

SAMSUNG DVD-VR357 SERVICE MANUAL



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SERVICE MANUAL

DVD-VR357 / DVD-VR355 / DVD-VR350



DVD-VCR Recorder COMBO

Chassis : Nexus (4th Generation)

BASIC : DVD- VR357

Application Models

: DVD-VR357 / DVD-VR355 /
DVD-VR350

Application Areas

: XAA, XAC, XAX

SERVICE Manual

DVD-VCR RECORDER COMBINATION



Merit & Character regarding Product

- ① Super Multi Fomat Recoding
DVD- RAM/ DVD $\pm$ R/ VDV $\pm$ R
- ② Multi Format Playback
DVD/ DVD- RAM/ DVD $\pm$ RW/ DVD $\pm$ R
CD/ CD- R/ CD- RW/ MP3/ JPEG
- ③ Recording Mode
XP(1Hour)/ SP(2Hour)/ LP(4Hour)/ EP(6~ 8Hour)
- ④ Progressive Scan
Both DVD & VCR
- ⑤ Automatic Chapter Product ON
- ⑥ Quick Recoding

IMPORTANT SERVICE GUIDE

◆ MODE SWITCH (PROGRAM SWITCH) ASSEMBLY POINT

1) When installing the ass'y deck on the Main PCB, be sure to align the assembly point of mode switch.

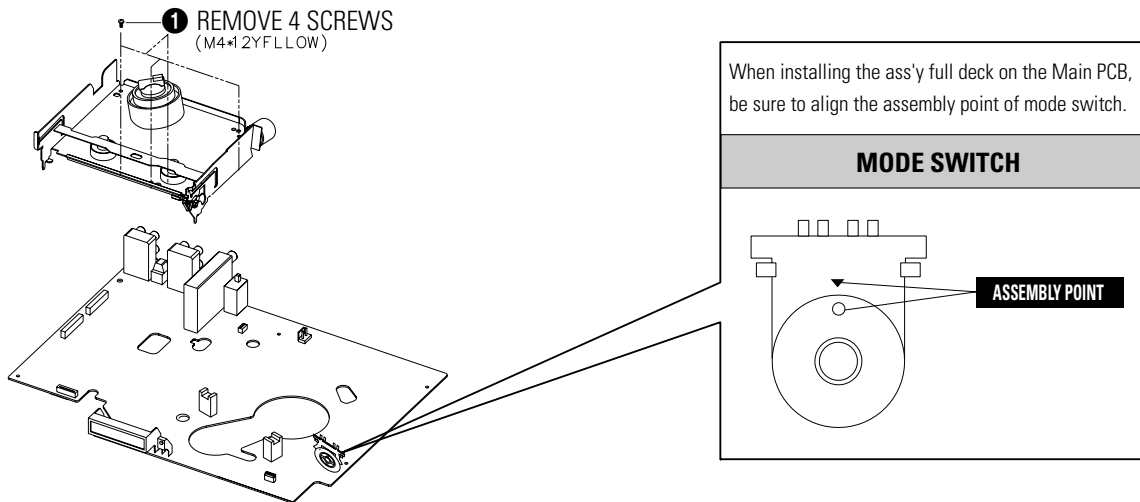


Fig. 1

◆ HOW TO EJECT THE CASSETTE TAPE (If the tape is stuck in the unit)

- 1) Turn the Gear Worm ❶ clockwise in the direction of arrow with a screwdriver. (See Fig. 2)
(Other method ; Remove the screw of Motor Load Ass'y, Separate the Motor Load Ass'y)
- 2) When Slider S, T approaches the unloading position, rotate holder Clutch counterclockwise after inserting screwdriver in the frame's bottom hole in order to wind the unwound tape. (Refer to Fig. 3)
(If you rotate Gear Worm ❶ continuously when tape is unwinding, you may cause tape contamination by grease and tape damage. Be sure to wind the unwound tape with the unit in the horizontal position.)
- 3) Rotate Gear Worm ❶ clockwise using a screwdriver until the mecha is in the eject state. Remove the tape. (Refer to Fig. 2)

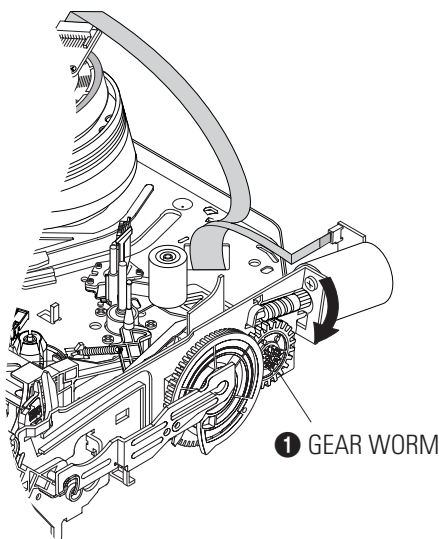


Fig. 2

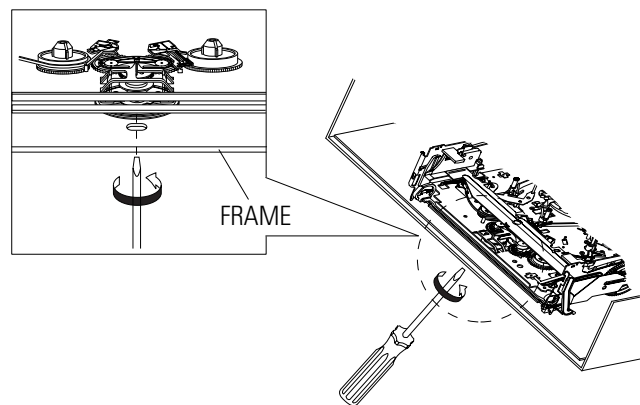
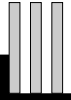


Fig. 3



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1. Precautions

1-1 Safety Precautions

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

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

- (2) Be sure that there are no cabinet openings through which adults or children might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, excessively wide cabinet ventilation slots, and an improperly fitted and/or incorrectly secured cabinet back cover.

- (3) Leakage Current Hot Check-With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1270 (40.7). With the instrument's AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinets, screw-heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis.

Any current measured must not exceed 0.5mA. Reverse the instrument power cord plug in the outlet and repeat the test. See Fig. 1-1.

Any measurements not within the limits specified herein indicate a potential shock hazard that must be eliminated before returning the instrument to the customer.

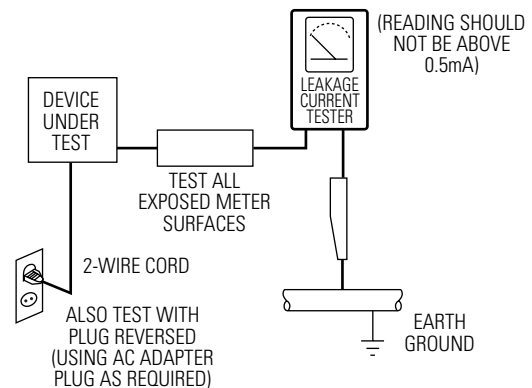


Fig. 1-1 AC Leakage Test

- (4) Insulation Resistance Test Cold Check-(1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug.(2) Measure the resistance with an ohmmeter between the jumpered AC plug and all exposed metallic cabinet parts on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. When an exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 megohm. When there is no return path to the chassis, the reading must be infinite. If the reading is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer. See Fig. 1-2.

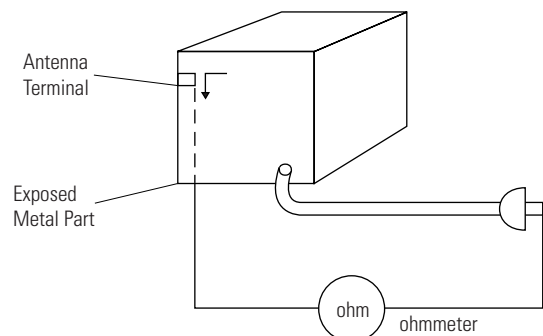


Fig. 1-2 Insulation Resistance Test

- 2) Read and comply with all caution and safety related notes on or inside the cabinet, or on the chassis.
- 3) Design Alteration Warning-Do not alter or add to the mechanical or electrical design of this instrument. Design alterations and additions, including but not limited to, circuit modifications and the addition of items such as auxiliary audio output connections, might alter the safety characteristics of this instrument and create a hazard to the user. Any design alterations or additions will make you, the servicer, responsible for personal injury or property damage resulting therefrom.
- 4) Observe original lead dress. Take extra care to assure correct lead dress in the following areas:
(1) near sharp edges, (2) near thermally hot parts (be sure that leads and components do not touch thermally hot parts), (3) the AC supply, (4) high voltage, and (5) antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between a component and the printed-circuit board. Check the AC power cord for damage.
- 5) Components, parts, and/or wiring that appear to have overheated or that are otherwise damaged should be replaced with components, parts and/ or wiring that meet original specifications.
Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
- 6) Product Safety Notice-Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by shading, an (⚡) or a (⚡) on schematics and parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1-2 Servicing Precautions

CAUTION : Before servicing units covered by this service manual and its supplements, read and follow the Safety Precautions section of this manual.

Note : If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions. Remember: Safety First.

1-2-1 General Servicing Precautions

- (1) a. Always unplug the instrument's AC power cord from the AC power source before (1) re-moving or reinstalling any component, circuit board, module or any other instrument assembly, (2) disconnecting any instrument electrical plug or other electrical connection, (3) connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
- b. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
- c. Do not apply AC power to this instrument and /or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
- d. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Note : Refer to the Safety Precautions section ground lead last.

- (2) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.
- (3) The components used in the unit have a specified flame resistance and dielectric strength. When replacing components, use components which have the same ratings. Components identified by shading, by ($\triangle$) or by (∇) in the circuit diagram are important for safety or for the characteristics of the unit. Always replace them with the exact replacement components.

- (4) An insulation tube or tape is sometimes used and some components are raised above the printed wiring board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. Install such elements as they were.

- (5) After servicing, always check that the removed screws, components, and wiring have been installed correctly and that the portion around the serviced part has not been damaged and so on. Further, check the insulation between the blades of the attachment plug and accessible conductive parts.

1-2-2 Insulation Checking Procedure

Connect the insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts(see note) should be more than 1 Megohm.

Note : Accessible conductive parts include metal panels, input terminals, earphone jacks, etc.

1-3 ESD Precautions

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity.

Such components commonly are called Electrostatically Sensitive Devices(ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

- (1) Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
- (2) After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
- (3) Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
- (4) Use only an anti-static solder removal devices. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
- (5) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
- (6) Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it.(Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
- (7) Immediately before removing the protective materials from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
- (8) Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

CAUTION : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

1-4 Handling the optical pick-up

The laser diode in the optical pick up may suffer electrostatic breakdown because of potential static electricity from clothing and your body.

The following method is recommended.

- (1) Place a conductive sheet on the work bench (The black sheet used for wrapping repair parts.)
 - (2) Place the set on the conductive sheet so that the chassis is grounded to the sheet.
 - (3) Place your hands on the conductive sheet (This gives them the same ground as the sheet.)
 - (4) Remove the optical pick up block
 - (5) Perform work on top of the conductive sheet. Be careful not to let your clothes or any other static sources to touch the unit.
- ◆ Be sure to put on a wrist strap grounded to the sheet.
 - ◆ Be sure to lay a conductive sheet made of copper etc. Which is grounded to the table.

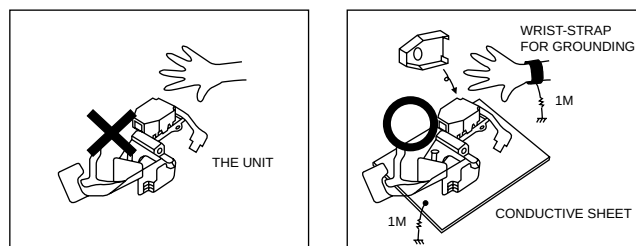


Fig.1-3

- (6) Short the short terminal on the PCB, which is inside the Pick-Up ASS'Y, before replacing the Pick-Up. (The short terminal is shorted when the Pick-Up Ass'y is being lifted or moved.)
- (7) After replacing the Pick-up, open the short terminal on the PCB.

MEMO

2. Product Specification

2-1 Product Specification

General	Power requirements	120V AC,60Hz
	Power consumption	28Watts
	Weight	8.75 lb
	Dimensions	16.9in(W) x 10.6(D) x 3.1in(H)
	Operating temp	+41°F to 95°F
	Other conditions	Keep level when operating. Less than 75% operating humidity
Input	Video	1.0 V p-p at 75ohm load, sync negative
		S-Video input (Y:1.0Vp-p, C: 0.286Vp-p at 75ohm load)
	Max. Audio input level	2Vrms
	DV Input	IEEE 1394(4p) compatible jack
Output	Audio	Audio output jacks 1,2
		Optical/coaxial digital audio output support
	Video	Min. 100dB signal-to-noise ratio
		Max. 0.005% total harmonic distortion(T. H. D) at average 1KHz
		Video output jacks 1,
		S-Video output 1 (Y: 1.0Vp-p, C:0.286Vp-p at 75 ohm load)
DVD	Picture compression format	MPEG-II
		Dolby digital 2ch/256kbps
	Recording Quality	XP(about 8Mbps), SP(about 4Mbps), LP(about 2Mbps), EP(about 1.2Mbps)
	Video S/N Ratio	Min. 50dB at standard recording
	Audio S/N Ratio	MIN. 75dB
	Audio frequency characteristics	20Hz ~ 20KHz

2-2 Chassis Product Specification

	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
			
General	Export Country	USA	USA / USA / CANADA
	Buyer Name	SEA	SEA / SEA / SECA
	Production	TSEC	TSEC
	Instruction Manual (Language)	Eng	Eng / Eng / Eng/Fra
	OSD/OSP - Language (RED ; Initial)	Eng / Fre / Spa	Eng/Fre/Spa
	Front Panel Tool Name	06-SECRECCOMB	07-SECRECCOMA
	Body Color	Black	Black
	Applied Regulation	UL / FCC	UL/FCC / UL/FCC / CSA
	BOM Model Name (PV14) * Suwon SAP R/3	DVD-VR335/XAA	DVD-VR357/XAA / DVD-VR355/XAA / DVD-VR350/XAC
SYSTEM	GENERAL SYSTEM		
	NTSC3.58 REC/PB	Yes / Yes	Yes / Yes
	PAL-M Rec/PB	No	No
	PAL-N Rec/PB	No	No
	PAL-M → NTSC Convesion	No	No
	PAL → NTSC Convesion	No	No
	NTSC → PAL-M Convesion		No
	NTSC → PAL-N Convesion	No	No
	FEATURES		
	One Touch Timer	Yes	Yes
	Copy	Bi-directional	Bi-directional
	Control OSD Menu (UI)	Yes	Yes
	On Screen Help Message (UI)	No	No
	Quick Set Up	Yes	No / No / Yes
	Back Ground Graphic	Yes (Black)	Yes (Black)
	SA Programming	No	No
	STB Control/CBC	No	Yes / No / No
	CM Adv	No	No
	DESIGN		
	Front Panel Tool Name	06-SECRECCOMB	07-SECRECCOMA
	Key Function	Power , Progressive , STOP, Ch Up / Down , Open/Close, DVD/VCR , REC , PB , Copy(DVD/VCR) , EJECT	Power, Progressive, STOP, REW/F .F, Open/Close, DVD/VCR, REC, PB , Copy(DVD/VCR), EJECT / Power, Progressive, STOP, REW/F .F, Open/Close, DVD/VCR, REC, PB , Copy(DVD/VCR), EJECT / Power , Progressive , STOP, Ch Up / Down , Open/Close, DVD/VCR , REC , PB , Copy(DVD/VCR) , EJECT
	Body Color	Black	Black
	Half Mirror	No	Yes
	Hot stamping	No	No
	Window Material	ACRYL	ACRYL
	Display of Panel Front	LED Module	LED Module
	EZ View Key on Front	No	No
	P480 Key on Front	Yes	Yes
	Power Knob LED	No	Yes(Blue)
	Indicator LED	No	Yes(Rec : Red)
	REMOTE		
	Tool Name	7th 53-key(VR7253)	7th 53-key(VR7253)
	JOG & Shuttle	No	No
	Glow-in-the-dark	No	No
	Color	Black	Black
	Battery Type	AAAx2EA	AAAx2EA
	Language	Eng	Eng

SYSTEM	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
	10key (for Ch Select)	Yes	Yes
SYSTEM	Multi-Brand TV Control	Yes	Yes
	TERMINALS (IN /OUT)		
SYSTEM	Video/Audio In RCA Jack (on the Front)	Yes (LINE 2) x1	Yes (LINE 2) x1
	S-Video Input (on the Rear)	Yes(1)	Yes(1)
SYSTEM	DV Input (on the Front)	Yes(1)	Yes(1)
	HDMI Output (on the Rear)	Yes(1)	Yes(1) / Yes(1) / No
SYSTEM	Video/Audio In RCA Jack (on the Rear)	Yes (LINE 1) x1	Yes (LINE 1) x1
	Video/Audio Out RCA Jack (on the Rear)	Yes (LINE OUT) x1	Yes (LINE OUT) x1
SYSTEM	Aerial In / RF-Out (on the Rear)	Yes /Yes	No/No / No/No / Yes/Yes
	Component Video Output (on the Rear)	Yes (1)	Yes (1)
SYSTEM	S-Video Output (on the rear)	Yes (1)	Yes (1)
	D Terminal (on the rear)	No	No
SYSTEM	ANYNET	No	No
	Audio Output for component/S-Video (on the Rear)	Yes (1)	Yes (1)
SYSTEM	Coaxial Digital Audio Output (on the Rear)	Yes (1)	Yes (1)
	Optical Digital Audio Output (on the Rear)	Yes (1)	Yes (1)
SYSTEM	5.1ch Audio Output	No	No
	11 in 2(MS,SMC,SD,MMC) Memory Slot	No	No
SYSTEM	CBC Jack	No	Yes
	Control-S In	No	No
SYSTEM	TUNER		
	Tuning System	FSS	- / - / FSS
SYSTEM	INITIAL SET KEY(Easy Set Up)	Plug & Play(Channel/Clock)	- / - / Plug & Play (Channel/Clock)
	Broadcast System	NTSC-M	- / - / NTSC-M
SYSTEM	CH Coverage	VHF / UHF / CATV	- / - / VHF/UHF/CATV
	RF-out CH & System 3/4	VHF 3/4	- / - / 3/4 VHF
SYSTEM	Default RF Channel	No	- / - / No
	RF-out channel Auto seeking -->all G&I version	No	- / - / No
SYSTEM	Stereo System	MTS / SAP	- / - / MTS/SAP
	Station Capacity (Number of Preset)	181CH	- / - / 181CH
SYSTEM	TIMER RECORDING		
	No. of Events	12 Event / 1 Month	12 Event / 1 Month
SYSTEM	Backup Time	Permanent	30sec / 30sec / No
	Clock Type	Quartz	Quartz
SYSTEM	Auto Clock Set	Yes	No / No / Yes
	Just Clock	No	No
SYSTEM	Auto speed Timer Recording	Yes	Yes
	Easy Timer Programming (REC Dial Timer)	No	No
SYSTEM	EPG (Gemstar Function)	No	No
	VCR Plus	No	No
SYSTEM	SWITCH		
	Jog/Shuttle Dial (on the Front Panel)	No	No
SYSTEM	TV/VCR select Button	Yes	No / No / Yes
	Audio Mute Button	No	No
SYSTEM	Mode / Speed Select Switch	Yes (on the remote control)	Yes (on the remote control)
	Video System Select Switch	No	No
SYSTEM	Modulator System Select Switch	No	No
	GENERAL SYSTEM		
SYSTEM	Deck Type	X-13A	X-13A
	Cylinder Type	4Head Hi-Fi (6ch)	4Head Hi-Fi (6ch)

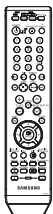
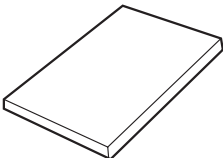
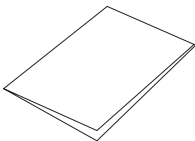
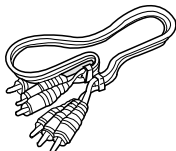
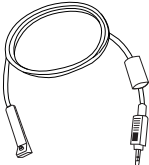
VCR	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
	Narrow Head	Yes (19μ)	Yes (19μ)
	Tape Speed NTSC : REC, (PB)	SP / EP , (SP / LP / EP)	SP / EP , (SP / LP / EP)
	FEATURES		
	Index Function (Search & SCAN)	Yes	Yes
	REW Time	about 120sec(T120)	about 120sec(T120)
	Auto Head Cleaner	No	No
	16:9 (Wide Broadcast : TV through)	No	No
	Digital Auto Tracking	Yes	Yes
	IPC (= Smart Trilogic)	No	No
	Auto Repeat Playback	Yes	Yes
	S-VHS (SQPB)	Yes	Yes
	Flying Erase Head	No	No
	Soft Cassette Door	No	No
	CODO	No	No

DVD	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
	Export Country	USA	USA / USA / CANADA
	Buyer Name	SEA	SEA / SEA / SECA
	GENERAL SYSTEM		
	DVD Deck Type	DP-R3(RAMBO-3)	DP-R4(RAMBO-4)
	Opt Type		FULL MULTI / FULL MULTI / RAM MULTI
	Dynamic Tilt Compensation	No	No
	REC mode	XP / SP / LP / EP	XP / SP / LP / EP
	Recording Media DVD-RAM	Yes	Yes
	Recording Media DVD-RW	Yes	Yes
	Recording Media DVD-R	Yes	Yes
	Recording Media DVD+RW	Yes	Yes / Yes / No
	Recording Media DVD+R	Yes	Yes / Yes / No
	Yes DVD	No	No
	Region Code	1	1
	Karaoke	No	No
	NTSC	Yes	Yes
	PAL Play to NTSC3.58	No	No
	Playable Media		
	DVD-VIDEO	Yes	Yes
	CD	Yes	Yes
	VCD	No	No / No / Yes
	SVCD	No	No
	CVD	No	No
	MPEG-4 (Divx)	Yes	Yes
	DVD-R	Yes	Yes
	DVD-RW (Video Mode)	Yes	Yes
	DVD-RW (VR Mode)	Yes	Yes
	DVD+R	Yes	Yes
	DVD+RW	Yes	Yes
	DVD-RAM	Yes	Yes
	DVD-R/RW	Yes	Yes
	MP3	Yes (500 folders)	Yes (500 folders)
	JPEG	Yes	Yes
	PHOTO-CD (KODAK)	Yes	Yes

DVD	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
	Super Audio CD (HD Layer)	No	No
	Super Audio CD (CD Layer)	Yes	Yes
	Copy Controlled CD	Yes	Yes
	DISC TEXT	No	No
	Memory Stick (ATRAC3)	No	No
	Memory Stick (JPEG)	No	No
	VIDEO		
	Video DAC	54MHz/10Bit	54MHz/10Bit
	Progressive (P480)	Yes	Yes
	Upscaling(720P/1080i)	Yes	Yes / Yes / No
	Block Noise Reduction	No	No
	Digital Video Enhancer	Yes (Embedded)	Yes (Embedded)
	Custom Picture Mode	No	No
	Video Equalizer	Yes (Embedded)	Yes (Embedded)
	AUDIO		
	Audio DAC	96kHz, 24 bit	96kHz, 24 bit
	DTS Digital Output	Yes	Yes
	Dolby Digital 5.1ch Decode	No	No
	DTS 5.1ch Decode	No	No
	Super Audio CD Multi ch Output	No	No
	Virtual Surround (2ch)	Yes	Yes
	V.C.Filter	No	No
	R-Core Transformer	No	No
	Audio Isolated Circuit Board	No	No
	Off Center Insulator	No	No
	FEATURES		
	Start Up Screen	No	No
	Screen Saver	Yes	Yes
	Audio/Video Bit Rate Indicator	No	No
	Layer Indicator	No	No
	1.5x Audio during Scan Forward	Yes	Yes
	128x Search	Yes	Yes
	HDMI CEC	No	Yes / Yes / No
	Instant Search	No	No
	Instant Replay	No	No
	Time Slip	No	No / Yes / No
	PIP	No	No
	30 sec SKIP	Yes	Yes
	Picture Navi	No	No
	Playback Memory	No	No
	Picture Memory	No	No
	Bookmark	Yes (10 discs)	Yes (10 discs)
	Zoom	Yes (x2 , x4)	Yes (x2 , x4)
	Resume	Yes	Yes
	Custom Parental Control	Yes	Yes
	Child Lock	Yes	Yes
	WMA	No	No
	EZ View	No	No
	EZ Play	No	No
	My DVD	No	No
	Sound Feedback	No	No

COMMON	Model Name(Buyer Model Name)	DVD-VR335	DVD-VR357 / VR355 / VR350
	ACCESSORIES		
	Remote Controller	Yes	Yes
	Batteries	Yes	Yes
	Power Cord Type	EP-2 Polarity	EP-2 Polarity
	Plug Conversion	No	No
	Euro Scart Cable(21pin)	No	No
	RF Cable	Yes	No / No / Yes
	RCA Audio Cable	No	No
	RCA A/V Cable	Yes	Yes
	HDMI Cable	No	No
	STB Control Cable	No	Yes / No / No
	Instruction Manual	Yes	Yes
	Quick Setup Guide	Yes	Yes
	Warranty Card	Yes(IB Included)	Yes(IB Included)
	REGISTRATION Card	Yes	Yes / Yes / No
	AS List (Stop Return Sheet)	Yes	Yes
	Customer Request Card	No	No
	DISC	No	No
	CARTON BOX		
	Packing Box (White Carton)	Flexo	Flexo
	EPS-less Carton	No	No
	Language	ENG	ENG / ENG / Eng/Fra
	DIMENSION ETC.		
	Dimension (W*H*D mm) <Net>	430x79x271	430x79x271
	Dimension (W*H*D mm) <Gross>	514X180X384	514X180X384 / 514X180X384 / -
	Weight (kg) <Net> / Weight (kg) <Gross>	3.97/5.48	3.9/5.4 / 3.9/5.4 / -
	Power Consumption ON/STANDBY	28W / 3.5W	28W/3.5W / 28W/3.5W / 23W/3.5W
	Power Requirement	~ 120V 60Hz	~ 120V 60Hz

2-3 Option Product Specification

Description Fig	Description	Parts No	Remark
	Remote Control	AK59-00062A	Model Standard of DVD-VR357/XAA
	Batteries for Remote Control	AC43-12002H	Model Standard of DVD-VR357/XAA S.N.A
	User's Manual	AK68-01287A	Model Standard of DVD-VR357/XAA
	Quick Guide	AK68-01288A	Model Standard of DVD-VR357/XAA S.N.A
	Video/Audio Cable	AC39-00073A	Model Standard of DVD-VR357/XAA
	IR Blaster Cable	AK39-00055A	Model Standard of DVD-VR357/XAA

MEMO

3. Alignment and Adjustments

3-1 VCR Adjustment

3-1-1 Reference

- 1) X-Point (Tracking center) adjustment, "Head switching adjustment" and "NVRAM option setting" can be adjusted with remote control.
 - 2) When replacing the Main PCB Micom (IC601) and NVRAM (IC603 ; EEPROM) be sure to adjust the "Head switching adjustment" and "NVRAM option setting".
 - 3) When replacing the cylinder ass'y, be sure to adjust the "X-Point" and "Head switching adjustment".
-) How to adjust.
- Intermittently short-circuit the Test Point on VCR-Jack PCB with pincers to the adjustment mode.
 - If the corresponding adjustment button is pressed, the adjustment is performed automatically.
 - When the adjustment is completed, be sure to turn the power off.

3-1-1(a) Location of adjustment button of remote control

- ✎ X-Point (Tracking Center) Adjustment ; ① + ⑤
- ✎ NVRAM Option Setting ; ① + ④
- ✎ Head Switching Adjustment ; ① + ①

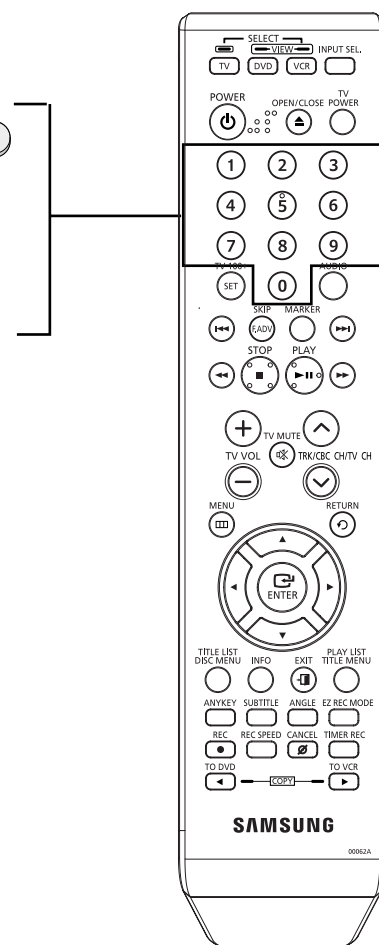


Fig. 3-1

3-1-1(b) TEST location for adjustment mode setting

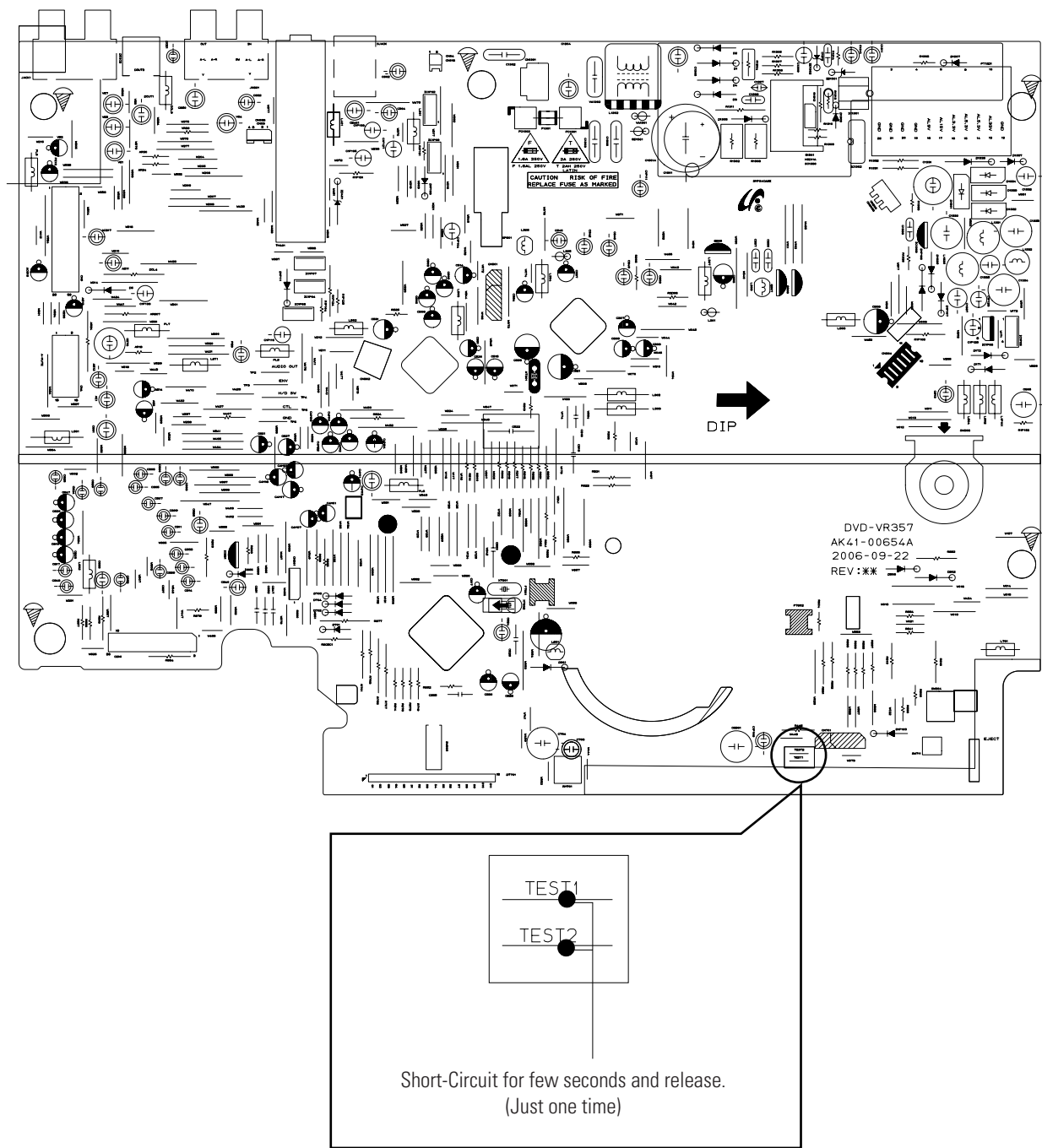


Fig. 3-2 VCR-Jack PCB (Top View)

3-1-2 Head Switching Point Adjustment

- 1) Playback the alignment tape.
- 2) Intermittently short-circuit the two Test Points on VCR-Jack PCB while setting the adjustment mode. (See Fig. 3-2)
- 3) Press the “1, 0” buttons; remote control adjustment operates automatically. (See Fig. 3-1)

3-1-3 NVRAM Option Setting

- 1) NVRAM Option is adjusted in the factory.
- 2) In case VCR-Jack PCB Micom (IC601) and NVRAM (IC603 ; EEPROM) are replaced, be sure to set the corresponding option number of the required model. (If the option is not set, the unit will not operate.)

- 1) Intermittently short-circuit the two Test Points on VCR-Jack PCB. (See Fig. 3-2)
- 2) Press the “1, ” button on the remote control. The option setting appears. (See Fig. 3-3)
- 3) Select the option number (See table 3-1) of corresponding model with “◀, ▶, ▲, ▼” buttons on the remote control.
- 4) After selecting the option number is completed, press the “▲” button of remote control.
(If “▲” button is pressed, the selected number is changes color. ; See Fig. 3-4)
- 5) Press the “ENTER” button of remote control again to store the option number.
- 6) Turn the Power off.

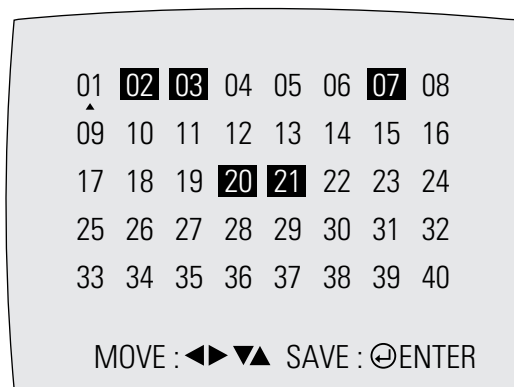


Fig. 3-3

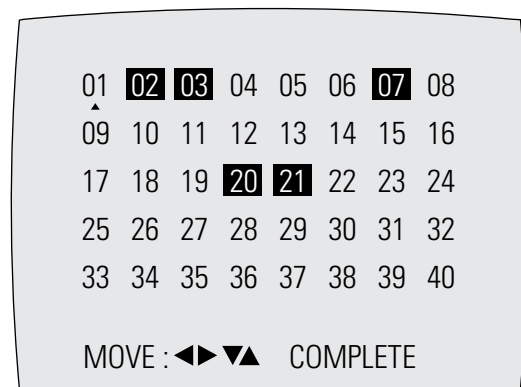


Fig. 3-4

<Table 3-1 NVRAM Option Table>

MODEL	OPTION NUMBERS
DVD-VR357/XAA	2, 5, 7, 9, 12, 13, 20, 21, 25, 26, 31, 32, 33, 34, 35, 37, 38
DVD-VR355/XAA	2, 5, 7, 9, 13, 20, 21, 25, 26, 31, 32, 33, 34, 35, 37, 38
DVD-VR355/XAC	2, 3, 5, 7, 13, 16, 20, 21, 25, 26, 31, 32, 33, 34, 35, 37
DVD-VR350/XAC	2, 3, 5, 7, 13, 16, 20, 21, 25, 26, 31, 34, 35
DVD-VR350/XAX	2, 5, 7, 8, 9, 12, 13, 16, 17, 20, 25, 26, 31, 33, 34, 35, 37

3-2 VCR Mechanical Adjustment

3-2-1 Tape Transport System and Adjustment Locations

The tape transport system has been adjusted precisely in the factory. Alignment is not necessary except for the following :

- 1) Noise observed on the screen.
- 2) Tape damage.
- 3) Parts replacement in the tape transport system.

Lower flange height of tape guide is used as the reference for the transport adjustment.

To maintain the height of the tape guide and prevent damage, do not apply excessive force onto the main base.

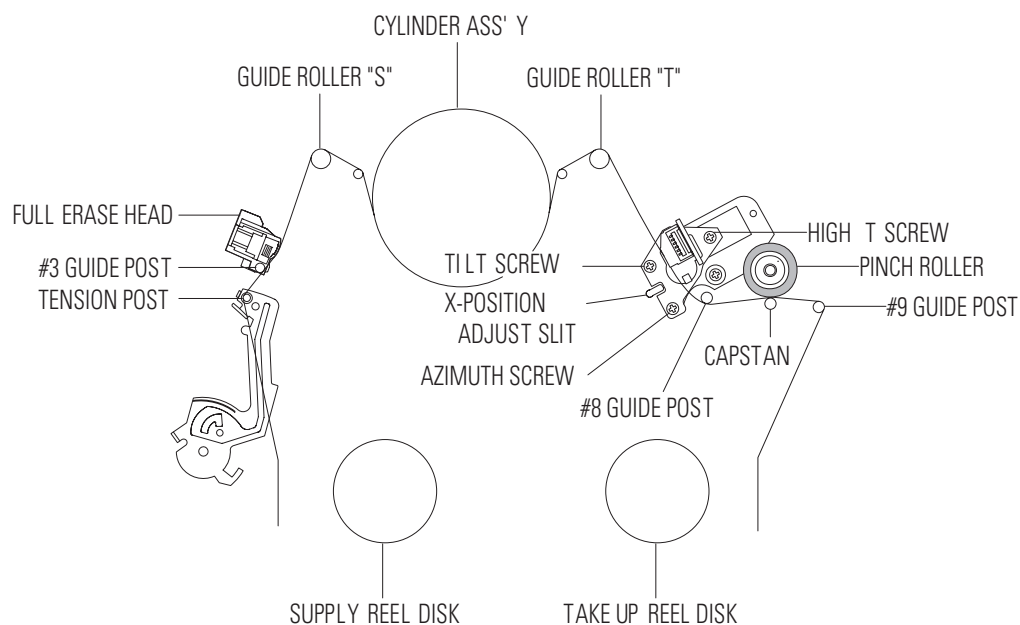


Fig. 3-5 Location of Tape Transport Adjustment

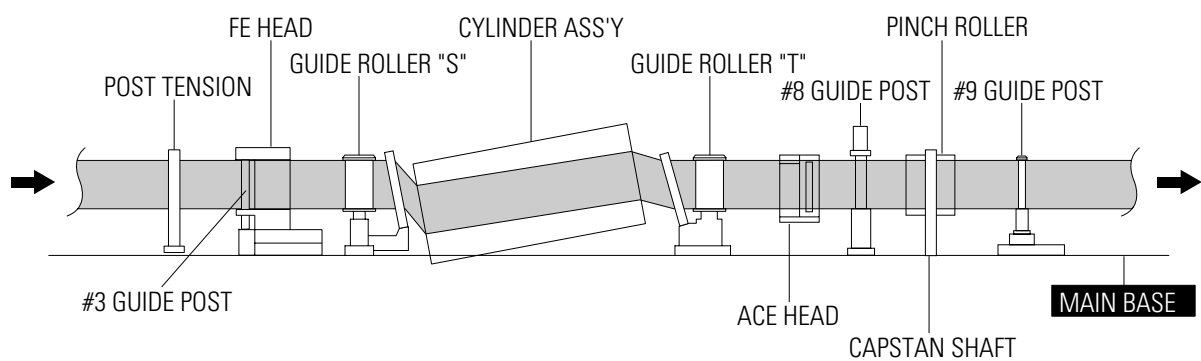


Fig. 3-6 Tape Travel Diagram

3-2-2 Tape Transport System Adjustment

When parts are replaced, perform the required adjustments by referring to procedures for the tape transport system. If there are any changes to the tape path, first run a T-120 tape and make sure excessive tape wrinkle does not occur at the tape guides.

- ◆ If tape wrinkle is observed at the guide roller S, T, turn the guide roller S, T until wrinkle disappears.
- ◆ If the tape wrinkle is still observed at the tape guide, perform the tilt adjustment of the AC head.

(1) AC Head Assembly Adjustment

a. AC HEAD HEIGHT ADJUSTMENT

- 1) Run the alignment tape (Color bar) in the playback mode.
- 2) Observe surface of the audio head using a dental mirror.
- 3) Turn screw (C) clockwise or counterclockwise until the gap of lower tape edge and the lower edge of the control head is about 0.25mm. (Refer to Fig. 3-7 and 3-8)

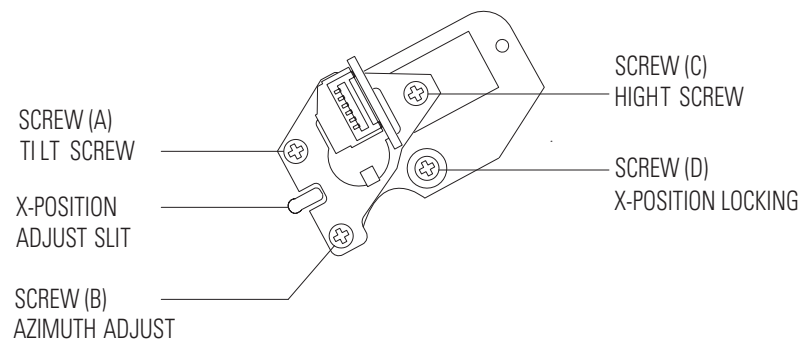


Fig. 3-7 Location of AC Head Adjustment Screw

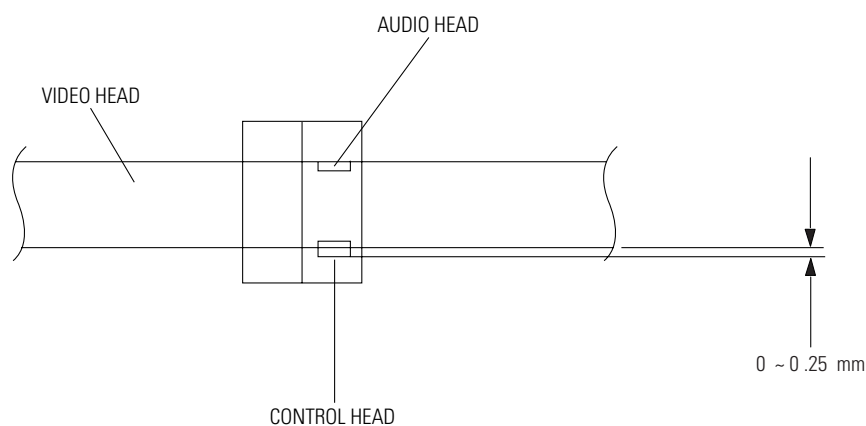


Fig. 3-8 AC Head Height Adjustment

b. AC HEAD TILT ADJUSTMENT

- 1) Playback a blank tape and observe the position of the tape at the lower flange of tape guide.
- 2) Confirm that there is no curl or wrinkle at the lower flange of tape guide as shown in Fig. 3-9 (B).
- 3) If a curl or wrinkle of the tape occurs, slightly turn the screw (A) tilt adjust on the AC head ass'y.
- 4) Reconfirm the AC head height.

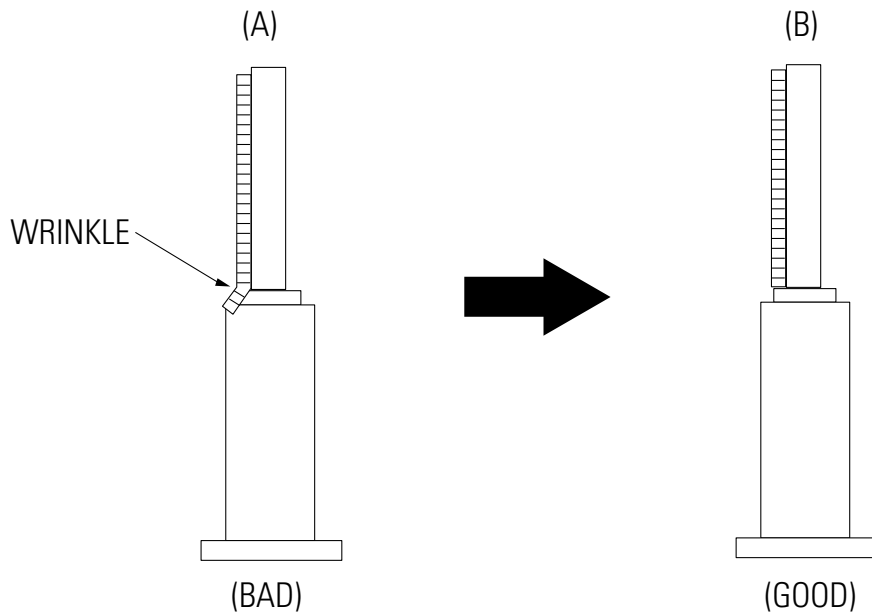


Fig. 3-9 Tape Guide Check

c. AUDIO AZIMUTH ADJUSTMENT

- 1) Load alignment tape (Mono scope) and playback the 7KHz signal.
- 2) Connect channel-1 scope probe to audio output.
- 3) Adjust screw (B) to achieve maximum audio level. (See Fig. 3-7)

d. AC HEAD POSITION (X-POINT) ADJUSTMENT

- 1) Playback the alignment tape (Color bar)
- 2) Intermittently short-circuit the two Test Points on VCR-Jack PCB. (See Fig. 3-2)
- 3) Press the "0, 5" remote control buttons, then adjustment is operates automatically. (See Fig. 3-1)
- 4) Connect the CH-1 probe to "Envelope" the CH-2 probe to "H'D switching pulse" and then trigger to CH-1.
- 5) Insert the (-) driver into the X-Point adjustment hole and adjust it so that envelope waveform is maximum.

Test point :

- TP2 (Audio Output)
- TP3 (Envelope)
- TP4 (H'D S/W -Trigger)
- TP5 (Control Pulse)

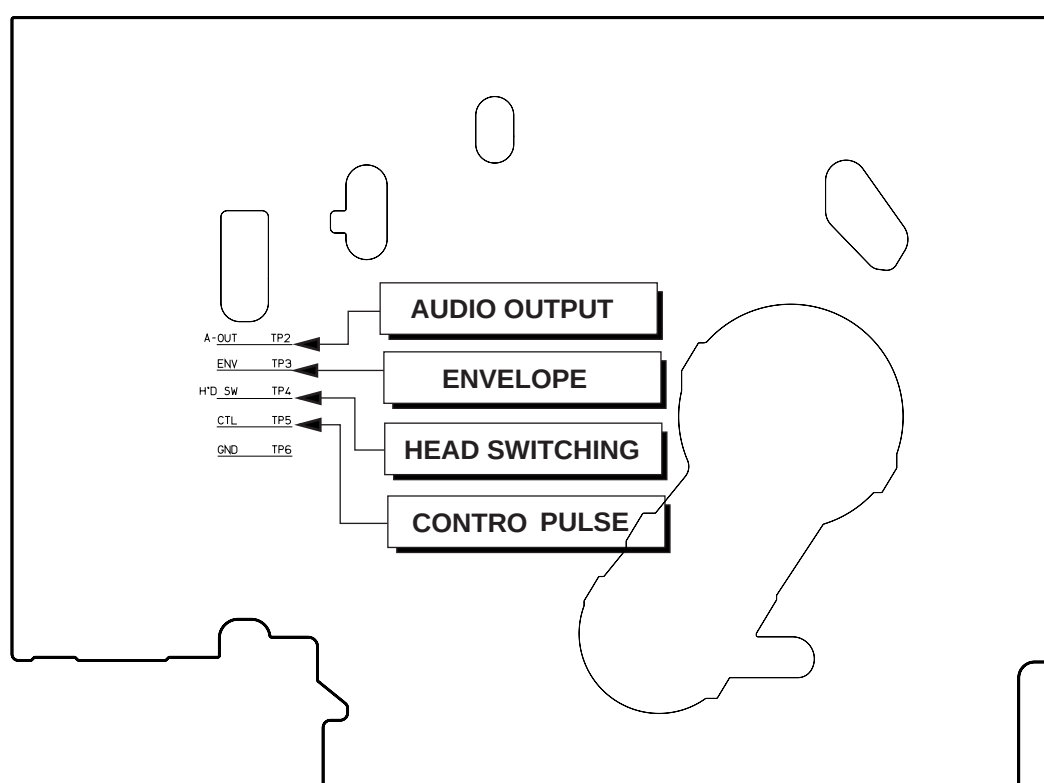


Fig. 3-10 Location of Test point (VCR-Jack PCB-Top View)

(2) Linearity adjustment (Guide roller S, T adjustment)

- 1) Playback the Mono Scope alignment tape (SP mode).
- 2) Observe the video envelope signal on an oscilloscope (triggered by the video switching pulse).
- 3) Make sure the video envelope waveform (at its minimum) meets the specification shown in Fig. 3-11.

If it does not, adjust as follows :

Note :

- a=Maximum output of the video RF envelope.
- b=Minimum output of the video RF envelope at the entrance side.
- c=Minimum output of the video RF envelope at the center point.
- d=Maximum output of the video RF envelope at the exit side.

- 4) If the section A in Fig. 3-15 does not meet the specification, adjust the guide roller S up or down.
- 5) If the section B in Fig. 3-15 does not meet the specification, adjust the guide roller T up or down.

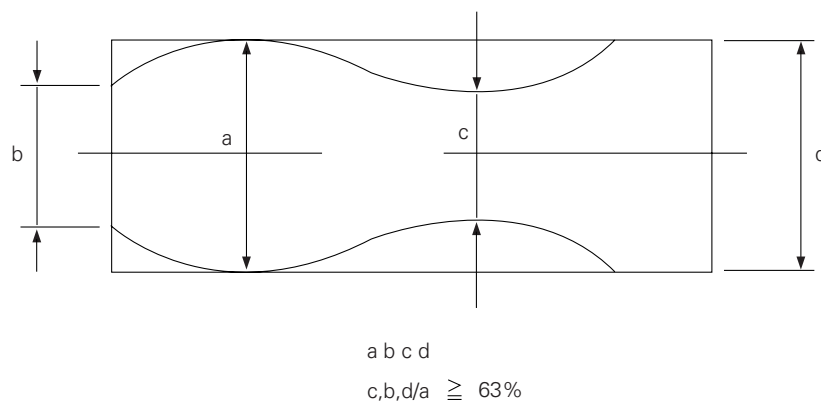


Fig. 3-11 Envelope Waveform Adjustment

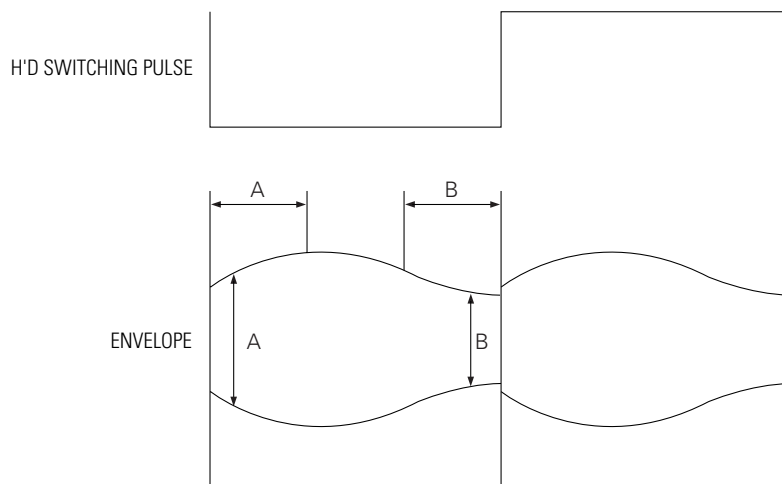


Fig. 3-12 Adjustment Points

- 6) Play back the Mono Scope alignment tape (SP mode).
- 7) Connect an oscilloscope CH-1 to the "Envelope" and CH-2 to the "H'D SW Pulse" for triggering.
- 8) Turn the guide roller heads with a flat head () driver to obtain a flat video RF envelope as shown in Fig. 3-13.

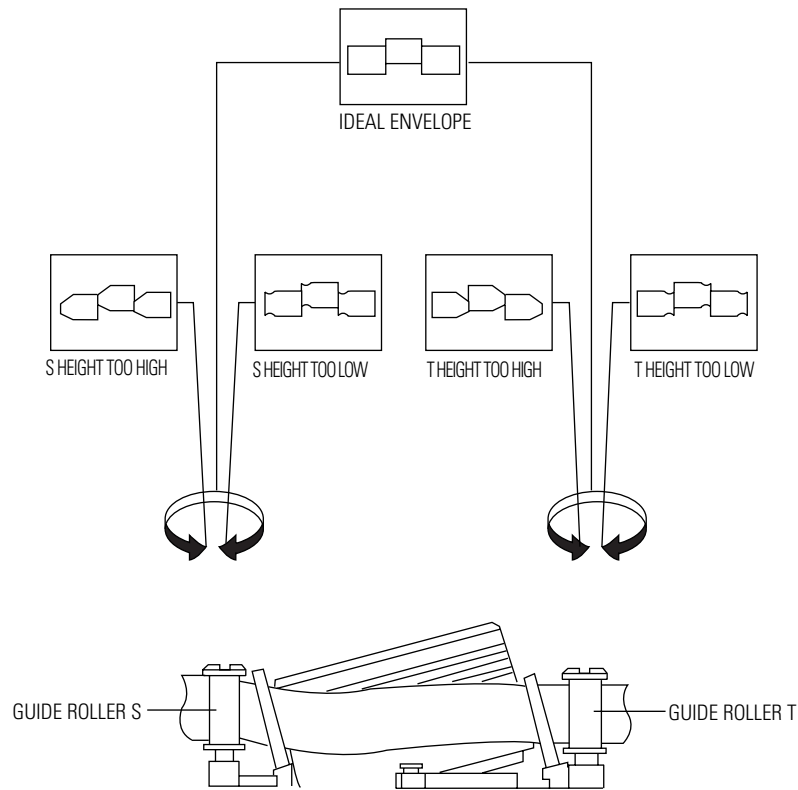


Fig. 3-13 Guide Roller S, T Height Adjustment

(3) Check Transitional Operation from RPS to Play

Check transition from RPS mode to play mode : Using a pre-recorded SP tape, make sure the entry side of envelope comes to an appropriate steady state within 3 seconds (as shown in Fig. 3-1).

If the envelope waveform does not reach specified peak-to-peak amplitude within 3 seconds, adjust as follows :

- 1) Make sure there is no gap between the supply roller lower flange and the tape.
If there is a gap, adjust the supply guide roller again.
- 2) Change operation mode from the RPS to the play mode (again) and make sure the entry side of envelope rises within 3 seconds.

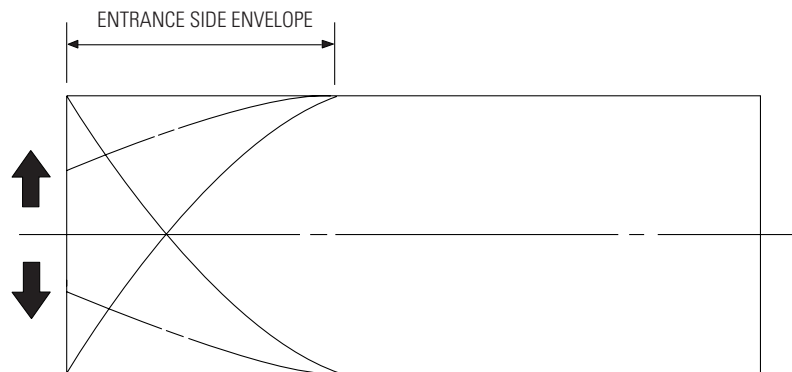


Fig.3-14 Video Envelope Rising when Operation mode Changes from RPS to Play Mode

(I) Envelope Check

- 1) Make recordings on T-120 (E-120) and T-160 (E-180) tape.
Make sure the playback output envelope meets the specification as shown in Fig. 3-15.
- 2) Play back a self recorded tape (recording made on the unit using with T-120 (E-120)).
The video envelope should meet the specification as shown in Fig. 3-18.
In SP mode, (A) should equal (B).
If the head gap is wide, upper cylinder should be checked.

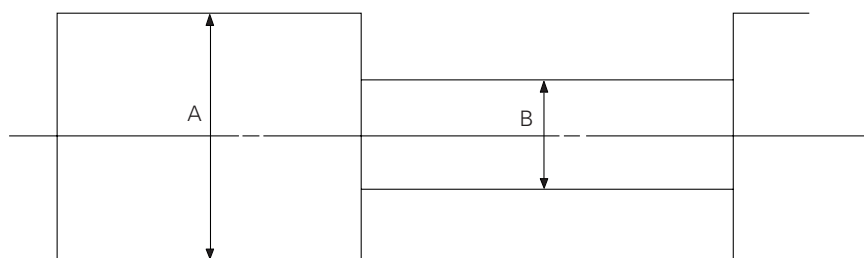


Fig. 3-15 Envelope Input and Output Level

(5) Tape Wrinkle Check

- 1) Run the T-160 (E-180) tape in the playback, FPS, RPS and Pause modes and observe tape wrinkle at each guide.
- 2) If excessive tape wrinkle is observed, perform the following adjustments in Playback mode :

- ◆ Tape wrinkle at the guide roller S, T section : Linearity adjustment.
- ◆ Tape wrinkle at tape guide flange : AC head assembly coarse adjustment.

3-2-3 Reel Torque

- 1) The rotation of the capstan motor causes the holder clutch ass'y to rotate through the belt pulley.
- 2) The spring wrap PLAY/REV of holder clutch ass'y drives the disk reel S, T through gear idler by rotation of gear center ass'y.
- 3) Brake is operated by slider cam at FF/REW mode.
- 4) Transportation of accurate driving force is done by gears. (Gear Center Ass'y)

Note : If the spec. does not meet the followings specifications, replace the holder clutch ass'y and then recheck.

<Table 3-2>

MODE	TORQUE g/cm	GAUGE
PB	2 ± 11	Cassette Torquemeter
RPS	15 ± 30	Cassette Torquemeter

MEMO

4. Software Update

4-1 Drive Firmware Update

4-1-1 Introduction

Samsung will often support software update to improve the performance of DVD Recorder&VCR to the latest status, through Samsung Internet Site. (www.samsung.com)

4-1-2 How to make an update disc

• **Write the downloaded file onto a blank CD-R or CD-RW disc, using the following settings :**

- 1) You have to download a new file through Samsung Internet site. (www.samsung.com)
- 2) Write the file to disc using the CD-RW of your computer.

NOTE

- Recommended Application Program
 - Nero Burning / Easy CD Creator ..etc
- Option
 - Name : SDM2224
 - Extension name : "*.REC"
 - Multisession : No Multisession
 - File name length : Max. of 11 = 8 + 3
 - Format : Mode 1
 - Character set : ISO 9660 or Joliet Format
 - CD Close & Disc at once
 - Label : RAMBO

WARNING

It is very important : please read the below notice below before updating your unit.

The following events may interrupt the update process and MAY RESULT IN PERMANENT DAMAGE TO THE UNIT WHILE UPDATING

- ① Unplugging the power cord.
- ② Power Outage.
- ③ Dirt or Scratches on the disc.
- ④ Opening a disc tray during processing.

- 1) Press **OPEN/CLOSE** to open the disc tray.
 - 2) Insert the update CD-R disc with the software update, label facing up.
 - 3) Press **OPEN/CLOSE** to close the disc tray.
- * It takes about 1~2 minutes before the message below appears.

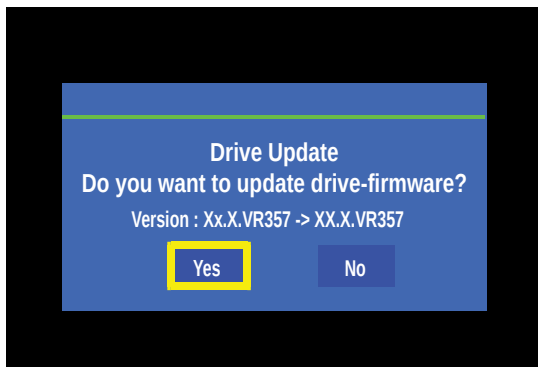


Fig. 4-1

* If you don't see the message above, try another disc. Generally, this is caused by disc quality and by disc creating problem.

- 4) Press the **ENTER** button on the remote control (Fig. 4-2).

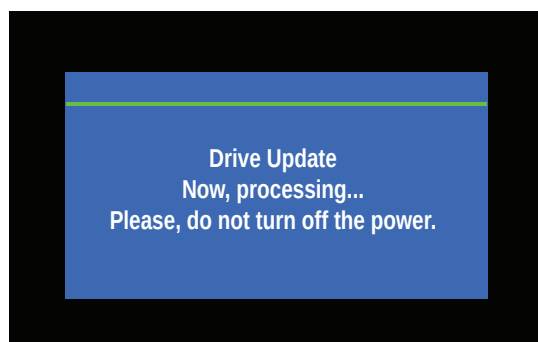


Fig.4-3

After checking old and new version, select "Yes" or "No" with "◀" or "▶" on the remote control.
 * The Version is indicated by "XX.X modelName"

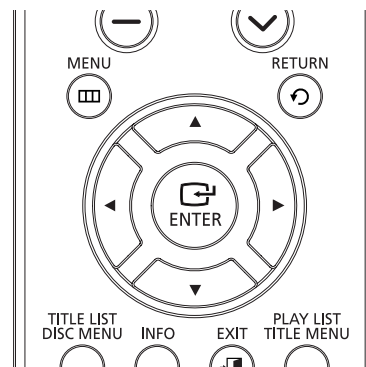


Fig. 4-2 Remote Control

You will see "LOAD" on FLT Display.

- 5) It takes about 1~2 minutes to complete the update.
 The message below will be displayed in the screen after update is completed and the tray will open automatically.

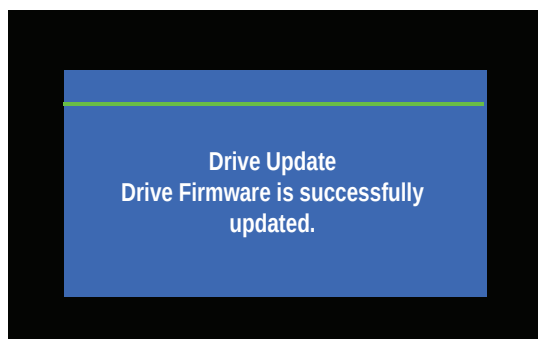


Fig. 4-4



Fig. 4-5

- 6) After removing the update disc, turn off the unit with power button.
 Afterwards turn unit back on with power button to close file.
 The drive firmware is now completed.

4-2 Flash Update

4-2-1 Introduction

Samsung will often support software update to improve the performance of DVD Recorder&VCR to the latest status, through Samsung Internet Site. (www.samsung.com)

4-2-2 How to make an update disc

Write the downloaded file onto a blank CD-R or CD-RW disc, using the following settings :

- 1) You have to download a new file through Samsung Internet site. (www.samsung.com)
- 2) Write the file to disc using the CD-RW of your computer.

NOTE

- Recommended Application Program
 - Nero Burning / Easy CD Creator ..etc
- Option
 - Only single session
 - CD close & disc at once
 - ISO 9660 or joliet format
 - Extension name : "*.RUF"
- In order to increase disc playability, add a dummy file (over 100MB) together with the latest program.
(The dummy file can be used any kind of file except MP3 file etc which can be played in the unit and we recommend to use a file with extension name as "*.dmy", which can be changed from original one.)

WARNING

It is very important : please read the below notice below before updating your unit.

The following events may interrupt the update process and MAY RESULT IN PERMANENT DAMAGE TO THE UNIT WHILE UPDATING

- ① Unplugging the power cord.
- ② Power Outage.
- ③ Dirt or Scratches on the disc.
- ④ Opening a disc tray during processing.

- 1) Press **OPEN/CLOSE** to open the disc tray.
- 2) Insert the update CD-R disc with the software update, label facing up.
- 3) Press **OPEN/CLOSE** to close the disc tray.

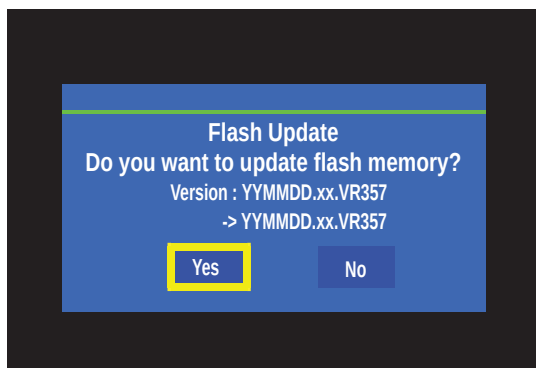


Fig. 4-6

* If you don't see the message above, try another disc.
Generally, this is caused by disc quality and by disc creating problem.

- 4) Press the **ENTER** button on the remote control (Fig. 4-7).

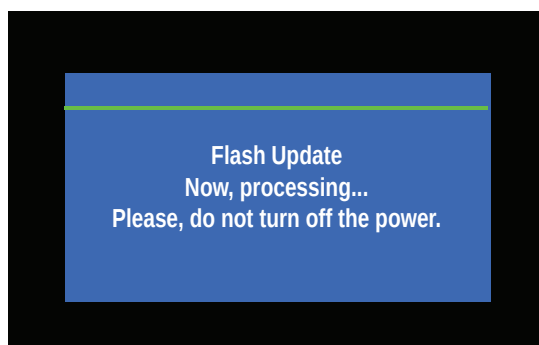


Fig. 4-8

- 5) It takes about 5 minutes to complete the update.
The message below will be displayed in the screen after update is completed and the tray will open automatically.

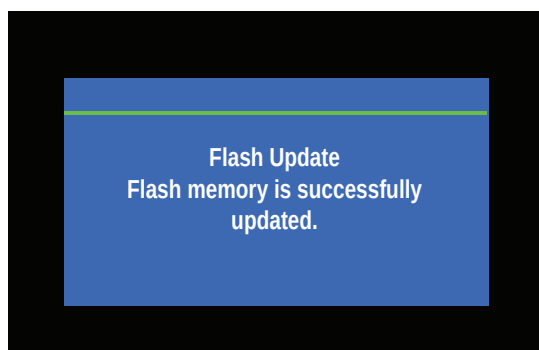


Fig. 4-9

- 6) After removing the update disc, turn off the unit with power button.
And there after turn on the unit with power button and then the will be closed.
The Flash update is now completed.

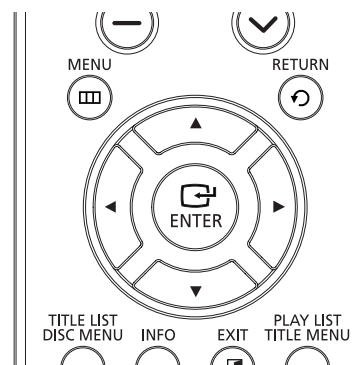


Fig. 4-7 Remote Control

After checking old and new version, select "Yes" or "No" with "◀" or "▶" on the remote control.
* The Version is indicated by "YYMMDD.xx modelName"

* If the message to the left isn't displayed after 10minutes and the unit is no longer functioning properly, contact a samsung authorized service center.

5. Disassembly and Reassembly

5-1 Cabinet and PCB

5-1-1 Cabinet Top Removal

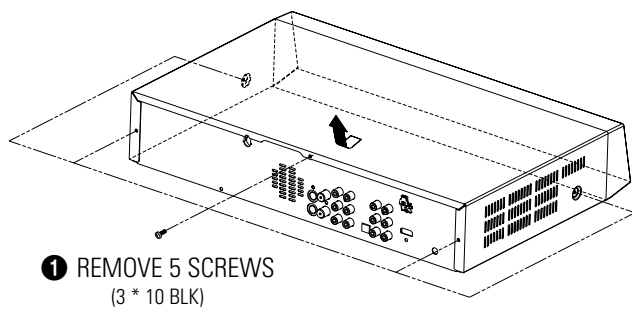


Fig. 5-1 Cabinet Top Removal

5-1-2 Ass'y Bottom Cover Removal

(Bottom View)

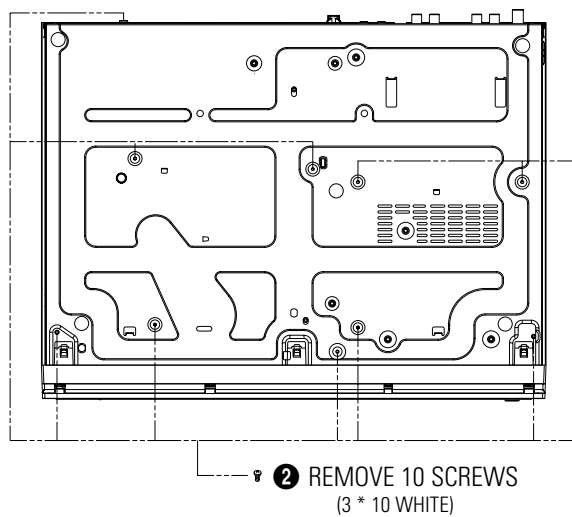


Fig. 5-2 Ass'y Bottom Cover Removal

5-1-3 Ass'y Front Panel Removal

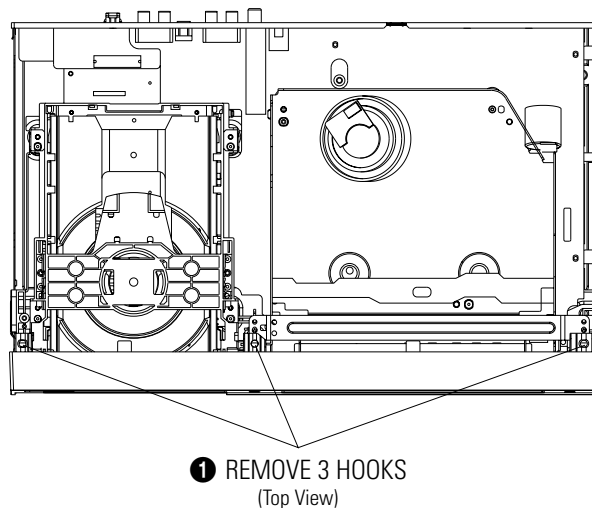


Fig. 5-3 Ass'y Front Panel Removal(Top View)

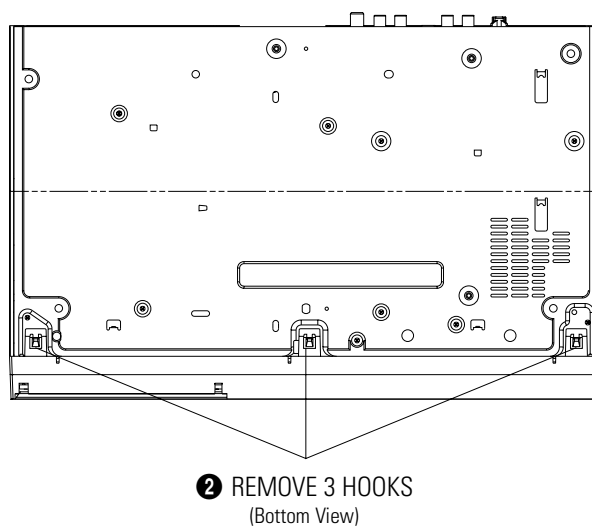


Fig. 5-4 Ass'y Front Panel Removal(Bottom View)

5-1-5 Chassis Removal

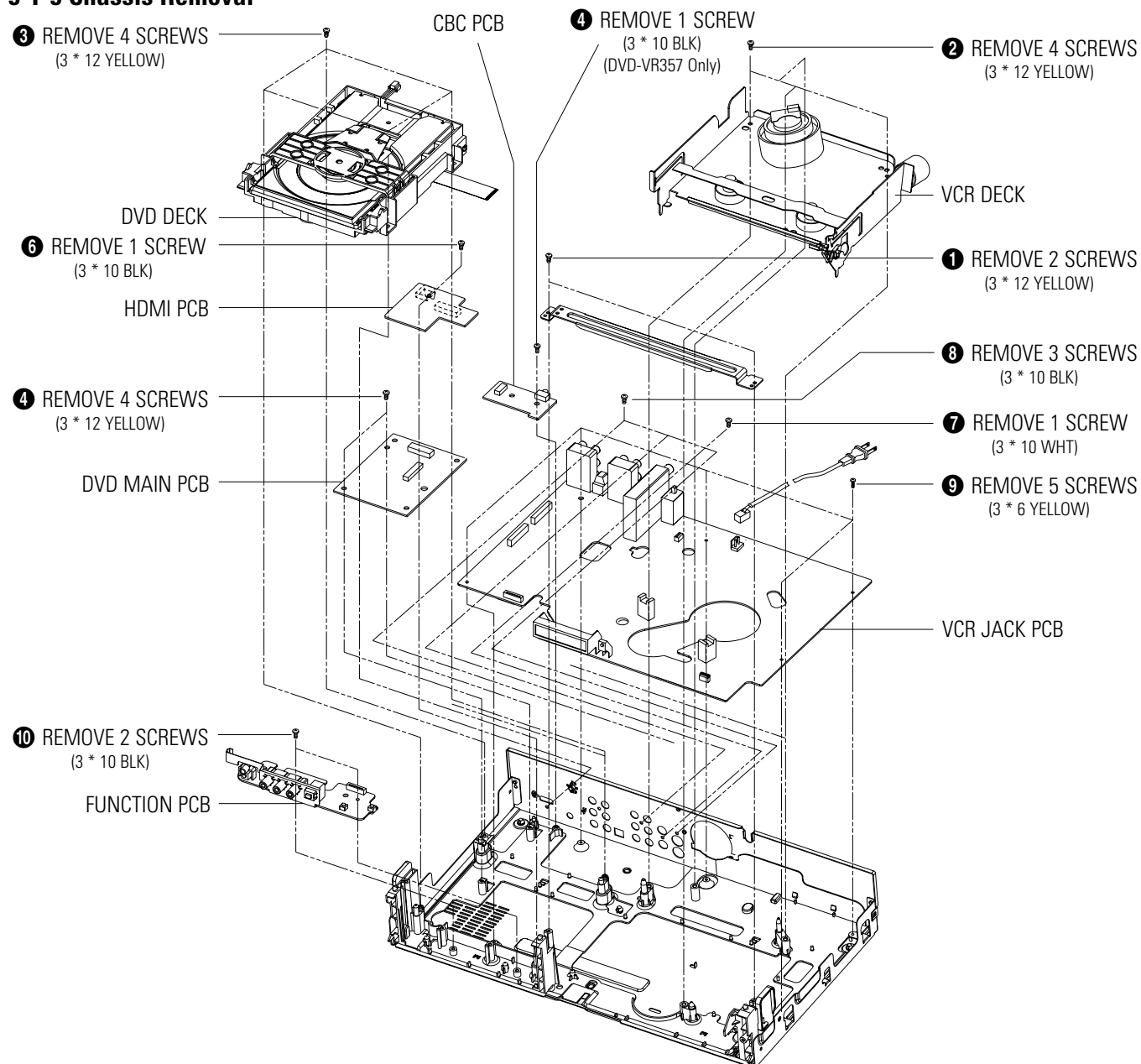


Fig. 5-5 Chassis Removal

5-1-6 VCR Main PCB Removal

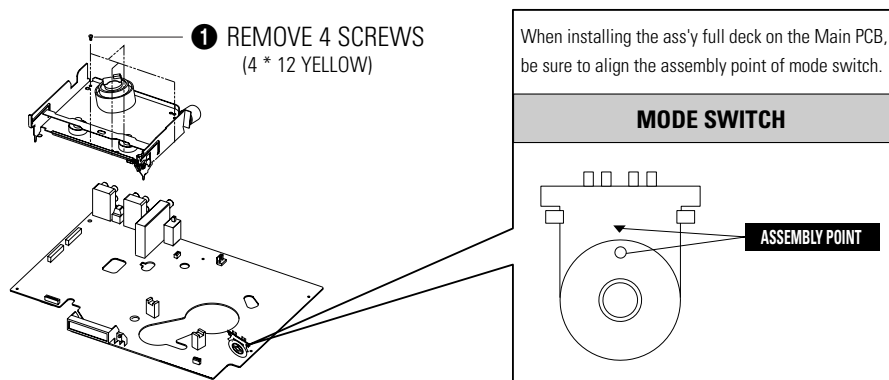


Fig. 5-6 VCR Main PCB Removal

5-2 Circuit Board Locations

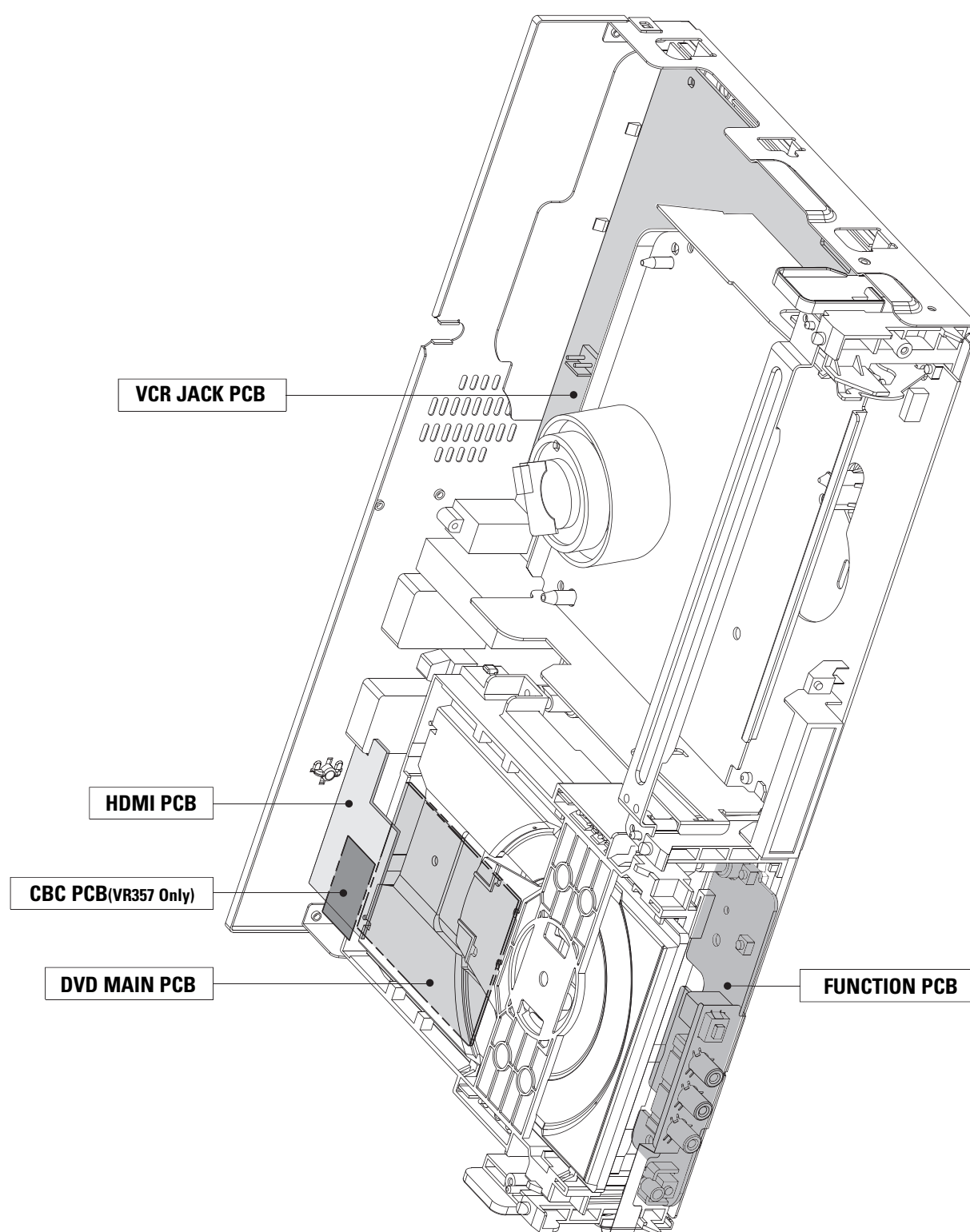


Fig. 5-7 Circuit Board Locations

5-3 VCR Deck Parts Locations

5-3-1 Top View

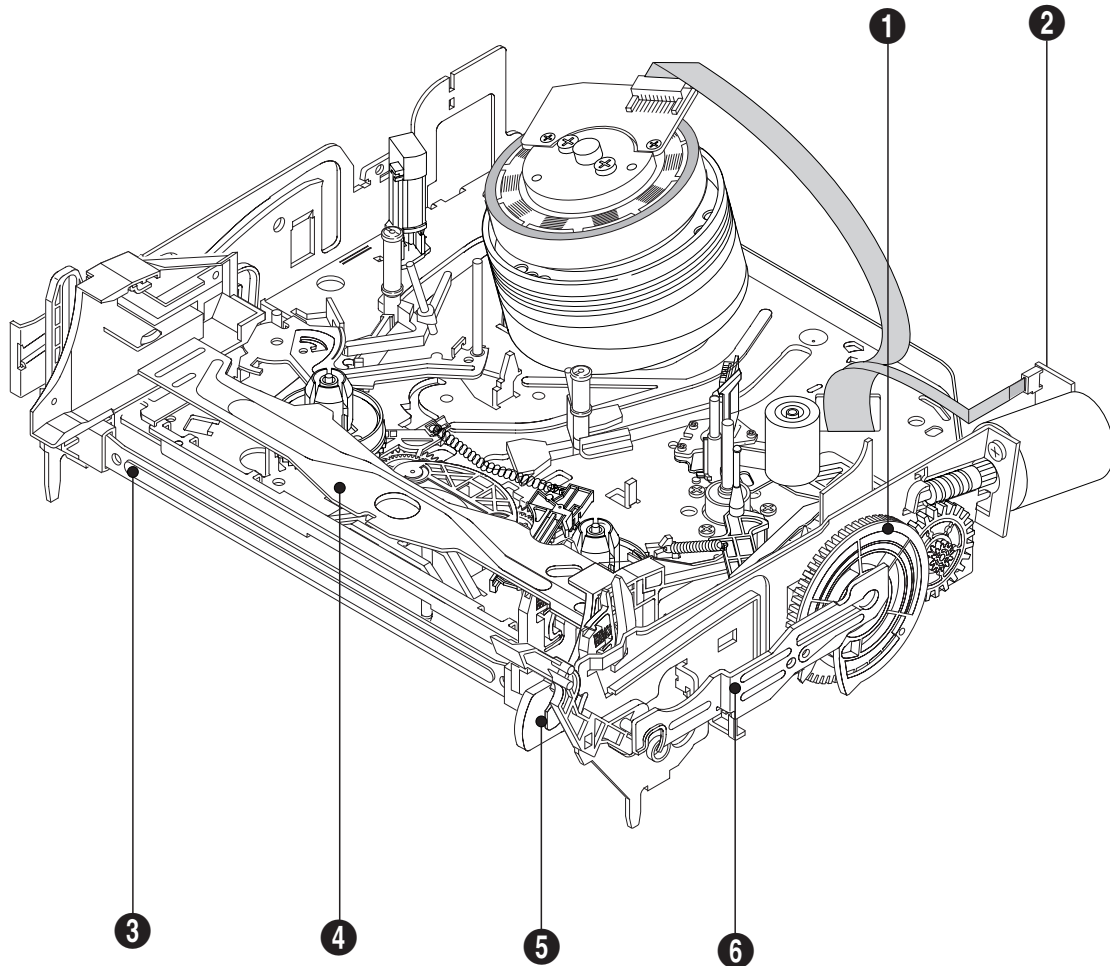


Fig. 5-8 Top parts Location-1

- ❶ GEAR FL CAM
- ❷ ASS'Y MOTOR LOADING
- ❸ ASS'Y LEVER ARM
- ❹ ASS'Y HOLDER CASSETTE
- ❺ LEVER DOOR
- ❻ SLIDER FL DRIVE

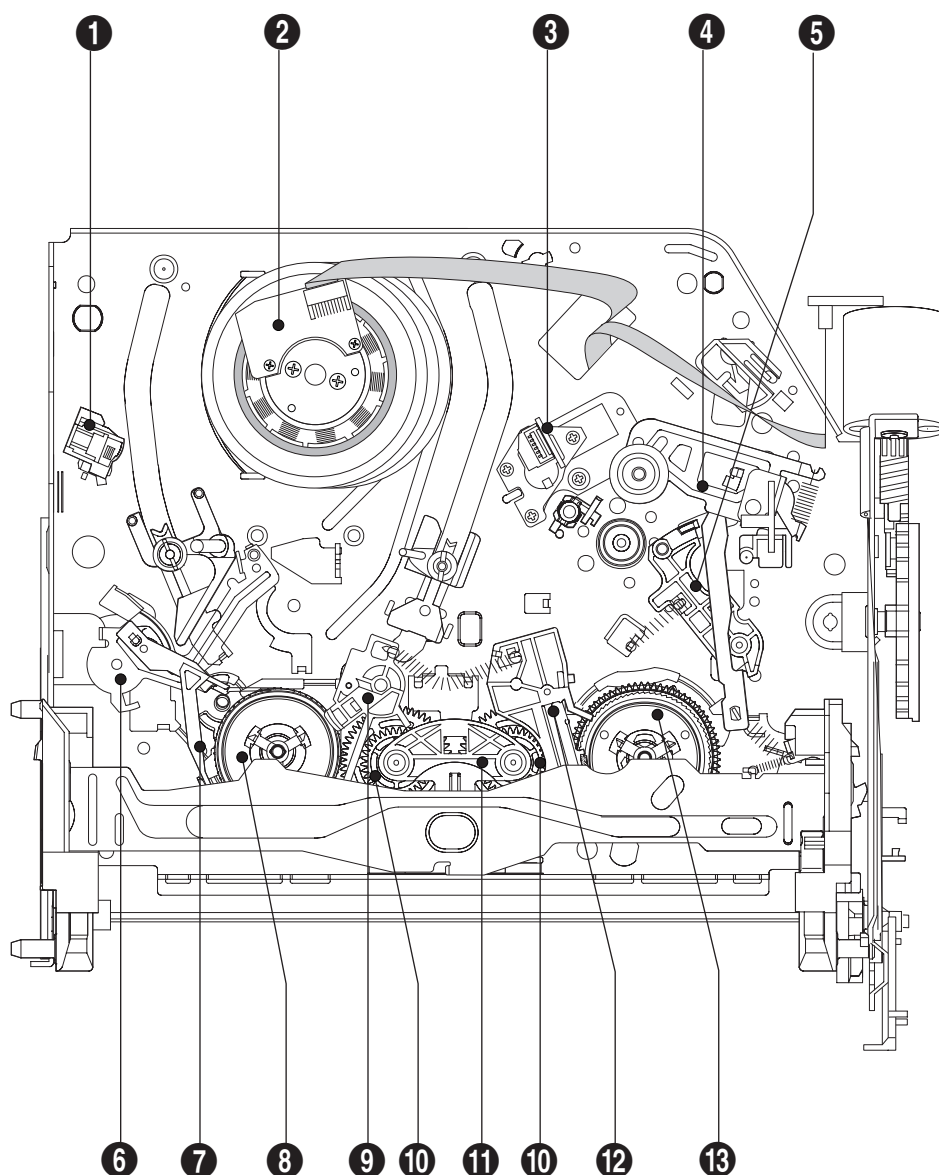


Fig.5-9 Top Parts Location-2

- | | |
|--------------------------|-----------------------|
| ❶ FE HEAD | ❸ DISK S REEL |
| ❷ ASS'Y CYLINDER | ❹ ASS'Y LEVER S BRAKE |
| ❸ ASS'Y CE HEAD | ❺ GEAR IDLE |
| ❹ ASS'Y LEVER UNIT PINCH | ❻ LEVER IDLE |
| ❺ ASS'Y LEVER #9 GUIDE | ❼ ASS'Y LEVER T BRAKE |
| ❻ ASS'Y LEVER TENSION | ❽ DISK T REEL |
| ❼ ASS'Y BAND BRAKE | |

5-3-2 Bottom View

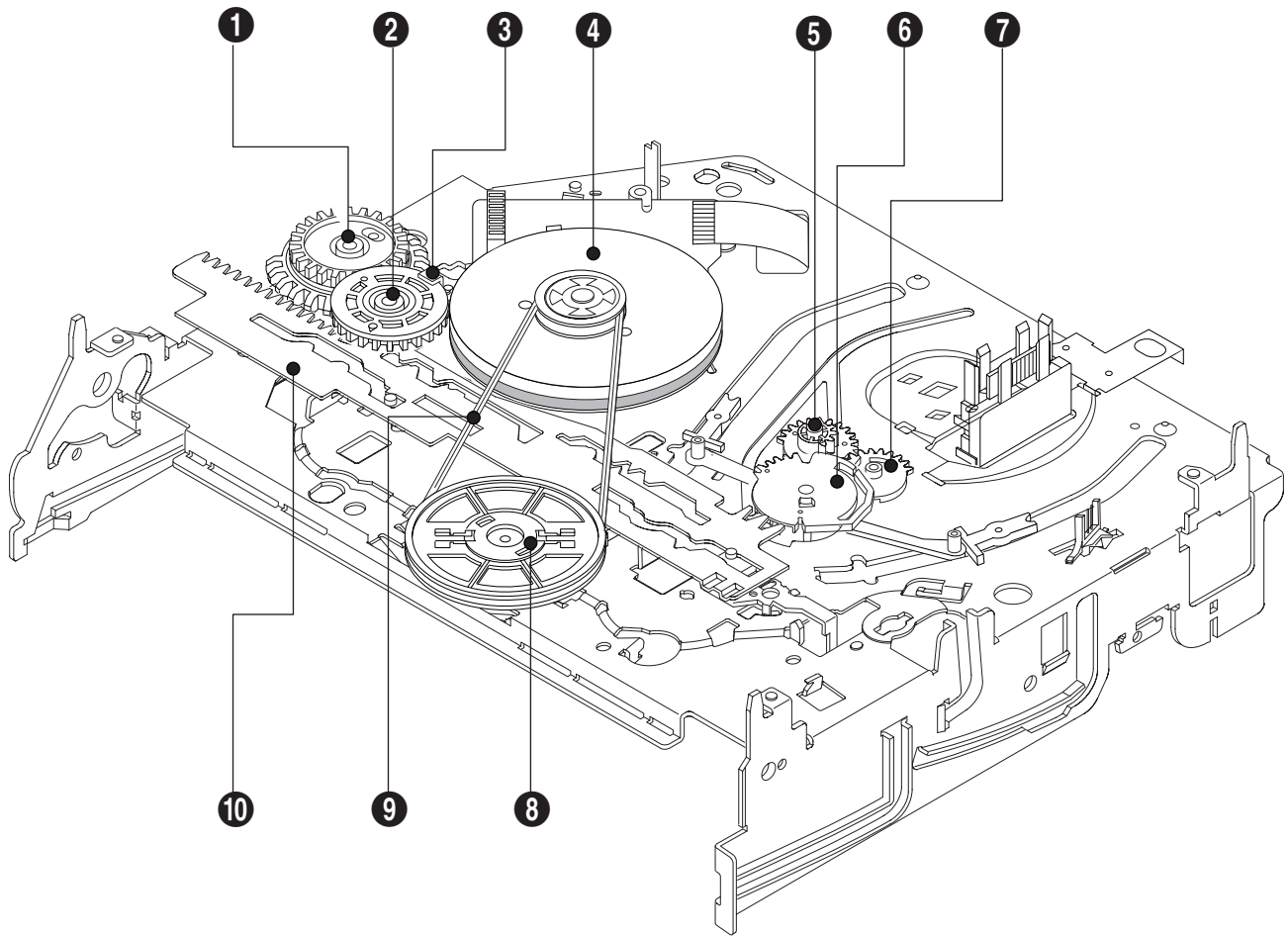


Fig. 5-10 Bottom Parts Location

- ❶ GEAR JOINT 1
- ❷ GEAR JOINT 2
- ❸ BRACKET GEAR
- ❹ ASS'Y MOTOR CAPSTAN
- ❺ ASS'Y LEVER T LOAD
- ❻ GEAR LOADING DRIVE
- ❼ ASS'Y LEVER S LOAD
- ❽ ASS'Y CLUTCH
- ❾ BELT PULLEY
- ❿ SLIDER CAM

5-4 VCR Deck

5-4-1 Ass'y Holder Cassette Removal

- 1) Pull the Ass'y Holder Cassette ❶ to the eject position.
- 2) Pull the Ass'y Holder Cassette ❶ as grasping the Ass'y Holder Cassette ❶ and Lever Lock ❷ in the same time to release hooking from Main Base until the Boss [A] of Ass'y Holder Cassette ❶ is taken out from the Rail [B].
- 3) Lift the Ass'y Holder Cassette ❶, in this time, you have to grasp the Lever Lock ❷ Continuously until the Ass'y Holder Cassette ❶ is taken out completely.

Note : Be sure to insert Lever Lock ❷ in the direction of "A" to prevent separation and breakage of the Lever Lock ❷ at disassembling and reassembling.

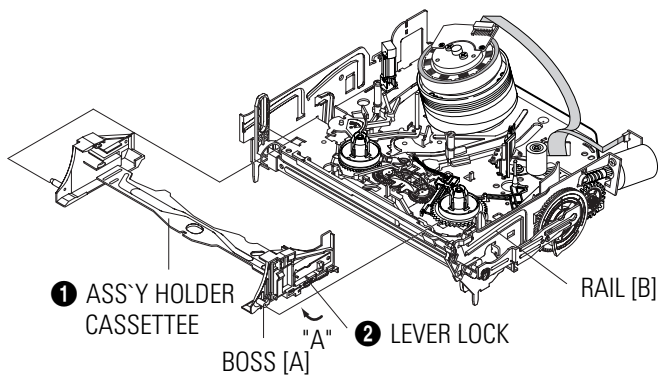


Fig. 5-11 Ass'y Holder Cassette Removal

5-4-2 Ass'y Lever Arm Removal

- 1) Push the hole "A" in the direction of arrow "B" use the pin.(about Dia. 2.5)
- 2) Pull out the Ass'y Lever Arm ❶ from the Boss of Main Base.
- 3) Remove the Ass'y Lever Arm ❶ in the direction of arrow "C".

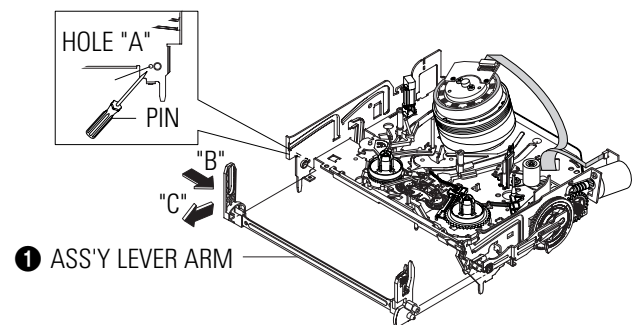


Fig. 5-12 Ass'y Lever Arm Removal

5-4-3 Lever Door Removal

- 1) Release the Hook ❷ and Remove the Lever Door ❶ in the direction of arrow "A".

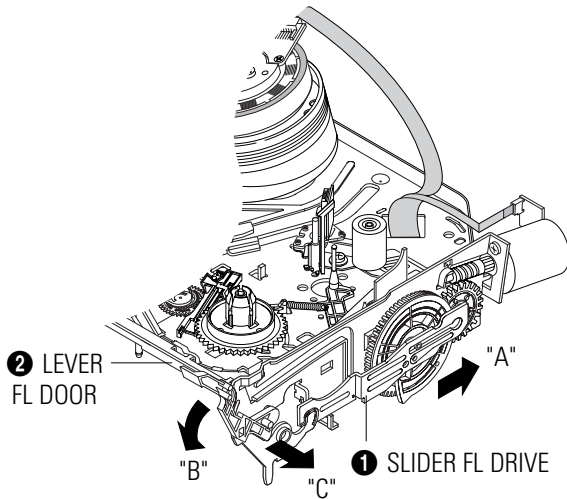


Fig. 5-13 Lever Door Removal

5-4-4 Slider FL Drive, Gear FL Cam Removal

- 1) Pull the Slider FL Drive ❶ to the front direction.
- 2) Remove the Slider FL Drive ❶ in the direction of arrow. (Refer to Fig. 5-13)
- 3) Remove the Gear FL cam ❷.

Note : When reinstalling be sure to reassemble Slider FL drive ❶ after you insert the Boss of Lever ARM-R in Groove of Slider Fl drive ❶.

Assembly : Align the Gear FL Cam ❶ with the Gear worm wheel Post as shown drawing. (Refer to Timing point)

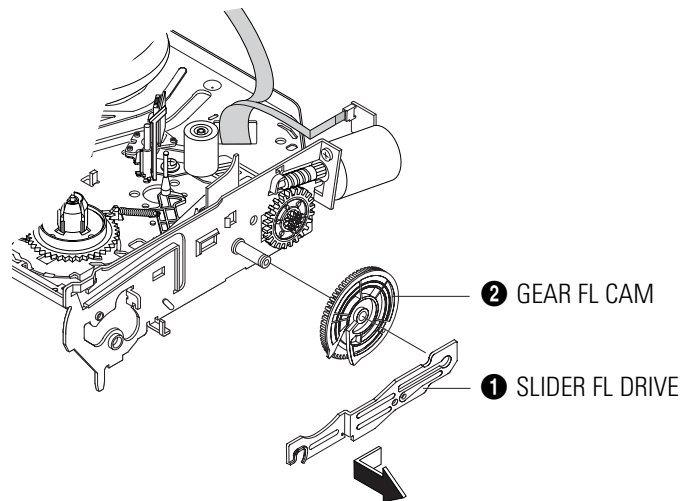


Fig. 5-14 Slider FL Drive Removal

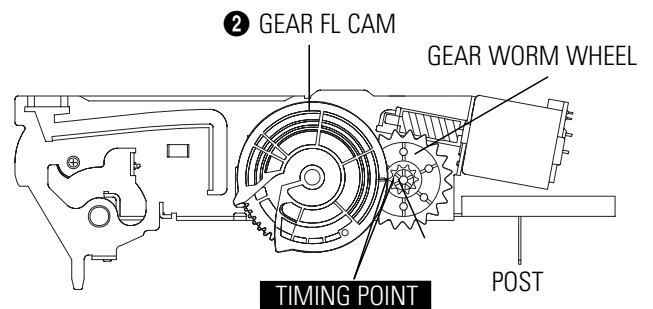


Fig. 5-15 Gear FL Cam, Gear Worm

5-4-5 Gear Worm Wheel Removal

- 1) Remove the Gear Worm wheel ❶.

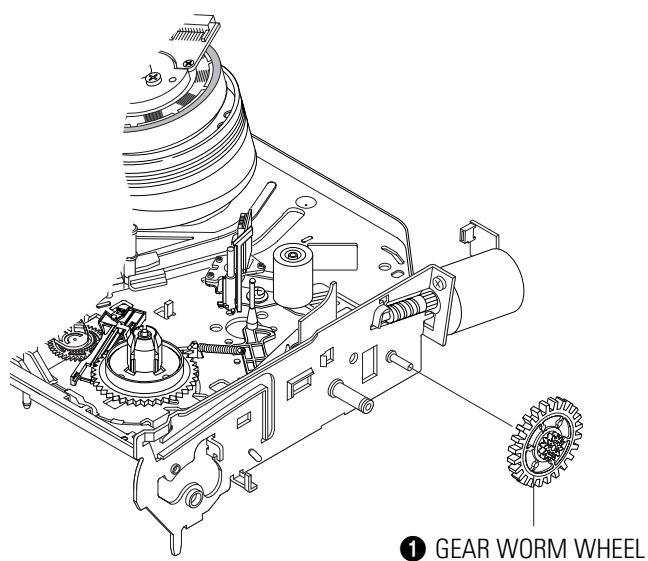


Fig. 5-16 Gear Worm Wheel Removal

5-4-6 Cable Flat Removal

- 1) Remove the Drum connecting part of Cable Flat ❶ from Connector Wafer ❷, ❸.

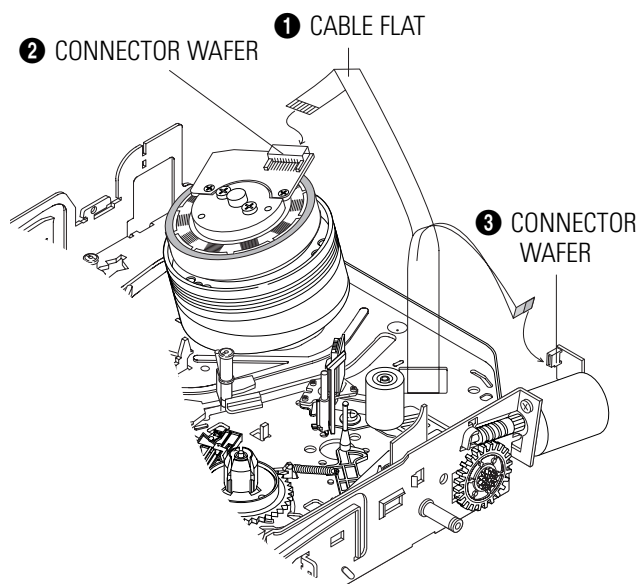


Fig. 5-17 Cable Flat Removal

5-4-7 Ass'y Motor Loading Removal

- 1) Remove the Screw ❶.
- 2) Remove the Ass'y Motor Loading ❷.

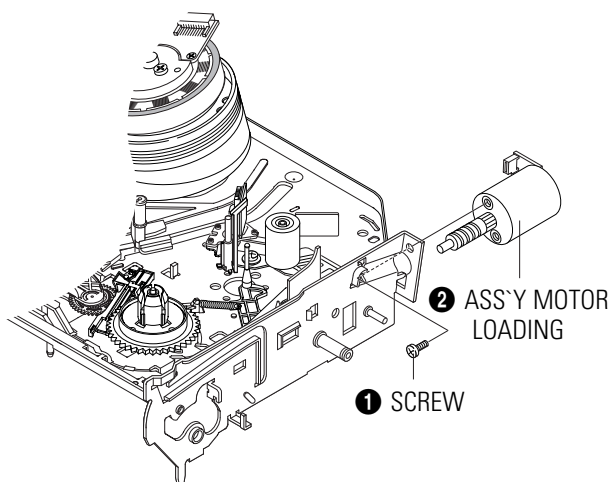


Fig.5-18 Ass'y Motor Loading Removal

5-4-8 Bracket Gear, Gear Joint 2, 1 Removal

- 1) Remove the Screw ❶.
- 2) Remove the Bracket Gear ❷.
- 3) Remove the Gear Joint 2 ❸.
- 4) Remove the Gear Joint 1 ❹.

Assembly :

- 1) Be sure to align dot mark of Gear Joint 1 ❶ with dot mark of Gear Joint 2 ❷ as shown Fig 5-20. (Refer to Timing point1)
- 2) Confirm the Timing Point 2 of the Gear Joint 2 ❷ and Slider Cam ❸.

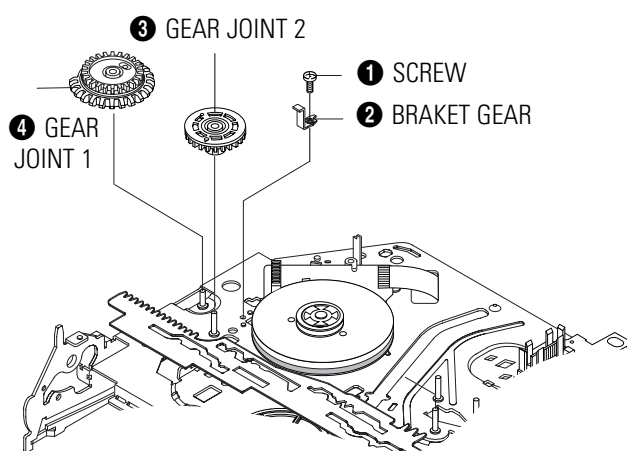


Fig. 5-19 Bracket Gear, Gear Joint 1,2 Removal

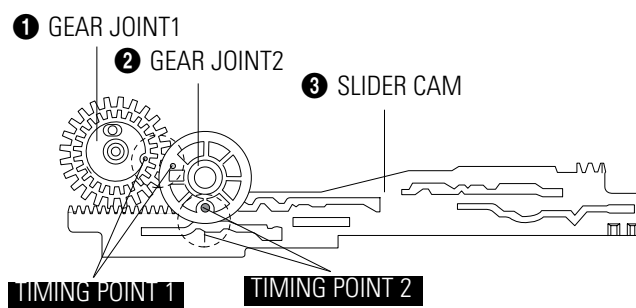


Fig. 5-20 Gear Joint 1,2 Assembly

5-4-9 Gear Loading Drive, Slider Cam, Ass'y Lever Load S, T Removal

- 1) Remove the Belt Pulley. (Refer to Fig. 5-38)
- 2) Remove the Gear Loading Drive ❶ after releasing Hook [A] in the direction arrow as shown in detail drawing.
- 3) Remove the Slider Cam ❷.
- 4) Remove the Ass'y Lever Load S ❸ & Ass'y Lever Load T ❹.

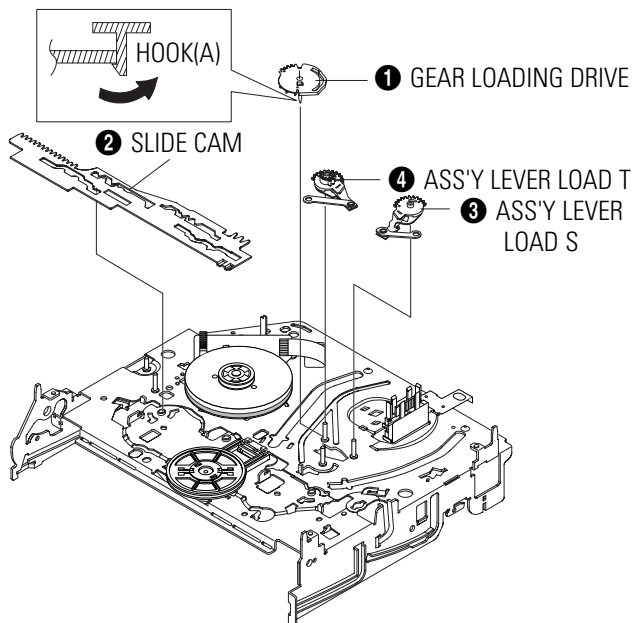


Fig. 5-21 Gear Loading Drive, Slider Cam, Ass'y Lever T, S Load Removal

5-4-10 Gear Loading Drive, Slider Cam, Ass'y Lever Load S, T Assembly

- 1) When reinstalling, be sure to align dot of Ass'y Lever Load T ❶ with dot of Ass'y Lever Load S ❷ as shown in drawing, (Refer to Timing Point 1).
- 2) Insert the Pin A,B,C,D into the Slider Cam ❸ hole.
- 3) Be sure to align dot of Ass'y Lever Load T ❶ and dot of Gear Loading Drive ❹, (Refer to Timing Point 2).
- 4) Aline dot of Gear Loading drive ❹ with mark of Slider Cam ❸ as shown in drawing (Refer to Timing Point 3).

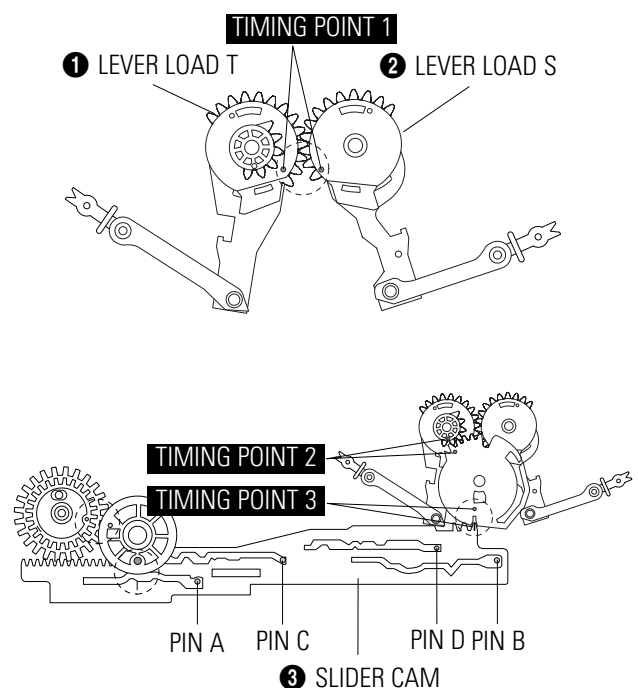


Fig.5-22 Gear Loading Drive, Slider Cam, Ass'y Lever Load S, T Assembly

5-4-11 Lever Pinch Drive, Lever Tension Drive Removal

- 1) Remove the Lever Pinch Drive ❶, Lever Tension Drive ❷.

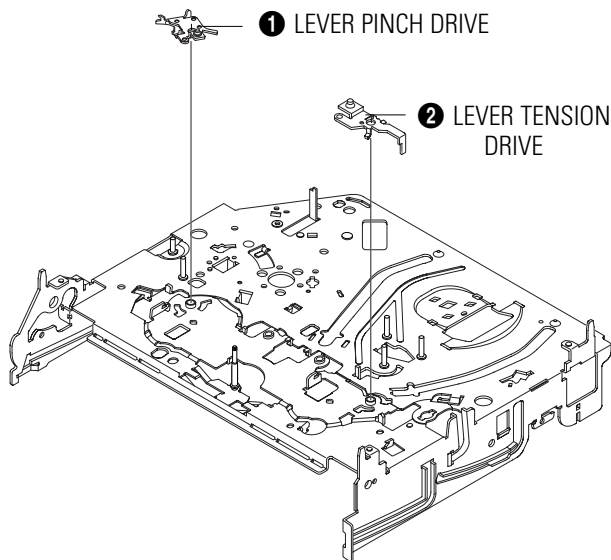


Fig. 5-23 Lever Pinch Drive,
Lever Tension Drive Removal

5-4-12 Ass'y Lever Tension , Ass'y Band Brake Removal

- 1) Remove the Ass'y Lever Brake S (Refer to Fig 5-25).
- 2) Remove the Spring Tension Lever ❶.
- 3) Rotate stopper of Main Base in the direction of arrow "A".
- 4) Lift the Ass'y Lever Tension ❷ & Ass'y Band brake ❸.

Note :

- 1) When replacing the Ass'y Lever Tension ❷, be sure to apply Grease on the post,
- 2) Take care not to touch stain on the felt side, and not to be folder and broken Ass'yBand brake.
- 3) After Ass'y Lever Tension seated, Rotate stopper of Main Base to the Mark[B].

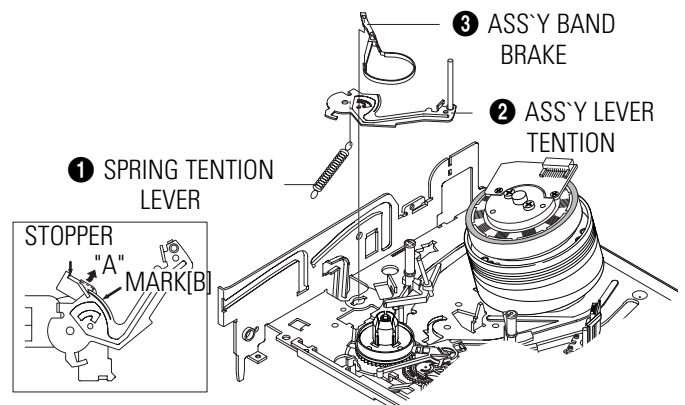


Fig. 5-24 Ass'y Lever Tension ,
Ass'y Band Brake Removal

5-4-13 Ass'y Lever Brake S, T Removal

- 1) Release the Hook [A] and the Hook [B], [C] in the direction of arrow as shown in Fig 5-25.
- 2) Lift the Ass'y Lever S, T Brake ❶, ❷ with spring brake ❸.

Assembly :

- 1) Assemble the Ass'y Lever S Brake ❶ on the Main Base.
- 2) Assemble the Ass'y Lever T Brake ❷ with spring brake ❸.

Note : Take extreme care not to be folded and transformed Spring Brake at removing or reinstalling.

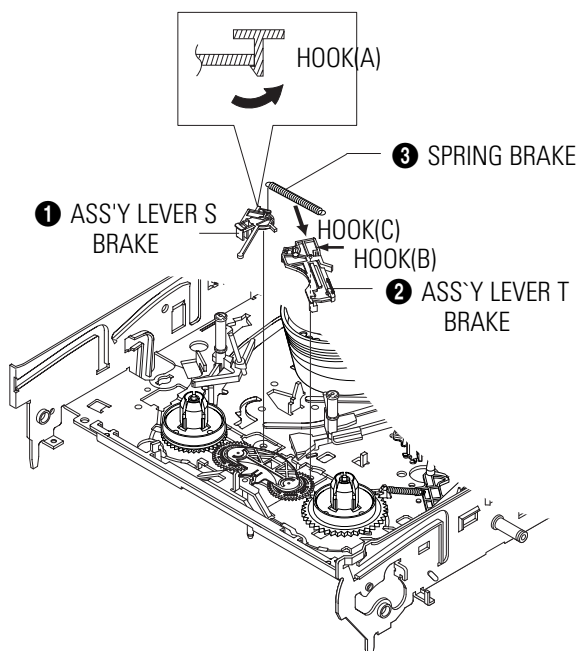


Fig. 5-25 Ass'y Lever Brake S, T Removal

5-4-14 Ass'y Gear Idle Removal

- 1) Push the Lever Idle ❶ in the direction of arrow "A", "B".
- 2) Lift the Lever Idle ❶.

Assembly :

- 1) Apply oil in two Bosses of Lever Idle ❶.
- 2) Assemble the Gear Idle ❷ with the Lever Idle ❶.

Note : When replacing the Gear Idle ❷, be sure to add oil in the boss of Lever Idle ❶.

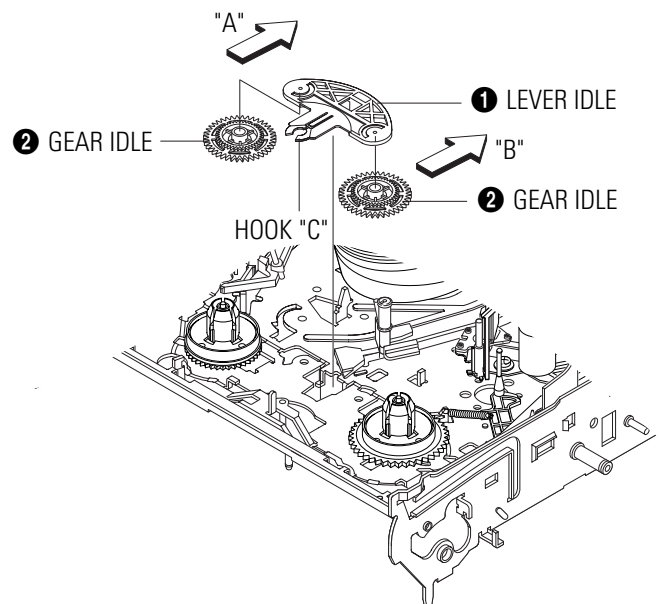


Fig. 5-26 Ass'y Gear Idle Removal

5-4-15 Disk S, T Reel Removal

- 1) Lift the Disk S, T Reel ❶, ❷.

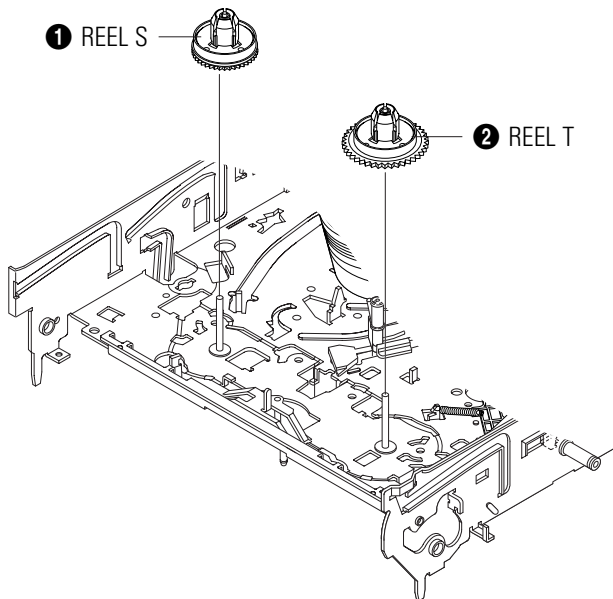


Fig. 5-27 Disk S, T Reel Removal

5-4-16 Ass'y Holder Clutch Removal

- 1) Remove the Washer Slit ❶.
- 2) Lift the Ass'y Holder Clutch ❷.

Note : When you reinstall Ass'y Holder Clutch.

- 1) Check the condition of spring as shown in detail A.
- 2) Don't push Ass'y Holder Clutch down with excessive force Just insert Holder Clutch Ass'y into post center with dead force and Rotate it smoothly. Be sure to confirm that spring is in the slit of Ass'y Gear Center as shown in detail B.

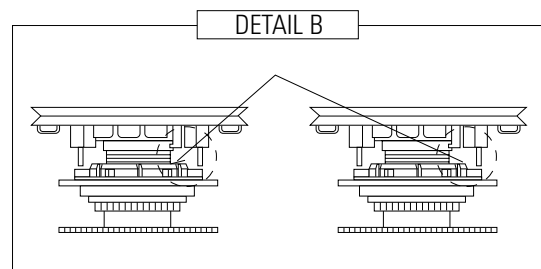
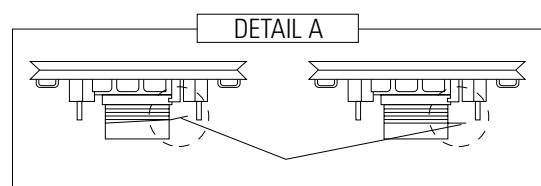
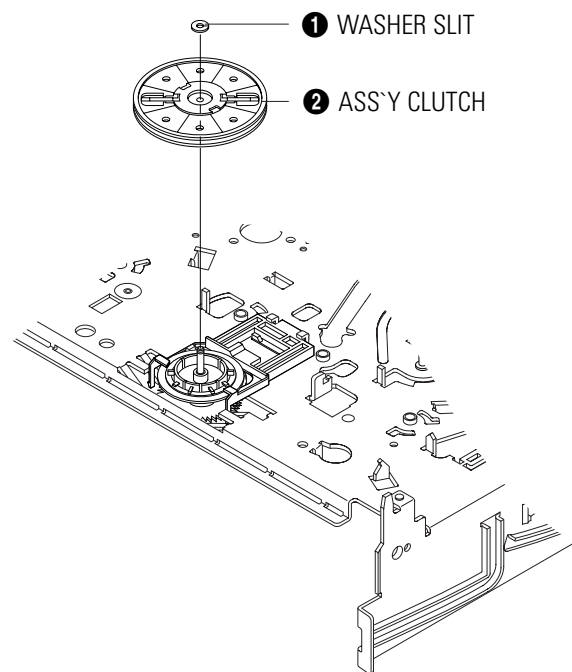


Fig. 5-28 Ass'y Holder Clutch Removal

5-4-17 Ass'y Lever Up Down, Ass'y Gear Center Removal

- 1) Remove the 2 hooks in the direction of arrow as shown Fig. 5-28 and lift the Ass'y Lever Up Down ❶.
- 2) Lift the Ass'y Gear Center ❷.

Assembly :

- 1) Insert the Ass'y Lever Up Down ❶ in the rectangular holes on Main Base as shown in Fig 5-30.
- 2) Lift the Lever Ass'y Up Down ❶ about 35°.
(Refer to Fig 5-30)
- 3) Insert Ring of the Ass'y Gear Center ❷ in the Guide of the Ass'y Lever Up Down ❶.
- 4) Insert the Ass'y Gear Center ❷ in the post on Main Base.
- 5) Push down the Ass'y Lever Up Down ❶ for locking of the Hook.

Note : Be sure to confirm that Ring of the Ass'y Gear Center ❷ is in the Guide of the Ass'y Lever Up Down ❶ after finishing assembly of Ass'y Lever Up Down ❶ and Ass'y Gear Center ❷.

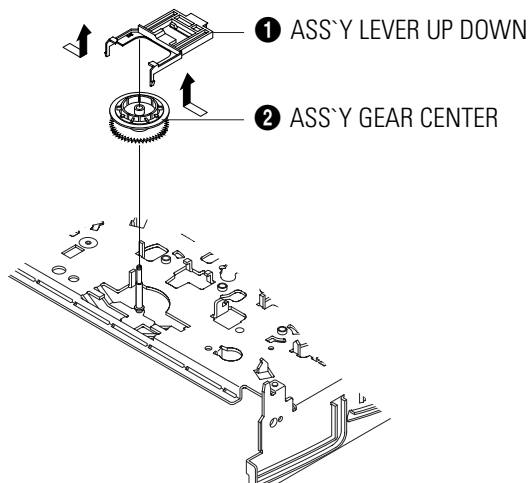


Fig. 5-29 Ass'y Lever Up Down Removal

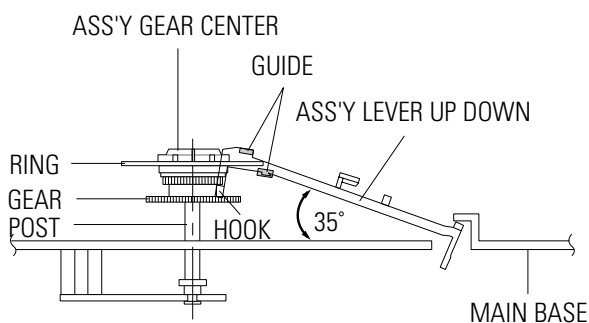


Fig. 5-30 Ass'y Lever Up Down Removal

5-4-18 Guide Cassette Door Removal

- 1) Lift the Hook [A].
- 2) Rotate the Guide Cassette Door ❶ in the direction of arrow.

Note : After reinstalling the Guide Cassette Door ❶ sure the Hook [A].

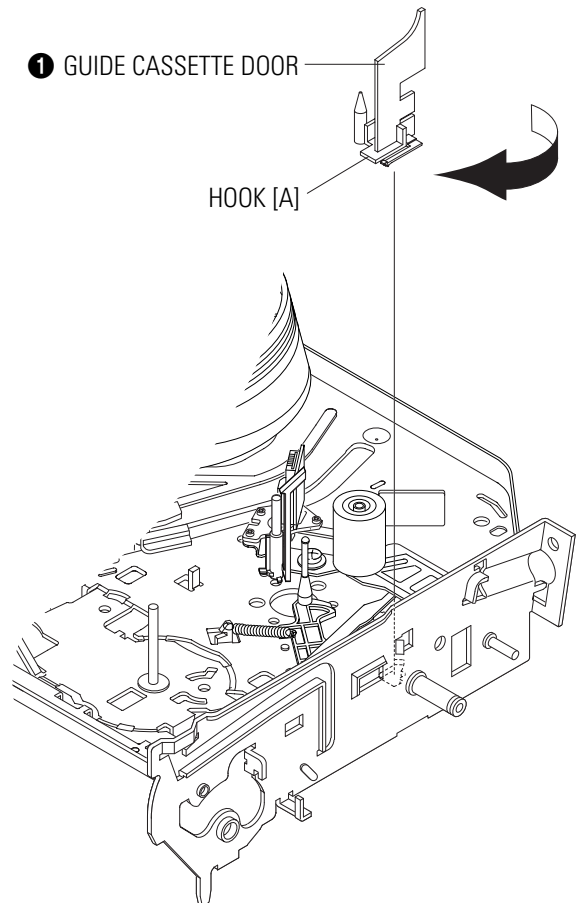


Fig. 5-31 Guide Cassette Door Removal

5-4-19 Ass'y Lever Unit Pinch , Plate Joint, Spring Pinch Drive Removal

- 1) Lift the Ass'y Unit Pinch ❶.
- 2) Remove the Plate Joint ❷ from Lever Pinch Drive.
- 3) Remove the Spring Pinch Drive ❸.

Note :

- 1) Take extreme care not to touch the grease on the Roller Pinch.
- 2) When reinstalling, be sure to apply grease on the post pinch roller.

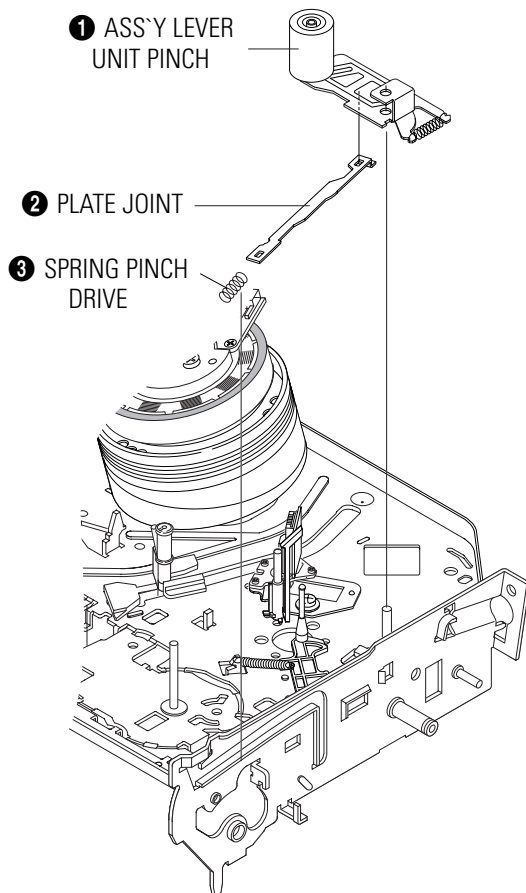


Fig. 5-32 Ass'y Lever Unit Pinch , Plate Joint, Spring Pinch Drive Removal

5-4-20 Ass'y Lever #9 Guide Removal

- 1) Remove the Spring #9 Guide ❶.
- 2) Lift the Ass'y Spring #9 Guide ❷ in the direction of arrow "A".

Note :

- 1) Take extreme care not to get grease on the tape Guide Post.
- 2) After reinstalling, check the bottom side of the Post #9 Guide to the top side of Main Base.

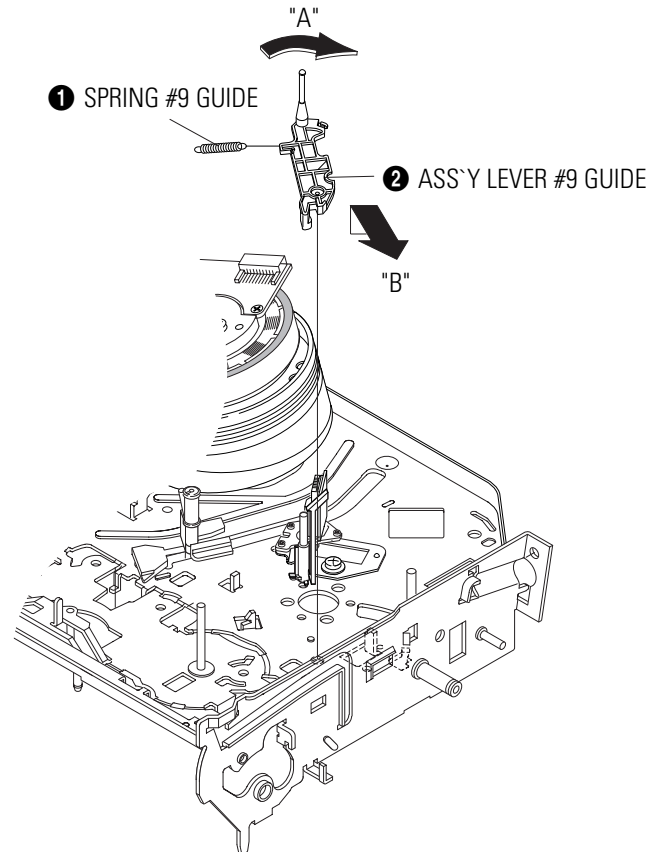


Fig. 5-33 Ass'y Lever #9 Guide Removal

5-4-21 FE Head Removal

- 1) Remove the Screw ❶.
- 2) Lift the FE Head ❷.

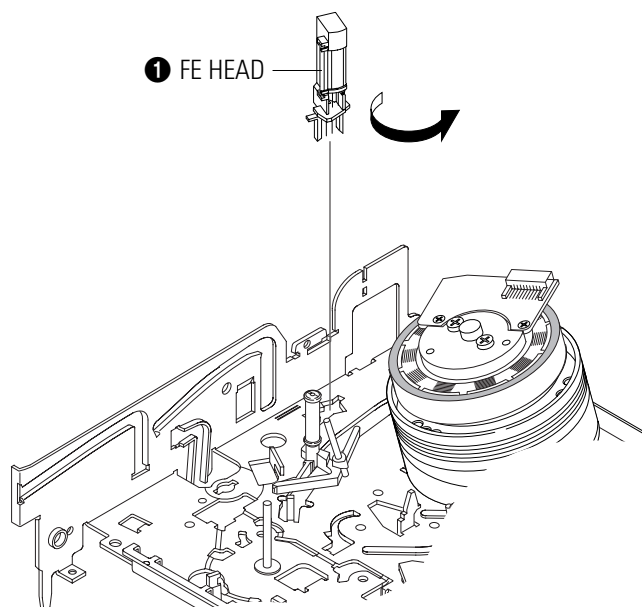


Fig. 5-34 FE Head Removal

5-4-22 Ass'y AC Head Removal

- 1) Pull out the FPC from connector of Ass'y AC Head ❷.
- 2) Remove the screw ❶.
- 3) Lift the Ass'y AC Head ❷.

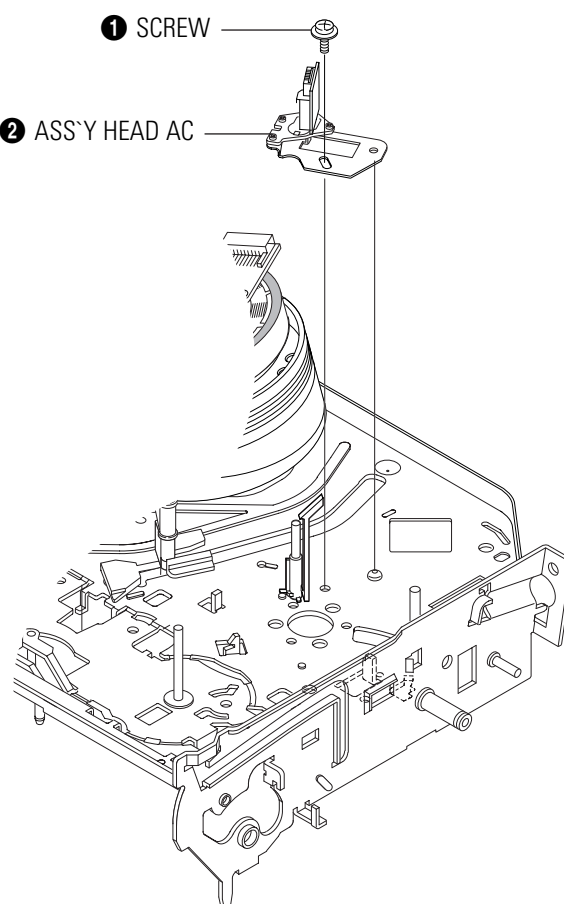


Fig. 5-35 Ass'h AC Head Removal

5-4-23 Ass'y Slider S, T Removal

- 1) Move the Ass'y Slider S, T ❶, ❷ to slot, and then lift it to remove. (Refer to arrow)

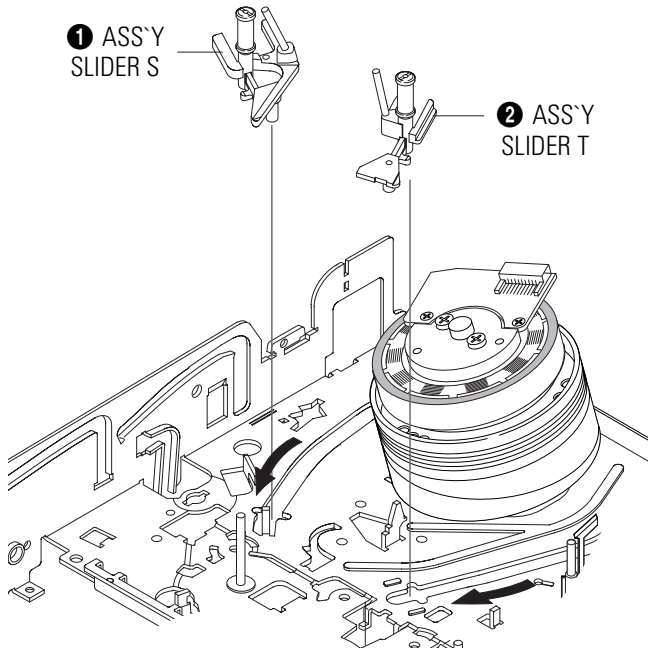


Fig. 5-36 Ass'y Slider S, T Removal

5-4-24 Plate Ground Deck, Ass'y Cylinder Removal

- 1) Remove the 3 Screws ❶.
- 2) Lift the Plate Ground Deck ❷.
- 3) Lift the Ass'y Cylinder ❸.

Assembly :

- 1) Match the 3 holes in the bottom of Ass'y Cylinder ❸ to the 3 holes of Main Base as attending not to drop or knock the Ass'y Cylinder ❸.
- 2) Tighten the 1 Screw ❶.
- 3) Match the Plate Ground Deck ❷ to the Hole of Base Main.
- 4) Tighten the other 2 Screws ❶.

Note :

- 1) Take care not to touch the Ass'y Cylinder ❸ and the tape guide post at reinstalling.
- 2) When reinstalling, Don't push down too much on Screw Driver.

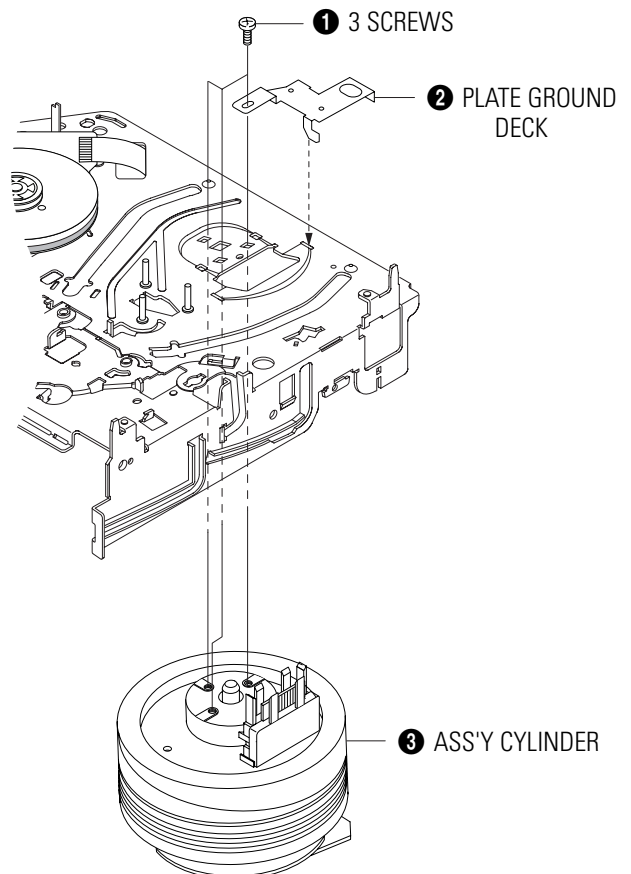


Fig. 5-37 Plate Ground Deck, Ass'y Cylinder Removal

5-4-25 Hook Capstan, Belt Pulley Removal

- 1) Remove the Hook Capstan ❶ after releasing Hook in the direction arrow as shown in detail drawing.
- 2) Remove the Belt Pulley ❷.

Note : Take extreme care not to get grease on Belt Pulley ❷ at assembling or reassembling.

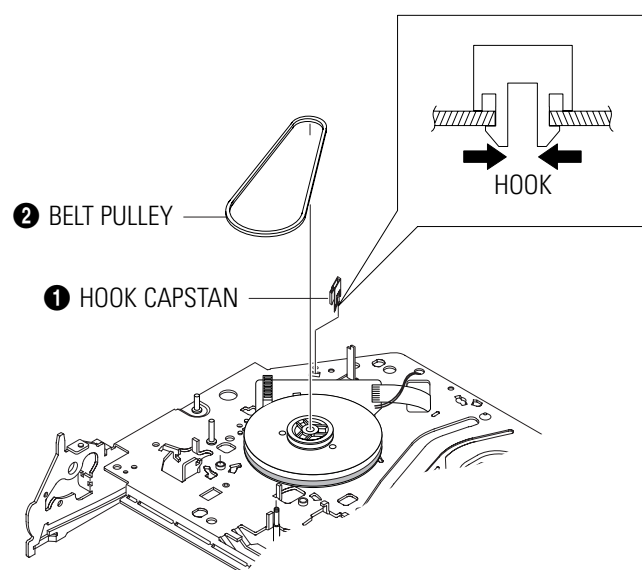


Fig. 5-38 Belt Pulley Removal

5-4-26 Ass'y Motor Capstan Removal

- 1) Remove the 3 Screws ❶.
- 2) Remove the Ass'y Motor Capstan ❷.

Assembly :

- 1) Match the 3 holes of Ass'y Motor Capstan ❷ to the 3 holes of Main Base. Be careful not to drop or knock the Ass'y Motor Capstan ❷.
- 2) Tighten the 3 Screws ❶ in the direction of arrow as shown detail drawing.

Note : After tightening screws, check if there is gap between the head of screws and the top side of Main Base. There should have no gap between the head of screws and the top side of Main Base. After reinstalling, adjusting the tape transport system again.

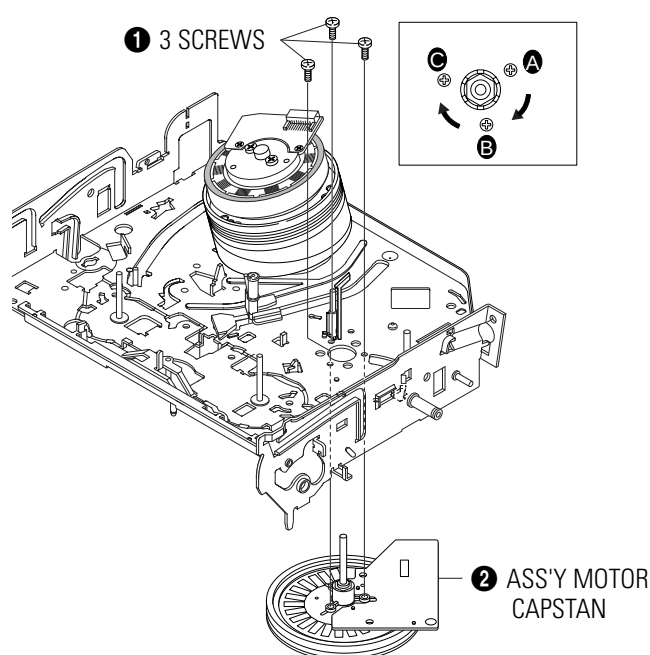


Fig. 5-39 Ass'y Motor Capstan Removal

5-4-27 Ass'y Post #8 Guide Removal

- 1) Rotate the Ass'y Post #8 Guide ❶ in the direction of arrow to lift up.



Fig. 5-40 Ass'y Post #8 Guide Removal

5-4-28 How to Eject the Cassette Tape (If the tape is stuck in the unit)

- 1) Turn the Gear worm ❶ clockwise with screw driver. (Refer to arrow)
(Other method : Remove the Screw of Ass'y Motor Load , Separate the Ass'y Motor Load)

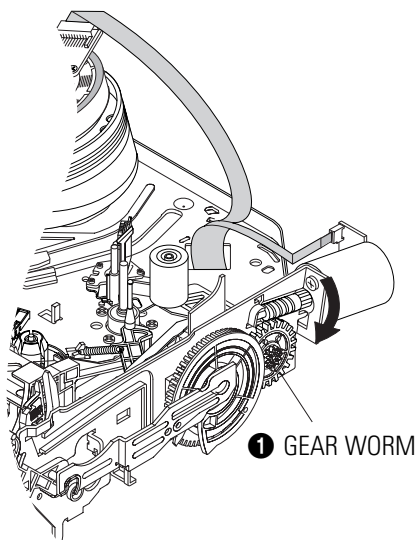


Fig.5-41

- 2) When Slider S,T are approached in the position of unloading, rotate holder Clutch counterclockwise after inserting screw driver in the hole of frame's bottom in order to wind the unwinded tape.
(Refer to Fig.5-43)

(If you rotate Gear Worm ❶ continuously when tape is in state of unwinding, you may cause a tape contamination by grease and tape damage. Be sure to wind the unwinded tape in the state of set horizontally.)

- 3) Rotate Gear Worm ❶ clockwise using screw driver again up to the state of eject mode and then pick out the tape.(Refer to Fig.5-42)

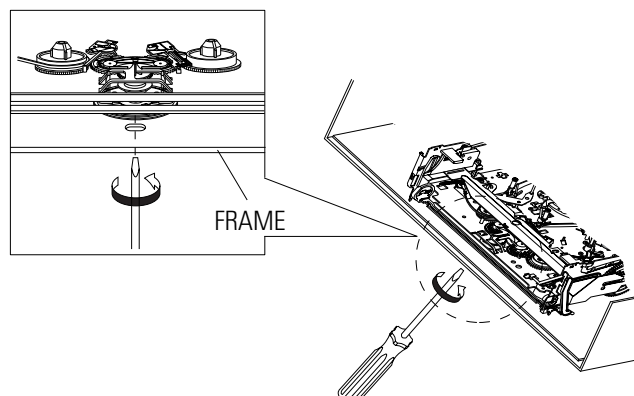


Fig. 5-42

5-5 The table of cleaning, Lubrication and replacement time about principal parts

- 1) The replacement time of parts is not life of parts.
- 2) The table 5-1 is that the VCR Set is in normal condition (normal temperature, normal humidity).
The checking period may be changed owing to the condition of use, runtime and environmental conditions.
- 3) Life of the Cylinder Ass'y is depend on the condition of use.
- 4) See exploded view for location of each parts.

<Table 5-1>

*	Parts Name	Checking Period										Remark
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
T A P E P A T H S Y S T E M	POST TENSION	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	- To clean the parts, use patch and alcohol (solvent).
	SLANT POST S, T	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	#8 GUIDE SHAFT	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	- After cleaning, use the video tape after alcohol is gone away completely.
	CAPSTAN SHAFT	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	#9 GUIDE POST	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	- We recommend to use oil [EP-50] or solvent.
	#3 GUIDE POST	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	GUIDE ROLLER S, T	Δ	Δ	Δ	0	0	0	0	0	0	0	- One or two drops of oil should be applied after cleaning with alcohol.
	CYLINDER ASS'Y	Δ	0	0	0	0	0	0	0	0	0	
	FE HEAD	Δ	Δ	Δ	0	0	0	0	0	0	0	- Periodic time of applying oil (Apply oil after cleaning)
	ACE HEAD	Δ	0	0	0	0	0	0	0	0	0	
	PINCH ROLLER	Δ	0	0	0	0	0	0	0	0	0	- The excessive applying oil may be the cause of malfunction.
	POST REEL S, T		◆		◆		◆		◆		◆	
	SLEEVE TENSION		◆		◆		◆		◆		◆	
	POST CENTER		◆		◆		◆		◆		◆	
D R I V I N G S Y S T E M	LEVER IDLE BOSS (2Point)		◆		◆		◆		◆		◆	
	CAPSTAN MOTOR PULLEY	Δ	Δ	Δ	Δ	Δ	0	0	0	0	0	
	BELT PULLEY				0	0	0	0	0	0	0	
	HOLDER CLUTCH ASS'Y	Δ	0	0	0	0	0	0	0	0	0	
	GEAR CENTER ASS'Y		0	0	0	0	0	0	0	0	0	
	GEAR IDLE (2Point)		0	0	0	0	0	0	0	0	0	
B R A K E S Y S T E M	LOADING MOTOR		0	0	0	0	0	0	0	0	0	
	BAND BRAKE ASS'Y		0	0	0	0	0	0	0	0	0	
	BRAKE T ASS'Y		0	0	0	0	0	0	0	0	0	

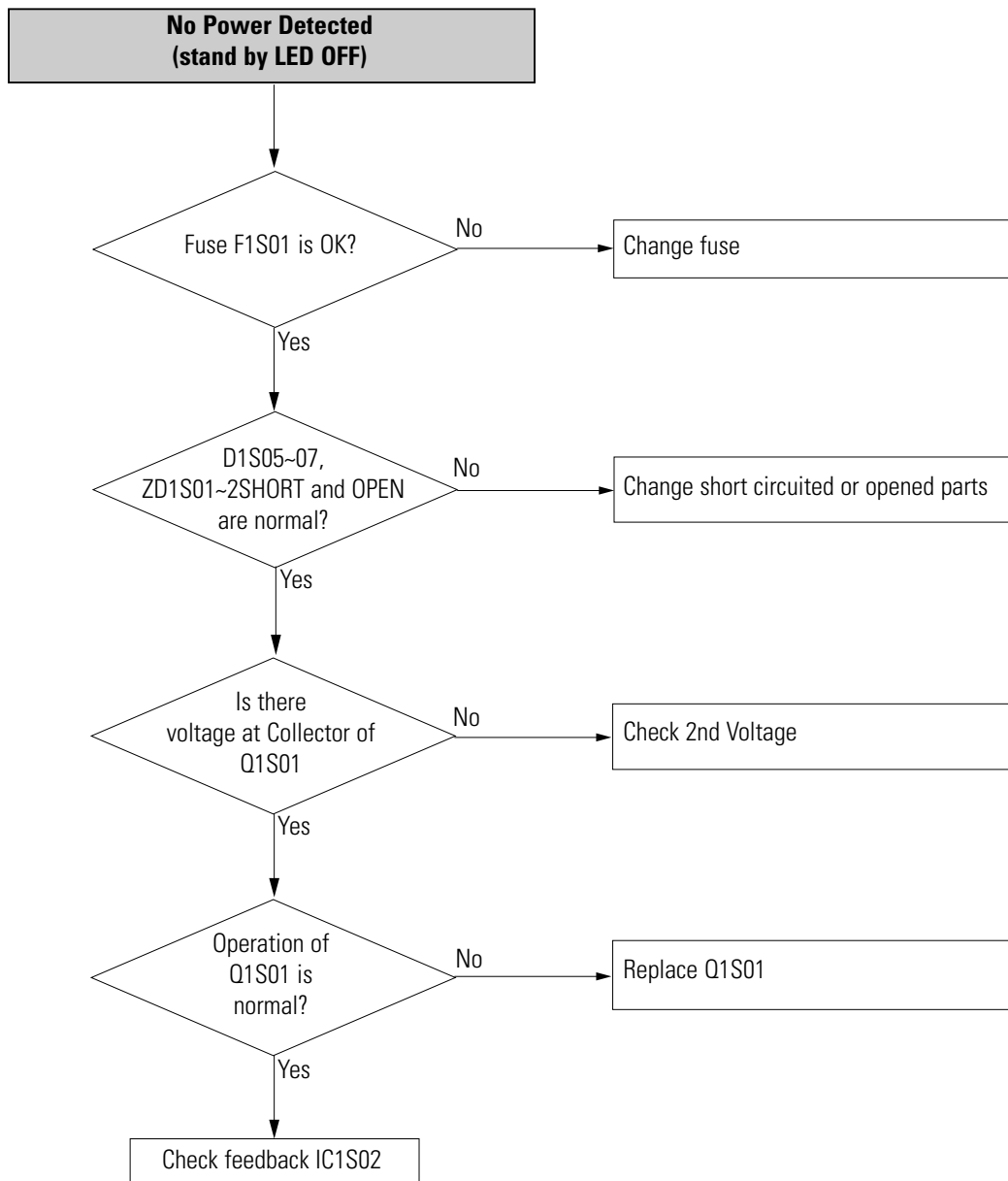
Δ : Cleaning

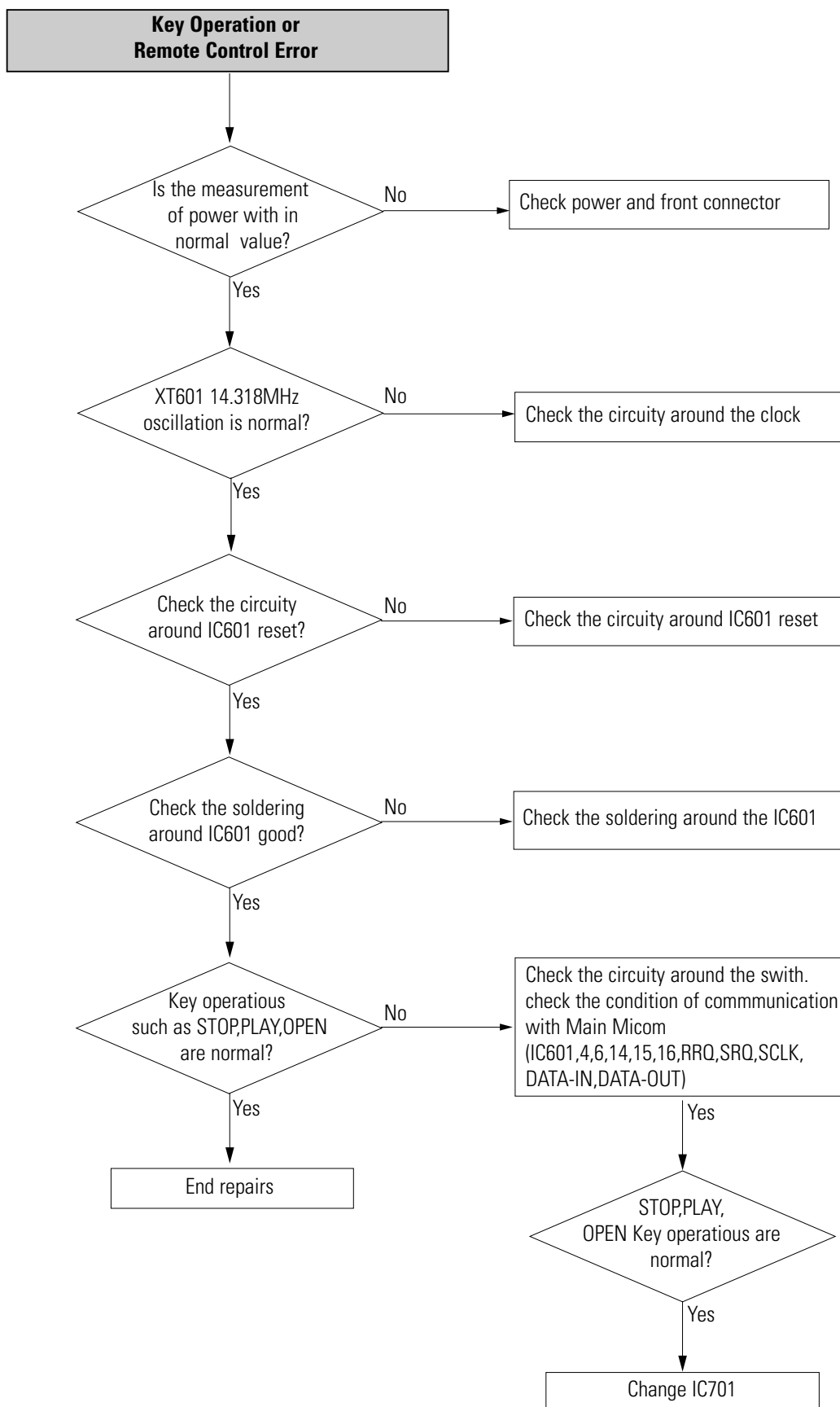
0 : Check and replacement in necessary

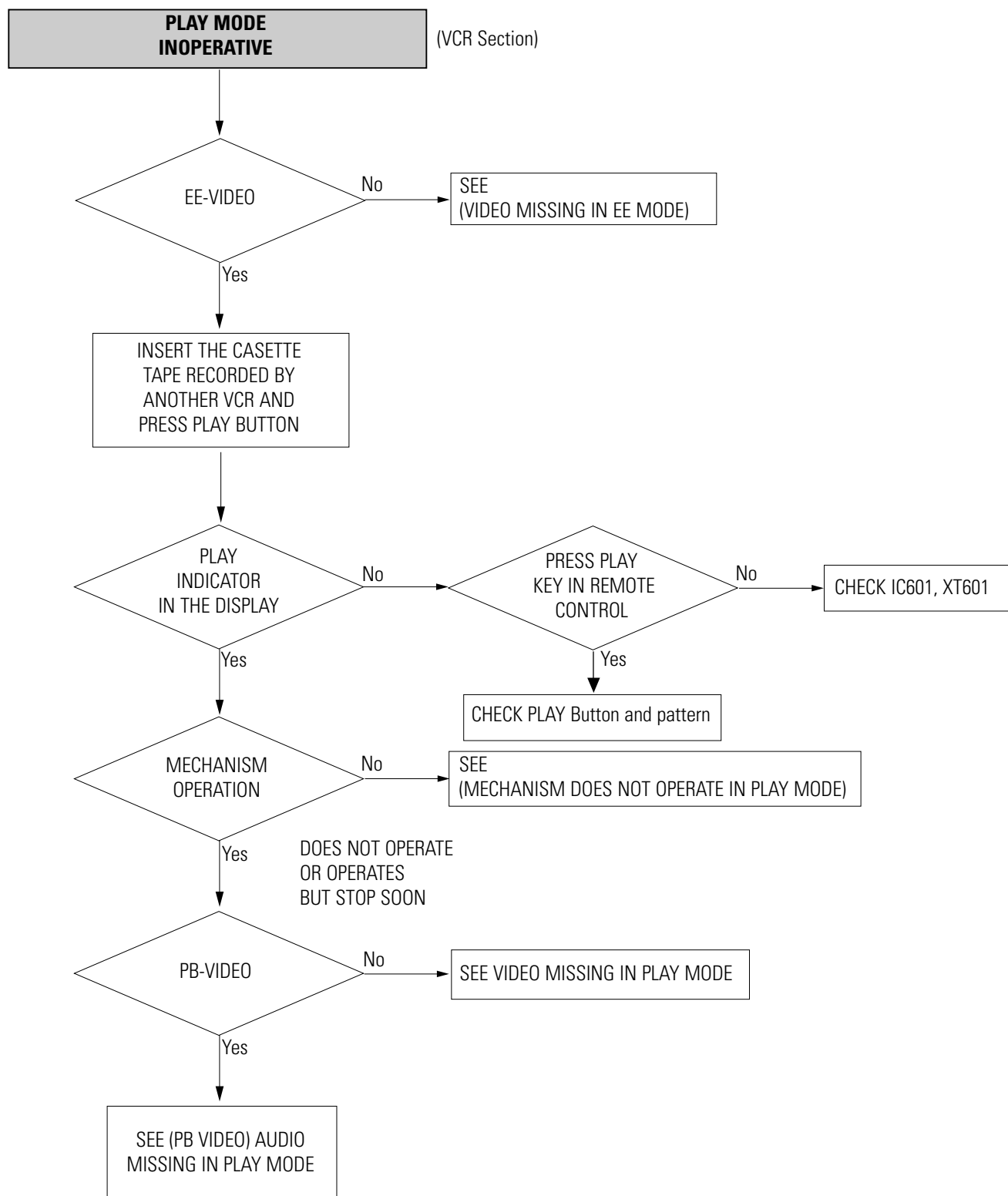
◆ : Add Oil

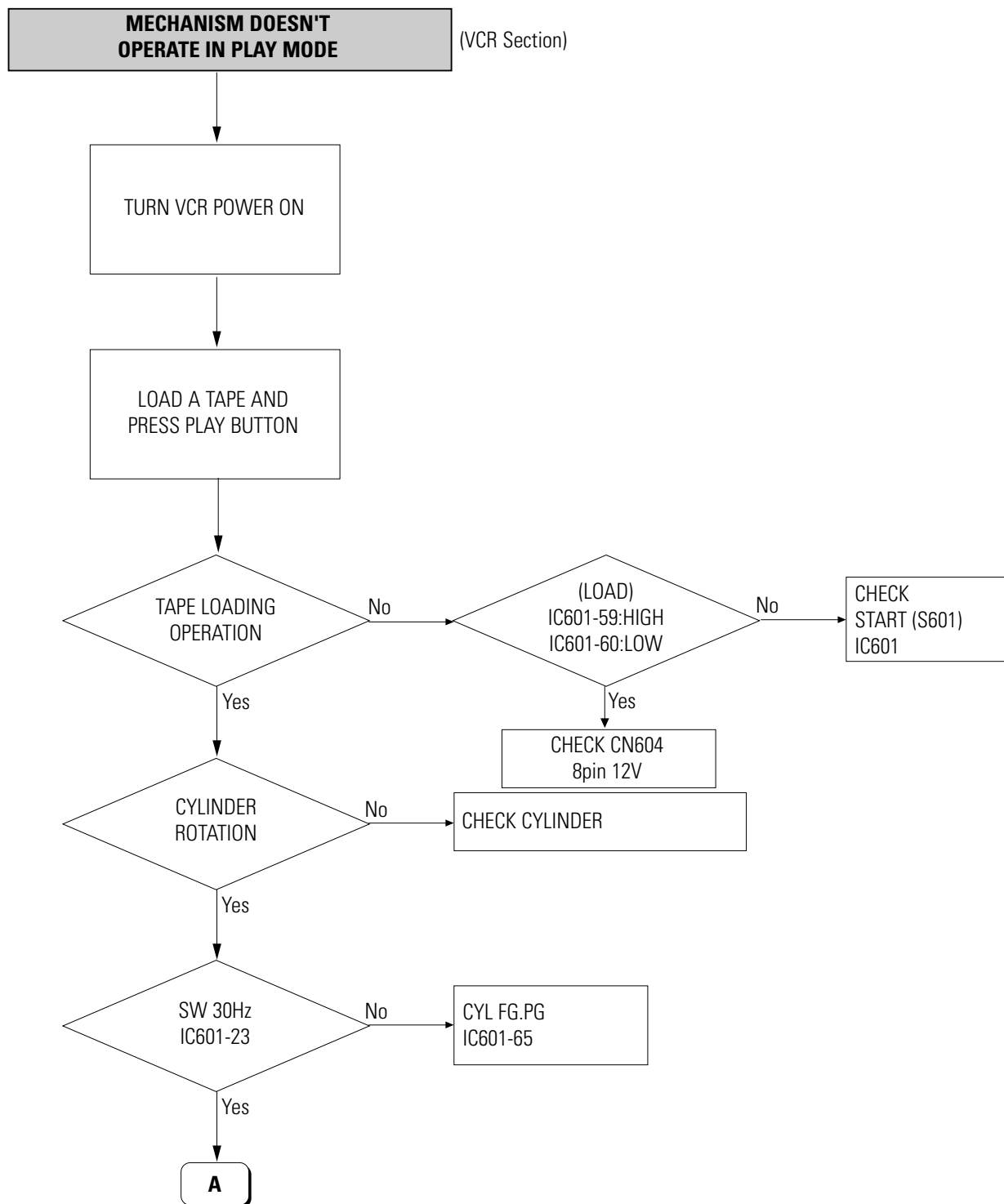
MEMO

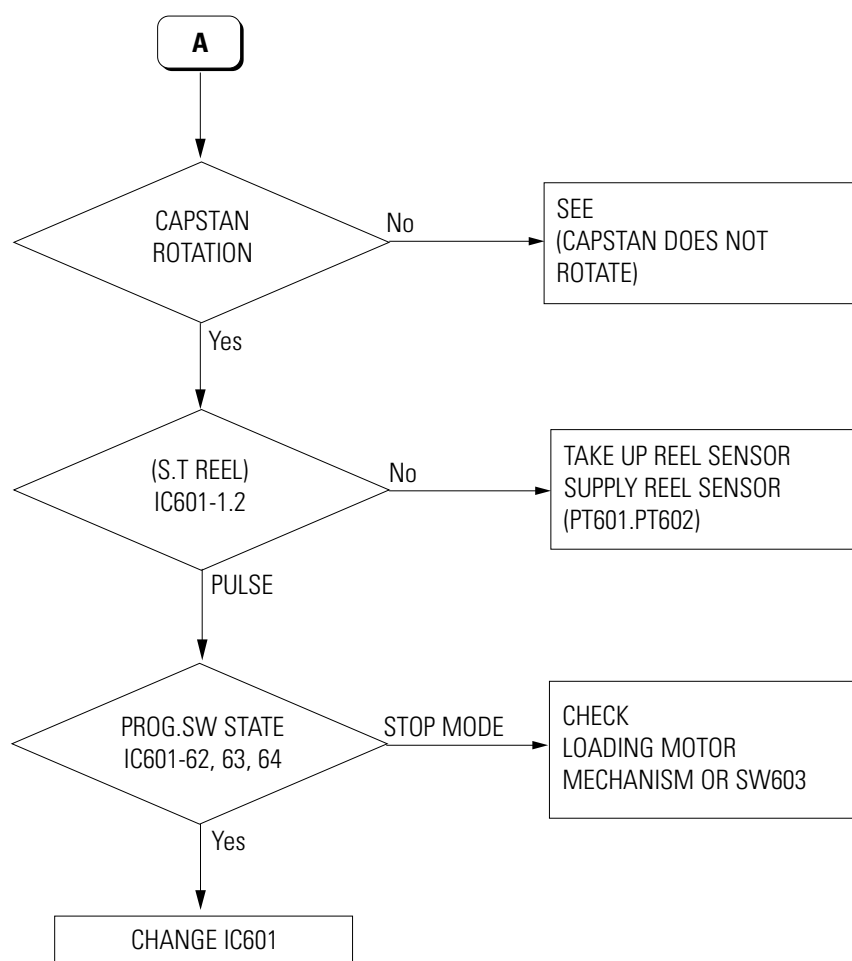
6. Trouble Shooting

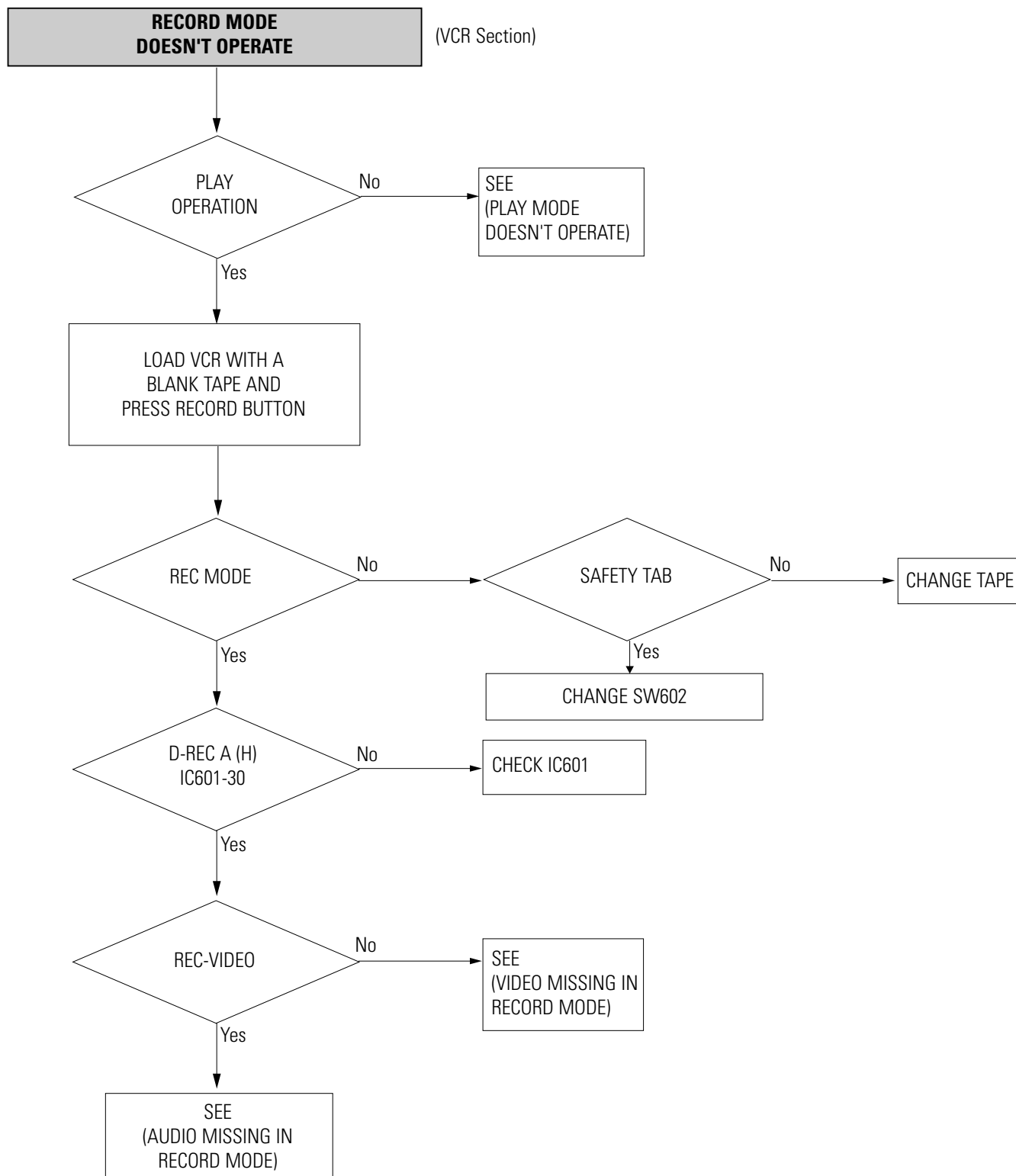


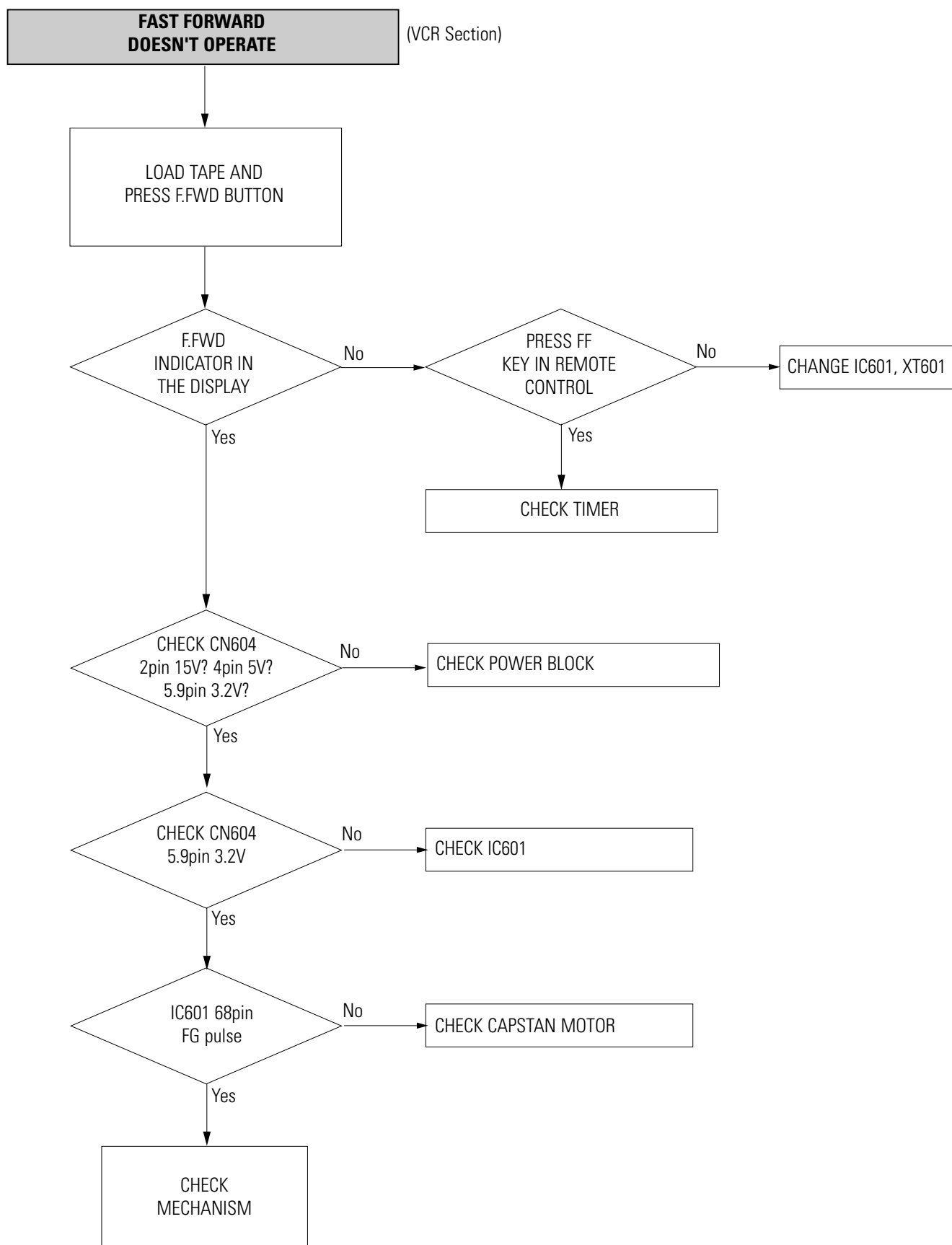


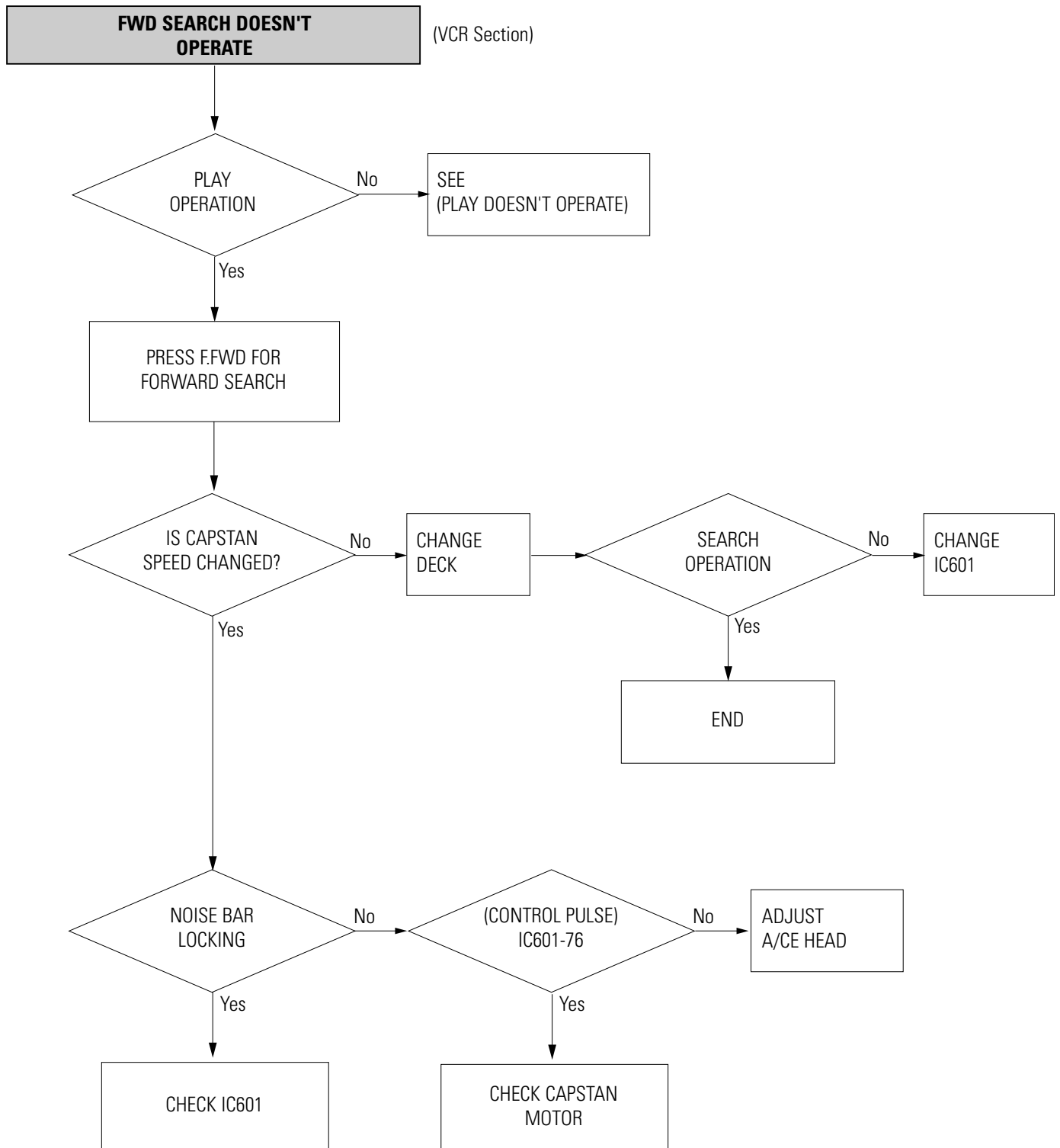


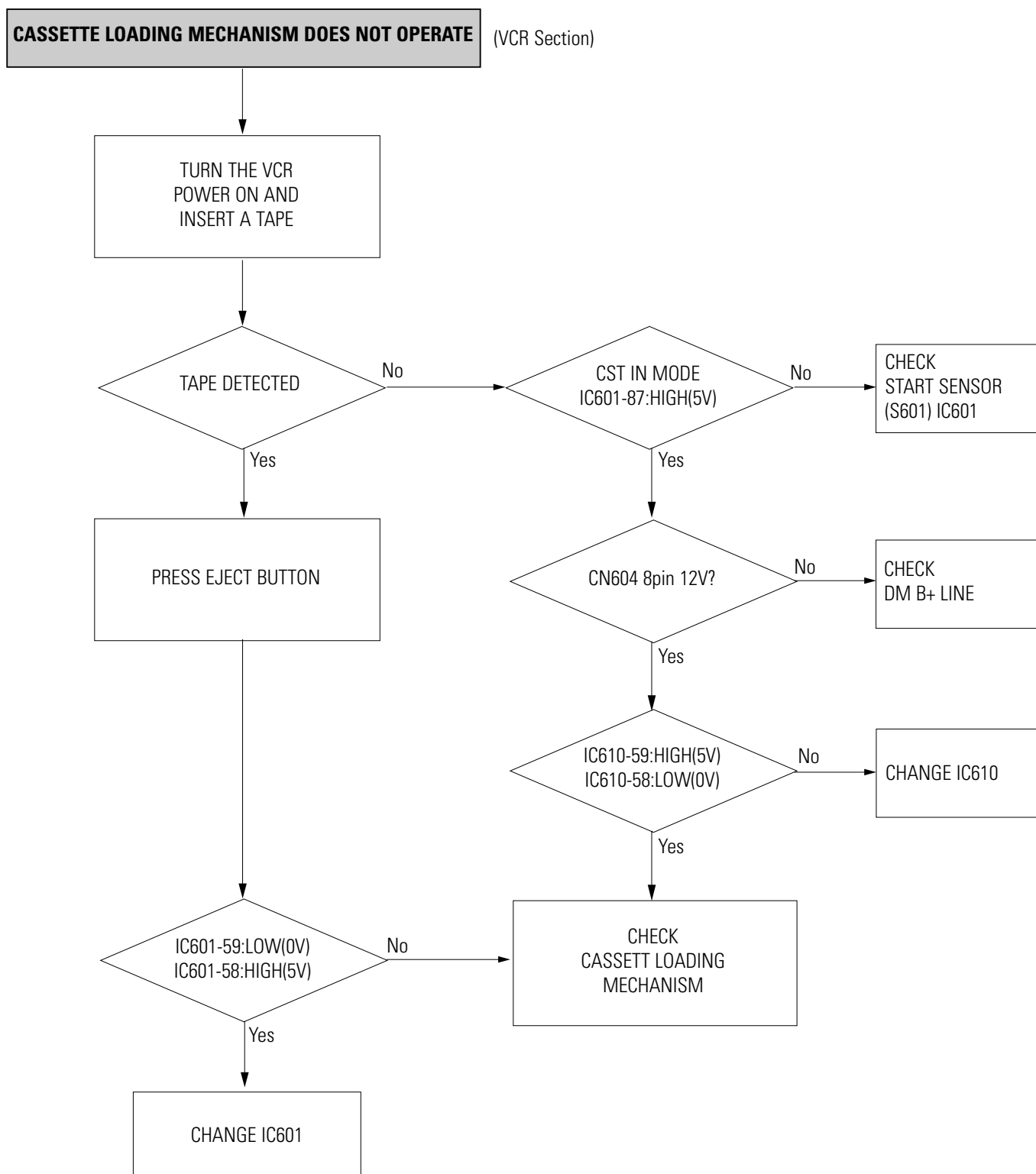


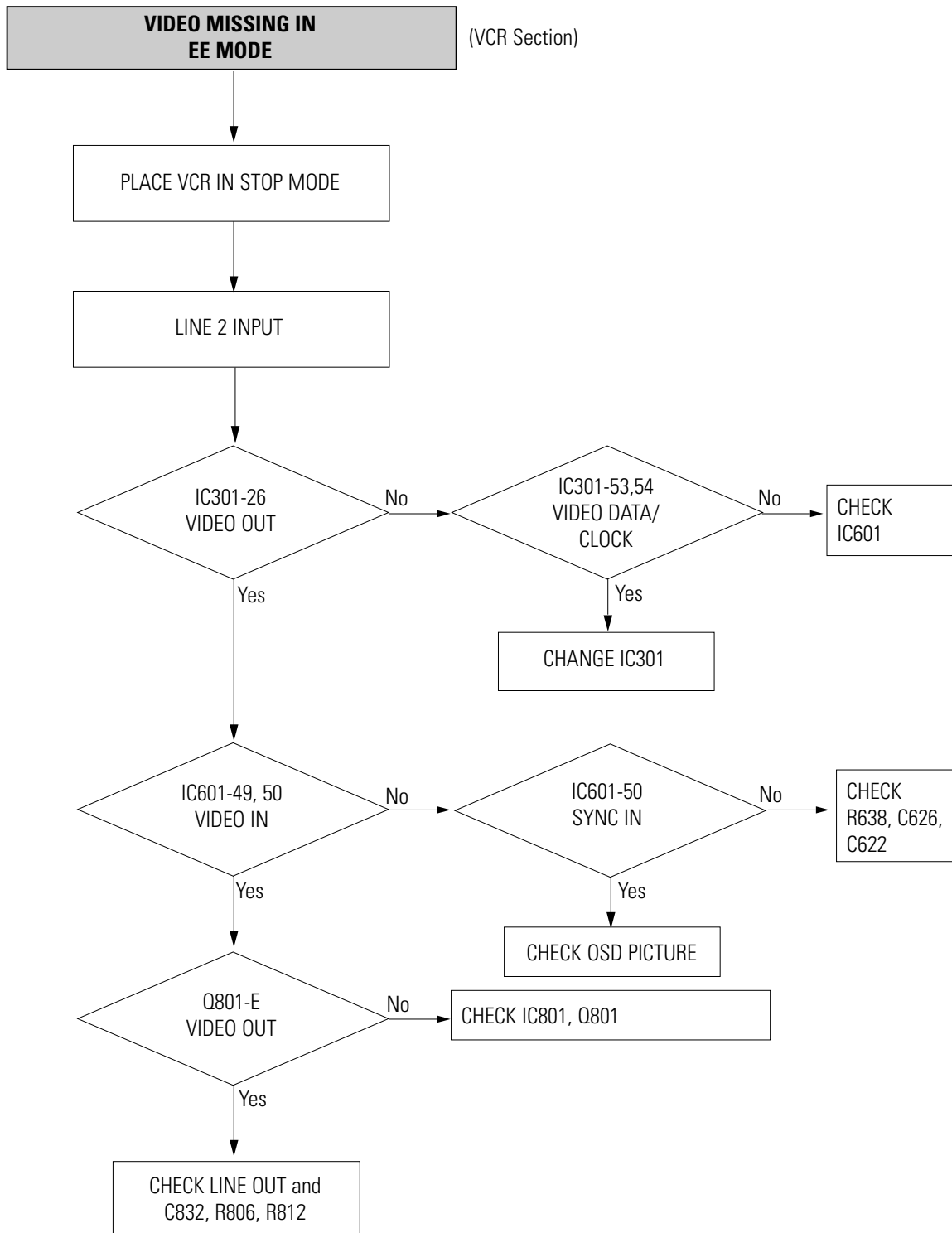


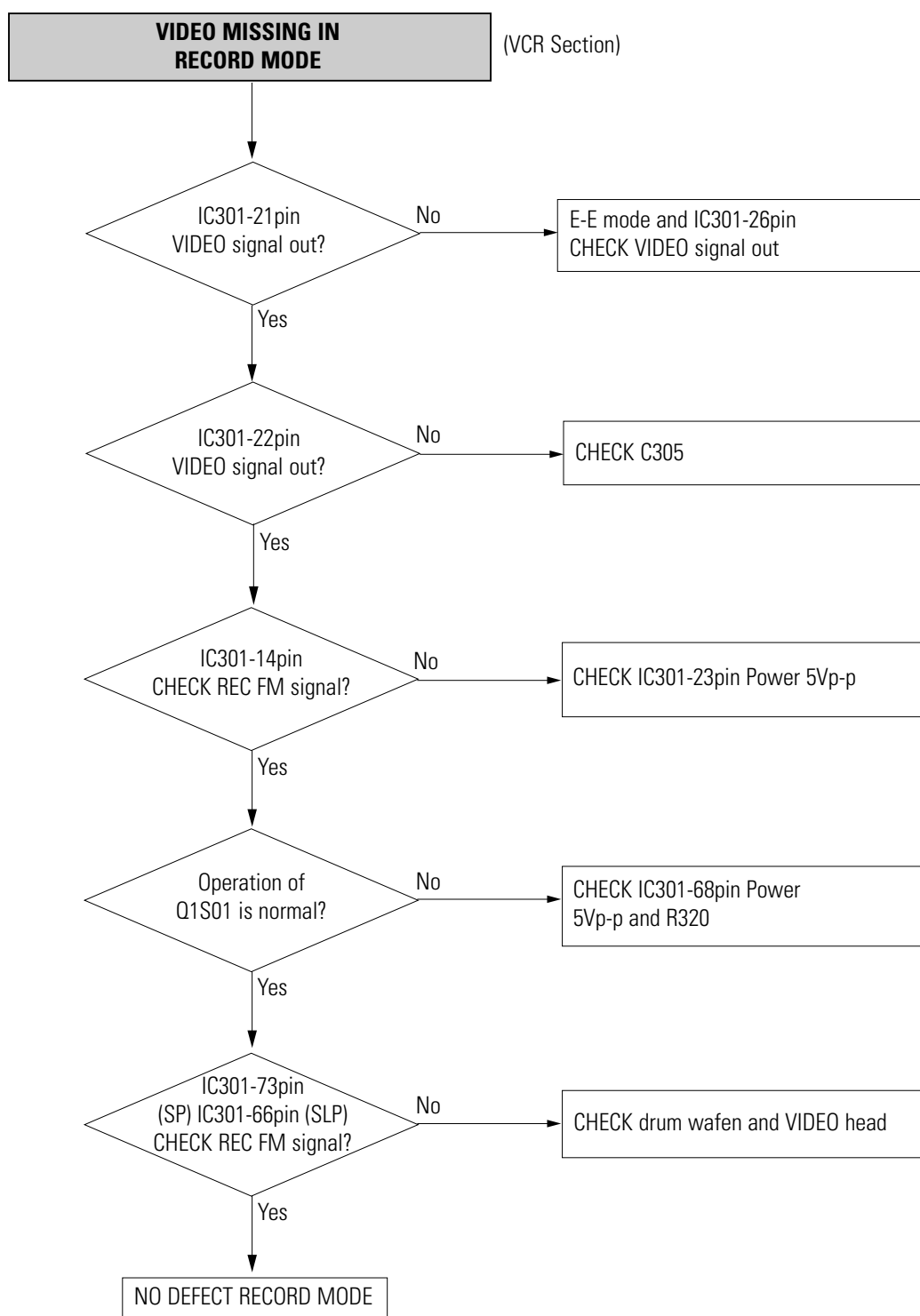


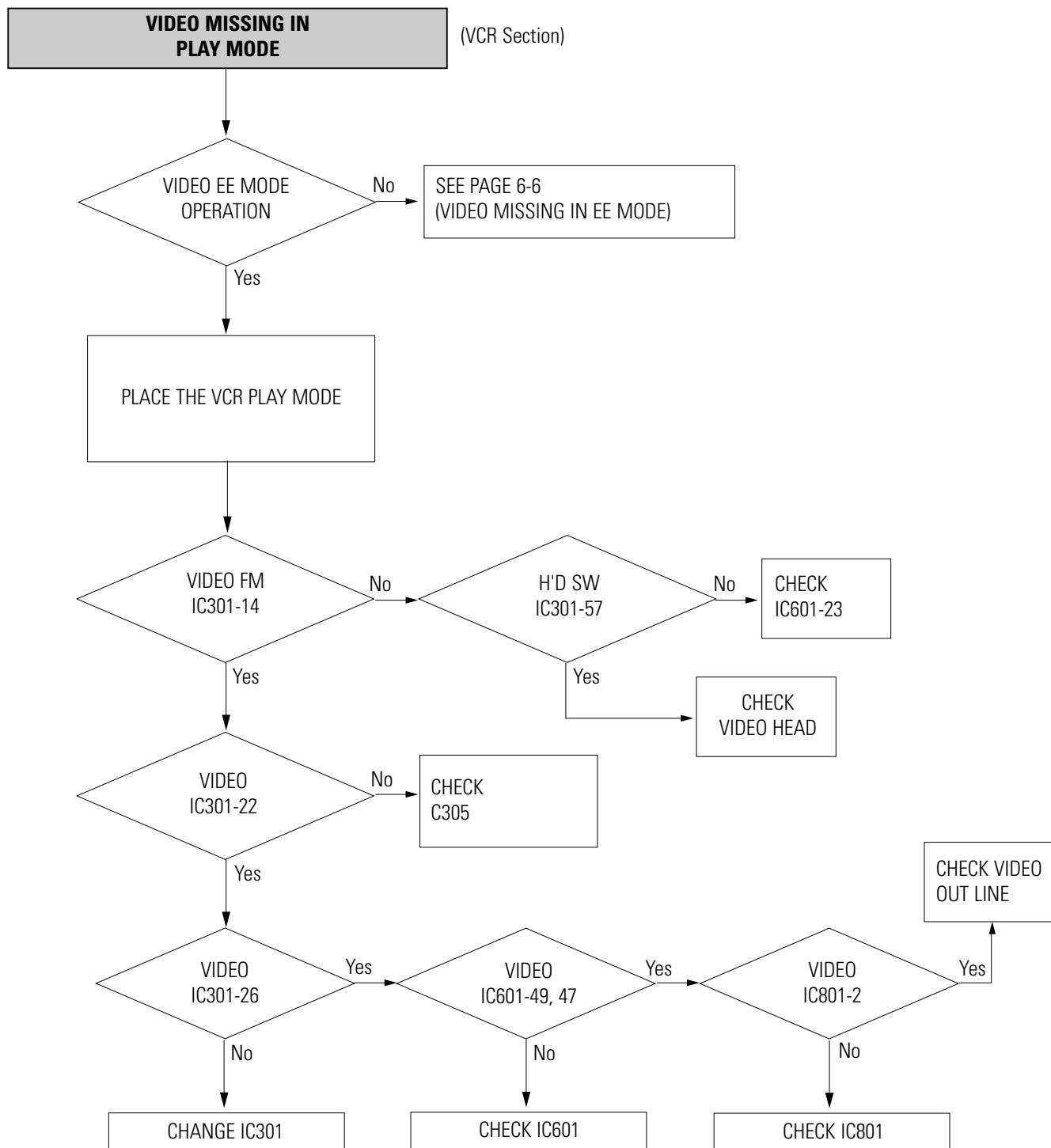


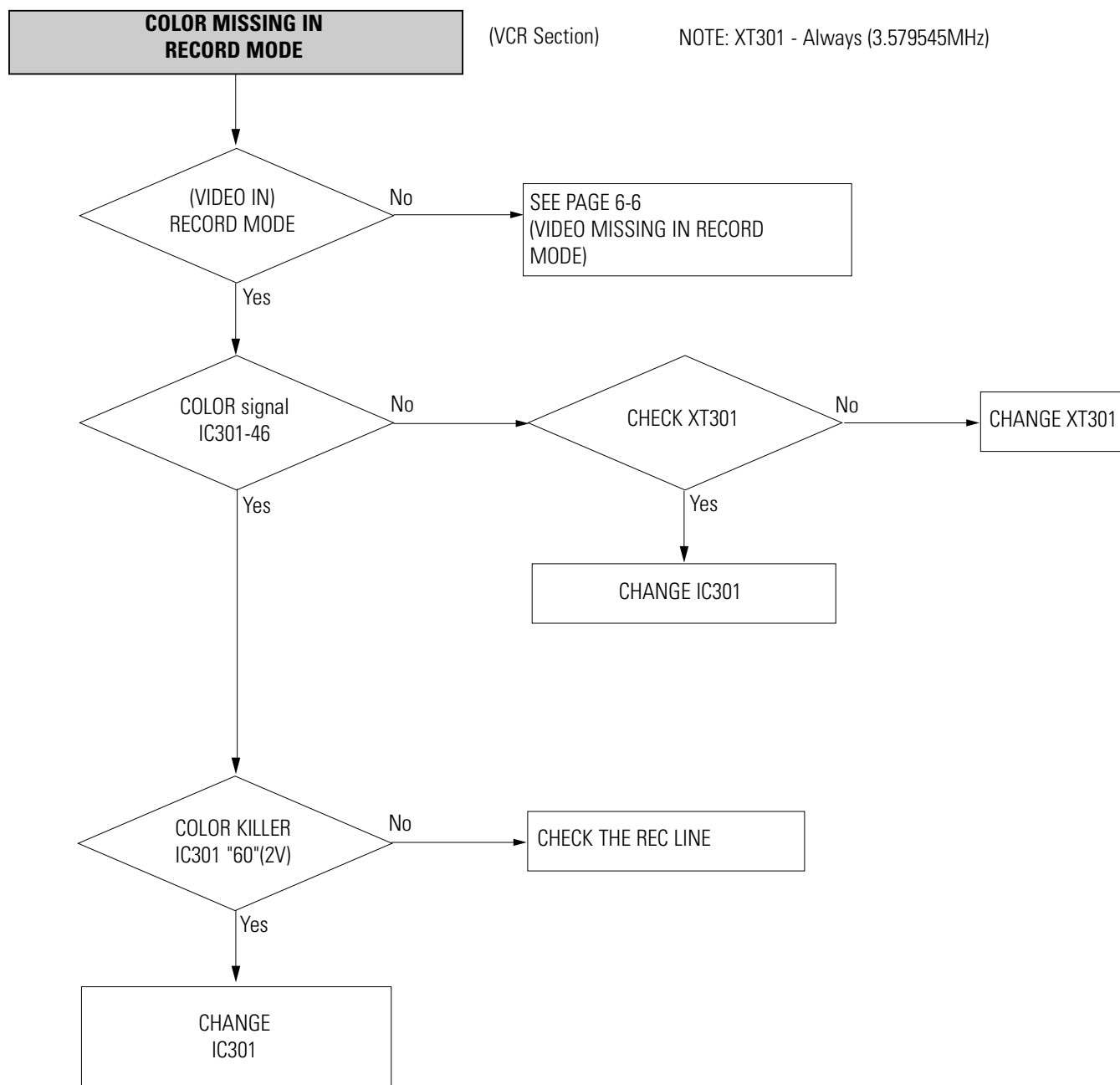


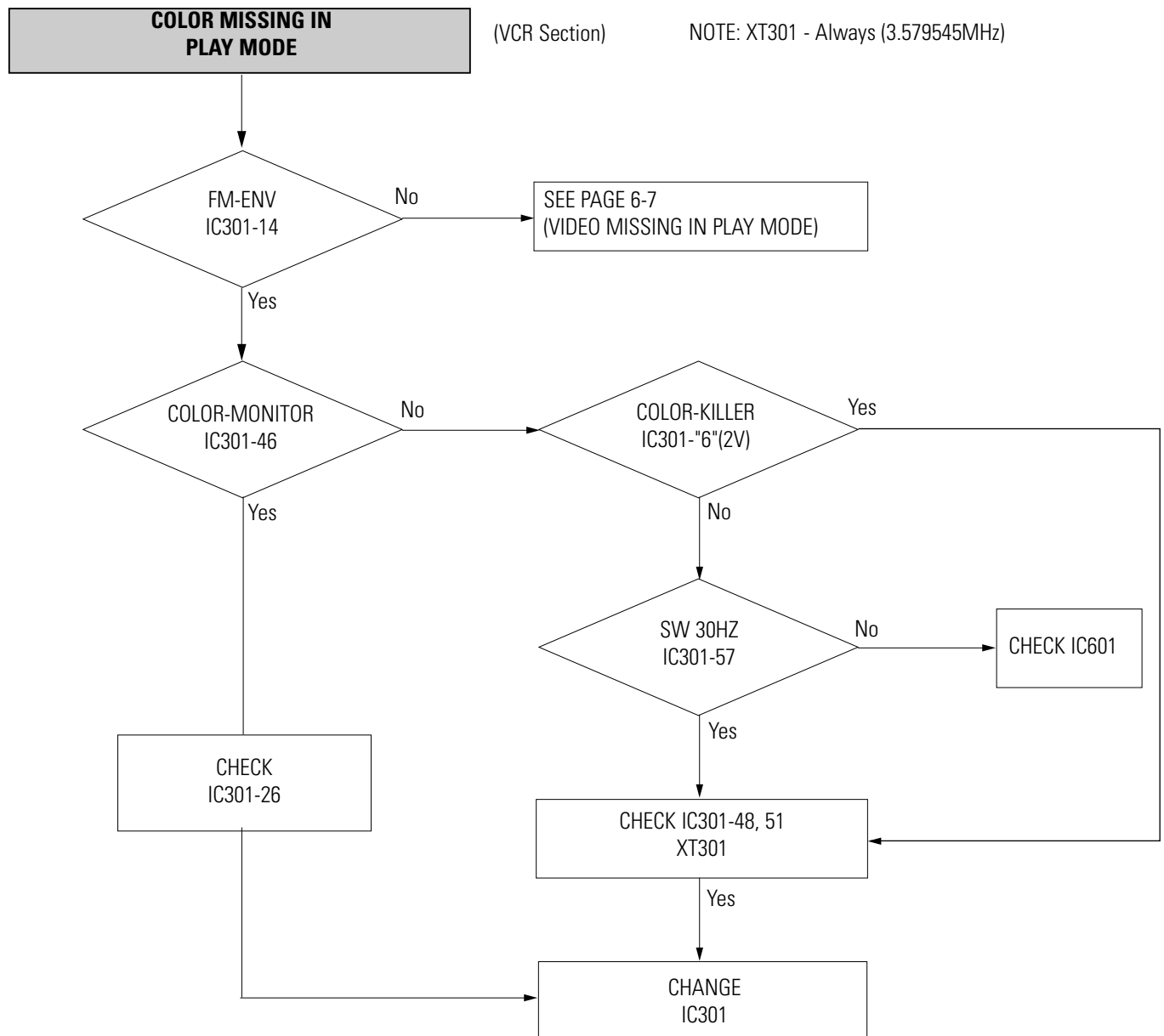


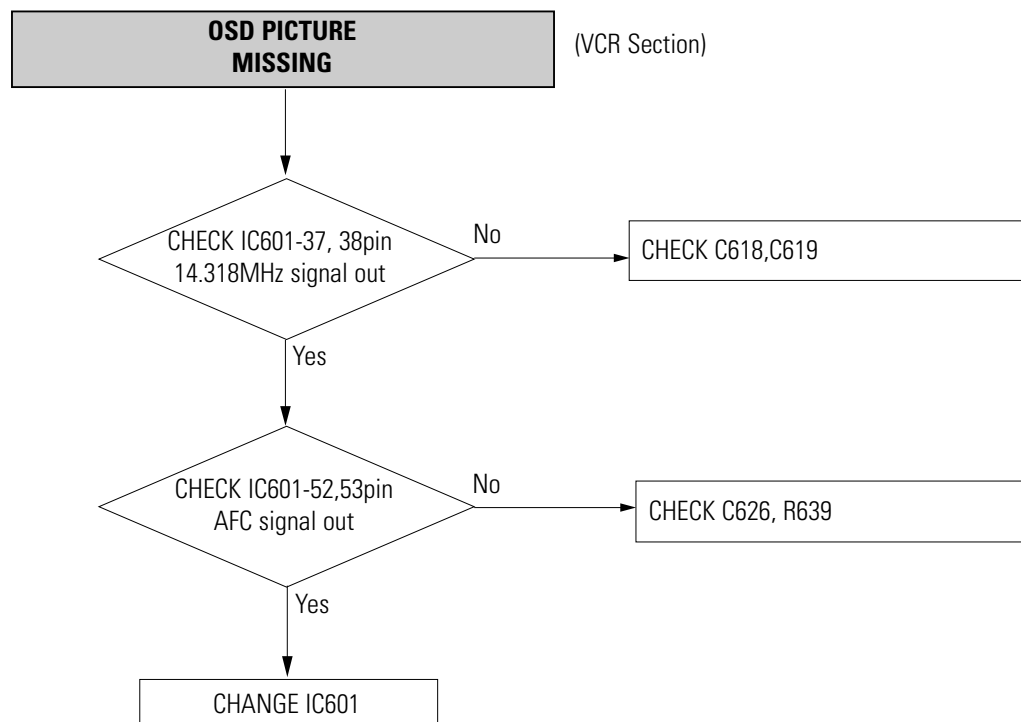


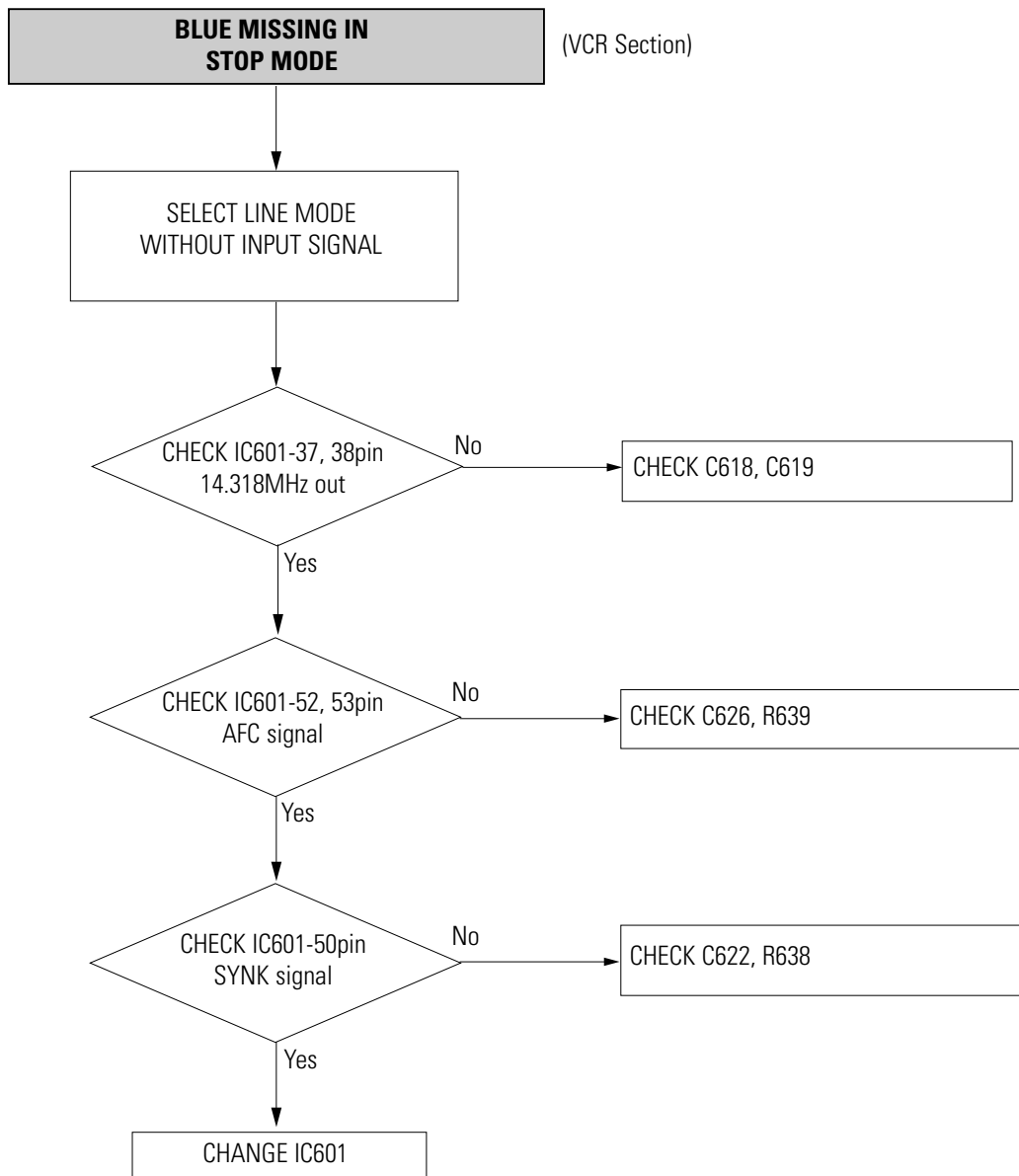


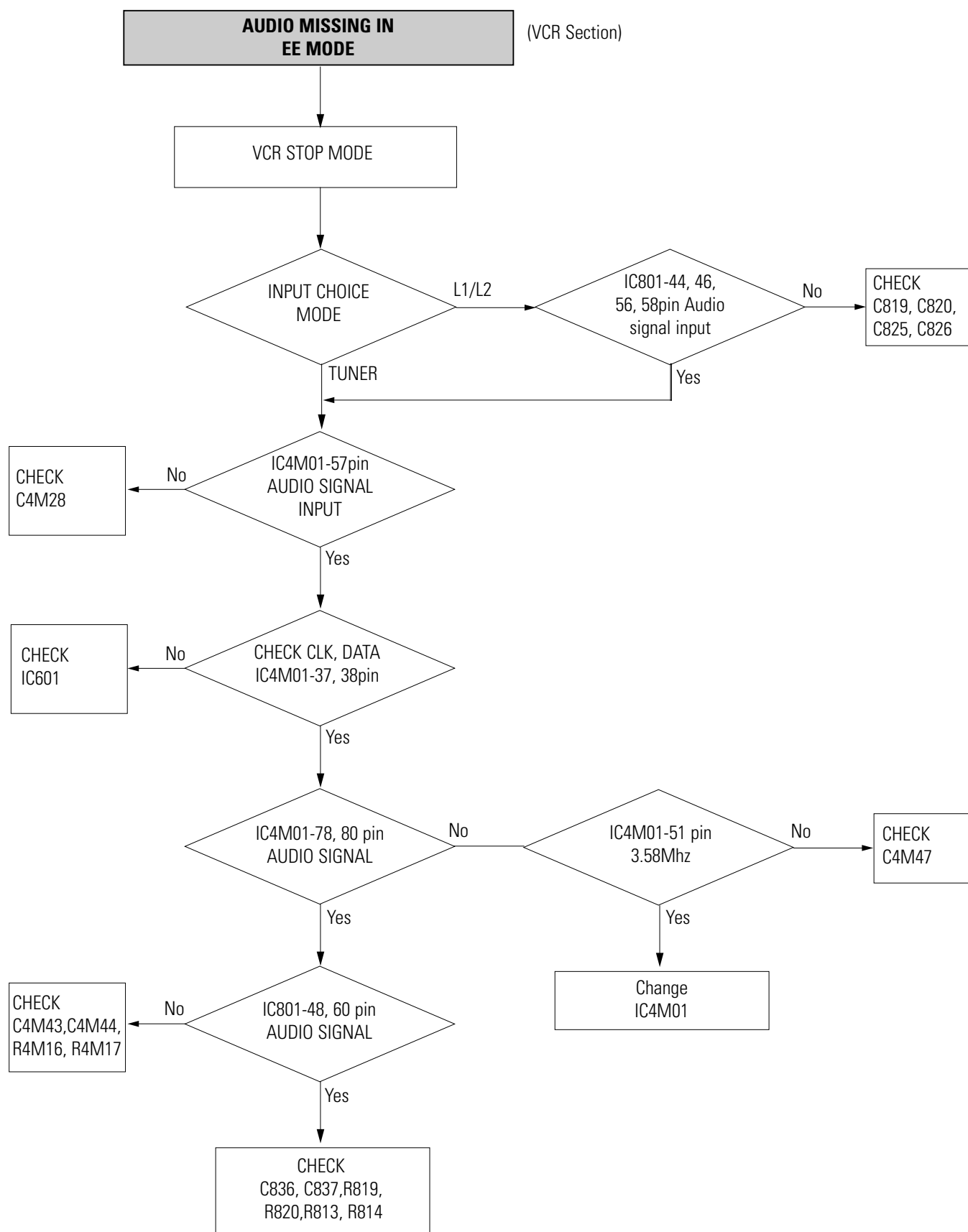


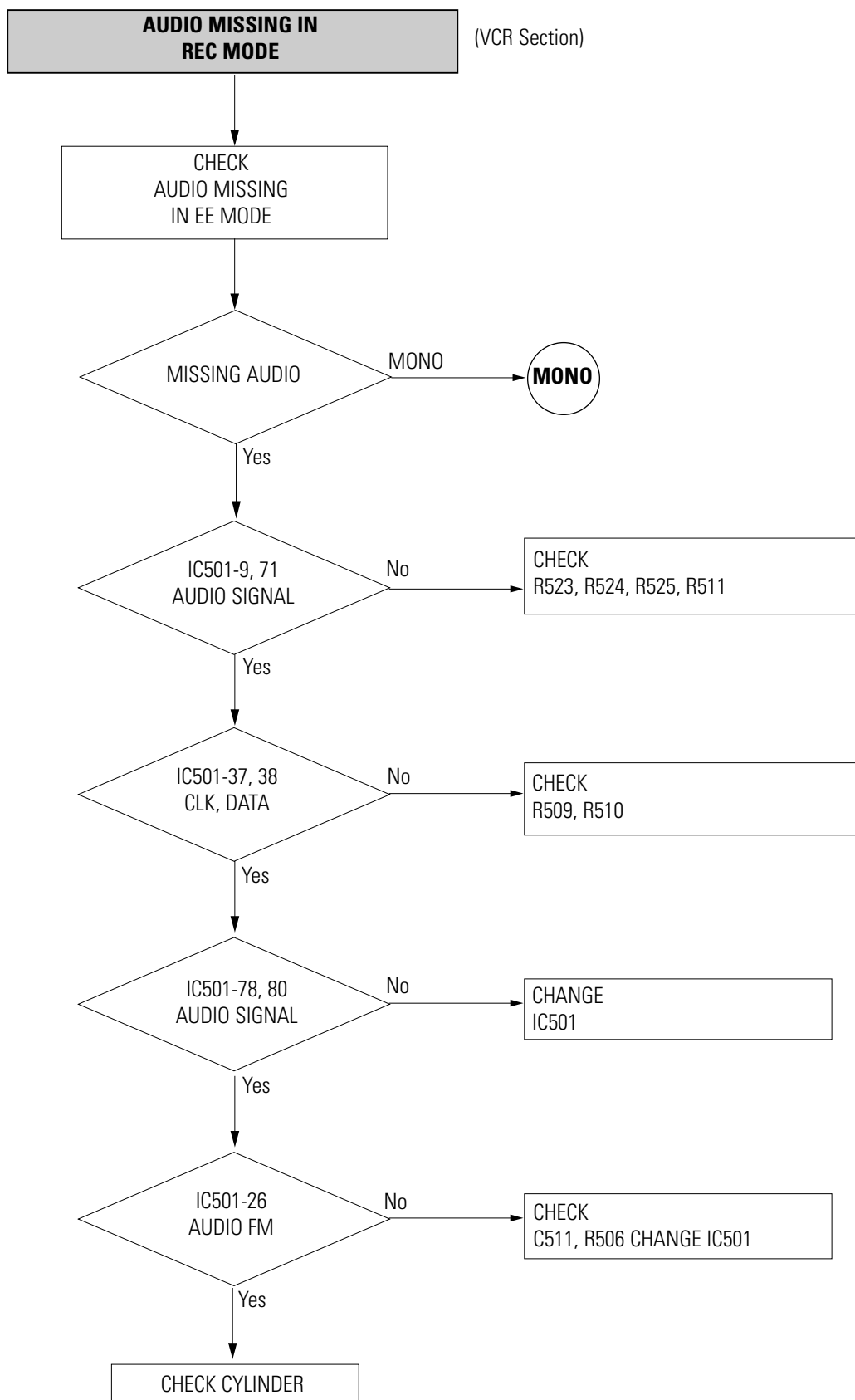


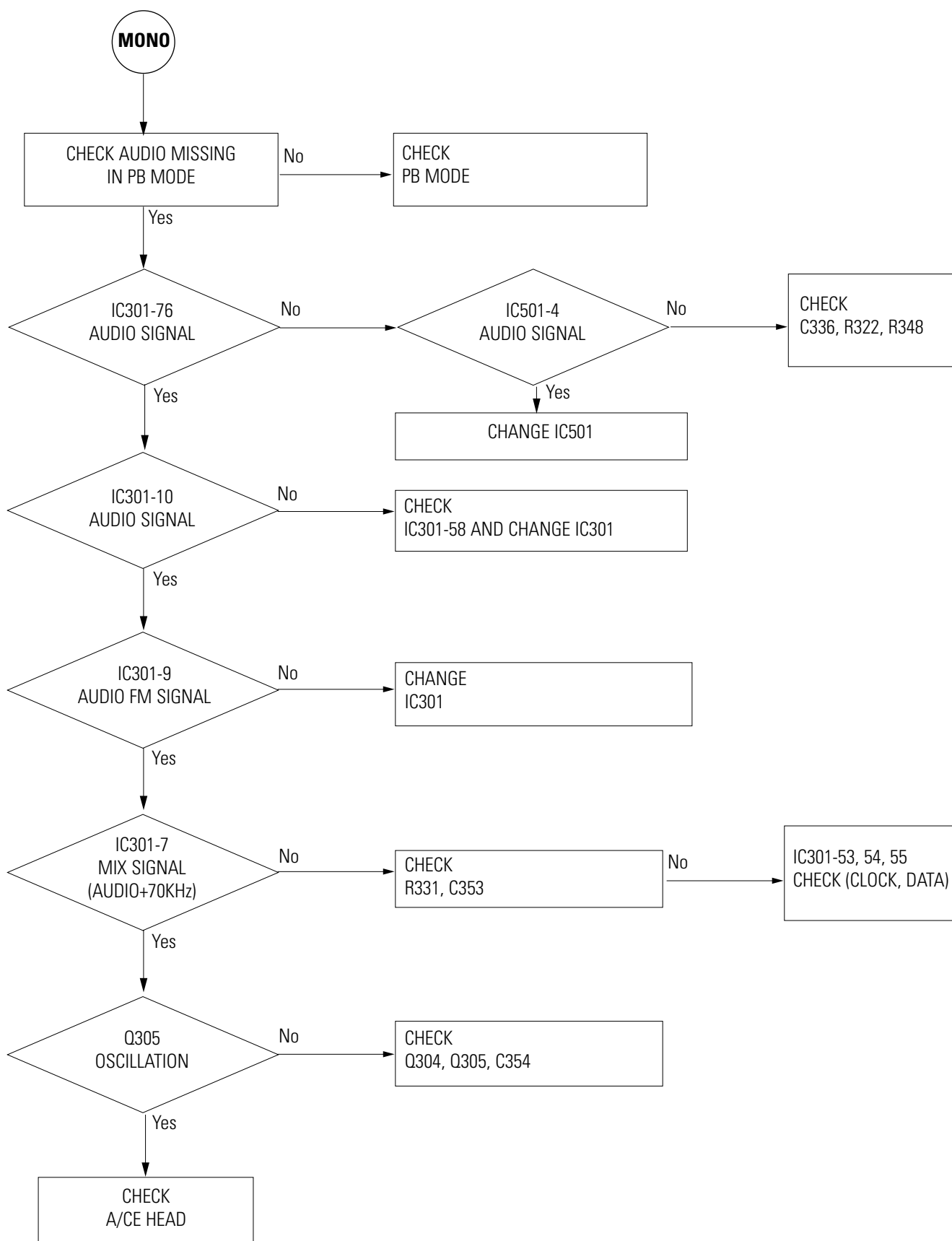


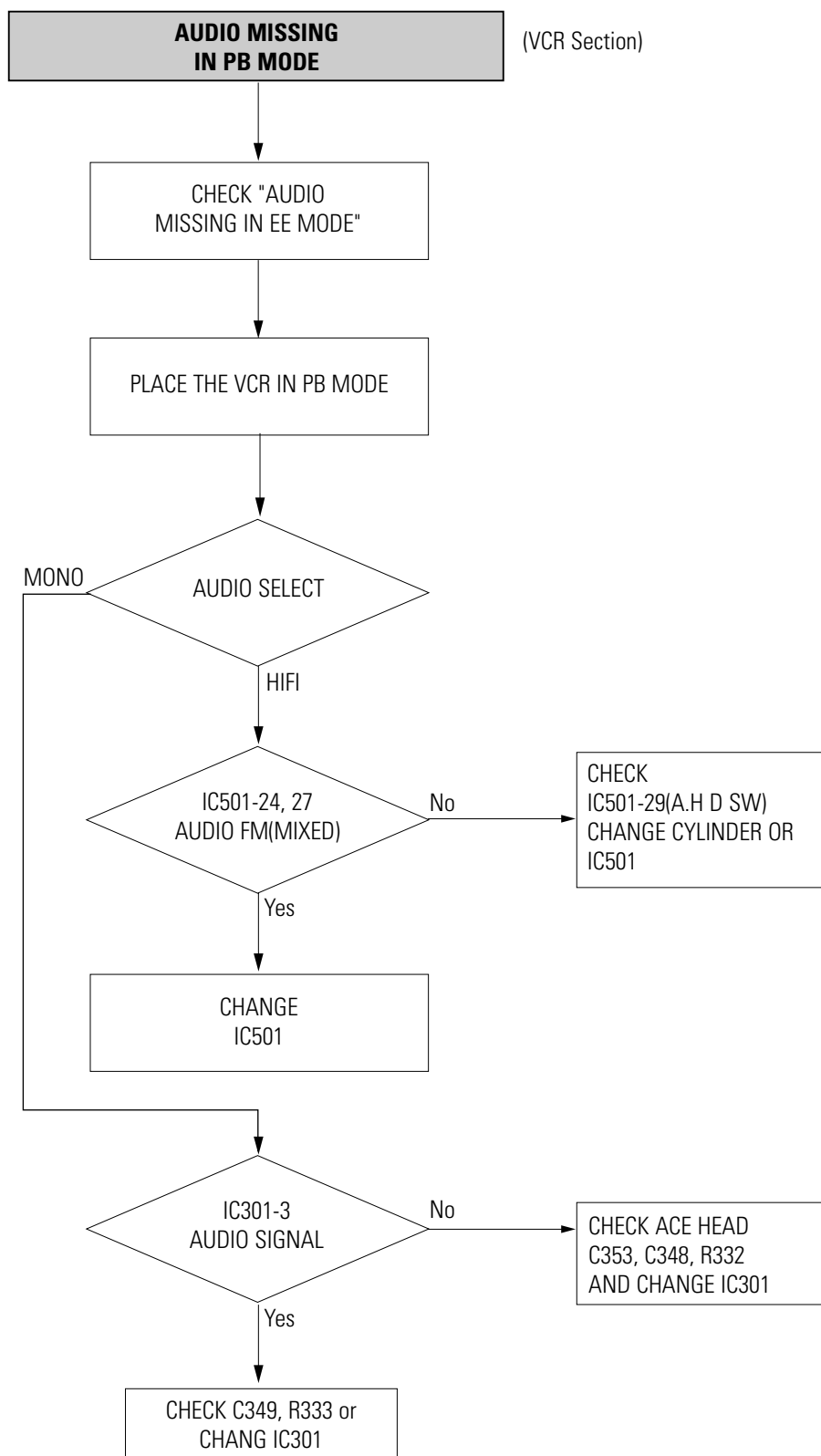


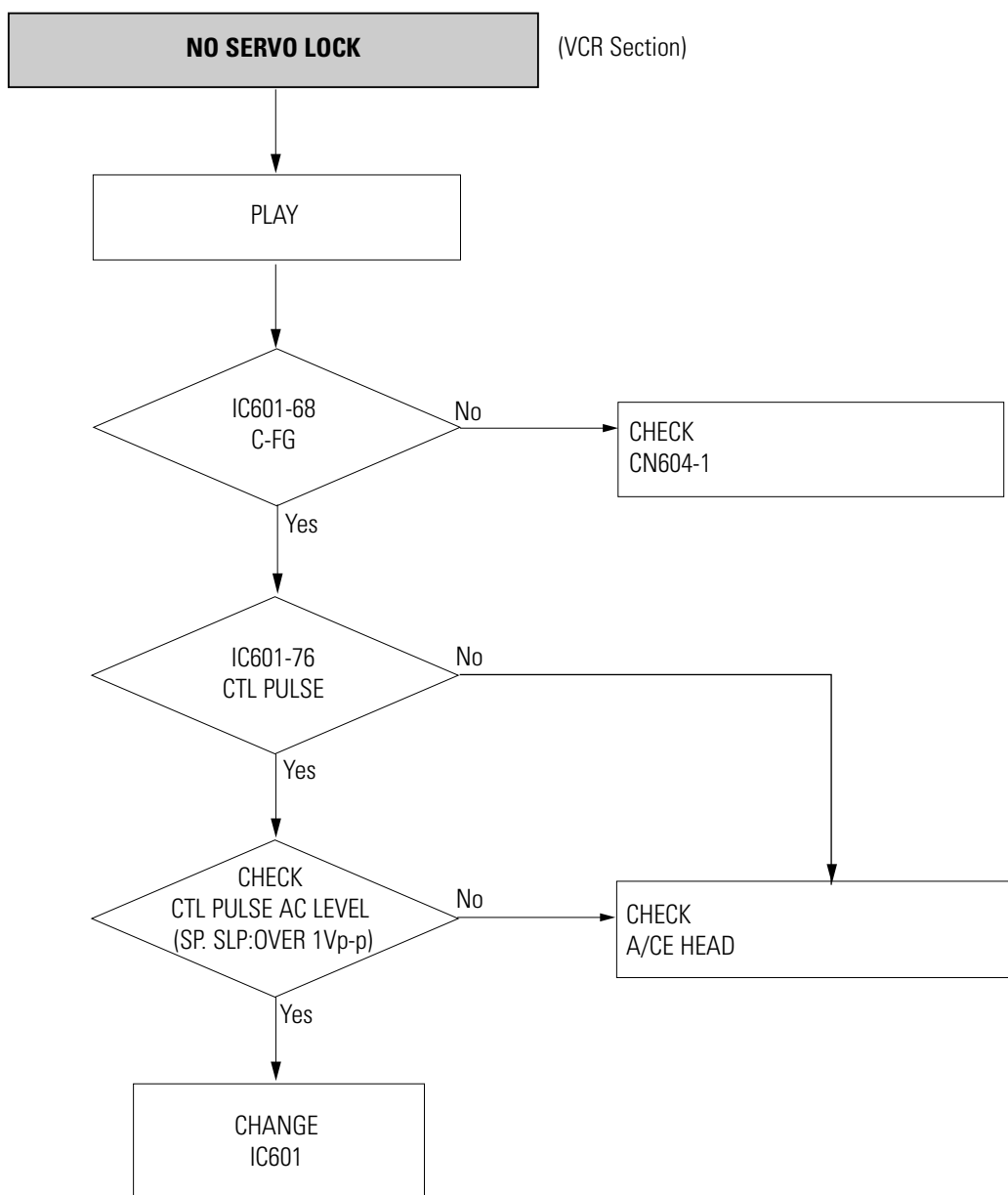


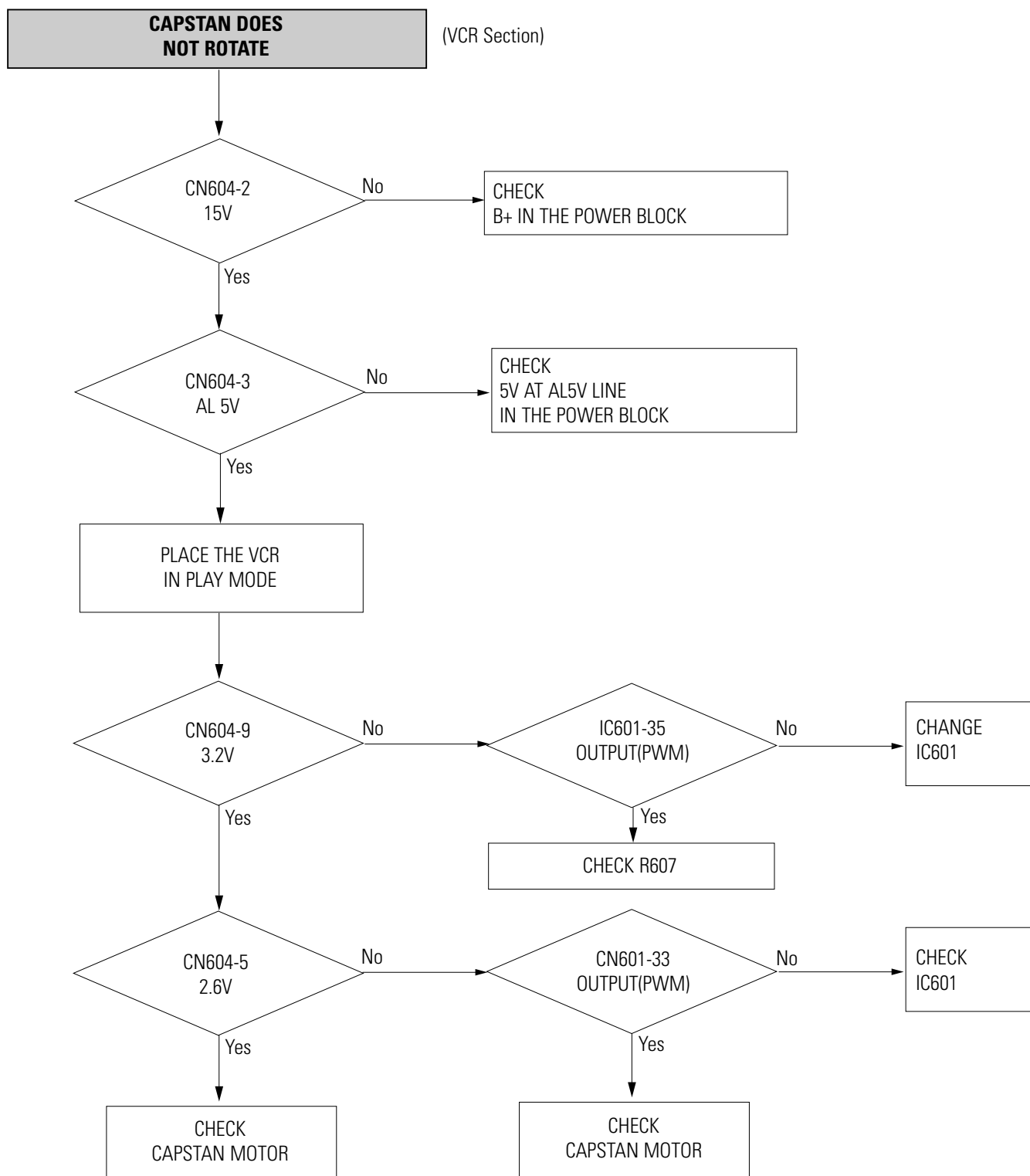


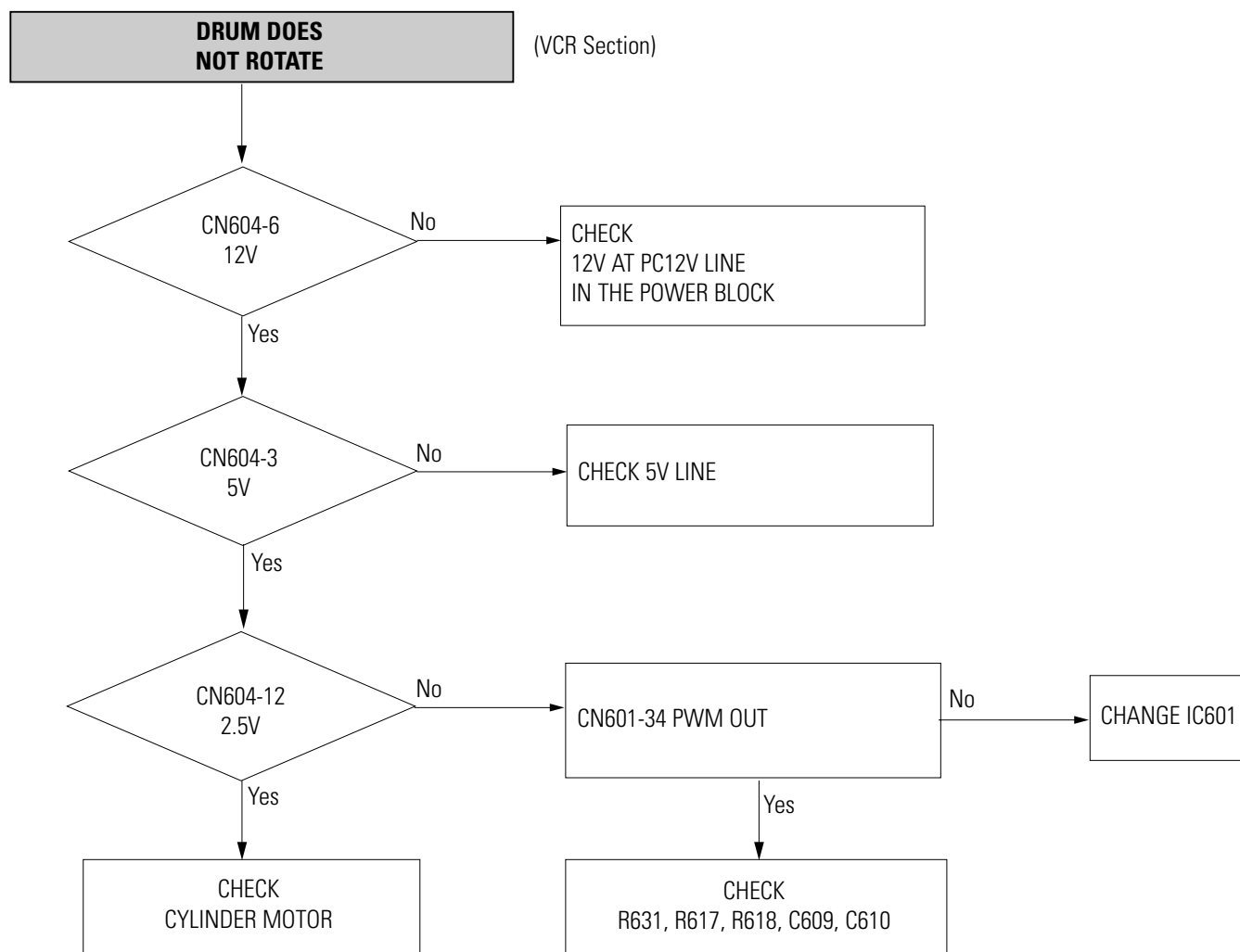


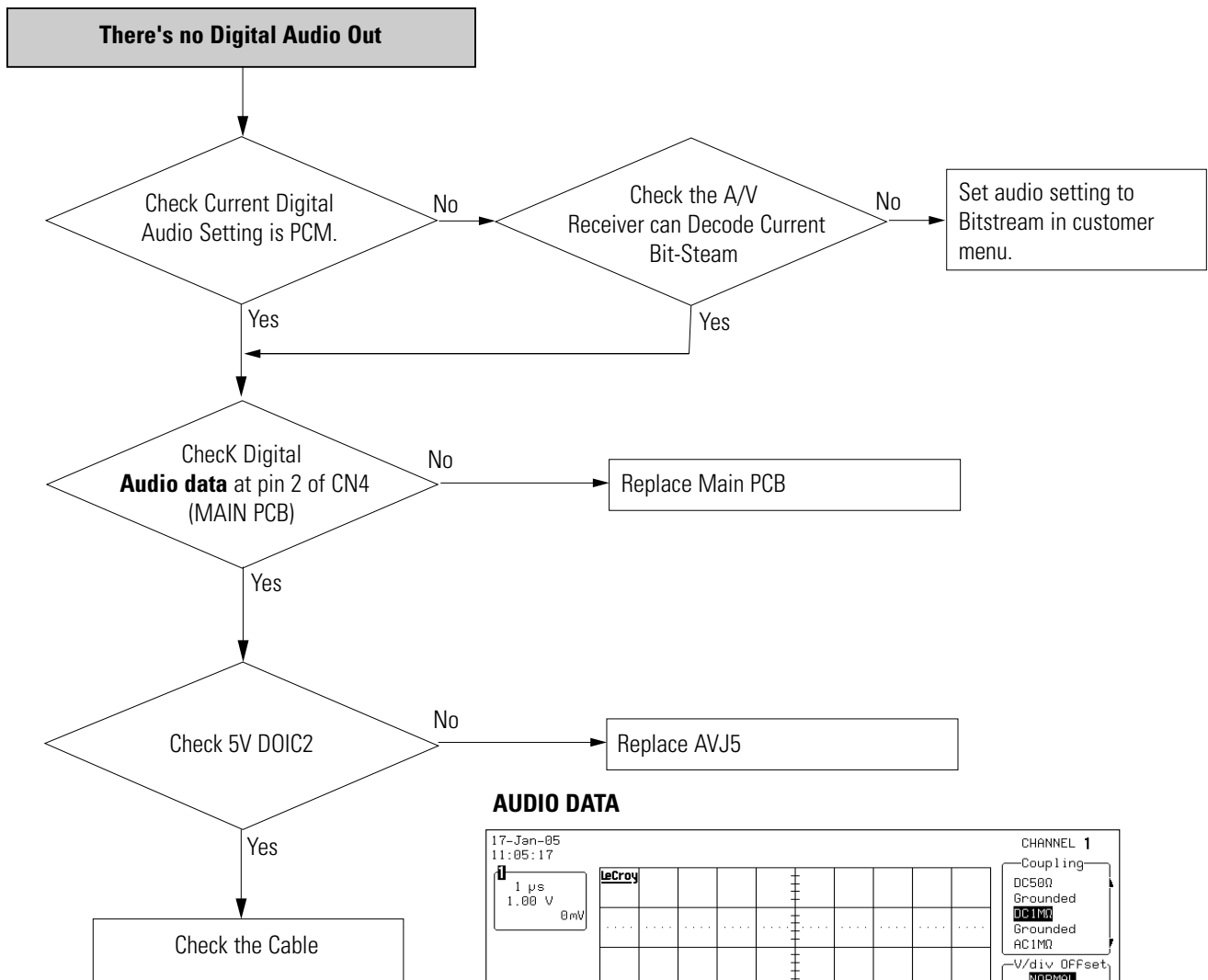




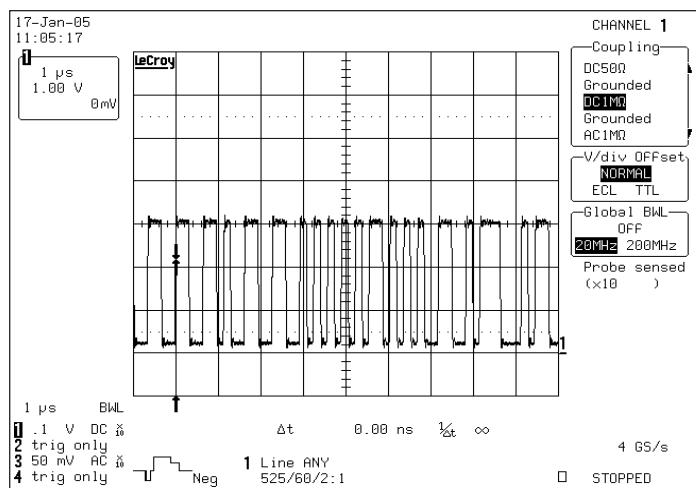


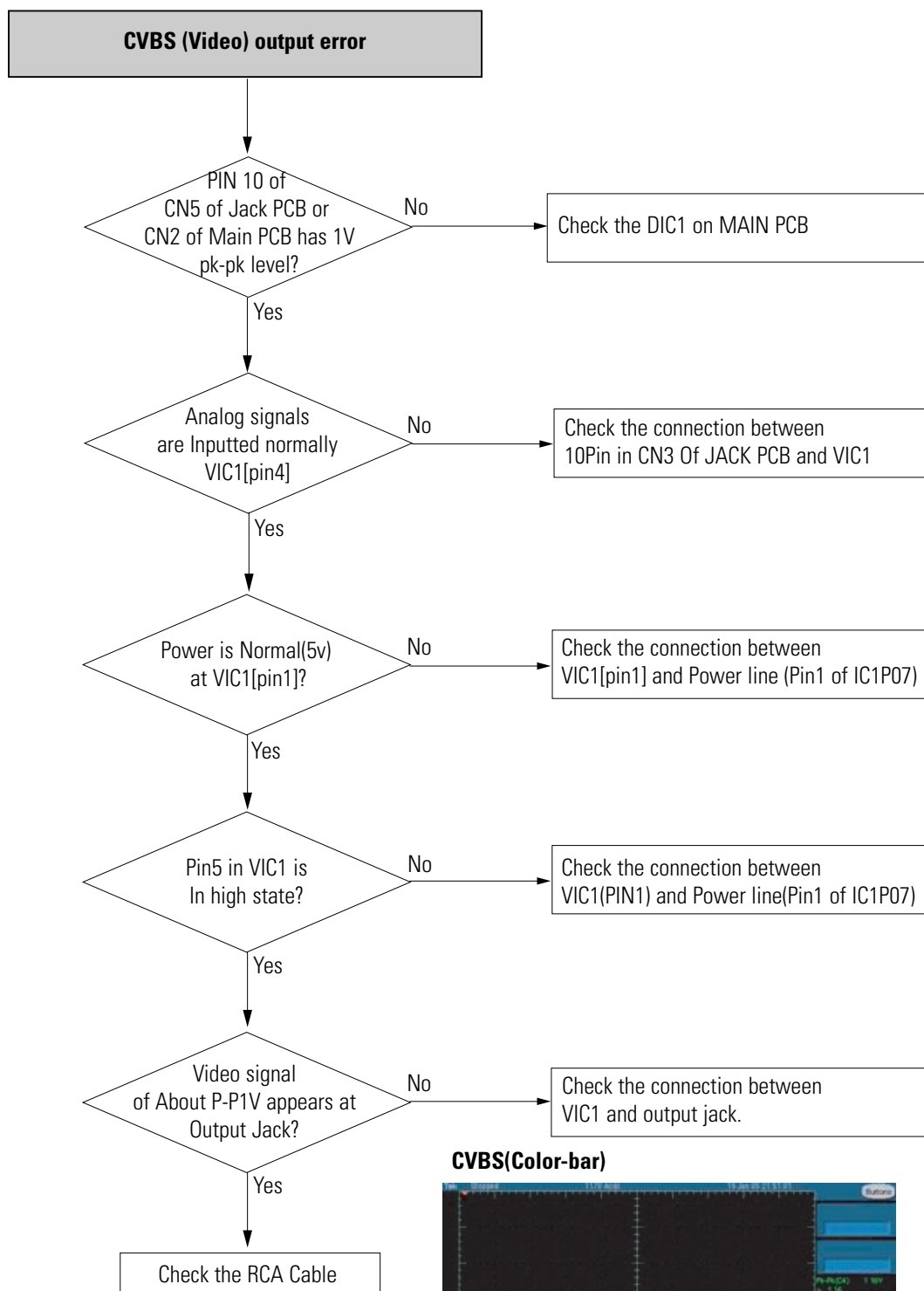
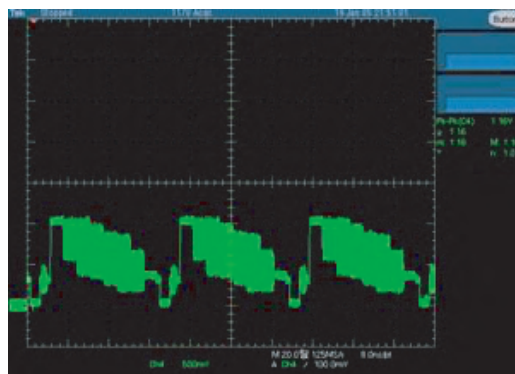


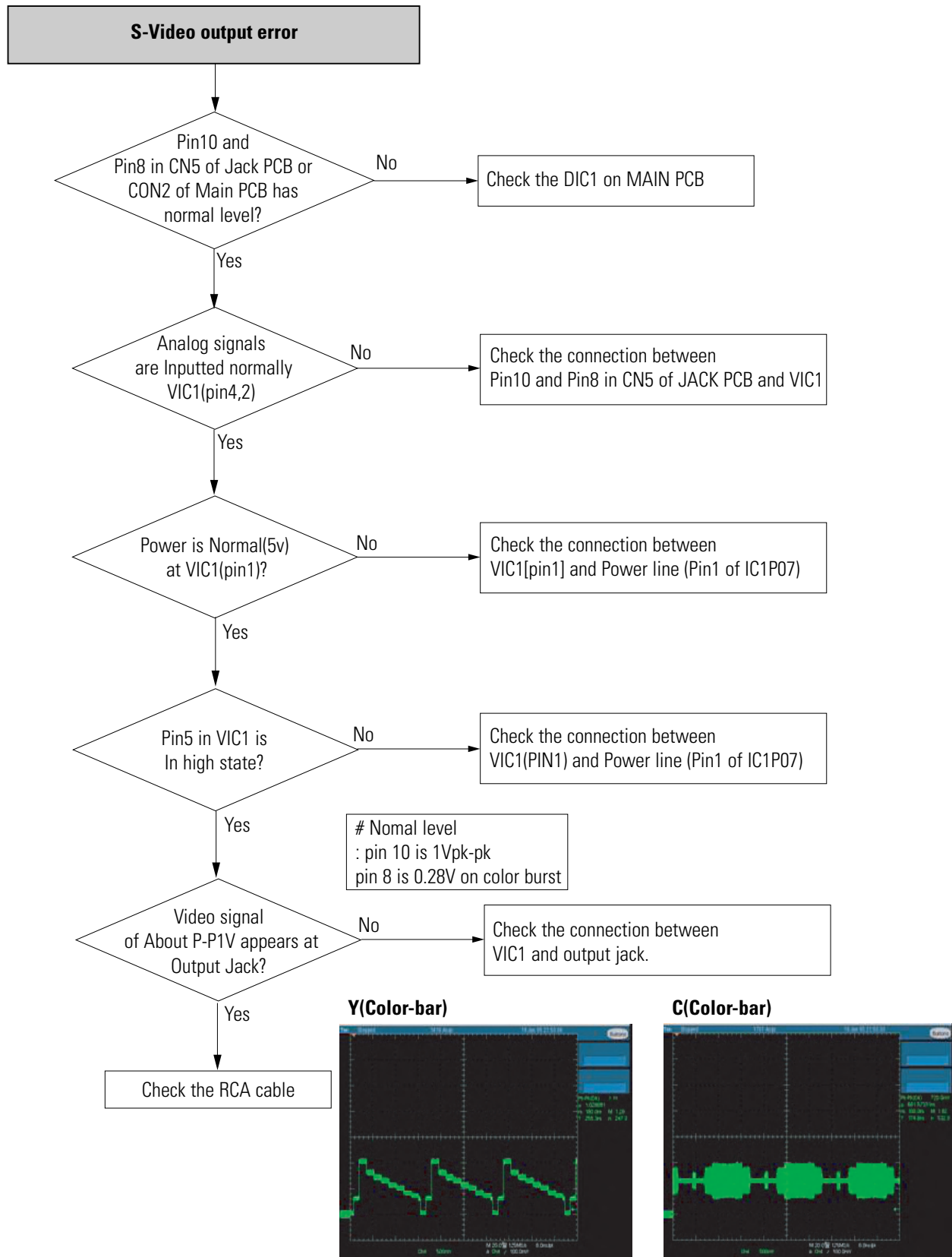


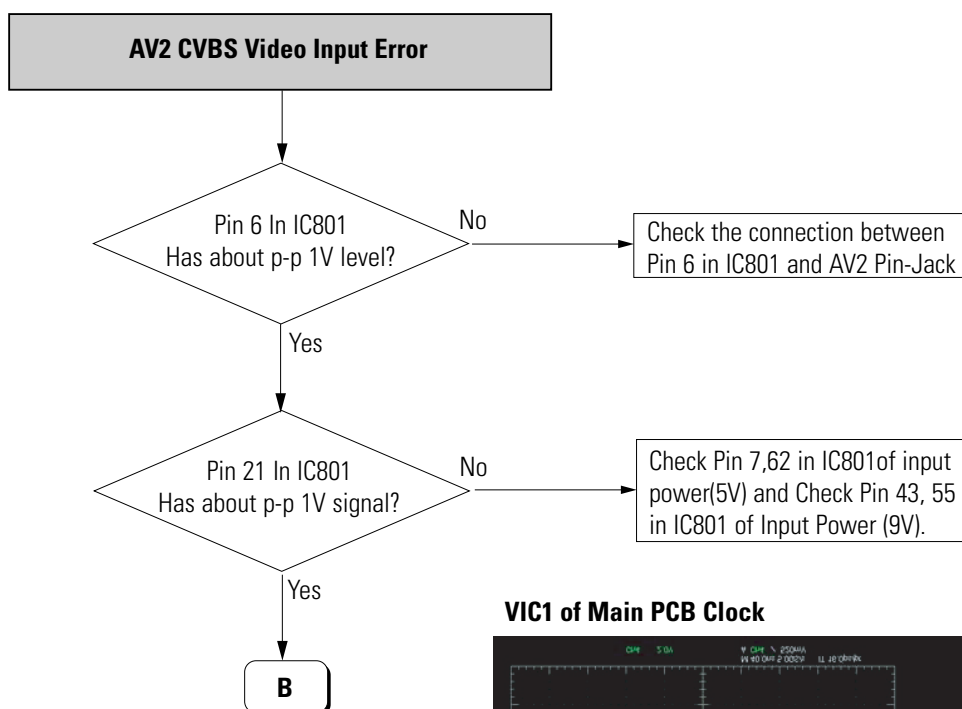


AUDIO DATA

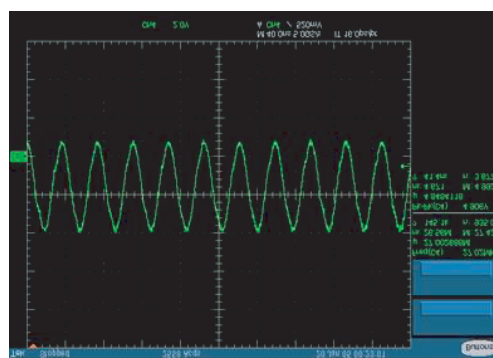


**CVBS(Color-bar)**

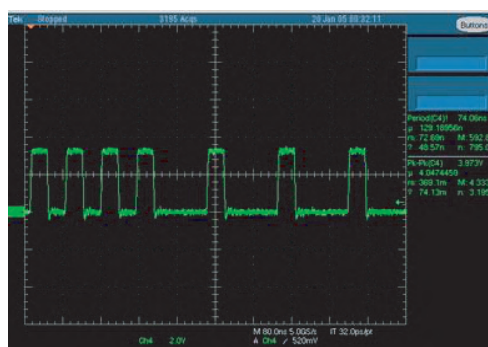


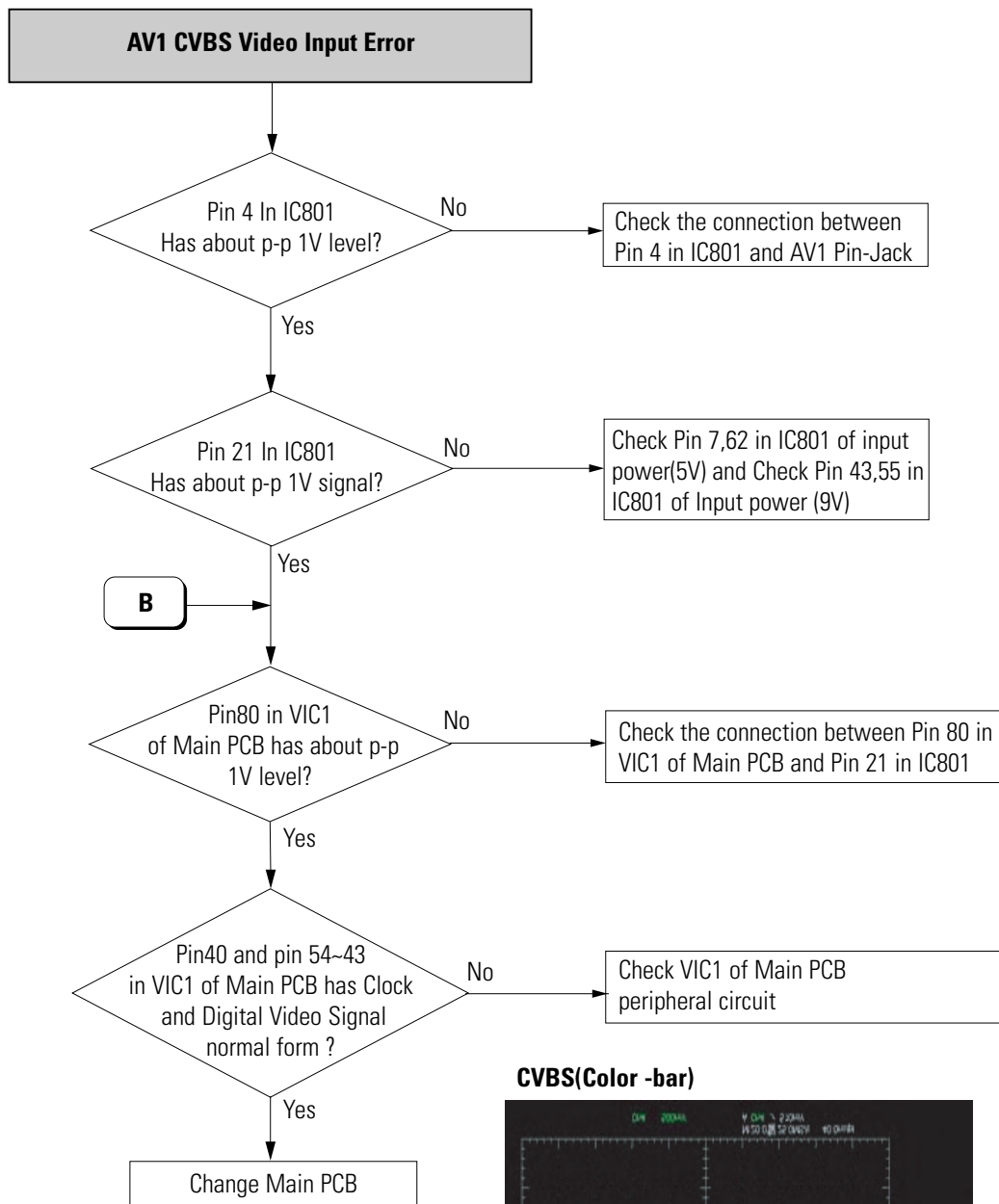


VIC1 of Main PCB Clock

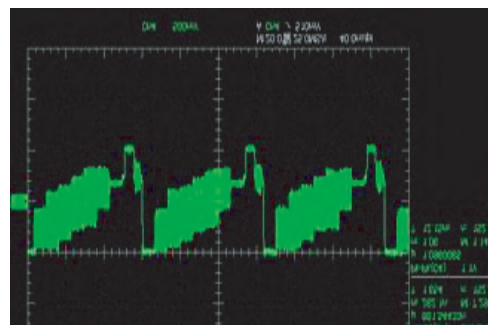


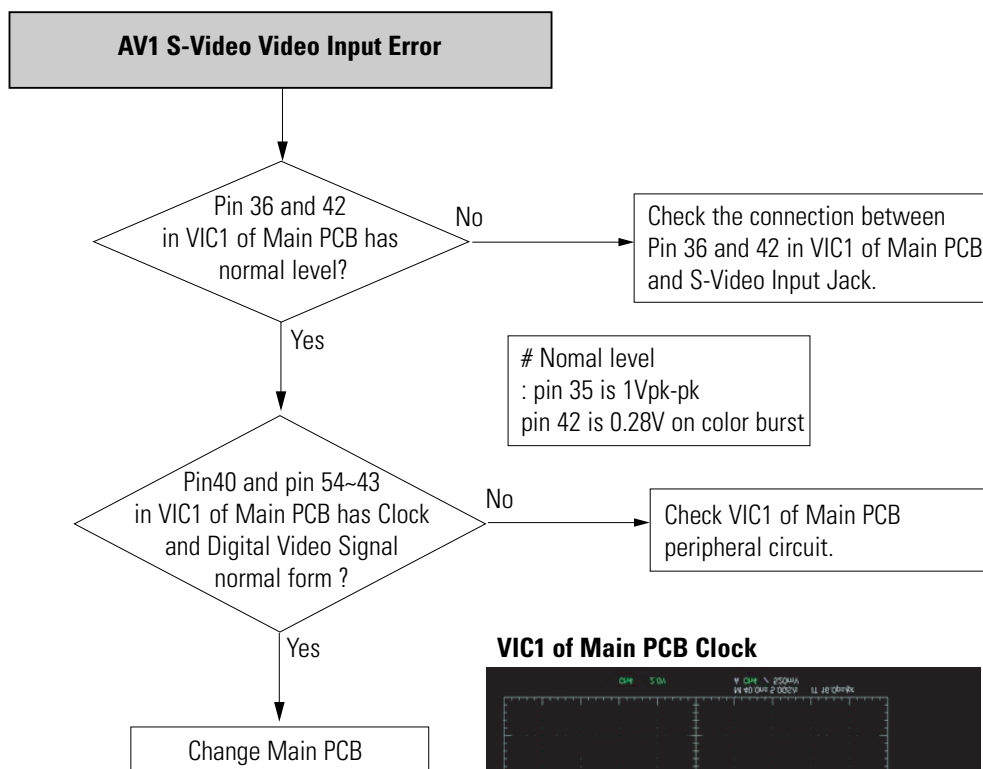
VIC1 of Main PCB DATA



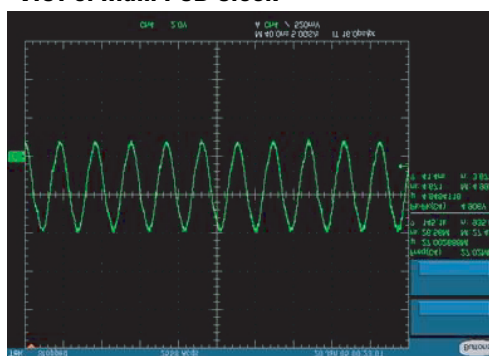


CVBS(Color -bar)

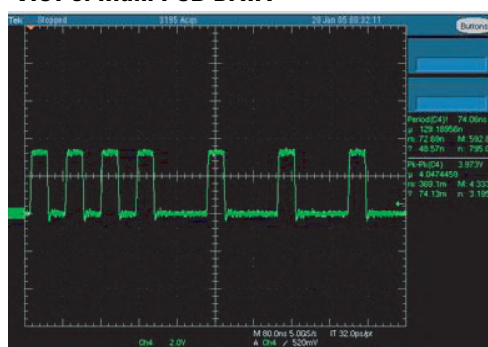


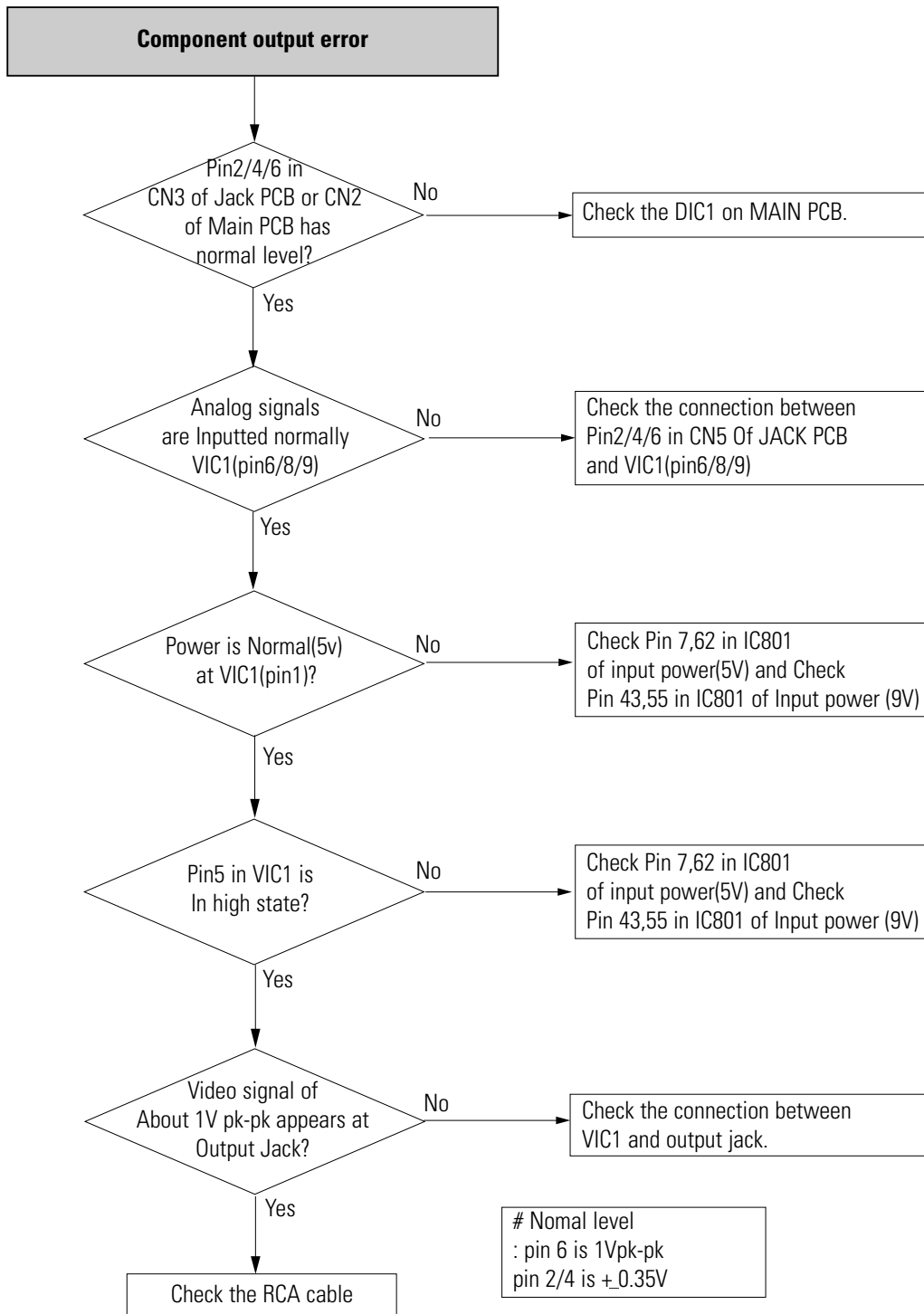


VIC1 of Main PCB Clock

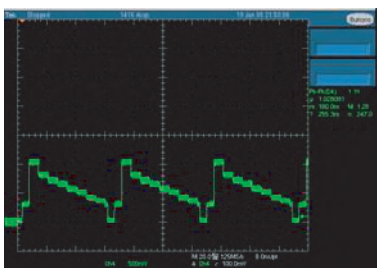


VIC1 of Main PCB DATA

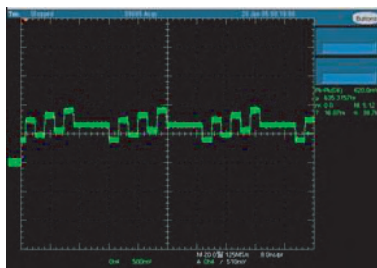




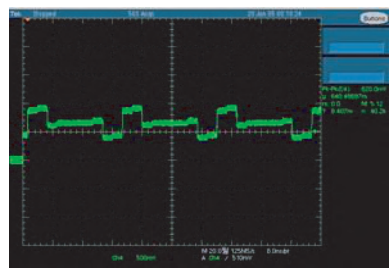
Y(Color-bar)

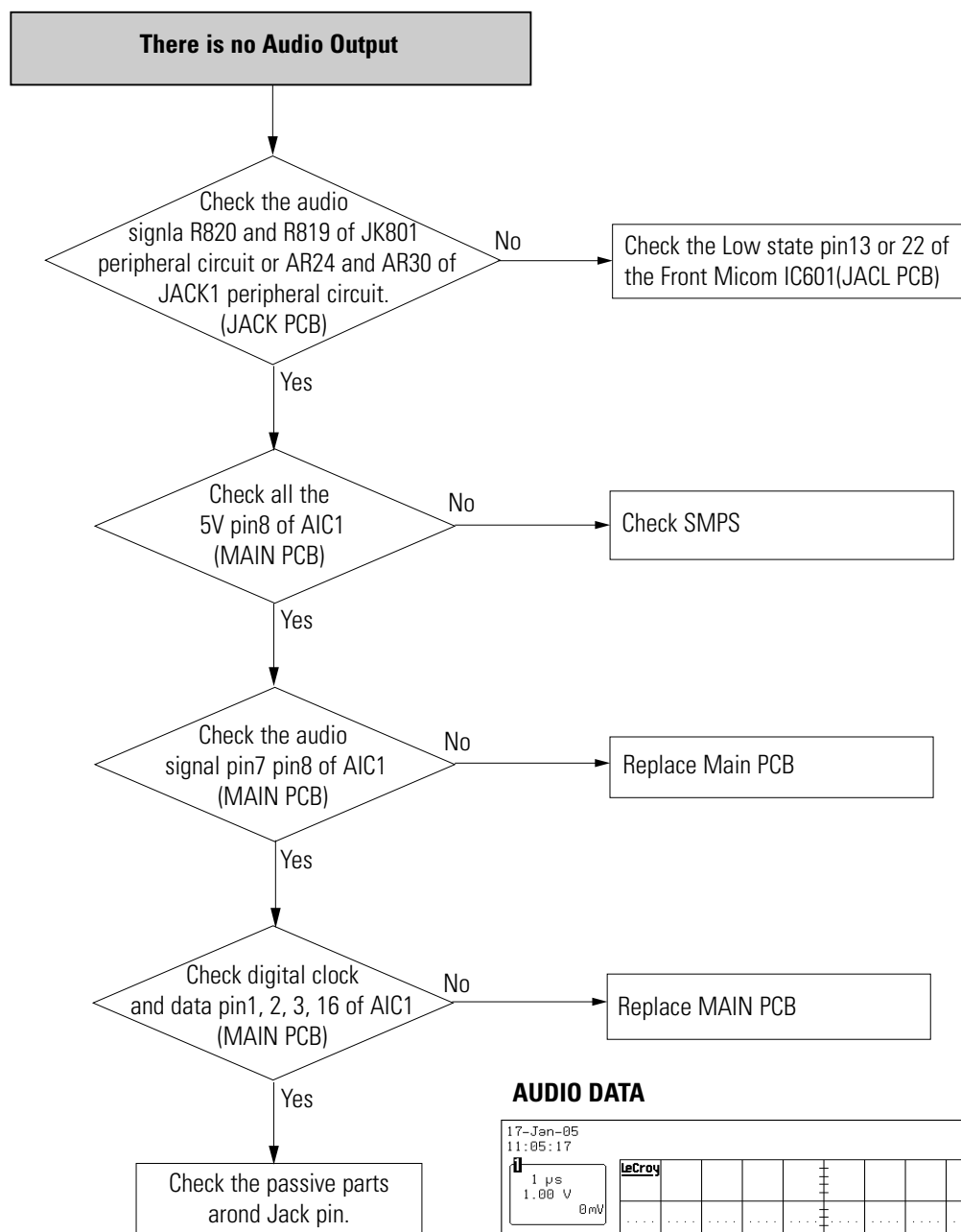


Pb(Color-bar)

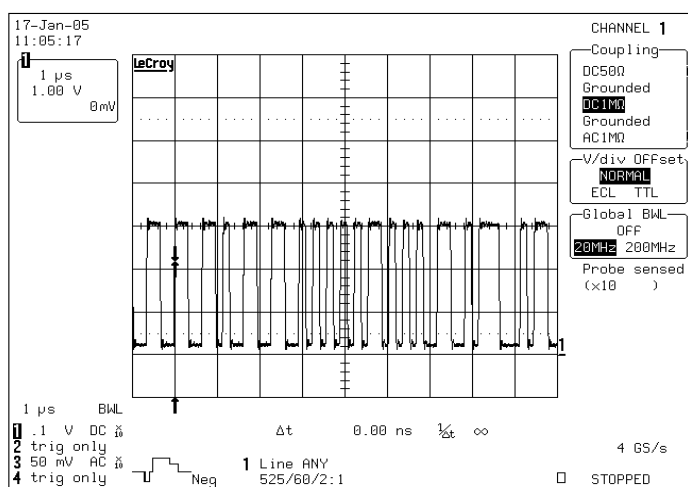


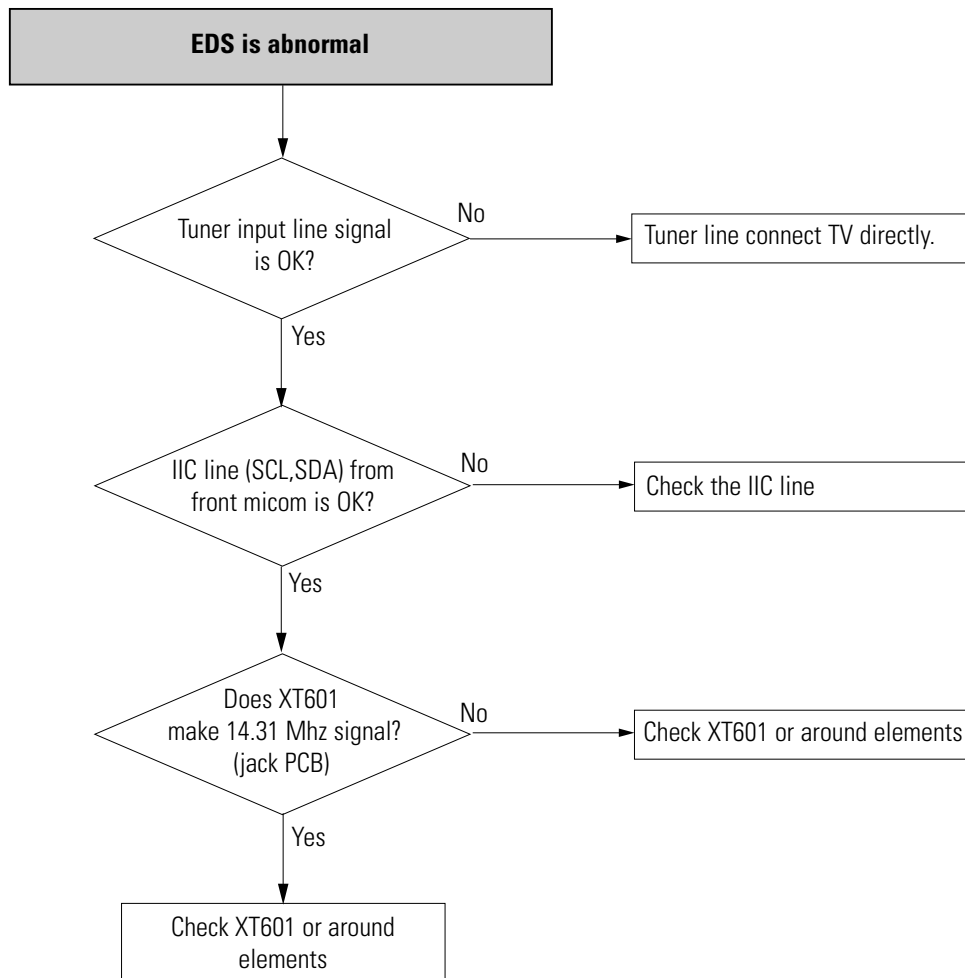
Pr(Color-bar)

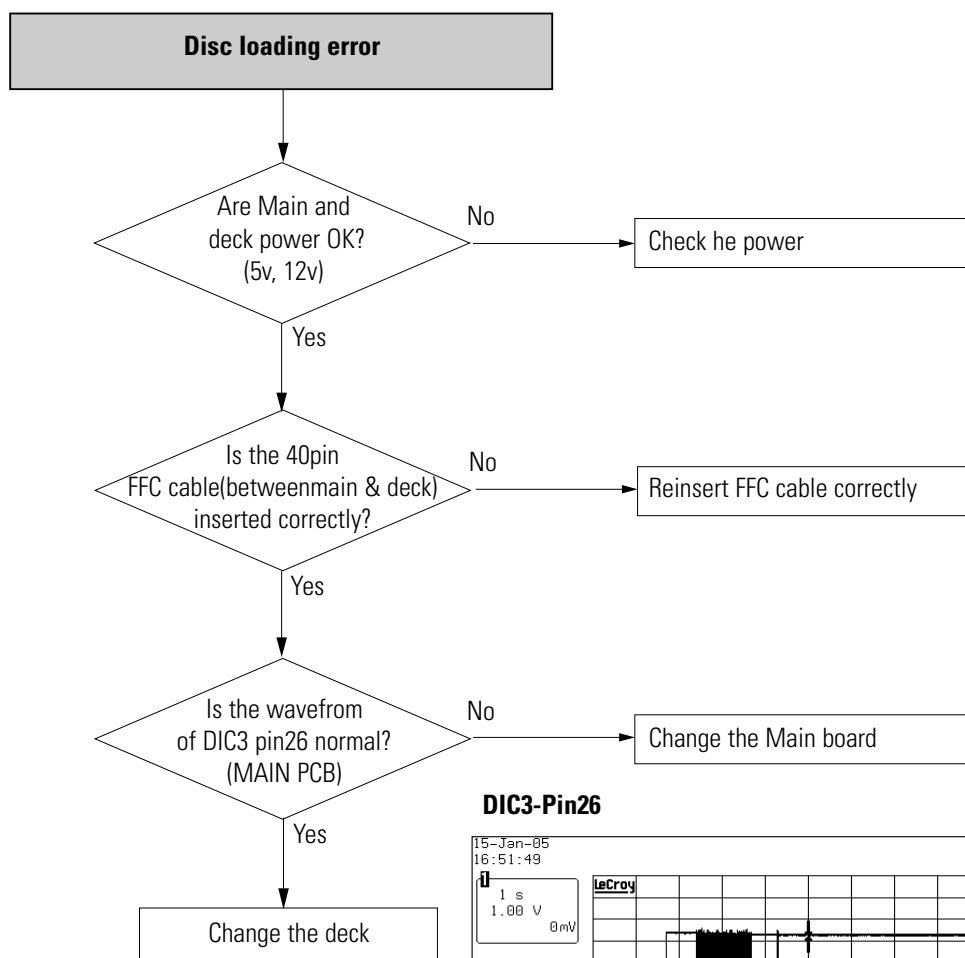




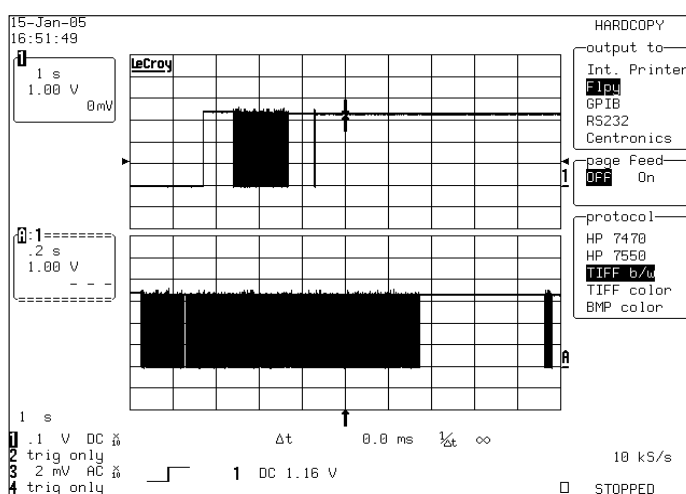
AUDIO DATA

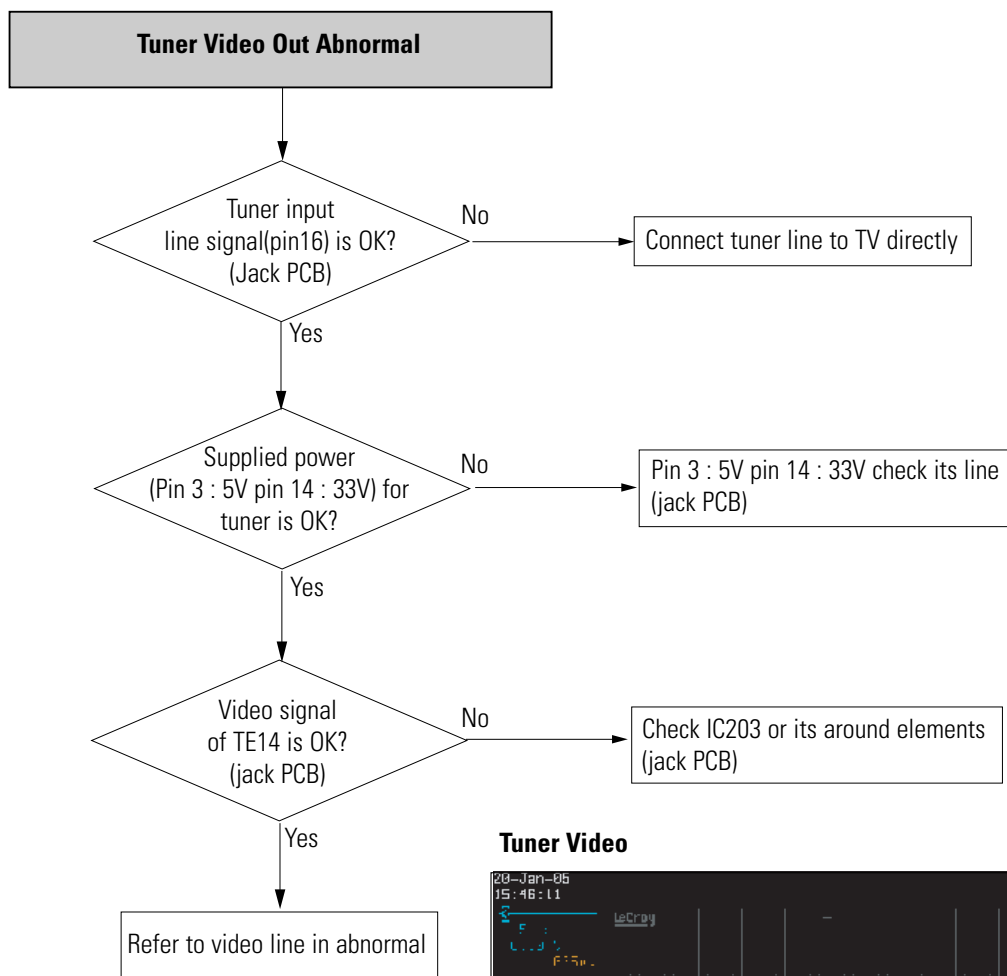




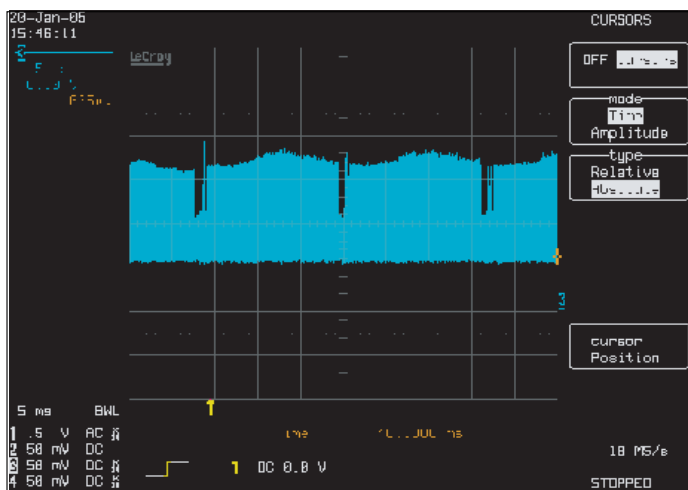


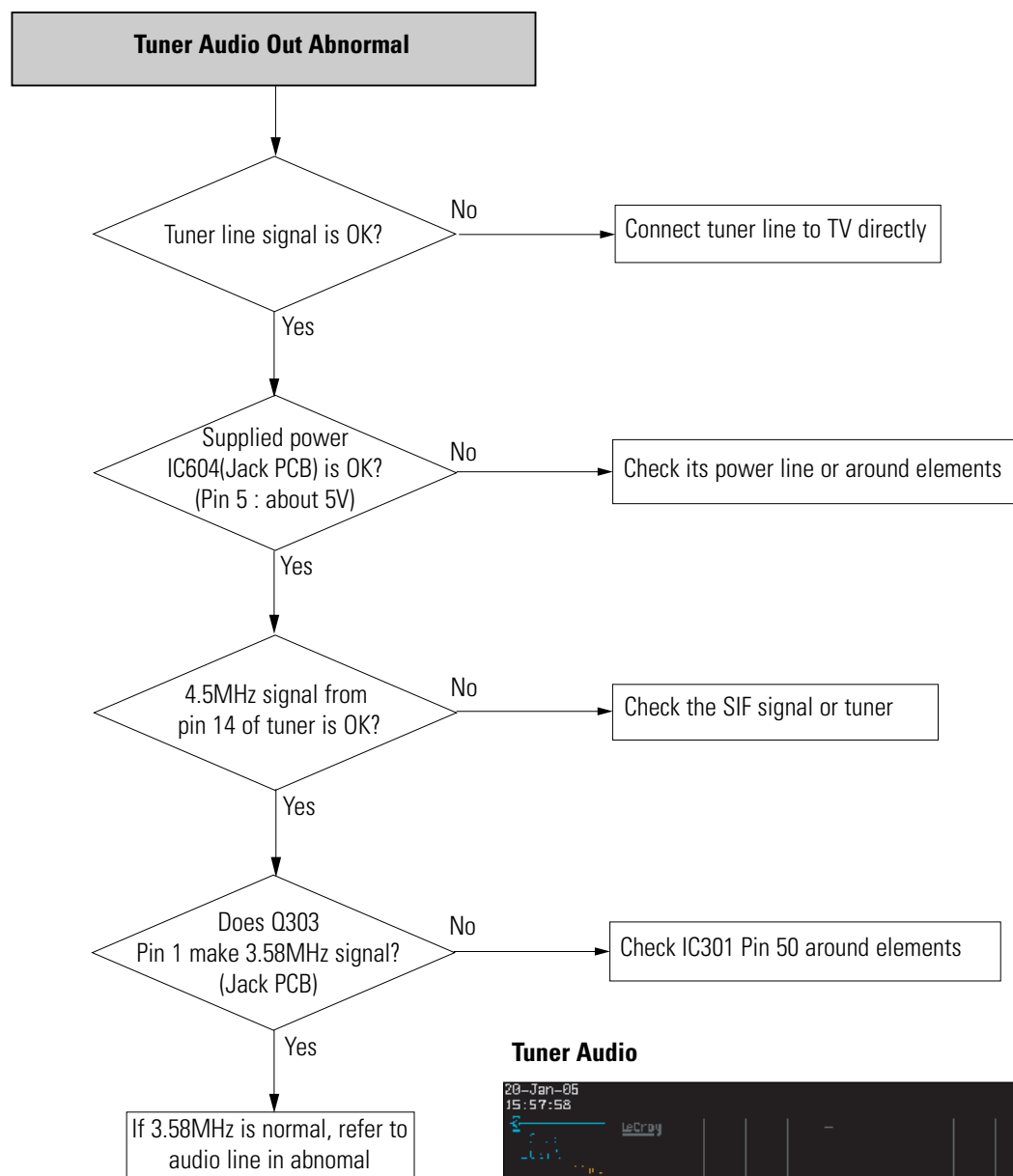
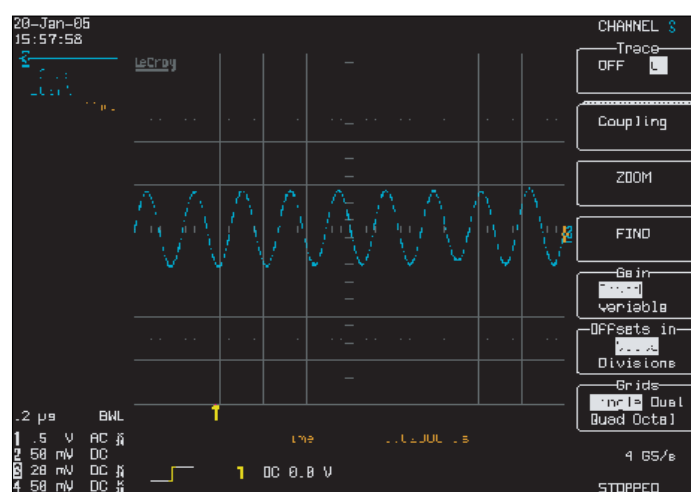
DIC3-Pin26

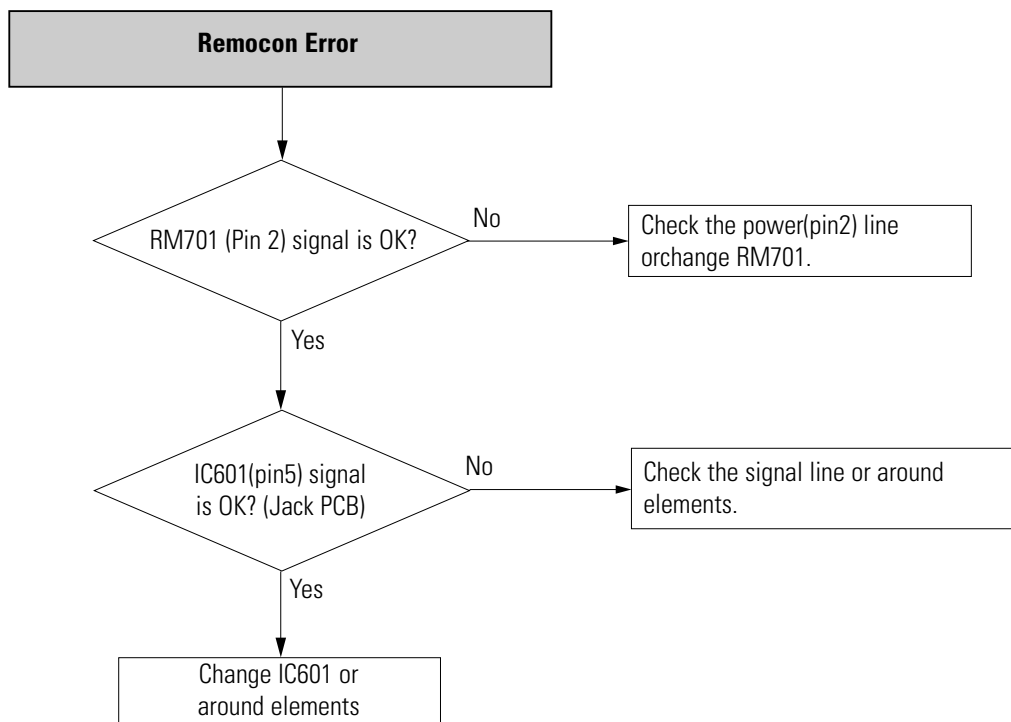




Tuner Video



**Tuner Audio**



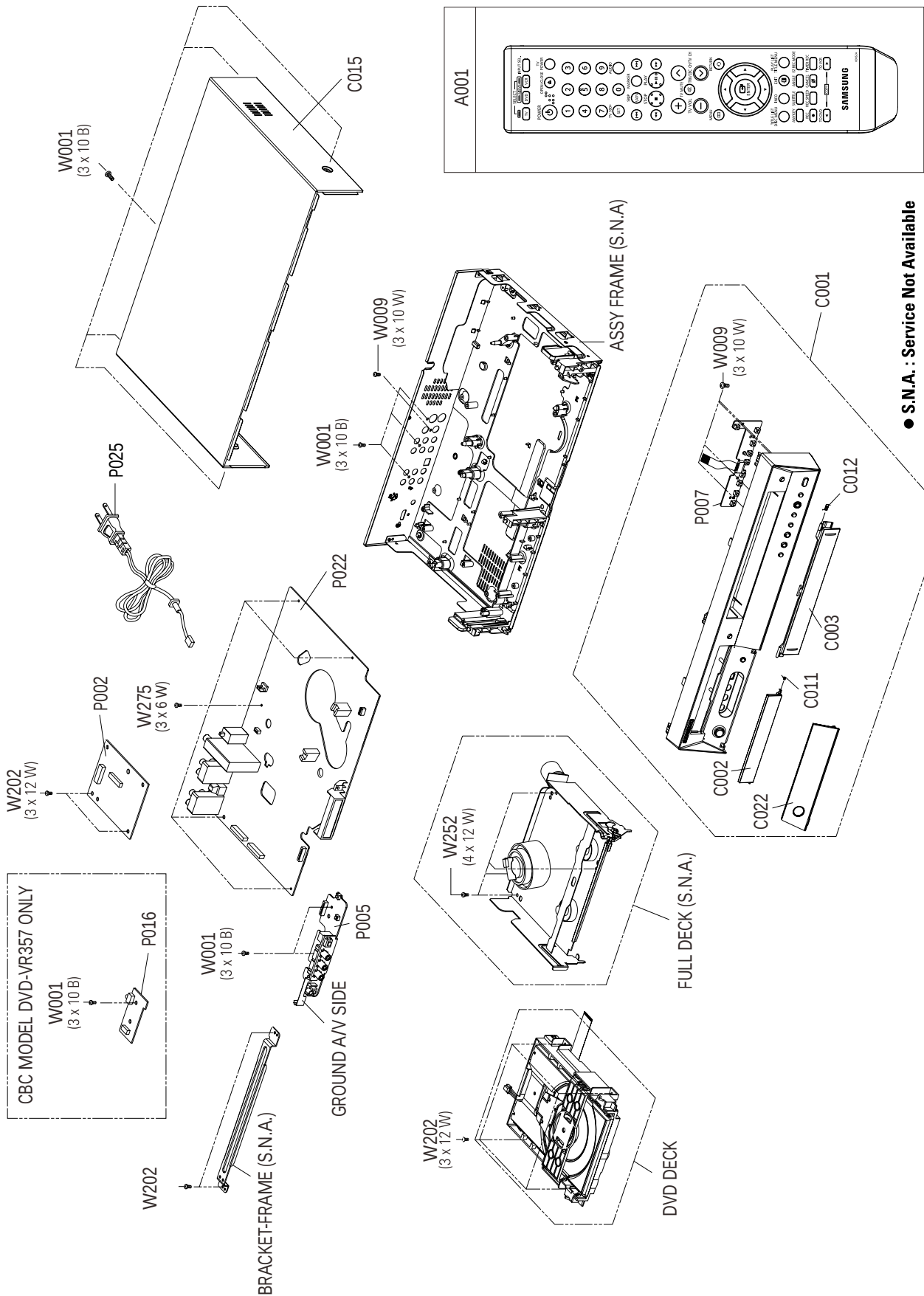
7. Exploded View and Parts List

7-1 Cabinet Assembly - - - - - 7-2

7-2 VCR Mechanical Parts (Top Side) - - - - - 7-4

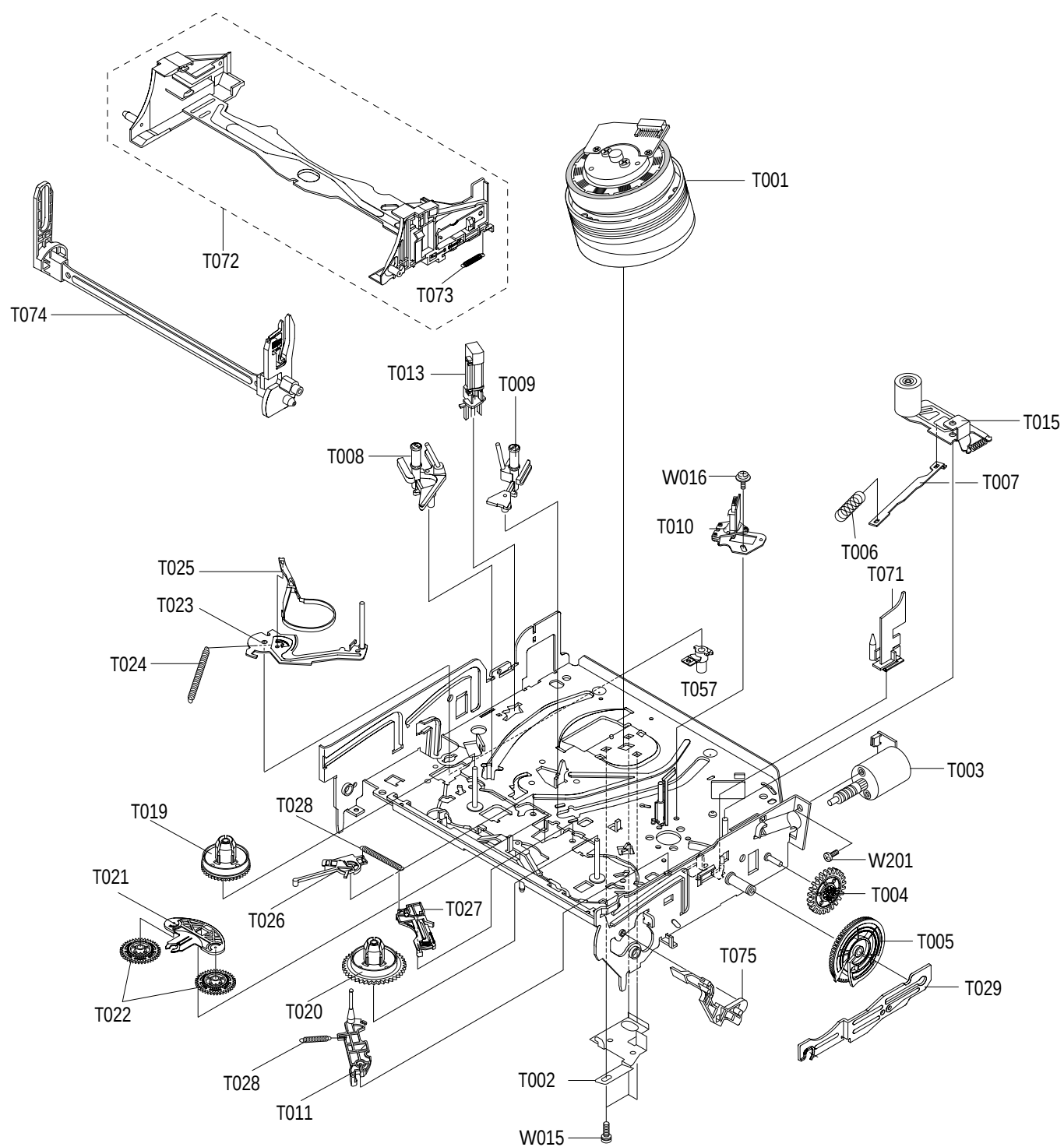
7-3 VCR Mechanical Parts (Bottom Side)- - - - - 7-6

7-1 Cabinet Assembly



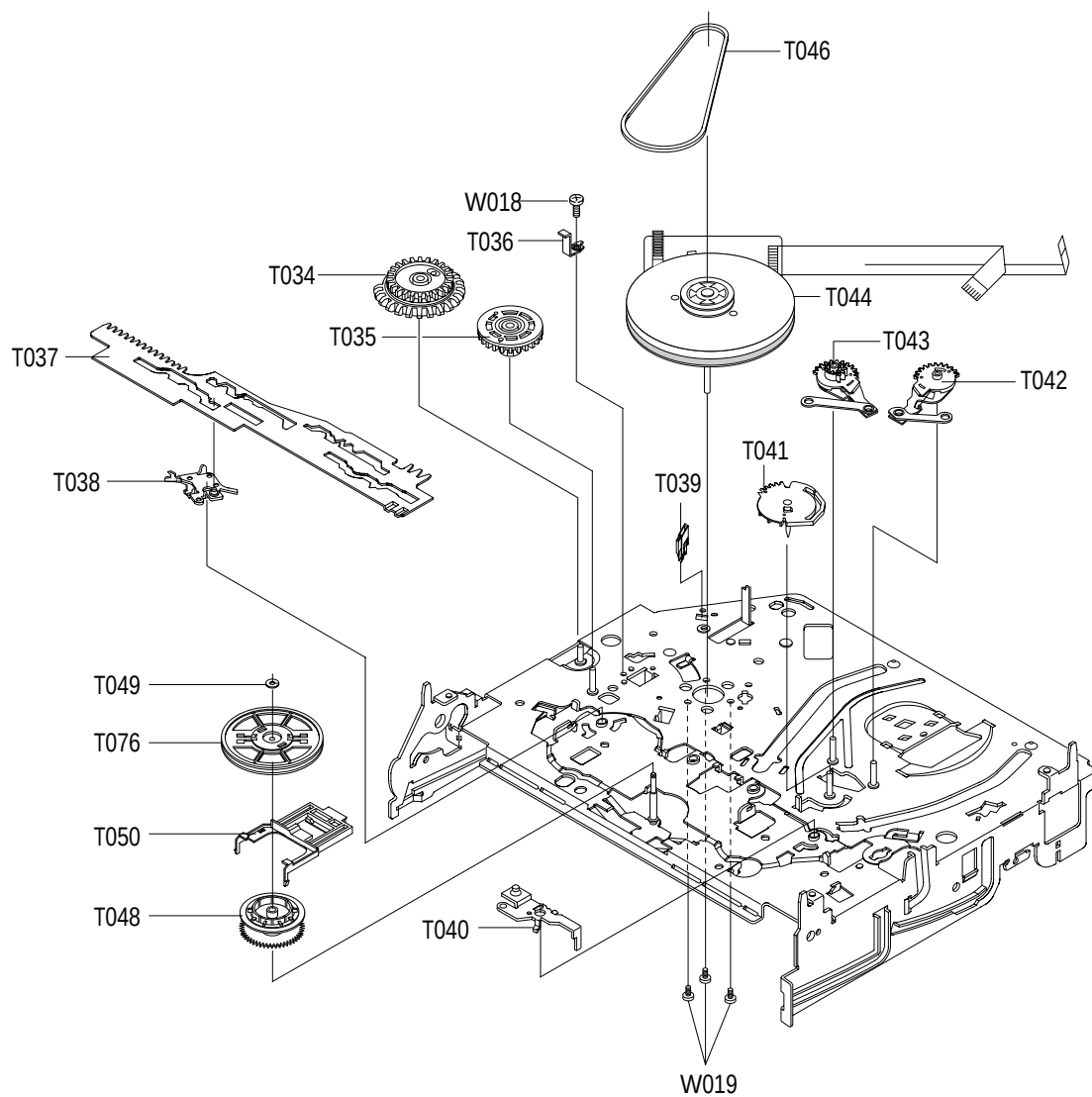
Loc. No	Parts No.	Description ; Specification	Q'ty S.N.A		Remark
A001	AK59-00062G	REMOCON-ASSY;DVD-VR355/XAC,SEC,217	1	SA	
C001	AK97-01893K	ASSY-PANEL FRONT;HIPS94,DVD-VR350/	1	SA	
C002	AK64-01961B	DOOR-TRAY;DVD-VR350/XAC,ABS94HB,T2	1	SA	
C003	AK64-01960C	DOOR-CASSETTE;SV-CR6700,ABS94HB,T2	1	SA	
C011	AK64-00334A	DOOR-SPRING;DVD-V3500,SWPB,,,,-,,,	1	SA	
C012	AC61-62032A	SPRING ETC-MASK;SV-C130,SUS,4.4,-,	1	SA	
C015	AK64-01469A	CABINET-TOP;DVD-VR330,TEXTURE,T0.5	1	SA	
C022	AK64-01973A	DOOR-FRONT;DVD-VR357,ABS 94 HB,T2.	1	SA	
P002	AK92-01451A	ASSY PCB-MAIN DVD;DVD-VR350/XAC,TS	1	SA	
P005	AK92-01298A	ASSY PCB-FUNCTION;DVD-VR357/XAA,Ne	1	SA	
P007	AK92-01299A	ASSY PCB-KEY;DVD-VR357/XAA,Nexus,	1	SA	
P022	AK92-01450A	ASSY PCB-JACK;DVD-VR350/XAX,TSEC	1	SA	
P025	3903-000230	CBF-POWER CORD;AT,MX,EP2/N,HOUSING	1	SA	
W001	6003-000275	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(	11	SA	
W009	6003-000276	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(	4	SA	
W202	6003-000277	SCREW-TAPTITE;BH,+,-,B,M3,L12,ZPC(	8	SA	
W252	AC60-12126A	SCREW-MACHINE;TH,+,-,M4,L12,ZPC(WH	4	SC	
W275	6003-001561	SCREW-TAPTITE;BH,+,-,B,M3,L6,ZPC(W	5	SA	

7-2 VCR Mechanical Parts (Top Side)



Loc. No	Parts No.	Description ; Specification	Qty	S.N.A	Remark
T001	AC97-02640A	ASSY-CYLINDER;-6N,CX13A-DAESUNG,N	1	SA	
T002	AC61-00391A	PLATE-GROUND DECK;X-13,SPTE,T0.3,-	1	SA	
T003	AC31-00018A	MOTOR-LOADING ASSY;-SCORPIO2(TS-10A)-,	1	SA	
T004	AC66-00101A	GEAR-WORM WHEEL;X-13,POM(M90-44 EQ	1	SA	
T005	AC66-00102A	GEAR-FL CAM;X-13,POM(M90-44 EQU),-	1	SA	
T006	AC61-00105A	SPRING ETC-PINCH DRIVE;TS-10,SUS30	1	SA	
T007	AC61-00390A	PLATE-JOINT;X-13,SECC 20/20,T0.8,-	1	SA	
T008	AC97-02570A	ASSY-SLIDER SUPPLY;(PPS),X-13,-	1	SA	
T009	AC97-02556A	ASSY-SLIDER TAKE UP;-X-13,-	1	SA	
T010	AC97-02625A	ASSY-HEAD A/C;-X-13A,-	1	SA	
T011	AC66-00094A	LEVER-9 GUIDE;X-13,PPS,-,-,-,BRO	1	SA	
T013	AC33-00018A	HEAD-FULL ERASE;-X-13,-,-	1	SA	
T015	AC97-02620A	ASSY-UNIT PINCH;-X-13A,-	1	SA	
T019	AC66-00124A	REEL-S;X-13,POM,-,BLK,2.5,-,27,-	1	SA	
T020	AC66-00123A	REEL-T;X-13,POM,-,BLK,2.5,-,36.5,-	1	SA	
T021	AC66-00115A	LEVER-IDLE;X-13,POM,T15,W38,L25,-,	1	SA	
T022	AC66-00114A	GEAR-IDLE;X-13,PET,0.5,54,27,NAT,2	2	SA	
T023	AC97-02562A	ASSY-LEVER TENSION;-X-13,-	1	SA	
T024	AC61-00107A	SPRING ETC-TENSION LEVER;TS-10,SUS	1	SA	
T025	AC97-02560A	ASSY-BAND BRAKE;-X-13,-	1	SA	
T026	AC97-02567A	ASSY-LEVER BRAKE S;-X-13,-	1	SA	
T027	AC97-02568A	ASSY-LEVER BRAKE T;-X-13,-	1	SA	
T028	AC61-00106A	SPRING ETC-BRAKE;TS-10,SUS304-WPB,	2	SA	
T029	AC66-00104A	SLIDER-FL DRIVE;X-13,SECC,T1.0,W15	1	SA	
T057	AC61-00386A	SLEEVE-TENSION;X-13,-,2.5,-,-,	1	SA	
T071	AC61-00388A	GUIDE-CASS DOOR;X-13,POM(M90-44 EQ	1	SA	
T072	AC97-02622A	ASSY-HOLDER CASSETTE;SECC+POM+SUS,	1	SA	
T073	AC61-00397A	SPRING ETC-LOCK;X-13,SWP-B,0.25,2.	1	SA	
T074	AC97-02564A	ASSY-LEVER ARM;-X-13,-	1	SA	
T075	AC66-00108A	LEVER-DOOR;X-13,POM,-,W30,L75,-,NA	1	SA	
W015	6006-001092	SCREW-MACHINE;PH,+,WS,M3.0,L6.0,ZP	3	SA	
W016	6006-001154	SCREW-TAPTITE;PH,+,WSP,B,M2.6,L5.6	1	SA	
W201	6001-001711	SCREW-MACHINE;PH,+,M3,L3.3,ZPC(W	1	SA	

7-3 VCR Mechanical Parts (Bottom Side)



Loc. No	Parts No.	Description ; Specification	Qty	S.N.A	Remark
T034	AC66-00103A	GEAR-JOINT 1;X-13,POM(M90-44 EQU),	1	SA	
T035	AC66-00077A	GEAR-JOINT 2;X-11,POM(K300),-, -, -,	1	SA	
T036	AC61-00389A	BRACKET-GEAR;X-13,SECC 20/20,T0.8,	1	SA	
T037	AC66-00092A	SLIDER-CAM;X-13,SECC 20/20,T1.2,-,	1	SA	
T038	AC66-00099A	LEVER-PINCH DRIVE;X-13,SECC 20/20,	1	SA	
T039	AC70-00003A	HOOK-CAPSTAN;-,-,L10,W10,H10,POM(M	1	SA	
T040	AC66-00100A	LEVER-TENSION DRIVE;X-13,SECC 20/2	1	SA	
T041	AC66-00078A	GEAR-LOADING DRIVE;X-11,POM(K300),	1	SA	
T042	AC97-02557A	ASSY-LEVER LOADING S;- ,X-13,-	1	SA	
T043	AC97-02558A	ASSY-LEVER LOADING T;- ,X-13,-	1	SA	
T044	3101-001427	MOTOR-CAPSTAN;0rpm,0g.cm,12V,90mA	1	SA	
T046	AC66-60051A	BELT-PULLEY;- ,5CM-70,2 * 2,- ,71.3,	1	SA	
T048	AC97-02566A	ASSY-GEAR CENTER;- ,X-13,-	1	SA	
T049	AC60-30306A	FASTENER-WASHER SLIT;- , -, ID2.1,OD5	1	SA	
T050	AC66-00111A	LEVER-UP DOWN;X-13,POM,T15,E25,L55	1	SA	
T076	AC97-02569A	ASSY-CLUTCH;- ,X-13,-	1	SA	
W018	6003-001450	SCREW-TAPTITE;PH,+,- ,S,M2.6,L5,ZPC	1	SA	
W019	6003-000108	SCREW-TAPTITE;BH,+ ,B,M2.6,L6,ZPC(Y	3	SA	

MEMO

8. Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark	Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
P002	AK92-01451A	ASSY PCB-MAIN DVD;DVD-VR350/XAC,TS	1	SA		DC61	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
AC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC62	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
AC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC63	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
AE1	2402-001096	C-AL,SMD;220UF,20%,16V,GP,TP,6.6X6	1	SA							
AE2	2402-000204	C-AL,SMD;10UF,20%,16V,WT,TP,4.3X4	1	SA		DC64	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC65	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
AIC1	1002-001395	IC-D/A CONVERTER;PCM1753,24Bit,SSO	1	SA		DC66	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
AL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		DC67	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC68	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CC2	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							
CC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC69	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC70	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CE1	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6X6.6	1	SA		DC71	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CE3	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6X6.6	1	SA		DC72	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CEQ1	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA							
CEQ2	0505-000110	FET-SILICON;2N7002,N,60V,115mA,7.5	1	SA		DC73	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC74	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CER28	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		DC75	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CER36	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA		DC76	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CN5	3708-001935	CONNECTOR-FPC/FPC;PIC;40P,0.5mm,SM	1	SA		DC77	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CON1	3710-002445	SOCKET-BOARD TO BOARD;16P,2R,2mm,S	1	SA							
CON2	3710-002075	SOCKET-BOARD TO BOARD;30P,2R,2MM,S	1	SA		DC78	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC79	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CR1	2007-001323	R-CHIP;3Kohm,5%,1/16W,TP,1005	1	SA		DC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CR10	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA		DC80	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CR11	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA		DC81	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CR2	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA							
CR3	2007-001320	R-CHIP;1.8Kohm,5%,1/16W,TP,1005	1	SA		DC82	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC83	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
CR4	2007-001325	R-CHIP;3.3Kohm,5%,1/16W,TP,1005	1	SA		DC84	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC1	2203-000386	C-CER,CHIP;0.015nF,5%,50V,COG,1005	1	SA		DC85	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC15	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1005	1	SA		DC86	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC16	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1005	1	SA							
DC17	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1005	1	SA		DC89	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC90	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC18	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1005	1	SA		DC91	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC2	2203-000330	C-CER,CHIP;0.012nF,5%,50V,COG,1005	1	SA		DC92	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC20	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC93	2203-000311	C-CER,CHIP;0.12nF,5%,50V,COG,1005	1	SA	
DC22	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							
DC23	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC94	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
						DC95	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC24	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC96	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC25	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DC97	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
DC26	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DE2	2402-000007	C-AL,SMD;22uF,20%,6.3V,GP,TP,4.3x4	1	SA	
DC27	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							
DC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DE5	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6X6.6	1	SA	
						DE7	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6X6.6	1	SA	
DC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DE8	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6X6.6	1	SA	
DC50	2203-005481	C-CER,CHIP;47nF,10%,10V,X7R,TP,100	1	SA		DIC1	1205-002844	IC-CODEC;S5L3210,LQFP;256P,28x28mm	1	SA	
DC51	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DIC2	1105-001563	IC-DRAM;HYB25D256160CE-6,16Mx16Bit	1	SA	
DC52	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							
DC53	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DIC3	1107-001242	IC-FLASH MEMORY;39VF160,1Mx16,TSOP	1	SNA	
						DIC5	1103-001134	IC-EEPROM;24C040,512x8,SOP;8P,5.13	1	SA	
DC54	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DIC7	0801-002701	IC-CMOS LOGIC;74VHC125A,BUFFER,TS	1	SA	
DC56	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DIC8	0801-002166	IC-CMOS LOGIC;7SHU04,INVERTER,SSOP	1	SA	
DC57	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DR1	2007-000174	R-CHIP;47ohm,5%,1/16W,TP,1005	1	SA	
DC58	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							
DC59	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DR2	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
						DR3	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA		DR30	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DC60	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA							

Electrical Parts List

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DR32	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR35	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
DR36	2007-000982	R-CHIP;5.6Kohm,5%,1/16W,TP,1005	1	SA	
DR37	2007-000932	R-CHIP;470OHM,5%,1/16W,TP,1005	1	SA	
DR38	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR39	2007-000162	R-CHIP;100Kohm,5%,1/16W,TP,1005	1	SA	
DR40	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR41	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
DR42	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
DR43	2007-001298	R-CHIP;51ohm,5%,1/16W,TP,1005	1	SA	
DR44	2007-001298	R-CHIP;51ohm,5%,1/16W,TP,1005	1	SA	
DR47	2007-001298	R-CHIP;51ohm,5%,1/16W,TP,1005	1	SA	
DR48	2007-001298	R-CHIP;51ohm,5%,1/16W,TP,1005	1	SA	
DR49	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
DR5	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR50	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
DR51	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
DR52	2007-001323	R-CHIP;3KOHM,5%,1/16W,TP,1005	1	SA	
DR55	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
DR6	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR63	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
DR69	3301-001309	BEAD-SMD;47ohm,1608,TP;-	1	SA	
DR70	3301-001309	BEAD-SMD;47ohm,1608,TP;-	1	SA	
DR71	2007-000174	R-CHIP;47ohm,5%,1/16W,TP,1005	1	SA	
DR72	2007-000174	R-CHIP;47ohm,5%,1/16W,TP,1005	1	SA	
DR74	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
DR75	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
DR76	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
DR8	2007-000170	R-CHIP;1Mohm,5%,1/16W,TP,1005	1	SA	
DR80	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
DR82	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR83	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR85	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
DR86	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
DR87	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR88	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR89	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR9	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR90	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR91	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
DR92	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR93	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
DRP1	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP10	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP11	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP12	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP13	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP14	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP15	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP16	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP17	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP18	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP19	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP2	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP20	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	

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DRP21	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP22	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP23	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP24	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP25	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
DRP26	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,8P,T	1	SA	
DRP27	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,8P,T	1	SA	
DRP28	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,8P,T	1	SA	
DRP29	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,8P,T	1	SA	
DRP3	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP4	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP5	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP6	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP7	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP9	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHIP,8P	1	SA	
RIC1	1203-003996	IC-POS.FIXED REG.;KIA78R025F,DPAK	1	SA	
RIC2	1203-003806	IC-POS.ADJUST REG.;KIA78R000,DPAK	1	SA	
TC1	2203-000552	C-CER,CHIP;0.02nF,5%,50V,COG,1608	1	SA	
TC16	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,COG,10	1	SA	
TC2	2203-000552	C-CER,CHIP;0.02nF,5%,50V,COG,1608	1	SA	
TC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TC4	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1005	1	SA	
TC5	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TC9	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
TE1	2402-001238	C-AL,SMD;1uF,20%,50V,HR,TP,4.3x4.3	1	SA	
TE2	2402-001059	C-AL,SMD;220#F,20%,6.3V,-,TP,6x6	1	SA	
TIC1	1205-001988	IC-DATA COMM./GEN.;TSB41AB1-PAP,QF	1	SA	
TR10	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR11	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR12	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR13	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
TR14	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR15	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR16	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
TR17	2007-000145	R-CHIP;6.2Kohm,5%,1/16W,TP,1005	1	SA	
TR19	2007-002970	R-CHIP;56ohm,5%,1/16W,TP,1005	1	SA	
TR2	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
TR20	2007-002970	R-CHIP;56ohm,5%,1/16W,TP,1005	1	SA	
TR21	2007-002970	R-CHIP;56ohm,5%,1/16W,TP,1005	1	SA	
TR22	2007-002970	R-CHIP;56ohm,5%,1/16W,TP,1005	1	SA	
TR24	2007-000144	R-CHIP;5.1KOHM,5%,1/16W,TP,1005	1	SA	
TR25	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
TR26	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR27	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
TR28	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
TR29	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
TR3	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
TR30	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
TR31	2007-000170	R-CHIP;1Mohm,5%,1/16W,TP,1005	1	SA	
TR32	2007-000073	R-CHIP;91ohm,5%,1/10W,TP,1608	1	SA	
TR33	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	

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TR4	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
TR9	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TY1	2801-004021	CRYSTAL-SMD;24.576MHz,20ppm,28-AAN	1	SA	
V29	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC11	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC12	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC13	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC15	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC16	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC17	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC2	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC20	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC21	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC22	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC23	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC24	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC25	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC26	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC27	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,COG,10	1	SA	
VC28	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC5	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VC9	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
VE3	2402-001059	C-AL SMD;220#F,20%,6.3V,-,TP,6x6	1	SA	
VE4	2402-001248	C-AL SMD;220UF,20%,6.3V,-,TP,6x6.6	1	SA	
VIC1	1204-002419	IC-VIDEO DECODER;TW9906,TQFP,80P,1	1	SA	
VL1	2703-000398	INDUCTOR-SMD;10uH,10%,3225	1	SA	
VR14	3301-000314	BEAD-SMD;120ohm,1.6x0.8x0.8mm,-,-,	1	SA	
VR15	2007-000137	R-CHIP;2KOHM,5%,1/16W,TP,1005	1	SA	
VR16	2007-000137	R-CHIP;2KOHM,5%,1/16W,TP,1005	1	SA	
VR2	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
VR23	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
VR25	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
VRP3	2011-001344	R-NET;100ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
VRP4	2011-001344	R-NET;100ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
Y1	2801-004621	CRYSTAL-SMD;27MHz,15ppm,-,14pF,300	1	SA	
P005	AK92-01298A	ASSY PCB-FUNCTION;DVD-VR357/XAA,Ne	1	SA	
C843	2202-000231	C-CERAMIC,MLC-AXIAL;0.33NF,10%,50V	1	SA	
C844	2202-000231	C-CERAMIC,MLC-AXIAL;0.33NF,10%,50V	1	SA	
CN7	3722-002118	JACK-IEEE1394;4P,NL,BLK,ANGLE,IEEE	1	SA	
CNR20	2001-000734	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8	1	SA	
CON2	3708-000208	CONNECTOR-FPC/FFC/PIC;20P,1.25MM,S	1	SA	
FL218	3809-001100	CABLE-FLAT;30V,80C,50mm,20P,1.25mm	1	SA	
JK701	3722-001943	JACK-PIN;3P,8.3PI,NL,BLK,-	1	SA	
LD61A	AK61-00418A	HOLDER-LED;DVD-HD850/XAA,ABS 94HB,	1	SA	
LD701	0601-001928	LED;ROUND,BLUE,3mm,465nm,3.6x3.8mm	1	SA	
R854	2001-000660	R-CARBON;33KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R855	2001-000660	R-CARBON;33KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R856	2001-000969	R-CARBON;75OHM,5%,1/8W,AA,TP,1.8X3	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
SW713	3404-001261	SWITCH-TACT;15V DC,20mA,100gf,7.4X	1	SA	
SW714	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW715	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
P007	AK92-01298A	ASSY PCB-KEY;DVD-VR357/XAA,Nexus,	1	SA	
CN702	3708-001803	CONNECTOR-FPC/FFC/PIC;10P,1.25MM,A	1	SA	
FL238	3809-001444	CABLE-FLAT;30V,80C,90MM,10P,1.25MM	1	SA	
LD702	0601-001587	LED;ROUND,RED,3.1mm,635nm,3.8x5.2m	1	SA	
P025	3903-000230	CBF-POWER CORD;AT,MX,EP2/N,HOUSING	1	SA	
SW701	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW702	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW703	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW704	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW707	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW708	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW709	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW710	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
SW711	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6.0X6	1	SA	
P022	AK92-01450A	ASSY PCB-JACK;DVD-VR350/XAX,TSEC	1	SA	
AC14	2203-001607	C-CER,CHIP;0.22nF,5%,50V,NP0,1608	1	SA	
AC21	2203-000357	C-CER,CHIP;0.15nF,5%,50V,COG,1608	1	SA	
AC22	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
AC23	2203-000125	C-CER,CHIP;1.2nF,10%,50V,X7R,TP,16	1	SA	
AC24	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
AC25	2203-000357	C-CER,CHIP;0.15nF,5%,50V,COG,1608	1	SA	
AC26	2203-000125	C-CER,CHIP;1.2nF,10%,50V,X7R,TP,16	1	SA	
AC27	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
AC816	2203-0001052	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1	1	SA	
AC818	2203-001052	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1	1	SA	
AC9	2203-001607	C-CER,CHIP;0.22nF,5%,50V,NP0,1608	1	SA	
AC915	2401-000408	C-AL;10uF,20%,16V,GP,TP,5x5,2.5	1	SA	
AC917	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
AD1	0407-000114	DIODE-ARRAY;-;80V,100mA,CA2-3,SOT-	1	SA	
AD2	0407-000114	DIODE-ARRAY;-;80V,100mA,CA2-3,SOT-	1	SA	
AD5	0407-000114	DIODE-ARRAY;-;80V,100mA,CA2-3,SOT-	1	SA	
AE1	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
AE11	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
AE12	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	1	SA	
AE13	2401-000909	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	1	SA	
AE14	2401-001492	C-AL;47uF,20%,16V,GP,-;5x7mm,2.5	1	SA	
AE5	2401-000909	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	1	SA	
AI4	1201-000163	IC-OP AMP;4560,SOP,8P;173MIL,DUAL	1	SA	
AQ1	0504-000128	TR-DIGITAL;-;NPN,200MMW,22K/22K,SOT	1	SA	
AQ2	0504-000156	TR-DIGITAL;KSR2103,PNP,200MMW,22K/2	1	SA	
AQ3	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA	
AQ4	0504-000128	TR-DIGITAL;-;NPN,200MMW,22K/22K,SOT	1	SA	
AQ5	0504-000156	TR-DIGITAL;KSR2103,PNP,200MMW,22K/2	1	SA	
AQ6	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA	
AR17	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR18	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
AR22	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	

Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
AR23	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR24	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
AR28	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR29	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR30	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
AR31	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR32	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR33	2007-000118	R-CHIP;390ohm,5%,1/10W,TP,1608	1	SA	
AR34	2001-000005	R-CARBON;390ohm,5%,1/8W,AA,TP,1.8x	1	SA	
AR41	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR42	2007-000091	R-CHIP;12Kohm,5%,1/10W,TP,1608	1	SA	
AR43	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
AR44	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
AR45	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
AR46	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR47	2007-000091	R-CHIP;12Kohm,5%,1/10W,TP,1608	1	SA	
AR48	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
AR49	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
AR50	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
AR801	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR802	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR805	2007-000123	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	1	SA	
AR807	2001-000241	R-CARBON;1.5KOHM,5%,1/8W,AA,TP,1.8	1	SA	
C1P103	2401-002144	C-AL;47uF,20%,16V,GP,TP,6.3x7,5	1	SA	
C1P104	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	1	SA	
C1P105	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
C1P108	2401-000302	C-AL;100uF,20%,25V,GP,TP,6.3x11,5	1	SA	
C1P109	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
C1P110	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	1	SA	
C1P123	2401-002095	C-AL;47uF,20%,25V,GP,TP,6.3x5,5	1	SA	
C1P126	2401-000426	C-AL;10uF,20%,16V,GP,TP,3.5x5,5	1	SA	
C1P127	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
C1S01	2401-003903	C-AL;82uF,20%,400V,-BK,22x25mm,10	1	SA	
C1S02	2201-002044	C-CERAMIC,DISC;0.1nF,10%,400V,Y5P,	1	SA	
C1S03	2201-002044	C-CERAMIC,DISC;0.1nF,10%,400V,Y5P,	1	SA	
C1S04	2301-001792	C-FILM,LEAD;150nF,20%,275V,BK,17.5	1	SA	
C1S05	2301-001711	C-FILM,LEAD;220nF,20%,275V,BK,17	1	SA	
C1S06	2201-000987	C-CERAMIC,DISC;2.2nF,20%,400V,Y5U,	1	SA	
C1S07	2201-000129	C-CERAMIC,DISC;0.1nF,10%,1000V,Y5P	1	SA	
C1S08	2305-001029	C-FILM,LEAD-PEF;10nF,10%,630V,TP,1	1	SA	
C1S09	2401-002438	C-AL;47uF,20%,50V,WT,TP,6.3x11,5m	1	SA	
C1S10	2401-002608	C-AL;33uF,20%,35V,GP,TP,5x11,5	1	SA	
C1S11	2401-000598	C-AL;1uF,20%,50V,GP,TP,4x7,5	1	SA	
C1S12	2301-000383	C-FILM,LEAD-PEF;10nF,5%,50V,TP,6x7	1	SA	
C1S30	2401-003059	C-AL;1000uF,20%,16V,WT,TP,10x16,5	1	SA	
C1S31	2401-003390	C-AL;2200uF,20%,16V,LZ,TP,13x31,5	1	SA	
C1S32	2401-000385	C-AL;10uF,20%,100V,GP,TP,6.3x11,5	1	SC	
C1S33	2401-001126	C-AL;330uF,20%,25V,WT,TP,10x12,5,5	1	SA	
C1S34	2401-001126	C-AL;330uF,20%,25V,WT,TP,10x12,5,5	1	SA	
C1S37	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
C1S38	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
C1S39	2301-000129	C-FILM,LEAD-PEF;100nF,5%,50V,TP,10	1	SA	
C301	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C302	2203-006243	C-CER,CHIP;0.36nF,10%,50V,X7R,1608	1	SA	
C303	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
C304	2203-000405	C-CER,CHIP;0.18nF,5%,50V,COG,1608	1	SA	
C305	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C306	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C307	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2.5	1	SA	
C308	2401-000909	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	1	SA	
C309	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C310	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C312	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C314	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C315	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C316	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C317	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C318	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y	1	SA	
C319	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y	1	SA	
C320	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C321	2401-003221	C-AL;100uF,20%,16V,GP,TP,8x5,2.5	1	SA	
C322	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C323	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C324	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C325	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C326	2203-002398	C-CER,CHIP;22nF,10%,50V,X7R,1608	1	SA	
C327	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C328	2401-003221	C-AL;100uF,20%,16V,GP,TP,8x5,2.5	1	SA	
C329	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C330	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP,160	1	SA	
C331	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP,160	1	SA	
C332	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP,160	1	SA	
C333	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP,160	1	SA	
C334	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2.5	1	SA	
C335	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C336	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C337	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2.5	1	SA	
C338	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C340	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
C342	2401-002069	C-AL;33uF,20%,16V,GP,TP,6.3x5,5	1	SA	
C343	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C344	2203-001211	C-CER,CHIP;8.2nF,10%,50V,X7R,1608	1	SA	
C345	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C346	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C347	2203-000491	C-CER,CHIP;2.2nF,10%,50V,X7R,1608	1	SA	
C348	2203-001052	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1	1	SA	
C349	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
C350	2203-001103	C-CER,CHIP;6.8nF,10%,50V,X7R,1608	1	SA	
C351	2203-001211	C-CER,CHIP;8.2nF,10%,50V,X7R,1608	1	SA	
C352	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C353	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
C354	2203-002041	C-CER,CHIP;0.47nF,10%,50V,X7R,1608	1	SA	
C355	2301-000110	C-FILM,LEAD-PEF;1.8nF,5%,100V,TP,7	1	SA	
C356	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2.5	1	SA	
C357	2301-000224	C-FILM,LEAD-PEF;22nF,5%,50V,TP,7,4	1	SA	
C358	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C359	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C360	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C371	2203-001071	C-CER,CHIP;0.056nF,5%,50V,COG,1608	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
C372	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C401	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C402	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C403	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C404	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C405	2203-005249	C-CER,CHIP;100nF,10%,50V,X7R,1608	1	SA	
C4M01	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M02	2203-001662	C-CER,CHIP;5.6nF,10%,50V,X7R,1608	1	SA	
C4M03	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M04	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M05	2203-000888	C-CER,CHIP;4.7nF,10%,50V,X7R,1608	1	SA	
C4M06	2203-001652	C-CER,CHIP;470nF,+80-20%,16V,Y5V,1	1	SA	
C4M07	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M08	2203-000323	C-CER,CHIP;12nF,10%,50V,X7R,TP;201	1	SA	
C4M09	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M10	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M11	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C4M12	2401-001249	C-AL;4.7uF,20%,35V,GP,TP;4x5,2,5	1	SA	
C4M13	2401-000249	C-AL;100uF,20%,10V,GP,TP;6.3x5,5	1	SA	
C4M15	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP;160	1	SA	
C4M16	2401-000588	C-AL;1uF,20%,50V,GP,TP;3x5,2,5	1	SA	
C4M17	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C4M22	2401-002186	C-AL;3.3uF,20%,50V,GP,BK,4x5,2,5	1	SA	
C4M23	2203-000531	C-CER,CHIP;2.7nF,10%,50V,X7R,1608	1	SA	
C502	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C503	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C504	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C505	2401-000909	C-AL;22uF,20%,16V,GP,TP;5x5,2,5	1	SA	
C506	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C507	2203-001724	C-CER,CHIP;4700nF,+80-20%,16V,Y5V,	1	SA	
C508	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C509	2401-000909	C-AL;22uF,20%,16V,GP,TP;5x5,2,5	1	SA	
C510	2203-000888	C-CER,CHIP;4.7nF,10%,50V,X7R,1608	1	SA	
C511	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C513	2203-001724	C-CER,CHIP;4700nF,+80-20%,16V,Y5V,	1	SA	
C514	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C515	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C516	2401-000909	C-AL;22uF,20%,16V,GP,TP;5x5,2,5	1	SA	
C517	2203-000888	C-CER,CHIP;4.7nF,10%,50V,X7R,1608	1	SA	
C518	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C519	2203-001724	C-CER,CHIP;4700nF,+80-20%,16V,Y5V,	1	SA	
C520	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C521	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C522	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y	1	SA	
C531	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2,5	1	SA	
C532	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C543	2203-001724	C-CER,CHIP;4700nF,+80-20%,16V,Y5V,	1	SA	
C544	2203-001724	C-CER,CHIP;4700nF,+80-20%,16V,Y5V,	1	SA	
C545	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C551	2401-000408	C-AL;10uF,20%,16V,GP,TP;3.5x5,2,5	1	SA	
C552	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C603	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C604	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C605	2401-000360	C-AL;100uF,20%,50V,GP,TP;8x11,5,5	1	SA	
C606	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
C607	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C608	2401-003221	C-AL;100uF,20%,16V,GP,TP;8x5,2,5	1	SA	
C609	2203-002398	C-CER,CHIP;22nF,10%,50V,X7R,1608	1	SA	
C610	2203-000975	C-CER,CHIP;47nF,10%,25V,X7R,TP;160	1	SA	
C611	2203-000140	C-CER,CHIP;1.5nF,10%,50V,X7R,1608	1	SA	
C613	2401-002095	C-AL;47uF,20%,25V,GP,TP;6.3x5,5	1	SA	
C614	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C615	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C616	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C617	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2,5	1	SA	
C618	2203-000552	C-CER,CHIP;0.02nF,5%,50V,COG,1608	1	SA	
C619	2203-000552	C-CER,CHIP;0.02nF,5%,50V,COG,1608	1	SA	
C620	2203-000681	C-CER,CHIP;0.027nF,5%,50V,COG,1608	1	SA	
C621	2203-000626	C-CER,CHIP;0.022nF,5%,50V,COG,1608	1	SA	
C622	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,	1	SA	
C623	2202-000121	C-CERAMIC,MLC-AXIAL;0.1nF,10%,50V,	1	SA	
C624	2401-002165	C-AL;100uF,20%,16V,GP,TP;6.3x7,5	1	SA	
C625	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y	1	SA	
C626	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C627	2203-001697	C-CER,CHIP;0.082nF,5%,50V,NPO,1608	1	SA	
C628	2401-001168	C-AL;33uF,20%,16V,GP,TP;6.3x5,2,5	1	SA	
C629	2203-005221	C-CER,CHIP;15nF,10%,50V,X7R,1608	1	SA	
C630	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2,5	1	SA	
C631	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C632	2203-001071	C-CER,CHIP;0.056nF,5%,50V,COG,1608	1	SA	
C633	2203-000140	C-CER,CHIP;1.5nF,10%,50V,X7R,1608	1	SA	
C634	2203-001071	C-CER,CHIP;0.056nF,5%,50V,COG,1608	1	SA	
C635	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y	1	SA	
C636	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C637	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C640	2401-002165	C-AL;100uF,20%,16V,GP,TP;6.3x7,5	1	SA	
C643	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C644	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C647	2202-000216	C-CERAMIC,MLC-AXIAL;0.027NF,5%,50V	1	SA	
C651	2202-000216	C-CERAMIC,MLC-AXIAL;0.027NF,5%,50V	1	SA	
C652	2202-000216	C-CERAMIC,MLC-AXIAL;0.027NF,5%,50V	1	SA	
C653	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C657	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C6B01	2401-002259	C-AL;10000uF,+80-20%,5.5V,-,TP;12	1	SA	
C701	2203-000440	C-CER,CHIP;1nF,10%,50V,X7R,1608	1	SA	
C702	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
C703	2401-002165	C-AL;100uF,20%,16V,GP,TP;6.3x7,5	1	SA	
C704	2401-000118	C-AL;1000uF,20%,10V,GP,TP;10x12,5	1	SA	
C705	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C800	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	
C801	2401-002165	C-AL;100uF,20%,16V,GP,TP;6.3x7,5	1	SA	
C802	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C803	2401-001492	C-AL;47uF,20%,16V,GP,-5x7mm,2,5	1	SA	
C804	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
C805	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	
C806	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	
C807	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	
C808	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	
C809	2401-000414	C-AL;10uF,20%,16V,GP,TP;4x7,5	1	SA	

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Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
C811	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C814	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C817	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C819	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C820	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C821	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C824	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C825	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C826	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C827	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C828	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
C829	2203-005148	C-CER,CHIP;0.10nF,10%,16V,X7R,1608	1	SA	
C830	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
C832	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
C834	2203-000236	C-CER,CHIP;0.1nF,5%,50V,COG,1608	1	SA	
C835	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
C836	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C837	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C838	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C839	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C845	2203-000783	C-CER,CHIP;0.33nF,5%,50V,COG,1608	1	SA	
C846	2203-000783	C-CER,CHIP;0.33nF,5%,50V,COG,1608	1	SA	
C847	2401-000408	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	1	SA	
C848	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
CE401	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
CE76	2401-000118	C-AL;1000uF,20%,10V,GP,TP,10x12.5,	1	SA	
CN03	3711-004379	HEADER-BOARD TO CABLE;BOX,4P,1R,2m	1	SA	
CN04	3711-000827	HEADER-BOARD TO CABLE;BOX,2P,1R,2m	1	SA	
CN1S01	3711-000203	HEADER-BOARD TO CABLE;1WALL,2P/3P,	1	SA	
CN301	3708-000391	CONNECTOR-FPC/FFC/PIC;10P,1.25mm,S	1	SA	
CN302	AC37-00028A	CONNECTOR-SOCKET;-X-11,T9.0,W8.5,	1	SA	
CN303	3708-001165	CONNECTOR-FPC/FFC/PIC;6P,1.25MM,ST	1	SA	
CN4	3711-006316	HEADER-BOARD TO BOARD;BOX,16P,2R,2	1	SA	
CN5	3711-005612	HEADER-BOARD TO BOARD;BOX,30P,2R,2	1	SA	
CN701	3708-001802	CONNECTOR-FPC/FFC/PIC;10P,1.25MM,S	1	SA	
CON1	3708-000208	CONNECTOR-FPC/FFC/PIC;20P,1.25MM,S	1	SA	
CS01	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,1608	1	SA	
CS02	2401-002144	C-AL;47uF,20%,16V,GP,TP,5x11,5	1	SA	
CS04	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
CVL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
CVL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
CVL3	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
D1	0402-001111	DIODE-RECTIFIER;1N5397GP,600V,1.5A	1	SA	
D1P108	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,DO-4	1	SA	
D1P109	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,DO-4	1	SA	
D1P111	0402-000127	DIODE-RECTIFIER;1N4002,100V,1A,DO-	1	SA	
D1S01	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3000m	1	SA	
D1S05	0402-000012	DIODE-RECTIFIER;UF4007,1KV,1A,DO-4	1	SA	
D1S06	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D1S07	0402-001195	DIODE-RECTIFIER;FLT4,400V,1A,DO-20	1	SA	
D1S32	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3000m	1	SA	
D1S33	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3000m	1	SA	
D1S34	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3000m	1	SA	
D1S35	0402-001680	DIODE-RECTIFIER;SF34,200V,3A,DO-20	1	SA	
D1S37	0402-001195	DIODE-RECTIFIER;FLT4,400V,1A,DO-20	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
D1S39	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D2	0402-001111	DIODE-RECTIFIER;1N5397GP,600V,1.5A	1	SA	
D3	0402-001111	DIODE-RECTIFIER;1N5397GP,600V,1.5A	1	SA	
D4	0402-001111	DIODE-RECTIFIER;1N5397GP,600V,1.5A	1	SA	
D5	0402-000127	DIODE-RECTIFIER;1N4002,100V,1A,DO-	1	SA	
D601	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D605	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D701	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D702	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D703	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
D704	0401-000005	DIODE-SWITCHING;1N4148,75V,150mA,D	1	SA	
DOC3	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
DOC4	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
DOE1	2401-000598	C-AL;1uF,20%,50V,GP,TP,4x7,5	1	SA	
DOIC2	3707-001070	CONNECTOR-OPTICAL;PLUG,GP1FA550TZ,	1	SA	
DOL1	2901-001273	FILTER-EMI SMD;50V,2A-,220pF,3.2x	1	SA	
DOL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
DOL3	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
DOR1	2007-000040	R-CHIP;150ohm,1%,1/10W,TP,1608	1	SA	
DOR2	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
DOR3	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
DT701	AK07-00049A	LED DISPLAY;BCD-9041A,DVD-VR330,70	1	SA	
DVR1	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
DVR2	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
DVR3	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
DVR4	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
F1S01	3601-000237	FUSE-CARTRIDGE;250V,2A,SLOW-BLOW,C	1	SA	
FLO42	3809-001206	CABLE-FLAT;30V,80C,140MM,6P,1.25MM	1	SA	
FVR1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
FVR2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
FVR3	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
FVR4	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
IC1P02	AC14-12006N	IC-VOLT REGU;KA78R12,SIP,STICK	1	SA	
IC1P03	1203-003216	IC-POSI.FIXED REG.;G9133,TO-220F,4	1	SA	
IC1P04	1203-003293	IC-POSI.FIXED REG.;G9205,TO-220F,4	1	SA	
IC1P05	AC14-12006N	IC-VOLT REGU;KA78R12,SIP,STICK	1	SA	
IC1P06	1203-000299	IC-POSI.FIXED REG.;7809,TO-220,3P,	1	SA	
IC1P07	1203-003230	IC-POSI.FIXED REG.;G9105,TO-220F,4	1	SA	
IC1P08	1203-003230	IC-POSI.FIXED REG.;G9105,TO-220F,4	1	SA	
IC1S01	1203-002805	IC-PWM CONTROLLER;ICE2BS01,PDIP,8P	1	SA	
IC1S02	0604-001028	PHOTO-COUPLER;TR,50-600%,250mW,DIP	1	SA	
IC1S03	AC14-12006D	IC;KA431Z,TO-92,TAPING	1	SA	
IC301	1204-001952	IC-VIDEO PROCESS;LA71207,QFP,8P,1	1	SA	
IC4M01	1204-002509	IC-SIGNAL PROCESSOR;CXA2207N,SSOP,	1	SA	
IC501	1204-002222	IC-SIGNAL PROCESSOR;LA72670M-MPB,Q	1	SA	
IC601	AK09-00166A	IC MICOM;MN101D10G-EC1,DVD-VR357/X	1	SNA	
IC603	1103-001134	IC-EEPROM;24C040,512x8,SOP,8P5.13	1	SA	
IC6B1	AC14-12009W	IC-RESET;PST572K,TO-92,R59-1766.2	1	SA	
IC701	1003-001443	IC-LED DRIVER;PT6959,SOIC,28P,300M	1	SA	
IC801	AC14-12015T	IC;SV1274/LA7274M,QFP,64PIN,-,-	1	SA	
JACK1	3722-002302	JACK-PIN;6P,Ni,WH-GN/RD-BU/BK-RD,A	1	SA	
JK801	3722-002301	JACK-PIN;6P,Ni,YL/WH/RDX2,ANGLE	1	SA	
JI1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
JI2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark	Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
JP02	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA		R1P102	2001-000008	R-CARBON;15KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
JP03	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA		R1P103	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L1P101	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1P104	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L1S02	AK29-00002A	FILTER EMI;RECORDER,SQ2222,0.42Ohm	1	SA		R1P124	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L1S30	AC27-12001N	COIL CHOKE;10UH-15%,RA,K-30,Q80,15	1	SA		R1P125	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L1S31	AH27-00039A	COIL CHOKE;DR CHOKE(8*6),DVD-R2000	1	SA		R1P131	2001-000855	R-CARBON;560OHM,5%,1/4W,AA,TP,2.4X	1	SA	
L1S32	AC27-12001N	COIL CHOKE;10UH-15%,RA,K-30,Q80,15	1	SA		R1S02	2006-000273	R-CEMENT;27KOHM,5%,2W,CA,BK,6.4X6.	1	SA	
L301	AC27-92001M	COIL-INDUCTOR;RH3.5X6.5RS,BEAD/RAD	1	SC		R1S03	2006-000273	R-CEMENT;27KOHM,5%,2W,CA,BK,6.4X6.	1	SA	
L302	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,-,T	1	SA		R1S04	1404-001361	THERMISTOR-NTC;3ohm,4A,-,35mW/C,0u	1	SA	
L303	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,-,T	1	SA		R1S05	2001-000546	R-CARBON;27KOHM,5%,1/4W,AA,TP,2.4	1	SA	
L304	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,-,T	1	SA		R1S06	2001-000793	R-CARBON;47OHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L305	AC27-92001M	COIL-INDUCTOR;RH3.5X6.5RS,BEAD/RAD	1	SC		R1S07	2001-000546	R-CARBON;27KOHM,5%,1/4W,AA,TP,2.4	1	SA	
L306	2702-000120	INDUCTOR-RADIAL;15000uH,5%,6.2x7.4	1	SA		R1S08	2001-000546	R-CARBON;27KOHM,5%,1/4W,AA,TP,2.4	1	SA	
L307	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S09	2001-000598	R-CARBON;3.3OHM,5%,1/8W,AA,TP,1.8X	1	SA	
L308	2702-000166	INDUCTOR-RADIAL;47uH,5%,6.0x6.4mm	1	SA		R1S10	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X	1	SA	
L502	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,-,T	1	SA		R1S11	2001-000449	R-CARBON;2.2KOHM,5%,1/8W,AA,TP,1.8	1	SA	
L503	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,-,T	1	SA		R1S12	2001-000527	R-CARBON;22OHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L601	2702-000108	INDUCTOR-RADIAL;100uH,5%,6.0x6.4mm	1	SC		R1S13	2003-000105	R-METAL OXIDE;0.33ohm,5%,2W,AD,TP	1	SA	
L602	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S14	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
L603	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S15	2007-008711	R-CHIP;1MOHM,5%,1/2W,TP,5025	1	SA	
L604	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S31	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X	1	SA	
L701	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S32	2001-000221	R-CARBON;1.2KOHM,5%,1/8W,AA,TP,1.8	1	SA	
L801	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S33	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
L802	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S35	2004-000500	R-METAL;2.7Kohm,1%,1/8W,AA,TP,1.8x	1	SA	
LS01	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R1S36	2007-000490	R-CHIP;2.2Kohm,1%,1/8W,TP,2012	1	SA	
P022	AC37-00027A	CONNECTOR-HEADER;20045WS,X-11,T8.5	1	SA		R301	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
PC21	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		R302	2007-001056	R-CHIP;6.2Kohm,5%,1/10W,TP,1608	1	SA	
PC23	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		R303	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	1	SA	
PC25	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		R304	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	1	SA	
PE8	2401-002095	C-AL;47uF,20%,25V,GP,TP,6.3x5.5	1	SA		R305	2001-000734	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8	1	SA	
PL5	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R306	2001-000362	R-CARBON;150OHM,5%,1/8W,AA,TP,1.8X	1	SA	
PL6	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA		R308	2007-000106	R-CHIP;220Kohm,5%,1/10W,TP,1608	1	SA	
PT1SD1	AC26-00014S	TRANS SWITCHING-DVD-VR330;EER3534,	1	SA		R309	2007-000105	R-CHIP;200Kohm,5%,1/10W,TP,1608	1	SA	
PT601	0604-001141	PHOTO-INTERRUPTER;-,-,0mW,SNAP,TP	1	SA		R310	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	1	SA	
PT602	0604-001141	PHOTO-INTERRUPTER;-,-,0mW,SNAP,TP	1	SA		R311	2007-001114	R-CHIP;680Kohm,5%,1/10W,TP,1608	1	SA	
Q1S01	0505-001729	FET-SILICON;SPA04N60C3,N,600V,4.5A	1	SA		R312	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	1	SA	
Q302	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R313	2001-000258	R-CARBON;1.8KOHM,5%,1/8W,AA,TP,1.8	1	SA	
Q303	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA		R314	2007-000123	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	1	SA	
Q304	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R315	2007-001179	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	1	SA	
Q305	0501-000442	TR-SMALL SIGNAL;KTC3203-Y,NPN,400m	1	SA		R316	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
Q306	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R317	2001-000387	R-CARBON;16Kohm,5%,1/8W,AA,TP,1.8x	1	SA	
Q307	0501-000442	TR-SMALL SIGNAL;KTC3203-Y,NPN,400m	1	SA		R318	2001-000387	R-CARBON;16Kohm,5%,1/8W,AA,TP,1.8x	1	SA	
Q308	0501-000442	TR-SMALL SIGNAL;KTC3203-Y,NPN,400m	1	SA		R319	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
Q601	0504-000129	TR-DIGITAL;KSR1104,NPN,200mW,47K/4	1	SA		R320	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	1	SA	
Q602	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R322	2007-000082	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	1	SA	
Q605	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R326	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	1	SA	
Q801	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R327	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
Q802	0504-000128	TR-DIGITAL;-NPN,200MW,22K/22K,SOT	1	SA		R328	2007-000127	R-CHIP;9.1Kohm,5%,1/10W,TP,1608	1	SA	
Q803	0504-000156	TR-DIGITAL;KSR2103,PNP,200MW,22K/2	1	SA		R329	2007-000133	R-CHIP;330Kohm,5%,1/10W,TP,1608	1	SA	
Q804	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA		R330	2007-000402	R-CHIP;150ohm,5%,1/10W,TP,1608	1	SA	
Q805	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA		R331	2007-000129	R-CHIP;27Kohm,5%,1/10W,TP,1608	1	SA	
QS01	0501-000002	TR-SMALL SIGNAL;KSA812,PNP,150MW,S	1	SA		R332	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
QS02	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA		R333	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	1	SA	
QS03	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,200m	1	SA		R334	2007-000094	R-CHIP;22Kohm,5%,1/10W,TP,1608	1	SA	
R1P101	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA		R335	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA	

Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
R336	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R338	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R339	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	1	SA	
R340	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	1	SA	
R341	2001-000522	R-CARBON;22KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R342	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R343	2007-001002	R-CHIP;510ohm,5%,1/10W,TP,1608	1	SA	
R344	2007-001002	R-CHIP;510ohm,5%,1/10W,TP,1608	1	SA	
R348	2007-000086	R-CHIP;5.6Kohm,5%,1/10W,TP,1608	1	SA	
R350	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	1	SA	
R3D05	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	1	SA	
R3D06	2001-000800	R-CARBON;5.1KOHM,5%,1/8W,AA,TP,1.8	1	SA	
R401	2007-000450	R-CHIP;180ohm,5%,1/10W,TP,1608	1	SA	
R402	2007-000450	R-CHIP;180ohm,5%,1/10W,TP,1608	1	SA	
R4J01	2007-000109	R-CHIP;1Mohm,5%,1/10W,TP,1608	1	SA	
R4J02	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
R4M02	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R4M03	2007-000125	R-CHIP;3.9Kohm,5%,1/10W,TP,1608	1	SA	
R4M04	2007-000082	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	1	SA	
R4M05	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R4M06	2007-001125	R-CHIP;68Kohm,1%,1/10W,TP,1608	1	SA	
R4M07	2007-000842	R-CHIP;3Kohm,1%,1/10W,TP,1608	1	SA	
R506	2007-000077	R-CHIP;470ohm,5%,1/10W,TP,1608	1	SA	
R507	2007-000081	R-CHIP;2.7Kohm,5%,1/10W,TP,1608	1	SA	
R508	2007-000130	R-CHIP;39Kohm,5%,1/10W,TP,1608	1	SA	
R509	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R510	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R516	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R517	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R523	2007-000088	R-CHIP;7.5Kohm,5%,1/10W,TP,1608	1	SA	
R524	2001-000786	R-CARBON;47KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R525	2001-000786	R-CARBON;47KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R526	2007-000088	R-CHIP;7.5Kohm,5%,1/10W,TP,1608	1	SA	
R527	2007-000091	R-CHIP;12Kohm,5%,1/10W,TP,1608	1	SA	
R528	2007-000134	R-CHIP;33Kohm,5%,1/10W,TP,1608	1	SA	
R601	2007-000094	R-CHIP;22Kohm,5%,1/10W,TP,1608	1	SA	
R602	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R603	2007-000094	R-CHIP;22Kohm,5%,1/10W,TP,1608	1	SA	
R604	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R606	2001-000633	R-CARBON;30KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R609	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R611	2007-000081	R-CHIP;2.7Kohm,5%,1/10W,TP,1608	1	SA	
R613	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R614	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R615	2007-000086	R-CHIP;5.6Kohm,5%,1/10W,TP,1608	1	SA	
R616	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R617	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	1	SA	
R618	2007-000098	R-CHIP;56Kohm,5%,1/10W,TP,1608	1	SA	
R619	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R621	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R622	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R623	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
R624	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
R630	2007-000098	R-CHIP;56Kohm,5%,1/10W,TP,1608	1	SA	
R631	2007-000098	R-CHIP;56Kohm,5%,1/10W,TP,1608	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
R632	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA	
R633	2007-000106	R-CHIP;220Kohm,5%,1/10W,TP,1608	1	SA	
R636	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R638	2007-000082	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	1	SA	
R639	2007-000081	R-CHIP;2.7Kohm,5%,1/10W,TP,1608	1	SA	
R641	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R643	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R644	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R645	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R646	2007-000086	R-CHIP;5.6Kohm,5%,1/10W,TP,1608	1	SA	
R647	2007-000076	R-CHIP;330ohm,5%,1/10W,TP,1608	1	SA	
R648	2007-000076	R-CHIP;330ohm,5%,1/10W,TP,1608	1	SA	
R649	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
R650	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
R651	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
R652	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R653	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R656	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R659	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R660	2007-000100	R-CHIP;68Kohm,5%,1/10W,TP,1608	1	SA	
R661	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R662	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X	1	SA	
R663	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R664	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R666	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R667	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R668	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R669	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R670	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R671	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R673	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R676	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R677	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R678	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R680	2001-000734	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8	1	SA	
R681	2001-000734	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8	1	SA	
R684	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R685	2001-000515	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X	1	SA	
R690	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R691	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R692	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R694	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R695	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R6A01	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,1608	1	SA	
R6B01	2007-000659	R-CHIP;270HM,5%,1/10W,TP,1608	1	SA	
R6CEC1	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R701	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R702	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R703	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R704	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R705	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R706	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R707	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R708	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark	Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
R710	2007-000076	R-CHIP;330ohm,5%,1/10W,TP,1608	1	SA		VC9	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA	
R711	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA		VDR1	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R712	2007-001010	R-CHIP;51Kohm,5%,1/10W,TP,1608	1	SA		VDR2	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R719	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA		VDR4	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R801	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA		VDR5	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R802	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA		VDR6	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R803	2001-000036	R-CARBON;330OHM,5%,1/4W,AA,TP,2.4X	1	SA		VE1	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7.5	1	SA	
R804	2007-000115	R-CHIP;82ohm,5%,1/10W,TP,1608	1	SA		VE2	2401-000909	C-AL;22uF,20%,16V,GP,TP,5x5.2,5	1	SA	
R806	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		VE4	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
R807	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA		VE5	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
R808	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA		VE6	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
R813	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA		VE7	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,	1	SA	
R814	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA		VIC1	1201-002335	IC-VIDEO AMP;MM1692XVBE,TSOP,16P,5	1	SA	
R817	2007-000450	R-CHIP;180ohm,5%,1/10W,TP,1608	1	SA		VR30	2001-000969	R-CARBON;75OHM,5%,1/8W,AA,TP,1.8X3	1	SA	
R818	2001-000405	R-CARBON;180OHM,5%,1/8W,AA,TP,1.8X	1	SA		VR31	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
R819	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		VR32	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
R820	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		VR33	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
R821	2007-000134	R-CHIP;33Kohm,5%,1/10W,TP,1608	1	SA		VR34	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
R822	2007-000134	R-CHIP;33Kohm,5%,1/10W,TP,1608	1	SA		VS208	AK39-00086A	LEAD CONNECTOR;SV-R3600,LEAD CONNE	1	SA	
R823	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		W004	6003-000283	SCREW-TAPTITE,BH,+,B,M3,L8,ZPC(W	1	SA	
R826	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		W027	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
R827	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		W478	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
R851	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		W599	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
R852	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		XT301	2801-003399	CRYSTAL-UNIT;3.579545MHz,15ppm,28-	1	SA	
R853	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA		XT601	2801-001384	CRYSTAL-UNIT;14.31818MHz,30ppm,28-	1	SC	
R857	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA		XT602	2801-003318	CRYSTAL-UNIT;32.768KHz,20ppm,28-AA	1	SA	
R858	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3	1	SA		ZD1S01	0403-001318	DIODE-ZENER;MTZJ4.3B,4.17-4.43V,50	1	SA	
R859	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		ZD1S02	0403-000713	DIODE-ZENER;MTZJ20B,18.63-17.7V,50	1	SA	
R860	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		ZD401	0403-000390	DIODE-ZENER;UZP33B,31.4-34.6V,1000	1	SA	
RM701	0609-001198	MODULE REMOCON;VERTICAL,19MM,TR	1	SA		ZD801	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS01	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA		ZD802	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS02	2007-000125	R-CHIP;3.9Kohm,5%,1/10W,TP,1608	1	SA		ZD803	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS03	2007-000094	R-CHIP;22Kohm,5%,1/10W,TP,1608	1	SA		ZD804	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS04	2007-000125	R-CHIP;3.9Kohm,5%,1/10W,TP,1608	1	SA		ZD805	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS05	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA		ZD806	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS06	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA		ZD807	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS07	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA		ZD808	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS08	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP,1608	1	SA		ZD809	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS09	2007-000125	R-CHIP;3.9Kohm,5%,1/10W,TP,1608	1	SA		ZD810	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
RS10	2007-000077	R-CHIP;470ohm,5%,1/10W,TP,1608	1	SA		ZD811	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
SJACK	3722-001924	JACK-DIN;4P/2C,-,SN,BLK,-	1	SA		ZD812	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200	1	SA	
SVL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA							
SVL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA							
SW603	AC34-00005A	SWITCH MODE;SSS-55MD,-,-,-,DC5V,-,	1	SA		H100	AC97-02653A	ASSY-FULL DECK;L/Speed,DX13A-6N(A)	1	SNA	
SW604	3409-001165	SWITCH-DETECTOR;5V,1mA,-,50gf,ON-O	1	SA		S.N.A	AC97-02616A	ASSY-DECK,-,DX13A,L/ASPEED	1	SNA	
SW605	AC34-00006B	SWITCH-REC;LSA-1135-9,push,-,16,16	1	SA		S.N.A	AC97-02610A	ASSY-DECK COMMON,-,DX13A,-	1	SNA	
TM401	AK40-00023A	TM BLOCK;TCMN0682PA26A,NTSC,181CH,	1	SA		S.N.A	AC97-02580A	ASSY-TENSION BLOCK,-,X-13,-	1	SNA	
VA1S01	1405-001026	VARIATOR;470V,600A,9x7mm,TP	1	SA		S.N.A	AC61-00384A	HOLDER-BAND BRAKE;X-13,POM,-,-,-,N	1	SNA	
VA1S02	1405-000186	VARIATOR;470V,2500A,17.5x7.5mm,TP	1	SA							
VC10	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC69-00094A	BAND-BRAKE SUB ASSY;TS-10,WOOL 10	1	SNA	
VC11	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC61-00398A	POST-TENSION GUIDE;X-13,SUS303C,2,	1	SNA	
VC17	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC61-00399A	POST-TENSION LEVER;X-13,SUS303,2.5	1	SNA	
VC6	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC66-00093A	LEVER-TENSION;X-13,SECC,T0.8,-,-,-	1	SNA	
VC7	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC97-02581A	ASSY-REEL BLOCK,-,X-13,-	1	SNA	
VC8	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1608	1	SA		S.N.A	AC66-00112A	GEAR-CENTER 1;X-13,POM,0.5,25,12.5	1	SNA	

Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
S.N.A	AC66-00113A	GEAR-CENTER 2;X-13,POM,0.5,46,23,N	1	SNA	
S.N.A	AC61-00395A	HOLDER-CLUTCH;X-13,POM(SW-01),-W1	1	SNA	
S.N.A	AC61-62030A	SPRING ETC-WRAP PLAY;X-9,SUS 304-W	1	SNA	
S.N.A	AC61-62031A	SPRING ETC-WRAP REV.;X-9,SUS 304-W	1	SNA	
S.N.A	AC66-00109A	PULLEY-CLUTCH;X-13,POM,-,NAT,2.5,-	1	SNA	
S.N.A	AC97-02582A	ASSY-BRAKE BLOCK;-X-13,-	1	SNA	
S.N.A	AC60-40645A	FASTENER-PIN BRAKE;-,-1.5,L=12,-	1	SNA	
S.N.A	AC66-00117A	LEVER BRAKE-S;X-13,POM,T10,W20,L40	1	SNA	
S.N.A	AC60-40645A	FASTENER-PIN BRAKE;-,-1.5,L=12,-	1	SNA	
S.N.A	AC61-60563A	SPRING ETC-TBRAKE;X-9,SUS304-WPB,	1	SNA	
S.N.A	AC66-00116A	LEVER BRAKE-T;X-13,POM,T10,W20,L40	1	SNA	
S.N.A	AC69-12136A	PAD-TBRAKE;X-9,FUR FELT,1.5,10.7,	1	SNA	
S.N.A	AC97-02583A	ASSY-LOADING BLOCK;-X-13,-	1	SNA	
S.N.A	AC61-60572A	SPRING ETC-LOADING;X-9,SUS304WPB,O	1	SNA	
S.N.A	AC66-00079A	GEAR-S LOADING;X-11,POM(K300),-,-	1	SNA	
S.N.A	AC66-00095A	LEVER-LOADING S;X-13,SECC 20/20,T1	1	SNA	
S.N.A	AC61-60572A	SPRING ETC-LOADING;X-9,SUS304WPB,O	1	SNA	
S.N.A	AC66-00080A	GEAR-T LOADING;X-11,POM(K300),-,-	1	SNA	
S.N.A	AC66-00096A	LEVER-LOADING T;X-13,SECC 20/20,T1	1	SNA	
S.N.A	AC97-02604A	ASSY-SUB MATERIALS;-DX11,-	1	SNA	
S.N.A	0205-000129	GREASE-SILICON;SC102,JAPAN,1000G/C	0.2	SNA	
S.N.A	0205-001033	GREASE-PL-30G,W050030019,-	1.16	SNA	
S.N.A	0205-001035	OIL,EP-56,W050050072,MICHANG	0.004	SNA	
S.N.A	AC97-02611A	ASSY-PINCH BLOCK;-X-13A,-	1	SNA	
S.N.A	AC60-30304A	FASTENER-WASHER PINCH;-,-D2.7,D4,	1	SNA	
S.N.A	AC61-00104A	SPRING ETC-PINCH;TS-10,SUS304-WPB,	1	SNA	
S.N.A	AC61-00404A	POST-PINCH ROLLER;X-13,SUS XM-7,-	1	SNA	
S.N.A	AC61-21006A	CAP-PINCH;X-9,POM,-,-,-,-	1	SNA	
S.N.A	AC66-00015A	LEVER-PINCH SUB;TS-10,SECC E20/20,	1	SNA	
S.N.A	AC66-00110A	LEVER-PINCH MAIN;X-13,SECC,T1.2,W2	1	SNA	
S.N.A	AC66-00128A	ROLLER-PINCH;-Rubber,14,18,NAT,-	1	SNA	
S.N.A	AC97-02621A	ASSY-GUIDE BLOCK;-X-13A,-	1	SNA	
S.N.A	AC61-00385A	BASE-TAKE UP SLIDER;X-13,PPS/Ryton	1	SNA	
S.N.A	AC61-00405A	POST-SLANT GUIDE;X-13,SUS303,PI 3.	1	SNA	
S.N.A	AC66-40154A	ROLLER-TAKE UP ASSY;-VW-32,OD7,-	1	SNA	
S.N.A	AC61-00383A	BASE-SUPPLY SLIDER;X-13,PPS/Ryton	1	SNA	
S.N.A	AC61-00405A	POST-SLANT GUIDE;X-13,SUS303,PI 3.	1	SNA	
S.N.A	AC66-40154A	ROLLER-TAKE UP ASSY;-VW-32,OD7,-	1	SNA	
S.N.A	AC97-02618A	ASSY-DECK ONLY;-DX13A,L/Speed	1	SNA	
S.N.A	3708-00163A	CONNECTOR-FPC/FFC/PIC;3P1.25MM,AN	1	SNA	
S.N.A	AC31-12016F	MOTOR-LOADING;MDHB2B66,SCORPIO2(TS	1	SNA	
S.N.A	AC41-00238A	PCB-LOADING MOTOR;SCORPIO2(TS-10A)	1	SNA	
S.N.A	AC66-00010A	GEAR WORM;TS-10,POM,0.8,1,-,NAT,7.	1	SNA	
S.N.A	AC97-02586A	ASSY-M/B BLOCK;-X-13,-	1	SNA	
S.N.A	AC97-02555A	ASSY-BASE MAIN;-X-13,-	1	SNA	
S.N.A	AC61-00342A	POST-LOADING;X-11,SWCH18A,OD3.0,L9	6	SNA	
S.N.A	AC61-00380A	BASE-MAIN;X-13,SECC,T1.2,-,-,NTR,-	1	SNA	
S.N.A	AC61-00402A	POST-REEL;X-13,SWCH18A,3,-,-,Non-e	2	SNA	
S.N.A	AC61-00403A	POST-CENTER;X-13,SWCH18A,-,-,-,Non	1	SNA	
S.N.A	AC61-50672A	POST-PINCH LEVER;X-9,SWCH18A,-,L24	1	SNA	
S.N.A	AC61-50677A	POST-FL CAM GEAR;X-9,SWCH18A,-,L14	1	SNA	
S.N.A	AC61-00387A	SLEEVE-8 GUIDE;X-13,-,-,-,-,-,BL	1	SNA	
S.N.A	AC61-00401A	POST-#8 GUIDE;X-13,SUS XM-7,2.5,-	1	SNA	
S.N.A	AC97-02608A	ASSY-CAPSTAN BLOCK;-X-13,Phenol/P	1	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
S.N.A	AC97-02613A	ASSY-ACE HEAD BLOCK;-X-13A,AE Les	1	SNA	
S.N.A	3708-001676	CONNECTOR-FPC/FFC/PIC;6P1.25MM,AN	1	SNA	
S.N.A	AC33-00019A	HEAD-A/C;HVMXB1016A,-,X13A,-,-	1	SNA	
S.N.A	AC41-00130A	PCB-ACE HEAD;TS-10,-,-,-,-,-,-,-	1	SNA	
S.N.A	AC61-00382A	BASE-ACE MAIN;X-13,SECC,T1.2,-,-,N	1	SNA	
S.N.A	AC61-00406A	SPRING ETC-ACE;X-13,SWPB,1,-,7.2,-	1	SNA	
S.N.A	AC97-02623A	ASSY-FL BLOCK;-X-13A,-	1	SNA	
S.N.A	AC61-00108A	SPRING ETC-FL ARM R;TS-10,SUS304-W	1	SNA	
S.N.A	AC66-00106A	LEVER-ARM R;X-13,POM,-,W35,L70,-,N	1	SNA	
S.N.A	AC66-00107A	LEVER-ARM L;X-13,POM,-,W35,L70,-,N	1	SNA	
S.N.A	AC70-00004A	PLATE-FL ARM;X-11,SECC E20/20,T1.6	1	SNA	
S.N.A	AC61-00392A	PLATE-CASSETTE;X-13,SECC,T0.8,W28,	1	SNA	
S.N.A	AC61-00393A	HOLDER-CASSETTE R;X-13,POM,-,W35,L	1	SNA	
S.N.A	AC61-00394A	HOLDER-CASSETTE L;X-13,POM,-,W35,L	1	SNA	
T001	AC97-02640A	ASSY-CYLINDER;-6N,CX13A-DAESUNG,N	1	SA	
T002	AC61-00391A	PLATE-GROUND DECK;X-13,SPT,E,T0.3,-	1	SA	
T003	AC31-00018A	MOTOR-LOADING ASSY;-SCORPIO2(TS-1	1	SA	
T003	AC97-01652A	ASSY-LOADING MOTOR;SANKYO LOADING	1	SNA	
T004	AC66-00101A	GEAR-WORM WHEEL;X-13,POM(M90-44 EQ	1	SA	
T005	AC66-00102A	GEAR-FL CAM;X-13,POM(M90-44 EQU),-	1	SA	
T006	AC61-00105A	SPRING ETC-PINCH DRIVE;TS-10,SUS30	1	SA	
T007	AC61-00390A	PLATE-JOINT;X-13,SECC 20/20,T0.8,-	1	SA	
T008	AC97-02570A	ASSY-SLIDER SUPPLY;PPS;X-13,-	1	SA	
T009	AC97-02556A	ASSY-SLIDER TAKE UP;-X-13,-	1	SA	
T010	AC97-02625A	ASSY-HEAD A/C;-X-13A,-	1	SA	
T011	AC66-00094A	LEVER-9 GUIDE;X-13,PPS,-,-,-,-,BRO	1	SA	
T013	AC33-00018A	HEAD-FULL ERASE;-,-X-13,-,-	1	SA	
T015	AC97-02620A	ASSY-UNIT PINCH;-X-13A,-	1	SA	
T016	AC97-02563A	ASSY-POST #8 GUIDE;-X-13,PI 2.5	1	SA	
T019	AC66-00124A	REEL-S;X-13,POM,-,BLK,2.5,-,27,-	1	SA	
T020	AC66-00123A	REEL-T;X-13,POM,-,BLK,2.5,-,36.5,-	1	SA	
T021	AC66-00115A	LEVER-IDLE;X-13,POM,T15,W38,L25,-	1	SA	
T022	AC66-00114A	GEAR-IDLE;X-13,PET,0.5,54,27,NAT,2	2	SA	
T023	AC97-02562A	ASSY-LEVER TENSION;-X-13,-	1	SA	
T024	AC61-00107A	SPRING ETC-TENSION LEVER;TS-10,SUS	1	SA	
T025	AC97-02560A	ASSY-BAND BRAKE;-X-13,-	1	SA	
T026	AC97-02567A	ASSY-LEVER BRAKE S;-X-13,-	1	SA	
T027	AC97-02568A	ASSY-LEVER BRAKE T;-X-13,-	1	SA	
T028	AC61-00106A	SPRING ETC-BRAKE;TS-10,SUS304-WPB,	1	SA	
T028	AC61-00106A	SPRING ETC-BRAKE;TS-10,SUS304-WPB,	1	SA	
T029	AC66-00104A	SLIDER-FL DRIVE;X-13,SECC,T1.0,W15	1	SA	
T034	AC66-00103A	GEAR-JOINT 1;X-13,POM(M90-44 EQU),	1	SA	
T035	AC66-00077A	GEAR-JOINT 2;X-11,POM(K300),-,-,-	1	SA	
T036	AC61-00389A	BRACKET-GEAR;X-13,SECC 20/20,T0.8,	1	SA	
T037	AC66-00092A	SLIDER-CAM;X-13,SECC 20/20,T1.2,-	1	SA	
T038	AC66-00099A	LEVER-PINCH DRIVE;X-13,SECC 20/20,	1	SA	
T039	AC70-00003A	HOOK-CAPSTAN;-,-L10,W10,H10,POM(M	1	SA	
T040	AC66-00100A	LEVER-TENSION DRIVE;X-13,SECC 20/2	1	SA	
T041	AC66-00078A	GEAR-LOADING DRIVE;X-11,POM(K300),	1	SA	
T042	AC97-02557A	ASSY-LEVER LOADING S;-X-13,-	1	SA	
T043	AC97-02558A	ASSY-LEVER LOADING T;-X-13,-	1	SA	
T044	3101-001427	MOTOR-CAPSTAN;0rpm,0g.cm,12V,90mA	1	SA	
T046	AC66-60051A	BELT-PULLEY;-5CM-70.2 * 2,-,71.3,	1	SA	
T048	AC97-02566A	ASSY-GEAR CENTER;-X-13,-	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
T049	AC60-30306A	FASTENER-WASHER SLIT,-,ID2.1,OD5	1	SA	
T050	AC66-00111A	LEVER-UP DOWN;X-13,POM,T15,E25,L55	1	SA	
T053	AC66-00097A	LINK-LOADING S;X-13,SECC 20/20,-,T	1	SNA	
T055	AC66-00098A	LINK-LOADING T;X-13,SECC 20/20,-,T	1	SNA	
T057	AC61-00386A	SLEEVE-TENSION;X-13,-,2.5,-,-,-	1	SA	
T071	AC61-00388A	GUIDE-CASS DOOR;X-13,POM(M90-44 EQ	1	SA	
T072	AC97-02622A	ASSY-HOLDER CASSETTE;SECC+POM+SUS,	1	SA	
T073	AC61-00397A	SPRING ETC-LOCK;X-13,SWP-B,0.25,2.	1	SA	
T074	AC97-02564A	ASSY-LEVER ARM,-,X-13,-	1	SA	
T075	AC66-00108A	LEVER-DOOR;X-13,POM,-,W30,L75,-,NA	1	SA	
T076	AC97-02569A	ASSY-CLUTCH,-,X-13,-	1	SA	
VS165	AC66-00105A	LEVER-LOCK;X-13,SECC,T1.0,W25,L50,	1	SNA	
W015	6006-001092	SCREW-MACHINE;PH,+WS,M3.0,L6.0,ZP	3	SA	
W016	6006-001154	SCREW-TAPTITE;PH,+WSPB,M2.6,L5.6	1	SA	
W018	6003-001450	SCREW-TAPTITE;PH,+S,M2.6,L5,ZPC	1	SA	
W019	6003-000108	SCREW-TAPTITE;BH,+B,M2.6,L6,ZPC(Y	3	SA	
W201	6001-001711	SCREW-MACHINE;PH,+M3,L3.3,ZPC(W	1	SA	
W291	6001-000506	SCREW-MACHINE;PH,+M2,L6,ZPC(WHT	3	SNA	
H001	AK97-01883B	ASSY-LOADER,-,DVD-R150,RAM Multi	1	SA	
C771	AK61-00390A	HOLDER-WIRE;SOH-DR2,PPS,T5.2,W14.1	1	SNA	
C1C1	1203-003177	IC-VOL. DETECTOR;BD5326G,SSOP;5P,2	1	SA	
CN1	3708-002193	CONNECTOR-FPC/FFC/PIC;50P,0.5mm,SM	1	SA	
DECK_C	3708-002176	CONNECTOR-FPC/FFC/PIC;5P,1mm,SMD-A	1	SA	
H001	AK97-01878A	ASSY-RECORDER DECK;DP-R4L,-,-	1	SNA	
H103	AK66-00061A	GEAR-PULLEY;DP-RW,POM,-,-,-,BL	1	SNA	
H105	6602-001076	BELT-RECTANGULAR;CR,T1.2,4.3%,1.2X	1	SA	
H106	AK66-00062A	GEAR-TRAY;DP-RW,POM,-,-,WHT,-,-	1	SNA	
H108	AK63-00432A	TRAY-DISC;DP-R3.5,ABS,-,-,-,-,-	1	SNA	
H207	AK31-00028A	MOTOR SPINDLE;DP-R3L,8500,9.8mN.m,	1	SNA	
H209	AK64-01462A	CHASSIS-SUB;DP-R3H,ABS,T2,W114,L54	1	SNA	
H211	AK97-01856A	ASSY-PICK UP,-,SOH-DR4,-	1	SNA	
H212	AK61-00738A	HOLDER-CHUCK;DP-R3.5L,ABS,-,-,-,-	1	SNA	
H241	AK41-00609A	FFC-PU;DP-R3.5,POLYESTER,PITCH0.5,	1	SNA	
H265	AK61-00736A	BRACKET-SHAFT PU;DP-R3.5,SUS T1.0,	2	SNA	
H268	AK61-00452A	SPRING ETC-HINGE PU;DP-R2,SUS304WP	1	SNA	
H271	AK61-00735A	HINGE-PU;DP-R3.5,POM,-,-,-,-,-	1	SNA	
H275	AK66-00072A	SHAFT-PU;DP-RW2,SUS420J2,91.5,3,NA	2	SNA	
H401	AK61-00734A	FRAME-MAIN;DP-R3.5,ABS,-,-,-,-,-	1	SNA	
JP9	3708-001331	CONNECTOR-FPC/FFC/PIC;40P,0.5mm,SM	1	SA	
PC1	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
PC10	2402-000179	C-AL,SMD;47uF,20%,16V,GP,TP;6.6x6	1	SA	
PC12	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
PC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
PC15	2404-001131	C-TA,CHIP;22uF,10%,10V,GP,TP;3528	1	SA	
PC2	2203-006214	C-CER,CHIP;220nF,10%,25V,X7R,3216	1	SA	
PC3	2402-001042	C-AL,SMD;100uF,20%,16V,GP,TP;6.6x6	1	SA	
PC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,YSV,1	1	SA	
PC5	2402-001042	C-AL,SMD;100uF,20%,16V,GP,TP;6.6x6	1	SA	
PC6	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
PC7	2203-005171	C-CER,CHIP;100nF,10%,16V,X7R,2012	1	SA	
PC8	2203-005171	C-CER,CHIP;100nF,10%,16V,X7R,2012	1	SA	
PC9	2402-000179	C-AL,SMD;47uF,20%,16V,GP,TP;6.6x6	1	SA	
PCB	AK41-00623B	PCB-FRONT;RAMBO4,CEM-3.2,-,1.6T,13	0.5	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
PCN	3711-005477	HEADER-BOARD TO CABLE;BOX,4P,1R,2m	1	SA	
PIC2	1203-003997	IC-MULTI REG.;BA30E00WHFP;HRP;7P,9	1	SA	
PIC3	1203-003999	IC-POSIFIXED REG.;BH25FB1WHFV;HVS	1	SA	
PL1	2901-001281	FILTER-EMI SMD;16V,2A,-,220000pF,2	1	SA	
PL3	2901-001281	FILTER-EMI SMD;16V,2A,-,220000pF,2	1	SA	
PL4	2901-001281	FILTER-EMI SMD;16V,2A,-,220000pF,2	1	SA	
PL5	2901-001281	FILTER-EMI SMD;16V,2A,-,220000pF,2	1	SA	
PR1	2007-000097	R-CHIP;47Kohm,5%,1/10W,TP;1608	1	SA	
PR2	2007-000616	R-CHIP;24Kohm,5%,1/10W,TP;1608	1	SA	
PR3	3301-001495	BEAD-SMD;120ohm,2012,2500mA,TP;115	1	SA	
RC10	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC11	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC12	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC13	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC15	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC16	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC17	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC21	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC22	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP;3216	1	SA	
RC23	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC25	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP;3216	1	SA	
RC26	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC27	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP;3216	1	SA	
RC28	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC29	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC3	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC30	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC31	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC32	2203-000234	C-CER,CHIP;0.1nF,5%,50V,COG,TP;100	1	SA	
RC33	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC34	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC35	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC36	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC37	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP;3528	1	SA	
RC38	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC39	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP;3528	1	SA	
RC40	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC41	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC42	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC43	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC44	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC45	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
RC46	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
RC47	2203-000627	C-CER,CHIP;0.022nF,5%,50V,COG,TP;1005	1	SA	
RC48	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
RC49	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
RC50	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC51	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC52	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC53	2203-000234	C-CER,CHIP;0.1nF,5%,50V,COG,TP;100	1	SA	
RC54	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC55	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP;3528	1	SA	
RC56	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	

Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
RC57	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC58	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP3528	1	SA	
RC59	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC6	2203-005496	C-CER,CHIP;220nF,+80-20%,10V,Y5V,1	1	SA	
RC60	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC61	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC62	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1005	1	SA	
RC63	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1005	1	SA	
RC64	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1005	1	SA	
RC65	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1005	1	SA	
RC66	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC67	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC68	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC69	2203-000234	C-CER,CHIP;0.1nF,5%,50V,COG,TP100	1	SA	
RC7	2203-005496	C-CER,CHIP;220nF,+80-20%,10V,Y5V,1	1	SA	
RC70	2203-001239	C-CER,CHIP;0.082nF,5%,50V,NP0,1005	1	SA	
RC71	2203-001239	C-CER,CHIP;0.082nF,5%,50V,NP0,1005	1	SA	
RC72	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
RC73	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
RC74	2203-000489	C-CER,CHIP;2.2nF,10%,50V,X7R,1005	1	SA	
RIC2	AK13-00028A	IC ASIC;S111101X01,-,128,5V,-0 ~ +	1	SNA	
RR10	2007-000151	R-CHIP;15Kohm,5%,1/16W,TP,1005	1	SA	
RR11	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
RR13	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
RR16	2007-000159	R-CHIP;56Kohm,5%,1/16W,TP,1005	1	SA	
RR17	2007-003009	R-CHIP;16Kohm,5%,1/16W,TP,1005	1	SA	
RR18	2007-000157	R-CHIP;47Kohm,5%,1/16W,TP,1005	1	SA	
RR21	2007-007107	R-CHIP;100Kohm,1%,1/16W,TP,1005	1	SA	
RR22	2007-007107	R-CHIP;100Kohm,1%,1/16W,TP,1005	1	SA	
RR24	2007-000145	R-CHIP;6.2Kohm,5%,1/16W,TP,1005	1	SA	
RR25	2007-000154	R-CHIP;24KOHM,5%,1/16W,TP,1005	1	SA	
RR26	2007-001320	R-CHIP;1.8Kohm,5%,1/16W,TP,1005	1	SA	
RR27	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
RR28	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
RR29	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
RR30	2007-000157	R-CHIP;47Kohm,5%,1/16W,TP,1005	1	SA	
RR32	2007-000159	R-CHIP;56Kohm,5%,1/16W,TP,1005	1	SA	
RR33	2007-000154	R-CHIP;24KOHM,5%,1/16W,TP,1005	1	SA	
RR35	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
RR37	2007-000170	R-CHIP;1Mohm,5%,1/16W,TP,1005	1	SA	
RR43	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
RR44	2007-000151	R-CHIP;15Kohm,5%,1/16W,TP,1005	1	SA	
RR45	2007-000151	R-CHIP;15Kohm,5%,1/16W,TP,1005	1	SA	
RR46	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
S.N.A	3403-001026	SWITCH-PUSH;5V,0.7mA,DPST,OFF-ON-O	1	SA	
S.N.A	AK61-00740A	BRACKET-DECK;DP-R3.5L,SECC T1.6,-,	1	SNA	
S.N.A	AK73-00053A	RUBBER-DECK;DP-R3.5,BUTYL,-,-,-,-,	4	SNA	
S.N.A	AK97-01876A	ASSY-TRAVERSE;DP-R4,-,-	1	SNA	
S.N.A	AK31-00024A	MOTOR STEP-FEED;-DP-RW,727 mA,200	1	SNA	
S.N.A	AK61-00490A	SPRING ETC-SHAFT PU;DP-RW2,PW2,0.8	2	SNA	
S.N.A	AK97-01877A	ASSY-HOLDER CHUCK;DP-R4L,-,-	1	SNA	
S.N.A	AK97-01331B	ASSY-CLAMPER;DP-R4L,-,-	1	SNA	
S.N.A	AK61-00486A	BODY CLAMPER-UPPER;DP-RW2,POM,T0.7	1	SNA	
S.N.A	AK61-00739A	BRACKET-CLAMPER;DP-R3.5L,SECC T0.6	1	SNA	
S.N.A	BG33-30001D	MAGNET-CLAMPER;-,-,-,13.5x6x1.1	1	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
S.N.A	AK97-01879A	ASSY-HOUSING;-DP-R4,-	1	SNA	
S.N.A	AH31-00025A	MOTOR-LOADING;RF-300EA-1D390,DP-7,	1	SNA	
S.N.A	AK66-00038A	PULLEY MOTOR;DP-R1,POM,-,BLK,1.95,	1	SNA	
S.N.A	AK97-01646A	ASSY-MOTOR PCB;PHENOL,DP-R3H,SWITC	1	SNA	
S.N.A	AK41-00400A	FFC-DECK;DP-RW2,PITCH1.0,PET,5P,-,	1	SNA	
S.N.A	AK41-00546A	PCB-MOTOR;DP-R3H,PHENOL,1.1,1.6,28	1	SNA	
SPIN_C	3708-002067	CONNECTOR-FPC/FFC/PIC;12P,1mm,SMD-	1	SA	
STEP_C	3708-002018	CONNECTOR-FPC/FFC/PIC;4P,1MM,SMD-A	1	SA	
T037	AK66-00079A	SLIDER-CAM;DP-R3H,POM,T10,W89,L18.	1	SNA	
U8	AK13-00025A	IC ASIC;S5L1484A01,RAMBO-3,256,3.3	1	SNA	
U9	1107-001453	IC-FLASH MEMORY;29W160E,16Mbit,2Mx	1	SNA	
UB1	1105-001284	IC-DRAM;636165,-,16Mbit,1Mx16Bit,T	1	SA	
UC100	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC18	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA	
UC19	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,COG,10	1	SA	
UC21	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC22	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC23	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC24	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC25	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC26	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC27	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC28	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA	
UC29	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA	
UC30	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA	
UC31	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC32	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC33	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC34	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC35	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC36	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC37	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC38	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC39	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC40	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC41	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC42	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC43	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC44	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC45	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
UC46	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC47	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
UC48	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC49	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC50	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC51	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC52	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC53	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC54	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC55	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC56	2203-000854	C-CER,CHIP;0.039nF,5%,50V,COG,1005	1	SA	
UC57	2203-001072	C-CER,CHIP;0.056nF,5%,50V,NP0,1005	1	SA	
UC58	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UC62	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark	Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
UC63	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR59	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
UC64	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR6	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UC67	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR63	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	1	SA	
UC69	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA		UR64	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA	
UC70	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR69	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UC71	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA		UR7	2007-001217	R-CHIP;820HM,5%,1/16W,TP,1005	1	SA	
UC72	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR73	2007-001305	R-CHIP;120ohm,5%,1/16W,TP,1005	1	SA	
UC75	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA		UR75	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
UC76	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR76	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UC77	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR77	3301-001861	BEAD-SMD;600ohm,1005,TP,500ohm/75M	1	SNA	
UC79	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR8	2007-001217	R-CHIP;820HM,5%,1/16W,TP,1005	1	SA	
UC80	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA		UR80	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
UC81	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA		UR81	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UC82	2203-001072	C-CER,CHIP;0.056nF,5%,50V,NP0,1005	1	SA		UR82	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608	1	SA	
UR1	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P,TP	1	SA		UR83	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608	1	SA	
UR10	2007-001217	R-CHIP;820HM,5%,1/16W,TP,1005	1	SA		UR87	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR100	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		UR88	2007-001305	R-CHIP;120ohm,5%,1/16W,TP,1005	1	SA	
UR11	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA		UR89	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR12	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA		UR9	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UR13	2007-001217	R-CHIP;820HM,5%,1/16W,TP,1005	1	SA		UR90	2007-000831	R-CHIP;39Kohm,5%,1/16W,TP,1005	1	SA	
UR14	2007-001217	R-CHIP;820HM,5%,1/16W,TP,1005	1	SA		UR91	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR16	2007-000170	R-CHIP;1Mohm,5%,1/16W,TP,1005	1	SA		UR92	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR17	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA		UR93	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR19	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA		UR94	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
UR2	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA		UR95	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
UR20	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		UR96	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
UR21	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		UR97	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
UR22	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		UR98	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR23	2007-000174	R-CHIP;47ohm,5%,1/16W,TP,1005	1	SA		UR99	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
UR24	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VC1	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR25	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA		VC10	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,1005	1	SA	
UR26	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA		VC11	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR27	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VC12	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR28	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VC13	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,3528	1	SA	
UR29	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UR3	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA		VC15	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,1005	1	SA	
UR30	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA		VC16	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR31	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA		VC17	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR32	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA		VC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR33	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA		VC19	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y5V,1	1	SA	
UR34	2007-000139	R-CHIP;220ohm,5%,1/16W,TP,1005	1	SA		VC2	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR35	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA		VC20	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1005	1	SA	
UR36	2007-000139	R-CHIP;220ohm,5%,1/16W,TP,1005	1	SA		VC21	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3216	1	SA	
UR37	2007-001325	R-CHIP;3.3Kohm,5%,1/16W,TP,1005	1	SA		VC3	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR39	2007-000775	R-CHIP;33KOHM,5%,1/16W,TP,1005	1	SA		VC4	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR4	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA		VC5	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR42	2007-007001	R-CHIP;3.9KOHM,5%,1/16W,TP,1005	1	SA		VC6	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,1005	1	SA	
UR43	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VC7	2203-000234	C-CER,CHIP;0.1nF,5%,50V,COG,TP,100	1	SA	
UR44	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA		VC8	2203-000234	C-CER,CHIP;0.1nF,5%,50V,COG,TP,100	1	SA	
UR47	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VIC1	1003-001881	IC-MOTOR DRIVER;BD7956FS,HSSOP,54P	1	SA	
UR48	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA		VR1	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR5	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA		VR10	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR50	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA		VR11	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
UR55	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA		VR12	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
UR58	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,1005	1	SA							

Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
VR13	2007-000034	R-CHIP;10HM,5%,1/4W,TP,3216	1	SA	
VR14	2007-000034	R-CHIP;10HM,5%,1/4W,TP,3216	1	SA	
VR15	2007-000034	R-CHIP;10HM,5%,1/4W,TP,3216	1	SA	
VR16	2007-000034	R-CHIP;10HM,5%,1/4W,TP,3216	1	SA	
VR18	2007-000034	R-CHIP;10HM,5%,1/4W,TP,3216	1	SA	
VR20	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
VR25	2007-007107	R-CHIP;100Kohm,1%,1/16W,TP,1005	1	SA	
VR26	2007-000159	R-CHIP;56Kohm,5%,1/16W,TP,1005	1	SA	
VR27	2007-000159	R-CHIP;56Kohm,5%,1/16W,TP,1005	1	SA	
VR28	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
VR31	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR32	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR33	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR34	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR35	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR36	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR37	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR38	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR39	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR40	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR41	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR42	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR43	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR44	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR45	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR46	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR47	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR48	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
VR5	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
VR6	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
VR8	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
VR9	2007-000164	R-CHIP;150KOHM,5%,1/16W,TP,1005	1	SA	
W012	6002-001086	SCREW-TAPPING;PH,+,-,B,M1.7,L5.0,Z	1	SA	
W018	6003-001450	SCREW-TAPTITE;PH,+,-,S,M2.6,L5,ZPC	2	SA	
W274	6001-001730	SCREW-MACHINE;BH,+,-,M1.7,L2.5,ZPC	2	SA	
W350	6001-001003	SCREW-MACHINE;BH,+,-,M2.6,L6,ZPC(BLK)	4	SA	
W352	6001-000883	SCREW-MACHINE;PH,+,-,M1.4,L5,ZPC(BLK)	1	SNA	
W353	6003-001199	SCREW-TAPTITE;PWH,+,-,B,M2.7,ZPC	4	SA	
W354	6003-001258	SCREW-TAPTITE;PH,+,-,B,M1.4,L2.0,NI	4	SA	
W355	6003-001526	SCREW-TAPTITE;CH,+,-,S-TITE,M1.4,L4	2	SNA	
W377	6001-001291	SCREW-MACHINE;CH(0.5)*,-,M1.7,L4	3	SA	
Y1	2802-001163	RESONATOR-CERAMIC;33.86MHz,0.5%,TP	1	SA	
	0603-001181	PHOTO DIODE;5.5V,658.79nm,-	1	SA	
	1003-001854	IC-DIODE DRIVER;EL6939CLZ,LPP;32P	1	SA	
	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
	2007-000076	R-CHIP;330ohm,5%,1/10W,TP,1608	1	SA	
	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608	2	SA	
	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
	2007-000309	R-CHIP;10ohm,5%,1/10W,TP,1608	1	SA	
	2007-000932	R-CHIP;470OHM,5%,1/16W,TP,1005	1	SA	
	2007-001319	R-CHIP;1.2KOHM,5%,1/16W,TP,1005	1	SA	
	2007-007136	R-CHIP;4.7Kohm,1%,1/16W,TP,1005	1	SA	
	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
	2011-001344	R-NET;100ohm,5%,1/16W,L,CHIP,8P,TP	1	SA	
	2104-001087	VR-SMD;2.2Kohm,25%,0.15W,TOP	2	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
	2203-000189	C-CER,CHIP;100nF,+80-20%,25V,Y5V,1	5	SA	
	2203-000626	C-CER,CHIP;0.022nF,5%,50V,C0G,1608	1	SA	
	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm/70M	1	SA	
	3708-002193	CONNECTOR-FPC/FFC/PIC;50P,0.5mm,SM	1	SA	
	2203-005664	C-CER,CHIP;4700nF,10%,6.3V,X5R,201	1	SC	
	AK92-01223A	ASSY PCB-LOADER;DVD-R135A/XAA,F/EN	1	SNA	
	AC99-40322L	ASSY PCB-SUB.c;DVD-V5600, EURO,FUN	1	SNA	
	0202-001221	SOLDER-CREAM;PF305-116HO(A),-,25-4	4.04	SNA	
	AC99-90324K	ASSY PCB-LOADER,m;DVD-R135A/XAA,F/	1	SNA	
	0202-001214	SOLDER-WIRE FLUX;HI-ALMIT HR19M LF	0.024	SNA	
	AK97-01857A	ASSY-SUB PICK UP,-,SOH-DR4,-	1	SNA	
	0201-000169	ADHESIVE-CYA;ARCN-A501F,NTR	0.01	SNA	
	0201-000172	ADHESIVE-AA;EP-171,BRN	0.01	SNA	
	0201-001006	ADHESIVE-AA;#7452,TRP,-	0.02	SNA	
	0201-001553	ADHESIVE-TP;G-800-A,GRY,220###40Pa	0.013	SNA	
	0201-001718	ADHESIVE-A.C.F;A-80T,SILVER,11000-	0.003	SNA	
	0201-001819	ADHESIVE-UV;8833M,YELLOW,21000mPas	0.05	SNA	
	0202-001499	SOLDER-WIRE FLUX;SR34 SUPER LFM-48	0.085	SNA	
	0602-001127	DIODE-LASER;160mW,2,658nm,CAN	1	SNA	
	AH61-00812A	SPRING ETC-L/G HOLDER;SOH-DH2,PBR,	1	SNA	
	AK61-00720A	HOLDER-LD DVD;SOH-DR3.5,Zn,4.8,8.2	1	SNA	
	AK61-00721A	HOLDER-LD CD;SOH-DR3.5,Zn,T6.2,W7.	1	SNA	
	AK61-00722A	HOLDER-LG;SOH-DR3.5,Zn,T6.43,W11.1	1	SNA	
	AK61-00747A	SPRING ETC-SHAFT GUIDE;SOH-DR4,PBS	1	SNA	
	AK63-00438A	COVER BASE;SOH-DR4,Cu,T0.2,W32,L25	1	SNA	
	AK97-01859A	ASSY-ACT,-,SOH-DR4,-	1	SNA	
	0201-001081	ADHESIVE-AA;1401C,RED,-,BOND-LOCK	0.006	SNA	
	0201-001230	ADHESIVE-CYA;LOCTITE 480,BLK,300,-	0.002	SNA	
	0201-001709	ADHESIVE-UV;8839L,YEL,24500mPa.s,-	0.01	SNA	
	0201-001793	ADHESIVE-UV;8791L3,WHITE,20000mPa.	0.01	SNA	
	0202-001499	SOLDER-WIRE FLUX;SR34 SUPER LFM-48	0.085	SNA	
	3302-001651	MAGNET-RARE EARTH;AF,14000Gauss,47	2	SNA	
	3812-001263	WIRE-NO SHEATH CU;SCW,-,19MM,-,W	1	SNA	
	3812-001419	WIRE-NO SHEATH CU;SCW,0V,18.5mm,1/	5	SNA	
	AK62-00020A	YOKE-ACT;SOH-DR3,SPCC,T7.6,W24.8,L	1	SNA	
	AK67-00040A	LENS-OL;SOH-DR3,PLS,WHIT,3.8,1.7,-	1	SNA	
	AK97-01858A	ASSY-BLADE,-,SOH-DR4,-	1	SNA	
	0201-001253	ADHESIVE-STR;TB2212B,BLK,25(250),T	0.008	SNA	
	0201-001371	ADHESIVE-SIL;KE3494,GRAY,50 PA,OL	0.002	SNA	
	0202-001215	SOLDER-BAR;HSE-16,S60S-20,D3,SNV0.	0.01	SNA	
	AK61-00480A	BLADE-ACT;SOH-DR3,E5006J,L,IVORY,1	1	SNA	
	0201-001911	ADHESIVE-UV;ZV-102L,WHITE,8200MPA.	0.06	SNA	
	AK97-01860A	ASSY-FPCB,-,SOH-DR4,DVD-RECORDER	1	SNA	
	0202-001221	SOLDER-CREAM;PF305-116HO(A),-,25-4	0.12	SNA	
	0603-001187	PHOTO-RECEIVER;6.0V,17.0mA,650nm,M	1	SNA	
	1404-001328	THERMISTOR-NTC;10Kohm,-,3370K,-,-	1	SNA	
	2203-006158	C-CER,CHIP;100nF,10%,16V,X7R,1005	4	SNA	
	AK32-00004A	SENSOR PHOTO;CNB1001,-25-85,-,-,20	1	SNA	
	AK41-00626A	FPC-MAIN;SOH-DR4,00,POLYAMIDE,-,0.	1	SNA	
	AK61-00723A	PLATE-PD;SOH-DR3.5,Zn,1.2,13.4,7.6	1	SNA	
	AK97-01862A	ASSY-OPT,-,SOH-DR4,DVD-RECORDER	1	SNA	
	0201-001525	ADHESIVE-UV;8840L,YEL,TRANS,23000,	0.03	SNA	
	0201-001709	ADHESIVE-UV;8839L,YEL,24500mPa.s,-	0.02	SNA	
	0201-001819	ADHESIVE-UV;8833M,YELLOW,21000mPas	0.05	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
	AK61-00717A	BASE-PICK UP;SOH-DR4,ZnDC,T12,W37,	1	SNA	
	AK61-00724A	HOLDER-GT;SOH-DR3.5,Zn,T1.6,W5.6,L	1	SNA	
	AK61-00742A	SPRING ETC-DVD GT;SOH-DR4,Cu,-,2.8	1	SNA	
	AK67-00061A	LENS-CL;SOH-DR4,PLS,WHT,6.6,1.7,-,	1	SNA	
	AK67-00055A	LENS-CDL;SOH-DR4,-,CLEAR,R1.9,1.2,	1	SNA	
	AK67-00056A	LENS-ASL;SOH-DR4,-,CLEAR,5.9*5.6,4	1	SNA	
	AK67-00058A	LENS-QWP;SOH-DR4,GLS,WHT,5.5 * 5.0	1	SNA	
	AK67-00060A	LENS-WBS;SOH-DR4,GLS,WHT,5.5 * 3.5	1	SNA	
	AK67-00062A	LENS-MR;SOH-DR4,GLS,WHT,7.0 * 7.4,	1	SNA	
	AK67-00063A	LENS-PBS;SOH-DR4,GLS,WHT,4.0 * 8.7	1	SNA	
	AK67-00036A	LENS-DVD GT;SOH-DR3,GLS,WHT,2.5*3.	1	SNA	
	AK67-00059A	LENS-CD GT;SOH-DR4,GLS,WHT,2.0 * 2	1	SNA	
	0602-001152	DIODE-LASER;5mW,2V/30V,790nm,OPEN	1	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
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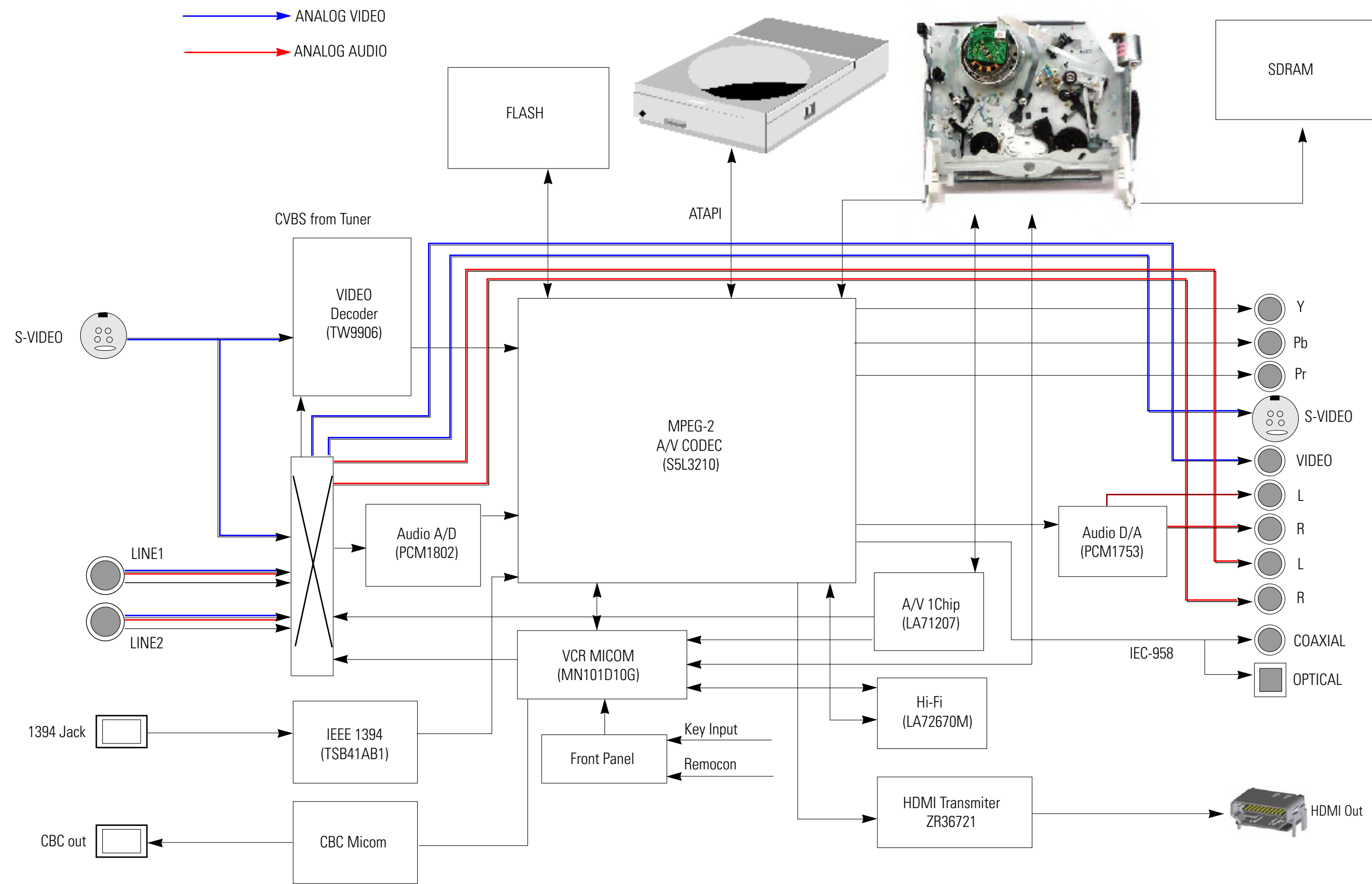
FL672	3809-001856	FFC CABLE-FLAT;30V,80C,180mm,40P,0	1	SA	
P030	3103-001171	FAN-DC;DC 12.0V,180mA,2500rpm,0.15	1	SA	
W001	6003-000275	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(	11	SA	
W009	6003-000276	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(	4	SA	
W200	6003-001375	SCREW-TAPTITE;BH,+,-,B,M3,L8,ZPC(W	2	SA	
W202	6003-000277	SCREW-TAPTITE;BH,+,-,B,M3,L12,ZPC(	2	SA	
W252	AC60-12126A	SCREW-MACHINE;TH,+,-,M4,L12,ZPC(WH	4	SC	
W268	6003-000254	SCREW-TAPTITE;BH,+,-,S,M3,L6,ZPC(W	1	SA	
W272	6003-001464	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(WH	3	SA	
W275	6003-001561	SCREW-TAPTITE;BH,+,-,B,M3,L6,ZPC(W	5	SA	
W344	6003-001076	SCREW-TAPTITE;BH,+,-,S,M3,L6,ZPC(B	1	SA	
	AC39-00073A	CABLE-RCA;SJ01-08-099,1.2MT,3P,A/V	1	SA	
	AC39-42001J	CABLE-RF ASSY;-,-,#1365,1200mm,3A,	1	SA	
	AK68-01344B	MANUAL USERS;DVD-VR350,XAX,SPA,-,M	1	SA	
	AK69-00508G	PACKING CASE;DVD-VR350/XAX,PEPER,S	1	SA	
	AK61-00310A	BRACKET-FRAME;DVD-VR300,SECC,T1.2,	1	SA	

MEMO

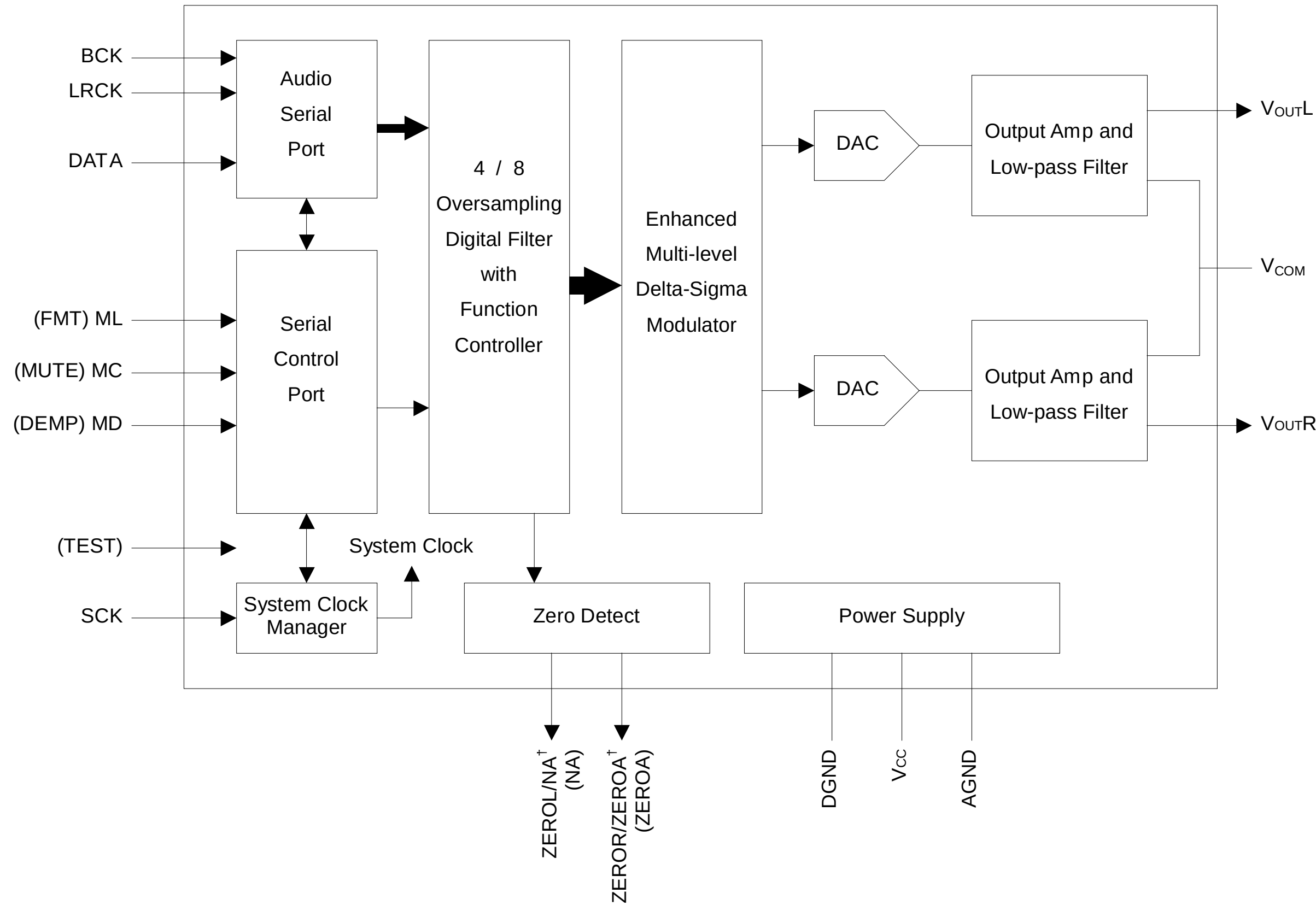
9. Block Diagrams

9-1 All Block Diagram (DVD-VR357) - - - - -	9-2
9-2 AIC1 (PCM1753) Audio DA Block Diagram - - - - -	9-3
9-3 AIC9 (PCM1802) Audio AD Block Diagram - - - - -	9-4
9-4 DIC1 (S5L3200) A/V Codec Block Diagram - - - - -	9-5
9-5 DIC3 (29DL323) Flash MEM Block Diagram - - - - -	9-6
9-6 IC301 (LA71207) A/V 1Chip Block Diagram - - - - -	9-7
9-7 IC501 (LA71607M) Hi-Fi Block Diagram - - - - -	9-8
9-8 TIC1 (TW9906) Video Decoder Block Diagram - - - - -	9-9
9-9 U3,U4 (HY5DU281622ETP-J) Dram Block Diagram - - - - -	9-10

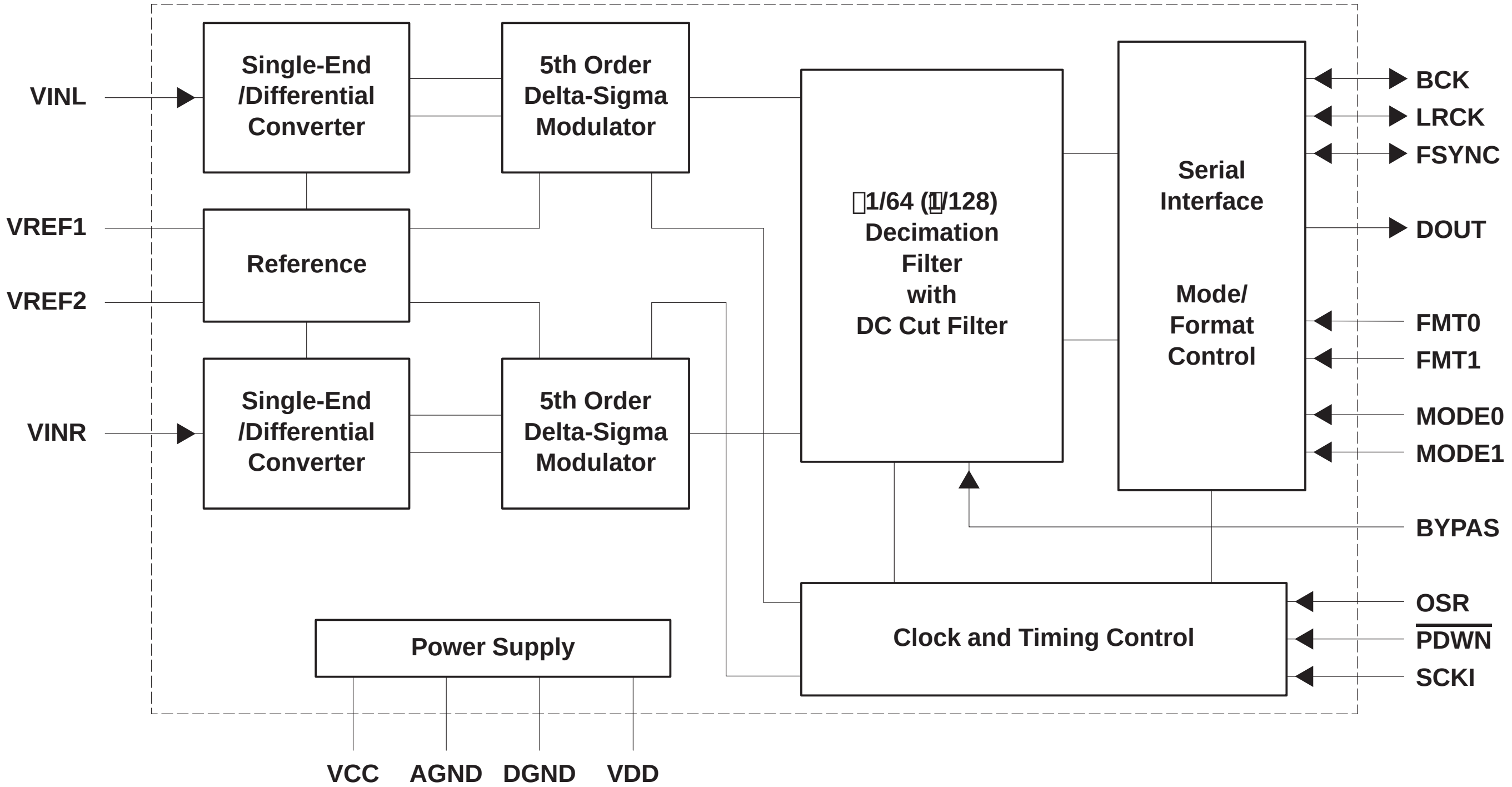
9-1 All Block Diagram (DVD-VR357)



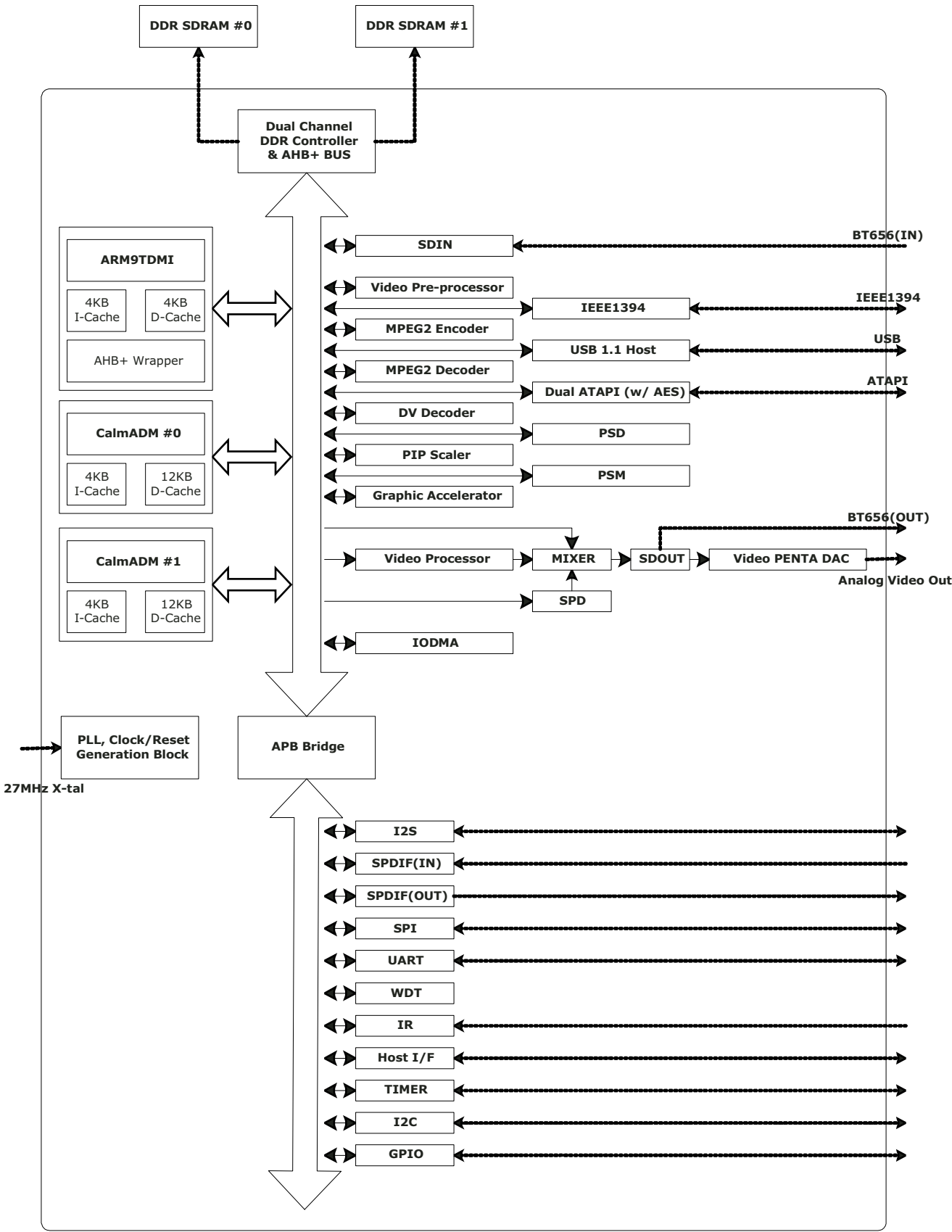
9-2 AIC1 (PCM1753) Audio DA Block Diagram



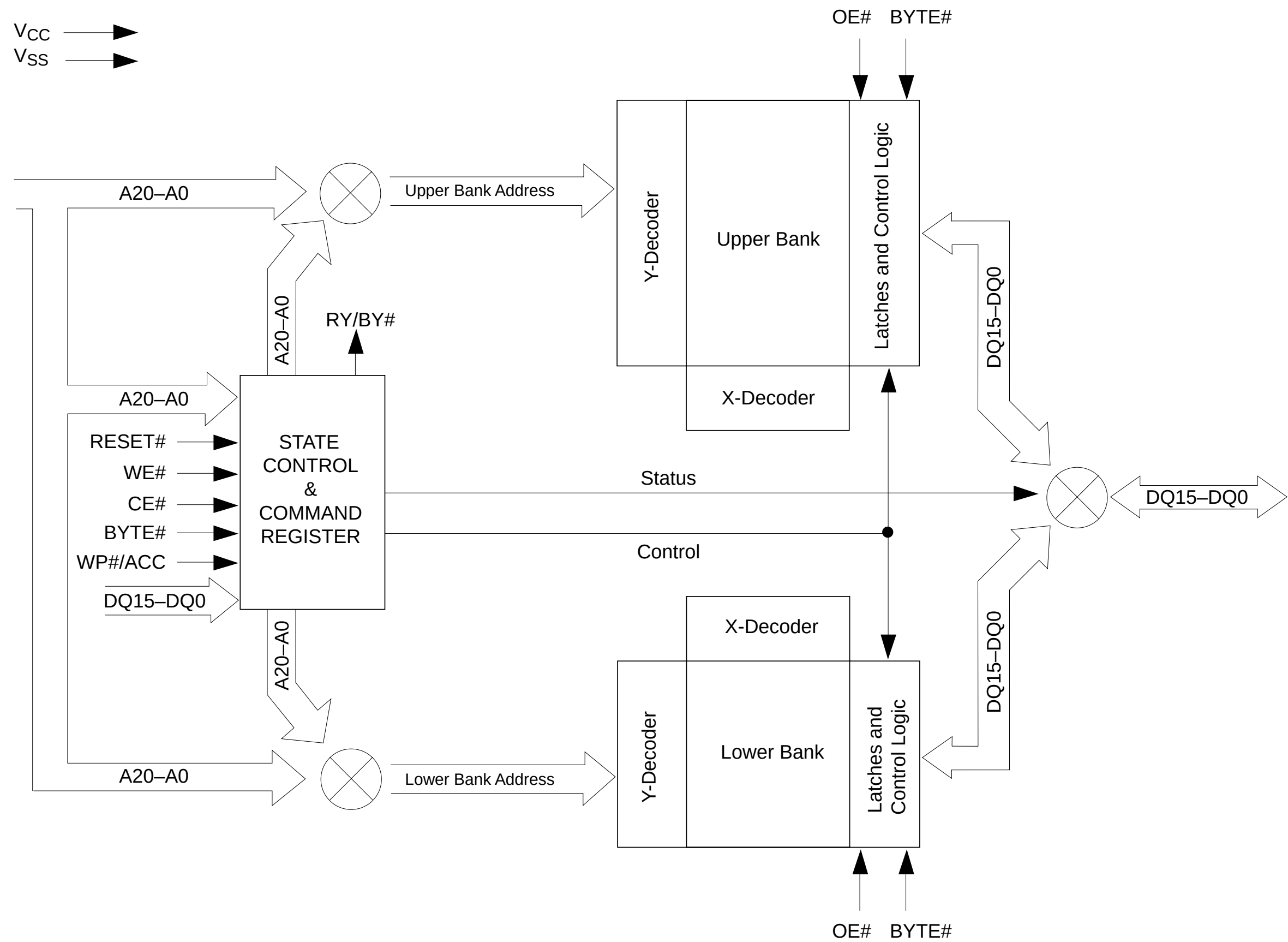
9-3 AIC9 (PCM1802) Audio AD Block Diagram

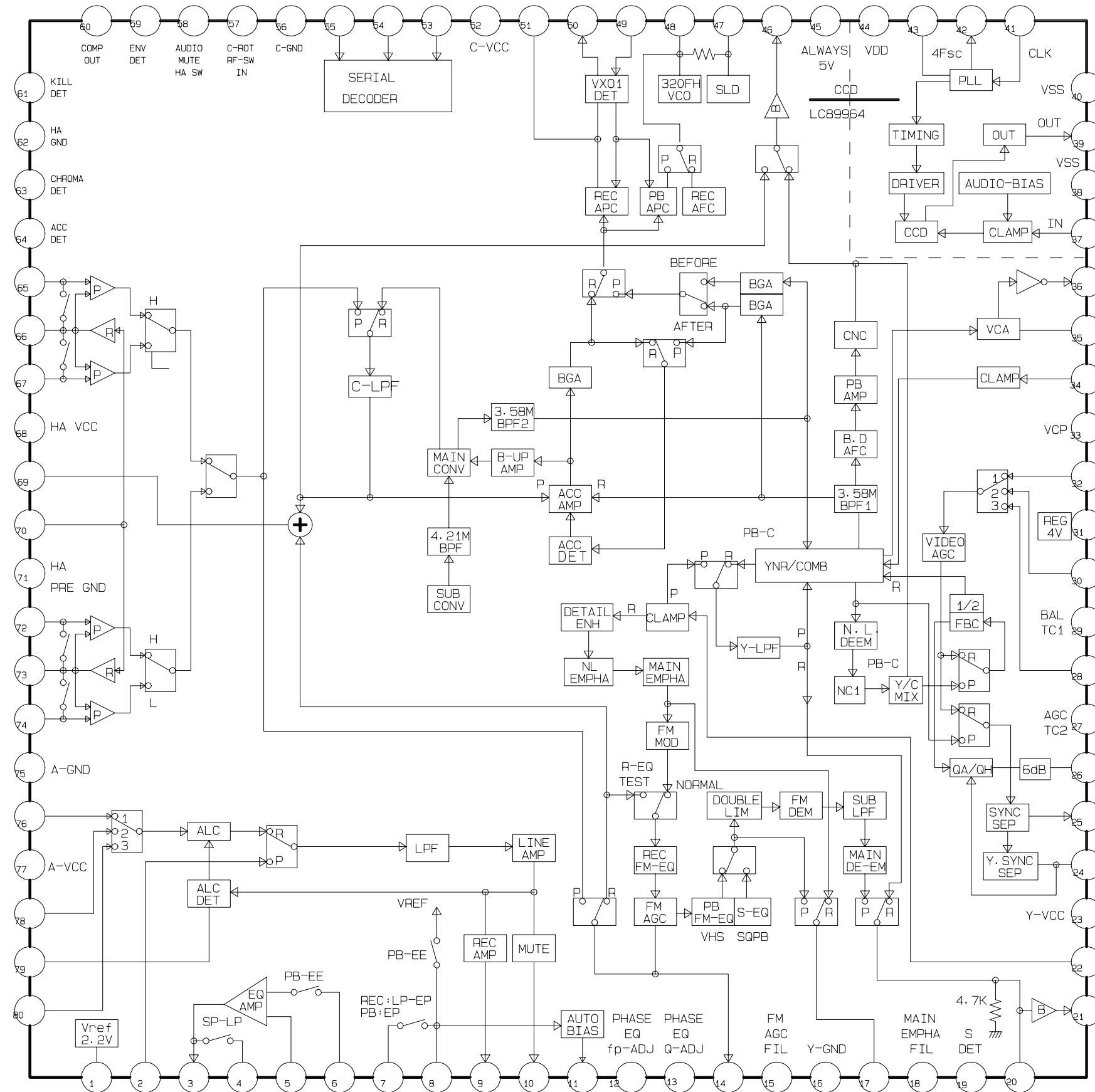


9-4 DIC1 (S5L3200) A/V Codec Block Diagram

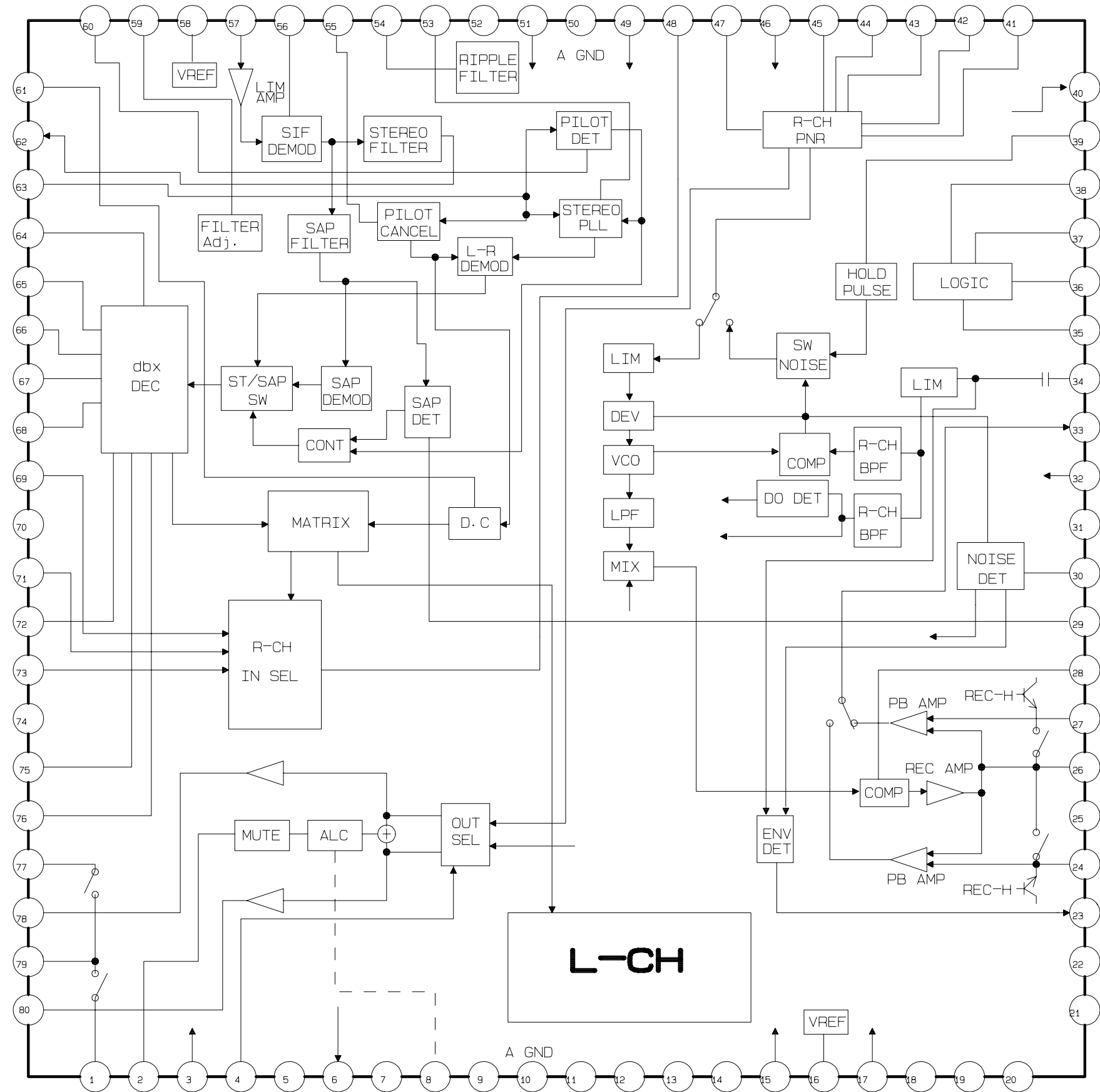


9-5 DIC3 (29DL323) Flash MEM Block Diagram

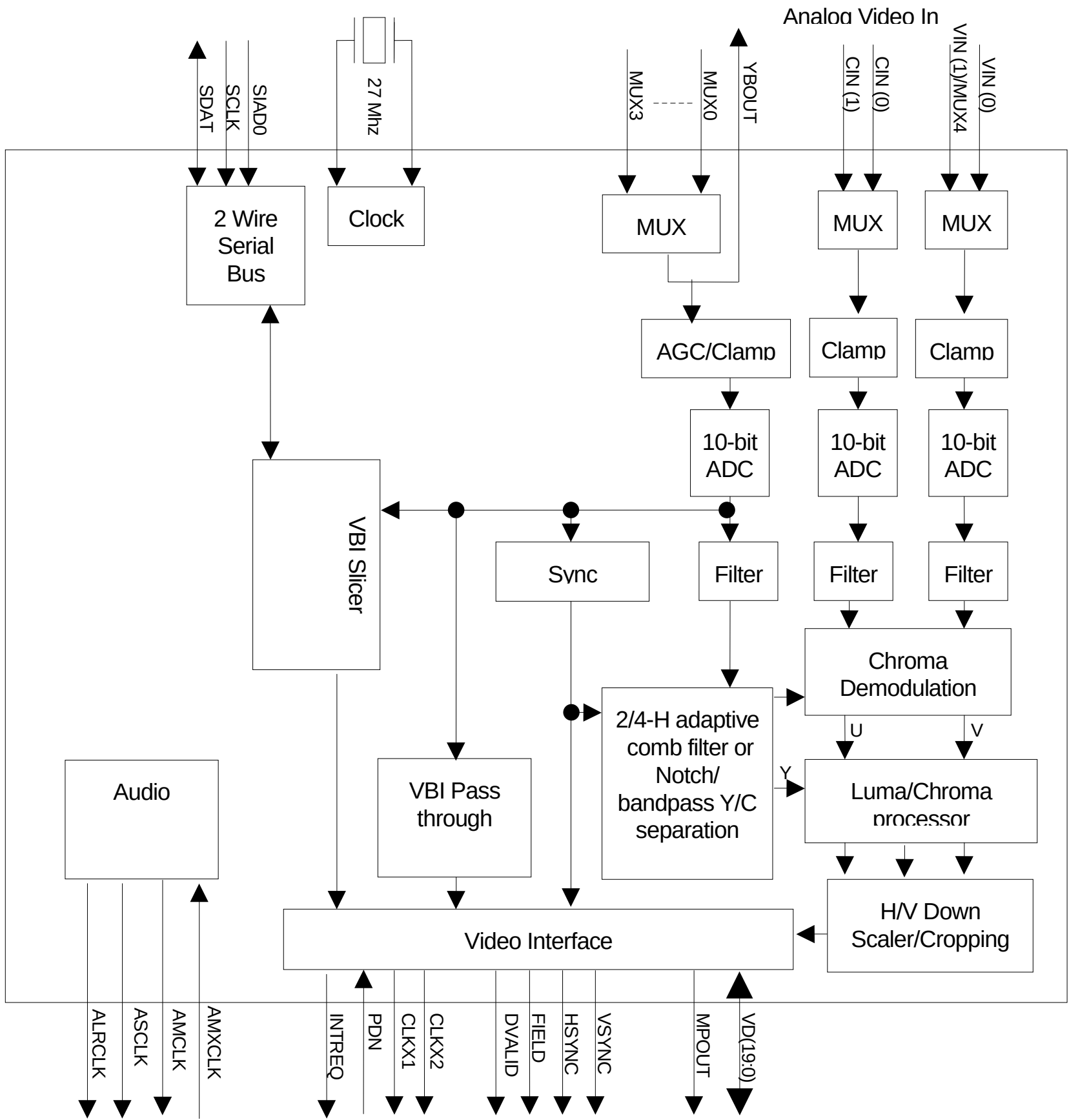




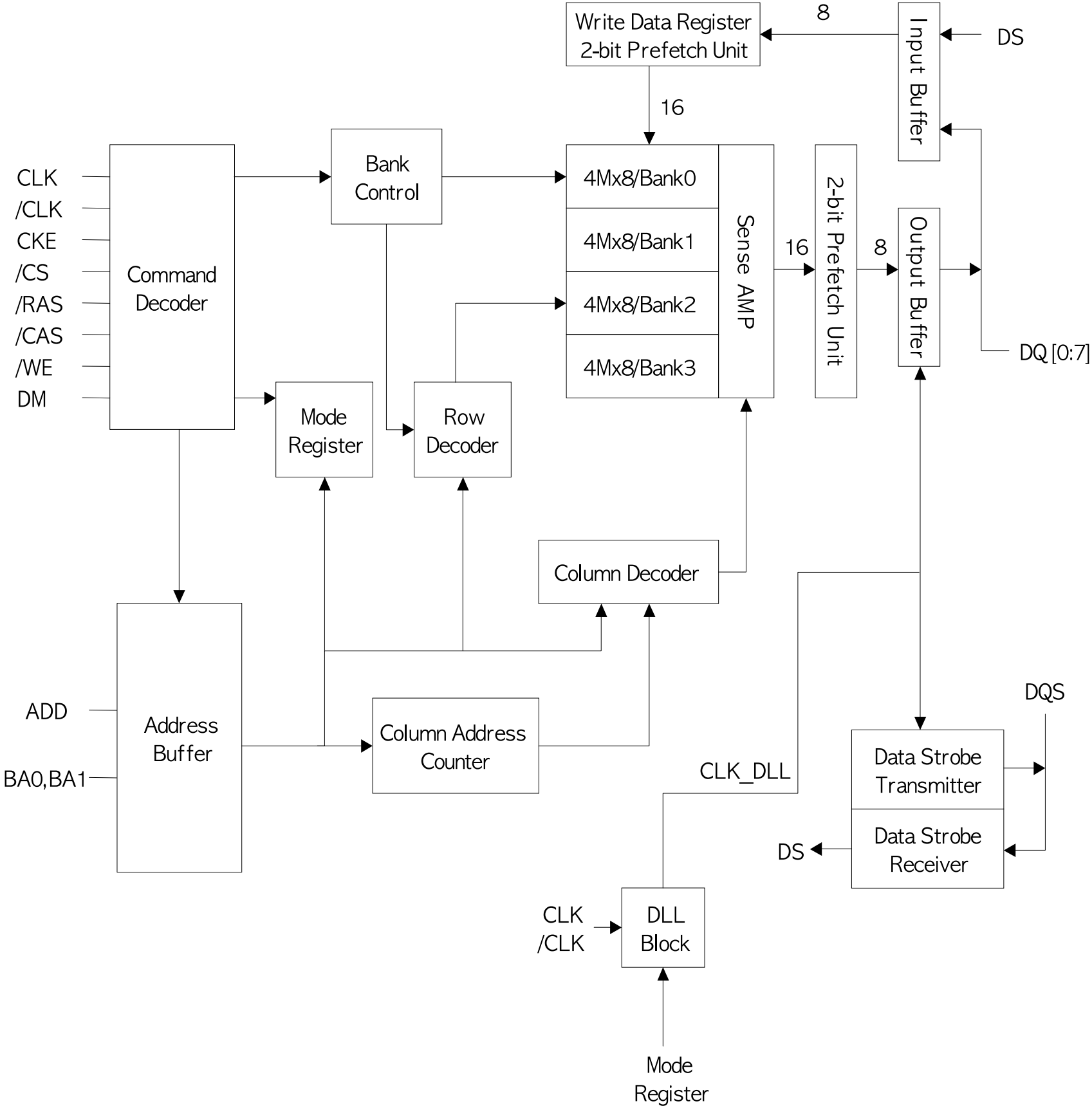
9-7 IC501 (LA71607M) Hi-Fi Block Diagram



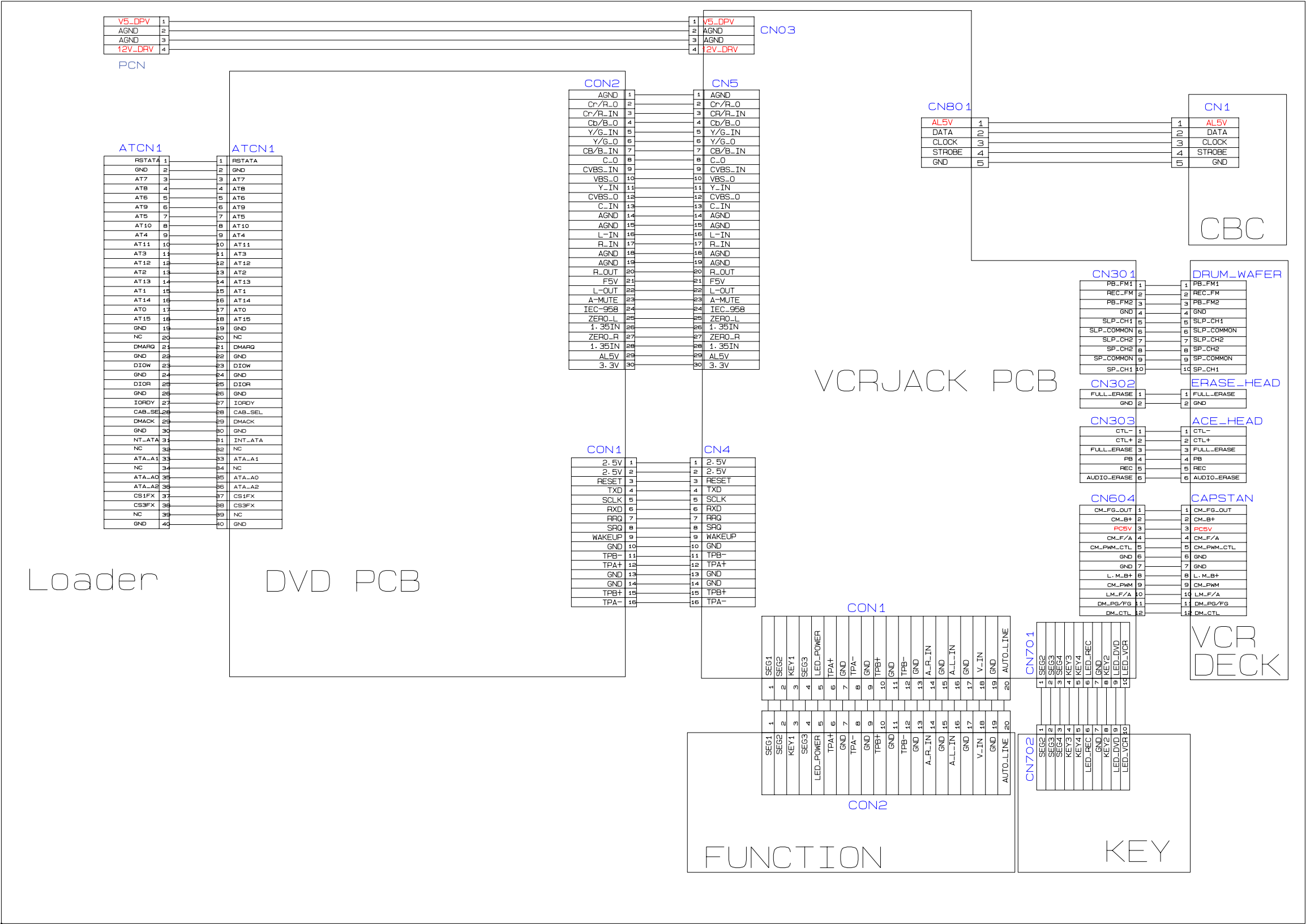
9-8 TIC1 (TW9906) Video Decoder Block Diagram



9-9 U3,U4 (HY5DU281622ETP-J) Dram Block Diagram



10. Wiring Diagram



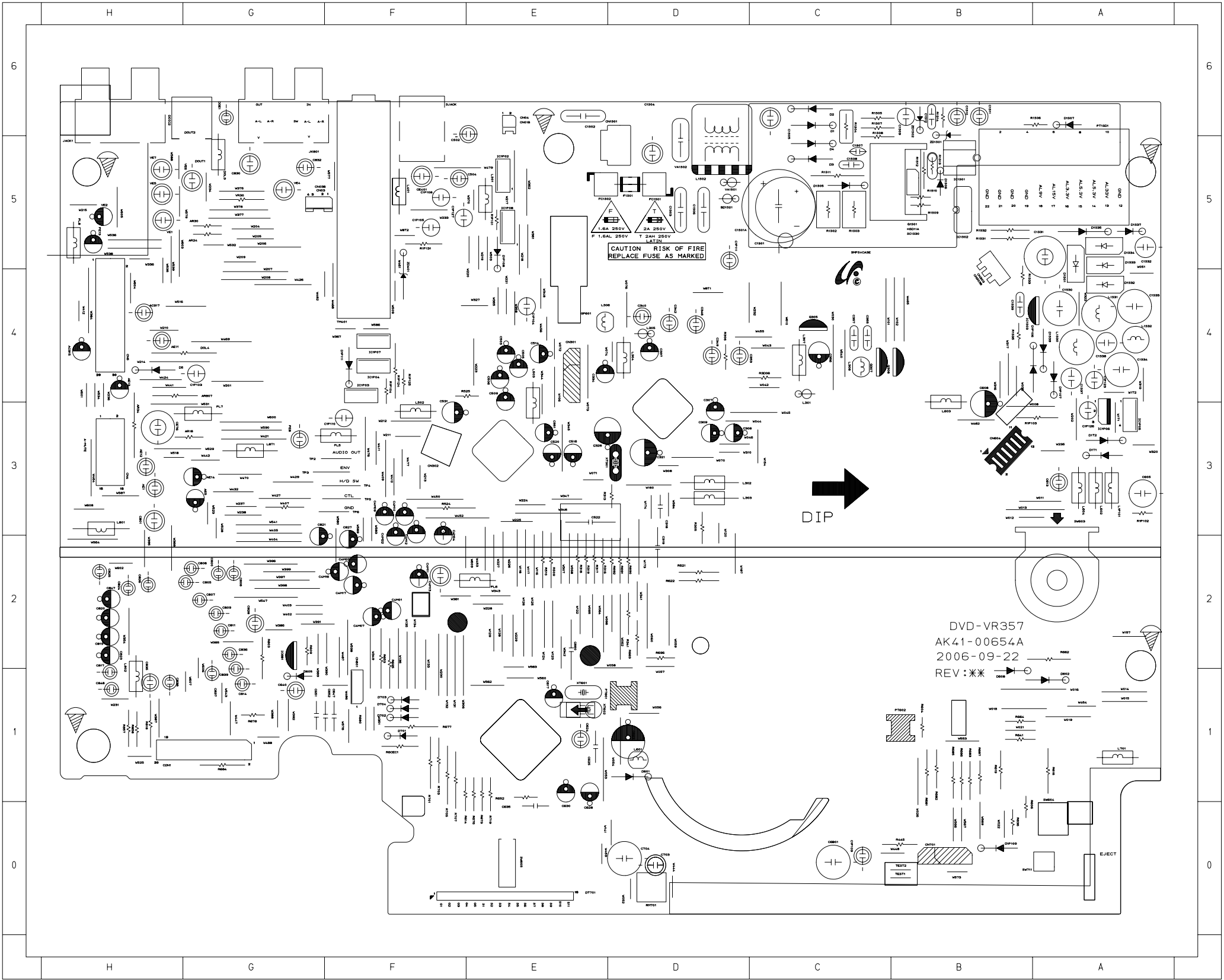
MEMO

11. PCB Diagrams

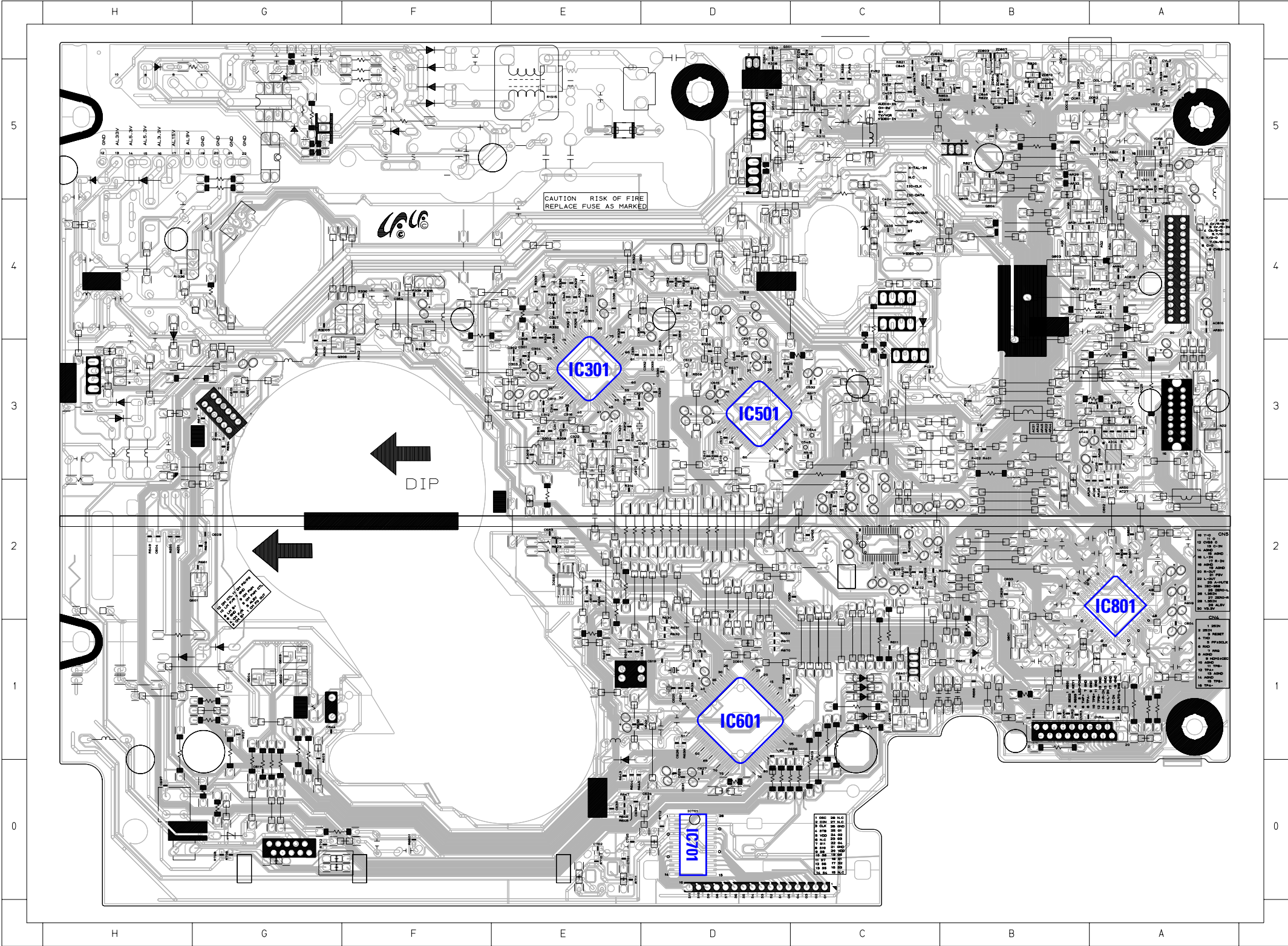
11-1 VCR Jack PCB - - - - -	11-2
11-2 DVD Main PCB - - - - -	11-4
11-3 Key PCB - - - - -	11-8
11-4 Front AV PCB - - - - -	11-9
11-5 CBC PCB- - - - -	11-10

11-1 VCR Jack PCB

COMPONENT SIDE



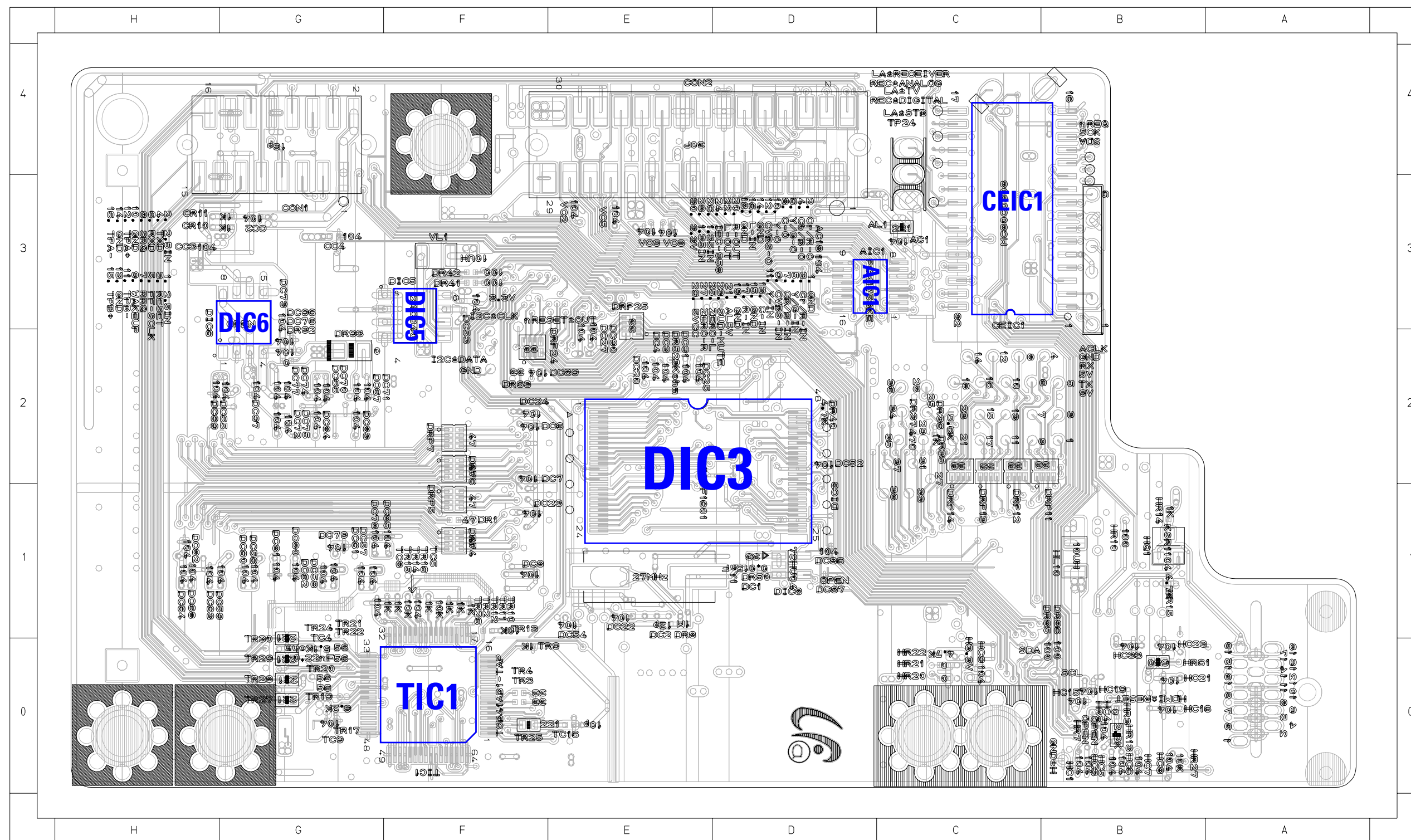
CONDUCTOR SIDE

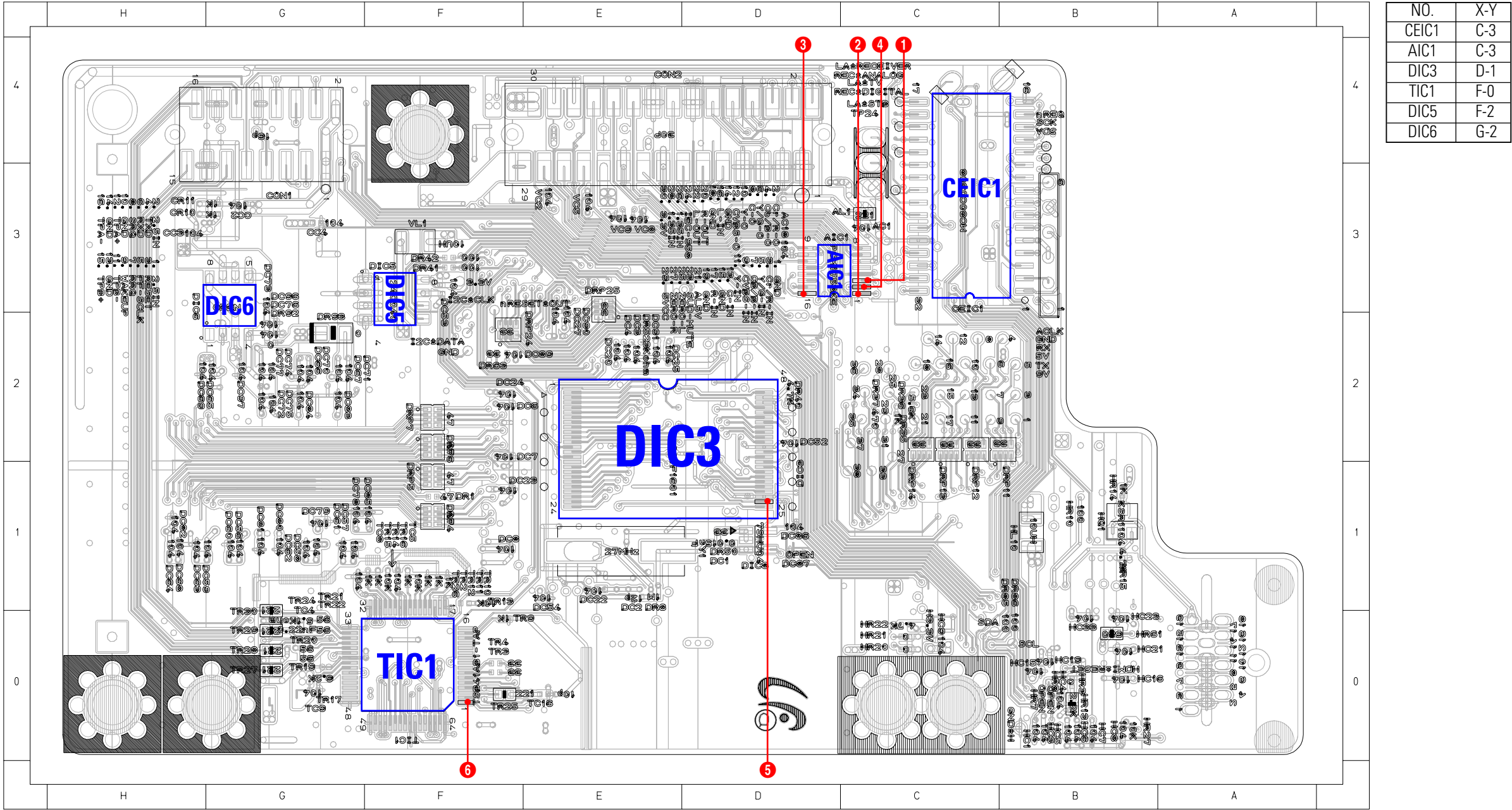


NO.	X-Y
IC801	A-2
IC701	D-0
IC601	D-1
IC501	D-3
IC301	E-3

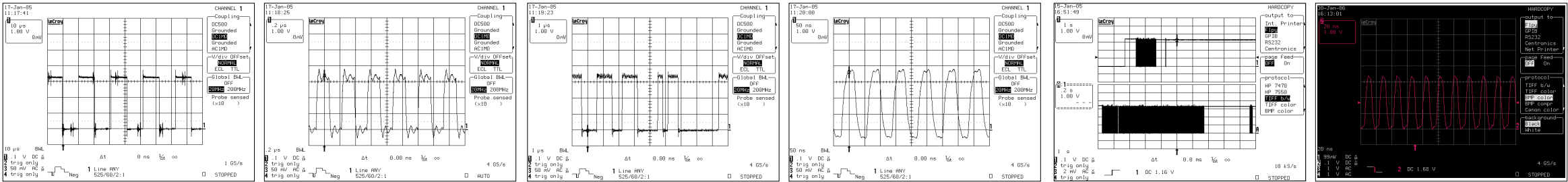
11-4

Samsung Electronics





NO.	X-Y
CEIC1	C-3
AIC1	C-3
DIC3	D-1
TIC1	F-0
DIC5	F-2
DIC6	G-2



1 I2S_LRCK(116)

2 I2S_BCK(117)

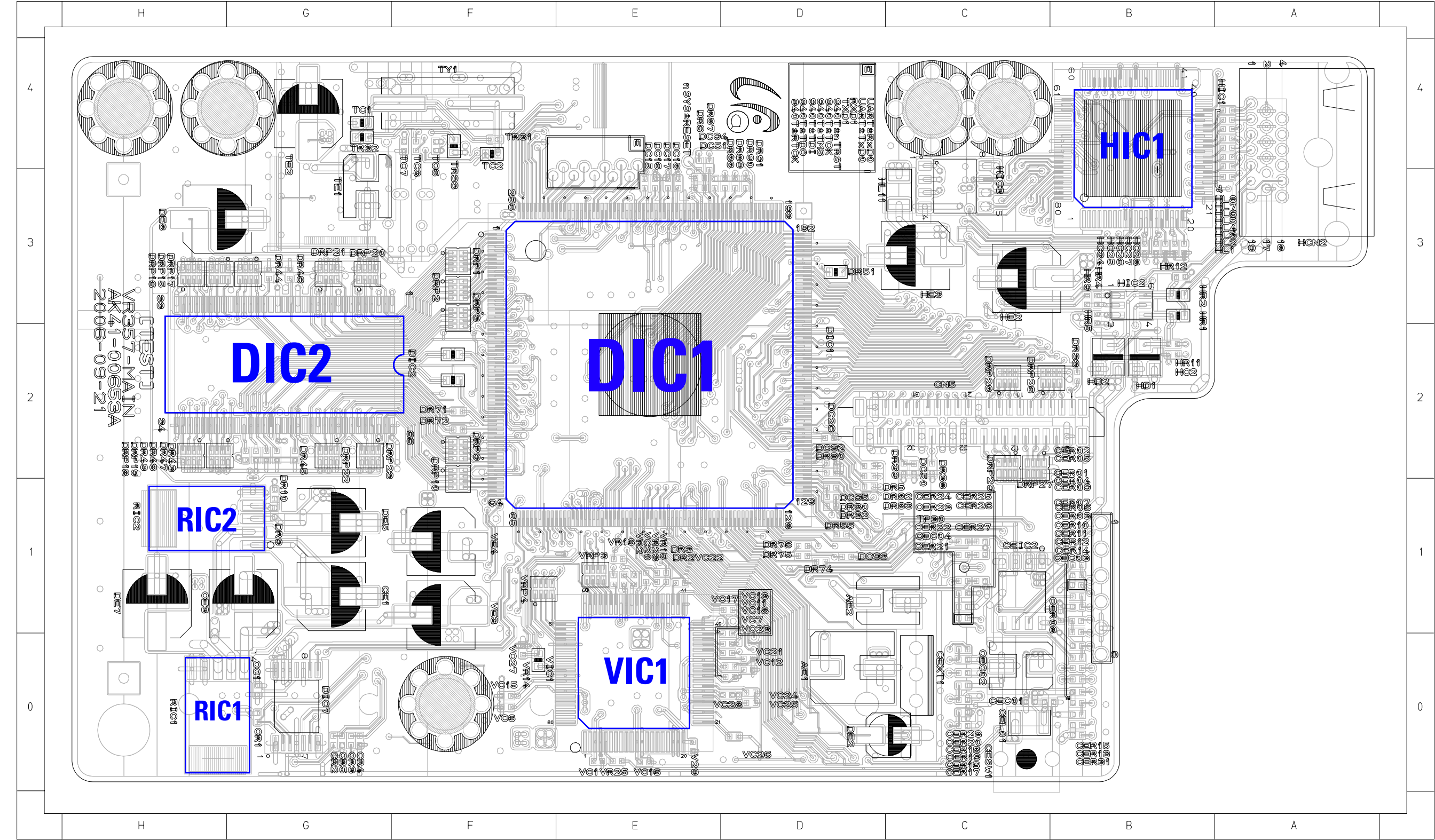
3 I2S_MCK

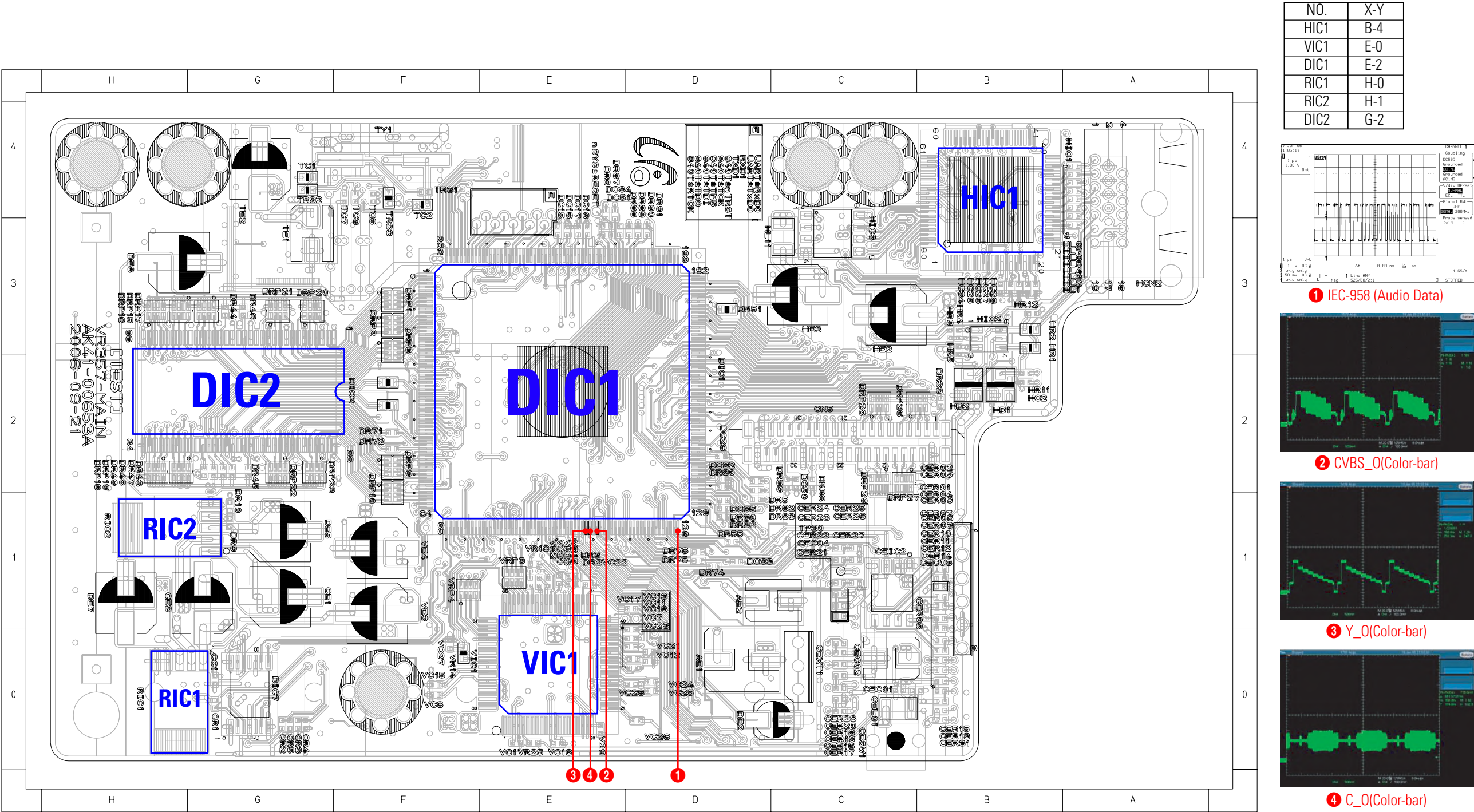
4 I2S_D00(119)

5 nSCS0(DIC3-Pin26)

6 1394_SCLK

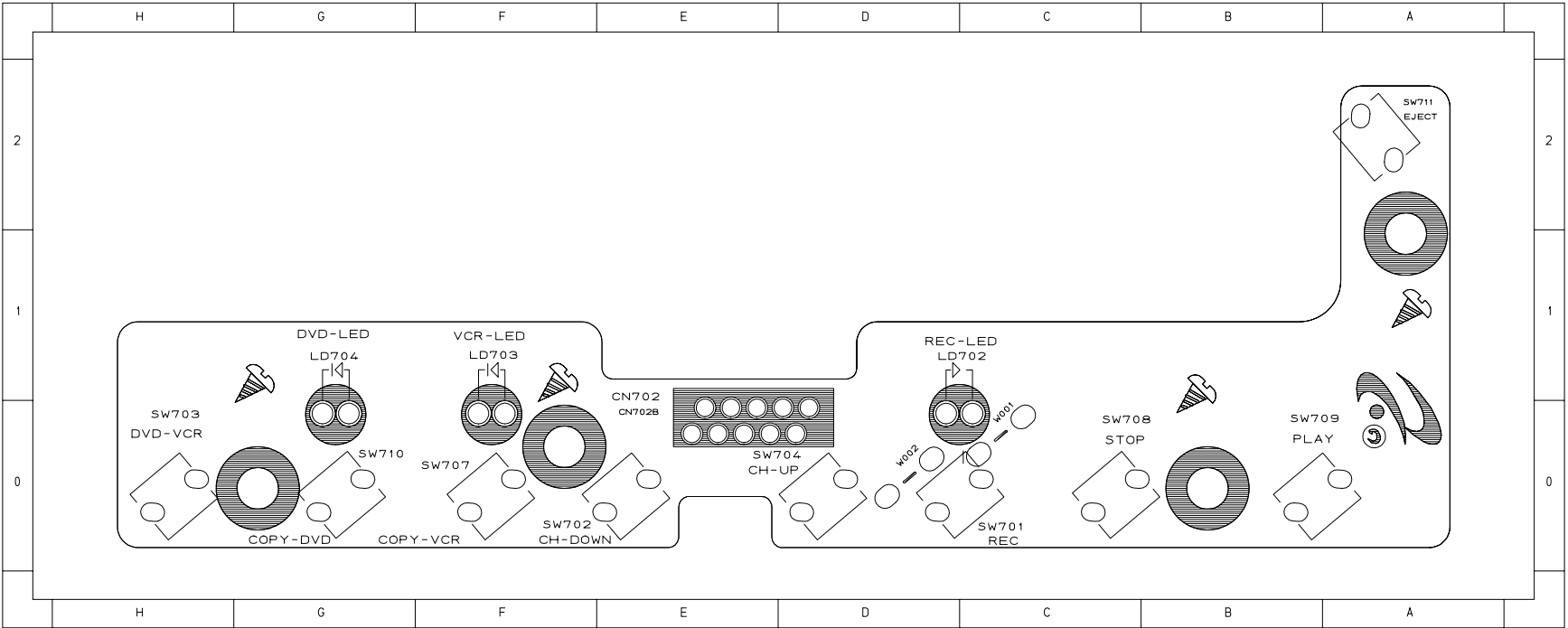
CONDUCTOR SIDE



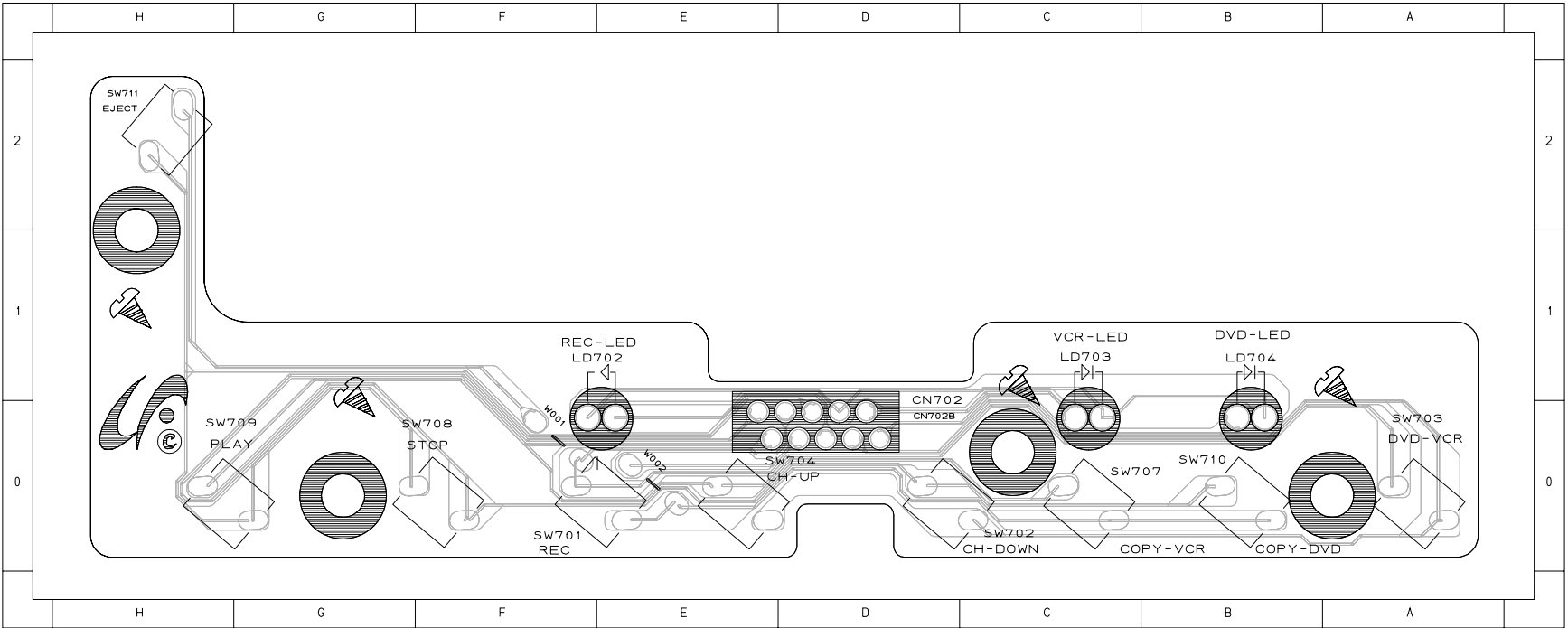


11-3 Key PCB

COMPONENT SIDE

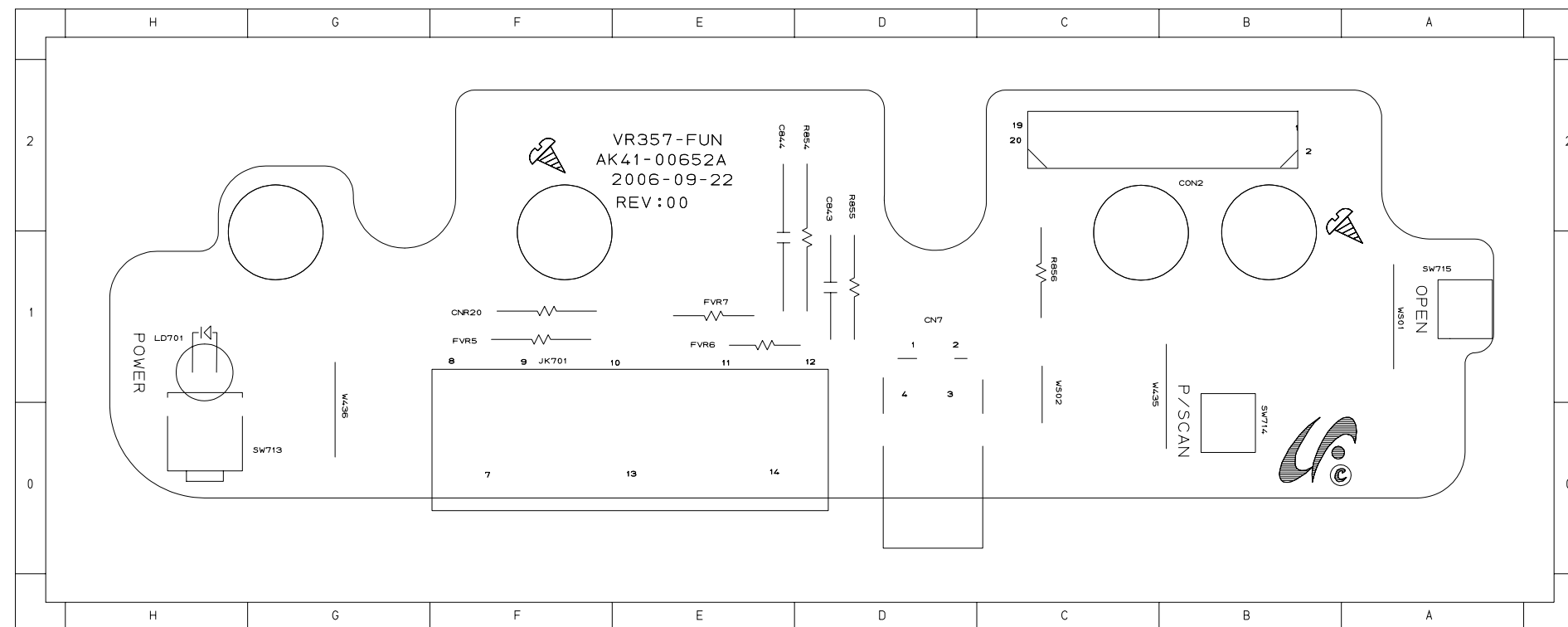


CONDUCTOR SIDE

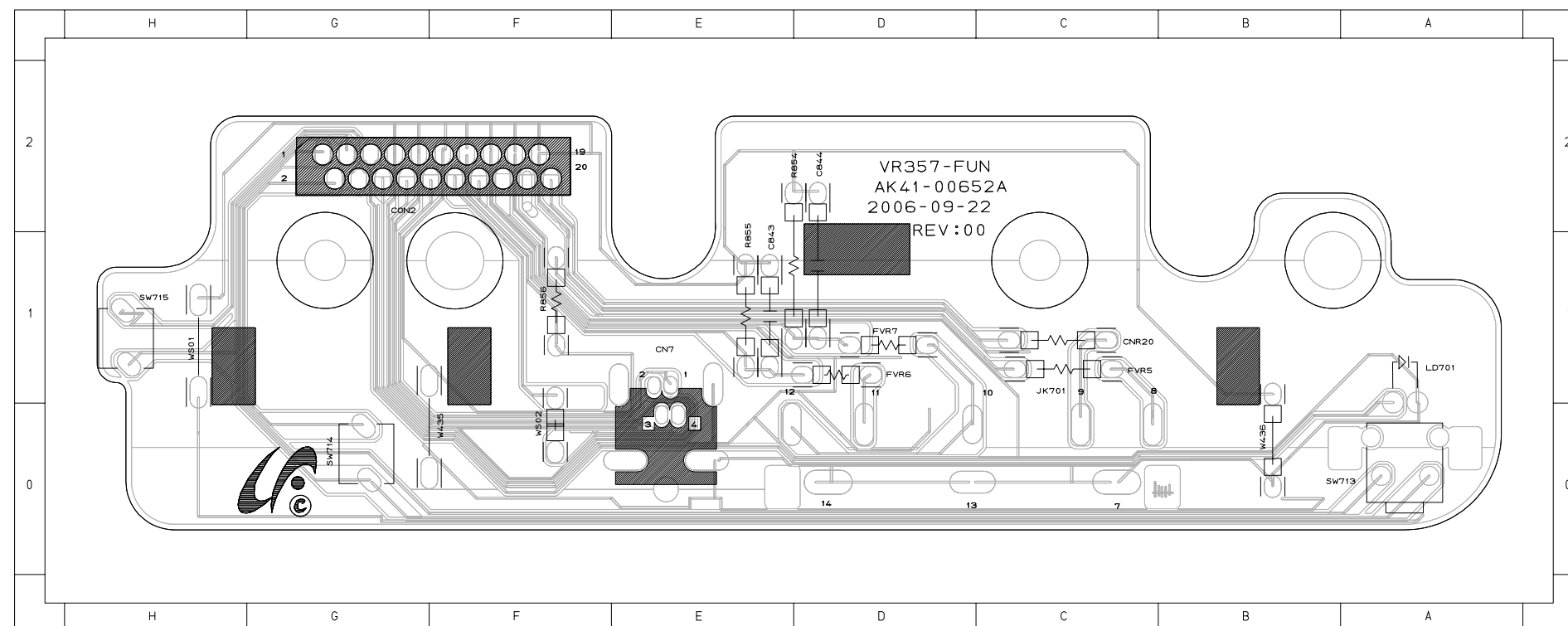


11-4 Front AV PCB

COMPONENT SIDE

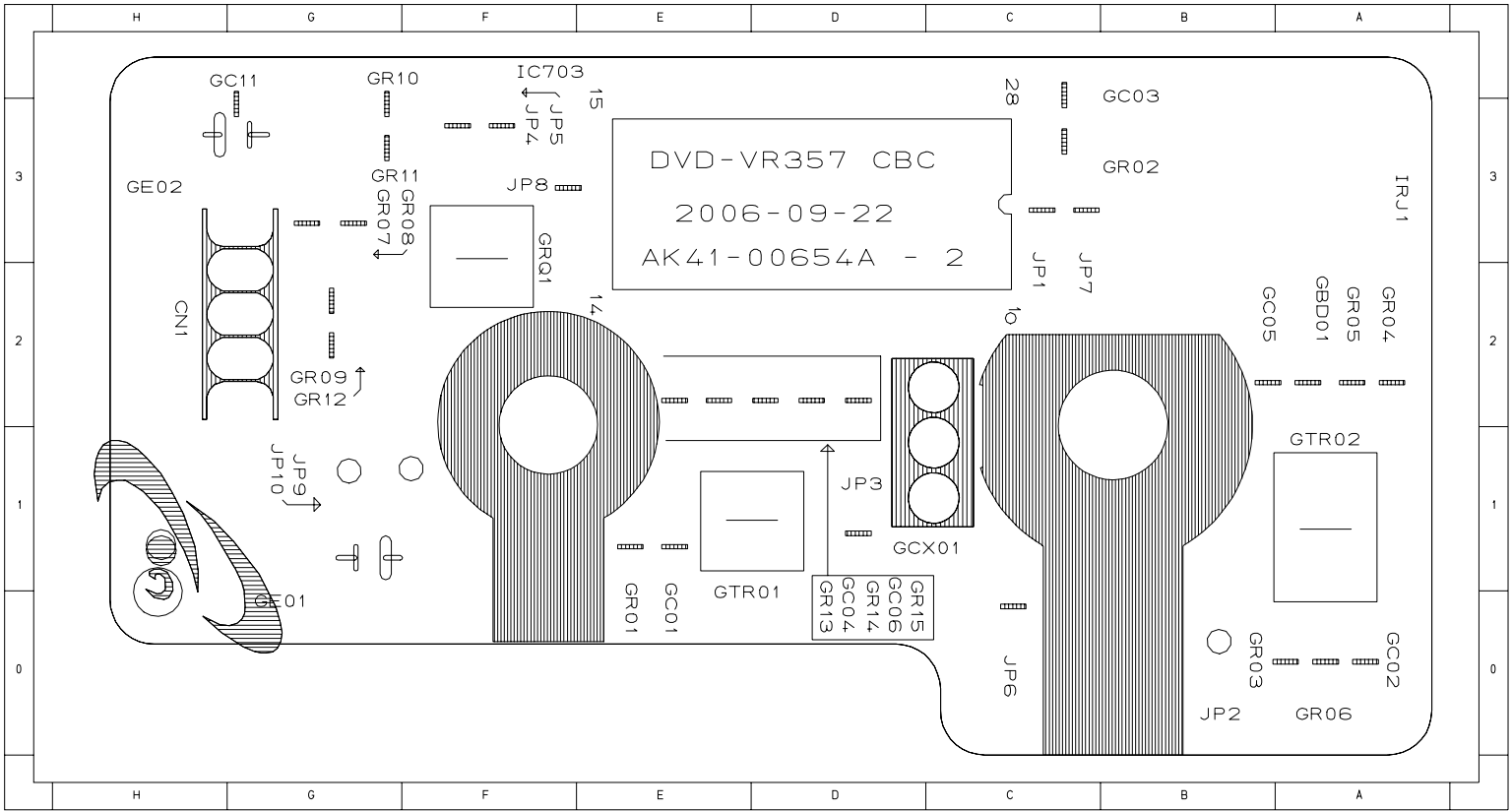


CONDUCTOR SIDE

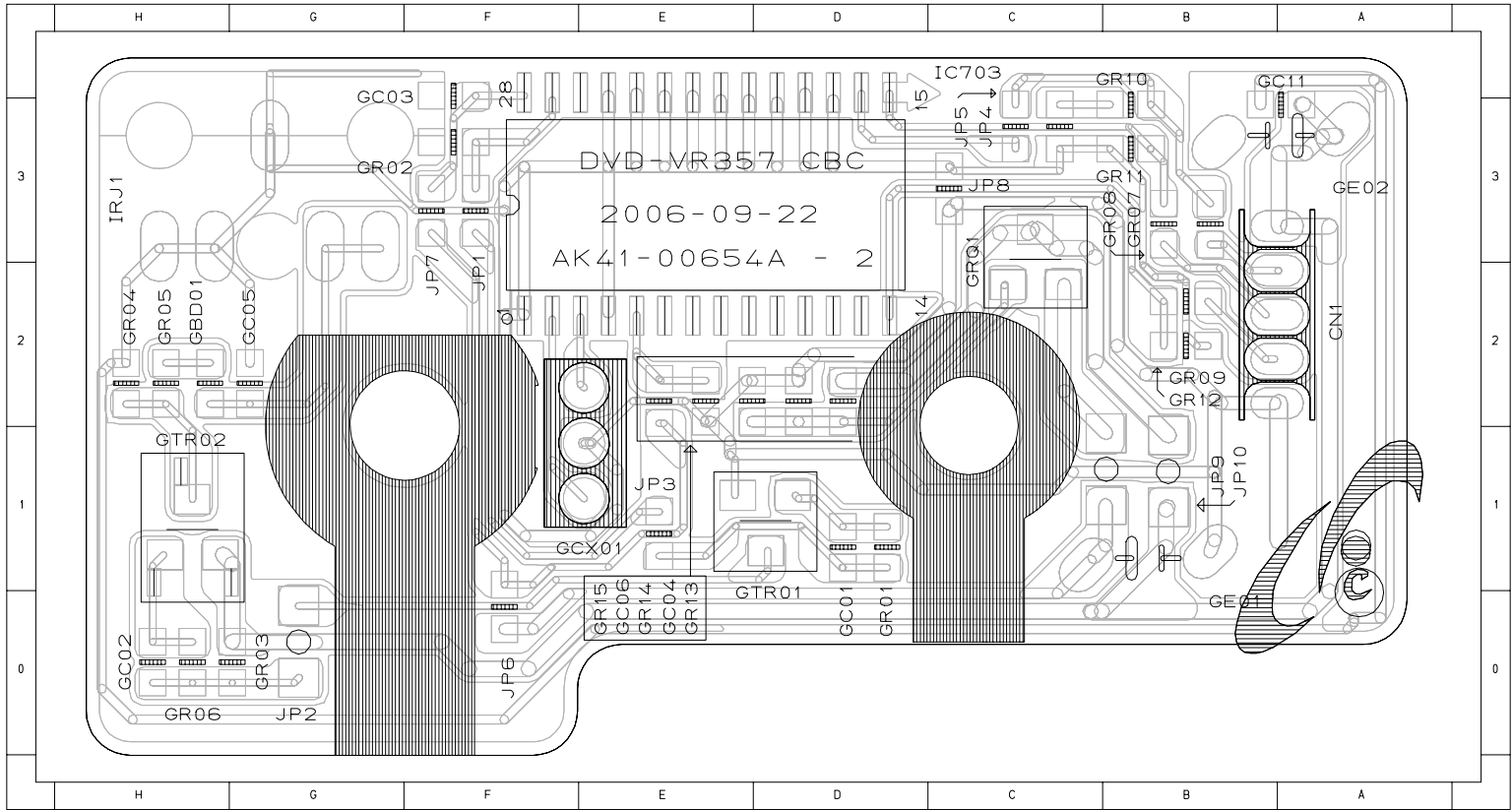


11-5 CBC PCB

COMPONENT SIDE



CONDUCTOR SIDE



12. Schematic Diagrams

◆ Block Identification of Jack PCB - - - - -	12-2
12-1 S.M.P.S (VCR-Jack PCB) - - - - -	12-3
12-2 Power (VCR-Jack PCB)- - - - -	12-4
12-3 Logic (VCR-Jack PCB) - - - - -	12-5
12-4 AV (VCR-Jack PCB) - - - - -	12-6
12-5 Hi-Fi (VCR-Jack PCB) - - - - -	12-7
12-6 MUX_MTS_TM_JACK (VCR-Jack PCB) - - - - -	12-8
12-7 CODEC (DVD Main PCB) - - - - -	12-9
12-8 AV (DVD Main PCB) - - - - -	12-10
12-9 ATAPI_Flash (DVD Main PCB) - - - - -	12-11
12-10 DDR (DVD Main PCB) - - - - -	12-12
12-11 DV_1394 (DVD Main PCB) - - - - -	12-13
12-12 Audio (DVD Main PCB) - - - - -	12-14
12-13 Main Connector (DVD Main PCB) - - - - -	12-15
12-14 Video Decoder (DVD Main PCB) - - - - -	12-16
12-15 HDMI (DVD Main PCB) - - - - -	12-17
12-16 HDMI CEC (DVD Main PCB) - - - - -	12-18
12-17 AV Out (DVD Main PCB) - - - - -	12-19
12-18 Front (Function PCB)- - - - -	12-20
12-19 Key (Key PCB) - - - - -	12-21
12-20 CBC (CBC PCB) - - - - -	12-22

Note

For schematic Diagram
- Resistors are in ohms, 1/8W unless otherwise noted.

Special note :

Most semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

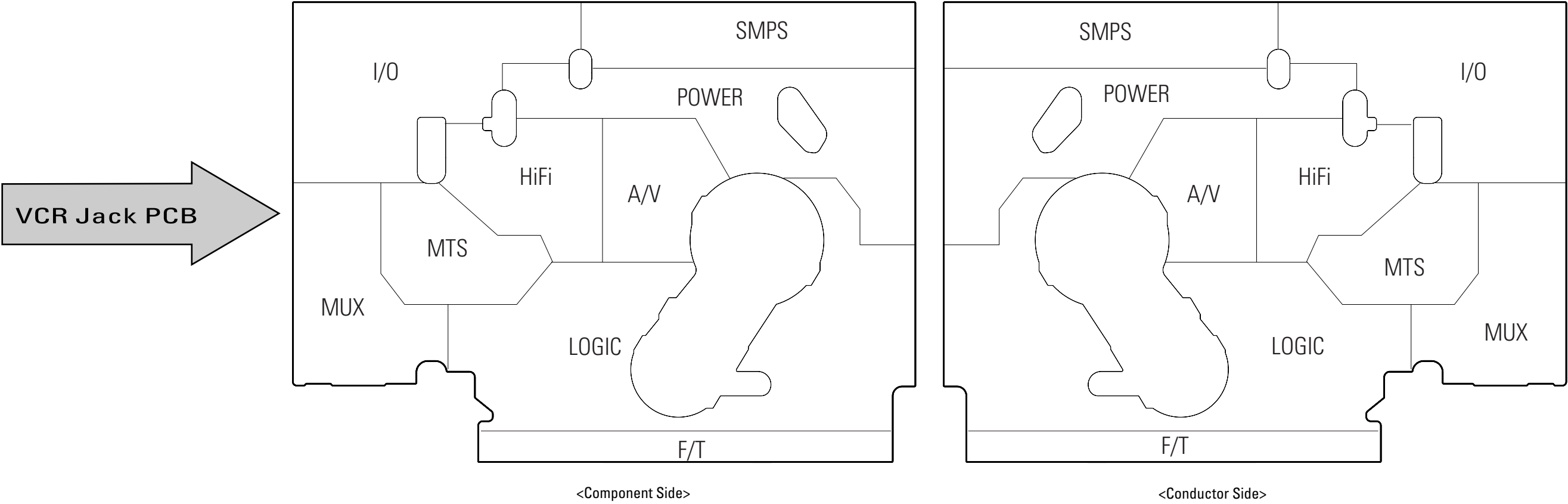
Note :

Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list (may be slightly different or amended since this drawing was prepared).

Important safety notices :

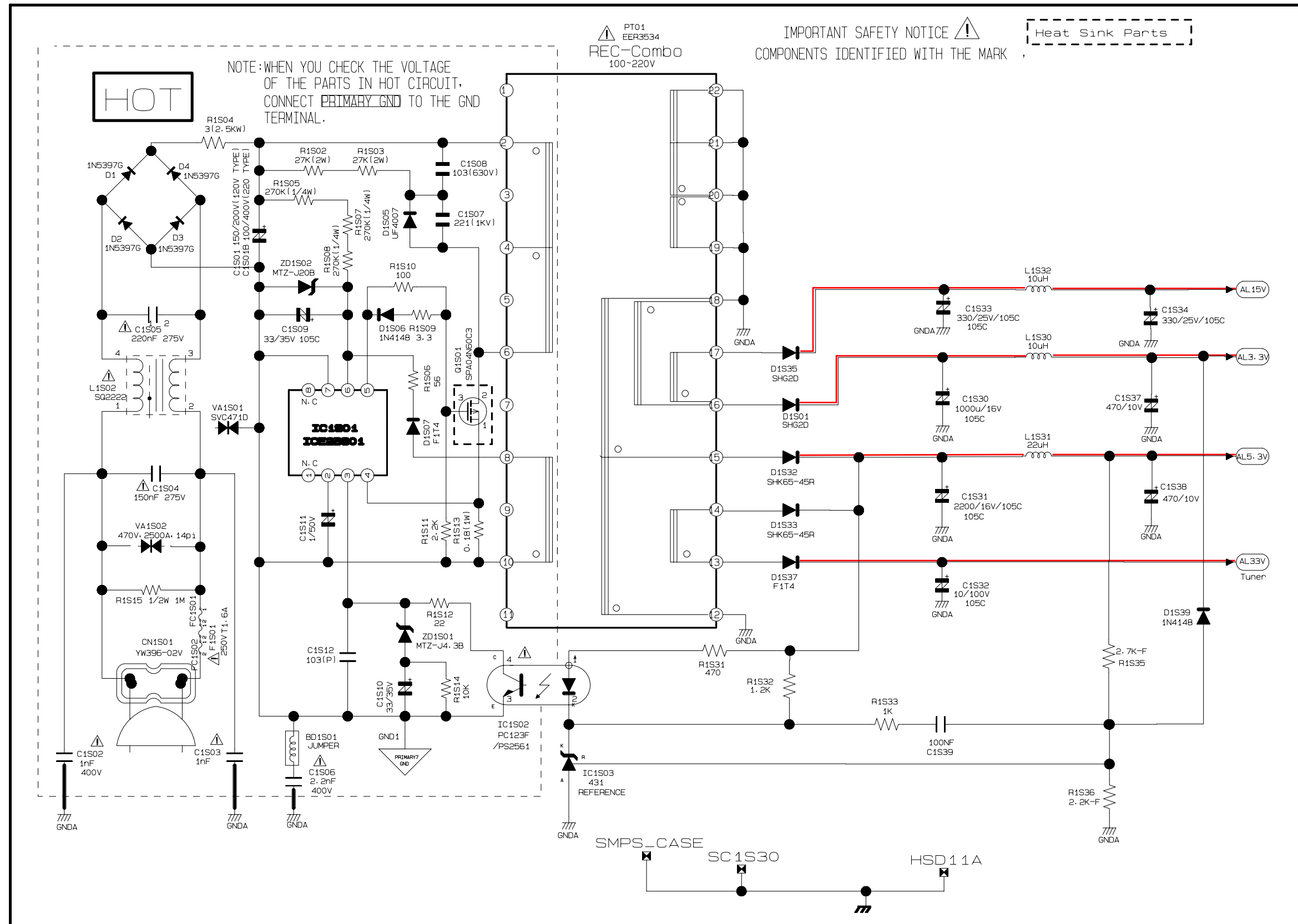
Components identified with the mark  have the special characteristics for safety. When replacing any of these components. Use only the same type.

◆ Block Identification of Jack PCB

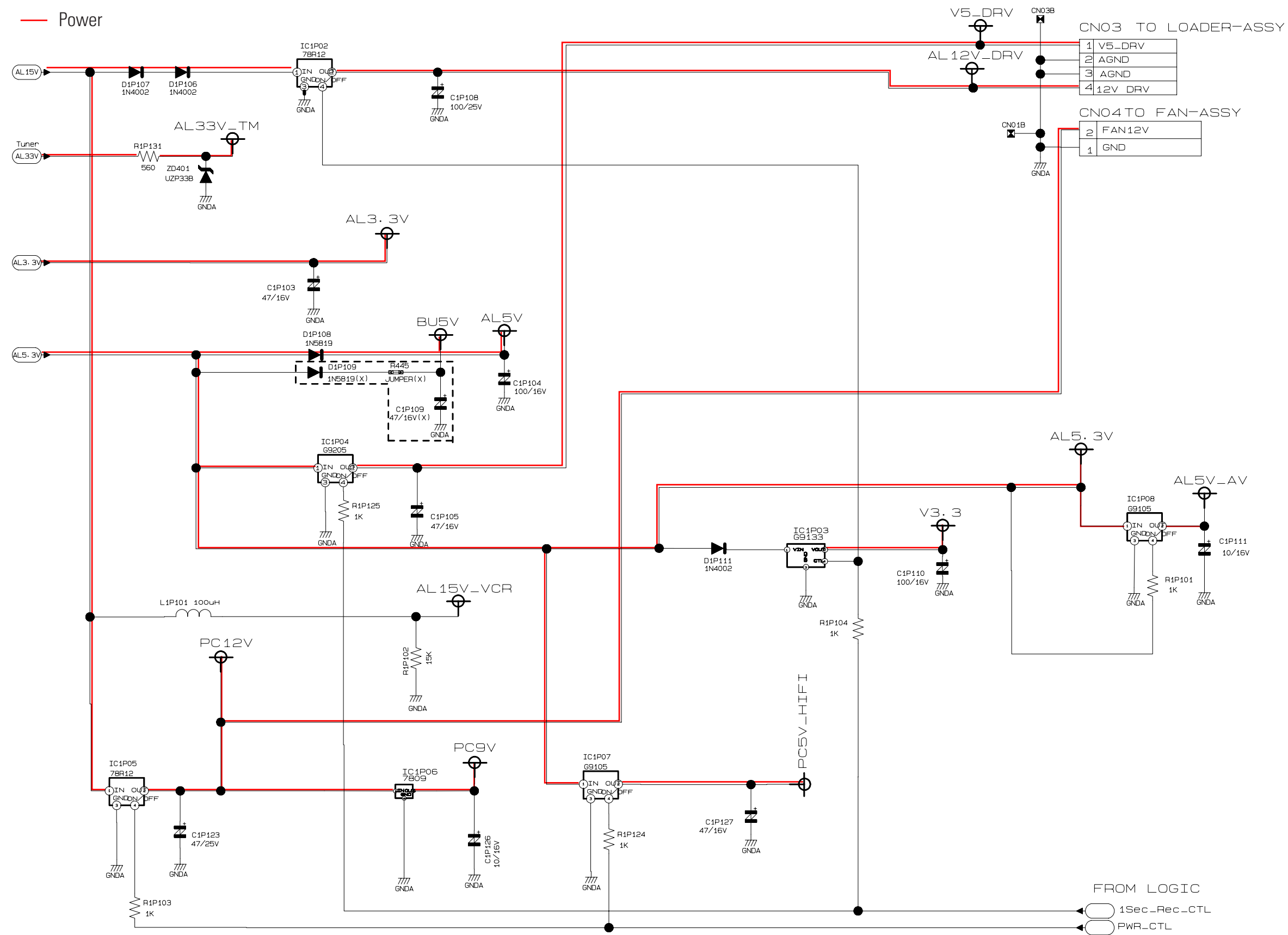


12-1 S.M.P.S (VCR-Jack PCB)

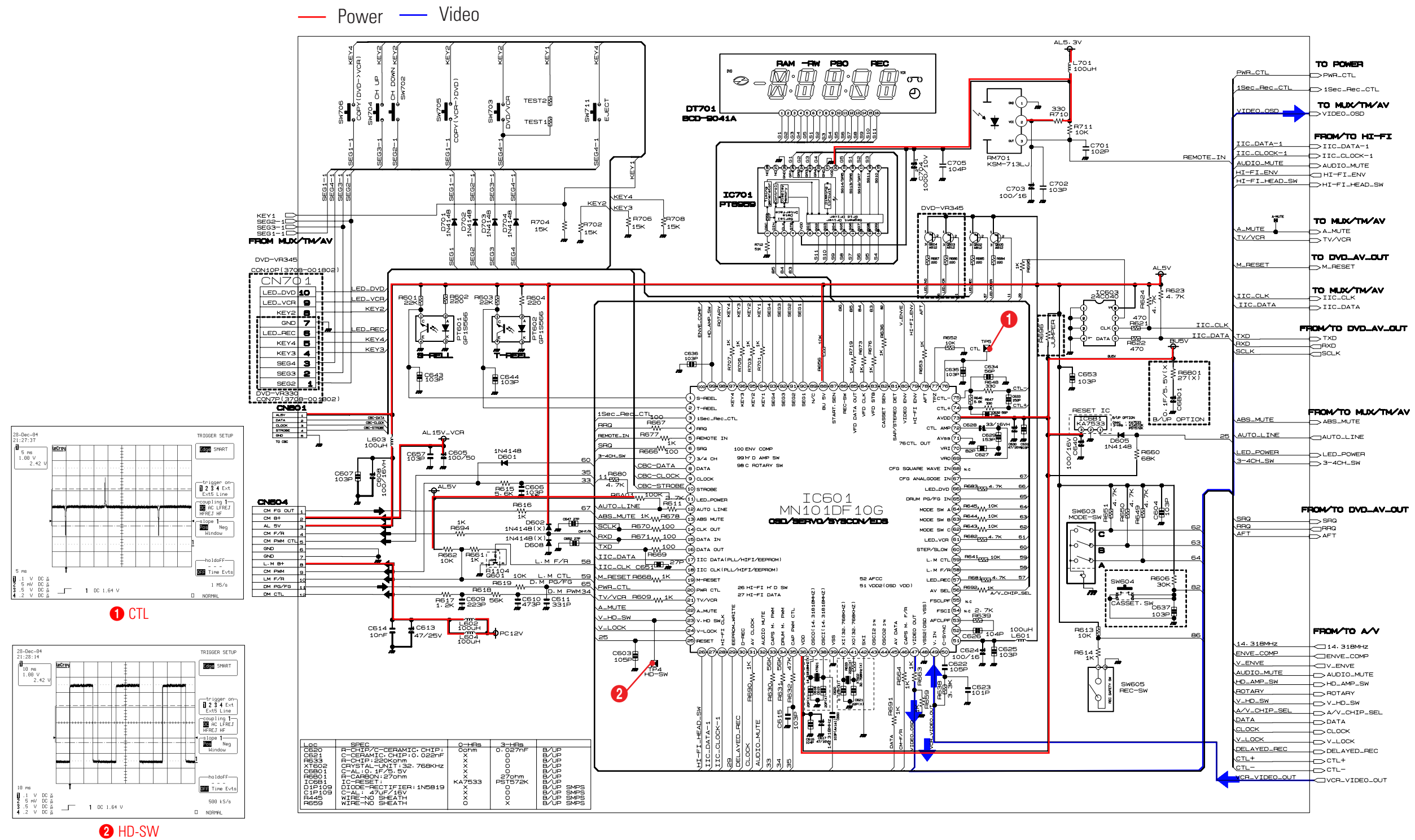
— Power



12-2 Power (VCR-Jack PCB)

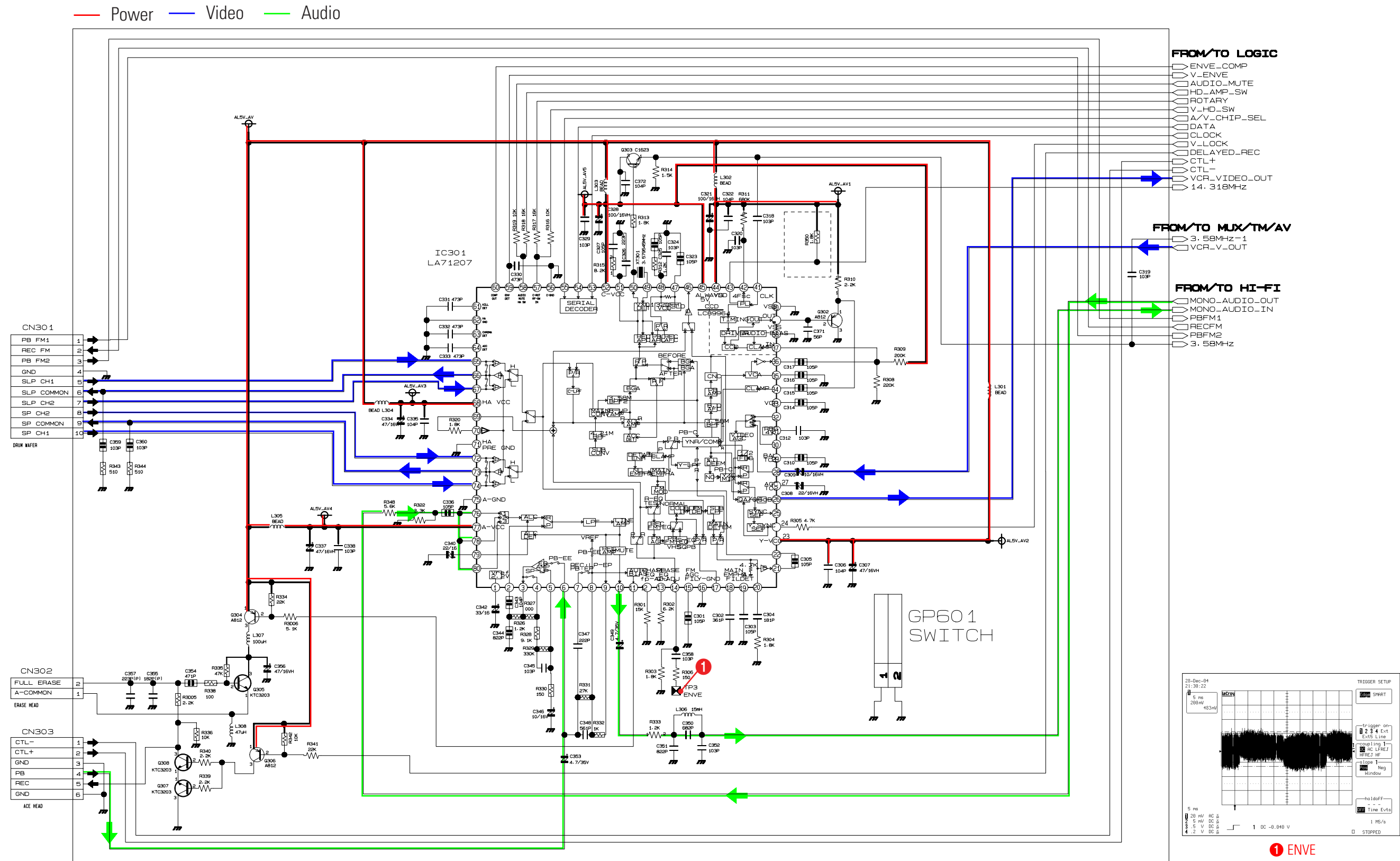


12-3 Logic (VCR-Jack PCB)



◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.

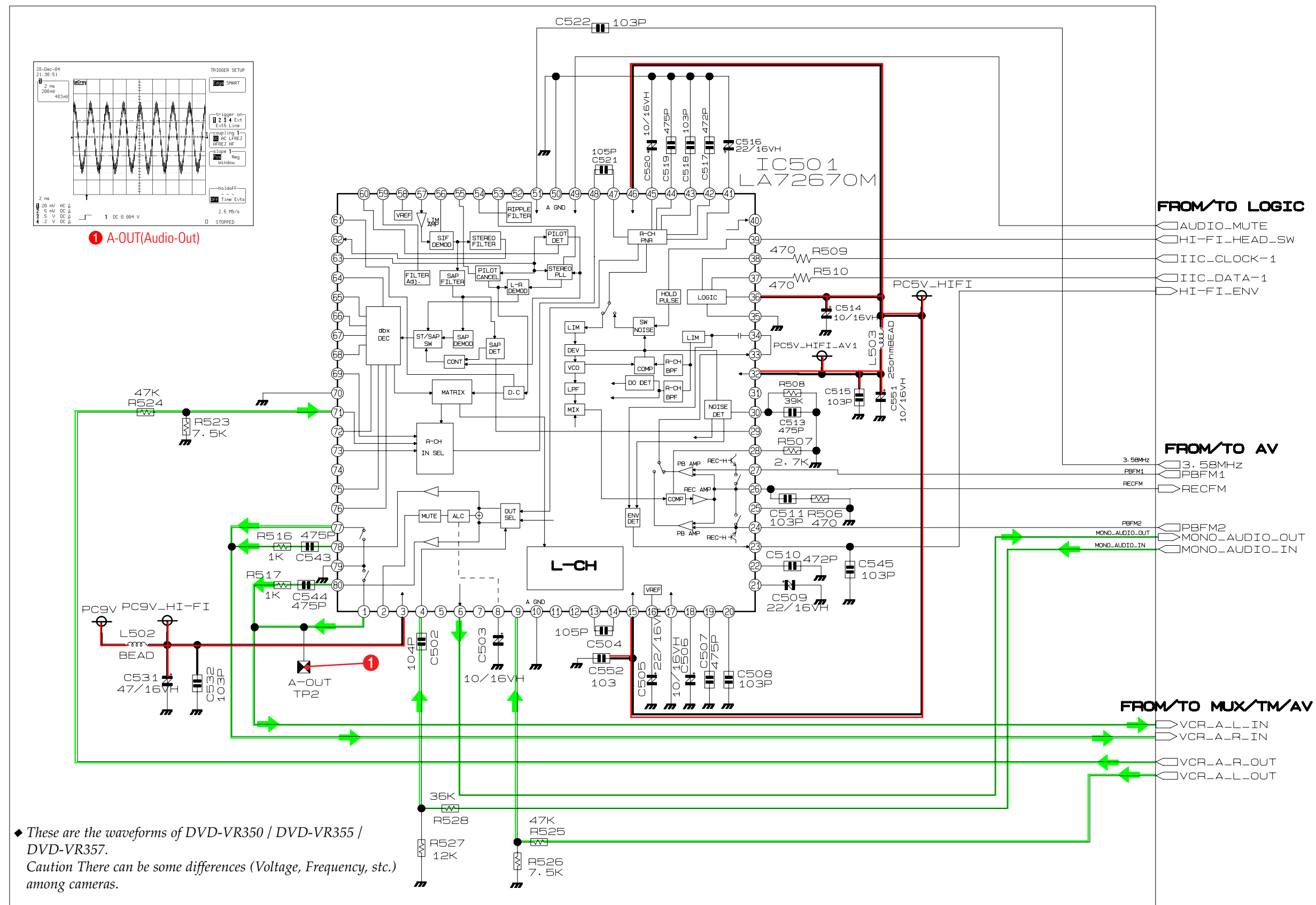
12-4 AV (VCR-Jack PCB)



◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.

12-5 Hi-Fi (VCR-Jack PCB)

— Power — Audio



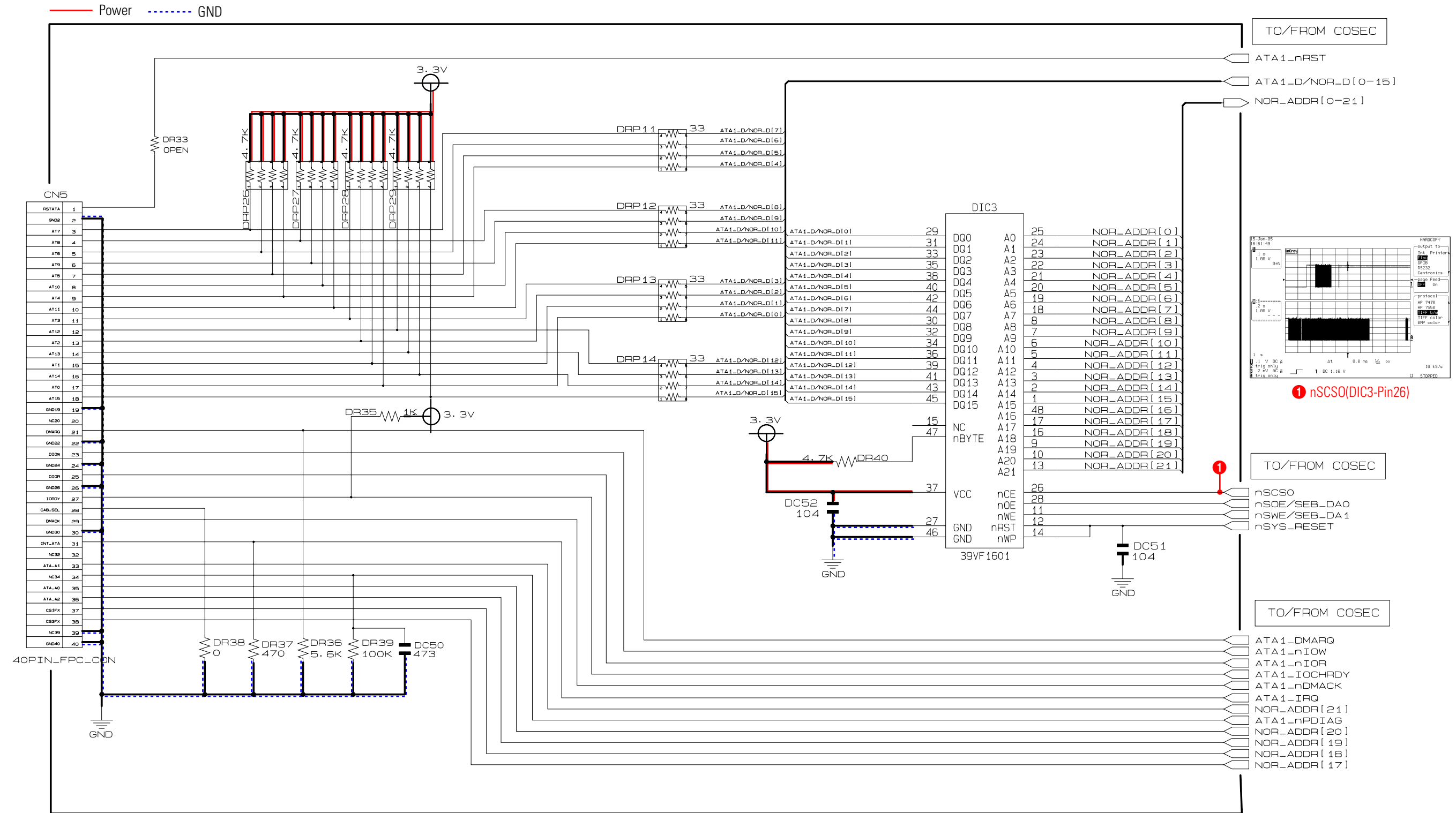


◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.



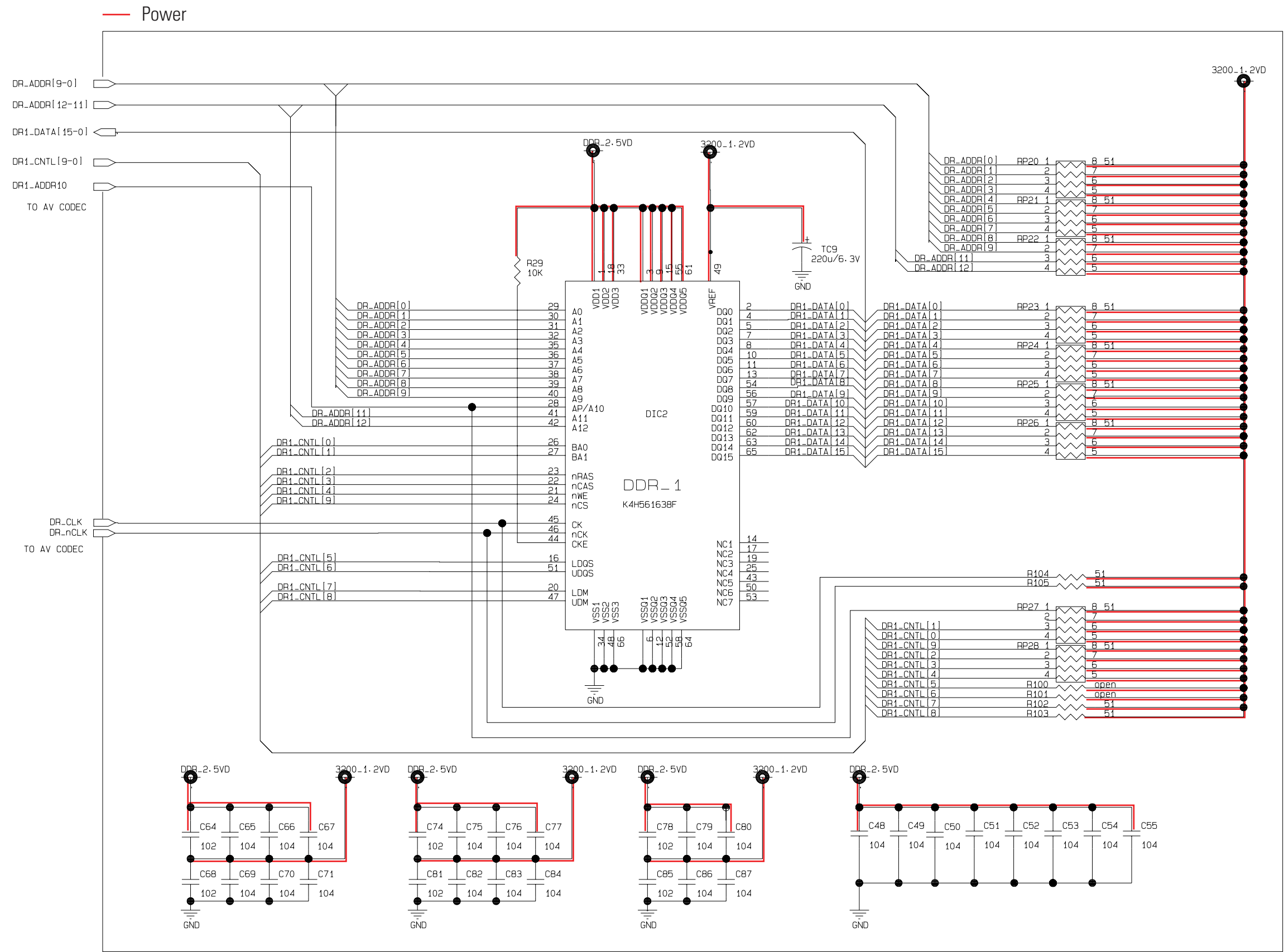
◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, stc.) among cameras.

12-9 ATAPI_Flash (DVD Main PCB)

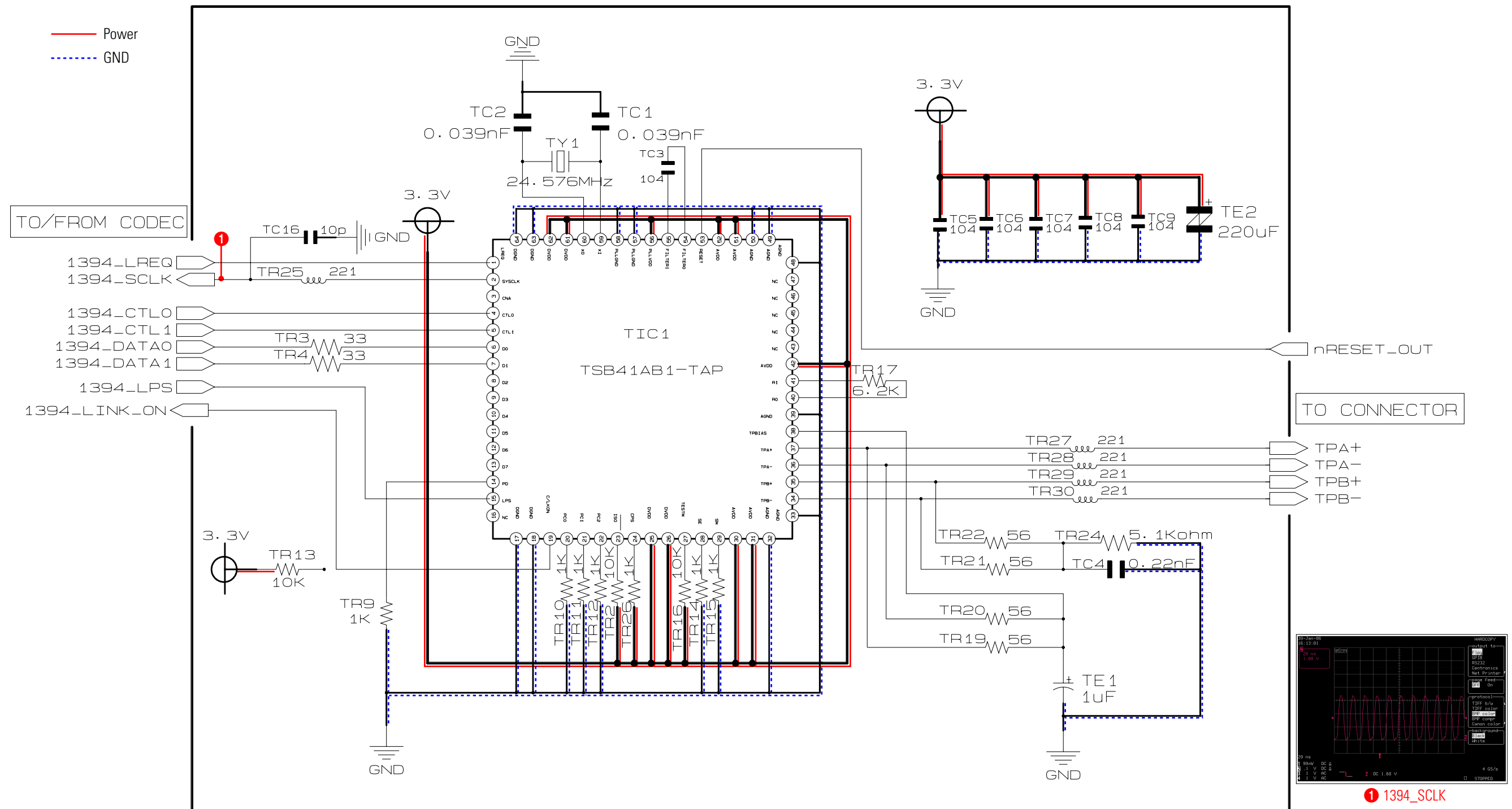


◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.

12-10 DDR (DVD Main PCB)

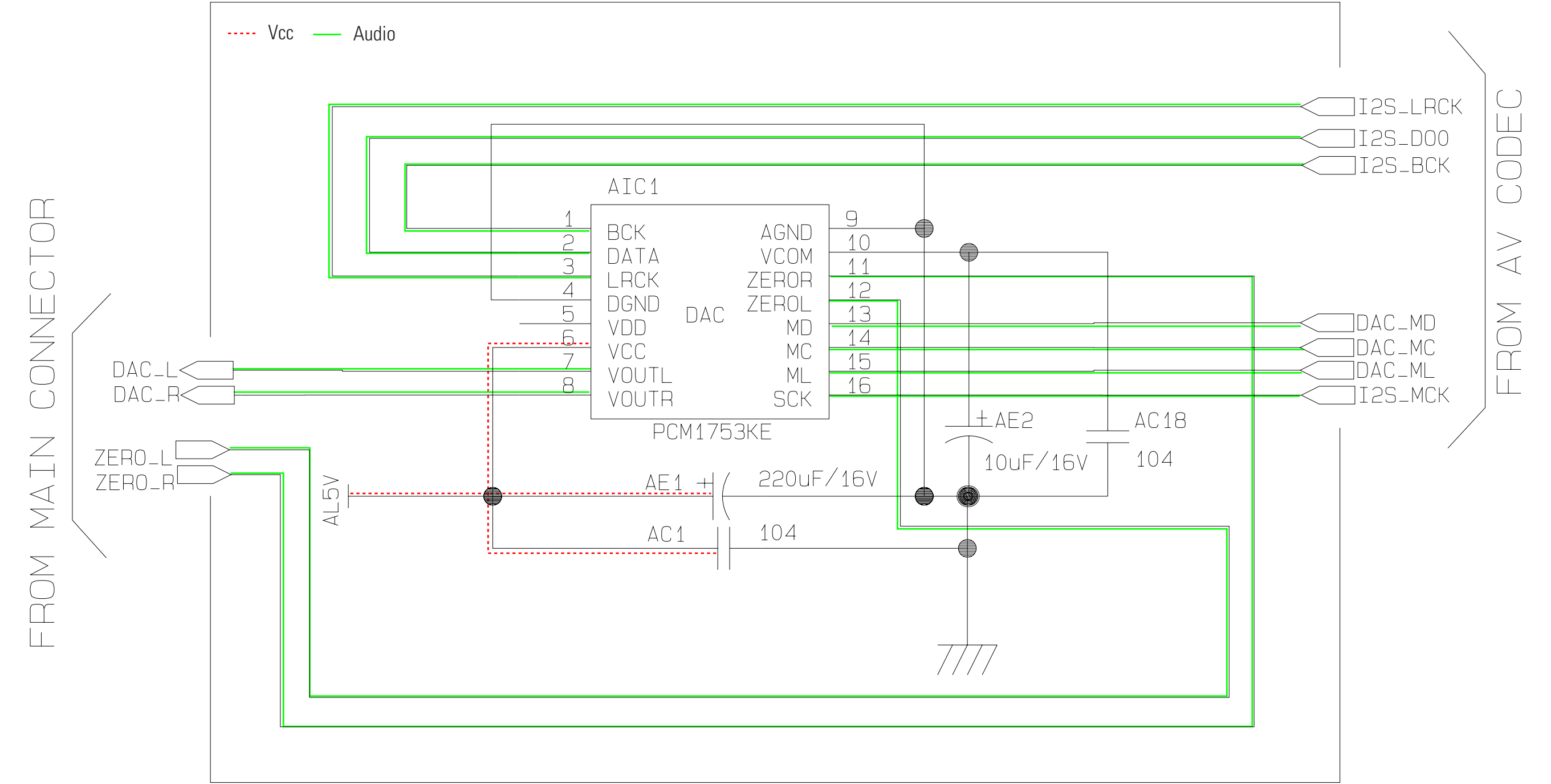


12-11 DV_1394 (DVD Main PCB)

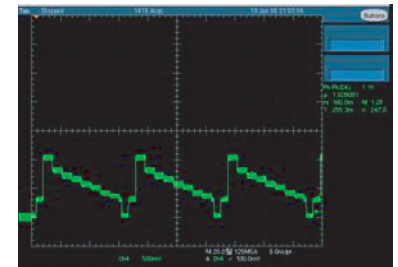
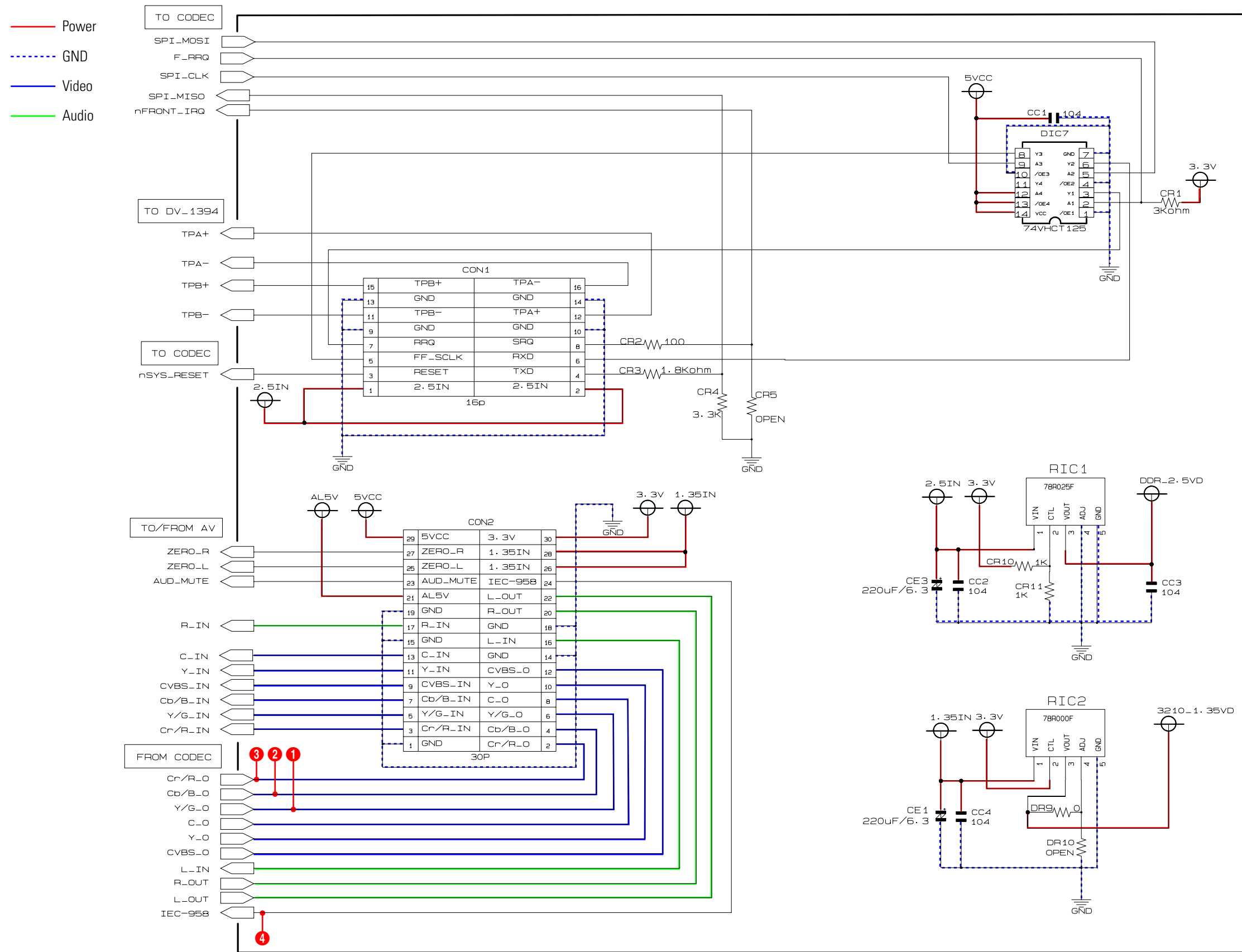


◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.

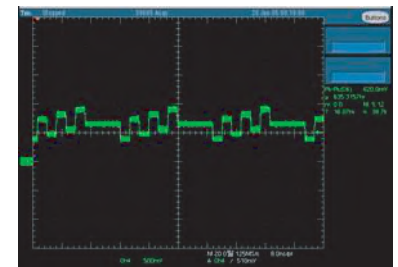
12-12 Audio (DVD Main PCB)



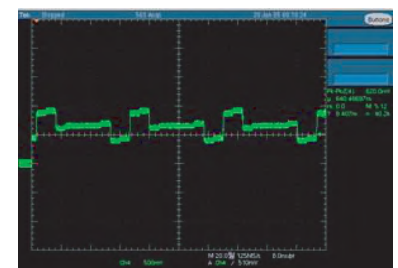
12-13 Main Connector (DVD Main PCB)



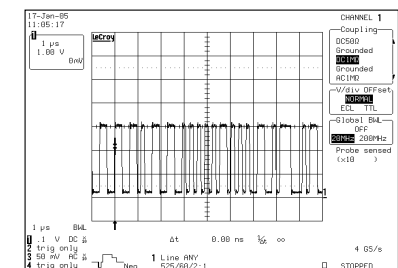
1 Y_O(Color-bar)



2 Cb(Color-bar)



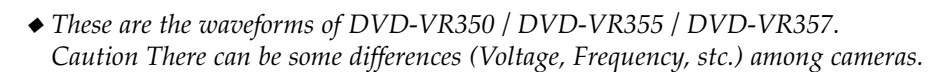
3 Cr(Color-bar)



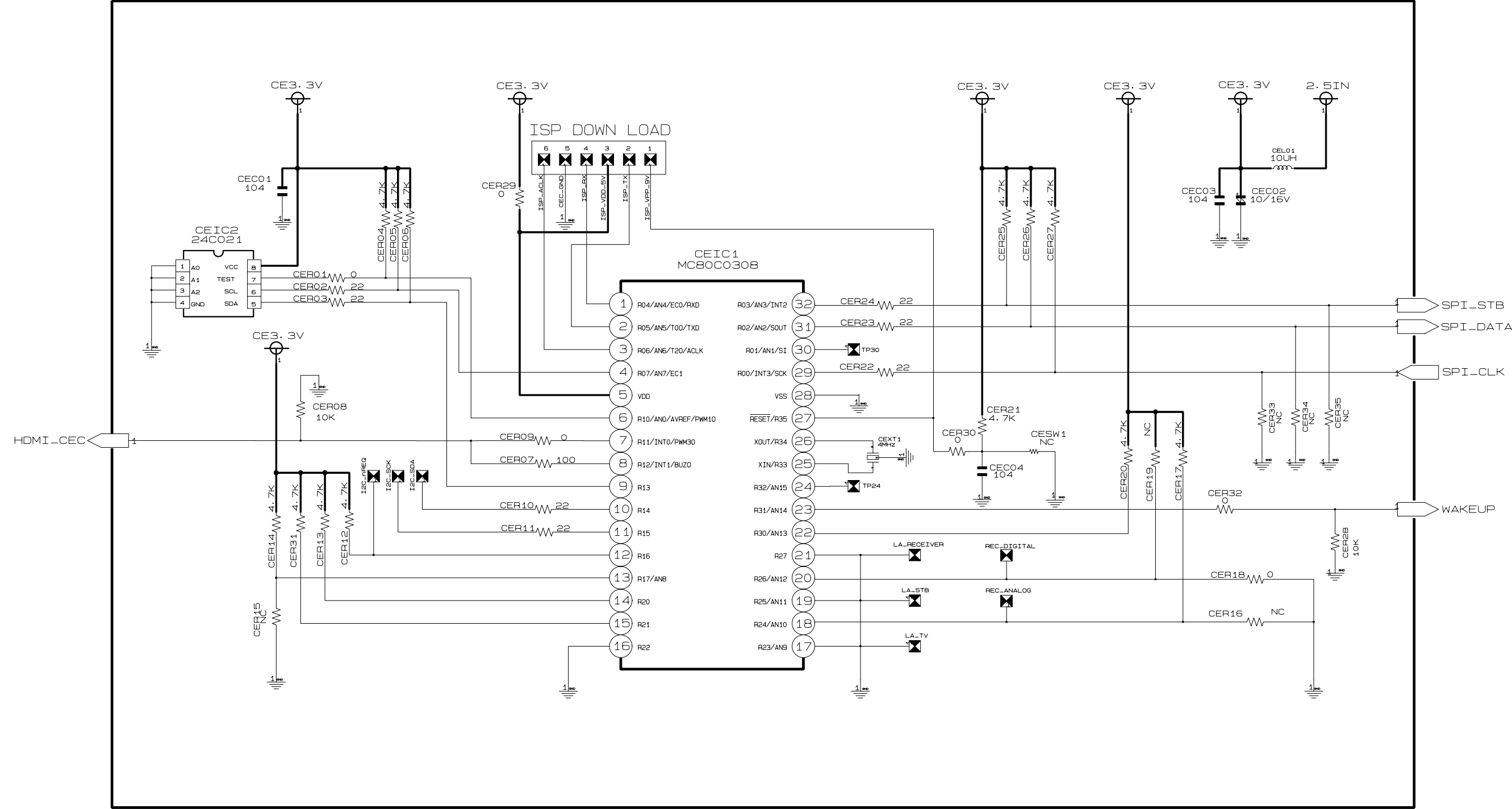
4 IEC-958(Audio Data)

◆ These are the waveforms of DVD-VR350 / DVD-VR355 / DVD-VR357.
Caution There can be some differences (Voltage, Frequency, etc.) among cameras.



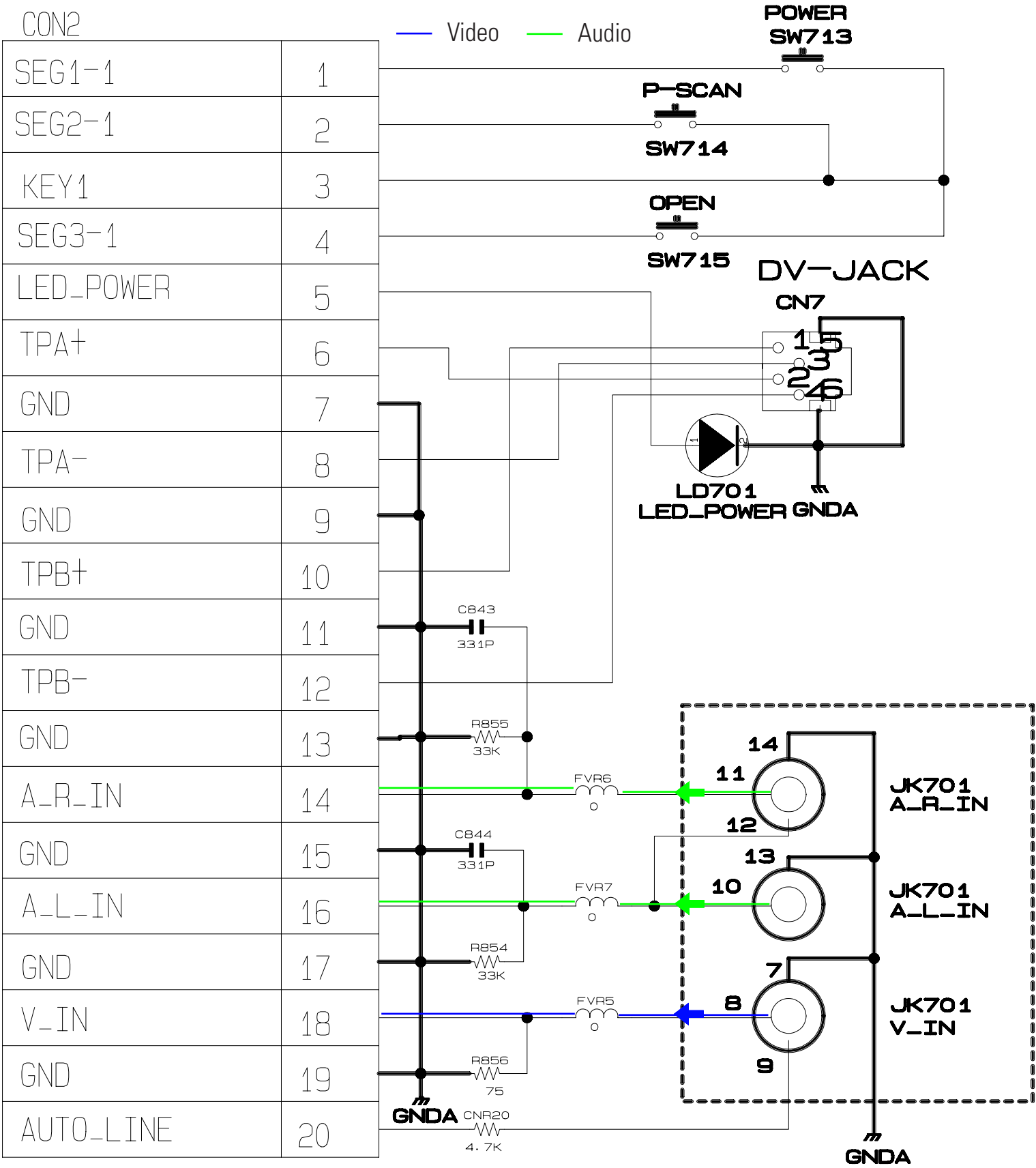


12-16 HDMI CEC (DVD Main PCB)

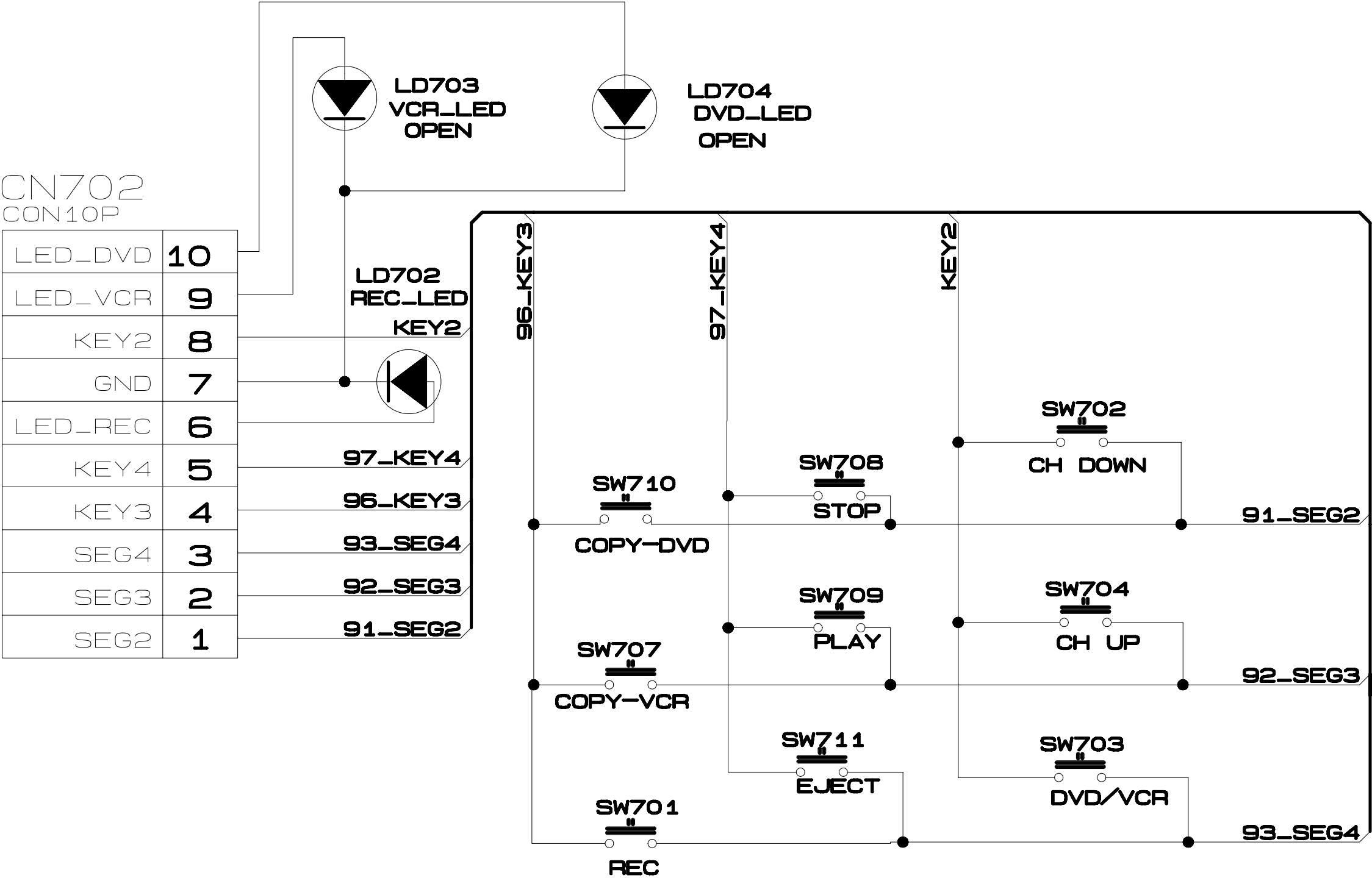




12-18 Front (Function PCB)



12-19 Key (Key PCB)

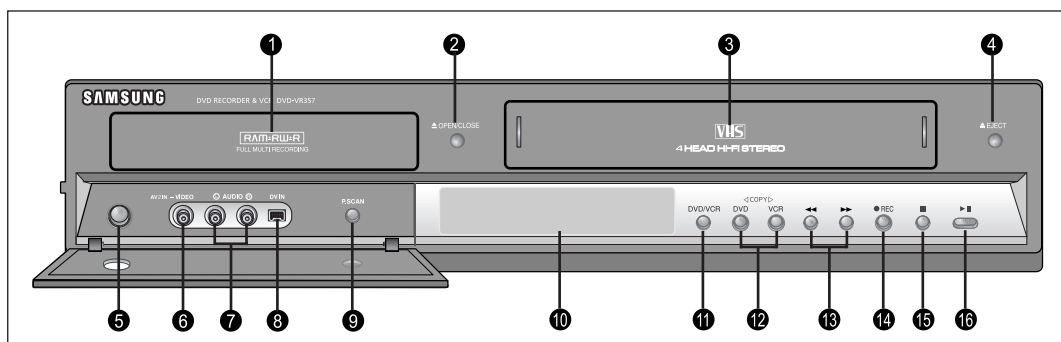




13. Operating Instructions

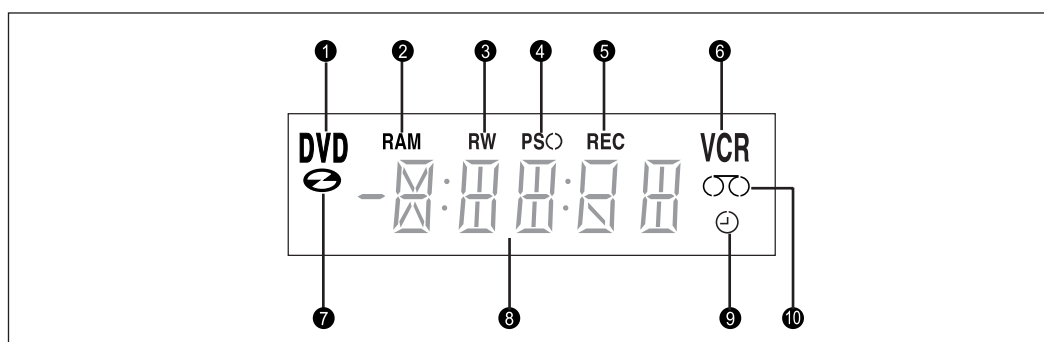
Description

Front Panel



- | | |
|-------------------------------------|----------------------------|
| 1. DVD DECK | 9. P.SCAN BUTTON |
| 2. DVD OPEN/CLOSE BUTTON | 10. FRONT PANEL DISPLAY |
| 3. VCR DECK | 11. DVD/VCR SELECT BUTTON |
| 4. VCR EJECT BUTTON | 12. COPY BUTTON |
| 5. POWER BUTTON | 13. FORWARD/REWIND BUTTONS |
| 6. VIDEO INPUT JACK (AV 2 IN) | 14. RECORD BUTTON |
| 7. AUDIO L, R INPUT JACKS (AV 2 IN) | 15. STOP BUTTON |
| 8. DV INPUT JACK | 16. PLAY/STILL BUTTON |

Front Panel Display

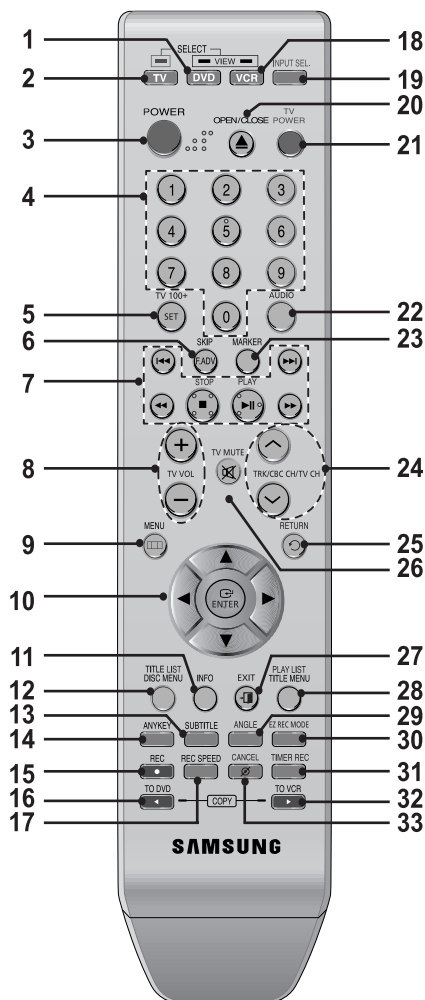


- | | |
|--|--|
| 1. DVD is activated. | 7. DVD or CD media is loaded. |
| 2. DVD-RAM is activated. | 8. The time, counter position or current deck status is indicated. |
| 3. DVD(±)R or DVD(±)RW is activated. | 9. When you set a Timer recording, this indicator appears. |
| 4. Progressive Scan mode is activated. | 10. VHS videotape is loaded. |
| 5. Record function is activated. | |
| 6. VCR is activated. | |

Tour of the Remote Control

You can control part of another manufacturer's TV functions with this remote control.

- Buttons that can be controlled on your TV : TV POWER, INPUT SEL., TV VOL +/-, TRK/CBC CH/TV CH ($\wedge/\vee$), TV MUTE, 0~9, TV 100+.



1. **DVD Button**
Press this when you use a DVD.
2. **TV Button**
Press this to operate your TV.
3. **POWER Button**
4. **NUMBER Button**
5. **TV 100+/SET Button**
Press this to select channel 100 or higher.
Press this to change the set top box channels.
(For some set top box brands)
6. **F.ADV/SKIP Button**
7. **Playback-related Buttons**
Forward/Rewind, Search, Skip, Stop, Play/Pause
8. **TV VOL (Volume) Button**
TV volume adjustment
9. **MENU Button**
Press this to bring up the DVD Recorder & VCR's setup menu.
10. **ENTER/DIRECTION Buttons**
(UP/DOWN or LEFT/RIGHT Buttons)
This button functions as a toggle switch.

â This is a special remote control for the visually impaired, and has Braille points on the POWER(●), STOP(⏏) and PLAY(⏮) buttons.

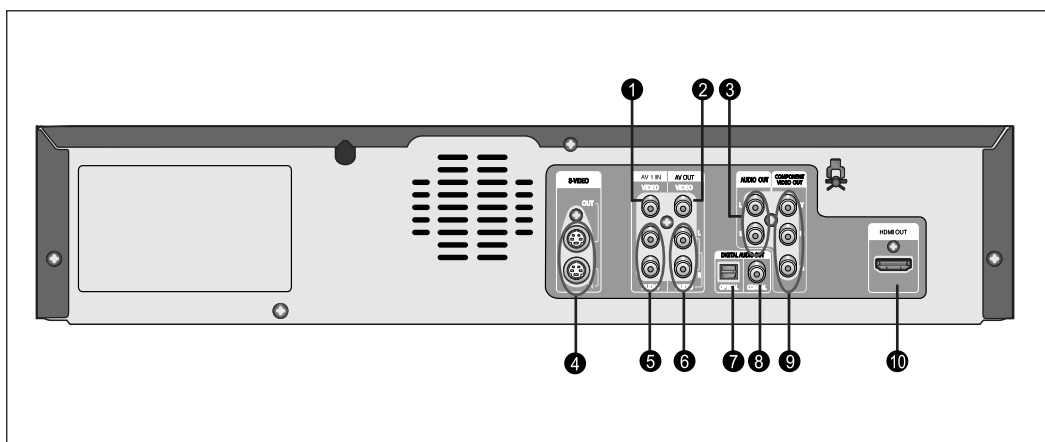
11. **INFO Button**
Press this to display current setting or disc status.
12. **TITLE LIST/DISC MENU Button**
Press this to enter the TITLE LIST/Disc menu.
13. **SUBTITLE Button**
Press this to switch the DVD's subtitle language.
14. **ANYKEY Button**
Press this to set the status of the disc that is being played.
15. **REC Button**
Press this to make a recording on VCR, DVD-RAM/±RW/±R discs.
16. **TO DVD COPY Button**
Press this when you copy from the VCR to the DVD.
17. **REC SPEED Button**
Press this to set the desired recording time and picture quality.
18. **VCR Button**
Press this when you use a VCR.
19. **INPUT SEL. Button**
Press this to select AV input signal in external input mode. (AV input, DV input)
20. **OPEN/CLOSE Button**
Press this to open and close the disc tray.
21. **TV POWER Button**
22. **AUDIO Button**
Press this to access various audio functions.
23. **MARKER Button**
Press this to bookmark or mark a position while playing a disc.
24. **TRK/CBC CH/TV CH Button**
Press this to adjust tape tracking/select a CBC channel or TV channel.
25. **RETURN Button**
Returns to a previous menu.
26. **TV MUTE Button**
This also operates as sound mute. (TV mode)
27. **EXIT Button**
28. **PLAY LIST/TITLE MENU Button**
Press this to enter the Edit playlist/Title menu.
29. **ANGLE Button**
Press this to access various camera angles on a disc (if the disc contains multiple camera angles).
30. **EZ REC MODE Button**
31. **TIMER REC Button**
Press this when you use Timer Recording.
32. **TO VCR COPY Button**
Press this when you copy from the DVD to the VCR.
33. **CANCEL Button**

Key Lock Function

If you do not want others to operate the DVD Recorder & VCR (for example if you have programmed a timer recording) you can set the equipment to lock out all button controls.

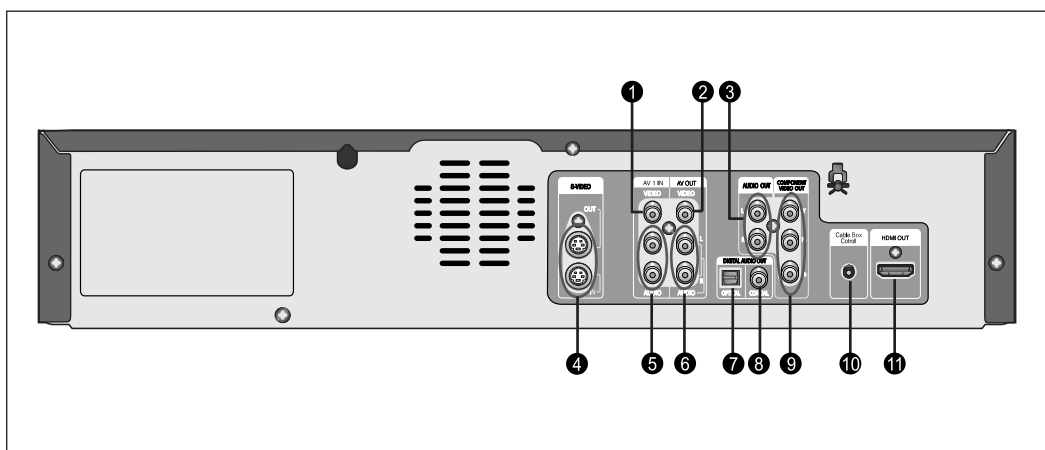
- Press and hold the **INFO** button on the remote control for 5 seconds.
- The display will show "SAFE" when the feature is activated.
- To resume normal mode, press and hold the **INFO** button again for 5 seconds. "SAFE" will disappear and the DVD Recorder & VCR will operate normally.

Rear Panel (DVD-VR355)



- | | |
|------------------------------------|---|
| 1. VIDEO INPUT JACK (AV 1 IN) | 7. DIGITAL AUDIO OUT JACK (OPTICAL) |
| 2. VIDEO OUT JACK (AV OUT) | 8. DIGITAL AUDIO OUT JACK (COAXIAL) |
| 3. AUDIO OUT JACKS (COMPONENT OUT) | 9. VIDEO OUT JACKS (COMPONENT OUT) |
| 4. S-VIDEO IN/OUT JACKS | 10. HDMI OUT |
| 5. AUDIO INPUT JACKS (AV 1 IN) | Connects the input of external equipment using an HDMI cable. |
| 6. AUDIO OUT JACKS (AV OUT) | |

Rear Panel (DVD-VR357)



- | | |
|-------------------------------------|---|
| 1. VIDEO INPUT JACK (AV 1 IN) | 8. DIGITAL AUDIO OUT JACK (COAXIAL) |
| 2. VIDEO OUT JACK (AV OUT) | 9. VIDEO OUT JACKS (COMPONENT OUT) |
| 3. AUDIO OUT JACKS (COMPONENT OUT) | 10. Cable Box Control OUT |
| 4. S-VIDEO IN/OUT JACKS | Connection of the IR Blaster for a cable box. |
| 5. AUDIO INPUT JACKS (AV 1 IN) | 11. HDMI OUT |
| 6. AUDIO OUT JACKS (AV OUT) | Connects the input of external equipment using an HDMI cable. |
| 7. DIGITAL AUDIO OUT JACK (OPTICAL) | |

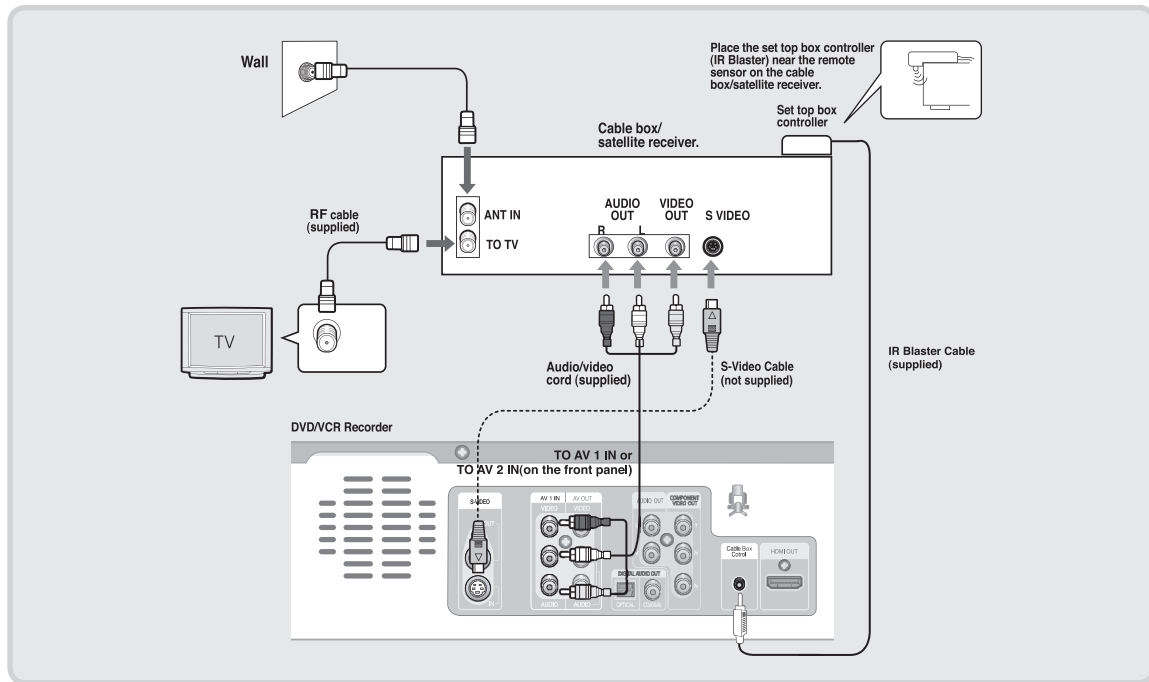


Connecting & Setting Up

Step 1: Connecting the Antenna Cable

Antenna + Set Top Box Controller + DVD Recorder & VCR + TV : Cable box with a video/audio output or a satellite receiver (DVD-VR357 only)

You can record channels by selecting the channel on the cable box. You cannot record one channel while watching another channel. Be sure that the cable box is turned on.



1. Find and Connect the included Cable Box Control (IR Blaster) cable into the Cable Box Control jack of the DVD Recorder.
2. Find the Cable Box IR Sensor
 - A. Turn the Cable box Off.
 - B. Hold the Cable box's remote so that it touches the front of the Cable Box device (see Figure 1).

Figure 1

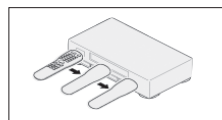


Correct

Incorrect

- C. Move the Cable Box's remote across the front of the Cable Box while pressing the remote's power button On and Off (Figure 2).

Figure 2



(Press and release the power button each time you move the remote; holding down the button will not work.)
D. When the cable box powers On, you have found the sensor.
E. Remember the location of the sensor.

3. Place the IR Blaster cable under or over the cable box, approximately 1 inch in front of the sensor you located in step 2. Use double-sided tape to secure the Set-top box controller (IR Blaster) to the cable box



- You must select a cable box brand from the table on. If you do not know the brand name, please contact your cable provider.
- After setting up your cable box with the DVD recorder through the IR Blaster cable, you need to set up the Set-top Box Control menu.

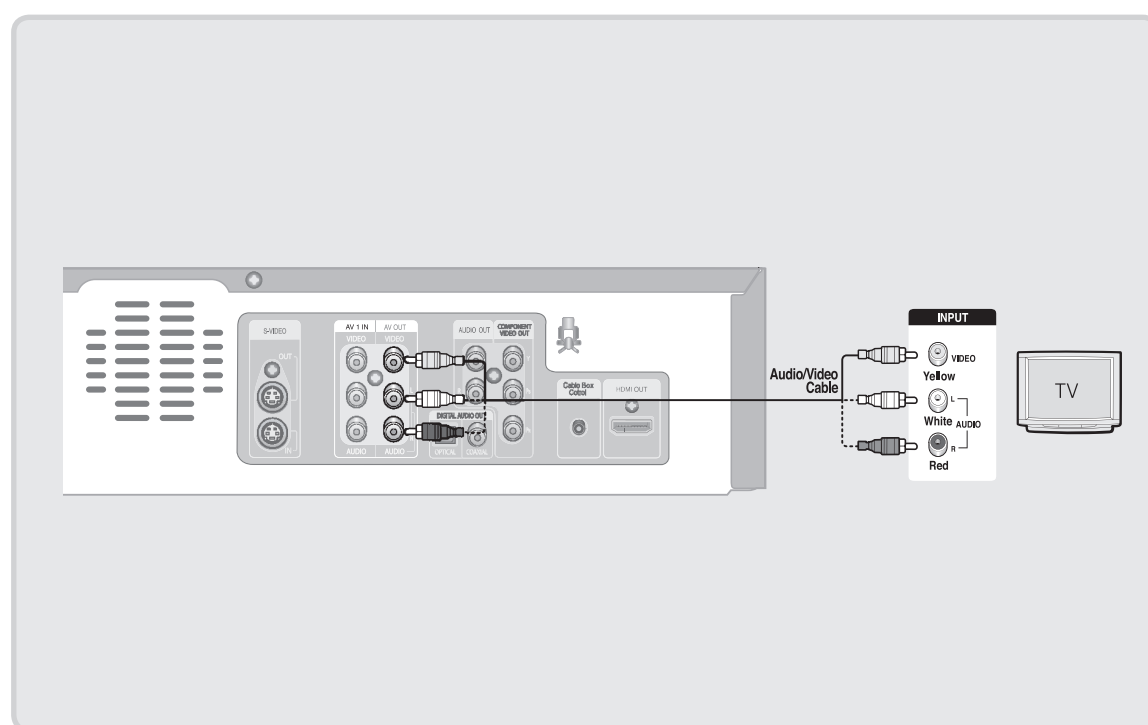
Step 2 : Connecting the Video Cable

There are several ways to connect your DVD Recorder & VCR. Select one of the video connections on the following pages.

You must use one of the following audio/video connections on this unit.

Connecting to a Video input jack

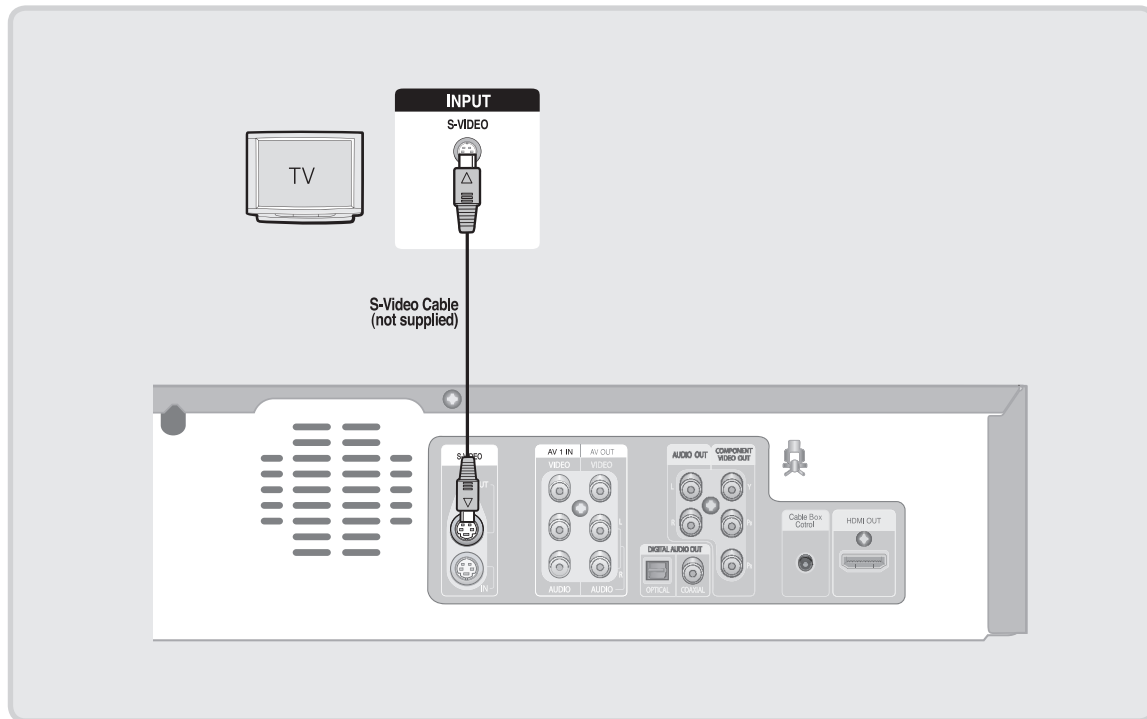
Connect a video(yellow) cable between the VIDEO(yellow) OUT jack on DVD Recorder & VCR and VIDEO(yellow) IN jack on the TV.



- You will enjoy regular quality images.
- Connect audio cables(white and red) between the AUDIO OUT jacks on the DVD Recorder & VCR and AUDIO IN jacks on TV(or AV amplifier).

Connecting to an S-Video input jack

Connect an S-Video cable(not supplied) between the S-VIDEO OUT jack on DVD Recorder & VCR and S-VIDEO IN jack on your TV.

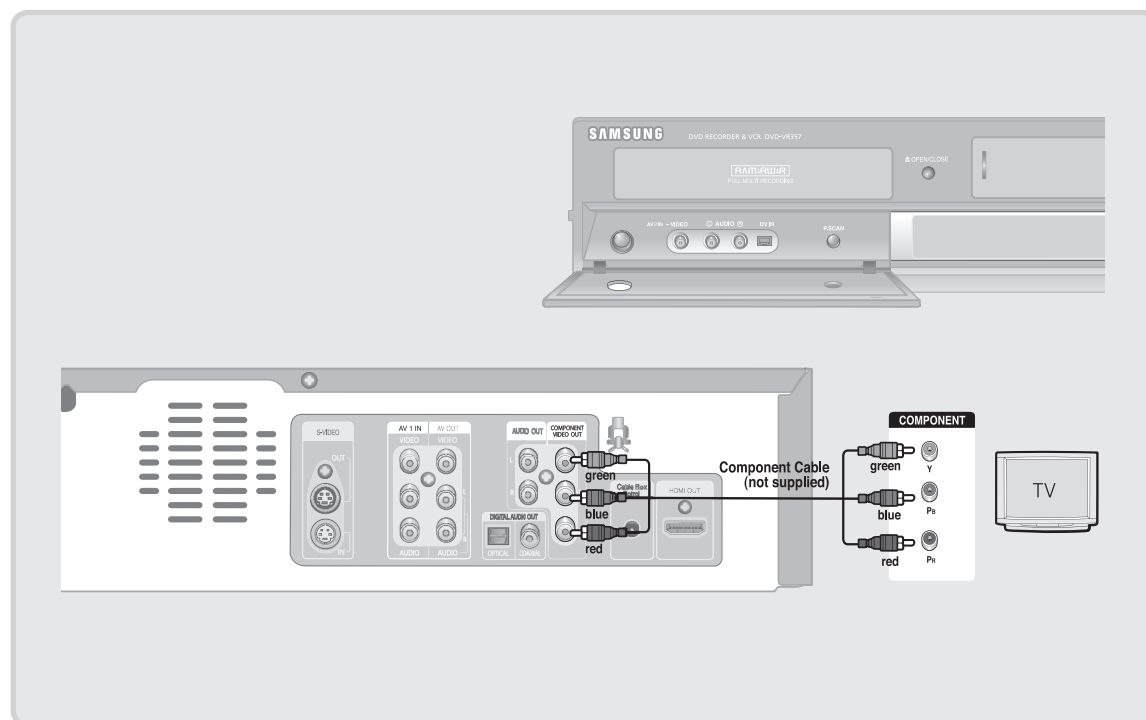


- You will enjoy high quality images. S-Video separates the picture element into black and white (Y) and color (C) signals to present clearer images than regular video input mode.
- Connect audio cables(white and red) between the AUDIO OUT jacks on the DVD Recorder & VCR and AUDIO IN jacks on TV(or AV amplifier).

- S-Video and Component video output are available only if your TV supports S-Video input or Component video input, respectively. If S-Video or Component video output does not work, check the TV connections and the TV input selection settings.

Connecting to Component video input jacks (Y,P_B,P_R)

Connect Component video cables (not supplied) between the **COMPONENT OUT (Y,P_B,P_R)** jacks on DVD Recorder & VCR and **COMPONENT IN (Y,P_B,P_R)** jacks on your TV.



- You will enjoy high quality accurate color reproduction images. Component video separates the picture element into black and White(Y), blue(P_B), red(P_R) signals to present clear and clean images.
- Connect audio cables(white and red) between the Component AUDIO OUT jacks on the DVD Recorder & VCR and Component AUDIO IN jacks on TV(or AV amplifier).
- Progressive scan
 - If the your TV supports Progressive Scan, you can enjoy higher quality video by pressing the P.SCAN button. (The component cable has to be connected.)
 1. With the unit in stop mode, press the P.SCAN button on the front of the DVD Recorder & VCR.
 2. The message 'Press "Yes" to confirm Progressive scan mode. Otherwise press "No"' will appear. Press the $\uparrow$ $\downarrow$ buttons to select Yes, and then press the ENTER button.



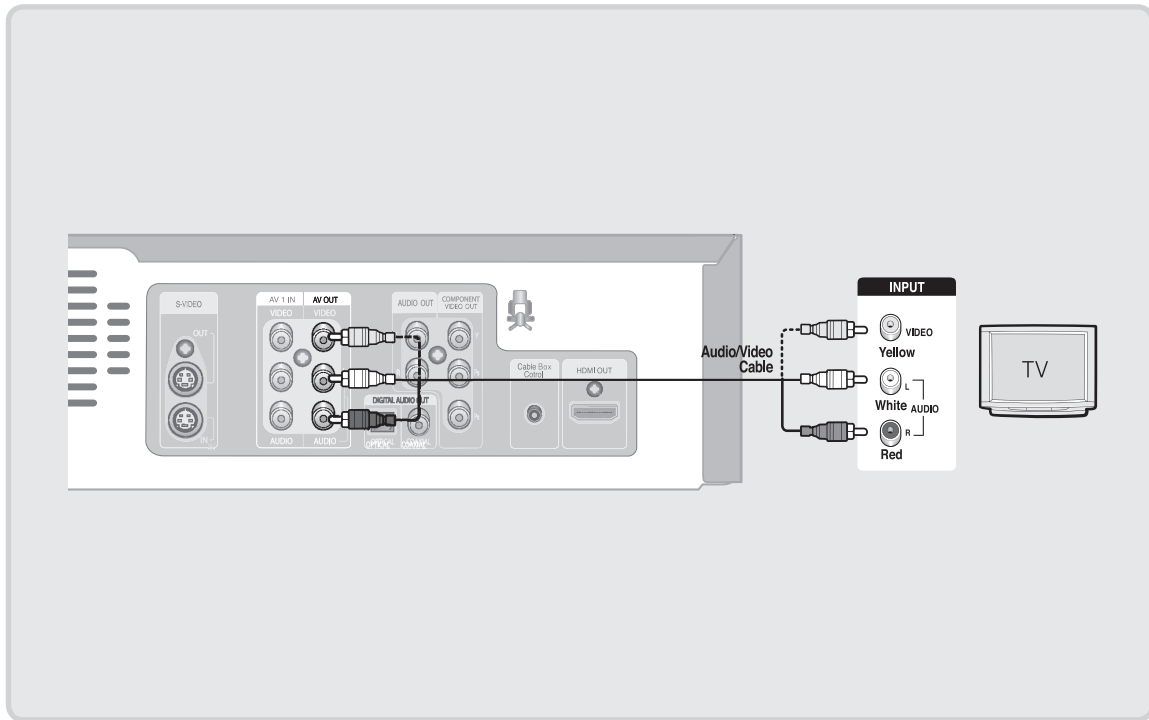
- Compared to standard interlaced video, progressive scan doubles the amount of video lines fed to your TV, resulting in a more stable, flicker-free, and clear image than interlaced video. The progressive scan video output jack is used in progressive output mode. This is only available with TVs that support progressive scan.
- Progressive Scan Output (480p)
Consumers should note that not all high definition television sets are fully compatible with this product and may cause artifacts to be displayed in the picture. If you experience 480p progressive scan picture problems, it is recommended that you switch the connection to the 'standard definition' output. If there are questions regarding TV set compatibility with this model, please contact our customer service center at 1-800-SAMSUNG.
- The Component jacks will not output video resolutions above 480p. To view 720p and 1080i, connect the DVD-VR355, DVD-VR357 to your TV with an HDMI-HDMI cable. With HDMI connected, press the P.SCAN button to alternate between all available resolutions.

Step 3 : Connecting the Audio Cable

Select one of the Audio connections on the following pages.

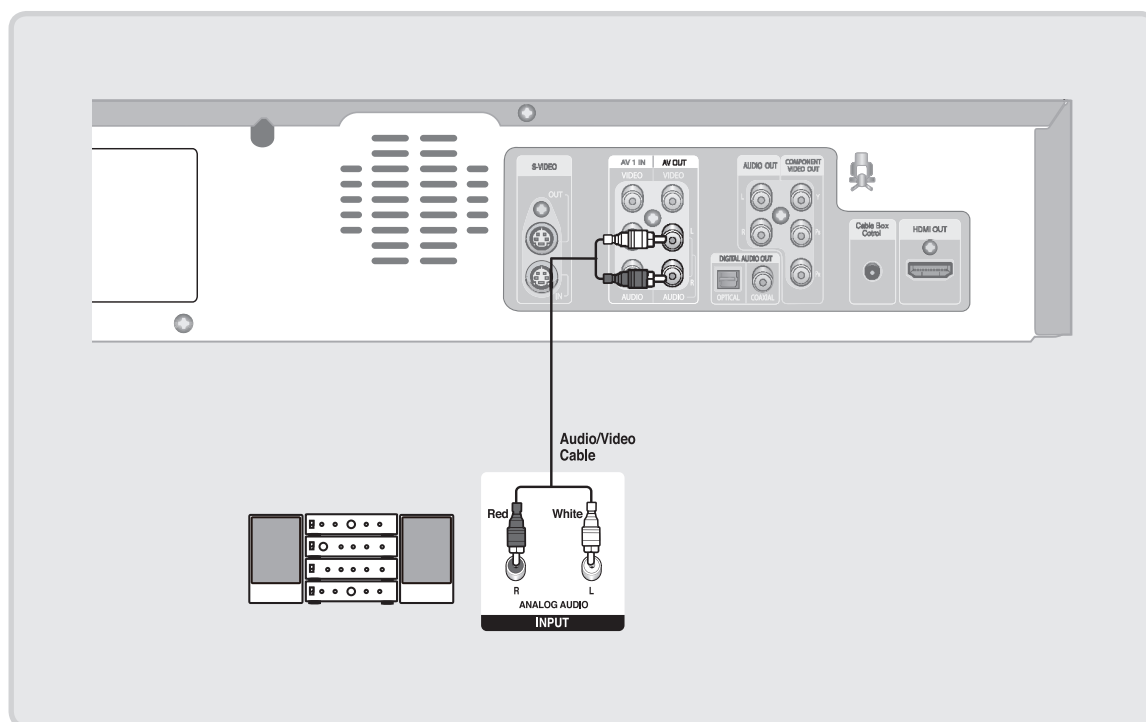
Connecting to your TV

This connection will use your TV's speakers.



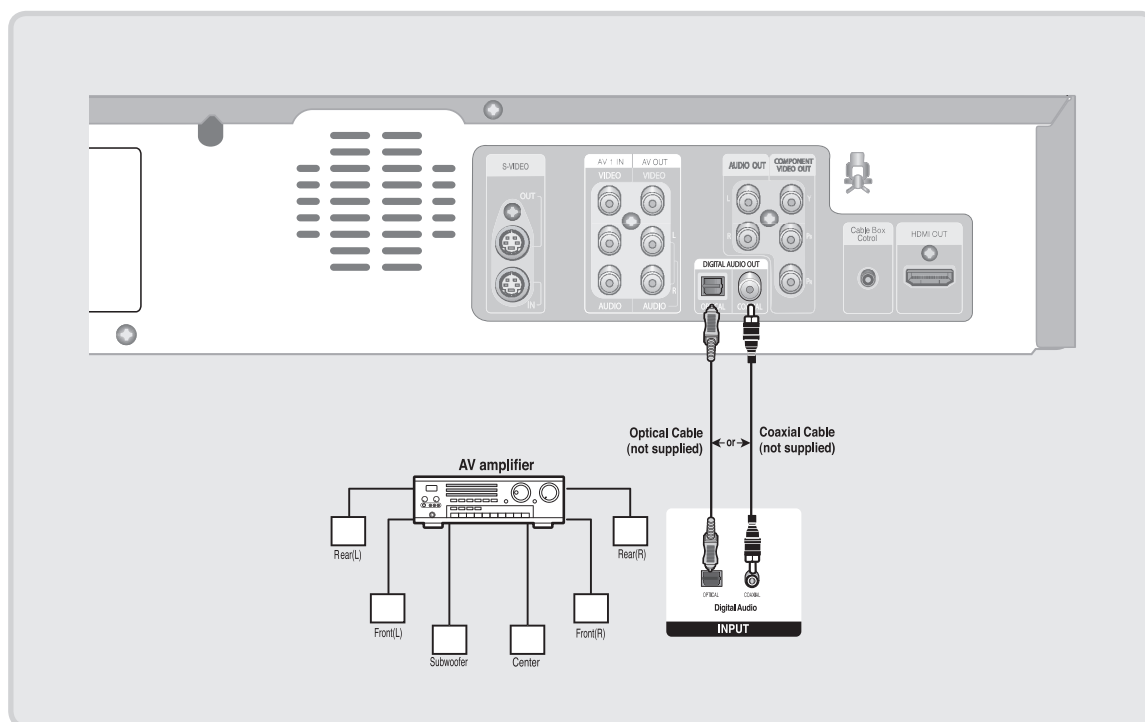
Connecting to a stereo amplifier with analog input jacks

If your stereo amplifier only has AUDIO INPUT jacks(L and R), use the AUDIO OUT jacks.



Connecting to an AV amplifier with a digital input jack

If your AV amplifier has a Dolby Digital or DTS decoder and a digital input jack, use this connection. To enjoy Dolby Digital or DTS sound, you will need to set up the audio settings.



Manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

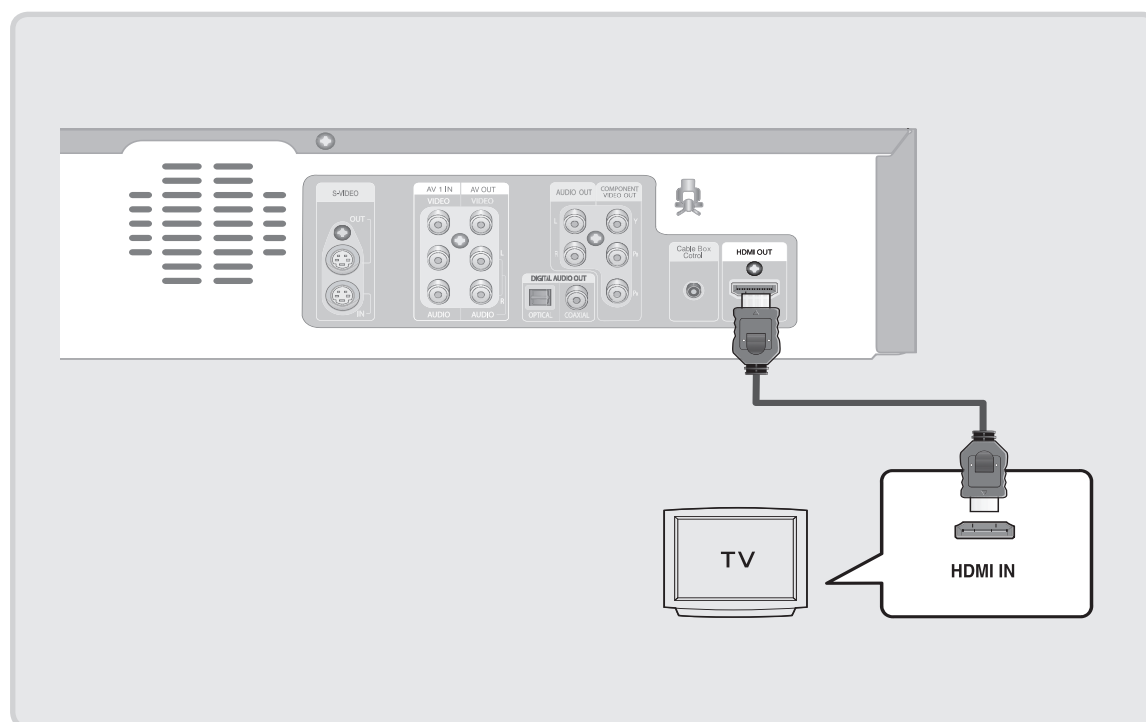
"DTS" and "DTS Digital Out" are trademarks of DTS, Inc.

Step 4 : Connecting HDMI/DVI to a TV

Connecting to a TV with HDMI Jack

Using an HDMI- HDMI cable(not included) connect the HDMI OUT jack on the rear of the DVD Recorder to the HDMI IN jack of your TV.

Press the input selector on your TV remote control until the HDMI signal from the DVD Recorder appears on your TV screen.



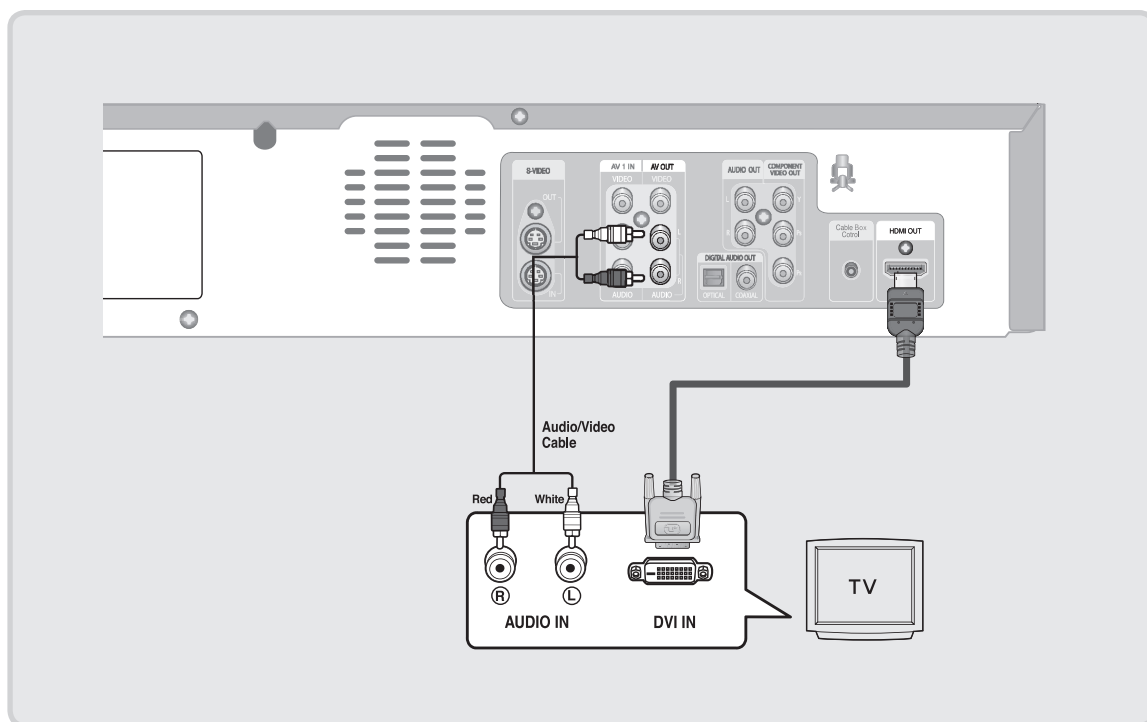
- To hear audio on your TV when using HDMI, set the digital audio output to PCM (2 channel).
- Depending on the HDMI device (TV/HDMI Receiver) you use, audio may not be supported. If TV does not support Dolby digital/DTS, Audio output is not available when you set Digital output as Bitstream or select DTS On in Audio setup menu. In this case, set the digital audio output to PCM or DTS Off.
- If you connect SAMSUNG TV to DVD recorder using HDMI cable, you can operate easily DVD Recorder using the TV remote control. (This is only available with SAMSUNG TVs that support HDMI CEC.)

Connecting to a TV with DVI Jack

Using an HDMI-DVI cable (not included), connect the HDMI OUT terminal on the rear of the DVD Recorder to the DVI IN terminal of your TV.

Using the audio cables, connect the AUDIO (red and white) OUT terminals on the rear of the DVD Recorder to the AUDIO (red and white) IN terminals of your TV. Turn on the DVD Recorder and TV.

Press the input selector on your TV remote control until the DVI signal from the DVD Recorder appears on your TV screen.



- To change HDMI output resolution.

■ HDMI (High Definition Multimedia Interface)

HDMI is an interface to enable the digital transmission of video and audio data with just a single connector. Since HDMI is based on DVI, it is completely compatible with DVI. The only difference between HDMI and DVI is that HDMI supports multi-channel audio. Using HDMI, the DVD recorder transmits a digital video and audio signal and displays a vivid picture on a TV having an HDMI input jack.

■ HDMI connection description

- HDMI connector - Both uncompressed video data and digital audio data (LPCM or Bit Stream data).
- Even though the DVD recorder records analog audio and video, with HDMI the analog signal is converted to digital, and a pure digital signal is sent to the TV.
- If TV does not support HDCP (High-bandwidth Digital Content Protection), snow noise appears on the screen.

■ Why does Samsung use HDMI?

Analog TVs require an analog video/audio signal. However, when playing a DVD, the data transmitted to a TV is digital. Therefore either a digital-to-analog converter (in the DVD Recorder) or an analog-to-digital converter (in the TV) is required. During this conversion, the picture quality is degraded due to noise and signal loss. HDMI technology is superior because it requires no D/A conversion and is a pure digital signal from the DVD recorder to your TV.

■ What is the HDCP?

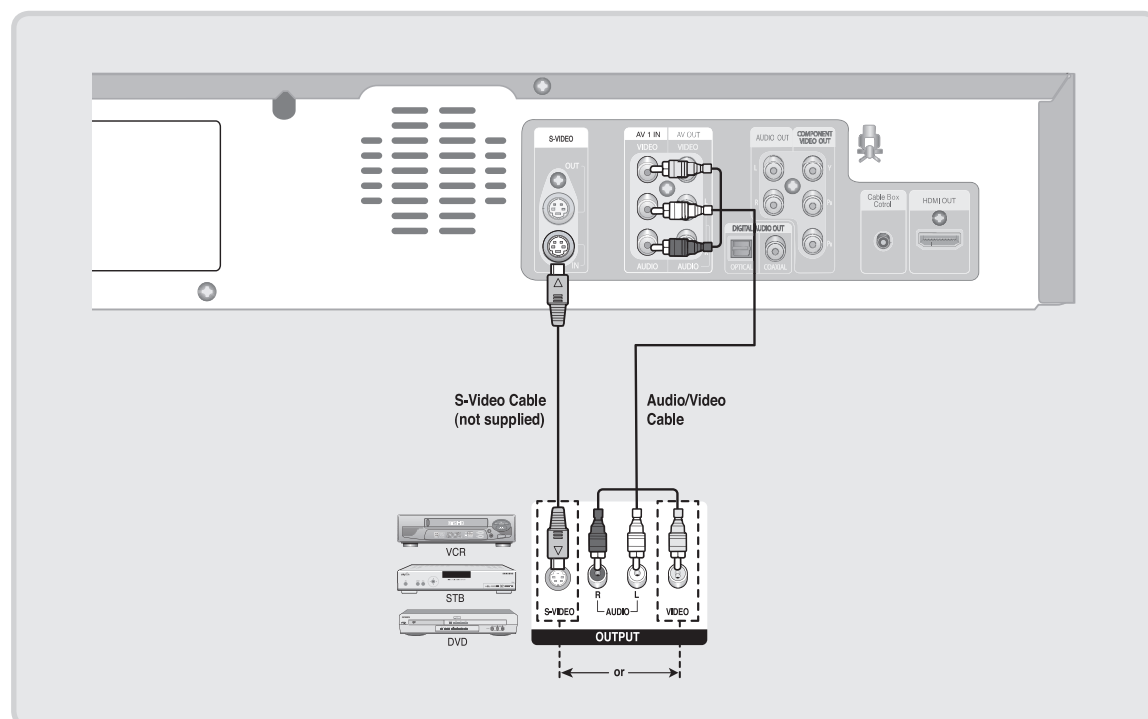
HDCP (High-bandwidth Digital Content Protection) is a system for protecting DVD content outputted via HDMI from being copied. It provides a secure digital link between a video source (PC, DVD, etc) and a display device (TV, projector, etc). Content is encrypted at the source device to prevent unauthorized copies from being made.

Step 5 : Connecting External Devices

This allows you to connect your DVD Recorder & VCR to other external devices and view or record their outputs.

Connecting a VCR, Set-Top Box(STB) or DVD player to the AV 1 IN or S-VIDEO IN jacks

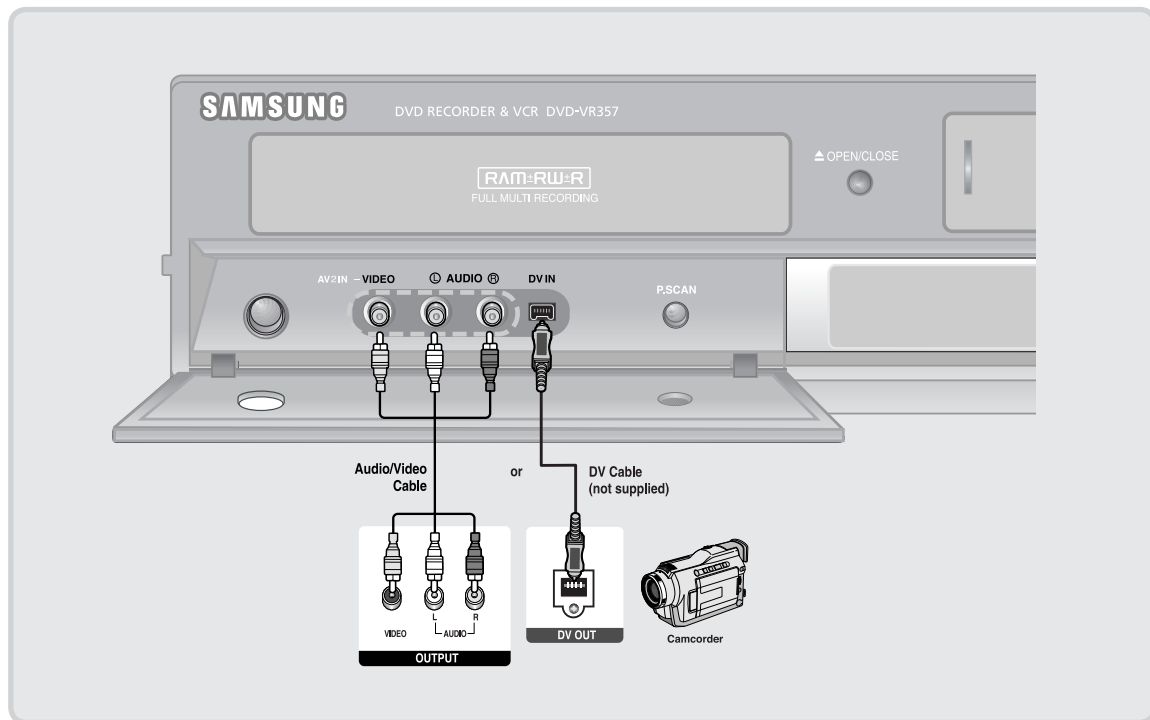
Connecting a VCR or external device to AV 1 IN jacks of the DVD Recorder & VCR. If desired, you can connect an S-Video cable to the S-Video In jack instead of connecting the Video (yellow) cable. You can record from connected equipment (VCR, STB or DVD).



- You can also use the AV 2 IN jacks on the front panel of the DVD Recorder & VCR.
- Press the INPUT SEL. button to select the AV1 or S-Video input.
- Copy protected content cannot be recorded.
- Depending on your input connection, you must choose **AV 1 (Composite)** or **S-video**.

Connecting a Camcorder

you can record from connected equipment, such as a camcorder by using the AV2 IN or DV IN jacks on front of the DVD Recorder.



- when an Input source is inserted into AV 2 while watching TV, the input will be switched to AV 2 automatically
- If the Input is not selected automatically, press the **INPUT SEL.** button on the remote control to select the DV Input.
- Check your camcorder's owner's manual to see how to use the camcorder in this mode.

14. Circuit Operating Descriptions

14-1 Power

14-1-1 About S.M.P.S

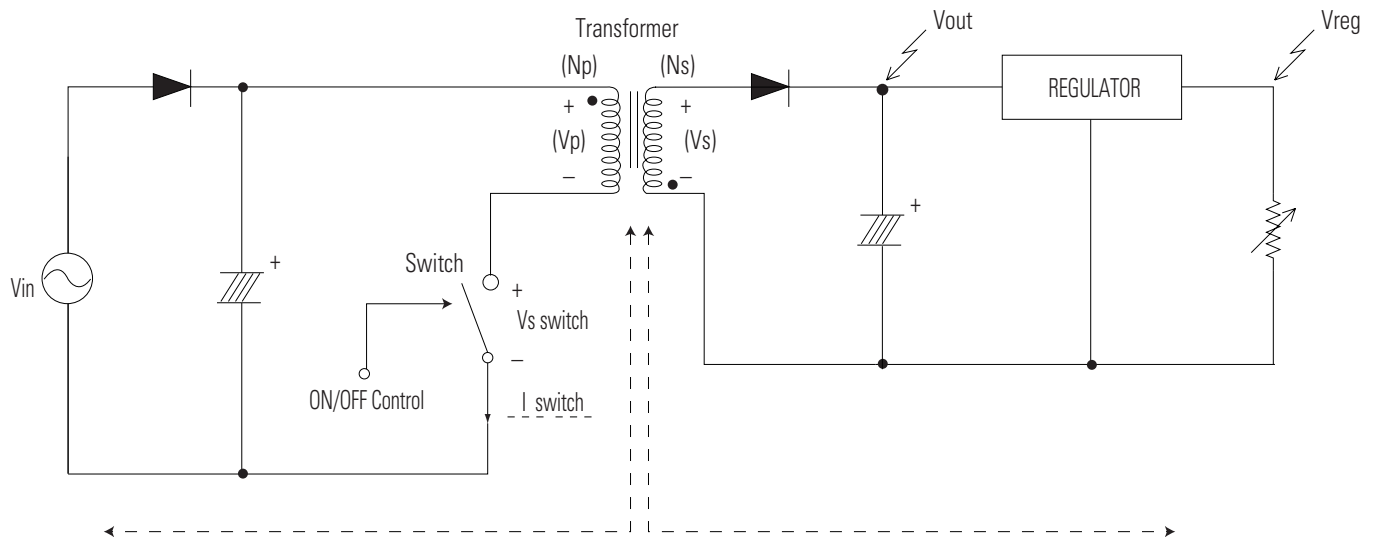


Fig. 14-1

◆Terms

- 1) 1st : Common power input to 1st winding.
- 2) 2nd : Circuit follows output winding of transformer.
- 3) f (Frequency) : Switching frequency (T : Switching cycle)
- 4) Duty : $(T_{on}/T) \times 100$

14-1-2 Circuit description Control

(a) AC Power Rectification/Smoothing Terminal

- 1) BD01 : Convert AC power to DC (Wave rectification).
- 2) CIS01 : Smooth the voltage converted to DC.
- 3) L1S02, C1S04, C1S05 : Noise removal at power input/output.
- 4) R1S04 : Rush current limit resistance at the moment of power cord insertion.
 - Without R1S04, the bridge diode might be damaged as the rush current increases.

(b) SNUBBER Circuit : R1S02, R1S03, C1S08, C1S07, D1S05

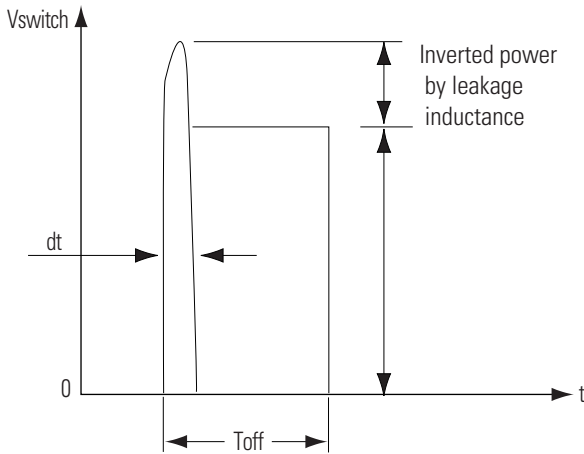


Fig. 14-2

- 1) Prevent residual high voltage at the terminals of switch during switch off/Suppress noise. High inverted power occurs at switch off, because of the 1st winding of transformer : ($V = -L1 \times di/dt$, L1 : Leakage Induction) A very high residual voltage exist on both terminals of Q1S01 because dt is a very short.
- 2) SNUBBER circuit protects Q1S01 from damage through leakage voltage suppression by RC, (Charges the leakage voltage to D1S05 and C1S08 and discharges to R1S02, R1S03).
- 3) C1S38 : For noise removal

(c) IC1S01 Vcc circuit

- 1) R1S05, R1S07, R1S08 : IC1S01 driving resistance (IC1S01 works through driving resistance at power cord in)
- 2) IS1S01 Vcc : R1S06, D1S07, C1S09
 - ① Use the output of transformer as Vcc,because the current starts to flow into transformer while IC1S01 is active
 - ② Rectify to D1S07 and smooth to C1S09.
 - ③ Use the output of transformer as IC1S01 Vcc : The loads are different before and after IC1S01 driving. (Vcc of IC1S01 decreases below OFF voltage , using only the resistance dut to lode increase after IC1S01 driving.)

(d) Feedback Control Circuit

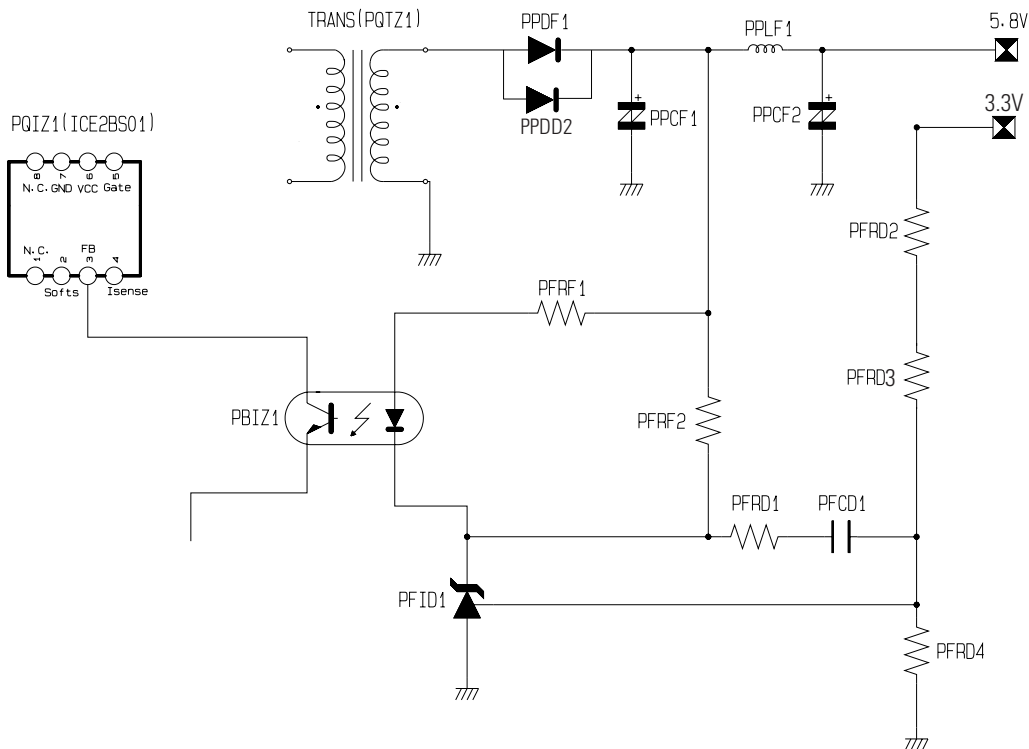


Fig. 14-3

- 1) F/B terminal of IC1S01 determines output duty cycle.
- 2) C-E (Collector-Emitter) of IC1S01 and F/B potential of IC1S01 are same.

14-1-3 Internal Block Diagram (Internal Block Diagram of S.M.P.S. Circuit)

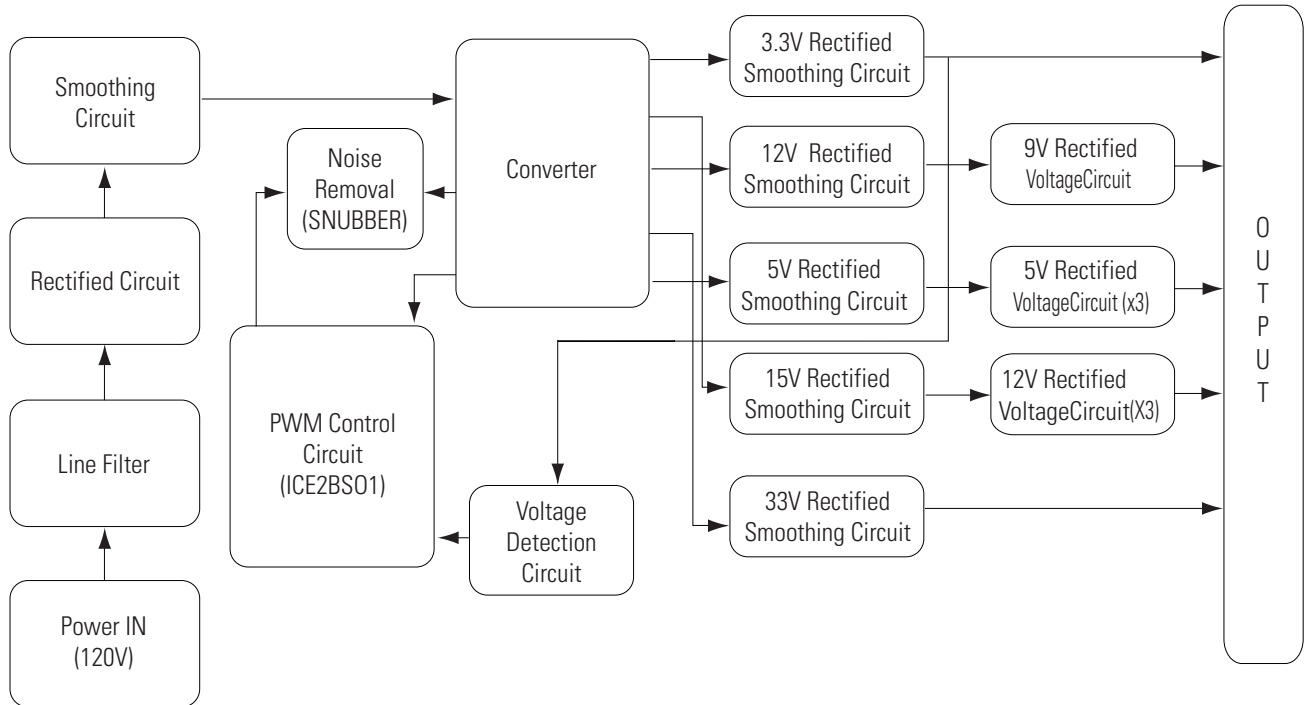


Fig. 14-4

14-2 AV Codec

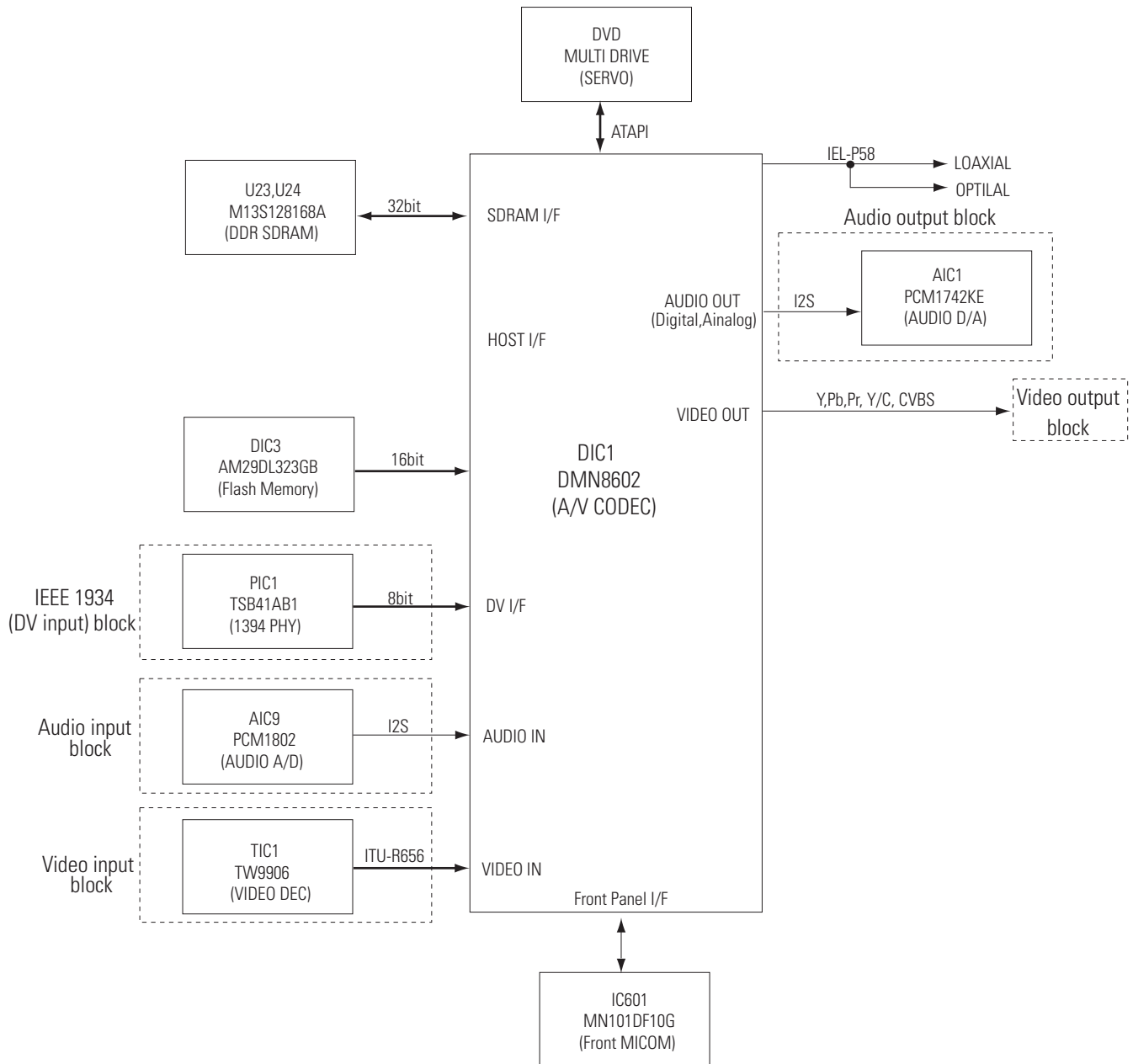


Fig. 14-5

- Main system control
- A/V Encoding/Decoding
- Transcoding/rating
- IEEE 1394 link layer function
- ATAPI interface with DVD-Multi Drive
- Analog Progressive/interlaced video output

14-2-1 GENERAL DESCRIPTION

Samsung S5L3200 MPEG AV Codec is designed to provide a cost-effective, low power size and high performance DVD recorder solution for DVD-VR, DVD-video, DVD-audio & many of CD applications. To reduce total system cost, The S5L3200 also provides the following features: a front-end controller, a back-end decoder, a control CPU with separate 4KB instruction and 4KB data cache, an improved audio DSP, a programmable video encoder with a dual output capability of interlaced and progressive scan, DDR memory controller, 4-channel timers with PWM, I/O ports, 5-channel 10-bit DACs, 2-channel UARTs with handshake, IIC bus interface, IIS bus interface, SPI, dual ATAPI, IEEE1394, USB 1.1 Host I/F and PLL for clock generation.

14-2-2 A/V Processor (V1) Functional Description

1) RISC processor architecture

- ARM940T core processor
- Fully 16/32-bit RISC architecture
- Harvard cache architecture with separate 4KB instruction and 4KB data cache
- Protection unit to partition memory and set individual protection attributes for each partition
- Up to 200 MHz operating frequency.

2) Memory controller

- Address space: 256 M-byte for each bank (total 1 Gbyte space)
- Supports programmable 8/16-bit data bus width for ROM/SRAM interface
- Supports 16-bit data bus width for DDR-SDRAM interface
- 3 memory banks; 2 memory banks for ROM, SRAM etc, 1 memory bank for SDRAM
- Fully programmable access cycles for all memory banks
- Supports external wait signal to expand the bus cycle.

3) Cache memory

- 64 way set-associative cache with I-cache (4KB) and Dcache (4KB)
- 8-words per line with one valid bit and two dirty bits per line
- Pseudo random or round robin replacement algorithm
- Write through or write back cache operation to update the main memory
- Write buffer can hold 8 words of data and four addresses.

Clock & power manager

- Low power consumption
- On-chip PLLs
- Clock can be fed selectively to each function block by software
- Power mode: normal, slow and idle mode (normal mode: normal operating mode, slow mode: low frequency clock without PLL, idle mode: stop CPU clock only)
- Wake up by interrupt from idle mode.

4) Interrupt controller

- 32 interrupt sources (watch dog timer, 4 timers, UARTs, 8 external interrupts, IIC, IIS, SPI, IR, etc.)
- Edge detect mode on external interrupt source
- Programmable polarity of rising and falling
- Supports FIQ (fast interrupt request) for very urgent interrupt request.

5) Video pre-processor

- Noise reduction by motion-compensated temporal filtering
- Bitmap generation for motion estimation of MPEG encoder
- Scene change detection.

6) MPEG video encoder

- Encodes MPEG1 & MPEG2 video stream (MP@ML)
- Efficient motion estimation by hierarchical motion vector search and binary image matching.

7) MPEG video decoder

- Decodes MPEG1 & MPEG2 video stream (MP@ML)
- Error detection and autonomous error concealment.

8) Audio DSP

- Decodes Dolby AC-3, MPEG1, MPEG2, DTS, MLP, HDCD, AAC and WMA
- Supports down mix
- MAC2424 for audio signal processing
 - 24-bit high performance fixed-point DSP coprocessor, 24x24 MAC operation in 1 cycle.
 - 2 multiplier accumulator registers, 4 general accumulator registers, and 8 pointer registers.

14-3 SERVO (DVP Multi Drive)

1) Pick-Up

Data in the disc is processed from the optical pick-up unit (OPU). OPU includes the Elantec chip (EL6912c) which is a highly integrated laser diode driver designed to support multi-standard writable optical drives. This chip also has an IV amplifier with concurrent read and write sampling. The architecture allows reprogramming of the timers to support different media DVD or CD standards, and different speed.

2) A-Chip

A chip is RF processor. This module performs RF signal processing which includes RFIP, RFIN, AGC, RF equalizer. This processor is able to detect tracking error, focus error and various signals such as CE, PE, SBAD, DEFECT, BCA, MIRROR, Wobble, TZC, RC, and RECD.

3) C-Chip

C-Chip is composed of DP1, PRML and WS.

First, the Data processor1 (DP1) performs EFM/EFM+ Demodulation and data is stored in the buffer memory in data processor2 (DP2). DVD data in this buffer is transferred to CSS/ATAPI through error-correction code

(ECC), descramble process and error detection code (EDC).

Second, WS performs the following processes.

- ① Delay compensation using Shift register
- ② Sample/Hold pulse generation
- ③ I/V Gain Control
- ④ Providing clock for RF chip
- ⑤ OPC Control signal generation

Lastly, PRML completes the adaptive EQ/VD and Digital PLL.

4) D-Chip

D-Chip consists of Servo DSP, DP2 and 1Mbit memory. Servo DSP is dealing with controlling the servo-mechanism in DVD recorder. Servo-DSP has the following features.

- ① Built-in 10Bit ADC(8ch), DAC(3ch) and PWM(7ch)
- ② Step Motor Control Logic: Macro/Micro Step
- ③ Track Counter: long distance velocity control direct seek
- ④ Shock/Defect detection
- ⑤ Header (DVD-RAM)/Land Pre-Pit (DVD-R/RW) Detection
- ⑥ Several Servo Monitor Signal Detection
- ⑦ RF IC Interface
- ⑧ Micom Interface
- ⑨ Digital Servo Control of focus, tracking, sled and seek
- ⑩ Disc Auto-Detection
- ⑪ Automatic Adjustment of the offset, balance and gain of Focus and Tracking Signal
- ⑫ Direct Seek with Velocity Control
- ⑬ Step Motor Control: Macro Seek
- ⑭ De-Track and Lens Shift Detection and Compensation
- ⑮ Center Error Control
- ⑯ DVD Layer Jump
- ⑰ Tilt Detect and Compensation

DP2 performs High Speed ECC and CD DA Decoder.

5) ATAPI Controller

ATAPI (ATA Packet Interface) the standard interface protocol used to connect the CD/DVD Drive to IDE interface. Data from the front-end is processed to back-end through this ATAPI protocol. Sanyo chip (LC98600CT-XB0) is utilized for ATAPI interface. LC98600CT-XB0 has the following features.

- ① ECC and EDC correction/addition for CD-ROM data
- ② Subcode decoding/encoding
- ③ Spindle servo control
- ④ CLV/CAV servo control using ATIP data
- ⑤ ATIP decoding and CRC check functions
- ⑥ Providing random EFM output for PCA use
- ⑦ High-accuracy write strategy signal output enabled (CD-R 52x)
- ⑧ Buffer RAM can be accessed by the microcontroller through the LC98600CT-XB0
- ⑨ Built-in ATA-PI(IDE) interface (supports Ultra DMA modes 0,1, and 2)
- ⑩ 52x decoding speed/52x encoding speed supported with 33.8688Mhz
- ⑪ Maximum transfer speed PIO mode: 16.6 MB/s (with IORDY), Ultra-DMA: 66MB/s (with DMARQ)
- ⑫ User can freely set the CD main channel, C2 flag, and subcode areas in buffer RAM
- ⑬ Built-in batch transfer function for transferring (CD main channel, C2 flag, etc., in a single operation)
- ⑭ Built-in multi-transfer function (allows multiple blocks to be sent to the host automatically in a single operation)

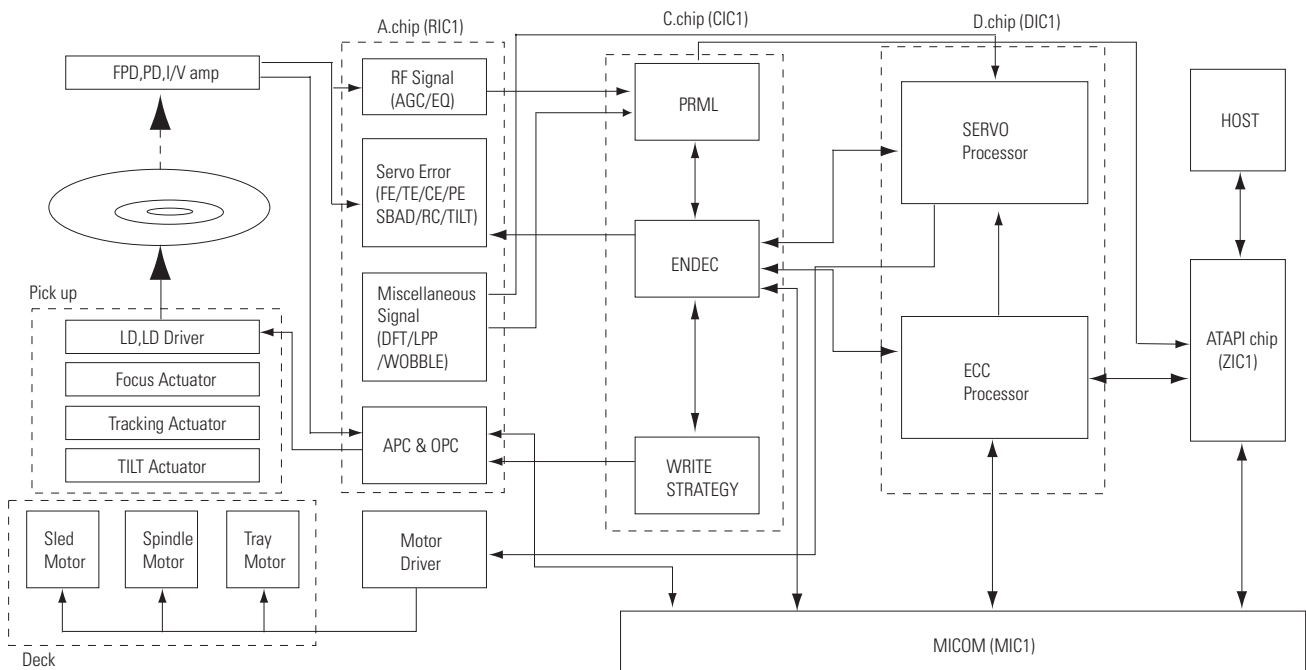


Fig. 14-6

14-4 Video Input

14-4-1 Video Input Outline

The model specified in this book uses service manual is the two Line Video input. Line 1 Video input is CVBS1 & S-Video1 at the Rear Panel.

Line 2 Video input is CVBS2 at the Front Panel.

The analog Video signal select Line 1 or Line 2 by the IC601 (Front Micom).

TIC1 (Video Decoder) diverges from the 27MHz crystal, then generates ITU-R656 (10bits) and 27MHz clock.

TIC1 (Video Decoder) does closed caption, copy guard detect processing and A/D conversion of analog Video signal converted into 11bit Digital Video signal (ITU-R656 Format) is outputted via DIC1 (MPEG2 Decoder & Encoder with video Encoder) of digital part.

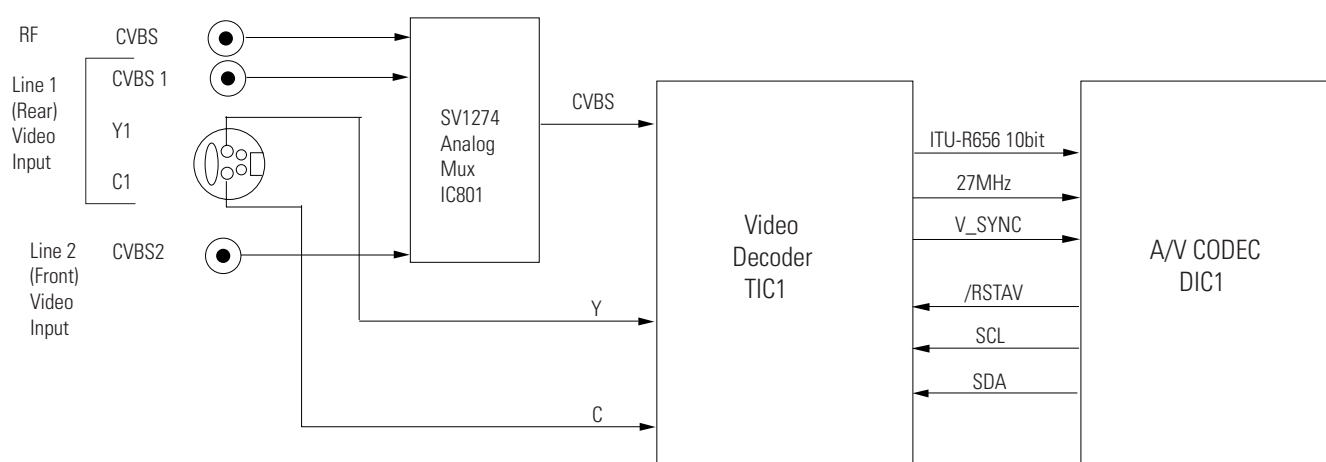


Fig. 14-7

14-4-2 Analog Mux (BU4052)

IC201 is Analog Mux.

As Pin 9, 10 of the IC201 are controlled by the Front Micom, IC201 select RF OF CVBS(Pin12) Line1 of CVBS[Pin14] and Line2 of CVBS[Pin 15].

The analog Video Signal of IC201 output is selected by the ic601 via TIC1(Video Decoder : TW9906) of analog Video input parts.

IC801 is Analog Mux.

As Pin53, 54 of the IC801 are controlled by the Front Micom, IC801 select RF OF CVBS(Pin2) Line1 of CVBS[Pin4] and Line2 of CVBS[Pin 6].

The analog Video Signal of IC801 output is selected by the ic601 via TIC1(Video Decoder : TW9906) of analog Video input parts.

14-4-3 NTSC/PAL Video Decoder (TW9906 : Video Decoder)

The TIC1 (Video Decoder : TW9906) device is a high quality, single-chip digital video decoder that digitizes and decodes all popular baseband analog video formats into digital component video. The TIC1 (Video Decoder : TW9906) supports the analog-to-digital (A/D) conversion of component RGB and YPbPr signals, as well as the A/D conversion and decoding of NTSC, PAL and SECAM composite and S-video into component YCbCr. This TIC1 (Video Decoder : TW9906) includes four 10-bit 30-MSPS A/D converters. and A/D conversion of 10bit analog Video signal converted into Digital Video signal (ITU-R656 Format) is outputted via DIC1 (MPEG2 Decoder & Encoder with video Encoder) of digital part.

The following output formats supply 10-bit 4:2:2 YCbCr to the DIC1 (MPEG2 Decoder & Encoder with video Encoder) of digital part.

On CVBS and S-video inputs, the user can control video characteristics such as contrast, Brightness, saturation, and hue via an I2C DIC1 port [PIN V17, V18] interface.

The TW9906 decoder includes methods for advanced vertical blanking interval (VBI) data retrieval. The VBI data processor (VDP) slices, parses, and performs error checking on teletext, closed caption (CC), Copy Guard Detect Processing and other VBI data.

14-5 Video Output

14-5-1 Outline

DIC1 (MPEG2 Decoder & Encoder with video Encoder) diverges from the 13.5MHz crystal, then generates VSYNC and HSYNC.

DIC1 (MPEG2 Decoder & Encoder with video Encoder) does RGB encoding, copy guard processing and D/A conversion of 10bit Video signal converted into analog signal is outputted via amplifier of analog part.

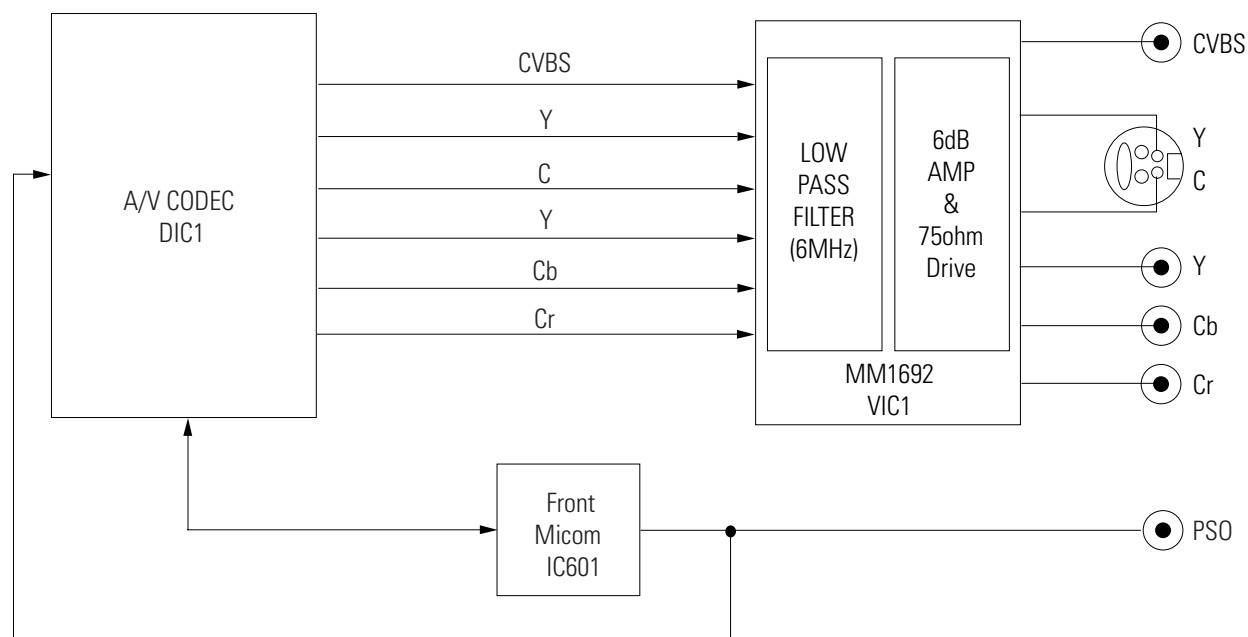


Fig. 14-8

14-5-2 NTSC/PAL Digital

DIC1 inputted from pin E1 with 13.5MHz generates HSYNC and VSYNC which are based on video signal. DIC1 is synchronous signals with decoded video signal.

The above signals, which are CVBS (Composite Video Burst Synchronized), Y(S_Video), C(S_Video), Y(Component)/G(Green), Cr(component)/R(Red), Cb(component)/B(Blue), are selectively outputted 480i (interlaced Video Output), 480P(progressive Video Output) by the Pront button DiC1 adopts 10bit D/A converter. DIC1 perform video en-coding as well as copy protection.

14-5-3 Amplifier (MM1692)

VIC1 of JACK PCB is 6dB amplifier.

Based on CVBS signal, the final output level must be 2Vpp without 75ohm terminal resistance.

Because the level of video encoder output is only 1Vpp, the level is adjusted with the special amplifier.

When mute of pin 5 is high active, if the pin is floating and connect to power, the output signal is never outputted.

Y, C, Y(R), Cb(B), Cr(R) outputted from video encoder are inputted to VIC1 [Pin14, 16, 13, 12, 11] respectively.

And CVBS Output[Pin 15] is made by Y & C Mixing signal.

The signal to which gain is adjusted by amplifier is outputted from jack via 75ohm Resistance (VDR1,2,4,5,6,).

14-6 Audio

14-6-1 Input Block

This Model has two stereo line input terminals. and internal TV-audio from RF Tuner Block.

These three Analog audio signal source are converted to digital data by Input Block.

Input Block has a Multiplexer (IC801), A/D converter (AIC2).

IC801 change it's output by selection control signal from IC601 (Front Micom).

14-6-2 Output Block

The model specified in this service manual has two stereo analog line out terminal, and two digital output terminal.

Decoded signal by DIC1 is inputted to AIC1 (D/A Converter), then filtered and amplified by AIC4 (OP-Amp).

And the digital audio signal (IEC-958) is driven by AIC3 inverter and ouputted in Optical/Coaxial (S/PDIF) terminal.

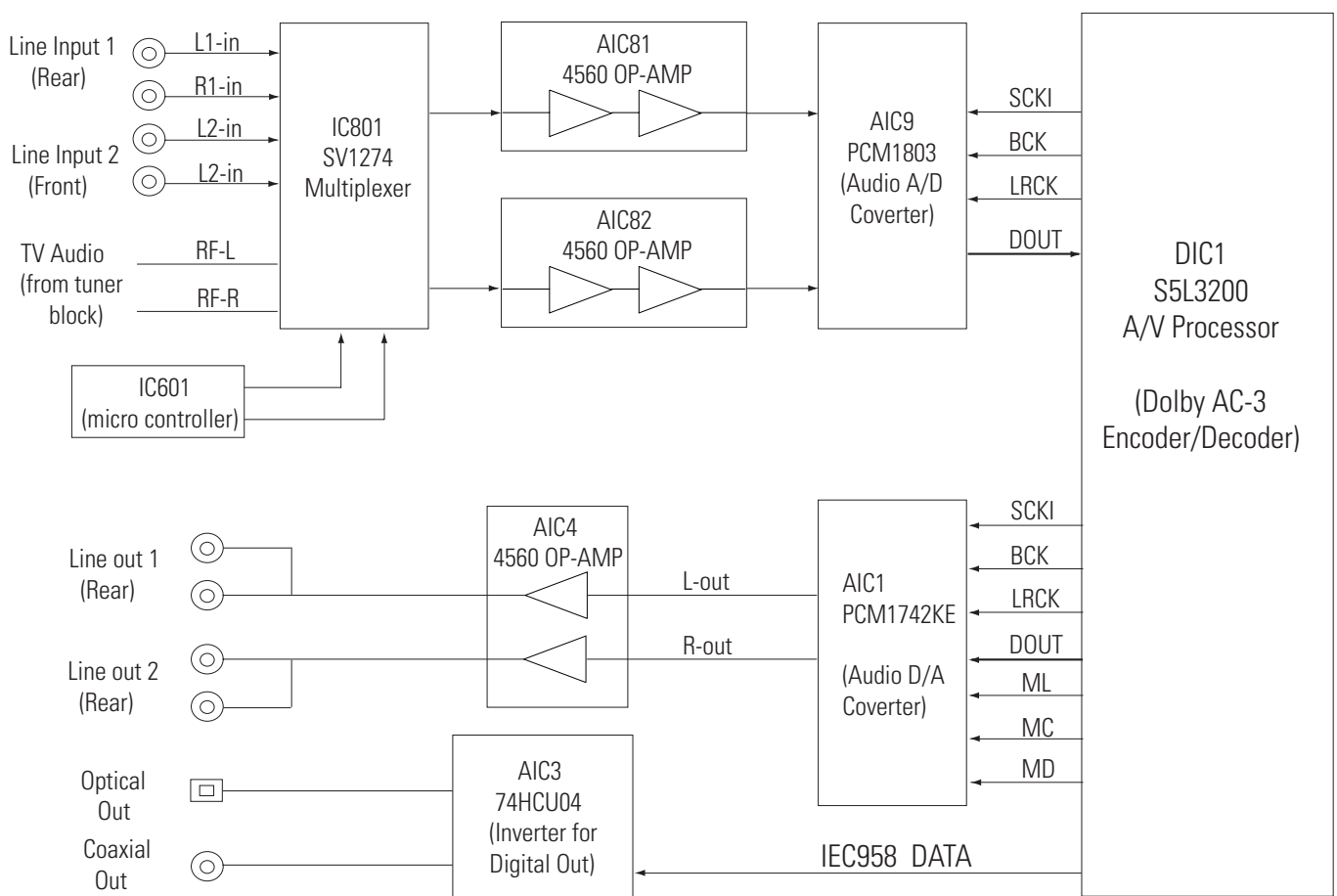


Fig. 14-9

14-7 Tuner

1) Low Pass Filter & High Pass Filter

This consists of IF trap circuit and UHF & VHF separation circuit. If the input signal is IF (45.75MHz), this filter prevents interference.

2) Single tune

This consists of a filter circuit, RF AMF, impedance conversion circuit, image trap and a single tuning circuit. It prevents noise and other interference signals. It is a very important part which improves NF (noise figure) and prevents the various of spurious signals.

3) RF AMF

RF AMF is made of FET (Field Effects Transistor). It is controlled by AGC coming from IF DEMOD block.

4) Double tune

It consists of a double tuning circuit to improve characteristic of rejection that results in a better band characteristic.

5) Mixer IC (Mixer, OSC, PLL)

It consists a VHF and UHF OSC and Mixer circuit. We applied mixer to make better characteristic of rejection, it shows especially various beat characteristic.

6) PLL IC

The PLL IC plays a role selection of Tuner channel. It was built-in three wire PLL IC, charge pump and band driver.

The minimum of step frequency is 31.25KH z.

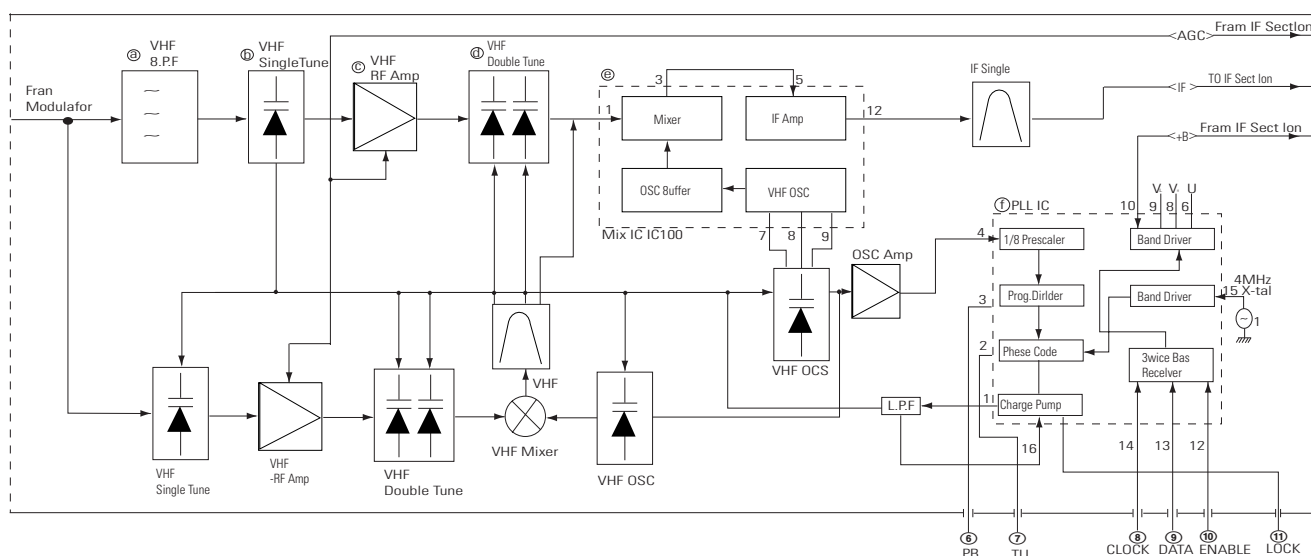


Fig.14-10

14-8 IF

1) SAW FILTER

It passes only needed band of the signal that is converted to IF frequency and decrease the others band to minimize the effect of adjacent channel.

2) RF AGC Control

It used adjusting to determine RF AGC working point in tuner.

3) VCO Tank

When VCO tank detects PLL, it makes the signal which sets a standard.

4) AFT (Auto Frequency Tuning)

AFT automatically controls the oscillator frequency in the tuner, so that it retains a constant level.

It is a quadrature detection type. The carrier, which is detected from video det is directly input to AFT.

The 90 degree delayed phase signal is input at the same time to AFT and, the results come out.

5) IF AMP

IF signal, which is selected in Saw filter, is amplified in IF amp frequency enough to be detected. The IF amp has parallel inputs & outputs structure.

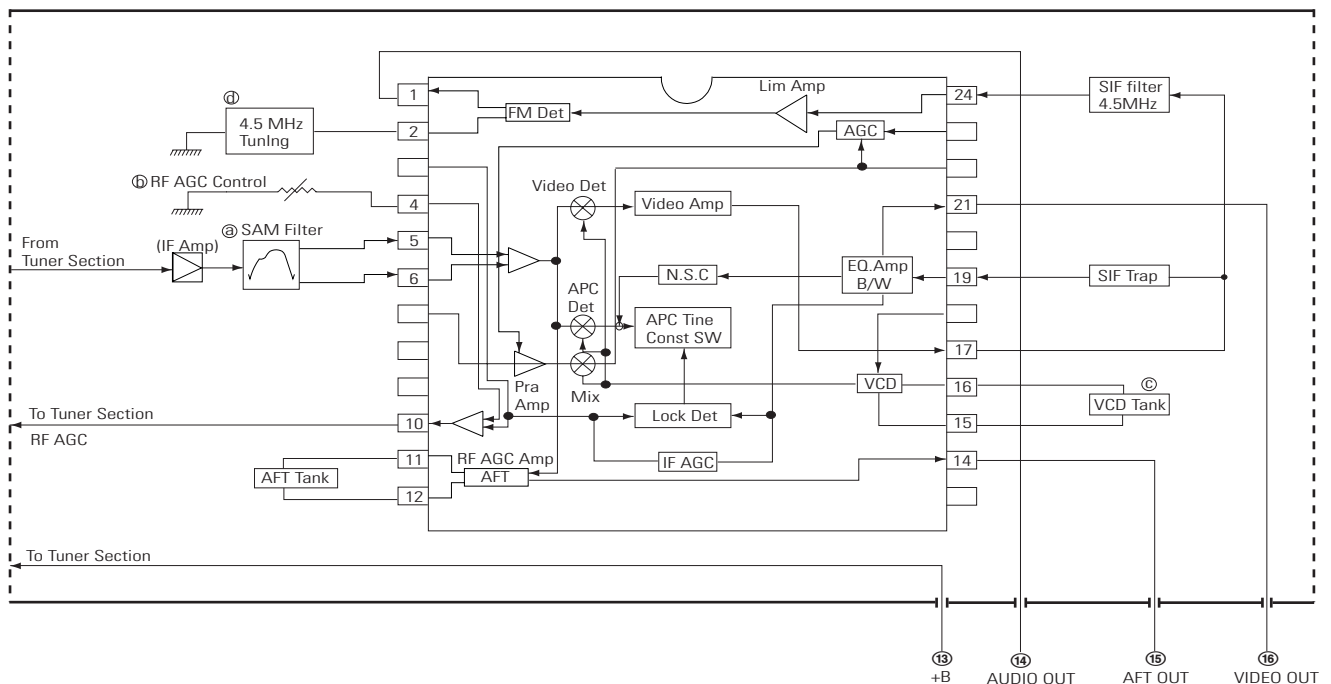


Fig. 14-11

14-9 VCR System Control

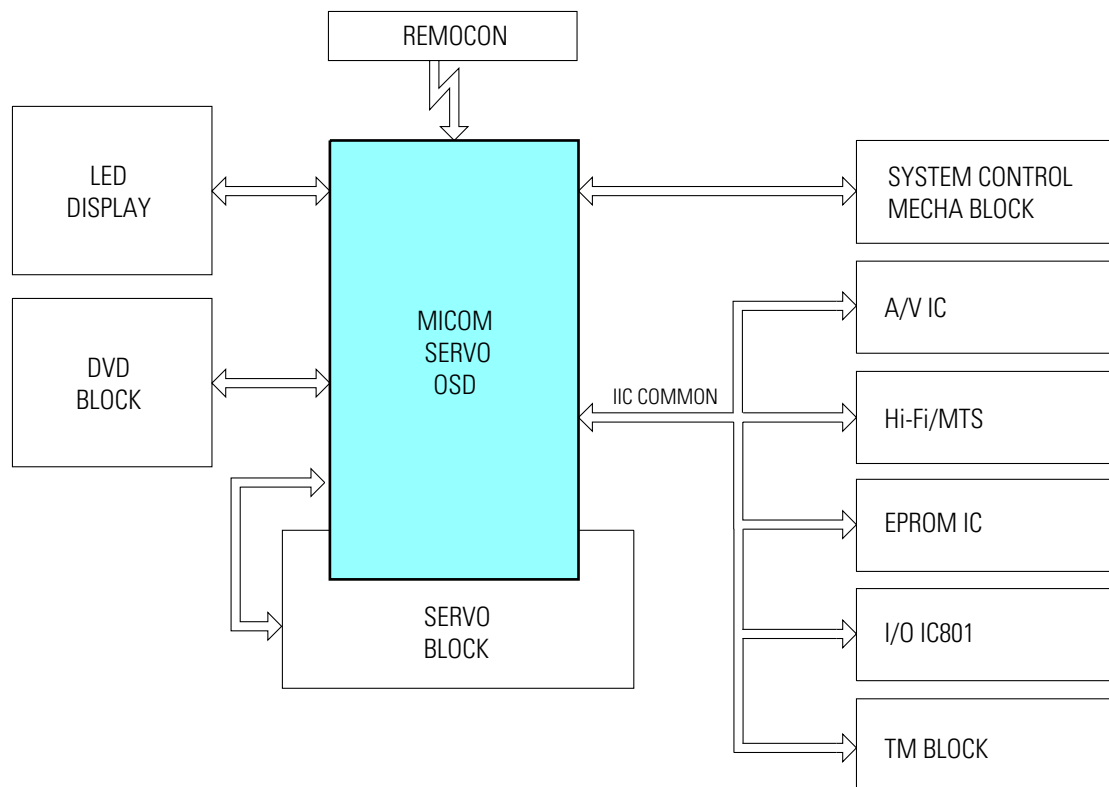


Fig. 14-12 Micom Block Diagram

(1) Outline

The system control circuit inputs the commands given by the operator to set the mechanism and circuit to the commanded mode. The circuit also inputs the detected output from the tape and mechanism protection sensor and protects the VCR and tape against abnormal operation.

Fig. 14-11 is a simplified system control block diagram.

The system control is performed by 4 control sections. (System and timer control, Servo control, F/S Tuner, On Screen Display).

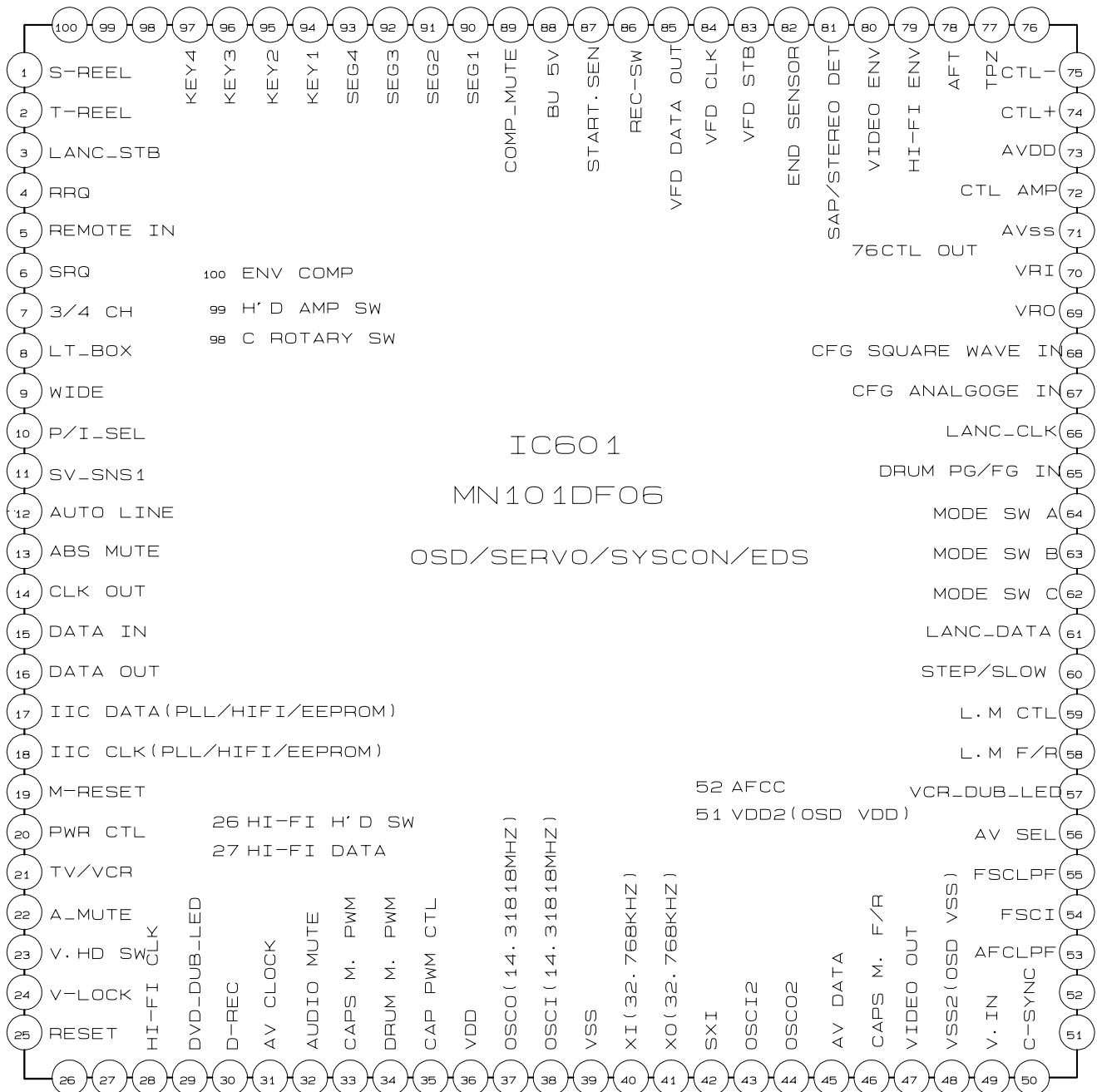


Fig. 14-13 IC601 Block Diagram

(2) Mechanism/Circuit Control

When the u-COM inputs operator's commands via the key input or remote input, the mechanism and circuits are set to the command mode. This function controls mechanism/servo section and audio/video processing section.

1) Cassette Loading Control

Controls loading and ejection of a cassette and determines the mechanism operation mode; tape loading/unloading, action/release of various breaks, tension, take up mechanism etc.

2) Tape Protection Sensor Monitoring

Detects abnormal operation in tape using the supply and take up end sensor, reel sensor and SW 30Hz pulse for drum rotation.

3) Capstan Motor Control

Determines the tape speed and direction, fast forwards and rewinds the tape etc.

4) Tape Counter Control

Counts the control pulses on the control track, picked up by the control head and shows it on the digital multidisplay.

5) Servo Control

Determines the operation mode of the servo circuit. Control the speed of drum and capstan motor, and then Control the phase of drum and capstan motor.

6) Record Safety Tap Detection

Detects the safety tab on the rear of a cassette to prevent a prerecorded program from being erased.

7) Loading/Unloading control

Controls a series of loading/unloading operation after the u-COM judges the operation mode and sets the mechanism to suitable mode. Fig. 14-13 show correlation between u-COM and peripheral components during the loading/unloading operation.

The mechanism state switch (PROG. SW) detects the mechanism position. When the driving gear is turned by the loading motor, the switch driving slider traces the groove, and this switch stops at the correct position corresponding to each mode. In other words, the u-COM judges the present mechanism state from the PROG SW after receiving the mode data, then it outputs the loading motor and capstan motor control signals.

This continues until the PROG SW reaches the correct state by the u-COM.

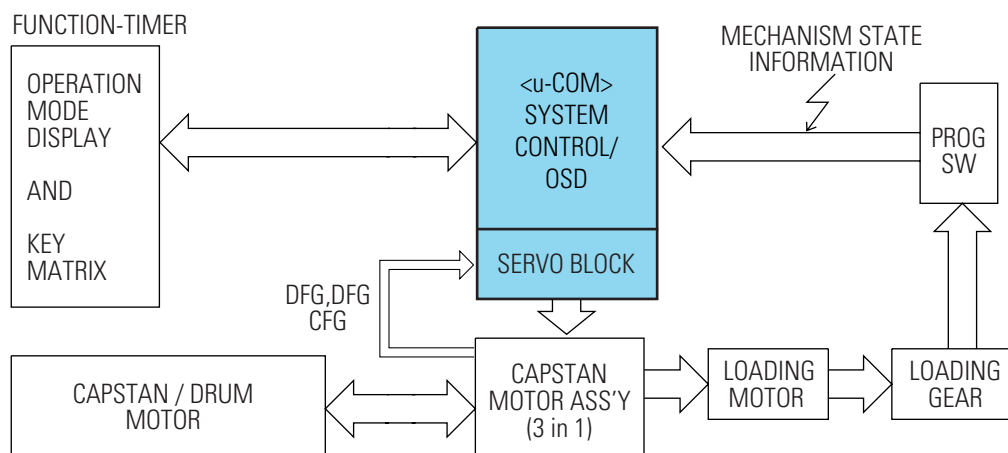


Fig. 14-14 The Relationship Between u-COM, Capstan, Cylinder and Loading Motor

(3) Program SW Input

The mechanism state for each mode is shown in table 1 below. The mechanism state is classified into position, and correlation between the switch position and mechanism state is shown in table 1, also.

<Table 14-1 : Prog. SW State in Each Mode>

POSITION	CAM S/W			START SEN	ACTION MODE
	A	B	C		
STANBY	0	0	0	0	Eject
POWER OFF	0	0	0	1	Unload POWER OFF
LOADING START	0	0	0	1	(Tape loading start point)
LOADING END	1	0	1	1	(Tape loading end point)
REV	1	1	0	X	Reverse picture search, reverse SLOW
PLAY	0	1	0	X	Play, Rec, F-PS, Still, SLOW, F-ADV
STOP 1	0	0	1	1	Stop (Play position 5 Min. over)
STOP 2	0	0	1	X	(MAIN Break ON MODE)
FF/REW 1	1	0	0	X	High speed Rew, Low speed FF
FF/REW 2	0	1	1	X	High speed FF, Low speed Rew

(4) Motor Control

In case of Scorpio-2 Deck, Loading Motor Drive IC lies in Capstan Motor, not like Scorpio-1 Deck.

In detail, Capstan Motor Drive IC is designed to drive Loading Motor + Capstan Motor + Cylinder Motor in one IC. (See Fig. 14-14)

<Table 14-2 : Motor Control Logic>

CN604-PIN10	MOTOR
0 ~ 1V	Reverse
2 ~ 3V	Stop
4 ~ 5V	Forward

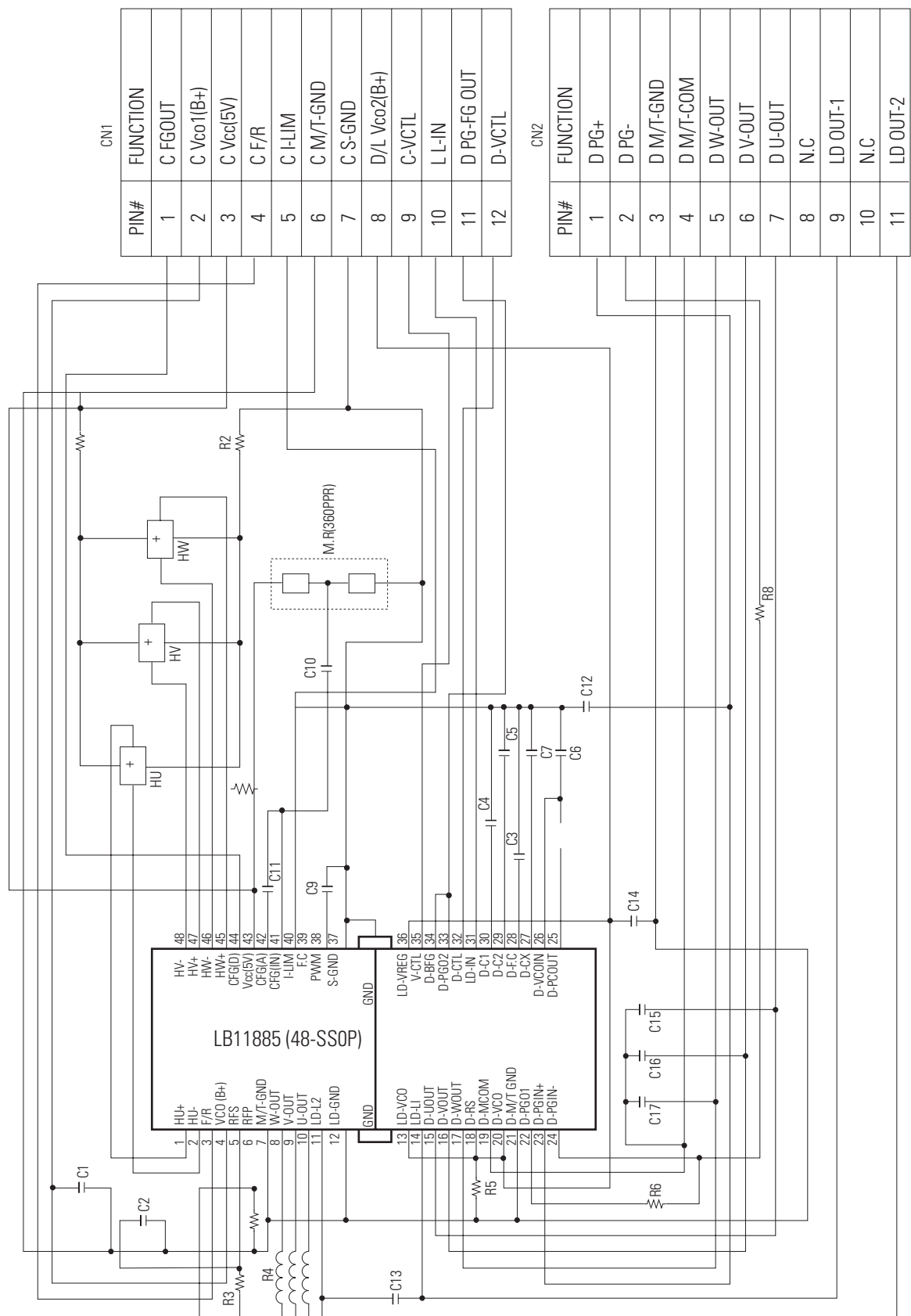


Fig. 14-15 Loading Motor + Capstan Motor + Cylinder Motor Block Diagram

(5) Stop Mode

The VCR enters the stop mode when the stop button is pressed during playback, record, rewind and fast forward mode. When trouble is detected, the VCR enters the stop mode to protect the tape and mechanism or when the tape reaches the end, etc.

- State Input ;
Power switch on position.
Stop button operation in all mode, except for timer recording and XPR.

(6) Play Mode

- State input ; Play button operated in stop, fast forward, rewind, forward search, reverse search, still mode, etc.,
- Indication output ;
"PLAY" lights in LED Module.
- Output at ;
IC601 Pin 46 (CAP F/R) : H

(7) Trick Play Mode

Trick play modes are classified into forward search, reverse search, still, slow and frame advance. Audio signal is muted by pin 32 of IC601 (A.MUTE). V-lock is controlled by pin 24 of IC601.

(8) Forward Search Mode

7 Times play speed search in SP and SLP, 21 times play speed search in SLP.

- State input ; Press the fast forward button on the VCR front panel or the remote control in play or still mode.
- Indication output ; "FPS " display in LED Module during 3 seconds.
- Output at ;
IC601 Pin 46 (CAP F/R) : H
IC601 Pin 32 (A.MUTE) : H

(9) Reverse Search Mode

7 times play speed reverse search in SP, 21 times play speed reverse search in SLP.

- State input ;
Press the rewind button on the VCR front panel or on the remote control in play or still mode.
- Indication output ;
"RPS" display in LED Module during 3 seconds.
- Output ;
IC601 Pin 46 (CAP F/R) : L
IC601 Pin 32 (A.MUTE) : H

(10) Slow Mode

- State input ; Press "▶||" button and then press "▶▶" button on the remote control.
The slow speed can be changed when "▶▶" or "◀◀" button is pressed.
- Indication output ; "SLOW" lights in LED Module.
- Output at ;
IC601 Pin 46 (CAP F/R) : H
IC601 Pin 32 (A.MUTE) : H

(11) Play/Still Mode

The same track is traced by the video heads.

- State input ; Press “▶||” button in play modes.
- Indication output ; “STILL” display in LED Module.
- Output at ;
IC601 Pin 46 (CAP F/R) : H
IC601 Pin 32 (A.MUTE) : H

(12) Record Mode

Must use a cassette with the safety tab.

Index signal is recorded on the control track of the tape at the start of recording.

- State input ;
Press the record button during stop mode and record pause mode or at the preset time reached in the timer record mode. Press the REC button in stop mode.
- Indication output ;
“REC” lights in LED Module in normal record mode, “0:30, 1:00, 1:30, 2:00, 3:00 or 4:00” display in timer XPR modes.
- Output at ;
IC601 Pin 46 (CAP F/R) : H

(13) Record Pause Mode

The pinch roller is released from the capstan shaft in a moment.

The brake is applied to the take up reel to prevent tape slack during the record pause mode.

- State input ; Press “||” button in the record mode.

Note : Inoperative during recording and XPR mode.

- Indication output ; “PAUSE” display in LED Module.

(14) Fast Forward Mode

Tape fast forward operation using capstan motor.

- State input ; Press the rewind button in the stop or fast forward modes.
- Indication output ; “FF” lights in LED Module.
- Output at ;
IC601 Pin 46 (CAP F/R) : H

(15) Rewind Mode

Tape rewind operation using the capstan motor.

- State input ; Press the rewind button in the stop or fast forward modes.
- Indication output ; “REW” lights in LED Module.
- Output at ;
IC601 Pin 46 (CAP F/R) : L

(16) Rewind Shut-Off Mode

Tape rewind operation then power off mode.

- State input ; Press the power button in the rewind mode.

(17) Trouble Detection

The trouble detection circuits are provided to protect the from damage (Fig. 14-15). The reel lock sensor detects incorrect rotation of supply and take up reel. The reel lock sensor consists of the disk and photo sensor installed at the bottom of the reel disk. the disk has 6 or 8 shielder parts and the photo sensor consists of the LED and photo transistor assembly. When the light is shielded by the the shielder or enters the photo transistor, the output is obtained from the photo sensor. IC601 measures the period of the pulse. When it is 4 seconds or more during record/play, the VCR enters the reel emergency mode.

The VCR maintains the unload-power-on state in the reel emergency.

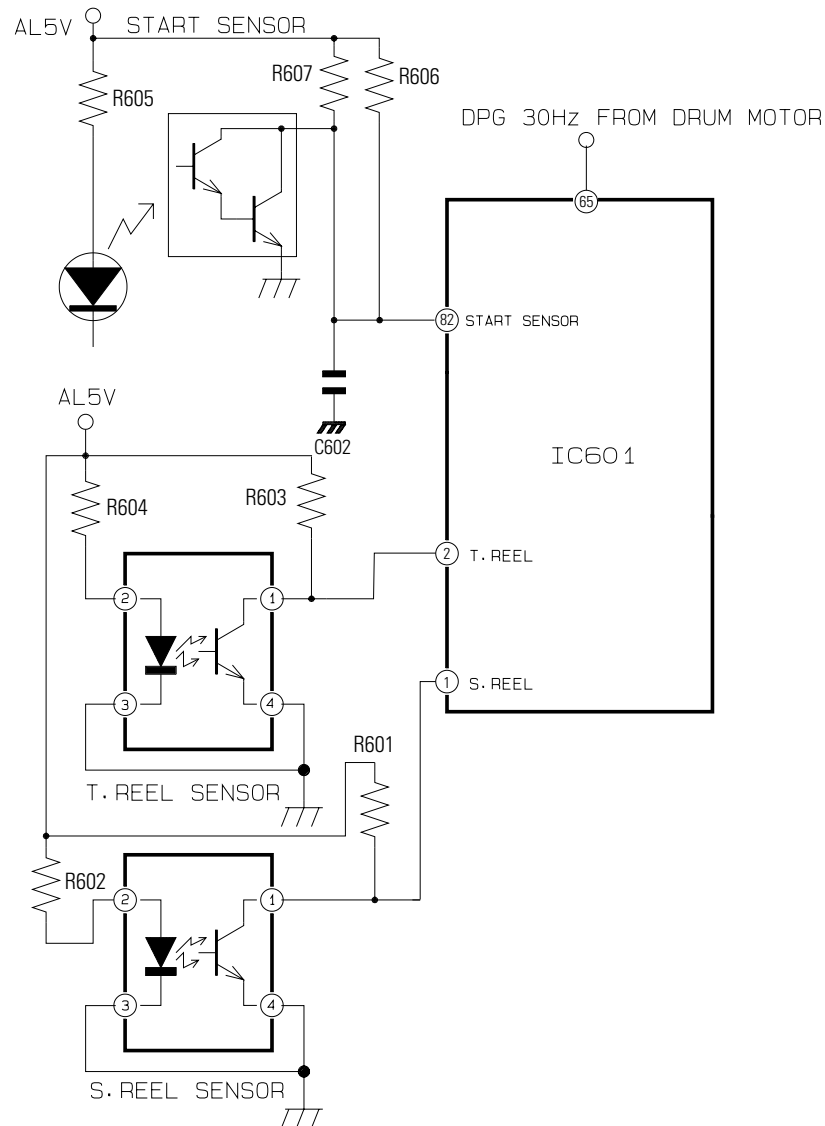


Fig. 14-16 Reel and Cylinder Lock T.END/S.END Sensor

(18) Cylinder Lock Sensor

If the frequency of D-FG is less than 230Hz or more than 430Hz during 500msec, and such situation occurs 3 times continued, micom makes the VCR drum emergency.

(19) Tape End Sensor

When end sensor detects the transparent section at the end of tape, the VCR enters auto rewind mode, except during timer recording and OTR mode. The cassette LED emits light through the transparent section of tape to the photo transistors, which are installed at both ends of the cassette. When start sensor detects the start section of the tape during reverse search and rewind, the VCR automatically goes to stop mode.

(20) Tape Counter Control

Fig. 14-16 is a simplified diagram of the tape counter control circuit. The tape counter in the u-COM counts the control pulses derived from control head. The control signal on the control track of the tape is picked up by the control head and supplied to pins 74, 75 of IC601. The control pulse is amplified by the u-COM IC. The u-COM determines the tape direction so the counter counts up when the "CAP F/R" signal is Hi and the counter counts down when the "CAP F/R" signal is Low. By counting the control pulse, the counter data is supplied to the VF display. Counter displays the time and it is increased or decreased by one minute after counting 1800 control pulses. Counter mode is switched to clock mode when the display button is pushed or when the VCR goes to power off mode. When the Clear button is pressed, the counter is reset to "00 : 00". The tape counter has a memory stop function.

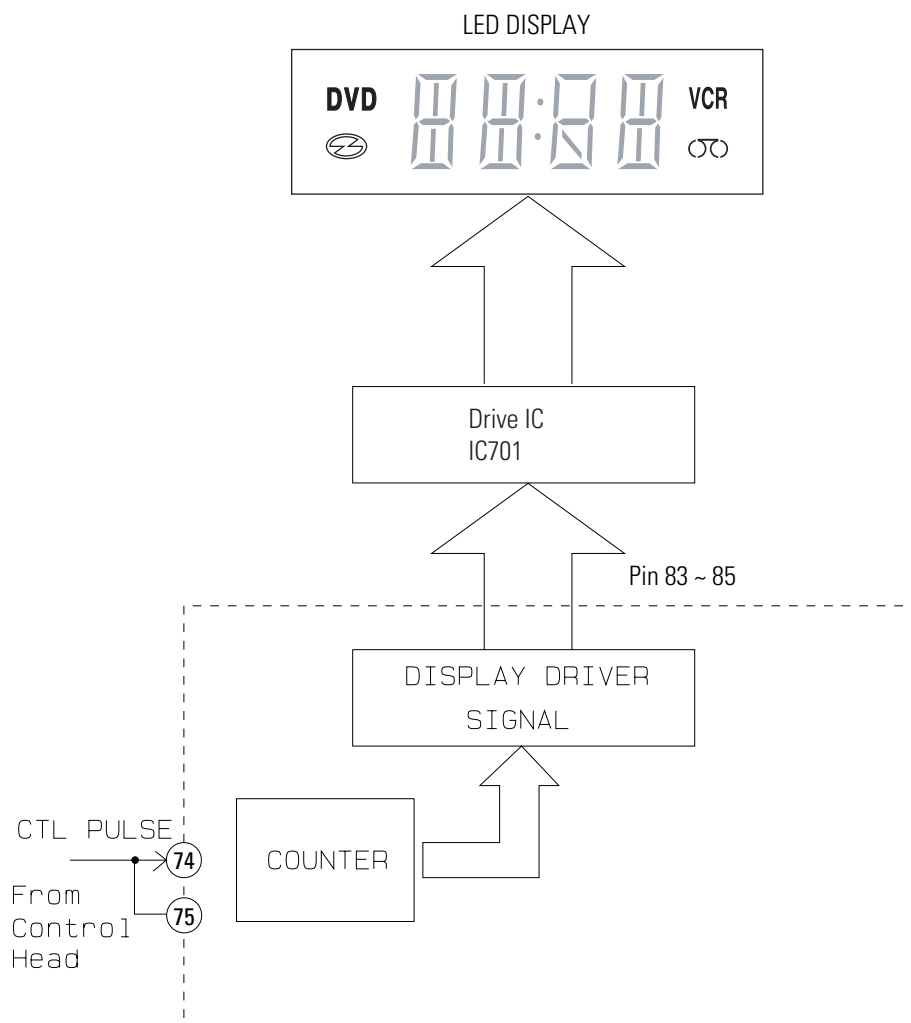


Fig. 14-17 Counter Display

(21) Timer/OTR Control

The timer can preset 12 programs in one month including daily and weekly programs. Express recording lets the operator record up to 4 hours without programming the timer.

(22) Clock Display

The clock generator inside of the u-COM counts the oscillation signal of XT601 for the timer clock data.

(23) Power Failure Detection

u-COM goes to the power failure mode when the 88 port is lower than 4/5 of AD Vcc level.

(24) 4H'D Control

During trick play (still,slow,F-advance), it is necessary to control pre-amp,video circuit. the micom control pin 98 (C-ROTARY), pin 99 (HD-AMP) of the IC601 during PB period in Slow mode.

These port is applied to video IC to operate the trick play.

14-10 VCR Servo

(1) Outline

The servo system is divided into three loops. The cylinder servo controls the rotation of video heads, the capstan servo controls the tape speed, and the tension. In addition it's necessary to control cylinder motor, especially during trick play in 4H'D models. The tension servo maintains the tape tension constant: it keeps the compression strength of tape against the video heads at the optimum level so that a stable RF signal is produced during recording and playback. The tension servo operation is entirely mechanical. The cylinder servo loop controls the phase and speed of the cylinder motor. The speed is kept at a constant 1800 RPM and the phase determines the mechanical position relative to the vertical Sync signal. The capstan servo loop controls the phase and speed of the capstan motor so that the video head can trace the video track correctly. It keeps tape speed constant according to the mode (SP, SLP) during playback and recording.

<Table 14- 3 : Servo System Signal>

MOTOR	SYSTEM	MODE	REFERENCE SIGNAL	COMPARISON SIGNAL
CYLINDER (VIDEO HEAD) (4H' D)	PHASE	REC	V-SYNC	SW 30Hz
		PB	REF30Hz	
	SPEED	COMMON	8MHz	CYLINDER FG(720Hz)
	SPEED& PHASE	TRICK PLAY (STILL. SLOW)	MICOM CONTROL CYLINDER SPEED TO MATCH H-SYNC SPEED	
CAPSTAN (4H' D)	PHASE	REC	DIVIDED CFG PULSE	REF 30Hz
		PB	CTL 30Hz	
	SPEED	COMMON	8MHz	CAPSTAN FG
	SPEED& PHASE	TRICK PLAY (STILL. SLOW)	MICOM CONTROL CAPSTAN DRIVE SIGNAL WITH CAP C.L	

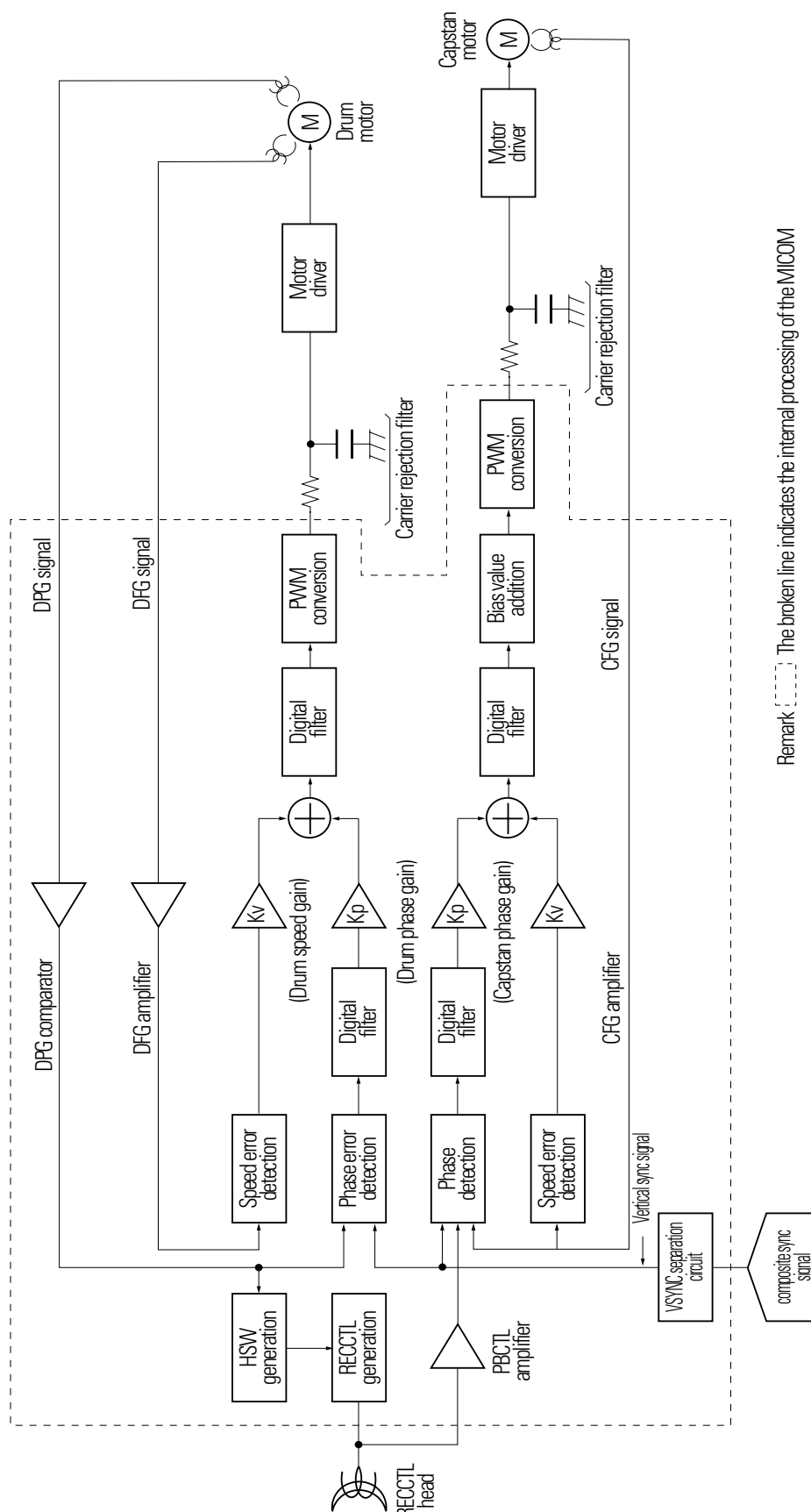


Fig. 14-18 Block Diagram

(2) Capstan Speed Error Detector

The capstan speed control operates so as to hold the capstan at a constant rotational speed, by measuring the period of the CFG signal. A digital counter detects the speed deviation from a preset value. The speed error data is added to phase error data in a digital filter. This filter controls a pulse-width modulate (PWM) output, which controls the rotational speed and phase the capstan.

When the error is zero, the PWM circuit outputs a waveform with a 50% duty cycle.

The CFG input signal from the capstan motor is a square wave. The CFG input signal is compared by a comparator and then sent to speed error detector as the CFG signal.

The speed error detector uses the system clock to measure the period of the CFG signal, and detects the deviation from a preset data value. The preset data is the value that would result from measuring the CFG signal period with the clock signal if the capstan motor were running at the correct speed.

The error detector operates by latching a counter value when it detects an edge of the CFG signal.

The latched counter provides 16 bits of speed error data for the digital filter to operate on.

The digital filter adds the speed error data to phase error data from the capstan phase control system, then sends the result to the pulse-width modulator as capstan error data.

(3) Capstan Phase Error Detector

The capstan phase error detector consists of a 16-bit counter, a capstan phase preset data register pair, a latch signal circuit driven by a feedback signal, and a capstan phase error data register pair.

The capstan phase control in rec mode is executed by comparing HD S/W, which is synchronized with V-sync, with divided CFG signal. And then it does in playback mode by comparing HD S/W, which is synchronized with DFG and DPG, with PB CTL signal.

The latch signal for the phase error data in record mode is the divided CFG signal, which is divided from the CFG signal in the CFG frequency divider to a frequency of 30Hz.

In playback, the latch signal is the divided CFG signal obtained by frequency division from the rising edge of PB-CTL signal (playback control pulse signal).

The error data is a signed binary value centered on a phase error of zero (corresponding to the correct rotational phase). If the phase lags the correct phase, the error is positive (+).

If the phase leads the correct phase, the error is negative (-).

(4) Drum Speed Error Detector

Drum speed control operates so as to hold the drum at a constant rotational speed, by measuring the period of the DFG signal. A digital counter detects the speed deviation from a preset value. The speed error data is added to phase error data in a digital filter. The filter controls a pulsewidth modulated (PWM) output, which controls the rotational speed and phase of the drum.

The DFG input signal from the drum motor is a square wave. The DFG input signal is compared by a comparator and then sent to the speed error detector as the DFG signal.

The speed error detector uses the system clock to measure the period of the DFG signal, and detects the deviation from a preset data value. The preset data is the value that would result from measuring the DFG signal period with the clock signal if the drum motor were running at the correct speed.

The error detector operates by latching a counter value when it detects an edge of the DFG signal. The latched count provides 16 bits of speed error data for the digital to operate on.

The digital filter adds the speed error data to phase error data from the drum phase control system, then sends the result to the pulse-width modulator as drum error data.

(5) Drum Phase Error Detector

Drum phase control must start operating after the drum motor is brought to the correct rotational speed by the speed control system. Drum speed control works as follows in record and playback.

- Record : Phase is controlled so that the vertical blanking intervals of the recorded video signal will line up along the edge of the tape.
- Playback : Phase is controlled so as to trace the recorded tracks accurately.

A digital counter detects the phase deviation from a preset value. The phase error data is added to speed error data in a digital filter. This filter controls a pulse-width modulated (PWM) output, which controls the rotation phase and speed of the drum. When the error is zero, the PWM circuit outputs a waveform with a 50% duty cycle.

The phase counter error detector compares the phase of the DPG pulse (tach pulse), which contains video head phase information, with a reference signal. In the actual circuit, the comparison is carried out by comparing the head-switching (HSW) signal, which is delayed by a counter that is reset by DPG, with a reference signal. The reference signal is the REF 30Hz signal, which differs between record and playback as follows.

- Record : V sync signal extracted from the video signal to be recorded (frame rate signal, actually 1/2V sync).
- Playback : 30Hz signal divided from the system clock.

14-11 VCR Video

(1) Luminance Signal Recording System

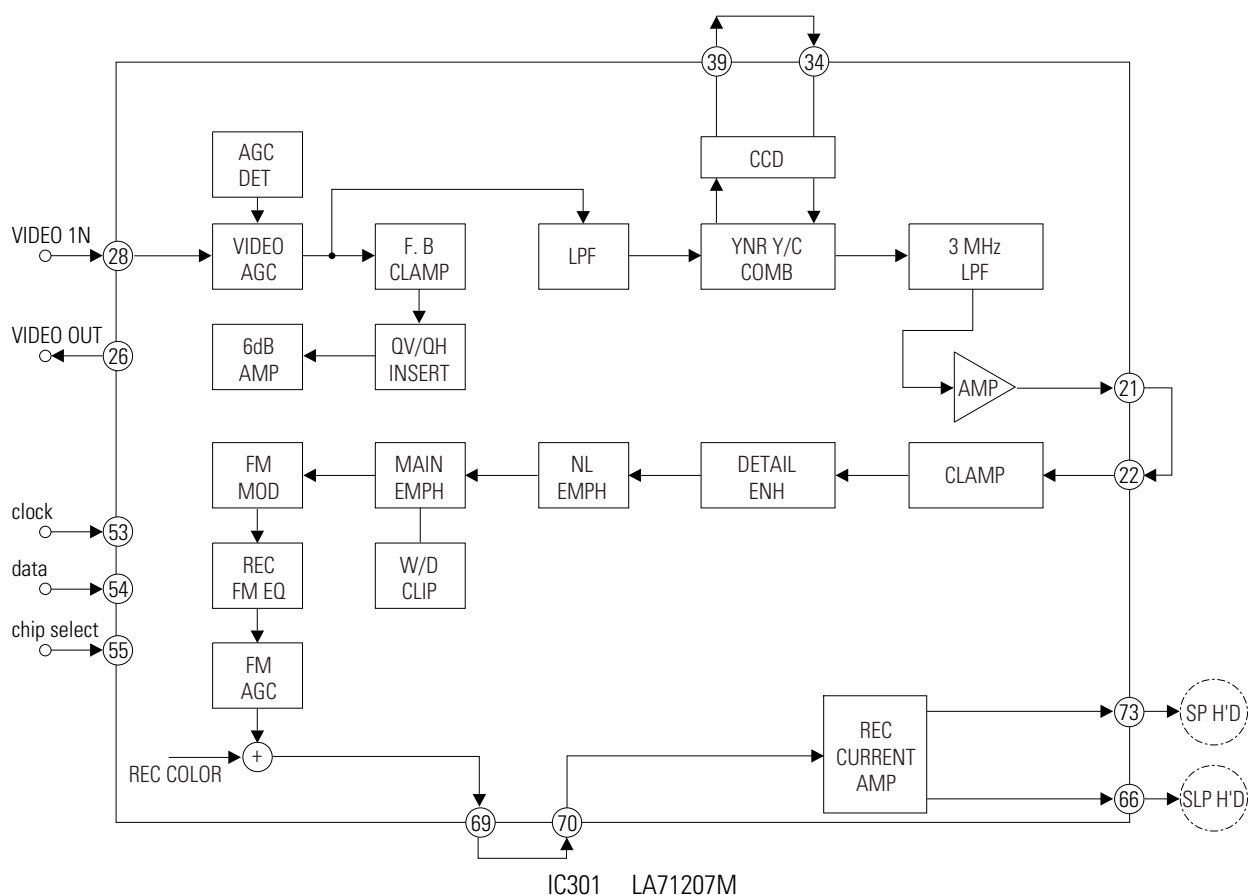


Fig. 14-19 Luminance Record Process

1) Outline

Fig. 14-19 shows the video signal recording system.

The selected video input signal goes to pin 28 of Luma/Chroma processor IC (IC301). And then it enters VIDEO AGC circuit. The gain of AGC circuit is controlled by AGC detector so that the output is constant (approx. 2Vp-p). The output signal of AGC is clamped by the FBC(Feed Back Clamp) circuit. This signal appears at pin 26, after being amplified at the internal video amp and driver.

The output signal from the clamp circuit enter the detail enhancer circuit. In the detail enhancer circuit, the low level high frequency video signal is emphasized to improve the original signals frequency characteristics. nonlinear emphasis circuit is employed to improve S/N and frequency response characteristics together with the following main emphasis. Noise effects the FM wave at a higher frequency, so the S/N can be improved by emphasizing the higher frequency before recording and by suppressing the play signal during demodulation. The difference of non linear emphasis from main emphasis is that the emphasis characteristics change is depending on the input level. The gain of the emphasis circuit is inversely proportional to the level of the high frequency component of the signal. That is, if the high frequency portion of the signal is low the main emphasis circuit will amplify the signal.

2) Main Emphasis Circuit

The dynamically emphasized luminance signal is now supplied to the main emphasis circuit where all the high frequency components of the signal are boosted more than the low frequency components. The boosting action is required for the high frequency components because in the FM recording method, the noise of the playback signal increases in proportion to the modulated signal frequency or low level signal. By using the nonlinear emphasis and main emphasis system, the total S/N ratio is increased. The output of the main emphasis circuit is then supplied to the white and dark clip circuit.

3) White and Dark Clip Circuit

After emphasis is performed, large overshoots and undershoots in the luminance signal are limited to a specified level. This is done to avoid FM over modulation. The output of the main emphasis circuit is then supplied to the FM modulator circuit.

4) FM Modulator

A. The amplitude of the FM signal is limited, so the signal is recorded on tape near the maximum record level which increases the S/N ratio.

B. The FM carrier is set 3.4MHz (at the Sync tips) and the deviation to 4.4MHz by inside IC circuit (for the white peak). The actual device which constitutes the FM modulator is a stable multivibrator.

This multivibrator generates a sine wave output of variable frequency.

The frequency of sine wave is governed by the level of the processed video signal at any given point. Therefore, the processed video signal varies the frequency of the sine wave which is frequency modulation (FM). During playback in SLP mode, the crosstalk of the adjacent track is more apparent than is standard mode. It appears as jitter and noise on the monitor. To reduce this noise from the screen, the FM carrier frequency has to be 1/2fh shifted up during recording. This is done by applying the head switching pulse to the FM modulator control pin57 during SLP recording. The FM modulated luminance signal goes to record equalizer circuit and it is mixed with chrominance signal at the record Amp circuit inside video IC.

5) Record Amp

The frequency modulated luminance signal and chroma signal are mixed in the record amp of pre-amp block inside video IC. Then this mixed signal is amplified and supplied to the video heads via the rotary transformer and recorded on the magnetic tape.

Tape speed selection determines which video heads will be used. That is, signal output from pin 66 (SLP) and 73 (SP) of pre-amp block are supplied to video heads.

Control signal of speed mode is applied to pin 53(clock), 54(data), 55(chip select) of video IC from Micom IC.

(2) Luminance Signal Playback System

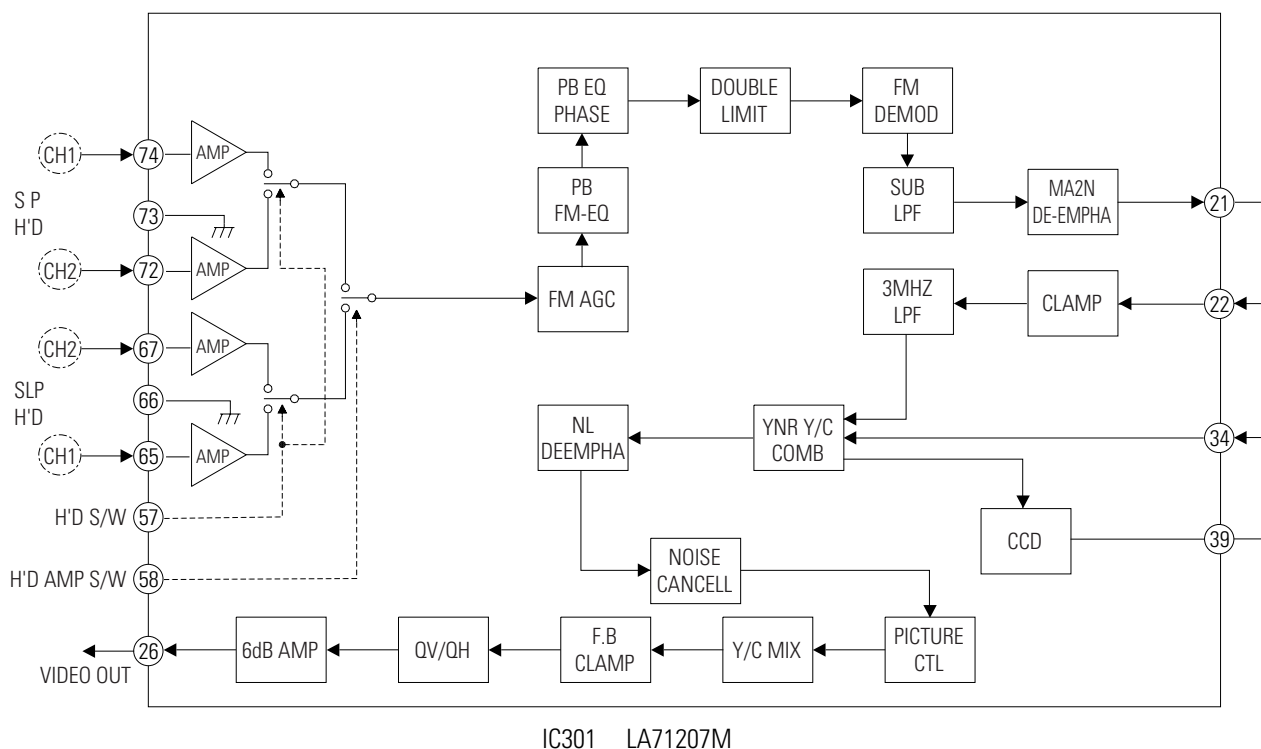


Fig. 14-20 Luminance Playback Process

1) Outline

The video signal recorded on the tape is picked up by CH1,CH2 head and is supplied to pre-amp block via rotary trans. During playback, as per the speed, SP and SLP head is determined by Pin60 of respectively.

CH1 signal inputs to Pins 65 and 74 while CH2 signal inputs to Pins 67 and 72 of video IC. The pick up operation is controlled by the head switching pulse inputted to pin 57. During the high portion of the switching pulse, CH2 is picked-up and just the opposite is true for CH1. In the pre amp IC, the FM signal is amplified 60dB and this signal is applied to FM AGC.

2) FM AGC AMP

At the FM AGC Amp (FM), signals are automatically balanced. One of the AGC circuit outputs is fed to AGC detector circuit which detects signal level fluctuations. The detector output signal is applied to the FM AGC Amp to keep the output constant. This output is applied to the PB FM EQ block. FM EQ is correct the phase distortion and level. The signal through PB EQ circuit is applied to the double limiter.

3) Double Limiter Circuit

A FM signal on the tape which contains AM components will be read during playback. If there is a severe AM component, a drastic drop in FM carrier can occur. This lack of FM carrier can be called a noise region. Double limiting is used for improving the S/N ratio and carrier loss. The playback FM signal is split into two paths, one goes to high pass filter and sub-limiter. The other goes to the main-limiter after passing through a LPF. ONE path of the FM signal goes to the high pass filter, so that the low frequency(AM) component can be removed, and the other carrier is supplied to the sub-limiter. The output signal of sub-limiter is mixed with the signal from the low-pass filter and sent to the FM demodulation circuit.

4) FM DEMODULATOR

The FM demodulator consists of a stable mono multivibrator balanced modulator (BM) and a LPF. The FM demodulator circuit first converts the FM signal to a pulse width modulator signal. Then the circuit smoothes the PWM signal to demodulate the video signal. This demodulated signal is fed to the LPF to remove its FM carrier component and any other harmonics. The demodulated luminance signal outputs from Pin 21 and is applied to the 3MHz LPF through main deemphasis circuit. To reduce demodulation noise, the output of the 3MHz LPF is applied to a non-linear deemphasis circuit through YNR circuit.

5) Main De-emphasis Circuit

Before modulation, main emphasis was performed. Because the high frequency components of video signal were boosted more than the low frequency components in the recording mode, main deemphasis must be performed to obtain a normal video signal. That is this circuit returns the emphasized high frequency component to the original value.

6) Non Linear De-Emphasis Circuit

This circuit is the counter part of the dynamic pre-emphasis circuit during recording. The characteristics are also the opposite of those in recording.

7) Drop Out Compensator/YNR Circuit

This circuit compensated for missing parts of the FM signal due to dust, dirt on the tape or irregular tape coating, etc. The clamped video signal is supplied to the CCD 1H circuit. The 1H delayed video signal from CCD block is also supplied to the 6MHz LPF to reject the sampling noise of CCD IC.

Then, the output of LPF is applied to Pin 34 of video IC. When the DOC detector detects the FM loss, a 1H delayed video signal is added in place of the missing signal.

8) Noise Canceller Circuit

The noise canceller circuit removes the high frequency noise contained in the video signal which has the reverse characteristics of the detail enhance in the recording mode. The output of the noise canceller circuit is supplied to the Luminance and Chrominance mixer circuit. The mixed chroma and luminance signal are then output at Pin 26.

(3) Chroma Signal Recording System

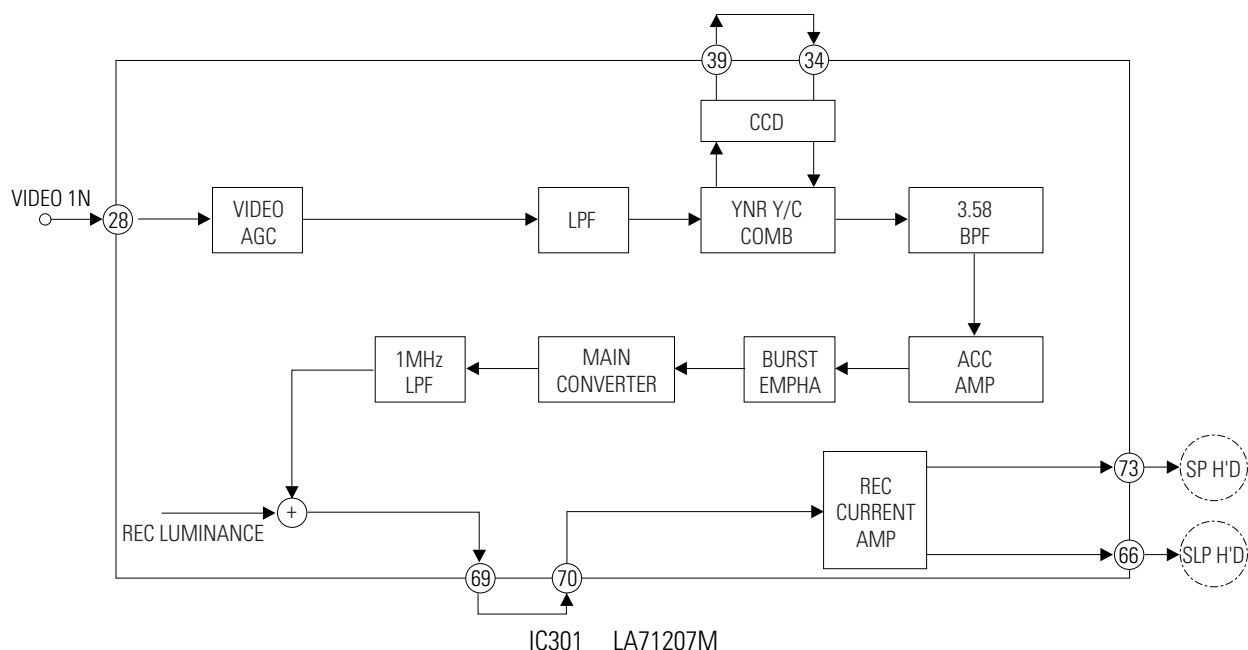


Fig. 14-21 Chrominance Record Process

1) Outline

Fig. 14-21 shows the chroma signal recording system. The chroma signal recording process is performed by video IC. The input video signal is fed to Pin 28 of IC and supplied to Y/C COMB circuit through AGC AMP.

The output signal of Y/C COMB circuit is applied to ACC amplifier. The ACC amplifier is used for both burst ACC which keeps the burst level at a constant value in recording and the color ACC which controls the reference level of the burst ACC with the color signal level. The color ACC works to maintain a relatively high output level by boosting low level input signals to improve color S/N ratio. The signal is then applied to the burst emphasis circuit. Burst emphasis emphasizes the burst signal by +6dB during recording and feeds it to the main converter. The 3.58MHz signal are mixed in the main converter to perform frequency conversion.

The main converter is a mixer having the two types of output components which are the added frequency of $4.21 + 3.58 = 7.8\text{MHz}$ and the difference frequency component 629KHz.

Added frequency is rejected by the 1MHz LPF and the 629KHz down converted chroma signal is supplied to the luma/chroma mixer of pre-amp block and then recorded on the tape via the record amp and heads.

AFC detection is performed with the head switching pulse and the fh signal generated from 321fh VOC output. The detector output controls the VCO frequency which will be locked precisely at 320fh (5.035MHz).

The 320fh signal is counted down to 1/8 and the resultant 40fh (=629KHz) carrier signal is phase shifted triggered by each horizontal sync signal which is wave shaped as a 50% duty pulse by the pulse generator.

The direction of the rotational phase shift depends on the levels of the rotary head switching signal from pin 57 and when the switching signal is "H" level, the phase is retarded by 90 degrees for every 1H, and when it is at a "L" level it will advance by 90° for every 1H this 40fh phase shifted sub-carrier (PSSC) signal enters the sub-converter and the 3.58MHz carrier signal is locked at the color burst frequency by the record APC.

The PSSC signal is frequency converted into $3.58\text{MHz} \pm 629\text{KHz}$. Then 4.21MHz component ($= 3.58\text{MHz} \pm 629\text{KHz}$) is extracted through a 4.2MHz BPF.

The 4.21MHz signal is used as a carrier signal for down conversion of the color signal as described previously.

2) ACC (Automatic Color Gain Control) Circuit

The ACC is used as burst ACC in the LP mode, however it is also used for peak ACC in the SP/SLP mode. The purpose of using two different ACC operations is to improve the overall Chroma S/N ratio during playback. In SP and SLP, there is H-sync alignment. This indicates that there is burst alignment as well. Whenever two video tracks overlap or a video head picks up crosstalk from an adjacent track, beats are produced during playback. Perhaps the most noticeable beats are produced by H-sync and burst. But in SP and SLP, these beats occur right at H-sync and burst and are out of the picture. In LP, however, there is no H-sync alignment and these beats can be seen in the picture. To keep the beats at a minimum in LP, we keep the burst level constant so that the beat intensity is constant. We know that ACC acts to improve the color S/N, and in LP, the ACC detector locks at the burst level, and keeps it constant. Thus we have ACC operation with the least beats. In SP and SLP, the beats caused by burst overlap are out of picture, so we don't really mind if the burst level changes or not. To improve the color S/N ratio even more, we use peak ACC in SP and SLP. That is, if the chroma level is too low to record, the amplification degree is increased by 3dB. However, the chroma level is sufficient for recording, this peak ACC is changed to burst ACC to avoid over amplification. By changing the ACC according to picture color content, the burst level may vary. The color ratio improvement is based on the color content itself during SP and SLP provides a somewhat better S/N ratio.

3) Four (4) Phase Rotation

CH1 is advanced 90° every channel, while CH2 is delayed 90° . When the frequency is set to 629KHz, if phase is shifted by ± 90 it becomes $629\text{KHz} \pm 90$. The $40\text{fh} \pm 90$ ($=629\text{KHz} \pm 90$) is balanced modulated via fsc (3.58MHz) depending on which side band is detected. That is, the $f_s + 40\text{fh} \pm 90$ ($4.2\text{MHz} \pm 90$) of total frequency is supplied to the main converter. In record mode, the signal operates same as in play back mode. During playback, the phase is returned to original state.

4) AFC (Automatic Frequency Control) Circuit

Luminance signal is input to H-sync separator. The H-sync is separated and supplied to phase comparator. This signal can be described as fh (Horizontal Sync frequency of input video signal). However, VCO oscillates at 320fh (5.035MHz). This 321fh is counted down by $1/8$ and $1/40$ and resultant fh is supplied to phase comparator. fh and fh are supplied to the phase comparator for comparison of their phases.

After comparison, the phase

differences is output to VCO (320fh) in terms of error voltage. Therefore, the oscillation frequency of VCO is controlled by this error voltage. That is, if the fh phase is changed by H-sync signal fh, error voltage is changed accordingly and if the phases of fh and fh are met due to change of VCO oscillation frequency, error voltage does not feedback. 320fh VCO is oscillated in accordance with phase sync at fh. Therefore, 40fh input to sub converter by phase shift is always sync horized with phase.

The AFC loop performs the same operation during record and playback. In recording, phase of VCO is in accordance with H-sync signal of current video signal.

Which in playback, the phase sync of VCO is consistent with H-sync signal which is separated from the video signal.

(4) Chroma Signal Playback System

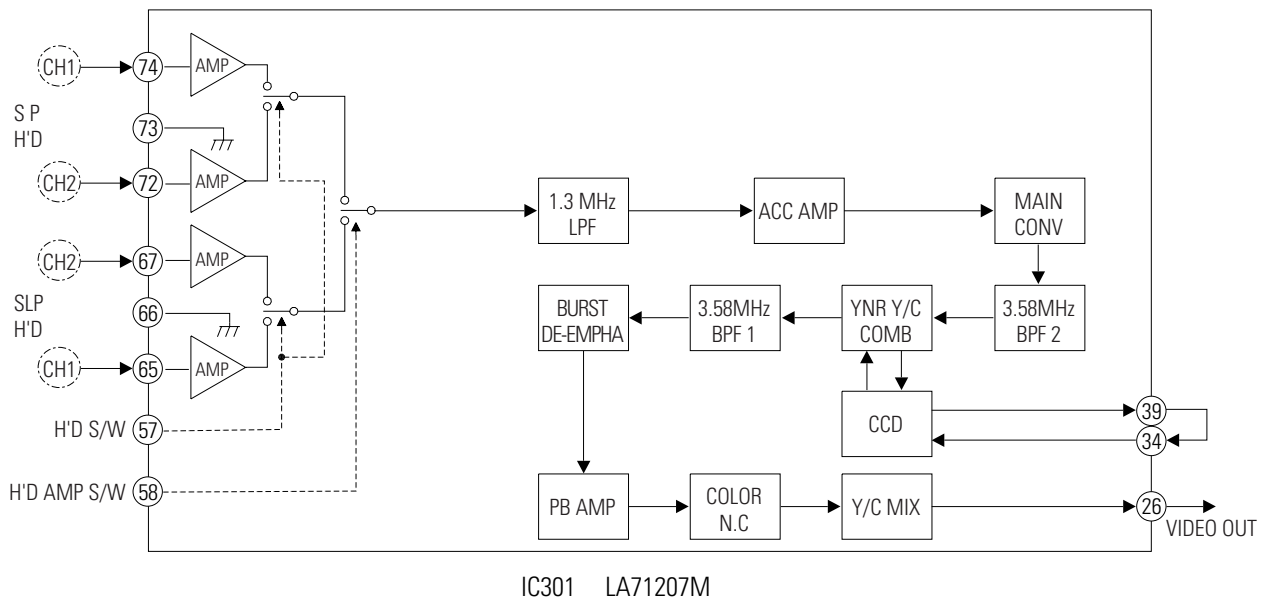


Fig. 14-22 Chrominance Playback Process

1) Outline

Fig. 14-22 shows the chroma signal playback system.

The FM signals picked up by the CH-1 and CH-2 video heads are supplied to the pre-amp block.

The FM signal from CH-1 and CH-2 are alternately selected by the switch and output signal as a continuous signal. Goes to the ACC amp through the 1.3MHz LPF. The 1.3MHz LPF is used for passing only down converted 629KHz chroma signal in the playback mode. The ACC amp stabilizes the 629KHz color signal level.

The output color signal from amp then enters the main converter circuit. In the main converter circuit this signal is mixed with the 4.21MHz phase shifted carrier signal and converted into 4.21MHz + 629KHz signals.

2) Main Converter

Inside of IC, the main converter converts the 629KHz rotational chroma signal to a 3.58MHz non-rotational signal. The two inputs of this main converter are the 629KHz signal, which comes from the output of the ACC, and a 4.21MHz which has the same rotational phase as the 629KHz signal. It is important that the rotational phase of the 4.21MHz signal is the same direction as the 629KHz playback chroma signal. To obtain the 3.58MHz non-rotational stable signal, the same direction rotational signal should be mixed with the rotational chroma signal.

During the conversion process, the phase is also mixed by the frequency. Therefore, when 629KHz is subtracted from 4.21MHz, the result is the non-rotational 3.58MHz stable signal. The output signal of the main converter goes to the 3.58MHz BPF. In the 3.58MHz BPF, the conversion noise ($4.21\text{MHz} + 629\text{KHz} = 4.8\text{MHz}$) is rejected and the 3.58MHz color signal goes to the comb filter.

In the comb filter, the crosstalk components due to the adjacent track are eliminated and the color signal is applied to PB-AMP, BURST De-Emphasis, Killer and are applied to LUMA and CHROMA mixer input through the CNC block.

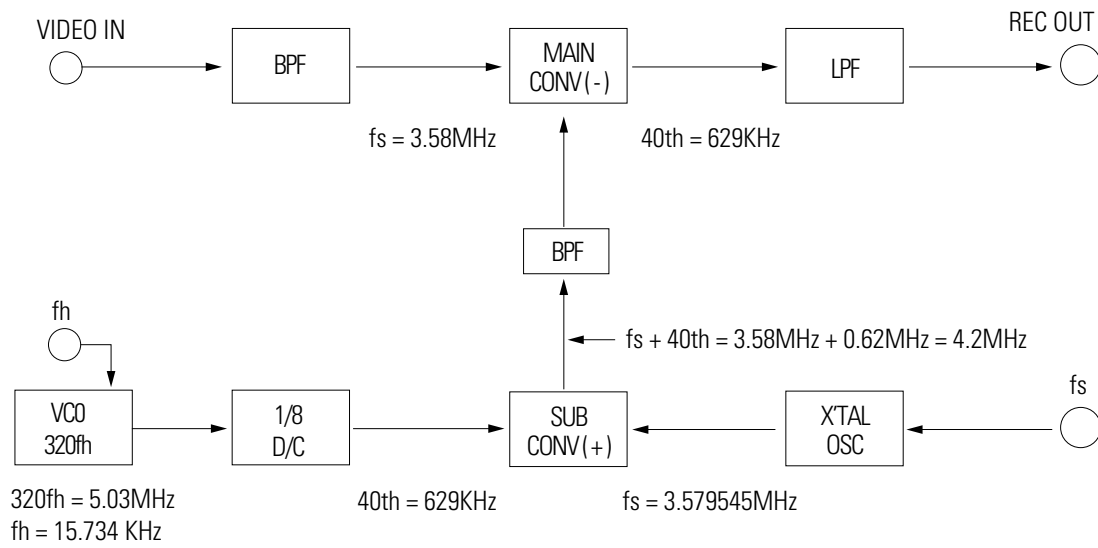


Fig. 14-23 Block Diagram of Color REC mode by the method of a Down Converter

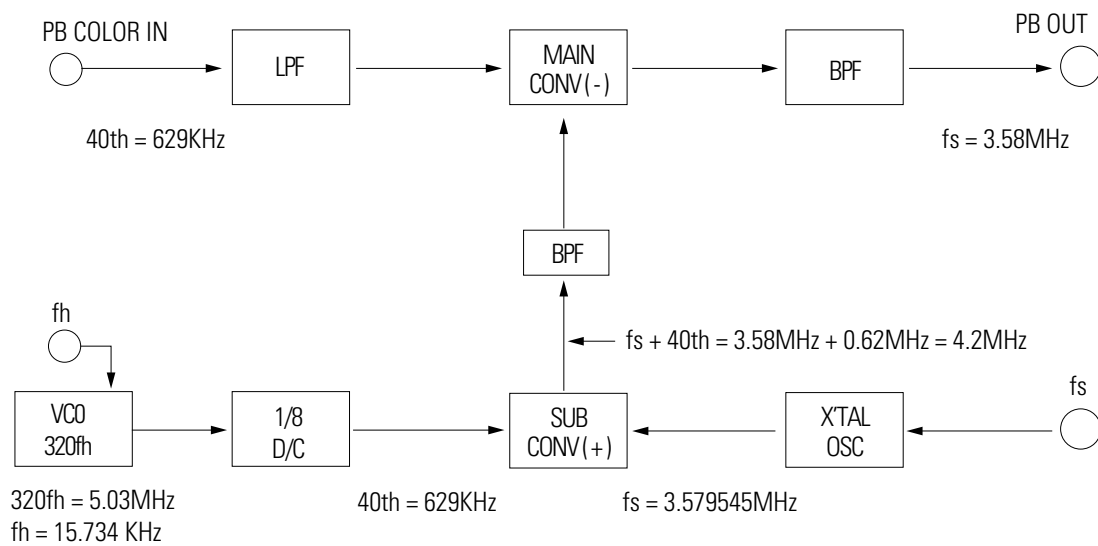


Fig. 14-24 Block Diagram of Color PB mode by the method of a Down Converter

14-12 Hi-Fi Audio

(1) Outline

Hi-Fi circuit consists of HiFi audio LPF,VCO,BPF,FM detect circuit and switching noise compensator, PRE-AMP etc. Linear audio consists of an ALC circuit,REC EQ circuit and a PB EQ circuit.

Hi-Fi and Linear audio share the same input selector,output selector and mute circuit.

1) REC Mode (L-CH Only)

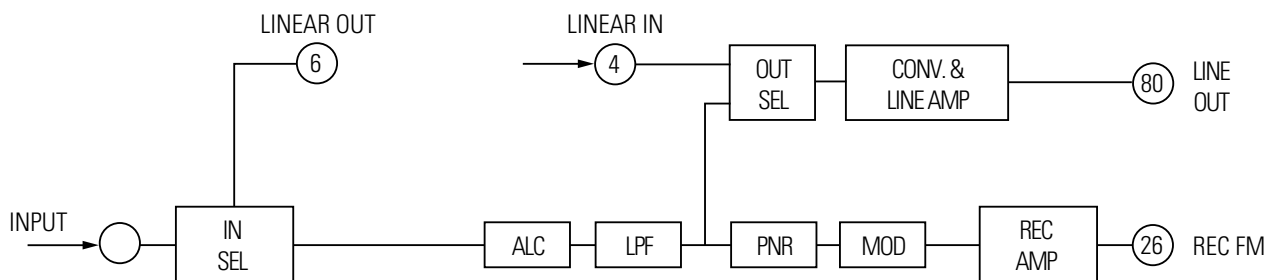


Fig. 14-25 REC Mode (L-CH Only)

2) PB Mode (L-CH Only)

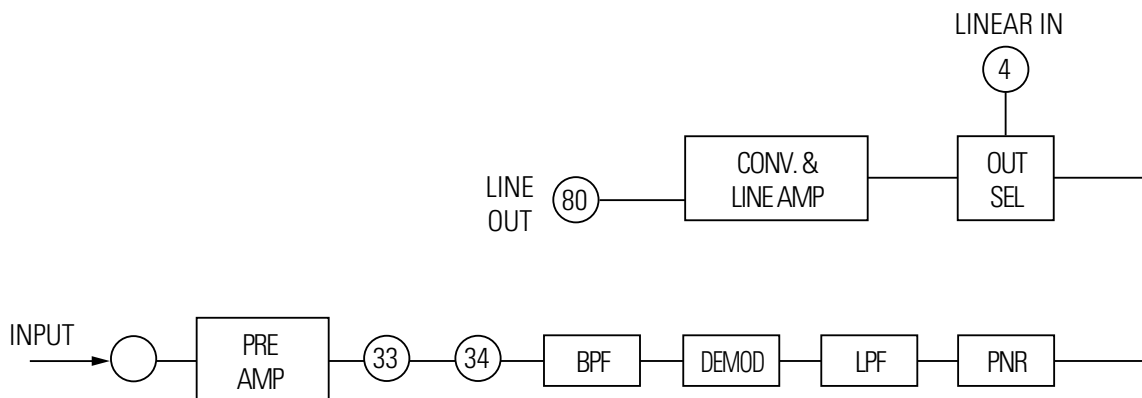


Fig. 14-26 PB Mode (L-CH Only)

(2) Block Description

1) Input Selector

Input selector outputs 1 signal from 4 different signals received. It outputs 1 selected signal from tuner, rear, front.

2) Normal(Linear) Selector

Two signals, L-CH and R-CH are input to Hi-Fi IC. But, linear audio is capable of receiving only one signal. Therefore, the

2 input signals must be selected. Usually, the outputs are mixed signals of L-CH and R-CH unlike the input selector, the normal selector does not amplify the selected signal.

3) Output Selector

It selects to output Hi-Fi L-CH, Hi-Fi R-CH, LINEAR and MIX(Hi-Fi+LINEAR) signals with the final output IC pin 78 (R-CH) and pin 80 (L-CH).

4) Output ALC(Convertor)

ALC is used because when the input level of RF converter gets bigger, it shows up as noise on the screen. But, this block is not used in this model (ALC OFF).

5) PNR(Peak Noise Reduction)

It is a type of emphasis, de-emphasis function to eliminate noise during modulation / demodulation. PNR operates as that of VHS FORMAT to reduce noise.

6) Audio Limiter

Before modulating the signals from PNR block, it limits signals exceeding the size limit to a maximum deviation of $\pm 150\text{KHz}$.

7) VCO(Voltage Control Oscillation)

It is a modulation function that oscillates 1.3MHz (L-CH) and 1.7MHz (R-CH).

8) RF LPF

It is a function to eliminate the harmonic components of Hi-Fi carrier formed during VCO, which may affect other block. Its pass-band is approximately 2MHz.

9) MIXER

It mixes the Hi-Fi carrier formed in L-CH and R-CH. However, due to the frequency difference between L-CH and R-CH, when equal amount of R-CH is recorded to tape, R-CH is much smaller than L-CH.

Therefore, the R-CH output is approximately 10dB bigger than L-CH.

10) Current Amp

It is the final amplifier of the mixed Hi-Fi carrier. IC pin 28's resistance controls current, which changes the size of IC pin 26.

11) AGC(Auto Gain Control)

It maintains uniform size of Hi-Fi envelope, which is input by pre-amp in play back mode.

12) BPF(Band Pass Filter)

L-CH and R-CH each has BPF. The center frequency is same as carrier frequency.

It is used to receive only Hi-Fi carrier from all signals input to pre-amp.

13) SW Noise Compensation

Unlike the linear audio, instead of using fixed head, drum heads are used, which creates halting points. However, in order for the audio to be headed continuously, the damages from halting points are modulated, which creates noise. SW noise compensation is a block to minimize this particular noise.

14) Hold Pulse

It makes standard signal(Pulse) to compensate SW noise.

15) DET(Hi-Fi/LINEAR)

From the Hi-Fi envelope inputted from pre-amp, it decides whether the signal passing through L-CH BPF is Hi-Fi or LINEAR tape. If the signal passing through BPF is below 10mVpp, it is not Hi-Fi, therefore, it outputs linear.

16) DOC(Drop Out Compensation)

If demodulation is conducted without properly treating the damage on Hi-Fi envelope caused by scratch on the tape, noise occurs. In order to improve this noise occurrence, DO DET compensates the drop-out using the same method of compensating the switching noise when the damage on the envelope ranges 10~15mVpp.

17) ENV DET

To obtain optimal tracking, envelope must be peak to peak and micom should be in DC. It is a function to convert Hi-Fi envelope to DC. If it is lower than 0.8V at micom, it sends linear mode data to HiFi IC.

18) Serial Data Decoder

It receives IIC BUS to enable the operation of inner block and decodes into serial data.

(3) Pin Port Description (Tuner Mode ; 1KHz, 100% Modulation Input)

PIN NO.	PIN NAME	DC VOLT.	SIGNAL	REMARK
1	LINE MUTE	0 / 5	-	Reduce the line out noise.
2	Linear out to TM	4.2 V	-17 dbm	Converter Model Only
3	Vcc 9V	9 V		Power Supply for in/out Select
4	Linear Input	2.5 V	- 28.2 dBV	Audio from A/V IC
5	Vcc 5V	5 V		Power Supply for in/out Select
6	Linear out ti A/V	2.5 V	-21.5 dBV	Audio out to A/V IC
7	EXT1-INPUT (L)	0	-28.2 dBV	Line Input 1 (FRONT)
8	ALC Detector	-		ALC Detector for RF converter
9	EXT2-INPUT (L)	0	-28.2 dBV	Line Input 2 (REAR)
10	GND	-		
11	EXT3-INPUT (L)	0	-28.2 dBV	Line Input 3 (DVD)
12	Monitor Input (L)	2.5 V		DVD Audio (L) Input
13	Input changeover switch output (L)	2.2 V	-21 dBV	PB/REC sitch output . Transform R/P signals into DC.
14	ALC Input (L)	2.5 V	-21 dBV	ALC Input Terminal
15	Vcc 5V	5 V		Power Supply for in/out Select
16	1/2 Vcc	2.5 V		1/2 Vcc Terminal
17	Rec Mute Terminal	0 V		GND (Not in use)
18	NR Waiting Det	-	-	Terminal for waiting dector
19	NR Waiting Filter	2.5 V		NR Waiting Filter 1 For L-CH
20	NR Waiting Filter	2.5 V		NR Waiting Filter 2 For L-CH
21	CCA Reference			CCA Reference for L-CH
22	NR Empha			NR Empahasis for L-CH
23	Tracking DC out	0 ~ 5 v		Hi-Fi Env Det Level Output
24	Audio Pb FM1	2 V / 4 V		Audio Playbak FM 1 input (H)
25	GND			Hi-Fi PRE-AMP GND
26	REC Current OUT			Rec current out to Head
27	Audio Pb FM2	2 V / 4 V		Audio Playbak FM 2 input (L)
28	Crrrent adjust	2.4 V		Rec Current adjust point
29	Alc detector			ALC detection
30	Hi-Fi detector			Hi-Fi/ Normal detect
31	Monitor	2.5 V		FM Monitor
32	Vcc 5V	5 V		Power Supply for Hi-Fi
33	Pb FM Out	2.5 V		Output of H'D Amp in PB Mode
34	Pb FM Input	-	350 mVp-p	Input of FM in PB Mode
35	GND			GND FOR LOGIC
36	Vcc 5V	5 V		Power Supply for LOGIC
37	Serial data input	0 / 5 V		
38	Serial clock input	0 / 5 V		
39	Audio head s/w	0 / 5 V		Head s/w 30 hz input
40	Mts Mode out			1V : mo / 2V : St / 3V : Bi

PIN NO.	PIN NAME	DC VOLT.	SIGNAL	REMARK
41	CCA Reference			CCA Reference for R-CH
42	NR Empha			NR Empahasis for R-CH
43	NR Waiting Filter	2.5 V		NR Waiting Filter 2 For R-CH
44	NR Waiting Filter	2.5 V		NR Waiting Filter 1 For R-CH
45	NR Waiting Det	-	-	Terminal for waiting dector
46	Vcc 5V	5 V		Power Supply for in/out Select
47	ALC Input (R)	2.5 V	-21 dBV	ALC Input Terminal
48	Input changeover switch output (R)	2.2 V	-21 dBV	PB/REC sitch output . Transform R/P signals into DC.
49	Mute Control			
50	GND			GND FOR ANALOGE
51	FSC IN		200 mVp-p	3.58 Mhz input
52	DC Reg	1.2 V		Bandgap Power supply for MTS
53	Stereo PLL filter	3.8 V		LPF for Stereo PLL
54	Vcc 5V	5 V		Power Supply for MTS Select
55	Pilot Cancellor f	3.8 V		CTL Pin of cancel signal for pilot C.
56	FM Filter			Filter for making stable dc
57	SIF Input			SIF Audio input from TM Block
58	REG Filter	4.5 V		Filter of reference voltage source.
59	Filter Auto Adjust	3.8 V		Loof filterof PLL for auto adj
60	Pilot Det Filter	3.8 V		Detection for pilot detection circuit
61	PC_DC_MO	3.3 V		Absorbing the DC offset
62	PCDOUT	3.8 V		Absorbing the DC offset
63	PCDIN	3.8 V		Absorbing the DC offset
64	PCDBXIN	2.6 V		Absorbing the DC offset
65	Main V/I convert	3.8 V		Converting the voltage of signal
66	SPE Det V/I convert	3.8 V		Connecting pin of smooth capacity of detection circuit.
67	Spectral DET			Converting the voltage of signal
68	Wide Band Det			Connecting pin of smooth capacity of detection circuit.
69	EXT1-INPUT (R)	0	-28.2 dBV	Line Input 1 (FRONT)
70	GND			GND FOR MTS
71	EXT2-INPUT (R)	0	-28.2 dBV	Line Input 2 (REAR)
72	Wid det V/I convert	3.8 V		Converting the voltage of signal
73	EXT3-INPUT (R)	0	-28.2 dBV	Line Input 3 (DVD)
74	Monitor Input (R)	2.5 V		DVD Audio (R) Input
75	PCDCOSPE			Absorbing the DC offset
76	PC_OUT_DBX	3.3 V		Absorbing the DC offset
77	LINE MUTE (R)	0 / 5	-	Reduce the line out noise.
78	Line out (R-CH)			
79	GND			GND FOR AUDIO
80	Line out (L-CH)			

14-13 Linear Audio

(1) Block Diagram

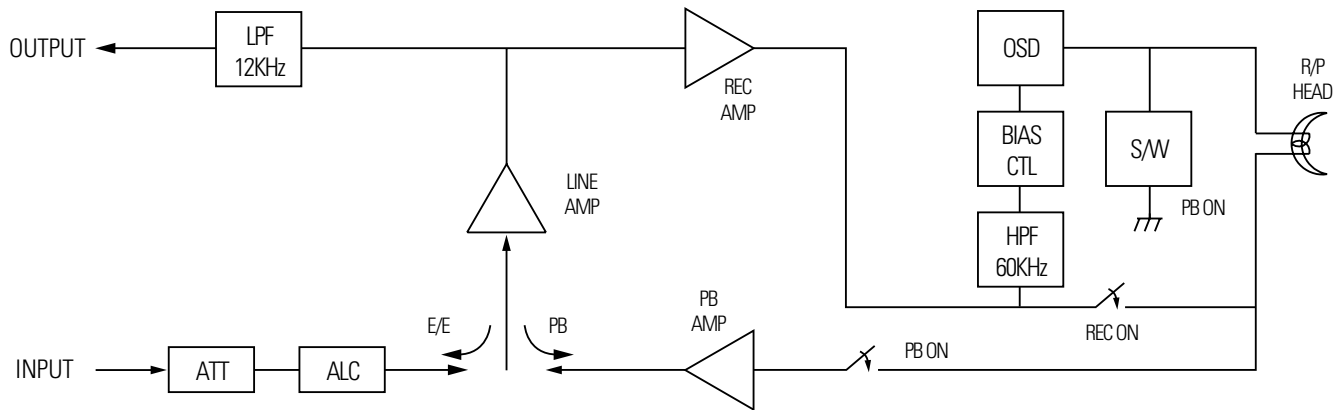


Fig. 14-27 Block Diagram

(2) Block Description

1) ATT (Attenuation)

Line amp is shared between PB mode and E/E mode, which reduces the recorded signal by 20dB and resistor.

2) ALC (Auto Level Control)

If the signal level is lower than the reference signal (-6dBm) level, the output signal will equal the input signal. However, if the input signal is higher than the reference signal, the output will not equal the input and will generate uniform signal.

* ALC Application Purpose : Since linear audio is in AM (amplitude modulation) and uses magnetic recording device, it only records limited size and as the size of input signal increases, distortion increases. To prevent this occurrence, make sure the signal does not get bigger even if the level of distortion repeatedly increases.

3) LINE AMP

Line amp's gain is approximately 23dB. The purpose of the line amp is to amplify to 68dB in order to obtain the recorded signal on the tape during playback. As the amp gain increases, the passband decreases, which enables the amplification of low frequency. However, it is impossible to amplify frequency of 10KHz to 68dB with just 1 OPAMP. Therefore, to satisfy frequency and gain.

Line amp must be constructed into 2 steps of OP AMP. (gain is fixed within IC)

4) 12KHz LPF

There are various noises to signal output. The loudest noise is the "Video SYNC Frequency" of 15.734KHz. In order to eliminate the "Video SYNC Frequency", "LPF" and "TRAP" are combined to "LPF".

5) PB AMP

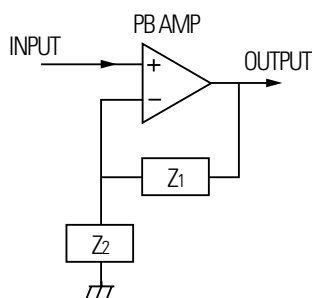


Fig. 14-28 PB Amp

The diagram to the left is the playback amp and the gain input/output are as follows.

$$Av = 1 + \frac{Z_1}{Z_2} \approx \frac{Z_1}{Z_2}$$

The playback characteristic of VHS format can be satisfied by using Z_1 , Z_2 in the above equation.

PB amp gain should be designed to be approximately 45dB (1KHz).

6) REC AMP

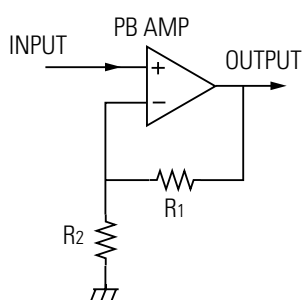


Fig. 14-29 REC Amp

The diagram to the left is REC AMP. The amp gain is approximately 14dB. R_1 and R_2 that determine the gain is located inside the IC.

It is uniform and independent to frequency. Frequency characteristics should be considered when designing rec amp. The REC amp should be the opposite to playback characteristics.

7) OSC (Oscillation)

Oscillation frequency is 70KHz. It's size is approximately 45Vp-p. it operates on recoed mode. It is supplied to audio erase head and full erase head used to erase already recorded signals.

Also, it conducts "AM (Amplitude Modulation)" using oscillation signals.

8) BIAS Control

Oscillation coil is used in oscillation Bias. Coil output changes according to the impedance of F/E, A/E and R/P head connected to the coil.

9) 60KHz HPF

There must be standard signal for bias control and that signal uses HPF only to obtain oscillation signal that comes through R/P head.

10) S/W

The switch opens when recording, shorts during playback and exterior transistor is used.

(3) Pin Port Description (IC301 ; LA71207M)

PIN NO.	PIN NAME	DC VOLT.	SIGNAL	REMARK
9	REC OUT	2.3	-2dBm	REC AMP OUTPUT (GAIN ; 14dB)
75	GND	0	-	
6	BIAS	REC:2.3 PB:0	70KHz+1KHz MIX 3Vp-p	It is grounded due to the switch inside of IC during playback. During recording, it operates on 60KHz input HPF
11	BIAS CTL	REC:4.3V PB:5V	-	The BIAS CTL voltage change depends on the external TR.
6	PB EQ (+)	2.3	-	PB EQ AMP INPUT (+)
5	PB EQ (-)	2.3	-	PB EQ AMP INPUT (-)
7	PB EQ SW	2.3	-	PB EQ AMP SLP SW
3	PB EQ OUT	2.3	-32dBm	PB EQ AMP OUTPUT
2	LINE PB IN	2.3	-32dBm	LINE AMP INPUT (PB)
58	A.MUTE	0	-	Operates at HIGH (5V)
76	INPUT 1	2.3	-27dBm	AUDIO INPUT : -27dBm
78	INPUT 2	2.3	-27dBm	AUDIO INPUT : -27dBm
1	Vref Filter	2.3	-	
80	Input 3	2.3	-27dBm	AUDIO INPUT : -27dBm
77	Vcc	5.0	-	
10	Line Out	2.3	-4dBm	AUDIO OUTPUT : -4dBm
79	ALC IN	2.3	-13dBm	ALC level selector

14-14 OSD

The on screen display circuit consist of a character generator decoder, video mixer, sync separator and sync generator, sync detector circuit.

The data is decoded and generates characters in syncro with composite video signal applied pin 49, 50.

Also the sync detector circuit discriminates the presence of a video signal by detecting sync, if no sync is detected, a blue screen is displayed. In other word, the OSD circuit displays character on the video when there is a video signal or on blue screen when there is no video signal. (No sync).

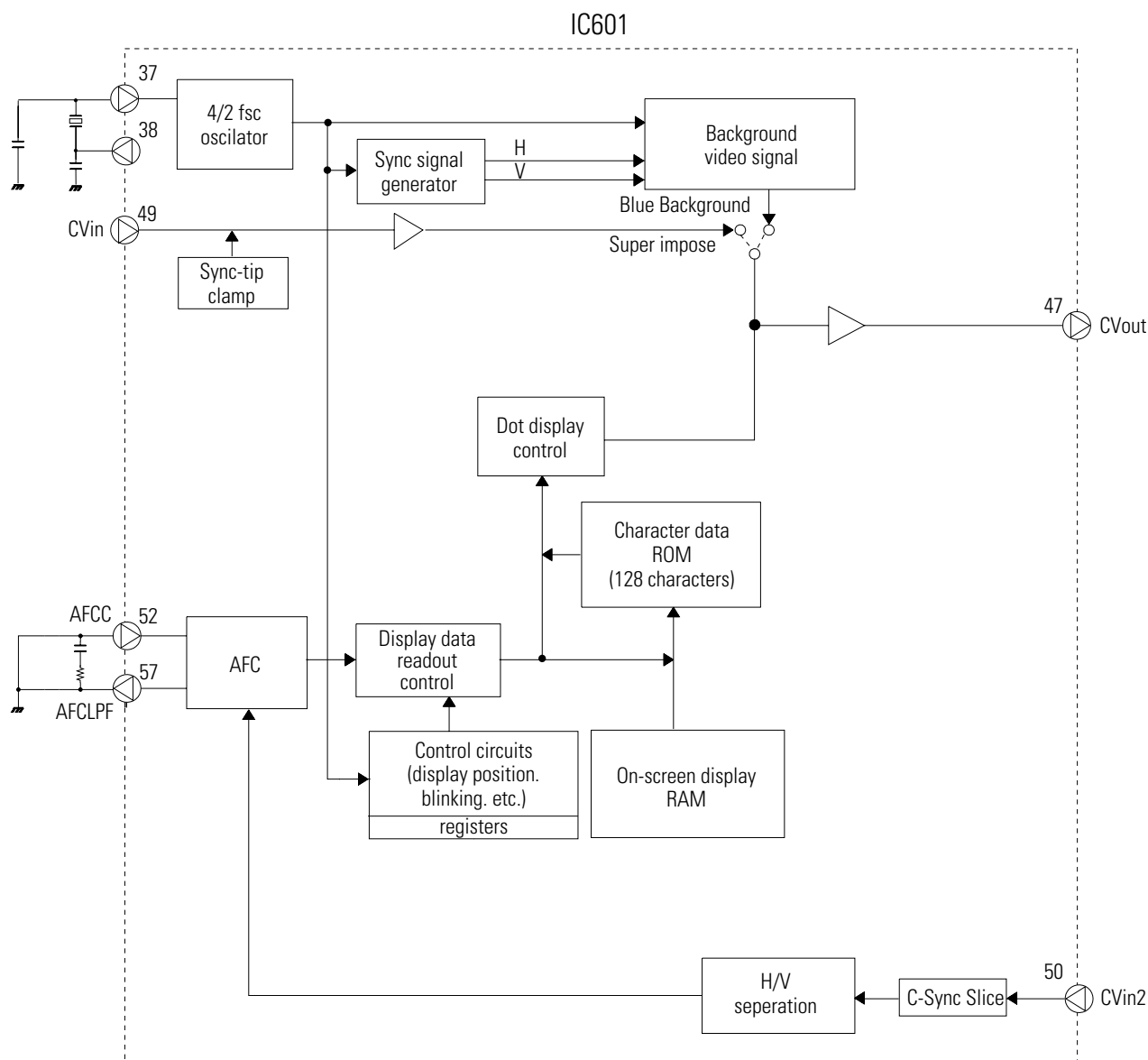


Fig. 14-30 Block Diagram

15. Reference Information

15-1 VCR Deck Operating Description

15-1-1 Features of Mechanism

The following items describe features of the mechanism in VCR.

- (1) This VCR uses 3-motor system consisted of a cylinder motor, capstan motor, and loading motor.
A capstan motor is used to drive the reel and the driving force is transmitted through the belt capstan.
The cassette loading, tape loading, and mode shift operation are performed by the loading motor.
- (2) The time duration from cassette-in to picture appearance is shortened by employing the loading drive mechanism (automatic transferring operation from the cassette loading to the tape loading by rotating the loading motor continuously), and by increasing the speed of the tape loading, etc
- (3) Employment of the full loading system shortens time required to shift the mode such as STOP to PLAY-BACK picture display.

15-2 Basic Configuration of Mechanism

As shown in Fig. 15-1, the mechanism of VCR is configured with five main blocks, and each operation is precisely controlled by the microcomputer built in the system control section.

First, load a video cassette tape in VCR :

- (1) The cassette is automatically set on the reel disc.
- (2) The tape is pulled out from the cassette, and wrapped around the cylinder.
- (3) The cylinder turns in a constant speed rate synchronizing with the vertical Sync. signal of video signal.
- (4) The tape runs in synchronization with cylinder rotation and traces the video tracks precisely.
- (5) The running tape is taken up by the reel, the tape feeding side is given with a proper tension so that tape is not slacked.

The above series of operations are performed under control of the system control section. The system control section also sends commands to each mechanism according to the operation buttons, thus the VCR is designed so that various operations such as recording, playback, special playback, FPS/RPS, and FF/REW, etc. are correctly performed.

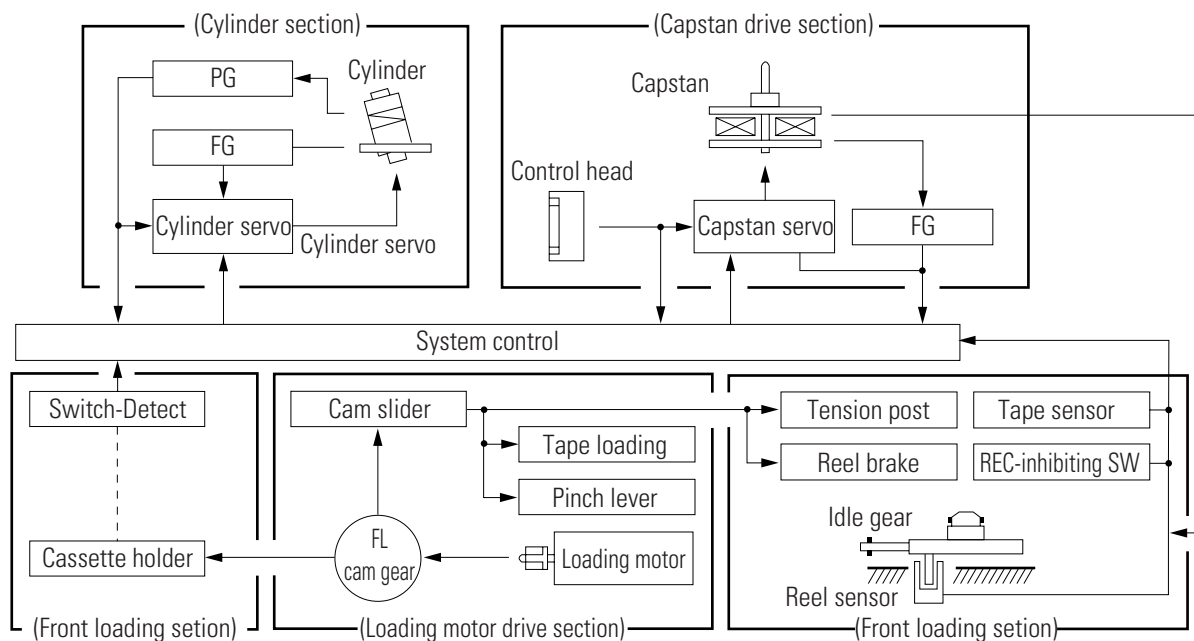


Fig. 15-1 Basic Configuration of Mechanism

15-3 Main Mechanism and Functions

15-3-1 Tape Path System

The tape come out from the supply reel (S) of the video cassette runs through paths shown in Figs. 15-2 and 15-3, and is taken up by the take-up (T) reel. (S stands for the supply reel, and T for the take-up reel, hereafter.)

At S reel side (tape entrance side of the cylinder) against the cylinder, a tension post to allow the tape surface to contact with each head with a proper tension which assures stable running, an FE head which erases entire data of the tape, and an S guide roller which restricts tape motion in upward/downward direction are provided.

In the same way, a T guide roller, audio head to record audio signals at upper side of the tape, control head to record and reproduce a control signal at lower side of the tape, and an audio erase head to erase only the audio signals and perform after-recording in parallel with the audio head are provided at T reel side. (tape exit side of the cylinder).

The guide parts marked with asterisks (*) are equipped with the adjusting mechanism to stabilize the tape running or to record and reproduce the signals precisely.

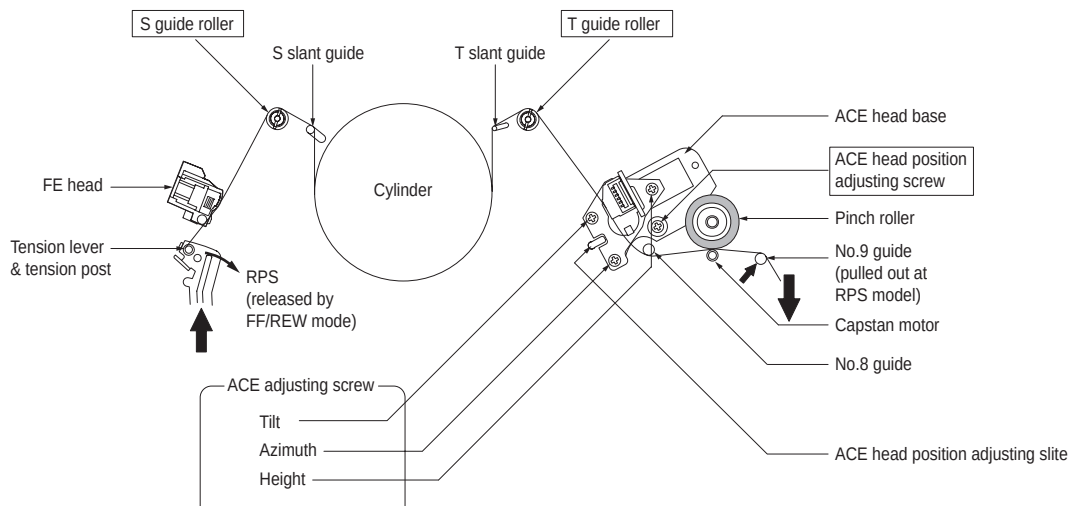


Fig. 15-2 Tape Path System

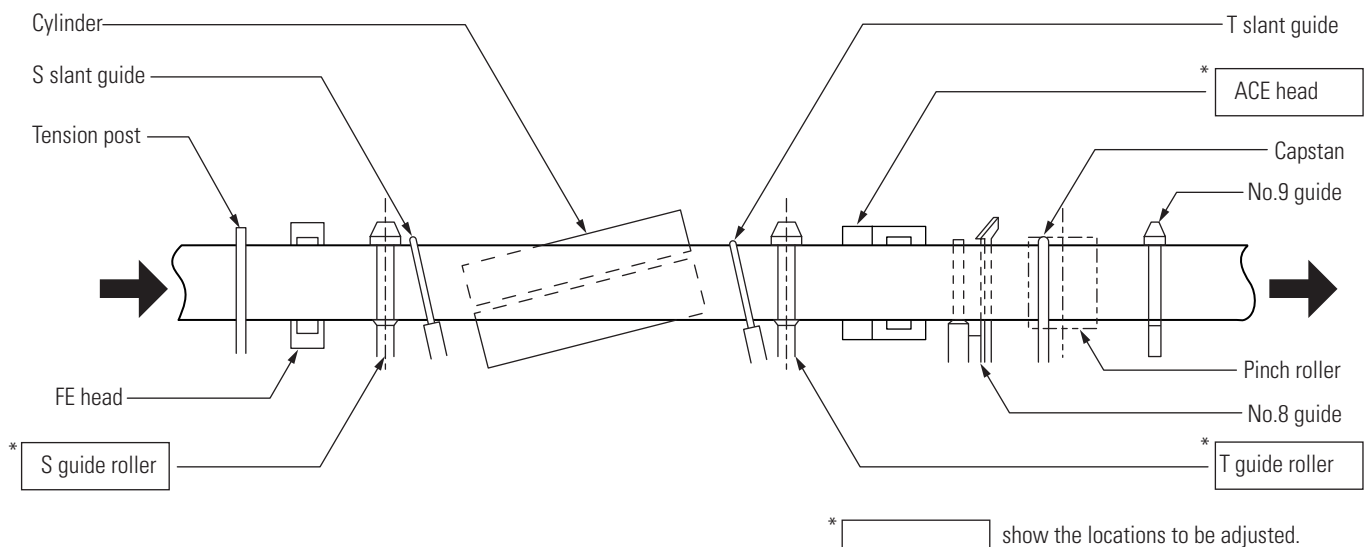


Fig. 15-3 Guide Path System

15-3-2 Reel Drive System

The reel drive system consists of a capstan motor as a drive power source, belt as a power transmission mechanism, clutch mechanism, idle gears, and a reel disc. Selecting of forward rotation or reverse rotation is carried out by an idle gear which changes its rotating direction according to rotating direction of the clutch holder.

Reel take-up torque is selected according to an operation mode.

In the record, playback, fps, rps modes, the reel take-up torque is controlled by the clutch mechanism, thereby the tape fed by the capstan is taken up with a proper torque.

In the FF and REW modes, the clutch enters a direct connecting status in which the clutch mechanism does not operate and the capstan drive torque is transmitted without reduction, so a high speed taking-up is enabled.

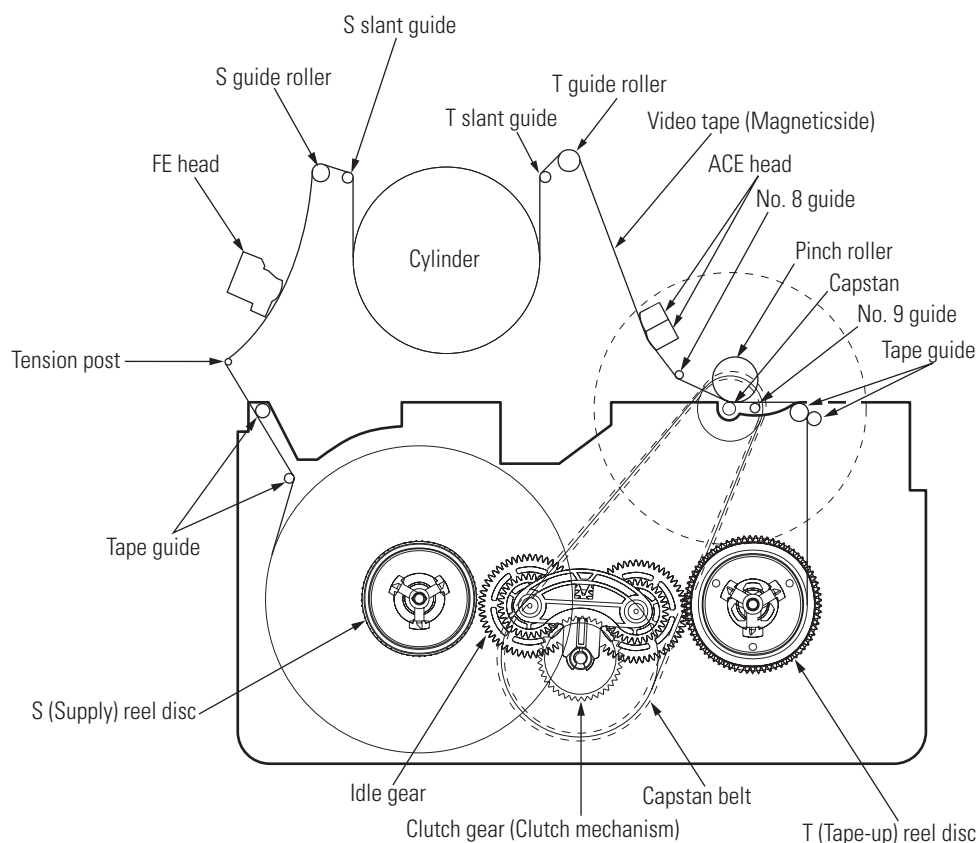


Fig. 15-4 Reel Drive System

15-4 Basis of the Mechanism

15-4-1 Front Loading

- (1) When a video cassette is inserted into the cassette holder and pushed furthermore, FL arm lever is rotated by motion of the cassette holder. The rotation of FL arm lever makes the horizontal moving of FL drive slider.
- (2) When the information of Switch Detect is transmitted to the microcomputer, the loading motor starts to rotate.
- (3) The rotation is transmitted in a sequence shown below :
Loading motor - worm gear - worm wheel - FL Cam Gear - FL Drive Slider - Arm Lever - Cassette Holder
- (4) The video cassette is horizontally moved.
- (5) The cassette tape is vertically moved.
In this case, the cassette lid is opened.
- (6) The cassette tape is set on the reel disc, and loading operation completes.
- (7) The cassette tape is loaded.
- (8) The status becomes full loading.
- (9) When the cassette is out, the reverse steps of the above procedure are carried out.

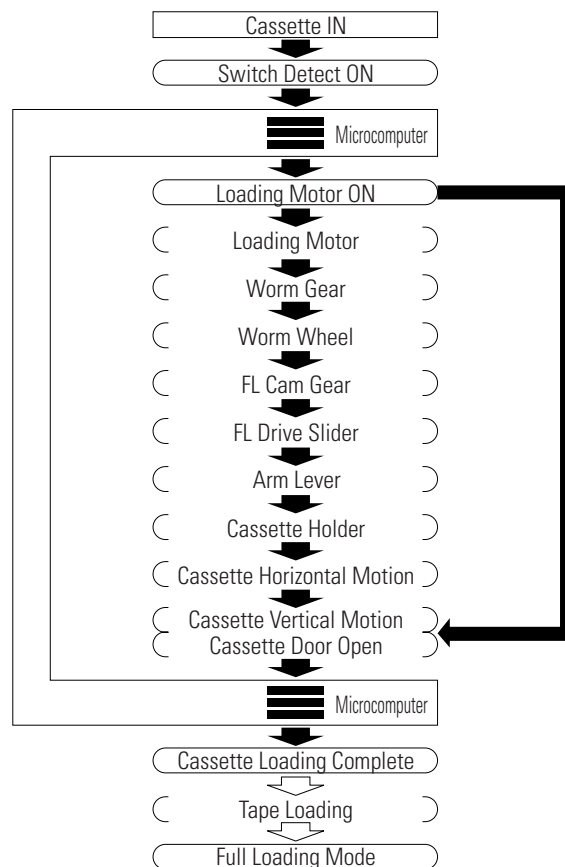


Fig. 15-5

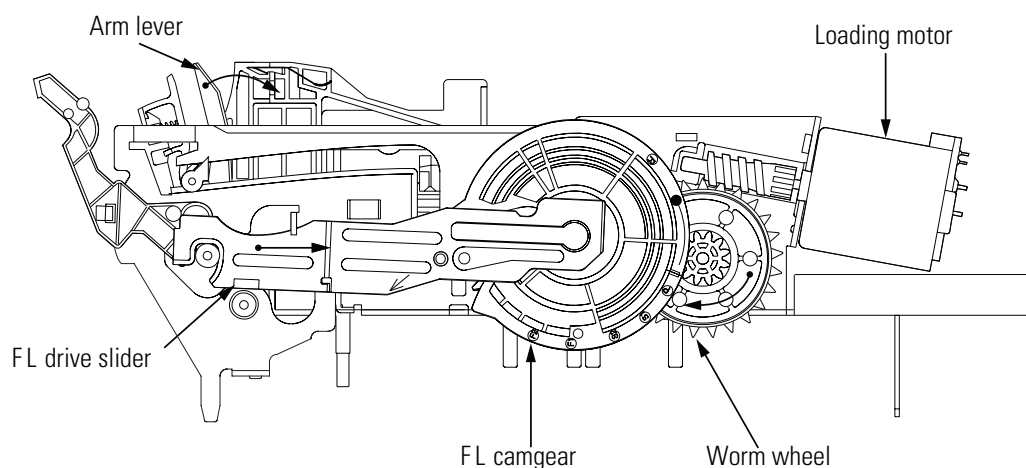


Fig. 15-6 Drive Transmission Path

15-4-2 Cassette loading/unloading Modes

When a cassette is entered in the VCR, the cassette is set on the reel disc by the front loading mechanism. In this case, the tension post, loading tape guide, capstan motor, and the No.9 guide are positioned inside of the tape in the cassette case.

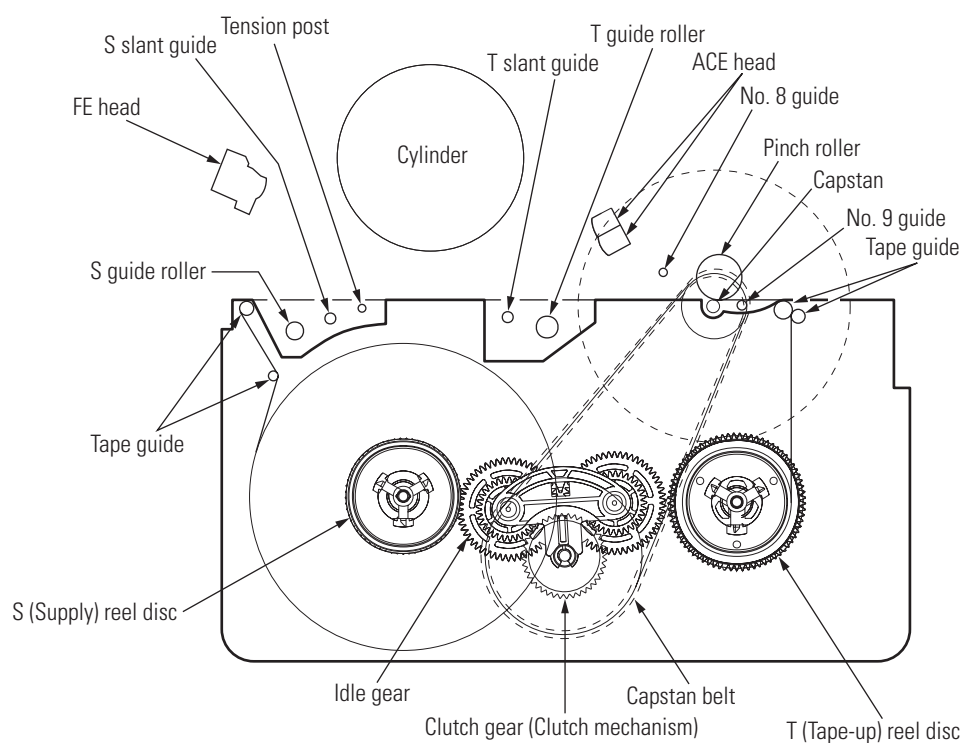


Fig. 15-7 Cassette IN/OUT Mode

15-4-3 Tape Loading

A full loading system is employed.

In the full loading system, the tape loading starts at the same time when the cassette loading operation has completed and cassette has been mounted, and the tape is pulled out, wrapped around the cylinder and the mechanism enters the stop status under this condition.

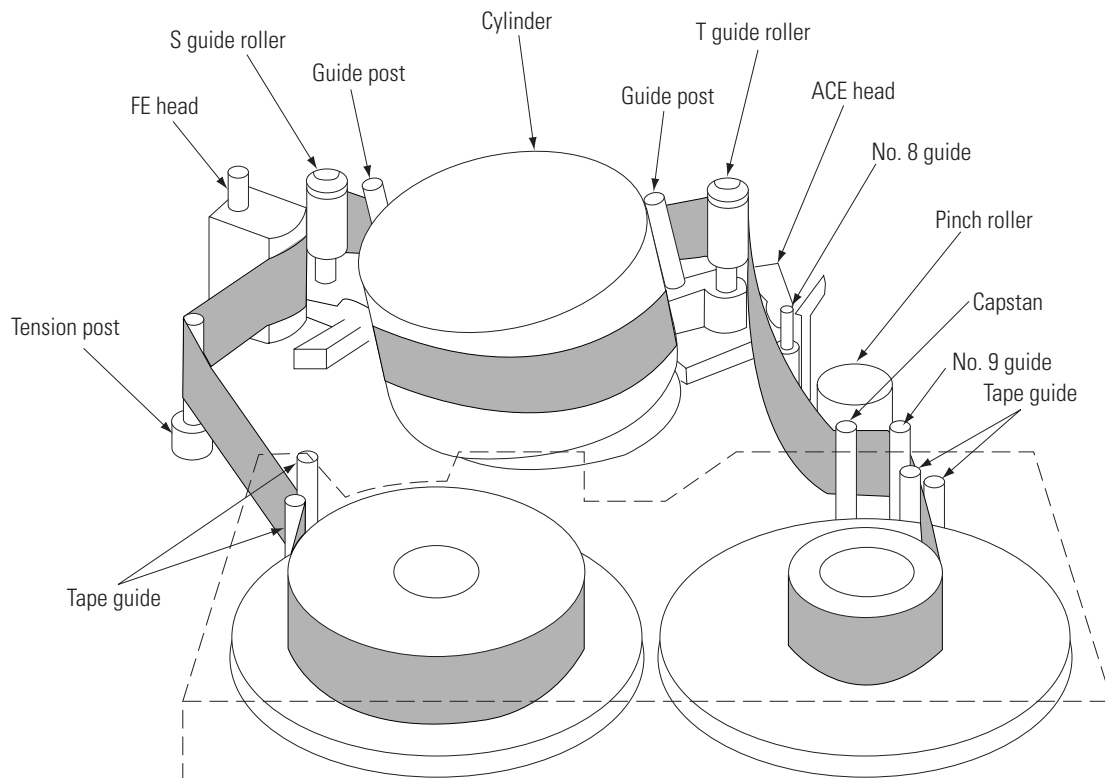


Fig. 15-8 Tape Loading

15-4-4 Playback Standby Mode

In the full loading system, the tape loading starts at the same time when the cassette mounting has completed, the mechanism shifts to the playback position, and enters the standby status with keeping tape wrapped around the cylinder.

In this case, tape tension applied to the cylinder is decreased to protect the tape and to prevent the tape from scratches.

15-4-5 FF/REW Modes

The reels enter a free status by rotating the loading motor to go to FF/REW position.

In this case, the capstan motor rotates in clock wise direction in the REW mode. The idle gear is swung rightward or leftward according to the rotating direction of the capstan motor. As a result, the T reel rotates in the FF mode or the S reel rotates in the REW mode, thus taking up the tape to the rotating reel.

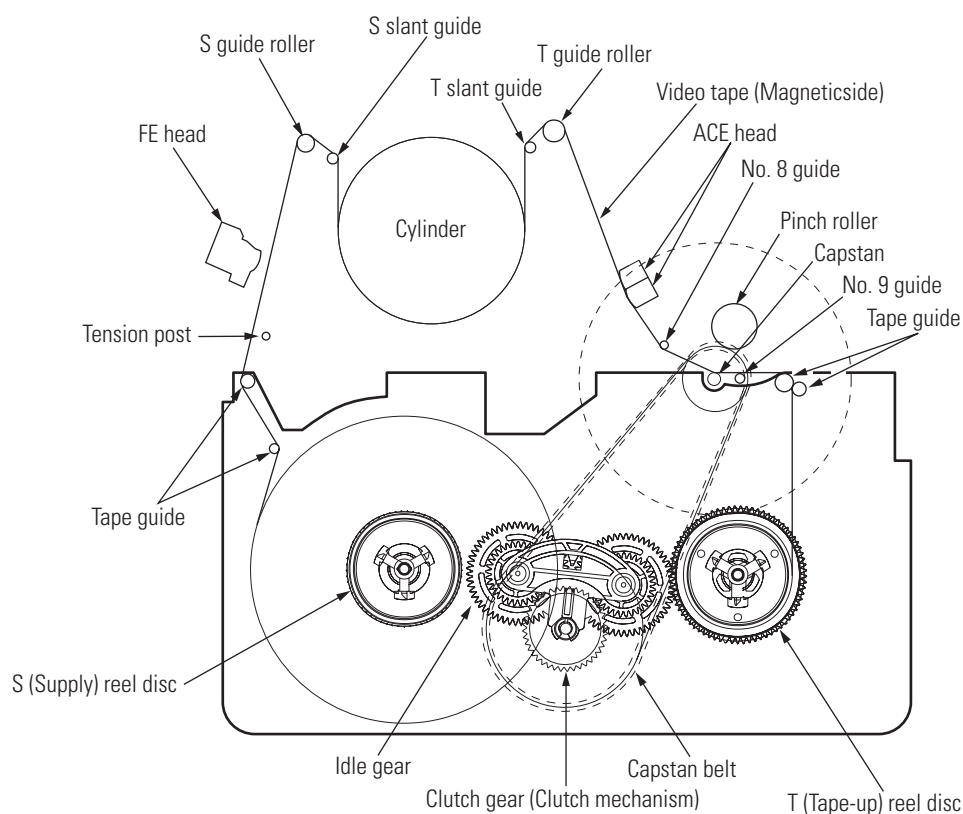


Fig. 15-9 FF/REW Mode

15-4-6 Record/Playback Modes

When the record or playback button is pressed, the tape is fed by the rotation of the capstan motor. In this case, a tension post touches the tape and braking forces created by the band brake linked with the tension post is applied to the S reel, thereby stabilizing the tape tension. The tape fed by the capstan is taken up around the T reel. The T reel is driven with a constant torque generated by transmitting rotation of the capstan motor to the clutch mechanism.

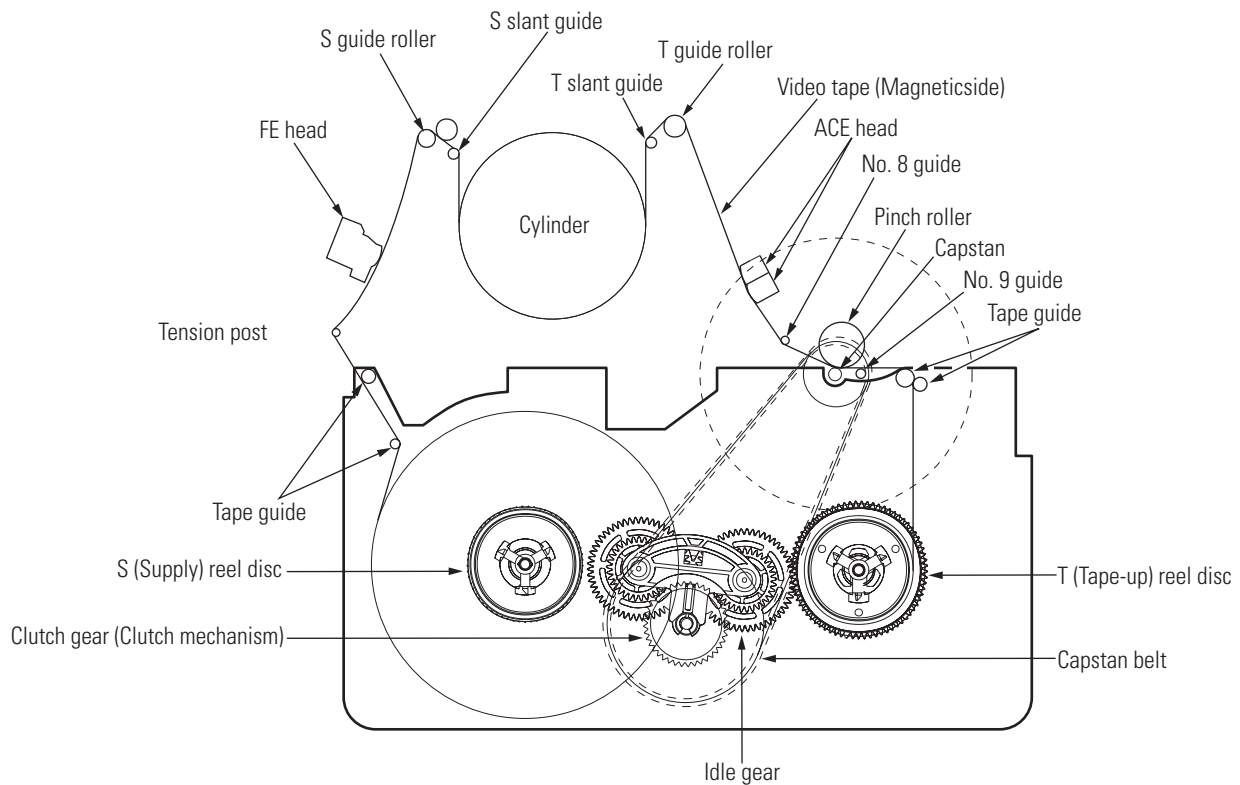


Fig. 15-10 Record/Playback Mode

15-5 System Control

In the VCR, complex mechanism, video, audio, servo circuits, etc. must be operated in specified timings matched each other. The system control circuit performs entire controls for the VCR.

An automatic stop function is also provided to protect important tape if a trouble occurs on the complex mechanism and the electrical circuits.

For this purpose, status of each part of the mechanism is always monitored with various sensor switches, and the microcomputer controls collectively the unit so that the best condition is kept.

Moreover, the microcomputer controls signal switchings for each circuit according to the mechanism status.

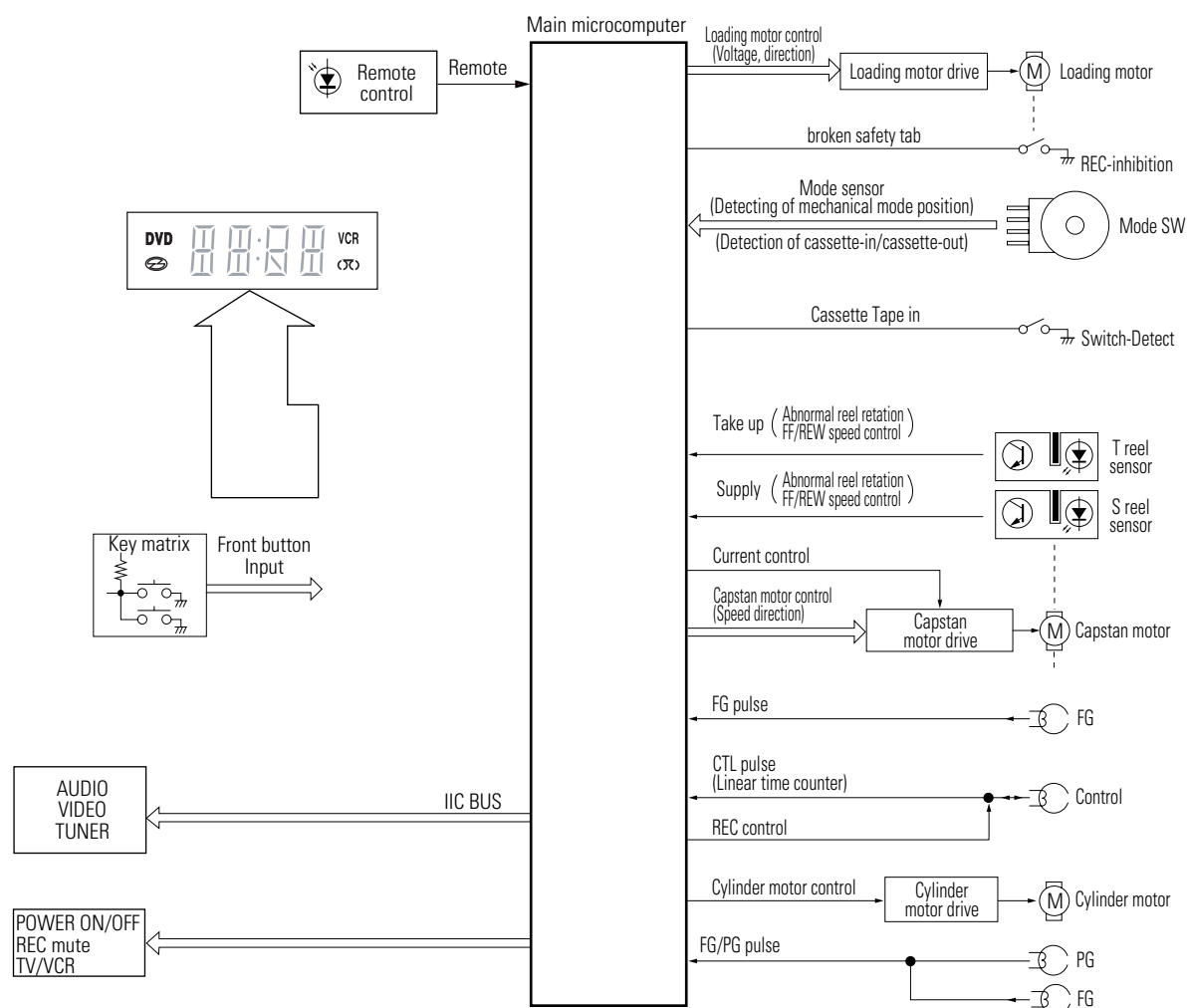


Fig. 15-11 System Control Block Diagram

15-6 System Control and Mechanical Operations

15-6-1 Mechanical Operation

The operation of mechanism is performed by rotation of the loading motor, and the transmission path of the operation is as shown in Fig. 15-12.

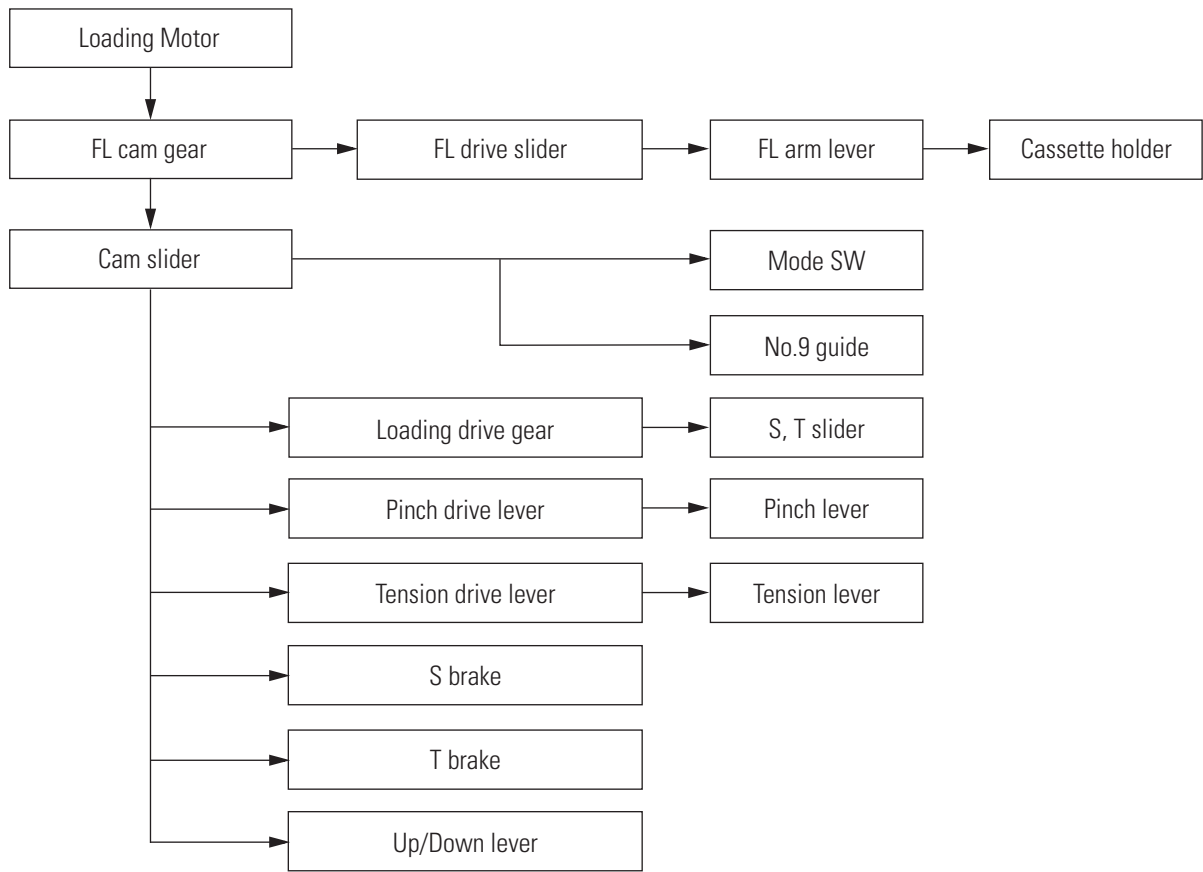


Fig. 15-12 Transmission Path of Operation

Fig. 15-14 shows each mode and mechanism status in each mode concerned with the rotation of the FL cam gear or cam slider shift. The mechanism operates as shown in Fig. 15-13 according to the timing chart in Fig. 15-14.

Note :

The Switch Detect is actuated by the rotational moving of Lever FL Arm-R and Switch on or off by insertion or ejection of a cassette.

<Top View>

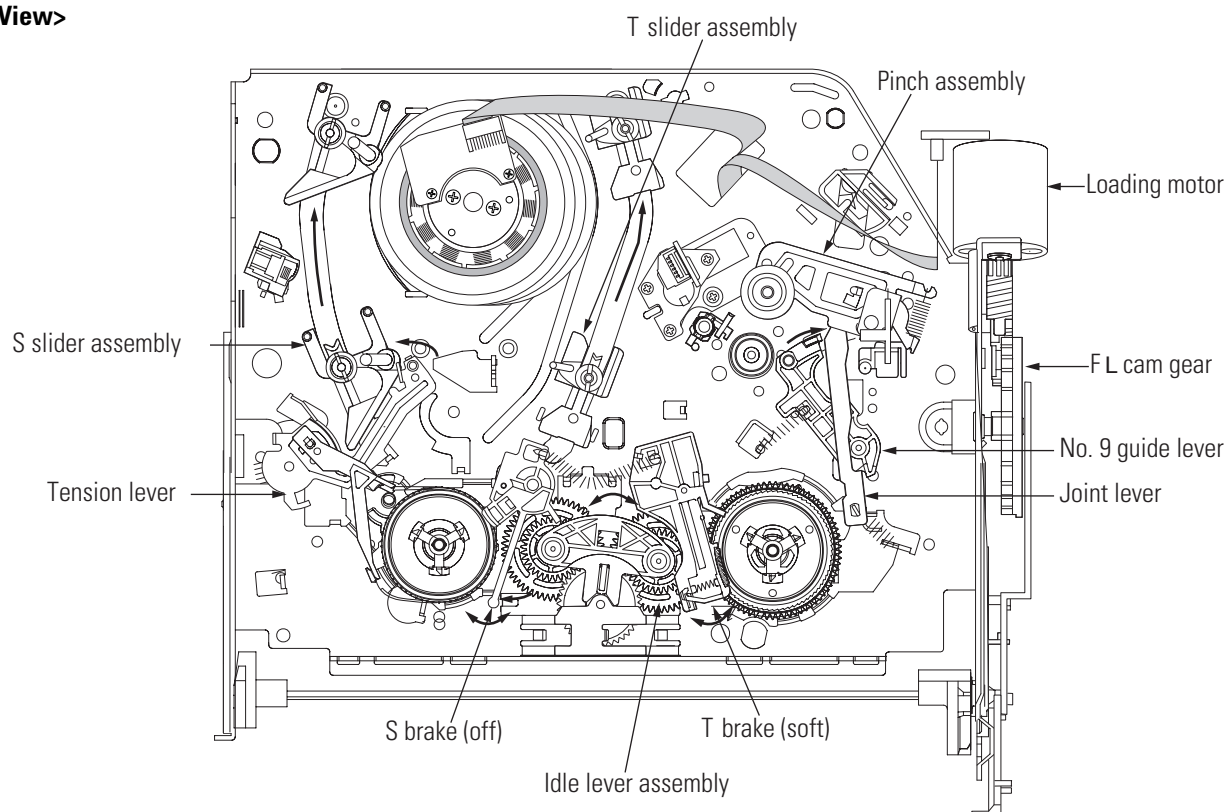


Fig. 15-13 Mechanical Operation

(4) To simplify wiring and others, the electrical components relating to operation of the mechanical deck, such as sensors, mode switch, servo microcomputer, etc. are mounted on the PCB arranged all over the bottom side of the mechanical deck.

<Bottom View>

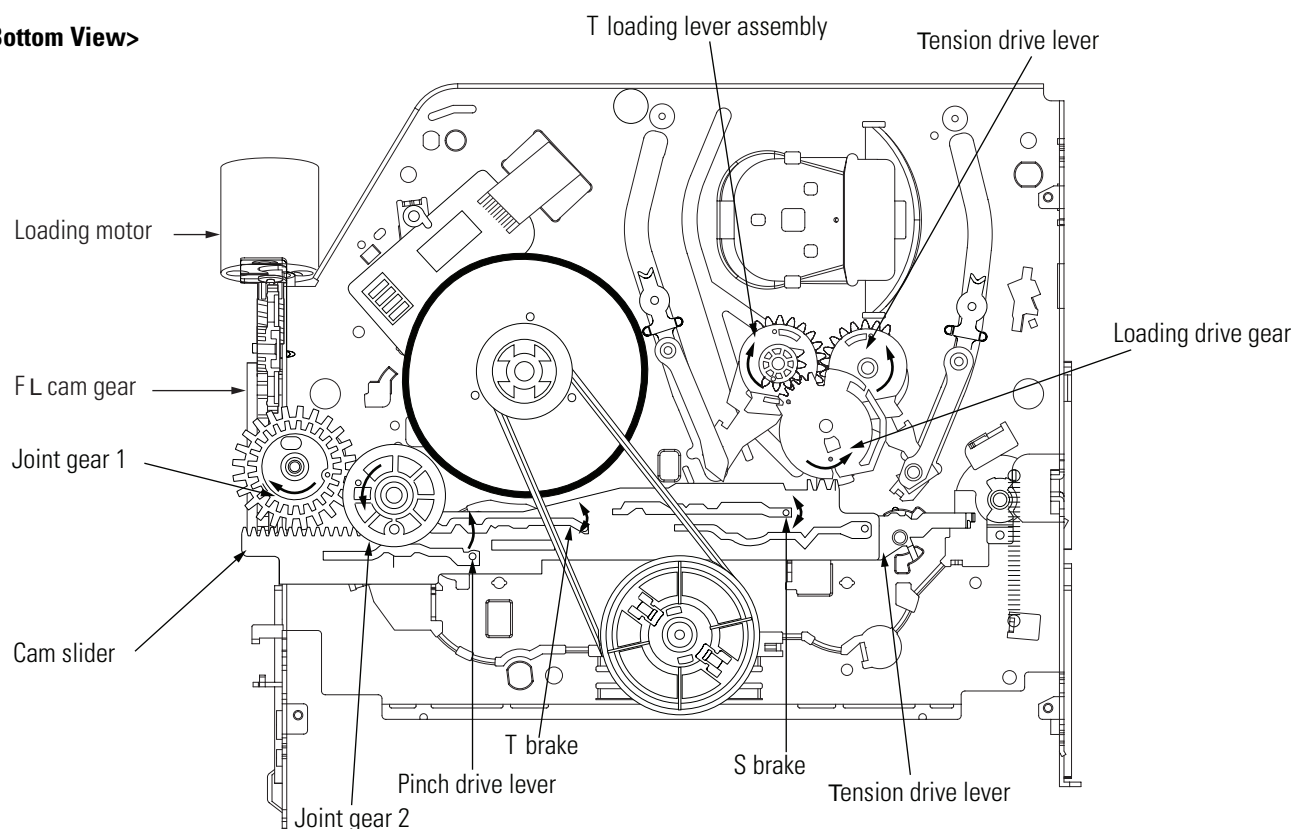


Fig. 15-14 Mechanical Operation

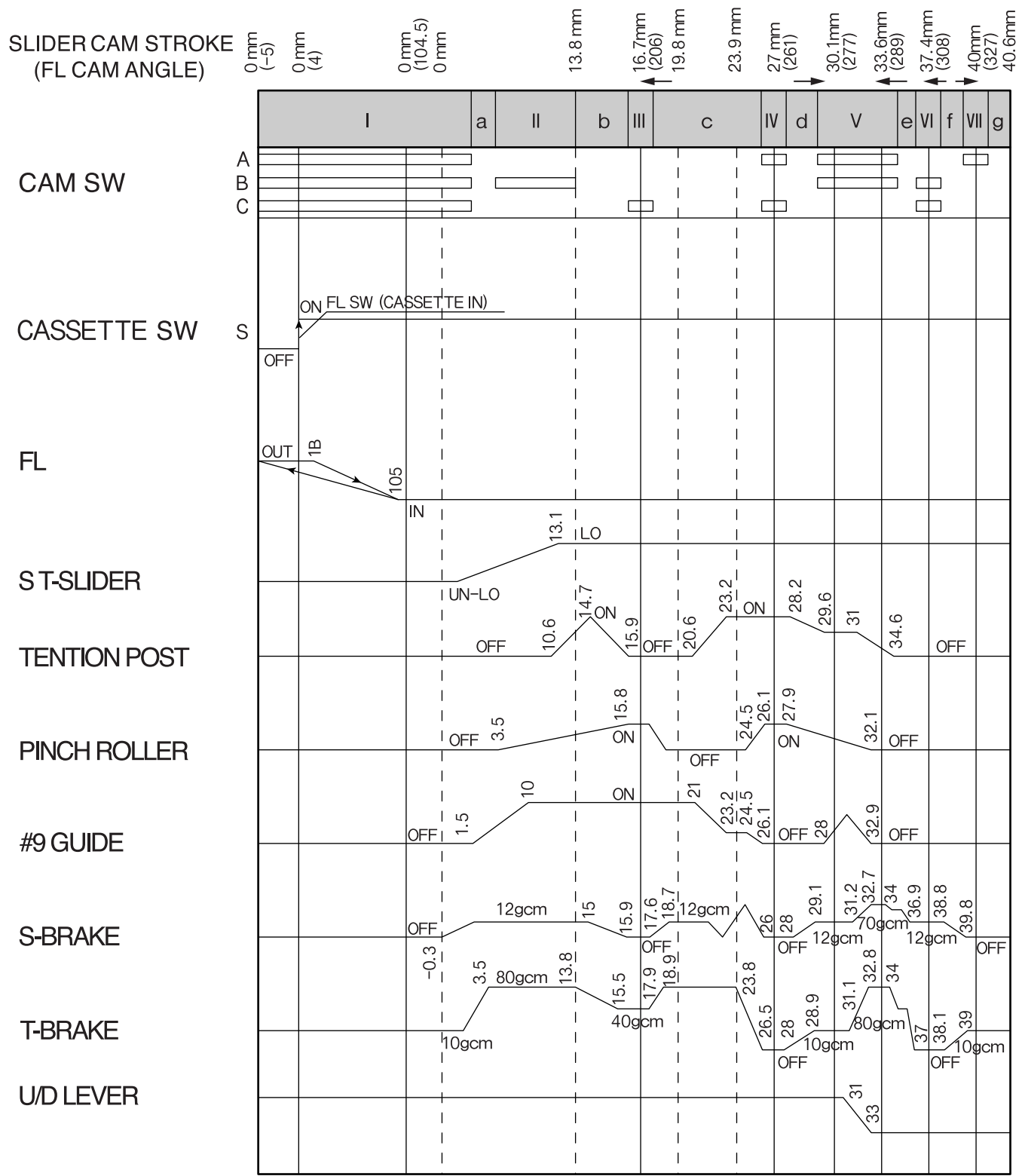


Fig. 15-15 Mecha Timing Chart (Kaiser-II)

(1) There are two STOP modes and two FF/REW modes.**1) STOP 1**

This mode is performed when PB and FF/REW is not done for 5 minute at power on.

The small load is given to S REEL DISC and T REEL DISC. And the cylinder motor is stopped.

2) STOP 2

This mode is performed when you press the stop button as performing FF/REW.

The large load is given to S REEL DISC and T REEL DISC.

3) FF/REW 1

This mode is performed when

❶ The tape load is small during performing FF and reducing speed.

❷ The tape load is large during performing REW.

The small load is given to S REEL DISK and no load is given to T REEL DISC.

4) FF/REW 2

This mode is performed when

❶ The tape load is large during performing FF.

❷ The tape load is small during performing REW and reducing speed

No load is given to S REEL DISK and the small load is given to T REEL DISK.

(Cf) According to acceleration, deceleration, and the location of tape, tension control which is caused by converting FF/REW 1 and FF/REW 2 each other is performed during FF or REW.

(2) The condition of S Brake and T Brake at each mode.**< S BRAKE >****1) OFF BRAKE (Unloading completion, RPS, PLAY, FF/REW 2)**

- S BRAKE is detached from S REEL DISC completely. So S REEL DISC is free.

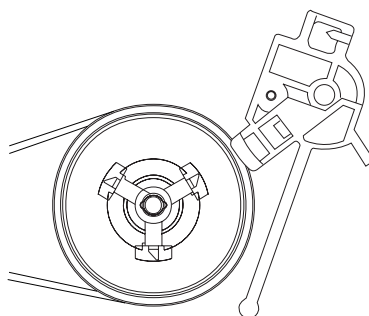


Fig. 15-16

2) SOFT BRAKE (during LOADING, STOP 1, FF/REW 1)

- The small load is given to S REEL DISC.

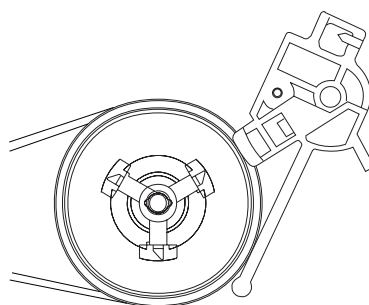


Fig. 15-17

3) MAIN BRAKE (STOP 2)

- The large load is given to S REEL DISC.

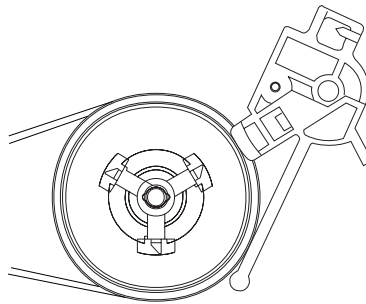


Fig. 15-18

< T BRAKE >

1) OFF BRAKE (PLAY, FF/REW 1)

- T BRAKE is detached from T REEL DISC completely. So T REEL DISC is free.

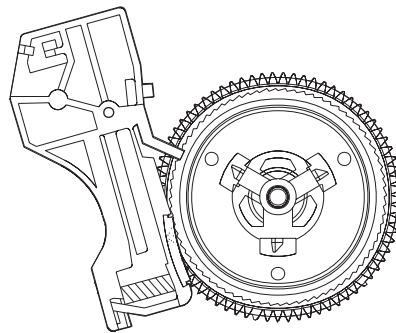


Fig. 15-19

2) SOFT BRAKE (UNLOADING Completion ,STOP 1, FF/REW 2)

- The small load is given to T REEL DISC.

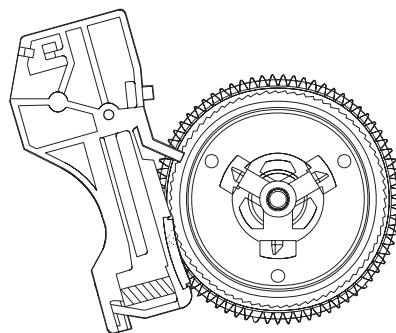


Fig. 15-20

3) REVERSE SEARCH BRAKE (RPS)

- The medium load is given to T REEL DISC.

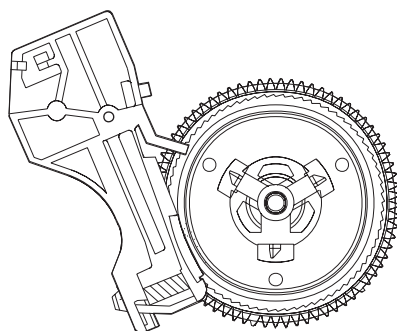


Fig. 15-21

4) MAIN BRAKE (on the loading, STOP 2)

- The large load is given to T REEL

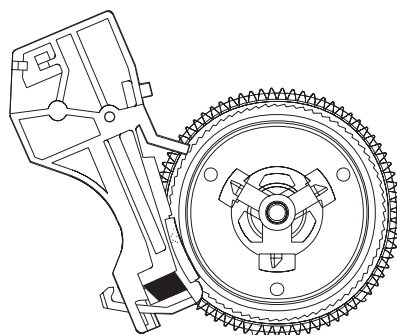


Fig. 15-22

15-6-2 Mode Sensor Drive

The mode sensor converts each mode of the mechanism into an electrical signal and transmits it to the microcomputer. The FL cam gear is rotated by the loading motor, and the cam slider slides after operation of the cassette holder.

Then the mode switch also rotates synchronized with the cam slider and outputs a signal corresponding to each mode. This signal is transmitted to the microcomputer and the microcomputer stops the cam slider at a specified angle, thus establishing each mode.

The IC601 controls Capstan Motor Drive IC for each mode to make the loading motor rotate in forward or reverse direction, thereby setting the mechanism at a specified position.

The mode switch develops three outputs A, B and C.

The circuit configuration of the mode sensor drive is shown in Fig. 15-22.

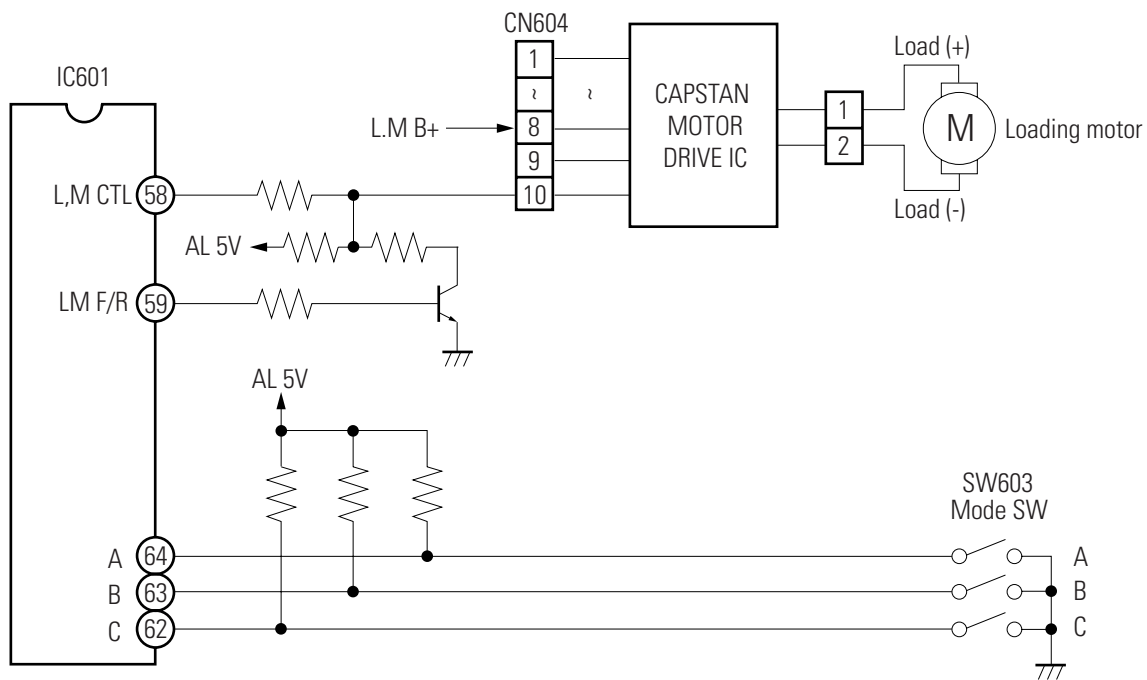


Fig. 15-23 Mode Sensor Drive

15-6-3 Operations in Each Mode

[1] Cassette loading & Tape loading mode

<Cassette loading>

- (1) The FL cam gear is in the Cassette unloading (position I) position, and the cassette holder is in the out status (Switch Detect OFF). Under this condition, each motor is stopped.
- (2) Status of the mechanism is as follows.
 - 1) S.T guide rollers, tension post, No.9 guide are in unloading status and housed in the reel disc side.
 - 2) S brake is released and T brake is in soft brake status.
 - 3) The clutch holder assembly is in clutched status and idle lever assembly is enabled to be engaged with both S and T reel discs.
- (3) When a cassette is inserted, the lock lever of cassette holder is released from the stopper, the cassette holder moves, the FL arm lever rotates, and the FL Drive Slider slides, thereby Switch Detect OF => ON.
- (4) IC601 controls Capstan Motor Drive IC to rotate the loading motor in forward direction, and move the cassette holder. At the same time, the capstan motor rotates in the reverse direction and moves the cassette down (vertical motion) while rotating the S reel disc.
- (5) The cassette lid opens when the vertical motion starts.
- (6) When the vertical motion has completed and the cassette is mounted, the capstan motor rotates in the reverse direction. At that time the position "a" is detected with the cam slider shifted and the loading/capstan motors are stopped. After 300msec the loading motor rotates in the forward direction and enters the tape loading operation.

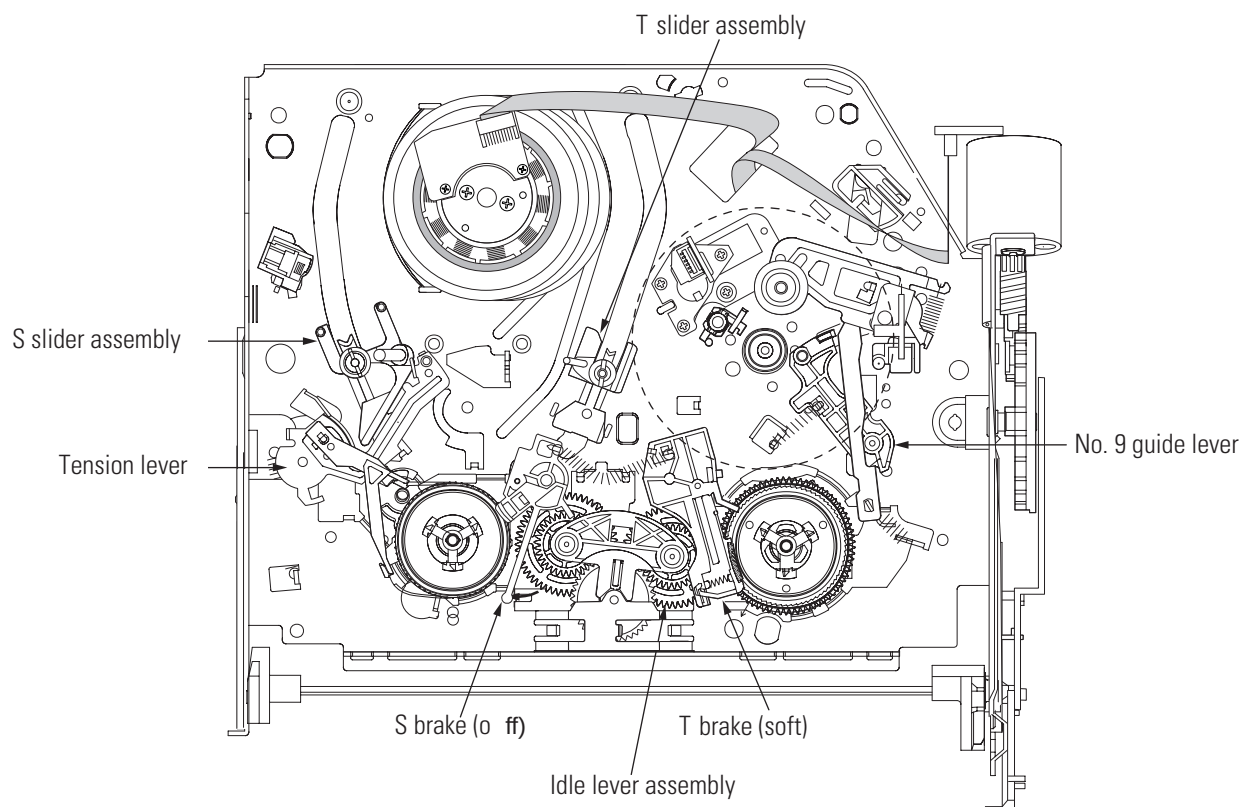


Fig. 15-24 Cassette-Loading Mode (Position I)

<Tape loading>

(1) After slot-in operation (cassette loading), FL cam gear rotates and the cam slider starts shifting, and a loading gear is ready to start.

Under this condition, the mechanism status is as follows :

- 1) The T main brake actuates so that tape does not come out from the T reel during the loading operation.
- (2) The cylinder starts to rotate after the loading motor is rotated.
- (3) When the cam slider reaches the position II (loading/unloading modes), the mechanism enters the loading status and operates as described below.
 - 1) S,T sliders are moved through the loading drive gear and turn on the tension post.
 - 2) The No. 9 guide is loaded.
 - 3) The pinch roller is loaded up to front of the capstan.
 - 4) The head cleaner is actuated during loading operation.
 - 5) The S soft brake is actuated.
- (4) When the cam slider passes through the position III, and detects the position IV (playback standby mode), the loading motor stops. Under this condition, the mechanism status is described as below :
 - ❶ The pinch roller is pressed to the capstan.
 - ❷ The No.9 guide is stored in the cassette.
 - ❸ The tension post touches the tape, band brake force is applied, and the tension servo brake mechanism actuates.
 - ❹ Brakes for the reel discs are all off.

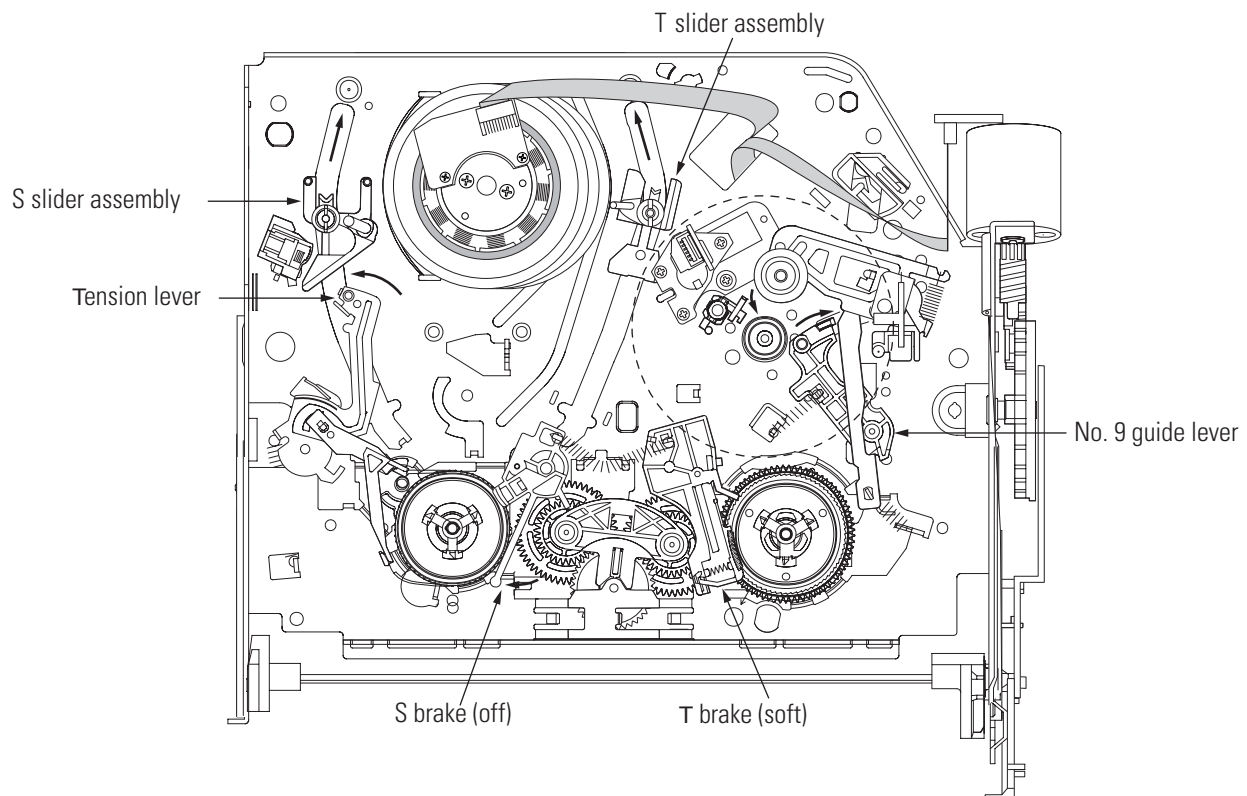


Fig. 15-25 Tape Loading Operation (Position II)

<Playback Stand-by (Stop) mode>

- (1) The tape loading operation completes and the loading motor stops.
- (2) In the same way as in the playback mode, the capstan motor rotates in forward direction and the T reel disc takes up the tape. (For more details, refer to the playback mode.)
- (3) After running the tape for 0.6s, the mechanism rotates the capstan in the reverse direction for 0.3s to slack the tape properly with pinch roller pressed.
- (4) If nothing is operated for about 5 minutes, the loading motor rotates in the forward direction and the cam position reaches the position V, and both the loading motor and the cylinder motor stop.
- (5) During this period, the video and audio systems are in the same status as in the stop mode.

[2] Tape unloading & Cassette unloading

<Tape Unloading>

- (1) When the [EJECT] button is pressed in the stop mode, the mechanism enters the eject mode.
- (2) IC601 controls cylinder motor drive IC to make the cylinder motor rotates.
- (3) IC601 makes the loading motor rotate in the reverse direction, and shifts the cam slider.
 - 1) The mechanism components move in the reverse direction against the loading operation.
- (4) When the cam slider reaches the position II, IC601 makes the capstan motor rotate in the reverse direction (LP X11) and takes up the tape at a specified torque using the clutch mechanism.
- (5) When the cam slider reaches the position I, it brakes the capstan motor to stop, and then stops the loading motor after 230ms passed.

<Cassette unloading>

- (1) Furthermore, IC601 makes the loading motor rotate in the reverse direction and also the capstan motor in reverse direction, applies braking force to the capstan motor by detecting the Switch-Detect ON --> OFF, and the capstan motor stops.
- (2) IC601 makes the loading motor stop after 200ms passed from sensing "OFF".
- (3) Also IC601 makes the loading motor rotate in the forward direction after 120ms passed.
- (4) IC601 makes the loading motor stop after 100ms passed from loading motor rotating in the forward direction.

[3] Stop mode

- (1) The cam slider is in the stop mode (position V)(Fig. 15-26)and each motor stops.
- (2) The mechanism status is as follows :
 - 1) The S, T guide rollers are in the loading status.
 - 2) The pinch roller is kept away from the capstan.
 - 3) The tension post is shifted to the reel disc side. That is, the band brake is released from the ON status and the back tension is also released.
 - 4) The S, T soft brakes are being applied.

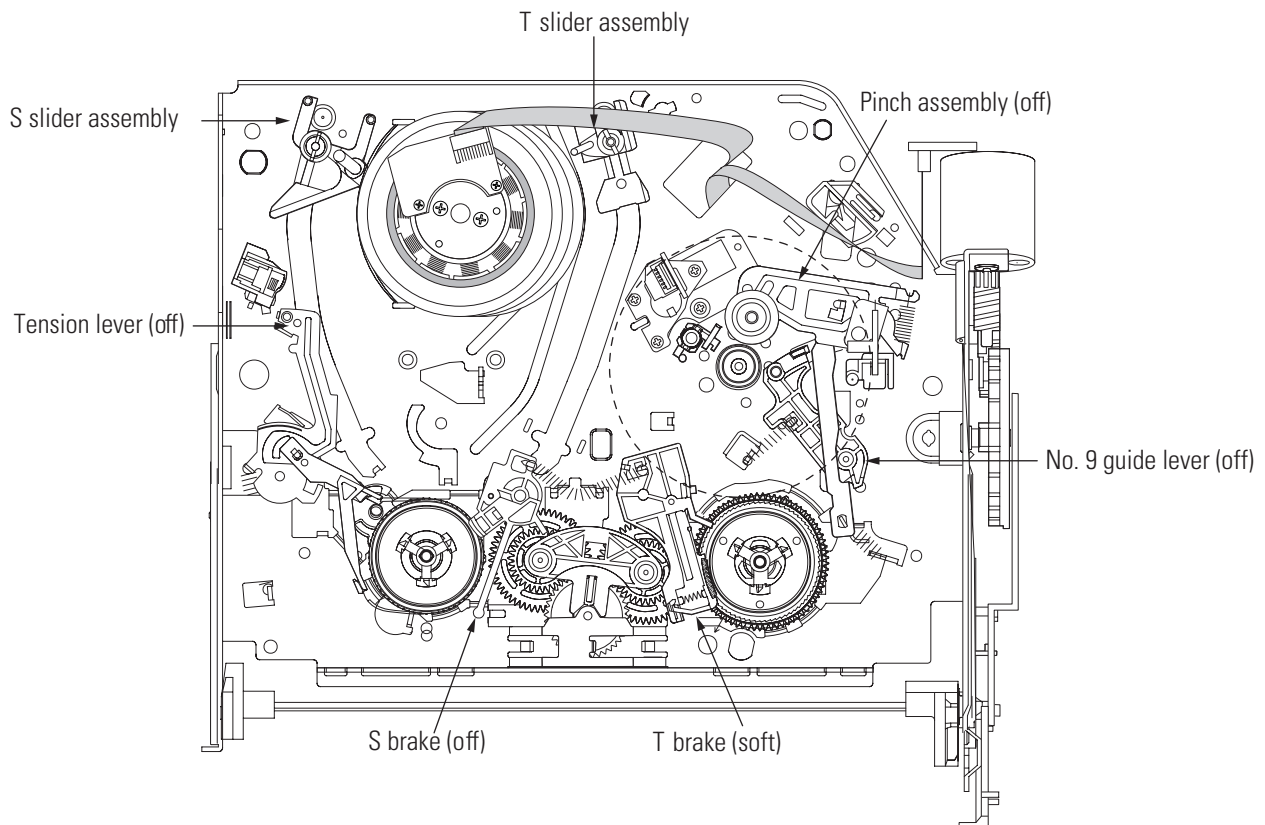


Fig. 15-26 Stop Mode (Position V)

[4] FF/REW mode

- (1) When the [REW] button is pressed in playback standby mode, the mode enters the FF/REW mode.
- (2) IC601 controls Capstan Motor Drive IC and makes the loading motor rotate in the forward direction.
The loading motor stops when the cam position reaches the position IV(Fig. 15-28), VII(Fig. 15-27) (FF/REW mode).
The mechanism status is as follows :
 - 1) The pinch roller is OFF.
 - 2) The No. 9 guide is once loaded but immediately returned.
 - 3) The tension post is moved to the reel disc side. That is, the band brake is released from the ON status and the back tension is released.
 - 4) The clutch holder assembly is in the direct status and the capstan driving force is directly transmitted to the reel disc.
 - 5) Brakes for the reel discs are as follows :
 - ❶ VI position FF/REW 1 mode (S Brake : soft brake, T Brake : off)
 - ❷ VII position FF/REW 2 mode (S Brake : off, T Brake : soft brake)
- (3) IC601 makes the capstan motor rotate in the forward direction and the idle gear transmits the rotation to the S/T reel discs to take up the tape.

[5] FF/REW to STOP mode

- (1) When the [STOP] button is pressed in the REW mode, the mechanism enters the playback standby mode.
- (2) IC601 makes the loading motor rotate in the reverse direction and stops at the position V(Fig. 15-26).
With this mode shift, the mechanism actuates S, T main brakes to stop the tape. Then, the capstan motor also stops by braking force 70ms after detecting "e" position.
- (3) IC601 makes the loading motor rotate in the reverse direction again and stops the loading motor when the cam slider reaches the position IV(Fig. 15-28) (playback mode), thus setting the playback standby mode.

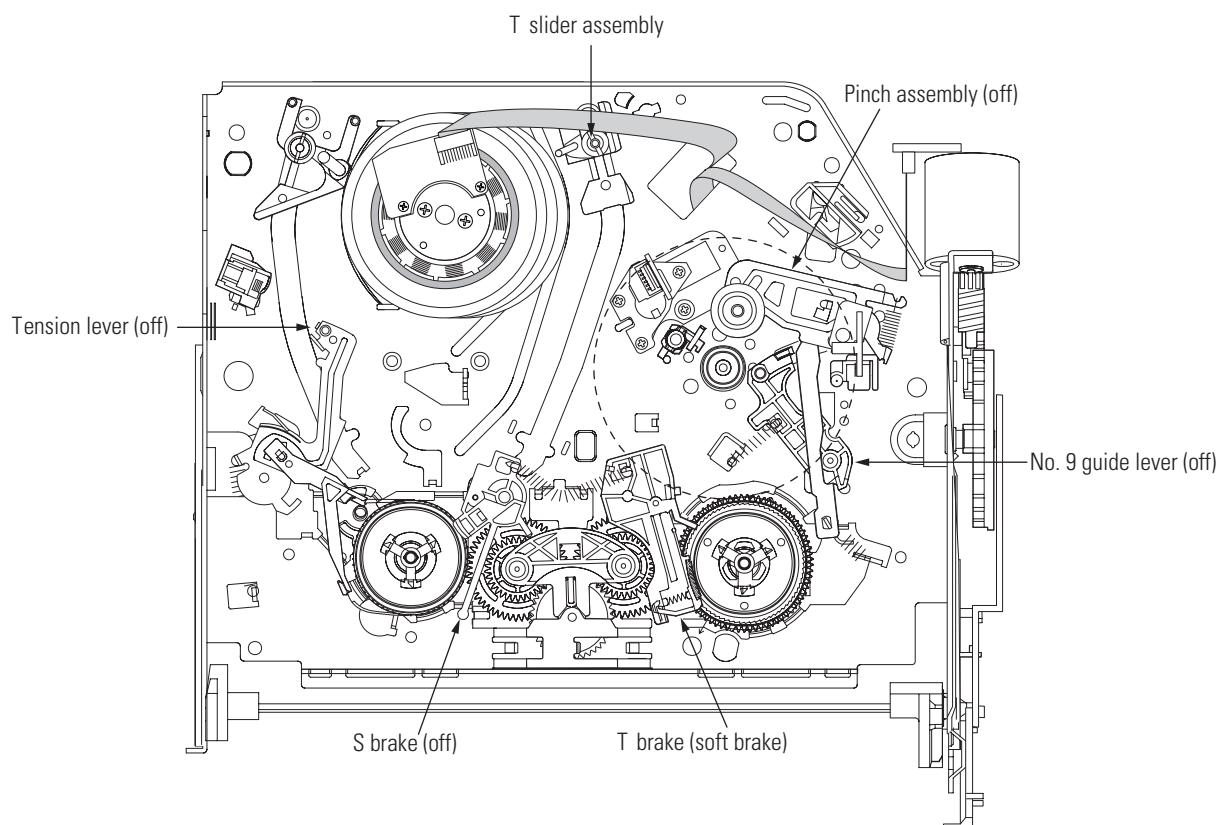


Fig. 15-27 FF/REW 2 Mode (Position VII)

[Playback mode]

- (1) When the [PLAY] button is pressed in the stop mode, the mechanism enters the playback mode.
- (2) IC601 controls cylinder motor drive IC and rotates the cylinder motor.
- (3) IC601 controls Capstan Motor Drive IC to rotate the loading motor in the reverse direction and stops the motor when the cam slider reaches the position IV(Fig. 15-28) (playback mode). (When operating from the playback standby mode, the cam slider has been already on the position IV.) The mechanism works as follows :
 - 1) The pinch roller moves toward the capstan side and press fits the capstan.
 - 2) The No.9 guide is loaded once and then returned immediately.
 - 3) The tension post touches the tape, the band braking force is applied, and the tension servo mechanism works.
 - 4) The clutch holder assembly enters clutched condition.
 - 5) S,T brakes are released.
- (4) IC601 makes the capstan rotate in the forward direction and feeds the tape. The idle gear transmits the rotation to the T reel disc and the reel disc takes up the tape at a constant torque by the clutch mechanism.
- (5) IC601 controls the video circuit and switches the playback screen.
- (6) The recording speed data identified by IC601 is displayed in the Led module.

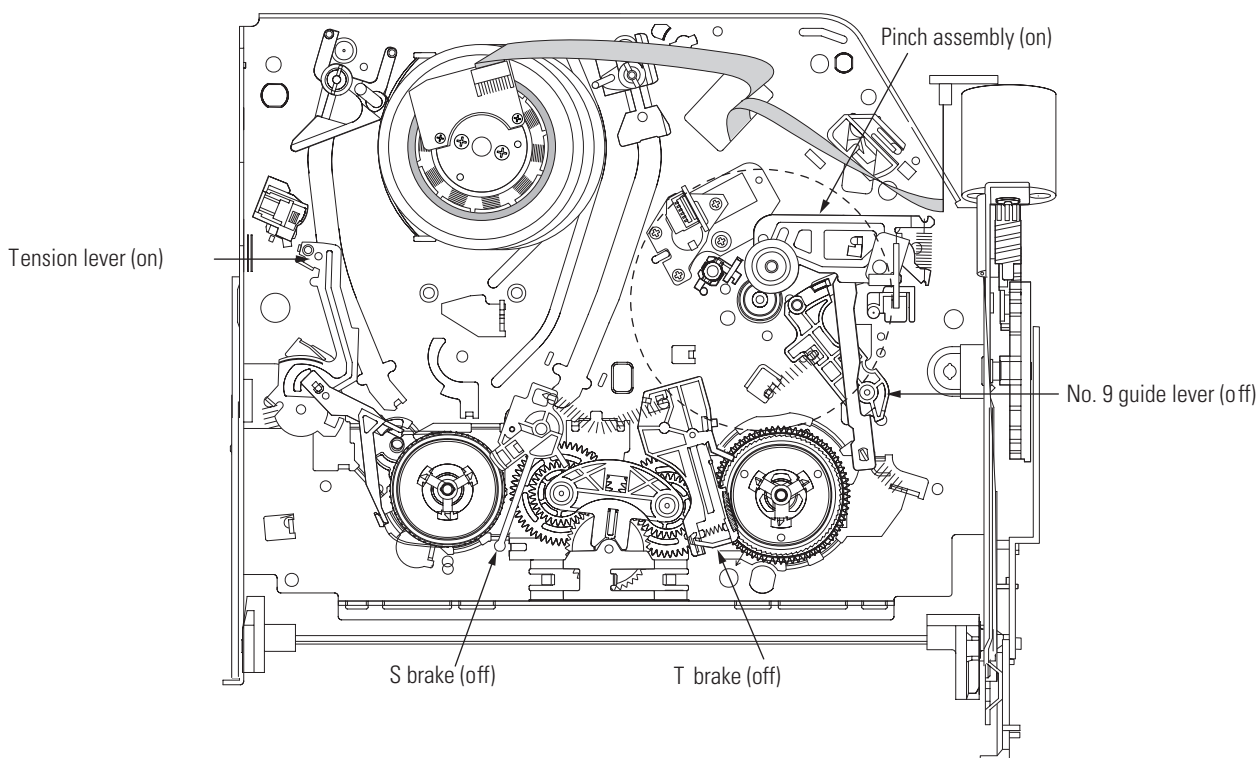


Fig. 15-28 Playback Mode (Position IV)

<Still mode>

- (1) When the [PAUSE] button is pressed in the playback mode, the mechanism enters the still mode.
The cam slider is in the position IV (Fig. 15-28) (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
- (2) IC 601 controls the audio circuit and actuates the audio mute function.
- (3) The capstan motor enters the intermittent operation mode and then stops.
- (4) IC 601 maintains the recording speed data just before the still operation.
- (5) In the slow mode, the capstan motor rotates continuously in the intermittent driving.

<FPS mode>

- (1) When the [FF] button is pressed in the playback mode, the mechanism enters the FPS mode (forward picture search). The cam slider is in the position IV (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
- (2) IC 601 controls the audio circuit to actuate the audio mute operation.
- (3) IC601 makes the capstan rotate at 7 times for SP, 21 times for SLP to feed the tape, respectively.
The tape is taken up at a constant torque by the clutch mechanism. (The mechanical operation is the same as that in the playback mode.)
- (4) The recording speed data identified by IC601 is displayed on the Led module.

<RPS mode>

- (1) When the [REW] button is pressed in the playback mode, the mechanism enters the RPS mode.
The cam slider is in the position IV (Fig. 15-28) (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
- (2) IC601 controls the audio circuit to actuate the audio mute operation.
- (3) IC601 controls Capstan Motor Drive IC to make the loading motor rotate in the reverse direction.
After 180ms the loading motor stops for 250ms. During the mode shift operation, the mechanism rotates the capstan motor in the forward direction for a constant time so that the tape is not slackened.
- (4) When the cam slider reaches the position "c" (loading motor stopped for 250ms), the capstan motor is rotated in the reverse direction for a constant time, and the idle gear is swung toward the S reel disc side.
Then, the loading motor rotates in reverse direction and shifts to the position III (RPS mode).
When the cam slider reaches the position III (RPS mode), the loading motor stops.
The mechanism status is as follows :
 - 1) The No.9 guide is loaded.
 - 2) The tension post is separated from the tape.
 - 3) The T soft brake is turned on.
 The capstan motor rotates in the reverse direction at 7 times for SP, 21 times for SLP to feed the tape in the REW direction, respectively. At the same time, the idle gear transmits the rotation to the S reel disc and the S reel disc takes up the tape by the clutch mechanism.
- (5) The recording speed data identified by IC601 is displayed on the Led module.

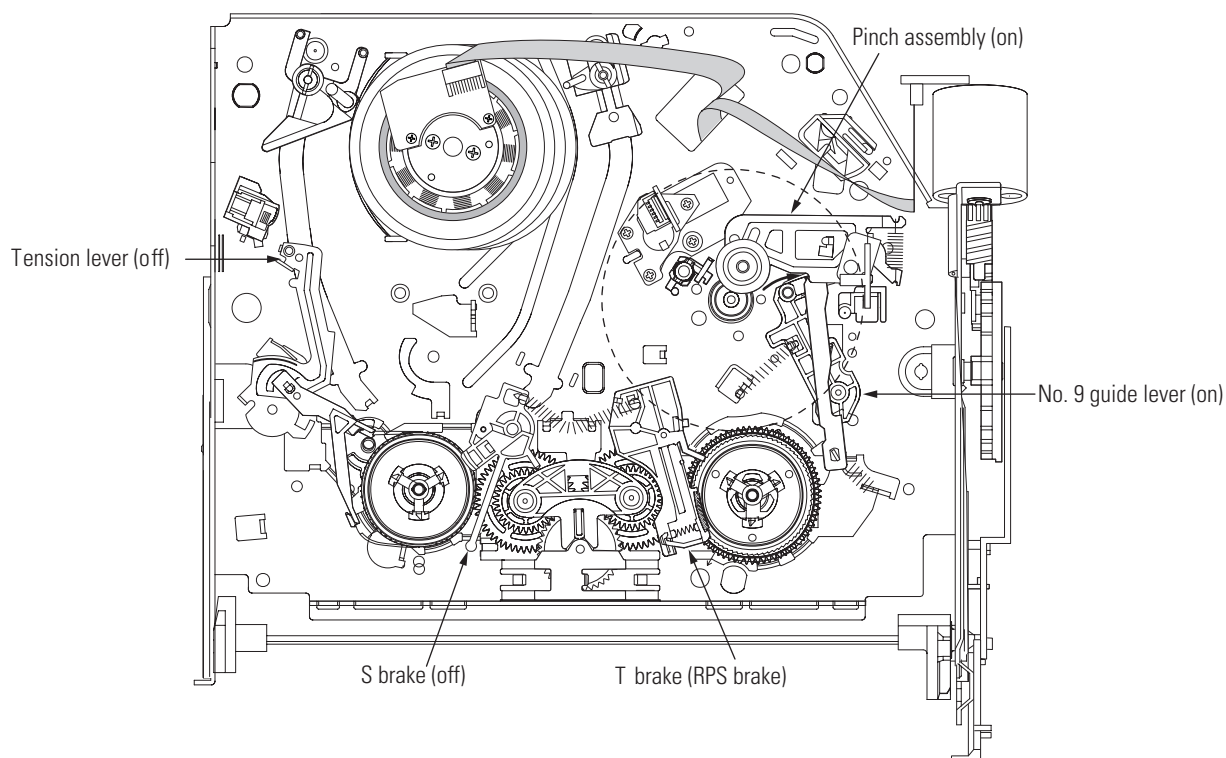


Fig. 15-29 RPS Mode (Position III)

[7] REC mode

<REC mode>

- (1) When the [REC] button is pressed in the stop mode, the mechanism enters the REC mode.
- (2) The cylinder motor starts and then the loading motor rotates in reverse direction.
The cam slider reaches the position IV(Fig. 15-28) (playback mode).
The tape is taken up at a constant torque. The mechanism operations are the same as those in the playback.
- (3) IC601 controls the audio circuit and video circuit to set the record enable mode.
- (4) Recording mute is released, thus setting the recording status. The CTL signal is output for recording.

<REC PAUSE mode>

- (1) When [PAUSE] button is pressed in the REC mode, the mechanism enters the REC pause mode.
- (2) IC601 controls the audio circuit and the video circuit, and releases the record enable mode and performs the rewinding for synchronous editing.
- (3) After completion of the rewinding for synchronous editing, the cam slider is in the position IV(Fig. 15-28) (playback mode), the cylinder motor is rotating, and the capstan motor and the loading motor stop.

15-7 Introduction to DVD

15-7-1 The Definition of DVD

DVD is the next generation medium and is the acronym of the Digital Versatile Disc or the Digital Video Disc, which maximizes the saving density of the disk surface using the MPEG-2 compression technology to enable the storage of 17G bytes of data on the same size CD.

1) 7 times the storage capacity of the conventional CD

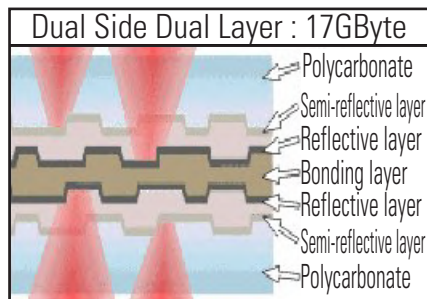
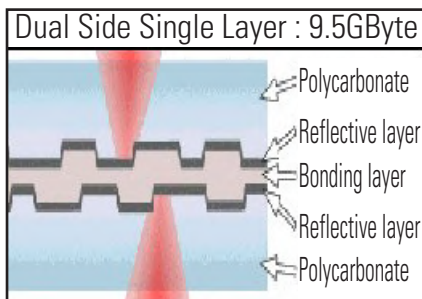
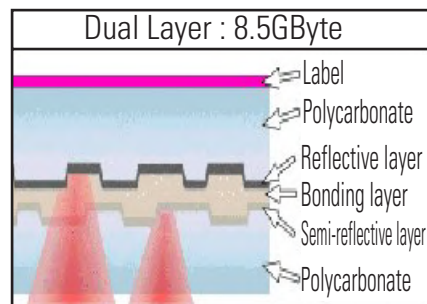
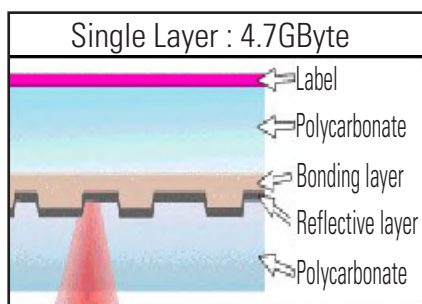
- Minimized the track pitch and pit size to 1/2 of conventional CD.
- Uses red laser with short-wavelength of 650nm (635nm).

• DVD Vs. CD-ROM

	CD-ROM	CD-R/RW	DVD-ROM	DVD-R/RW	DVD-RAM
Disc Thickness	1.2mm	1.2mm	0.6*2mm	0.6*2mm	0.6*2mm
Lens NA	0.45	0.45(0.5)	0.6	0.6	0.6
Laser wavelength	780nm	780nm	650nm	650nm	650nm
Track pitch	1.6μm	1.6μm	0.74μm	0.74μm	0.615μm
Capacity	0.65GB	0.65GB	4.7GB	4.7GB	4.7GB
Track structure	Pit train	Groove	Pit train	Groove	Land/Groove

2) Disc Formats

DVD consists of two 0.6mm discs attached together, enabling access to the upper and lower side of the disk, and 4 sides could be used at maximum.



15-7-2 DVD Types

FORMAT	TYPE	APPLICATIONS
DVD-Video	Playback Only	High quality image and sound for movies and other video media.
DVD-ROM	Read Only	Multi-functional, multi-media software that requires large storage capacity.
DVD-Audio	Playback Only	High quality sound that exceeds the CD, multi-channel Audio.
DVD-R	1 Time Recording	As with CD-R, write only once
DVD-RAM	Rewritable (more than 100,000times)	This can be virtually used as hard-disk, with a random read-write access
DVD-RW	Rewritable (About 1000times)	Similar to DVD-RAM except than its technology features a separated read-write access more like phonograph than a hard disk.

15-8 DVD-Video Format

15-8-1 Main Features

- 1) Able to store up to 160 minutes of Movie by utilizing the MPEG-2 compression technology. (Aver. 133min.)
- 2) Enables more than 500 lines of horizontal resolution. (Class corresponding to the Master Tapes used in broadcasting stations)
- 3) Provides Dolby Digital 5.1ch Surround 3D sound, which enables theater quality sound (NTSC area).
 - For PAL areas, 1 of either MPEG-2 Audio or Dolby Digital must be selected.
- 4) Multi-Language
 - Able to store up to 8 languages of dubbing.
 - Able to store up to 32 subtitle languages.
- 5) Multi-Aspect Ratio
3TV Mode alternatives ; 16:9 Wide Screen (DVD Basic)/4:3 Pan & Scan/Letter Box.
- 6) Multi-Story
Possible to implement Interactive Viewing which enables the user to select the scenario.
- 7) Multi-Angle
Able to view the camera angle you selected among the scenes recorded with multiple camera angles.

Note ; The above media features must have the DVD Title that contains the appropriate contents to function properly.

15-8-2 Audio & Video Specifications

Classification		DVD-Video		Video-CD	LD
VIDEO	Compression	MPEG-2		MPEG-1	Analog
	Pixel	720 x 480		352 x 240	
	Horizontal resolution	Max. 500 Lines		Max. 250 Lines	Max.420 Lines
	Compression rate	1/40		1/140	Analog
	Transmission speed	Max. 9.8Mbps (variable)		1.15Mbps (fixed)	
	TV aspect	16:9 / 4:3		4:3	4:3
AUDIO	Audio	Max. 8 streams		2CH stereo	2 Analog CH. 2 Digital CH. (16Bit/44.1KHz)
	Recording type	Dolby Digital	Linear PCM	MPEG-1 Layer 2	
	Transmission rate	448Kbps/stream	6.144Mbps/stream	224Kbps	or 1 Analog CH. 1 Stream of Dolby Digital 2 Digital CH. (16Bit/44.1KHz)
	Channel	5.1CH/stream	8CH/stream	2CH	
	Sampling frequency	48KHz	16, 20, 24Bit/48, 96KHz	16Bit/44.1KHz	

15-8-3 Detailed Feature

DVD-Video Feature 1

When Developing the DVD Software, various addition and modification is possible.

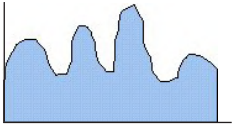
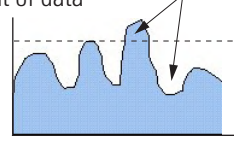
As the storage capacity increases, the DVD-Video separates the main data and the additional data such as the Multi-Function into different data areas, enabling the control of time-data ratio to provide the format that enables the flexible Software development

- 1 Movie (3.5Mbps)
 - + Subtitle (1 Language)
 - + Surround Audio (1 Language)
 - = 160min storage (4.673Gbytes)
- 1 Movie (3.5Mbps)
 - + Subtitle (4 Language)
 - + Surround Audio (4 Language)
 - = 160min storage (4.680Gbytes)
- 1 Music Video (4Mbps)
 - + 2ch High quality Audio (96kHz / 24bit)
 - = 72min storage (4.648Gbytes)

DVD-Video Feature 2

Application of the MPEG-2 compression technology.

DVD-Video uses the variable compression technology, the MPEG-2 to compress the moving image optimally, minimizing the Data loss to Provide a clear, natural screen while increasing the storage time.

DVD-Video	• MPEG-2 (Variable compression : Max. 1 / 40) - Field unit compression. - Compression rate change according to the amount of Data. - Differentiates the still image and the moving image compression rate, reducing Data loss and enables efficient compression.	Amount of data  Time
Video-CD	• MPEG-1 (Fixed compression : Max. 1 / 140) - Frame unit compression. - Compresses all data using the same ratio. • Fast movements are jagged, and unnatural	Amount of data  Time

DVD-Video Feature 3**High quality surround audio.**

DVD-Video can store the audio using the 5.1ch Dolby Digital compression or the advanced Linear PCM method, providing the better-than-CD quality and theater like audio quality.

- **DTS (Digital Theater System)**

Home theatre and music playback in the home, DTS provides high quality 5.1-channel surround sound with many extras not offered by other consumer formats. As well as handling DTS-branded releases from a growing number of music labels and consumer software producers, DTS provides enhanced 6.1 matrix and DTS 6.1 discrete decoding that envelopes the listener in sound. DTS technology is featured in a wide cross section of receiver/pre-amplifiers, DVD players and add-on components from leading consumer audio vendors

- **Dolby Digital (AC-3)**

- Unlike the traditional Dolby pro-Logic method, the Dolby Digital method separates all 5 main channels (Front L/R, Center, Surround (Rear) L/R) and the Sub woofer to provide live surround audio.
- Using the Down Mix method, the conventional Dolby Pro-Logic and Stereo are all compatible.
- Each separated channels are played back at CD quality sound. (Frequency band: 20Hz ~ 20KHz)

- **Linear PCM (Pulse Code Modulation)**

- Provides the high quality Digital sound without the audio data compression.
- Various Digital Recordings are possible as shown in the table to the right.

Sampling Frequency	Bit Rate
48KHz	16bit
	20bit
	24bit
96KHz	16bit
	20bit
	24bit

- **Dolby Digital compatible Audio Mode**

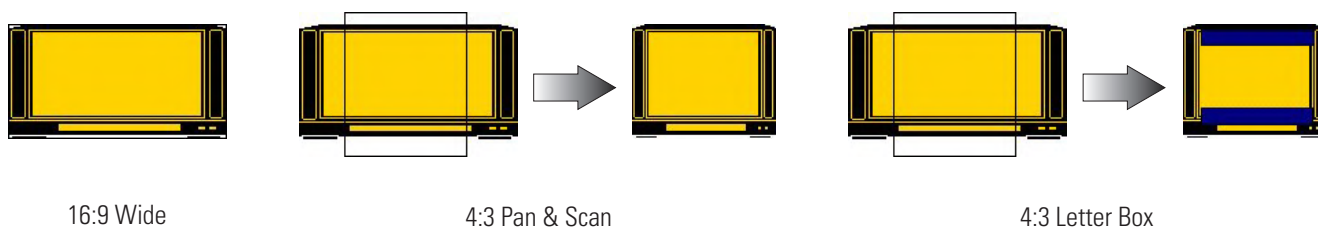
Audio Coding Mode	Channel Format					Remark
		Front		Surround (Rear)		
	L	C	R	L	R	
1/0		0				Mono
2/0	0		0			Stereo
3/0	0	0	0			Surround
2/1	0		0	Mono		
3/1	0	0	0	Mono		
2/2	0		0	0	0	
3/2	0	0	0	0	0	

DVD-Video Feature 4**Multi-Language**

- Audio Dubbing - Max. 8 Languages
- Subtitle - Max. 32 Languages. Capable of storing, and selectiong.
- Linear PCM (Pulse Code Modulation)

DVD-Video Feature 5**Multi-Aspect**

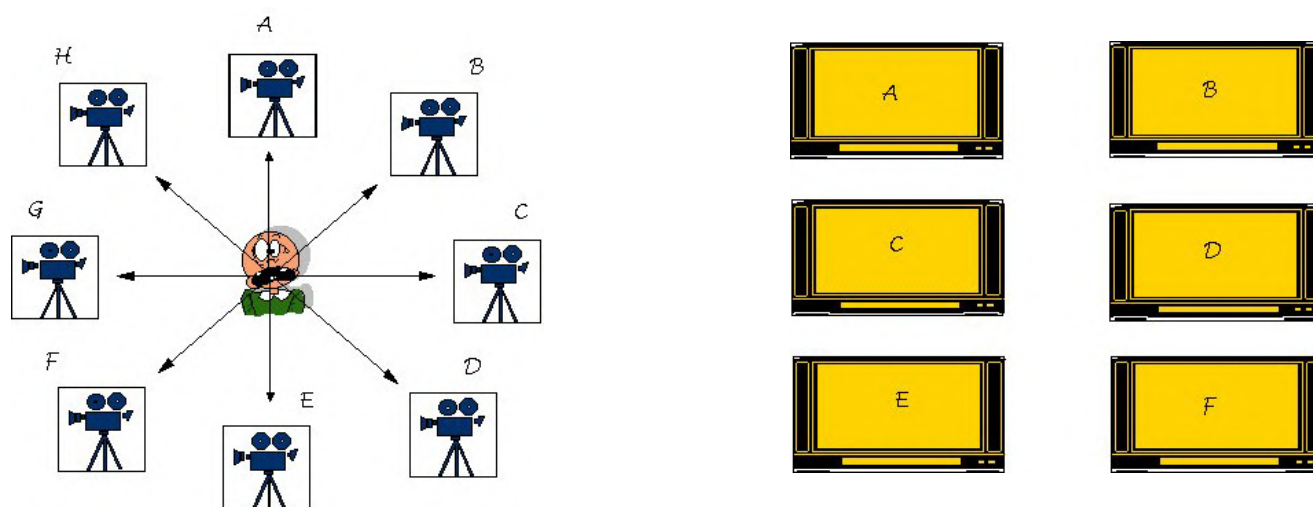
- Unlike the conventional VCD or LD, DVD-Video has the default of 16:9 Wide, and can be viewed using the conventional 4:3 TV, enabling the expansion of viewer selection capabilities.
 - 16 : 9 TV : Wide Mode (16:9 Wide Full Screen)
 - 4 : 3 TV : Letter Box Mode, Pan & Scan Mode



Note ; This function is disc-dependent, may not work on all DVDs.

DVD-Video Feature 6**Multi-Angle**

- Up to 9 angles of view may be stored, enabling the viewer to select a specific viewpoint at a given time.
 - > Especially, for the Music Video and Sports Title, this provides a more lively image of the scene.



Note ; This function is disc-dependent, may not work on all DVDs.

DVD-Video Feature 7**Multi-Story**

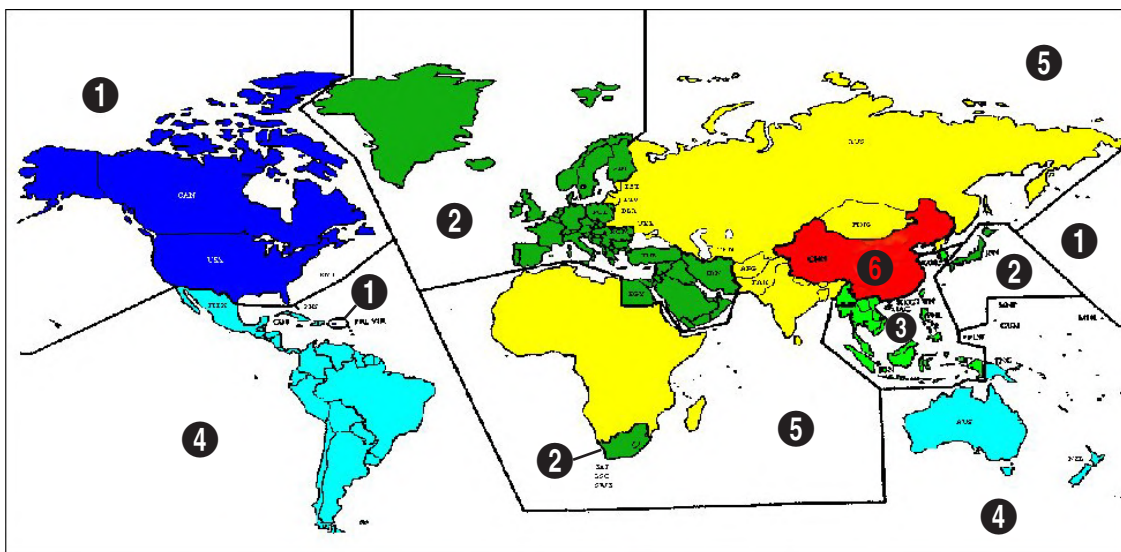
- DVD-Video provides the environment suitable for the bi-directional Software development, providing multiple scenarios. This feature enables the Multi-Story function.

OPTION**Parental Lock**

- For the titles that are not suitable for children viewing, Parental Locks are set, requesting user defined passwords for viewing
- Parental Locks may be set on specific frames of the Title, enabling the player to skip those frames during playback.

COPYRIGHT**Regional Code & Macrovision**

- Classify the world into 6 regions, and if the DVD Title and the Player's "Regional Code" do not agree, playback is prohibited.
- **Regionnal Coding is optional for the Soft developers (Region 0 All Code), but the Hardware developers must adopt the appropriate regionnal code for sale.**
 - Region 1 : The United States and its territories, Canada.
 - Region 2 : Europe, Japan, Greenland, Egypt, South Africa, the Middle East.
 - Region 3 : Taiwan, Hongkong, Korea, South East Asia.
 - Region 4 : Mexico, South America, Australia, New Zealand.
 - Region 5 : Russia, Eastern Europe, India, Africa.
 - Region 6 : China.
 - Region 0 : Worldwide (All Code)

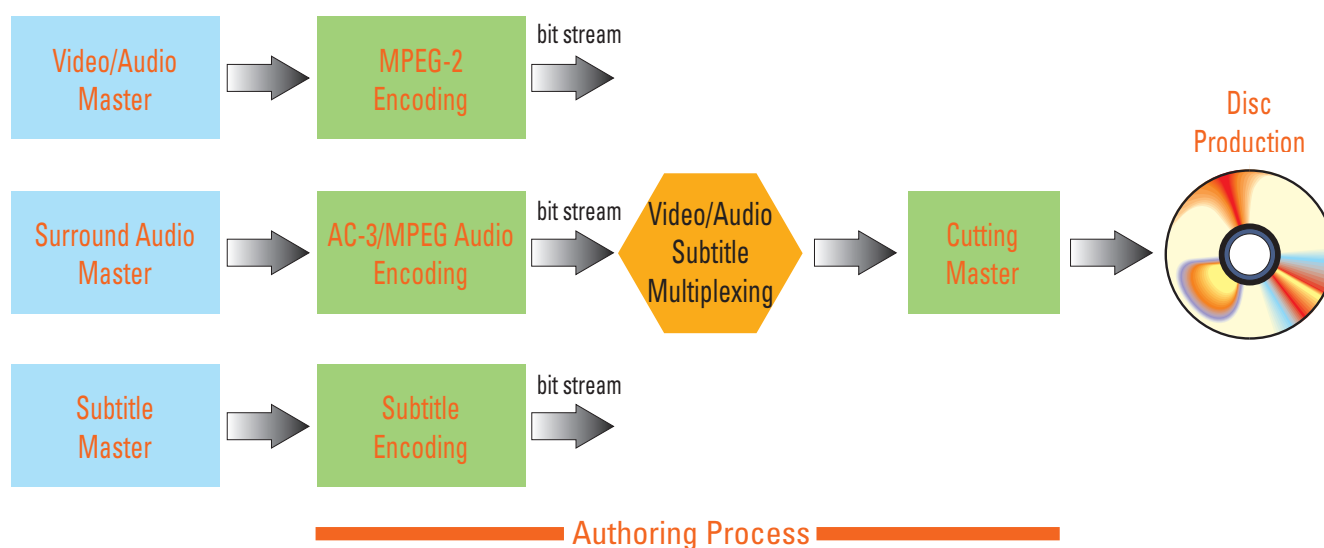


- Adoption of the Macrovision System disables the copying on to other media.

Remark**DVD-Video Authoring Process**

- The image quality of the DVD-Video may vary according to the quality of the Master and the Authoring Process
 - The image quality of the DVD-Video varies according to the Digital Mastering Source such as the conventional LD, VCD, or Original Film.
 - Different Authoring Process are used according to the Software developers, and this may affect the DVD image quality.

- **Authoring Process**



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