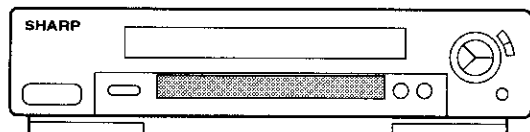


SHARP SERVICE MANUAL

S66i8VC-M23HM

VHS VIDEO CASSETTE RECORDER



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MODELS

VC-M23HM

VC-M24HM

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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PRECAUTIONS IN PART REPLACEMENT

When servicing the unit with power on, be careful to the section marked white all over.

This is the primary power circuit which is live.

When checking the soldering side in the tape travel mode, make sure first that the tape has been loaded and then turn over the PWB with due care to the primary power circuit.

Make readjustment, if needed after replacement of part, with the mechanism and its PWB in position in the main frame.

(1) Start and end sensors: Q851 and Q852

Insert the sensor's projection deep into the upper hole of the holder (LHLDZ1893AJ00). Referring to the PWB, fix the sensors tight enough.

(2) Photocoupler RH-FX0005GEZZ: IC901

Refer to the symbol on the PWB and the anode marking of the part.

(3) Cam switches A and B (RH-PX0238GEZZ): D852 and D853

Adjust the notch of the part to the white marker of the symbol on the PWB. Do not allow any looseness.

(4) Take-up and supply sensors (RH-PX0252GEZZ): D855 and D854

Be careful not to confuse the setting direction of the parts in reference to the symbols on the PWB. Do not allow any looseness.

(5) Diode bridge (RH-DX0083GEZZ): D901

Adjust the + marking of the part to the symbol's cathode marking on the PWB.

1. SPECIFICATIONS

Format:	VHS PAL standard
Video recording system:	Two rotary heads, helical scan system
Video signal:	PAL colour and B/G signals, 625 lines
Recording/playing time:	240 min max. with SHARP E-240 tape (SP) 480 min max. with SHARP E-240 tape (LP)
Tape width:	12.7mm
Tape speed:	23.39 mm/s (SP) 11.70 mm/s (LP)
Antenna:	75 ohm unbalanced
Receiving channel:	UHF Channel E21-E69
RF converter output signal:	UHF Channel E30-E39 (preset to CH E36)
Power requirement:	AC230V-240V, 50Hz
Power consumption:	Approx. 16 W (230V)
Operating temperature:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	Approx. 3.5 kg
Dimensions:	380 mm (W) x 290.5 mm (D) x 93 mm (H)
VIDEO	
Input:	0.5~2.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
S/N ratio:	45 dB (SP)
Horizontal resolution:	250 lines (SP)
AUDIO	
	0 dBs = 0.775 Vrms
Input:	Line: -3.8 dB, 10k ohm
Output:	Line: -3.8 dB, 1k ohm
S/N ratio:	42 dB
Frequency response:	80 Hz ~ 10 kHz (SP) 80 Hz ~ 5kHz (LP)
Accessories included:	75 ohm coaxial cable Operation manual Infrared remote control Battery (2pcs.)

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

BEFORE RETURNING THE VIDEO CASSETTE RECORDER

In addition to the checks necessary as a result of a repair having been carried out, the following additional safety checks should also be made before returning the unit to the user.

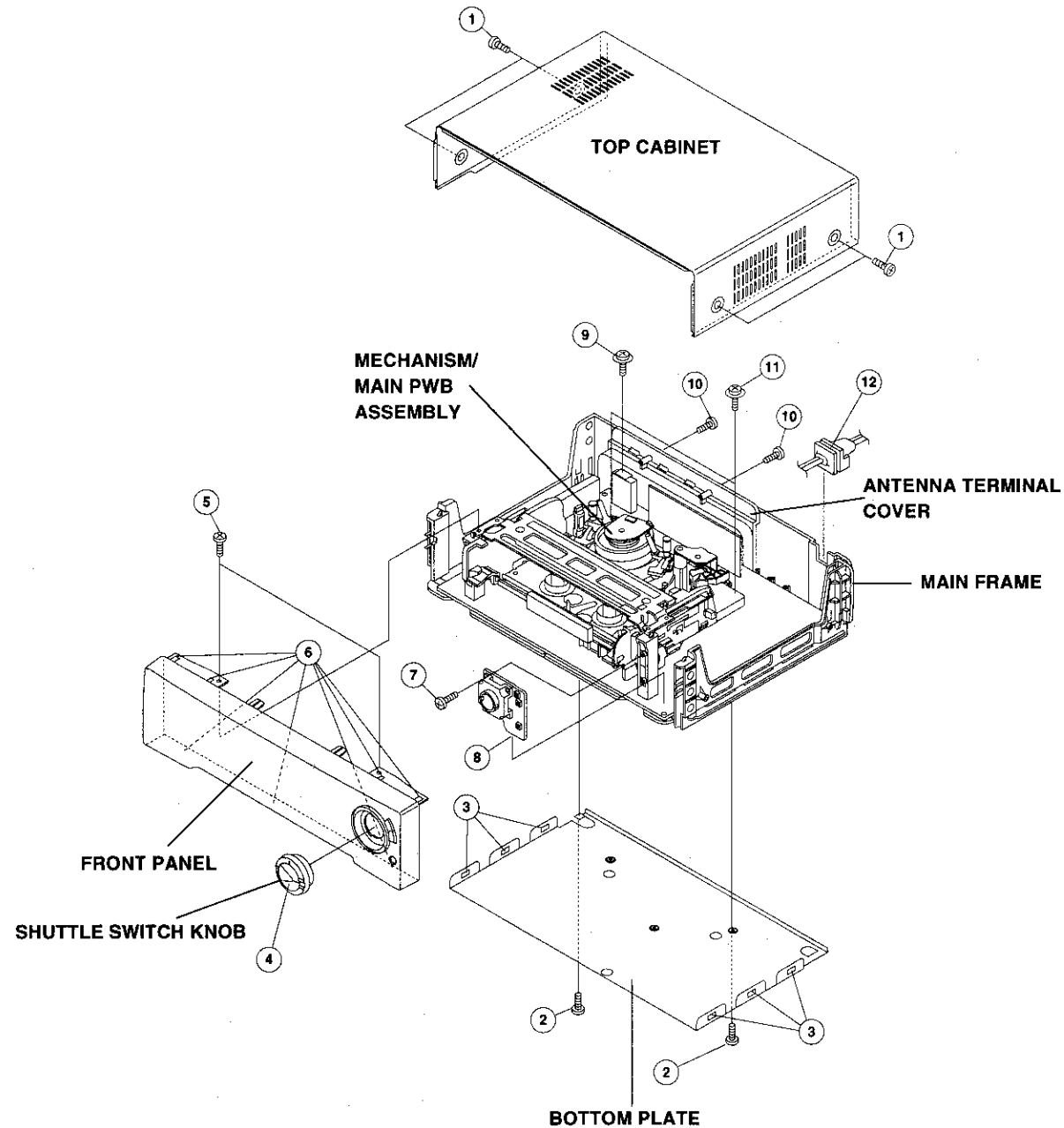
1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the Video cassette recorder.
2. Inspect all protective devices such as non-metallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators etc.
3. Apply test voltage of 3000 volts between live parts and accessible metal parts for 3 seconds.

2. DISASSEMBLY AND REASSEMBLY

2-1 DISASSEMBLY OF MAJOR BLOCKS

- TOP CABINET** : Remove 4 screws ①.
BOTTOM PLATE : Remove 2 screws ② and 6 hooks ③.
FRONT PANEL : Remove shuttle switch ④. Remove 2 screws ⑤ and 7 clips ⑥.
OPERATION PWB : Remove 1 screw ⑦ and take it out of connector ⑧.

- MECHANISM/
MAIN PWB
ASSEMBLY** : Remove 1 screw ⑨, 2 screws ⑩, 2 screws ⑪ and 1 connector ⑫. Lift the antenna terminal cover and take the assembly out of the main frame.

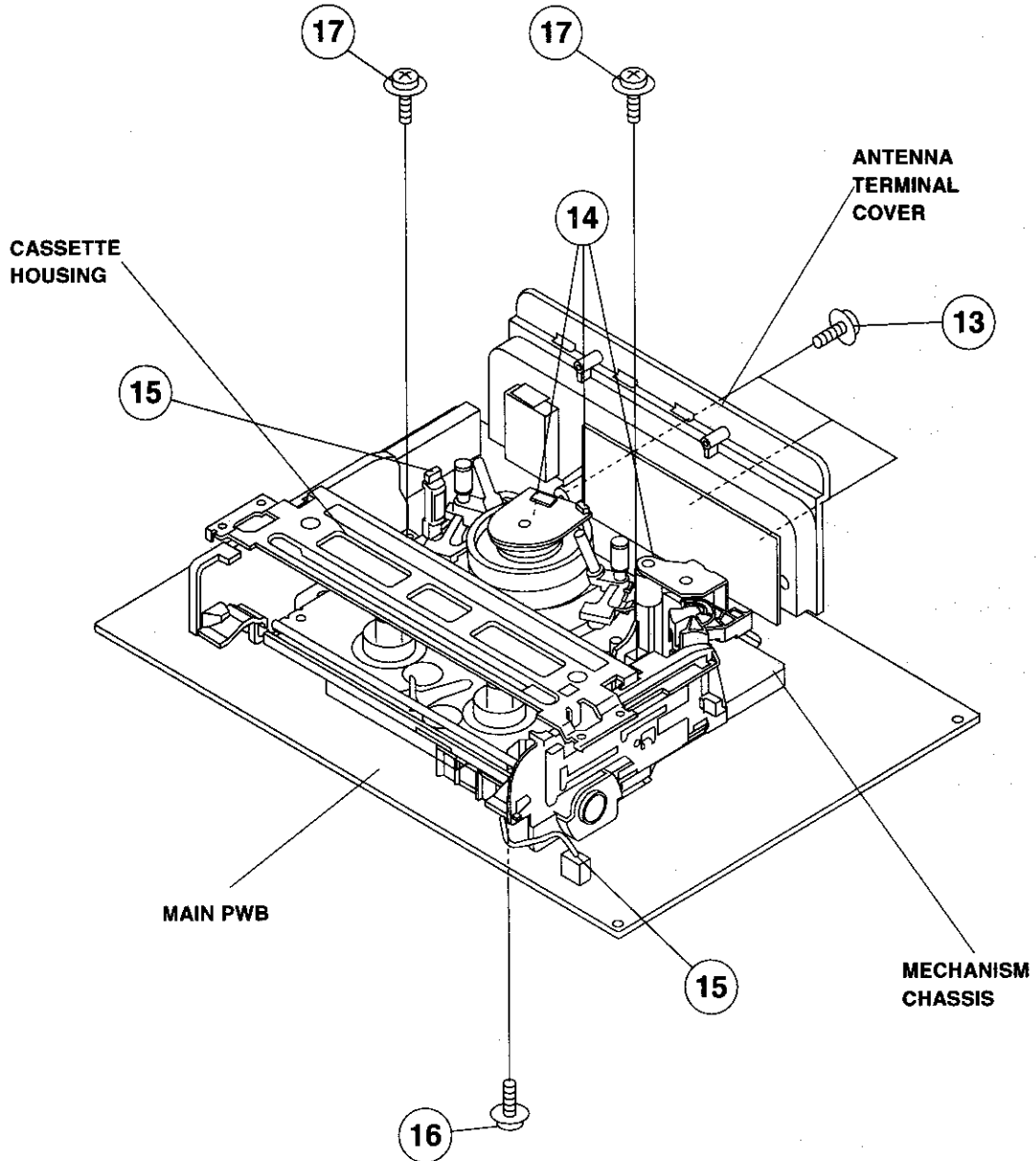


2-2 DISASSEMBLING THE MECHANISM/MAIN PWB ASSEMBLY

ANTENNA TERMINAL COVER MECHANISM CHASSIS/ : Remove 3 screw ⑬. Remove the shield case.
: Remove 3 FFCs ⑭ and 2 harnesses ⑮. Be careful not to confuse the top and

CASSETTE HOUSING ASSEMBLY
CASSETTE HOUSING

bottom of the FFC. Remove 1 screw ⑯ from behind the main PWB. Remove the mechanism chassis assembly straight up from the main PWB with care not to damage their surrounding parts.
: Remove 2 screws ⑰.



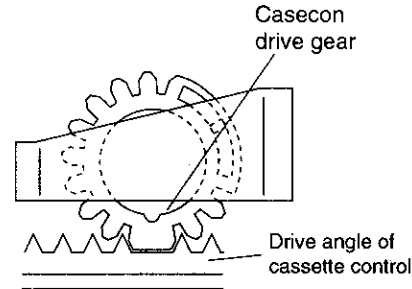
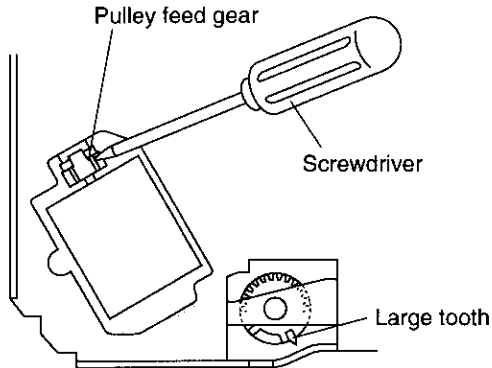
2-3 PRECAUTIONS IN REASSEMBLING

MOUNTING THE CASSETTE CONTROLLER

Initial setting is indispensable before placing the cassette controller in the mechanism. The initial setting is made in two ways; electrical and mechanical.

Electrical setting:

Make a short-circuit between TP703 and TP704 and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is used when the mechanism has been already set on its PWB.)



Mechanical setting:

Turn the loading motor's pulley feed gear using a screwdriver and be sure that the mechanism is back to its initial setting position (*1). Now place the cassette controller in position. (This method is applicable for the mechanism alone.)

COUPLING THE MECHANISM TO THE PWB

Match the mechanism's projections with the two symbols (round reference and oval sub-reference) on the main PWB. Place the mechanism straight down in position with due care so that the mechanism chassis's outer edges should not damage any parts nearby.

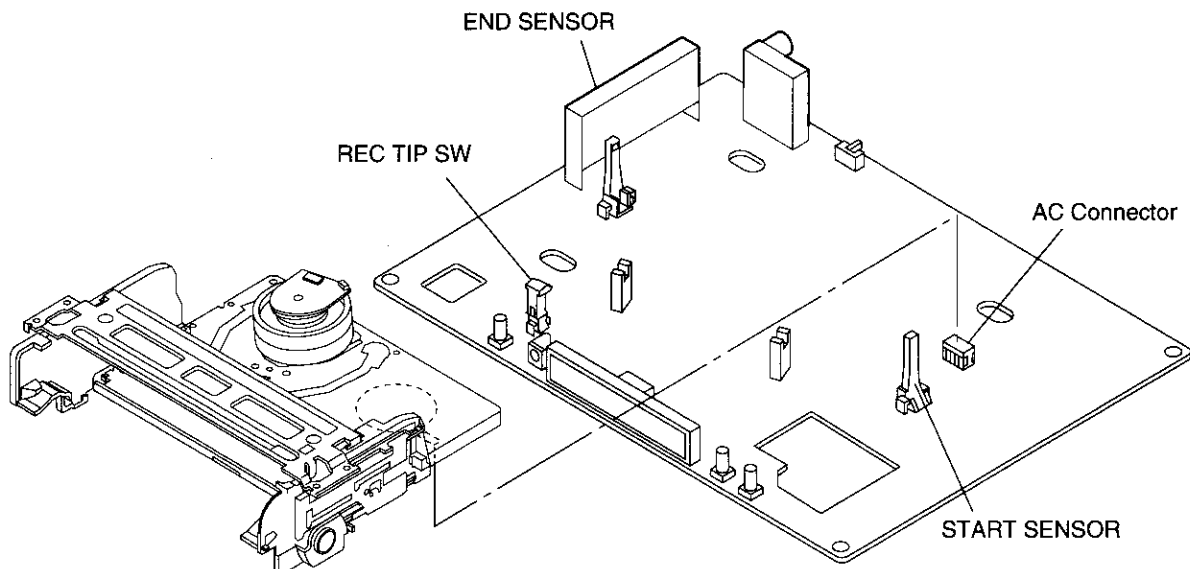
Tighten up the two screws (one for fixing the mechanism and the head amplifier shield, the other on the main PWB's soldering side and located near the loading motor) to fix the mechanism and main PWB. Reconnect the FFC cables (AN and AS) and harness (AB) between the mechanism and main PWB.

Parts to pay attention to:

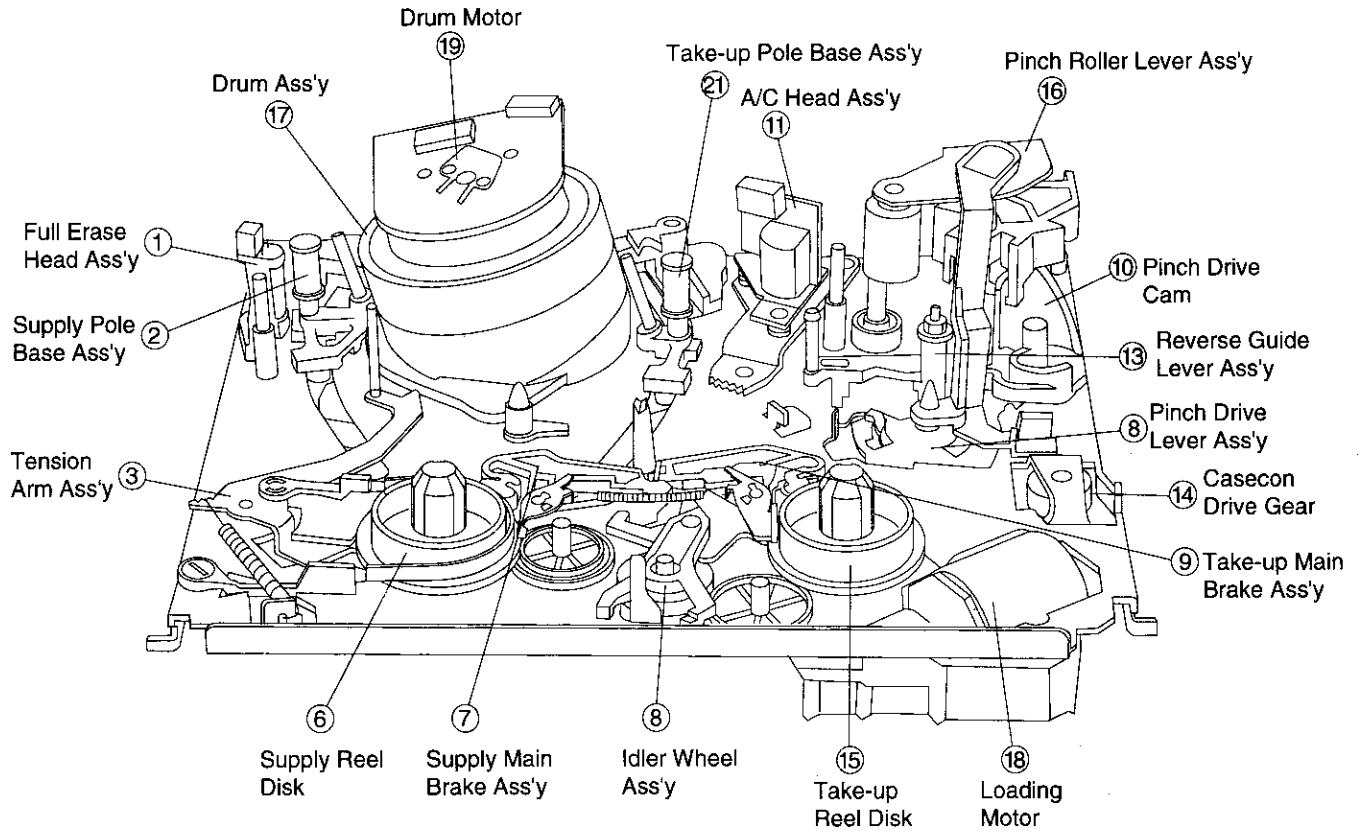
Start and end sensors Q851 and Q852

Rec tip switch S851

Take special care of the AE connector (board to board) between the mechanism and main PWB.

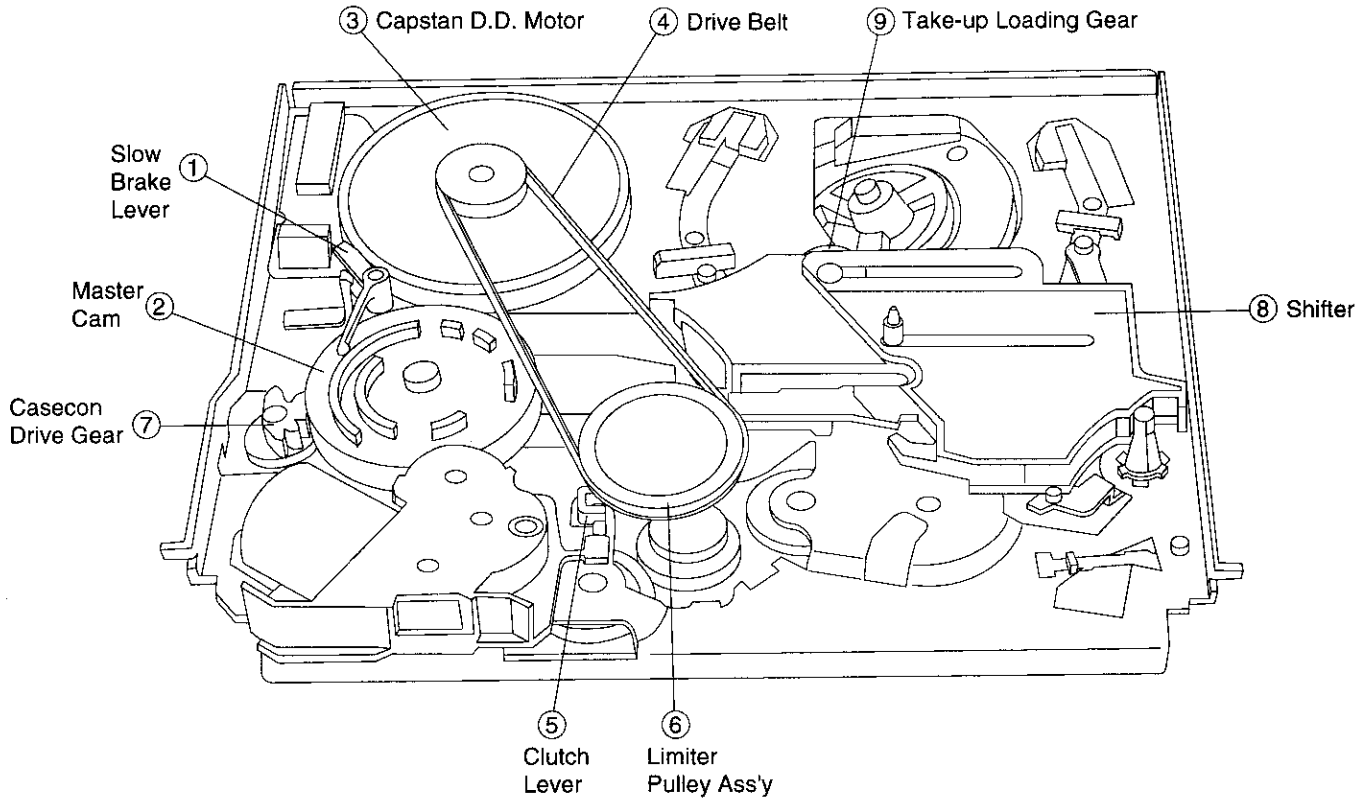


3. FUNCTION OF MAJOR MECHANICAL PARTS (TOP VIEW)



No.	Function	No.	Function
1.	Full erase head ass'y Erase the old recording on the tape in the recording mode.	13.	Reverse guide lever ass'y Pulls out the tape and controls the tape drive train height with the upper and lower guides.
3.	Tension arm ass'y Detects the tension of tape while running, and brakes the supply reel disk via the tension band.	16.	Pinch roller lever ass'y Press-fits the tape to the capstan during tape running.
7.	Sup Main brake ass'y Brakes the supply reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	18.	Loading motor A motive power which drives the mechanism. It transmits the power to the master cam and cassette housing control assembly.
9.	Take-up main brake ass'y Brakes the take-up reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.		

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 (BOTTOM VIEW)



No.	Function	No.	Function
1.	Slow brake lever Gets in contact with the capstan D.D. motor linking to the master cam in the slow still mode, and brakes it to a certain degree.	6.	Limiter pulley ass'y Transmits the power of the capstan D.D. motor to the reel disk via the drive idler.
3.	Capstan D.D. motor A motive power which runs the tape. It transmits the power via the Drive belt.	8.	Shifter Transmits the operation of the master cam to break ass'y. loading gear, tension arm and clutch lever.
4.	Drive belt Transmits the power to run the tape to the Limiter pulley.	9.	Take-up Loading gear Shifts the take-up pole base and guide roller via the loading gear T, and applies the tape around the drum assembly, as well as transmits the power to the loading gears.







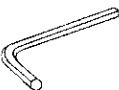
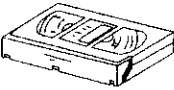
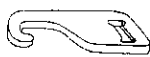
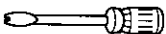
4. ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS

Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly replacement, for example).


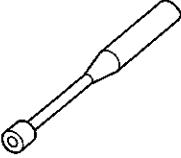

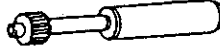
We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original working condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.		Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002	BR		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JiGMP0001	BY		
4	Torque Gauge (90g)	JiGTG0090	CM		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2kg)	JiGTG1200	CN		
5	Gauge Head	JiGTH0006	AW		
6	Cassette Torque Meter	JiGVHT-063	CZ		
7	Tension Gauge (300g)	JiGCG0300	BF		There are two gauges used for the tension measurements, 300 g and 2.0kg.
	Tension Gauge (2.0kg)	JiGSG2000	BS		
8	Hex Wrench (0.9mm)	JiGHW0009	AE		These Jigs are used for loosening or tightening special hexagon type screws.
	Hex Wrench (1.5mm)	JiGHW0015	AE		
9	Alignment Tape (PAL)	VROCPSV	CK		These tapes are especially used for electrical fine adjustment.
	Alignment Tape (PAL)	VROUBZFS			
11	Tension Gauge Adapter	JiGADP003	BK		This Jig is used with the tension gauge. Rotary transformer clearance adjusting jig.
12	Special Bladed Serewdriver	JiGDRIVERH-4	AP		This screwdriver is used for adjusting the guide roller height.

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No.	Jig Item	Part No.		Configuration	Remarks
14	Torque Driver	JiGTD1200	CB		This is used to screw down resinmade parts: the specified torque is 5kg.
15	M3 type 5.5 mm square box driver for reverse guide	JiGDRIVER11055	AR		This Jig is used for height adjustment of the reverse guide (for reverse guide height adjustment).
17	Reverse Guide Height Adjusting Jig	JiGRVGH-F18	BU		This Jig is used for height adjustment of the reverse guide.
18	Gear Driver	JiGDRIVER-6	BM		For X value adjustment

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts	Maintained	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Sup Guide Shaft		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Clean tape contact part with the specified cleaning liquid.
Retaining guide		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Slant pole		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>		
Upper and lower drum ass'y		<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor S/N ratio, no colour Poor flatness of the envelope with alignment tape	Clean tape contact area with the specified cleaning liquid.
Full-erase head		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Poor colour, beating	
A/C head		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Low or distorted audio	
Capstan D.D. Motor		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	No tape running, uneven colour	
Pinch roller		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Drive belt			<input type="checkbox"/>		<input type="radio"/>	No tape running, tape slack, no fast forward/rewind motion	
Tension band ass'y					<input type="radio"/>	Cassette not loaded or unloaded	
Loading Motor					<input type="radio"/>		
Idler Wheel ass'y					<input type="radio"/>	No tape running	
Limit pulley ass'y			<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>		
Supply/take-up Main brake levers					<input type="radio"/>	Tape slack	

- NOTE: ○ : Part replacement.
 : Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△ : Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000hrs).

If the reading is out of the specified value, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

• Removal

1. Set the cassette ejected condition in the cassette eject mode.
2. Unplug the recorder from the main source.
3. Follow the procedures below in the specified order.
 - a) Remove the cassette housing installation screws ①.
 - b) Slide and pull out the cassette housing control assembly upward.

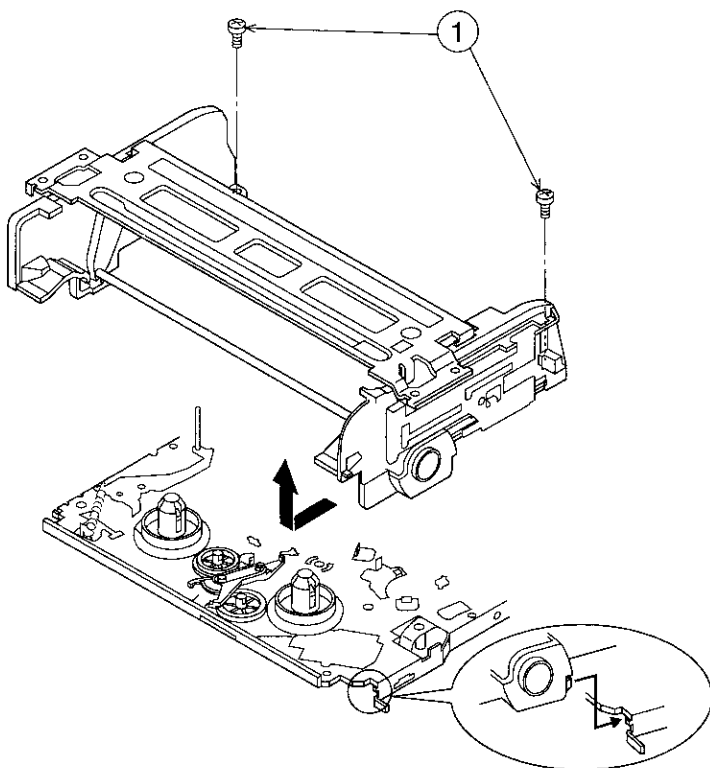


Figure 4-1.

• Reassembly

1. Before installation of the cassette housing control assembly, make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Plug in the power cord. The cassette control drive gear starts and stops just when the big face gear shows in the mechanism chassis window. Engage the tooth 2 of the casecon drive gear with the tooth 3 of the cassette control drive angle as shown in Fig. 5-2, to position the cassette control on the mechanism chassis.

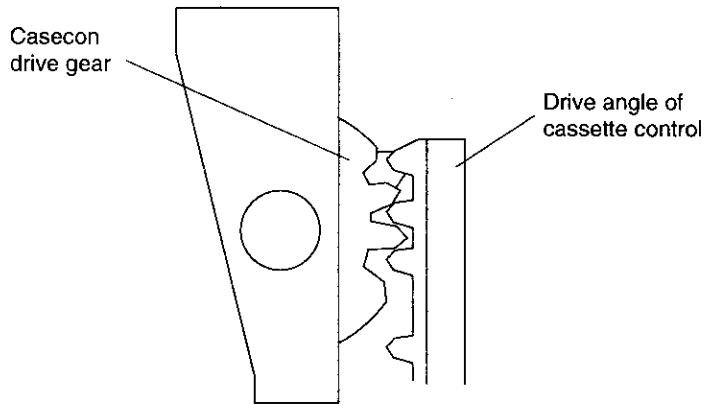


Figure 4-2.

2. Follow the procedures for removal in the reverse order.

Notes:

- ① In using a magnet screw driver, be sure to keep it away from the A/C head, FE (Full Erase) head, and the drum.
- ② In removal and reassembly, take care not to hit the cassette housing control assembly and tools against the guide pin, drum, or the like there about.
- ③ Load the cassette once onto the cassette housing control assembly after reassembly.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Be sure to make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB before turning on the power.
2. Plug in the power cord.
3. Turn on the power switch.
4. Open the lid of a cassette tape by hand.
5. Hold the lid with two pieces of vinyl tape.
6. Set the cassette tape in the mechanism shassis.
7. Stabilize the cassette tape with a weight (500g) to prevent floating.
8. Perform running test.

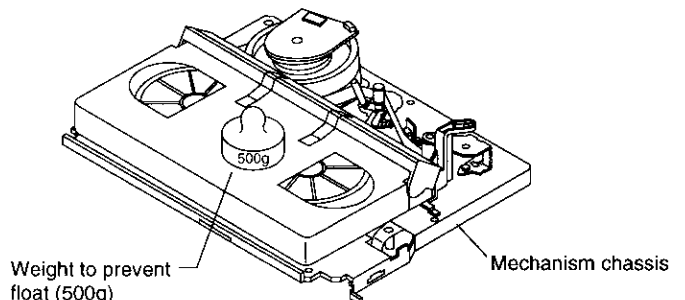


Figure 4-3.

Note:

The weight should not be more than 500g.

REPLACEMENT AND HEIGHT CHECKING AND ADJUSTMENT OF REEL DISKS

• Removal (Supply and Take-up reel disks)

1. Remove the cassette housing control assembly.
2. Pull the tension band out of the tension arm.
3. Release the supply/take-up auxiliary brake lever by hand, which makes unnecessary removal of the supply main brake and the take-up main brake.
4. Open the hook at the top of the reel disk, and remove the reel disk.

<In the EJECT or UL STOP mode>

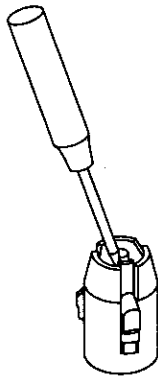
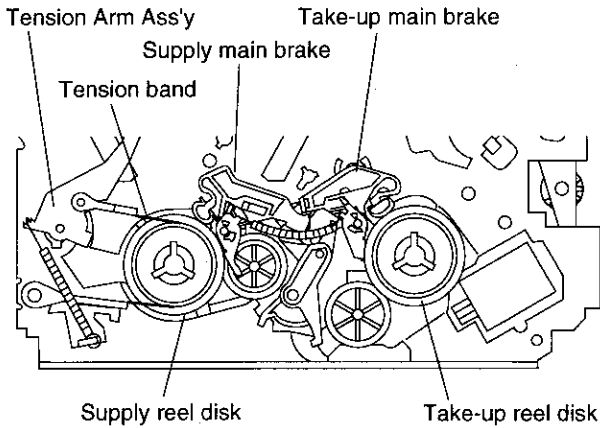


Figure 4-4.

Note:

When the tension band is pressed in the direction of the arrow for removal, the catch is hard to be deformed.



Figure 4-5.

• Reassembly (Supply reel disk)

1. Clean the reel disk shaft and apply oil to it.
2. Align the phase of the reel disk to that of the reel relay gear, and install a new supply reel disk onto the shaft.
3. Replace the tension band around the supply reel disk, and insert it into the hole of the tension arm with the supply auxiliary brake lever released.
4. Check the reel disk height.

Notes:

- ① Take enough care not to deform the tension band during installation of the supply reel disk.
- ② Be careful not to damage the supply main brake and the reel relay gear.

• Reassembly (Take-up reel disk)

1. Clean the reel disk shaft and apply oil to it.
2. Release the take-up auxiliary brake lever to align the phase of the reel disk to that of the reel relay gear and to install a new take-up reel disk onto the shaft.
3. Check the reel disk height and reassemble the take-up main brake.

Note:

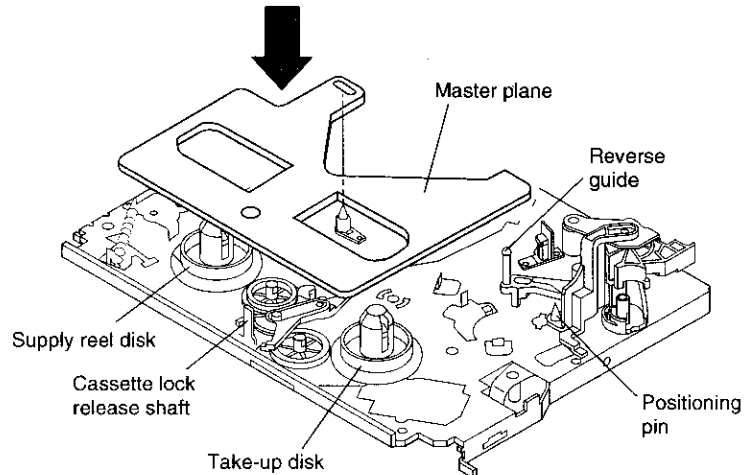
Take care not to damage the take-up main brake.

- * After reassembly, check the video search rewind back tension (see page 16), and check the brake torque (see page 18).

• Height checking and adjustment

Note:

Place the master plane onto the mechanism unit, taking care not to hit the drum (see Figure 4-6).



Set the master plane releasing the reverse guide by a finger.

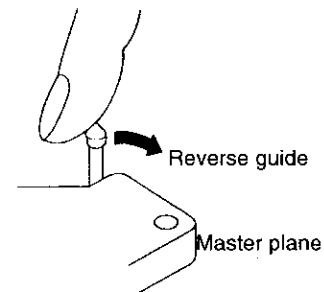


Figure 4-6.

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- Check that the reel disk is lower than part A but higher than part B. If the height is not correct, readjust the reel disk height by changing the poly-slider washer under the reel disk.

Note:

Whenever replacing the reel disk, perform the height checking and adjustment.

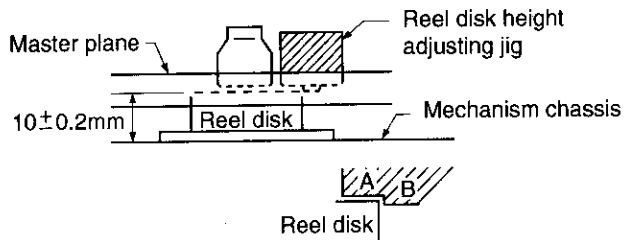


Figure 4-7.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST FORWARD MODE

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.**
- **Setting**
 1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
 2. Press the FF button to set the mechanism to the fast forward mode.
 3. To calculate the remaining capacity of the play back mode, slowly rotate the supply reel disk, and then shift it into the forward mode.
- **Checking**
 1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
 2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

• **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, drive belt and limiter pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the drive belt.

Notes:

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.**
- **Setting**
 1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
 2. Press the REW button to set the mechanism to the rewind mode.
 3. To calculate the remaining capacity, slowly rotate the take-up reel disk, and then shift it into the rewind mode.
- **Checking**
 1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
 2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

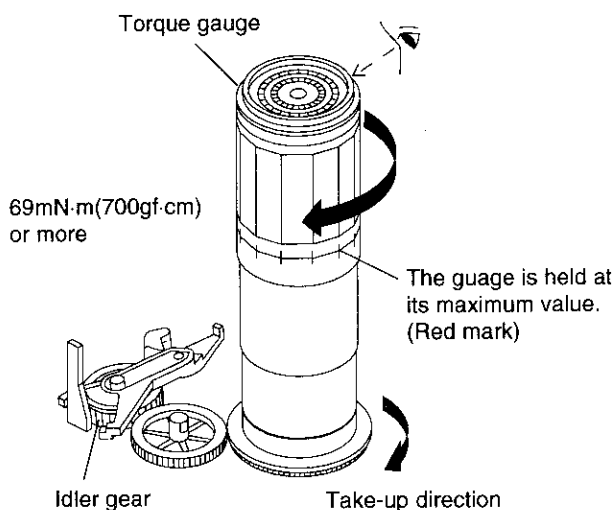


Figure 4-8.

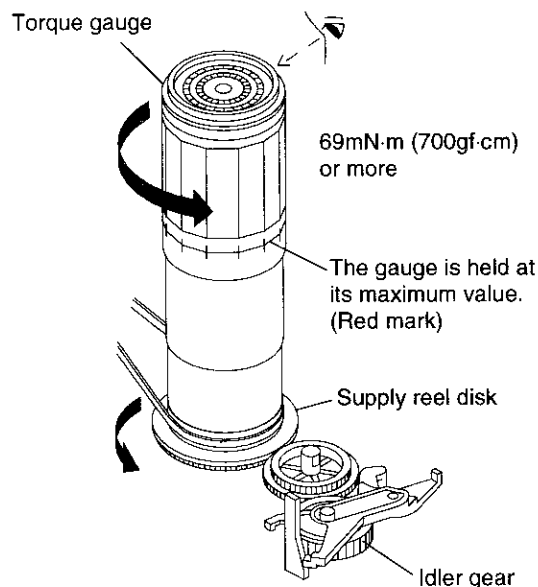


Figure 4-9.

• **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, drive belt and limiter pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the drive belt.

Notes:

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN PLAYBACK MODE

1. Remove the cassette housing control assembly.
2. Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
3. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
4. Load the cassette torque meter into the unit.
5. Put the weight (500g) on the cassette torque meter.
6. Press the REC button to put the unit in REC mode.

Set value LP $10.5 \pm 3.8\text{mN}\cdot\text{m}$ ($107 \pm 39\text{gf}\cdot\text{cm}$)

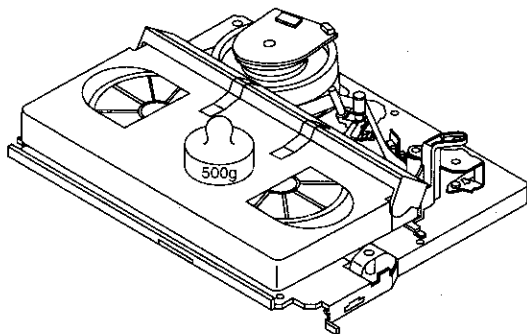


Figure 4-10.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.**
- **Setting**
 1. Push the PLAY button to place the ass'y in the playback mode.
 2. Push the REW button to place the ass'y in the video search rewind mode.
- **Checking**
 1. Place the torque gauge on the supply reel disk, and turn it counterclockwise very slowly (one rotation every 1 to 2 seconds) and check that the torque is within the set value $14.0 \pm 3.9\text{mN}\cdot\text{m}$ ($144 \pm 40\text{gf}\cdot\text{cm}$).

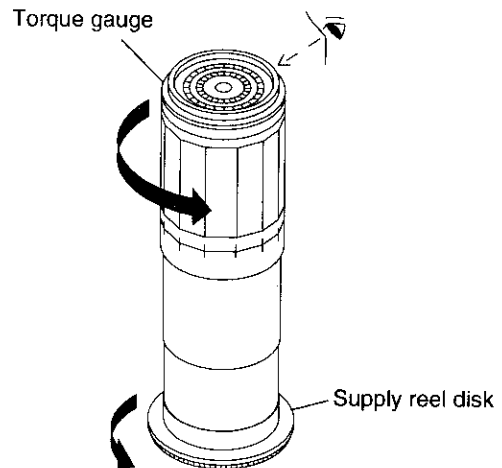


Figure 4-11.

• **Checking**

1. Check that the torque is in the range of $10.5 \pm 3.8\text{mN}\cdot\text{m}$ ($107 \pm 39\text{gf}\cdot\text{cm}$).
2. The torque fluctuates due to the rotational deviation of the limiter pulley ass'y. Use the center of the fluctuation as the value.
3. Place the ass'y in the LP record mode, and check that the take-up torque is within the range.

• **Adjustment**

If the take-up torque in the playback mode is outside the range, replace the limiter pulley ass'y.

Note:

Stabilize the cassette torque meter to prevent floating.

Note:

Set the torque gauge securely on the supply reel disk. If it is not secure, the measurement will be incorrect.

• **Adjustment**

If the take-up torque in video search rewind mode is outside the range, replace the limiter pulley ass'y.

Note:

The torque fluctuates due to the rotational deviation of the limiter pulley ass'y. Use the center of the fluctuation at the value.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

- Remove the cassette housing control assembly.
- Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
- **Checking**
 1. Push the PLAY button to place the ass'y in the playback mode.
 2. Push the rewind button to place the ass'y in the video search rewind mode.
 3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within the set value $3.0 \pm 1 \text{ mN}\cdot\text{m}$ ($31 \pm 10 \text{ gf}\cdot\text{cm}$).

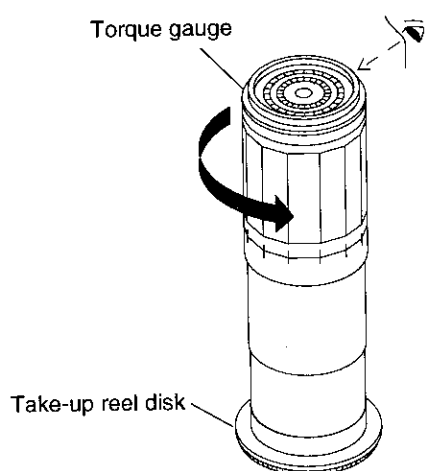


Figure 4-12.

Notes:

1. Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.
2. Measure the torque applying the torque gauge's weight.

CHECKING THE PINCH ROLLER PRESSURE

- Remove the cassette housing control assembly.
- Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
- **Checking**
Push the PLAY button to place the ass'y in the playback mode.

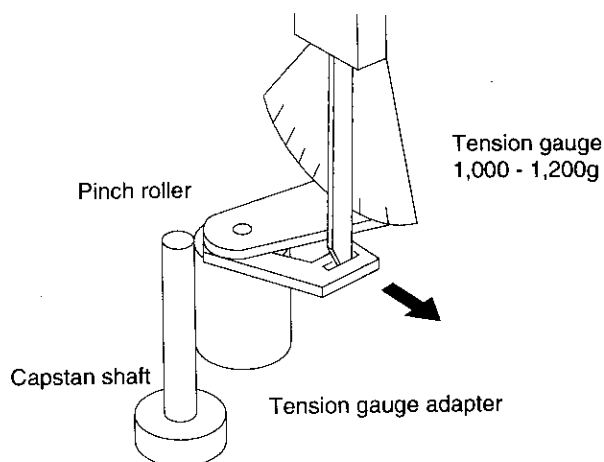


Figure 4-13.

1. Detach the pinch roller from the capstan shaft.
2. Set the tension gauge by hooking the tension gauge adapter onto the pinch roller shaft.
3. Gradually release the pressure to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
4. Check that the reading of the tension gauge is in the range of 900 to 1200 g.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

- Remove the cassette housing control assembly.
- Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
- **Setting**
 1. Open the lid of cassette tape (E-180), and hold it with two pieces of vinyl tapes.
 2. Load the cassette tape into the unit.
 3. Put the weight (500g) on the cassette tape.
 4. Make the adjustment with the beginning of a E-180 tape.

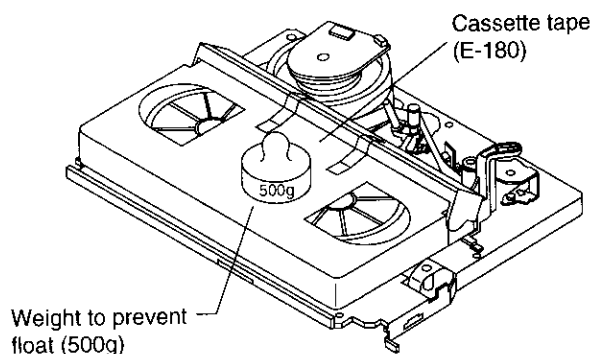
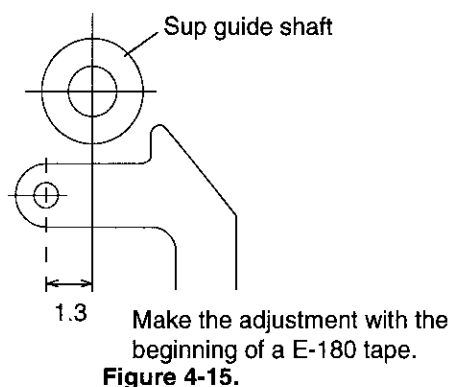


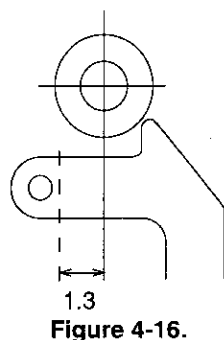
Figure 4-14.

- **Checking**
 1. Set a cassette tape, press the REC button and get the tape loaded. Now check the tension pole position.

2. Visually check to see if the center of the tension pole is in alignment with the line 1.3 mm left of the center line of the sup guide shaft. Readjust as required in the following steps.

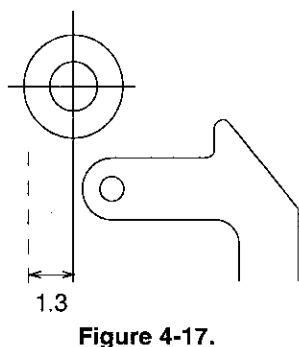


- ① If the center of tension pole is at the left from the dotted line:



Put a bladed screwdriver into the tension pole ADJUSTER and turn it clockwise.

- ② If the end is at the right from the dotted line:



Put a bladed screwdriver into the tension pole adjuster to turn it counter-clockwise.

- ③ Adjustable range of the tension pole ajuster.
- ④ Adjustable range of tension pole adjusting cam.

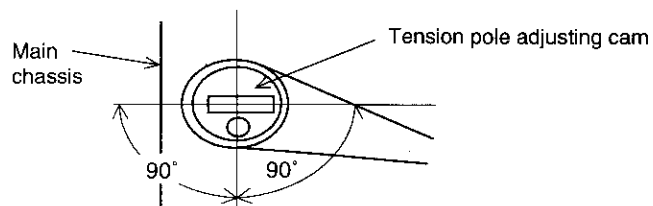


Figure 4-18.

Adjust the tension pole adjuster so that the circle mark on the cam be within 90° left and right.

CHEKING AND ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

- Remove the cassette housing control assembly.
- Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
- **Setting**
 1. Open the lid of cassette torque meter, and hold it with two pieces of vinyl tapes.
 2. Load the cassette torque meter into the unit.
 3. Put the weight (500g) on the cassette torque meter.

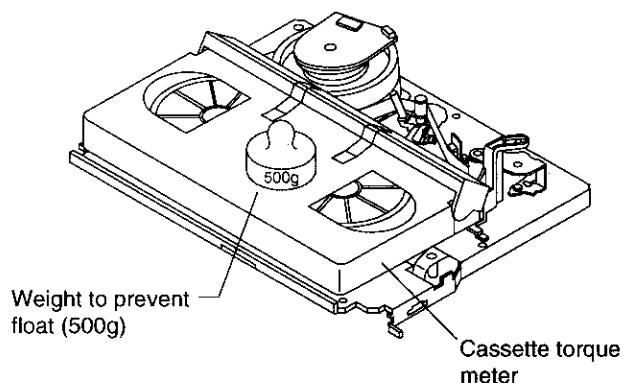


Figure 4-19.

- **Checking**
 1. Push the REC button to place the unit in the record mode.
 2. Check that the back tension indicated by the gauge is within the set range 31 to 38 g.cm.

Notes:

1. Make sure that the video cassette tape is over the retaining guide.
2. Make sure that the tape is not slack nor damaged at either end.

• **Adjustment**

1. If the reading of the cassette torque meter is less than specified, move the tension spring hook toward A.
2. If the reading of the cassette torque meter is more than specified, move the tension spring hook toward B.

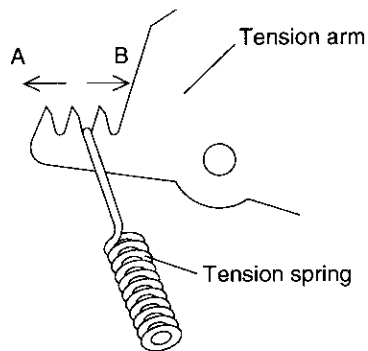
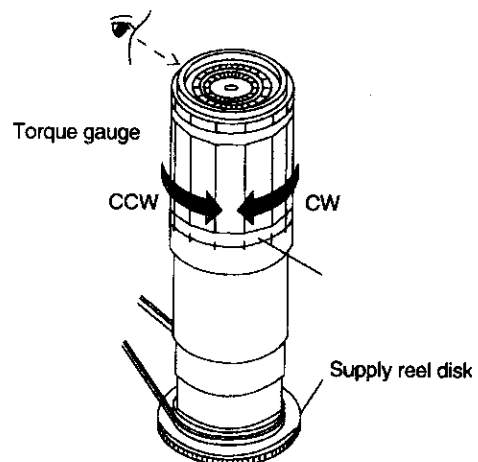


Figure 4-20.

CHECKING THE BRAKE TORQUE

- **Checking the brake torque at the supply side**



CCW: 5.9~9.8mN·m (60~100gf·cm)
CW: 10~32mN·m (100~330gf·cm)

Figure 4-21.

- **Remove the cassette housing control assembly.**
- **Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.**
- **Setting**
 1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
 2. Switch from the FF mode to the STOP mode.
 3. Disconnect the AC power plug.
- **Checking**
 1. Rotate the torque gauge (approx. one revolution per 2 seconds) in the clockwise (CW) direction and counterclockwise (CCW) direction of the supply brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CW direction = 10~32mN·m (100~330gf·cm), CCW direction = 5.9~9.8mN·m (60~100gf·cm), and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

- Checking the brake torque at the take-up side

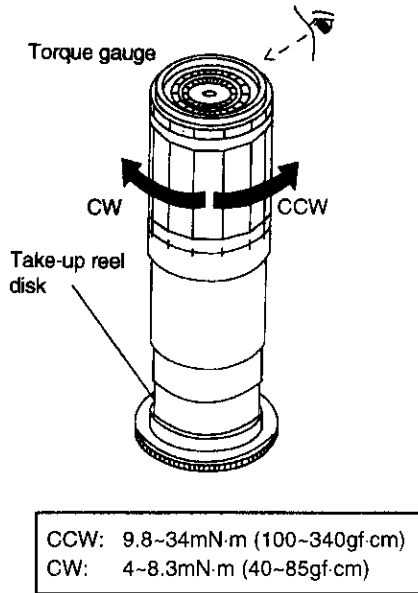


Figure 4-22.

- Remove the cassette housing control assembly.
- Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.

• Setting

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

• Checking

1. Rotate the torque gauge (approx. one revolution per 2 seconds) in the clockwise (CW) direction and counterclockwise (CCW) direction of the take-up brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CCW direction= 9.8~34mN·m (100~340gf·cm), CW direction = 4~8.3mN·m (40~85gf·cm), and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

• Adjustment of the brake torque at the supply side and the take-up side

1. If the supply or take-up brake torque is outside the range, clean the supply or take-up reel disk brake lever pad, then recheck the torque.
2. If the supply or take-up brake torque is still outside the range, replace the main brake ass'y.

Note:

When the main brake is replaced, perform the height checking and adjustment of reel disks (see page 13), and the brake torque checking.

REPLACEMENT OF A/C (Audio/Control) HEAD

1. Remove the cassette housing control assembly.
2. Place the unit in the unloading mode, and unplug the power cord.

• Removal

1. Remove the screw (A)(B)(C)(1)(2).
2. Unsolder the A/C head PWB soldered to the A/C head assembly.

Notes:

1. After replacement, be sure to perform the adjustment of the tape drive train (see page 21). Under any circumstances, avoid touching the head. Clean the head, if touched with your finger, with alcohol.
2. Take care that the springs do not fly off when removing the screws (A)(B)(C).

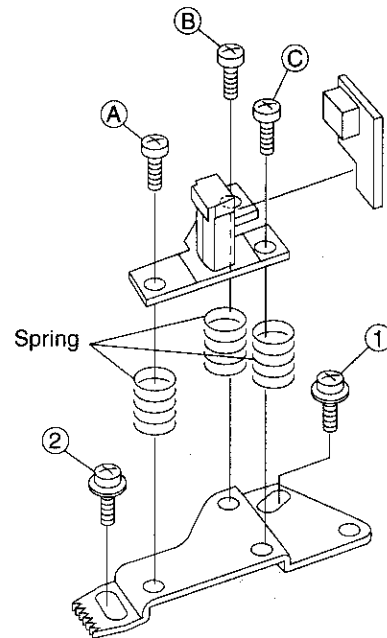


Figure 4-23.

• Replacement

1. Solder the removed A/C head PWB onto a new A/C head assembly.
2. Using the slide calipers, set 10.3 mm for the height of the A/C head arm (bottom surface) to the A/C head plate (screw area). (3 places)
(See the figure below.)

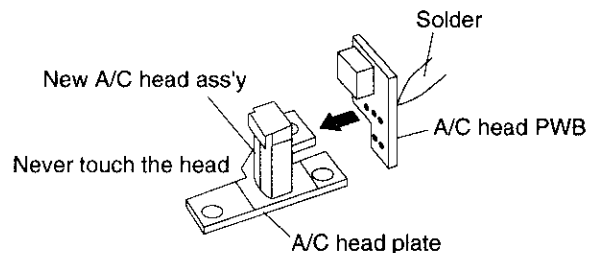


Figure 4-24.

- Align the left end of the gear of the A/C head arm to the mark on the chassis, and temporarily tighten the screws ① and ② to allow the A/C head arm to smoothly move.
(Reference: Temporary tightening torque: 0.2 N.m as preferable)

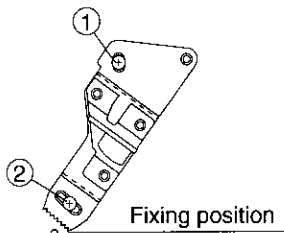


Figure 4-25.

Note:

Take care that the adjustment or height of the A/C head may vary during final tightening if the screws ① or ② is temporarily tightened to be loose.

[A/C head height rough adjustment]

• **Setting**

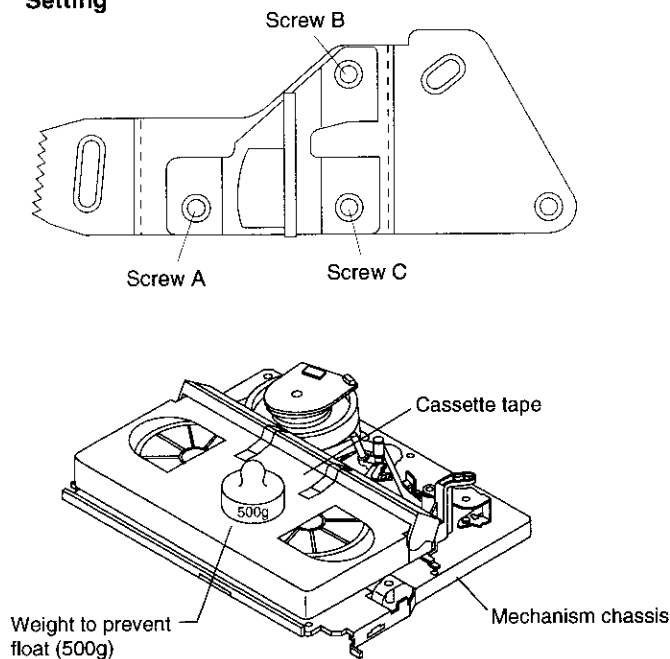


Figure 4-26.

- Set the cassette tape to the mechanism chassis.
- Press the PLAY button to put the unit in the playback mode.
- Roughly adjust the height of the A/C head by turning the screw ③ until the tape is in the position shown below.

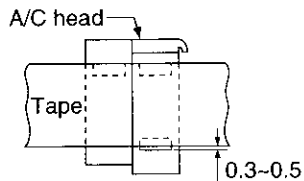


Figure 4-27.

• **Adjustment**

Adjust the screw (③) visually so that the control head is visible 0.3 to 0.5mm below the bottom of the tape.

HEIGHT ADJUSTMENT OF REVERSE GUIDE

[Height adjustment of reverse guide]

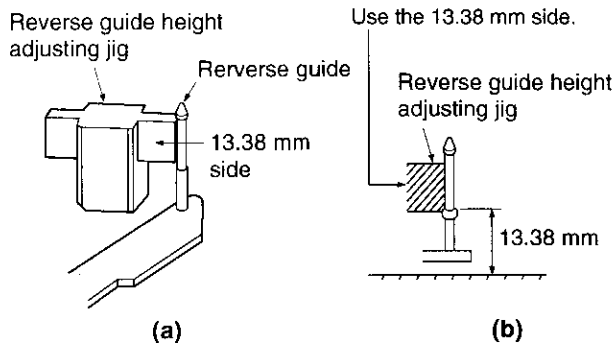


Figure 4-28.

- Remove open lever (Figure 4-29(a)).
- In the tape load mode, make adjustment at the 13.38mm side first and then rotate the reverse guide adjuster nut by 1/10 turn counterclockwise.
- Actually load the unit with a tape, put it in the play mode, and make sure the tape is free from wrinkles near the reverse guide.
- Use a commercially available box driver to turn the height adjusting nut.

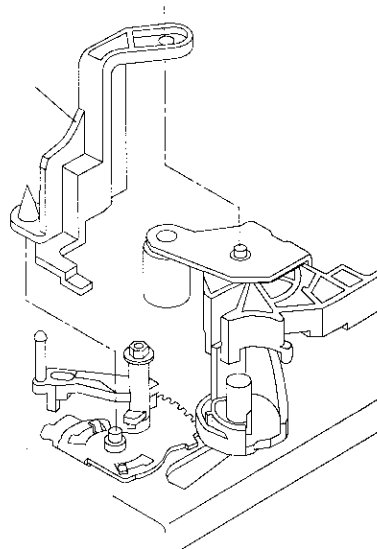


Figure 4-29 (a).

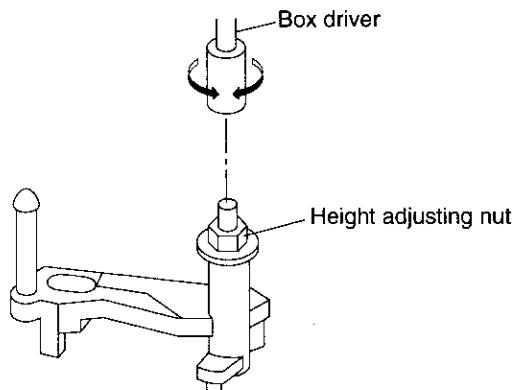


Figure 4-29 (b).

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Remove the cassette housing control assembly.
2. Make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB. Now turn on the power.
3. Check and adjust the position of the tension pole. (See page 16.)
4. Check and adjust the video search rewind back tension. (See page 16.)
5. Set the A/C head. (See page 19.)
6. Rough adjustment of tape drive train.
 - a) Connect the oscilloscope to the test point for PB CHROMA envelope output (TP201). Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP202).
 - b) Loosen the setscrew at the lower part of the guide roller, and adjust it with an adjusting screw driver (JIGDRIVERH-4) so that the guide roller turns smoothly. (Do not overloosen the setscrew, which causes insecurity of the guide roller.) (See Figure 4-30.)
 - c) Set the alignment tape (monoscope pattern) on the reel disk, and place the unit in the playback mode. (Place a 500 g weight on the cassette tape to prevent floating of the cassette tape.)

Notes:

1. Place the tracking control in the center position, and adjust the X-position so that the PB CHROMA envelope becomes maximum for easier rough adjustment of the tape drive train.
2. In the rough adjustment, pay particular attention to the outlet side.

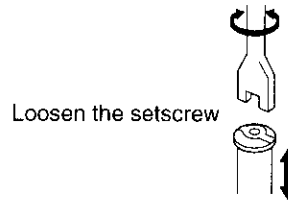


Figure 4-32.

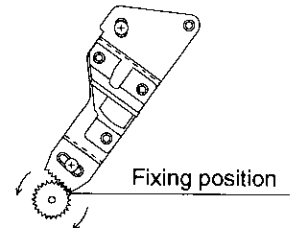


Figure 4-33.

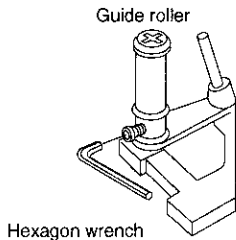


Figure 4-30.

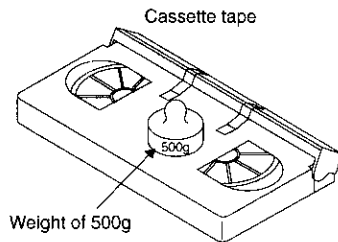


Figure 4-31.

- d) In the X value adjustment mode (see the Electrical Adjustment), change the envelope waveform from MAX to MIN, and MIN to MAX by pushing the (+) or (-) tracking button, and check a flat response is obtained on the waveform.
 - e) If a flat response cannot be obtained, roughly adjust the guide rollers on the supply side and take-up side using an adjusting screw driver until a flat response can be obtained.
 - f) Tighten the screw (A) to eliminate wrinkles from the tape of the retain guide flange area.
Replace the tape to check the tape on the retain guide flange area for wrinkles.
 - (1) No wrinkle is present.
Turn the screw (A) clockwise to generate wrinkles on the tape at the flange area, and then back off the screw (A) as far as the wrinkles are just eliminated.
 - (2) Wrinkles are present.
Turn the screw (A) counterclockwise as far as the wrinkles are just eliminated.
- Reference:**
If the screw (A) is turned clockwise, wrinkles will be produced on the lower flange.

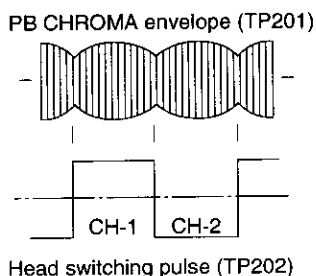


Figure 4-34.

7. Adjustment of A/C head height and azimuth

- a) Connect an oscilloscope to the audio output terminal.
- b) Using the alignment tape with linear audio pre-recorded signal of 1 kHz, adjust the screws ② and ③ to maximize the audio output, and adjust the screw A to eliminate wrinkles from the tape at the retain guide flange. (Refer to P21-6-f.) Repeatedly adjust the screws ②, ③ and ① in this sequence until the audio output becomes the maximum. (1 to 3 times as ordinary)
- c) Using the alignment tape which records a linear audio signal of 7 kHz, finally adjust the screw ② until the audio output becomes the maximum.

8. Adjustment of tape drive train and X-Position

(Use the alignment tape VROUBZFS.)

- a) Connect the oscilloscope to the test points (TP201) for PB CHROMA envelope output. Set the synchronism of the oscilloscope to EXT.
The PB CHROMA signal is to be triggered by the head switching pulse (TP202).
- b) Play back the tape drive train alignment tape.
- c) Push the (+) or (-) button to change the envelope waveform from MAX to MIN, and MIN to MAX.
Adjust the guide roller's height on the supply and take-up sides with an adjusting screw driver, to obtain an envelope waveform that is as flat as possible.
- d) If the tape is above or below the helical lead, the PB CHROMA waveform will take the shape shown in Figure 4-35.
- e) Adjust for maximum flatness of the envelope as the step 6, e) in page 21.
- f) Push the (+) or (-) tracking button to check that a flat response is obtained on the envelope waveform.

	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 4-35.

- g) Secure the guide roller by tightening the guide roller set-screw in the unloading mode.
 - h) Play back the tape drive train alignment tape to check that the envelope waveform does not change.
9. Adjustment of A/C head X-position.
- a) In the X value adjustment mode (see the Electrical Adjustment), make a short-circuit between TP5005 and TP5006, both located at the left on your side on the main PWB, to center the tracking.
 - b) Move the A/C head arm with an adjusting gear driver, and adjust the A/C head position for maximum head switching pulse hi side envelope.
Finally tighten the screws ① and ②. (First tighten the screw ①, and next the screw ②.) (Figure 4-36①②)
(Reference: Final tightening torque: 0.6 N.m as preferable.)
 - c) Adjust the playback switching point.
 - d) Check the flatness of the envelope waveform and sound by playing back a recorded tape.

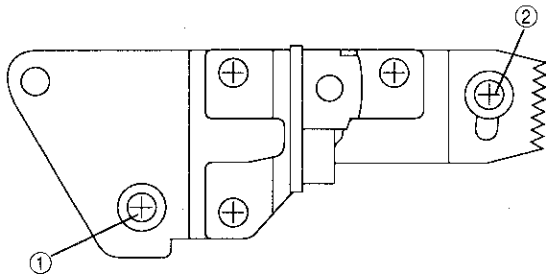


Figure 4-36.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- Remove the cassette housing control assembly.
 - Removal (Follow the order of indicated numbers.)
1. Disconnect from the board-to-board connector on the main PWB.
 2. Remove the reel belt ①.
 3. Remove the screws ②.

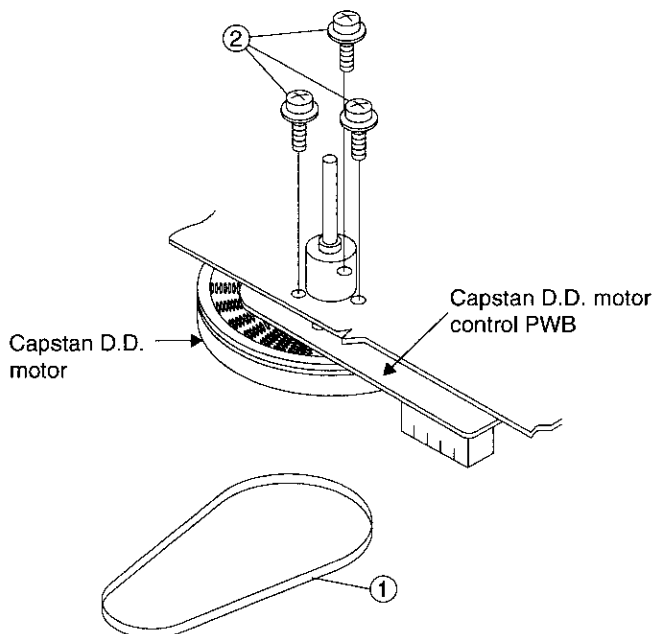


Figure 4-37.

- Reassembly
1. Mount the capstan motor on the mechanism chassis making sure not to allow the capstan shaft to hit the mechanism chassis, and attach it with the three screws.
 2. Attach the reel belt. Reconnect to the board-to-board connector on the main PWB.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan D.D. motor and check the movement.
2. Check the servo circuit.

REPLACEMENT OF DRUM D.D. MOTOR

1. Put the unit in the cassette eject position.
2. Unplug the power cord.

- Removal (Reverse the order in reassembly.)

1. Disconnect the FFC cable ①.
2. Unscrew the D.D. stator assembly fixing screws ②.
3. Take out the D.D. stator assembly ③.
4. Unscrew the D.D. rotor assembly fixing screws ④.
5. Take out the D.D. rotor assembly ⑤.

Notes:

1. In removing the D.D. stator assembly, part of the drum earth spring pops out of the pre-load collar. Be careful not to lose it.
2. Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and upper drum assembly match.
(Match the upper drum's notch with the rotor's hole.)
3. Be careful not to damage the upper drum or the video head.
4. Be sure that the hall device and the D.D. stator assembly are not damaged by the D.D. rotor assembly or other parts.
5. After installation, adjust the playback switching point.

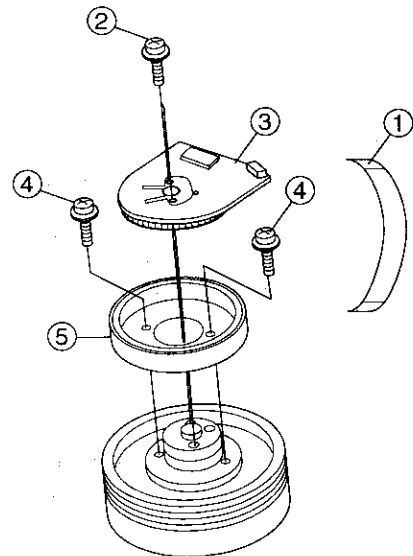


Figure 4-38.

ASSEMBLE THE MECHANISM'S PARTS REQUIRING THE PHASE MATCHING IN THE STEPS BELOW.

1. Assembling the pinch roller assembly, reverse guide assembly and the pinch drive cam (on the front of the mechanism chassis).
2. Mounting the shifter (on the back of the mechanism chassis).
3. Mounting the master cam (on the back of the mechanism chassis).
4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

1. Assembling the pinch roller assembly, reverse guide assembly and the pinch drive cam (on the front of the mechanism chassis).

Place the following parts in position in numerical order.

- (1) Reverse drive lever ①
- (2) Reverse guide spring ②
- (3) Reverse guide lever ass'y ③
- (4) R/G adjusting nut ④
- (5) Pinch drive cam ⑤
- (6) Pinch roller ass'y ⑥
- (7) Open lever ⑦

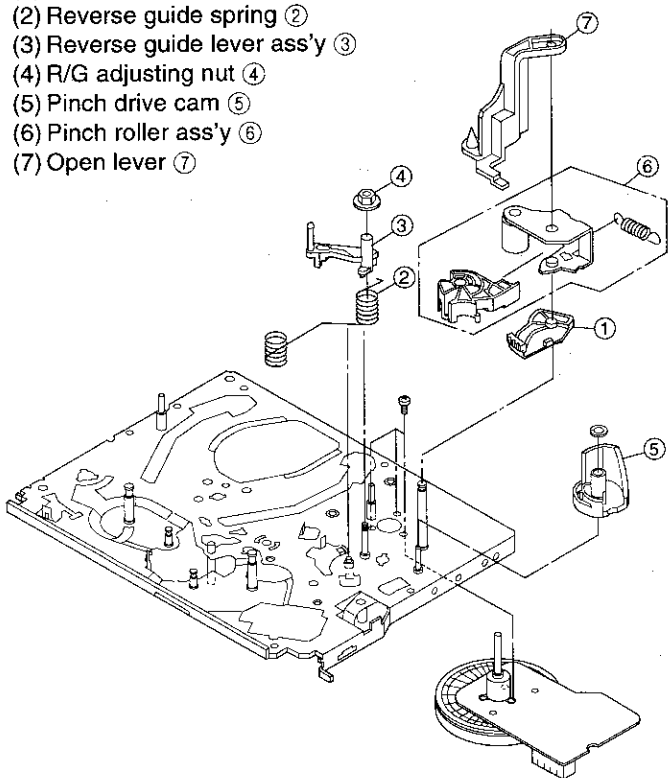
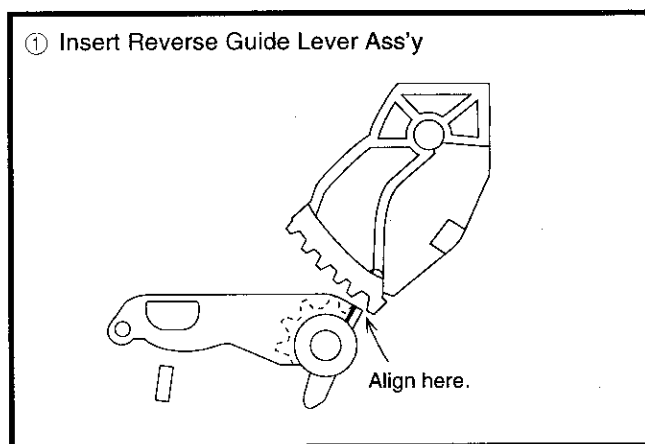


Figure 4-39.

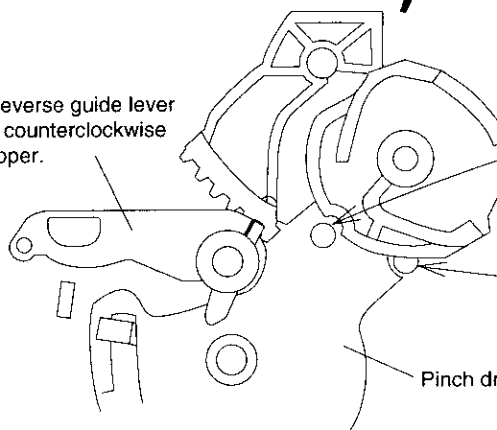


① Insert Reverse Guide Lever Ass'y

Align here.

② Insert Pinch Drive Cam

Turn the reverse guide lever assembly counterclockwise to the stopper.



Insert the pinch drive cam, aligning its notch to the projection on the pinch drive lever assembly.

Insert the pinch drive lever assembly, aligning its notch to the projection on the chassis.

Pinch drive lever ass'y

Figure 4-40-1.

③ Insert Pinch Roller/Pinch Double Action Lever Ass'y.

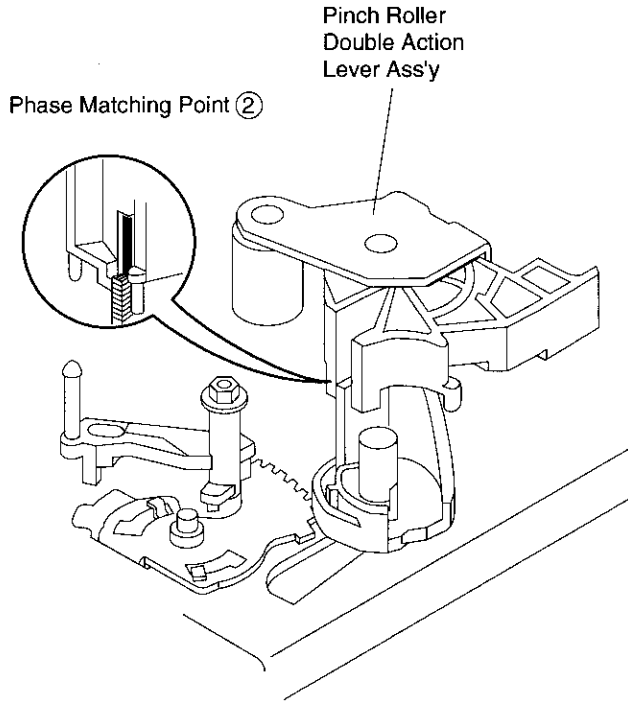


Figure 4-40-2.

④ Insert Open Lever.

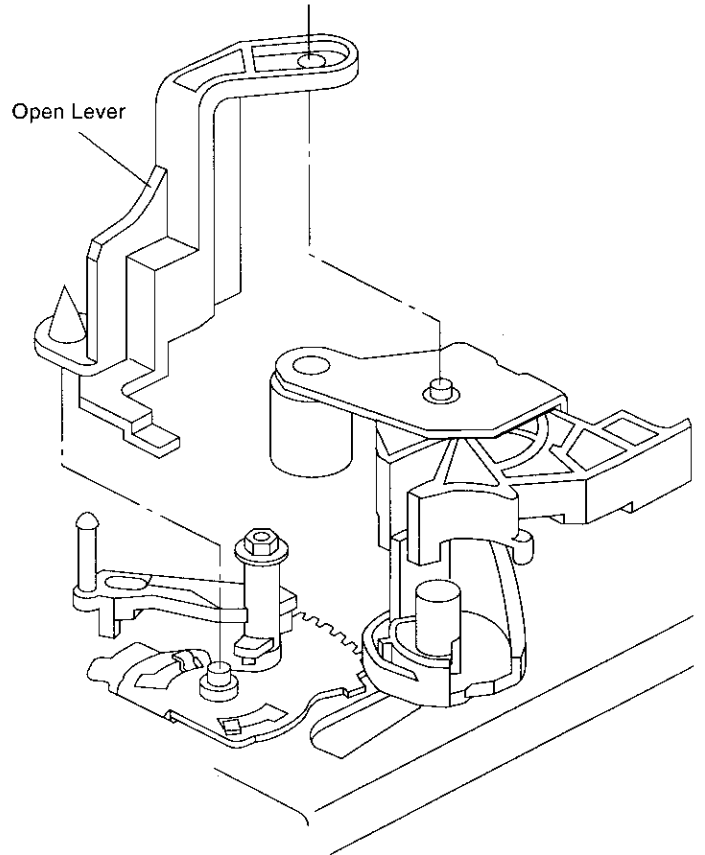


Figure 4-40-3.

2. Mounting the shifter (on the back of the mechanism chassis).

1. Make sure that the loading gear is at the point ① as shown below.
2. Place the shifter in position, keeping in mind the 6 insertion points and the three relief points.
3. For the phase matching at the insertion point ①, see the point ② as shown below.
4. Finally fix the shifter with two washers located on insert points ① and ④.

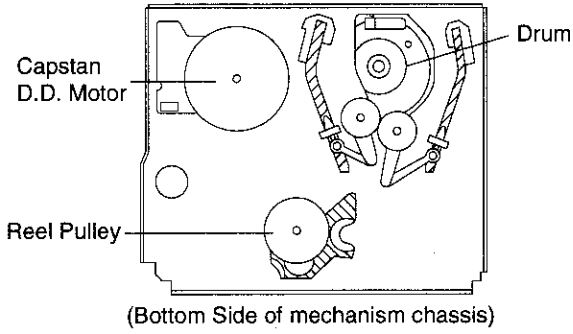


Figure 4-41.

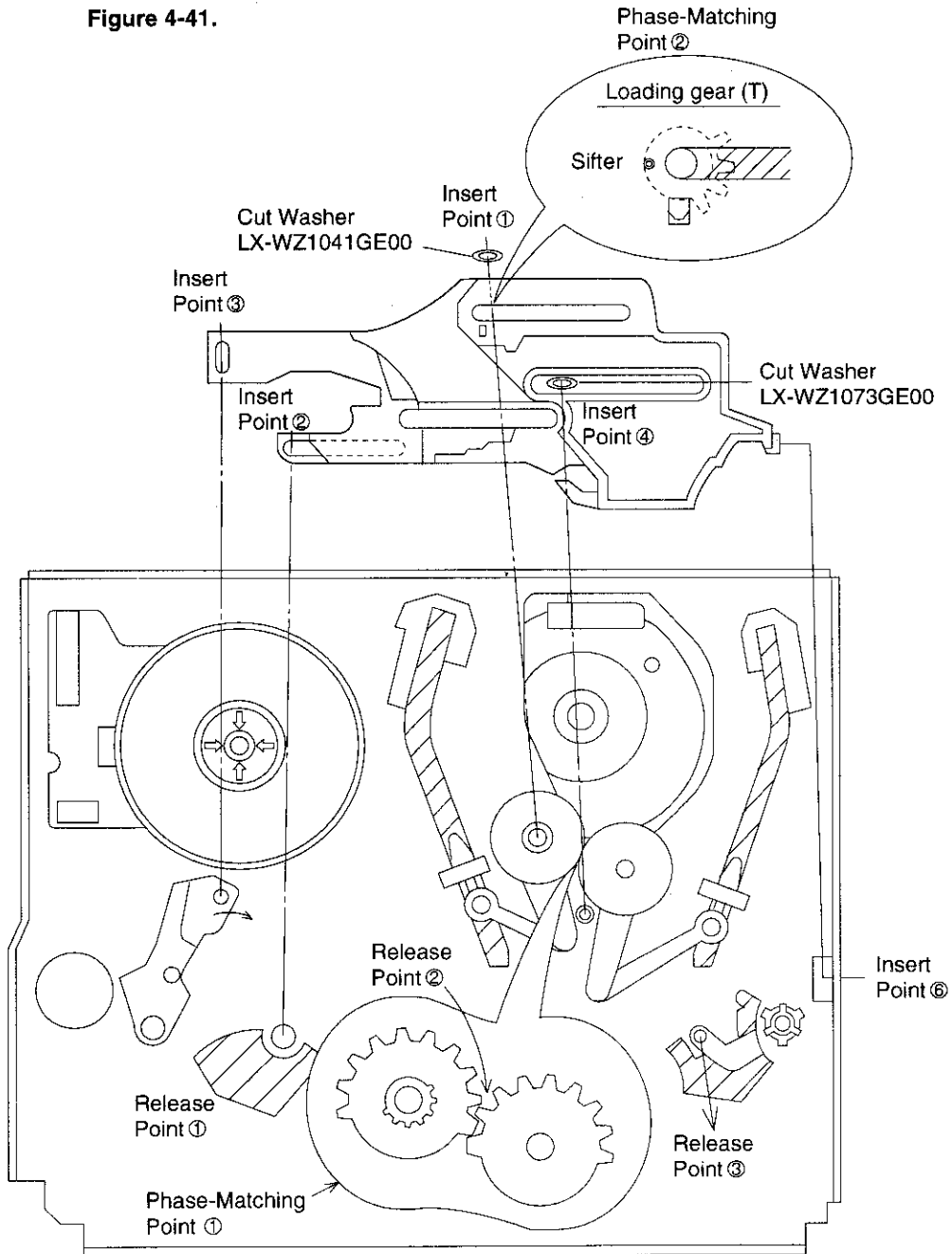


Figure 4-42.

3. Mounting the master cam (on the back of the mechanism chassis).

- (1) Make sure beforehand that the shifter is at the point as shown below.
- (2) Place the master cam in the position as shown below.

Note:

See the figure below for the phase matching between the master cam and the cassette control drive gear.

- (3) Finally fix the master cam with E ring.

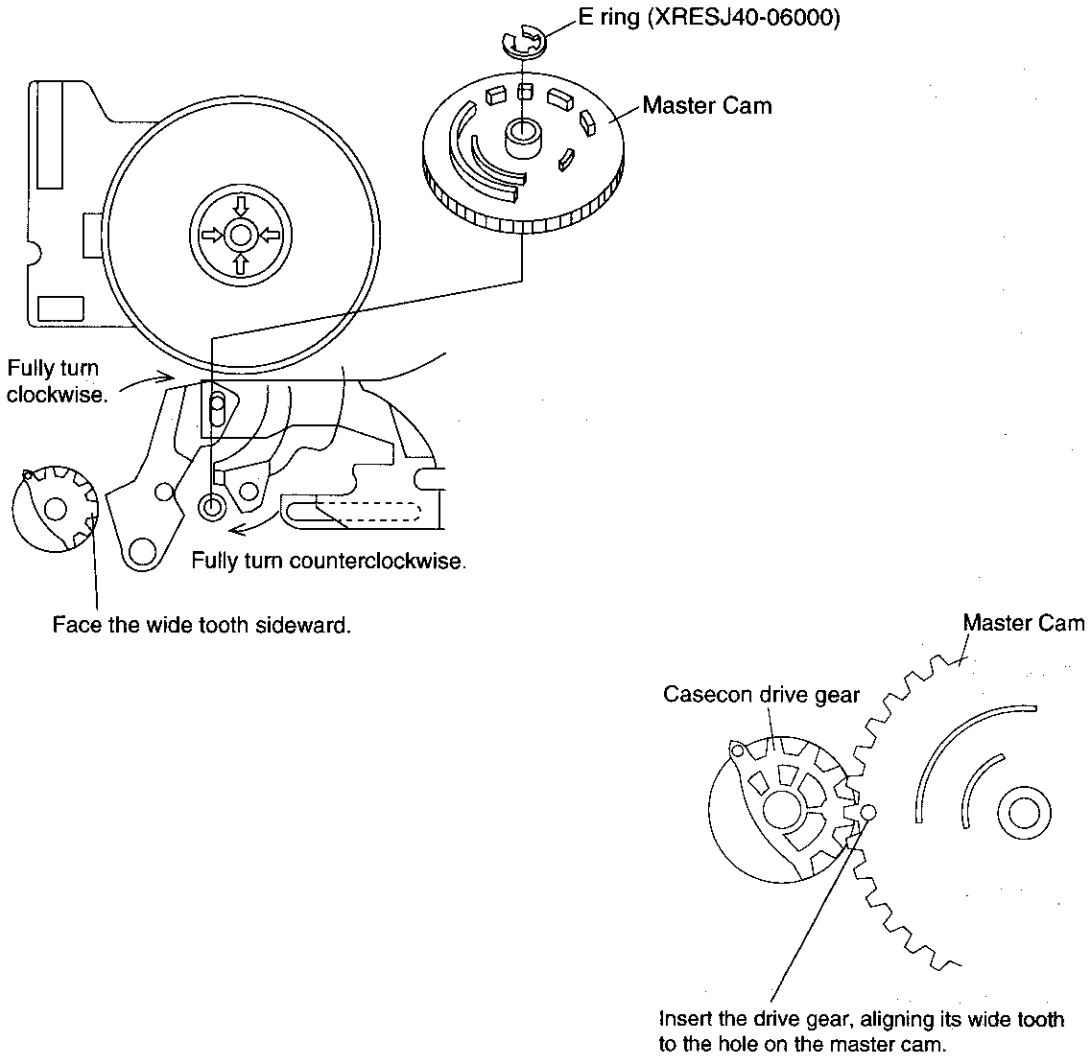


Figure 4-43.

VC-M23HM
VC-M24HM

REPLACEMENT OF LOADING MOTOR

- Removal

Remove 2 screws.

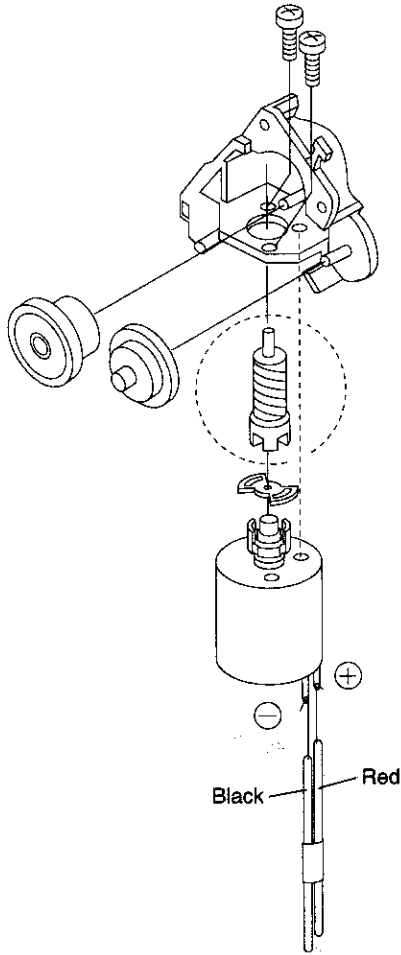


Figure 4-44.

- Replacement

- ① Take out the old loading motor. Place a replacement loading motor as shown above (Figure 4-44).

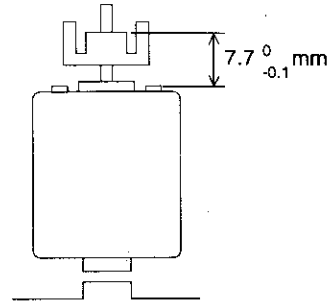


Figure 4-45.

Press-fit the loading motor pulley with a force of less than 98N (10 kgf). Be sure that the pulley is $7.7^{+0}_{-0.1}$ mm away from the motor.

ASSEMBLY OF CASSETTE HOUSING

① Framer ass'y

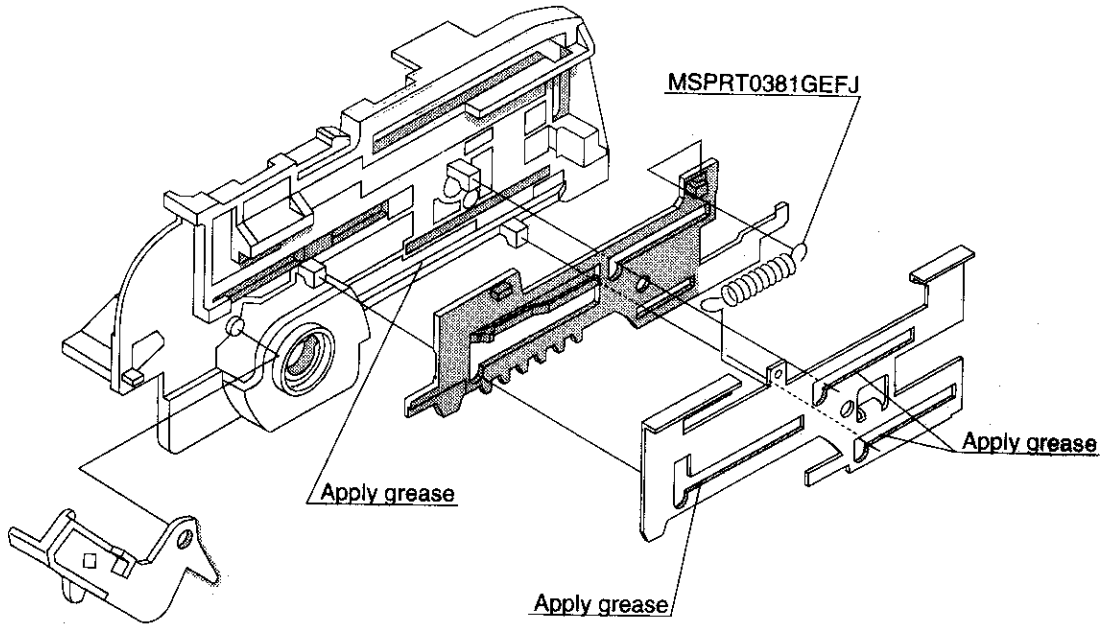


Figure 4-46.

/C-M23HM
/C-M24HM

② Synchro Gear, Drive Gear L and Drive Gear R

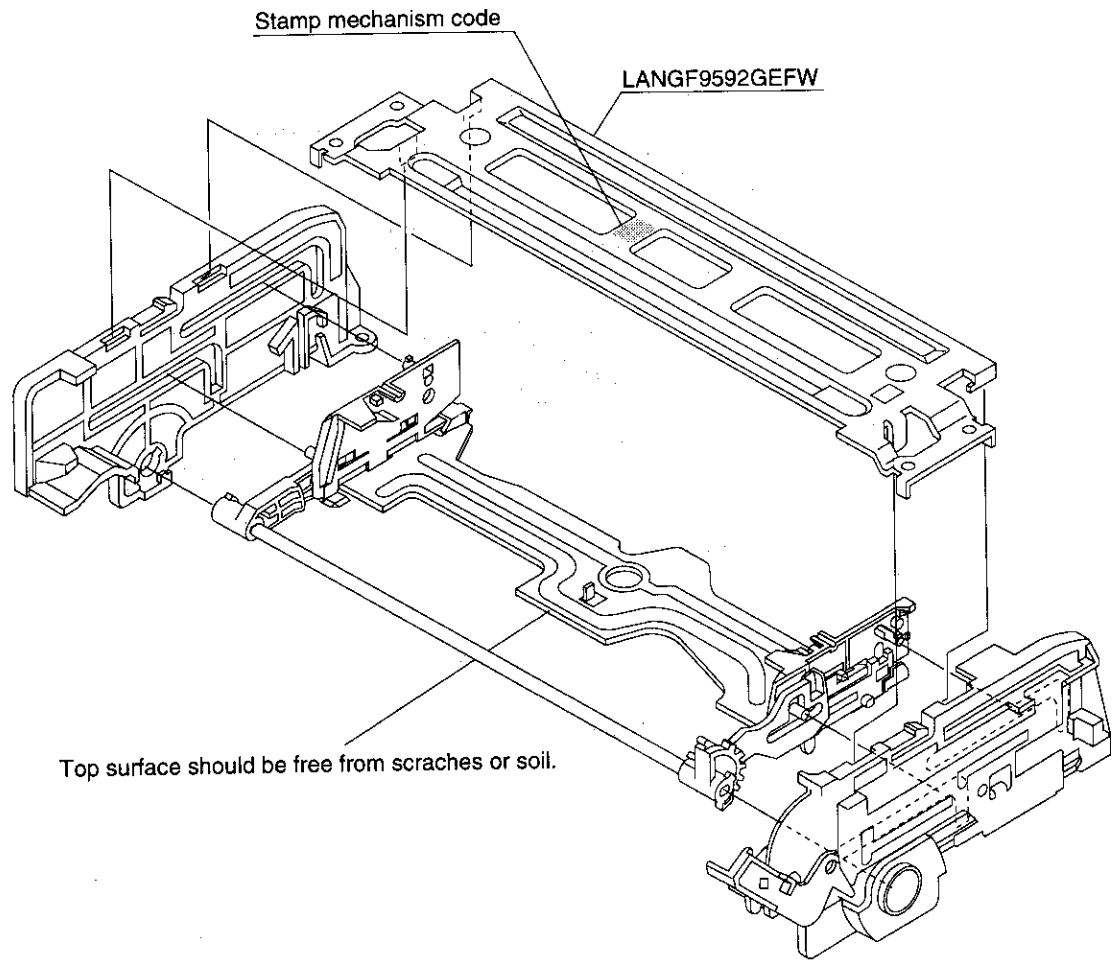


Figure 4-47.

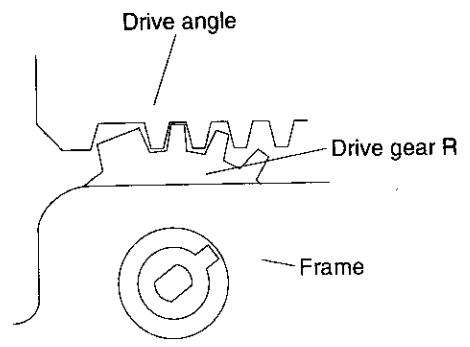


Figure 4-48.

5. ELECTRICAL ADJUSTMENT

Notes:

- Before the adjustment:
Electrical adjustments discussed here are often required after replacement of electronic components and mechanical parts such as video heads.
Check that the mechanism and all electric components are in good working condition prior to the adjustments, otherwise adjustments can not be completed.

- Instruments required:

- | | |
|--|--|
| <input type="checkbox"/> Colour TV monitor | <input type="checkbox"/> Dual-trace oscilloscope |
| <input type="checkbox"/> Audio signal generator | <input type="checkbox"/> AC milli-voltmeter |
| <input type="checkbox"/> DC voltmeter | <input type="checkbox"/> Frequency counter |
| <input type="checkbox"/> Blank video cassette tape | <input type="checkbox"/> Alignment tape (VROCPSV) |
| <input type="checkbox"/> Screwdriver for adjustment | <input type="checkbox"/> Alignment tape (VROATSV) |
| <input type="checkbox"/> Colour bar signal generator | <input type="checkbox"/> Alignment tape (VROCBFFS) |

✗ Servicing precautions

When the IC804 (E²PROM) has been replaced, make the following reprogramming. Depending on models, the IC804 (E²PROM) has been factory-adjusted for it's memory function.

It's therefore necessary to reprogram the memory function for the model in question.

Note that the servo circuit requires readjustments for the head switching point, slow and still modes.

- Location of controls and test points

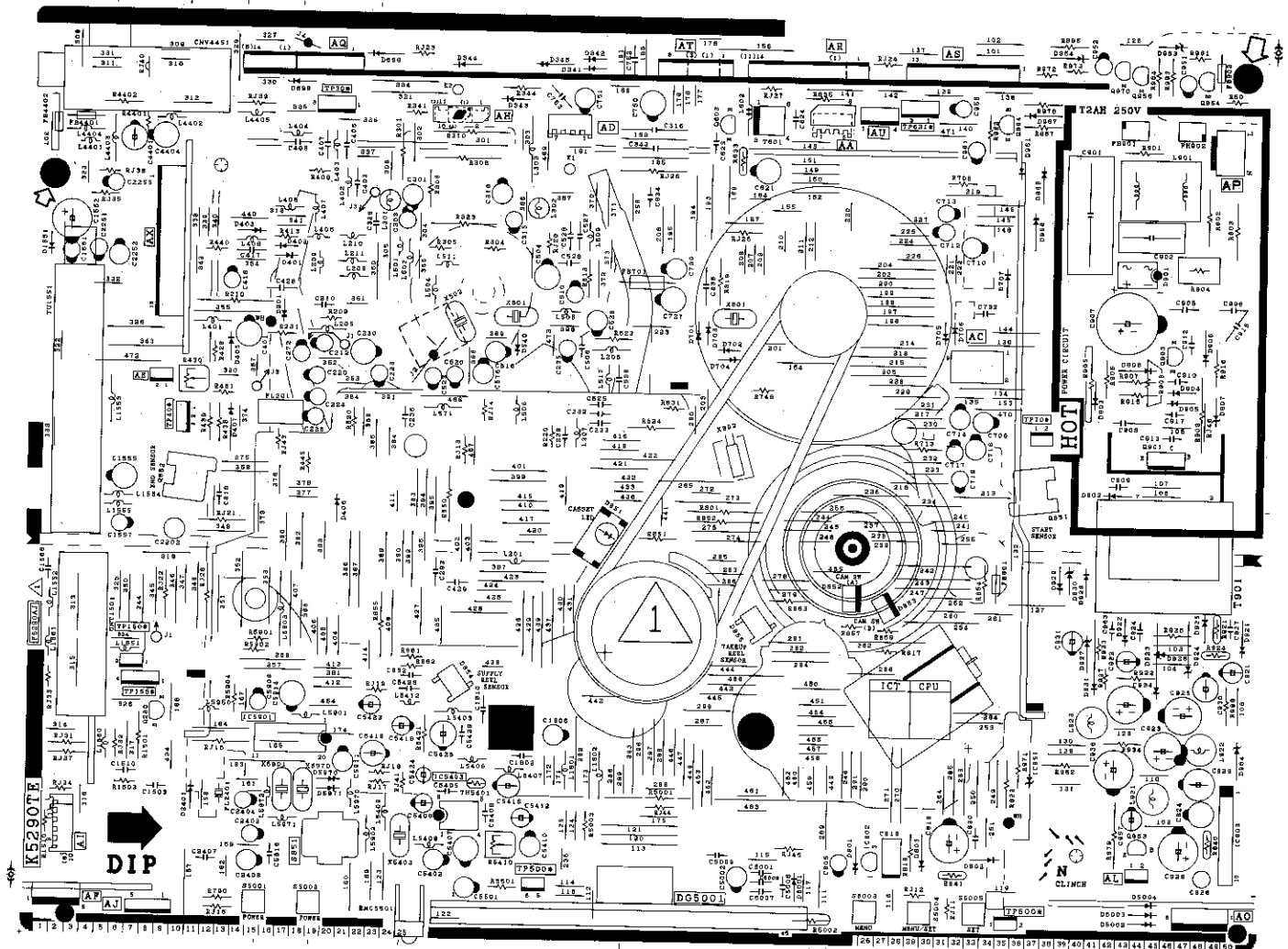


Figure 5-1.

SERVO CIRCUIT ADJUSTMENT

ADJUSTMENT OF HEAD SWITCHING POINT

Measuring instrument	Dual-trace oscilloscope Colour TV monitor
Mode	Playback
Cassette	Alignment tape (VROCPSV)
Test point	TP302 (H.SW.P.) to CH-1, VIDEO OUT jack to CH-2 (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side.)
Specification	$6.5 \pm 0.5H$ (lines)

- Remove the front panel and play the alignment tape. (VROCPSV)
(Playback picture on the monitor screen.)
- Make for a moment short-circuit between TP5001 and TP5002, both located at the front side on the main PWB.
Be sure that all the fluorescent display tubes light up into the TEST mode.
(See Note below)

- Press the PLAY button.
Be sure the "PLAY" appears in the fluorescent display tubes flashing (about 1Hz) into the auto PG adjustment operating.

Note:

When the manual PG adjustment, observe the waveform with an oscilloscope and make adjustment FF or REW button so that the specification.

- Stop the "PLAY" appears in the flashing of fluorescent display tubes at adjusted.
- Press the STOP button in the return to normal mode.
- Make this checking of waveform on the oscilloscope screen be as shown in Figure 5-2. just after the head switching point have been adjusted.

Note:

- Set-up of TEST mode.
When the adjustment of HEAD SWITCHING POINT, AUTO TRACKING function is invalid.
- When the cassette housing control ass'y is removed, set-up of mechanism operating mode.
 - Replug the AC power cord it a few minutes later.
 - Make a short-circuit between TP5005 and TP5006, both located at the front side on the main PWB with a 22 ohm resistor, to center the tracking.
 - AC power cord is plugged in.
 - You can mechanism operatig mode, Replug the AC power cord a few minutes later.

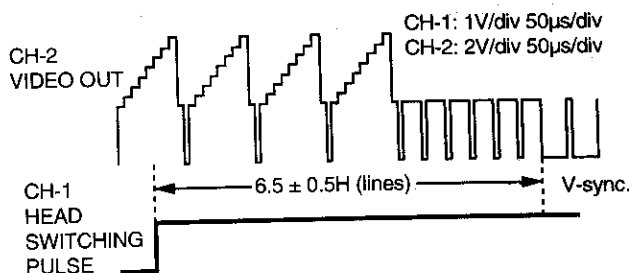


Figure 5-2.

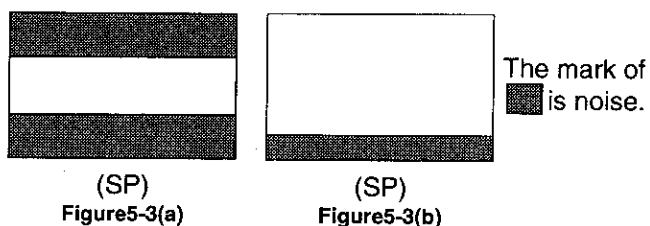
ADJUSTMENT OF SP/LP SLOW TRACKING PRESET

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (See Note below)
Control	Tracking control buttons (+) or (-)
Specification	Reference of following step 6.

- Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note ② below)
- Set the tape speed in SP mode by using the remote control and record the signal on tape.
- Rewind and play the tape where signal was recorded in above step.
- Press the SLOW button on the remote control, and playback the recorded portion in the slow mode.
- Make for a moment short-circuit between TP5001 and TP5002, both located at the front side on the main PWB.
Be sure that all the fluorescent display tubes light up into the TEST mode.
- Look at the monitor screen and adjust the (+) or (-) TRACKING buttons so that the position of noise come following Figure 5-3 (a) and (b).
- Press the STOP button to return to normal mode.
- Play the tape a few seconds then press the SLOW button again and make sure there is no noise in the screen.
(For the LP mode put adjustment at the same adjustment way as SP mode.)

Notes:

- Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.
- The TV program will not be recorded if RCA or 21pin plugs are plugged in to the AUDIO/VIDEO input terminals.



ADJUSTMENT OF FV (False Vertical Sync) OF STILL PICTURE

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (See Note below ②)
Control	Tracking control buttons (+) or (-)
Specification	No vertical jitter of picture

1. Play a cassette which was recorded.
2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (-) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape and make sure vertical jitter of the picture is not noticeable.
(For the LP mode put adjustment at the same adjustment way as SP mode)

Note:

- ① The FV goes back to the it's initial state when the unit is put into the system controller reset mode due to power failure, etc.
In this case, preset the FV once again.
- ② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

Y/C CIRCUIT ADJUSTMENT

CHECKING OF VIDEO E-E LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	$0.95 \pm 0.1V_{p-p}$

1. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor.
(See Note below.)
2. Feed a colour bar signal to the VIDEO IN jack.
3. Make sure that the E-E signal amplitude is $1.0V_{p-p}$ as shown in Figure 5-4.

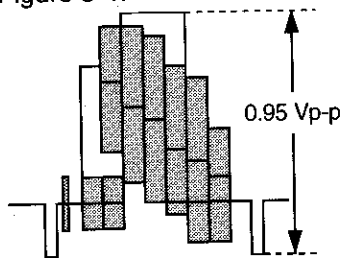


Figure 5-4.

Notes:
If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

CHECKING OF WHITE CLIP LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	Pin(48) of IC401, GND
Specification	$190 \pm 5\%$ (See note below)

1. Connect an oscilloscope to pin (48) of IC401 and GND.
2. Feed the colour bar signal to the VIDEO IN jack and set the unit in E-E or recording mode.
3. Make sure that the overshoot of the video signal is clipped at 190% as shown in Figure 5-5.

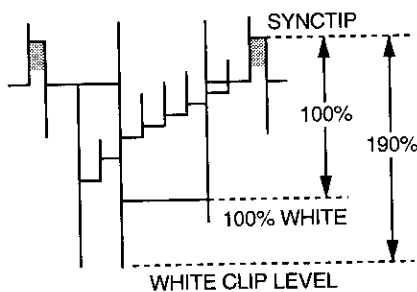


Figure 5-5.

Note:

From sync tip to white peak, the level is 100%.
The white clip level is 90% above the white level.

CHECKING OF RECORD LEVEL

Measuring instrument	Dual-trace oscilloscope
Mode	Record mode
Input signal	EIA colour bar (1.0Vp-p)
Test point	Chroma (Red) R514 terminal lead at L509 side (Sig.) ~ GND Sync tip R225 terminal lead at L210 side (Sig.) ~ GND
Specification	Chroma (Red): $400\sim 600mV_{p-p}$ Sync tip: $150\sim 220mV_{p-p}$

1. Feed the colour bar signal to the VIDEO IN jack and set the unit in recording mode.
2. Connect a dual-trace oscilloscope to each test point shown in table.
3. Make sure so that the amplitude of the chroma (Red) portion and the sync tip portion are specified as shown in Figure 5-6.

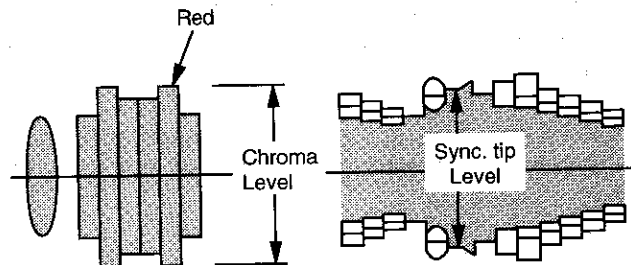


Figure 5-6 (a).

Figure 5-6 (b).

CHECKING OF PLAYBACK LEVEL

Measuring instrument	Oscilloscope
Mode	Record/Playback
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	$0.95 \pm 0.1V_{p-p}$

1. Be sure that E-E level has been correctly specified.
2. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor.
(See Note below ①.)
3. Feed a colour bar signal to the VIDEO IN jack and set the unit in recording mode.
4. Play the colour bar portion of the recorded tape.
5. Make sure that the output signal amplitude is 1.0Vp-p as shown in Figure 5-7.

Note:

- ① If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.
- ② Set the S.PICTURE switch turn off.

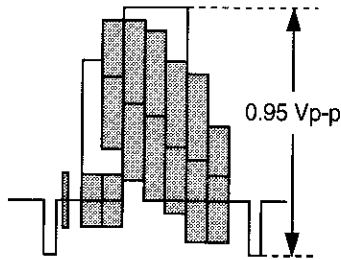


Figure 5-7.

ADJUSTMENT OF S.PICTURE

Measuring instrument	DC voltmeter/Colour TV monitor
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p) or Monoscope (1.0Vp-p)
Test point	TP401 (Sig.) ~ TP402 (GND)
Control	R430 S.PICTURE control
Specification	$7.7 \pm 0.1V$

1. Connect a DC voltmeter to the test points TP401 (Sig.) ~ TP402 (GND).
2. Feed a colour bar or monoscope signal to the VIDEO IN jack.
3. Set the S.PICTURE switch turn on.
4. Adjust R430 (S.PICTURE control) so that the DC voltmeter reads specified value, and checking of make sure so that the nothing unusual on the playback monoscope screen.

AUDIO CIRCUIT

CHECKING OF E-E LEVEL

Measuring instrument	AC milli-voltmeter
Mode	E-E/Record
Input signal	1kHz, -8.0dBs (at RCA type jack) 1kHz, -3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	-8.0 ± 2dBs (at RCA type jack) -3.8 ± 2dBs (at 21pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Put the unit in E-E or recording mode.
4. Make sure that the output level is value shown in table.

CHECKING OF AUDIO PLAYBACK LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Playback
Input signal	Alignment tape. (VROCPSV) (1kHz level control signal.)
Test point	AUDIO OUT jack
Specification	-9 ^{+2dBs} _{-1dBs} (at RCA type jack) -7.8 ^{+2dBs} _{-1dBs} (at 21 pin type jack)

1. Playback the Alignment tape. (VROCPSV 1kHz level audio signal)
2. Connect an AC milli-voltmeter to the AUDIO OUT jack.
3. Make sure that the output level is value shown in table.

CHECKING OF AUDIO RECORD LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Record/playback
Input signal	1kHz, -8.0dBs (at RCA type jack) 1kHz, -3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	-8.0 ± 3dBs (at RCA type jack) -3.8 ± 3dBs (at 21pin type jack)

1. Connect an AC milli-voltmeter to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Make the self-recording and playback of the signal.
4. Make sure that the output level is value shown in table.

CHECKING OF ERASE VOLTAGE AND OSCILLATION FREQUENCY

Measuring instrument	Oscilloscope
Mode	Record
Test point	Full erase head
Control	T601
Specification	70 ± 5kHz, 40Vp-p or greater

1. Put the unit in recording mode.
2. Connect an oscilloscope across the full erase head.
3. Make sure the erase voltage across the full erase head is approx. 40Vp-p or more and frequency is 70 ± 5kHz.

RF CIRCUIT

ADJUSTMENT OF RF AGC CIRCUIT

Measuring instrument	DC voltmeter and VHF signal generator
Mode	RF signal at I69-CH (by UHF signal generator) (EBU colour bar signal at 87.5% modulated.)
Test point	TP1552 (Sig.) TP1554 (GND)
Control	VR001 AGC control
Specification	3.7 ± 0.1V

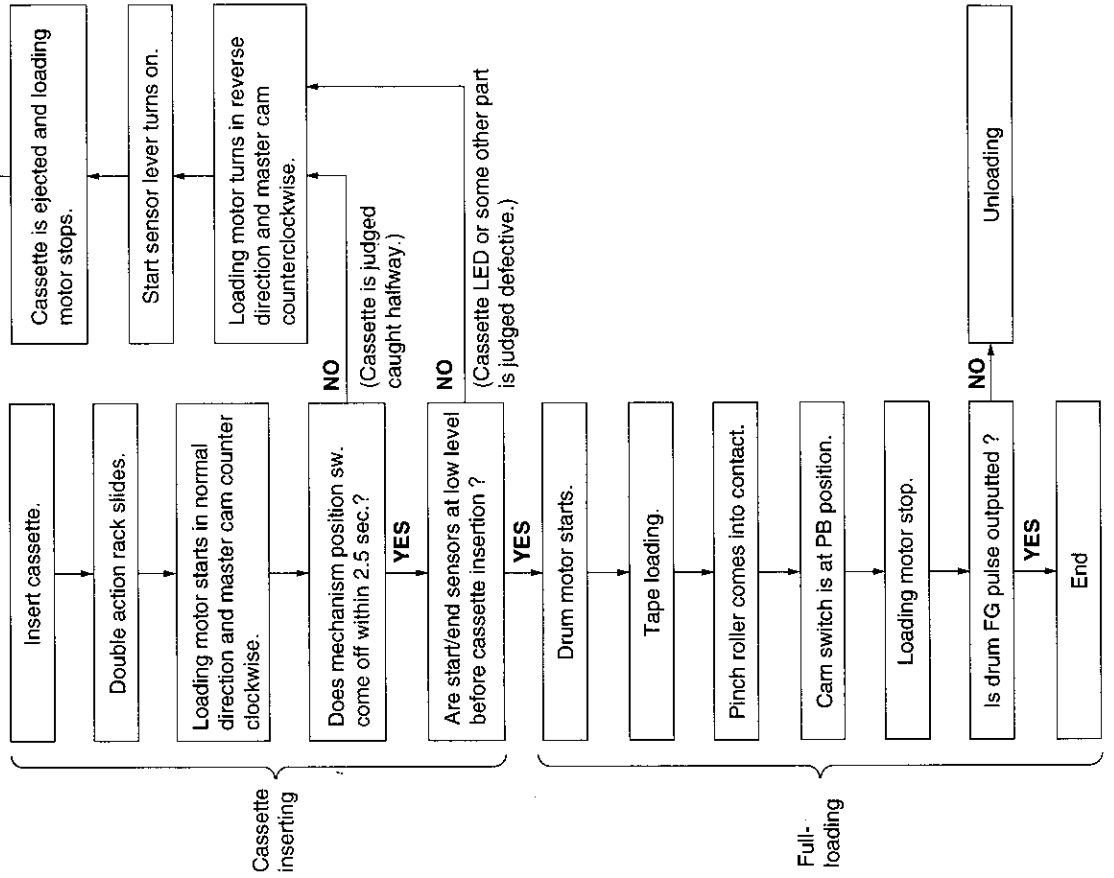
1. Receive the I69 channel signal (colour bar signal at 87.5% modulated.) at Input field strength: 70dBμV of antenna terminal.
2. Connect a DC voltmeter to test points shown in table.
3. Adjust VR001 (AGC control) in the IF pack so that the voltage be specified.

6. MECHANISM OPERATION FLOWCHART AND TROUBLESHOOTING GUIDE

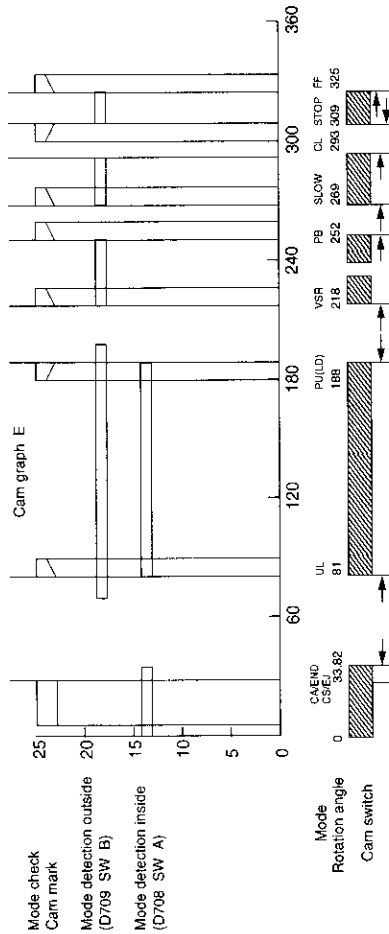
MECHANISM OPERATION FLOWCHART

CASSETTE INSERTION → STOP

* This flowchart describes the outline of the mechanism's operation, but does not give its details.



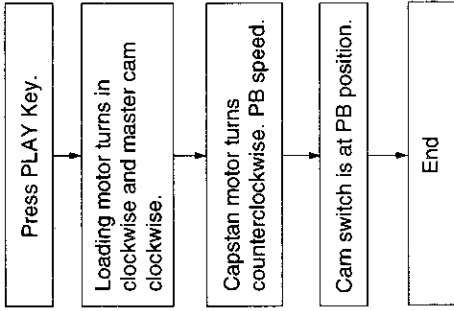
F mechanical timing



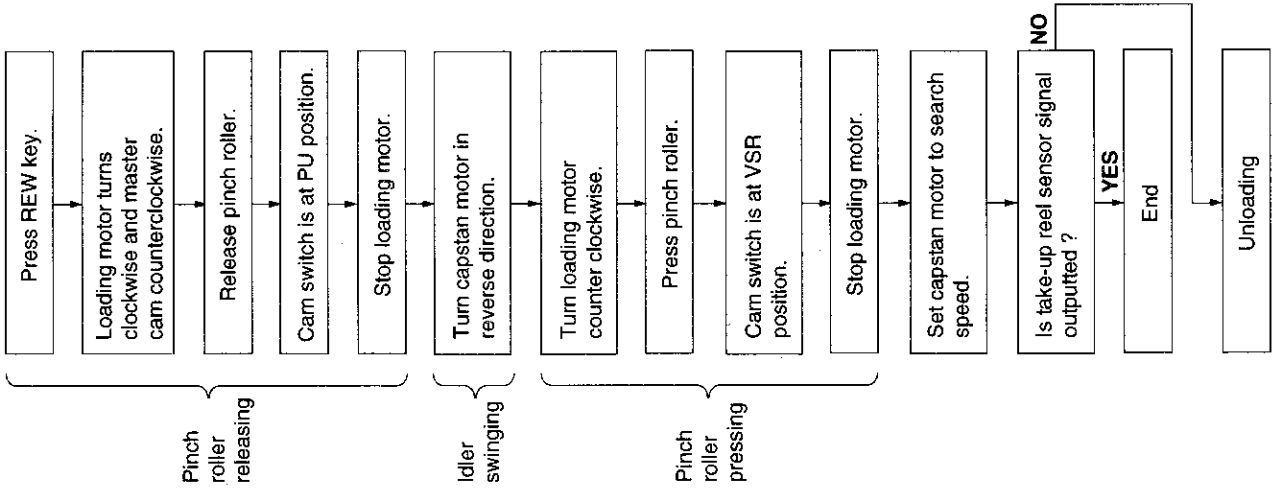
	EJ	UL	UL	PU	VSR	PB	SLOW	CL	STOP	FF
Mode detection outside	0	0	0	1	1	0	1	0	0	1
Mode detection inside	1	0	1	1	0	1	0	1	0	1
S sensor:	1	1	0	1	1	0	1	1	0	0
S sensor:	open	close	open	close	open	close	open	close	open	close

	Mode detection inside Sensor A	Mode detection outside Sensor B
CS/EJ	1	0
ULD	1	1
PU LD	1	1
VSR	0	1
PB	0	0
STILL	0	1
CL	0	0
STOP	0	0
FF	0	0

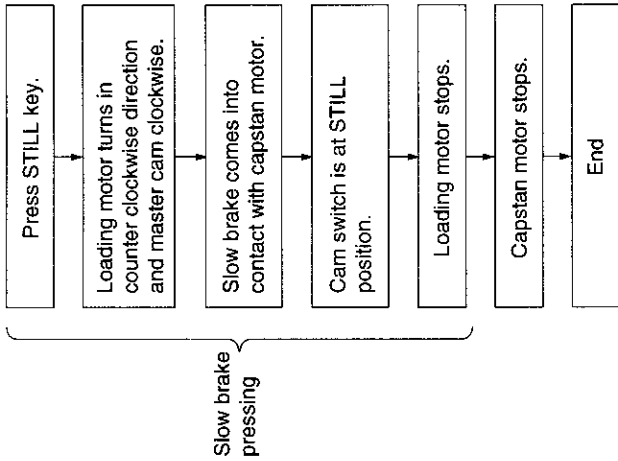
VSR → PLAY



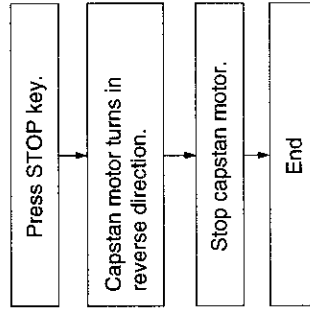
PLAY → VSR



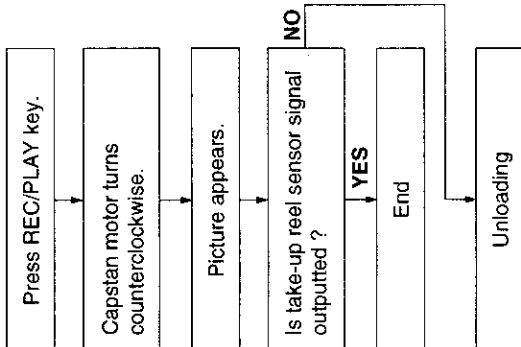
PLAY → STILL



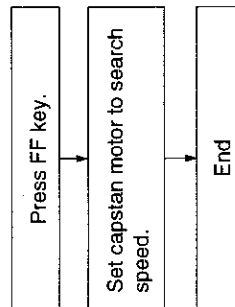
REC/PLAY → STOP



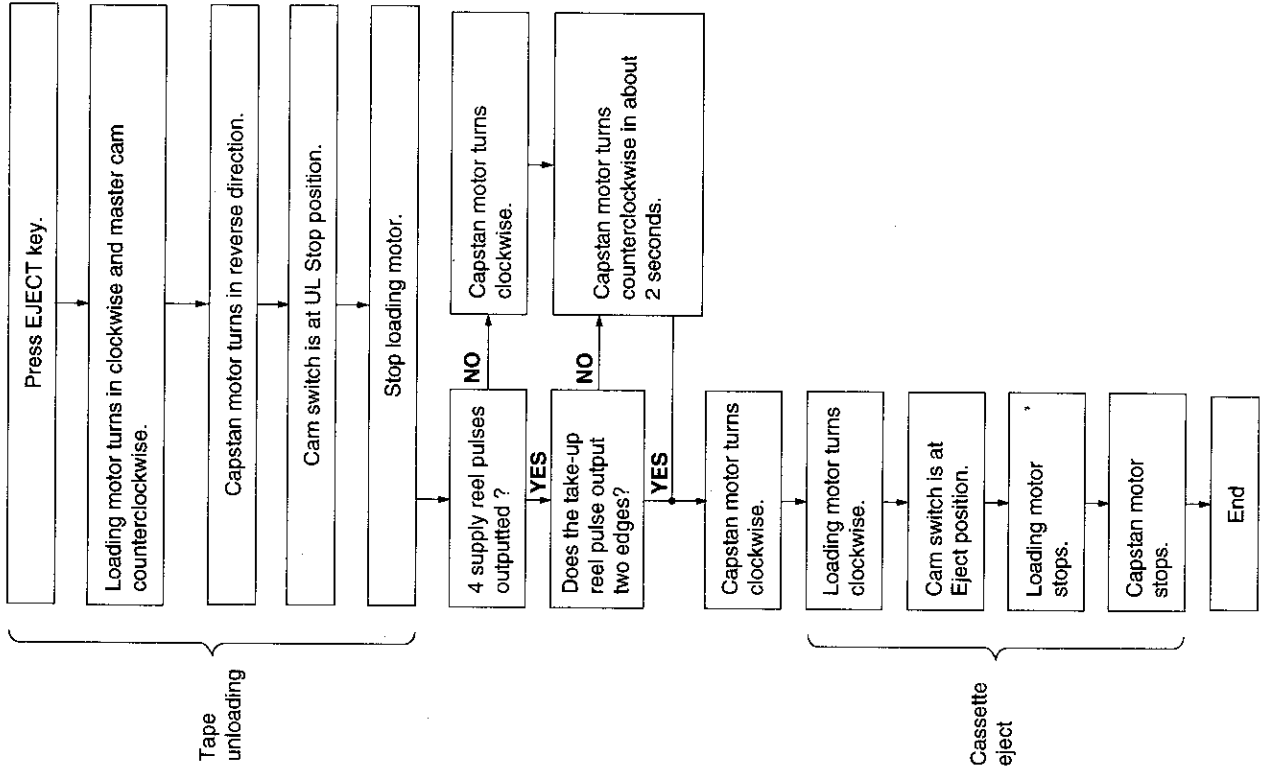
STOP → REC/PLAY



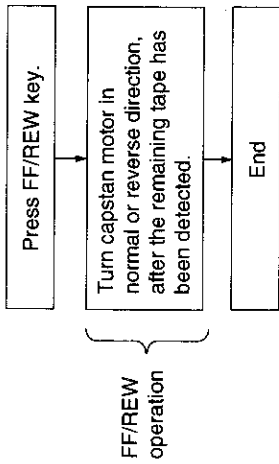
PLAY → VSF



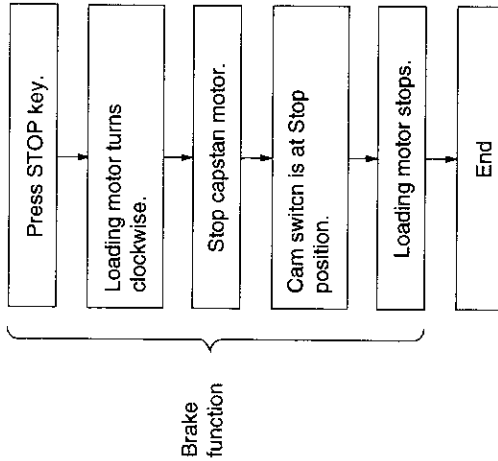
STOP → CASSETTE EJECT



STOP → FF/REW



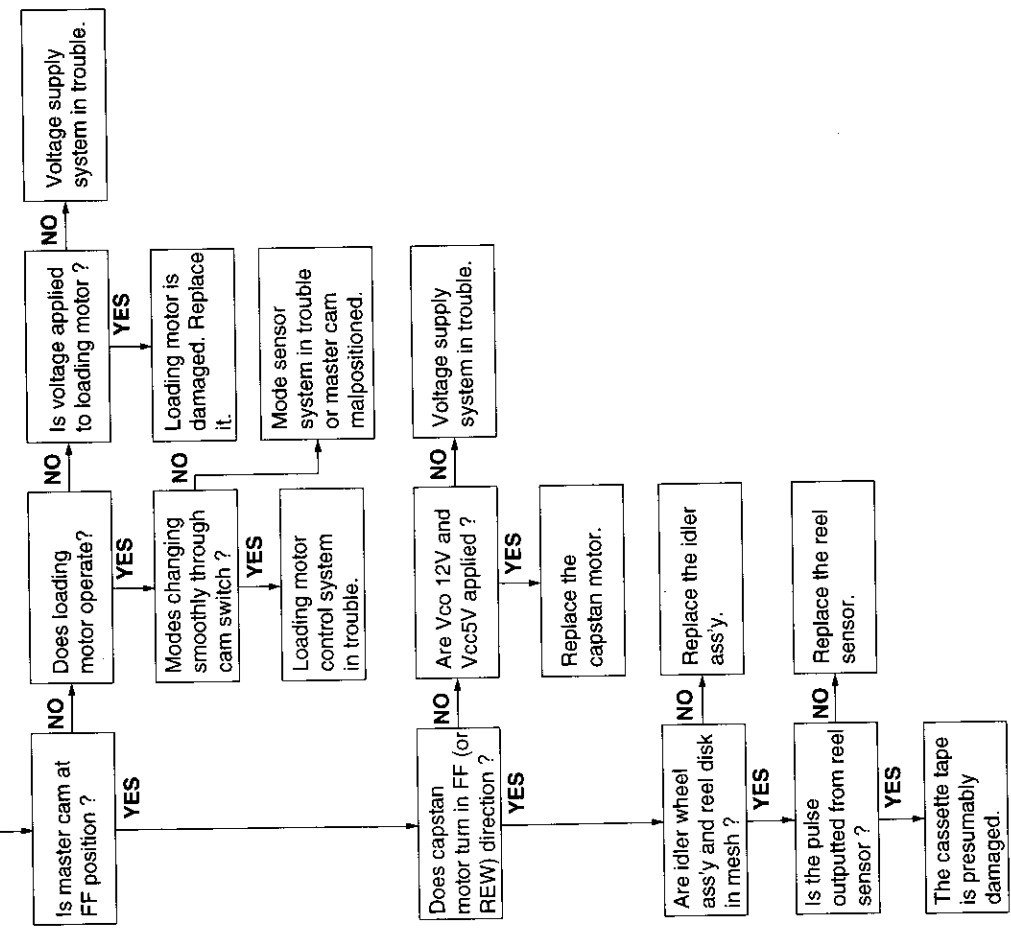
FF/REW → STOP



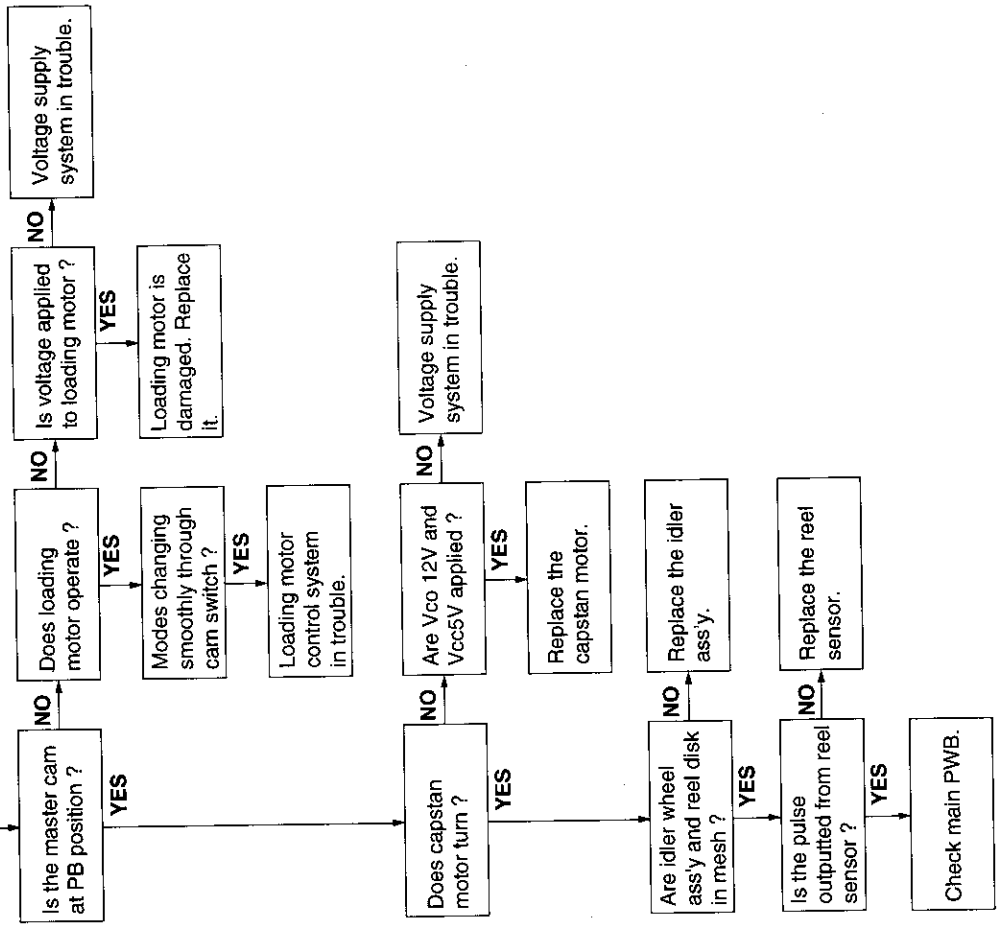
MECHANISM TROUBLESHOOTING

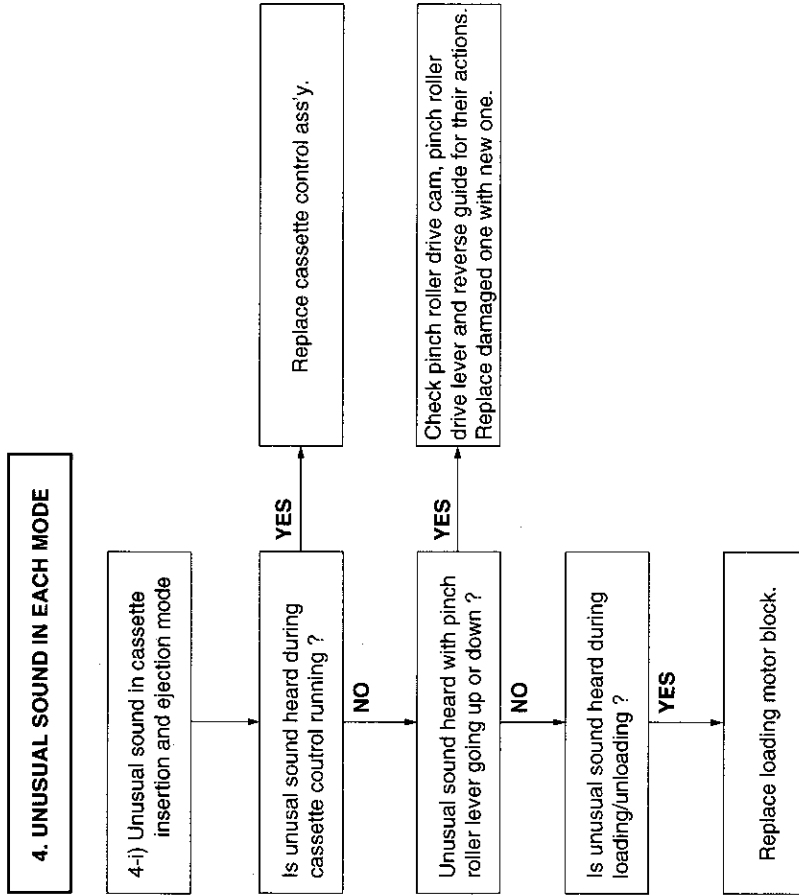
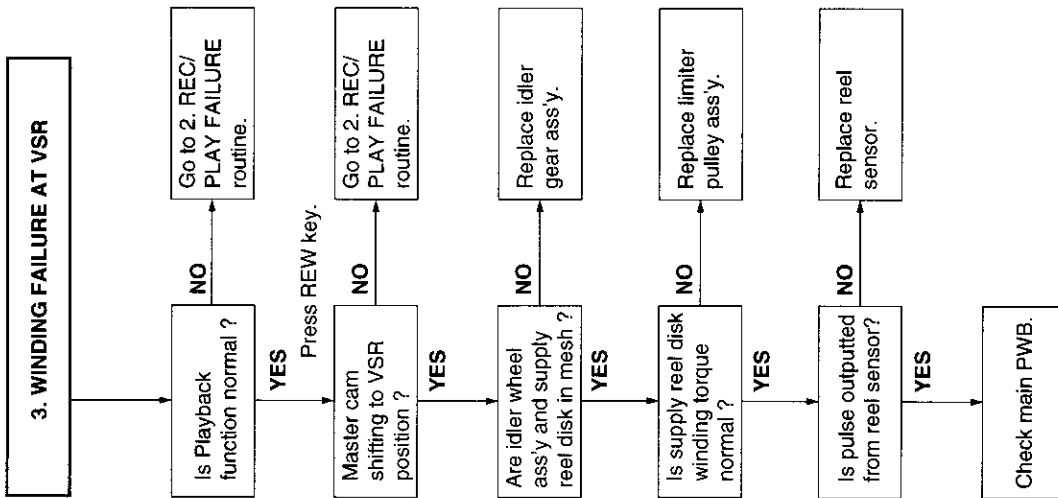
1. FF/REW FAILURE (NO TAPE WINDING)

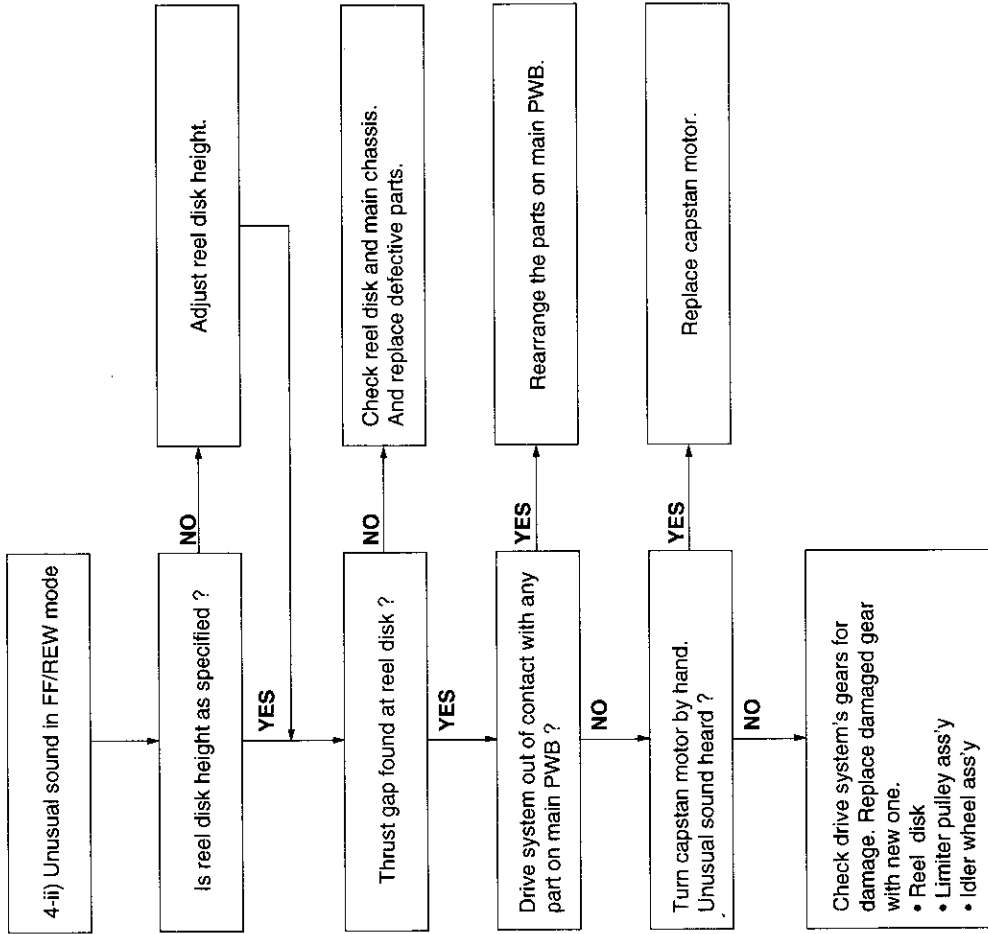
Press FF key.



2. RECPLAY FAILURE (MODE RELEASE)

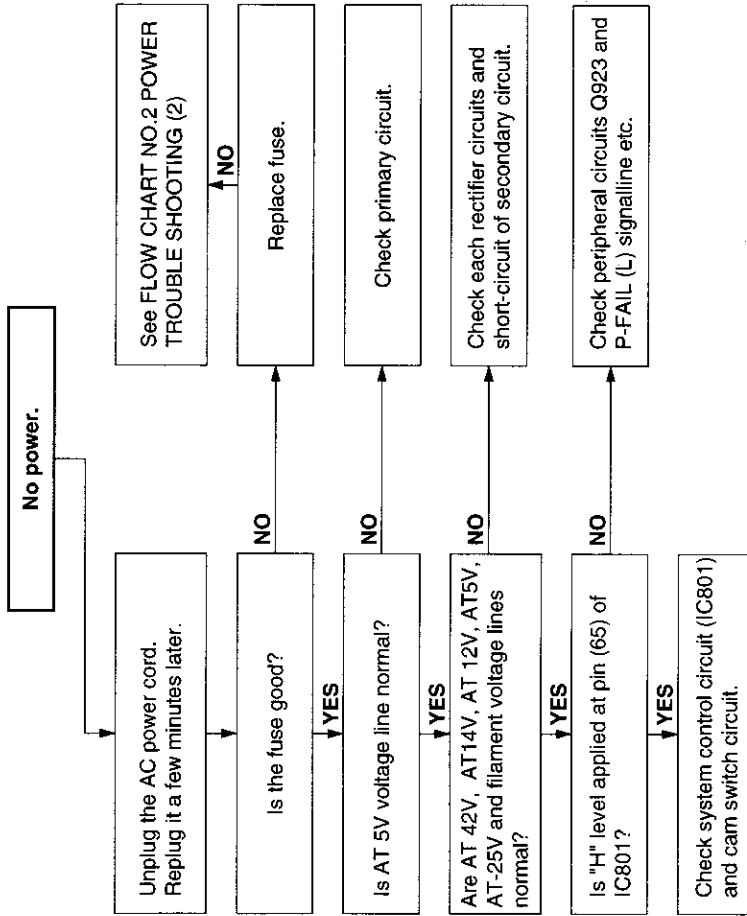




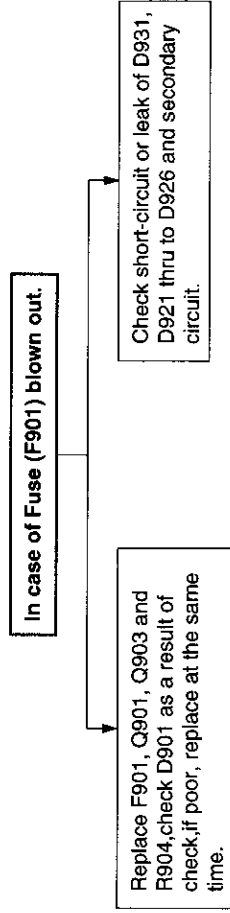


7. TROUBLESHOOTING

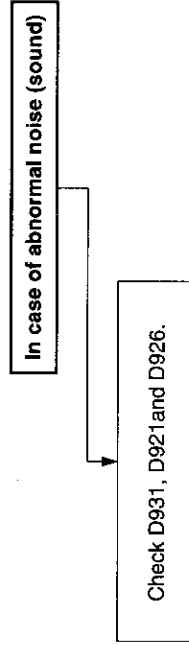
FLOW CHART NO.1 POWER TROUBLESHOOTING (1)



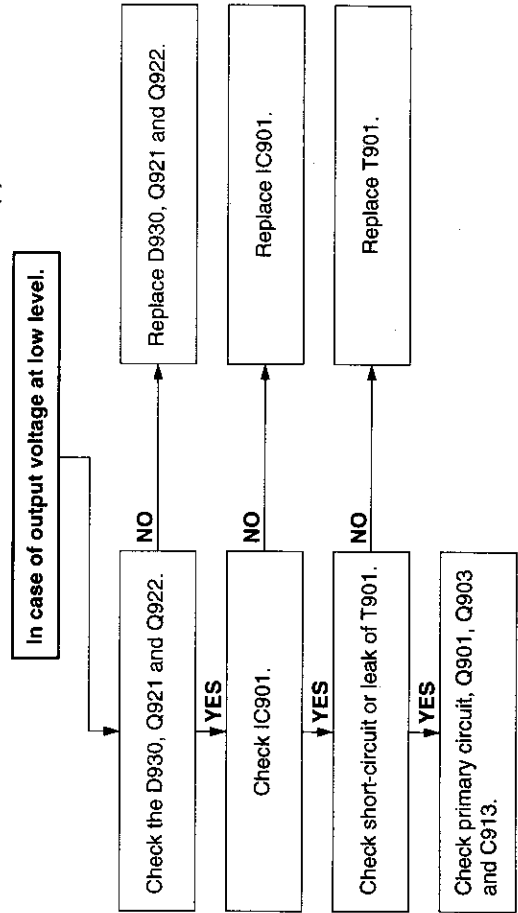
FLOW CHART NO.2 POWER TROUBLESHOOTING (2)



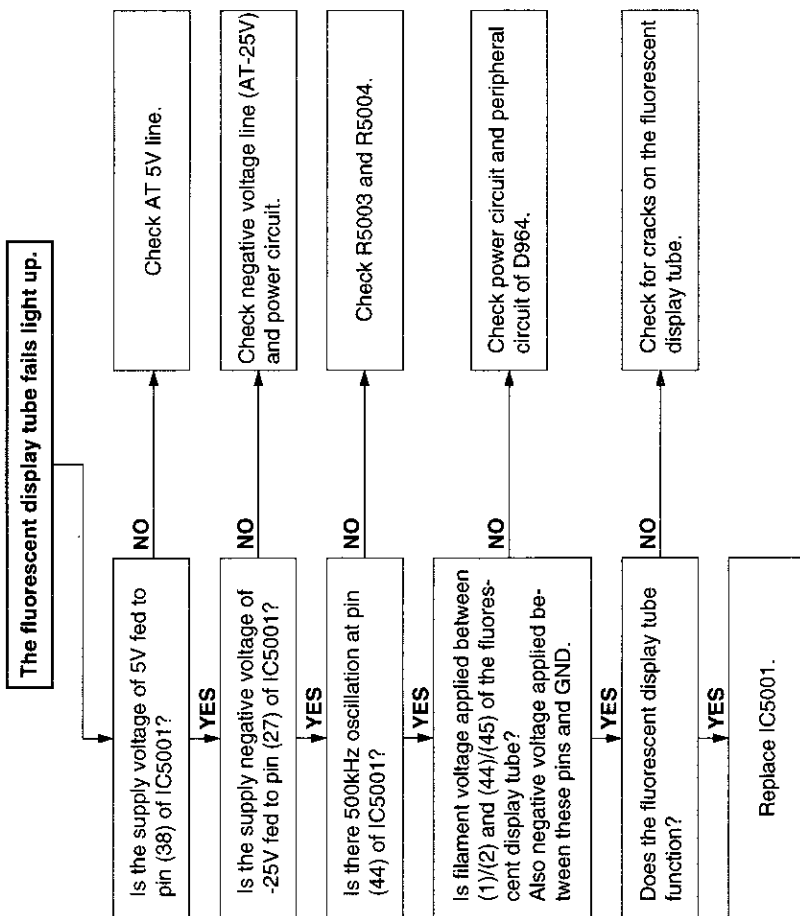
FLOW CHART NO.3 POWER TROUBLESHOOTING (3)



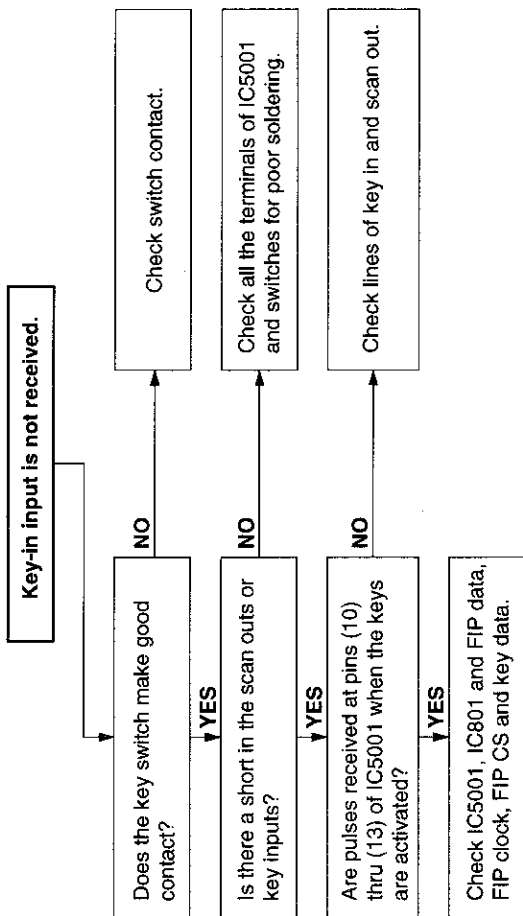
FLOW CHART NO.4 POWER TROUBLESHOOTING (4)



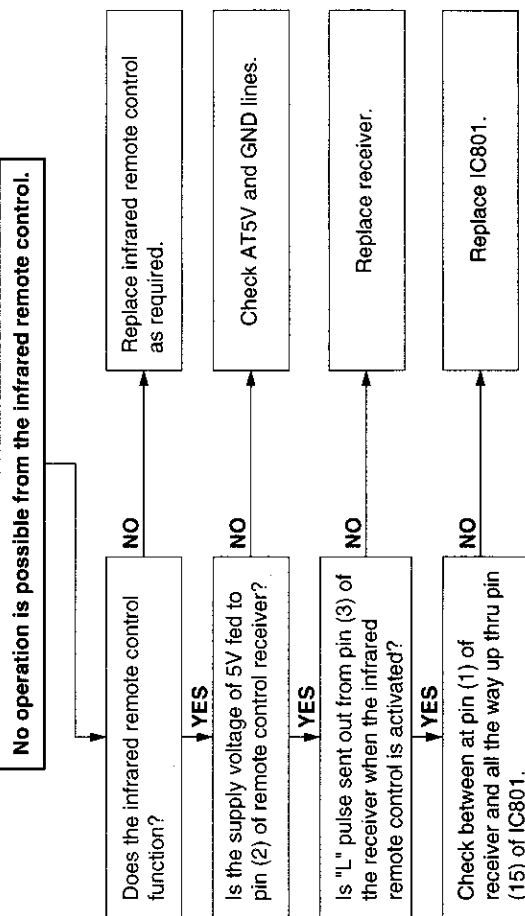
FLOW CHART NO.5 TIMER (1) TROUBLESHOOTING



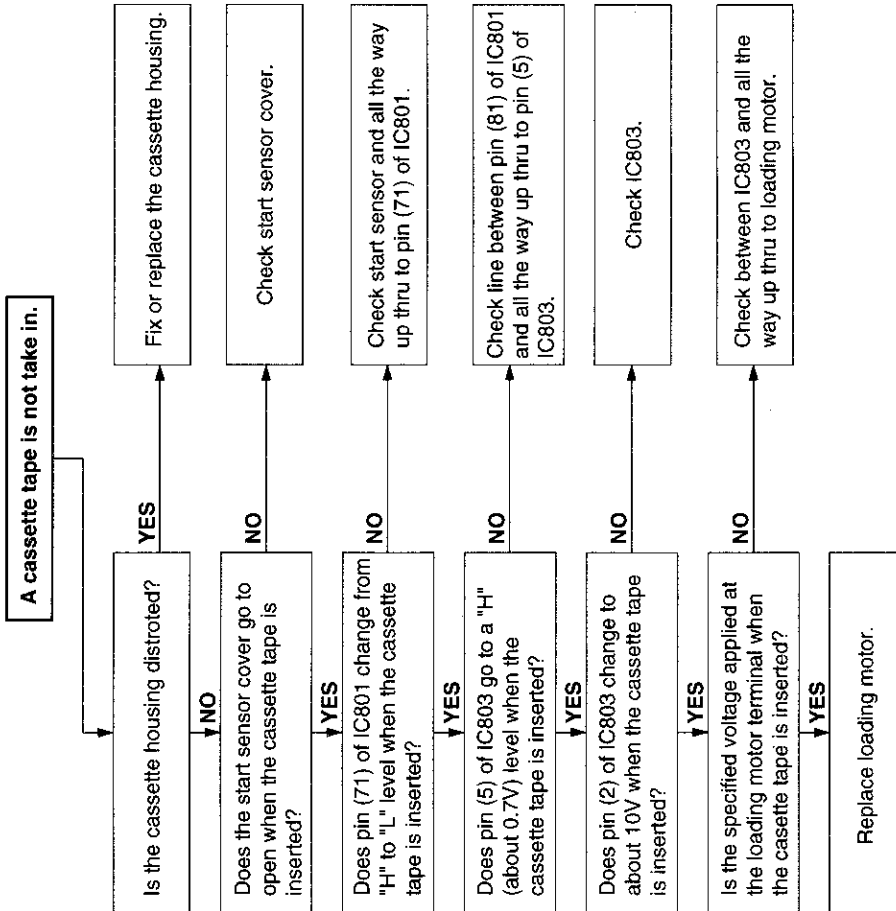
FLOW CHART NO.6 TIMER (2) TROUBLESHOOTING



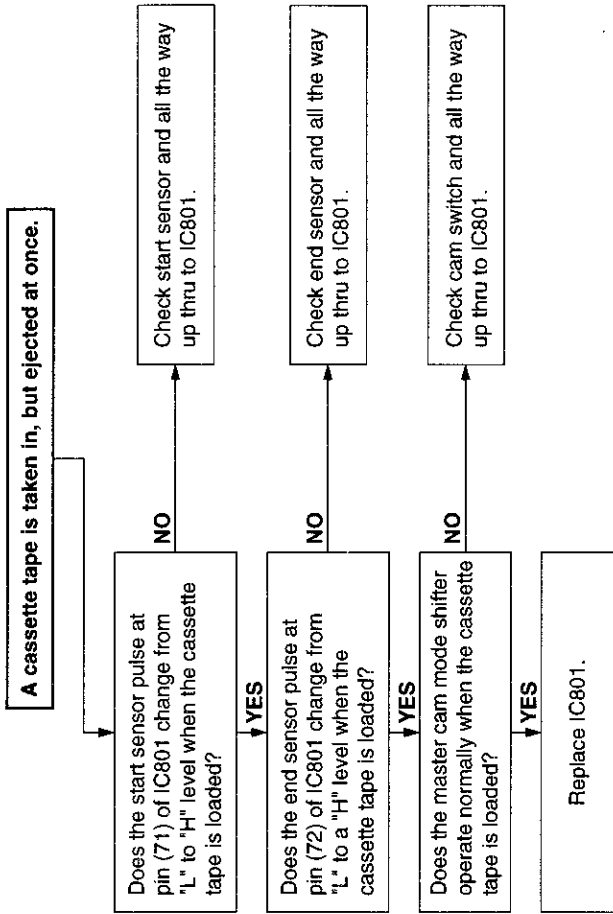
FLOW CHART NO.7 INFRARED R/C TROUBLESHOOTING



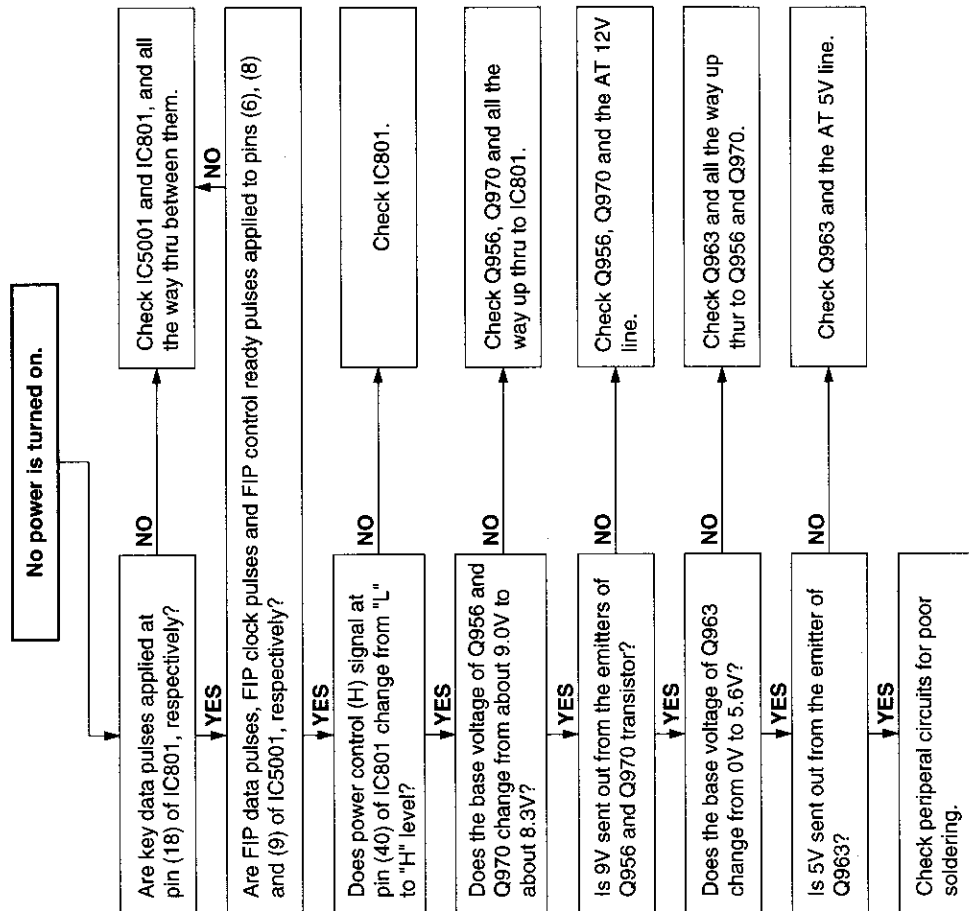
FLOW CHART NO.8 CASSETTE CONTROL TROUBLESHOOTING(1)



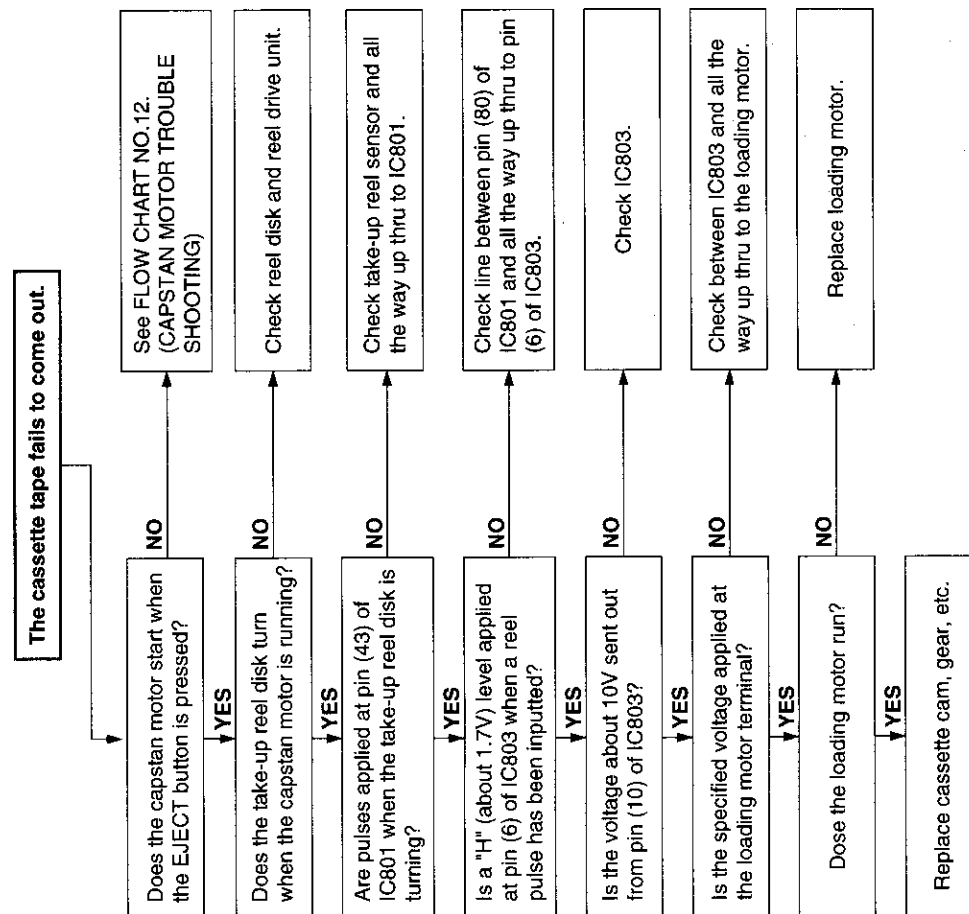
FLOW CHART NO.9 CASSETTE CONTROL TROUBLESHOOTING (2)



FLOW CHART NO.11 SYSTEM CONTROL TROUBLESHOOTING

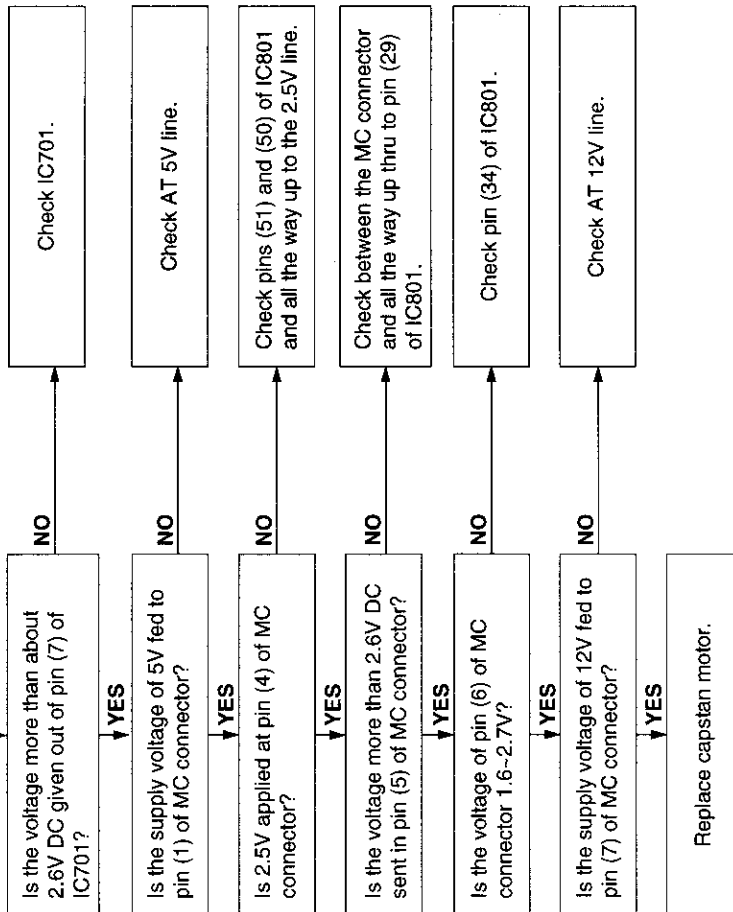


FLOW CHART NO.10 LOADING MOTOR AND EJECT TROUBLESHOOTING



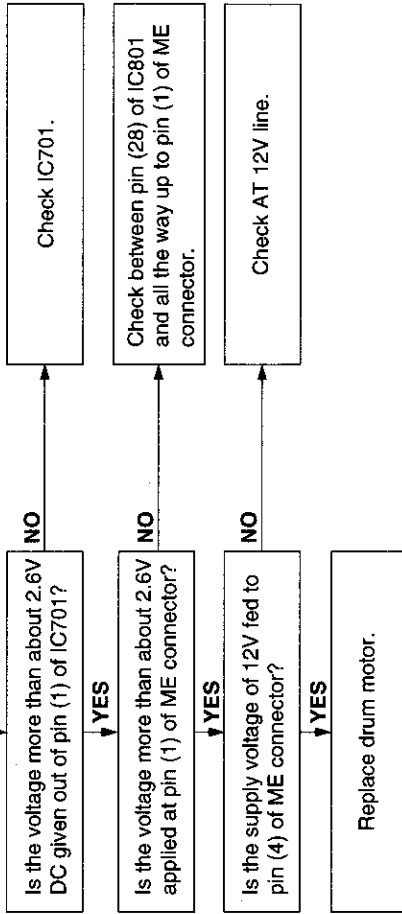
FLOW CHART NO.12 CAPSTAN MOTOR TROUBLESHOOTING

The capstan motor fails to run.



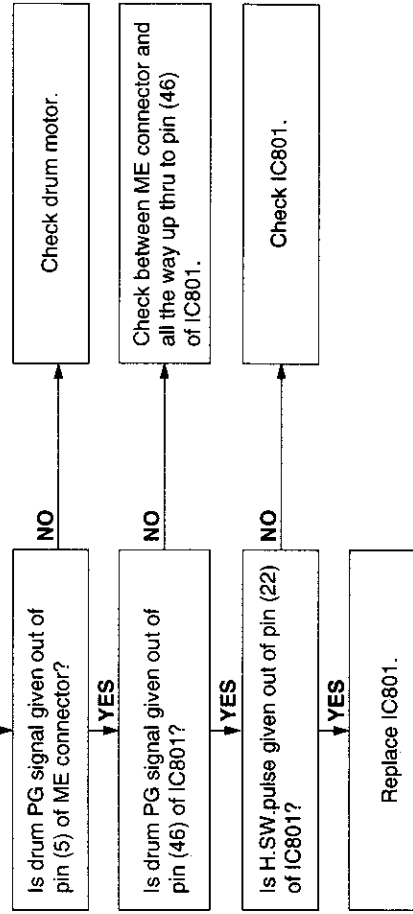
FLOW CHART NO.13 DRUM MOTOR TROUBLESHOOTING (1)

The drum motor fails to run.

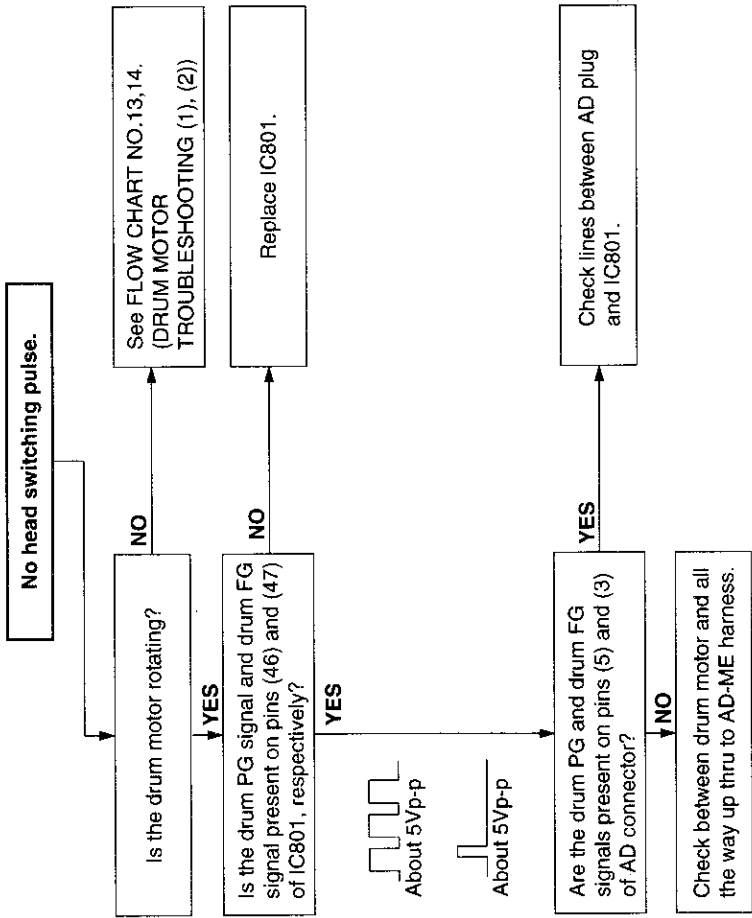


FLOW CHART NO.14 DRUM MOTOR TROUBLESHOOTING (2)

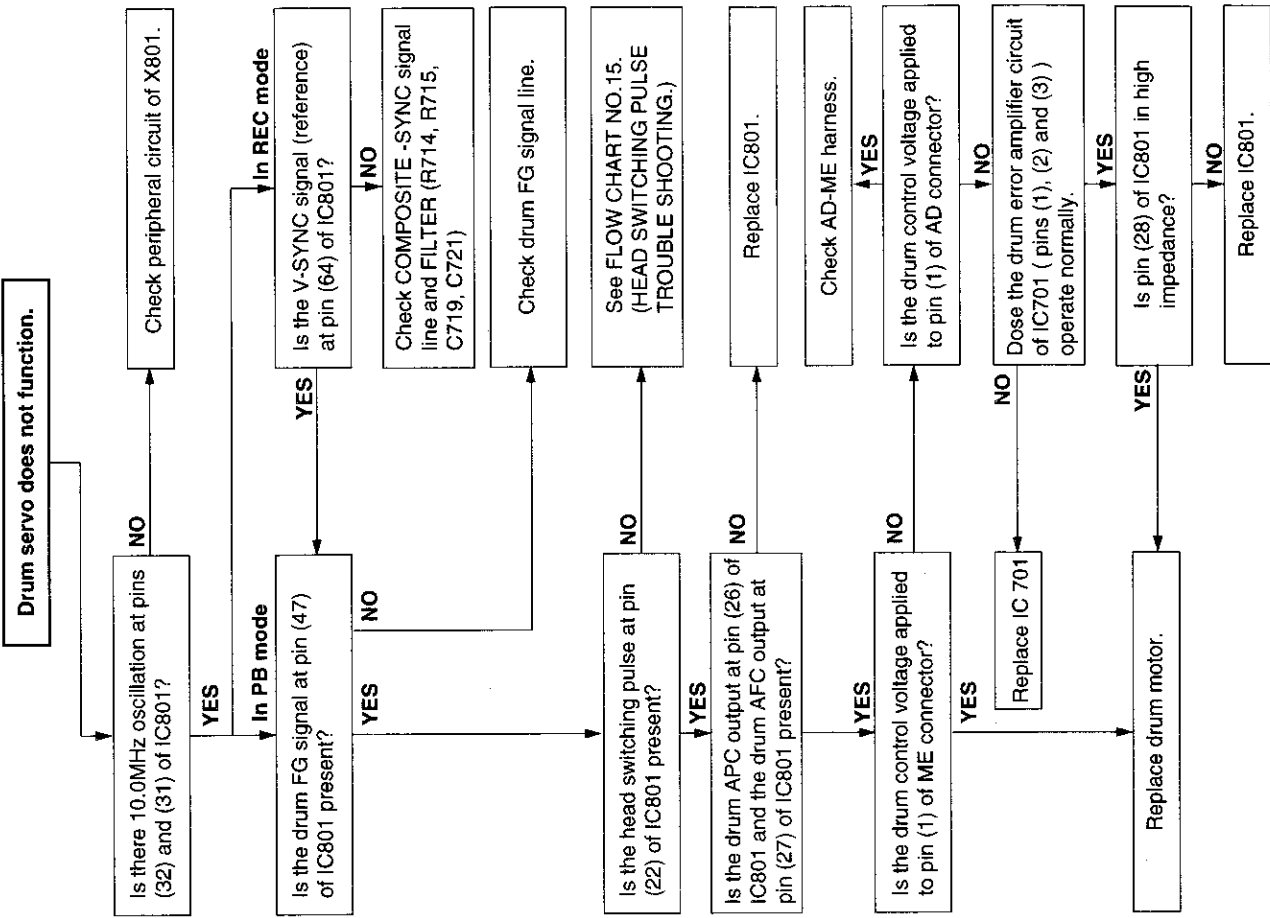
The drum motor runs only for a few seconds.



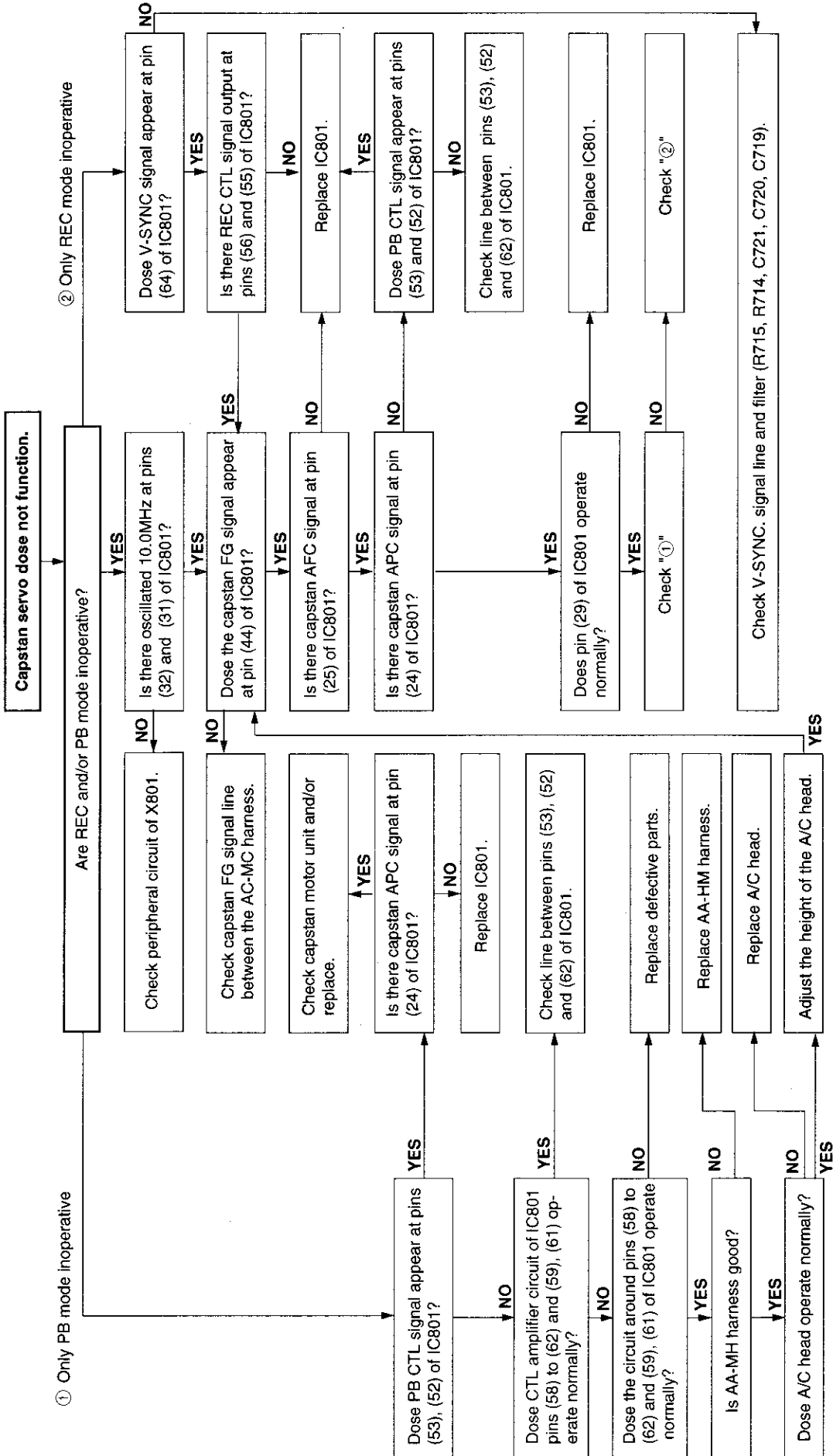
FLOW CHART NO.15 HEAD SWITCHING PULSE TROUBLESHOOTING.



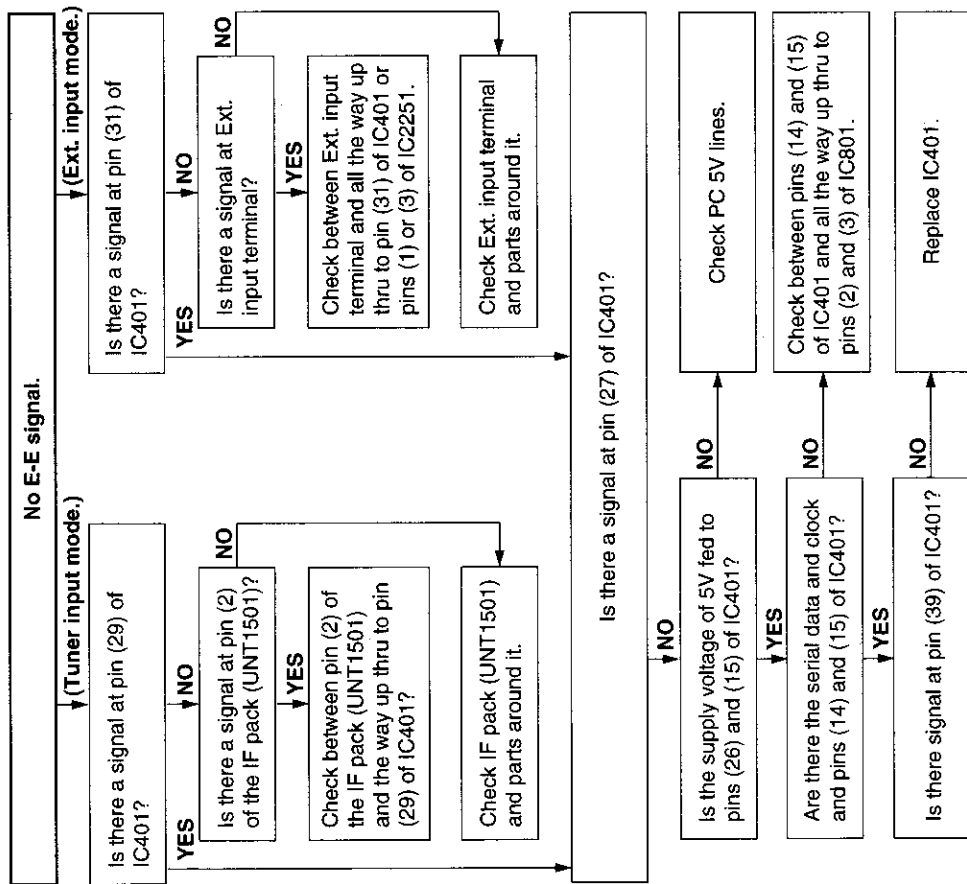
FLOW CHART NO.16 DRUM SERVO TROUBLESHOOTING



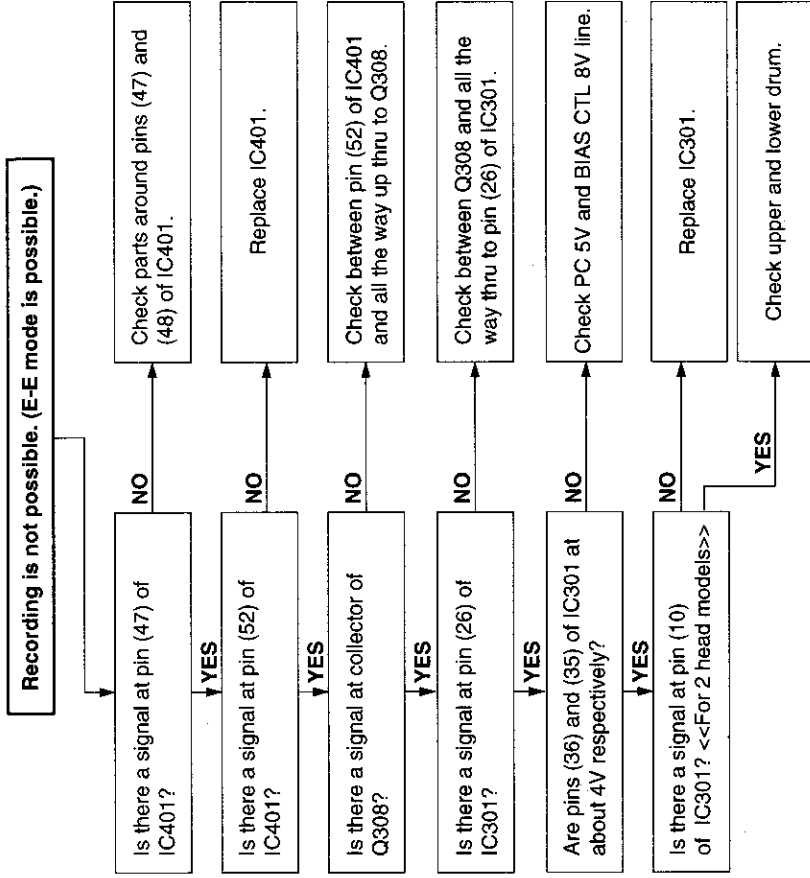
FLOW CHART NO.17 SYSTEM CONTROL SERVO TROUBLESHOOTING



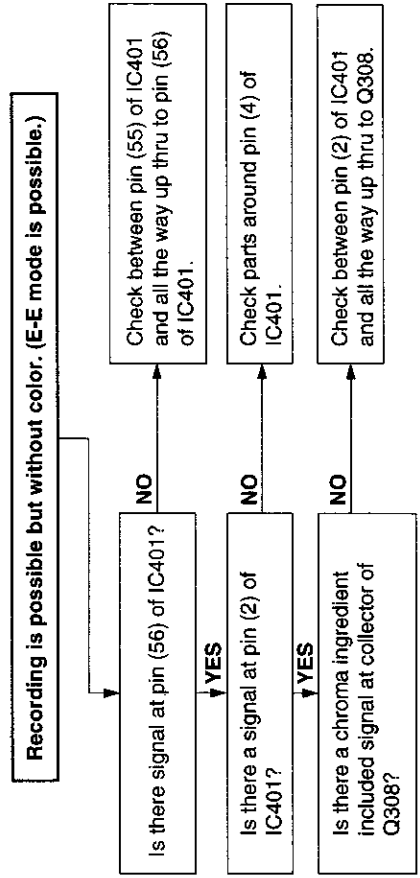
FLOW CHART NO.18 E-E MODE TROUBLESHOOTING



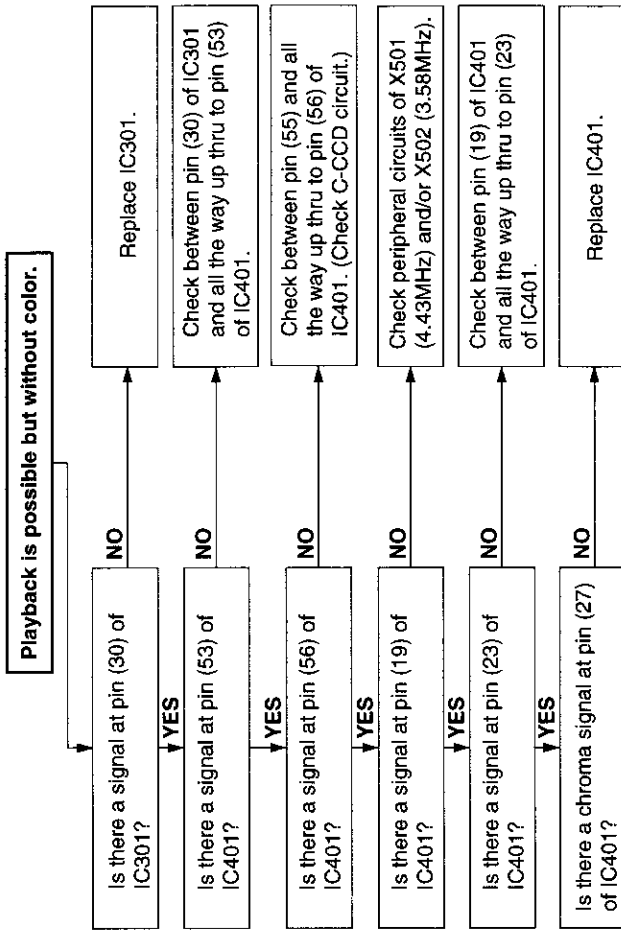
FLOW CHART NO.19 RECORDING MODE (LUMINANCE) TROUBLESHOOTING



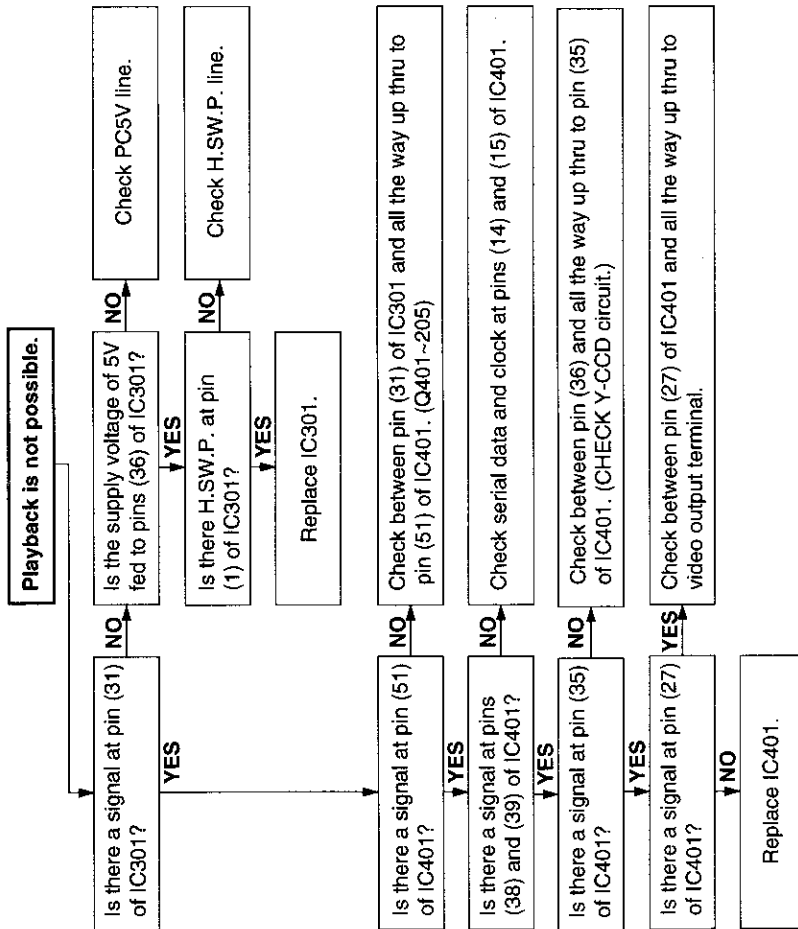
FLOW CHART NO.20 RECORDING MODE (CHROMA) TROUBLESHOOTING



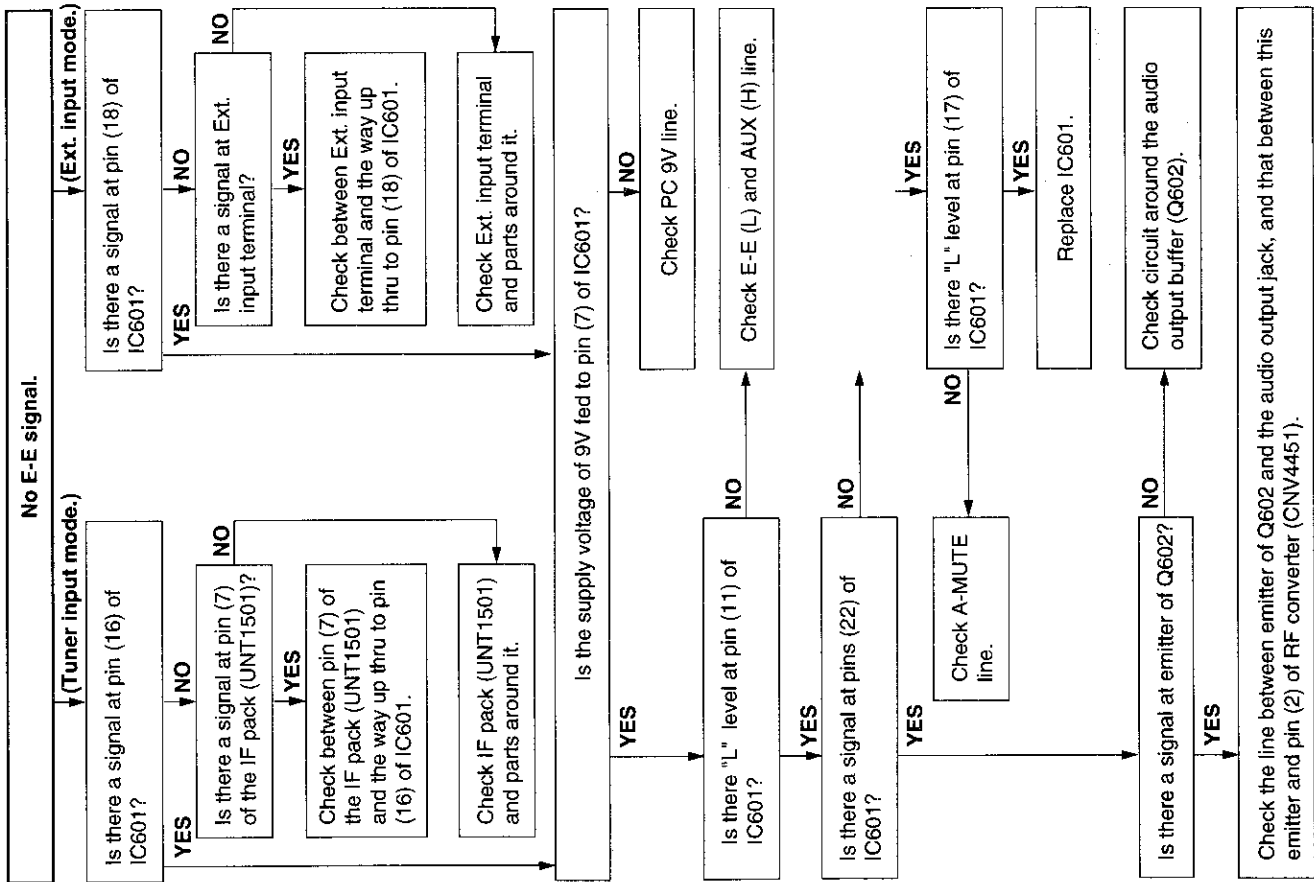
FLOW CHART NO.22 PLAYBACK MODE (CHROMA) TROUBLESHOOTING



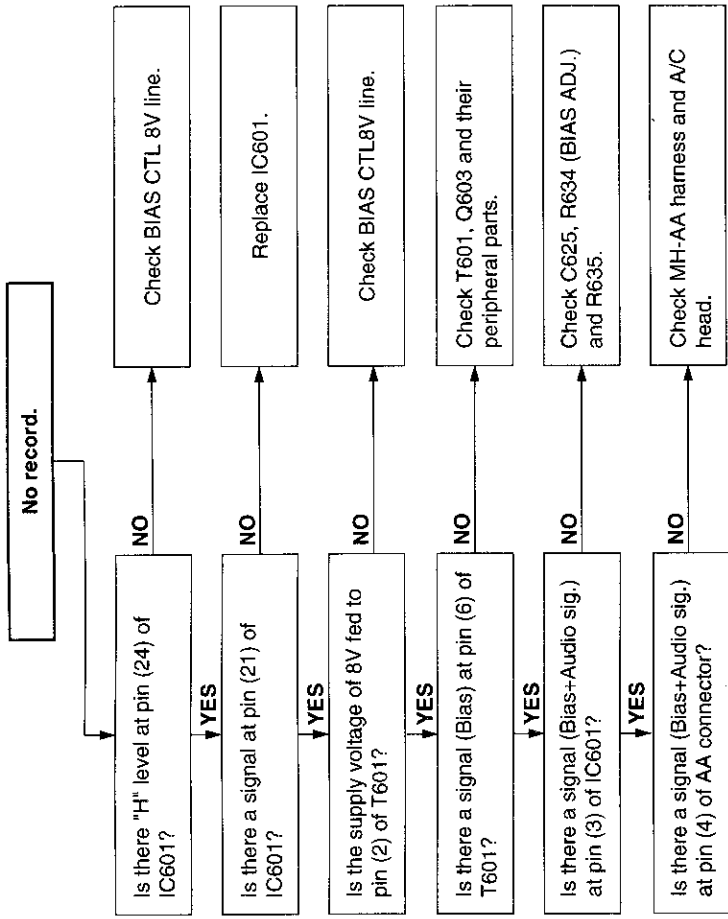
FLOW CHART NO.21 PLAYBACK MODE (LUMINANCE) TROUBLESHOOTING



FLOW CHART NO.23 LINEAR SOUND E-E MODE TROUBLESHOOTING



FLOW CHART NO.24 LINEAR SOUND RECORDING MODE TROUBLESHOOTING



REPLACEMENT OF IC804 (E²PROM)

«Servicing precautions»

When the IC804 (E²PROM) has been replaced, make the following reprogramming.
Depending on models, the IC804 (E²PROM) has been factory adjusted for its memory function.
It's therefore necessary to reprogram the memory function for the model in question.
Note that the servo circuit requires readjustments for the slow and still modes.

Memory function reprogramming.

1. Check the power off. (power is standby mode)
2. Make for a moment short-circuit between TP5001 and TP5002, both located at the front side on the main PWB.
Be sure that all the fluorescent display tubes light up into the TEST mode.
3. Using the CHANNEL (+) and (-) buttons, select the right function numbers from among JP0-JP31, which appear in the fluorescent display tube, referring to the E²PROM map.

Press the DISPLAY button to pick up the functions (ON) and the CLEAR button to discard the functions (OFF).
DISPLAY and CLEAR buttons, are located on the remote control unit.

* When the DISPLAY button has been pressed (ON), the memory function No. starts flashing.

* When the CLEAR button has been pressed (OFF), the memory function No. lights up.

4. Make a short-circuit between TP5003 and TP5004, both located at the front side on the main PWB, and the settings will be displayed in hexadecimal notation.

Now you can see if the settings are correct.

5. Example: "ON" and "OFF" are taken as "1" and "0" respectively.

The numbers JP0 to JP31 are divided into four groups and each group's setting is displayed in hexadecimal notation.

J31	J30	J29	J28	J27	J26	J25	J24	J23	J22	J21	J20	J19	J18	J17	J16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		↓				↓				↓				↓	
		SPACE				0				0				0	
J15	J14	J13	J12	J11	J10	J09	J08	J07	J06	J05	J04	J03	J02	J01	J00
0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1
		↓				↓				↓				↓	
		0				4				0				D	

"000040D" appears in the fluorescent display tube.

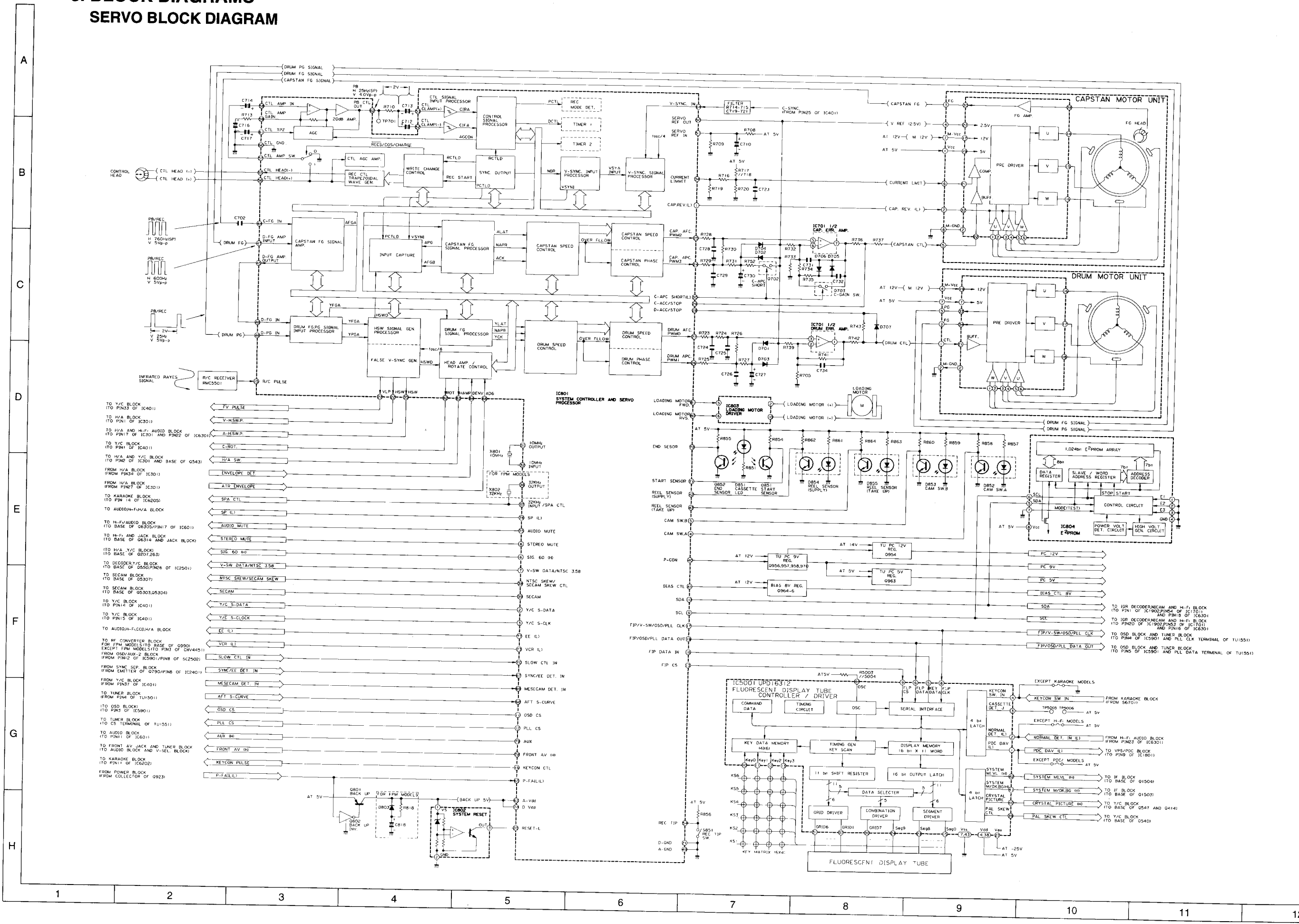
6. Finally make for a moment short-circuit between TP5001 and TP5002, both located at the front side on the main PWB to clear the TEST mode or press the OPERATE button to turn the power on.

8. BLOCK DIAGRAMS

SERVO BLOCK DIAGRAM

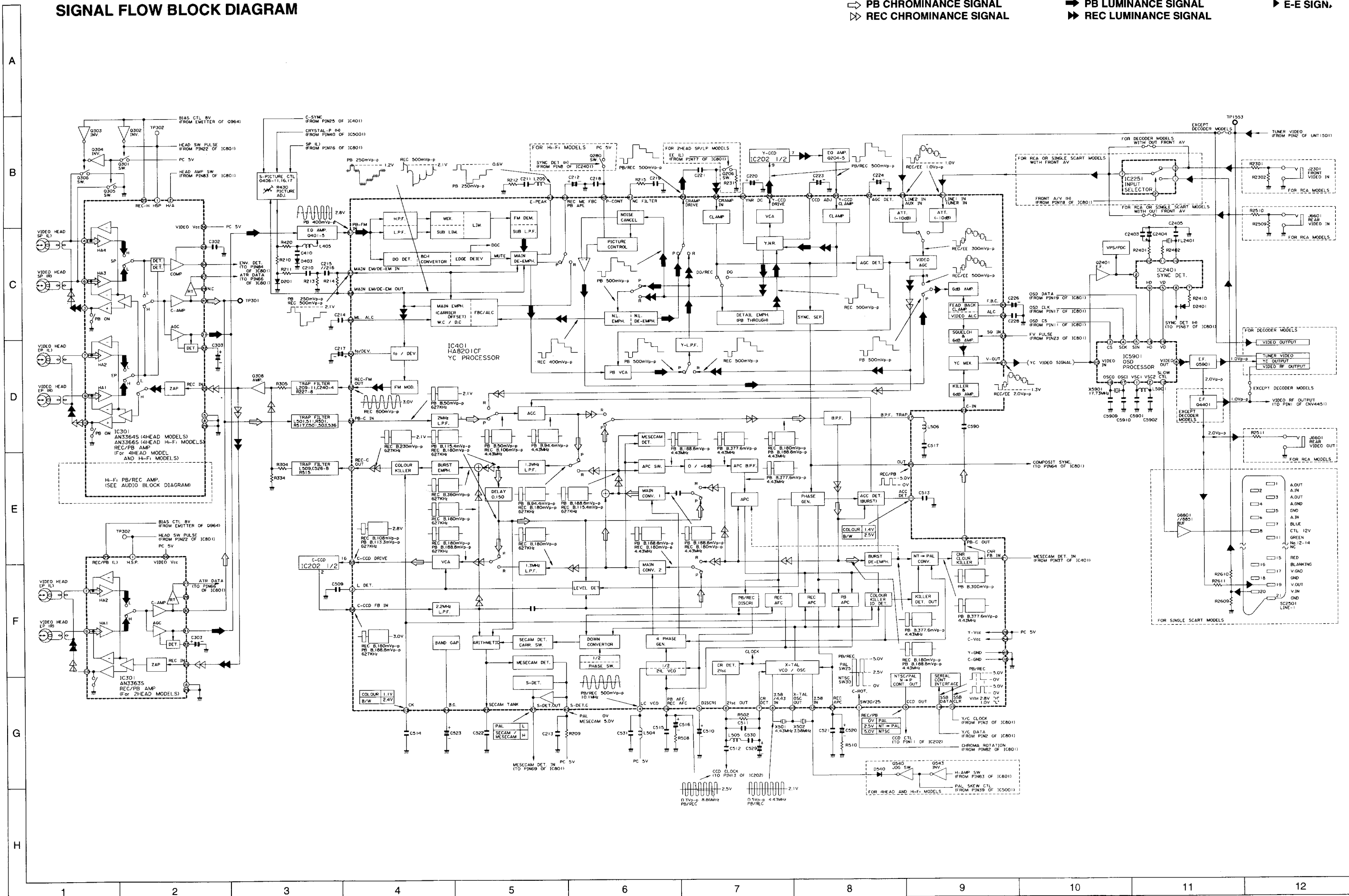
VC-M23HM
VC-M24HM

VC-M23HM
VC-M24HM

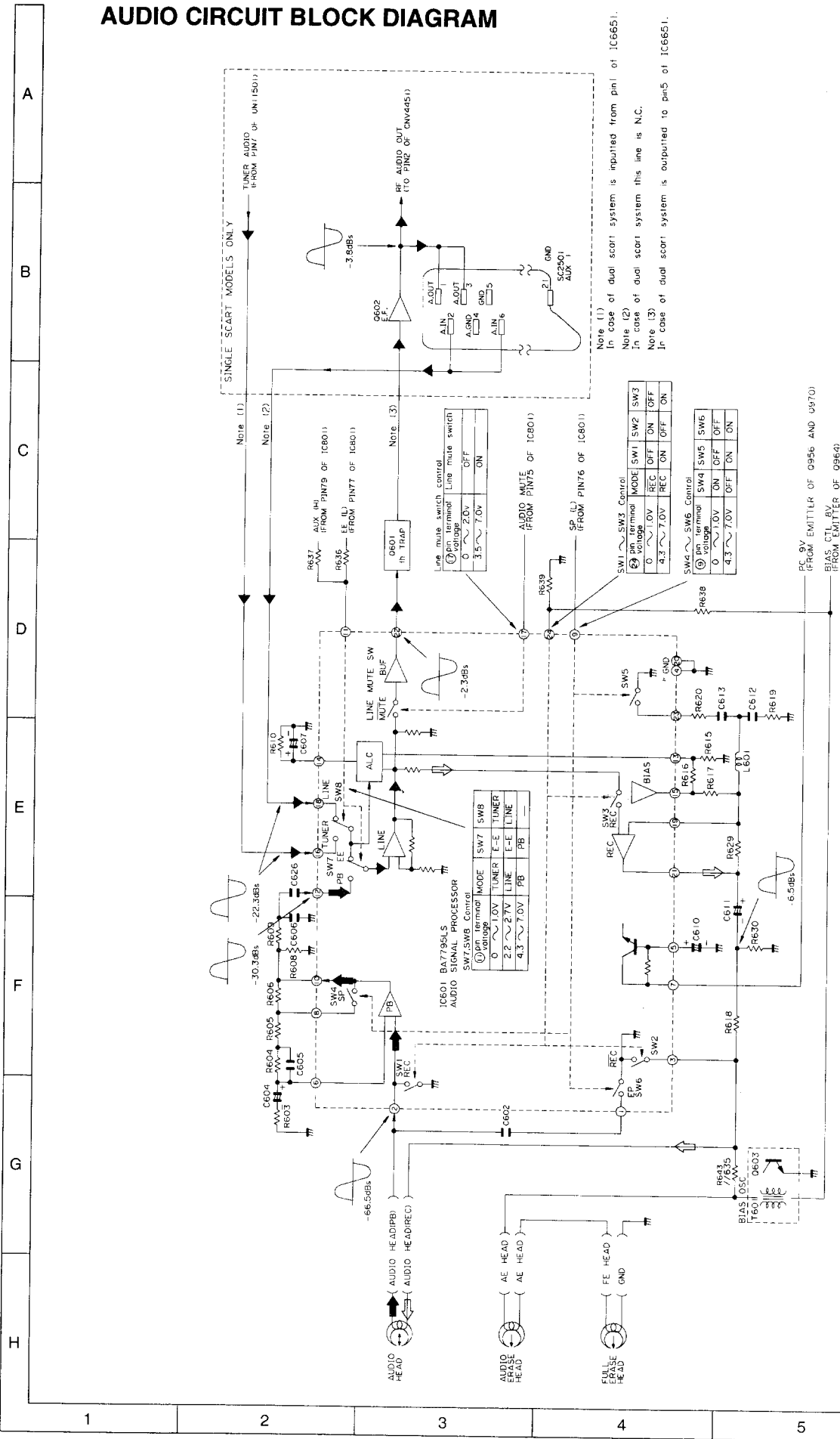


SIGNAL FLOW BLOCK DIAGRAM

⇨ PB CHROMINANCE SIGNAL
⇨ REC CHROMINANCE SIGNAL
⇨ PB LUMINANCE SIGNAL
⇨ REC LUMINANCE SIGNAL
⇨ E-E SIGN.



AUDIO CIRCUIT BLOCK DIAGRAM

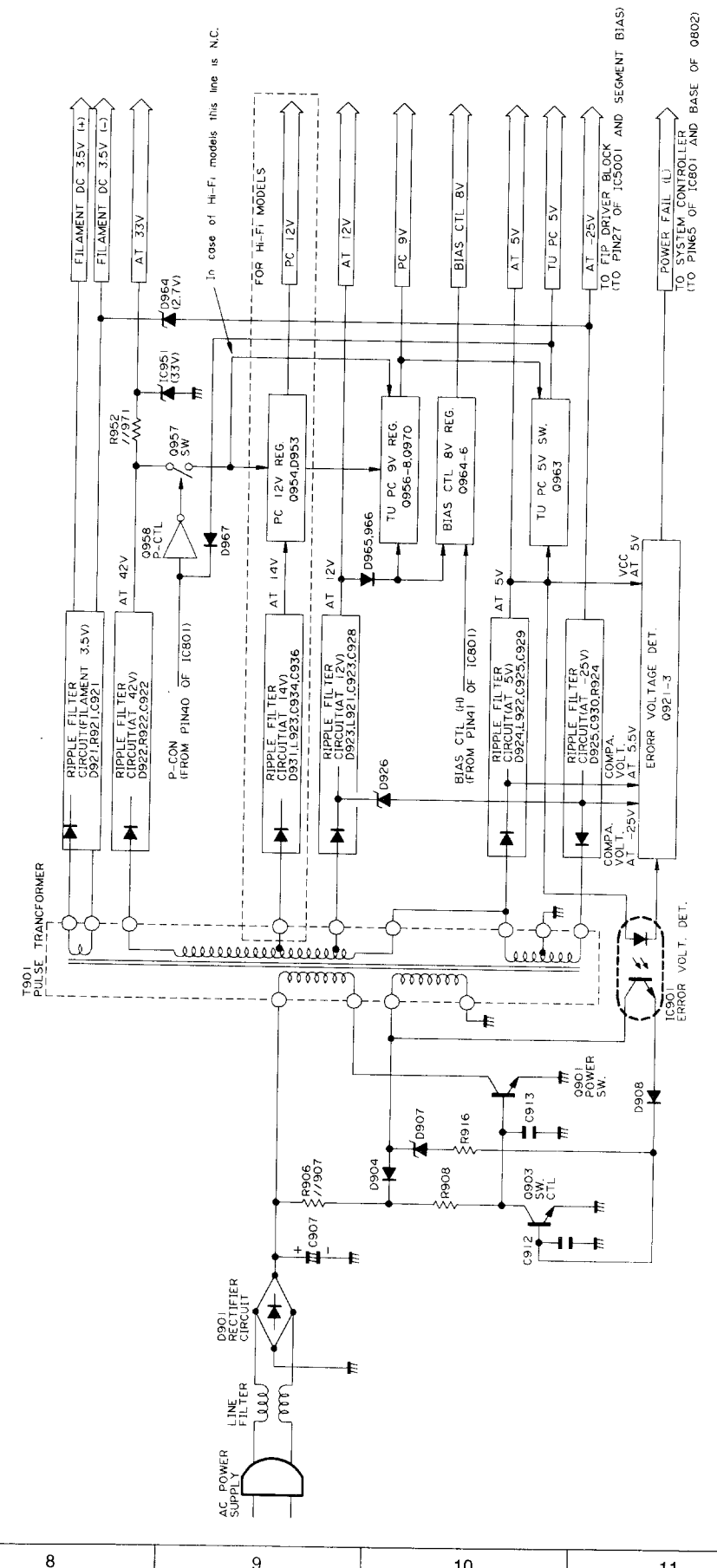


VC-M23HM
VC-M24HM

VC-M23HM
VC-M24HM

- ⇨ PLAYBACK SIGNAL
- ➔ RECORDING SIGNAL
- ▶ E-E SIGNAL

POWER CIRCUIT BLOCK DIAGRAM



MEMO

Lined area for writing a memo.

SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET.
PARTS MARKED WITH " Δ " AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.
BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:
1. DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.
2. SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.

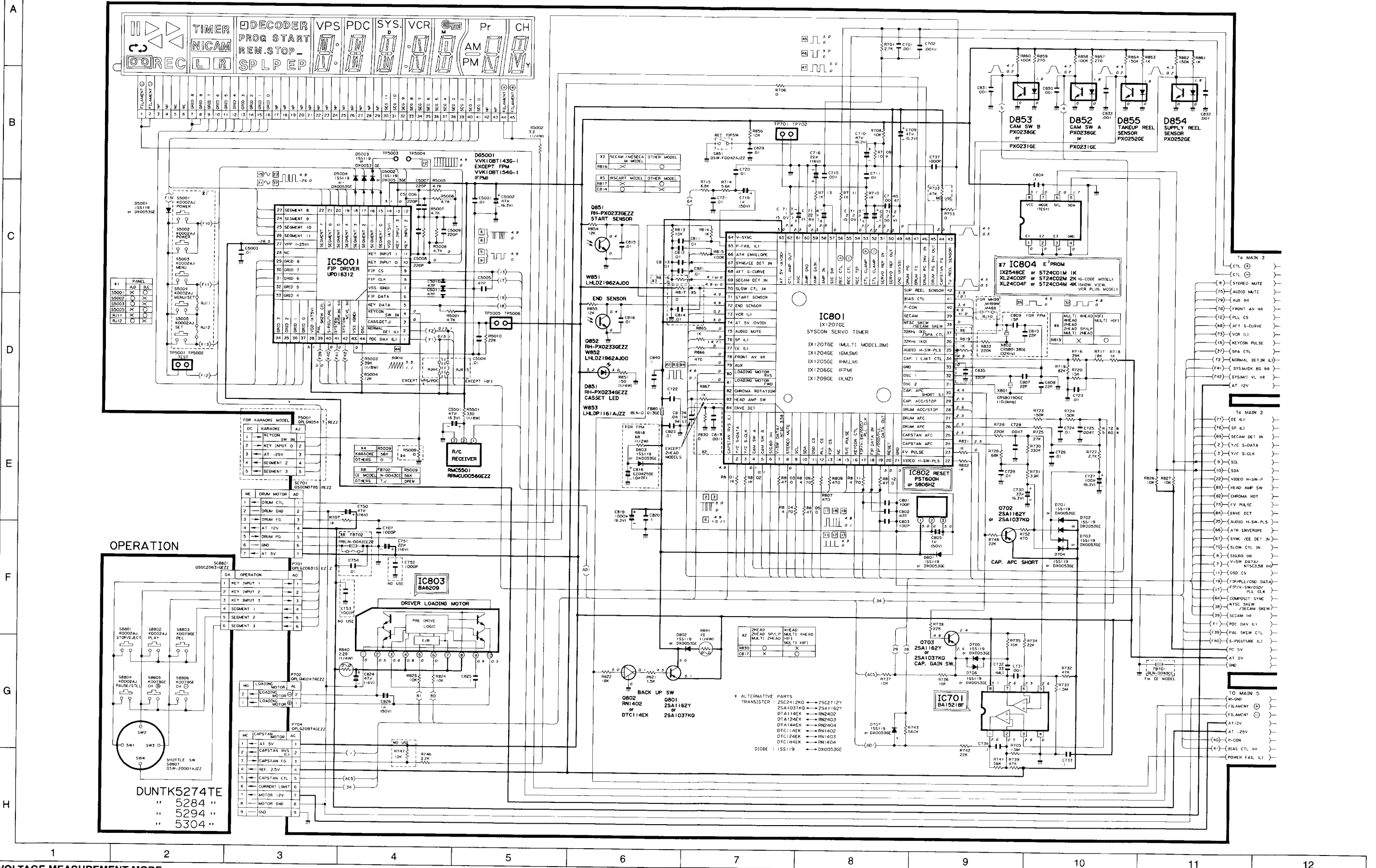
NOTES:
1. The unit of resistance "ohm" is omitted ($k=1000$ ohm, $M=1$ Meg ohm).
2. All resistors are 1/8 watt, unless otherwise noted.
3. The unit of capacitance "F" is omitted ($\mu=\mu F$, $p=\mu\mu F$).
4. The values in parentheses are the ones in the PB mode; the values without parentheses are the ones in the REC mode.

VOLTAGE MEASUREMENT CONDITIONS:
1. DC voltages are measured between points indicated and chassis ground by VTVM, with AC230V/50Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.
2. Voltages are measured with 10000 μV B & W or colour noted.

WAVEFORM MEASUREMENT CONDITIONS:
10000 μV 87.5 percent modulated colour bar signal is fed into tuner.

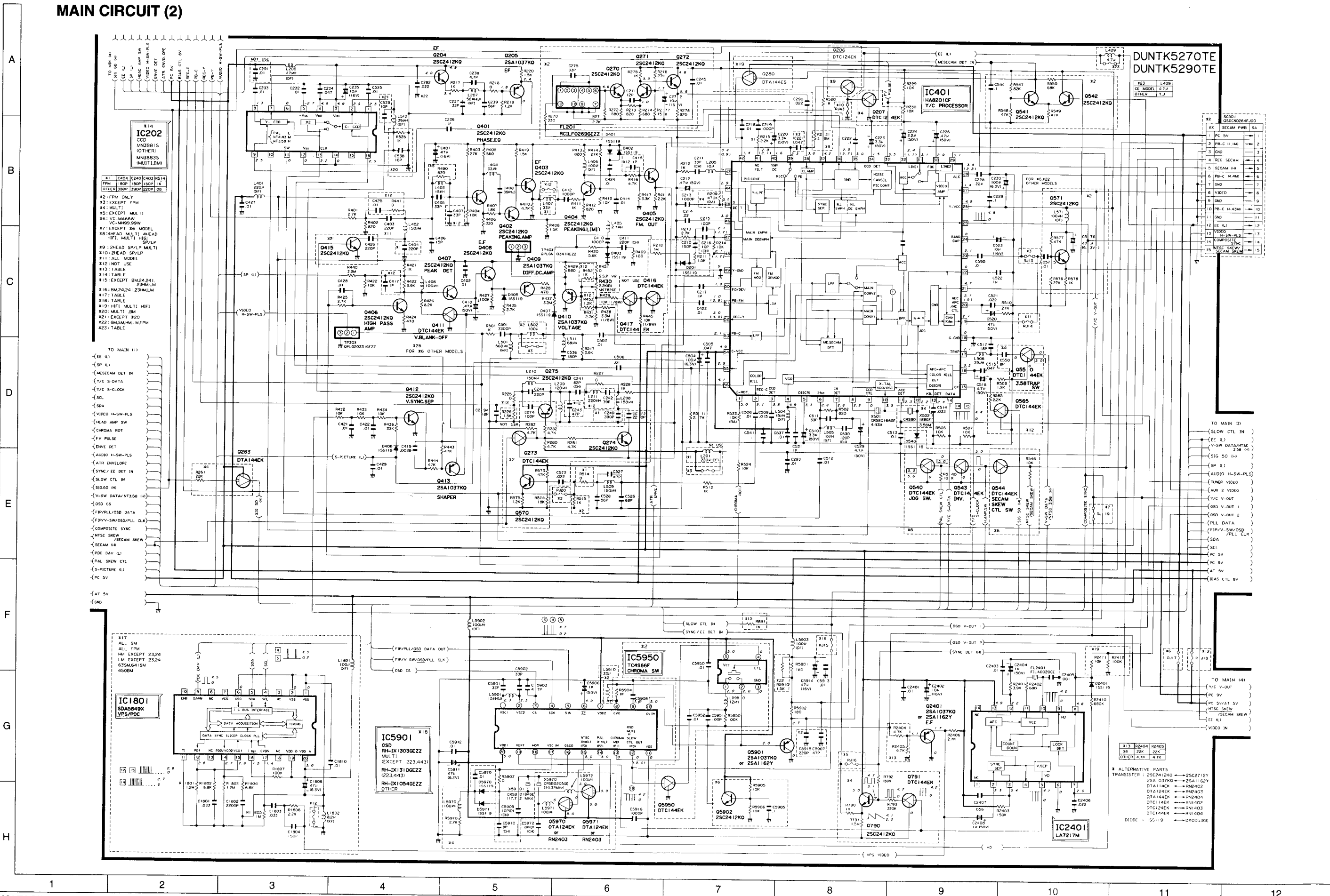
CAUTION:
This circuit diagram is original one. Therefore there may be a slight difference from yours.

9. CIRCUIT DIAGRAM AND PWB FOIL PATTERN
MAIN CIRCUIT (1) AND OPERATION CIRCUIT



VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses

MAIN CIRCUIT (2)



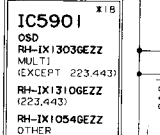
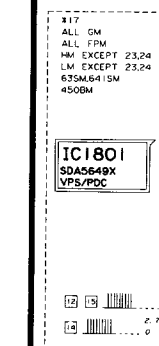
DUNTK5270TE
DUNTK5290TE

AX	SECAM PWB	SA
1	PC SV	1
2	PR-C 11 IM	2
3	IND	3
4	REC SECAM	4
5	SECAM HR	5
6	PR-C 14 RM	6
7	IND	7
8	VIDEO	8
9	IND	9
10	PR-C 14 Q3M	10
11	IND	11
12	EE ILI	12
13	VIDEO	13
14	COMPOSITE SYNC	14
15	NTSC SKEW SECAM SKEW	15

- X1: C404 C403 C403 R14
- FM: 10P 10P 150P TX
- OTHER DRIP: 300P 220P OS
- X2: FPM ONLY
- X3: EXCEPT FPM
- X4: MULTI
- X5: EXCEPT MULTI
- X6: VC-MA66W
- X7: VC-MH999W
- X8: EXCEPT X8 MODEL
- X9: HEAD MULT1 HEAD HFI, MULTI HFI
- X10: HEAD SP/LP MULTI
- X11: ALL MODEL
- X12: NOT USE
- X13: TABLE
- X14: TABLE
- X15: EXCEPT BM24241 23M4LM
- X16: BM24241 23M4LM
- X17: TABLE
- X18: TABLE
- X19: HFI MULTI HFI
- X20: MULTI BM
- X21: EXCEPT X20
- X22: OMSM/MALM/FPM
- X23: TABLE

- (EE ILI)
- (SP ILI)
- (V-SECAM DET IN)
- (Y/C S-DATA)
- (Y/C S-LOCK)
- (SOL)
- (SDA)
- (VIDEO H-SW-PLS)
- (HEAD AMP SW)
- (CHROMA ROT)
- (FV PULSE)
- (ENVE DET)
- (AUDIO H-SW-PLS)
- (ATH ENVELOPE)
- (SYNC/FV DET IN)
- (SLOW CTL IN)
- (SIG60 IH)
- (V-SW DATA/NT350 RH)
- (OSD CS)
- (FIPV/P/OSD DATA)
- (FIPV-SW/OSD/PLL CLK)
- (COMPOSITE SYNC)
- (NTSC SKEW)
- (SECAM SKEW)
- (PDC DAV GL)
- (PAL SKEW CTL)
- (S-PICTURE LI)
- (PC SV)

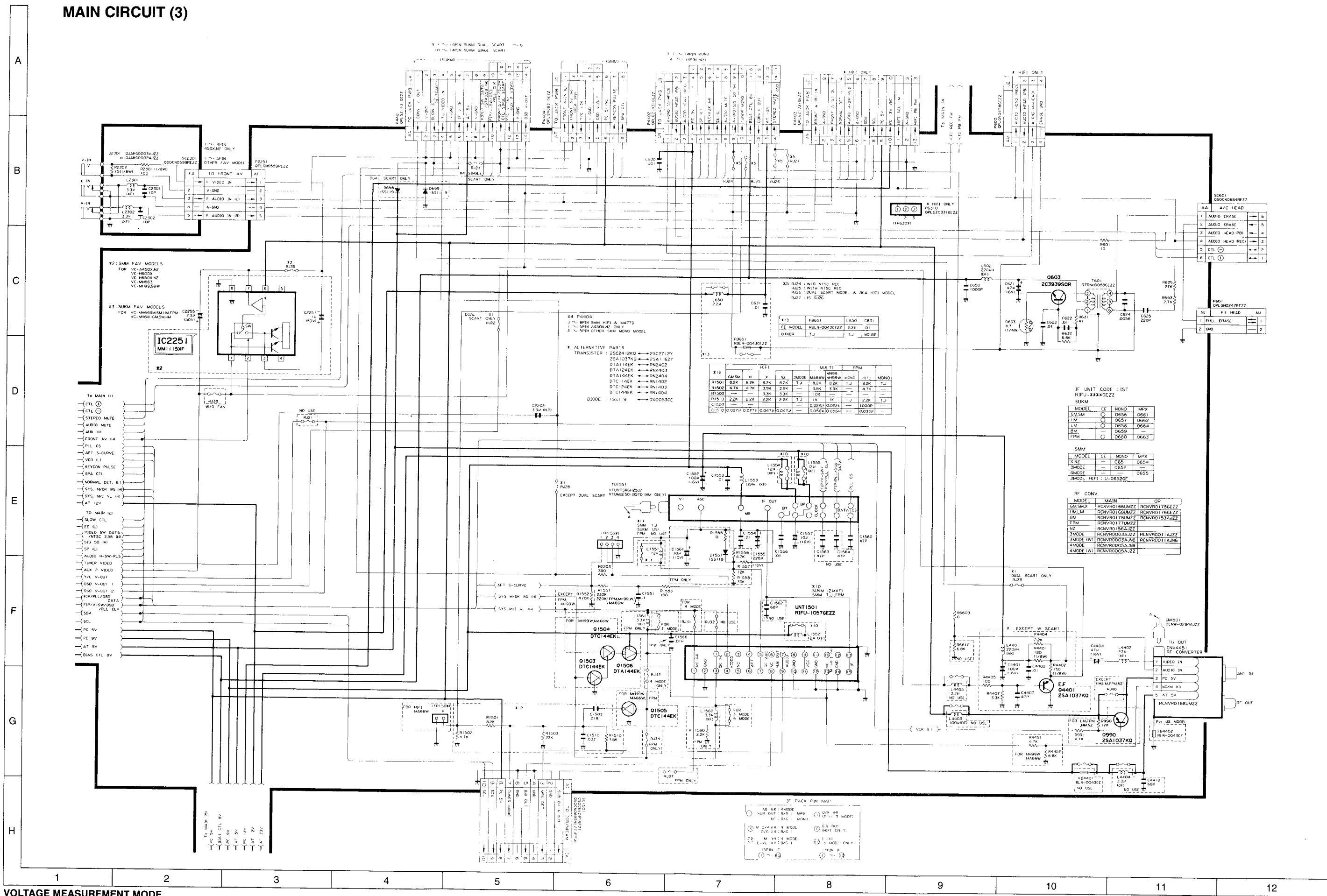
- (TO MAIN I3)
- (EE ILI)
- (V-SW DATA/SEC)
- (SIG 50 IH)
- (SP ILI)
- (AUDIO H-SW-PLS)
- (TUNER VIDEO)
- (AUX 2 VIDEO)
- (Y/C V-OUT)
- (OSD V-OUT 1)
- (OSD V-OUT 2)
- (PLL DATA)
- (FIPV-SW/OSD)
- (7PLL CLK)
- (SOL)
- (PC SV)
- (PC SV)
- (AT SV)
- (BIAS CTL BV)



ALTERNATIVE PARTS
TRANSISTOR: 2SC2412K0 → 2SC212Y
2SA1037K0 → 2SA1162Y
DTA144EK → RNE402
DTA144EK → RNE403
DTA144EK → RNE404
DTA144EK → RNE405
DTC144EK → RNE402
DTC144EK → RNE403
DTC144EK → RNE404
DTC144EK → RNE405
DIODE: 1S5119 → DX00536E

VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses

MAIN CIRCUIT (3)



IF UNIT CODE LIST
R1FU-XXXXGEZZ

MODEL	CE	MONO	MPX
GM5M	○	○	○
HM	○	○	○
LM	○	○	○
BM	○	○	○
FM	○	○	○

SUM

MODEL	CE	MONO	MPX
GM5M	○	○	○
HM	○	○	○
LM	○	○	○
BM	○	○	○
FM	○	○	○

IF CONV.

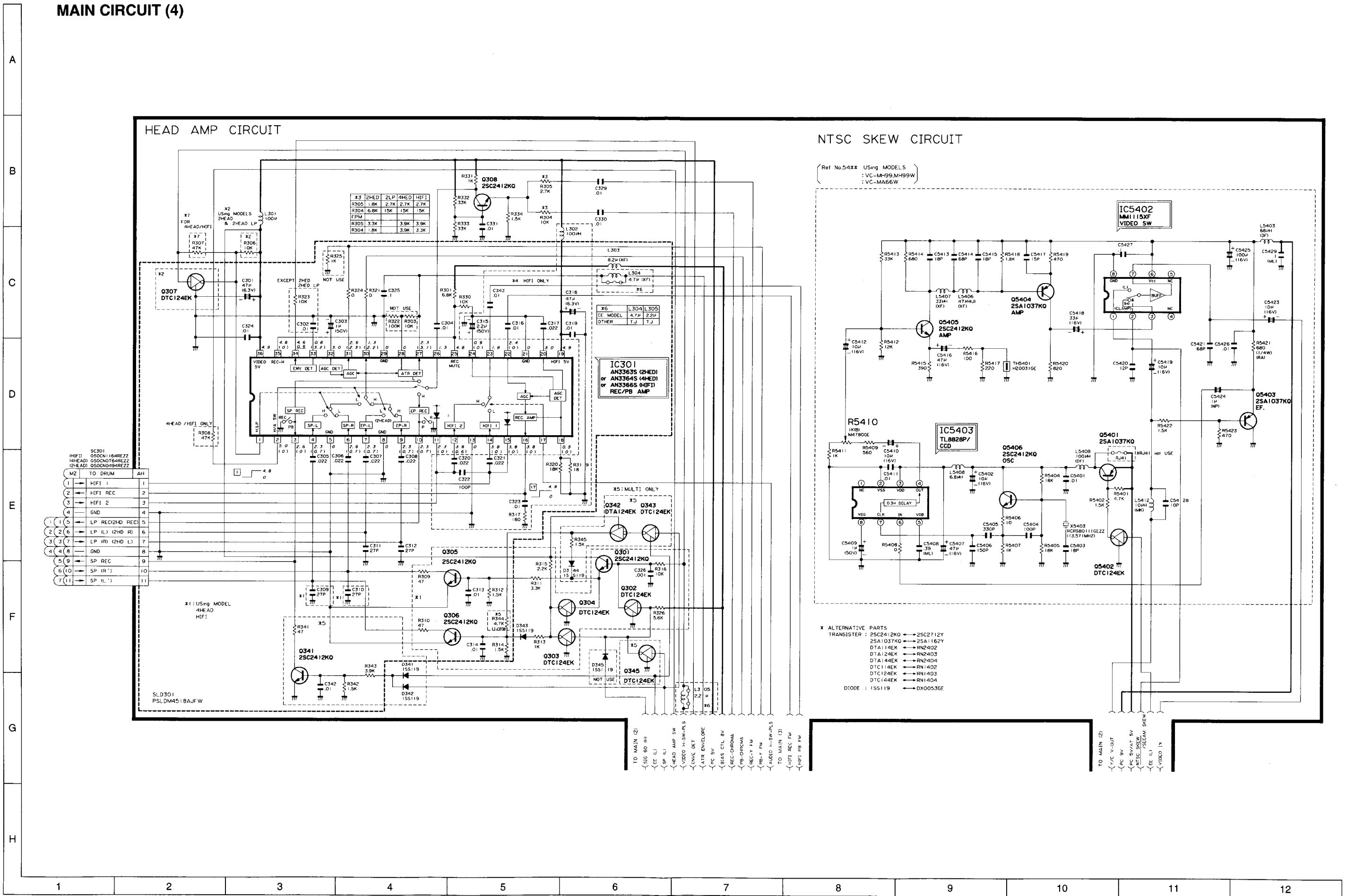
MODEL	MAIN	GR
GM5M	RCNVRO166UMZ	RCNVRO175GZZ
HM	RCNVRO168UMZ	RCNVRO176GZZ
LM	RCNVRO178UMZ	RCNVRO153AJZZ
BM	RCNVRO171UMZ	RCNVRO156AJZZ
FM	RCNVRO003AJZZ	RCNVRO11AJZZ
3MODE (W)	RCNVRO005AJZZ	RCNVRO11AJZZ
4MODE (W)	RCNVRO005AJZZ	RCNVRO11AJZZ
4MODE (W)	RCNVRO005AJZZ	RCNVRO11AJZZ

3P PACK PIN MAP

①	NO USE	②	MPX
③	MONO	④	MPX
⑤	MONO	⑥	MPX
⑦	MONO	⑧	MPX
⑨	MONO	⑩	MPX
⑪	MONO	⑫	MPX
⑬	MONO	⑭	MPX
⑮	MONO	⑯	MPX
⑰	MONO	⑱	MPX
⑲	MONO	⑳	MPX
㉑	MONO	㉒	MPX
㉓	MONO	㉔	MPX
㉕	MONO	㉖	MPX
㉗	MONO	㉘	MPX
㉙	MONO	㉚	MPX
㉛	MONO	㉜	MPX
㉝	MONO	㉞	MPX
㉟	MONO	㊱	MPX
㊲	MONO	㊳	MPX
㊴	MONO	㊵	MPX
㊶	MONO	㊷	MPX
㊸	MONO	㊹	MPX
㊺	MONO	㊻	MPX
㊼	MONO	㊽	MPX
㊾	MONO	㊿	MPX

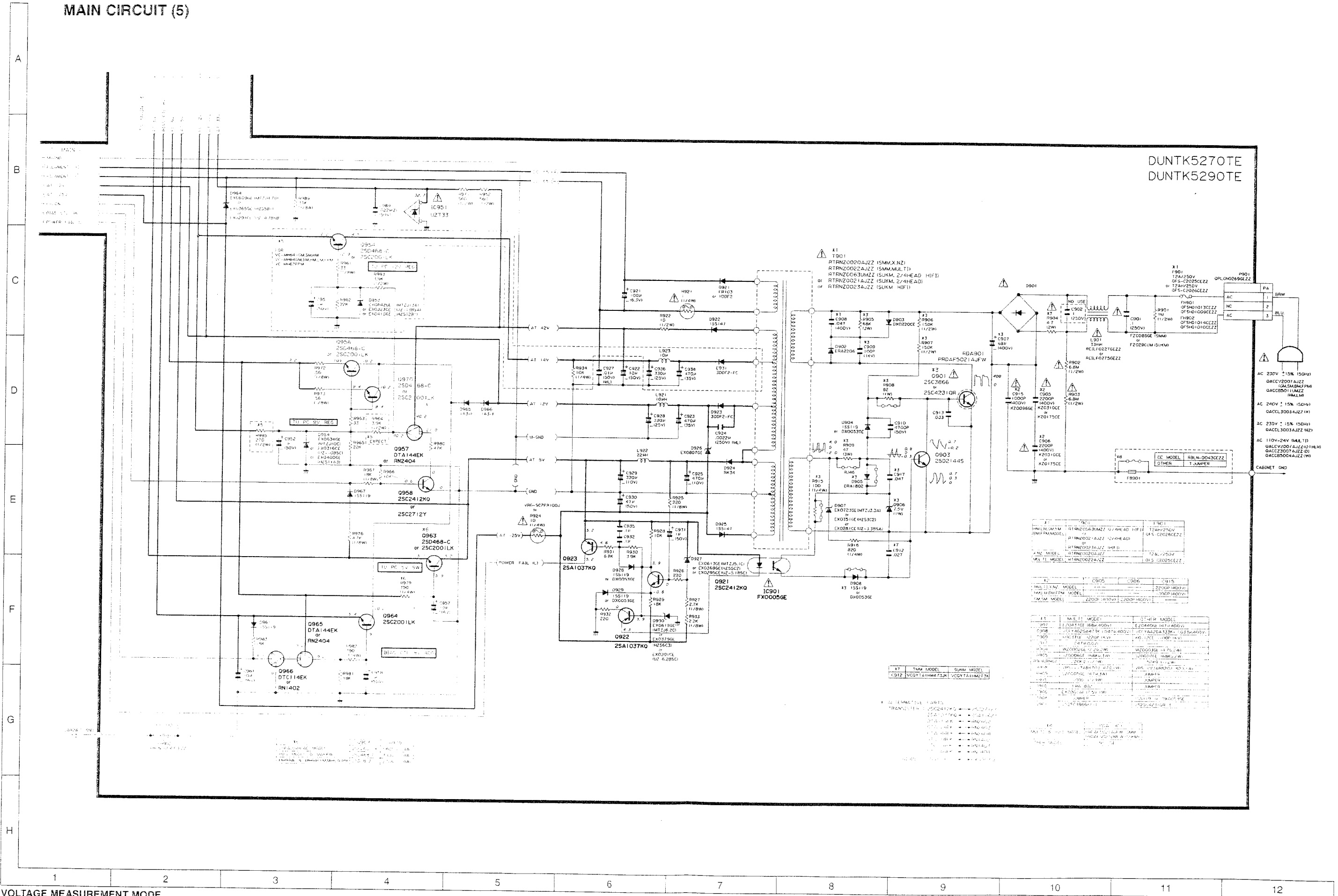
VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses

MAIN CIRCUIT (4)



VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses

MAIN CIRCUIT (5)



DUNT K5270 TE
DUNT K5290 TE

1	1901	RTRNZ0020AJZZ (SUKM, X, NZ)	1901	12A/250V
2	1902	RTRNZ0021AJZZ (SUKM, MULT)	1902	12A/250V
3	1903	RTRNZ0022AJZZ (SUKM, 2/4HEAD HIFI)	1903	12A/250V
4	1904	RTRNZ0023AJZZ (SUKM, 2/4HEAD)	1904	12A/250V
5	1905	RTRNZ0024AJZZ (SUKM, HIFI)	1905	12A/250V

1	1906	12A/250V	1906	12A/250V
2	1907	12A/250V	1907	12A/250V
3	1908	12A/250V	1908	12A/250V
4	1909	12A/250V	1909	12A/250V
5	1910	12A/250V	1910	12A/250V

1	1911	12A/250V	1911	12A/250V
2	1912	12A/250V	1912	12A/250V
3	1913	12A/250V	1913	12A/250V
4	1914	12A/250V	1914	12A/250V
5	1915	12A/250V	1915	12A/250V

VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses

10. REPLACEMENT PARTS LIST PARTS REPLACEMENT

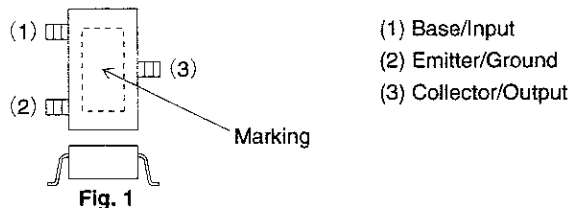
Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by \triangle and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |
| 5. PRICE CODE | |

HOW TO IDENTIFY CHIP TRANSISTORS AND DIODES BY ITS MARKING



Package	Marking	Parts No.
Fig. 1	BQ	VS2SC2412KQ-1
Fig. 1	FQ	VS2SA1037KQ-1
Fig. 1	25	VSDTC124EK/-1
Fig. 1	26	VSDTC144EK/-1
Fig. 1	24	VSDTC114EK/-1
Fig. 1	16	VSDTA144EK/-1

MARK \star : SPARE PARTS-DELIVERY SECTION.

Ref. No.	Part No.	\star	Description	Code
----------	----------	---------	-------------	------

PRINTED WIRING BOARD ASSEMBLIES (NOT REPLACEMENT ITEM)

DUNTK5290TEVA	-	Main Unit (VC-M23HM)	—
DUNTK5290TEV0	-	Main Unit (VC-M24HM)	—
DUNTK5301TEV0	-	Terminal Unit	—
DUNTK5304TEV0	-	Operation Unit	—

Ref. No.	Part No.	\star	Description	Code
----------	----------	---------	-------------	------

DUNTK5290TEVA (VC-M23HM) DUNTK5290TEV0 (VC-M24HM) MAIN UNIT

TUNER AND ASSEMBLY

CNV4451	RCNVR0168UMZZ	U	Converter	
TU1551	VTUMUE50-B57D	J	Tuner	
UNT1501	RiFU-0657GEZZ	J	IF-Pack	

INTEGRATED CIRCUITS

IC202	VHiMN3881S/1E	J	MN3881S-E1	AL
IC301	VHiAN3363S/-1	J	AN3363SB	AH
IC401	VHiHA8201CF-1	J	HA118201CF	AW
IC701	VHiBA15218F1E	J	BA15218F	AF
IC801	RH-IX1205GEZZ	J	I.C.	
IC802	VHiS806HZ//-1	J	S-806H	AC
IC803	VHiBA6209//1E	J	BA6209-V3	AG
IC804	RH-IX2548CEZZ	J	I.C. (VC-M23HM)	
IC804	VHiXL24C02F-1	J	I.C. (VC-M24HM)	
\triangle IC951	VHiUZT33///-1	J	I.C.	AC
IC2401	VHiLA7217M/-1	J	LA7217M	AG
IC5001	VHiUPD16312-1	J	UPD16312GB-3B4	AQ
IC5901	RH-IX1054GEZZ	J	M35014-052SP	AM

TRANSISTERS

Q204	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q205	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q206	VSDTC124EK/-1	J	DTC124EK	AB
Q307	VSDTC124EK/-1	J	DTC124EK	AB
Q308	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q401	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q402	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q403	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q404	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q405	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q406	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q407	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q408	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q409	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q410	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q411	VSDTC144EK/-1	J	DTC144EK	AB
Q412	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q413	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q416	VSDTC144EK/-1	J	DTC144EK	AB
Q417	VSDTC144EK/-1	J	DTC144EK	AB
Q603	VS2C3939SQR-1	J	2SC3939SQR	AC
Q702	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q703	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q801	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q802	VSDTC114EK/-1	J	DTC114EK	AB
\triangle Q901	VS2SC4231QR-3	J	2SC4231QR	AH
\triangle Q903	VS2SD2144S/-1	J	2SD2144S	AC

10. REPLACEMENT PARTS LIST PARTS REPLACEMENT

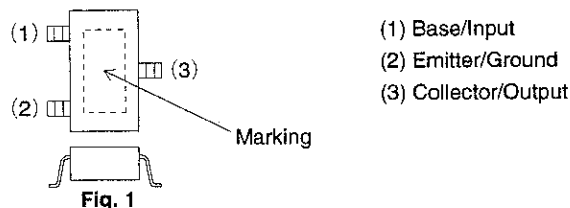
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"HOW TO ORDER REPLACEMENT PARTS"

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1. MODEL NUMBER
2. REF. NO.
3. PART NO.
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5. PRICE CODE

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Fig. 1	24	VSDTC114EK/-1
Fig. 1	16	VSDTA144EK/-1

MARK \star : SPARE PARTS-DELIVERY SECTION.

Ref. No.	Part No.	\star	Description	Code
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PRINTED WIRING BOARD ASSEMBLIES (NOT REPLACEMENT ITEM)

DUNTK5290TEVA	-	Main Unit (VC-M23HM)	—
DUNTK5290TEV0	-	Main Unit (VC-M24HM)	—
DUNTK5301TEV0	-	Terminal Unit	—
DUNTK5304TEV0	-	Operation Unit	—

Ref. No.	Part No.	\star	Description	Code
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DUNTK5290TEVA (VC-M23HM) DUNTK5290TEV0 (VC-M24HM) MAIN UNIT

TUNER AND ASSEMBLY

CNV4451	RCNVR0168UMZZ	U	Converter	
TU1551	VTUMUE50-B57D	J	Tuner	
UNT1501	RiFU-0657GEZZ	J	IF-Pack	

INTEGRATED CIRCUITS

IC202	VHiMN3881S/1E	J	MN3881S-E1	AL
IC301	VHiAN3363S/-1	J	AN3363SB	AH
IC401	VHiHA8201CF-1	J	HA118201CF	AW
IC701	VHiBA15218F1E	J	BA15218F	AF
IC801	RH-iX1205GEZZ	J	I.C.	
IC802	VHiS806HZ/-1	J	S-806H	AC
IC803	VHiBA6209//1E	J	BA6209-V3	AG
IC804	RH-iX2548CEZZ	J	I.C. (VC-M23HM)	
IC804	VHiXL24C02F-1	J	I.C. (VC-M24HM)	
\triangle IC951	VHiUZT33///-1	J	I.C.	AC
IC2401	VHILA7217M/-1	J	LA7217M	AG
IC5001	VHiUPD16312-1	J	UPD16312GB-3B4	AQ
IC5901	RH-iX1054GEZZ	J	M35014-052SP	AM

TRANSISTERS

Q204	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q205	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q206	VSDTC124EK/-1	J	DTC124EK	AB
Q307	VSDTC124EK/-1	J	DTC124EK	AB
Q308	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q401	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q402	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q403	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q404	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q405	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q406	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q407	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q408	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q409	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q410	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q411	VSDTC144EK/-1	J	DTC144EK	AB
Q412	VS2SC2412KQ-1	J	2SC2412KQ	AA
Q413	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q416	VSDTC144EK/-1	J	DTC144EK	AB
Q417	VSDTC144EK/-1	J	DTC144EK	AB
Q603	VS2C3939SQR-1	J	2SC3939SQR	AC
Q702	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q703	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q801	VS2SA1037KQ-1	J	2SA1037KQ	AA
Q802	VSDTC114EK/-1	J	DTC114EK	AB
\triangle Q901	VS2SC4231QR-3	J	2SC4231QR	AH
\triangle Q903	VS2SD2144S/-1	J	2SD2144S	AC

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
TRANSISTORS (Continued)					DIODES (Continued)				
△ Q921	VS2SC2412KQ-1	J	2SC2412KQ	AA	D954	RH-EX0634GEZZ	J	Zener Diode	AA
△ Q922	VS2SA1037KQ-1	J	2SA1037KQ	AA	D961	RH-DX0053GEZZ	J	1SS132	AA
△ Q923	VS2SA1037KQ-1	J	2SA1037KQ	AA	D964	RH-EX0609GEZZ	J	Zener Diode	AA
Q956	VS2SD468-C/-1	J	2SD468-C	AD	D965	VHD1A3-F///-1	J	1A3-F	AA
Q957	VSDTA144EK/-1	J	DTA144EK	AC	D966	VHD1A3-F///-1	J	1A3-F	AA
Q958	VS2SC2412KQ-1	J	2SC2412KQ	AA	D967	RH-DX0053GEZZ	J	1SS132	AA
Q963	VS2SC2001LK-1	J	2SC2001LK	AA	D2401	RH-DX0053GEZZ	J	1SS132	AA
Q964	VS2SC2001LK-1	J	2SC2001LK	AA	D5001	RH-DX0053GEZZ	J	1SS132	AA
Q965	VSDTA144EK/-1	J	DTA144EK	AC	D5002	RH-DX0053GEZZ	J	1SS132	AA
Q966	VSDTC114EK/-1	J	DTC114EK	AB	D5003	RH-DX0053GEZZ	J	1SS132	AA
Q970	VS2SD468-C/-1	J	2SD468-C	AD	D5004	RH-DX0053GEZZ	J	1SS132	AA
Q990	VS2SA1037KQ-1	J	2SA1037KQ	AA	△ IC901	RH-FX0005GEZZ	J	Photo Coupler	AE
Q2401	VS2SA1037KQ-1	J	2SA1037KQ	AA	Q851	RH-PX0233GEZZ	J	Photo Diode	AD
Q4401	VS2SA1037KQ-1	J	2SA1037KQ	AA	Q852	RH-PX0233GEZZ	J	Photo Diode	AD
Q5901	VS2SA1037KQ-1	J	2SA1037KQ	AA					
DIODES					PACKAGED CIRCUIT				
D401	RH-DX0053GEZZ	J	1SS132	AA	X501	RCRSB0166GEZZ	J	Crystal, 4.43MHz	AG
D402	RH-DX0053GEZZ	J	1SS132	AA	X801	RCRSB0190GEZZ	J	Crystal, 10MHz	AM
D403	RH-DX0053GEZZ	J	1SS132	AA	X5901	RCRSB0184GEZZ	J	Crystal, 17.73MHz	AM
D405	RH-DX0053GEZZ	J	1SS132	AA					
D406	RH-DX0053GEZZ	J	1SS132	AA	COILS AND TRANSFORMERS				
D407	RH-DX0053GEZZ	J	1SS132	AA	FL2401	RFILA0020CEZZ	J	Filter	AD
D701	RH-DX0053GEZZ	J	1SS132	AA	L205	VP-XF100K0000	J	10μH	AB
D702	RH-DX0053GEZZ	J	1SS132	AA	L206	VP-DF470K0000	J	47μH	AB
D703	RH-DX0053GEZZ	J	1SS132	AA	L207	VP-XF560J0000	J	56μH	AB
D704	RH-DX0053GEZZ	J	1SS132	AA	L208	VP-XF151K0000	J	150μH	AB
D705	RH-DX0053GEZZ	J	1SS132	AA	L209	VP-XF121K0000	J	120μH	AB
D706	RH-DX0053GEZZ	J	1SS132	AA	L210	VP-XF151K0000	J	150μH	AB
D707	RH-DX0053GEZZ	J	1SS132	AA	L301	VP-MK101K0000	J	100μH	AB
D801	RH-DX0053GEZZ	J	1SS132	AA	L303	VP-XF8R2K0000	J	8.2μH	AB
D802	RH-DX0053GEZZ	J	1SS132	AA	L401	VP-XF221J0000	J	220μH	AB
D851	RH-PX0234GEZZ	J	Photo Diode	AD	L402	VP-XF151K0000	J	150μH	AB
D852	RH-PX0238GEZZ	J	Photo Diode	AF	L403	VP-XF150J0000	J	15μH	AB
D853	RH-PX0238GEZZ	J	Photo Diode	AF	L404	VP-XF330J0000	J	33μH	AB
D854	RH-PX0252GEZZ	J	Photo Diode	AF	L405	VP-XF2R7J0000	J	2.7μH	AC
D855	RH-PX0252GEZZ	J	Photo Diode	AF	L406	VP-XF101K0000	J	100μH	AB
△ D901	RH-DX0083GEZZ	J	Diode Bridge	AC	L407	VP-XF330K0000	J	33μH	AB
△ D902	VHDERA2206/-1	J	ERA2206	AC	L408	VP-XF101K0000	J	110μH	AB
△ D903	RH-DX0220CEZZ	J	Diode	AB	L501	VP-MK561K0000	J	560μH	AB
△ D904	RH-DX0053GEZZ	J	1SS132	AA	L504	VP-XF150J0000	J	15μH	AB
△ D907	RH-EX0723GEZZ	J	Zener Diode	AB	L505	VP-XF100K0000	J	10μH	AB
△ D908	RH-DX0053GEZZ	J	1SS132	AA	L506	VP-XF390K0000	J	39μH	AB
△ D921	VHDFR103///-1	J	FR103	AC	L509	VP-XF151K0000	J	150μH	AB
△ D922	VHD1SS147///-1	J	1SS147	AA	L511	VP-XF680K0000	J	68μH	AB
△ D923	VHD30DF2-FC-1	J	30DF2	AE	L512	VP-XF390K0000	J	39μH	AB
△ D924	VHDRK34////-1	J	RK34	AE	L602	VP-DF221K0000	J	220μH	AB
△ D925	VHD1SS147///-1	J	1SS147	AA	△ L901	RCiLF0227GEZZ	J	Coil	AM
△ D926	RH-EX0807GEZZ	J	Zener Diode	AC	△ L921	RCiLP0171CEZZ	J	Coil	AD
△ D927	RH-EX0613GEZZ	J	Zener Diode	AA	△ L922	RCiLP0175CEZZ	J	Coil	AD
△ D928	RH-DX0053GEZZ	J	1SS132	AA	L1552	VP-XF120K0000	J	12μH	AB
△ D929	RH-DX0053GEZZ	J	1SS132	AA	L1553	VP-XF120K0000	J	12μH	AB
△ D930	RH-EX0619GEZZ	J	Zener Diode	AA	L1554	VP-XF120K0000	J	12μH	AB

Ref. No.	Part No.	★	Description	Code
COILS AND TRANSFORMERS (Continued)				
L1555	VP-XF120K0000	J	12μH	AB
L4401	VP-MK221K0000	J	220μH	AB
L4402	VP-XF270K0000	J	27μH	AB
L5901	VP-XF150J0000	J	15μH	AB
L5902	VP-DF101K0000	J	100μH	AB
L5903	VP-DF101K0000	J	100μH	AB
T601	RTRNH0053GEZZ	J	OSC. Transformer	AE
△ T901	RTRNZ0063UMZZ	U	Transformer	

CONTROLS

R430	RVR-M4782GEZZ	J	2.2k(B) S.S.P. Adj.	AB
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CAPACITORS

C211	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C212	VCEAEM1HW474M	J	0.47 50V Electrolytic	AB
C213	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C214	VCKYCY1CF224Z	J	0.22 16V Ceramic	AA
C215	VCCCCY1HH101J	J	100p 50V Ceramic	AA
C216	VCCCCY1HH100D	J	10p 50V Ceramic	AA
C217	VCKYCY1AF105Z	J	1 10V Ceramic	AC
C218	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C219	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C220	VCEAEM1HW335M	J	3.3 50V Electrolytic	AB
C221	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C222	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C223	VCEAEM1HW335M	J	3.3 50V Electrolytic	AB
C224	VCEAEM1HW225M	J	2.2 50V Electrolytic	AB
C226	VCEAEM1HW474M	J	0.47 50V Electrolytic	AB
C228	VCKYCY1CF224Z	J	0.22 16V Ceramic	AA
C229	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C230	VCEAEM0JW107M	J	100 6.3V Electrolytic	AB
C232	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C233	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C234	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C235	VCEAEM1CW106M	J	10 16V Electrolytic	AB
C236	VCKYD41HF104Z	J	0.1 50V Ceramic	AA
C237	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C238	VCCCD41HH4R7K	J	4.7p 50V Ceramic	AA
C239	VCCCCY1HH560J	J	56p 50V Ceramic	AA
C240	VCKYCY1HB391K	J	390p 50V Ceramic	AA
C241	VCCCCY1HH820J	J	82p 50V Ceramic	AA
C244	VCCCCY1HH221J	J	220p 50V Ceramic	AA
C292	VCKYCY1HF103Z	J	0.01 50V Ceramic	AB
C293	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C294	VCCCCY1HH180J	J	18p 50V Ceramic	AA
C301	VCEAEM0JW476M	J	47 6.3V Electrolytic	AB
C303	VCEAEM1HW105M	J	1 50V Electrolytic	AB
C304	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C307	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C308	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C311	VCCCCY1HH270J	J	27p 50V Ceramic	AA
C312	VCCCCY1HH270J	J	27p 50V Ceramic	AA

Ref. No.	Part No.	★	Description	Code
CAPACITORS (Continued)				
C324	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C325	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C329	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C330	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C331	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C401	VCEAEM1CW476M	J	47 16V Electrolytic	AB
C402	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C403	VCKYCY1HB221K	J	220p 50V Ceramic	AA
C404	VCKYCY1HB391K	J	390p 50V Ceramic	AA
C405	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C406	VCCCD41HH150J	J	15p 50V Ceramic	AA
C408	VCCSD41HL390J	J	39p 50V Ceramic	AA
C410	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C411	VCKYCY1HB331K	J	330p 50V Ceramic	AA
C412	VCKYCY1HB102K	J	1000p 50V Ceramic	AA
C414	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C418	VCEAEM1HW474M	J	0.47 50V Electrolytic	AB
C419	VCKYCY1HB392K	J	3900p 50V Ceramic	AA
C421	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C422	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C423	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C424	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C427	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C428	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C429	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C501	VCKYCY1HB332K	J	3300p 50V Ceramic	AA
C503	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C504	VCEAEM0JW107M	J	100 6.3V Electrolytic	AB
C505	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C506	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C508	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C509	VCKYCY1EB153K	J	0.015 25V Ceramic	AA
C510	VCEAEM1HW335M	J	3.3 50V Electrolytic	AB
C511	VCCCCY1HH330J	J	33p 50V Ceramic	AA
C512	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C513	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA
C514	VCKYCY1HF333Z	J	0.033 50V Ceramic	AA
C515	VCKYCY1HF473Z	J	0.047 50V Ceramic	AA
C516	VCEAEM1HW475M	J	4.7 50V Electrolytic	AB
C517	VCCCCY1HH180J	J	18p 50V Ceramic	AA
C520	VCEAEM1HW474M	J	0.47 50V Electrolytic	AB
C521	VCKYCY1HF223Z	J	0.022 50V Ceramic	AB
C522	VCKYCY1AF105Z	J	1 10V Ceramic	AC
C523	VCEAEM1CW106M	J	10 16V Electrolytic	AB
C525	VCKYD41CY103N	J	0.01 16V Ceramic	AA
C526	VCCSD41HL680J	J	68p 50V Ceramic	AA
C527	VCCSD41HL470J	J	47p 50V Ceramic	AA
C528	VCCSD41HL560J	J	56p 50V Ceramic	AA
C529	VCEAEM1HW475M	J	4.7 50V Electrolytic	AB
C530	VCCCCY1HH121J	J	120p 50V Ceramic	AA
C531	VCCCCY1HH1R0C	J	1p 50V Ceramic	AA
C536	VCCCCY1HH181J	J	180p 50V Ceramic	AA
C537	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA
C539	VCCCCY1HH100D	J	10p 50V Ceramic	AA
C541	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
CAPACITORS (Continued)					CAPACITORS (Continued)				
C590	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C824	VCEAEM1CW476M	J 47	16V Electrolytic	AB
C621	VCEAEM1CW476M	J	47 16V Electrolytic	AB	C825	VCKYCY1EF104Z	J 0.1	25V Ceramic	AA
C622	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C826	VCE9EM1HW105M	J 1	50V Elect.(N.P.)	AB
C623	VCKYD41CY103N	J	0.01 16V Ceramic	AA	C829	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C624	VCQPYA2AA562J	J	5600p 100V Mylar	AC	C830	VCKYCY1HB102K	J 1000p	50V Ceramic	AA
C625	VCCCCY1HH221J	J	220p 50V Ceramic	AA	C831	VCKYCY1HB102K	J 1000p	50V Ceramic	AA
C630	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	C832	VCKYD41HB102K	J 1000p	50V Ceramic	AA
C650			1000p		C833	VCKYCY1HB102K	J 1000p	50V Ceramic	AA
C701	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	△ C901	RC-FZ029CUMZZ	U 0.1	250V Mylar	AD
C707	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	△ C907	RC-EZ0440GEZZ	J 47	400V Electrolytic	AH
C709	VCEAEM0JW476M	J	47 6.3V Electrolytic	AB	△ C908	VCFYAA2GA333K	J 0.033	400V Mylar	AD
C710	VCEAEM0JW476M	J	47 6.3V Electrolytic	AB	△ C909	RC-KZ0112CEZZ	J 100p	1kV Ceramic	AB
C711	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C910	VCKYPA1HB472K	J 4700p	50V Ceramic	AA
C712	VCEAEM1HW225M	J	2.2 50V Electrolytic	AB	△ C912	VCQYTA1HM273J	J 0.027	50V Mylar	AB
C713	VCEAEM1HW225M	J	2.2 50V Electrolytic	AB	△ C913	VCQYTA1HM333J	J 0.033	50V Mylar	AA
C714	VCEAEM1CW226M	J	22 16V Electrolytic	AB	△ C915	RC-KZ0096GEZZ	J 1000p	400V Ceramic	AD
C715	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	△ C921	VCEAGA0JW107M	J 100	6.3V Electrolytic	AB
C716	VCEAEM1CW226M	J	22 16V Electrolytic	AB	△ C922	VCEAGA1HW106M	J 10	50V Electrolytic	AC
C717	VCEAEM1HW105M	J	1 50V Electrolytic	AB	△ C923	VCEAVA1VN477M	J 470	35V Electrolytic	AD
C719	VCEAEM1HW105M	J	1 50V Electrolytic	AB	△ C924	RC-QZ0104GEZZ	J 2200p	250V Mylar	AC
C720	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C925	VCEAVA1AN477M	J 470	10V Electrolytic	AC
C721	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C927	VCQYTA1HM103J	J 0.01	50V Mylar	AA
C722	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA	△ C928	VCEAGA1EW337M	J 330	25V Electrolytic	AC
C723	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C929	VCEAGA1AW337M	J 330	10V Electrolytic	AB
C724	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C930	VCEAGA1HW476M	J 47	50V Electrolytic	AB
C725	VCKYCY1HB472K	J	4700p 50V Ceramic	AA	△ C931	VCEAEA1HW105M	J 1	50V Electrolytic	AB
C726	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	△ C932	VCKYCY1EF104Z	J 0.1	25V Ceramic	AA
C727	VCEAEM0JW107M	J	100 6.3V Electrolytic	AB	△ C935	VCKYCY1EF104Z	J 0.1	25V Ceramic	AA
C728	VCKYCY1HB472K	J	4700p 50V Ceramic	AA	C952	VCEAEM1HW105M	J 1	50V Electrolytic	AB
C729	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C957	VCEAEA1CW106M	J 10	16V Electrolytic	AB
C730	VCEAEM0JW336M	J	33 6.3V Electrolytic	AA	C958	VCEAEM1HW105M	J 1	50V Electrolytic	AB
C731	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	C961	VCEAEM1CW106M	J 10	16V Electrolytic	AB
C732	RC-FZ5334BMNK	J	0.33 Mylar		C989	VCKYCY1HF223Z	J 0.022	50V Ceramic	AB
C733	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA	C1551	VCKYCY1EF104Z	J 0.1	25V Ceramic	AA
C734	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA	C1552	VCEAGA1CW107M	J 100	16V Electrolytic	AB
C737	VCKYCY1HB102K	J	1000p 50V Ceramic	AA	C1553	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C740	VCKYCY1HB472K	J	4700p 50V Ceramic	AA	C1554	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C750	VCEAEM1CW476M	J	47 16V Electrolytic	AB	C1555	VCEAEM1CW476M	J 47	16V Electrolytic	AB
C751	VCEAEM1CW226M	J	22 16V Electrolytic	AB	C1556	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C801	VCCCCY1HH470J	J	47p 50V Ceramic	AA	C1557	VCEAEM1CW106M	J 10	16V Electrolytic	AB
C802	VCCCCY1HH470J	J	47p 50V Ceramic	AA	C1560	VCCCCY1HH470J	J 47p	50V Ceramic	AA
C803	VCCCCY1HH470J	J	47p 50V Ceramic	AA	C1561	VCEAEM1CW106M	J 10	16V Electrolytic	AB
C804	VCKYCY1EF104Z	J	0.1 25V Ceramic	AA	C2202	VCE9EM1HW335M	J 3.3	50V Elect.(N.P.)	AD
C805	VCEAEM1HW105M	J	1 50V Electrolytic	AB	C2401	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C807	VCCCCY1HH220J	J	22p 50V Ceramic	AA	C2402	VCEAEM1CW106M	J 10	16V Electrolytic	AB
C808	VCCCCY1HH220J	J	22p 50V Ceramic	AA	C2403	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C811	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C2404	VCEAEM1HW105M	J 1	50V Electrolytic	AB
C812	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C2405	VCKYCY1HB102K	J 1000p	50V Ceramic	AA
C813	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C2406	VCKYCY1HF223Z	J 0.022	50V Ceramic	AB
C815	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C2407	VCQYTA1HM563J	J 0.056	50V Mylar	AB
C816	VCKYD41CY103N	J	0.01 16V Ceramic	AA	C2408	VCEAEM1HW105M	J 1	50V Electrolytic	AB
C819	VCEAGA0JW108M	J	1000 6.3V Electrolytic	AC	C4401	VCEAEA1CW107M	J 100	16V Electrolytic	AC
C820	VCKYD41HF104Z	J	0.1 50V Ceramic	AA	C4402	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C821	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C4404	VCEAEM1CW476M	J 47	16V Electrolytic	AB
C823	VCKYCY1HF103Z	J	0.01 50V Ceramic	AA	C5001	VCKYD41CY103N	J 0.01	16V Ceramic	AA

Ref. No.	Part No.	★	Description	Code
CAPACITORS (Continued)				
C5002	VCEAEM0JW476M	J 47	6.3V Electrolytic	AB
C5003	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C5004	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C5005	VCCCCY1HH470J	J 47p	50V Ceramic	AA
C5006	VCKYD41HB221K	J 220p	50V Ceramic	AA
C5007	VCKYD41HB221K	J 220p	50V Ceramic	AA
C5008	VCKYD41HB221K	J 220p	50V Ceramic	AA
C5009	VCKYD41HB221K	J 220p	50V Ceramic	AA
C5501	VCEAEM0JW476M	J 47	6.3V Electrolytic	AB
C5901	VCCCCY1HH330J	J 33p	50V Ceramic	AA
C5902	VCCCCY1HH330J	J 33p	50V Ceramic	AA
C5903	VCCCCY1HH470J	J 47p	50V Ceramic	AA
C5906	VCEAEM1HW105M	J 1	50V Electrolytic	AB
C5907	VCCCCY1HH470J	J 47p	50V Ceramic	AA
C5908	VCKYCY1EF104Z	J 0.1	25V Ceramic	AA
C5909	VCCCCY1HH100D	J 10p	50V Ceramic	AA
C5910	VCCCCY1HH8R0D	J 8p	50V Ceramic	AA
C5911	VCEAEM0JW476M	J 47	6.3V Electrolytic	AB
C5912	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C5913	VCKYCY1HF103Z	J 0.01	50V Ceramic	AA
C5914	VCEAEM1CW476M	J 47	16V Electrolytic	AB
C5915	VCKYCY1HB221K	J 220p	50V Ceramic	AA
C5916	VCKYD41HB102K	J 1000p	50V Ceramic	AA

RESISTORS

R212	VRS-CY1JF681J	J 680	1/16W Metal Oxide	AA
R213	VRS-CY1JF222J	J 2.2k	1/16W Metal Oxide	AA
R214	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R215	VRS-CY1JF222J	J 2.2k	1/16W Metal Oxide	AA
R217	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R219	VRS-CY1JF122J	J 1.2k	1/16W Metal Oxide	AA
R220	VRD-RA2BE152J	J 1.5k	1/8W Carbon	AA
R228	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R229	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R230	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R231	VRD-RA2BE395J	J 3.9M	1/8W Carbon	AA
R301	VRD-RA2BE682J	J 6.8k	1/8W Carbon	AA
R304	VRD-RA2BE153J	J 15k	1/8W Carbon	AA
R305	VRD-RA2BE272J	J 2.7k	1/8W Carbon	AA
R306	VRD-RA2BE103J	J 10k	1/8W Carbon	AA
R330	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R331	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R332	VRS-CY1JF333J	J 33k	1/16W Metal Oxide	AA
R333	VRS-CY1JF333J	J 33k	1/16W Metal Oxide	AA
R334	VRS-CY1JF152J	J 1.5k	1/16W Metal Oxide	AA
R401	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R402	VRS-CY1JF821J	J 820	1/16W Metal Oxide	AA
R403	VRS-CY1JF273J	J 27k	1/16W Metal Oxide	AA
R404	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R405	VRS-CY1JF561J	J 560	1/16W Metal Oxide	AA
R406	VRD-RA2BE331J	J 330	1/8W Carbon	AA
R407	VRS-CY1JF561J	J 560	1/16W Metal Oxide	AA
R408	VRS-CY1JF152J	J 1.5k	1/16W Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code
RESISTORS (Continued)				
R409	VRS-CY1JF101J	J 100	1/16W Metal Oxide	AA
R410	VRS-CY1JF472J	J 4.7k	1/16W Metal Oxide	AA
R411	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R412	VRS-CY1JF821J	J 820	1/16W Metal Oxide	AA
R413	VRD-RA2BE821J	J 820	1/8W Carbon	AA
R414	VRS-CY1JF273J	J 27k	1/16W Metal Oxide	AA
R415	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R416	VRS-CY1JF472J	J 4.7k	1/16W Metal Oxide	AA
R417	VRS-CY1JF332J	J 3.3k	1/16W Metal Oxide	AA
R418	VRS-CY1JF222J	J 2.2k	1/16W Metal Oxide	AA
R419	VRS-CY1JF152J	J 1.5k	1/16W Metal Oxide	AA
R420	VRS-CY1JF562J	J 5.6k	1/16W Metal Oxide	AA
R421	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R422	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R423	VRS-CY1JF392J	J 3.9k	1/16W Metal Oxide	AA
R424	VRS-CY1JF471J	J 470	1/16W Metal Oxide	AA
R425	VRD-RA2BE272J	J 2.7k	1/8W Carbon	AA
R426	VRS-CY1JF822J	J 8.2k	1/16W Metal Oxide	AA
R427	VRS-CY1JF104J	J 100k	1/16W Metal Oxide	AA
R428	VRD-RA2BE471J	J 470	1/8W Carbon	AA
R429	VRS-CY1JF681J	J 680	1/16W Metal Oxide	AA
R431	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R432	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R433	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R434	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R435	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R436	VRS-CY1JF333J	J 33k	1/16W Metal Oxide	AA
R437	VRS-CY1JF335J	J 3.3M	1/16W Metal Oxide	AA
R438	VRD-RA2BE335J	J 3.3M	1/8W Carbon	AA
R439	VRD-RA2BE103J	J 10k	1/8W Carbon	AA
R440	VRD-RA2BE335J	J 3.3M	1/8W Carbon	AA
R443	VRS-CY1JF473J	J 47k	1/16W Metal Oxide	AA
R444	VRS-CY1JF473J	J 47k	1/16W Metal Oxide	AA
R445	VRD-RA2BE103J	J 10k	1/8W Carbon	AA
R490	VRD-RA2BE821J	J 820	1/8W Carbon	AA
R501	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA
R502	VRS-CY1JF821J	J 820	1/16W Metal Oxide	AA
R506	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R507	VRS-CY1JF103J	J 10k	1/16W Metal Oxide	AA
R508	VRS-CY1JF122J	J 1.2k	1/16W Metal Oxide	AA
R510	VRS-CY1JF273J	J 27k	1/16W Metal Oxide	AA
R511	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R513	VRD-RA2BE102J	J 1k	1/8W Carbon	AA
R517	VRS-CY1JF392J	J 3.9k	1/16W Metal Oxide	AA
R523	VRD-RA2BE103J	J 10k	1/8W Carbon	AA
R524	VRD-RA2BE103J	J 10k	1/8W Carbon	AA
R601	VRS-CY1JF100J	J 10	1/16W Metal Oxide	AA
R631	VRS-CY1JF470J	J 47	1/16W Metal Oxide	AA
R632	VRS-CY1JF682J	J 6.8k	1/16W Metal Oxide	AA
R633	VRG-SC2EB4R7J	J 4.7	1/4W Fuse Resistor	AB
R635	VRD-RA2BE273J	J 27k	1/8W Carbon	AA
R643	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R701	VRS-CY1JF272J	J 2.7k	1/16W Metal Oxide	AA
R705	VRS-CY1JF155J	J 1.5M	1/16W Metal Oxide	AA
R707	VRS-CY1JF102J	J 1k	1/16W Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code
RESISTORS (Continued)				
R708	VRD-RA2BE103J	J	10k 1/8W Carbon	AA
R709	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R710	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R711	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R713	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R714	VRS-CY1JF562J	J	5.6k 1/16W Metal Oxide	AA
R715	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
R716	VRS-CY1JF393J	J	39k 1/16W Metal Oxide	AA
R717	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
R718	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R719	VRS-CY1JF823J	J	82k 1/16W Metal Oxide	AA
R720	VRS-CY1JF153J	J	15k 1/16W Metal Oxide	AA
R723	VRS-CY1JF154J	J	150k 1/16W Metal Oxide	AA
R724	VRS-CY1JF154J	J	150k 1/16W Metal Oxide	AA
R725	VRS-CY1JF273J	J	27k 1/16W Metal Oxide	AA
R726	VRS-CY1JF564J	J	560k 1/16W Metal Oxide	AA
R727	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R728	VRS-CY1JF224J	J	220k 1/16W Metal Oxide	AA
R729	VRS-CY1JF683J	J	68k 1/16W Metal Oxide	AA
R730	VRS-CY1JF334J	J	330k 1/16W Metal Oxide	AA
R731	VRS-CY1JF392J	J	3.9k 1/16W Metal Oxide	AA
R732	VRS-CY1JF473J	J	47k 1/16W Metal Oxide	AA
R733	VRS-CY1JF155J	J	1.5M 1/16W Metal Oxide	AA
R734	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R735	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R736	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R737	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R738	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R739	VRS-CY1JF473J	J	47k 1/16W Metal Oxide	AA
R741	VRS-CY1JF563J	J	56k 1/16W Metal Oxide	AA
R742	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R743	VRS-CY1JF564J	J	560k 1/16W Metal Oxide	AA
R746	VRS-CY1JF222J	J	2.2k 1/16W Metal Oxide	AA
R748	VRD-RA2BE223J	J	22k 1/8W Carbon	AA
R752	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R801	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R802	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R803	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R804	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R805	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R806	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R807	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R809	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R811	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R812	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
R813	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R814	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R815	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R821	VRS-CY1JF152J	J	1.5k 1/16W Metal Oxide	AA
R822	VRD-RA2BE183J	J	18k 1/8W Carbon	AA
R824	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R825	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R826	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R827	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R831	VRD-RA2BE102J	J	1k 1/8W Carbon	AA

Ref. No.	Part No.	★	Description	Code
RESISTORS (Continued)				
R832	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R840	VRG-SC2EB2R2J	J	2.2 1/4W Fuse Resistor	AC
R841	VRG-SC2EB1R0J	J	1 1/4W Fuse Resistor	AB
R851	VRD-RA2EE151J	J	150 1/4W Carbon	AA
R854	VRD-RA2BE123J	J	12k 1/8W Carbon	AA
R855	VRD-RA2BE123J	J	12k 1/8W Carbon	AA
R856	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R857	VRD-RA2BE271J	J	270 1/8W Carbon	AA
R858	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R859	VRD-RA2BE271J	J	270 1/8W Carbon	AA
R860	VRS-CY1JF104J	J	100k 1/16W Metal Oxide	AA
R861	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R862	VRD-RA2BE154J	J	150k 1/8W Carbon	AA
R863	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R864	VRS-CY1JF154J	J	150k 1/16W Metal Oxide	AA
R865	VRS-CY1JF102J	J	1k 1/16W Metal Oxide	AA
R866	VRS-CY1JF471J	J	470 1/16W Metal Oxide	AA
△ R901	VRD-RA2HD105J	J	1M 1/2W Carbon	AA
△ R902	VRC-UA2HG685K	J	6.8M 1/2W Solid	AA
△ R903	VRC-UA2HG685K	J	6.8M 1/2W Solid	AA
△ R904	RR-WZ0003GEZZ	J	4.7 2W Solid	AD
△ R905	RR-SZ0007GEZZ	J	68 2W Solid	AB
△ R906	VRD-RA2HD154J	J	150k 1/2W Carbon	AA
△ R907	VRD-RA2HD154J	J	150k 1/2W Carbon	AA
△ R908	VRS-VV3AB820J	J	82 1W Metal Oxide	AA
△ R916	VRD-RA2EE821J	J	820 1/4W Carbon	AA
△ R921	VRG-SC2EB1R0J	J	1 1/4W Fuse Resistor	AB
△ R922	VRD-RA2HD100J	J	10 1/2W Carbon	AA
△ R924	VRG-SC2EB100J	J	10 1/4W Fuse Resistor	AB
△ R925	VRD-RA2BE221J	J	220 1/8W Carbon	AA
△ R926	VRS-CY1JF221J	J	220 1/16W Metal Oxide	AA
△ R927	VRD-RA2BE272J	J	2.7k 1/8W Carbon	AA
△ R928	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
△ R929	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
△ R930	VRS-CY1JF392J	J	3.9k 1/16W Metal Oxide	AA
△ R931	VRS-CY1JF682J	J	6.8k 1/16W Metal Oxide	AA
△ R932	VRS-CY1JF221J	J	220 1/16W Metal Oxide	AA
△ R933	VRD-RA2BE222J	J	2.2k 1/8W Carbon	AA
R952	VRD-RA2HD561J	J	560 1/2W Carbon	AA
R963	VRS-CY1JF330J	J	33 1/16W Metal Oxide	AA
R964	VRD-RA2HD392J	J	3.9k 1/2W Carbon	AA
R965	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R966	VRS-CY1JF103J	J	10k 1/16W Metal Oxide	AA
R967	VRD-RA2BE183J	J	18k 1/8W Carbon	AA
R971	VRD-RA2HD561J	J	560 1/2W Carbon	AA
R972	VRD-RA2BER56J	J	0.56 1/8W Carbon	AA
R973	VRD-RA2BER56J	J	0.56 1/8W Carbon	AA
R976	VRD-RA2BE472J	J	4.7k 1/8W Carbon	AA
R979	VRD-RA2EE561J	J	560 1/4W Carbon	AA
R980	VRS-CY1JF473J	J	47k 1/16W Metal Oxide	AA
R981	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
R982	VRD-RA2EE391J	J	390 1/4W Carbon	AA
R983	VRS-CY1JF183J	J	18k 1/16W Metal Oxide	AA
R989	VRD-RA2BE333J	J	33k 1/8W Carbon	AA
R990	VRS-CY1JF123J	J	12k 1/16W Metal Oxide	AA

Ref. No. Part No. ★ Description Code

RESISTORS (Continued)

R991	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R1551	VRS-CY1JF334J	J	330k 1/16W Metal Oxide	AA
R1552	VRS-CY1JF474J	J	470k 1/16W Metal Oxide	AA
R1553	VRS-CY1JF101J	J	100 1/16W Metal Oxide	AA
R2203	VRS-CY1JF391J	J	390 1/16W Metal Oxide	AA
R2401	VRS-CY1JF392J	J	3.9k 1/16W Metal Oxide	AA
R2402	VRS-CY1JF681J	J	680 1/16W Metal Oxide	AA
R2403	VRS-CY1JF154J	J	150k 1/16W Metal Oxide	AA
R2404	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R2405	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R2406	VRS-CY1JF272J	J	2.7k 1/16W Metal Oxide	AA
R2410	VRS-CY1JF684J	J	680k 1/16W Metal Oxide	AA
R4401	VRD-RA2BE181J	J	180 1/8W Carbon	AA
R4402	VRD-RA2BE151J	J	150 1/8W Carbon	AA
R4404	VRS-CY1JF222J	J	2.2k 1/16W Metal Oxide	AA
R4405	VRS-CY1JF101J	J	100 1/16W Metal Oxide	AA
R4407	VRS-CY1JF332J	J	3.3k 1/16W Metal Oxide	AA
R5001	VRD-RA2BE472J	J	4.7k 1/8W Carbon	AA
R5002	VRD-RA2EE1R0J	J	1 1/4W Carbon	AA
R5003	VRD-RA2BE393J	J	39k 1/8W Carbon	AA
R5004	VRS-CY1JF123J	J	12k 1/16W Metal Oxide	AA
R5005	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R5006	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R5007	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R5008	VRS-CY1JF472J	J	4.7k 1/16W Metal Oxide	AA
R5010	VRS-CY1JF223J	J	22k 1/16W Metal Oxide	AA
R5501	VRD-RA2BE331J	J	330 1/8W Carbon	AA
R5901	VRD-RA2BE181J	J	180 1/8W Carbon	AA
R5902	VRD-RA2BE181J	J	180 1/8W Carbon	AA
R5904	VRD-RA2BE102J	J	1k 1/8W Carbon	AA
R5910	VRD-RA2BE152J	J	1.5K 1/8W Carbon	AA

MISCELLANEOUS PARTS

△ ACC1	QACCB5011UMZZ	U	AC Cord	
DG5001	VVK10BT143G-1	J	Fluorescent Display Tube	AV
△ F901	QFS-C2026CEZZ	J	Fuse, T2AH/250V	AE
FB701	RBLN-0043CEZZ	J	Balun	AB
FB801	RBLN-0013GEZZ	J	Balun	AB
FB902	RBLN-0043CEZZ	J	Balun	AB
FB4402	RBLN-0043CEZZ	J	Balun	AB
△ FH901	QFSDH1013CEZZ	J	Fuse Holder	AC
△ FH902	QFSDH1014CEZZ	J	Fuse Holder	AC
P301	QPLGZ0331GEZZ	J	Plug, 3pin	AB
P401	QPLGN0347REZZ	J	Plug, 3pin	AA
P601	QPLGN0247REZZ	J	Plug, 2pin	AA
P701	QPLGZ0631GEZZ	J	Plug, 6pin	AA
P702	QPLGN0247REZZ	J	Plug, 2pin	AA
P703	QPLGN0247REZZ	J	Plug, 2pin	AA
P704	QPLGZ0974GEZZ	J	Plug, 9pin	AD
△ P901	QPLGN0269GEZZ	J	Plug, 2pin	AB
P1551	QPLGN0447REZZ	J	Plug, 4pin	AA
P4401	QPLGZ0531GEZZ	J	Plug, 5pin	AC
P4402	QPLGZ1431GEZZ	J	Plug, 14pin	AC

Ref. No. Part No. ★ Description

MISCELLANEOUS PARTS (Continued)

RMC5501	RRMCU0056GEZZ	J	Remote Receiver	AQ
S851	QSW-F0042AJZZ	V	Rec Tip Switch	
S5001	QSW-K0086GEZZ	J	Switch	AC
S5004	QSW-K0086GEZZ	J	Switch	AC
S5005	QSW-K0086GEZZ	J	Switch	AC
SC301	QSOCN0494REZZ	J	Socket, 4pin	AC
SC601	QSOCN0684REZZ	J	Socket, 6pin	AB
SC701	QSOCN0795REZZ	J	Socket, 7pin	AC

— End of Main —

Ref. No. Part No. ★ Description Code

**DUNTK5301TEV0
TERMINAL UNIT**

INTEGRATED CIRCUITS

IC601 VHiBA7795LS-1 J BA7795LS AG

TRANSISTERS

Q601 VS2SC2412KQ-1 J 2SC2412KQ AA
Q602 VS2SC2412KQ-1 J 2SC2412KQ AA
Q606 VSDTC144ES/-1 J DTC114ES AB
Q8801 VSDTC144EK/-1 J DTC144EK AB
Q8851 VSDTA144EK/-1 J DTA144EK AC

DIODES

D2603 RH-EX0646GEZZ J Zener Diode AA
D2604 RH-EX0646GEZZ J Zener Diode AA
D8851 RH-EX0646GEZZ J Zener Diode AA

COILS AND TRANSFORMERS

L601 VP-YF822J0000 J 8200μH AC
L6604 VP-XF3R9K0000 J 3.9μH AB
L6605 VP-XF3R3K0000 J 3.3μH AB
L6606 VP-XF3R3K0000 J 3.3μH AB

CAPACITORS

C601 VCKYCY1HB152K J 1500p 50V Ceramic AA
C603 VCEAEA1HW335M J 3.3 50V Electrolytic AB
C604 VCEAEA1CW106M J 10 16V Electrolytic AB
C605 VCQYTA1HM123J J 0.012 50V Mylar AA
C606 VCKYCY1HB272K J 2700p 50V Ceramic AA
C607 VCEAEA1CW476M J 47 16V Electrolytic AB
C608 VCKYCY1CF224Z J 0.22 16V Ceramic AA
C609 VCKYCY1CF224Z J 0.22 16V Ceramic AA
C610 VCEAEA1CW226M J 22 16V Electrolytic AB
C611 VCEAEA1CW106M J 10 16V Electrolytic AB
C612 VCKYCY1EB153K J 0.015 25V Ceramic AA
C613 VCKYCY1EB223K J 0.022 25V Ceramic AA
C614 VCCCCY1HH151J J 150p 50V Ceramic AA
C615 VCCCCY1HH151J J 150p 50V Ceramic AA
C616 VCCCCY1HH331J J 330p 50V Ceramic AA
C617 VCCCCY1HH220J J 22p 50V Ceramic AA
C618 VCEAEA1CW106M J 10 16V Electrolytic AB
C619 VCKYCY1HB102K J 1000p 50V Ceramic AA
C620 VCKYD41HB820K J 82p 50V Ceramic AA
C626 VCKYCY1EF104Z J 0.1 25V Ceramic AA
C640 VCEAEA1HW105M J 1 50V Electrolytic AB
C2512 VCEAEA1CW476M J 47 16V Electrolytic AB
C2513 VCKYCY1HF103Z J 0.01 50V Ceramic AA
C2606 VCEAGA1HW335M J 3.3 50V Electrolytic AB
C2607 VCEA2A0JW477M J 470 6.3V Electrolytic AB
C6601 VCCCCY1HH390J J 39p 50V Ceramic AA
C6602 VCCCCY1HH100D J 10p 50V Ceramic AA
C6603 VCCCCY1HH100D J 10p 50V Ceramic AA
C8851 VCKYCY1HB102K J 1000p 50V Ceramic AA

Ref. No. Part No. ★ Description Code

RESISTORS (Continued)

R602 VRS-CY1JF333J J 33k 1/16W Metal Oxide AA
R603 VRS-CY1JF221J J 220 1/16W Metal Oxide AA
R604 VRS-CY1JF274J J 270k 1/16W Metal Oxide AA
R605 VRS-CY1JF682J J 6.8k 1/16W Metal Oxide AA
R606 VRS-CY1JF682J J 6.8k 1/16W Metal Oxide AA
R609 VRS-CY1JF332J J 3.3k 1/16W Metal Oxide AA
R610 VRS-CY1JF225J J 2.2M 1/16W Metal Oxide AA
R611 VRD-RA2BE473J J 47k 1/8W Carbon AA
R612 VRS-CY1JF822J J 8.2k 1/16W Metal Oxide AA
R613 VRS-CY1JF473J J 47k 1/16W Metal Oxide AA
R614 VRS-CY1JF103J J 10k 1/16W Metal Oxide AA
R615 VRS-CY1JF563J J 56k 1/16W Metal Oxide AA
R616 VRS-CY1JF153J J 15k 1/16W Metal Oxide AA
R617 VRS-CY1JF152J J 1.5k 1/16W Metal Oxide AA
R618 VRS-CY1JF183J J 18k 1/16W Metal Oxide AA
R619 VRS-CY1JF471J J 470 1/16W Metal Oxide AA
R620 VRS-CY1JF102J J 1k 1/16W Metal Oxide AA
R621 VRS-CY1JF683J J 68k 1/16W Metal Oxide AA
R622 VRS-CY1JF683J J 68k 1/16W Metal Oxide AA
R623 VRS-CY1JF333J J 33k 1/16W Metal Oxide AA
R624 VRS-CY1JF563J J 56k 1/16W Metal Oxide AA
R625 VRS-CY1JF103J J 10k 1/16W Metal Oxide AA
R626 VRS-CY1JF332J J 3.3k 1/16W Metal Oxide AA
R629 VRS-CY1JF153J J 15k 1/16W Metal Oxide AA
R630 VRS-CY1JF103J J 10k 1/16W Metal Oxide AA
R636 VRD-RA2BE103J J 10k 1/8W Carbon AA
R637 VRD-RA2BE103J J 10k 1/8W Carbon AA
R638 VRD-RA2BE562J J 5.6k 1/8W Carbon AA
R639 VRS-CY1JF153J J 15k 1/16W Metal Oxide AA
R2609 VRS-CY1JF750J J 75 1/16W Metal Oxide AA
R2610 VRS-CY1JF101J J 100 1/16W Metal Oxide AA
R2611 VRS-CY1JF750J J 75 1/16W Metal Oxide AA
R6618 VRS-CY1JF222J J 2.2k 1/16W Metal Oxide AA
R6619 VRS-CY1JF562J J 5.6k 1/16W Metal Oxide AA
R6620 VRD-RA2BE272J J 2.7k 1/8W Carbon AA
R6621 VRS-CY1JF471J J 470 1/16W Metal Oxide AA
R6623 VRS-CY1JF562J J 5.6k 1/16W Metal Oxide AA
R8801 VRS-CY1JF473J J 47k 1/16W Metal Oxide AA
R8851 VRD-RA2EE821J J 820 1/4W Carbon AA

MISCELLANEOUS PARTS

FB2501 RBLN-0043CEZZ J Balun AB
FB6301 RBLN-0043CEZZ J Balun AB
FB6302 RBLN-0043CEZZ J Balun AB
SC2501 QSOCZ2185GEZZ J Socket, 21pin AF
SC6602 QSOCZ1431GEZZ J Socket, 14pin AD
SC6604 QSOCZ0531GEZZ J Socket, 5pin AD

— End of Terminal —

7C-M23HM
7C-M24HM

Ref. No. Part No. ★ Description Code

Ref. No. Part No. ★ Description

DUNTK5304TEV0
OPERATION UNIT

MISCELLANEOUS PARTS

S8801	QSW-K0002AJZZ	V	Switch	AD
S8802	QSW-K0002AJZZ	V	Switch	AD
S8803	QSW-K0077UMZZ	U	Switch	
S8804	QSW-K0002AJZZ	V	Switch	AD
S8805	QSW-K0077UMZZ	U	Switch	
S8806	QSW-K0077UMZZ	U	Switch	
S8807	QSW-Z0001AJZZ	V	Switch	AQ
SC8801	QSOCZ0631GEZZ	J	Socket, 6pin	AB

— End of Operation —

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
MECHANISM CHASSIS PARTS									
1	LBNDK1009GEZZ	J	Tension Band Ass'y		48	NPLYV0156GEZZ	J	Limiter Pully Ass'y	
2	LBOSZ1001GEZZ	J	Tension Arm Boss	AC	49	NROLP0110GEZZ	J	Guide Roller	AH
3	LBOSZ1002GEZZ	J	Slow Brake Boss		50	NSFTP0034GEZZ	J	Tension Pole Adjuster	
4	LBOSZ1003GEZZ	J	Cassette Stay L		51	PGUMM0043GEZZ	J	Damper Raber	
5	LCHSM0158GEZZ	J	Main Chassis Ass'y		52	PREFL1007GEZZ	J	Light Guide	
6	LHLDZ1958GEZZ	J	Loading Motor Block		53	QCNW-0247AJZZ	V	FFC For Drum Motor	AG
7	LPOLM0056GEZZ	J	Supply Pole Base Ass'y	AM	54	QCNW-7501GEZZ	J	Lead Wire For Loading Motor	AD
8	LPOLM0057GEZZ	J	Take-Up Pole Base Ass'y	AM	55	QCNW-0272AJZZ	V	FFC For Audio/Control Head	AF
9	MLEVF0459GEZZ	J	Take-Up Loading Arm Ass'y		56	QPWBF5243AJZZ	V	Audio/Control Head PWB	AE
10	MLEVF0461GEZZ	J	Supply Loading Arm Ass'y		57	QSOCN0685REZZ	J	Socket, 6 pin	AB
11	MLEVF0463GEZZ	J	Pinch Drive Lever Ass'y		58	RHEDT0031GEZZ	J	Full Erase Head	AH
12	MLEVF0464GEZZ	J	Pinch Roller Lever Ass'y	AW	59	RHEDU0085GEZZ	J	Audio/Control Head Ass'y	BA
15	MLEVF0467GEZZ	J	Tension Arm Ass'y		60	RMOTM1062GEZZ	J	Loading Motor	AP
16	MLEVF0468GEFW	J	Audio/Control Head Arm		61	RMOTN2053GEZZ	J	Capstan Motor	BF
17	MLEVP0271GEZZ	J	Sifter Drive Lever		62	RMOTP1129GEZZ	J	Drum Drive Motor	AX
18	MLEVP0272GEZZ	J	Pinch Double Action Lever		63	DDRMW0014TEV1	V	Upper And Lower Drum Ass'y	
19	MLEVP0273GEZZ	J	Reverse Guide Lever Ass'y		64	MSPRC0194GEFJ	J	Drum Earth Brush Spring	AA
20	MLEVP0275GEZZ	J	Reverse Drive Lever		65	QBRSK0034GEZZ	J	Drum Earth Brush	AD
21	MLEVP0276GEZZ	J	Slow Brake		66	XBPSD26P05J00	J	Drum Drive Motor Mounting Screw (SW2.6P+5S)	AA
22	MLEVP0277GEZZ	J	Open Lever		67	PGiDC0055GEFW	J	Drum Base	AL
23	MLEVP0278GEZZ	J	Clutch Lever						
24	MLEVP0279GEZZ	J	Supply Main Brake Ass'y						
25	MLEVP0280GEZZ	J	Take-up Main Brake Ass'y						
27	MSLIP0008GEZZ	J	Sifter						
28	MSPRC0205AJFJ	V	Audio/Control Head Spring	AB					
29	MSPRD0165GEFJ	J	Reverse Guide Spring						
30	MSPRT0402GEFJ	J	Loading Double Action Spring						
31	MSPRT0403GEFJ	J	Pinch Double Action Spring						
33	MSPRT0405GEFJ	V	Tension Spring						
34	NBLTK0066AE00	V	Drive Belt	AE					
35	NDAIV1070GE00	J	Reel Disk						
36	NGERH1267GEZZ	J	Loading Connect Gear						
37	NGERH1268GE00	J	Master Cam						
38	NGERH1269GEZZ	J	Cassette Control Drive Gear						
39	NGERH1270GEZZ	J	Take-Up Loading Gear						
40	NGERH1271GEZZ	J	Supply Loading Gear						
41	NGERH1272GEZZ	J	Pinch Drive Cam						
42	NGERH1275GEZZ	J	Supply Reel Relay Gear						
43	NGERH1276GEZZ	J	Take-Up Reel Relay Gear						
44	NGERW1062GEZZ	J	Worm Gear						
45	NGERW1063GEZZ	J	Worm Wheel Gear						
46	NiDR-0015GEZZ	J	Idler Wheel Ass'y						
47	NPLYV0155GEZZ	J	Motor Pully						

— End of Mechanism Chassis Parts —

Ref. No. Part No. ★ Description Code

Ref. No. Part No. ★ Description

CASSETTE HOUSING CONTROL PARTS

SCREWS, NUTS AND WASHERS

300	CHLDX3074GE02	J	Cassette Housing Control Ass'y	
301	LANGF9592GEFW	J	Upper Plate	
302	LHLDX1028GE00	J	Frame (L)	
303	LHLDX1029GE00	J	Frame (R)	
304	LHLDX1030GEZZ	J	Holder (L)	
305	LHLDX1031GEZZ	J	Holder (R)	
306	MLEVF0469GEFW	J	Proof Lever (R)	
307	MLEVP0281GE00	J	Door Open Lever	
308	MSLIF0073GEFW	J	Slider	
309	MSPRD0151GEFJ	J	Proof Lever (R) Spring	AB
310	MSPRD0166GEFJ	J	Drive Gear (R) Spring	
311	MSPRP0159GEFJ	J	Cassette Spring	AD
312	MSPRT0381GEFJ	J	Double Action Spring	AB
313	NGERH1278GEZZ	J	Drive Gear (L)	
314	NGERH1279GEZZ	J	Drive Gear (R)	
315	NGERR1008GE00	J	Double Action Rack Gear	
316	NGERR3005GEFW	J	Drive Angle Gear	
317	NSFTD0041GEFD	J	Main Shaft	

200	LX-XZ3030GEFD	J	Set Screw	AC
201	LX-BZ3176GEZZ	J	Tilt Adjusting Screw	AD
202	LX-HZ3082GEZZ	J	Audio/Control Head Screw	AD
203	XHPSD26P07WS0	J	Screw, C2.6P+7S (For Capstan Motor)	AA
204	XBPSD30P05J00	J	Screw, SW2.6P+5S (For Loading Motor)	AA
205	XHPSD26P06WS0	J	Screw, C2.6P+6S (For Loading Motor Block)	AA
206	XHPSD26P08WS0	J	Screw, C2.6P+8S (For F/E Head)	AA
207	XHPSD30P08WS0	J	Screw, C3.0P+8S (For Drum Base)	AA
208	XRESJ40-06000	J	E-Ring, E-4	AA
209	XWHJZ52-05095	J	Washer, W5.2-9.5-0.5 (Reel Hight Adj.)	AD
210	XWHJZ52-03095	J	Washer, W5.2-9.5-0.3 (Reel Hight Adj.)	AD
211	XWHJZ52-04095	J	Washer, W5.2-9.5-0.4 (Reel Hight Adj.)	AD
212	XWHJZ52-06095	J	Washer, W5.2-9.5-0.6 (Reel Hight Adj.)	AD
213	XWHJZ52-07095	J	Washer, W5.2-9.5-0.7 (Reel Hight Adj.)	AD
214	PSPAP0009GEZZ	J	Reverse Guide Adjusting Nut	
215	LX-WZ1003GE00	J	CUT Washer	AA
216	LX-WZ1041GE00	J	CUT Washer	AA
217	LX-WZ1073GE00	J	CUT Washer	AB
218	XBPSD30P08J00	J	Drum Base Mounting Screw	AA

— End of Cassette Housing Control Parts —

— End of Screws, Nuts And Washers —

Ref. No. Part No. ★ Description Code

MECHANICAL PARTS

601	GCABB1172UMZZ	U	Main Frame	
602	GCOVA1975UMZZ	U	Antenna Terminal Cover	
603	GCABA3102UMSE	U	Top Cabinet	
604	GBDYU3098UMFW	U	Bottom Plate	
605	LANGQ9065UMFW	U	Earth Angle (Converter Side)	
606	LANGQ9063UMFW	U	Earth Angle (Power Side)	
607	PFLT-0016AJZZ	V	Foot Felt	AB
608	PSLDM4531UMFW	U	H/A Shield	
609	XEBSD30P12000	J	Screw (Front Panel)	AA
611	XHPSD30P06WS0	J	Screw	AA
612	XJPSD30P10WS0	J	Screw	AA
613	LX-BZ3014GEFD	J	Screw (Converter)	AA
616	PSPA0532AJZZ	V	Spacer	AD
617	LX-HZ3030GEFF	J	Screw (Top Cabinet)	AA

— End of Mechanical Parts —

Ref. No. Part No. ★ Description Code

FRONT PANEL PARTS

501	CPNLC2154TEV0	U	Front Panel (VC-M23HM)	
501	CPNLC2143TEV0	U	Front Panel (VC-M24HM)	
501-2	HBDGB1008AJSA	V	Badge, "SHARP"	
501-3	HDECQ1519UMSA	U	Cassette Flap	
501-4	HDECQ1474UMSA	U	Window Decoration	
501-8	JBTN-2717UMSB	U	Button, CH/REC	
501-10	MSPRD0103AJFJ	V	Cassette Spring	AB
502	JKNBK1092UMSB	U	Dial	
503	CBTN-2723TEV7	U	Button Ass'y	
503-1	JBTN-2723UMSB	U	Button, Stop	
503-2	LHLDZ1964UMZZ	U	Button Hplder	
503-3	JBTN-2734UMSC	U	Button, Play	

— End of Front Panel Parts —

SUPPLIED ACCESSORIES

ACCESORIES

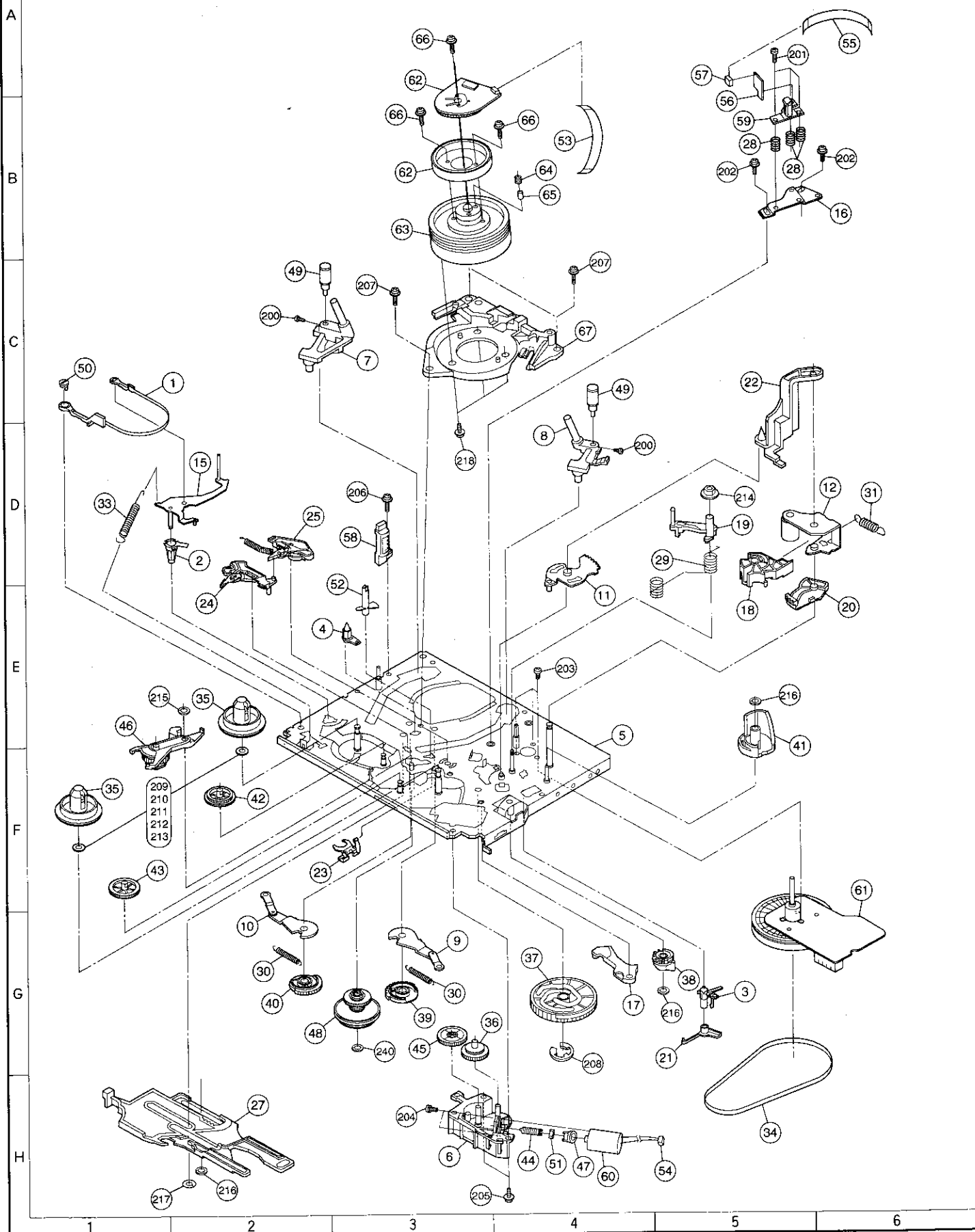
QCNW-7544UMZZ	U	75ohm Coaxial Cable	
RRMCG0129AJSA	J	Infrared Remote Control Unit	
93GHR14172001	J	Battery Civer, Infrared Remote Control Unit	AE

ACCESORIES (NOT REPLACEMENT ITEM)

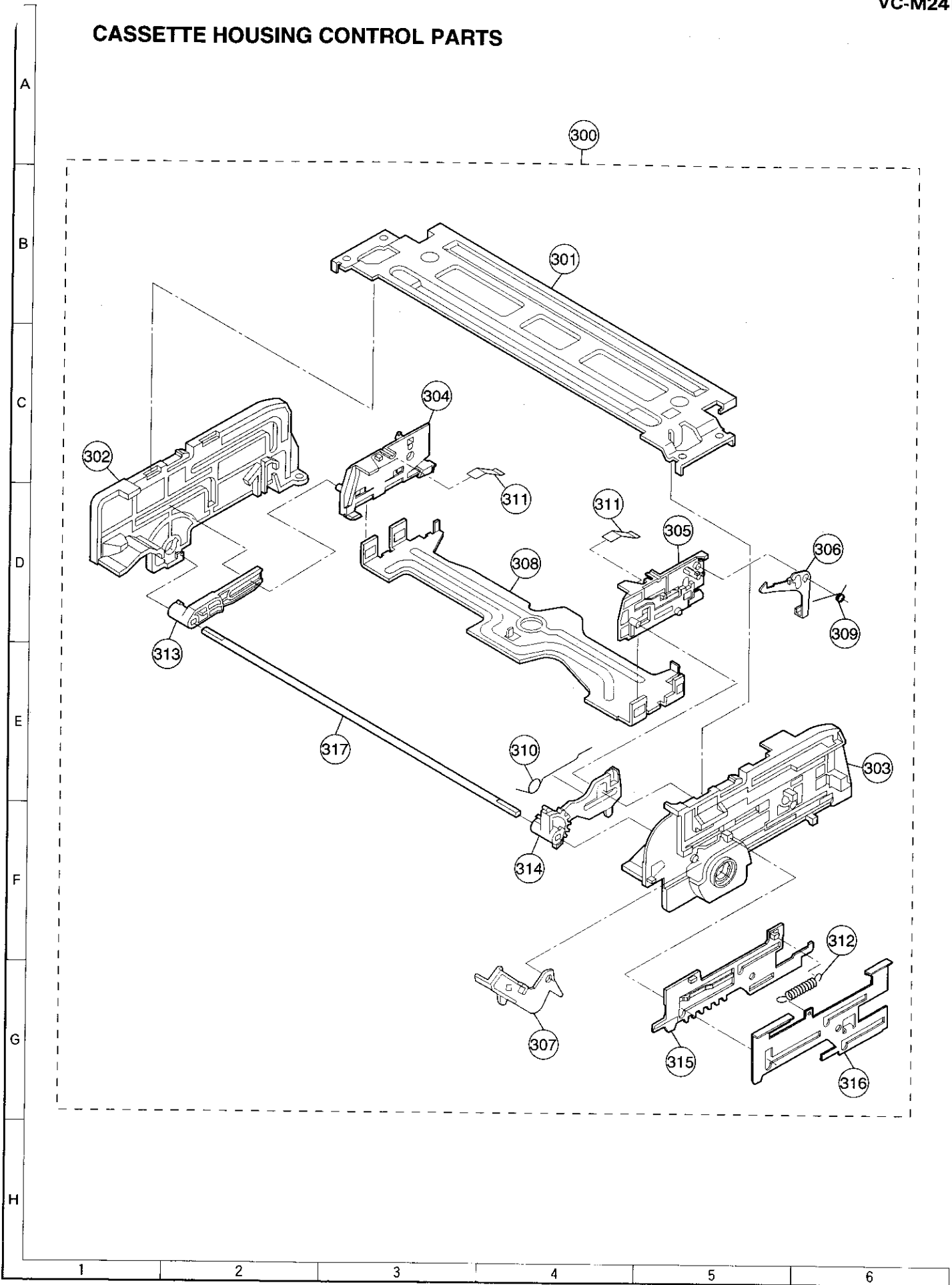
TINS-2864UMZZ	-	Operation Manual	—
TGAN-3135UMZZ	-	Guarantee Card	—

— End of Supplied Accessories —

11. EXPLODED VIEWS MECHANISM CHASSIS PARTS

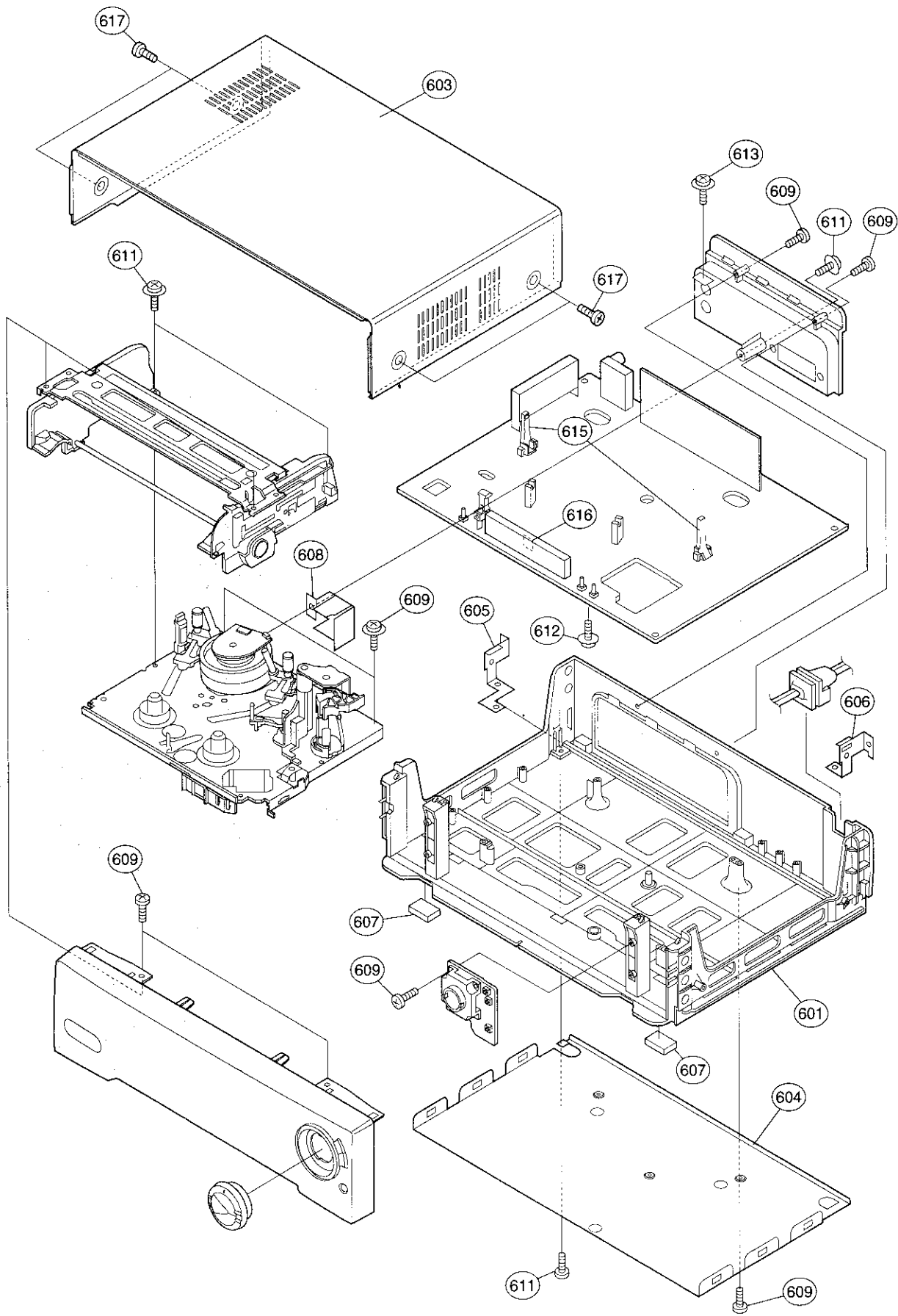


CASSETTE HOUSING CONTROL PARTS



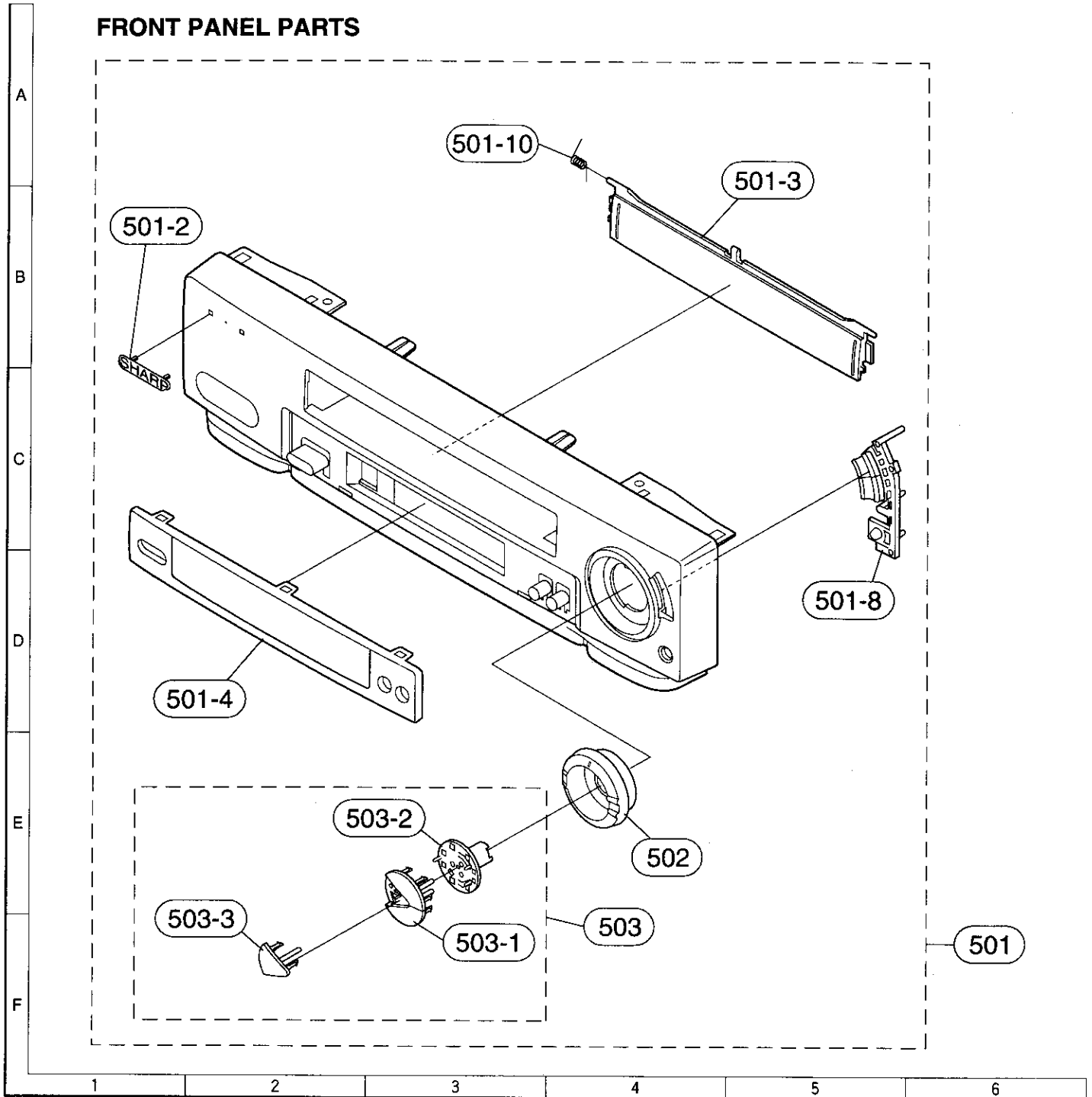
MECHANICAL PARTS

A
B
C
D
E
F
G
H



1 2 3 4 5 6

FRONT PANEL PARTS



PRECAUTION ON FRONT PANEL SET-UP

Cassette housing
Cassette cover open lever

Before attaching the front panel in position, make sure that the cassette cover open lever is in its right place (lower-most). If it is out of position, push it down with a finger.

Front panel
Cassette cover
Cassette cover open lever

About 45°

Keep the cassette cover about 45° open and make sure that the cassette cover open lever is between the front panel and the cassette cover. Now fix the front panel in place.

Cassette cover

- 1 Open the cassette compartment cover fully.
- 2 Remove the center positioner.
- 3 Slide the cover to the right.
- 4 Slightly bend the cover.
- 5 Draw out the left-side rod.

Removing the cassette compartment cover.

VC-M23HM
VC-M24HM

12. PACKING OF THE SET

■ Setting position of the Knobs

RF conv. CH. preset	at "E36" channel	Test Signal Switch	at "OFF" position
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Accessories

- ★ TINS-2864UMZZ Operation Manual
- ★ TGAN-3135UMZZ Guarantee Card

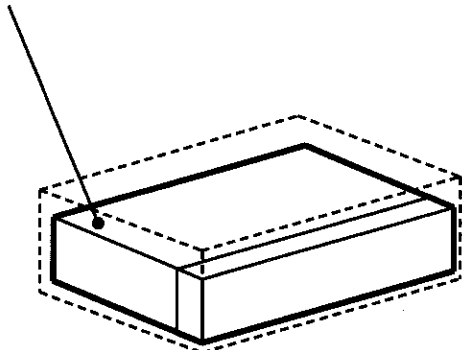


★ Battery



QCNW-7544UMZZ
75 ohm Coaxial Cable

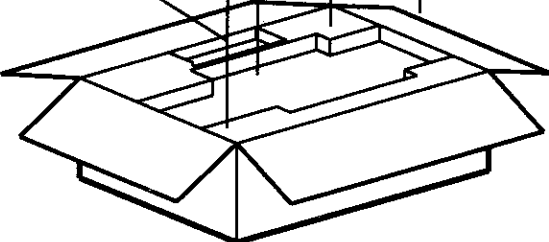
★ SPAKP0051UMZZ
Polystyrene Sack



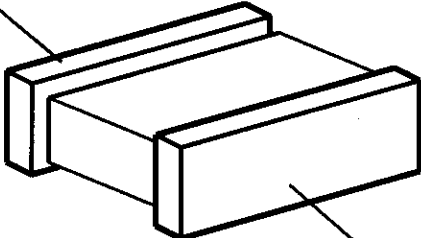
RRMCG0129AJSA
Infrared Remote
Control Unit



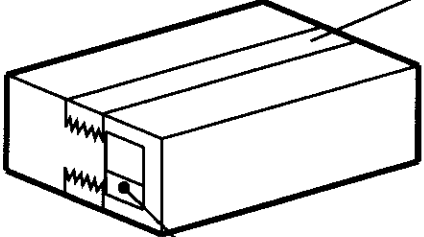
★ CPAKC3311UMZZ
(VC-M23HM)
CPAKC3301UMZZ
(VC-M24HM)
Packing Case



★ SPAKX0973UMZZ
Buffer Material



★ SPAKX0974UMZZ
Buffer Material



Fix with craft tape

★ TLABK0010UMZZ
No Card

PACKAGING WEIGHTS DATA SHEET

Model: VCM23HM

MATERIAL TYPE	WEIGHT (grammes)
Cardboard	475
Paper	0
Total Card	475
EPS	70
PE	0
PP	0
Other Plastic	15
Total Plastic	85
Aluminium	0
Steel	0
Total Metal	0
Total Wood	0
Total Glass	0
Other	0

VIDEO TECHNICAL BULLETIN

<u>MODELS</u>	VCM20HM	VCM21HM	VCM23HM
	VCM24HM	VCM25HM	VCHM60HM
	VCMH64HM	VCM201HM	VCM202HM

SYMPTOM After replacing the EEPROM, a noisy playback picture may be experienced.

CAUSE Corruption of data within the EEPROM.

ACTION After setting the JP numbers and closing the test mode, turn off the mains supply to the VCR. Enough time should be allowed for the the back-up capacitor to discharge.

When the VCR is powered up again, the microprocessor will read the newly stored hexadecimal codes from the EEPROM and the unit will perform correctly.

VIDEO TECHNICAL BULLETIN

<u>MODELS</u>	VCM23HM	VCM24HM	VCM25HM	VCMH54HM
	VCMH64HM			

SYMPTOM Tape creasing, which may be intermittent.

CAUSE AC head tilt adjustment incorrect.

ACTION In the event of customer complaint of tape creasing or damage, the tape path must be carefully checked as follows.

1. Insert a known good E180 cassette, which has been rewound to the start. Press RECORD and wait ten seconds before inspecting the tape transport. A bright light is useful while carrying out this procedure.
2. In the event of the tape becoming visually damaged along its lower edge, between the reverse guide and the cassette shell, the AC head is probably adjusted correctly. This phenomenon is usually caused by the reverse guide height being set too high. Adjust as indicated in the service manual.
3. Observe the tape as it passes over the fixed guide. The lower flange should just be visible and the tape should not be attempting to ride over it. No wrinkles should be visible as the tape travels over the surface of the guide.
4. If the tape path is not as described in 2. above, and it is attempting to, or has succeeded in riding over the lower flange, the AC head has excessive tilt. Using a **non-magnetic** screwdriver, **slowly** turn the tilt adjustment screw (front of AC head) counterclockwise until the tape path is correct at this point.
5. If the tape path at the fixed guide is good, as described in 2. above, proceed to inspecting the tape path between the capstan/pinch roller and the reverse guide. This should be carried out while viewing the tape from the rear of the VCR.
6. The tape between the capstan/pinch roller and reverse guide should be flat and free from kinks/wrinkles. A useful check for this is to observe the reflections from the tape surface. Assuming that the tape at the fixed guide is now correct, any creases or damage to the top edge of the tape is due to excessive backward tilt (over correction from step 3.) or is the original complaint, if the tape path in 2. was good.
7. Verify that the tape is travelling smoothly over the fixed guide, capstan/pinch roller and reverse guide and is returning to the cassette shell in good condition. There should be between 0.3 and 0.5mm of the control track head visible at the bottom of the AC head.
8. Check the audio playback quality using a commercially available test tape.

Important Note

It is recommended to adjust the screws in very small steps, waiting for a few seconds between each step to allow the tape to 'ride' to its new position. No more than one full turn should be required.