Service Manual

General Description
Adjustment Procedures
Block / Schematic Diagrams
Exploded Views / Parts List

DVD-Recorder
LOEWE

MODELS

CENTROS 1102
Art.-Nr. 64501

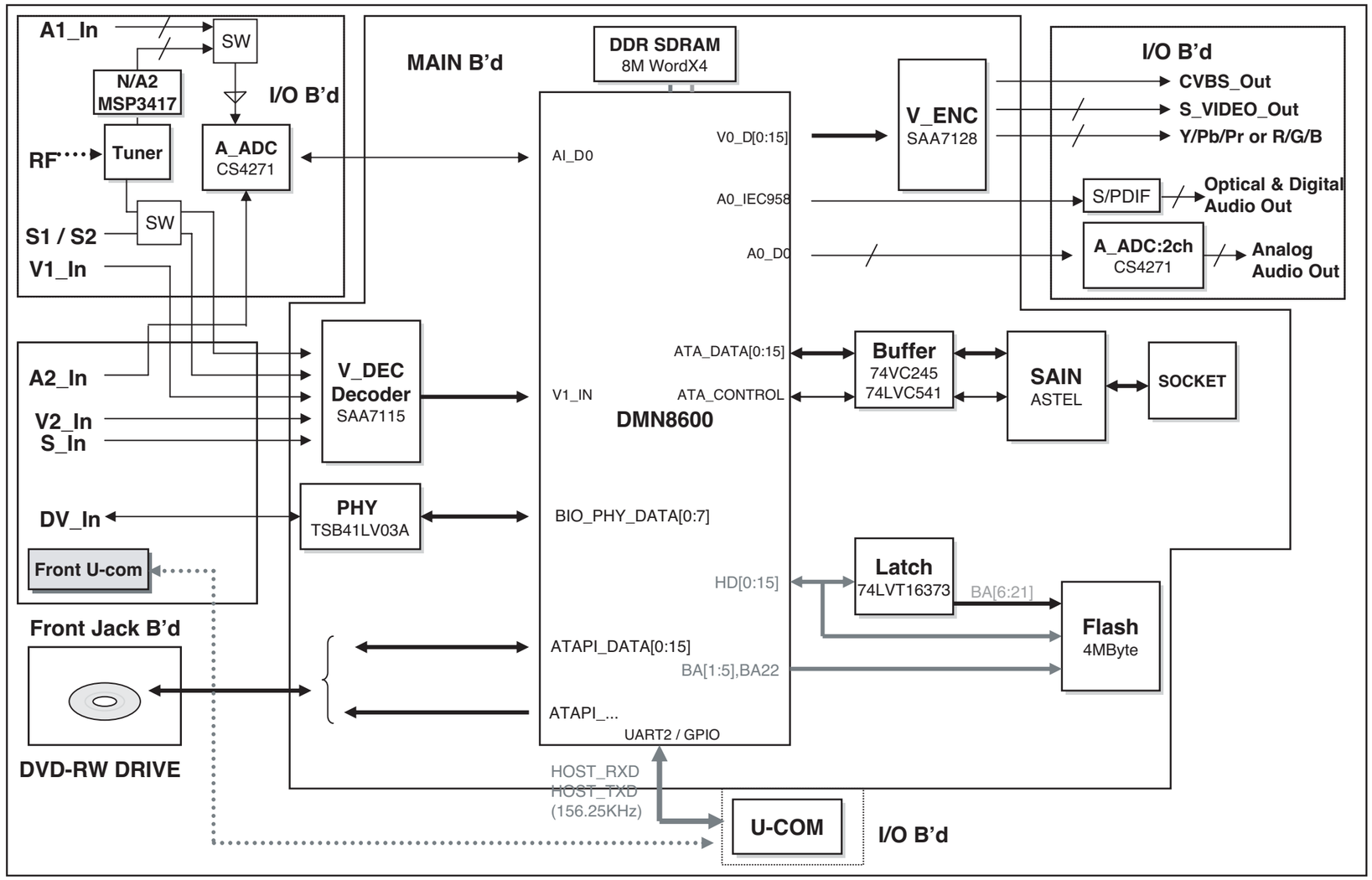
CENTROS 1172
Art.-Nr. 64511

LOEWE.

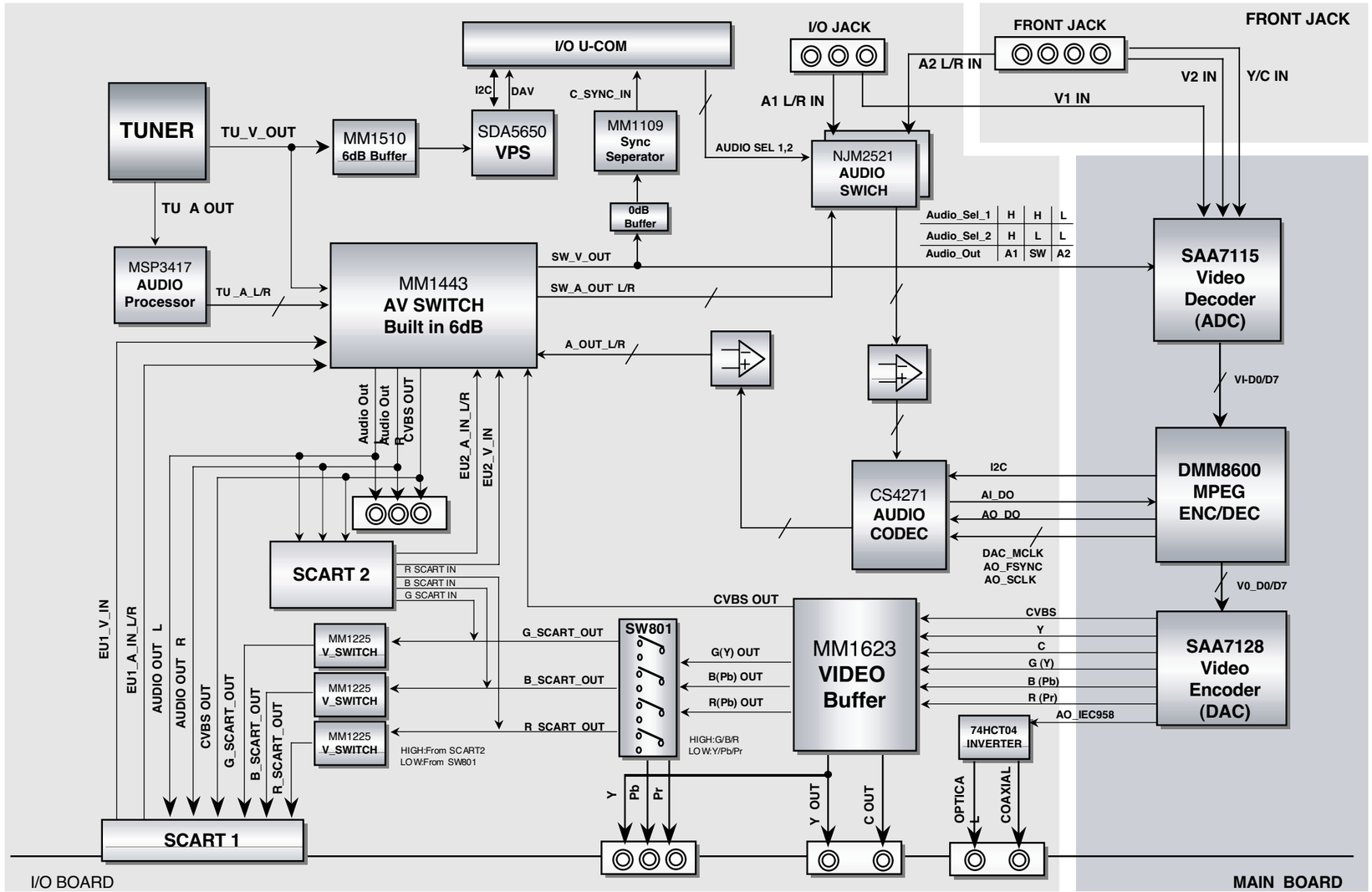
230-90430.990

BLOCK DIAGRAMS

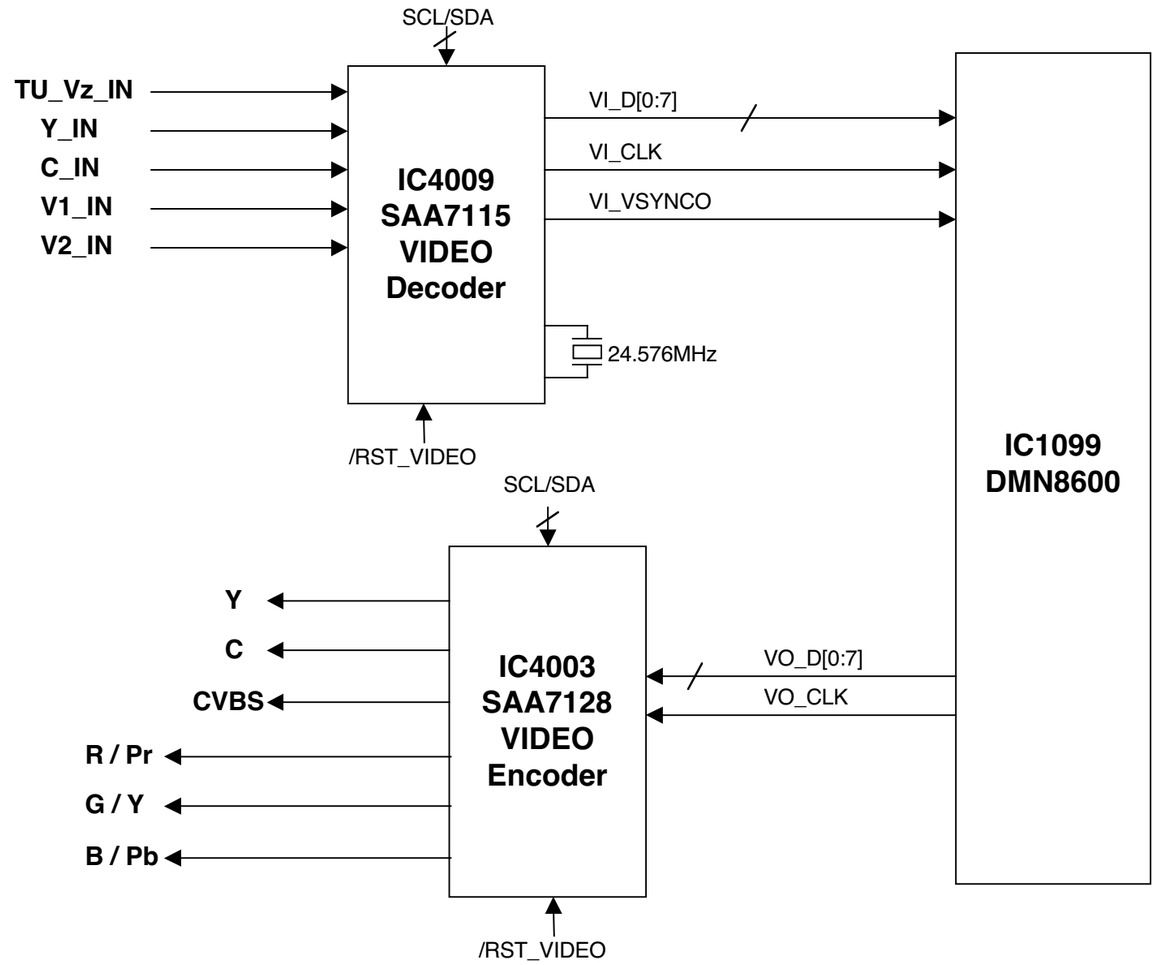
1. LSI Overall Block Diagram



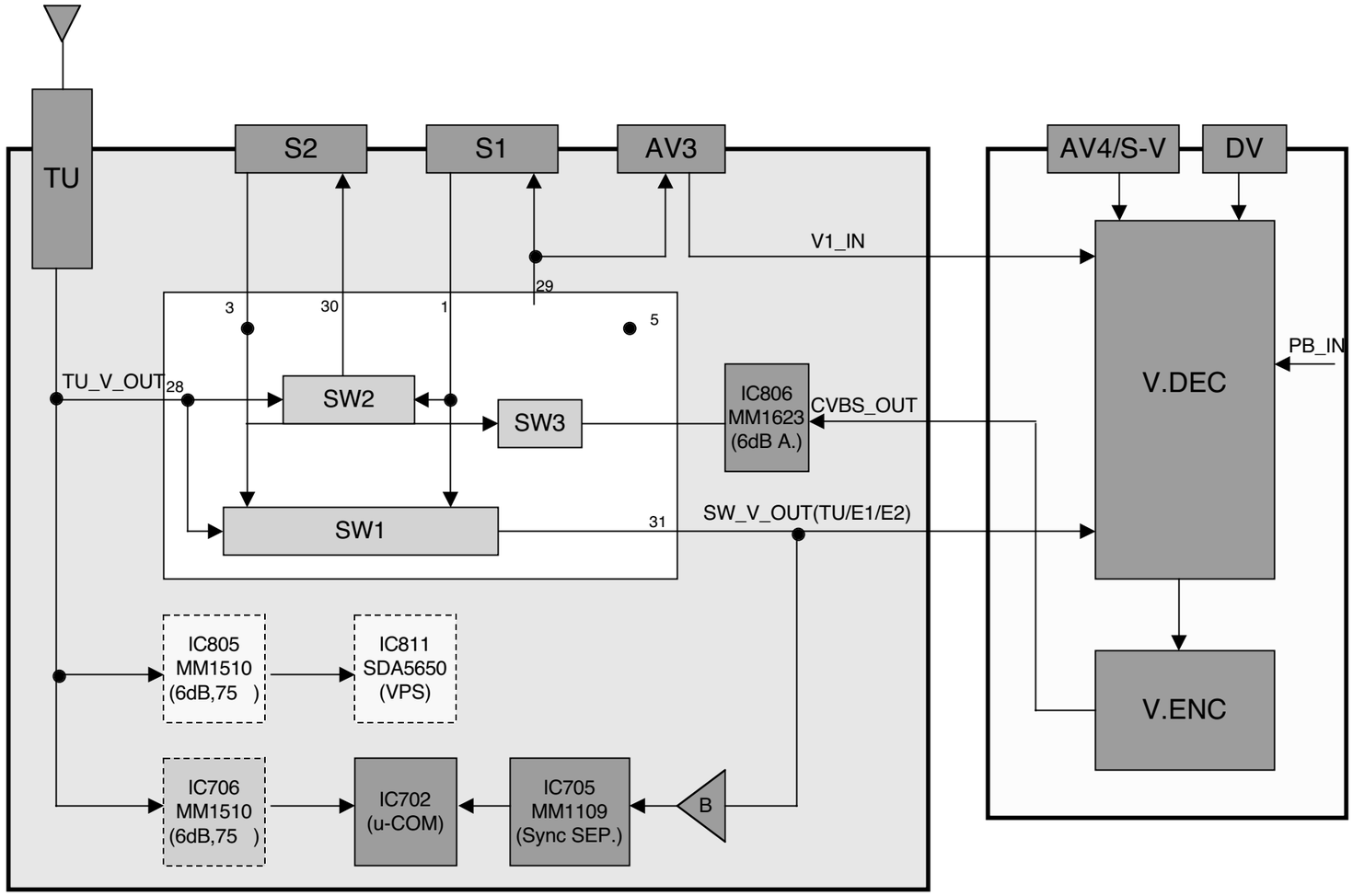
2. In/Out Block Diagram



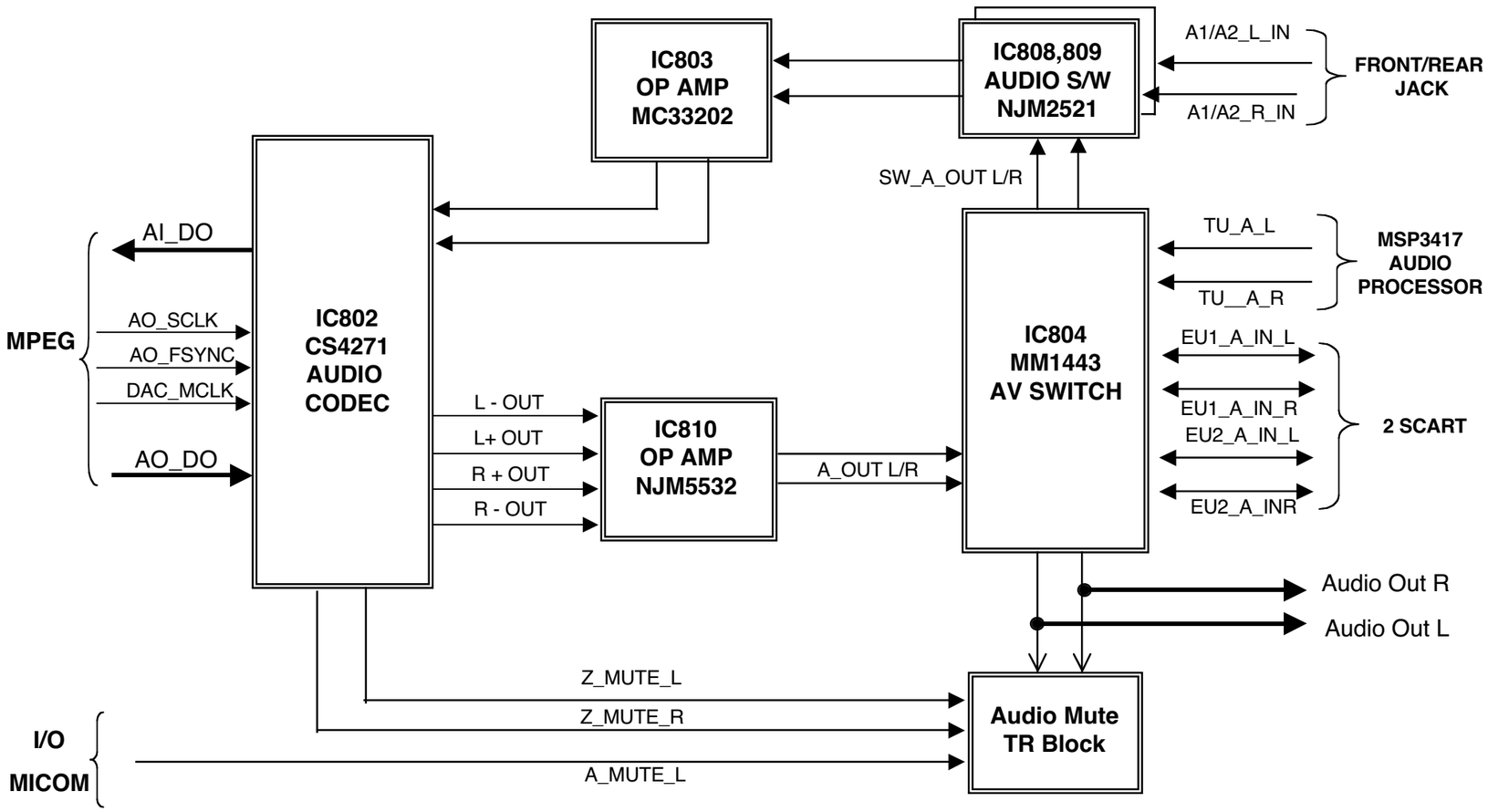
3. Video In/Out Block Diagram



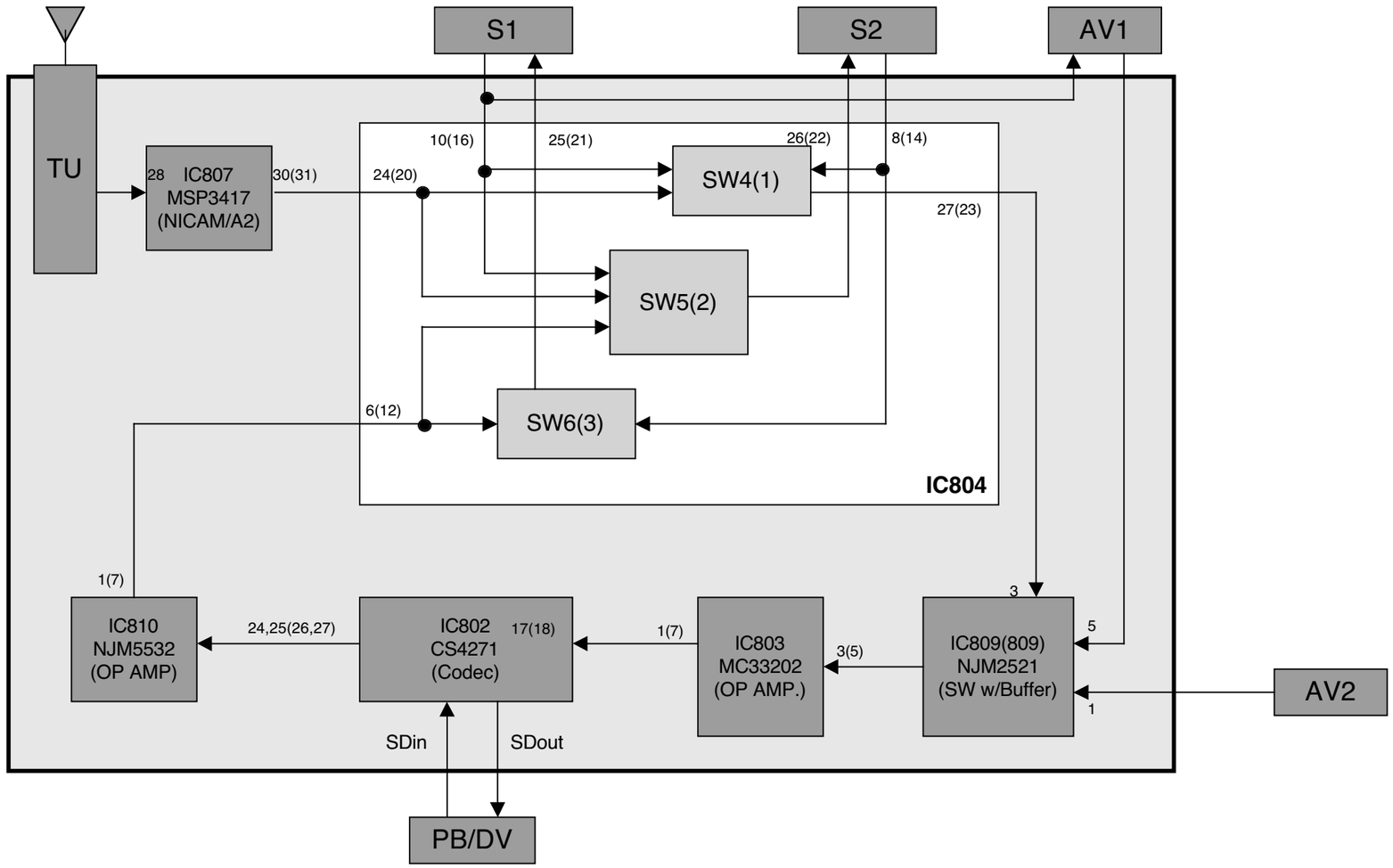
4. Video SW Path Block Diagram



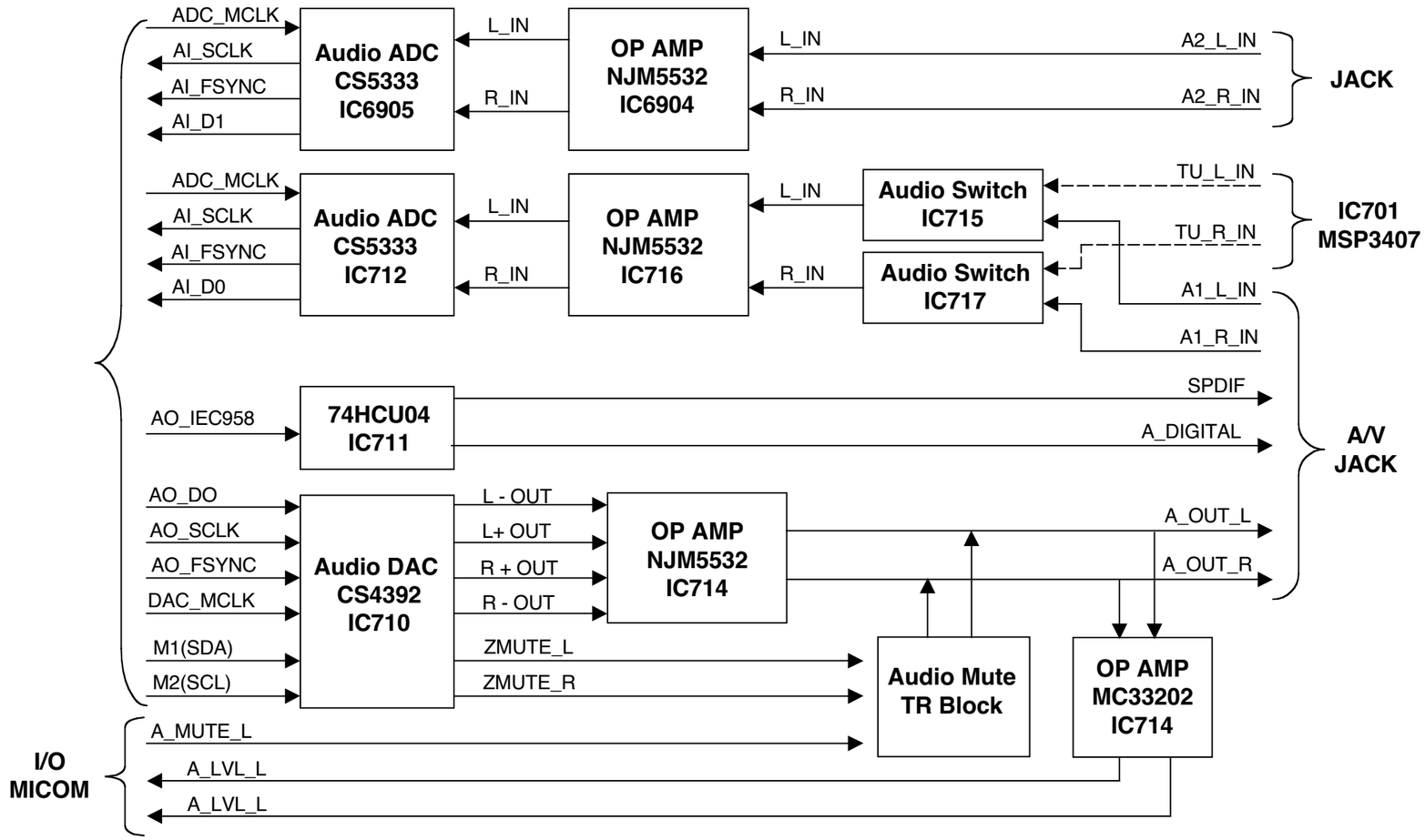
5. Audio Block Diagram



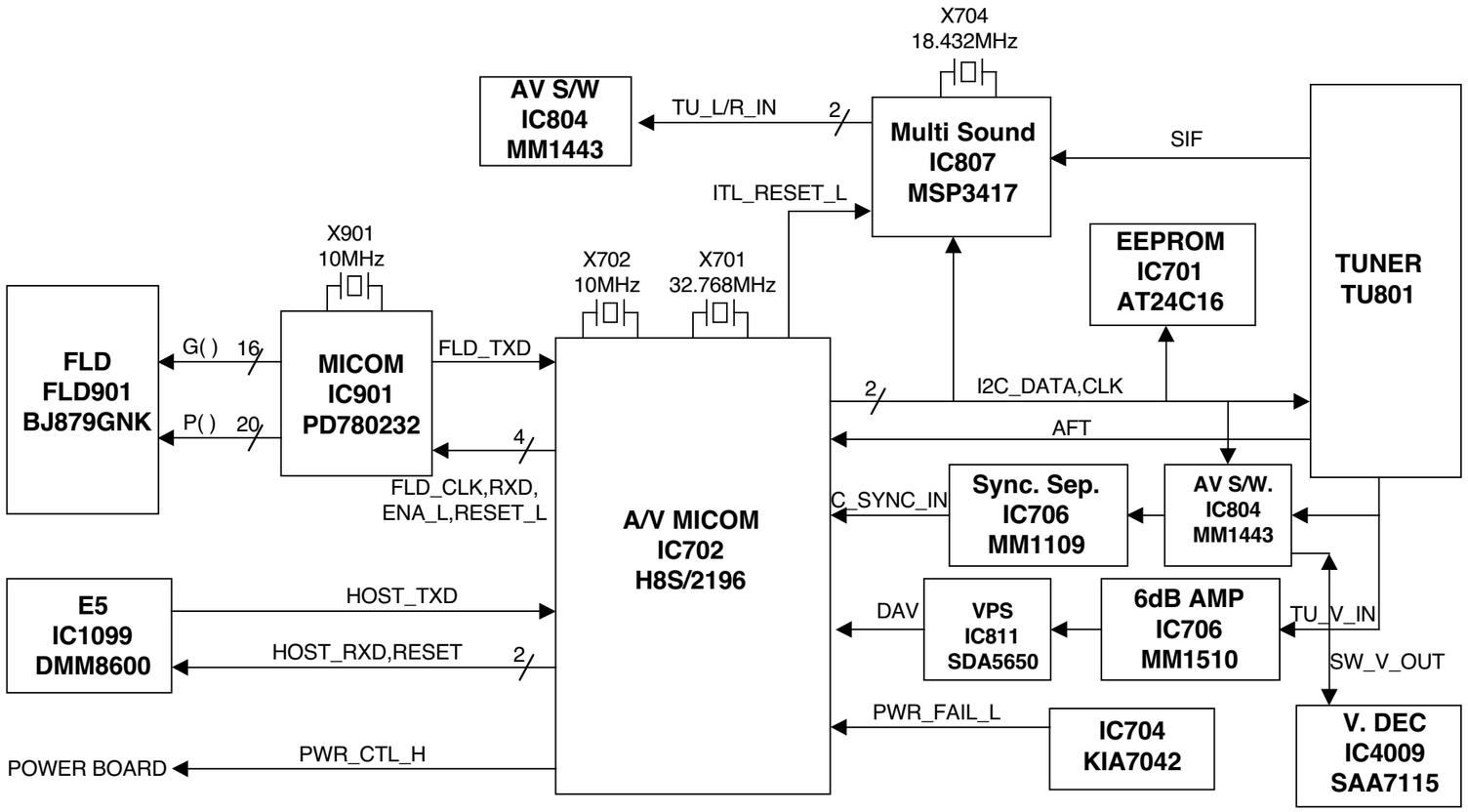
6. Audio SW Path Block Diagram



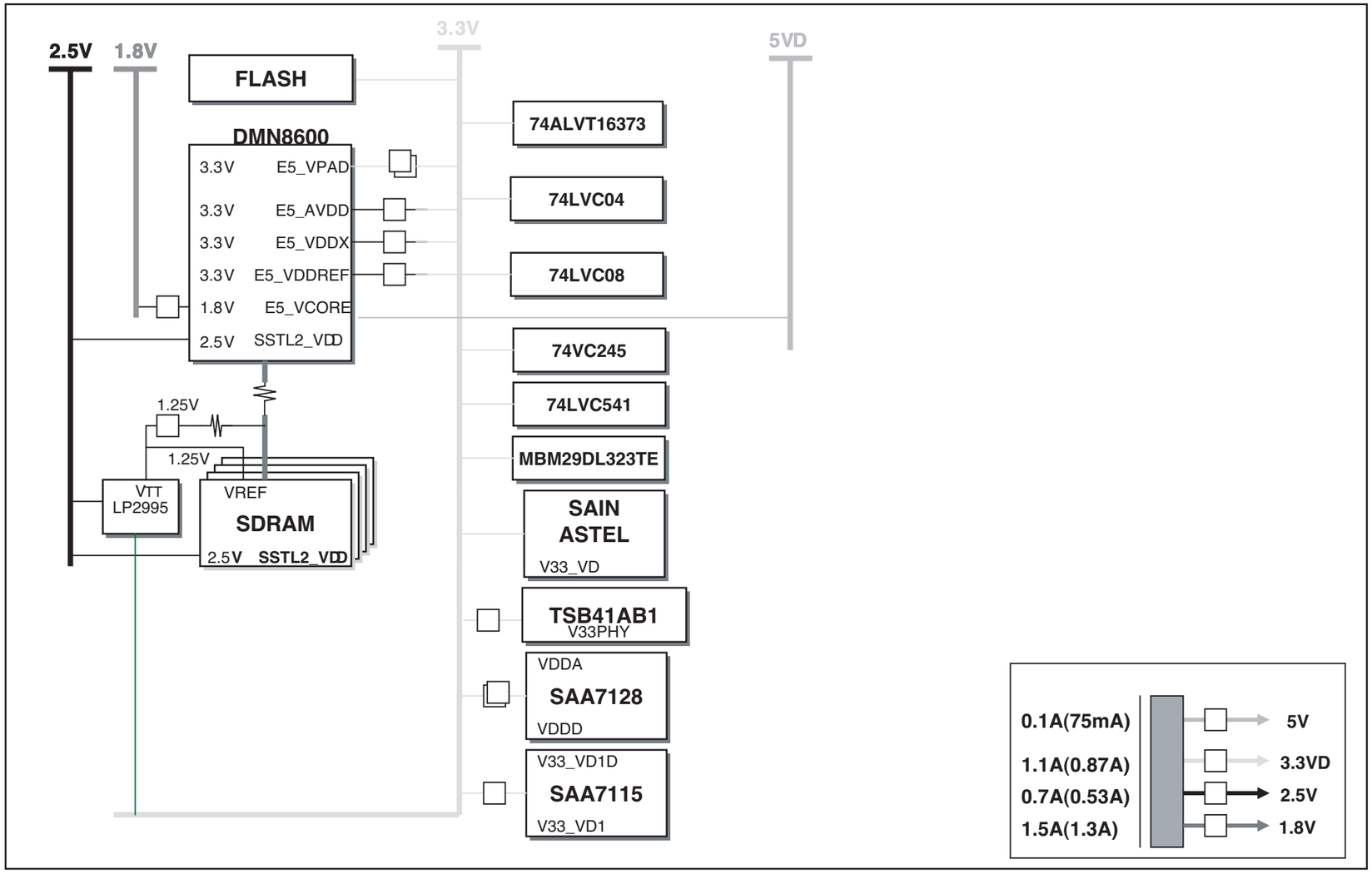
7. Audio In/Out Block Diagram



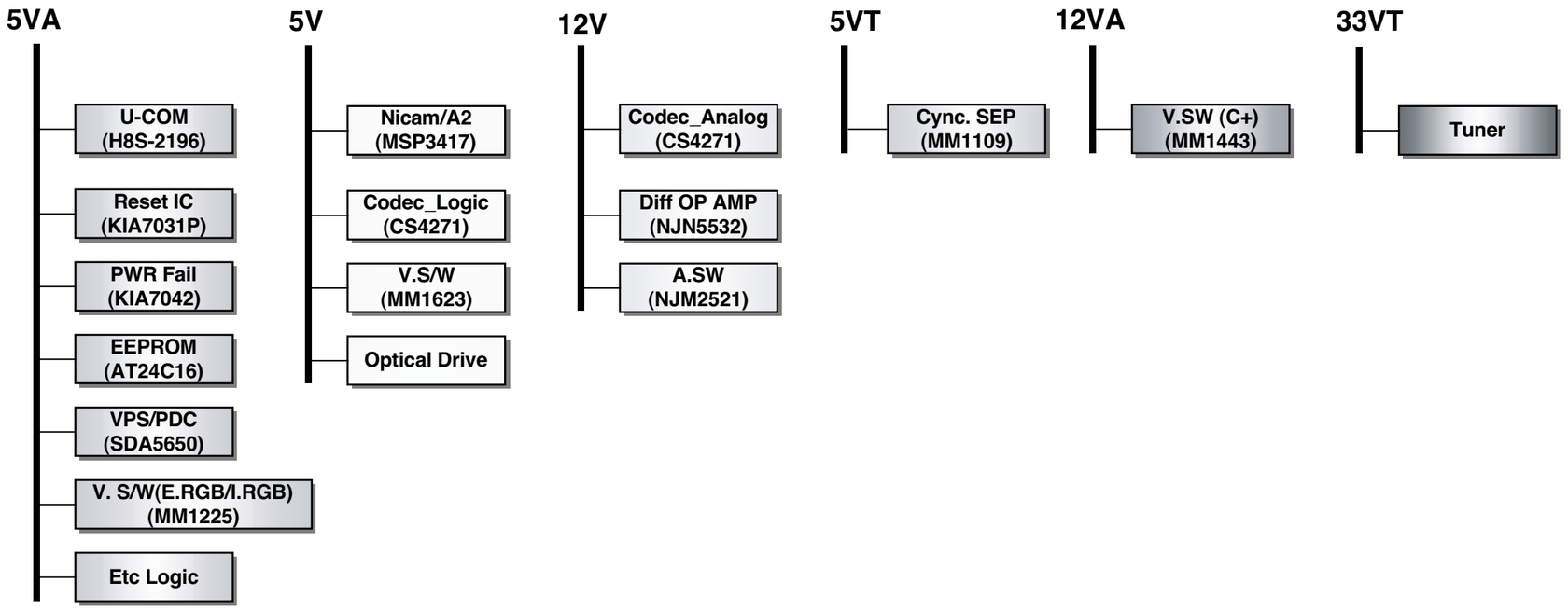
8. FLD/μ-COM/Tuner Block Diagram



9. Power : Main Board Block Diagram

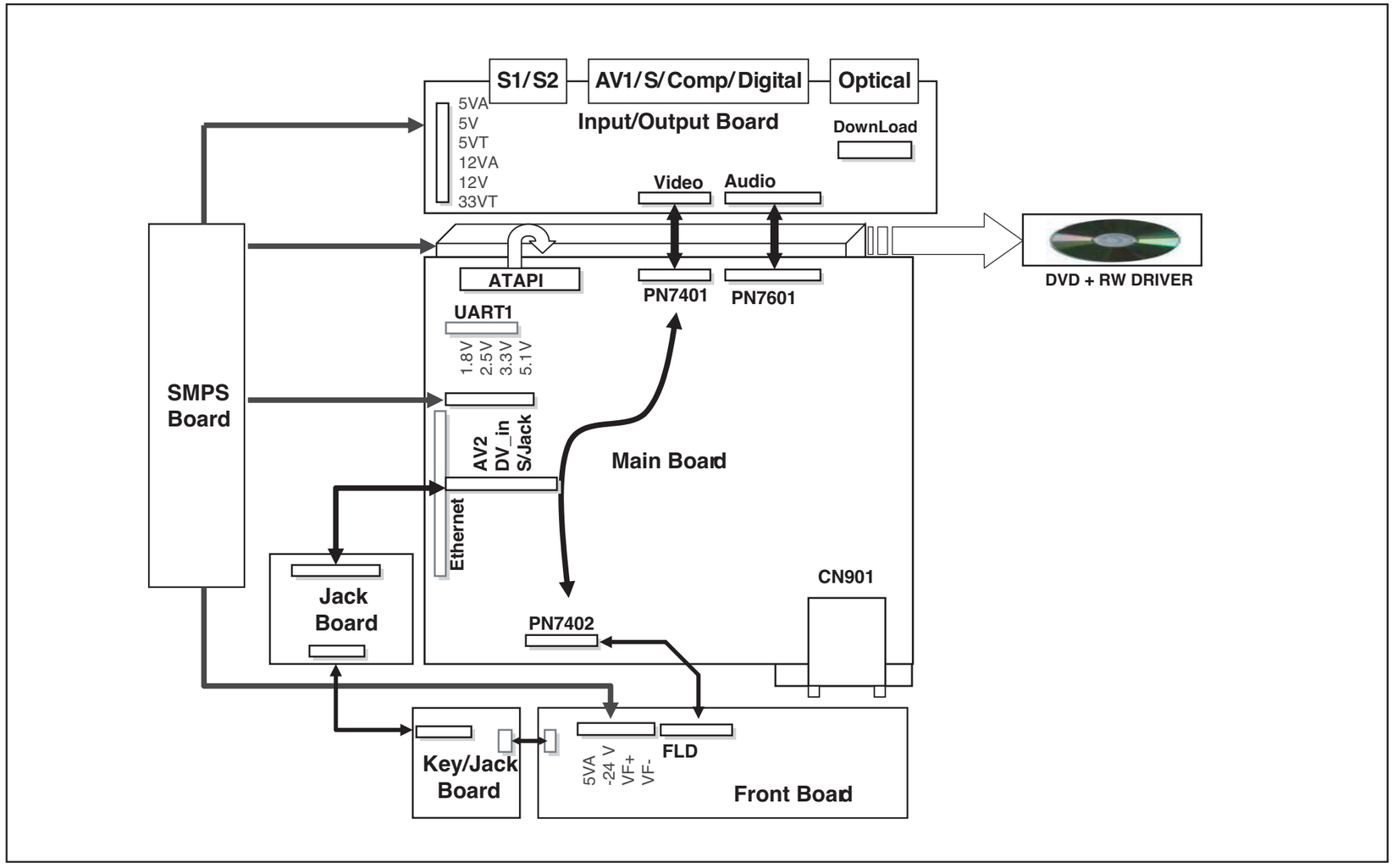


10. Power : I/O Board Block Diagram

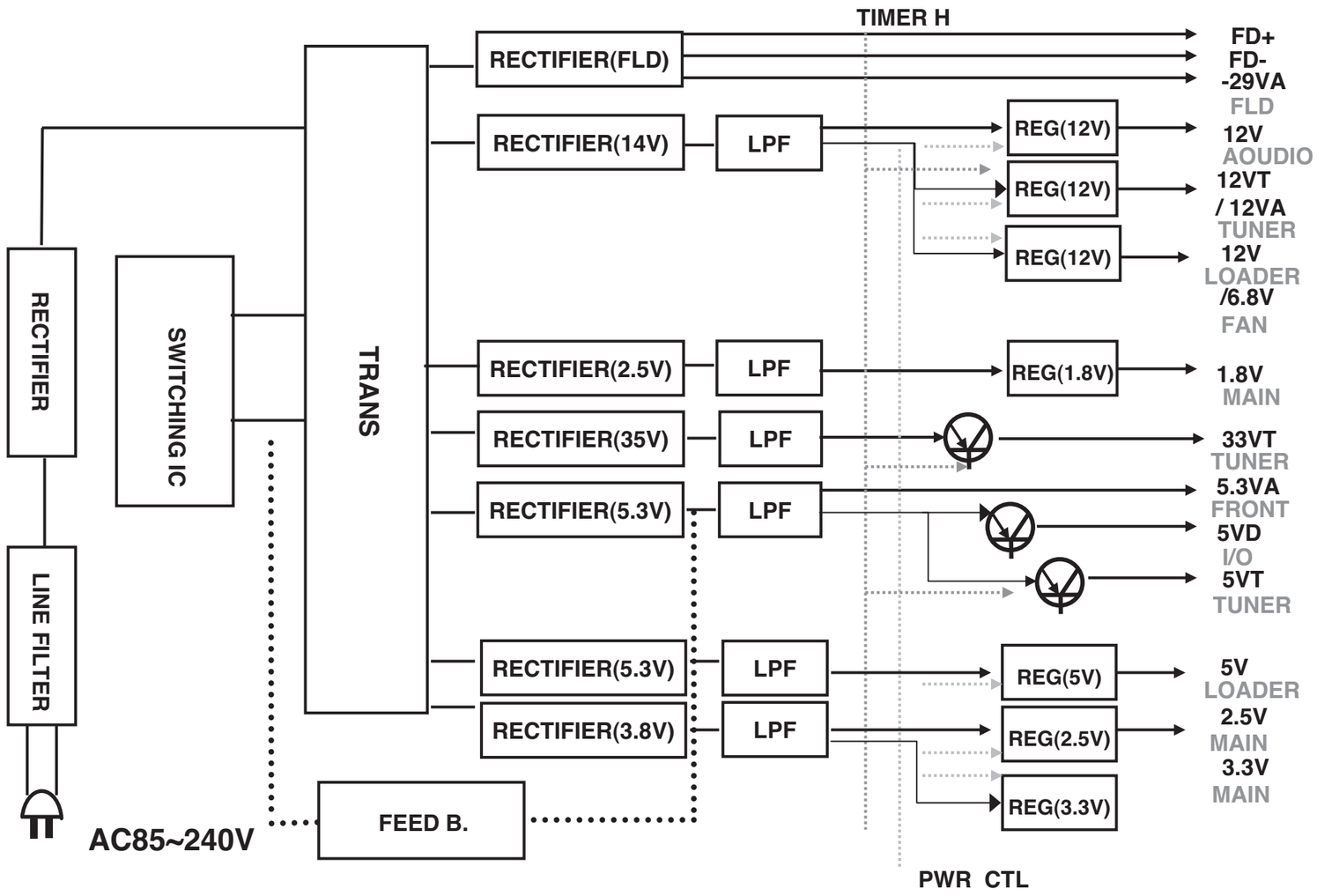


I/O Ucom PWR CTL SIGNAL	
PWR_CTL_H	5V, 12V CONTROL
TIMER_H	5VT, 33VT

11. Power : Layout Connection Block Diagram

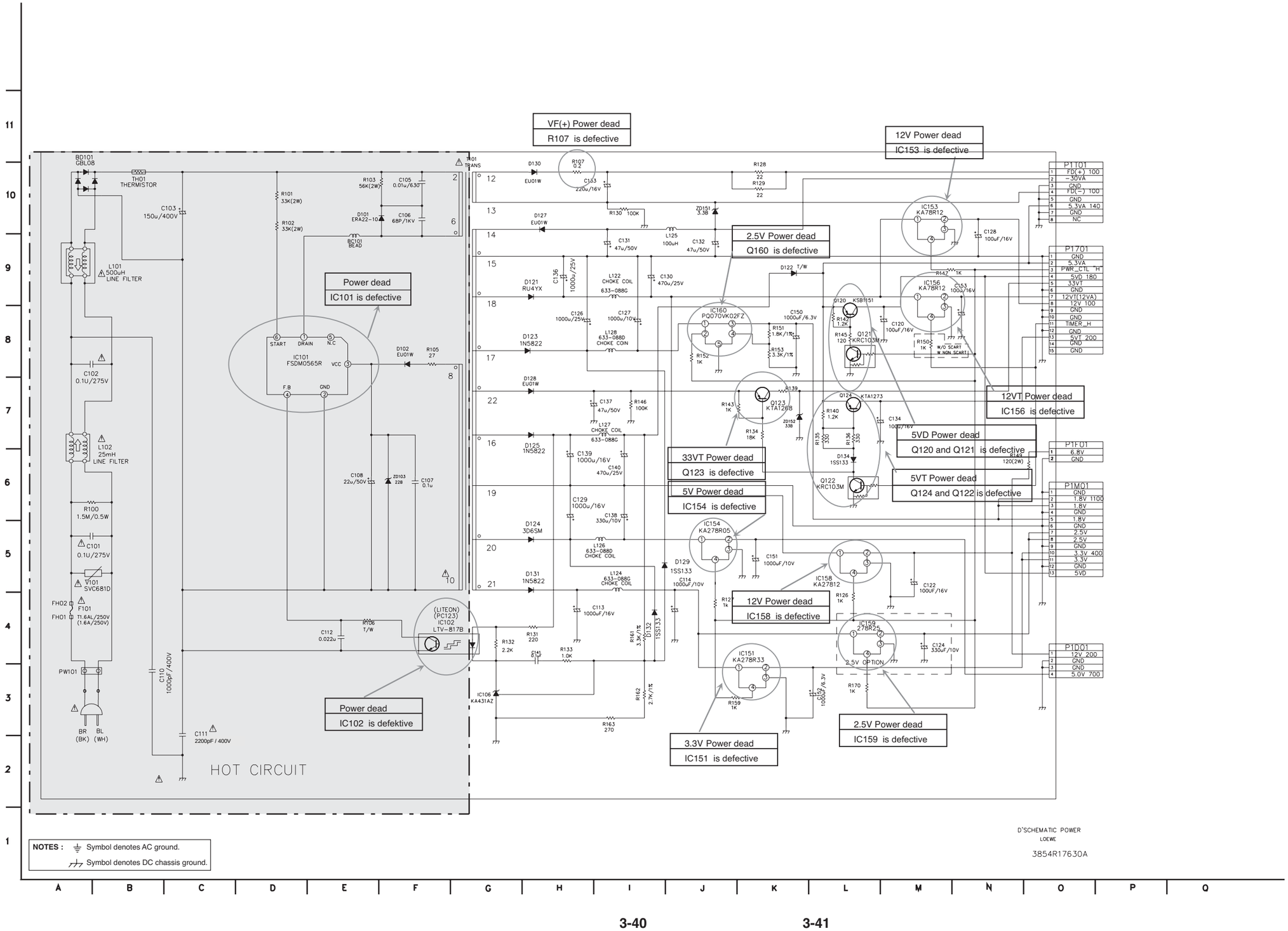


12. SMPS Block Diagram

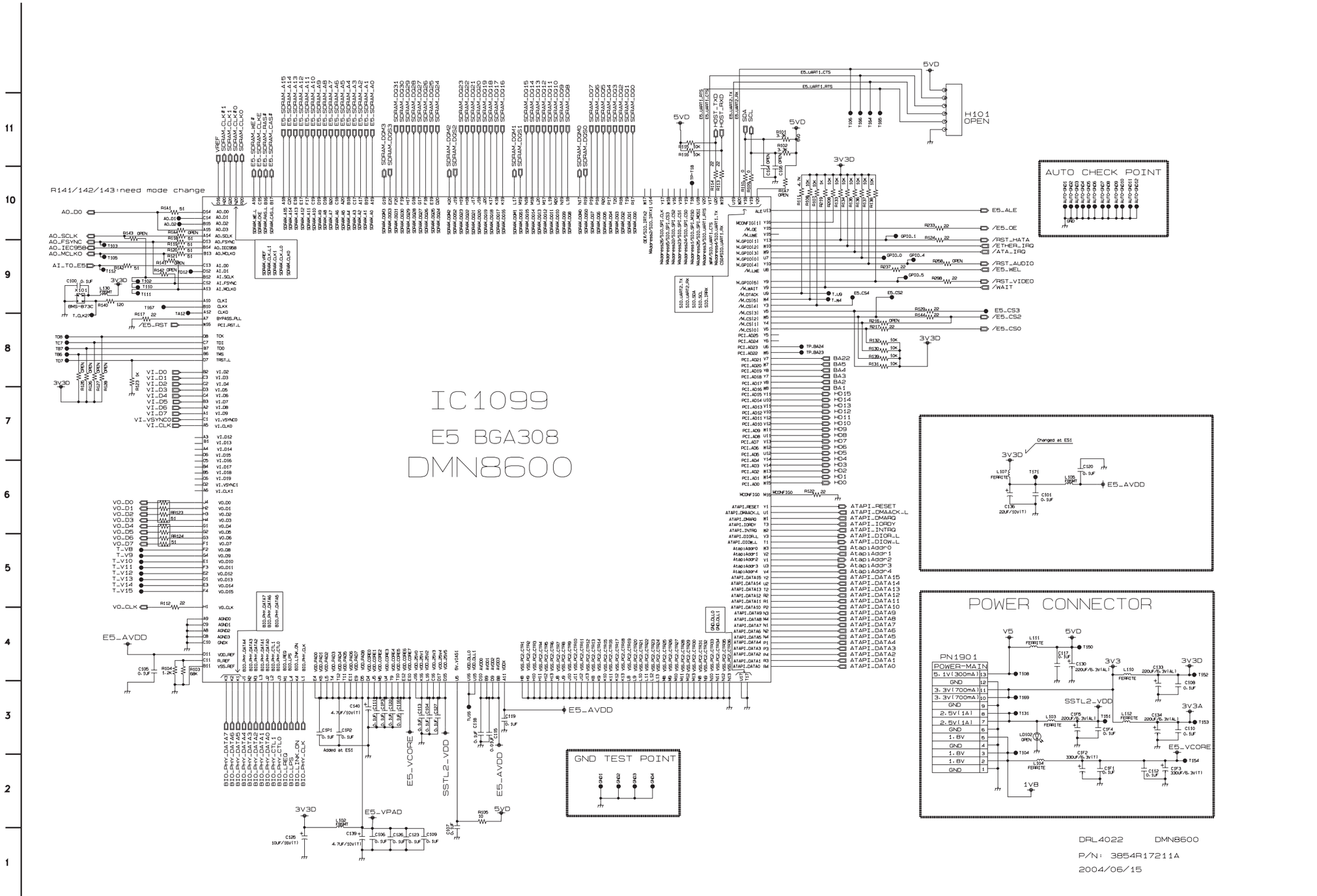


CIRCUIT DIAGRAMS

1. POWER CIRCUIT DIAGRAM

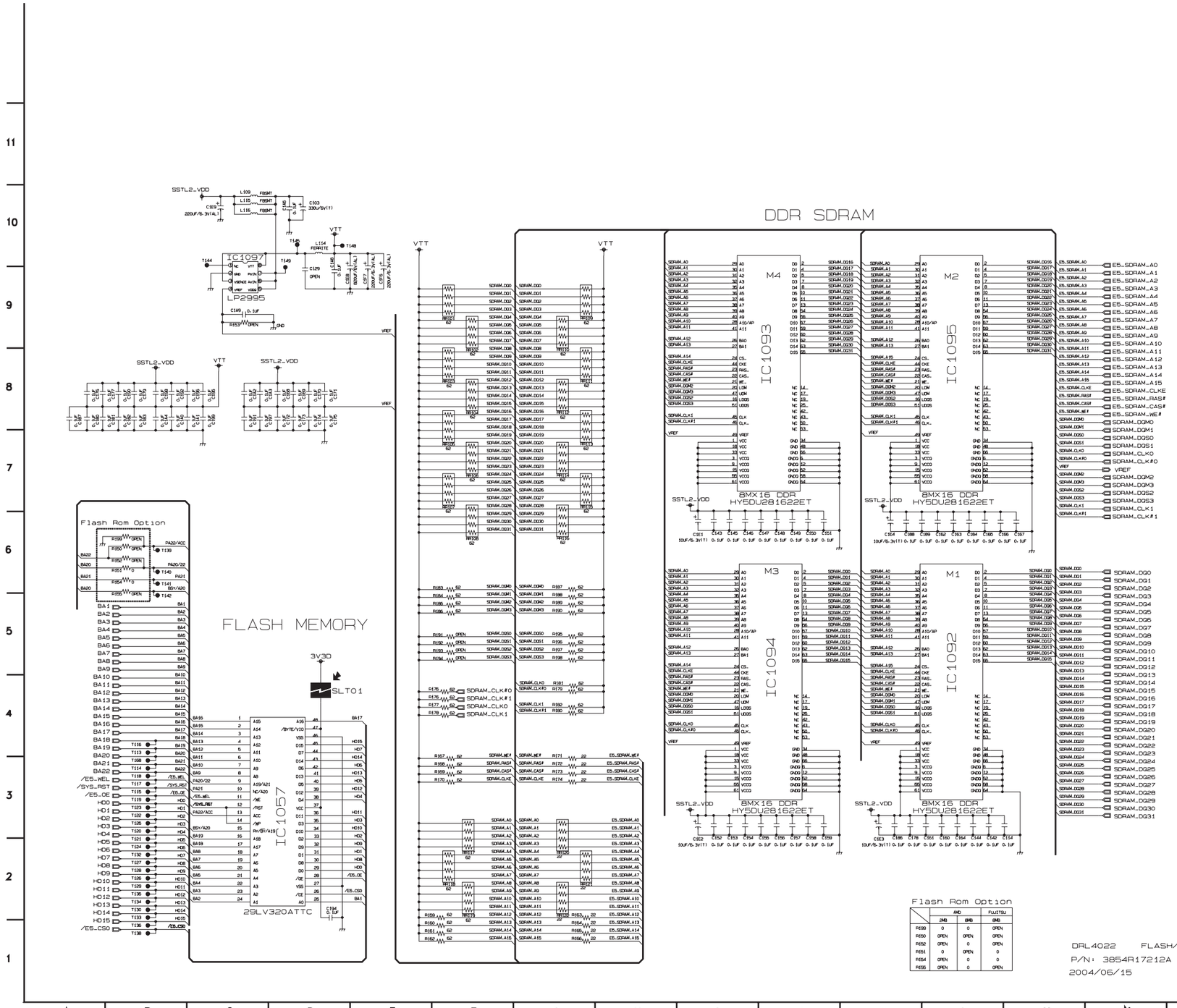


2. E5 BGA, POWER, UART2 CIRCUIT DIAGRAM



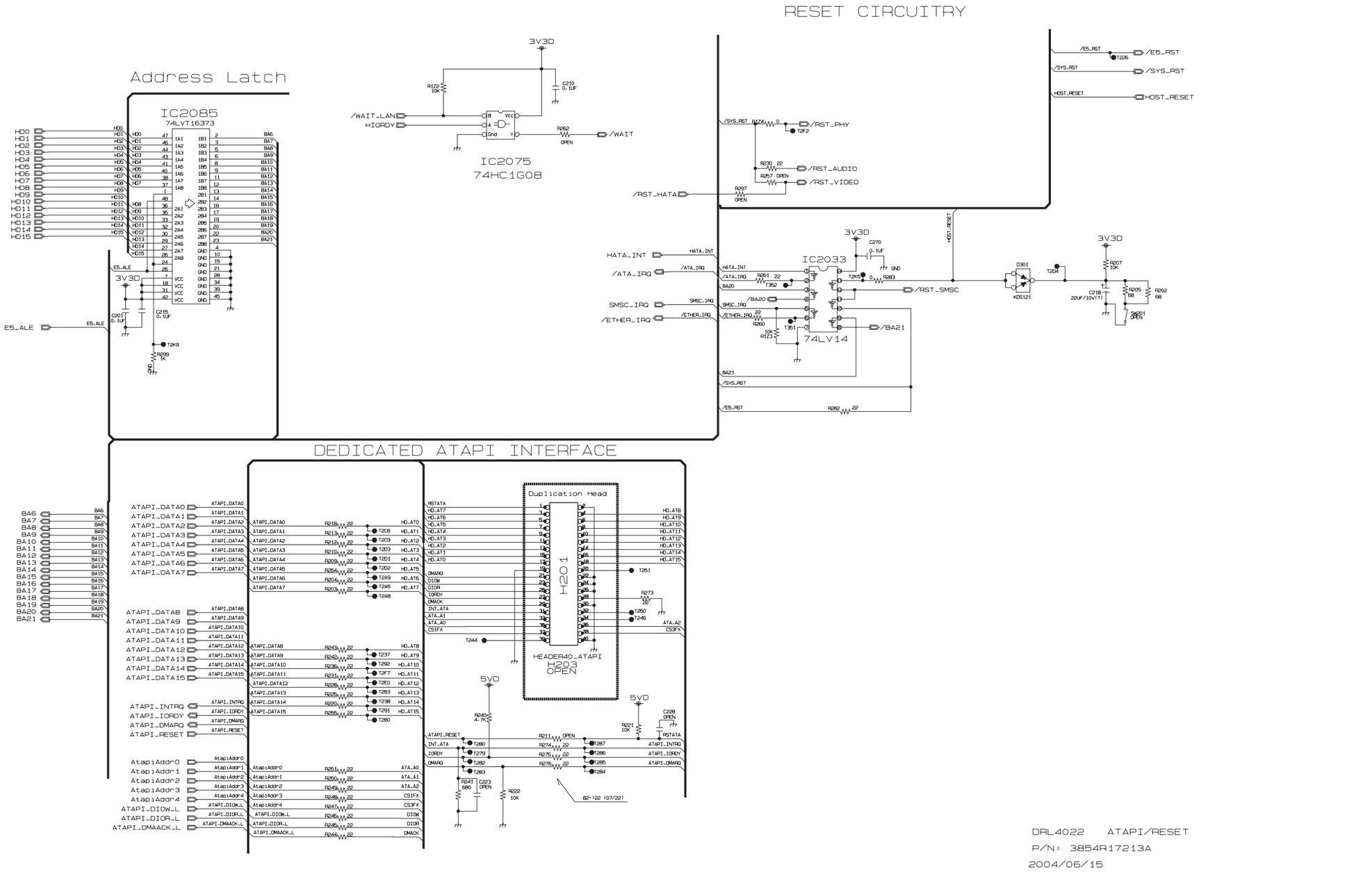
DRL4022 DMN8600
P/N: 3854R17211A
2004/06/15

3. DDR SDRAM, FLASH CIRCUIT DIAGRAM



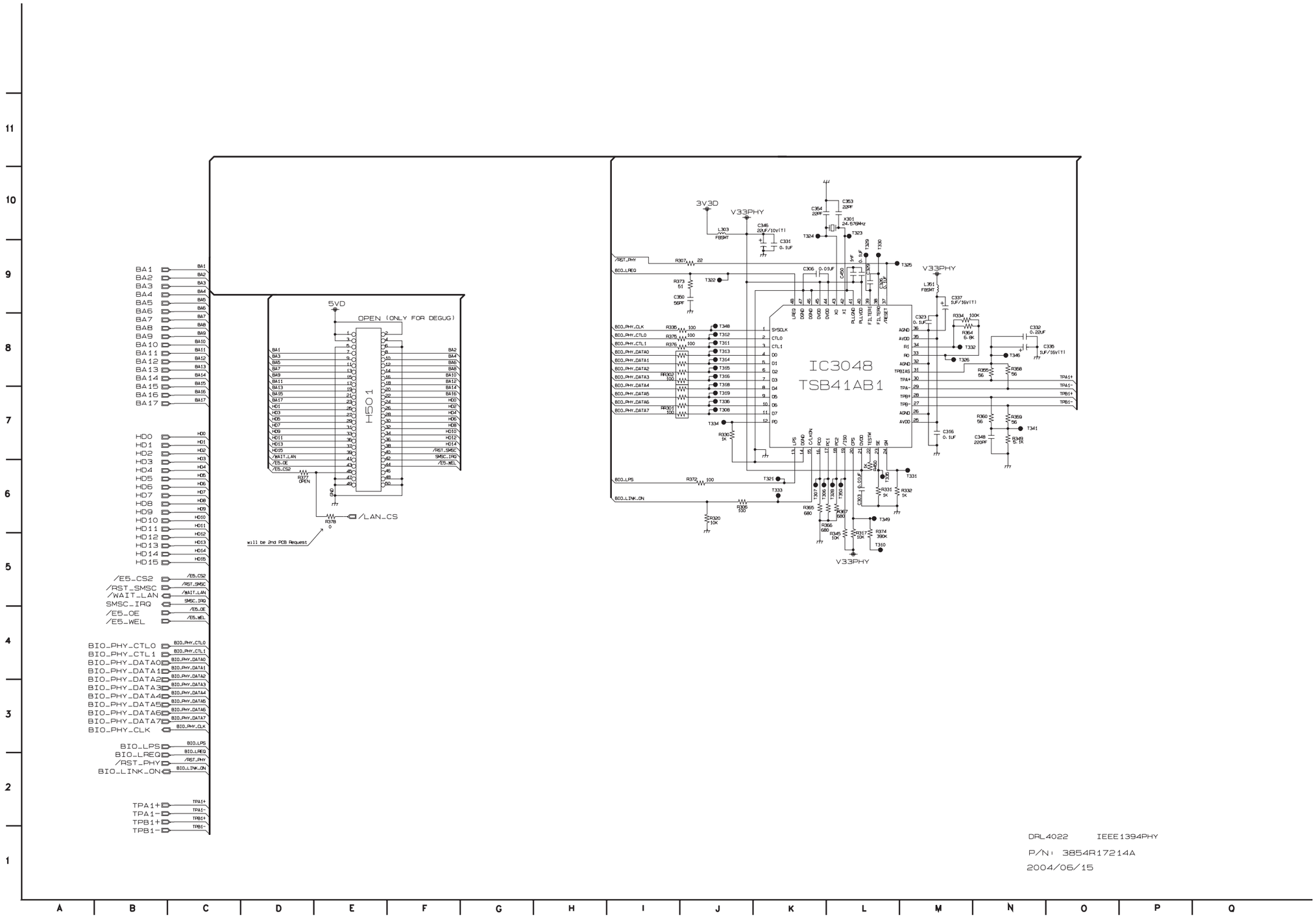
	AMD		FUJITSU
	2MB	4MB	8MB
R198	0	0	OPEN
R150	OPEN	OPEN	OPEN
R152	OPEN	0	OPEN
R151	0	OPEN	0
R154	OPEN	0	0
R155	OPEN	0	OPEN

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

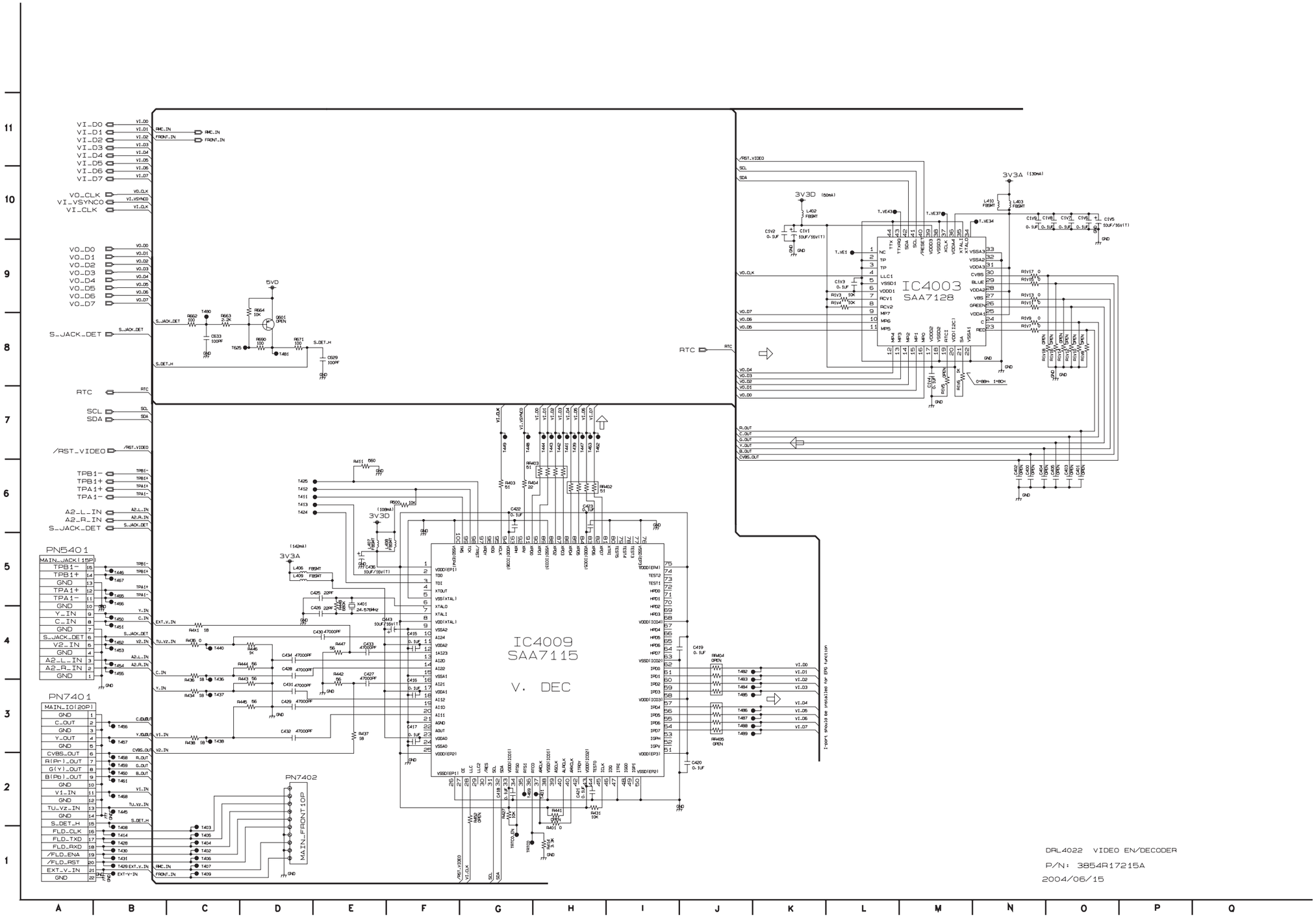


DRL4022 ATAPI/RESET
P/N: 3854R17213A
2004/06/15

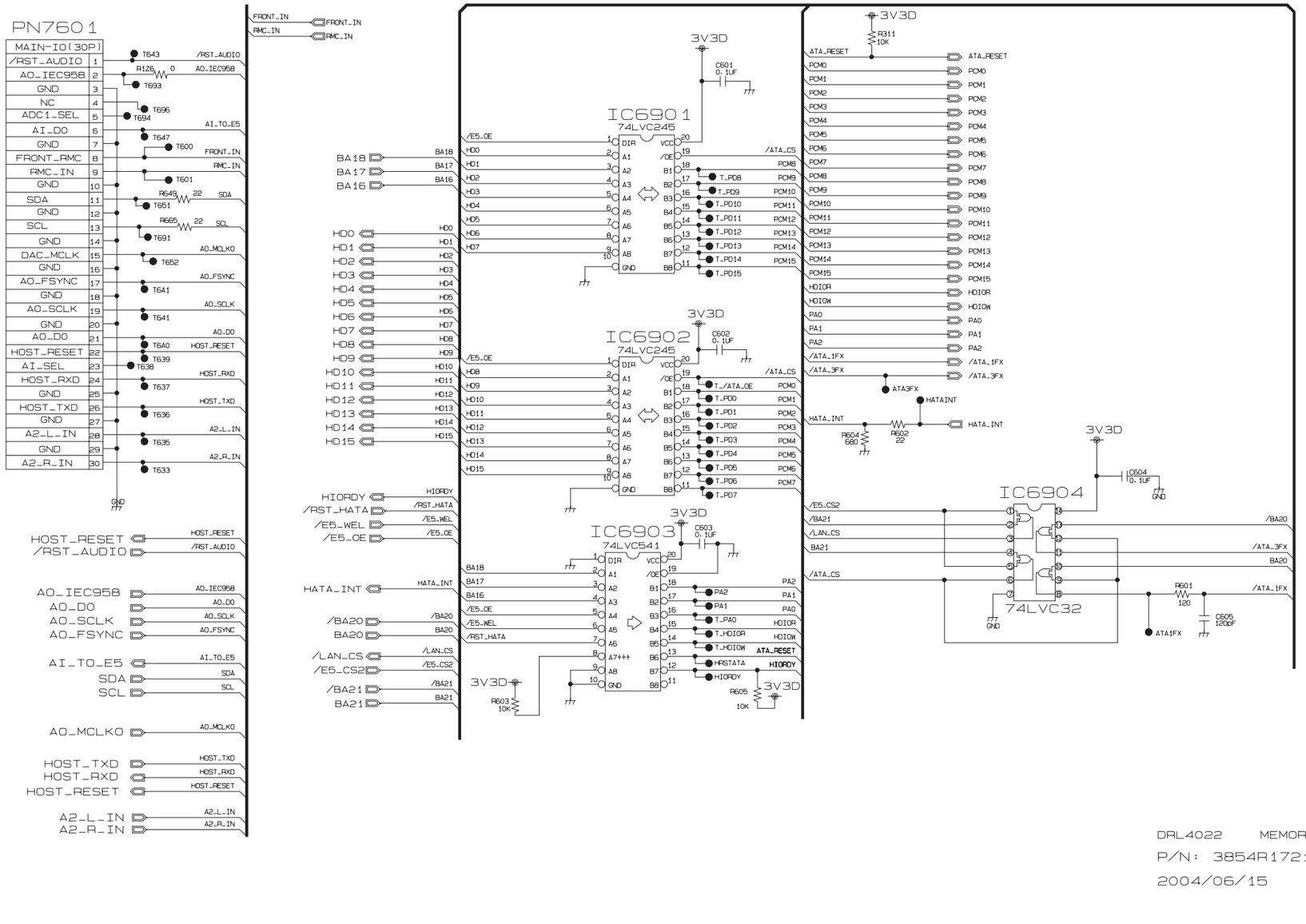
5. 1394, ETHERNET CONNECTOR CIRCUIT DIAGRAM



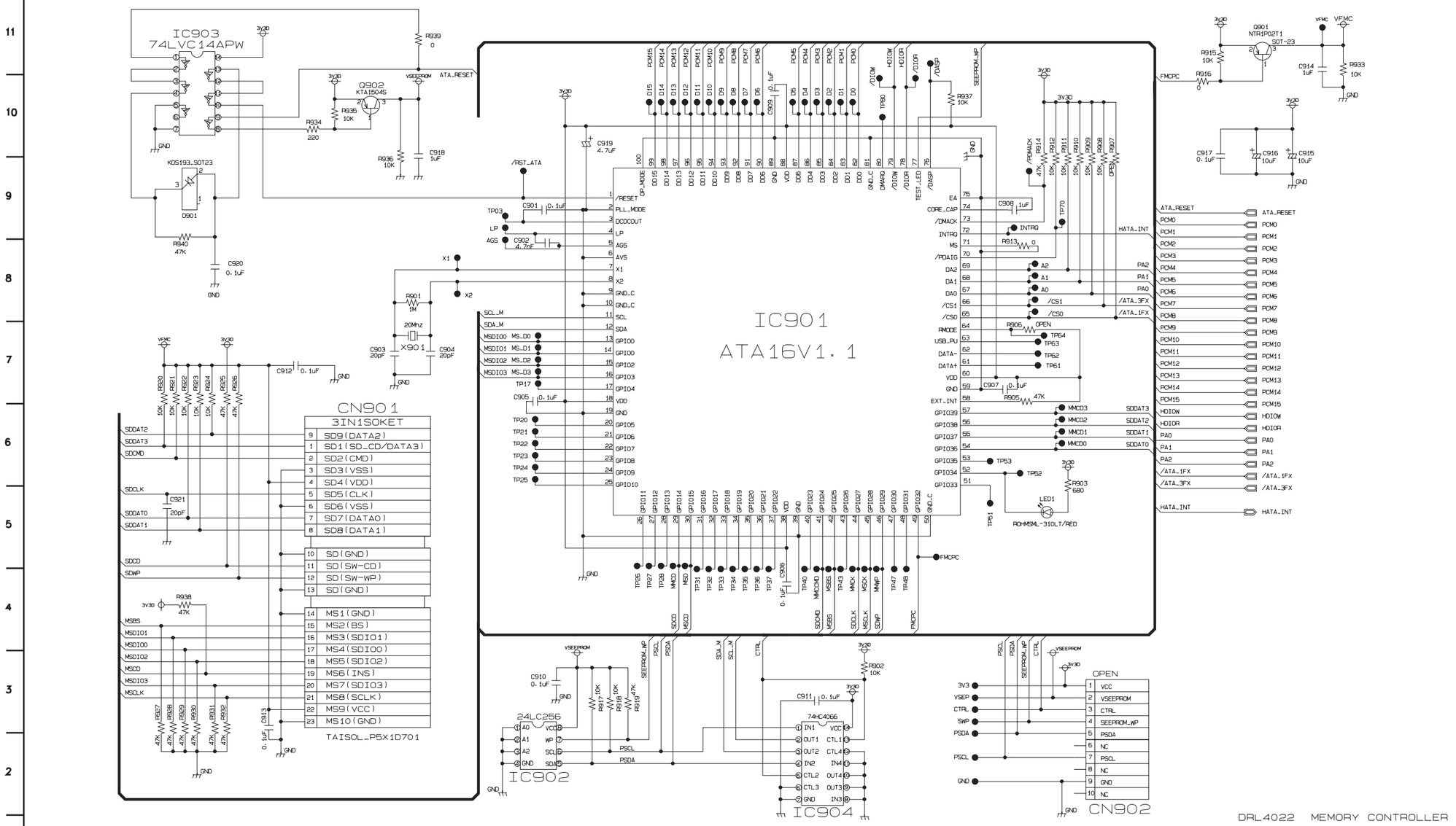
6. VIDEO IN/OUT CIRCUIT DIAGRAM



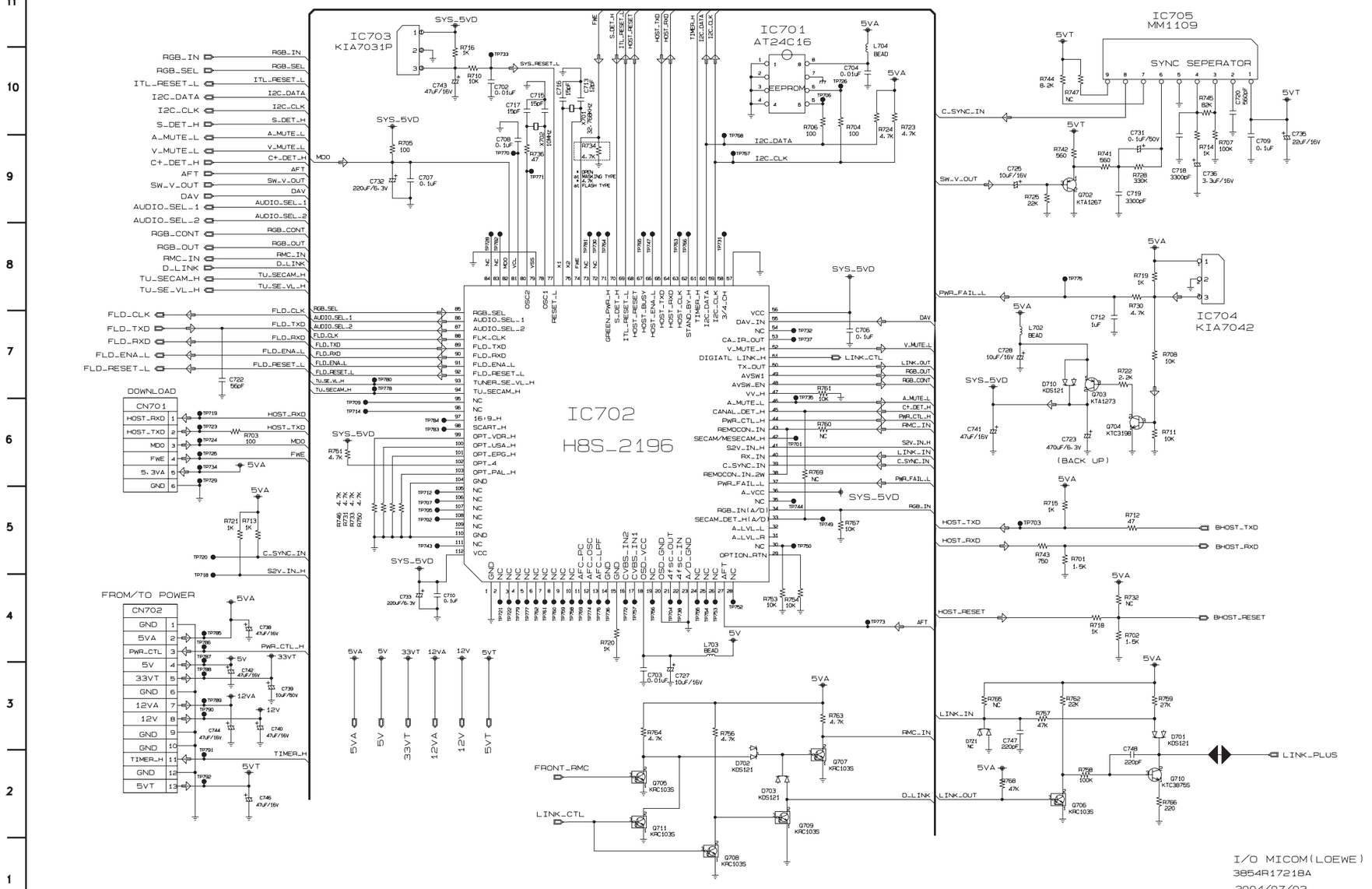
7. AUDIO IN/OUT NON-STD VIDEO CIRCUIT DIAGRAM



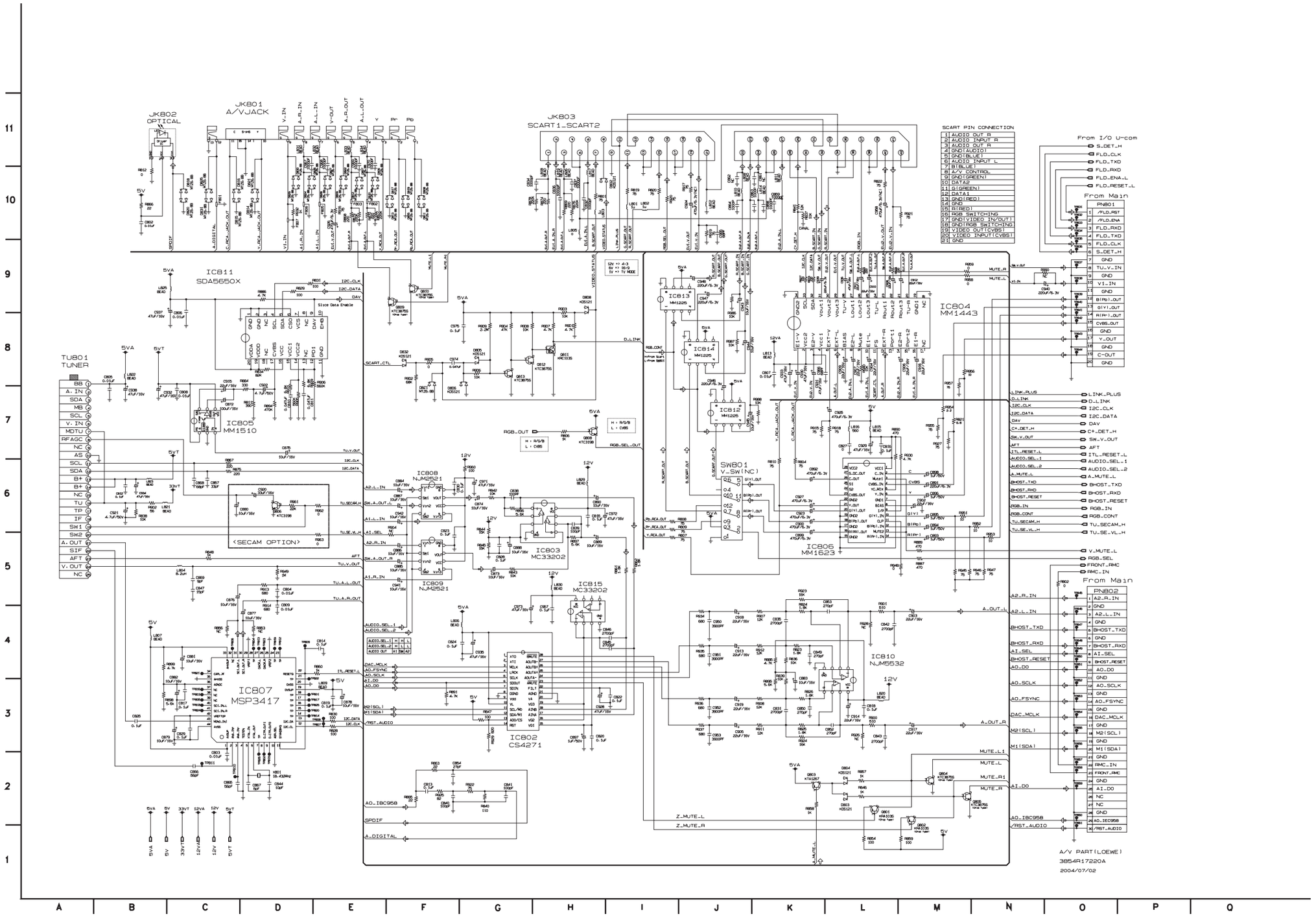
8. 3-IN-1 MEMORY CIRCUIT DIAGRAM



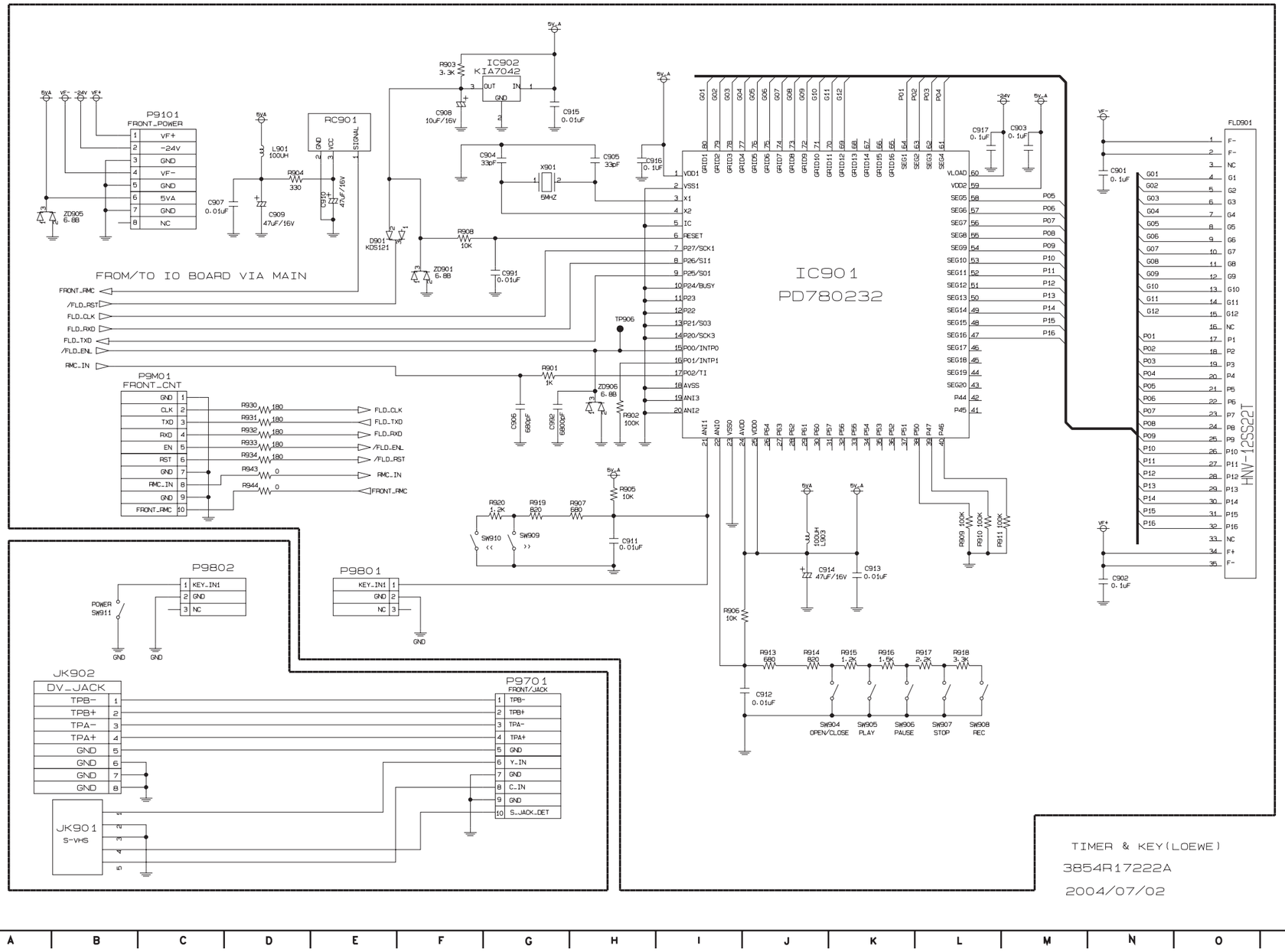
9. I/O MICOM CIRCUIT DIAGRAM



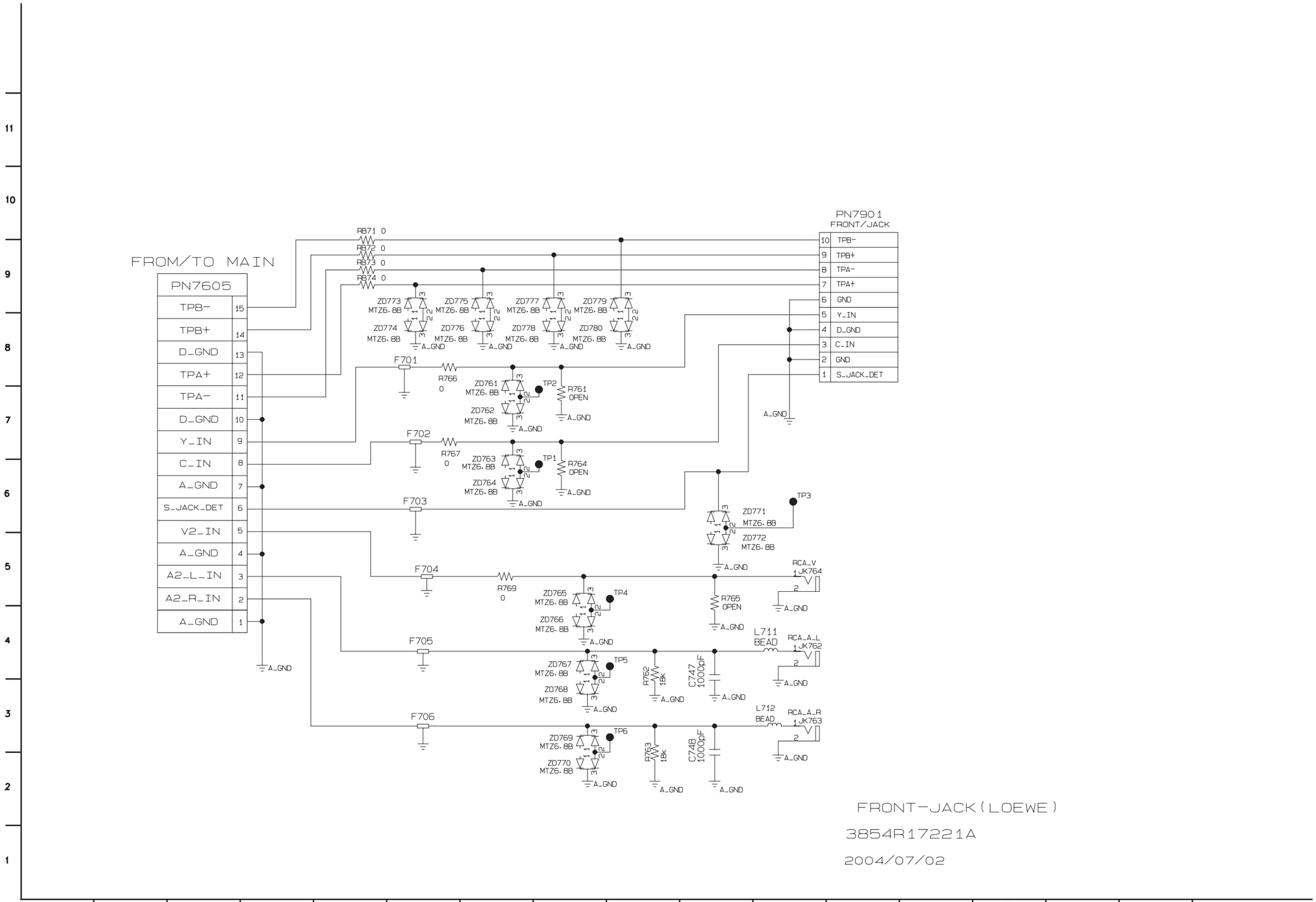
10. I/O JACK CIRCUIT DIAGRAM



11. FRONT CIRCUIT DIAGRAM



12. FRONT JACK CIRCUIT DIAGRAM



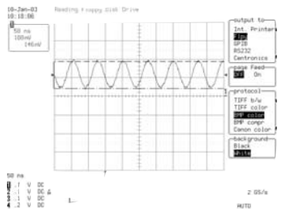
FRONT-JACK(LOEWE)

3854R17221A

2004/07/02

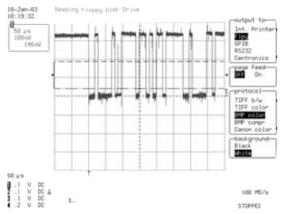
• WAVEFORMS

①



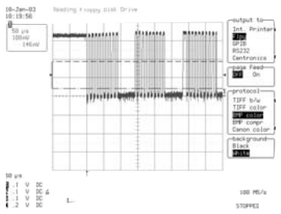
X102
13.5MHz

②



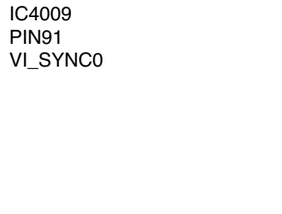
IC4009
PIN32
SDA

③



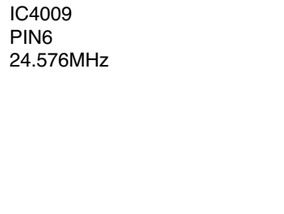
IC4009
PIN31
SCL

④



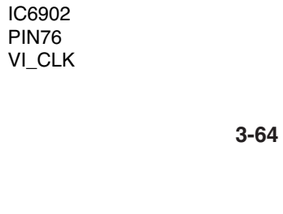
PN7601
PIN24
HOST_RXD

⑤



PN7601
PIN26
HOST_TXD

⑥



IC1094
PIN45
SDRAM_SCLK0

⑦

IC3048
PIN77
24.576MHz

⑧

IC3048
PIN2
BIO_PHY_CLK

⑨

IC4009
PIN94
VI_CLK0

⑩

IC4009
PIN91
VI_SYNC0

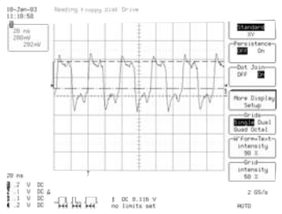
⑪

IC4009
PIN6
24.576MHz

⑫

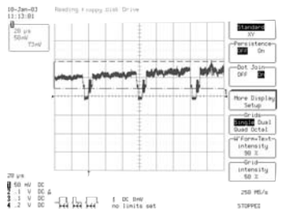
IC6902
PIN76
VI_CLK

⑬



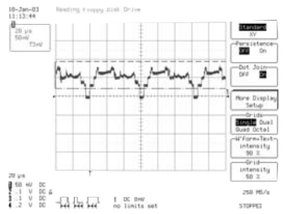
IC4002
PIN22
/PIXCLKIX

⑭



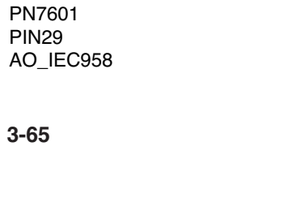
PN7401
PIN6
CVBS_OUT

⑮



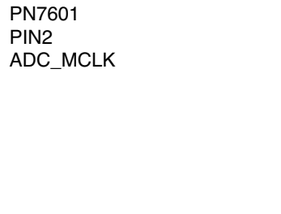
PN7401
PIN4
Y_OUT

⑯



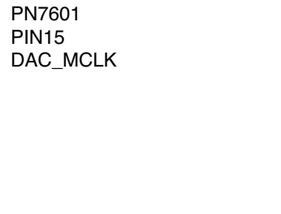
PN7401
PIN2
C_OUT

⑰



PN7401
PIN7
R_Pr_OUT

⑱



PN7401
PIN8
G_Y_OUT

⑲

PN7401
PIN9
B_Pb_OUT

⑳

IC4003
PIN4
VO_CLK

㉑

IC4002
PIN37
VO_CLK

㉒

PN7601
PIN29
AO_IEC958

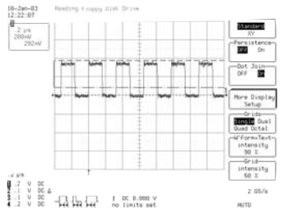
㉓

PN7601
PIN2
ADC_MCLK

㉔

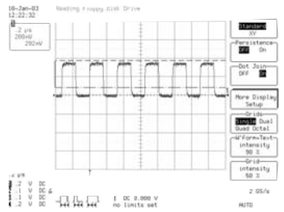
PN7601
PIN15
DAC_MCLK

㉕



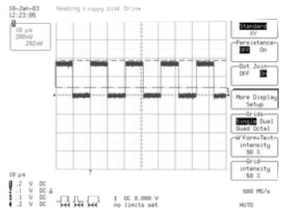
PN7601
PIN4
AI_SCLK

㉖



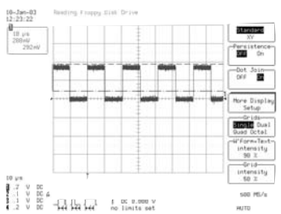
PN7601
PIN19
AO_SCLK

㉗



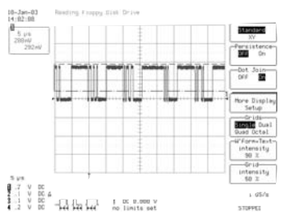
PN7601
PIN8
AI_FSYNC

㉘



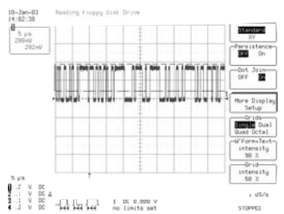
PN7601
PIN17
AO_FSYNC

㉙



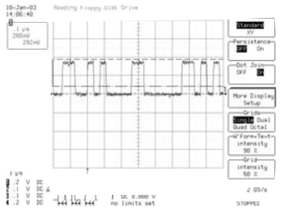
PN7601
PIN6
AI_D0

㉚



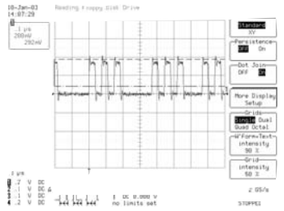
PN7601
PIN21
AO_D0

㉛



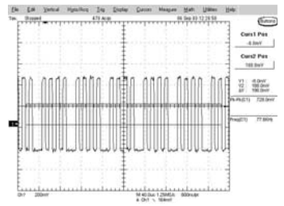
IC4002
PIN40
VO_D0

㉜



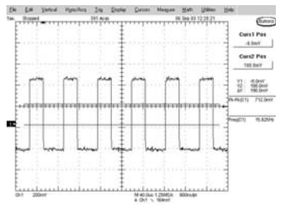
IC4009
PIN90
VI_D0

㉝



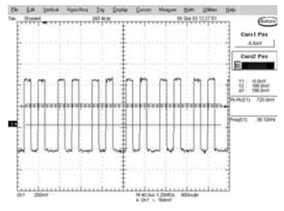
PN7401
PIN7
R_Pr_OUT

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

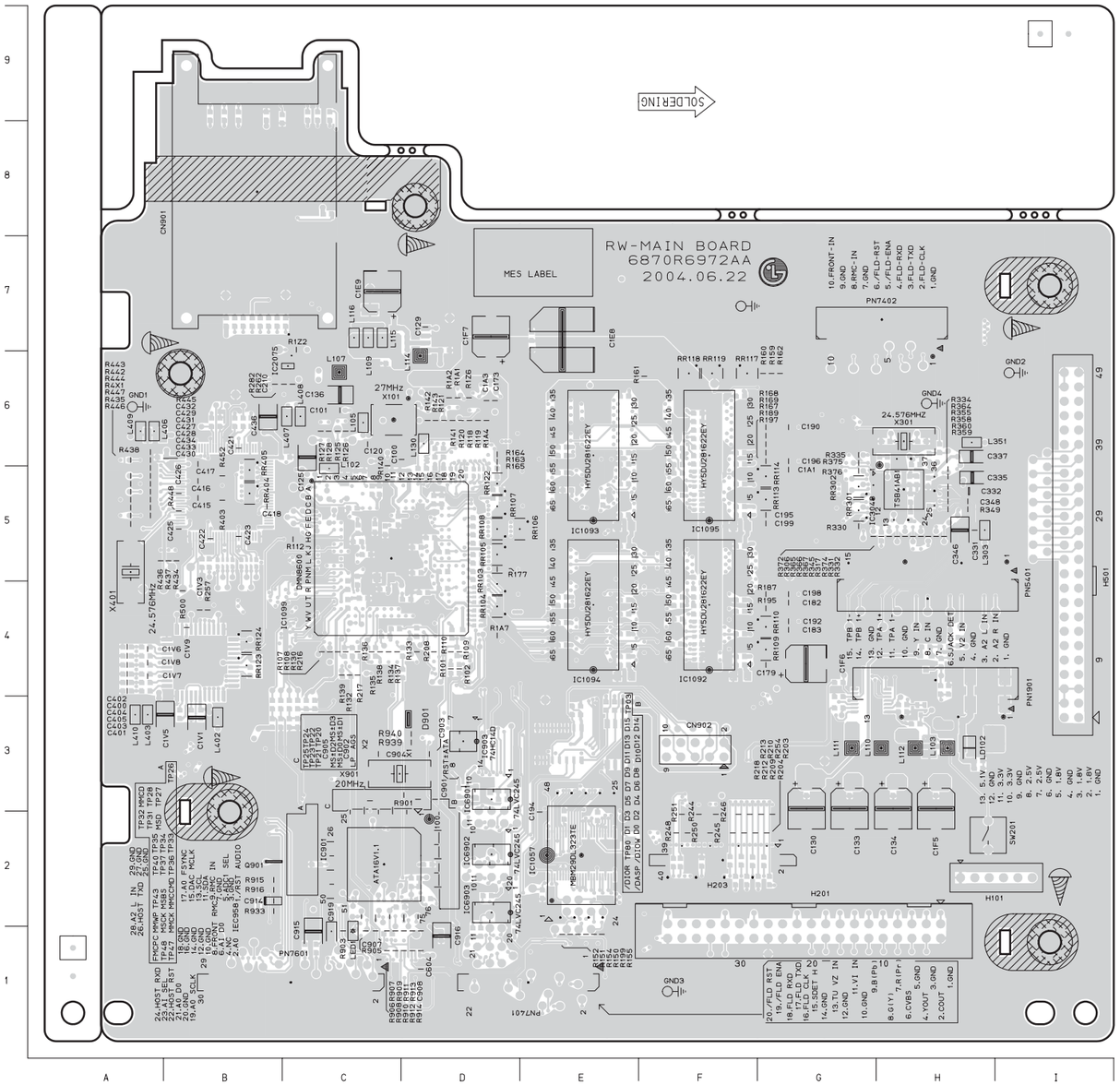
MODE / PIN NO.	EE	PB	REC
7	0.00	0.00	0.00
8	2.46	0.00	2.45
9	0.00	0.00	0.00
10	1.13	1.25	1.24
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	4.95	4.95	4.95
14	2.41	2.40	2.40
15	0.00	0.00	0.00
16	2.47	2.47	2.47
17	0.00	0.00	0.00
18	2.44	2.44	2.44
19	0.00	0.00	0.00
20	0.00	1.42	1.32
21	0.00	2.08	1.89
22	0.00	0.00	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

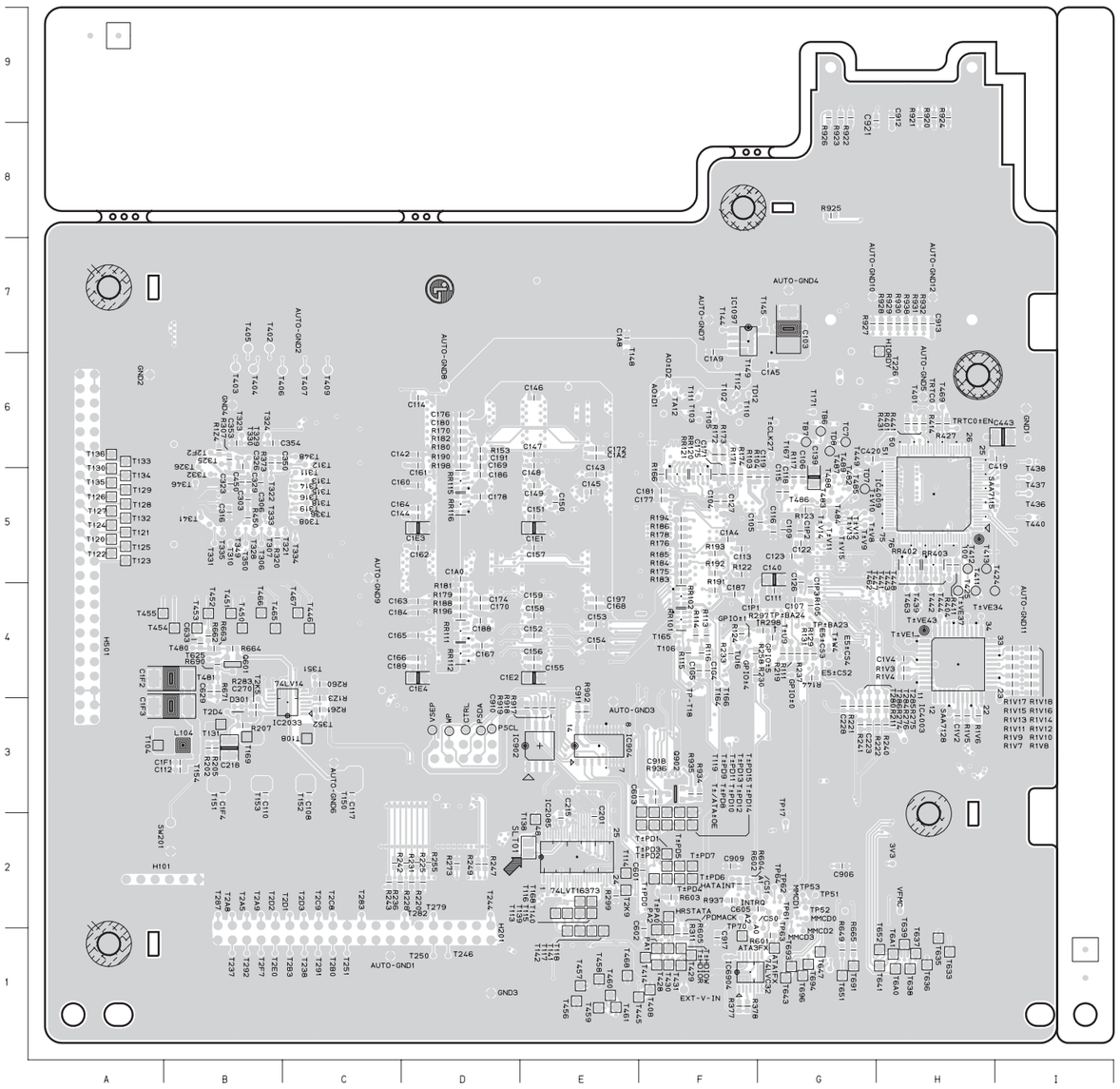
1. MAIN P.C.BOARD(TOP SIDE)



LOCATION GUIDE

/DASP	D2	C423	B5	IC1095	F6	R119	D6	R245	F2	R915	B2
/DIOR	D2	C425	B5	IC1099	C5	R120	D6	R246	F2	R916	B2
/DIOW	D2	C426	B5	IC2075	C6	R121	D6	R248	F2	R933	B2
/RST±ATAC	D3	427	A5	IC3048	H5	R125	C6	R250	F2	R939	D3
AGS	D3	C428	A5	IC6901	D3	R126	C6	R251	F2	R940	D3
C100	D6	C429	A5	IC6902	D2	R127	C6	R254	G2	RR103	D4
C101	C6	C430	A5	IC6903	D2	R128	C6	R257	B4	RR104	D4
C120	C6	C431	A5	IC901	C2	R130	C4	R262	C6	RR105	D5
C125	C6	C432	A6	IC903	D3	R132	C4	R282	B6	RR106	D5
C129	D7	C433	A5	L102	C5	R133	D4	R306	H5	RR107	D5
C130	G3	C434	A5	L103	H3	R134	C4	R317	H5	RR108	D5
C133	G3	C436	B6	L105	C6	R135	C4	R330	G5	RR109	G4
C134	H3	C604	D1	L107	C6	R136	C4	R331	H5	RR110	G4
C136	C6	C901	D3	L109	C7	R137	C4	R332	H5	RR113	G5
C173	D6	C902	D3	L110	H3	R138	C4	R334	H5	RR114	G5
C179	G4	C903	D3	L111	G3	R139	C4	R335	G6	RR117	F6
C182	G4	C904	C3	L112	H3	R140	C5	R345	H5	RR118	F6
C183	G4	C905	C3	L114	D6	R141	D6	R349	H5	RR119	F6
C190	G6	C907	C1	L115	C7	R142	D6	R355	H5	RR122	D5
C192	G4	C908	D1	L116	C7	R143	D6	R358	H5	RR123	B4
C194	E2	C914	B2	L130	D6	R150	E1	R359	H5	RR124	B4
C195	G5	C915	C1	L303	H5	R151	E1	R360	H5	RR301	G5
C196	G6	C916	D1	L351	H6	R152	E1	R364	H5	RR302	G5
C198	G4	C919	C1	L402	B3	R154	E1	R365	H5	RR404	B5
C199	G5	C920	D3	L403	A3	R155	E1	R366	H5	RR405	B5
C1A1	G5	CN901	B8	L406	A6	R159	G6	R367	H5	SW201	H2
C1A3	D6	CN902	F3	L407	C6	R160	G6	R372	G5	TP03	D3
C1E8	E7	D0	D2	L408	C6	R161	F6	R374	H5	TP20	C3
C1E9	C7	D1	D2	L409	A6	R162	G6	R375	G6	TP21	C3
C1F5	H3	D10	D2	L410	A3	R163	D6	R376	G5	TP22	C3
C1F6	G4	D11	D2	LD102	H3	R164	D6	R403	B5	TP23	C3
C1F7	D7	D12	D2	LED1	C1	R165	D5	R434	B5	TP24	C3
C1V1	B3	D13	D2	LP	D3	R167	G6	R435	A5	TP25	C3
C1V3	B4	D14	D2	MMCCMD	C2	R168	G6	R436	A5	TP26	C3
C1V5	B3	D15	D2	MMCD	C2	R169	G6	R437	B5	TP27	C2
C1V6	A4	D2	D2	MMCK	C2	R177	D5	R438	A6	TP28	C2
C1V7	A4	D3	D2	MMWP	C2	R187	G4	R442	A5	TP31	C2
C1V8	A4	D4	D2	MSBS	C2	R189	G6	R443	A5	TP32	C2
C1V9	B4	D5	D2	MSCK	C2	R195	G4	R444	A5	TP33	C2
C210	C6	D6	D2	MSD	C2	R197	G6	R445	A6	TP34	C2
C331	H5	D7	D2	MS±D0	C3	R199	E1	R446	A5	TP35	C2
C332	H5	D8	D2	MS±D1	C3	R1A1	D6	R447	A5	TP36	C2
C335	H5	D9	D2	MS±D2	C3	R1A2	D6	R448	B5	TP37	C2
C337	H6	D901	D3	MS±D3	C3	R1A4	D6	R452	B5	TP40	C2
C346	H5	FMCPC	C2	PN1901	H4	R1A7	D4	R4X1	A5	TP43	C2
C348	H5	GND	F7	PN5401	H4	R1Z2	C7	R500	B4	TP47	C2
C400	A4	GND1	A6	PN7401	E1	R1Z6	D6	R901	D3	TP48	C2
C401	A4	GND2	I6	PN7402	E7	R203	G2	R903	C1	TP80	D2
C402	A4	GND3	F1	PN7601	C1	R204	G2	R905	C1	X1	D3
C403	A4	GND4	H6	Q901	B2	R208	D4	R906	C1	X101	C6
C404	A4	H101	H2	R101	D4	R209	F2	R907	C1	X2	C3
C405	A4	H201	H2	R102	D4	R210	F2	R908	C1	X301	H6
C415	B5	H203	F2	R107	C4	R212	F2	R909	C1	X401	A5
C416	B5	H501	I3	R108	C4	R213	F2	R910	D1	X901	C3
C417	B6	IC1057	E2	R109	D4	R216	C4	R911	D1		
C418	B5	IC1092	F4	R110	D4	R217	C4	R912	D1		
C421	B6	IC1093	E6	R112	C5	R218	F2	R913	D1		
C422	B5	IC1094	E4	R118	D6	R244	F2	R914	D1		

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



LOCATION GUIDE

/CS0 G2	C157 E5	C323 B5	R105 G4	R211 G3	R920 H9	T134 A5	T310 B5	T446 C4	TP-T18 E4
/CS1 G2	C158 E4	C326 B6	R111 G4	R219 G4	R921 H9	T135 A5	T311 C5	T447 H5	TP17 G2
/PDMACK G2	C159 E4	C329 B5	R113 F4	R220 D2	R922 G9	T136 A6	T312 C6	T448 H5	TP51 G2
A0 G1	C160 D5	C350 B6	R114 F4	R221 G3	R923 G9	T138 E2	T313 C5	T449 G5	TP52 G2
A1 G2	C161 D6	C353 B6	R115 F4	R222 H3	R924 H9	T139 E2	T314 C5	T450 B4	TP53 G2
A2 F2	C162 D5	C354 B6	R116 F4	R225 D2	R925 G8	T140 E2	T315 C5	T451 B4	TP61 G2
A0±D1 F6	C163 D4	C419 I6	R117 G5	R228 D2	R926 G9	T141 E1	T316 C5	T452 B4	TP62 G2
A0±D2 F6	C164 D5	C420 G6	R122 F5	R230 F4	R927 G7	T142 E1	T318 C5	T453 B4	TP63 G2
ATA1FX G1	C165 D4	C443 I6	R123 G5	R231 D2	R928 H7	T144 F7	T319 C5	T454 B4	TP64 G2
ATA3FX G1	C166 D4	C450 B5	R124 F4	R233 F4	R929 H7	T145 G7	T321 C5	T455 A4	TP70 F1
AUTO-GND1 C7	C167 D4	C601 F2	R129 G4	R236 C2	R930 H7	T148 E7	T322 B5	T456 E1	TP±BA23 G4
AUTO-GND2 C8	C168 E4	C602 F1	R131 G4	R237 G4	R931 H7	T149 F6	T323 B6	T457 E1	TP±BA24 G4
AUTO-GND3 C4	C169 D6	C603 F3	R144 G4	R240 H3	R932 H7	T150 C3	T324 B6	T458 E1	TRTC0 H6
AUTO-GND4 D7	C170 D4	C605 G2	R153 D6	R241 G3	R934 F3	T151 B3	T325 B6	T459 E1	TRTC0±EN H6
AUTO-GND5 C2	C171 F5	C629 B4	R166 F5	R242 C2	R935 F3	T152 C3	T326 B6	T460 E1	TU16 F4
AUTO-GND6 G3	C172 E6	C633 B4	R170 D6	R243 C2	R936 F3	T153 B3	T328 B5	T461 E1	T±/ATA20E G6
AUTO-GND7 C4	C174 D4	C906 G2	R171 F5	R247 D2	R937 F2	T154 B3	T329 B6	T462 H5	T±CLK26 G6
AUTO-GND8 C5	C175 F5	C909 F2	R172 F6	R249 D2	R938 H7	T164 F4	T330 B6	T463 H4	T±HDIOR G6
AUTO-GND9 C6	C176 D6	C910 E3	R173 F6	R255 D2	RR101 F4	T165 F4	T331 B5	T465 B4	T±HDIOW G6
AUTO-GND10 C7	C177 F5	C911 E3	R174 F5	R258 F4	RR102 F4	T166 F4	T332 B5	T466 B4	T±PA0 F1
AUTO-GND11 C8	C178 D5	C912 H9	R175 F5	R260 C4	RR111 D4	T167 G6	T333 B5	T467 C4	T±PD0 F2
AUTO-GND12 C9	C180 D6	C913 H7	R176 F5	R261 C3	RR112 D4	T168 E2	T334 C5	T468 E1	T±PD1 F2
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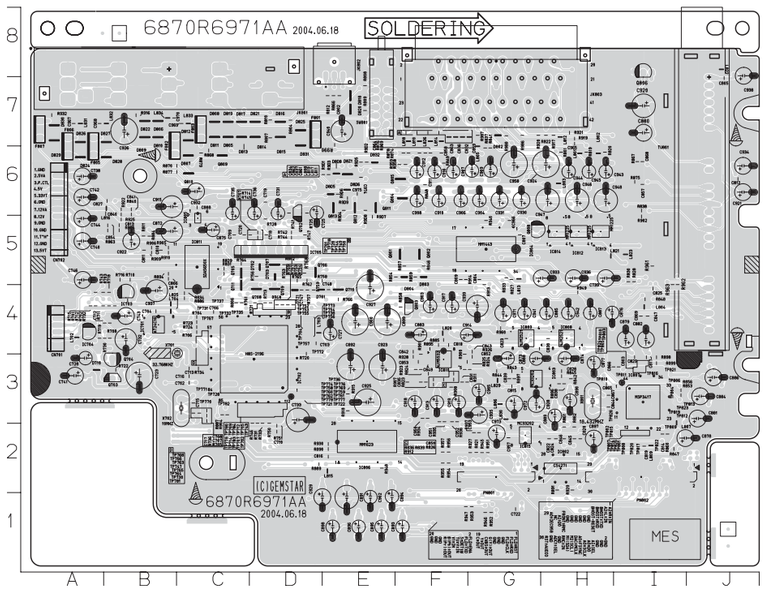
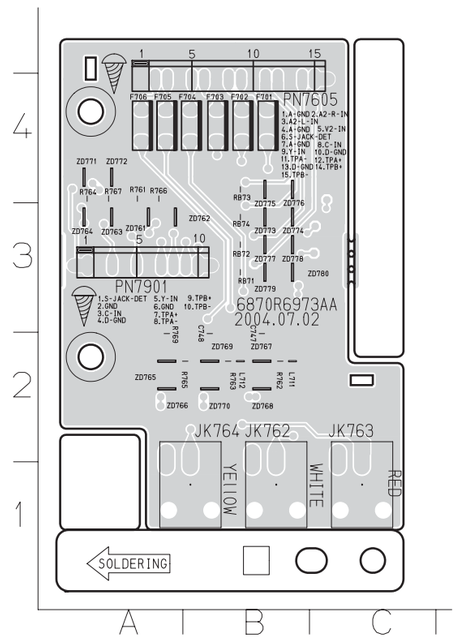
C106 G5	C187 F4	CTRL D3	R181 D4	R276 H3	RR121 F5	T173 G6	T339 B5	T482 G5	T±PD13 F2
C107 G4	C188 D4	D301 B3	R182 D6	R283 B3	RR402 H5	T174 G6	T340 C5	T483 G5	T±PD14 F2
C108 C3	C189 D4	E5±CS24	R183 F5	R297 G4	RR403 H5	T175 G6	T341 B5	T484 G5	T±PD15 F2
C109 G5	C191 D6	E5±CS34	R184 F5	R298 G4	SLT01 E2	T176 G6	T342 B5	T485 G5	T±PD2 F2
C110 B3	C197 E4	E5±CS44	R185 F5	R299 E2	SWP D3	T177 G6	T343 B5	T486 G5	T±PD3 F2
C111 G4	C1A0 D5	EXT-VIN H1	R186 F5	R307 B6	T102 F6	T178 G6	T344 B5	T487 G5	T±PD4 F2
C112 B3	C1A2 E6	GPIO±C4	R188 D4	R311 F1	T103 F6	T179 G6	T345 B5	T488 G5	T±PD5 F2
C113 F5	C1A4 F5	GPIO±F4	R190 D6	R320 B5	T104 A3	T180 G6	T346 B5	T489 G5	T±PD6 F2
C114 D6	C1A5 G6	GPIO±F4	R191 F4	R373 B6	T105 F6	T181 G6	T347 C5	T600 G1	T±PD7 F2
C115 G5	C1A8 E7	GPIO±G4	R192 F5	R377 F1	T106 F4	T182 G6	T348 C6	T601 G1	T±PD8 F2
C116 G5	C1A9 F6	HATAINT2	R193 F5	R378 F1	T108 C3	T183 G6	T349 B5	T602 G1	T±PD9 F2
C117 C3	C1E1 E5	HIORDY H7	R194 F5	R401 H6	T110 F6	T184 G6	T350 B5	T625 B4	T±U9 G4
C118 G5	C1E2 E4	HRSTATA2	R196 D4	R404 H5	T111 F6	T185 G6	T351 C4	T633 H1	T±V10 G5
C119 G5	C1E3 D5	IC1097 F7	R198 D6	R411 H5	T112 F6	T186 G6	T352 C3	T635 H1	T±V11 G5
C122 G5	C1E4 D4	IC2033 C3	R1V10 I4	R414 H6	T113 E2	T187 G6	T360 C5	T636 H1	T±V12 G5
C123 G5	C1F1 B3	IC2085 E2	R1V11 I4	R427 H6	T114 E2	T188 G6	T361 C5	T637 H1	T±V13 G5
C126 G4	C1F2 B4	IC4009 B4	R1V12 I4	R431 H6	T115 E2	T189 G6	T362 C5	T638 H1	T±V14 G5
C127 F5	C1F3 B3	IC4009 B5	R1V13 I4	R441 H6	T116 E2	T2A5 B2	T412 H5	T639 H1	T±V15 G5
C139 G5	C1F4 B3	IC6904 F1	R1V14 I4	R450 B5	T117 E1	T2A8 B2	T413 H5	T641 H1	T±V8 G5
C140 G5	C1G4 F4	IC902 E3	R1V15 I4	R601 G1	T118 E1	T2A9 B2	T414 F1	T643 G1	T±V9 G5
C142 D6	C1G5 F4	IC904 E3	R1V16 I4	R602 F2	T119 F3	T2B0 C1	T424 I4	T647 G1	T±VE1 H4
C143 E5	C1P1 F4	INTRQ F2	R1V17 I4	R603 F2	T120 A5	T2B3 C1	T425 H4	T651 G1	T±VE2 H4
C144 D5	C1P2 G5	L104 B3	R1V18 I4	R604 F2	T121 A5	T2C8 C2	T428 F1	T652 H1	T±VE3 H4
C145 E5	C1P3 G4	MMCD0 G2	R1V3 H4	R605 F1	T122 A5	T2C9 C2	T429 F1	T691 G1	T±VE4 H4
C146 E6	C1V2 H3	MMCD1 G2	R1V4 H4	R649 G1	T123 A5	T2D1 C2	T430 F1	T693 G1	T±W4 G4
C147 E6	C1V4 H4	MMCD2 G1	R1V5 H3	R662 B4	T124 A5	T2D2 B2	T431 F1	T694 G1	VFMC H2
C148 E6	C201 E2	MMCD3 G1	R1V6 H3	R663 B4	T125 A5	T2D3 C2	T436 I5	T696 G1	VSEP D3
C149 E5	C215 E2	PA1 F1	R1V7 I4	R664 B4	T126 A5	T2D4 B3	T437 I5	T6A0 H1	
C150 E5	C218 B3	PA2 F1	R1V8 I4	R665 G1	T127 A5	T2E0 B1	T438 I6	T6A1 H1	
C151 E5	C2223 G3	PSCL D3	R1V9 I4	R671 B4	T128 A5	T2F2 B6	T439 H4	TA12 F6	
C152 E4	C228 G3	PSDA D3	R1Z3 C3	R690 B4	T129 A5	T2F7 B1	T440 I5	TB6 G6	
C153 E4	C270 B3	Q601 B4	R1Z4 B6	R902 E3	T130 A5	T2K5 B3	T441 H5	TB7 G6	
C154 E4	C303 B5	Q902 F3	R202 B3	R917 E3	T131 B3	T2K9 E2	T442 H4	TC7 G6	
C155 E4	C306 B5	R103 F5	R205 B3	R918 E3	T132 A5	T306 B5	T443 H5	TD12 F6	
C156 E4	C316 B5	R104 G5	R207 B3	R919 E3	T133 A6	T307 B5	T444 H4	TD7 G5	
						T308 C5	T445 E1	TD8 G6	

3. I/O P.C.BOARD



4. JACK P.C.BOARD



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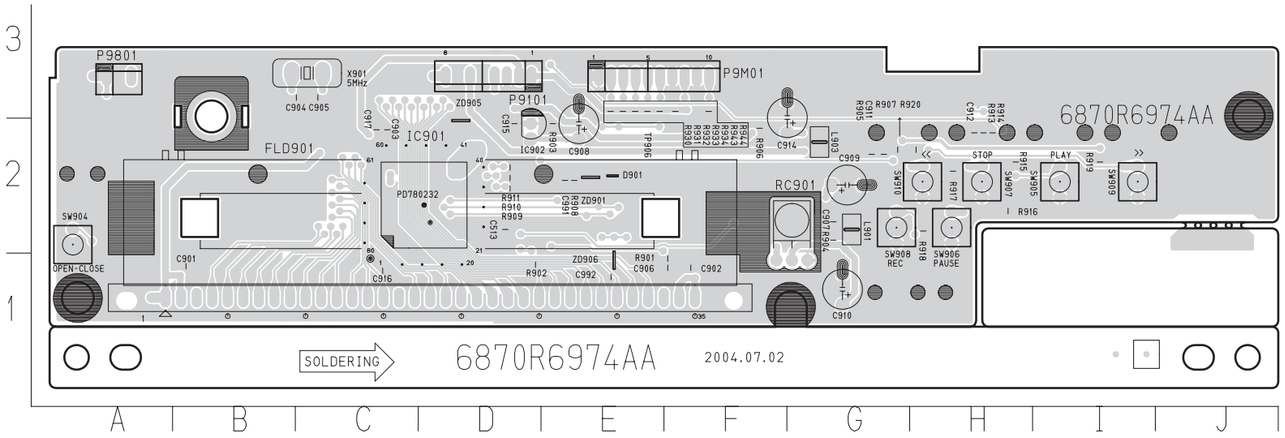

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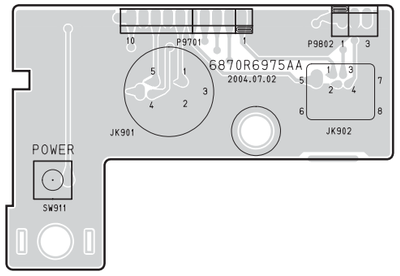
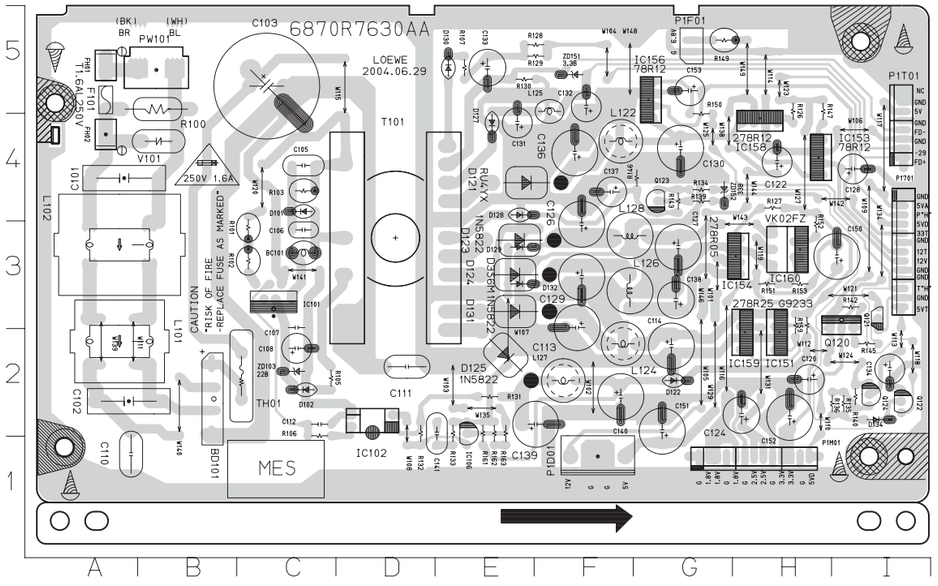


7. POWER P.C.BOARD



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SECTION 1

SUMMARY

CONTENTS

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:

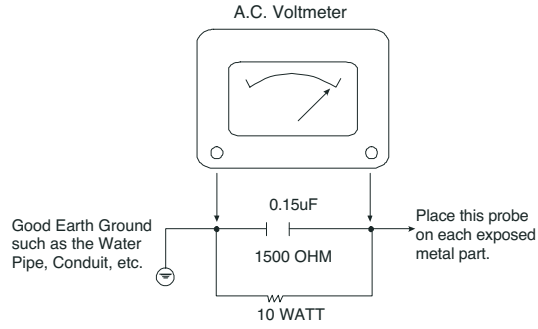
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

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.

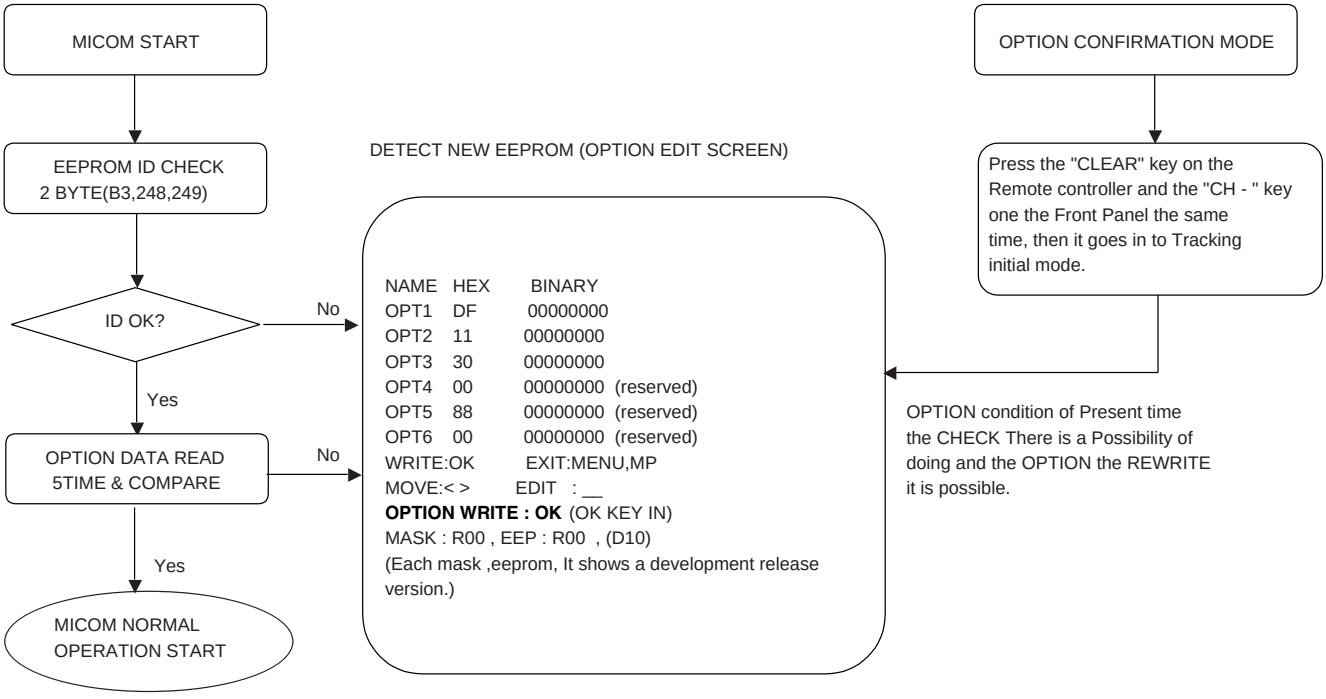
6. Do not remove a replacement ES device from its protec tive package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).

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.)

SERVICE INFORMATION FOR EEPROM IC SETTING



*** EEPROM INITIAL ***

- SETUP is displayed in the field if pressing the Front ch- & ch+ Key with the Remocon number "clear" key pressed in the status of powering on.
- AUTO SEARCH is done since the initial screen of ACMS is serviced if powering on.

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

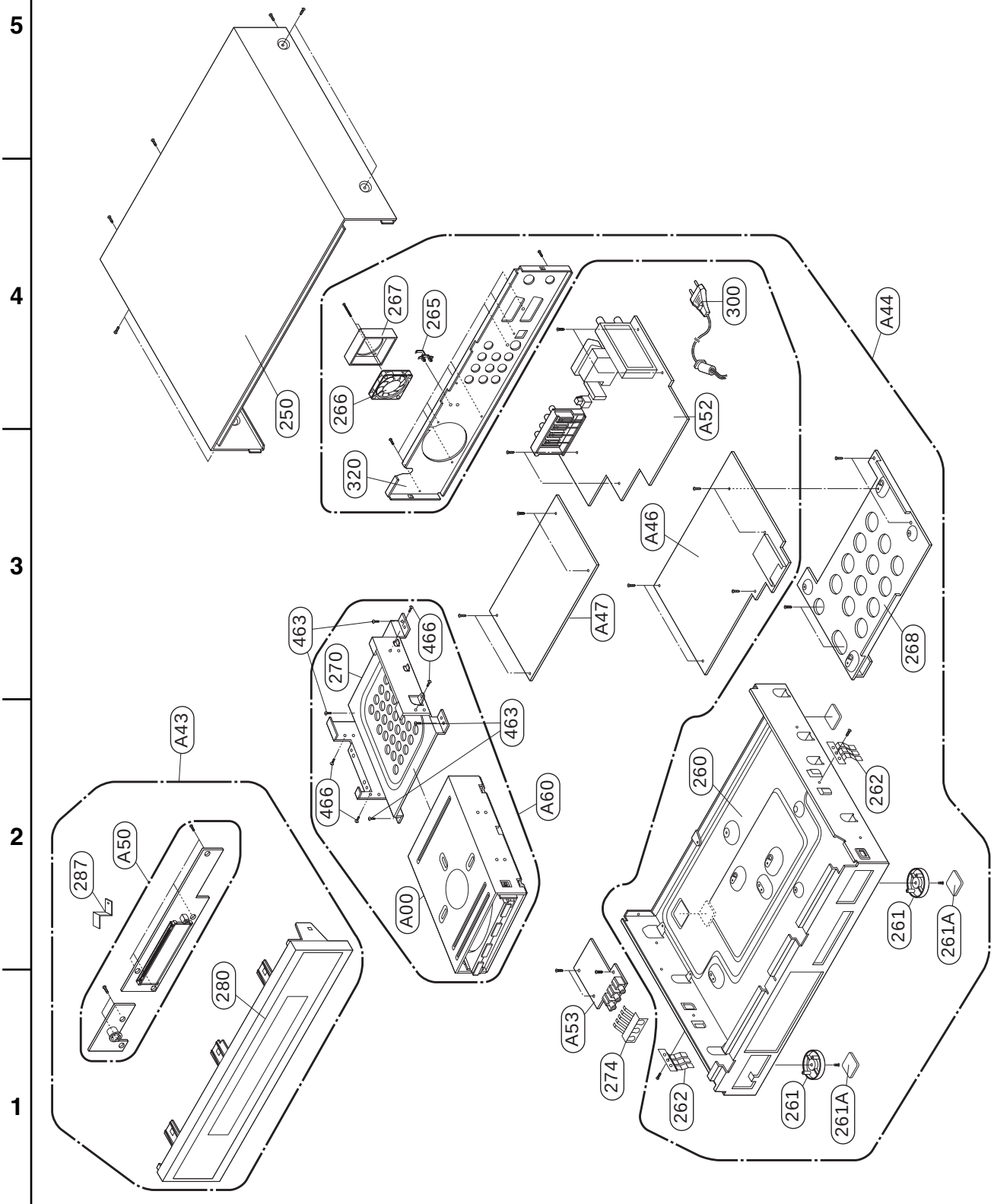
SECTION 2

CABINET & MAIN CHASSIS

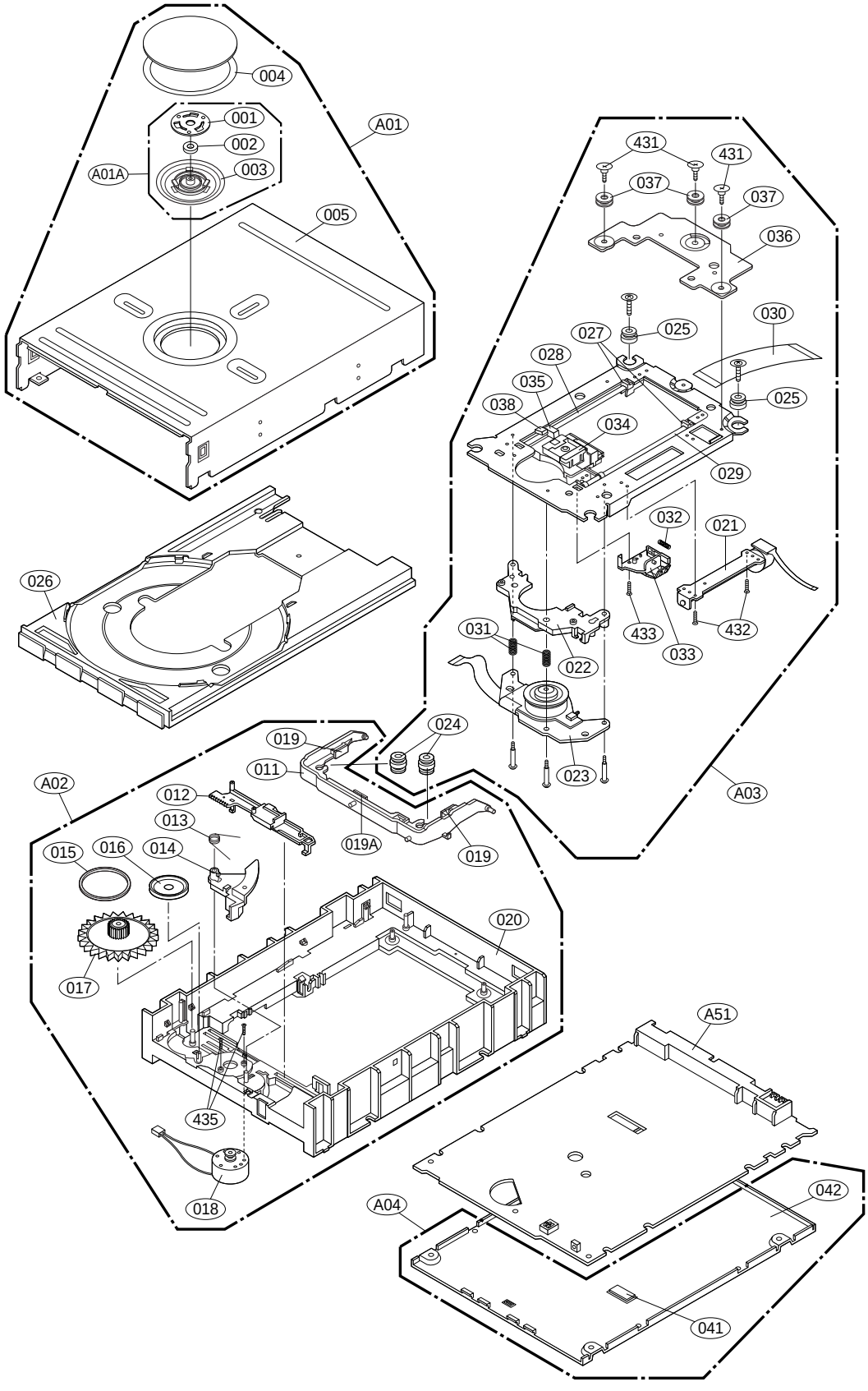
CONTENTS

EXPLODED VIEWS

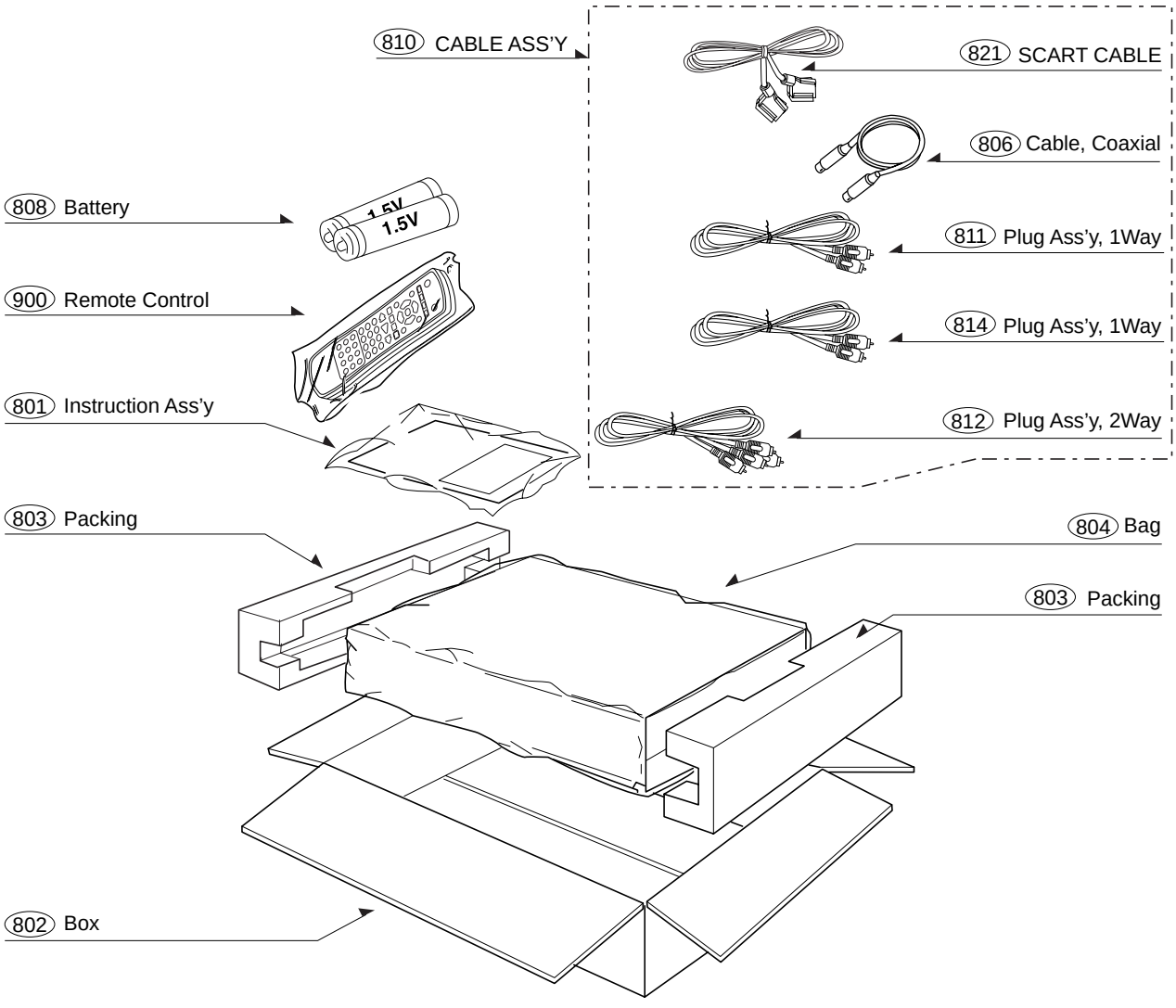
1. Cabinet and Main Frame Section



2. DECK MECHANISM SECTION(RL-01A)



3. Packing Accessory Section



SECTION 3
ELECTRICAL

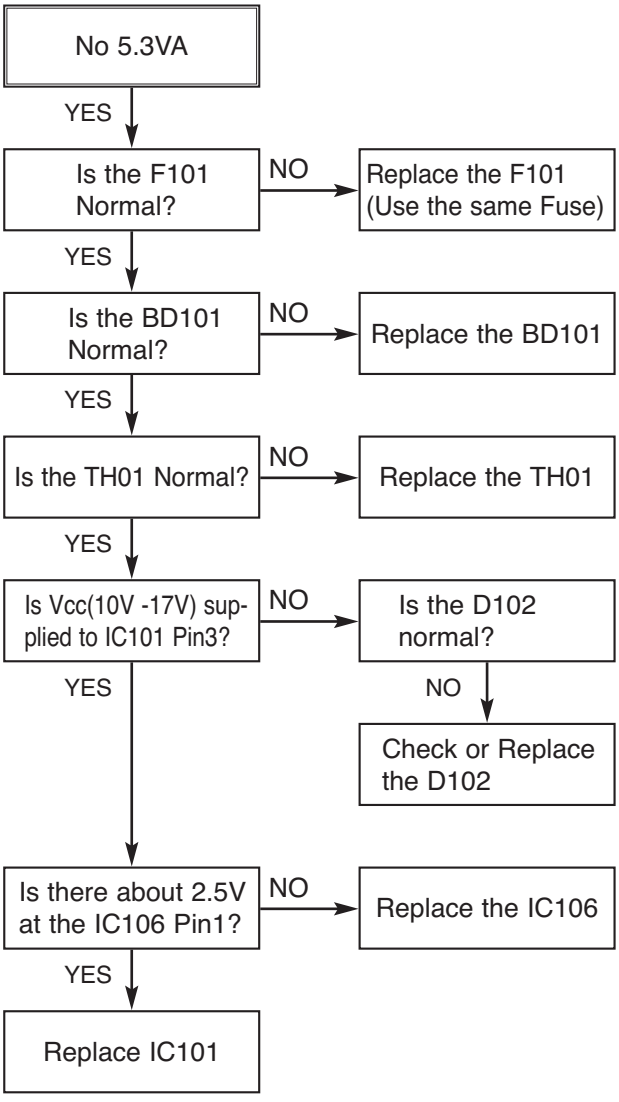
CONTENTS

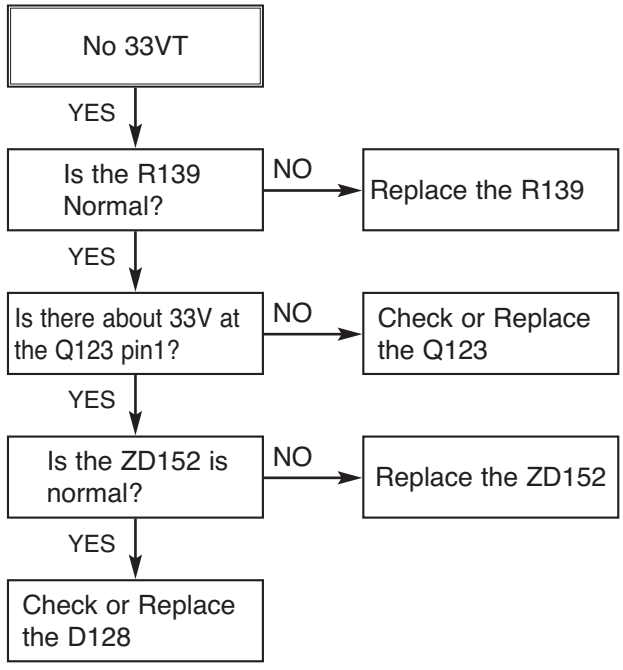
VDR PART

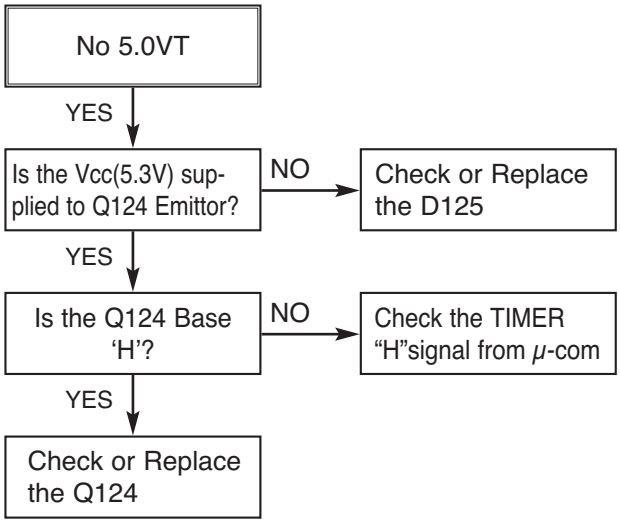
RL-01A LOADER PART

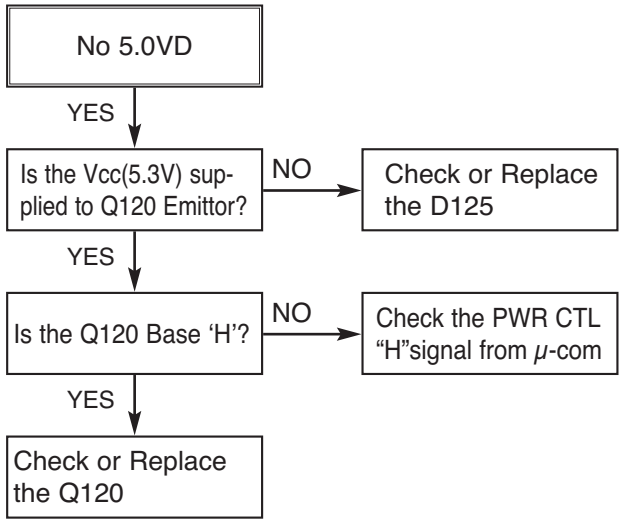
VDR PART

ELECTRICAL TROUBLESHOOTING GUIDE

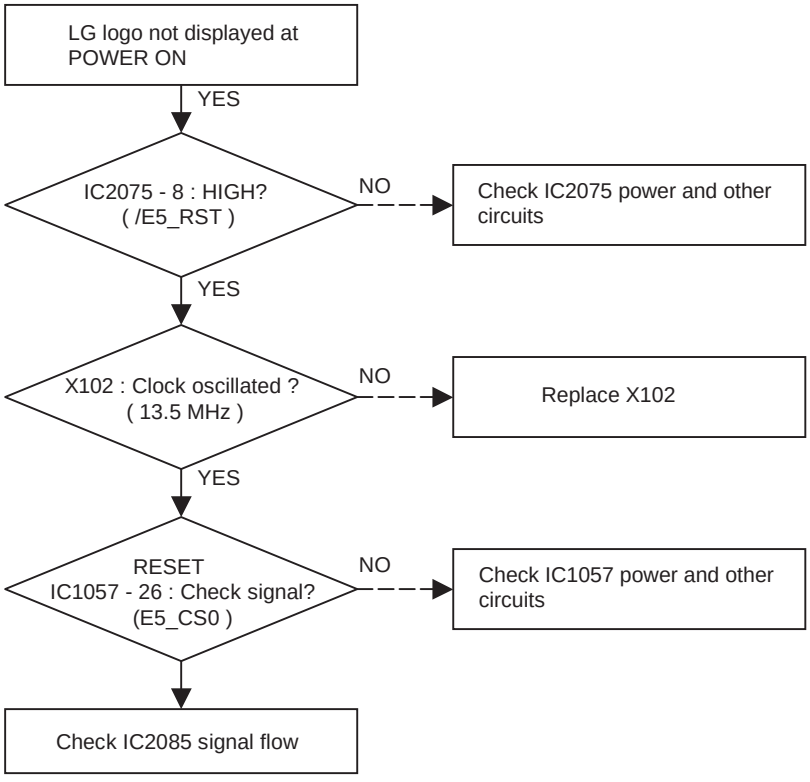




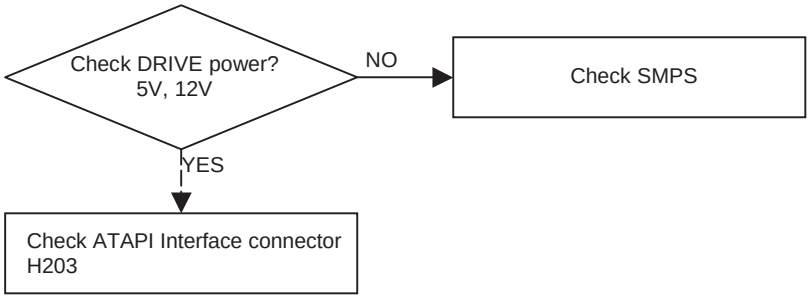

No 5.0VT
YES
Is the Vcc(5.3V) supplied to Q124 Emittor?
NO
Check or Replace the D125
YES
Is the Q124 Base 'H'?
NO
Check the TIMER "H"signal from μ-com
YES
Check or Replace the Q124


No 5.0VD
YES
Is the Vcc(5.3V) supplied to Q120 Emittor?
NO
Check or Replace the D125
YES
Is the Q120 Base 'H'?
NO
Check the PWR CTL "H"signal from μ-com
YES
Check or Replace the Q120

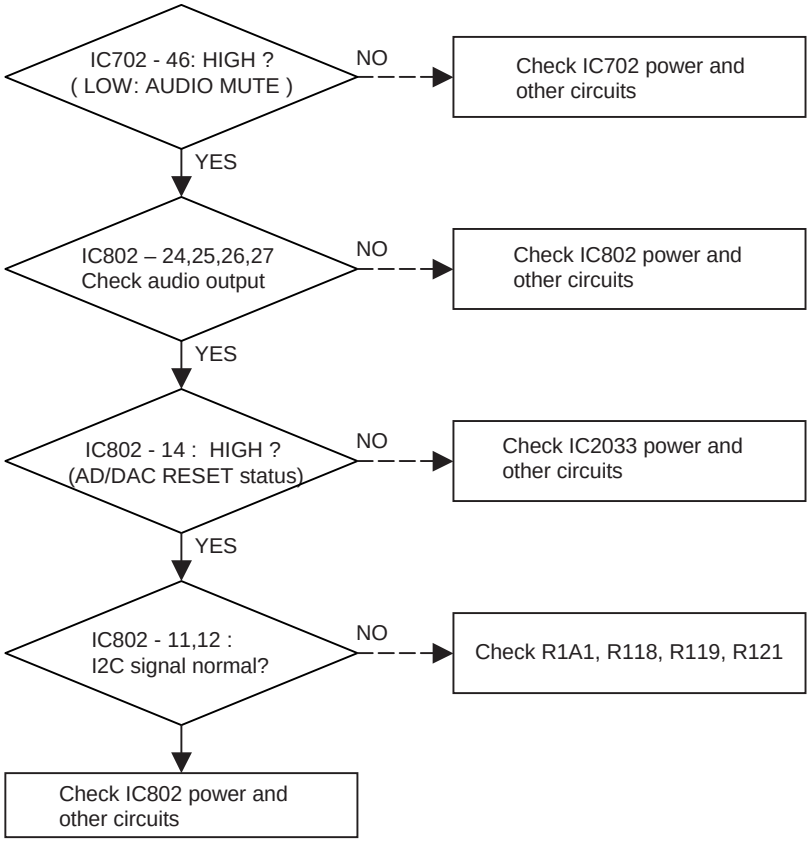
SYSTEM Section



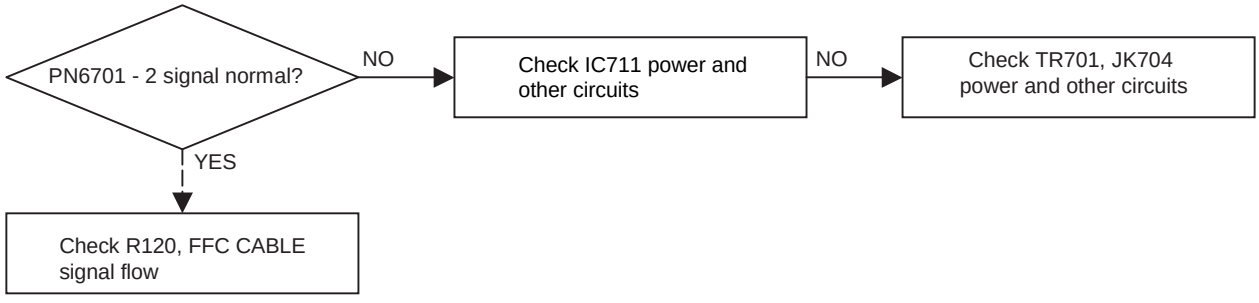
DISC not recognized



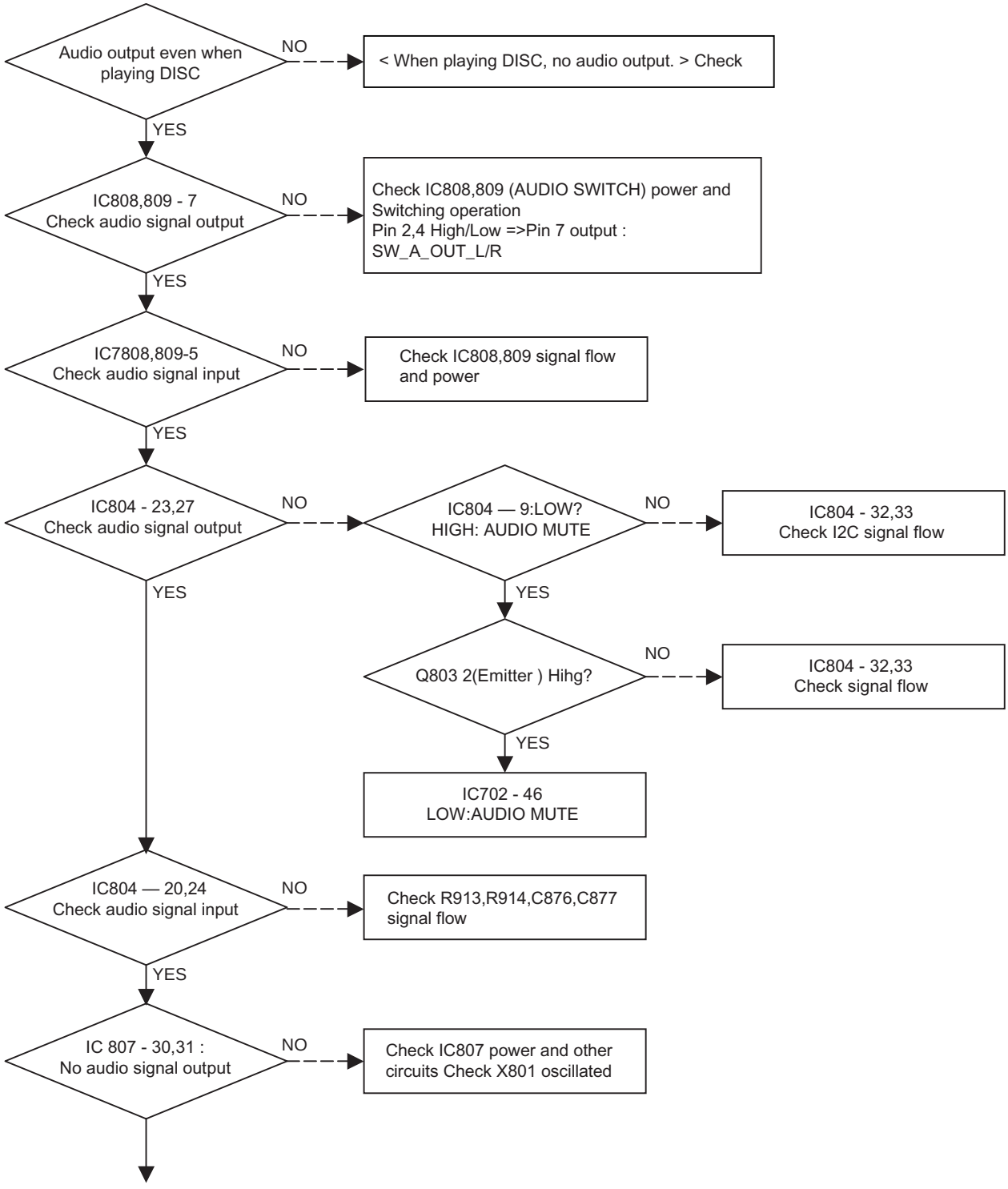
When playing DISC, no audio output

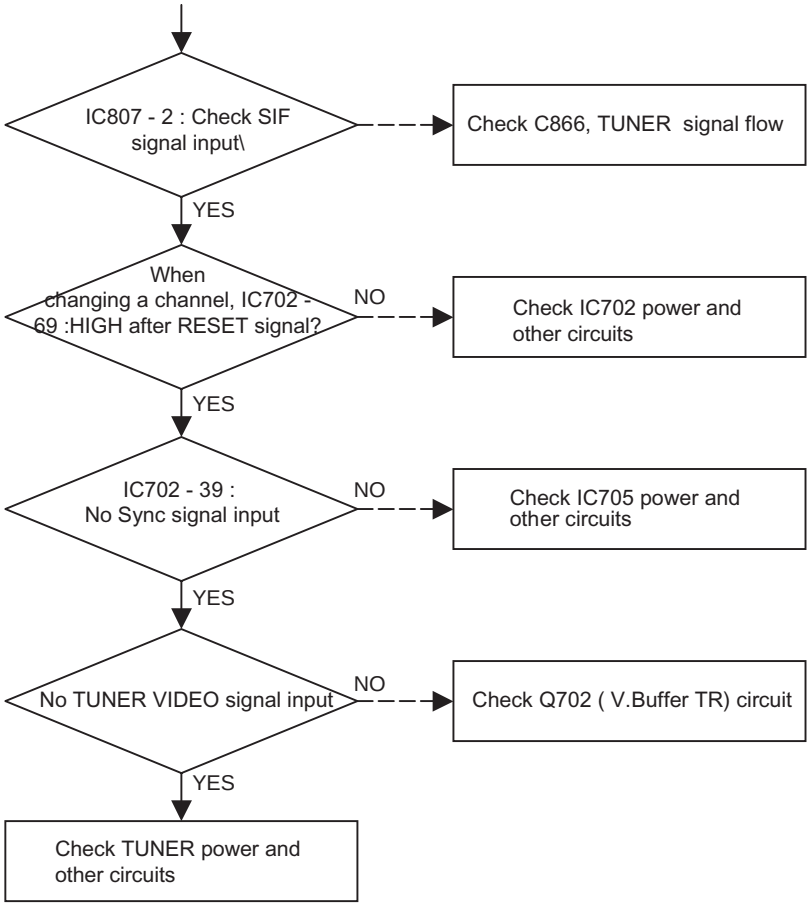


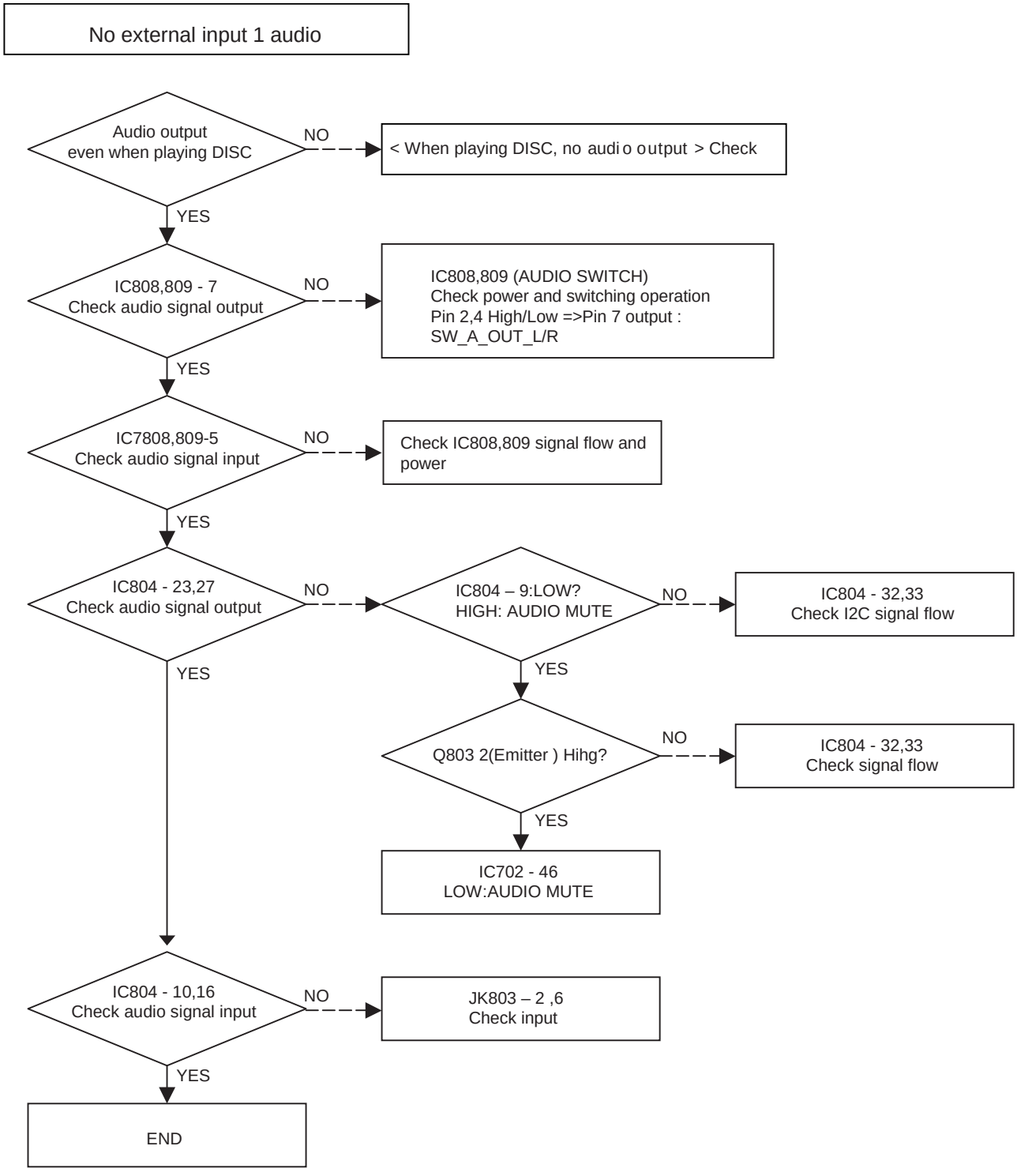
No OPTICAL / DIGITAL output

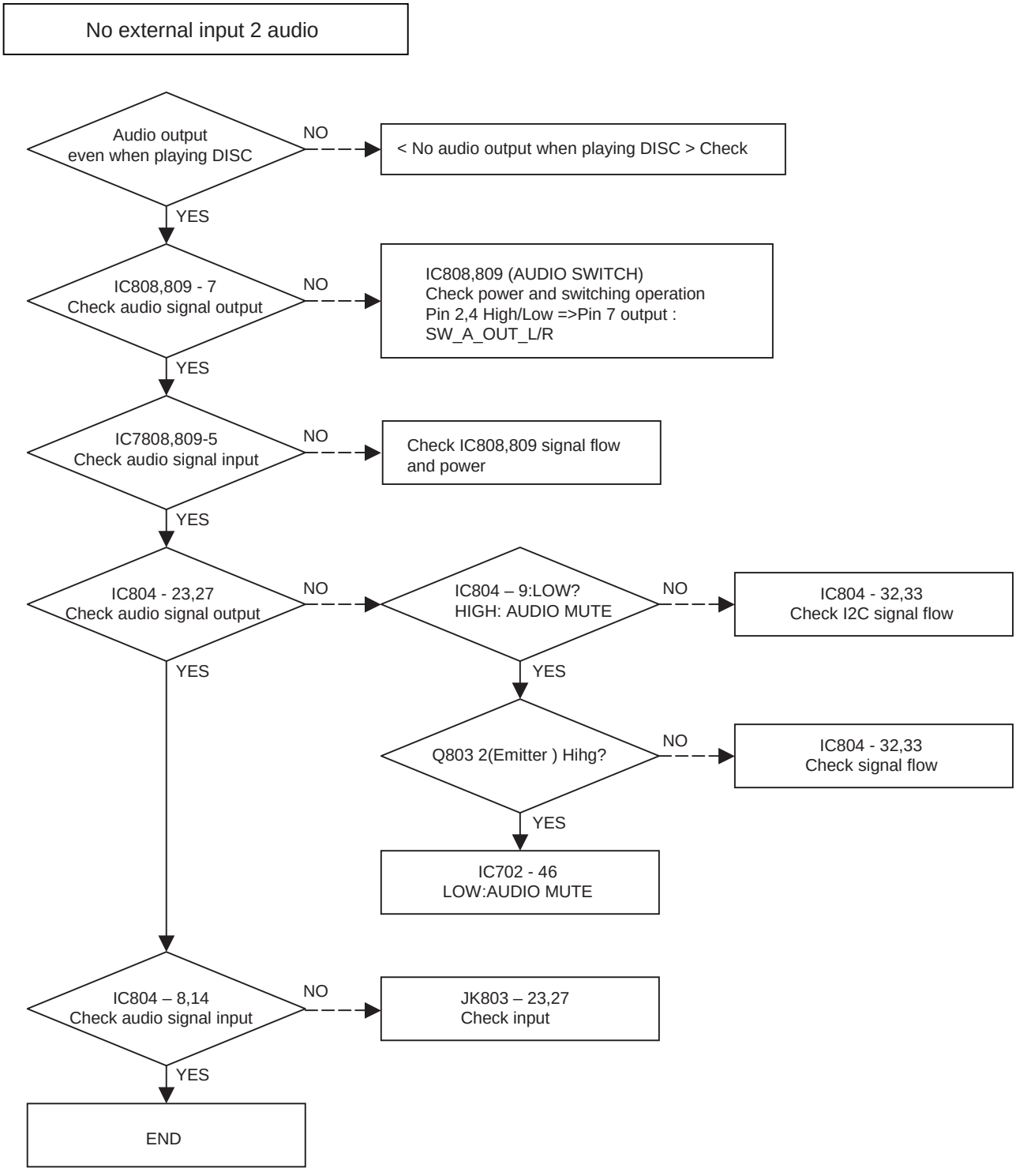


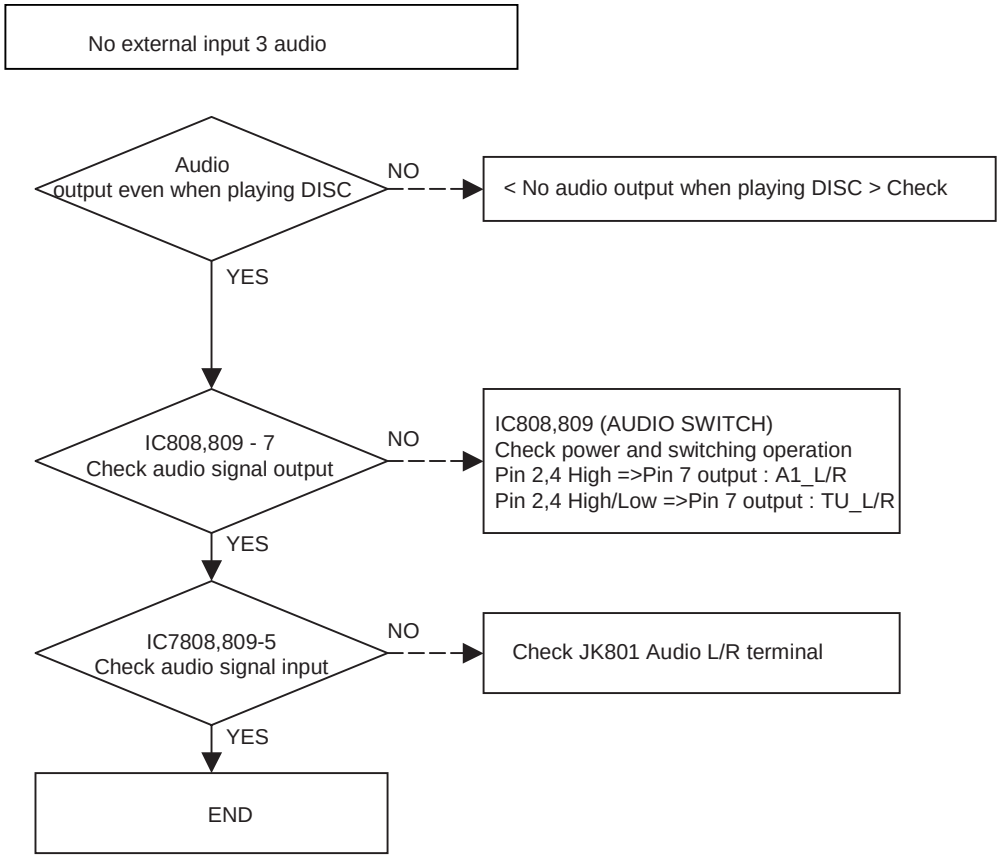
No TUNER audio output

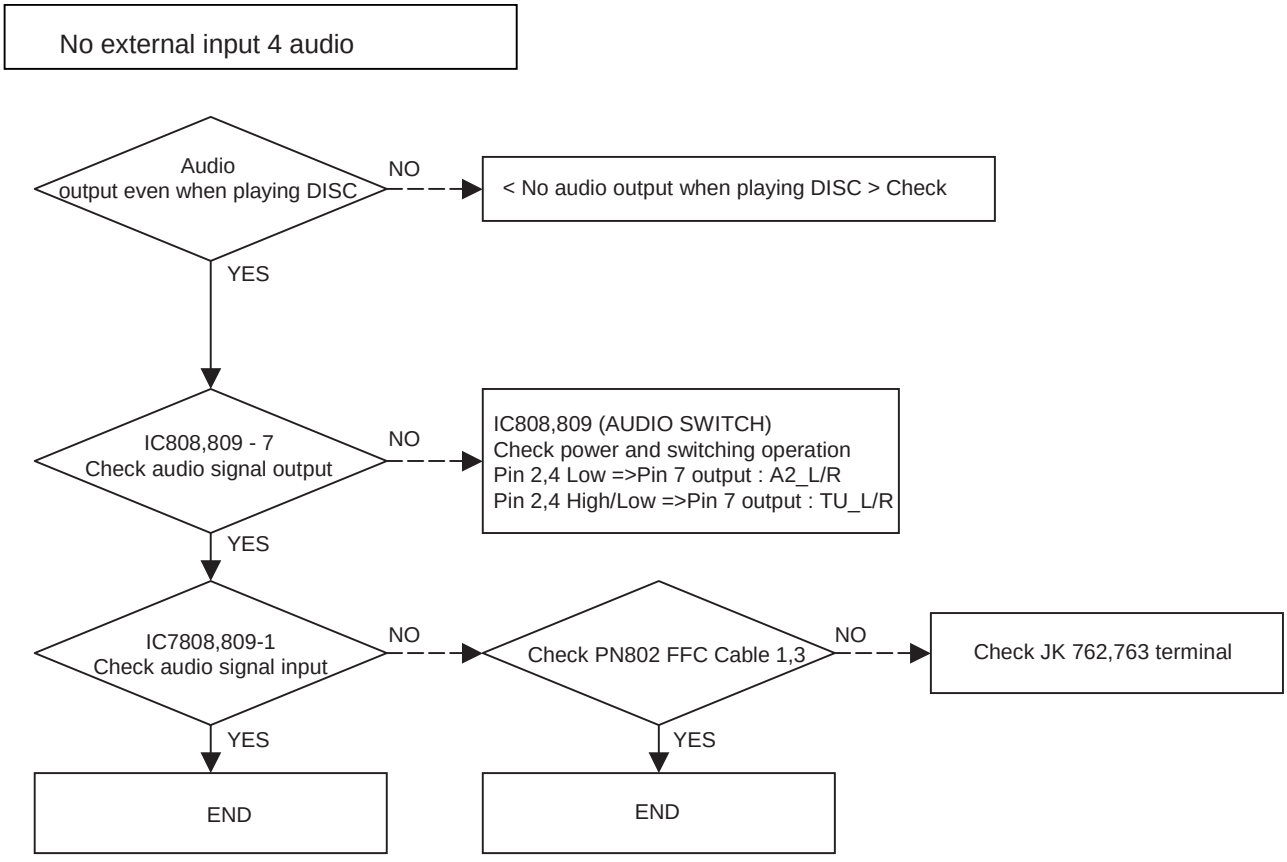


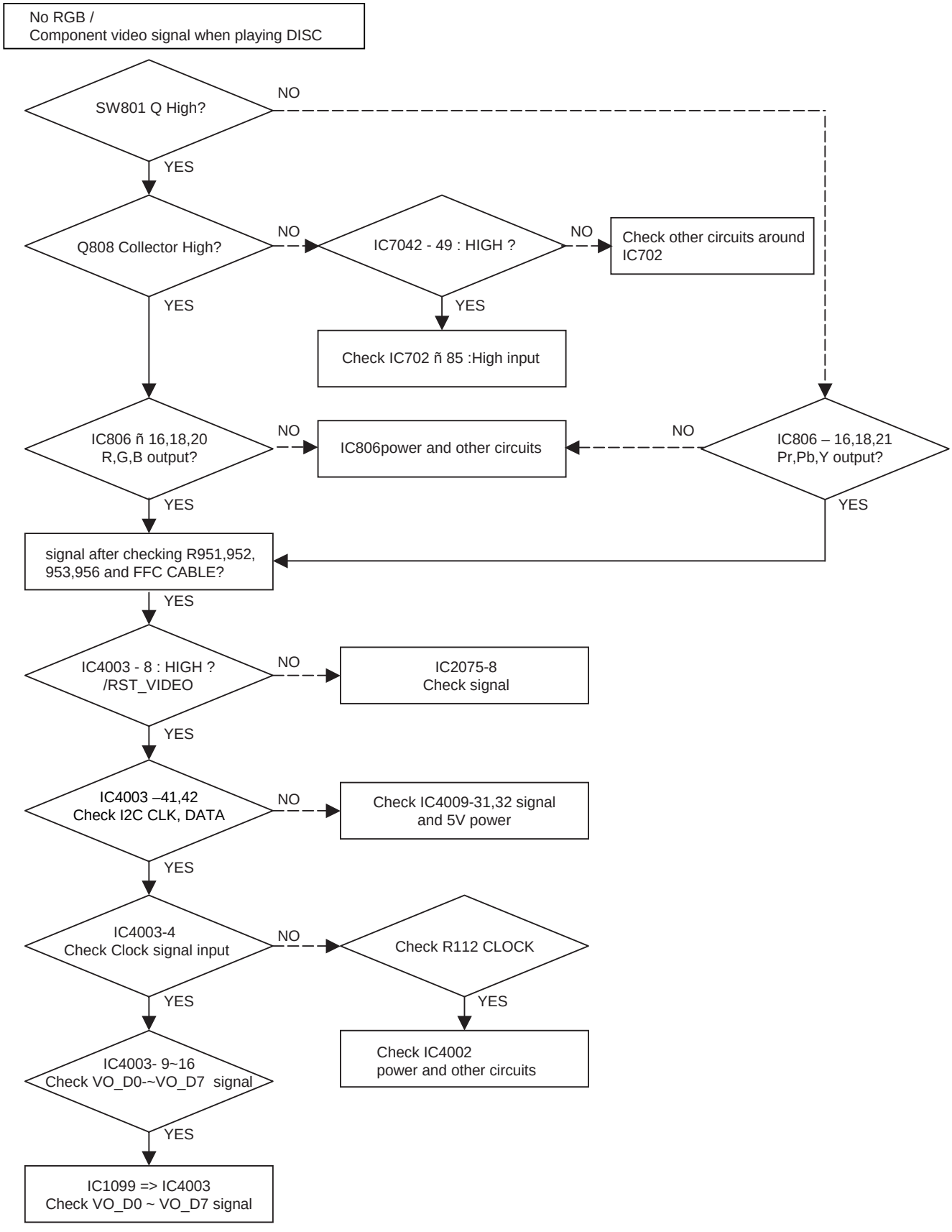

IC807 - 2 : Check SIF signal input\
Check C866, TUNER signal flow
YES
When changing a channel, IC702 - 69 :HIGH after RESET signal?
NO
Check IC702 power and other circuits
YES
IC702 - 39 : No Sync signal input
NO
Check IC705 power and other circuits
YES
No TUNER VIDEO signal input
NO
Check Q702 (V.Buffer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

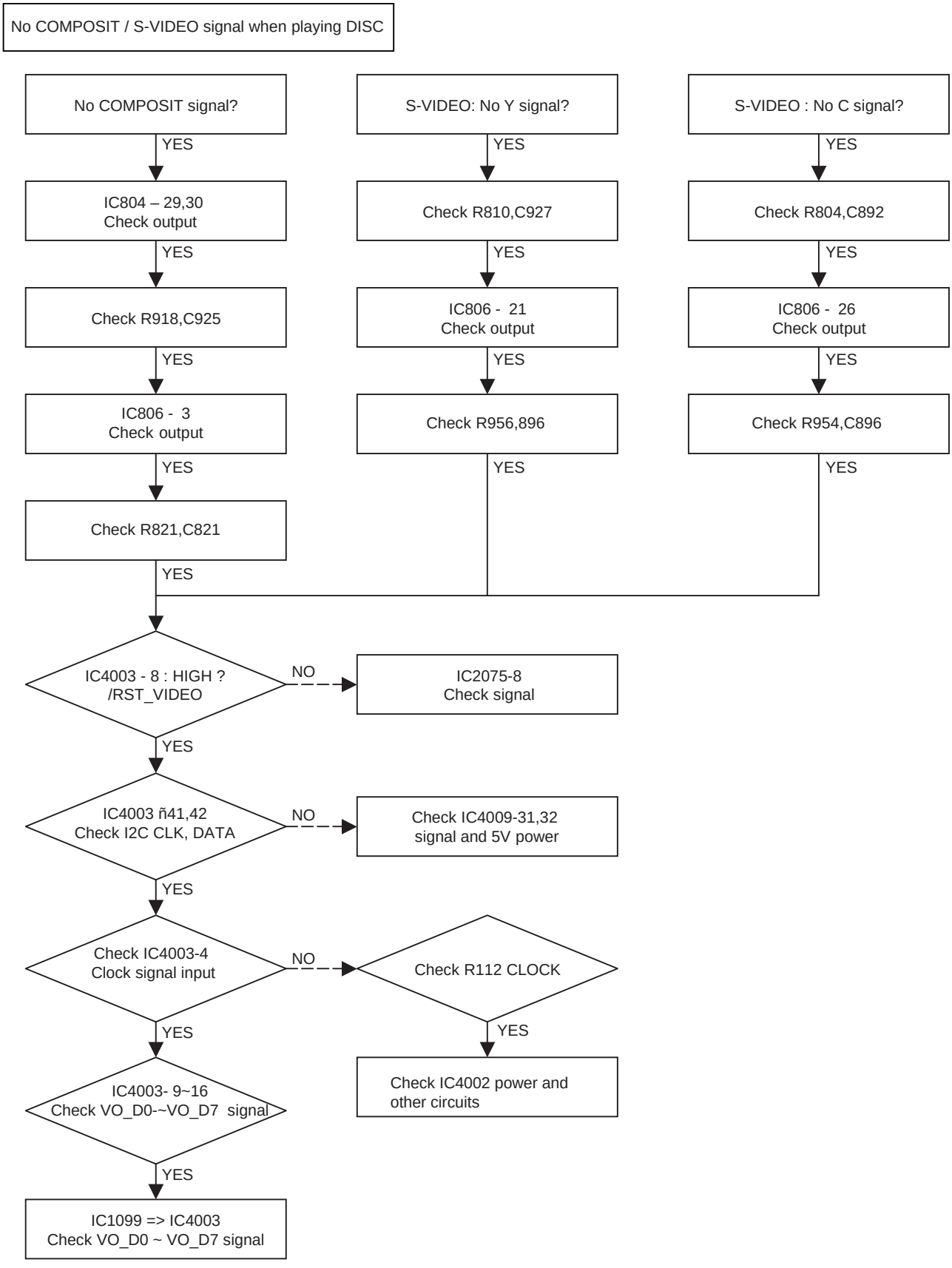

No external input 1 audio
Audio output even when playing DISC
NO
< When playing DISC, no audio output > Check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH) Check power and switching operation Pin 2,4 High/Low =>Pin 7 output : SW_A_OUT_L/R
YES
IC7808,809-5 Check audio signal 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

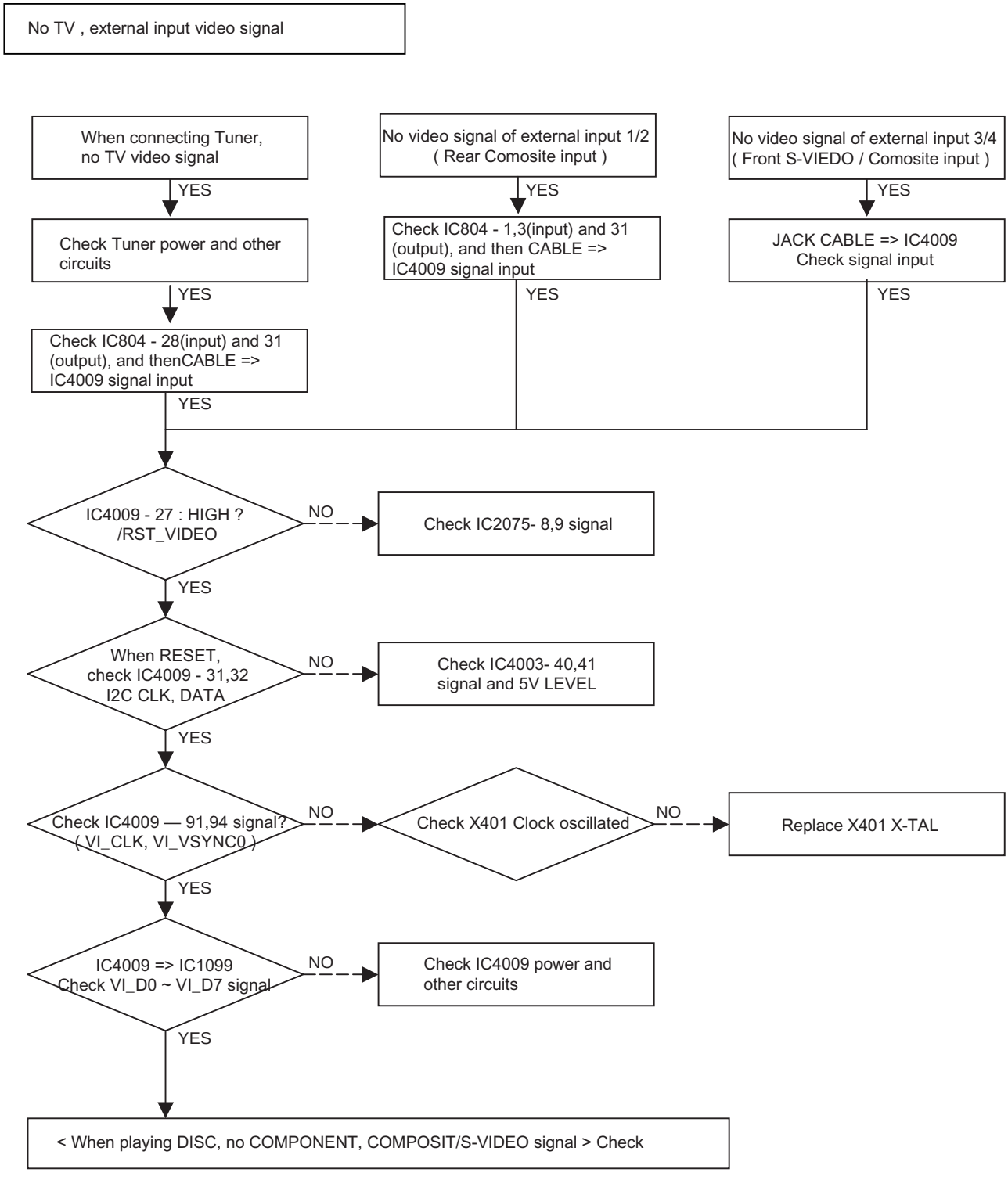

No external input 2 audio
Audio output even when playing DISC
NO
< No audio output when playing DISC > Check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH) Check power and switching operation Pin 2,4 High/Low =>Pin 7 output : SW_A_OUT_L/R
YES
IC7808,809-5 Check audio signal input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

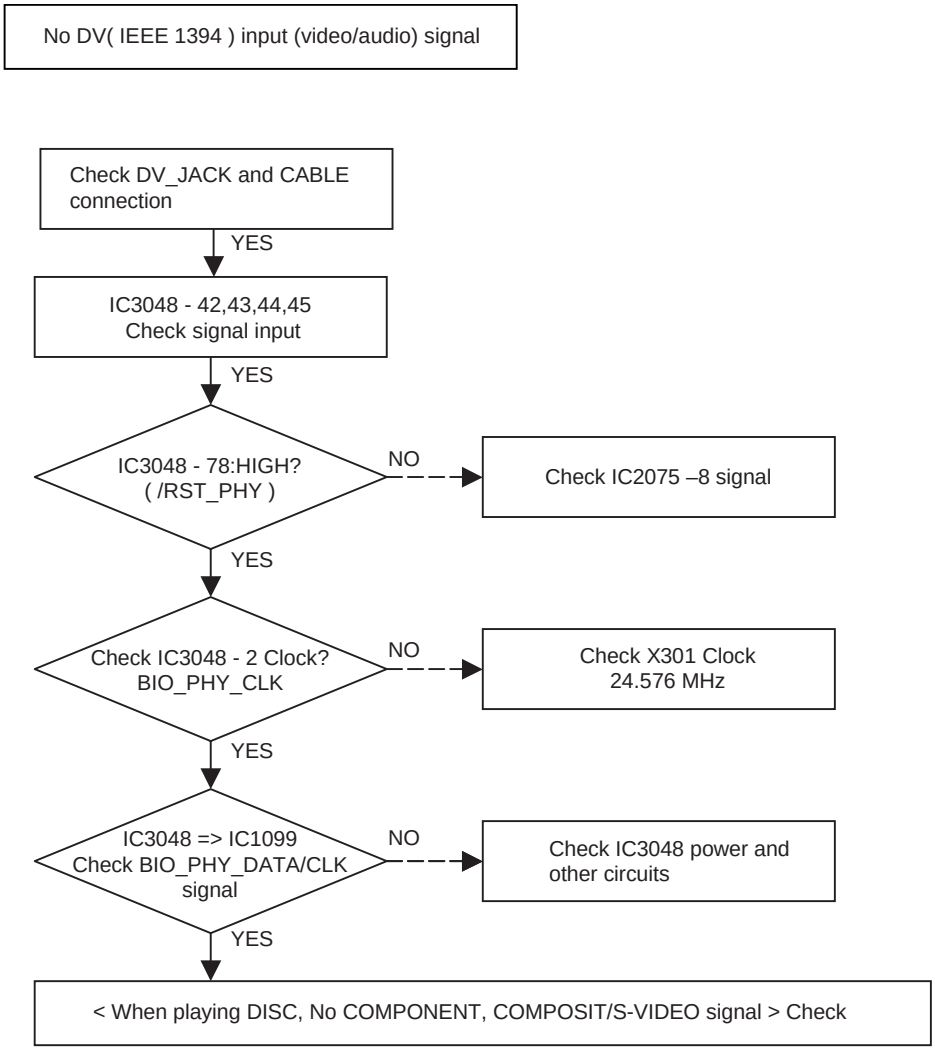

No external input 3 audio
Audio
output even when playing DISC
NO
< No audio output when playing DISC > Check
YES
IC808,809 - 7
Check audio signal output
NO
IC808,809 (AUDIO SWITCH)
Check power and switching operation
Pin 2,4 High =>Pin 7 output : A1_L/R
Pin 2,4 High/Low =>Pin 7 output : TU_L/R
YES
IC7808,809-5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


No external input 4 audio
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 Low =>Pin 7 output : A2_L/R
Pin 2,4 High/Low =>Pin 7 output : TU_L/R
YES
IC7808,809-1
Check audio signal input
NO
Check PN802 FFC Cable 1,3
NO
Check JK 762,763 terminal
YES
YES
END
END


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

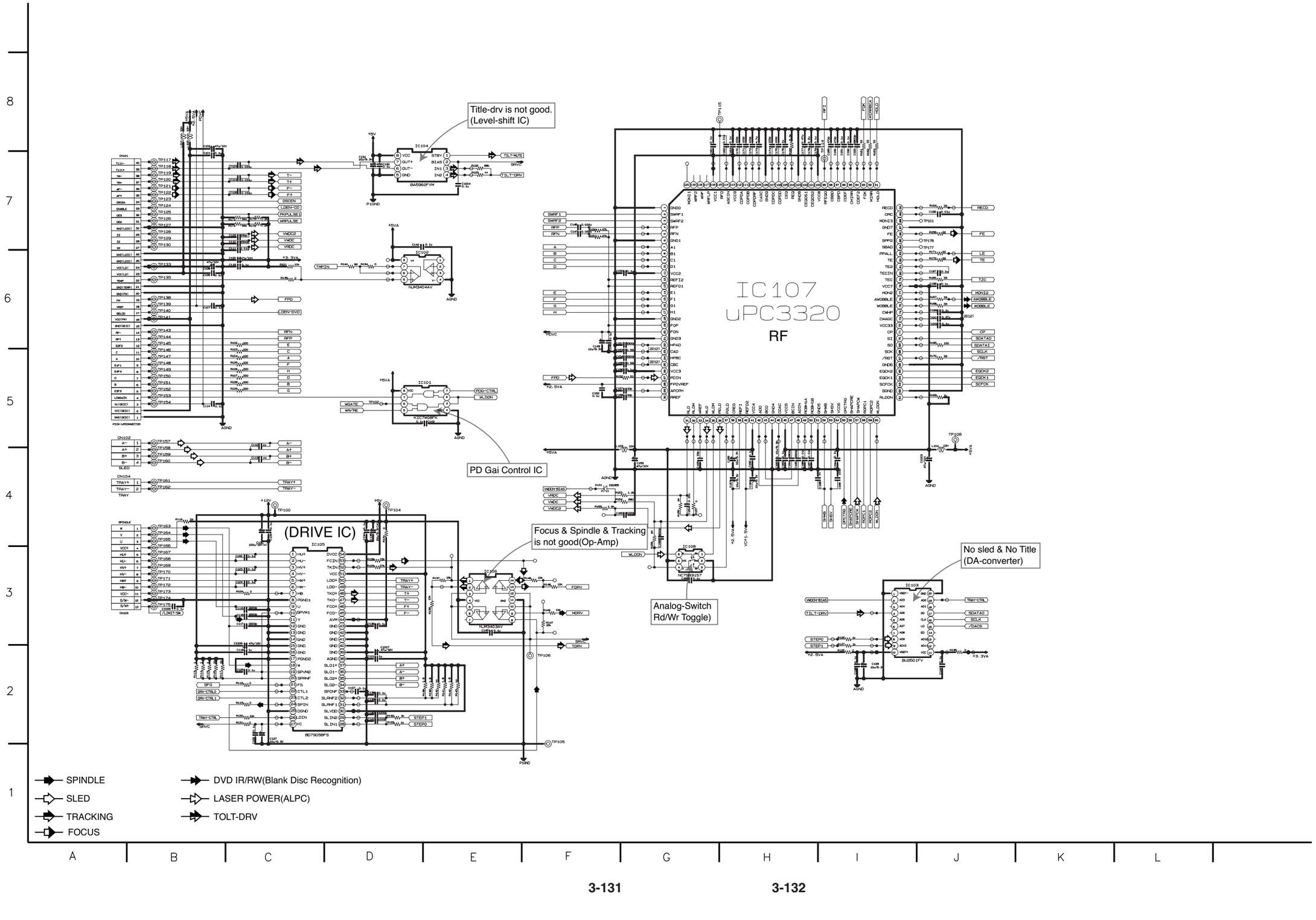

No COMPOSIT / S-VIDEO signal when playing DISC
No COMPOSIT signal?
YES
IC804 – 29,30
Check output
YES
Check R918,C925
YES
IC806 - 3
Check output
YES
Check R821,C821
YES
S-VIDEO: No Y signal?
YES
Check R810,C927
YES
IC806 - 21
Check output
YES
Check R956,896
YES
S-VIDEO : No C signal?
YES
Check R804,C892
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

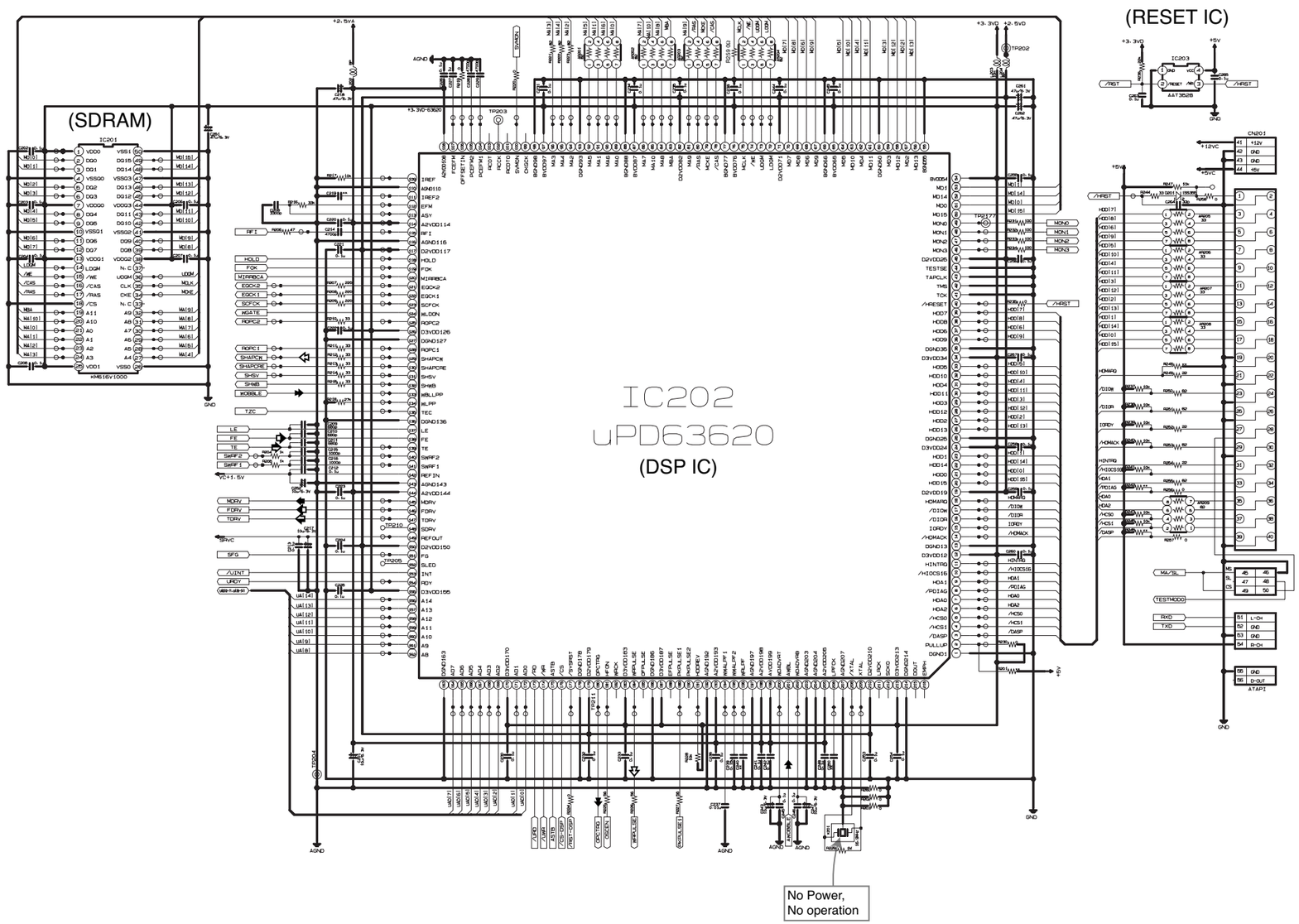

No DV(IEEE 1394) input (video/audio) signal
Check DV_JACK and CABLE connection
YES
IC3048 - 42,43,44,45 Check signal input
YES
IC3048 - 78:HIGH? (/RST_PHY)
NO
Check IC2075 –8 signal
YES
Check IC3048 - 2 Clock? BIO_PHY_CLK
NO
Check X301 Clock 24.576 MHz
YES
IC3048 => IC1099 Check BIO_PHY_DATA/CLK signal
NO
Check IC3048 power and other circuits
YES
< When playing DISC, No COMPONENT, COMPOSIT/S-VIDEO signal > Check

CIRCUIT DIAGRAMS

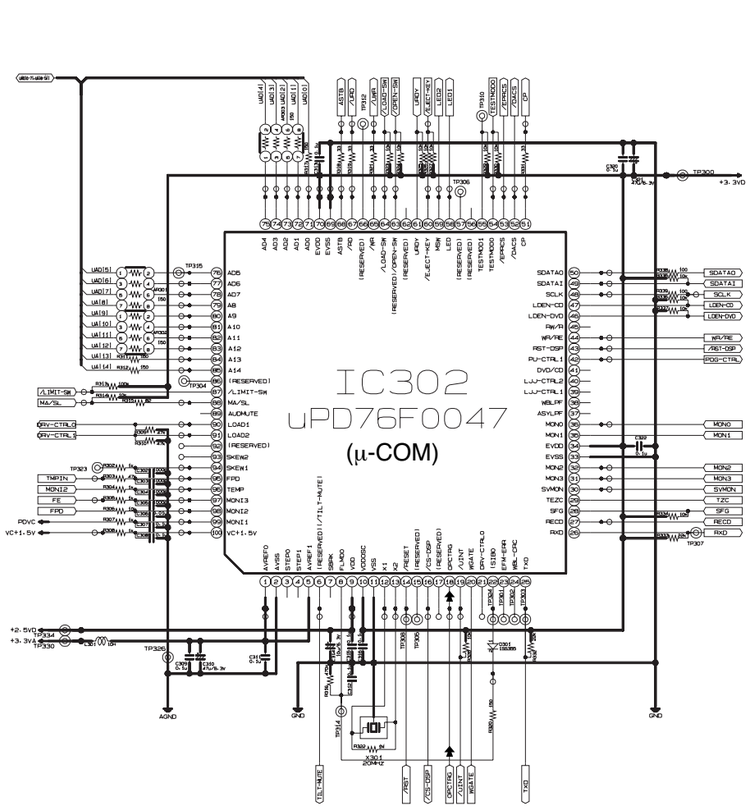
1. RF CIRCUIT DIAGRAM

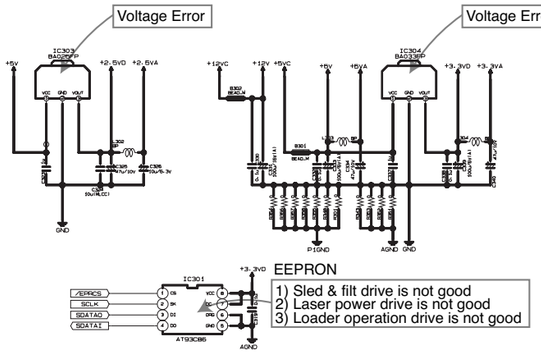


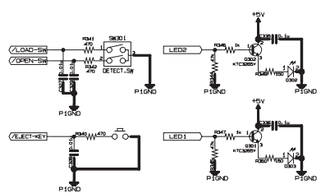
2. DSP CIRCUIT DIAGRAM



3. μ-COM CIRCUIT DIAGRAM

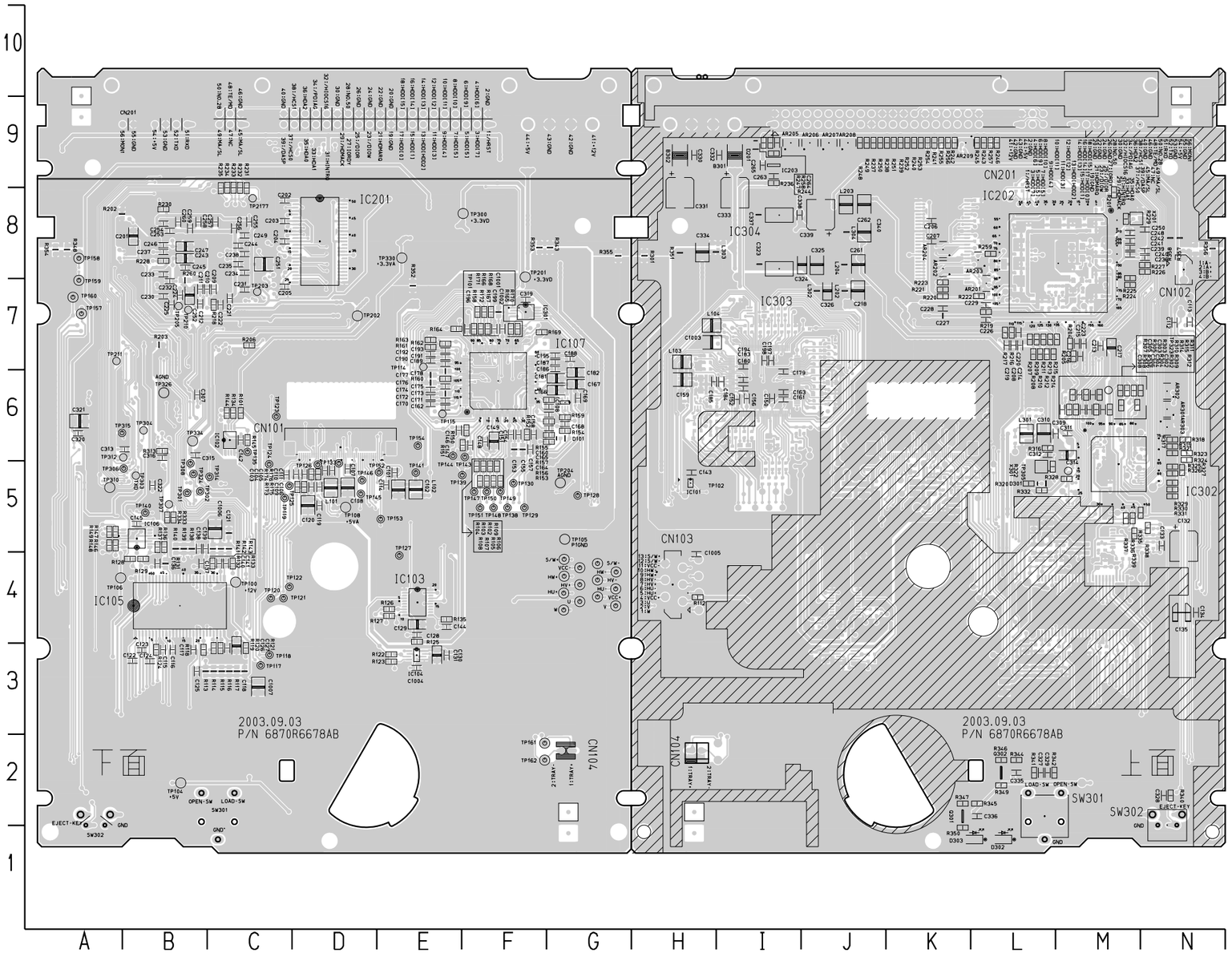






PRINTED CIRCUIT DIAGRAMS

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	L101	D5	R168	F7	TP1167	E4	TP164	G4	TP2220	D9	AR301	M6	C325	J8	R239	K9	R358	N8	TP2011	K8	TP2208	J9
C106	D5	C189	E7	L102	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	J9	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	D5	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
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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	L103	H7	R310	M6	TP1058	I7	TP2082	M7	TP345	N6
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C151	F6	C253	B8	R141	C5	TP1019	E6	TP129	F5	TP2105	E6	TP383	C4	C220	L7	L304	J8	R319	N6	TP1091	H6	TP2112	H7	TP372	N6
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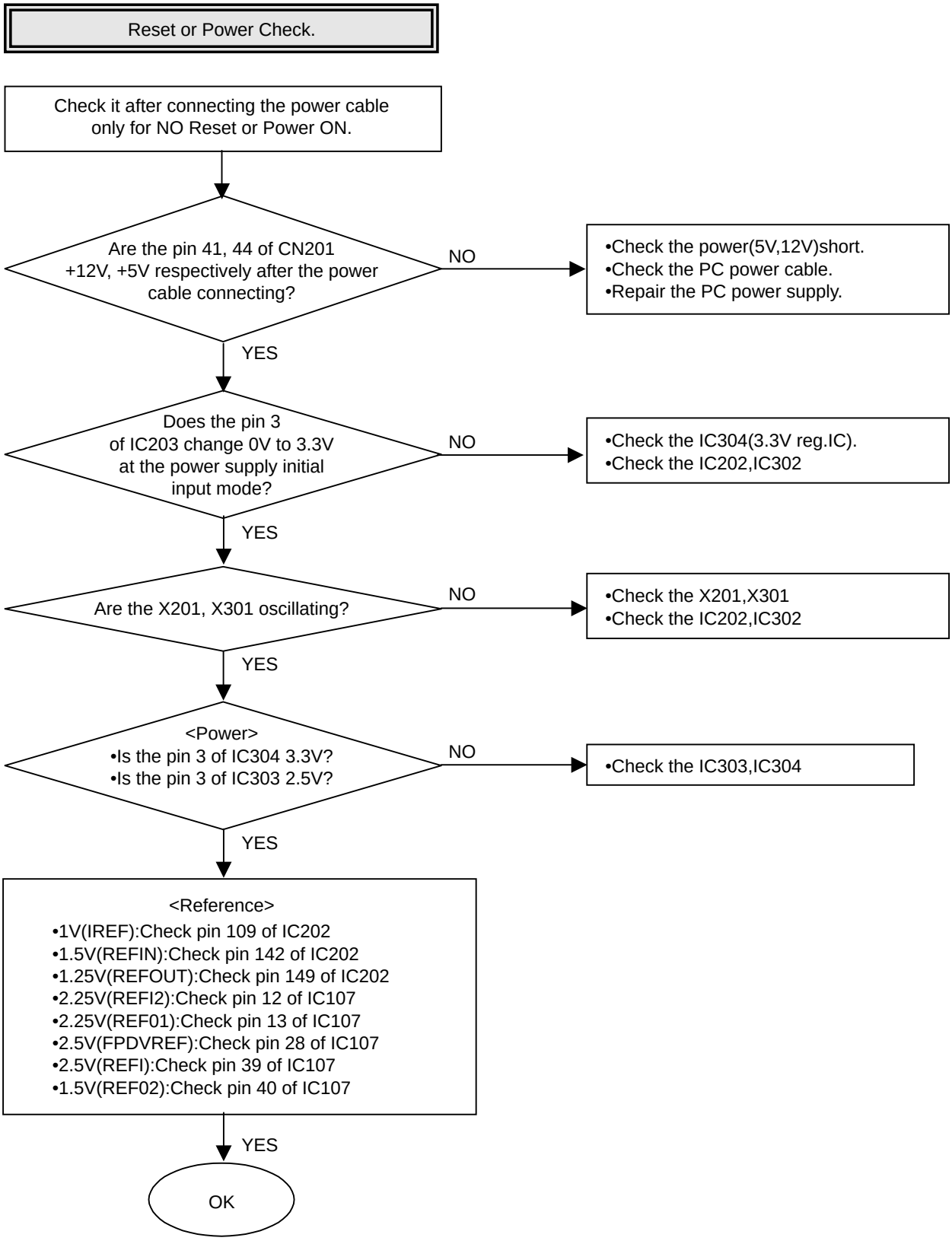
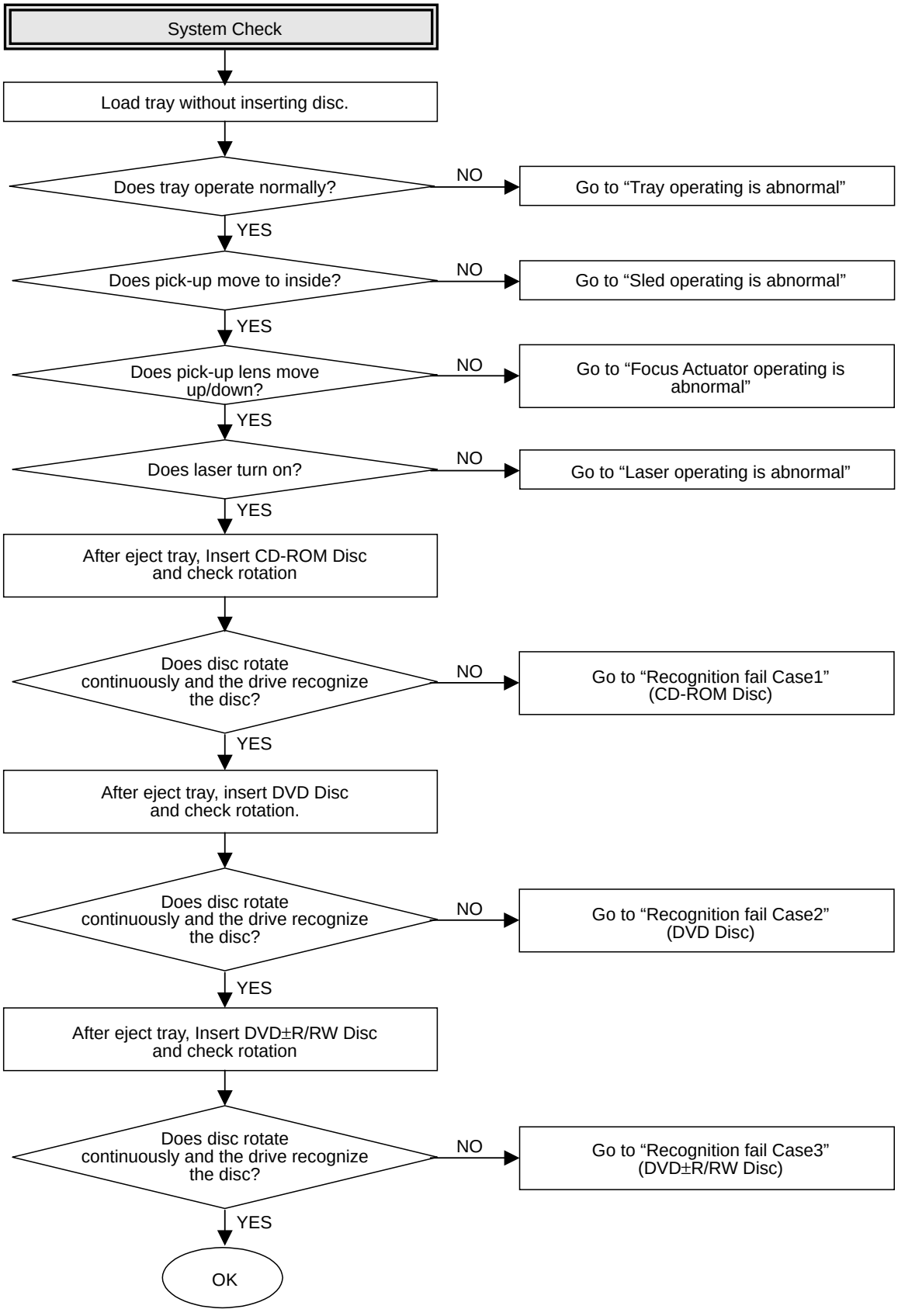
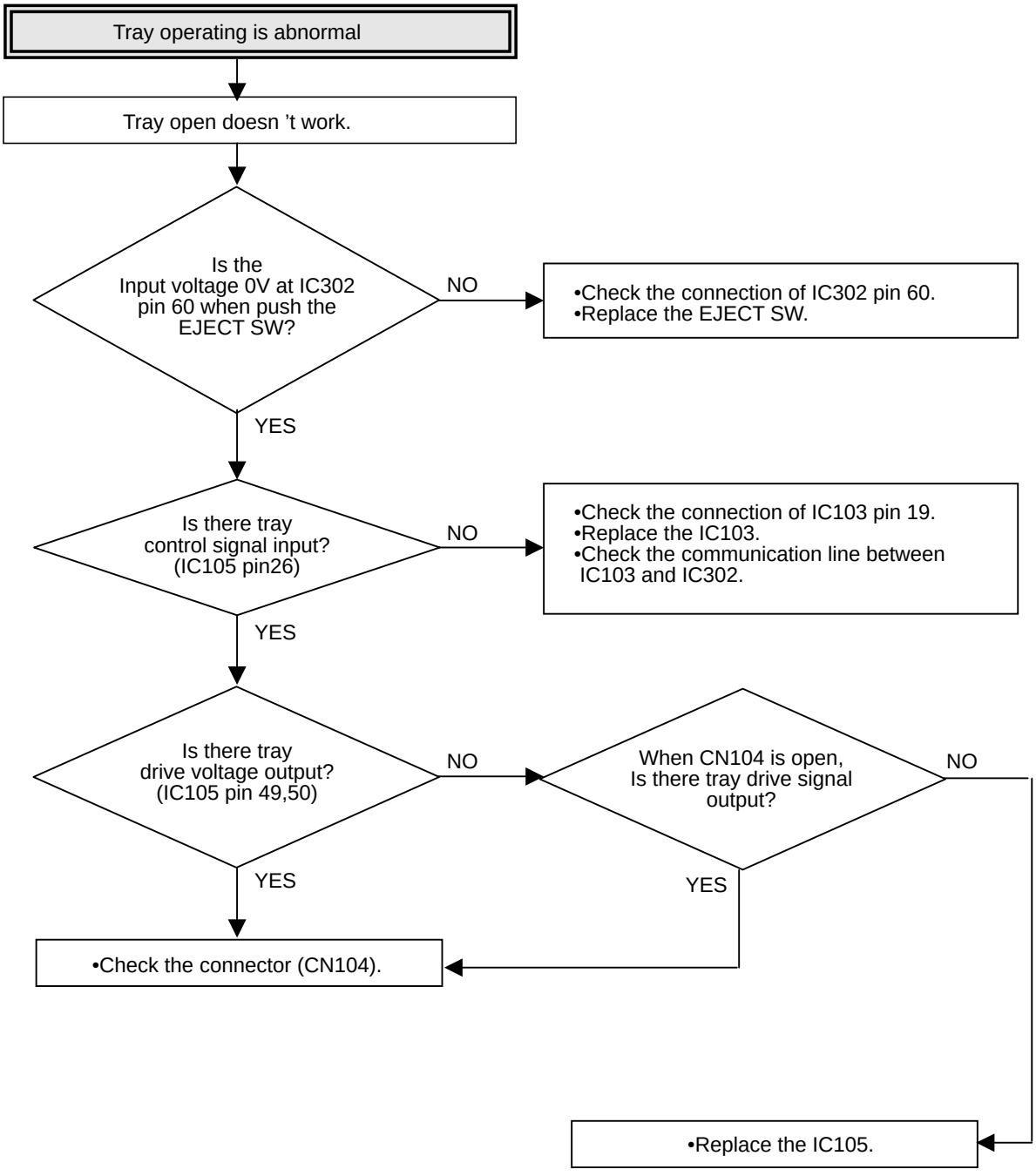
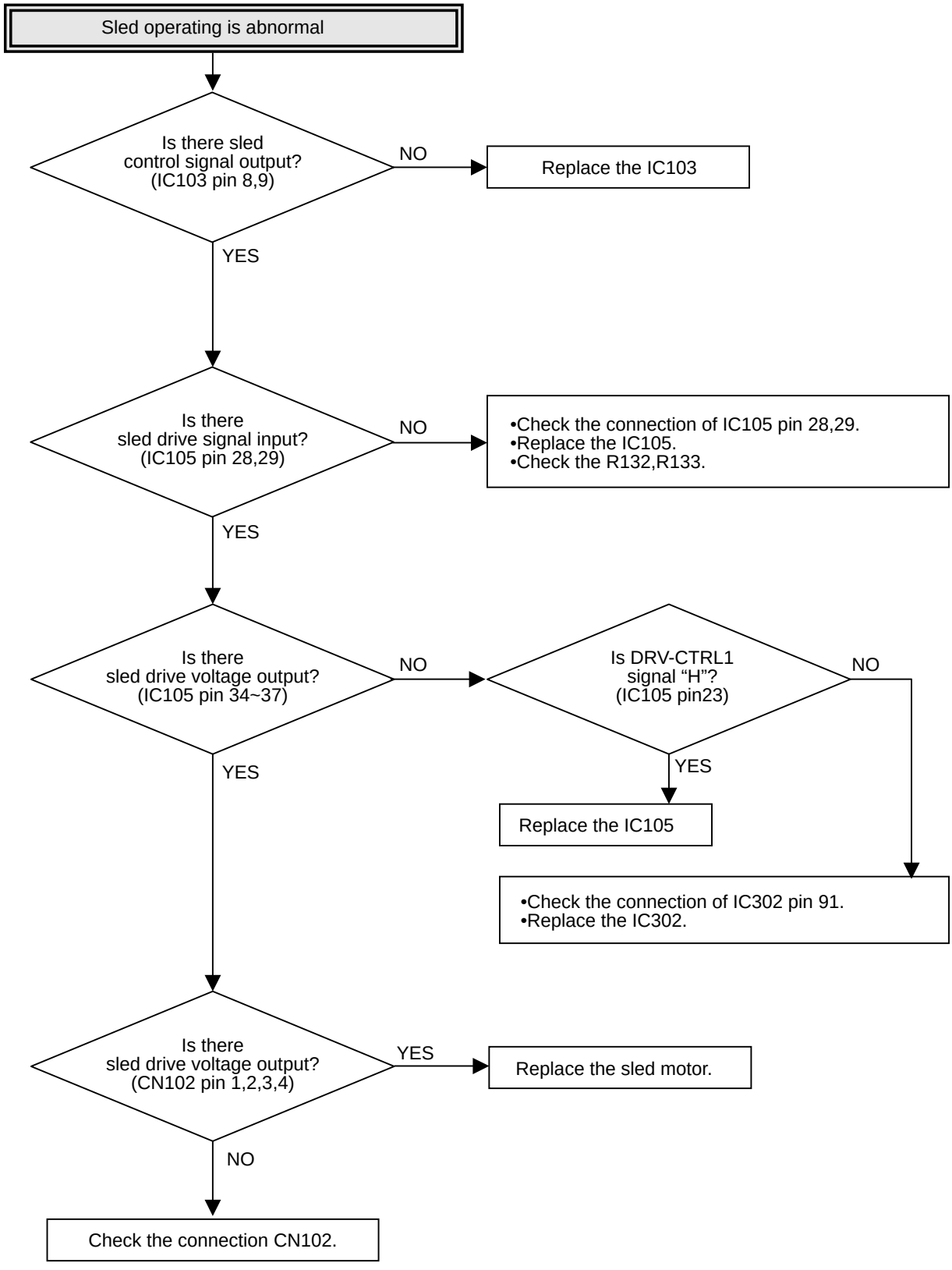
C154	F6	C255	C8	R143	C5	TP1027	E7	TP133	D5	TP2108	F7	TP397	B6	C226	L7	Q302	L2	R321	N6	TP1093	I6	TP2114	H6	TP374	M6
C155	F6	C256	C8	R144	C6	TP1028	F7	TP135	C6	TP2109	F7	TP414	C5	C227	K7	R112	H4	R322	L5	TP1095	I7	TP2115	I6	TP375	M6
C157	F6	C257	C8	R145	C6	TP1029	E7	TP138	F5	TP211	A7	TP415	B5	C228	K7	R201	M8	R323	N6	TP1103	H6	TP2119	L7	TP376	M6
C158	F6	C258	B8	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		

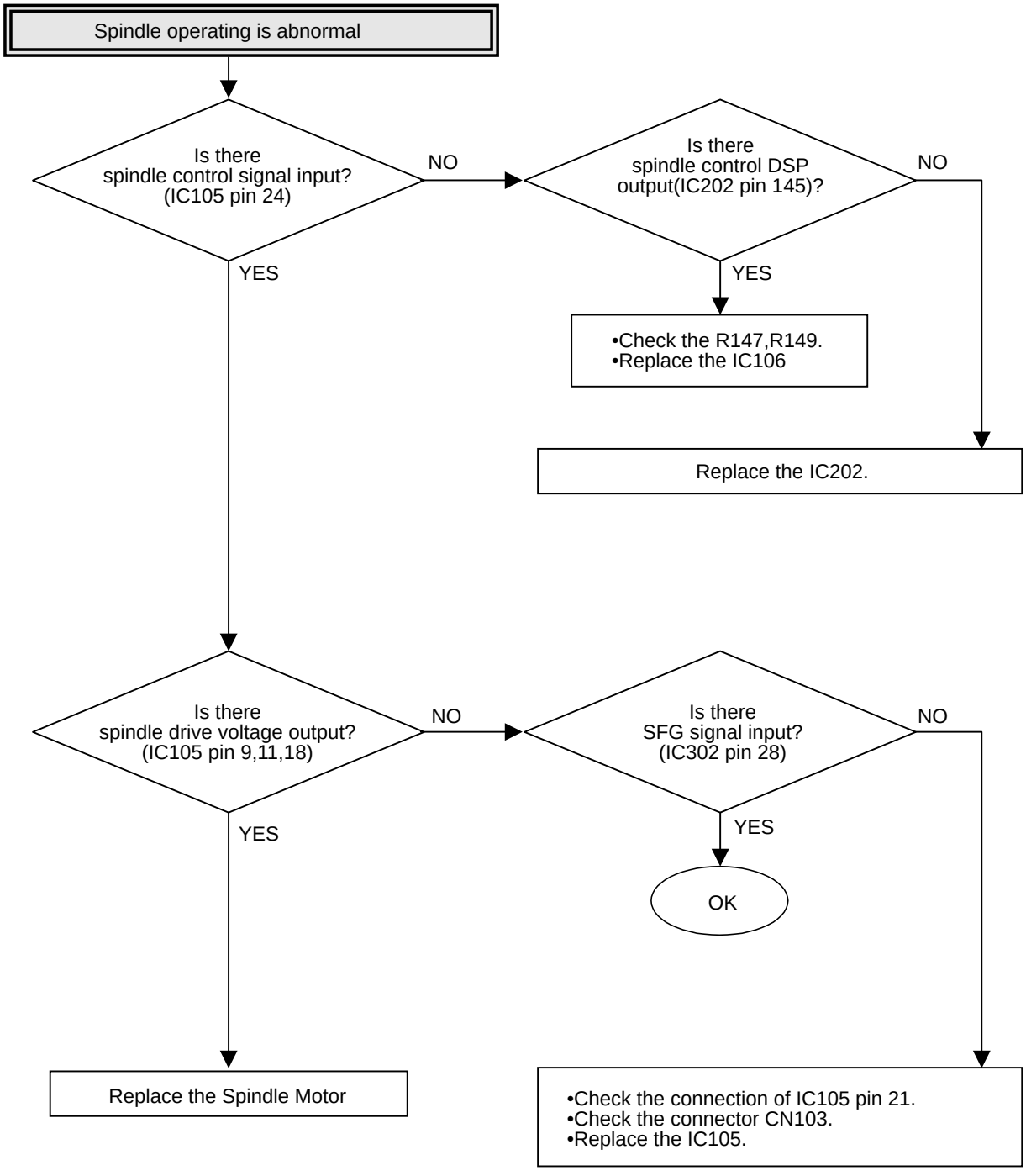
RL-01A LOADER PART
ELECTRICAL TROUBLESHOOTING GUIDE

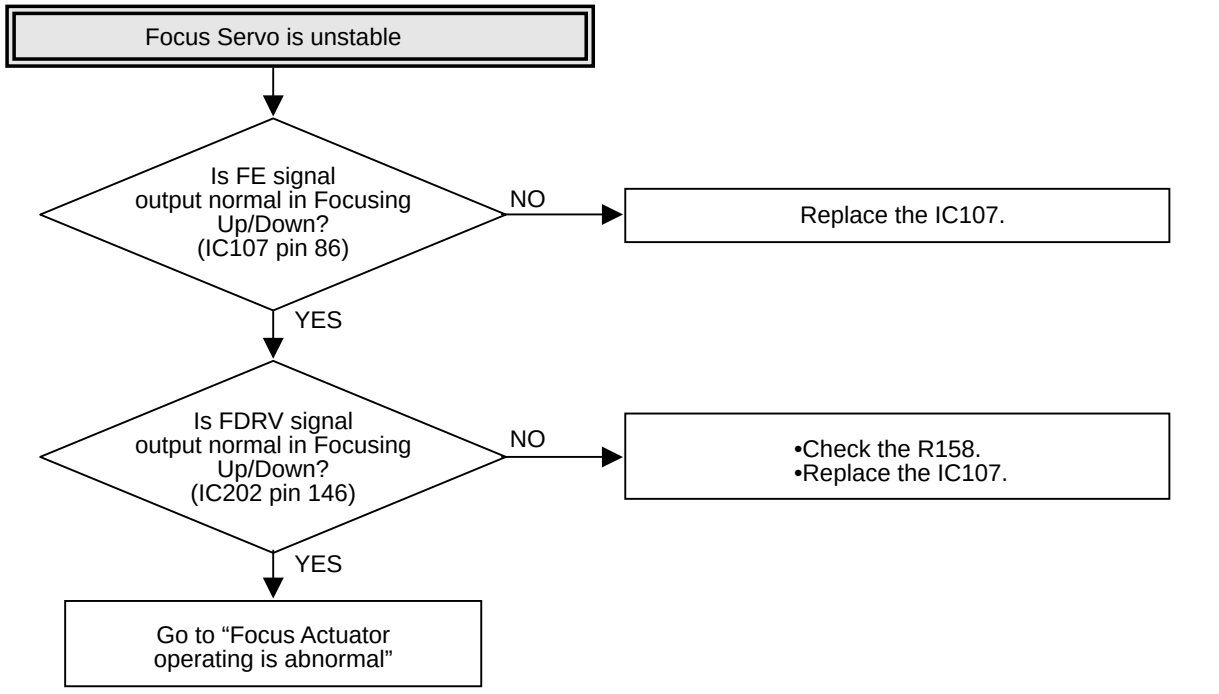


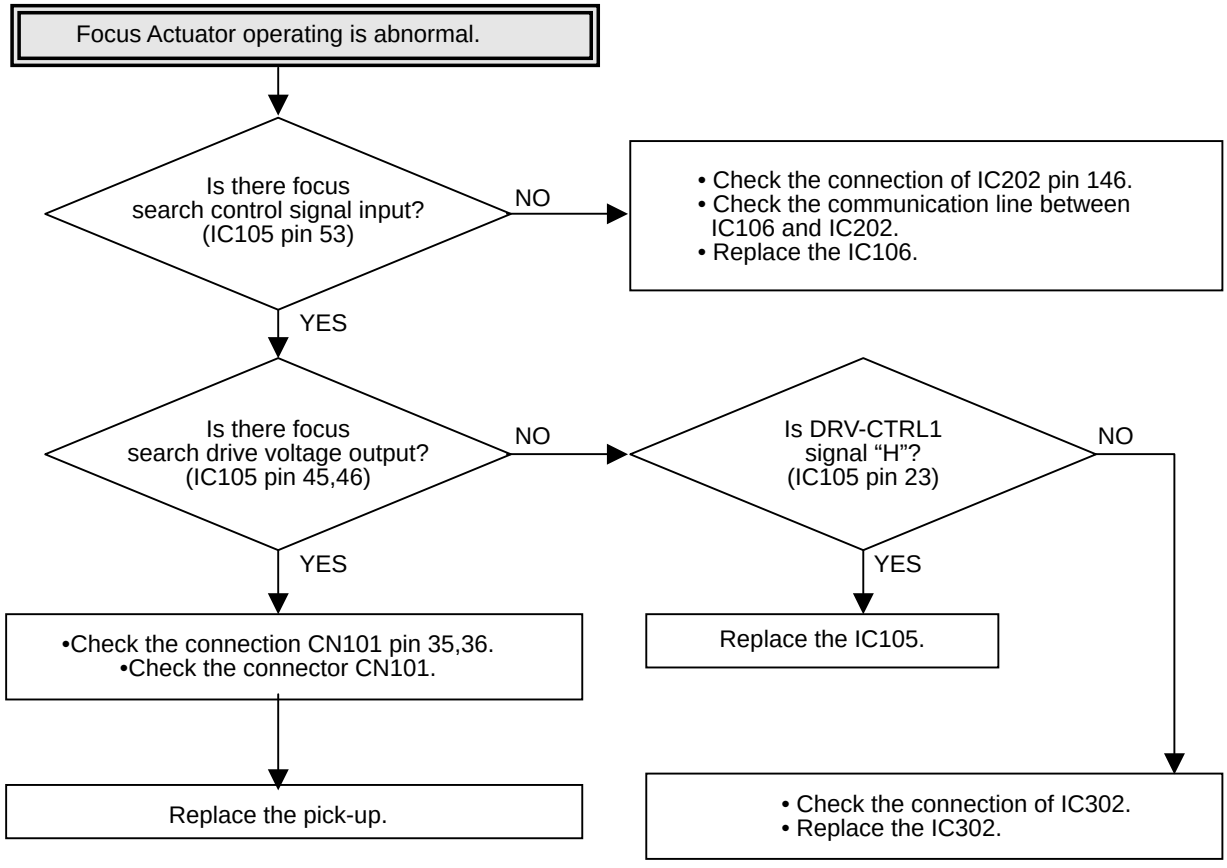

System Check
Load tray without inserting disc.
Does tray operate normally?
NO
Go to “Tray operating is abnormal”
YES
Does pick-up move to inside?
NO
Go to “Sled operating is abnormal”
YES
Does pick-up lens move up/down?
NO
Go to “Focus Actuator operating is abnormal”
YES
Does laser turn on?
NO
Go to “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

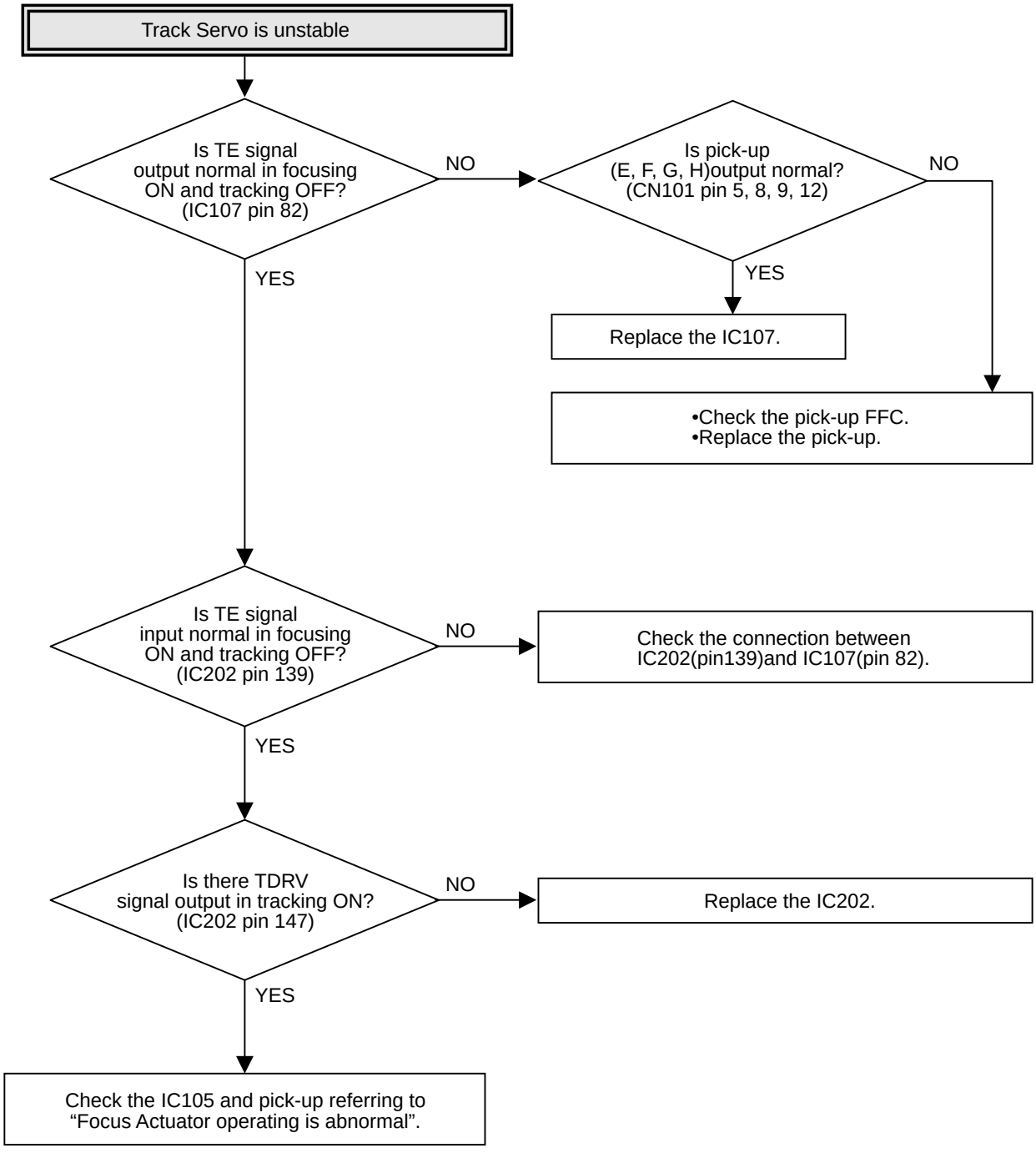

Tray operating is abnormal
Tray open doesn ’t work.
Is the Input voltage 0V at IC302 pin 60 when push the EJECT SW?
NO
•Check the connection of IC302 pin 60.
•Replace the EJECT SW.
YES
Is there tray control signal input? (IC105 pin26)
NO
•Check the connection of IC103 pin 19.
•Replace the IC103.
•Check 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.

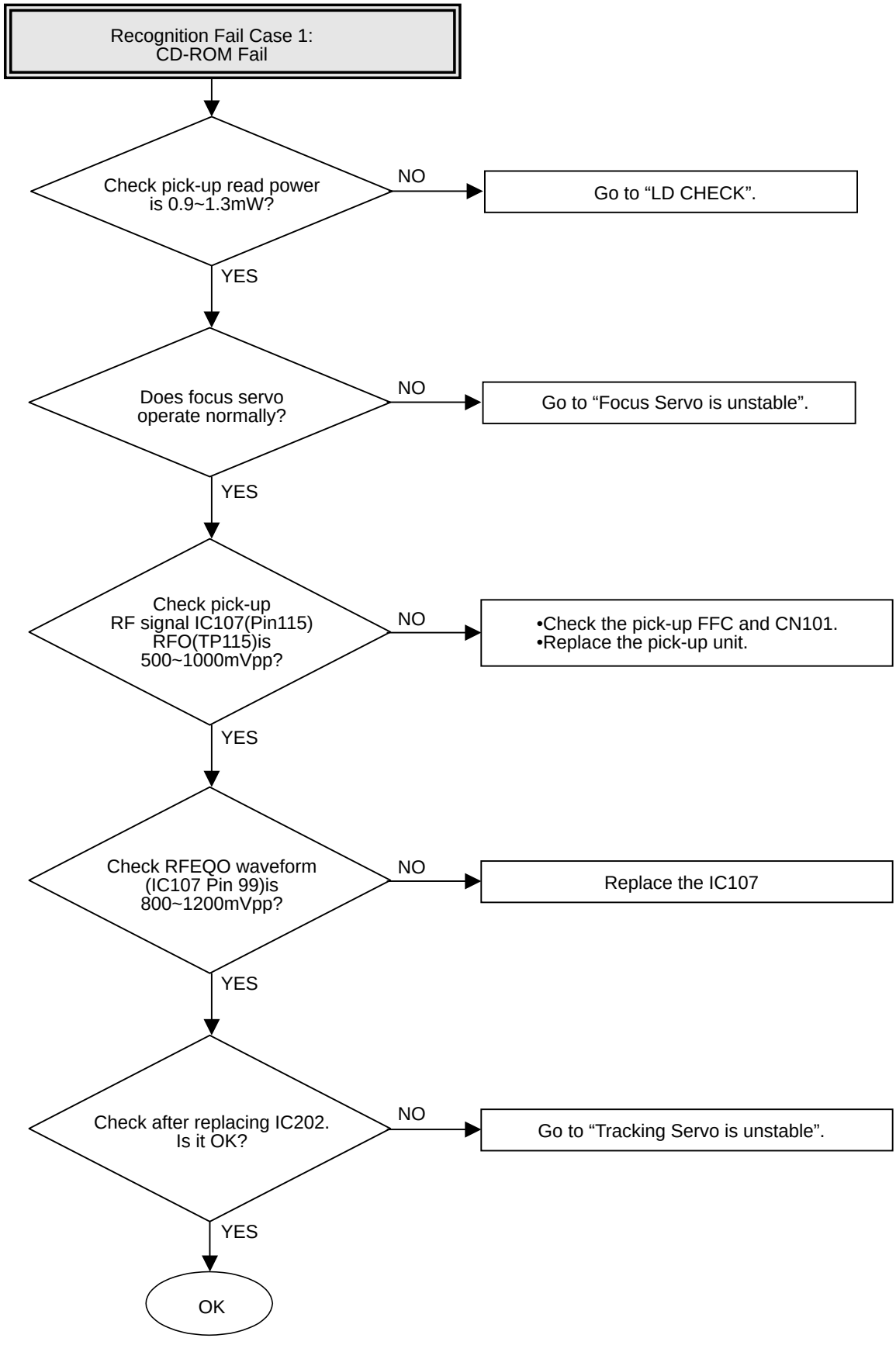

Sled operating is abnormal
Is there sled control signal output? (IC103 pin 8,9)
NO
Replace the IC103
YES
Is there sled drive signal input? (IC105 pin 28,29)
NO
•Check the connection of IC105 pin 28,29.
•Replace the IC105.
•Check the R132,R133.
YES
Is there sled drive voltage output? (IC105 pin 34~37)
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.

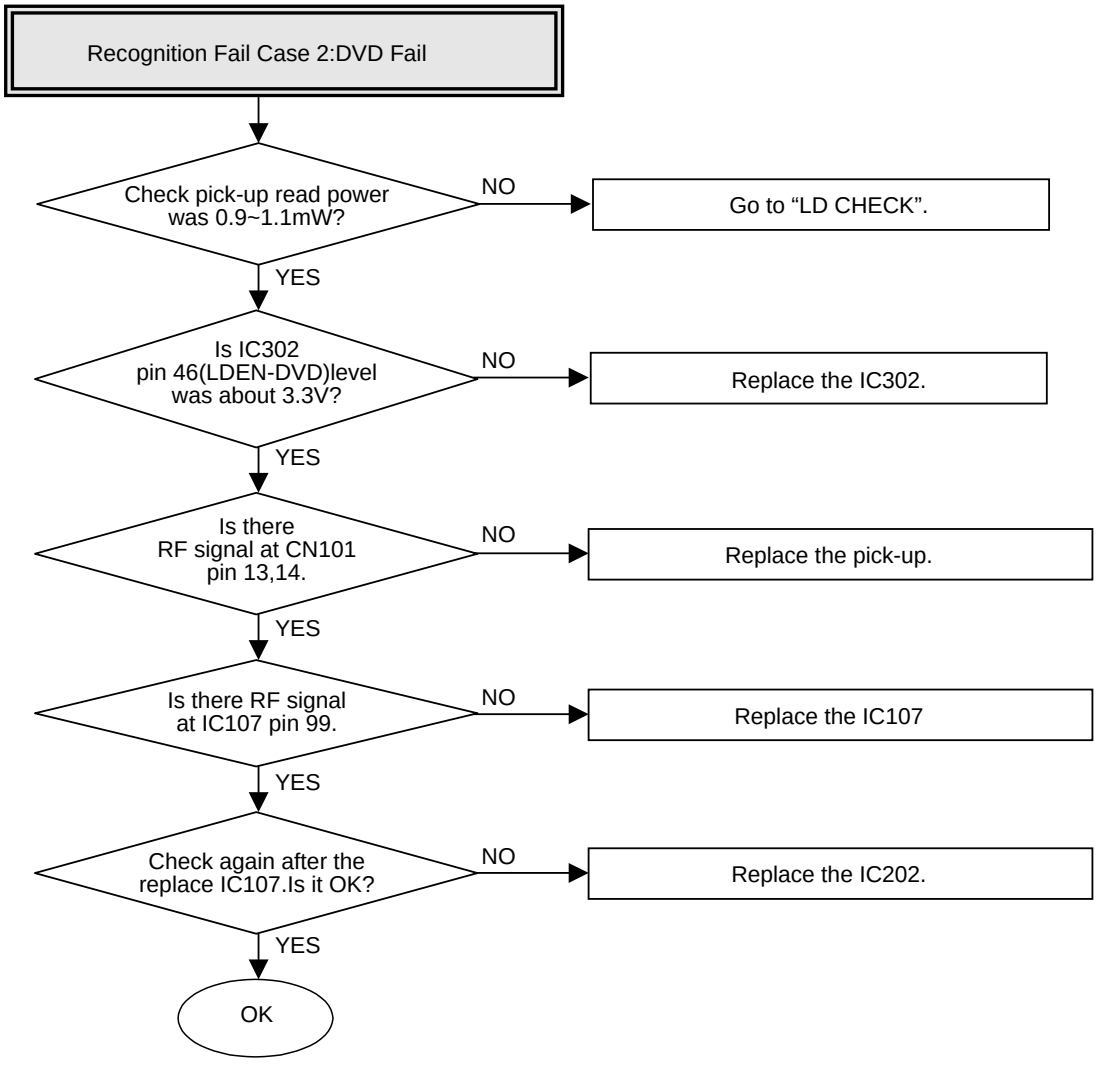

Spindle operating is abnormal
Is there spindle control signal input? (IC105 pin 24)
NO
YES
Is there spindle control DSP output(IC202 pin 145)?
NO
YES
•Check the R147,R149.
•Replace the IC106
Replace the IC202.
Is there spindle drive voltage output? (IC105 pin 9,11,18)
NO
YES
Is there SFG signal input?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

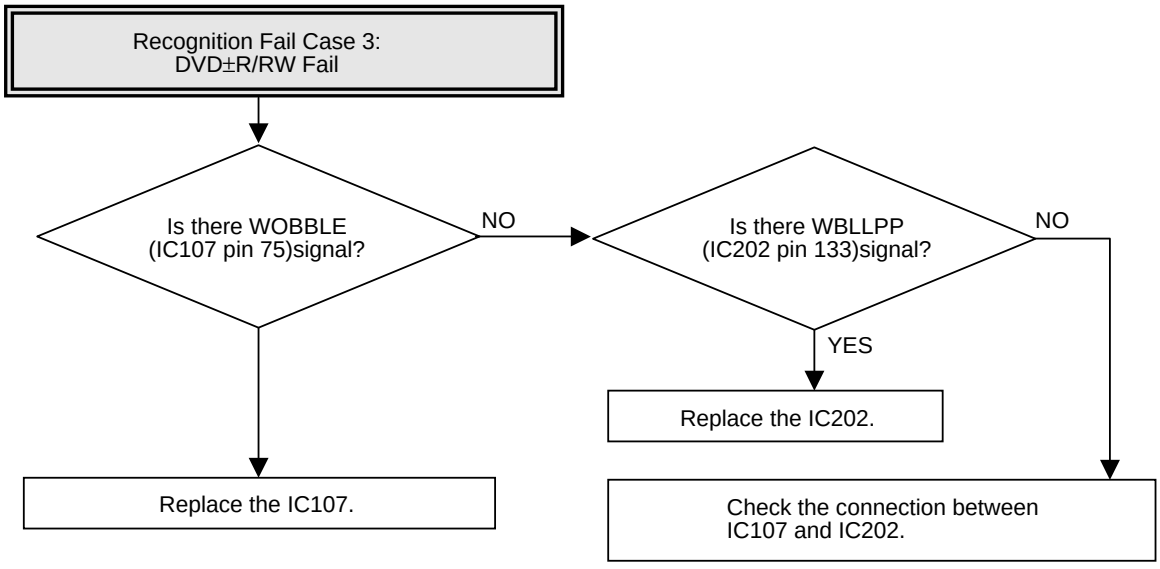

Focus Servo is unstable
Is FE signal output normal in Focusing Up/Down? (IC107 pin 86)
NO
Replace the IC107.
YES
Is FDRV signal output normal in Focusing Up/Down? (IC202 pin 146)
NO
•Check the R158.
•Replace the IC107.
YES
Go to “Focus Actuator operating is abnormal”

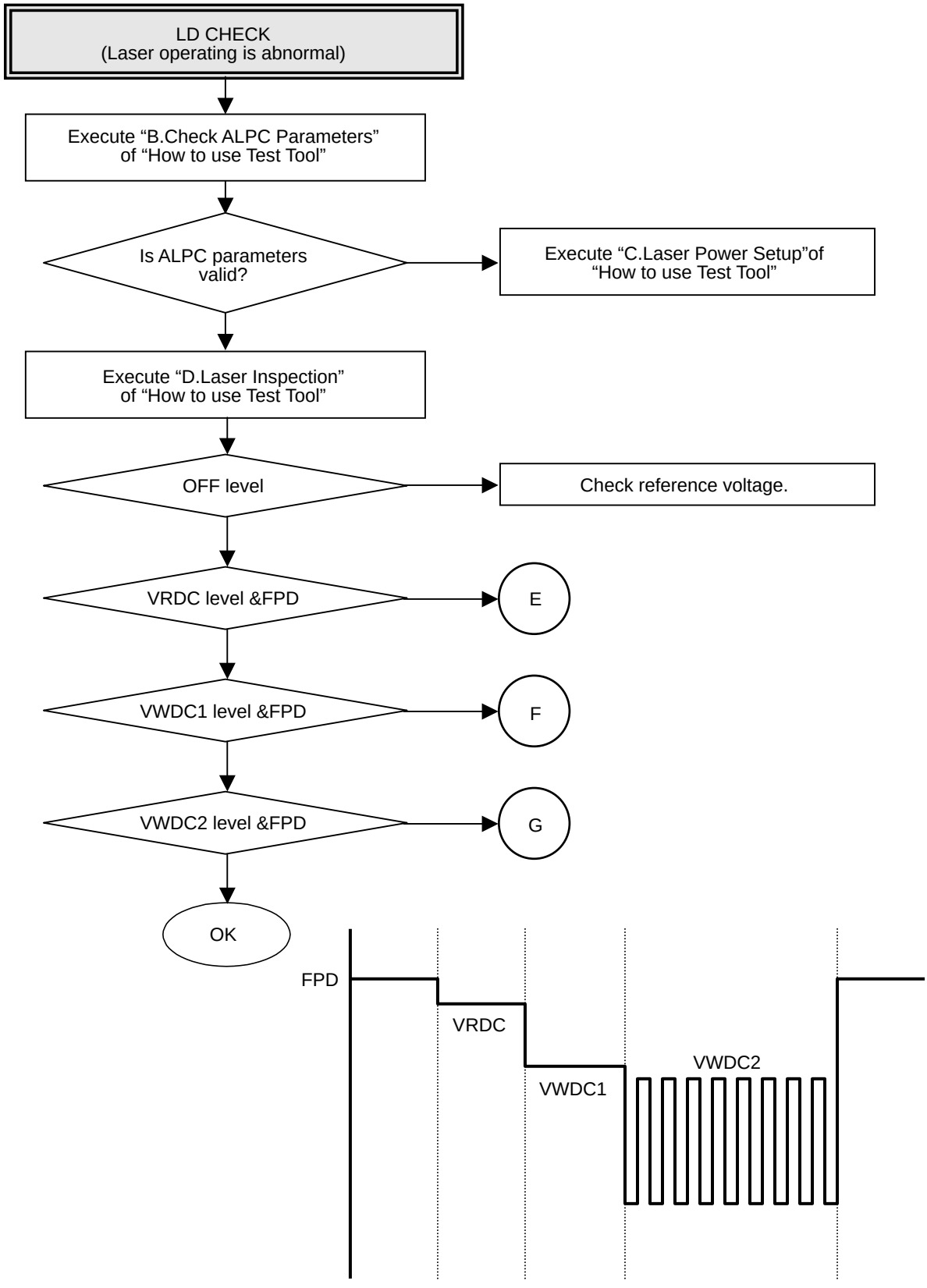

Focus Actuator operating is abnormal.
Is there focus search control signal input? (IC105 pin 53)
NO
• Check the connection of IC202 pin 146.
• Check the communication line between IC106 and IC202.
• Replace the IC106.
YES
Is there focus search drive voltage output? (IC105 pin 45,46)
NO
Is DRV-CTRL1 signal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

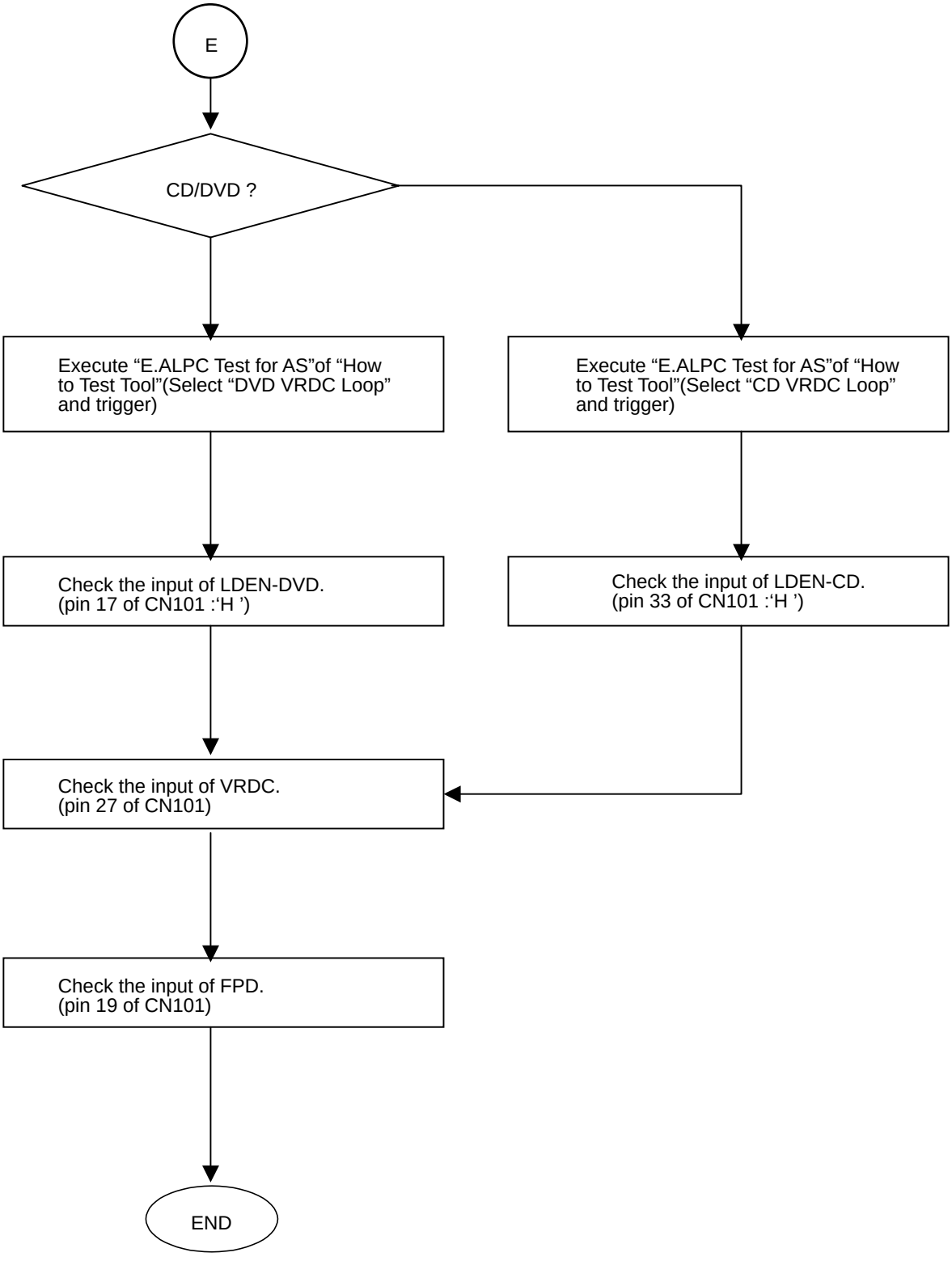

Track Servo is unstable
Is TE signal output normal in focusing ON and tracking OFF? (IC107 pin 82)
NO
Is pick-up (E, F, G, H)output normal? (CN101 pin 5, 8, 9, 12)
NO
YES
YES
Replace the IC107.
•Check the pick-up FFC.
•Replace the pick-up.
Is TE signal input normal in focusing ON and tracking OFF? (IC202 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”.

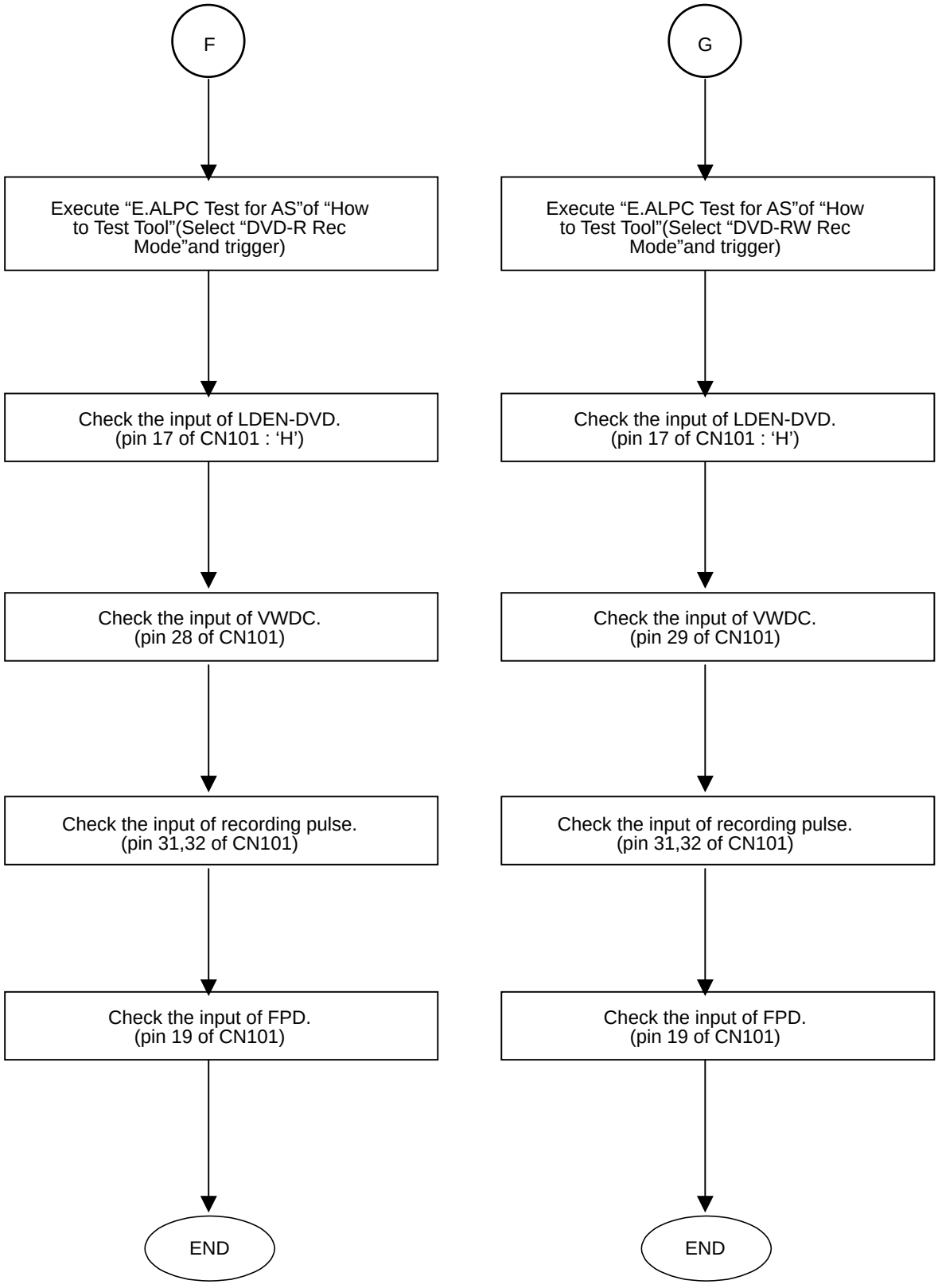

Recognition Fail Case 1:
CD-ROM Fail
Check pick-up read power
is 0.9~1.3mW?
NO
Go to “LD CHECK”.
YES
Does focus servo
operate normally?
NO
Go to “Focus Servo is unstable”.
YES
Check pick-up
RF signal IC107(Pin115)
RFO(TP115)is
500~1000mVpp?
NO
•Check the pick-up FFC and CN101.
•Replace the pick-up unit.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

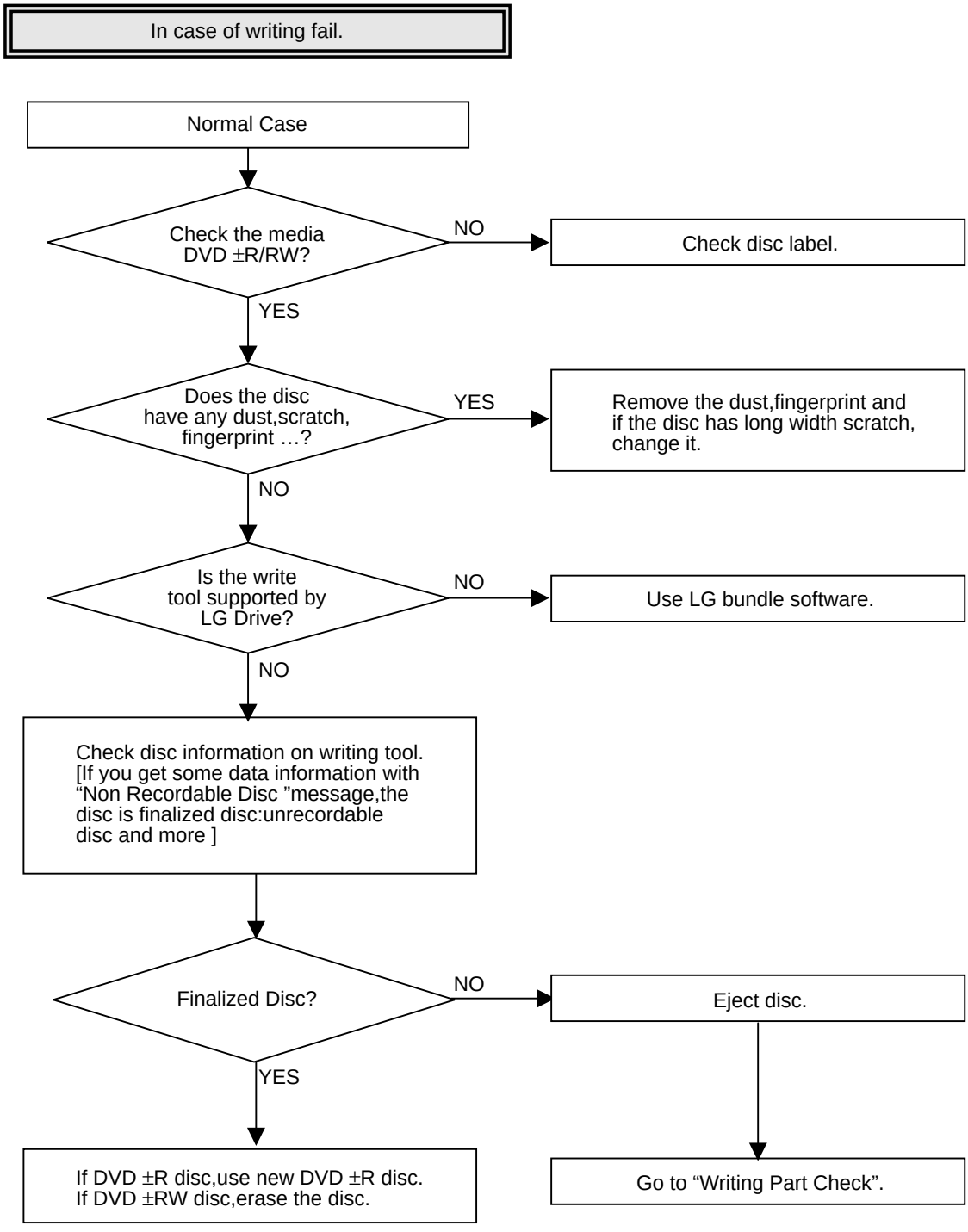

Recognition Fail Case 2:DVD Fail
Check pick-up read power was 0.9~1.1mW?
NO
Go to “LD CHECK”.
YES
Is IC302 pin 46(LDEN-DVD)level was about 3.3V?
NO
Replace the IC302.
YES
Is there RF signal at CN101 pin 13,14.
NO
Replace the pick-up.
YES
Is there RF signal at IC107 pin 99.
NO
Replace the IC107
YES
Check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

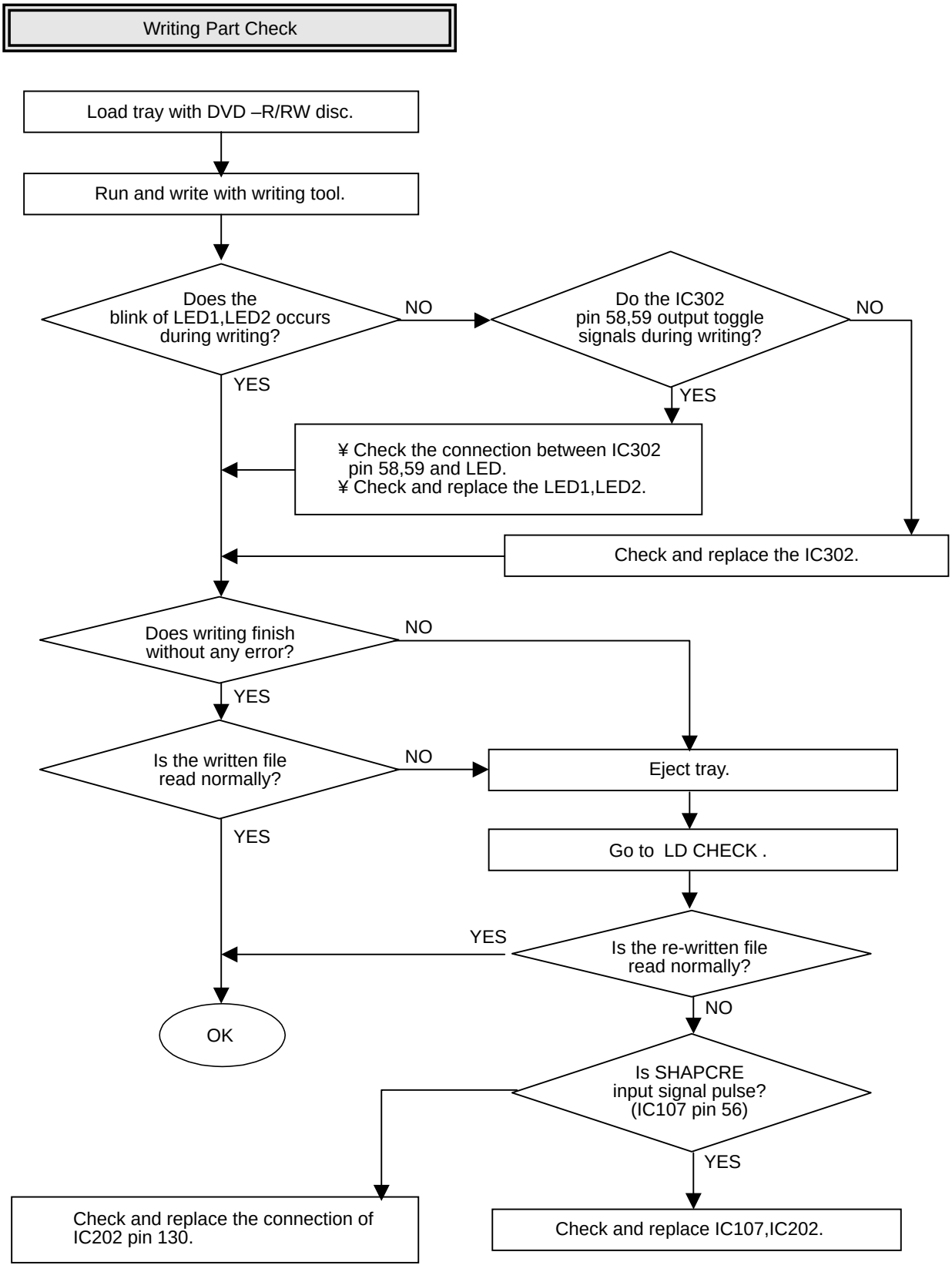

Recognition Fail Case 3: DVD±R/RW Fail
Is there WOBBLE (IC107 pin 75)signal?
NO
Is there WBLLPP (IC202 pin 133)signal?
NO
YES
Replace the IC202.
Replace the IC107.
Check the connection between IC107 and IC202.


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

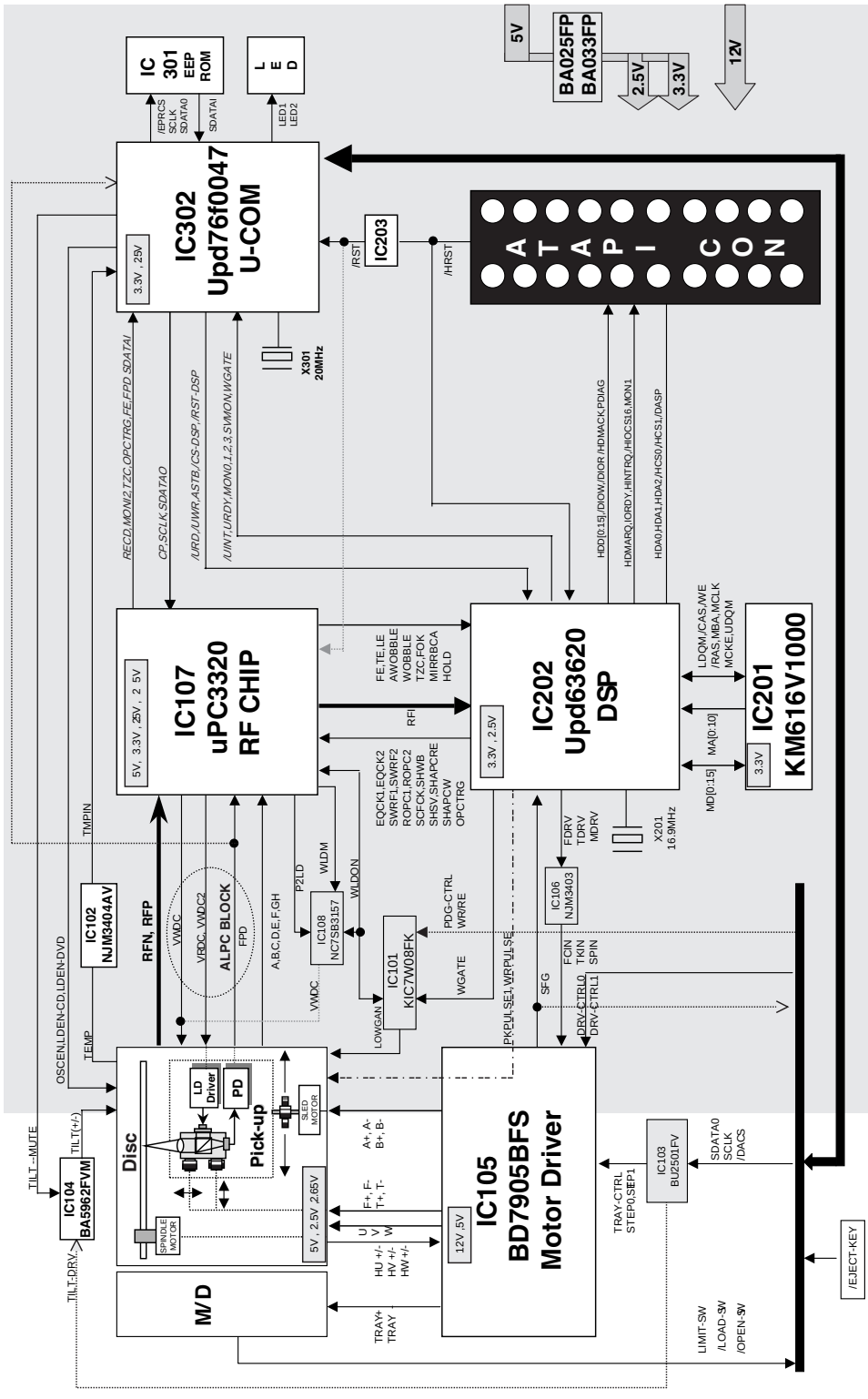

F
Execute “E.ALPC Test for AS”of “How to Test Tool”(Select “DVD-R Rec Mode”and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 : ‘H’)
Check the input of VWDC. (pin 28 of CN101)
Check the input of recording pulse. (pin 31,32 of CN101)
Check the input of FPD. (pin 19 of CN101)
END
G
Execute “E.ALPC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

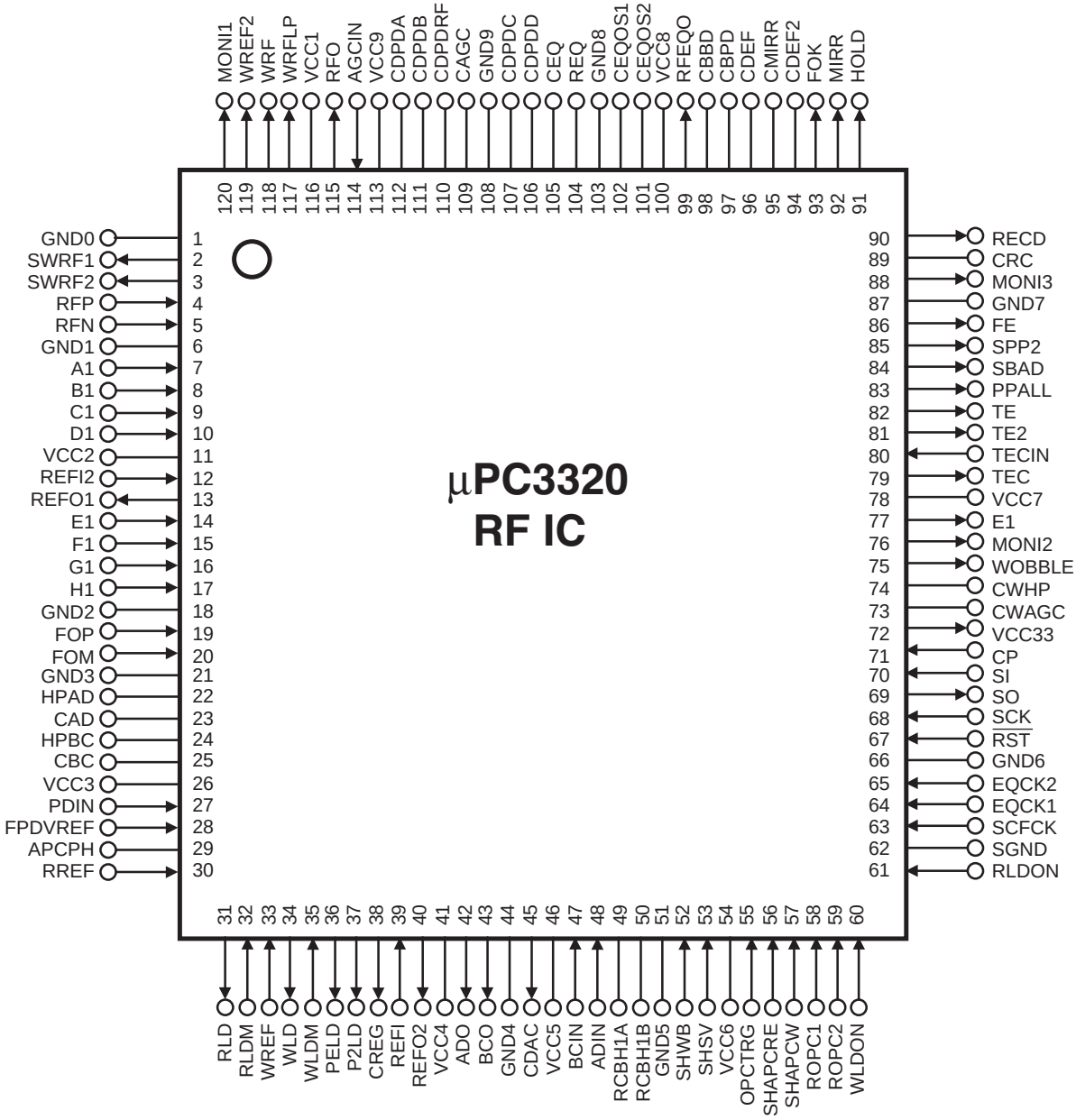
1. Overall Block Diagram



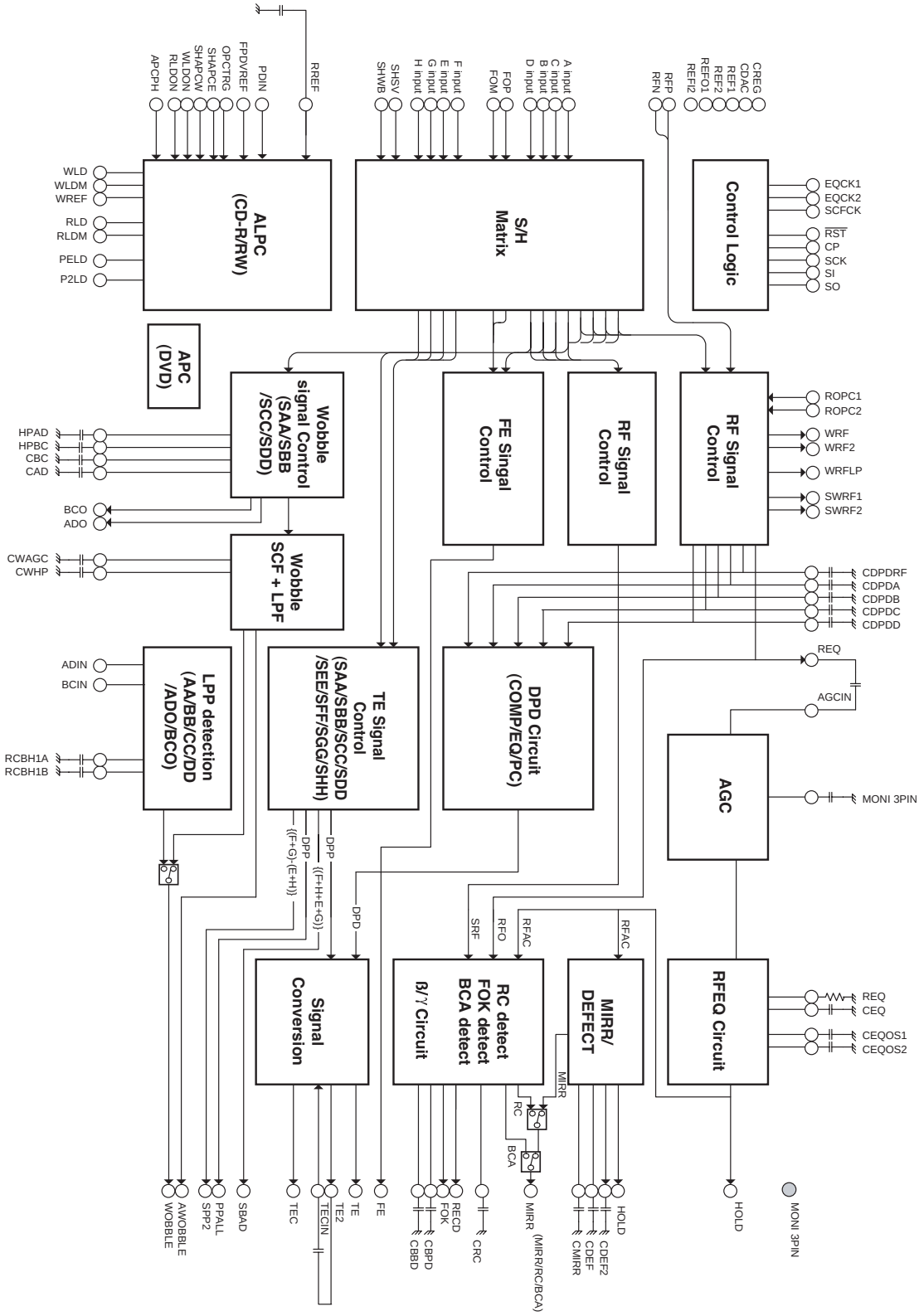
2. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

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].

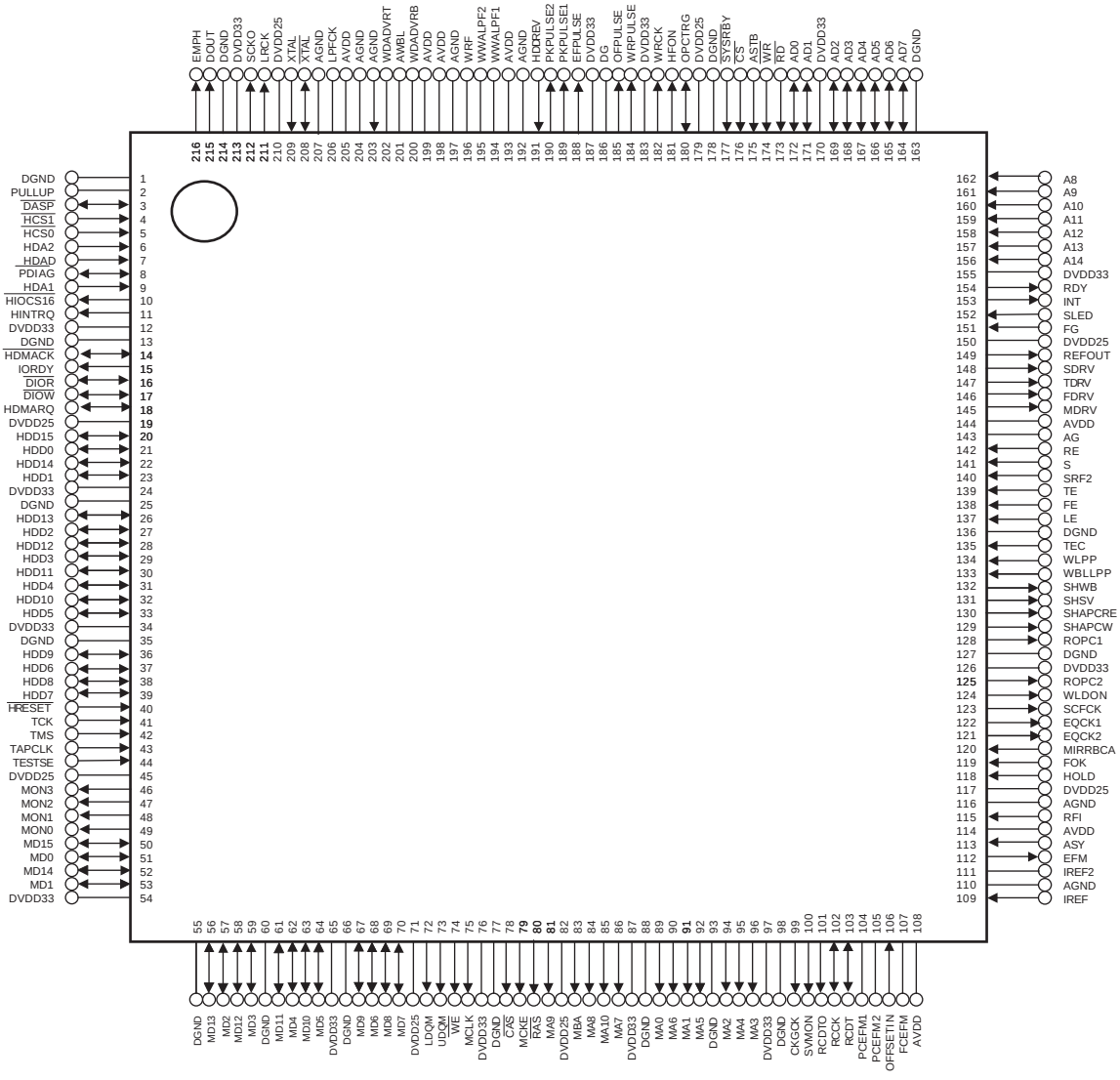
No.	Pin Name	Type	Description
41	VCC4	-	Analog power.
42	ADO	OUTPUT	Wobble circuit [A+D] signal output.
43	BCO	OUTPUT	Wobble circuit [B+C] signal output.
44	GND4	-	Analog GND
45	CDAC	OUTPUT	DAC reference voltage output.
46	VCC5	-	Digital power.
47	BCIN	INPUT	[B+C] signal input.
48	ADIN	INPUT	[A+D] signal 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.

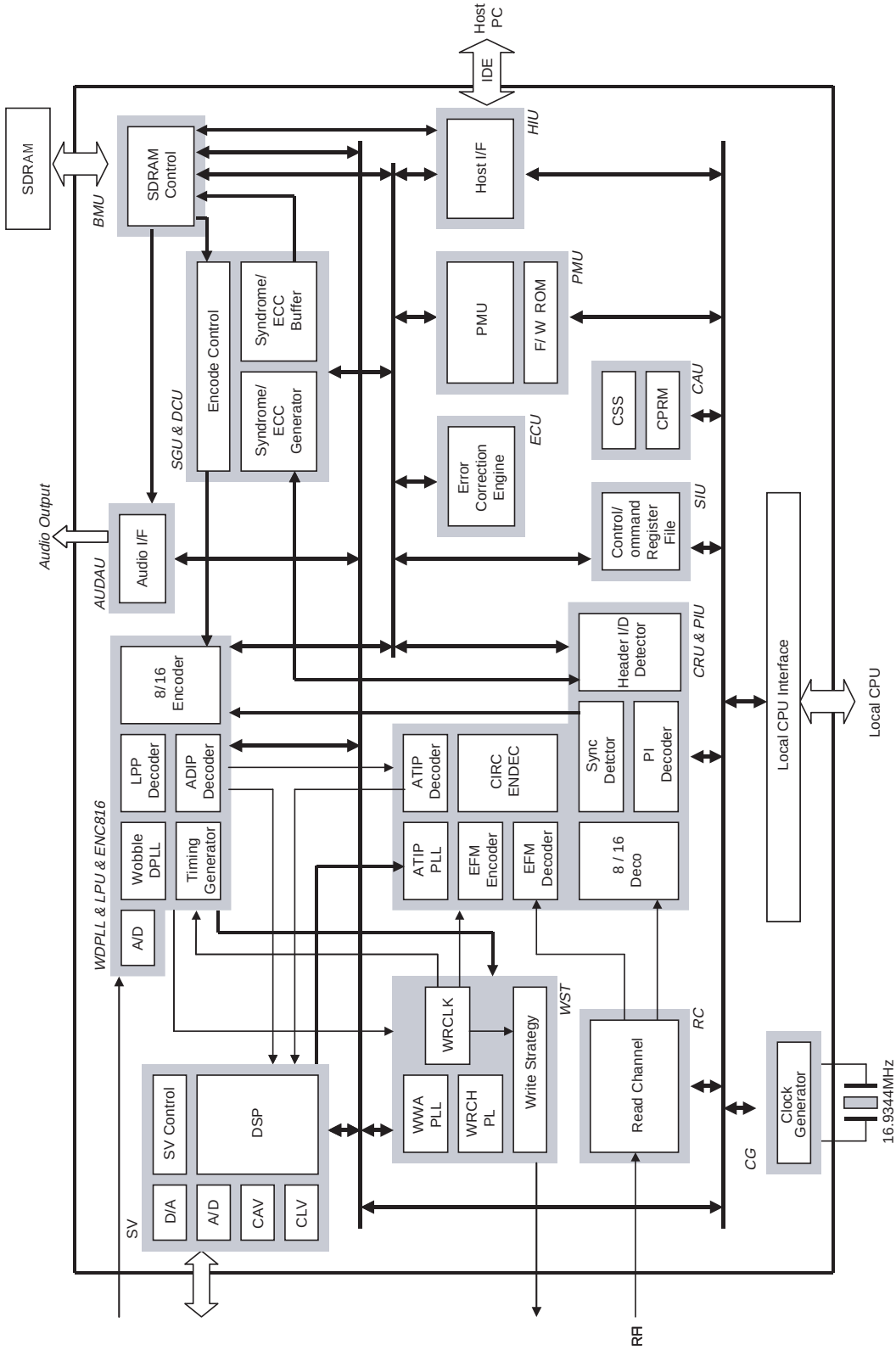
3. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC201(μPD63620) : 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.

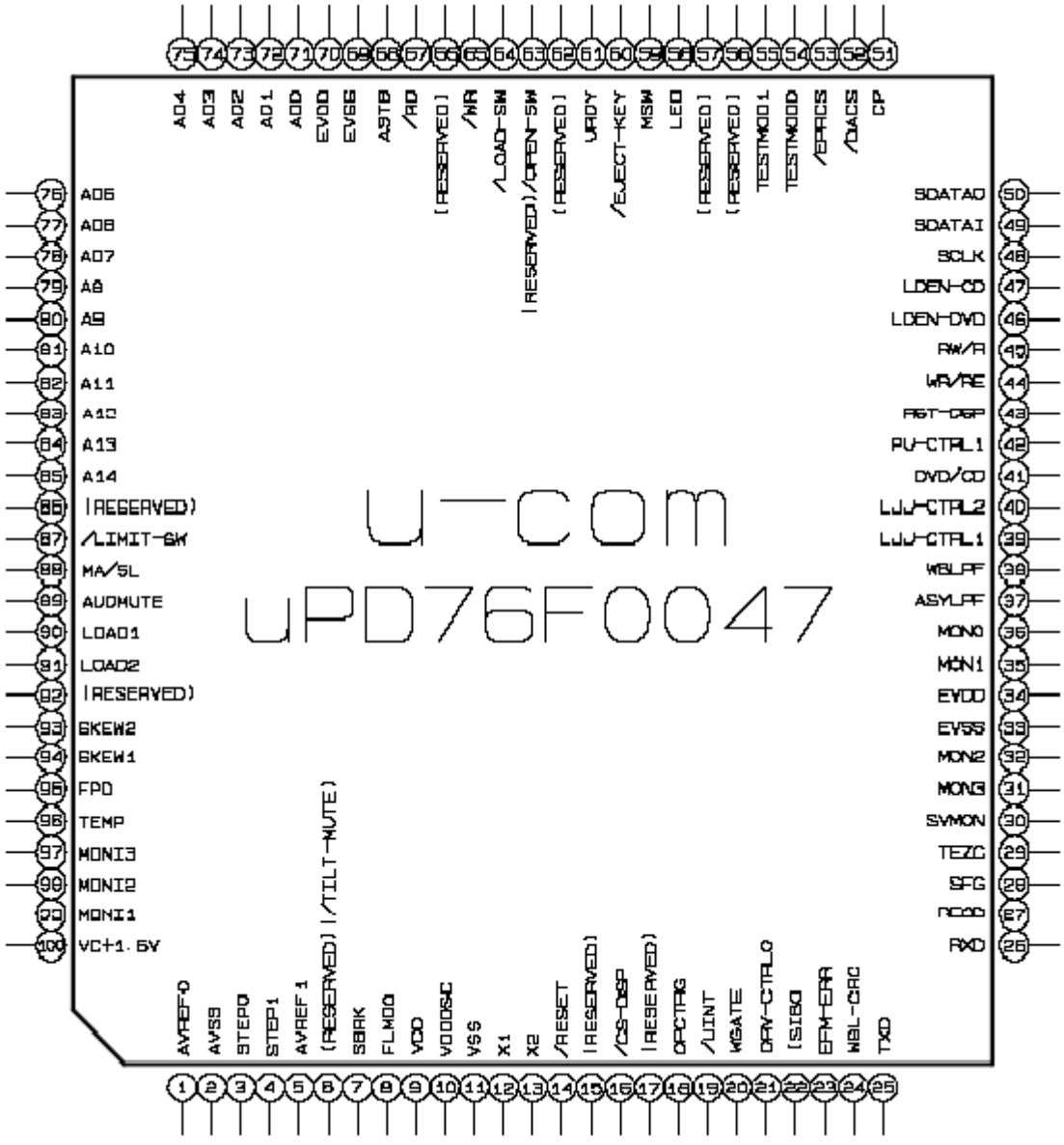
Pin No.	Pin Name		Type		Description
121	MIRRBCA	3V	O	Pull-up	RF AMP PC3320 RF equalizer automatic follow-up clock output.
122	EQCK1	3V	O	Pull-up	RF AMP PC3320 RF equalizer fixed clock output.
123	SCFCK	3V	O	P	RF AMP PC3320 RF equalizer automatic follow-up clock output.
124	WLDON	3V	O	L	Laser, Driver 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.

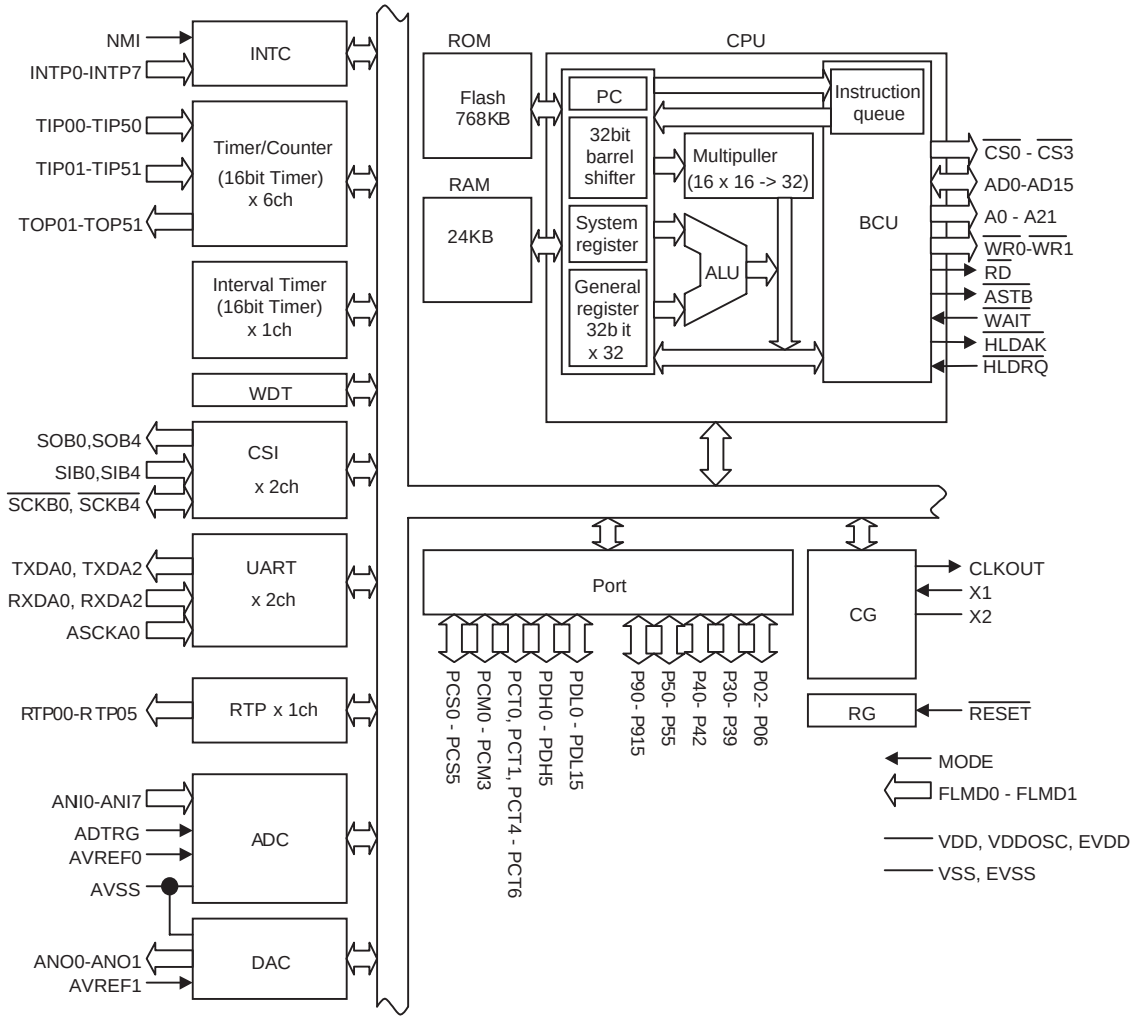
Pin No.	Pin Name		Type		Description
187	DVDD33	-	-	-	Digital power[3.3V]
188	EFPULSE	3V	O	L	OFF pluse output[write laser/driver control signal].
189	PKPULSE1	3V	O	L	Peak pluse output[write laser/driver control signal].
190	PKPULSE2	3V	O	L	Peak pluse output[write laser/driver control signal].
191	HDDREV	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



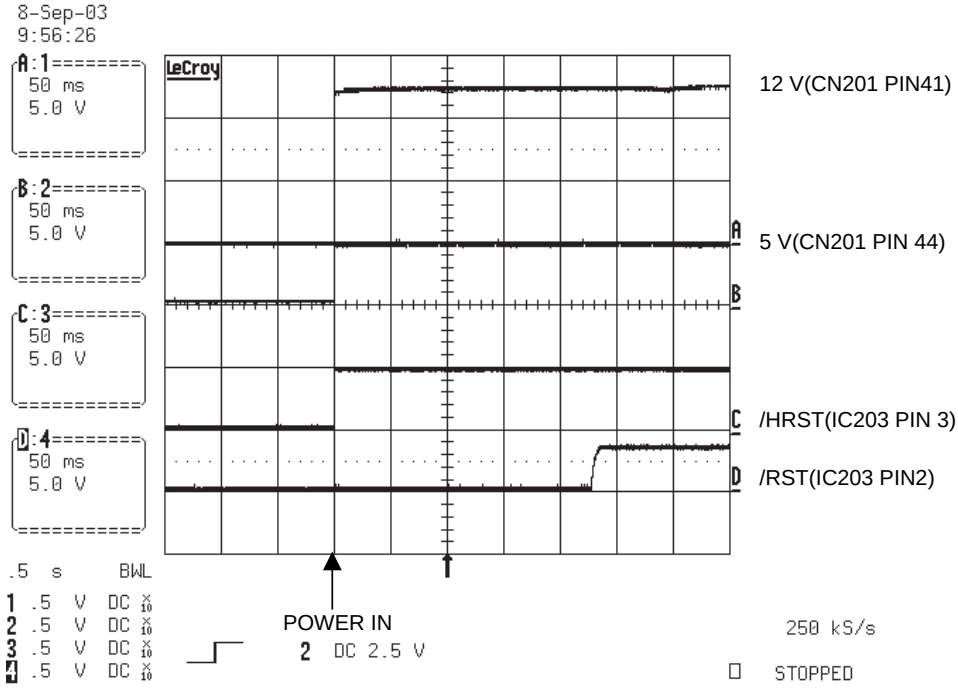
Pin description

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

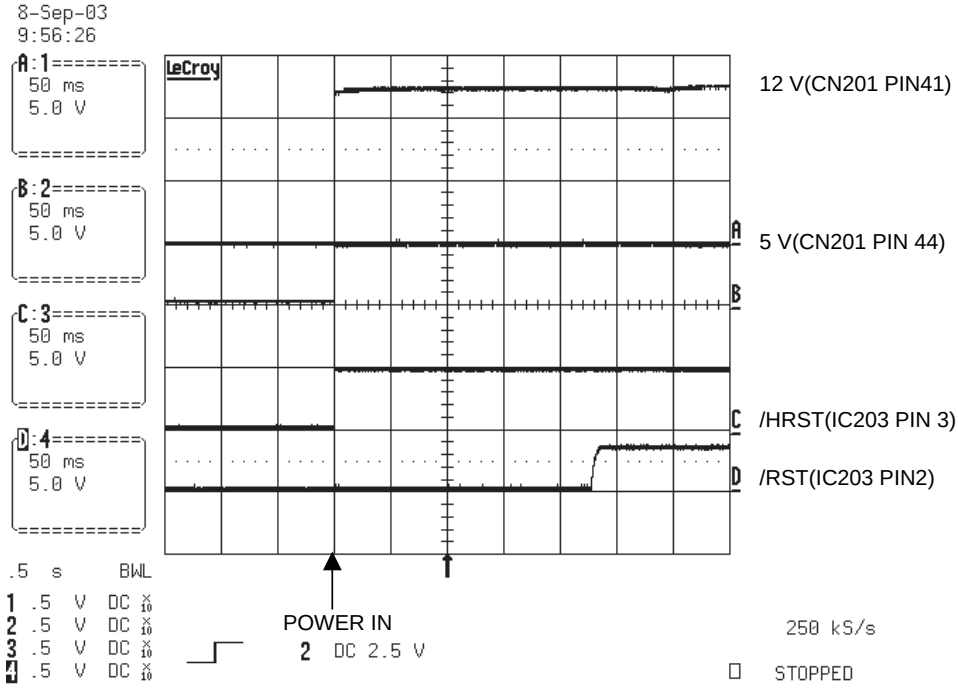
Pin No.	Pin Name	Type	Des cription
51	CP	O	REGISTER ADDRESS OUPUT
52	/DACS	O	CHIP SELECTOR
53	/BPRCS	O	EEPROM COMM UNICATON LINE
54	TEST MOD0	-	-
55	TEST MOD1	-	-
56	(RESERVED)	-	-
57	(RESERVED)	-	-
58	LED	O	LED ENABLE LINE
59	MSW	O	LED ENABLE LINE
60	/EJECT-KEY	O	TRAY OPE N LINE
61	URDY	O	ACCESS CONTROL 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

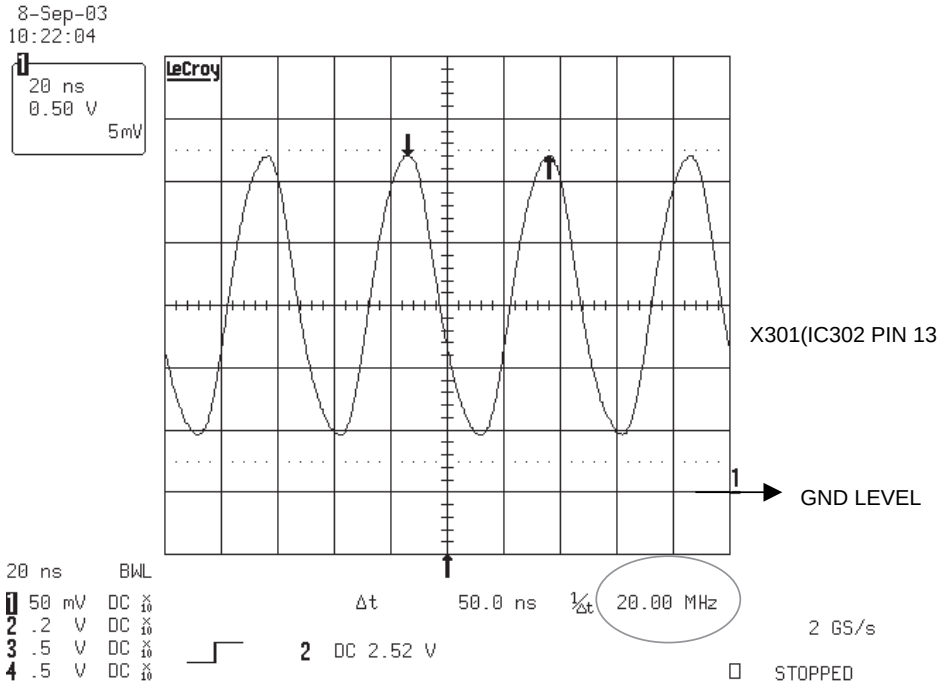
1. POWER & RESET Signal



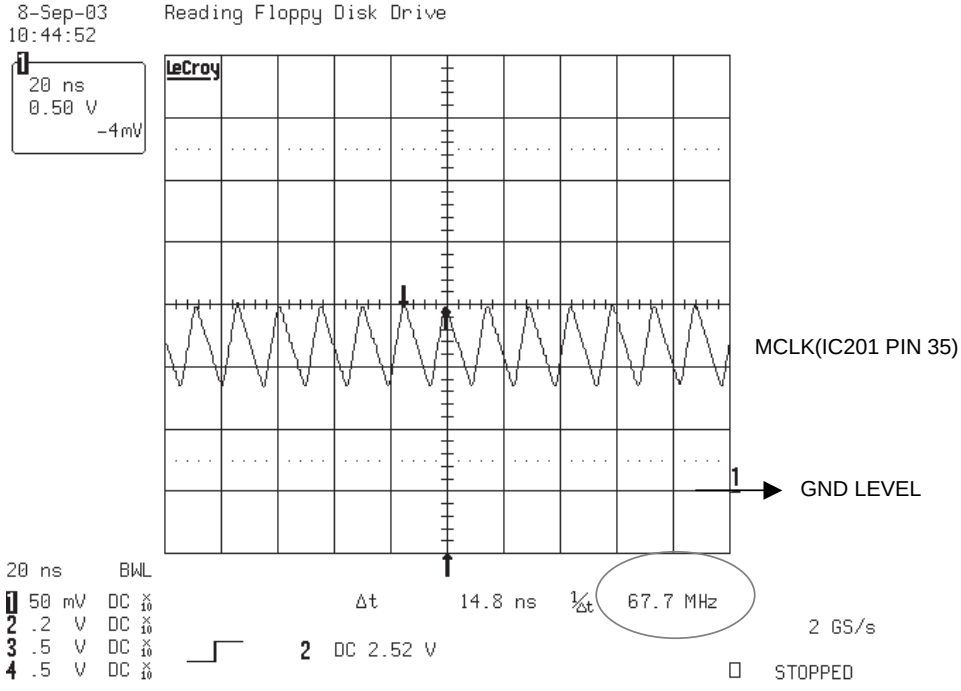
2. Main Clock1 for IC202 (16.9MHz)



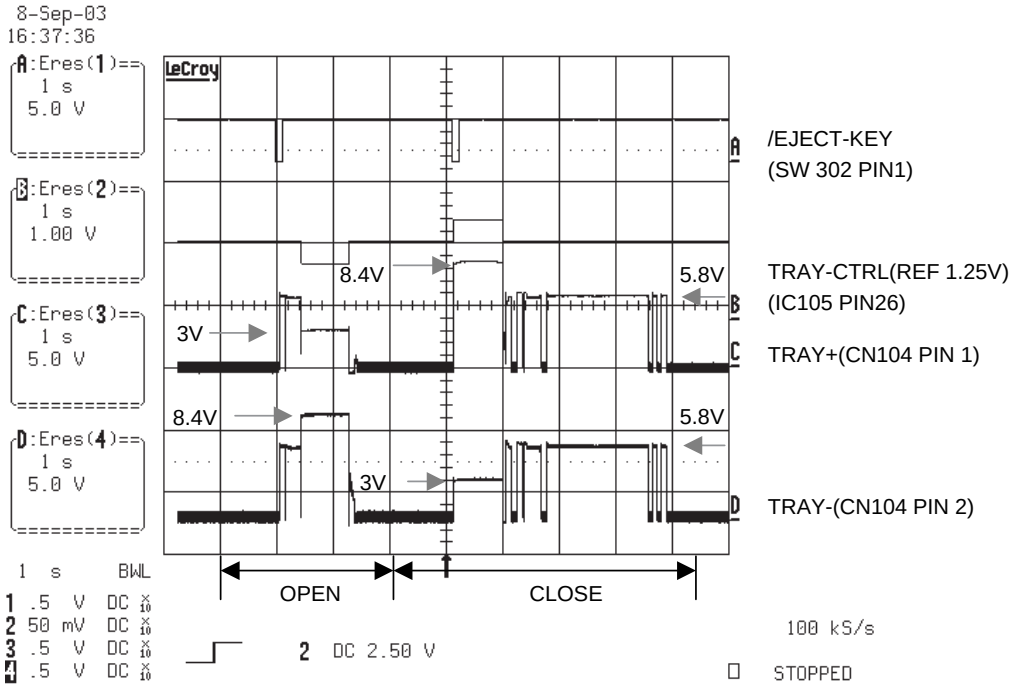
3. Main Clock2 for IC302 (20MHz)



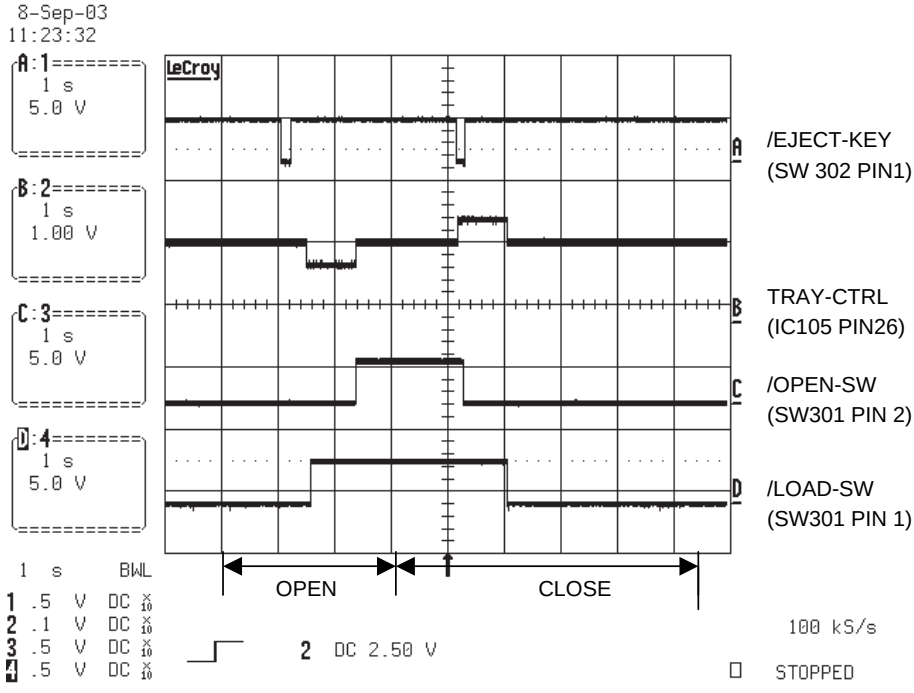
4. SDRAM Clock



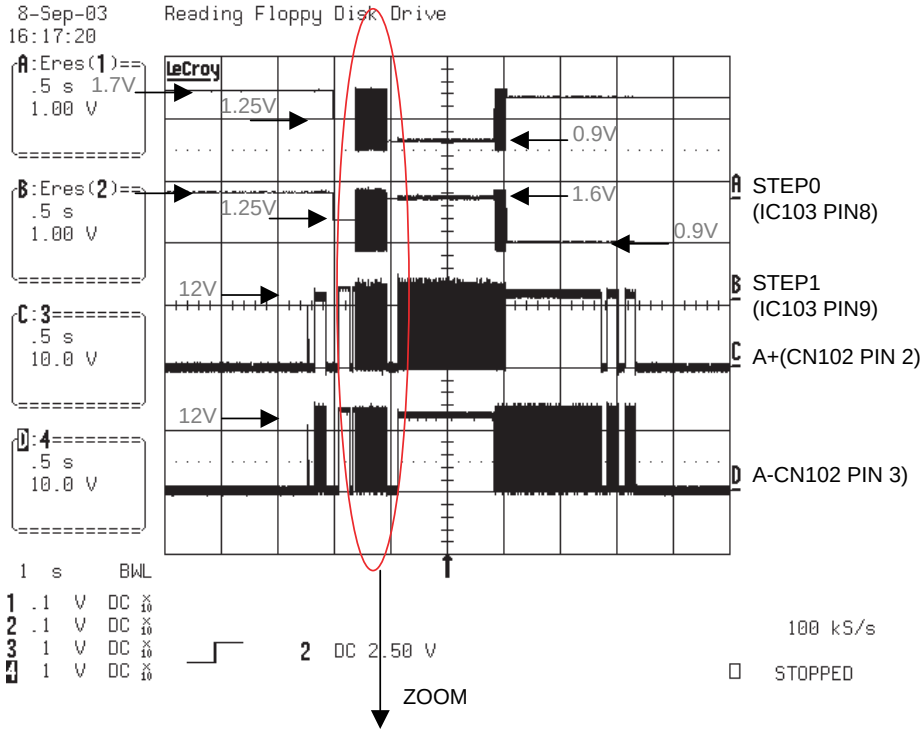
5. TRAY OPEN/CLOSE SIGNAL 1



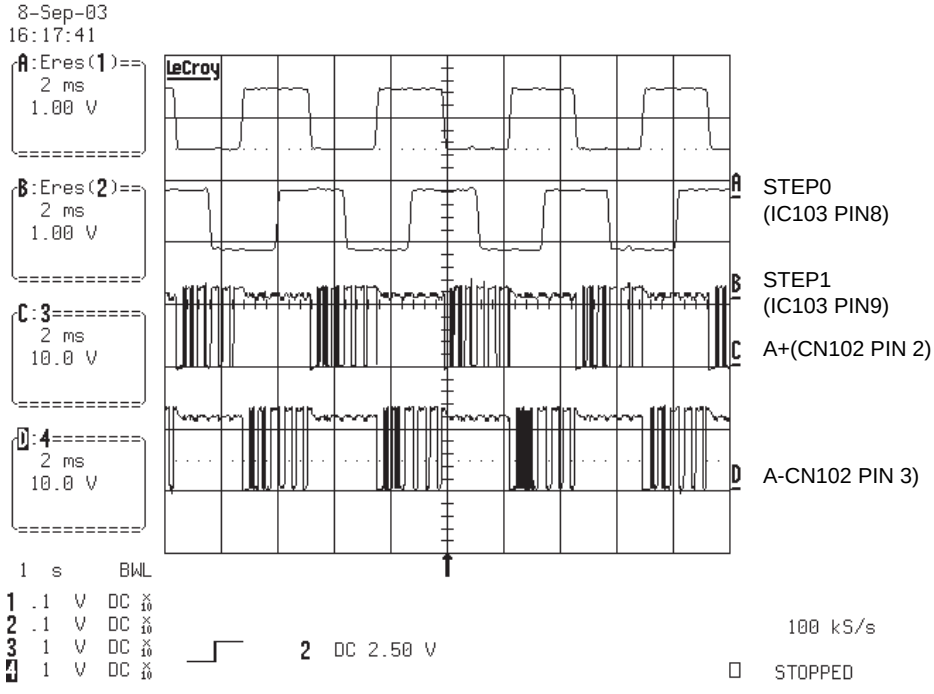
6. TRAY OPEN/CLOSE SIGNAL 2



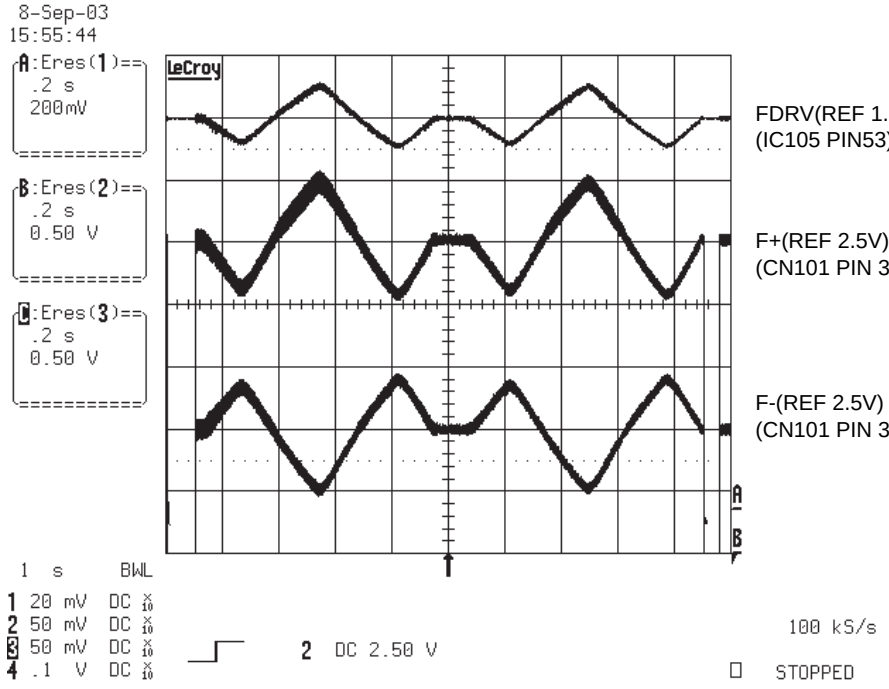
7. SLED MOVE SIGNAL 1



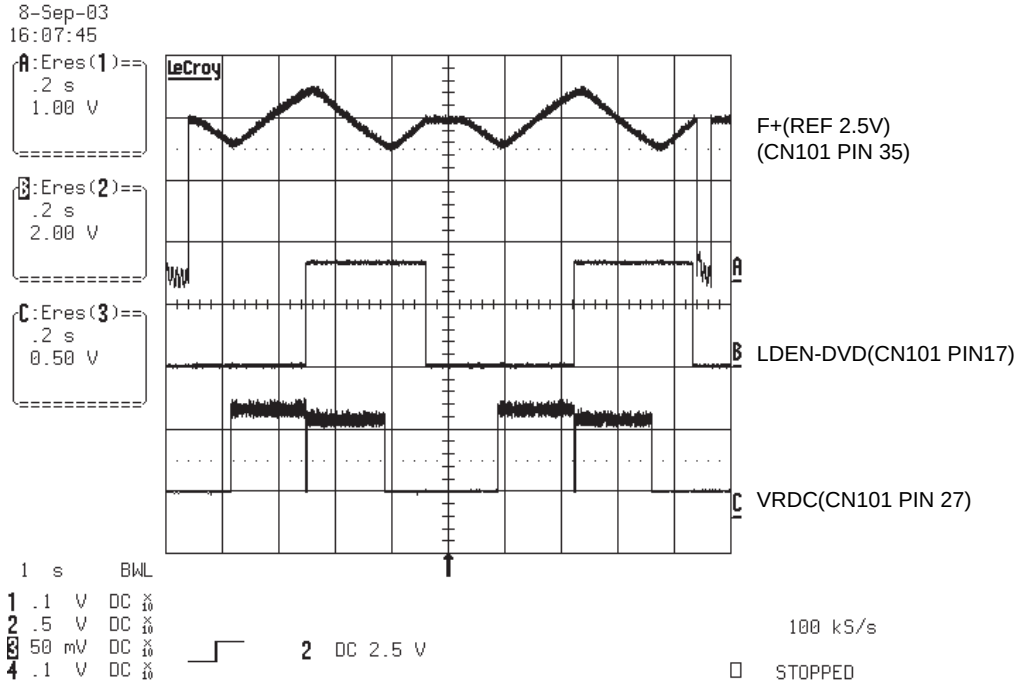
8. SLED MOVE SIGNAL 2



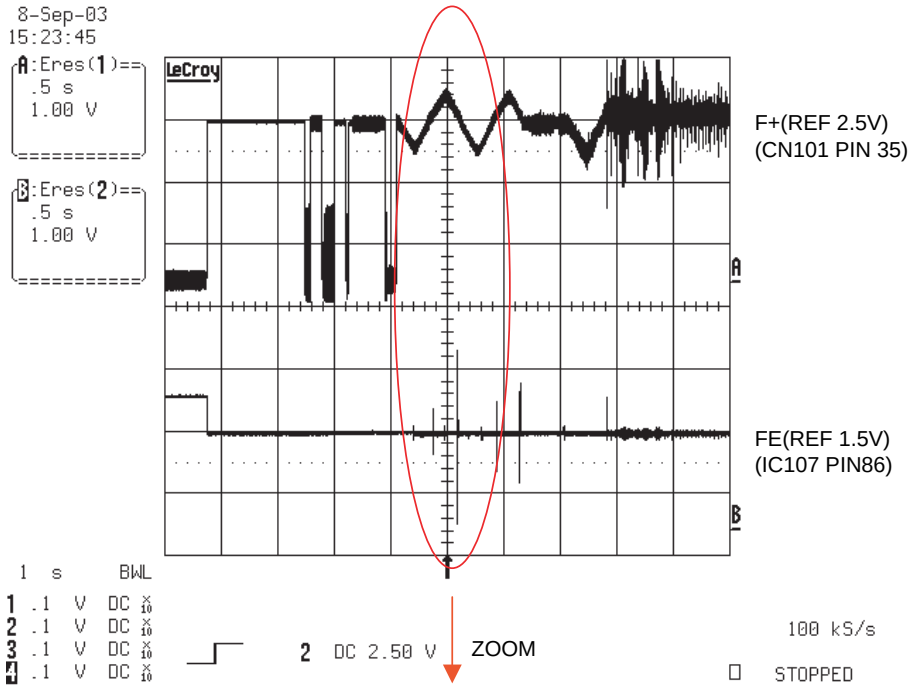
9. FOCUS SEARCH SIGNAL



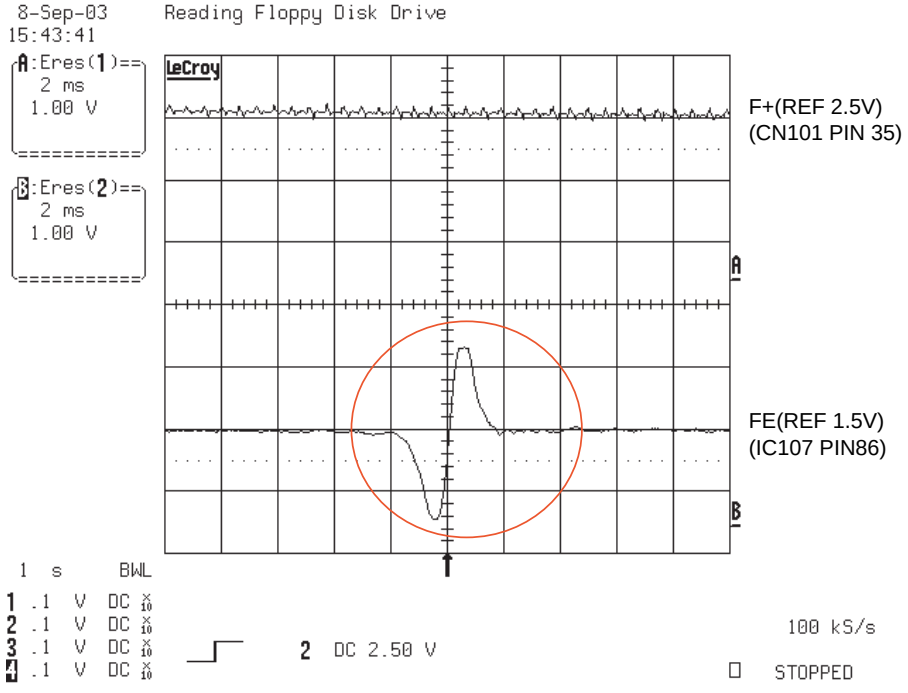
10. LASER TURN ON SIGNAL



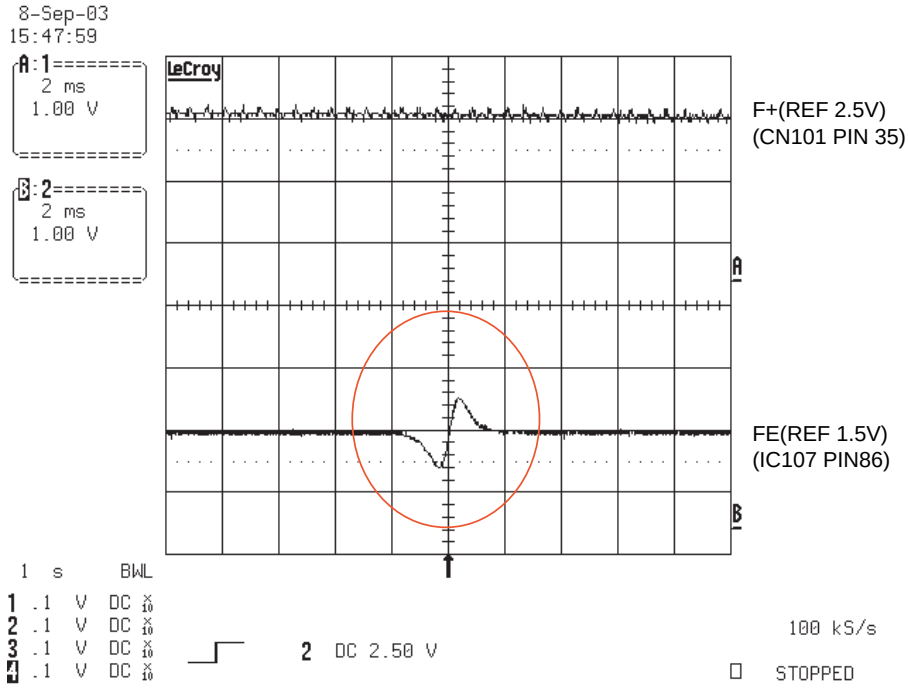
11. DISC TYPE JUDGEMENT WAVEFORM (CD SERIES)



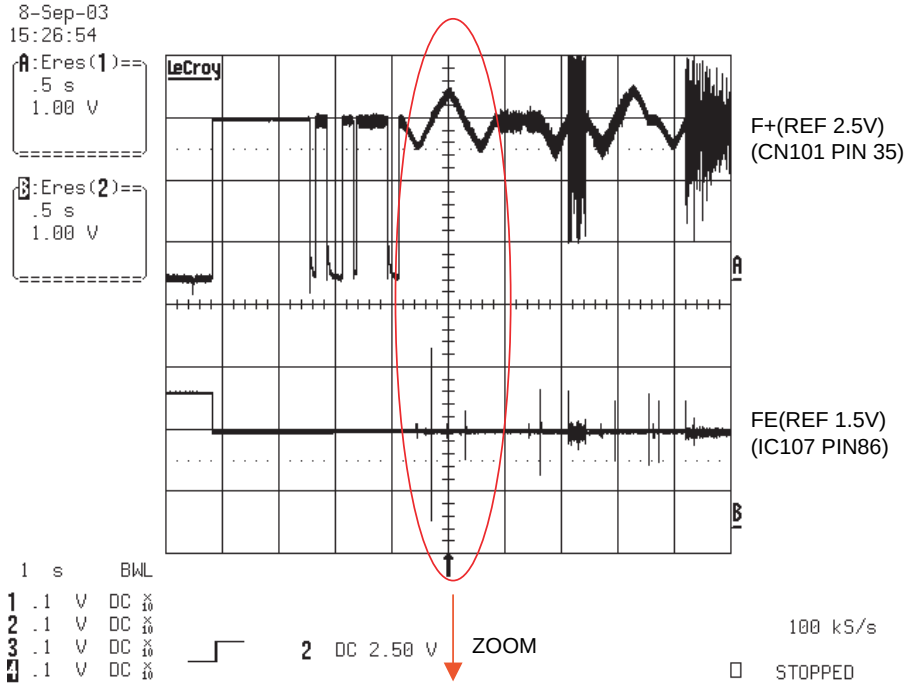
12. DISC TYPE JUDGEMENT WAVEFORM (CD&CD-R)



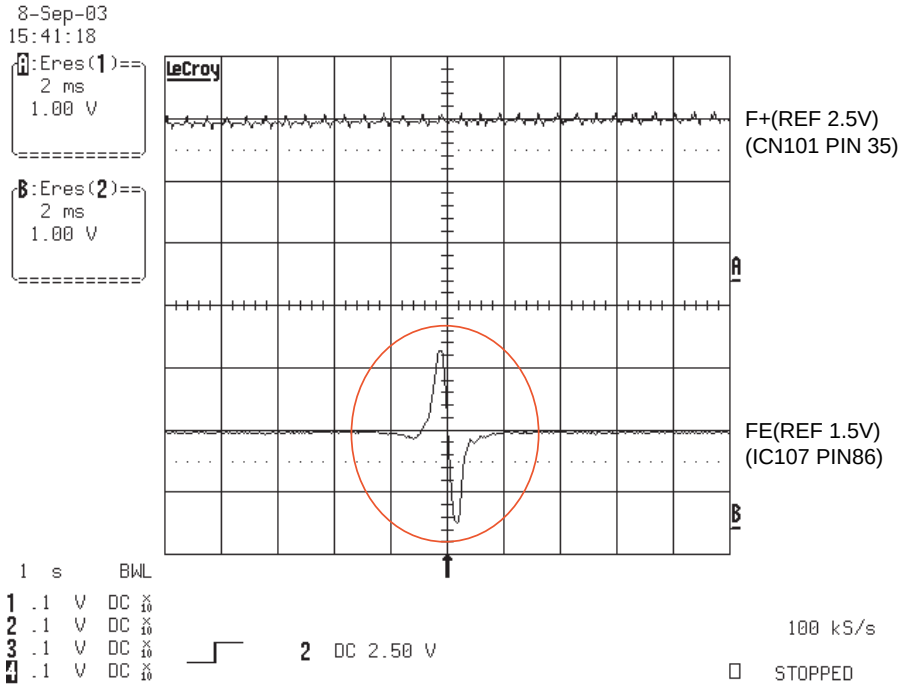
13. DISC TYPE JUDGEMENT WAVEFORM (CD-RW)



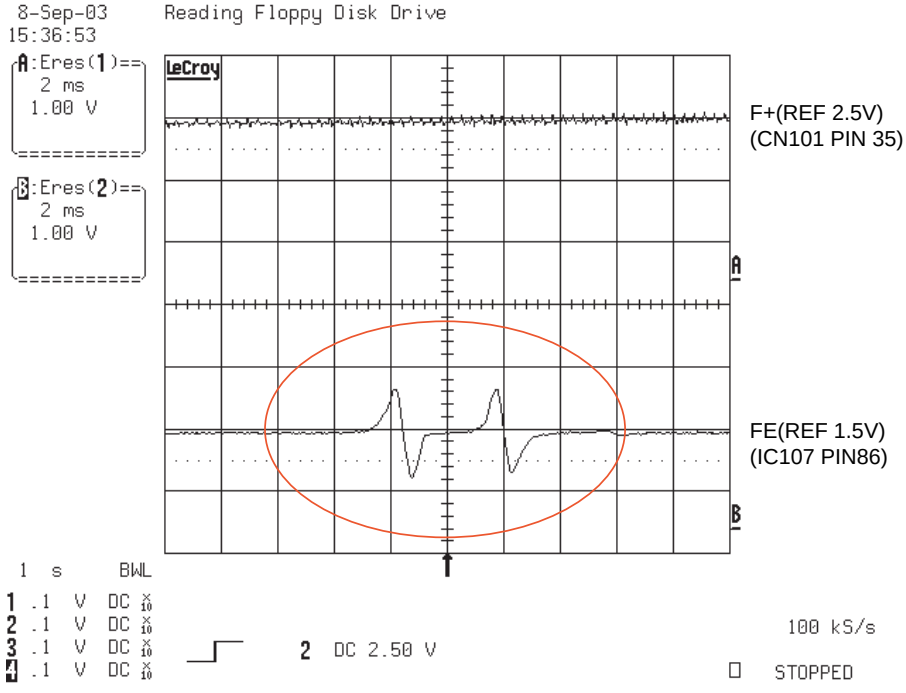
14. DISC TYPE JUDGEMENT WAVEFORM (DVD SERIES)



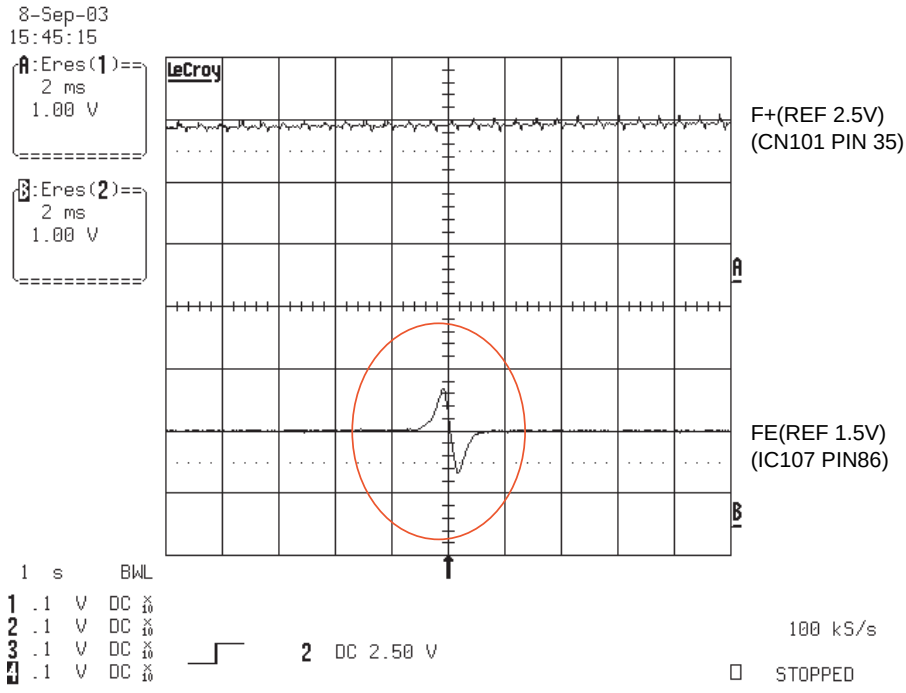
15. DISC TYPE JUDGEMENT WAVEFORM (DVD_SINGLE&R)



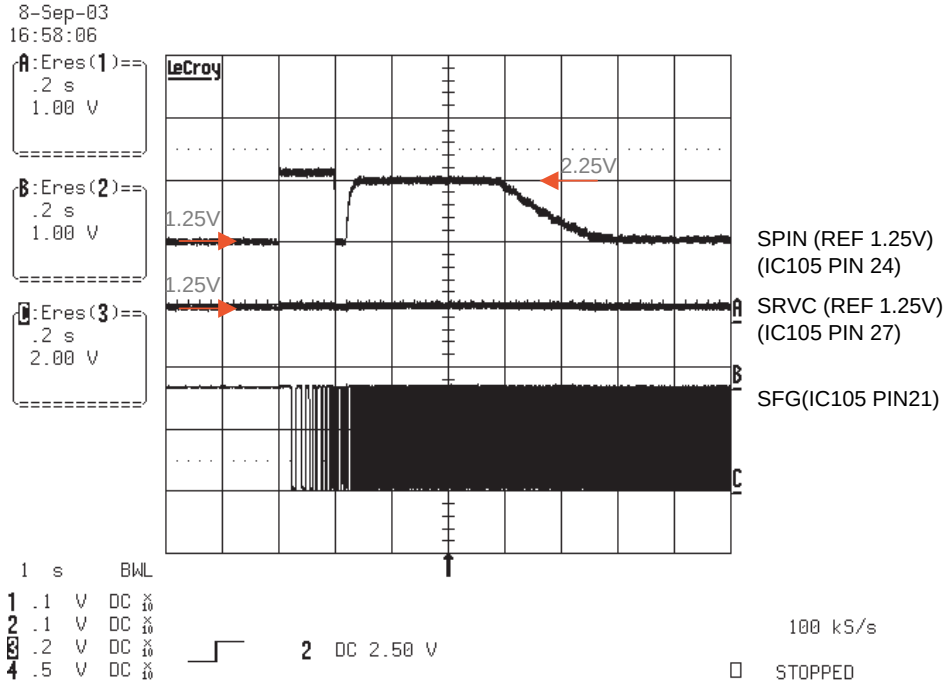
16. DISC TYPE JUDGEMENT WAVEFORM (DVD _DUAL)



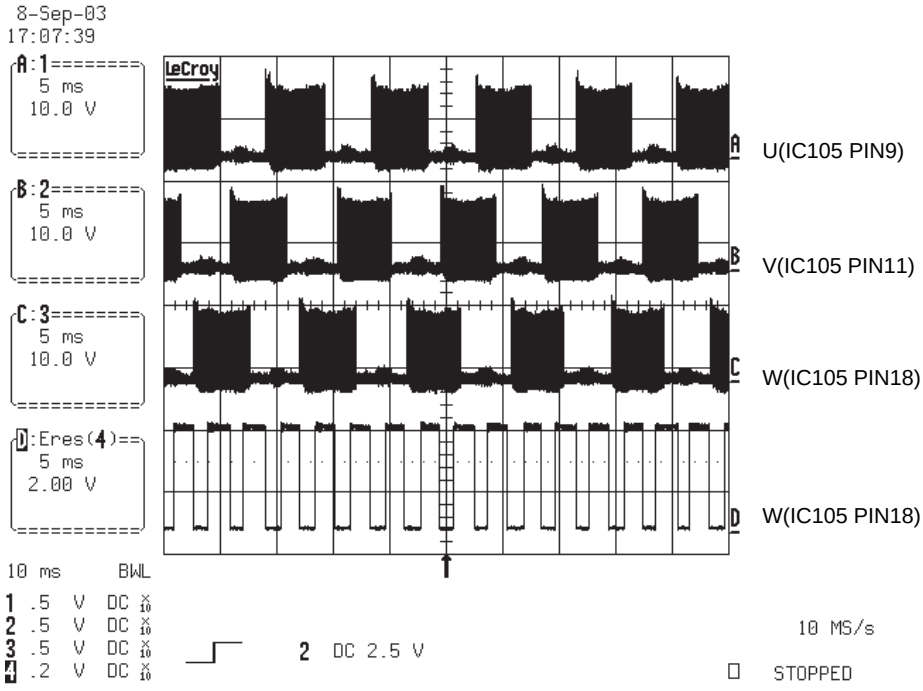
17. DISC TYPE JUDGEMENT WAVEFORM (DVDRW)



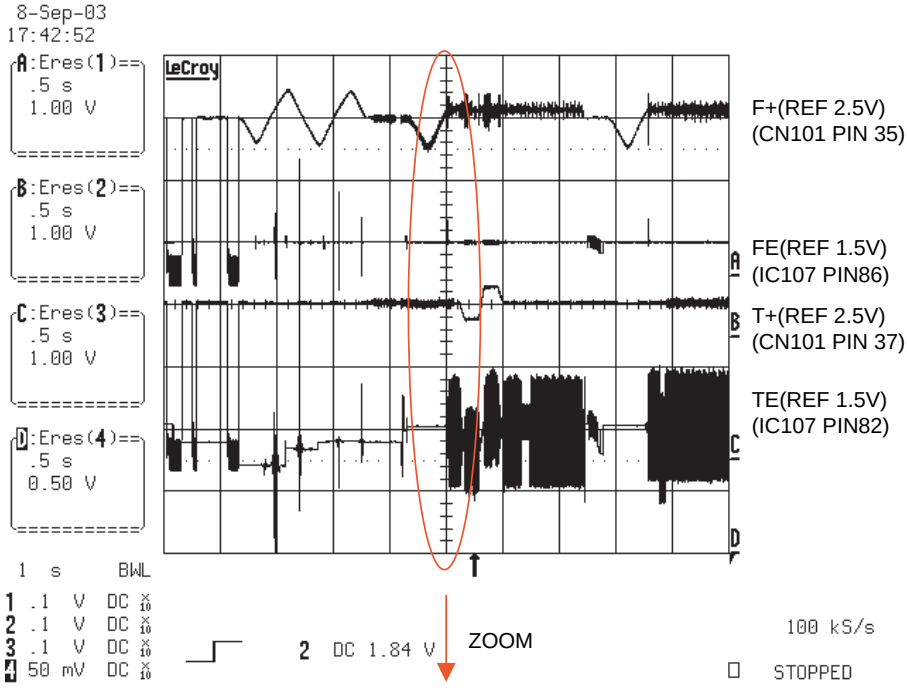
18. SPINDLE WAVEFORM1



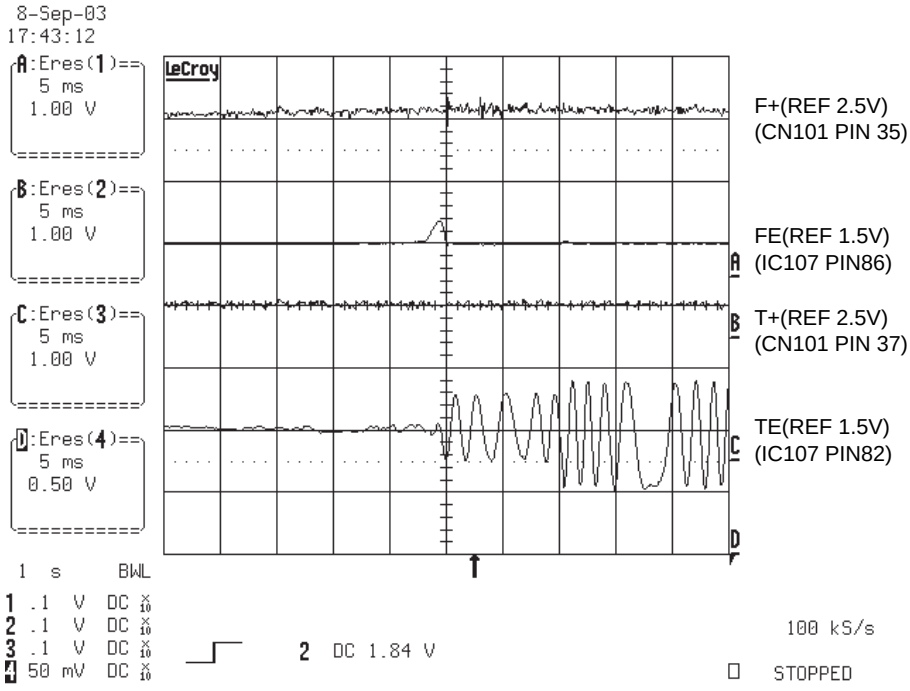
19. SPINDLE WAVEFORM2



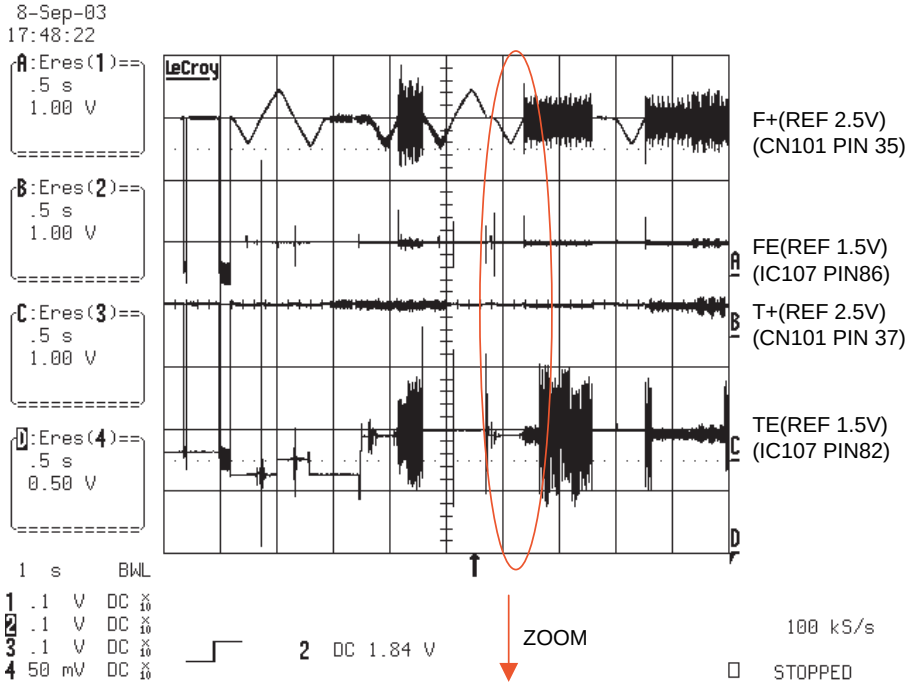
20. FOCUS ON SIGNAL(CD)



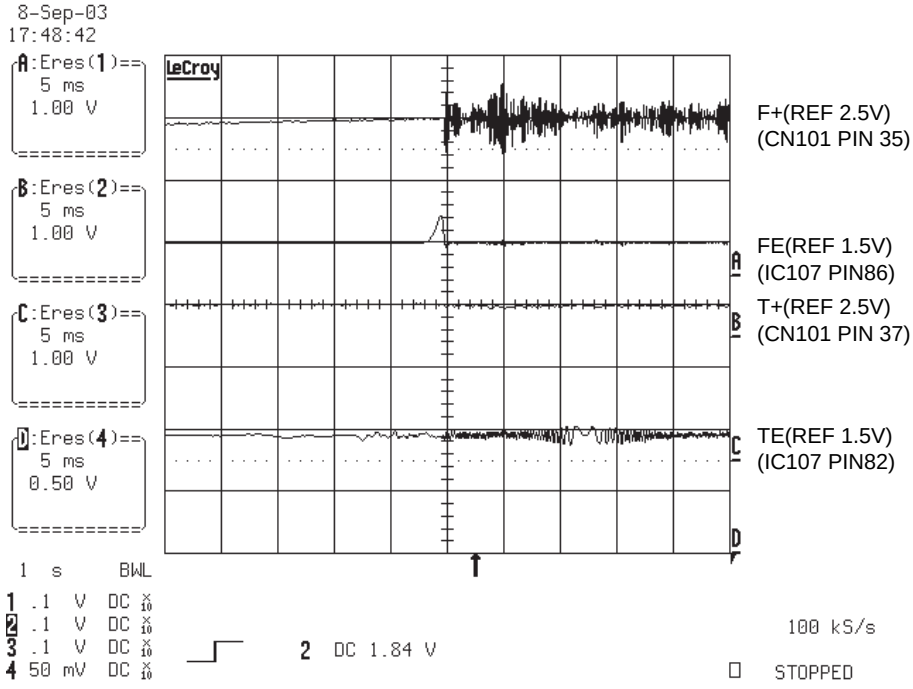
21. FOCUS ON SIGNAL(CD)



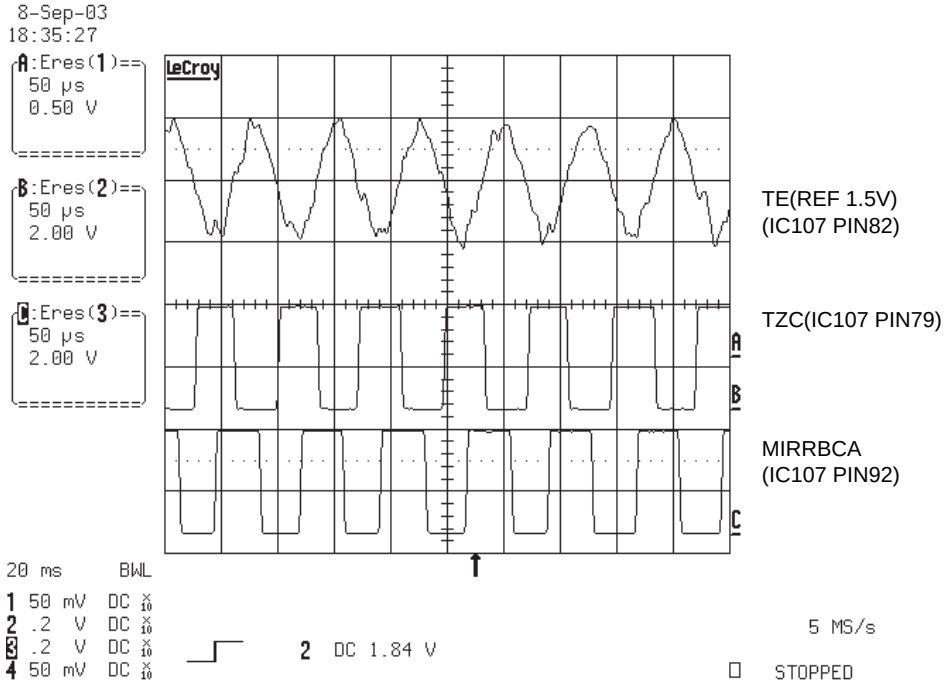
22. FOCUS ON SIGNAL(DVD)



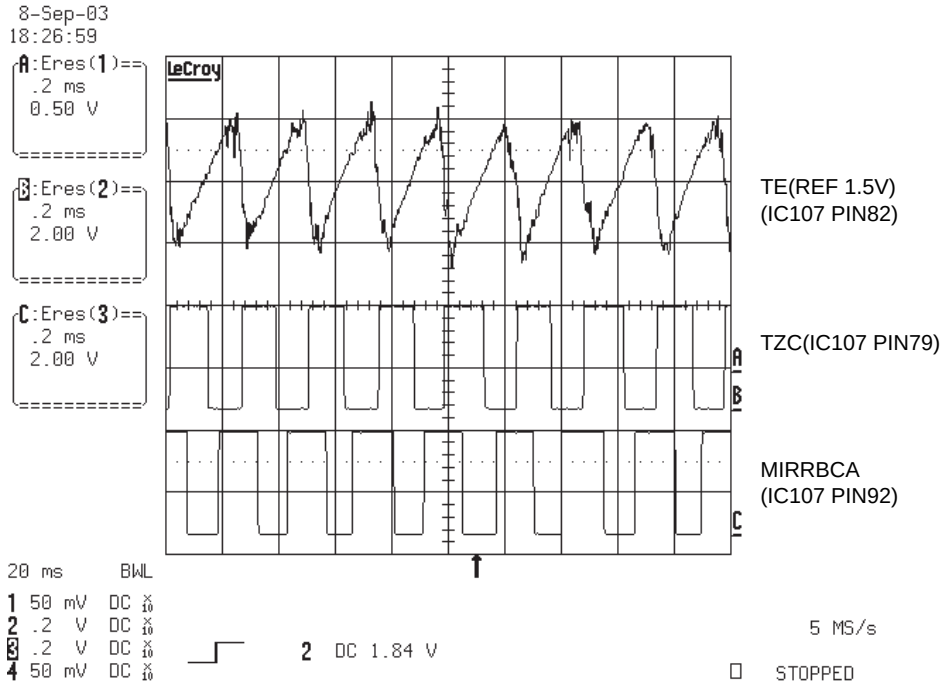
23. FOCUS ON SIGNAL (DVD)



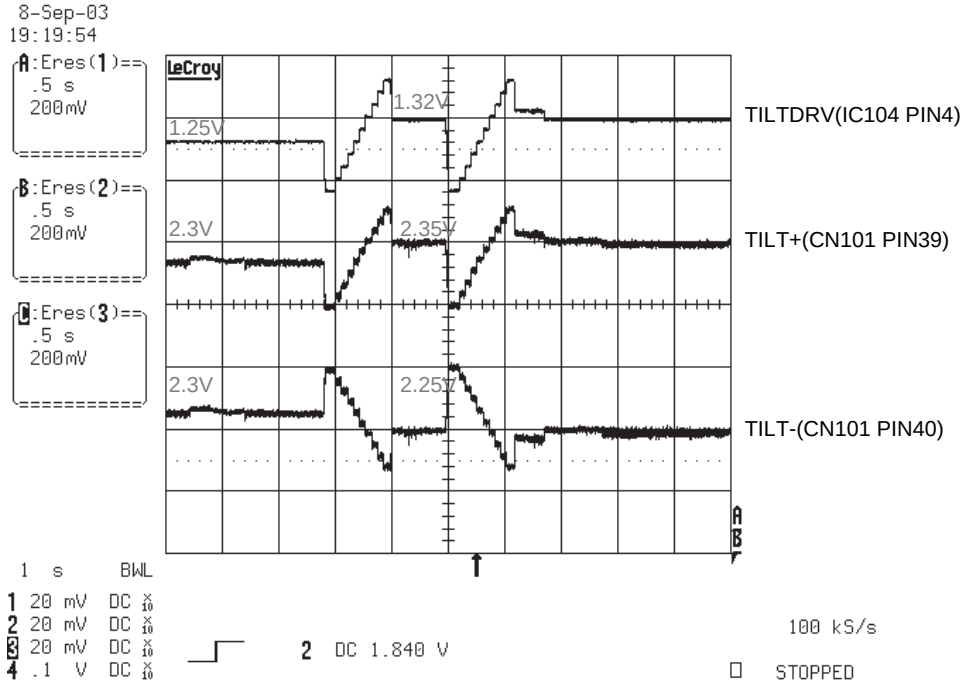
24. TRACK OFF SIGNAL(CD)



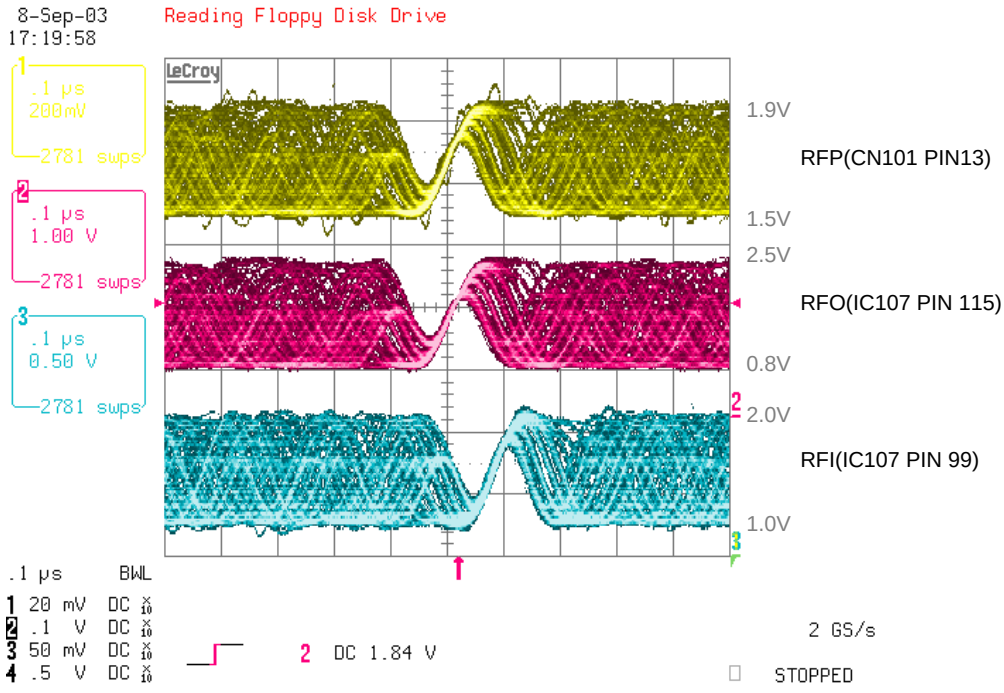
25. TRACK OFF SIGNAL(DVD)



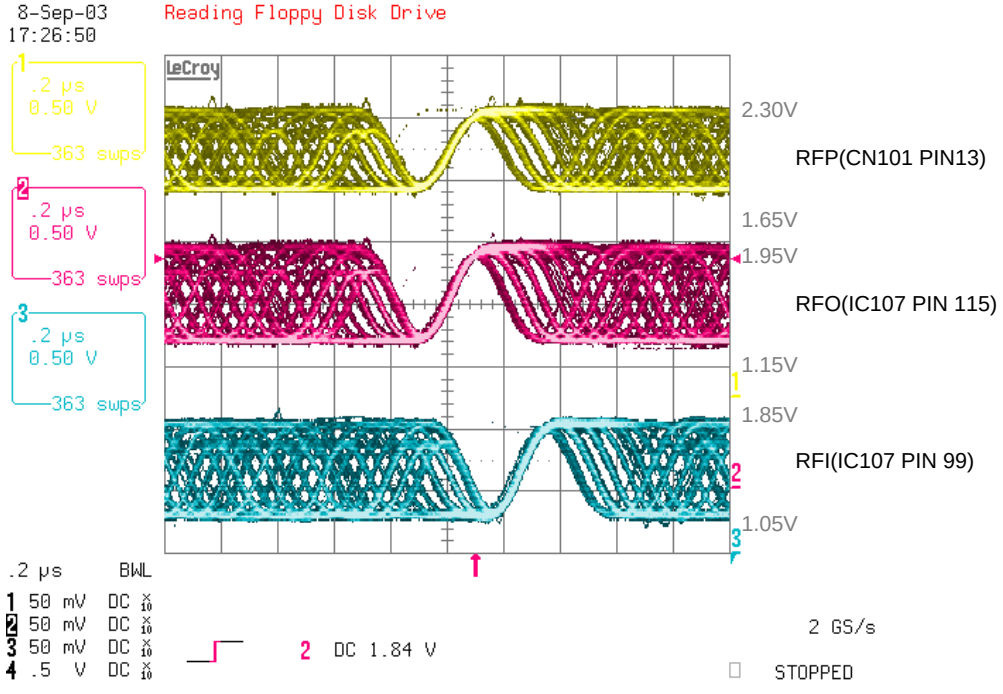
26. Tilt Driver signal(Disc reading)



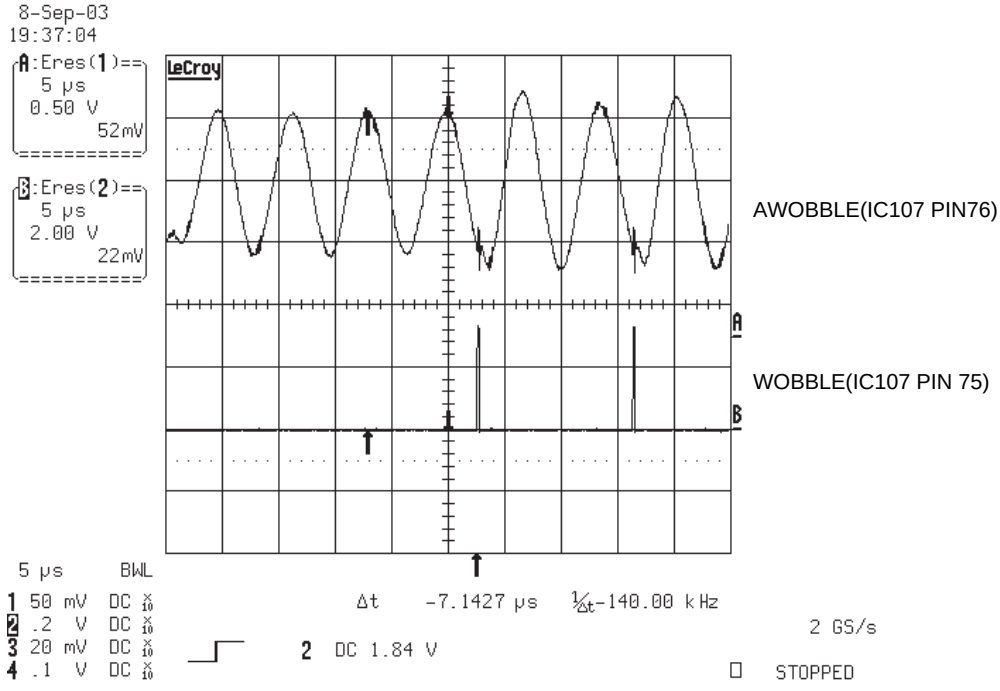
27. RF WAVEFORM(DVD)



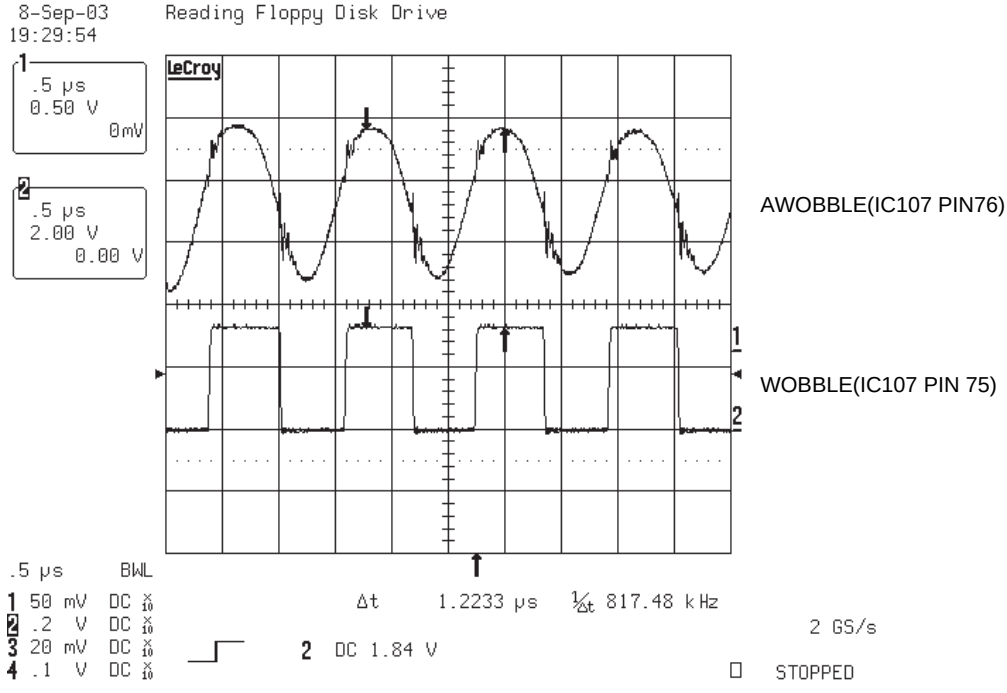
28. RF WAVEFORM(CD)



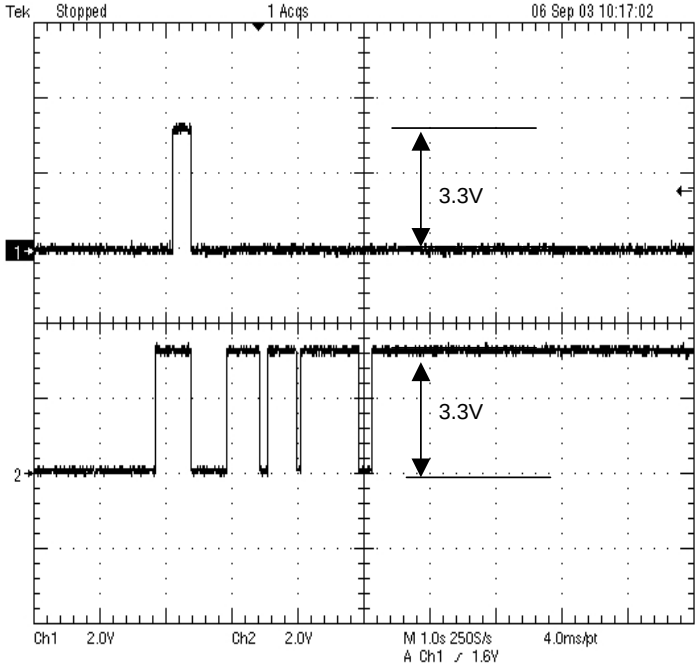
29. WOBBLE(DVD-R/RW)_READING



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



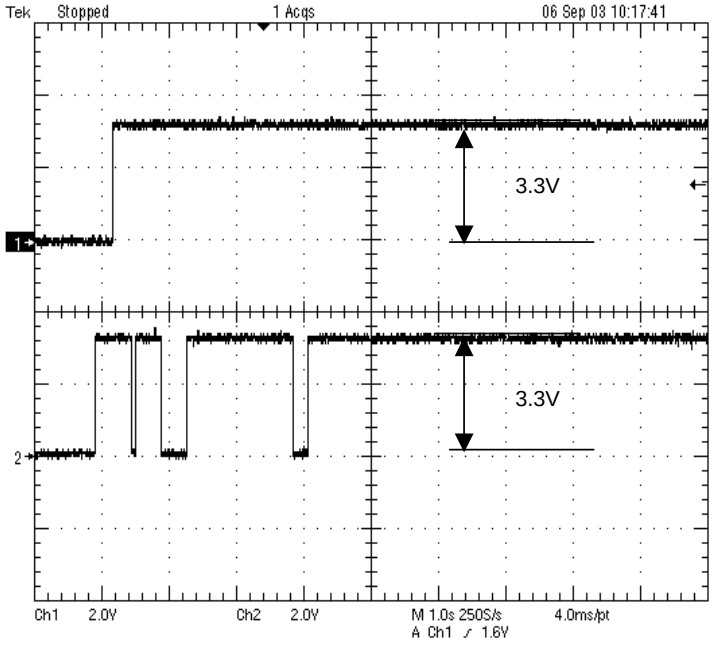
31. LD Enable(DVD)



LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

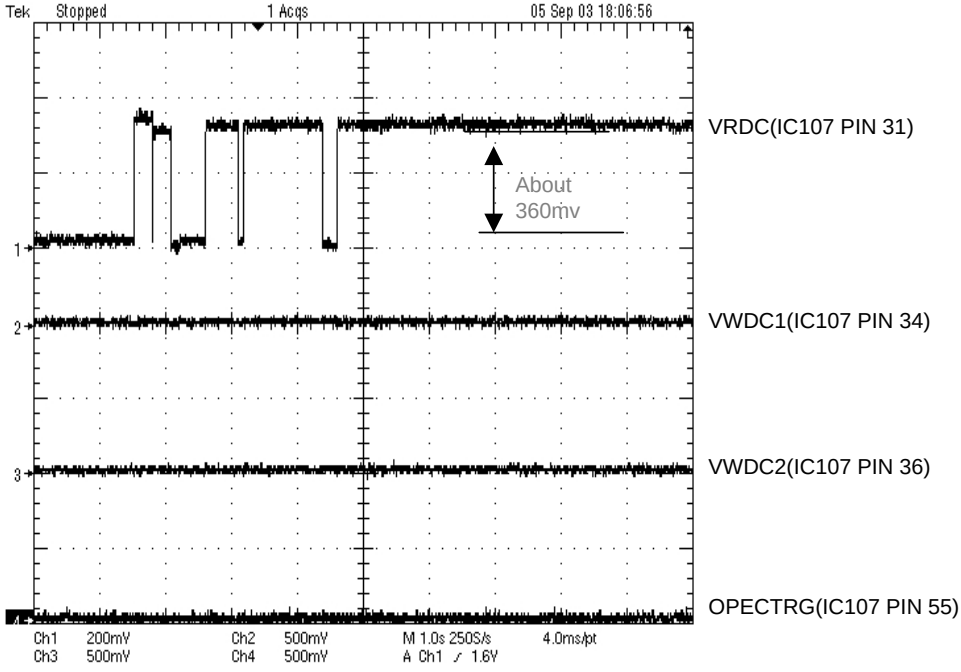
32. LD Enable(CD)



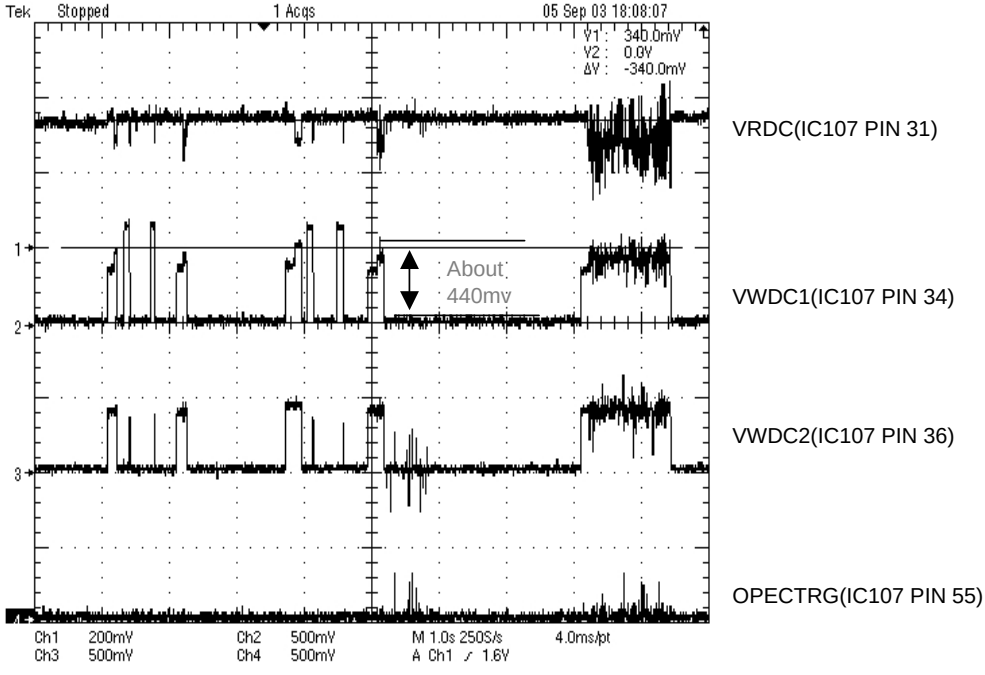
LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

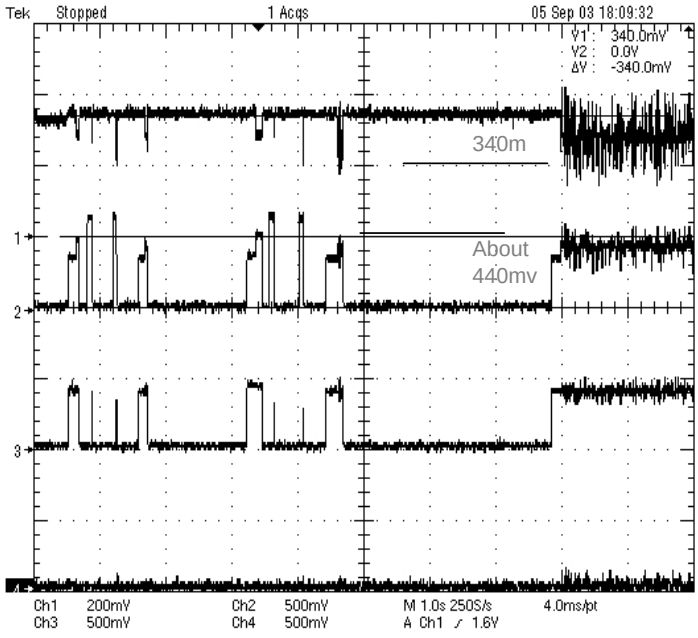
33. Laser Power(reading)_DVD+RW



34. Laser Power(Erase)_DVD+RW



35. Laser Power(Writing)_initial state



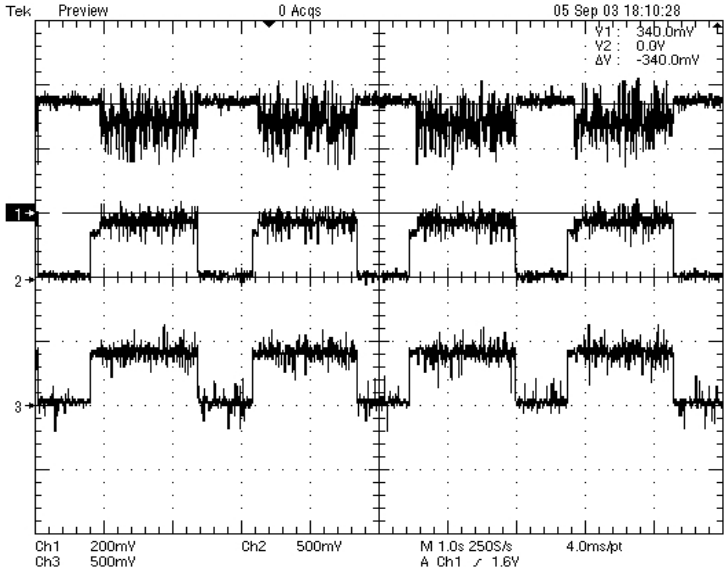
VRDC(IC107 PIN 31)

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