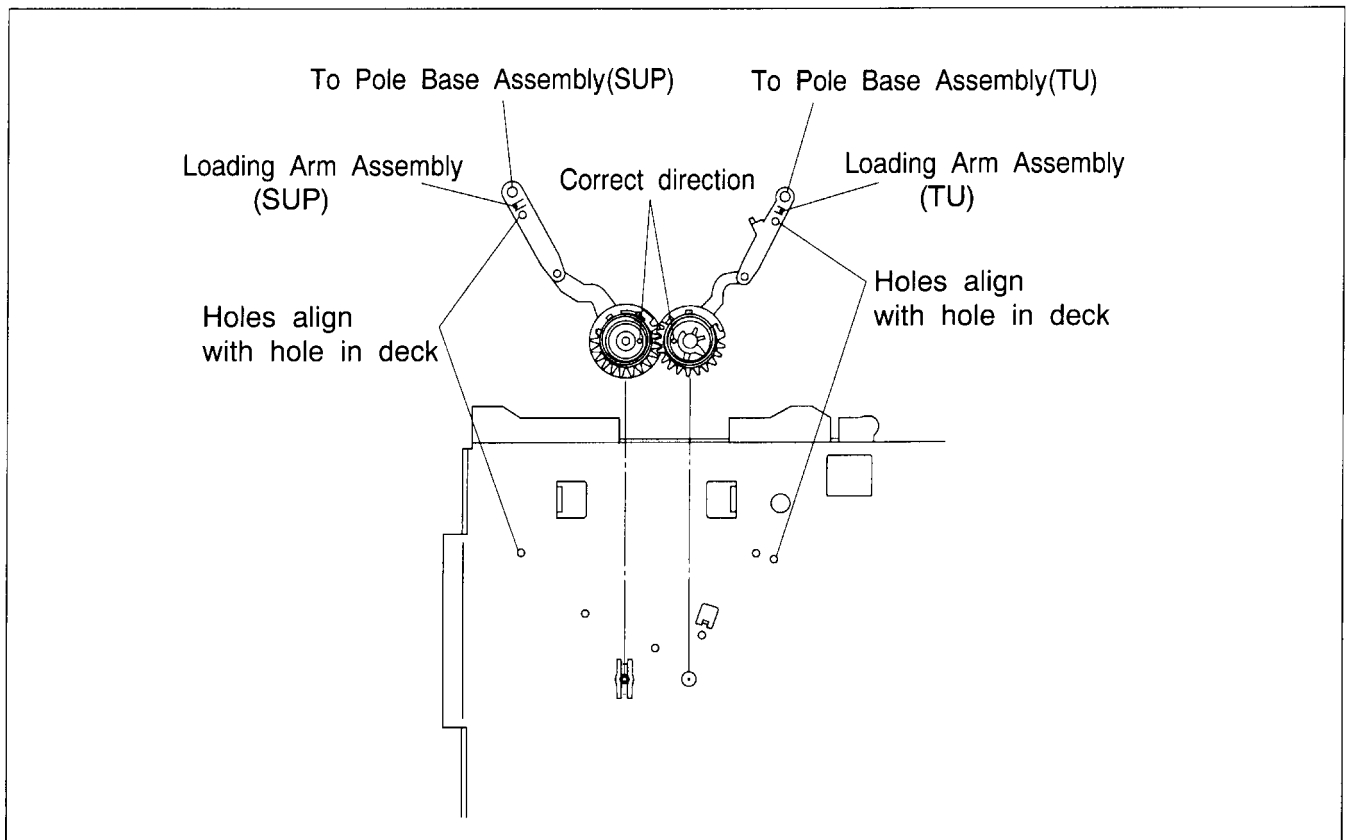


Fig. 2-6-1

2.6.3 Rotary Encoder, Change Lever, Control Cam

- (1) When reinstalling the rotary encoder, adjust its position so as to fit the triangle marks each other and push it deep until it is locked by the pawls.
- (2) When reinstalling the change lever, set it so as to make its positioning hole correspond to the hole of the main deck assembly.
- (3) When re-engaging the control cam, lower the capstan brake assembly while setting it so as to make its positioning hole correspond to the hole of the main deck assembly.

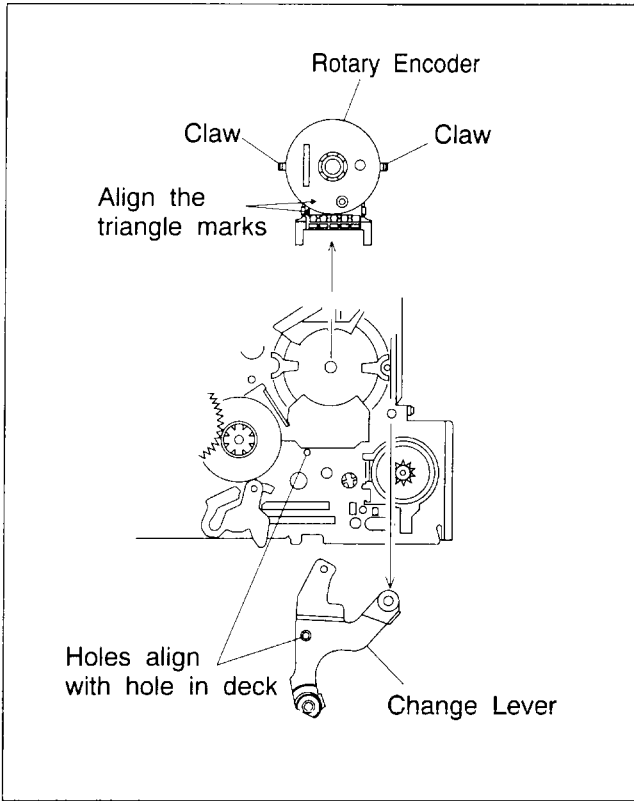


Fig. 2-6-2

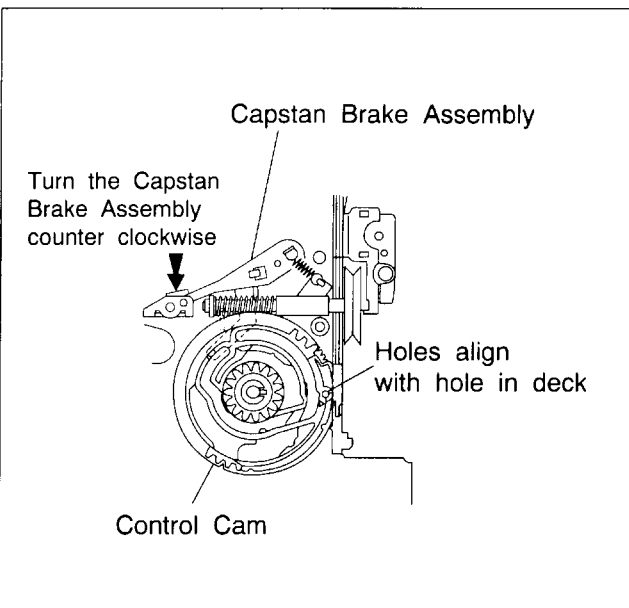


Fig. 2-6-3

2.6.4 Slide Plate

- (1) Lower both the main brake assembly (supply and take-up) until they touch the edge of the main deck assembly while reinstalling the slide plate so as to make the respective positioning holes of the main brake assembly correspond to the holes on the main deck assembly.

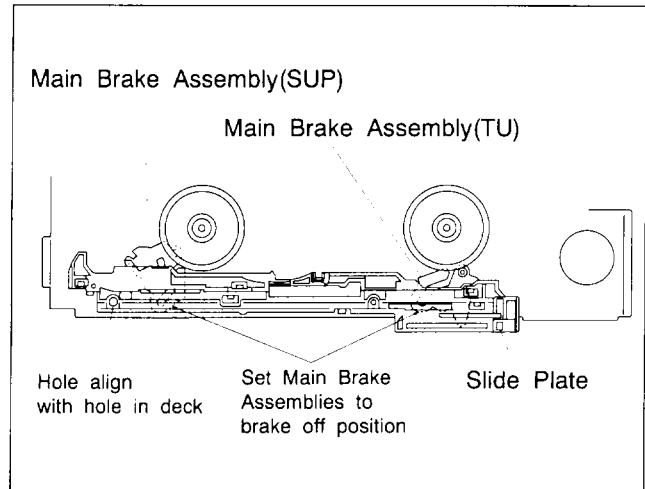


Fig.2-6-4

2.6.5 Control Plate

- (1) Reinstall the control plate so as to set the two positioning holes of it on the holes on the main deck assembly respectively and to set the positioning hole of the take-up lever on the hole of the main deck at the same time. When adjusting the hole position of the take-up lever, use a pair of tweezers to hold and move it since it is pulled by a tension spring.
- (2) After reinstalling the control plate, fix it with the slit washer, control bracket and control bracket 2.

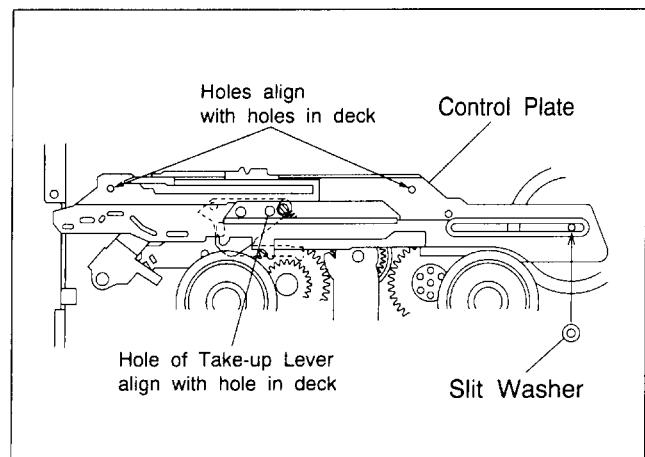


Fig. 2-6-5

2.7 TAPE INTERCHANGEABILITY ADJUSTMENT

- NOTE :**
- This adjustment is extremely important. However, it is normally not required during routine service. Perform only after replacing major components(A/C head,upper/lower drum assembly,pole base assembly,etc).
 - Before using costly alignment tape,use a spare tape and confirm correct operation of the tape transport.

2.7.1 Tape pattern

- (1) Connect the oscilloscope to TP106(PB FM) on the Main board.Use TP111(D.FF) on the Main board as a trigger.
- (2) Playback the SP staircase portion of the alignment tape. Confirm that the FM waveform appears as indicated in Fig.2-7-1.
- (3) Set the manual tracking position by simultaneously pressing the CH " + " and " - " buttons.
- (4) Operate the tracking adjustment (press the CH buttons during playback) and set for maximum playback FM waveform.
- (5) By operating the CH button, vary the FM waveform from maximum to minimum and vice versa to confirm that the waveform varies nearly in a flat shape as shown in Fig.2-7-1.
- (6) When the FM waveform does not remain flat during this process,first slightly loosen the set screw located at the bottom of the guide rollers.Using the guide roller adjustment tool (Roller driver), adjust the supply and take-up guide rollers (refer to Fig.2-7-2) to obtain the correct waveform as indicated in Fig.2-7-3.
- (7) By pressing the CH buttons several times, vary the FM waveform output from maximum to minimum (and vice versa) gradually,and confirm that the variation proceeds in flat shape, as shown in Fig.2-7-3.
- (8) After adjustments,tighten the set screw of the guide rollers.
- (9) Confirm that the tape wrinkling does not occur at the roller upper or lower limits as indicated in Fig.2-7-4.

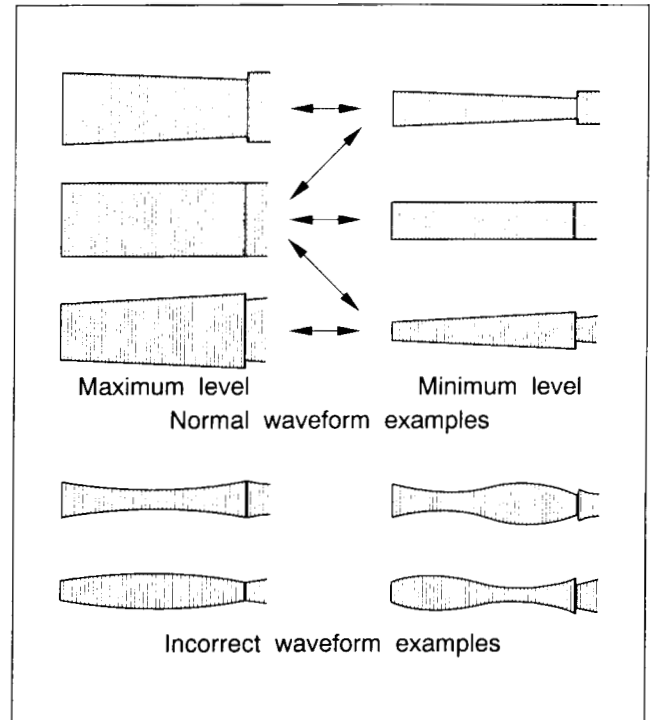


Fig. 2-7-1

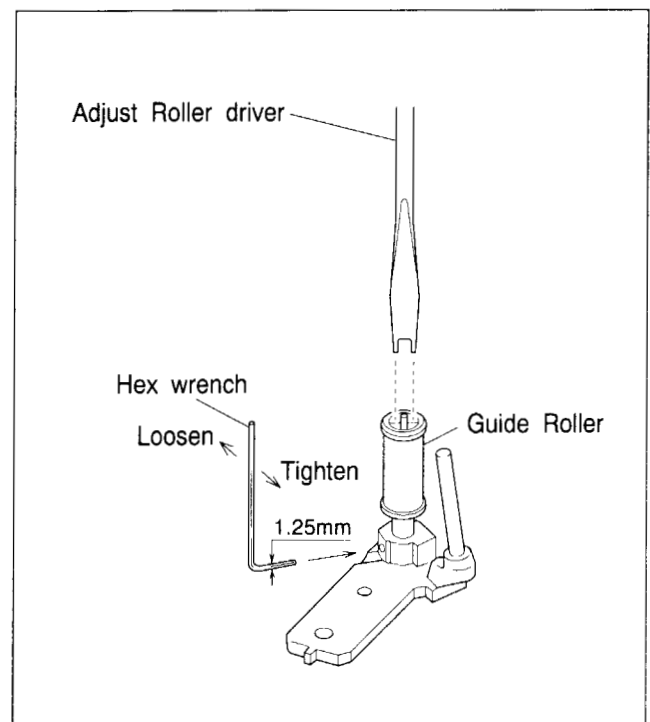


Fig. 2-7-2

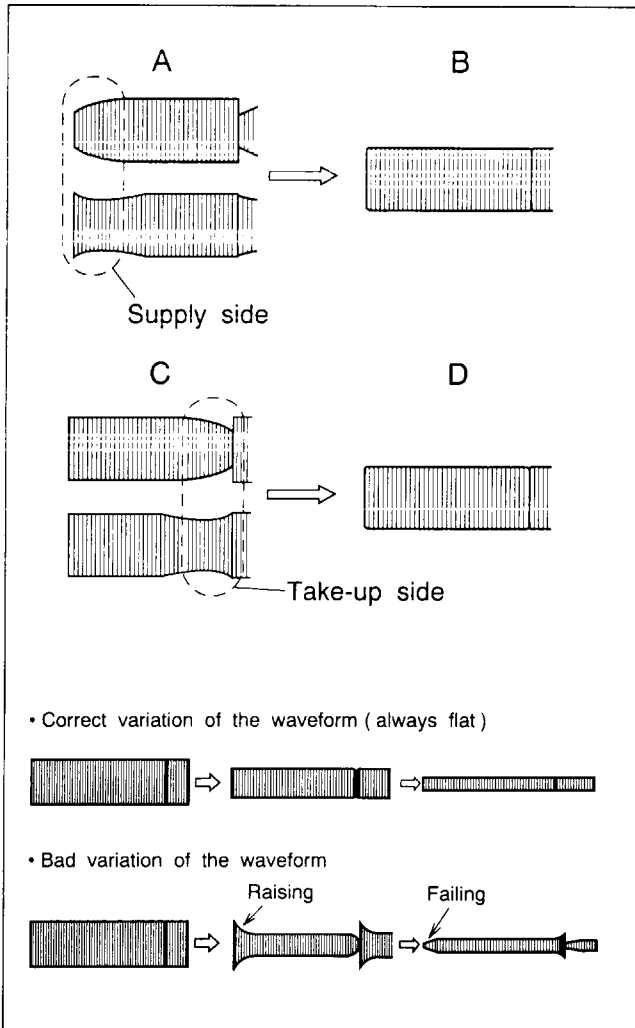


Fig. 2-7-3

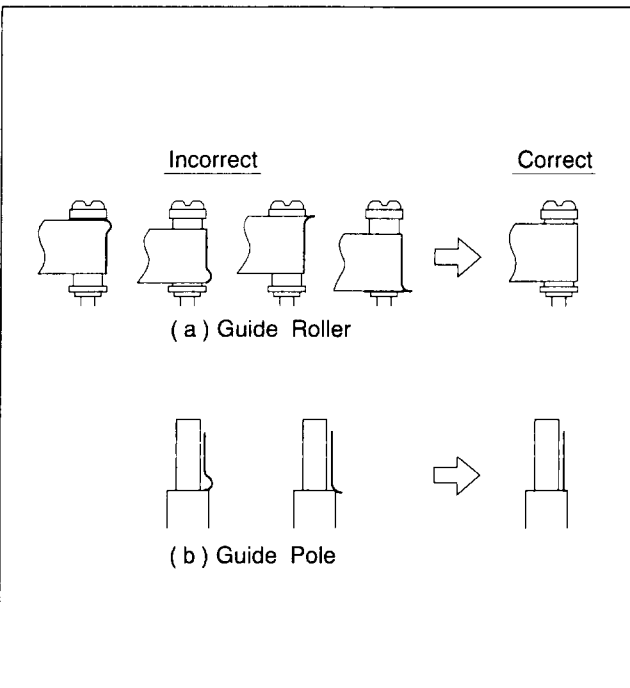


Fig. 2-7-4

2.7.2 A/C head height & azimuth

NOTE :

- Temporarily set A/C head height as indicated in Fig. 2-5-4.
- Use spare tape to check the transport and confirm the tape is not scratched or damaged.

1. Tilt

- (1) Use spare tape and set for playback.
- (2) Turn screw (3) clockwise to where the tape curls just slightly at the TU guide pole bottom flange as shown in Fig.2-7-5.
- (3) Then slowly turn screw (3) counterclockwise to where the curling ceases.

2. Height

- (1) Connect CH-1 of a dual trace oscilloscope to Audio Out.
- (2) Connect CH-2 to TP1101(CTL P) of the Main board assembly and use the ALT mode.
- (3) Playback the SP stairstep portion of the alignment tape.
- (4) Adjust screws (1),(2) and (3) for maximum audio output and control pulse level.

3. Azimuth

- (1) Connect the oscilloscope to Audio Out.
- (2) Playback the SP stairstep portion of the alignment tape.
- (3) Adjust screw (2) so that the audio output is both maximum and with minimum fluctuation.

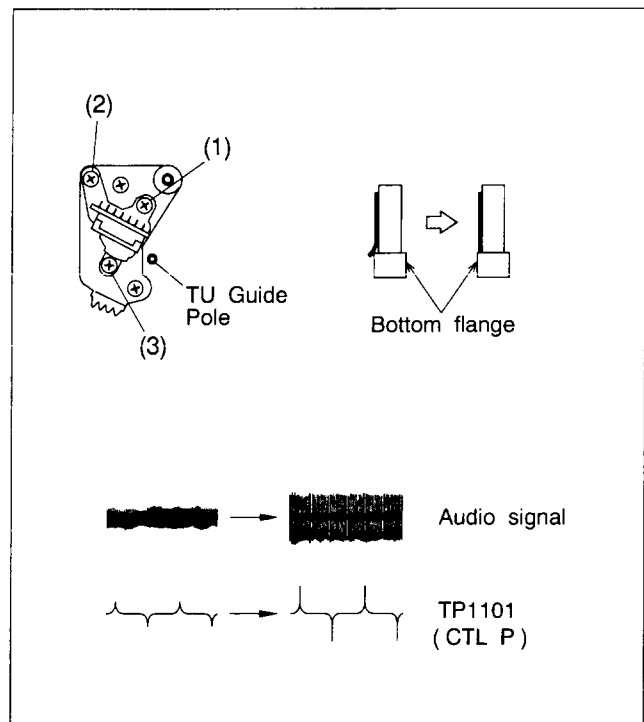


Fig. 2-7-5

2.7.3 A/C head phase(X-value)

- (1) Connect the oscilloscope to TP106(PB FM) on the Main board. Use TP111(D.FF) on the Main board as a trigger.
- (2) Playback the SP stairstep portion of the alignment tape.
- (3) Set the neutral manual tracking position by simultaneously pressing the CH " + " and " - " buttons.
- (4) If adjustment is required, slightly loosen screws (4) and (5). Set A/C head positioning tool on the A/C head adjusting boss as indicated in Fig.2-7-6.
- (5) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig.2-7-7.
- (6) Tighten screw (5). Remove the tool and tighten screw (4).

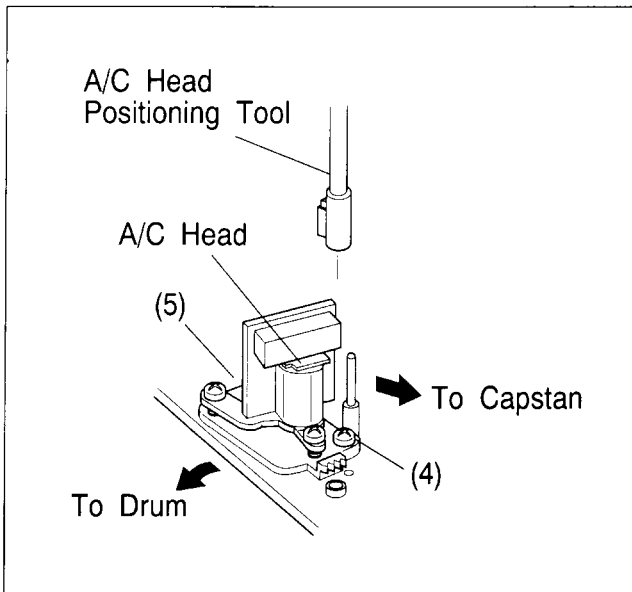


Fig. 2-7-6

2.7.4 Tension pole position

- (1) Set for playback mode using MECHANISM SERVICE MODE(See SECTION 1 DISASSEMBLY).
- (2) Slightly loosen the screw (A) .
- (3) Turn the adjust pin so that the tension arm assembly does not touch $\phi 2.5$ pole on the outside.
- (4) Tighten the screw (A).
- (5) After adjustment, use the back tension cassette gauge and set for the playback mode.
- (6) Confirm reading of 29 to 46 g-cm.

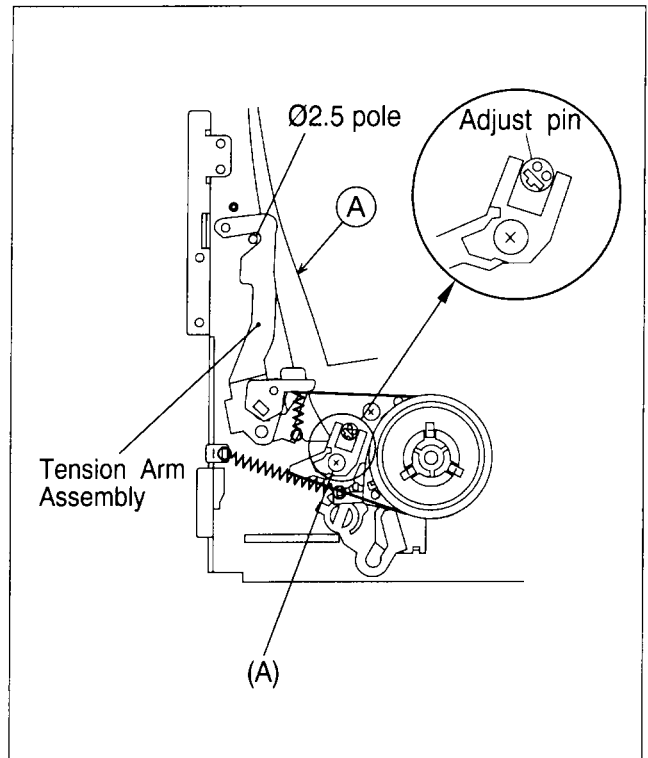


Fig. 2-7-8

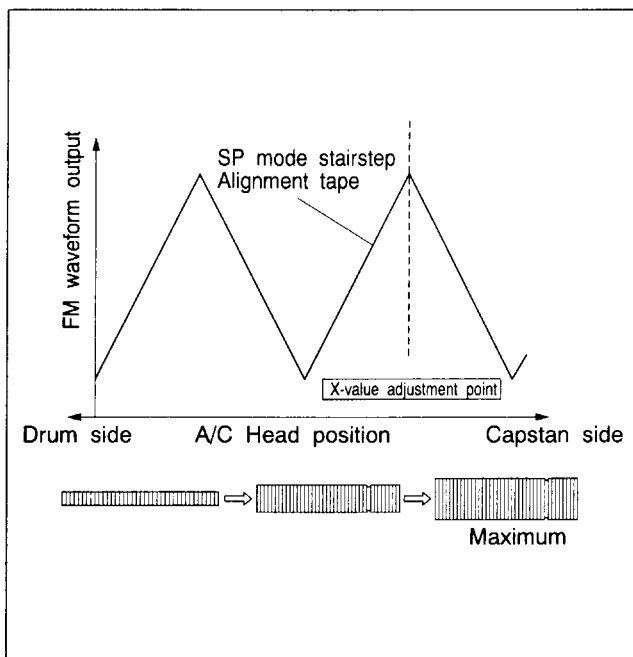


Fig. 2-7-7

SECTION 3 ELECTRICAL ADJUSTMENT

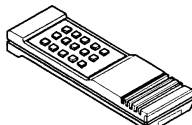
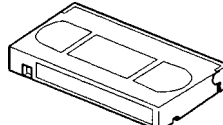
3.1 PRECAUTION

Electrical adjustment are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also do not attempt these adjustments unless the proper equipments is available.

3.1.1 Required test equipment

- ① Colour television or monitor
- ② Oscilloscope: wide-band,dual-trace,triggered delayed sweep
- ③ Frequency counter
- ④ Digital voltmeter
- ⑤ Signal generator: RF/IF sweep/maker
- ⑥ Signal generator: PAL colour bar, stairstep
- ⑦ Recording tape
- ⑧ Numeric remote controller(provided)

3.1.2 Required adjustment tools

Presetting unit 75981-311.26	Alignment tape 75981-311.27
	

3.1.3 Colour bar signal,colour bar pattern

- Colour bar signal

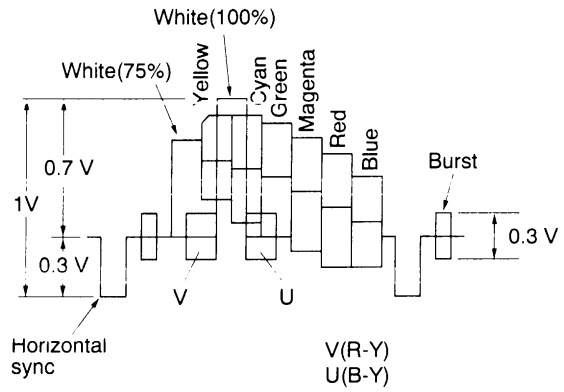


Fig.3-1-1 Colour bar signal waveform

- Colour bar pattern

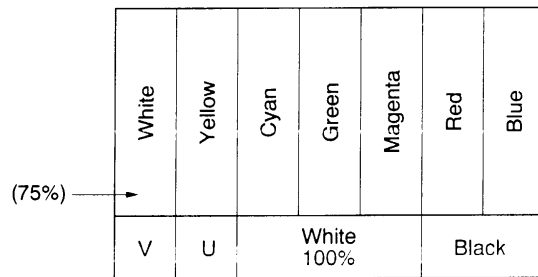


Fig.3-1-2 Colour bar pattern

- Depress button "A" on presetting unit, to set VCR to "code receive" mode.
- Use only buttons "O", depressing other buttons during adjustment may cause adjustment errors.

3.2.1 PB switching point

Signal	• Alignment tape, Stairstep
Mode	• PB
Equipment	• Oscilloscope
Measurement point	• VIDEO OUT TERMINAL
Trigger slope (-)	• TP111(DRUM FF)
Adjustment tool	• Presetting unit
Specification	• 6.5 ± 0.5H

- (1) Connect an oscilloscope to VIDEO OUT TERMINAL and external trigger from TP111 (negative slope).
- (2) Playback the stairstep signal of the alignment tape.
- (3) Press the "O" button of the presetting unit.
- (4) The adjustment is performed automatically.
Once the adjustment is performed, the VCR will go into the STOP mode.

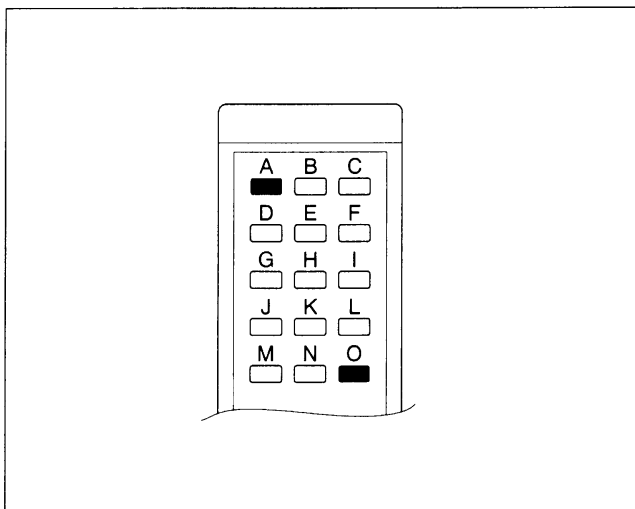


Fig.3-2-1 Presetting unit

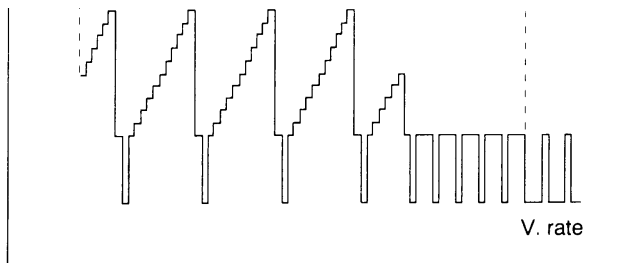


Fig.3-2-2 PB switching point

3.2.2 Slow tracking preset

Signal	• Tuner or colour bar
Mode	• SP, REC → PB(SLOW)
Equipment	• TV-Monitor
Adjustment tool	• Presetting unit
Specification	• Minimum noise

- Notes :**
- Depress button "A" on presetting unit, to set VCR to "code receive" mode.
 - Use only buttons "B" and "C", depressing other buttons during adjustment may cause adjustment errors.

- (1) Record a colour bar signal in the SP mode.
- (2) Playback recorded signal on the FWD slow mode.
- (3) Observe the display on the TV monitor and adjust for optimum noise condition (best tracking) by depressing "B" or "C" buttons of the presetting unit.
- (4) Depress the STOP button.
- (5) Confirm that the bar noise is not visible on the TV monitor in the slow mode.

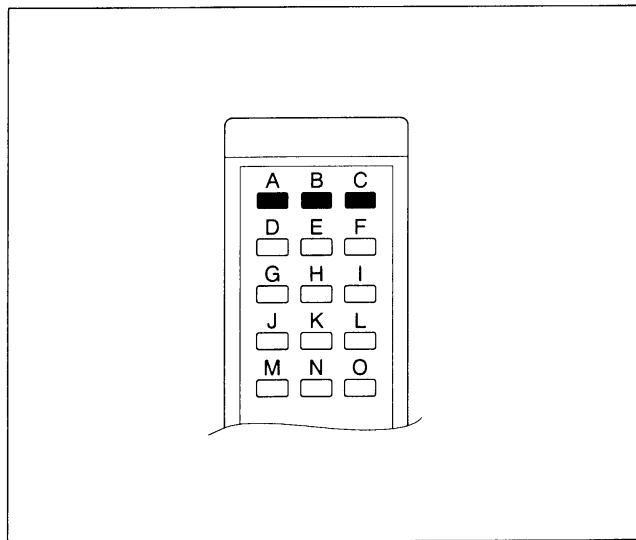


Fig.3-2-3 Presetting unit

3.3 VIDEO CIRCUIT

- Notes:**
- Unless otherwise specified, all measurement point and adjustment parts are located on the MAIN BOARD.
 - Use only buttons "B" and "C", depressing other buttons during adjustment may cause adjustment errors.
 - Depress button "A" on presetting unit, to set VCR to "code receive" mode.

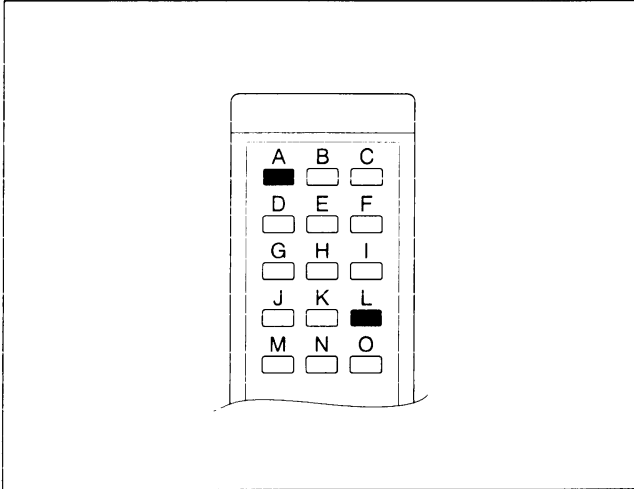


Fig.3-3-1 Presetting unit

3.3.1 Auto picture

Signal	• Monoscope
Mode	• REC then PB • SP
Adjustment tool	• Presetting unit
Specification	• STOP mode

- (1) Record a monoscope signal in the SP mode.
- (2) Playback the recorded signal.
- (3) Press the "L" button of the presetting unit during playback.
- (4) Confirm that VCR will go into the STOP mode.

3.4 SYSCON CIRCUIT

- Notes:**
- Unless otherwise specified, all measurement point and adjustment parts are located on the MAIN BOARD.
 - When perform this adjustment, remove the MECHANISM assembly.

3.4.1 Timer clock

Signal	• No signal
Mode	• EE
Equipment	• Frequency counter
Measurement point	• TP702 round(SYS.CLK)
Adjustment part	• C701 (TIMER CLOCK)
Specification	• 1024.008 ± 0.001 Hz [976.5549 ± 0.0010 usec]

- (1) Connect the frequency counter to TP702 round and GND.
- (2) Connect the short wire between TP701 round and Vcc(5V).
- (3) Short the leads of capacitor C704 once in order to reset IC701.
- (4) Disconnect the short wire then connect it again quickly.
- (5) Adjust C701 for 1024.008 ± 0.001 Hz.
(976.5549 ± 0.0010 usec)

3.5 TUNER CIRCUIT

- Note:** Unless otherwise specified, all measurement points and adjustment parts are located on the IF UNIT.

3.5.1 RF AGC

Signal	• TV broadcasting
Mode	• Tuner
Equipment	• TV monitor
Measurement point	• IF UNIT
Adjustment part	• IF VR
Specification	• Minimum noise

- Note:** Adjust IF VR (RF AGC) to correct for excess noise in the picture or when streaks cross interference occurs due to strong electrical fields.

- (1) Adjust IF VR to minimize noise or streaks on the TV screen.
- (2) Adjust for noisy picture with strong signal. Then adjust until noise just disappears. Select other channels to confirm proper pick-up of channels.

SECTION 4 CHARTS AND DIAGRAMS

NOTES OF SCHEMATIC DIAGRAM

Safety precautions
The Components identified by the symbol are critical for safety. For continued safety, replace safety critical components only with manufactures recommended parts.

1. Units of components on the schematic diagram

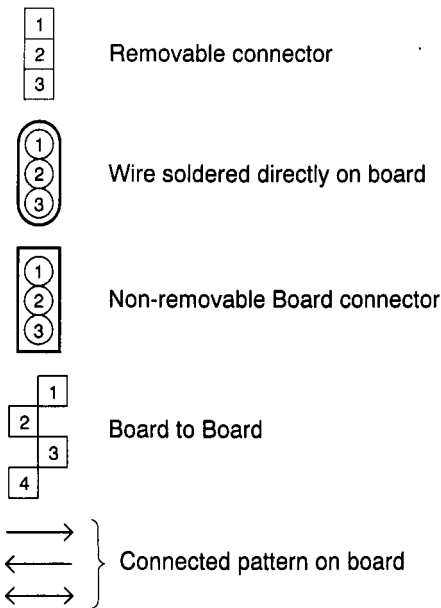
Unless otherwise specified.

- 1) All resistance values are in ohm. 1/6 W, 1/8 W (refer to parts list).
 Chip resistors are 1/16 W.
 K: K Ω (1000 Ω), M: M Ω (1000K Ω)
- 2) All capacitance values are in μ F, (P: PF).
- 3) All inductance values are in μ H, (m: mH).
- 4) All diodes are 1SS133, MA165 or IN4148M (refer to parts list).

2. Indications of control voltage

AUX : Active only at high.
 AUX or AUX(L) : Active at low.

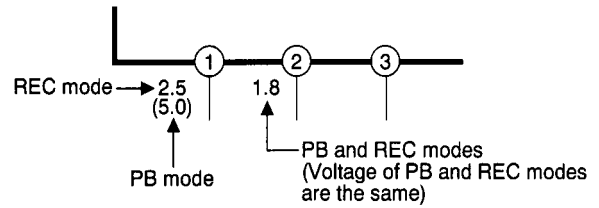
3. Interpreting Connector indications



4. Voltage measurement

- 1) Video circuits
 REC : Colour bar signal in SP mode, normal VHS mode.
 PB : Alignment tape, colour bar SP mode, normal VHS mode.
 — : Unmeasurable or unnecessary to measure.
- 2) Audio circuits
 REC : 1KHz, -8 dBs sine wave signal in SP mode, Normal VHS mode.
 PB : REC then playback it.
- 3) Movie Camera circuits
 Measured using a correctly illuminated grey scale or colour bar test charts in the E-E mode.

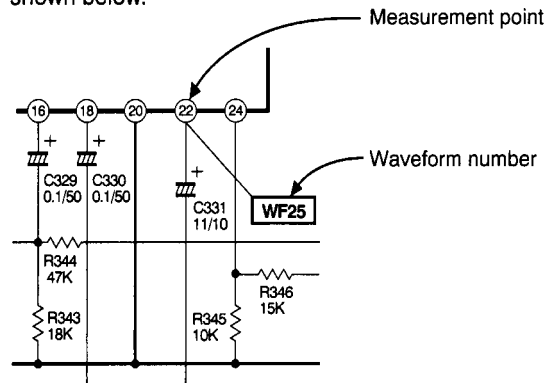
- 4) Indication on schematic diagram
 Voltage Indications for REC and PB mode on the schematic diagram are as shown below.



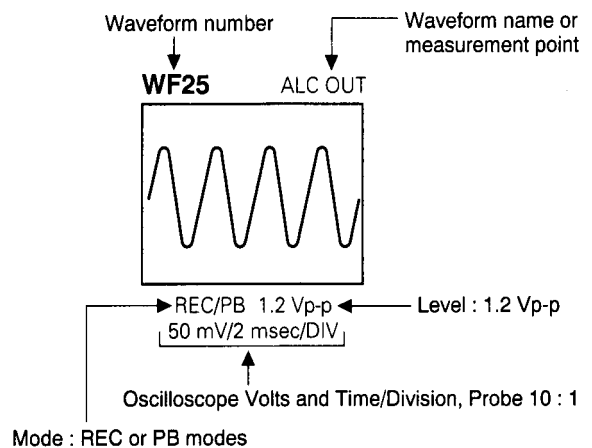
Note: If the voltages are not indicated on the schematic diagram, refer to the voltage charts.

5. Waveform measurement

- 1) Video circuits
 REC : Colour bar signal in SP mode, normal VHS mode.
 PB : Alignment tape, colour bar SP mode, normal VHS mode.
- 2) Audio circuits
 REC : 1KHz, -8 dBs sine wave signal in SP mode, normal VHS mode.
 PB : REC then playback it.
- 3) Movie Camera circuits
 Measured using a correctly illuminated grey scale or colour bar test charts in the E-E mode.
- 4) Indication on schematic diagram
 Waveform indications on the schematic diagram are as shown below.













5) Waveform indications



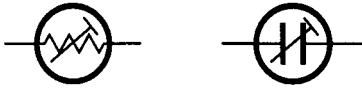
6. Signal path Symbols

The arrows indicate the signal path as follows.

-  Playback signal path
-  Playback and recording signal path
-  Recording signal path (including E-E signal path)
-  Y signal path
-  Colour (Chroma) signal path
-  R or R-Y signal path
-  B or B-Y signal path
-  Capstan servo path
-  Drum servo path
-  Reel servo path

7. Indication of the parts for adjustments

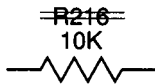
The parts for the adjustments are surrounded with the circle as shown below.



8. Indication of the parts not mounted on the circuit board

“OPEN” is indicated by the parts not mounted on the circuit board.

Or the symbol number is struck off by two lines as below.



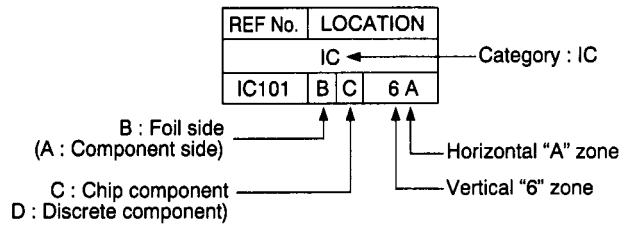
CIRCUIT BOARD NOTES

1. Foil and Component sides

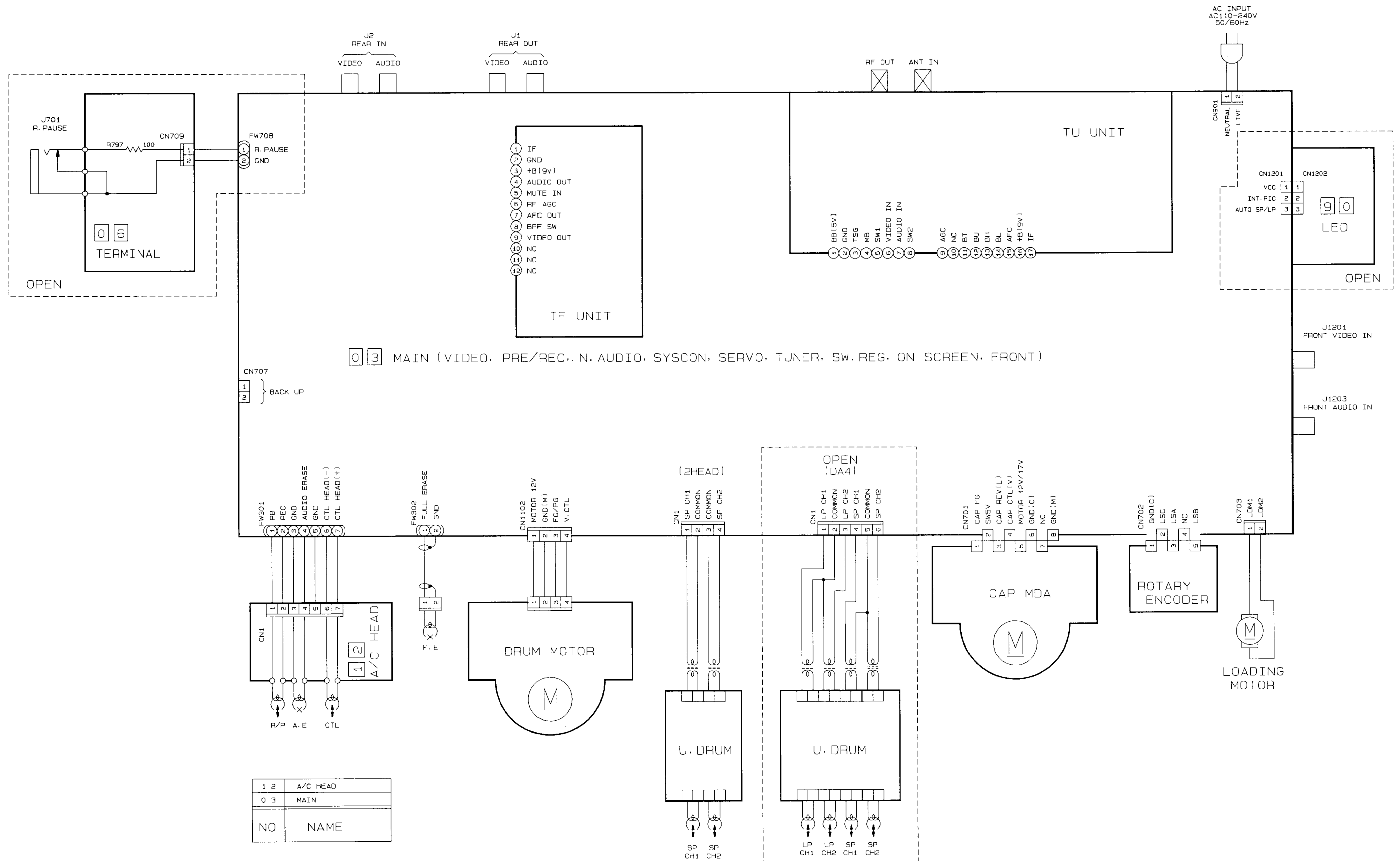
- 1) Foil side (B side) :
Parts on the foil side seen from foil face (pattern face) are indicated.
- 2) Component side (A side) :
Parts on the component side seen from component face (parts face) indicated.

2. Parts location guides

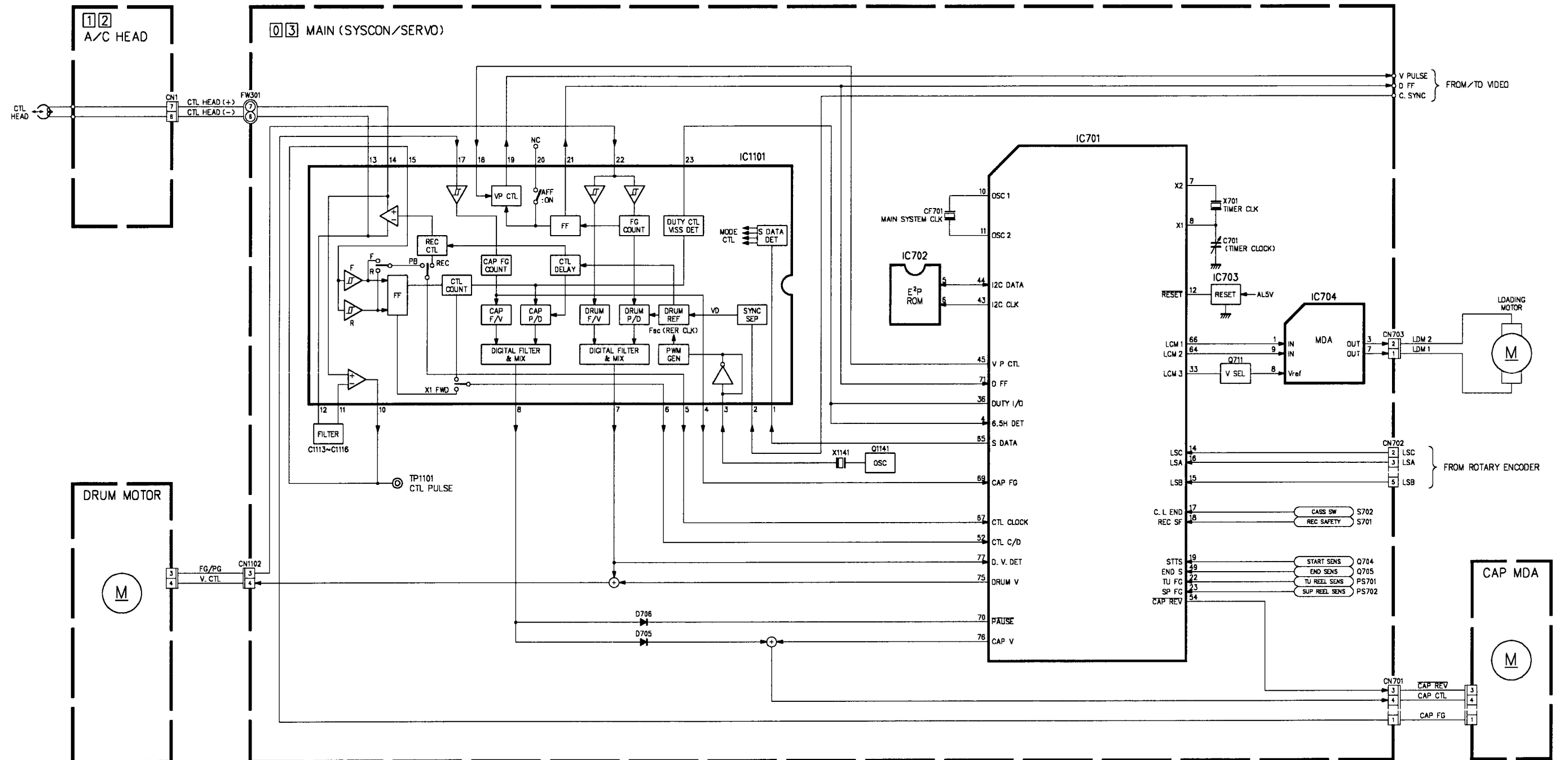
Parts location are indicated by guide scale on the circuit board.



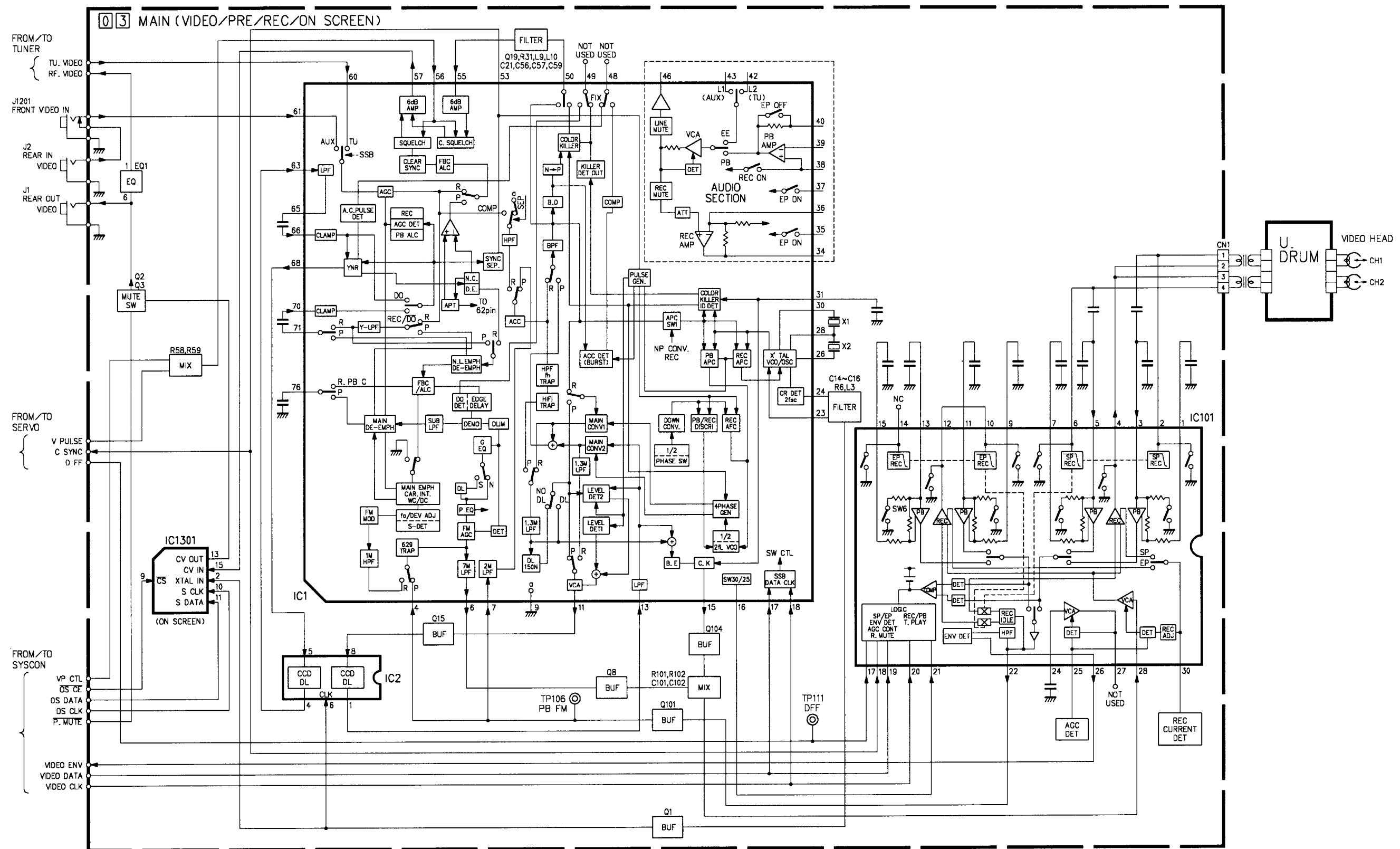
4.1 BOARD INTERCONNECTIONS



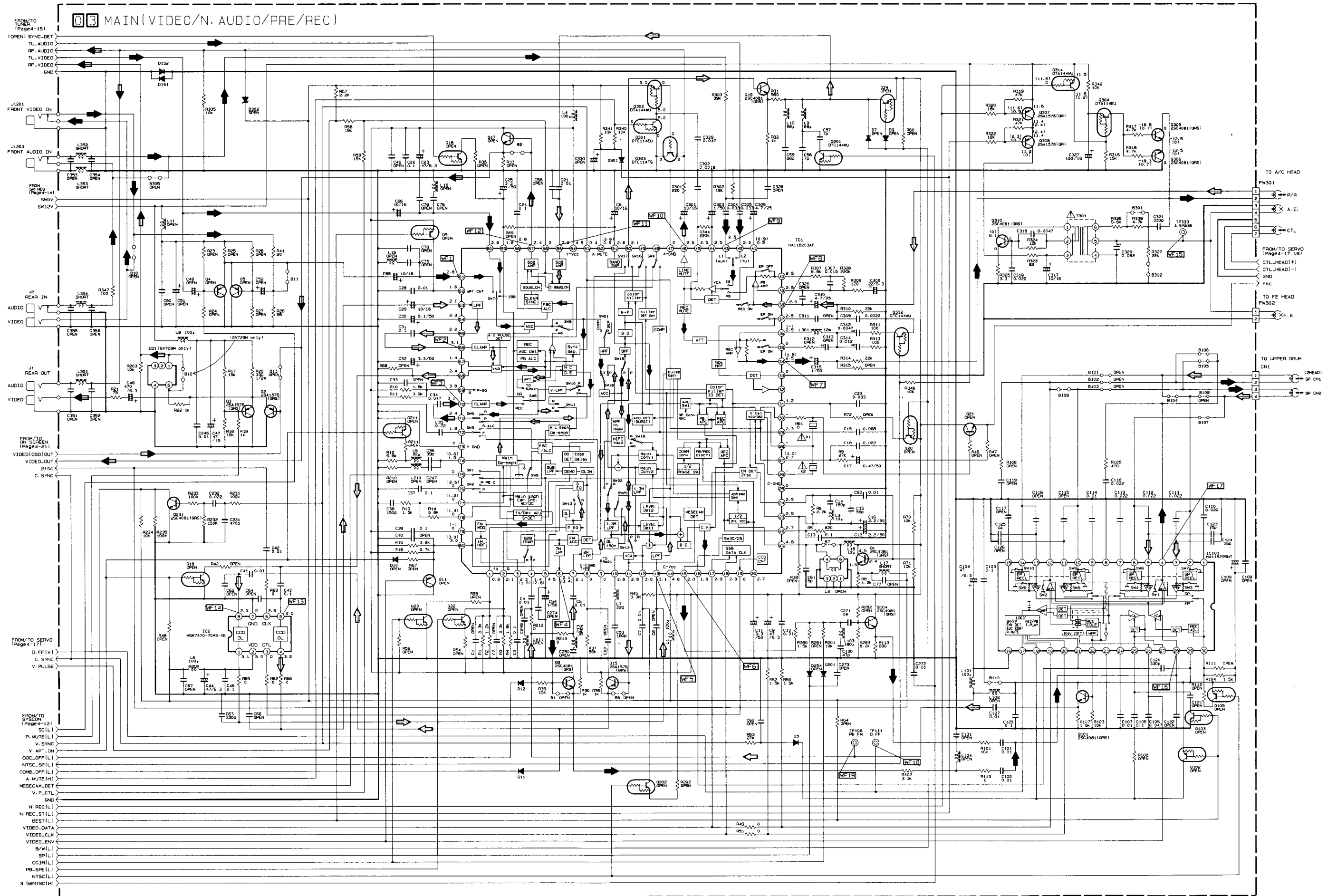
4.2 SYSTEM CONTROL BLOCK DIAGRAM



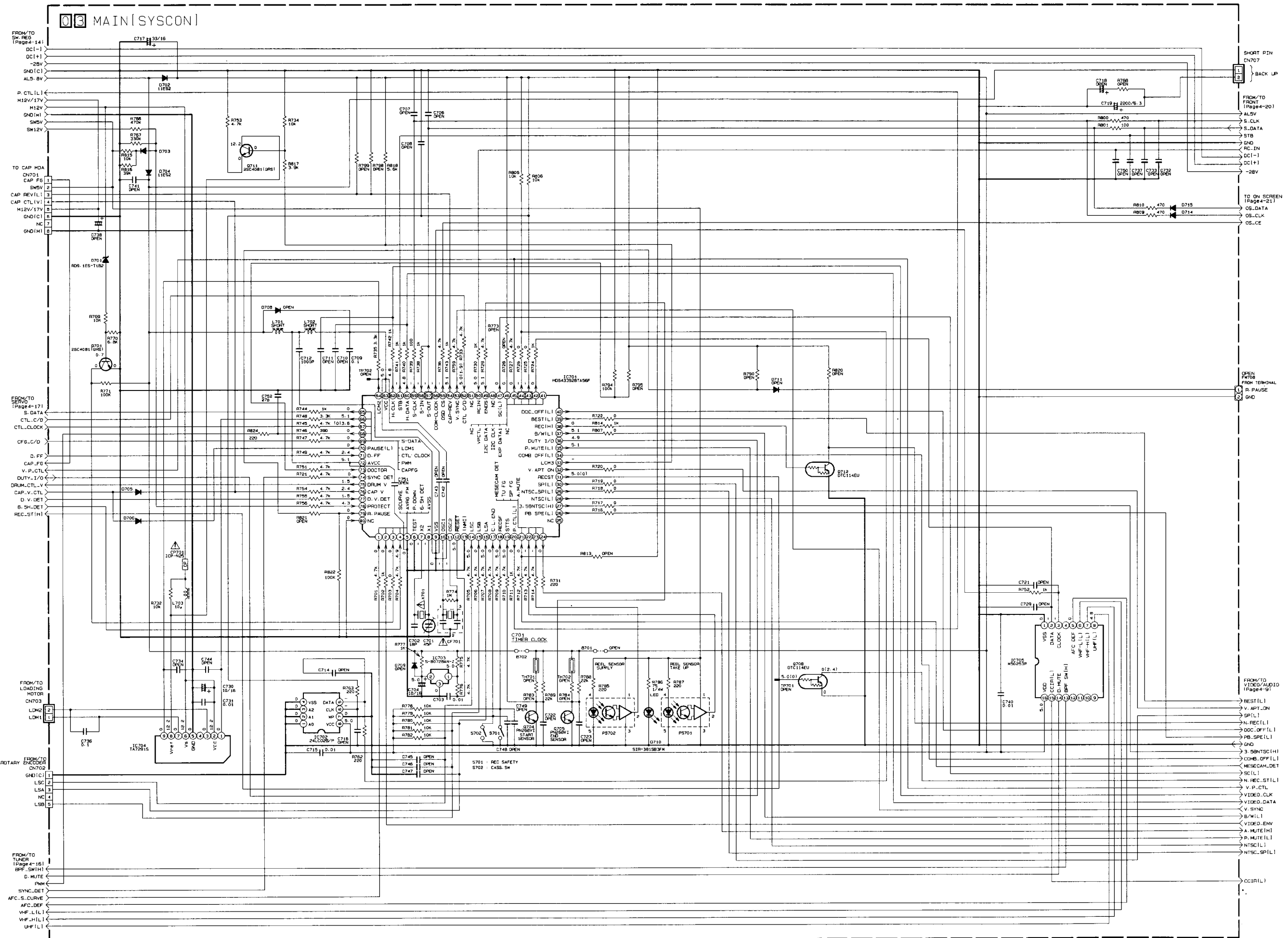
4.3 VIDEO BLOCK DIAGRAM



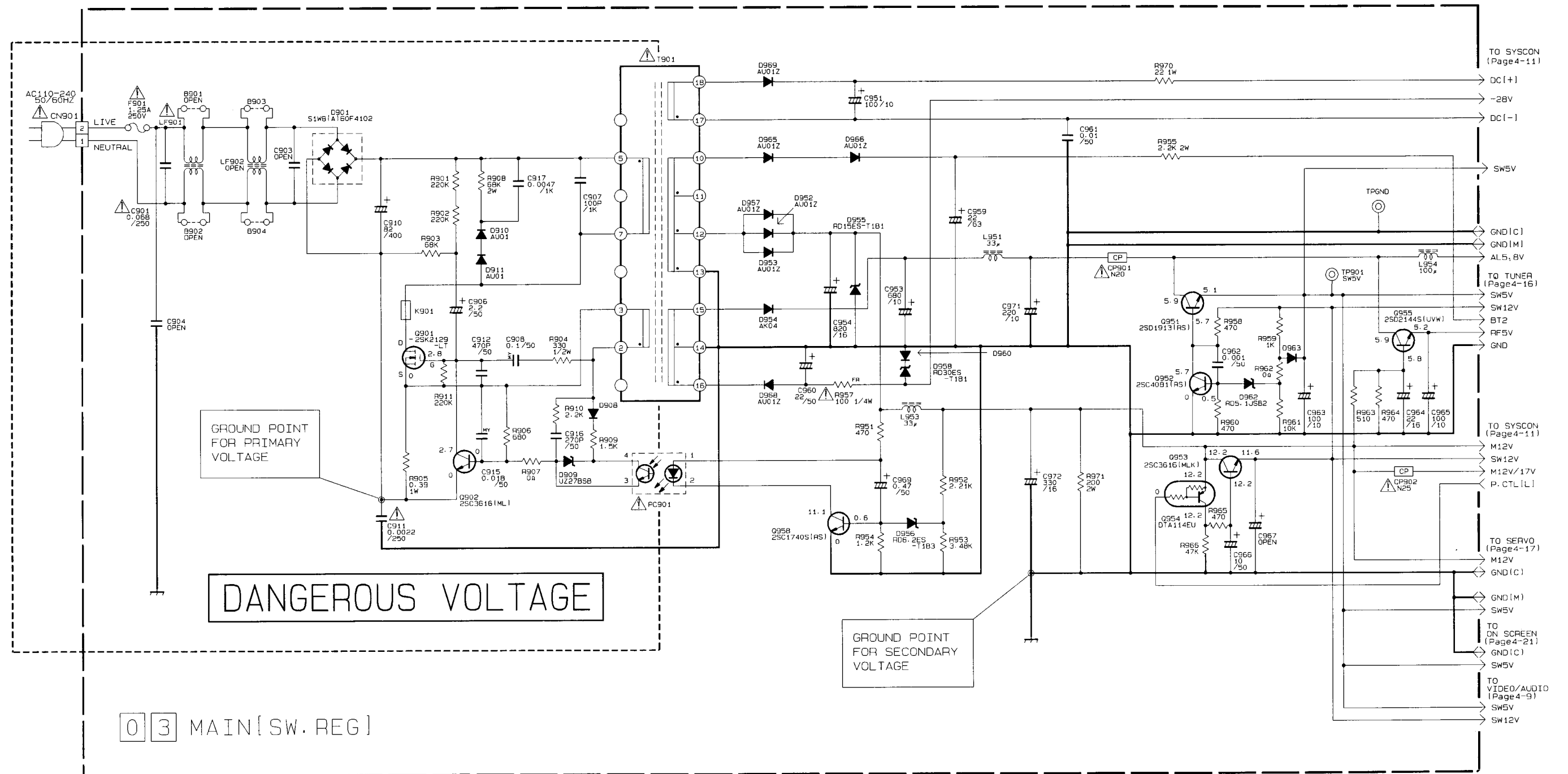
4.4 VIDEO, PRE/REC AND AUDIO SCHEMATIC DIAGRAM



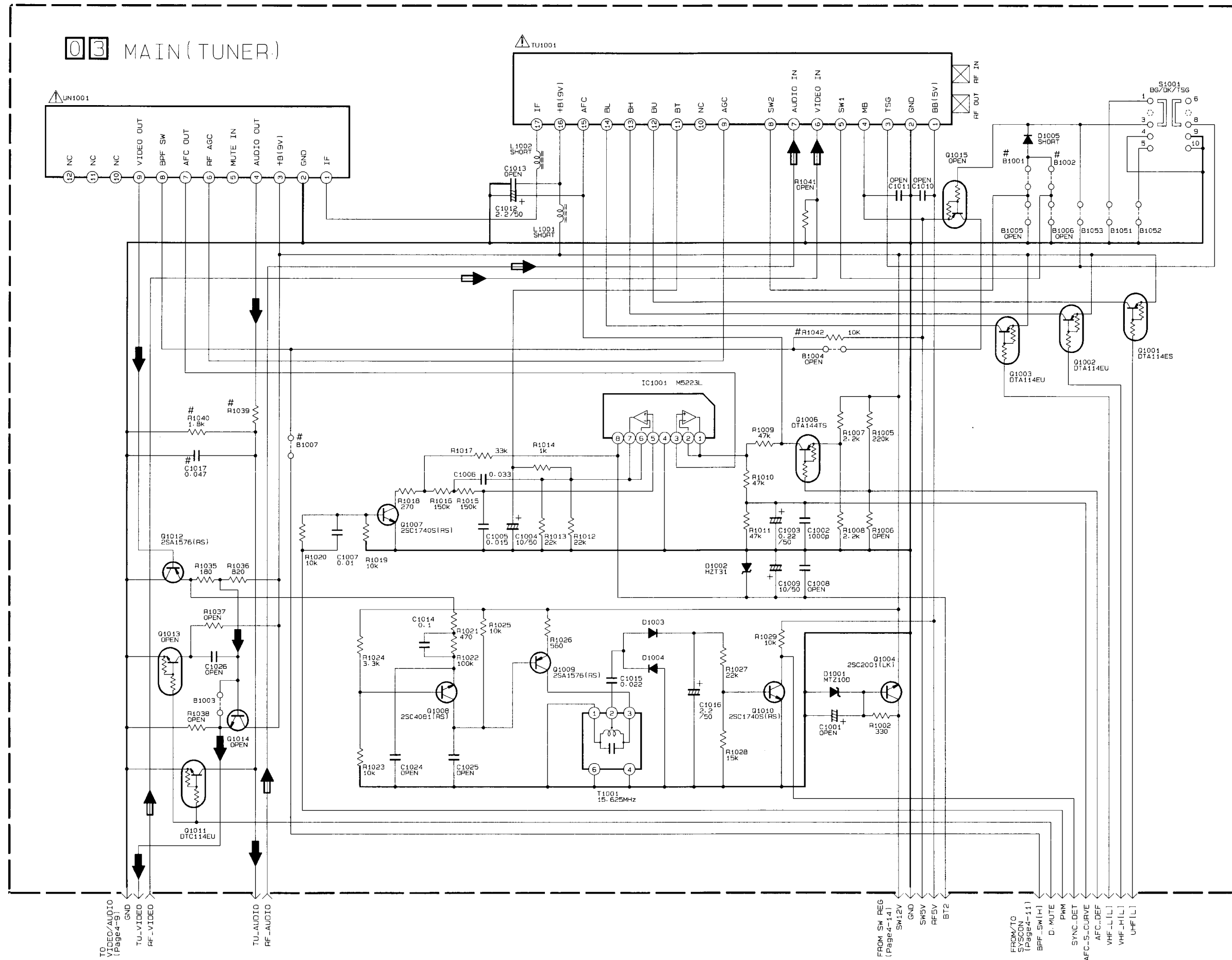
4.5 SYSTEM CONTROL SCHEMATIC DIAGRAM



4.6 SWITCHING REGULATOR SCHEMATIC DIAGRAM



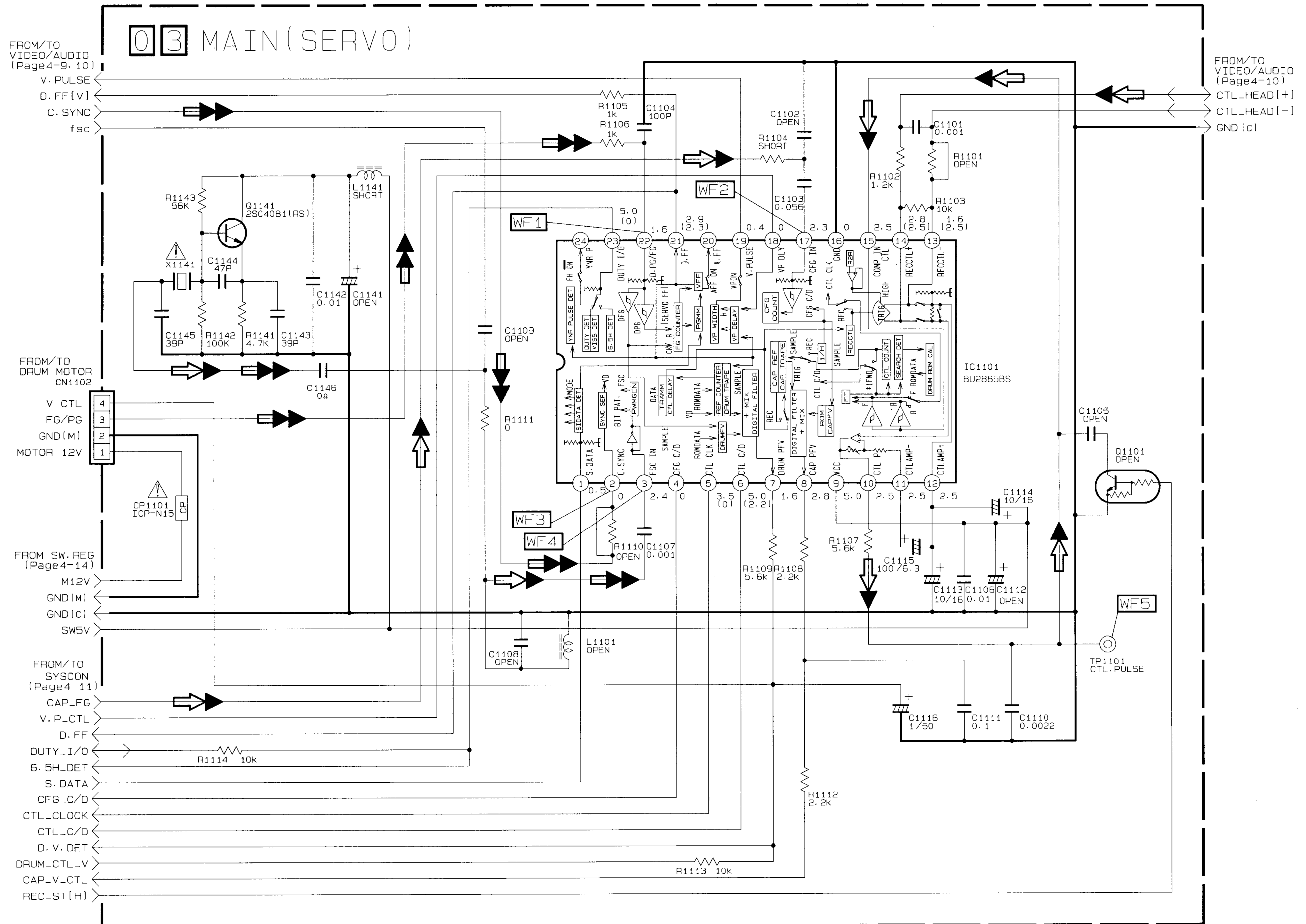
4.7 TUNER SCHEMATIC DIAGRAM



NOTE : COMPARISON CHART OF MODELS & MARKS(#)

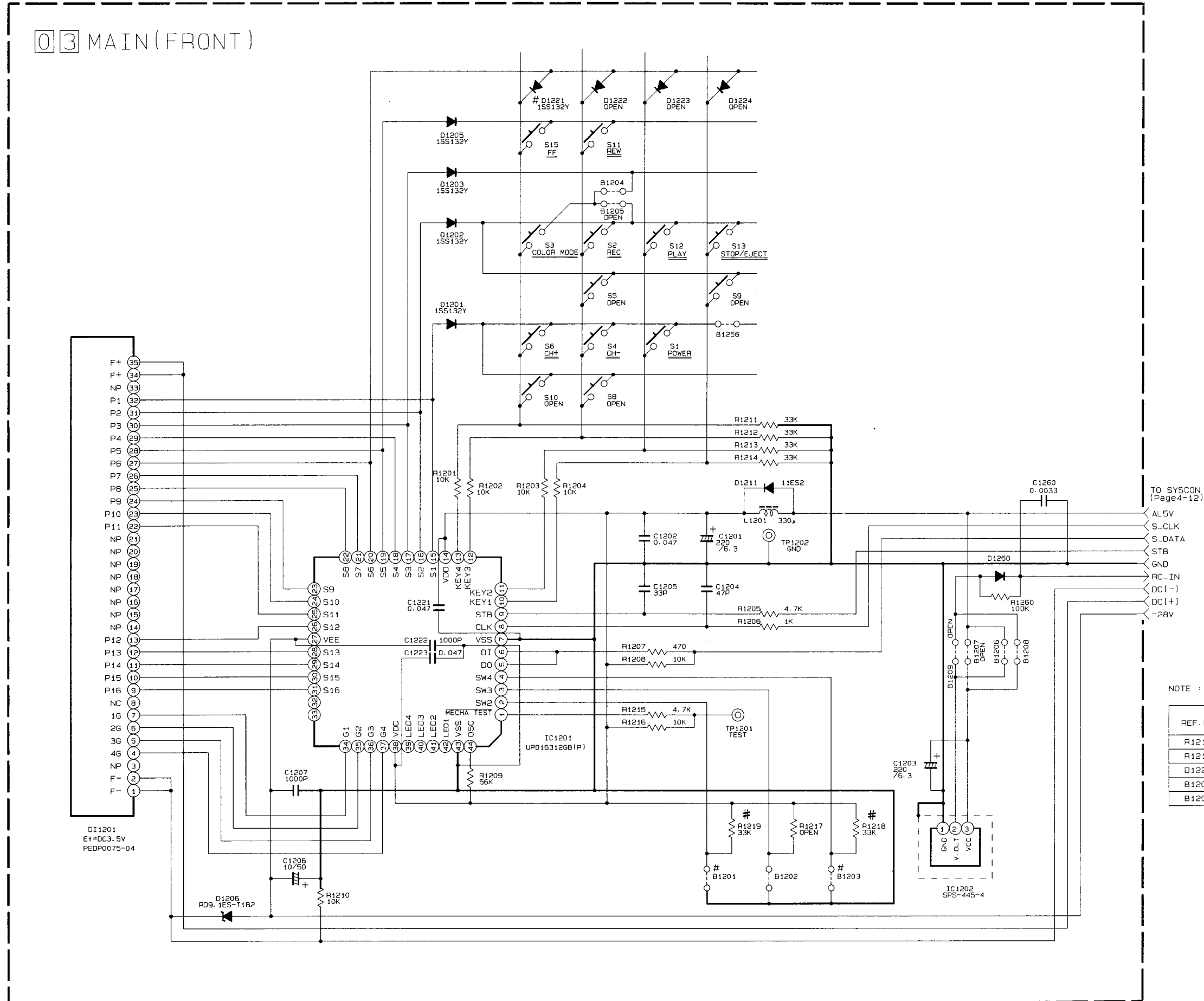
REF. NO.	MODELS	
	GV709M	GV729M
B1001	OPEN	USED
B1002	USED	OPEN
B1007	OPEN	USED
R1039	3.3K	0R
R1040	USED	OPEN
R1042	OPEN	USED
C1017	USED	OPEN

4.8 SERVO SCHEMATIC DIAGRAM

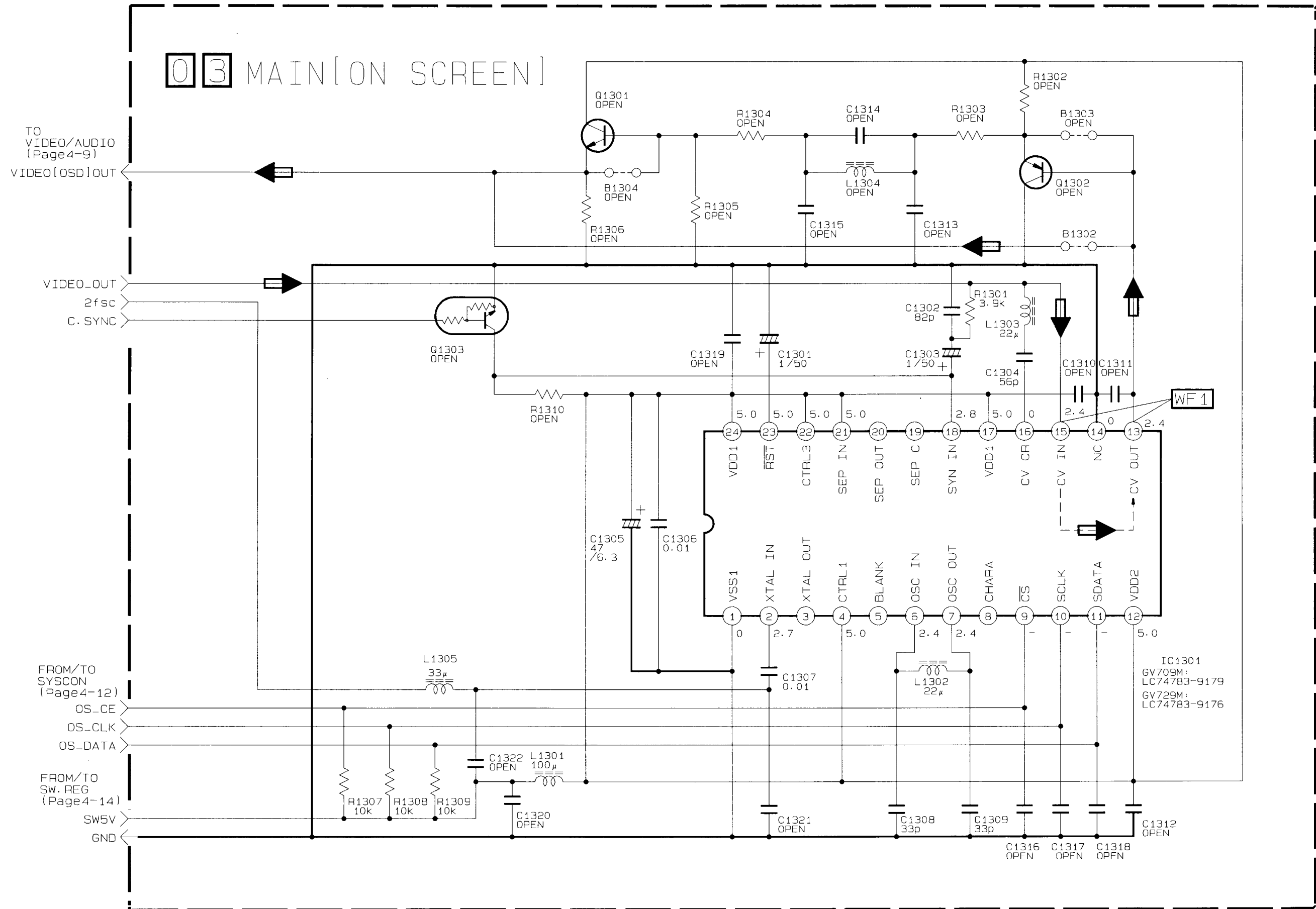


NOTE : For SERVO waveforms, please refer to page4-23.

4.9 FRONT SCHEMATIC DIAGRAM



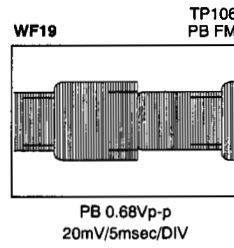
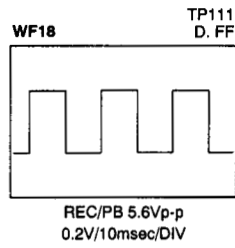
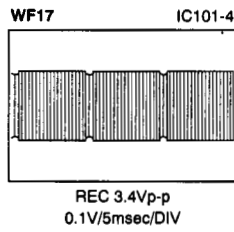
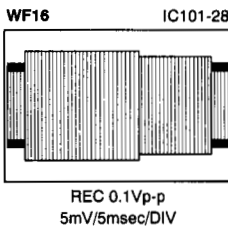
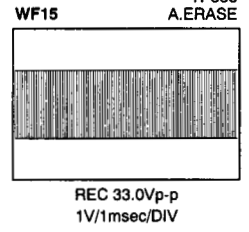
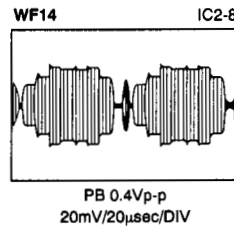
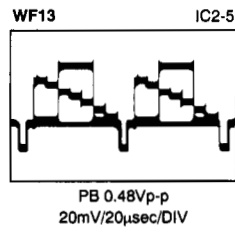
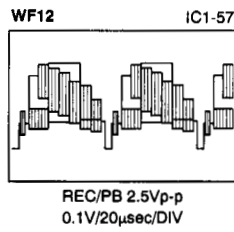
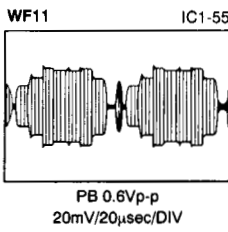
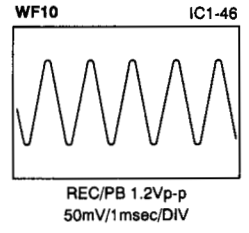
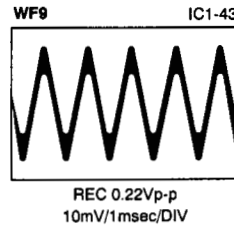
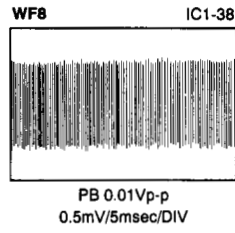
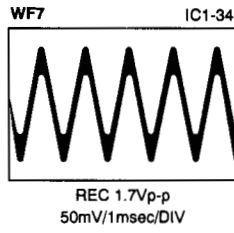
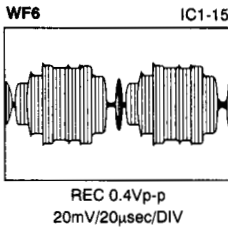
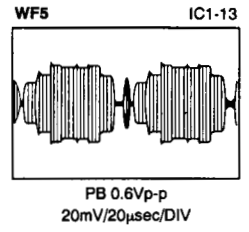
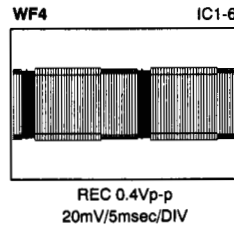
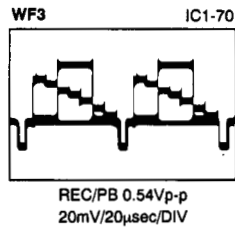
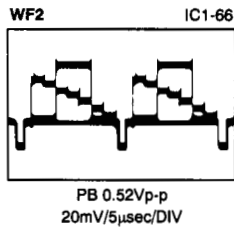
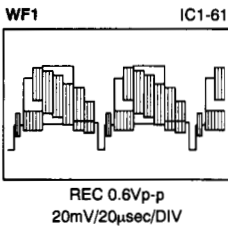
4.10 ON SCREEN SCHEMATIC DIAGRAM



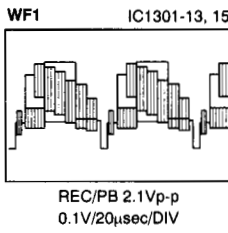
NOTE : For ON SCREEN waveforms, please refer to page4-23.

WAVEFORMS

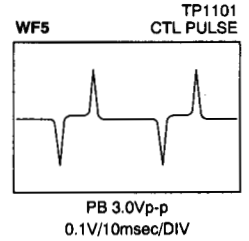
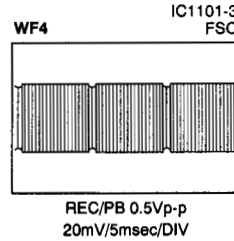
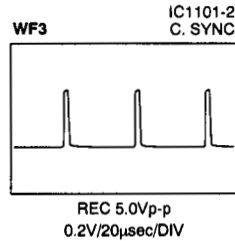
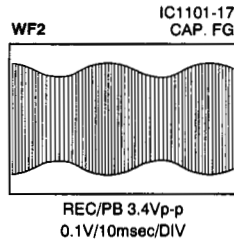
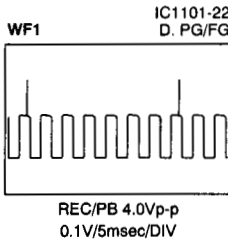
— VIDEO/N.AUDIO —



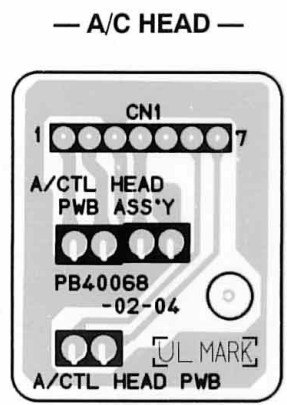
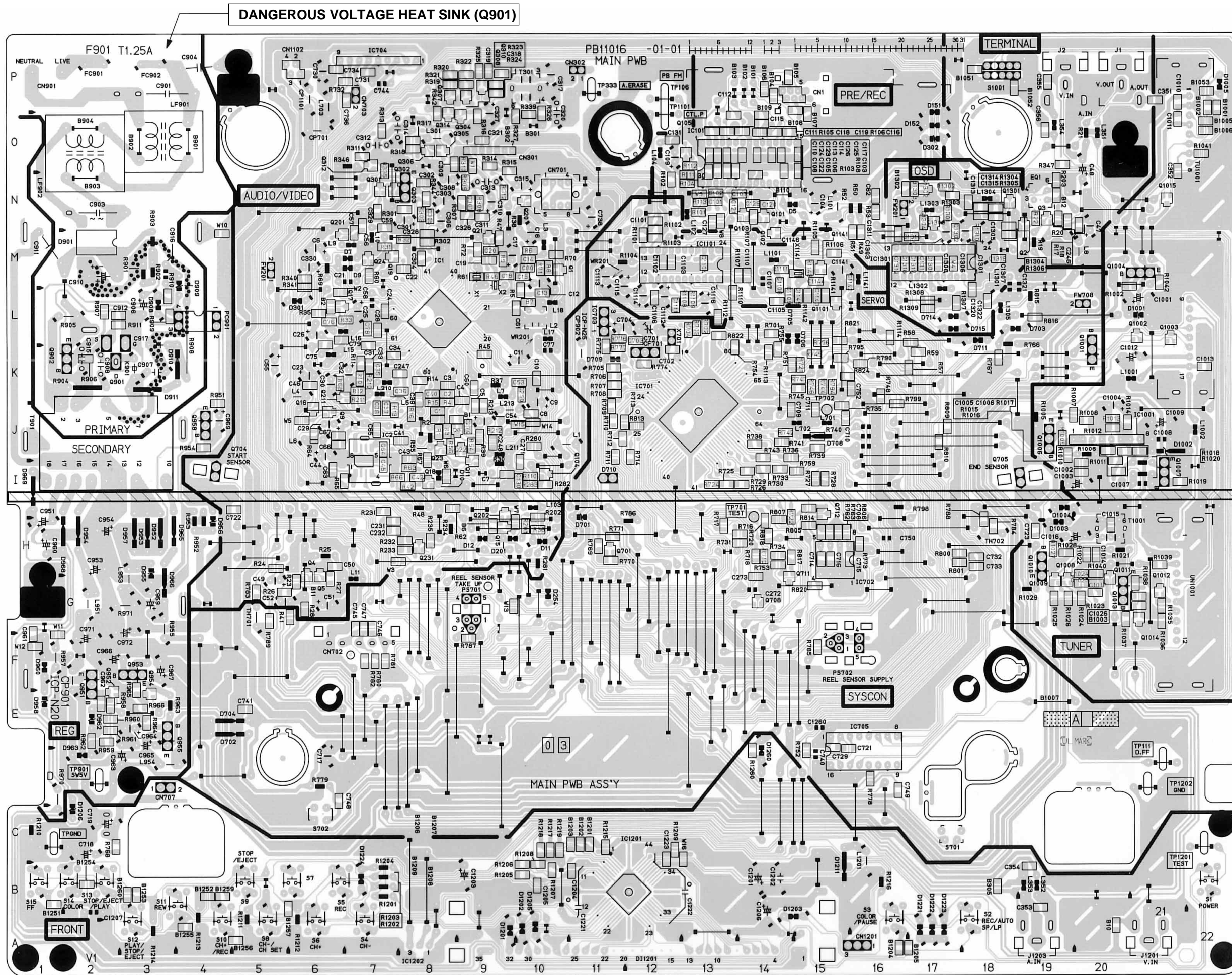
— ON SCREEN —



— SERVO —

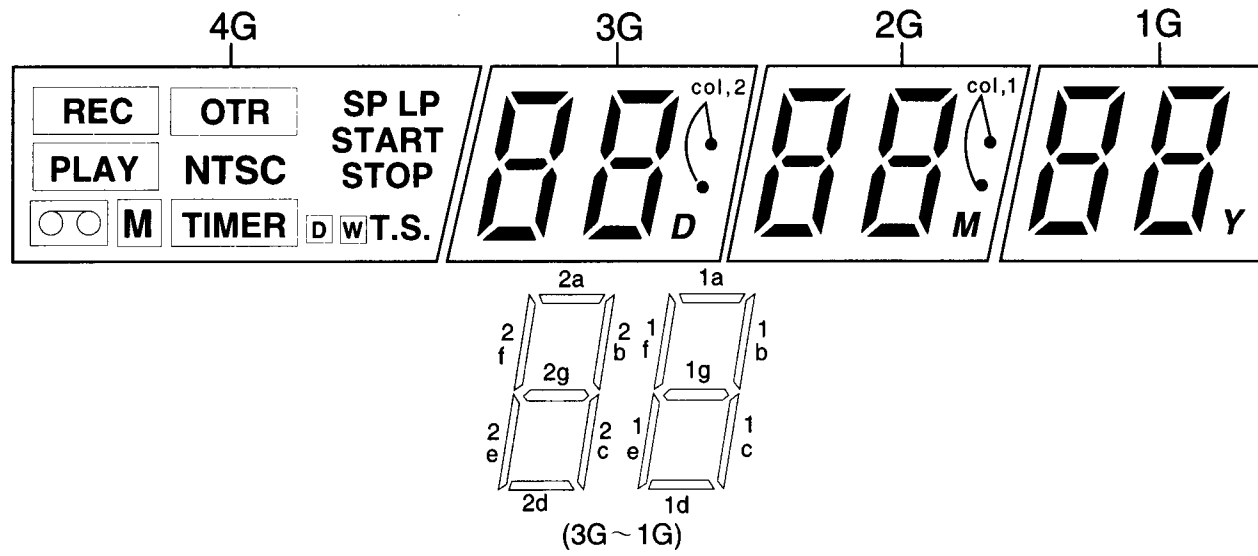


4.11 MAIN AND A/C HEAD CIRCUIT BOARDS



4.12 FDP GRID ASSIGNMENT AND ANODE CONNECTION

GRID ASSIGNMENT

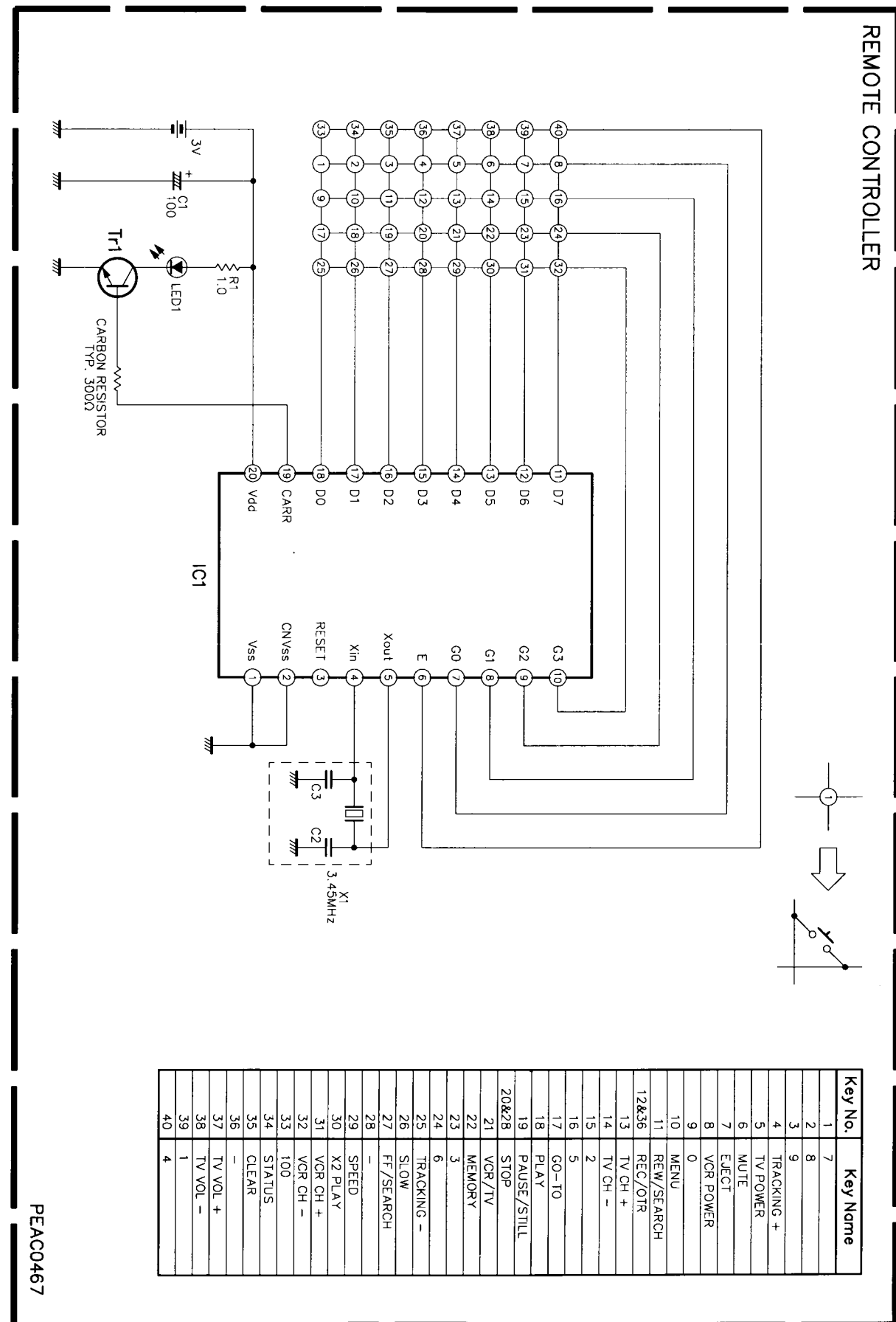


ANODE CONNECTION

	4G	3G	2G	1G
P1	REC	1a	1a	1a
P2	PLAY	1b	1b	1b
P3		1f	1f	1f
P4	M	1g	1g	1g
P5	OTR	1c	1c	1c
P6	NTSC	1e	1e	1e
P7	TIMER	1d	1d	1d
P8	—	col2	col1	—
P9	—	D	M	Y
P10	SP	2a	2a	2a
P11	LP	2b	2b	2b
P12	START	2f	2f	2f
P13	STOP	2g	2g	2g
P14	D	2c	2c	2c
P15	W	2e	2e	2e
P16	T.S.	2d	2d	2d

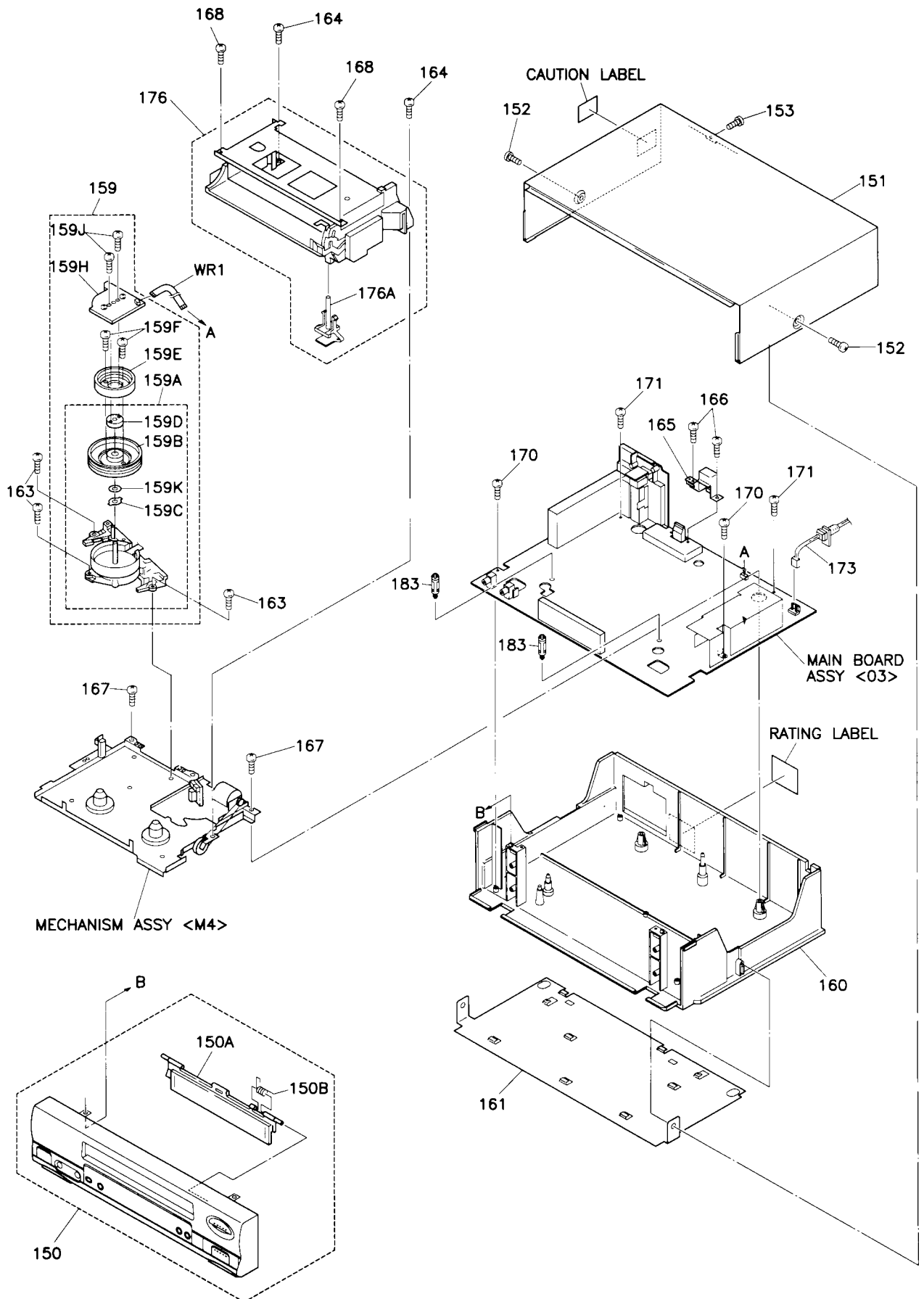
4.13 REMOTE CONTROL SCHEMATIC DIAGRAM

- NOTES:
 1. All parts shown in this schematic are critical for safety.
 2. This schematic is only for reference.
 Avoid replacing individual parts.
 Replace the entire unit only.

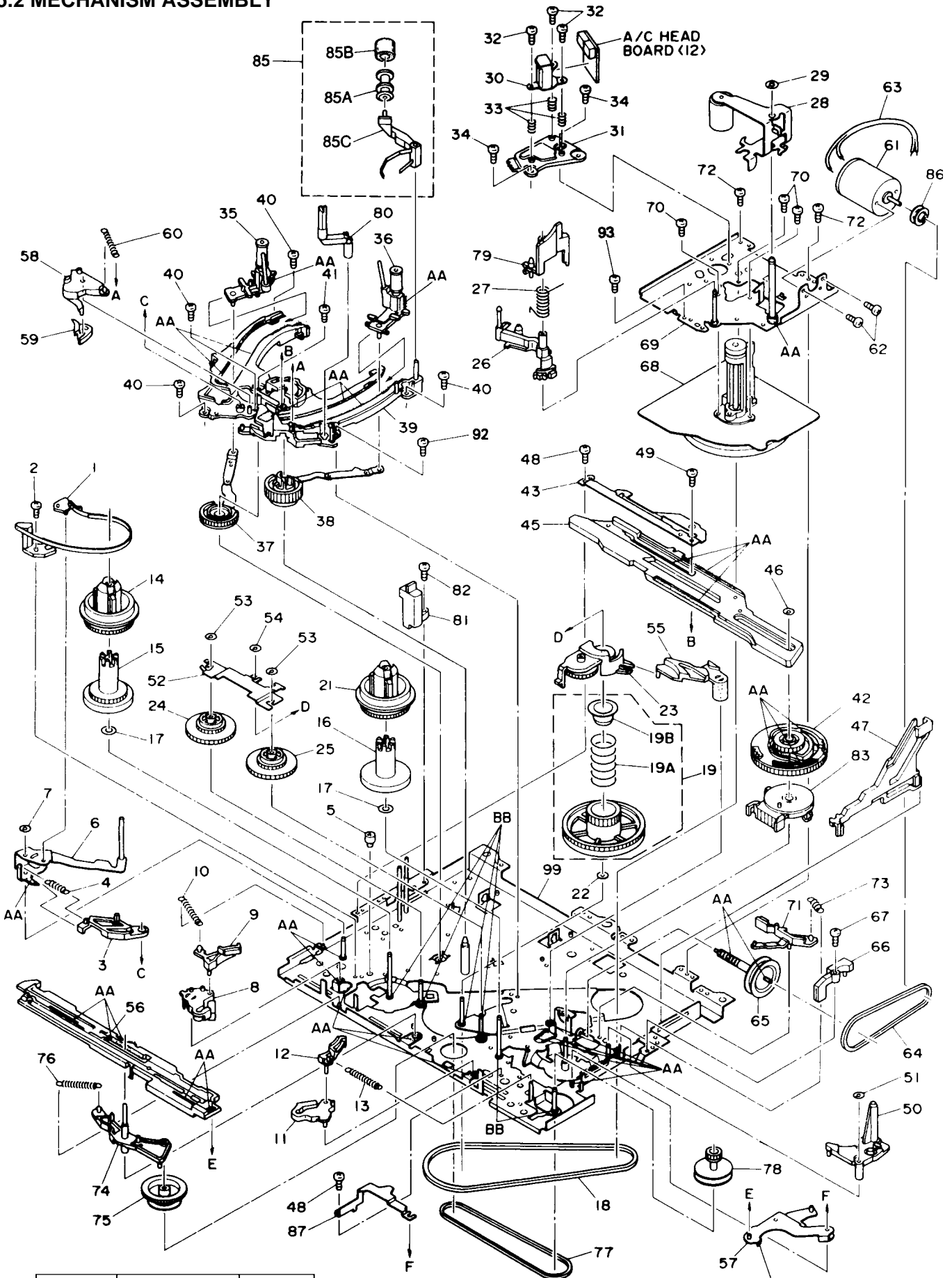


Key No.	Key Name
1	7
2	8
3	9
4	TRACKING +
5	TV POWER
6	MUTE
7	EJECT
8	VCR POWER
9	0
10	MENU
11	REW/SEARCH
12&36	REC/OTR
13	TV CH +
14	TV CH -
15	2
16	3
17	GO-TO
18	PLAY
19	PAUSE/STILL
20&28	STOP
21	VCR/TV
22	MEMORY
23	3
24	6
25	TRACKING -
26	SLOW
27	FF/SEARCH
28	-
29	SPEED
30	X2 PLAY
31	VCR CH +
32	VCR CH -
33	100
34	STATUS
35	CLEAR
36	-
37	TV VOL +
38	TV VOL -
39	1
40	4

5.1 CABINET AND CHASSIS ASSEMBLY



5.2 MECHANISM ASSEMBLY



Category	Part number	MARK
Grease	75988-034.74	AA
Oil	75981-311.30	BB

NOTE: The section marked in AA and BB indicate lubrication and greasing areas.

SECTION 6 TECHNICAL INFORMATION

6.1 SYSCON CIRCUIT

6.1.1 Syscon CPU pin function(IC701) 1/2

PIN NO.	LABEL	IN/OUT	NOTE
1	S.CURVE	IN	TUNING CHECK
2	AVG FM	IN	AUTO TRACKING DATA(AVRG VOLTAGE OF PB LEVEL INPUT)
3	P.DOWN	IN	POWER DOWN DETECT(POWER DOWN:H → L)
4	6.5H DET	IN	PB SWITCHING POINT ADJUST PULSE
5	AVSS	-	GND
6	TEST	-	GND
7	X2	-	TIMER CLOCK(32.768KHz)
8	X1	-	TIMER CLOCK(32.768KHz)
9	VSS	-	GND
10	OSC1	IN	SYSTEM CLOCK(10MHz)
11	OSC2	OUT	SYSTEM CLOCK(10MHz)
12	RESET	IN	RESET AT CONNECT VCR TO AC
13	(NMI)	-	NC
14	LSC	IN	MECHANISM MODE DETECT(C)
15	LSB	IN	MECHANISM MODE DETECT(B)
16	LSA	IN	MECHANISM MODE DETECT(A)
17	C.L.END	IN	CASSETTE TAPE LOAD SWITCH(CASSETTE IN:L)
18	RECSF	IN	REC SAFETY SWITCH DETECT(SW ON:L)
19	STTS	IN	LEADER TAPE DETECT(DETECT ON:L)
20	P.CTL	OUT	POWER ON/OFF CONTROL (POWER ON:L)
21	MESECAM DET	IN	MESECAM MODE:H
22	TU FG	IN	TAKE-UP REEL ROTATION DET/TAPE REMAIN
23	SUP FG	IN	SUPPLY REEL ROTATION DET/TAPE REMAIN
24	A.MUTE	OUT	AUDIO MUTE CONTROL(MUTE ON:H)
25	NC	-	NC
26	PB SPE	-	NC
27	3.58NTSC	OUT	3.58MHz NTSC MODE:H
28	NTSC	OUT	NTSC MODE:L
29	NTSC SP	OUT	NTSC SP MODE:L
30	SP	OUT	SP MODE:L
31	REC ST	OUT	REC START:H
32	V.APT ON	-	NC
33	LCM3	OUT	LOADING MOTOR DRIVE(3)
34	COMB OFF	OUT	1HCCD DELAY LINE OFF MODE:L
35	P.MUTE	OUT	PICTURE MUTE CONROL(MUTE ON:L)
36	DUTY I/O	IN/OUT	IN/OUT INDEX DATA CONTROL
37	B/W	OUT	BLACK/WHITE SWITCH DETECT
38	REC	OUT	REC MODE:H
39	BEST	-	NC
40	DOC. OFF	OUT	DOC OFF MODE:L

Table 6-1-1 SYSCON CPU pin function(1/2)

6.1.2 Syscon CPU pin function(IC701) 2/2

PIN NO.	LABEL	IN/OUT	NOTE
41	NC	-	NC
42	EXP DATA1	OUT	EXPANDER IC(IC705) DATA OUTPUT
43	I2C CLK	OUT	PDC DATA TRANSFER CLOCK
44	I2C DATA	OUT	PDC DATA OUTPUT
45	VPCTL	OUT	V.PULSE ADDITION TIMING CONTROL
46	NC	-	NC
47	SC	-	NC
48	NC	-	NC
49	ENDS	IN	TRAILER TAPE DETECT(DETECT ON:L)
50	RC IN	IN	REMOTE CONTROL DATA INPUT
51	NC	-	NC
52	CTL C/D	IN	CTL PULSE INPUT(MODE DETECT/BLANK PORTION DET)
53	V.SYNC	IN	V.SYNC INPUT
54	CAP REV	OUT	CAPSTAN MOTOR CONTROL(FWD:H/REV:L)
55	OSD CS	OUT	ON SCREEN IC CHIP SELECT
56	COM-CLOCK	OUT	MEMORY IC DATA TRANSFER CLOCK
57	S-OUT	OUT	ON SCREEN CONTROL DATA
58	S-IN	IN	ON SCREEN/FDP CONTROL DATA
59	S-CLK	OUT	DATA TRANSFER CLOCK
60	H DATA	OUT	VIDEO IC CONTROL DATA
61	STB	OUT	CLOCK OUTPUT PERMISSION
62	H CLK	OUT	VIDEO IC DATA TRANSFER CLOCK
63	VCC	-	SYSTEM POWER
64	LCM2	OUT	LOADING MOTOR DRIVE(2)
65	S-DATA	OUT	SERVO IC CONTROL DATA
66	LCM1	OUT	LOADING MOTOR DRIVE(1)
67	CTL CLOCK	IN	INDEX CONTROL
68	PWM	OUT	TUNING PULSE
69	CAP FG	IN	TAPE SPEED DETECT/BACK SPACE COUNT
70	PAUSE	OUT	CAPSTAN MOTOR CONTROL(PAUSE:L)
71	D.FF	IN	DRUM ROTATION DETECT/REC TIMING CONTROL
72	AVCC	-	SYSTEM POWER(for ANALOG)
73	DOCTOR	IN	DOCTOR PROGRAM DETECT
74	SYNC DET	IN	SYNC DET(NO SYNC:H)
75	DRUM V	OUT	DRUM MOTOR VOLTAGE CONTROL
76	CAP V	OUT	CAPSTAN MOTOR VOLTAGE DETECT
77	DV DET	IN	DRUM DRIVE VOLTAGE DET
78	PROTECT	IN	SWD5V/12V DETECT
79	R.PAUSE	-	NC
80	NC	-	NC

Table 6-1-2 SYSCON CPU pin function(1/2)

