SAMSUNG ELECTRONICS

SERVICE MANUAL

DVD-R150

SAMSUNG

DVD- RECORDER

Chassis : Nexus (4th Generation)

BASIC : DVD-R157

Application Model

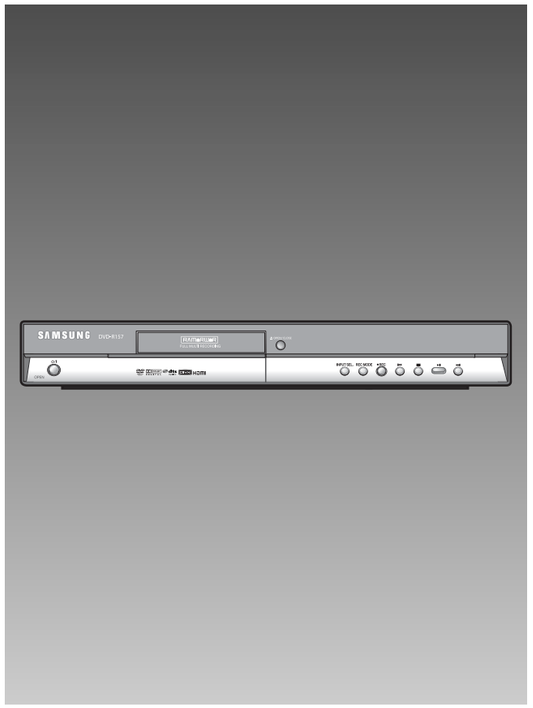
: DVD-R150

Application Areas

: XAC, XAX, XAP, XAO, RCL, STR, XAZ, XBG

SERVICE *Manual*

DVD-RECORDER



Merit & Character regarding Product

1. **Multi format recording**
   DVD ±R / ±RW
2. **Multi format playback**
   DVD/ DVD-RAM/ DVD-RW/ DVD-R/ DVD+R/ DVD+RW/ CD/ CD-R/ CD-RW/ MP3/ JPEG/ DivX
3. **Recording mode**
   XP(1Hour)/ SP(2Hour)/ LP(4Hour)/ EP(6~8Hour)
4. **Automatic Chapter product on**
5. **49mm Slim Design**
6. **EZ REC MODE**

Printed in Korea

AK82-01226A

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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, screwheads, 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.

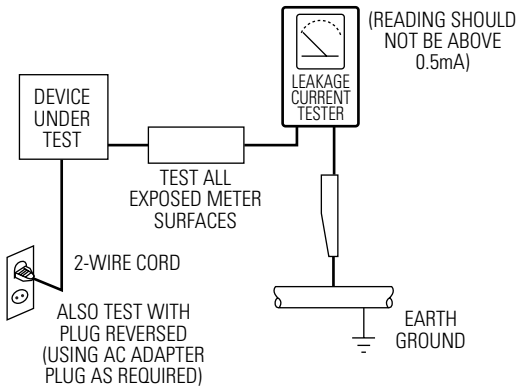

Fig. 1-1 AC Leakage Test

(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) Turn on the power switch of the instrument. (3) 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.

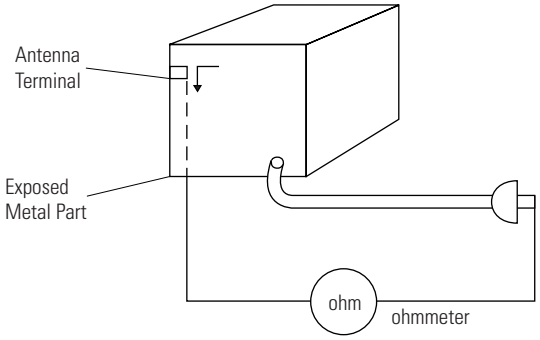

Fig. 1-2 Insulation Resistance Test

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 unforseen 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(⚠) 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

Disconnect the attachment plug from the AC outlet and turn the power ON. 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 your 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.

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

(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).

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.

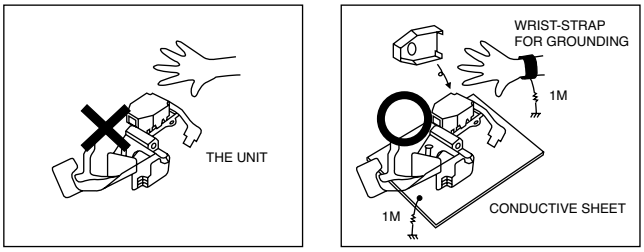

Fig.1-3

(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.

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2. Product Specification

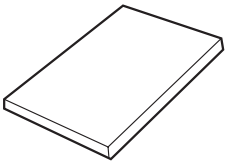
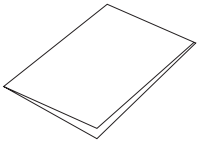
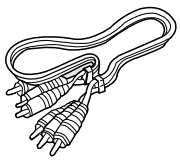
2-1 Product Specification

General	Power requirements	120V AC,60Hz
	Power consumption	19Watts
	Weight	5.1 IB
	Dimensions	16.9inch(W) x 8.5inch(D) x 1.9inch(H)
	Operating temp	+41°F to 95°F
	Other conditions	Keep level when operating. Less than 75% operating humidity
Input	Video (1,2)	1.0 V p-p at 75ohm load, sync negative
		S-Video input (Y:1.0Vp-p, C: 0.286Vp-p at 75ohm load)
	Audio (1,2)	Max. Audio input level : 2Vrms
	DV Input	IEEE 1394(4p) compatible jack
Output	Audio	Audio output jacks 1,2
		Optical/coaxial digital audio output
		Full scale analog output level : 2Vrms
	Video	Video output jacks 1,
		S-Video output 1 (Y: 1.0Vp-p, C:0.286Vp-p at 75 ohm load)
		Component output (Y: 1.0Vp-p ,Pb:0.70Vp-p, Pr:0.70Vp-p at 75ohm load)
Recording	Picture compression format	MPEG-II
	Audio compression format	Dolby digital 2ch/256kbps
	Recording Quality	XP (about 8 Mbps), SP (about 4 Mbps), LP (about 2 Mbps),
		EP (about 1.2 Mbps), FR (about 1.2 Mbps to 8Mbps)
	Audio frequency characteristics	20 Hz ~ 20 KHz

2-2 Chassis Product Specification

General	Model Name	DVD-R135	DVD-R150
Chassis			
Info	Function	Standard	Standard
SYSTEM	COLOR SYSTEM	NTSC	NTSC
	BROADCAST SYSTEM	M	M
	AUTO CLOCK	O	-
RECORDER FUNCTION	DVD-RAM	-	O
	DVD-R	O	O
	DVD-RW	O	O
	VIDEO	MPEG-2	MPEG-2
	AUDIO	2ch	2ch
	DVD +R	-	-
	DVD +RW	-	-
	Flexible Recording	O	O
	OTR	O	O
	Time Slip	-	-
	Video Plus+/Show View/G-Code	-/-	-/-
	Quick Dubbing	-	-
	EPG(Gemstar)	-	-
SUB FUNCTION	CBC(CABLE BOX CONTROL)	-	-
	Play List	O	O
	Auto Chaptering	O	O
	JPEG Browser with BG music	-	O
	DV Input	O	O
	HDMI	O	-
PLAYBACK FUNCTION	DVD-RAM/-R/-RW/+R/+RW	O	O
	DVD-Video/VCD/CD-DA	O/-/O	O/-/O
	CD-R/RW	O/O	O/O
	Music CD	O	O
	Divx	O	O
	Multi Memory Card	-	-
	Progressive Scan Output	O	O
	Upscaling(720P/1080i)	O	-
N/OUT	Video Input	2ea	2ea
	Video Output	1ea	1ea
	S-Video Input	1ea	1ea
	S-Video Output	1ea	1ea
	Component Output	1ea	1ea
	HDMI Output	1ea	-
	Analog Audio Input(L/R)	2sets	2sets
	Analog Audio Output(L/R)	2sets	2sets
	Optical/Coaxial	O/O	O/O
	CBC	-	-
ETS	Panel disply	LED Module	LED Module
	REMOCON	Multi 47key	Multi 47key
	IB	English	English/French
	Size: Net(W x H x D)	430X49.5X210	430X95X215
	Weigh	2.3Kg	2.3Kg

2-3 Option Product Specification

Description Fig	Description	Parts No	Remark
	Remote Control	AK59-00061E	Model Standard of DVD-R150/XAC
	Batteries for Remote Control	AC43-12002H	Model Standard of DVD-R150/XAC S.N.A
	User's Manual	AK68-01316A	Model Standard of DVD-R150/XAC
	Quick Guide	AK68-01314A	Model Standard of DVD-R150/XAC S.N.A
	Video/Audio Cable	AC39-00073A	Model Standard of DVD-R150/XAC

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3. Software Update

3-1 Drive Firmware Update

3-1-1 Introduction

When you can not record and play on specific recording media (especially on newly available DVD-RW or DVD-R).

3-1-2 How to make an update disc

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

1) Download the software update file from the samsung internet site. (www.samsung.com)

2) Write the file to disc using the CD-RW of your computer.

N O T E

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

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 minites before the mesage below appears.

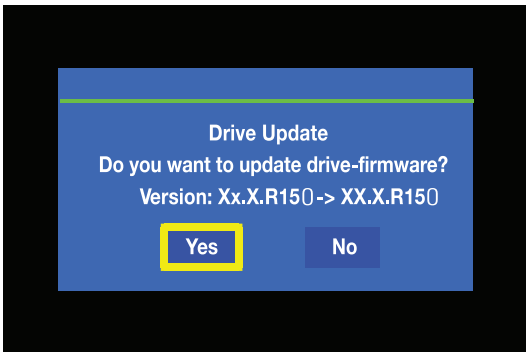


Fig. 3-1

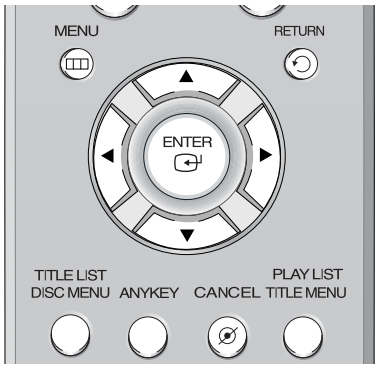


Fig. 3-2 Remote Control

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

* 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. 3-2).

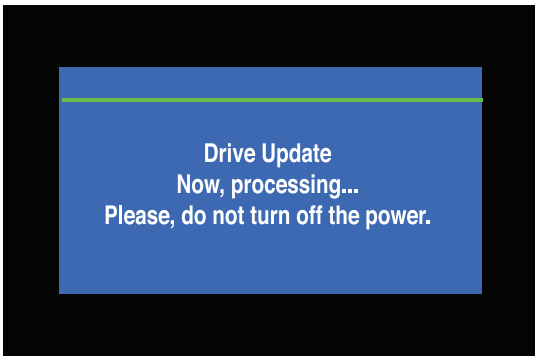


Fig.3-3

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.

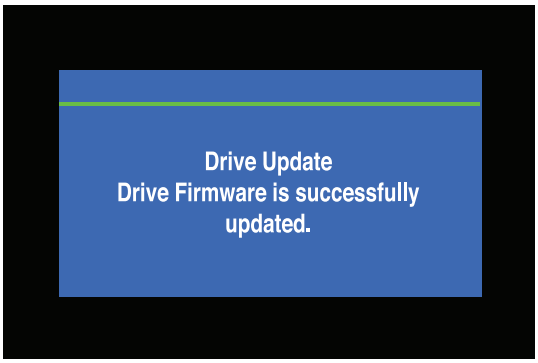


Fig. 3-4

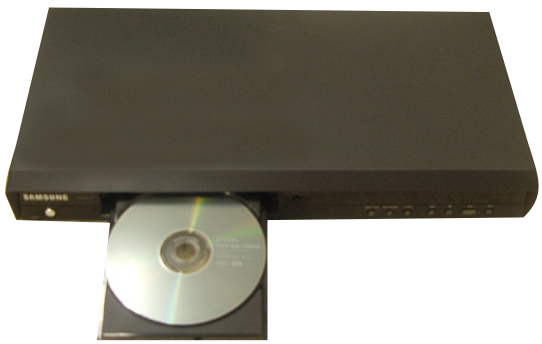


Fig. 3-5

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 drive firmware is now completed.

3-2 Flash Update (Main PCB)

3-2-1 Introduction

When you encounter a problem which is not related to the DVD drive.

3-2-2 How to make an update disc

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

1) Download the software update file from the 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
  - Multisession : No Multisession
  - CD close & disc at once
  - ISO 9660 or joliet format
  - Extension name : "*.RUF"
- In order to increase dise 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 whin 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 followong 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.

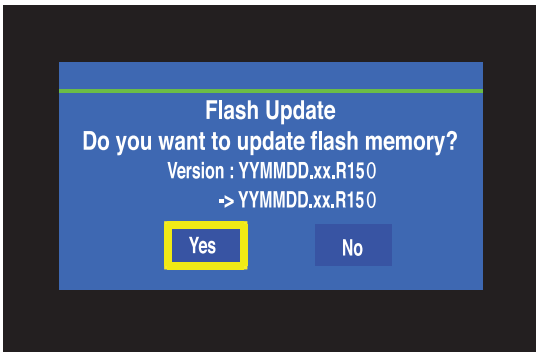


Fig. 3-6

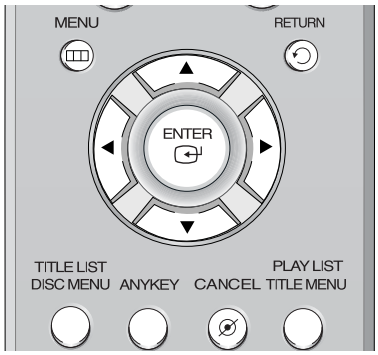


Fig. 3-7 Remote Control

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

* 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. 3-7).

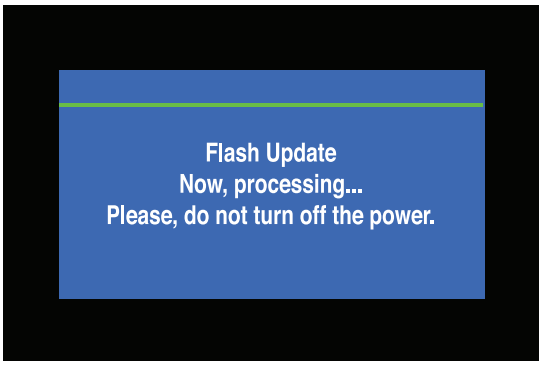


Fig. 3-8

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.

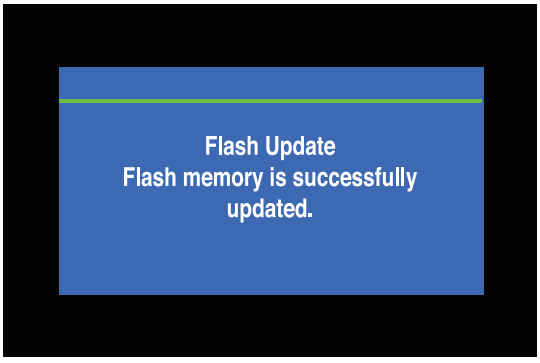


Fig. 3-9

* 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.

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.

4. Disassembly and Reassembly

4-1 Cabinet and PCB

Note : Reassembly in reverse order.

4-1-1 Top Cabinet Removal

1) Remove 5 Screws ❶, ❷, ❸.
2) Lift up the Top Cabinet in direction of arrow.

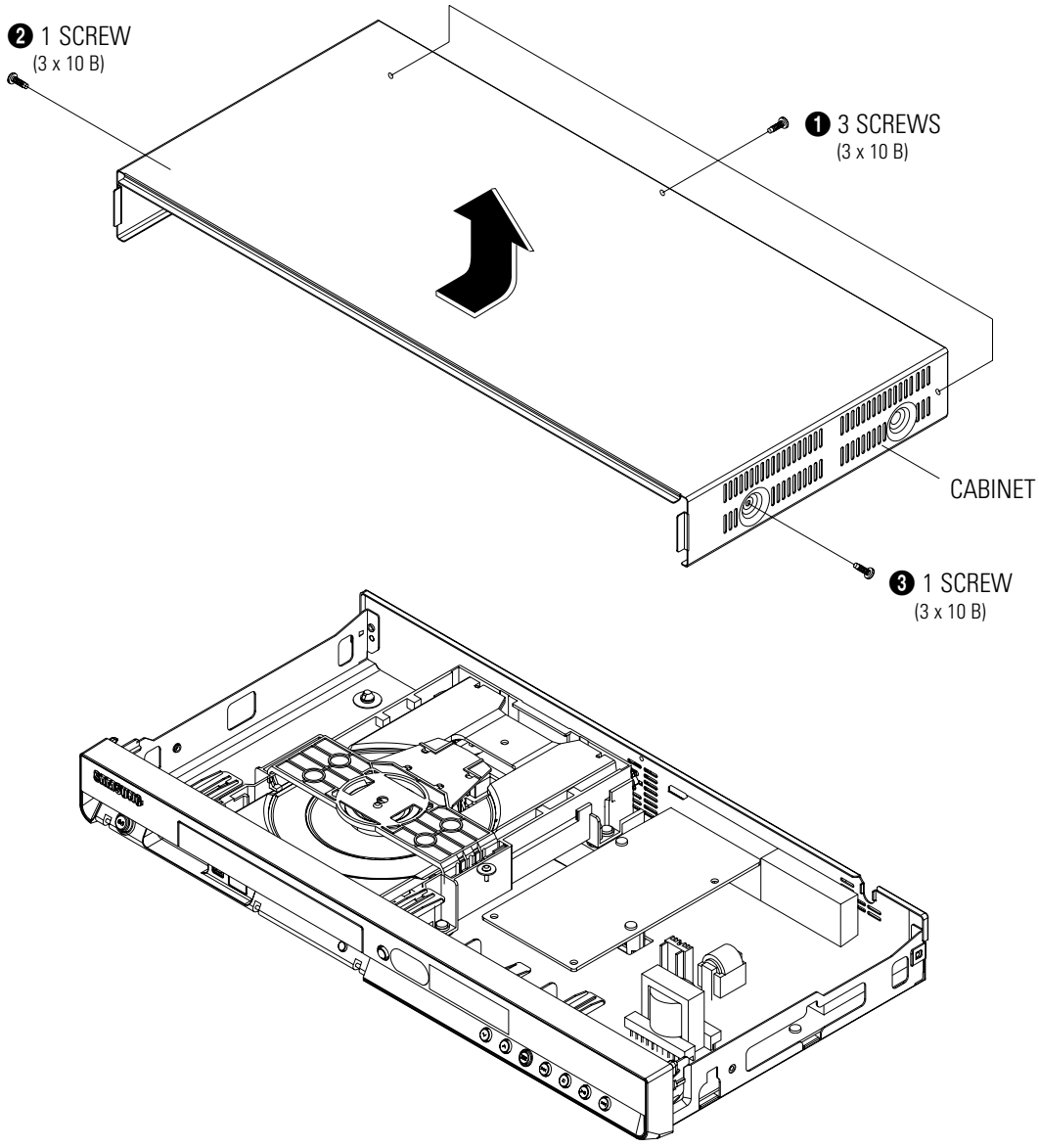


Fig. 4-1 Top Cabinet Removal

4-1-2 Ass'y Front-Cabinet Removal

1) Release 6 Hooks ❶, ❷, ❸, ❹ and Ass'y Front-Cabinet ❺.

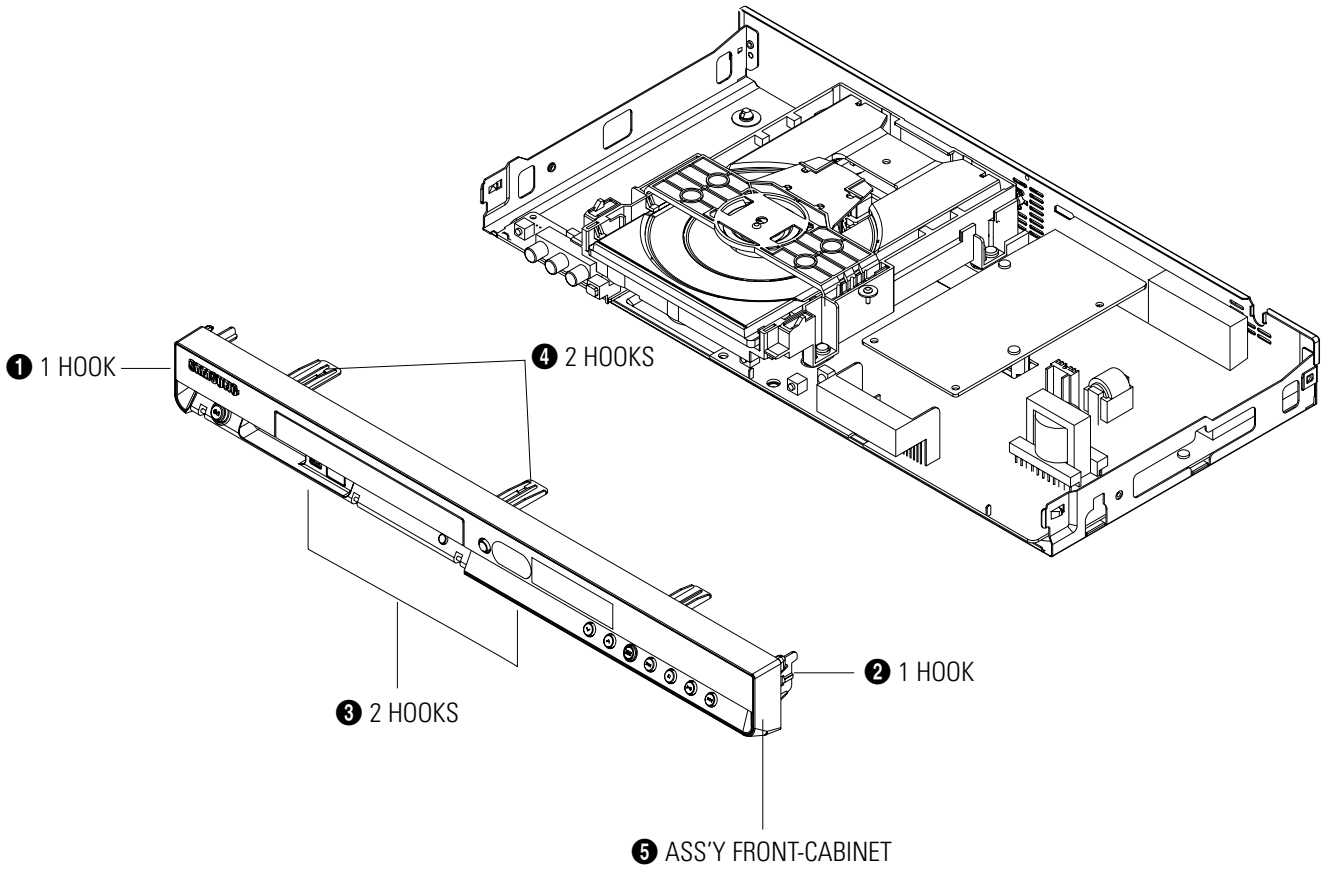


Fig. 4-2 Ass'y Front-Cabinet Removal

4-1-3 Ass'y Deck Removal

1) Remove 4 Screws ❶, ❷ from the Ass'y Deck ❸ and lift it up.

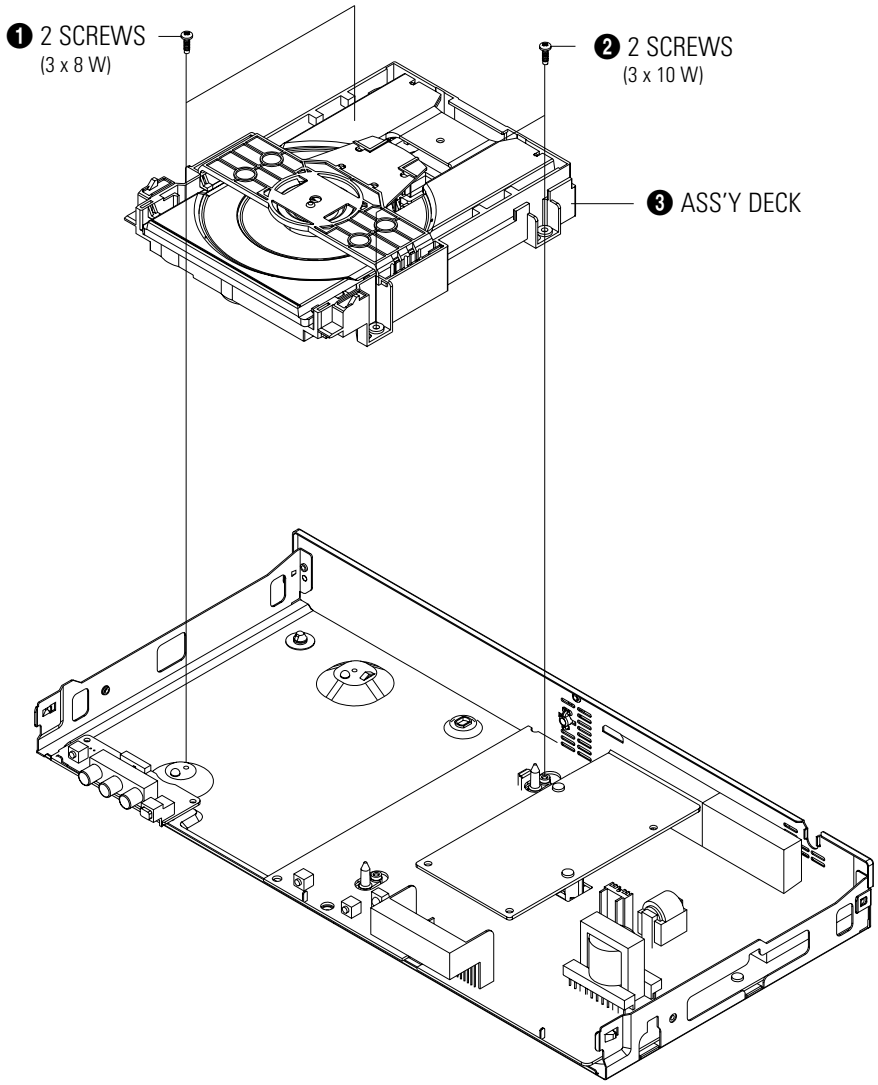


Fig. 4-3 Ass'y Deck Removal

4-1-4 Main PCB Removal

1) Remove 2 Screws ❶, from the Main PCB ❷ and lift it up.

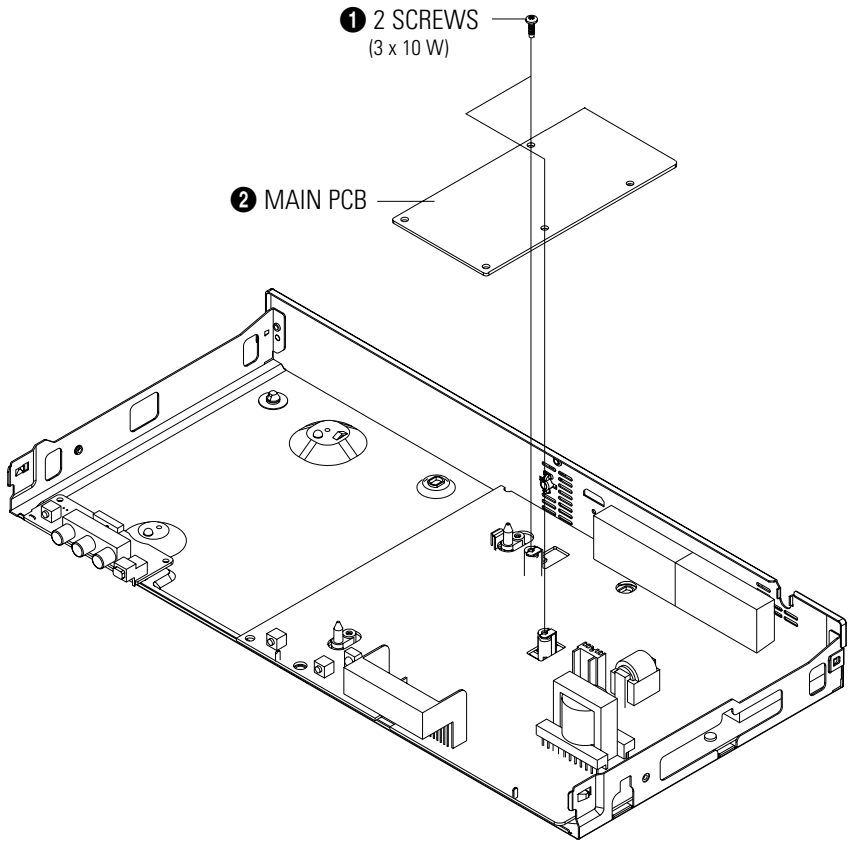


Fig. 4-4 Main PCB Removal

4-1-5 Jack PCB and Sub PCB Removal

1) Remove 5 Screws ❶, ❷ from the Jack PCB ❸ and lift it up.
2) Remove 1 Screw ❹ from the Sub PCB ❺ and lift it up.

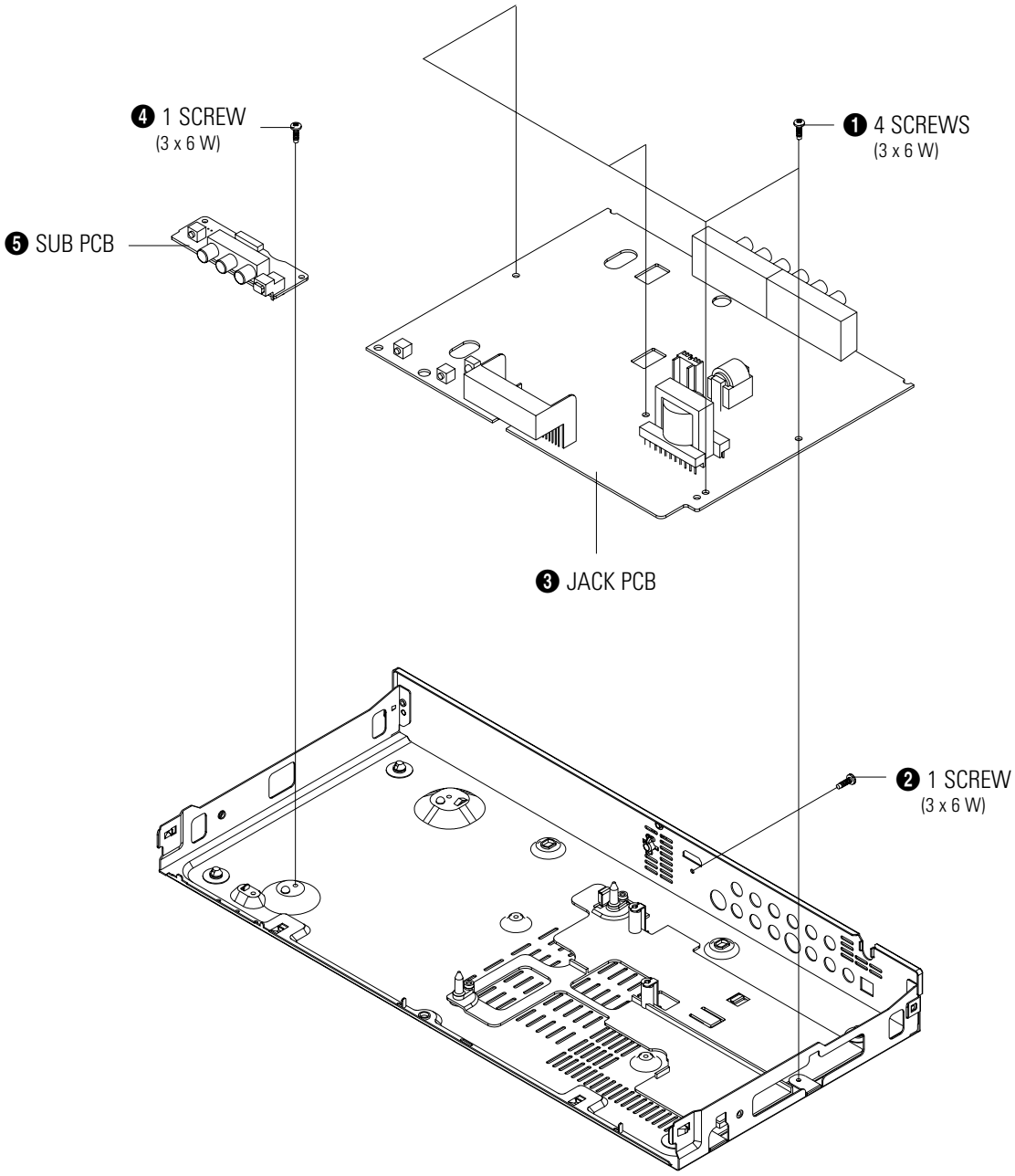


Fig. 4-5 Jack PCB and Sub PCB Removal

4-2 PCB Location

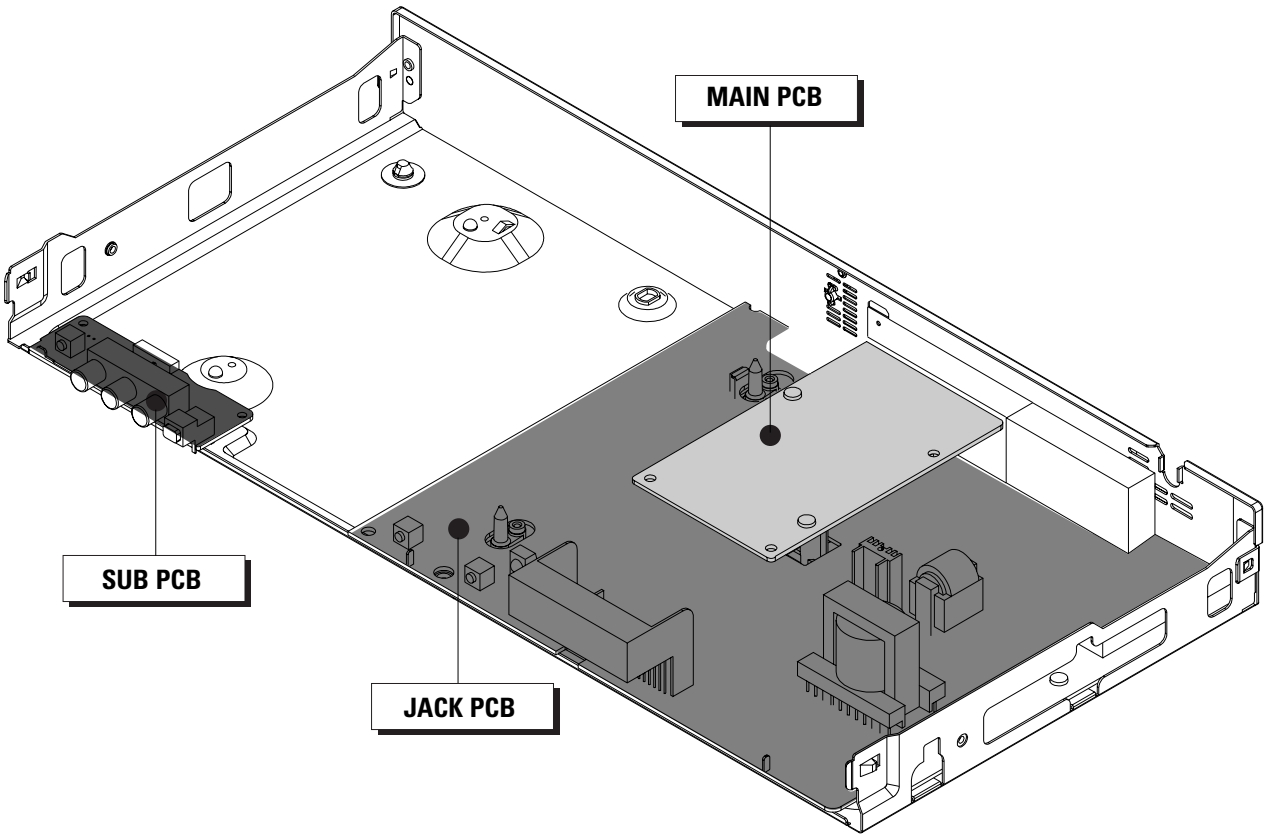
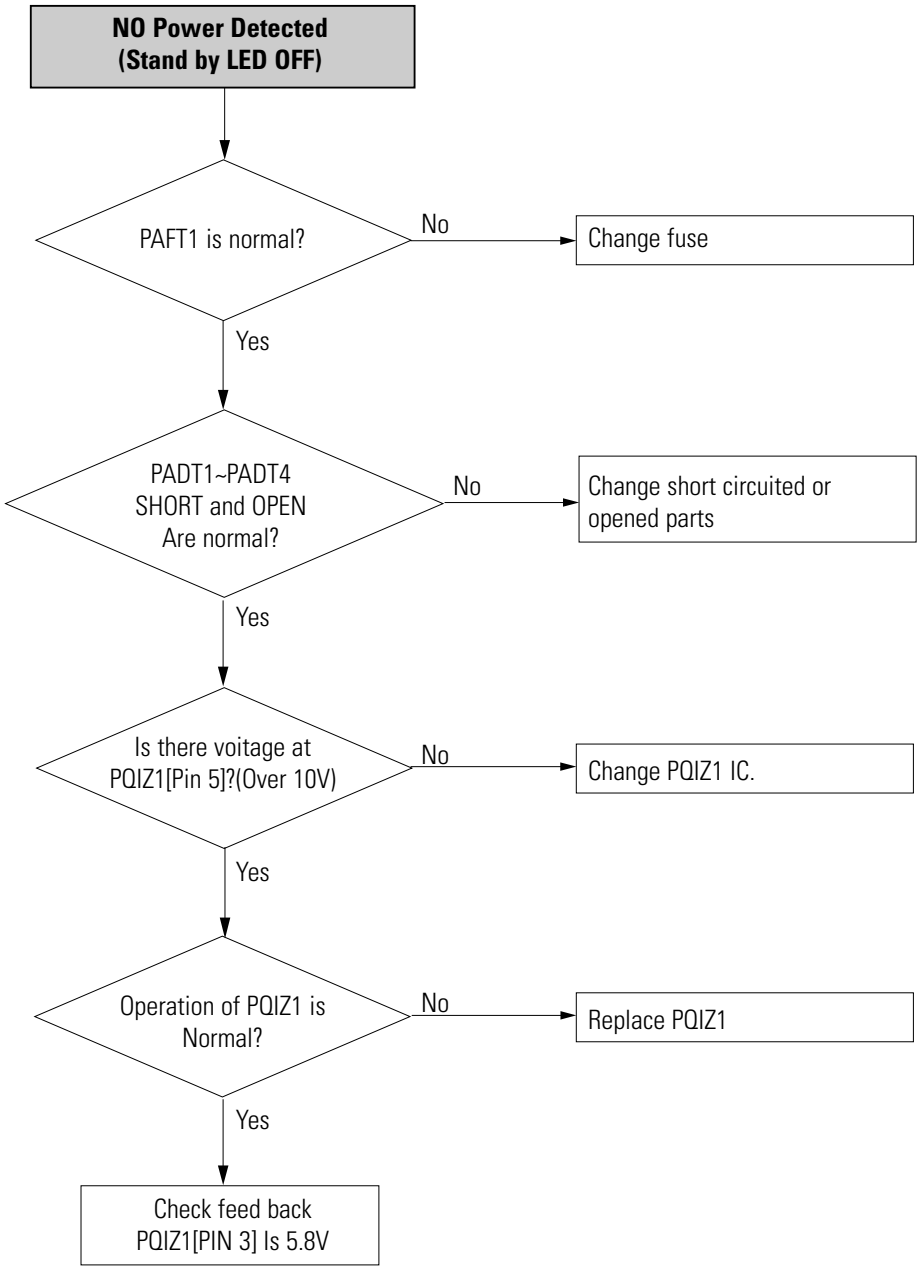
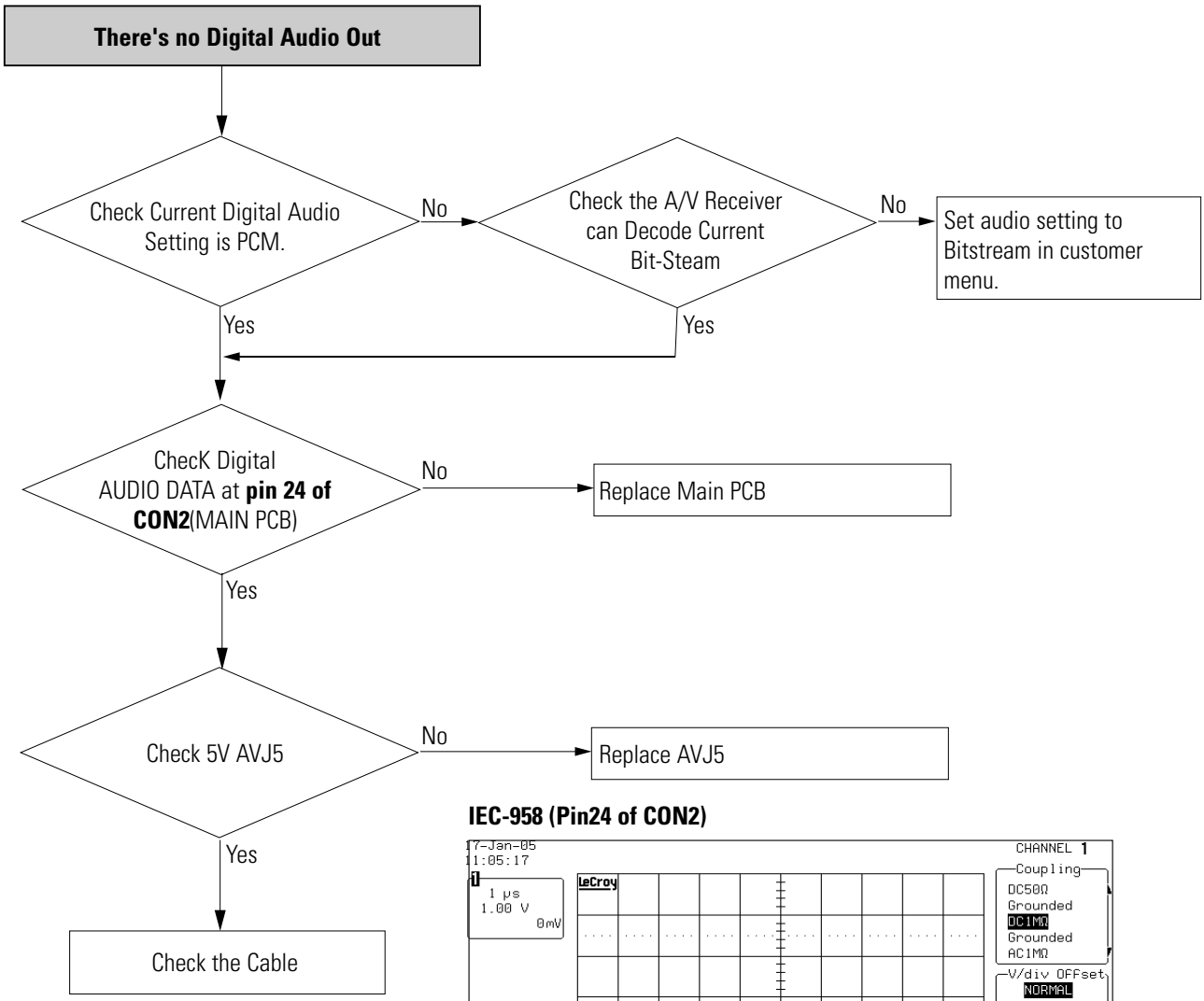


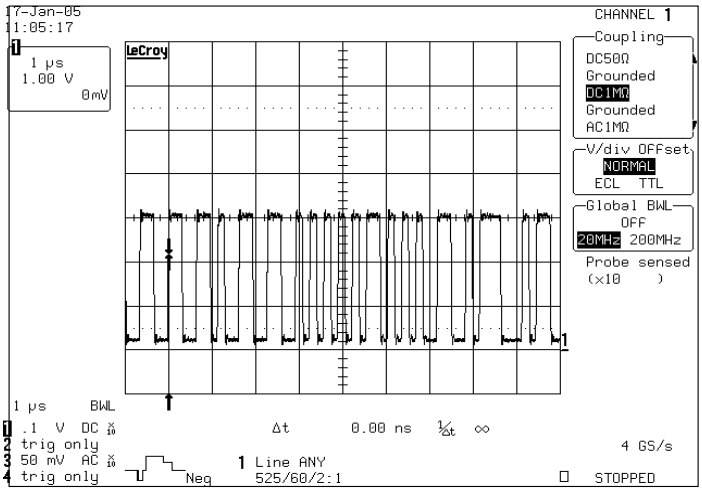
Fig. 4-6 PCB Location

5. Trouble Shooting





IEC-958 (Pin24 of CON2)



CVBS (Video) output error

PIN 12 of CN3 of Jack PCB or CN2 of Main PCB has 1V pk-pk level?
- No → Check the DIC1 on MAIN PCB
- Yes ↓

Check pin7 of the IC801 1V p-p level?
- No → Check the connection between 12Pin in CN3 Of Jack PCB and IC801
- Yes ↓

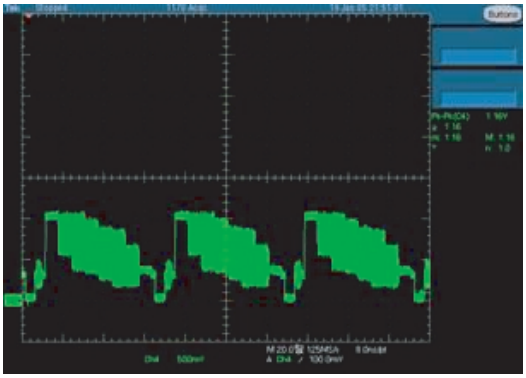
Power is Normal(5v) at IC801[pin24, 29]?
- No → Check the connection between IC801[pin24, 29] and Power line (FL1, PPIF2).
- Yes ↓

Check pin25 of the IC801 1V p-p level?
- No → Check the connection between IC801(Pin21,22) and IC601(Pin16,17). Check IC801 peripheral circuit.
- Yes ↓

Video signal of About P-P1V appears at Output Jack?
- No → Check the connection between IC801 and output jack.
- Yes ↓

Check the RCA Cable

CVBS (Pin12 of CON2)



S-Video output error

Pin10 and Pin8 in CN3 of Jack PCB or CON2 of Main PCB has * normal level?

No → Check the DIC1 on MAIN PCB

Yes

Analog signals are Inputted normally VIC1(pin4,2)

No → Check the connection between Pin10 and Pin8 in CN3 Of JACK PCB and VIC1

Yes

Power is Normal(5v) at VIC1(pin1)?

No → Check the connection between VIC1[pin1] and Power line (PPLI1, PPII1).

Yes

Pin5 in VIC1 is In high state?

No → Check the connection between VIC1(PIN5) and IC601(PIN89). Check VIC1 peripheral circuit.

Yes

Nomal level
: pin 10 is 1Vpk-pk
pin 8 is 0.28V on color burst

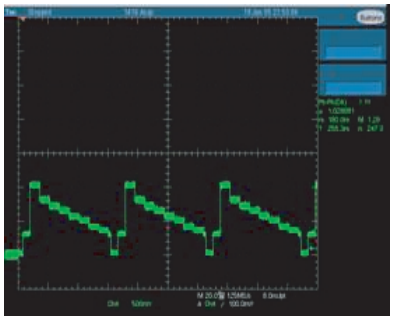
Video signal of About P-P1V appears at Output Jack?

No → Check the connection between VIC1 and output jack.

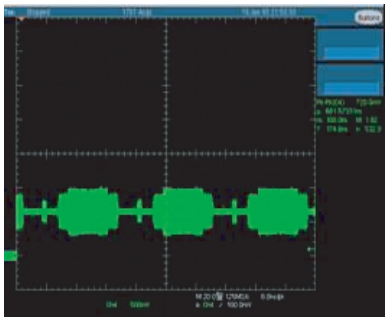
Yes

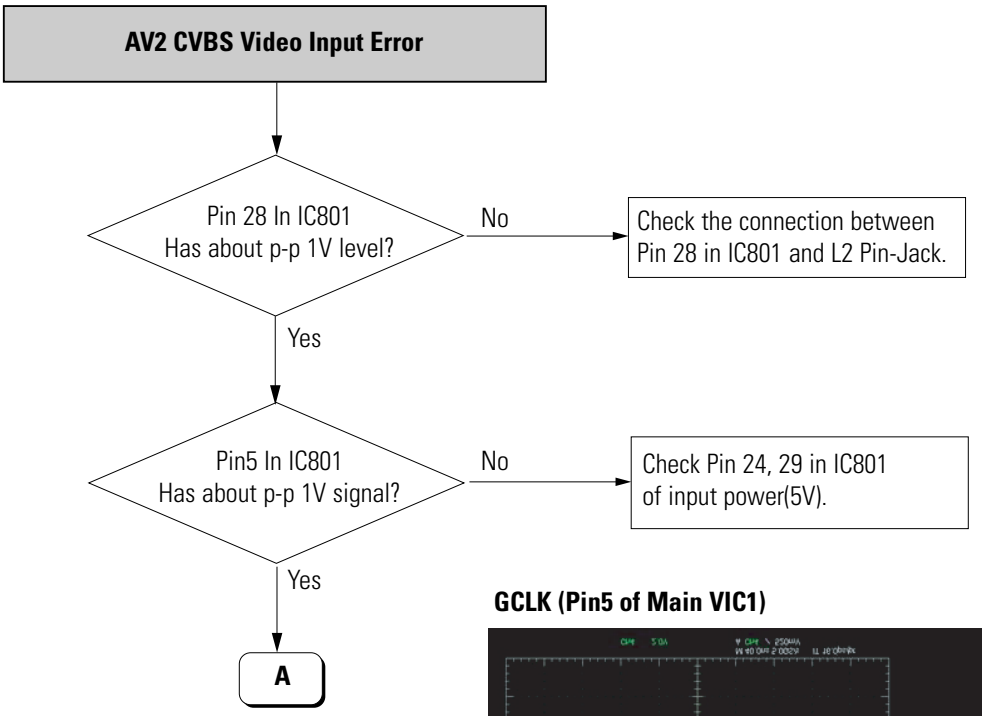
Check the RCA cable

Y (Pin10 of Main CON2 Pin10 of Jack CN3)

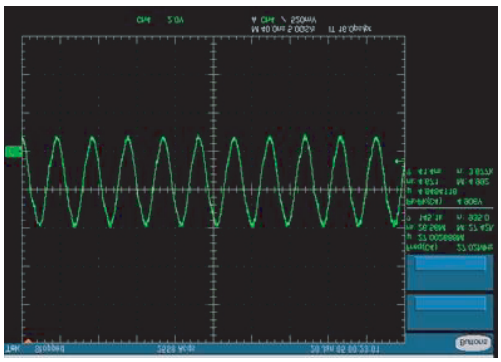


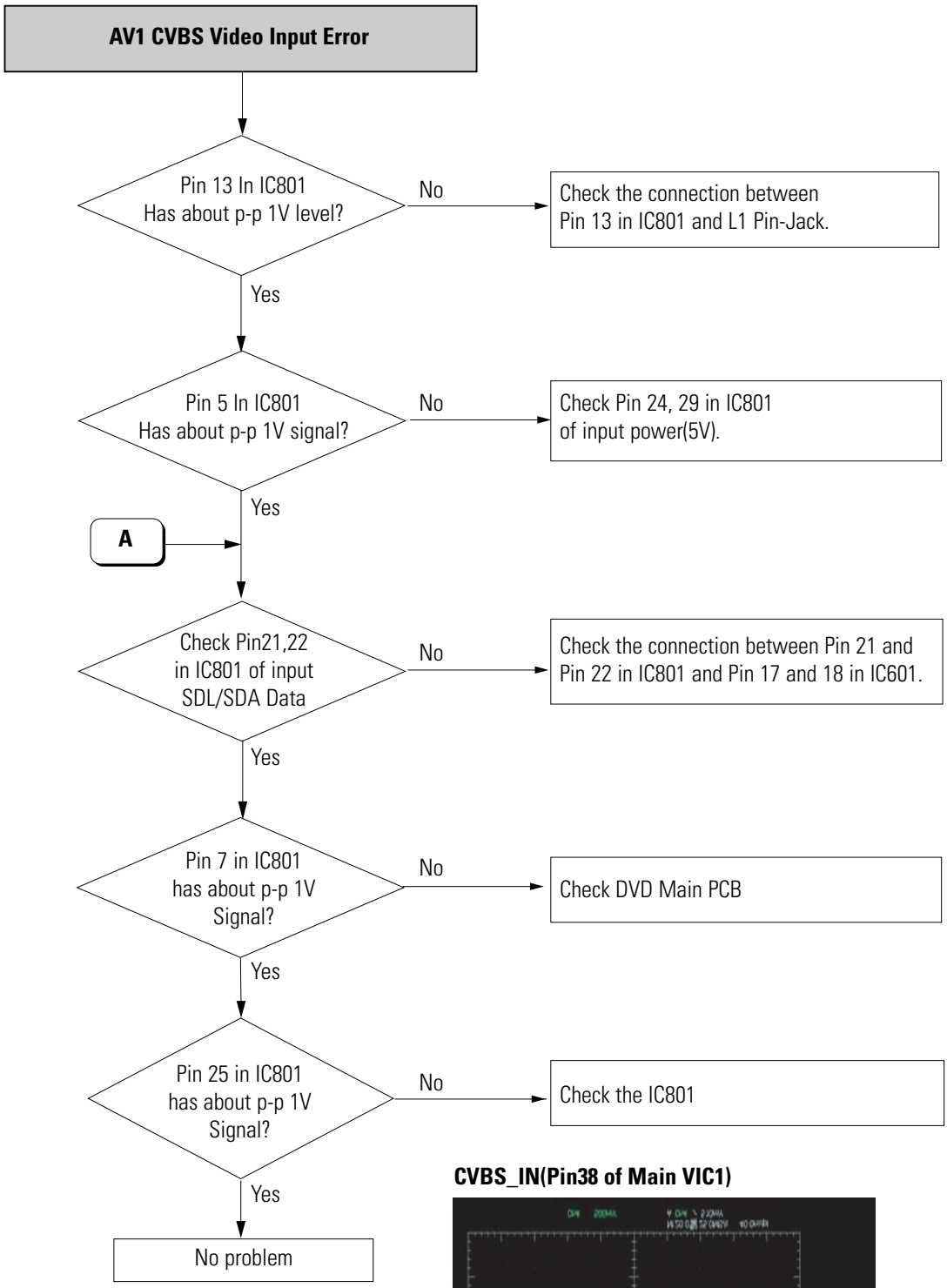
C (Pin8 of Main CON2 Pin10 of Jack CN3)



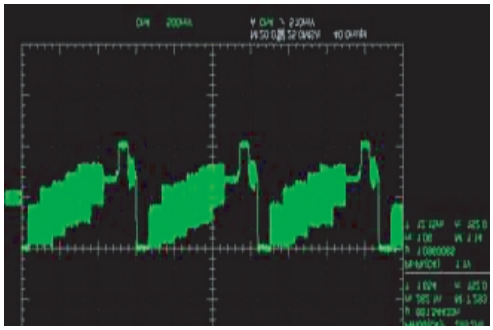


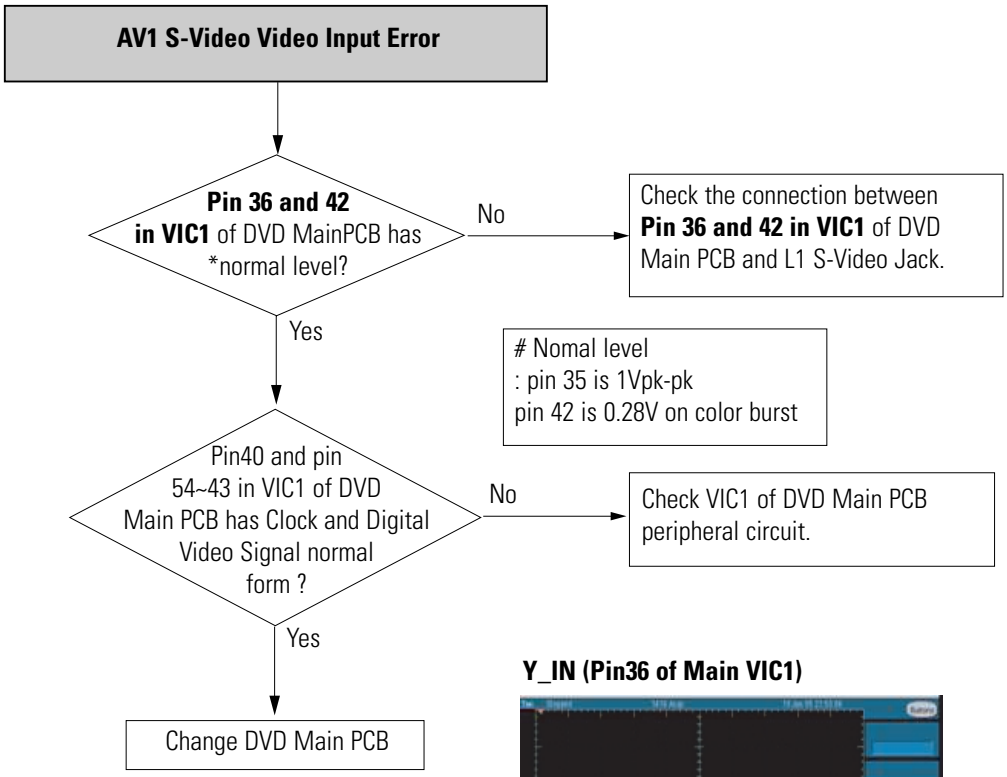
GCLK (Pin5 of Main VIC1)



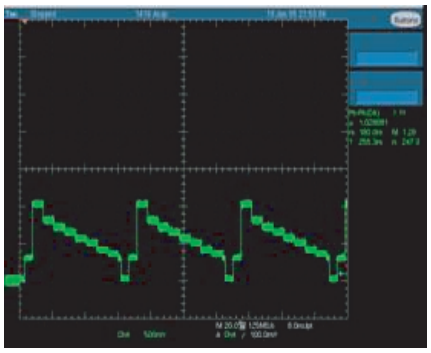


CVBS_IN(Pin38 of Main VIC1)

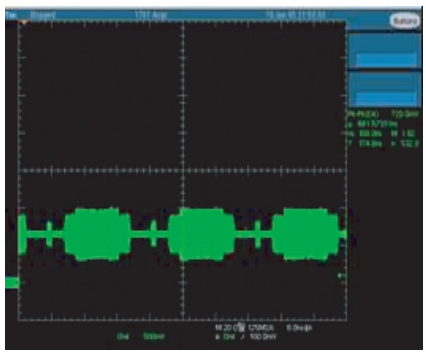


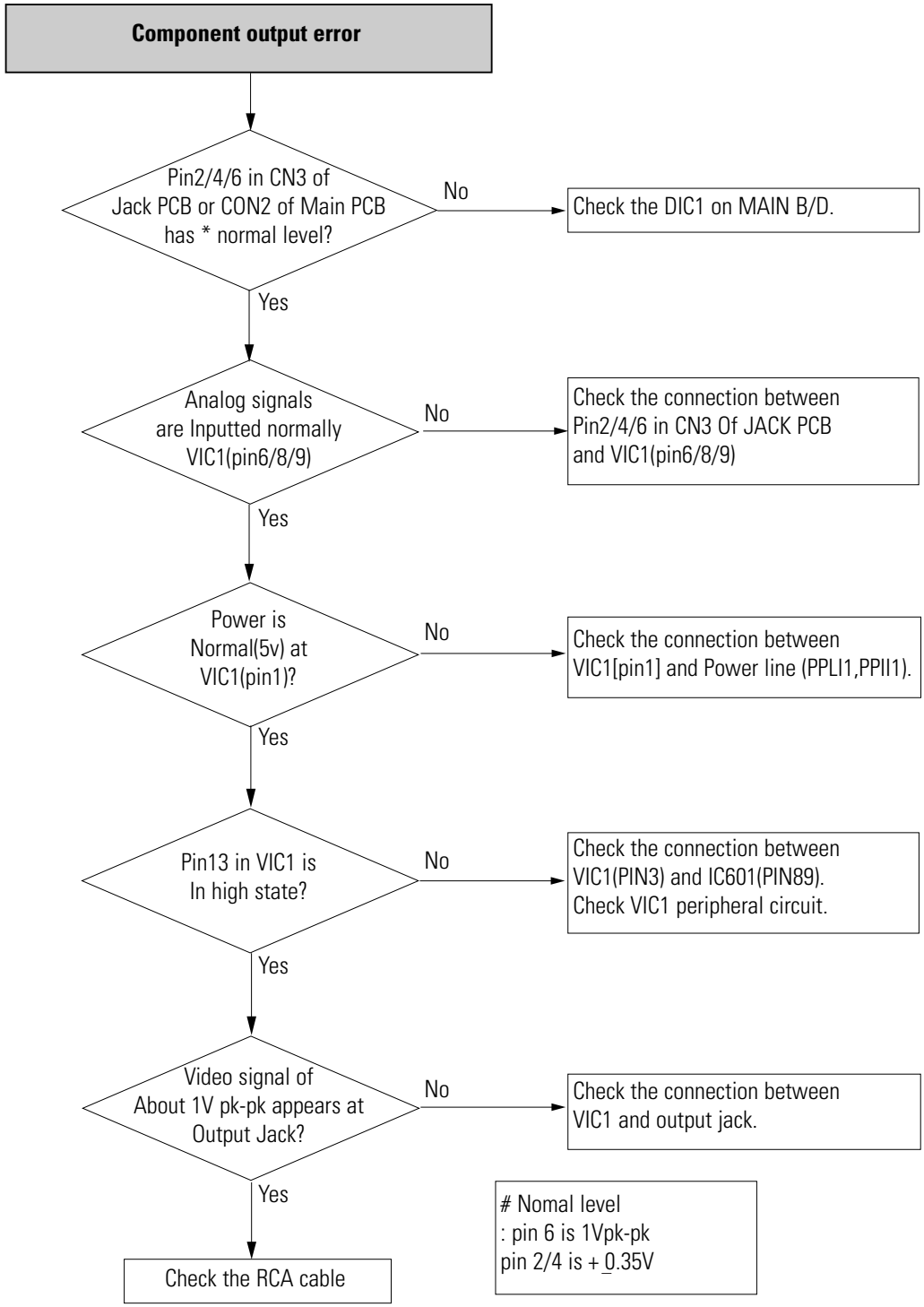


Y_IN (Pin36 of Main VIC1)

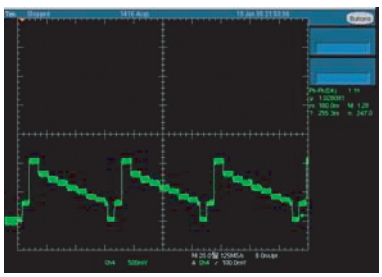


C_IN (Pin42 of Main VIC1)

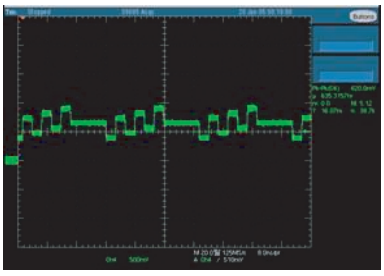




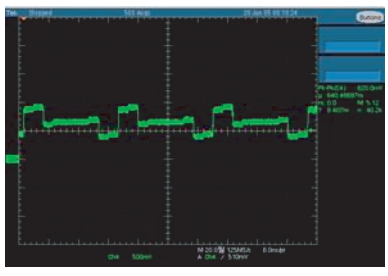
Y_out (Pin6 of Main CON2 Pin6 of Jack CN3)



Pb_out (Pin4 of Main CON2 Pin4 of Jack CN3)



Pb_out (Pin2 of Main CON2 Pin2 of Jack CN3)



Audio Input is not Recording

Check the select signal pin21,22of IC801 (JACK PCB)
- No → Check pin 17,18(5V) of the Front Micom IC601 (JACK PCB)
- Yes ↓

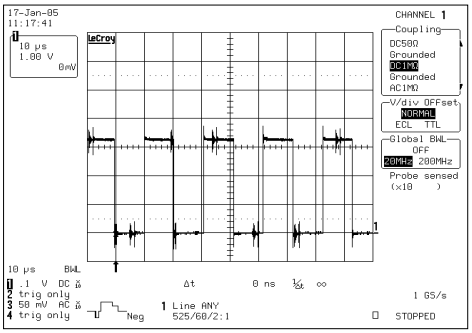
Check all the 12Vcc pin 14 of IC801 and 12Vcc pin 8 of AIC4(JACK).
- No → Check SMPS
- Yes ↓

Check the 5V pin5 of DIC1 (MAIN PCB)
- No → Replace Main PCB
- Yes ↓

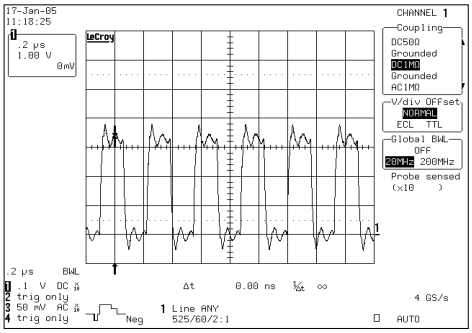
Check Digital clock and data pin **116,117,118,119** of DIC1(MAIN PCB)
- No → Replace Main PCB
- Yes ↓

Check the passive parts around jack pin.

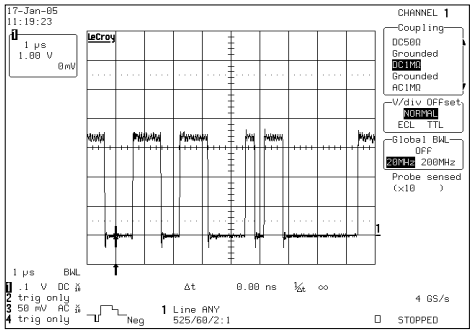
I2S_LRCK (Pin116 of DIC1)



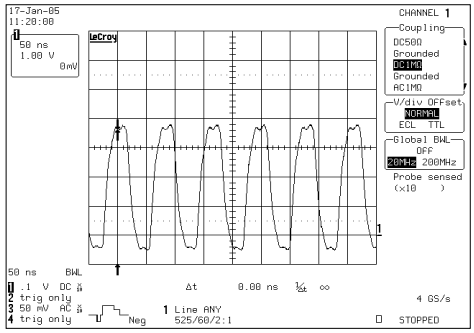
I2S_BCK (Pin117 of DIC1)

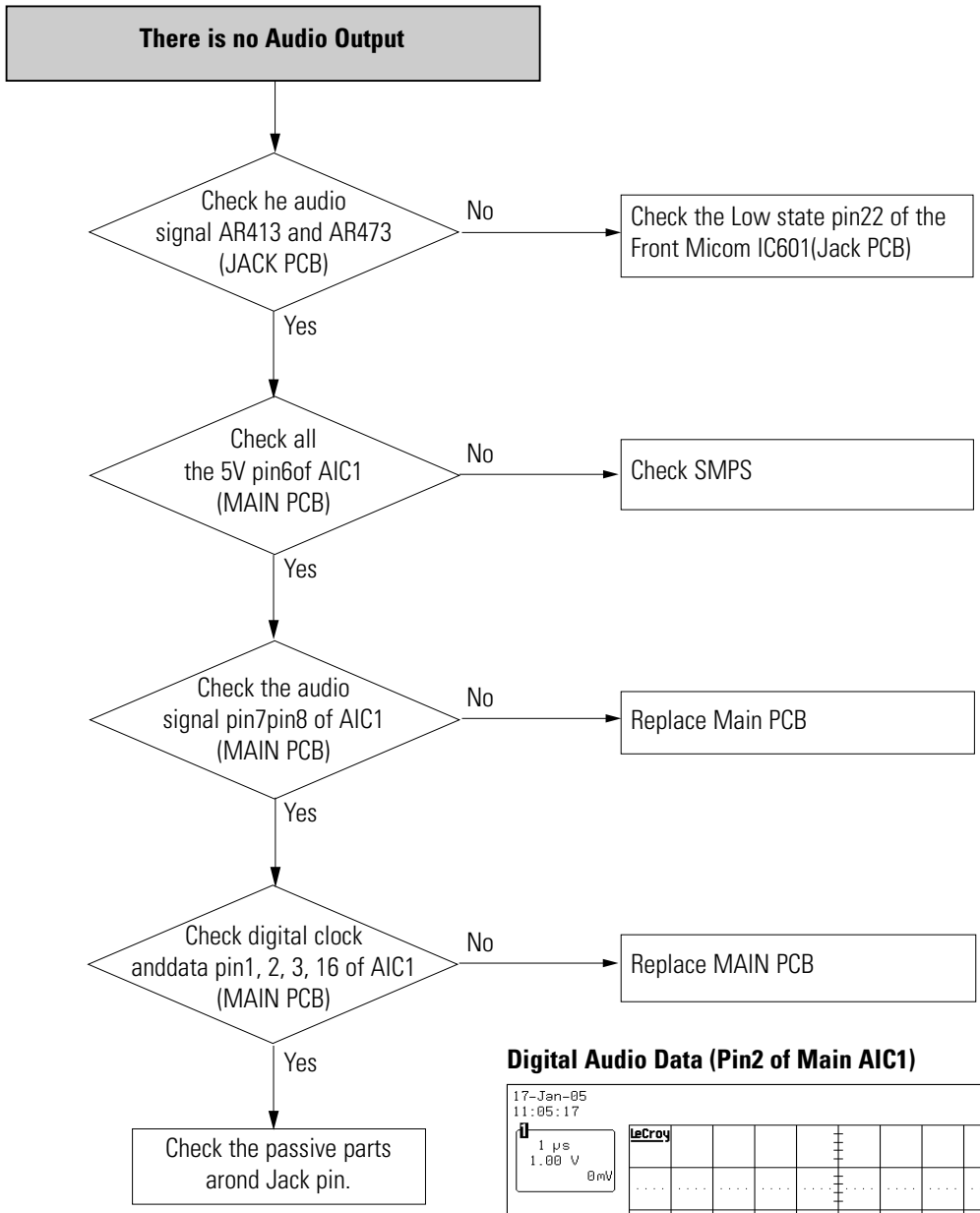


I2S_MCK (Pin118 of DIC1)

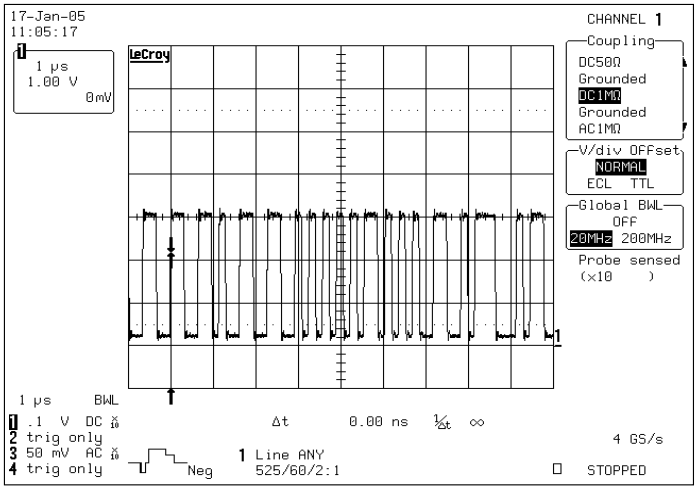


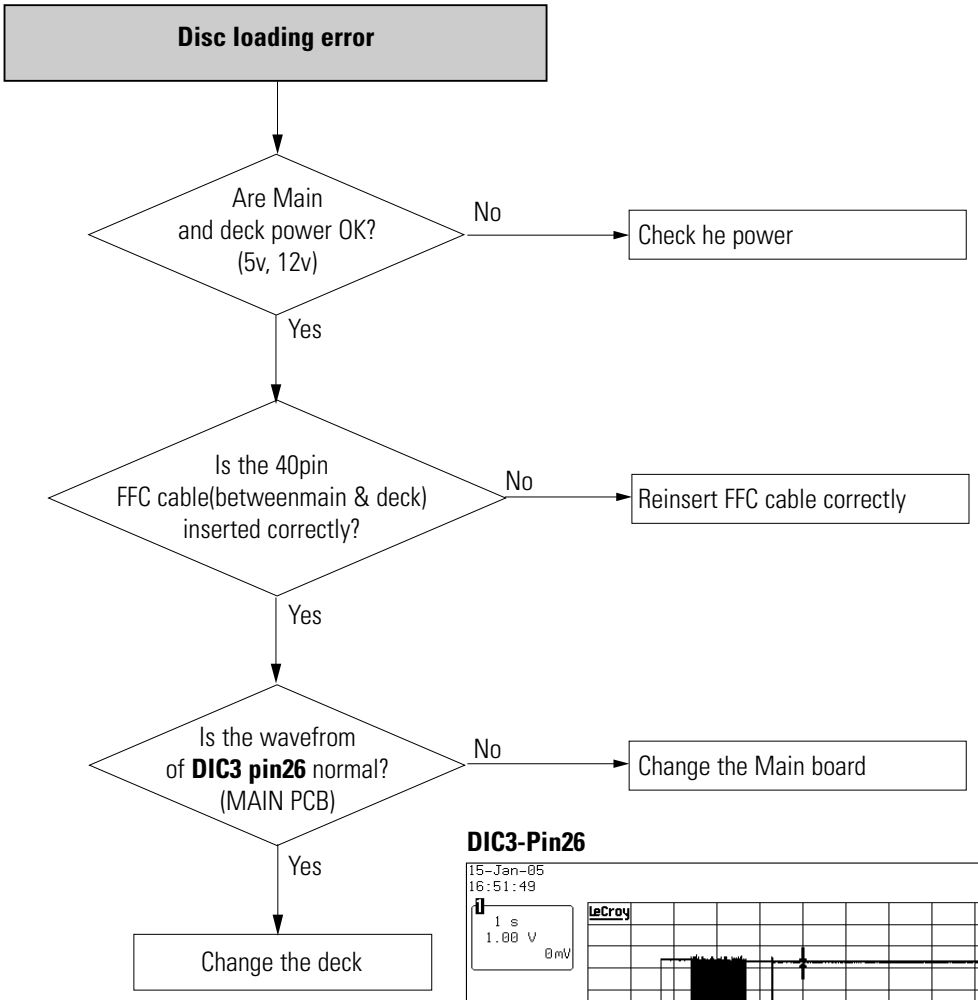
I2S_DATA (Pin119 of DIC1)



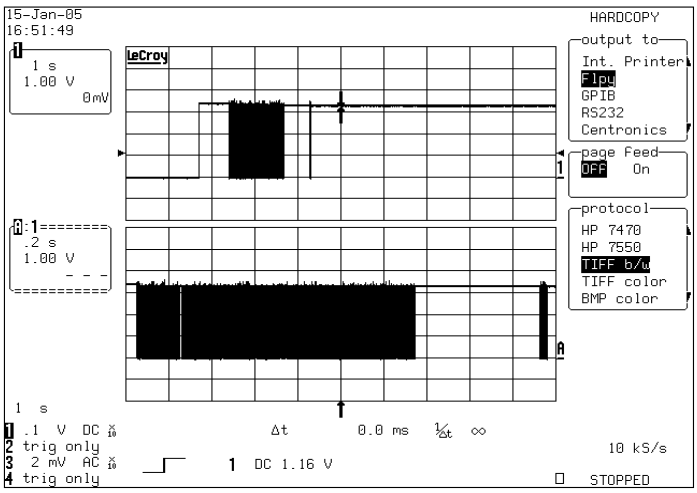


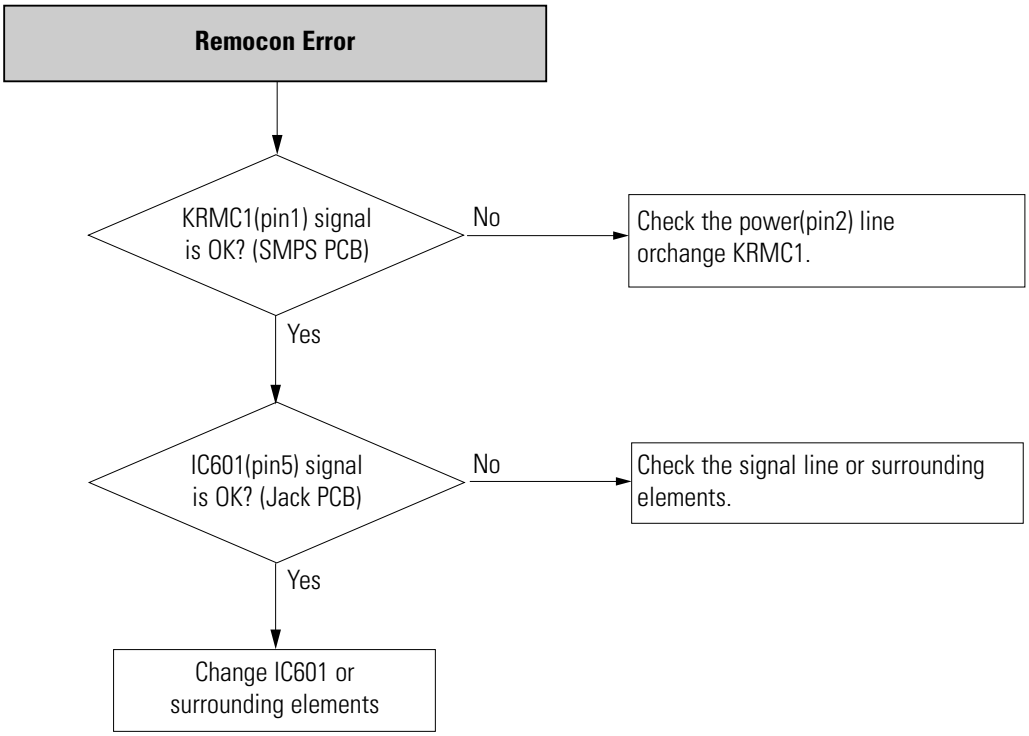
Digital Audio Data (Pin2 of Main AIC1)




Disc loading error
Are Main and deck power OK? (5v, 12v)
No
Check he power
Yes
Is the 40pin FFC cable(betweenmain & deck) inserted correctly?
No
Reinsert FFC cable correctly
Yes
Is the wavefrom of DIC3 pin26 normal? (MAIN PCB)
No
Change the Main board
Yes
Change the deck

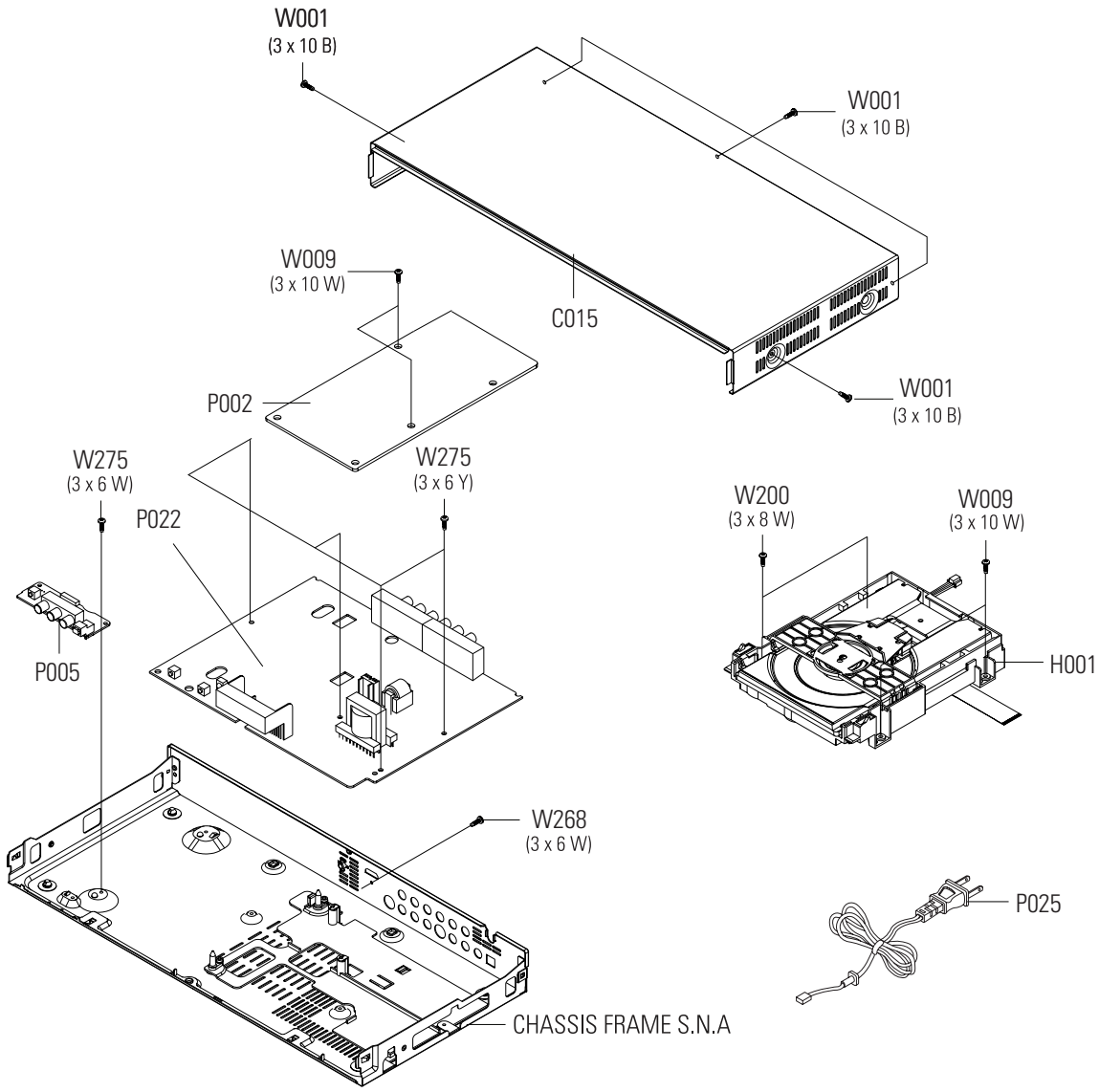
DIC3-Pin26


15-Jan-05
16:51:49
HARDCOPY
output to
Int. Printer
Flpy
GPIB
RS232
Centronics
page Feed
OFF On
protocol
HP 7470
HP 7550
TIFF b/w
TIFF color
BMP color
LeCroy
1 s
1.00 V
0mV
.2 s
1.00 V
1 s
Δt 0.0 ms
10 kS/s
1 DC 1.16 V
STOPPED
trig only
trig only

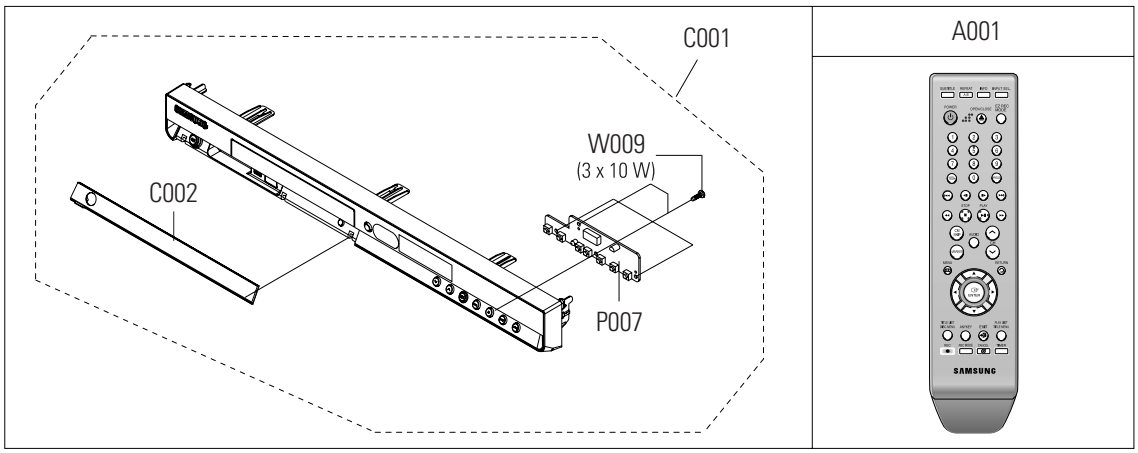

Remocon Error
KRMC1(pin1) signal is OK? (SMPS PCB)
No
Check the power(pin2) line orchange KRMC1.
Yes
IC601(pin5) signal is OK? (Jack PCB)
No
Check the signal line or surrounding elements.
Yes
Change IC601 or surrounding elements

6. Exploded View and Parts List

6-1 Cabinet Assembly



● **S.N.A.: Service Not Available**



Loc. No	Parts No.	Description ; Specification	Q ty	S.N.A	Remark
A001	AK59-00061E	REMOCON-ASSY;DVD-R150/XAX,SEC,197.5	1	SA	
C001	AK97-01889B	ASSY-PANEL FRONT;HIPS94HB,DVD-R150/	1	SA	
C002	AK64-01928B	DOOR-TRAY;DVD-R155,ABS 94HB,T2.5,H1	1	SA	
C015	AK64-01896A	CABINET-TOP;DVD-R157/XAA,TM6524,T0.	1	SA	
H001	AK97-01883B	ASSY-LOADER;-,DVD-R150,RAM Multi	1	SA	
P002	AK92-01381A	ASSY PCB-MAIN DVD;DVD-R150/XAC,-	1	SA	
P005	AK92-01326A	ASSY PCB-FUNCTION;DVD-R157/XAA,Func	1	SA	
P007	AK97-01947A	ASSY-R157 KEY;-,R157/XAA,NEXUS	1	SA	
P022	AK92-01373A	ASSY PCB-JACK I/O;DVD-R155/XAC,JACK	1	SA	
P025	AC39-10200N	CBF-POWER CORD;AT,US,EP2/Y,HOUSING(	1	SA	
W001	6003-000275	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(B	5	SA	
W009	6003-000276	SCREW-TAPTITE;BH,+,-,B,M3,L10,ZPC(W	8	SA	
W200	6003-001375	SCREW-TAPTITE;BH,+,-,B,M3,L8,ZPC(WH	2	SA	
W268	6003-000254	SCREW-TAPTITE;BH,+,-,S,M3,L6,ZPC(WH	1	SA	
W275	6003-001561	SCREW-TAPTITE;BH,+,-,B,M3,L6,ZPC(WH	5	SA	

MEMO

7. Electrical Parts List

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
P002	**AK92-01381A**	**ASSY PCB-MAIN DVD;DVD-R150/XAC**	**1**	**SA**	
AC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
AC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
AE1	2402-001096	C-AL,SMD;220UF,20%,16V,GP,TP,6	1	SA	
AE2	2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	SA	
AIC1	1002-001395	IC-D/A CONVERTER;PCM1753,24Bit	1	SA	
AL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
CC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
CC2	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
CC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
CC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
CE1	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
CE3	2402-001059	C-AL,SMD;220•ÏF,20%,6.3V,-,TP,	1	SA	
CN5	3708-001935	CONNECTOR-FPC/FFC/PIC;40P,0.5m	1	SA	
CON1	3710-002445	SOCKET-BOARD TO BOARD;16P,2R,2	1	SA	
CON2	3710-002075	SOCKET-BOARD TO BOARD;30P,2R,2	1	SA	
CR1	2007-001323	R-CHIP;3KOHM,5%,1/16W,TP,1005	1	SA	
CR10	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
CR11	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
CR12	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	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,100	1	SA	
CR4	2007-001325	R-CHIP;3.3Kohm,5%,1/16W,TP,100	1	SA	
DC1	2203-000386	C-CER,CHIP;0.015nF,5%,50V,C0G,	1	SA	
DC15	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1	1	SA	
DC16	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1	1	SA	
DC17	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1	1	SA	
DC18	2203-005138	C-CER,CHIP;1.8nF,10%,50V,X7R,1	1	SA	
DC2	2203-000330	C-CER,CHIP;0.012nF,5%,50V,C0G,	1	SA	
DC20	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC22	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC23	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC24	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC25	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC26	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC27	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC50	2203-005481	C-CER,CHIP;47nF,10%,10V,X7R,TP	1	SA	
DC51	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC52	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC53	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC54	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC56	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC57	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC58	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC59	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC60	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC61	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC62	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC63	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC64	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC65	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC66	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC67	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC68	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC69	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC70	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC71	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC72	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC73	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC74	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC75	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC76	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC77	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC78	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC79	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC80	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC81	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC82	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC83	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC84	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC85	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC86	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC89	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC90	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC91	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC92	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC93	2203-000311	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
DC94	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC95	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC96	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DC97	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
DE2	2402-000007	C-AL,SMD;22uF,20%,6.3V,GP,TP,4	1	SA	
DE5	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
DE7	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
DE8	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
DIC1	1205-002844	IC-CODEC;S5L3210,LQFP,256P,28x	1	SA	
DIC2	1105-001563	IC-DRAM;HYB25D256160CE-6,16Mx1	1	SA	
DIC3	1107-001242	IC-FLASH MEMORY;39VF160,1Mx16,	1	SNA	
DIC5	1103-001134	IC-EEPROM;24C040,512x8,SOP,8P,	1	SA	
DIC7	0801-002701	IC-CMOS LOGIC;74VHCT125A,BUFFE	1	SA	
DIC8	0801-002166	IC-CMOS LOGIC;7SHU04,INVERTER,	1	SA	
DR1	2007-000174	R-CHIP;47ohm,5%,1/16W,TP,1005	1	SA	
DR2	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR3	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR30	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR32	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	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,100	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
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,100	1	SA	
DR40	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	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,100	1	SA	
DR50	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
DR51	2007-000659	R-CHIP;27ohm,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,100	1	SA	
DR64	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR65	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR66	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR67	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DR68	2007-000171	R-CHIP;0ohm,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	
DR79	2007-000140	R-CHIP;1Kohm,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,100	1	SA	
DR83	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR87	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR88	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR89	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	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,100	1	SA	
DR91	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
DR92	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
DR93	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
DRP1	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP10	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP11	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP12	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP13	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP14	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
DRP15	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP16	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP17	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP18	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP19	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP2	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP20	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	

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DRP21	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP22	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP23	2011-001478	R-NETWORK;51ohm,5%,1/16W,L,CHI	1	SA	
DRP26	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,	1	SA	
DRP27	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,	1	SA	
DRP28	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,	1	SA	
DRP29	2011-001396	R-NET;4.7KOHM,5%,1/16W,L,CHIP,	1	SA	
DRP3	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP4	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP5	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP6	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP7	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
DRP9	2011-001474	R-NETWORK;47ohm,5%,1/16W,L,CHI	1	SA	
RIC1	1203-003996	IC-POSI.FIXED REG.;KIA78R025F,	1	SA	
RIC2	1203-003806	IC-POSI.ADJUST REG.;KIA78R000,	1	SA	
TC1	2203-000552	C-CER,CHIP;0.02nF,5%,50V,C0G,1	1	SA	
TC16	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,C0	1	SA	
TC2	2203-000552	C-CER,CHIP;0.02nF,5%,50V,C0G,1	1	SA	
TC3	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TC4	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1	1	SA	
TC5	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TC9	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
TE1	2402-001238	C-AL,SMD;1uF,20%,50V,HR,TP,4.3	1	SA	
TE2	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
TIC1	1205-001988	IC-DATA COMM./GEN.;TSB41AB1-PA	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,100	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,100	1	SA	
TR25	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
TR26	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
TR27	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
TR28	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
TR29	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
TR3	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
TR30	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	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	1	SA	
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	

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TY1	2801-004021	CRYSTAL-SMD;24.576MHz,20ppm,28	1	SA	
V29	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC1	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC11	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC12	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC13	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC15	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC16	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC17	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC2	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC20	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC21	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC22	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC23	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC24	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC25	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC26	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC27	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,C0	1	SA	
VC28	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC5	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC6	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC7	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC8	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC9	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VE3	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
VE4	2402-001248	C-AL,SMD;220UF,20%,6.3V,-,TP,6	1	SA	
VIC1	1204-002419	IC-VIDEO DECODER;TW9906,TQFP,8	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,8	1	SA	
VRP4	2011-001344	R-NET;100ohm,5%,1/16W,L,CHIP,8	1	SA	
Y1	2801-004621	CRYSTAL-SMD;27MHz,15ppm,-,14pF	1	SA	
P005	**AK92-01326A**	**ASSY PCB-FUNCTION;DVD-R157/XAA**	**1**	**SA**	
AR722	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
AR740	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
AVIN2	3722-002384	JACK-PIN;3P,SN/NI,YEL/WHT/RED,	1	SA	
AVIN2B	AK63-00307A	GROUND-FRONT AV;DVD-R130,SUS,T	1	SA	
CN7	3722-002383	JACK-IEEE1394;4P/1,AU,BLK,ANGL	1	SA	
ESD01	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD02	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD03	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD04	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD05	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD06	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD07	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD08	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD09	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD10	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD11	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD12	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD13	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
ESD14	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
FCON4	3708-001695	CONNECTOR-FPC/FFC/PIC;13P,1MM,	1	SA	
FL615	3809-001787	FFC CABLE-FLAT;30V,80C,115mm,1	1	SA	
JP36	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
LD61A	AK61-00531A	HOLDER-LED;DVD-R145,ABS 94HB,T	1	SA	
LD701	0601-001928	LED;ROUND,BLUE,3mm,465nm,3.6x3	1	SA	
PWR01	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,160	1	SA	
PWR02	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
QWR01	0501-000398	TR-SMALL SIGNAL;KSC945-Y,NPN,2	1	SA	
R720	2007-000098	R-CHIP;56Kohm,5%,1/10W,TP,1608	1	SA	
SW711	3404-001261	SWITCH-TACT;15V DC,20mA,100gf,	1	SA	
VR40	2001-000969	R-CARBON;75OHM,5%,1/8W,AA,TP,1	1	SA	
P007	**AK97-01947A**	**ASSY-R157 KEY;-,R157/XAA,NEXUS**	**1**	**SA**	
CN704	3708-001803	CONNECTOR-FPC/FFC/PIC;10P,1.25	1	SA	
FL286	3809-001667	FFC CABLE-FLAT;30V,80C,70mm,10	1	SA	
LD702	0601-001587	LED;ROUND,RED,3.1mm,635nm,3.8x	1	SA	
QWR01	0501-000398	TR-SMALL SIGNAL;KSC945-Y,NPN,2	1	SA	
SW703	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW705	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW706	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW707	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW708	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW709	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW710	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
P022	**AK92-01373A**	**ASSY PCB-JACK I/O;DVD-R155/XAC**	**1**	**SA**	
AC16	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
AC17	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
AC405	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
AC406	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
AC407	2203-000125	C-CER,CHIP;1.2nF,10%,50V,X7R,T	1	SA	
AC408	2203-000125	C-CER,CHIP;1.2nF,10%,50V,X7R,T	1	SA	
AC409	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
AC410	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
AC413	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
ACC2	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
ACC3	2203-000315	C-CER,CHIP;0.12nF,5%,50V,C0G,1	1	SA	
AD1	0407-000123	DIODE-ARRAY;DAN202K,80V,100mA,	1	SA	
AD2	0407-000123	DIODE-ARRAY;DAN202K,80V,100mA,	1	SA	
AD3	0407-000123	DIODE-ARRAY;DAN202K,80V,100mA,	1	SA	
AE404	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
AE405	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
AE412	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
AE42	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
AE46	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
AIC4	1201-000163	IC-OP AMP;4560,SOP,8P,173MIL,D	1	SA	
AQ1	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
AQ3	0501-000341	TR-SMALL SIGNAL;KSC1623-L,NPN,	1	SA	
AQ4	0504-000128	TR-DIGITAL;-,NPN,200MW,22K/22K	1	SA	
AQ5	0504-000156	TR-DIGITAL;KSR2103,PNP,200MW,2	1	SA	
AQ51	0504-000128	TR-DIGITAL;-,NPN,200MW,22K/22K	1	SA	
AQ52	0504-000156	TR-DIGITAL;KSR2103,PNP,200MW,2	1	SA	
AQ6	0504-000128	TR-DIGITAL;-,NPN,200MW,22K/22K	1	SA	
AQ7	0504-000156	TR-DIGITAL;KSR2103,PNP,200MW,2	1	SA	
AR105	2001-000633	R-CARBON;30KOHM,5%,1/8W,AA,TP,	1	SA	
AR106	2001-000633	R-CARBON;30KOHM,5%,1/8W,AA,TP,	1	SA	
AR107	2007-000129	R-CHIP;27Kohm,5%,1/10W,TP,1608	1	SA	
AR108	2007-000129	R-CHIP;27Kohm,5%,1/10W,TP,1608	1	SA	
AR26	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
AR4	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR40	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
AR403	2007-001010	R-CHIP;51Kohm,5%,1/10W,TP,1608	1	SA	
AR404	2007-001010	R-CHIP;51Kohm,5%,1/10W,TP,1608	1	SA	
AR407	2007-001010	R-CHIP;51Kohm,5%,1/10W,TP,1608	1	SA	
AR408	2001-000837	R-CARBON;51KOHM,5%,1/8W,AA,TP,	1	SA	
AR409	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
AR410	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
AR412	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR413	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR414	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR415	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR420	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,160	1	SA	
AR421	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR460	2007-000122	R-CHIP;1.2Kohm,5%,1/10W,TP,160	1	SA	
AR461	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,	1	SA	
AR471	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
AR472	2001-000290	R-CARBON;10KOHM,5%,1/8W,AA,TP,	1	SA	
AR473	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR474	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR475	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
AR476	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR477	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
AR5	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
AR725	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
AR734	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
AR735	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
AVJ1	3722-002449	JACK-PIN;6P+VHS,Ni/Sn,RD-BU-GN	1	SA	
AVJ2	3722-002450	JACK-PIN;6P+VHS,Ni/Sn,RD-WH-YL	1	SA	
AVJ5	3707-001070	CONNECTOR-OPTICAL;PLUG,GP1FA55	1	SA	
BD05	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
BD06	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
BD07	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
BD08	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
BD21	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
BD22	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
BD23	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
BD24	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
C4M17A	2203-000323	C-CER,CHIP;12nF,10%,50V,X7R,TP	1	SA	
C4M18A	2203-000357	C-CER,CHIP;0.15nF,5%,50V,C0G,1	1	SA	
C4M19A	2203-000681	C-CER,CHIP;0.027nF,5%,50V,C0G,	1	SA	
C603	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,	1	SA	
C616	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
C617	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
C618	2203-000426	C-CER,CHIP;0.018nF,5%,50V,C0G,	1	SA	
C619	2203-000426	C-CER,CHIP;0.018nF,5%,50V,C0G,	1	SA	
C620	2203-000626	C-CER,CHIP;0.022nF,5%,50V,C0G,	1	SA	
C621	2203-000626	C-CER,CHIP;0.022nF,5%,50V,C0G,	1	SA	
C622	2203-005065	C-CER,CHIP;1000nF,+80-20%,10V,	1	SA	
C623	2203-000236	C-CER,CHIP;0.1nF,5%,50V,C0G,16	1	SA	
C626	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
C627	2203-001697	C-CER,CHIP;0.082nF,5%,50V,NP0,	1	SA	
C628	2401-002069	C-AL;33uF,20%,16V,GP,TP,6.3x5,	1	SA	
C629	2203-005221	C-CER,CHIP;15nF,10%,50V,X7R,16	1	SA	
C630	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
C631	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
C635	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
C636	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
C637	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
C647	2203-000681	C-CER,CHIP;0.027nF,5%,50V,C0G,	1	SA	
C651	2202-000216	C-CERAMIC,MLC-AXIAL;0.027NF,5%	1	SA	
C652	2203-000681	C-CER,CHIP;0.027nF,5%,50V,C0G,	1	SA	
C658	2203-001683	C-CER,CHIP;0.068nF,5%,50V,NP0,	1	SA	
C701	2401-000118	C-AL;1000uF,20%,10V,GP,TP,10x1	1	SA	
C702	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
C703	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
C704	2401-000240	C-AL;100uF,20%,10V,GP,TP,5x11,	1	SA	
C707	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
C708	2401-000118	C-AL;1000uF,20%,10V,GP,TP,10x1	1	SA	
C801	2203-000972	C-CER,CHIP;47nF,10%,16V,X7R,16	1	SA	
C802	2401-001915	C-AL;1uF,20%,50V,GP,TP,3x5,5	1	SA	
C803	2401-004136	C-AL;100uF,°æ20%,16V,WT,TP,8X5	1	SA	
C804	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
C805	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
C806	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
C807	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
C808	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
C809	2401-003107	C-AL;47uF,20%,16V,GP,TP,5x7,5	1	SA	
C810	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C811	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C812	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
C813	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	
C815	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C816	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C817	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C818	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C819	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C820	2401-003645	C-AL;1UF,20%,50V,WT,TP,4X5MM,5	1	SA	
C821	2401-000665	C-AL;2.2uF,20%,50V,GP,TP,3.5x5	1	SA	
C822	2401-000665	C-AL;2.2uF,20%,50V,GP,TP,3.5x5	1	SA	
C824	2401-000665	C-AL;2.2uF,20%,50V,GP,TP,3.5x5	1	SA	
C825	2401-000665	C-AL;2.2uF,20%,50V,GP,TP,3.5x5	1	SA	
CN3	3711-005563	HEADER-BOARD TO BOARD;BOX,30P,	1	SA	
CN4	3711-006319	HEADER-BOARD TO BOARD;BOX,16P,	1	SA	
CVL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
CVL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
CVL3	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
D702	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
D703	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
D704	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
D705	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
D719	0402-001533	DIODE-RECTIFIER;1N5408,1000V,3	1	SA	
D720	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
DAR01	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
DOC3	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
DOC4	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
DOC5	2203-000998	C-CER,CHIP;0.047nF,5%,50V,C0G,	1	SA	
DOE1	2401-001915	C-AL;1uF,20%,50V,GP,TP,3x5,5	1	SA	
DOL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
DOL3	2701-000114	INDUCTOR-AXIAL;10UH,10%,2534	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	AK07-00063A	LED DISPLAY;BCD-9051A,DVD-R155	1	SA	
FC10	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
FC12	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
FCON1	3708-001802	CONNECTOR-FPC/FFC/PIC;10P,1.25	1	SA	
FCON3	3708-001695	CONNECTOR-FPC/FFC/PIC;13P,1MM,	1	SA	
FD2	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
FD3	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
FD4	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
FD7	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
FDJ1	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
FDJ2	0402-000165	DIODE-RECTIFIER;1N5819,40V,1A,	1	SA	
FE4	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
FE5	2401-001992	C-AL;2200UF,20%,10V,WT,TP,10X2	1	SA	
FIC5	AC14-12009W	IC-RESET;PST572K,TO-92,R59-176	1	SA	
FL2	2701-000181	INDUCTOR-AXIAL;33uH,5%,2434	1	SA	
FL3	2701-000181	INDUCTOR-AXIAL;33uH,5%,2434	1	SA	
FR24	2007-000100	R-CHIP;68Kohm,5%,1/10W,TP,1608	1	SA	
FR25	2007-000503	R-CHIP;2.2ohm,5%,1/10W,TP,1608	1	SA	
IC603	1103-001134	IC-EEPROM;24C040,512x8,SOP,8P,	1	SA	
IC604	1204-002509	IC-SIGNAL PROCESSOR;CXA2207N,S	1	SA	
IC701	1003-001561	IC-LED DRIVER;PT6961,SOP,32P,3	1	SA	
IC801	1204-001763	IC-AUDIO PROCESSOR;LA73024V,SS	1	SA	
JPS07	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
KRMC1	0609-001225	MODULE REMOCON;VERTICAL,3.6mm,	1	SA	
L701	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
L801	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
L802	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
ME01	2401-003499	C-AL;330uF,20%,16V,LZ,TP,8x11.	1	SA	
PACT1	2301-001792	C-FILM,LEAD;150nF,20%,275V,BK,	1	SA	
PACT2	2301-001792	C-FILM,LEAD;150nF,20%,275V,BK,	1	SA	
PADT1	0402-001196	DIODE-RECTIFIER;1T5,600V,1A,TS	1	SA	
PADT2	0402-001196	DIODE-RECTIFIER;1T5,600V,1A,TS	1	SA	
PADT3	0402-001196	DIODE-RECTIFIER;1T5,600V,1A,TS	1	SA	
PADT4	0402-001196	DIODE-RECTIFIER;1T5,600V,1A,TS	1	SA	
PAFT1	3601-000244	FUSE-CARTRIDGE;250V,2A,SLOW-BL	1	SC	
PALT2	AC29-00003A	FILTER LINE NOISE;-,20mH MIN,-	1	SA	
PART1	2002-000121	R-COMPOSITION;1Mohm,10%,1/2W,A	1	SA	
PAVV1	1405-000186	VARISTOR;470V,2500A,17.5x7.5mm	1	SA	
PAVV2	1405-001026	VARISTOR;470V,600A,9x7mm,TP	1	SA	
PAWT1	3711-000203	HEADER-BOARD TO CABLE;1WALL,2P	1	SA	
PBCU1	2201-002044	C-CERAMIC,DISC;0.1NF,10%,400V,	1	SA	
PBCU2	2201-002044	C-CERAMIC,DISC;0.1NF,10%,400V,	1	SA	
PBCU3	2201-000828	C-CERAMIC,DISC;3.3NF,20%,400V,	1	SA	
PBCU4	2201-000828	C-CERAMIC,DISC;3.3NF,20%,400V,	1	SA	
PBIZ1	0604-001028	PHOTO-COUPLER;TR,50-600%,250mW	1	SA	
PDCZ1	2301-001654	C-FILM,LEAD-PEF;1000nF,5%,100V	1	SA	
PFCF1	2301-000129	C-FILM,LEAD-PEF;100nF,5%,50V,T	1	SA	
PFCZ1	2307-000104	C-FILM,LEAD-PCF;10nF,5%,50V,TP	1	SA	
PFID1	AC14-12006D	IC;KA431Z,TO-92,TAPING	1	SA	
PFRF1	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,	1	SA	
PFRF2	2001-000221	R-CARBON;1.2KOHM,5%,1/8W,AA,TP	1	SA	
PFRF3	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
PFRF4	2001-000674	R-CARBON;360OHM,5%,1/8W,AA,TP,	1	SA	
PFRF5	2004-000459	R-METAL;2.2Kohm,1%,1/8W,AA,TP,	1	SA	
PFRF6	2004-000459	R-METAL;2.2Kohm,1%,1/8W,AA,TP,	1	SA	
PFRZ1	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
PLCZ1	2301-000129	C-FILM,LEAD-PEF;100nF,5%,50V,T	1	SA	
PLRU1	1404-001361	THERMISTOR-NTC;3ohm,4A,-,35mW/	1	SA	
PLRZ1	2003-000105	R-METAL OXIDE;0.33ohm,5%,2W,AD	1	SA	
PPCD1	2401-003480	C-AL;1000UF,20%,10V,LZ,TP,10X1	1	SA	
PPCD2	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
PPCF1	2401-003480	C-AL;1000UF,20%,10V,LZ,TP,10X1	1	SA	
PPCF2	2401-003480	C-AL;1000UF,20%,10V,LZ,TP,10X1	1	SA	
PPCF3	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
PPCF4	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
PPCF7	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
PPCF8	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
PPCI1	2401-001126	C-AL;330uF,20%,25V,WT,TP,10x12	1	SA	
PPCI2	2401-001126	C-AL;330uF,20%,25V,WT,TP,10x12	1	SA	
PPCI3	2401-003499	C-AL;330uF,20%,16V,LZ,TP,8x11.	1	SA	
PPCO1	2401-000385	C-AL;10uF,20%,100V,GP,TP,6.3x1	1	SC	
PPCO2	2401-002300	C-AL;47•ÏF,20%,50V,GP,TP,6.3x1	1	SA	
PPDD1	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3	1	SA	
PPDD2	0401-000005	DIODE-SWITCHING;1N4148,75V,150	1	SA	
PPDF10	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3	1	SA	
PPDF2	0404-001235	DIODE-SCHOTTKY;SHK65-45R,60V,3	1	SA	
PPDF3	0402-001533	DIODE-RECTIFIER;1N5408,1000V,3	1	SA	
PPDI1	0402-001624	DIODE-RECTIFIER;SF26,400V,2A,D	1	SA	
PPDO1	0402-000012	DIODE-RECTIFIER;UF4007,1KV,1A,	1	SA	
PPID1	1203-003216	IC-POSI.FIXED REG.;G9133,TO-22	1	SA	
PPIF2	1203-001589	IC-POSI.FIXED REG.;278R05,TO-2	1	SA	
PPII1	1203-002183	IC-SWITCH VOL. REG.;278R12,TO-	1	SA	
PPLD1	AC27-12001N	COIL CHOKE;10UH-15%,RA,K-30,Q8	1	SA	
PPLF1	AH27-00039A	COIL CHOKE;DR CHOKE(8*6),DVD-R	1	SA	
PPLI1	AC27-12001N	COIL CHOKE;10UH-15%,RA,K-30,Q8	1	SA	
PPRD1	2003-000148	R-METAL OXIDE;100ohm,5%,2W,AE,	1	SC	
PPRF2	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
PPRF4	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
PPRF6	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
PPRO1	2001-000062	R-CARBON;470OHM,5%,1/4W,AA,TP,	1	SA	
PPZO1	0403-000390	DIODE-ZENER;UZP33B,31.4-34.6V,	1	SA	
PQIZ1	1203-003883	IC-PWM CONTROLLER;3B2065P-2,TO	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
PQTZ1	AC26-00014K	TRANS SWITCHING-RAM RECORDER;E	1	SA	
PRCU1	2401-003024	C-AL;220uF,20%,200V,WT,BK,22x3	1	SA	
PSCX1	2305-001029	C-FILM,LEAD-PEF;10nF,10%,630V,	1	SA	
PSCZ2	2201-000129	C-CERAMIC,DISC;0.1nF,10%,1000V	1	SA	
PSDZ1	0402-000012	DIODE-RECTIFIER;UF4007,1KV,1A,	1	SA	
PSRZ1	2003-000994	R-METAL OXIDE(S);33Kohm,5%,2W,	1	SA	
PSRZ2	2003-000994	R-METAL OXIDE(S);33Kohm,5%,2W,	1	SA	
PVCL1	2401-002608	C-AL;33uF,20%,35V,GP,TP,5x11,5	1	SA	
PVDL1	0402-001195	DIODE-RECTIFIER;F1T4,400V,1A,D	1	SA	
PVRL4	2001-000793	R-CARBON;470HM,5%,1/8W,AA,TP,1	1	SA	
PVZL1	0403-000713	DIODE-ZENER;MTZJ20B,18.63-17.7	1	SA	
PWR09	2007-000119	R-CHIP;560ohm,5%,1/10W,TP,1608	1	SA	
PWR10	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
PZWZ1	3711-004379	HEADER-BOARD TO CABLE;BOX,4P,1	1	SA	
Q4M01	0501-000398	TR-SMALL SIGNAL;KSC945-Y,NPN,2	1	SA	
Q4M02	0501-000398	TR-SMALL SIGNAL;KSC945-Y,NPN,2	1	SA	
R4M06	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R4M07	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,160	1	SA	
R4M08	2007-000124	R-CHIP;2.2Kohm,5%,1/10W,TP,160	1	SA	
R4M09	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,160	1	SA	
R4M10	2007-000965	R-CHIP;5.1Kohm,5%,1/10W,TP,160	1	SA	
R4M20	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
R611	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R621	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,	1	SA	
R622	2001-000780	R-CARBON;470OHM,5%,1/8W,AA,TP,	1	SA	
R623	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,160	1	SA	
R624	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,160	1	SA	
R633	2007-000106	R-CHIP;220Kohm,5%,1/10W,TP,160	1	SA	
R638	2007-000082	R-CHIP;3.3Kohm,5%,1/10W,TP,160	1	SA	
R639	2007-000081	R-CHIP;2.7Kohm,5%,1/10W,TP,160	1	SA	
R652	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R653	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R656	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R666	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
R667	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
R668	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
R670	2007-000074	R-CHIP;100ohm,5%,1/10W,TP,1608	1	SA	
R673	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R674	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R676	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R677	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
R678	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
R680	2001-000472	R-CARBON;2.7KOHM,5%,1/8W,AA,TP	1	SA	
R6A01	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R6A02	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R6A04	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R6A05	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R6A10	2001-000273	R-CARBON;100KOHM,5%,1/8W,AA,TP	1	SA	
R701	2007-001010	R-CHIP;51Kohm,5%,1/10W,TP,1608	1	SA	
R702	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R703	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R704	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R705	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R706	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R707	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R708	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R711	2007-000090	R-CHIP;10Kohm,5%,1/10W,TP,1608	1	SA	
R7K1	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R7K2	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R7K3	2007-000092	R-CHIP;15Kohm,5%,1/10W,TP,1608	1	SA	
R801	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R802	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
R803	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
R804	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
R805	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
R806	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
R807	2007-000083	R-CHIP;3Kohm,5%,1/10W,TP,1608	1	SA	
R808	2007-000083	R-CHIP;3Kohm,5%,1/10W,TP,1608	1	SA	
R809	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,160	1	SA	
R810	2007-000079	R-CHIP;1.8Kohm,5%,1/10W,TP,160	1	SA	
R811	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R812	2007-000078	R-CHIP;1Kohm,5%,1/10W,TP,1608	1	SA	
R813	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
R814	2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,1	1	SA	
RA606	2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	SA	
SVL2	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
SVLA	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
SW701	3404-001182	SWITCH-TACT;DC12V,50MA,100GF,6	1	SA	
SW702	3404-001261	SWITCH-TACT;15V DC,20mA,100gf,	1	SA	
TC1	2401-004014	C-AL;4.7•IF,20%,16V,NP,TP,4x5,	1	SA	
TC10	2401-001915	C-AL;1uF,20%,50V,GP,TP,3x5,5	1	SA	
TC11	2401-004014	C-AL;4.7•IF,20%,16V,NP,TP,4x5,	1	SA	
TC12	2202-000253	C-CERAMIC,MLC-AXIAL;4.7nF,20%,	1	SA	
TC13	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
TC14	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
TC15	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
TC16	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
TC17	2203-001652	C-CER,CHIP;470nF,+80-20%,16V,Y	1	SA	
TC19	2203-001662	C-CER,CHIP;5.6nF,10%,50V,X7R,1	1	SA	
TC2	2203-000531	C-CER,CHIP;2.7nF,10%,50V,X7R,1	1	SA	
TC20	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
TC21	2203-000257	C-CER,CHIP;10nF,10%,50V,X7R,16	1	SA	
TC22	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
TC3	2203-000972	C-CER,CHIP;47nF,10%,16V,X7R,16	1	SA	
TC4	2401-001249	C-AL;4.7uF,20%,35V,GP,TP,4x5,2	1	SA	
TC5	2401-001020	C-AL;3.3UF,20%,50V,GP,TP,4X7,5	1	SA	
TC6	2401-004014	C-AL;4.7•IF,20%,16V,NP,TP,4x5,	1	SA	
TC74	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
TC9	2401-000414	C-AL;10uF,20%,16V,GP,TP,4x7,5	1	SA	
TE12	2401-001250	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	1	SA	
TE8	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
TM1	AK40-00019A	TM BLOCK;VRA05ASE,NTSC,181CH,-	1	SA	
TR1	2007-000082	R-CHIP;3.3Kohm,5%,1/10W,TP,160	1	SA	
TR10	2007-000121	R-CHIP;820ohm,5%,1/10W,TP,1608	1	SA	
TR2	2007-000842	R-CHIP;3Kohm,1%,1/10W,TP,1608	1	SA	
TR3	2007-000125	R-CHIP;3.9Kohm,5%,1/10W,TP,160	1	SA	
TR4	2007-001125	R-CHIP;68Kohm,1%,1/10W,TP,1608	1	SA	
TR5	2007-000109	R-CHIP;1Mohm,5%,1/10W,TP,1608	1	SA	
TR6	2007-000102	R-CHIP;100Kohm,5%,1/10W,TP,160	1	SA	
TR7	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	

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TR8	2007-000075	R-CHIP;220ohm,5%,1/10W,TP,1608	1	SA	
TR9	2007-000121	R-CHIP;820ohm,5%,1/10W,TP,1608	1	SA	
VC10	2203-000440	C-CER,CHIP;1nF,10%,50V,X7R,160	1	SA	
VC17	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
VC6	2203-005148	C-CER,CHIP;100nF,10%,16V,X7R,1	1	SA	
VC7	2202-000797	C-CERAMIC,MLC-AXIAL;10NF,30%,1	1	SA	
VC8	2202-002037	C-CERAMIC,MLC-AXIAL;100nF,80-2	1	SA	
VC9	2202-002037	C-CERAMIC,MLC-AXIAL;100nF,80-2	1	SA	
VDR1	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
VDR2	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
VDR3	2007-001131	R-CHIP;68ohm,1%,1/10W,TP,1608	1	SA	
VDR4	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
VDR5	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
VDR6	2007-001164	R-CHIP;75ohm,1%,1/10W,TP,1608	1	SA	
VDR7	2007-000879	R-CHIP;4.7ohm,1%,1/10W,TP,1608	1	SA	
VE1	2401-002165	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	SA	
VE10	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
VE2	2401-000922	C-AL;22uF,20%,16V,GP,TP,5x5,5	1	SA	
VE4	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
VE5	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
VE6	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
VE7	2401-001479	C-AL;470uF,20%,10V,GP,TP,6.3*1	1	SA	
VE8	2401-001915	C-AL;1uF,20%,50V,GP,TP,3x5,5	1	SA	
VE9	2401-001915	C-AL;1uF,20%,50V,GP,TP,3x5,5	1	SA	
VIC1	1201-002335	IC-VIDEO AMP;MM1692XVBE,TSOP,1	1	SA	
VL1	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VL11	2701-000181	INDUCTOR-AXIAL;33uH,5%,2434	1	SA	
VL12	2701-000181	INDUCTOR-AXIAL;33uH,5%,2434	1	SA	
VL6	2703-000398	INDUCTOR-SMD;10uH,10%,3225	1	SA	
VR30	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VR31	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VR32	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VR33	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VR34	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VR60	2007-001167	R-CHIP;75ohm,5%,1/10W,TP,1608	1	SA	
VZ1	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ10	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ11	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ12	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ13	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ14	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ15	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ16	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ17	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ18	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ19	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ2	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ20	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ3	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ4	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ5	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ6	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ7	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ8	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	
VZ9	0403-001083	DIODE-ZENER;UDZ9.1B,8.85-9.23V	1	SA	

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W004	6003-000283	SCREW-TAPTITE;BH,+,-,B,M3,L8,Z	1	SA	
W224	3301-000297	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm	1	SA	
W233	2701-000002	INDUCTOR-AXIAL;100UH,10%,4298	1	SA	
W324	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
W868	3301-001689	BEAD-SMD;220ohm,2012,TP,80ohm/	1	SA	
W881	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
W882	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
W889	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
W890	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
W920	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
W923	2007-000033	R-CHIP;0ohm,5%,1/4W,TP,3216	1	SA	
W946	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
XT4M01	2801-003399	CRYSTAL-UNIT;3.579545MHz,15ppm	1	SA	
XT601	2801-001384	CRYSTAL-UNIT;14.31818MHz,30ppm	1	SC	
XT602	2801-003318	CRYSTAL-UNIT;32.768KHz,20ppm,2	1	SA	
H001	**AK97-01883B**	**ASSY-LOADER;-,DVD-R150,RAM Mul**	**1**	**SA**	
C771	AK61-00390A	HOLDER-WIRE;SOH-DR2,PPS,T5.2,W	1	SNA	
CIC1	1203-003177	IC-VOL. DETECTOR;BD5326G,SSOP,	1	SA	
CN1	3708-002193	CONNECTOR-FPC/FFC/PIC;50P,0.5m	1	SA	
DECK_C	3708-002176	CONNECTOR-FPC/FFC/PIC;5P,1mm,S	1	SA	
H001	AK97-01878A	ASSY-RECORDER DECK;DP-R4L,-,-	1	SNA	
H103	AK66-00061A	GEAR-PULLEY;DP-RW,POM,-,-,-,-	1	SNA	
H105	6602-001076	BELT-RECTANGULAR;CR,T1.2,4.3%,	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,8500,9.8m	1	SNA	
H209	AK64-01462A	CHASSIS-SUB;DP-R3H,ABS,T2,W114	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,PITCH	1	SNA	
H265	AK61-00736A	BRACKET-SHAFT PU;DP-R3.5,SUS T	2	SNA	
H268	AK61-00452A	SPRING ETC-HINGE PU;DP-R2,SUS3	1	SNA	
H271	AK61-00735A	HINGE-PU;DP-R3.5,POM,-,-,-,-,-	1	SNA	
H275	AK66-00072A	SHAFT-PU;DP-RW2,SUS420J2,91.5,	2	SNA	
H401	AK61-00734A	FRAME-MAIN;DP-R3.5,ABS,-,-,-,-	1	SNA	
JP9	3708-001331	CONNECTOR-FPC/FFC/PIC;40P,0.5m	1	SA	
PC1	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
PC10	2402-000179	C-AL,SMD;47uF,20%,16V,GP,TP,6.	1	SA	
PC12	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
PC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
PC15	2404-001131	C-TA,CHIP;22UF,10%,10V,GP,TP,3	1	SA	
PC2	2203-006214	C-CER,CHIP;2200nF,10%,25V,X7R,	1	SA	
PC3	2402-001042	C-AL,SMD;100uF,20%,16V,GP,TP,6	1	SA	
PC4	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
PC5	2402-001042	C-AL,SMD;100uF,20%,16V,GP,TP,6	1	SA	
PC6	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
PC7	2203-005171	C-CER,CHIP;1000nF,10%,16V,X7R,	1	SA	
PC8	2203-005171	C-CER,CHIP;1000nF,10%,16V,X7R,	1	SA	
PC9	2402-000179	C-AL,SMD;47uF,20%,16V,GP,TP,6.	1	SA	
PCB	AK41-00623B	PCB-FRONT;RAMBO4,CEM-3,2,-,1.6	0.5	SNA	
PCN	3711-005477	HEADER-BOARD TO CABLE;BOX,4P,1	1	SA	
PIC2	1203-003997	IC-MULTI REG.;BA30E00WHFP,HRP,	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
PIC3	1203-003999	IC-POSI.FIXED REG.;BH25FB1WHFV	1	SA	
PL1	2901-001281	FILTER-EMI SMD;16V,2A,-,220000	1	SA	
PL3	2901-001281	FILTER-EMI SMD;16V,2A,-,220000	1	SA	
PL4	2901-001281	FILTER-EMI SMD;16V,2A,-,220000	1	SA	
PL5	2901-001281	FILTER-EMI SMD;16V,2A,-,220000	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	1	SA	
RC10	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC11	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC12	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC13	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC15	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC16	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC17	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC21	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC22	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
RC23	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC25	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
RC26	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC27	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
RC28	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC29	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC3	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC30	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC31	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC32	2203-000233	C-CER,CHIP;0.1nF,5%,50V,C0G,10	1	SA	
RC33	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC34	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC35	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC36	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC37	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,35	1	SA	
RC38	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC39	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,35	1	SA	
RC40	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC41	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC42	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC43	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC44	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC45	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
RC46	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
RC47	2203-000627	C-CER,CHIP;0.022nF,5%,50V,C0G,	1	SA	
RC48	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
RC49	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
RC50	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC51	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC52	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC53	2203-000233	C-CER,CHIP;0.1nF,5%,50V,C0G,10	1	SA	
RC54	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC55	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,35	1	SA	
RC56	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC57	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC58	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,35	1	SA	
RC59	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
RC6	2203-005496	C-CER,CHIP;220nF,+80-20%,10V,Y	1	SA	
RC60	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC61	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC62	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1	1	SA	
RC63	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1	1	SA	
RC64	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1	1	SA	
RC65	2203-005642	C-CER,CHIP;0.22nF,5%,50V,NP0,1	1	SA	
RC66	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC67	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC68	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC69	2203-000233	C-CER,CHIP;0.1nF,5%,50V,C0G,10	1	SA	
RC7	2203-005496	C-CER,CHIP;220nF,+80-20%,10V,Y	1	SA	
RC70	2203-001239	C-CER,CHIP;0.082nF,5%,50V,NP0,	1	SA	
RC71	2203-001239	C-CER,CHIP;0.082nF,5%,50V,NP0,	1	SA	
RC72	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
RC73	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RC74	2203-000489	C-CER,CHIP;2.2nF,10%,50V,X7R,1	1	SA	
RIC2	AK13-00028A	IC ASIC;S1L1101X01,-,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,100	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,100	1	SA	
RR22	2007-007107	R-CHIP;100Kohm,1%,1/16W,TP,100	1	SA	
RR24	2007-000145	R-CHIP;6.2Kohm,5%,1/16W,TP,100	1	SA	
RR25	2007-000154	R-CHIP;24KOHM,5%,1/16W,TP,1005	1	SA	
RR25	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
RR26	2007-001320	R-CHIP;1.8Kohm,5%,1/16W,TP,100	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	
RR32	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	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	AK61-00740A	BRACKET-DECK;DP-R3.5L,SECC T1.	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	1	SNA	
S.N.A	AK61-00490A	SPRING ETC-SHAFT PU;DP-RW2,PW2	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,	1	SNA	
S.N.A	AK61-00739A	BRACKET-CLAMPER;DP-R3.5L,SECC	1	SNA	
S.N.A	BG33-30001D	MAGNET-CLAMPER;-,-,-,-,13.5x6x	1	SNA	
S.N.A	AK97-01879A	ASSY-HOUSING;-,DP-R4,-	1	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
S.N.A	AH31-00025A	MOTOR-LOADING;RF-300EA-1D390,D	1	SNA	
S.N.A	AK66-00038A	PULLEY MOTOR;DP-R1,POM,-,BLK,1	1	SNA	
S.N.A	AK97-01646A	ASSY-MOTOR PCB;PHENOL,DP-R3H,S	1	SNA	
S.N.A	3403-001026	SWITCH-PUSH;5V,0.7mA,DPST,OFF-	1	SA	
S.N.A	AK41-00400A	FFC-DECK;DP-RW2,PITCH1.0,PET,5	1	SNA	
S.N.A	AK41-00546A	PCB-MOTOR;DP-R3H,PHENOL,1,1,1.	1	SNA	
SPIN_C	3708-002067	CONNECTOR-FPC/FFC/PIC;12P,1mm,	1	SA	
STEP_C	3708-002018	CONNECTOR-FPC/FFC/PIC;4P,1MM,S	1	SA	
T037	AK66-00079A	SLIDER-CAM;DP-R3H,POM,T10,W89,	1	SNA	
U8	AK13-00025A	IC ASIC;S5L1484A01,RAMBO-3,256	1	SNA	
U9	1107-001551	IC-FLASH MEMORY;S29AL016M10TAI	1	SNA	
UB1	1105-001284	IC-DRAM;636165,-,16Mbit,1Mx16B	1	SA	
UC100	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC18	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC19	2203-000278	C-CER,CHIP;0.01nF,0.5pF,50V,C0	1	SA	
UC21	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC22	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC23	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC24	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC25	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC26	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC27	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC28	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC29	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC30	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC31	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC32	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC33	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC34	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC35	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC36	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC37	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC38	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC39	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC40	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC41	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC42	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC43	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC44	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC45	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
UC46	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC47	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
UC48	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC49	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC50	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC51	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC52	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC53	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC54	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC55	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC56	2203-000854	C-CER,CHIP;0.039nF,5%,50V,C0G,	1	SA	
UC57	2203-001072	C-CER,CHIP;0.056nF,5%,50V,NP0,	1	SA	
UC58	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC62	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC63	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC64	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC67	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC69	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC70	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC71	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC72	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC75	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
UC76	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC77	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC79	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC80	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
UC81	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
UC82	2203-001072	C-CER,CHIP;0.056nF,5%,50V,NP0,	1	SA	
UR1	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR10	2007-001217	R-CHIP;82OHM,5%,1/16W,TP,1005	1	SA	
UR100	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR11	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UR12	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UR13	2007-001217	R-CHIP;82OHM,5%,1/16W,TP,1005	1	SA	
UR14	2007-001217	R-CHIP;82OHM,5%,1/16W,TP,1005	1	SA	
UR16	2007-000170	R-CHIP;1Mohm,5%,1/16W,TP,1005	1	SA	
UR17	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
UR19	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
UR2	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR20	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR21	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR22	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	
UR24	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR25	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
UR26	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
UR27	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR28	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR29	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR3	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR30	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR31	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR32	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR33	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR34	2007-000139	R-CHIP;220ohm,5%,1/16W,TP,1005	1	SA	
UR35	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
UR36	2007-000139	R-CHIP;220ohm,5%,1/16W,TP,1005	1	SA	
UR37	2007-001325	R-CHIP;3.3Kohm,5%,1/16W,TP,100	1	SA	
UR39	2007-000775	R-CHIP;33KOHM,5%,1/16W,TP,1005	1	SA	
UR4	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR42	2007-007001	R-CHIP;3.9KOHM,5%,1/16W,TP,100	1	SA	
UR43	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR44	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR47	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR48	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR5	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR50	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
UR55	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
UR58	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
UR59	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
UR6	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UR63	2007-000084	R-CHIP;4.7Kohm,5%,1/10W,TP,160	1	SA	
UR64	2007-000143	R-CHIP;4.7Kohm,5%,1/16W,TP,100	1	SA	
UR69	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR7	2007-001217	R-CHIP;82OHM,5%,1/16W,TP,1005	1	SA	
UR73	2007-001305	R-CHIP;120ohm,5%,1/16W,TP,1005	1	SA	
UR75	2007-001292	R-CHIP;33ohm,5%,1/16W,TP,1005	1	SA	
UR76	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR77	3301-001861	BEAD-SMD;600ohm,1005,TP,500ohm	1	SNA	
UR8	2007-001217	R-CHIP;82OHM,5%,1/16W,TP,1005	1	SA	
UR80	2007-000140	R-CHIP;1Kohm,5%,1/16W,TP,1005	1	SA	
UR81	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR82	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608	1	SA	
UR83	2007-000113	R-CHIP;33ohm,5%,1/10W,TP,1608	1	SA	
UR87	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	
UR89	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR9	2007-000173	R-CHIP;22ohm,5%,1/16W,TP,1005	1	SA	
UR90	2007-000831	R-CHIP;39Kohm,5%,1/16W,TP,1005	1	SA	
UR91	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR92	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR93	2007-000171	R-CHIP;0ohm,5%,1/16W,TP,1005	1	SA	
UR94	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR95	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR96	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR97	2011-001432	R-NET;82ohm,5%,1/16W,L,CHIP,8P	1	SA	
UR98	2007-000148	R-CHIP;10Kohm,5%,1/16W,TP,1005	1	SA	
UR99	2007-000070	R-CHIP;0ohm,5%,1/10W,TP,1608	1	SA	
VC1	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC10	2203-000438	C-CER,CHIP;1nF,10%,50V,X7R,100	1	SA	
VC11	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC12	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC13	2404-000284	C-TA,CHIP;10uF,20%,16V,-,TP,35	1	SA	
VC14	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
VC15	2203-000254	C-CER,CHIP;10nF,10%,16V,X7R,10	1	SA	
VC16	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC17	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC18	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC19	2203-005061	C-CER,CHIP;100nF,+80-20%,16V,Y	1	SA	
VC2	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC20	2203-006048	C-CER,CHIP;100nF,10%,10V,X7R,1	1	SA	
VC21	2404-001020	C-TA,CHIP;10uF,20%,10V,GP,TP,3	1	SA	
VC3	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC4	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC5	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC6	2203-006047	C-CER,CHIP;33nF,10%,16V,X7R,10	1	SA	
VC7	2203-000233	C-CER,CHIP;0.1nF,5%,50V,C0G,10	1	SA	
VC8	2203-000233	C-CER,CHIP;0.1nF,5%,50V,C0G,10	1	SA	
VIC1	1003-001881	IC-MOTOR DRIVER;BD7956FS,HSSOP	1	SA	
VR1	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
VR10	2007-000138	R-CHIP;100ohm,5%,1/16W,TP,1005	1	SA	
VR11	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR12	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR13	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR14	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR15	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR16	2007-000034	R-CHIP;1OHM,5%,1/4W,TP,3216	1	SA	
VR18	2007-000034	R-CHIP;1OHM,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,100	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	1	SA	
VR32	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR33	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR34	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR35	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR36	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR37	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR38	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR39	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR40	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR41	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR42	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR43	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR44	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR45	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR46	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR47	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
VR48	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	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,100	1	SA	
W012	6002-001086	SCREW-TAPPING;PH,+,-,B,M1.7,L5	1	SA	
W018	6003-001450	SCREW-TAPTITE;PH,+,-,S,M2.6,L5	2	SA	
W274	6001-001730	SCREW-MACHINE;BH,+,-,M1.7,L2.5	2	SA	
W350	6001-001003	SCREW-MACHINE;BH,+,M2.6,L6,ZPC	4	SA	
W352	6001-000883	SCREW-MACHINE;PH,+,M1.4,L5,ZPC	1	SNA	
W353	6003-001199	SCREW-TAPTITE;PWH,+,-,B,M2,L7,	4	SA	
W354	6003-001258	SCREW-TAPTITE;PH,+,B,M1.4,L2.0	4	SA	
W355	6003-001526	SCREW-TAPTITE;CH,+,S-TITE,M1.4	2	SNA	
W377	6001-001291	SCREW-MACHINE;CH(0.5),*,-,M1.7	3	SA	
Y1	2802-001163	RESONATOR-CERAMIC;33.86MHz,0.5	1	SA	
	AK92-01223A	ASSY PCB-LOADER;DVD-R135A/XAA,	1	SNA	
	AC99-40322L	ASSY PCB-LOADER,c;DVD-R135A/XA	1	SNA	
	0202-001221	SOLDER-CREAM;PF305-116HO(A),-,	4.04	SNA	
	AC99-90324K	ASSY PCB-LOADER,m;DVD-R135A/XA	1	SNA	
	0202-001214	SOLDER-WIRE FLUX;HI-ALMIT HR19	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?40	0.013	SNA	
	0201-001718	ADHESIVE-A.C.F;A-80T,SILVER,11	0.003	SNA	
	0201-001819	ADHESIVE-UV;8833M,YELLOW,21000	0.05	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
	0202-001499	SOLDER-WIRE FLUX;SR34 SUPER LF	0.085	SNA	
	0602-001127	DIODE-LASER;160mW,2,658nm,CAN	1	SNA	
	AH61-00812A	SPRING ETC-L/G HOLDER;SOH-DH2,	1	SNA	
	AK61-00720A	HOLDER-LD DVD;SOH-DR3.5,Zn,4.8	1	SNA	
	AK61-00721A	HOLDER-LD CD;SOH-DR3.5,Zn,T6.2	1	SNA	
	AK61-00722A	HOLDER-LG;SOH-DR3.5,Zn,T6.43,W	1	SNA	
	AK61-00747A	SPRING ETC-SHAFT GUIDE;SOH-DR4	1	SNA	
	AK63-00438A	COVER BASE;SOH-DR4,Cu,T0.2,W32	1	SNA	
	AK97-01859A	ASSY-ACT;-,SOH-DR4,-	1	SNA	
	0201-001081	ADHESIVE-AA;1401C,RED,-,BOND-L	0.006	SNA	
	0201-001230	ADHESIVE-CYA;LOCTITE 480,BLK,3	0.002	SNA	
	0201-001709	ADHESIVE-UV;8839L,YEL,24500mPa	0.01	SNA	
	0201-001793	ADHESIVE-UV;8791L3,WHITE,20000	0.01	SNA	
	0202-001499	SOLDER-WIRE FLUX;SR34 SUPER LF	0.085	SNA	
	3302-001651	MAGNET-RARE EARTH;AF,14000Gaus	2	SNA	
	3812-001263	WIRE-NO SHEATH CU;SCW,-,19MM,-	1	SNA	
	3812-001419	WIRE-NO SHEATH CU;SCW,0V,18.5m	5	SNA	
	AK62-00020A	YOKE-ACT;SOH-DR3,SPCC,T7.6,W24	1	SNA	
	AK67-00040A	LENS-OL;SOH-DR3,PLS,WHT,3.8,1.	1	SNA	
	AK97-01858A	ASSY-BLADE;-,SOH-DR4,-	1	SNA	
	0201-001253	ADHESIVE-STR;TB2212B,BLK,25(25	0.008	SNA	
	0201-001371	ADHESIVE-SIL;KE3494,GRAY,50 PA	0.002	SNA	
	0202-001215	SOLDER-BAR;HSE-16,S60S-20,D3,S	0.01	SNA	
	AK61-00480A	BLADE-ACT;SOH-DR3,E5006J,L,IVO	1	SNA	
	0201-001911	ADHESIVE-UV;ZV-102L,WHITE,8200	0.06	SNA	
	AK97-01860A	ASSY-FPCB;-,SOH-DR4,DVD-RECORD	1	SNA	
	0202-001221	SOLDER-CREAM;PF305-116H0(A),-,	0.12	SNA	
	0603-001181	PHOTO DIODE;5.5V,658.79nm,-	1	SA	
	0603-001187	PHOTO-RECEIVER;6.0V,17.0mA,650	1	SNA	
	1003-001854	IC-DIODE DRIVER;EL6939CLZ,LPP,	1	SA	
	1404-001328	THERMISTOR-NTC;10Kohm,-,3370K,	1	SNA	
	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,100	1	SA	
	2007-007136	R-CHIP;4.7Kohm,1%,1/16W,TP,100	1	SA	
	2011-001261	R-NET;33ohm,5%,1/16W,L,CHIP,8P	1	SA	
	2011-001344	R-NET;100ohm,5%,1/16W,L,CHIP,8	1	SA	
	2104-001087	VR-SMD;2.2Kohm,25%,0.15W,TOP	2	SA	
	2203-000189	C-CER,CHIP;100nF,+80-20%,25V,Y	5	SA	
	2203-000626	C-CER,CHIP;0.022nF,5%,50V,C0G,	1	SA	
	2203-005664	C-CER,CHIP;4700nF,10%,6.3V,X5R	1	SA	
	2203-006158	C-CER,CHIP;100nF,10%,16V,X7R,1	4	SNA	
	3301-001419	BEAD-SMD;220ohm,1608,TP,133ohm	1	SA	
	3708-002193	CONNECTOR-FPC/FFC/PIC;50P,0.5m	1	SA	
	AK32-00004A	SENSOR PHOTO;CNB1001,-25~85,-,	1	SNA	
	AK41-00626A	FPC-MAIN;SOH-DR4,00,POLYAMIDE,	1	SNA	
	AK61-00723A	PLATE-PD;SOH-DR3.5,Zn,1.2,13.4	1	SNA	
	AK97-01862A	ASSY-OPT;-,SOH-DR4,DVD-RECORDE	1	SNA	
	0201-001525	ADHESIVE-UV;8840L,YEL,TRANS,23	0.03	SNA	
	0201-001709	ADHESIVE-UV;8839L,YEL,24500mPa	0.02	SNA	
	0201-001819	ADHESIVE-UV;8833M,YELLOW,21000	0.05	SNA	

Loc.No	Part No	Description ; Specification	Q'ty	S.N.A	Remark
	AK61-00717A	BASE-PICK UP;SOH-DR4,ZnDC,T12,	1	SNA	
	AK61-00724A	HOLDER-GT;SOH-DR3.5,Zn,T1.6,W5	1	SNA	
	AK61-00742A	SPRING ETC-DVD GT;SOH-DR4,Cu,-	1	SNA	
	AK67-00061A	LENS-CL;SOH-DR4,PLS,WHT,6.6,1.	1	SNA	
	AK67-00055A	LENS-CDL;SOH-DR4,-,CLEAR,R1.9,	1	SNA	
	AK67-00056A	LENS-ASL;SOH-DR4,-,CLEAR,5.9*5	1	SNA	
	AK67-00058A	LENS-QWP;SOH-DR4,GLS,WHT,5.5 *	1	SNA	
	AK67-00060A	LENS-WBS;SOH-DR4,GLS,WHT,5.5 *	1	SNA	
	AK67-00062A	LENS-MR;SOH-DR4,GLS,WHT,7.0 *	1	SNA	
	AK67-00063A	LENS-PBS;SOH-DR4,GLS,WHT,4.0 *	1	SNA	
	AK67-00036A	LENS-DVD GT;SOH-DR3,GLS,WHT,2.	1	SNA	
	0602-001115	DIODE-LASER;4.5MW,2V,785NM,TR	1	SNA	
	AK67-00059A	LENS-CD GT;SOH-DR4,GLS,WHT,2.0	1	SNA	
C011	AK61-00519A	SPRING ETC-DOOR;DVD-SR420,STS3	1	SA	
C022	AK64-01939B	DOOR-FRONT;DVD-R150/XAX,ABS 94	1	SA	
FL261	3809-001906	FFC CABLE-FLAT;30V,80,65mm,40P	1	SA	
VS203	AK39-00103A	LEAD CONNECTOR-ASSY;DVD-R135A/	1	SA	
W001	6003-000275	SCREW-TAPTITE;BH,+,-,B,M3,L10,	5	SA	
W009	6003-000276	SCREW-TAPTITE;BH,+,-,B,M3,L10,	4	SA	
W200	6003-001375	SCREW-TAPTITE;BH,+,-,B,M3,L8,Z	2	SA	
W268	6003-000254	SCREW-TAPTITE;BH,+,-,S,M3,L6,Z	1	SA	
W275	6003-001561	SCREW-TAPTITE;BH,+,-,B,M3,L6,Z	4	SA	
	AC39-00073A	CABLE-RCA;SJ01-08-099,1.2MT,3P	1	SA	
	AC39-42001J	CABLE-RF ASSY;-,-,#1365,1200mm	1	SA	
	AK68-01316A	MANUAL USERS;DVD-R150/XAC,XAC,	1	SA	
	AK69-00500B	PACKING CASE;DVD-R150//XAC,PEP	1	SA	

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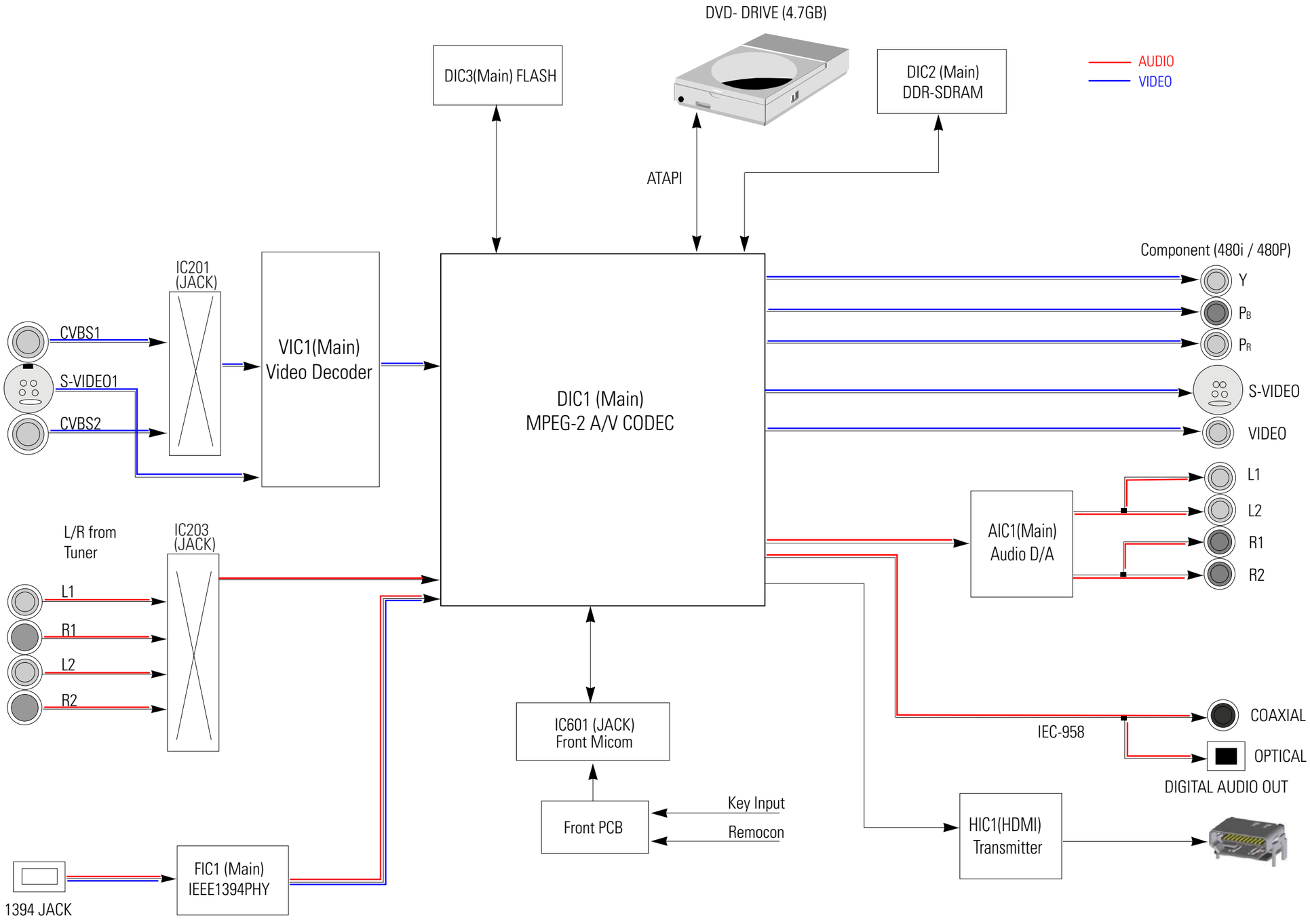
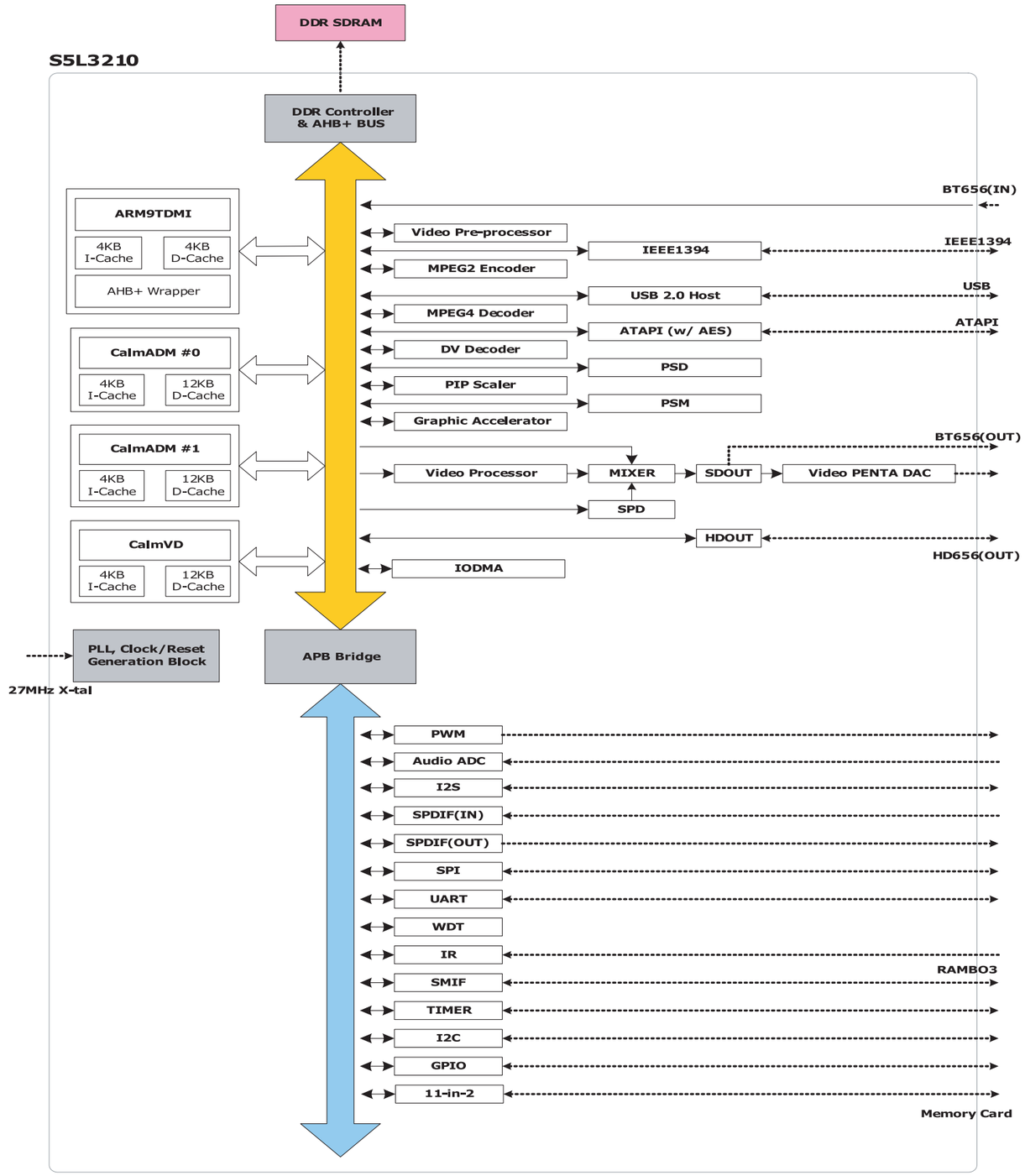
8. Block Diagrams

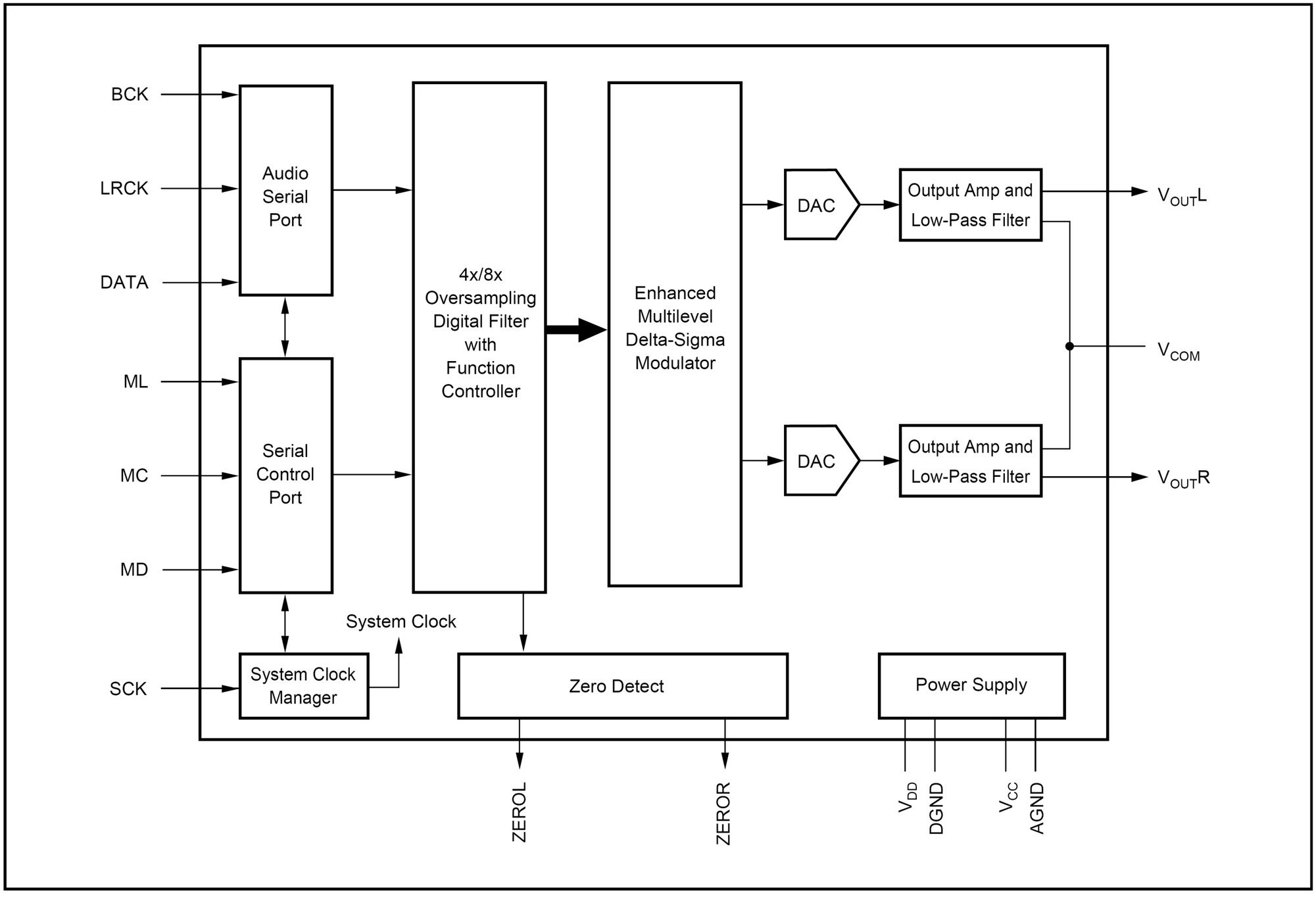
8-1 All Block Diagram



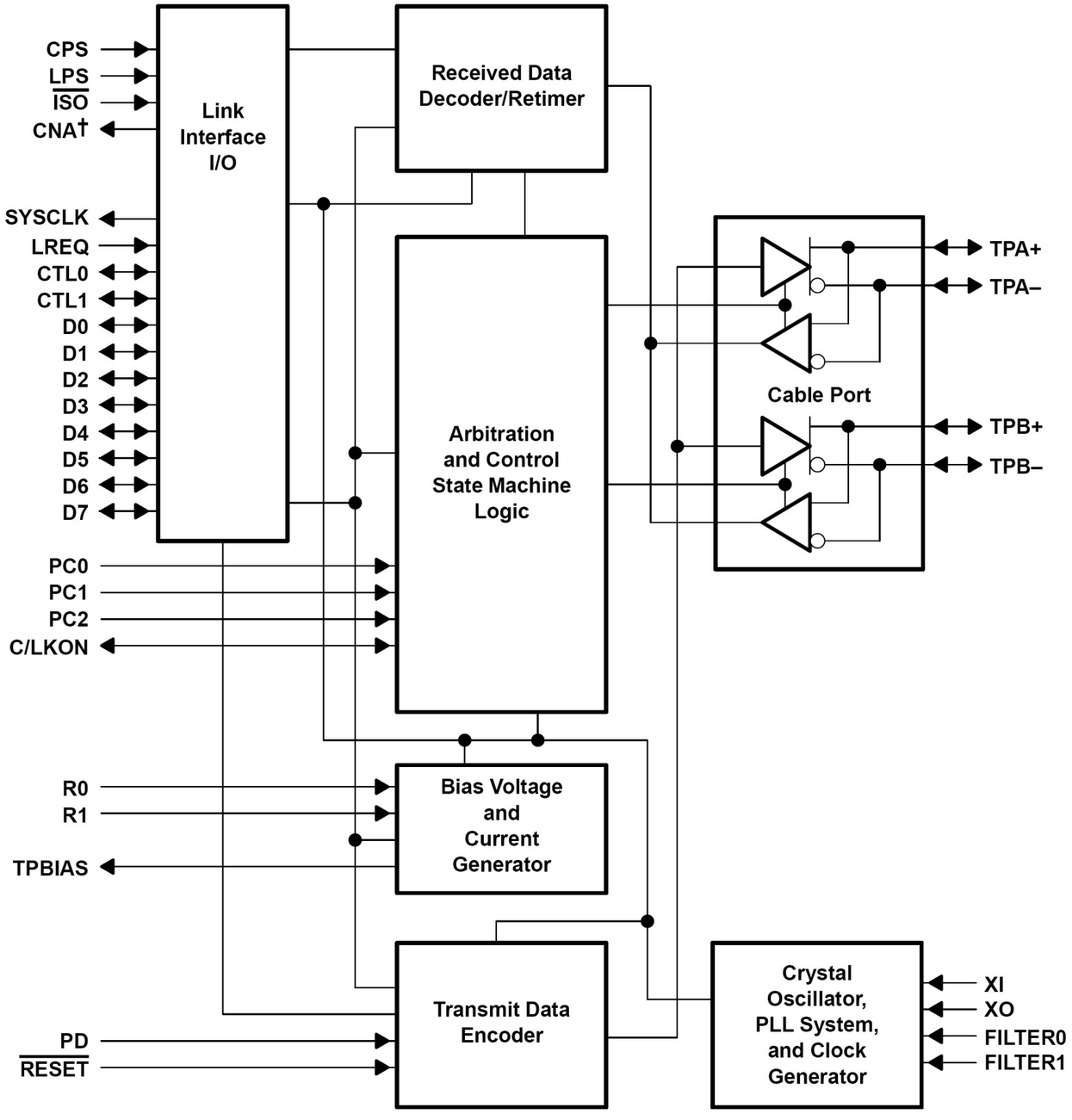
8-2 DIC1(S5L3210) Block Diagram



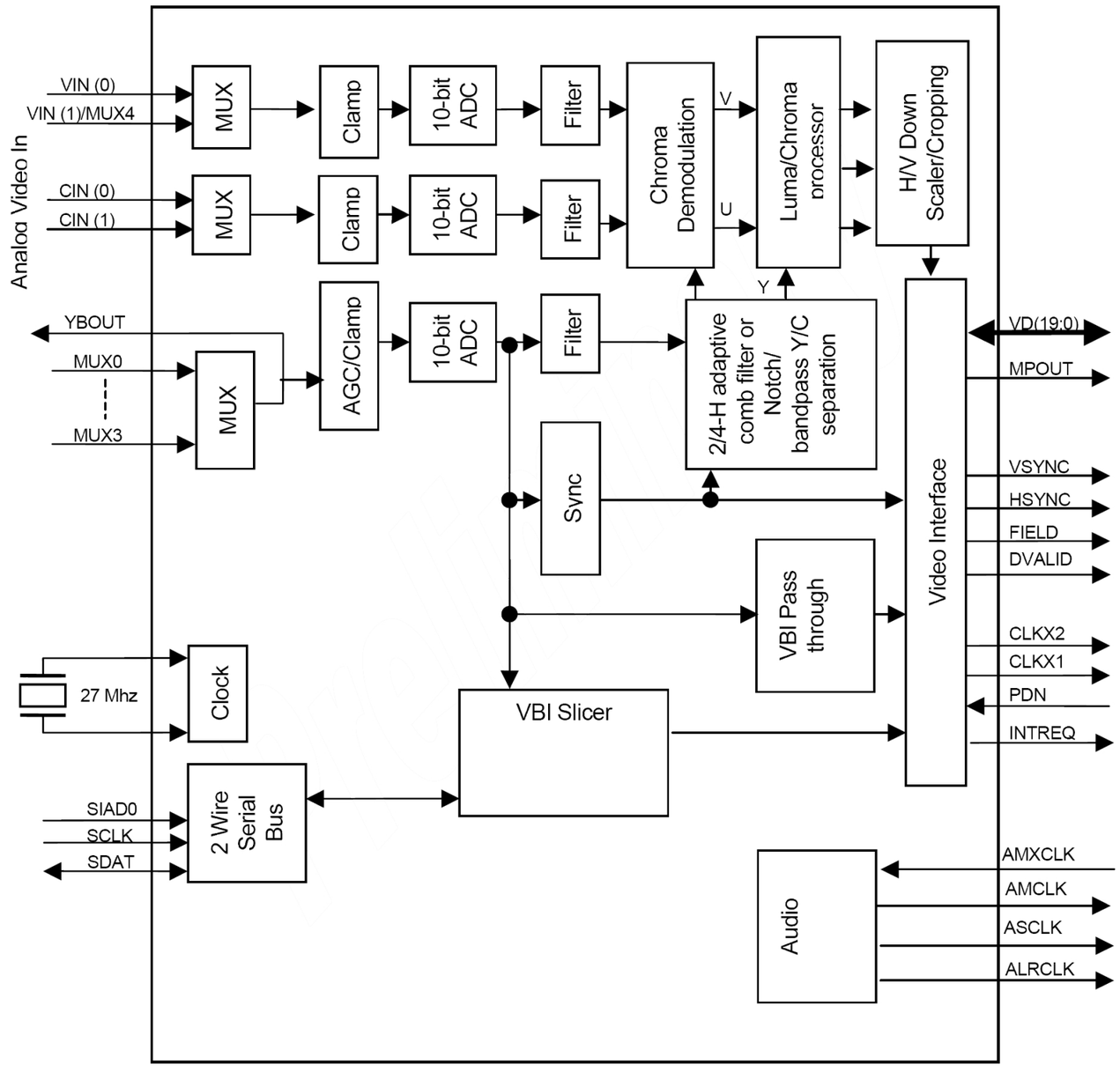
8-3 AIC1(PCM1753) Block Diagram



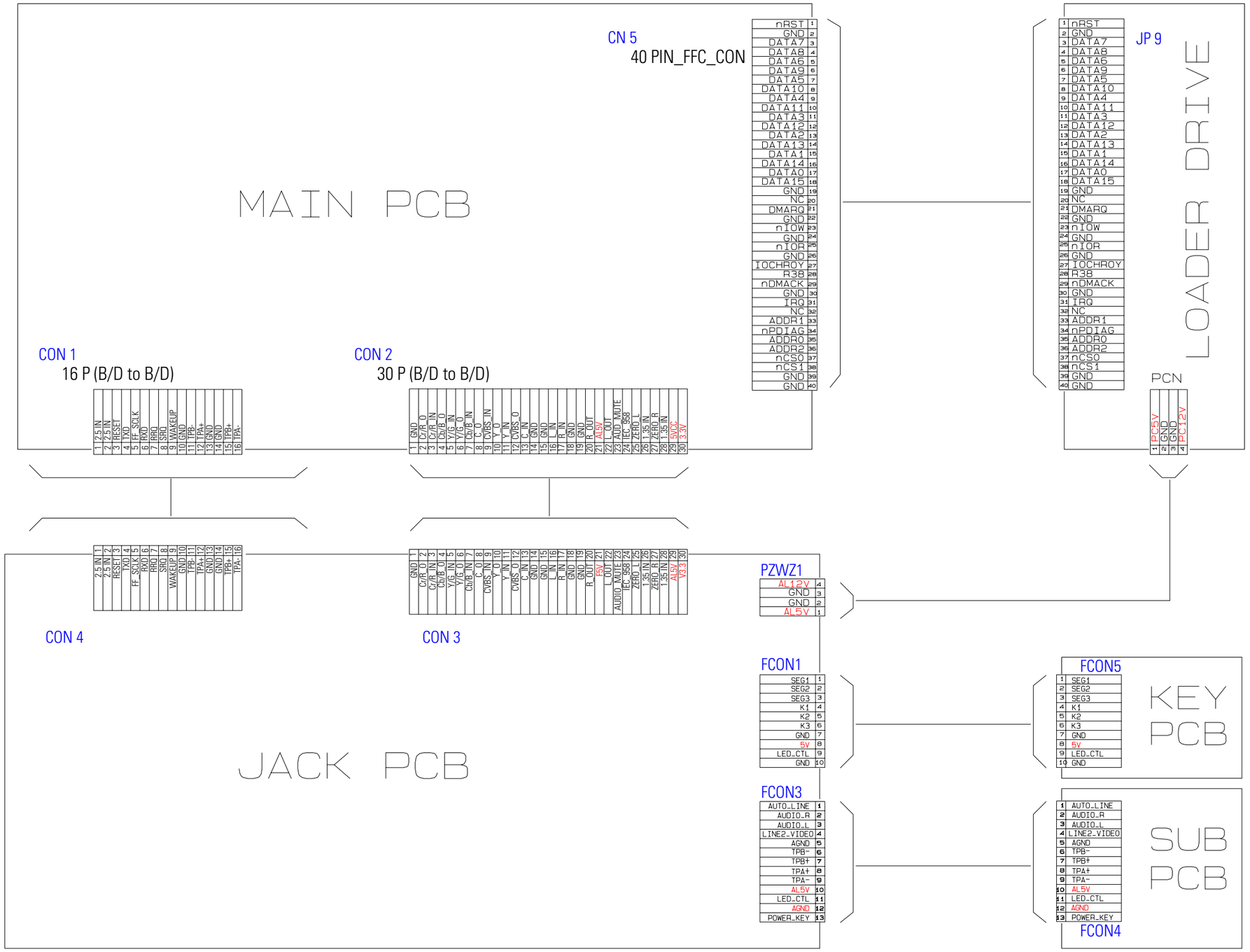
8-4 FIC1(TSB4AB1) Block Diagram



8-5 VIC1(TW9906) Block Diagram



9. Wiring Diagram

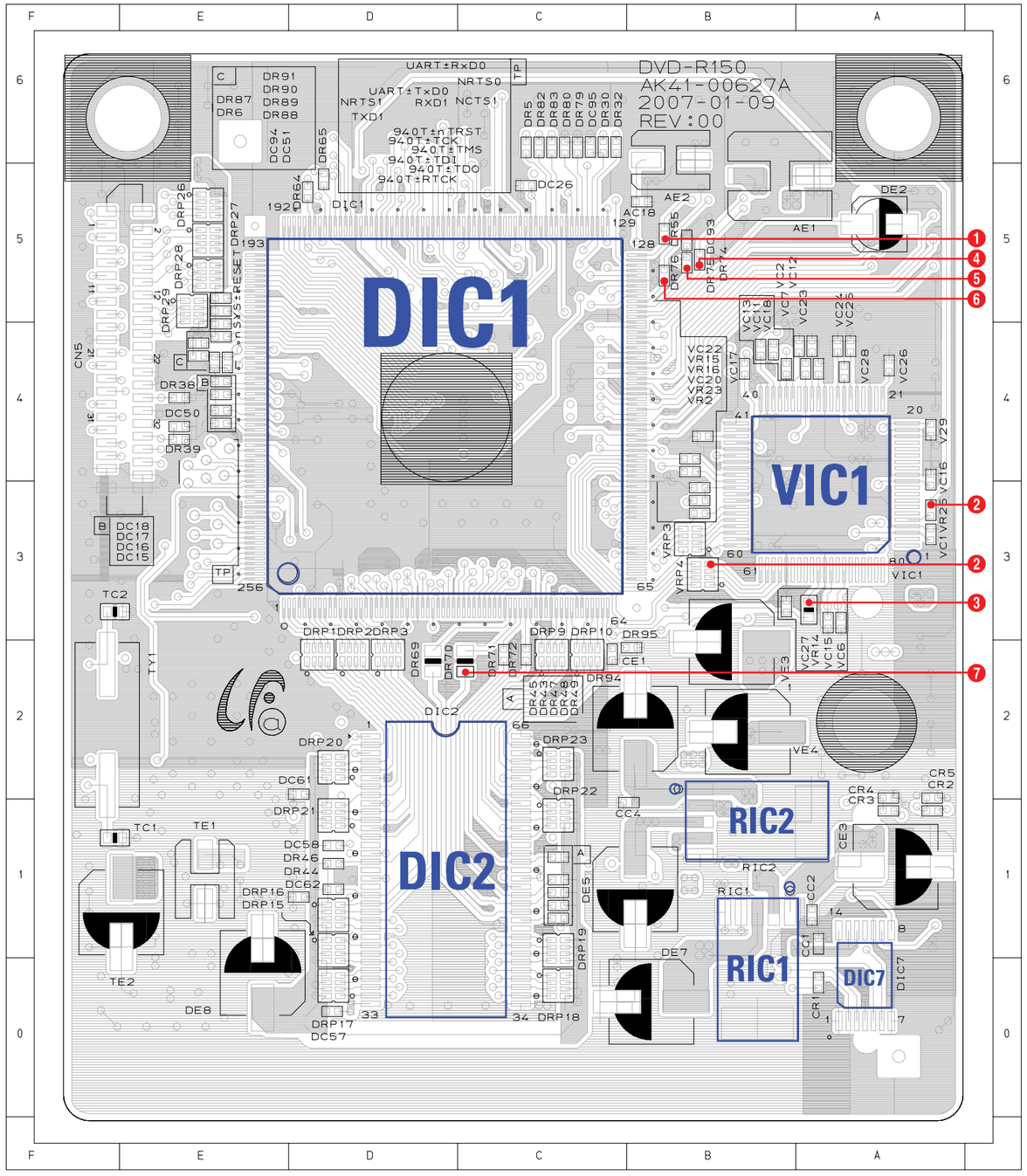


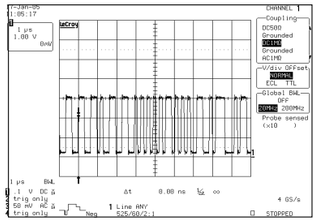
MEMO

10. PCB Diagrams

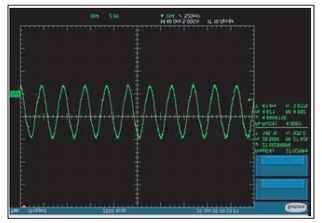
10-1 Main PCB

COMPONENT SIDE

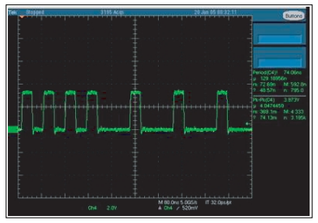




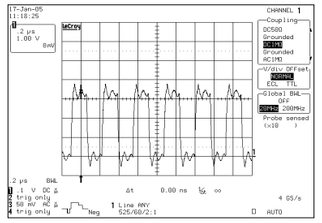
1 AUDIO DATA



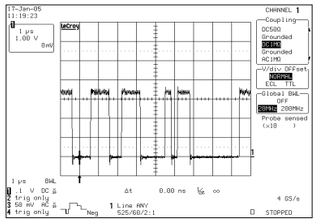
2 VIC1 of Main PCB Clock



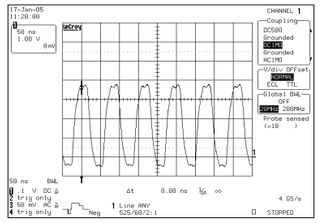
3 VIC1 of Main PCB DATA



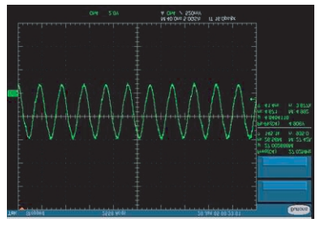
4 Digital clock(117)



5 Digital clock(118)



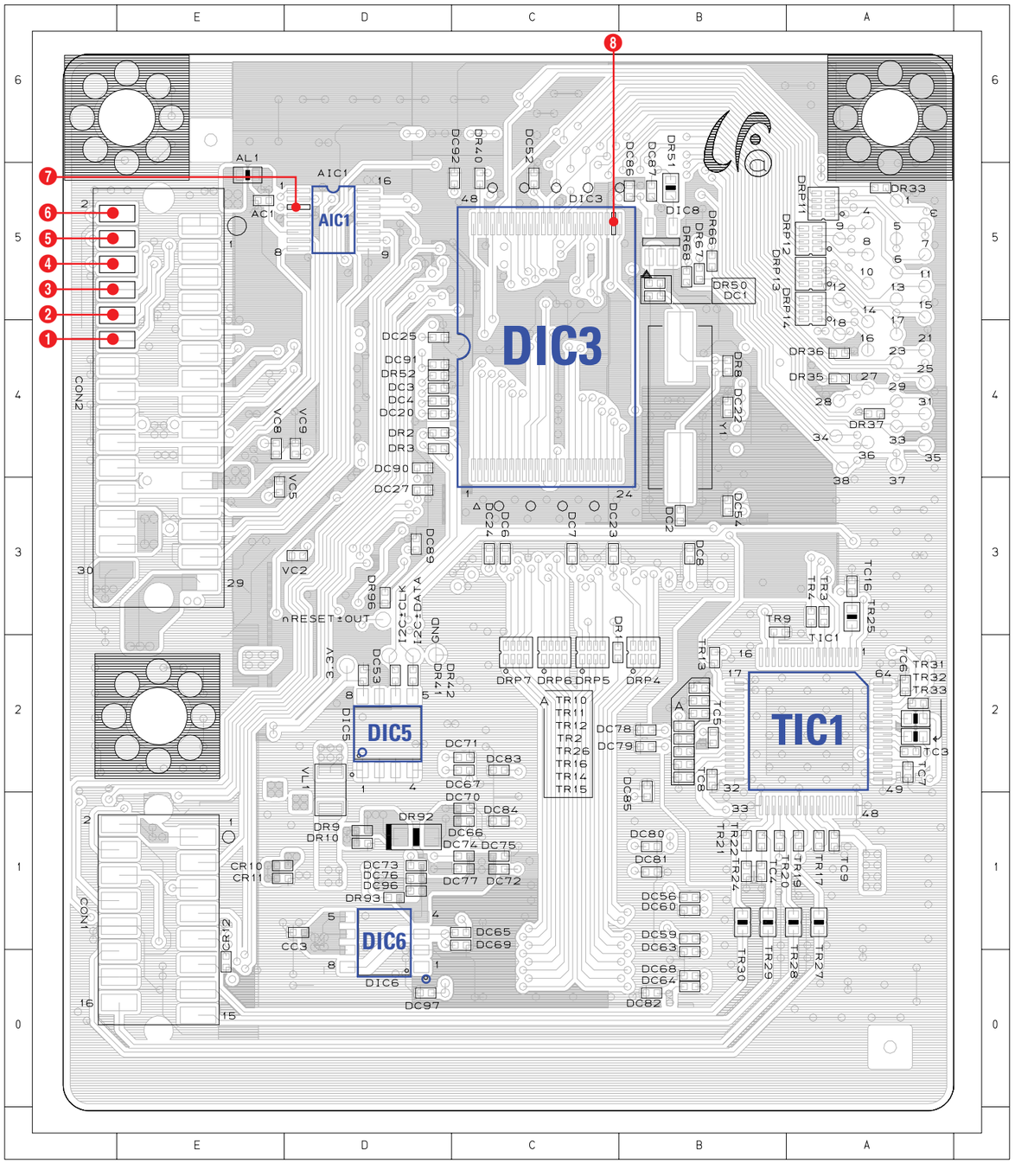
6 Digital clock(119)

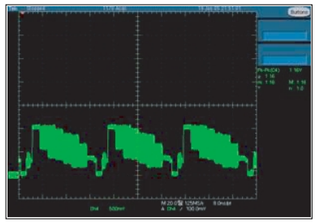


7 DIC1 of Main PCB Clock

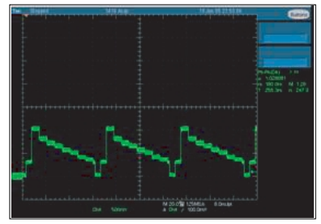
LOC.NO	X-Y
DIC7	A-0
RIC2	A-1
VIC1	A-3
RIC1	B-0
DIC2	C-0
DIC1	C-3

CONDUCTOR SIDE

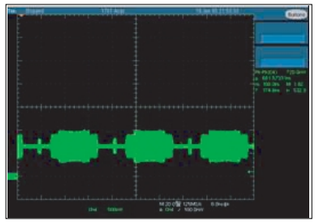




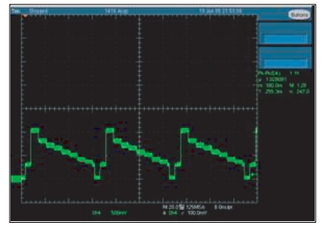
❶ CVBS(Color-bar)



❷ Y(Color-bar)



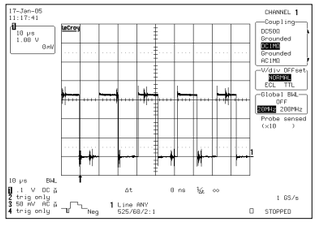
❸ C(Color-bar)



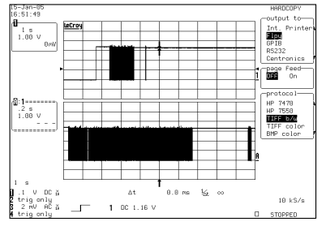
❹ Y(Color-bar)

❺ Pb(Color-bar)

❻ Pr(Color-bar)



❼ Digital clock(116)

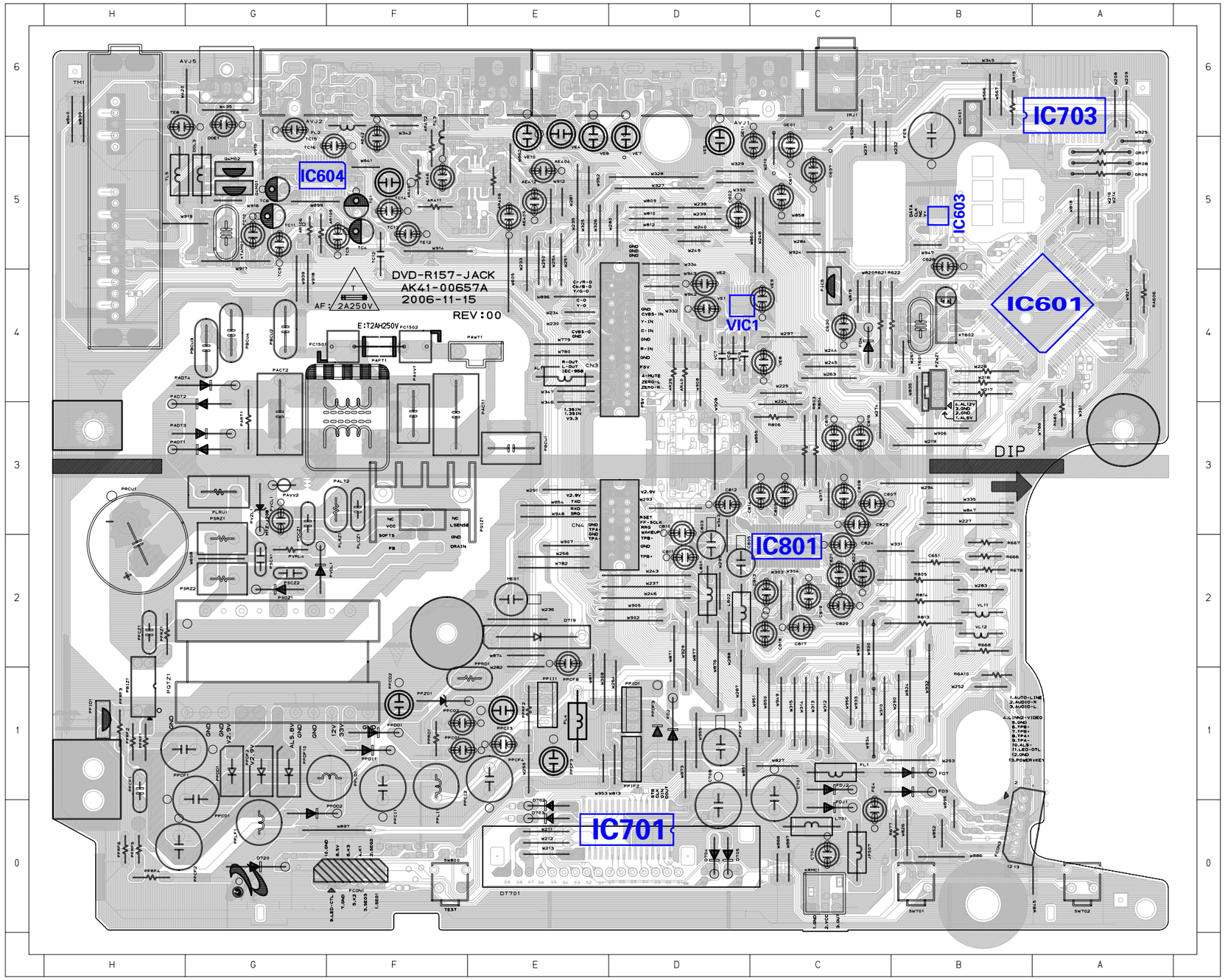


❽ DIC3-Pin26

LOC.NO	X-Y
CEIC1	A-2
AIC1	B-3
DIC3	D-0
TIC1	D-2
DIC5	D-5

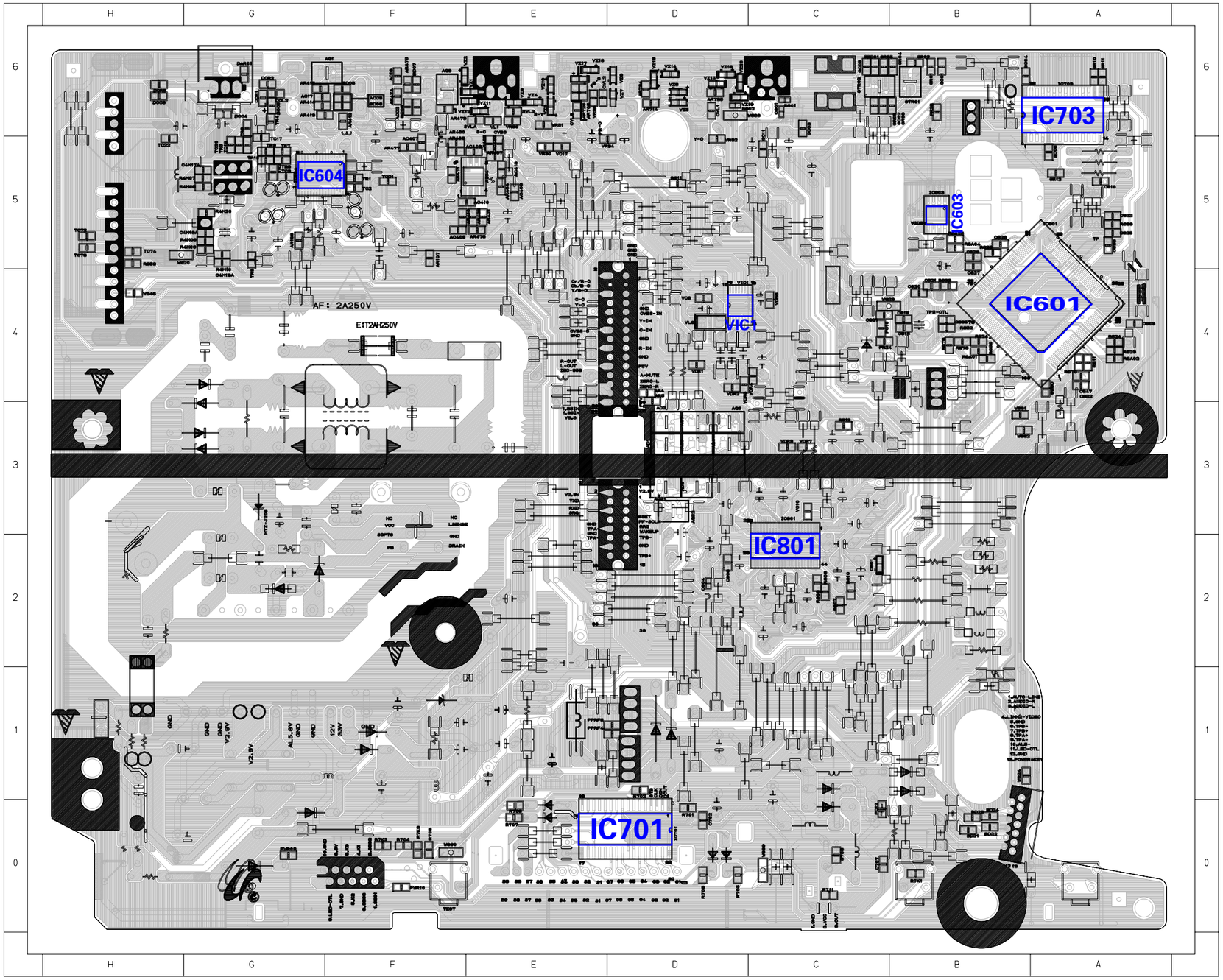
10-2 Jack PCB

COMPONENT SIDE



LOC.NO	X-Y
IC601	A-4
IC703	A-6
IC603	B-5
IC801	C-2
VIC1	C-4
IC701	D-0
AIC4	E-5
IC604	F-5

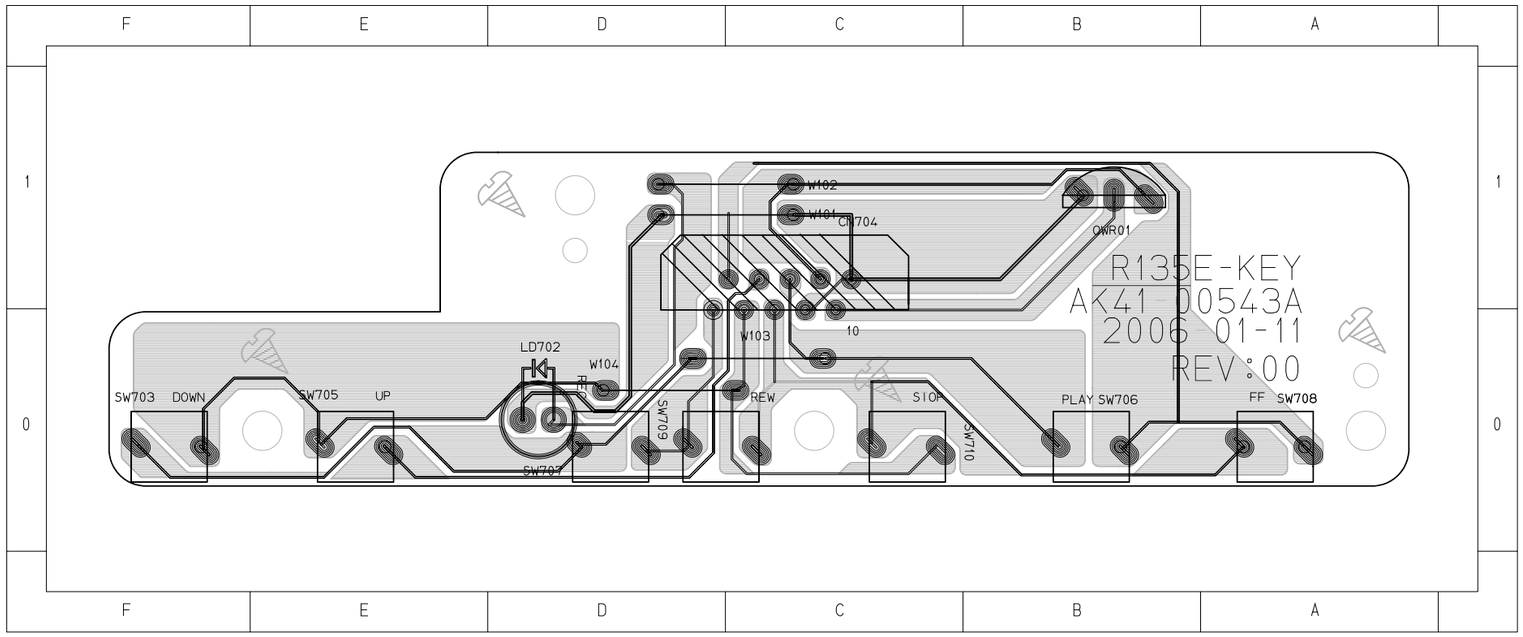
CONDUCTOR SIDE



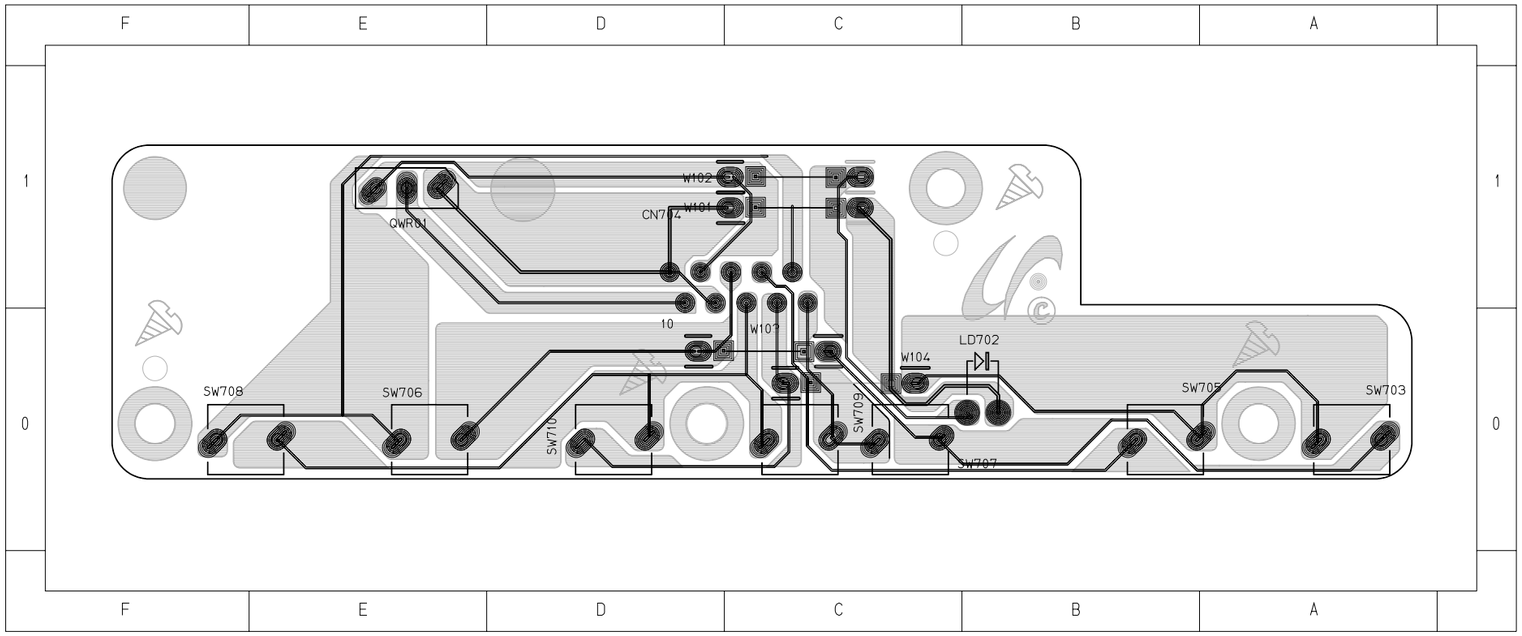
LOC.NO	X-Y
IC601	A-4
IC703	A-6
IC603	B-5
IC801	C-2
VIC1	C-4
IC701	D-0
AIC4	E-5
IC604	F-5

10-3 Key PCB

COMPONENT SIDE

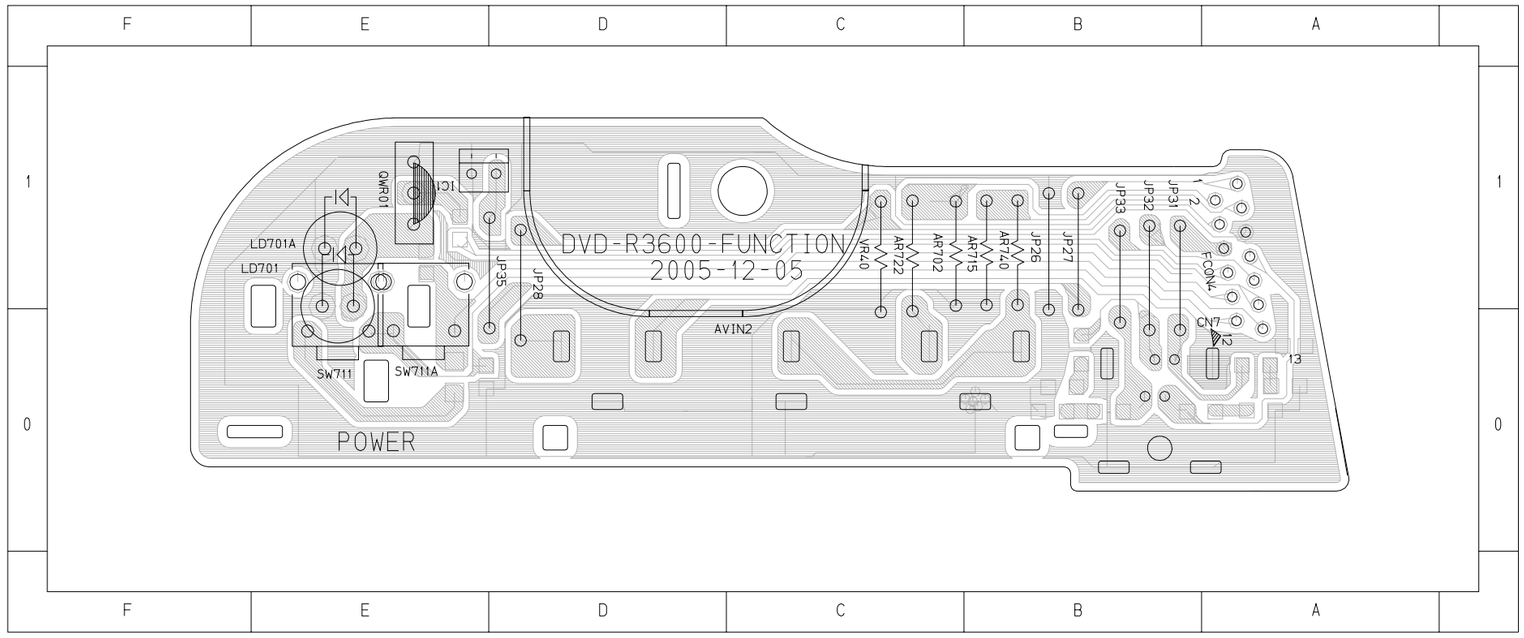


CONDUCTOR SIDE

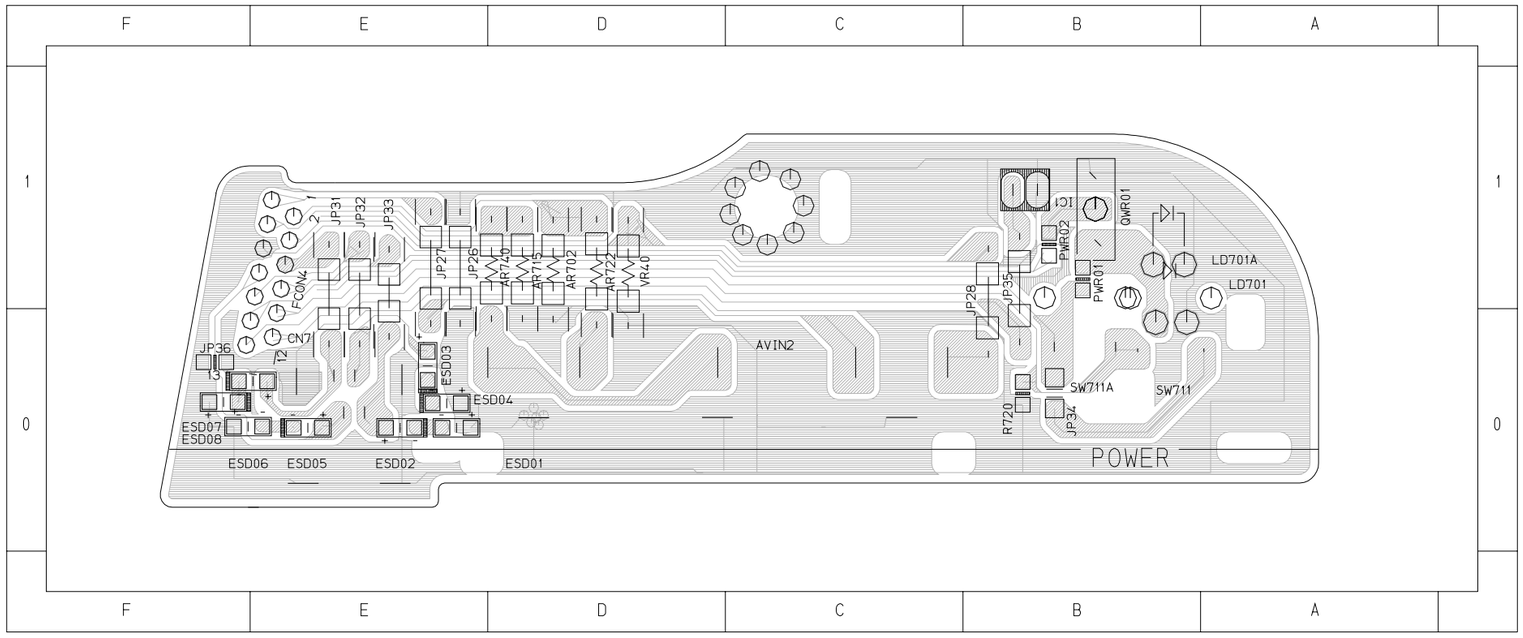


10-4 Function PCB

COMPONENT SIDE



CONDUCTOR SIDE



MEMO

11. Schematic Diagrams

Note

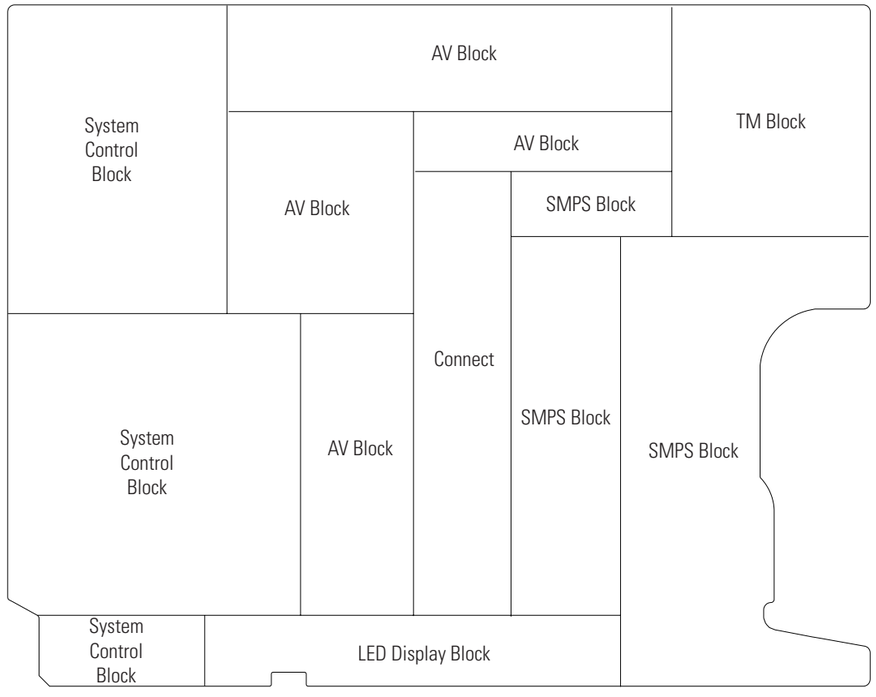
For schematic Diagram
- Resistors are in ohms, 1/8W unless otherwise noted.

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.

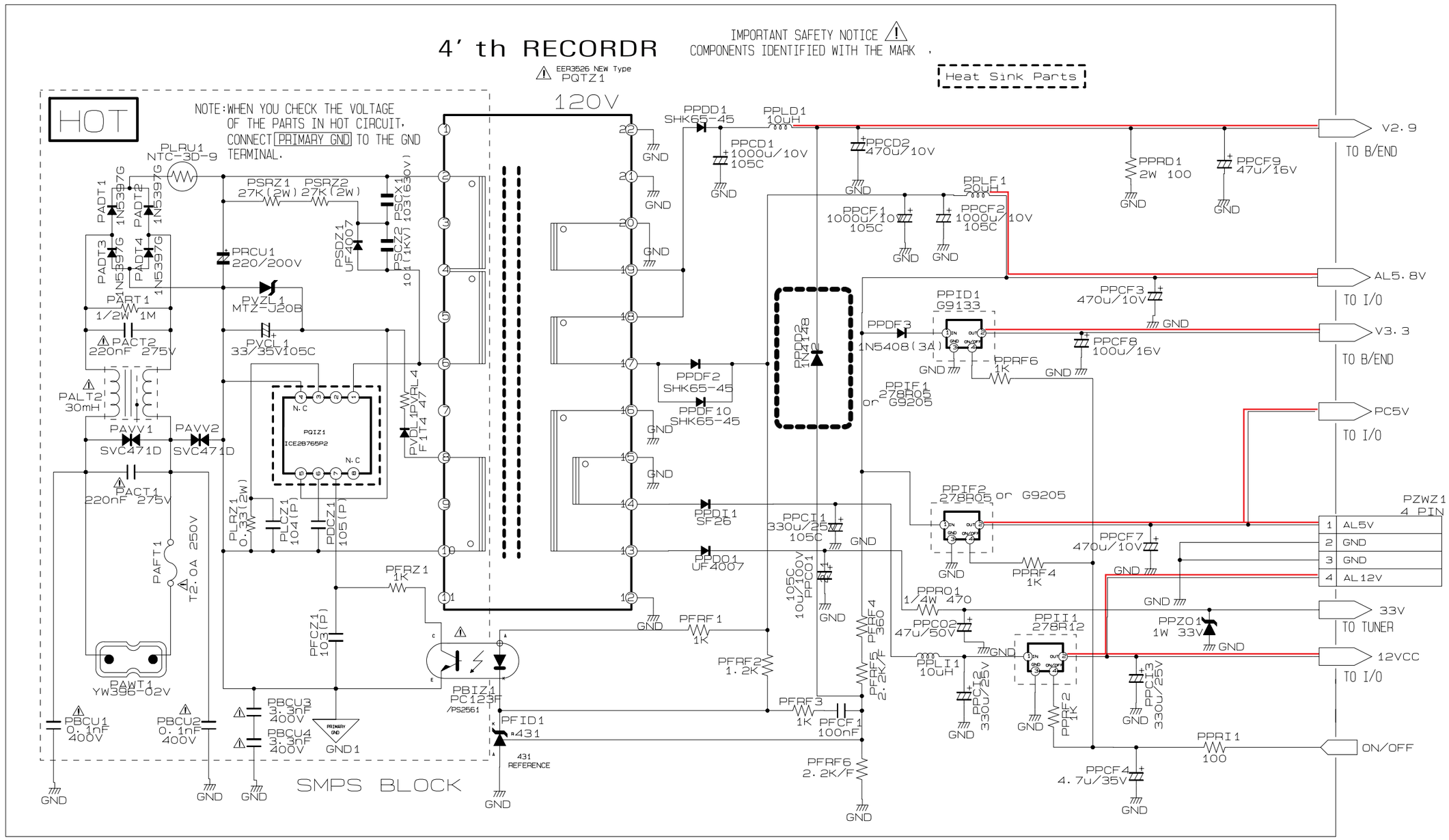
Block Identification of PCB



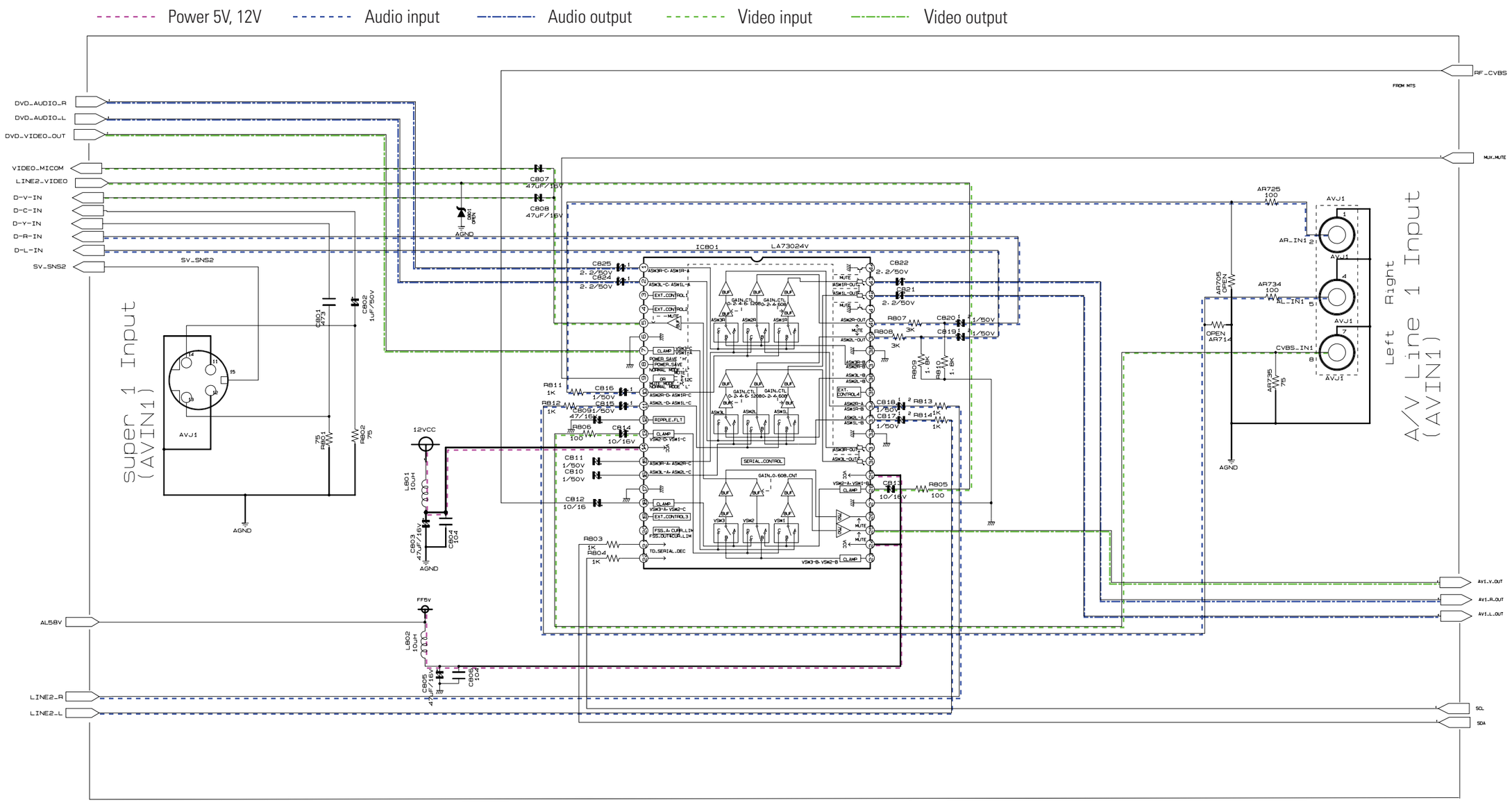
Jack PCB (Component Side)

11-1 S.M.P.S (Jack PCB)

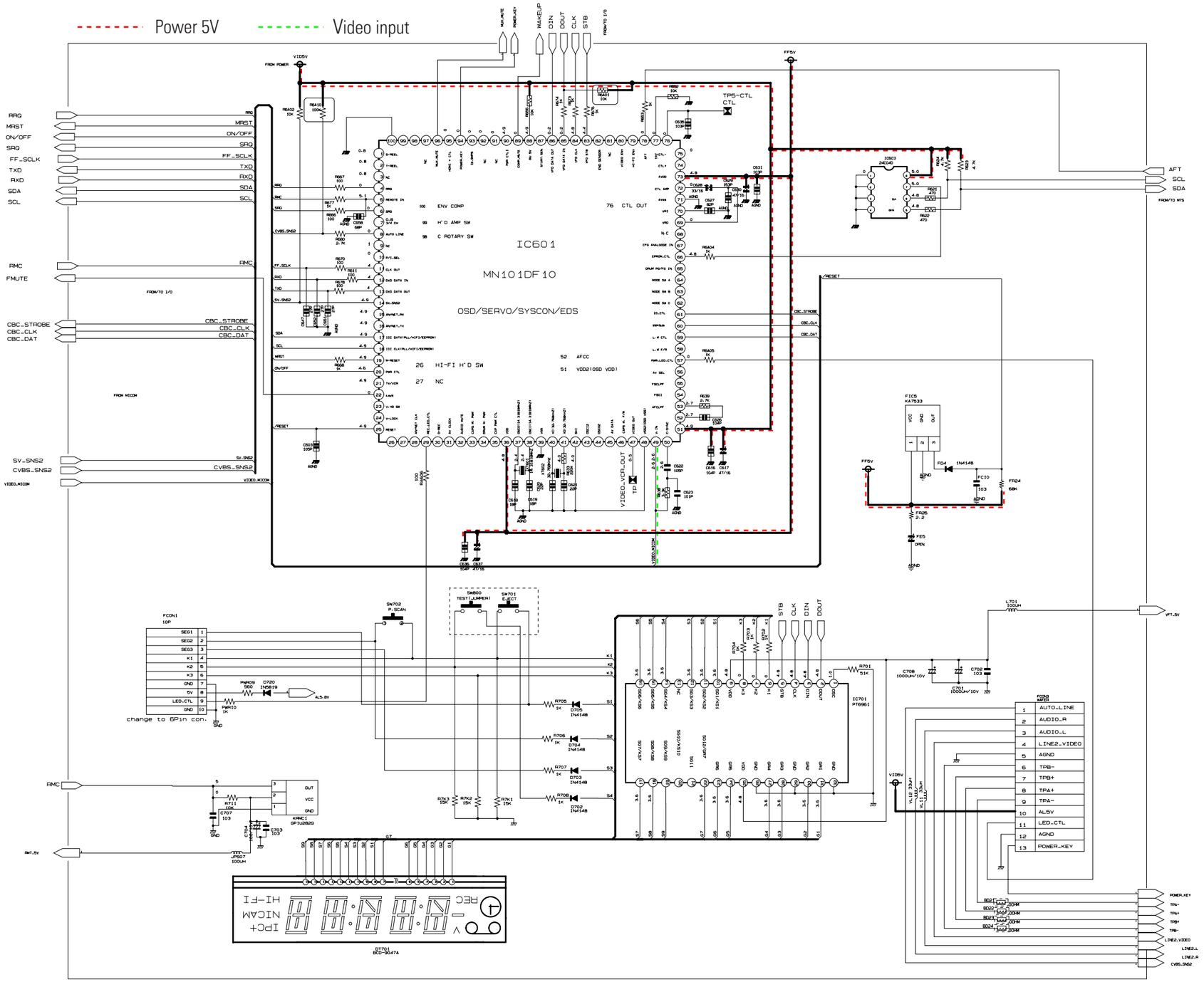
Power



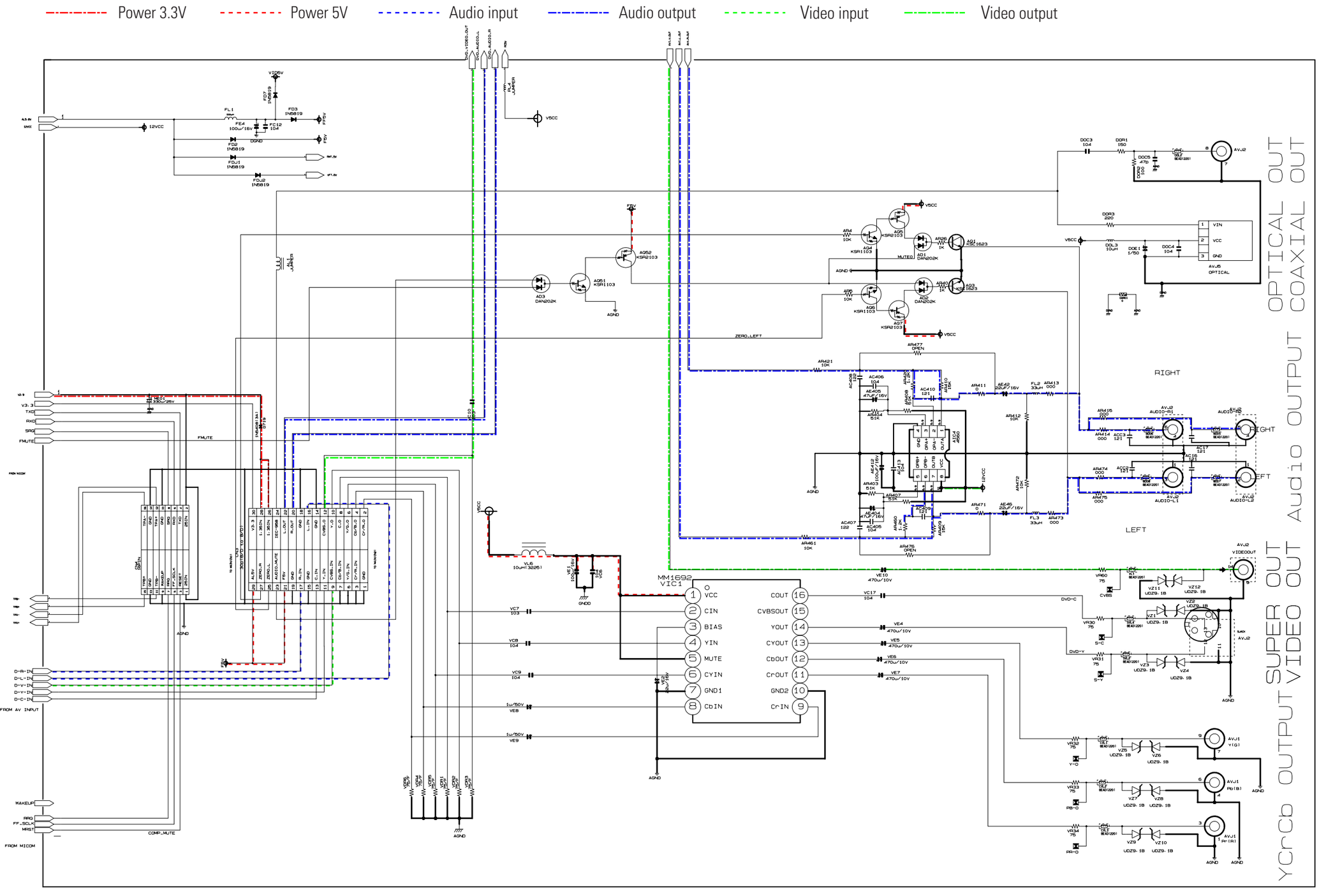
11-2 AV Input (Jack PCB)



11-3 Micom (Jack PCB)

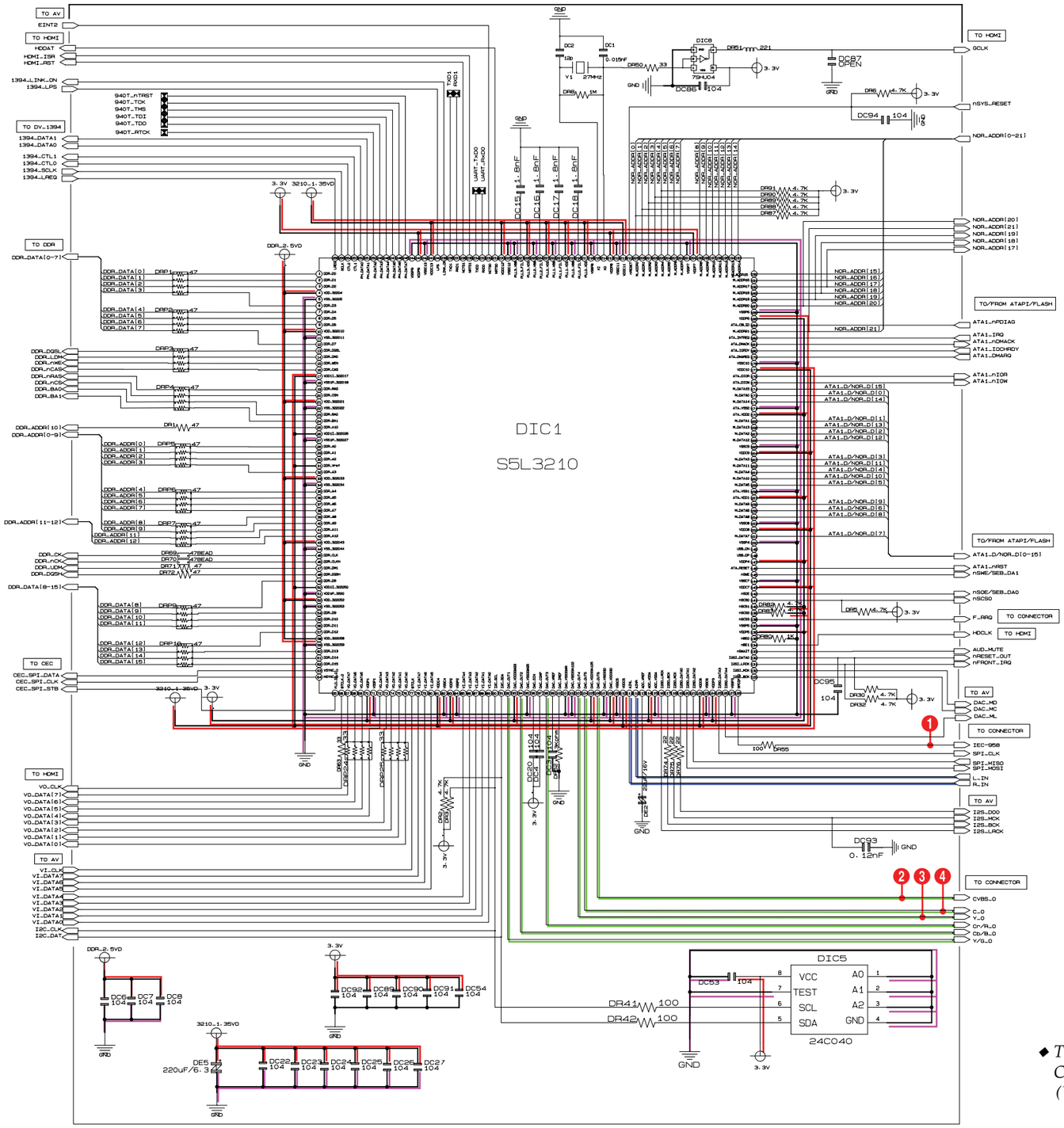


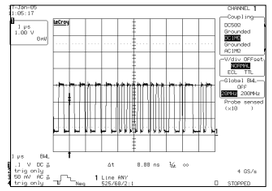
11-4 I/O (Jack PCB)



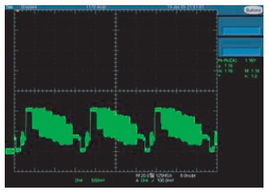
11-6 CODEC (Main PCB)

Power
GND
Video
Audio

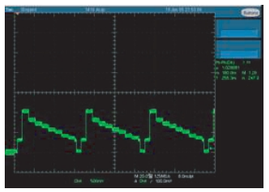




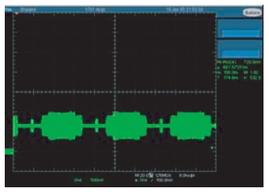
❶ IEC958
(DIC1-Pin128)



❷ CVBS(Color-bar)
(DIC1-Pin106)



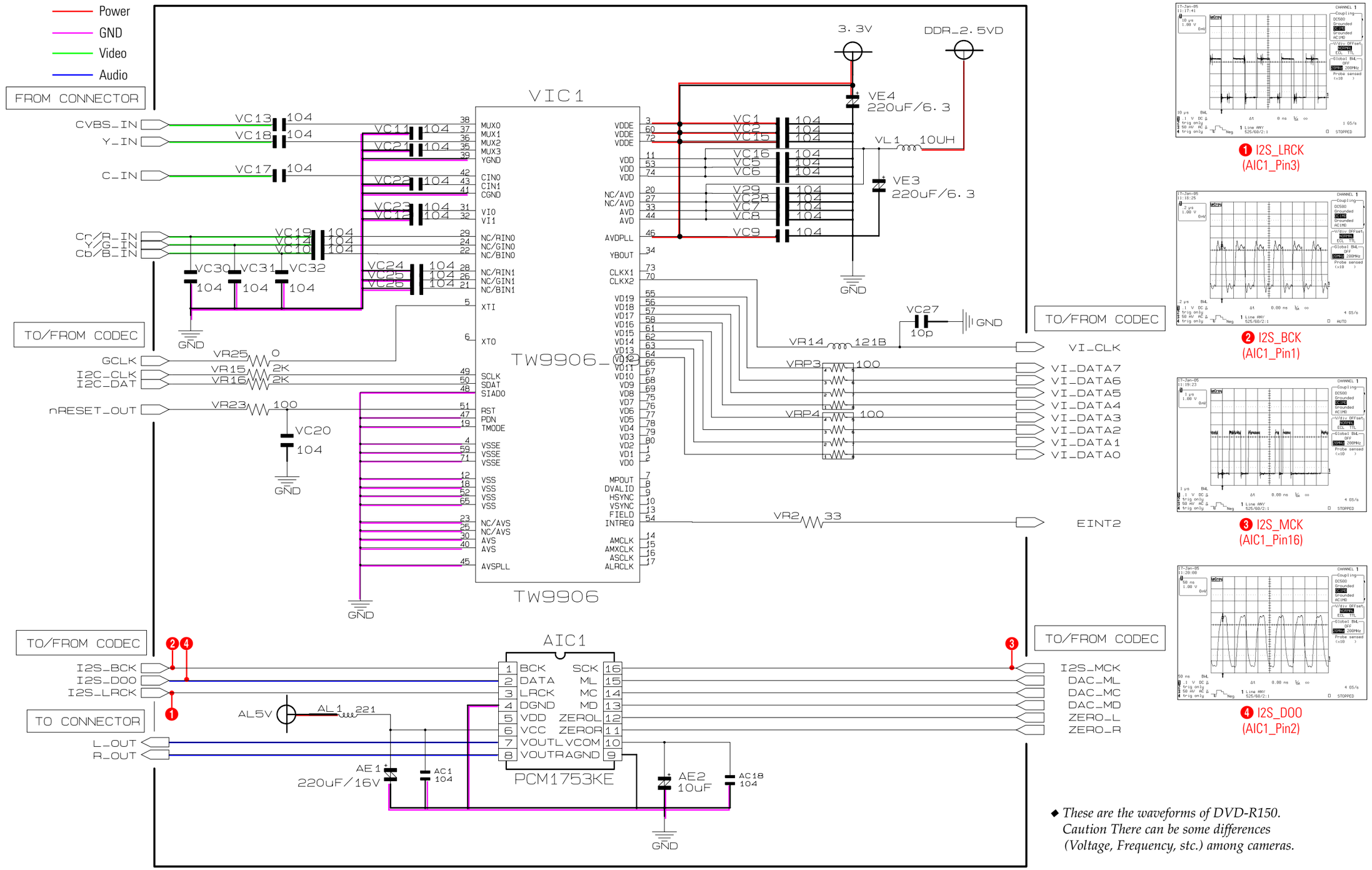
❸ Y(Color-bar)
(DIC1-Pin103)



❹ C(Color-bar)
(DIC1-Pin104)

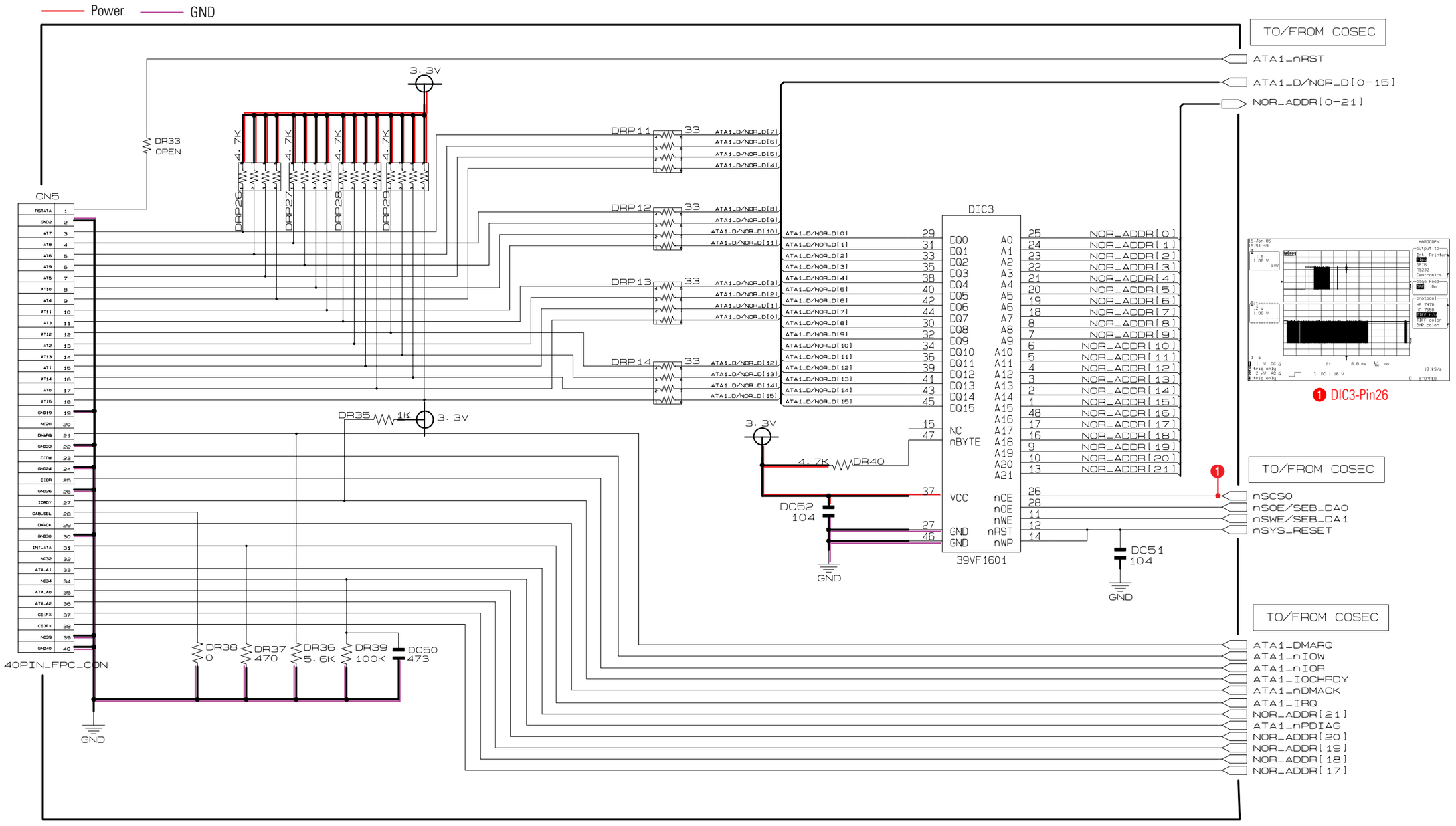
◆ *These are the waveforms of DVD-R150. Caution There can be some differences (Voltage, Frequency, stc.) among cameras.*

11-7 AV (Main PCB)



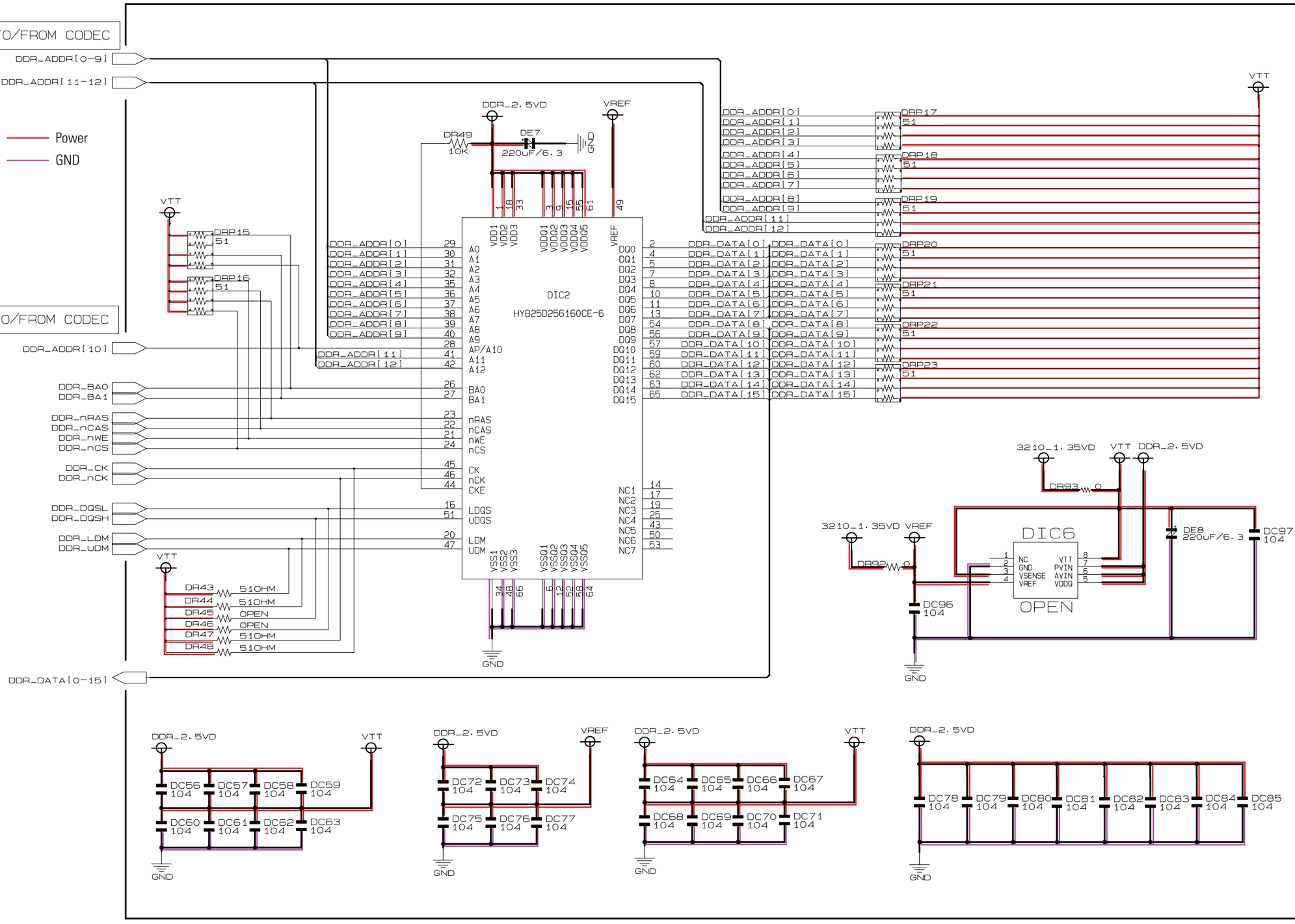
◆ *These are the waveforms of DVD-R150. Caution There can be some differences (Voltage, Frequency, stc.) among cameras.*

11-8 ATAPI-Flash (Main PCB)

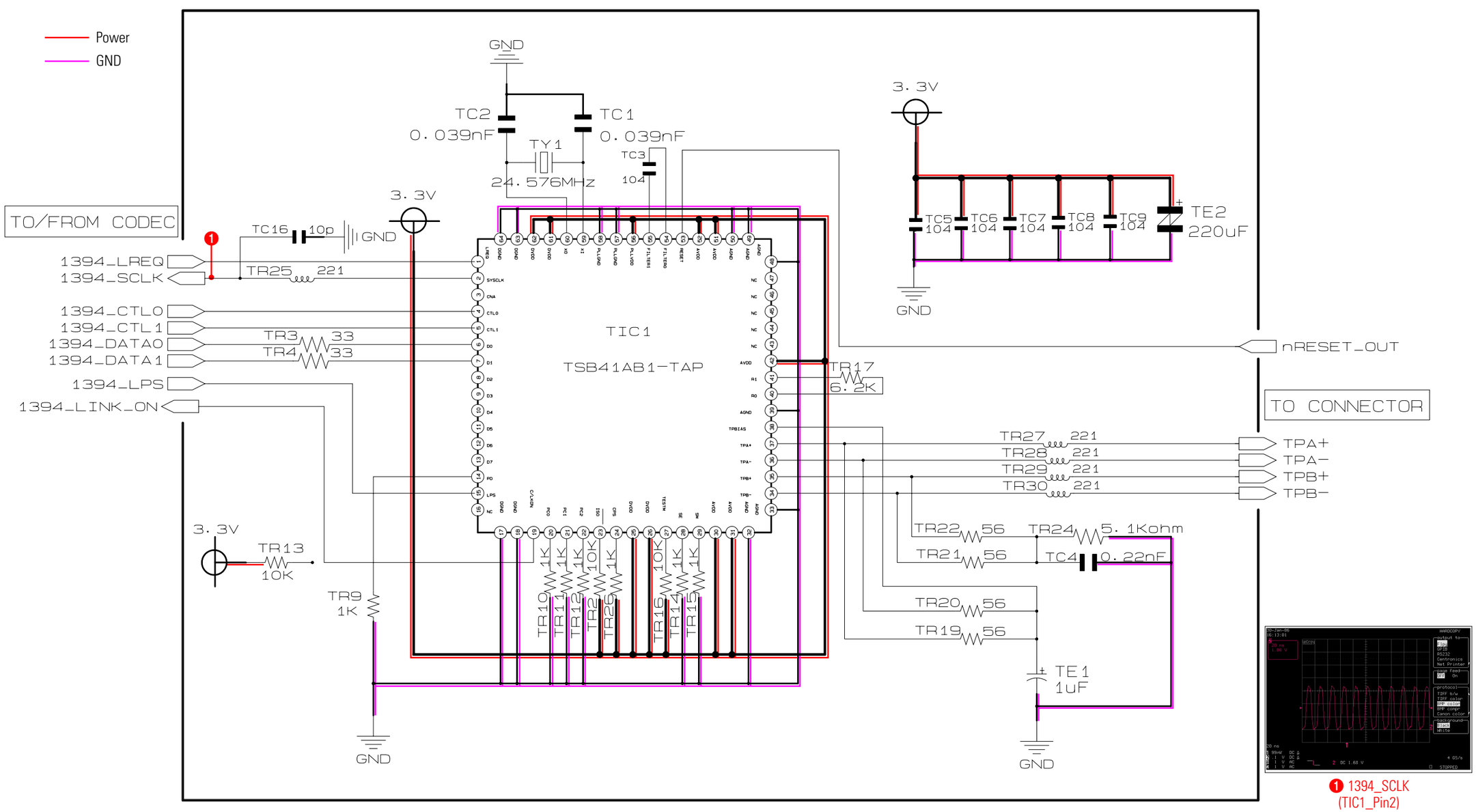


◆ *These are the waveforms of DVD-R150.*
Caution There can be some differences (Voltage, Frequency, stc.) among cameras.

11-9 DDR (Main PCB)



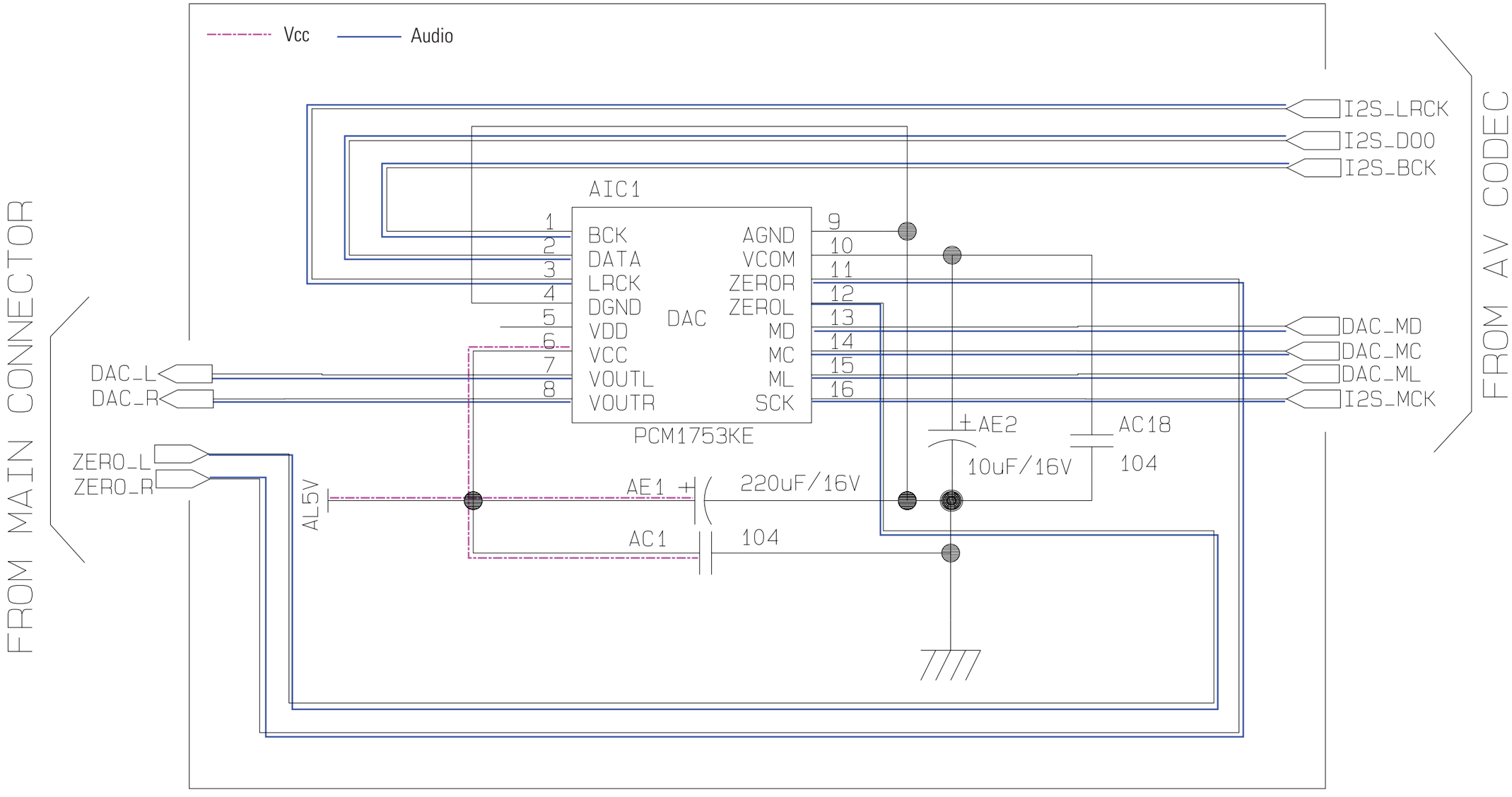
11-10 DV_1394 (Main PCB)



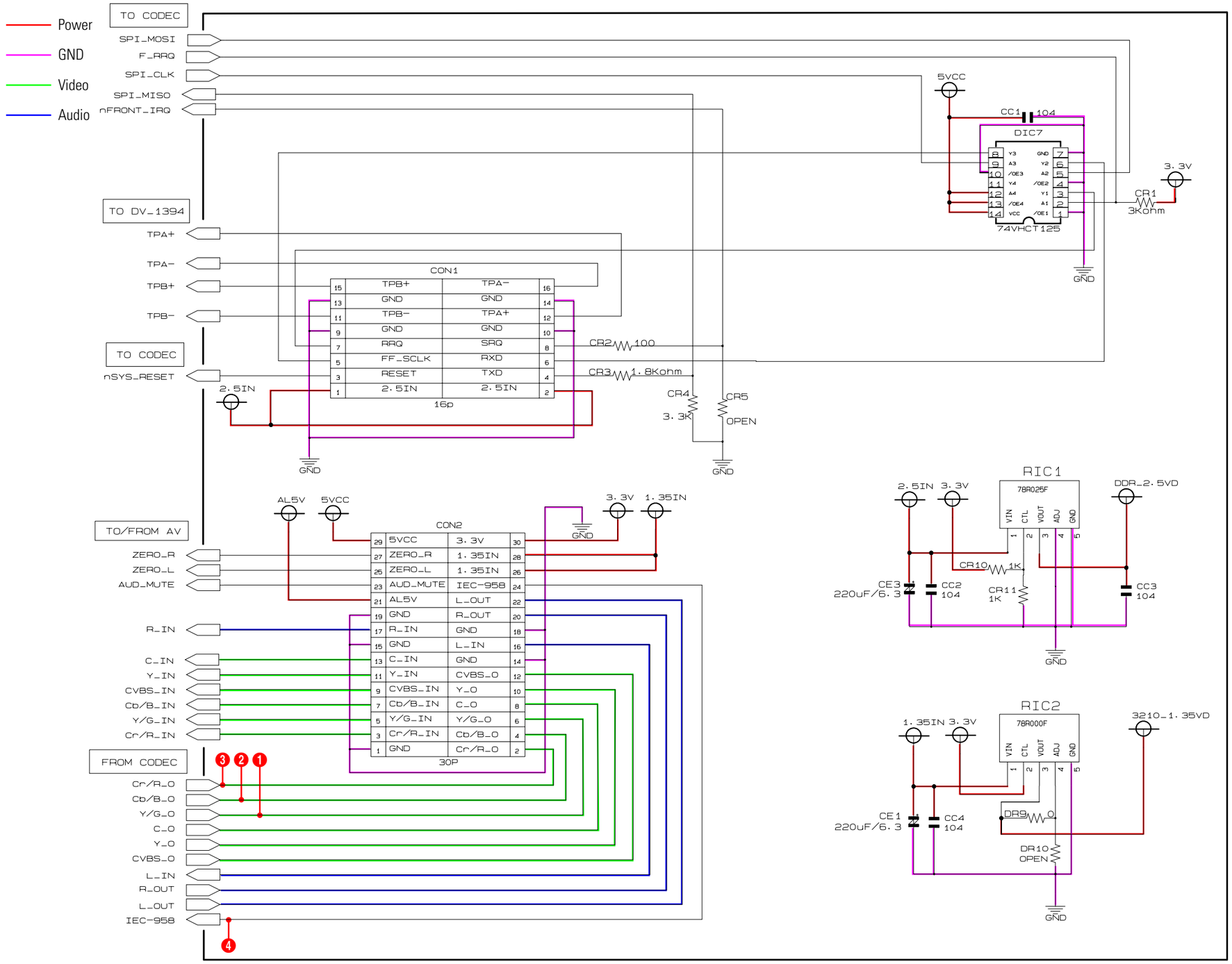
1 1394_SCLK
(TIC1_Pin2)

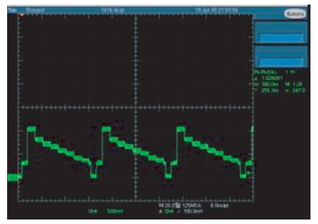
◆ *These are the waveforms of DVD-R150.*
Caution There can be some differences (Voltage, Frequency, stc.) among cameras.

11-11 Audio (Main PCB)

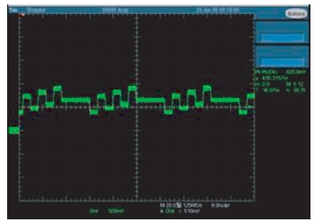


11-12 Main Connector (Main PCB)

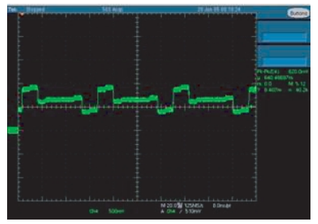




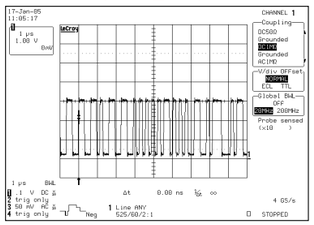
❶ Y(Color-bar)
(CON2_Pin6)



❷ Cb(Color-bar)
(CON2_Pin4)



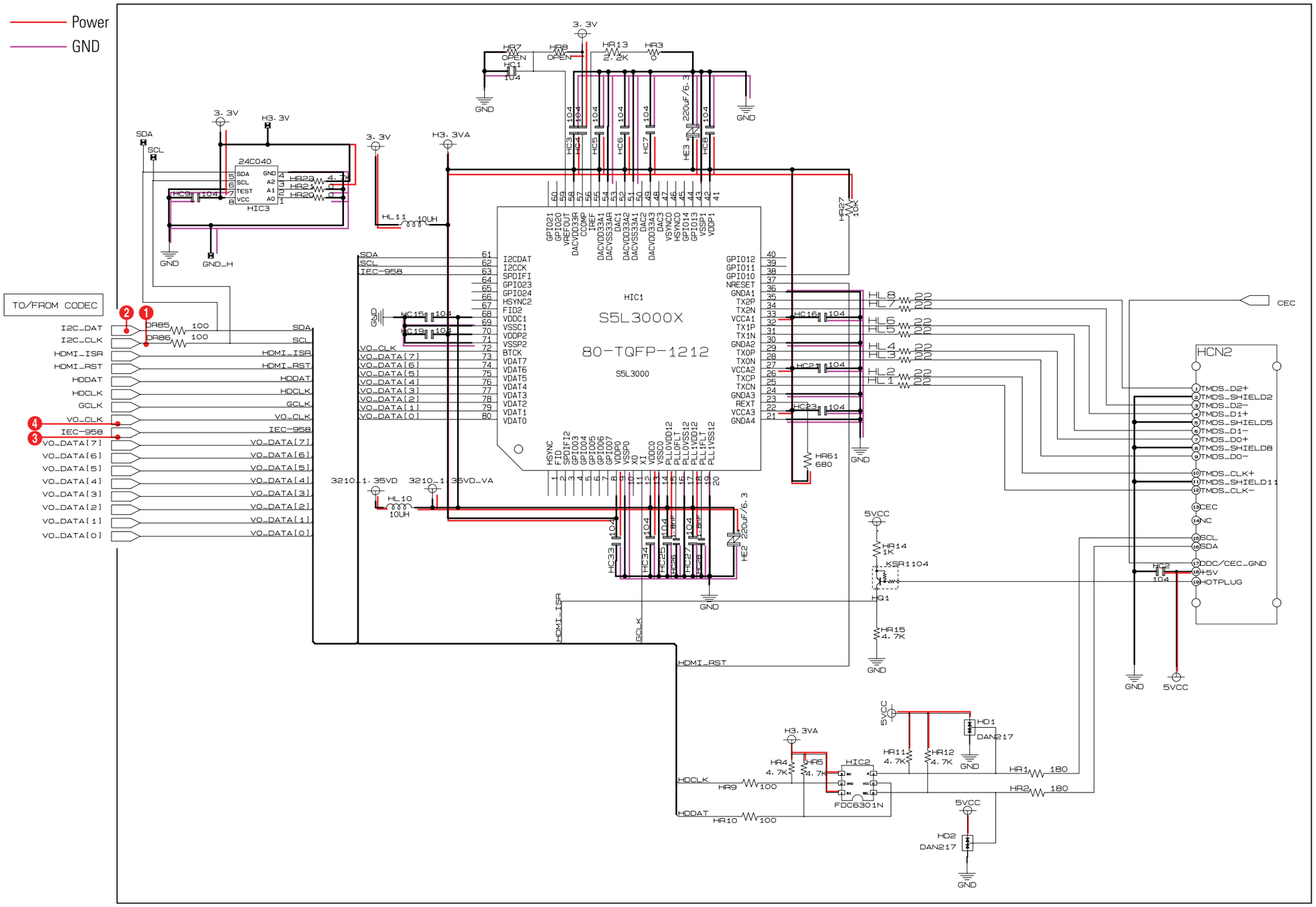
❸ Cr(Color-bar)
(CON2_Pin2)



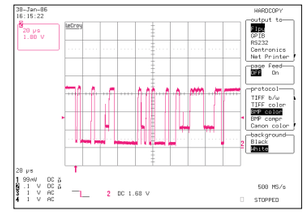
❹ IEC958
(CON2_Pin24)

◆ *These are the waveforms of DVD-R150. Caution There can be some differences (Voltage, Frequency, stc.) among cameras.*

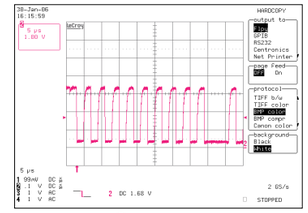
11-13 HDMI (Main PCB)



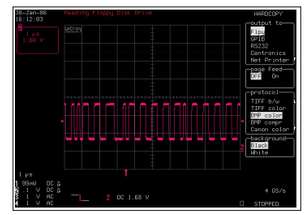
1 I2C_CLK



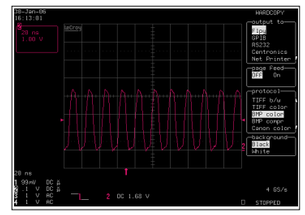
2 I2C_DAT



3 IEC958

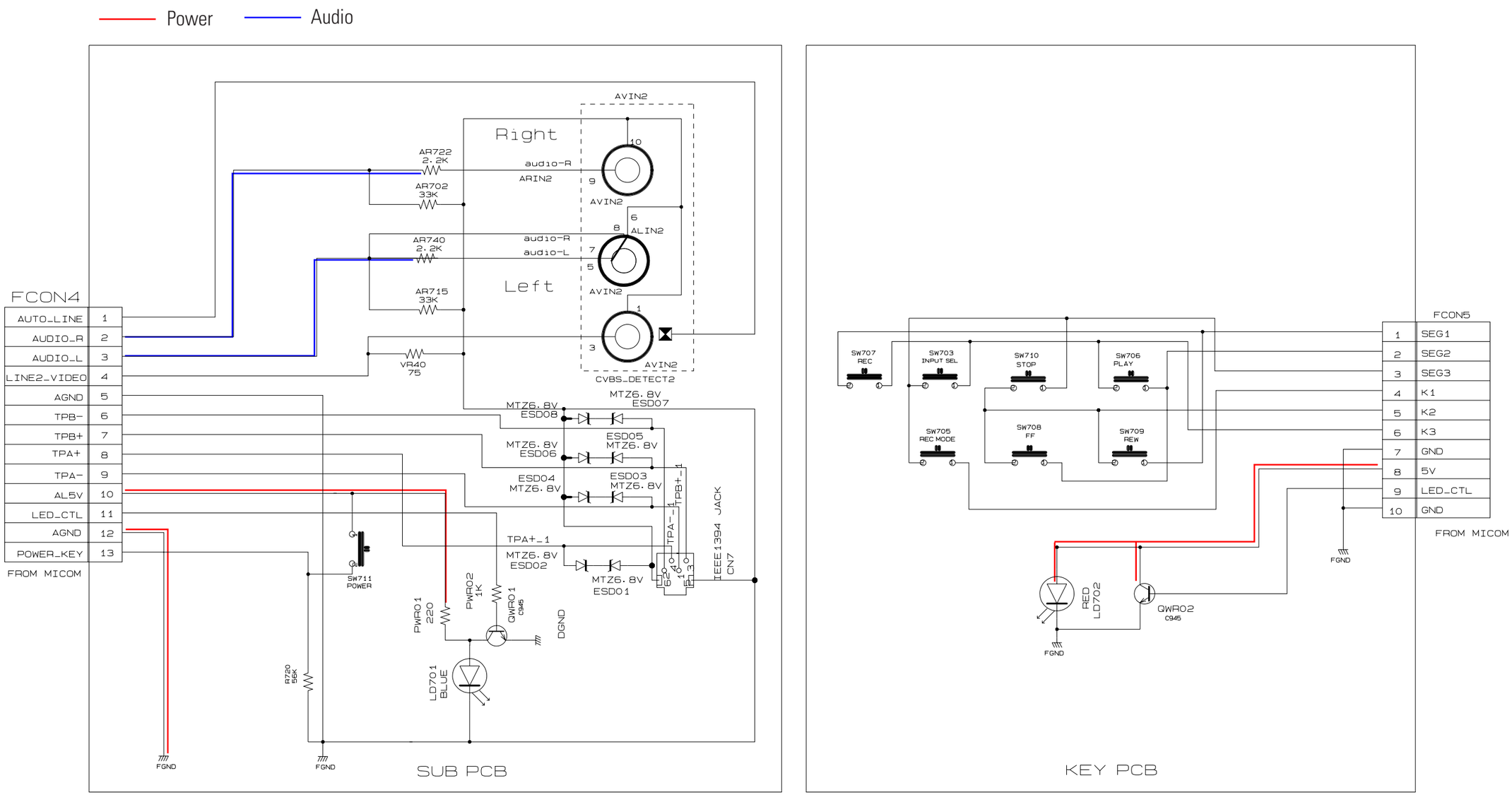


4 VO_CLK



◆ *These are the waveforms of DVD-R150.*
Caution There can be some differences (Voltage, Frequency, stc.) among cameras.

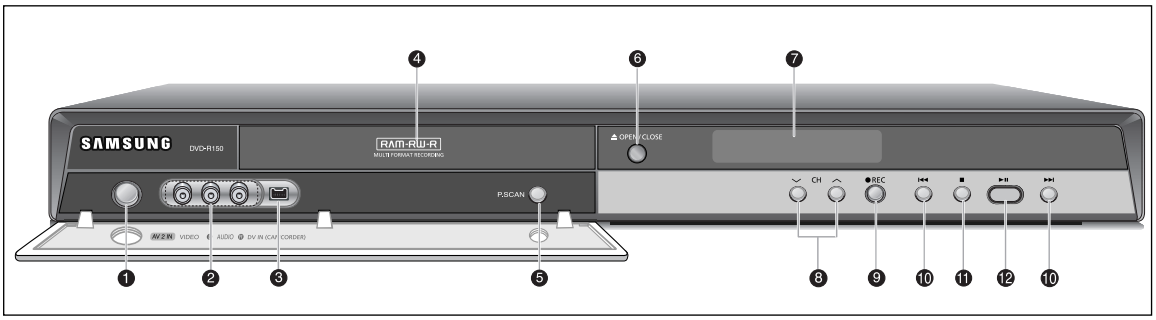
11-14 Sub and Key (Sub and Key PCB)



12. Operating Instructions

Description

Front panel



1. POWER Button
Turns the recorder on and off.

2. AV 2 IN
Connect external equipment.

3. DV-IN
Connects external digital equipment with a DV jack. (such as a camcorder)

4. DISC TRAY
Opens to accept a disc.

5. P.SCAN Button
Selects the progressive scan mode.

6. OPEN/CLOSE Button
Opens and closes the disc tray.

7. DISPLAY
Displays the playing status, time, etc.

8. CH (∨∧)
Select TV channels.

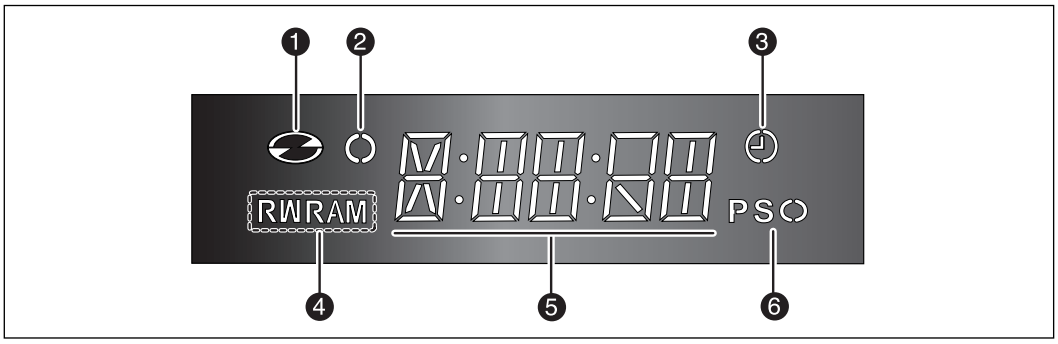
9. REC
Starts recording.

10. SKIP
Go to the next title/chapter/track, or go back to the previous title/chapter/track.

11. STOP
Stops disc playback.

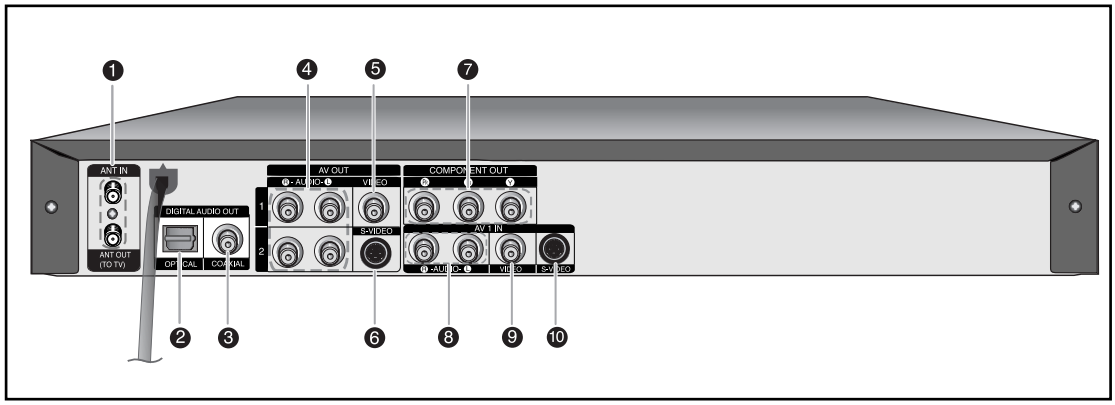
12. PLAY/PAUSE
Plays a disc or pauses playback.

Front Panel Display



1. Lights when a disc is loaded.
2. Lights in the record mode.
3. Lights to indicate the timer record mode.
4. Lights when a DVD-RAM/DVD±RW/DVD±R disc is loaded.
5. Alpha/Numeric display.
6. Lights in the progressive scan mode.

Rear Panel



1. ANT IN/ANT OUT (TO TV)
Connect antenna cables.

2. DIGITAL AUDIO OUT(OPTICAL)
Connects to an amplifier having a digital optical audio input jack.

3. DIGITAL AUDIO OUT(COAXIAL)
Connects to an amplifier having a digital coaxial audio input jack.

4. AV AUDIO OUT
Connects to the audio input of external equipment using audio cables.

5. AV VIDEO OUT(good video quality)
Connects the input of external equipment using a Video cable.

6. AV S-VIDEO OUT(better video quality)
Connects the input of external equipment using an S-Video cable.

7. COMPONENT VIDEO OUT(excellent video quality)
Connect to equipment having Component video input jacks.

8. AV 1 AUDIO IN
Connects the output of external equipment using audio cables

9. AV 1 VIDEO IN
Connects the output of external equipment using a video cable.

10. AV 1 S-VIDEO IN
Connects the output of external equipment using an S-Video cable.

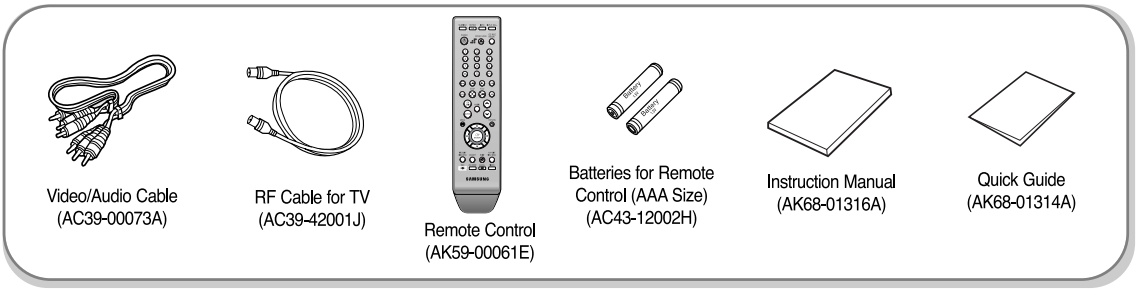
NOTE

The Antenna connection does not pass audio/video signals. To watch a DVD on your TV, you must connect audio/video cables.

Unpacking

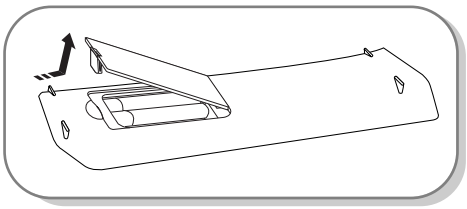
Accessories

Check for the supplied accessories below.



Preparing the Remote Control

Install Batteries in the Remote Control



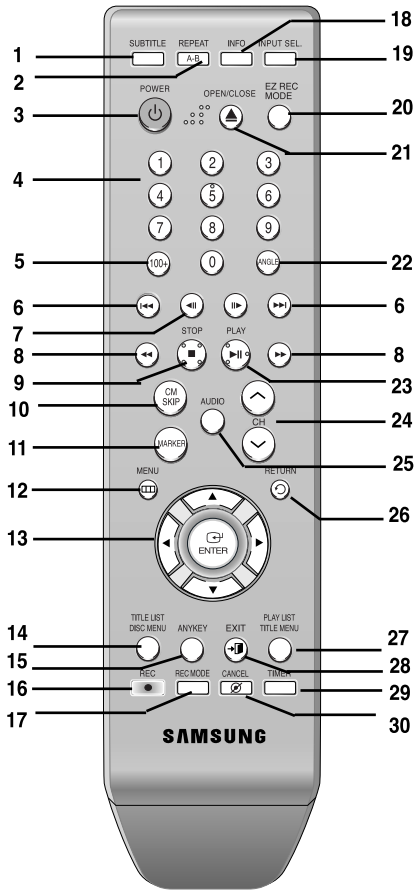
- Open the battery cover on the back of the remote.
- Insert two AAA batteries.
  Make sure that the polarities (+ and -) are aligned correctly.
- Replace the battery cover.

If the remote control does not operate properly:

- Check the polarity + - of the batteries .
- Check if the batteries are drained.
- Check if remote sensor is blocked by obstacles.
- Check if there is any fluorescent lighting nearby.

Dispose of batteries according to local environmental regulations.
Do not put them in the household trash.

Tour of the Remote Control



1. SUBTITLE Button
Press this to switch the DVD's subtitle language.

2. REPEAT(A-B) Button
Allows you to repeat playback of the A-B section.

3. POWER Button
Press to power the DVD Recorder on and off.

4. NUMBER Buttons

5. 100+ Button
Press this to select channel 100 or higher.

6. REVERSE/FORWARD SKIP Buttons
Press to skip a disc backwards or forwards.

7. REVERSE/FORWARD STEP Buttons
Press to play frame by frame.

8. REVERSE/FORWARD SEARCH Buttons
Press to search a disc backwards or forwards.

9. STOP Button
Press to stop a disc or to stop the recording.

10.CM SKIP Buttons
Press this to skip a portion of the program automatically during playback of a DVD disc.

11. MARKER Button
Use this to Bookmark or mark a position while playing a disc.

12. MENU Button
Brings up the DVD recorder's setup menu.

13. ENTER/DIRECTION Buttons
(UP/DOWN and LEFT/RIGHT Buttons)
This button functions as a toggle switch.

14. TITLE LIST/DISC MENU Button
Use this to enter the View Recording list/Disc menu.

15. ANYKEY Button
Use this to view the status of the disc that is being played.

16. REC Button
Use to make a recording on writable/rewritable discs.

17. REC MODE Button
Use this to set the desired Recording time and picture quality. (XP/SP/LP/EP)

18. INFO button
This will display current setting or disc status.

19. INPUT SEL. Button
Selects line input signal in external input mode. (Tuner, AV1, AV2 or DV)

20. EZ REC MODE Button
Use this to set the EZ REC MODE.

21. OPEN/CLOSE Button
To open and close the disc tray.

22. ANGLE Button
Press this to switch angles of a particular scene.

23. PLAY/PAUSE Button
Press to play/pause a disc.

24. CH Buttons
Use this to select a TV channel.

25. AUDIO Button
Use this to access various audio functions on a disc. (DVD mode)

26. RETURN Button
Returns to the previous menu.

27. PLAY LIST/TITLE MENU Button
Use this to return to the Title menu, or to view the recorded Playlist.

28. EXIT Button
Exit the current menu.

29. TIMER Button
Press to directly enter the Timer Recording Mode menu.

30. CANCEL Button

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

Connecting & Setting Up

This section involves various methods of connecting the DVD Recorder to other external components and setting required initial modes.

Quick Overview

A Quick Overview presented in this guide will give you enough information to start using the recorder.

Step 1 : Connecting the Antenna Cable

▼

Step 2 : Connecting the Video Cable

▼

Step 3 :Connecting the Audio Cable

▼

Step 4 : Connecting External Devices

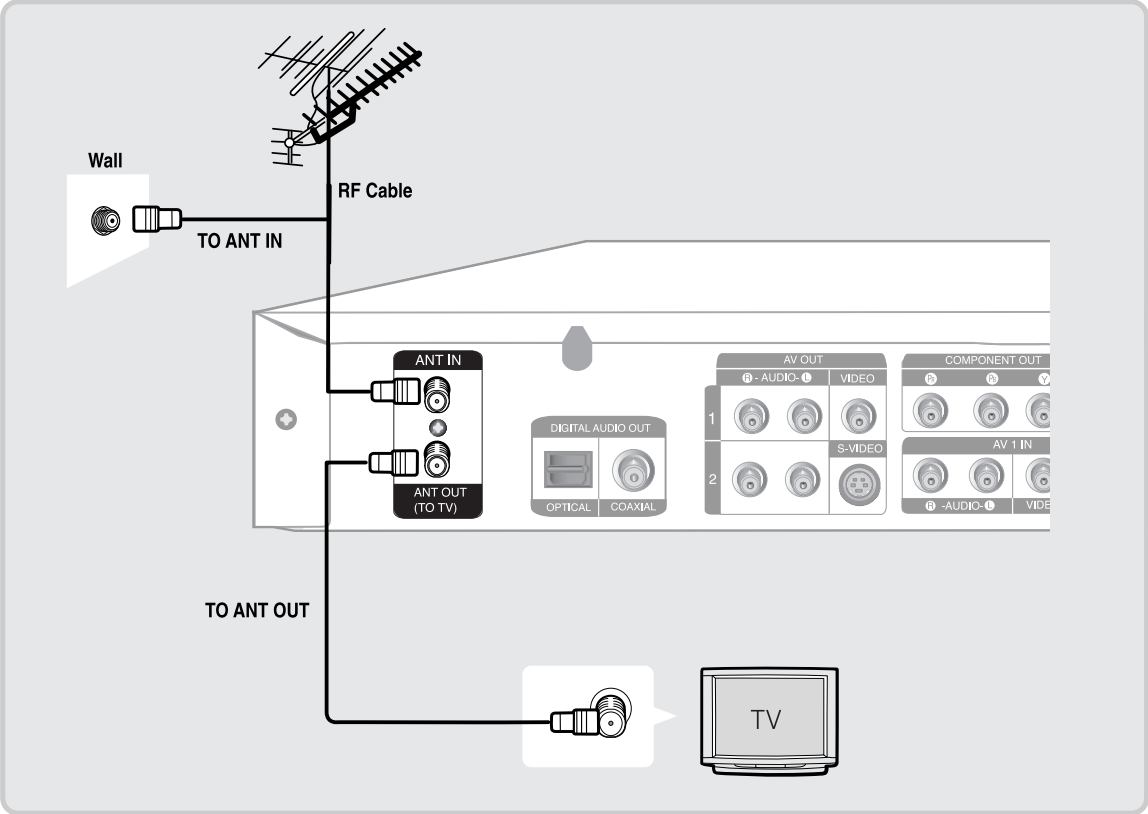
• Note to CATV system installer: : This reminder is provided to call CATV system installer's attention to Article 820-40 of the National Electrical Code (Section 54 of Canadian Electrical Code, Part I), that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

Step 1: Connecting the Antenna Cable

There are several ways to connect your DVD Recorder. Select the antenna connection that best suits you below.

Antenna + DVD Recorder + TV : No Cable box

You can record non-scrambled channels by selecting the channel on the DVD Recorder. Also use this method if you watch channels without cable box.



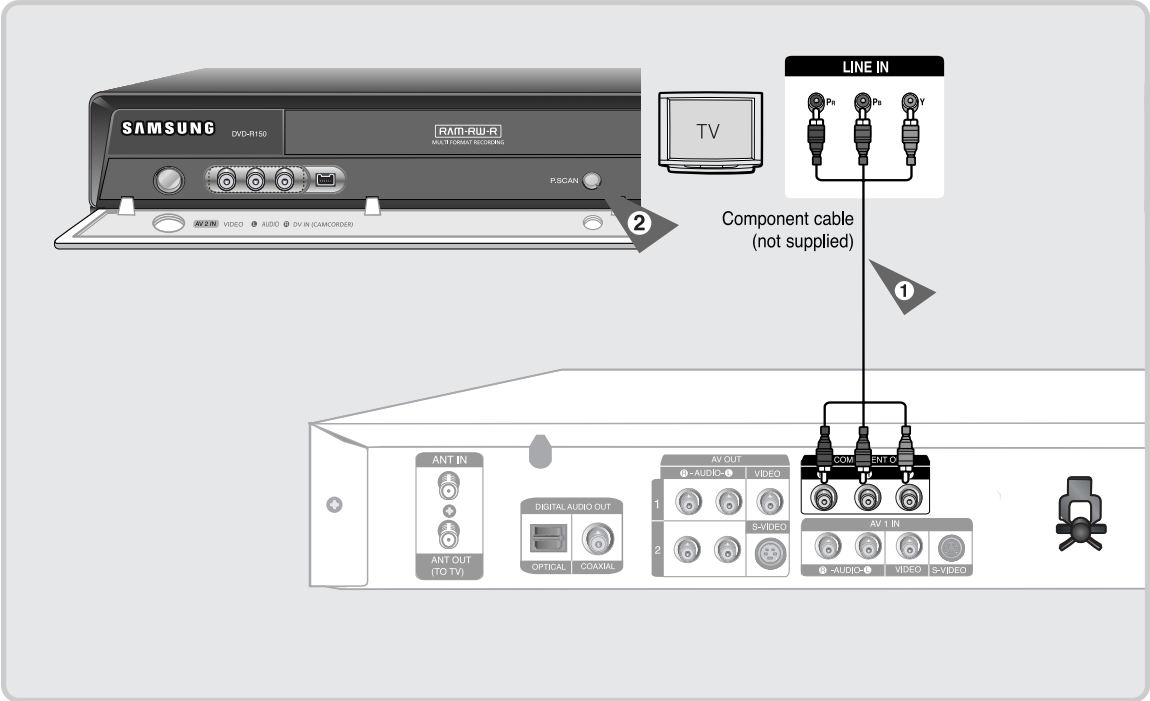
NOTE

- The VHF/UHF ANT (RF) OUT jack of this product sends only signals received through the antenna. It does not output Audio/Video signals. You must connect Audio/Video cables to view Video from the unit.
  (i.e. DVD playback)

Step 2 : Connecting the Video Cable

There are several ways to connect your DVD Recorder. 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 Component video input jacks (Y,PB,PR)



1. Connect Component video cables(not supplied) between the COMPONENT OUT(Y,PB,PR) jacks on DVD Recorder and COMPONENT IN(Y,PB,PR) jacks on your TV (or AV amplifier). This connection outputs the 480i or 480p resolution to your TV
2. If the connected TV supports Progressive Scan, press the P.SCAN button on the front of the DVD Recorder to enjoy best quality video.
   Pressing the **P.SCAN** button switches Progressive (480p) / Interlace (480i) scan mode on.

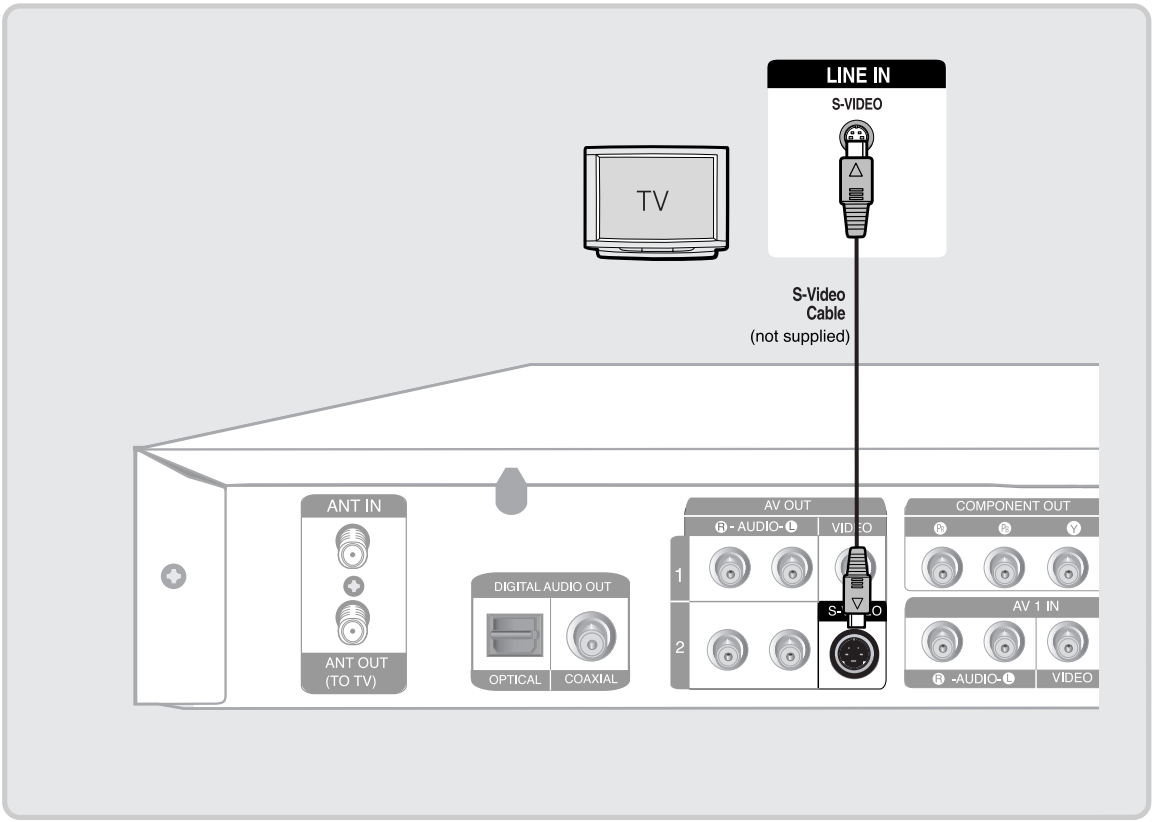
- You will enjoy the best quality accurate color reproduction images. Component video separates the picture element into black and white(Y), blue(PB), and red(PR) signals to present clear and clean images.
- Connect the audio cables(white and red) between the AUDIO OUT jacks on the DVD Recorder and AUDIO IN jacks on your TV(or AV amplifier).

NOTE

- Compared to standard interlaced video, progressive scan doubles the amount of video lines fed to your TV, resulting in a clearer, more stable, and flicker free image than interlaced video. The component output jack of the DVD player can be used for progressive output mode, which is only available with TVs that support progressive scan.
- Progressive Scan Output (480p).
  Not all high definition television sets are fully compatible with this product. If the 480p progressive scan picture is not satisfactory, press the **P.SCAN** button on the unit to switch to the Interlace mode.
  If there are questions regarding TV set compatibility with this model, please contact our customer service center at 1-800-SAMSUNG.

Connecting to an S-Video input jack

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



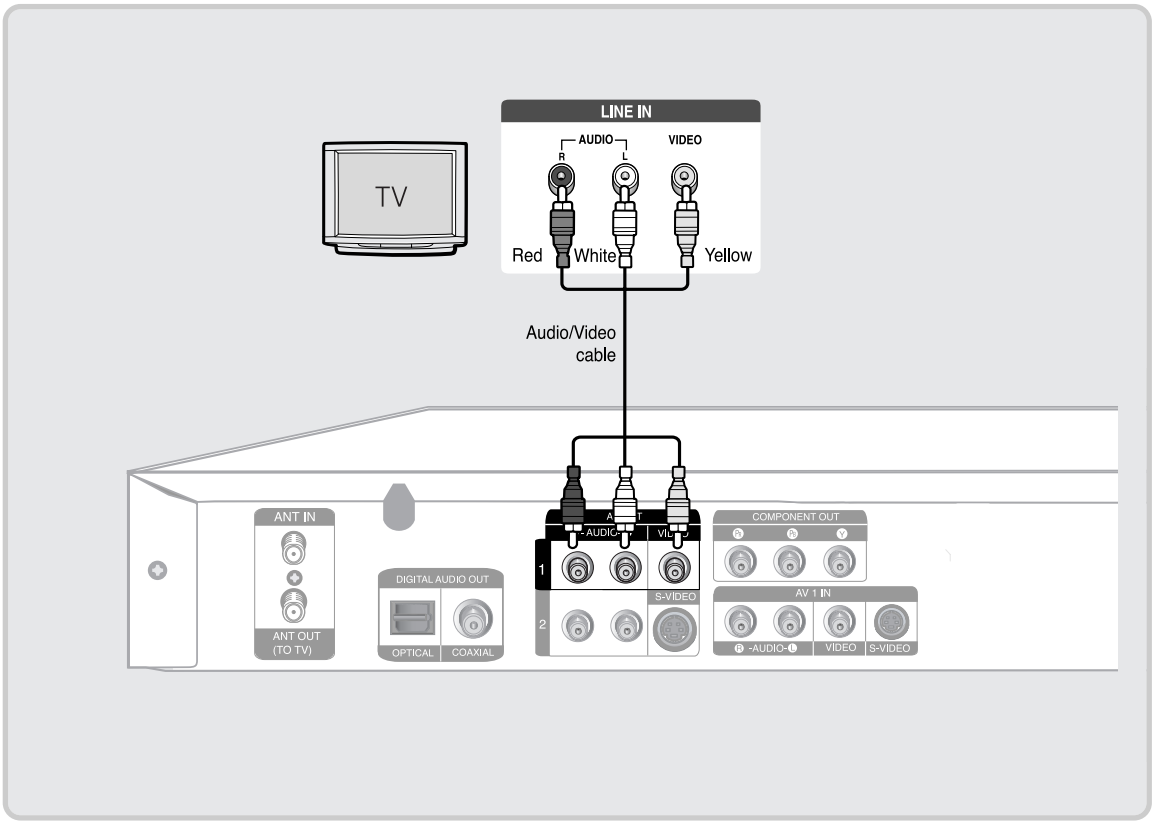
- You will enjoy high quality images. S-Video separates the picture element into black and white (Y) and color (C) signals to present clearer images than regular video input mode. This connection outputs the 480i resolution to your TV.
- Connect the audio cables(white and red) between the AUDIO OUT jacks on the DVD Recorder and AUDIO IN jacks on your TV(or AV amplifier).

NOTE

- S-Video or Component video outputs 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 your TV connections and the TV input selection settings.

Connecting to a Video input jack

Connect a video(yellow) cable between the VIDEO(yellow) OUT jack on DVD Recorder and VIDEO(yellow) IN jack on the TV (or AV amplifier).



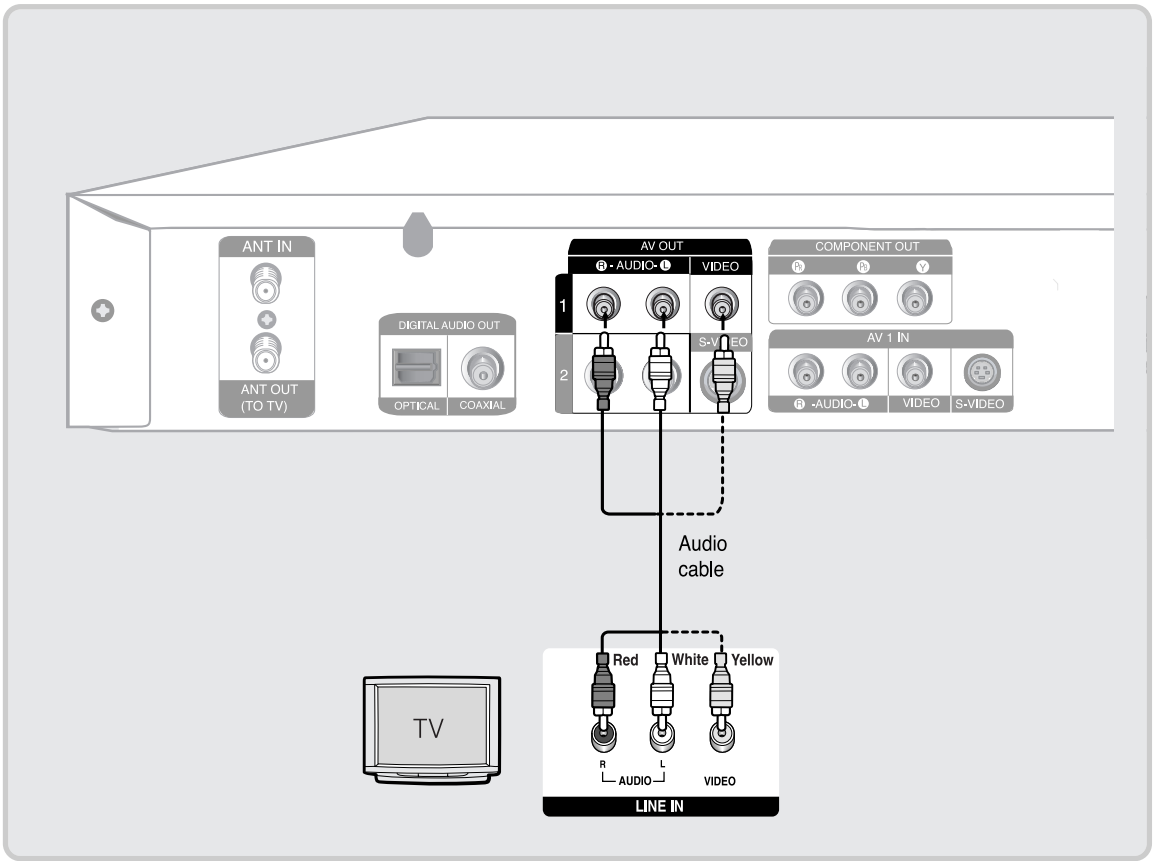
- You will enjoy normal quality images.This connection outputs the 480i resolution to your TV.
- Connect the audio cables(white and red) between the AUDIO OUT jacks on the DVD Recorder and AUDIO IN jacks on your TV(or AV amplifier).

Step 3 : Connecting the Audio Cable

Select one of the Audio connections on the following pages.

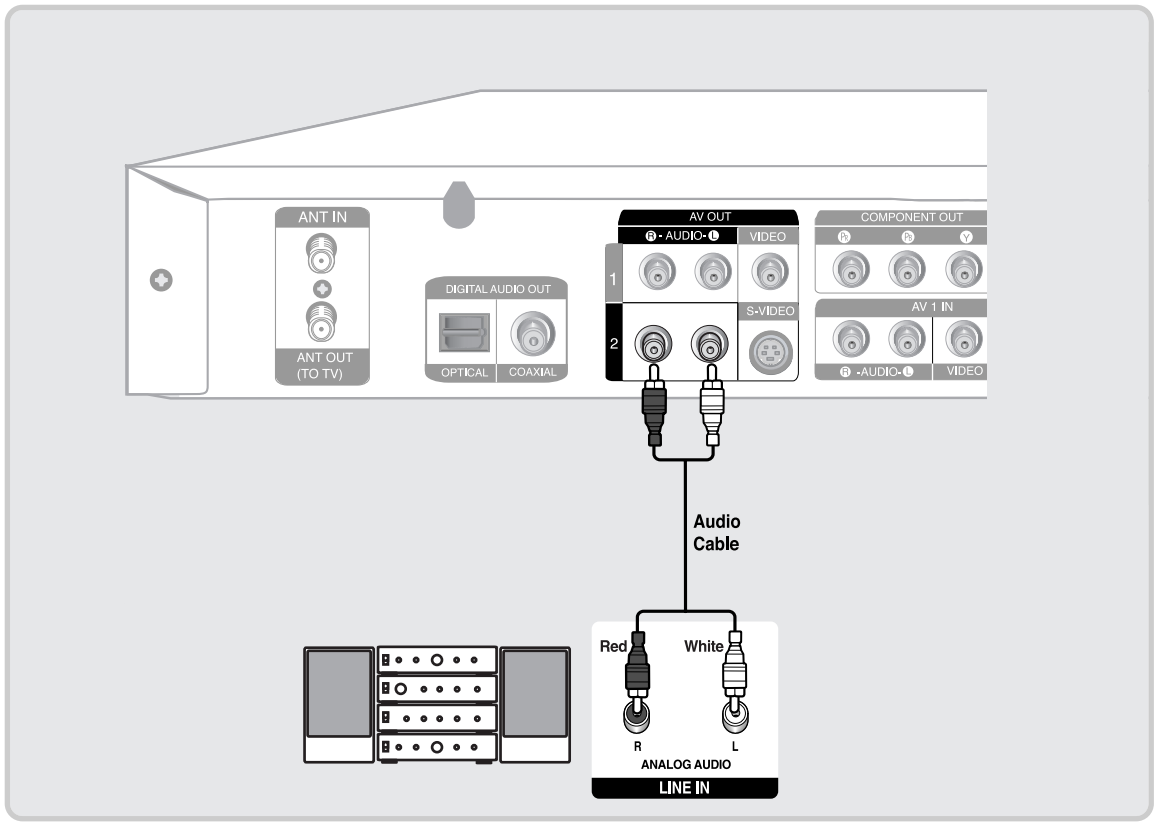
Connecting to your TV

This connection will use your TV's speakers.



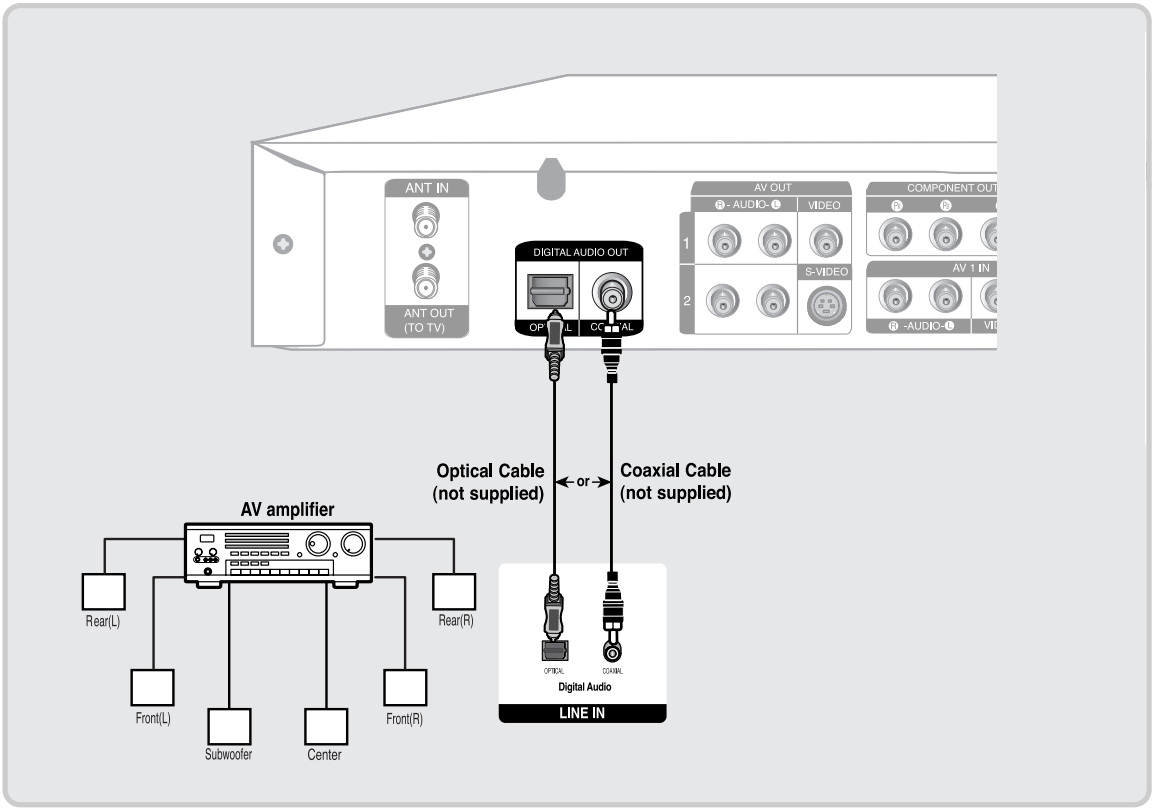
Connecting to a Stereo Amplifier with Analog Input Jacks

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. (See page 30)

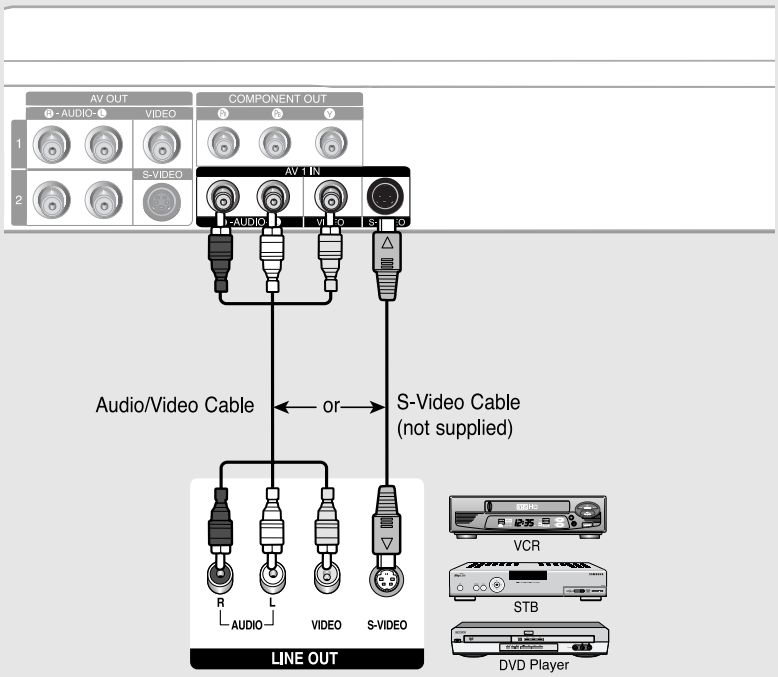


Step 4 : Connecting External Devices

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

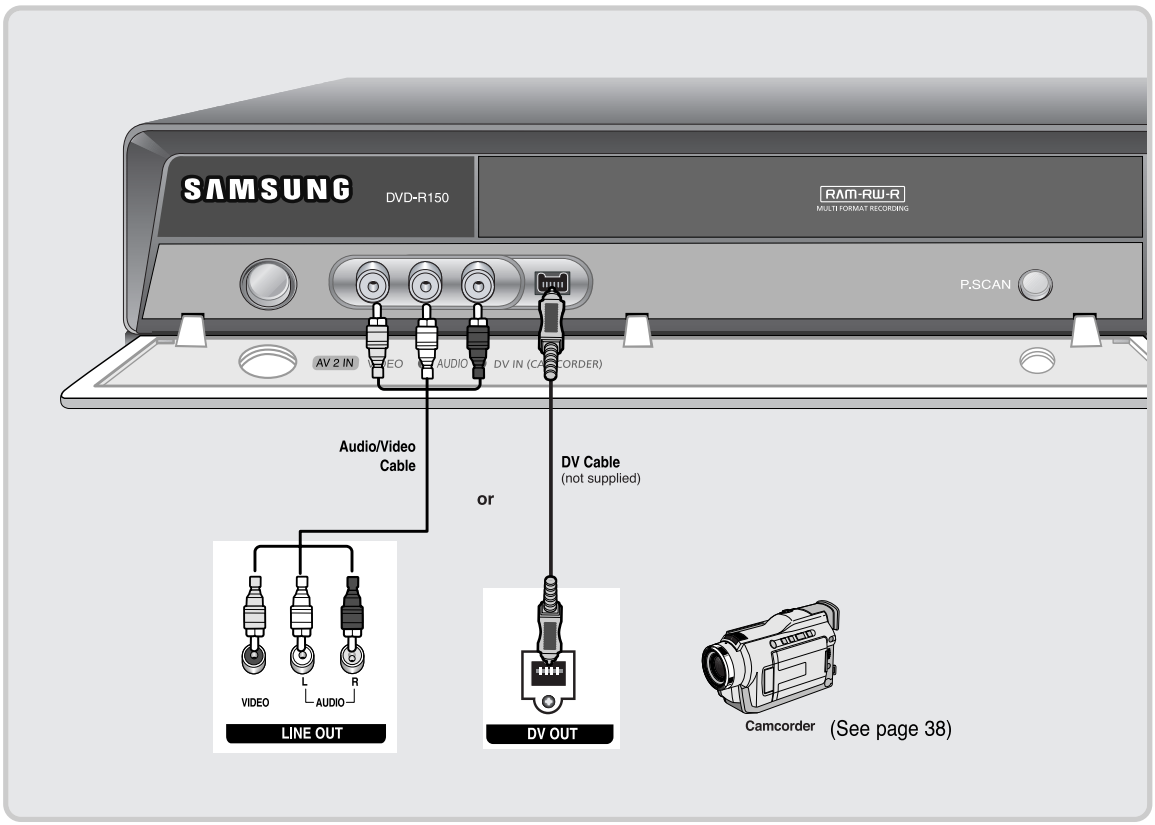
Connecting a VCR, Set Top Box(STB) or DVD Player to the AV 1 IN or S-VIDEO IN jacks

Connect the VCR or external device to the AV 1 IN jacks of the DVD Recorder.
You can record from connected equipment (VCR, STB or DVD Player).



Connecting a Camcorder

You can record from connected equipment, such as a camcorder by using the AV 2 IN or DV IN jacks on front of the DVD recorder.



NOTE

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.

13. Circuit Operating Descriptions

13-1 Power

13-1-1 About S.M.P.S (Ringing Choke Converter Method)

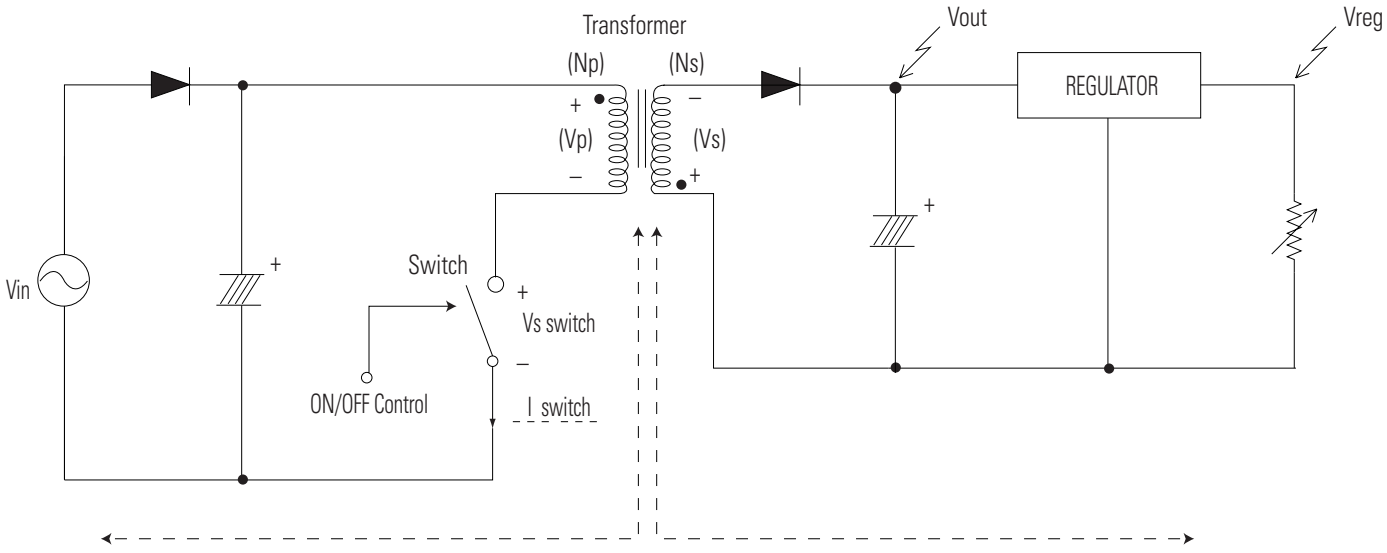


Fig. 13-1

◆Terms

1) 1st : Common power input to 1st winding.
2) 2nd : Circuit followings output winding of transformer.
3) f (Frequency) : Switching frequency (T : Switching cycle)
4) Duty : (Ton/T) x 100

13-1-2 Circuit description [FLY-Back RCC(Ringing Choke Converter)] Control

(a) AC Power Rectification/Smoothing Terminal

1) PADT1, PADT2, PADT3, PADT4 : Convert AC power to DC (Wave rectification).
2) PRCU1 : Smooth the voltage converted to DC.
3) PALT1, PALT2, PACT1, PACT2 : Noise removal at power input/output.
4) PLRU1 : Rush current limit resistance at the momemt of power cord insertion.
   · Without PLRT1, the bridge diode might be damaged as the rush current increases.

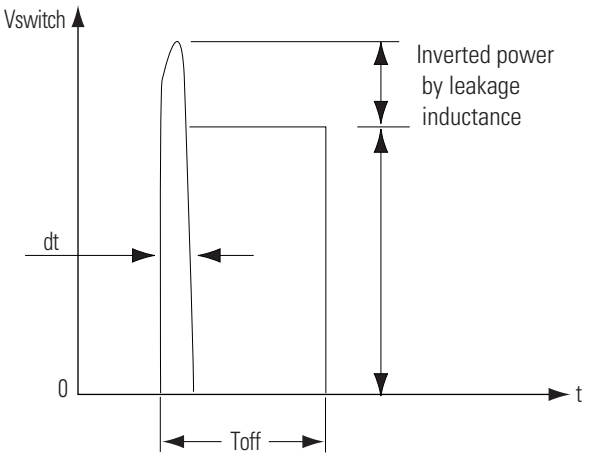


Fig. 13-2

(b) SNUBBER Circuit :
PSRZ1, PSRZ2, PSCX1, PSCZ2, PSDZ1

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 xdi/dt. L1 : Leakage Induction)
A very high residual voltage exist on both terminals of PQIZ1 because dt is a very short.

2) SNUBBER circuit protects PQIZ1 from damage through leakage voltage suppression by RC,
(Charges the leakage voltage to PSDZ1 and PSCX1 and discharges to PSRZ1, PSRZ2).

3) PSCZ2 : For noise removal

(c) PQIZ1 Vcc circuit

1) PQIZ1 Vcc : PVRL4, PVDL1, PVCL1
① Use the output of transformer as Vcc,because the current starts to flow into transformer while PQIZ1 is active
② Rectify to PVDL1 and smooth to PVCL1.
③ Use the output of transformer as PQIZ1 Vcc : The loads are different before and after PQIZ1 driving.
(Vcc of PQIZ1 decreases below OFF voltage , using only the resistance dut to lode increase after PQIZ1 driving.)

(d) Feedback Control Circuit

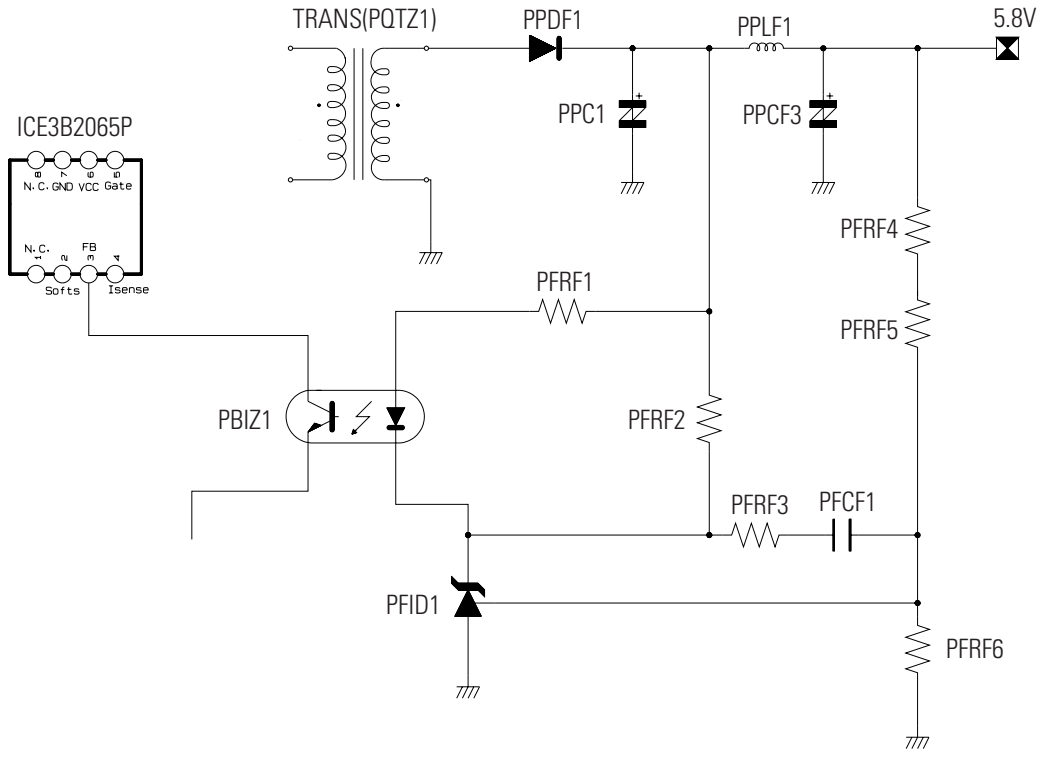


Fig. 13-3

1) F/B terminal of PQIZ1 determines output duty cyle.
2) C-E (Collector-Emitter) of PQIZ1 and F/B potential of PQIZ1 are same.

13-1-3 Internal Block Diagram (Internal Block Diagram of S.M.P.S. Circuit)

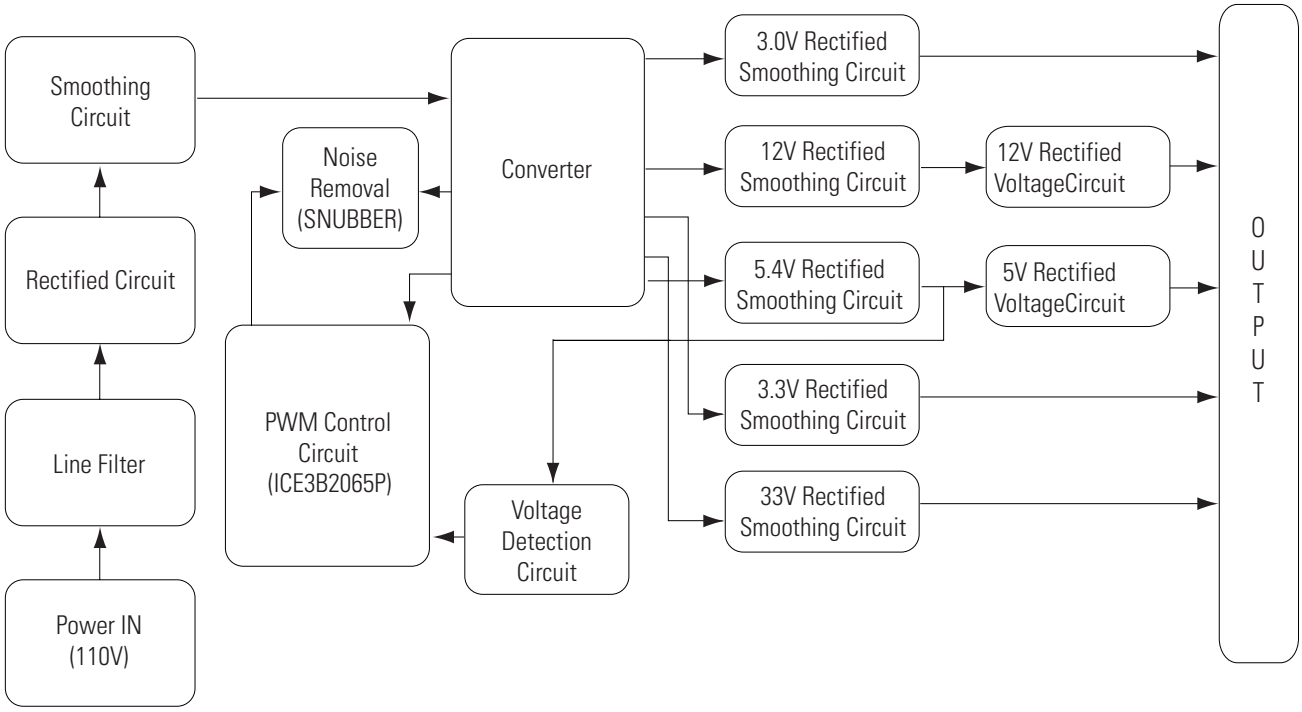


Fig. 13-4

13-2 AV Codec

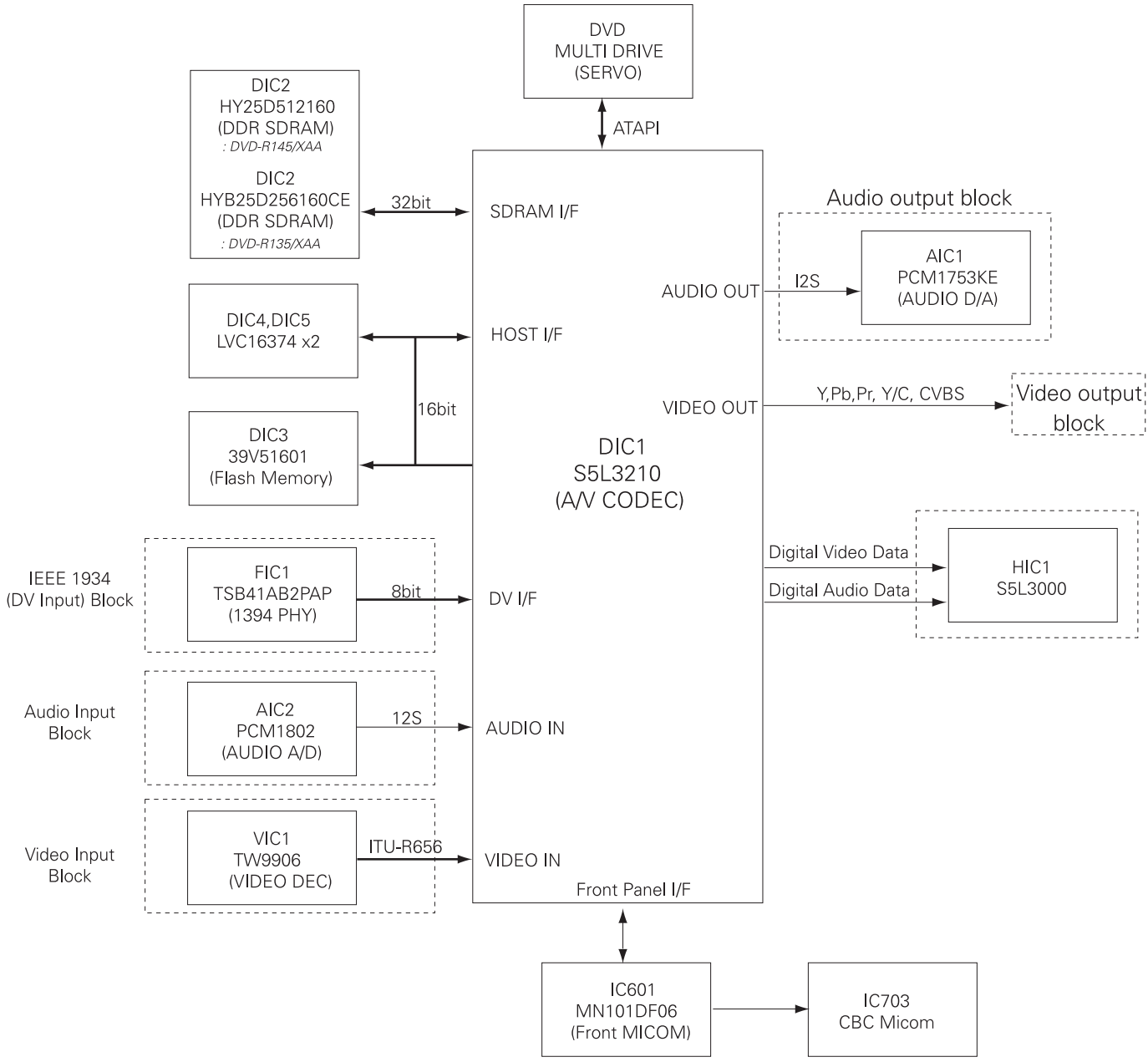


Fig. 13-5

· 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

13-2-1 GENERAL DESCRIPTION

SAMSUNG S5L3210 MPEG AV Codec is designed to provide a cost-effective, low power and high performance DVD recorder solution for DVD-VR, DVD-Video, DVD-Audio & many of CD applications. To reduce total system cost, S5L3210 also provides the following features: a front-end controller, a back-end decoder, a control CPU with separate 4KB Instruction and 4KB Data Cache, improved audio DSPs, a programmable video encoder with a dual output capability of interlaced and progressive scan, a DDR memory controller, 4-channel Timers with PWM, I/O Ports, 6-channel 10-bit Video DACs, 2-channel PWM processors for Hi-fi Audio, 2-channel UARTs with hand-shake, IIC-BUS interface, IIS interface, SPI, ATAPI, IEEE1394, USB 2.0 Full & Low Speed Host I/F and PLL for clock generation.

13-2-2 A/V Processor (DIC1) Functional Description

1) **RISC processor architecture**
   · ARM946ES 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 160 MHz operating frequency

2) **Memory controller**
   · Address space: 128M bytes for each bank (Total 1Gbyte 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 banks 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 D-Cache (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.
   · The write buffer can hold 8 words of data and four address.

4) **Clock & power manager**
   · Low power consumption
   · On-chip PLLs
   · Clock can be fed selectively to each function block by software.

5) **Interrupt controller**
   · 62 interrupt sources(Watch dog timer, 4 Timers, UARTs, 8 External interrupts, IIC, IIS, SPI, IR,...)
   · Edge detect mode on external interrupt source.
   · Programmable polarity of rising and falling.
   · Supports FIQ (Fast Interrupt request) for very urgent interrupt request.

6) **Video pre-processor**
   · Noise Reduction by Motion-compensated Temporal Filtering.
   · Bitmap Generation for Motion Estimation of MPEG Encoder.
   · Scene Change Detection.

7) **MPEG video encoder**
   · Encodes MPEG1 & MPEG2 video stream (MP@ML)
   · Efficient Motion Estimation by reduced calculation and accurate Motion Vector Search

8) **MPEG video decoder**
   · Decodes MPEG1, MPEG2 (MP@ML) & DivX/MPEG4 video stream(ASP)
   · Error detection and autonomous error concealment.

9) **Audio DSP**
   · Decodes Dolby AC-3, MPEG1, MPEG2, DTS 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

13-3 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 equal izer. 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-mecha nism in DVD recorder. Servo-DSP has the following features.
① Bulit-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 inter face. 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)

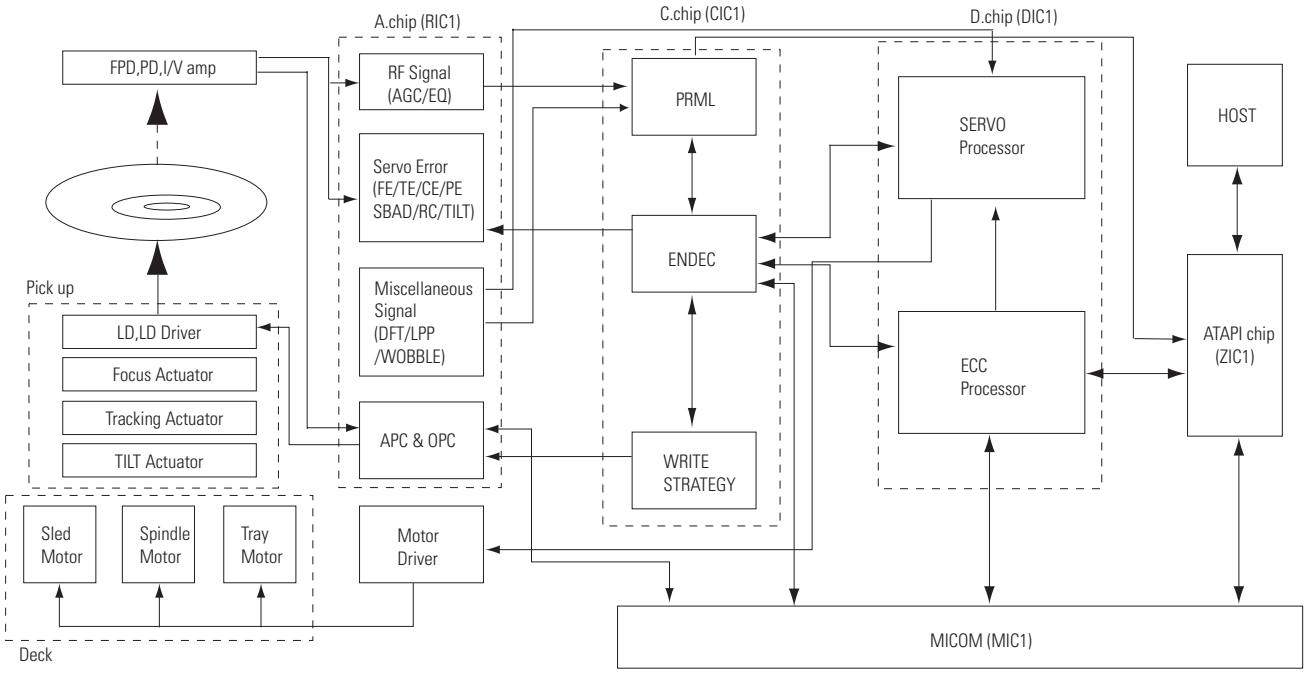


Fig. 13-6

13-4 Video Input

13-4-1 Video Input Outline

The model specified in this book uses service manual is the two AV Video input. AV 1 Video input is CVBS1 & S-Video1 at the Rear Panel. AV 2 Video
input is CVBS2 at the Front Panel.
The analog Video signal select AV 1 or AV 2 by the IC601 (Front Micom).
TIC1 (Video Decoder) diverges from the 27MHz crystal, then generates ITU-R656 (10bits) and
27MHz clock. VIC1 (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.

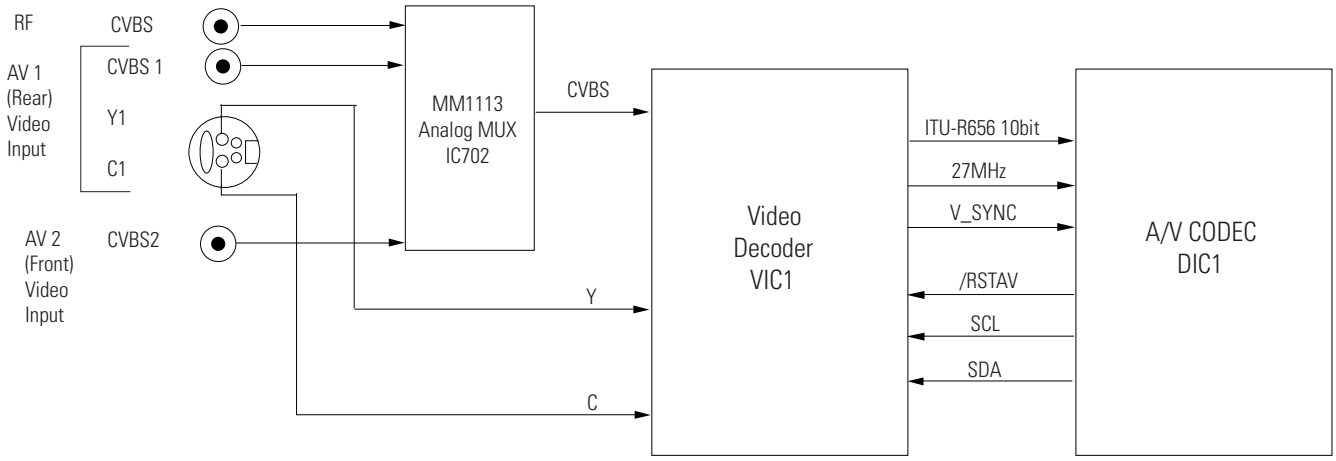


Fig. 13-7

13-4-2 Analog Mux (MM1113)

IC702 is Analog Mux.
As Pin 2, 4 of the IC702 are controlled by the Front Micom, IC702 select RF OF CVBS(Pin1)
Line1 of CVBS[Pin3] and AV2 of CVBS[Pin 5].
The analog Video Signal of IC201 output is selected by the IC601 via VIC1(Video Decoder : TW9906) of analog Video Input parts.

13-4-3 NTSC/PAL Video Decoder (TW9906 : Video Decoder)

The VIC1 (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 VIC1 (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 VIC1 (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.

13-5 Video Output

13-5-1 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 amplifer of analog part.

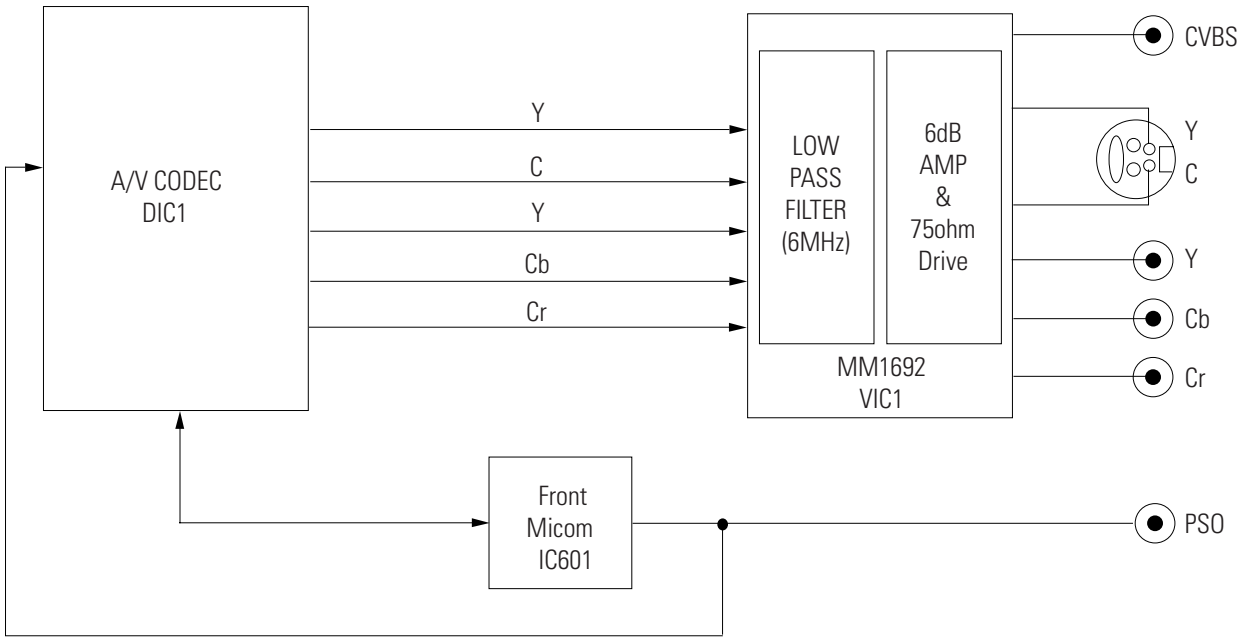


Fig. 13-8

13-5-2 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.

13-5-3 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,).

13-6 Audio

13-6-1 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 (IC203), A/D converter (AIC2).
IC203 change it's output by selection control signal from IC601 (Front Micom).

13-6-2 Output Block

The model specified in this book uses 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 outputted in Optical/Coaxial (S/PDIF) terminal.

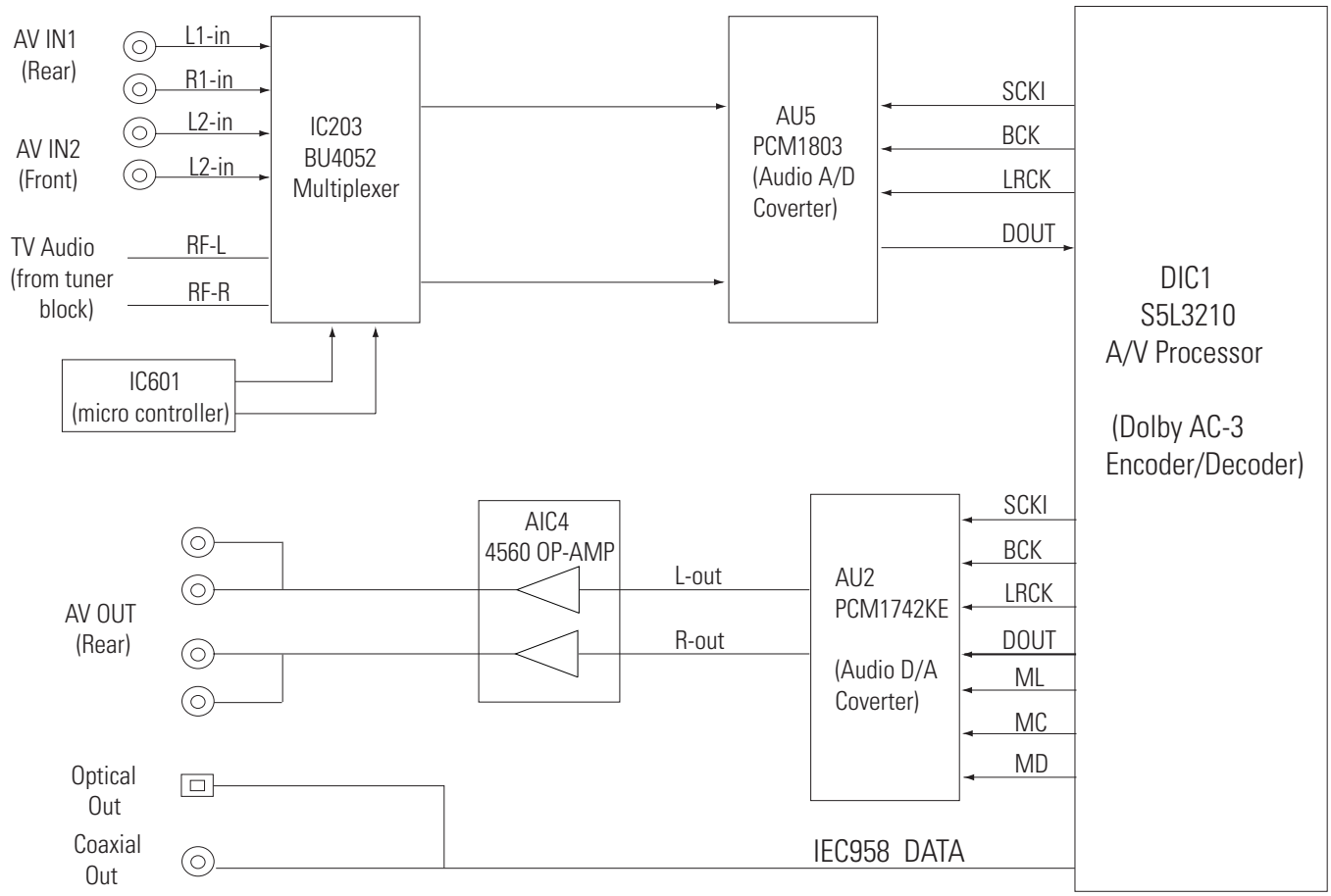


Fig. 13-9

13-7 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 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.

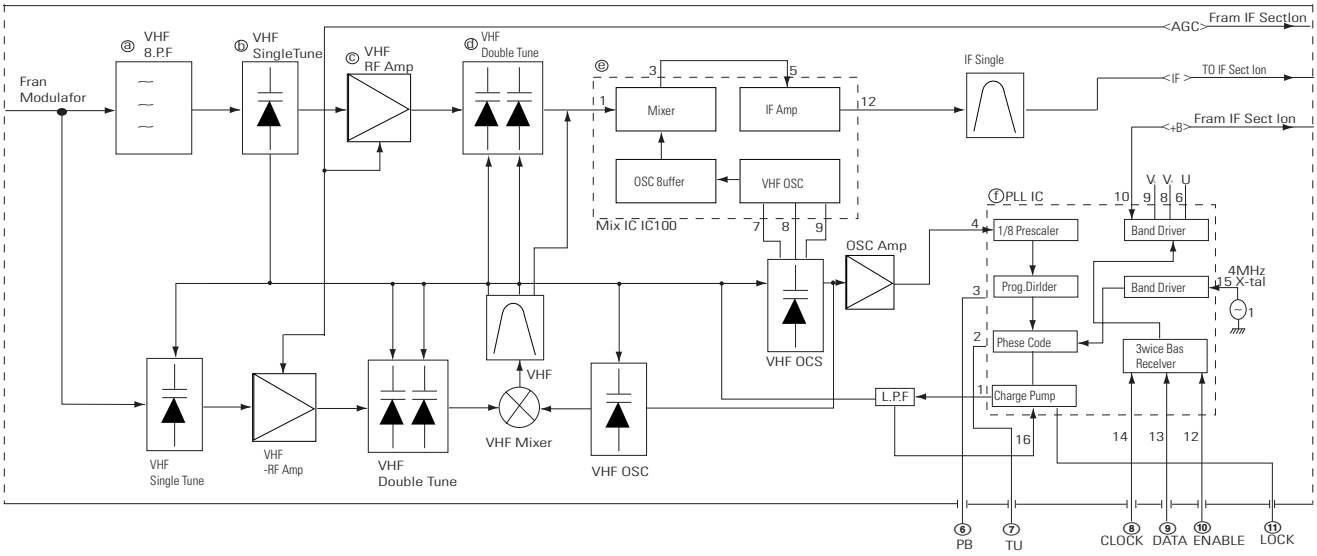


Fig.13-10

13-8 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.

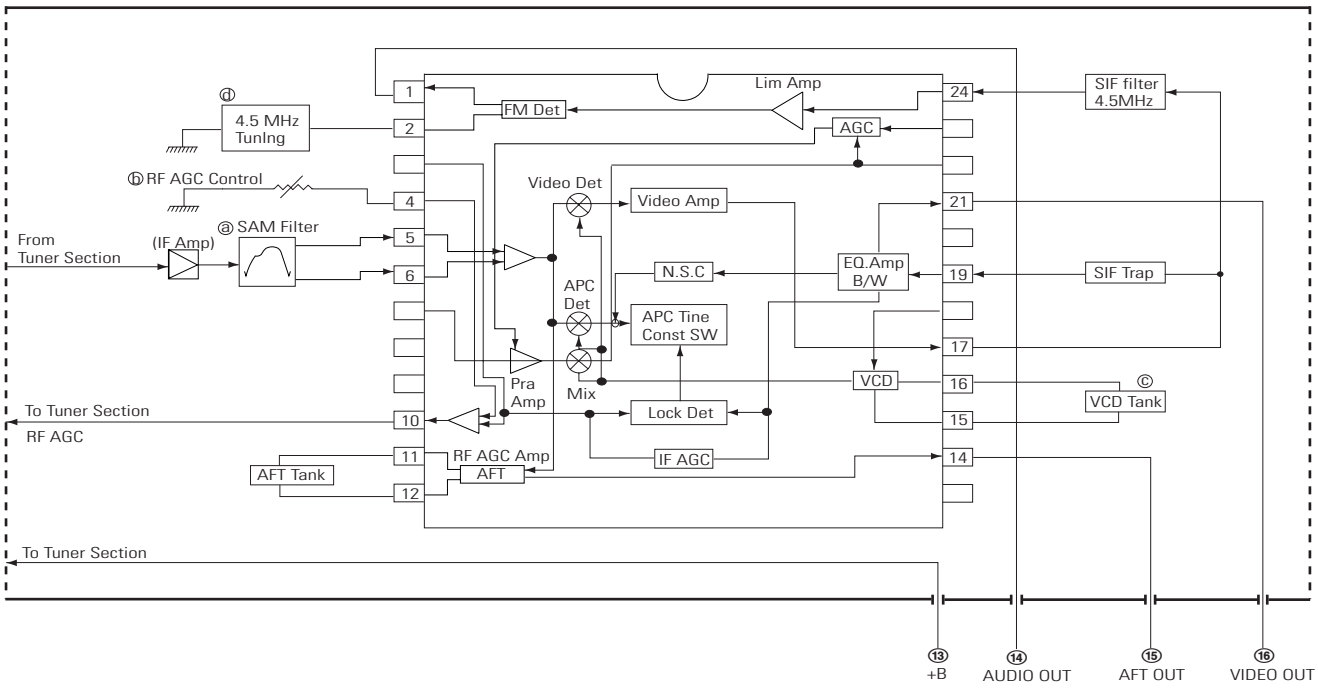


Fig. 13-11

MEMO

14. Reference Information

14-1 Introduction to DVD

14-1-1 The Definition of DVD

DVD is the next generation medium and is the acronym of the Digital Versatile Disc or thr 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

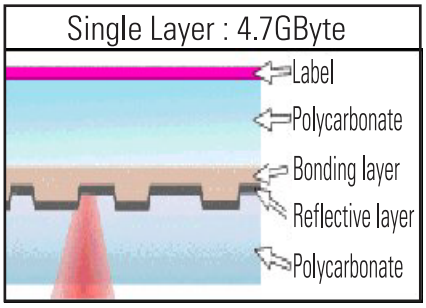
- Minimized the track pitch and pit size to 1/2 of conventional CD.
- Uses red laser with short-wavelenght of 650nm (635nm).

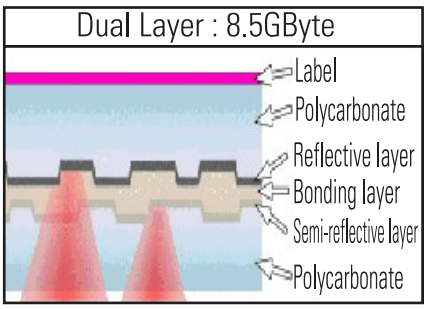
DVD Vs. CD-ROM

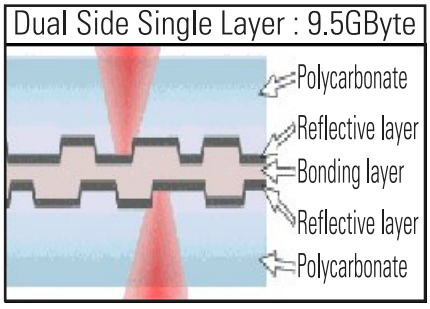
	CD-ROM	CD-R/RW	DVD-ROM	DVD-R/RW	DVD-RAM
Disc Thickness	1.2mm	1.2mm	0.6*2mm	0.6*2mm	0.6*2mm
Lens NA	0.45	0.45(0.5)	0.6	0.6	0.6
Laser wavelenght	780um	780um	650um	650um	650um
Track pitch	1.6pm	1.6pm	0.74pm	0.74pm	0.615pm
Capacity	0.65GB	0.65GB	4.7GB	4.7GB	4.7GB
Track structure	Pit train	Groove	Pit train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

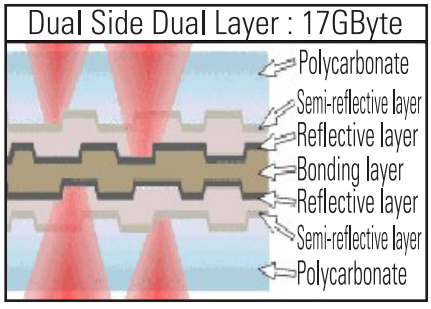
2) Disc Formats

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.









14-1-2 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 100,000 times)	This can be virtually used as hard-disk, with a random read-write access
DVD-RW	Rewritable (About 1,000 times)	Similar to DVD-RAM except than its technology features a separated read-write access more like phonograph than a hard disk.

14-2 DVD-Video Format

14-2-1 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.

14-2-2 Audio & Video Specifications

<table>
<tr><th colspan="2">Classification</th><th colspan="2">DVD-Video</th><th>Video-CD</th><th>LD</th></tr>
<tr><td rowspan="6">VIDEO</td><td>Compression</td><td colspan="2">MPEG-2</td><td>MPEG-1</td><td rowspan="2">Analog</td></tr>
<tr><td>Pixel</td><td colspan="2">720 x 480</td><td>352 x 240</td></tr>
<tr><td>Horizontal resolution</td><td colspan="2">Max. 500 Lines</td><td>Max. 250 Lines</td><td>Max.420 Lines</td></tr>
<tr><td>Compression rate</td><td colspan="2">1/40</td><td>1/140</td><td rowspan="2">Analog</td></tr>
<tr><td>Transmission speed</td><td colspan="2">Max. 9.8Mbps (variable)</td><td>1.15Mbps (fixed)</td></tr>
<tr><td>TV aspect</td><td colspan="2">16:9 / 4:3</td><td>4:3</td><td>4:3</td></tr>
<tr><td rowspan="5">AUDIO</td><td>Audio</td><td colspan="2">Max. 8 streams</td><td>2CH stereo</td><td rowspan="5">2 Analog CH.
2 Digital CH.
(16Bit/44.1KHz)
or
1 Analog CH.
1 Stream of Dolby Digital
2 Digital CH.
(16Bit/44.1KHz)</td></tr>
<tr><td>Recording type</td><td>Dolby Digital</td><td>Linear PCM</td><td>MPEG-1 Layer 2</td></tr>
<tr><td>Transmission rate</td><td>448Kbps/stream</td><td>6.144Mbps/stream</td><td>224Kbps</td></tr>
<tr><td>Channel</td><td>5.1CH/stream</td><td>8CH/stream</td><td>2CH</td></tr>
<tr><td>Sampling frequency</td><td>48KHz</td><td>16, 20, 24Bit/48, 96KHz</td><td>16Bit/44.1KHz</td></tr>
</table>

14-2-3 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

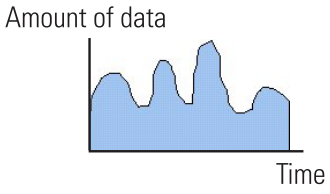
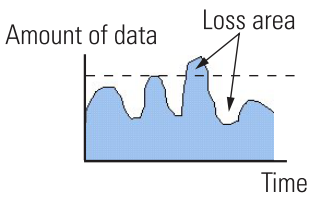
- 1 Movie (3.5Mbps)
  + Subtitle (1 Language)
  + Surround Audio (1 Language)
  = 160min storage (4.673Gbytes)

- 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 compresion 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.	
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	

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

DVD-Video can store the audio using the 5.1ch Dolby Digital compression or the advanced Liner 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 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	

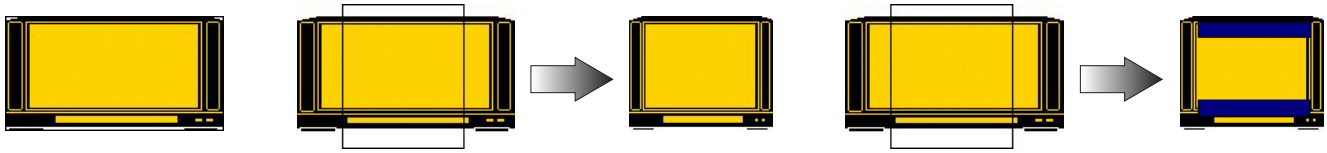
DVD-Video Feature 4 — Multi-Language

- 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

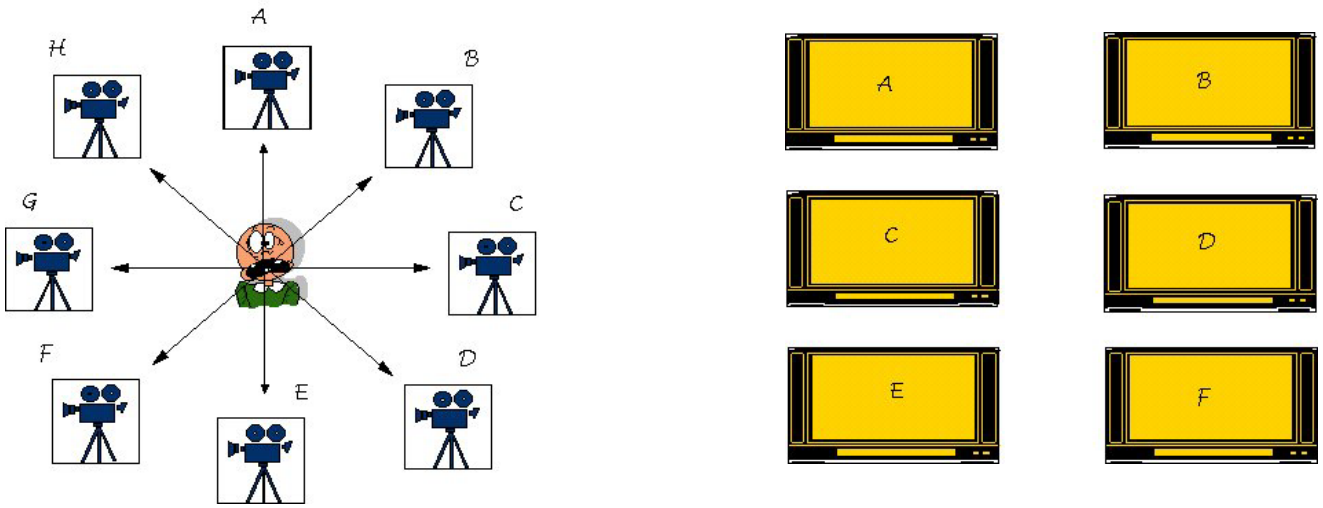


16:9 Wide | 4:3 Pan & Scan | 4:3 Letter Box

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 enviroment suitable for the bi-directional Software develoment, providing multiple scenarios. This feature enables the Multi-Story function.

OPTION | **Parental Lock**

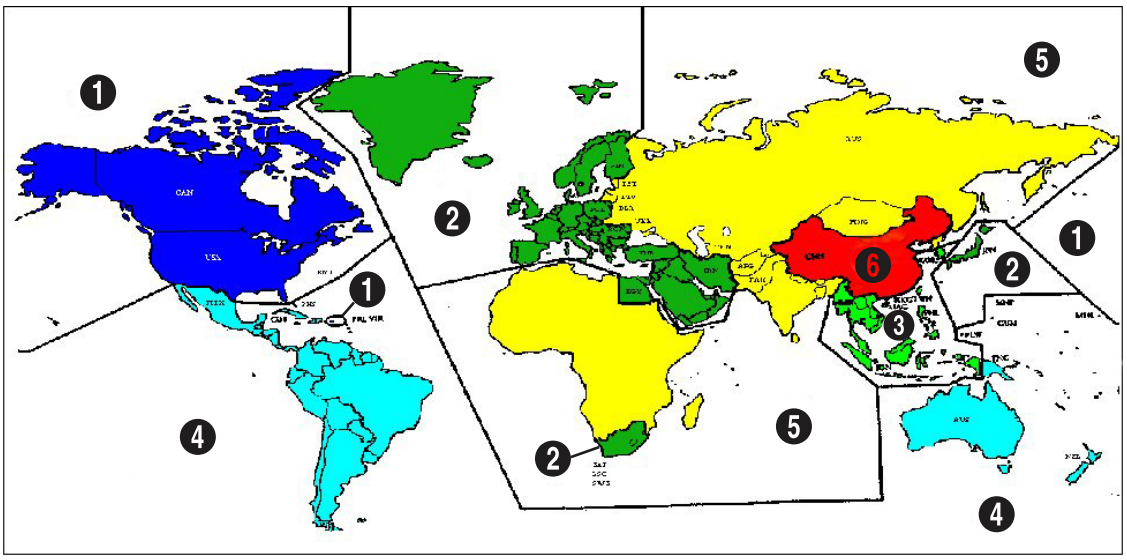
- For the titles that are not suitable for children viewing, Parental Locks are set, requesting user defined passwords for viewing
- Parential Locks may be set on specific frames of the Title, enabling the player to skip those frames during playback.

COPYRIGHT | **Regional Code & Macrovision**

- Classify the world into 6 regions, and if the DVD Title and the Player's "Reginal 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)



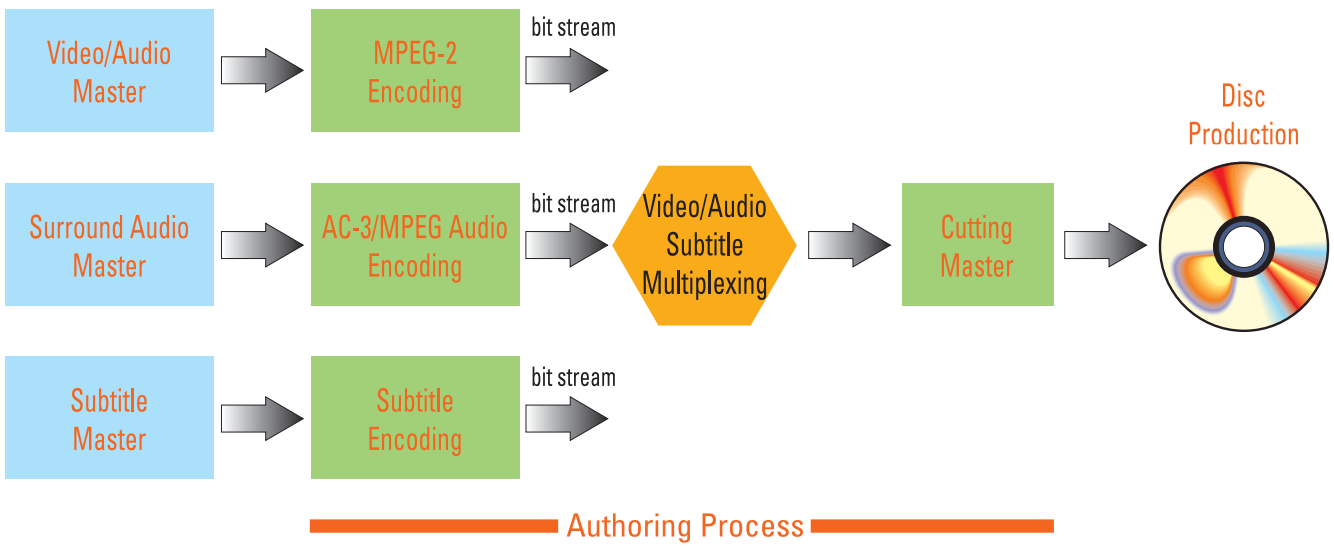
- Adoptation of the Macrovision System disables the copying on to other media.

Remark | **DVD-Video Authoring Process**

- The image quality of the DVD-Video may vary accoring 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 accoring to the Software developers, and this may affect the DVD image quality.

- **Authoring Process**



14-3 About IEEE1394

14-3-1 Comparison between IEEE-1394 and other digital interfaces

Since there are many different interfaces available, for example, RS422, RS644, and USB, vision system integ rators are very likely to be confused when choos ing the right interface for their application. For the ideal design of a vision syste m, it is vital to have the righ t bus/inte rface. To make things even more complex, ther e is no easy answer such as IEEE-1394 is the best choice.
Furthermore, the new CameraLink standard, promoted by compan ies such as Puln ix, Basler AG, and many frame grabb er companies, seems to be the stat e of the art interface. So why should IEEE-1394 be an alternative?

These questions are as complex as mostvision applicatio ns and there is no simple guideline .
Each of these interfaces offers many benefits and each of them has its individual drawbacks and restric tions. In the table below, we try to give a brief comparison of the most popular interface systems.

	RS 644 [1]	CameraLink	IEEE-1394	USB 2
Topology	Link	Link	Bus	Bus
Windows Driver	Proprietary	Proprietary	Native (Win 200, Win 98)	Native (Win 200, Win 98)
"Guaranteed" Bandwidth	~20 to 40 MByte/s	~255 MBytes/s	~32 MBytes/s[2]	~38 MBytes/s[2]
Cable Length	~10 m @ 40MHz ~20 m @ 200MHz	~10 meters	4.5 meters	5 meters
Wires Needed for 8 Data Bits	22[3]	10	4	2
Parameter Port	No	≥ 1 KByte/s	~8 MBytes/s [2]	~9 MBytes/s [2]

[1] These specs are for a typical 8-bit camera application operating at 20 MHz or at 40 MHz.
[2] 80% of the bus bandwidth is used for image data and 20% is used for parameter data.
[3] 16 wires are used for data bit transfer and two wires each are used for the separate Line Valid, Frame Valid, and Pixel Clock signals required with RS-644 transmission.

A careful comparison of the specifications shown in the table should be your first sele ction guide for the interface. For example, for an integ rator who needs very high speed, USB 2 and IEEE-1394 are not the first choice. On the other hand, these buses are the ones to select in cases
where multiple cameras are needed or cost is a critical issue. Also, the user needs to be aware
that the D-Cam specification curre ntly does not specifically support Line Scan cameras.
However, the specification is open and line scan suppor t could be achieved via Format 7. As
for USB 2, it is still in its infancy in machine vision and we are not aware of any kind of machine vision support.

14-3-2 Fiexibility and Cost Reduction

Many image processing application engineers face a familiar group of problems when designing and building a system. The end user requires system flexib ility, simple adaptation, fast delivery times, and most importantly a reasonable price. With conve ntional systems, whether analogor digital, engine ers must confine them selves to certain combina tions of the existing cameras, frame grabbers, and software. The product choice for this system config uration is limited. Unless the decision is made to use a high cost frame grabber that supports multiple cameras, sometimes known as multi-norm , it is usually not possible to operate camera s with different resolutions from the same frame grabber.

For many applications, the introductio n of digital cameras is hindered by the cost specified by the end custom er, however technically effective digital cameras may be. With the increa sed use of IEEE-1394 in the industrial image processing business, many of these problems are solvable in a sure , safe , and cost effec tive way.

1) Hardware Cost Example

This example compares two simi lar vision systems. Each system uses four Megapixel
resolution digital cameras . The traditio nal solu tion consists of one frame grabber per camera, one parallel digital data cable per camera, and one power supply per camera.
The 1394 solution requi res one hub and one interface card to connect the four cameras , along
with five ine xpensive 1394 cables. The 1394 cables carry power to the cameras directly from the computers internal power supply. (Note tha t not all compute rs are capab le of supplyi ng enough power for the cameras. In some cases a separate power supply may be required.)

Traditional Solution with multiple frame grabbers	**Price**	**1394 Solution**	**Price**
Four Cameras	18,000	Four 1394 Cameras	18,000
Four Frame Grabbers	4,400	One 1394 Interface Card	100
Four Cable	400	One 1394 Hub	120
Four power Supplies	320	Five Cables	150
Total	$23,120	Total	$18,370

14-3-3 Application Examples

Today, there are already applications realizing the benefits of IEEE-1394 technology. For example, at one of our customer sites, Basler was faced with a vision system which has the following specificatio ns:
The machine is a hig h-speed assembly system . Two indepe ndent robots take different par ts (different in size, shape, and reflection) from a support unit and mount these parts on a mounting plate. Timing is crucial, and in the worst case, a part must be taken from the tray every 100 ms. Accuracy of parts mounting is also critical (0.5 mm) . To have a vision system inspecting these operations , 4 cameras (2 on each of the rob ots) are needed:
- 2 low resolution Basler A302f camera s (640 x 480) for checking if the mounting plate is in place
- 2 high-resolution Basler A101f cameras (13 00 x 1030) for checking the components to be mounted.

Since most of the parts are differen t, the two A101f cameras must be reconfigured before almost every image acquisit ion. In the worst case, the AOI, shutter, and som etim es gain need to be adjusted.

1) Solution used before Basler s Intervention

The customer used analog camera s with CCIR resolution (768 x 582) only. This drast ically restricted the number of parts which could be mounted using the robots. Sin ce thes e camera s had no communication por t for configuration, adjusting the AOI was not possible and differ ences in reflection of the parts needed to be adjusted for by driving a flash circuit. All cameras were interfaced into one frame grabber (one PC).

2) Possible solution wih digial cameas using RS 644 OR Camera Link

Using RS 644 or CameraLink based camera s, the customer would need one frame grabber for each camera. It is very likely that the user would need two PCs (one for each robot). Changing the camera-configuration on the fly would require adv ance d grab ber cards since simple grabbers are not capable of easily changing their registers for different AOIs.

3) IEEE-1394 solution

All cameras are attached to a sing le interface card in the PC. The Basler A302f is only used when a new mounting plate is pos itione d by the handler. In norm al operation , only the two Basler A101f cameras will be sending data at the same time and they will be operating at about 10 FPS. This results in a data rate of about 27 MBytes/s, which is well within the specification for IEEE-1394.

Since IEEE-1394 supports bi-directional communication between the camera and the PC, before each frame capture , the PC can easily change resolution, gain , offset, shutter speed, or whatev er is required.

The IEEE-13 94 solution results in the se clea r advanta ges for the custom er:

- Onlyone PC,

- Only one inter face card (very inexpensive compare d with frame grabber cards),

- Easy and inexpens ive cabl ing ,

- The system meet s the expect ations for spee d and accuracy,

- The range of inspect able parts is much bigger than with the old syste m.

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