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SECTION 1

SUMMARY

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NEW FUNCTIONS OF DVD-RECORDER

• SUMMARY OF PRODUCT

- RECORDING FUNCTION OF DVD-RW AND DVD-R SPECIFICATIONS
  • DVD-RW: VIDEO MODE AND VR MODE RECORD AVAILABLE
  • DVD-R :VIDEO MODE RECORD AVAILABLE

- DIGITAL DUBBING FUNCTION OF DV CAMCORDER BY USING DV TERMINAL (IEEE1394)
  • RECORD, PLAY, FF/REW FUNCTION BY REMOTE CONTROL OF DV CAMCORDER

- DVD PROGRESSIVE PLAY RESPONSE

- VARIOUS FUNCTION RESPONSE OF DVD RECORDING (DISC NAVIGATION AND CONVENIENT PLAY, EDIT FUNCTION)

- OUTSIDE INPUT AND TV RECORDING AVAILABLE
  • RECORDING SCREEN QUALITY :VR(HQ, SQ, LQ), VIDEO(HQ, SQ)

- TV RESERVE RECORDING FUNCTION (AUTO MODE SETTING AVAILABLE FOR RECORDING IN ACCORDANCE WITH THE REMAINING DISC SPACE IN RESERVATION)

SUMMARIZED EXPLANATION OF MAIN FUNCTION

• DVD RECORDING FUNCTION(VR MODE RECORD / VIDEO MODE RECORD)

1) VR MODE RECORD : MANUAL MODE RECORDING IN ACCORDANCE WITH VARIOUS EDITING FUNCTION, REMAINING DISC SPACE AND PROGRAM TIME DVD-RW DISC RECORDED IN THE VR MODE CAN BE PLAYED WITH A DVD PLAYER CORRESPONDING TO THE DVD-RW THERE IS ALSO A PLAYER TO BE PLAYED THROUGH FINALIZING. FOR THE DVD-RW, RECORDING AND EDITING IS AVAILABLE AT THE SAME DEVICE EVEN AFTER FINALIZING.

2) VIDEO MODE RECORDING : THERE IS NO EDITING FUNCTION SUCH AS VR MODE RECORDING BUT VIDEO MODE RECORDING IS PLAYED IN A GAME DEVICE (FOR EXAMPLE, “PLAY STATION 2”) WITH PC, DVD PLAY FUNCTION CORRESPONDING TO DVD PLAYER, CAR DVD, DVD-ROM. TO PLAY IN ANOTHER DEVICE, FINALIZING IS REQUIRED. RECORDING, EDITING AND EDITING IS NOT POSSIBLE AFTER FINALIZING. HOWEVER, RECORDING IS ALLOWED AT THE DVD-RW DISC IF ERASING THE TITLE FINALLY RECORDED AFTER FINALIZING.

3) RECORDING MODE INITIALIZATION (A KIND OF FORMATTING): BEGINS INITIALIZATION AFTER SELECTING RECORDING MODE AS VR OR VIDEO MODE BY USING INITIALIZATION FUNCTION OF THE DISC SETTING MENU. INITIALIZES DEFAULT AS VR MODE FOR DVD-RW. RECORDS IT AS VIDEO MODE WITHOUT INITIALIZATION FOR VIDEO MODE.

4) FINALIZE: BEGINS FINALIZE AT THE DISC SETTING MENU DURING STOP.

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO 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 Electronics 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 Electronics 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 noninsulated "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:

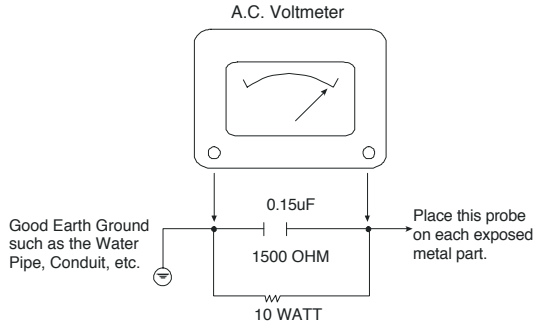
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

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 trans-ported 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 publications, always follow the safety precautions.
Remembers 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) Disconnection 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 whitch 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 solid-state device heat sinks are cerrectly installed.

6. Always connect test instrument ground lead to the appropriate ground before connection 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 1M-ohm.

Note 1 : Accessible Conductive Parts including 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 grouned-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified a “anti-static” can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protec tive 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.)

SPECIFICATIONS

• GENERAL

Power requirements	AC 200-240V, 50/60 Hz
Power consumption	44W
Dimensions (approx.)	430 X 92 X 382.5 mm (16.9 x 3.6 x 15 inches) (w x h x d)
Mass (approx.)	6.4 kg (14.1 lbs)
Operating temperature	5˚C to 35˚C (41˚F to 95˚F)
Operating humidity	5 % to 90 %
Television system	PAL B/G colour system
Recording format	PAL

• RECORDING

Recording format	DVD VideoRecording, DVD-VIDEO
Recordable discs	DVD-ReRecordable, DVD-Recordable
Recordable time	Approx. 1 hour (HQ mode), 2 hours (SQ mode), 4 hours (LQ mode)
Video recording format	
Sampling frequency	27MHz
Compression format	MPEG 2
Audio recording format	
Sampling frequency	48kHz
Compression format	Dolby Digital

• DVD SPECIFICATIONS

Laser system	Semiconductor laser
Frequency response	DVD (PCM 48 kHz): 8 Hz to 22 kHz, CD: 8 Hz to 20 kHz
Signal-to-noise ratio	More than 100 dB
Harmonic distortion	Less than 0.008%
Dynamic range	More than 95 dB

• INPUTS

AERIAL IN	Aerial input, 75 ohms
VIDEO IN	1.0 Vp-p 75 ohms, sync negative, RCA jack x 2 / SCART
AUDIO IN	0 dBm more than 47 kohms, RCA jack (L, R) x 2 / SCART
DV IN	4 pin (i.LINK/IEEE 1394 standard)

• OUTPUTS

VIDEO OUT	1 Vp-p 75 Ω, sync negative, RCA jack x 1
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, Mini DIN 4-pin x 1 (C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, RCA jack x 1 (Pb)/(Pr) 0.7 V (p-p), 75 Ω, RCA jack x 2
Audio output (digital audio)	0.5 V (p-p), 75 Ω, RCA jack x 1
Audio output (optical audio)	5 V (p-p), 75 Ω, Optical connector x 1
Audio output (analog audio)	2.0 Vrms (1 KHz, 0 dB), 600 Ω, RCA jack (L, R) x 1 / SCART

• ACCESSORY:

Video cable 1	Audio cable 1
RF Coaxial Cable.....1	Blank DVD-R disc 2
Remote control 1	Batteries 2

SECTION 2

CABINET & MAIN CHASSIS

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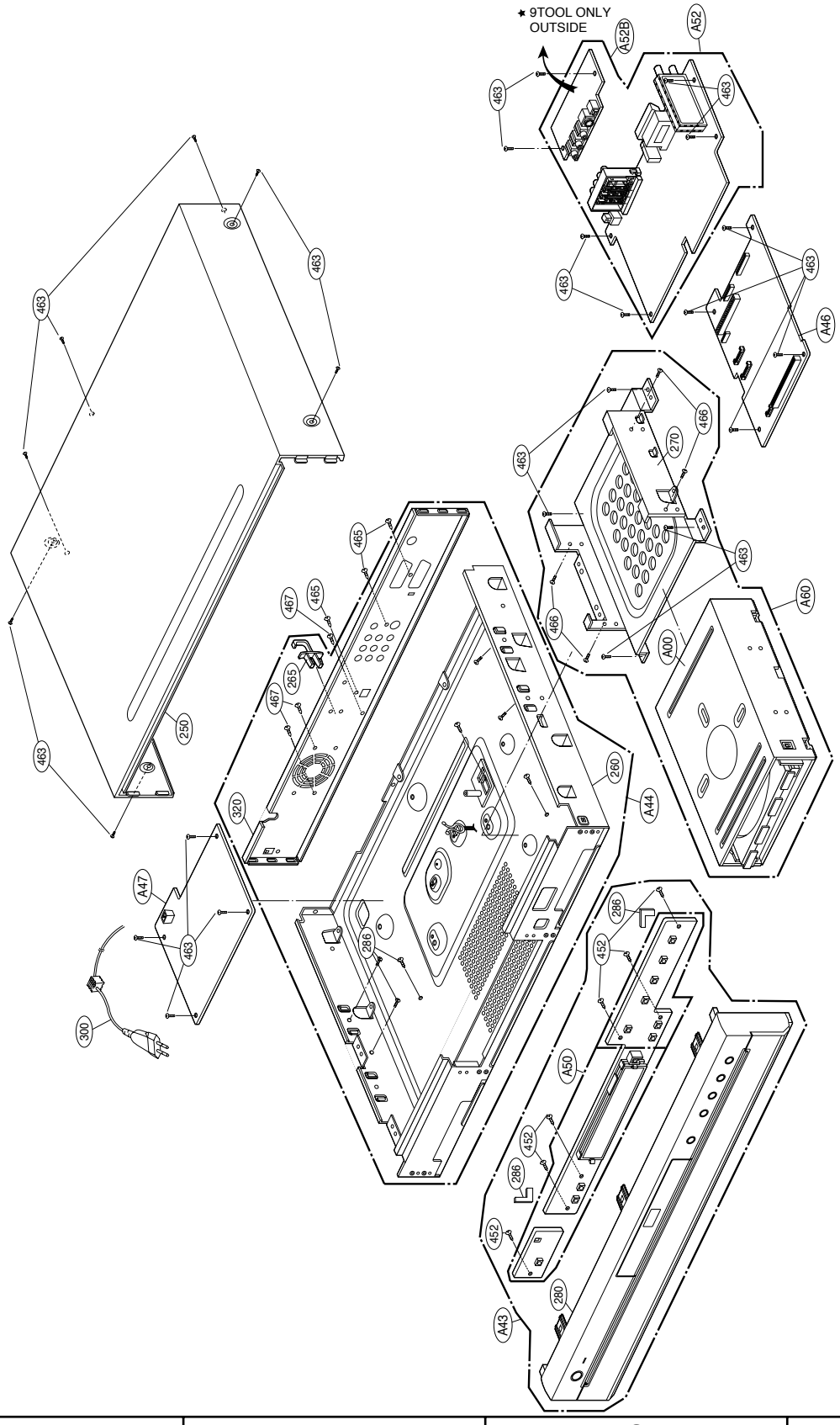
EXPLODED VIEWS

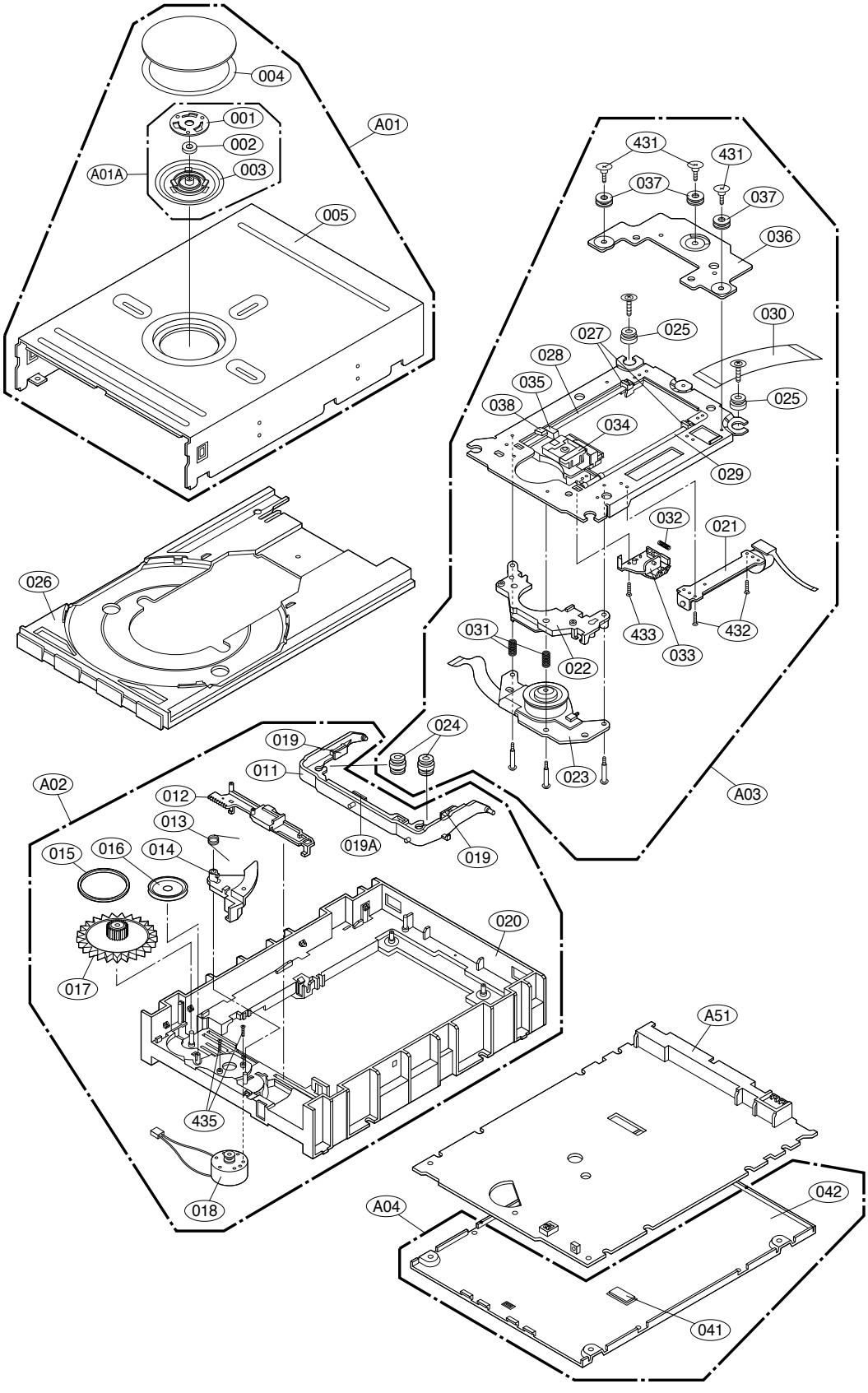
1. Cabinet and Main Frame Section



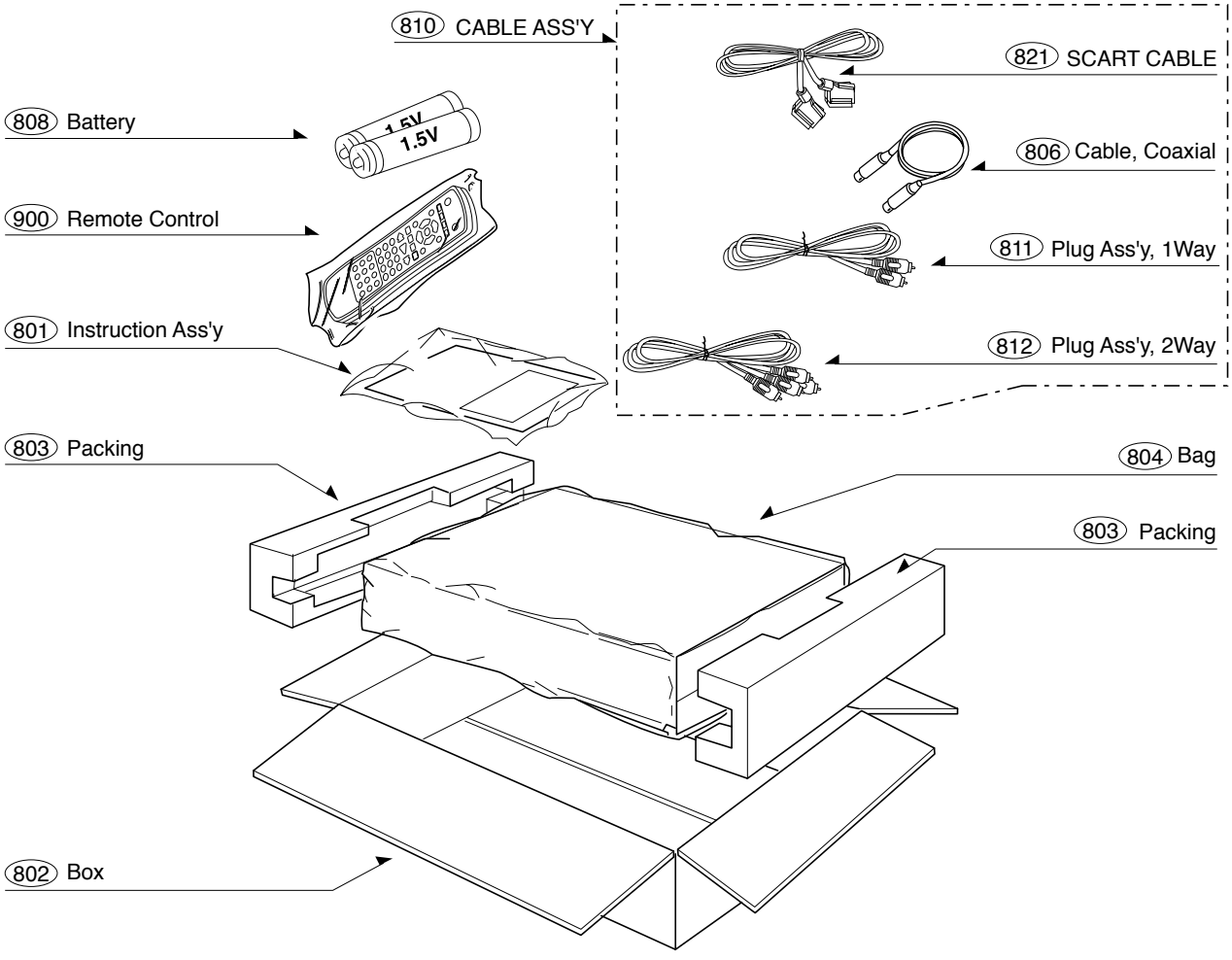
5 4 3 2 1

A B C D

2. DECK MECHANISM SECTION(RL-01A)



3. Packing Accessory Section



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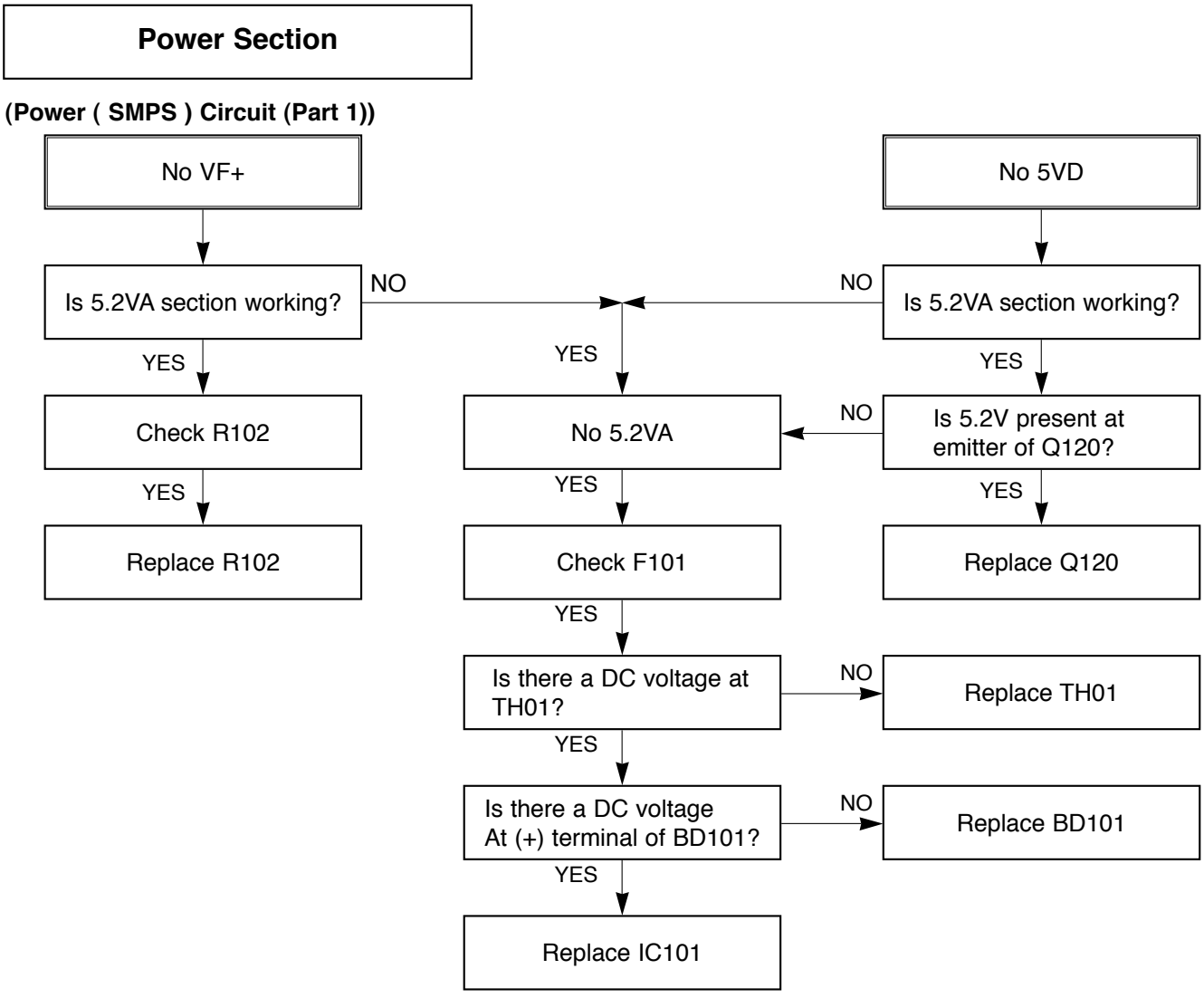
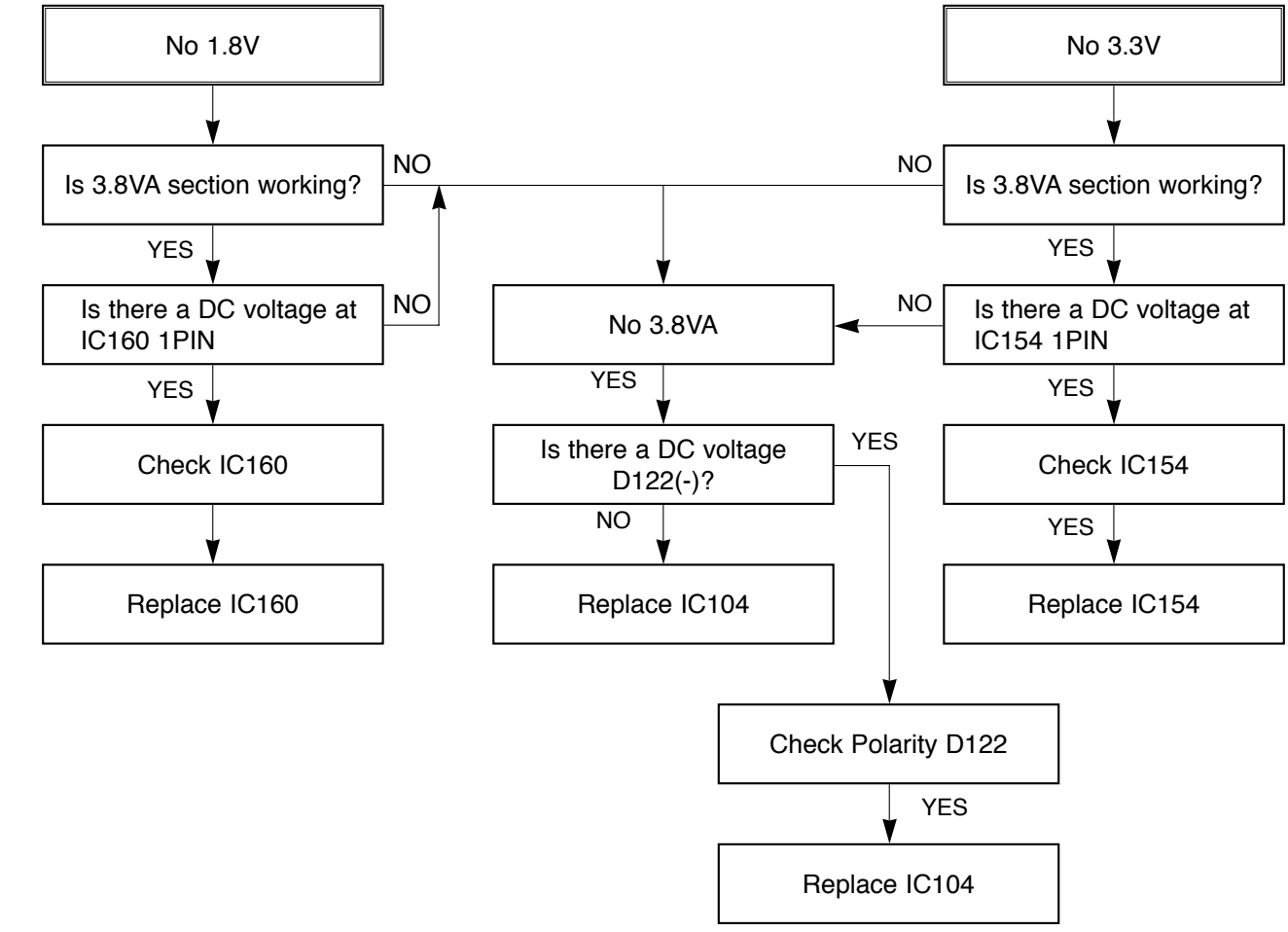
VDR PART

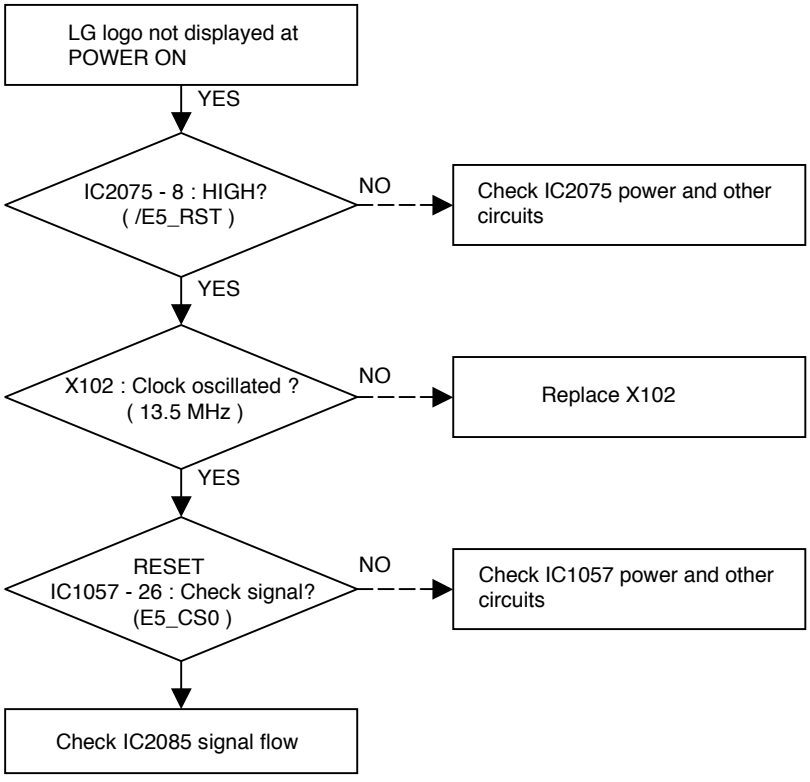
ELECTRICAL TROUBLESHOOTING GUIDE



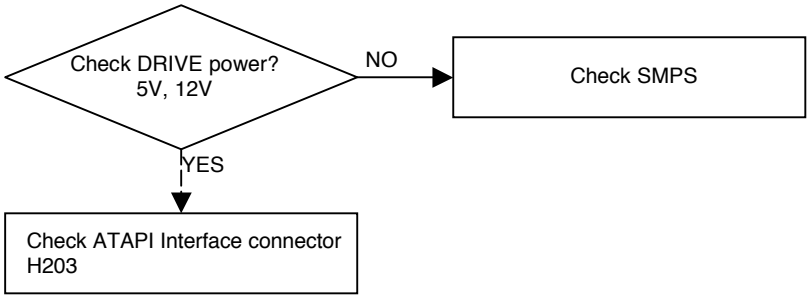
(Power (SMPS) Circuit (Part 2))



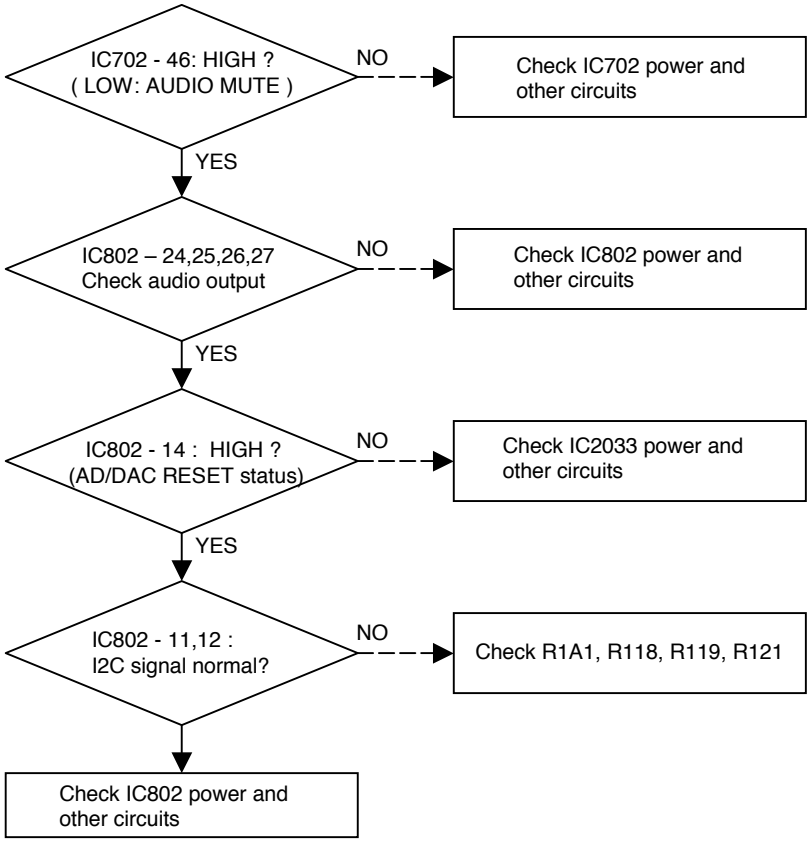
SYSTEM Section



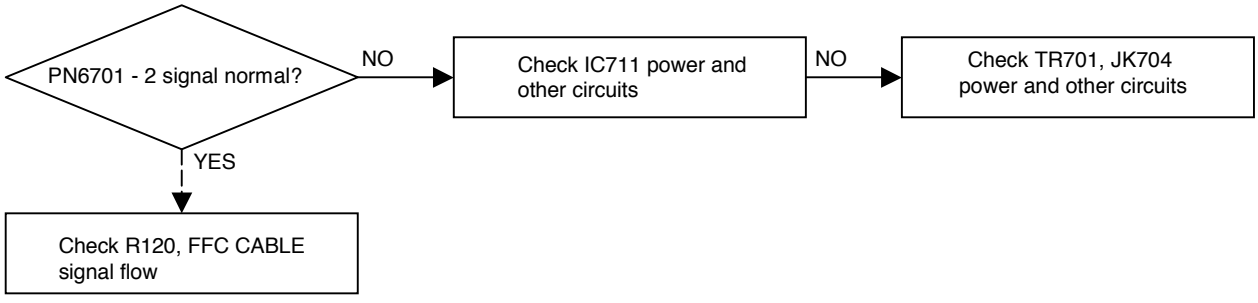
DISC not recognized



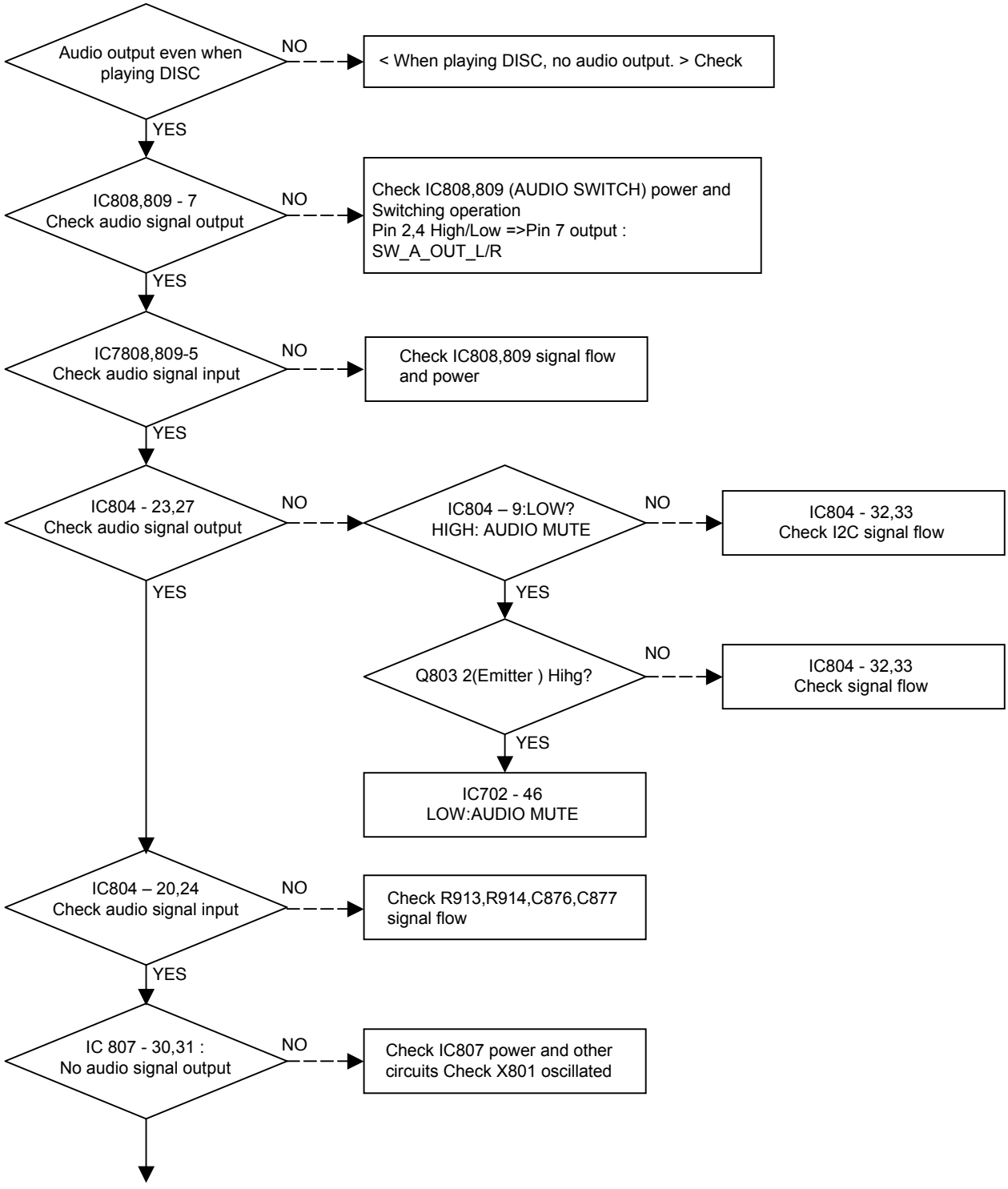
When playing DISC, no audio output

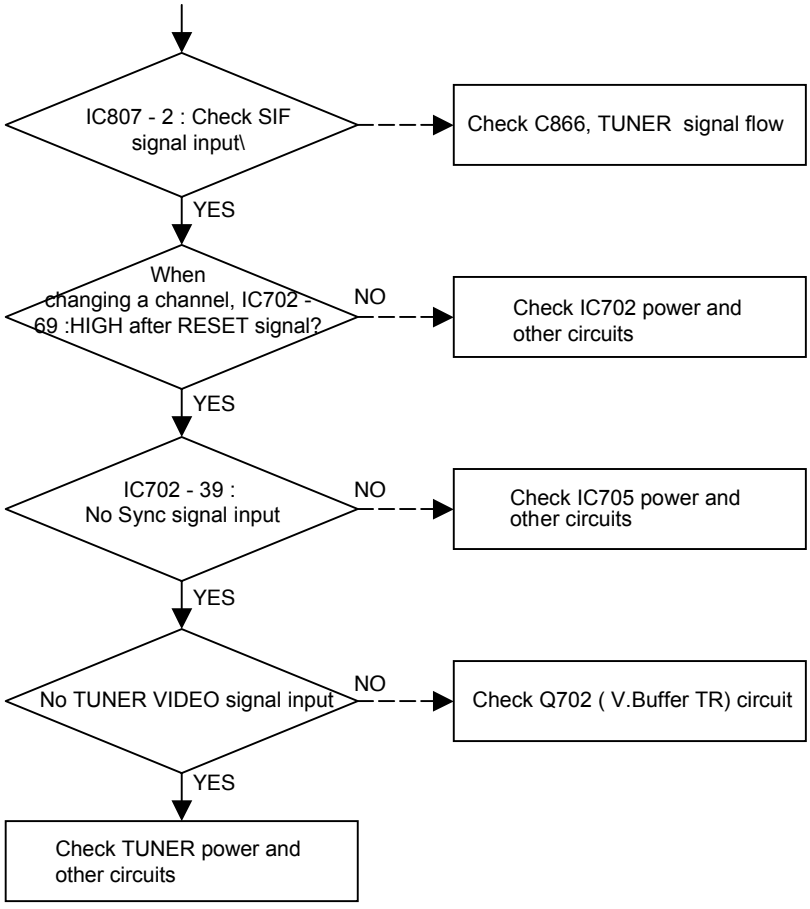


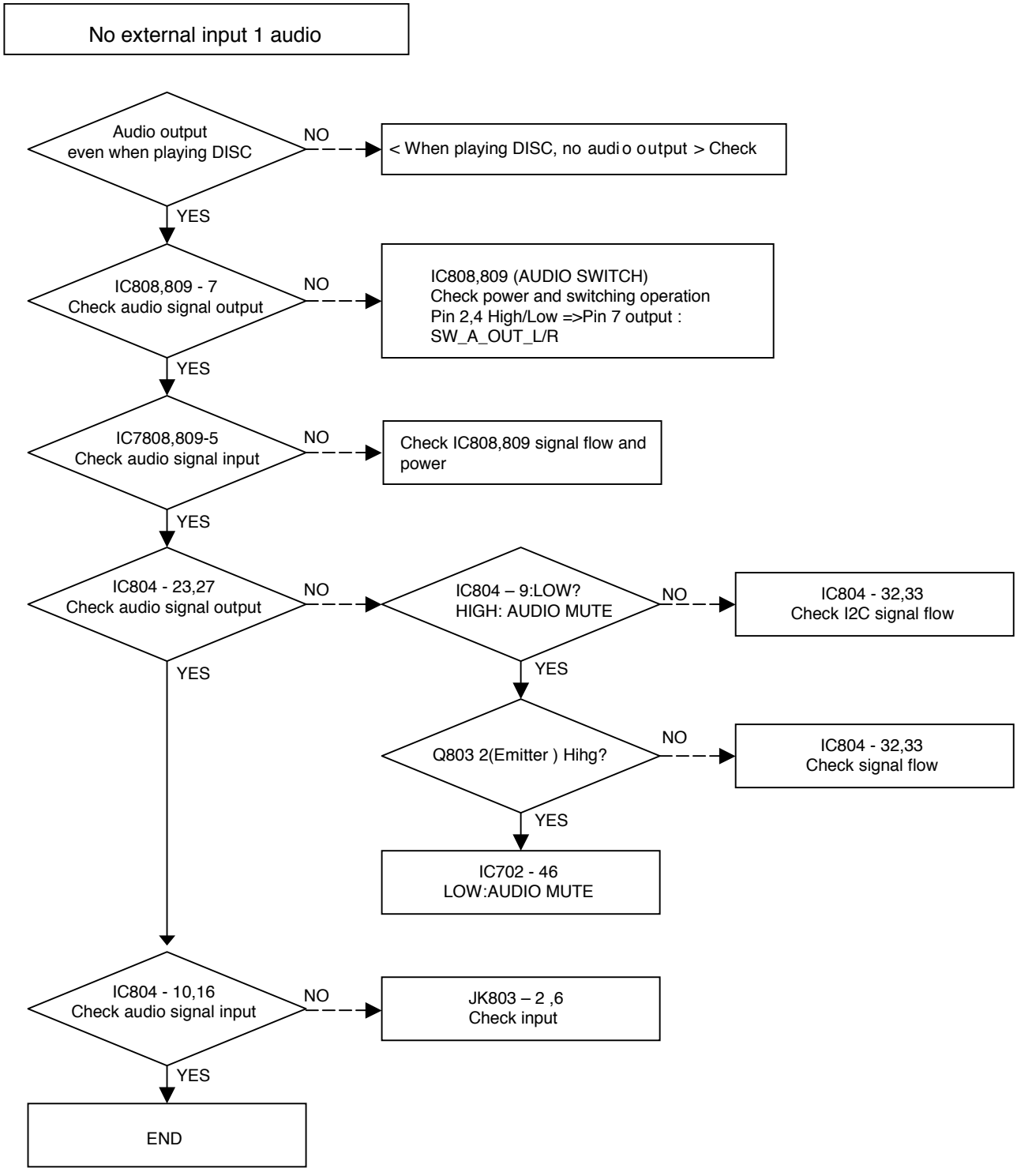
No OPTICAL / DIGITAL output

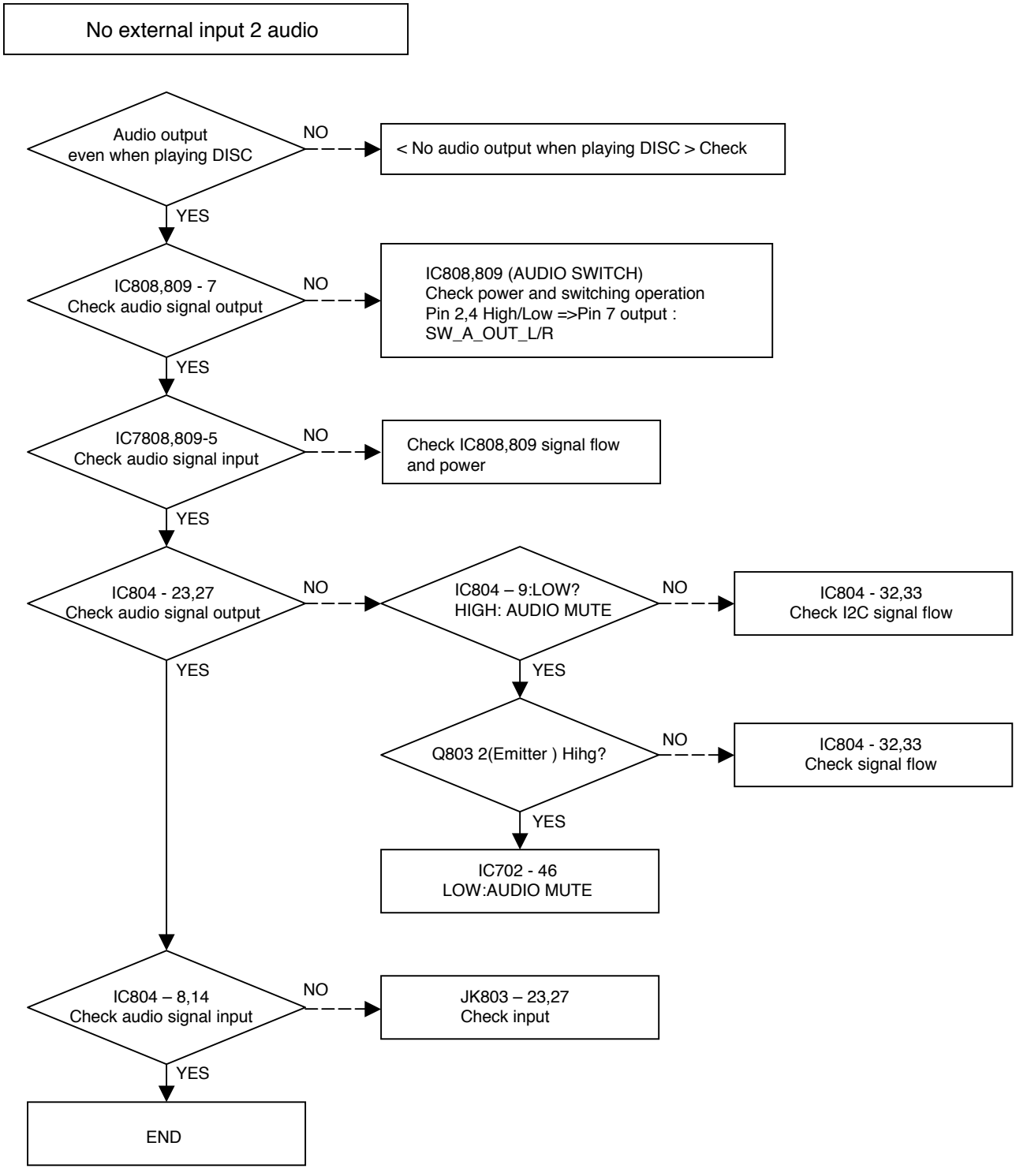


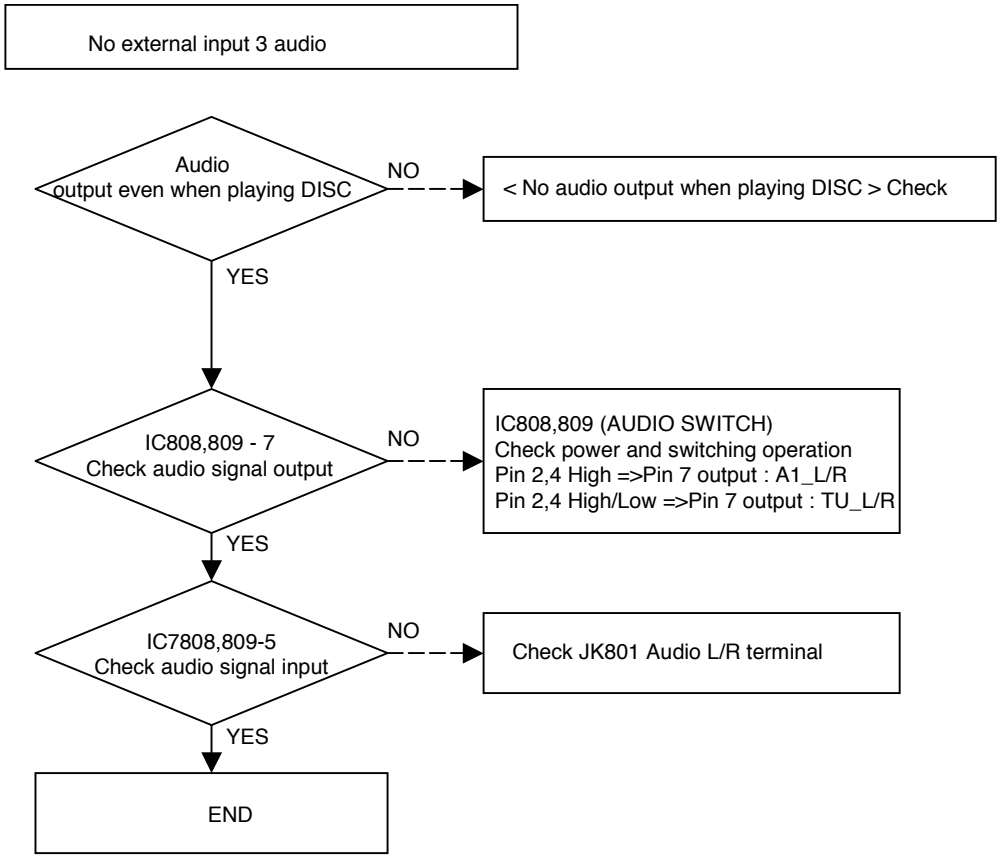
No TUNER audio output



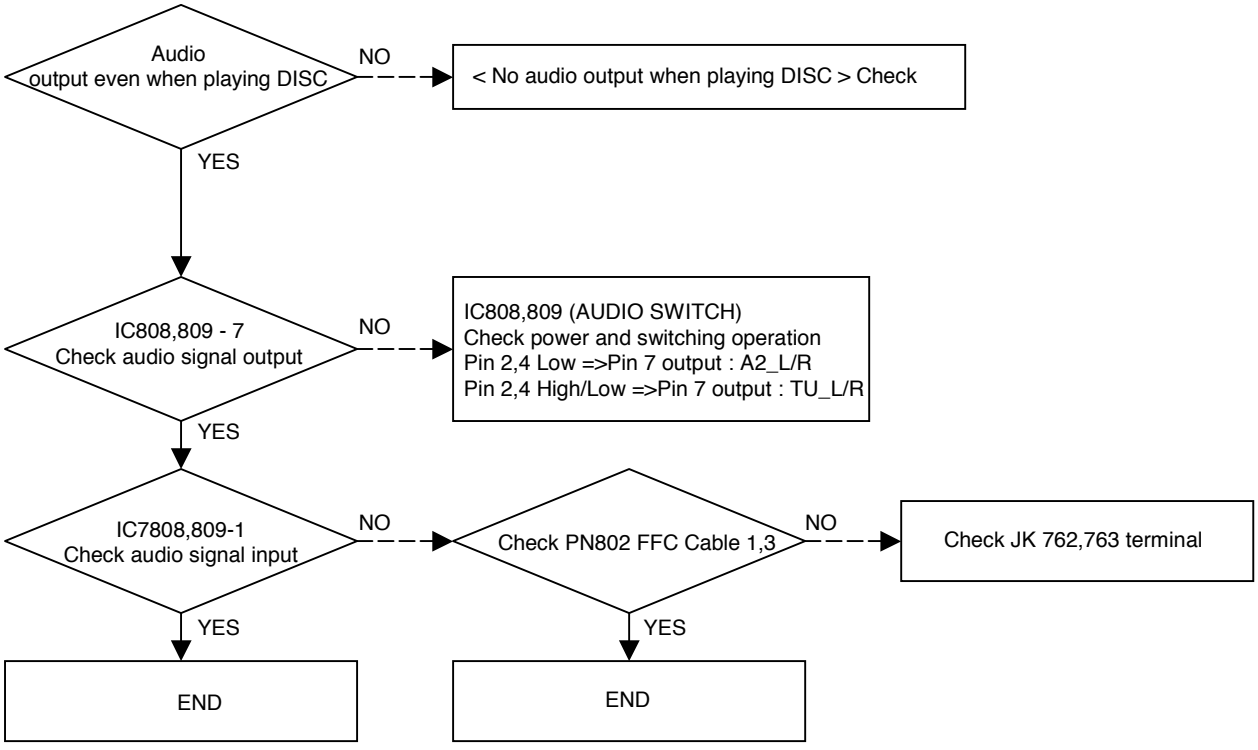

IC807 - 2 : Check SIF signal input\
Check C866, TUNER signal flow
YES
When changing a channel, IC702 - 69 :HIGH after RESET signal?
NO
Check IC702 power and other circuits
YES
IC702 - 39 : No Sync signal input
NO
Check IC705 power and other circuits
YES
No TUNER VIDEO signal input
NO
Check Q702 (V.Buffer TR) circuit
YES
Check TUNER power and other circuits

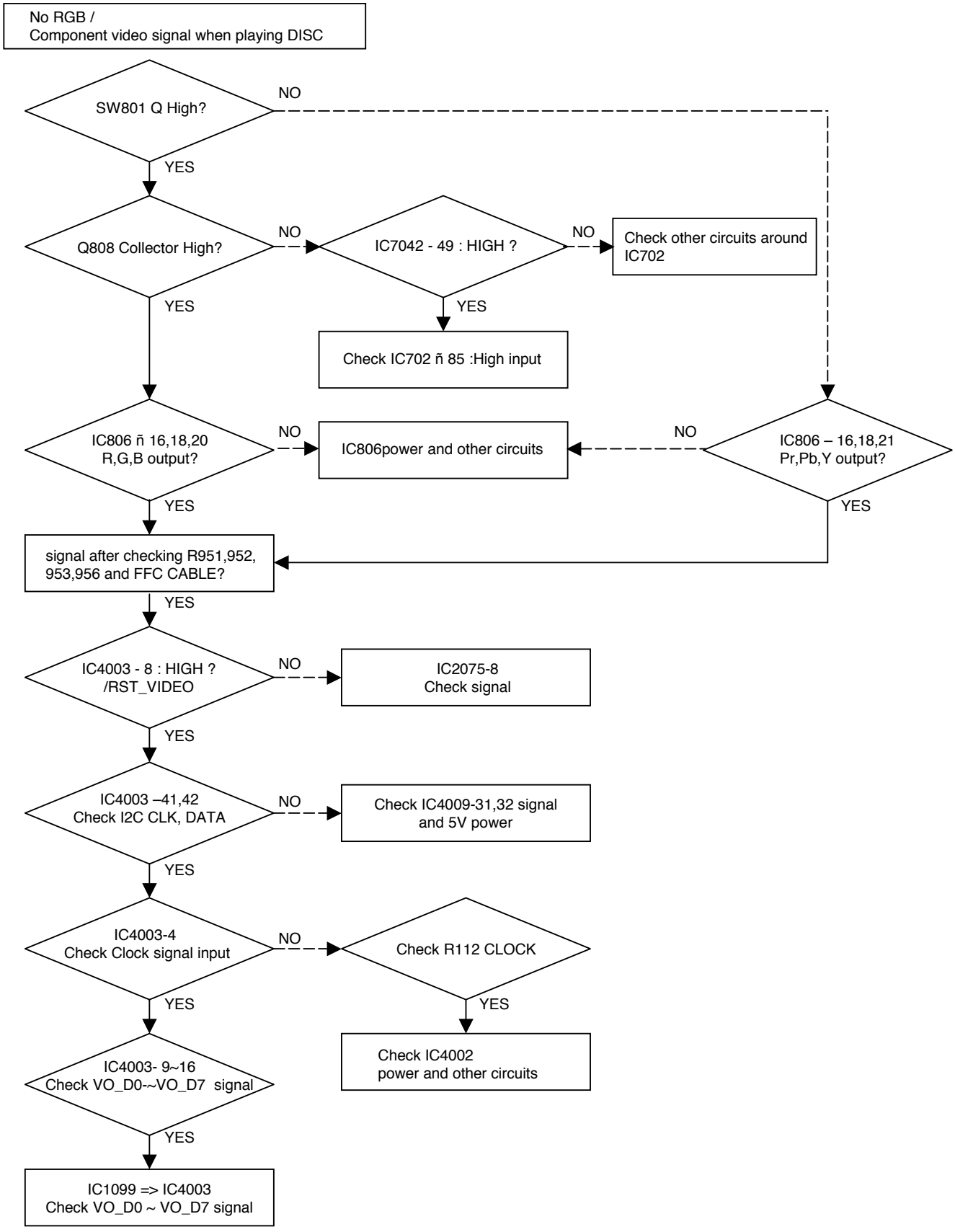

No external input 1 audio
Audio output even when playing DISC
NO
< When playing DISC, no audio output > Check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH) Check power and switching operation Pin 2,4 High/Low =>Pin 7 output : SW_A_OUT_L/R
YES
IC7808,809-5 Check audio signal input
NO
Check IC808,809 signal flow and power
YES
IC804 - 23,27 Check audio signal output
NO
IC804 – 9:LOW? HIGH: AUDIO MUTE
NO
IC804 - 32,33 Check I2C signal flow
YES
Q803 2(Emitter) Hihg?
NO
IC804 - 32,33 Check signal flow
YES
IC702 - 46 LOW:AUDIO MUTE
YES
IC804 - 10,16 Check audio signal input
NO
JK803 – 2 ,6 Check input
YES
END

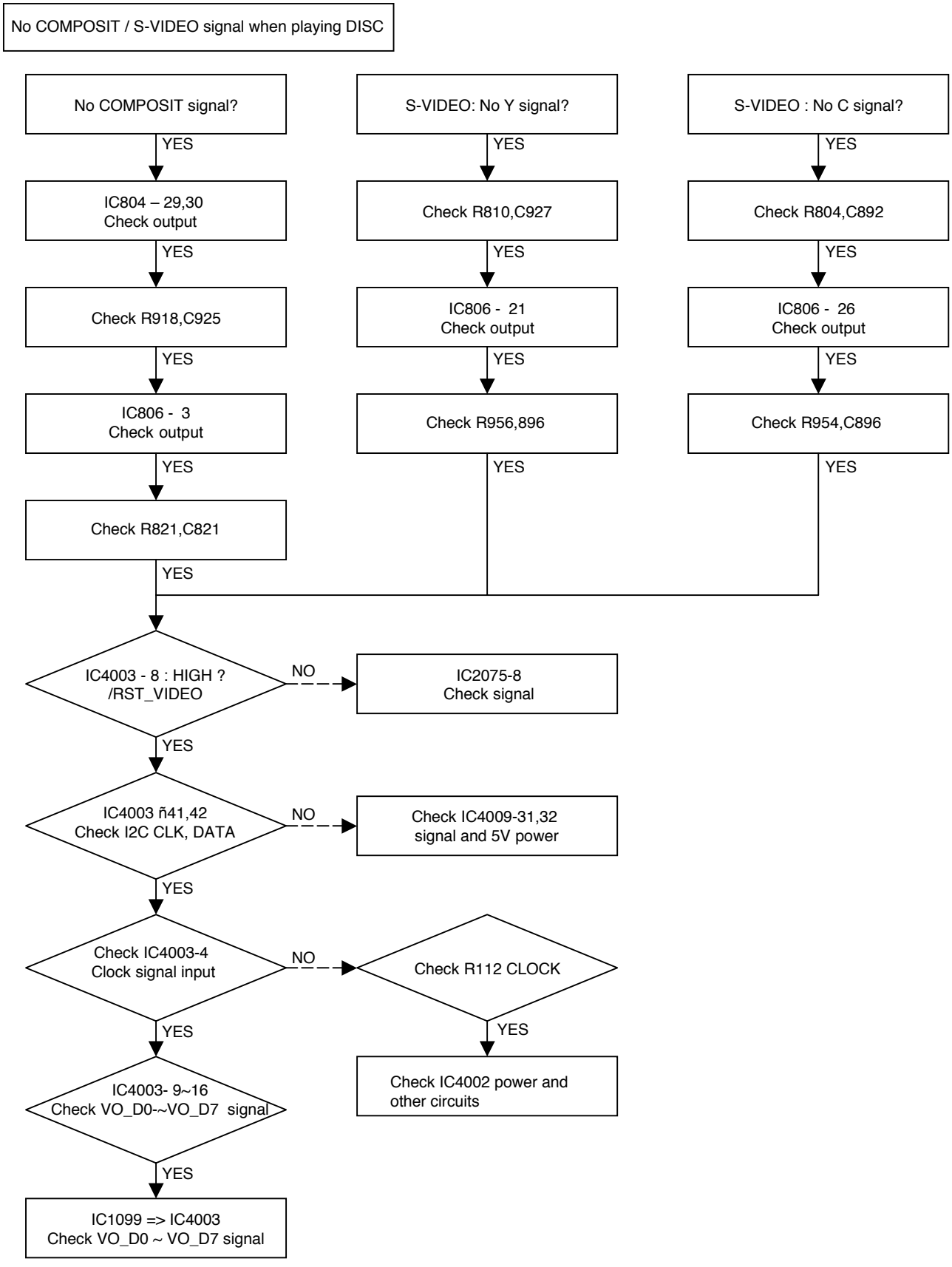

No external input 2 audio
Audio output even when playing DISC
NO
< No audio output when playing DISC > Check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH) Check power and switching operation Pin 2,4 High/Low =>Pin 7 output : SW_A_OUT_L/R
YES
IC7808,809-5 Check audio signal input
NO
Check IC808,809 signal flow and power
YES
IC804 - 23,27 Check audio signal output
NO
IC804 – 9:LOW? HIGH: AUDIO MUTE
NO
IC804 - 32,33 Check I2C signal flow
YES
Q803 2(Emitter) Hihg?
NO
IC804 - 32,33 Check signal flow
YES
IC702 - 46 LOW:AUDIO MUTE
YES
IC804 – 8,14 Check audio signal input
NO
JK803 – 23,27 Check input
YES
END

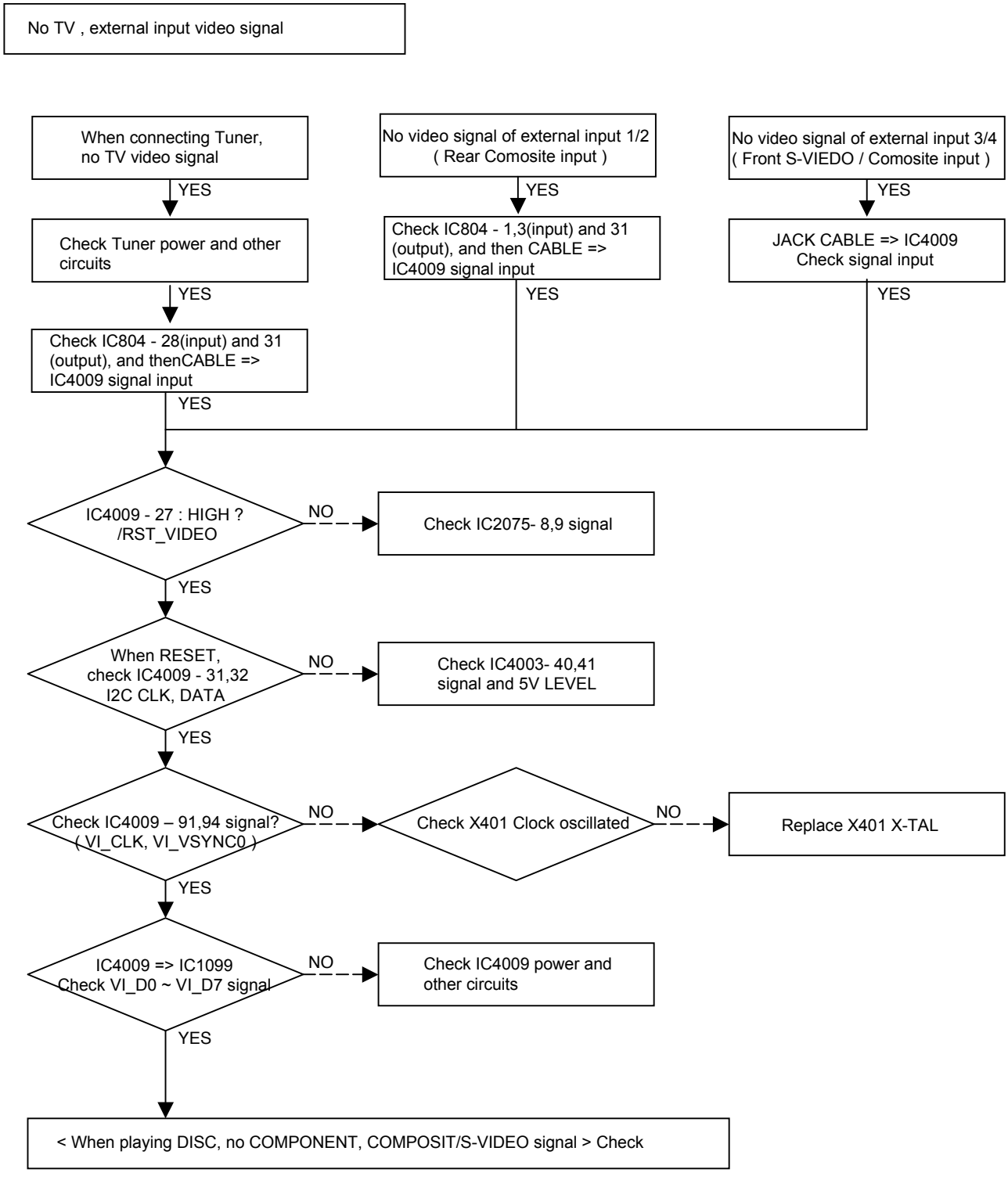

No external input 3 audio
Audio output even when playing DISC
NO
< No audio output when playing DISC > Check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH)
Check power and switching operation
Pin 2,4 High =>Pin 7 output : A1_L/R
Pin 2,4 High/Low =>Pin 7 output : TU_L/R
YES
IC7808,809-5 Check audio signal input
NO
Check JK801 Audio L/R terminal
YES
END

No external input 4 audio

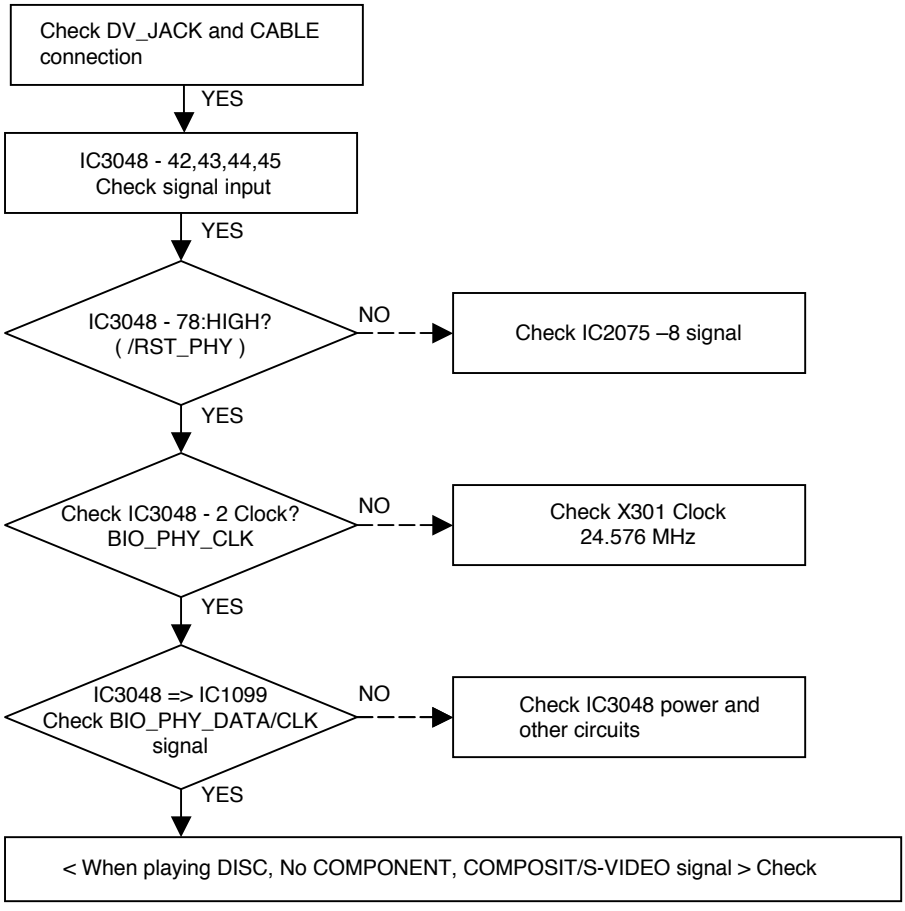



No RGB /
Component video signal when playing DISC
SW801 Q High?
NO
YES
Q808 Collector High?
NO
IC7042 - 49 : HIGH ?
NO
Check other circuits around IC702
YES
YES
Check IC702 ñ 85 :High input
IC806 ñ 16,18,20 R,G,B output?
NO
IC806power and other circuits
NO
IC806 – 16,18,21 Pr,Pb,Y output?
YES
YES
signal after checking R951,952, 953,956 and FFC CABLE?
YES
IC4003 - 8 : HIGH ? /RST_VIDEO
NO
IC2075-8 Check signal
YES
IC4003 –41,42 Check I2C CLK, DATA
NO
Check IC4009-31,32 signal and 5V power
YES
IC4003-4 Check Clock signal input
NO
Check R112 CLOCK
YES
YES
Check IC4002 power and other circuits
IC4003- 9~16 Check VO_D0-~VO_D7 signal
YES
IC1099 => IC4003 Check VO_D0 ~ VO_D7 signal


No COMPOSIT / S-VIDEO signal when playing DISC
No COMPOSIT signal?
YES
IC804 – 29,30
Check output
YES
Check R918,C925
YES
IC806 - 3
Check output
YES
Check R821,C821
YES
S-VIDEO: No Y signal?
YES
Check R810,C927
YES
IC806 - 21
Check output
YES
Check R956,896
YES
S-VIDEO : No C signal?
YES
Check R804,C892
YES
IC806 - 26
Check output
YES
Check R954,C896
YES
IC4003 - 8 : HIGH ?
/RST_VIDEO
NO
IC2075-8
Check signal
YES
IC4003 ñ41,42
Check I2C CLK, DATA
NO
Check IC4009-31,32
signal and 5V power
YES
Check IC4003-4
Clock signal input
NO
Check R112 CLOCK
YES
Check IC4002 power and
other circuits
YES
IC4003- 9~16
Check VO_D0-~VO_D7 signal
YES
IC1099 => IC4003
Check VO_D0 ~ VO_D7 signal

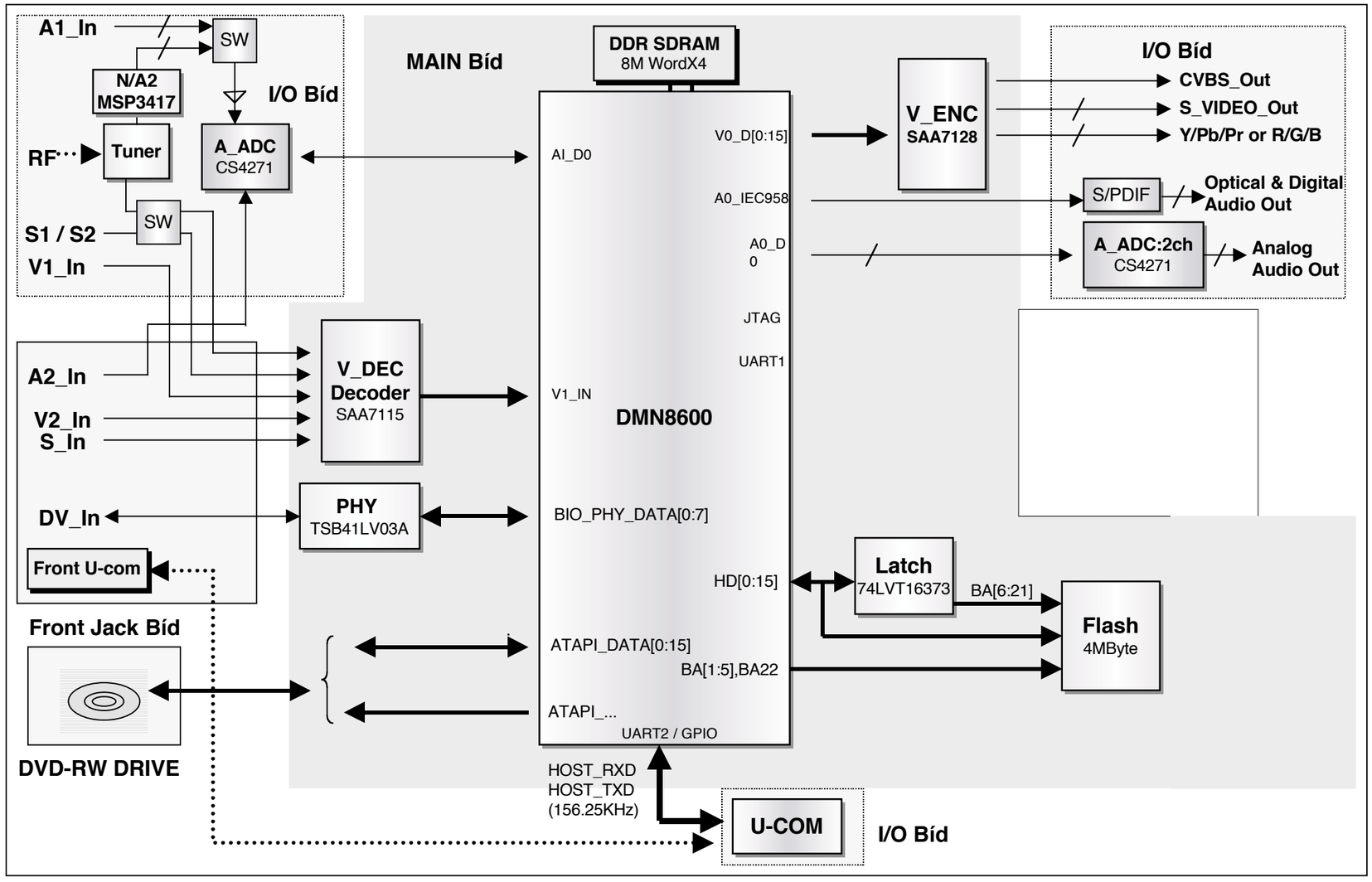

No TV , external input video signal
When connecting Tuner, no TV video signal
YES
Check Tuner power and other circuits
YES
Check IC804 - 28(input) and 31 (output), and thenCABLE => IC4009 signal input
YES
No video signal of external input 1/2 (Rear Comosite input)
YES
Check IC804 - 1,3(input) and 31 (output), and then CABLE => IC4009 signal input
YES
No video signal of external input 3/4 (Front S-VIEDO / Comosite input)
YES
JACK CABLE => IC4009 Check signal input
YES
IC4009 - 27 : HIGH ? /RST_VIDEO
NO
Check IC2075- 8,9 signal
YES
When RESET, check IC4009 - 31,32 I2C CLK, DATA
NO
Check IC4003- 40,41 signal and 5V LEVEL
YES
Check IC4009 – 91,94 signal? (VI_CLK, VI_VSYNC0)
NO
Check X401 Clock oscillated
NO
Replace X401 X-TAL
YES
IC4009 => IC1099 Check VI_D0 ~ VI_D7 signal
NO
Check IC4009 power and other circuits
YES
< When playing DISC, no COMPONENT, COMPOSIT/S-VIDEO signal > Check

No DV(IEEE 1394) input (video/audio) signal

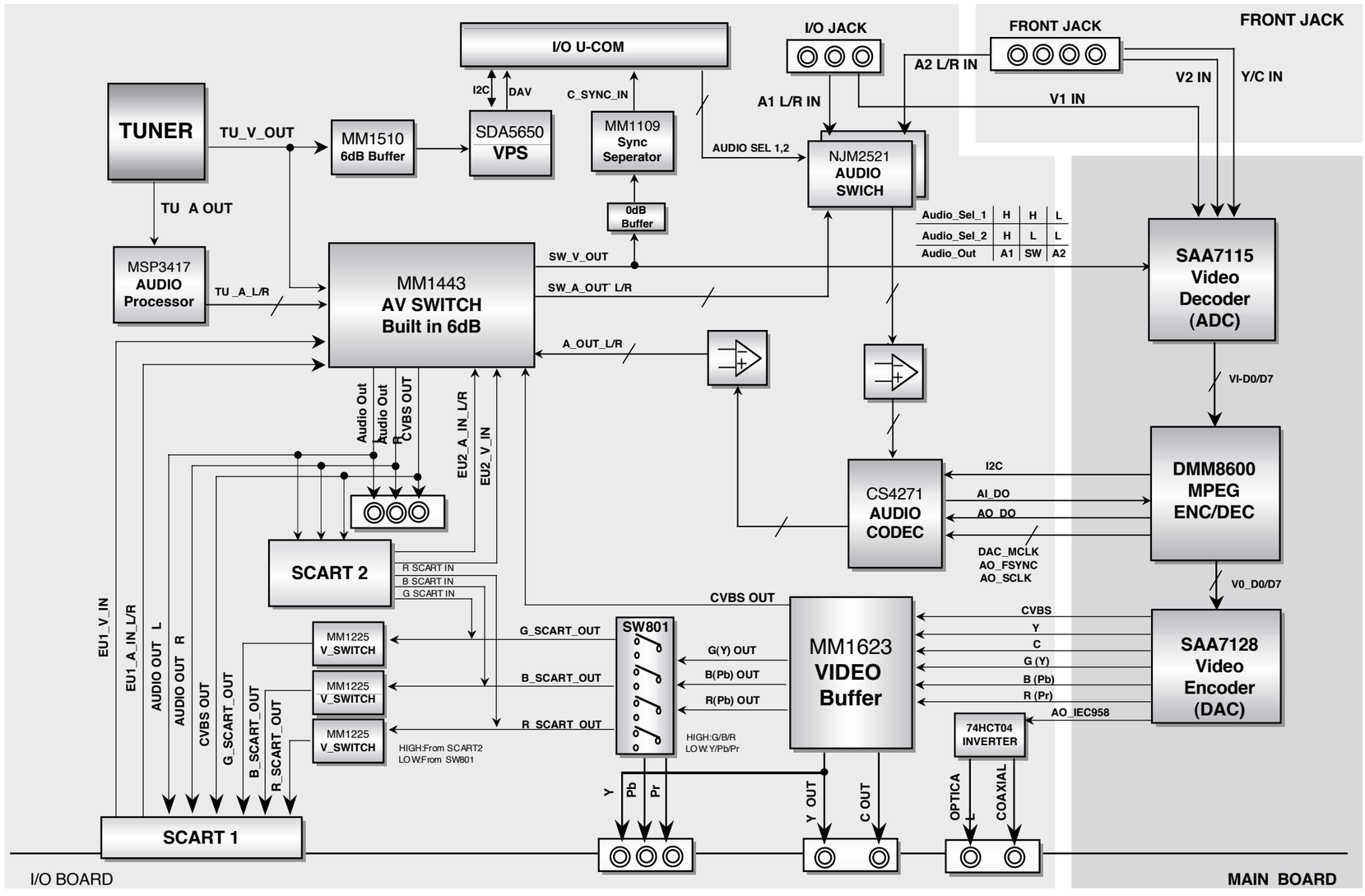


BLOCK DIAGRAMS

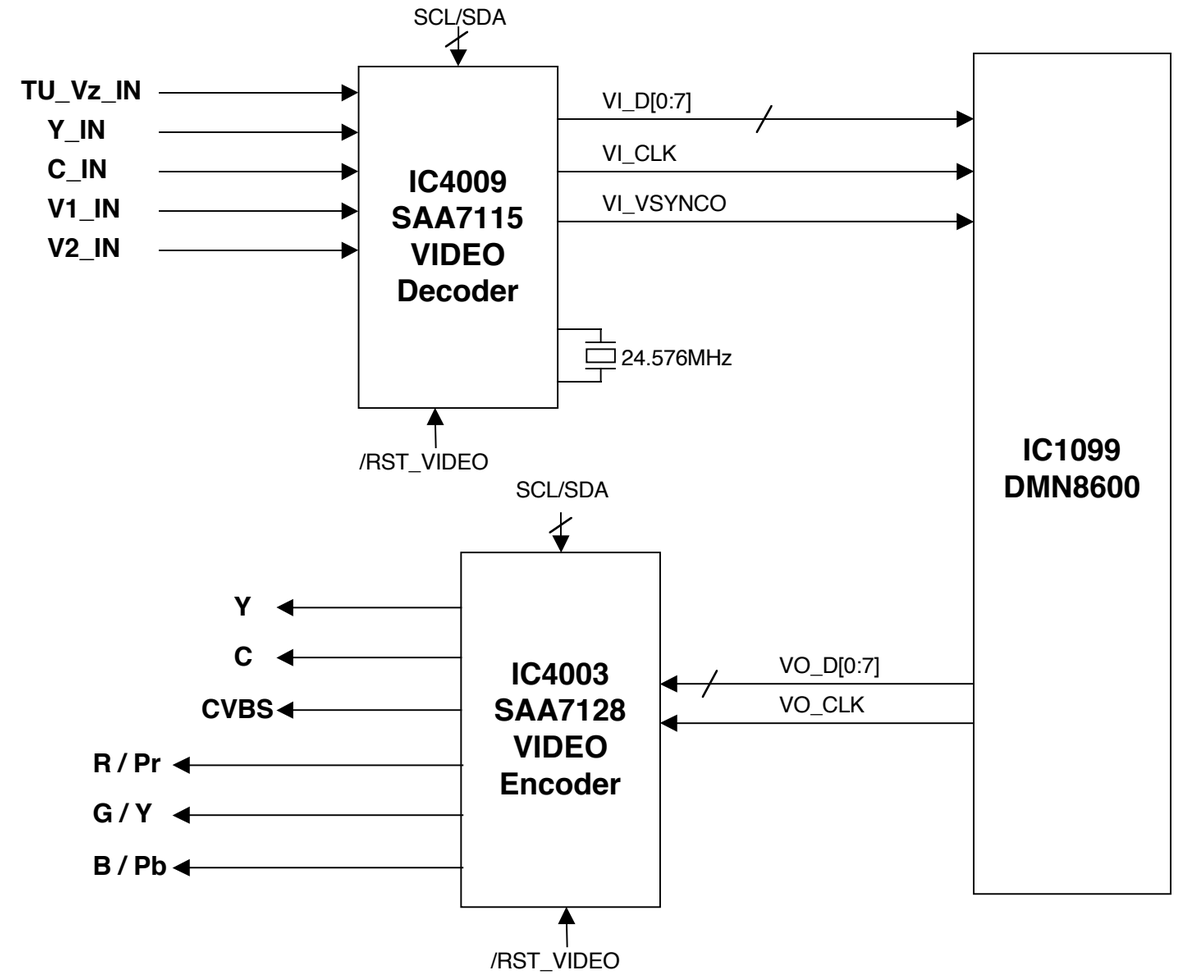
1. LSI Overall Block Diagram



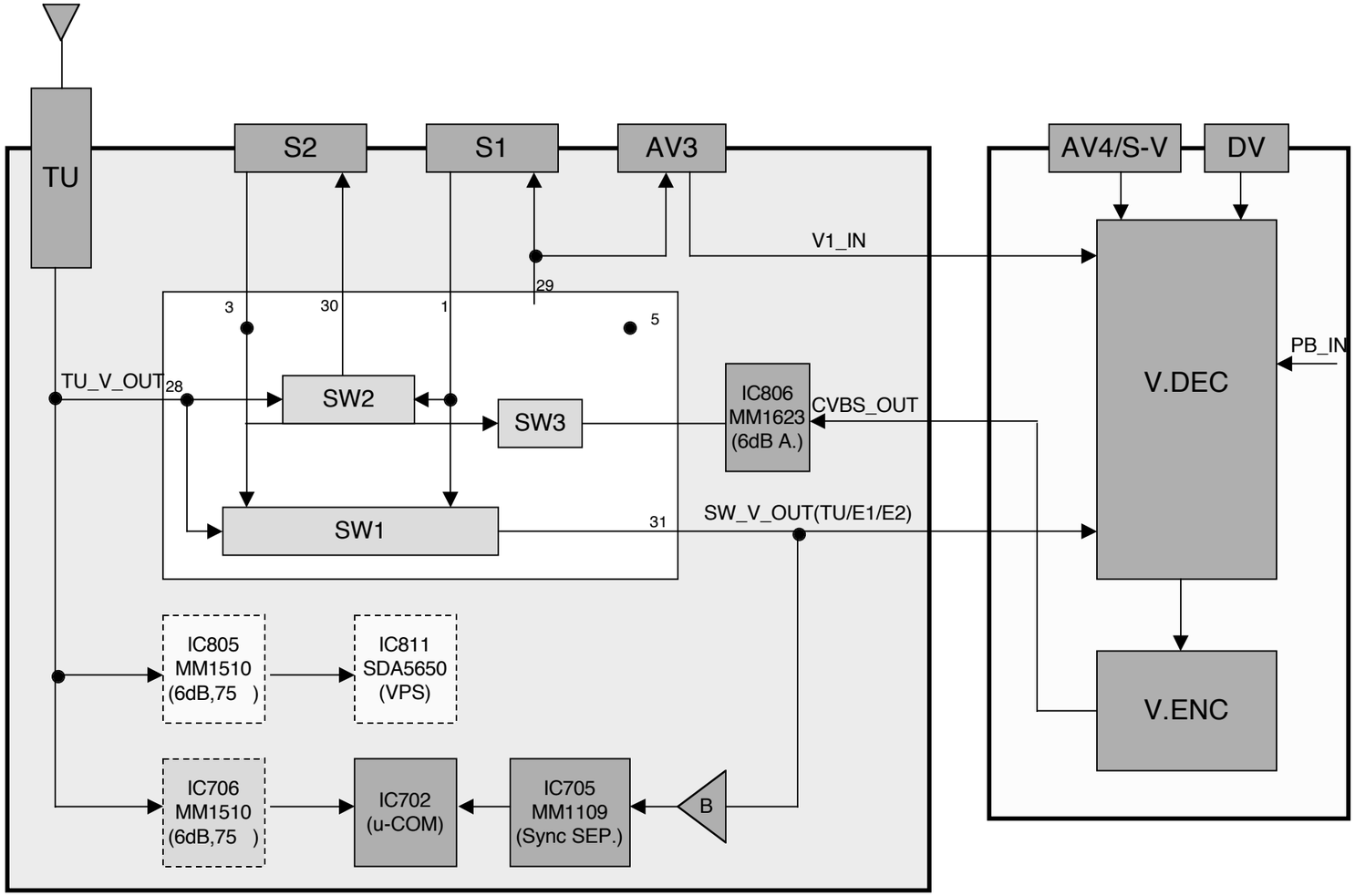
2. In/Out Block Diagram



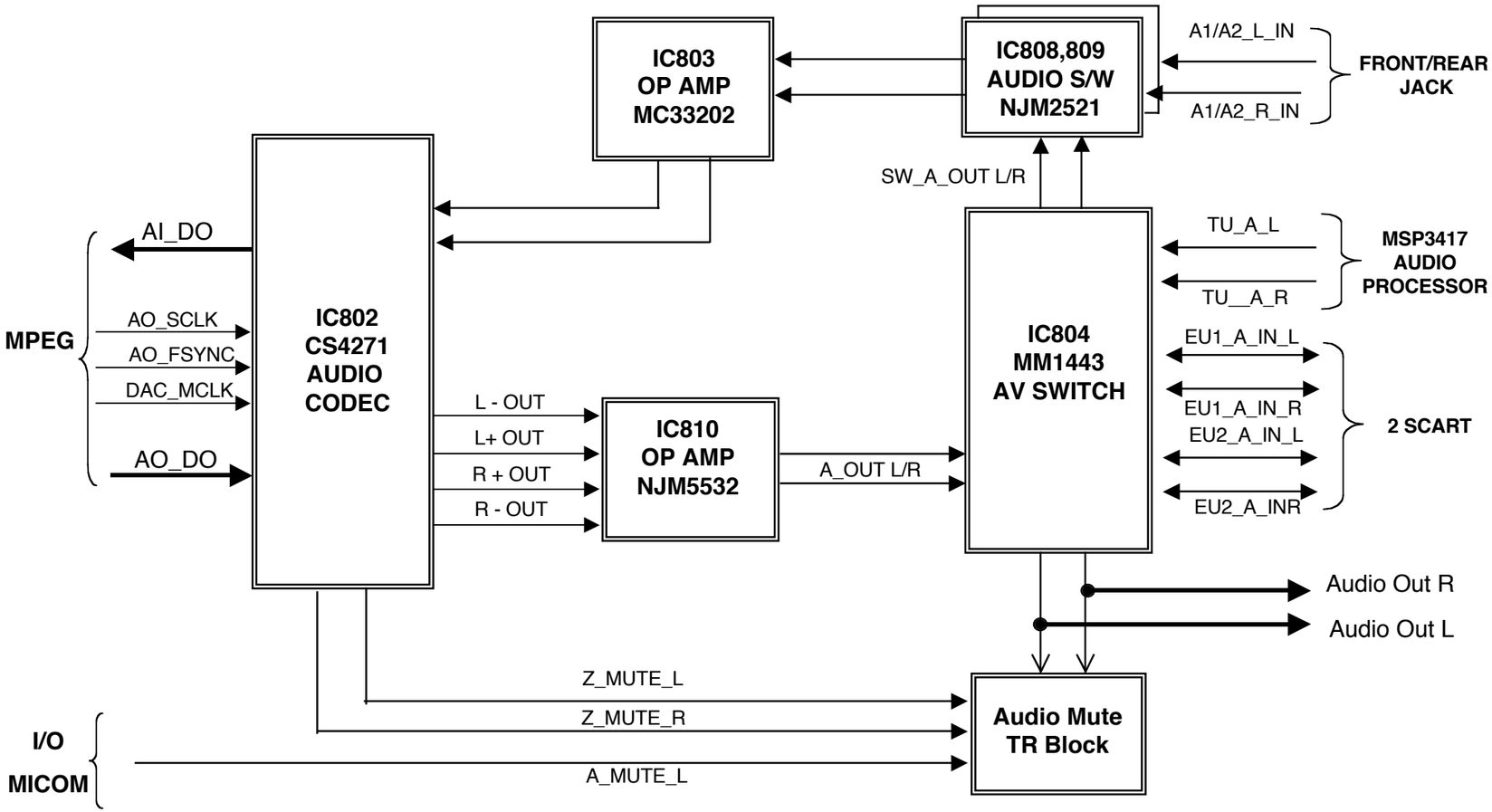
3. Video In/Out Block Diagram



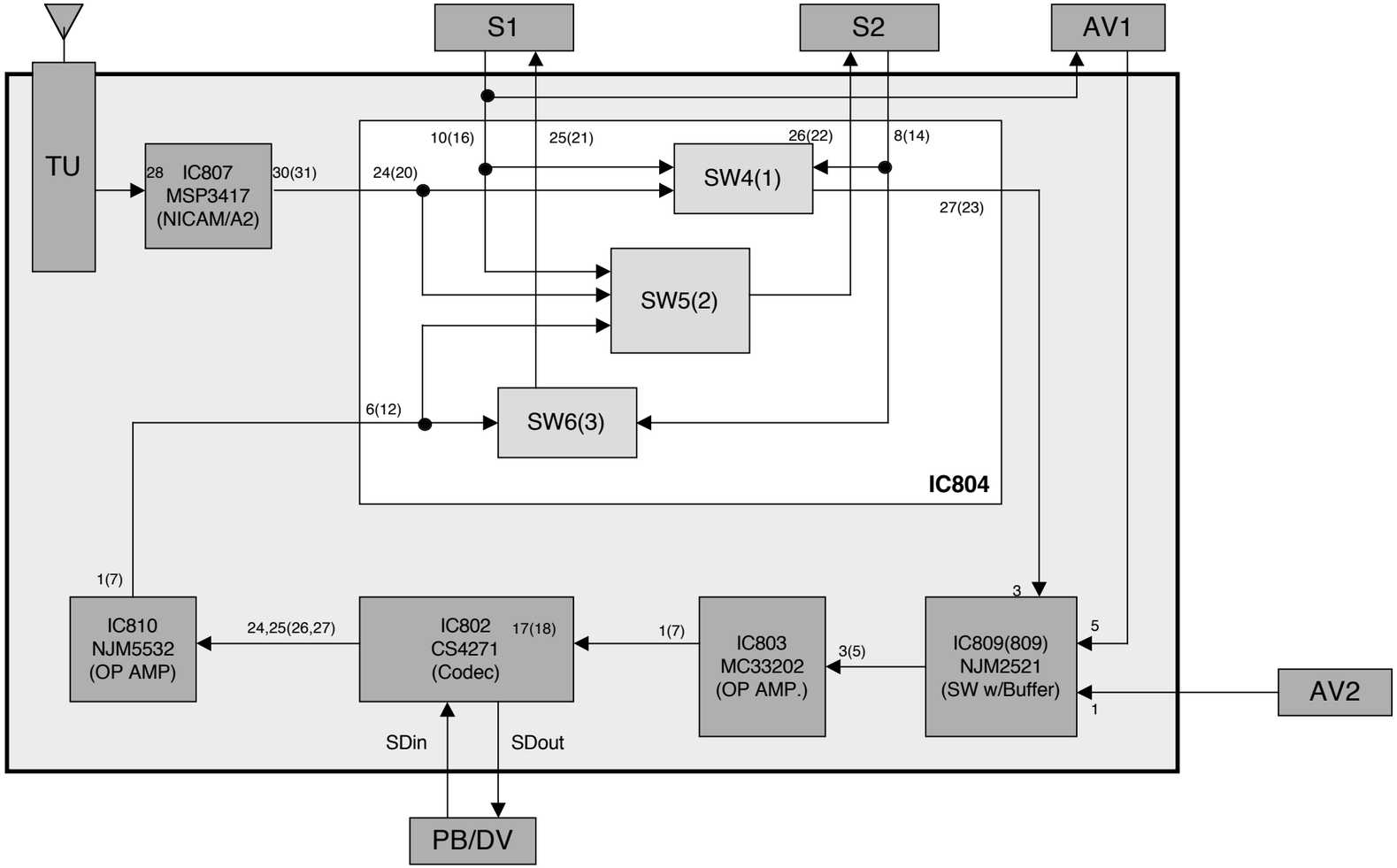
4. Video SW Path Block Diagram



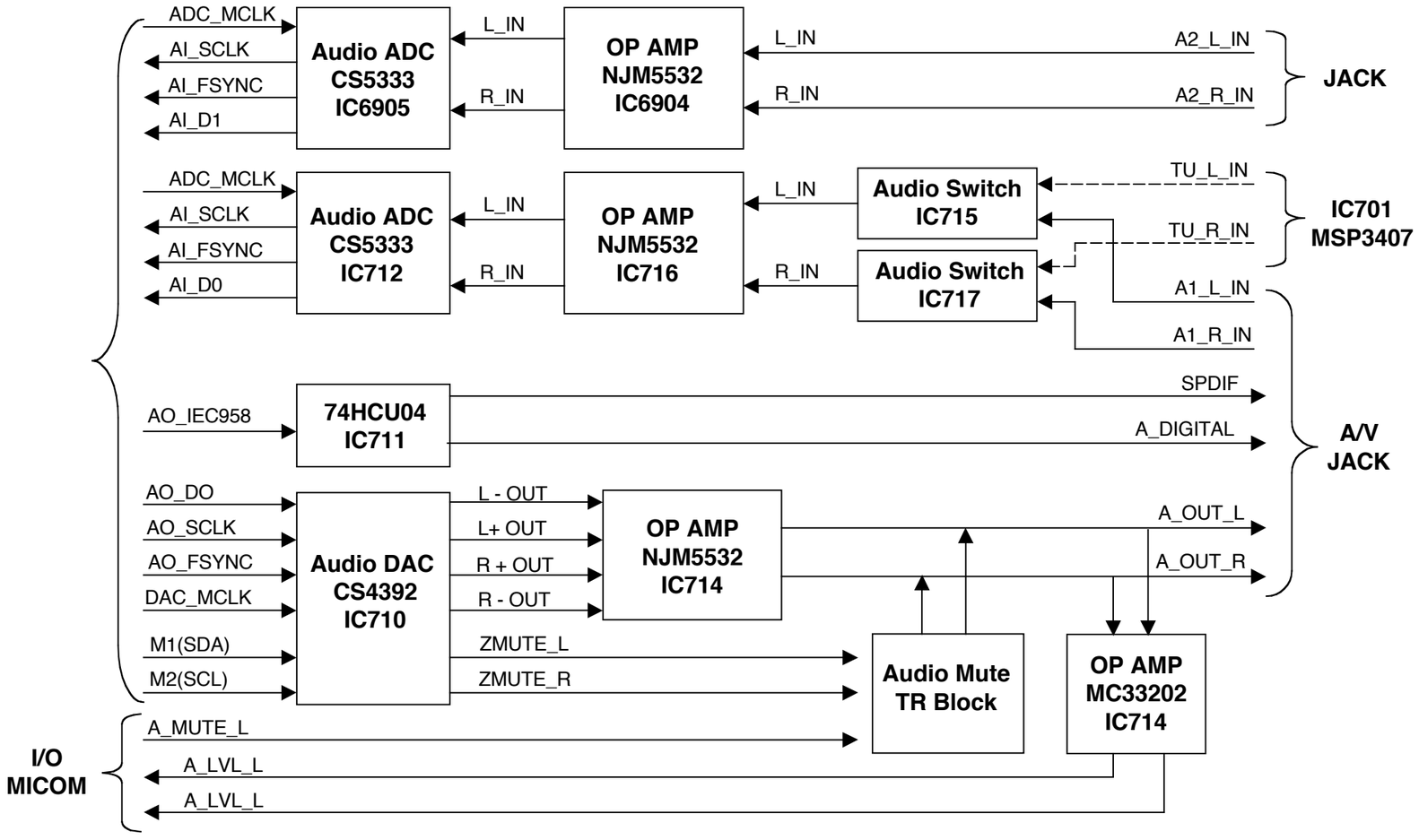
5. Audio Block Diagram



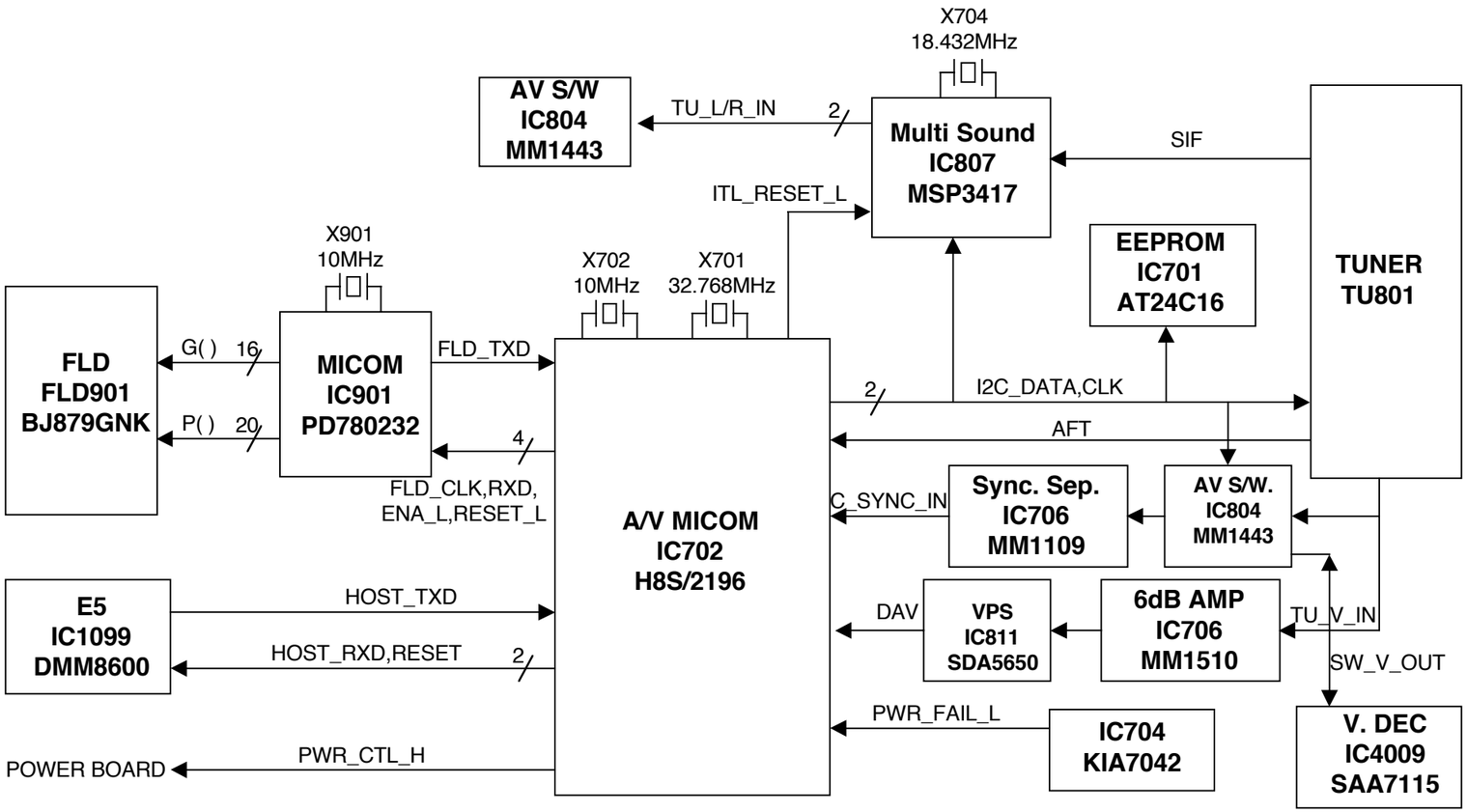
6. Audio SW Path Block Diagram



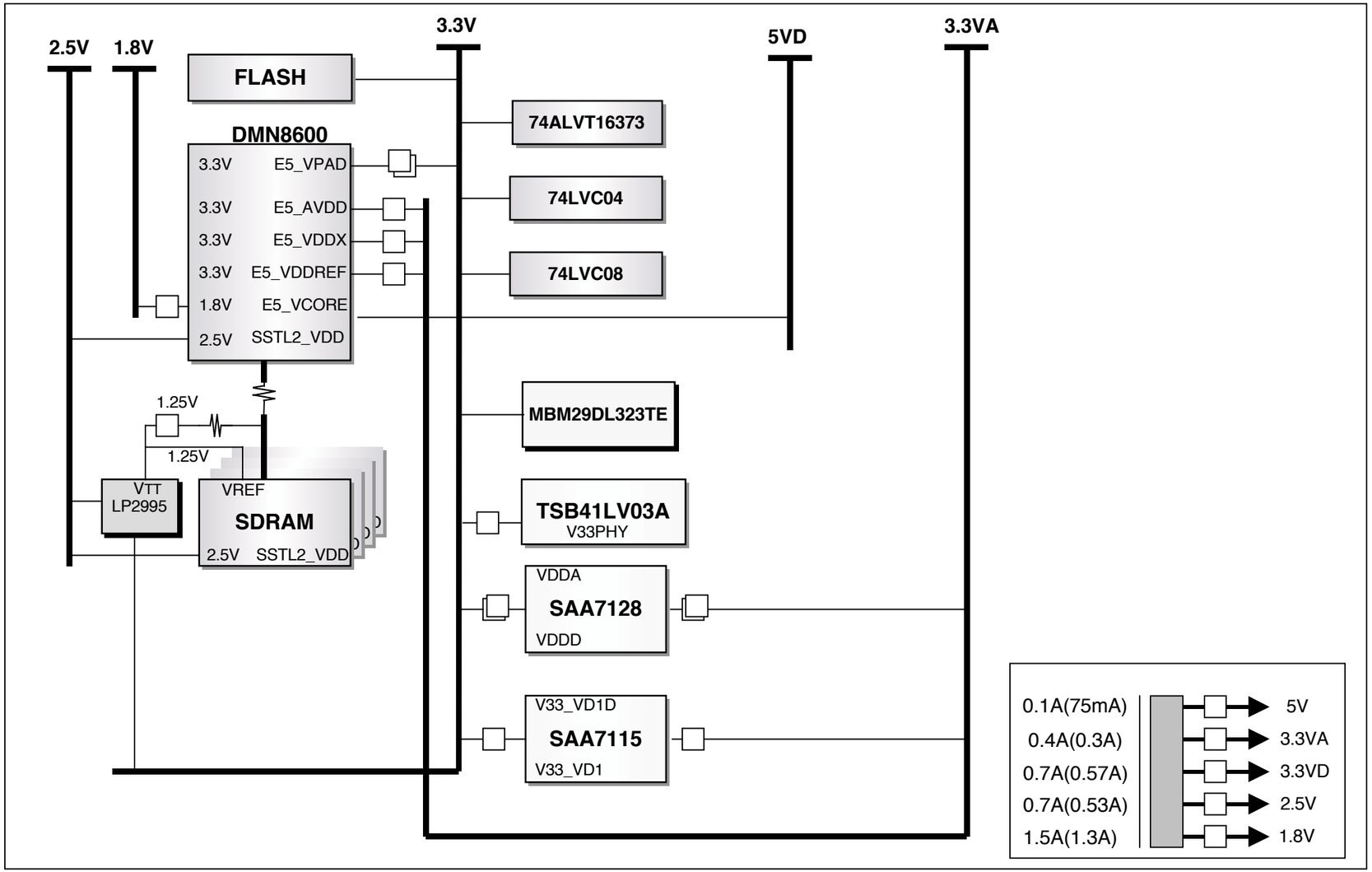
7. Audio In/Out Block Diagram



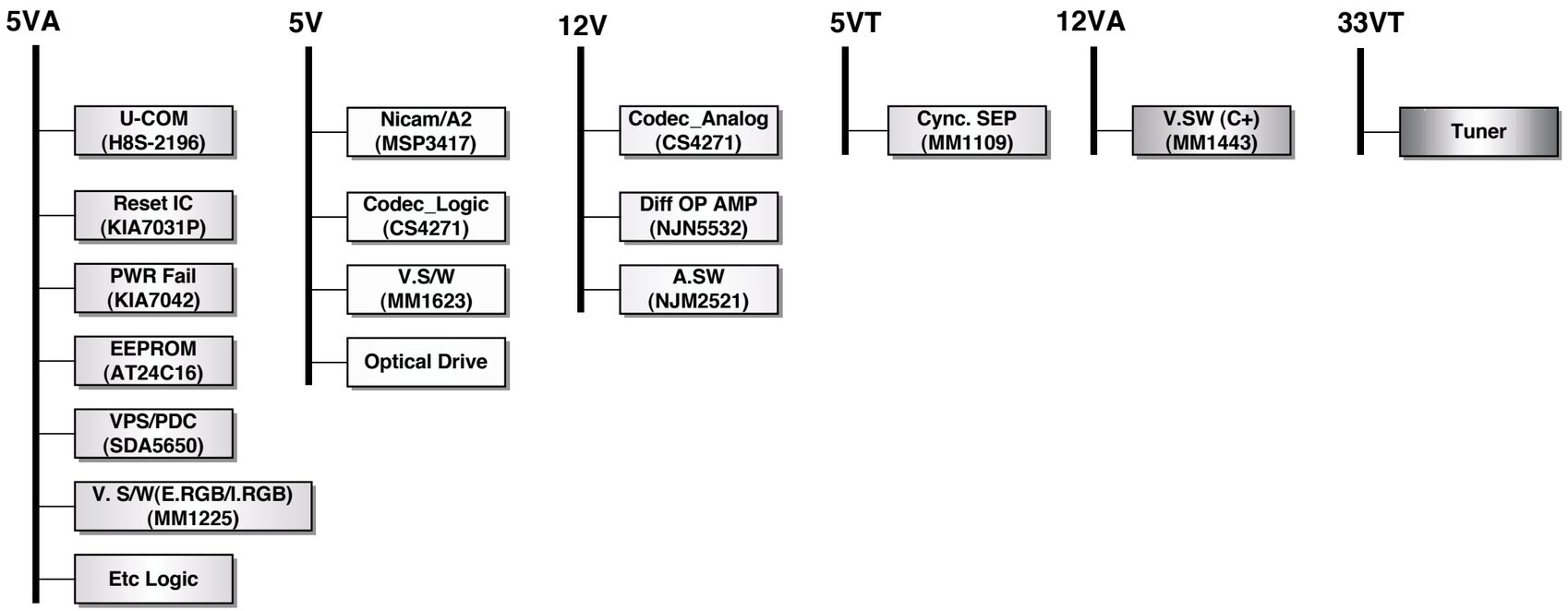
8. FLD/μ-COM/Tuner Block Diagram



9. Power : Main Board Block Diagram

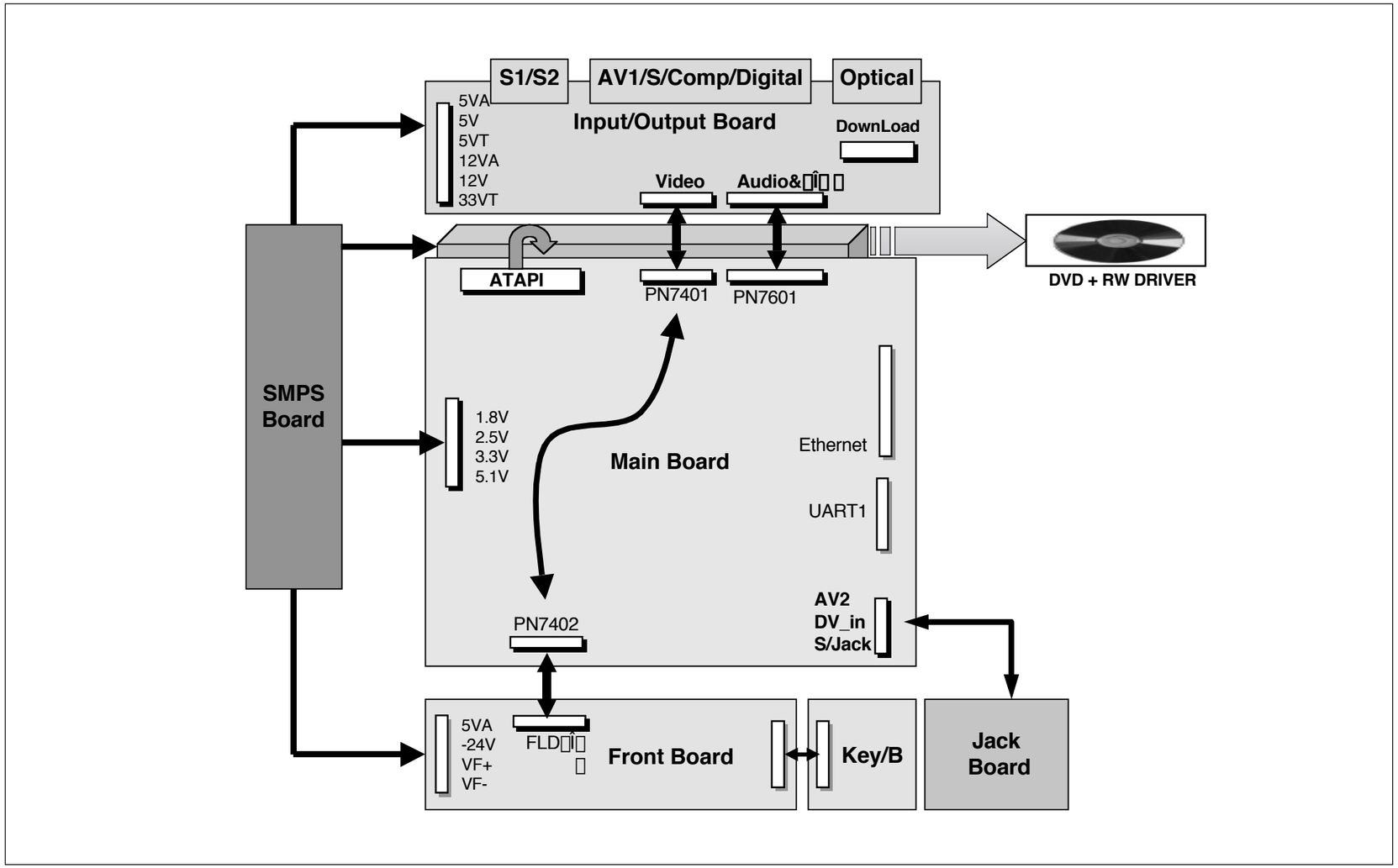


10. Power : I/O Board Block Diagram

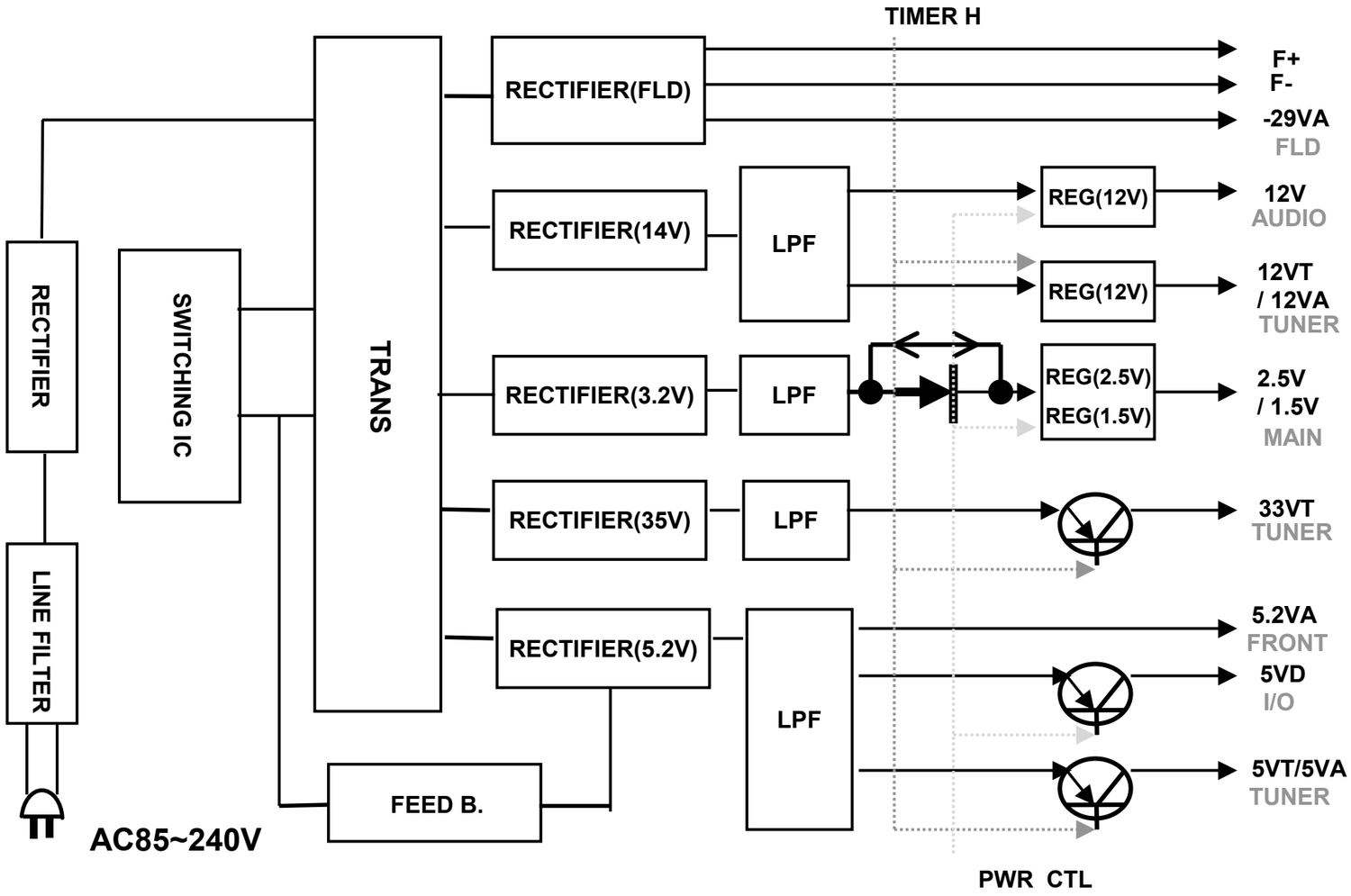


I/O Ucom PWR CTL SIGNAL	
PWR_CTL_H	5V, 12V CONTROL
TIMER_H	5VT, 33VT

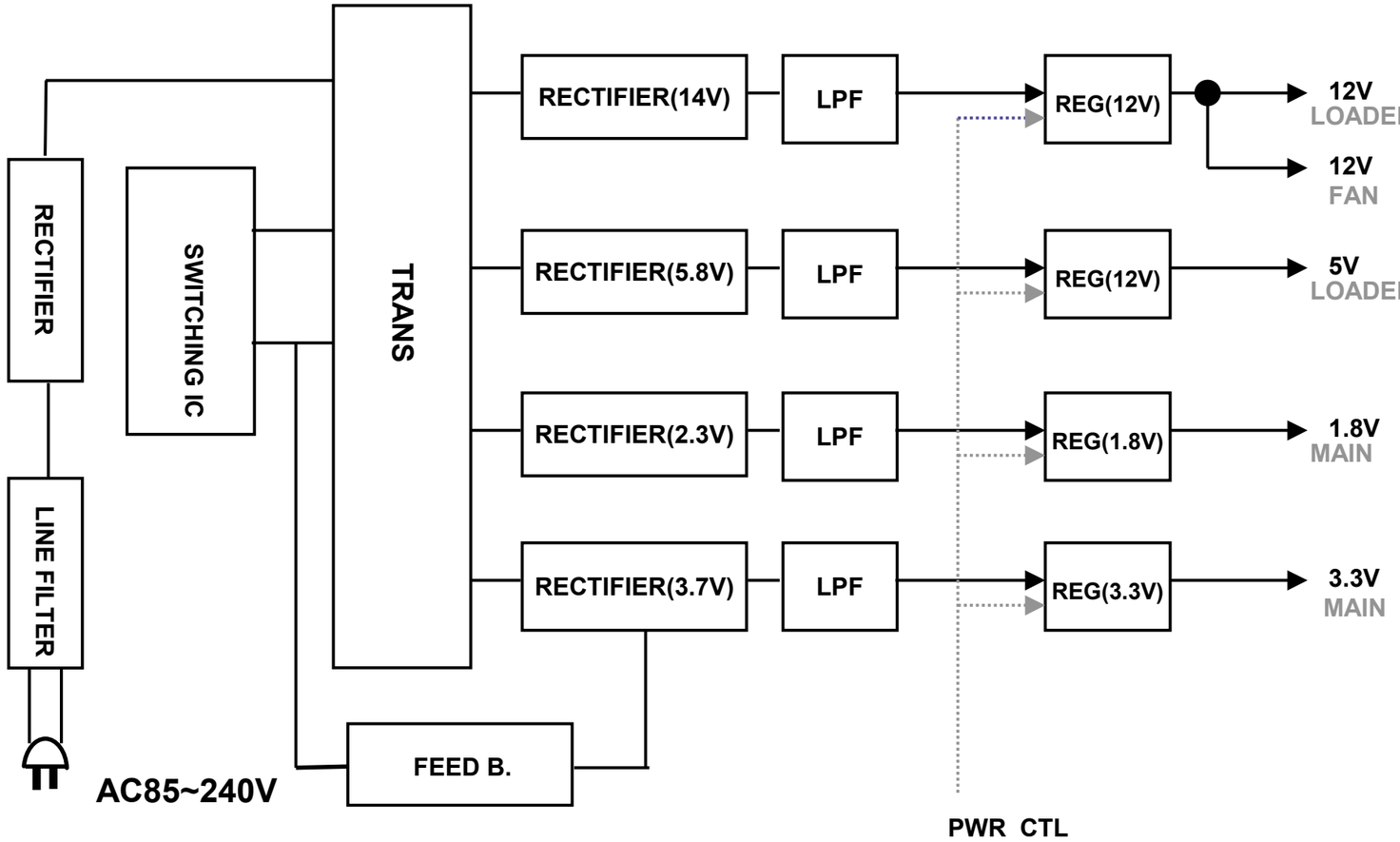
11. Power : Layout Connection Block Diagram



12. SMPS Block Diagram (PART 1)

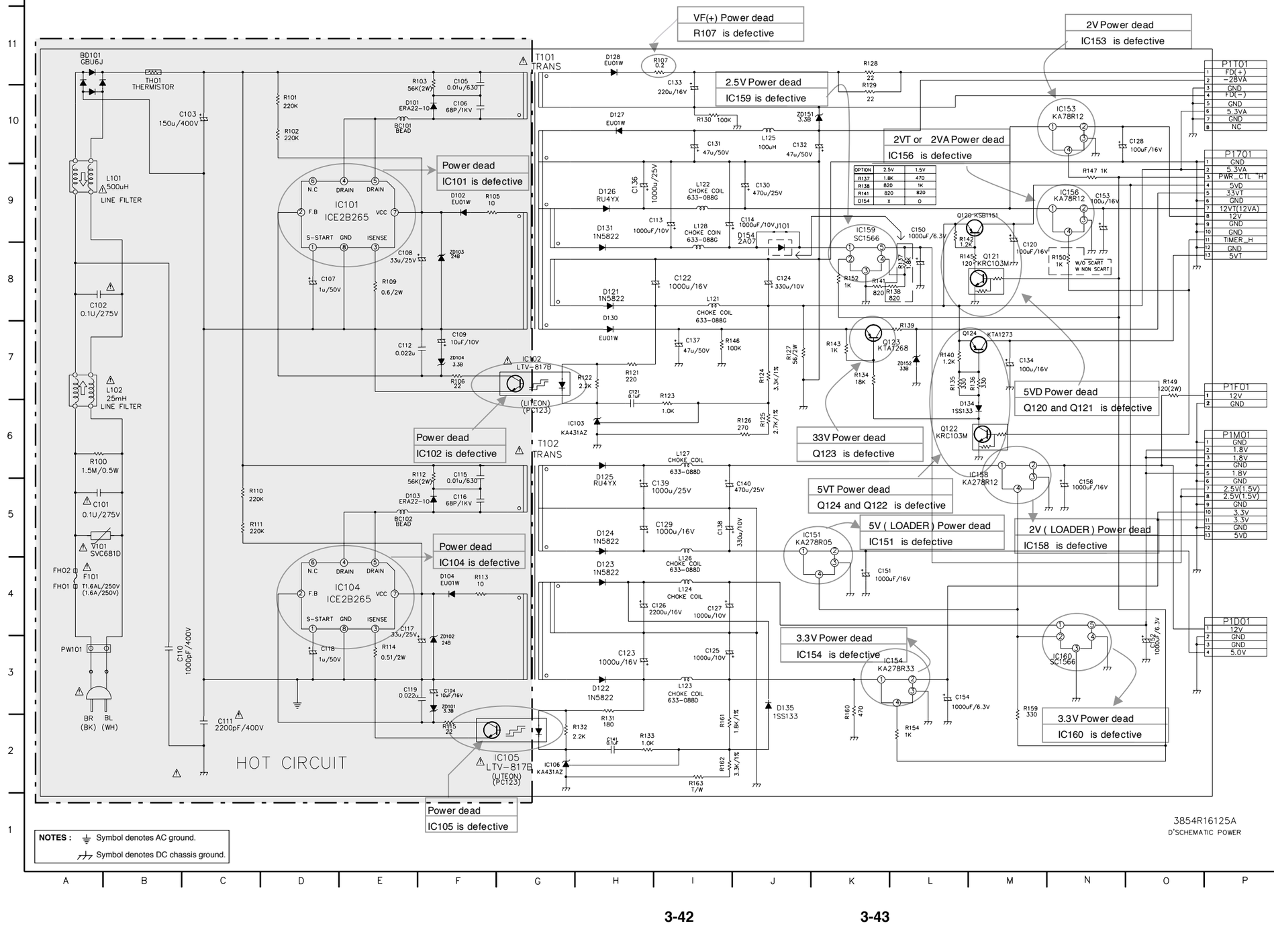


13. SMPS Block Diagram (PART 2)

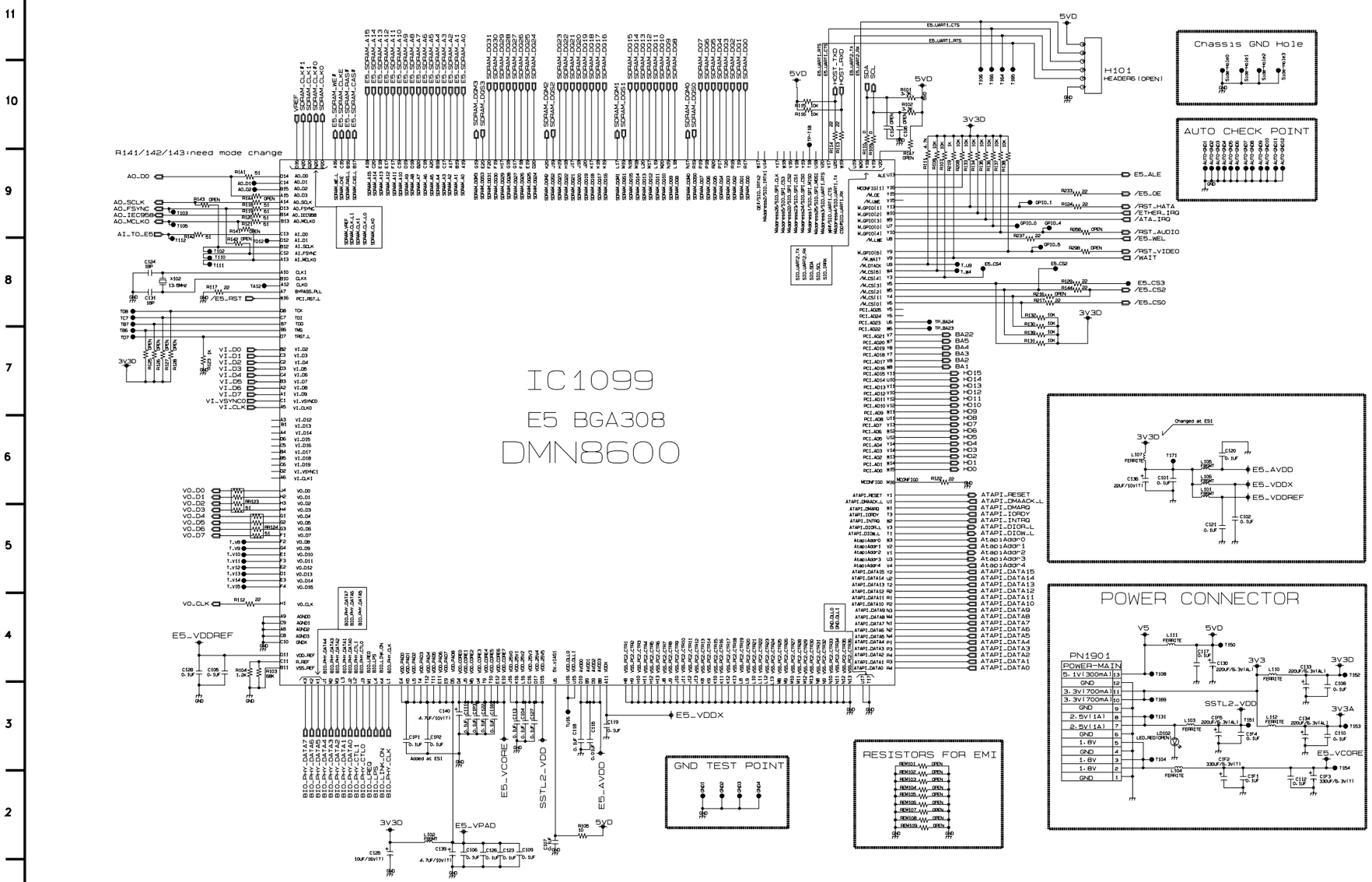


CIRCUIT DIAGRAMS

1. POWER CIRCUIT DIAGRAM

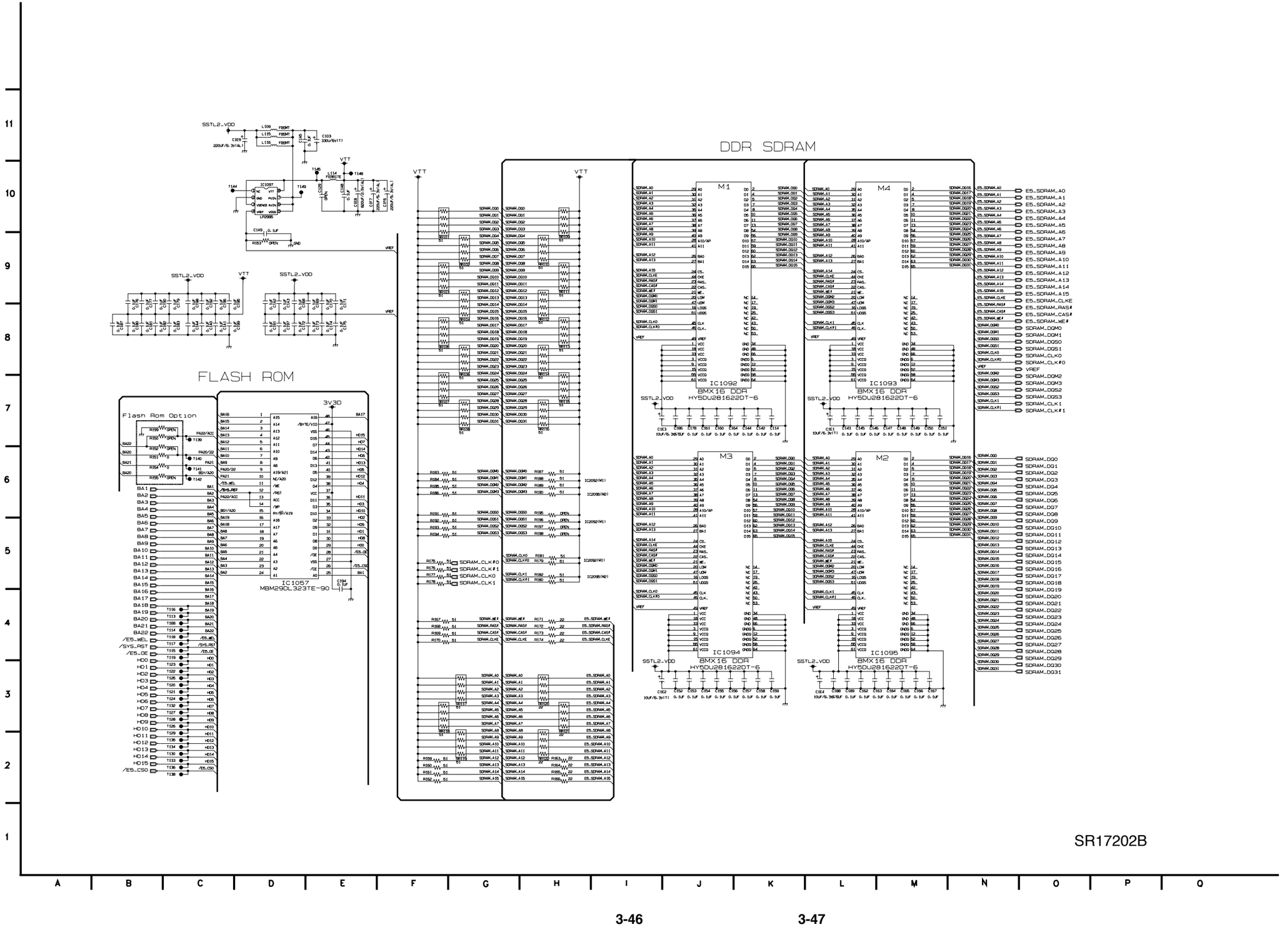


2. E5 BGA, POWER, UART2 CIRCUIT DIAGRAM

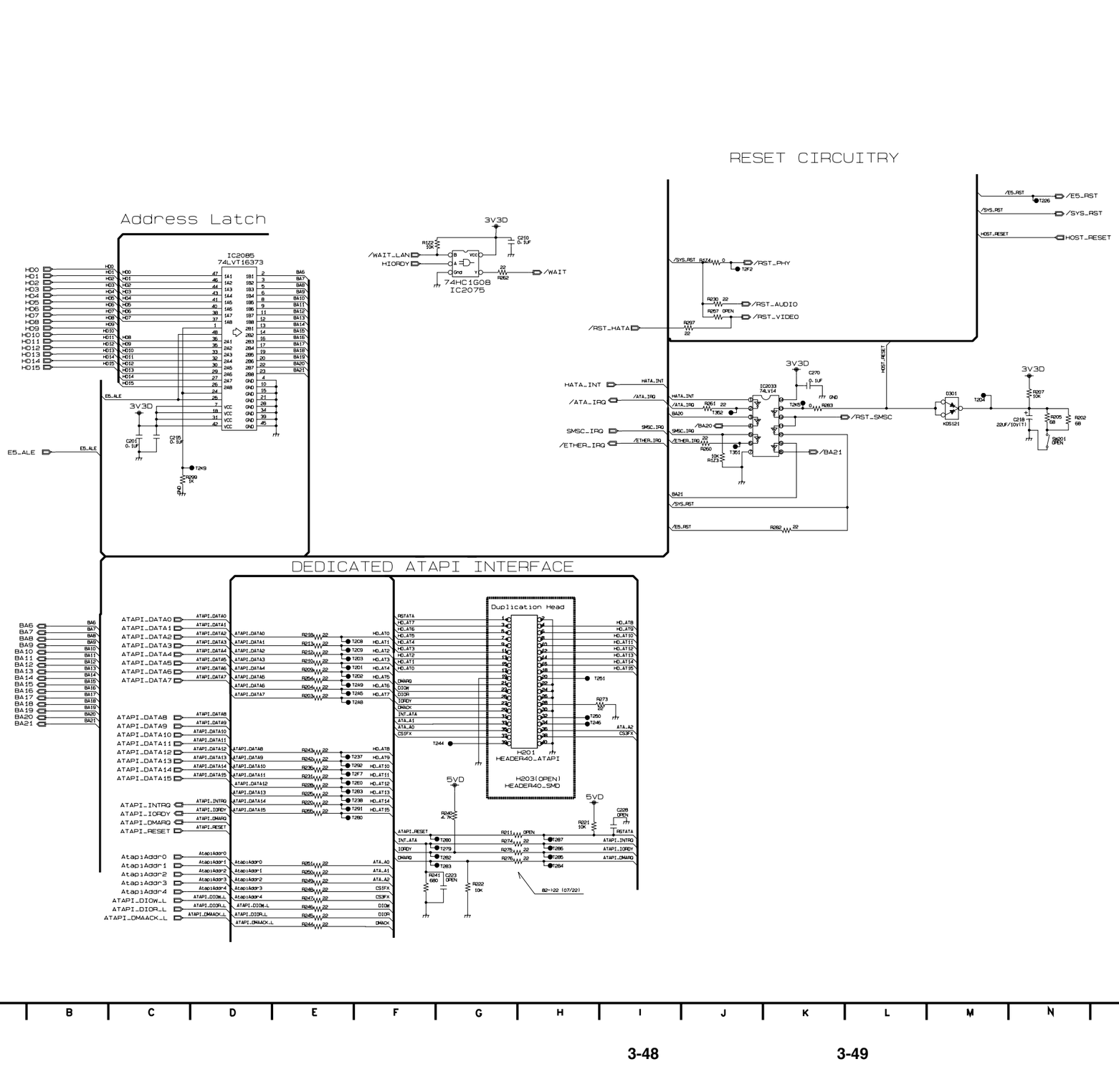


SR17201B

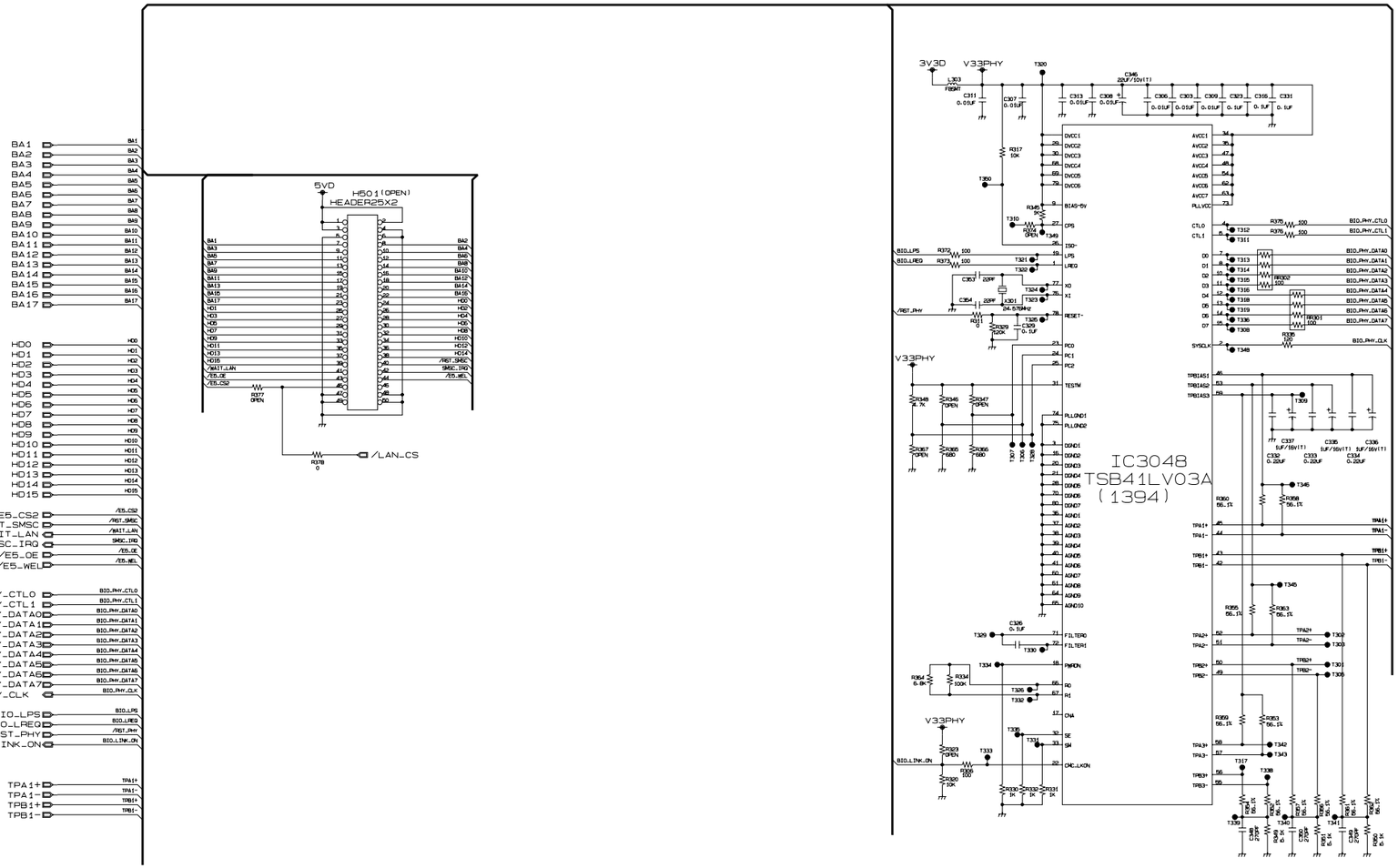
3. DDR SDRAM, FLASH CIRCUIT DIAGRAM



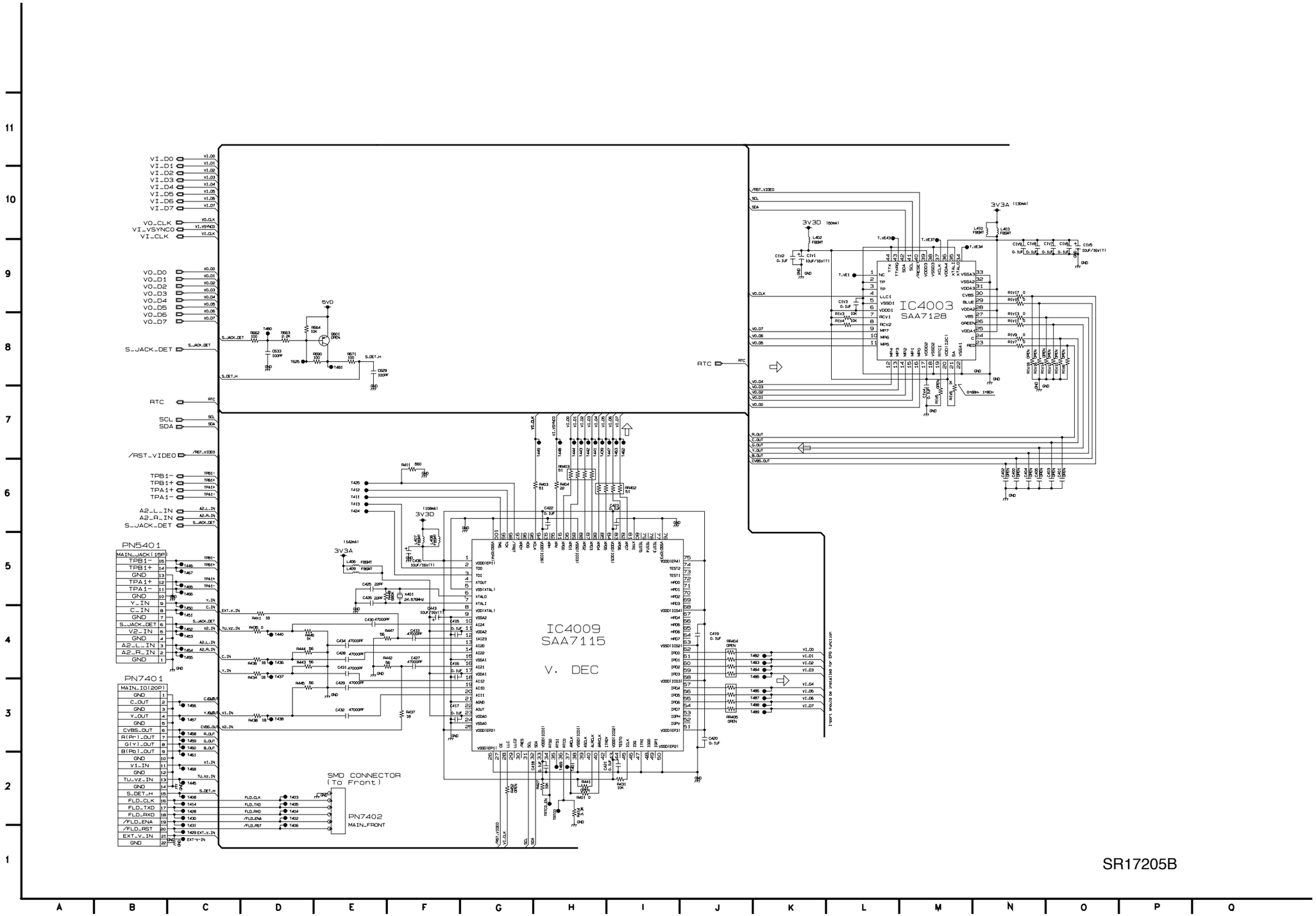
4. RST, CONTROL/STATUS REG, ATAPI, HOST CPLD, LATCH CIRCUIT DIAGRAM



5. 1394, ETHERNET CONNECTOR CIRCUIT DIAGRAM

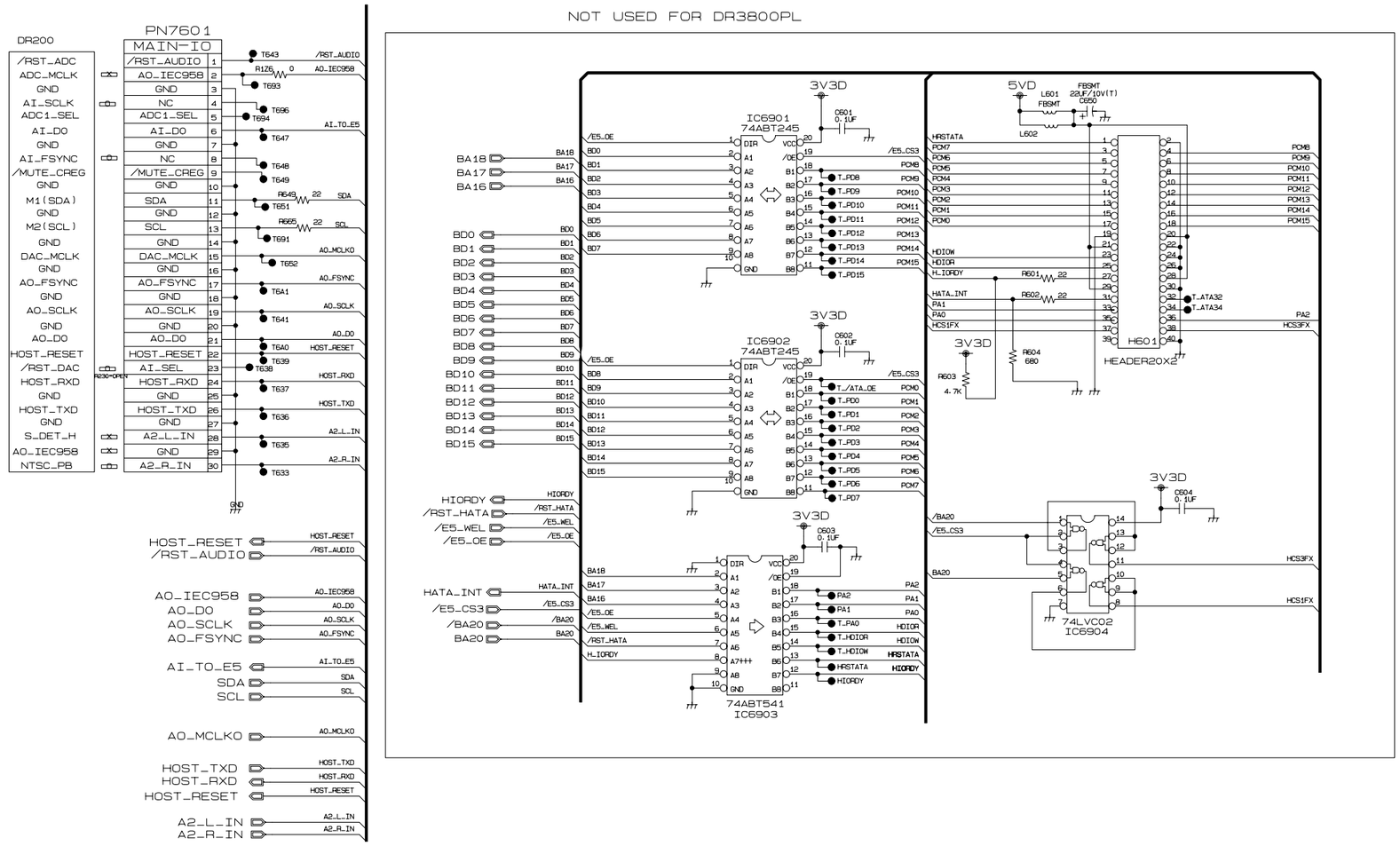


6. VIDEO IN/OUT CIRCUIT DIAGRAM



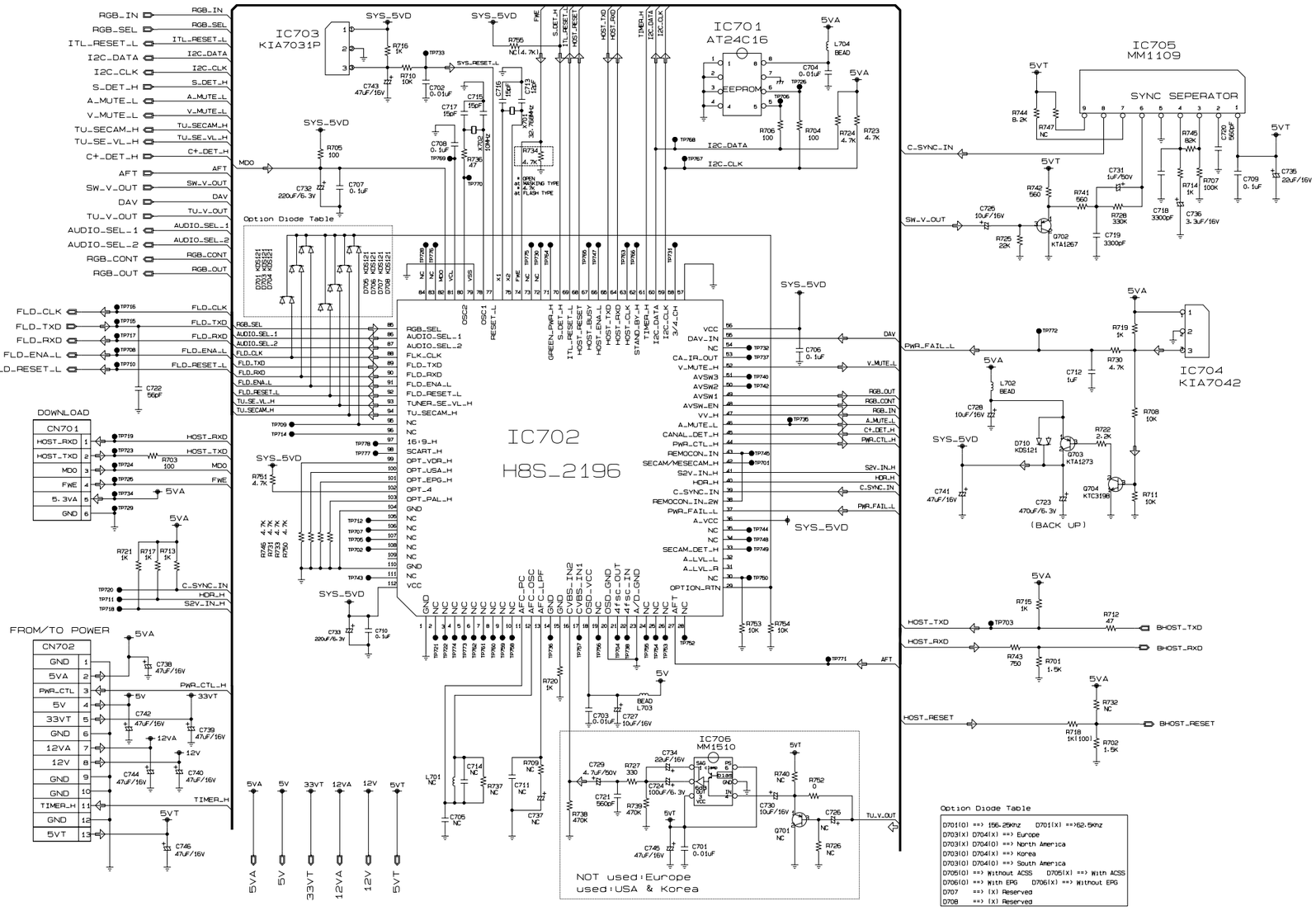
SR17205B

7. AUDIO IN/OUT NON-STD VIDEO CIRCUIT DIAGRAM

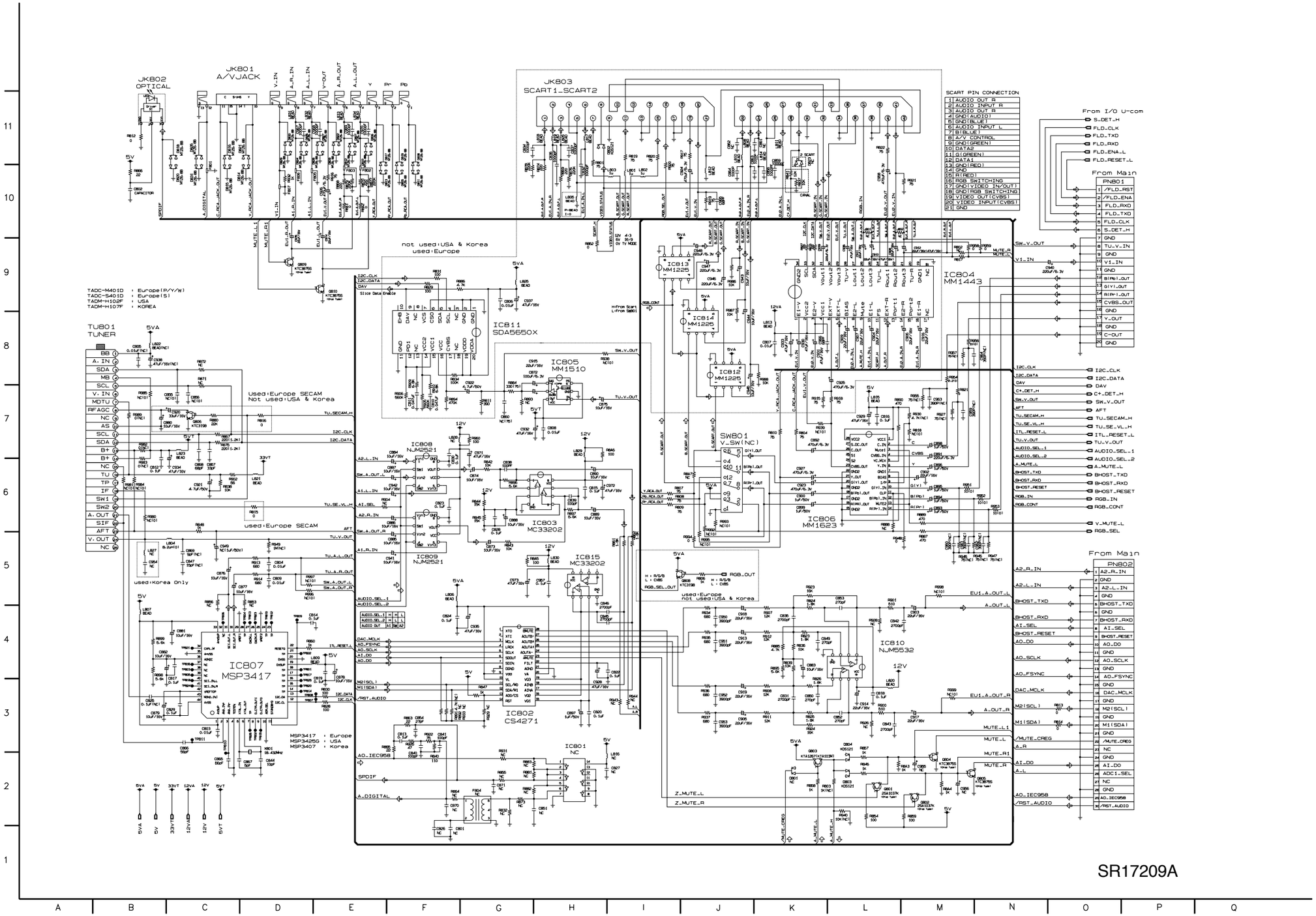


SR17206A

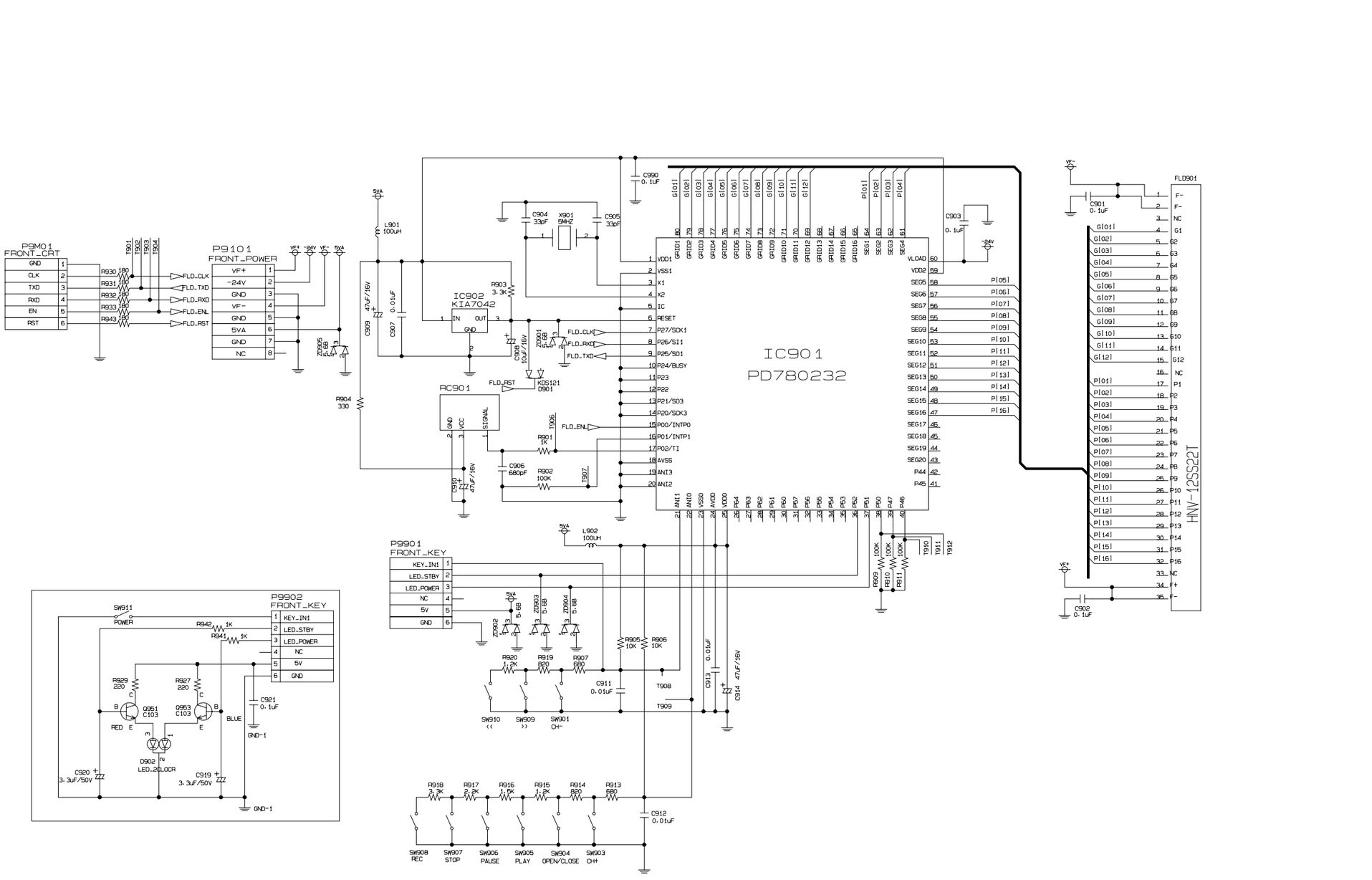
8. I/O MICOM CIRCUIT DIAGRAM



9. I/O JACK CIRCUIT DIAGRAM

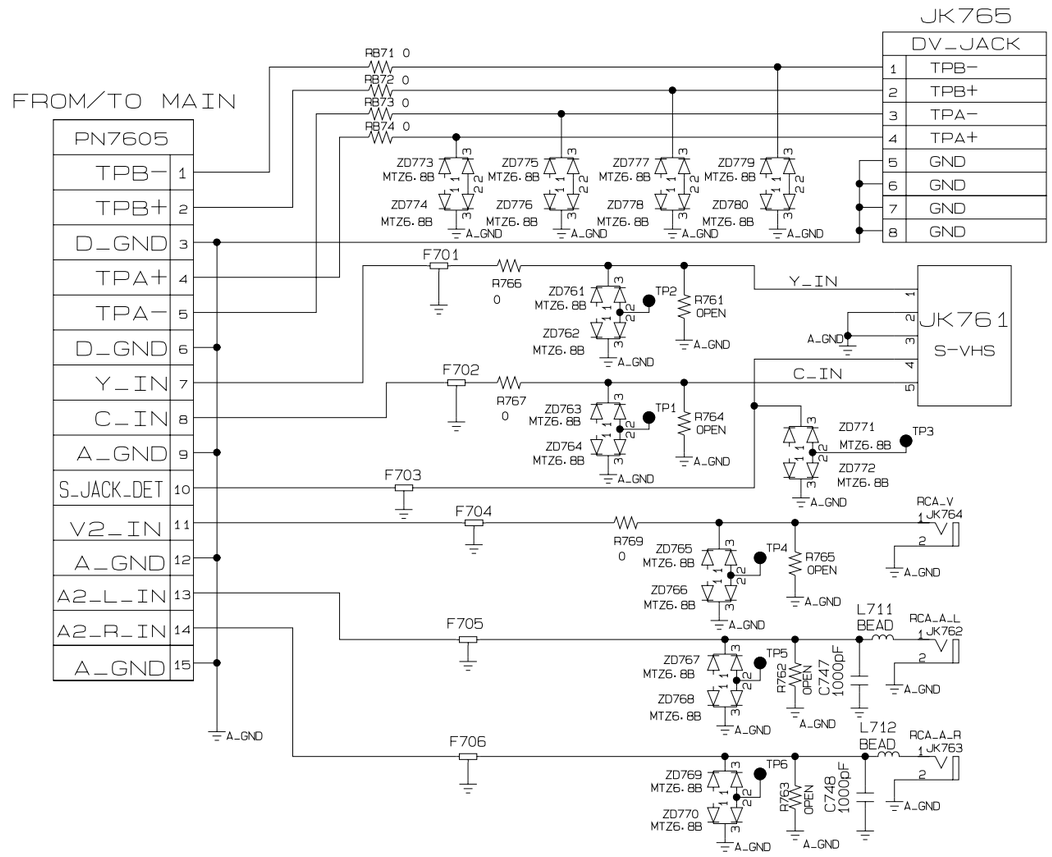


10. FRONT CIRCUIT DIAGRAM



SR17210A

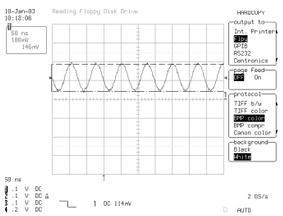
11. FRONT JACK CIRCUIT DIAGRAM



SR17207A

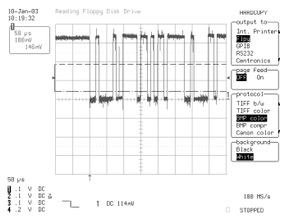
• WAVEFORMS

①



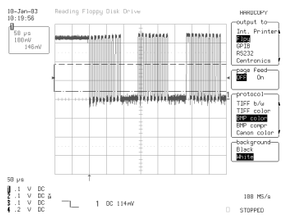
X102
13.5MHz

②



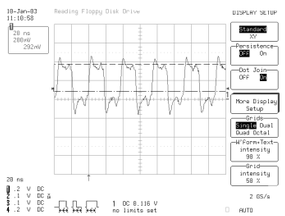
IC4009
PIN32
SDA

③



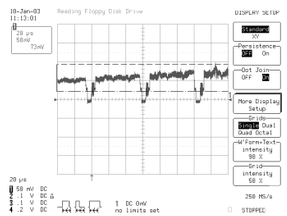
IC4009
PIN31
SCL

⑬



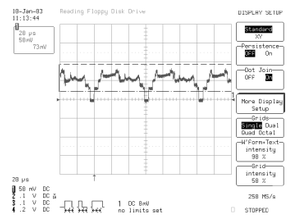
IC4002
PIN22
/PIXCLKIX

⑭



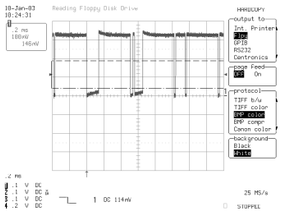
PN7401
PIN6
CVBS_OUT

⑮



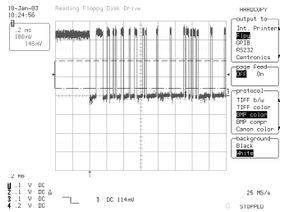
PN7401
PIN4
Y_OUT

④



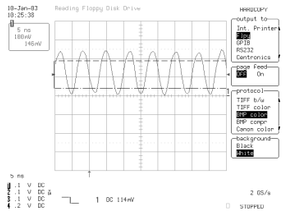
PN7601
PIN24
HOST_RXD

⑤



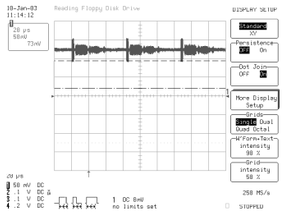
PN7601
PIN26
HOST_TXD

⑥



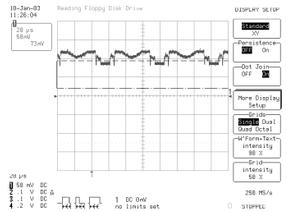
IC1094
PIN45
SDRAM_SCLK0

⑯



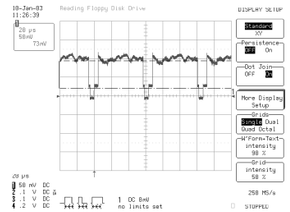
PN7401
PIN2
C_OUT

⑰



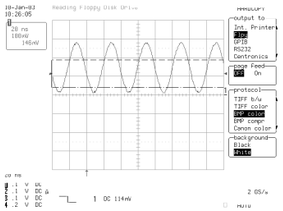
PN7401
PIN7
R_Pr_OUT

⑱



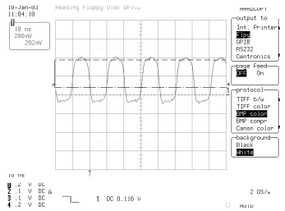
PN7401
PIN8
G_Y_OUT

⑦



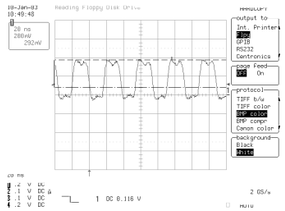
IC3048
PIN77
24.576MHz

⑧



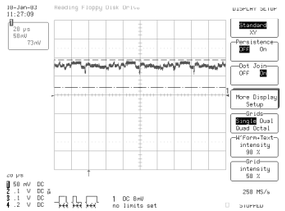
IC3048
PIN2
BIO_PHY_CLK

⑨



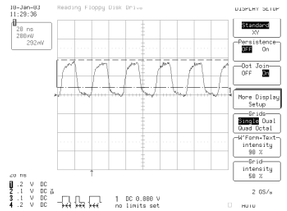
IC4009
PIN94
VI_CLK0

⑲



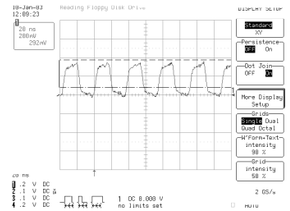
PN7401
PIN9
B_Pb_OUT

⑳



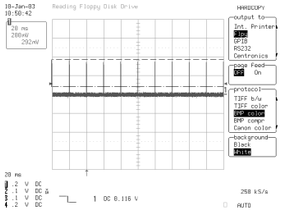
IC4003
PIN4
VO_CLK

㉑



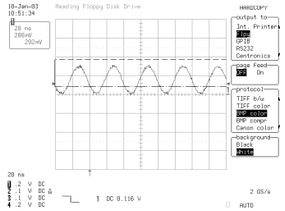
IC4002
PIN37
VO_CLK

⑩



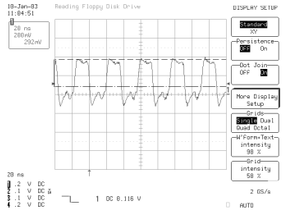
IC4009
PIN91
VI_SYNC0

⑪



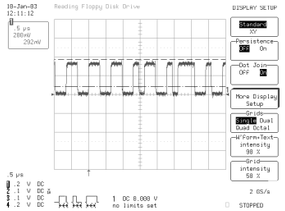
IC4009
PIN6
24.576MHz

⑫



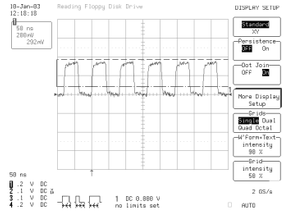
IC6902
PIN76
VI_CLK

㉒



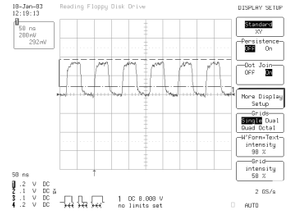
PN7601
PIN29
AO_IEC958

㉓



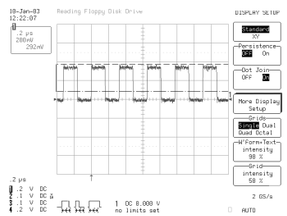
PN7601
PIN2
ADC_MCLK

㉔



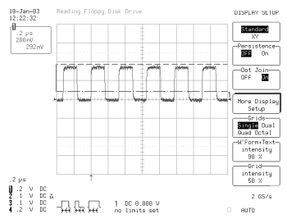
PN7601
PIN15
DAC_MCLK

㉕



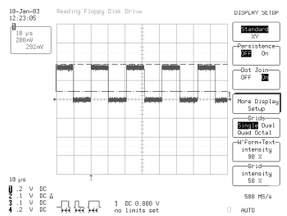
PN7601
PIN4
AI_SCLK

㉖



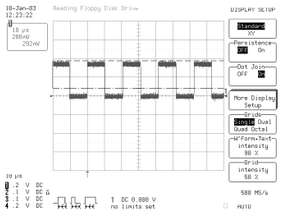
PN7601
PIN19
AO_SCLK

㉗



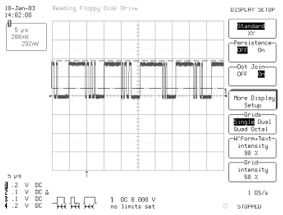
PN7601
PIN8
AI_FSYNC

㉘



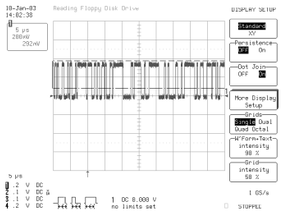
PN7601
PIN17
AO_FSYNC

㉙



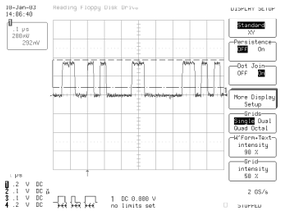
PN7601
PIN6
AI_D0

㉚



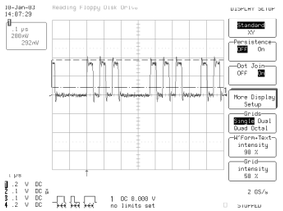
PN7601
PIN21
AO_D0

㉛



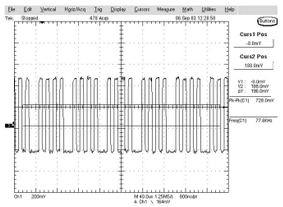
IC4002
PIN40
VO_D0

㉜



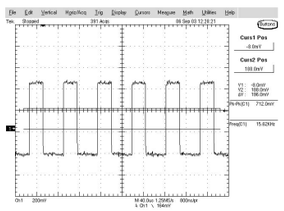
IC4009
PIN90
VI_D0

㉝



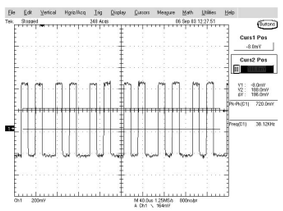
PN7401
PIN7
R_Pr_OUT

㉞



PN7401
PIN8
G_Y_OUT

㉟



PN7401
PIN9
B_Pb_OUT

• CIRCUIT VOLTAGE CHART

MODE / PIN NO.	EE	PB	REC
IC2066			
1	3.28	3.28	3.28
2	3.28	3.27	3.28
3	0	0	0
4	0	0	0
5	3.28	3.27	3.28
6	0	0	0
7	3.27	3.27	3.28
8	3.28	0	0
9	3.27	3.27	3.28
10	3.27	3.27	3.28
11	0	0	0
12	3.26	3.27	3.28
13	0	0	0
14	3.28	3.27	3.28
15	3.27	3.27	3.28
16	0	0	0
17	3.27	3.27	3.28
18	0	0	0
19	3.26	3.27	3.28
20	3.27	3.27	3.28
21	3.27	3.27	3.28
22	0	0	0
23	3.27	3.27	3.28
24	0	0	0
25	3.28	0	3.28
26	0.05	0.05	0.05
27	3.27	3.27	3.28
28	3.27	3.27	3.28
29	3.27	3.27	3.28
30	0	0	0
31	3.27	3.27	3.28
32	0.19	0	0.3
33	3.27	3.27	3.28
34	3.27	3.27	3.28
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0.02	0	0.42
40	3.28	3.27	3.28
41	3.27	3.27	3.28
42	0	0	0
43	0.04	0.04	0.04
44	0.04	0.04	0.04
IC4009			
1	3.27	3.26	3.27
2	1.85	0.3	0.3
3	3.09	2.35	2.34
4	1.3	0.13	0.02
5	0	0	0
6	1.63	1.55	1.56
7	1.53	1.53	1.52
8	3.3	3.26	3.27
9	0	0	0
10	0.4	0.61	0.6
11	3.3	3.25	3.26
12	0	0	0
13	1.05	1.06	1.05
14	0	0	0
15	0	0	0
16	0	0	0
17	3.3	3.25	3.26
18	1.03	1.03	1.03
19	1.04	1.04	1.04
20	0	0	0
21	0	0	0
22	0.025	0.02	0
23	3.26	3.25	3.26
24	0	0	0
25	3.27	0.01	3.27
26	0	0	0
27	3.3	3.28	3.28
28	1.66	1.06	1.66
29	0.9	0.05	0
30	3.3	3.26	3.27
31	3.18	3.1	2.8
32	3.2	3.2	3.2
33	3.3	3.26	3.27
34	3.3	3.26	3.27
35	3.3	3.27	3.28
36	2.97	2.96	3
37	1.27	1.28	1.28
38	0	0	0
39	1.64	1.64	1.64
40	1.6	1.61	1.6
41	1.27	1.28	1.28
42	2.36	2.35	2.35
43	3.3	3.27	3.27
44	0	0.08	0
45	1.73	1.72	1.72
46	0	0	0
47	0	0	0
48	0	0	0
49	0	0	0
50	0	0	0
51	3.3	3.27	3.27
52	0	0	0
53	0	0	0
54	0	0	0
55	0	0	0
56	0	0	0
57	0	0	0
58	3.27	3.27	3.27
59	0	0.03	0.03
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0.08	0.06	0
65	0.09	0.06	0
66	0.1	0.08	0
67	0.1	0.03	0
68	3.3	3.27	3.27
69	0.08	0.08	0
70	0.05	0.05	0
71	0.05	0.04	0
72	0.05	0.04	0
73	2.35	2.35	2.35
74	2.7	0.03	0
75	3.3	0.03	3.27
76	0	0	0
77	2.35	2.35	2.34
78	0	0.02	0
79	2.35	2.34	2.34
80	0	0	0
81	1.98	0.97	2
82	0.42	0.42	0.43
83	3.3	3.27	3.27
84	3.3	3.44	0.45
85	0.71	0.02	0.7
86	0.45	0.45	0.46
87	0.46	0.46	0
88	0	0	0
89	0.47	0.47	0.47
90	0.89	0.89	0
91	0	0.02	0
92	2.7	2.71	2.7
93	3.3	3.27	3.27
94	1.7	1.7	1.7
95	2.05	0	2.05
96	0	0	0
97	2.35	2.34	2.35
98	2.35	2.34	2.34
99	2.35	2.34	2.34
100	0	0	0
IC4003			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	3.3	3.26	3.27
7	0	0	0
8	3.3	3.27	3.27
9	2.38	2.35	2.37
10	0.2	0.5	0
11	0.18	0.5	0
12	3.3	3.27	3.27
13	0	0	0
14	3.3	3.27	3.28
15	3.2	3.2	3.2
16	0	0.62	0
17	3.27	3.23	3.27
18	3.23	3.23	3.24
19	1.56	1.56	1.56
20	1.6	1.58	1.58
21	0.4	1.25	0.43
22	0.4	1.25	0.43
23	0.42	1.25	0.34
24	1.35	1.25	0.95
25	3.27	2.27	3.27
26	0	0	0
27	0	0	3.27
28	2.49	2.5	2.5
29	3.25	3.26	3.27
30	2.9	0.6	0
31	1.58	0.59	0
32	3.3	0.42	0
33	0	0	0
34	0	0	0
35	0.62	0.57	0.58
36	1.6	1.58	1.58
37	0.06	0.02	0
38	0.06	0	0
39	0.02	0	0
40	0.02	0	3.15
41	1.23	1.24	1.24
42	0.47	0.5	0.47
43	3.3	3.26	3.27
44	3.3	0	3.27
45	0.47	0.5	0.47
46	1.22	1.25	1.24
47	0.69	0.71	0.7
48	0	0	0
49	0	0	0
50	3	3.25	3.26
51	0	0	0
52	3.3	3.26	3.27
53	3.25	3.26	3.27
54	0	0	0
55	2.38	2.38	2.38
56	2.38	2.37	2.38
57	0	0	0
58	3.28	3.27	3.27
59	0	0	0
60	0.04	0	0.1
61	0.78	1.55	0.8
62	0.42	0.89	0.42
63	0.4	0.89	0.4
64	1.64	1.27	0.96
IC2075			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	3.27	3.28	3.28
9	2.94	2.95	2.95
10	3.27	3.28	3.28
11	3.28	3.28	3.28
12	2.95	2.95	2.95
13	3.27	3.28	3.28
14	3.28	3.28	3.28
IC1057			
1	0.03	0.03	0.03
2	0.03	0.03	0.03
3	0.03	0.03	0.03
4	0.03	0.03	0.03
5	0.03	0.03	0.03
6	0.03	0.03	0.03
7	0.03	0.03	0.03
8	0.03	0.03	0.03
9	0.03	0.03	0.03
10	0.03	0.03	0.03
11	3.26	3.28	3.28
12	3.28	3.28	3.28
13	0	0	0
14	3.26	3.28	3.28
15	0	0	0
16	0.03	0.03	0.03
17	0.03	0.03	0.03
18	0.03	0.03	0.03
19	0.03	0.03	0.03
20	0.03	0.03	0.03
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	3.26	3.28	3.28
27	0	0	0
28	3.26	3.28	3.28
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	2.89	2.91	2.989
36	0	0	0
37	2.26	2.26	2.28
38	0	0	0
39	2.91	2.91	2.92
40	0	0	0
41	0	0	0
42	2.9	2.91	2.92
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	3.26	3.28	3.28
48	0.03	0.03	0.03
IC3048			
1	0	0	0
2	1.54	1.56	1.54
3	0	0	0
4	1.04	1.04	0
5	0	0	0
6	3.27	3.27	3.27
7	0.01	0.02	0
8	0.01	0.02	0
9	3.25	3.27	3.26
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	3.27	3.27	3.27
18	0	0	0
19	3.27	3.27	3.26
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	3.26	3.27	3.26
26	3.27	3.27	3.27
27	3.26	3.26	3.27
28	0	0	0
29	3.27	3.27	3.27
30	3.25	3.27	3.27
31	3.25	3.27	3.28
32	0	0	0
33	0	0	0
34	3.25	3.27	3.26
35	3.25	3.27	3.27
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	3.26	3.27	3.27
45	3.27	3.27	3.27
46	3.27	3.27	3.26
47	3.26	3.27	3.26
48	0	0	0
49	0	0	0
50	0	0	0
51	3.27	3.27	3.27
52	3.27	3.27	3.26
53	3.26	3.26	3.26
54	3.27	3.27	3.27
55	0	0	0
56	0	0	0
57	3.27	3.26	3.26
58	3.26	3.26	3.26
59	3.26	3.26	3.27
60	0	0	0
61	0	0	0
62	3.25	3.27	3.28
63	3.26	3.27	3.27
64	0	0	0
65	0	0	0
66	0	0	0
67	1.25	1.26	1.27
68	3.26	3.27	3.26
69	0	0	0
70	0	0	0
71	0	0	0
72	1.14	1.15	1.15
73	3.25	3.27	3.25
74	0	0	0
75	0	0	0
76	1.45	1.46	1.46
77	1.28	1.3	1.3
78	3.26	3.27	3.26
79	3.25	3.27	3.27
80	0	0	0
IC702			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	1.82	1.82	1.81
12	1.85	1.85	1.85
13	1.62	1.63	1.63
14	0.54	0.06	0.058
15	0	0	0
16	2.87	2.87	2.85
17	2.4	2.4	2.38
18	4.96	4.96	4.95
19	4.43	4.44	4.44
20	0	0	0
21	4.82	4.84	4.84
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0.1	0.11	0.1
27	0.1	0.11	0.11
28	0.1	0.1	0.1

MODE / PIN NO.	EE	PB	REC
29	0.1	0.1	0.1
30	0	0	0
31	2.52	2.52	2.51
32	2.5	2.52	2.52
33	0.1	0.1	0.1
34	0.1	0.1	0.1
35	0	0	0
36	4.96	4.94	4.97
37	4.75	4.75	4.75
38	0	0	0
39	4.97	4.96	4.96
40	0.3	0.32	0.32
41	0.32	0.32	0.32
42	0.04	0.04	0.04
43	0	0	0
44	5.1	5.08	5.1
45	0	0	0
46	5.2	5.18	5.2
47	0.02	0.03	0.03
48	2.5	2.5	2.5
49	0.09	0.09	0.09
50	2.56	2.55	2.55
51	2.56	2.55	2.55
52	0.03	0.02	0.02
53	0.03	0.02	0.02
54	0.12	0.1	0.1
55	0	0	0
56	5.1	5.08	5.08
57	0	0	0
58	0	0	0
59	5.11	5.1	5.1
60	5.1	5.1	5.1
61	5.03	5	5
62	0	0	0
63	2.49	2.47	2.47
64	3.84	3.82	3.82
65	0	0	0
66	0.33	0.32	0.31
67	0	0	0
68	4.8	4.9	4.9
69	0	0	0
70	5.2	5.22	5.22
71	0	0	0
72	0	0	0
73	5.1	5.1	5.1
74	0	0	0
75	1.45	1.47	1.47
76	1.43	1.43	1.45
77	5.21	5.21	5.21
78	2.5	2.52	2.52
79	0	0	0
80	0	0	0
81	3.42	3.4	3.41
82	5.08	5.11	5.1
83	0	0	0

MODE / PIN NO.	EE	PB	REC
84	0	0	0
85	0	0	0
86	2.53	2.54	2.52
87	2.53	2.54	2.52
88	4.94	4.96	4.96
89	4.04	4.06	4.06
90	2.18	2.2	2.2
91	4.27	4.3	4.3
92	5.06	5.1	5.1
93	0	0	0
94	0.02	0.02	0.02
95	0	0	0
96	0.31	0.31	0.31
97	0	0.02	0.02
98	0	0.02	0.02
99	2.06	2.06	2.06
100	0	0	0
101	0	0	0
102	0	0	0
103	0	0	0
104	0	0	0
105	0	0	0
106	0	0	0
107	0	0	0
108	0	0	0
109	0.03	0.06	0.06
110	0	0	0
111	0	0	0
112	5.1	5.2	5.2
IC705			
1	4.95	4.96	4.96
2	1.87	1.9	1.91
3	2.08	2.1	2.13
4	1.98	2	2
5	0	0	0
6	2.68	2.71	2.71
7	4.93	4.95	4.96
8	4.93	4.95	4.96
9	0.04	0.06	0.06
IC802			
1	2.57	2.57	2.57
2	2.56	2.55	2.56
3	0.00	1.64	1.64
4	1.63	1.62	1.62
5	1.63	1.63	1.63
6	0.00	1.30	1.30
7	1.48	1.62	1.55
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	5.01	5.01	5.01
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	3.26	3.25	3.26
15	2.52	2.52	2.52

MODE / PIN NO.	EE	PB	REC
16	2.53	2.53	2.53
17	2.53	2.53	2.53
18	2.52	2.52	2.52
19	2.53	2.53	2.53
20	5.07	5.06	5.07
21	0.00	0.00	0.00
22	4.99	4.99	4.99
23	5.06	5.05	5.06
24	2.57	2.57	2.57
25	2.46	2.46	2.46
26	2.47	2.47	2.47
27	2.58	2.57	2.58
28	5.03	5.02	5.02
IC804			
1	2.64	2.74	2.54
2	12.24	12.26	12.26
3	2.64	2.75	2.75
4	12.24	12.26	12.25
5	2.66	3.41	3.41
6	5.78	5.83	5.77
7	5.83	5.81	5.82
8	5.75	5.74	5.74
9	4.67	0.00	0.00
10	5.75	5.74	5.75
11	0.00	11.64	11.64
12	5.81	5.82	5.82
13	0.00	0.00	0.00
14	0.00	5.74	5.74
15	0.00	0.00	0.00
16	5.75	5.74	5.74
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	5.81	5.81	5.81
21	0.05	0.00	0.00
22	5.88	5.84	5.84
23	5.80	5.76	5.76
24	0.00	0.00	0.00
25	0.05	0.00	0.00
26	5.87	5.84	5.85
27	5.79	5.76	5.76
28	3.58	3.73	3.57
29	0.00	0.00	0.00
30	0.00	0.00	0.00
31	2.30	2.32	2.32
32	5.04	5.05	5.05
33	5.08	5.08	5.08
34	0.00	0.00	0.00
IC806			
1	5.13	5.07	5.08
2	2.41	0.00	2.41
3	4.95	0.00	4.95
4	0.00	1.50	1.45
5	0.00	0.00	0.00
6	0.00	0.00	0.00

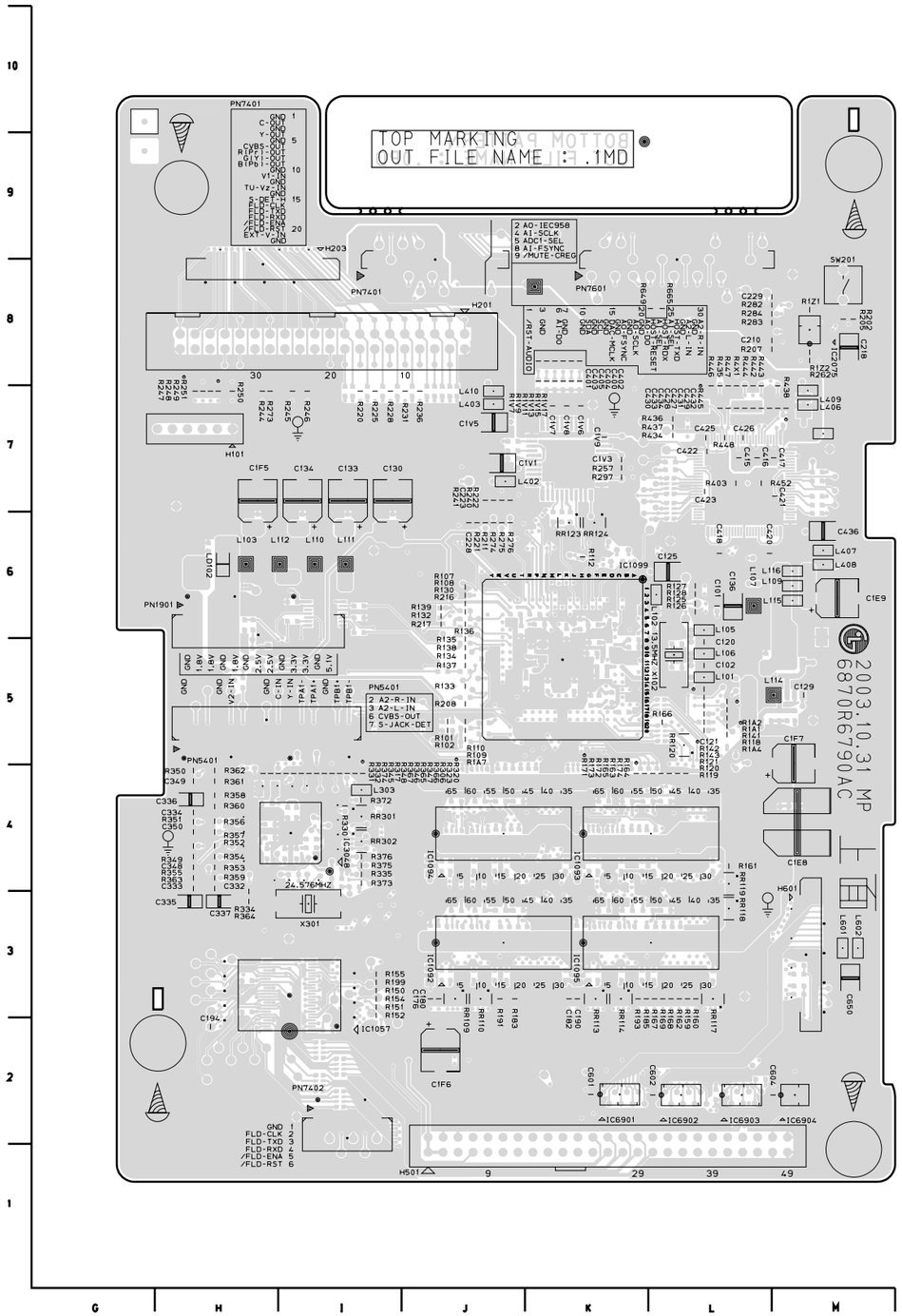
MODE / PIN NO.	EE	PB	REC
7	0.00	0.00	0.00
8	2.46	0.00	2.45
9	0.00	0.00	0.00
10	1.13	1.25	1.24
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	4.95	4.95	4.95
14	2.41	2.40	2.40
15	0.00	0.00	0.00
16	2.47	2.47	2.47
17	0.00	0.00	0.00
18	2.44	2.44	2.44
19	0.00	0.00	0.00
20	0.00	1.42	1.32
21	0.00	2.08	1.89
22	0.00	0.00	0.00
23	1.16	1.99	1.85
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	2.49	2.48	2.48
27	0.00	0.00	0.00
28	5.07	5.07	5.07
IC807			
1	5.08	5.07	5.08
2	1.52	1.52	1.52
3	1.52	1.52	1.52
4	0.00	0.00	0.00
5	2.39	2.42	2.40
6	2.18	2.18	2.18
7	0.40	0.23	0.24
8	0.39	0.00	0.00
9	0.39	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	5.07	5.08	5.08
13	5.04	5.06	5.05
14	0.41	0.24	0.28
15	0.38	0.23	0.25
16	0.41	0.00	0.00
17	0.36	0.23	0.29
18	0.44	0.24	0.44
19	5.08	5.08	5.08
20	0.00	0.00	0.00
21	0.00	0.25	0.24
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	2.55	2.55	2.55
31	2.56	2.56	2.53
32	0.00	0.00	0.00

MODE / PIN NO.	EE	PB	REC
33	5.08	5.08	5.08
34	4.96	4.96	4.96
35	0.00	0.00	0.00
36	2.55	2.55	2.54
37	0.00	0.00	0.00
38	0.00	0.00	0.00
39	0.00	0.00	0.00
40	2.54	2.55	2.53
41	0.00	0.00	0.00
42	2.61	2.54	2.60
43	0.00	0.00	0.00
44	0.00	0.00	0.00
IC808			
1	8.16	8.16	8.16
2	5.12	5.12	5.12
3	7.96	7.94	7.94
4	0.00	0.00	0.00
5	8.16	8.16	8.16
6	12.09	12.10	12.10
7	7.31	7.31	7.31
8	0.00	0.00	0.00
IC807			
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	5.07	5.07	5.07
5	5.04	5.04	5.04
6	0.00	0.00	0.00
7	0.18	0.18	0.18
8	0.00	0.00	0.00
9	5.19		
10	0.00	5.19	5.19
11	0.00	0.00	0.00
12	4.93	4.93	4.93
13	0.00	0.00	0.00
14	4.98	4.98	4.98
15	4.93	4.93	4.93
16	1.51	1.51	1.51
17	1.44	1.44	1.44
18	0.00	0.00	0.00
19	5.19	5.19	5.19
20	0.00	5.19	5.19
IC153			
1	12.8		
2	12		
3	0		
4	4.9		
IC156			
1	12.8		
2	12		
3	0		
4	2		
IC159			
1	2.9		
2	4.1		

MODE / PIN NO.	EE	PB	REC
3	0		
4	1.2		
5	2.5		
IC158			
1	14		
2	12		
3	0		
4	4.3		
IC151			
1	5.7		
2	5		
3	0		
4	4.3		
IC154			
1	3.8		
2	3.4		
3	0		
4	4.9		
IC160			
1	2.2		
2	4.3		
3	0		
4	0		
5	1.8		
Q120			
	5.2	4.4	5.1
Q121			
	0	4.9	0.7
Q122			
	0	5	0
Q123			
	32.7	32	32.6
Q124			
	5.2	4.5	5.2

PRINTED CIRCUIT DIAGRAMS

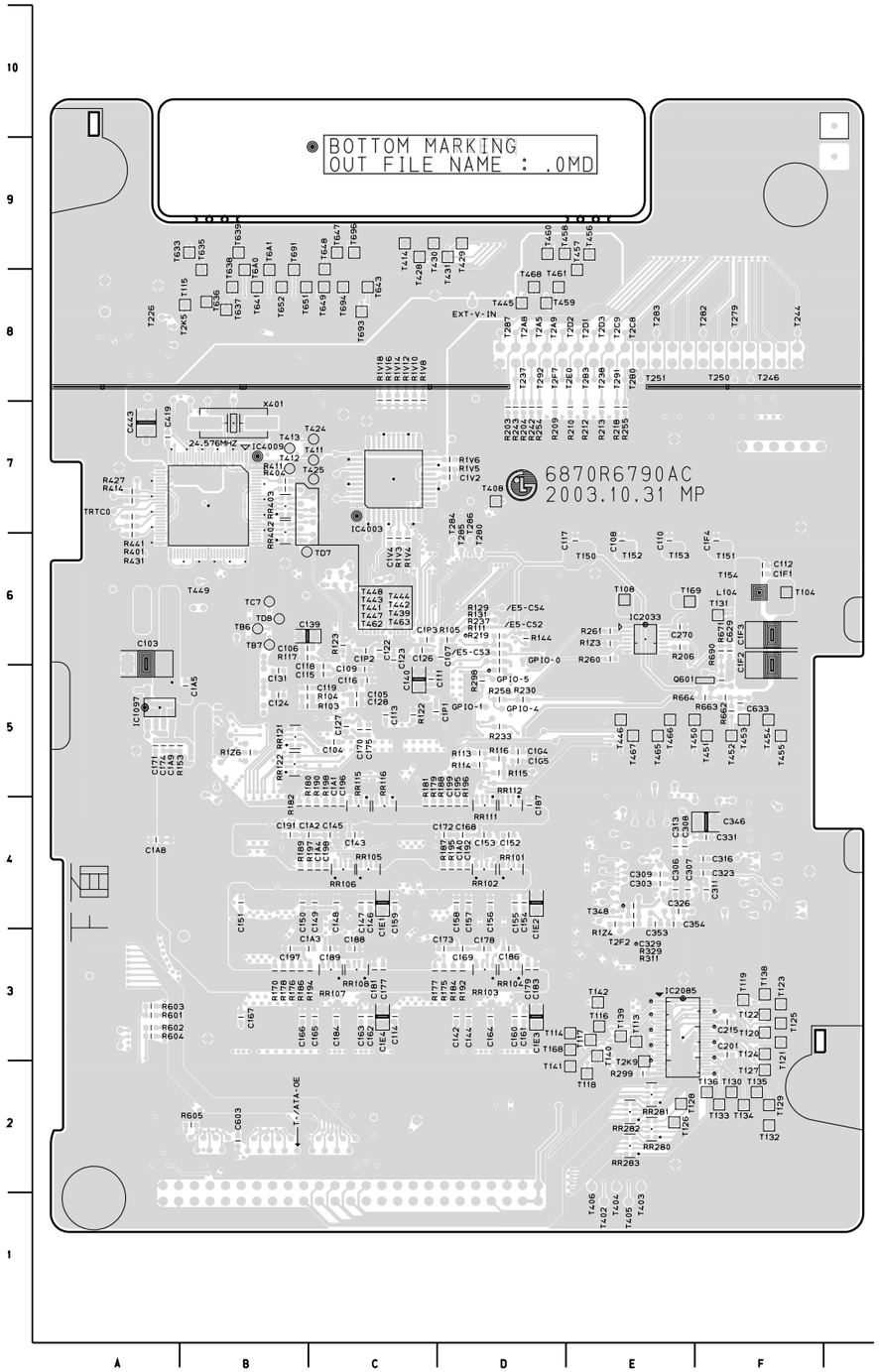
1. MAIN P.C.BOARD(TOP SIDE)



LOCATION GUIDE

C101	L6	C429	L7	PN7402	J2	R1V13	K8	R354	H4
C102	L5	C430	L7	PN7601	L8	R1V15	K8	R355	H4
C120	L5	C431	L7	R101	J5	R1V17	K8	R356	H4
C121	L5	C432	M7	R102	J5	R1V7	K8	R357	H4
C125	L6	C433	L7	R107	J6	R1V9	K8	R358	H4
C129	M5	C434	L7	R108	J6	R1Z1	M8	R359	H4
C130	I7	C436	M6	R109	J5	R1Z2	M8	R360	H4
C133	I7	C601	K2	R110	J5	R202	M8	R361	H4
C134	I7	C602	L2	R112	K6	R205	M8	R362	H4
C136	L6	C604	M2	R118	L5	R207	M8	R363	H4
C176	J3	C650	M3	R119	L5	R208	J5	R364	H3
C180	J3	GND1	I7	R120	L5	R211	J6	R365	I4
C182	K3	GND2	K7	R121	L5	R216	J6	R366	I4
C190	K3	GND3	L3	R125	L6	R217	J6	R367	I4
C194	H2	GND4	H4	R126	L6	R220	I7	R372	I4
C1E8	M4	H101	H7	R127	L6	R221	J6	R373	I4
C1E9	M6	H201	J8	R128	L6	R222	J7	R374	I4
C1F5	H7	H203	H8	R130	J6	R225	I7	R375	I4
C1F6	J2	H501	J1	R132	J6	R228	I7	R376	I4
C1F7	M5	H601	M3	R133	J5	R231	J7	R403	L7
C1V1	J7	IC1057	I3	R134	J5	R236	J7	R434	L7
C1V3	K7	IC1092	J3	R135	J5	R240	J7	R435	L7
C1V5	J7	IC1093	J4	R136	J6	R241	J7	R436	L7
C1V6	K7	IC1094	J4	R137	J5	R244	H7	R437	L7
C1V7	K7	IC1095	L3	R138	J5	R245	I7	R438	M7
C1V8	K7	IC1099	K5	R139	J6	R246	I7	R442	L7
C1V9	K7	IC2075	M8	R141	L5	R247	H7	R443	L7
C210	M8	IC3048	J4	R142	L5	R248	H7	R444	L7
C218	M8	IC6901	K2	R143	L5	R249	H7	R445	M7
C223	J7	IC6902	I2	R150	I3	R250	H7	R446	L7
C228	J6	IC6903	I2	R151	I3	R251	H7	R447	L7
C229	M8	IC6904	M2	R152	I3	R257	K7	R448	L7
C332	H4	L101	L5	R154	I3	R262	M8	R452	L7
C333	H4	L102	L6	R155	I3	R273	H7	R4X1	L7
C334	H4	L103	H6	R159	L3	R274	J6	R649	L8
C335	H3	L105	L6	R160	L3	R275	J6	R665	L8
C336	H4	L106	L5	R161	L4	R276	J6	RR109	J3
C337	H3	L107	L6	R162	L3	R282	M8	RR110	J3
C348	H4	L109	M6	R163	L4	R283	M8	RR113	K3
C349	H4	L110	I6	R164	L4	R284	M8	RR114	K3
C350	H4	L111	I6	R165	L4	R297	K7	RR117	L3
C400	K8	L112	I6	R166	L5	R306	I4	RR118	L3
C401	K8	L114	M5	R167	L3	R317	I4	RR119	L4
C402	K8	L115	M6	R168	L3	R320	I4	RR120	L5
C403	K8	L116	M6	R169	L3	R323	I4	RR123	K6
C404	K8	L303	I4	R171	K4	R330	I4	RR124	K6
C405	K8	L402	J7	R172	L4	R331	H4	RR301	I4
C415	L7	L403	J7	R173	K4	R332	H4	RR302	I4
C416	L7	L406	M7	R174	L4	R334	H3	SIDE-H9	LE0
C417	M7	L407	M6	R183	J3	R335	I4	SIDE-M9	LE1
C418	L6	L408	M6	R185	K3	R345	I4	SIDE-M0	LE2
C420	L6	L409	M7	R191	J3	R346	I4	SIDE-H0	LE3
C421	M7	L410	J7	R193	K3	R347	I4	SW201	M8
C422	L7	L601	M3	R199	I3	R348	I4	X102	L5
C423	L7	L602	M3	R1A1	L5	R349	H4	X301	I3
C425	L7	LD102	H6	R1A2	L5	R350	H4		
C426	L7	PN1901	H6	R1A4	L5	R351	H4		
C427	L7	PN5401	H5	R1A7	J5	R352	H4		
C428	L7	PN7401	J8	R1V11	K8	R353	H4		

2. MAIN P.C.BOARD(BOTTOM SIDE)



LOCATION GUIDE

/E5±C52	C5	C164	D3	C329	E4	R1V16	C7	RR281	E2	T279	F8	T343	F4	T641	B8
/E5±C54	C5	C165	C3	C331	F4	R1V18	C7	RR282	E2	T280	D6	T345	F4	T643	C8
/E5±C56	C5	C166	B3	C346	F4	R1V3	C6	RR283	E2	T282	F8	T346	F4	T647	C9
A0±D1	B4	C167	B3	C353	E4	R1V4	C6	RR402	B7	T283	E8	T348	E4	T648	C8
A0±D2	B5	C168	D4	C354	E4	R1V5	D7	RR403	B7	T284	D6	T349	E4	T649	C8
AUTO-GND	C1	C169	D3	C419	A7	R1V6	D7	T102	B5	T285	D6	T350	E5	T651	B8
AUTO-GND	C1	C170	C5	C443	A7	R1V8	C7	T103	B5	T286	D6	T401	A7	T652	B8
AUTO-GND	C1	C171	A5	C603	B2	R1Z3	E6	T104	F6	T287	D8	T402	E1	T691	B8
AUTO-GND	C1	C172	D4	C629	F6	R1Z4	E4	T105	B5	T291	E8	T403	E2	T693	C8
AUTO-GND	C2	C173	D3	C633	F5	R1Z6	B5	T106	D5	T292	D8	T404	E2	T694	C8
AUTO-GND	C3	C174	A5	EXT-V-IN	B8	R203	D7	T108	E6	T2A5	D8	T405	E1	T696	C9
AUTO-GND	C4	C175	C5	GPIO±D6	R204	D7	T110	B5	T2A8	D8	T406	E2	T6A0	B8	
AUTO-GND	C5	C177	C3	GPIO±D5	R206	E6	T111	B5	T2A9	D8	T408	D7	T6A1	B8	
AUTO-GND	C6	C178	D3	GPIO±D5	R209	D7	T112	B5	T2B0	E8	T411	C7	TA12	B5	
AUTO-GND	C7	C179	D3	GPIO±D5	R210	E7	T113	E3	T2B3	E8	T412	B7	TB6	B6	
AUTO-GND	C8	C181	C3	H1ORDY	B2	R212	E7	T114	E3	T2C8	E8	T413	B7	TB7	B6
AUTO-GND	C9	C183	D3	HRSTAT	B2	R213	E7	T115	B8	T2C9	E8	T414	C9	TC7	B6
C103	A6	C184	C3	IC109	A5	R218	E7	T116	E3	T2D1	E8	T424	C7	TD12	B5
C104	C5	C186	D3	IC203	E6	R219	D5	T117	E3	T2D2	D8	T425	C7	TD7	B6
C105	C5	C187	D4	IC208	E3	R230	D5	T118	E2	T2D3	E8	T428	C9	TD8	B6
C106	B6	C188	C3	IC400	B7	R233	D5	T119	F3	T2D4	A8	T429	D9	TP-T18	B5
C107	D6	C189	C3	IC400	B7	R237	D6	T120	F3	T2E0	D8	T430	C9	TRTC0	A7
C108	E6	C191	B4	L104	F6	R242	D7	T121	F3	T2F2	E3	T431	D9	TRTC0	A7
C109	C5	C192	D4	PA1	B2	R243	D7	T122	F3	T2F7	D8	T436	B7	TU16	D5
C110	E6	C195	D4	PA2	B2	R254	D7	T123	F3	T2K5	A8	T437	B7	T±/ATA	B2
C111	C5	C196	C4	Q601	F5	R255	E7	T124	F3	T2K9	E2	T438	A7	T±ATA	B2
C112	F6	C197	B3	R103	B5	R258	D5	T125	F3	T301	F4	T439	C7	T±ATA	B2
C113	C5	C198	C4	R104	B5	R260	E6	T126	E2	T302	F4	T440	B7	T±HDIOR	B2
C114	C3	C199	D4	R105	D6	R261	E6	T127	F2	T303	F4	T441	B7	T±HDIOW	B2
C115	C5	C1A0	D4	R111	D6	R298	D5	T128	E2	T305	F4	T442	C7	T±PA0	B2
C116	C5	C1A1	C4	R113	D5	R299	E2	T129	F2	T306	E4	T443	B7	T±PD0	B2
C117	E6	C1A2	C4	R114	D5	R311	E4	T130	F2	T307	E4	T444	C7	T±PD1	B2
C118	C5	C1A3	C3	R115	D5	R329	E4	T131	F6	T308	E4	T445	D8	T±PD10	C2
C119	B5	C1A4	C4	R116	D5	R401	A7	T132	F2	T309	F4	T446	E5	T±PD11	C2
C122	C6	C1A5	B5	R117	B6	R404	B7	T133	F2	T310	F4	T447	B7	T±PD12	C2
C123	C6	C1A8	A4	R122	C5	R411	B7	T134	F2	T311	E4	T448	B7	T±PD13	B2
C124	B5	C1A9	A5	R123	C6	R414	A7	T135	F2	T312	E4	T449	B6	T±PD14	C2
C126	C6	C1E1	C4	R129	D6	R427	A7	T136	F2	T313	E4	T450	E5	T±PD15	C2
C127	C5	C1E2	D4	R131	D6	R431	A6	T138	F3	T314	E4	T451	F5	T±PD2	B2
C128	C5	C1E3	D3	R144	D6	R441	A7	T139	E3	T315	E4	T452	F5	T±PD3	B2
C131	B5	C1E4	C3	R153	B5	R601	A3	T140	E3	T316	E4	T453	F5	T±PD4	B2
C139	B6	C1F1	F6	R170	B3	R602	A3	T141	E2	T317	F4	T454	F5	T±PD5	B2
C140	C5	C1F2	F5	R175	D3	R603	A3	T142	E3	T318	E4	T455	F5	T±PD6	B2
C142	D3	C1F3	F6	R176	B3	R604	A3	T144	A5	T319	E4	T456	E9	T±PD7	B2
C143	C4	C1F4	F6	R177	C3	R605	B2	T145	A5	T320	E5	T457	E8	T±PD8	C2
C144	D3	C1G4	D5	R178	B3	R662	F5	T148	A4	T321	E4	T458	D9	T±PD9	C2
C145	C4	C1G5	D5	R179	C4	R663	F5	T149	B5	T322	E4	T459	D8	T±U9	D6
C146	C4	C1P1	C5	R180	B4	R664	F5	T150	E6	T323	E4	T460	D9	T±V10	C6
C147	C4	C1P2	C6	R181	C4	R671	F6	T151	F6	T324	E4	T461	D8	T±V11	C6
C148	C4	C1P3	C6	R182	B4	R690	F5	T152	E6	T325	E4	T462	B6	T±V12	C6
C149	C4	C1V2	D7	R184	D3	RR101	D4	T153	E6	T326	F4	T463	C6	T±V13	C6
C150	B4	C1V4	C6	R186	B3	RR102	D4	T154	F6	T328	E4	T465	E5	T±V14	C6
C151	B4	C201	F3	R187	D4	RR103	D3	T164	D5	T329	E4	T466	E5	T±V15	C6
C152	D4	C215	F3	R188	D4	RR104	D3	T165	D5	T330	E4	T467	E5	T±V8	C6
C153	D4	C270	E6	R189	B4	RR105	C4	T166	D5	T331	F4	T468	D8	T±V9	C6
C154	D4	C303	E4	R190	C4	RR106	C4	T168	E3	T332	F4	T469	A7	T±VE1	C6
C155	D4	C306	E4	R192	D3	RR107	C3	T169	E6	T333	E4	T480	F5	T±VE3	C7
C156	D4	C307	E4	R194	C3	RR108	C3	T171	B6	T334	E4	T481	F5	T±VE3	C7
C157	D4	C308	E4	R195	D4	RR111	D4	T226	A8	T335	F4	T625	F5	T±VE4	C7
C158	D4	C309	E4	R196	D4	RR112	D4	T237	D8	T336	E4	T633	B9	T±W4	D6
C159	C4	C311	F4	R197	C4	RR115	C4	T238	E8	T338	F4	T635	B8	X401	B7
C160	D3	C313	E4	R198	C4	RR116	C4	T244	F8	T339	F4	T636	B8		
C161	D3	C316	F4	R1V10	C7	RR121	B5	T246	F8	T340	F4	T637	B8		
C162	C3	C323	F4	R1V12	C7	RR122	B5	T250	F8	T341	F4	T638	B8		
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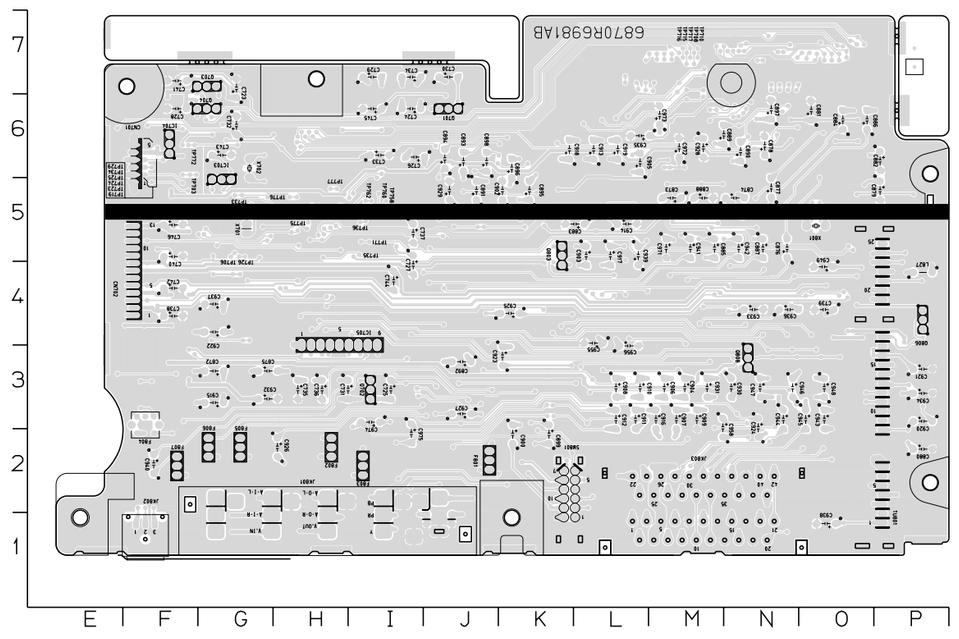
3. I/O P.C.BOARD



LOCATION GUIDE

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C702	G5	C804	M4	C857	O3	C908	L3	C958	M3	D823	M2	JK801	H1	P1N0010	F3	P1N0124	M6	R711	F6	R801	N2	R856	O6	R8A7	J2	R947	L7	TP714	H6	TP812	O6
C703	I5	C805	O1	C858	L2	C909	M3	C959	L6	D824	G2	JK802	F1	P1N0011	F3	P1N0129	M6	R712	F6	R802	L3	R857	L4	R8A8	L2	R948	K5	TP718	H4	TP813	O6
C704	G4	C806	G4	C859	M2	C910	L3	C960	L6	D825	J2	JK803	M1	P1N0013	M5	P1N0136	M4	R713	H4	R803	L4	R858	K5	R8A9	L2	R949	N4	TP720	H4	TP814	N6
C705	I5	C807	N3	C860	F4	C911	L3	C961	L7	D826	G2	L701	I5	P1N0014	O5	P1N0137	M4	R714	H3	R804	J2	R859	L4	R8C1	O3	R951	L6	TP721	I5	TP815	N5
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C711	I5	C813	F3	C866	O5	C917	L5	C967	G2	F701	C4	L801	N2	P1N0020	N6	P1N0147	N6	R720	I5	R811	I3	R865	F3	R903	M4	R957	L6	TP737	H4	TP821	O6
C712	F6	C814	N6	C867	O5	C918	K6	C968	G2	F702	C4	L802	O2	P1N0021	M5	P1N0149	H4	R721	H4	R812	F2	R866	F2	R905	G3	R958	L3	TP738	I5	TP822	N6
C713	G5	C815	M6	C868	O3	C919	L6	C969	H2	F703	C4	L803	N3	P1N0022	F3	P1N0150	H4	R722	G6	R813	O7	R867	O3	R906	G3	R959	L3	TP740	H4	TP823	O6
C714	I5	C816	J5	C869	O5	C920	P3	C970	H2	F704	C3	L804	O5	P1N0026	O5	P1N0156	G3	R723	G4	R814	O7	R868	I2	R907	K6	R960	M5	TP742	H4	TP824	O6
C715	G6	C817	O6	C870	F3	C921	P3	C971	M5	F705	C3	L805	M2	P1N0027	L5	P1N0157	G4	R724	G5	R815	O4	R869	L2	R908	L6	R980	P4	TP743	I6	TP825	N6
C716	G5	C818	L5	C871	F3	C922	G4	C972	M6	F706	C3	L806	M6	P1N0028	L5	P1N0158	G4	R725	I3	R816	O4	R870	H3	R909	G3	R981	P3	TP744	I4	TP826	O5
C717	G6	C819	N6	C872	G3	C923	K3	C973	M6	F801	J2	L807	N6	P1N0029	F3	P1N0173	O4	R726	I6	R817	L3	R871	O2	R910	G3	R982	P3	TP745	H4	TU801	P1
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C721	I7	C824	N6	C876	N5	C927	J3	CN702	F4	F805	G2	L811	M2	P1N0033	L5	P1N0210	I6	R731	H6	R821	L6	R875	O3	R914	M4	R986	N2	TP750	I4	ZD761	B4
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C733	I6	C837	L2	C888	M5	C939	L5	D804	L4	IC804	M4	L823	O4	P1N0070	J2	Q801	L4	R744	I3	R833	M4	R887	H6	R926	L5	RB71	C5	TP766	G5	ZD773	B5
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C735	H3	C839	M6	C890	N6	C941	M5	D806	H2	IC806	K5	L826	L2	P1N0081	G3	Q803	K5	R746	H6	R836	L6	R889	J5	R928	K5	RB73	C5	TP768	H5	ZD775	B5
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C737	I5	C841	F3	C892	J3	C943	O3	D808	I2	IC808	N5	L828	M5	P1N0086	G3	Q805	L3	R750	H6	R838	O3	R891	N7	R930	J5	SW801	L1	TP770	G6	ZD777	B5
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C739	O4	C843	L5	C894	J6	C945	O3	D810	H2	IC810	L5	L830	M6	P1N0092	I5	Q808	N3	R752	I6	R840	F3	R893	F3	R932	F2	TP2	B4	TP774	I5	ZD779	C5
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C744	I4	C849	L5	C899	K2	C950	L6	D815	J2	IC815	M6	P1N0001	H6	P1N0101	H6	R703	F5	R762	B3	R845	N5	R898	O6	R937	L6	TP701	H4	TP804	O6		
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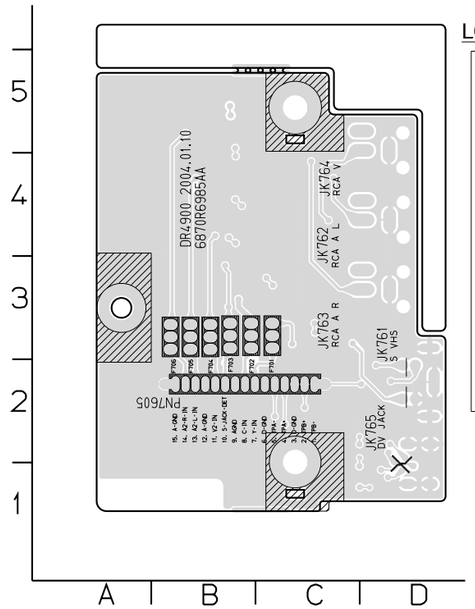
4. JACK P.C.BOARD



LOCATION GUIDE

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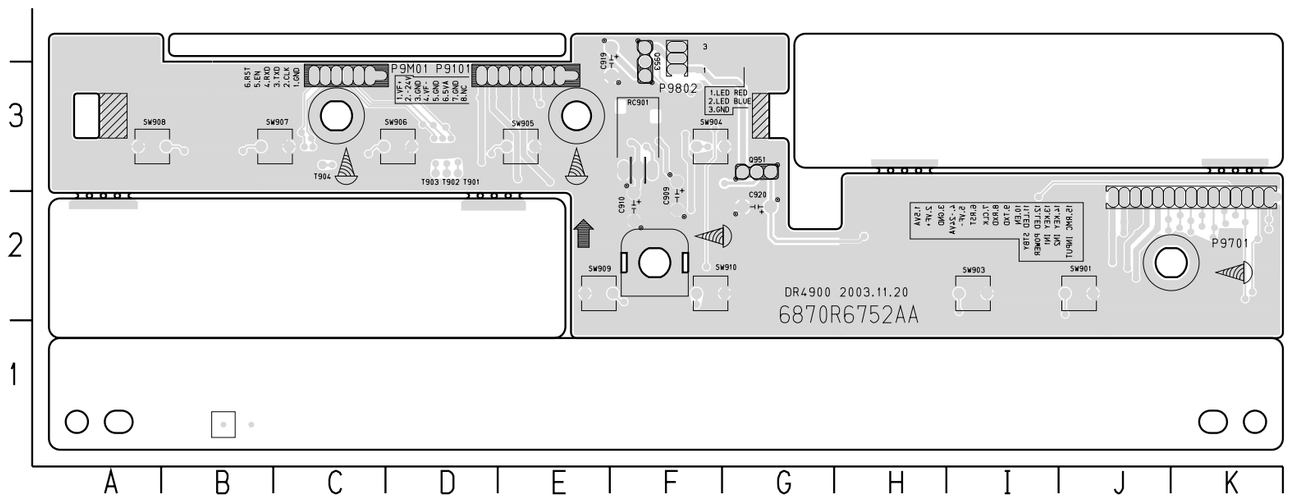
C748	B5	RB72	C2
F701	C3	RB73	C2
F702	B3	RB74	C2
F703	B3	ZD761	C3
F704	B3	ZD762	C3
F705	B3	ZD763	C3
F706	B3	ZD764	B3
JK761	D2	ZD765	B4
JK762	D4	ZD766	B4
JK763	D3	ZD767	B4
JK764	D5	ZD768	B4
JK765	D1	ZD769	B5
L711	C4	ZD770	B5
L712	B5	ZD771	B4
PN7605	C2	ZD772	C4
R761	C3	ZD773	D1
R762	C4	ZD774	C1
R763	C5	ZD775	D2
R764	C3	ZD776	C2
R765	C4	ZD777	D2
R766	C3	ZD778	C2
R767	B3	ZD779	D2
R769	B4	ZD780	C2

5. FRONT P.C.BOARD



LOCATION GUIDE

C907	E3	R927	F3
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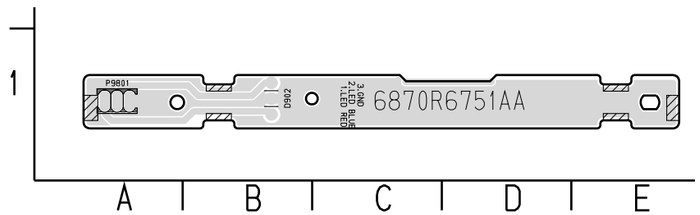
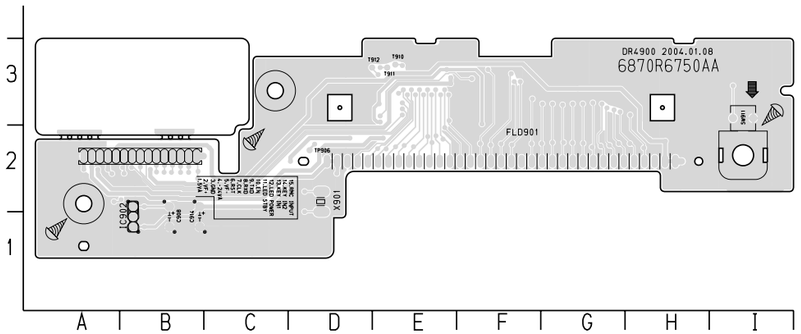
C910	F2	R930	D3
C919	F4	R931	D3
C920	G2	R932	D3
L901	F3	R933	C3
P9101	D3	R934	C3
P9701	J2	R941	F3
P9802	F3	R942	H2
P9M01	C3	RC901	F3
Q951	G3	SW901	J2
Q953	F4	SW903	I2
R904	F3	SW904	F3
R907	J1	SW905	E3
R913	I1	SW906	D3
R914	F3	SW907	C3
R915	D3	SW908	A3
R916	C3	SW909	E2
R917	B3	SW910	F2
R918	B3	ZD903	H2
R919	F2	ZD904	F3
R920	F2	ZD905	E3

6. LED P.C.BOARD (9TOOL ONLY)



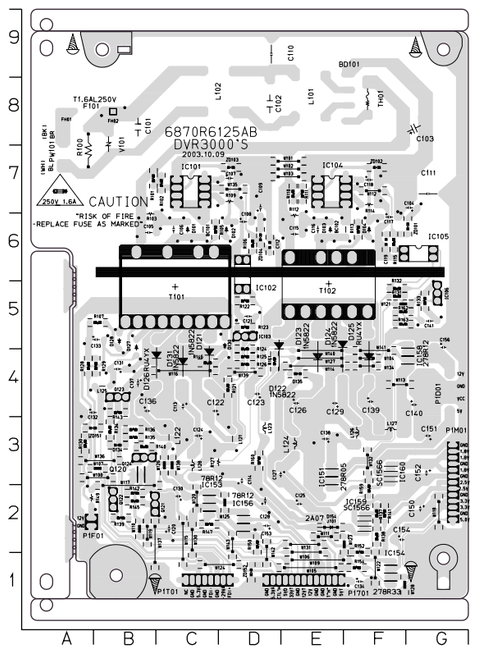
7. KEY P.C.BOARD



LOCATION GUIDE

C901	H2	IC901	E3
C902	D2	IC902	B1
C903	F3	L903	D2
C904	D2	P9702	A2
C905	D1	P9801	D1
C906	E2	R901	E2
C908	B1	R902	E2
C911	D3	R903	B2
C912	D3	R905	D3
C913	D3	R906	D3
C914	B1	R908	B2
C915	B1	R909	D3
C916	F2	R910	D3
C917	F3	R911	D3
C991	E2	SW911	I3
C992	E2	X901	D2
D901	B2	ZD901	B2
D902	F1	ZD906	E2
FLD901	F3		

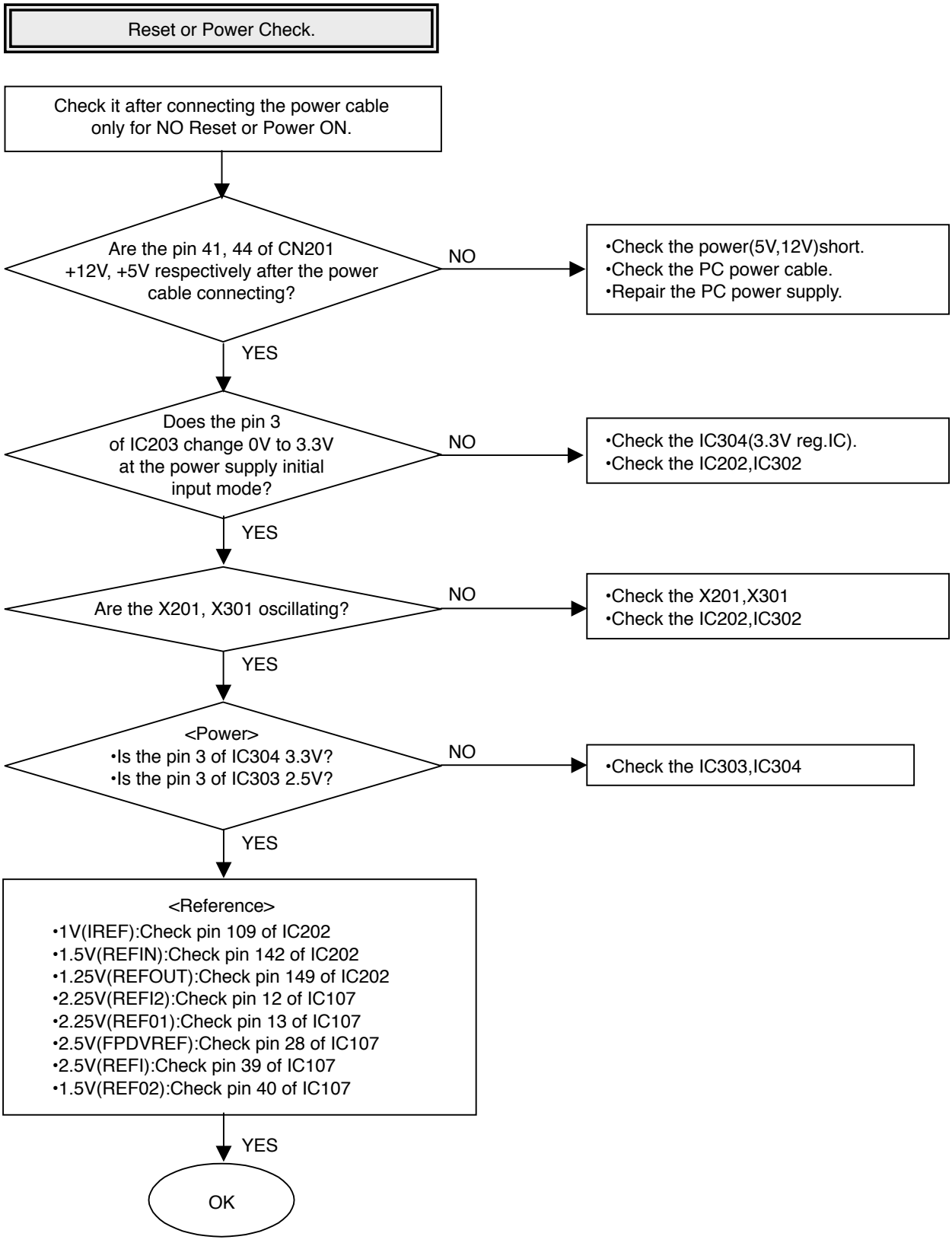
8. POWER P.C.BOARD

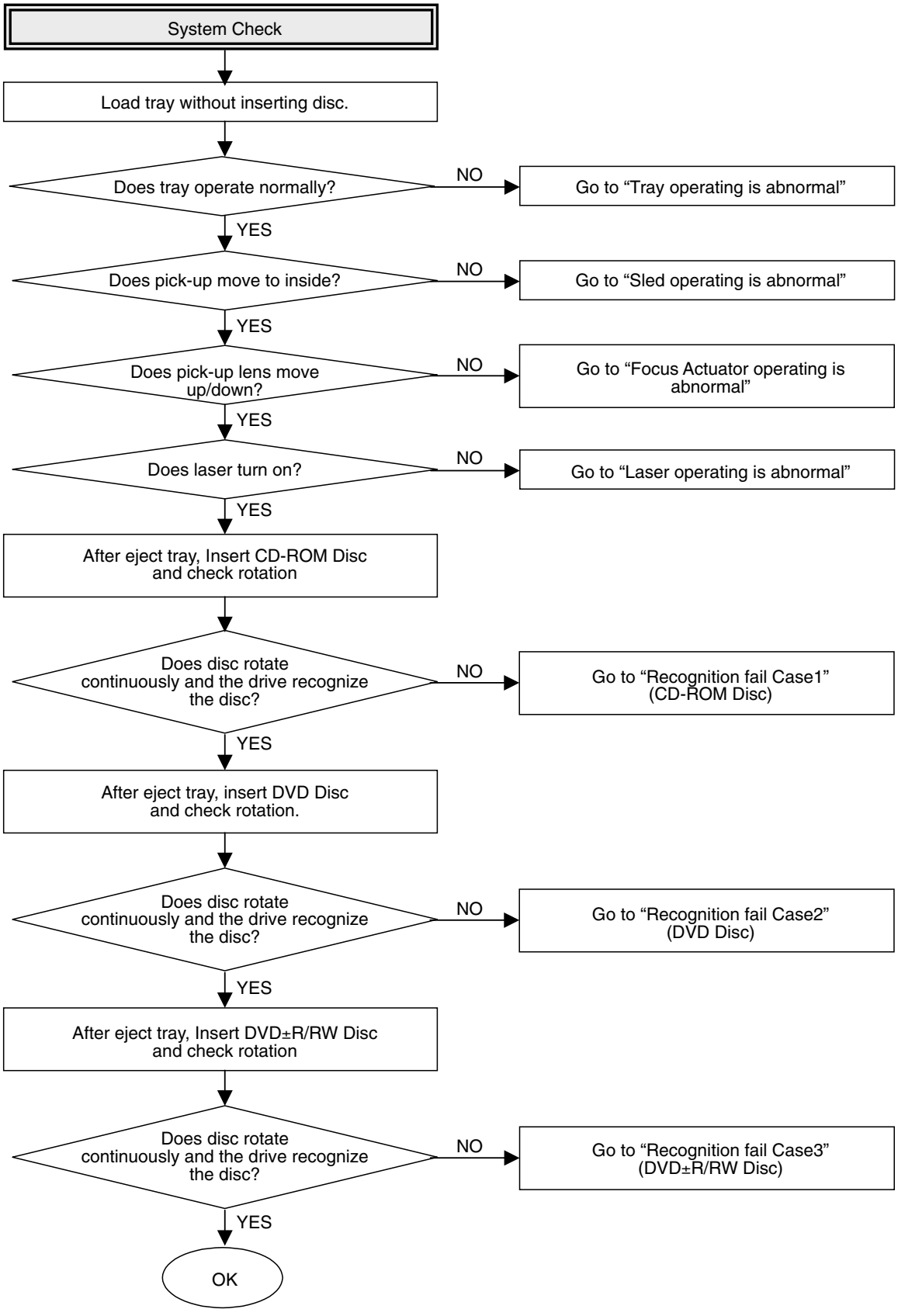


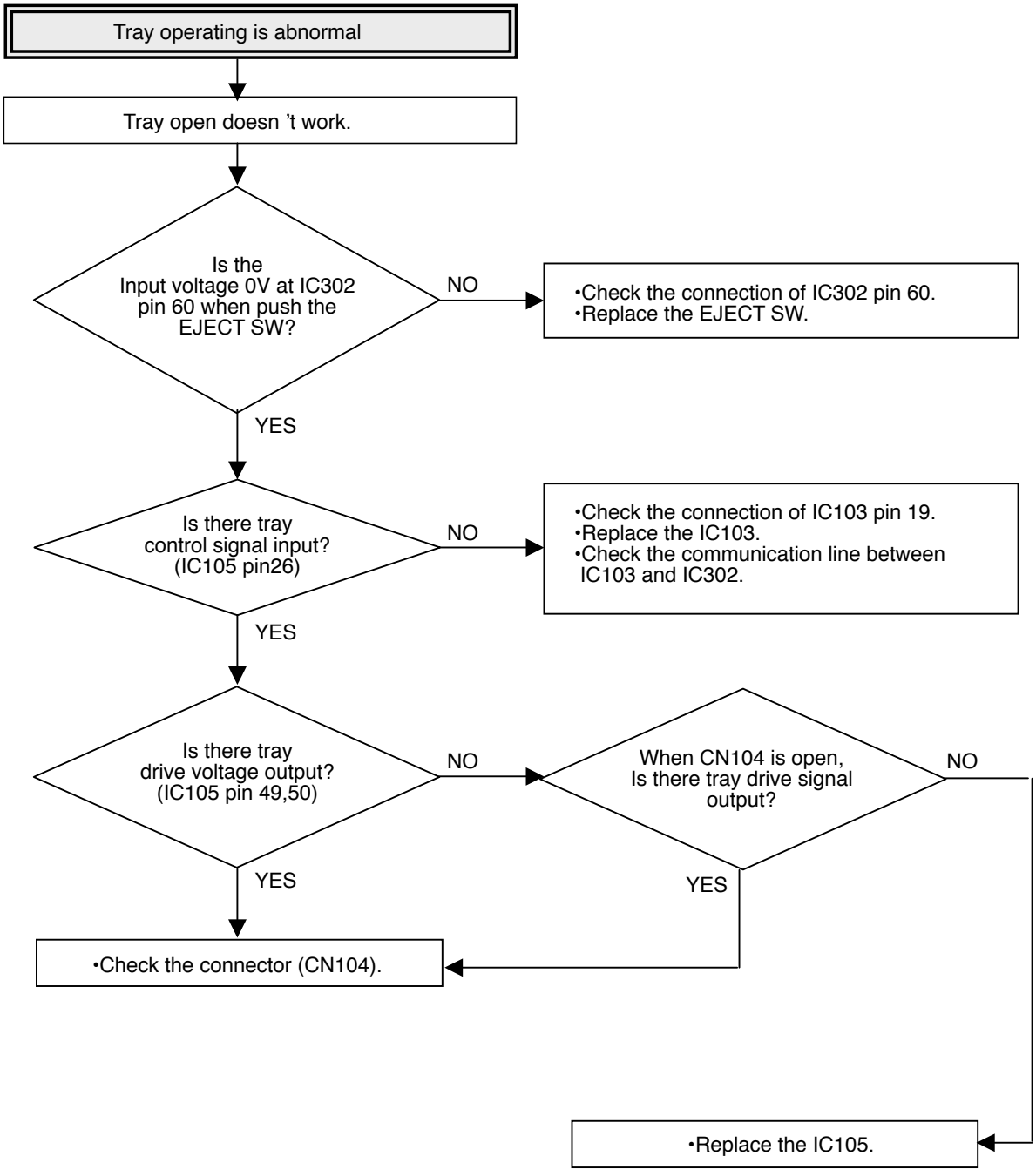
LOCATION GUIDE

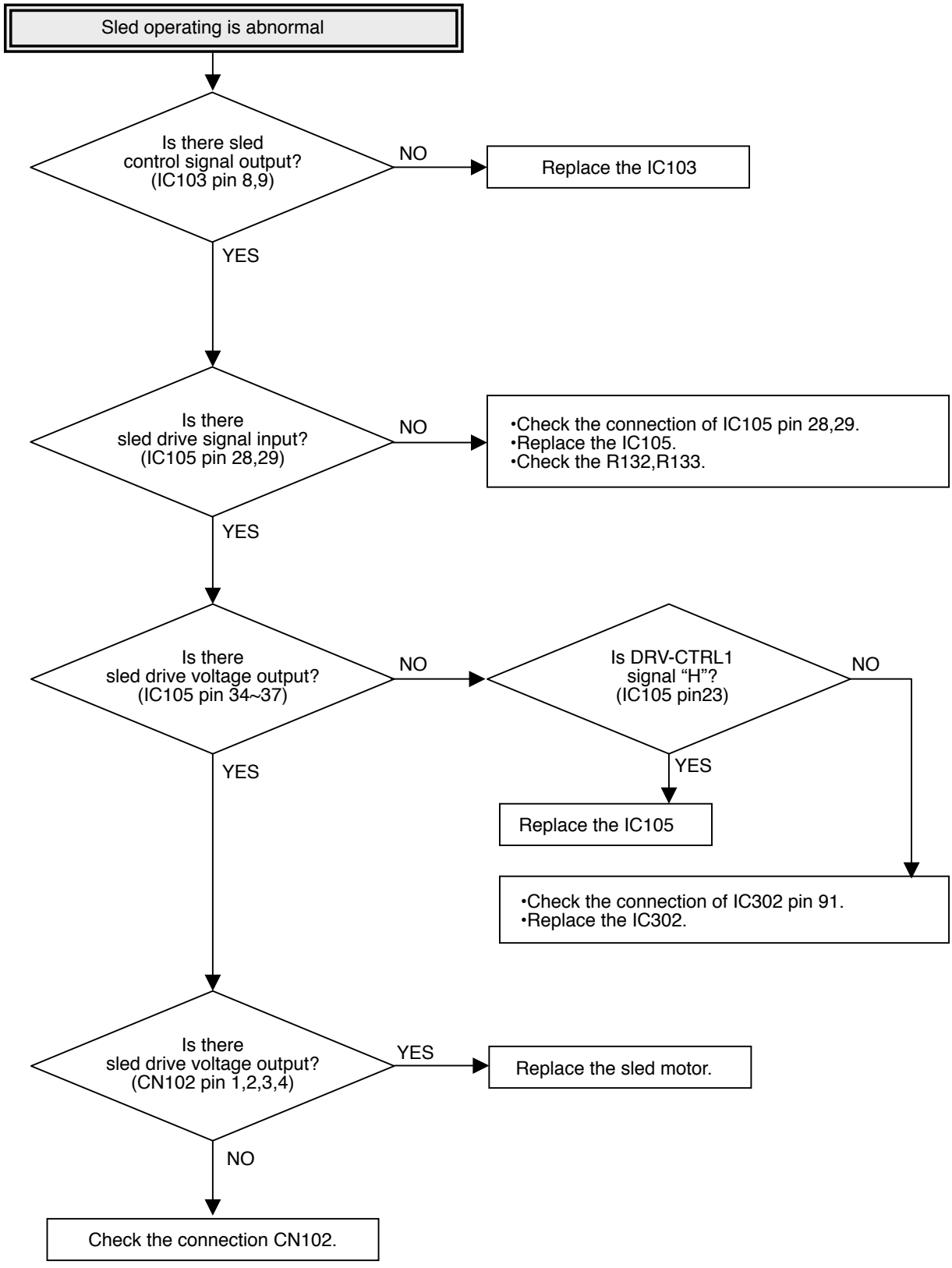
BC101	C6	DI22	D4	R106	D6
BC102	F6	DI23	E4	R107	B5
BD101	F8	DI24	E4	R109	D7
C101	B8	DI25	F4	R110	E7
C102	D8	DI26	C4	R111	E7
C103	G8	DI27	B5	R112	E6
C104	G7	DI28	B5	R113	F6
C105	B6	DI30	D5	R114	F7
C106	C6	DI31	C4	R115	F6
C107	D7	DI34	B3	R121	D4
C108	D6	DI35	E4	R122	D5
C109	D7	DI54	E2	R123	D5
C110	D9	FH01	A8	R124	D4
C111	G7	FH02	B8	R125	D4
C112	D6	IC101	C7	R126	D4
C113	C4	IC102	D5	R127	D3
C114	D3	IC103	D5	R128	A4
C115	E6	IC104	F7	R129	B4
C116	E6	IC105	G6	R130	A3
C117	F6	IC106	G5	R131	F5
C118	F7	IC151	E3	R132	F5
C119	F6	IC153	C2	R133	G5
C120	C2	IC154	F1	R134	B3
C121	D5	IC156	D2	R135	B3
C122	C4	IC158	F4	R136	B3
C123	D4	IC159	F2	R137	F2
C124	C3	IC160	F3	R138	F2
C125	E2	J101	E2	R139	B2
C126	E4	L101	E8	R140	B3
C127	D3	L102	D8	R141	F2
C128	D2	L121	D3	R142	B2
C129	E4	L122	C3	R143	B4
C130	C2	L123	D3	R145	B2
C131	B4	L124	E3	R146	C4
C132	A4	L125	B4	R147	C2
C133	B5	L126	F3	R149	A2
C134	F1	L127	F3	R150	D2
C136	B4	L128	C3	R152	F2
C137	B4	PI7101	E1	R154	F1
C138	E3	PI001	G4	R159	F2
C139	F4	PIF01	A2	R160	D3
C140	G4	PIM01	G3	R161	D4
C141	G5	PIT01	C1	R162	F5
C150	G2	PW101	A7	R163	F5
C151	G3	QI20	B3	T101	C5
C152	G3	QI21	B2	T102	E5
C153	D2	QI22	B2	TH01	F8
C154	F2	QI23	B4	V101	B8
C156	G5	QI24	B3	ZD101	G6
DI01	C6	R100	A7	ZD102	F7
DI02	D6	R101	B7	ZD103	D7
DI03	E6	R102	C7	ZD104	D6
DI04	F6	R103	B6	ZD151	A3
DI21	C4	R105	C6	ZD152	D1

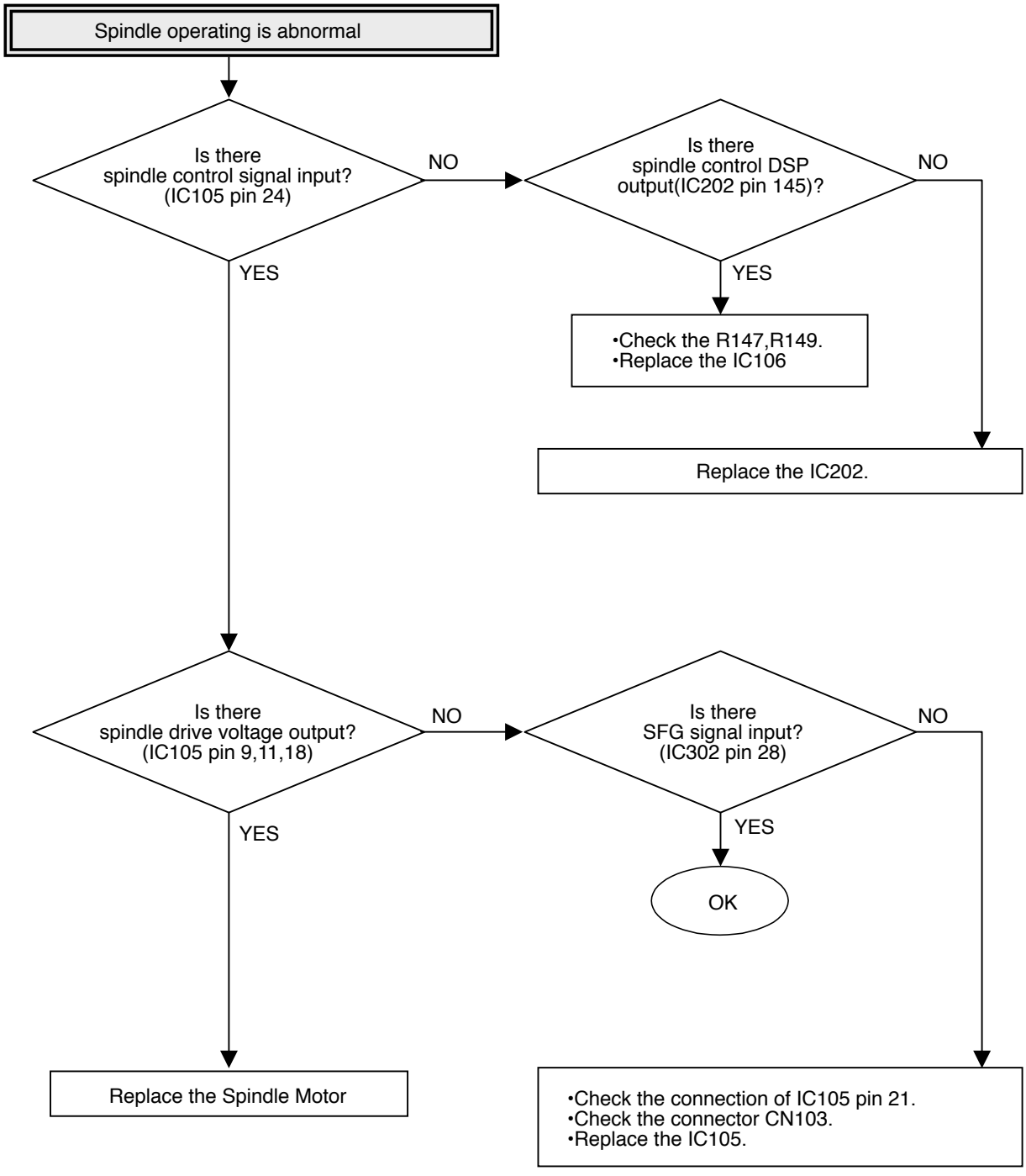
RL-01A LOADER PART
ELECTRICAL TROUBLESHOOTING GUIDE

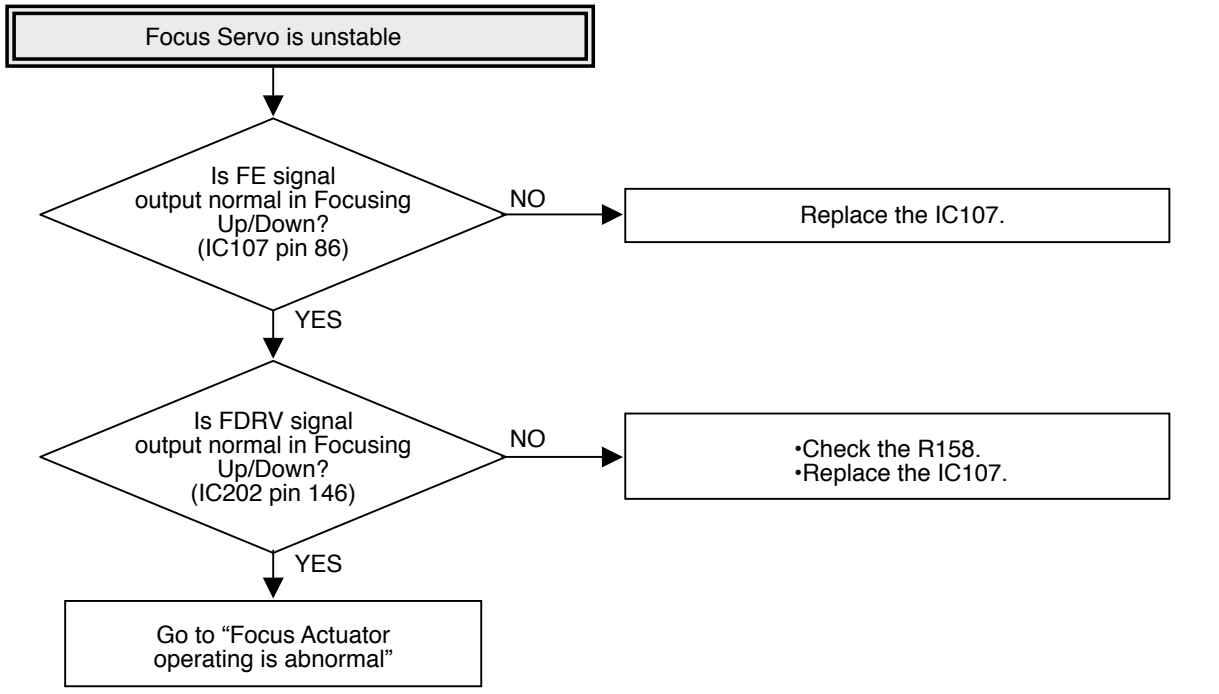


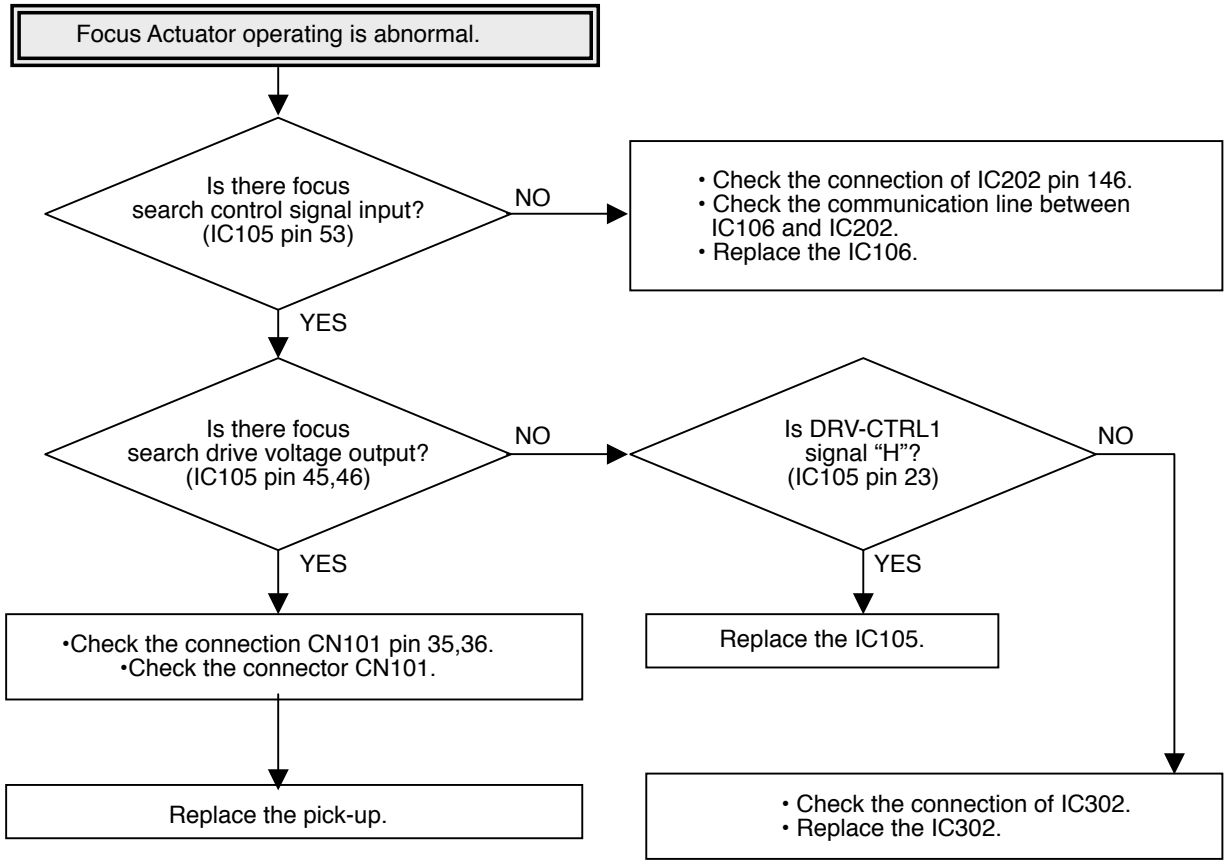

System Check
Load tray without inserting disc.
Does tray operate normally?
NO
Go to “Tray operating is abnormal”
YES
Does pick-up move to inside?
NO
Go to “Sled operating is abnormal”
YES
Does pick-up lens move up/down?
NO
Go to “Focus Actuator operating is abnormal”
YES
Does laser turn on?
NO
Go to “Laser operating is abnormal”
YES
After eject tray, Insert CD-ROM Disc and check rotation
Does disc rotate continuously and the drive recognize the disc?
NO
Go to “Recognition fail Case1” (CD-ROM Disc)
YES
After eject tray, insert DVD Disc and check rotation.
Does disc rotate continuously and the drive recognize the disc?
NO
Go to “Recognition fail Case2” (DVD Disc)
YES
After eject tray, Insert DVD±R/RW Disc and check rotation
Does disc rotate continuously and the drive recognize the disc?
NO
Go to “Recognition fail Case3” (DVD±R/RW Disc)
YES
OK

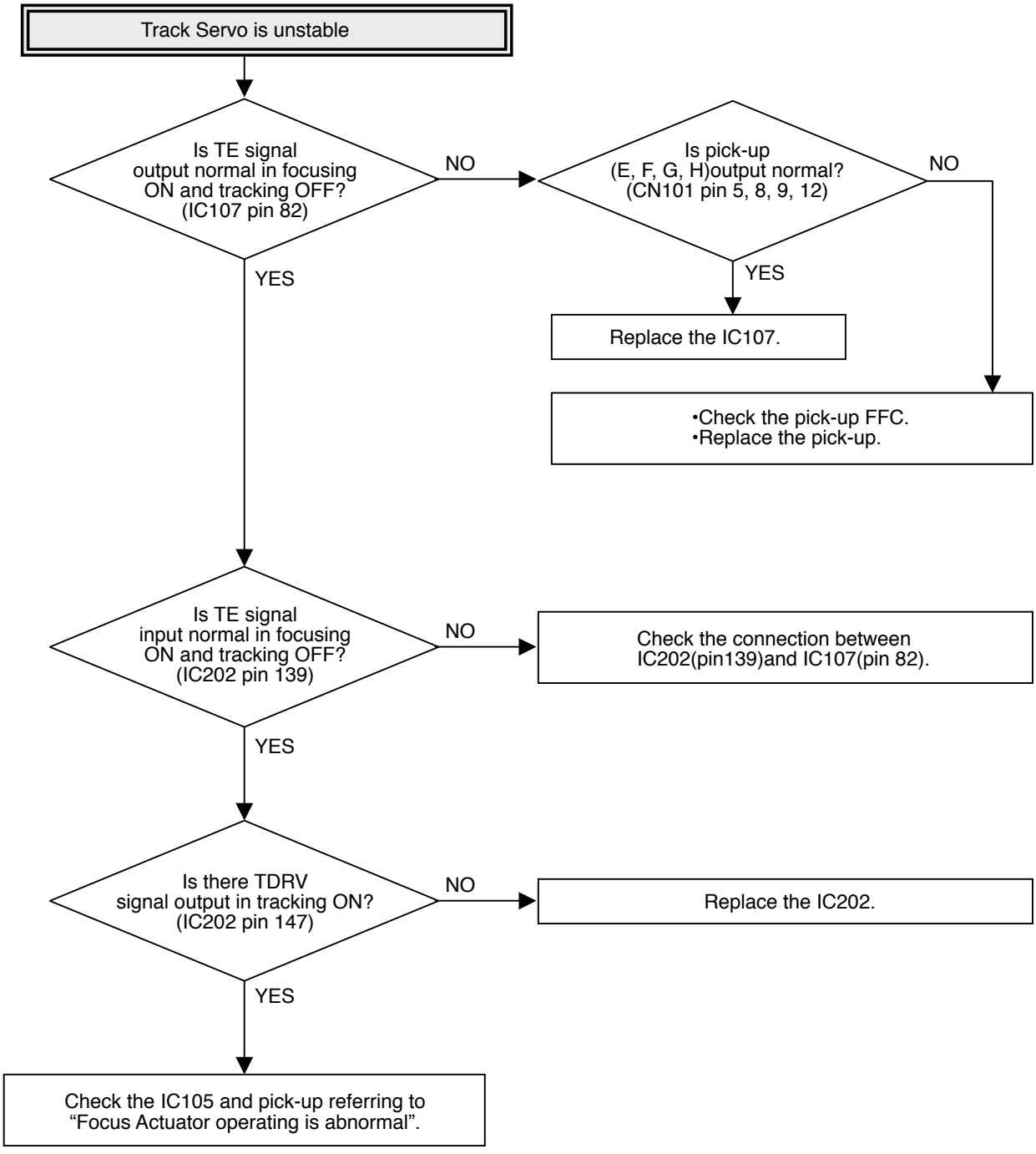

Tray operating is abnormal
Tray open doesn 't work.
Is the Input voltage 0V at IC302 pin 60 when push the EJECT SW?
NO
•Check the connection of IC302 pin 60.
•Replace the EJECT SW.
YES
Is there tray control signal input? (IC105 pin26)
NO
•Check the connection of IC103 pin 19.
•Replace the IC103.
•Check the communication line between IC103 and IC302.
YES
Is there tray drive voltage output? (IC105 pin 49,50)
NO
When CN104 is open, Is there tray drive signal output?
NO
YES
YES
•Check the connector (CN104).
•Replace the IC105.

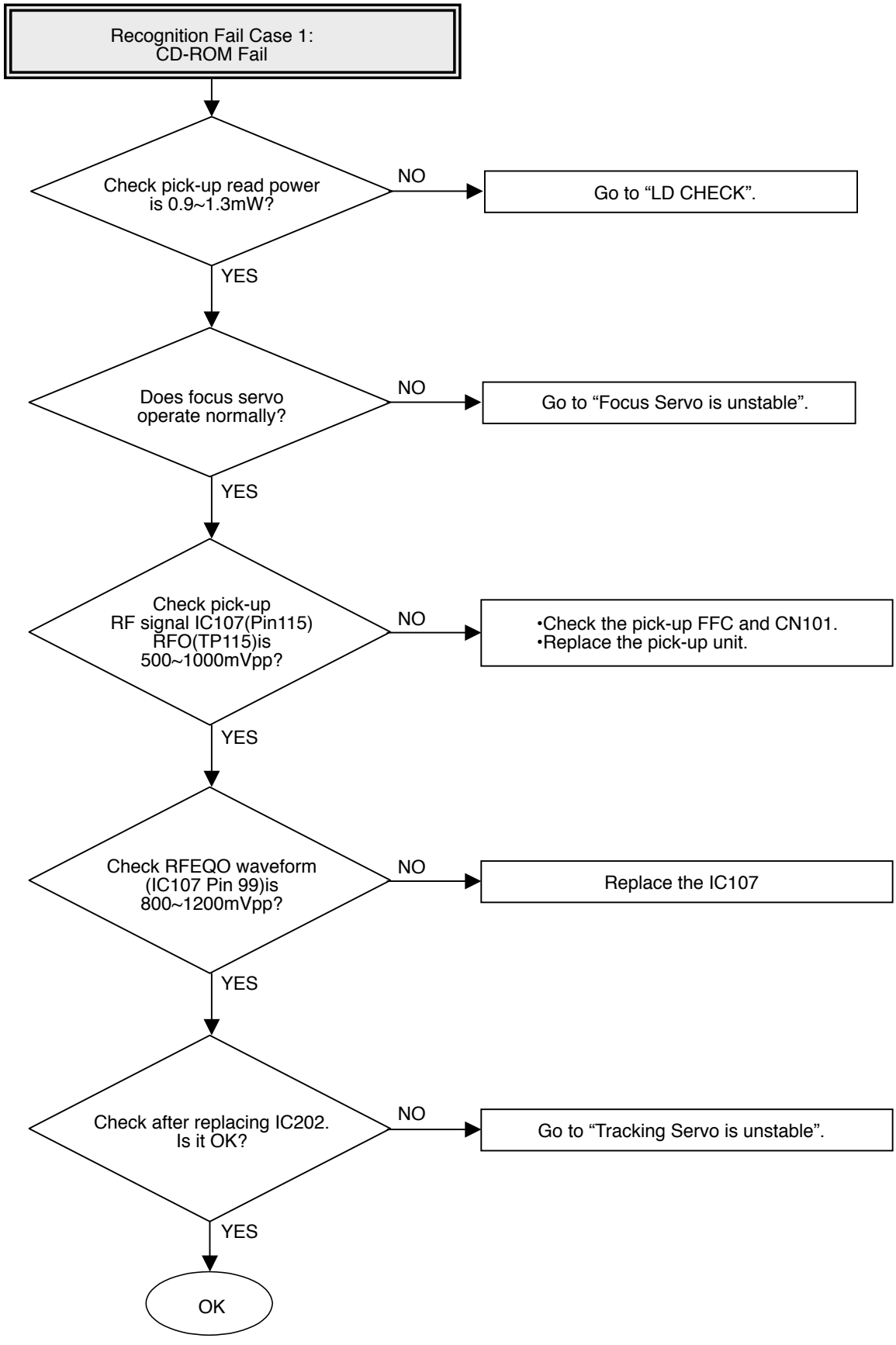

Sled operating is abnormal
Is there sled control signal output? (IC103 pin 8,9)
NO
Replace the IC103
YES
Is there sled drive signal input? (IC105 pin 28,29)
NO
•Check the connection of IC105 pin 28,29.
•Replace the IC105.
•Check the R132,R133.
YES
Is there sled drive voltage output? (IC105 pin 34~37)
NO
Is DRV-CTRL1 signal “H”? (IC105 pin23)
NO
YES
Replace the IC105
•Check the connection of IC302 pin 91.
•Replace the IC302.
YES
Is there sled drive voltage output? (CN102 pin 1,2,3,4)
YES
Replace the sled motor.
NO
Check the connection CN102.

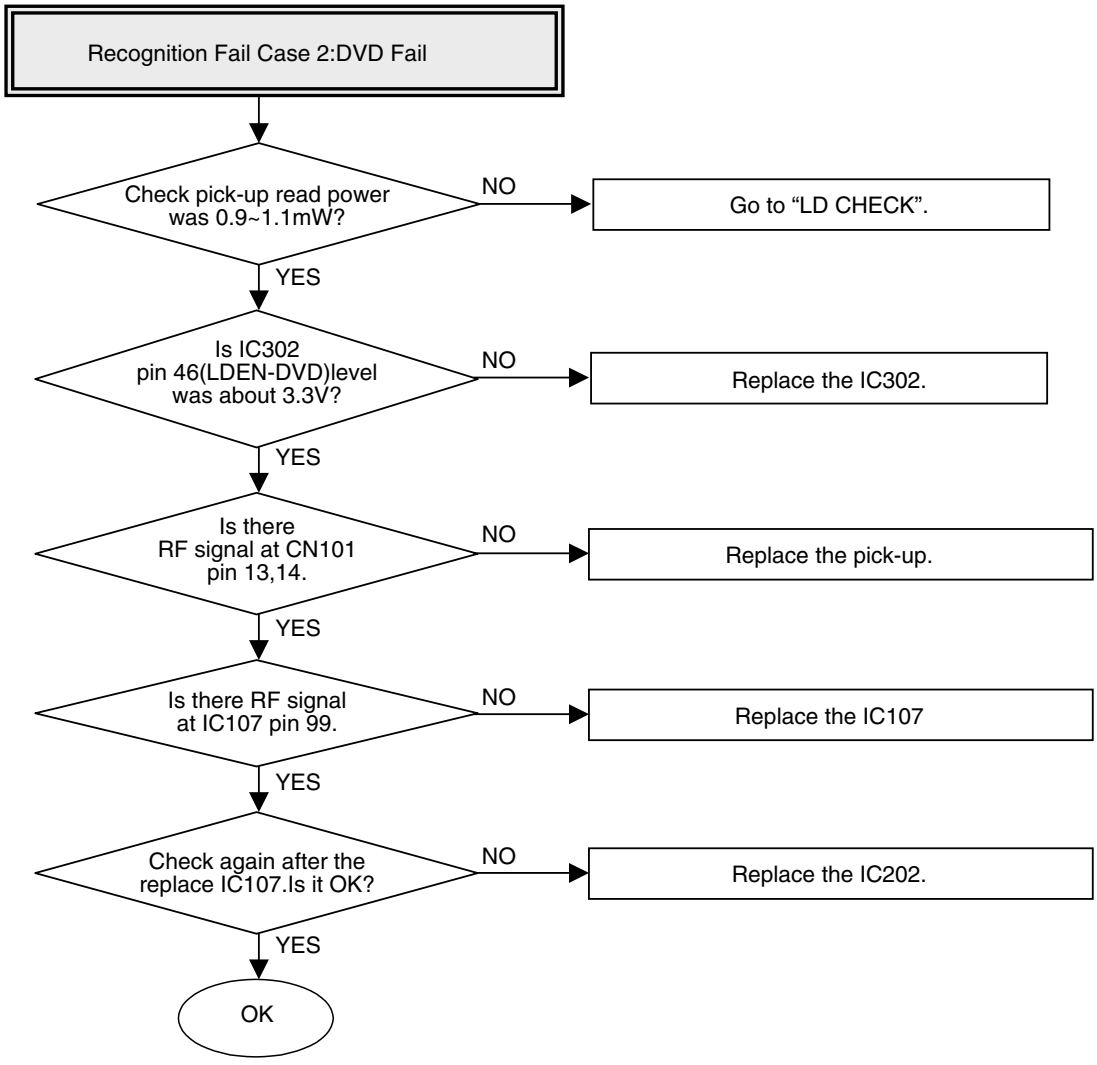

Spindle operating is abnormal
Is there spindle control signal input? (IC105 pin 24)
NO
Is there spindle control DSP output(IC202 pin 145)?
NO
YES
YES
•Check the R147,R149.
•Replace the IC106
Replace the IC202.
Is there spindle drive voltage output? (IC105 pin 9,11,18)
NO
Is there SFG signal input? (IC302 pin 28)
NO
YES
YES
OK
Replace the Spindle Motor
•Check the connection of IC105 pin 21.
•Check the connector CN103.
•Replace the IC105.

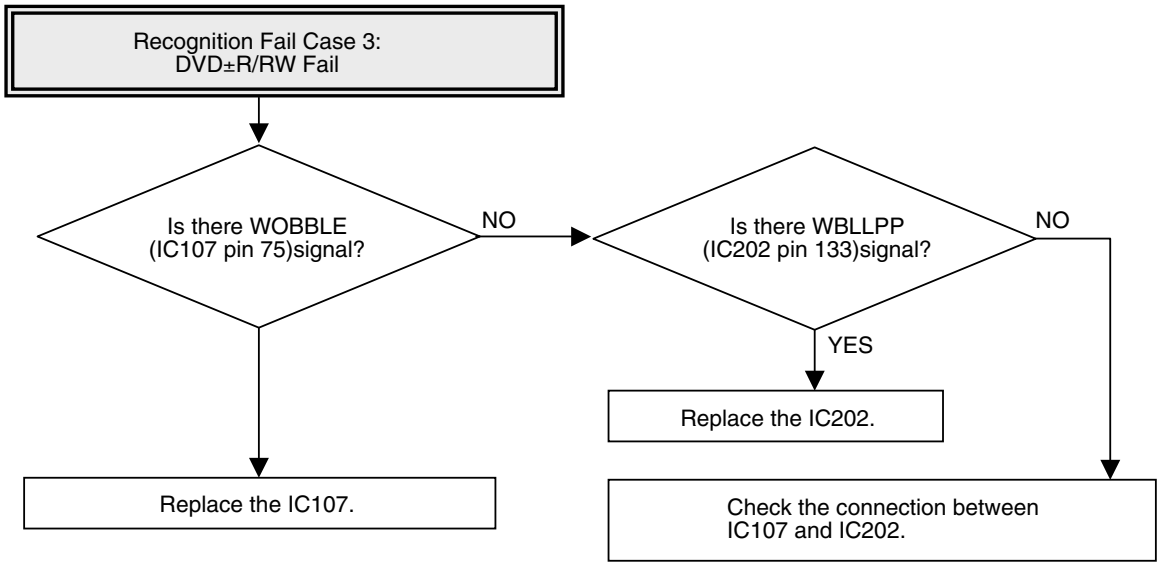

Focus Servo is unstable
Is FE signal output normal in Focusing Up/Down? (IC107 pin 86)
NO
Replace the IC107.
YES
Is FDRV signal output normal in Focusing Up/Down? (IC202 pin 146)
NO
•Check the R158.
•Replace the IC107.
YES
Go to “Focus Actuator operating is abnormal”

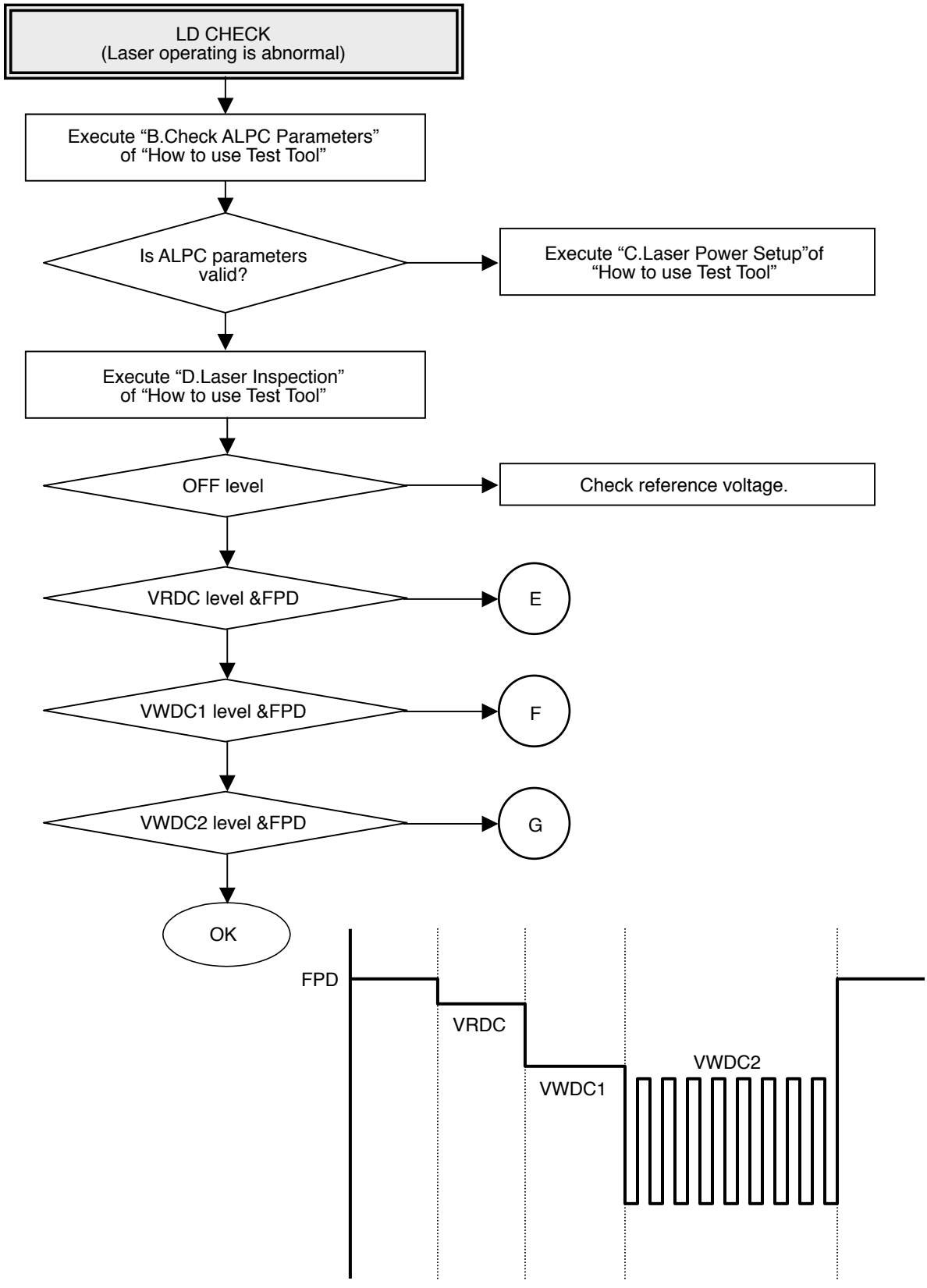

Focus Actuator operating is abnormal.
Is there focus search control signal input? (IC105 pin 53)
NO
• Check the connection of IC202 pin 146.
• Check the communication line between IC106 and IC202.
• Replace the IC106.
YES
Is there focus search drive voltage output? (IC105 pin 45,46)
NO
Is DRV-CTRL1 signal “H”? (IC105 pin 23)
NO
YES
YES
•Check the connection CN101 pin 35,36.
•Check the connector CN101.
Replace the IC105.
Replace the pick-up.
• Check the connection of IC302.
• Replace the IC302.

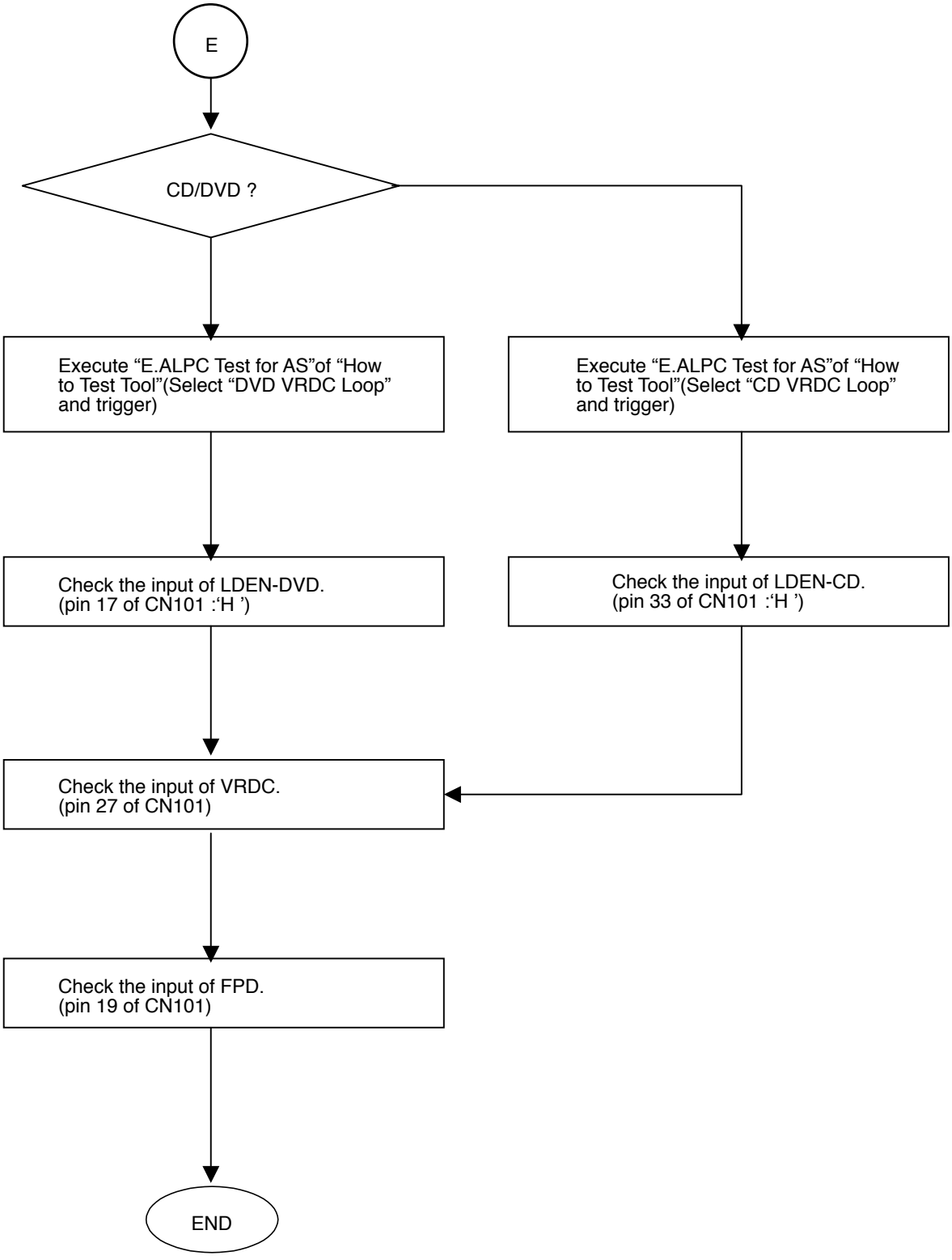

Track Servo is unstable
Is TE signal output normal in focusing ON and tracking OFF? (IC107 pin 82)
NO
Is pick-up (E, F, G, H)output normal? (CN101 pin 5, 8, 9, 12)
NO
YES
YES
Replace the IC107.
•Check the pick-up FFC.
•Replace the pick-up.
Is TE signal input normal in focusing ON and tracking OFF? (IC202 pin 139)
NO
Check the connection between IC202(pin139)and IC107(pin 82).
YES
Is there TDRV signal output in tracking ON? (IC202 pin 147)
NO
Replace the IC202.
YES
Check the IC105 and pick-up referring to "Focus Actuator operating is abnormal".

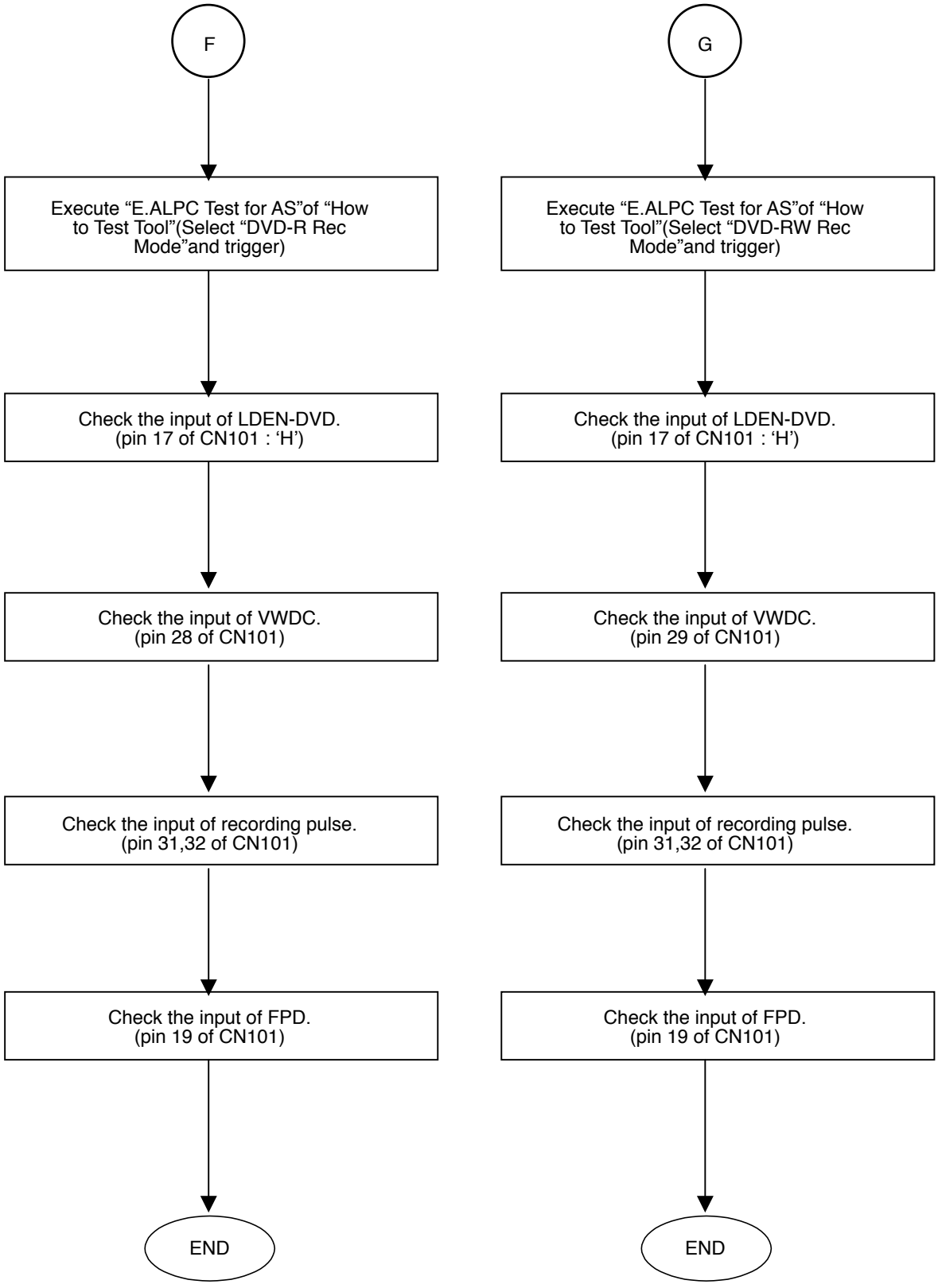

Recognition Fail Case 1:
CD-ROM Fail
Check pick-up read power
is 0.9~1.3mW?
NO
Go to “LD CHECK”.
YES
Does focus servo
operate normally?
NO
Go to “Focus Servo is unstable”.
YES
Check pick-up
RF signal IC107(Pin115)
RFO(TP115)is
500~1000mVpp?
NO
•Check the pick-up FFC and CN101.
•Replace the pick-up unit.
YES
Check RFEQO waveform
(IC107 Pin 99)is
800~1200mVpp?
NO
Replace the IC107
YES
Check after replacing IC202.
Is it OK?
NO
Go to “Tracking Servo is unstable”.
YES
OK

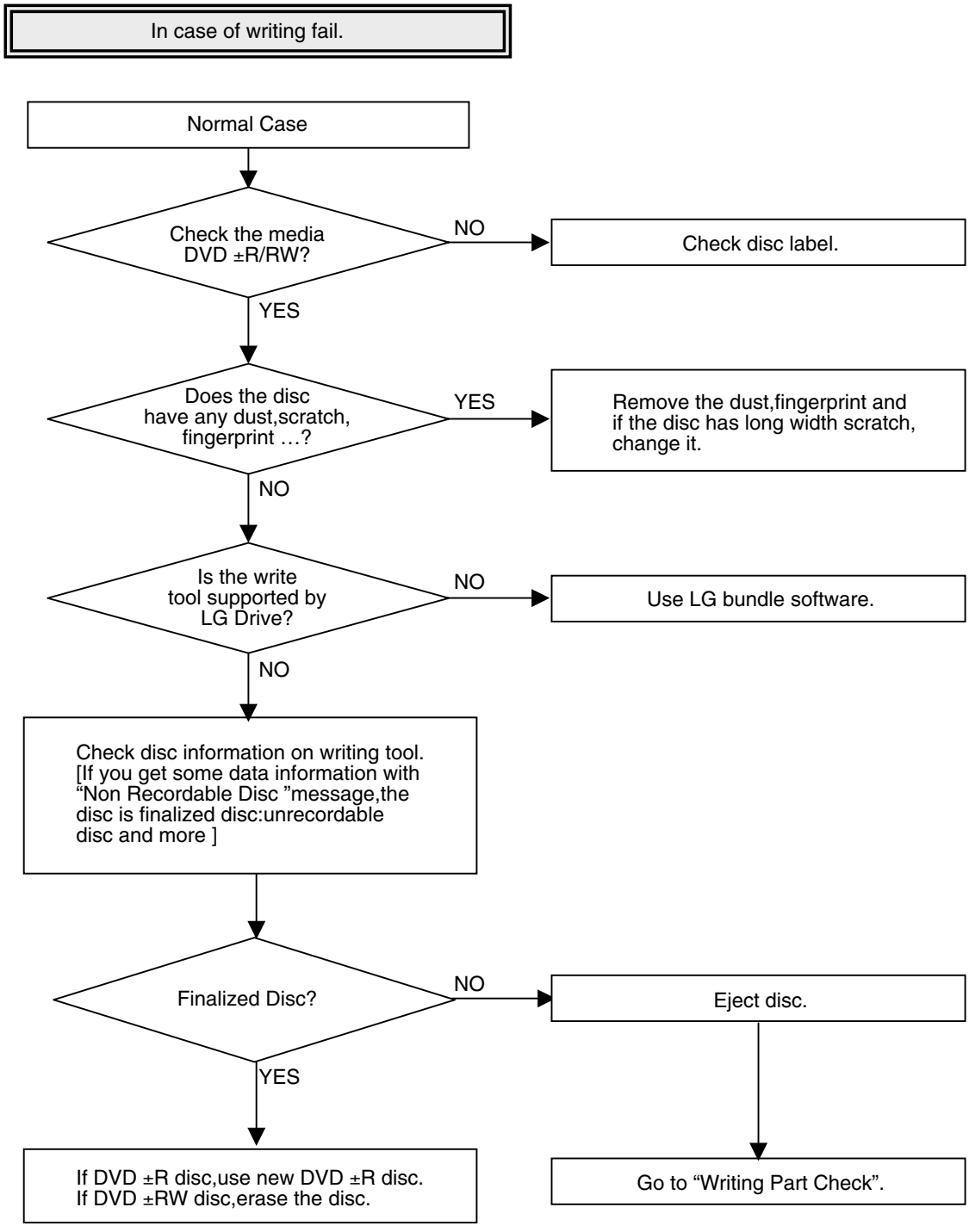

Recognition Fail Case 2:DVD Fail
Check pick-up read power was 0.9~1.1mW?
NO
Go to “LD CHECK”.
YES
Is IC302 pin 46(LDEN-DVD)level was about 3.3V?
NO
Replace the IC302.
YES
Is there RF signal at CN101 pin 13,14.
NO
Replace the pick-up.
YES
Is there RF signal at IC107 pin 99.
NO
Replace the IC107
YES
Check again after the replace IC107.Is it OK?
NO
Replace the IC202.
YES
OK

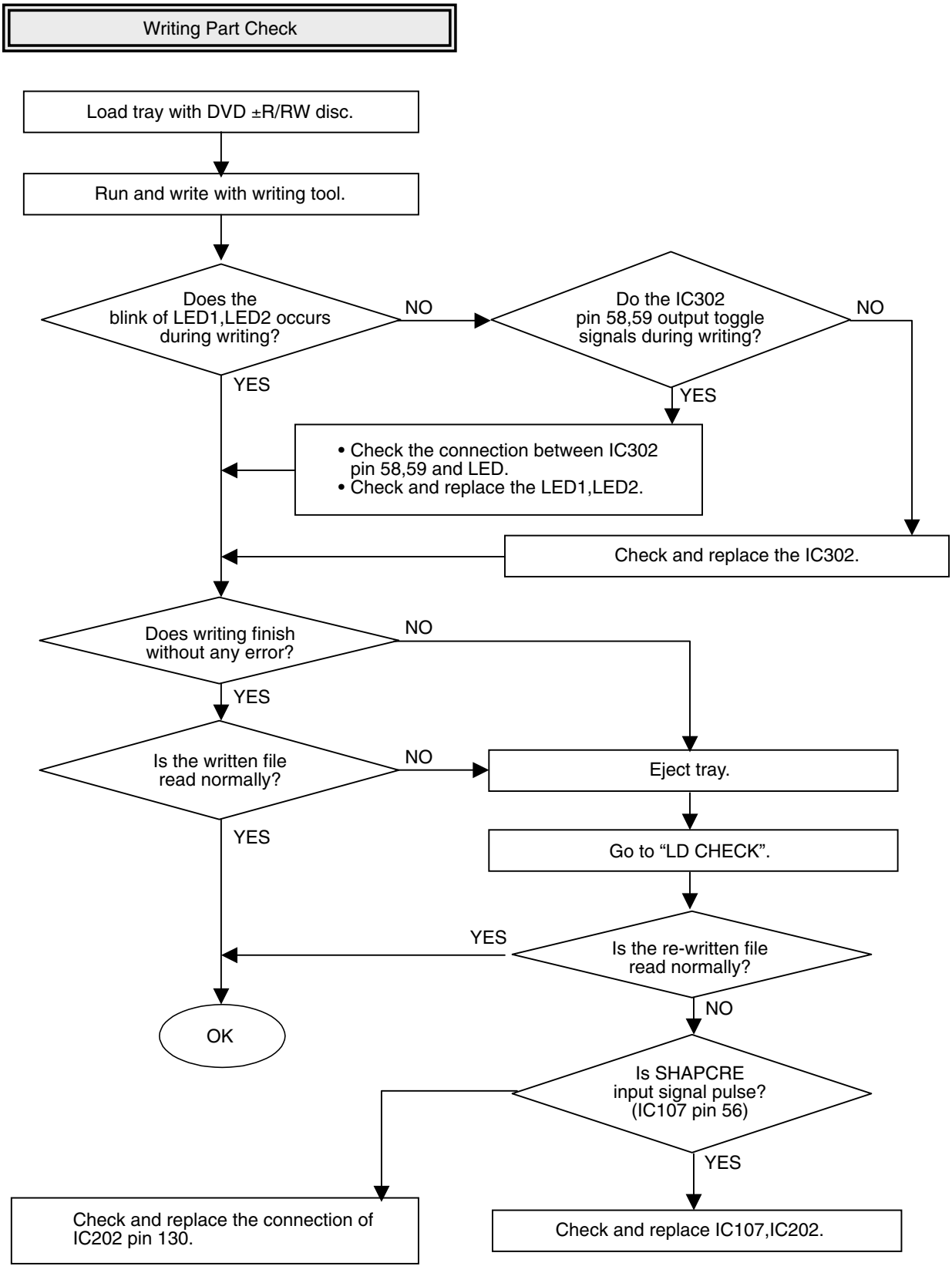

Recognition Fail Case 3: DVD±R/RW Fail
Is there WOBBLE (IC107 pin 75)signal?
NO
Is there WBLLPP (IC202 pin 133)signal?
NO
YES
Replace the IC202.
Replace the IC107.
Check the connection between IC107 and IC202.


LD CHECK
(Laser operating is abnormal)
Execute “B.Check ALPC Parameters”
of “How to use Test Tool”
Is ALPC parameters
valid?
Execute “C.Laser Power Setup”of
“How to use Test Tool”
Execute “D.Laser Inspection”
of “How to use Test Tool”
OFF level
Check reference voltage.
VRDC level &FPD
E
VWDC1 level &FPD
F
VWDC2 level &FPD
G
OK
FPD
VRDC
VWDC1
VWDC2


E
CD/DVD ?
Execute “E.ALPC Test for AS”of “How to Test Tool”(Select “DVD VRDC Loop” and trigger)
Execute “E.ALPC Test for AS”of “How to Test Tool”(Select “CD VRDC Loop” and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 :‘H ’)
Check the input of LDEN-CD. (pin 33 of CN101 :‘H ’)
Check the input of VRDC. (pin 27 of CN101)
Check the input of FPD. (pin 19 of CN101)
END

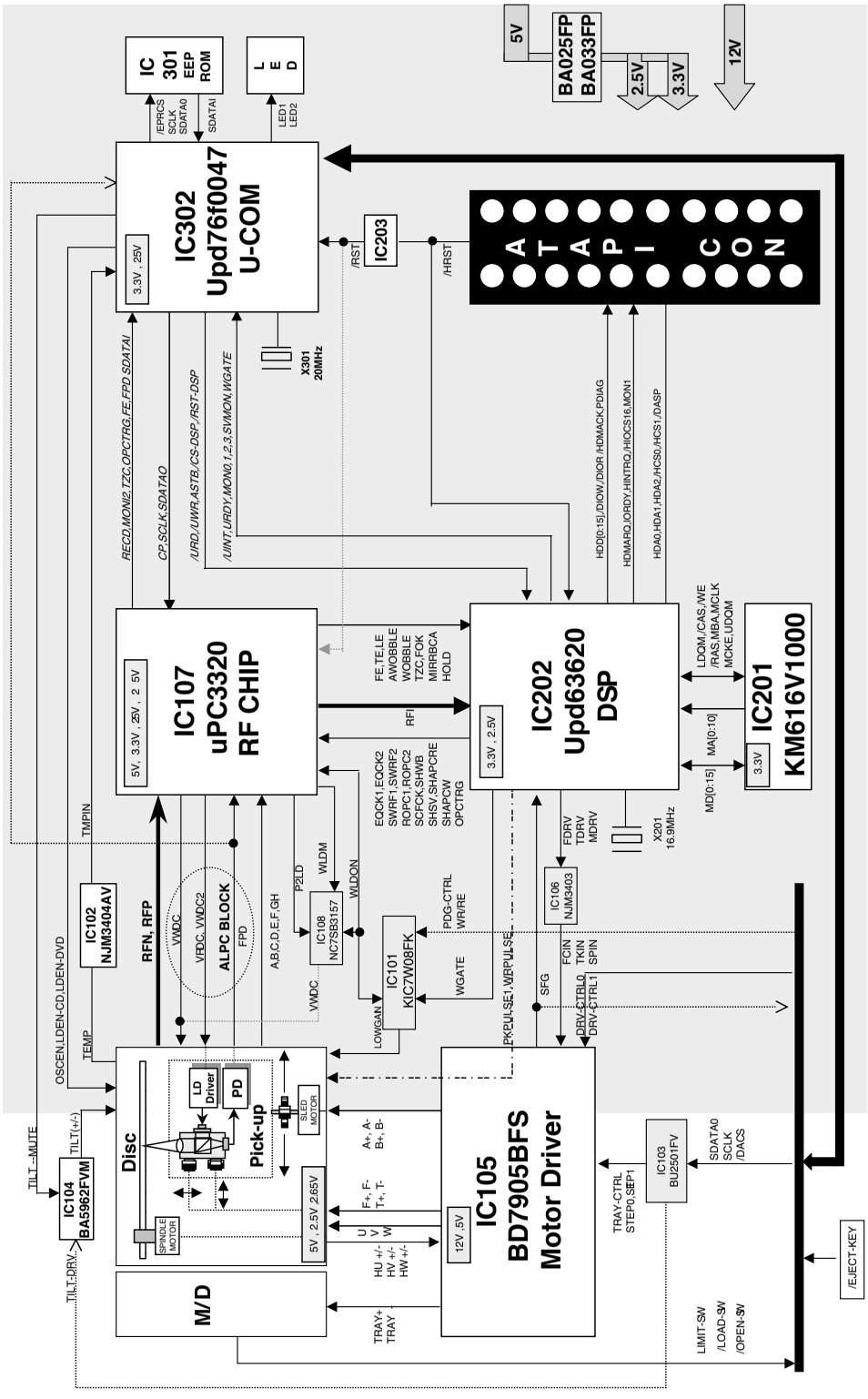

F
Execute “E.ALPC Test for AS”of “How to Test Tool”(Select “DVD-R Rec Mode”and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 : ‘H’)
Check the input of VWDC. (pin 28 of CN101)
Check the input of recording pulse. (pin 31,32 of CN101)
Check the input of FPD. (pin 19 of CN101)
END
G
Execute “E.ALPC Test for AS”of “How to Test Tool”(Select “DVD-RW Rec Mode”and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 : ‘H’)
Check the input of VWDC. (pin 29 of CN101)
Check the input of recording pulse. (pin 31,32 of CN101)
Check the input of FPD. (pin 19 of CN101)
END


In case of writing fail.
Normal Case
Check the media
DVD ±R/RW?
NO
Check disc label.
YES
Does the disc
have any dust,scratch,
fingerprint …?
YES
Remove the dust,fingerprint and
if the disc has long width scratch,
change it.
NO
Is the write
tool supported by
LG Drive?
NO
Use LG bundle software.
NO
Check disc information on writing tool.
[If you get some data information with
“Non Recordable Disc ”message,the
disc is finalized disc:unrecordable
disc and more]
Finalized Disc?
NO
Eject disc.
YES
If DVD ±R disc,use new DVD ±R disc.
If DVD ±RW disc,erase the disc.
Go to “Writing Part Check”.


Writing Part Check
Load tray with DVD ±R/RW disc.
Run and write with writing tool.
Does the blink of LED1,LED2 occurs during writing?
NO
YES
Do the IC302 pin 58,59 output toggle signals during writing?
NO
YES
• Check the connection between IC302 pin 58,59 and LED.
• Check and replace the LED1,LED2.
Check and replace the IC302.
Does writing finish without any error?
NO
YES
Is the written file read normally?
NO
YES
Eject tray.
Go to “LD CHECK”.
Is the re-written file read normally?
YES
NO
OK
Is SHAPCRE input signal pulse? (IC107 pin 56)
YES
Check and replace the connection of IC202 pin 130.
Check and replace IC107,IC202.

BLOCK DIAGRAMS & DESCRIPTION

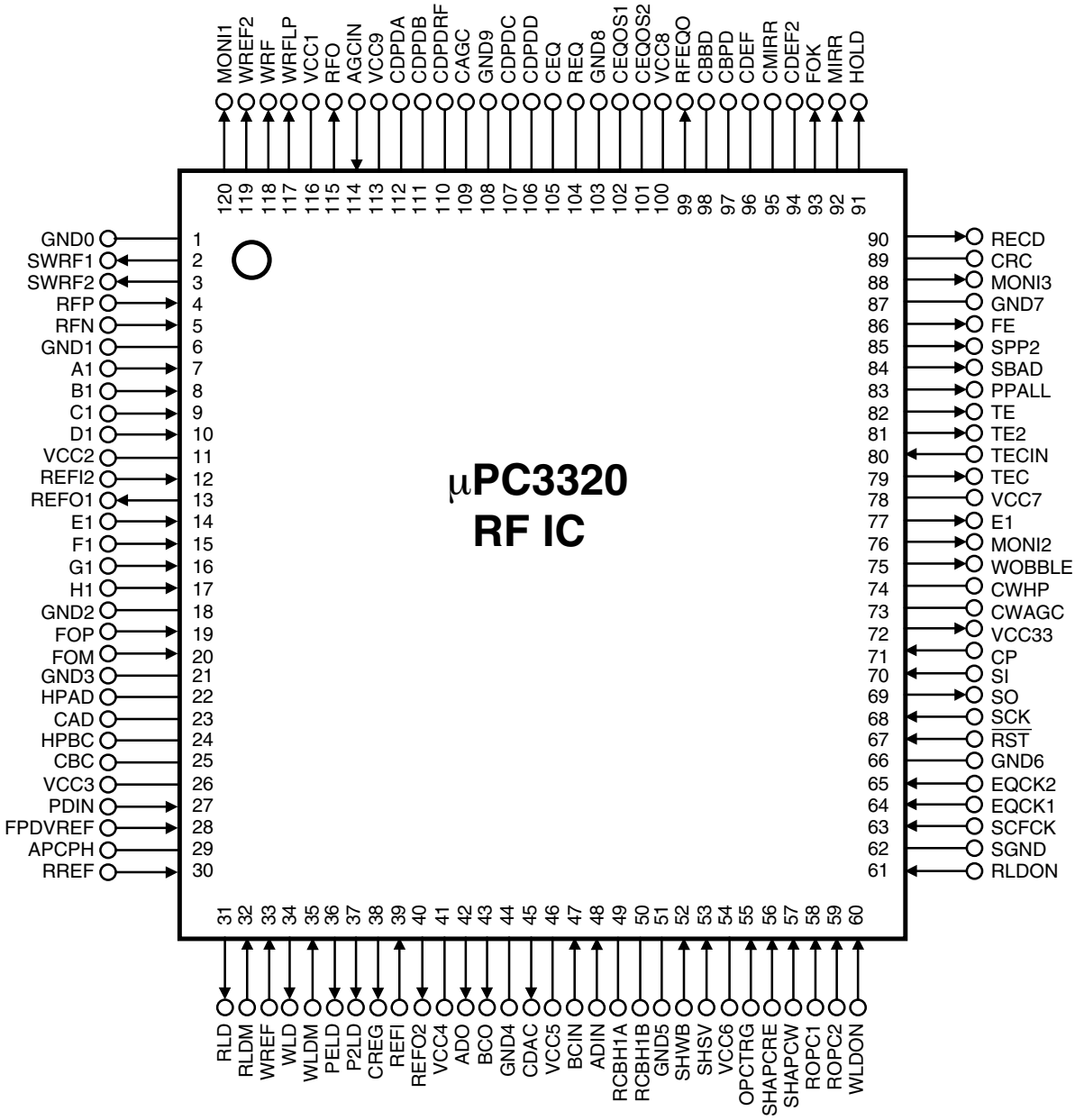
1. Overall Block Diagram



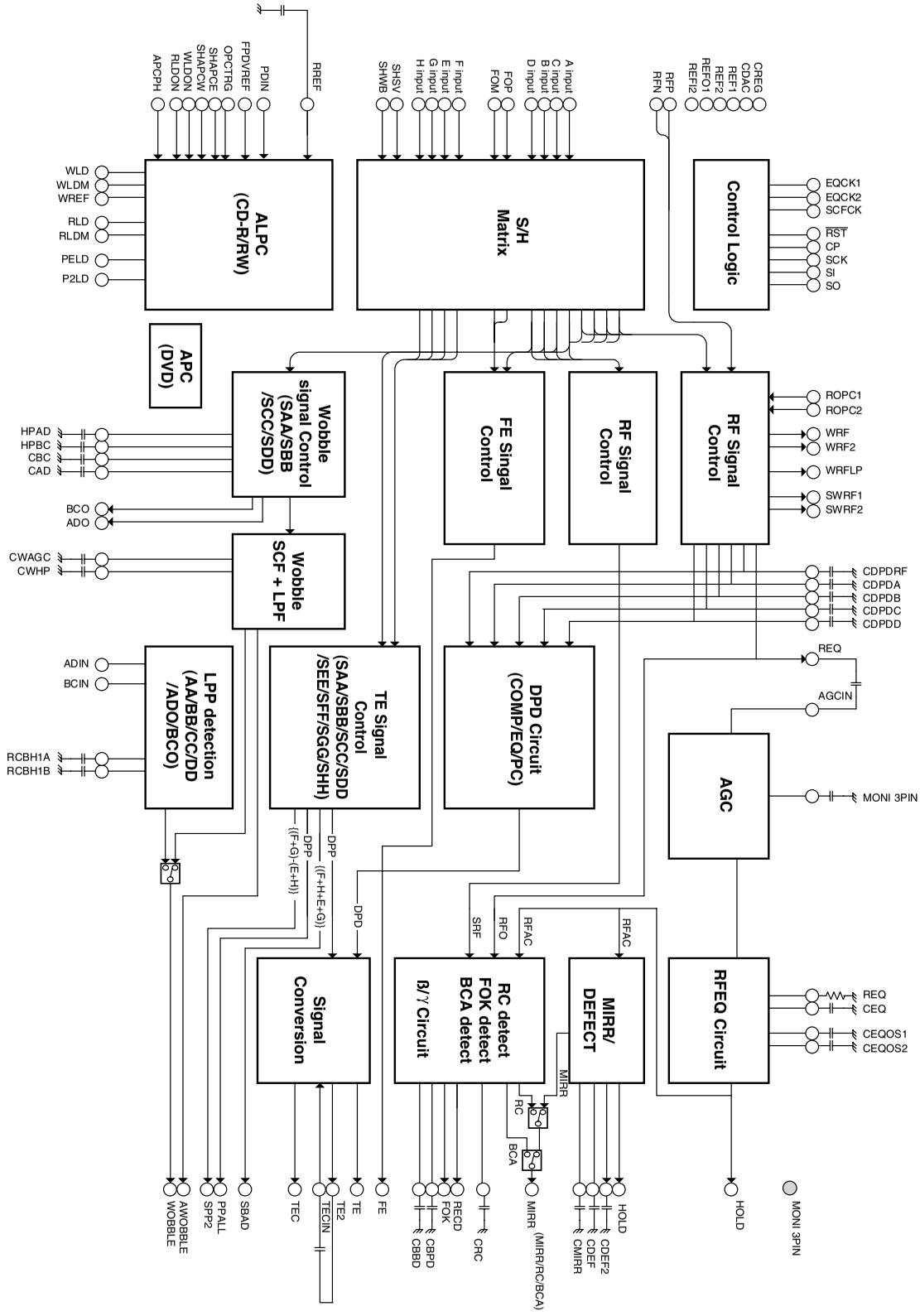
2. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC101 (μPC3320) : RF Signal Processor for CD/DVD

Pin Assignment



Block Diagram



Pin description

No.	Pin Name	Type	Description
1	GND0	-	Analog GND
2	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
3	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
4	RFP	INPUT	RF differerential signal[+] input.
5	RFN	INPUT	RF differerential signal[-] input.
6	GND1	-	Analog GND
7	A1	INPUT	Main beam signal [A1] input.
8	B1	INPUT	Main beam signal [B1] input.
9	C1	INPUT	Main beam signal [C1] input.
10	D1	INPUT	Main beam signal [D1] input.
11	VCC2	-	Analog power.
12	REFI2	INPUT	Reference voltage input pin for PDIC.
13	REFO1	OUTPUT	Pick-up internal reference voltage output[at REFI pin 2.5V: 2.25V output.]
14	E1	INPUT	Sub beam signal [E1] input.
15	F1	INPUT	Sub beam signal [F1] input.
16	G1	INPUT	Sub beam signal [G1] input.
17	H1	INPUT	Sub beam signal [H1] input.
18	GND2	-	Analog GND
19	FOP	INPUT	FO+ signal input for Focus.
20	FOM	INPUT	FO- signal input for Focus.
21	GND3	-	Analog GND
22	HPAD	-	Wobble circuit HPF band setting condenser connecting port.
23	CAD	-	Wobble circuit AGC response time setting condenser connecting port.
24	HPBC	-	Wobble circuit HPF band setting condenser connecting port.
25	CBC	-	Wobble circuit AGC response time setting condenser connecting port.
26	VCC3	-	Analog power.
27	PDIN	INPUT	Laser monitor current input.
28	FPDVREF	INPUT	Reference voltage input pin for front monitor.
29	APCPH	-	Peak-hold condenser connecting pin for ALPC .
30	RREF	-	Read ALPC Condenser connecting port.
31	RLD	OUTPUT	Read Laser drive control output.
32	RLDM	INPUT	Read Laser drive control Amp[-] input.
33	WREF	-	Write ALPC Condenser connecting port.
34	WLD	OUTPUT	Write Laser drive control output.
35	WLDM	INPUT	Write Laser drive control Amp[-] input.
36	PELD	OUTPUT	Pick power output port1.
37	P2LD	OUTPUT	Pick power output port 2.
38	CREG	OUTPUT	Regulater voltage[2.5V] output.
39	REF1	INPUT	DSP power voltage input[2.5V].
40	REFO2	OUOTPTU	DSP Reference voltage output [at REFI port 2.5V: 1.5V output].

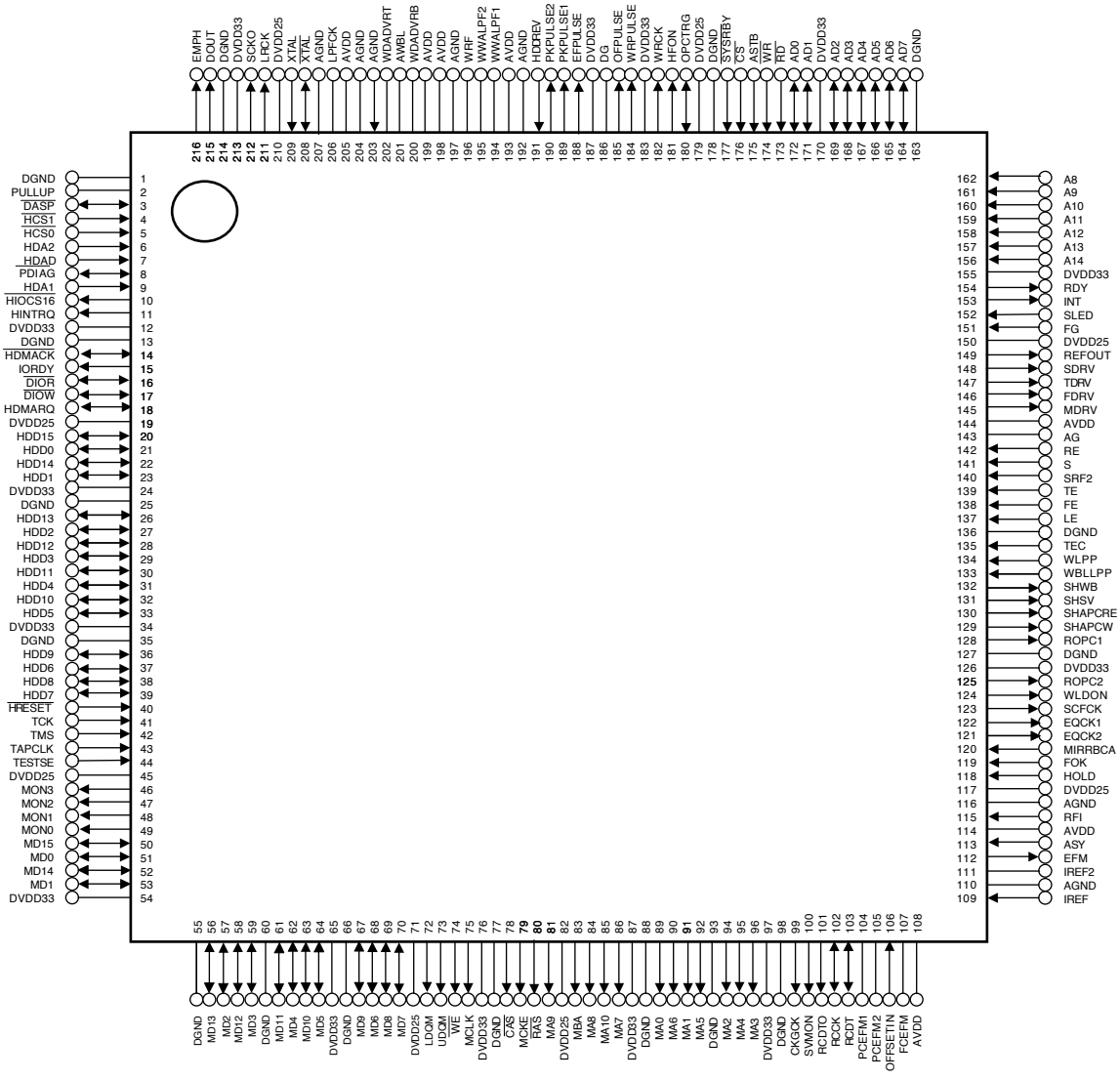
No.	Pin Name	Type	Description
41	VCC4	-	Analog power.
42	ADO	OUTPUT	Wobble circuit [A+D] signal output.
43	BCO	OUTPUT	Wobble circuit [B+C] signal output.
44	GND4	-	Analog GND
45	CDAC	OUTPUT	DAC reference voltage output.
46	VCC5	-	Digital power.
47	BCIN	INPUT	[B+C] signal input.
48	ADIN	INPUT	[A+D] signal input.
49	RCBH1A	-	RLPP circuit bottom hold condenser connecting port.
50	RCBH1B	-	RLPP circuit bottom hold condenser connecting port.
51	GND5	-	Analog GND
52	SHWB	INPUT	Sample hold pulse input for Wobble signal.
53	SHSV	INPUT	Sample hold pulse input for Servo signal.
54	VCC6	-	Digital power.
55	OPCTRG	INPUT	OPCTRG signal input.
56	SHAPCRE	INPUT	Sample hold pulse input for Read/Erase ALPC.
57	SHPCW	INPUT	Sample hold pulse input fot Write ALPC.
58	ROPC1	INPUT	Sample hold pulse input 1 for WRF signal.
59	ROPC2	INPUT	Sample hold pulse input 2 for WRF signal.
60	WLDON	INPUT	Write ALPC Center signal input.
61	RLDON	INPUT	Read ALPC Center signal input.
62	SGND	-	Sub straight GND.
63	SCFCK	INPUT	SCF clock input.
64	EQCK1	INPUT	Fixed clock input.
65	EQCK2	INPUT	Equalize automatic control clock input.
66	GND6	-	Analog GND
67	RST	INPTU	Register reset input.
68	SCK	INPUT	Register setting clock input.
69	SO	OUTPUT	Serial data output.
70	SI	INPUT	Serial data input.
71	CP	INPUT	Address
72	VCC33	OUTPUT	Power voltage [3.3V monitor].
73	CWAGC	-	Wobble circuit AGC response time setting condenser connecting port.
74	CWHP	-	Wobble circuit HPF band setting condenser connecting port.
75	WOBBLE	OUTPUT	Wobble signal output [Digital signal].
76	AWOBBLE	OUTPUT	Wobble signal output [Analog signal].
77	MONI2	OUTPUT	Internal signal monitor port.
78	VCC7	-	Digital power.
79	TEC	OUTUPT	Tracking zero cross signal output.
80	TECIN	INPUT	Tracking zero cross signal input.

No.	Pin Name	Type	Description
81	TE2	OUTPUT	Tracking error signal output.
82	TE	OUTPUT	Tracking error signal output for Servo.
83	PPALL	OUTPUT	Main side push-pull signal output.
84	SBAD	OUTPUT	Sub beam signal output [(E+F+G+H) signal].
85	SPP2		Sub beam signal output [(F+G)-(E+H) signal].
86	FE	OUTPUT	Focus error signal.
87	GND7	-	Analog GND
88	MONI3	OUTPUT	Internal signal monitor port.
89	CRC	-	Radial contrast circuit condenser connecting port.
90	RECD	OUTPUT	No recording area detection.
91	HOLD	OUTPUT	Detection signal output.
92	MIRR	OUTPUT	Mirror detection/RCA signal output.
93	FOK	OUTPUT	Focus OK signal.
94	CDEF2	-	Detect circuit condenser connecting port 2.
95	CMIRR	-	Mirror circuit condenser connecting port.
96	CDEF	-	Detect circuit condenser connecting port .
97	CBPD	-	β, γ adetection[peak]condenser connecting port.
98	CBBD	-	β, γ adetection[buttom]condenser connecting port.
99	RFEQO	OUTPUT	Equalizer output.
100	VCC8	-	Analog power.
101	CEQOS2	-	RF Equalizer circuit condenser connecting port 2.
102	CEQOS1	-	RF Equalizer circuit condenser connecting port 1.
103	GND8	-	Analog GND
104	REQ	-	RF Equalizer circuit volatage setting resistance connecting port.
105	CEQ	-	Equalizer fc automatic control curcuit condenser connecting port.
106	CDPDD	-	DPD [D signal] HPF band setting condenser connecting port.
107	CDPDC	-	DPD [C signal] HPF band setting condenser connecting port.
108	GND9	-	Analog GND
109	CDPDC	-	RFAGC circuit condenser connecting port.
110	CDPDRF	-	DPD [RF signal] HPF band setting condenser connecting port.
111	CDPDRF	-	DPD [B signal] HPF band setting condenser connecting port.
112	CDPDA	-	DPD [A signal] HPF band setting condenser connecting port.
113	VCC9	-	Analog power.
114	AGCIN	INPTU	AGC input
115	RFO	OUTPUT	Read RF signal output.
116	VCC1	-	Analog power.
117	WRFLP	OUTPUT	Write RF LPF output.
118	WRF	OUTPUT	Write RF signal output.
119	WFR2	OUTPUT	Write RF2 signal output.
120	MONI1	OUTPUT	Internal signal monitor port.

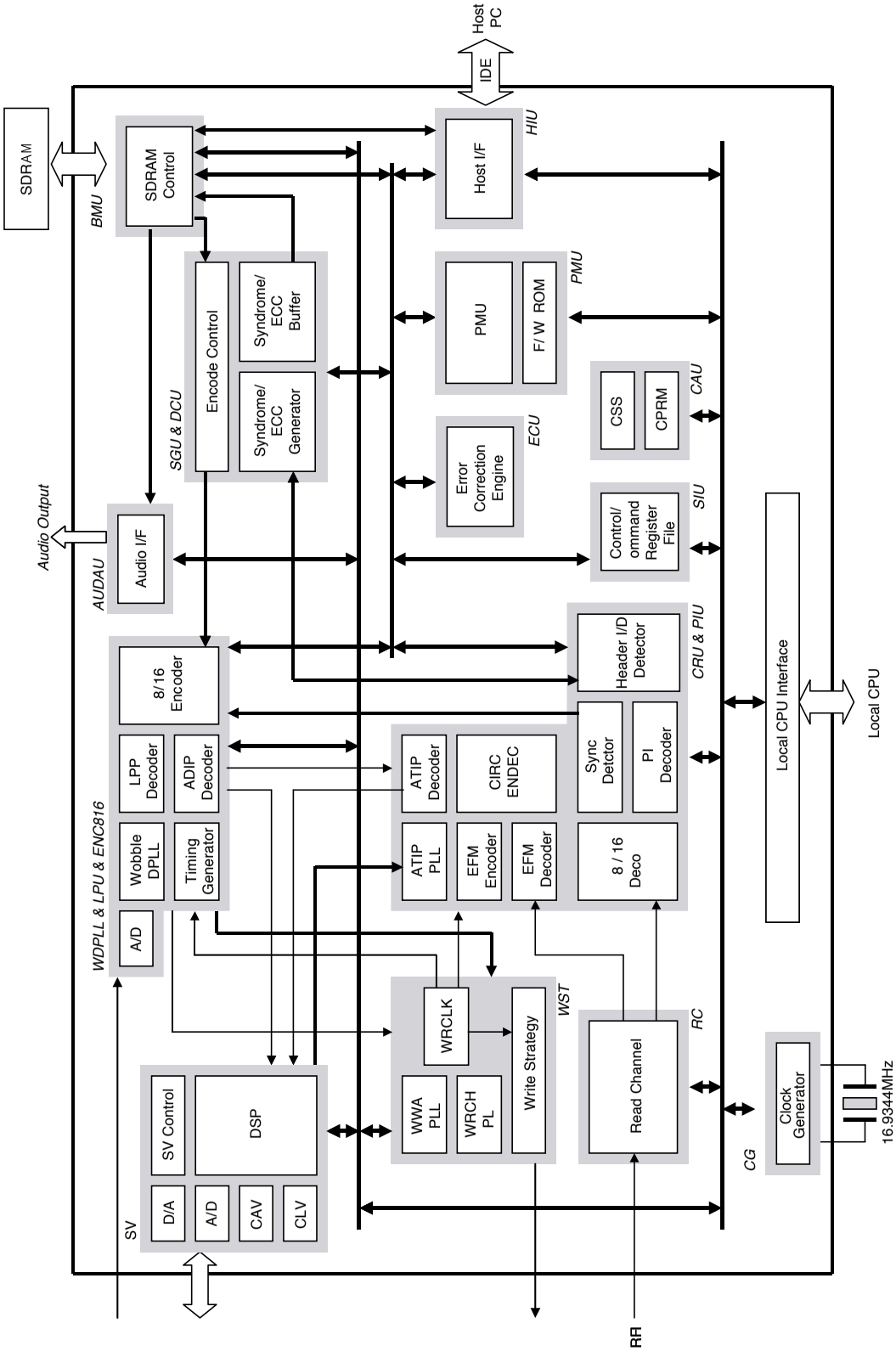
3. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC201(*μ*PD63620) : Encoder, Decoder & DSP Signal Processor

Pin Assignment



Block Diagram



Pin description

Pin No.	Pin Name		Type		Description
1	DGND	-	-	-	Digital GND
2	PULLUP	-	-	-	Pull-up resistance connecting port.[5V or 3.3V]
3	$\overline{\text{DASO}}$	5V_tolerant	I/O	Pull-up	Drive active slave presesnt signal.[open/drain]
4	$\overline{\text{HCS1}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
5	$\overline{\text{HCS0}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
6	HDA2	5V_tolerant	I	-	Host interface chip, address signal input.
7	HDAO	5V_tolerant	I	-	Host interface chip, address signal input.
8	$\overline{\text{PDIAG}}$	5V_tolerant	I/O	Pull-up	Diagnostic signal [open/drain]
9	HDA1	5V_tolerant	I	-	Host interface chip, address signal input.
10	$\overline{\text{HIOCS16}}$	5V_tolerant	I	Pull-up	16 bit I/O signal [open/drain]. When Ultra DMA burst, this is 3 state port.
11	HINTRQ	5V_tolerant	O	Pull-up	Host interrupt signal output.
12	DVDD33	-	-	-	Digital power[3.3V]
13	DGND	-	-	-	Digital GND
14	$\overline{\text{HDMACK}}$	5V_tolerant	I/O	-	DMA acknowledge signal.
15	IORDY	5V_tolerant	I	Pull-up	I/O Channel ready[open/drain]. When Ultra DMA burst, this is DDMARDY: DSTROBE signal.
16	$\overline{\text{DIOR}}$	5V_tolerant	I/O	-	Host interface read input signal. When Ultra DMA burst, this is HDMARDY: HSTROBE signal.
17	$\overline{\text{DIOW}}$	5V_tolerant	I/O	-	Host interface write input signal. When Ultra DMA burst, this is STOP signal.
18	HDMARQ	5V_tolerant	O	Pull-up	DMA request signal output.
19	DVDD25	-	-	-	Digital power[2.5V]
20	HDD15 HDD8	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
21	HDD0 HDD6	5V_tolerant	O	Pull-up	Host interface data bus.[within slave resistance]
22	HDD14 HDD9	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
23	HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
24	DVDD33	-	-	-	Digital power[3.3V]
25	DGND	-	-	-	Digital GND
26	HDD13 HDD10	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
27	HDD2 HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]

Pin No.	Pin Name		Type		Description
28	DGND HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
29	HDD3 HDD3	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
30	HDD11 HDD12	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
31	HDD4 HDD2	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
32	HDD7 HDD13	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
33	HDD7 HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
34	DVDD33	-	-	-	Digital power[3.3V]
35	DGND	-	-	-	Digital GND
36	HDD9 HDD14	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
37	HDD6 HDD0	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
38	HDD8 HDD15	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
39	HDD7	5V_tolerant	I/O	Pull-up	Host interface data bus.
40	$\overline{\text{HRESET}}$	5V_tolerant	I/O	-	Host reset input.
41	TCK	3V	I	-	Test port. It must be connected to DGND.
42	TMS	3V	I	-	Test port. It must be connected to DGND.
43	TAPCLK	3V	I	-	Test port. It must be connected to DGND.
44	TESTSE	3V	I	-	Test port. It must be connected to DGND.
45	DVDD25	-	-	-	Digital power[2.5V]
46	MON3	3V	O	L	Monitor: test signal.
47	MON2	3V	O	L	Monitor: test signal.
48	MON1	3V	I/O	L	Monitor: test signal.
49	MON0	3V	I/O	L	Monitor: test signal.
50	MD15	3V	I/O	Pull-up	Buffer memory , Interface data bus.
51	MD0	3V	I/O	Pull-up	Buffer memory , Interface data bus.
52	MD14	3V	I/O	Pull-up	Buffer memory , Interface data bus.
53	MD1	3V	I/O	Pull-up	Buffer memory , Interface data bus.
54	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
55	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
56	MD13	3V	I/O	Pull-up	Buffer memory , Interface data bus.
57	MD2	3V	I/O	Pull-up	Buffer memory , Interface data bus.
58	MD12	3V	I/O	Pull-up	Buffer memory , Interface data bus.
59	MD3	3V	I/O	Pull-up	Buffer memory , Interface data bus.
60	DGND	-	-	-	Digital GND.
61	MD11	3V	I/O	Pull-up	Buffer memory , Interface data bus.
62	MD4	3V	I/O	Pull-up	Buffer memory , Interface data bus.
63	MD10	3V	I/O	Pull-up	Buffer memory , Interface data bus.
64	MD5	3V	I/O	Pull-up	Buffer memory , Interface data bus.
65	DVD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
66	DGND	-		-	Digital GND.(Buffer. Memory. Block)
67	MD9	3V	I/O	Pull-up	Buffer memory , Interface data bus.
68	MD6	3V	I/O	Pull-up	Buffer memory , Interface data bus.
69	MD8	3V	I/O	Pull-up	Buffer memory , Interface data bus.
70	MD7	3V	I/O	Pull-up	Buffer memory , Interface data bus.
71	DVDD25	-	-	-	Digital power.[2.5V]
72	LDQM	3V	O	H	Low byte, data input/output mask control signal.
73	UDQM	3V	O	H	High byte, data input/output mask control signal.
74	WE	3V	O	H	Buffer memory , Interface write enable signal.
75	MCLK	3V	O	Pull-up	SDRAM clock output.
76	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
77	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
78	$\overline{\text{CAS}}$	3V	O	H	Buffer memory , Interface column address strobe control signal.
79	MCKE	3V	O	H	SDRAM clock enable control signal.
80	$\overline{\text{RAS}}$	3V	O	H	Buffer memory , Interface row address strobe control signal.
81	MA9	3V	O	L	Buffer memory , Interface address bus.
82	DVDD25	-	-	-	Digital power.[2.5V]
83	MBA	3V	O	L	Buffer memory , Interface bank address signal.
84	MA8	3V	O	L	Buffer memory , Interface data bus.
85	MA10	3V	O	L	Buffer memory , Interface data bus.
86	MA7	3V	O	L	Buffer memory , Interface data bus.
87	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
88	DGND	-	-	-	Buffer memory , Interface data bus.
89	MA0	3V	O	H	Buffer memory , Interface data bus.
90	MA6	3V	O	L	Buffer memory , Interface data bus.
91	MA1	3V	O	L	Buffer memory , Interface data bus.
92	MA5	3V	O	L	Buffer memory , Interface data bus.
93	DGND	-	-	-	Digital GND
94	MA2	3V	O	L	Buffer memory , Interface data bus
95	MA4	3V	O	L	Buffer memory , Interface data bus.
96	MA3	3V	O	L	Buffer memory , Interface data bus.
97	DVDD3	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
98	DGND	-	-	-	Digital GND (Buffer. Memory. Block)
99	CKGCK	3V	O		Clock, Generator output.
100	SVMON	3V	O	L	Servo, block monitor signal output.
101	RCDTO	3V	O	L	Read channel data output.
102	RCCK	3V	I/O	Hi-Z	Read channel clock output.
103	RCDT	3V	I/O	Hi-Z	Read channel data output.
104	PCEFM1	Analog	-	-	Read channel phase discriminator condenser connecting port.
105	PCEFM2	Analog	-	-	Read channel phase discriminator condenser connecting port.
106	OFFSETIN	Analog	-	-	Read channel phase discriminator charge pump control port.
107	FCEFM	Analog	-	-	Read channel frequency discriminator condenser connecting port.
108	AVDD	-	-	-	Analog power[2.5V]
109	IREF	Analog	o	-	Read channel analog reference voltage input.
110	AGND	-	-	-	Analog GND[EFM PLL]
111	IREF2	Analog	O	-	Non connecting port.
112	EFM	Analog	O	Pull-up	EFM comparator output.
113	ASY	Analog	O	-	EFM comparator asymmetry control voltage input.
114	AVDD	-	-	-	Analog power[2.5V]
115	RFI	Analog	O		EFM comparator RF signal input.
116	AGND	-	-	-	Analog GND[EFM]
117	DVDD25	-	-	-	Digital power.[2.5V]
118	HOLD	3v	O	-	HOLD control signal input.
119	FOK	3v	O	-	FOK signal input.
120	MIRRBCA	3V	O	-	Mirror signal or BCA signal input.

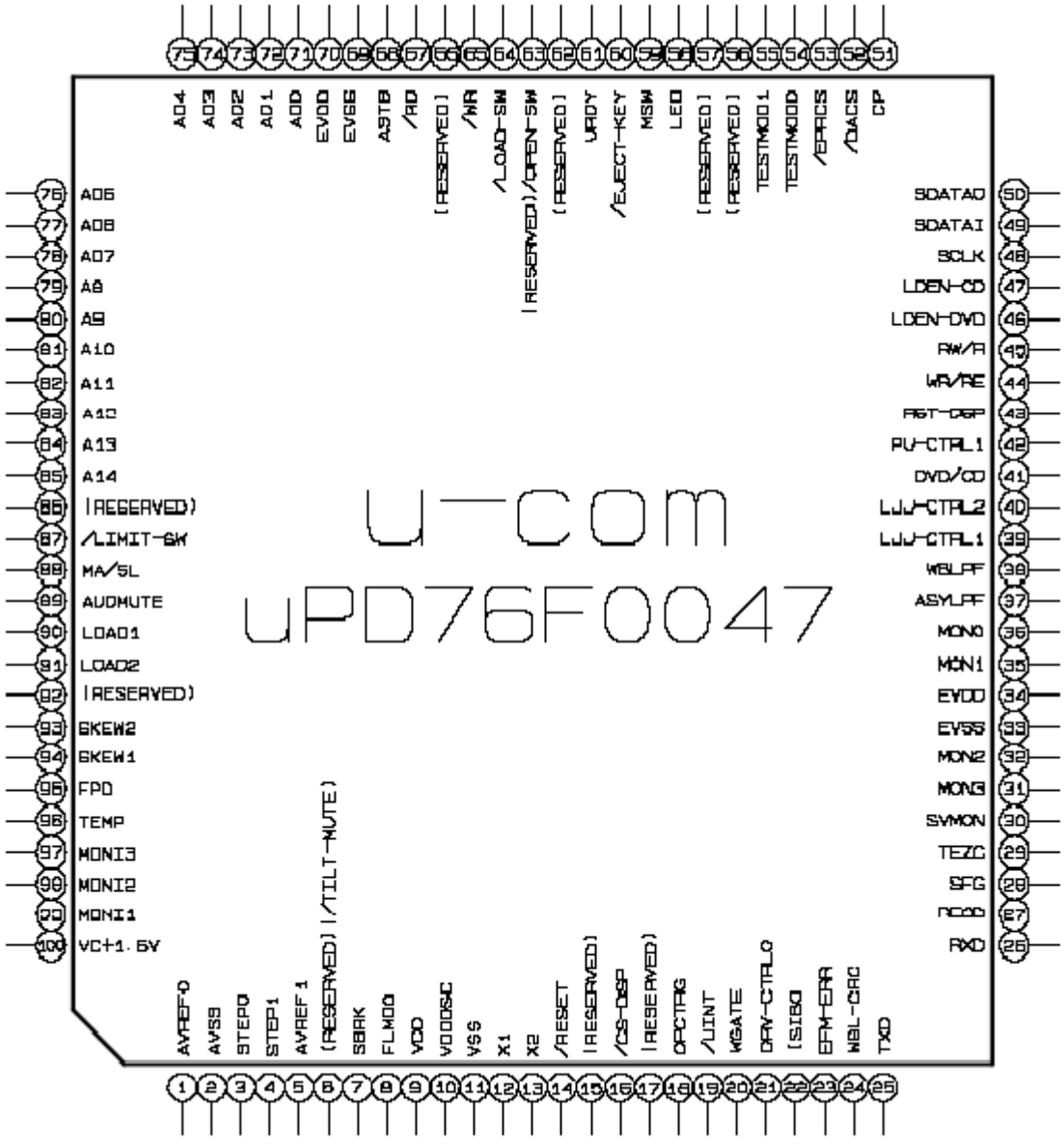
Pin No.	Pin Name		Type		Description
121	MIRRBCA	3V	O	Pull-up	RF AMP PC3320 RF equalizer automatic follow-up clock output.
122	EQCK1	3V	O	Pull-up	RF AMP PC3320 RF equalizer fixed clock output.
123	SCFCK	3V	O	P	RF AMP PC3320 RF equalizer automatic follow-up clock output.
124	WLDON	3V	O	L	Laser, Driver write laser control signal.
125	ROPC2	3V	O	L	Running OPC,sample hold signal.
126	DVDD33	-	-	-	Digital power.[3.3V]
127	DGND	-	-	-	Digital GND
128	ROPC1	3V	O	L	Running OPC,sample hold signal.
129	ROPC1	3V	O	L	APC write, sample hold signal.
130	SHAPCRE	3V	O	H	APC read/erase, sample hold signal.
131	SHSV	3V	O	H	Servo, sample hold signal.
132	SHWB	3V	O	H	Wobble, sample hold signal.
133	WBLLPP	3V	I	-	CD: 2 direct Wobble signal input, DVD: RLPP signal input.
134	TEC	3V	I	-	Test port. It must be connected to DGND.
135	TEC	3V	I	-	Tracking, zero, cross signal input.
136	DGND	-	-	-	Digital GND
137	LE	Analog	I	-	Lens error signal input [A/D convertor].
138	FE	Analog	I	-	Focus error signal input [A/D convertor].
139	TE	Analog	I	-	Tracking error signal input [A/D convertor].
140	SWRF2	Analog	I	-	WRF sample hold signal input [A/D convertor].
141	SWRF1	Analog	i	-	WRF sample hold signal input [A/D convertor].
142	REFIN	Analog	I	-	Reference voltage input [A/D convertor].
143	AGND	-	-	-	Analog GND[Servo A/D, D/A block]
144	AVDD	-	-	-	Analog power 2.5V[Servo A/D, D/A block].
145	MDRV	Analog	O		Spindle drive output [D/A convertor output].
146	FDRV	Analog	O		Focus drive output [D/A convertor output].
147	TDRV	Analog	O		Trackng drive output [D/A convertor output].
148	SDRV	Analog	O		Sled drive output [D/A convertor output].
149	REFOUT	Analog	O	1/2AVDD	Reference voltage output.
150	DVDD25	-	-	-	Digital power[2.5V]
151	FG	5V_tolerant	I	-	FG signal input
152	SLED	5V_tolerant	O	-	Sled position sensor input.
153	INT	5V_tolerant	O	L	Interrupted request signal output to Local CPU

Pin No.	Pin Name		Type		Description
154	RDY	5V_tolerant	I	-	Access control signal output from Local CPU to SDRAM.
155	DVDD33	-	-	-	Digital power[3.3V]
156	A14	5V_tolerant	I	-	Local CPU Adress bus.
157	A13	5V_tolerant	I	-	Local CPU Adress bus.
158	A12	5V_tolerant	I	-	Local CPU Adress bus.
159	A11	5V_tolerant	I	-	Local CPU Adress bus.
160	A10	5V_tolerant	I	-	Local CPU Adress bus.
161	A9	5V_tolerant	I	-	Local CPU Adress bus.
162	A8	5V_tolerant	I	-	Local CPU Adress bus.
163	DGND	-	-	-	Digital GND
164	AD7	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
165	AD6	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
166	AD5	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
167	AD4	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
168	AD3	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
169	AD2	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
170	DVDD33	-	-	-	Digital power[3.3V]
171	AD1	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
172	AD0	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
173	RD	5V_tolerant	I	-	Read strobe signal input.
174	WR	5V_tolerant	I	-	Write strobe signal input.
175	ASTB	5V_tolerant	I	-	Address strobe input.
176	$\overline{CS}$	5V_tolerant	I	-	Chip selector input from Local CPU.
177	$\overline{SYSRST}$	5V_tolerant	I	-	Reset input.
178	DGND	-	-	-	Digital GND.
179	DVDD25	-	-	-	Digital power[2.5V]
180	OPCTRG	3V	I/O	-	Wobble FM demodulation data output. DVD mode: OPCTRG signal output.
181	HFON	3V	O	H	Laser, Driver high-frequency control signal.
182	WRCK	-	-	L	Write Clock.
183	DVDD33	-	-	-	Digital power[3.3V]
184	WRPULSE	3V	O	L	Write pulse [write laser/driver control signal]
185	OFPULSE	3V	O	H	Write pulse [write laser/driver control signal]
186	DGND	-	-	-	Digital GND.

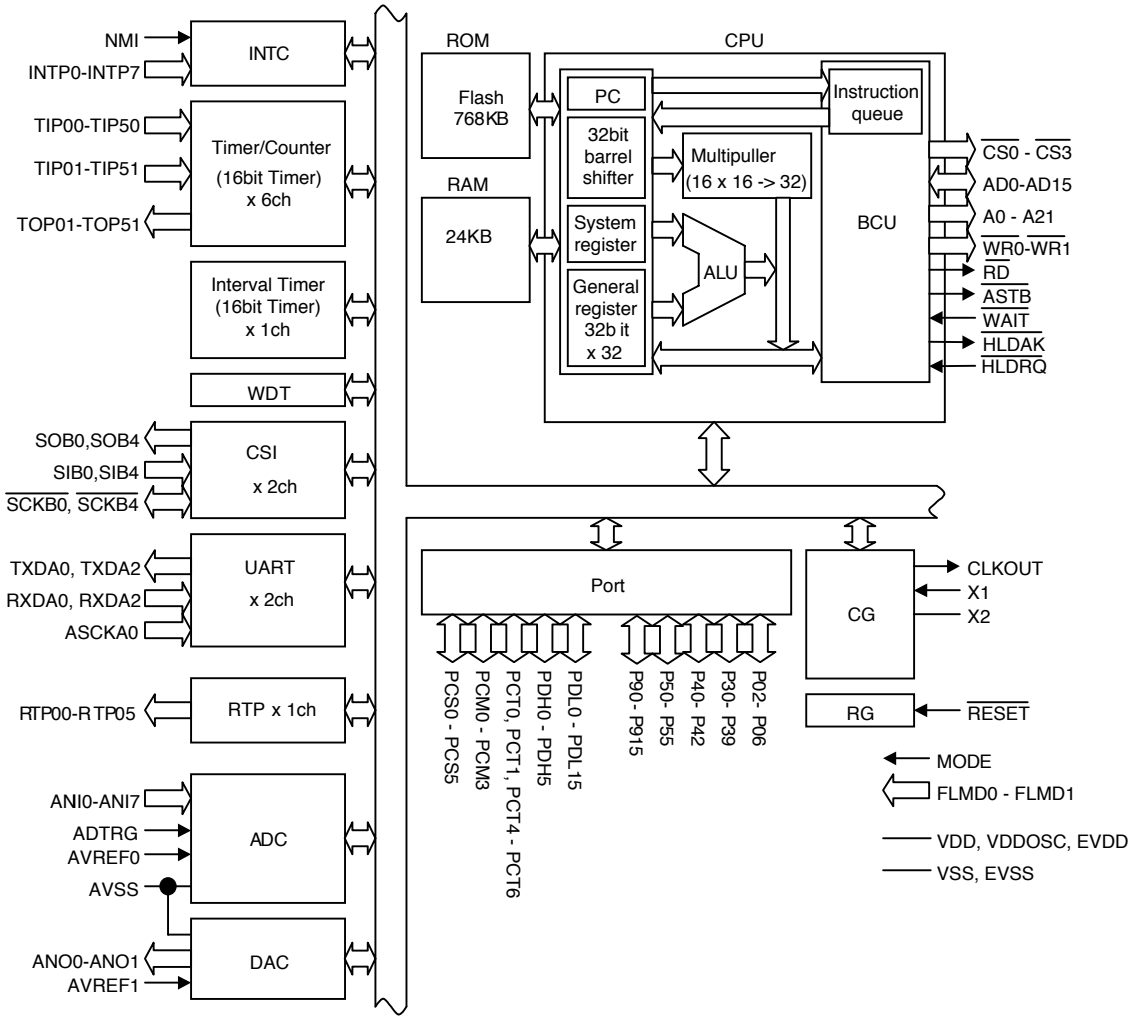
Pin No.	Pin Name		Type		Description
187	DVDD33	-	-	-	Digital power[3.3V]
188	EFPULSE	3V	O	L	OFF pluse output[write laser/driver control signal].
189	PKPULSE1	3V	O	L	Peak pluse output[write laser/driver control signal].
190	PKPULSE2	3V	O	L	Peak pluse output[write laser/driver control signal].
191	HDDREV	3V	I	-	Host interface data bus selector.[H: general, L: reverse]
192	AGND	-	-	-	Analog GND[WWAPLL]
193	AVDD	-	-	-	Analog power 2.5V [WWAPLL]
194	WWALPF1	Analog	-	-	WWAPLL condenser connecting port.
195	WWALPF2	Analog	-	-	WWAPLL condenser connecting port.
196	WRLPF	Analog	-	-	WST DLL condenser connecting port.
197	AGND	-	-	-	Analog GND[WST DLL block]
198	AVDD	-	-	-	Analog power 2.5V [WST DLL block]
199	AVDD	-	-	-	Analog power 2.5V [WDPLL A/D block]
200	WDADVRT	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
201	AWBL	Analog	I	-	Analog wobble signal input port.
202	WDADVRB	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
203	AGND	-	-	-	Analog GND[WDPLL A/D block]
204	AGND	-	-	-	Analog GND[PLL block]
205	AVDD	-	-	-	Analog power 2.5V [PLL block]
206	LPFCK	Analog	-	-	Test port. It must be connected to AGND.
207	AGND	-	-	-	Analog GND[Crystal block]
208	$\overline{\text{XTAL}}$	-	I/O	-	Crystal oscillator connecting port.
209	XTAL	-	I	-	Crystal oscillator connecting port.
210	DVDD25	-	-	-	Digital power[2.5V]
211	LRCK	3V	O	Pull-up	DOUT serial audio data.
212	SCKO	3V	O	Pull-up	Serial audio data synchronizing clock output port.
213	DVDD33	-	-	-	Digital power[3.3V]
214	DGND	-	-	-	Digital GND
215	DOUT	3V	O	Pull-up	Serial audio data output port.
216	EMPH	3V	O	Pull-up	Emphasis distingish signal.

4. IC302(uPD76f0047):MICOM

Pin Assignment



Block Diagram



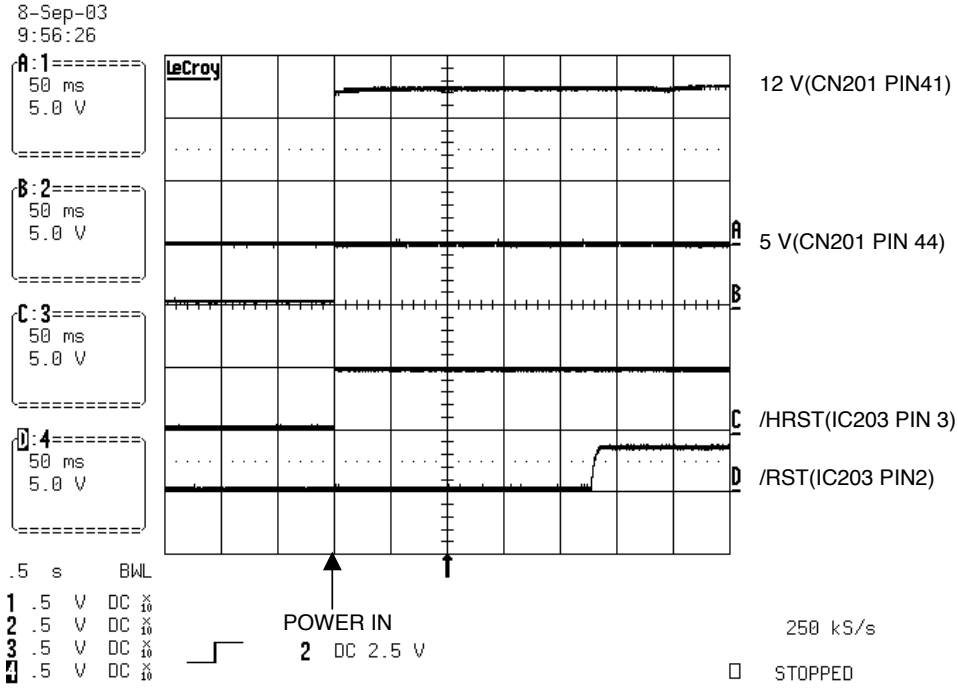
Pin description

Pin No.	Pin Name	Type	Des cription
1	AVREF0	I	A/D CONVERTER REFERENCE VOLTAGE INPUT
2	AVSS	-	A/D,D/A CONVERTER POTENTIAL
3	STEP0	O	STEPPTING MOTOR CONTROL SIGNAL
4	STEP1	O	STEPPTING MOTOR CONTROL SIGNAL
5	AVREF1	I	D/A CONVERTER REFERENCE VOLTAGE INPUT
6	TILT-MUTE	O	TILT DRIVE MUTE SIGNAL
7	SBRK	O	EXTERNAL MEMORY ADDRESS BUS
8	FLMD0	I	FLASH PROFLAMING MODE
9	VDD	-	I NTERNAL CONSTANT POWER
10	VDDOSC	-	CONSTANT POWER
11	VSS	-	INTERNAL GROUND POTENTIAL
12	X1	I	MAIN CLOCK
13	X2	-	MAIN CLOCK
14	/RESET	I	SYSTEM RESET
15	(RESERVED)	-	-
16	/CS-DSP	O	CHIP SELECTOR OUPUT
17	(RESERVED)	-	-
18	OPCTRG	I/O	WOBBLE FM DE M ODUL ATI ON DATA
19	/UINT	I	INTERRUPTED REQUEST SIGNAL INPUT
20	WGATE	I	DRIVER WRITER LASER CONTROL SIGNAL
21	DRV-CTRL0	-	-
22	SIB0	I	SERIAL CLOCK
23	EFM-ERR	-	-
24	WBL-CRC	-	-
25	TXD	O	SERIAL CLOCK
26	RXD	I	SERIAL CLOCK
27	RECD	I	NO RECODRDING AREA DETECTION
28	SFG	I	FG SIGNAL INPUT
29	TEZC	I	TRACK ZERO CROSS SIGNAL INPUT
30	SVMON	I	SERVO BLOCK MONITOR SIGNAL
31	MON3	I	M ONI TOR TEST SINGNAL
32	MON2	I	M ONI TOR TEST SINGNAL
33	EVSS	-	EXTERNAL CONSTANT POWER
34	EVDD	-	EXTERNAL CONSTANT POWER
35	MON1	I	MONITOR TEST SINGNAL
36	MON0	I	MONITOR TEST SINGNAL
37	ASYLPF	-	-
38	WBLPF	-	-
39	LJJ-CTRL1	-	-
40	LJJ-CTRL2	-	-
41	DV D/CD	-	-
42	PU-CTRL1	O	PD IC GAIN CONTROL SIGNAL
43	RST-DSP	O	RESET OUT
44	WR/RE	O	PD IC GAIN COTTROL SI NAL(WRITE/READ)
45	RW/R	-	-
46	LDEN-DVD	O	PICK-UP LD ENABLE SIGNAL (DV D)
47	LDEN-CD	O	PIC K-UP LD ENABLE SIGNAL (C D)
48	SCLK	O	REGISTER SETTING CLOCK
49	SDATAI	I	REGISTER SETTING DATA INPUT
50	SDATAO	O	REGISTER SETTING DATA OUTPUT

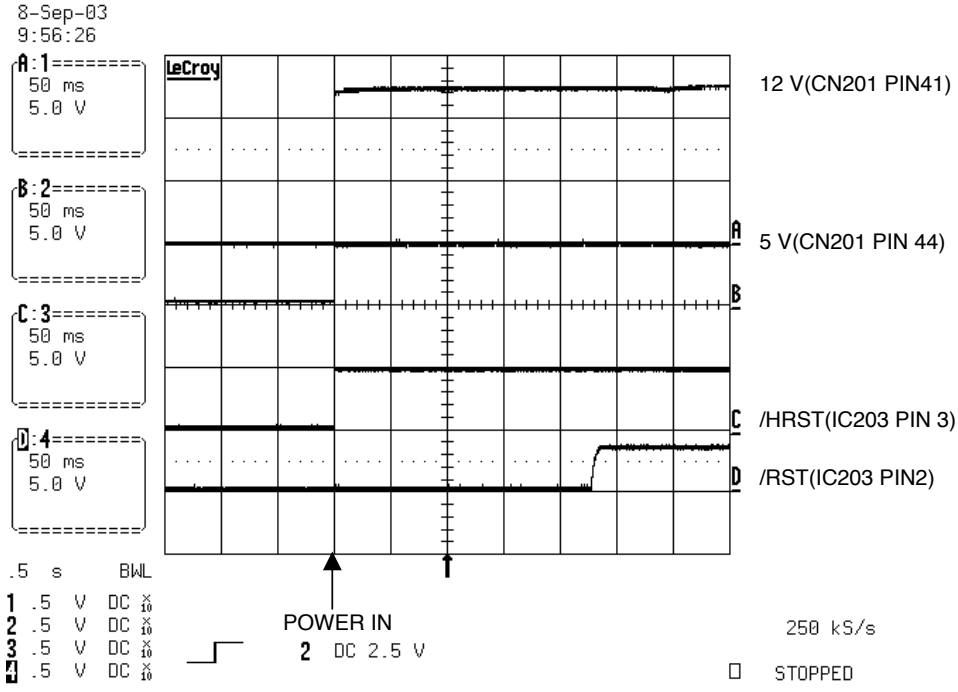
Pin No.	Pin Name	Type	Des cription
51	CP	O	REGISTER ADDRESS OUPUT
52	/DACS	O	CHIP SELECTOR
53	/BPRCS	O	EEPROM COMM UNICATON LINE
54	TEST MOD0	-	-
55	TEST MOD1	-	-
56	(RESERVED)	-	-
57	(RESERVED)	-	-
58	LED	O	LED ENABLE LINE
59	MSW	O	LED ENABLE LINE
60	/EJECT-KEY	O	TRAY OPE N LINE
61	URDY	O	ACCESS CONTROL SIGNAL INPUT FRON CPU TO SDRAM
62	(RESERVED)	-	-
63	/OPEN-SW	I	OPEN S/W INPUT
64	/LOAD-SW	I	LOAD S/W INPUT
65	/WR	O	WRITE STROBE SIGNAL OUTPUT
66	(RESERVED)	-	-
67	/RD	O	READ STROBE SIGNAL OUPUT
68	ASTB	O	ADDRESS STROBE OUPUT
69	EVSS	-	EX TERNAL CONSTANT POWER
70	EVDD	-	EX TERNAL CONSTANT POWER
71	AD0	I/O	PORT DL 16BIT INPUT/OUTPUT
72	AD1	I/O	PORT DL 16BIT INPUT/OUTPUT
73	AD2	I/O	PORT DL 16BIT INPUT/OUTPUT
74	AD3	I/O	PORT DL 16BIT INPUT/OUTPUT
75	AD4	I/O	PORT DL 16BIT INPUT/OUTPUT
76	AD5	I/O	PORT DL 16BIT INPUT/OUTPUT
77	AD6	I/O	PORT DL 16BIT INPUT/OUTPUT
78	AD7	I/O	PORT DL 16BIT INPUT/OUTPUT
79	A8	I/O	PORT DL 16BIT INPUT/OUTPUT
80	A9	I/O	PORT DL 16BIT INPUT/OUTPUT
81	A10	I/O	PORT DL 16BIT INPUT/OUTPUT
82	A11	I/O	PORT DL 16BIT INPUT/OUTPUT
83	A12	I/O	PORT DL 16BIT INPUT/OUTPUT
84	A13	I/O	PORT DL 16BIT INPUT/OUTPUT
85	A14	I/O	PORT DL 16BIT INPUT/OUTPUT
86	(RESERVED)	I/O	PORT DL 16BIT INPUT/OUTPUT
87	/LIMIT-SW	I	TRAY LIMIT S/W INPUT
88	MA/SL	I	MASTER/SLAVE MODE SELECTOR
89	AUDMUTE	-	-
90	LOAD1	O	STANDBY/BRAKE CONTROL SIGNAL
91	LOAD2	O	STANDBY/BRAKE CONTROL SIGNAL
92	(RESERVED)	-	-
93	SKEW2	-	-
94	SKEW1	-	-
95	FPD	I	TEMPERATURE MONITOR CURRENT INPUT
96	TEMP	I	MONITOR TEST SINGNAL
97	MONI3	I	FOCUS ERROR INPUT
98	MONI2	I	LASER MONITOR CURRENT INPUT
99	MONI1	I	PDIC REFERNEC VOLTAGE
100	VC+1.5V	I	VCC 1.5V INPUT

WAVEFORMS

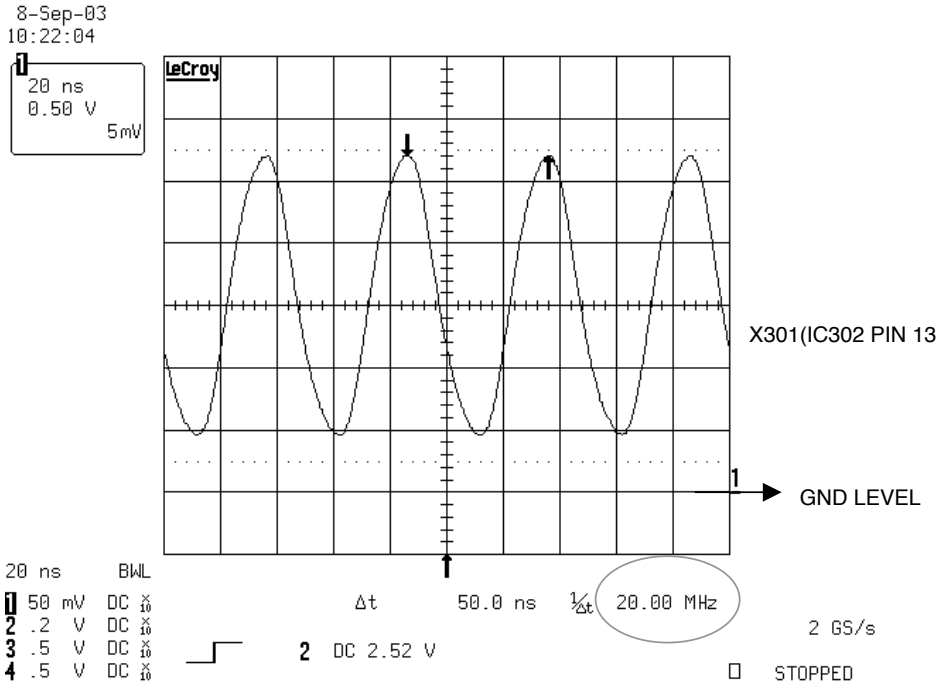
1. POWER & RESET Signal



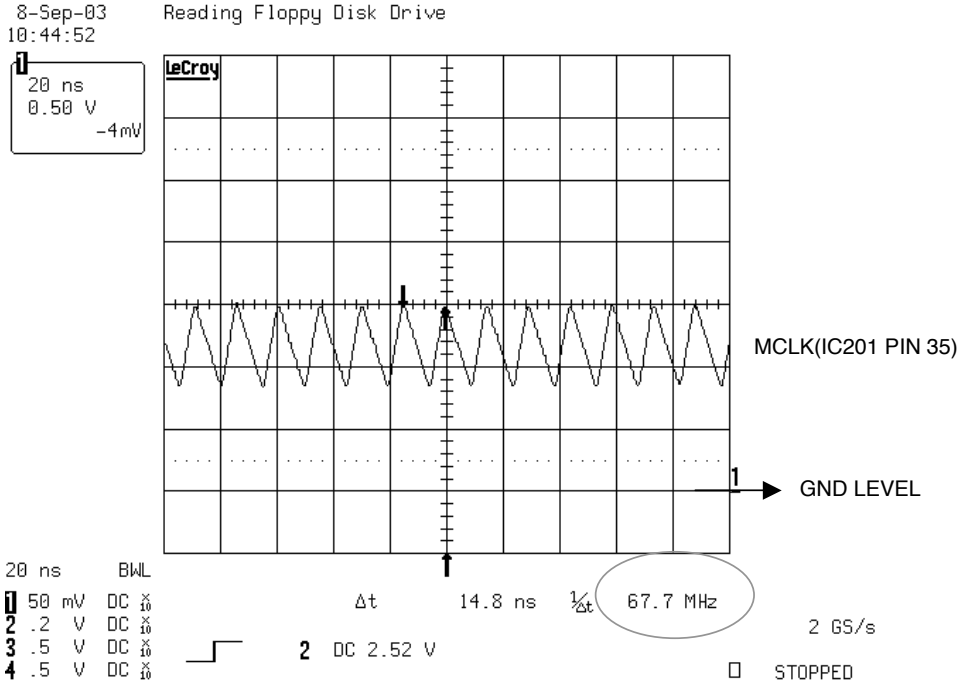
2. Main Clock1 for IC202 (16.9MHz)



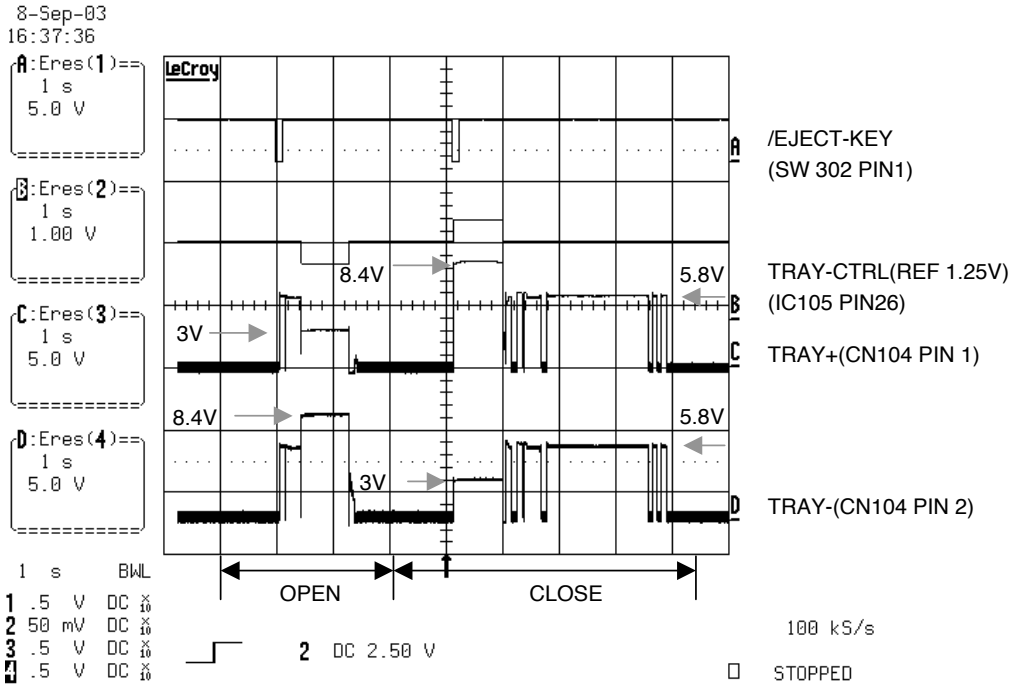
3. Main Clock2 for IC302 (20MHz)



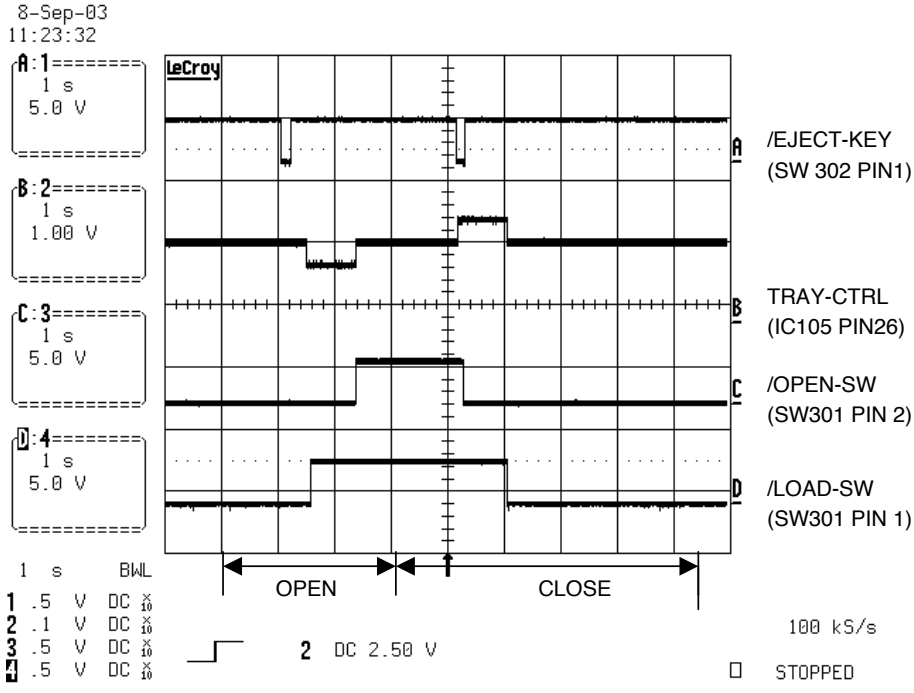
4. SDRAM Clock



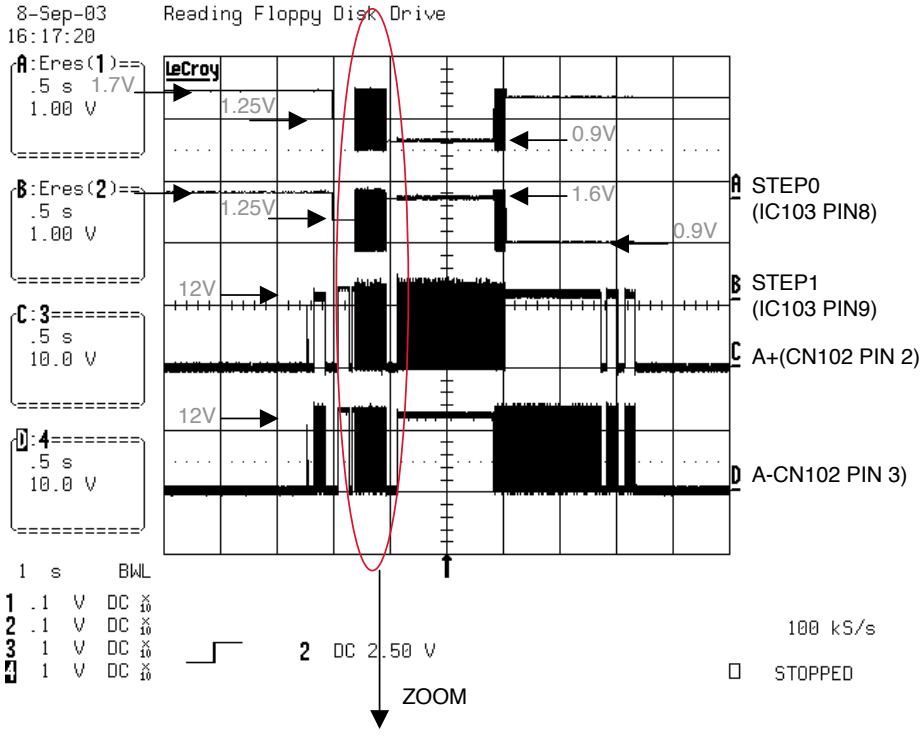
5. TRAY OPEN/CLOSE SIGNAL 1



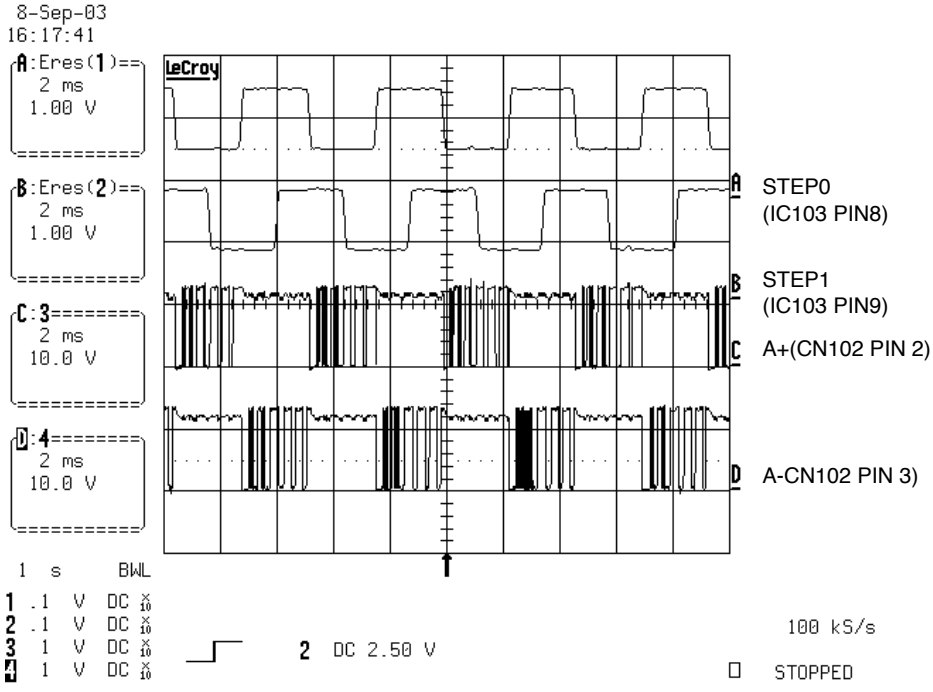
6. TRAY OPEN/CLOSE SIGNAL 2



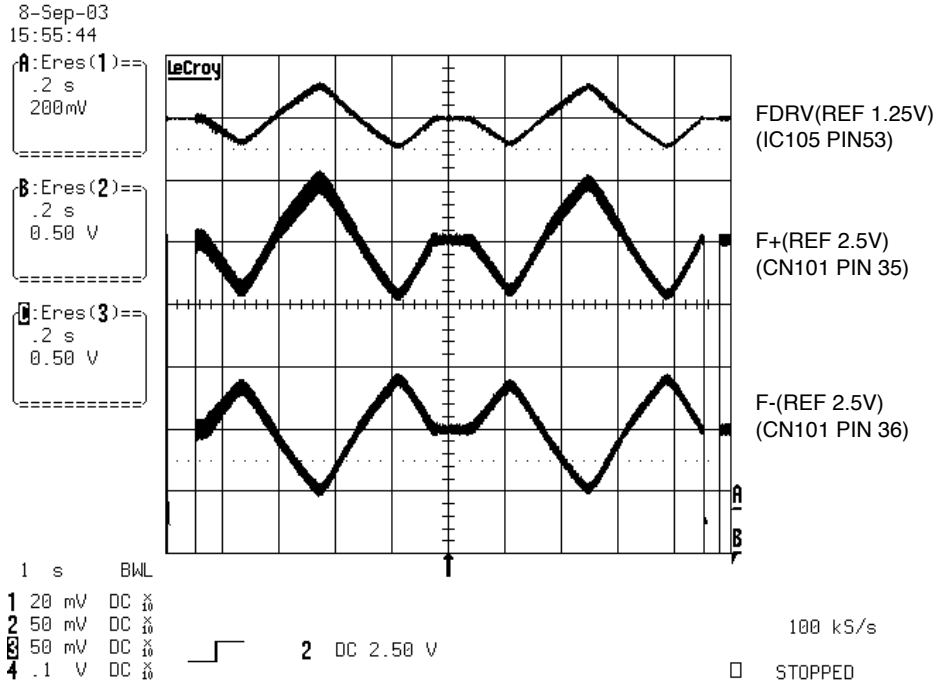
7. SLED MOVE SIGNAL 1



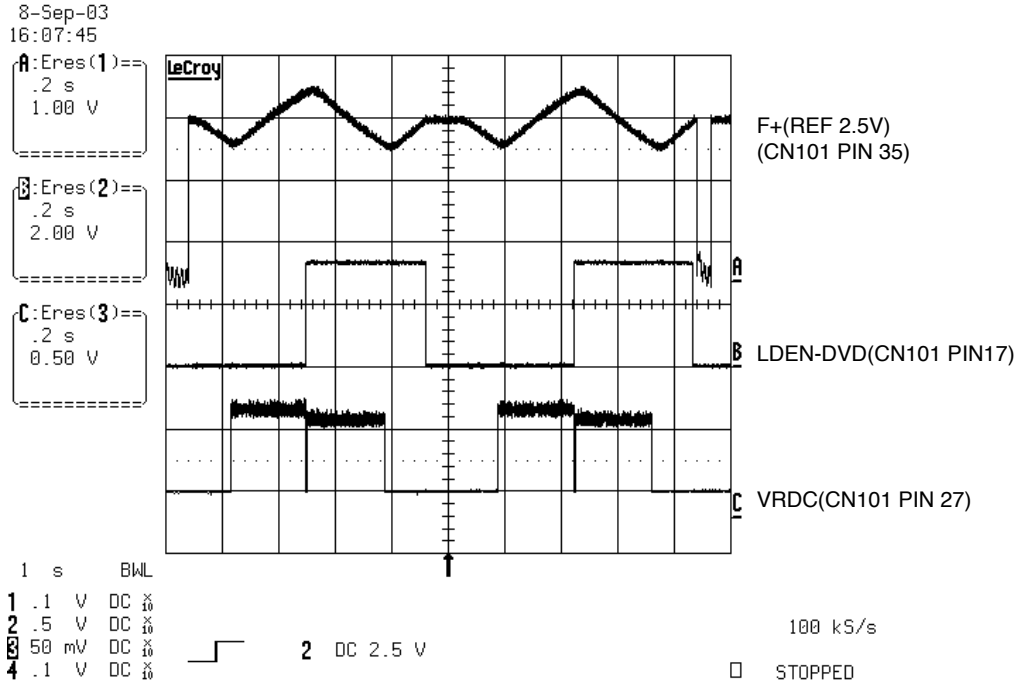
8. SLED MOVE SIGNAL 2



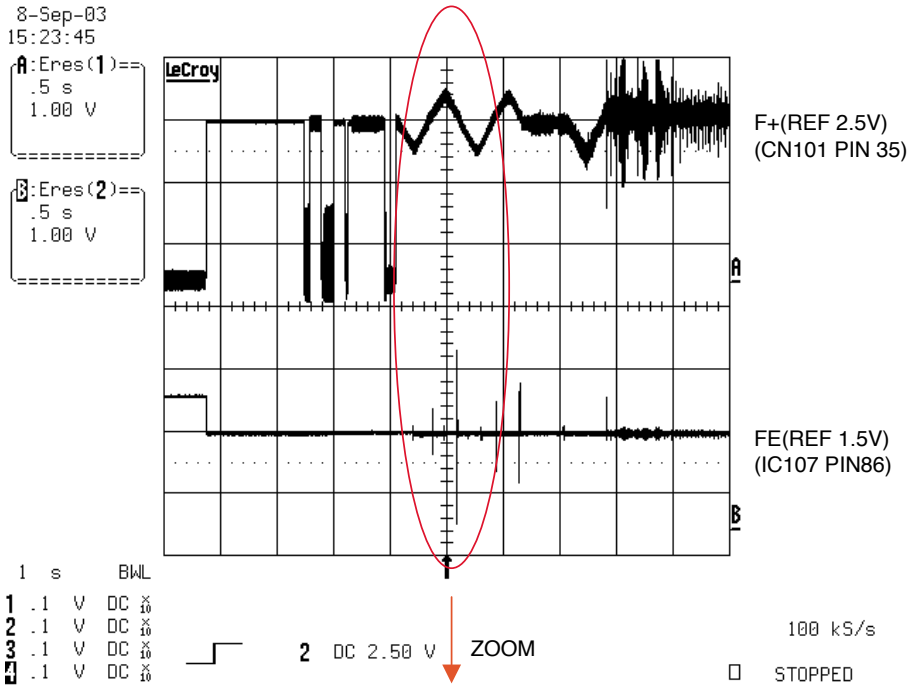
9. FOCUS SEARCH SIGNAL



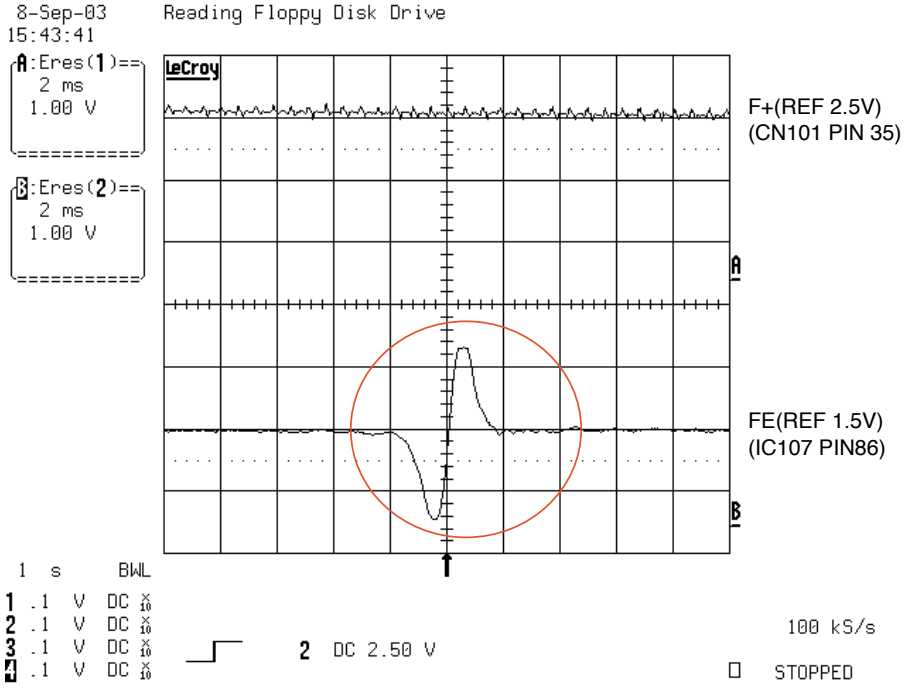
10. LASER TURN ON SIGNAL



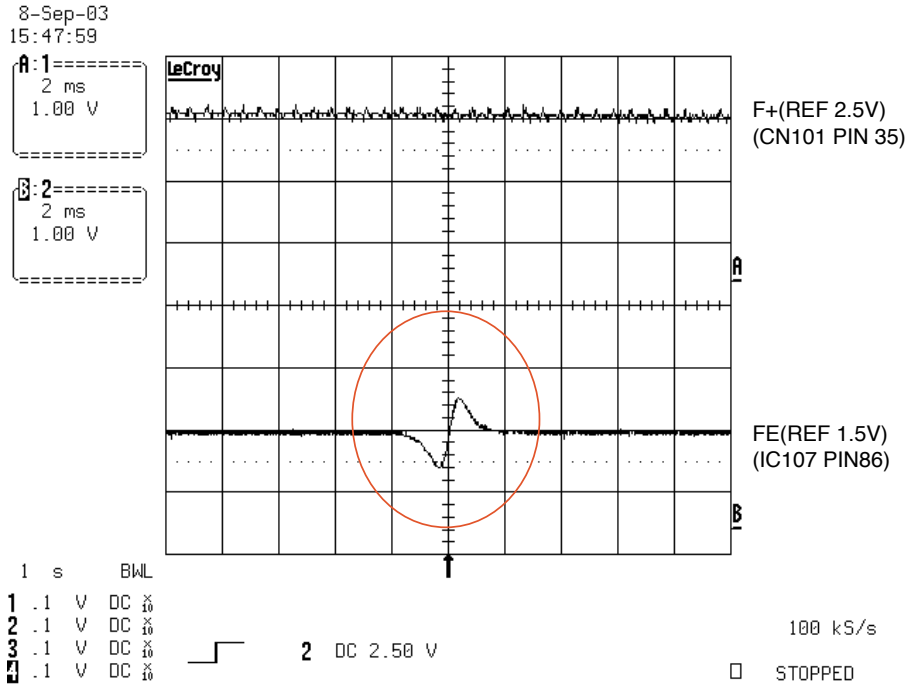
11. DISC TYPE JUDGEMENT WAVEFORM (CD SERIES)



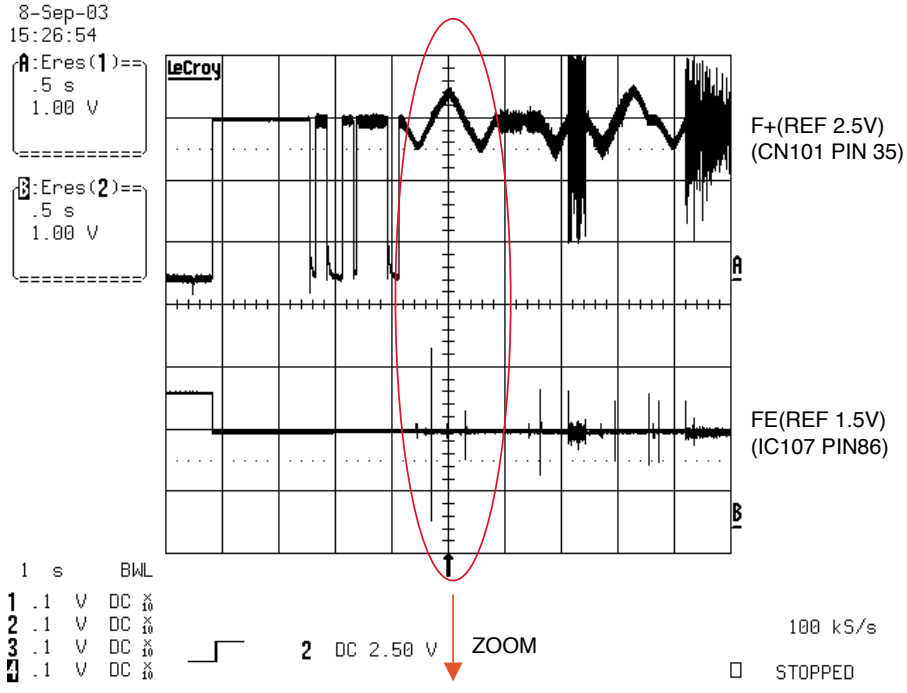
12. DISC TYPE JUDGEMENT WAVEFORM (CD&CD-R)



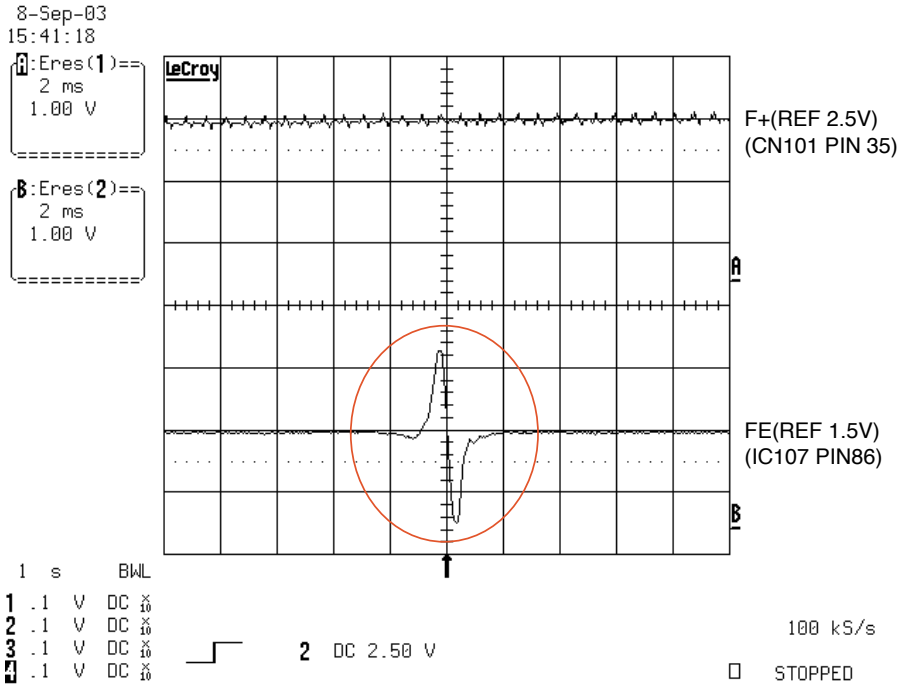
13. DISC TYPE JUDGEMENT WAVEFORM (CD-RW)



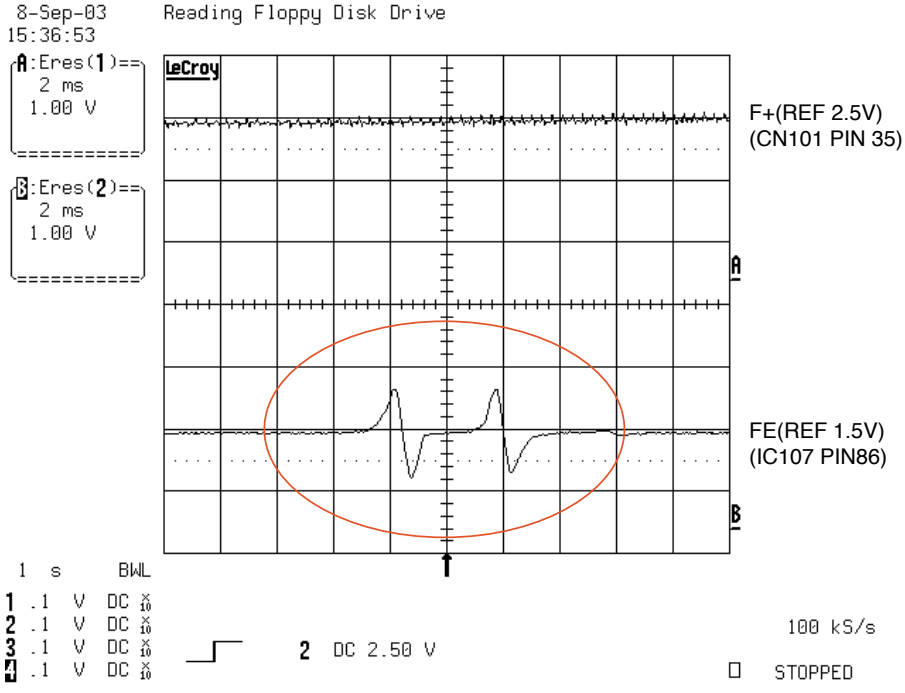
14. DISC TYPE JUDGEMENT WAVEFORM (DVD SERIES)



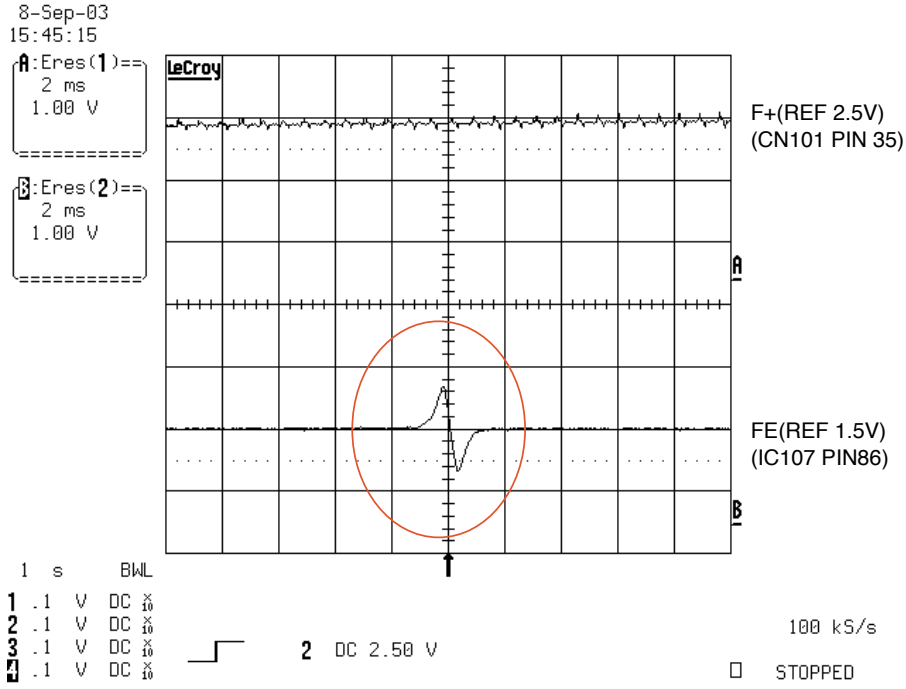
15. DISC TYPE JUDGEMENT WAVEFORM (DVD_SINGLE&R)



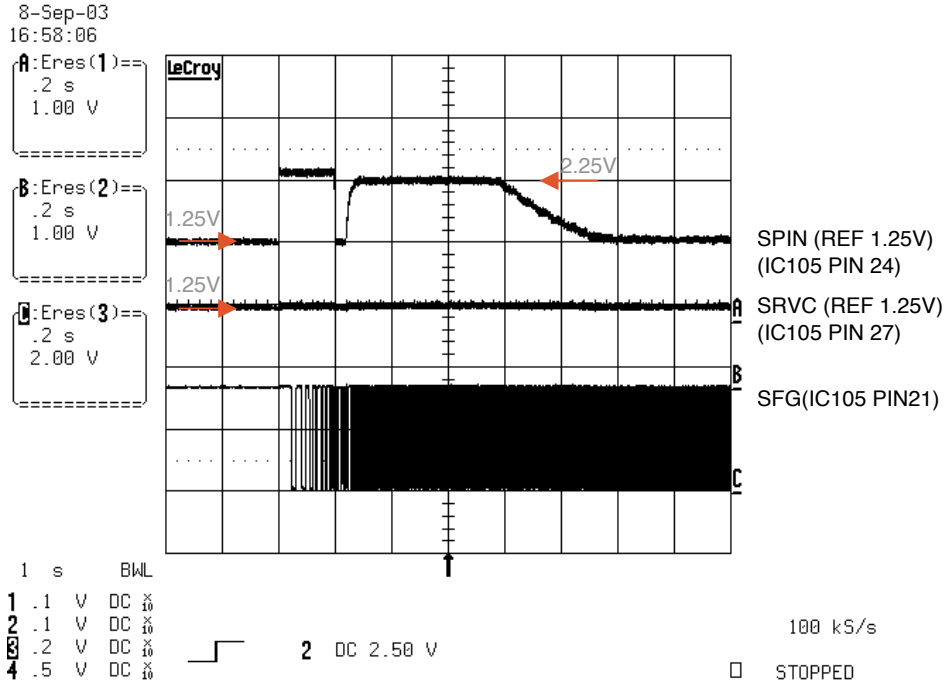
16. DISC TYPE JUDGEMENT WAVEFORM (DVD _DUAL)



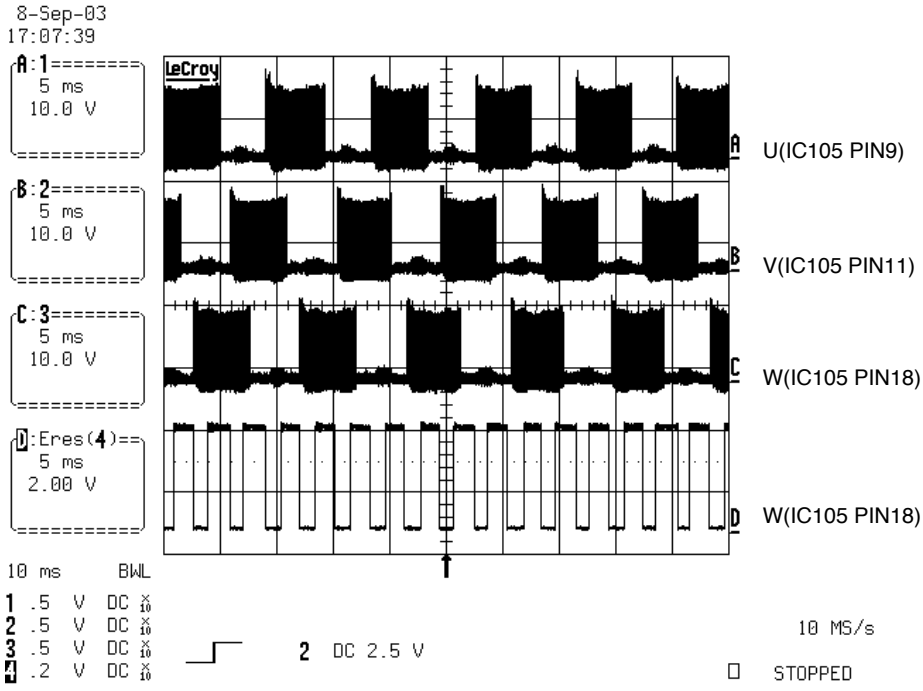
17. DISC TYPE JUDGEMENT WAVEFORM (DVDRW)



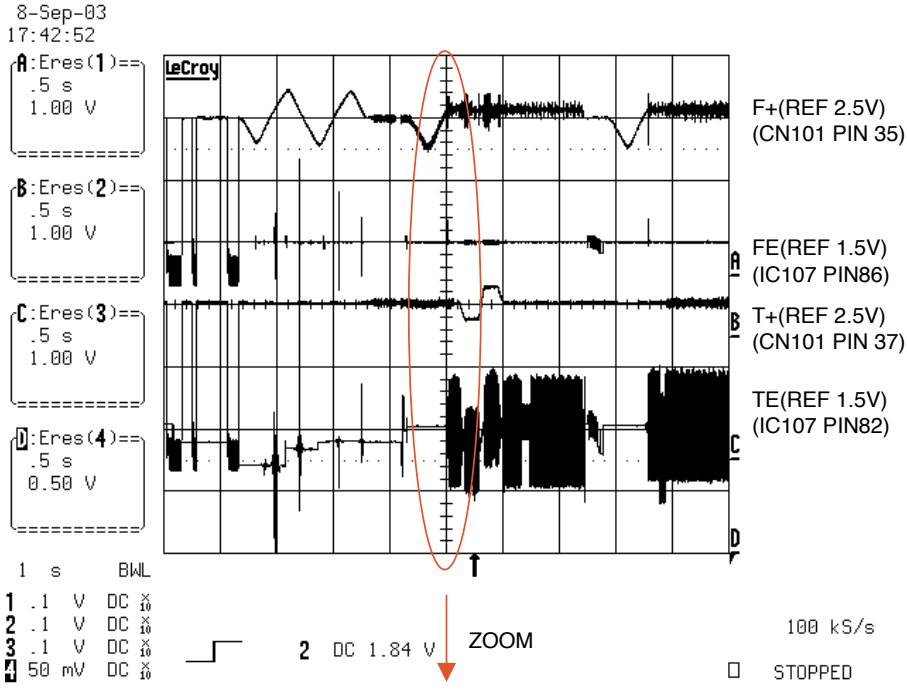
18. SPINDLE WAVEFORM1



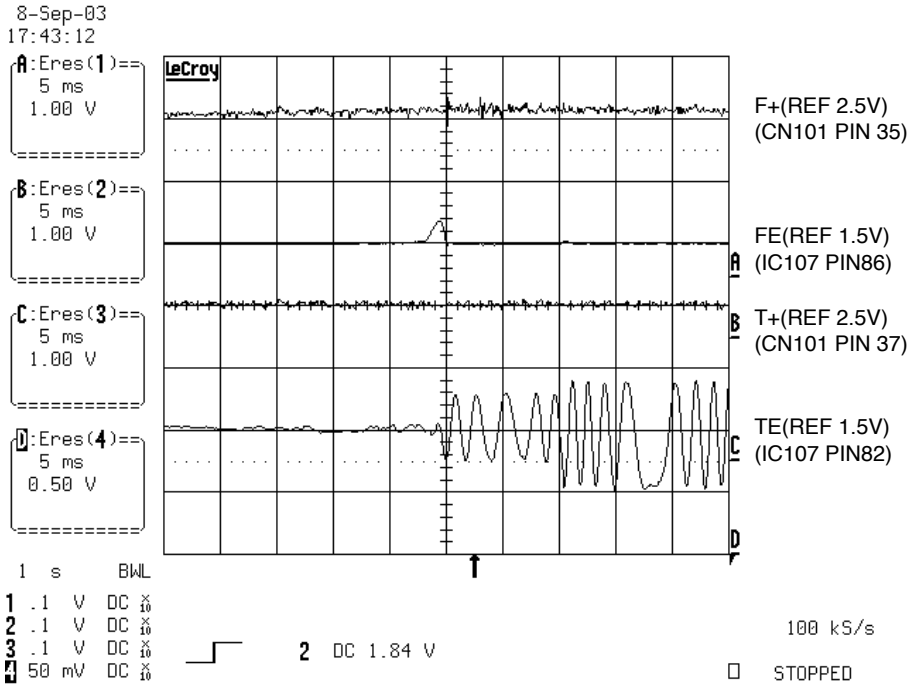
19. SPINDLE WAVEFORM2



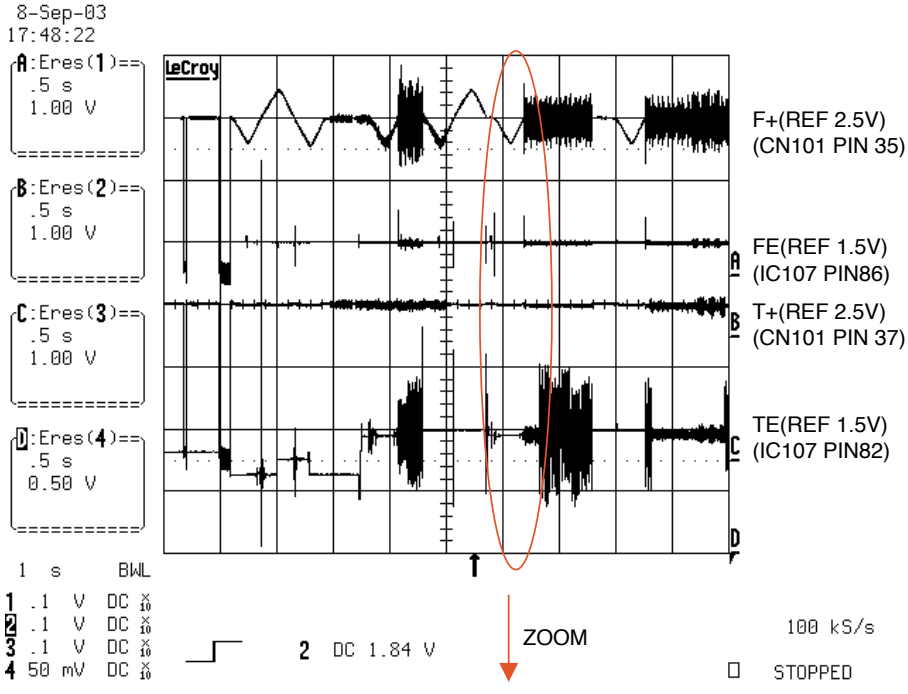
20. FOCUS ON SIGNAL(CD)



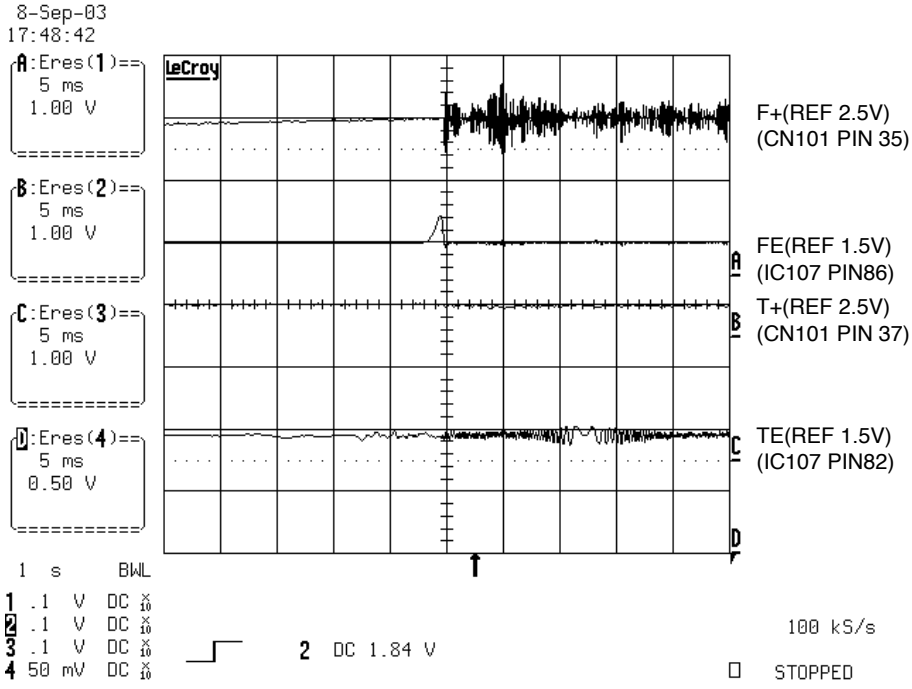
21. FOCUS ON SIGNAL(CD)



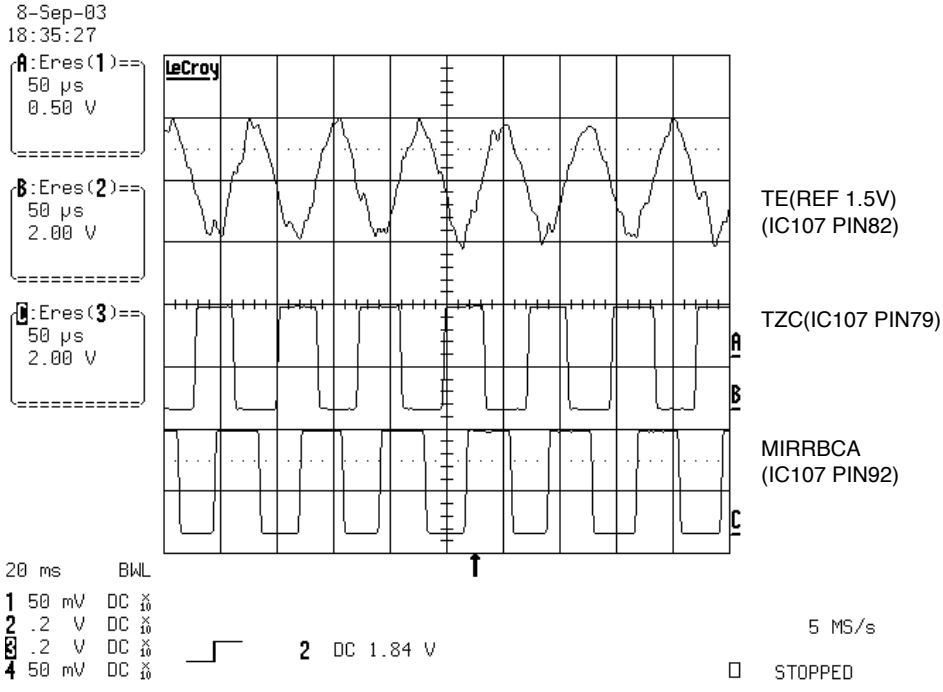
22. FOCUS ON SIGNAL(DVD)



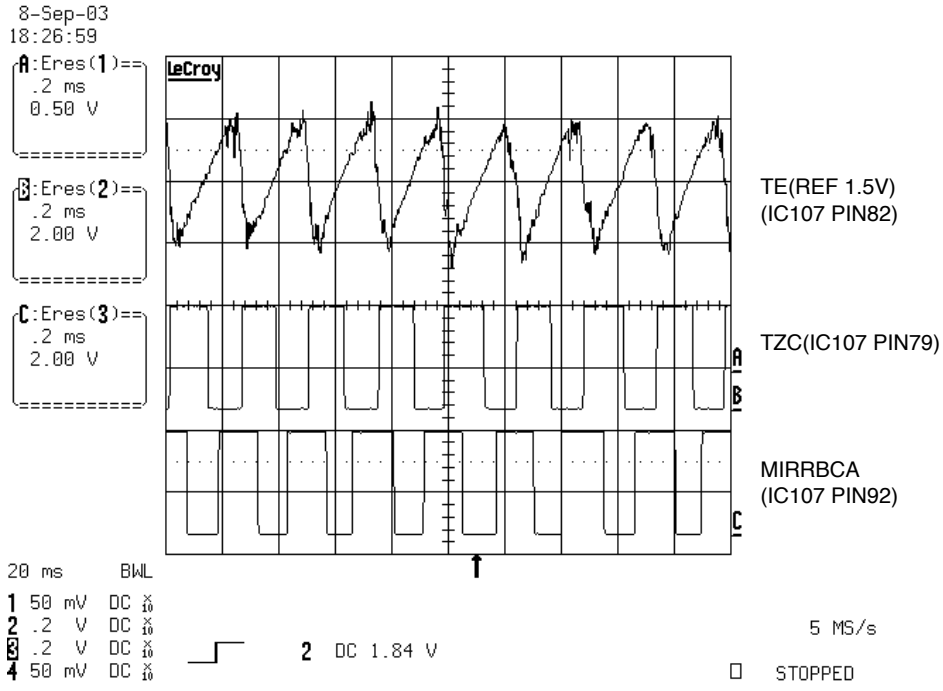
23. FOCUS ON SIGNAL (DVD)



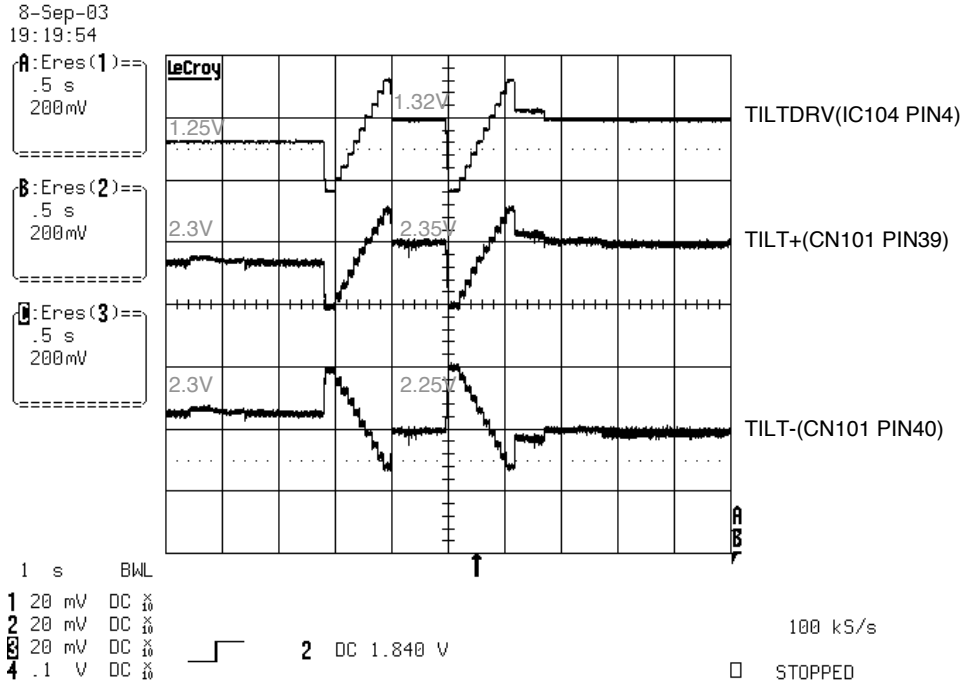
24. TRACK OFF SIGNAL(CD)



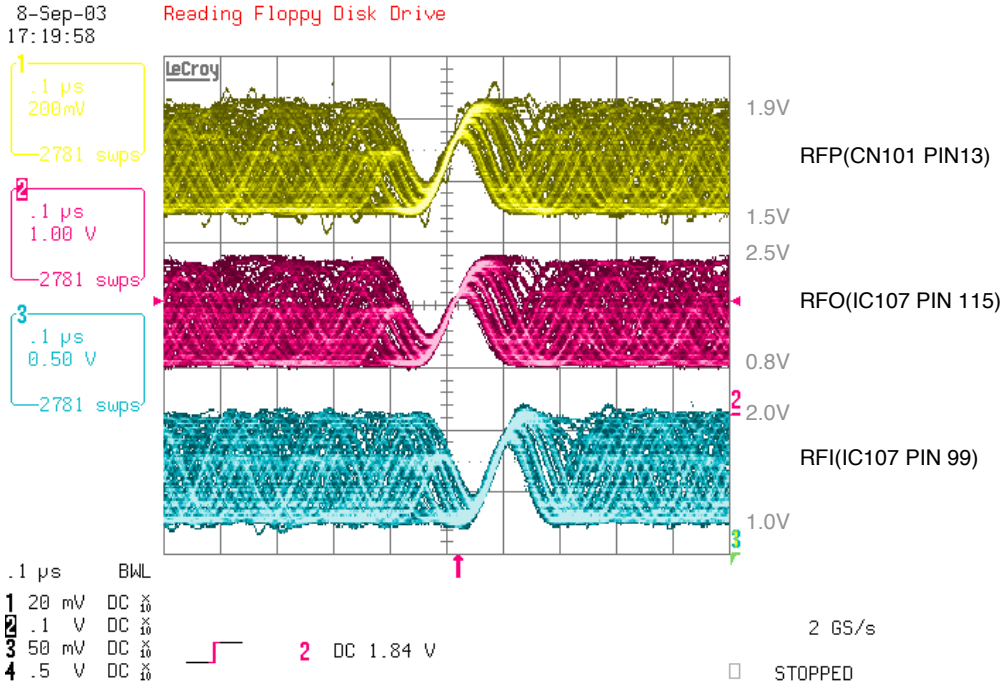
25. TRACK OFF SIGNAL(DVD)



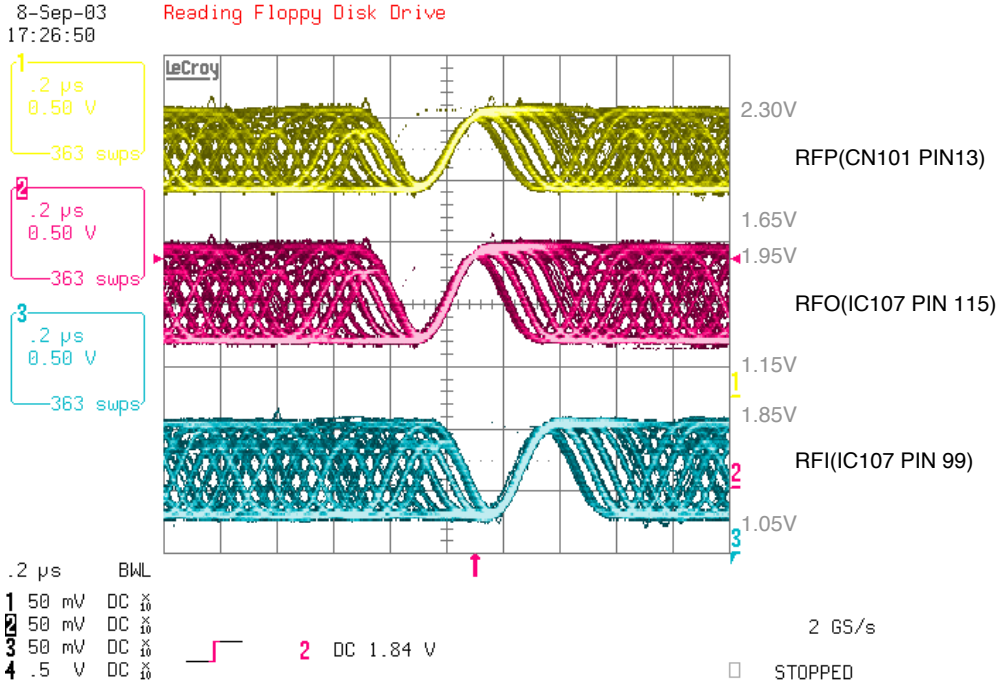
26. Tilt Driver signal(Disc reading)



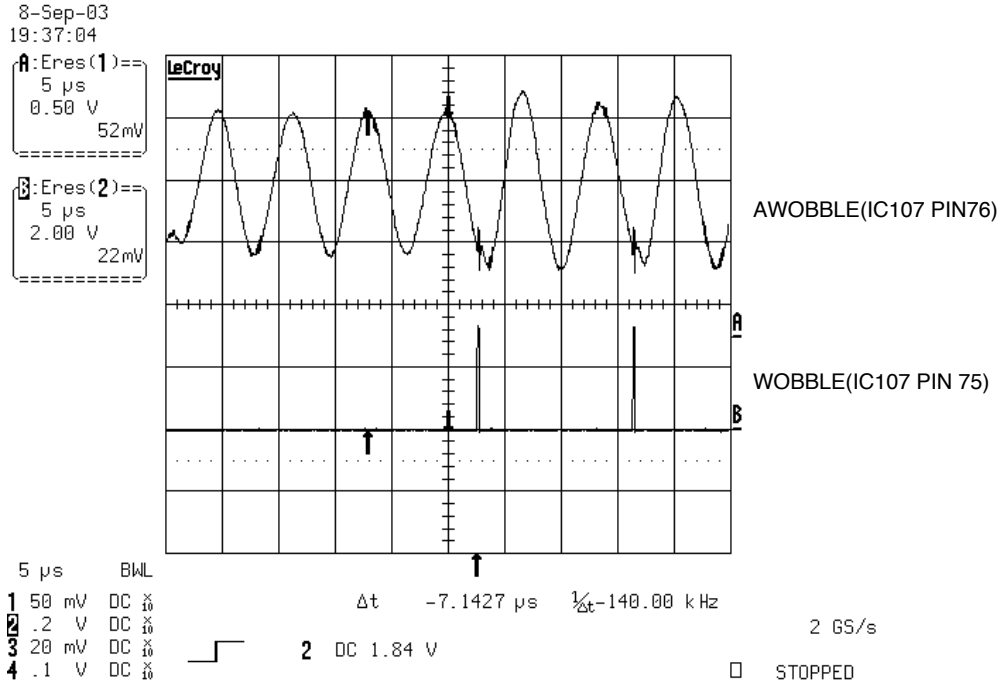
27. RF WAVEFORM(DVD)



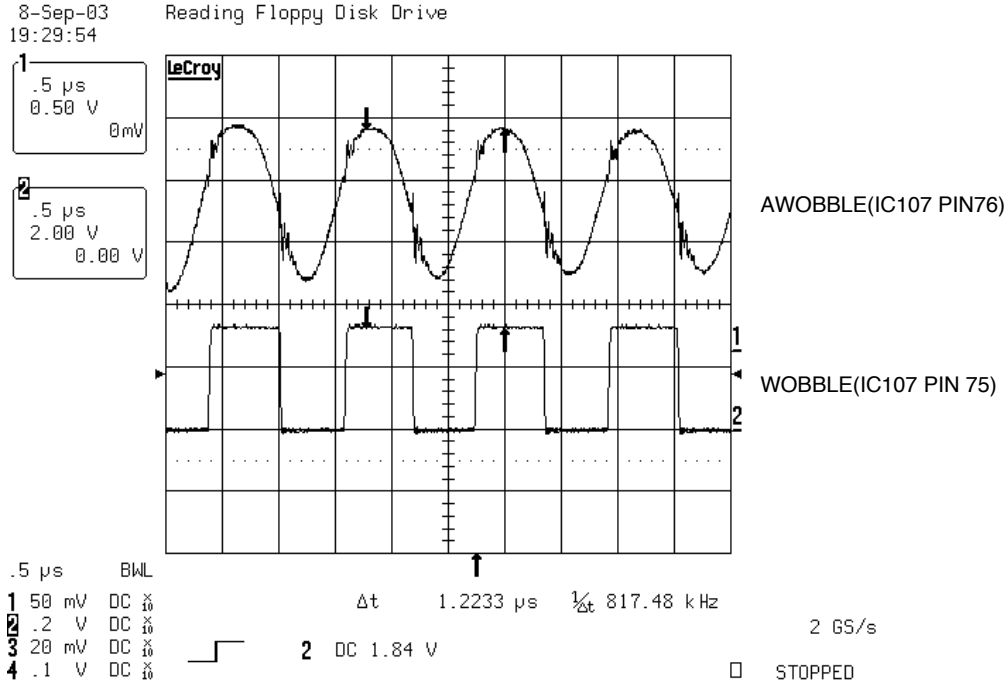
28. RF WAVEFORM(CD)



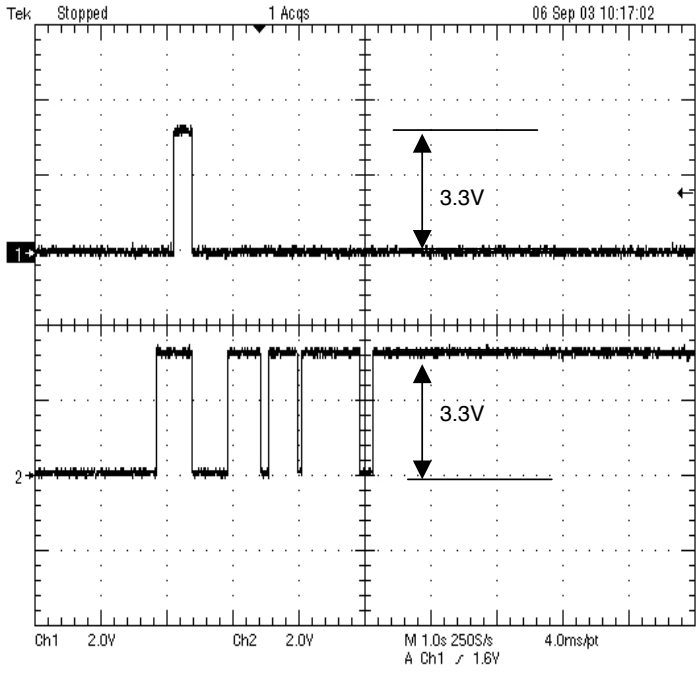
29. WOBBLE(DVD-R/RW)_READING



30. WOBBLE(DVD+R/RW)_READING&WRITING =>X1 SPEED



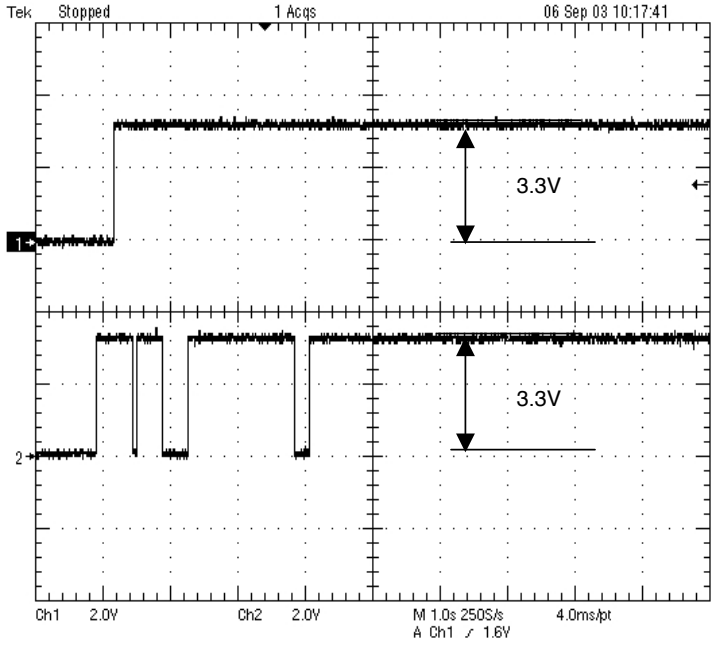
31. LD Enable(DVD)



LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

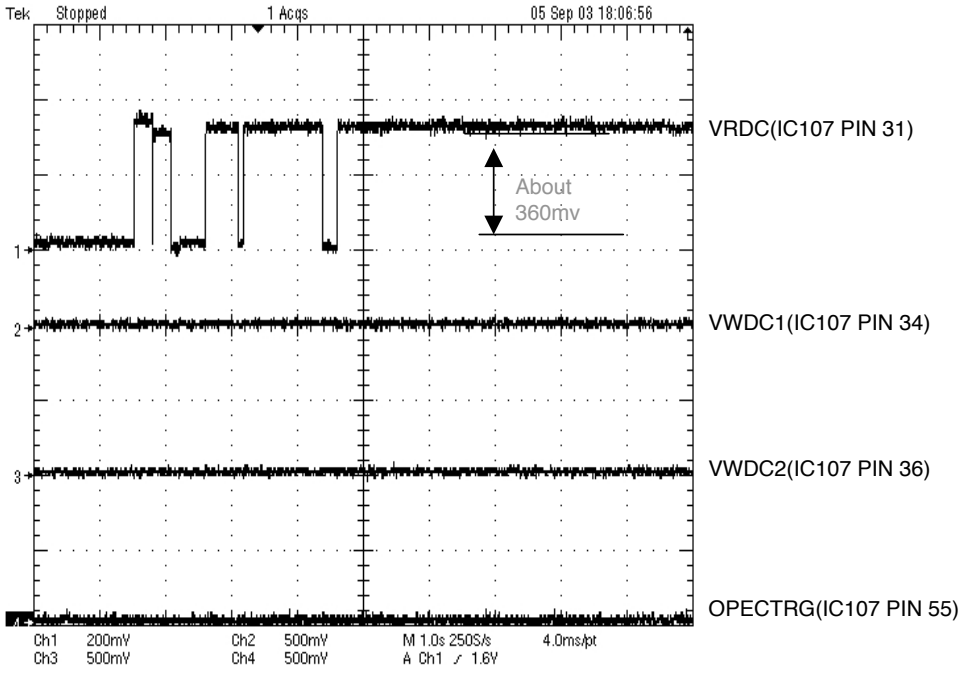
32. LD Enable(CD)



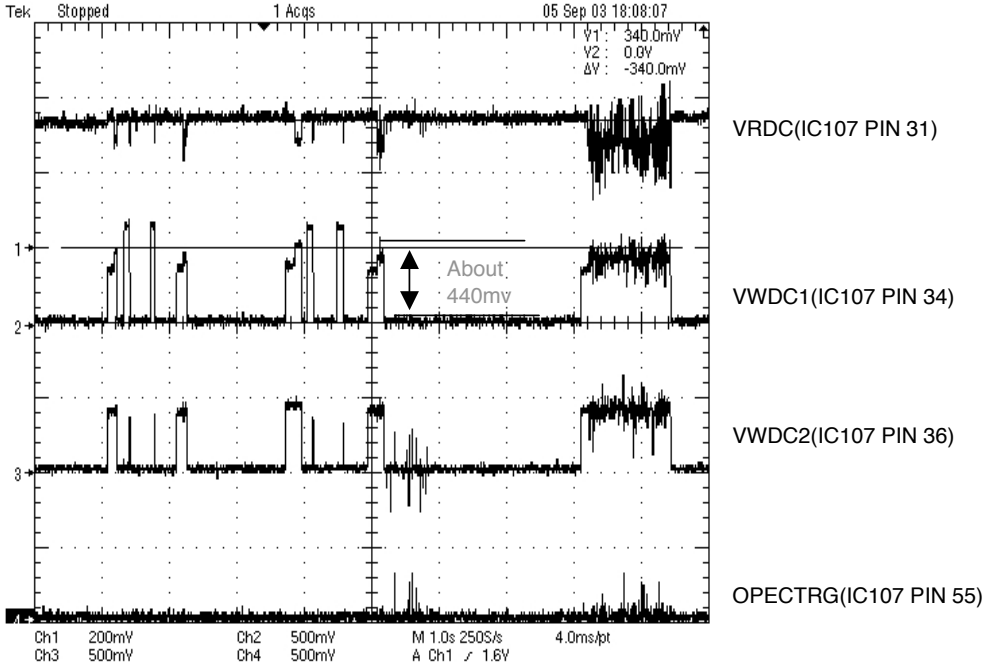
LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

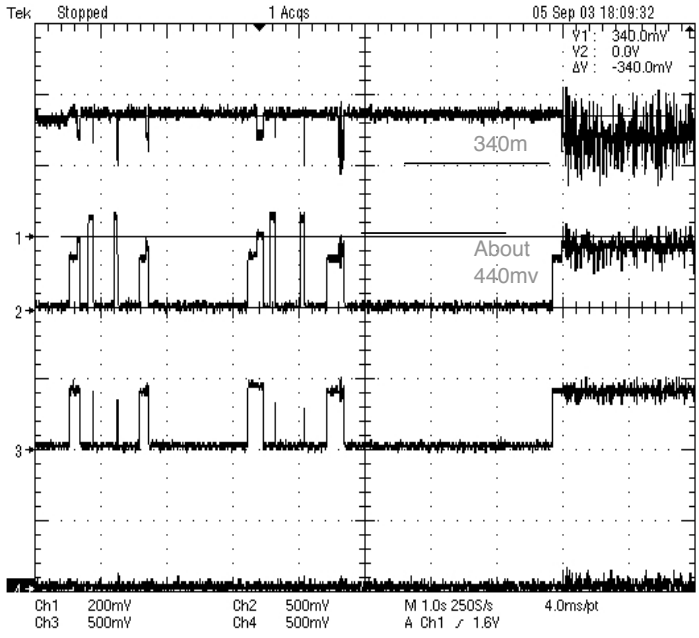
33. Laser Power(reading)_DVD+RW



34. Laser Power(Erase)_DVD+RW



35. Laser Power(Writing)_initial state



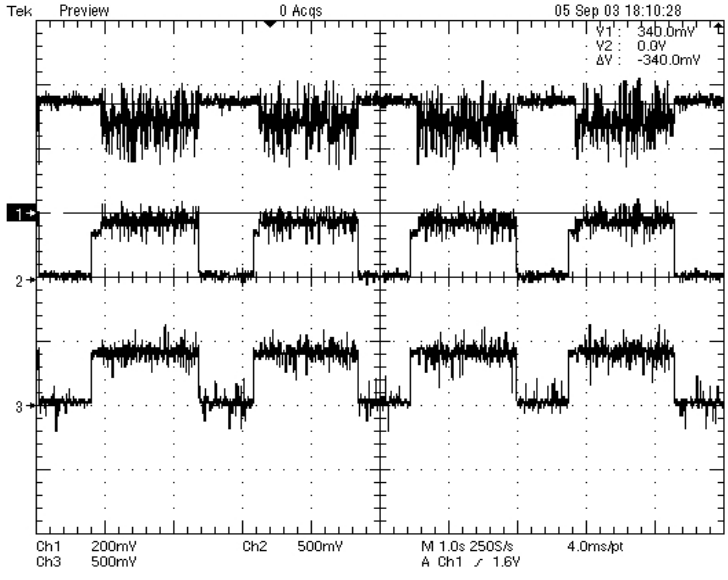
VRDC(IC107 PIN 31)

VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

OPECTRG(IC107 PIN 55)

36. Laser Power(Writing)_Processing



VRDC(IC107 PIN 31)

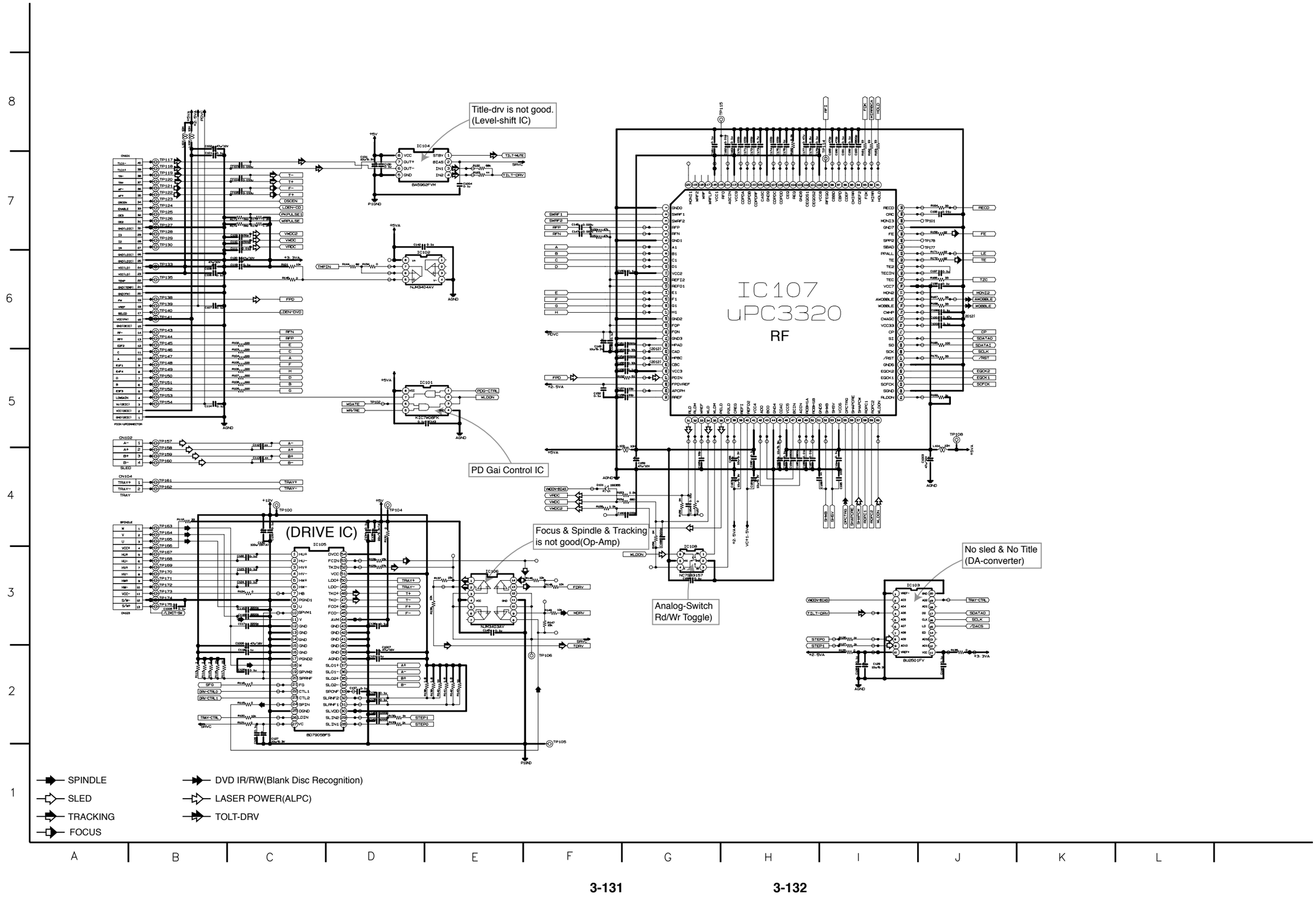
VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

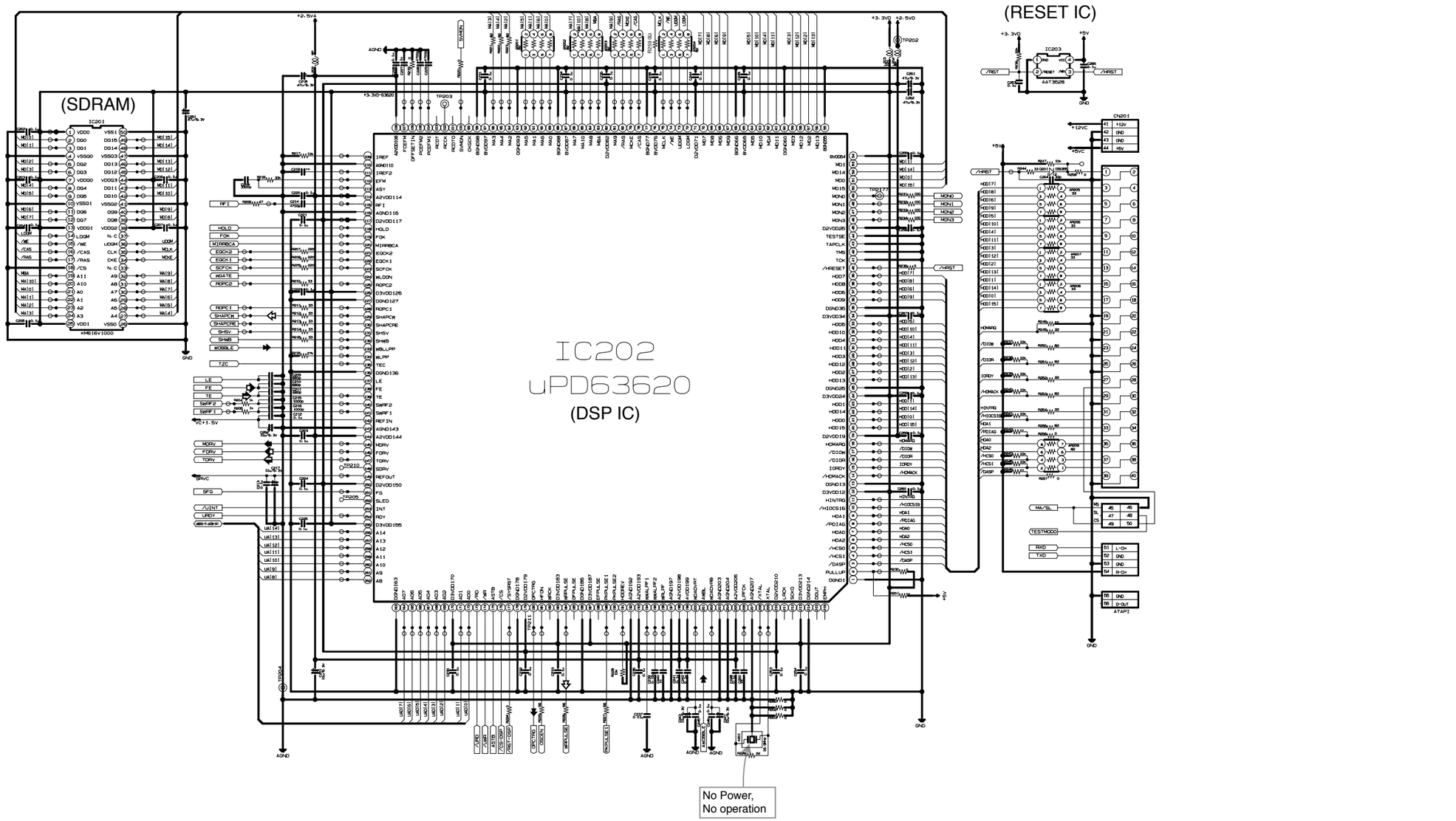
MEMO

CIRCUIT DIAGRAMS

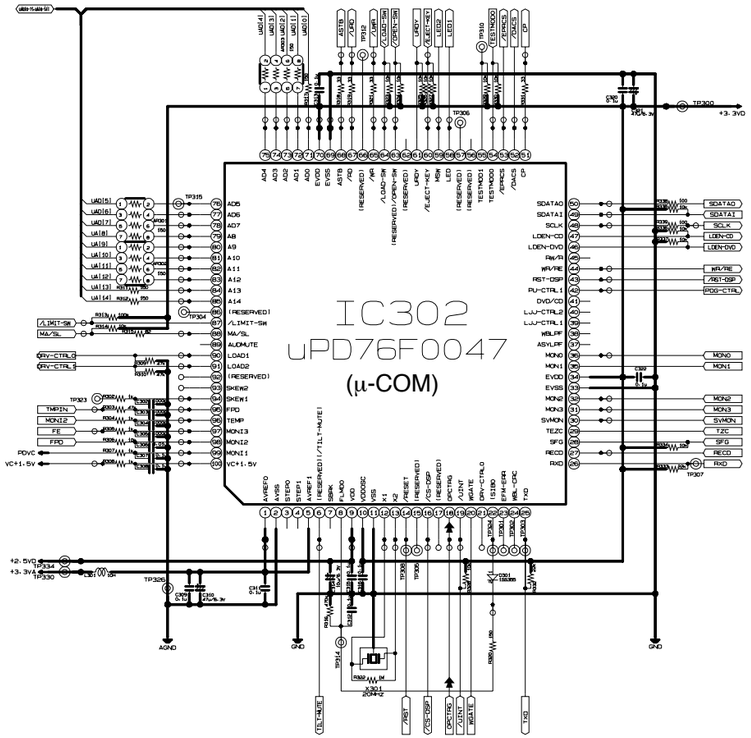
1. RF CIRCUIT DIAGRAM

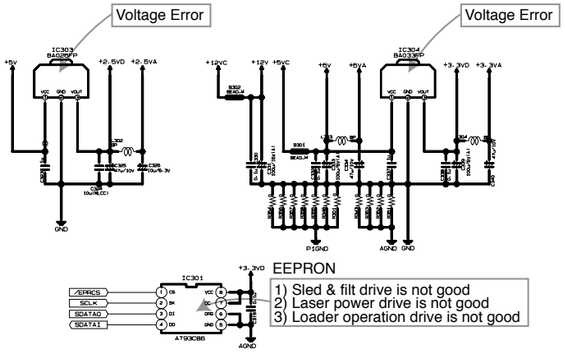


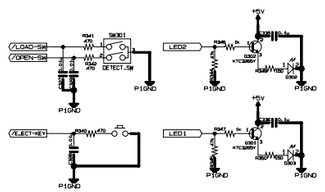
2. DSP CIRCUIT DIAGRAM



3. μ-COM CIRCUIT DIAGRAM

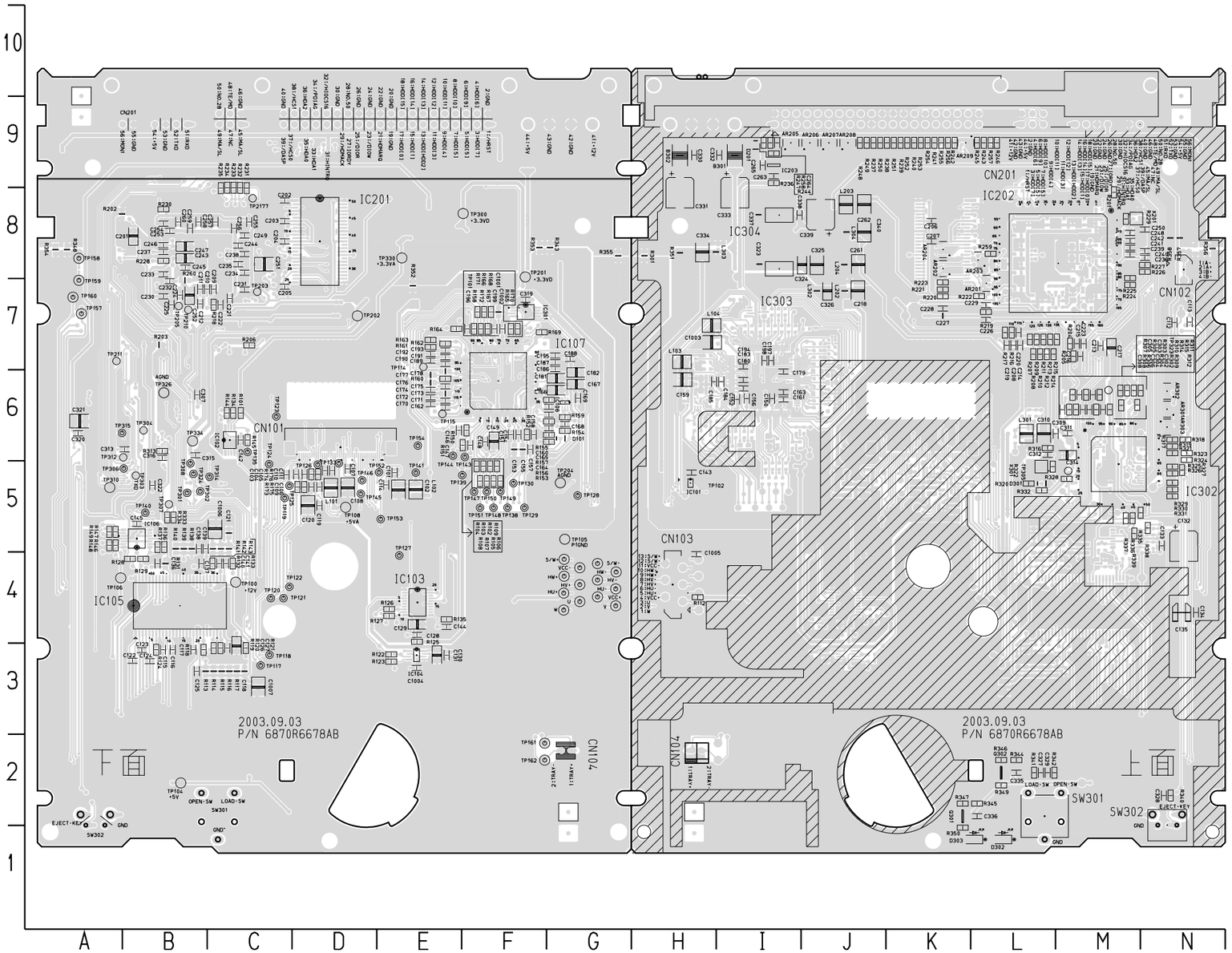






PRINTED CIRCUIT DIAGRAMS

1. MAIN P.C.BOARD



LOCATION GUIDE

C1001	F7	C174	E6	IC102	C6	R159	G6	TP1123	E6	TP153	E5	TP2178	C8	AR201	L7	C306	M6	R223	K7	R344	L2	TP1220	N5	TP2196	J9
C1002	F7	C175	E6	IC103	E4	R160	E6	TP1129	F6	TP154	E6	TP2179	C8	AR202	K8	C308	M6	R224	M7	R345	L2	TP1232	M5	TP2197	J9
C1004	E3	C176	E6	IC104	E3	R161	E7	TP114	E7	TP157	A7	TP2180	C8	AR203	L8	C309	M6	R225	M7	R346	L2	TP177	I7	TP2198	J9
C1006	C5	C177	E6	IC105	B4	R162	E7	TP1141	F6	TP158	A8	TP2186	C8	AR204	K8	C310	L6	R226	N8	R347	K2	TP2000	J8	TP2199	J9
C1007	C3	C178	E6	IC106	B5	R163	E7	TP115	E6	TP159	A7	TP2215	D9	AR205	J9	C311	M6	R227	N8	R349	L2	TP2001	K8	TP2200	J9
C101	E5	C181	G6	IC107	F6	R164	E7	TP1152	E3	TP160	A7	TP2216	D9	AR206	J9	C312	L6	R229	M8	R350	K1	TP2002	L8	TP2203	J9
C102	E5	C182	G6	IC108	G6	R165	F7	TP1156	E4	TP161	F2	TP2217	D9	AR207	J9	C314	M6	R236	I9	R351	H8	TP2003	K8	TP2204	J9
C103	C5	C186	G7	IC201	D8	R166	F7	TP1157	E4	TP162	F2	TP2218	D9	AR208	J9	C323	I8	R237	J9	R356	N8	TP2005	K8	TP2205	J9
C104	D5	C187	G7	IC301	F7	R167	F7	TP1159	E4	TP163	G4	TP2219	D9	AR209	K9	C324	J8	R238	K9	R357	N8	TP2006	I9	TP2206	J9
C105	D5	C188	G7	IL101	D5	R168	F7	TP1167	E4	TP164	G4	TP2220	D9	AR301	N6	C325	J8	R239	K9	R358	N8	TP2011	K8	TP2208	J9
C106	D5	C189	E7	IL102	E5	R169	F7	TP117	C3	TP165	G4	TP2221	C9	AR302	N6	C326	J7	R240	K9	SW301	L2	TP2013	K8	TP2209	J9
C107	D5	C190	E7	R101	C6	R170	F7	TP1170	B3	TP166	G4	TP2222	C9	AR303	N6	C327	L2	R241	K9	SW302	N1	TP2016	K8	TP2210	K9
C108	D5	C191	E7	R102	F5	R171	F7	TP118	C3	TP167	G4	TP2240	B7	B301	I9	C328	N2	R242	K9	TP1004	H7	TP2018	K8	TP2211	K9
C109	D5	C192	E7	R103	F5	R172	F7	TP1189	B4	TP168	G4	TP2252	A8	B302	H9	C329	L2	R243	L9	TP1008	J6	TP2021	L7	TP2212	K9
C110	D5	C193	E7	R104	F5	R173	D5	TP119	C5	TP169	G4	TP2254	B8	C1003	H7	C330	H9	R244	L9	TP1009	J6	TP2022	K7	TP2223	L9
C111	D5	C195	G7	R105	F5	R174	D5	TP1190	C4	TP170	G4	TP2257	B8	C1005	H4	C331	H8	R245	L9	TP1010	J6	TP2023	K7	TP2224	M6
C114	E5	C196	F7	R106	F5	R175	D5	TP1192	C4	TP171	G4	TP2259	A8	C112	N7	C332	I9	R246	L9	TP1013	J6	TP2026	K8	TP2244	M8
C115	B3	C199	F7	R107	F5	R176	D5	TP1194	C4	TP172	G4	TP2263	B8	C113	N7	C333	I8	R247	I9	TP1014	I6	TP2027	K8	TP2247	M8
C116	B3	C201	B8	R108	F5	R202	A8	TP1195	C4	TP173	G4	TP2265	B8	C132	N5	C334	H8	R248	J9	TP1015	J6	TP2029	K8	TP2258	M8
C117	B3	C202	C8	R109	F5	R203	B7	TP1197	B4	TP174	G4	TP2271	B8	C133	N5	C335	L2	R249	J9	TP1016	I6	TP2030	K8	TP2269	N8
C118	C3	C203	C8	R113	B3	R206	C7	TP1198	B4	TP175	G4	TP300	F8	C134	N4	C336	L2	R250	J9	TP1018	I6	TP2032	K8	TP2272	M8
C119	C5	C204	C8	R114	C3	R218	C7	TP120	C4	TP2004	C8	TP3000	C6	C135	N4	C337	I8	R251	K9	TP102	H5	TP2033	K8	TP3002	M6
C120	D5	C205	C7	R115	C3	R228	B8	TP1206	B4	TP2007	C8	TP3005	B6	C143	H5	C338	I8	R252	K9	TP1021	J7	TP2035	K8	TP305	M5
C121	C5	C209	G7	R116	C3	R230	B8	TP121	C4	TP2009	C7	TP301	B5	C150	I6	C339	J8	R253	K9	TP1026	I7	TP2036	K8	TP309	N5
C122	B3	C210	B7	R117	C3	R231	C8	TP1217	B4	TP201	F8	TP302	B5	C152	I6	C340	J8	R254	K9	TP1033	I6	TP2039	K8	TP311	N6
C123	B3	C211	B7	R118	B3	R232	C8	TP1218	B4	TP2010	C8	TP303	B5	C156	I6	CN102	N8	R255	K9	TP1033	I7	TP2040	K8	TP313	N6
C124	B3	C212	B7	R119	C3	R233	C8	TP1219	B4	TP2014	C8	TP304	B6	C159	H6	CN103	H4	R256	K9	TP1036	I7	TP2043	K8	TP319	J8
C125	B3	C221	C7	R120	C3	R234	C8	TP122	C4	TP2015	C8	TP306	B5	C161	I6	CN104	H2	R257	L9	TP1038	I7	TP2044	K8	TP320	H8
C126	C3	C222	C7	R121	C3	R235	C8	TP1221	C4	TP2019	C8	TP307	B5	C163	I6	CN201	M9	R258	I9	TP1039	I6	TP2045	K8	TP322	N6
C127	C3	C224	B7	R122	E3	R260	B7	TP1222	C4	TP202	D7	TP308	B5	C179	I6	D201	I9	R259	L8	TP1040	I7	TP2046	K8	TP323	M6
C128	E4	C225	B7	R123	E3	R313	B6	TP123	C6	TP2020	C8	TP310	A5	C180	I6	D301	L5	R301	H8	TP1041	I6	TP2047	K7	TP327	N6
C129	E4	C230	B7	R124	B3	R333	B5	TP1230	B4	TP203	C7	TP312	B6	C183	I6	D302	L1	R302	M6	TP1042	I7	TP2048	K7	TP328	N6
C130	E3	C231	C7	R125	E4	R334	B5	TP1233	G8	TP204	G5	TP314	C5	C184	I6	D303	L1	R303	M6	TP1043	I6	TP2055	J7	TP329	N6
C131	E3	C232	B7	R126	E4	R343	G8	TP1234	C6	TP2041	D8	TP315	A6	C185	H6	IC101	H5	R304	M6	TP1044	I7	TP2058	K7	TP331	N5
C136	B4	C233	B8	R127	E4	R348	A8	TP1235	C6	TP205	B7	TP324	B5	C194	I7	IC202	M8	R305	M6	TP1045	I6	TP2059	J7	TP332	N5
C137	B4	C234	C8	R128	B4	R352	E7	TP1236	C6	TP2063	C7	TP326	B6	C197	I7	IC203	I9	R306	M6	TP1046	I7	TP2060	J7	TP333	N5
C138	B5	C235	C8	R129	B4	R353	F8	TP124	C5	TP2066	C7	TP330	E8	C198	I7	IC302	M5	R307	M6	TP1049	H5	TP2061	J7	TP337	M5
C139	B5	C237	B8	R131	B4	R354	A8	TP1243	E3	TP2070	C7	TP334	B6	C206	K8	IC303	I8	R308	M6	TP1050	I7	TP2074	J7	TP338	M5
C140	C4	C238	C8	R132	C4	R355	G8	TP1248	E3	TP2075	B7	TP336	A5	C207	K8	IC304	I8	R309	M6	TP1052	I6	TP2080	J6	TP344	N6
C141	C4	C243	B8	R133	C4	TP100	C4	TP125	C5	TP2076	B7	TP339	B5	C208	L7	IL103	H7	R310	M6	TP1058	I7	TP2082	M7	TP345	N6
C142	C6	C244	C8	R134	C6	TP1005	G6	TP1250	A4	TP2087	A4	TP350	A2	C213	M7	IL104	H7	R311	N6	TP1066	J7	TP2086	M6	TP346	N6
C144	E4	C245	B8	R135	E4	TP1006	E6	TP1251	A5	TP2090	B7	TP368	B6	C214	L7	IL202	J7	R312	M6	TP1070	J7	TP2088	M7	TP357	N5
C145	B5	C246	B8	R136	B5	TP1007	E4	TP1255	A5	TP2095	B6	TP377	B6	C215	M7	IL203	J8	R314	M6	TP1078	H6	TP2092	M7	TP361	N6
C146	E6	C247	B8	R137	B5	TP101	F7	TP1256	A5	TP2097	B7	TP378	B6	C216	M7	IL204	J8	R315	M6	TP1080	H6	TP2098	M6	TP363	N6
C147	F6	C249	C8	R138	B5	TP1011	E6	TP126	D5	TP210	B7	TP379	B6	C217	M7	IL301	L6	R316	L6	TP1081	I6	TP2103	N6	TP365	N6
C148	F6	C251	C8	R139	B5	TP1012	D4	TP127	E4	TP2101	A6	TP380	B6	C218	J7	IL302	J7	R317	N6	TP1085	H6	TP2110	I7	TP370	M6
C149	F6	C252	B7	R140	B5	TP1017	E4	TP128	G5	TP2102	A6	TP382	B6	C219	L7	IL303	H8	R318	N6	TP1086	I6	TP2111	H7	TP371	M6
C151	F6	C253	B8	R141	C5	TP1019	E6	TP129	F5	TP2105	E6	TP383	C4	C220	L7	IL304	J8	R319	N6	TP1091	H6	TP2112	H7	TP372	N6
C153	F6	C254	B8	R142	C5	TP1025	E7	TP130	F5	TP2106	E6	TP384	B6	C223	M7	Q301	K2	R320	L5	TP1092	I6	TP2113	H7	TP373	N6
C154	F6	C255	C8	R143	C5	TP1027	E7	TP133	D5	TP2108	F7	TP397	B6	C226	L7	Q302	L2	R321	N6	TP1093	I6	TP2114	H6	TP374	M6
C155	F6	C256	C8	R144	C6	TP1028	F7	TP135	C6	TP2109	F7	TP414	C5	C227	K7	R112	H4	R322	L5	TP1095	I7	TP2115	I6	TP375	M6
C157	F6	C257	C8	R145	C6	TP1029	E7	TP138	F5	TP211	A7	TP415	B5	C228	K7	R201	M8	R323	N6	TP1103	H6	TP2119	L7	TP376	M6
C158	F6	C258	C8	R146	A5	TP1037	F7	TP139	F5	TP2120	C7	TP417	B5	C229	L7	R204	M7	R324	N6	TP1106	I6	TP2121	K7	TP380	L6
C160	G6	C259	B8	R147	A5	TP104	B2	TP140	B5	TP2122	C7	TP426	C5	C236	N8	R205	M7	R325	N5	TP1112	H6	TP2126	K7	TP402	L5
C162	E6	C260	B8	R148	A5	TP1047	F7	TP141	E5	TP2131	C7	TP431	B5	C239	M8	R207	L7	R326	N5	TP1124	I6	TP2130	K7	TP405	J8
C164	G6	C307	B6	R149	A5	TP105	G5	TP143	F6	TP2134	C7	TP438	B9	C240	N8	R208	L7	R327	N5	TP1126	I6	TP2132	K7	TP408	M5
C165	G6	C313	B6	R150	F6	TP1059	E7	TP144	E6	TP2135	C7	TP442	B9	C241	M8	R209	L7	R328	N5	TP1127	I6	TP2140	K8	TP409	L5
C166	G6	C315	B6	R151	F6	TP106	A4	TP145	D5	TP2137	C8	TP443	C9	C242	M8	R210	L7	R329	N5	TP1128	I6	TP2141	K8	TP412	N7
C167	G6	C316	B6	R152	F6	TP1074	F6	TP146	D5	TP2145	C8	TP444	B5	C248	M8	R211	L7	R330	N5	TP1133	I6	TP2142	K8	TP419	N5
C168	G6	C319	F7	R153	G6	TP1075	F6	TP147	F5	TP2146	C8	TP447	E5	C250	N8	R212	L7	R331	N5	TP1134	I6	TP2143	K8	TP420	M5
C169	G6	C320	A6	R154	G6	TP1076	F6	TP148	F5	TP2147	C8	TP450	E4	C261	J8	R213	L7	R332	L5	TP1135	I6	TP2151	K8	TP421	M5
C170	E6	C321	A6	R155	G6	TP1077	G6	TP149	F5	TP2148	C8			C262	J8	R214	L7	R335	N5	TP1136	I6	TP2153	K8	TP430	M5
C171	E6	C322	B5	R156	G6	TP1088	D5	TP150	F5	TP2152	C8			C263	I9	R215	M7	R336	M5	TP1142	I6	TP2187	I9	TP432	M5
C172	E6	CN101	D6	R157	G6	TP1088	G7	TP151	F5	TP2154	C8			C264	I9	R216	L7	R337	M5	TP1143	I6	TP2188	I9	TP461	I8
C173	E6	D101	G6	R158	F7	TP1116	F5	TP152	E5	TP2177	C8			C265	I9	R217	L7	R338	N5	TP1144	I6	TP2189	I9	X201	M8
														C302	M6	R219	L7	R339	M5	TP1146	I6	TP2190	J9	X301	L5
														C303	M6	R220	K7	R340	N2	TP1148	I6	TP2193	J9		
														C304	M6	R221	K7	R341	L2	TP1168	J8	TP2194	J9		
														C305	M6	R222	L7	R342	L2	TP1175	M3	TP2195	J9		