

HITACHI

SERVICE MANUAL

NR

FN-0001E

13VR10B

R/C:CLU-362VR

NTSC

Z5 Chassis

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CAUTION : Before servicing this chassis, it is important that the service technician read the " Safety Precaution " and " Product Safety Notices " in this Service Manual.

This television receiver will display television
Closed (or) in accordance with paragraph
15.119 of the FCC rules.

SAFETY NOTICE

USE ISOLATION TRANSFORMER WHEN SERVICING

Component having special safety characteristics are identified by Δ on schematics and on the parts list in this Service Data and its supplements and bulletins. Before servicing this chassis, it is important that the service technician read and follow the " Important Safety Precautions " and " Standard Note for Servicing " in this Service Manual.

for continued x-radiation protection, replace picture tube with original type of Hitachi approved equivalent type.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

TV/VCR COMBINATION TELEVISION

July 1996

* Test input terminal

<Tuner> ----- Ant. input (80dB μ V)

Video: 87.5%

Audio: 25KHz dev (1KHz Sin)

<VIDEO & CHROMA>

<VCR>

<TUNER>

Description	Condition	Unit	Nominal	Limit
1. Video S/N	—	dB	45	40
2. Audio S/N (W/LPF)	—	dB	43	40

All items are measured across 8Ω resistor at speaker output terminal.

Description	Condition	Unit	Nominal	Limit
1. Audio Output Power (Max.)	(R/P)	W	1.0	0.8
2. Audio S/N (W/LPF)	(R/P)	dB	40	36
3. Audio Distortion (W/LPF)	(R/P)	%	3.0	5.0
4. Audio Freq. Response	200Hz (R/P)	dB	-2.0	-2.0 ± 5.0
(-10dB Ref. 1KHz)	8KHz (R/P)	dB	0	0 ± 6.0

Note: Nominal specifications represent the design specifications. All units should be able to approximate these. Some will exceed and some may drop slightly below these specifications. Limit specifications represent the absolute worst condition that still might be considered acceptable. In no case should a unit fail to meet limit specifications.

1-1-1

B5700SP



FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCELE N'UTILISER QUE DES FUSIBLES DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.



"This symbol means fast operating fuse."

"Ce symbole représente un fusible à fusion rapide."

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products have been carefully inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Safety Precautions for TV Circuit

1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:

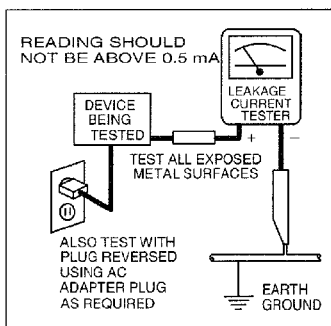
a. Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating materials, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**

b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

c. **Antenna Cold Check** - With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohm-meter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the

customer. Repeat this test with the instrument AC switch in the off position.

d. **Leakage Current Hot Check** - With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milli-ampere. Reverse the instrument power cord plug in the outlet and repeat the test.



ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE

ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.

e. **X-Radiation and High Voltage Limits** - Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be checked each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold down.") Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic. High voltage is maintained within specified limits by close tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning** - Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning** - The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without

first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning** -

a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.

b. Some TV receiver chassis normally have 85V AC(RS) between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.

c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

8. **Product Safety Notice** - Some electrical and me-

chanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc.. Parts that have special safety characteristics are identified by a (▲) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards.

Precautions during Servicing

- A.** Parts identified by the (▲) symbol are critical for safety.
Replace only with part number specified.
- B.** In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.
- C.** Use specified internal wiring. Note especially:
- 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
- D.** Use specified insulating materials for hazardous live parts. Note especially:
- 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers
 - 4) Insulators for transistors.
- E.** When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.
- F.** Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)
- G.** Check that replaced wires do not contact sharp edged or pointed parts.

The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

- H.** When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.
- I.** Also check areas surrounding repaired locations.
- J.** Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.
- K. Crimp type wire connector**
When replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, in order to prevent shock hazards, perform carefully and precisely the following steps:
Replacement procedure
- 1) Remove the old connector by cutting the wires at a point close to the connector.
- Important: Do not re-use a connector. Discard it.
- 2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
 - 3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
 - 4) Use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.
- L.** When connecting or disconnecting the VCR connectors, first, disconnect the AC plug from AC supply socket.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and check the specified values in order to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, check specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Region	Clearance Distance (d) (d')
110 to 130 V	USA or CANADA	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only.
Be sure to check the precise values.

2. Leakage Current Test

Check specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.

Table 2 : Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (I)	Earth Ground (B) to:
110 to 130 V	USA	0.15μF CAP. & 1.5kΩ RES. connected in parallel	≤0.5mA rms	Exposed accessible parts

Note: This table is unofficial and for reference only.
Be sure to check the precise values.

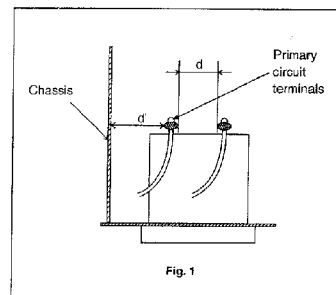


Fig. 1

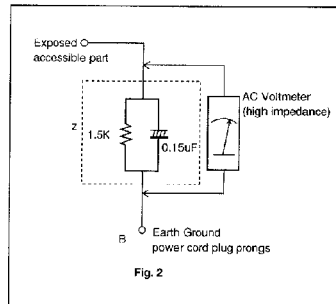
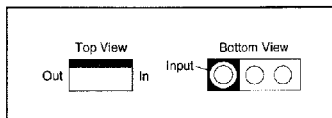


Fig. 2

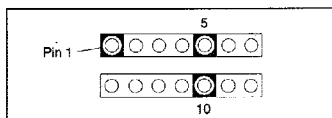
STANDARD NOTES FOR SERVICING

Circuit Board Indications

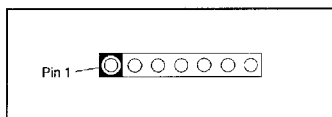
1. The output pin of the 3 pin Regulator ICs is indicated as shown:



2. For other ICs, pin 1 and every 5th pin are indicated as shown:

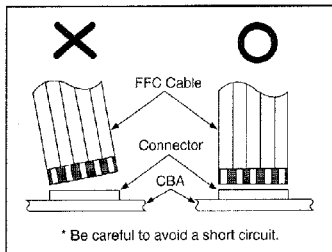


3. The 1st pin of every pin connector are indicated as shown:



Instructions for Connectors

1. When you connect or disconnect FFC cable (connector), be sure to disconnect the AC cord.
2. FFC cable (connector) should be inserted parallel into the connector, not at an angle.

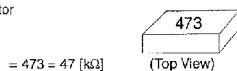


[CBA= Circuit Board Assembly]

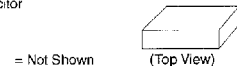
How to Read the Values of the Rectangular Type Chip Components

Example:

(a) Resistor



(b) Capacitor



Caution:

Once chip parts (Resistors, Capacitors, Transistors, etc.) are removed, they must not be reused. Always use a new part.

Replacement Procedures for Leadless (Chip) Components

The Following Procedures are Recommended for the Replacement of the Leadless Components Used in this Unit.

1. Preparation for replacement

- a. Soldering Iron
Use a pencil-type soldering iron (less than 30 watts).
- b. Solder
Eutectic solder (Tin 63%, Lead 37%) is recommended.
- c. Soldering time
Do not apply heat for more than 4 seconds.
- d. Preheating
Leadless capacitor must be preheated before installation. (130°C-150°C, for about two minutes.)

Notes:

- a. Leadless components must not be reused after removal.
- b. Excessive mechanical stress and rubbing for the component electrode must be avoided.

2. Removing the leadless component

Grasp the leadless component body with tweezers and alternately apply heat to both electrodes. When the solder on both electrodes has melted, remove leadless component with a twisting motion.

Notes:

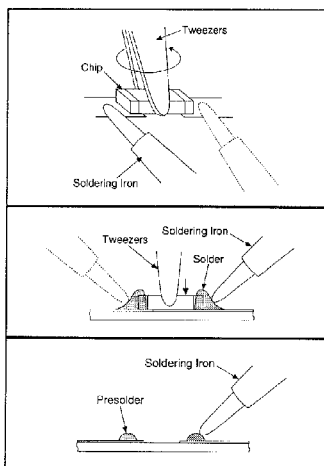
- a. Do not attempt to lift the component off the board until the component is completely disconnected from the board by the twisting action.
- b. Take care not to break the copper foil on the printed board.

3. Installing the leadless component

- a. Presolder the contact points of the circuit board.
- b. Press the part downward with tweezers and solder both electrodes as shown below.

Note:

Do not glue the replacement leadless component to the circuit board.



How to Remove / Install Flat Pack IC

Caution:

1. Do not apply the hot air to the chip parts around the Flat Pack-IC for over 6 seconds as damage may occur to the chip parts. Put Masking Tape around the Flat Pack-IC to protect other parts from damage. (Fig. S-1-2)
2. The Flat Pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or solder lands under the IC when removing it.

1. Removal

With Hot - Air Flat Pack - IC Desoldering Machine:

- a. Prepare the Hot - Air Flat Pack - IC Desoldering Machine, then apply hot air to Flat Pack - IC (about 5-6 seconds). (Fig. S-1-1)
- b. Remove the Flat Pack- IC with tweezers while applying the hot air.

With Soldering Iron:

- a. Using desoldering braid, remove the solder from all pins of the Flat Pack - IC. When you use solder flux which is applied to all pins of the Flat Pack - IC, you can remove it easily. (Fig. S-1-3)
- b. Lift each lead of the Flat Pack - IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air Desoldering Machine. (Fig. S-1-4)

With Iron Wire:

- a. Using desoldering braid, remove the solder from all pins of the Flat Pack - IC. When you use solder flux which is applied to all pins of the Flat Pack - IC, you can remove it easily. (Fig. S-1-3)
- b. Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.
- c. Pull up on the wire as the solder melts so as to lift the IC leads from the CBA contact pads, while heating the pins using a fine tip soldering iron or hot air blower.

Note:

When using a soldering iron, care must be taken to ensure that the Flat Pack - IC is not being held by glue, or when it is removed from the CBA, it may be damaged if force is used.

2. Installation

- a. Using desoldering braid, remove the solder from the foil of each pin of the Flat Pack - IC on the CBA, so you can install a replacement Flat Pack - IC more easily.
- b. The '●' mark on the Flat Pack - IC indicates pin 1 (See Fig. S-1-6). Make sure this mark matches the 1 on the CBA when positioning for installation. Then pre - solder the four corners of the Flat Pack- IC (See Fig. S-1-7).
- c. Solder all pins of the Flat Pack - IC. Make sure that none of the pins have solder bridges.

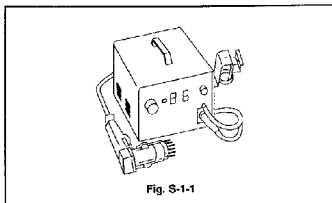


Fig. S-1-1

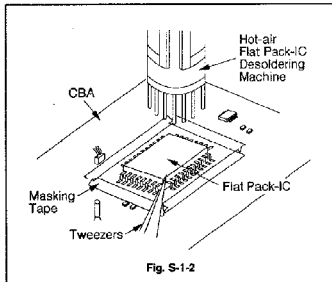


Fig. S-1-2

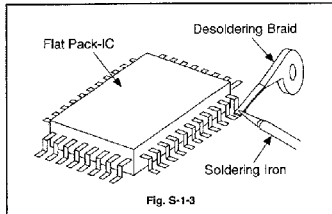


Fig. S-1-3

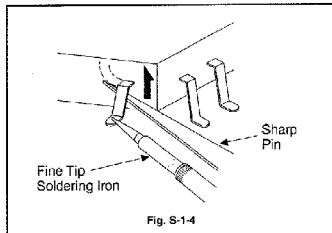


Fig. S-1-4

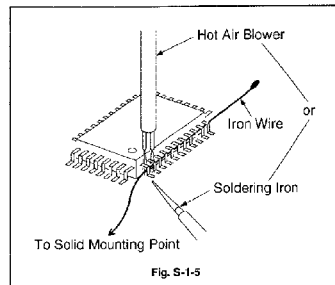


Fig. S-1-5

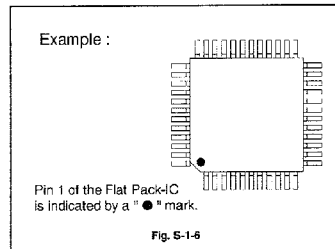


Fig. S-1-6

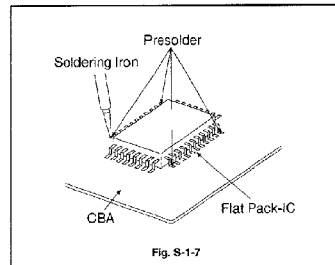


Fig. S-1-7

Instructions for Handling Semiconductors

Electrostatic breakdown of the semiconductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

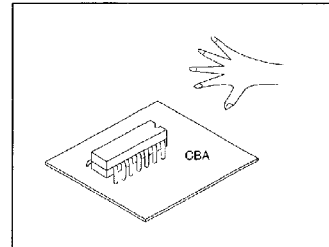
Ground for Human Body

Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

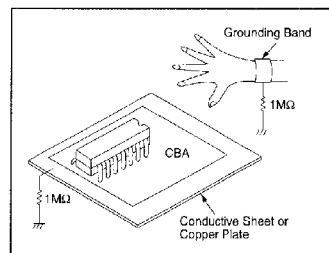
Ground for Work Bench

Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the work bench or other surface, where the semiconductors are to be placed. Because the static electricity charge on the clothing will not escape through the body grounding band, be careful to avoid contacting semiconductors to clothing.

Incorrect



Correct



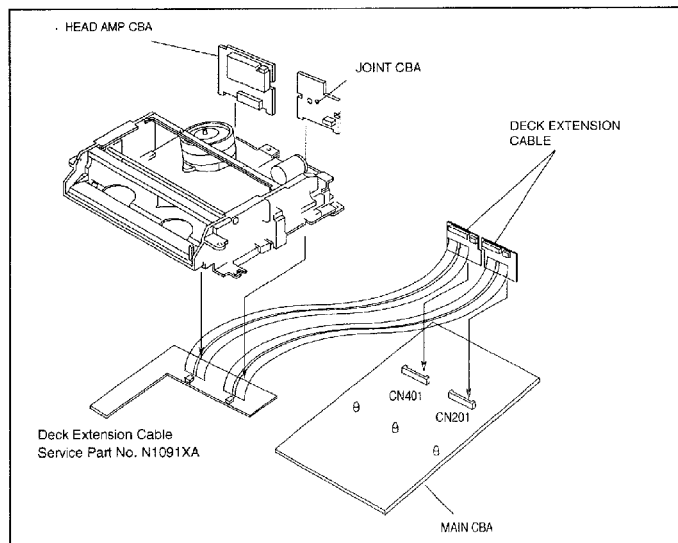
PREPARATION FOR SERVICING

How to Use Service Fixture

- (1) Remove Deck Mechanism Assembly.
If needed, remove VCR CBA from chassis.
- (2) Connect Deck Mechanism Assembly and VCR CBA by using the deck extension cable.

Note:

The deck extension cable can be used for both 4-head models and 2-head models.
Be sure to use correct connectors as specified.



1-4-1

Z5PFS-F

How to Enter the Service Mode

Caution: 1

- Optical sensor system is used for Tape Start and End Sensor on this equipment. Read this page carefully and prepare as described on this page before starting to service; otherwise, the unit may operate unexpectedly.

Preparing: 1

- Cover Q206 (START SENSOR) and Q205 (END SENSOR) with Insulation Tape or enter the service mode to activate Sensor Inhibition automatically.

Note: Avoid playing, rewinding or fast forwarding the tape to its beginning or end, because both Tape End Sensors are not active.

How to Enter the Service Mode

- Connect unit to an AC Outlet.
- Turn Power On.
- If - LANGUAGE SELECT - appears on the screen, Turn power off and on again.
- Make a momentary connection (1/2 second) between J1 and J2. (Located on the Main CBA.)
- Press No. 1 button on the Remote control unit for Cut-off adjustment.

Note: On this Service Mode, TV Screen shows only a Horizontal line.

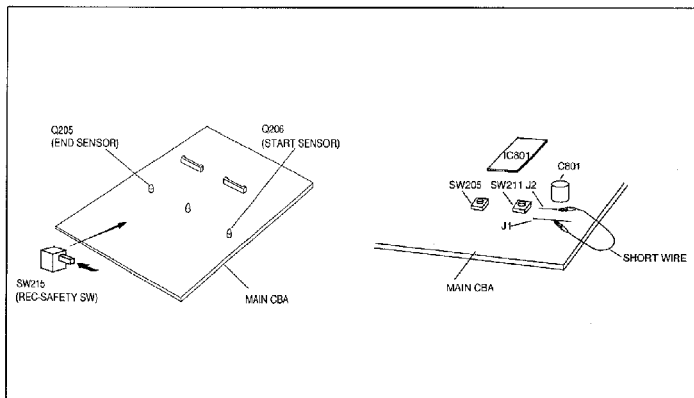
- Press No. 2 button on the Remote control unit for AGC adjustment.

Caution: 2

- The deck mechanism assembly is mounted on the Main CBA directly, and SW215 (REC-SAFETY SW) is mounted on the Main CBA. When deck mechanism assembly is removed from the Main CBA due to servicing, this switch can not be operated automatically.

Preparing: 2

- To eject the tape, press the STOP/EJECT Button on the unit (or Remote control).
- When you want to record during the Service mode, press the Rec Button while depressing the SW215 (REC-SAFETY SW) on the Main CBA.

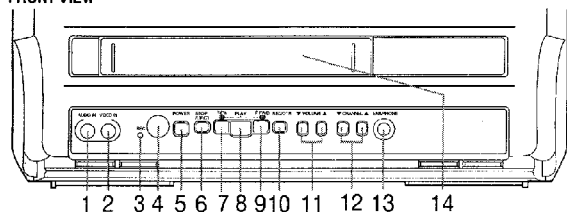


1-4-2

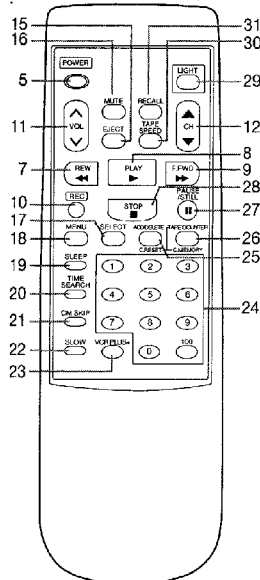
Z5PFS-F

OPERATING CONTROLS AND FUNCTIONS

- FRONT VIEW -



- REMOTE CONTROL VIEW -

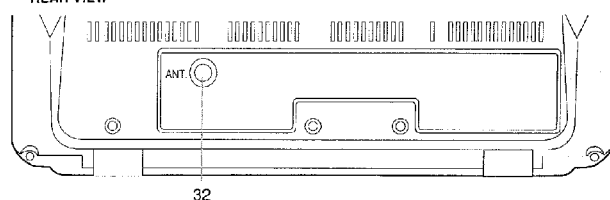


- 1 **AUDIO IN jack**—Connect to audio output jack of your audio equipment or another VCR.
- 2 **VIDEO IN jack**—Connect to video output jack of your video camera or another VCR.
- 3 **REC Indicator**—Flashes during recording. Lights up in the Stand-by mode for Timer Recording.
- 4 **Remote sensor window**—Receives the infrared signals from the remote control.
- 5 **POWER button**—Press to turn TV/VCR on and off. Press to activate the automatic timer recording.
- 6 **STOP button**—Press to stop the tape motion. **EJECT button**—Press in the Stop mode to remove a tape from the TV/VCR.
- 7 **REW button**—Press to rewind the tape, or to view the picture rapidly in reverse during the Play mode. (Reverse Search)
- 8 **PLAY button**—Press to begin playback of a tape.
- 9 **F.FWD button**—Press to rapidly advance the tape, or to view the picture rapidly in forward during the Play mode. (Forward Search)
- 10 **REC button**—Press to begin manual recording. **OTR button**—Press to activate One Touch Recording. (used on the TV/VCR only)
- 11 **VOLUME ▲/▼ buttons**—Press to adjust the volume level.
- 12 **CHANNEL ▲/▼ buttons**—Press to select the channel for viewing or recording. **PICTURE CONTROL function**—They may also be used to adjust the picture control. **TRACKING +/- function**—Press to minimize video 'noise' (lines or dots on screen) during the Play mode.

This Remote Control Unit does not have compatibility with other HITACHI Brand Unit.

B57071B

- REAR VIEW -



- 13 **EARPHONE jack**—Connect to earphone (not supplied) for personal listening. The size of jack is 1/8" monoaural (3.5mm).
- 14 **Cassette compartment**
- 15 **EJECT button**—Press in the Stop mode to remove a tape from the TV/VCR.
- 16 **MUTE button**—Press to mute sound. Press it again to resume sound.
- 17 **SELECT button**—When setting program (for example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. **Display function**—Press to display the counter or the current channel number and current time on the TV screen.
- 18 **MENU button**—Press to display main menu on the TV screen.
- 19 **SLEEP button**—Press to set the Sleep Timer.
- 20 **TIME SEARCH button**—Press to activate Time Search mode.
- 21 **CM SKIP button**—Press to skip a commercial range of playing tape.
- 22 **SLOW button**—Press to reduce the playback speed.
- 23 **VCR PLUS+ button**—Press to activate the VCR Plus function.
- 24 **Number buttons**—Press to select desired channels. for viewing or recording. To select channels 1 to 9, first press the 0 button and then 1 to 9. **+100 button**—Press to select cable channels which are equal or greater than number 100. (To select channel 125, first press "+100" button then press "2" and "5").
- 25 **ADD/DELETE button**—Press to delete or add channel numbers in the Channel Set Up mode. Press to cancel a setting program (for example: setting clock or timer program) (These functions are operative only when the menu is shown on the TV screen.)
- 26 **TAPE COUNTER RESET button**—Press to reset counter to 0:00:00.
- 27 **TAPE COUNTER MEMORY button**—Press to set counter memory on and off.
- 28 **PAUSE/STILL button**—Press to temporarily stop the tape during the recording or to view a still picture during playback. **Frame Advance Function**—Press to advance the picture by one frame during the Still mode.
- 29 **STOP button**—Press to stop the tape motion.
- 30 **LIGHT button**—Press to light up buttons. If it is dark, white buttons are lighted up to show their position.
- 31 **TAPE SPEED button**—Press to set desired recording speed. (SP/LP/SLP)
- 32 **RECALL button**—Press to go back to the previously viewed channel. For example, pressing this button once will change channel display from 3 (present channel) to 10 (previously viewed channel), and pressing it a second time will return from 10 to 3.
- 32 **ANT. terminal**—Connect to an antenna or CATV.

B57071B

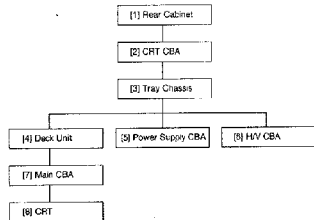
DISASSEMBLY INSTRUCTIONS

1. Disassembly Flowchart

This flowchart indicates the disassembly steps for the cabinet parts, and the CBA in order to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route and dress the cables as they were.

Caution !!

When removing the CRT, be sure to discharge the Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.



2. Disassembly Method

STEP/ LOC. NO.	PART	REMOVAL		NOTE
		FIG. NO.	REMOVE/UNLOCK/ RELEASE/UNPLUG/ UNCLAMP/DESOLDER	
[1]	Rear Cabinet	1, 2	5(S-1)	1
[2]	CRT CBA	4, 5	CN501, CN575, CN602	2
[3]	Tray Chassis	3, 5	1(S-2), CN601	3
[4]	Deck Unit	3	5(S-3), 2(S-4)	4
[5]	Power Supply CBA	3, 5	CN601 2(S-5), 3(L-1)	5
[6]	HV CBA	3	Anode Cap	6
[7]	Main CBA	3, 5	2(S-6)	7
[8]	CRT	4	4(S-7)	8

↓

①

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②

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③

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④

↓

⑤

① ② ③ ④ ⑤

Note :

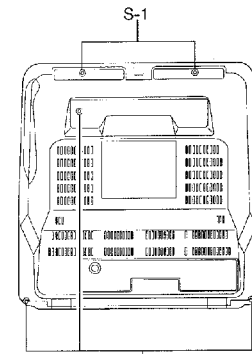
- ① Order of steps in Procedure. When reassembling, follow the steps in reverse order. These numbers are also used as the identification (location) No. of parts in Figures.
- ② Parts to be removed or installed.
- ③ Fig. No. showing Procedure of Part Location
- ④ Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
S=Screw, P=Spring, L=Locking Tab, CN=Connector, * =Unhook, Unlock, Release, Unplug, or Desolder
2(S-2) = two Screw (S-2)
- ⑤ Refer to the following "Reference Notes in the Table" following.

Reference Notes in the Table

1. Remove Screws 5(S-1).

Caution !!

- Discharge the Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.
2. If not already removed, first remove the Rear Cabinet. Remove CRT Ground Wire CN501 on the CRT CBA, CN575, CN602 with coupling CBA, then pull the CRT CBA backward.
3. If not already removed, first remove the Rear Cabinet. Remove 1(S-2) and CN801. Pull the Tray Chassis backward.
4. If not already removed, first remove the Rear Cabinet and remove Tray Chassis. Remove 5(S-3), 2(S-4). Lift up the Deck unit. Careful for the clearance.
5. If not already removed, first remove the Rear Cabinet, and remove Tray Chassis. Remove CN601. Remove Screw 2(S-5). Release 3(L-1) and Pull the Power Supply CBA backward.
6. If not already removed, first remove the Rear Cabinet, and remove Tray Chassis. Slide HV CBA backward. If necessary Remove Anode Cap.
7. If not already removed, first remove the Rear Cabinet, and remove Tray Chassis. Remove Screw 2(S-6) and Pull up the Main
8. If not already removed, first remove the Rear Cabinet, and remove Tray Chassis. Remove Screws 4(S-7) and Pull the CRT backward.



[1] REAR CABINET S-1

Fig. 1

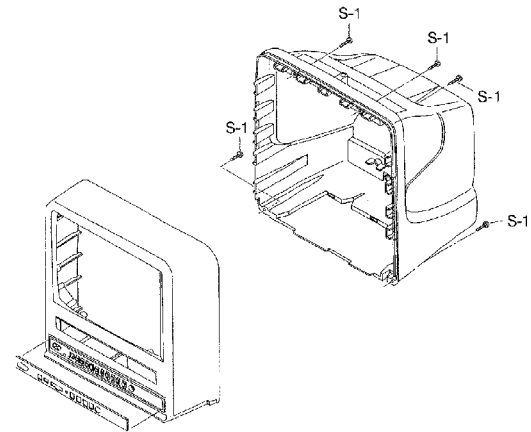


Fig. 2

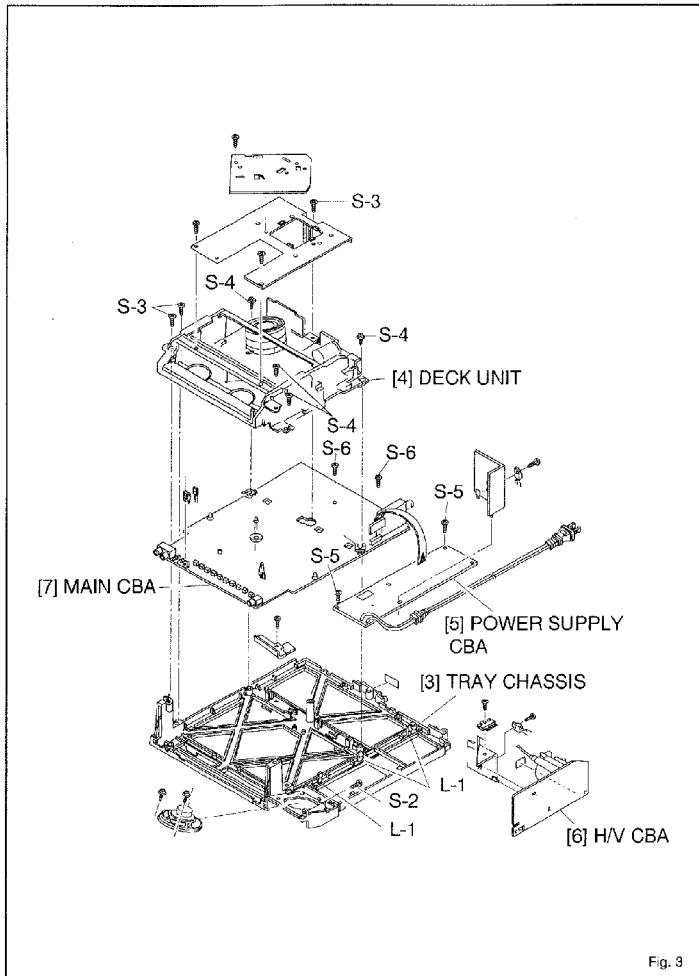


Fig. 3

1-6-3

B5707DC

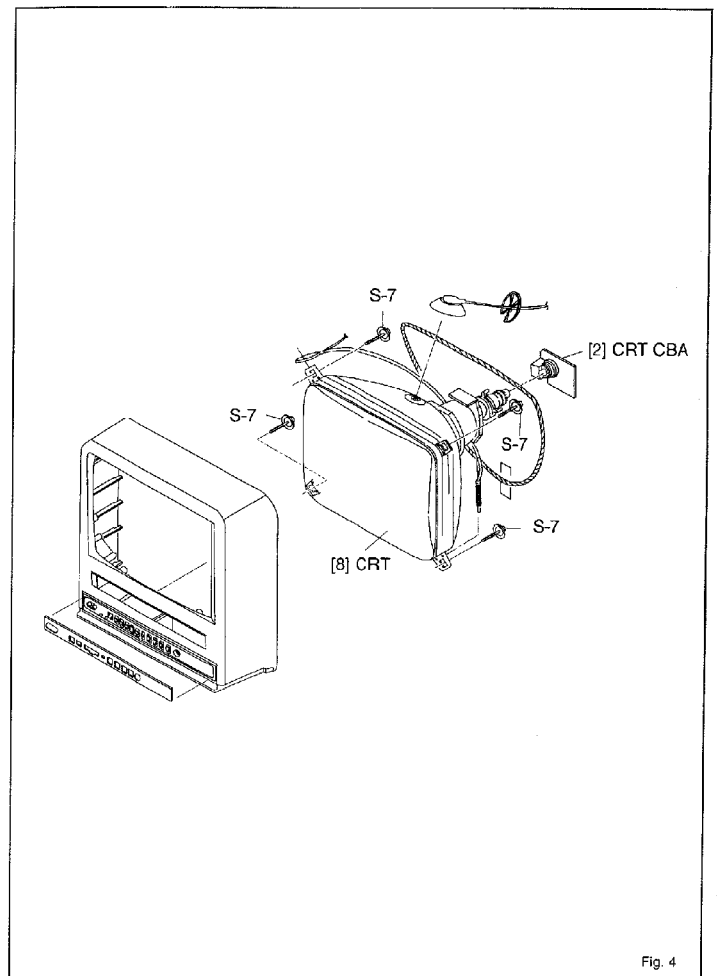


Fig. 4

1-6-4

B5707DC

ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note:
"CBA" is abbreviation for "Printed Circuit Board Assembly".

NOTE:

Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed.

Also, do not attempt these adjustments unless the proper equipment is available.

Test Equipment Required

1. NTSC Pattern Generator (Color Bar W/White Window, Red Color, Dot Pattern, Gray Scale, Monoscope, Multi-Burst)
2. AC Milli Voltmeter (RMS)
3. Alignment Tape (FL8A, FL8N), Blank Tape
4. DC Voltmeter
5. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001-50V/Div, F-Range: DC-AC-60MHz
6. Frequency Counter
7. Plastic Tip Driver

1. DC 112V Adjustment

Purpose: To obtain correct operation.

Symptom of Misadjustment: The picture is dark and unit does not operate correctly.

Test Point	Adjustment Point	Mode	Input
J608 (+112V) J607 (GND)	VR601	---	---
Tape	Measurement Equipment	Spec.	
---	DC Voltmeter	+112±0.5V DC.	

Note: J608, J607(GND), VR601

--- Power Supply CBA

1. Connect DC Volt Meter to J608 and J607(GND).
2. Adjust VR601 so that the voltage of J608 becomes +112±0.5V DC.

2. AFT Adjustment

Purpose: To operate AFT correctly.

Symptom of Misadjustment: AFT does not work correctly and/or synchronization is faulty.

Test Point	Adjustment Point	Mode	Input
J160 (AFT) J204 (GND)	T301 (VCO)	---	See Direction
Tape	Measurement Equipment	Spec.	
---	Oscilloscope or DC Volt Meter	+4.2±0.1V DC	

Figure

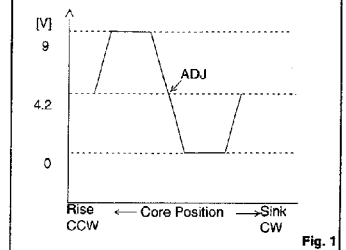


Fig. 1

Note: J160, J204(GND), T301 --- Main CBA

1. Disconnect the RF input and Set the unit to Channel 4.
2. Reconnect the RF input. Input Color Bar signal.
3. Turn the core of T301 fully counterclockwise.
4. Turn the core of T301 clockwise and find the point where the voltage drops from approximately 9V to 0V immediately on the oscilloscope. (J160)
5. Turn the core of T301 little by little and find the point where +4.2±0.1V DC is obtained between the area mentioned in step 3.

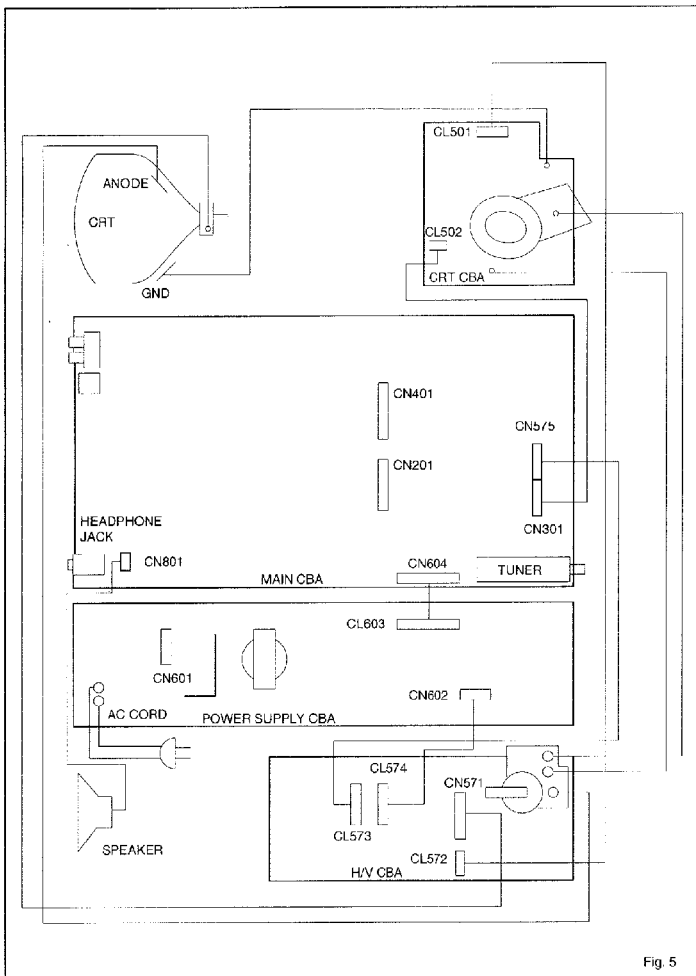


Fig. 5

3. AGC Adjustment

Purpose: Set AGC (Auto Gain Control) Level.

Symptom of Misadjustment: AGC does not synchronize correctly when RF input level is too weak and picture distortion may occur if it is too strong.

Test Point	Adjustment Point	Mode	Input
J210 (AGC) J204 (GND)	CH. Up/Down Button (Remote Control Unit)	---	Color Bar 67.25MHz 80dB μ V
Tape	Measurement Equipment	---	Spec.
---	Pattern Generator DC Volt Meter	+3.2(or 2.9) $\pm$ 0.1VDC By Tuner Type	

Notes: J210, J204 --- Main CBA

1. Enter the Service mode. (See Page 1-4-2) Then press number 2 button on the remote control unit.
2. Receive the Color Bar signal for channel 4 (67.25MHz). (RF Input Level: 80dB μ V)
2. Press CH. Up/Down button so that the voltage of J210 becomes +3.2 $\pm$ 0.1V DC. (Tuner is used TELH9-009A/012A/013A). If Tuner is used B8015AP, Voltage should be +2.9 $\pm$ 0.1V DC.

4. H. Shift Adjustment

Purpose: To get correct horizontal position and size of screen image.

Symptom of Misadjustment: Horizontal position and size of screen image may not be properly displayed.

Test Point	Adjustment Point	Mode	Input
---	Screen	play	Monoscope
Tape	Measurement Equipment	---	Spec.
F8-M or G	---	---	See below

Note:

1. Enter the Service mode. (See page 1-4-2) Then press number 4 button on the remote control unit.
2. Press CH. UP/DOWN Button so that the picture will stay on center.

5. V. Size Adjustment

Purpose: To obtain correct vertical width of screen image.

Symptom of Misadjustment: If V. Size is incorrect, vertical height of image on the screen may not be properly displayed.

Test Point	Adjustment Point	Mode	Input
---	VR541 (V. Size)	Play	Monoscope
Tape	Measurement Equipment	---	Spec.
---	Monochrome	---	90 $\pm$ 5%

Note: VR541 --- H/V CBA

1. Operate the unit for at least 20 minutes.
2. Input a Monoscope Pattern Signal.
3. Adjust VR541 so that the monochrome pattern will be 90 $\pm$ 5% of display size and the circle is round.

Note: If you don't have Monoscope, play test tape (F8-G or F8-M)

6. Cut-off Adjustment

Purpose: To adjust the beam current of R, G, B, and screen voltage.

Symptom of Misadjustment: White color may be reddish, greenish or bluish.

Test Point	Adjustment Point	Mode	Input
---	VR501 (R-Drive) VR502 (R-Cutoff) VR503 (G-Drive) VR504 (B-Drive) VR505 (B-Cutoff) Screen-Control	---	White Raster (APL 100%)
Tape	Measurement Equipment	---	Spec.
---	Pattern Generator	---	See Reference Notes below.

Figure

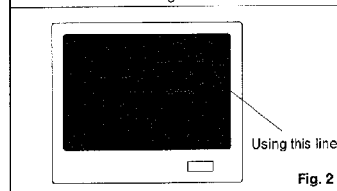


Fig. 2

Note: VR501, VR502, VR503, VR504, VR505 --- CRT CBA

Screen Control --- H/V CBA

FBT= Fly Back Transformer

1. Degauss the CRT and allow CRT to operate for 20 minutes before starting the alignment.
2. Input a White Raster Test Signal (APL 100%).
3. Pre-set the Screen Control located on the FBT to minimum (Fully Counter Clock Wise).
4. Pre-set VR502 (R-Cutoff), VR503 (G-Cutoff), and VR505 (B-Cutoff) to the 10 o'clock position.
5. Pre-set VR504 (B-Drive) and VR501 (R-Drive) to their center positions.
6. Enter the Service Mode. (See page 1-4-2) Then press the number 1 button on the Remote control unit.
7. Gradually turn the Screen Control (Clock Wise) until a horizontal line, of any color dimly appears.
8. Turn the Red, Blue or Green Cutoff controls up to achieve a "white" dim line.
9. Power off and power on again.

7. White Balance Adjustment

Note: The Cut-off adjustment procedure must be finished first before making this adjustment.

Purpose:

To mix red, green and blue beams correctly for pure white.

Symptom of Misadjustment:

White becomes bluish or reddish.

Test Point	Adjustment Point	Mode	Input
---	VR501 (R-DRIVE) VR504 (B-DRIVE)	---	White Raster (APL 100%)
Tape	Measurement Equipment	---	Spec.
---	Pattern Generator	---	See Reference Notes below.

Notes: VR501, VR504 --- CRT CBA

1. Operate the unit for at least 20 minutes.
2. Face the unit to the east. Degauss the CRT using Degaussing Coil.
3. Input a White Raster signal (APL 100%)
4. Adjust VR501(R. DRIVE) and VR504(B. DRIVE) so that the White Raster is shown as Pure White.

Note:

Check that Cut Off Adj. is correct after this adjustment, and Repeat Cut Off Adj. if needed.

8. Sub-Brightness Adjustment

Purpose: To get proper brightness.

Symptom of Misadjustment: If Sub-Brightness is incorrect, proper brightness cannot be obtained by adjusting the Brightness Control.

Test Point	Adjustment Point	Mode	Input
---	Screen Control	---	Gray Scale
Tape	Measurement Equipment	---	Spec.
---	Pattern Generator	---	See Reference Note Below

Figure

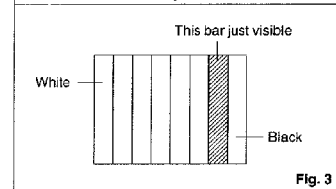


Fig. 3

Note: Screen Control --- H/V CBA

1. Operate the unit for at least 20 minutes.
2. Input a 8-step Gray Scale Signal.
3. Adjust Screen Control so that the 2nd bar is just visible (See above figure).

9. Focus Adjustment

Purpose: Set the optimum Focus.

Symptom of Misadjustment: If Focus Adjustment is incorrect, blurred images are shown on the display.

Test Point	Adjustment Point	Mode	Input
---	Focus Control	---	Monoscope
Tape	Measurement Equipment	---	Spec.
---	Pattern Generator	---	See below.

Note: Focus Control (FBT) --- H/V CBA

FBT= Fly Back Transformer

1. Operate the unit more than 30 minutes
2. Degauss the CRT using Degaussing Coil and Face the unit to the East.
3. Input a Monoscope Pattern Signal.
4. Adjust the Focus Control on the FBT to obtain clear picture.

10. Head Switching Position Adjustment

Purpose: Determine the Head Switching Point during Play back.

Symptom of Misadjustment: May cause Head Switching Noise or Vertical Jitter in the picture.

Note: Unit reads Head Switching Position automatically and display it on the screen.

1. Enter the Service Mode. (See page 1-4-2)
Play back test tape (FL8A) so that the value of Head Switching Position is displayed on the screen. If the test tape has 6.5H(412.7 μ s) Head Switching Point same number will display on the screen.
2. Press the number 5 button on the Remote Control Unit.
3. If the Adjustment is necessary, Follow Step 4.
4. Press CH UP or DOWN button on the Remote Control Unit if necessary then Value will be changed in 0.5H step up or down. Adjustable Range is up to 9.5H. If the values beyond adjustable range, display will change as:
Lower out of range; 0.0H
Upper out of range; --H

11. SIF Adjustment

Purpose: To set the SIF (Sound Intermediate Frequency).

Symptom: Audio may not sound correctly.

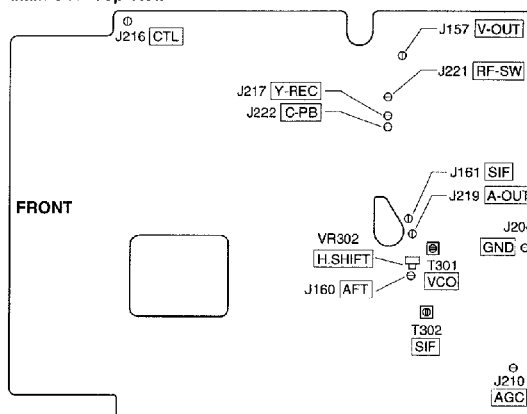
Test Point	Adjustment Point	Mode	Input
J161	T302	---	Color Bar
Tape	Measurement Equipment		Spec.
---	Pattern Generator Digital Volt Meter		See below.

Note: J161, T302 --- Main CBA

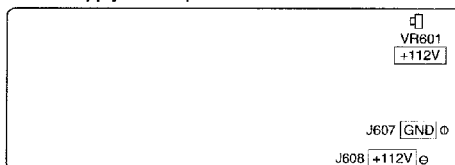
1. Receive Color Bar signal at any channel.
2. Connect Digital Volt Meter to J161.
3. Adjust T302 so that the voltage of TP.SIF becomes DC +3.1 $\pm$ 0.1V.

Adjustment Points and Test Points

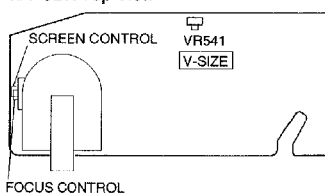
Main CBA Top View



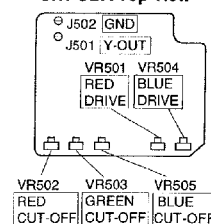
Power Supply CBA Top View

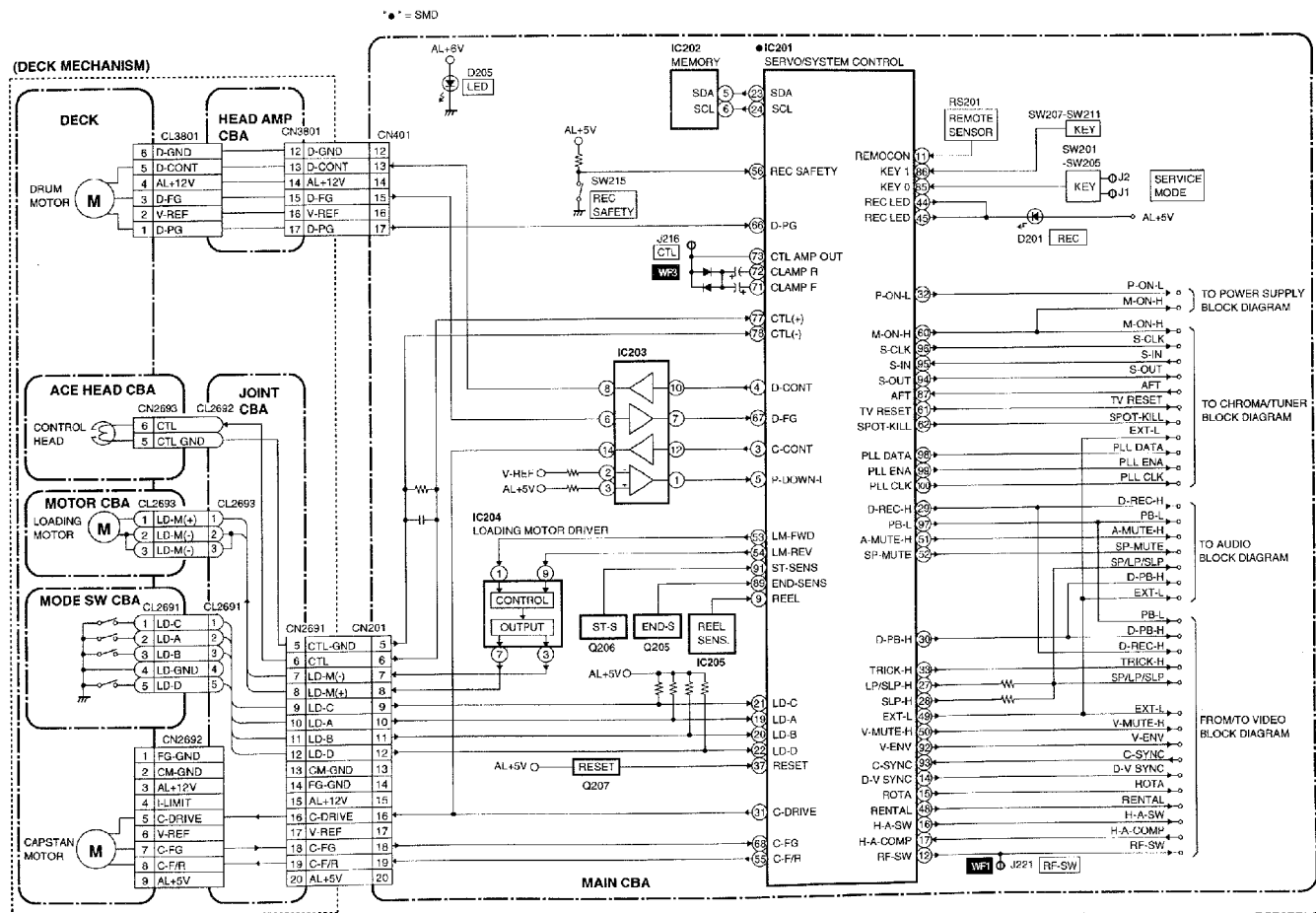


H/V CBA Top View

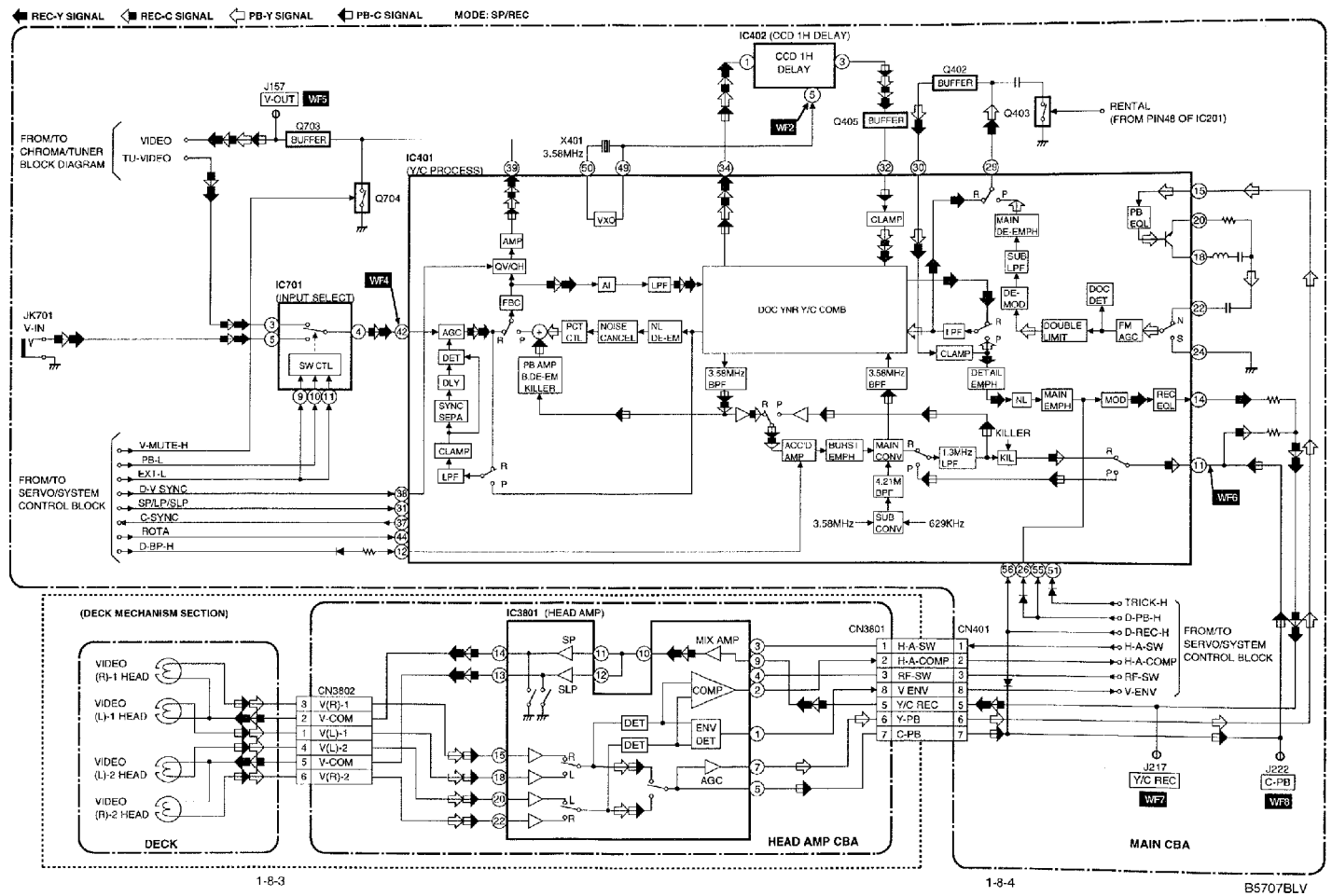


CRT CBA Top View





Video Block Diagram



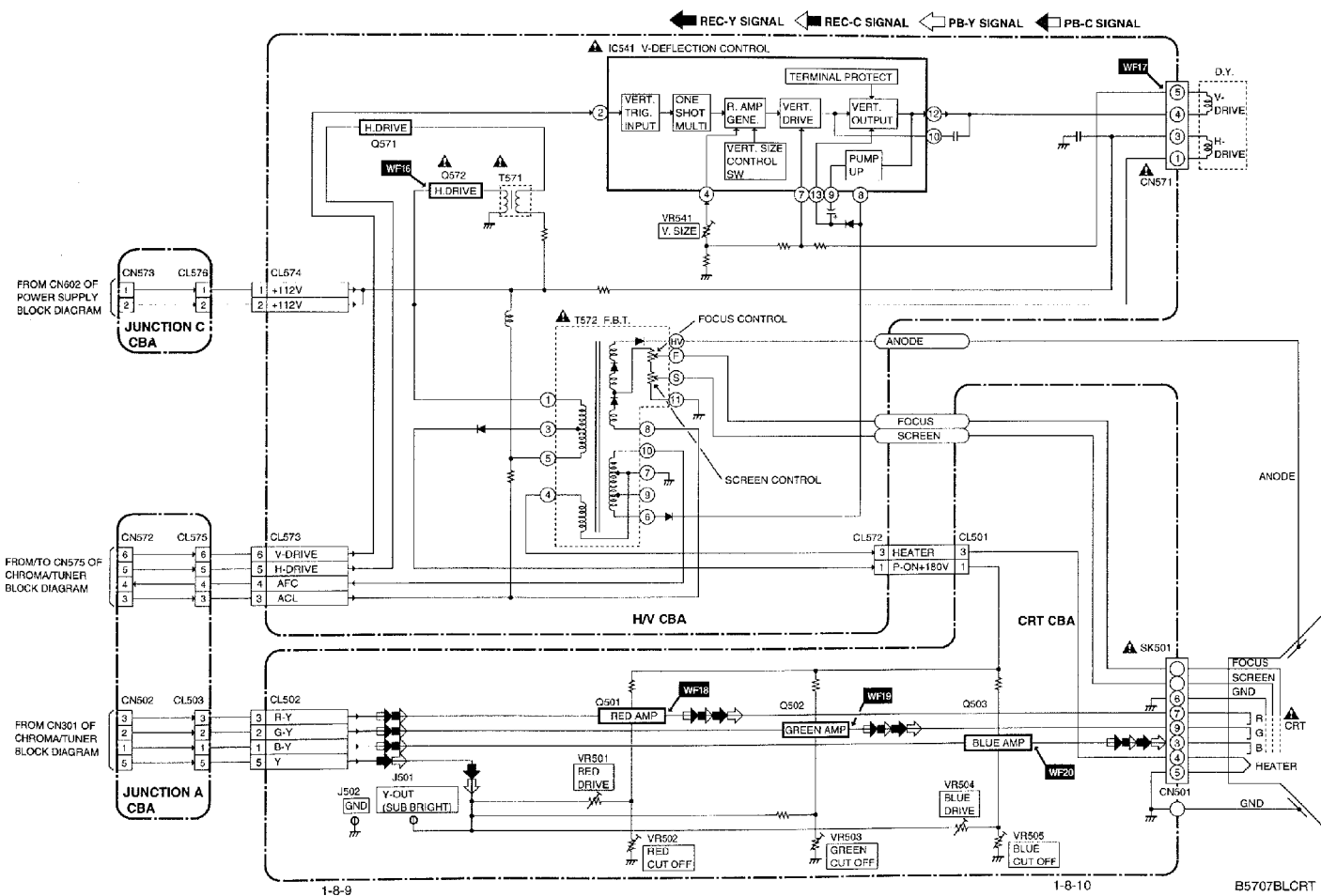
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1-8-7

1-8-8

B570731

CRT/H.V. Block Diagram



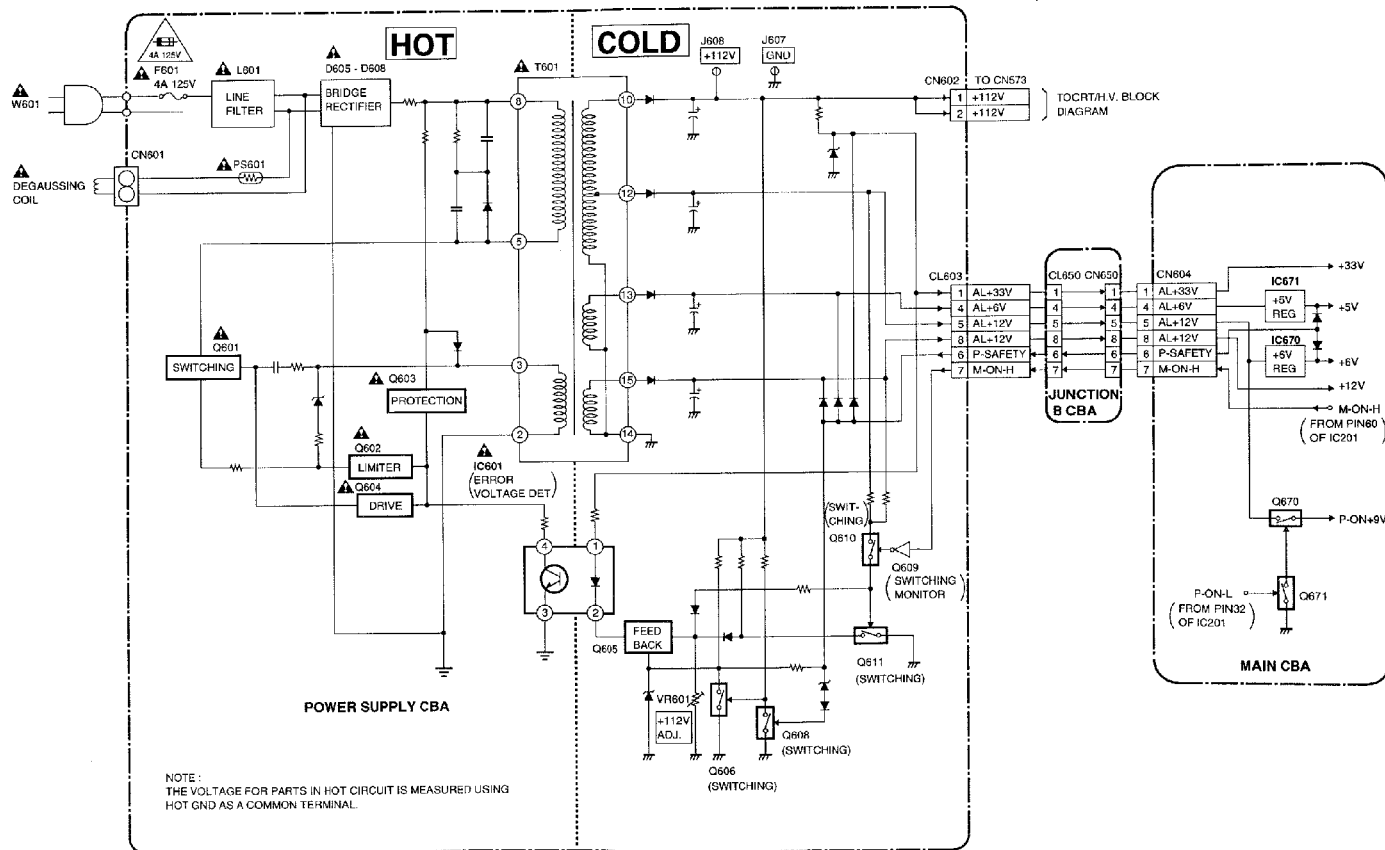
Power Supply Block Diagram

CAUTION !

Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F01) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.



CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCENDIE UTILISER QUE DES FUSIBLE DE MEME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.



1-8-11

1-8-12

B5707BLP

Troubleshooting Guides TV Section

OPERATION CHECK

STEP 1 No Power Page 1-8-15

STEP2 Power shut off after few seconds
Page1-8-16

STEP3(A) No Video from Tuner Page 1-8-17

STEP3(B) No Luminance from Tuner Page 1-8-18

STEP4 No color Page 1-8-19

STEP5 No Vertical Page 1-8-20

STEP6 No OSD Display Page 1-8-21

STEP7 No Adj. Tint, Sharpness Etc. Page 1-8-22

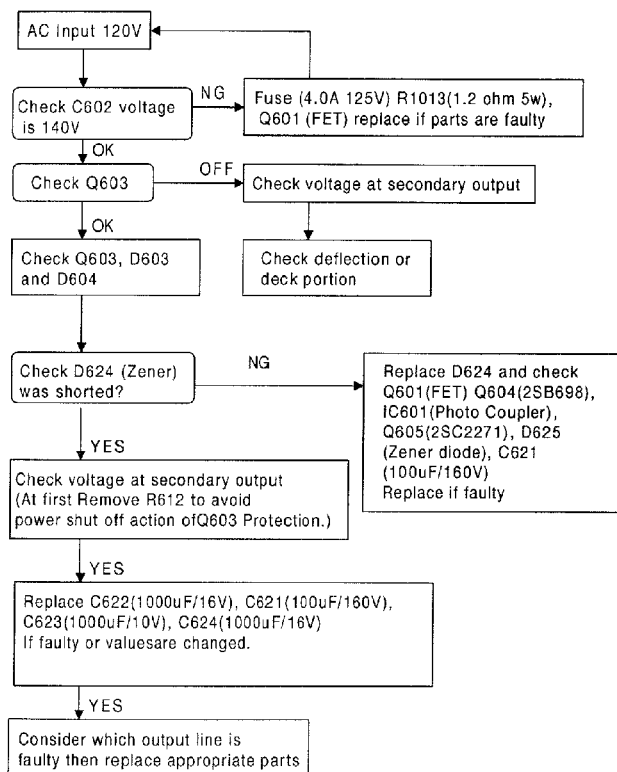
STEP8 No Audio (TV) Page 1-8-23

OPERATION CHECK

STEP9 No cassette in. Page1-8-24	STEP18 No play back (Picture).Page1-8-29
STEP10 No recording. Page 1-8-25	STEP19 No audio during play back. Page1-8-32
STEP11 Speed selection does not work. Page 1-8-26	STEP20 No search (F.F. / Rewind). Page1-8-32
STEP12 No rewind at Tape end (Auto rewind). Page1-8-26	STEP21 Tape does not stop or Eject. Page1-8-33
STEP13 Pause key does not work. Page1-8-26	STEP22 No power off. Page1-8-33
STEP14 Stop key does not work. Page1-8-27	STEP23 System Control IC trouble. Page1-8-34
STEP15 REW or F.F. key does not work. Page1-8-27	STEP24 "On-screen" Display problems. Page1-8-34
STEP16 Counter memory does not work. Page1-8-28	
STEP17 No play back (Deck). Page1-8-28	

STEP18 No play back (Picture).Page1-8-29	STEP19 No audio during play back. Page1-8-32
STEP20 No search (F.F. / Rewind). Page1-8-32	STEP21 Tape does not stop or Eject. Page1-8-33
STEP22 No power off. Page1-8-33	STEP23 System Control IC trouble. Page1-8-34
STEP24 "On-screen" Display problems. Page1-8-34	

STEP 1 No power



* When the SYSTEM CONTROL IC has locked up, the SYSTEM CONTROL IC will not accept any mode.
At this time, disconnect AC power cord to reset the SYSTEM CONTROL IC. Few minutes later, re-connect AC power cord to avoid BACK-UP function.

STEP 2 Power shut off after few seconds

Check for Mechanical trouble:
Cassette In
Drum and Drum Motor
Reel

YES

See VCR Section, Page 1-8-24 and 1-8-28

NO

Check IC101(TV IC)
Pin 7 (P-SAFTE) Voltage is High

NG

Replace IC101(TV IC)

OK

Check IC101(TV) IIC
Pin 3(X-RAY) Voltage is Lo.
Check R144 for open.
Check CL573.
check D575, R585, R586, R589

NG

Replace IC101(TV IC)

Check R693 for open

1-8-16

B5709TR

STEP3 (A) No Video from tuner (E-E mode)

Check voltage(6V) at
IC301(Chroma IC) Pin12, 19

No

Go to STEP 1, Page 1-8-15

OK

Check voltage(+5V) at
IC301(Chroma IC) Pin10

NG

Check CN604,
D670, R680,
Q670

NG

Replace IC602(Voltage Regulator IC)

Check waveform at
Q303 collector (IF)

NG

Check voltage(5V) at IC101
(D/A Converter) Pin27 Check X101
oscillation is OK

NG

Power supply faulty
replace X101

OK

Check pulse at IC101(D/A Converter)
Pin14(S-IN), 17(SCLK) and 16(SOUT)

NG

Replace IC101
(D/A Converter) or
TU001(Tuner Unit)

Yes

Check voltage at TU001(Tuner Unit)
Pin BM(+9), BP(+5V) and BT(+33V)

NG

Go to STEP1, Page
1-8-15

Yes

Confirm Adjustment is OK?

NG

Replace TU001(Tuner Unit)

Check IF waveform at
IC301(Chroma IC) Pin8, 9

NG

Replace SF031(Saw Filter)

Yes

Check TV Video at
IC301(Chroma IC) Pin51

NG

Replace T301(AFT), IC301
(Chroma IC)

Yes

Check TV Video at
Q308(Buffer) emitter

No

Replace CF302(4.5MHz),
Q201(Buffer)

Yes

Check TV Video at
IC701(Input Selector) Pin3(IN)

No

Check J16

Yes

Check Video at
IC701(Input Selector) Pin4(OUT)

No

Check voltage at
IC701(Input Selector) Pin16(Vcc +9V)

No

Go to STEP1, Page
1-8-15

Yes

Refer video section
troubleshooting
Step 10, Page 1-8-24

Check Voltage
low at IC701
(Input Selector) Pin9, 11

No

Check Q702
(Input Selector), I
C201(Servo/System
Control IC) Pin 49

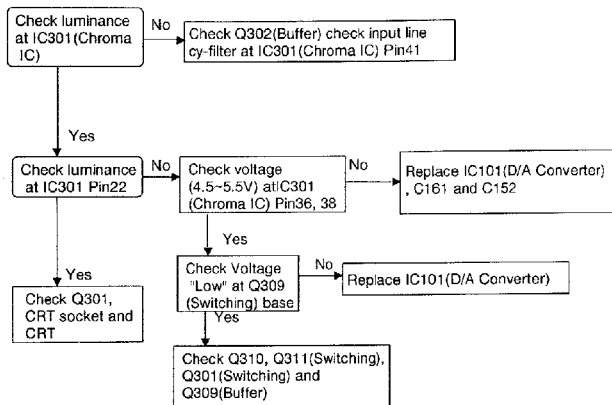
Yes

Replace IC701
(Input Selector IC)

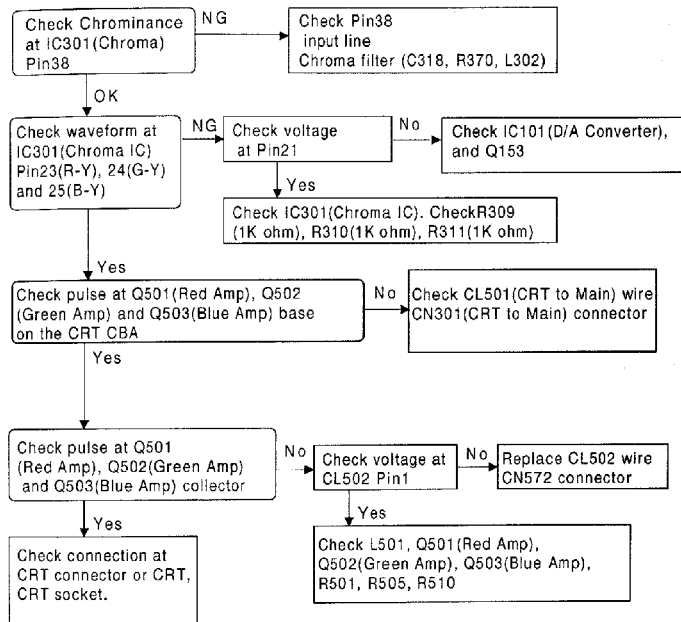
1-8-17

B5709TR

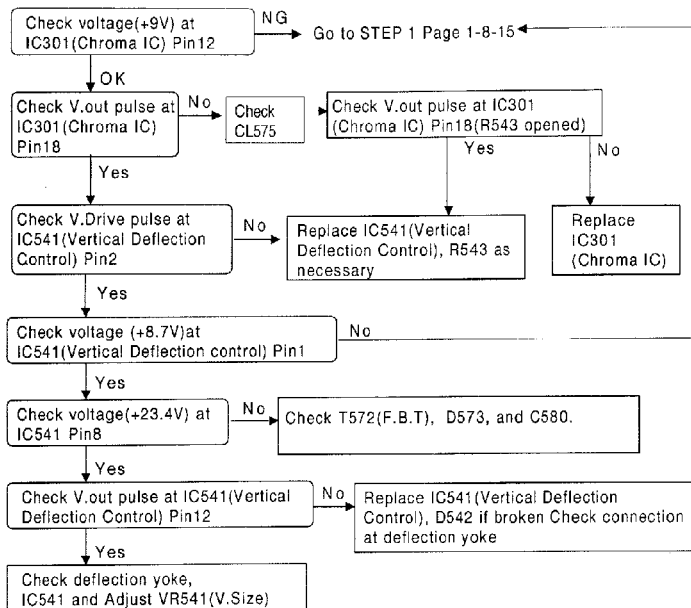
STEP3 (B) No luminance from tuner



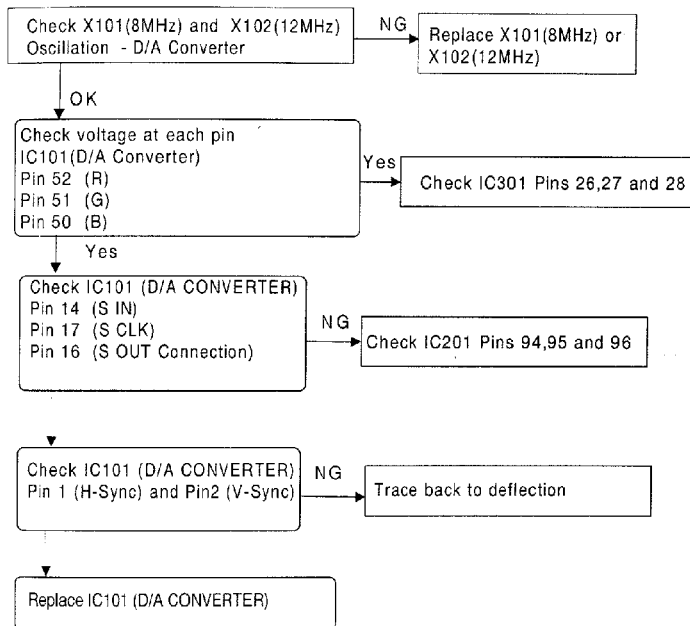
STEP4 No color



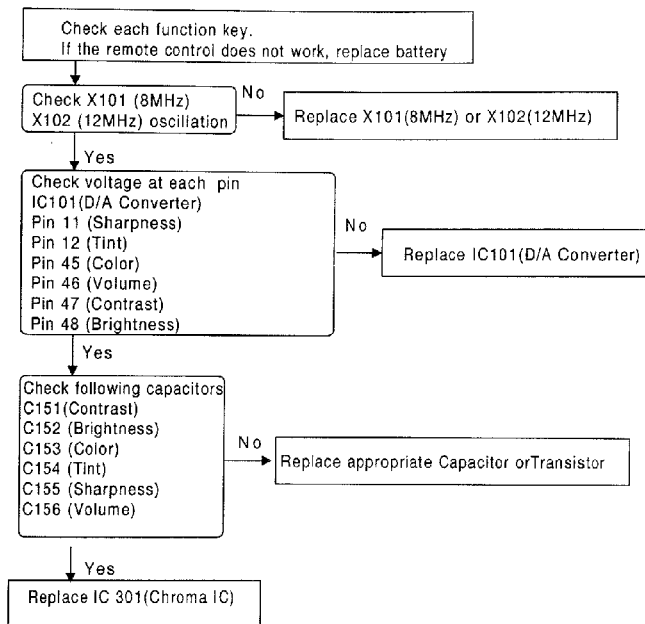
STEP 5 No Vertical



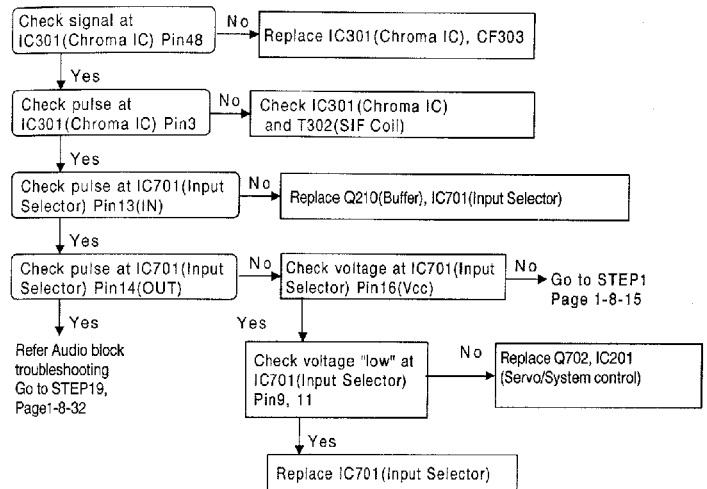
STEP 6 No OSD Display



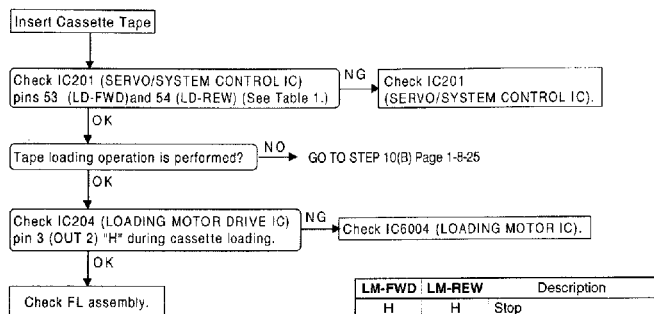
STEP 7 No Adj. Tint, Sharpness, etc.



STEP 8 No audio (TV)



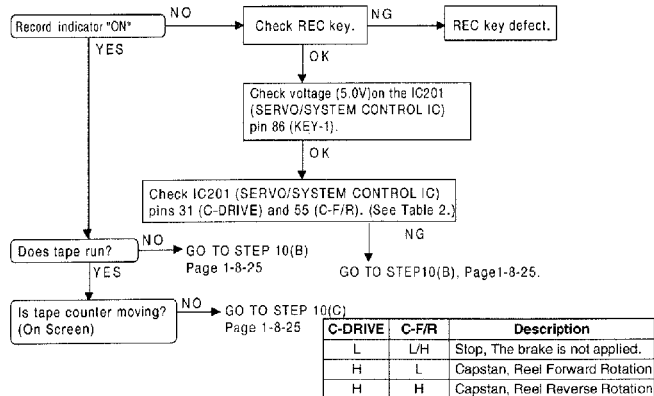
STEP 9 : No cassette in.



LM-FWD	LM-REW	Description
H	H	Stop
H	L	Loading Forward Rotation
L	H	Loading Reverse Rotation

Table 1

STEP 10 : No recording.



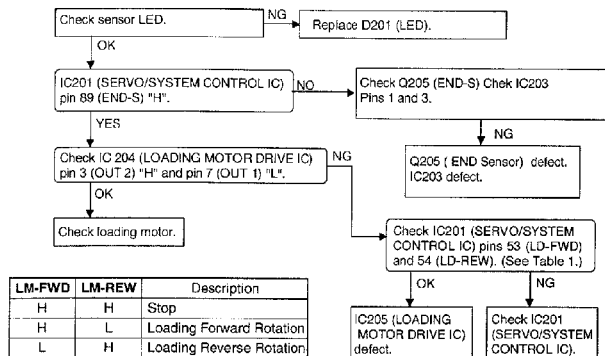
C-DRIVE	C-F/R	Description
L	L/H	Stop, The brake is not applied.
H	L	Capstan, Reel Forward Rotation
H	H	Capstan, Reel Reverse Rotation

Table 2

1-8-24

B5709TR1

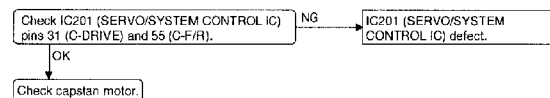
STEP 10(A) : CHECK END SENSOR and LOADING MOTOR.



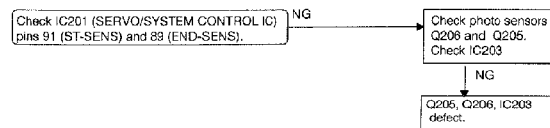
LM-FWD	LM-REW	Description
H	H	Stop
H	L	Loading Forward Rotation
L	H	Loading Reverse Rotation

Table 1

STEP 10(B): CHECK CAPSTAN MOTOR.



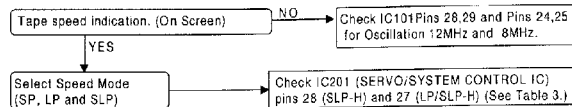
STEP 10(C): CHECK CAPSTAN MOTOR.



1-8-25

B5709TR1

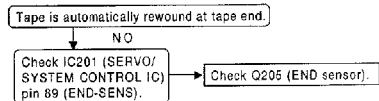
STEP 11 : SPEED Selection does not work.



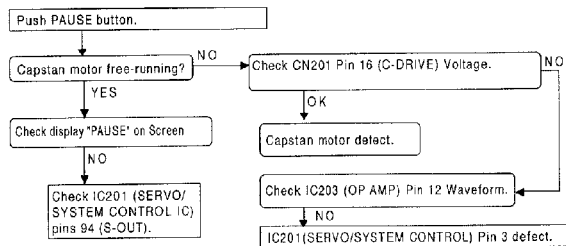
(10)	(9)	(13)VIDEO	(3)AUDIO
L	L	(12)TUN	(1)TUN
L	H	(14)NOT USED	(5)NOT USED
H	L	(15)(AUX 2)	(2)(AUX 2)
H	H	(11)AUX	(4)AUX

Table 3

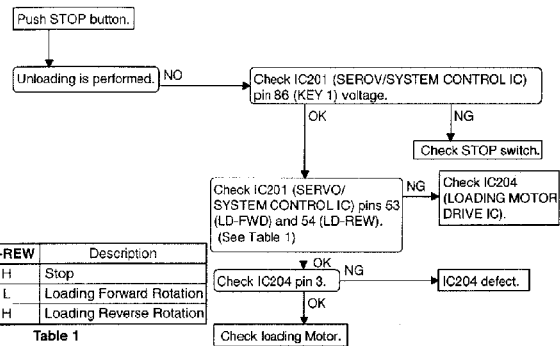
STEP 12 : No rewind at Tape end (Auto rewind).



STEP 13 : Pause key does not work.



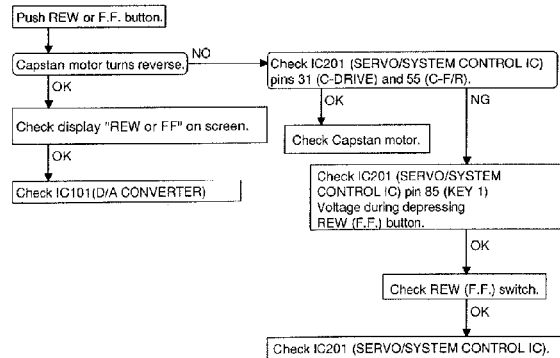
STEP 14 : STOP KEY does not work.



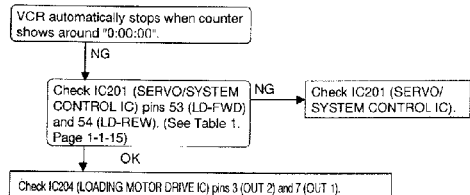
LM-FWD	LM-REW	Description
H	H	Stop
H	L	Loading Forward Rotation
L	H	Loading Reverse Rotation

Table 1

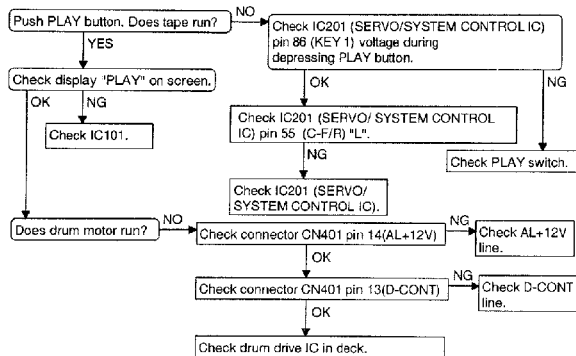
STEP 15 : REW or F.F. key does not work.



STEP 16 : Counter Memory button does not work.



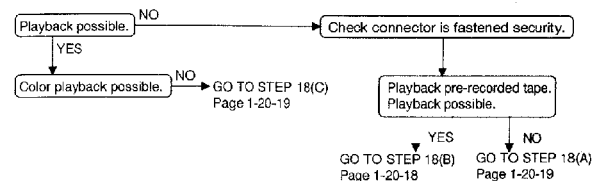
STEP 17 : No play back (Deck).



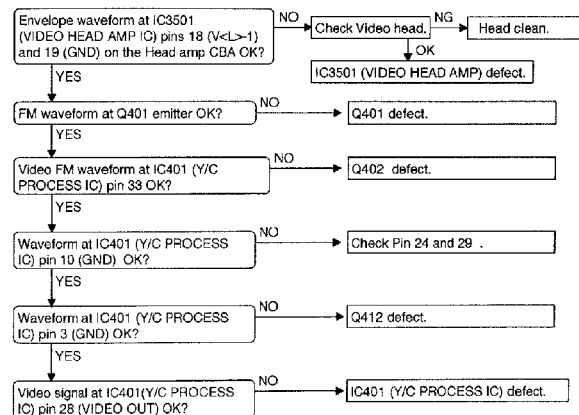
1-8-28

B5709TR1

STEP 18 : No playback (Picture).



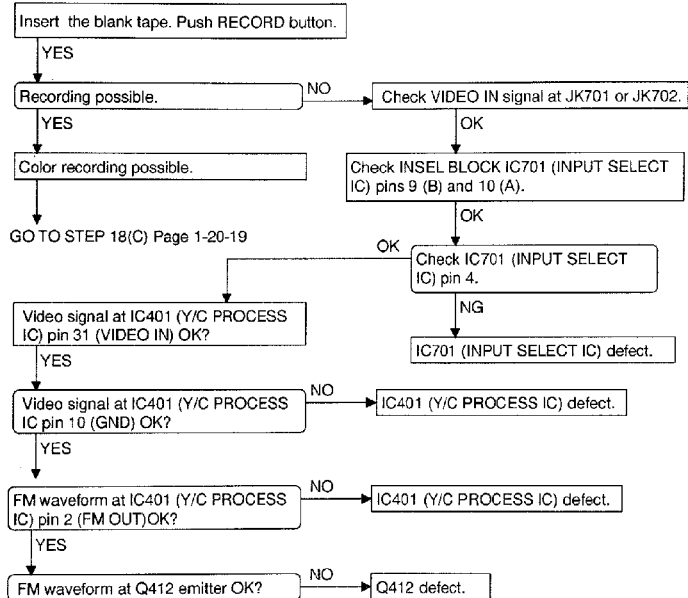
STEP 18(A) : CHECK Y/C PROCESS (VIDEO HEAD AMP) BLOCK.



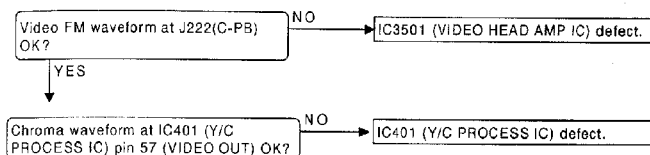
1-8-29

B5709TR1

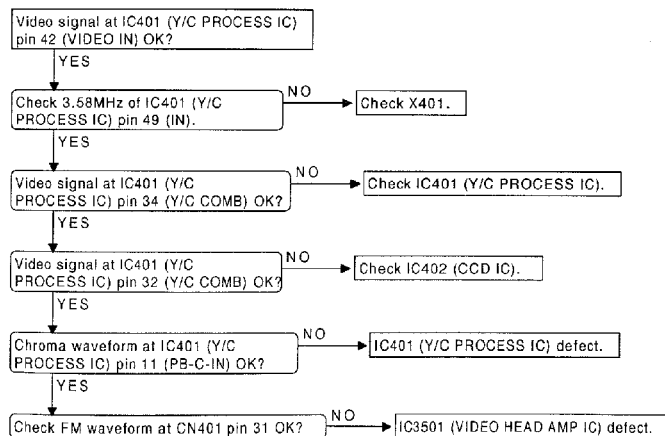
STEP 18 (B) : CHECK Y/C PROCESS (INPUT SELECTOR) BLOCK. Record mode.



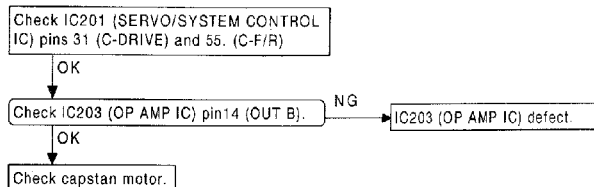
STEP 18 (C) : CHECK Y/C PROCESS (CHROMA) BLOCK.



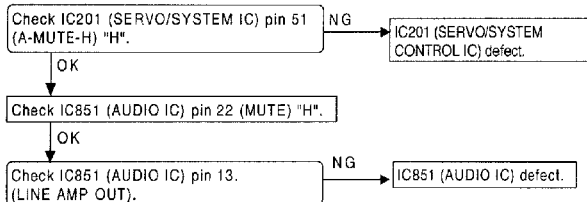
STEP 18 (D) : CHECK Y/C PROCESS (VIDEO) BLOCK.



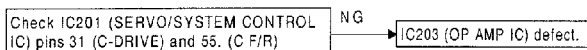
STEP 19 (A) : CHECK CAPSTAN MOTOR BLOCK.



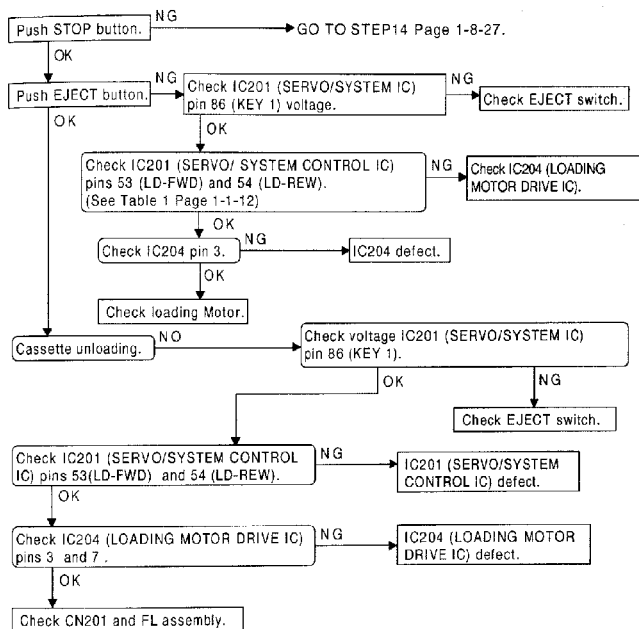
STEP 19 (B) : CHECK AUDIO IC BLOCK.



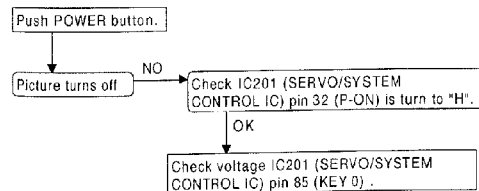
STEP 20 : CHECK CAPSTAN MOTOR BLOCK.

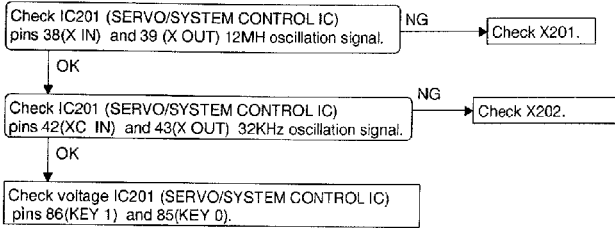


STEP 21 : Tape does not stop or eject

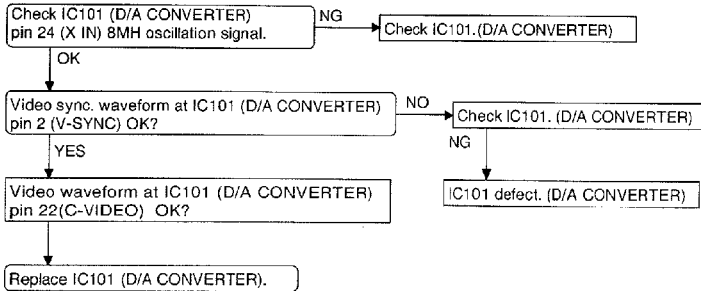


STEP 22 : No power off.



STEP 23 : System Control IC trouble.**STEP 24 : On-screen Display problems**

On-screen is irregular

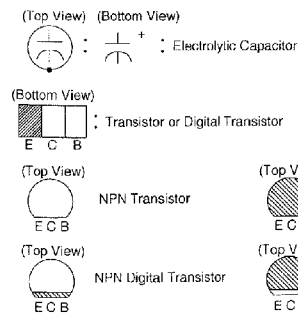
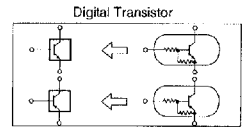
**Standard Notes****WARNING**

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark "▲" in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20°C	-25--+85°C
(F)	+30 -80%	20°C	-25--+85°C
(SR)	±15%	20°C	-25--+85°C
(Z)	+30 -80%	20°C	-10--+70°C

Capacitors and transistors are represented by the following symbols.

CBA Symbols**Schematic Diagram Symbols****Note:**

- 1 Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
- 2 All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
- 3 Resistor wattages are 1/4W or 1/8W unless otherwise specified.
- 4 All capacitance values are indicated in μF ($P=10^{-6}\mu F$).
- 5 All voltages are DC voltages unless otherwise specified.

LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. CAUTION:



FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

2. CAUTION:

Fixed voltage power supply circuit is used in this unit.

If Main Fuse (F01) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. Note:

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Wire Connectors

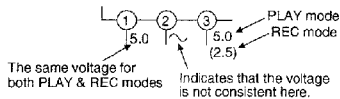
(1) Prefix symbol "CN" means "connector." (Can disconnect and reconnect)

(2) Prefix symbol "CL" means "wire-solder holes of the PCB." (Wire is soldered directly.)

5. Note: Mark "•" is a leadless (chip) component.

6. Mode: SP/REC

7. Voltage indications for PLAY and REC modes on the Schematics are as shown below:

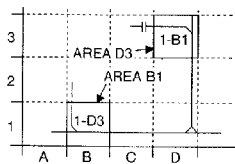


Unit: Volts

8. How to read converged lines

1-D3
Distinction Area
Line Number
(1 to 3 digits)
Examples:

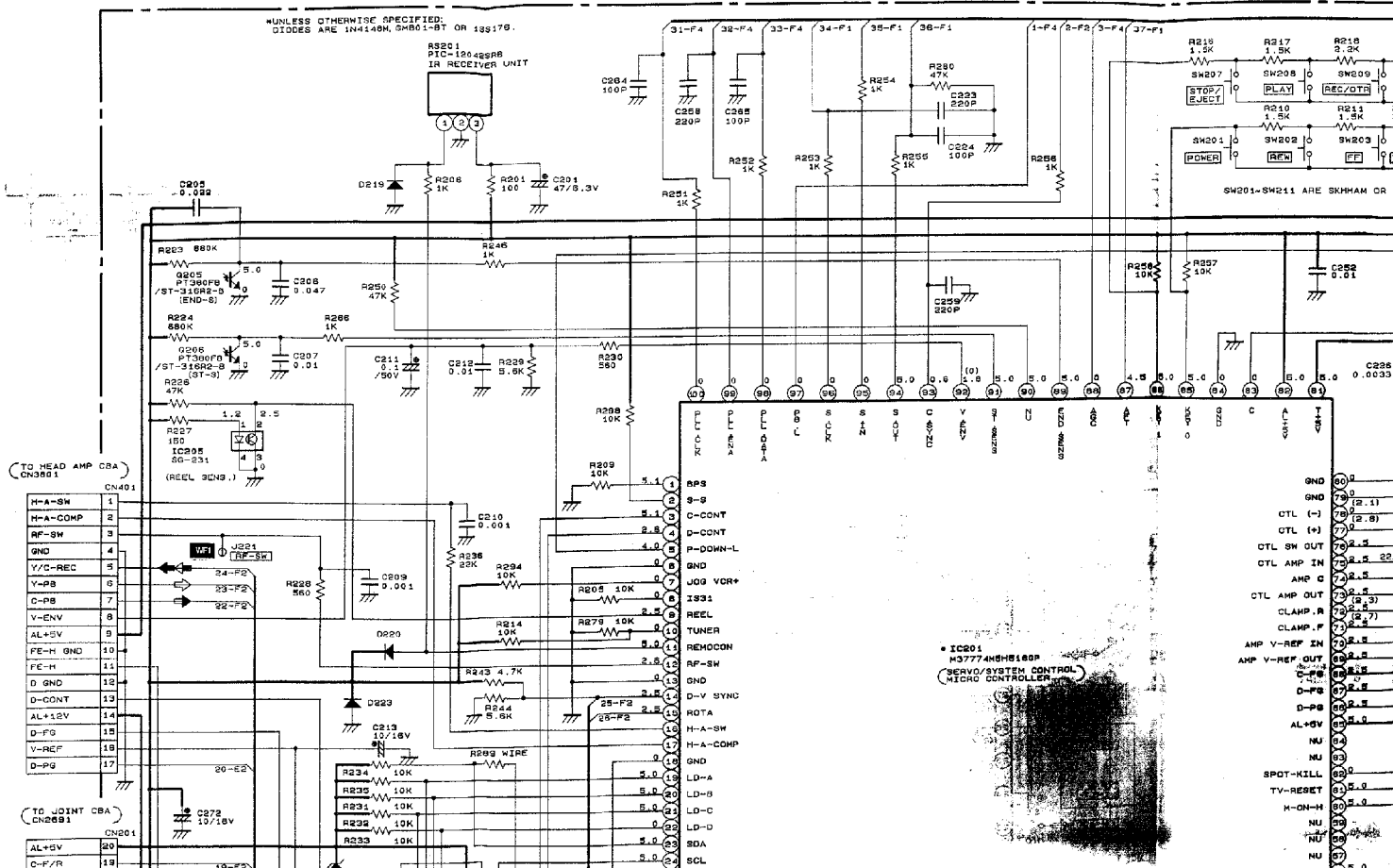
1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".

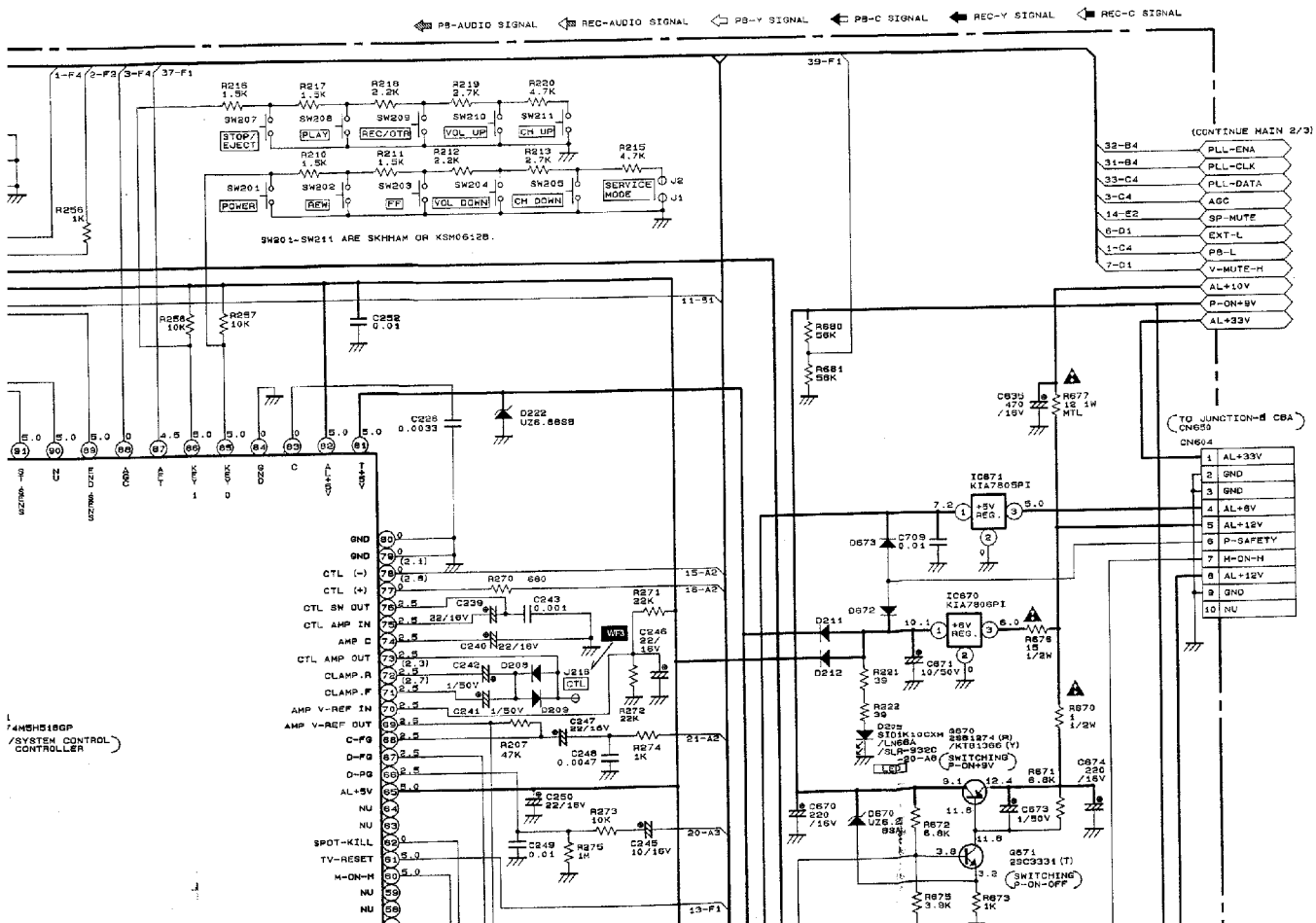


9. Test Point Information

- ⊙ : Indicates a test point with a jumper wire across a hole in the PCB.
- : Used to indicate a test point with a component lead on foil side.
- ⊗ : Used to indicate a test point with no test pin.
- : Used to indicate a test point with a test pin.

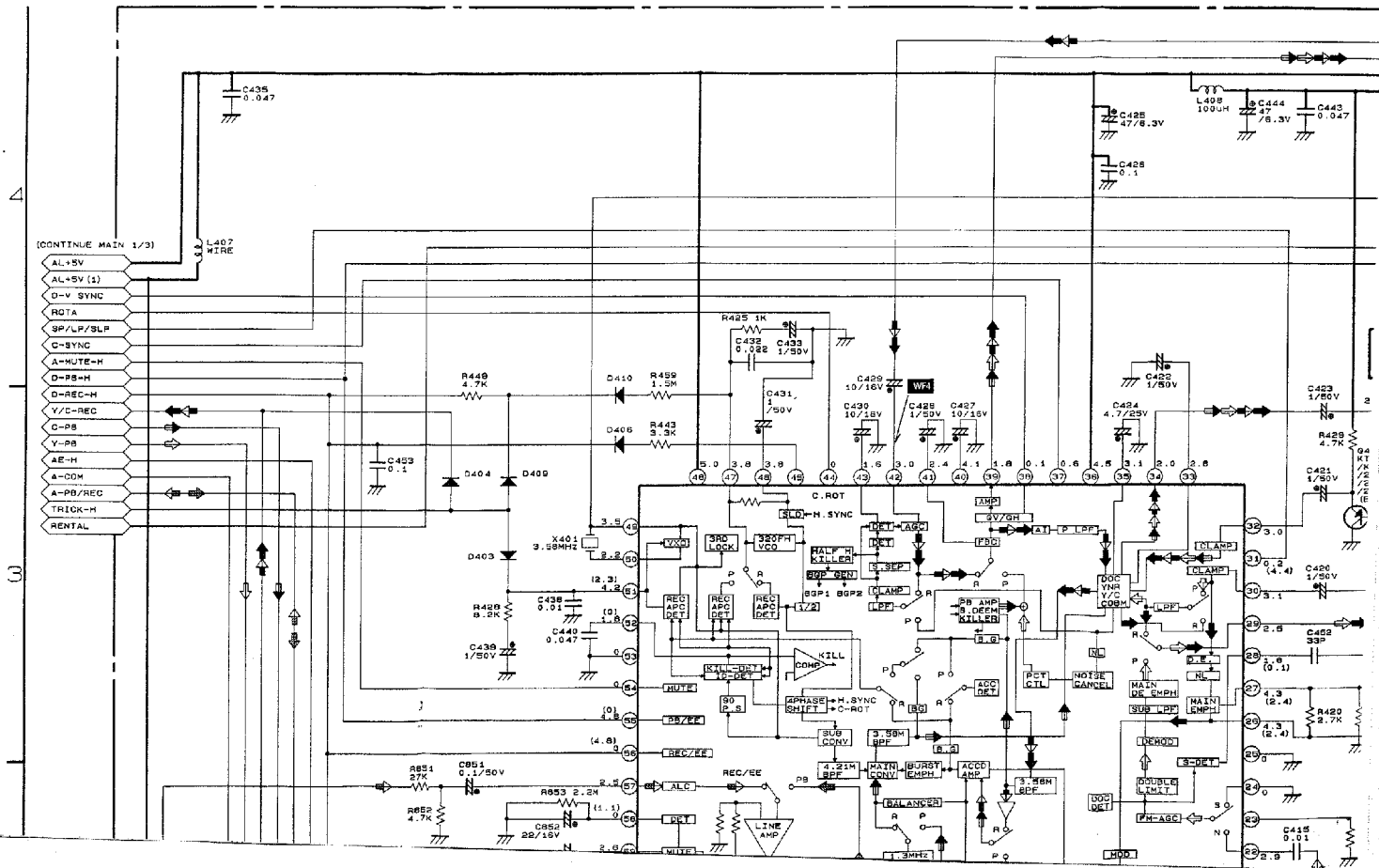
A vertical number line with tick marks at 3 and 4.

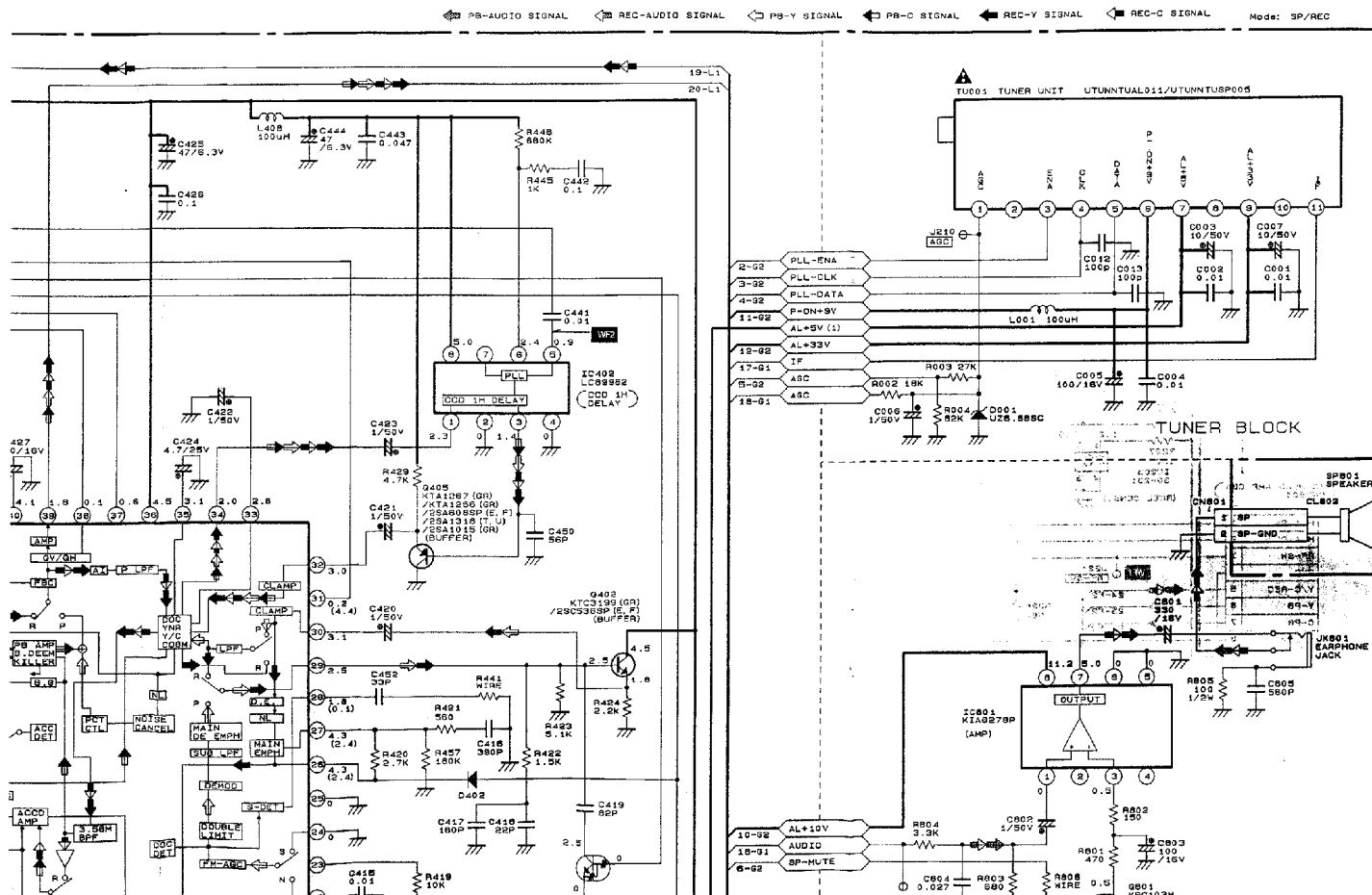


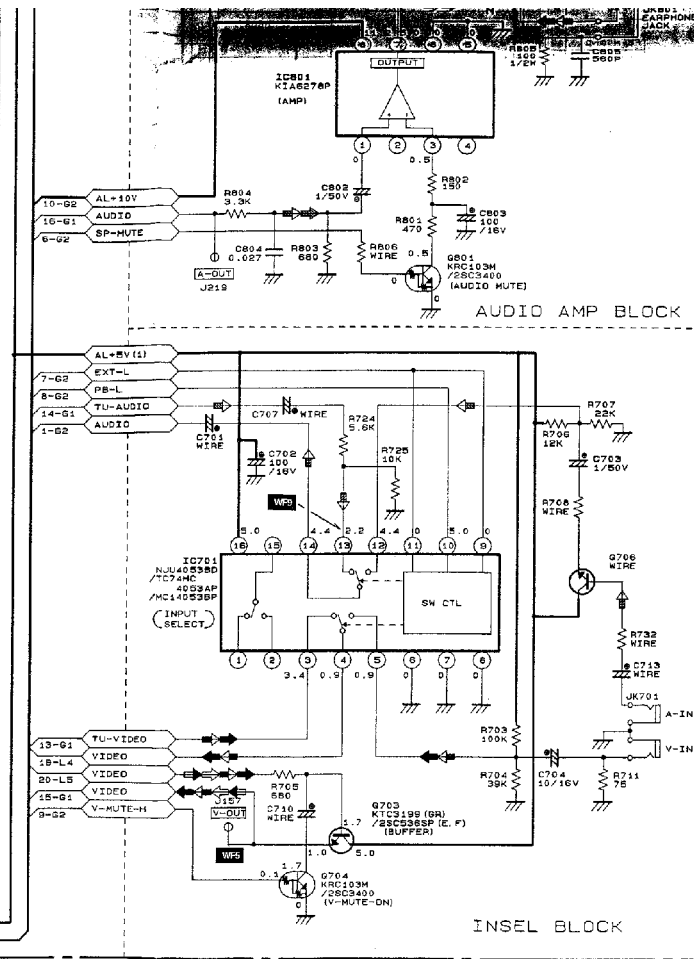
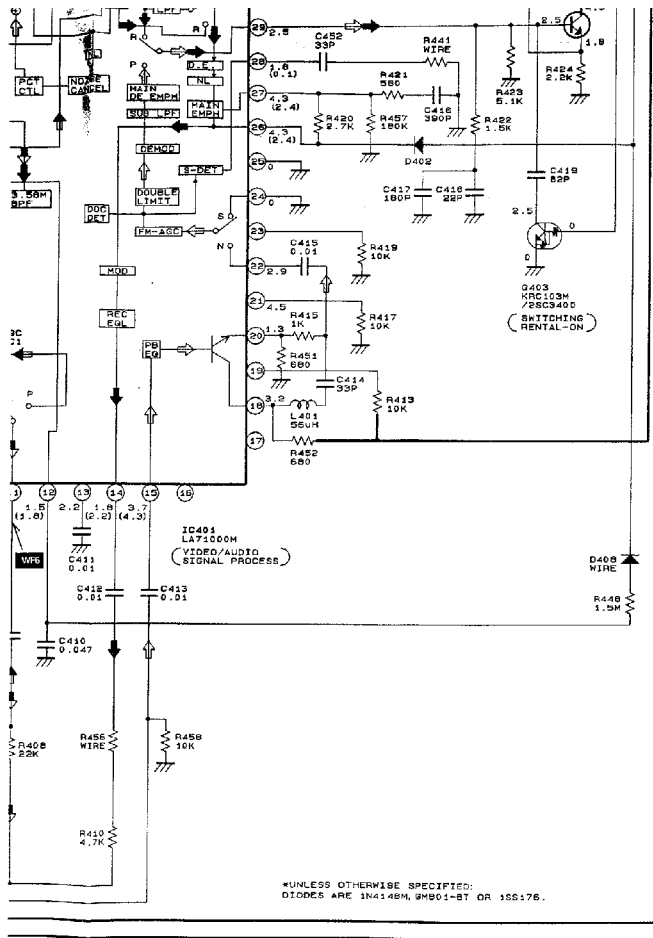




Main 2/3 Schematic Diagram







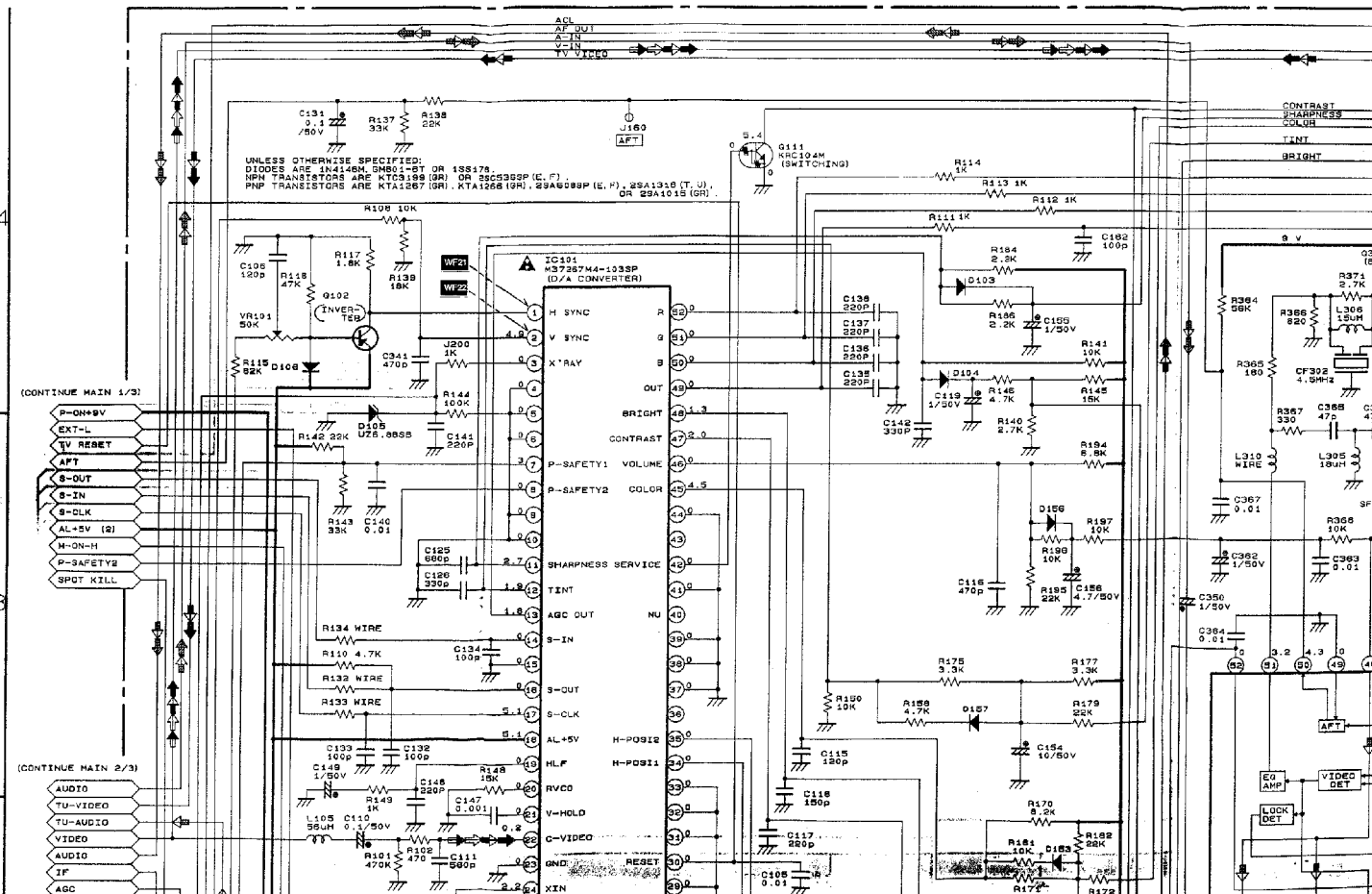
K

L

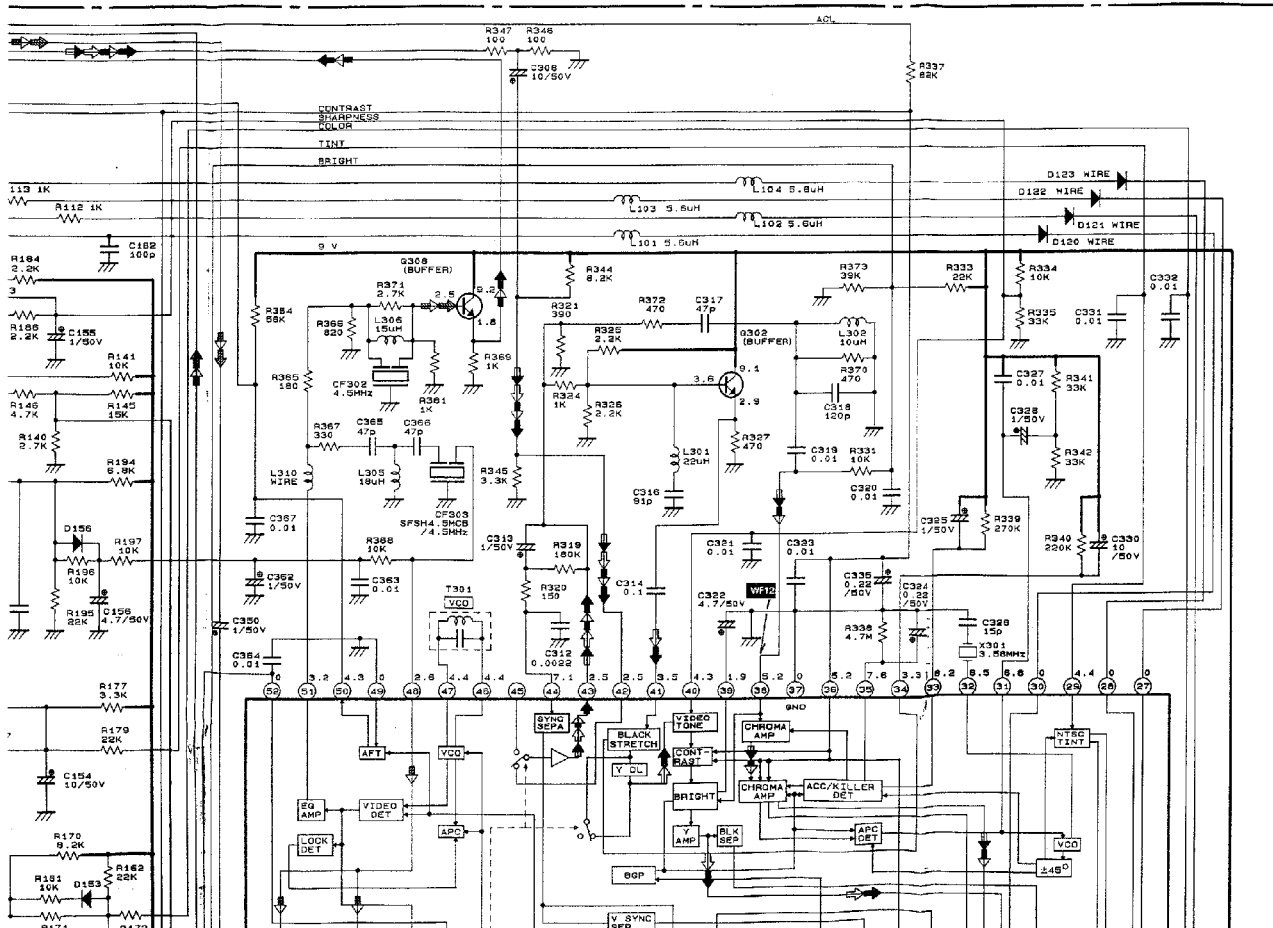
M

96/07/10

2



PB-AUDIO SIGNAL RED-AUDIO SIGNAL PB-Y SIGNAL PB-C SIGNAL REC-Y SIGNAL REC-C SIGNAL





B57Q7SCM3

4

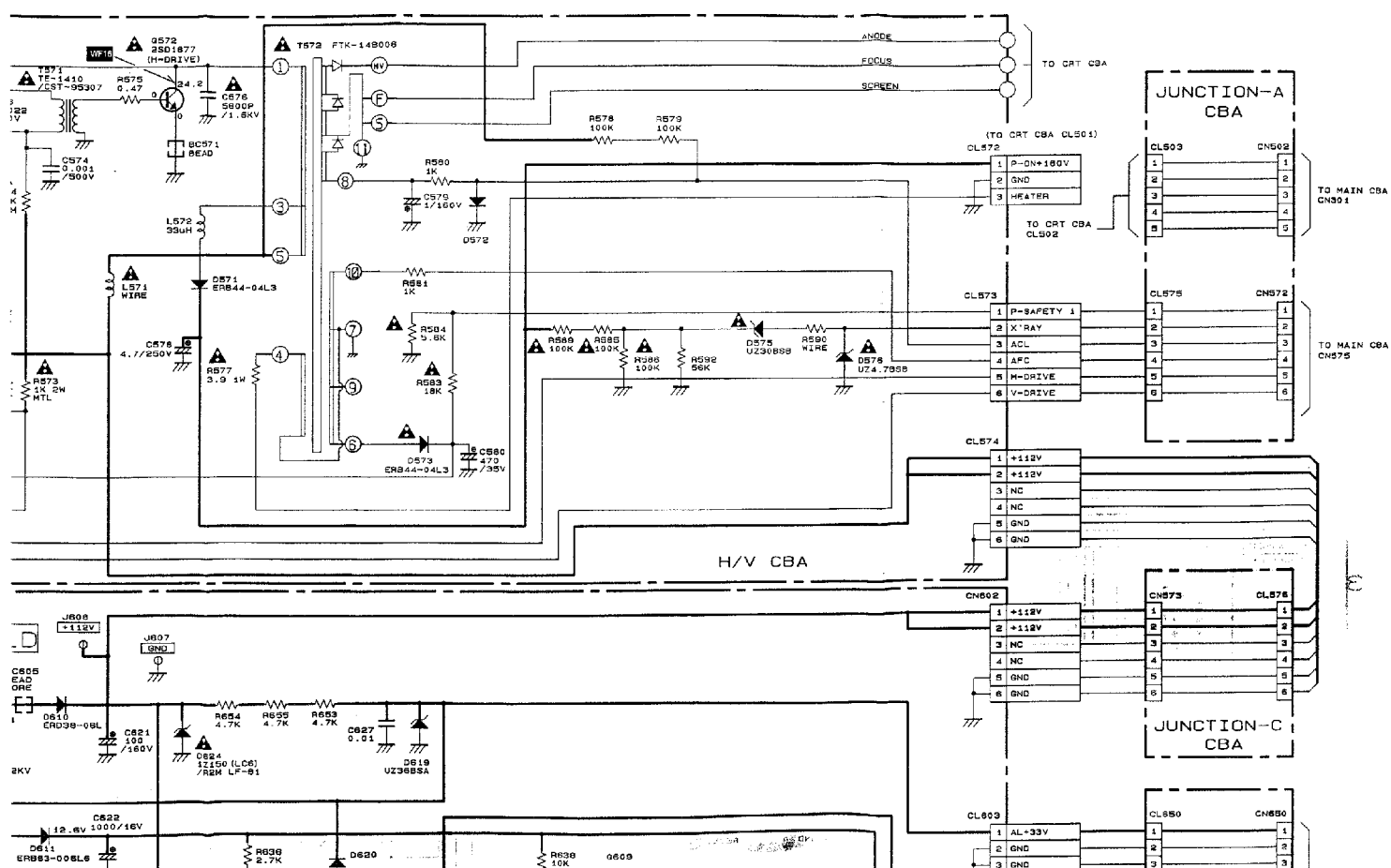


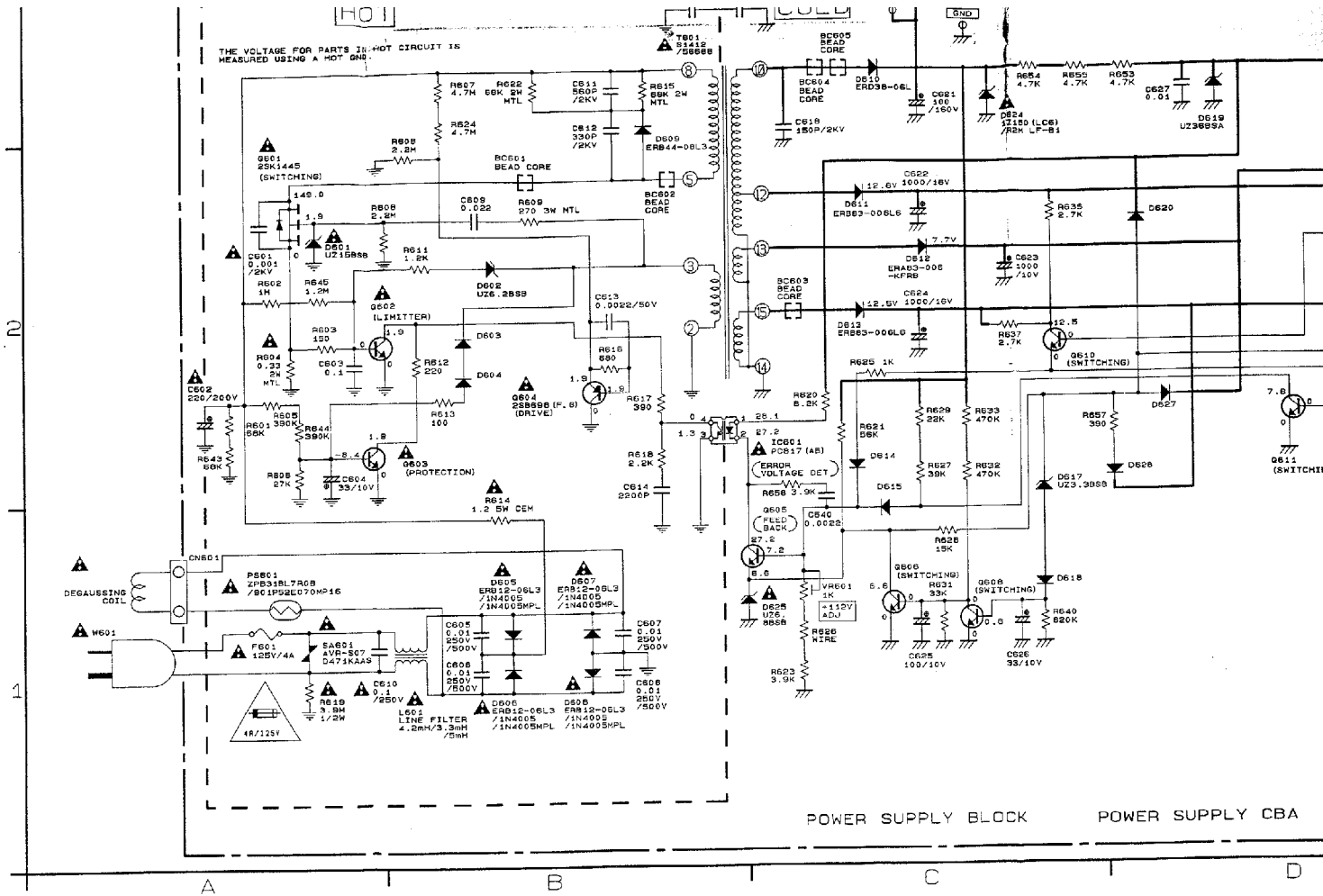
HOT

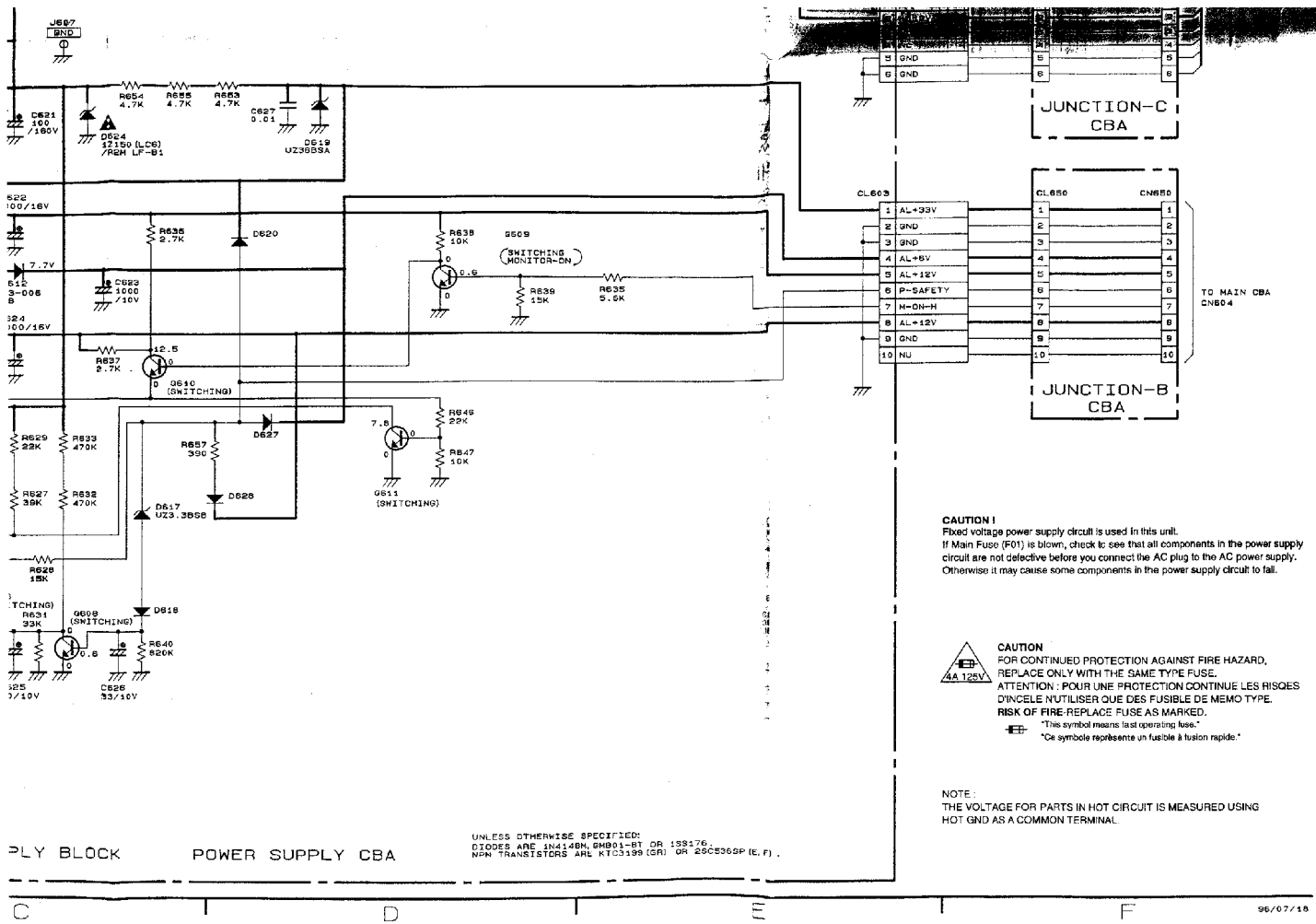
THE VOLTAGE FOR PARTS IN HOT CIRCUIT IS MEASURED USING A HOT GND.

COLD

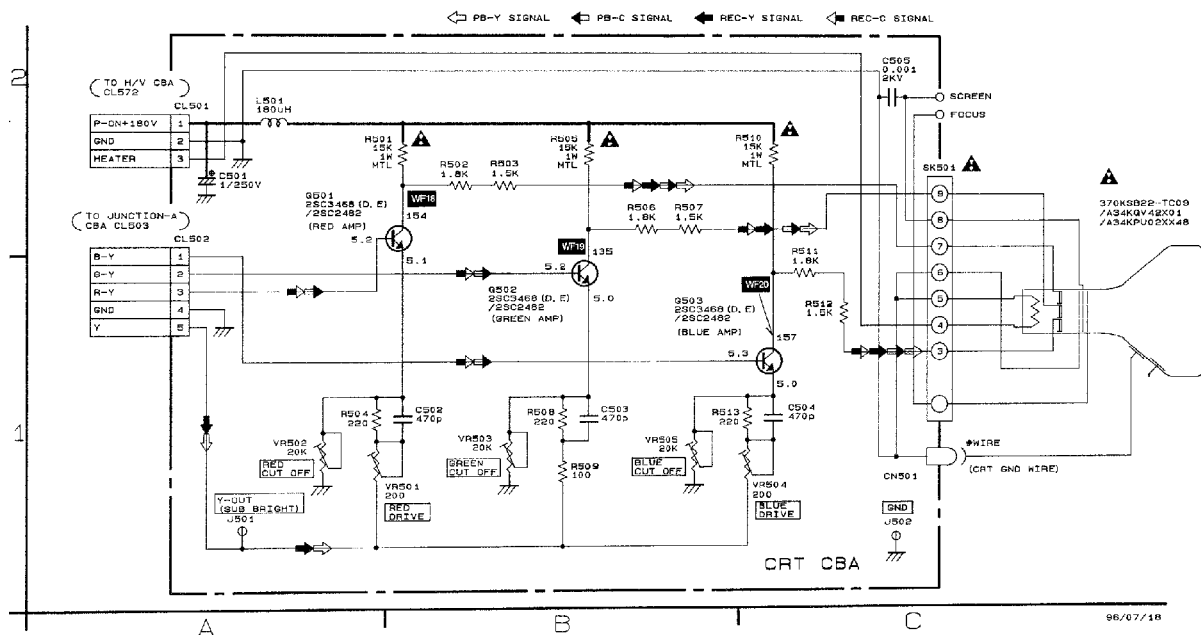
J807
GND



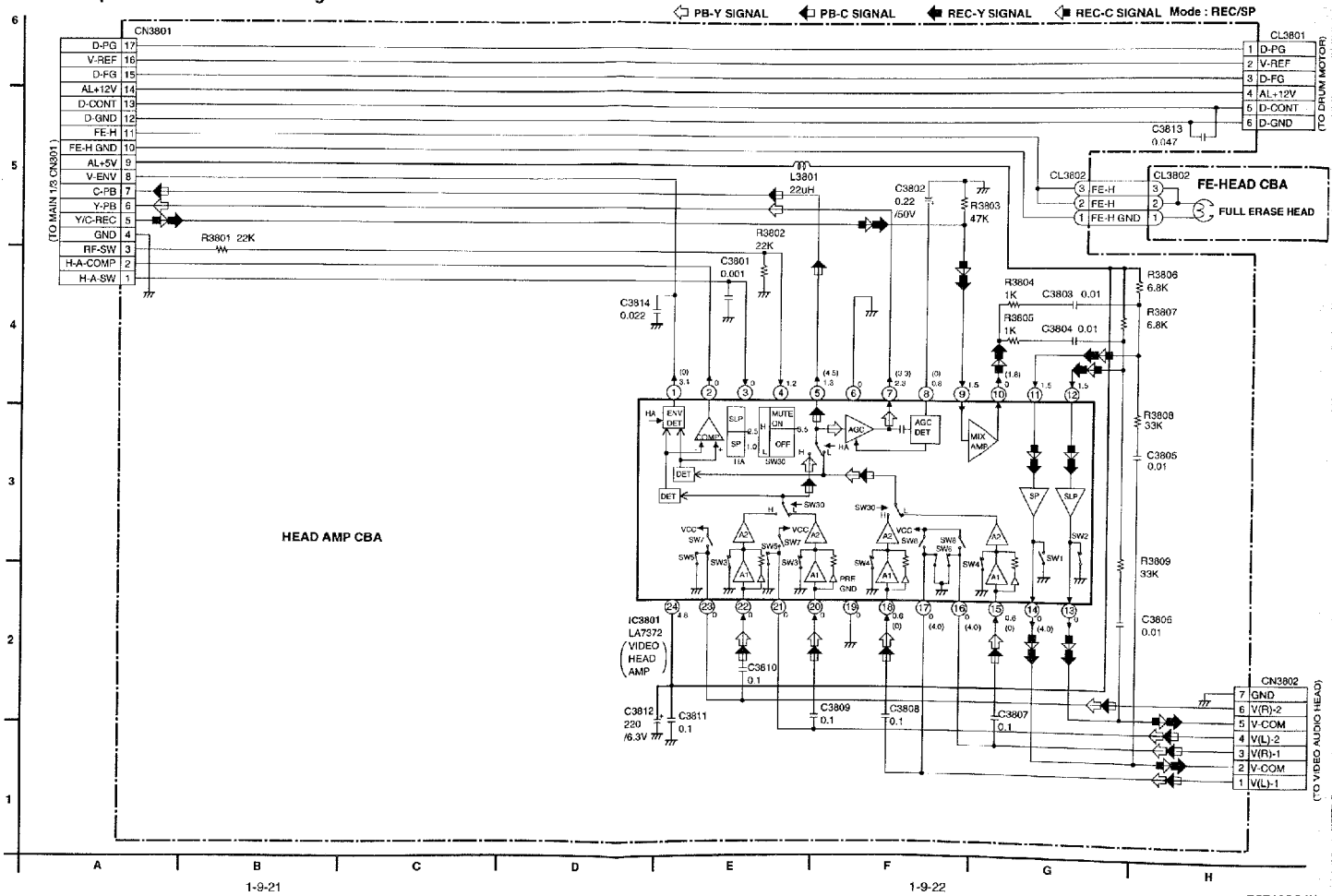




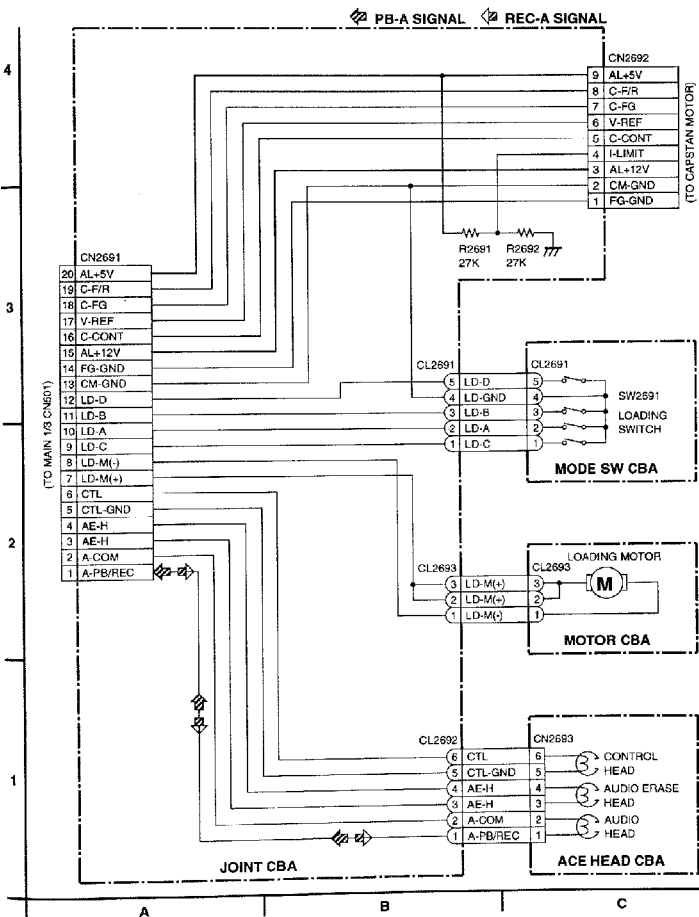
CRT Schematic Diagram

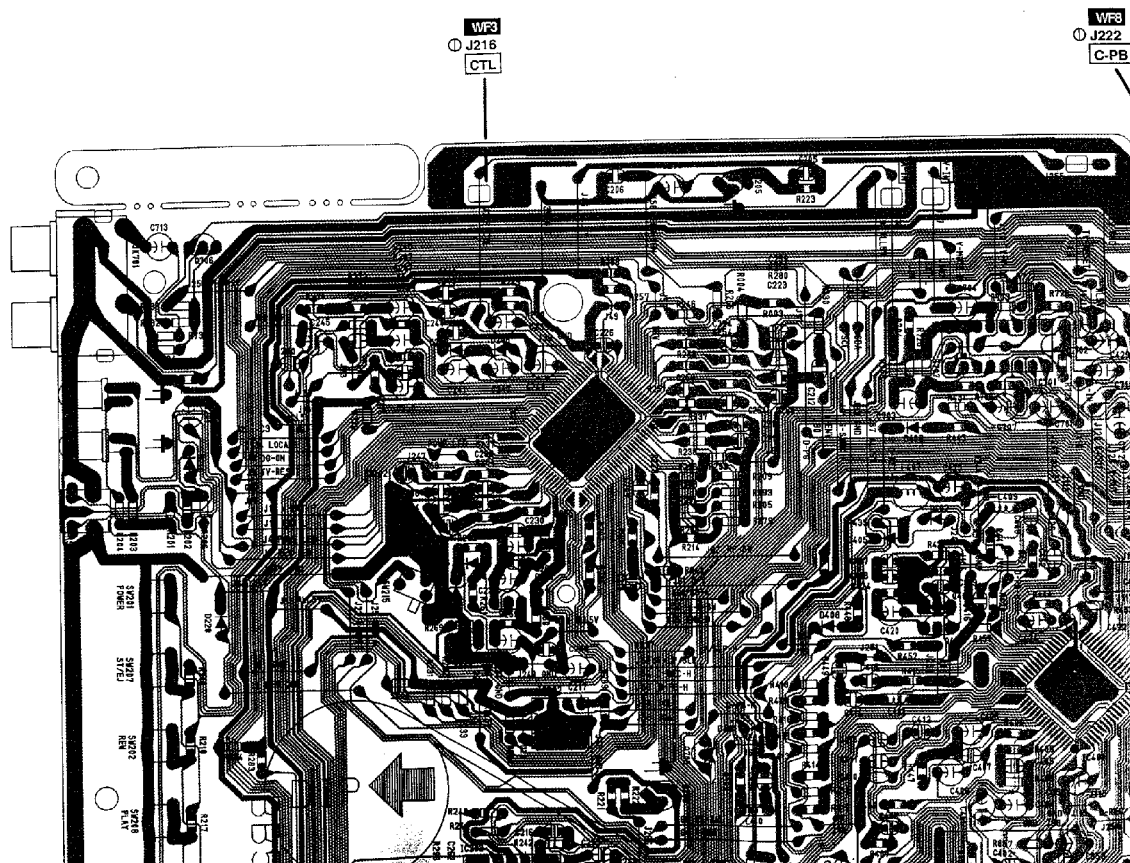


Head Amp/FE-Head Schematic Diagram



Joint/Mode Sw/Ace Head/Motor Schematic Diagram



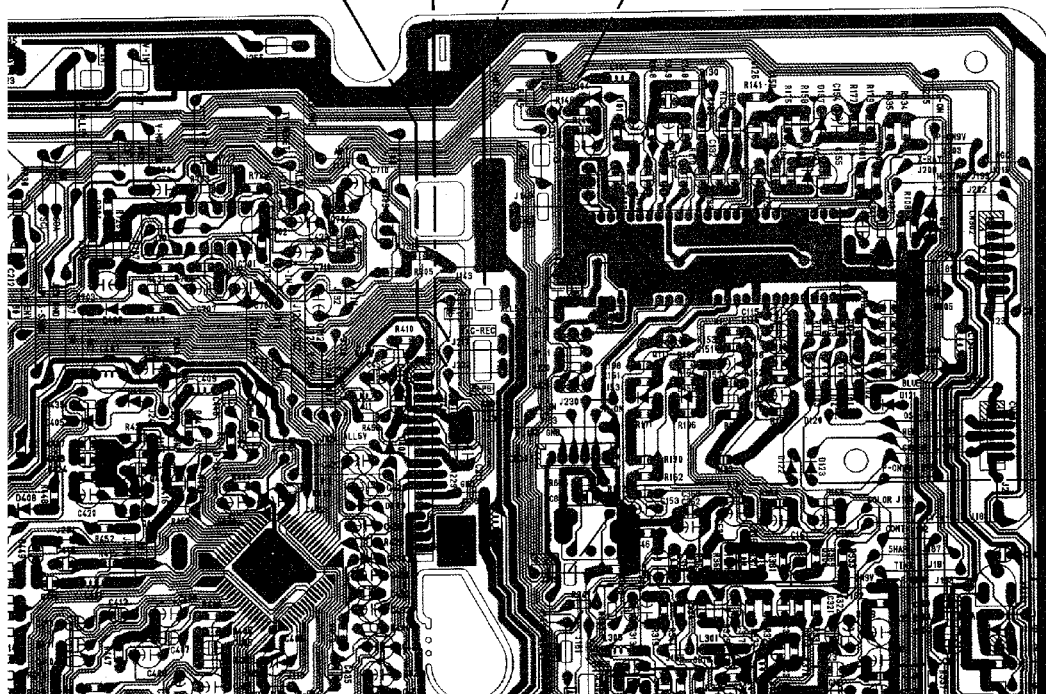


WF8
J222
C-PB

WF7
J217
Y/C REC

WF1
J221
RF SW

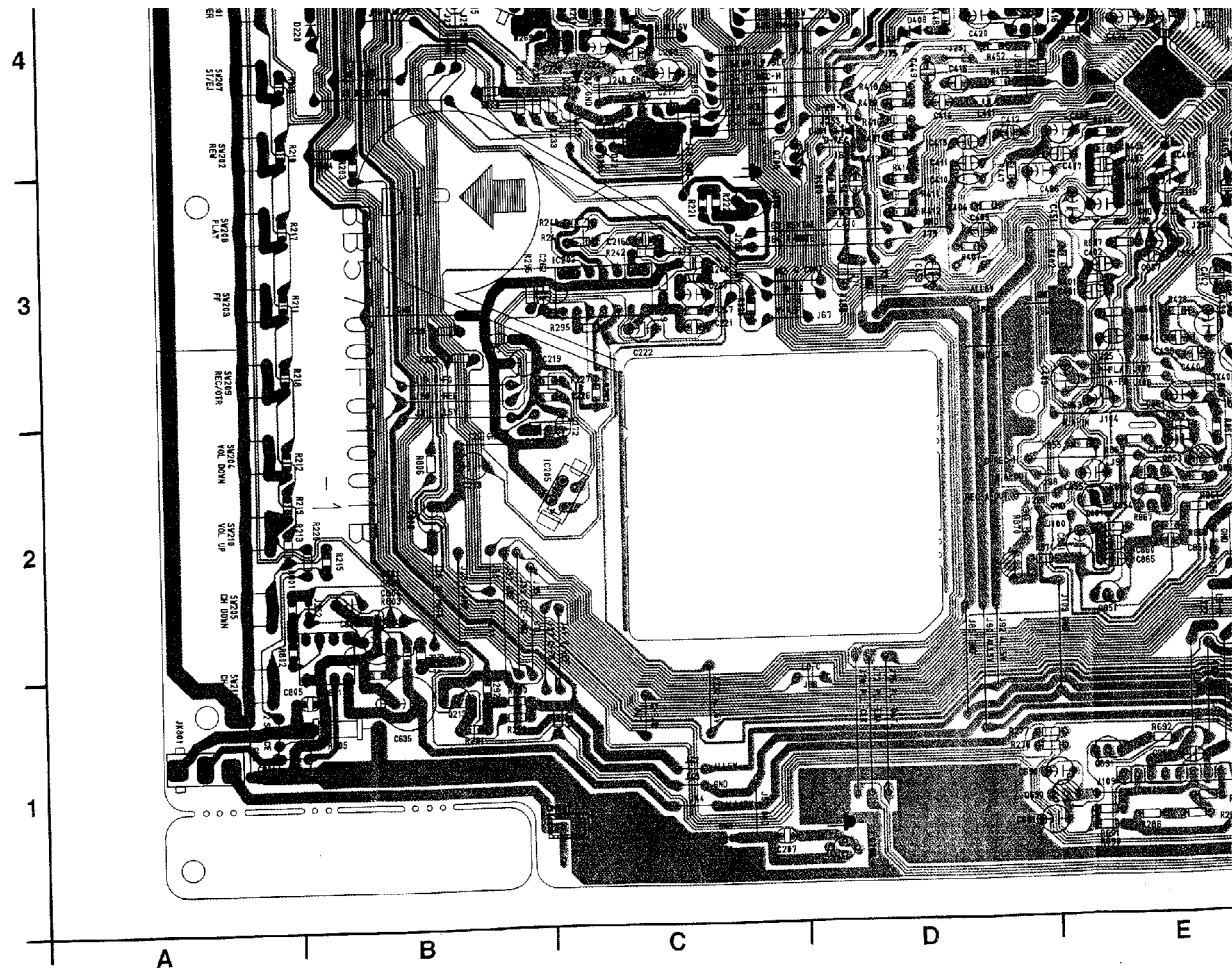
WF5
J157
V-OUT

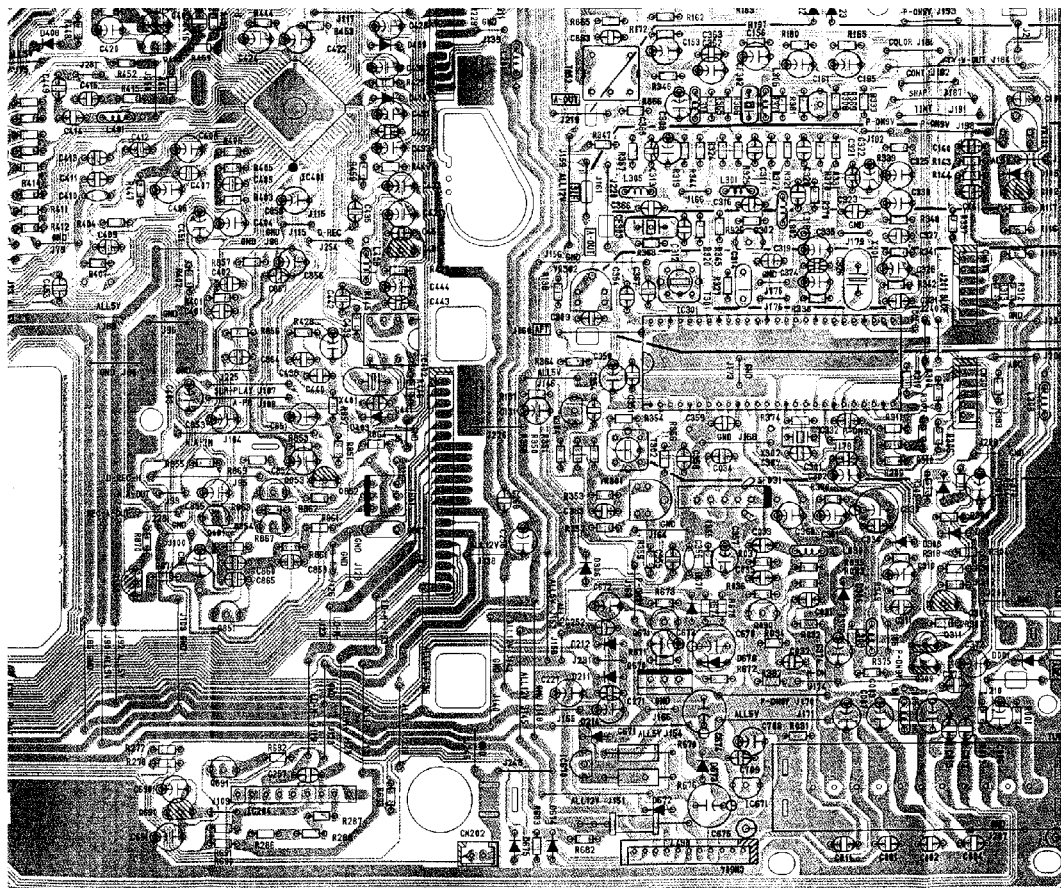


J219
A-OUT

J161
SIF

J220
A-OUT (NOT USED)

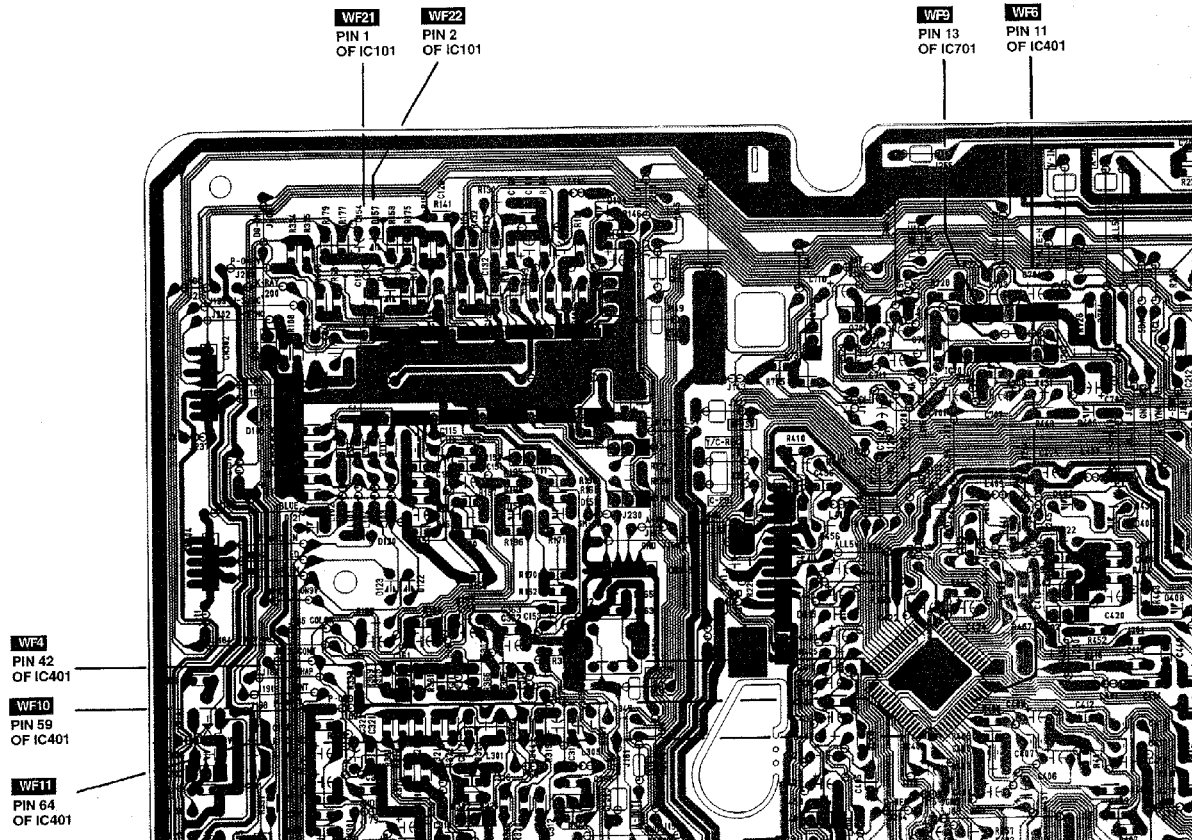




- ⊙ J219
A-OUT
- ⊙ J161
SIF
- ⊙ J220
A-OUT (NOT USED)
VR302
H. SHIFT
- T301
VCO
- ⊙ J204
GND
- ⊙ J160
AFT
- T302
SIF
- ⊙ J210
AGC

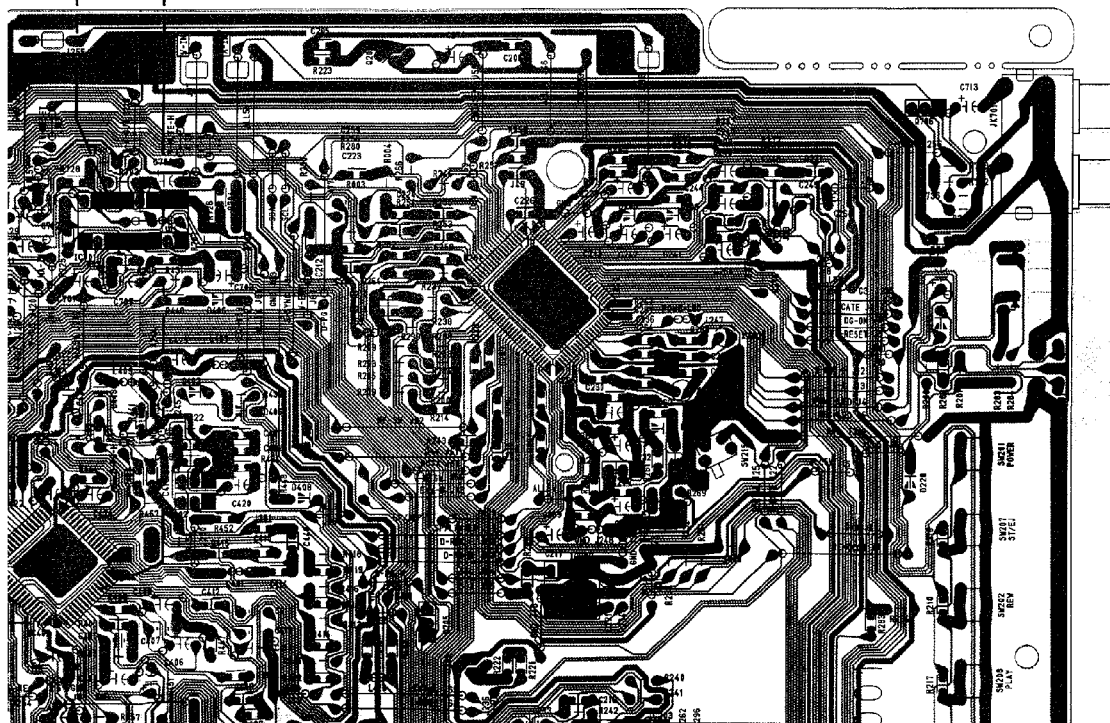
D E F G H

Main CBA Bottom View



WFB
PIN 13
OF IC701

WFB
PIN 11
OF IC401



6

5

4

WF4
PIN 42
OF IC401

WF10
PIN 59
OF IC401

WF11
PIN 64
OF IC401

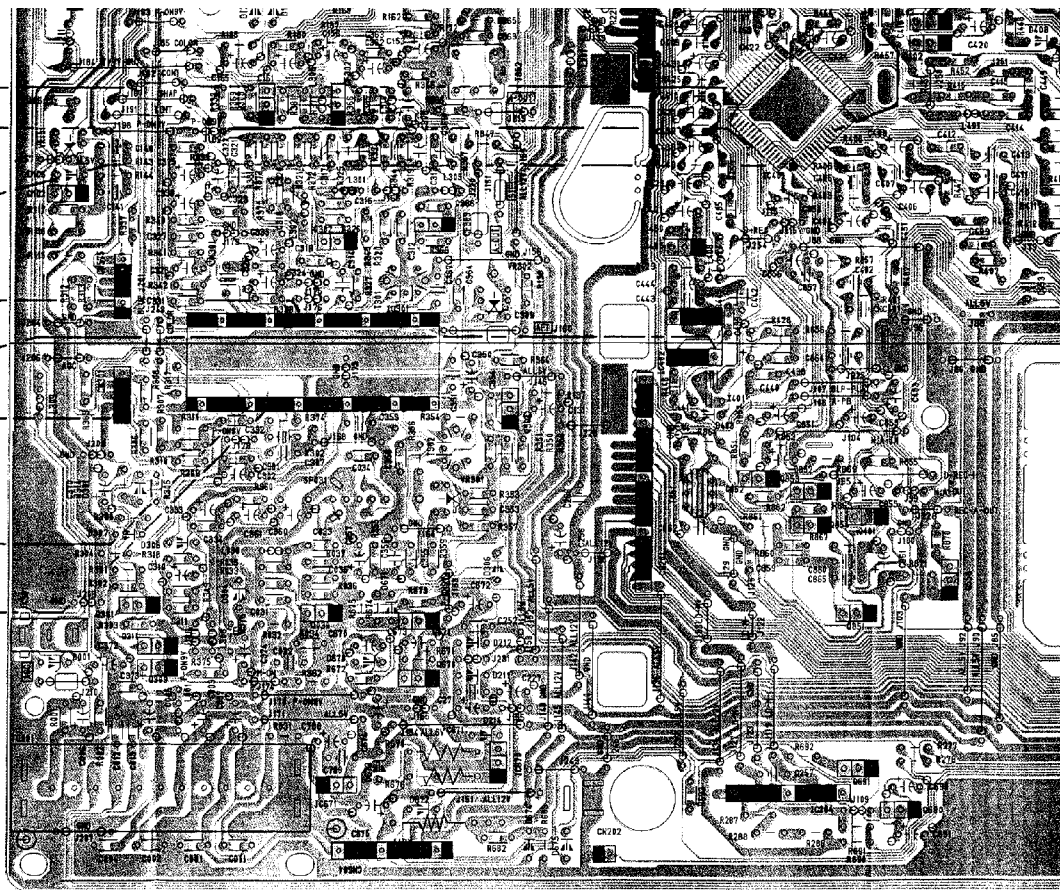
WF12
PIN 38
OF IC301

WF2
PIN 5
OF IC402

WF15
PIN 5
OF IC301

WF14
PIN 20
OF IC301

WF13
PIN 18
OF IC301



H

G

F

E

D

Power Supply CBA Top View

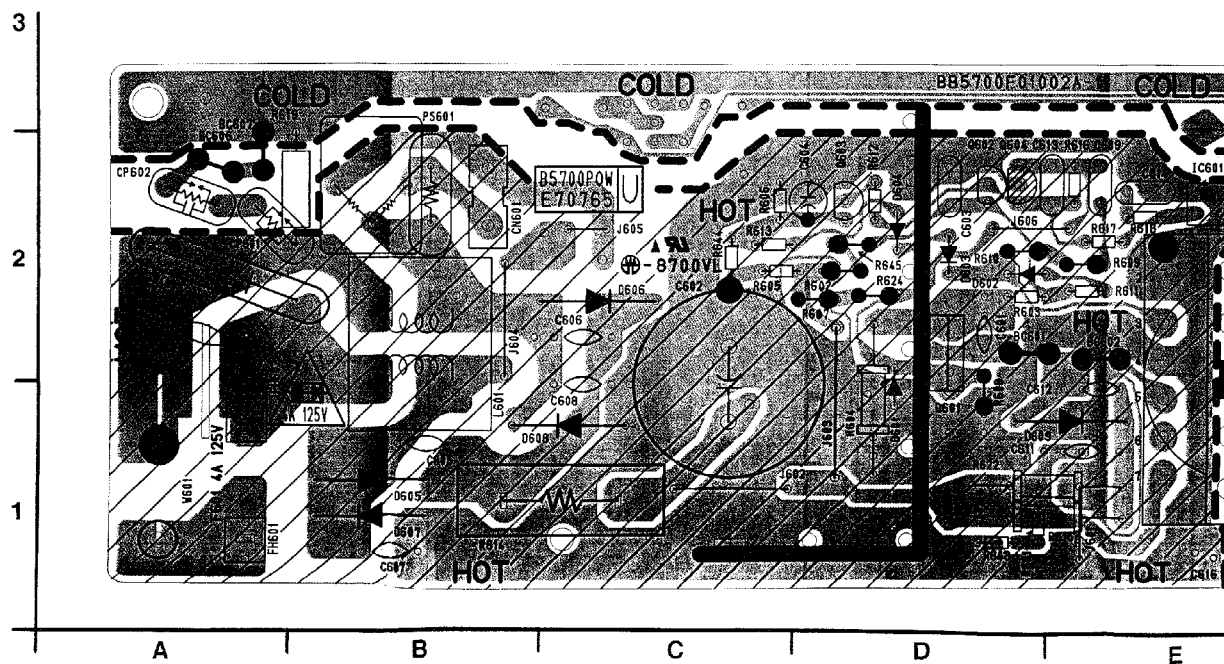
NOTE:
THE VOLTAGE FOR PARTS IN HOT CIRCUIT IS MEASURED USING
HOT GND AS A COMMON TERMINAL.



CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCENDIE N'UTILISER QUE DES FUSIBLES DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

 "This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

BECAI
SUPPL
ALSO,
SLOW
CIRCU



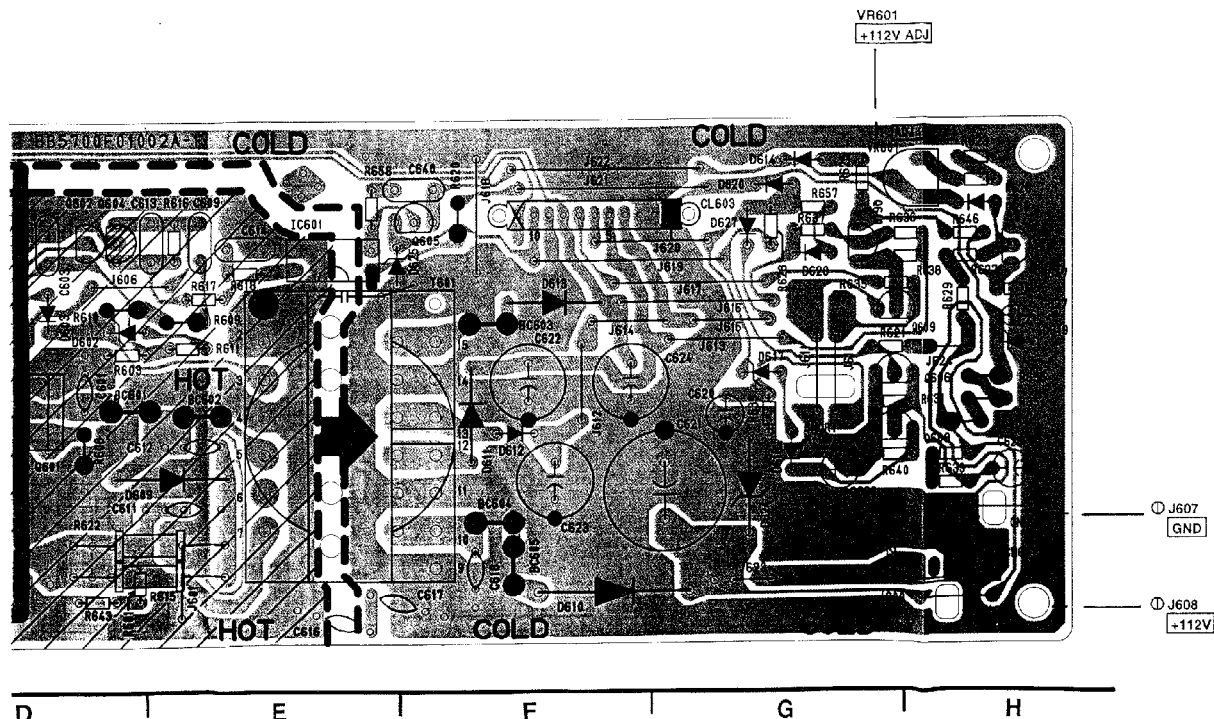
Power Supply CBA Bottom View

RE HAZARD,
 E.
 ITINUE LES RISQUES
 : MEMO TYPE.

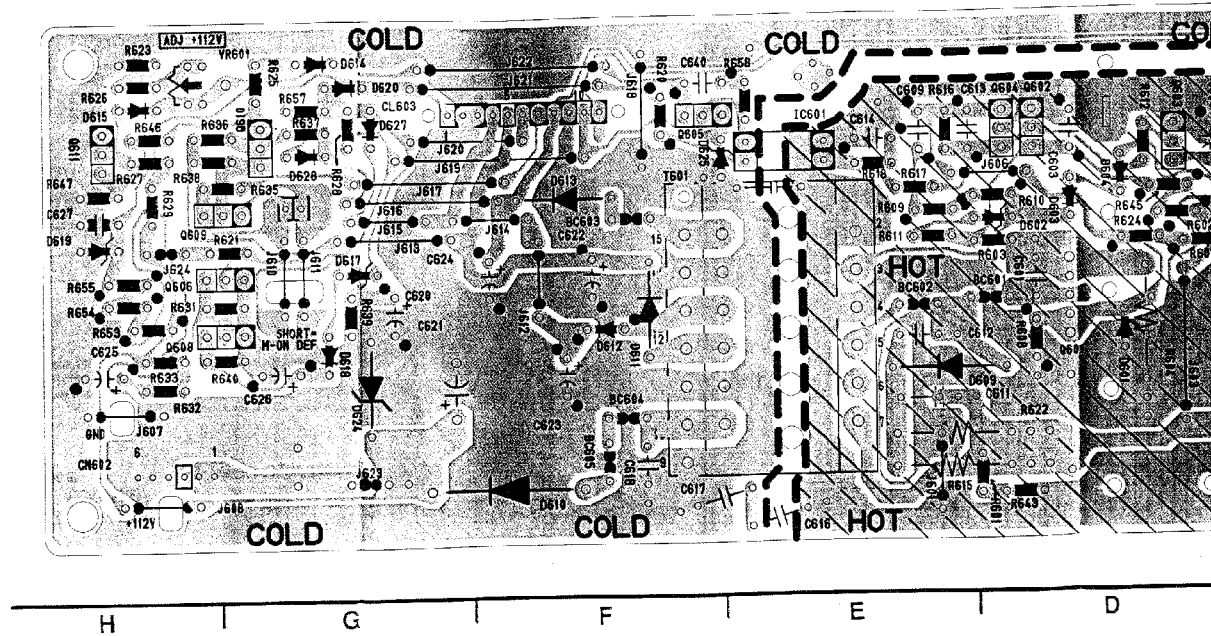
BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER
 SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED.
 ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT
 SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY
 CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

CAUTION:
 Fixed voltage power supply circuit is used in this unit.
 If Main Fuse (FD1) is blown, check to see that all components in the power supply
 circuit are not defective before you connect the AC plug to the AC power supply.
 Otherwise it may cause some components in the power supply circuit to fail.

rapid

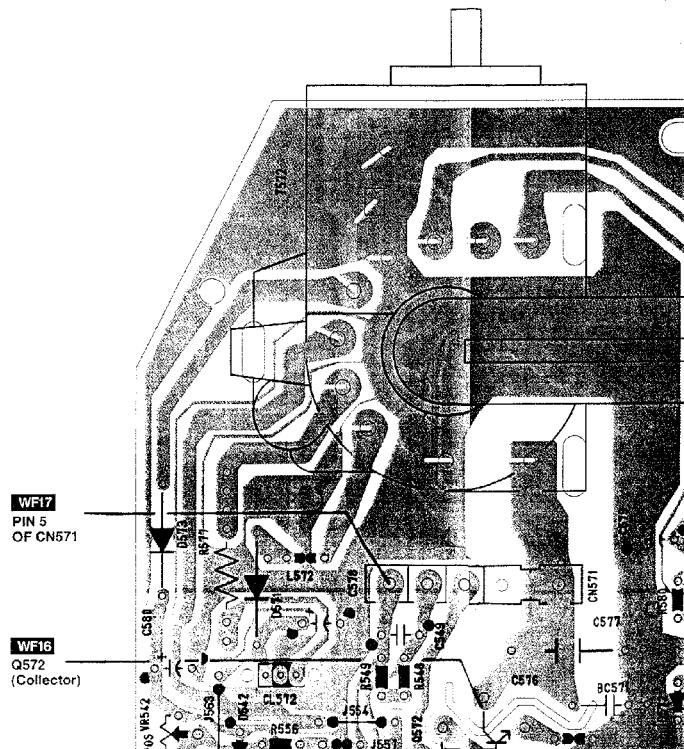
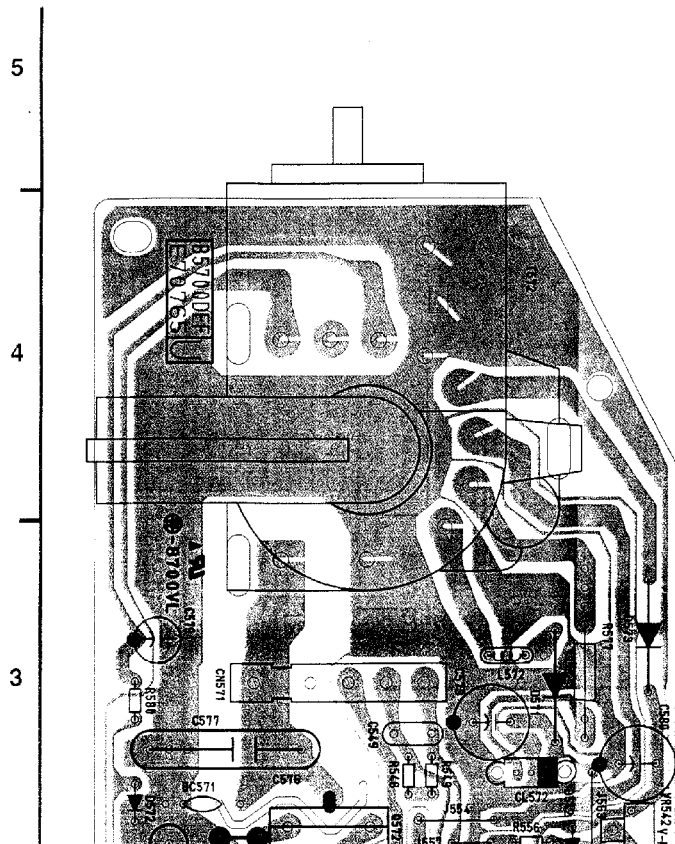


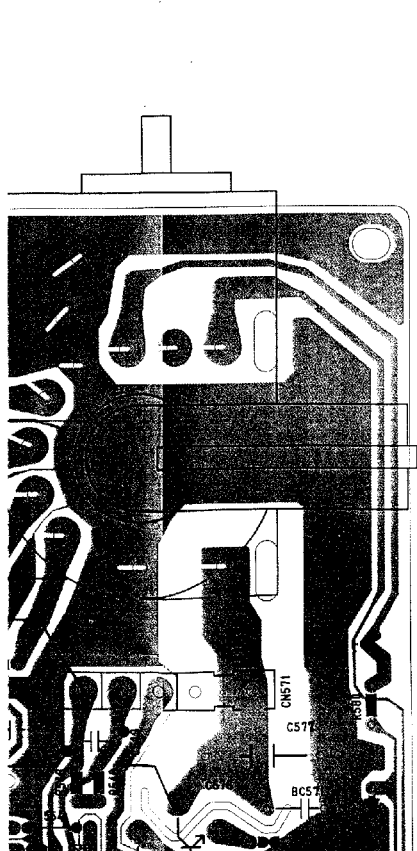
Power Supply CBA Bottom View



H/V CBA Top View

H/V CBA Bottom View

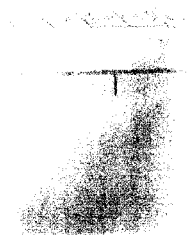




5

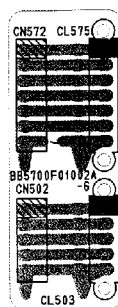
4

3



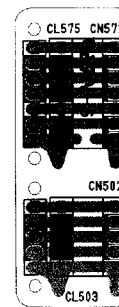
Junction A CBA Top View

5



4

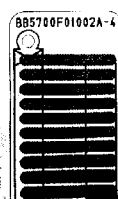
Junction A CBA Bottom View



BB5700F01002A-6

Junction B CBA Top View

3



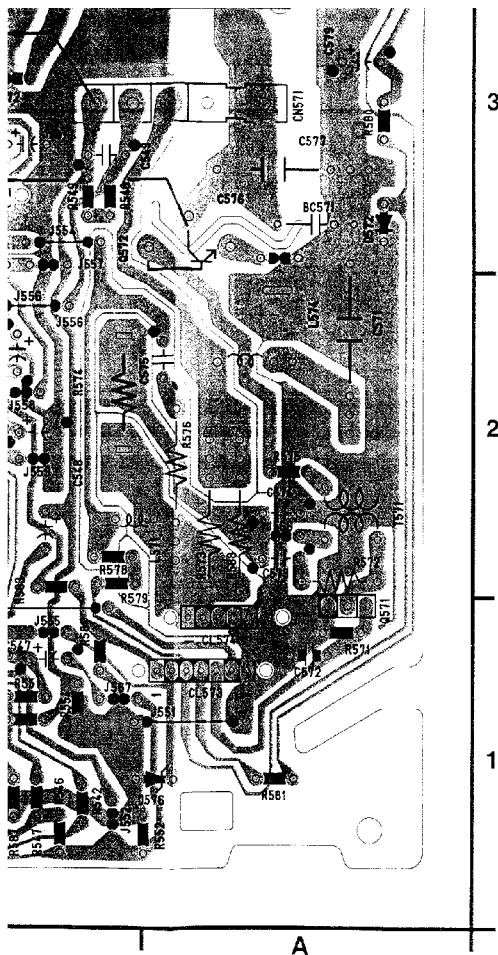
2

Junction B CBA Bottom View



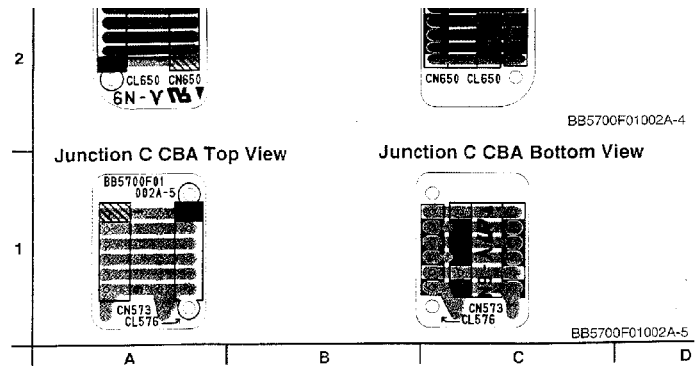
Jt

1



BB5700F01002A-2

1-9-38



1-9-39

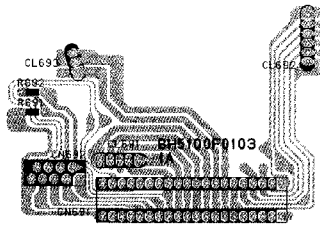
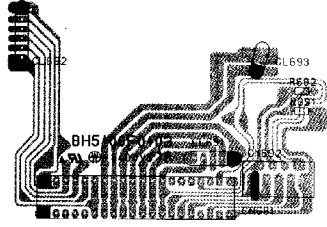
CRT CBA Bottom View



Note: The digit "2" is abbreviated in a reference number screened on CBAs listed above. For example, CL692 on CBA is in fact CL2692.

Joint CBA Top View

Joint CBA Bottom View



BH5100F0103-1A

Mode Sw CBA Top View

Mode Sw CBA Bottom View



BH5100F0103-1B

Ace Head CBA Top View

Ace Head CBA Bottom View



BH5100F0103-1C

Motor CBA Top View

Motor CBA Bottom View



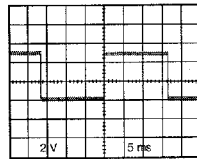
BH5100F0103-1D

A B C D

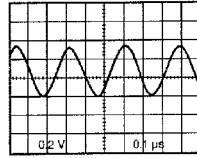
WAVEFORMS

WAVEFORM NOTES

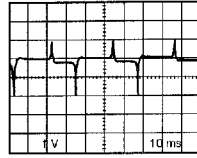
INPUT: NTSC COLOR BAR SIGNAL
OTHER CONTROLS : CENTER POSITION
SHOWING VOLTAGES ARE RANGE OF
OSCILLOSCOPE SETTING



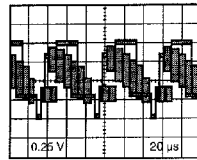
WF1 MAIN 1/3 SCHEMATIC DIAGRAM
J221 RF SW



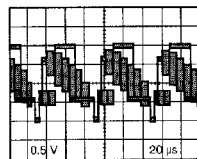
WF2 MAIN 2/3 SCHEMATIC DIAGRAM
IC402 PIN 5



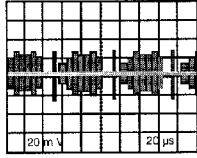
WF3 MAIN 1/3 SCHEMATIC DIAGRAM
J216 CTL



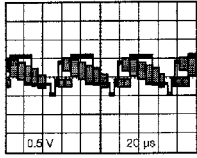
WF4 MAIN 2/3 SCHEMATIC DIAGRAM
IC401 PIN 42



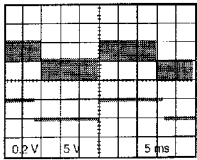
WF5 MAIN 2/3 SCHEMATIC DIAGRAM
J157 V-OUT



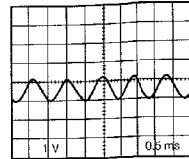
WF6 MAIN 2/3 SCHEMATIC DIAGRAM
IC401 PIN11



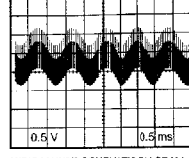
WF7 MAIN 2/3 SCHEMATIC DIAGRAM
J217 V/C REC



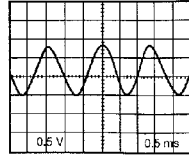
Upper: WF8 Lower: WF1
MAIN 2/3 SCHEMATIC DIAGRAM J222 C-PB



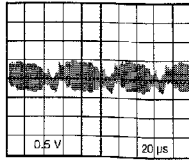
WF9 MAIN 2/3 SCHEMATIC DIAGRAM
IC701 PIN 13



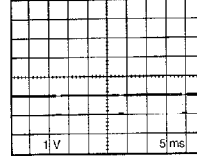
WF10 MAIN 2/3 SCHEMATIC DIAGRAM
IC401 PIN 59



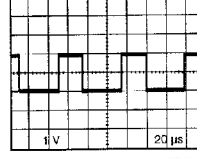
WF11 MAIN 2/3 SCHEMATIC DIAGRAM
IC401 PIN 64



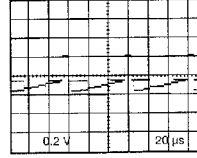
WF12 MAIN 3/3 SCHEMATIC DIAGRAM
IC301 PIN 38



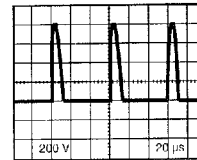
WF13 MAIN 3/3 SCHEMATIC DIAGRAM
IC301 PIN 18



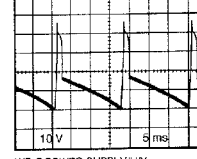
WF14 MAIN 3/3 SCHEMATIC DIAGRAM
IC301 PIN 20



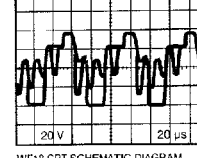
WF15 MAIN 3/3 SCHEMATIC DIAGRAM
CN301 PIN 5



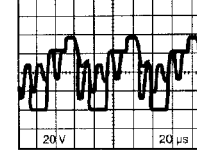
WF16 POWER SUPPLY/HV
SCHEMATIC DIAGRAM Q572 COLLECTOR



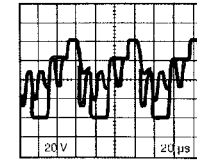
WF17 POWER SUPPLY/HV
SCHEMATIC DIAGRAM QN571 PIN 5



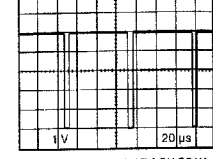
WF18 CRT SCHEMATIC DIAGRAM
Q501 COLLECTOR



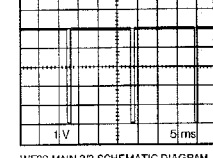
WF19 CRT SCHEMATIC DIAGRAM
Q502 COLLECTOR



WF20 CRT SCHEMATIC DIAGRAM
Q503 COLLECTOR

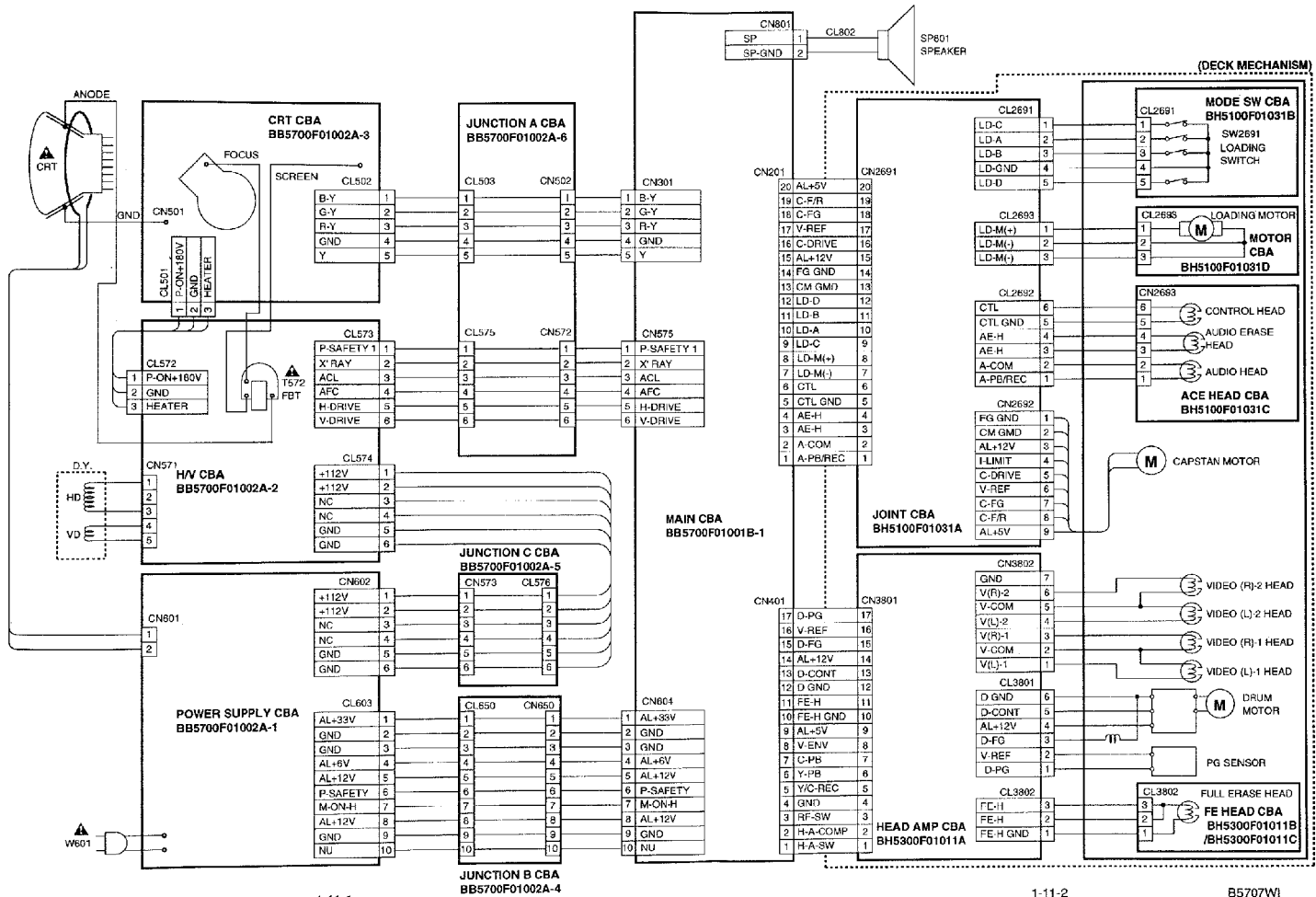


WF21 MAIN 3/3 SCHEMATIC DIAGRAM
IC101 PIN 1



WF22 MAIN 3/3 SCHEMATIC DIAGRAM
IC101 PIN 2

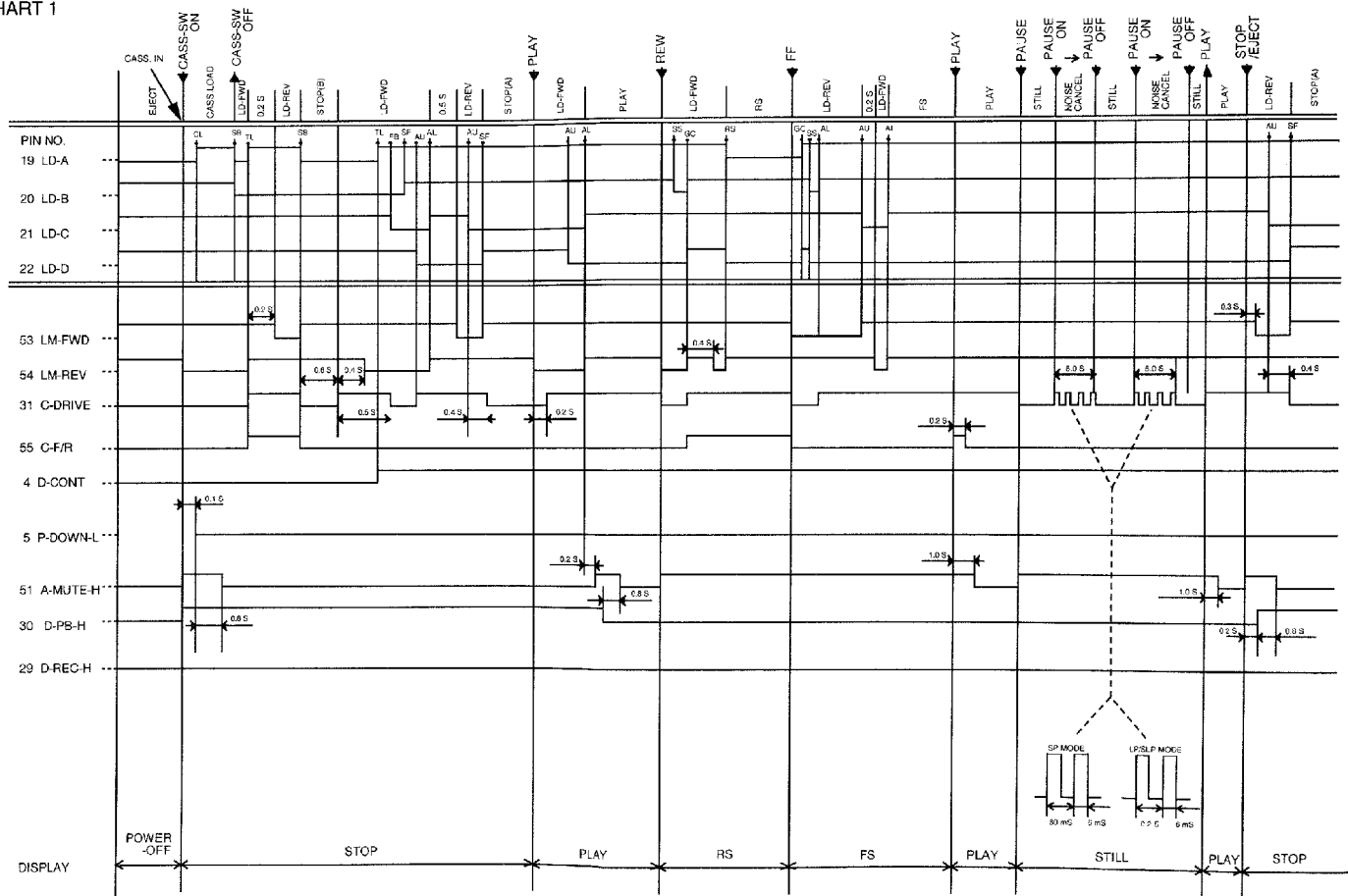
WIRING DIAGRAM



SYSTEM CONTROL TIMING CHARTS

CHART 1

1. EJECT → CASS. IN → STOP(B) → STOP(A) → PLAY → RS → FS → PLAY → STILL → PLAY → STOP(A)



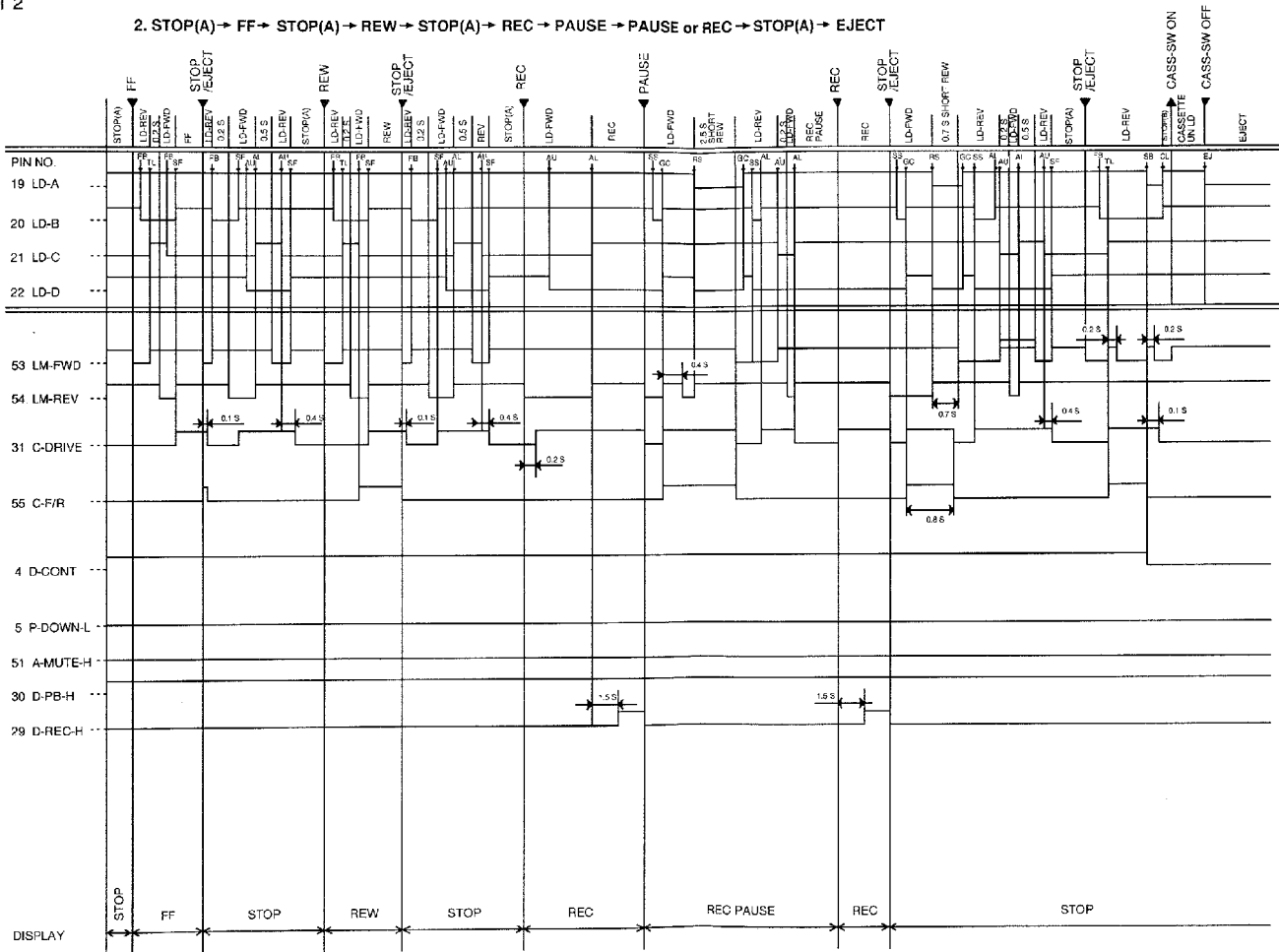
1-12-1

1-12-2

B5705T

CHART 2

2. STOP(A) → FF → STOP(A) → REW → STOP(A) → REC → PAUSE → PAUSE or REC → STOP(A) → EJECT



IC PIN FUNCTION DESCRIPTION

IC101 (TV Micro Computer)

Pin No.	In/Out	Signal Name	Function	Active Level
1	In	H-SYNC	Horizontal Synchronized Pulse Input	L
2	In	V-SYNC	Vertical Synchronized Pulse Input	L
3		X-RAY	X-Ray Protection	
4			Not Used	
5			Not Used	
6			Not Used	
7		P-SAFETY	Power Protection 1	
8		P-SAFETY 2	Power Protection 2	
9			Not Used	
10			Not Used	
11	Out	SHARP-NESS	Sharpness Control	
12	Out	TINT	Tint Control	
13	Out	AGC OUT	AGC Out for Adj.	
14	In	S-IN	Serial Input	
15			Not Used	
16	Out	S-OUT	Serial Out	
17	In	S-CLK	Serial Clock	
18		AL +5V	All 5V	
19		HLF	HLF	
20	In	RVCO	RVCO	
21	Out	V-HOLD	VHOLD	
22	In	C-VIDEO	Composite Vide Sync	
23		GND		
24	In	XIN	Oscillator Input	
25	Out	XOUT	Oscillator Output	
26		GND	Ground	
27		AL+5V	All 5V	
28			Not Used	
29			Not Used	
30	In	RESET	System Reset Signal	
31			Not Used	
32			Not Used	
33			Not Used	
34		N U	Not Used	
35		N U	Not Used	
36		N U	Not Used	
37			Not Used	
38			Not Used	
39			Not Used	

Pin No.	In/Out	Signal Name	Function	Active Level
40		NU	Not Used	H
41			Not Used	
42		SERVICE	Service Output	
43			Not Used	
44			Not Used	
45	Out	COLOR	Color Control	PWM
46	Out	VOLUME	Volume Control	PWM
47	Out	CONTRAST	Contrast Control	PWM
48	Out	BRIGHT	Bright Control	PWM
49	Out	OUT	Picture Cut Signal	H
50	Out	B	Signal (Blue) Out	H
51	Out	G	Signal (Green) Out	H
52	Out	R	Signal (Red) Out	H

IC201 (VCR-MICRO COMPUTER)

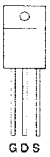
Pin No.	In/Out	Signal Name	Function	Active Level
1	In	BPS	Auto Clock Detection	H/L
2		S-S		
3	Out	C-CONT	Capstan Motor Control Signal	PWM
4	Out	D-CONT	Drum Motor Control Signal	PWM
5	In	P-DOWN	Power Down Detection Input	L
6		GND		
7		JOG		
8		VCR +		
9	In	IS31	IS31 On/Off Detection	H/L
10	In	REEL	Reel Pulse Input	H/L
11	In	TUNER	Tuner Judgement	H/L
12	In	REMOCON	Remote Control Input	L
13	Out	RF-SW	RF-SW Output	H/L
14		GND		
15	Out	D-V SYNC	Dummy V-sync Output	H
16	Out	ROTA	Rota Output	H/L
17		N U	Not Used	
18		N U	Not Used	
19		GND		
20	In	LD-A	Loading Position Detector	H/L
21	In	LD-B	Loading Position Detector	H/L

Pin No.	In/Out	Signal Name	Function	Active Level
21	In	LD-C	Loading Position Detector	H/L
22	In	LD-D	Loading Position Detector	H/L
23	Out	SDA	E2PROM DATA	L
24	Out	SCL	E2PROM CLOCK	L
25		GND		
26		T+5V	T+5V In	
27	Out	LP/SLP-H	Tape Speed LP or SLP mode="H" Output	H
28	Out	SLP-H	Tape speed SLP mode="H" Output	H
29	Out	D-REC-H	D-REC Output	H
30	Out	D-PB-H	D-PB Output	H
31	Out	C-DRIVE	Capstan Drive Output	
32	Out	P-ON-L	P-ON Output	
33	Out	TRICK H	Special Playback at "H"	H
34		GND		
35		GND		
36		GND		
37	In	RESET	System Reset Signal (Usually = "H" / Reset="L")	L
38	In	X in	Oscillator Input	
39	Out	X-Out	Oscillator Output	
40		GND		
41		GND		
42	In	XC in	Oscillator C Input	
43	Out	XC out	Oscillator C Output	
44	Out	REC-LED	REC-LED	L
45	Out	REC-LED	REC-LED	L
46		N U	Not Used	
47		N U	Not Used	
48		N U	Not Used	
49	Out	EXT-L	EXT-Selection Output	L
50	Out	V-MUTE H	V-MUTE Output	H
51	Out	A-MUTE -H	Audio Mute Output (Mute="H")	H
52		SP-MUTE	Speaker Mute Output	H
53	Out	LM-FWD	LD-FWD Output	H
54	Out	LM-REW	LD-REW Output	H
55	Out	C-F/R	Capstan Direction Output	H/L
56	In	REC-SAFETY	Cass. Tab Detection	L
57		N U	Not Used	
58		N U	Not Used	
59		N U	Not Used	
60	In	M-ON-H	Monitor On	H

Pin No.	In/Out	Signal Name	Function	Active Level
61	In	TV-RESET	TV MICRO Reset	L
62	Out	SPOT-KILL		L
63		N U	Not Used	
64		N U	Not Used	
65		AL +5V	AMP Power Supply	
66	In	D-PG	Drum Pulse Generator Input	
67	In	D-FG	Drum Frequency Generator Input	
68	In	C-FG	Capstan Frequency Generator Input	
69	Out	AMP V-REF OUT	AMPVREF Out	
70	In	AMP V-REF IN	AMPVREF In	
71	In	CLAMP.F	CLAMPForward	
72	In	CLAMP.R	CLAMPReverse	
73	Out	CTL AMP OUT	CTLAMP Out	
74		AMP C	AMPC	
75	In	CTLAMP IN	CTLAMP In	
76	Out	CTL SW OUT	CTL+SWOUT	L
77	In	CTL (+)	CTL (+)	
78	In	CTL (-)	CTL (-)	
79		GND		
80		GND		
81		T+5V	T+5V	
82		AL +5V	All +5V	
83		C		
84		GND		
85	In	KEY0	KEY0 Input	A/D
86	In	KEY1	KEY1 Input	A/D
87	In	AFT	AFT Input	A/D
88	In	AGC	AGC Input	
89	In	END-SENS	END-SENS Input	A/D
90		N U	Not Used	
91	In	ST-SENS	STS-SENS Input	A/D
92	In	V-ENV	V-ENV Input	A/D
93	In	V-SYNC	V-SYNC Input	H
94	Out	S-OUT	Serial Data Output	H
95	In	S-IN	Serial Data Input	L
96	Out	S-CLK	Serial Clock Output	L
97		PB-L	A-Mute Output	L
98	Out	PLL-ATA	SCL/PLL-Data Output	H
99	Out	PLL-ENA	SDA/PLL-ENA Output	H
100	Out	PLL-CLK	PLL-CLK Output	H

LEAD IDENTIFICATIONS

2SK1445



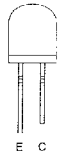
G: Gate
D: Drain
S: Source

2SD2331



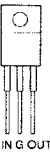
E: Emitter
C: Collector
B: Base

PT380FAB



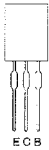
E C

AN7806



IN G OUT

KRC101M
KRA103M
KRC103M
2SC2839

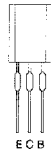


E C B

KTA1275



E C B



E C B

2SC2271
2SC3400
2SC3468
2SC3000
KTA1267
KTC3199
KRA103M
2SB698

DECK MECHANISM SECTION

13" TV/VCR COMBINATION TELEVISION

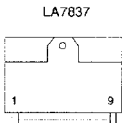
Model No. 13VR10B

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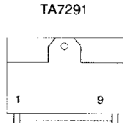
Standard Maintenance	2-1-1
Service Fixtures and Tools	2-2-1
Mechanical Alignment Procedures	2-3-1
Disassembly / Assembly Procedures of Deck Mechanism	2-4-1
Front Loading Assembly	2-4-9
Alignment Procedures of Mechanism	2-4-12



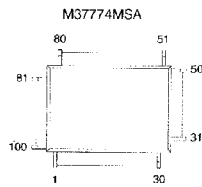
PC817



LA7837

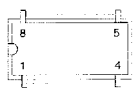


TA7291



M37774MSA

KIA6278P
X24C01AP



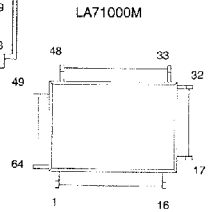
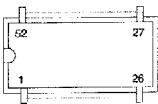
BA10324
LC89960



TC4053BC



M37263M3
M52339SP



LA71000M

STANDARD MAINTENANCE

Service Schedule of Components

H: Hours O: Check ●: Change

Deck		Periodic Service Schedule			
Ref. No.	Part Name	1,000 H	2,000 H	3,000 H	4,000 H
B2	Cylinder Assembly	○	●	○	●
B3	Loading Motor			●	
B6	Pinch Roller Arm Assembly		●		●
B8	Pulley Assembly		●		●
B21	Loading Belt		●		●
B27	Band Brake Assembly		●		●
B28	Main Brake S Assembly		●		●
B29	Main Brake T Assembly		●		●
B30	T Brake Arm Assembly		●		●
B31	ACE Head Assembly			●	
B32, B339	Reel Base Assembly			●	
B37	Capstan Motor		●		●
B52	Capstan Belt		●		●
B54	Ground Brush Assembly			●	
B73	FE Head CBA		●		●
B132	Clutch Assembly		●		●
B133	Arm Idler Assembly		●		●

Note:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

Cleaning

Cleaning of Video Head

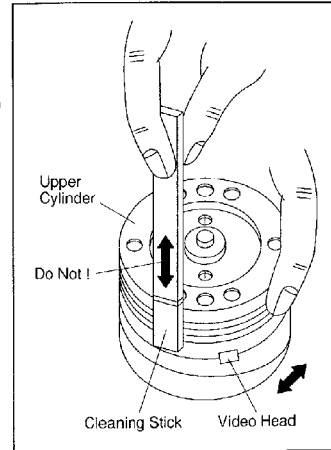
Clean the head with a head cleaning stick or chamois skin.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% isopropyl alcohol on the head cleaning stick or on the chamois skin and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois skin.



Cleaning of Audio Control Head

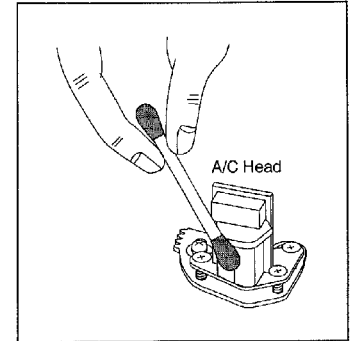
Clean the head with a cotton swab.

Procedure

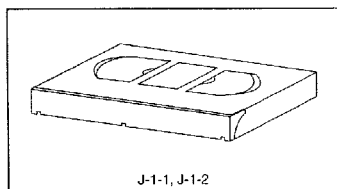
1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the audio control head. Be careful not to damage the upper drum and other tape running parts.

Notes:

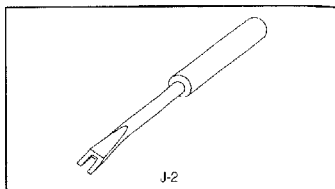
1. Avoid cleaning the audio control head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.



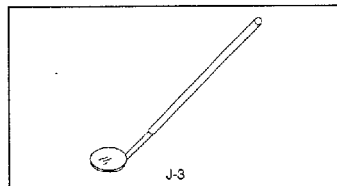
FIXTURE AND TAPE FOR ADJUSTMENT



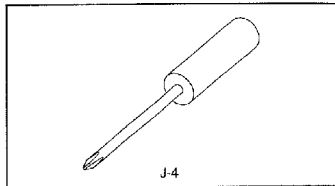
J-1-1, J-1-2



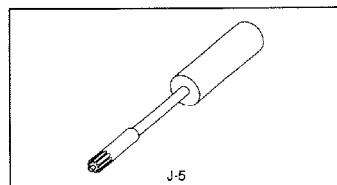
J-2



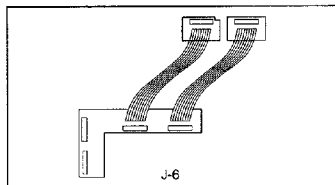
J-3



J-4



J-5



J-6

Ref. No.	Name	Part No.	Adjustment
J-1-1	Alignment Tape	FL8A	Electrical Adjustments
J-1-2	Alignment Tape	FL8NW	Azimuth and X Value Adjustment of Audio Control Head / Adjustment of Envelope Waveform
J-2	Guide Roller Adj. Screwdriver	FSJ-0006	Guide Roller
J-3	Mirror	FSJ-0004	Tape Transportation Check
J-4	Azimuth Adj. Screwdriver	Available Locally	A/C Head Height
J-5	X Value Adj. Screwdriver	FSJ-0007	X Value
J-6	Deck Extension Cable	N1091XA	All Mechanical and Electrical Adjustments

Note:

Before starting any adjustment, take the Deck Assembly out of the cabinet and use J-6 to connect the Deck Assembly with the Main CBA.

2-2-1

U13FIX4N

MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, tightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 until the cassette tape is fully loaded. By turning the Pulley Assembly, you are turning the cam indicated in this figure. However, movement of the cam will be very slow. Allow a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 to unload the cassette tape. When turning the Pulley Assembly, please be aware that this is a long process and the cassette will not start getting unloaded instantaneously. Within this long process, before the cassette actually starts getting unloaded, there is a time period during which the moving guide assemblies slide back to their original positions shown in Fig. M1. However, the tape will be left wound around the cylinder. To put the tape back into the cassette, gently turn the Capstan Motor in the direction shown in Fig. M2. Make sure that the tape is completely placed back in the cassette before the cassette starts getting unloaded. Otherwise the tape hanging out will be caught and damaged by the lid of the cassette when it closes. By turning the Pulley Assembly, you are turning the cam indicated in Fig. M1. As stated, movement of the cam will be very slow. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.

2. Remove the Top Cover.

3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

Top View

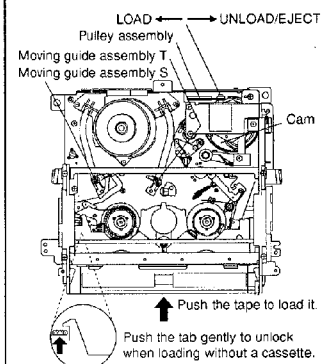


Fig. M1

Bottom View

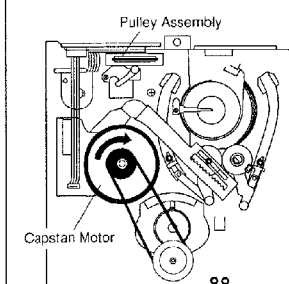


Fig. M2

2-3-1

U13MA4HN

1. Tape Interchangeability Alignment

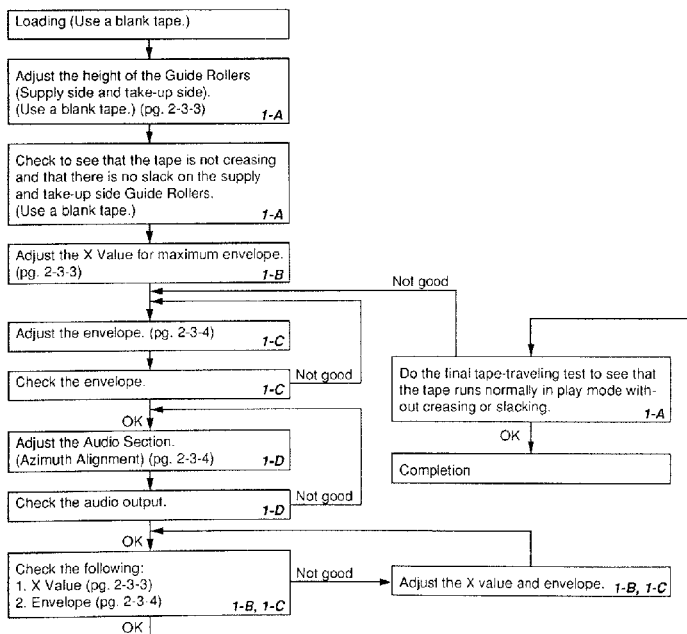
Note: To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 2-3-4, procedure 1-C, step 1.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (FL8NW)
Guide Roller Adj. Screwdriver
X-Value Adj. Screwdriver

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling



2-3-2

U13MA4HN

1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

Symptom of Misalignment:

If the tape runs unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Play back a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig M3 and M4.)

2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. M3 and M5.)

Note: Beneath each Guide Roller, there is a small screw. (Refer to Fig. M5.) This screw works to ap-

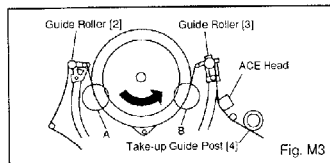


Fig. M3

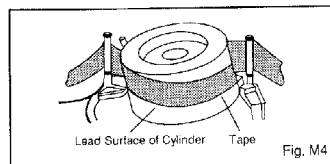


Fig. M4

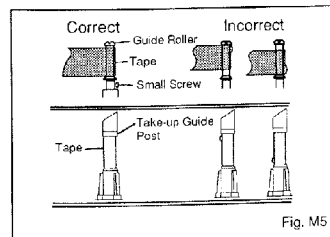


Fig. M5

ply adequate torque to the shaft of each Guide Roller so that the Guide Roller turns properly. Even when adjusting the height of the Guide Roller(s), do not touch these two small screws.

3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. M6)

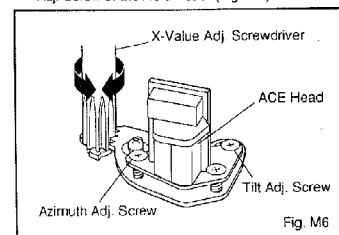


Fig. M6

1-B. X Value Alignment

Purpose:

To align the Horizontal Position of the Audio/Control/Erase Head.

Symptom of Misalignment:

If the Horizontal Position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Set the Tracking Control Circuit to the center position by pressing CH UP and DOWN buttons on VCR simultaneously. (Refer to note on page 2-3-4.)
2. Connect the oscilloscope to TP (C-PB) and TP (CTL) on the Main CBA. Use TP (RF-SW) as a trigger.
3. Play back the Gray Scale of the Alignment Tape (FL8NW) and confirm that the PB FM signal is present.
4. Use the X-Value Adj. Screwdriver so that the PB FM signal at TP (C-PB) or TP of AUDIO OUT is maximum. (Fig.M6)
5. Press CH UP button on VCR until CTL waveform is shifted by approx. +2msoc. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.
6. Press CH DOWN button on VCR until CTL waveform is shifted from its original position (not the po-

2-3-3

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sition achieved in step 5 just above, but the position of CTL waveform until step 4) by approximately -2msec. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.

7. Set the Tracking Control Circuit to the center position by pressing CH UP and DOWN buttons on VCR simultaneously.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Set the Tracking Control Circuit to the center position by pressing both CH UP and DOWN buttons on VCR simultaneously.
2. Connect the oscilloscope to TP (C-PB) on the Main CBA. Use TP (RF-SW) as a trigger.
3. Play back the Gray Scale on the Alignment Tape (FL8NW). Adjust the height of Guide Rollers [2] and [3] (Fig.M3) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
4. If the envelope is as shown in Fig. M7, adjust the height of Guide Roller [2] (Refer to Fig.M3) so that the waveform looks like the one shown in Fig. M8.
5. If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig.M3) so that the waveform looks like the one shown in Fig. M9.
6. When Guide Rollers [2] and [3] (Refer to Fig.M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the Tracking Control Up or Down buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes UP to achieve 1/2 level of envelope should match the number of pushes DOWN from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Play back the alignment tape (FL8NW) and confirm that the audio signal output level is 8 kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform of the oscilloscope is at maximum. (Fig. M6)

Dropping envelope level at the beginning of track.

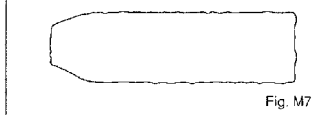


Fig. M7

Dropping envelope level at the end of track.

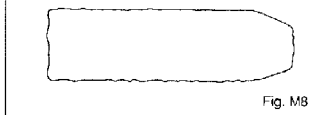


Fig. M8

Envelope is adjusted properly. (No envelope drop)



Fig. M9

DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Main Mechanism

Before following the procedures described below, be sure to:

1. Remove the deck assembly from the cabinet. (Refer to DISASSEMBLY INSTRUCTIONS in Main Section.)
2. Remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [33] and [34] in Fig. DM3 on page 2-4-4. When reassembling, follow the steps in reverse order.

STEP / LOC. No.	START-ING No.	PART	Fig. No.	REMOVAL	INSTALLATION
				REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Shield Plate	T DM1	2(S-3)	
[2]	[1]	Motor Holder Assembly	T DM3 DM5 DM6	3(S-4), Loading Belt	(+) Refer to Alignment Sec. Pg. 2-4-12.
[3]	[1]	Loading Motor Assembly	T DM2 DM3 DM5	2(S-5), CL2693	
[4]	[1]	Cassette Drive Lever Assembly	T DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-12.
[5]	[1]	Pinch Roller Arm Assembly	T DM3 DM5	(C-1) Pinch Roller Spring	Refer to Alignment Sec. Pg. 2-4-12.
[6]	[1]	Pinch Arm Assembly	T DM3 DM5		Refer to Alignment Sec. Pg. 2-4-12.
[7]	[7]	Mode SW CBA	B DM4 DM8	Stopper Boss, *(L-1)	
[8]	[8]	Joint CBA	T/B DM2 DM3 DM4 DM7 DM8	(S-6), CN2692, CL2693, *CL2691, CL2692	
[9]	[1]	Cam	T DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-12.
[10]	[1]	Pulley Assembly	T DM3 DM6	(W-1), Loading Belt	(+)
[11]	[11]	Head Amp CBA	T/B DM2 DM3 DM4 DM8	(S-7), (S-8), (S-22) CN3802, CL3801, CL3802	
[12]	[12]	Arm Idler Assembly	T DM3 DM9	Clutch Bushing	(+)
[13]	[13]	Clutch Assembly	B DM4 DM9	(C-2), (W-2) Capstan Belt	(+)
[14]	[13]	Capstan Motor Unit	B DM4 DM10	3(S-9)	
[15]	[1]	M Lever Holder	T DM3 DM11	(S-10)	(+) Oil, (+) Grease
[16]	[1]	Kick Arm Holder	B DM4 DM11	Kick Arm Spring	
[17]	[16]	Kick Arm	B DM4 DM11	Bushing	(+)
[18]	[18]	Mode Change Lever	T DM3 DM12	*2(L-2)	(+)
[19]	[1]	Main Lever Assembly	T DM3 DM12 DM15	*(L-3)	
[20]	[20]	Tape Guide Assembly	T DM3 DM15	*(P-2), *(L-4)	Keep the distance specified in Fig. DM15.
[21]	[21]	ACE Head Assembly	T DM3 DM14	2(S-11)	

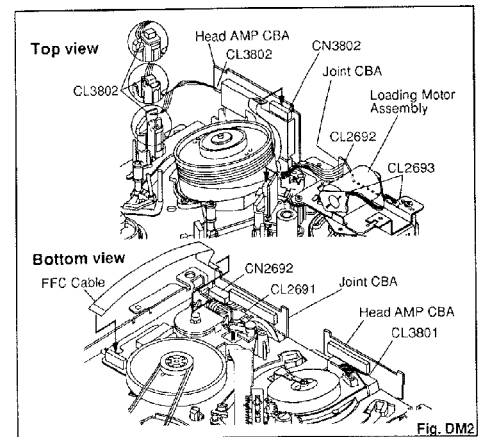
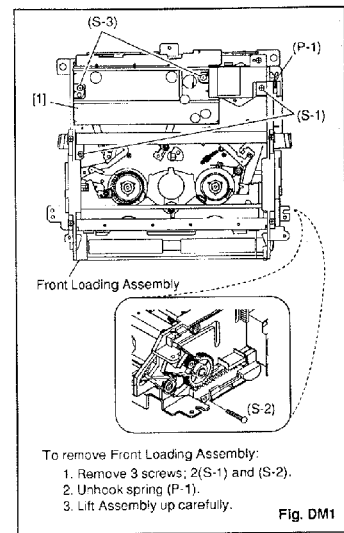
STEP /LOC. No.	START-ING No.	PART	Fig. No.	REMOVAL REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	INSTALLATION ADJUSTMENT CONDITION
[22]	[22]	Tension Lever Sub Assembly	T DM3 DM13 DM22	*(L-5) *(P-6)	Refer to Alignment Sec. Pg. 2-4-14.
[23]	[22]	Band Brake Sub Assembly	T DM3 DM13	(S-12), *(L-6)	
[24]	[18]	M Brake (S) Lever	T DM3 DM12 DM16		(-)
[25]	[18]	M Brake (S)	T DM3 DM16	*(P-3), *(L-7)	(-) When reassembling, hook the spring (P-3) after installation of Mode Change Lever.
[26]	[18]	S Brake Arm	T DM3 DM16	*(P-4), *(L-8)	(+) When reassembling, hook the spring (P-4) after installation of Mode Change Lever.
[27]	[18]	M Brake (T) Assembly	T DM3 DM16		(+)
[28]	[18]	T Brake Arm Assembly	T DM3 DM16	*(P-5)	(+) When reassembling, hook the spring (P-5) after installation of Mode Change Lever.
[29]	[18]	Reel Base Assembly T	T DM3 DM17	Poly Slider Washer	(+)
[30]	[18]	Reel Base Assembly S	T DM3 DM17	Poly Slider Washer	(+) Base has slots.
[31]	[31]	Ground Brush Assembly	B DM4 DM18 DM19	(S-13)	Refer to Alignment Sec. Pg. 2-4-12.
[32]	[11][31] Only	Cylinder Assembly	T DM3 DM18	3(S-14)	Refer to Alignment [31] Sec. Pg. 2-4-12.
[33]	[1]	Moving Guide S Assembly	T DM3 DM20		
[34]	[1]	Moving Guide T Assembly	T DM3 DM20		
[35]	[1] Only	FE Head	T DM3 DM20	(S-15)	
[36]	[36]	Main Prism	T DM3 DM20	(S-16)	
[37]	[1]	Loading Arm M Assembly	B DM4 DM21	(C-3)	(-) Refer to Alignment Sec. Pg. 2-4-12.
[38]	[1]	Loading Gear A	B DM4 DM21		(+) Refer to Alignment Sec. Pg. 2-4-12.
[39]	[1]	Loading Gear B	B DM4 DM21		(+) Refer to Alignment Sec. Pg. 2-4-12.
[40]	[40]	Spring Supporter	B DM4 DM22	(S-17)	
[41]	[40]	BT Drive Arm	B DM4 DM12 DM22	(S-18), *(P-6), *(P-7)	
[42]	[42]	Rec Arm Assembly	B DM4 DM22	(S-19)	
[43]	[42]	Reel Drive Arm	B DM23	(S-20), (C-4), *(P-8) Drive Arm Roller	
[44]	[42]	Holder Kick Arm	B DM23	*(P-9)	
[45]	[45]	F Brake (2)	B DM4 DM10	CS Ring	
[46]	[45]	F Brake Guide	B DM4 DM10	2(S-21) F Brake Spring	

① ② ③ ④ ⑤ ⑥ ⑦

2-4-2

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- Follow steps in sequence. When reassembling, follow the steps in reverse order. These numbers are also used as identification (location) No. of parts in the figures.
- Indicates the part to start disassembly in order to disassemble the part in column (1).
- Name of the part
- Location of the part
T=Top B=Bottom R=Right L=Left
- Figure Number
- Identification of parts to be removed, unhooked, unlocked, released, unplugged, undamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw
L=Locking Tab
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 2(C-2) = two Cut Washers (C-2)
2(L-2) = two Locking Tabs (L-2)
- Adjustment Information for Installation
(+) Refer to Deck Exploded Views for lubrication information.



2-4-3

U13DA4H

Top View

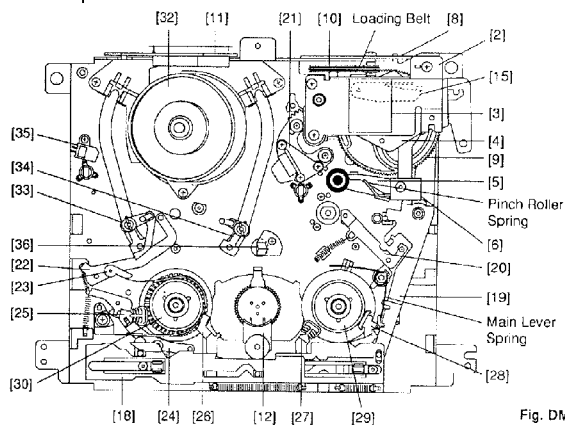


Fig. DM3

Bottom View

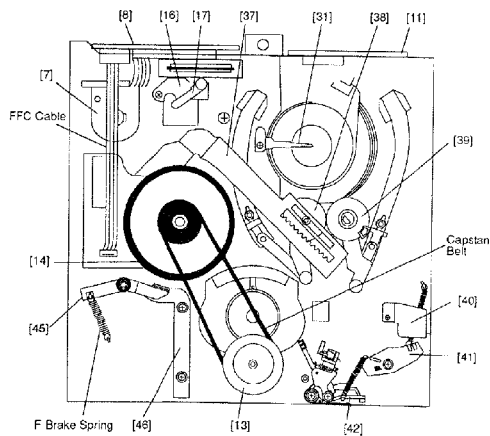


Fig. DM4

2-4-4

U13DA4H

When disassembling, unhook Pinch Roller Spring as shown by the arrow. With this spring unhooked, [5] and [6] can be removed from the chassis more easily.

When reassembling [2] through [6] and [9], refer to the Alignment Section, Pg. 2-4-12.

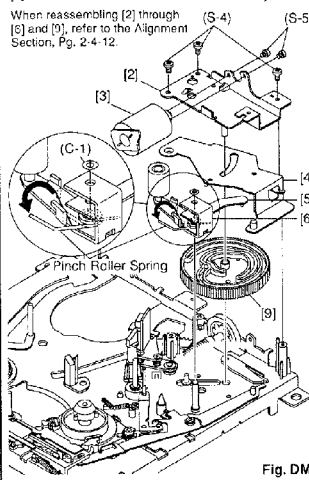


Fig. DM5

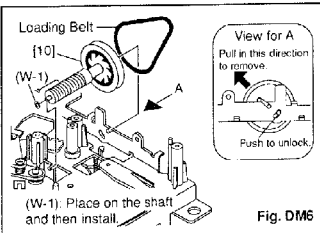


Fig. DM6

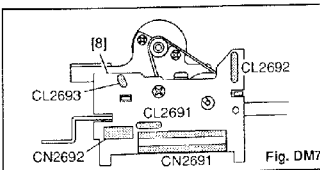


Fig. DM7

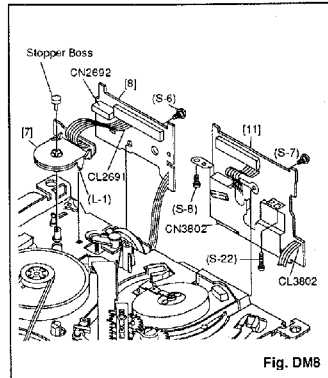


Fig. DM8

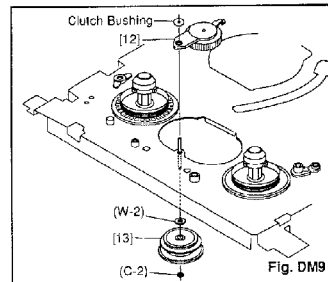


Fig. DM9

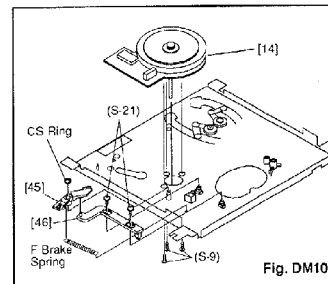
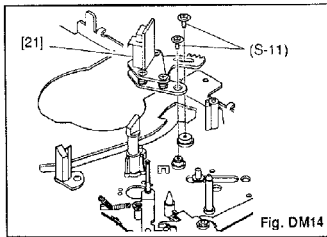
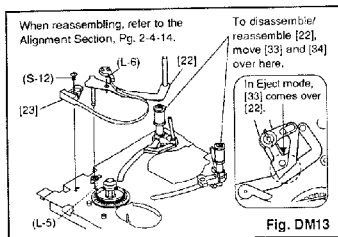
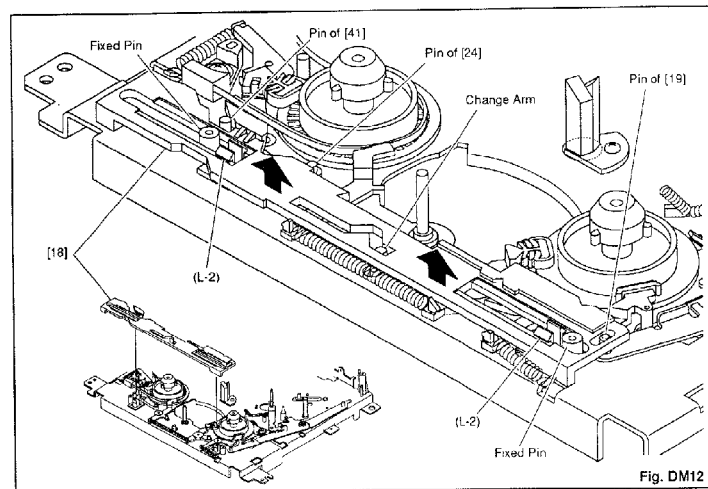
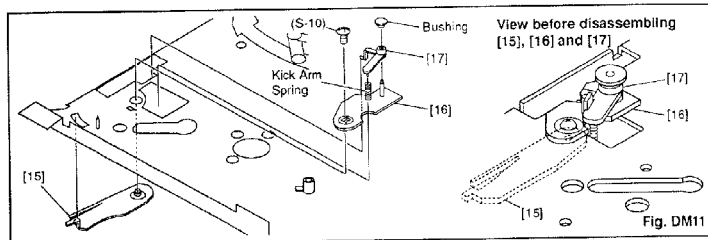


Fig. DM10

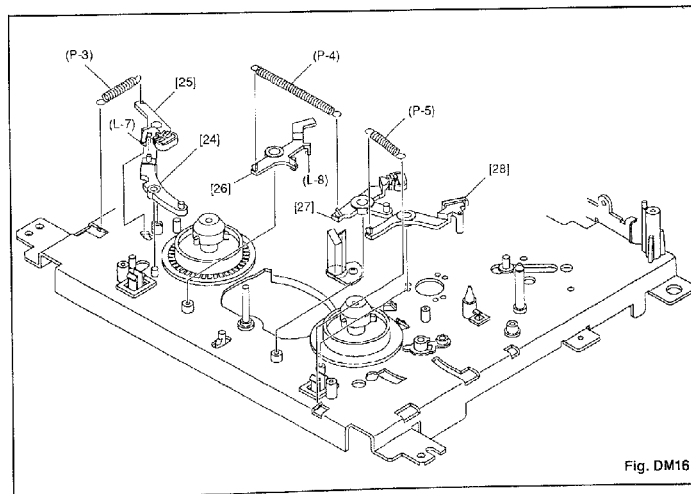
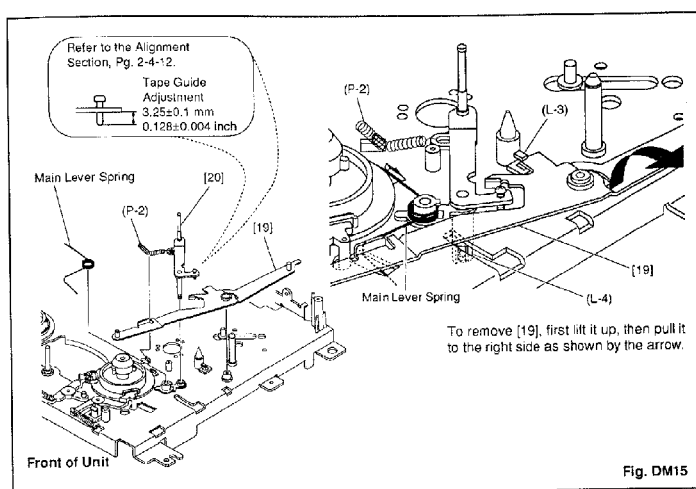
2-4-5

U13DA4H



2-4-6

U13DA



2-4-7

U13DA

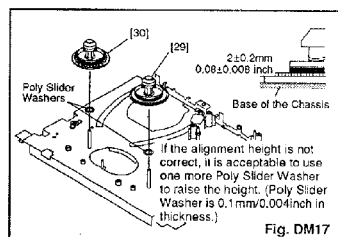


Fig. DM17

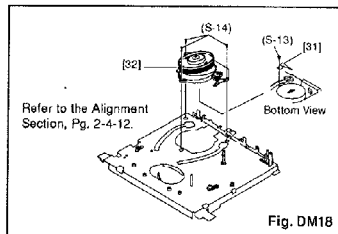


Fig. DM18

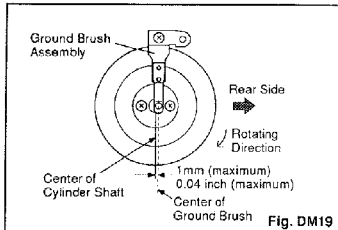


Fig. DM19

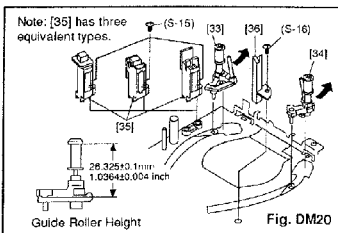


Fig. DM20

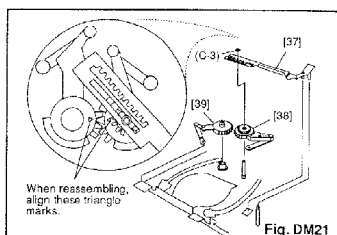


Fig. DM21

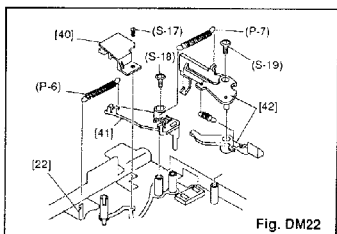


Fig. DM22

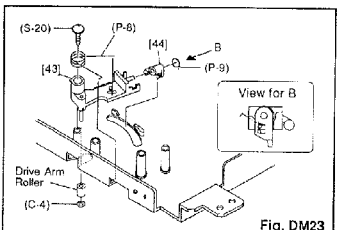


Fig. DM23

Front Loading Assembly

Before following the procedures described below, be sure to remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.) When reassembling, start with the unit in Cassette-in mode and follow the steps in reverse order.

STEP LOC. No.	START- ING No.	PART	Fig. No.	REMOVAL	INSTALLATION
				REMOVE/UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Door Opener R	DM24 DM27	*(L-1) Door Opener Spring	(+)
*[2]	[2]	Slider Gear	R (or L) DM28 DM30	(C-1)	(+)
[3]	[2]	Slider Gear Slider Shaft	L (or R) DM28 DM30	(C-2)	(+)
[4]	[2]	Cassette Drive Gear	R DM25 DM26 DM28	(S-1), (S-2) Cassette Drive Gear Spring	(+)
[5]	[2]	FL Rack	R DM25 DM26 DM28		
[6]	[2]	F Door Opener R	R DM25 DM28 DM29	*(L-2) F Door Opener R Spring	DM29
[7]	[2]	[7a] Front Guide	T DM25 DM26 DM27 DM28	4(S-3), *2(L-3)	
		[7b] Cassette Holder Assembly			
		[7c] Deck Support B			
		[7d] Deck Support F			
		[7e] Cassette Guide R	R		(+)
		[7f] Cassette Guide L	L		(+)
[8]	[8]	Gear Supporter	L DM28	(S-4)	
[9]	[9]	Mirror Holder R	R DM28		
[10]	[10]	Mirror Holder L	L DM28		

①: Follow steps in sequence. When reassembling, follow the steps in reverse order. These numbers are also used as identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column 1.

③: Name of the part

④: Location of the part. T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered. P=Spring, W=Washer, C=Cut Washer, S=Screw, * =Unhook, Unlock, Release, Unplug, or Desolder e.g. 2(L-2) = two Locking Tabs (L-2)

⑦: Adjustment information for installation (+): Refer to Deck Exploded Views for lubrication.

*[2], [3]: Slider Gear in Step [2] and that in Step [3] are identical. However, they are divided into two steps because, before reassembling Slider Shaft, one Slider Gear must be preinstalled at either end of Slider Shaft.

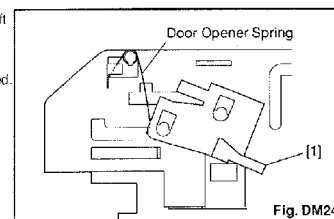


Fig. DM24

Before removing Parts [4], [5], [6] or [7], shift [7b] to Cassette-In position.

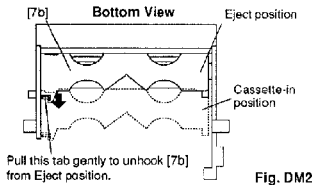


Fig. DM25

Install/remove in Cassette-In position to ensure that [7b] is in locked position.

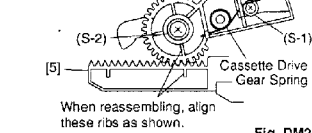


Fig. DM26

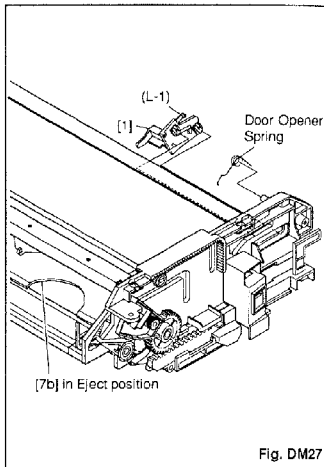


Fig. DM27

View before disassembling [6]
(F Door Opener R Spring Installation)

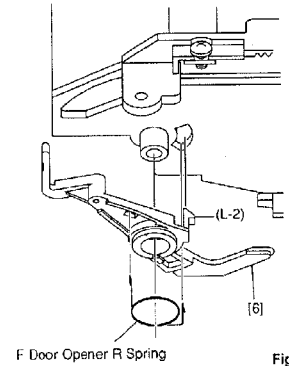
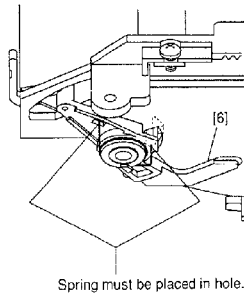
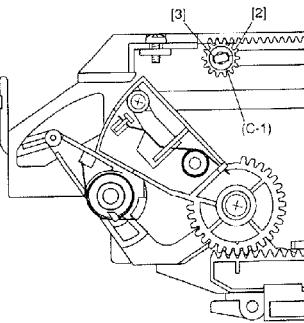


Fig. DM29

View before disassembling [2] and [3]
(Installation of Slider Shaft and Slider Gear)



Install [2] and [3] in Eject position.
(When disassembling, [2] and [3] can be removed either in Eject position or Cassette-In position.)

- This figure shows where [2], [3] and other parts are in Eject position.

Fig. DM30

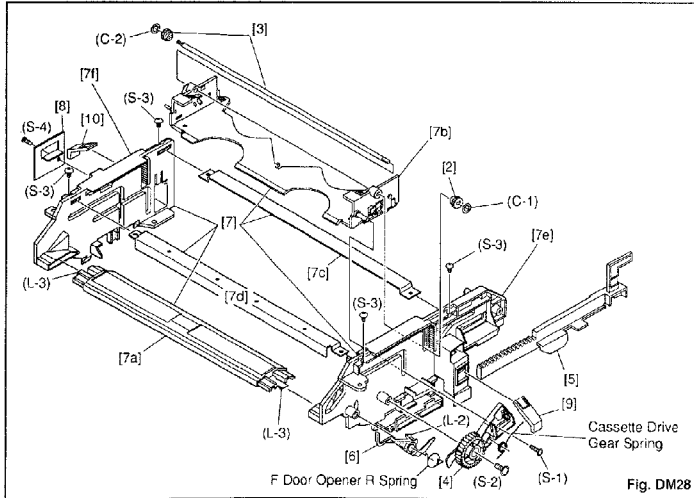


Fig. DM28

ALIGNMENT PROCEDURES OF MECHANISM

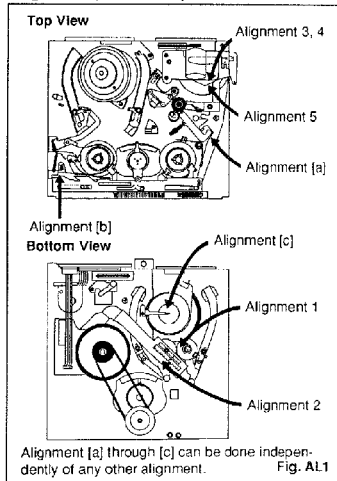
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment [a]

Tape Guide Assembly

1. Measurement of the black screw must be as specified in Fig. AL3.

Alignment 1

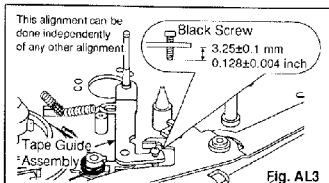
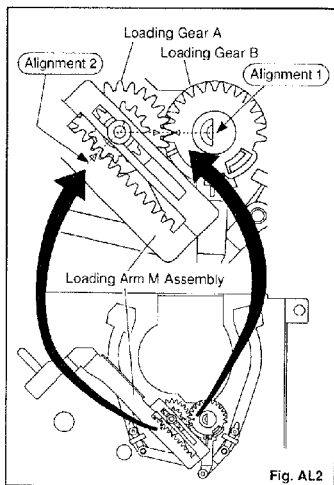
Loading Gears, A and B

1. Install Loading Gears A and B so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

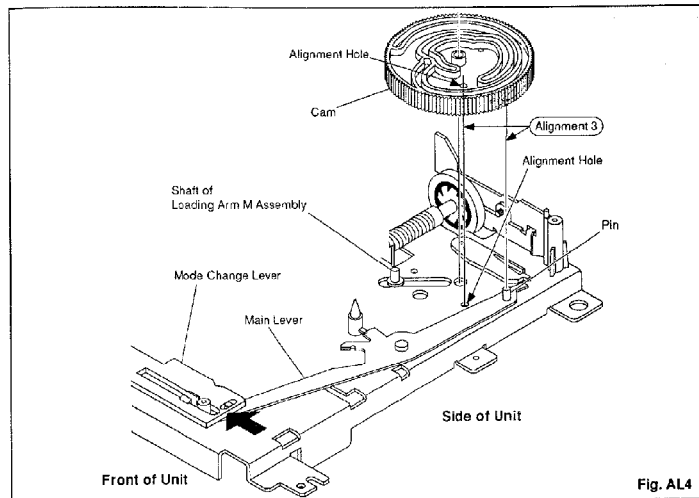
Loading Arm M Assembly

1. Keeping the two triangles pointing at each other, install Loading Arm M Assembly so that its tooth with yet another triangle mark is in the position to align with Loading Gear A and the center of the shaft. See Fig. AL2.



2-4-12

U13APM



Alignment 3

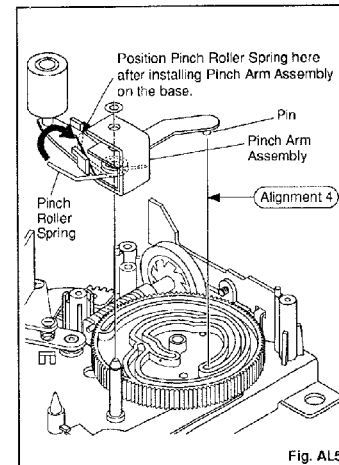
Cam

1. Make sure that the mechanism is in Eject mode so that the shaft of Loading Arm M Assembly is in the position shown in Fig. AL4.
2. Align the alignment hole of the Cam with the alignment hole of the base, holding the Cam just above the base.
3. Carefully keeping these two holes aligned, install the Cam while pushing Mode Change Lever in the direction of the arrow. The Mode Change Lever must be pushed to make the pin on the Main Lever fit in the proper groove in the lower Cam.
4. After installing the Cam, make sure that the alignment hole of the Cam is still aligned with the base hole and that the pin on the Main Lever is inserted into the proper groove of the lower Cam as specified in Fig. AL4.

Alignment 4

Pinch Roller Arm Assembly

1. Ensure that the pin of the Pinch Roller Arm Assembly is positioned in the end of the groove of the upper Cam as shown in Fig. AL5.



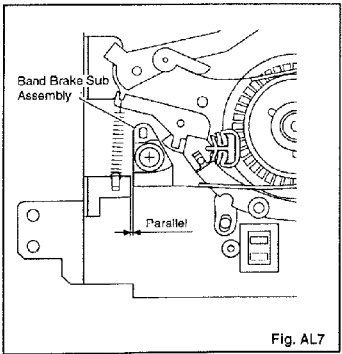
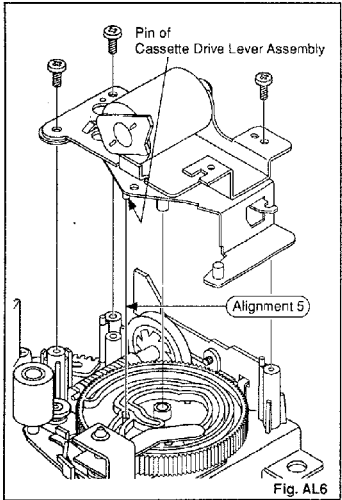
2-4-13

U13APM

Alignment 5

Cassette Drive Lever Assembly

1. Ensure that the pin of the Cassette Drive Lever Assembly is positioned in the groove of the upper Cam as shown in Fig. AL6.



Alignment [b]

This alignment can be performed independently of any other alignment.

Band Brake Sub Assembly

1. Ensure that Band Brake Sub Assembly is positioned parallel to the chassis' notch as shown in Fig. AL7. This measurement can be made by eye.

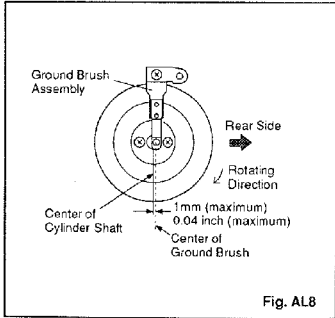
Alignment [c]

This alignment can be performed independently of any other alignment.

Ground Brush Assembly

1. Check to see if the Ground Brush Assembly is properly set in a position equal to or just less than 1mm (0.04 inch) (but never more than 1 mm or 0.04 inch), as measured from the center of the brush to the center of the Cylinder Shaft as shown in Fig. AL8.
2. If this measurement exceeds 1mm (0.04 inch), loosen and refasten the screw of the Ground Brush Assembly. If this is not enough and further adjustment is necessary, loosen and refasten the three screws of Cylinder Assembly. These three screws are shown in Fig. DM18 in DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM.

Note: DO NOT install the Ground Brush Assembly in the opposite position (on the left side of the center of the Cylinder shaft), but always within a maximum of 1mm (0.04 inch) to the right side of the center of this shaft.



EXPLODED VIEWS AND PARTS LIST SECTION

13" TV/VCR COMBINATION TELEVISION

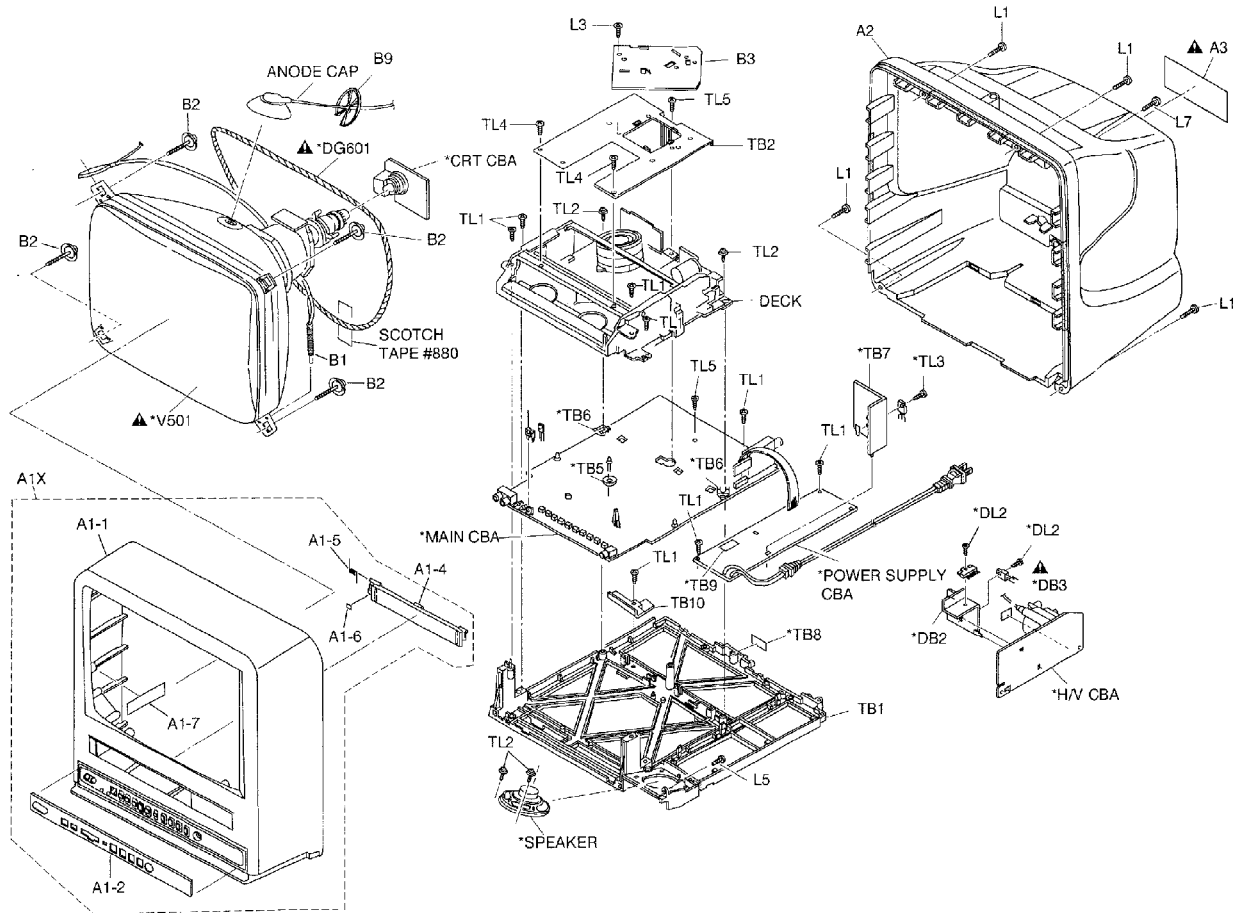
Model No. 13VR10B

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Deck Mechanical Parts List	3-4-1
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CABINET EXPLODED VIEW

*Marked parts see the Electrical Parts List

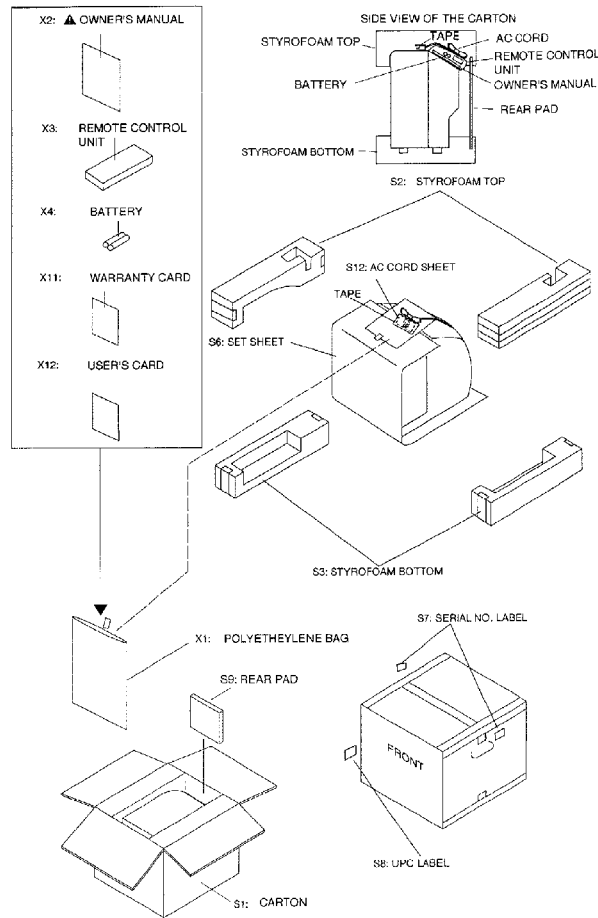


3-1-1

3-1-2

B5707EX

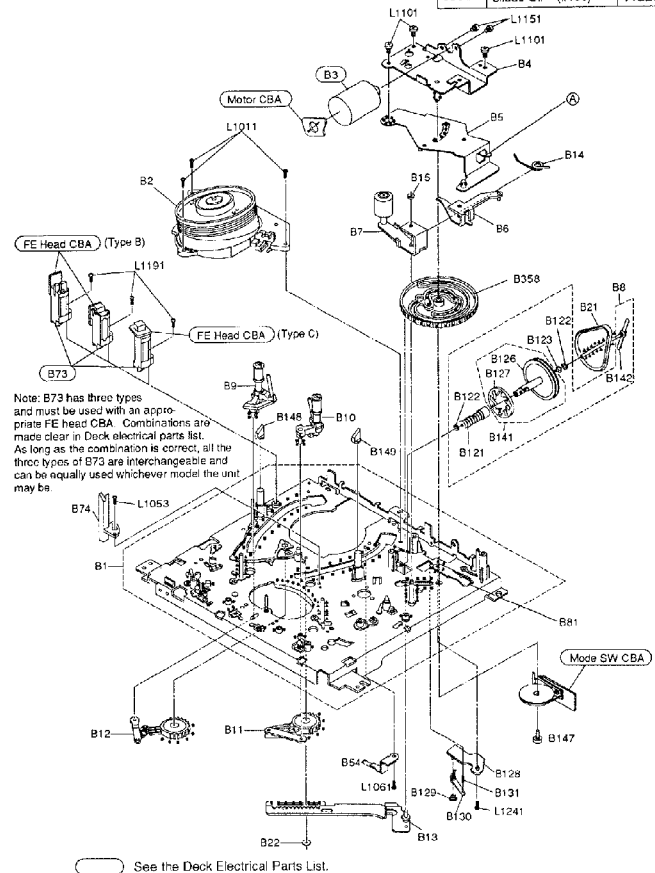
PACKING EXPLODED VIEW



3-1-3

B5707PAC

Deck Mechanism View 1

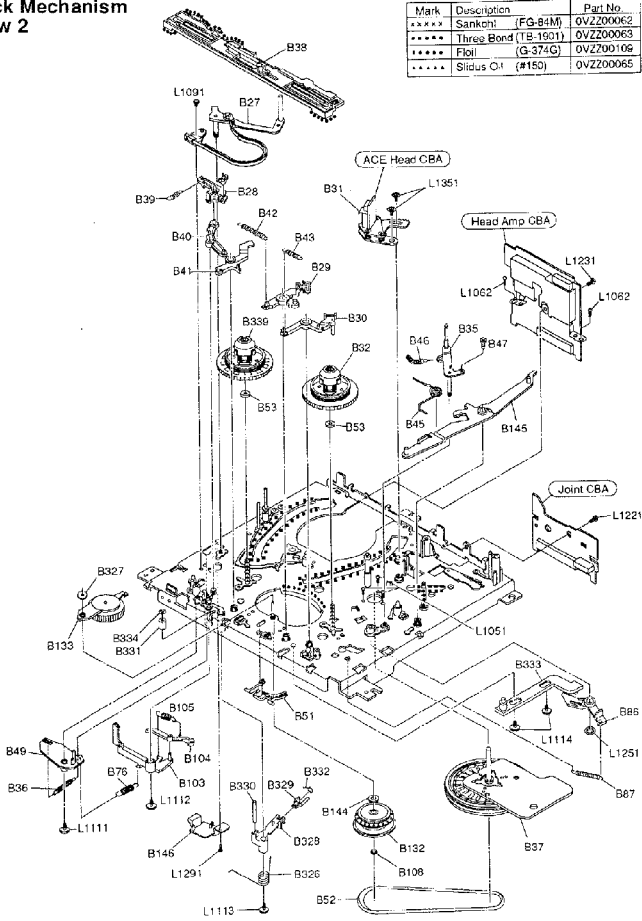


3-1-4

U13EX4H

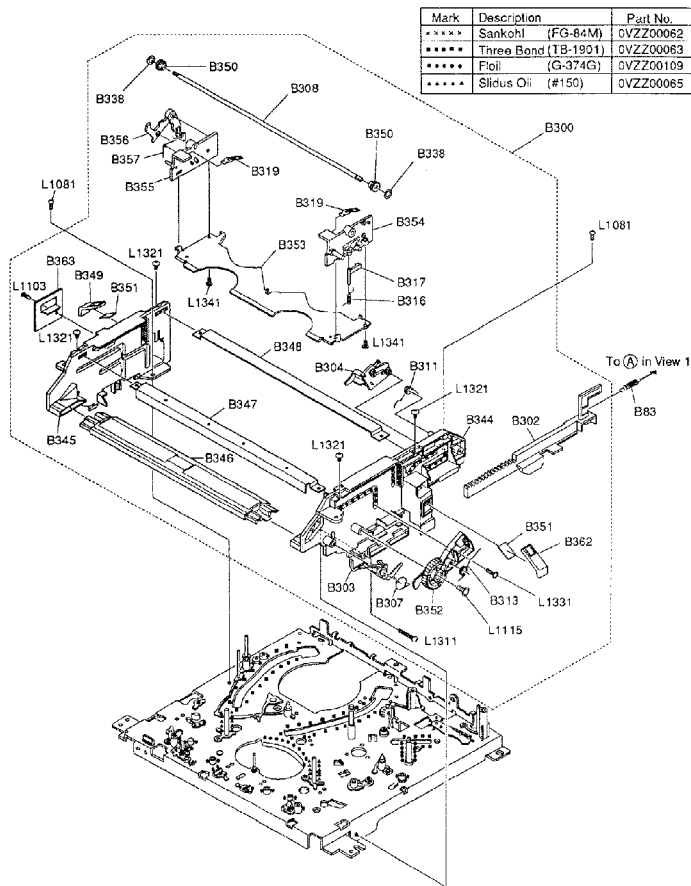
Deck Mechanism View 2

Mark	Description	Part No.
*****	Sankohi (FG-84M)	0V2200062
*****	Three Bond (TB-1601)	0V2200063
*****	Filoi (G-374G)	0V2200106
*****	Slidus O.I. (#150)	0V2200065



See the Deck Electrical Parts List.

Deck Mechanism View 3



3-1-6

U13EX4H

CABINET PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a **▲** have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A1X	DECK ASSY CZ0001/M5047	N5047L
A1-1	FRONT CABINET ASSY	DEM100764
A1-1	FRONT CABINET	DEM100750
A1-2	CONTROL PLATE	DEM000988
A1-4	CASSETTE DOOR	DEM003361
A1-5	DOOR SPRING	DEM003773
A1-6	CLOTH	DEM002404
A1-7 ▲	SERVICE CAUTION LABEL	24L1900
A 2	REAR CABINET	DEM000221
A 3 ▲	RATING LABEL	DEM003352
B 1	TENSION SPRING	25WH005
B 2	CRT MOUNTING SCREW	8A00083
B 3	SHIELD PLATE(SA)	DEM001885
B 9	ANODE SPACER	DEM000454
L 1	SCREW P-TIGHT 4X18 BIND HEAD	GRMP4180
L 2	ASSEMBLED SCREW M3X10	DEM001729
L 3	SCREW S-TIGHT 3X4 BIND HEAD+	GRMS3040
L 5	SCREW P-TIGHT 3X10 BIND HEAD	GRMP3100
L 7	TAPPING SCREW	DEM003455
TB 1	TRAY CHASSIS	DEM000219
TB 2	TOP SHIELD	DEM000513
TB 5	FIBER(BX4.5XT1.0)	DEM002861
TB 6	PLATE GROUND	DEM006158
TR 10	TRAY HOLDER	DEM003362
TB 13	WIRE TAPE	DEM000963
TL 1	SCREW P-TIGHT 3X10 BIND HEAD	GRMP3100
TL 2	ASSEMBLED SCREW M3X10	DEM001729
TL 3	SCREW S-TIGHT 3X4 BIND HEAD+	GRMS3060
TL 4	SCREW S-TIGHT 3X4 BIND HEAD+	GRMS3040
TL 5	SCREW P-TIGHT 3X20 BIND HEAD	GRKP2020
TL 6	SCREW P-TIGHT 3X12 BIND HEAD+	GRKP2120
S 1	CARTON	DEM003353
S 2	STYROFOAM TOP ASSY	DEM003364
S 3	STYROFOAM BOTTOM ASSY	DEM003435
S 6	SET SHEET B550XJ3.800X1500	DEM002969
S 7	SERIAL NO. LABEL	DEM001639
S 8	UPC LABEL	DEM003354
S 9	REAR PAD	DEM000466
S 12	ACCORD SHEET	DEM002360
X 1	POLYETHYLENE BAG	Z223880
X 2 ▲	OWNER'S MANUAL	DEM001145
X 3	REMOTE UNIT HTR0145-0110-0	UREM130H009
X 4	DRY BATTERY R6M UM3	3BX04451GW001
X 11	WARRANTY CARD	DEM001145
X 12	USER'S CARDS	DEM001170

3-2-1

B5707CA

B5707EL

Ref. No.	Description	Part No.
CR801	ANGLE PIN HEADER 2P 1730/9-2 or	1770247
DIODES		
D 001	ZENER DIODE UZ-6.8B9C	QD700Z68B9C
D 103	DIODE 1SS1767PA7	1SS1767
D 104	DIODE 1SS1767PA7	1SS1767
D 105	ZENER DIODE UZ-6.8B9B	QD700Z68B9B
D 106	DIODE 1SS1767PA7	1SS1767
D 120	PCB JUMPER DO.6-P5.0	JWS.0T
D 121	PCB JUMPER DO.6-P5.0	JWS.0T
D 122	PCB JUMPER DO.6-P5.0	JWS.0T
D 123	PCB JUMPER DO.6-P5.0	JWS.0T
D 153	DIODE 1SS1767PA7	1SS1767
D 156	DIODE 1SS1767PA7	1SS1761
D 167	DIODE 1SS1767PA7	1SS1761
D 201	LED(RED),FORMING CSL-601E5-MB	NP620SL601E5
D 205	LED SMD 1K100KM	QF-42D1K100KM
D 208	DIODE 1SS1767PA7	1SS1767
D 209	DIODE 1SS1767PA7	1SS1767
D 211	DIODE 1SS1767PA7	1SS1767
D 212	DIODE 1SS1767PA7	1SS1767
D 216	DIODE 1SS1767PA7	1SS1767
D 219	DIODE 1SS1767PA7	1SS1767
D 220	DIODE 1SS1767PA7	1SS1767
D 221	ZENER DIODE UZ-6.8B9B	QD700Z68B9B
D 222	ZENER DIODE UZ-6.8B9B	QD700Z68B9B
D 223	DIODE 1SS1767PA7	1SS1767
D 301	DIODE 1SS1767PA7	1SS1761
D 306	DIODE 1SS1767PA7	1SS1767
D 307	DIODE 1SS1767PA7	1SS1767
D 401	DIODE 1SS1767PA7	1SS1767
D 402	DIODE 1SS1767PA7	1SS1767
D 403	DIODE 1SS1767PA7	1SS1767
D 404	DIODE 1SS1767PA7	1SS1767
D 406	DIODE 1SS1767PA7	1SS1767
D 408	PCB JUMPER DO.6-P5.0	JWS.0T
D 409	DIODE 1SS1767PA7	1SS1761
D 410	DIODE 1SS1767PA7	1SS1767
D 570	ZENER DIODE UZ-6.2B9A	QD700Z62B9A
D 571	DIODE 1SS1767PA7	1SS1767
D 572	DIODE 1SS1767PA7	1SS1767
D 573	DIODE 1SS1767PA7	1SS1767
ICs		
IC 101	IC-TV MICON M3774M5-0645P	QSMQ405MB114
IC 201	IC-VCR MICON M3774M5H518CP	QSMQ406MB112
IC 202	IC-MEMORY 24LC02B/P	NS1MMA05M1003
IC 203	IC-OP-AMP KIA324P DNP-14	NS1LA05U1002
IC 204	IC-TA7291S	14UW42
IC 205	REL. SENSOR SQ-931	PCL-422X0005
IC 301	IC-CHROMAIF 1 CH MS2339SP	QSLA05SM9012
IC 401	IC-VIDEO IAT71000M	QSLA05SY006
IC 402	IC-VIDEO LCR6962	QSLA05SY018
IC 570	IC-VOLTAGE REGULATOR KIA7606PM	NS1LA02Z1008
IC 571	IC-REGULATOR 5V KIA7805PI	NS1LA02Z1008
IC 701	IC-MC140638P	14D0165
IC 801	IC-AUDIO POWER AMP KIA8278P	NS1LA05J1022
COILS		
L 001	INDUCTOR 100UH-K-26T	LLAKXATU101
L 002	INDUCTOR 100UH-K-26T	LLAKXATU101
L 101	INDUCTOR 5.6UH-K-26T	LLAKXATU505
L 102	INDUCTOR 5.6UH-K-26T	LLAKXATU505
L 103	INDUCTOR 5.6UH-K-26T	LLAKXATU505
L 104	INDUCTOR 5.6UH-K-26T	LLAKXATU505
L 105	INDUCTOR 56UH-K-26T	LLAKXATU560
L 151	INDUCTOR 22UH-K-26T	LLAKXATU220
L 201	INDUCTOR 100UH-K-26T	LLAKXATU101
L 301	INDUCTOR 22UH-K-26T	LLAKXATU220

Ref. No.	Description	Part No.
L 302	INDUCTOR 10UH-K-26T	LLAKXATU100
L 305	INDUCTOR 10UH-K-26T	LLAKXATU100
L 306	INDUCTOR 10UH-K-26T	LLAKXATU100
L 308	INDUCTOR 10UH-K-26T	LLAKXATU100
L 310	PCB JUMPER DO.6-P5.0	JWS.0T
L 401	INDUCTOR 5.6UH-K-26T	LLAKXATU560
L 407	PCB JUMPER DO.6-P5.0	JWS.0T
L 408	INDUCTOR 10UH-K-26T	LLAKXATU101
TRANSISTORS		
Q 030	TRANSISTOR 2SC3000F	2SC3000F7
Q 102	TRANSISTOR 2SA1318(T)-AANP	2SA1318T2
Q 111	RES. BUILT-IN TRANSISTOR KRC104M	NQ320KRC104M
Q 120	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 121	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 205	PHOTO TRANSISTOR PT380FB	QF4600PT380F
Q 206	PHOTO TRANSISTOR PT380FB	QF4600PT380F
Q 207	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 209	TRANSISTOR 2SA1318(T)-AANP	2SA1318T2
Q 302	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 304	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 308	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 309	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 311	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 392	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 401	TRANSISTOR 2SC3331(T)	QSC3331TMPAA
Q 402	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 403	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 405	TRANSISTOR 2SA1318(T)-AANP	2SA1318T2
Q 470	TRANSISTOR KTB1366(Y)	NQ0YKTB1366
Q 471	TRANSISTOR 2SC3331(T)	QSC3331TMPAA
Q 703	TRANSISTOR 2SC3685P(E)	2SC3685Z
Q 704	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 706	PCB JUMPER DO.6-P5.0	JWS.0T
Q 801	RES. BUILT-IN TRANSISTOR 2SC3400	2SC3400Z
Q 851	TRANSISTOR 2SC400(F)	2SD400Z
Q 852	RES. BUILT-IN TRANSISTOR 2SA1346	2SA1346Z
Q 853	TRANSISTOR 2SC3331(T)	QSC3331TMPAA
Q 854	TRANSISTOR 2SC2331(T)	QSC2331TMPAA
RESISTORS		
R 002	CHIP RES. 1/10W J 18K Ω	PRXAIBB20183
R 003	CHIP RES. 1/10W J 27K Ω	PRXAIBB20273
R 004	CARBON RES. 1/8W J 88K Ω	132A28T
R 081	CARBON RES. 1/8W J 22K Ω	132A22T
R 082	CARBON RES. 1/8W J 100 Ω	132A10T
R 083	CHIP RES. 1/10W J 6.8K Ω	PRXAIBB20682
R 084	CHIP RES. 1/10W J 1.5K Ω	PRXAIBB20152
R 085	CHIP RES. 1/10W J 330 Ω	PRXAIBB20331
R 086	CHIP RES. 1/10W J 33 Ω	PRXAIBB20330
R 101	CHIP RES. 1/10W J 470K Ω	PRXAIBB20474
R 102	CHIP RES. 1/10W J 470 Ω	PRXAIBB20471
R 106	CHIP RES. 1/10W J 10K Ω	PRXAIBB20101
R 110	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 111	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 112	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 113	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 114	CHIP RES. 1/10W J 1K Ω	132A82T
R 115	CARBON RES. 1/8W J 82K Ω	132A73T
R 116	CARBON RES. 1/8W J 47K Ω	132A72T
R 117	CARBON RES. 1/8W J 1.8K Ω	132A75T
R 120	CARBON RES. 1/8W J 75K Ω	132A75T
R 121	CARBON RES. 1/8W J 28K Ω	132A33T
R 122	PCB JUMPER DO.6-P5.0	JWS.0T
R 133	PCB JUMPER DO.6-P5.0	JWS.0T
R 134	PCB JUMPER DO.6-P5.0	JWS.0T
R 137	CARBON RES. 1/8W J 33K Ω	132A33T
R 138	CHIP RES. 1/10W J 22K Ω	PRXAIBB20225

Ref. No.	Description	Part No.
R 139	CHIP RES. 1/10W J 18K Ω	PRXAIBB20183
R 140	CHIP RES. 1/10W J 27K Ω	PRXAIBB20272
R 141	CHIP RES. 1/10W J 1K Ω	PRXAIBB20103
R 142	CARBON RES. 1/8W J 22K Ω	132A22T
R 143	CARBON RES. 1/8W J 33K Ω	132A33T
R 144	CARBON RES. 1/8W J 100K Ω	132A10T
R 145	CARBON RES. 1/8W J 15K Ω	132A15T
R 146	CHIP RES. 1/10W J 47K Ω	PRXAIBB20472
R 148	CHIP RES. 1/10W J 15K Ω	PRXAIBB20153
R 149	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 150	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20103
R 151	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 152	CHIP RES. 1/10W J 15K Ω	PRXAIBB20153
R 153	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 154	CHIP RES. 1/10W J 15K Ω	PRXAIBB20153
R 155	CARBON RES. 1/8W J 15K Ω	132A15T
R 157	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 158	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 161	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 162	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 163	CARBON RES. 1/8W J 8K Ω	132A82T
R 165	CARBON RES. 1/8W J 10K Ω	132A10T
R 170	CHIP RES. 1/10W J 8.2K Ω	PRXAIBB20822
R 171	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 172	CHIP RES. 1/10W J 3.3K Ω	PRXAIBB20332
R 175	CHIP RES. 1/10W J 3.3K Ω	PRXAIBB20332
R 177	CHIP RES. 1/10W J 3.3K Ω	PRXAIBB20332
R 179	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 180	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 184	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 186	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 190	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 194	CHIP RES. 1/10W J 8.8K Ω	PRXAIBB20882
R 195	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 196	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 197	CARBON RES. 1/8W J 10K Ω	132A10T
R 201	CARBON RES. 1/8W J 100K Ω	132A10T
R 203	CARBON RES. 1/8W J 330 Ω	132A33T
R 205	CARBON RES. 1/8W J 10K Ω	132A10T
R 206	CARBON RES. 1/8W J 1K Ω	132A10T
R 207	CHIP RES. 1/10W J 47K Ω	PRXAIBB20473
R 209	CARBON RES. 1/8W J 10K Ω	132A10T
R 210	CHIP RES. 1/10W J 1.5K Ω	PRXAIBB20152
R 211	CHIP RES. 1/10W J 1.5K Ω	PRXAIBB20152
R 212	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 213	CARBON RES. 1/8W J 2.2K Ω	132A22T
R 214	CHIP RES. 1/10W J 4.7K Ω	132A10T
R 215	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 216	CHIP RES. 1/10W J 1.5K Ω	PRXAIBB20152
R 217	CHIP RES. 1/10W J 1.5K Ω	PRXAIBB20222
R 218	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 219	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 220	CARBON RES. 1/8W J 4.7K Ω	132A72T
R 221	CARBON RES. 1/8W J 39 Ω	132A39T
R 222	CARBON RES. 1/8W J 39 Ω	132A39T
R 223	CHIP RES. 1/10W J 88K Ω	PRXAIBB20884
R 224	CARBON RES. 1/8W J 88K Ω	132A82T
R 225	PCB JUMPER DO.6-P5.0	JWS.0T
R 226	CHIP RES. 1/10W J 47K Ω	PRXAIBB20473
R 227	CHIP RES. 1/10W J 150 Ω	PRXAIBB20151
R 229	CHIP RES. 1/10W J 590 Ω	PRXAIBB20591
R 230	CARBON RES. 1/8W J 5.6K Ω	132A56T
R 231	CARBON RES. 1/8W J 960 Ω	132A96T
R 232	CARBON RES. 1/8W J 10K Ω	132A10T
R 233	CARBON RES. 1/8W J 10K Ω	132A10T

Ref. No.	Description	Part No.
R 234	CARBON RES. 1/8W J 10K Ω	132A10T
R 235	CARBON RES. 1/8W J 10K Ω	132A10T
R 236	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 237	CARBON RES. 1/8W J 38K Ω	132A38T
R 238	CARBON RES. 1/8W J 220K Ω	132A22T
R 239	CARBON RES. 1/8W J 4.7K Ω	132A72T
R 240	PCB JUMPER DO.6-P5.0	JWS.0T
R 241	PCB JUMPER DO.6-P5.0	JWS.0T
R 242	CARBON RES. 1/8W J 47K Ω	132A72T
R 243	CHIP RES. 1/10W J 4.7K Ω	PRXAIBB20472
R 244	CHIP RES. 1/10W J 5.6K Ω	PRXAIBB20562
R 245	CHIP RES. 1/10W J 2.7K Ω	PRXAIBB20272
R 246	CARBON RES. 1/8W J 1K Ω	132A10T
R 247	CHIP RES. 1/10W J 59K Ω	PRXAIBB20592
R 248	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 249	CARBON RES. 1/8W J 56K Ω	132A56T
R 250	CARBON RES. 1/8W J 47K Ω	132A73T
R 251	CARBON RES. 1/8W J 1K Ω	132A10T
R 252	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 253	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 254	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 255	CHIP RES. 1/10W J 1K Ω	PRXAIBB20102
R 256	CARBON RES. 1/8W J 1K Ω	132A10T
R 257	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 258	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 259	CHIP RES. 1/10W J 2.2K Ω	PRXAIBB20222
R 260	CHIP RES. 1/10W J 1.2K Ω	PRXAIBB20120
R 261	CHIP RES. 1/10W J 47 Ω	PRXAIBB20470
R 262	CHIP RES. 1/10W J 100K Ω	PRXAIBB20104
R 263	CARBON RES. 1/8W J 1K Ω	132A10T
R 264	CHIP RES. 1/10W J 1M Ω	PRXAIBB20105
R 265	CHIP RES. 1/10W J 1K Ω	132A10T
R 266	CHIP RES. 1/10W J 10K Ω	PRXAIBB20106
R 267	CHIP RES. 1/10W J 10M Ω	PRXAIBB20106
R 268	CHWS. 1/10W J 470K Ω	PRXAIBB20474
R 270	CHIP RES. 1/10W J 980 Ω	PRXAIBB20981
R 271	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 272	CHIP RES. 1/10W J 22K Ω	PRXAIBB20223
R 273	CHIP RES. 1/10W J 10K Ω	PRXAIBB20103
R 274	CARBON RES. 1/8W J 1K Ω	132A10T
R 275	CHIP RES. 1/10W J 1M Ω	PRXAIBB20105
R 276	CARBON RES. 1/8W J 47K Ω	132A47T
R 277	PCB JUMPER DO.6-P5.0	JWS.0T
R 278	PCB JUMPER DO.6-P5.0	JWS.0T
R 279	CARBON RES. 1/8W J 10K Ω	132A10T
R 280	CARBON RES. 1/8W J 47K Ω	132A47T
R 281	CHIP RES. 1/10W J 27K Ω	PRXAIBB20273
R 282	CHIP RES. 1/10W J 27K Ω	PRXAIBB20273
R 283	PCB JUMPER DO.6-P5.0	JWS.0T
R 286	CARBON RES. 1/8W J 1.1 Ω	132A109T
R 287	CARBON RES. 1/8W J 1.1 Ω	132A109T
R 288	CARBON RES. 1/8W J 1.1 Ω	132A109T
R 289	PCB JUMPER DO.6-P5.0	JWS.0T
R 294	CARBON RES. 1/8W J 10K Ω	132A10T
R 295	CARBON RES. 1/8W J 22K Ω	132A22T
R 296	CARBON RES. 1/8W J 6.8K Ω	132A68T
R 297	CHIP RES. 1/10W J 5.6K Ω	PRXAIBB20562
R 299	CARBON RES. 1/8W J 10K Ω	132A10T
R 301	CARBON RES. 1/8W J 10K Ω	132A10T
R 302	CHIP RES. 1/10W J 560 Ω	PRXAIBB20561
R 303	CHIP RES. 1/10W J 2.2 Ω	132A22T
R 304	CARBON RES. 1/8W J 2.2K Ω	132A22T
R 305	CHIP RES. 1/10W J 390 Ω	PRXAIBB20391
R 306	CHIP RES. 1/10W J 100 Ω	PRXAIBB20101
R 307	CHIP RES. 1/10W J 100 Ω	PRXAIBB20101
R 308	CHIP RES. 1/10W J 100 Ω	PRXAIBB20101

Ref. No.	Description	Part No.
R 620	CARBON RES. 1/4W J 8.2K Ω	1315822S
R 621	CARBON RES. 1/4W J 59K Ω	132A593T
R 622	METAL RESISTOR 2W J 68K Ω	RM26853KA015
R 623	CARBON RES. 1/4W J 3.9K Ω	132A393T
R 624	CARBON RES. 1/4W J 4.7M Ω	RCXAJATZ0475
R 625	CARBON RES. 1/4W J 1K Ω	RCXAJATZ0102
R 626	POB JUMPER DO.6 P5.0	JW5.0T
R 627	CARBON RES. 1/4W J 39K Ω	132A393T
R 628	CARBON RES. 1/4W J 15K Ω	132A153T
R 629	CARBON RES. 1/4W J 22K Ω	132A223T
R 631	CARBON RES. 1/4W J 33K Ω	132A333T
R 632	CARBON RES. 1/4W J 47K Ω	132A474T
R 633	CARBON RES. 1/4W J 47K Ω	132A474T
R 635	CARBON RES. 1/4W J 6.8K Ω	132A682T
R 636	CARBON RES. 1/4W J 2.7K Ω	132A272T
R 637	CARBON RES. 1/4W J 2.7K Ω	132A272T
R 638	CARBON RES. 1/4W J 10K Ω	RCXAJATZ0103
R 639	CARBON RES. 1/4W J 15K Ω	132A153T
R 640	CARBON RES. 1/4W J 820K Ω	132A824T
R 643	CARBON RES. 1/4W J 68K Ω	132A683T
R 644	CARBON RES. 1/4W J 38K Ω	132A384T
R 645	CARBON RES. 1/4W J 1.2M Ω	RCXAJATZ0125
R 646	CARBON RES. 1/4W J 22K Ω	132A223T
R 647	CARBON RES. 1/4W J 10K Ω	RCXAJATZ0103
R 653	CARBON RES. 1/4W J 4.7K Ω	1315472S
R 654	CARBON RES. 1/4W J 4.7K Ω	1315472S
R 655	CARBON RES. 1/4W J 4.7K Ω	1315472S
R 656	CARBON RES. 1/4W J 36K Ω	132A363T
R 658	CARBON RES. 1/4W J 3.9K Ω	132A392T
MISCELLANEOUS		
BC 601	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
BC 602	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
BC 603	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
BC 604	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
BC 605	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
F 601 ▲	FUSE 125V/4A 2500A TYPE	PAC220CAG4002
FH 601	FUSE HOLDER FH-400078	34H012007X001
HH 602 ▲	FUSE HOLDER FH-400078	34H012007X001
HS 601	HEAT SINK/PRP/ASSY D7700A	0EM400141
PS 601 ▲	POSISTOR ZPB31BL7Y0B	6700124
SA 801 ▲	SURGE ABSORBER AVR-507D471KAAS	GVQZ04VRS07D
T 601	SWITCHING TRANS S-1412	LT1000PSA014
VR 601	CARBON P.O.T. 1K Ω B	VR05100H+005
W 601 ▲	AC CORD	WAC0182LW005
	LEAD WIRE 10P 130BL/AWG262651	W030105SFF13

H/V CBA

Ref. No.	Description	Part No.
H/V CBA		
Consists of the following		
CAPACITORS		
C 541	ELECTROLYTIC CAP. 100μF/16V M	CE1GMASDL01
C 542	MYLAR CAP. 0.01μF/50V K	226103S
C 543	ELECTROLYTIC CAP. 1μF/50V M LL	CE1GMASLL010
C 544	ELECTROLYTIC CAP. 100μF/50V M	CE1GMASDL01
C 546	CERAMIC CAP.(AX) 5K 10PF/50V	CCA1JWLSL100
C 547	ELECTROLYTIC CAP. 2.2μF/50V M LL	CE1GMASLL12R
C 548	ELECTROLYTIC CAP. 1000μF/16V M(VRHQ)	CE1GMZNTL102
C 549	MYLAR CAP. 0.056μF/50V KT	225059S
C 571	P.P. CAP. 0.47μF/200V J	CBP2DKD00474
C 572	CERAMIC CAP.(AX) B K 330PF/50V	CCD1KJTOR331
C 573	CERAMIC CAP. 5 K 2X00PF/50V	CCD1KJTOR332
C 574	CERAMIC CAP. B K 1000PF/50V	CCD1KJTOR332
C 576	METALLIZED FILM CAP. 0.0066μF/1.8KV J	CAC56607007
C 577	CERAMIC CAP. 5N 980PF/2KV	CCD1KJTOR331

Ref. No.	Description	Part No.
C 578	ELECTROLYTIC CAP. 47μF/250V	CE2EMASDLAR7
C 579	ELECTROLYTIC CAP. 1μF/160V	CE2GMASDL010
C 580	ELECTROLYTIC CAP. 100μF/16V M	CE1GMZNDL471
CONNECTORS		
CN 571	CONNECTOR BASE SP 1W P3005-02	1730812
CN 572	CONNECTOR 6P TUC-P06X-B1	JCTUS605T0301
CN 573	CONNECTOR 6P TUC-P06X-B1	JCTUS605T0301
DIODES		
D 541	ZENER DIODE UZ-4.1BSB	CDT80L073R15S
D 542	RECTIFIER DIODE ERA22-02KFR	CDQ202ERA2202
D 571	FAST RECOVERY DIODE ERB44-04L3	CDQ202ERB4404
D 572	DIODE 1SS1751PA7	13S1751
D 573	FAST RECOVERY DIODE ERB44-04L3	CDQ202ERB4404
D 575	ZENER DIODE UZ-30BS5	CDT8001230BS
D 576	ZENER DIODE UZ-47BS3	CDT800247BS
IC		
IC 541	IC VERTICAL OUT 1A7837	Q3BLA025Y003
COILS		
L 571	POB JUMPER DO.6 P5.0	JW5.0T
L 572	INDUCTOR 33UH-K-26T	LLAKATTU0390
L 574	POB JUMPER DO.6 P10.0	JW10.0T
TRANSISTORS		
Q 541	TRANSISTOR 2SA-318T-AAMP	2SA31818T2
Q 542	TRANSISTOR 2SC2227(D)-ALMP	2SC22271DZ
Q 572	TRANSISTOR 2SD1897	QCS01977CA00
RESISTORS		
R 541	CARBON RES. 1/4W J 88K Ω	132A883T
R 542	CARBON RES. 1/4W J 22K Ω	132A223T
R 543	CARBON RES. 1/4W J 1.5K Ω	132A152T
R 546	CARBON RES. 1/4W J 1.5K Ω	132A152T
R 548	CARBON RES. 1/4W J 47K Ω	132A473T
R 547	CARBON RES. 1/4W J 12K Ω	RCXAJATZ0123
R 548	CARBON RES. 1/4W J 120 Ω	RCXAJATZ0121
R 549	CARBON RES. 1/4W J 120 Ω	RCXAJATZ0121
R 550	CARBON RES. 1/4W J 38K Ω	132A383T
R 551	CARBON RES. 1/4W J 2.7K Ω	132A272T
R 552	CARBON RES. 1/4W J 1.5 Ω	132A150T
R 554	CARBON RES. 1/4W J 500 Ω	RCXAJATZ0052
R 555	CARBON RES. 1/4W J 10K Ω	RCXAJATZ0103
R 556	CARBON RES. 1/4W J 1K Ω	132A101
R 571	CARBON RES. 1/4W J 1K Ω	RCXAJATZ0102
R 572	CARBON RES. 1/2W J 2.7K Ω	132A272
R 573	METAL RESISTOR 2W J 1K Ω	RM2102KA015
R 574	CEMENT RES. 5W K 2.2K Ω	RM20222KA004
R 575	CARBON RES. 1/4W J 0.47 Ω	RCXAJATZ0047
R 577	FUSE RES. 1W J 3.6 Ω	RFD1369KA008
R 578	CARBON RES. 1/4W J 100K Ω	132A104T
R 579	CARBON RES. 1/4W J 100K Ω	132A104T
R 580	CARBON RES. 1/4W J 1K Ω	RCXAJATZ0102
R 581	CARBON RES. 1/4W J 1K Ω	RCXAJATZ0102
R 583	CARBON RES. 1/4W J 18K Ω	132A183T
R 584	CARBON RES. 1/4W J 5.6K Ω	132A562T
R 585	CARBON RES. 1/4W J 100K Ω	RCXAJATZ0104
R 588	CARBON RES. 1/4W J 100K Ω	RCXAJATZ0104
R 589	METAL RESISTOR 2W J 1K Ω	RM2102KA015
R 590	CARBON RES. 1/4W J 100K Ω	RCXAJATZ0104
R 591	POB JUMPER DO.6 P5.0	JW5.0T
R 592	CARBON RES. 1/4W J 58K Ω	132A583T
MISCELLANEOUS		
VR 541	CARBON P.O.T. 50K Ω B	VR05050H+002
VR 542	POB JUMPER DO.6 P5.0	JW5.0T
DC 571	BEAD INDUCTORS B16RH3.5X10X1.3X2	LLBF002XM001
DB 2	HEAT SINK/PRP/ASSY	0EM400171
DB 3	CHASSIS NO. LABEL(DJ)	0EM400198
DL 2	SCREW 8-11/16T 3/8 BIND HEAD	GAMB3080
1 571 ▲	H. DRIVE TRANS C51-95307	LTH00CPVD001

Ref. No.	Description	Part No.
T 572 ▲	FLYBACK TRANS FTK-14806	LT7001PSM005
	LEAD WIRE SP 220BL/AWG362651	W03035SFF32
	LEAD WIRE SP 50BL/AWG262651	W03035SFF49
	LEAD WIRE SP 220BL/AWG362651	W03035SFF62

CR7 CBA

Ref. No.	Description	Part No.
CR7 CBA		
Consists of the following		
CAPACITORS		
C 501	ELECTROLYTIC CAP. 1μF/50V M PR	CA2E010NC006
C 502	CERAMIC CAP.(AX) B K 470PF/50V	CCA1UKT0B471
C 503	CERAMIC CAP.(AX) B K 470PF/50V	CCA1UKT0B471
C 504	CERAMIC CAP.(AX) B K 470PF/50V	CCA1UKT0B471
C 505	CERAMIC CAP. 0.001μF/2KV	6020285
CONNECTORS		
CN 501	CONNECTOR PIN 1P LV	1700276
CN 502	CONNECTOR SP TUC-P05X-B1	JCTUS05TG007
COIL		
L 501	INDUCTOR 180UH-K-5FT	LLARK05TU181
TRANSISTORS		
Q 501	TRANSISTOR 2SC348B(D)-AF	QCS0205C3468
Q 502	TRANSISTOR 2SC348B(D)-AE	QCS0205C3468
Q 503	TRANSISTOR 2SC348B(D)-AE	QCS0205C3468
RESISTORS		
R 501	METAL RESISTOR 1W J 19K Ω	RM01153KA008
R 502	CARBON RES. 1/4W J 1.8K Ω	132A182T
R 503	CARBON RES. 1/4W J 1.5K Ω	132A152T
R 504	CARBON RES. 1/4W J 220 Ω	132A221T
R 505	METAL RESISTOR 1W J 19K Ω	RM01153KA008
R 506	CARBON RES. 1/4W J 1.8K Ω	132A182T
R 507	CARBON RES. 1/4W J 1.5K Ω	132A152T
R 508	CARBON RES. 1/4W J 220 Ω	132A221T
R 509	CARBON RES. 1/4W J 100 Ω	RCXAJATZ0101
R 510	METAL RESISTOR 1W J 19K Ω	RM01153KA008
R 511	CARBON RES. 1/4W J 1.8K Ω	132A182T
R 512	CARBON RES. 1/4W J 1.5K Ω	132A152T
R 513	CARBON RES. 1/4W J 220 Ω	132A221T
MISCELLANEOUS		
SK 501 ▲	CR7 SOCKET HPS1171-01-020	1780080
VR 501	CARBON P.O.T. 200 Ω B	VR02020H+002
VR 502	CARBON P.O.T. 20K Ω B	VR02020H+002
VR 503	CARBON P.O.T. 20K Ω B	VR02020H+002
VR 504	CARBON P.O.T. 200 Ω B	VR02020H+002
VR 505	CARBON P.O.T. 20K Ω B	VR02020H+002

Chassis Electrical Parts

Ref. No.	Description	Part No.
DG 601 ▲	DEGAUSSING COIL AVDS016	LLB100L2VH016
SP 801	SPEAKER S08J77F2	DS008095X0003
V 501 1	CR7 370KS022-T008(SYB)	T007103CP006
	CR7 GND WIRE CR7 GND	W0117720-001
	LEAD CLAMPER	1790556

DECK MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a  have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Parts Interchangeability: Parts with the letters " or " in description column mean that parts so listed are interchangeable between part (s) listed in next line (s). You can use one of interchangeable parts, and it does not cause to change any specifications of the appliance.

Ref. No.	Description	Part No.
B 1	CHASSIS ASSEMBLY MK4	0VSA06769
B 2	CYLINDER ASSEMBLY N15C4H0	N50470YL
B 4	MOTOR HOLDER CALKING ASSEMBLY MK5	0VSA07421
B 5	CASSETTE DRIVE LEVER ASSEMBLY MK4	0VSA06819
B 6	PINCH ROLLER ARM ASSEMBLY U5	0VSA05848
B 7	PINCH ARM ASSEMBLY FUNAI	0VSA06094
B 8	PULLEY ASSEMBLY U6 MK2	0VSA06005
B 9	MOVING GUIDE S ASSEMBLY MK4 PLASTIC	0VSA06094
B 10	MOVING GUIDE T ASSEMBLY MK4 PLASTIC	0VSA06935
B 11	LOADING ARM T ASSEMBLY U6 MK2	0VSA05053
B 12	LOADING ARM B ASSEMBLY	0VSA04215
B 13	LOADING ARM M ASSEMBLY	0VSA04593
B 14	PINCH ROLLER SPRING(U5)	0VMA03949C
B 15	LUMIRROR WASHER 3.1X0.35	0VMA03269
B 21	LOADING BELT U5 or LOADING BELT	0VMA03432 0VMA03652
B 22	P.S.W(CUT)	0VMA04679
B 27	RAND BRAKE ASSEMBLY	0VSA04659
B 28	MAIN BRAKE S ASSEMBLY	0VSA04212
B 29	MAIN BRAKE T ASSEMBLY	0VSA04213
B 30	T BRAKE ARM ASSEMBLY	0VSA04541
B 31	AC HEAD ASSEMBLY MK4 R/P	0VSA06766
B 32	REEL BASE ASSEMBLY U5	0VSA04759
B 35	TAPE GUIDE ASSEMBLY	0VMA02560
B 36	TENSION LEVER SPRING ASSEMBLY	0VMA04550
B 37	CAPSTAN MOTOR F2QK902 or VA CAPSTAN MOTOR FAGGTB11	MM00186ZS002 MM020555001
B 38	MOORE CHANGE LEVER JOG SHUTTLE MK3	0VMA00811F
B 39	M BRAKE(S) SPRING	0VMA02678A
B 40	M BRAKE(S) LEVER	0VMA00753E
B 41	S BRAKE ARM U6/U7	0VMA01758
B 42	M BRAKE T ARM SPRING	0VMA02682C
B 43	T BRAKE SPRING(2) MK3 JOG	0VMA02798
B 45	M LEVER SPRING(3)	0VMA06664
B 46	TAPE GUIDE ARM SPRING	0VMA02681
B 47	TAPE GUIDE ARM ADJUST SCREW	0VMA03242
B 49	BT DRIVE ARM	0VMA02756K
B 51	CHANGE ARM or CHANGE ARM A	0VMA00441G 0VMA02685
B 52	CAPSTAN BELT or CAPSTAN BELT	0VMA02697A 0VMA03060B
B 53	P.S.W B	0VMA02625
B 54	GROUND BRUSH ASSEMBLY U5 or GROUND BRUSH ASSEMBLY	0VMA04524 0VMA04827
B 74	LUMINESCENCE PRISM(S) U6/U7	0VMA01764H
B 76	REC ARM SPRING	0VMA02578A
B 81	M LEVER HOLDER U6/U7	0VMA01717E
B 82	RACK SPRING B	0VMA03564A
B 86	T BRAKE ASSEMBLY U9 4HE/D	0VSA05335
B 87	F BRAKE SPR(3) F40	0VMA06233
B 103	REC ARM A	0VMA01441J
B 104	REC ARM B	0VMA01442I
B 105	REC SPRING	0VMA03724
B 108	P.S.W F	0VMA02929
B 121	WORM	0VMA02428E

Ref. No.	Description	Part No.
B 122	P.S.W C or P.S.W C	0VMA02926 0VMA02926
B 123	P.S.W (WORM THRUST)	0VMA03348
B 126	PULLEY U6/U7	0VMA03177B0
B 127	PULLEY FELT	0VMA04662
B 128	KICK ARM HOLDER U6/U7	0VMA031716
B 129	PRESS FIT BUSH	0VMA05552A
B 130	KICK ARM U6/U7	0VMA04382F
B 131	KICK ARM SPRING U6/U7	0VMA04424D
B 132	CLUTCH ASSEMBLY U6 MK2	0VSA05059
B 133	ARM IDLER ASSEMBLY U8 4HEAD	0VSA06834
B 141	PULLEY SUB ASSEMBLY U6/U7	0VSA06998
B 142	SHAFT LOCK ASSEMBLY	0VSA04642
B 144	CLUTCH WASHER MK2	0VMA04428
B 145	MAIN LEVER ASSEMBLY U9 4HEAD	0VSA06831
B 146	SPRING SUPPORTER	0VMA05084A
B 147	STOPPER B05	0VMA05188
B 148	TG CAP(2) MK4	0VMA06389A
B 300	FLASSEMBLY MK4	0VMA06662
B 302	RACK MK3	0VMA01456B
B 303	F DOOR OPENER(2) or F DOOR OPENER(S)	0VMA032218A 0VMA032351B
B 304	DOOR OPENER MK3	0VMA02019B
B 307	F DOOR OPENER R SPRING MK3	0VMA03214E
B 308	SLIDER SHAFT MK3	0VMA03222D
B 311	DOOR OPENER SPRING MK3	0VMA03502G
B 313	CASSETTE DRIVE GEAR R SPRING MK4	0VMA02633
B 316	DOOR LOOK RELEASE ARM SPRING	0VMA02506C
B 317	DOOR LOOK RELEASE ARM(2) MK3	0VMA05034D
B 319	CASSETTE SPRING STOPPER or CASSETTE SPRING STOPPER	0VMA02507I 0VMA02507I
B 326	DRIVE ARM SPR JOG SHUTTLE MK3	0VMA05172B
B 327	BUSH CLUTCH(2) JOG MK3	0VMA03588
B 328	REEL DRIVE ARM JOG SHUTTLE MK3	0VMA031978E
B 329	HOLDER KICK ARM JOG SHUTTLE MK3 or HOLDER KICK ARM(2) JOG SHUTTLE MK3	0VMA031978D 0VMA032218B
B 330	DRIVE ARM SHAFT JOG SHUTTLE MK3	0VMA05170
B 331	DRIVE ARM ROLLER JOG SHUTTLE MK3	0VMA05171
B 332	HOLDER ARM SPRING JOG SHUTTLE MK3	0VMA05174C
B 333	GUIDE F BRAKE MK3	0VMA01582E
B 334	P.S.W 1.7X3.2X0.5T	0VMA03678
B 338	P.S.W CUT MK3(3.1X0.3.25)	0VMA06606
B 339	REEL BASE ASSEMBLY U5 4HEAD	0VSA05332
B 344	CASSETTE GUIDE R MK4	0VMA00074G
B 345	CASSETTE GUIDE L MK4	0VMA00544E
B 346	FRONT GUIDE MK4	0VMA01618A
B 347	DECK ANGLE F MK4	0VMA02253D
B 348	DECK ANGLE B MK4	0VMA02254D
B 349	MIRROR ADJ. DER. L MK4	0VMA02255D
B 350	SLIDER GEAR MK4	0VMA02135A
B 351	MIRROR(S) or MIRROR(S)	0VMA06638 0VMA06638
B 352	CASSETTE DRIVE GEAR MK4	0VMA02260E
B 353	CASSETTE PLATE MK4	0VMA02261D
B 354	SLIDER R MK4	0VMA01615B

Ref. No.	Description	Part No.
B 355	SLIDER L MK4	0VMA01617D
B 356	LOCK LEVER MK4	0VMA02262F
B 357	LOCK LEVER SPRING MK4	0VMA04015Z
B 358	CAM MK4	0VMA02643A
B 362	MIRROR HOLDER R MK4	0VMA02365B
B 383	GEAR SUPPORTER MK4	0VMA02624D
L1011	SCREW, C-TIGHT M3X9 PAN HEAD+	GPMA03090
L1051	SCREW, S-TIGHT M2.6X8 PAN HEAD+ or SCREW(CAPSTAN) M2.6X8 S-TIGHT	GPMA03060 GPMA05001
L1053	SCREW, S-TIGHT M2.6X8 PAN HEAD+ or SCREW(CAPSTAN) M2.6X8 S-TIGHT	GPMA05000 GPMA05001
L1061	SCREW, S-TIGHT M2.6X8 PAN HEAD+	GPMA05040
L1062	SCREW, S-TIGHT M2.6X8 PAN HEAD+	GPMA05060
L1081	SCREW, S-TIGHT 3X8 BIND HEAD+	GBMS03000
L1091	SCREW, S-TIGHT M3X3 CUP HEAD+	GBMS03060
L1101	SCREW, P-TIGHT 3X8 BIND HEAD+	GBMP03080
L1103	SCREW, P-TIGHT 3X8 BIND HEAD+	GBMP03080
L1111	SCREW, P-TIGHT 3X8 WASHER HEAD+	GBMP03080
L1112	SCREW, P-TIGHT 3X8 WASHER HEAD+	GBMP03080
L1113	SCREW, P-TIGHT 3X8 WASHER HEAD+	GBMP03080
L1114	SCREW, P-TIGHT 3X8 WASHER HEAD+	GBMP03080
L1115	SCREW, P-TIGHT 3X8 WASHER HEAD+	GBMP03080
L1151	SCREW, SEMS M3X4 PAN HEAD+	GPMA03340
L1191	SCREW, P-TIGHT M2.6X12	GPMP0320
L1221	SCREW, SPECIAL	0VMA02698
L1231	SPACER SCREW ASSEMBLY	0VMA03152
L1241	P-TITE SCREW M2X6	GBMP03060
L1251	CS RING(Dx5)	WTM05003
L1291	SCREW, P-TIGHT M2.6X8 PAN HEAD+	GPMP03060
L1311	SCREW, S-TIGHT M3X18 PAN HEAD+	GPMA03180
L1321	SCREW, S-TIGHT M3X8 BIND HEAD+	GBMS03050
L1331	SCREW, S-TIGHT M2.6X12	GBMP03080
L1341	P-TITE SCREW M2.6X8 BIND HEAD+	GPMP03060
L1351	SCREW, SEMS M2.6X6	0VMA02625A

DECK ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a **Δ** have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Parts Interchangeability: Parts with the letters " or " in description column mean that parts so listed are interchangeable between part (s) listed in next line (s). You can use one of interchangeable parts, and it does not cause to change any specifications of the appliance.

NOTE: Parts that not assigned part numbers (-----) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25% D.....±0.5% F.....±1%
G.....±2% J.....±5% K.....±10%
M.....±20% N.....±30% Z.....±80-20%

JNT CBA

Ref. No.	Description	Part No.
	JNT CBA	0VSA07380
	Consists of the following:	
	JOINT CBA (JOINT-A)	
	MODE SW CBA (JOINT-B)	
	ACE HEAD CBA (JOINT-C)	
	LOADING MOTOR CBA (JOINT-D)	

Loading Motor CBA (Joint-D)

Ref. No.	Description	Part No.
	Loading Motor CBA (JOINT-D)	
	Consists of the following:	
B 3	LOADING MOTOR PREPARATION MK5	0VSA07425
	MOTOR PULLEY US	0VM03205A
	LOADING MOTOR RF-370CA-15870	MM020312M001
	LOADING MOTOR(M) MXN-13FRGA2	MM02030MS001

Joint CBA (Joint-A)

Ref. No.	Description	Part No.
	Joint CBA (Joint-A)	
	Consists of the following:	
	CONNECTORS	
CN2691	ANGLE SOCKET CONNECTOR, 20P	1770915
CN2692	FFC CONNECTOR BASE, TOP 9P or FFC CONNECTOR BASE, TOP 9P or FFC CONNECTOR BASE, TOP 9P or FFC CONNECTOR BASE, TOP 9P	JCSJ09SERH0C 1700915 1700449 1700515 1700986
	RESISTORS	
R2691	CARBON RES. 14W J 27K Ω	RCKAJAT20273
	CARBON RES. 15W J 27K Ω	RCKAJAT20273
R2692	CARBON RES. 14W J 27K Ω or CARBON RES. 15W J 27K Ω	RCKAJAT20273
	MISCELLANEOUS	
CL2691	JUMPER WIRE, 5P	WX1K7010-003
CL2692	JUMPER WIRE, 6P	WX1K7010-001
CL2693	JUMPER WIRE, 9P	WX1H5100-001
	FFC CABLE, 9P FFCP1.25/120	WX3909C2413

Mode SW CBA (Joint-B)

Ref. No.	Description	Part No.
	Mode SW CBA (Joint-B)	
	Consists of the following:	
SW 2991	MODE SWITCH HMV04020-810010 or MODE SWITCH SSS 21MD	SSR0104HD002 SSR0104K9001

ACE Head CBA (Joint-C)

Ref. No.	Description	Part No.
	ACE Head CBA (Joint-C)	
	Consists of the following:	
CN2693	FLAT CABLE CONNECTOR 6P or FLAT CABLE CONNECTOR 6P	JEBH06JE001 JC8J06NE001

Ref. No.	Description	Part No.
	CONNECTORS	
CN3801	ANGLE SOCKET CONNECTOR, 17P	1770912
CN3802	FFC CONNECTOR BASE, 9IDF 7P or FFC CONNECTOR BASE, SIDE 7P	JCSJ07FER00C 1700473
	IC	
IC3801	IC LA7372	QSBLAGSSY012
	COIL	
L3801	INDUKTOR 22μH-K-26T or INDUKTOR 22μH-K-26T	LLAKK0TKA220 LLAKKATU220
	RESISTORS	
R3801	CARBON RES. 14W J 22K Ω or CARBON RES. 15W J 22K Ω	RCKAJAT20233
R3802	CARBON RES. 14W J 22K Ω or CARBON RES. 15W J 22K Ω	RCKAJAT20233
R3803	CARBON RES. 14W J 22K Ω or CARBON RES. 15W J 22K Ω	RCKAJAT20233
R3804	CARBON RES. 14W J 47K Ω or CARBON RES. 15W J 47K Ω	RCKAJAT20473
R3805	CARBON RES. 14W J 1K Ω or CARBON RES. 15W J 1K Ω	RCKAJAT20102
R3806	CARBON RES. 14W J 1K Ω or CARBON RES. 15W J 1K Ω	RCKAJAT20102
R3807	CARBON RES. 14W J 8.8K Ω or CARBON RES. 15W J 8.8K Ω	RCKAJAT20882
R3808	CARBON RES. 14W J 8.8K Ω or CARBON RES. 15W J 8.8K Ω	RCKAJAT20882
R3809	CARBON RES. 14W J 33K Ω or CARBON RES. 15W J 33K Ω	RCKAJAT20333
	MISCELLANEOUS	
2B 2	SHIELD, TOP(U13 4#)	0VM302523
2B 3	SHIELD, BOTTOM(U13 4#)	0VM302532
CL3801	JUMPER WIRE, 6P	WX1K7010-012
CL3802	JUMPER WIRE, 5P	WX1H5100-001

FE HEAD CBA (PRV-B)

Ref. No.	Description	Part No.
	FE HEAD CBA (PRV-B)	
	Consists of the following:	
B 73	FEH ASSEMBLY MK5	0VSA07425
	SPACER, FE	0VM40209B
	FE HEAD MH-1315F5/KM-1311550 or FE HEAD VTR-1X2ERS11-122	DHVEC01L004 DHVEC01TE003

FE HEAD CBA (PRV-C)

Ref. No.	Description	Part No.
	FE HEAD CBA (PRV-C)	
	Consists of the following:	
B 73	FEH ASSEMBLY MK6	0VSA07427
	SPACER, FE	0VM40209B
	FE HEAD HV/HF0049A	DHVEC01AL002

HITACHI

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