



SERVICE MANUAL

MODEL: DRK898(DR389K-P)

DVD RECORDER SERVICE MANUAL

MODEL: DRK898(DR389K-P)

CAUTION

BEFORE SERVICING THE UNIT, READ THE "SAFETY PRECAUTIONS"
IN THIS MANUAL.



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SECTION 1

SUMMARY

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PRODUCT SAFETY SERVICING GUIDELINES FOR DVD RECORDER PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "X" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION : Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS



The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of non-insulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

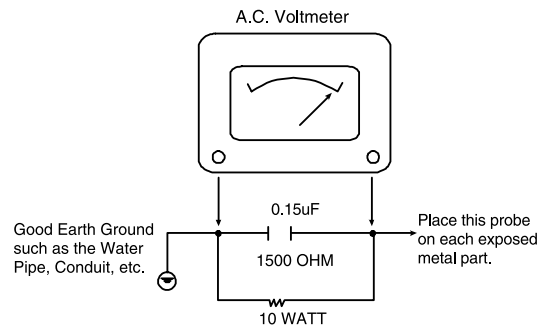
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items transported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. **DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST.** Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

SERVICING PRECAUTIONS

CAUTION: Before servicing the DVD RECORDER covered by this service data and its supplements and addends, read and follow the SAFETY PRECAUTIONS. NOTE: if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publication, always follow the safety precautions.
Remember Safety First :

General Servicing Precautions

1. Always unplug the DVD RECORDER AC power cord from the AC power source before:
 - (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
 - (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
 - (3) Connecting a test substitute in parallel with an electrolytic capacitor.
Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Do not spray chemicals on or near this DVD RECORDER or any of its assemblies.
3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.
Unless specified otherwise in this service data, lubrication of contacts is not required.
4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
5. Do not apply AC power to this DVD RECORDER and / or any of its electrical assemblies unless all solidstate device heat sinks are correctly installed.
6. Always connect the test instrument ground lead to an appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an 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 (Note 1) should be more than 1Mohm.

Note 1 : Accessible Conductive Parts include Metal panels, Input terminals, Earphone jacks, etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES 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 ES 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 ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate an electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

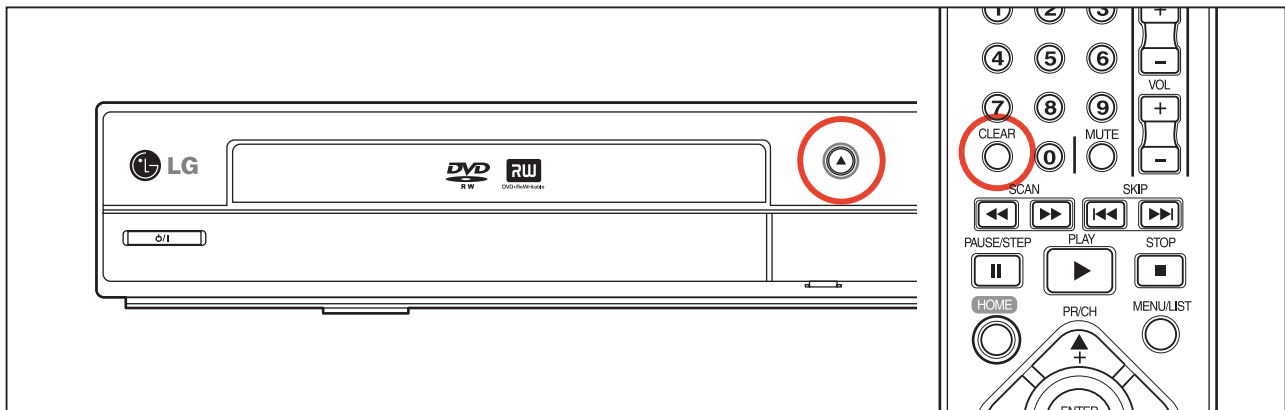
Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally 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 ES device.)

SERVICE INFORMATION FOR EEPROM IC SETTING

1. Press the CLEAR button on the remotecon together with “OPEN” on the front panel about ± 6 sec.

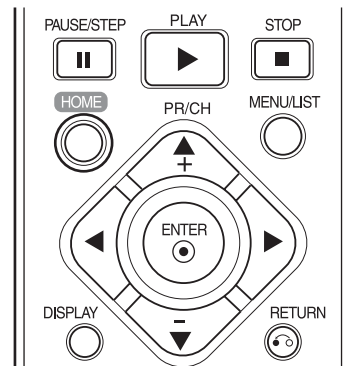
< 8 TOOL >



The picture on OSD will be as bellow :

Model : DRK898

OP1 : 6A	00000000	
OP2 : 30	00000000	071031A
OP3 : D7	00000000	
OP4 : 62	00000000	
OP5 : 1A	00000000	
OP6 : 5C	00000000	
OP7 : 15	00000000	Write : OK
OP8 : 01	00000000	Exit : MP
OP9 : 08	00000000	Move : <>
OPA : 00	00000000	Edit : **
checksum : 066D		



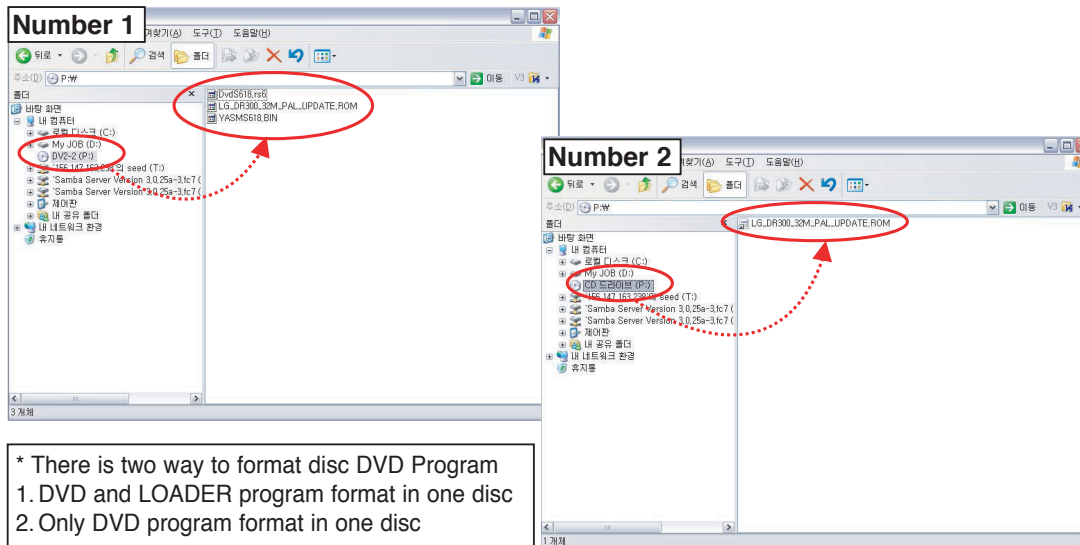
2. To MOVE from OP1 (Option 1) to another option, Press “◀▶” button on the remote control or front panel.
3. To CHANGE the option code, press “⬆” on the remote control.
4. To APPLY the option code, after change the option press “OK/ENTER” button on the remote control.
5. To INITIALIZE the system, press “CLEAR” button on the remote control and “OPEN” on the front panel together about ± 6 sec.
6. To exit from the option code menu without initializing the system, just turn off the power and then turn on again.

UP-DATING PROGRAM

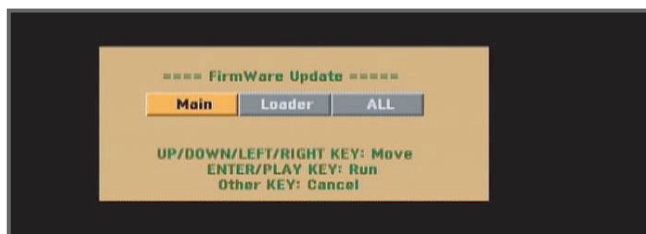
1. DVD & LOADER UP-DATING

1-1. BURNING DISC

1. For up-dating the DVD program using the disc, it must burning the disc which include the DVD software.
2. For DVD Recorder set which using the disc downloader program are DVD program and Loader program.
3. In 2nd generation for DVD Recorder can download the DVD program and Loader program on by one, or all together.



4. If you format like number 1 you'll see capture like **[FIGURE 1]**.
5. And you have three choice :
 - 1) Main : It's mean if you chose this it'll up-dating only DVD program.
 - 2) Loader : It's mean if you chose this it'll up-dating only Loader program.
 - 3) ALL : It's mean if you chose this it'll up-dating only DVD and Loader program.



[FIGURE 1]

6. If you format like number 2 you'll not see capture like figure 1 that give you choices, you have no choice only update DVD or Loader program.

1-2. UPGRADE INSTRUCTION

1-2-1. FORMAT NO.1

1. Press **"POWER"** key (front or remote control) to turn on.
2. After booting, insert the upgrade disc, and you will see message like **[FIGURE 1]**.
3. Press **"PLAY"** key (front or remote control) and you will see as **[FIGURE 2]** with remote control chose one of them then press **"ENTER"** key (remote control).
4. For update both of them [MAIN & LOADER] we chose **"ALL"** and first you will see **[FIGURE 3]** DVD update --> Check the "Current Version" and "New CD Write Version" and press **"PLAY"** key.
5. The DVD update will be on progress. And when finish update MAIN Version it's automatically continue to Update Loader Version and you will see **[FIGURE 4]**.
--> Check the "Current Version" and "New CD Write Version" and press **"PLAY"** key once more.
6. The Loader update will be on progress. And tray will open.
7. Remove the disc and wait until finish.
8. The tray will be close and automatically after completing "UNDER UPDATE" 100%.
9. Turn off the unit.
10. Turn on again the unit is operation with new software.



[FIGURE 1]



[FIGURE 2]



[FIGURE 3]



[FIGURE 4]

1-2-2. FORMAT NO.2

1. Press **"POWER"** key (front or remote control) to turn on.
2. After booting, insert the upgrade disc, and you will see message like **[FIGURE 1]**.
3. Press **"PLAY"** key (front or remote control) and you will see as **[FIGURE 2]**.
4. The DVD update will be on progress.
--> Check the "Current Version" and "New CD Write Version" and press **"PLAY"** key once more.
5. The tray will be close and automatically after completing "UNDER UPDATE" 100%.
6. Remove the disc and Turn off the unit.
7. Turn on again the unit is operation with new software.



[FIGURE 1]

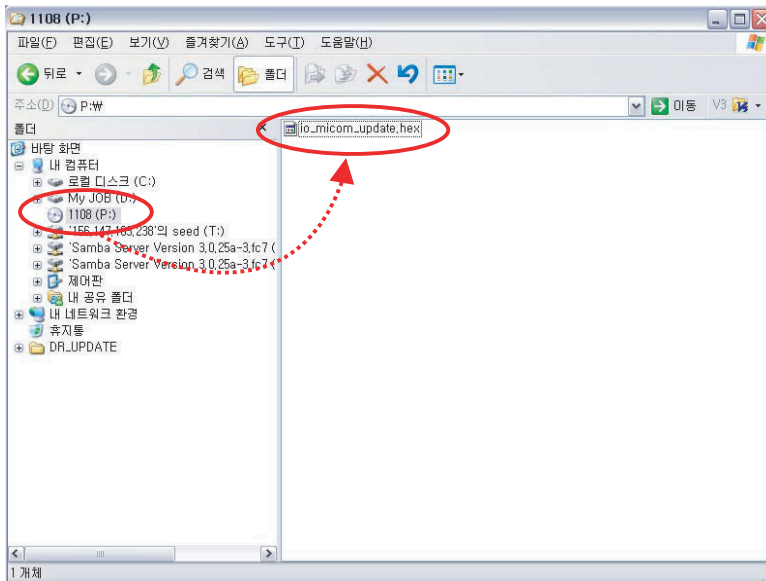


[FIGURE 2]

2. I/O MICOM UP-DATING

2-1. BURNING DISC

1. For up-dating the I/O Micom program using the disc, it must burning the disc which include the I/O Micom software.
2. For DVD Recorder set which using the disc downloader program are I/O Micom program.



2-2. UPGRADE INSTRUCTION

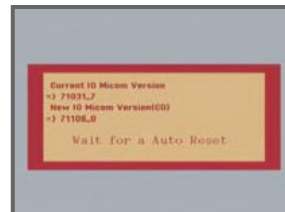
1. Press “**POWER**” key (front or remote control) to turn on.
2. After booting, insert the upgrade disc, and you will see message like [FIGURE 1].
3. Press “**PLAY**” key (front or remote control) and you will see as [FIGURE 2].
4. The I/O Micom update will be on progress.
--> Check the “Current I/O Micom Version” and “New I/O Micom Version(CD)” and press “**PLAY**” key once more.
5. The tray will be open and automatically after completing “100 percent done”.
6. Turn off the unit Automatically after “Wait for a Auto Reset” message [FIGURE 3].
7. Turn on again the unit is operation with new software.



[FIGURE 1]



[FIGURE 2]



[FIGURE 3]

SPECIFICATIONS

• GENERAL

Power requirements	AC 200 ~ 240V, 50/60Hz
Power consumption	15W
Dimensions (approx.)	430 X 49 X 245mm (w x h x d) without foot
Net weight (approx.)	2.5kg
Operating temperature	5°C to 35°C
Operating humidity	5% to 90%
Television system	PAL I, B/G, I/I, PAL D/K SECAM D/K, K1 color system
Recording format	PAL

• RECORDING

Recording format	DVD Video Recording, DVD-VIDEO
Recordable media	DVD-ReWritable, DVD-Recordable, DVD+ReWritable, DVD+Recordable
Recordable time	DVD (4.7GB) : Approx. 1 hour (XP mode), 2 hours (SP mode), 4 hours (LP mode), 6 hours (EP mode), 11 hours (MLP mode)

Video recording format

Sampling frequency	27MHz
Compression format	MPEG 2

Audio recording format

Sampling frequency	48kHz
Compression format	Dolby Digital

• PLAYBACK

Frequency response	DVD (PCM 48kHz) : 8Hz to 22kHz, CD : 8Hz to 20kHz DVD (PCM 96kHz) : 8Hz to 44kHz
Signal-to-noise ratio	More than 100dB (AUDIO OUT connector)
Harmonic distortion	Less than 0.008% (AUDIO OUT connector)
Dynamic range	More than 95dB (AUDIO OUT connector)

• INPUTS

ANTENNA IN	Antenna input, 75ohms
VIDEO IN	1.0Vp-p 75ohms, sync negative, RCA jack x 1 / SCART x 2
AUDIO IN	2.0Vrms more than 47kohms, RCA jack (L, R) x 1 / SCART x 2
DV IN	4pin (IEEE 1394 standard)
USB IN	4pin (USB 1.1 standard)

• OUTPUTS

S-VIDEO OUT	(Y) 1.0V (p-p), 75Ω, sync negative, Mini DIN 4-pin x 1 (C) 0.3V (p-p), 75Ω
COMPONENT VIDEO OUT	(Y) 1.0V (p-p), 75Ω, sync negative, RCA jack x 1 (Pb)/(Pr) 0.7V (p-p), 75Ω, RCA jack x 2
Audio output (digital audio)	0.5V (p-p), 75Ω, RCA jack x 1
Audio output (optical audio)	3V(p-p), Optical connector x 1
Audio output (analog audio)	2.0Vrms (1kHz, 0dB), 600Ω, RCA jack (L, R) x 1 / SCART x 2

SECTION 2

CABINET & MAIN CHASSIS

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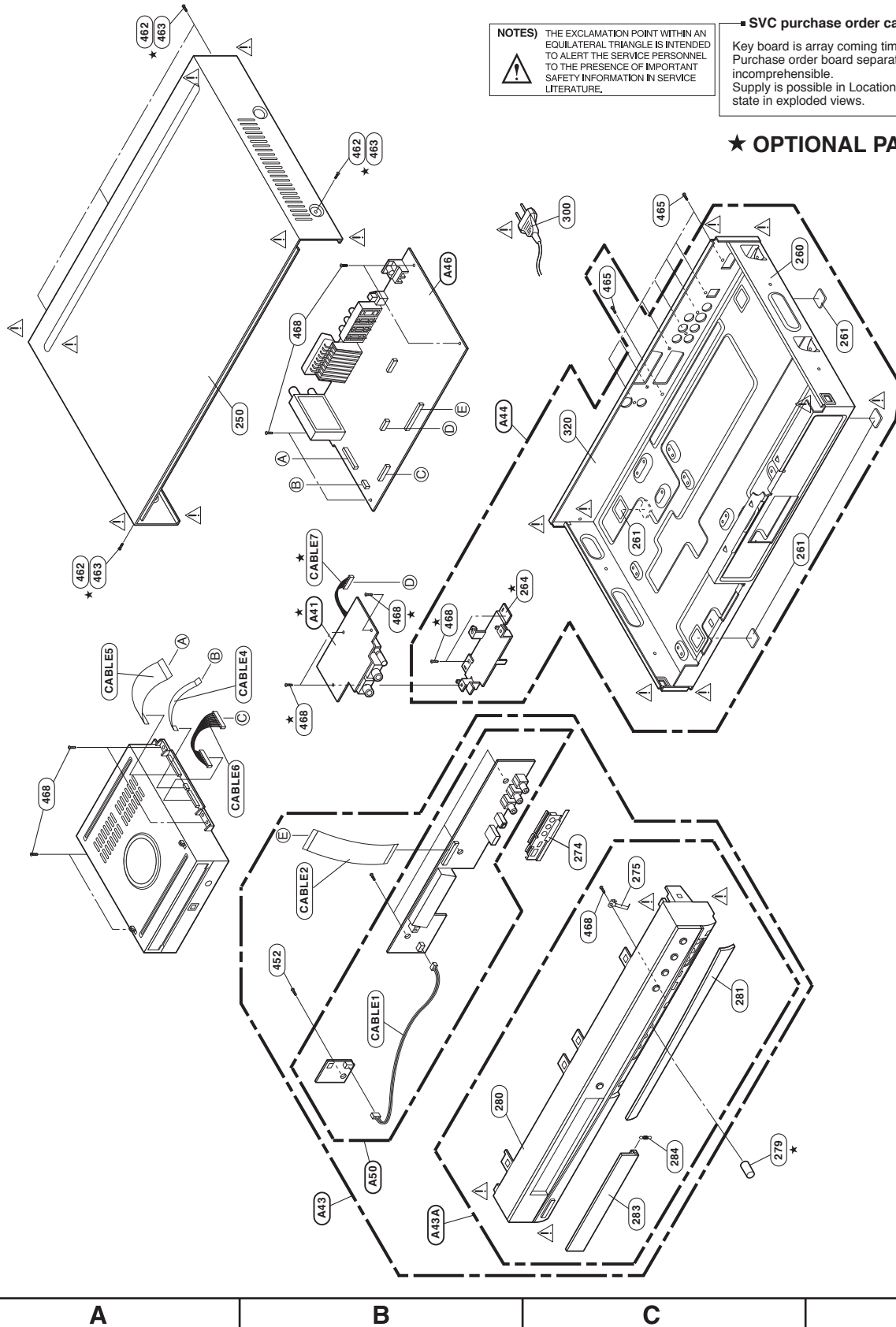
5

4

3

2

1

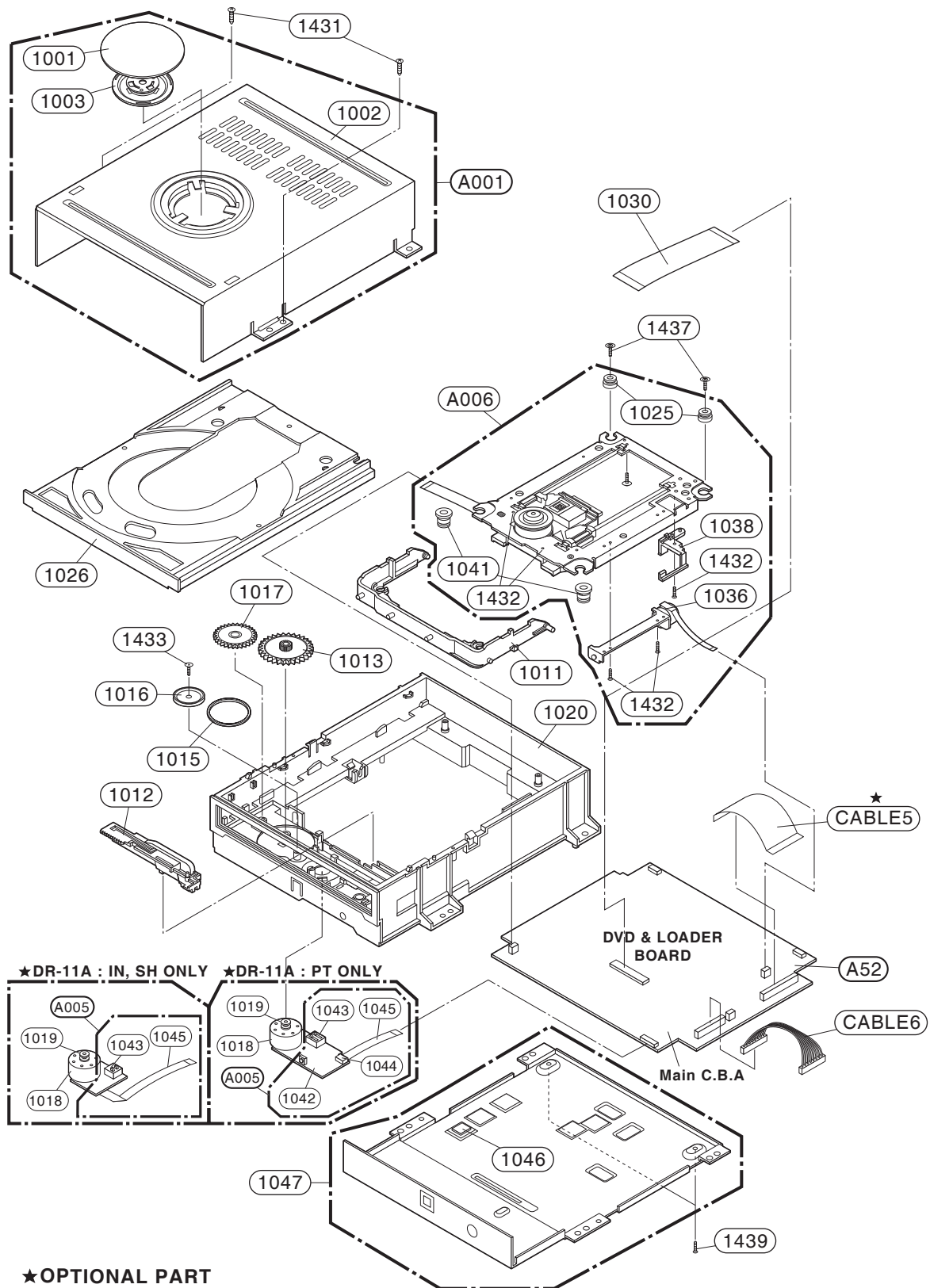


NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

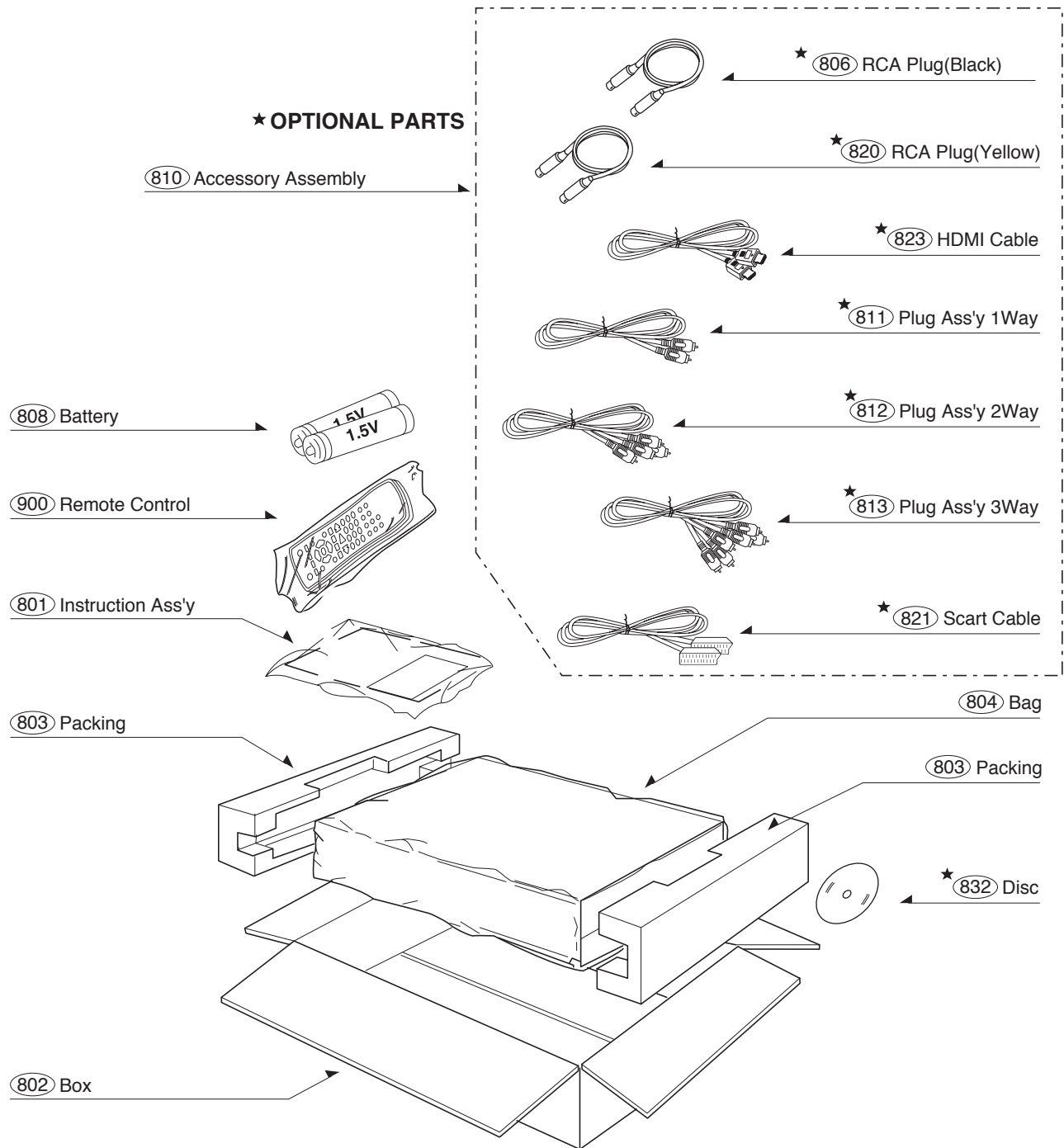
▪ **SVC purchase order caution** ▪
Key board is array coming timer board. Purchase order board separately supply incomprehensible. Supply is possible in Location No A50 state in exploded views.

★ **OPTIONAL PARTS**

2. DECK MECHANISM SECTION [RV9(DR-11A)]



3. PACKING ACCESSORY SECTION



SECTION 3

ELECTRICAL

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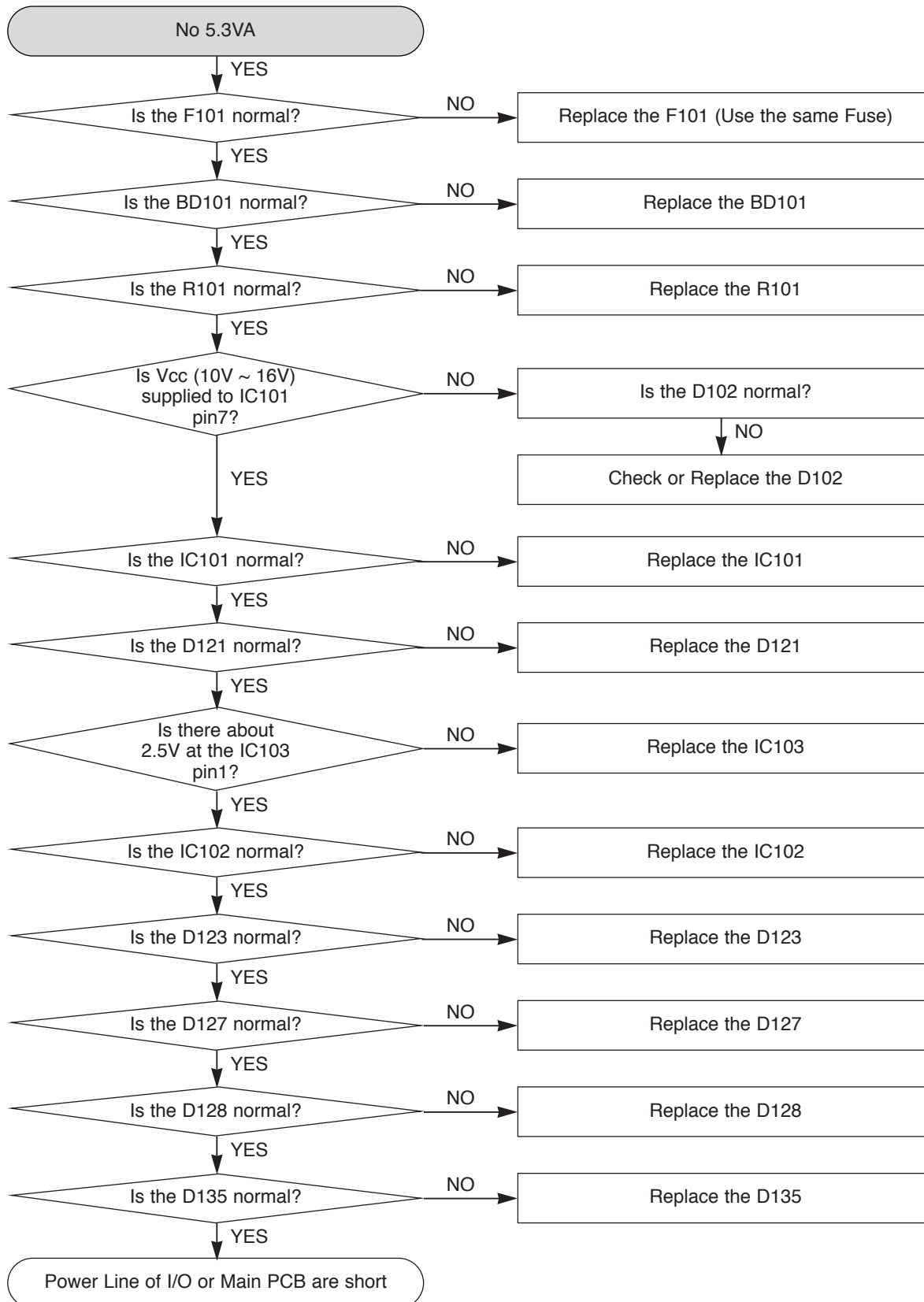
2. I/O & SMPS P.C.BOARD3-71

3. TIMER & KEY P.C.BOARD3-75

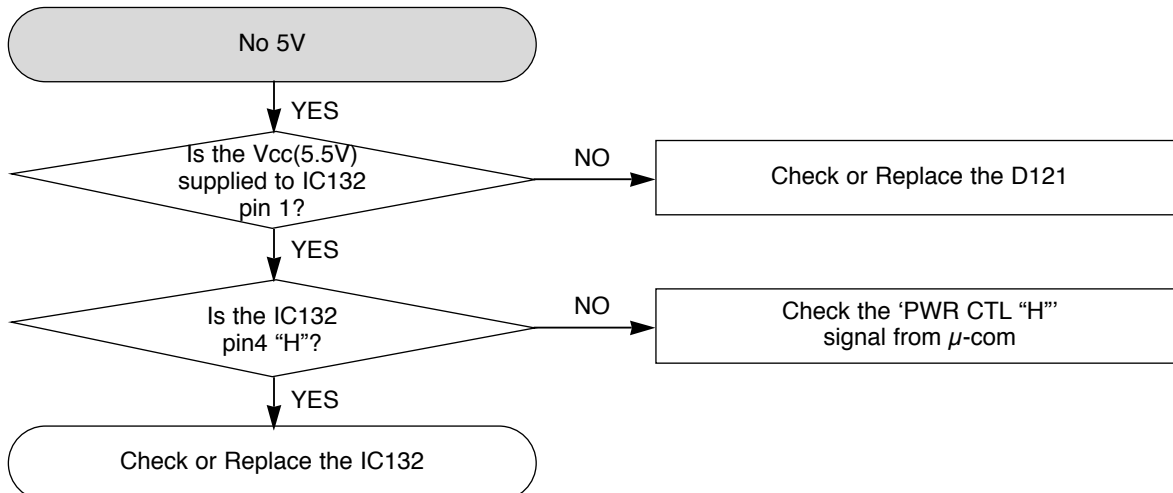
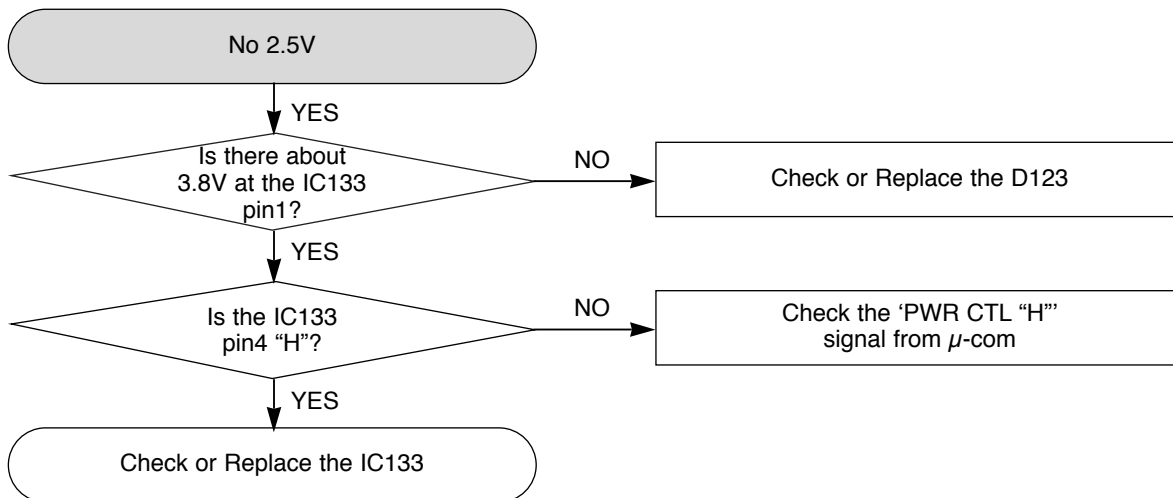
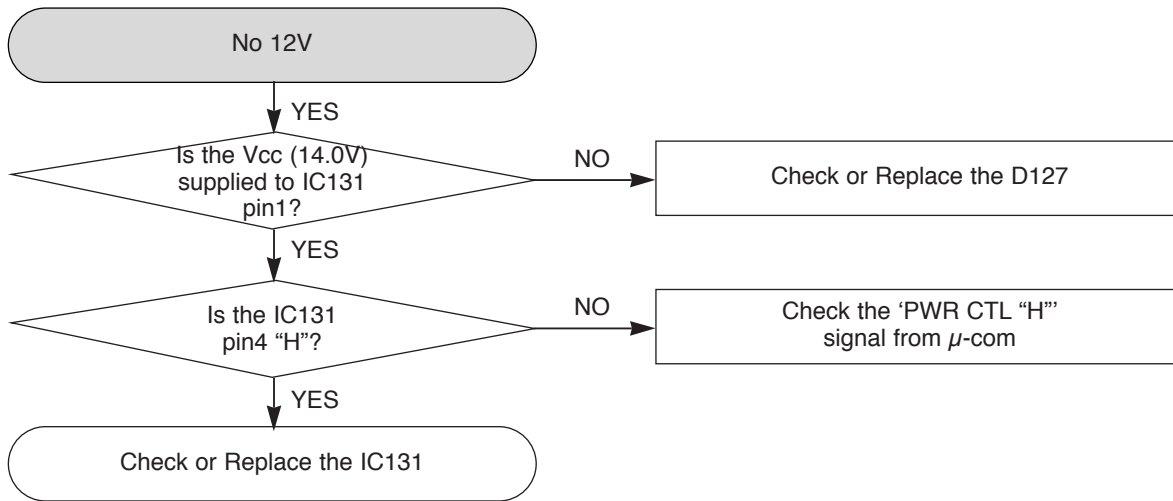
4. KARAOKE P.C.BOARD (OPTION)3-76

ELECTRICAL TROUBLESHOOTING GUIDE

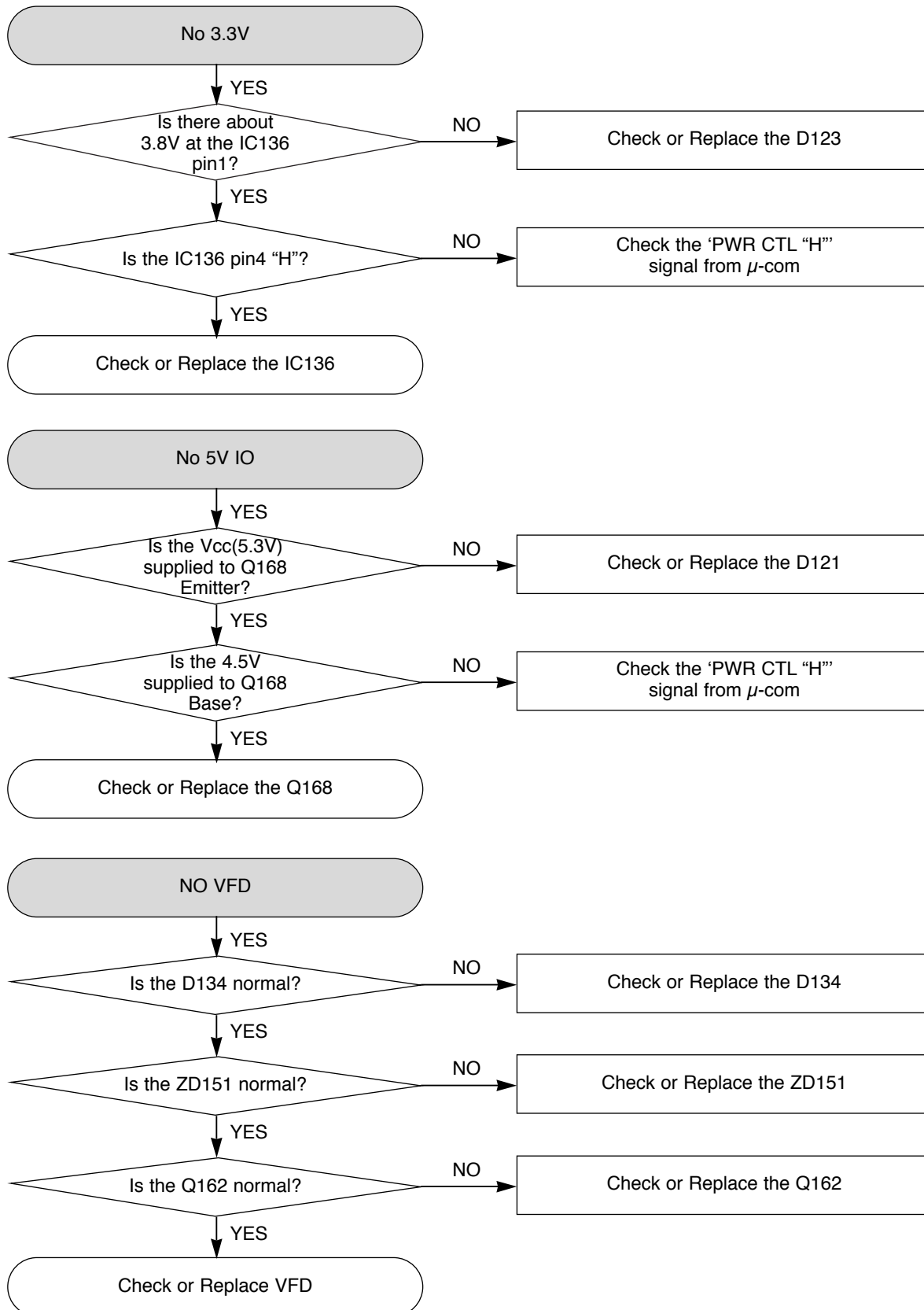
1. SMPS TROUBLESHOOTING



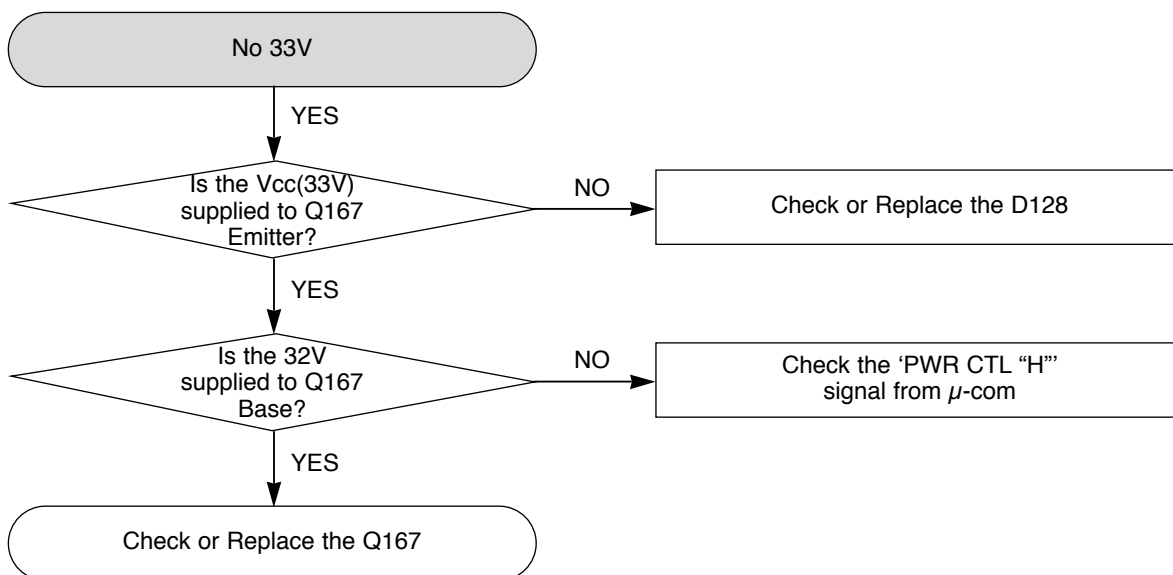
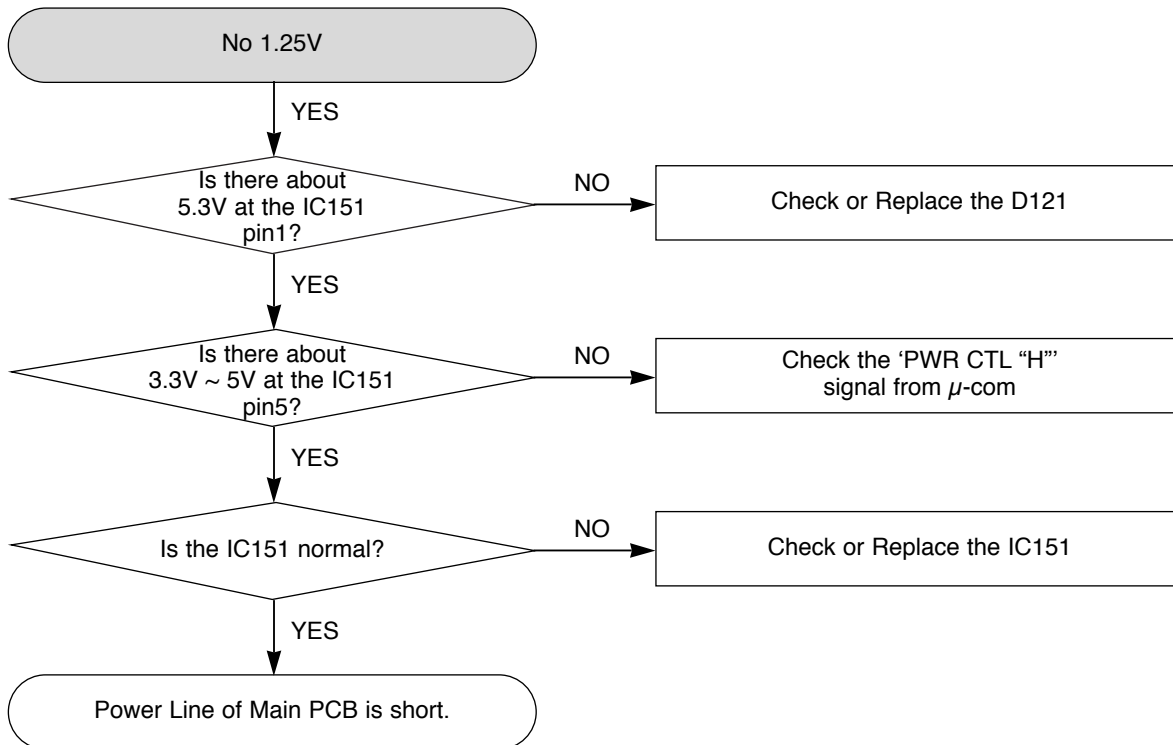
ELECTRICAL TROUBLESHOOTING GUIDE



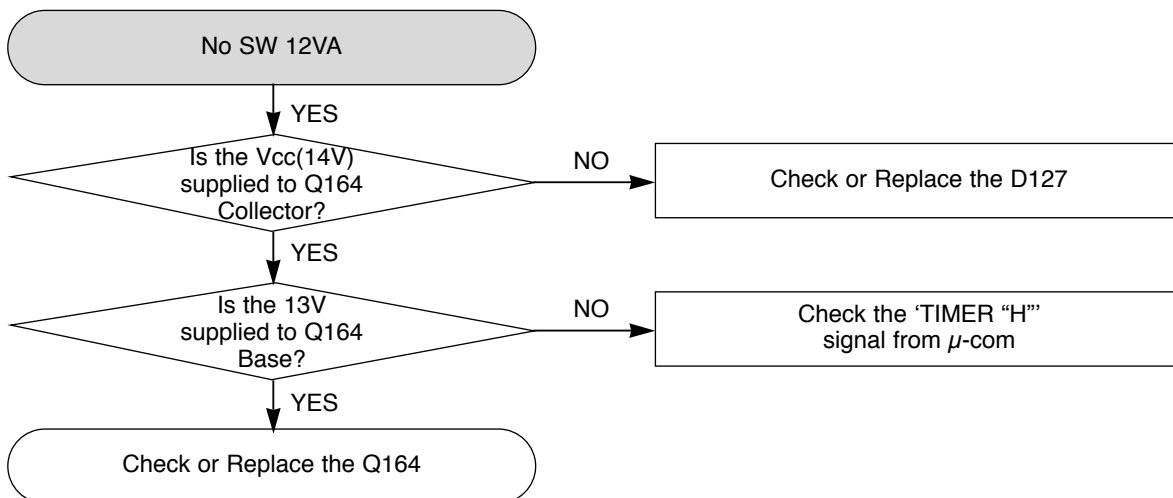
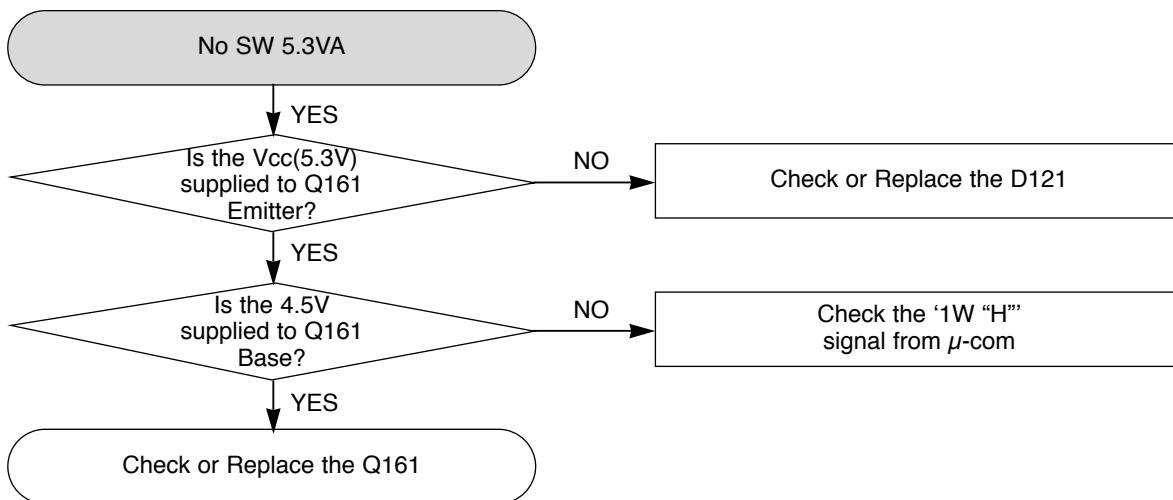
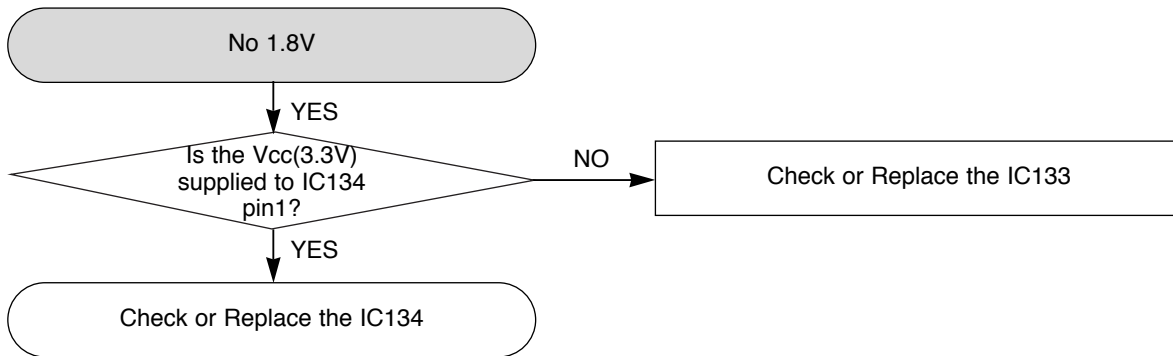
ELECTRICAL TROUBLESHOOTING GUIDE



ELECTRICAL TROUBLESHOOTING GUIDE

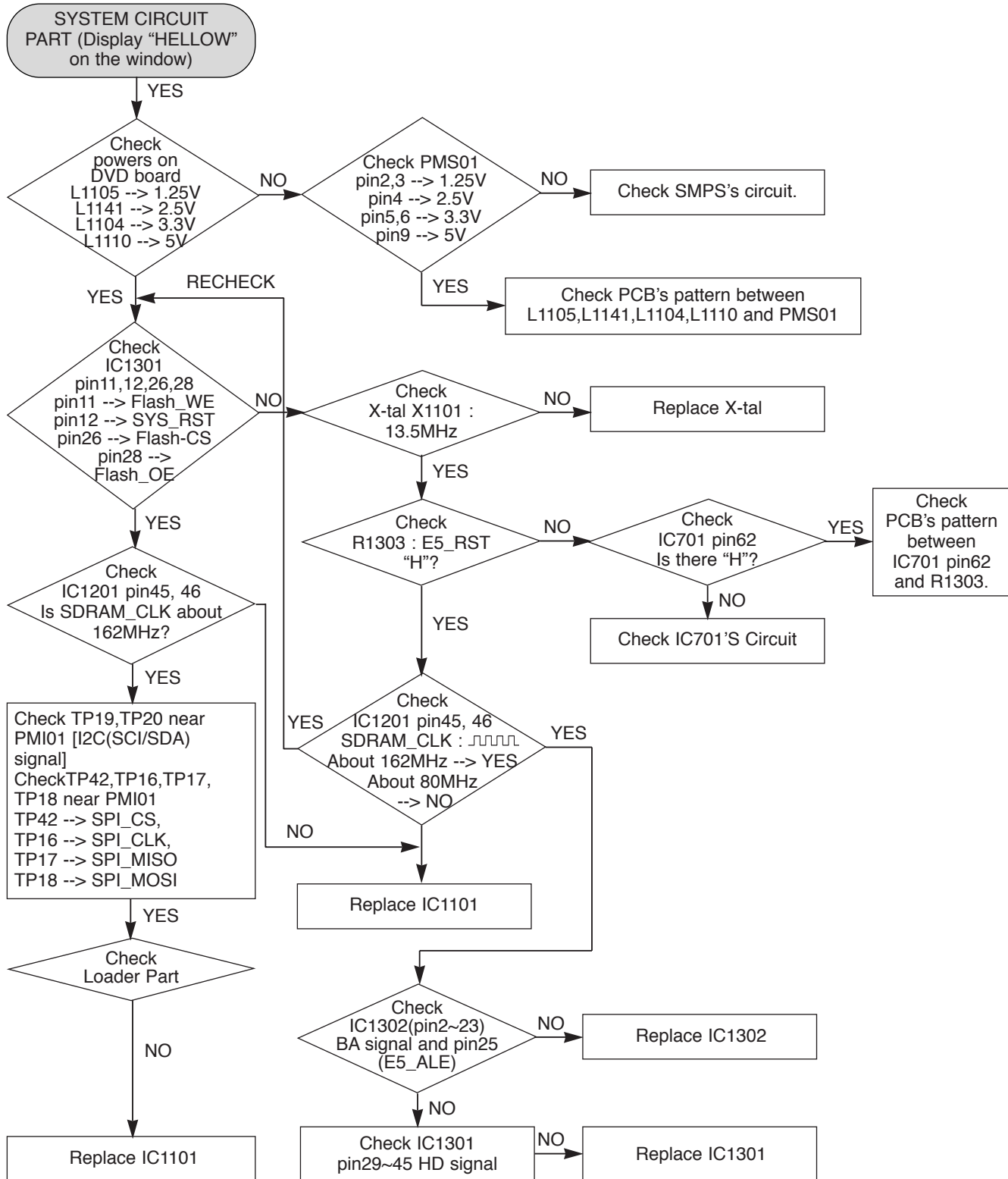


ELECTRICAL TROUBLESHOOTING GUIDE



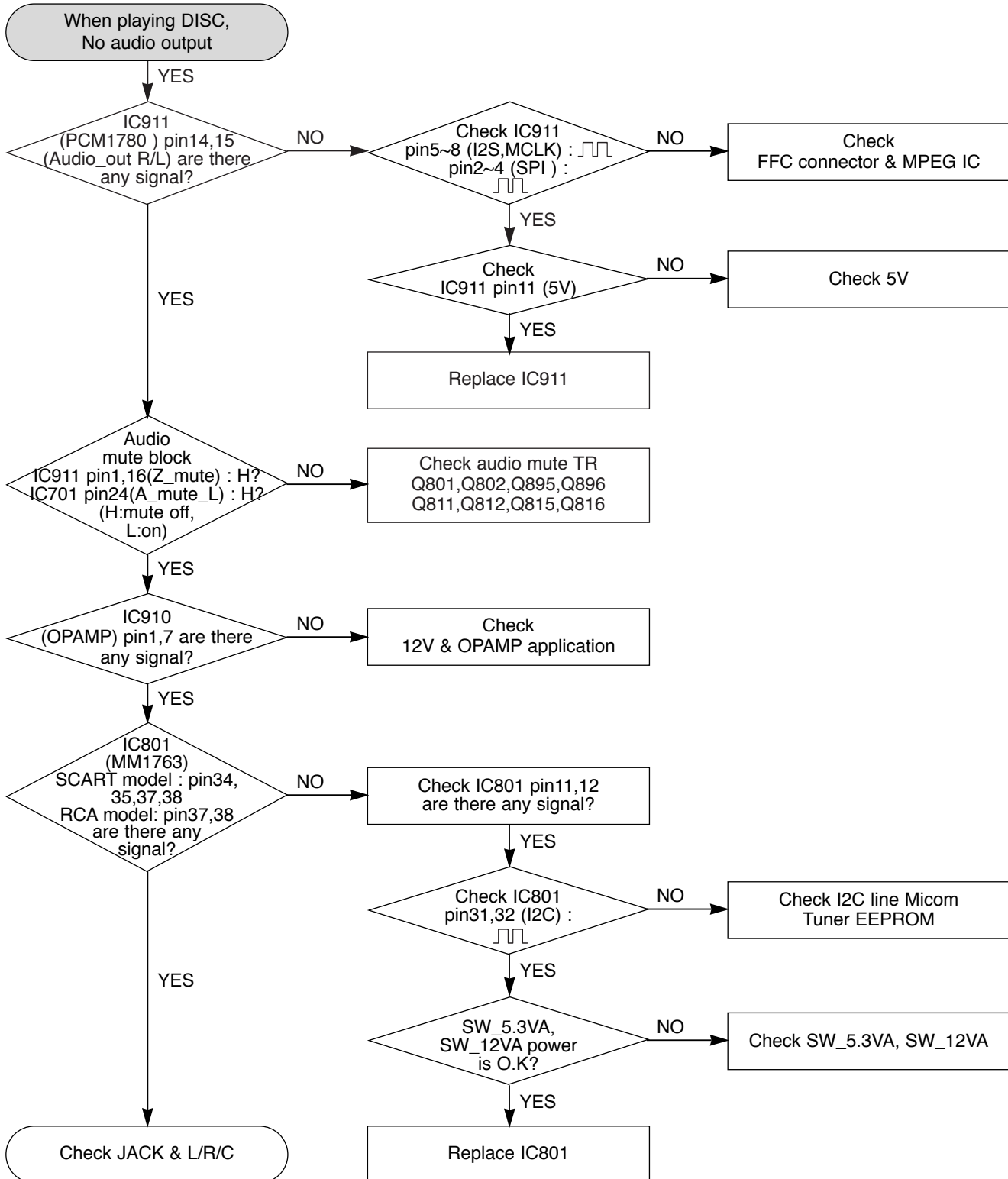
ELECTRICAL TROUBLESHOOTING GUIDE

2. SYSTEM CIRCUIT PART (DISPLAY "HELLOW" ON THE WINDOW)



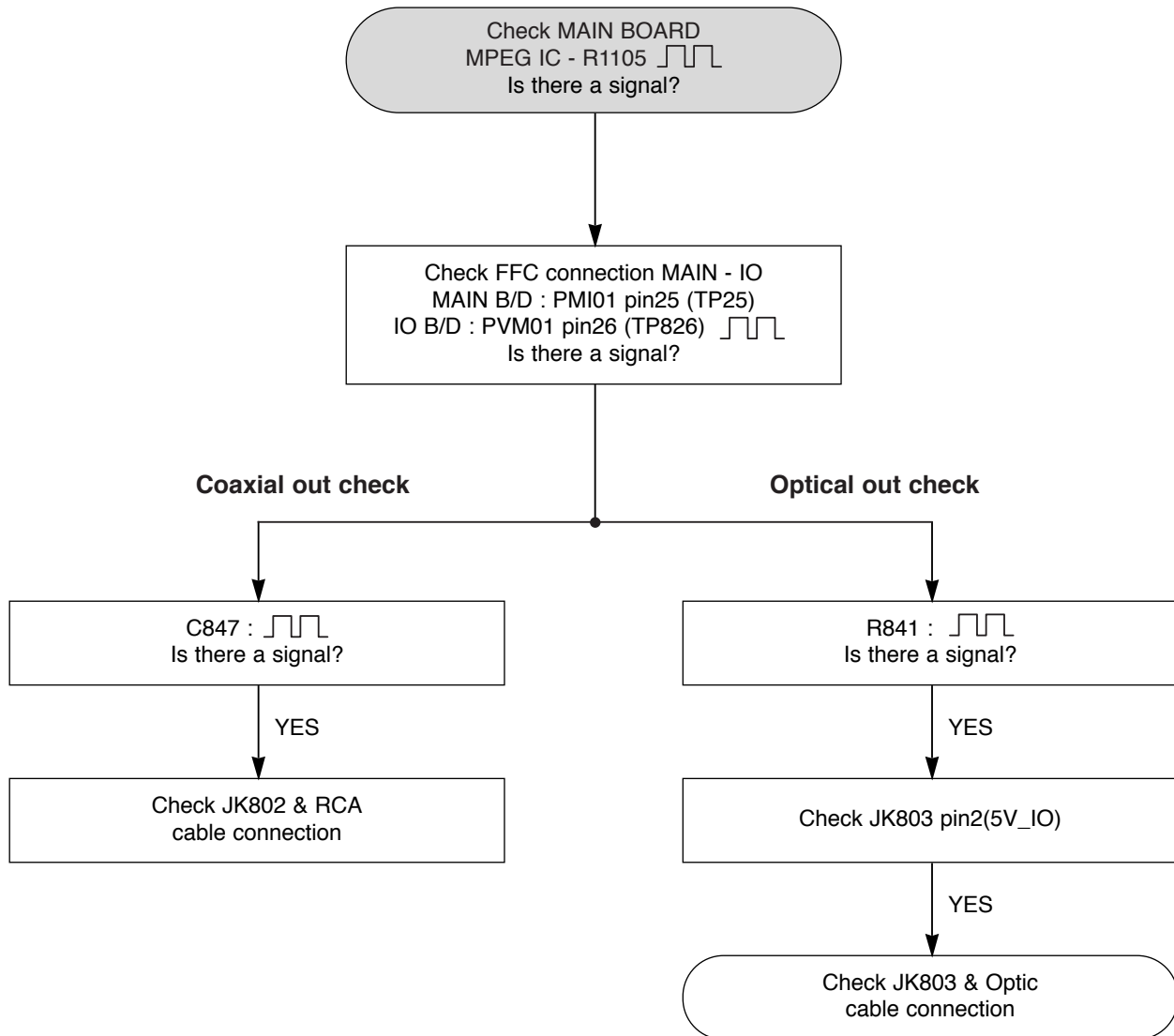
ELECTRICAL TROUBLESHOOTING GUIDE

3. WHEN PLAYING DISC, NO AUDIO OUTPUT



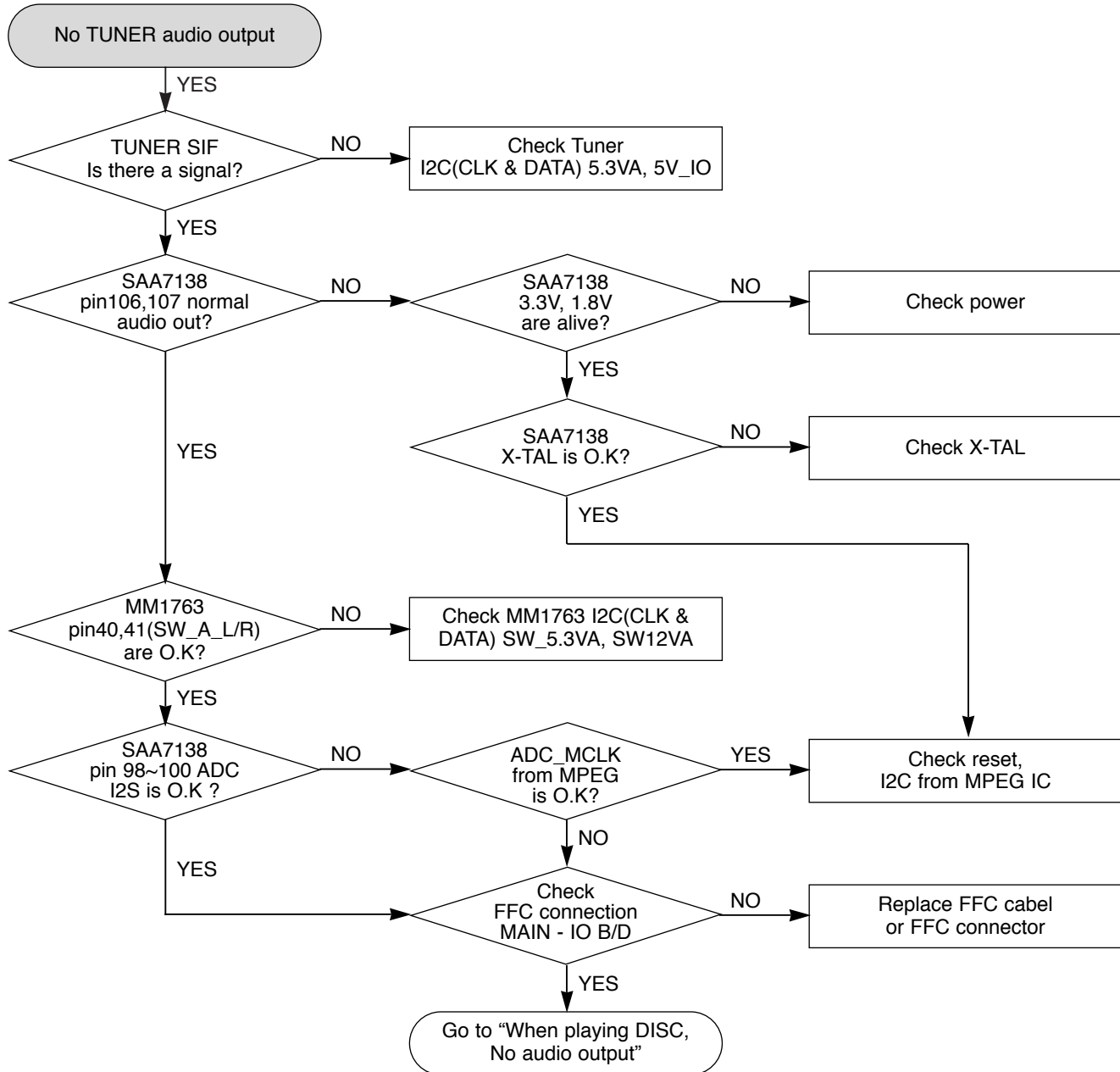
ELECTRICAL TROUBLESHOOTING GUIDE

4. NO OPTICAL / DIGITAL OUTPUT



ELECTRICAL TROUBLESHOOTING GUIDE

5. NO TUNER AUDIO OUTPUT

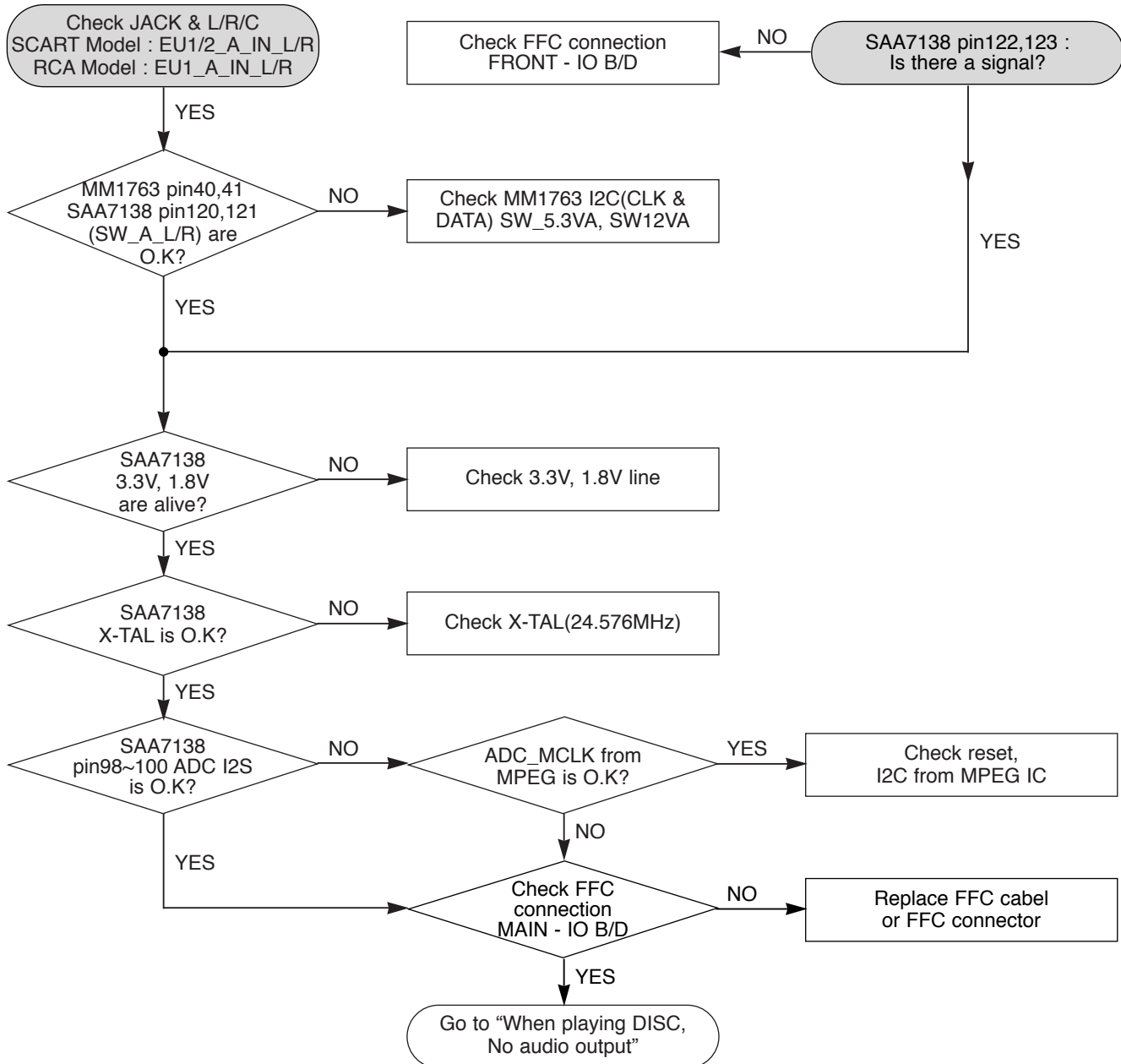


ELECTRICAL TROUBLESHOOTING GUIDE

6. NO EXTERNAL AUDIO INPUT

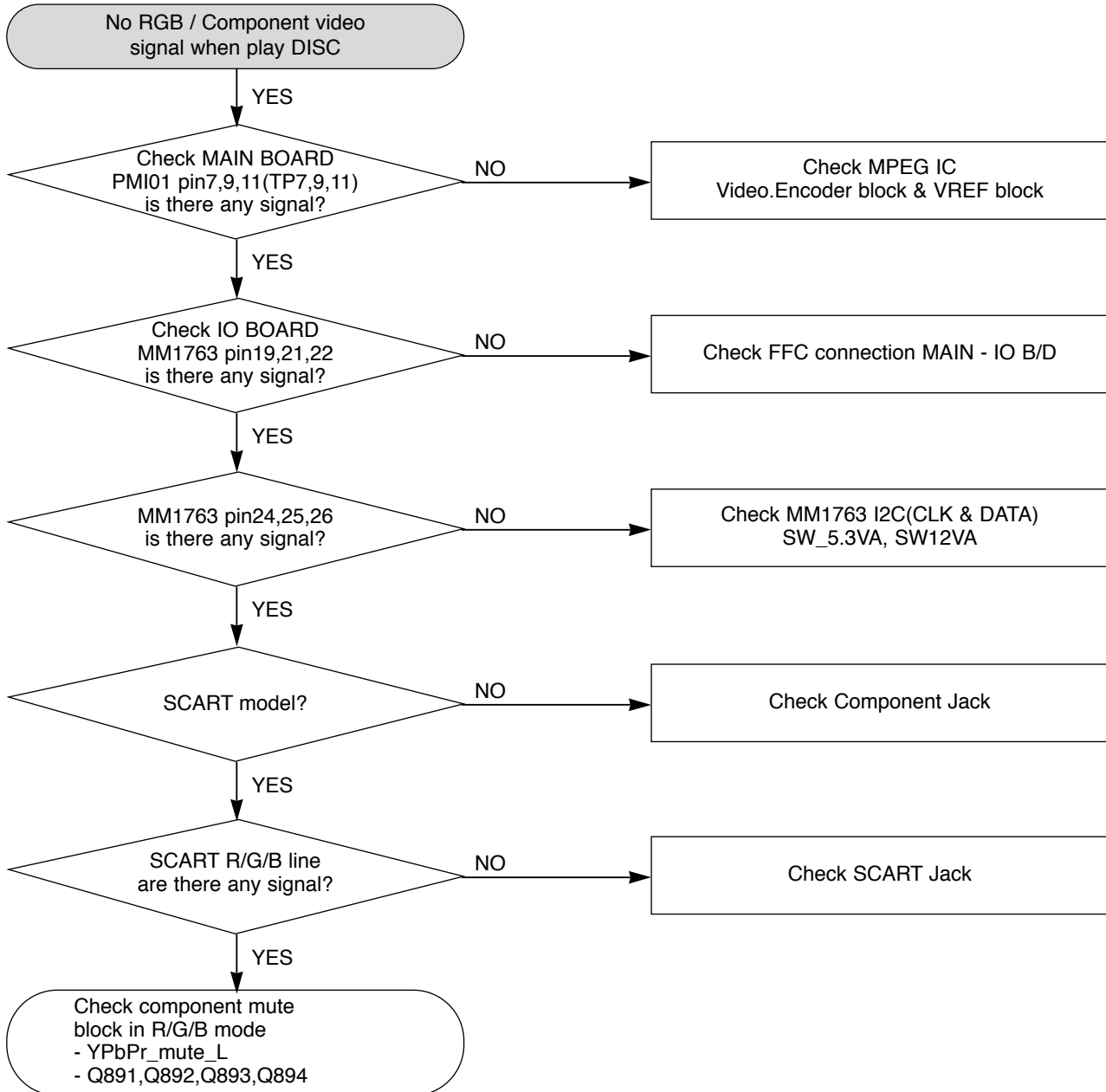
< REAR AV INPUT >

< FRONT AV INPUT >



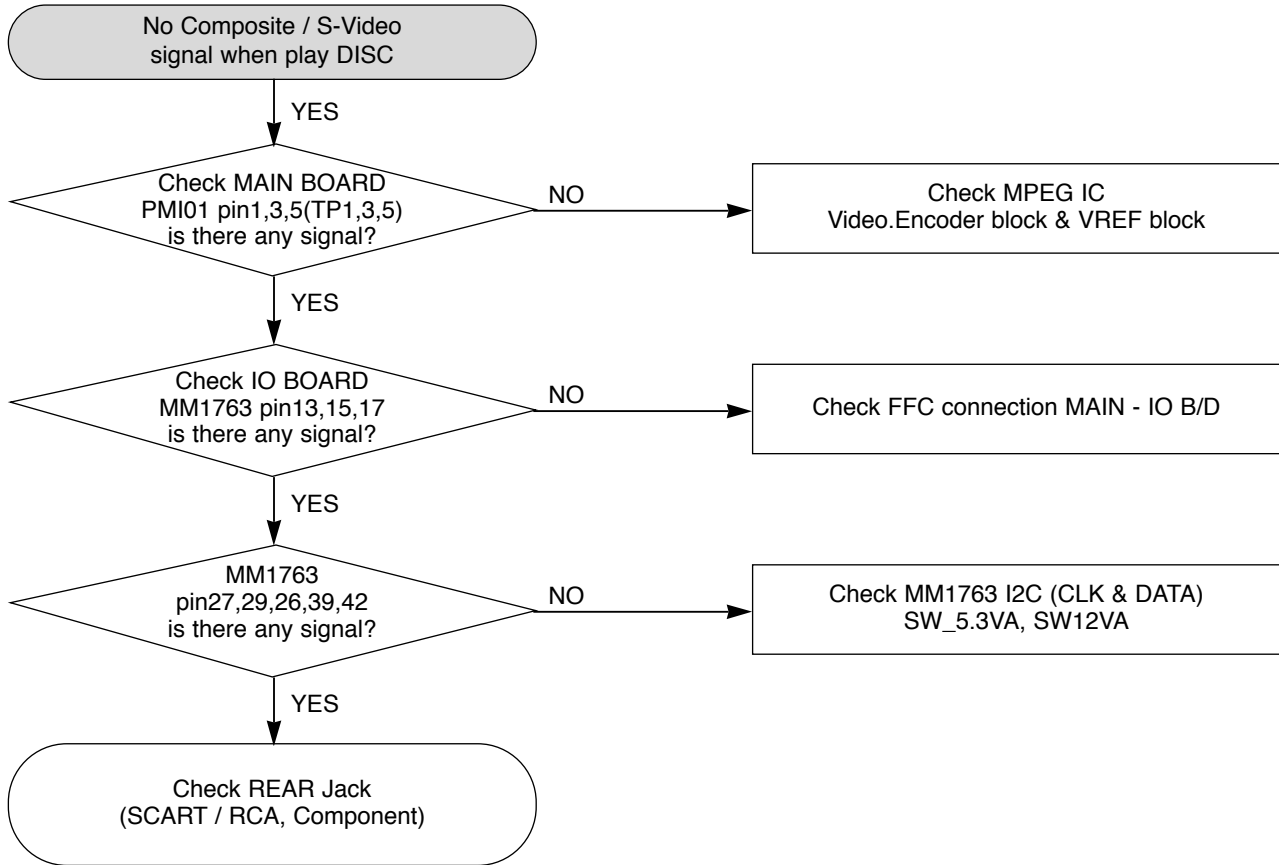
ELECTRICAL TROUBLESHOOTING GUIDE

7. NO RGB / COMPONENT VIDEO SIGNAL WHEN PLAY DISC



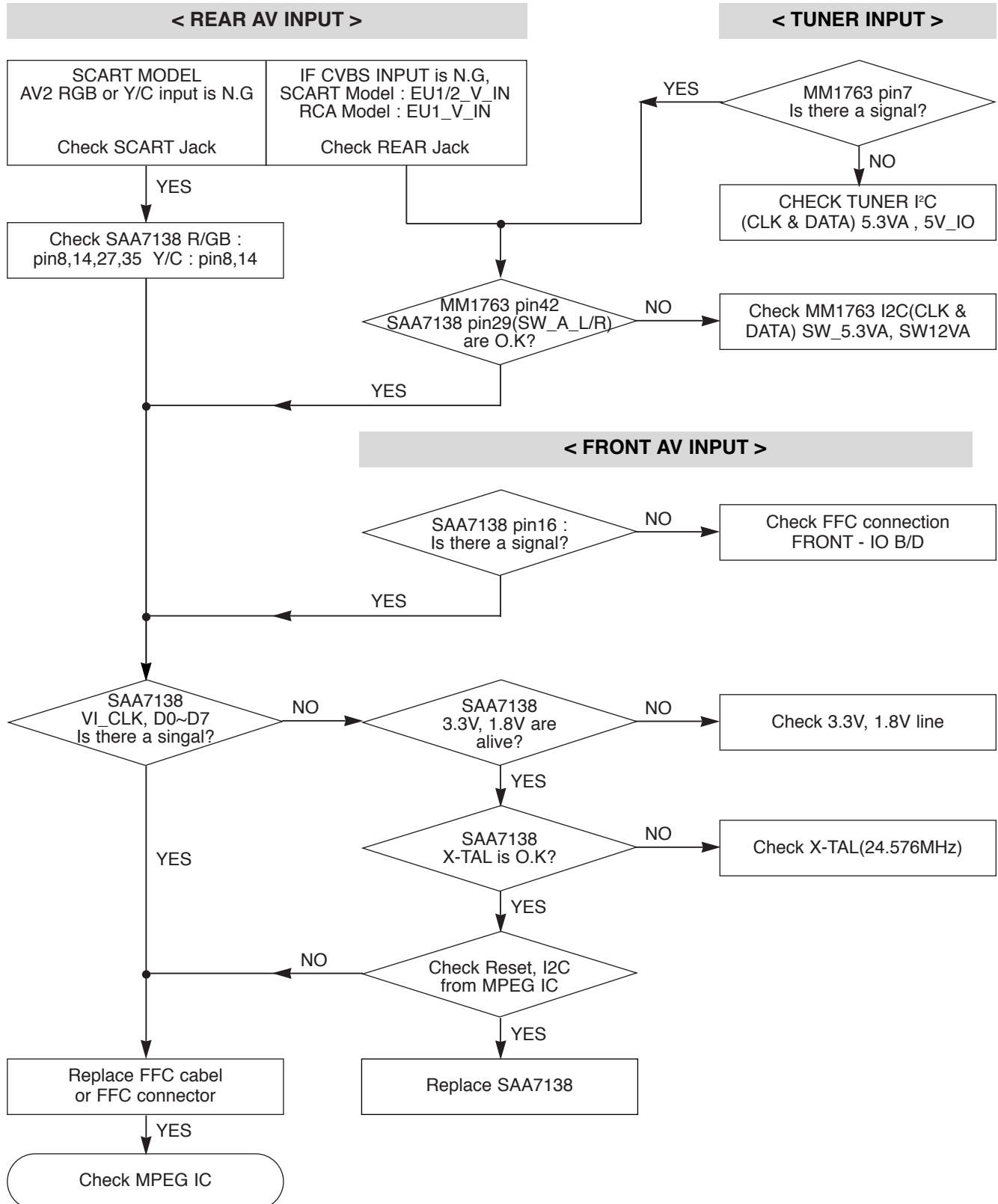
ELECTRICAL TROUBLESHOOTING GUIDE

8. NO COMPOSITE / S-VIDEO SIGNAL WHEN PLAY DISC



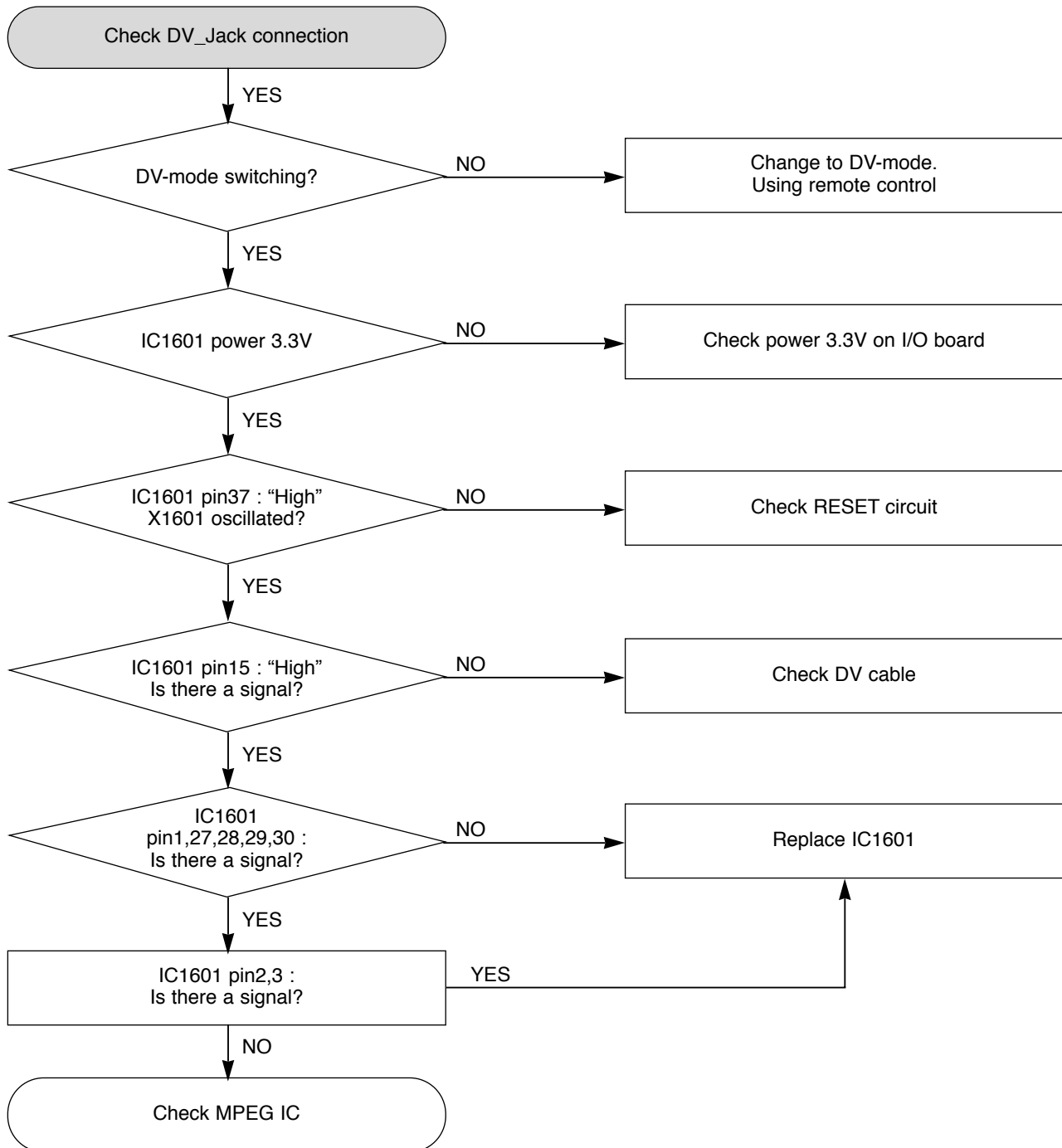
ELECTRICAL TROUBLESHOOTING GUIDE

9. NO TV, EXTERNAL INPUT VIDEO SIGNAL



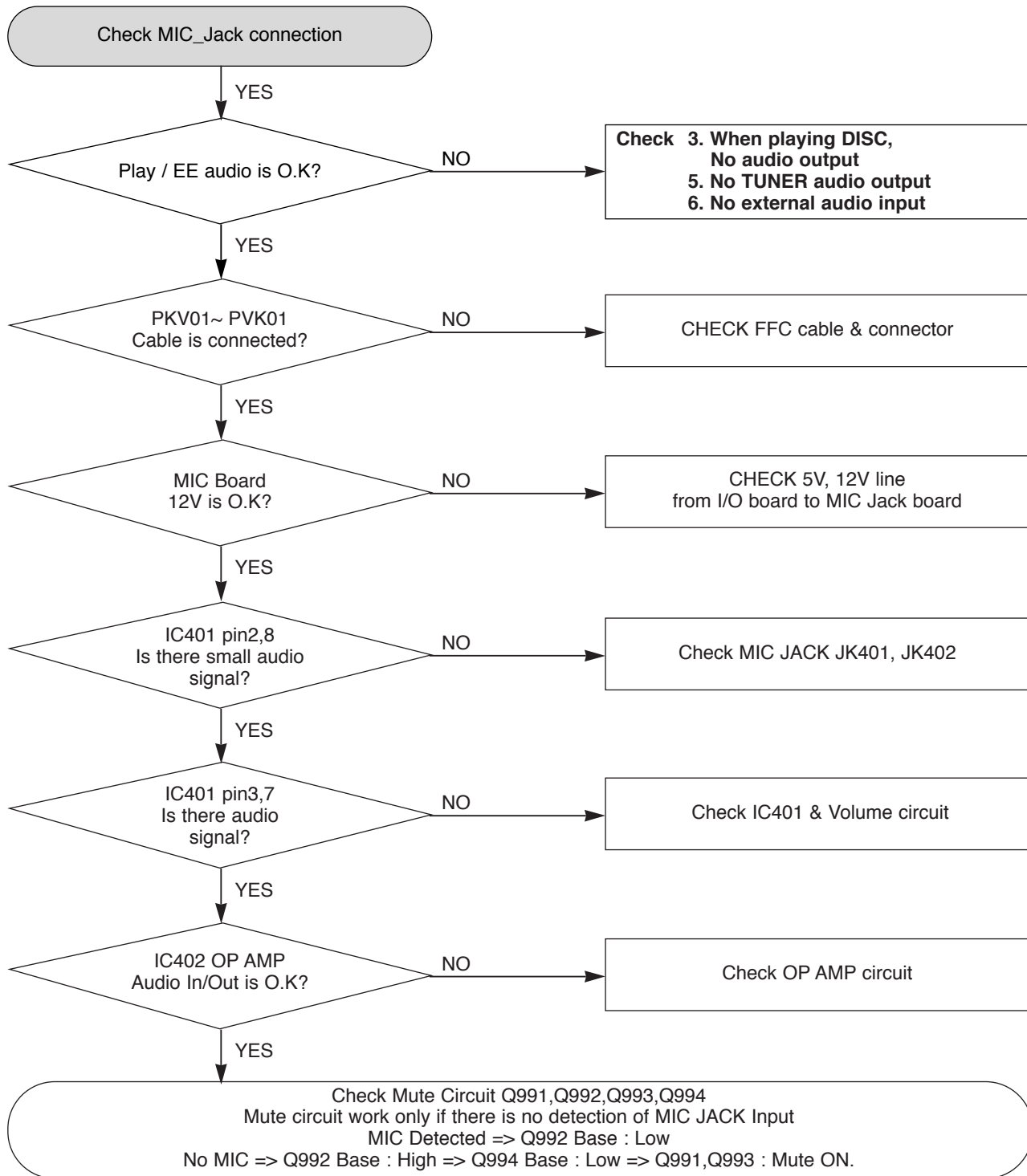
ELECTRICAL TROUBLESHOOTING GUIDE

10. NO DV(IEEE 1394) INPUT(VIDEO/AUDIO) SIGNAL



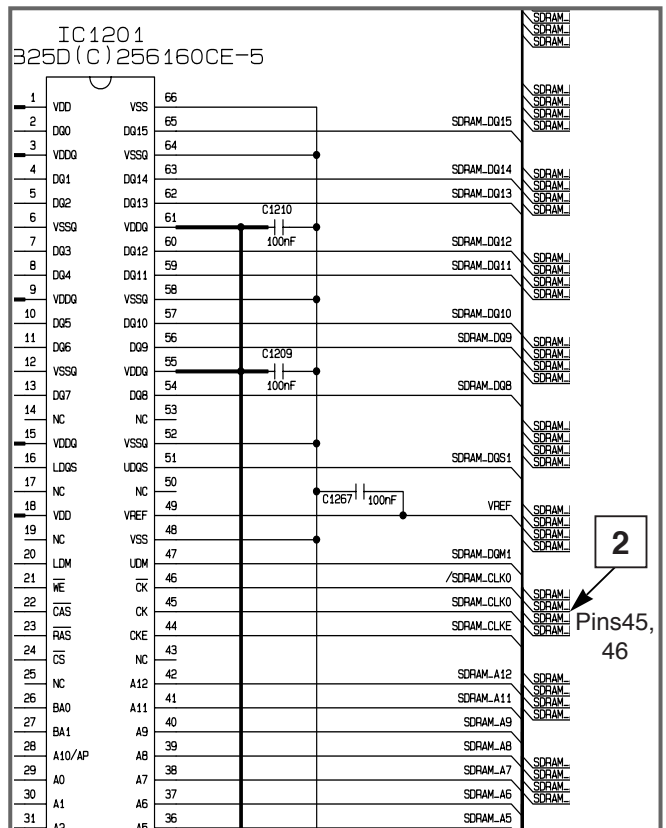
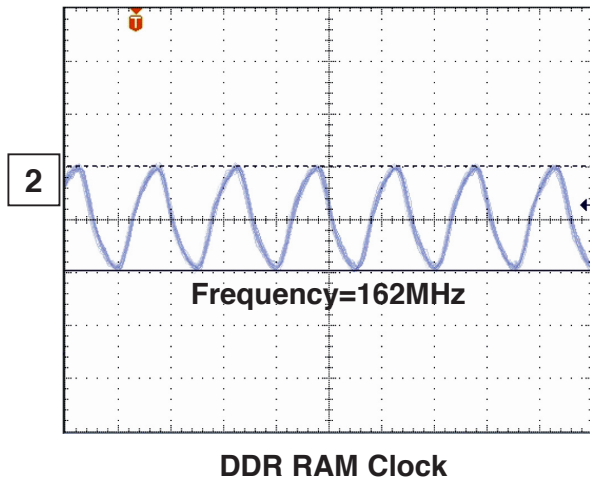
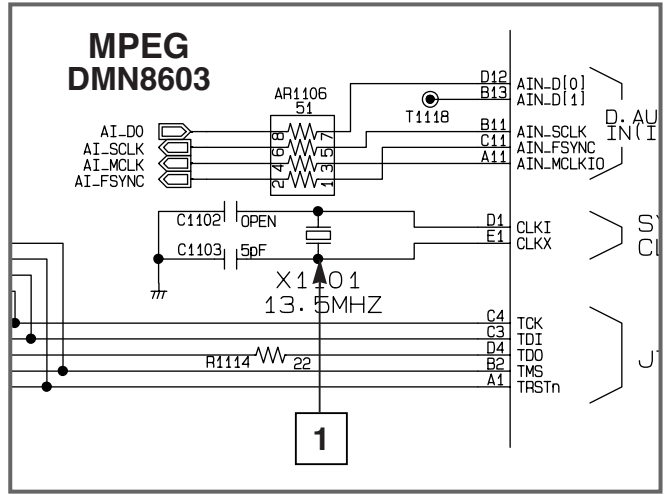
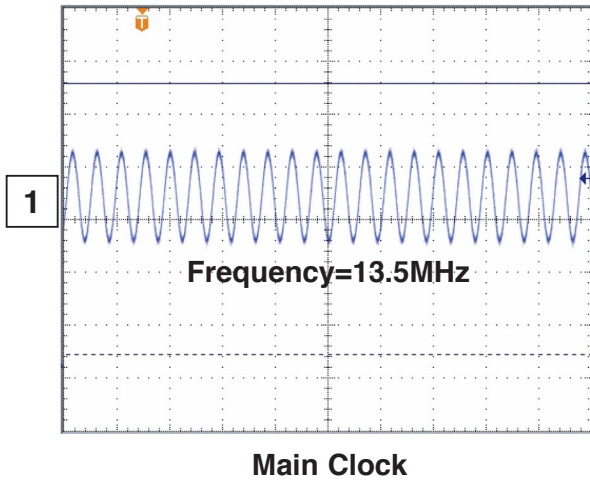
ELECTRICAL TROUBLESHOOTING GUIDE

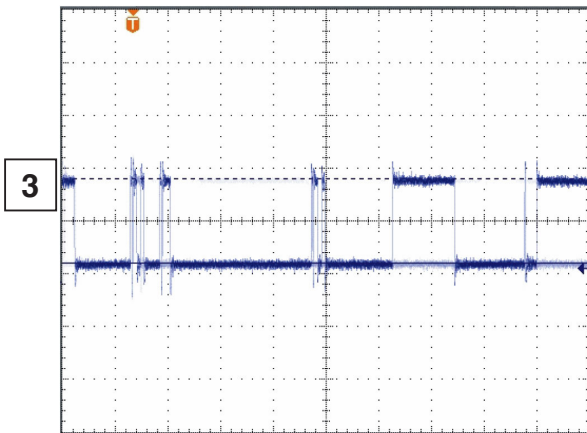
11. NO MIC AUDIO SIGNAL AT ANALOG OUTPUT (KARAOKE OPTION)



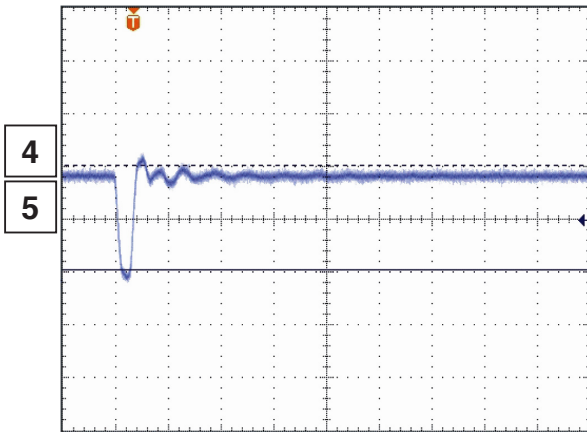
WAVEFORMS

1. SYSTEM BLOCK

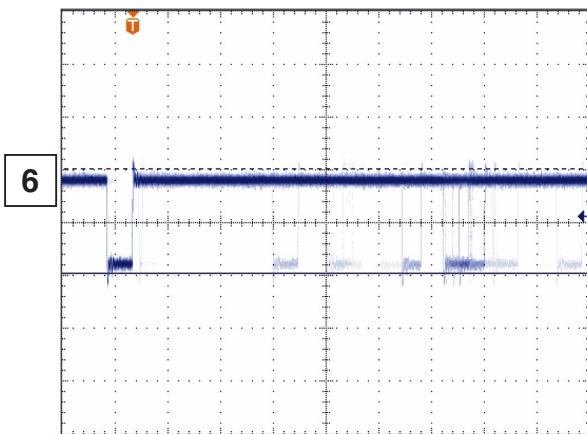




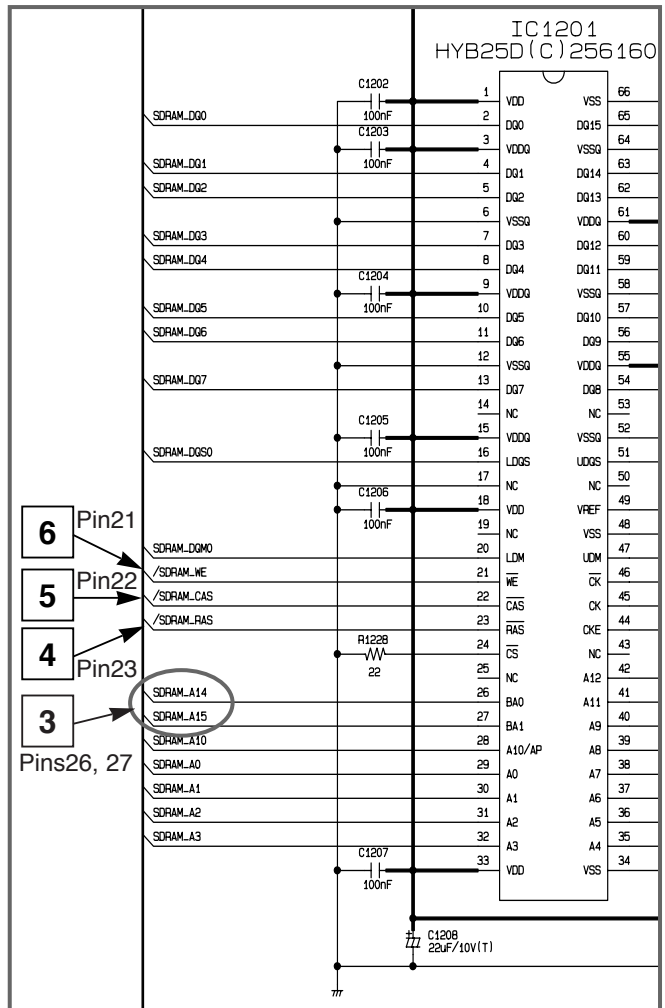
DDR Bank Address

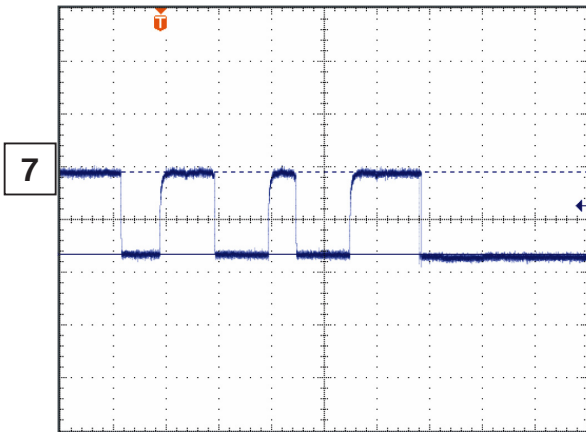
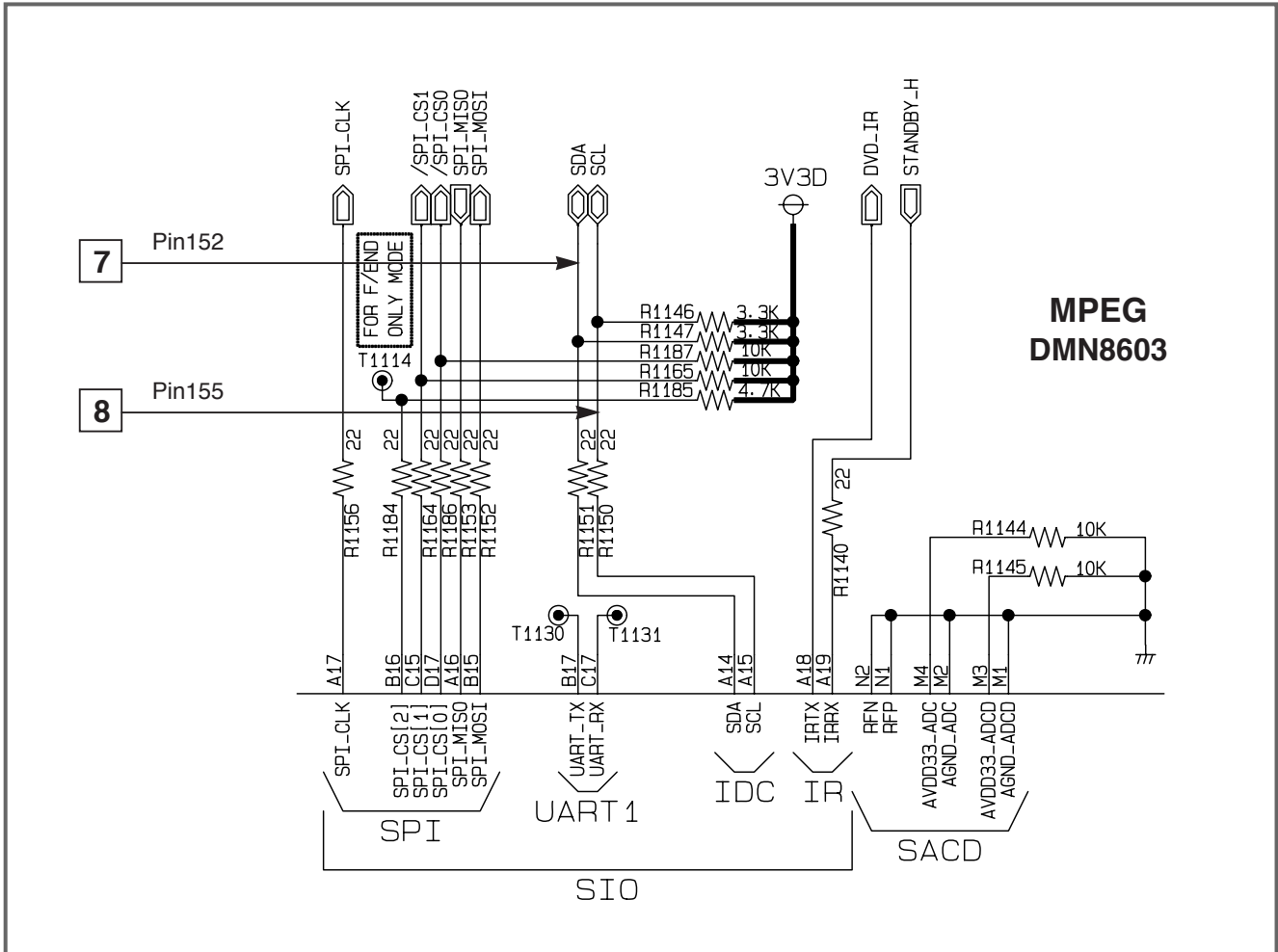


DDR RAS & CAS

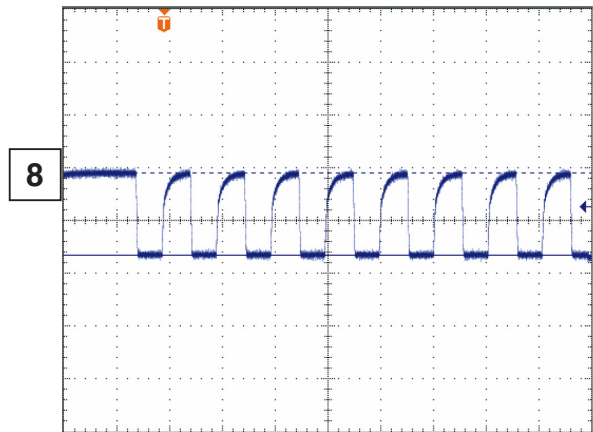


DDR Write Enable



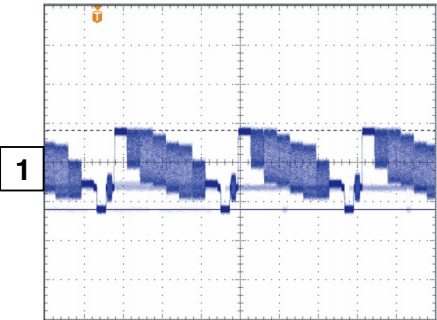


12C_SDA

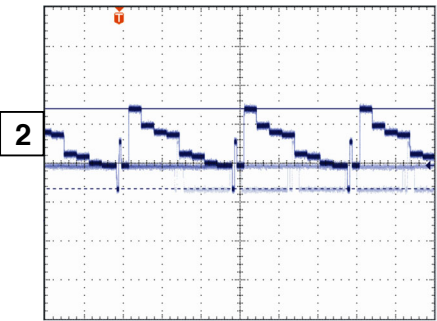


12C_SCL

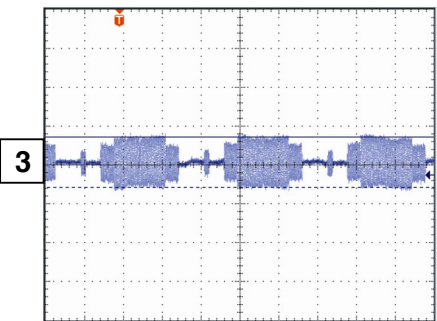
2. VIDEO BLOCK (COLOR BAR INPUT)



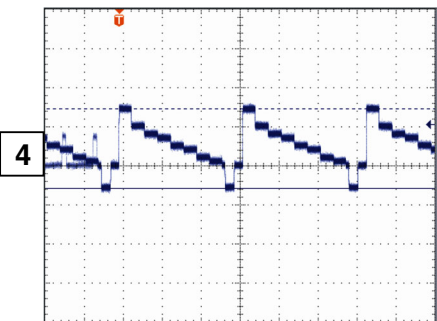
CVBS_OUT



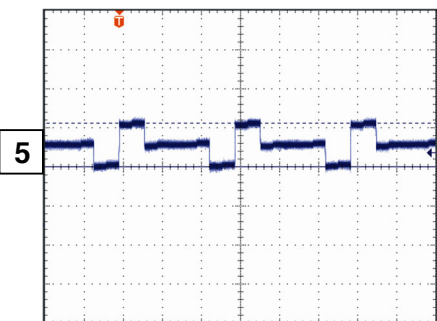
Y_OUT



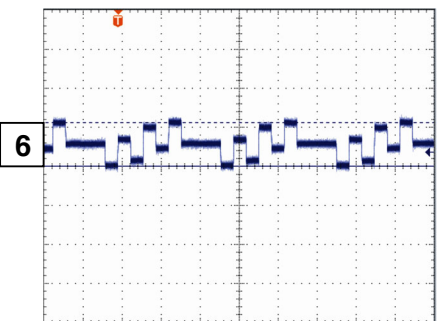
C_OUT



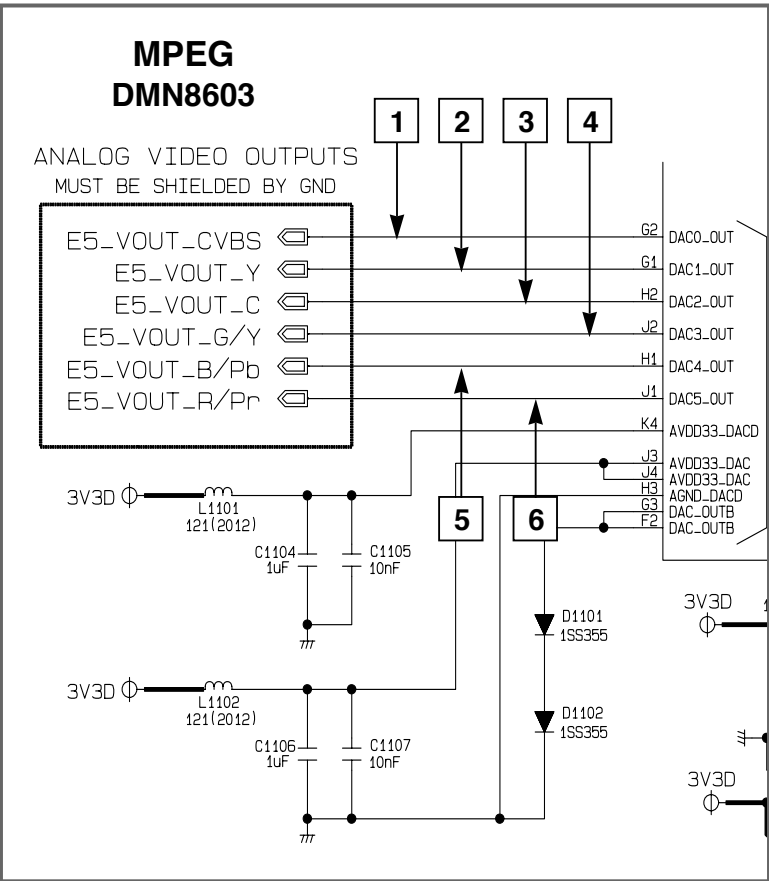
G/Y_OUT



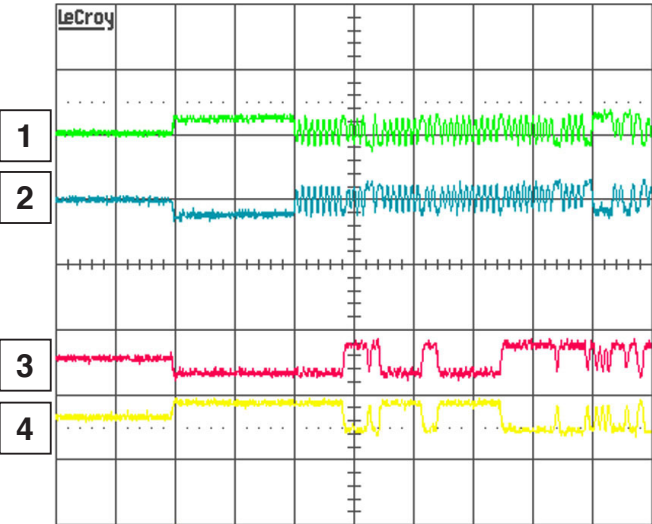
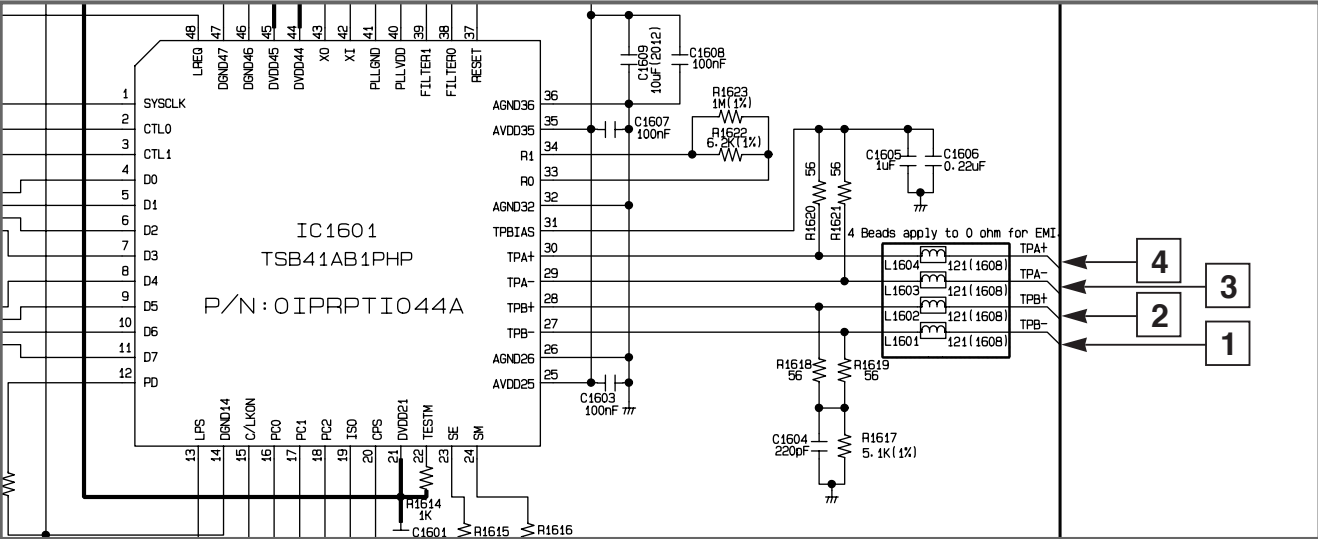
B/PB_OUT



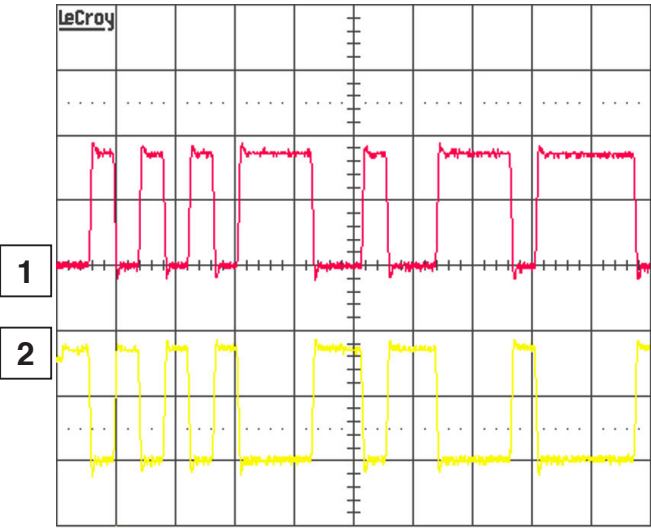
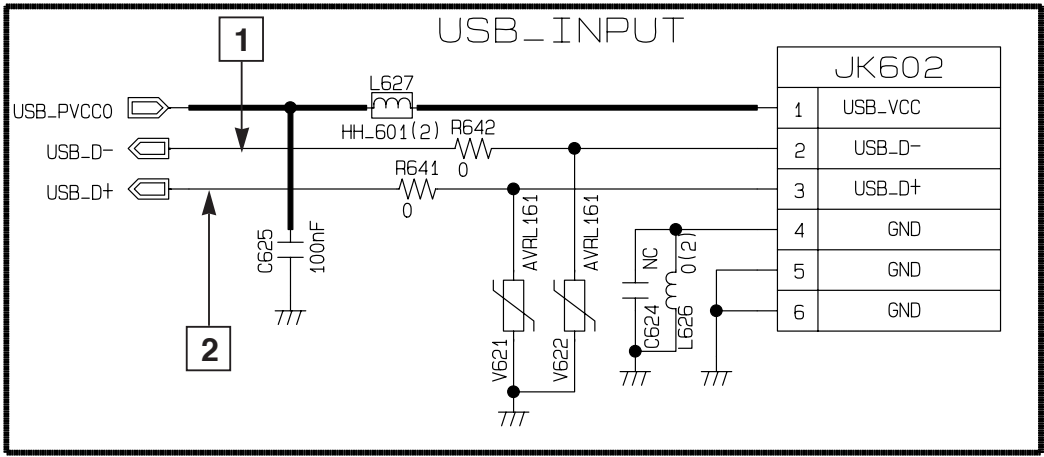
R/PR_OUT



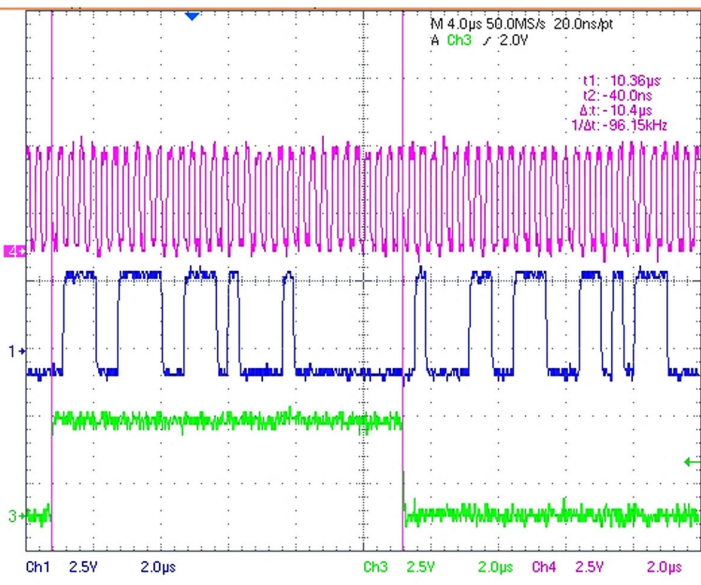
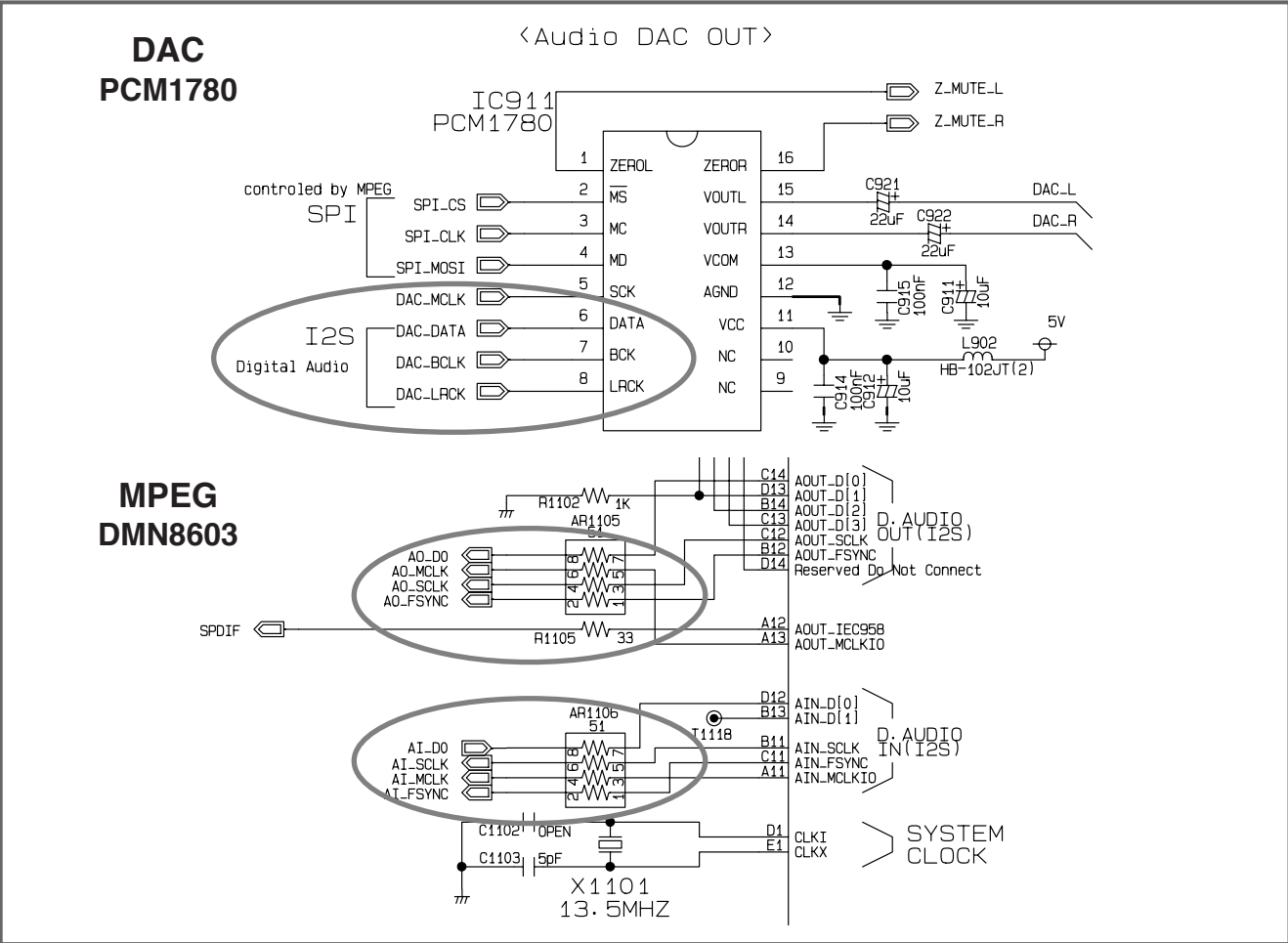
3. DV BLOCK (TPA±, TPB±)



4. USB BLOCK (D±)



5. DIGITAL AUDIO -12S WAVEFORM

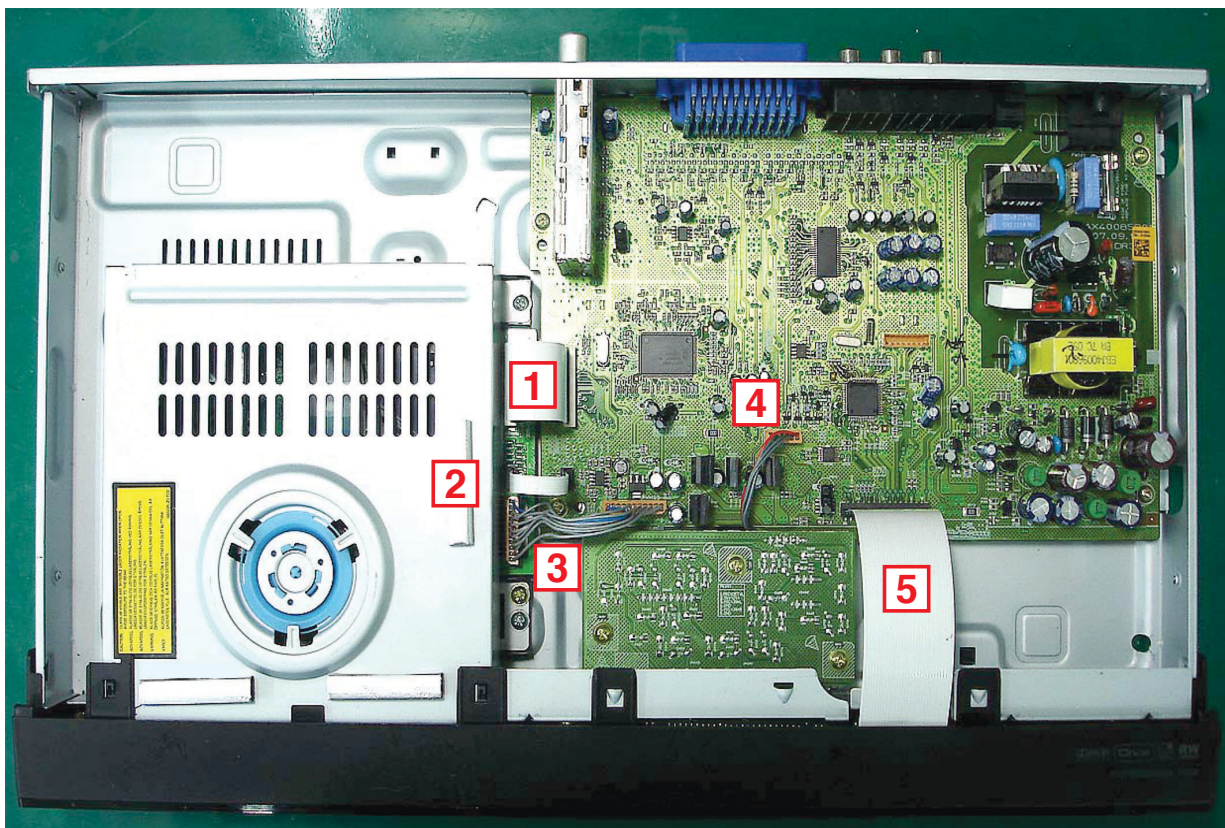
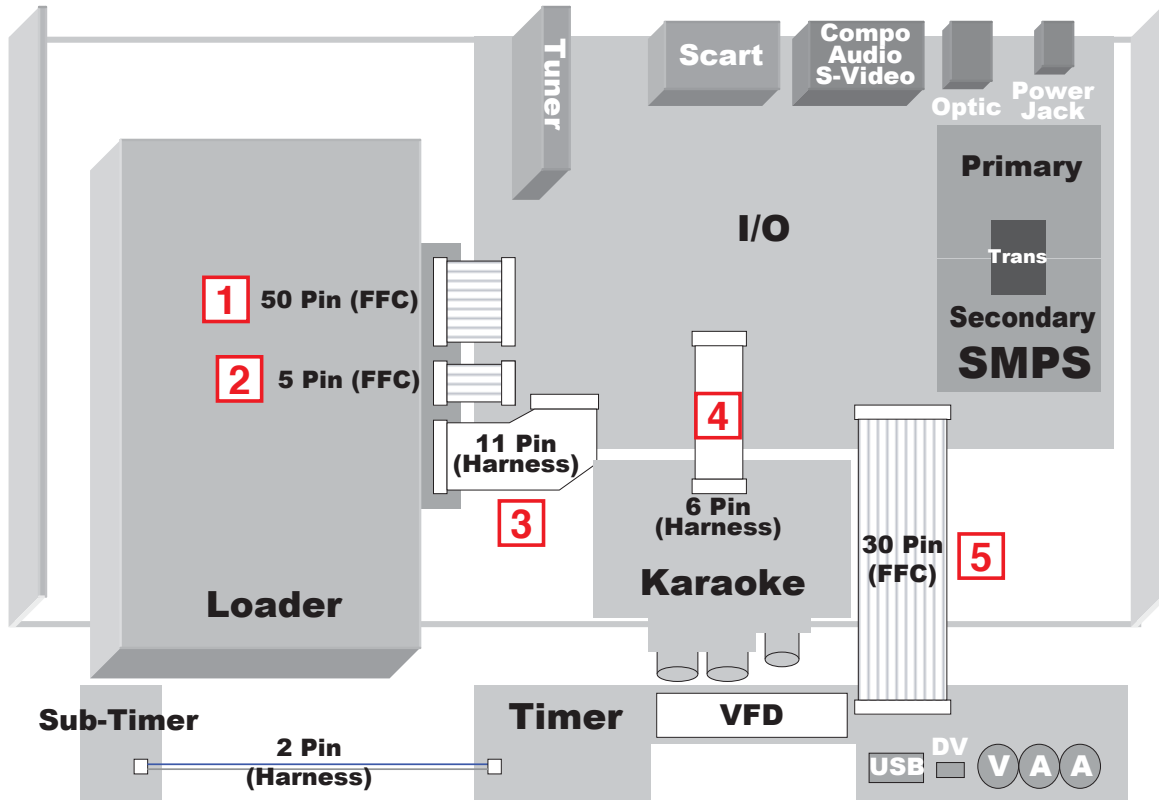


SCLK (= 64xLRCK)

DATA

LRCK / FSYNC

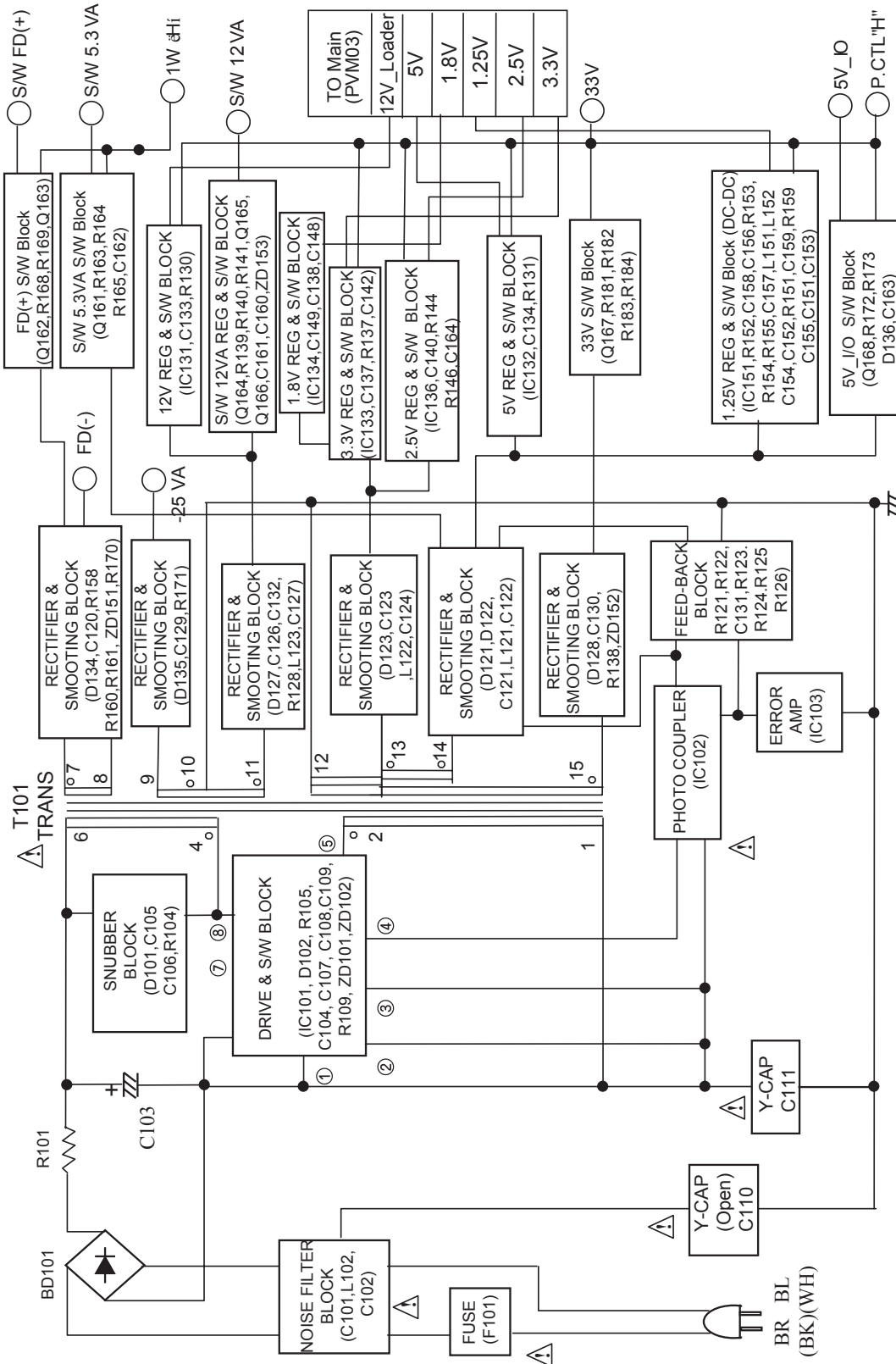
WIRING CONNECTION DIAGRAMS



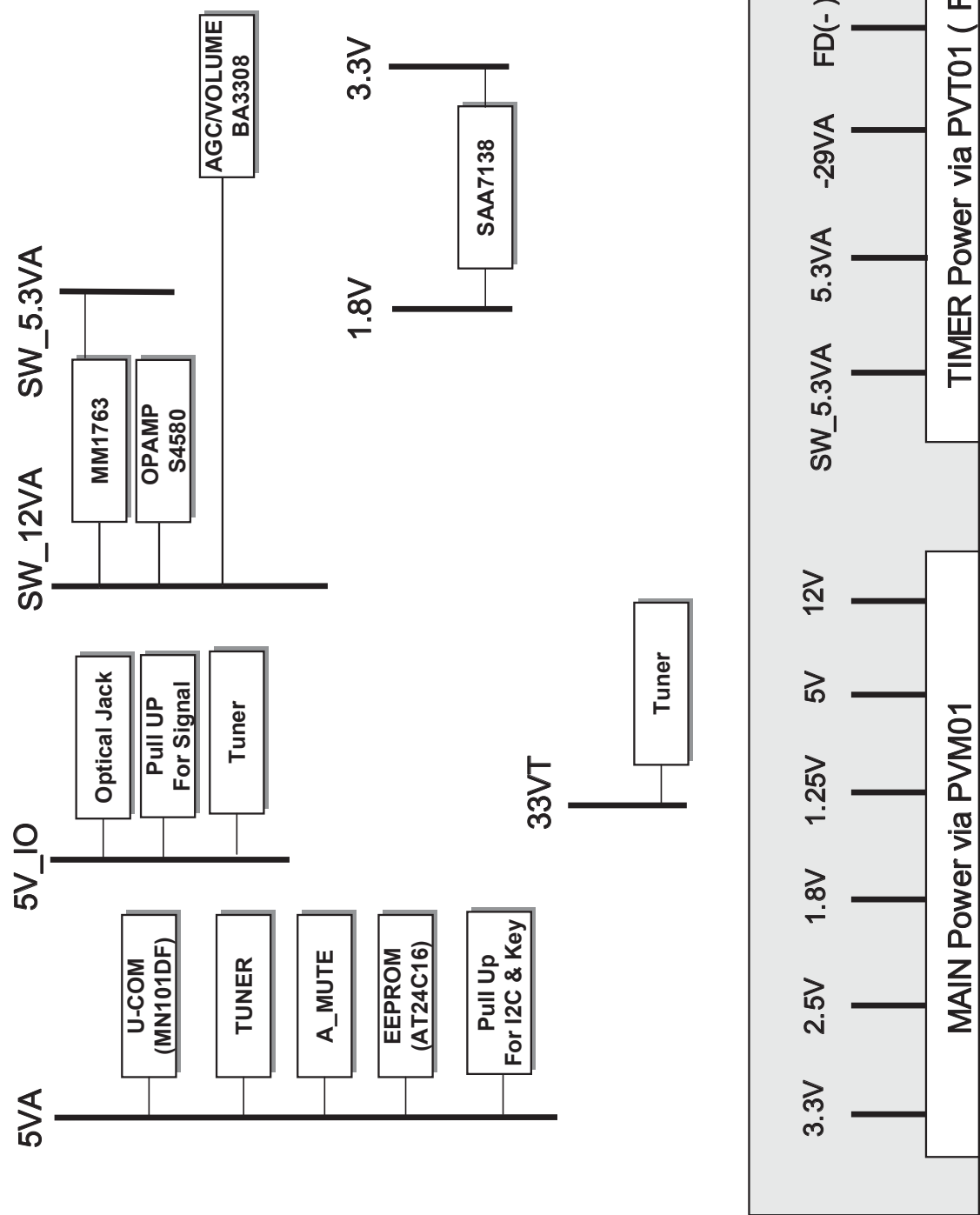
1. OVERALL BLOCK DIAGRAM



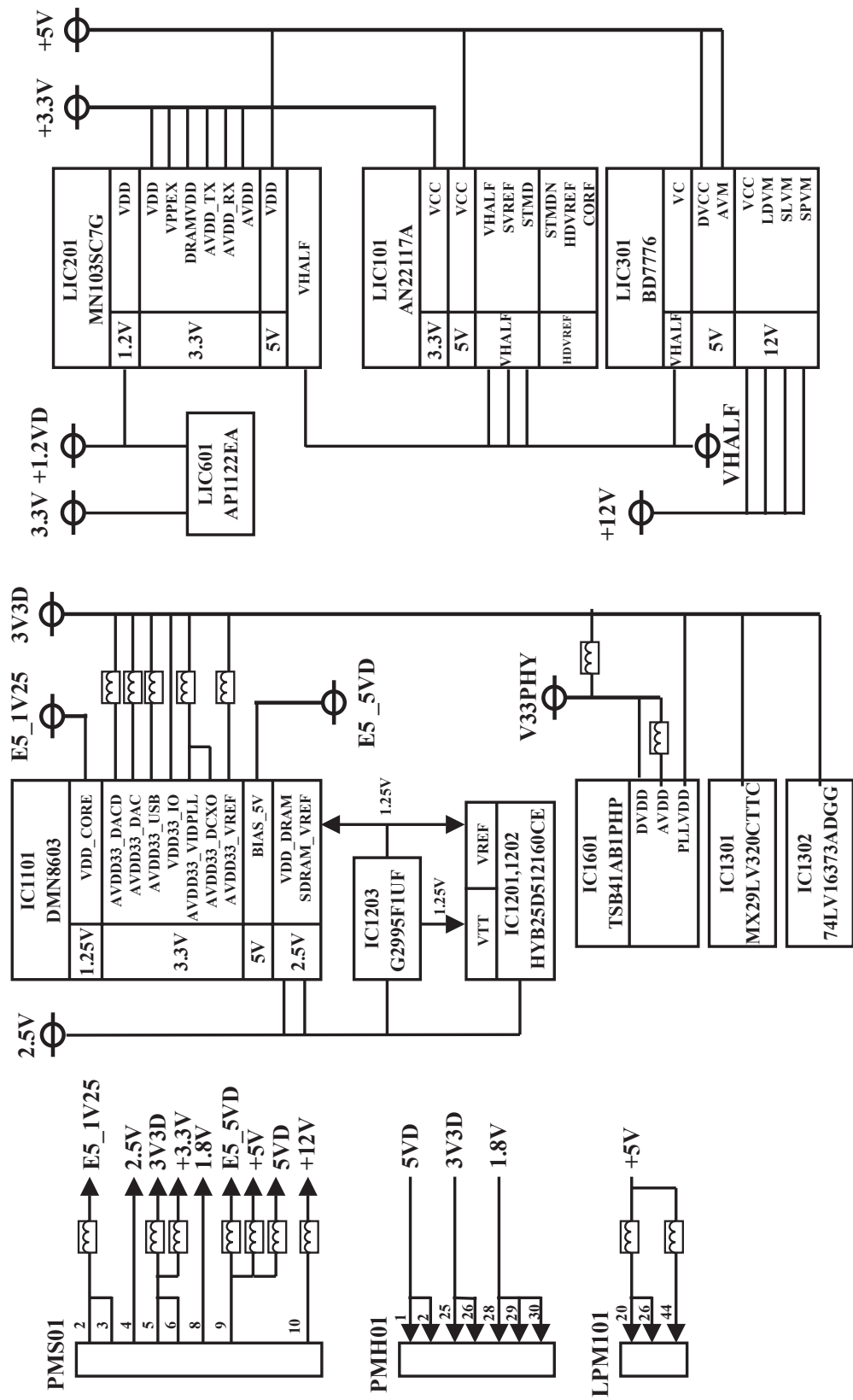
2. SMPS BLOCK DIAGRAM



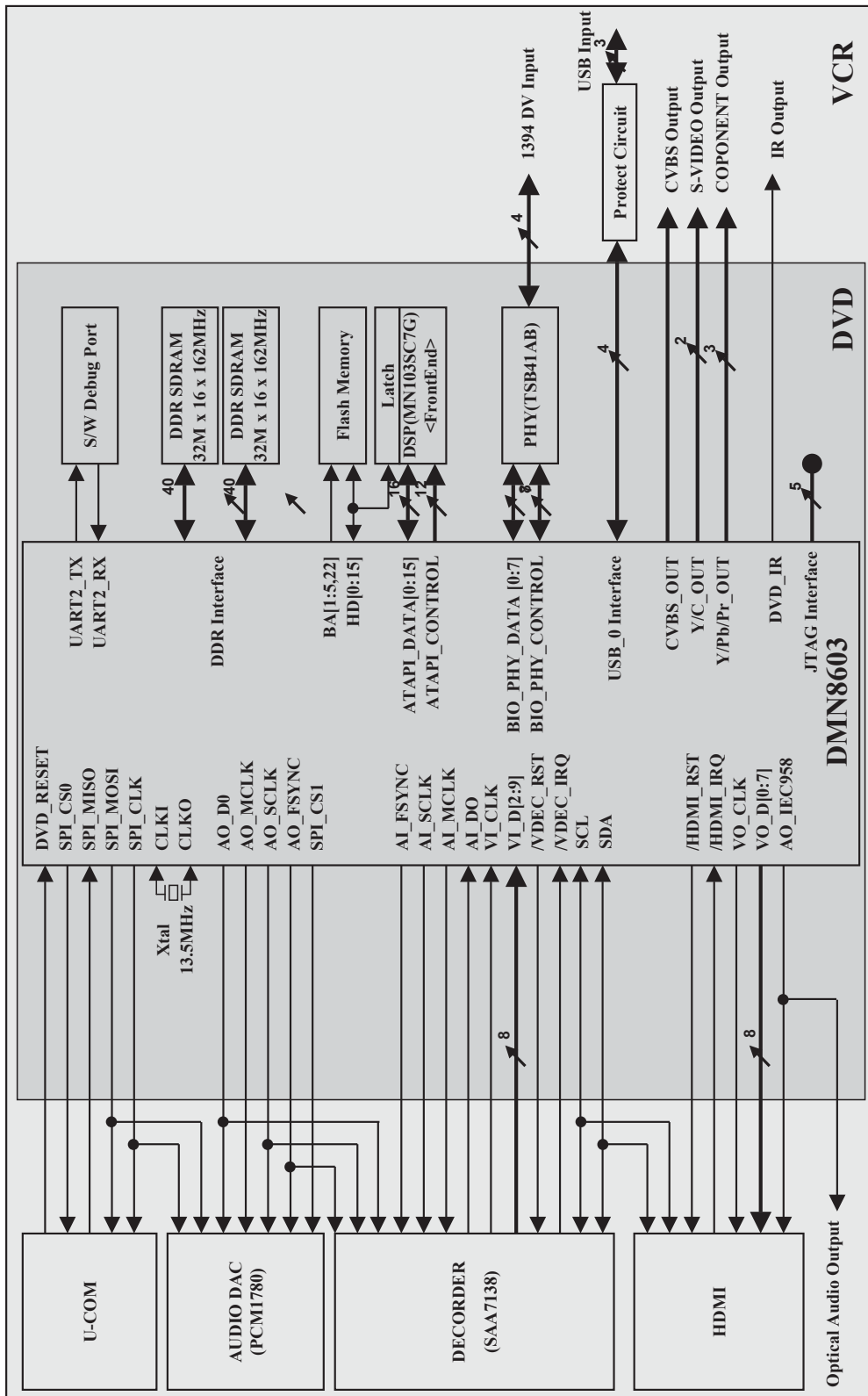
3. POWER I/O BLOCK DIAGRAM



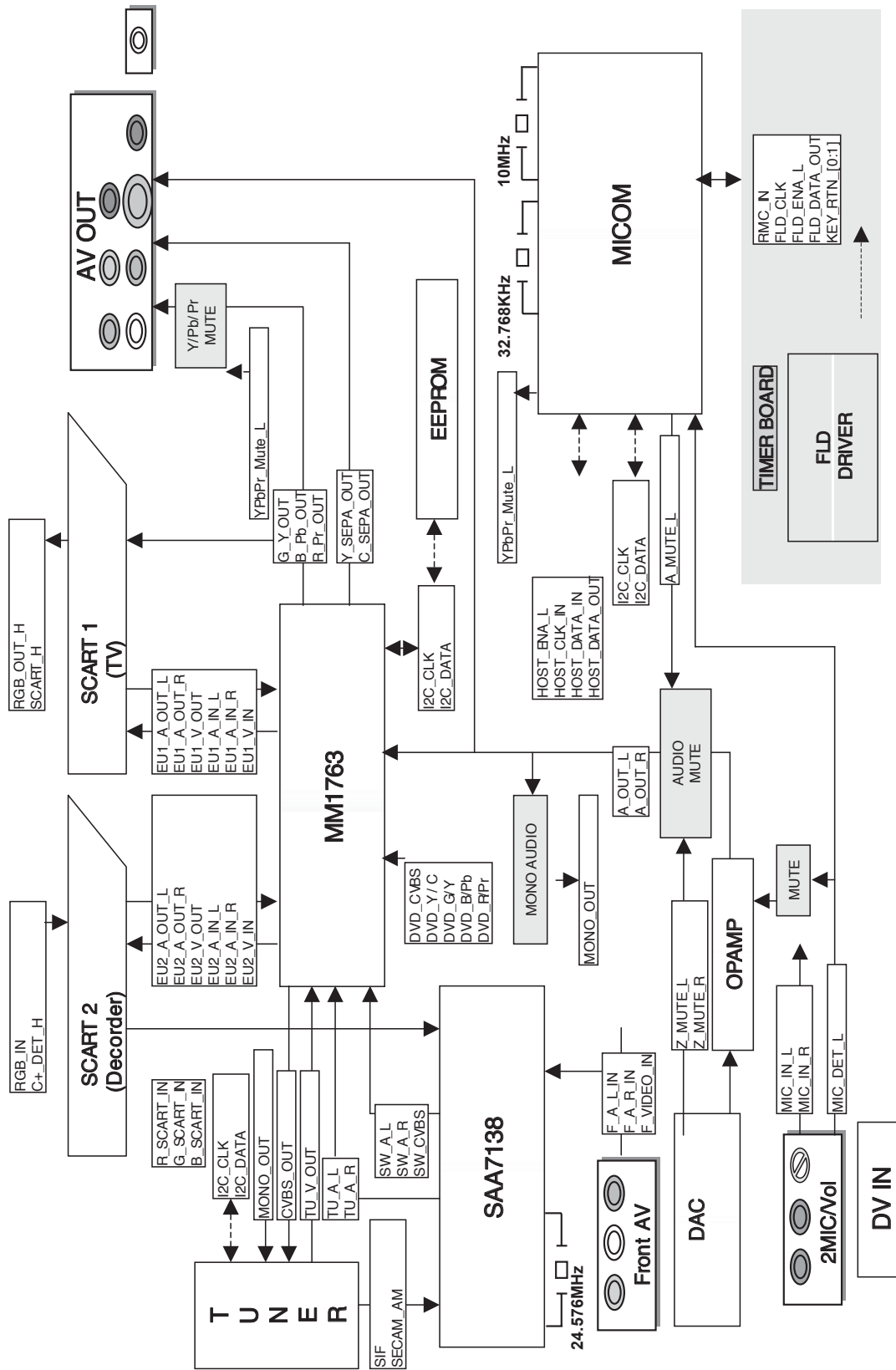
4. DVD POWER ALLOCATION BLOCK DIAGRAM



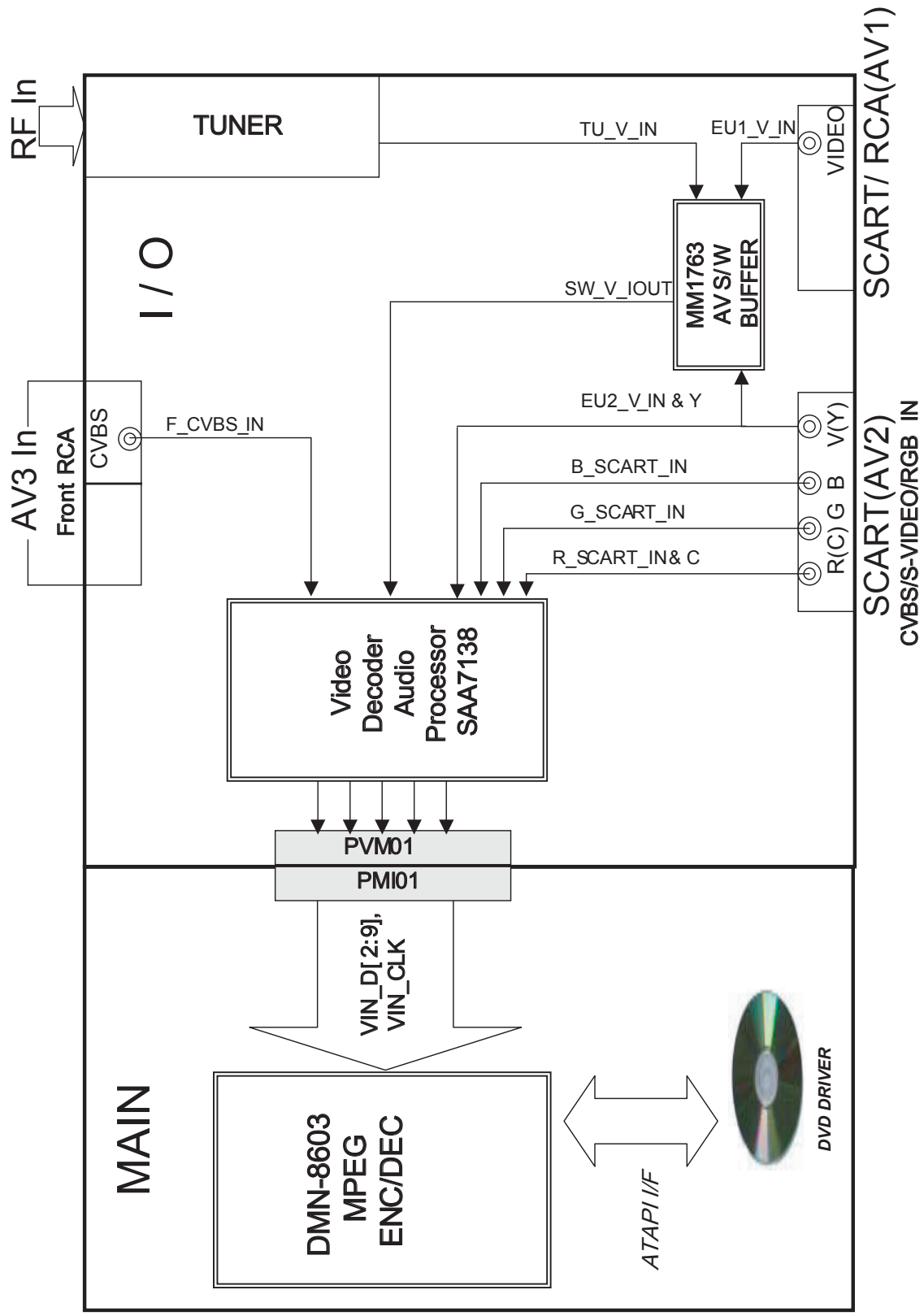
5. DMN8603 I/O INTERFACE SIGNAL BLOCK DIAGRAM



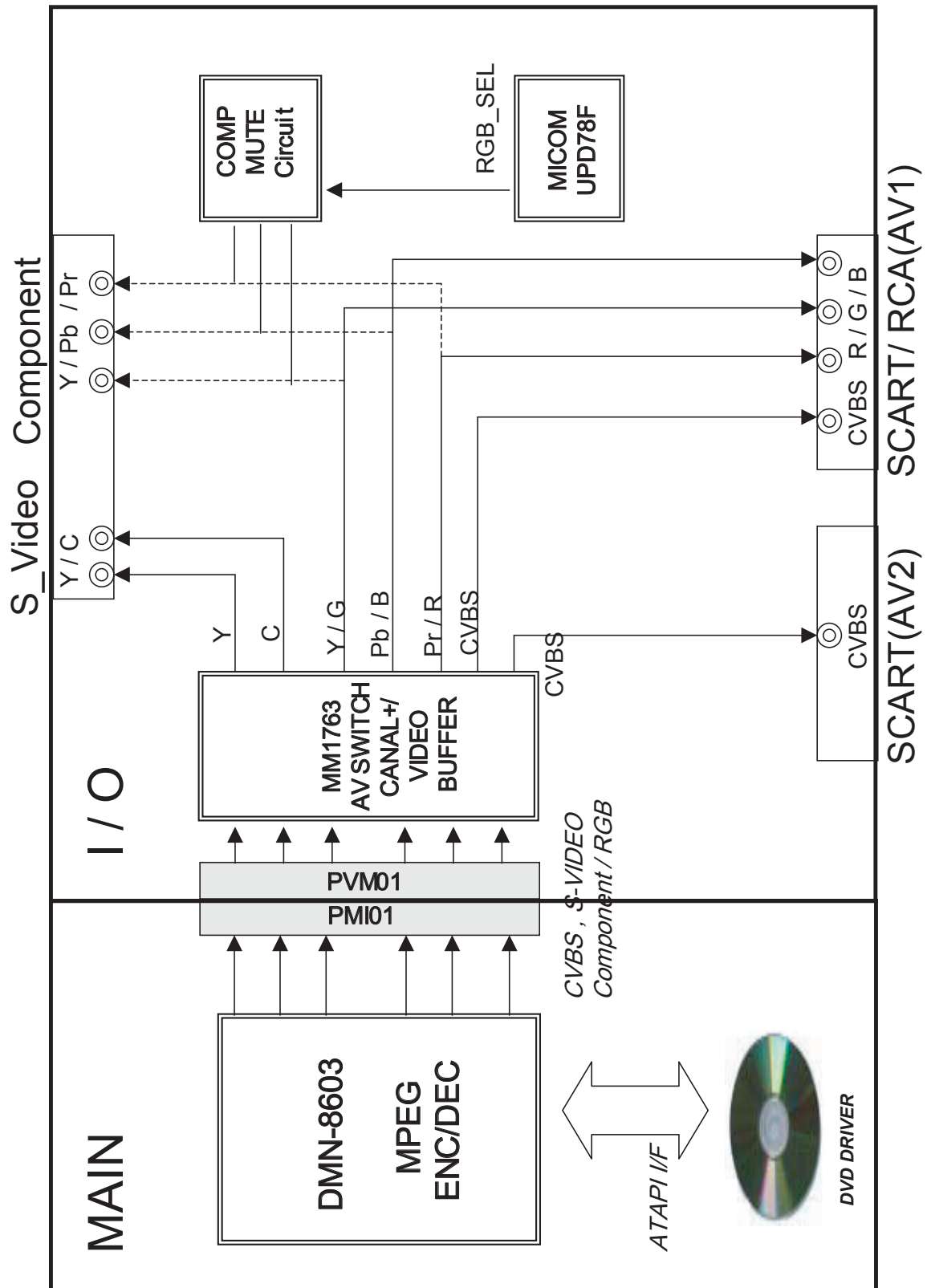
6. IN/OUT BLOCK DIAGRAM



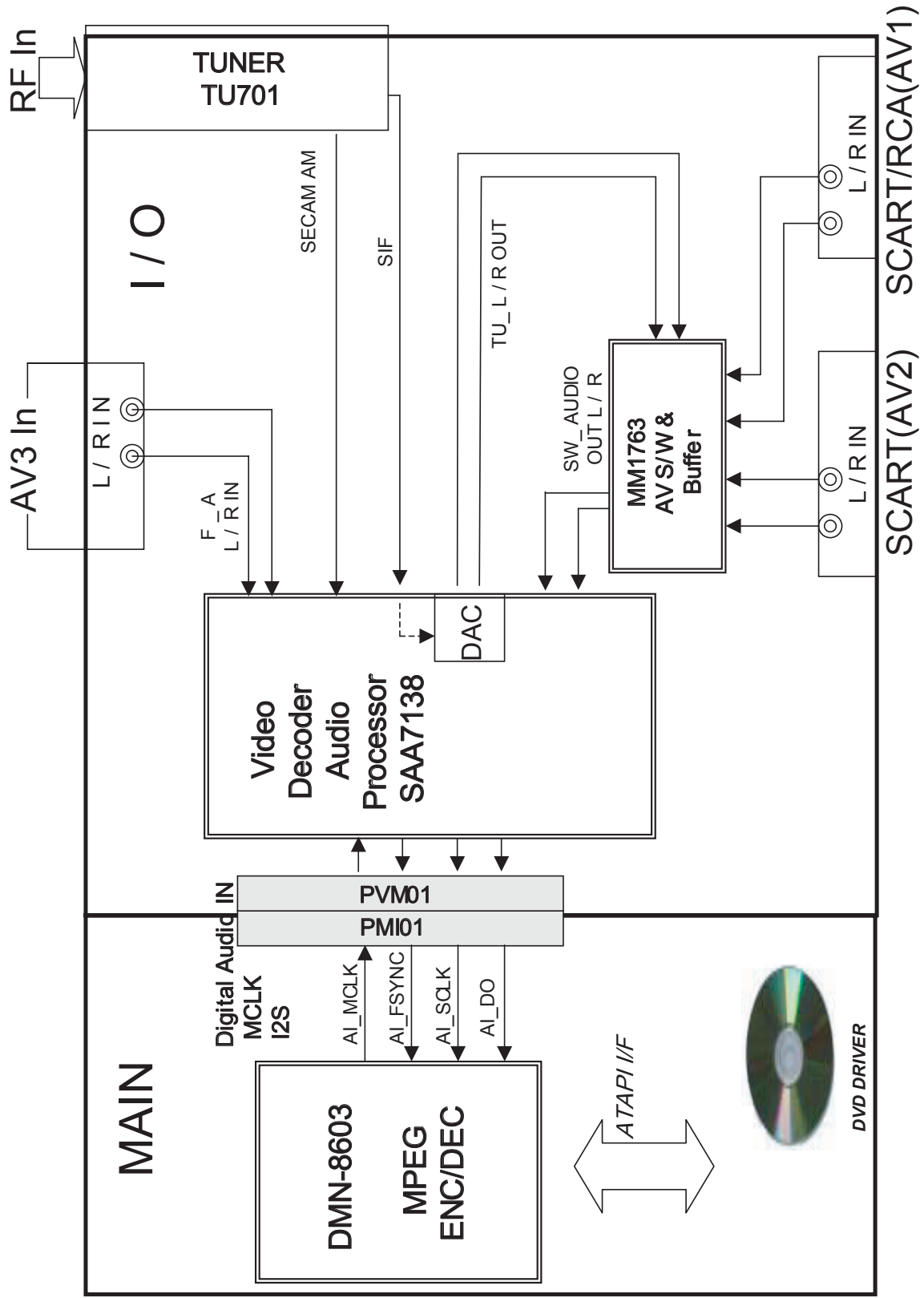
7. VIDEO IN BLOCK DIAGRAM



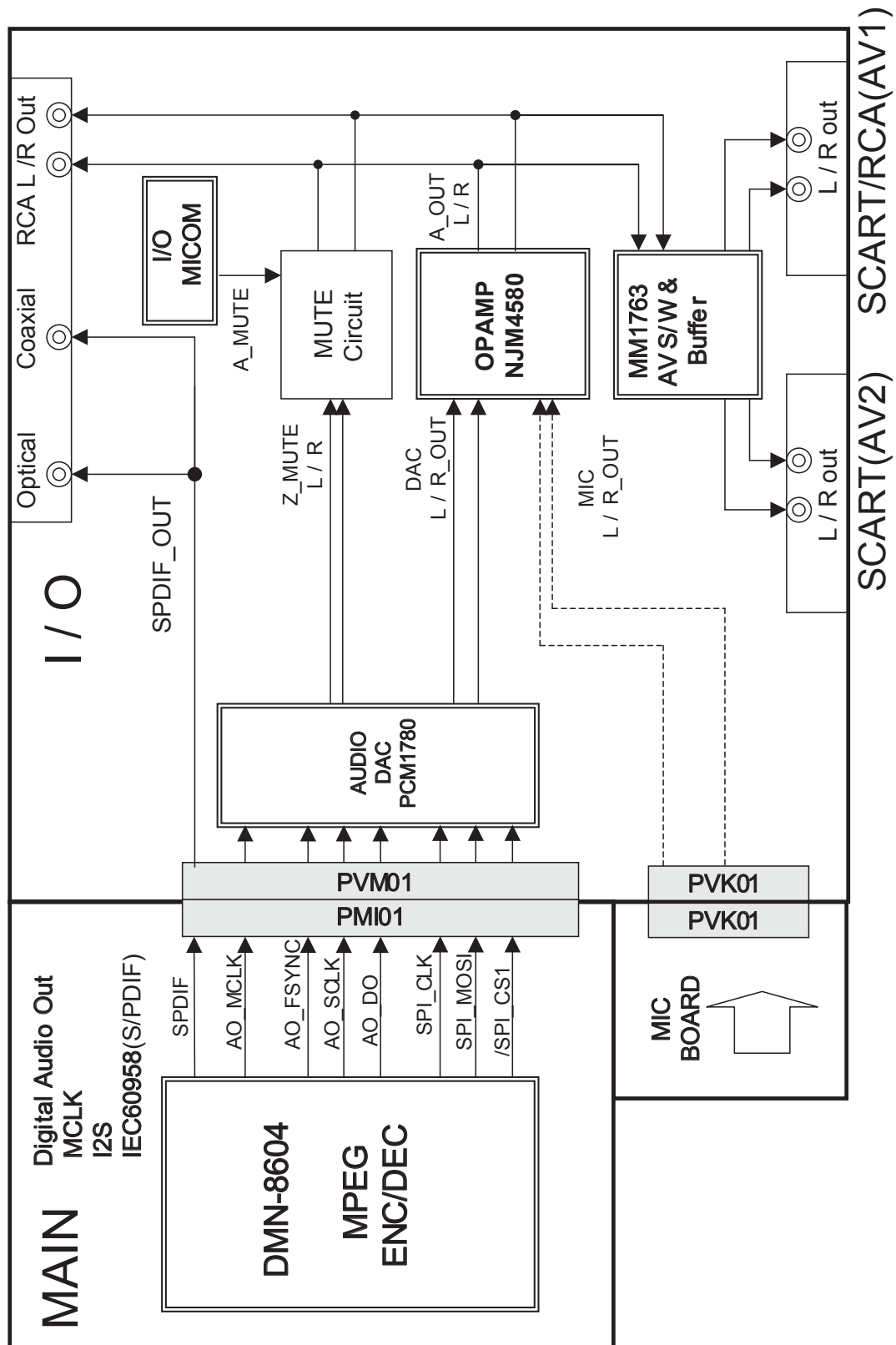
8. VIDEO OUT BLOCK DIAGRAM



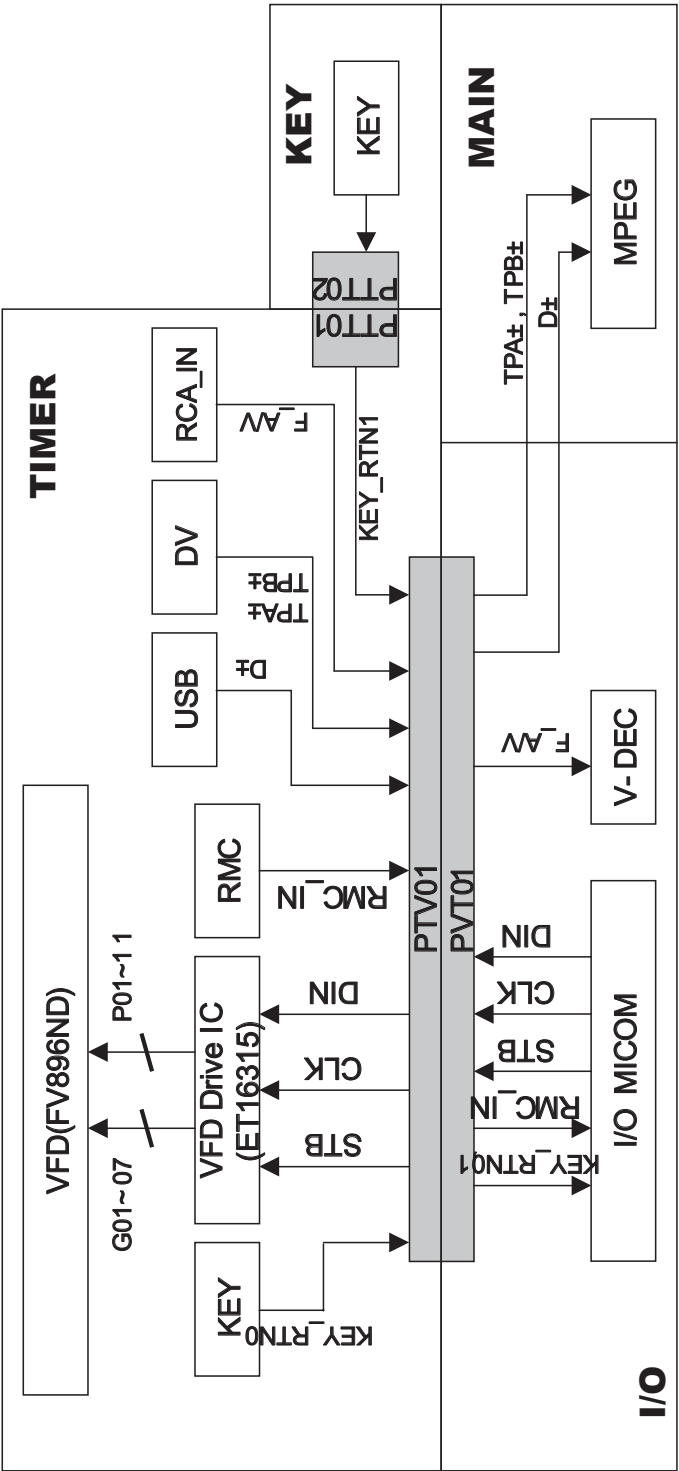
9. AUDIO IN BLOCK DIAGRAM



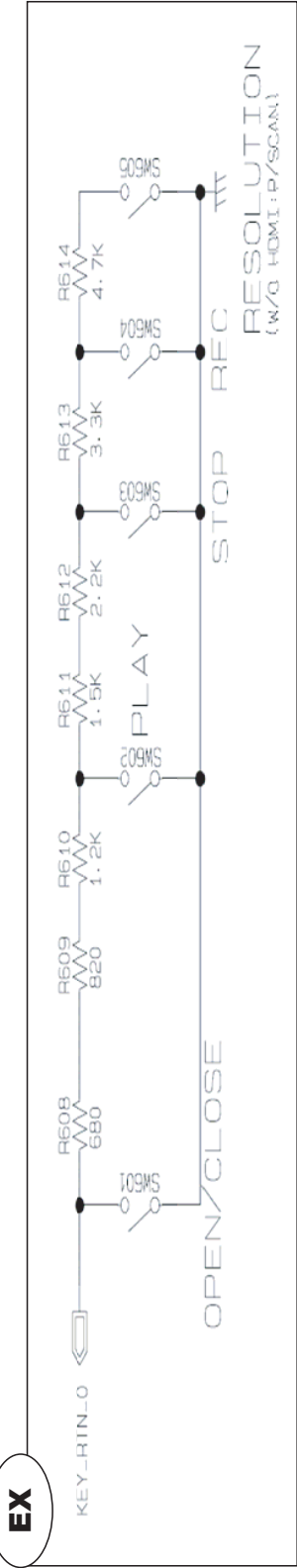
10. AUDIO OUT BLOCK DIAGRAM



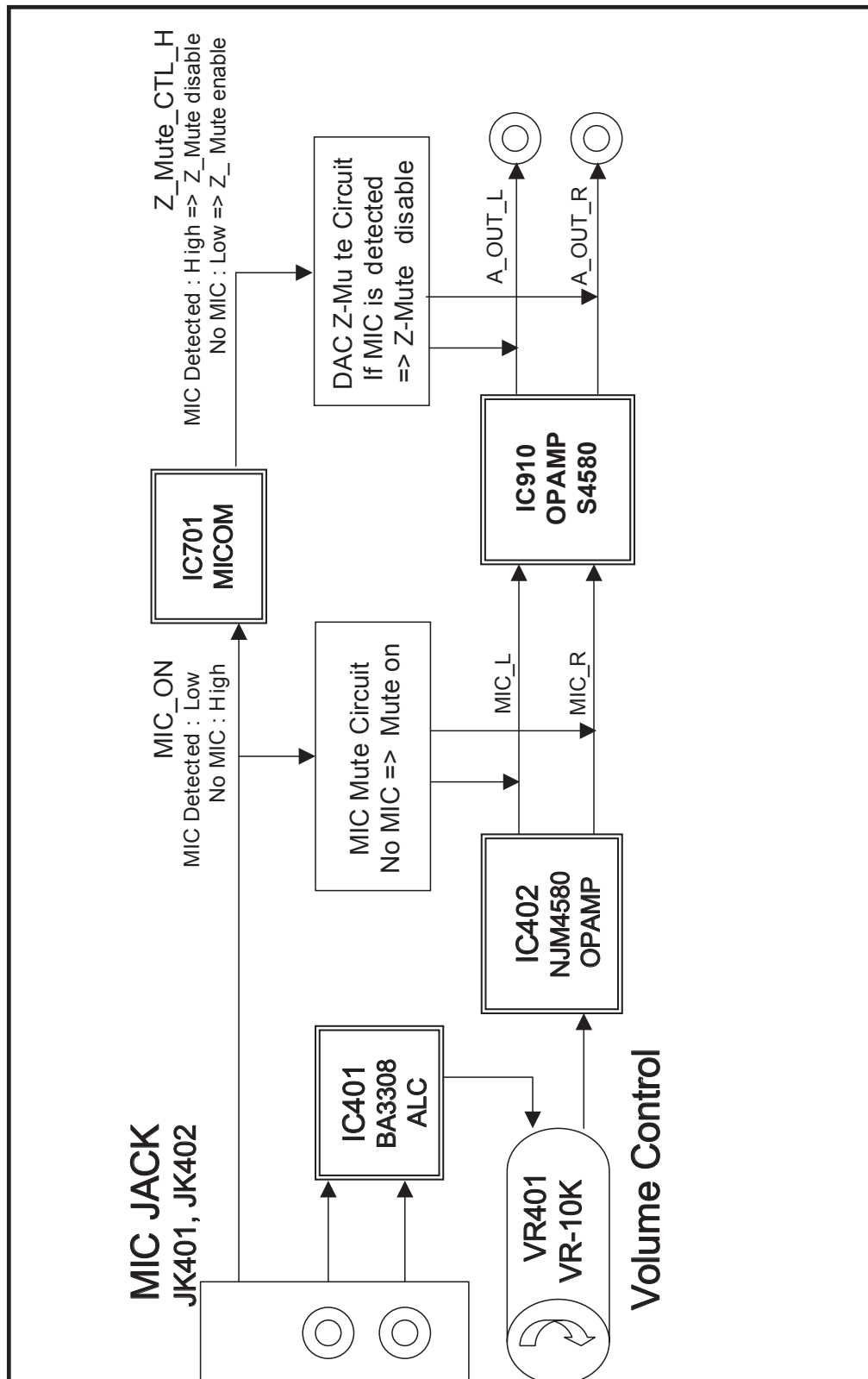
11. VFD TIMER BLOCK DIAGRAM



Adopt existing Timer form that convey the shame to I/O Micom using voltage divide circuit
With do unique voltage while is each Key yam who increase.

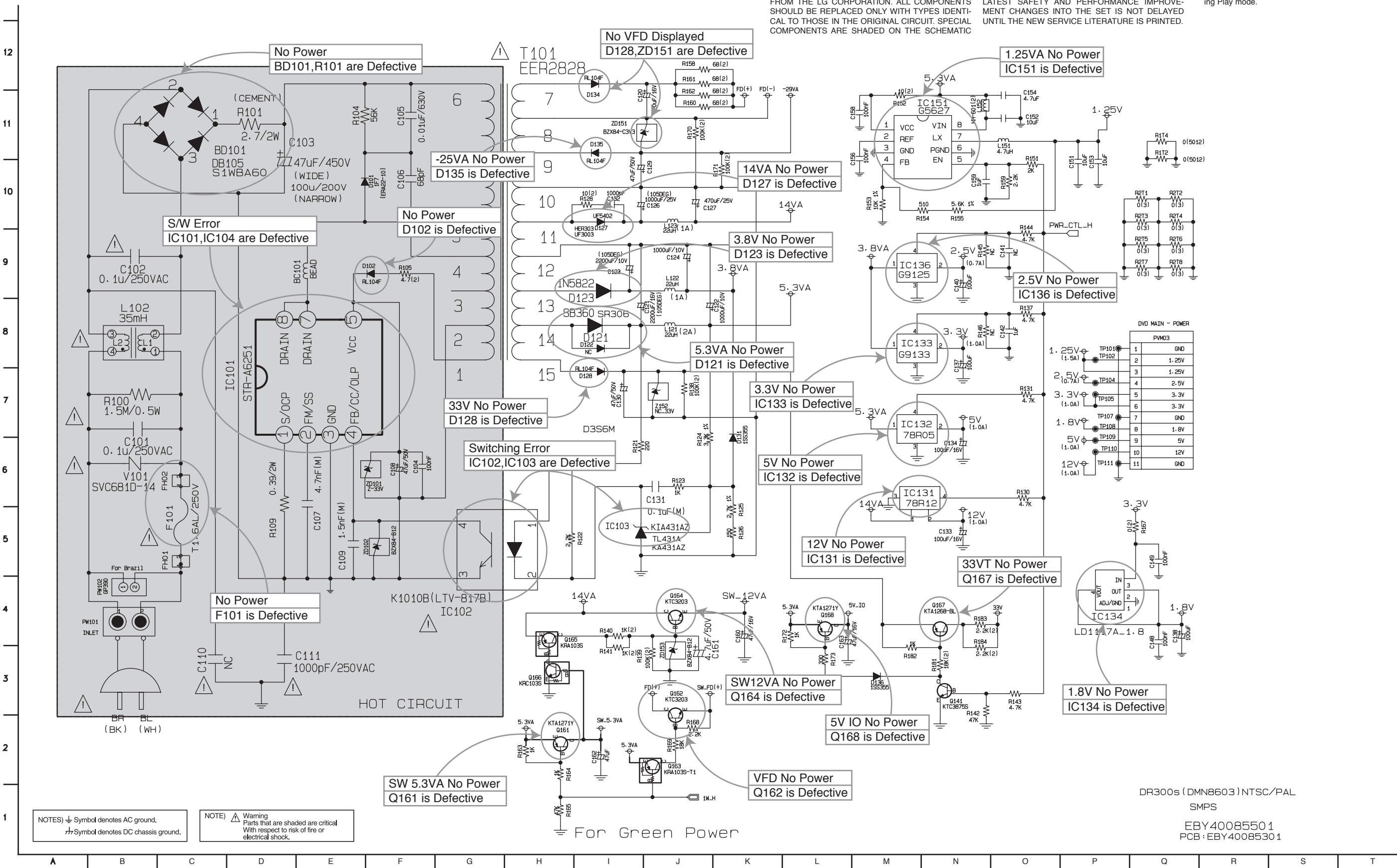


12. KARAOKE BLOCK DIAGRAM (OPTION)



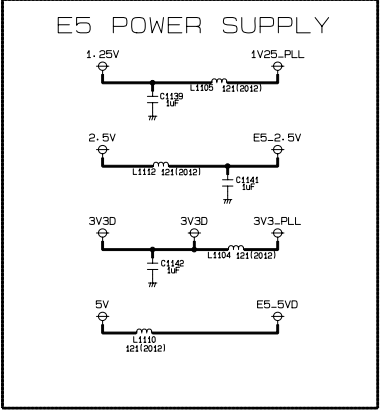
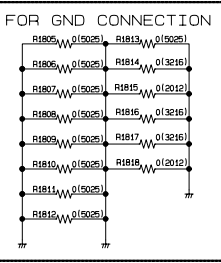
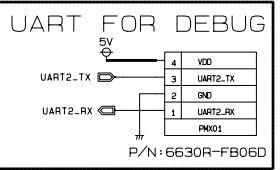
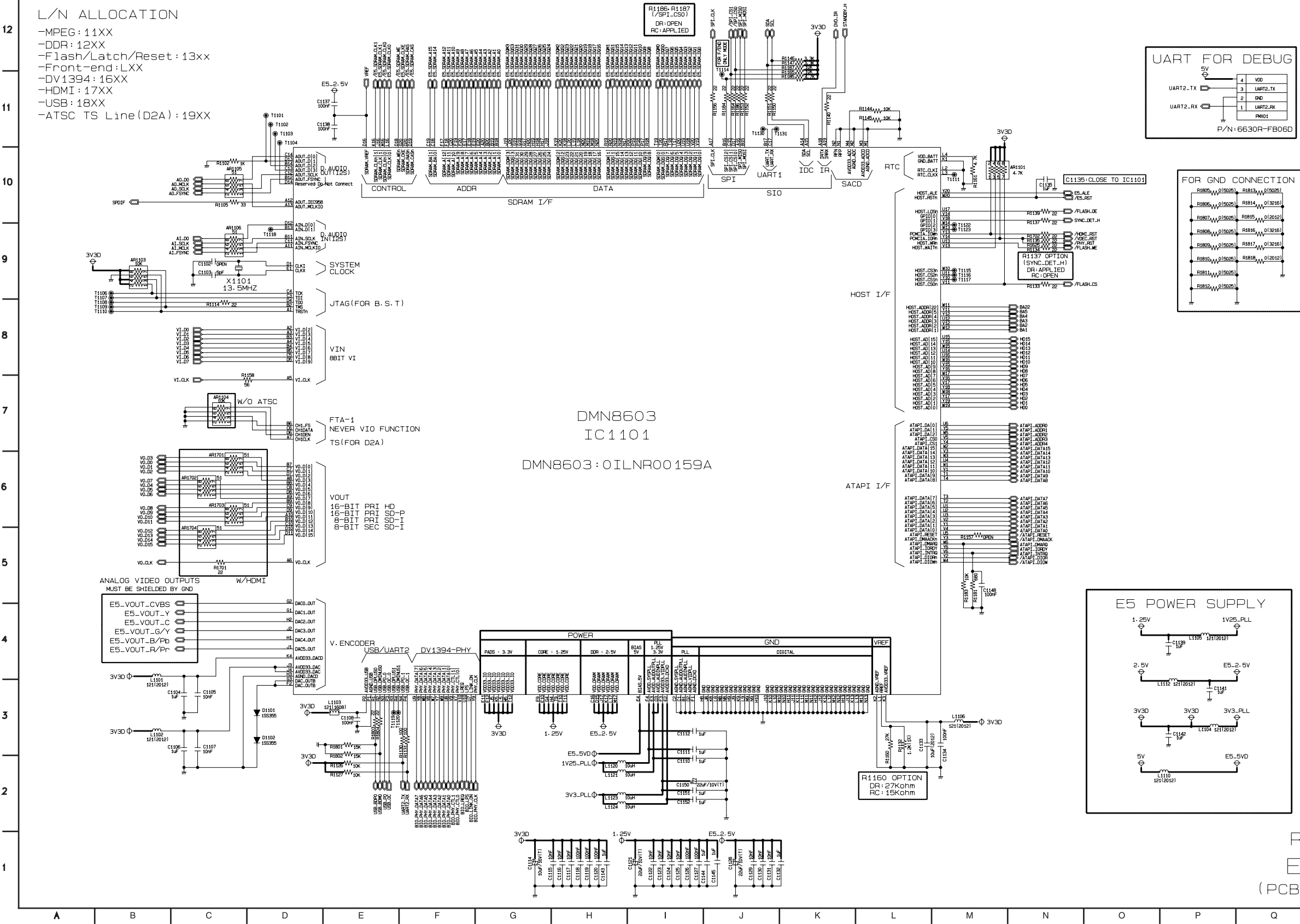
CIRCUIT DIAGRAMS

1. SMPS CIRCUIT DIAGRAM



2. MPEG CIRCUIT DIAGRAM

- L/N ALLOCATION
- MPEG: 11XX
 - DDR: 12XX
 - Flash/Latch/Reset: 13xx
 - Front-end:LXX
 - DV1394: 16XX
 - HDMI: 17XX
 - USB: 18XX
 - ATSC TS Line(D2A): 19XX



MPEG
RC300/DR300
EBY4200450 1-1
(PCB: EAX39254701) SHEET 1

TP (ATA#1~ATA#40)
On BOTTOM of PCB.

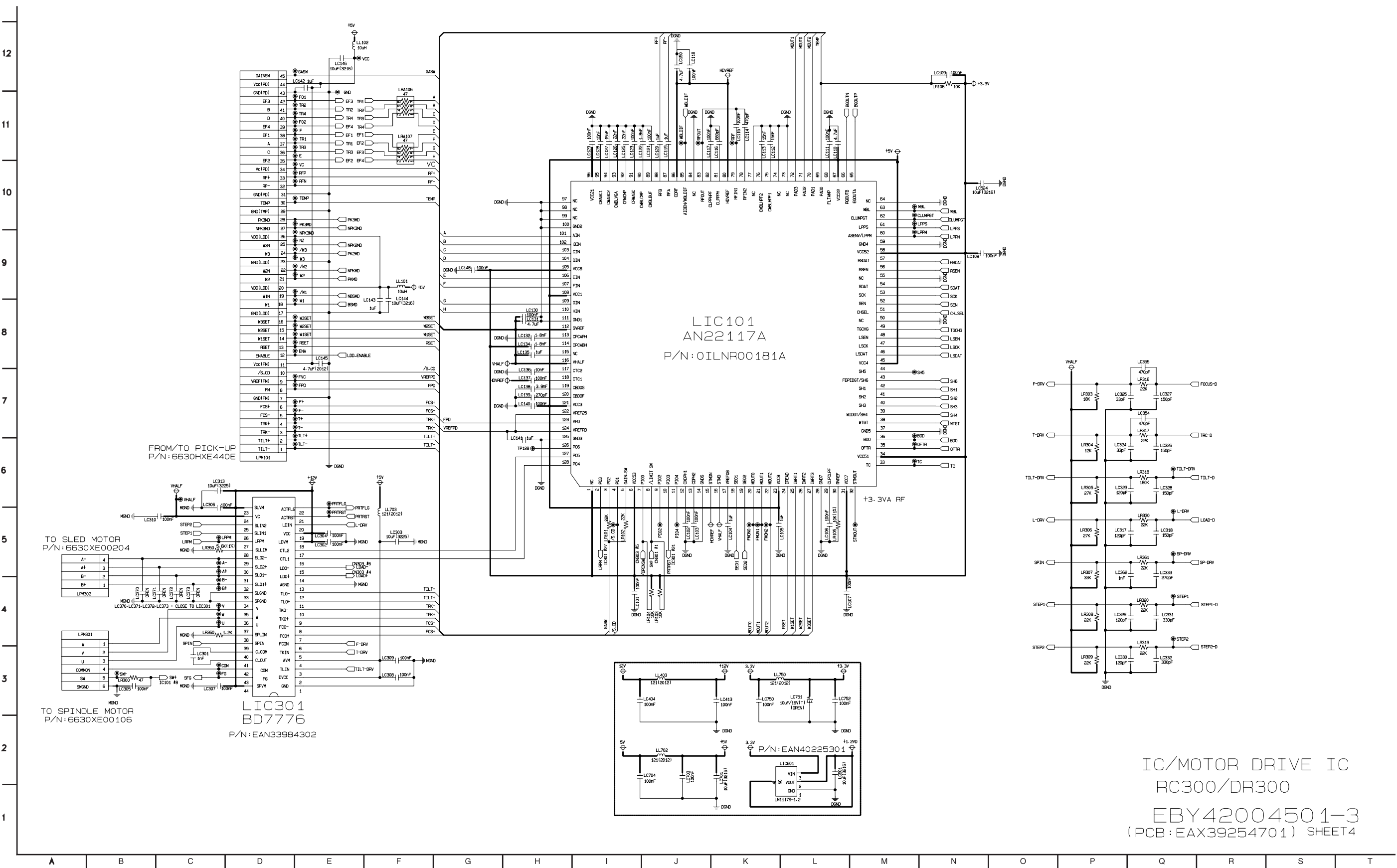
LX201
CSTCW16MX51005-R0
P/N: 6212BB3455A

LIC201
MN103SC7G
P/N: EAN33961801

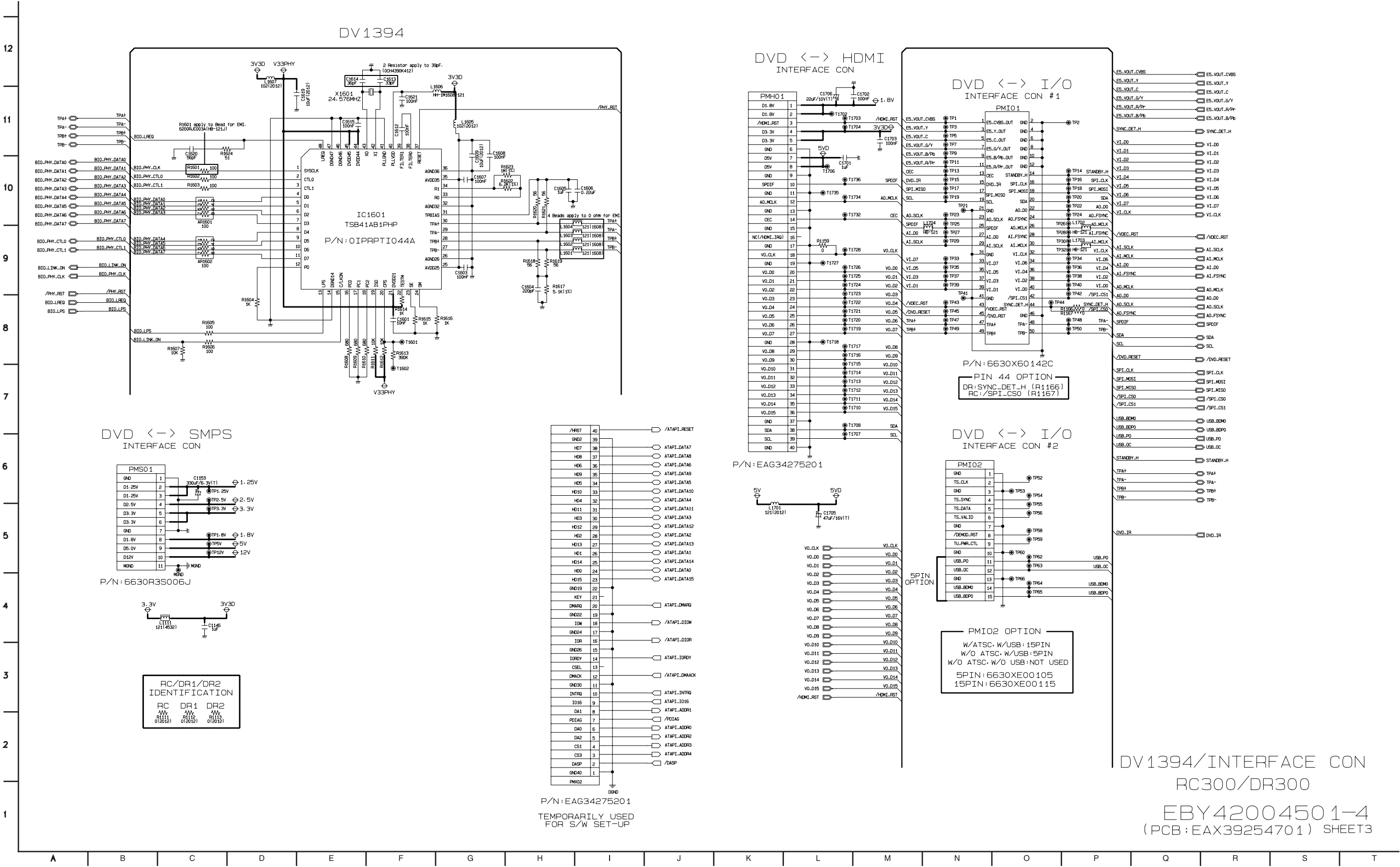
TP (OSCEN, SCK, LSCK, SH2) Must Be
On BOTTOM of PCB for FLASH D/L.

DSP
RC300/DR300
EBY42004501-2
(PCB: EAX39254701) SHEET5

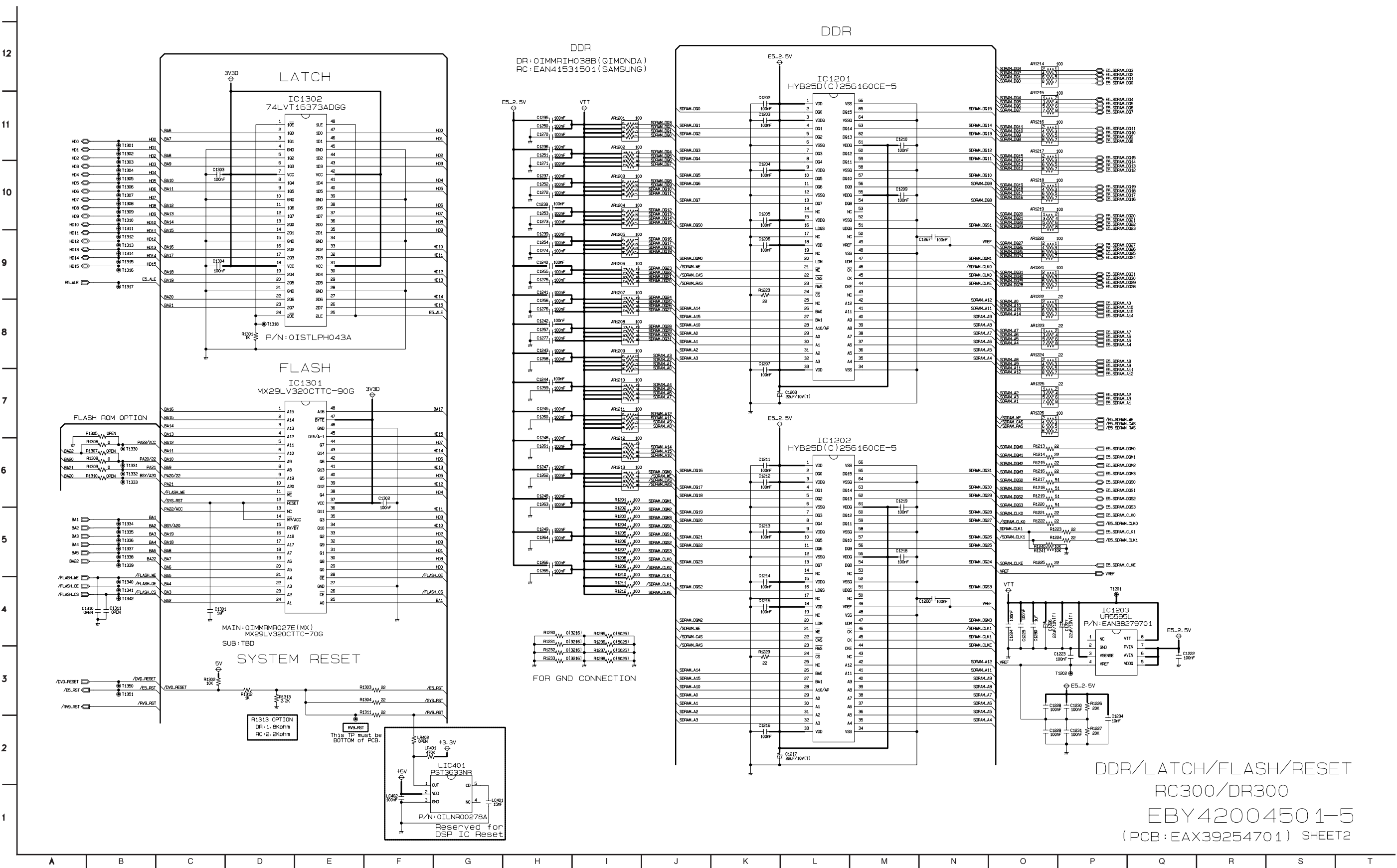
4. RF IC / MOTOR DRIVE IC CIRCUIT DIAGRAM



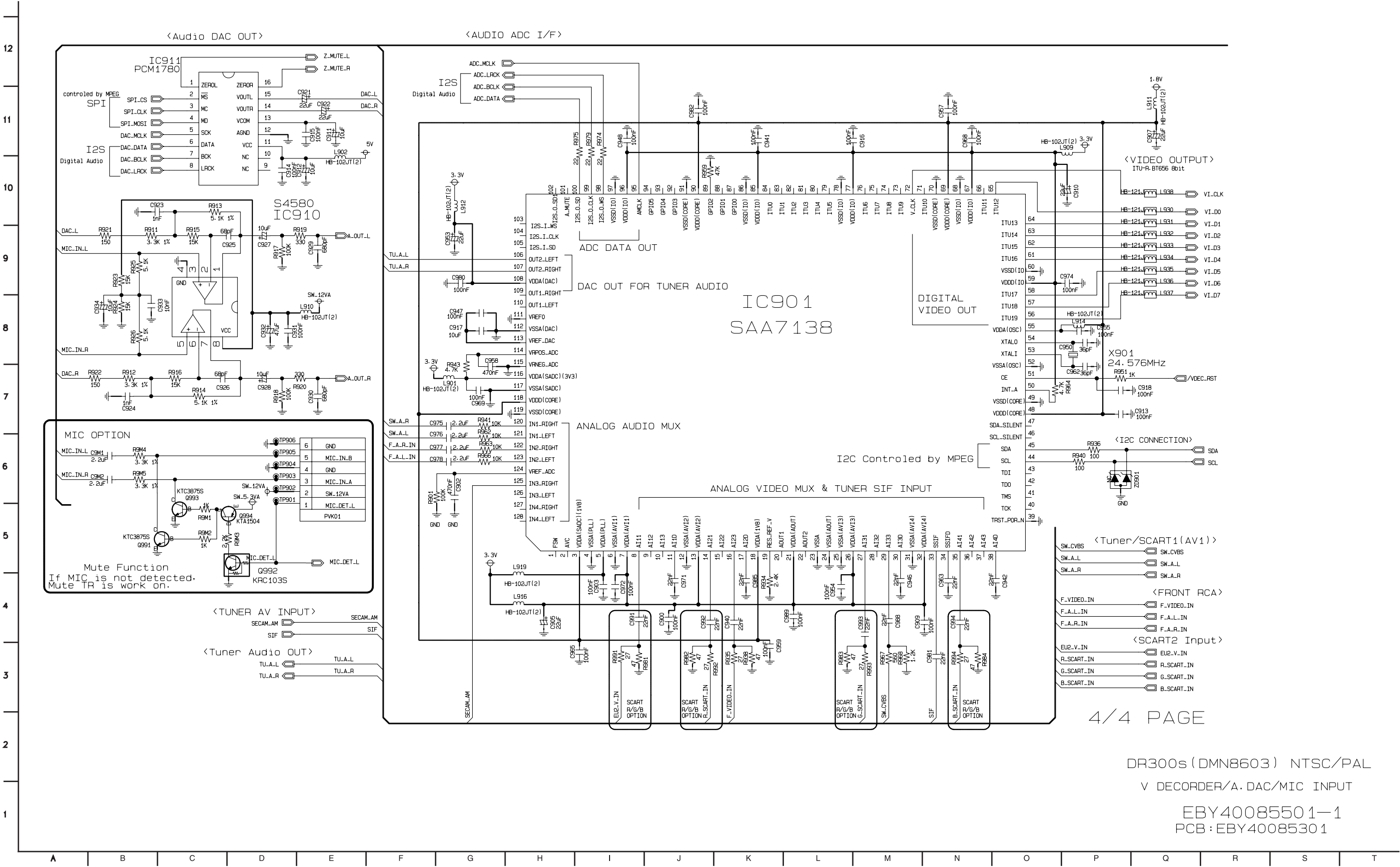
5. DV1394 / INTERFACE CONNECTOR CIRCUIT DIAGRAM



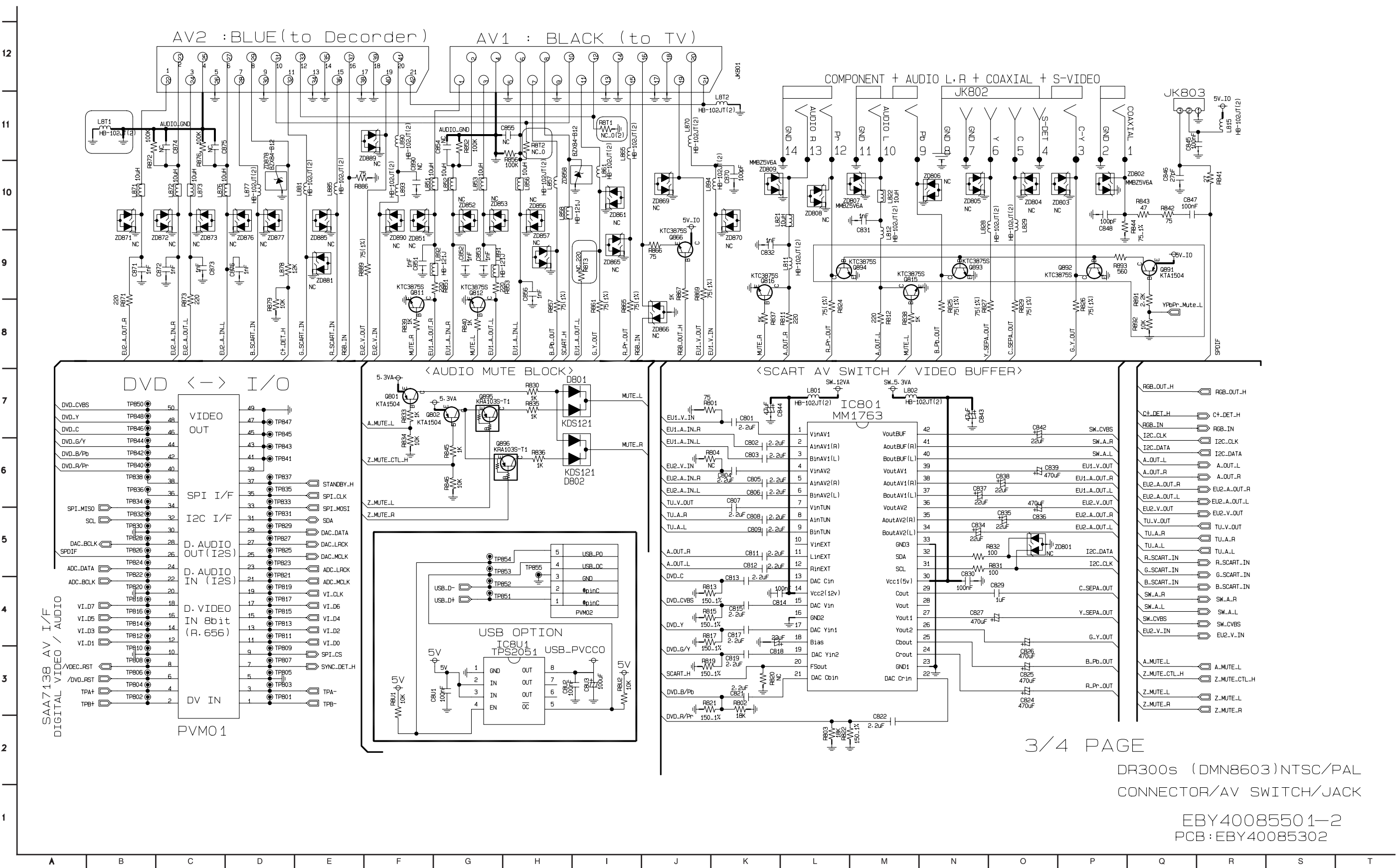
6. DDR / LATCH / FLASH / RESET CIRCUIT DIAGRAM



7. VIDEO DECODER / AUDIO DAC / MIC INPUT CIRCUIT DIAGRAM



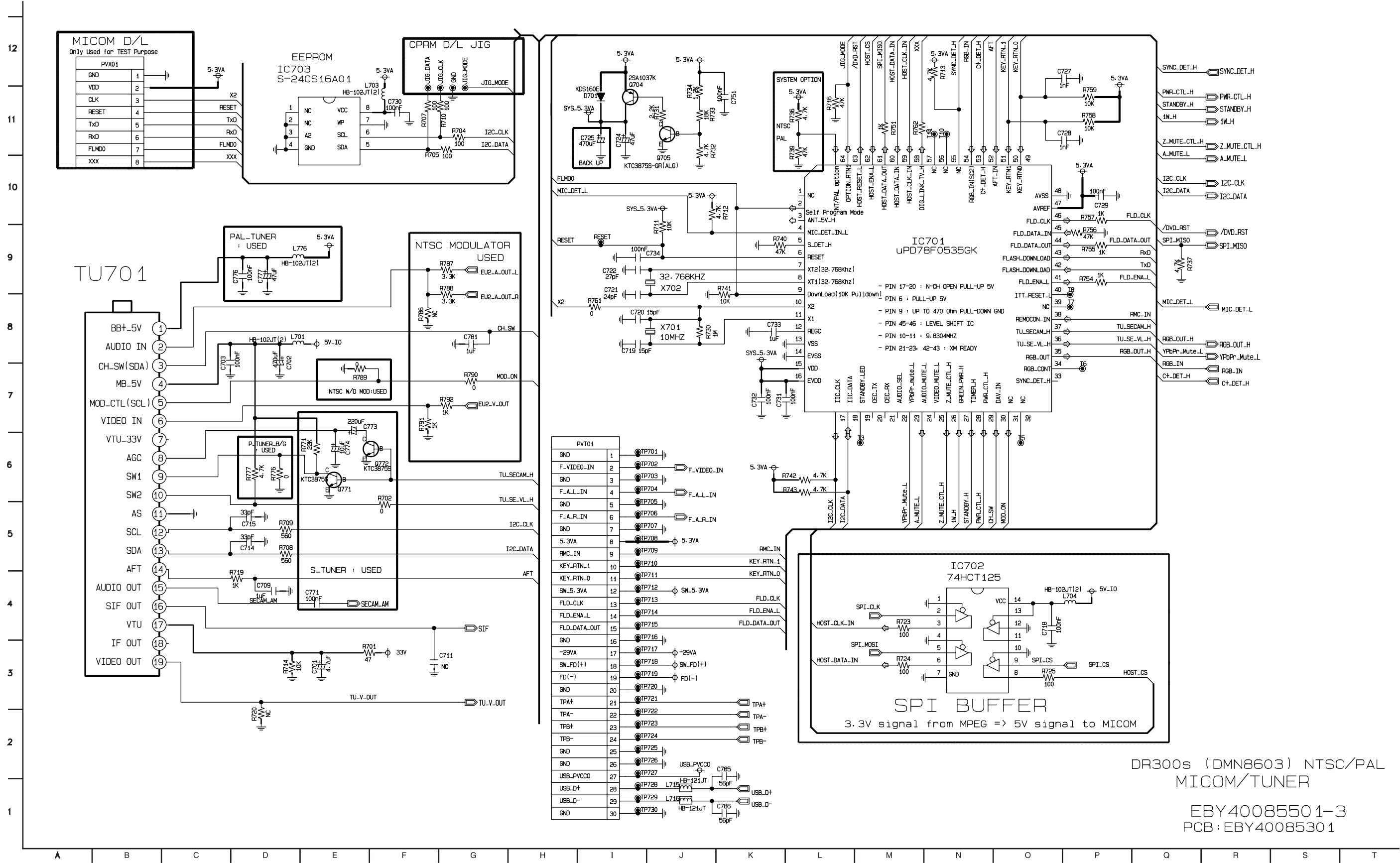
8. CONNECTOR / AV SWITCH / JACK CIRCUIT DIAGRAM



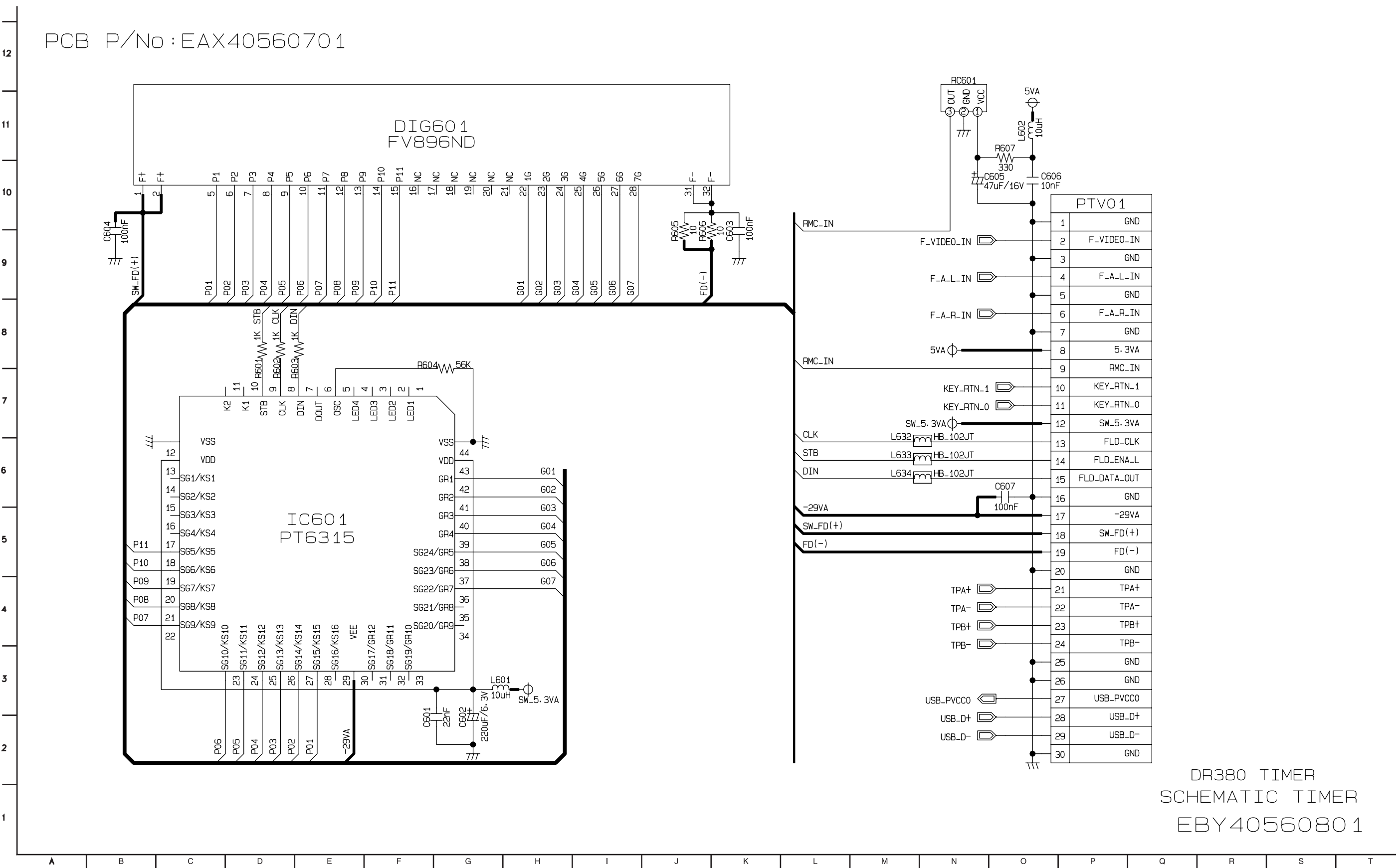
DR300s (DMN8603) NTSC/PAL
CONNECTOR/AV SWITCH/JACK

EBY40085501-2
PCB : EBY40085302

9. MICOM / TUNER CIRCUIT DIAGRAM

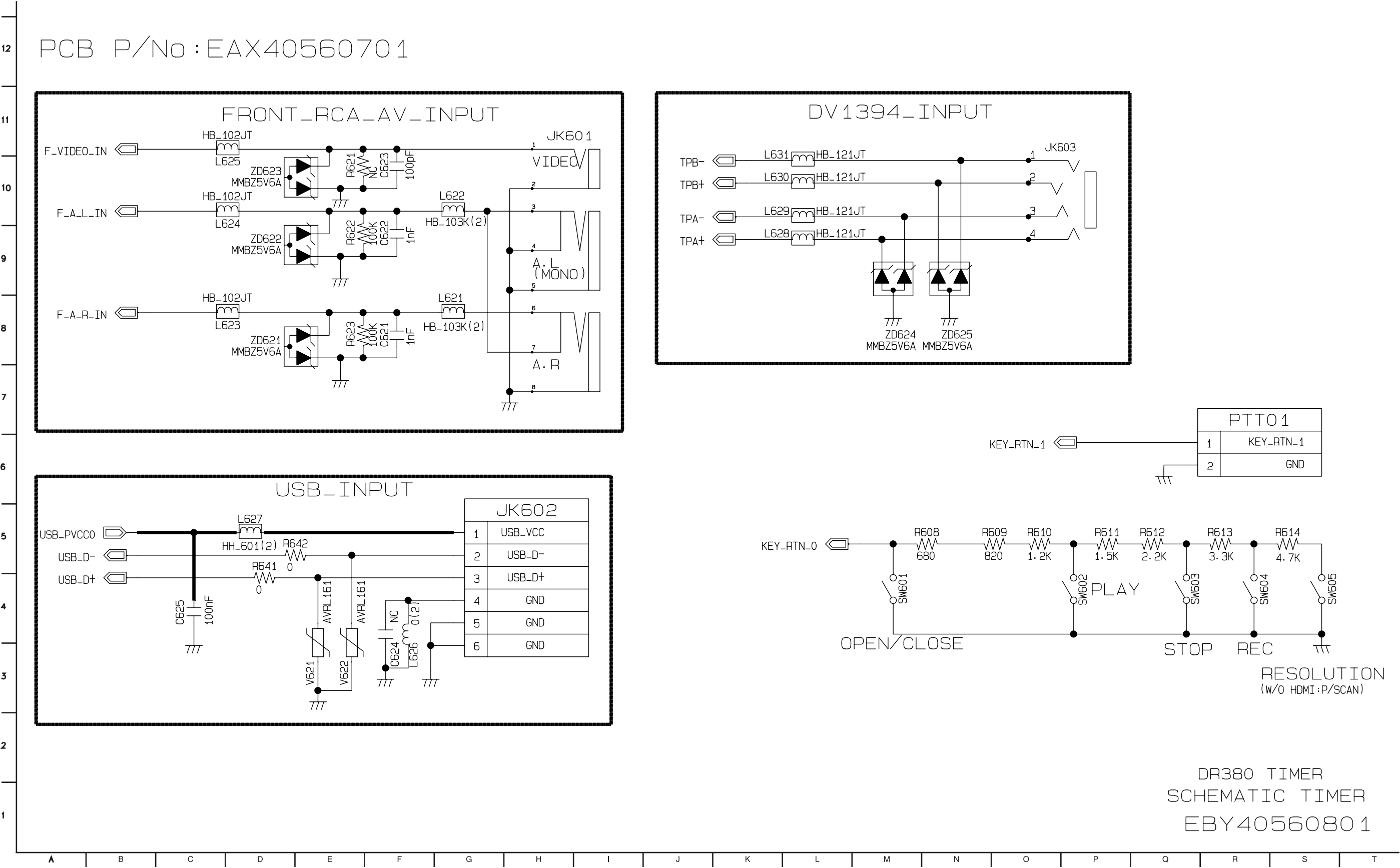


10. TIMER-1 CIRCUIT DIAGRAM (8 TOOL)

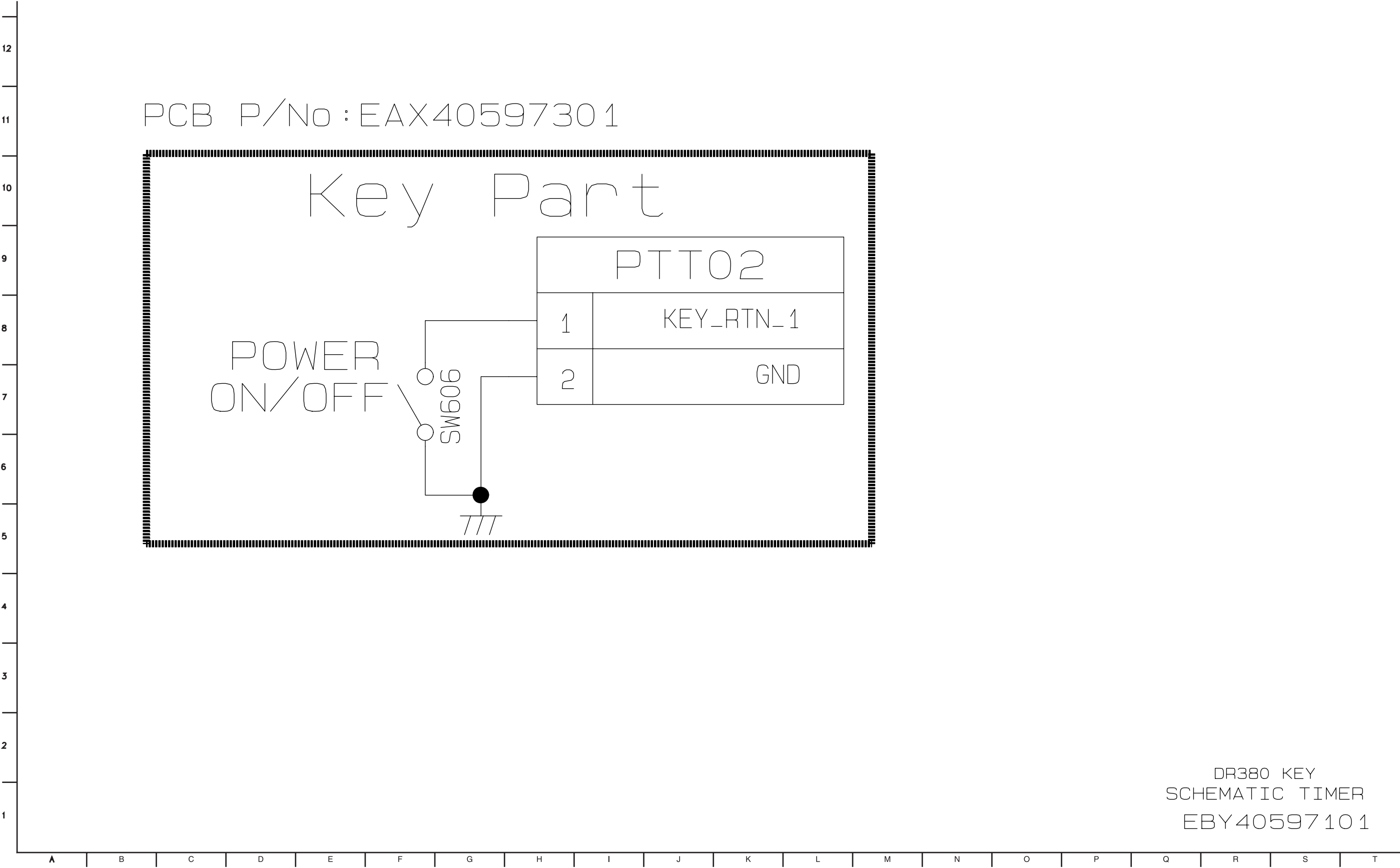


DR380 TIMER
SCHEMATIC TIMER
EBY40560801

11. TIMER-2 CIRCUIT DIAGRAM (8 TOOL)

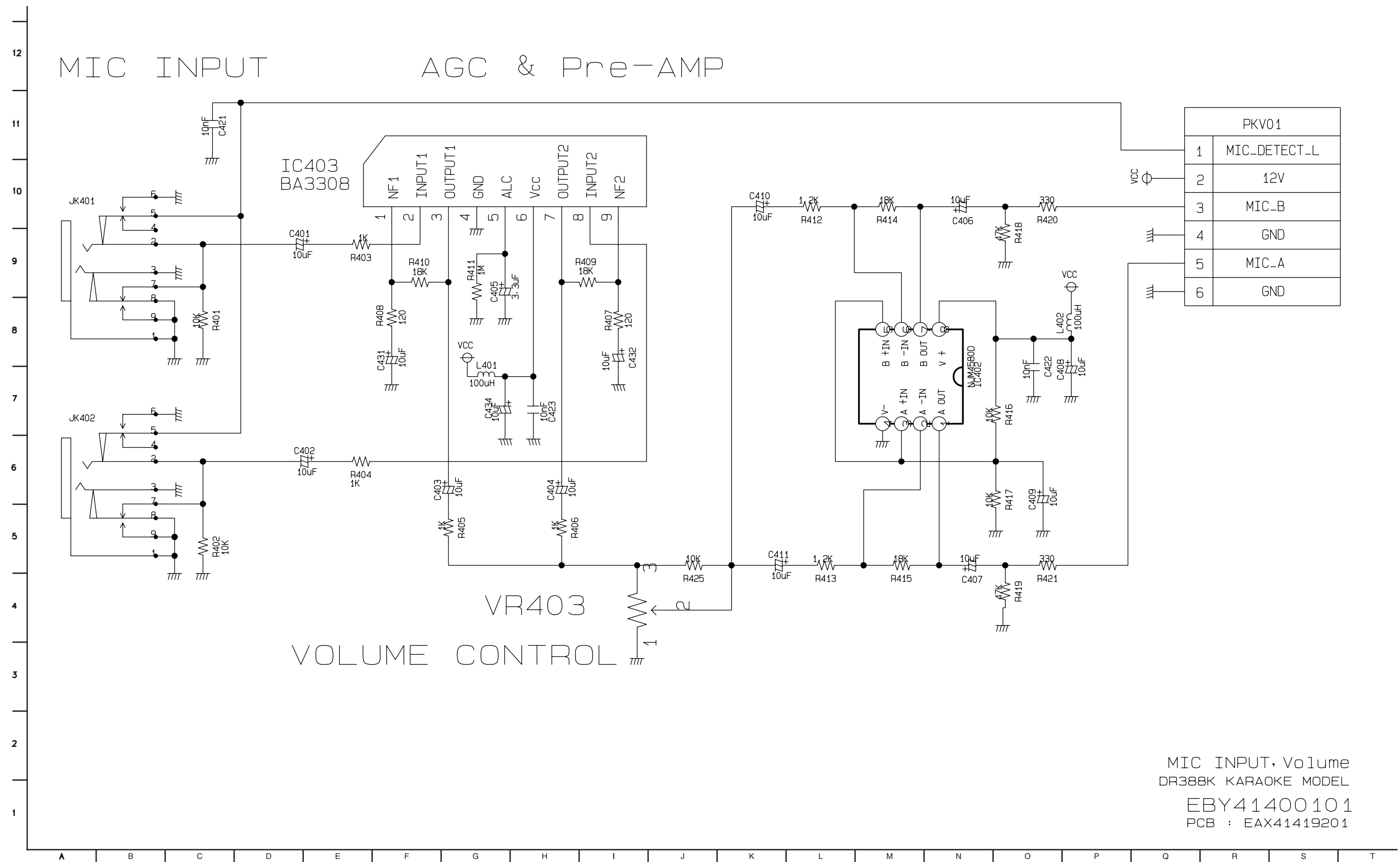


12. KEY CIRCUIT DIAGRAM (8 TOOL)



DR380 KEY
SCHEMATIC TIMER
EBY40597101

13. KARAOKE CIRCUIT DIAGRAM (OPTION)



MIC INPUT, Volume
DR388K KARAOKE MODEL
EBY41400101
PCB : EAX41419201

CIRCUIT VOLTAGE CHART

1. ICs on DVD MAIN BOARD

Voltage (V)	Connector (V)	Pin No.							
		Voltage							
DV1394									
3.3 Volt	3.16	21	22	25	35	40	44	45	
		3.15	3.15	3.15	3.15	3.15	3.15	3.15	
FLASH IC									
3.3 Volt	3.16	37	47						
		3.11	3.08						
LATCH									
3.3 Volt	3.16	7	18	31	42				
		3.14	3.14	3.14	3.14				
LIC101									
3.3 Volt	3.16	1	6	31	34	58	105		
		3.15	3.15	3.14	3.13	3.13	3.13		
5 Volt	4.89	23	45	67	108	121			
		4.85	4.86	4.85	4.85	4.86			
LIC201									
1.2 Volt		80	96	125					
		1.21	1.22	1.21					
3.3 Volt	3.16	4	7	16	25	39	59	66	79
		3.13	3.13	3.13	3.12	3.11	3.10	3.10	3.10
		91	97	100	123	133	137	144	
		3.10	3.05	3.06	3.07	3.07	3.07	3.08	
5 Volt	4.89	80							
		4.82							
MOTOR IC									
5 Volt	4.89	3	5						
		4.80	4.81						
12 Volt	11.98	18	19	23	44				
		11.99	11.99	11.98	11.99				
MPEG IC									
2.5 Volt	2.36	5	6	7					
		2.35	2.35	2.35					
REFF IC									
2.5 Volt	2.36	5	6	7					
		2.35	2.35	2.35					
RF IC									
3.3 Volt	3.16	1	6	31	34	58	105		
		3.11	3.11	3.11	3.11	3.09	3.08		
5 Volt	4.89	23	45	67	108	121			
		4.81	4.81	4.81	4.81	4.82			
			SDRAM IC						
IC1201									
2.5 Volt	2.36	1	3	9	15	18	33	55	61
		2.35	2.35	2.35	2.34	2.36	2.35	2.36	2.36
IC1202									
2.5 Volt	2.36	1	3	9	15	18	33	55	61
		2.35	2.35	2.35	2.36	2.35	2.35	2.36	2.36

2. Capacitors on DVD MAIN BOARD

Loca. No.	Spec	Power On		Playback	
		Voltage(+)	Voltage(-)	Voltage(+)	Voltage(-)
Tantal Cap					
C1114	10uF/16V 20%	3.168V	.018V	3.156V	.020V
C1121	22uF/10V 20%	1.210V	.018V	1.209V	.020V
C1128	22uF/10V 20%	2.388V	.018V	2.367V	.020V
C1208	22uF/10V 20%	2.391V	.018V	2.371V	.020V
C1217	22uF/10V 20%	2.390V	.018V	2.371V	.020V
C1226	22uF/10V 20%	1.195V	.018V	1.187V	.020V
C1227	22uF/10V 20%	1.195V	.018V	1.186V	.020V
C1706	22uF/10V 20%	1.809V	.018V	1.809V	.020V
AL Cap					
C1147	220uF/6.3V 20%	3.168V	.018V	3.160V	.020V
C1705	220uF/6.3V 20%	4.925V	.018V	4.874V	.020V
LC414	100uF/16V 20%	12.160V	.018V	12.121V	.020V
LC751	100uF/16V 20%	3.152V	.018V	3.145V	.020V

3. ICs on I/O BOARD

Pin	EE Mode	PB Mode	REC Mode
IC131			
1	15.58V	15.13V	15.1V
2	12.13V	12.13V	12.13V
3	0V	0V	0V
4	4.99V	4.99V	4.99V
IC132			
1	5.22V	5.22V	5.21V
2	4.97V	4.97V	4.97V
3	0V	0V	0V
4	4.9V	4.9V	4.9V
IC133			
1	3.91V	3.94V	3.92V
2	3.35V	3.35V	3.35V
3	0V	0V	0V
4	0.81V	0.8V	0.81V
IC136			
1	3.91V	3.94V	3.93V
2	2.52V	2.52V	2.52V
3	0V	0V	0V
4	4.7V	4.73V	4.7V
IC151			
1	5.21V	5.21V	5.2V
2	0.8V	0.8V	0.81V
3	0V	0V	0V
4	0.81V	0.8V	0.81V
5	5V	5V	4.99V
6	0V	0V	0V
7	1.37V	1.37V	1.37V
8	5.18V	5.17V	5.16V
IC701 UPD78F0535GK			
1	5.09V	5.09V	5.09V
2	0V	0V	0V
3	0V	0V	0V
4	4.44V	4.43V	4.43V
5	2.92V	2.93V	2.93V
6	5.17V	5.16V	5.16V
7	2.92V	2.93V	2.93V
8	2.31V	2.31V	2.31V
9	0V	0V	0V
10	3.06V	3.08V	3.07V
11	2.55V	2.55V	2.56V
12	2.53V	2.53V	2.53V
13	0V	0V	0V
14	0V	0V	0V
15	5.17V	5.17V	5.17V
16	5.17V	5.17V	5.17V
17	5.17V	5.17V	5.17V
18	5.1V	5.1V	5.1V
19	0.08V	0.07V	0.08V
20	0.09V	0.07V	0.09V
21	0V	0V	0V
22	0V	0V	0V

Pin	EE Mode	PB Mode	REC Mode
23	0.04V	0.95V	0.04V
24	5.13V	5.14V	5.13V
25	5.16V	5.15V	5.15V
26	0V	0V	0V
27	0.09V	0.09V	0.09V
28	5.15V	5.15V	5.15V
29	5V	4.99V	4.99V
30	0.13V	0.1V	0.08V
31	0V	0V	0V
32	0V	0V	0V
33	3.37V	3.37V	3.37V
34	0V	0V	0V
35	5.15V	5.15V	5.15V
36	0V	0V	0V
37	0V	0V	0V
38	4.87V	4.86V	4.86V
39	0V	0V	0V
40	0V	0V	0V
41	4.88V	4.86V	4.88V
42	5.14V	5.14V	5.14V
43	0V	0V	0V
44	0.76V	0.76V	0.79V
45	0V	0V	0V
46	5.09V	5.09V	5.09V
47	5.24V	5.24V	5.24V
48	0V	0V	0V
49	5.24V	5.23V	5.23V
50	5.24V	5.23V	5.23V
51	5.09V	5.09V	5.09V
52	0V	0V	0V
53	0V	0V	0V
54	0V	0V	0V
55	0V	0V	0V
56	0V	0V	0V
57	5.07V	5.06V	5V
58	5.18V	5.18V	5.19V
59	0.02V	0.02V	0.02V
60	0.33V	0.33V	0.27V
61	5.24V	5.24V	5.24V
62	4.35V	4.36V	4.36V
63	0V	0V	0V
64	0V	0V	0V
IC702 74HCT125			
1	0V	0V	0V
2	3.29V	3.29V	3.3V
3	5.18V	5.18V	5.19V
4	0V	0V	0V
5	0.03V	0.04V	0.03V
6	0.02V	0.02V	0.02V
7	0V	0V	0V
8	0V	0V	0V
9	0V	0V	0V

Pin	EE Mode	PB Mode	REC Mode
10	0V	0V	0V
11	0V	0V	0V
12	0V	0V	0V
13	0.01V	0.01V	0.01V
14	5.25V	5.24V	5.24V
IC703 S524A60X51			
1	0V	0V	0V
2	0V	0V	0V
3	0V	0V	0V
4	0V	0V	0V
5	51V	51V	51V
6	51V	51V	5.09V
7	0V	0V	0V
8	5.25V	5.24V	5.24V
IC8U1 USB tps2051			
1	0V	0V	0V
2	4.97V	4.96V	4.96V
3	4.97V	4.96V	4.96V
4	4.97V	4.96V	4.96V
5	4.97V	4.96V	4.96V
6	4.97V	4.96V	4.96V
7	4.97V	4.96V	4.96V
8	4.97V	4.96V	4.96V
IC801 MM1763			
1	1.93V	1.93V	1.93V
2	7.17V	7.16V	7.16V
3	7.17V	7.16V	7.16V
4	1.08V	1.08V	1.08V
5	7.17V	7.16V	7.16V
6	7.18V	7.16V	7.16V
7	2.32V	2.3V	1.6V
8	1.69V	1.69V	1.69V
9	1.69V	1.69V	1.69V
10	1.09V	1.1V	1.14V
11	7.18V	7.16V	7.16V
12	7.18V	7.16V	7.16V
13	2.47V	2.46V	2.46V
14	11.58V	11.56V	11.56V
15	1.65V	1.58V	1.54V
16	0V	0V	0V
17	0V	0V	0V
18	2.48V	2.48V	2.48V
19	2.48V	2.47V	2.47V
20	11.4V	11.4V	11.39V
21	2.46V	2.46V	2.46V
22	2.46V	2.46V	2.45V
23	0V	0V	0V
24	2.53V	0V	2.54V
25	2.55V	2.55V	2.54V
26	2.55V	2.55V	2.54V
27	0.91V	0.91V	0.91V
28	2.29V	2.1V	2.06V

Pin	EE Mode	PB Mode	REC Mode
29	2.53V	2.53V	2.53V
30	5.16V	5.15V	5.15V
31	5.1V	5.09V	5.09V
32	5.1V	5.1V	5.1V
33	0V	0V	0V
34	6.58V	6.59V	6.58V
35	6.59V	6.59V	6.58V
36	2.06V	1.77V	2.09V
37	6.59V	6.59V	6.58V
38	6.59V	6.59V	6.59V
39	2.07V	1.77V	2.07V
40	1.07V	1.08V	1.08V
41	1.07V	1.08V	1.07V
42	2.33V	2.32V	2.32V
IC901 SAA7318			
1	0.19V	0.11V	0.16V
2	0.2V	0.11V	0.16V
3	1.79V	1.8V	1.78V
4	0V	0V	0V
5	3.34V	3.34V	3.34V
6	0V	0V	0V
7	3.33V	3.33V	3.33V
8	0.59V	0.58V	0.59V
9	0.56V	0.58V	0.57V
10	0.56V	0.57V	0.57V
11	1.02V	1.02V	1.02V
12	0V	0V	0V
13	3.33V	3.33V	3.33V
14	0.59V	0.58V	0.58V
15	0.56V	0.57V	0.57V
16	0.93V	0.57V	0.57V
17	1.02V	1.01V	1.01V
18	1.79V	1.78V	1.78V
19	0V	0V	0V
20	1.87V	2.01V	2.01V
21	3.33V	3.33V	3.33V
22	0V	0V	0V
23	0V	0V	0V
24	0V	0V	0V
25	0V	0V	0V
26	3.33V	3.32V	3.32V
27	0.59V	0.58V	0.58V
28	0.57V	0.57V	0.58V
29	0.65V	0.74V	0.95V
30	1.02V	1.02V	1.02V
31	0V	0V	0V
32	3.33V	3.32V	3.32V
33	0.01V	0.01V	0.01V
34	0.01V	0.01V	0.01V
35	0.59V	0.58V	0.57V
36	0.59V	0.58V	0.57V
37	0.59V	0.58V	0.57V

Pin	EE Mode	PB Mode	REC Mode
38	1.01V	1.01V	1.01V
39	0V	0V	0V
40	1.48V	1.48V	1.48V
41	3.34V	3.34V	3.34V
42	0.2V	0.09V	0.18V
43	3.34V	3.34V	3.34V
44	3.29V	3.31V	3.31V
45	3.29V	3.31V	3.31V
46	0.2V	0.1V	0.18V
47	0.2V	0.1V	0.18V
48	1.8V	1.78V	1.8V
49	0V	0V	0V
50	0.04V	0.05V	0.04V
51	3.33V	3.33V	3.33V
52	0V	0V	0V
53	0.85V	0.85V	0.85V
54	0.84V	0.85V	0.84V
55	1.79V	1.79V	1.8V
56	1.45V	1.45V	1.4V
57	1.03V	1.03V	1.1V
58	1.15V	1.17V	1.16V
59	3.34V	3.35V	3.34V
60	0V	0V	0V
61	1.68V	1.38V	1.39V
62	1.37V	1.24V	1.54V
63	1.26V	1.38V	1.32V
64	1.26V	1.24V	1.32V
65	1.22V	1.02V	1.44V
66	3.08V	3.09V	3.08V
67	3.34V	3.35V	3.34V
68	0V	0V	0V
69	1.78V	1.78V	1.78V
70	0V	0V	0V
71	2.79V	2.79V	2.79V
72	1.63V	1.61V	1.6V
73	1.64V	1.66V	1.67V
74	0V	0V	0V
75	1.39V	1.03V	1.45V
76	1.32V	1.32V	1.32V
77	3.34V	3.35V	3.34V
78	0V	0V	0V
79	1.32V	1.32V	1.32V
80	1.5V	1.5V	1.53V
81	1.39V	1.39V	1.39V
82	1.16V	1.16V	1.16V
83	1.37V	1.11V	1.11V
84	1.96V	2.02V	1.43V
85	3.34V	3.33V	3.34V
86	0V	0V	0V
87	3.18V	0V	3.17V
88	3.18V	0V	3.18V
89	0V	0V	0V

Pin	EE Mode	PB Mode	REC Mode
90	1.78V	1.78V	1.78V
91	0V	0V	0V
92	0.25V	0.15V	0.16V
93	0.25V	0.15V	0.16V
94	3.34V	3.35V	3.34V
95	1.7V	1.7V	1.7V
96	3.34V	3.34V	3.34V
97	0V	0V	0V
98	1.67V	1.67V	1.67V
99	1.68V	1.67V	1.68V
100	1.25V	1.24V	1.25V
101	3.34V	0V	3.34V
102	3.34V	3.34V	3.34V
103	1.67V	1.68V	1.68V
104	1.68V	1.68V	1.68V
105	1.67V	0.03V	1.68V
106	1.69V	1.69V	1.69V
107	1.69V	1.69V	1.69V
108	3.34V	3.34V	3.34V
109	1.66V	1.66V	1.66V
110	1.66V	1.66V	1.66V
111	0V	0V	0V
112	0V	0V	0V
113	1.65V	1.66V	1.66V
114	3.16V	3.16V	3.16V
115	0V	0V	0V
116	3.34V	0V	3.34V
117	0V	0V	0V
118	1.78V	1.79V	1.79V
119	0V	0V	0V
120	1.65V	1.64V	1.64V
121	1.65V	1.64V	1.64V
122	1.65V	1.64V	1.64V
123	1.65V	1.64V	1.64V
124	1.65V	1.64V	1.64V
125	1.65V	1.64V	1.64V
126	1.65V	1.64V	1.64V
127	1.65V	1.64V	1.64V
128	1.65V	1.64V	1.64
IC910 NJM4580			
1	5.8V	5.77V	5.78V
2	5.8V	5.77V	5.78V
3	5.8V	5.78V	5.78V
4	0V	0V	0V
5	5.8V	5.77V	5.78V
6	5.8V	5.78V	5.79V
7	5.8V	5.77V	5.78V
8	11.59V	11.54V	11.55V

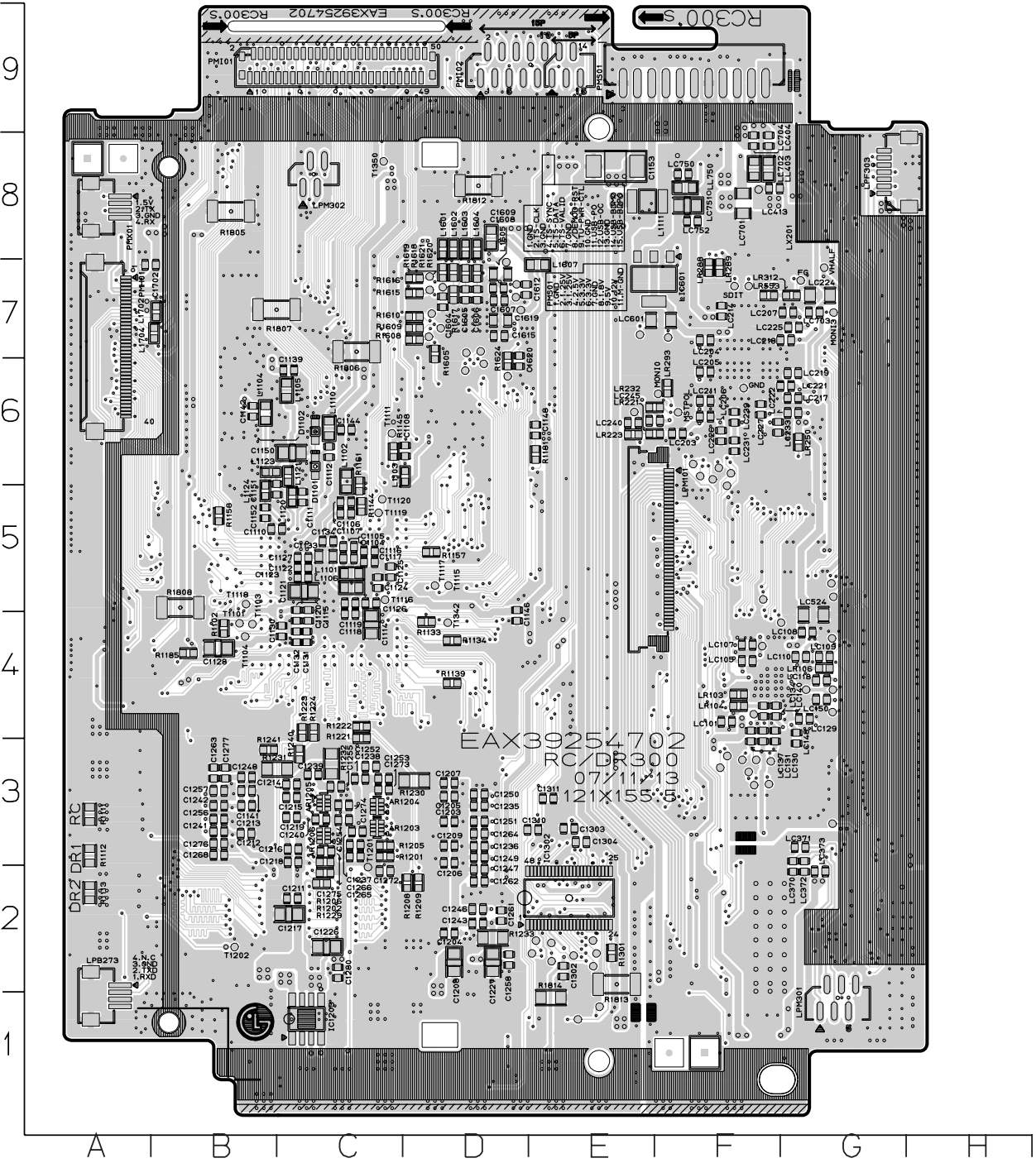
MEMO

4. Capacitors on I/O BOARD

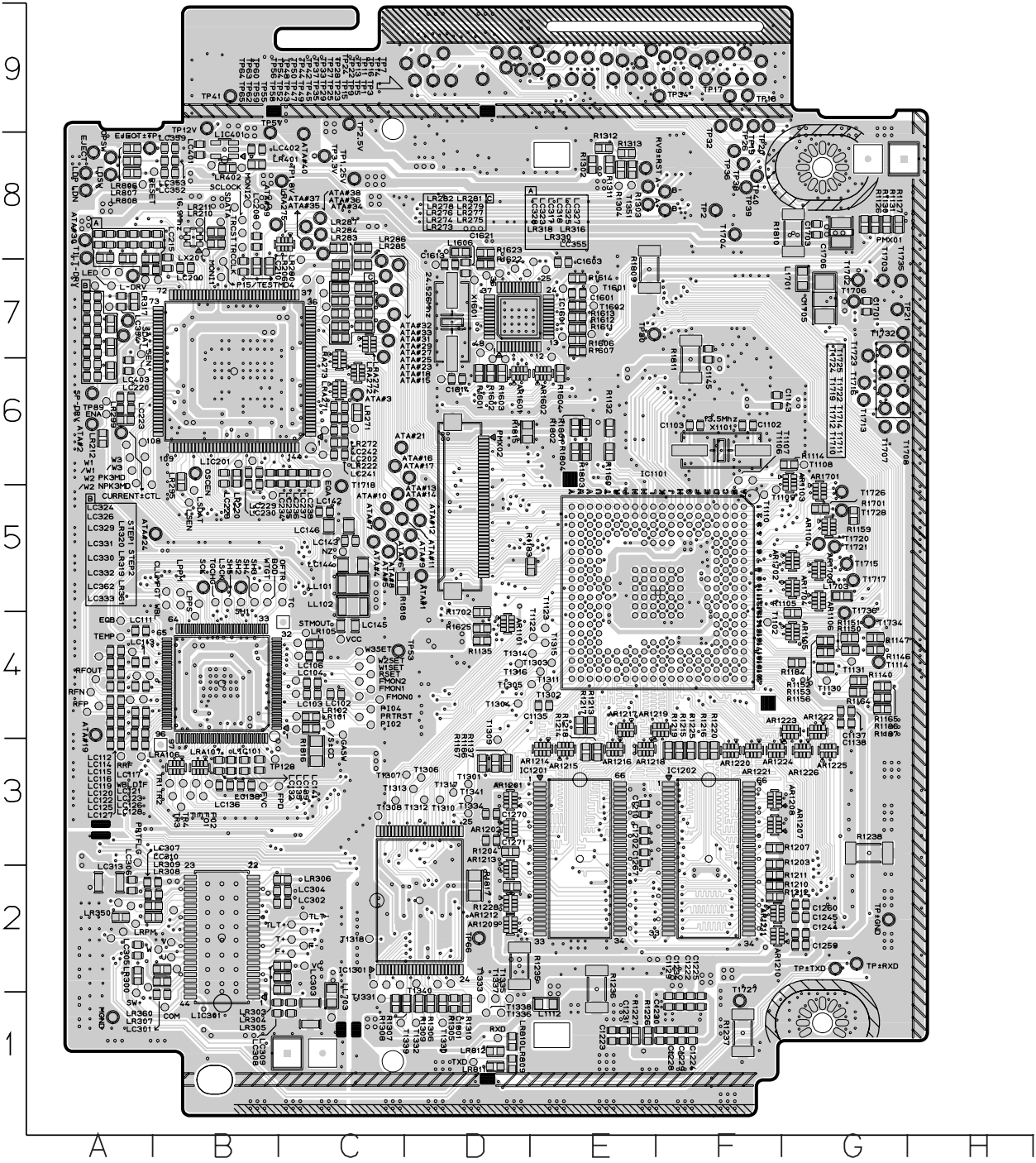
Loca. No.	Value Capacitor	Rated Voltage	Playback		Record	
			A-B (Gap)	Margin	A-B (Gap)	Margin
C133	100uF	16V	12.2V	3.8V	12.1V	3.9V
C134	100uF	16V	5V	11V	5V	11V
C137	100uF	16V	3.4V	12.6V	3.4V	12.6V
C138	100uF	16V	1.8V	14.2V	1.8V	14.2V
C140	100uF	16V	2.5V	13.5V	2.5V	13.5V
C160	10uF	16V	11.6V	4.4V	11.6V	4.4V
C161	4.7uF	50V	12.2V	37.8V	12.2V	37.8V
C701	4.7uF	50V	27.3V	22.7V	27.5V	22.5V
C702	470uF	10V	4.9V	5.1V	4.9V	5.1V
C724	47uF	16V	5.2V	10.8V	5.2V	10.8V
C725	470uF	10V	5.2V	4.8V	5.2V	4.8V
C777	47uF	16V	5.2V	10.8V	5.2V	10.8V
C818	22uF	16V	2.5V	13.5V	2.5V	13.5V
C824	470uF	10V	2.6V	7.4V	2.6V	7.4V
C825	470uF	10V	2.6V	7.4V	2.6V	7.4V
C826	470uF	10V	2.6V	7.4V	2.6V	7.4V
C827	470uF	10V	0.05V	9.95V	0.05V	9.95V
C834	22uF	16V	6.59V	9.41V	6.59V	9.41V
C835	22uF	16V	6.59V	9.41V	6.59V	9.41V
C836	470uF	10V	0.78V	9.22V	0.78V	9.22V
C837	22uF	16V	6.59V	9.41V	6.59V	9.41V
C838	22uF	16V	6.59V	9.41V	6.59V	9.41V
C839	470uF	10V	1.77V	8.23V	2.06V	7.94V
C842	22uF	16V	1.61V	14.39V	1.61V	14.39V
C843	47uF	16V	5.2V	10.8V	5.2V	10.8V
C844	47uF	16V	11.5V	4.5V	11.5V	4.5V
C8U3	100uF	10V	5V	5V	4.96V	5.04V
C905	10uF	16V	3.3V	12.7V	3.3V	12.7V
C907	10uF	16V	1.8V	14.2V	1.8V	14.2V
C910	10uF	16V	3.4V	12.6V	3.4V	12.6V
C921	22uF	16V	4.1V	11.9V	4.1V	11.9V
C922	22uF	16V	4.1V	11.9V	4.1V	11.9V
C927	10uF	16V	5.8V	10.2V	5.8V	10.2V
C928	10uF	16V	5.8V	10.2V	5.8V	10.2V
C932	47uF	16V	11.6V	4.4V	11.6V	4.4V
C934	10uF	16V	5.8V	10.2V	5.8V	10.2V
C953	10uF	16V	3.4V	12.6V	3.4V	12.6V

PRINTED CIRCUIT BOARD DIAGRAMS

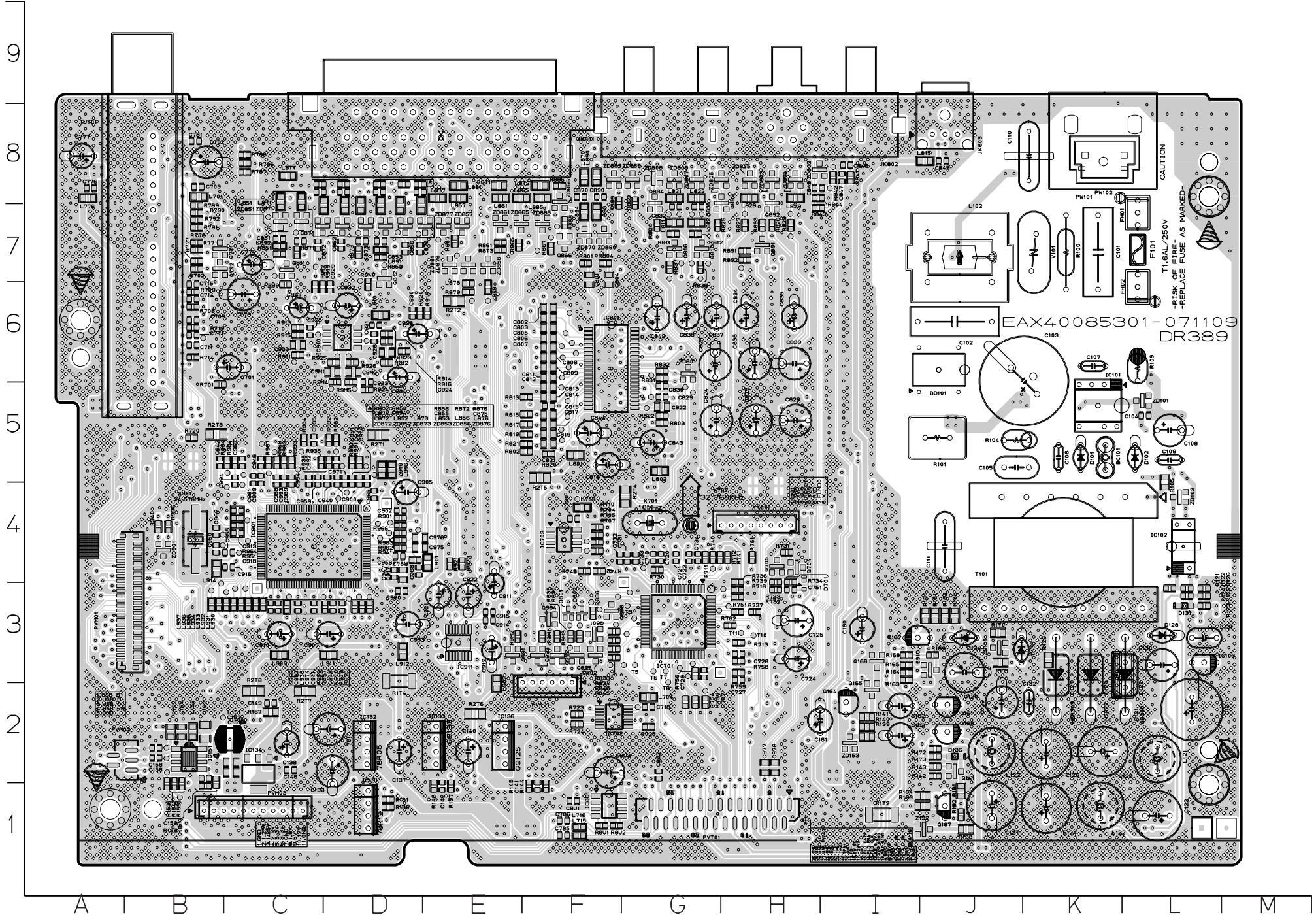
1. MAIN & LOADER P.C.BOARD
(TOP VIEW)



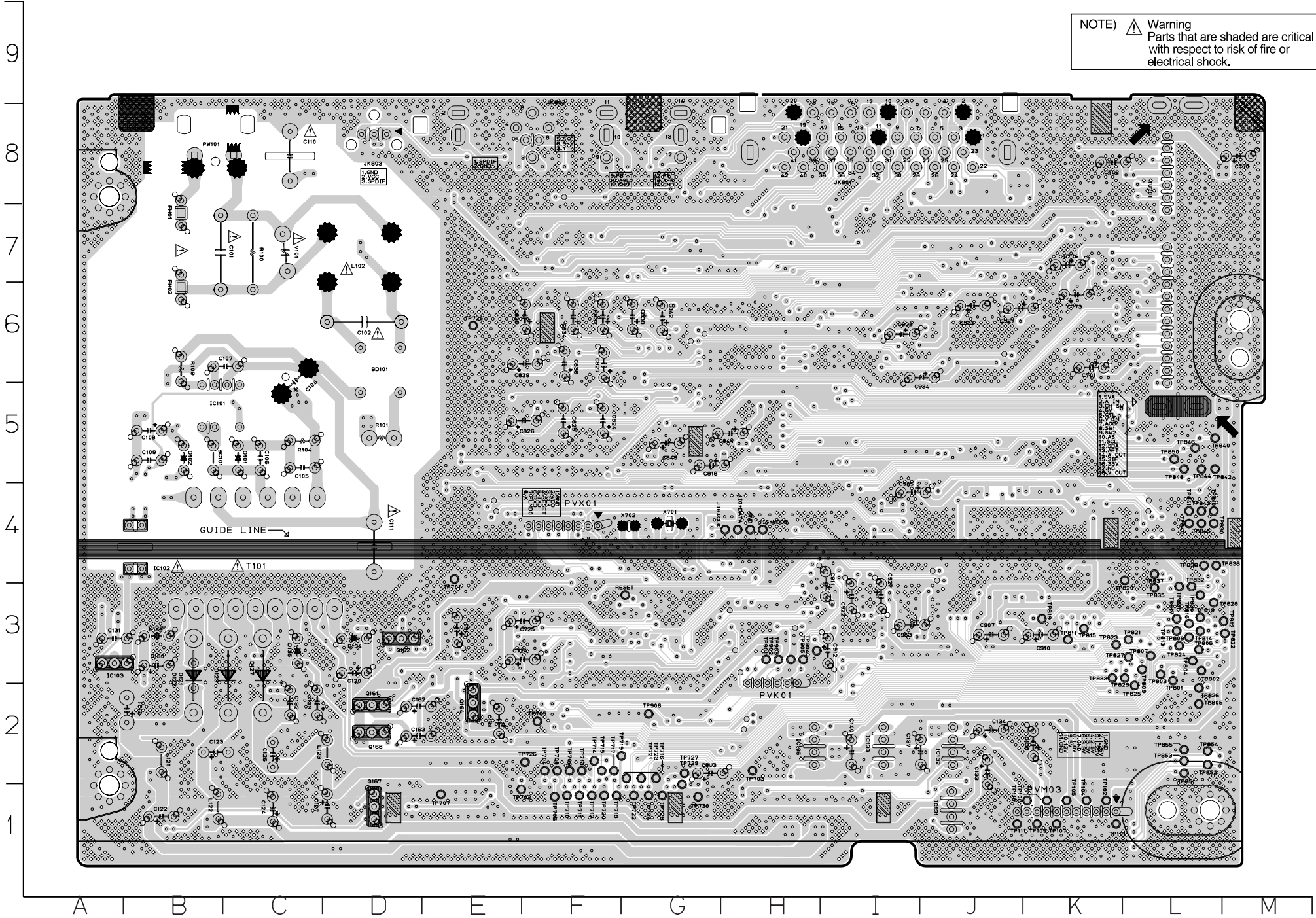
(BOTTOM VIEW)



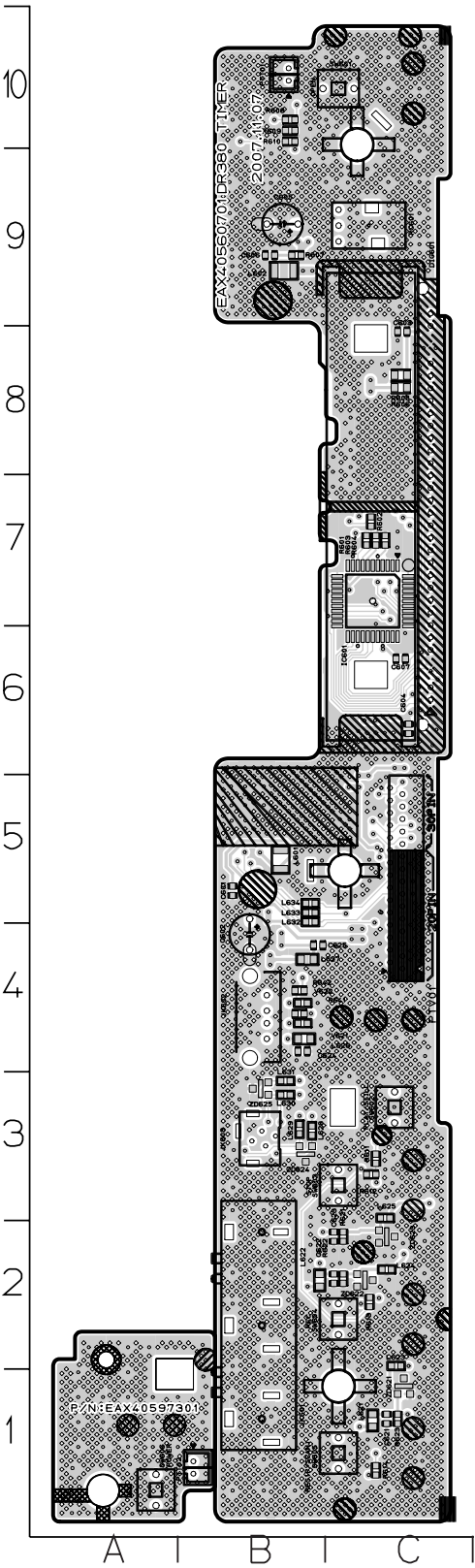
2. I/O & SMPS P.C.BOARD
(TOP VIEW)



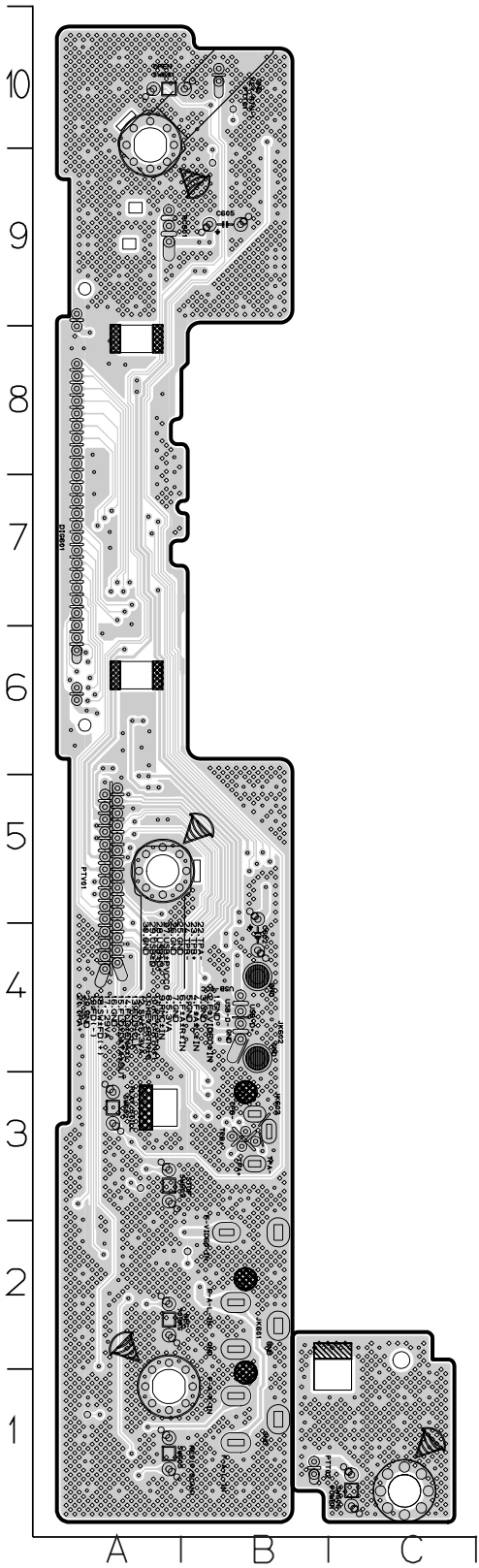
**I/O & SMPS P.C.BOARD
(BOTTOM VIEW)**



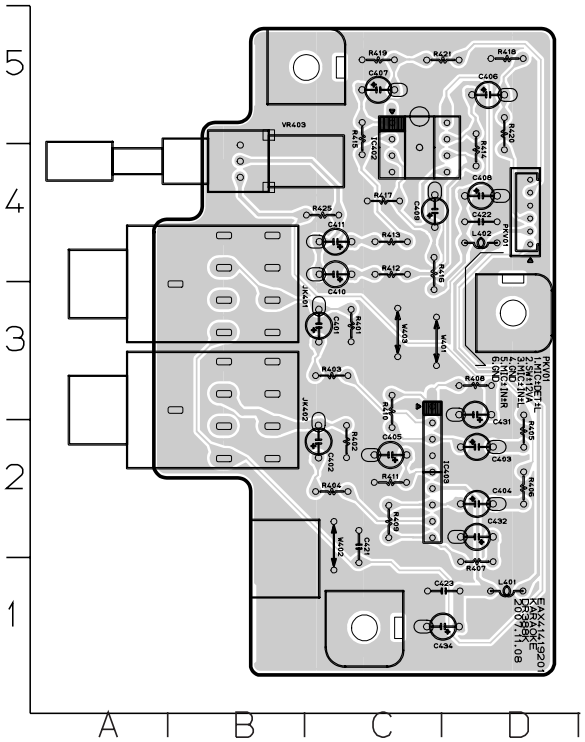
3. TIMER & KEY P.C.BOARD
(TOP VIEW)



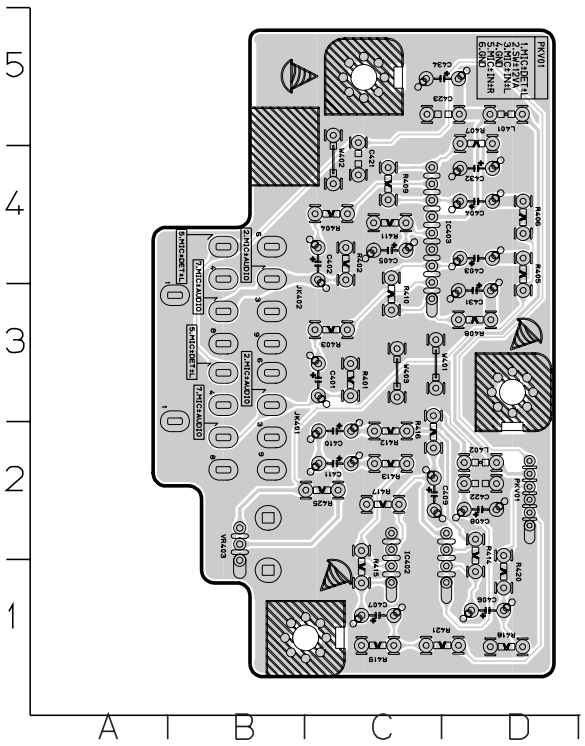
(BOTTOM VIEW)



4. KARAOKE P.C.BOARD (OPTION)
(TOP VIEW)



(BOTTOM VIEW)



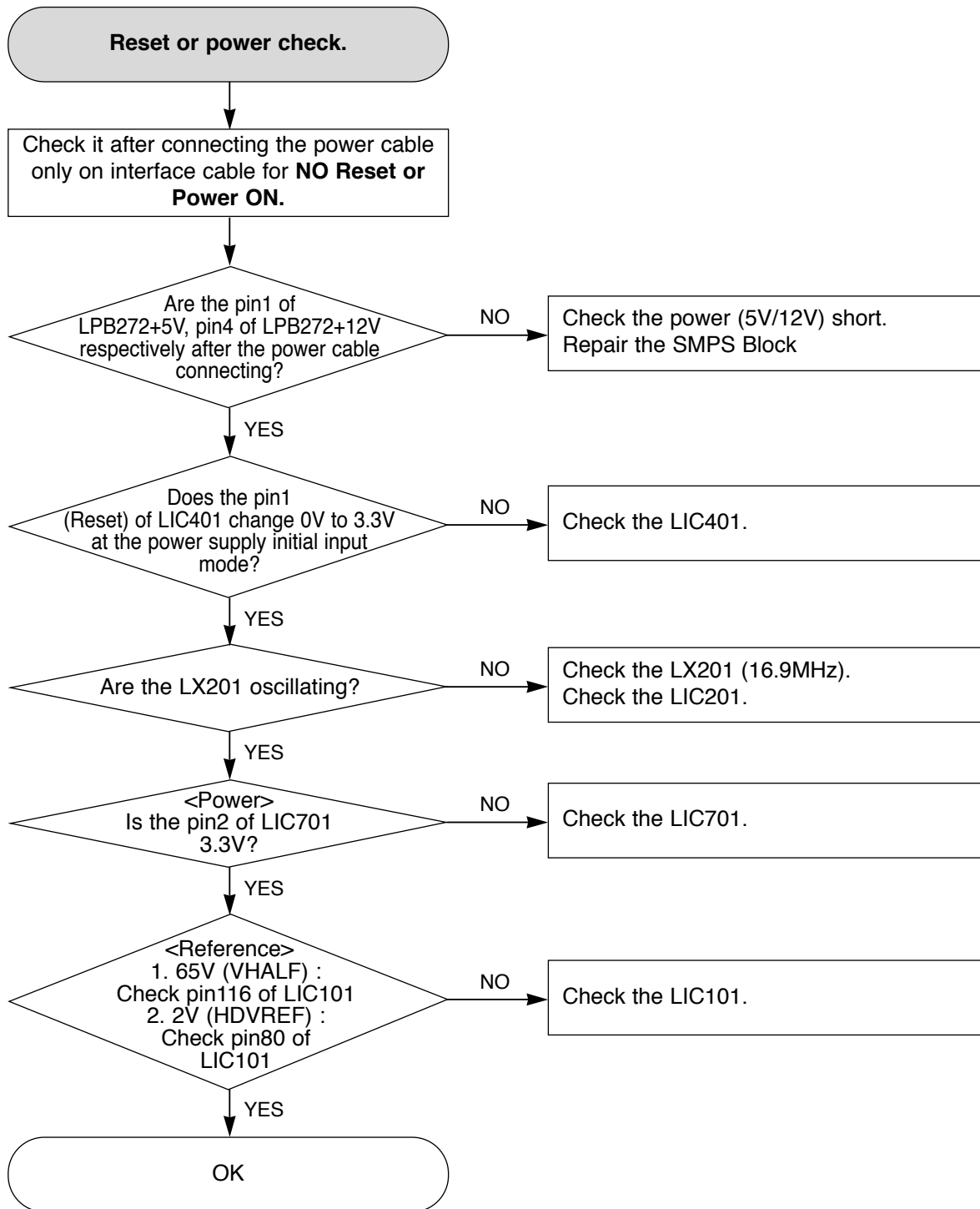
SECTION 4

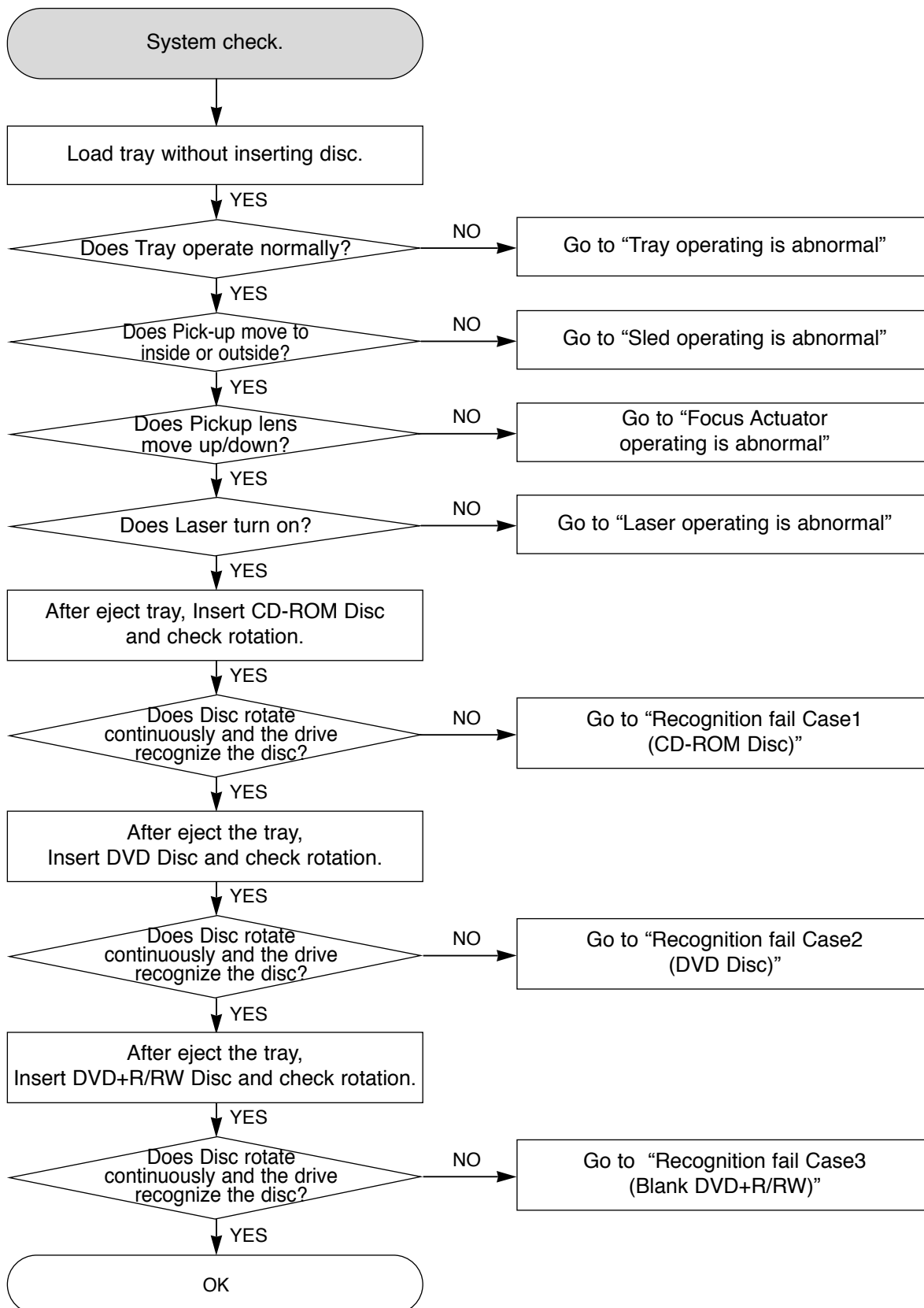
RV9 LOADER PART

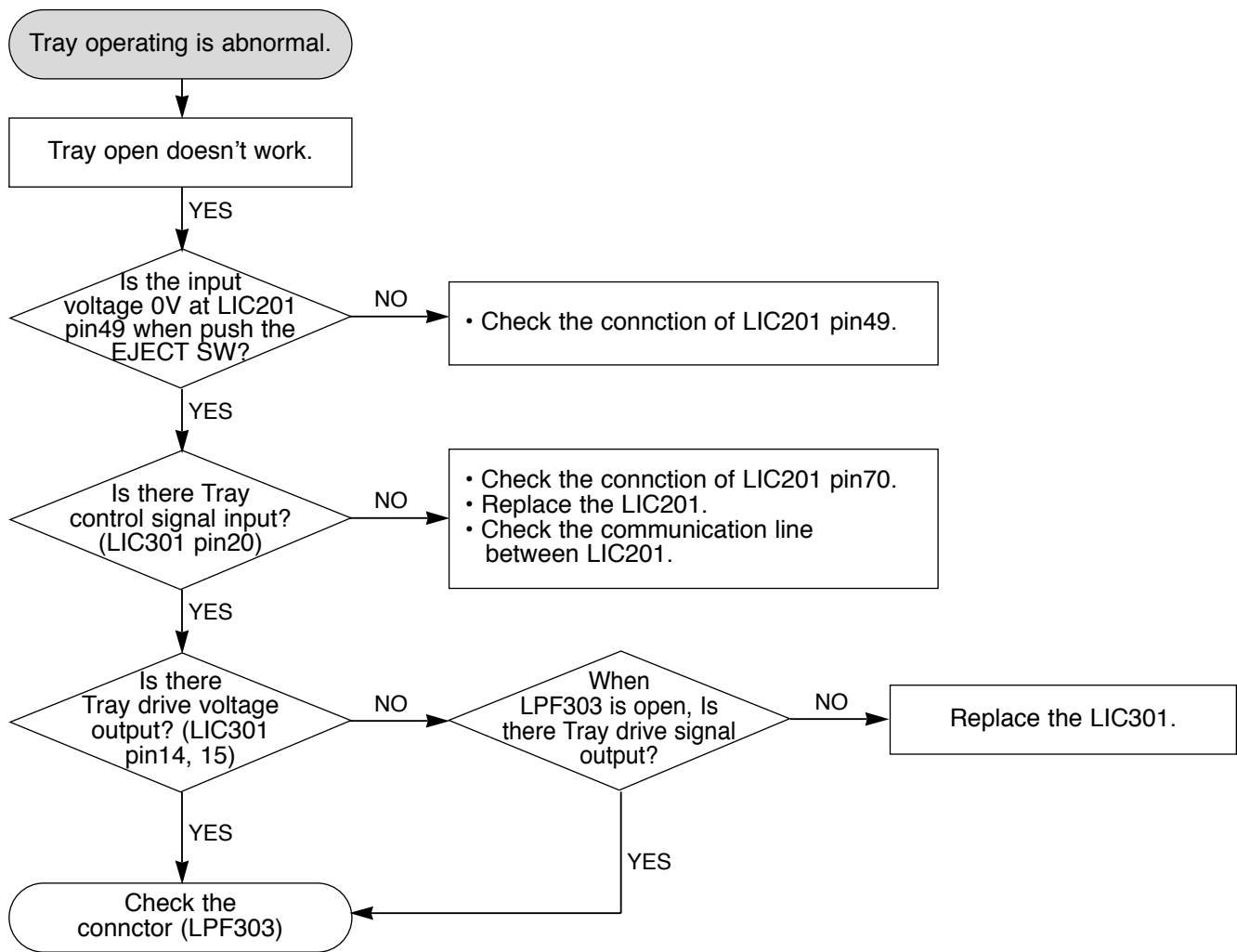
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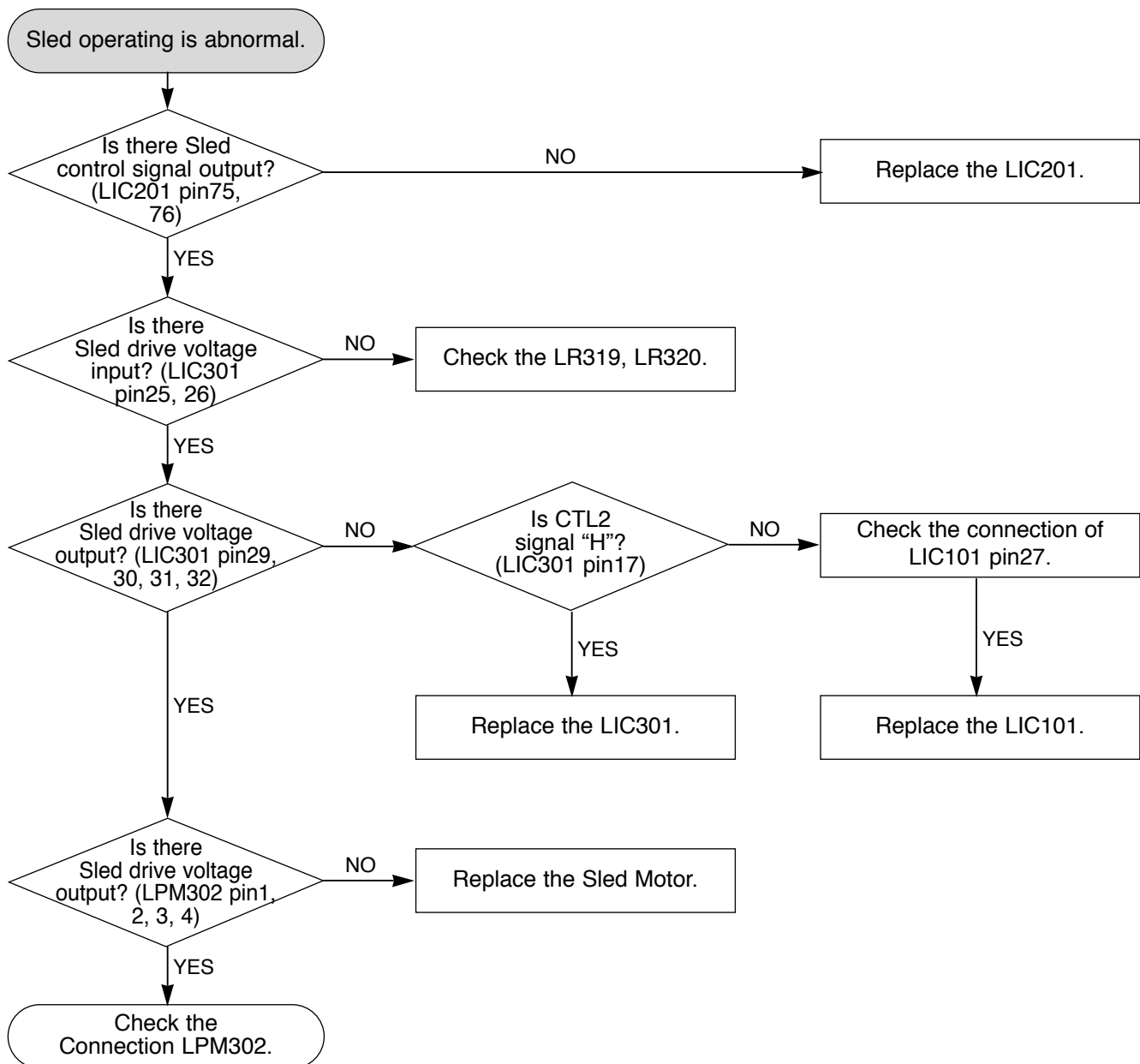
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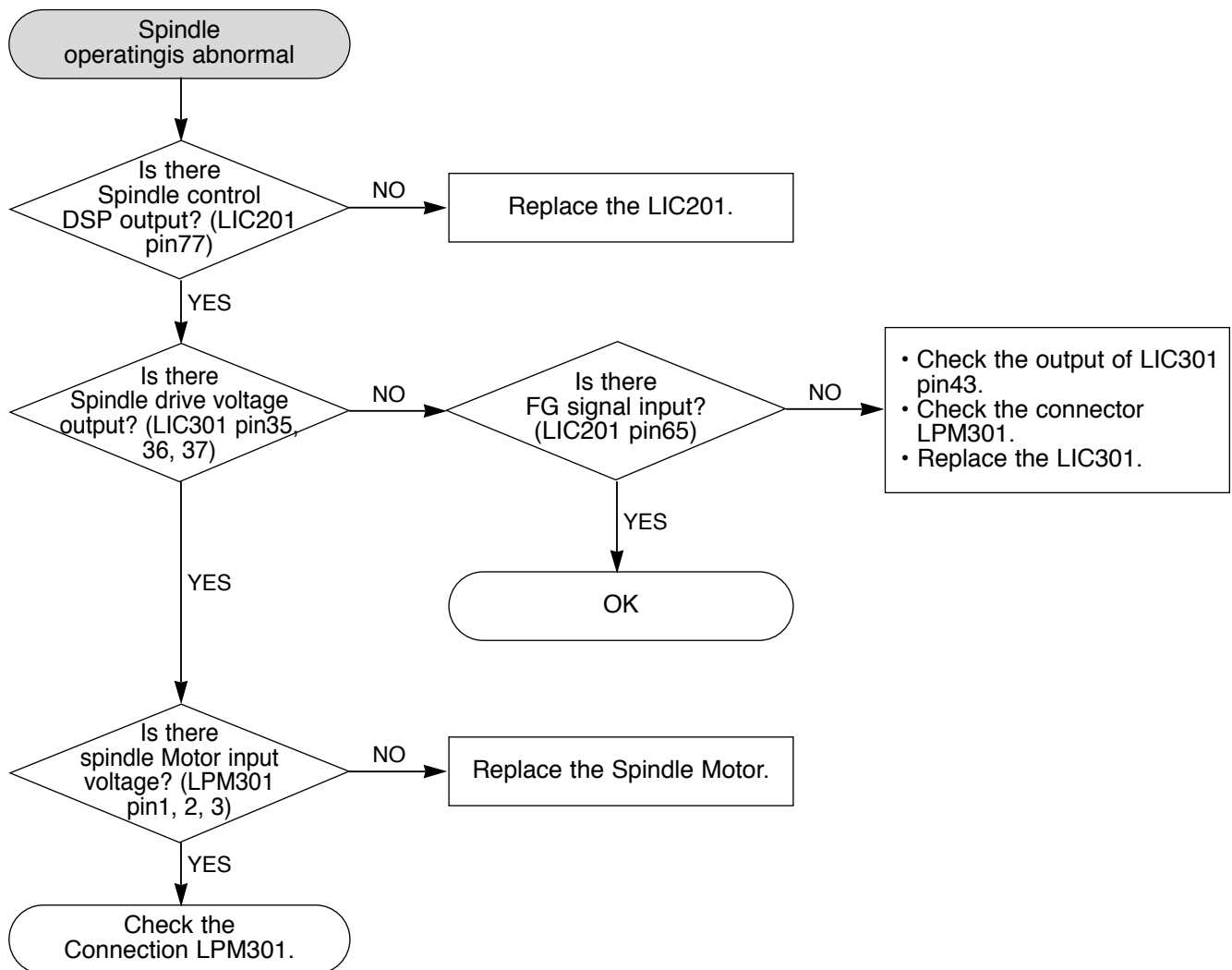
ELECTRICAL TROUBLESHOOTING GUIDE

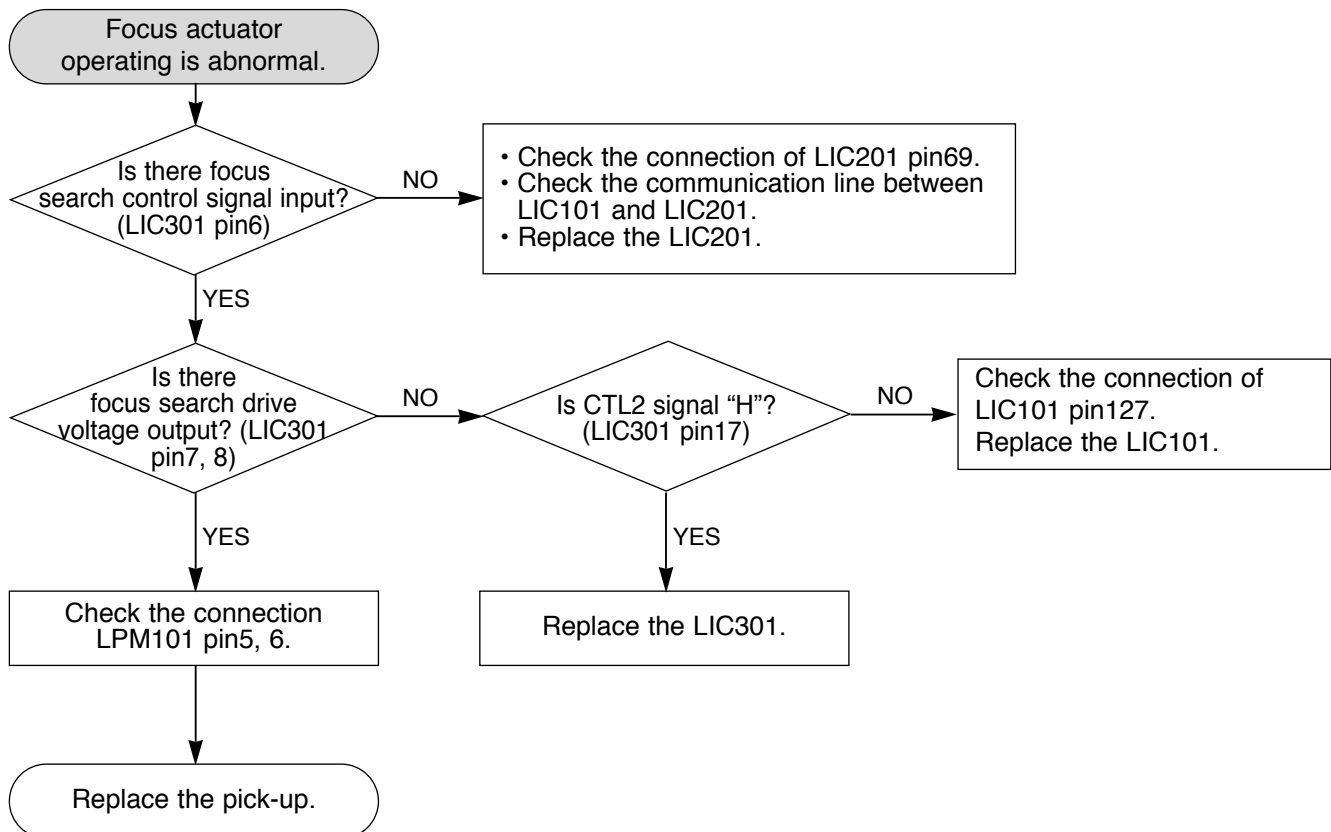
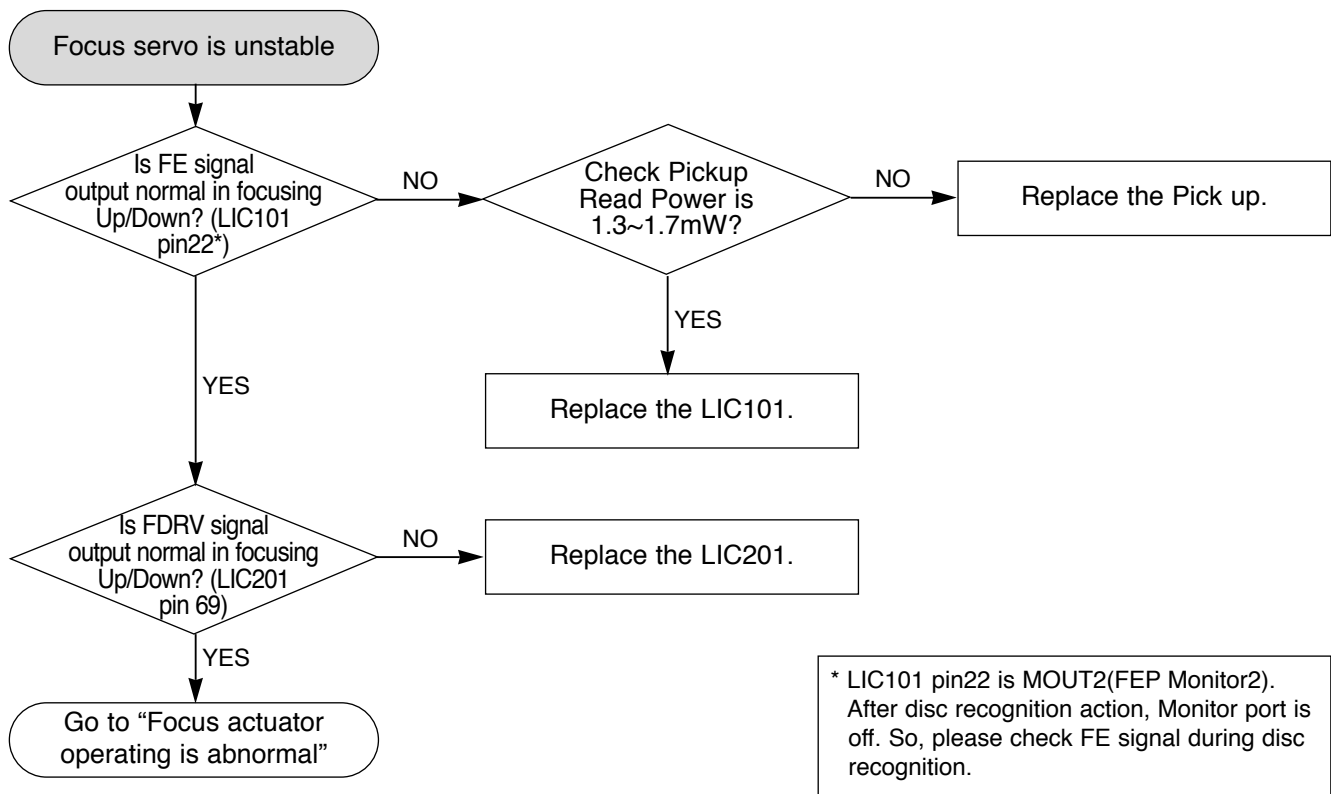


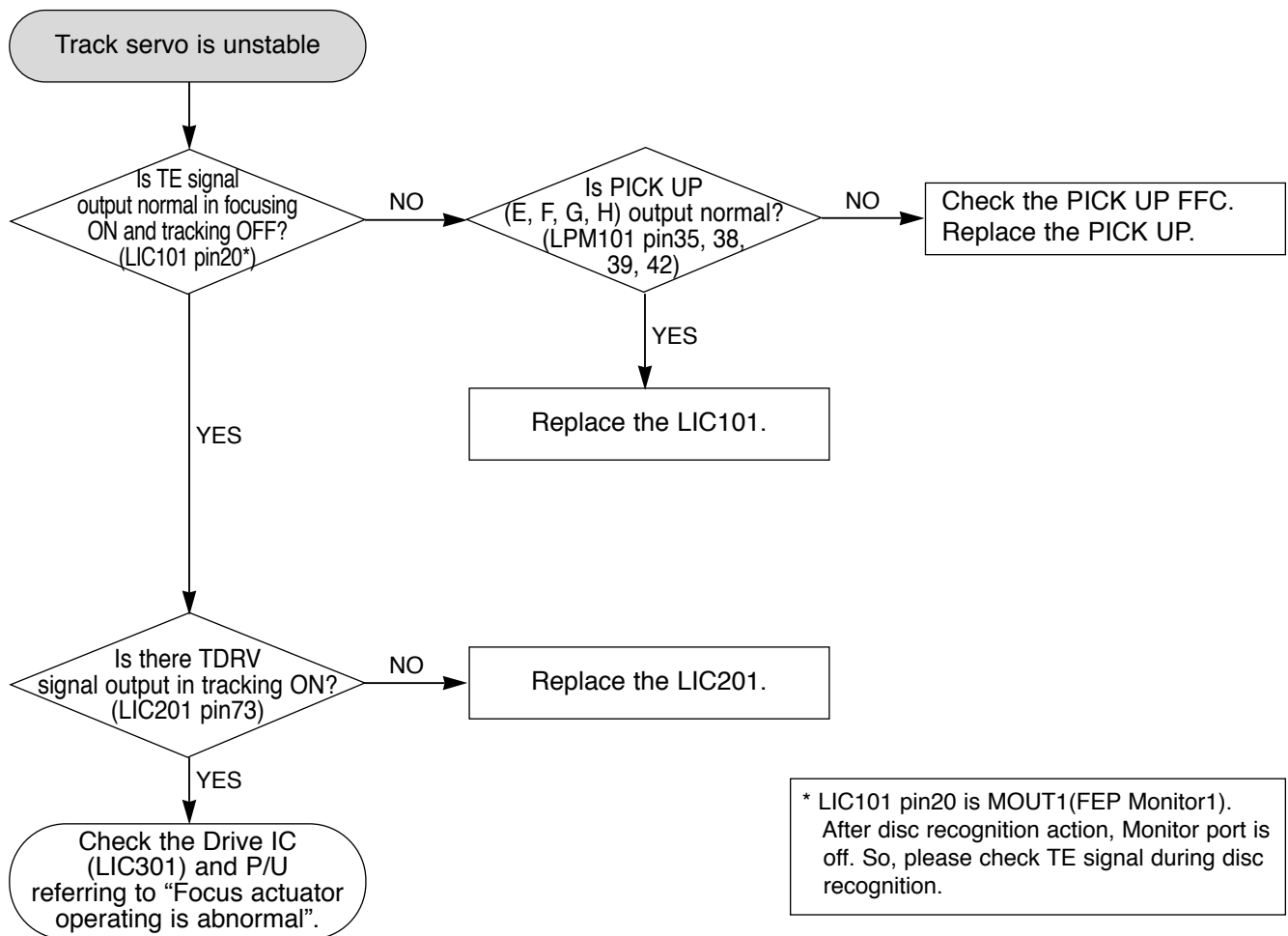


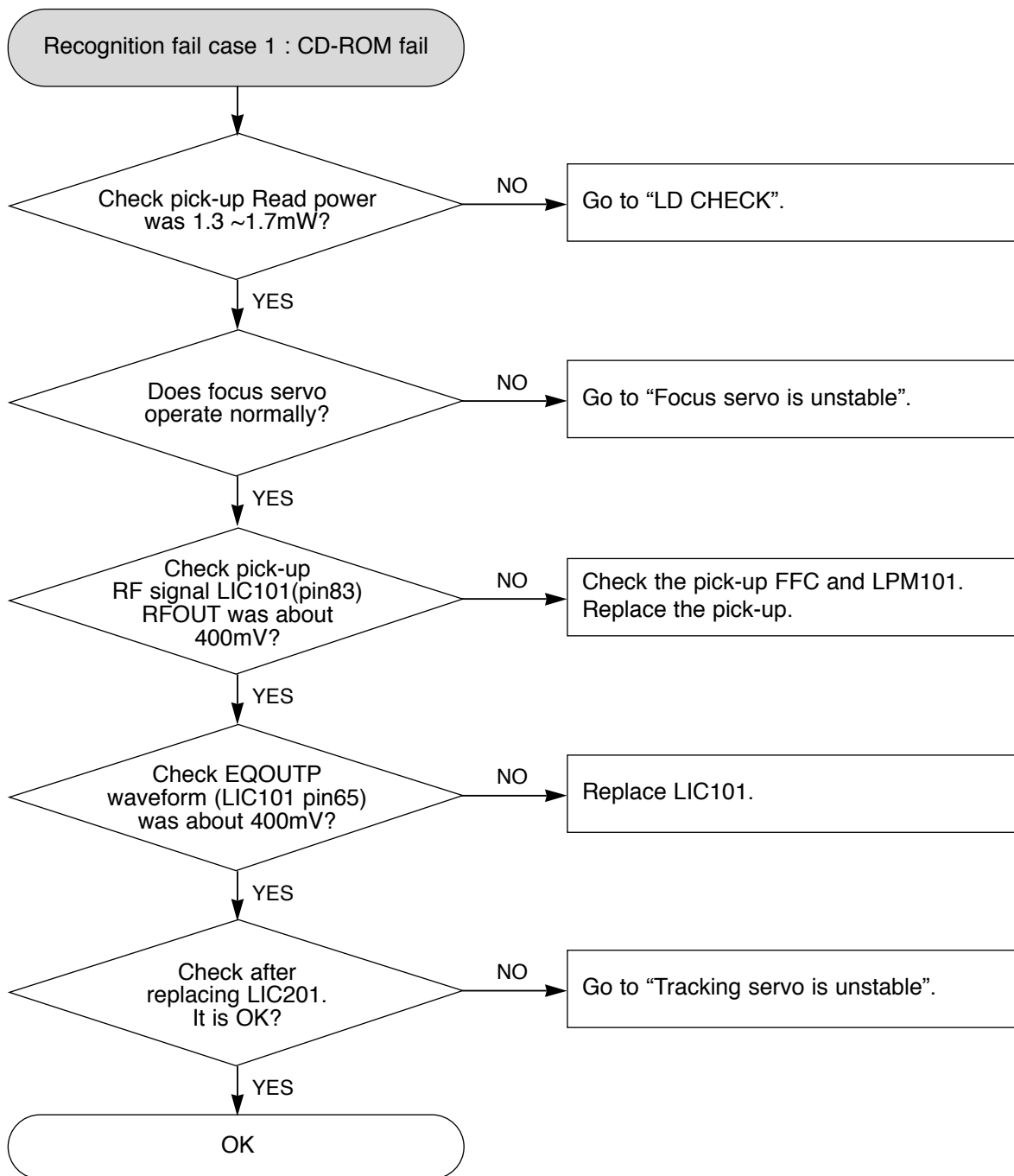


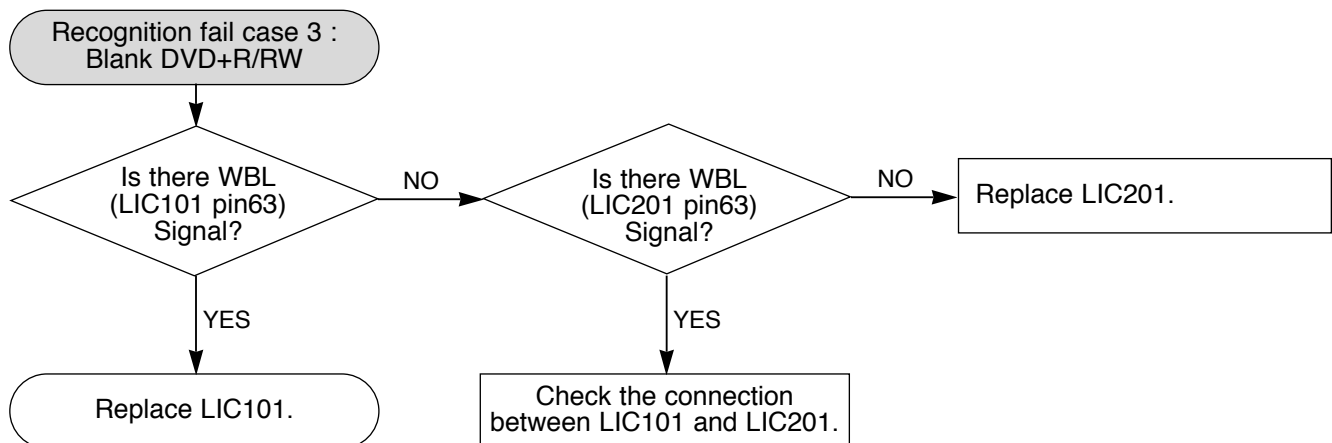
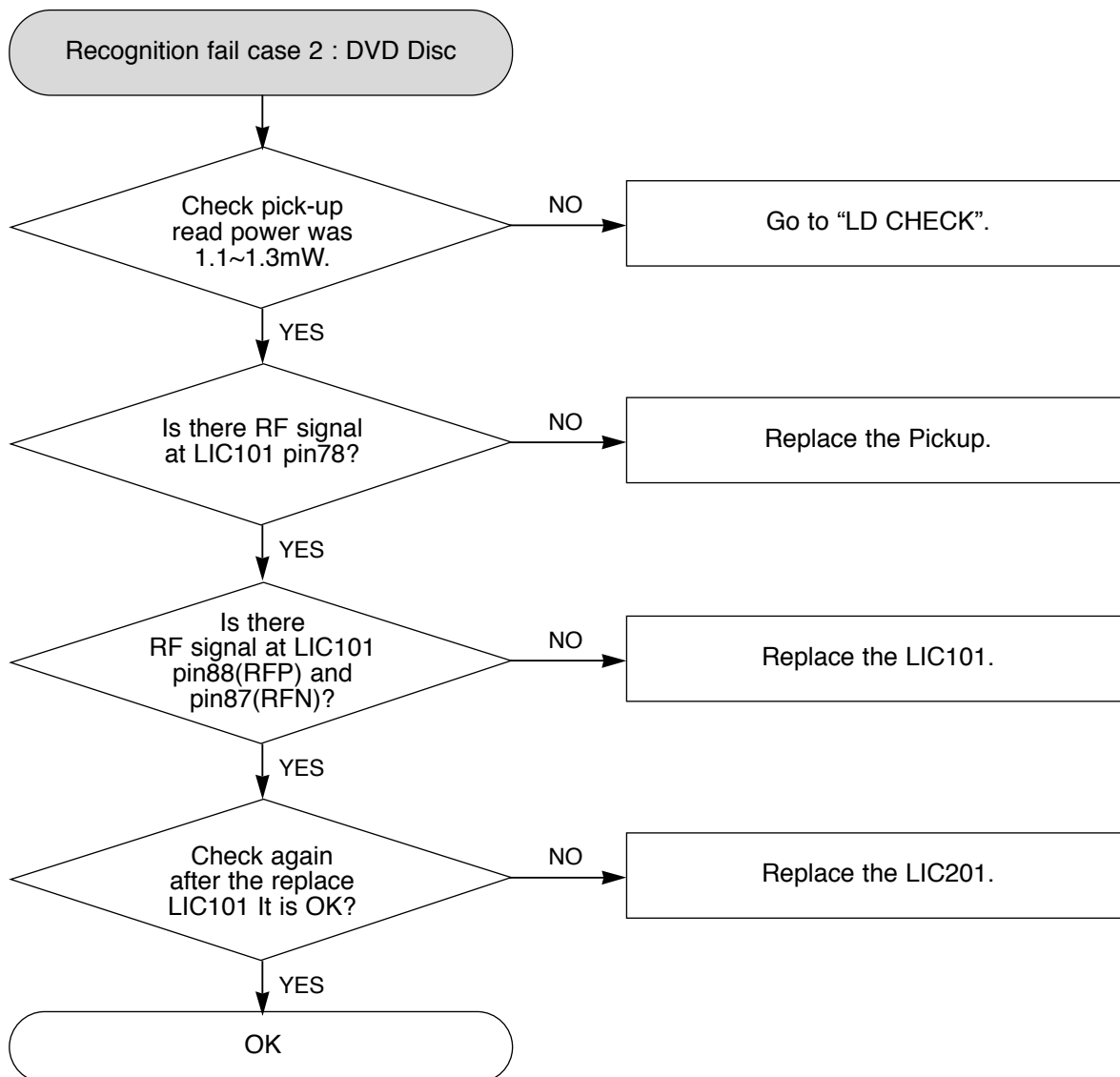


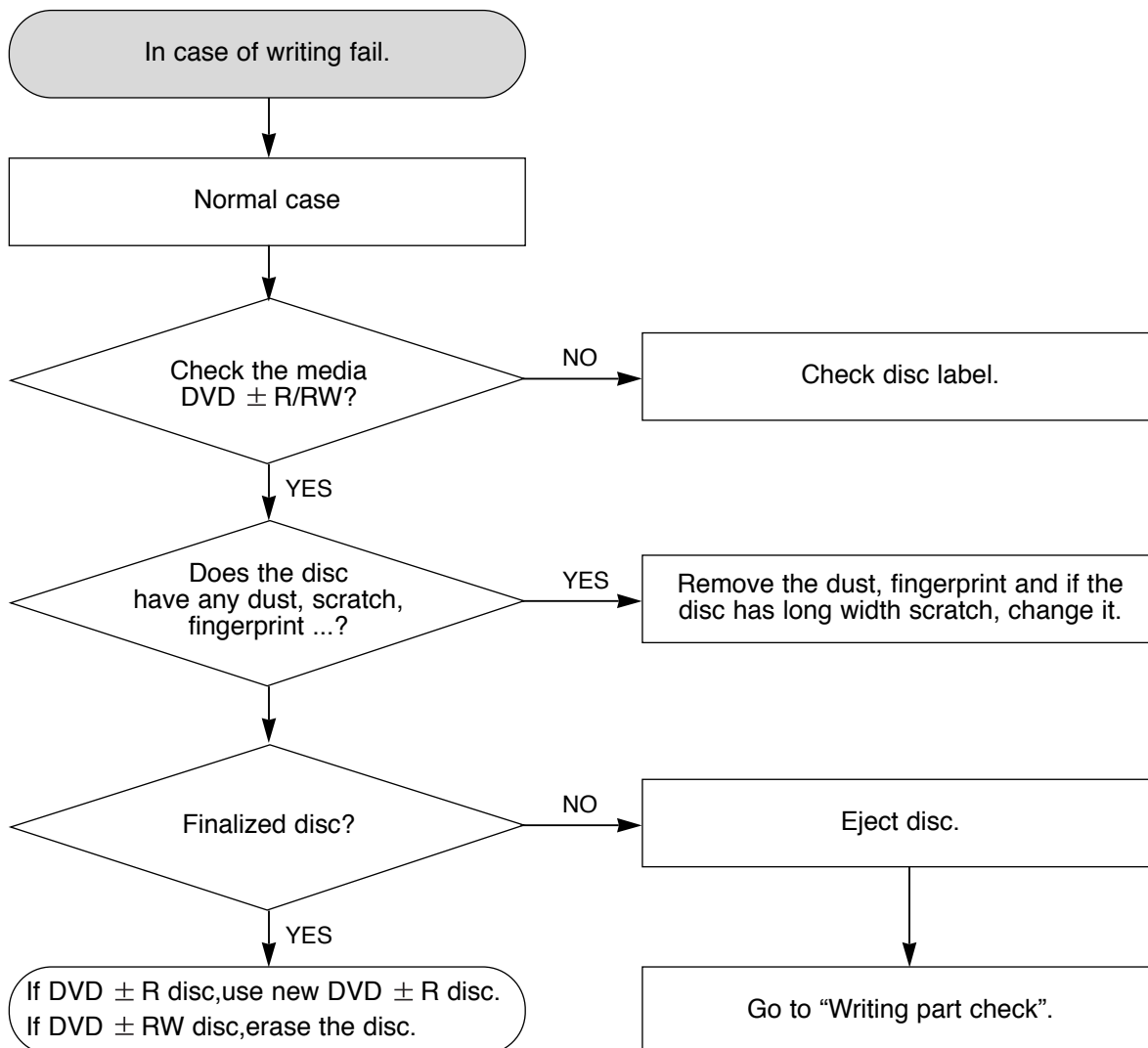


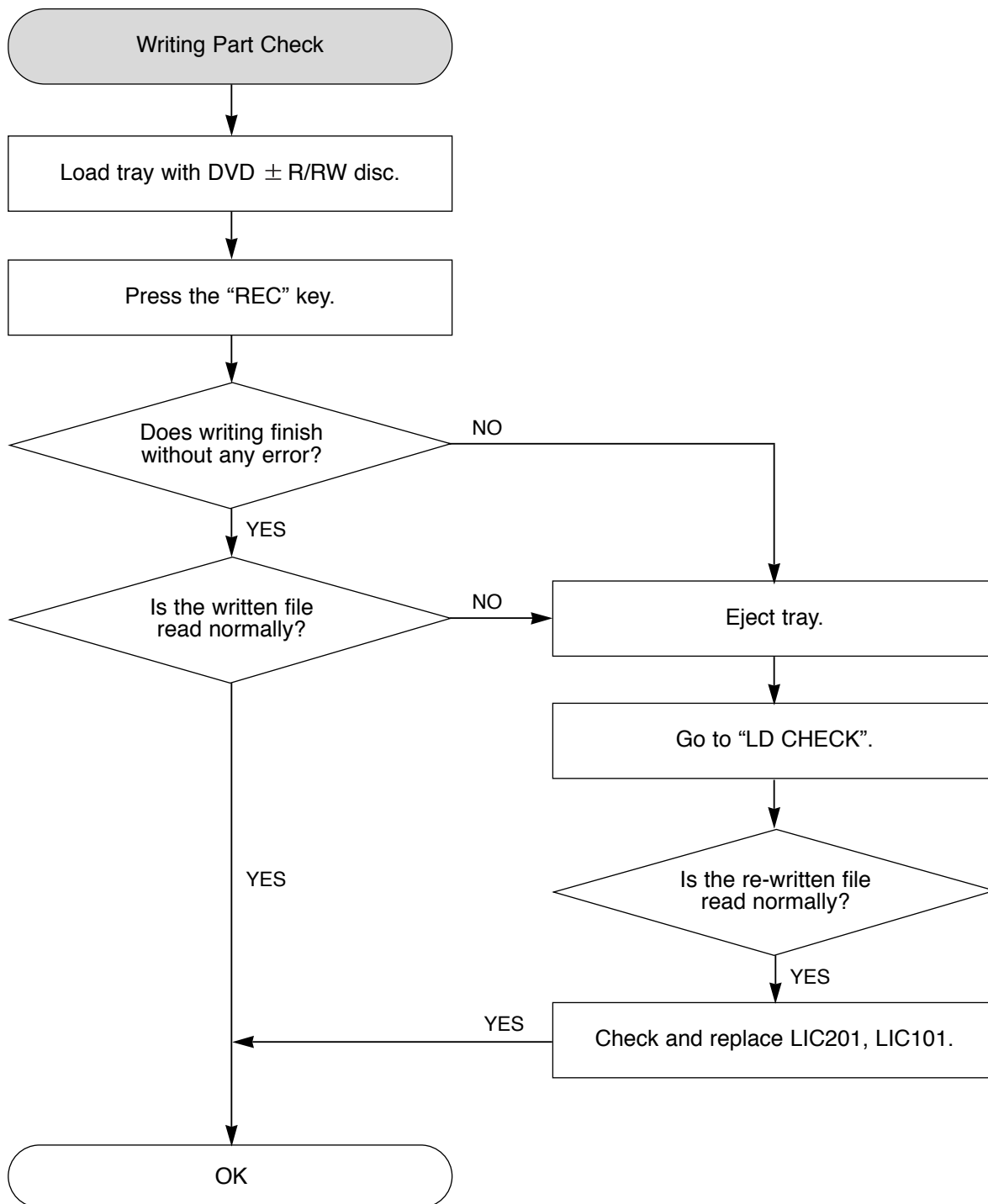


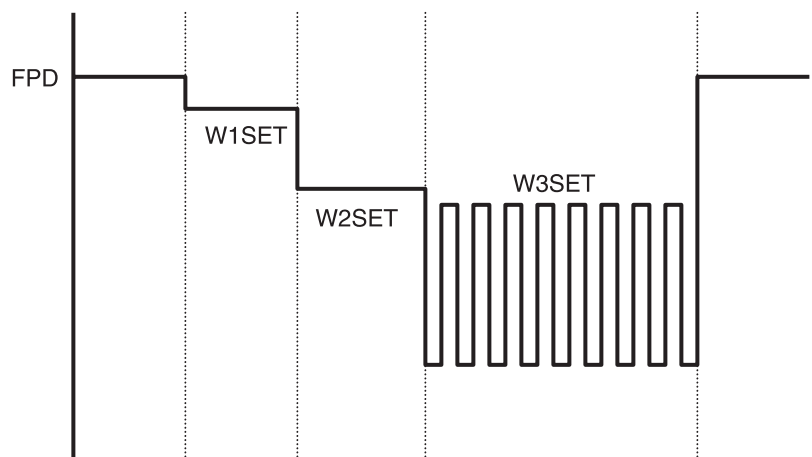
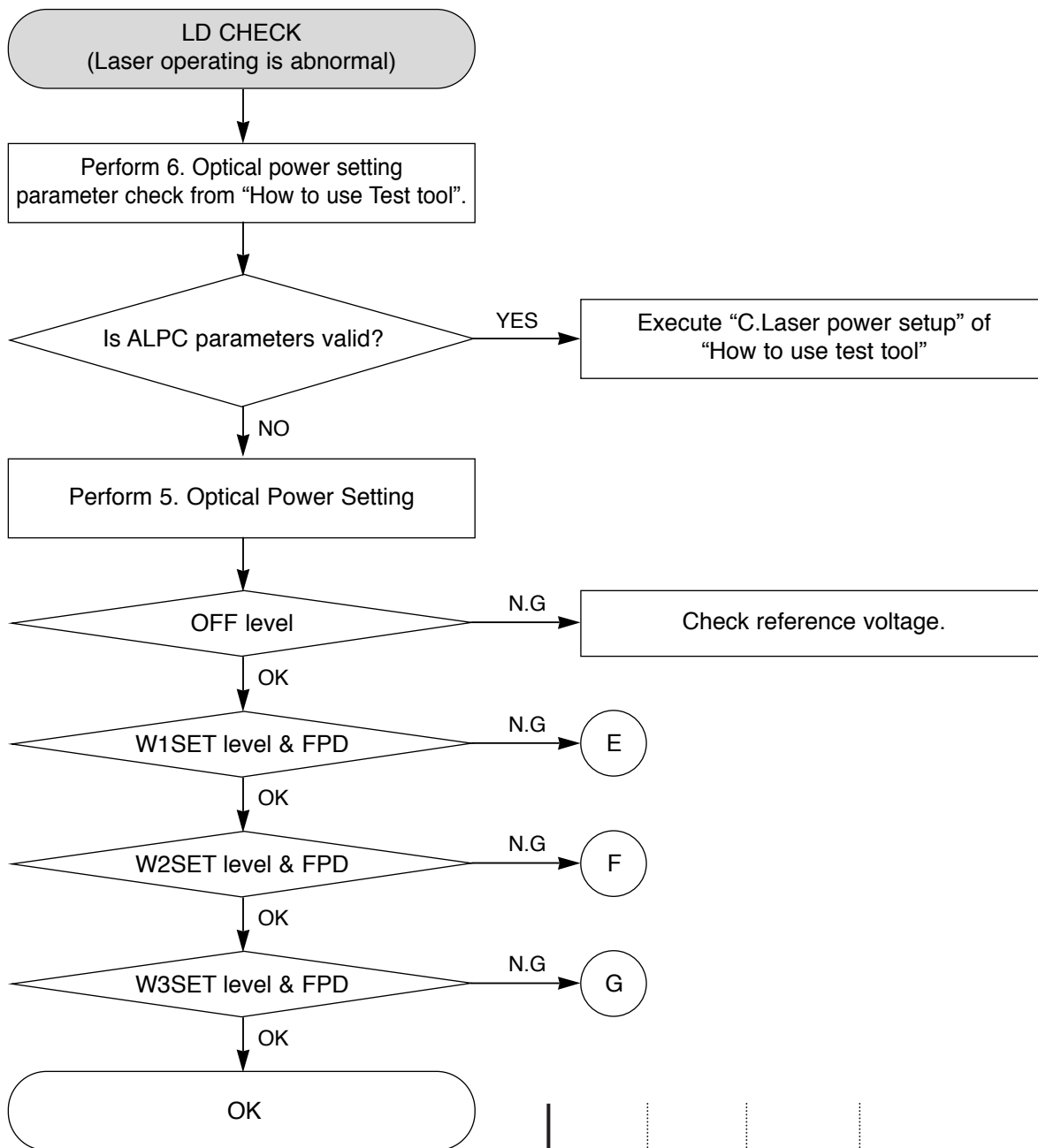


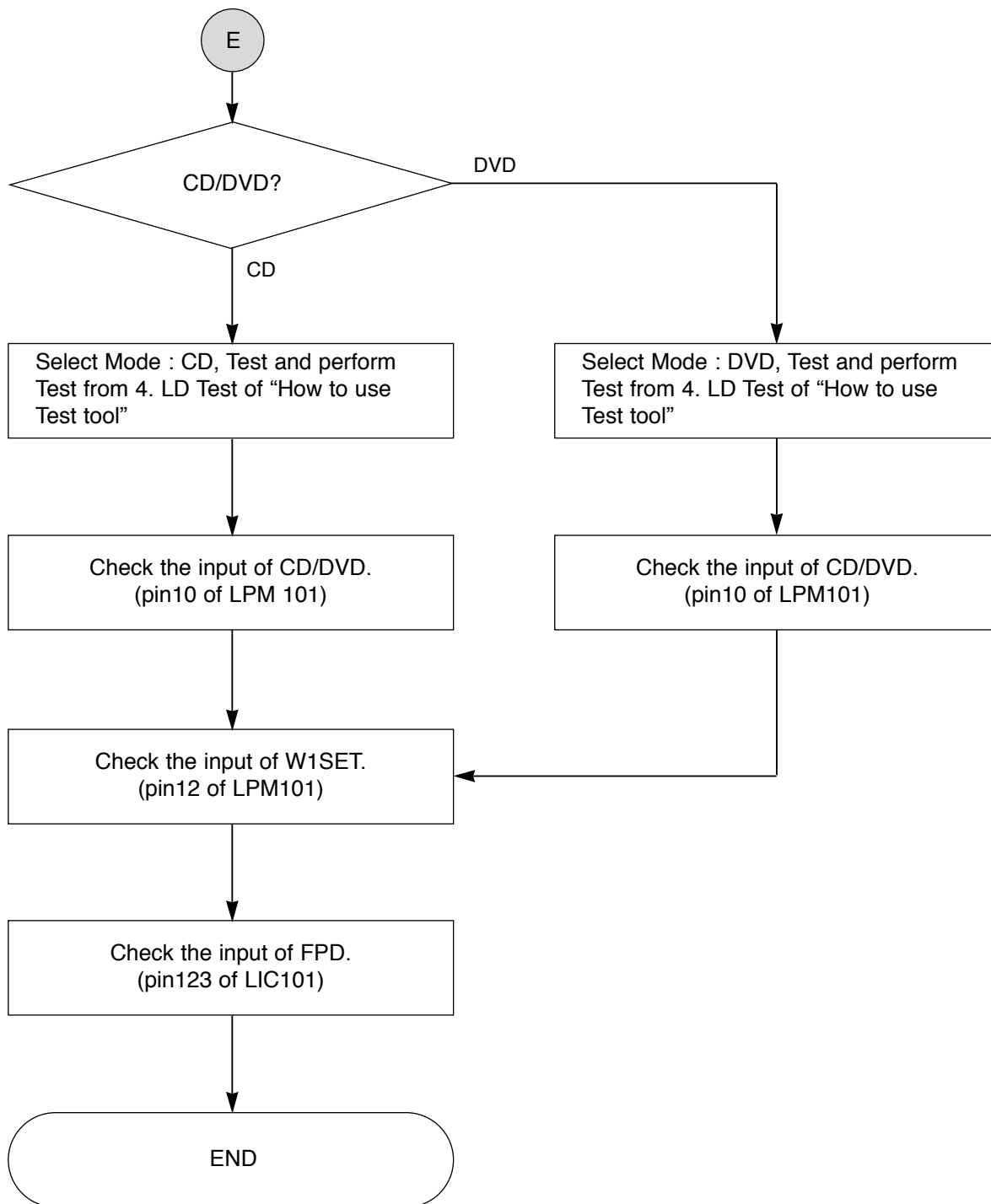


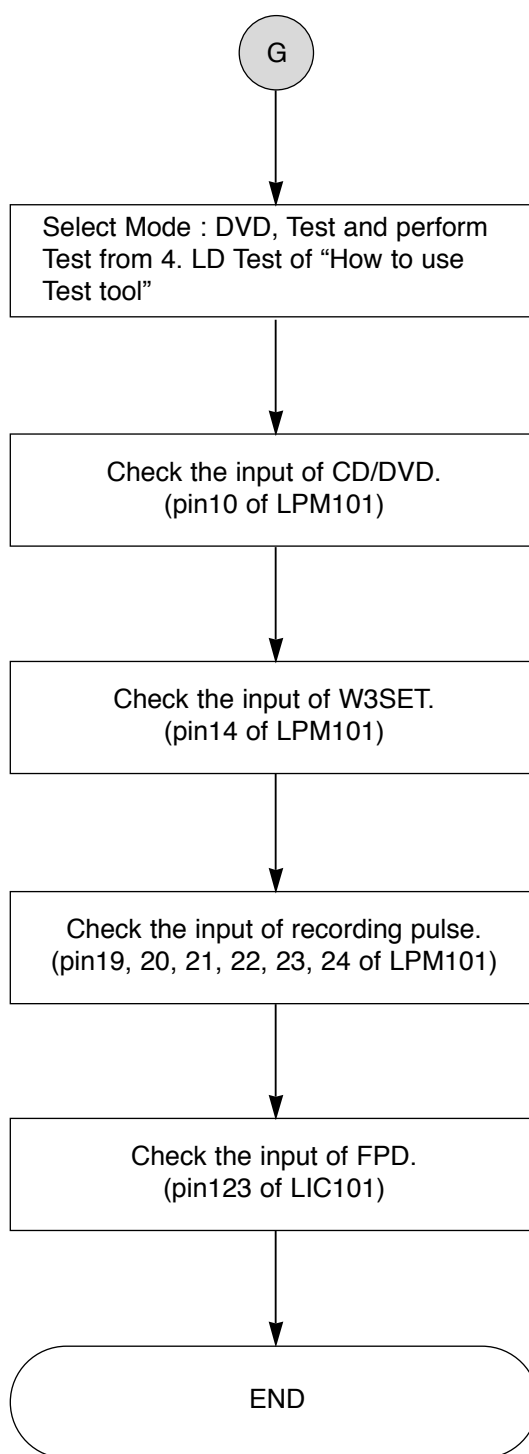
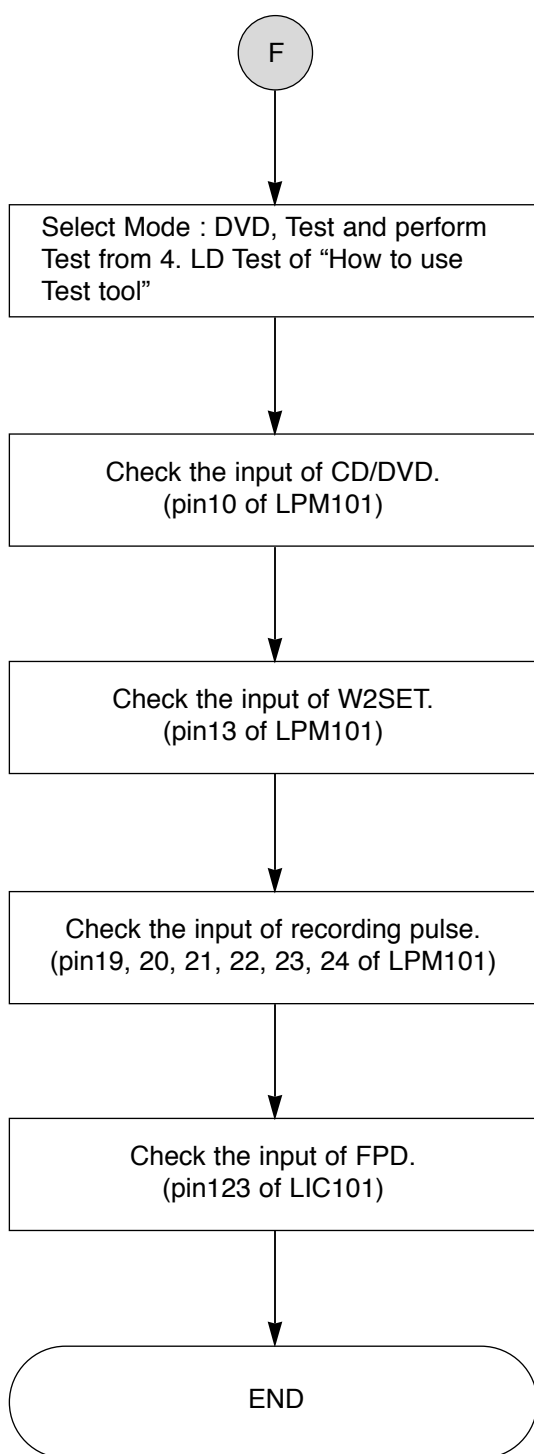








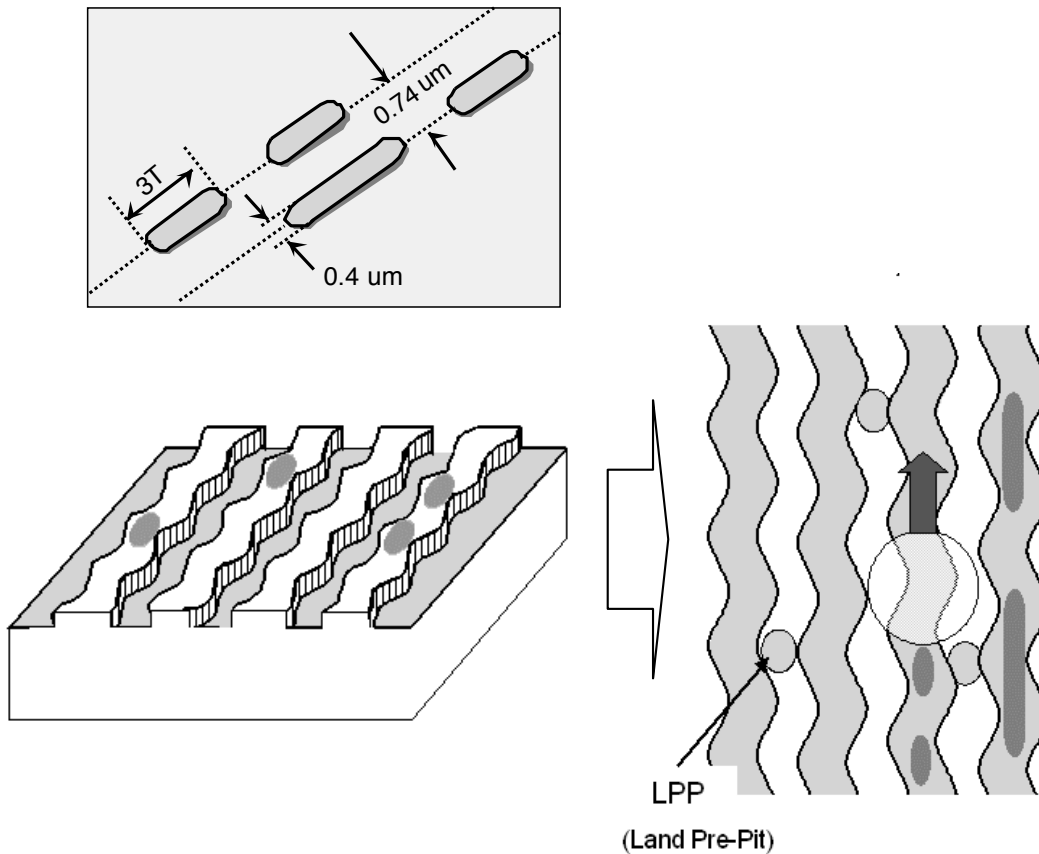




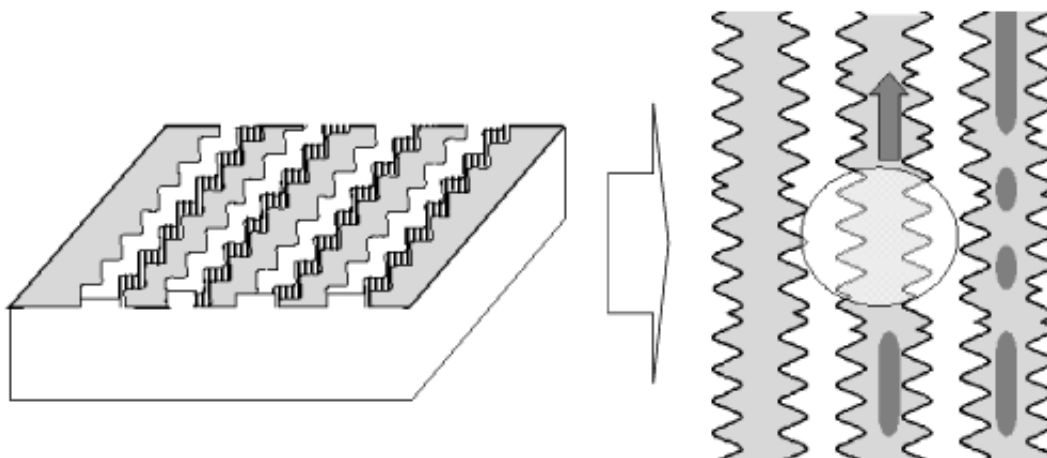
THE DIFFERENCE OF DVD-R/RW, DVD+R/RW DISCS AND DVD-ROM

1. RECORDING LAYER

- DVD-ROM (Read Only Disc)



- DVD+R/RW Disc

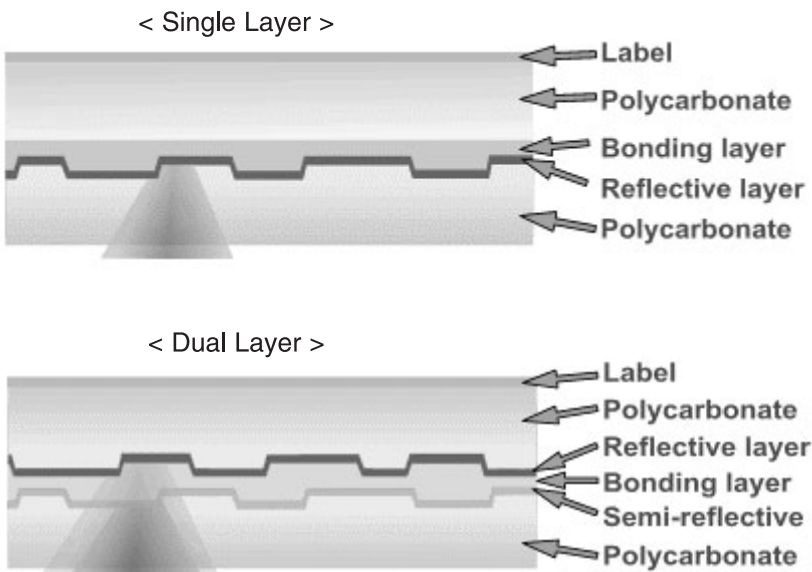


2. DISC SPECIFICATION

	DVD-ROM		DVD-R	DVD-RW	DVD+R	DVD+RW
	Single-Layer	Dual-Layer				
Media Type	Read Only	Read Only	Dye	Phase change	Dye	Phase change
User data capacity	4.7GB	8.54GB	4.7GB	4.7GB	4.7GB	4.7GB
Wavelength	650nm	650nm	650nm	650nm	650nm	650nm
Reflectivity	45~85%	18~30nm	45~85%	18~30 %	45~85 %	18~30nm
Track pitch	0.74μm	0.74μm	0.74μm	0.74μm	0.74μm	0.74μm
Minimum pit length	0.4μm	0.4μm	0.4μm	0.4μm	0.4μm	0.4μm
Modulation	>0.6	>0.6	>0.6	>0.6	>0.6	>0.6
Channel bit-rate	26.16MHz	26.16MHz	26.16MHz	26.16MHz	26.16MHz	26.16MHz
Wobble Frequency	—	—	140KHz	140KHz	817.4KHz	817.4KHz
Addressing	26.16MHz	26.16MHz	Wobble & LPP	Wobble & LPP	Wobble(ADIP)	Wobble(ADIP)
Read Power (mW)					0.7 ± 0.1	0.7 ± 0.1
Write Power (mW)	—					
Jitter	<8%	<8%	<8%	<8%	<9%	<9%

3. DISC MATERIALS

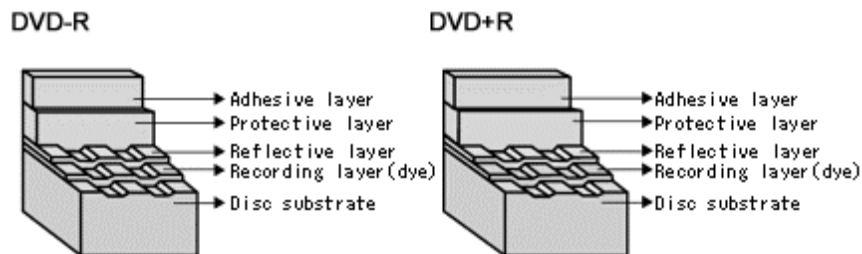
1) DVD-ROM



2) Recording format using organic dye material (DVD-R / DVD+R)

The format that records data through the creation of recorded marks by changing the organic dye material with a laser beam.

• Disc structure



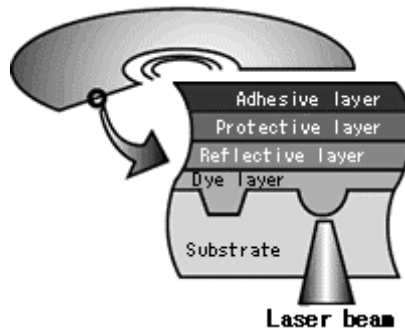
• Recording principles

[Recording]

Recording is done by changing the organic dye layer and the substrate with a laser. When a strong laser is applied to a disc, the temperature of the organic dye material goes up, the dye is decomposed and the substrate changes at the same time. At this time, a durable bit is created as is the case with a CD-ROM.

[Playback]

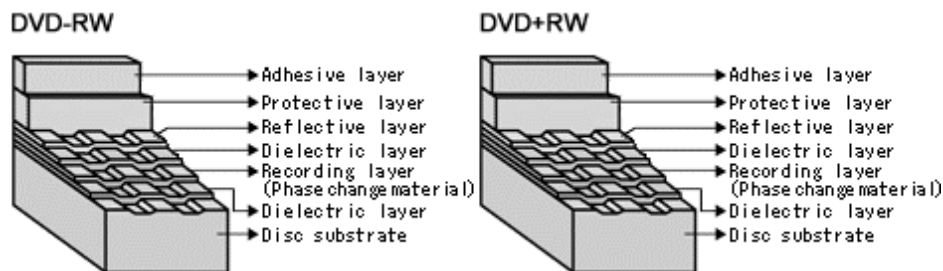
Signals are read with the differences of the reflection of a laser from pits.



3) Recording format using phase-change recording material (DVD-RW / DVD+RW)

Data is recorded by changing the recording layer from the amorphous status to the crystalline status, and played back by reading the difference of the reflection coefficient.
Amorphous: Non-crystalline.

• Disc structure



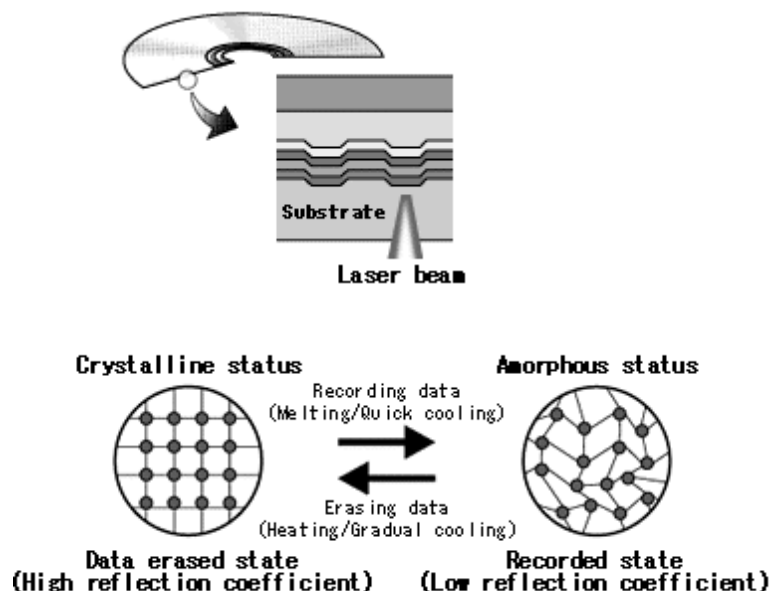
• Recording principles

[Recording]

When a high-power laser is applied to the recording material, it melts and then becomes amorphous with a low reflection coefficient when it quickly cools off. When a mid-power laser is applied to heat gradually the recording material and then gradually cools it off, it becomes crystal with a high reflection coefficient.

[Playback]

A low-power laser is used for playback. The amount of reflected light depends on the status (amorphous or crystalline) of the recording material. This is detected by an optical sensor.

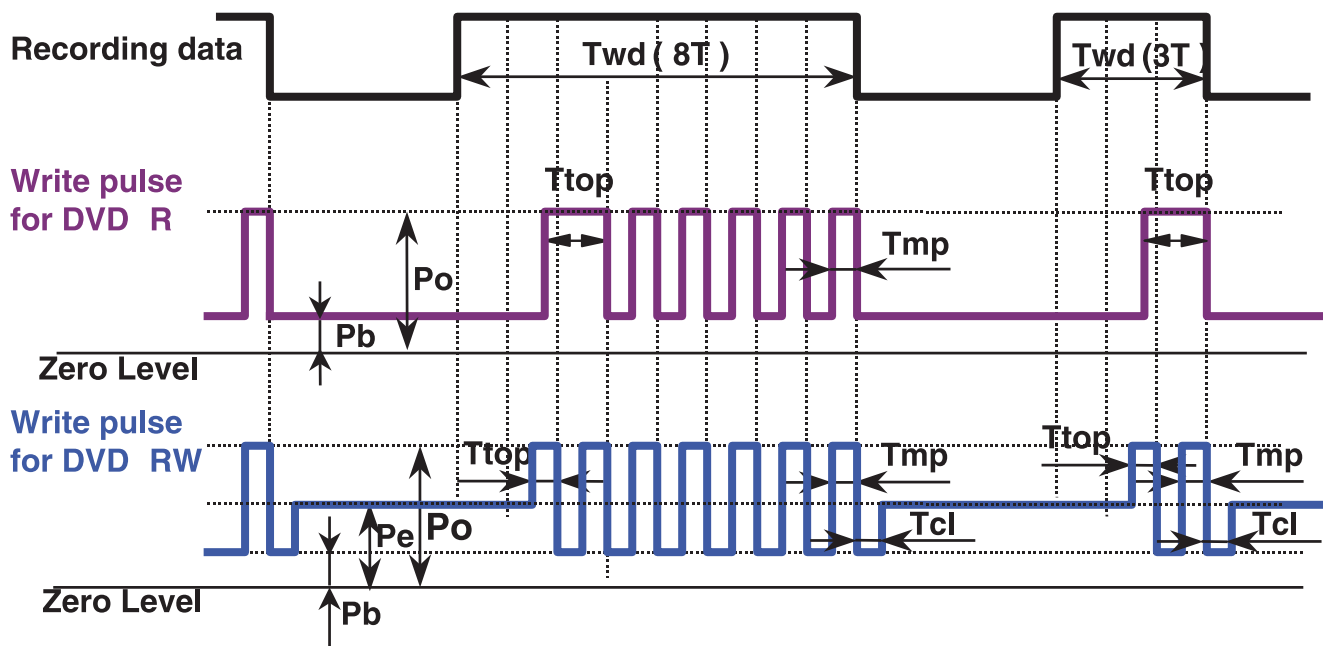


To make recordings, it is necessary to modulate the write pulse, which is called “Write Strategy”.

There can be many types in Write Strategy. Typically Write Strategy for DVD $\pm$ R has NMP(Non Multi-Pulse) type and MP(Multi-Pulse) type. In NMP type each single mark is created by subsequent separated short pulses. In MP type each single mark is created by one continuous pulse.

Write Strategy for DVD $\pm$ RW has Type 1 and Type 2. In Type 1 the mark with nT width is created by one top pulse and $(n-2)$ multi-pulses. Thus mark $3T$ is made by one top pulse and one multi-pulse. In Type 2 the mark with nT width is created by one top pulse and $(n-3)$ multi-pulses. Thus mark $3T$ is made by one top pulse only.

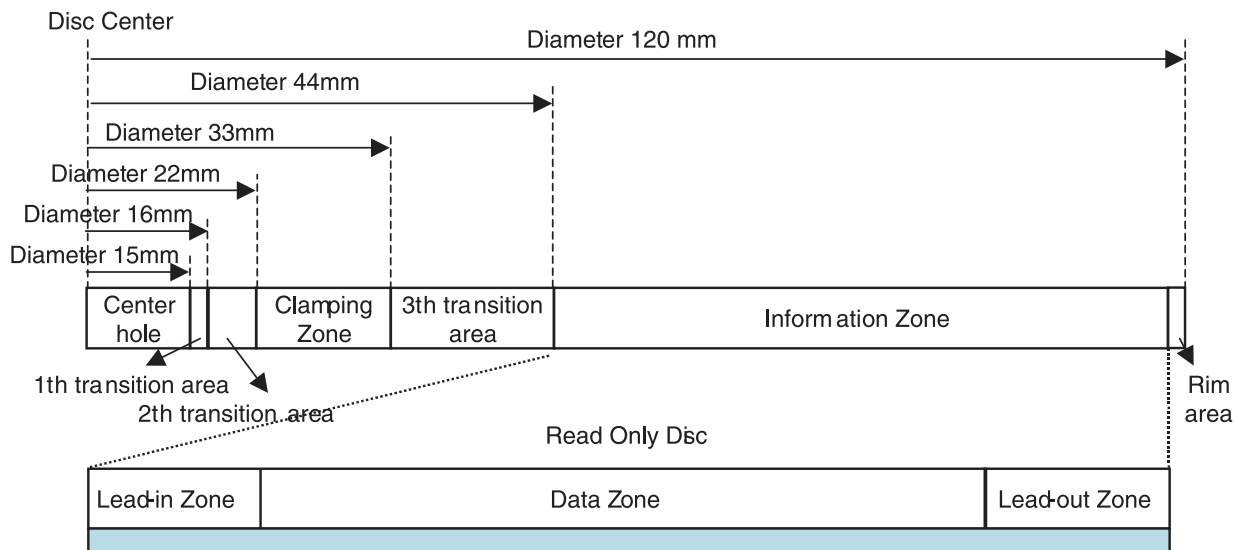
RV9 uses MP type Write Strategy for DVD $\pm$ R and Type 1 for DVD $\pm$ RW as shown below.



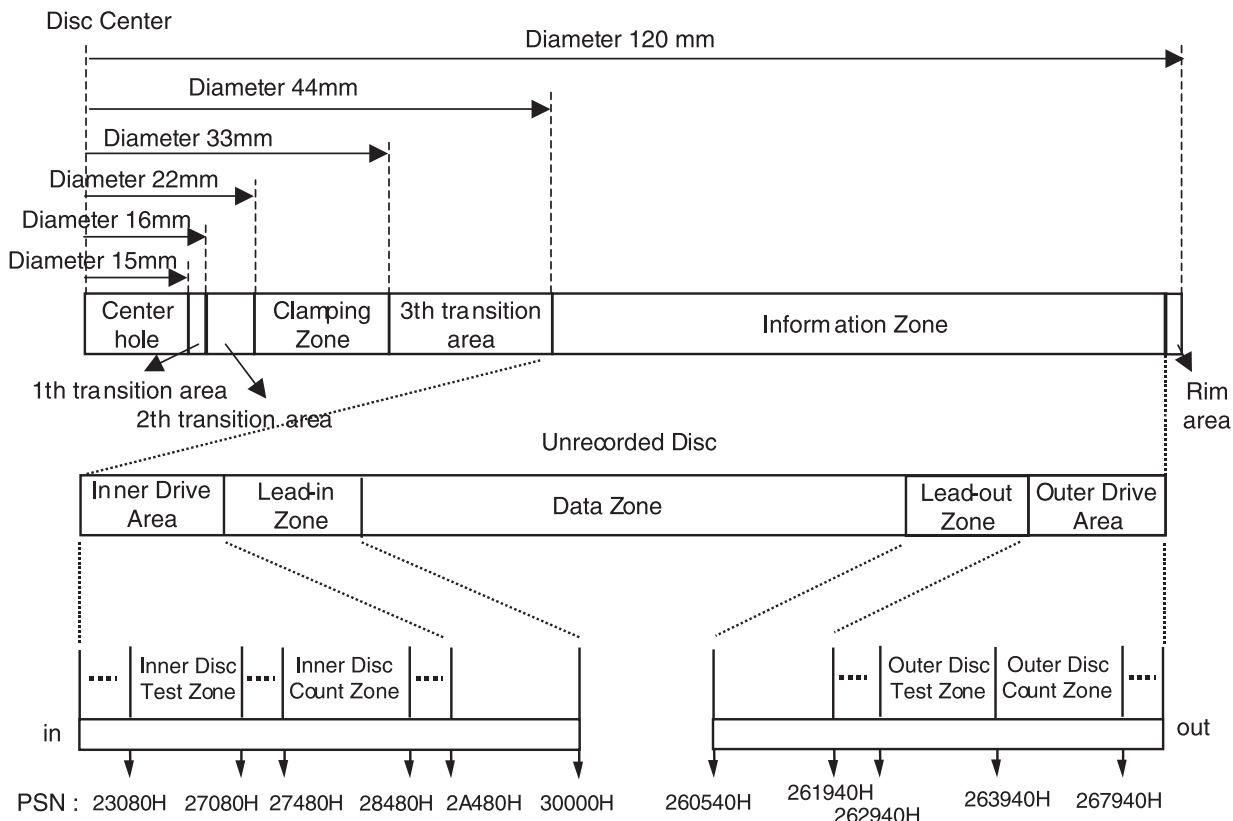
Po :Write Power (Peak Power)
 Pe :Erase Power
 Pb :Bias Power

4. ORGANIZATION OF THE INNER DRIVE AREA, OUTER DRIVE AREA, LEAD-IN ZONE AND LEAD-OUT ZONE

1) Layout of DVD-ROM disc



2) Layout of DVD+R disc



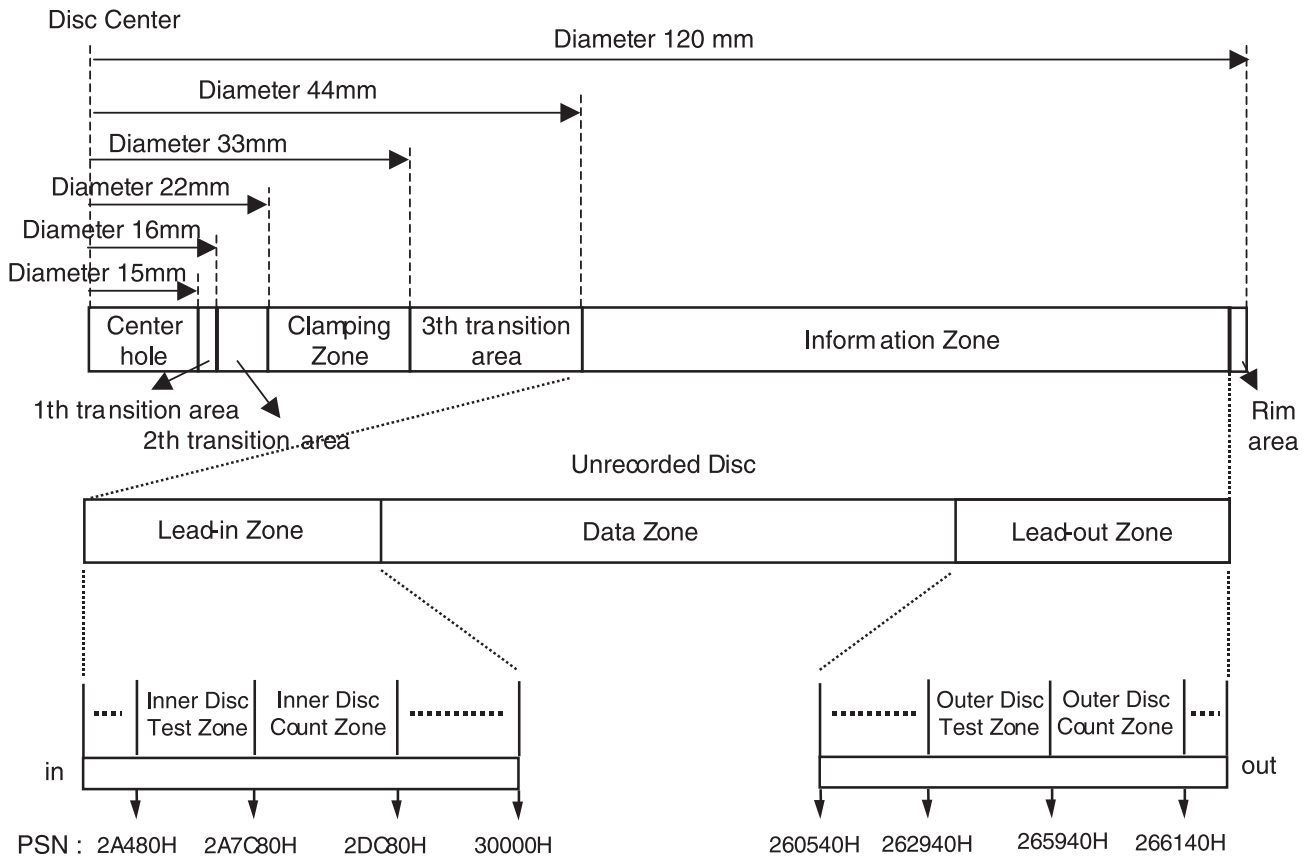
Inner Disc Test Zone : for performing OPC procedures.

Inner Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

Outer Disc Test Zone : for performing OPC procedures.

Outer Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

3) Layout of DVD+RW disc



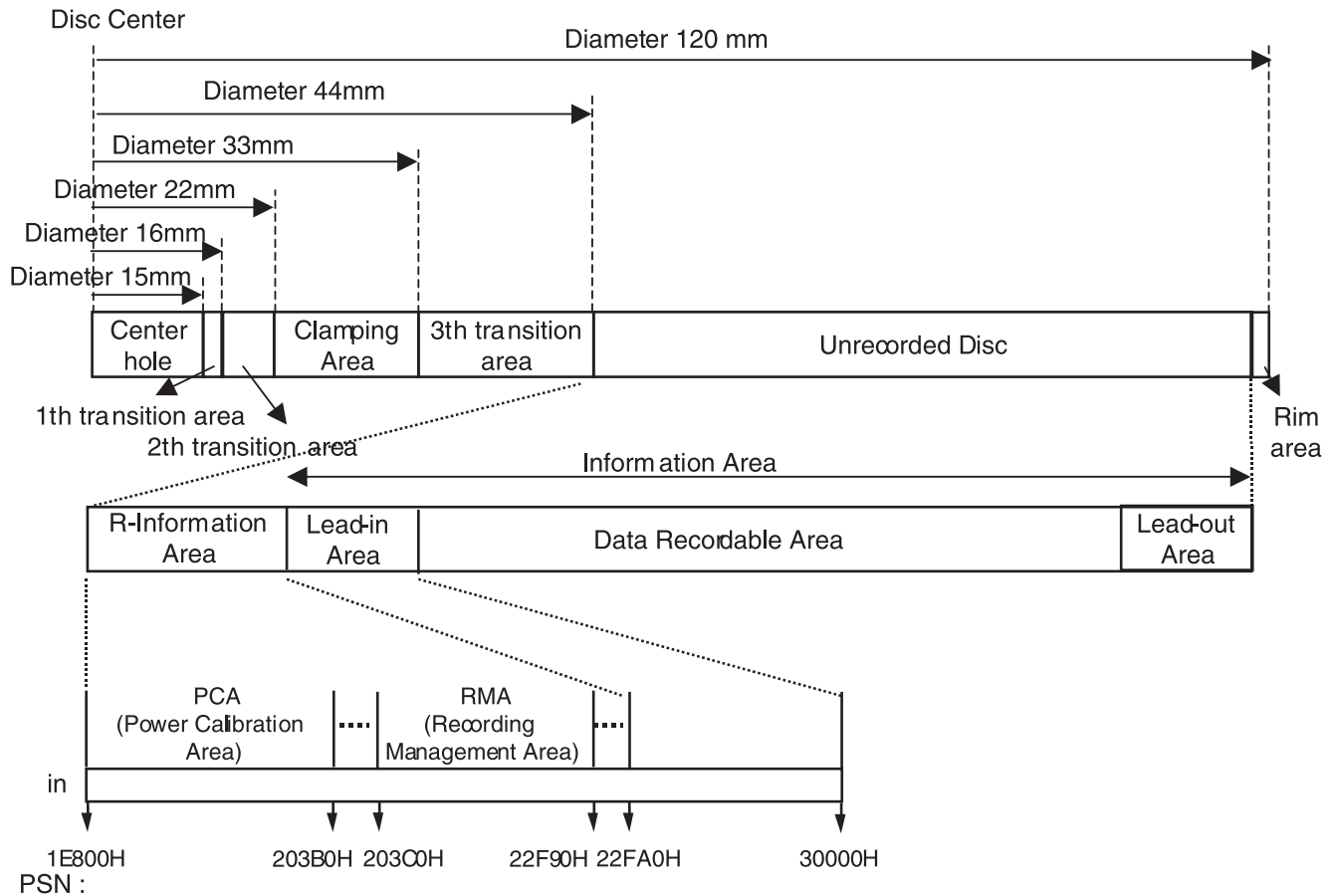
Inner Disc Test Zone : for performing OPC procedures.

Inner Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

Outer Disc Test Zone : for performing OPC procedures.

Outer Disc Count Zone : For counting the number of OPC algorithm performed in IDT Zone.

4) Layout of DVD-R/RW disc



AUTOMATIC OPTICAL POWER SETTING (SET-BASED)

The RV9 mounted models are supported by the B/END to automatically execute the optical power setting of the loader at the set condition with the following steps.

1. Use the remote controller to select the mode as Lock position at the Setup menu.
2. Use the remote controller to enter 5 -> 7 -> 2 -> 0 into the set.
When they are normally entered, the GUI is displayed as shown at Fig. 1.
3. When you select 'Yes', the optical power setting is automatically proceeded and it takes about 20 seconds.
4. When setting is finished, OK or NG is displayed on the screen.
The OK screen is displayed for the normal termination (Fig. 2)
The NG screen is displayed for the abnormal termination (Fig. 3)
5. When you select 'Yes' button, the GUI is cleared and it normally operates.

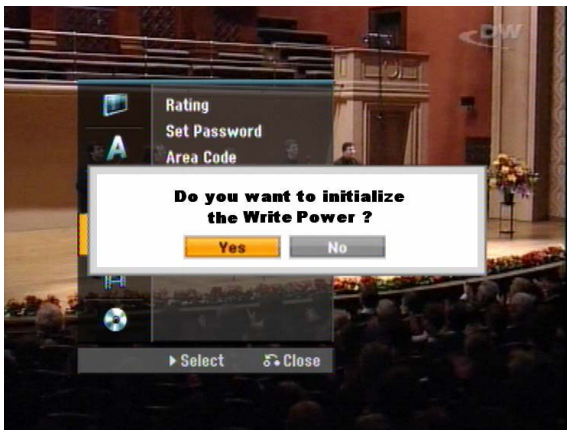


Fig. 1



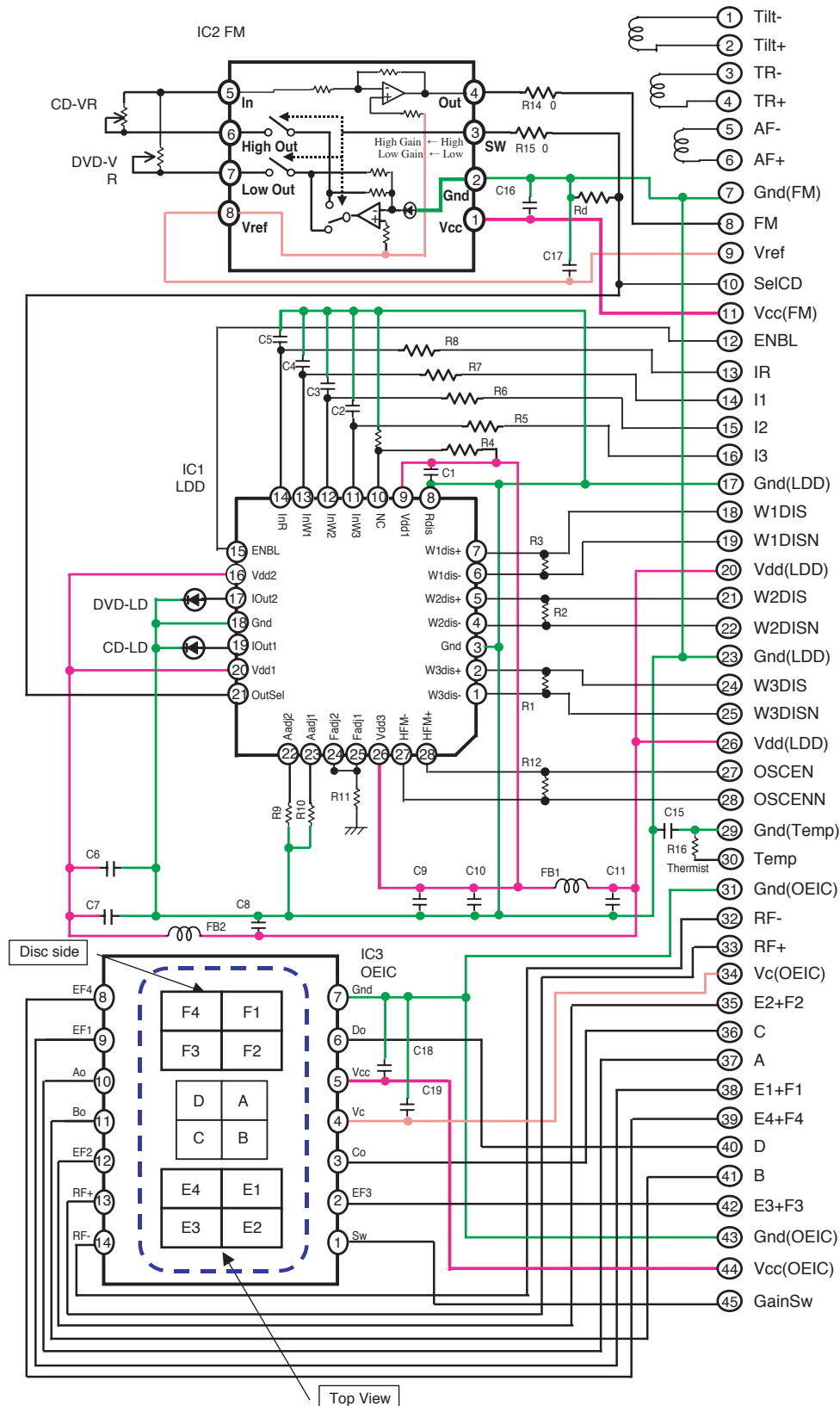
Fig. 2



Fig. 3

INTERNAL STRUCTURE OF THE PICK-UP

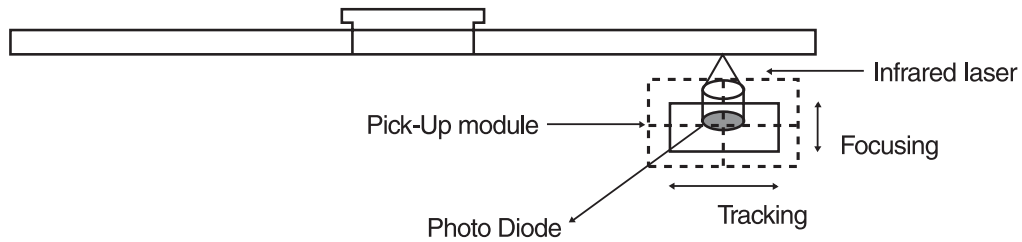
1. BLOCK DIAGRAM OF THE PICK-UP (HOP-7232TL)



2. PICK UP PIN ASSIGNMENT

No.	Signal Name	Signal Description	I/O
1	Tilt-	Tilting Actuator drive signal -	I
2	Tilt+	Tilting Actuator drive signal +	I
3	TR-	Tracking Actuator drive signal -	I
4	TR+	Tracking Actuator drive signal +	I
5	AF-	Focusing Actuator drive signal -	I
6	AF+	Focusing Actuator drive signal +	I
7	Gnd(FM)	Ground connection for FM	
8	FM	FM output	O
9	Vref	FM reference voltage input	I
10	SELCD	High:selects CD-LD,CD-VR Low: selects DVD-LD,DVD-VR	I
11	Vcc(FM)	Power supply for FM (+5 V)	
12	ENABLE	Disables output current regardless of **DIS (Low voltage:No lout)	I
13	IR	Input current for current amplifier	I
14	I1	Input current for current amplifier	I
15	I2	Input current for current amplifier	I
16	I3	Input current for current amplifier	I
17	GND(LDD)	Ground connection for LDD	
18	W1DIS	LVDS control for output current (Low active) (LVDS+)	I
19	W1DISN	LVDS control for output current (LVDS-)	I
20	VDD(LDD)	Power supply for LDD (+5 V)	
21	W2DIS	LVDS control for output current (Low active) (LVDS+)	I
22	W2DISN	LVDS control for output current (LVDS-)	I
23	Gnd(LDD)	Ground connection for LDD	
24	W3DIS	LVDS control for output current (Low active) (LVDS+)	I
25	W3DISN	LVDS control for output current (LVDS-)	I
26	Vdd(LDD)	Power supply for •DD (+5 V)	
27	OscEn	LVDS control for Oscillator (High active) (LVDS+)	I
28	OscEnN	LVDS control for Oscillator (LVDS-)	I
29	Gnd(TEMP)	Ground connection for Thermister	
30	TEMP	Resistance for controlling temperature	O
31	Gnd(OEIC)	Ground for OEIC	O
32	RF-	Signal OEIC RF negative differential output	O
33	RF+	Signal OEIC RF positive differential output	O
34	Vc(OEIC)	Reference voltage input for OEIC (+2.1 V)	I
35	E2+F2	Signal OEIC output EF2	O
36	C	Signal OEIC output C	O
37	A	Signal OEIC output A	O
38	E1+F1	Signal OEIC output EF1	O
39	E4+F4	Signal OEIC output EF4	O
40	D	Signal OEIC output D	O
41	B	Signal OEIC output B	O
42	E3+F3	Signal OEIC output EF3	O
43	Gnd(OEIC)	Ground for OEIC	
44	Vcc(OEIC)	Power supply for OEIC (+5 V)	I
45	GainSw	OEIC output gain control (High voltage:Low gain , Middle:Middle gain , Low:High gain)	I

3. SIGNAL DETECTION OF THE P/U



1) Focus Error Signal $\Rightarrow (A+C)-(B+D)$

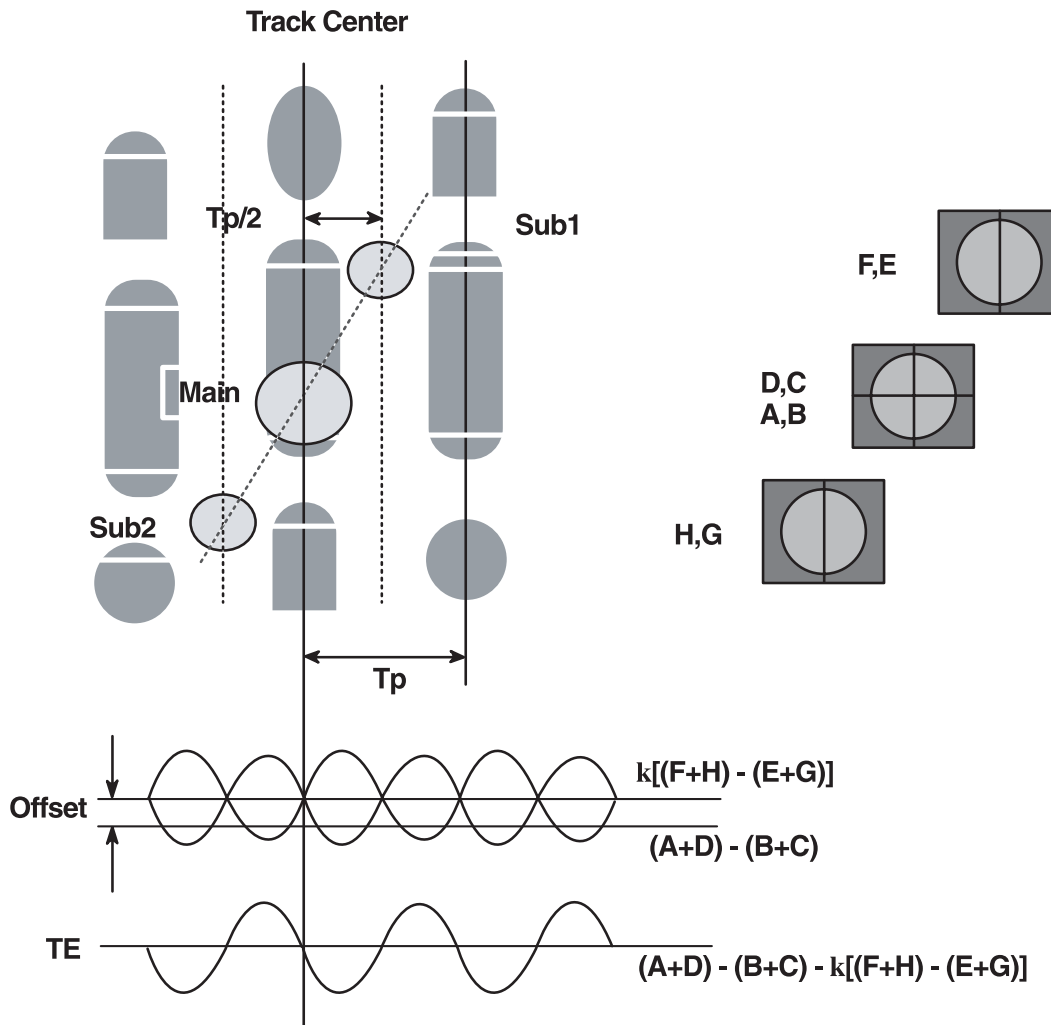
This signal is generated in RF IC (LIC121 : AN22113A) and controls the pick-up's up and down to focus on Disc.

2) Tracking Error Signal (DPP Method) $\Rightarrow \{(A+D)-(B+C)\} - k \times \{(EF1+EF4)-(EF2+EF3)\}$

This signal is generated in RF IC (LIC121 : AN22113A) and controls the pick-up's left and right shift to find track on Disc.

3) RF Signal $\Rightarrow (A+B+C+D)$

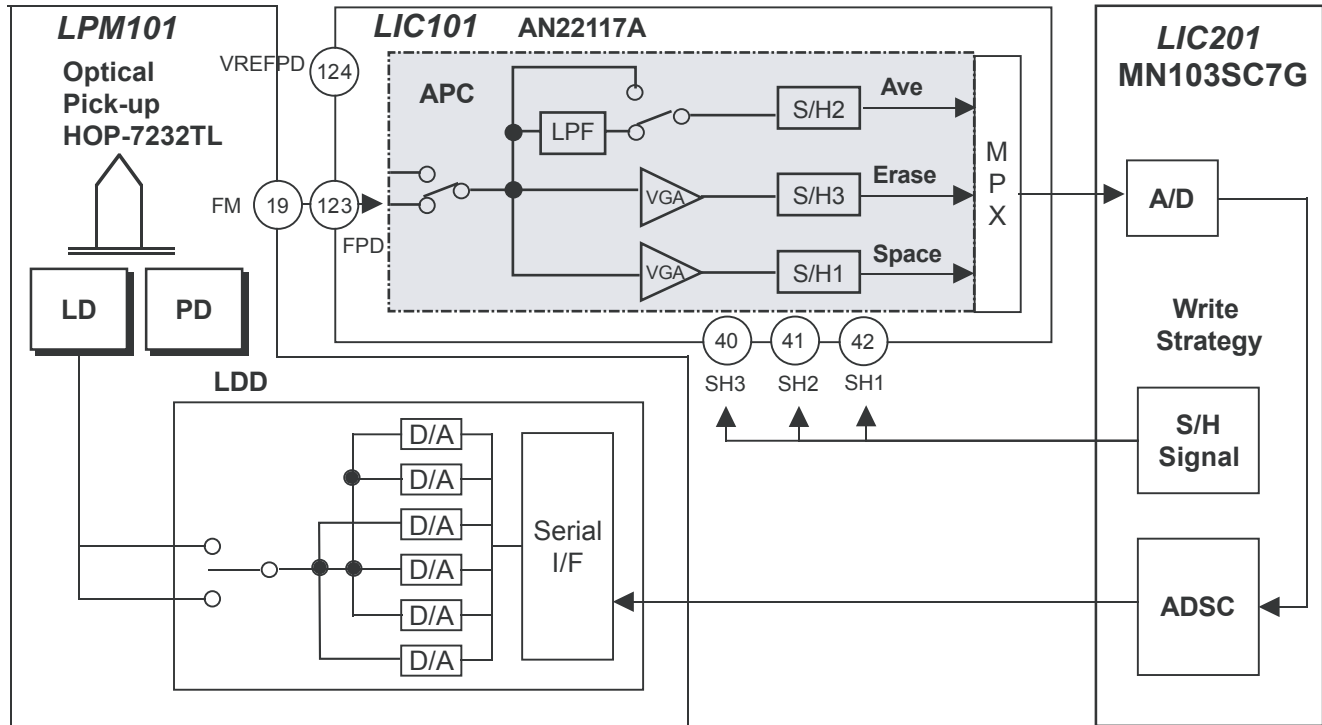
This signal is converted to DATA signal in DSP IC (LIC201 : MN103SA6G).



DESCRIPTION OF CIRCUIT

1. ALPC (AUTOMATIC LASER POWER CONTROL) CIRCUIT

1-1. Block Diagram

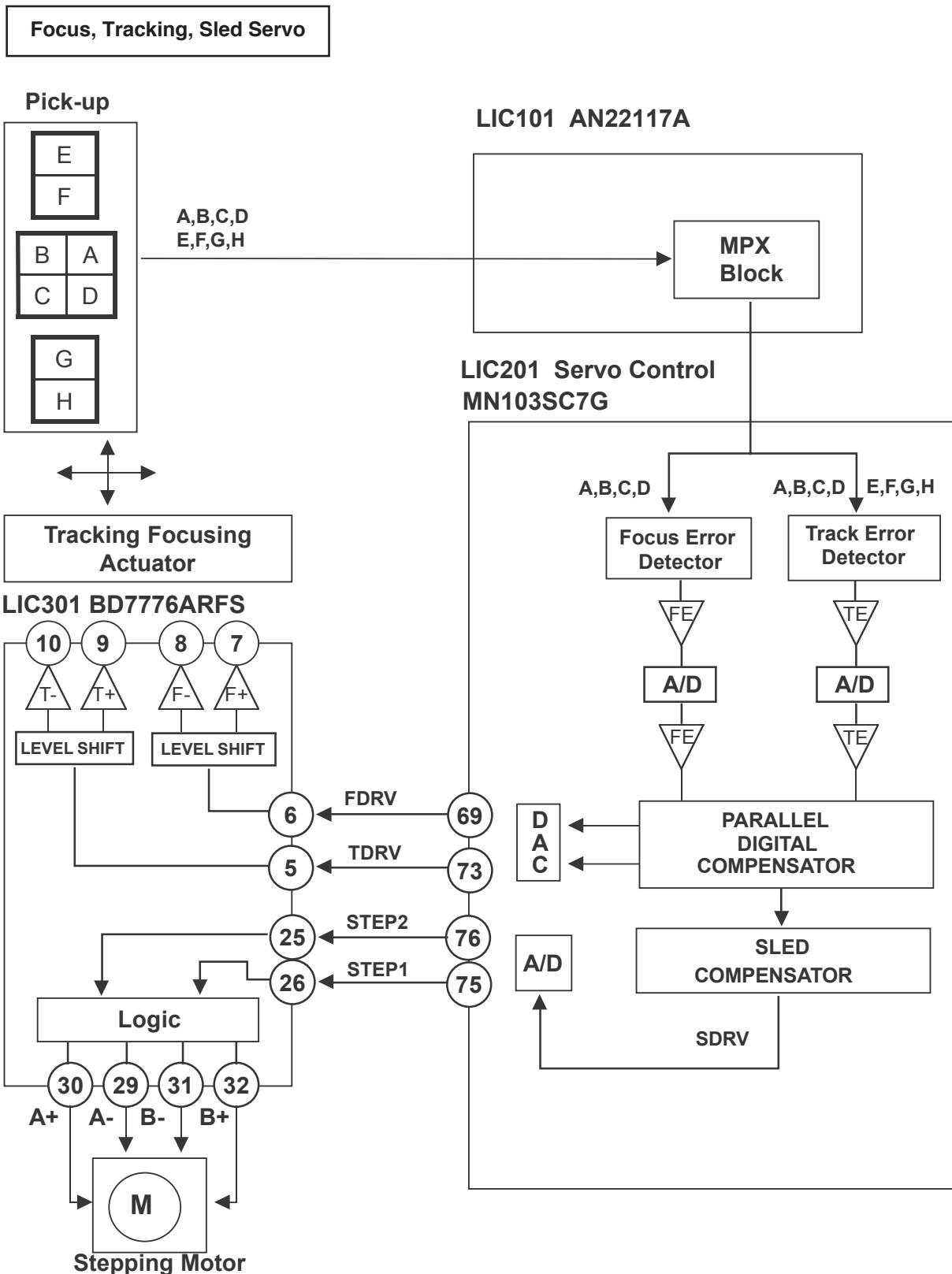


1-2. ALPC (Automatic Laser Power Control) Circuit Operation

The ALPC block detects the laser output power of the front monitor. The power signal detected with the PD for front monitor detection is input the voltage from the VPD pin(123Pin), the reference signal of the input signal is input from the VREFPD pin(124Pin). The ALPC block generates the singals from the input laser power signals in the following detection paths:All average value path, multi pulse average/peak value detection path, erase/bottom value detection path, space/playback power value detection path.

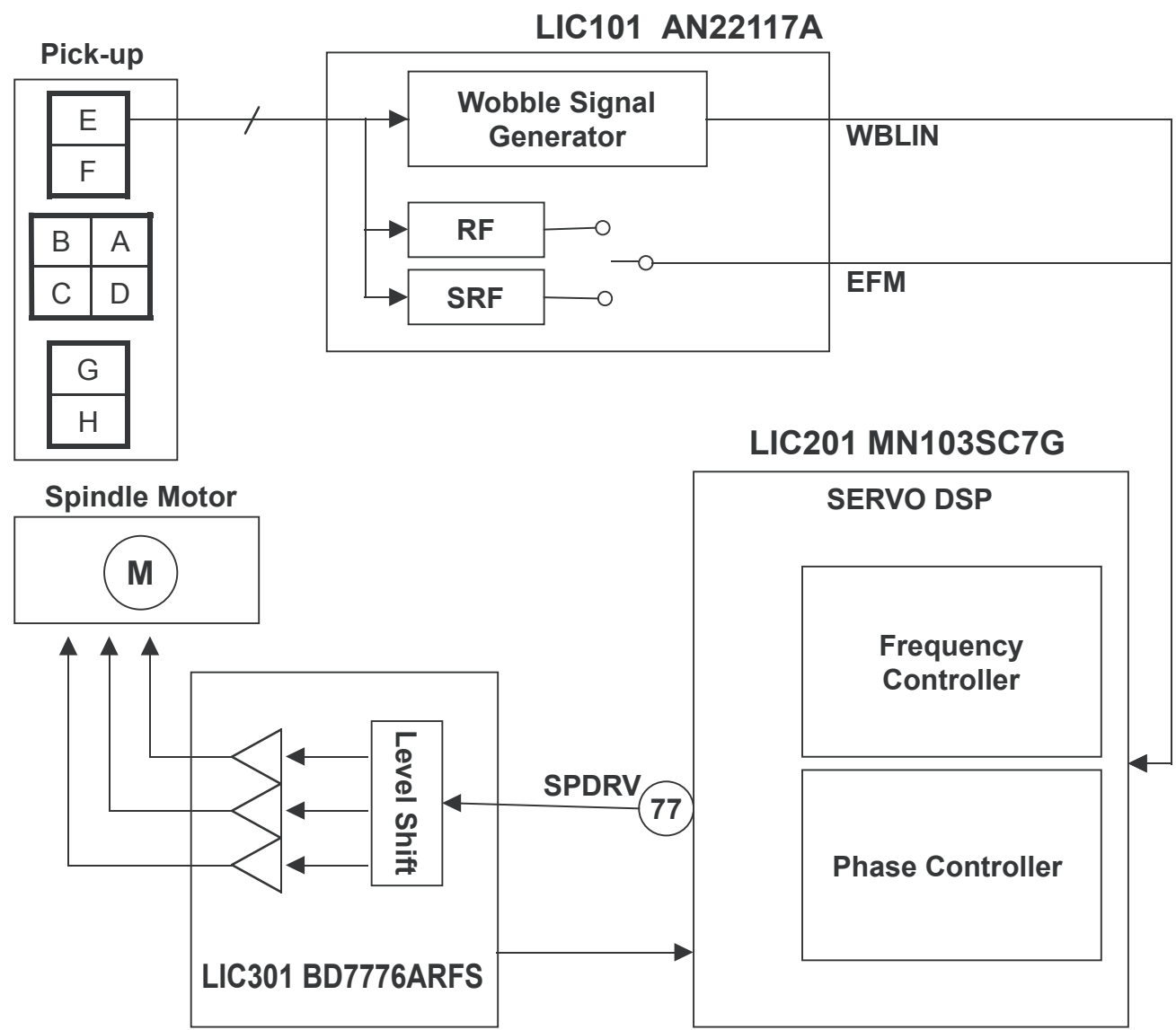
2. FOCUS/TRACKING/SLED SERVO CIRCUIT

2-1. Focus, Tracking & Sled Servo Process



3. SPINDLE SERVO CIRCUIT

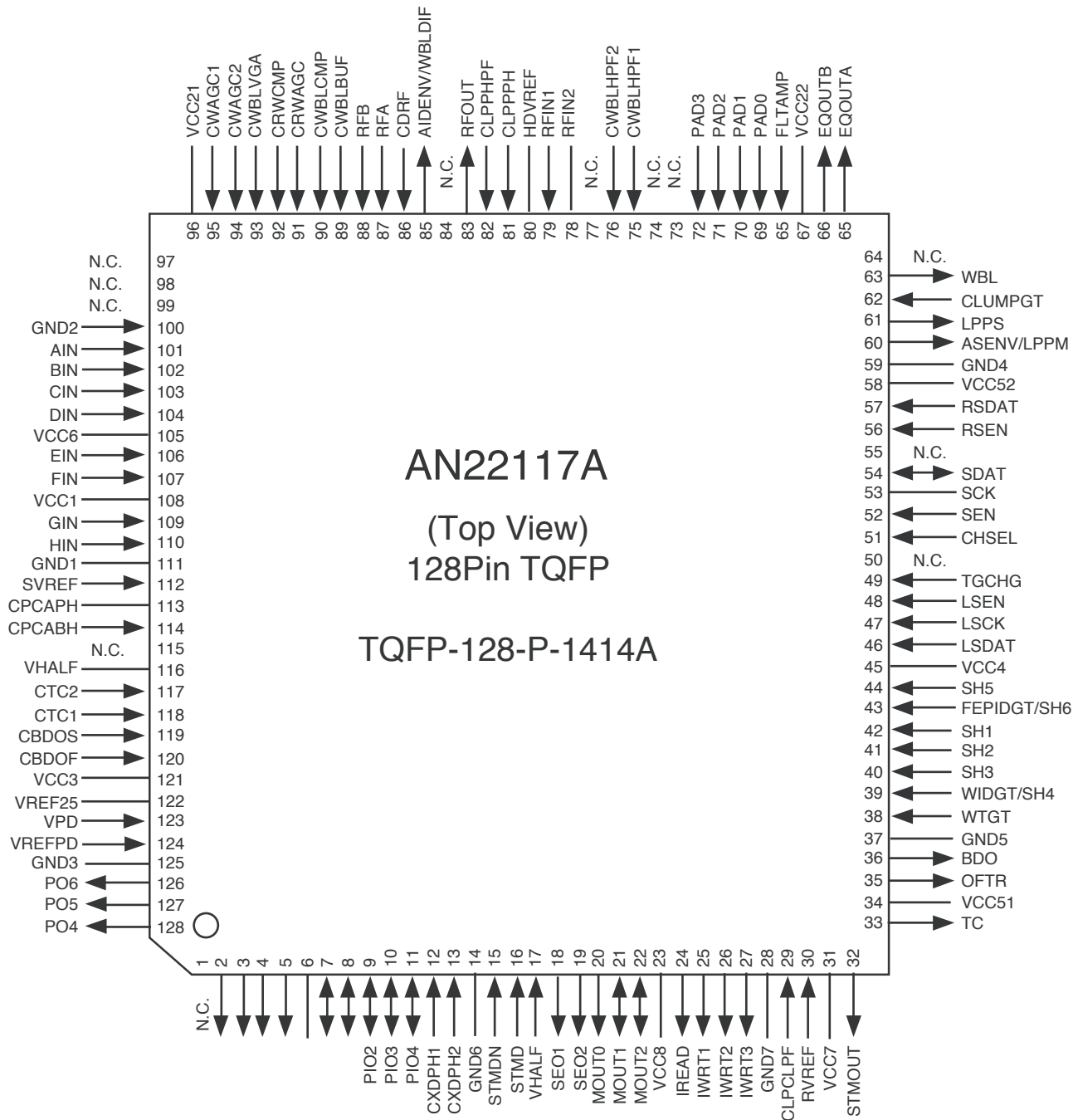
3-1. Spindle Servo Process



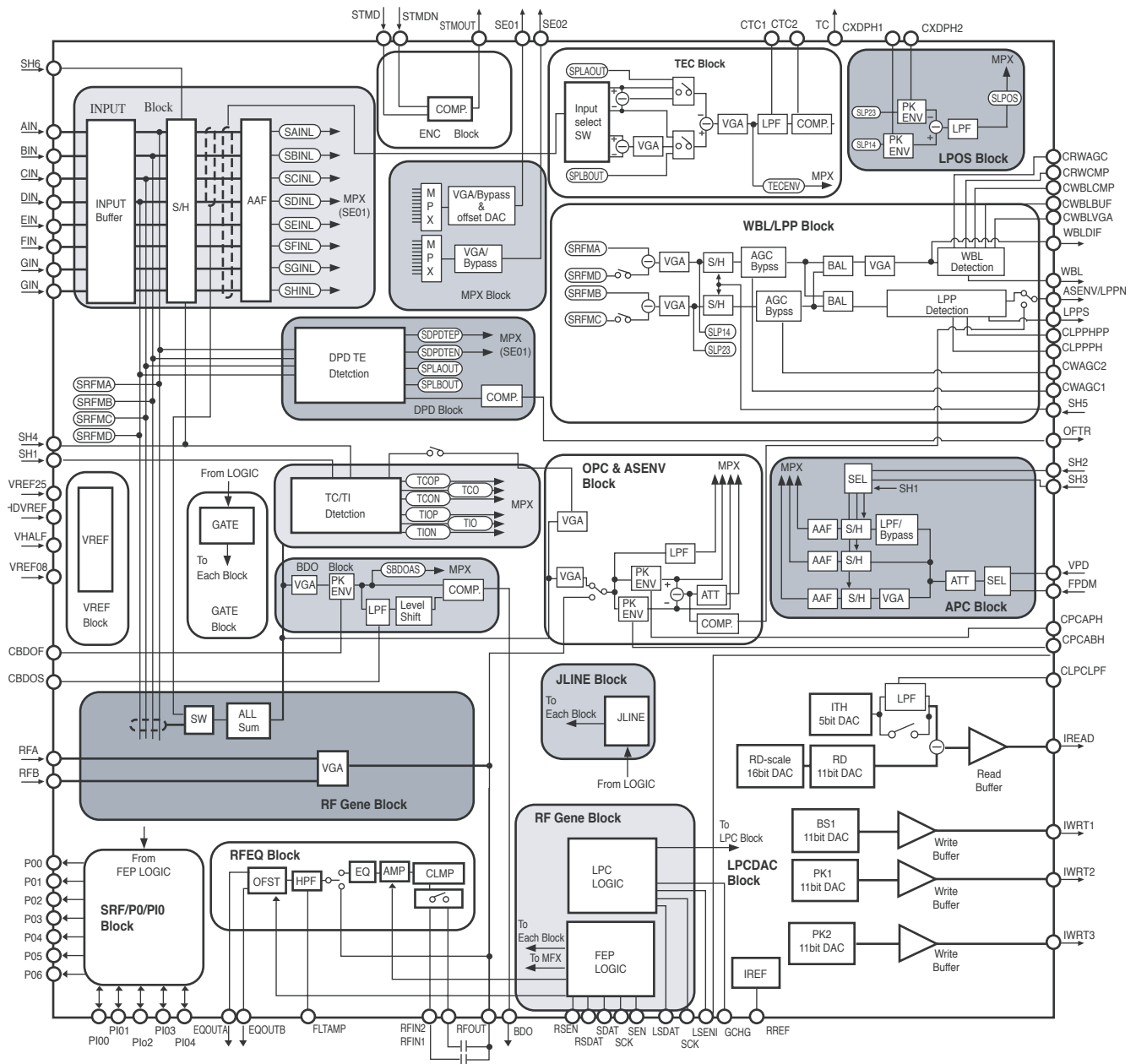
MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

1. LIC101 (AN22117A) : FEP(RF) ANALOG SIGNAL PROCESSOR

• Pin Assignment



- **Block Diagram**



• Pin Assignment

Pin no.	Pin Name	Type	Function
1	NC	-	-
2	PO3	O	General CMOS output pin
3	PO2	O	Head Amp/OEIC gain change signal output pin 3.
4	PO1	O	Head Amp/OEIC gain change signal output pin 2.
5	PO0	O	Head Amp/OEIC gain change signal output pin 1.
6	VCC53	PS	Power supply pin for CMOS I/F & LOGIC.
7	PIO0	I/O	General CMOS Input/Output pin 0.
8	PIO1	I/O	General CMOS Input/Output pin 1.
9	PIO2	I/O	General CMOS Input/Output pin 2.
10	PIO3	I/O	General CMOS Input/Output pin 3.
11	PIO4	I/O	General CMOS Input/Output pin 4.
12	CXDPH1	I	PH capacitor connection pin 1 for LPOS.
13	CXDPH2	I	PH capacitor connection pin 2 for LPOS
14	GND6	PS	GND pin for BG.
15	STMDN	I	PD input pin for STM.
16	STMD	I	PD input pin for STM.
17	VREF08	O	0.8V reference voltage output pin (APC).
18	SEO1	O	Output pin 1 after selection of each error signal.
19	SEO2	O	Output pin 2 after selection of each error signal.
20	MOUT0	O	Analog monitor 0.
21	MOUT1	I/O	Analog monitor 1.
22	MOUT2	I/O	Analog monitor 2.
23	VCC8	PS	Power supply pin for LPC (5.0V)
24	IREAD	O	DAC electric current output pin for READ.
25	IWRT1	O	DAC electric current output pin 1 for WRITE.
26	IWRT2	O	DAC electric current output pin 2 for WRITE.
27	IWRT3	O	DAC electric current output pin 3 for WRITE.
28	GND7	PS	GND pin for LPC.
29	CLPCLPF	I	Capacitor connection pin for LPC/DAC LPF.
30	RVREF	I	Capacitor connection pin for reference voltage setting.
31	VCC7	PS	Power supply pin for LPC (3.3V).
32	STMOUT	O	Encoder circuit comparator output.
33	TC	O	Track cross signal output.
34	VCC51	PS	Power supply pin for CMOS I/F & LOGIC(3.3V)
35	OFTR	O	OFTR signal output.
36	BDO	O	BDO output.
37	GND5	PS	Ground pin for CMOS I/F.
38	WTGT	I	Write gate signal input pin (pull-down)
39	WIDGT/SH4	I	VFO through signal input pin. ROPC mark detection sampling signal innput pin (pull-down)
40	SH3	I	PCA average detection, APC space detection/Playback power detection/ Erase detection sample timing signal input pin(pulldown).

Pin no.	Pin Name	Type	Function
41	SH2	I	PCA peak/bottom detection, APC space detection/ Playback power detection/Erase detection sample timing signal input pin (pulldown)
42	SH1	I	ROPC space detection, APC space detection/ Playback power detection sample timing signal input pin(pulldown).
43	FEPIDGT/SH6	I	CAPA through signal input pin/servo sampling signal input pin (pull-down)
44	SH5	I	Sample-and-hold timing signal input pin of wobble S/H at recording (pull-down)
45	VCC4	PS	Power supply pin for internal LOGIC (5.0V)
46	LSDAT	I/O	Serial data input for LPC.
47	LSCK	I	Serial clock enable input LPC.
48	LSEN	I	Serial enable input for LPC.
49	TGCHG	I	LPC DAC bank change control signal input pin.
50	NC	-	-
51	CHSEL	I	Serial MPX channel change data input pin.
52	SEN	I	Serial enable input pin for FEP (pull-down)
53	SCK	I	Serial clock input pin for FEP (pull-up).
54	SDAT	I/O	Serial data input pin for FEP.
55	NC	-	-
56	RSEN	I	Serial enable input for RF (pull-down).
57	RSDAT	I	Serial signal data input for RF
58	VCC52	PS	Power supply pin for CMOS I/F & internal current source power supply pin2 (3.3V)
59	GND4	PS	Ground pin for internal LOGIC
60	ASENV/LPPM	O	ASENV output/LPP mark output pin
61	LPPS	O	LPP space output pin
62	CLUMPGT	I	RFAGC input bias circuit clamp setting input pin (pulldown)
63	WBL	O	WBL binary output
64	NC	-	-
65	EQOUTA	O	Equalizer filter output pin 1.
66	EQOUTB	O	Equalizer filter output pin 2.
67	VCC22	PS	Power supply pin for RFEQ/LPP (5.0V)
68	FLTAMP	I	Filter final stage AMP reference voltage stabilization pin.
69	PAD0	I	A/D input pin 0
70	PAD1	I	A/D input pin 1
71	PAD2	I	A/D input pin 2
72	PAD3	I	A/D input pin 3
73	NC	-	-
74	NC-	-	-
75	CWBLHPF1	I	HPF capacitor connection pin for WBLAGC 1.
76	CWBLHPF2	I	HPF capacitor connection pin for WBLAGC 2.
77	NC	-	-

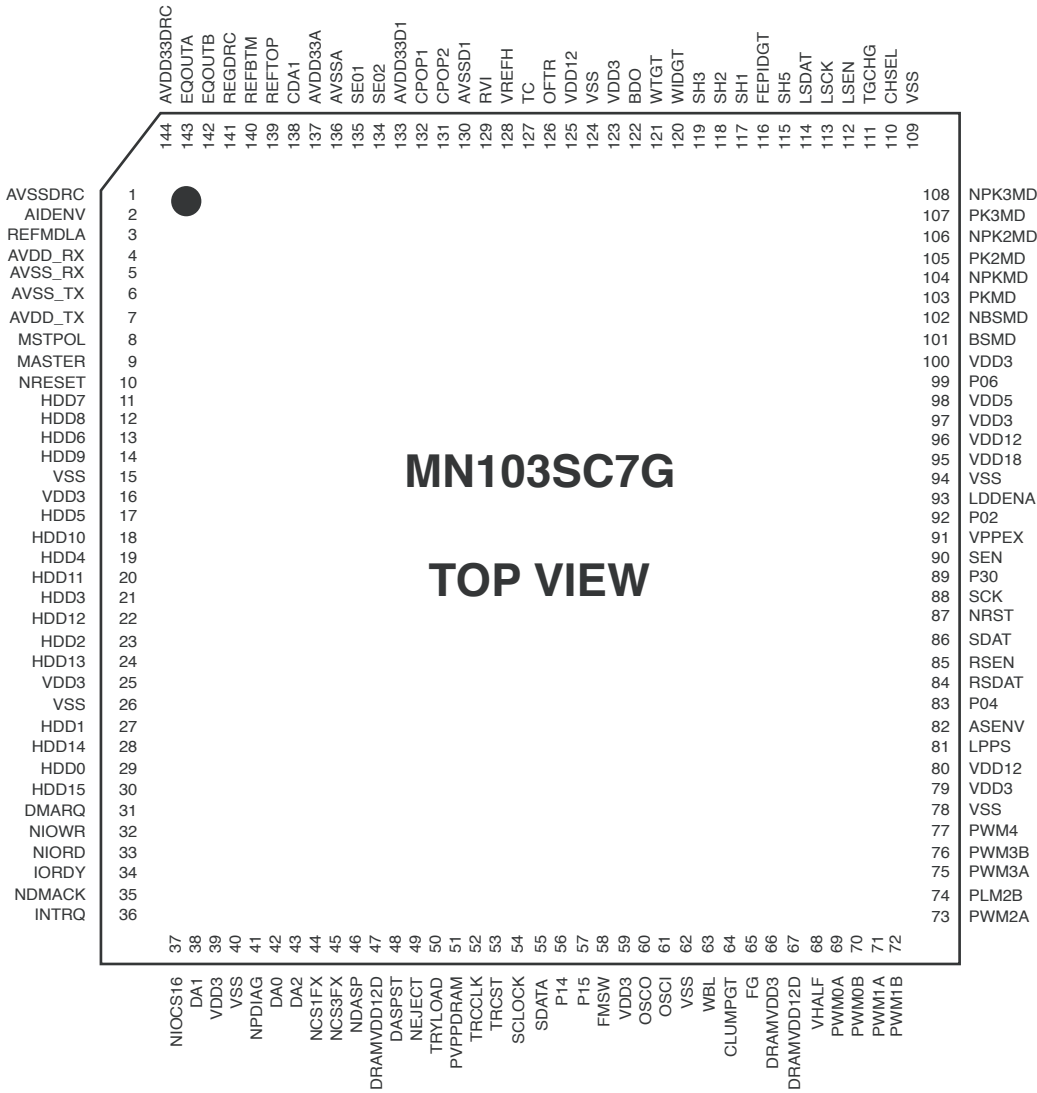
Pin no.	Pin Name	Type	Function
78	RFIN2	I	RFAGC signal input pin 2.
79	RFIN1	I	RFAGC signal input pin 1.
80	HDVREF	O	2.2V reference voltage output pin.
81	CLPPPH	I	Capacitor connection pin for LPP peak hold
82	CLPPHPF	I	Capacitor connection pin for LPPHPF
83	RFOUT	O	RF signal output pin.
84	NC	-	-
85	AIDENV/WBLDIF	O	ASENV binary output/Differential signal output pin for ADIP detection
86	CDRF	I	CD RF signal input pin.
87	RFA	I	DVD RF differential input pin 1.
88	RFB	I	DVD RF differential input pin 2.
89	CWBLBUF	I	Capacitor connection pin for WBLDIF.
90	CWBLCMP	I	Floating Capacitor connection pin for VGA before WBL binary.
91	CRWAGC	I	AGC adjustment capacitor connection pin for +RW.
92	CRWCMP	I	Floating Capacitor connection pin for VGA before WBLDIF AGC.
93	CWBLVGA2	I	Floating Capacitor connection pin for VGA before SRL.
94	CWAGC2	I	AGC adjustment capacitor connection pin 2 for WBL extraction.
95	CWAGC1	I	AGC adjustment capacitor connection pin 1 for WBL extraction.
96	VCC21	PS	-
97	NC	-	-
98	NC	-	-
99	NC	-	-
100	GND2	PS	Power supply pin for RF gene/WBL (5.0V)
101	AIN	I	DVD Tracking input pin 1.
102	BIN	I	DVD Tracking input pin 2.
103	CIN	I	DVD Tracking input pin 3.
104	DIN	I	DVD Tracking input pin 4.
105	VCC6	PS	Power supply pin for DPD (3.3V)
106	EIN	I	CD main signal input pin 1.
107	FIN	I	CD main signal input pin 2.
108	VCC1	PS	Power supply pin for INPUT MATRIX/SERVO (5.0V)
109	GIN	I	CD servo signal input pin 1.
110	HIN	I	CD servo signal input pin 2.
111	GND1	PS	Ground pin for INPUT MATRIX/SERVO/DPD.
112	SVREF	I	OEIC signal reference level input pin.
113	CPCAPH	I	PCA pick hold capacitor connection pin.
114	CPCABH	I	PCA bottom bold capactor connection pin.
115	NC	I	-
116	VHALF	O	Reference voltage output pin 1/2 VCC (3.3V).
117	CTC2	I	Floating capacitor connection pin for tracking error binary.

Pin no.	Pin Name	Type	Function
118	CTC1	I	Capacitor connection pin for TC HPF.
119	CBDOS	I	Capacitor connection pin for BDO detecting circuit LPF.
120	CBDOF	I	Capacitor connection pin for BDO detecting circuit Pick detection.
121	VCC3	PS	Power supply pin for APC/OPC/ASENV (5.0V).
122	VREF25	O	2.5V reference voltage output pin.
123	VPD	I	DVD front monitor signal input pin.
124	VREFPD	I	Front light system reference level input pin.
125	GND3	PS	Ground pin for APC/OPC/ASENV.
126	PO6	O	Ground CMOS output pin 6.
127	PO5	O	Ground CMOS output pin 5.
128	PO4	O	Ground CMOS output pin 4.

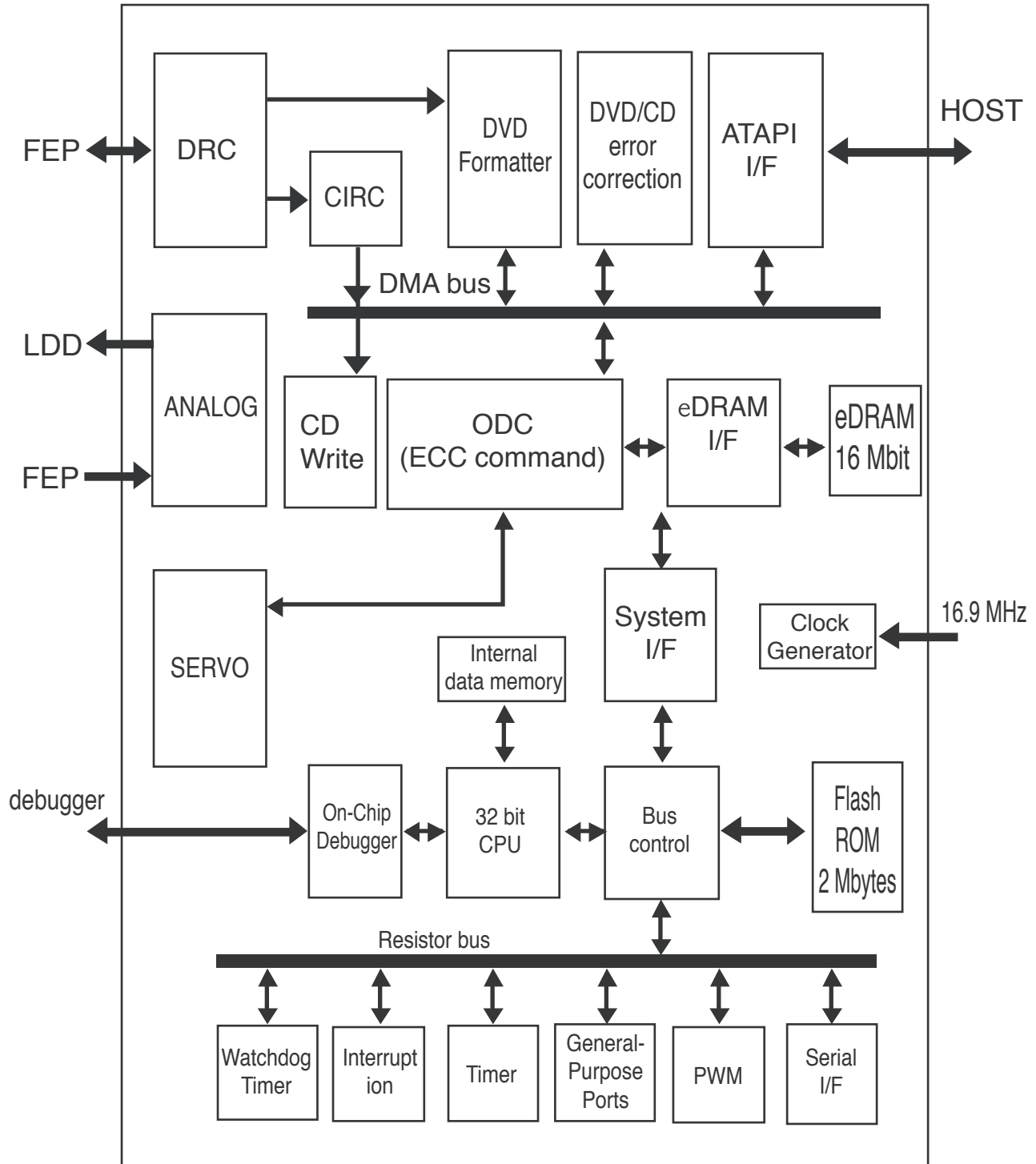
I : Input pin O: Output pin I/O : I/O pin PS : Power supply/Ground pin N.C: Non Connection

2. LIC201 (MN103SC7G) : ENCODER, DECODER & DSP SINGAL PROCESSOR

- Pin Assignment



- **Block Diagram (SODC : MN103SC7G)**



• **Pin Table**

Pin Number	Pin Name	I/O	Connection Target	Description
1	AVSSDRC	GND	GND	DRC analog Vss
2	AIDENV	I	FEP	TE signal for DVD-RAM
	WBLDIF			ADIP detector signal input
3	REFMDLA	O	Cap	Analog-to-digital converter reference voltage for ADIP
4	AVDD_RX	Power supply	Power supply	Analog power supply (3.3V)
5	AVSS_RX	GND	GND	Analog ground
6	AVSS_TX	GND	GND	Analog ground
7	AVDD_TX	Power supply	Power supply	Analog power supply (3.3V)
8	MSTPOL	I/O	-	MASTER pin polarity switch
	TRCDATA 1		-	Trace data 1
	P17		-	General-purpose I/O (GIO/PWM1)
9	MASTER	I/O	HOST	ATAPI master/slave signal
	P23		-	General-purpose I/O (GIO/TxD0/PWM0)
10	NRESET	I	HOST	ATAPI reset signal
11	HDD7	I/O	HOST	ATAPI data I/O
12	HDD8	I/O	HOST	ATAPI data I/O
13	HDD6	I/O	HOST	ATAPI data I/O
14	HDD9	I/O	HOST	ATAPI data I/O
15	VSS	GND	GND	Digital Vss
16	VDD3	Power supply	Power supply	I/O pad VDD (3.3V)
17	HDD5	I/O	HOST	ATAPI data I/O
18	HDD10	I/O	HOST	ATAPI data I/O
19	HDD4	I/O	HOST	ATAPI data I/O
20	HDD11	I/O	HOST	ATAPI data I/O
21	HDD3	I/O	HOST	ATAPI data I/O
22	HDD12	I/O	HOST	ATAPI data I/O
23	HDD2	I/O	HOST	ATAPI data I/O
24	HDD13	I/O	HOST	ATAPI data I/O
25	VDD3	Power supply	Power supply	I/O pad VDD (3.3V)
26	VSS	GND	GND	Digital Vss
27	HDD1	I/O	HOST	ATAPI data I/O
28	HDD14	I/O	HOST	ATAPI data I/O
29	HDD0	I/O	HOST	ATAPI data I/O
30	HDD15	I/O	HOST	ATAPI data I/O
31	DMARQ	O	HOST	DMA request to ATAPI host
32	NIOWR	I/O	HOST	ATAPI host write signal
33	NIORD	I/O	HOST	ATAPI host read signal
34	IORDY	O	HOST	Ready signal to ATAPI host
35	NDMACK	I	HOST	ATAPI host DMA acknowledge signal

Pin Number	Pin Name	I/O	Connection Target	Description
36	INTRQ	O	HOST	ATAPI Interrupt request to ATAPI host
37	NIOCS16	I/O	HOST	ATAPI host bus width select signal
	P22		-	General-purpose I/O (GIO)
38	DA1	I	HOST	ATAPI host daddress signal input
39	VDD3	Power supply	Power supply	I/O pad VDD (3.3V)
40	VSS	GND	GND	Digital Vss
41	NPDIAG	I/O	HOST	Diagnostic signal from ATAPI slave to master
42	DA0	I	HOST	ATAPI host address signal
43	DA2	I	HOST	ATAPI host address signal
44	NCS1FX	I	HOST	ATAPI host chip select signal
45	NCS3FX	I	HOST	ATAPI host chip select signal
46	NDASP	I/O	HOST	ATAPI host chip select signal
47	DRAMVDD12D	Power supply	Power supply	DRAM VDD (1.2V)
48	DASPST	I/O	-	DASP setting
	TRCDATA0		-	Trace data 0
	P16		-	General-purpose I/O (GIO/PWM0)
49	NEJECT	I/O	Mecha	Tray eject signal (SODC external interrupt)
	P25		-	General-purpose I/O (GIO)
50	TRYLOAD	I/O	Mecha	Tray eject signal (SODC external interrupt)
	P26		-	General-purpose I/O (GIO)
51	PVPPDRAM	Power supply	Cap	DRAM internal power supply output
52	TRCCLK	I/O	-	Trace clock
	P20		-	General-purpose I/O (GIO/TxD0/PWM0)
53	TRCST	I/O	-	Trace status
	P21		-	General-purpose I/O (GIO/RxT0/PWM1)
54	SCLOCK	I/O	-	Debugger clock
55	SDATA	I/O	-	Debugger data
56	P14	I/O	-	General-purpose I/O(GIO/SerialCLK0/PWM0/external interrupt 3)
	TRCDATA2		-	Trace data 2
	EXTRIG1		-	Trigger 1
57	P15	I/O	-	General-purpose I/O(GIO/RxD0/PWM1/external interrupt 4)
	TRCDATA3		-	Trace data 3
	EXTRIG2		-	Trigger 2
58	FMSW	I/O	PU	Power monitor detector multiplier conversion signal
	P03		-	General-purpose I/O (GIO)
60	OSCO	O	X'tal	Oscillator output
61	OSCI	U	X'tal	Oscillator input (16.9344 MHz)
62	VSS	GND	GND	Digital Vss
63	WBL	I	FEP	Wobble binary signal

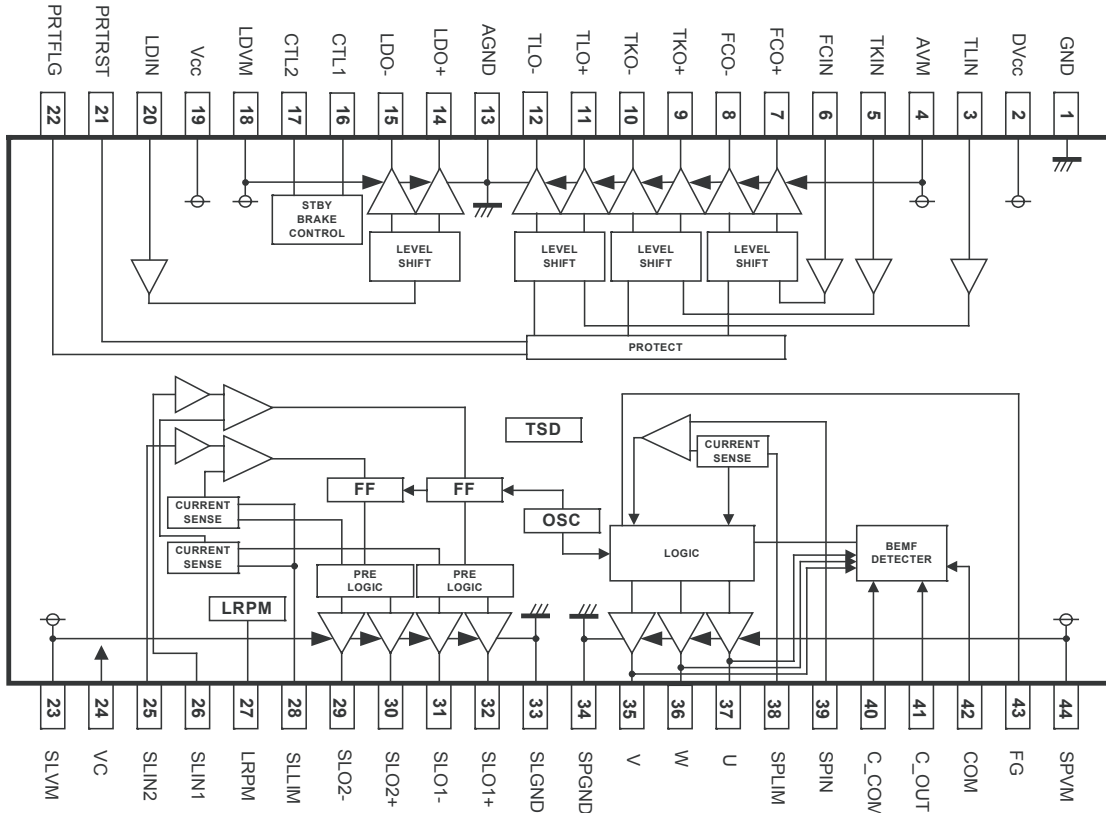
Pin Number	Pin Name	I/O	Connection Target	Description
64	CLUMPGT	O	FEP	RF AGC bias circuit clamp signal
65	FG	I	DRIVER	Spindle FG input
66	DRAMVDD3	Power supply	Power supply	DRAM VDD (3.3V)
67	DRAMVDD12D	Power supply	Power supply	DRAM VDD (1.2V)
68	VHALF	I/O	FEP	Drive pin central reference voltage input
69	PWM0A	O	DRIVER	Focus drive differential PWM+ output, focus drive BSDA output.
70	PWM0B	I/O	DRIVER	Focus drive differential PWM- output
	P10		-	General-purpose I/O (GIO/TxD0/SerialCLK0/PMW0)
71	PWM1A	O	DRIVER	Focus 2 (tilt) drive differential PWM+ output, focus 2 drive BSDA output.
72	PWM1B	I/O	DRIVER	Focus 3 (tilt) drive differential PWM-output
	P11			General-purpose I/O (GIO/RxD0/PWM1)
73	PWM2A	I/O	DRIVER	Tracking drive differential PWM+ output, tracking drive BSDA output
	P27			General-purpose I/O (GIO/PWM0)
74	PWM2B	I/O	DRIVER	Tracking drive differential PWM - output
	TX		HOST	IEC60958-compliant digital output
	P12		-	General-purpose I/O (GIO/TxD0)
75	PWM3A	I/O	DRIVER	Traverse drive differential PWM+ output, stepper 1 drive output
	P31		-	General-purpose I/O (GIO/PWM0)
76	PWM3B	I/O	DRIVER	Traverse drive differential PWM- output, stepper 2 drive output
	P31		-	General-purpose I/O (GIO/RxD0/PWM1)
77	PWM4	O	DRIVER	Spindle drive output
78	VSS	GND	GND	Digital Vss
79	VDD3	Power supply	Power supply	I/O pad VDD (3.3V)
80	VDD12	Power supply	Power supply	Internal logic VDD(1.2V)
81	LPPS	I	FEP	LPP space input
82	ASENV	I	FEP	ASENV input
	LPPM			LPP mark input
83	P04	I/O	-	General-purpose I/O (GIO/TxD0/PWM1/external interrupt 1)
	GENE0		Mache	Inner limit switch input
84	RSDAT	I/O	FEP	FEP serial interface data 2 (RF)
85	RSEN	O	FEP	FEP serial interface enable 2 (RF)
86	SDAT	I/O	FEP	FEP serial interface data
87	NRST	I	Reset	IC Reset input (power on reset)
88	VDD3	Power supply	Power supply	I/O pad VDD(3.3)
89	P30	I/O	-	General-purpose I/O (GIO/TxD1)
90	SEN	O	FEP	FEP serial interface enable

Pin Number	Pin Name	I/O	Connection Target	Description
91	VPPEX	Power supply	Power supply	Flash memory power supply Vpp
92	P02	I/O	-	General-purpose I/O (GIO/RxD0/PWM0/external interrupt 0)
	NLDERR		PU	Laser error detection signal
93	LDDENA	O	PU	LDD enable signal
94	VSS	GND	GND	Digital Vss
95	VDD18	Power supply	Power supply	Flash memory power supply Vpp
96	VDD12	Power supply	Power supply	Internal logic VDD (1.2V)
97	VDD3	Power supply	Power supply	I/O pad VDD (1.2V)
98	VDD5	Power supply	Power supply	DRAM VDD (5.0V)
99	P06	I/O	-	General-purpose I/O (GIO/RxD0/PWM1/external interrupt 2)
	HFON		PU	External high frequency module (HFM) ON/OFF
100	VDD3	Power supply	Power supply	I/O pad VDD (1.2V)
101	BSMD	O	PU	BIAS modulation signal differential current output
102	NBSMD	O	PU	NBIAS modulation signal differential current output
103	PKMD	O	PU	PEAK1 modulation signal differential current output
104	NPKMD	O	PU	NPEAK1 modulation signal differential current output
105	PK2MD	O	PU	PEAK2 modulation signal differential current output
106	NPK2MD	O	PU	NPEAK2 modulation signal differential current output
107	PK3MD	I/O	PU	PEAK3 modulation signal differential current output
	SRF1			OEIC gain switching timing adjustment 1 (when using external WTST)
	P00		-	General-purpose I/O (GIO/TxD0/PWM0)
108	NPK3MD	I/O	PU	NPEAK3 modulation signal differential current output
	SRF2			OEIC gain switching timing adjustment 2 (when using external WTST)
	P01		-	General-purpose I/O (GIO/RxD0/PWM1)
109	VSS	GND	GND	Digital Vss
110	CHSEL	I/O	FEP	Serial MPX channel conversion data output signal
	MMOD		-	Test mode selection signal(Do not connect to a pull-up resistor or similar part.)
111	TGCHG	I/O	FEP	Write power switch signal
	P05		-	General-purpose I/O (GIO)
112	LSEN	O	PU	LDD serial interface enable
113	LSCK	O	PU	LDD serial interface clock
114	LSDAT	I/O	PU	LDD serial interface data
115	SH5	I/O	FEP	Write WOBBLE sample and hold sampling signal
116	FEPIDGT	I/O	FEP	CAPA punch out signal
	SH6			Servo S/H sample signal
	P07		-	General-purpose I/O (GIO/SerialCLK1)

Pin Number	Pin Name	I/O	Connection Target	Description
117	SH1	I/O	FEP	Sample timing signal for ROPC space detection, APC space detection, and read power detection
118	SH2	I/O	FEP	Sample timing signal for PCA peak, bottom detection, APC peak detection, and mean valuer detection
119	SH3	I/O	FEP	Sample timing signal for PCA mean value detection, APC space detection, and read power detection, and erase detection
120	WIDGT	I/O	FEP	VFO punch out signal
	SH4			ROPC mark detection sampling signal
	P24			General-purpose I/O (GIO/TxD1)
121	WTGT	O	FEP	Write gate
122	BDO	I	FEP	Dropout signal input
123	VDD3	Power supply	Power supply	I/O pad VDD (3.3V)
124	VSS	GND	GND	Digital Vss
125	VDD12	Power supply	Power supply	Internal logic VDD (1.2V)
126	OFTR	I	FEP	Off track signal input
127	TC	I	FEP	Track crossing signal input
128	VREFH	I	FEP	2.2V reference voltage input
129	RVI	I/O	Res.	Fixed current source for LVDS, WBL, and analog blocks
130	AVSSD1	GND	GND	WOBBLE analog Vss
131	CPOP2	I/O	Cap. Res.	Filter connection pin for wobble PLL
132	CPOP1	I/O	Cap. Res.	Filter connection pin for wobble PLL
133	AVDD33DI	Power supply	Power supply	WOBBLE analog VDD (3.3V)
134	SE02	I	FEP	Error signal output after selection, analog input
135	SE01	I	FEP E	rror signal output after selection, analog input
136	AVSSA	GND	GND	Servo analog-to-digital converter analog Vss
137	AVDD33A	Power supply	Power supply	Servo analog-to-digital converter analog VDD (3.3V)
138	CDA1	O	Cap	Smoothing capacitance for DRC-VCO
139	REFTOP	O	Cap	Analog-to-digital converter reference voltage for DRC (TOP)
140	REFBTM	O	Cap	Analog-to-digital converter reference voltage for DRC (BOTTOM)
141	REGDRC	O	Cap	DRC analog-to-digital converter analog VDD (1.2V) Internal regulator output
142	EQOUTB	I	FEP	RF differential signal (NEG)
143	EQOUTA	I	FEP	RF differential signal (POS)
144	AVDD33DRC	Power supply	Power supply	DRC analog-to-digital converter analog VDD (3.3 V)

3. LIC301 (BD7776ARFS) : CD-ROM/DVD-ROM 7CH POWER DRIVER

• Block Diagram



• Pin Function

No	Pin name	Description	No	Pin name	Description
1	GND	GND	23	SLVM	Motor driver power supply
2	DVcc	PWM block control power supply	24	VC	Reference voltage input
3	TLIN	Tilt motor driver input	25	SLIN2	Motor driver input2
4	AVM	Actuator driver block power supply	26	SLIN1	Motor driver input1
5	TKIN	Tracking driver input	27	LRPM	Low speed rotational motor transfer terminal
6	FCIN	Focus driver input	28	SLLIM	Input terminal for slide current limit
7	FCO+	Focus driver inverted output	29	SLO2-	Motor driver 2 non-inverted output
8	FCO-	Focus driver non-inverted output	30	SLO2+	Motor driver 2 inverted output
9	TKO+	Tilt driver inverted output	31	SLO1-	Motor driver 1 non-inverted output
10	TKO-	Tilt driver non-inverted output	32	SLO1+	Motor driver 1 inverted output
11	TLO+	Tracking driver inverted output	33	SLGND	Motor driver power supply GND
12	TLO-	Tracking driver non-inverted output	34	SPGND	Spindle driver power supply GND
13	AGND	BTL driver GND	35	V	Spindle driver output V
14	LDO+	Loading driver inverted output	36	W	Spindle driver output W
15	LDO-	Loading driver non-inverted output	37	U	Spindle driver output U
16	CTL1	Loading driver control input	38	SPLIM	Input terminal for spindle current limit
17	CTL2	Loading driver control input	39	SPIN	Spindle control voltage input
18	LDVM	Loading driver power supply	40	C_COM	Condenser connection terminal (com)
19	Vcc	Power supply	41	C_OUT	Condenser connection terminal (OUT)
20	LDIN	Loading driver input	42	COM	Motor coil input terminal
21	PRTRST	Protect input	43	FG	FG signal output
22	PRTFLG	Protect flag output	44	SPVM	Spindle driver Power supply

BLOCK DIAGRAM

