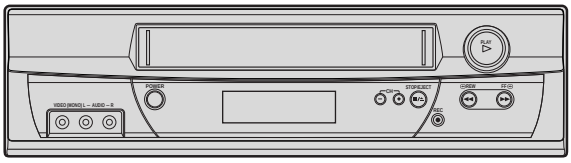
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-A590U/A591U



VHS Hi-Fi SQPB

SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-A591U.)*

GENERAL

Power requirement	: AC 120 V, 60 Hz
Power consumption	
Power on	: 9 W
Power off	: 1.7 W
Temperature	
Operating	: 5°C to 40°C (41°F to 104°F)
Storage	: –20°C to 60°C (–4°F to140°F)
Operating position	: Horizontal only
Dimensions (W x H x D)	: 360 mm x 95 mm x 224 mm (14-3/16" x 3-3/4" x 8-13/16")
Weight	: 3.2 kg (7.1 lbs)
Format	: VHS NTSC standard
Maximum recording time	
SP	: 210 min. with ST-210 video cassette
EP	: 630 min. with ST-210 video cassette

VIDEO/AUDIO

Signal system	: NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/Playback system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 42 dB
Horizontal resolution	: 230 lines
Frequency range	
Normal audio	: 100 Hz to 10,000 Hz
Hi-Fi audio	: 20 Hz to 20,000 Hz
Input/Output	: RCA connectors (IN x 1, OUT x 1)

TUNER

Tuning system	: Frequency-synthesized tuner
Channel coverage	
VHF	: Channels 2–13
UHF	: Channels 14–69
CATV	: 113 Channels
RF output	: Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

TIMER

Clock reference	: Quartz
Program capacity	: 1-month programmable timer/8 programs
Memory backup for timer	: Approx. 5 sec.

ACCESSORIES

Provided accessories	: RF cable (F-type), Infrared remote control unit, "AAA" battery x 2

Specifications shown are for SP mode unless specified otherwise.
E. & O.E. Design and specifications subject to change without notice.

No.82885
January 2002

TABLE OF CONTENTS

The following table lists the differing points between Models (HR-A591U, HR-A591U(C) and HR-A590U(C) in this series.

ITEM / MODEL	HR-A591U	HR-A591U(C)	HR-A590U(C)
INSTRUCTION LANGUAGE	ENGLISH	ENGLISH, FRENCH	ENGLISH, FRENCH
REGISTRATION CARD	USED	NOT USED	NOT USED
GUARANTEE CARD	NOT USED	USED	USED
SERVICE STAION LIST	NOT USED	USED	USED
FRONT INDICATOR	FDP	FDP	LED
RF OUTPUT SWITCH	NOT USED	NOT USED	USED

Important Safety Precautions

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

●Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded ( ) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape 3) Spacers 5) Barrier
   2) PVC tubing 4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

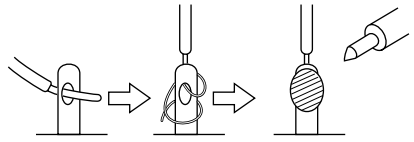


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

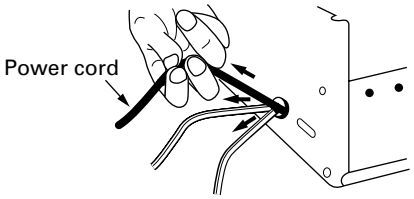


Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number :** E03830-001
    2) **Required tool :** Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

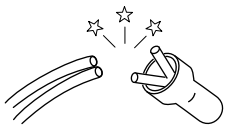


Fig.3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

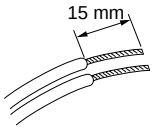


Fig.4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

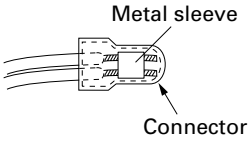


Fig.5

(4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

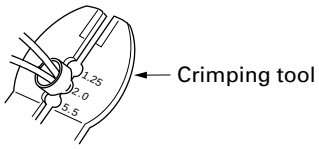


Fig.6

(5) Check the four points noted in Fig.7.

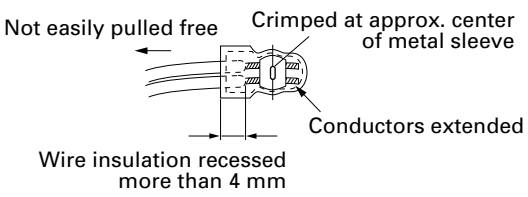


Fig.7

● Safety Check after Servicing

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

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

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

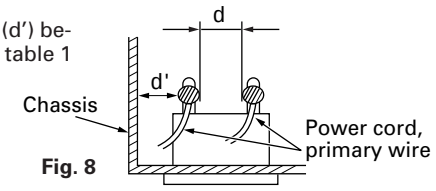


Fig. 8

4. Leakage current test

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

Measuring Method : (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

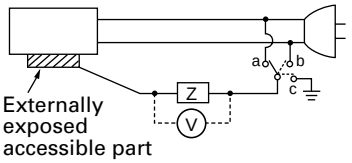


Fig. 9

5. Grounding (Class Ⅰ model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

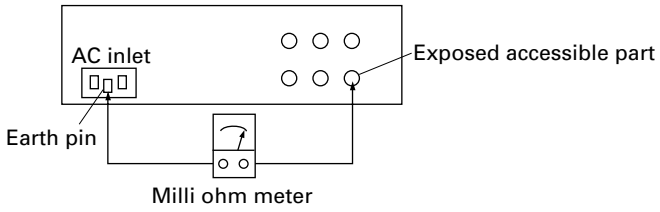


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 miute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	1 MΩ ≦ R ≦ 12 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class Ⅱ) AC 1.5 kV 1 minute (Class Ⅰ)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

1-1: TOP CABINET AND FRONT CABINET (Refer to Fig. 2-1)

1. Remove the 4 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Unlock the 7 supports ②.
4. Remove the Front Cabinet in the direction of arrow (B).

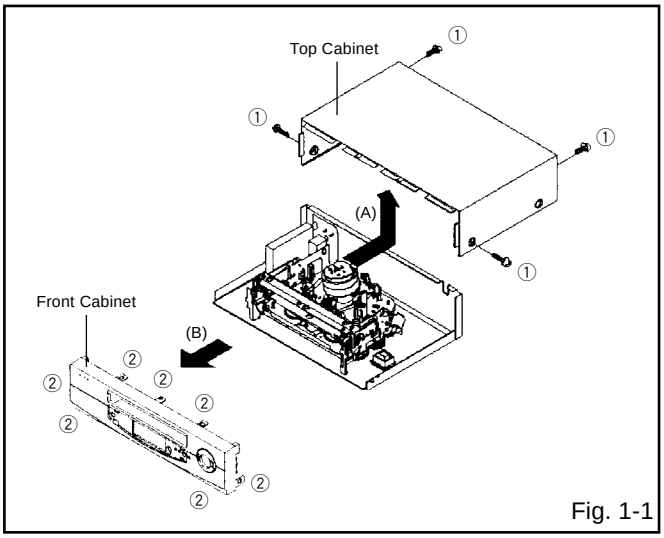


Fig. 1-1

1-2: FLAP (Refer to Fig. 1-2)

1. Open Flap to 90˚ and flex in direction of arrow (A), at the same time slide in direction of arrow (B).
2. Then lift in direction of arrow (C).

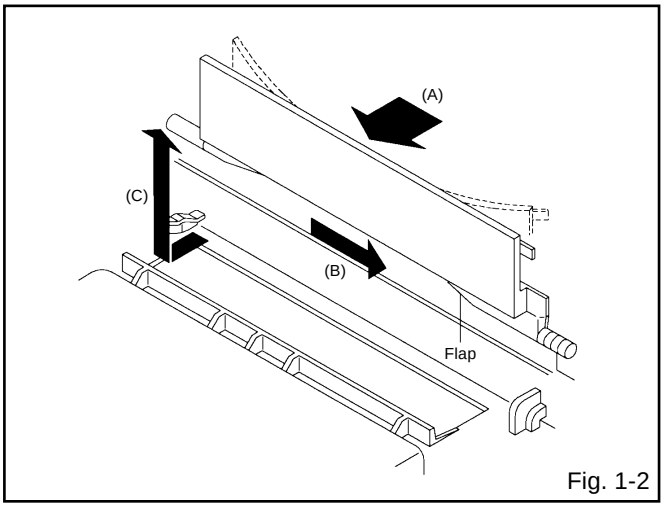


Fig. 1-2

1-3: DECK CHASSIS (Refer to Fig. 1-3)

1. Remove the 3 screws ①.
2. Disconnect the following connectors: (CP1001, CP4001, CP4002 and CP4003).
3. Remove the Deck Chassis in the direction of arrow.

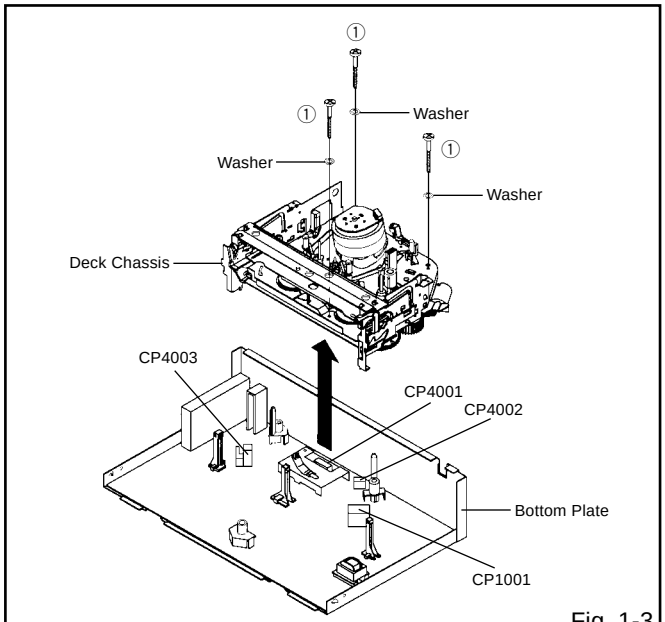


Fig. 1-3

1-4: SYSCON PCB (Refer to Fig. 1-4)

1. Remove the screw ①.
2. Remove the screw ②.
3. Remove the Syscon PCB in the direction of arrow.

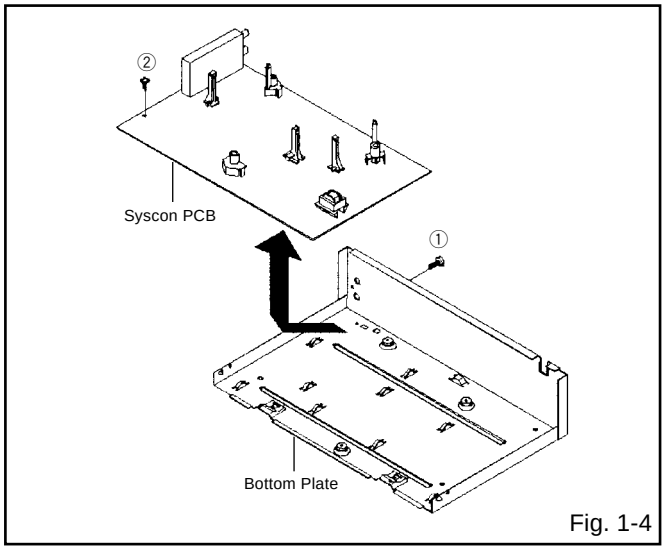


Fig. 1-4

DISASSEMBLY INSTRUCTIONS

2. REMOVAL OF DECK PARTS

2-1: TOP BRACKET (Refer to Fig. 2-1)

1. Extend the 2 supports ①.
2. Slide the 2 supports ② and remove the Top Bracket.

NOTE

1. After the installation of the Top Bracket, bend the support ① so that the Top Bracket is fixed.

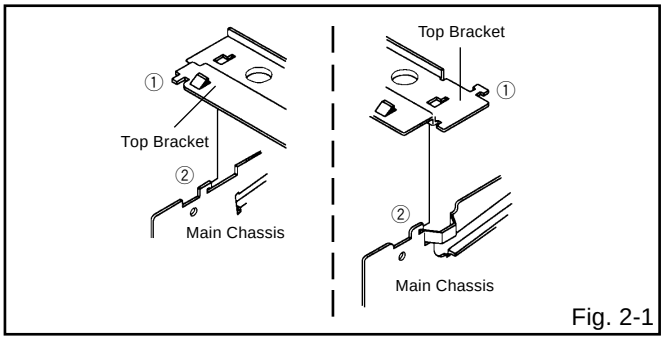


Fig. 2-1

2-2: CASSETTE HOLDER ASS'Y (Refer to Fig. 2-2)

1. Move the Cassette Holder Ass'y to the front side.
2. Push the Locker R to remove the Cassette Side R.
3. Remove the Cassette Side L.

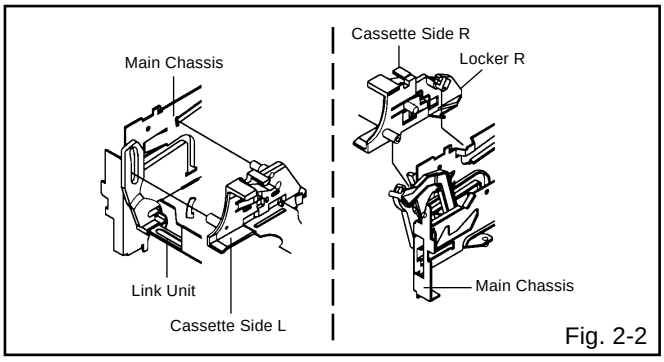


Fig. 2-2

2-3: CASSETTE SIDE L/R (Refer to Fig. 2-3-A)

1. Remove the Locker Spring.
2. Unlock the 4 supports ① and then remove the Cassette Side L/R.
3. Unlock the support ② and then remove the Locker R.

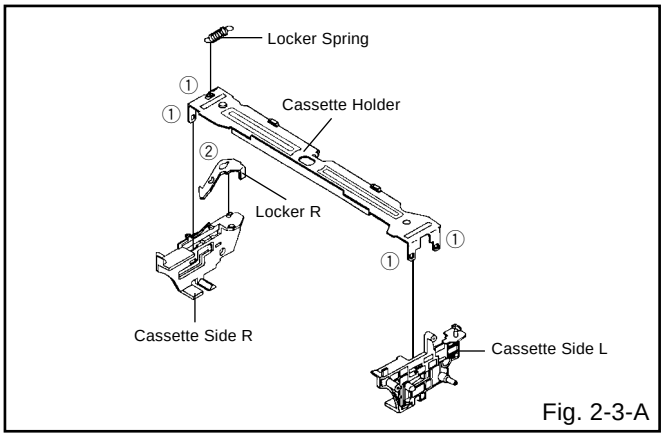


Fig. 2-3-A

NOTE

1. In case of the Locker R installation, check if the two positions of Fig. 2-3-B are correctly locked.
2. When you install the Cassette Side R, be sure to move the Locker R after installing.

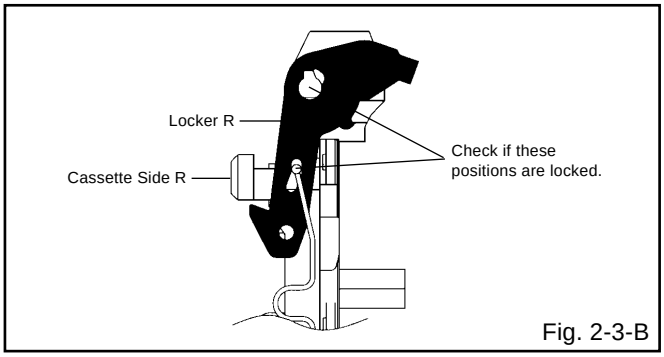


Fig. 2-3-B

2-4: LINK UNIT (Refer to Fig. 2-4)

1. Set the Link Unit to the Eject position.
2. Unlock the support ①.
3. Remove the (A) side of the Link Unit first, then remove the (B) side.

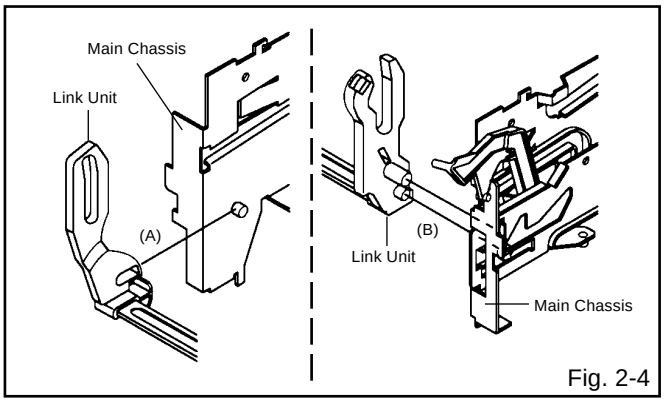


Fig. 2-4

2-5: LINK LEVER/FLAP LEVER (Refer to Fig. 2-5)

1. Extend the support ①.
2. Remove the Link Lever.
3. Remove the Flap Lever.

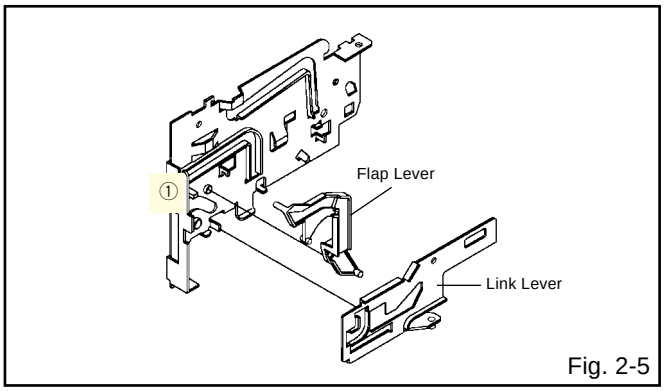


Fig. 2-5

DISASSEMBLY INSTRUCTIONS

2-6: LOADING MOTOR/WORM (Refer to Fig. 2-6-A)

1. Remove the screw ①.
2. Remove the Loading Motor.
3. Remove the Worm.

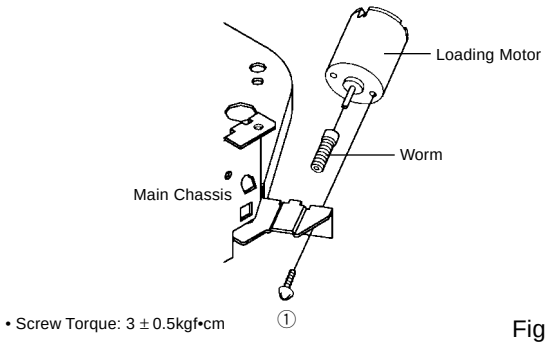


Fig. 2-6-A

NOTE

1. In case of the Worm installation, check if the value of the Fig. 2-6-B is correct.
2. In case of the Loading Motor installation, hook the wire on the Cassette Opener as shown Fig. 2-6-C.

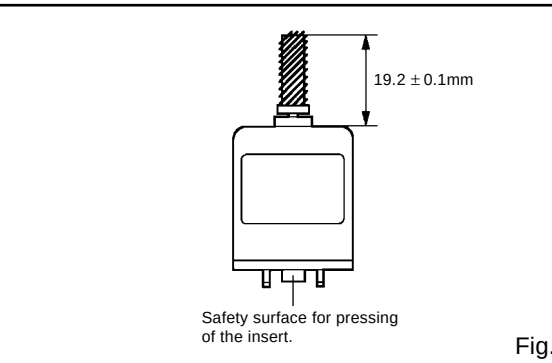


Fig. 2-6-B

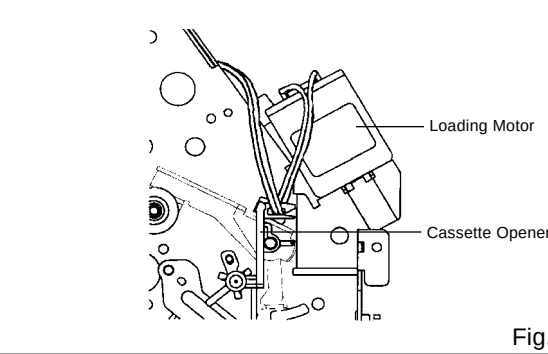


Fig. 2-6-C

2-7: TENSION ASS'Y (Refer to Fig. 2-7-B)

1. Turn the Pinch Roller Cam clockwise so that the Tension Holder hook is set to the position of Fig. 2-7-A to move the Tension Arm Ass'y.
2. Remove the Tension Spring.
3. Unlock the 2 supports ① and remove the Tension Band.
4. Unlock the support ② and remove the Tension Arm Ass'y.
5. Unlock the support ③ and remove the Tension Connect.
6. Float the hook ④ and turn it clockwise then remove the Tension Holder.

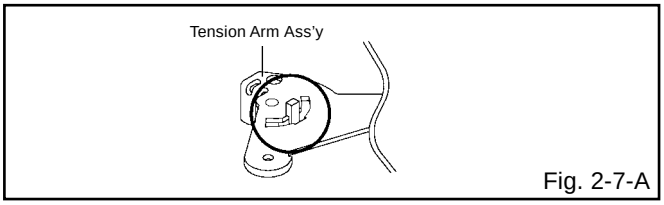


Fig. 2-7-A

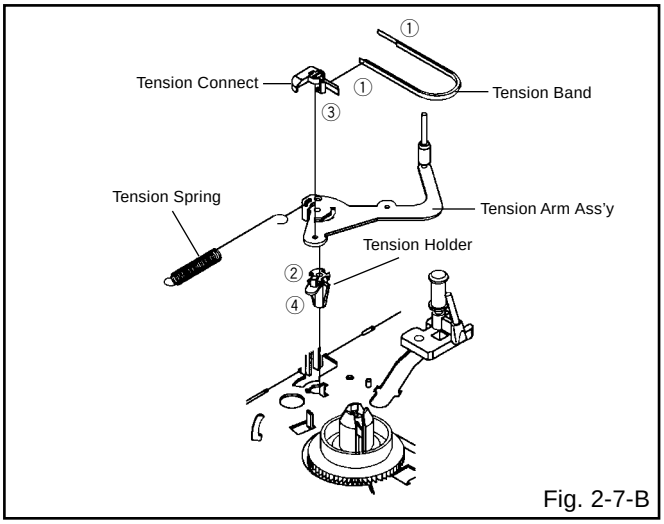


Fig. 2-7-B

NOTE

1. In case of the Tension Band installation, note the direction of the installation. **(Refer to Fig. 2-7-C)**
2. In case of the Tension Band installation, install correctly as Fig. 2-7-D.
3. In case of the Tension Connect installation, install as the circled section of Fig. 2-7-E.

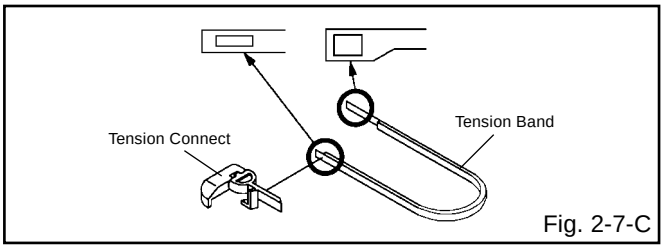


Fig. 2-7-C

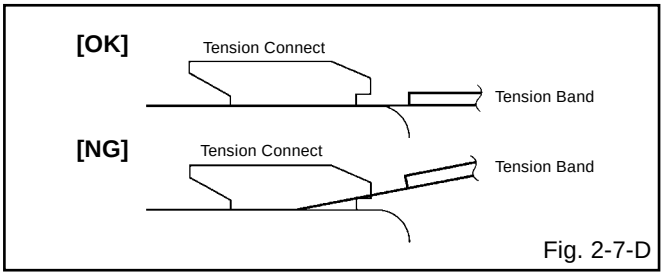


Fig. 2-7-D

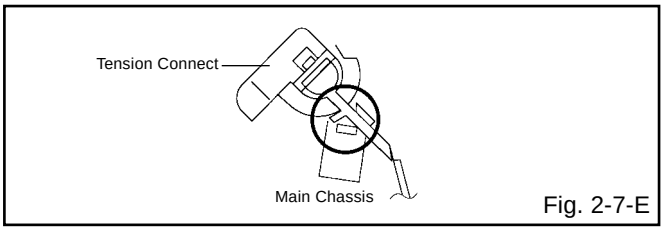


Fig. 2-7-E

DISASSEMBLY INSTRUCTIONS

2-8: T BRAKE ARM/T BRAKE BAND (Refer to Fig. 2-8-A)

1. Remove the T Brake Spring.
2. Turn the T Brake Arm clockwise and bend the hook section to remove it.
3. Unlock the 2 supports ① and remove the T Brake Band.

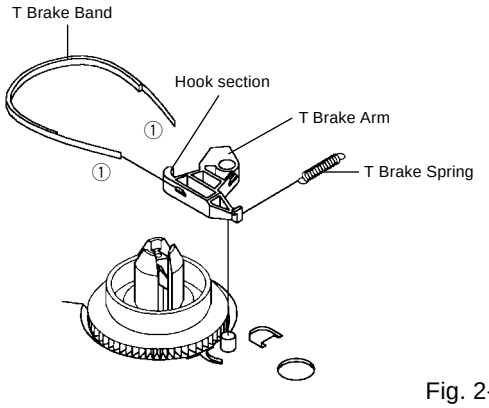


Fig. 2-8-A

NOTE

1. In case of the T Brake Band installation, install correctly as Fig. 2-8-B.

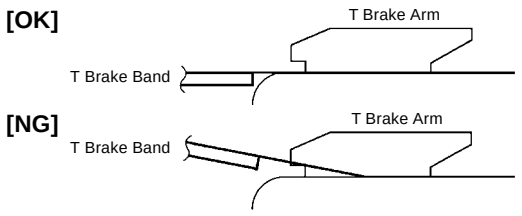


Fig. 2-8-B

2-9: S REEL/T REEL/IDLER ARM ASS'Y/IDLER GEAR (Refer to Fig. 2-9-A)

1. Remove the S Reel and T Reel.
2. Remove the 2 Polyslider Washers ①.
3. Remove the Idler Arm Ass'y and Idler Gear.

NOTE

1. Take care not to damage the gears of the S Reel and T Reel.
2. The Polyslider Washer may be remained on the back of the reel.
3. Take care not to damage the shaft.
4. Do not touch the section "A" of S Reel and T Reel. (Use gloves.) **(Refer to Fig. 2-9-A)** Do not adhere the stains on it.
5. When you install the reel, clean the shaft and grease it (FG-84M). (If you do not grease, noise may be heard in FF/REW mode.)
6. After installing the reel, adjust the height of the reel. **(Refer to MECHANICAL ADJUSTMENT)**

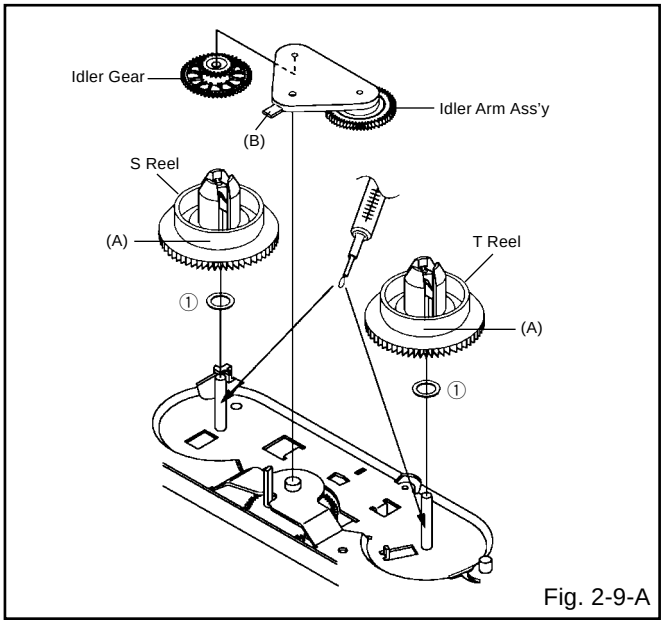


Fig. 2-9-A

NOTE

1. In case of the S Reel and T Reel installation, check if the correct parts are installed. **(Refer to Fig. 2-9-B)**
2. In case of the Idler Arm Ass'y installation, install correctly as Fig. 2-9-C. And also set it so that the section "B" of Fig. 2-9-A is placed under the Main Chassis tab.

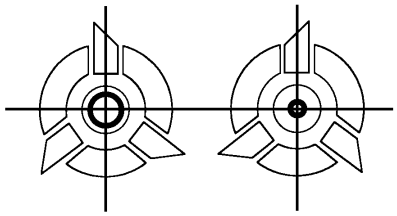


Fig. 2-9-B

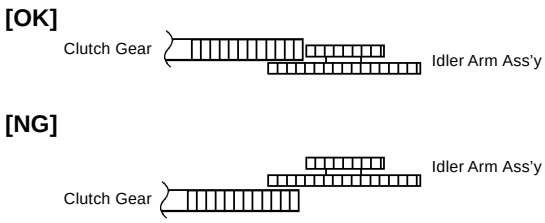


Fig. 2-9-C

DISASSEMBLY INSTRUCTIONS

2-10: CASSETTE OPENER/PINCH ROLLER BLOCK/P5 ARM ASS'Y (Refer to Fig. 2-10-A)

1. Unlock the support ① and remove the Cassette Opener.
2. Remove the Pinch Roller Block and P5 Arm Ass'y.

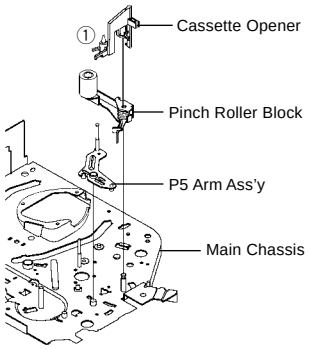


Fig. 2-10-A

NOTE

1. Do not touch the Pinch Roller. (Use gloves.)
2. In case of the Pinch Roller Block and the Pinch Roller Cam installation, install correctly as Fig. 2-10-B.

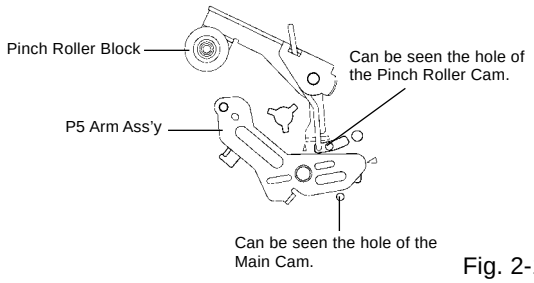


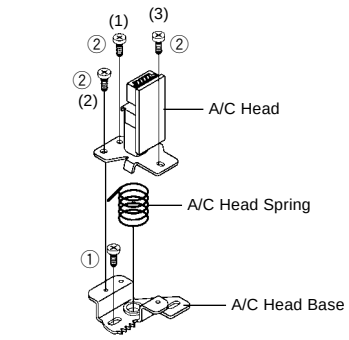
Fig. 2-10-B

2-11: A/C HEAD (Refer to Fig. 2-11-A)

1. Remove the screw ①.
2. Remove the A/C Head Base.
3. Remove the 3 screws ②.
4. Remove the A/C Head and A/C Head Spring.

NOTE

1. Do not touch the A/C Head. (Use gloves.)
2. When you install the A/C Head Spring, install as shown in Fig. 2-11-B.
3. When you install the A/C Head, tighten the screw (1) first, then tighten the screw (2), finally tighten the screw (3).



• Screw Torque: 5 ± 0.5kgf•cm (Screw ①)

Fig. 2-11-A

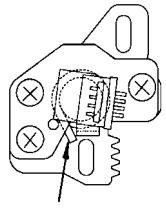
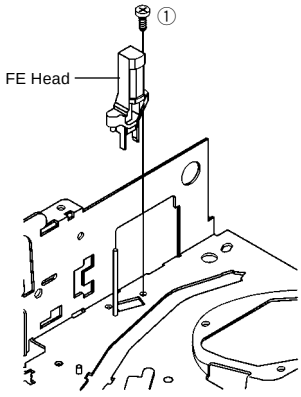


Fig. 2-11-B

2-12: FE HEAD (RECORDER ONLY) (Refer to Fig. 2-12)

1. Remove the screw ①.
2. Remove the FE Head.



• Screw Torque: 5 ± 0.5kgf•cm
• The FE Head is not installed on the Video Cassette Player.

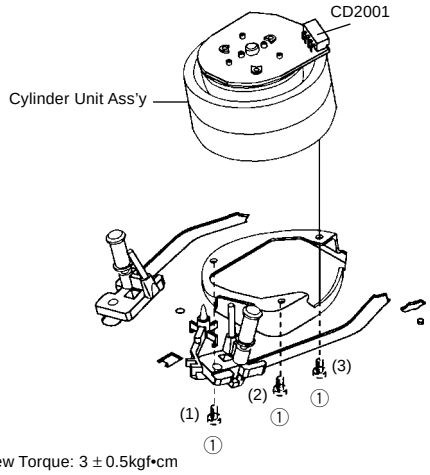
Fig. 2-12

2-13: AHC ASS'Y/CYLINDER UNIT ASS'Y (Refer to Fig. 2-13)

1. Disconnect the following connector: (CD2001)
2. Remove the 3 screws ①.
3. Remove the Cylinder Unit Ass'y.

NOTE

1. When you install the Cylinder Unit Ass'y, tighten the screws from (1) to (3) in order while pulling the Ass'y toward the left front direction.



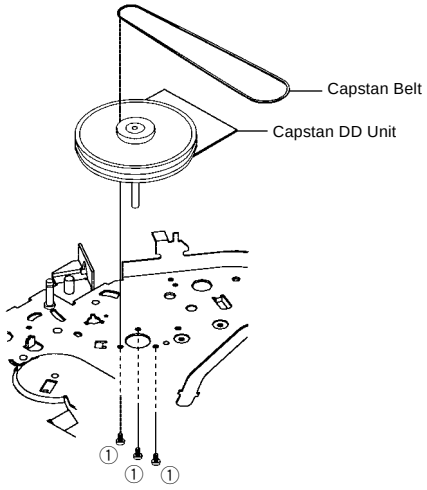
• Screw Torque: 3 ± 0.5kgf•cm

Fig. 2-13

DISASSEMBLY INSTRUCTIONS

2-14: CAPSTAN DD UNIT (Refer to Fig. 2-14-A)

1. Remove the Capstan Belt.
2. Remove the 3 screws ①.
3. Remove the Capstan DD Unit.



• Screw Torque: 4 ± 0.5kgf•cm

Fig. 2-14-A

NOTE

1. In case of the Capstan DD Unit installation, apply the silicon bond (TSE3843-W) on the position Fig. 2-14-B correctly. (If no silicon bond applied, abnormal noise will be heard on the deck operation.) **(Refer to Fig. 2-14-B, C)**

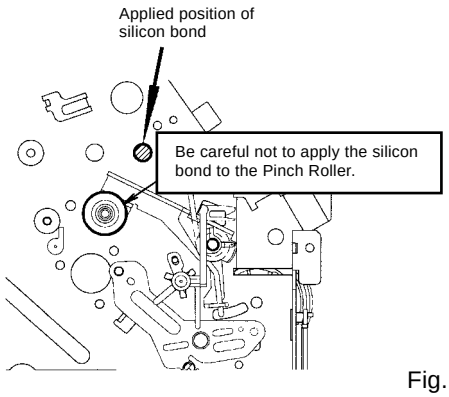


Fig. 2-14-B

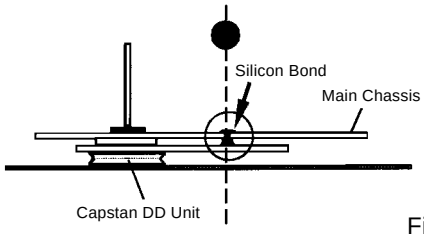


Fig. 2-14-C

2-15: MAIN CAM/PINCH ROLLER CAM/JOINT GEAR (Refer to Fig. 2-15-A)

1. Remove the E-Ring ①, then remove the Main Cam.
2. Remove the E-Ring ②, then remove the Pinch Roller Cam and Joint Gear.

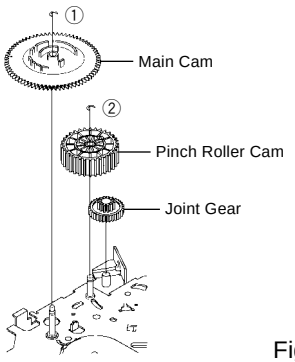


Fig. 2-15-A

NOTE

1. In case of the Pinch Roller Cam and Main Cam installation, install them as the circled section of Fig. 2-15-B so that the each markers are met. **(Refer to Fig. 2-15-B)** And also can be seen the Main Chassis hole through the Main Cam maker hole.

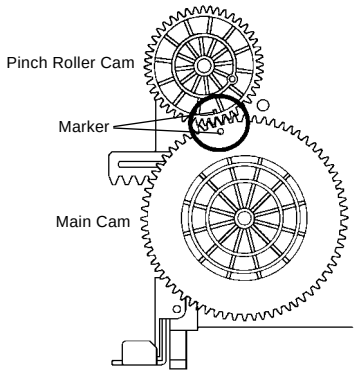


Fig. 2-15-B

2-16: LOADING GEAR S/T UNIT (Refer to Fig. 2-16-A)

1. Remove the E-Ring ① and remove the Main Loading Gear.
2. Remove the Main Rod, Tension Lever, Loading Arm S Unit and Loading Arm T Unit.

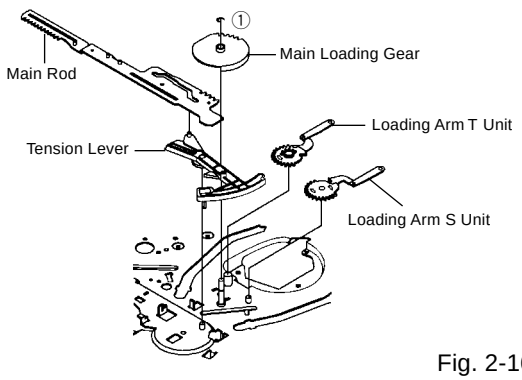


Fig. 2-16-A

DISASSEMBLY INSTRUCTIONS

NOTE

1. When you install the Loading Arm S Unit, Loading Arm T Unit and Main Loading Gear, align each marker. **(Refer to Fig. 2-16-B)**

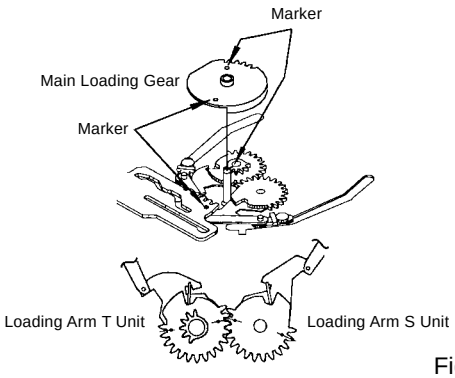


Fig. 2-16-B

2-17: CLUTCH ASS'Y/RING SPRING/CLUTCH LEVER/ CLUTCH GEAR (Refer to Fig. 2-17-A)

1. Remove the Polyslider Washer ①.
2. Remove the Clutch Ass'y and Ring Spring.
3. Remove the Clutch Lever.
4. Remove the Coupling Gear, Coupling Spring and Clutch Gear.

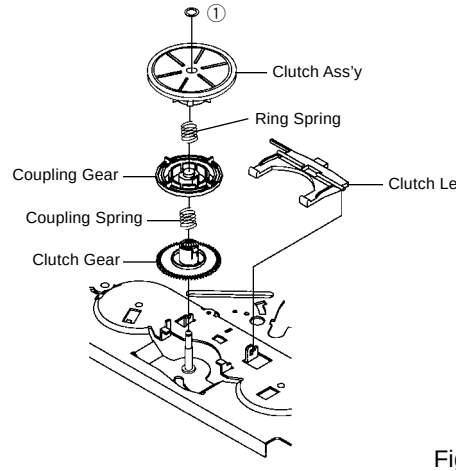


Fig. 2-17-A

NOTE

1. In case of the Clutch Ass'y installation, install it with inserting the spring of the Clutch Ass'y into the dent of the Coupling Gear. **(Refer to Fig. 2-17-B)**

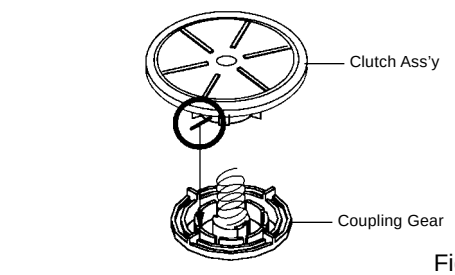


Fig. 2-17-B

2-18: CASSETTE GUIDE POST/INCLINED BASE S/T UNIT/P4 CAP (Refer to Fig. 2-18-A)

1. Remove the P4 Cap.
2. Unlock the support ① and remove the Cassette Guide Post.
3. Remove the Inclined Base S Unit and Inclined Base T Unit.

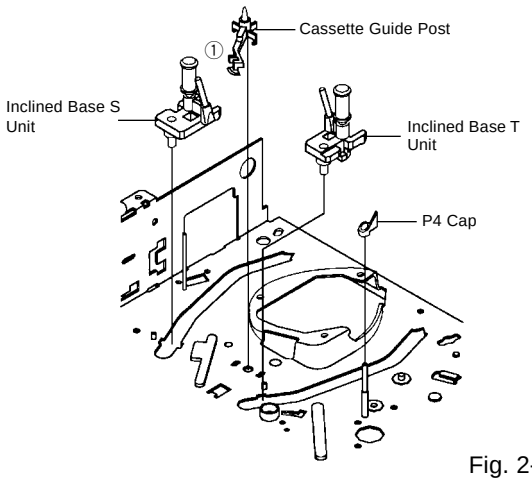


Fig. 2-18-A

NOTE

1. Do not touch the roller of Guide Roller.
2. In case of the P4 Cap installation, install it with parallel for "A" and "B" of Fig. 2-18-B.
3. In case of the Cassette Guide Post installation, install correctly as the circled section of Fig. 2-18-C.

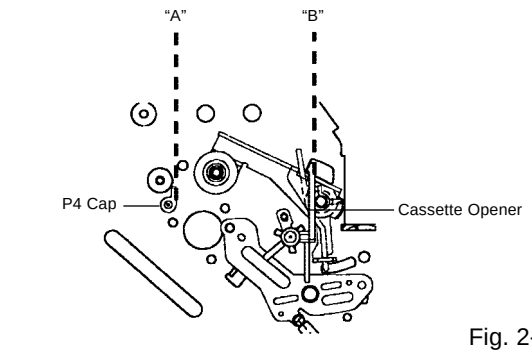


Fig. 2-18-B

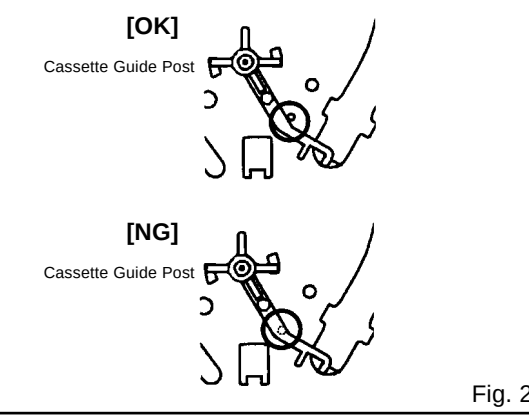


Fig. 2-18-C

DISASSEMBLY INSTRUCTIONS

3. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 3-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

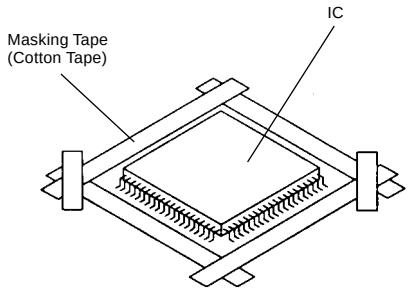


Fig. 3-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 3-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

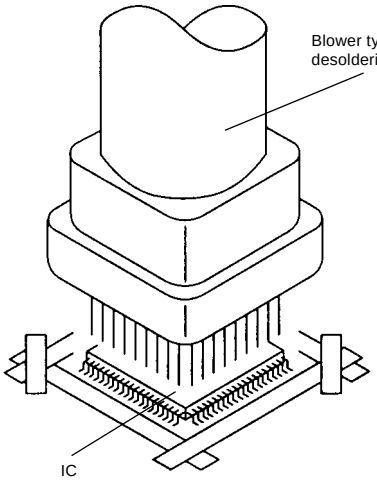


Fig. 3-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 3-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

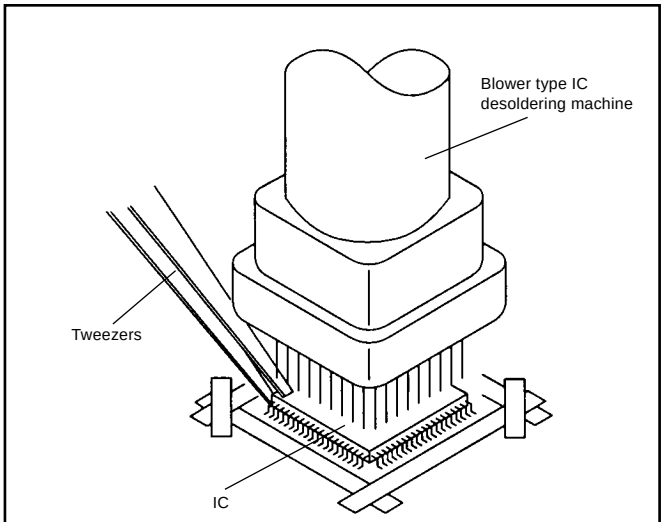


Fig. 3-3

4. Peel off the Masking Tape.
5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 3-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

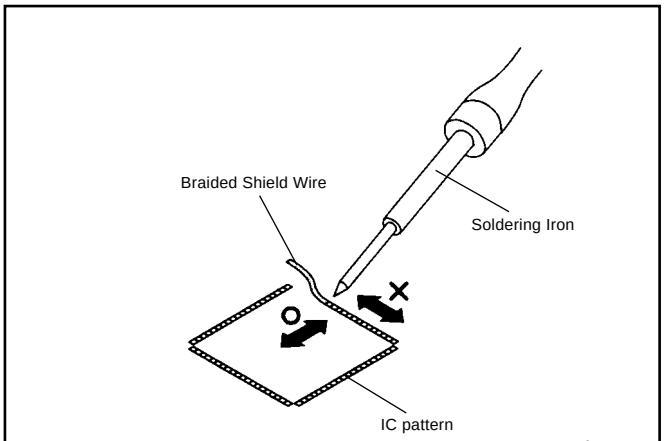


Fig. 3-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 3-5.)**

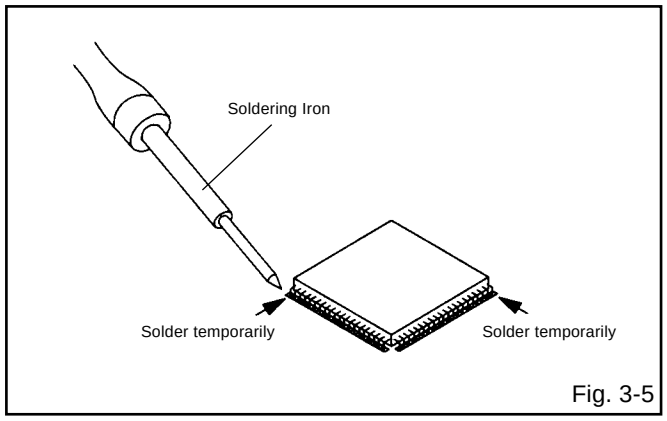


Fig. 3-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 3-6.)**

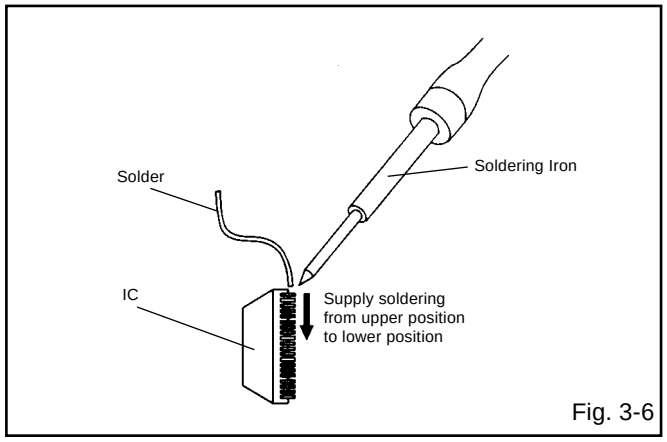


Fig. 3-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 3-7.)**

   NOTE

   Do not absorb the solder to excess.

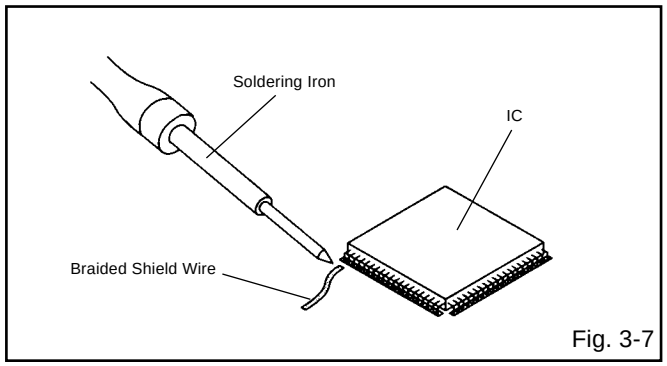


Fig. 3-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 3-8.)**

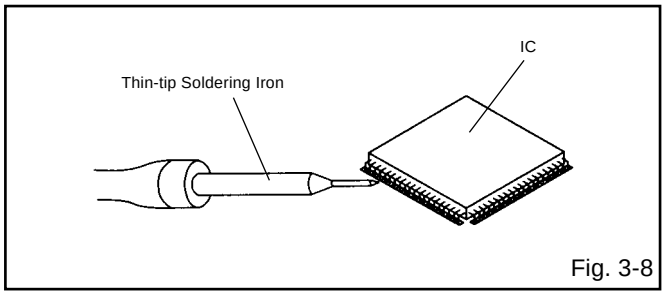


Fig. 3-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

KEY TO ABBREVIATIONS

A	**A/C**	:	Audio/Control
	ACC	:	Automatic Color Control
	AE	:	Audio Erase
	AFC	:	Automatic Frequency Control
	AFT	:	Automatic Fine Tuning
	AFT DET	:	Automatic Fine Tuning Detect
	AGC	:	Automatic Gain Control
	AMP	:	Amplifier
	ANT	:	Antenna
	A.PB	:	Audio Playback
	APC	:	Automatic Phase Control
	ASS'Y	:	Assembly
	AT	:	All Time
	AUTO	:	Automatic
	A/V	:	Audio/Video
B	**BGP**	:	Burst Gate Pulse
	BOT	:	Beginning of Tape
	BPF	:	Bandpass Filter
	BRAKE SOL	:	Brake Solenoid
	BUFF	:	Buffer
	B/W	:	Black and White
C	**C**	:	Capacitance, Collector
	CASE	:	Cassette
	CAP	:	Capstan
	CARR	:	Carrier
	CH	:	Channel
	CLK	:	Clock
	CLOCK (SY-SE)	:	Clock (Syscon to Servo)
	COMB	:	Combination, Comb Filter
	CONV	:	Converter
	CPM	:	Capstan Motor
	CTL	:	Control
	CYL	:	Cylinder
	CYL-M	:	Cylinder-Motor
	CYL SENS	:	Cylinder-Sensor
D	**DATA (SY-CE)**	:	Data (Syscon to Servo)
	dB	:	Decibel
	DC	:	Direct Current
	DD Unit	:	Direct Drive Motor Unit
	DEMOD	:	Demodulator
	DET	:	Detector
	DEV	:	Deviation
E	**E**	:	Emitter
	EF	:	Emitter Follower
	EMPH	:	Emphasis
	ENC	:	Encoder
	ENV	:	Envelope
	EOT	:	End of Tape
	EQ	:	Equalizer
	EXT	:	External
F	**F**	:	Fuse
	FBC	:	Feed Back Clamp
	FE	:	Full Erase
	FF	:	Fast Forward, Flipflop
	FG	:	Frequency Generator
	FL SW	:	Front Loading Switch
	FM	:	Frequency Modulation
	FSC	:	Frequency Sub Carrier
	FWD	:	Forward
G	**GEN**	:	Generator
	GND	:	Ground
H	**H.P.F**	:	High Pass Filter
	H.SW	:	Head Switch
	Hz	:	Hertz
I	**IC**	:	Integrated Circuit
	IF	:	Intermediate Frequency
	IND	:	Indicator
	INV	:	Inverter
K	**KIL**	:	Killer
L	**L**	:	Left
	LED	:	Light Emitting Diode
	LIMIT AMP	:	Limiter Amplifier
	LM, LDM	:	Loading Motor
	LP	:	Long Play
	L.P.F	:	Low Pass Filter
	LUMI.	:	Luminance
M	**M**	:	Motor
	MAX	:	Maximum
	MINI	:	Minimum
	MIX	:	Mixer, mixing
	MM	:	Monostable Multivibrator
	MOD	:	Modulator, Modulation
	MPX	:	Multiplexer, Multiplex
	MS SW	:	Mecha State Switch
N	**NC**	:	Non Connection
	NR	:	Noise Reduction
O	**OSC**	:	Oscillator
	OPE	:	Operation
P	**PB**	:	Playback
	PB CTL	:	Playback Control
	PB-C	:	Playback-Chrominance
	PB-Y	:	Playback-Luminance
	PCB	:	Printed Circuit Board
	P. CON	:	Power Control
	PD	:	Phase Detector
	PG	:	Pulse Generator
	P-P	:	Peak-to Peak
R	**R**	:	Right
	REC	:	Recording
	REC-C	:	Recording-Chrominance
	REC-Y	:	Recording-Luminance
	REEL BRK	:	Reel Brake
	REEL S	:	Reel Sensor
	REF	:	Reference
	REG	:	Regulated, Regulator
	REW	:	Rewind
	REV, RVS	:	Reverse
	RF	:	Radio Frequency
	RMC	:	Remote Control
	RY	:	Relay
S	**S. CLK**	:	Serial Clock
	S. COM	:	Sensor Common
	S. DATA	:	Serial Data
	SEG	:	Segment
	SEL	:	Select, Selector
	SENS	:	Sensor
	SER	:	Search Mode
	SI	:	Serial Input
	SIF	:	Sound Intermediate Frequency
	SO	:	Serial Output
	SOL	:	Solenoid
	SP	:	Standard Play
	STB	:	Serial Strobe
	SW	:	Switch

KEY TO ABBREVIATIONS

S	**SYNC**	:	Synchronization
	SYNC SEP	:	Sync Separator, Separation
T	**TR**	:	Transistor
	TRAC	:	Tracking
	TRICK PB	:	Trick Playback
	TP	:	Test Point
U	**UNREG**	:	Unregulated
V	**V**	:	Volt
	VCO	:	Voltage Controlled Oscillator
	VIF	:	Video Intermediate Frequency
	VP	:	Vertical Pulse, Voltage Display
	V.PB	:	Video Playback
	VR	:	Variable Resistor
	V.REC	:	Video Recording
	VSF	:	Visual Search Fast Forward
	VSR	:	Visual Search Rewind
	VSS	:	Voltage Super Source
	V-SYNC	:	Vertical-Synchronization
	VT	:	Voltage Tuning
X	**X'TAL**	:	Crystal
Y	**Y/C**	:	Luminance/Chrominance

PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage.
Parts replacing time does not mean the life span for individual parts.
Also, long term storage or misuse may cause transformation and aging of rubber parts.
The following list means standard hours, so the checking hours depends on the conditions.

Time / Parts Name	500 hours	1,000 hours	1,500 hours	2,000 hours	2,500 hours	Notes
Audio Control Head	■	■	■	●	●	Clean those parts in contact with the tape.
Full Erase Head (Recorder only)	■	■	■	●	●	
Capstan Belt		●	●	●	●	Clean the rubber, and parts which the rubber touches.
Pinch Roller	■	●	●	●	●	
Capstan DD Unit		●	●	●	●	
Loading Motor					●	
Tension Band		●	●	●	●	
T Brake Band		●	●	●	●	
Clutch Ass'y		●	●	●	●	
Idler Arm Ass'y		●	●	●	●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	●	●	●	●	Clean the Head

■ : Clean
● : Check it and if necessary, replace it.

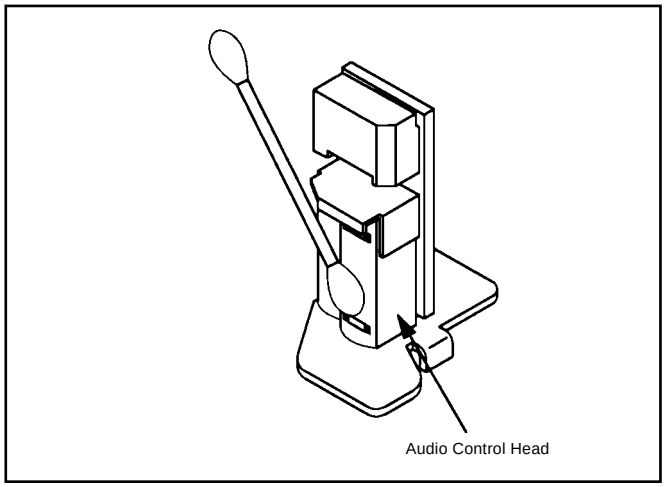
CLEANING

NOTE

After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

1. AUDIO CONTROL HEAD

Clean the Audio Control Head with the cotton stick soaked by alcohol. Clean the full erase head in the same manner. **(Refer to the figure below.)**



2. TAPE RUNNING SYSTEM

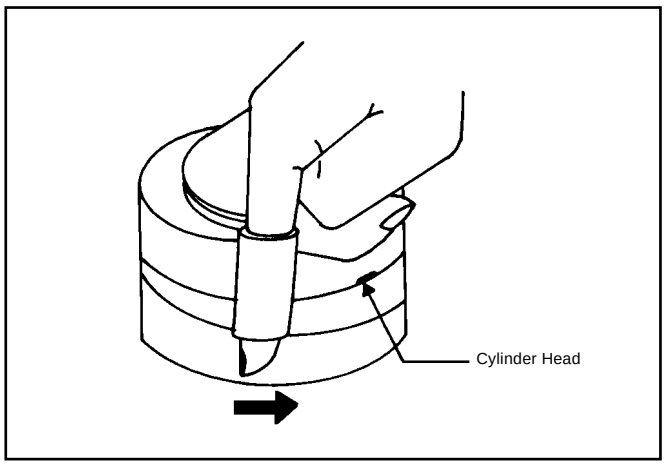
When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

3. CYLINDER

Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). **(Refer to the figure below.)**

NOTE

Do not exert force against the cylinder head. Do not move the chamois upward or downward on the head.
Use the chamois one by one.

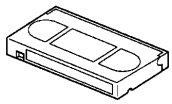
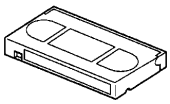
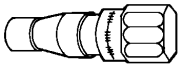
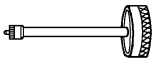
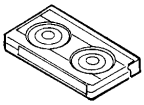
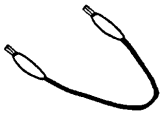


SERVICE MODE LIST

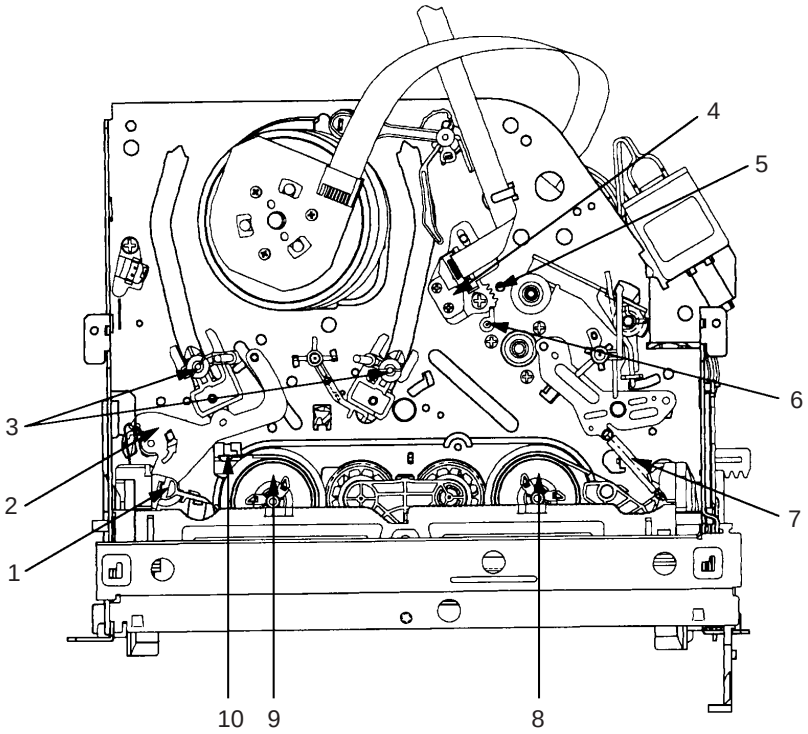
This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.

Method	Operations
Press the ATR button on the remote control for more than 2 seconds during PLAY.	Adjusting of the Tracking to the center position. Refer to the “MECHANICAL ADJUSTMENT” (GUIDE ROLLER) and “ELECTRICAL ADJUSTMENT” (SWITHCHING POINT).
Make the short circuit between the test point of SERVICE and the GND.	The BOT, EOT, and the Reel Sensor do not work and the deck can be operated without a cassette tape. Refer to the “PREPARATION FOR SERVICING”

SERVICING FIXTURES AND TOOLS

VHS Alignment Tape MHP 	VHS Alignment Tape MHP-L 	Torque Gauge PUJ48075-2 	Roller Driver PTU94002-2 	X-JG153 X Value Adjustment Screwdriver 
Torque Tape PUJ48076-2 	Short Jumper 			

MECHANISM ADJUSTMENT PARTS LOCATION GUIDE

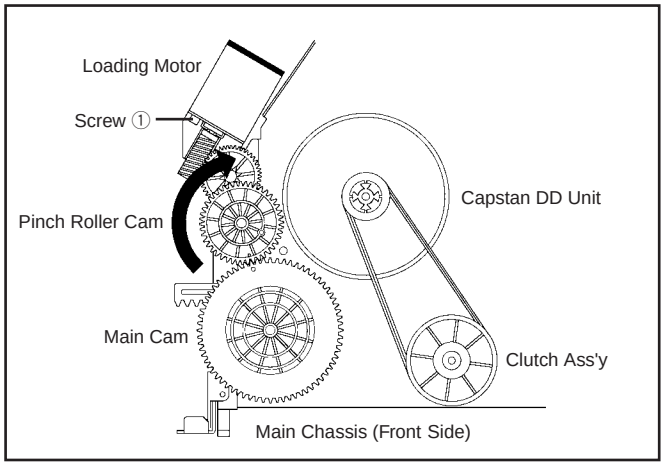


1. Tension Connect
2. Tension Arm
3. Guide Roller
4. Audio/Control Head
5. X value adjustment driver hole
6. P4 Post
7. T Brake Spring
8. T Reel
9. S Reel
10. Adjusting section for the Tension Arm position

MECHANICAL ADJUSTMENTS

TAPE REMOVAL METHOD AT NO POWER SUPPLY

1. Remove the Top Cabinet and Front Cabinet. **(Refer to item 1 of the DISASSEMBLY INSTRUCTIONS.)**
2. Remove the screw ① of the Deck Chassis and remove the Loading Motor.
3. Rotate the Pinch Roller Cam in the direction of the arrow by hand to slacken the Video Tape.
4. Rotate the Clutch Ass'y either of the directions to wind the Video Tape in the Cassette Case.
5. Repeat the above step 3~4. Then take out the Video Cassette from the Deck Chassis. Be careful not toscratch on the tape.



1. CONFIRMATION AND ADJUSTMENT

Read the following NOTES before starting work.

- Place an object which weighs between 450g~500g on the Cassette Tape to keep it steady when you want to make the tape run without the Cassette Holder. (Do not place an object which weighs over 500g.)

1-1: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Set to the PLAY mode.
2. Adjust the adjusting section for the Tension Arm position so that the Tension Arm top is within the standard line of Main Chassis.
3. While turning the S Reel clockwise, confirm that the edge of the Tension Arm is located in the position described above.

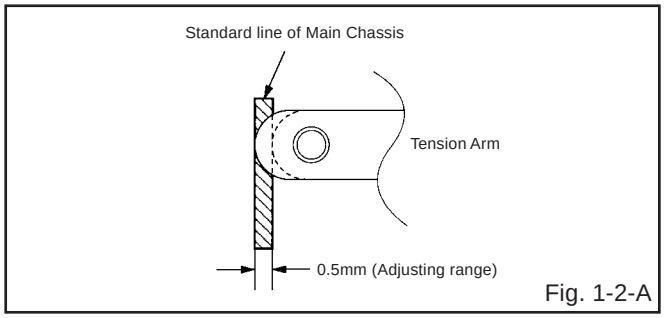


Fig. 1-2-A

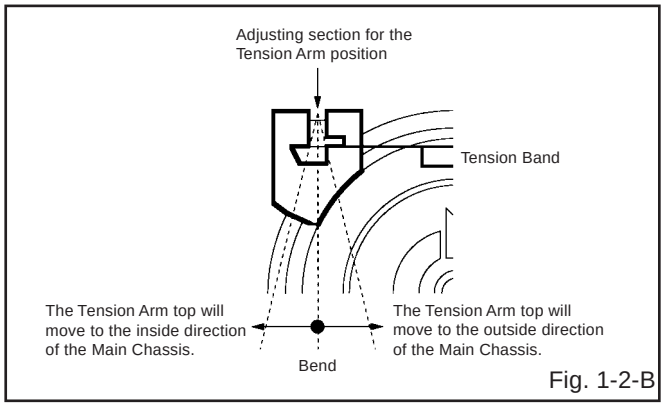


Fig. 1-2-B

1-2: CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK

1. After confirmation and adjustment of Tension Post position **(Refer to item 1-2)**, load the cassette type torque tape and set to the PLAY mode.
2. Confirm that the right meter of the torque tape indicates 50~90gf•cm during playback in SP mode.
3. Confirm that the left meter of the torque tape indicates 25~40gf•cm during playback in SP mode.

1-3: CONFIRMATION OF VSR TORQUE

1. Install the Torque Gauge on the S Reel. Set to the Picture Search (Rewind) mode. **(Refer to Fig.1-4-B)**
2. Then, confirm that it indicates 120~180gf•cm.

NOTE

Install the Torque Gauge on the reel disk firmly. Press the REW button to turn the reel disk.

MECHANICAL ADJUSTMENTS

1-4: CONFIRMATION OF REEL BRAKE TORQUE

(S Reel Brake) **(Refer to Fig. 1-4-B)**

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Ass'y from the S Reel.
3. Install the Torque Gauge on the S Reel. Turn the Torque Gauge clockwise.
4. Then, confirm that it indicates 60~100gf•cm.

(T Reel Brake) **(Refer to Fig. 1-4-B)**

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Ass'y from the T Reel.
3. Install the Torque Gauge on the T reel. Turn the Torque Gauge counterclockwise.
4. Then, confirm that it indicates 30~50gf•cm.

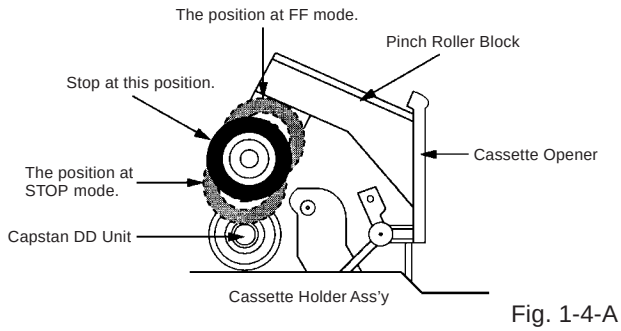


Fig. 1-4-A

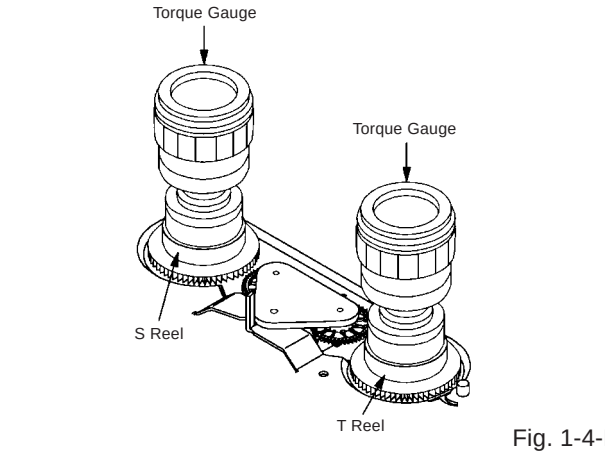


Fig. 1-4-B

NOTE

If the torque is out of the range, replace the following parts.

Check item	Replacement Part
1-3	Idler Ass'y/Clutch Ass'y
1-4	S Reel side: S Reel/Tension Band/Tension Connect/Tension Arm Ass'y T Reel side: T Reel/T Brake Band//T Brake Spring/T Brake Arm

2. CONFIRMATION AND ADJUSTMENT OF TAPE RUNNING MECHANISM

Tape Running Mechanism is adjusted precisely at the factory. Adjustment is not necessary as usual. When you replace the parts of the tape running mechanism because of long term usage or failure, the confirmation and adjustment are necessary.

2-1: GUIDE ROLLER

1. Playback the VHS Alignment Tape **(MHP)**.
2. Connect CH-1 of the oscilloscope to **TP4001 (Envelope)** and CH-2 to **TP1002 (SW Pulse)**.
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Trigger with SW Pulse and observe the envelope. **(Refer to Fig. 2-1-A)**
5. When observing the envelope, adjust the Roller Driver **(PTU94002-2)** slightly until the envelope will be flat. Even if you press the Tracking Button, adjust so that flatness is not moved so much.**(Refer to Fig. 2-1-B)**
6. Adjust so that the A : B ratio is better than 3 : 2 as shown in **Fig. 2-1-C**, even if you press the Tracking Button to move the envelope (The envelope waveform will begin to decrease when you press the Tracking Button).
7. Adjust the SWITCHING POINT during playback. **(Refer to the ELECTRICAL ADJUSTMENTS)**

NOTE

After adjustment, confirm and adjust A/C head. **(Refer to item 2-2)**

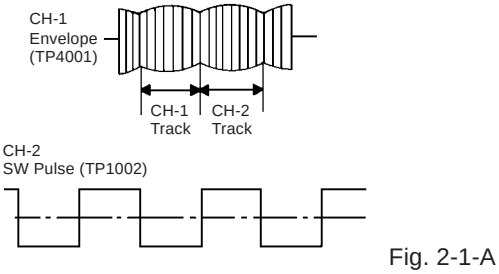


Fig. 2-1-A

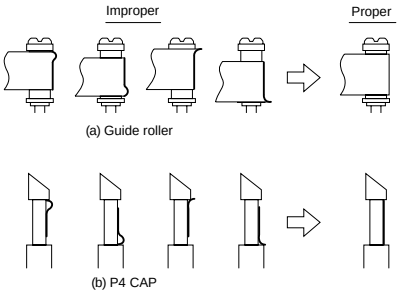


Fig. 2-1-B

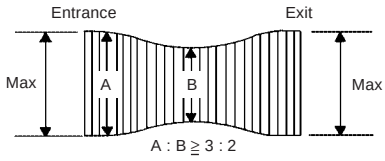


Fig. 2-1-C

MECHANICAL ADJUSTMENTS

2-2: CONFIRMATION AND ADJUSTMENT OF AUDIO/ CONTROL HEAD

When the Tape Running Mechanism does not work well, adjust the following items.

1. Playback the VHS Alignment Tape **(MHP)**.
2. Confirm that the reflected picture of stamp mark is appeared on the tape prior to P4 Post as shown in **Fig. 2-2-A**.
   a) When the reflected picture is distorted, turn the screw ① clockwise until the distortion is disappeared.
   b) When the reflected picture is not distorted, turn the screw ① counterclockwise until little distortion is appeared, then adjust the a).
3. Turn the screw ② to set the audio level to maximum.
4. Confirm that the bottom of the Audio/ Control Head and the bottom of the tape is shown in **Fig. 2-2-C**.
   c) When the height is not correct, turn the screw ③ to adjust the height. Then, adjust the 1~3 again.

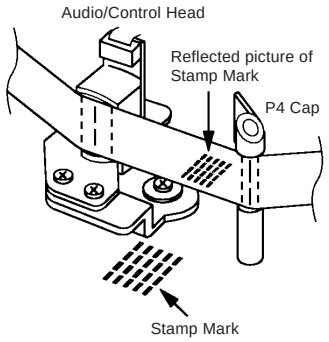


Fig. 2-2-A

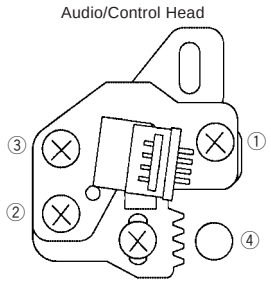


Fig. 2-2-B

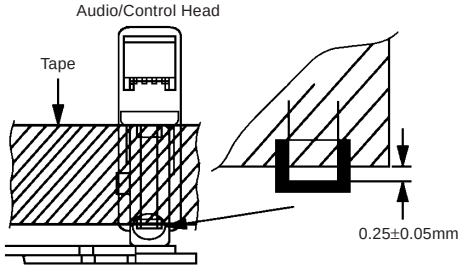


Fig. 2-2-C

2-3: TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT)

1. Confirm and adjust the position of the Tension Post. **(Refer to item 1-1)**
2. Adjust the Guide Roller. **(Refer to item 2-1)**
3. Confirm and adjust the Audio/Control Head. **(Refer to item 2-2)**
7. Connect CH-1 of the oscilloscope to **TP1002**, CH-2 to **TP4001** and CH-3 to **HOT side of Audio Out Jack**.
5. Playback the VHS Alignment Tape **(MHP)**.
6. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
7. Set the X Value adjustment driver **(X-JG153)** to the ④ of **Fig. 2-2-B**. At first, turn the Audio/Control Head position fully toward the capstan side. Then adjust X Value to turn it back gradually toward the cylinder side and stop on the second peak point position of the envelope.

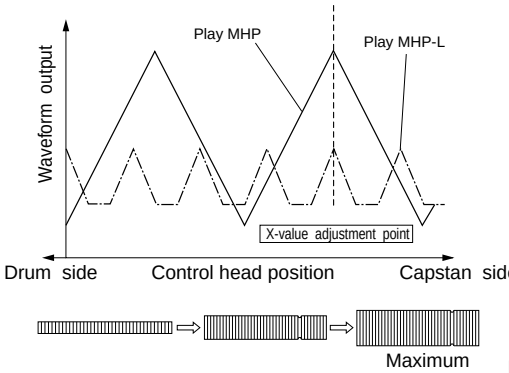


Fig. 2-3

8. Perform tracking operation and confirm the envelope is maximum on the tracking center position.
9. Playback the VHS Alignment Tape**(MHP-L)**.
10. Perform tracking operation and confirm the envelope is maximum on the tracking center position. If envelope is not maximum, should be fine-tune the X-VALUE.

ELECTRICAL ADJUSTMENTS

Read and perform this adjustment when repairing the circuits or replacing electrical parts or PCB assemblies.

1. BASIC ADJUSTMENT

1-1: SWITCHING POINT

CONDITIONS

MODE-PLAYBACK
Input Signal-Alignment Tape **(MHP)**

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP1002** and CH-2 to **TP4201**.
2. Playback the alignment tape. **(MHP)**
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Adjust the **VR1001** until the waveform of the oscilloscope measures 6.5 ± 0.5(H) at both leading and trailing edges. **(Refer to Fig. 1-1-A, B)**

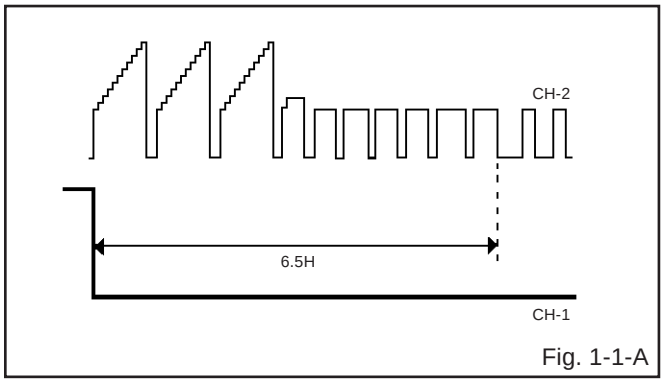


Fig. 1-1-A

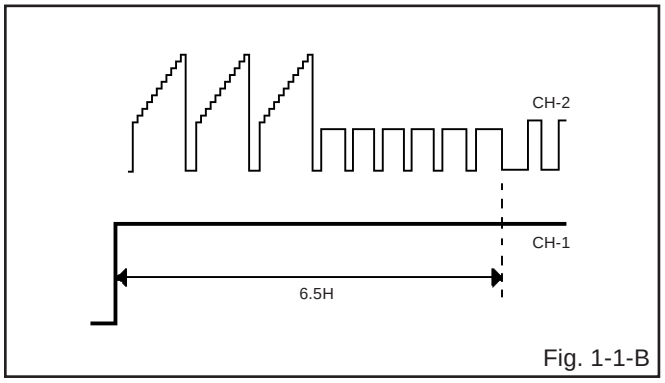
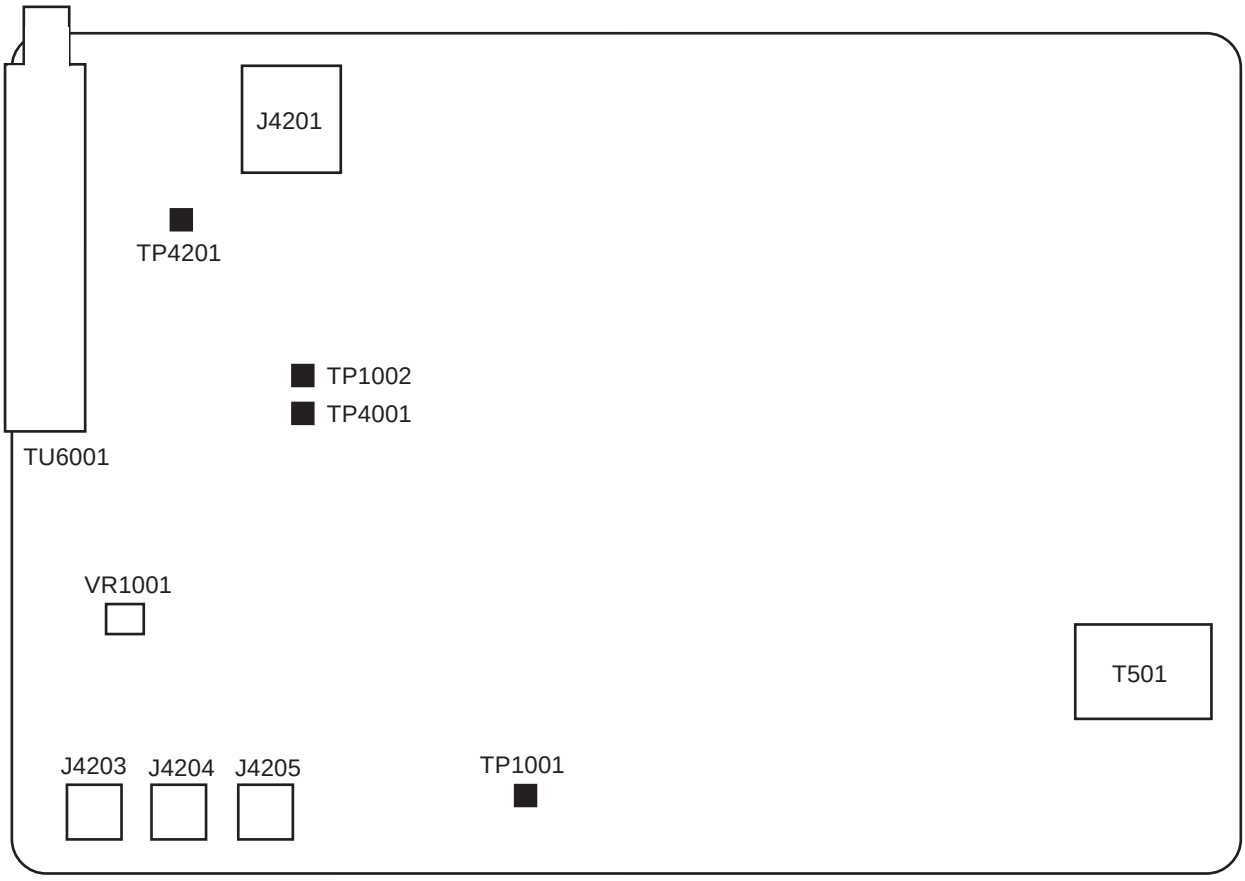


Fig. 1-1-B

ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE



SYSCON PCB

IC DESCRIPTIONS

SYSCON PCB OEC0115A (IC1001)

No.	PORT	PIN NAME	I/O	DESCRIPRION
1	P10	SEG8	OUT	LEM(LED Module) control terminal.
2	AVSS	AVSS	-	Ground.
3	P07/AN7	BOT-H	IN	Tape start sensor input signal.
4	P06/AN6	HI-FI_ENV	IN	Input terminal of HiFi RF envelope.
5	P05/AN5	PGMM	IN	Input voltage from Variable Resistor of PG SHIFTER.
6	P04/AN4	MS_SEN-B	IN	Input terminal of mecha state sensor.
7	P03/AN3	MS_SEN-A	IN	
8	P02/AN2	KEY-B	IN	Main unit key input.
9	P01/AN1	KEY-A	IN	
10	P00/AN0	STEREO_SEL	IN	Input terminal for the judgement of voice reception condition.
11	AN-B	AFT-S_CURVE	IN	AFT S CURVE input for tuner.
12	AN-A	EOT-H	IN	Tape end sensor input signal.
13	AN9	SLOW OFFSET	IN	Terminal for the offset of Slow.
14	AN8	ENV_DET	IN	Input terminal of video RF envelope.
15	AVDD	AVDD	-	ON/OFF control Micon AD section.
16	/RESET	/RESET	IN	RESET will be done when the voltage goes to HIGH after the reset signal.
17	P74	GND	IN	Ground.
18	P73	IIC CLK	OUT	CLOCK terminal for IIC BUS communication.
19	P72	IIC DATA	OUT/IN	DATA terminal for IIC BUS communication.
20	P71	Y/C CS	OUT	Control terminal for Y/C selection.
21	P70	CAP_FULL	OUT	Output the HIGH during the acceleration force of capstan motor at SLOW mode.
22	VDD	VDD	-	Power of CPU.
23	AUDIO_FF	HI-FI H.SW	OUT	Output terminal of HI-FI Head SW.
24	VIDEO_FF	H.SW	OUT	Output terminal of Video Head SW.
25	CAP_PWM	CAP_PWM	OUT	PWM output of Capastan control.
26	DRUM_PWM	DRUM_PWM	OUT	PWM output of Cylinder control.
27	V-PULSE	DUMMY_V-SYNC	OUT	Virtual V Pulse output.
28	C.ROTARY	C.ROTARY	OUT	Color Rotary Control output.
29	H.AMP.SW	H.AMP.SW	OUT	Switching output of Head Amp SW.
30	COMP	COMP	IN	Comparison results input of Playback Envelope level on SP/LP heads (4 heads).
31	CTL-H(+)	CTL-H(+)	-	Input and output terminal of Control Head.
32	CTL-H(-)	CTL-H(-)	-	Input terminal of Control Head.
33	SV VSS	SV VSS	-	Ground.
34	CTL_GAIN_SW	CTL_GAIN_SW	-	Output terminal for gain.
35	CTL_AMP(-)	CTL_AMP(-)	-	Output terminal for amp control.
36	CTL_BIAS	CTL_BIAS	-	Output terminal for bias.

IC DESCRIPTIONS

SYSCON PCB OEC0115A (IC1001)

No.	PORT	PIN NAME	I/O	DESCRIPRION
37	CTL_AMP	CTL_AMP	OUT	Output terminal for amp out.
38	DFG	DFG	IN	Input terminal for DRUM FG signal detection.
39	DPG	DPG	IN	Input terminal for DRUM PG signal derection.
40	CFG	CFG	IN	Input terminal for CAPSTAN FG signal detection.
41	SV VDD	VCC(SV)	-	+ 5V
42	OSD VDD	VCC(OSD)	-	+ 5V
43	CV_IN	CV_IN	IN	Composite Video input terminal.
44	V_REF	V_REF	OUT	Capacity connection for Sync Chip Clamp composite Video input.
45	CV_OUT	CV_OUT	OUT	Composite Video output.
46	CHR_BIAS	CHR_BIAS	IN	Brightness(Brilliant)level setting of OSD character Indications.
47	AFC_LPF	AFC_LPF	IN	Condenser connection for AFC LPF.
48	AFC_OSC	AFC_OSC	IN	Condenser connection for AFC OSC.
49	OSD_VSS	OSD_VSS	-	Ground.
50	DOSC_IN	DOSC_IN	IN	Dot Clock pulse(Oscillator)of OSD character indications.
51	DOSC_OUT	DOSC_OUT	OUT	Dot Clock pulse(Oscillator)of OSD character indications.
52	4FSC_OUT	4FSC_OUT	OUT	4 FSC pulse.
53	4FSC_IN	4FSC_IN	IN	4 FSC pulse.
54	SYNC	SYNC	IN	Input terminal for composite SYNC.
55	P67/Vsync	POWER_OFF_L	OUT	4FSC_MUTE control output of power off.
56	P66/YC01	V_REC_ST-H	OUT	On control of A/V recording(Whole width erase) circuit.
57	P65/YE01	2/4 HEAD	IN	The initial settings of 2 head or 4 head.
58	P64/YC02	TUNER-L	OUT	Output low at tuner and output high at external input/play.
59	P63/YE02	A.MUTE-H	OUT	Mute signal of audio mute.
60	P57	CAP_FWD-H	OUT	Capstan forward and backward command.
61	P56	CENTER LED	OUT	The CENTER LED light-up/put-off control output.
62	P55	RF CH OUT	OUT	Switching of a RF channel.
63	P54	LDM CTL	OUT	Loading motor control terminal.
64	P53/TM0	POWER ON-H	OUT	For control the user power switch ON/OFF.
65	P52/PWM2	CYL_SPEED_UP	OUT	Output terminal for correct cylinder during SLOW.
66	P51/PWM1	CAP_LIMIT	OUT	Switch the maximum output current of the Capstan Motor.
67	P50/BUZZ	SERVICE	IN	Input terminal for Service Mode.
68	TEST	TEST	IN	Ground.
69	X2	X2	OUT	Subclock pulse(32.768KHz)
70	X1	X1	IN	
71	DVSS	VSS	-	Ground.
72	OSC1	OSC1	IN	Connect the main crystal(10MHz)
73	OSC2	OSC2	OUT	
74	P47	GND	-	GND
75	P46	GRID5	OUT	LEM(LED Module) control terminal.

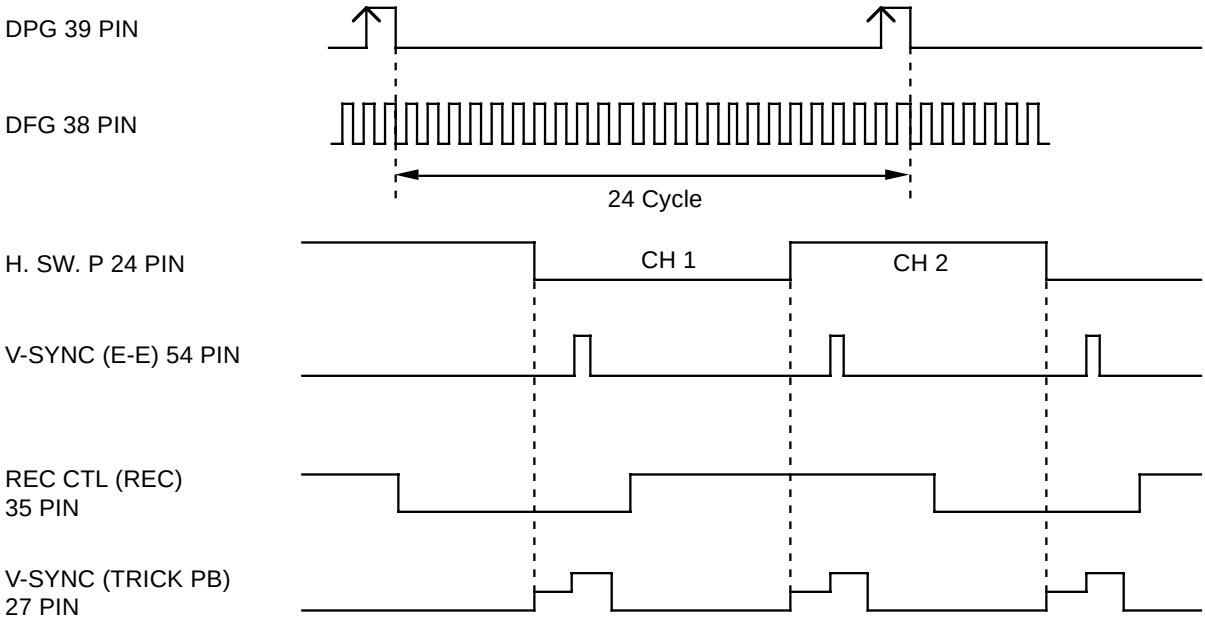
IC DESCRIPTIONS

SYSCON PCB OEC0115A (IC1001)

No.	PORT	PIN NAME	I/O	DESCRIPRION
76	P45	GRID4	OUT	LEM(LED Module) control terminal.
77	P44	GRID3	OUT	LEM(LED Module) control terminal.
78	P43	GRID2	OUT	LEM(LED Module) control terminal.
79	P42	GRID1	OUT	LEM(LED Module) control terminal.
80	P41	TAB SW	IN	Input terminal for judge the tape if it has TAB or not.
81	P40	POWER_ON_L	OUT	For control the user power switch ON/OFF.
82	P37/IC	REM_IN	IN	Receive the remote control signal.
83	P36/NM1	CFG IN2	IN	Input terminal for CAPSTAN FG signal detection.
84	P35/IRQ5	VCR-H	OUT	ON/OFF control of RF Modulator.
85	P34/IRQ4	SEG9	OUT	LEM(LED Module) control terminal.
86	P33/IRQ3	SEG10	OUT	LEM(LED Module) control terminal.
87	P32/IRQ2	REEL-T	IN	Input terminal of reel sensor take up.
88	P31/IRQ1	NC	OUT	Not used.
89	P30/IRQ0	POWER_FAIL	IN	Input terminal of Power fail signal.
90	P23	AC/32KHz	IN	The initial setting that is whether it does with subclock pulse or it does the counting of the clock with an AC pulse
91	P22	SP-L	OUT	Tape speed SP mode at the time of LOW.
92	P21	EP-L	OUT	Tape speed EP mode at the time of LOW.
93	P20	AUDIO_OUT_MUTE	OUT	L for at AUDIO MUTE and POWER OFF. H for except above case.
94	P17/PWM14	SEG1TV/CATV	OUT/IN	LEM(LED Module) control terminal.And this terminal uses it for the initial setting of TV/CATV mode.
95	P16/SCK2	SEG2 LANG SEL	OUT/IN	LEM(LED Module) control terminal.And this terminal uses it for the initial setting of language select.
96	P15/SI1	SEG3 INDEX	OUT/IN	LEM(LED Module) control terminal.And this terminal uses it for the initial setting of INDEX on/off.
97	P14/S01	SEG4	OUT	LEM(LED Module) control terminal.
98	P13/SCK2	SEG5	OUT	LEM(LED Module) control terminal.
99	P12/SI2	SEG6	OUT	LEM(LED Module) control terminal.
100	P11/SO2	SEG7	OUT	LEM(LED Module) control terminal.

SERVO TIMING CHART

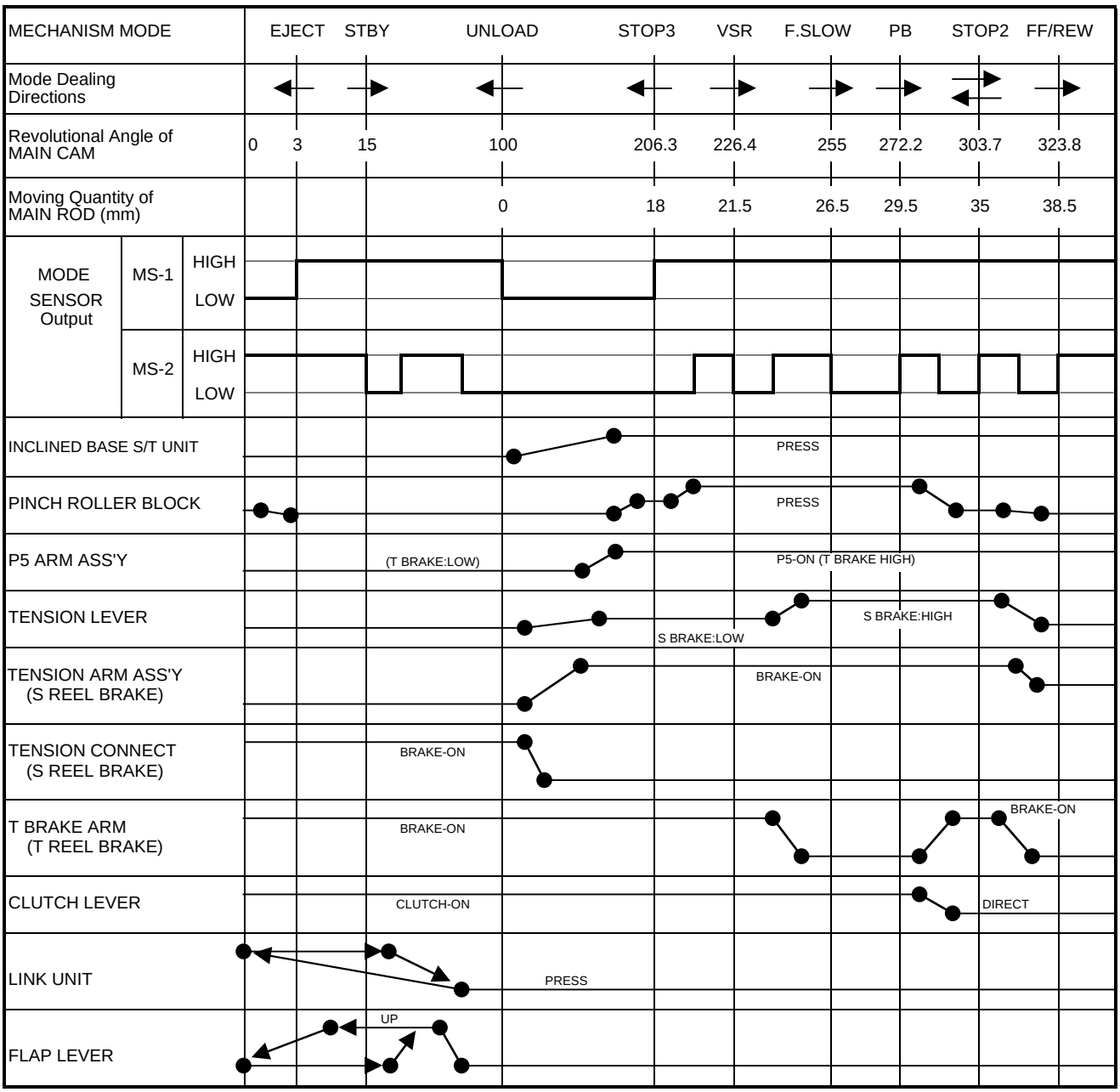
SYSCON PCB IC1001 (OEC0114A)



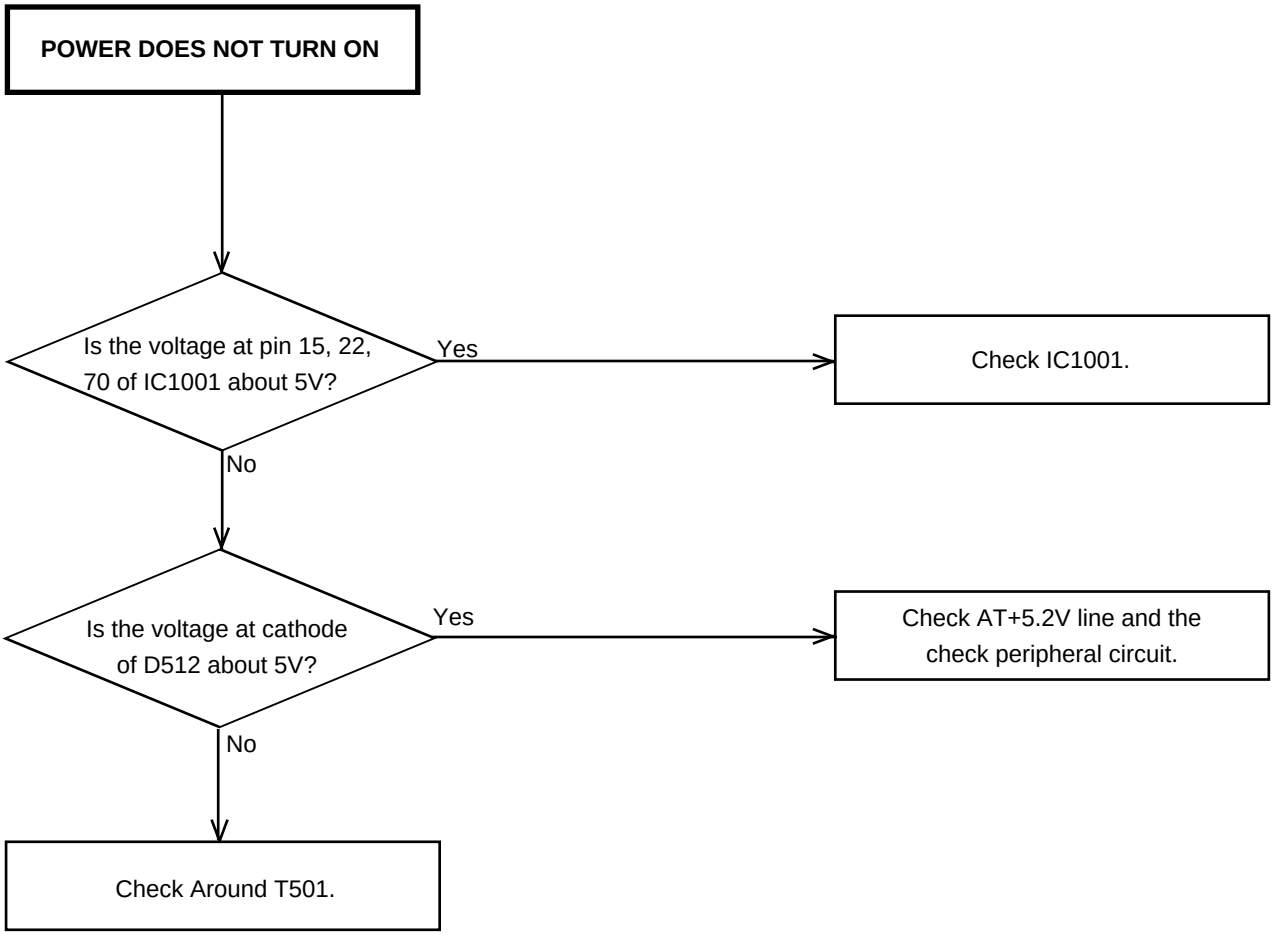
• WAVEFORM CHANGES DEPENDED ON THE TAPE SPEED

MECHANISM TIMING CHART

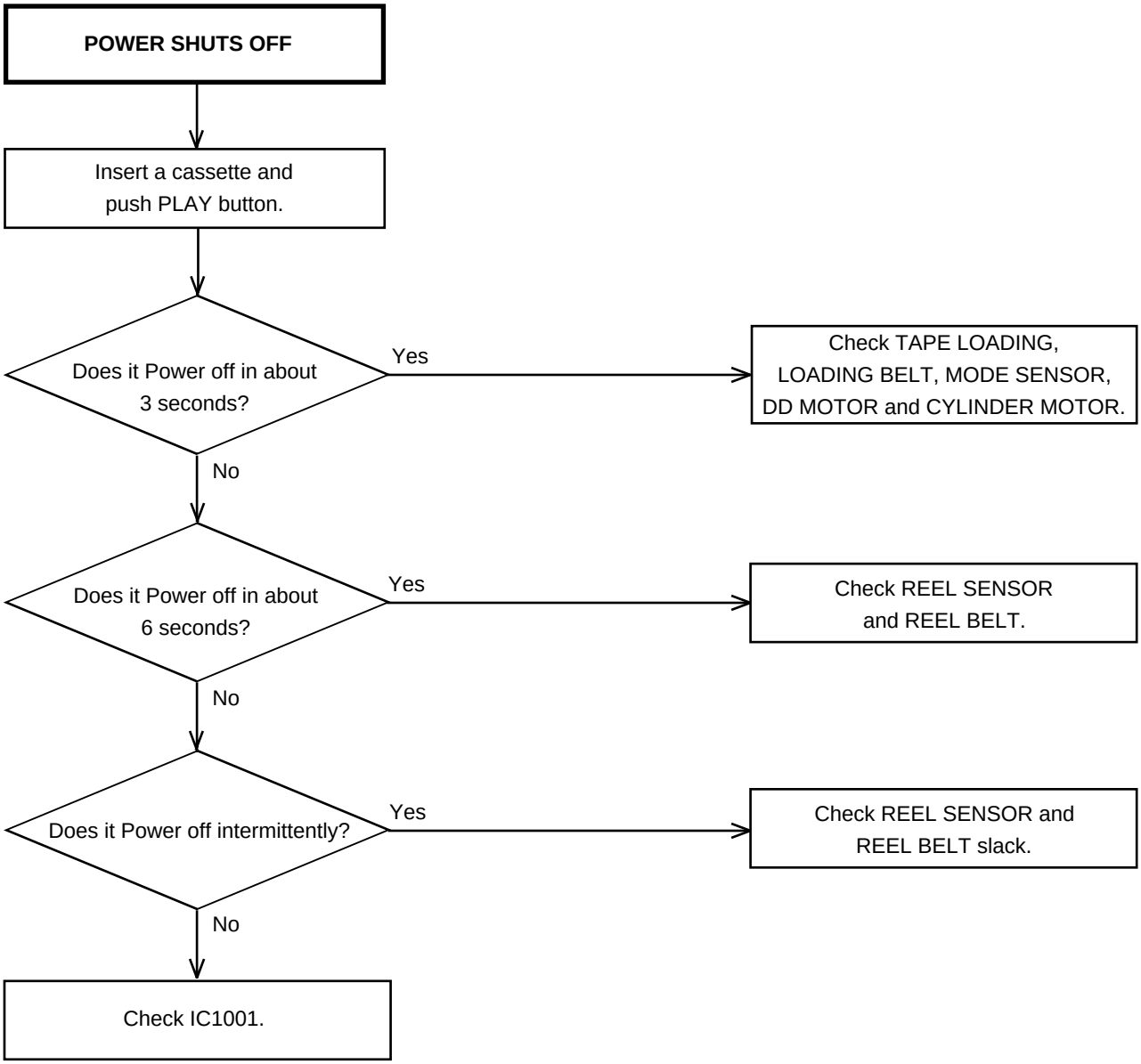
Please see the list below for the operational timing and the mode sensor output of the main parts on each mechanism modes.



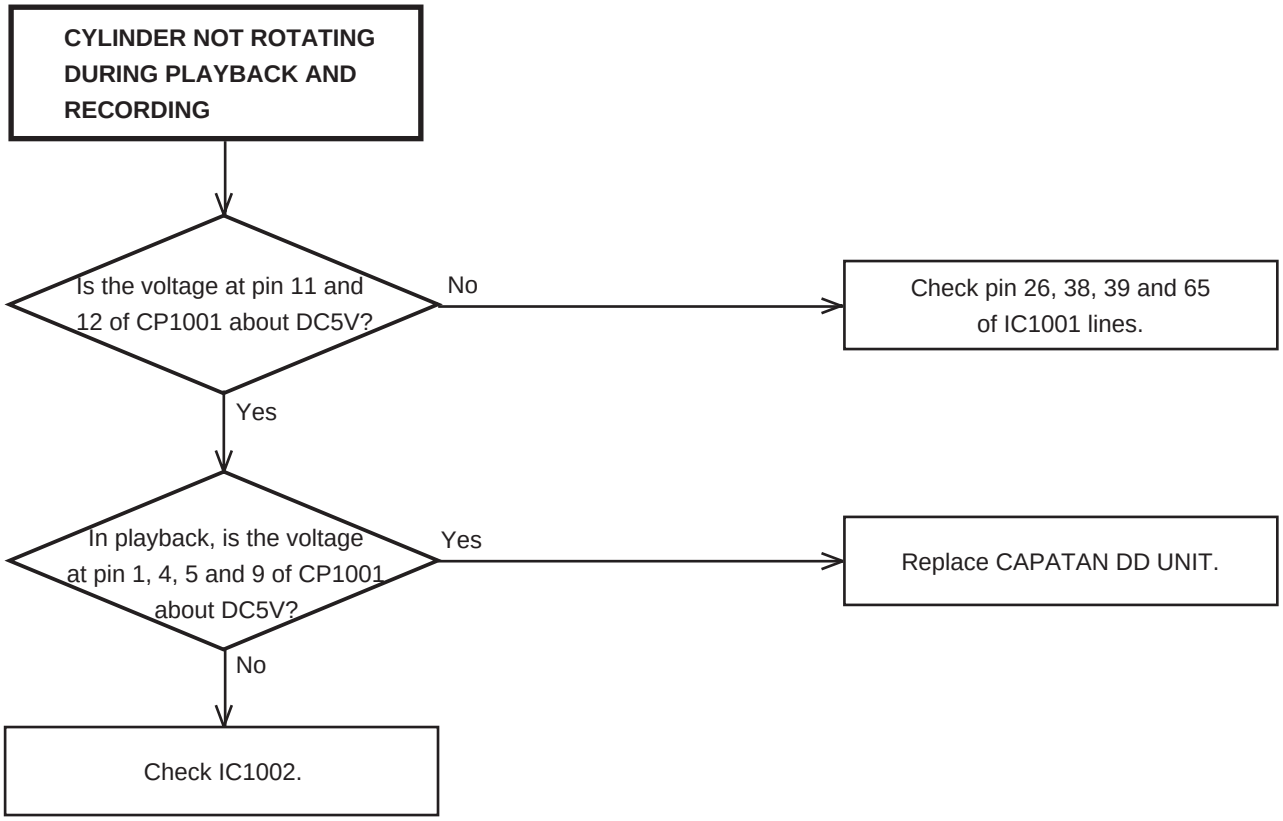
TROUBLESHOOTING GUIDE

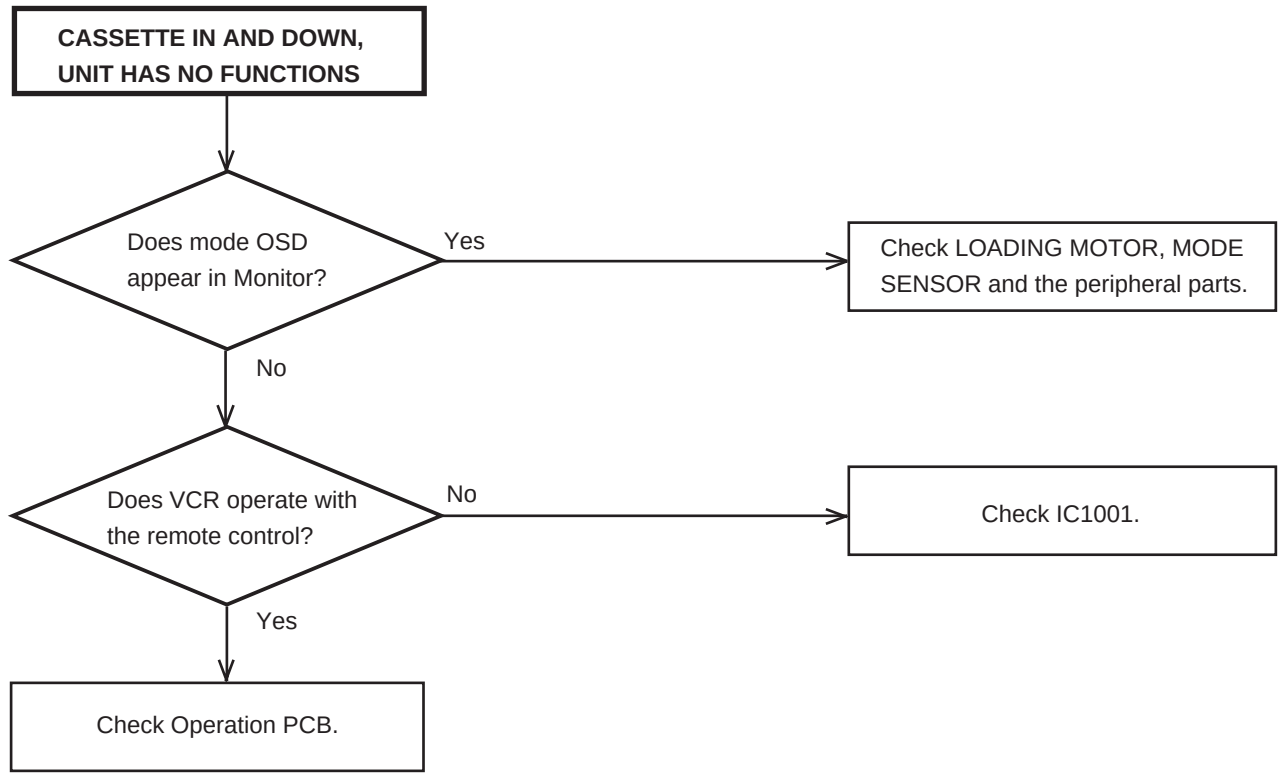


TROUBLESHOOTING GUIDE

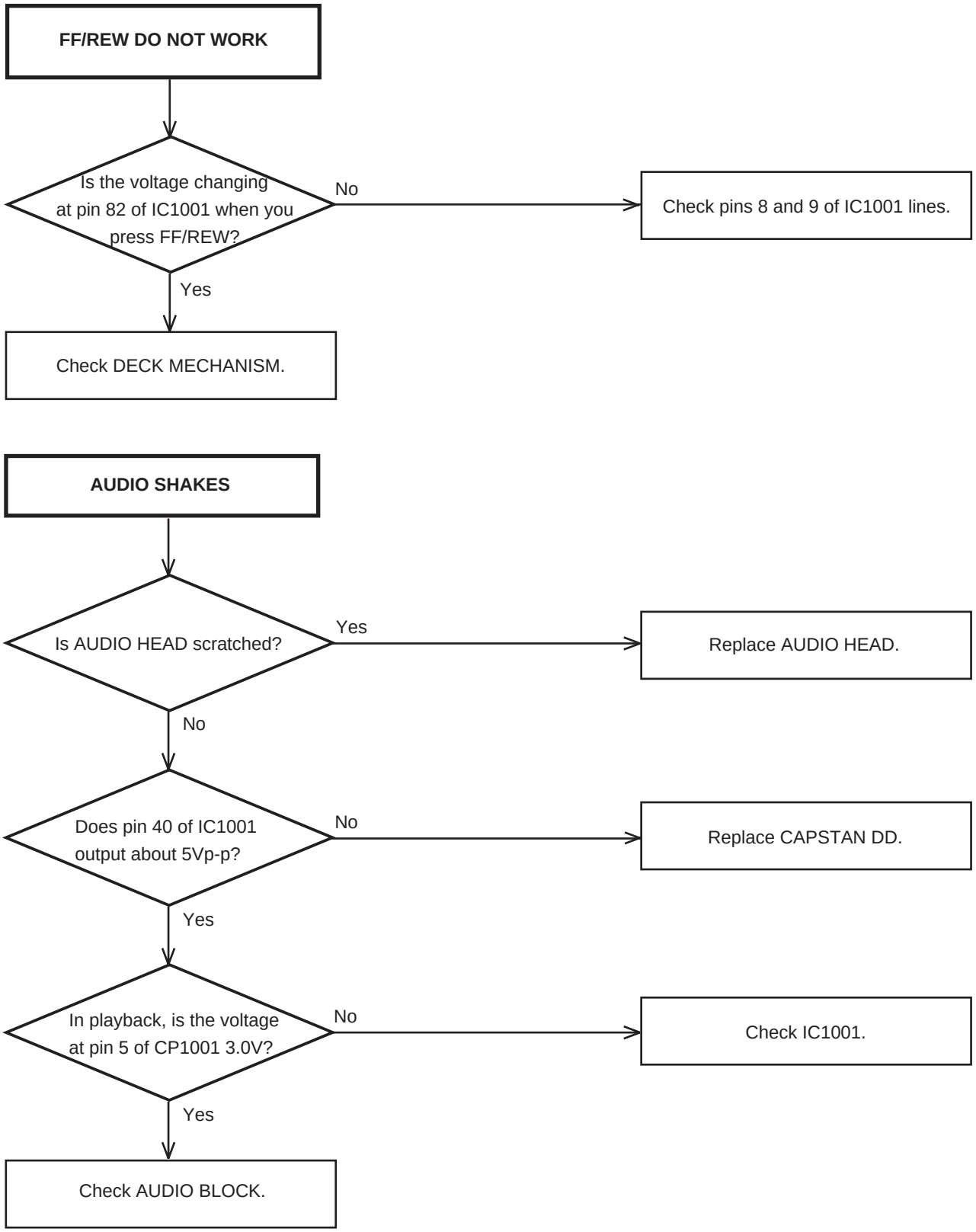


TROUBLESHOOTING GUIDE

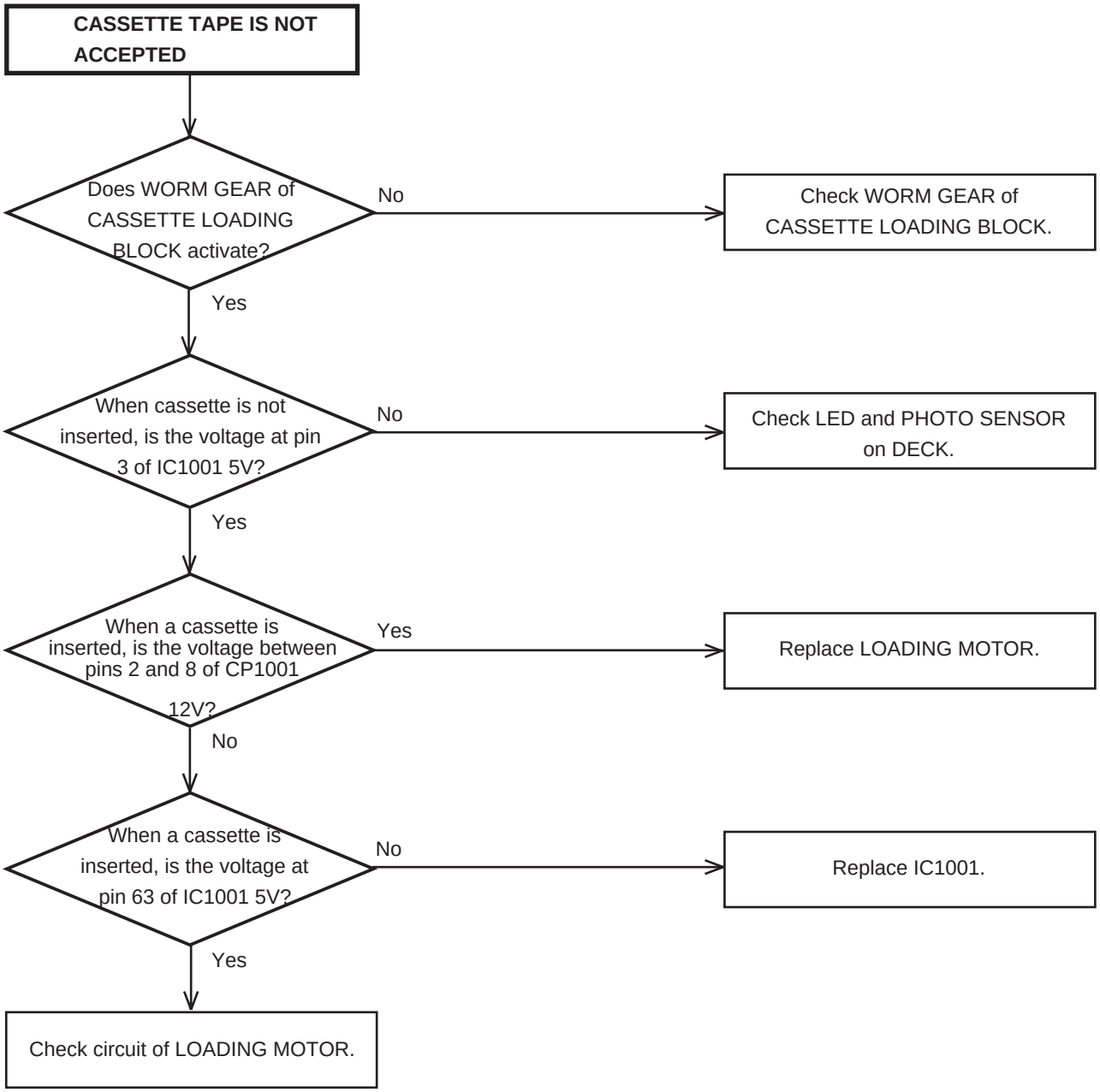




TROUBLESHOOTING GUIDE



TROUBLESHOOTING GUIDE



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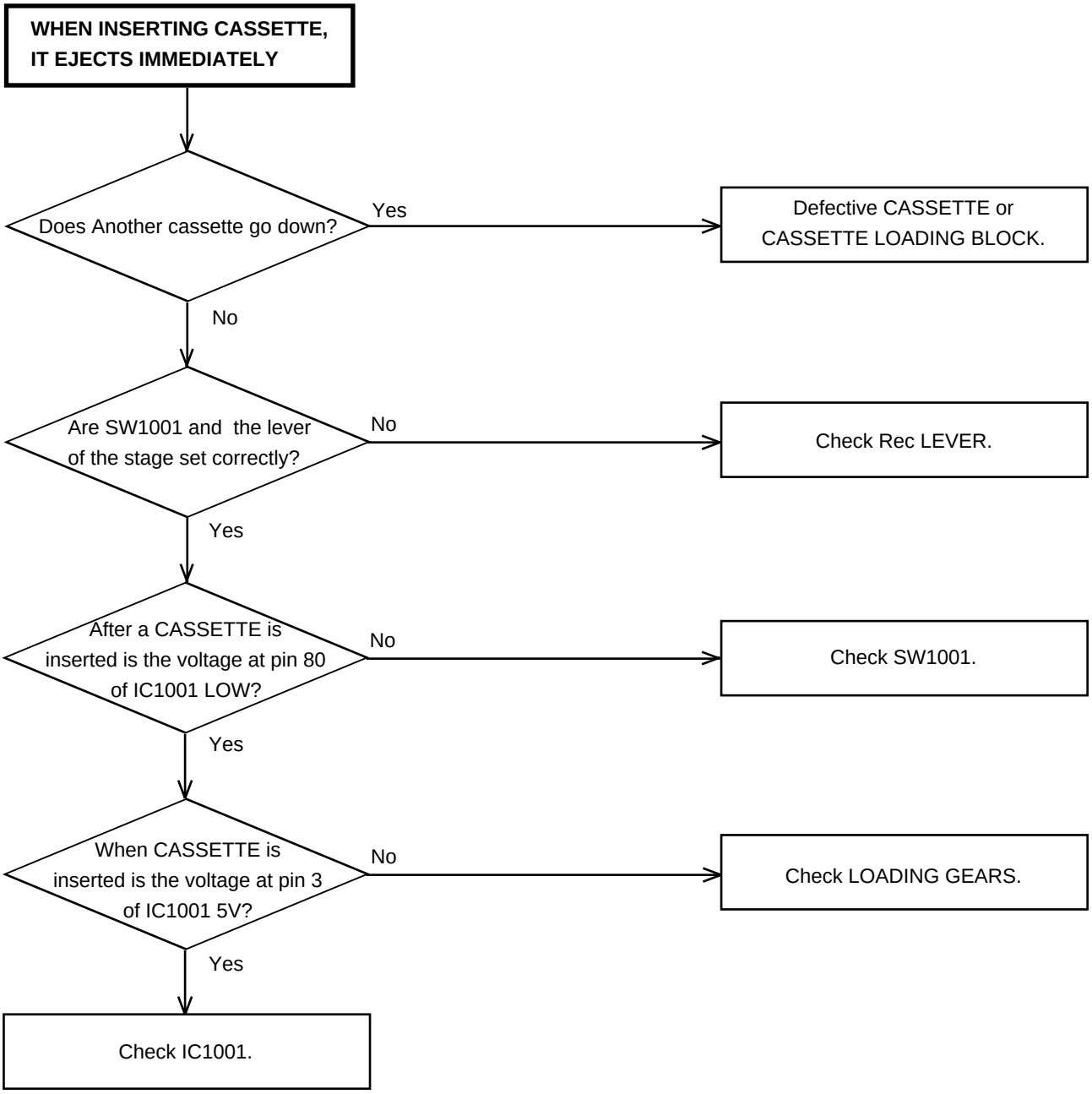

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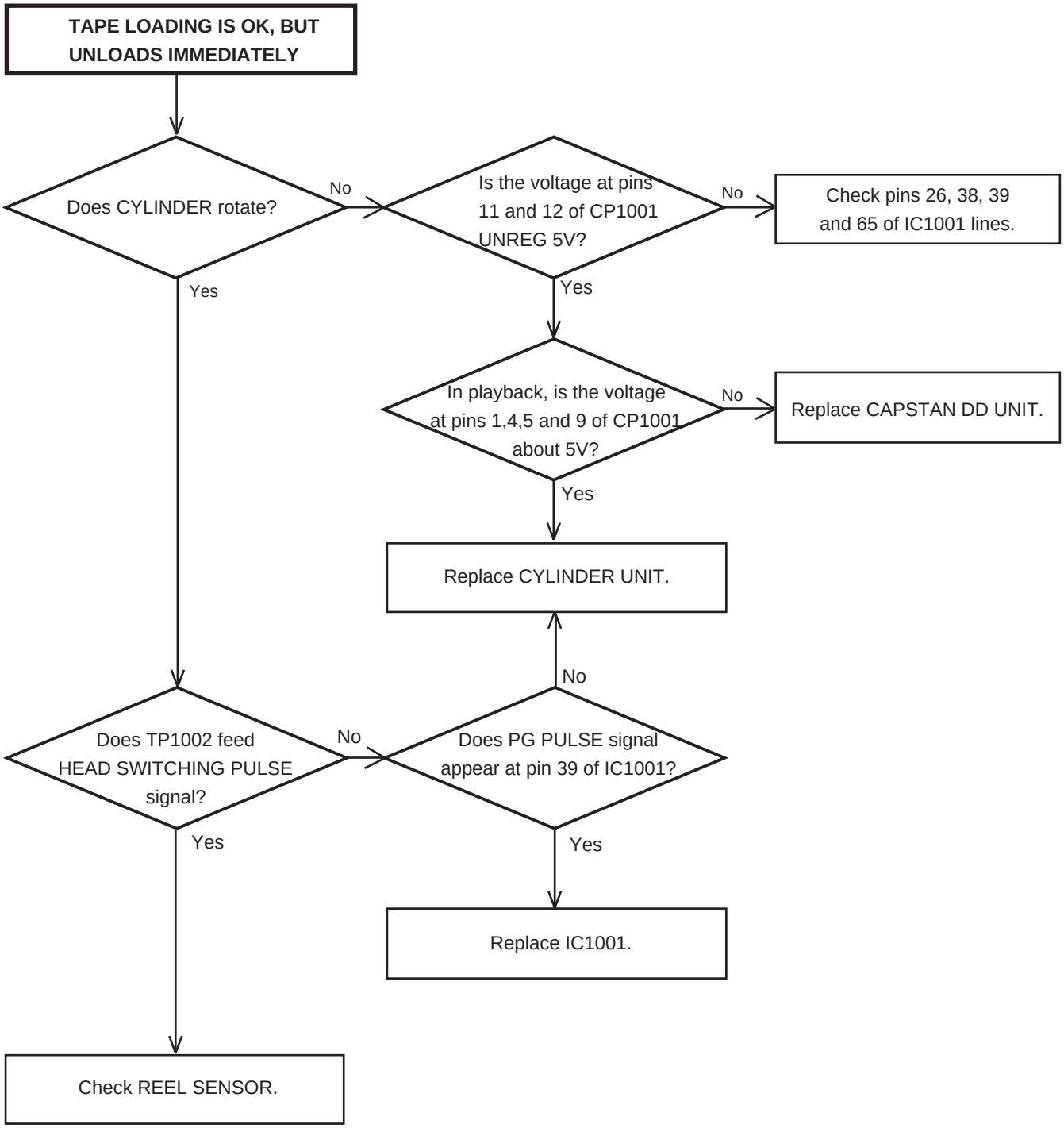

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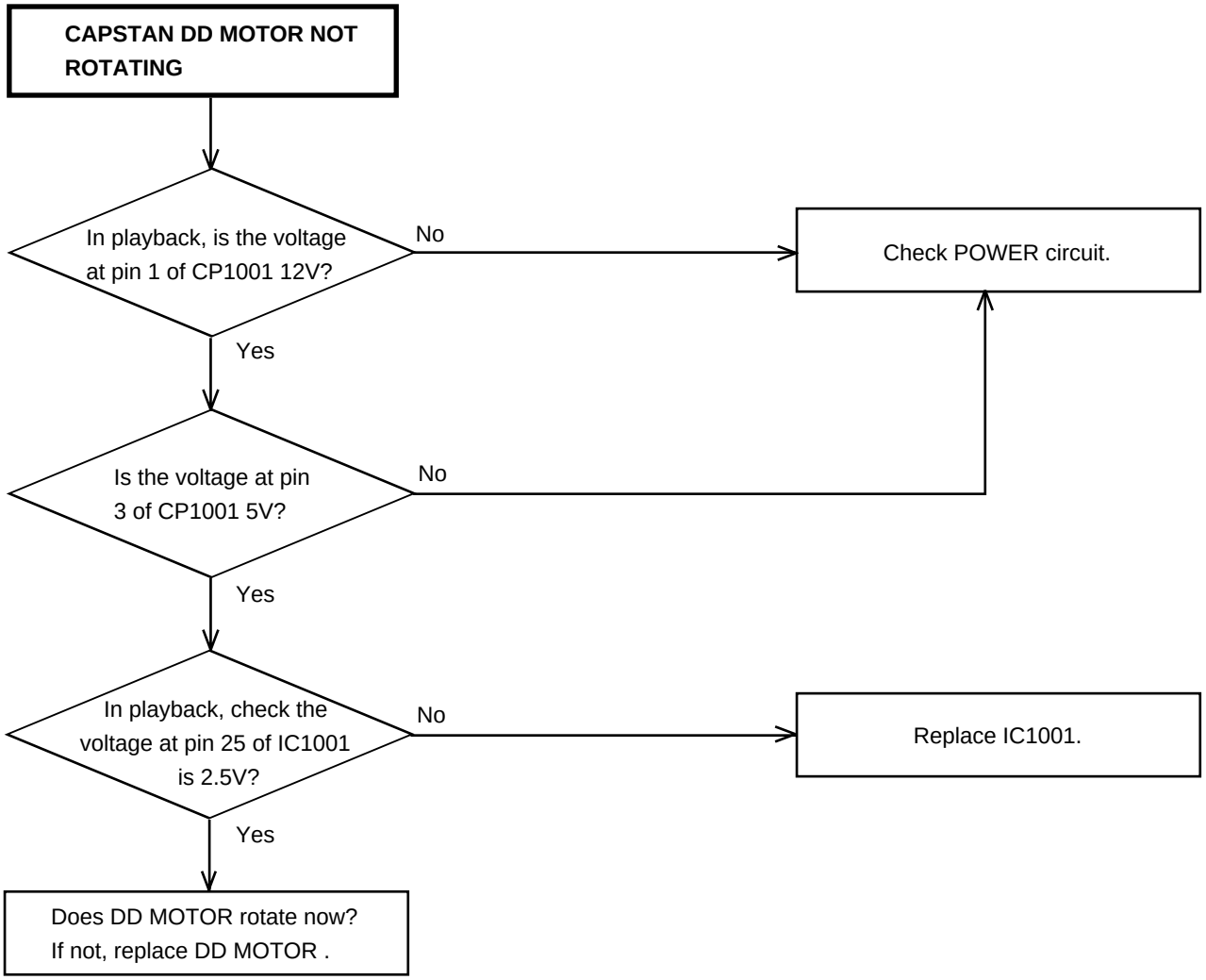
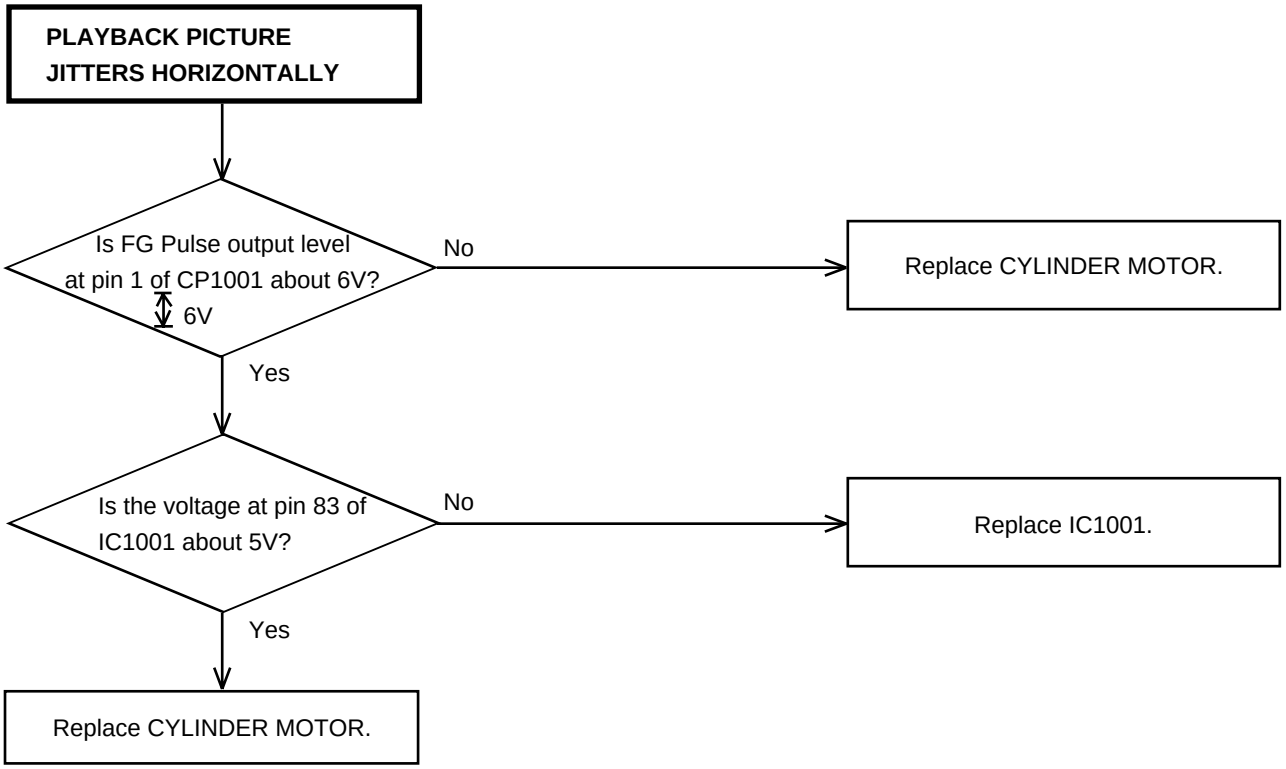
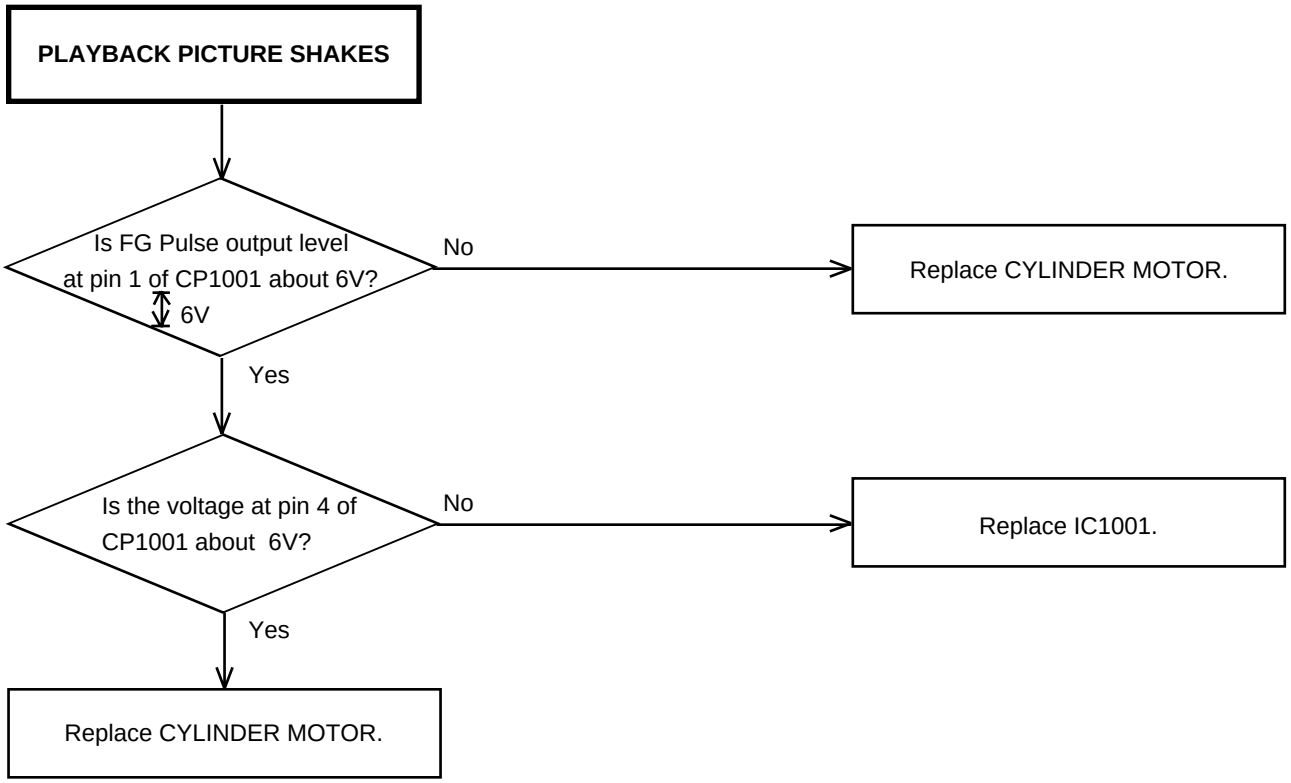


TROUBLESHOOTING GUIDE





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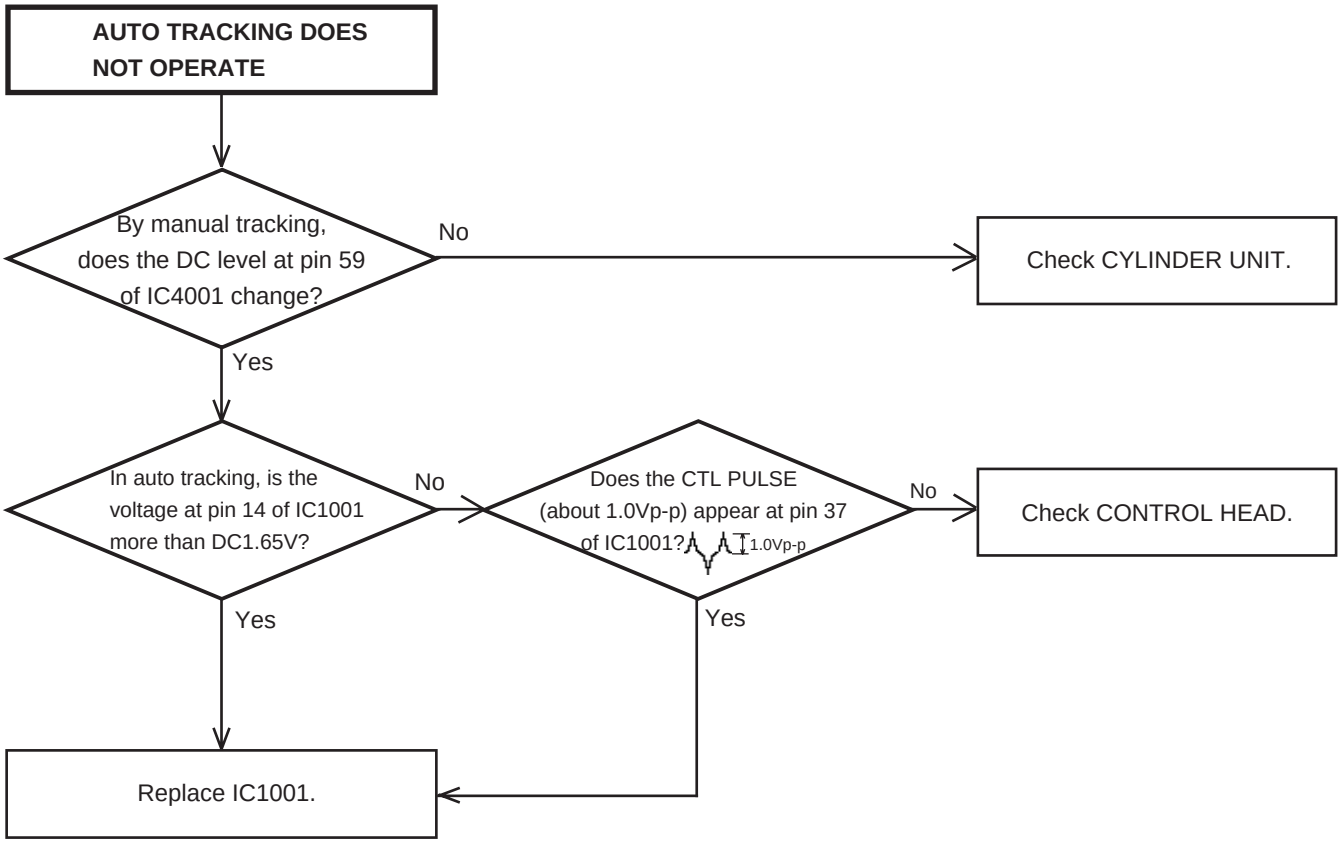
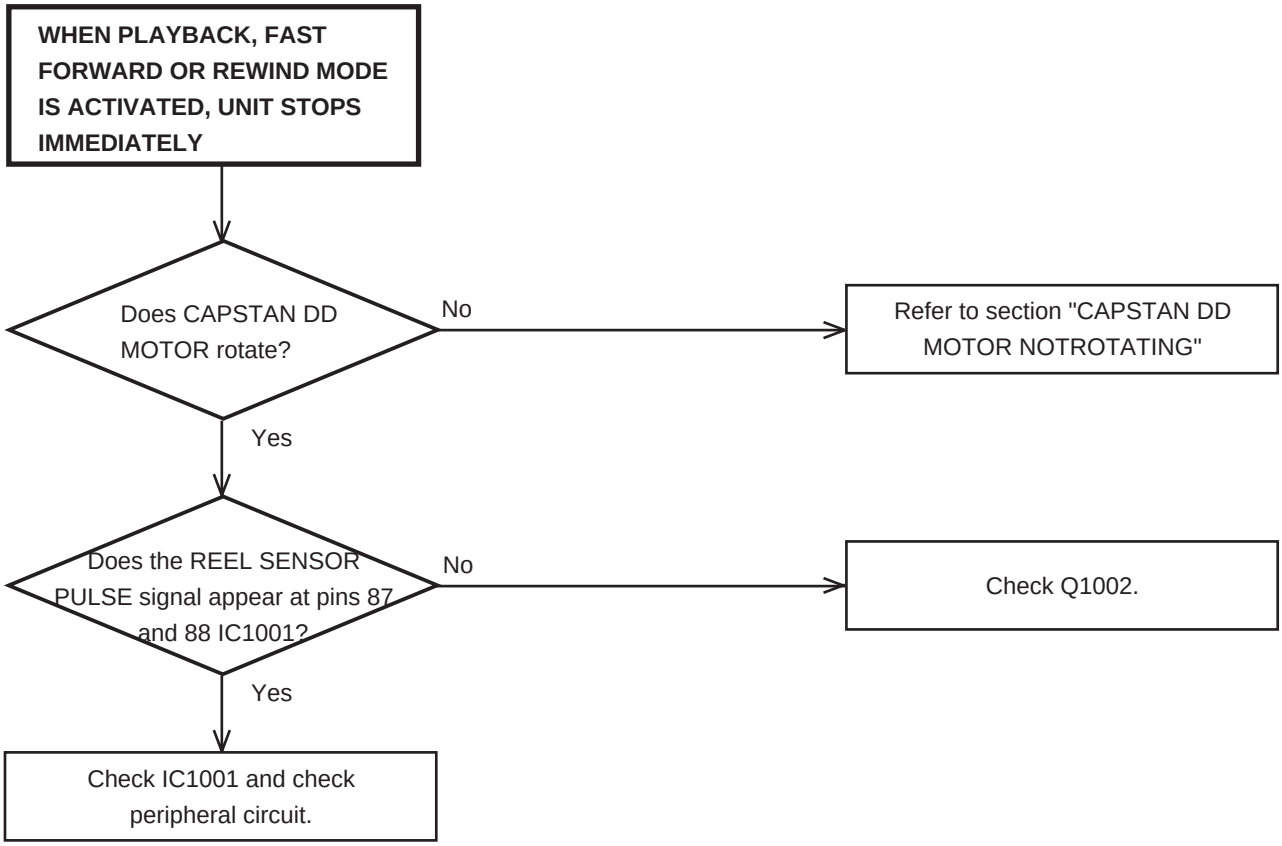
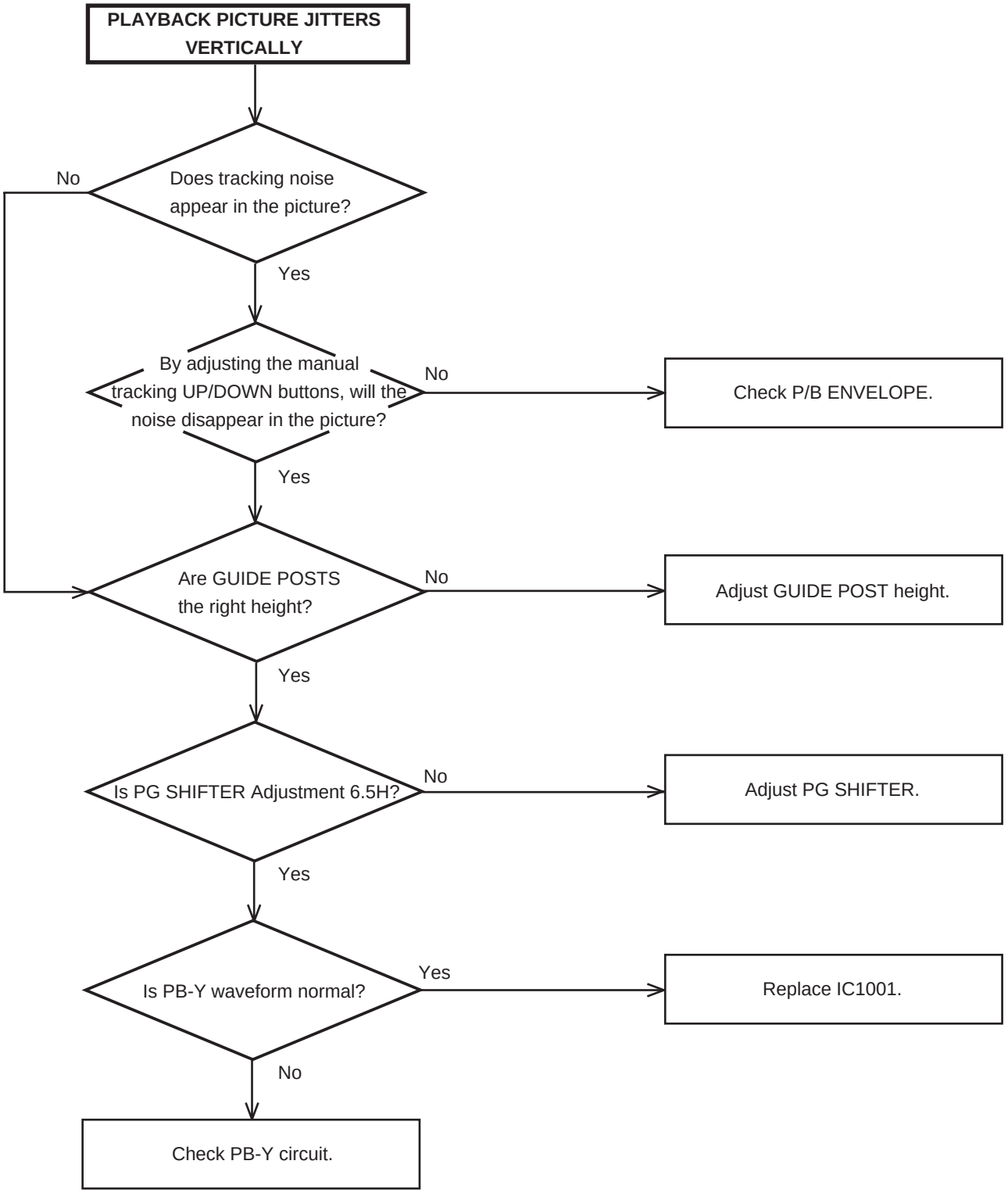
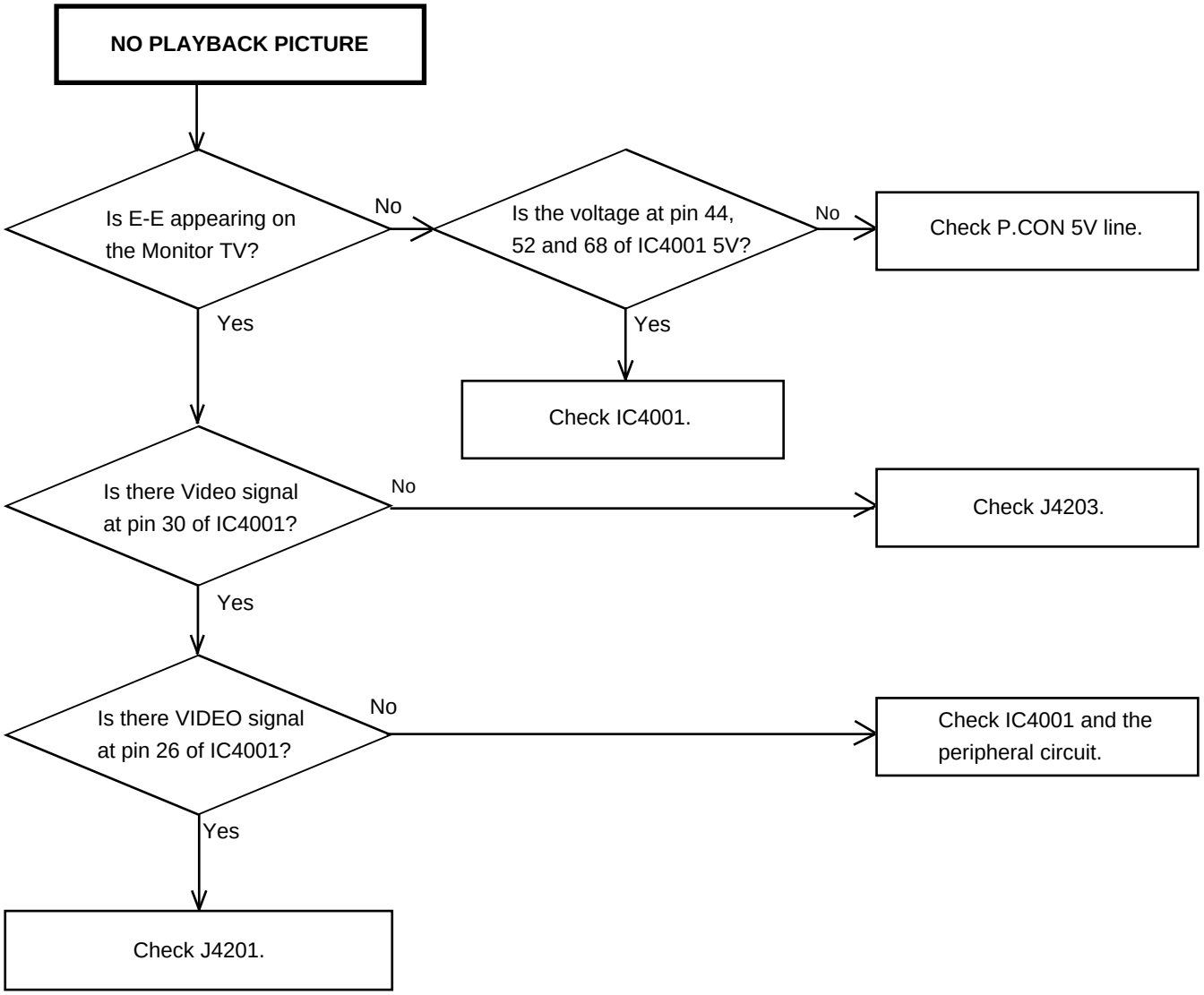




TROUBLESHOOTING GUIDE



TROUBLESHOOTING GUIDE



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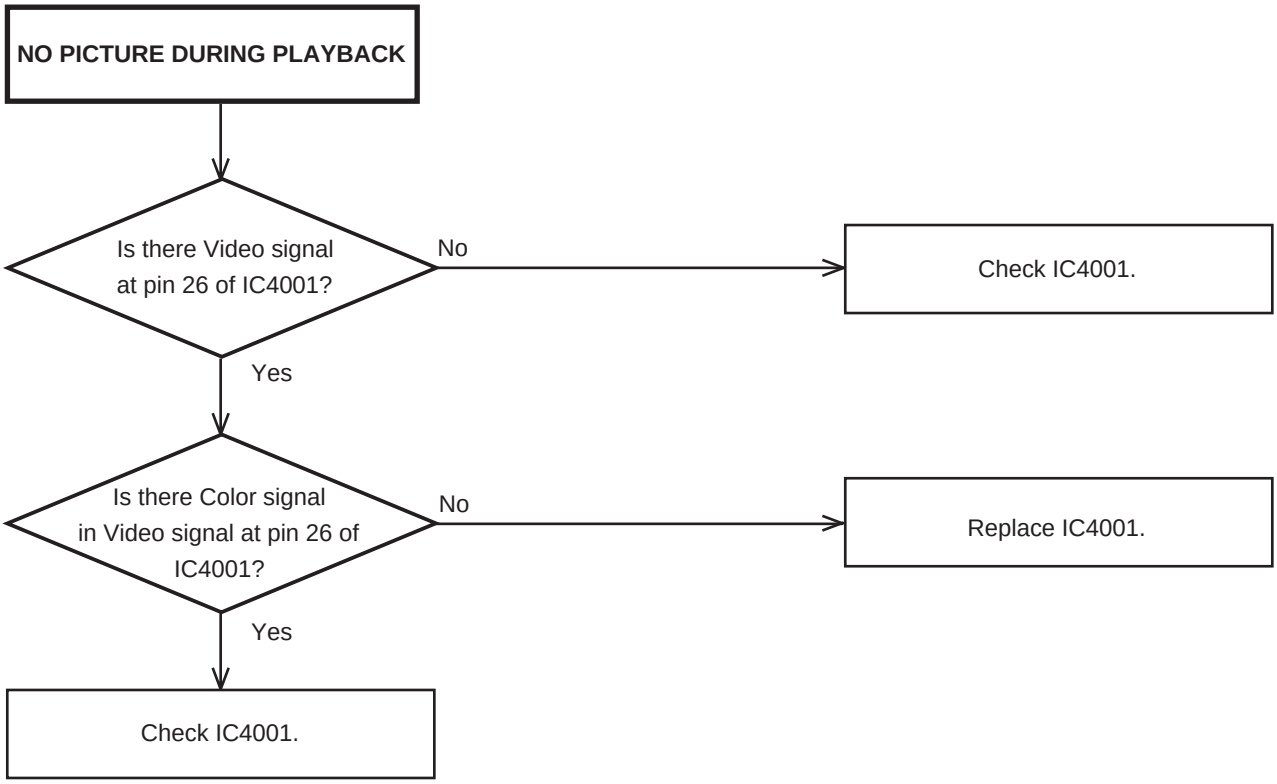
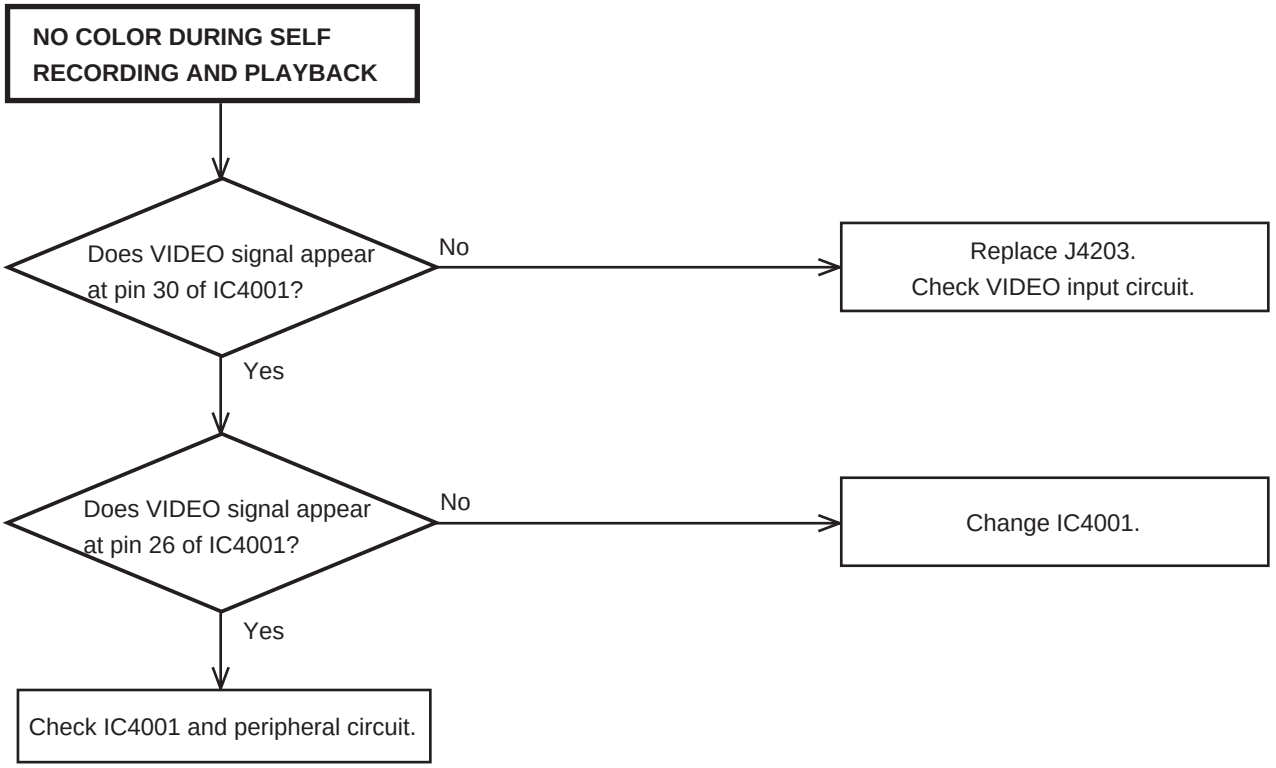
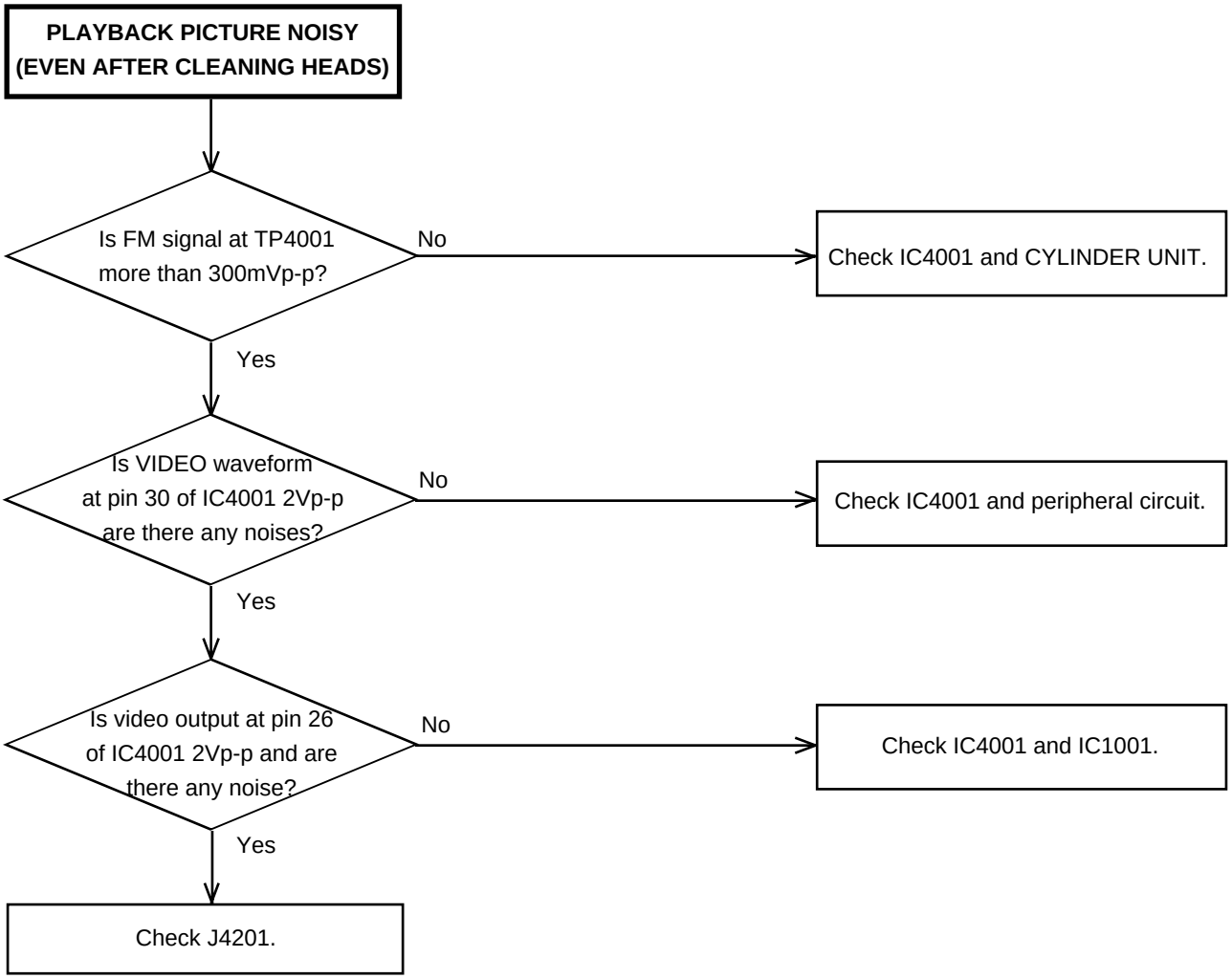




TROUBLESHOOTING GUIDE



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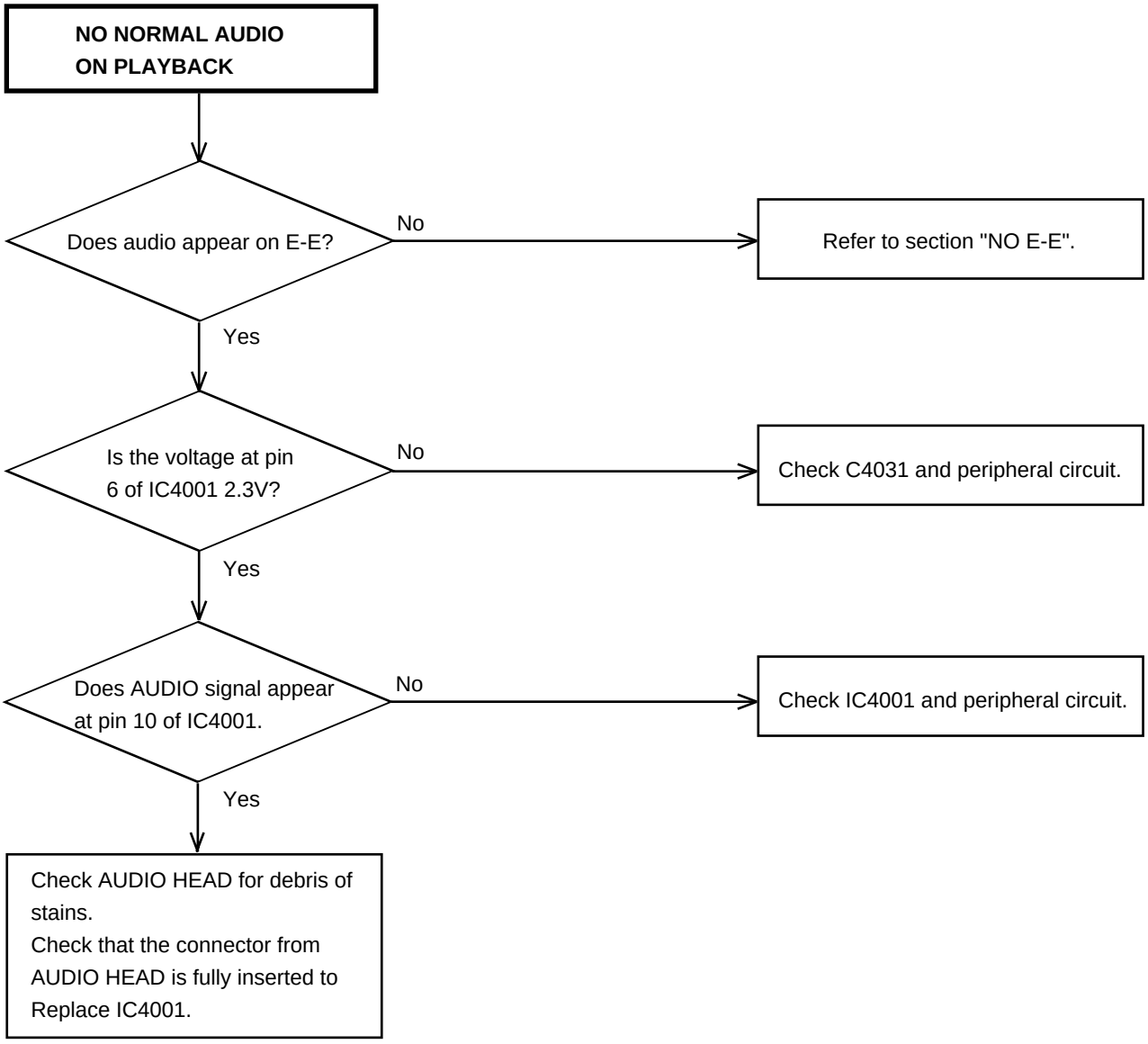

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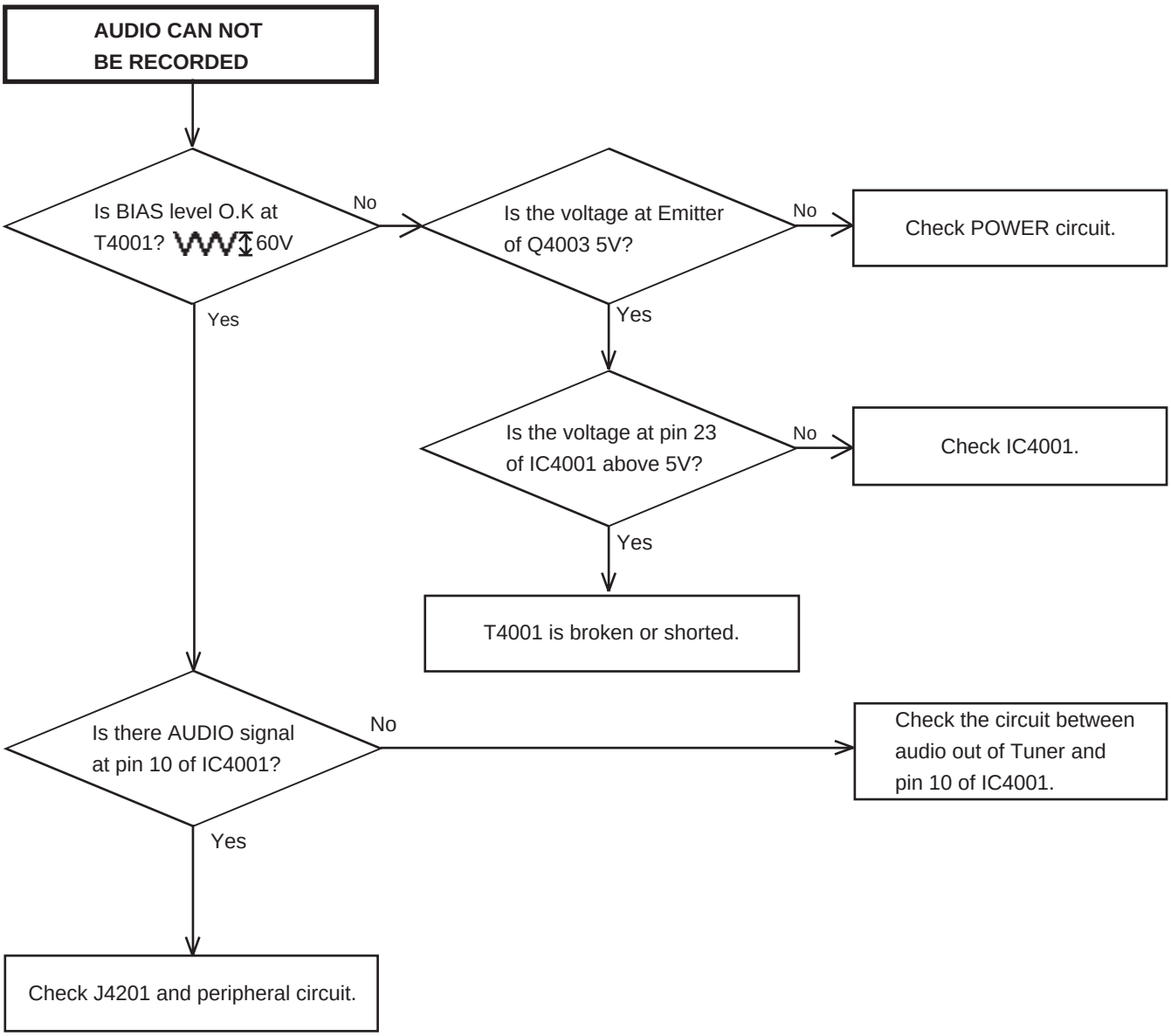

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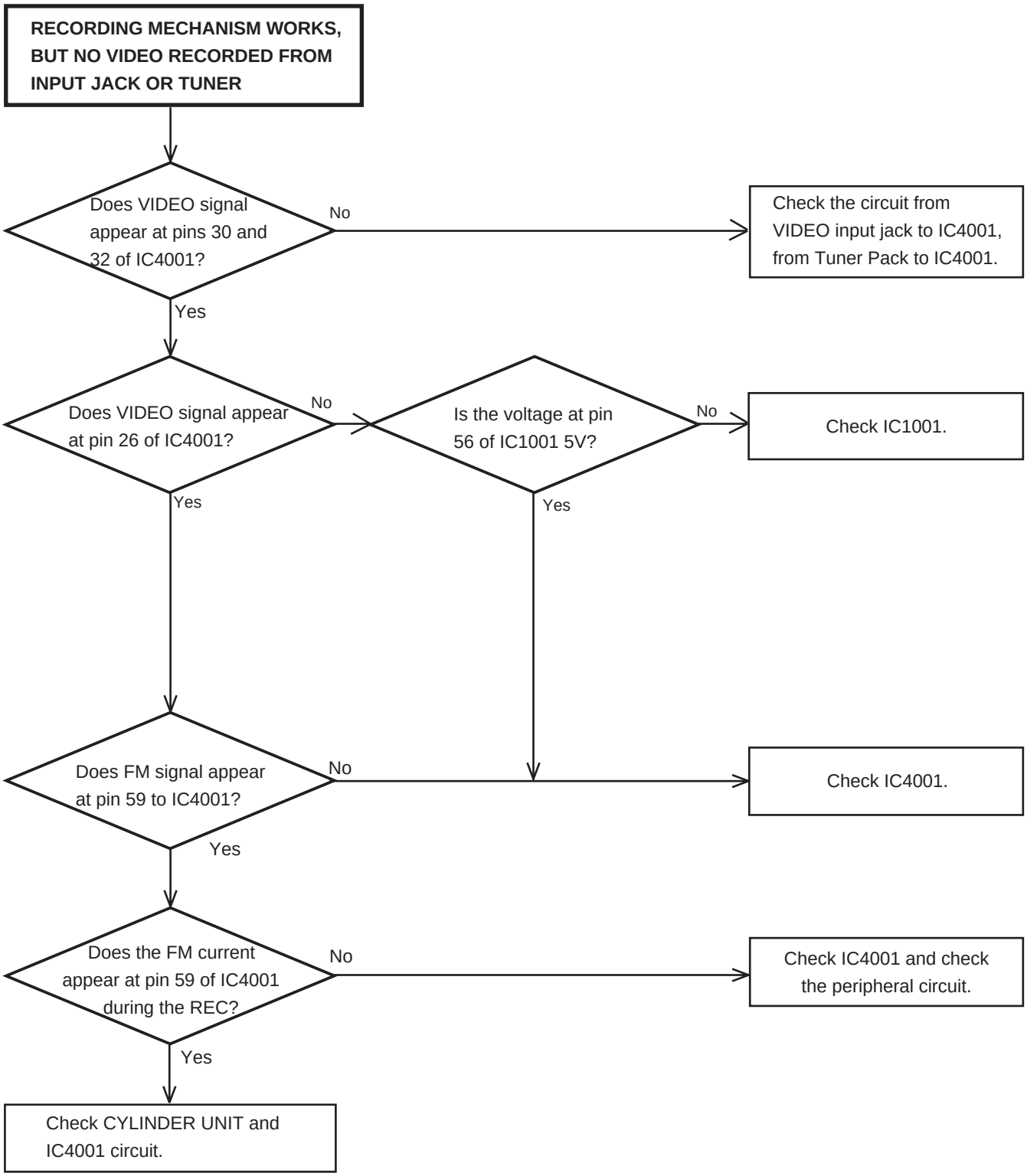

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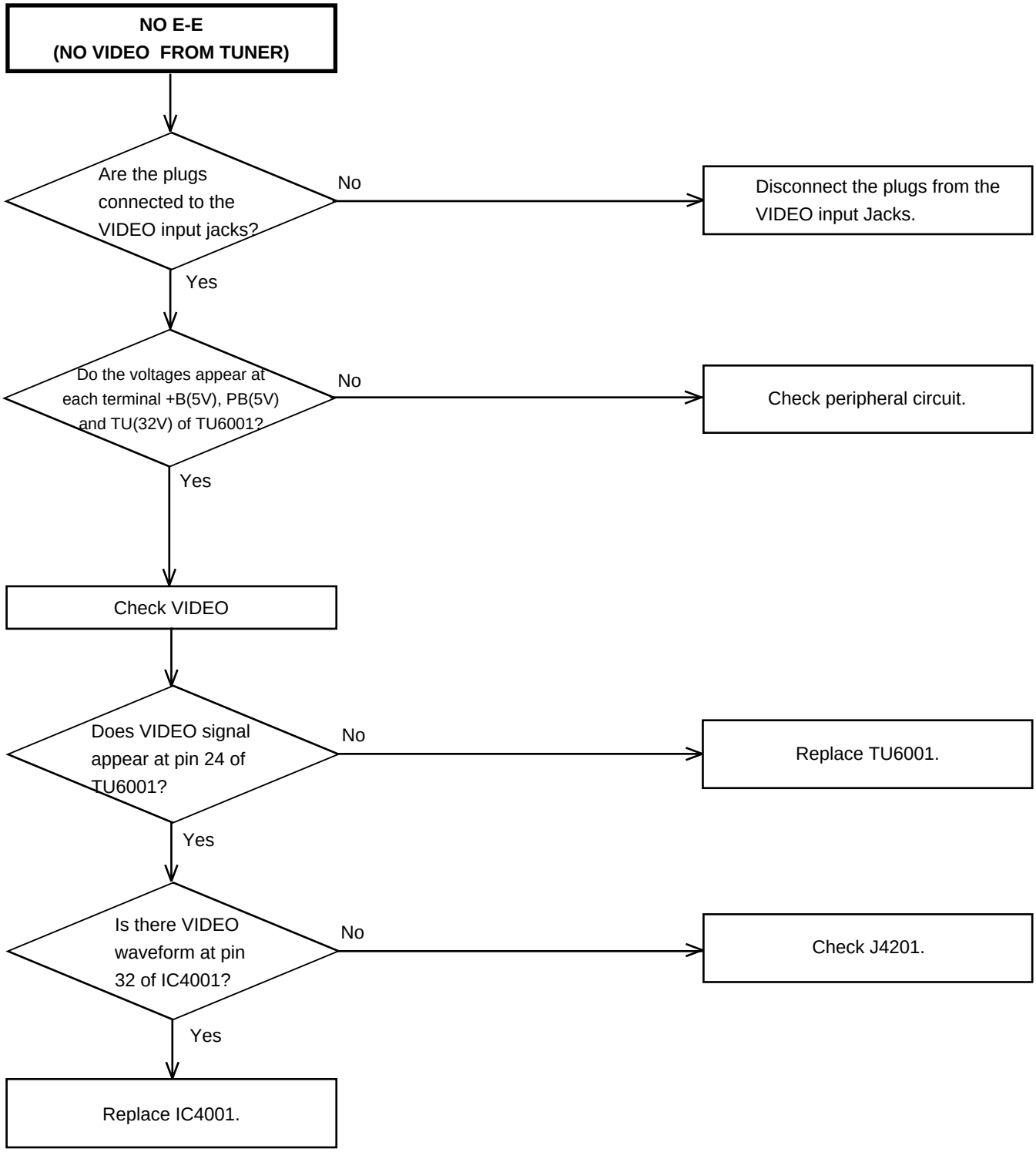

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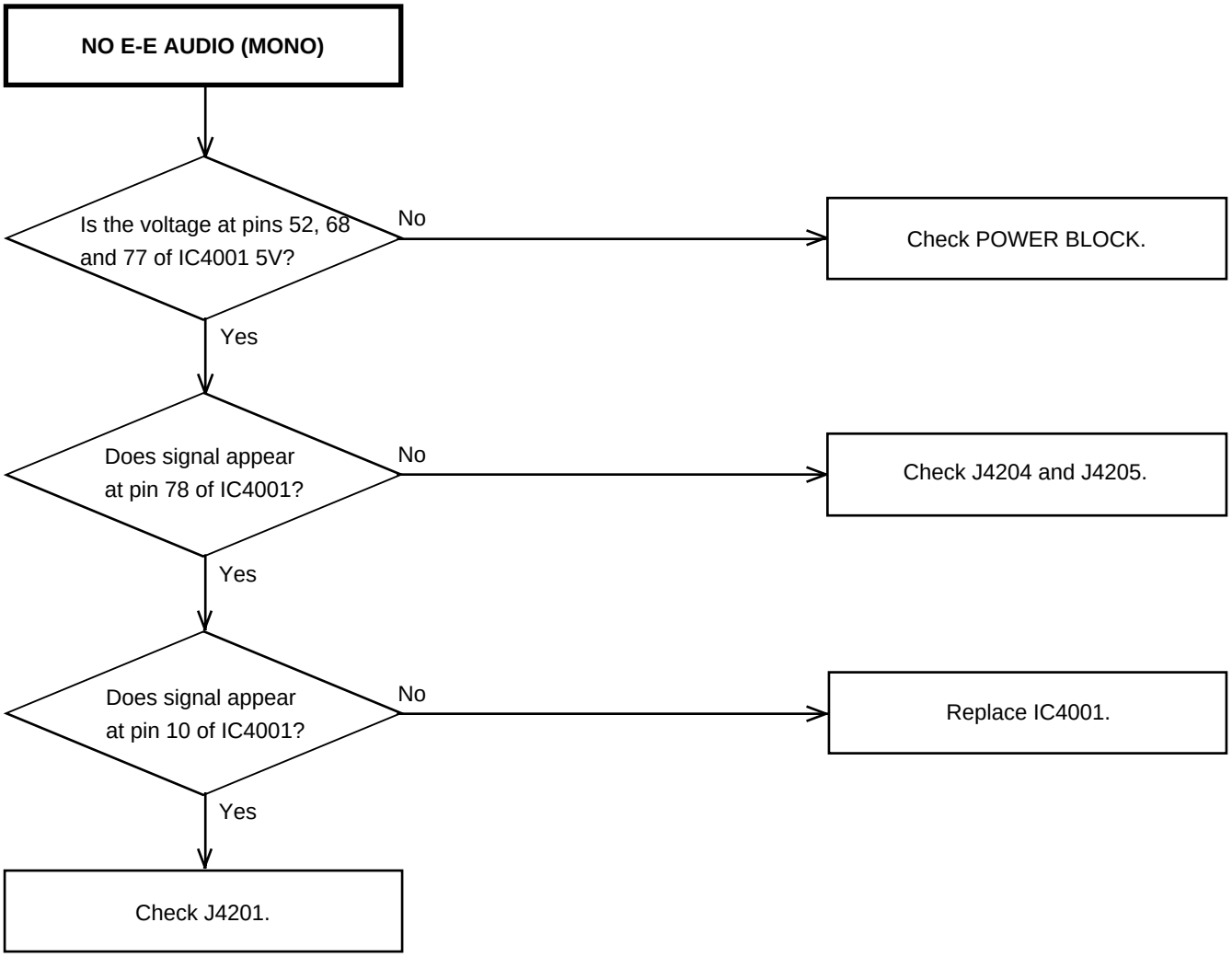

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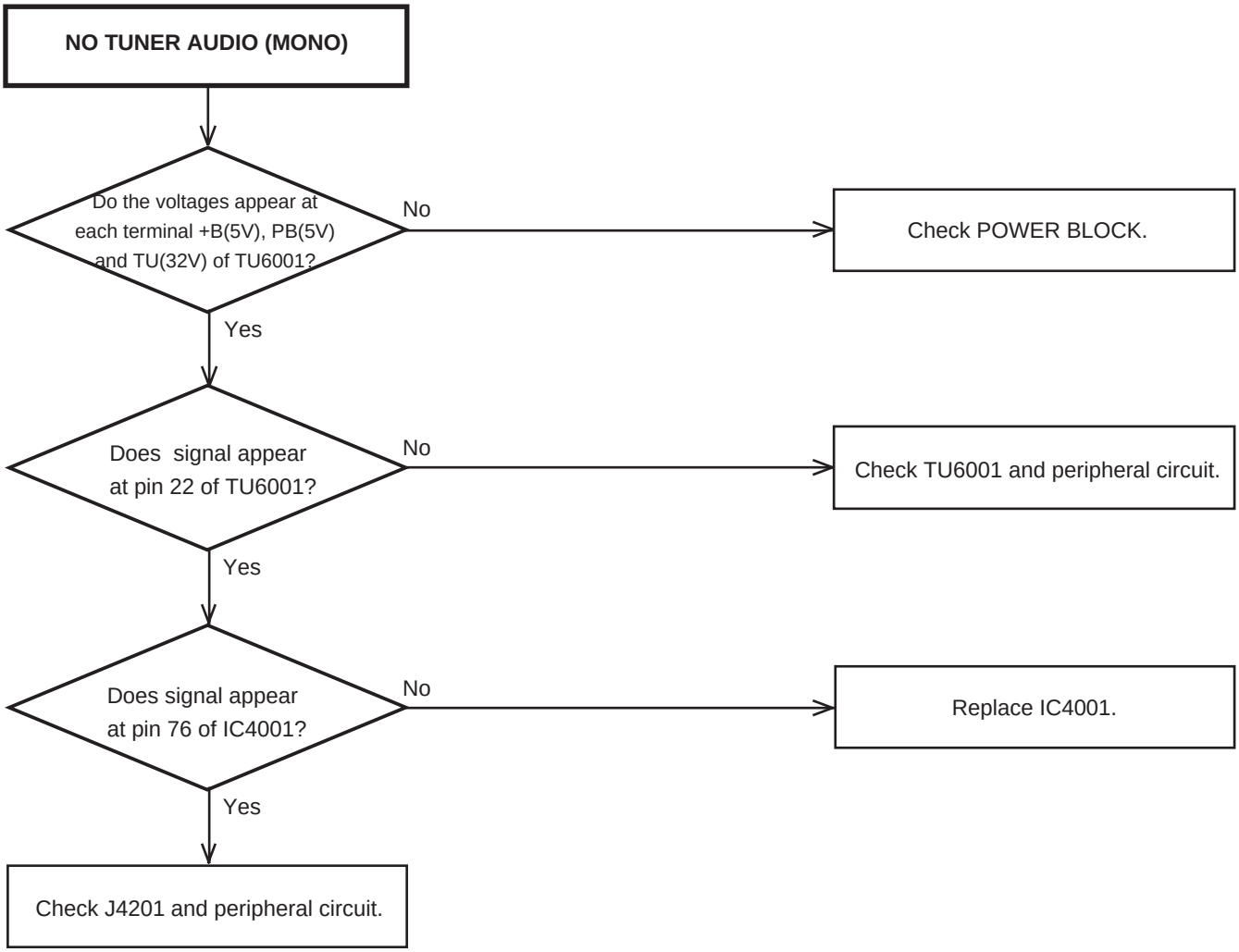

<Reference>

GENERAL SPECIFICATIONS [HR-A591U/A591U(C)]

G-1	VCR System	System			VHS Player / Recorder
		Video System			NTSC
		Hi-Fi STEREO			Yes
		NTSC PB(PAL60Hz)			No
		Deck		DECK	OVD-7
				Loading System	Front
				Motor	3
		Heads	Video Head		4Head
			FM Audio Head		2Head
			Normal Audio /Control		Mono / Yes
			Erase(Full Track Erase)		Yes
		Tape Speed	Rec	PAL	-
				NTSC	SP/EP(SLP)
			Play	PAL	-
				NTSC	SP/EP(SLP)
		Fast Forward / Rewind Time (Approx.)			FF:4'50"/REW:2'30"
				with Cassette	T-120
		Forward/Reverse Picture Search		NTSC or PAL-M	SP/EP(SLP)=3x,5x/9x,15x
				PAL or SECAM	-
		Frame Advance			1/10
		Slow Speed			1/10
G-2	Tuning System	Broadcasting System			US System M
		Tuner and Receive CH		System	1Tuner
				Destination	USA(w/CATV)
				Tuning System	F-Synth
				Input Impedance	VHF/UHF 75 OHM
				CH Coverage	2-69,4A,A-5~ A-1,A~I,J~ W W+1-W+84
		Intermediate Frequency		Picture(FP)	45.75MHz
				Sound(FS)	41.25MHz
				FP-FS	4.50MHz
		Preset CH			No
		RF Converter Output			Yes
			Channel		3 or 4 ch
			Level/Impedance		66dBu /75ohm
			Sound Selector		No
		Stereo/Dual TV Sound			Yes(US-ST)
G-3	Power	Power Source		AC	120V,60Hz
				DC	-
		Power Consumption		Power On(at AC)	9W at 120V 60Hz
				Stand by (at AC)	1.7W at 120V 60Hz
				Per Year	- kWh/Year
		Protector		Power Fuse	Yes
				Dew Sensor	No
G-4	Regulation			Safety	UL / CSA
				Radiation	FCC / DOC
G-5	Temperature			Operation	5oC - 40oC
				Storage	-20oC - 60oC
G-6	Operating Humidity				Less then 80% RH
G-7	Signal	Video Signal		Input Level	1 V p-p/75 ohm
				Output Level	1 V p-p/75 ohm
				S/N Ratio (Weighted)	50
				Horizontal Resolution at SP Mode	230Line
		Audio Signal		Input Level	-8dBm/50Kohm
				Output Level	-8dBm/1Kohm
				S/N Ratio at SP (Weighted)	42dB
				Harmonic Distortion at SP(1KHz) typ.	1.5%
				Frequency Response at SP	100Hz - 10kHz
				at LP	-
				at SLP	100Hz - 4kHz
		Hi-Fi Audio Signal		Dynamic Range : More than	90dB
				Frequency Response	20Hz ~20kHz
				Wow And Flutter : Less than	0.01 %Wrms
				Channel Separation : More than	60 dB
				Harmonic Distortion : Less than	0.01

GENERAL SPECIFICATIONS [HR-A591U/A591U(C)]

G-8	**On Screen Display**	Menu			Yes
			Menu Type		Character
			ATS		No
			Timer Rec Set		Yes
			Auto Repeat On/Off		Yes
			SAP On Off		Yes
			CH Set-Up		Yes
				TV/CATV	Yes
				Auto CH Memory	Yes
				Add/Delete	Yes
			Pin Code Registration		No
			System Set-Up		No
			Clock Set		Yes (Calendar 12H)
			Language		Yes
			No Noise Back Ground		Yes
		G-CODE(or SHOWVIEW or PLUSCODE)No. Entry			No
		NICAM 1/2,NICAM Off,Audio Output			No
		Stereo,Audio Output,SAP			Yes
		Play/Stop/FF/Rew/Rec/OTR/T-Rec/Pause/Eject/Tape In (Symbol Mark)			Yes
				CH/AV	Yes
				Clock	Yes
				Repeat	Yes
				Pin Code	No
				Tape Counter	Yes
				Index	No
				Hotel Lock	No
				Tape Speed	Yes
				Manual Tracking (Bar Setting)	No
				Hi-Fi	Yes
				S-Repeat/SR-R/SR-Play	No
				VPS	No
				PDC	No
G-9	**OSD Language**		OSD Language Setting		English French Spanish English
G-10	**Clock,Timer and Timer Back-up**	Calendar			1990/1/1 ~ 2081/12/31
		Timer Events			8 prog/1 month
		One Touch Recording Max Time			5 Hours
		OTPB Valid Time			No
		Timer Back-up (at Power Off Mode)			5 sec.
G-11	**Display**	Indicator			Yes
		Indicator Type			LED Module(Amber + Red)
			Clock/Counter,CH,Timer Rec,OTR, Play Rec.FF(Cue),Rew(Rev),Stop.ATR		Yes
				Pause	Yes
				Still	Yes
				Eject(Tape Mark Flash)	Yes
				Slow	Yes
				WKL,Y.M.D,Start,End	No
				AFT	No
				Repeat	No
				A-DUB	No
				VCR	Yes
				Memory	No
				Index	No
				VPS	No
				PDC	No
				SP	No
				LP	No
				SLP	No
				AM	No
				PM	Yes
				F1,F2	No
				RF Output CH	Yes
				Tape In	Yes

GENERAL SPECIFICATIONS [HR-A591U/A591U(C)]

G-12	**Remote Control**	Unit		RC-ES
		Glow in Dark Remocon		No
		Format type		JVC
		Custom Code		43 / 03
		Power Source	Voltage(D.C) UM size x pcs	3V UM-4 x 2 pcs
		Total Keys		35 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0/Input Select	Yes
			CH Up	Yes
			CH Down	Yes
			Input Select	No
			Play /Slow	Yes
			F.Fwd	Yes
			Rew	Yes
			Pause/Still	Yes
			Stop	Yes
			Rec/OTR	Yes
			Eject	No
			Counter Reset/Cancel	Yes
			Speed / Auto Tracking	Yes
			Timer Rec	Yes
			TV Monitor	No
			Quick View	No
			Program	No
			Slow	No
			Auto Tracking	No
			Set/Tracking+	Yes
			Set/ Tracking -	Yes
			Menu	Yes
			Enter	Yes
			Cancel	No
			Display(Clock/Counter+Call)	Yes
			TV/VCR	Yes
			Sleep Timer	No
			Muting	No
			Clock/Counter	No
			Zero Return	No
			CM Skip	No
			Audio Select	Yes
			TV CH+	Yes
			TV CH-	Yes
			TV Input Select	Yes
			TV Volume+	Yes
			TV Volume-	Yes
			TV Power	Yes

GENERAL SPECIFICATIONS [HR-A591U/A591U(C)]

G-13	**Features**	Auto Head Cleaning		No
		Auto Tracking	Yes	
		Index Search		No
		HQ (VHS Standard High Quality)	Yes	
		Auto Power On, Auto Play, Auto Rewind, Auto Eject	Yes	
		Auto Power Off	Yes	
		Forward/Reverse Picture Search	Yes	
		VIDEO PLUS+(SHOWVIEW,G-CODE)		No
		ATS		No
		PDC		No
		VPS		No
		One Touch Playback		No
		Picture Control		No
		Auto CH Memory	Yes	
		Channel Lock		No
		Hotel Lock		No
		Anti Theft		No
		Audio Dubbing		No
		Remort Control Code 1/2		No
		SQPB	Yes	
		CATV	Yes	
		Energy Star	Yes	
		MTS(SAP)	Yes	
		CM Skip(30sec x 6 Times)		No
G-14	**Accessories**	Owner's Manual Language	English	French(A591U(C))
		w/Guarantee Card	Yes	
		Remote Control Unit	Yes	
		Dew Cation Sheet		No
		Video Cassette Tape		No
		Battery	Yes	
		UM size x pcs	UM 4 x 2pcs	
			-	
		Safety Tip		No
		Toll Free Insert Sheet		No
		Quick Set-Up Sheet		No
		Information Sheet (Buyer Supply)		No
		75 Ohm Coaxial Cable	Yes	
		Rod Antenna		No
		Poles		
		Terminal		
		Loop Antenna		No
		Terminal		
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		No
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safeguard		No
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		AC Cord		No
		AV Cord		No
		Product Registration Card	Yes (Buyer's Supply)	
		PTB Sheet		No
		Tape Rewinder(Buyer Supply)		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS [HR-A591U/A591U(C)]

G-15	**Interface**	Switch	Front	Power	Yes
				Play	Yes
				Pause/Still	No
				System Select	No
				One Touch Playback	No
				Channel Up	Yes
				Channel Down	Yes
				F.FWD/Cue	Yes
				Eject/Stop	Yes
				Main Power SW	No
				Volume Up	No
				Volume Down	No
				Rew/Rev	Yes
				Rec/OTR	Yes
			Rear	RF Output SW	No
		Indicator		Power	No
				Stand by	No
				Repeat	No
				TV/VCR	No
				Rec	No
				T-Rec	No
				Tape In	No
		Terminals	Front	Video Input	RCA x 1 (Black)
				Audio Input	RCA x 2 (Stereo, Black)
				Other Terminal	No
			Rear	Video Input	No
				Audio Input	No
				Video Output	RCA x 1 (Yellow)
				Audio Output	RCA x 2 (Stereo, White/Red)
				Euro Scart	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Inlet	No
G-16	**Set Size**			Approx. W x D x H (mm)	360 x 224 x 95
G-17	**Weight**			Net (Approx.)	3.2kg(7.1lbs)
				Gross (Approx.)	3.8kg(8.4lbs)
G-18	**Carton**		Master Carton		No
				Content	-
				Material	-
				Dimensions W x D x H(mm)	-
				Description of Origin	-
			Gift Box		Yes
				Material	Single/White
				Dimensions W x D x H(mm)	420x291x160
				Design	As Per BUYER 's
				Description of Origin	Yes
			Drop Test	Natural Dropping At	1Corner / 3Edges / 6Surfaces
				Height (cm)	80
			Container Stuffing(40' container)		3136Sets
G-19	**Cabinet Material**			Cabinet Front	PS 94V2 or More / DECABROM

GENERAL SPECIFICATIONS [HR-A590U(C)]

G-1	VCR System	System			VHS Player / Recorder
		Video System			NTSC
		Hi-Fi STEREO			Yes
		NTSC PB(PAL60Hz)			No
		Deck		DECK	OVD-7
				Loading System	Front
				Motor	3
		Heads	Video Head		4Head
			FM Audio Head		2Head
			Normal Audio /Control		Mono / Yes
			Erase(Full Track Erase)		Yes
		Tape Speed	Rec	PAL	-
				NTSC	SP/EP(SLP)
			Play	PAL	-
				NTSC	SP/EP(SLP)
		Fast Forward / Rewind Time (Approx.)			FF:4'50"/REW:2'30"
				with Cassette	T-120
		Forward/Reverse Picture Search		NTSC or PAL-M	SP/EP(SLP)=3x,5x/9x,15x
				PAL or SECAM	-
		Frame Advance			1/10
		Slow Speed			1/10
G-2	Tuning System	Broadcasting System			US System M
		Tuner and Receive CH		System	1Tuner
				Destination	USA(w/CATV)
				Tuning System	F-Synth
				Input Impedance	VHF/UHF 75 OHM
				CH Coverage	2-69,4A,A-5~ A-1,A~I,J~ W W+1-W+84
		Intermediate Frequency		Picture(FP)	45.75MHz
				Sound(FS)	41.25MHz
				FP-FS	4.50MHz
		Preset CH			No
		RF Converter Output			Yes
			Channel		3 or 4 ch
			Level/Impedance		66dBu /75ohm
			Sound Selector		No
		Stereo/Dual TV Sound			Yes(US-ST)
G-3	Power	Power Source		AC	120V,60Hz
				DC	-
		Power Consumption		Power On(at AC)	9W at 120V 60Hz
				Stand by (at AC)	1.7W at 120V 60Hz
				Per Year	- kWh/Year
		Protector		Power Fuse	Yes
				Dew Sensor	No
G-4	Regulation			Safety	UL / CSA
				Radiation	FCC / DOC
G-5	Temperature			Operation	5oC - 40oC
				Storage	-20oC - 60oC
G-6	Operating Humidity				Less then 80% RH
G-7	Signal	Video Signal		Input Level	1 V p-p/75 ohm
				Output Level	1 V p-p/75 ohm
				S/N Ratio (Weighted)	50
				Horizontal Resolution at SP Mode	230Line
		Audio Signal (0dB=0.775Vrms)		Input Level	-8dBm/50Kohm
				Output Level	-8dBm/1Kohm
				S/N Ratio at SP (Weighted)	42dB
				Harmonic Distortion (1KHz)	1.5%
				Frequency Response at SP	100Hz - 10kHz
				at LP	-
				at SLP	100Hz - 4kHz
		Hi-Fi Audio Signal		Dynamic Range : More than	90dB
				Frequency Response	20Hz ~20kHz
				Wow And Flutter : Less than	0.01 %Wrms
				Channel Separation : More than	60 dB
				Harmonic Distortion : Less than	0.01

GENERAL SPECIFICATIONS [HR-A590U(C)]

G-8	On Screen Display	Menu			Yes
			Menu Type		Character
			ATS		No
			Timer Rec Set		Yes
			Auto Repeat On/Off		Yes
			SAP On Off		Yes
			CH Set-Up		Yes
				TV/CATV	Yes
				Auto CH Memory	Yes
				Add/Delete	Yes
			Pin Code Registration		No
			System Set-Up		No
			Clock Set		Yes (Calendar 12H)
			Language		Yes
			No Noise Back Ground		Yes
		G-CODE(or SHOWVIEW or PLUSCODE)No. Entry			No
		NICAM 1/2,NICAM Off,Audio Output			No
		Stereo,Audio Output,SAP			Yes
		Play/Stop/FF/Rew/Rec/OTR/T-Rec/Pause/Eject/Tape In (Symbol Mark)			Yes
				CH/AV	Yes
				Clock	Yes
				Repeat	Yes
				Pin Code	No
				Tape Counter	Yes
				Index	No
				Hotel Lock	No
				Tape Speed	Yes
				Manual Tracking (Bar Setting)	No
				Hi-Fi	Yes
				S-Repeat/SR-R/SR-Play	No
				VPS	No
				PDC	No
G-9	OSD Language				English French Spanish
			OSD Language Setting		English
G-10	Clock,Timer and Timer Back-up	Calendar			1990/1/1 ~ 2081/12/31
		Timer Events			8 prog/1 month
		One Touch Recording Max Time			5 Hours
		OTPB Valid Time			No
		Timer Back-up (at Power Off Mode)			5 sec.
G-11	Display	Indicator			No
		Indicator Type			-
			Clock/Counter,CH,Timer Rec,OTR, Play Rec,FF(Cue),Rew(Rev),Stop,ATR		-
				Pause	-
				Still	-
				Eject(Tape Mark Flash)	-
				Slow	-
				WKL,Y.M.D,Start,End	-
				AFT	-
				Repeat	-
				A-DUB	-
				VCR	-
				Memory	-
				Index	-
				VPS	-
				PDC	-
				SP	-
				LP	-
				SLP	-
				AM	-
				PM	-
				F1,F2	-
				RF Output CH	-
				Tape In	-

GENERAL SPECIFICATIONS [HR-A590U(C)]

G-12	Remote Control	Unit		RC-ES
		Glow in Dark Remocon		No
		Format type		JVC
		Custom Code		43 / 03
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		35 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0/Input Select	Yes
			CH Up	Yes
			CH Down	Yes
			Input Select	No
			Play/Slow	Yes
			F.Fwd	Yes
			Rew	Yes
			Pause/Still	Yes
			Stop	Yes
			Rec/OTR	Yes
			Eject	No
			Counter Reset/Cancel	Yes
			Speed / Auto Tracking	Yes
			Timer Rec	Yes
			TV Monitor	No
			Quick View	No
			Program	No
			Slow	No
			Auto Tracking	No
			Set/Tracking+	Yes
			Set/ Tracking -	Yes
			Menu	Yes
			Enter	Yes
			Cancel	No
			Display(Call)	Yes
			TV/VCR	Yes
			Sleep Timer	No
			Muting	No
			Clock/Counter	No
			Zero Return	No
			CM Skip	No
			Audio Select	Yes
			TV CH+	Yes
			TV CH-	Yes
			TV Input Select	Yes
			TV Volume+	Yes
			TV Volume-	Yes
			TV Power	Yes

GENERAL SPECIFICATIONS [HR-A590U(C)]

G-13	Features	Auto Head Cleaning		No
		Auto Tracking	Yes	
		Index Search		No
		HQ (VHS Standard High Quality)	Yes	
		Auto Power On, Auto Play, Auto Rewind, Auto Eject	Yes	
		Auto Power Off	Yes	
		Forward/Reverse Picture Search	Yes	
		VIDEO PLUS+(SHOWVIEW,G-CODE)		No
		ATS		No
		PDC		No
		VPS		No
		One Touch Playback		No
		Picture Control		No
		Auto CH Memory	Yes	
		Channel Lock		No
		Hotel Lock		No
		Anti Theft		No
		Audio Dubbing		No
		Remort Control Code 1/2		No
		SQPB	Yes	
		CATV	Yes	
		Energy Star	Yes	
		MTS(SAP)	Yes	
		CM Skip(30sec x 6 Times)		No
G-14	Accessories	Owner's Manual Language	English / French	
		w/Guarantee Card		No
		Remote Control Unit	Yes	
		Dew Cation Sheet		No
		Video Cassette Tape		No
		Battery	Yes	
		UM size x pcs	UM 4 x 2pcs	
				-
		Safety Tip		No
		Toll Free Insert Sheet		No
		Quick Set-Up Sheet		No
		Information Sheet (Buyer Supply)		No
		75 Ohm Coaxial Cable	Yes	
		Rod Antenna		No
		Poles		
		Terminal		
		Loop Antenna		No
		Terminal		
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card	Yes	
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Station List	Yes	
		Important Safeguard		No
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		AC Cord		No
		AV Cord		No
		Registration Card		No
		PTB Sheet		No
		Tape Rewinder(Buyer Supply)		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS [HR-A590U(C)]

G-15	Interface	Switch	Front	Power	Yes
				Play	Yes
				Pause/Still	No
				System Select	No
				One Touch Playback	No
				Channel Up	Yes
				Channel Down	Yes
				F.FWD/Cue	Yes
				Eject/Stop	Yes
				Main Power SW	No
				Volume Up	No
				Volume Down	No
				Rew/Rev	Yes
				Rec/OTR	Yes
			Rear	RF Output SW	Yes
		Indicator		Power	Yes(Green)
				Stand by	No
				Repeat	No
				TV/VCR	Yes(Green)
				Rec	Yes(Red)
				T-Rec	Yes(Red)
				Tape In	No
		Terminals	Front	Video Input	RCA x 1 (Black)
				Audio Input	RCA x 2 (Stereo,Black)
				Other Terminal	No
			Rear	Video Input	No
				Audio Input	No
				Video Output	RCA x 1 (Yellow)
				Audio Output	RCA x 2 (Stereo, White/Red)
				Euro Scart	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input/Output	F Type
				AC Inlet	No
G-16	Set Size			Approx. W x D x H (mm)	360 x 224 x 95
G-17	Weight			Net (Approx.)	3.2kg(7.1lbs)
				Gross (Approx.)	3.8kg(8.4lbs)
G-18	Carton		Master Carton		No
				Content	-
				Material	-
				Dimensions W x D x H(mm)	-
				Description of Origin	-
			Gift Box		Yes
				Material	Single/White
				Dimensions W x D x H(mm)	420x291x160
				Design	As Per BUYER 's
				Description of Origin	Yes
			Drop Test	Natural Dropping At	1Corner / 3Edges / 6Surfaces
				Height (cm)	80
			Container Stuffing(40' container)		3136Sets
G-19	Cabinet Material			Cabinet Front	PS 94V2 or More / DEC

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