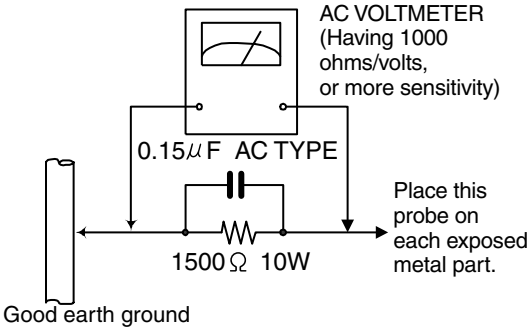
Safety Precautions

1. This design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Services should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations of the product should not be made. Any design alterations or additions will void the manufacturer`s warranty and will further relieve the manufacture of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement parts shown in the Parts List of Service Manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage currnet check (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal parts of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having, 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground. Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to eachexposed metal part, particularly any exposed metal part having a return path to the chassis, and meausre the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Voltage measured any must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).



Warning

1. This equipment has been designed and manufactured to meet international safety standards.
2. It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
3. Repairs must be made in accordance with the relevant safety standards.
4. It is essential that safety critical components are replaced by approved parts.
5. If mains voltage selector is provided, check setting for local voltage.

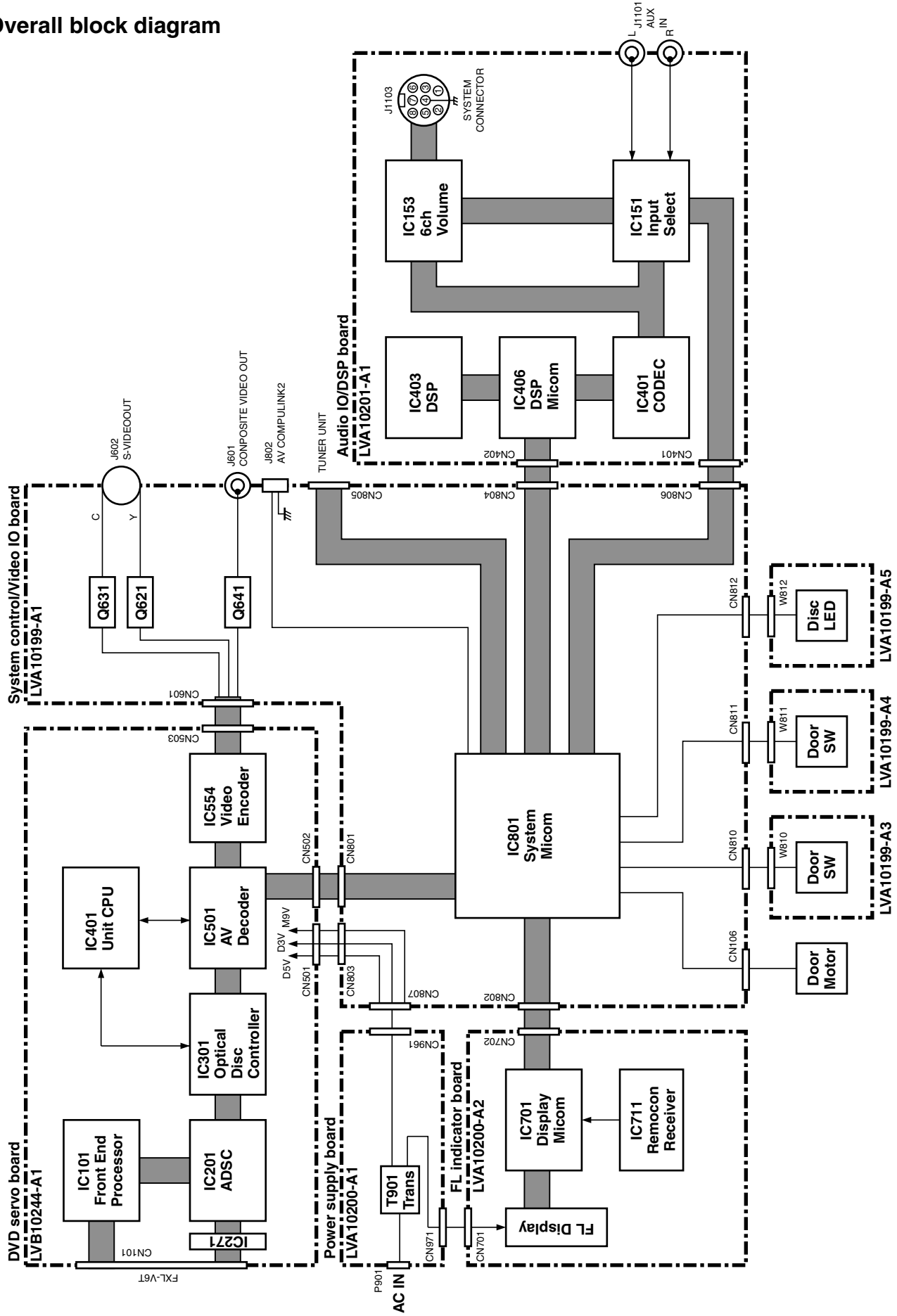
⚠ CAUTION

Burrs formed during molding may be left over on some parts of the chassis. Therefore, pay attention to such burrs in the case of preforming repair of this system.

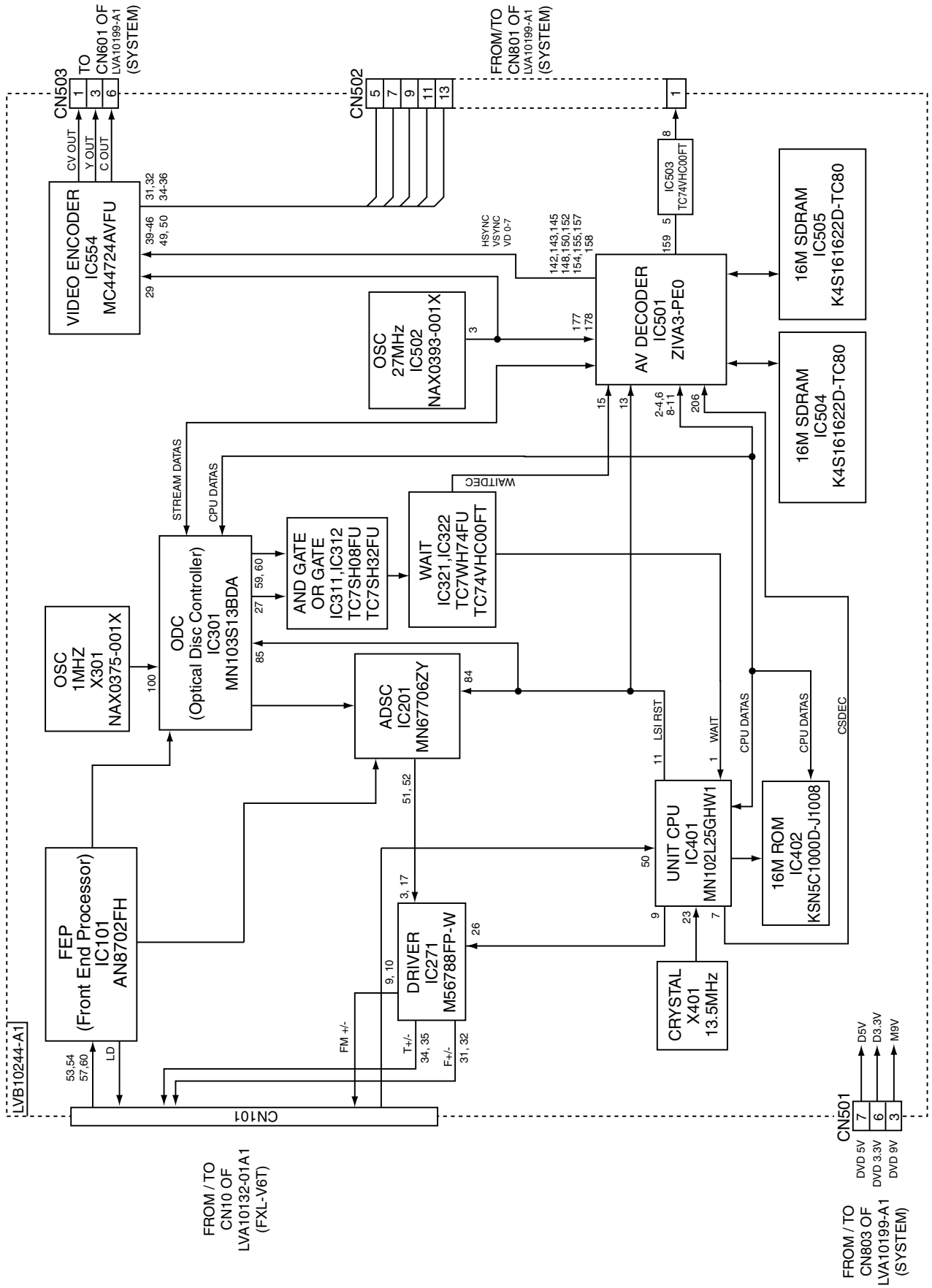
In regard with component parts appearing on the silk-screen printed side (parts side) of the PWB diagrams, the parts that are printed over with black such as the resistor (-▬-), diode (▬) and ICP (●) or identified by the "⚠" mark nearby are critical for safety.
When replacing them, be sure to use the parts of the same type and rating as specified by the manufacturer. (Except the J and C version)

Block diagrams

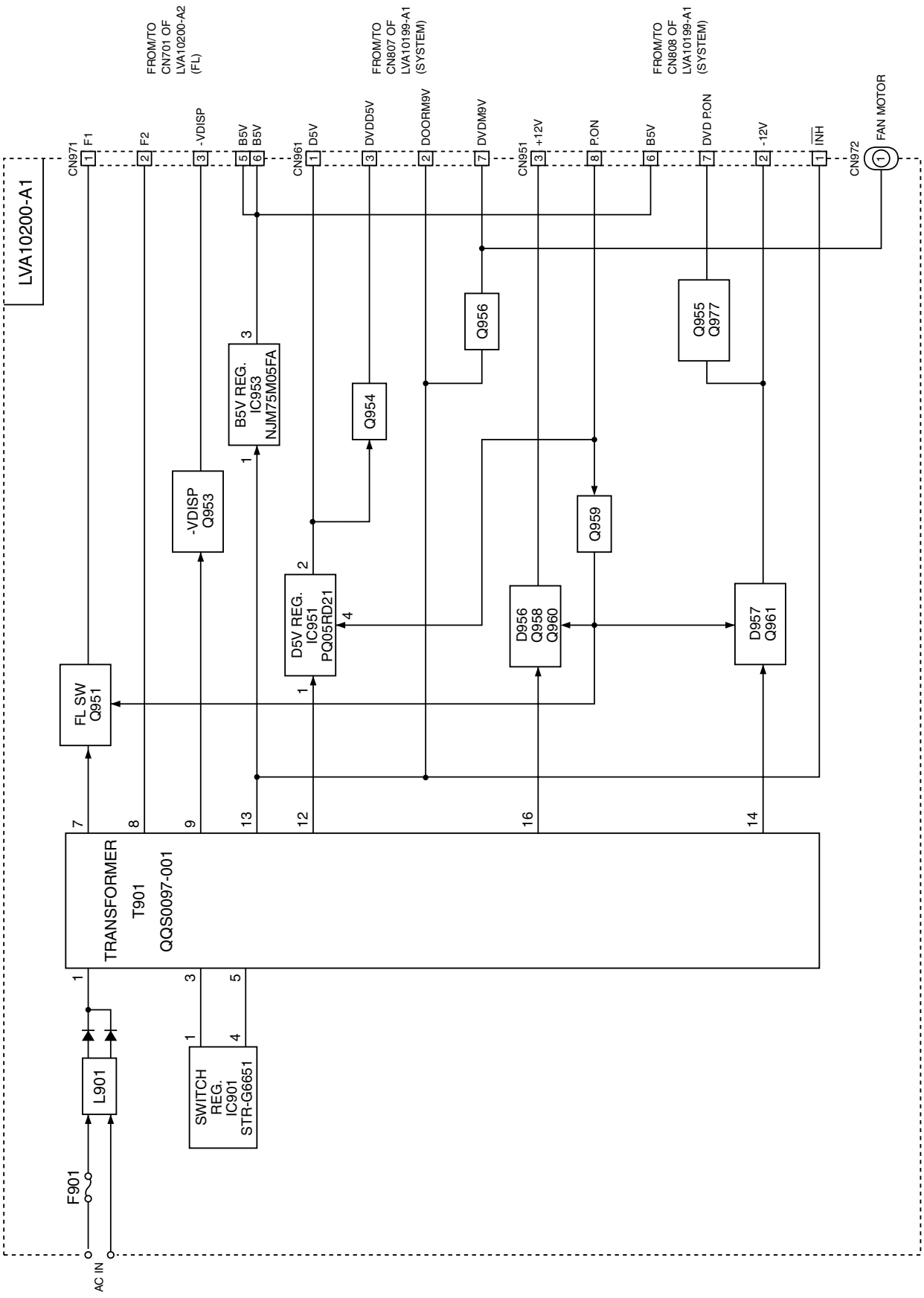
■ Overall block diagram



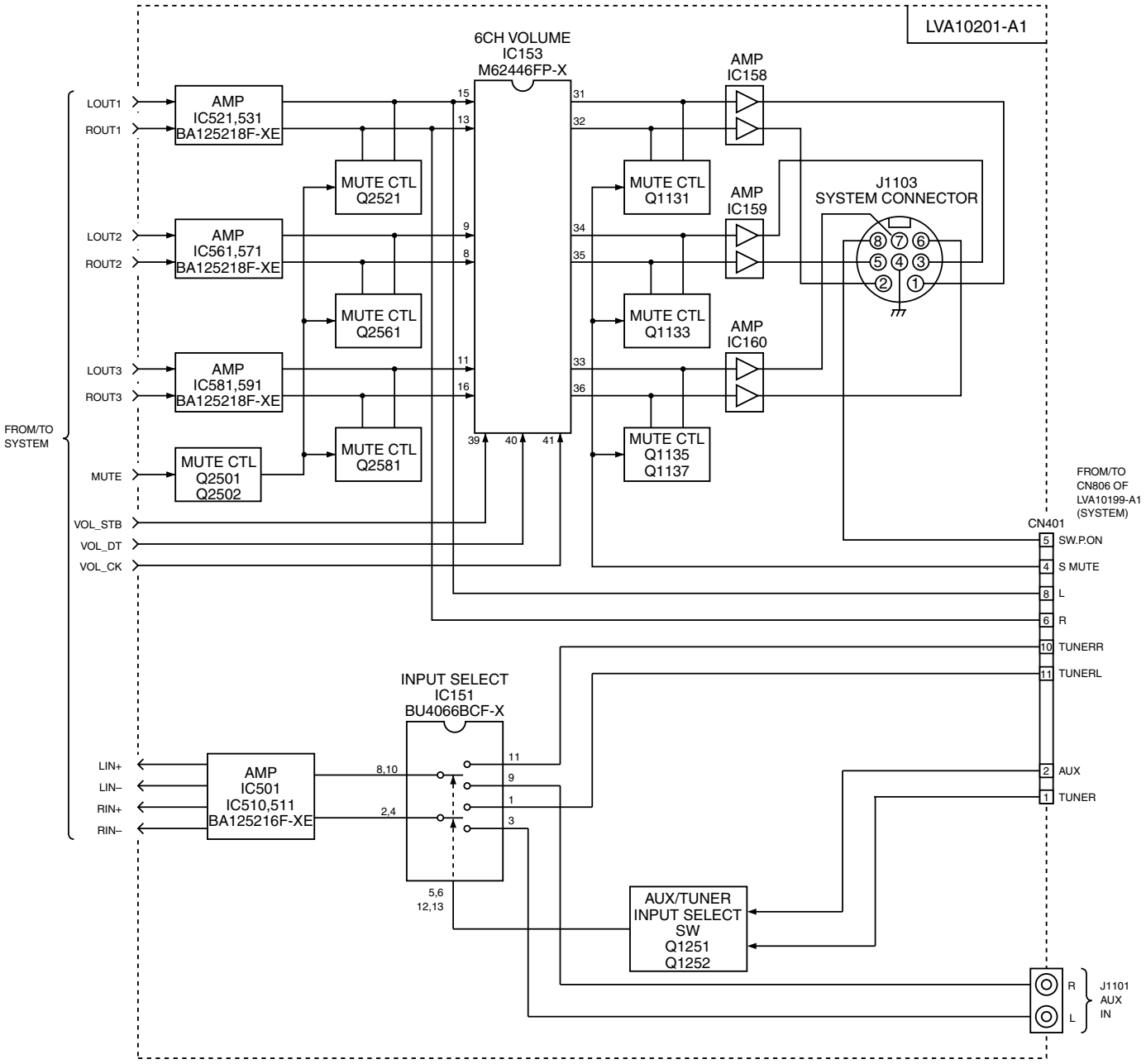
■ Overall block diagram



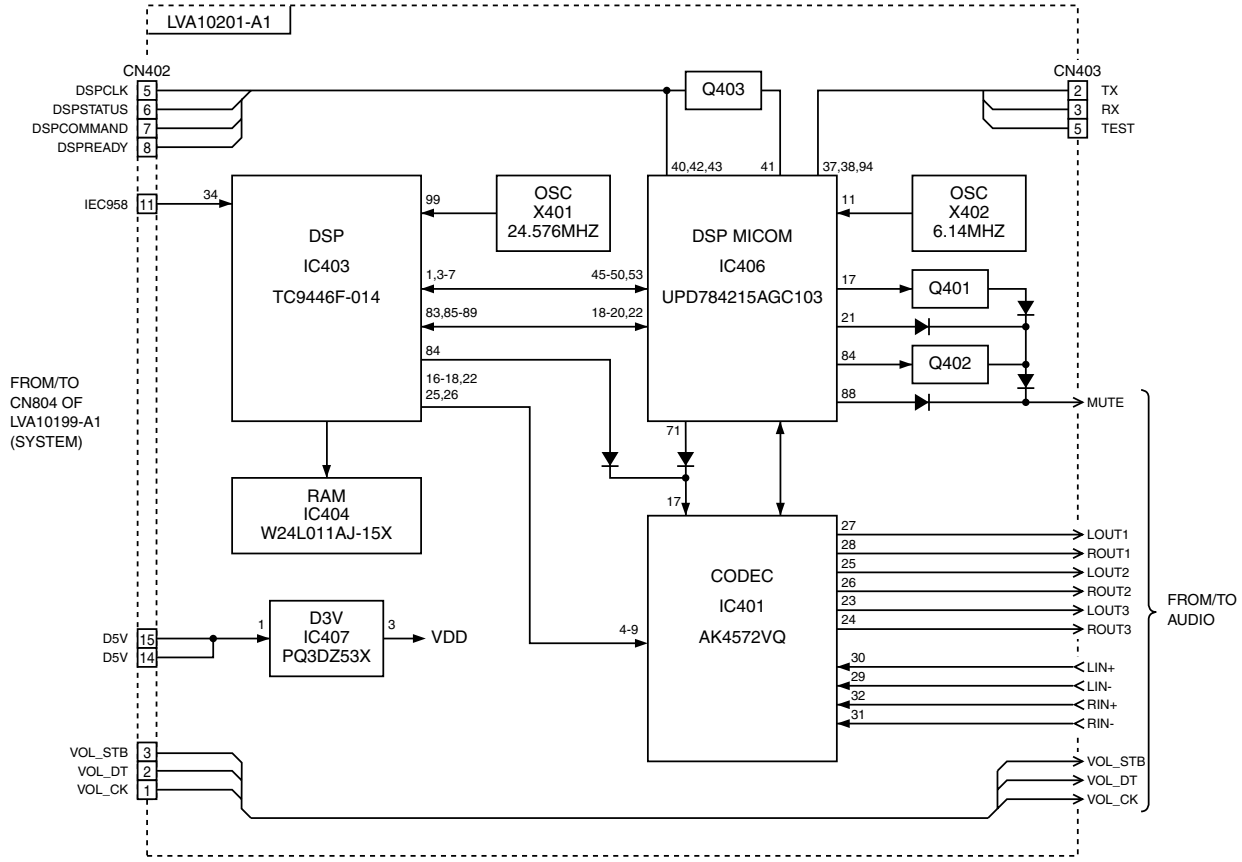
■ Block diagram (power supply section)



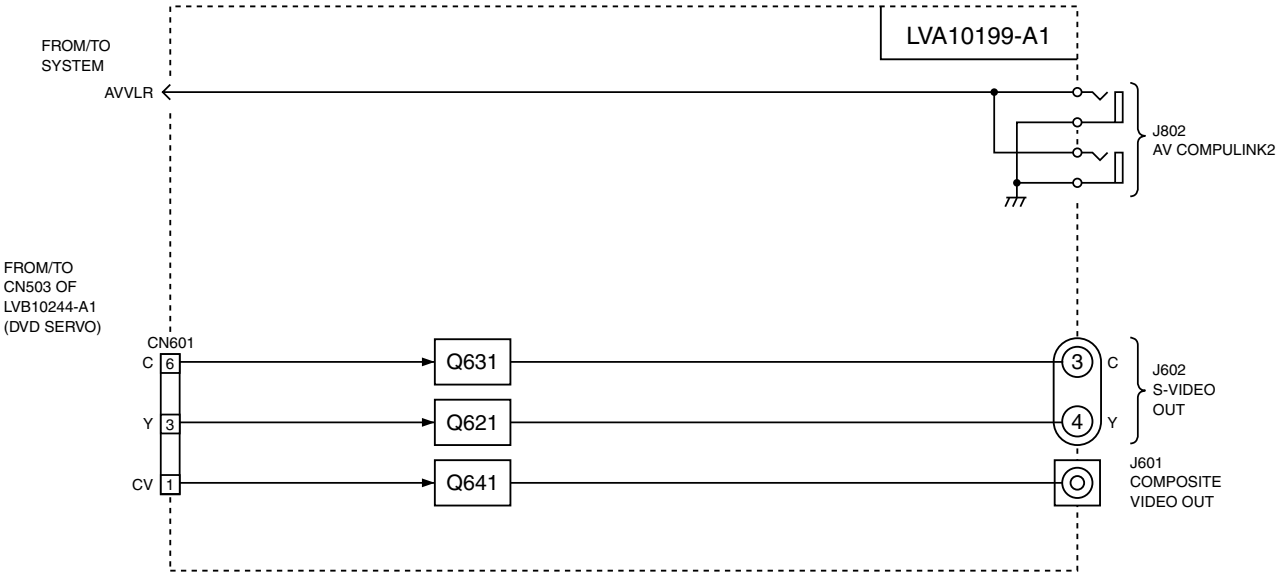
■ Block diagram (audio input/output section)



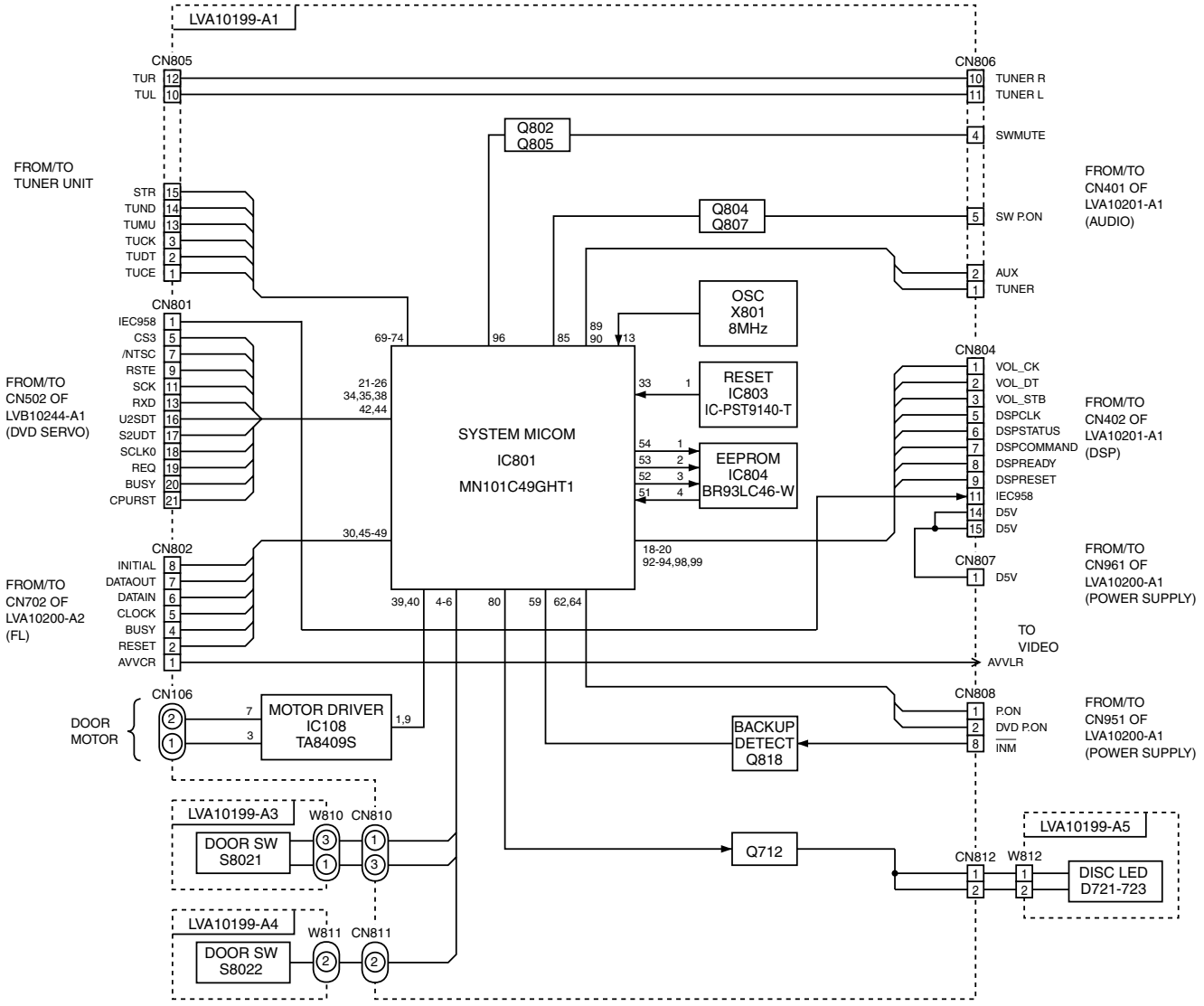
■Block diagram (DSP section)



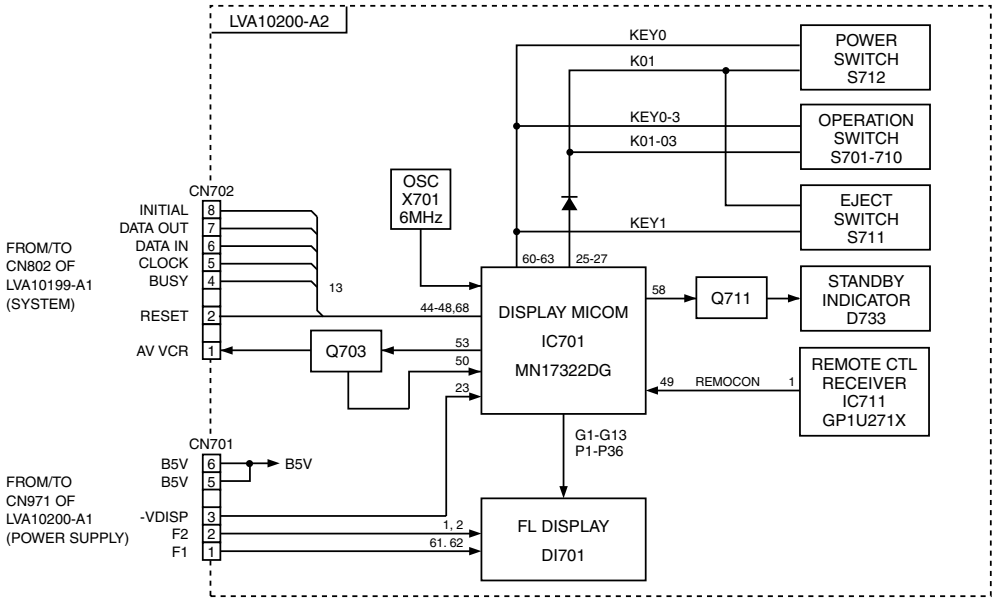
■Block diagram (video input/output section)



■ Block diagram (system control section)

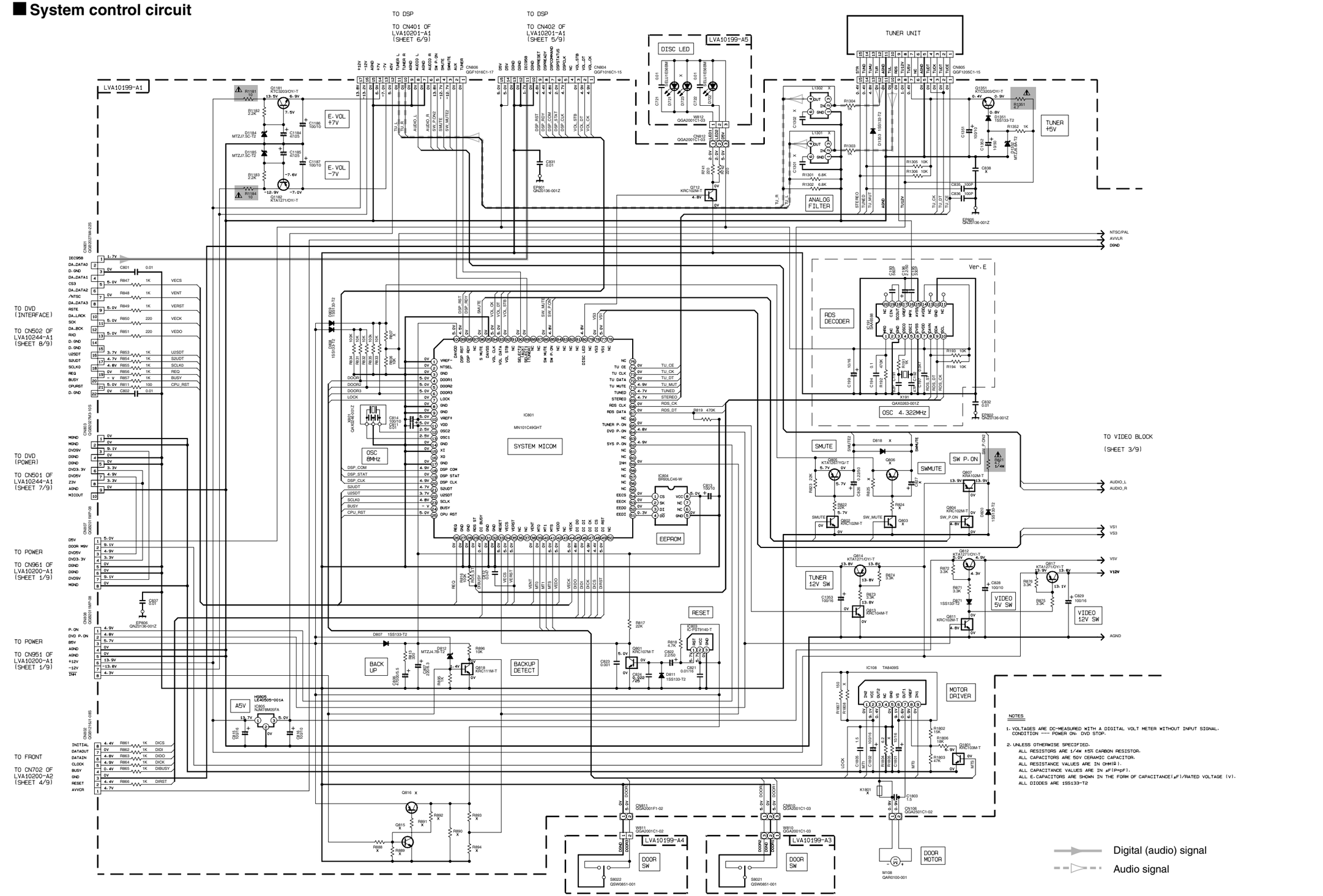


■ Block diagram (FL section)

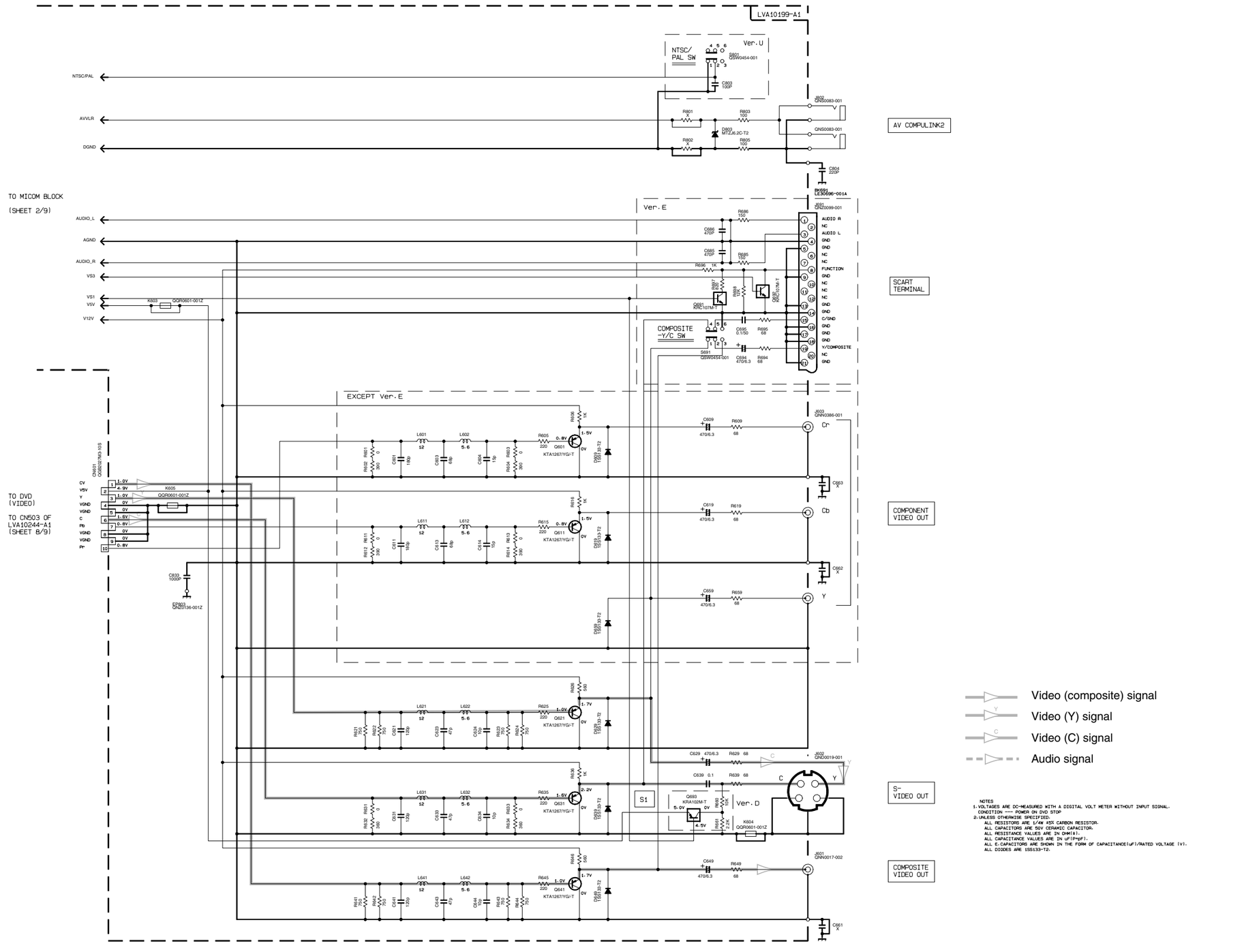


Standerd schematic diagrams

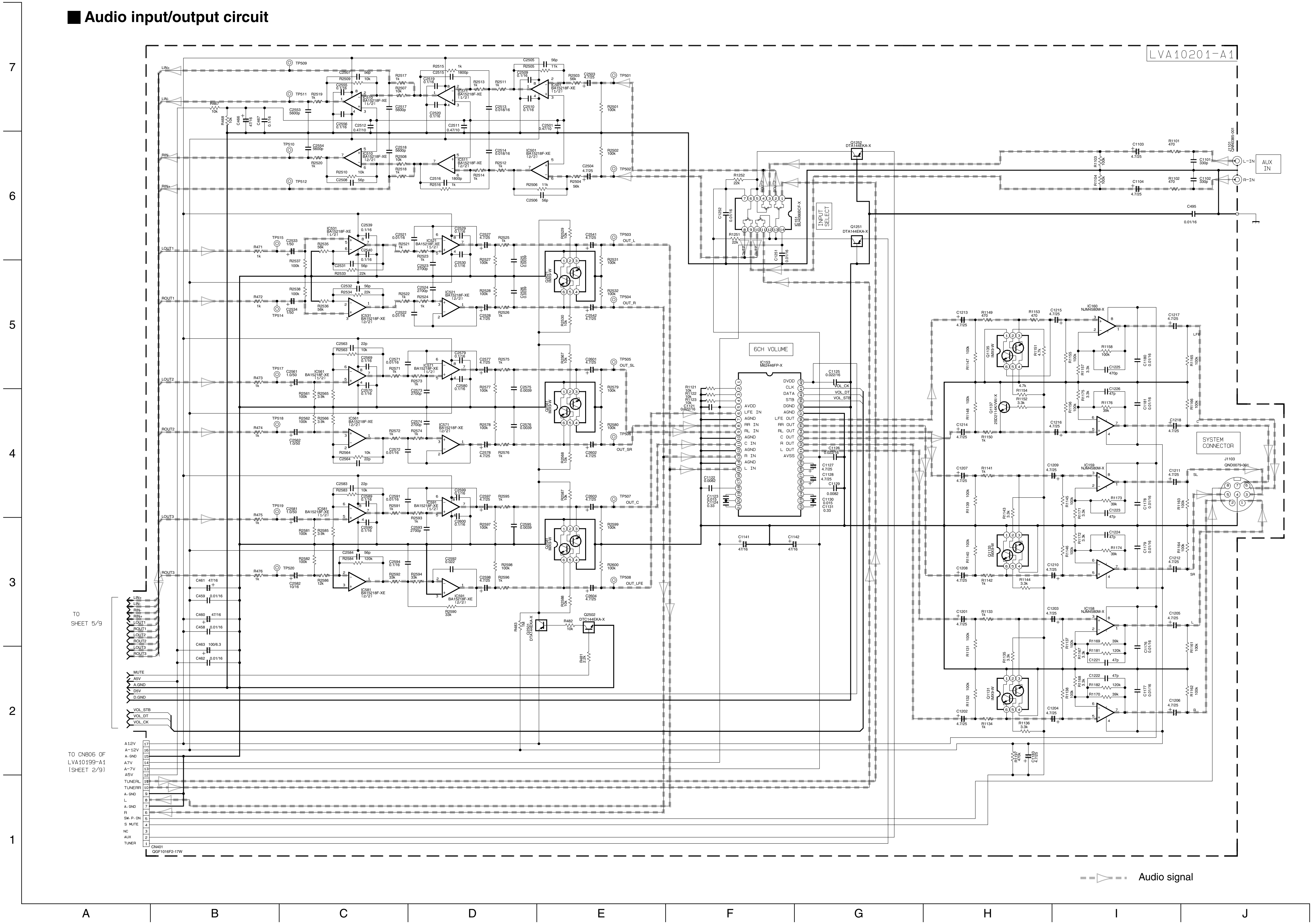
■ System control circuit



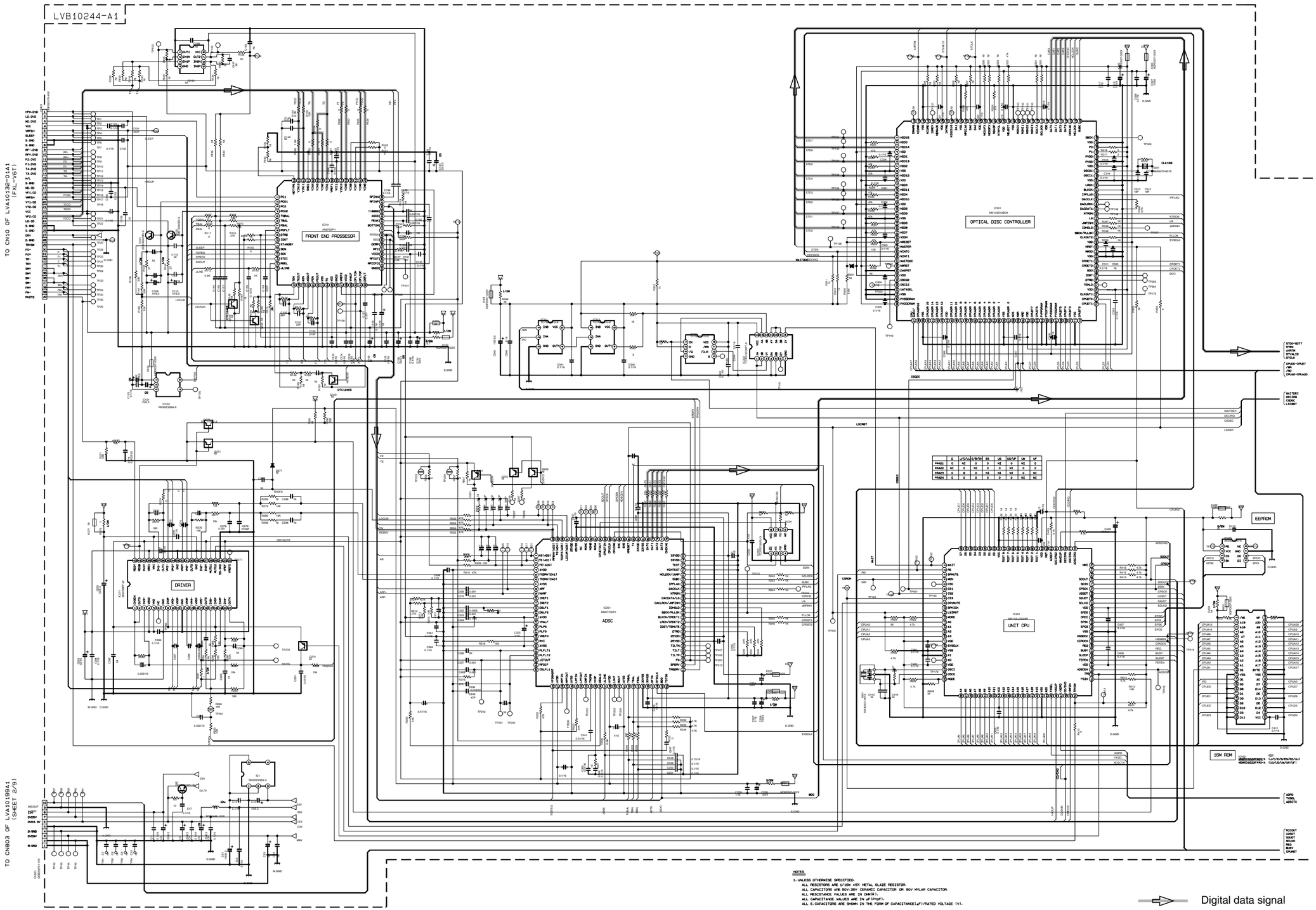
■ Video input/output circuit



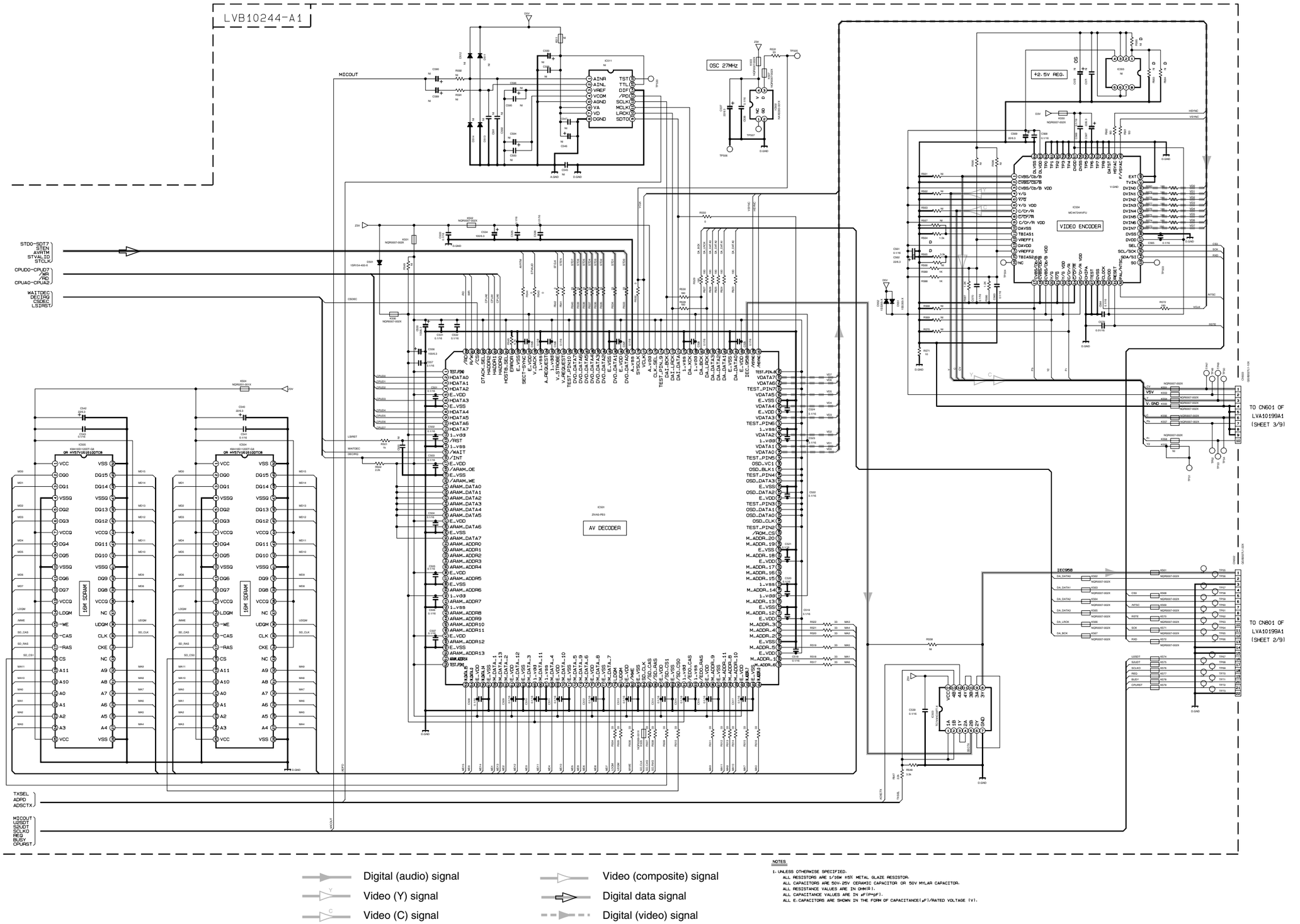
■ Audio input/output circuit



■DVD servo circuit 1/2



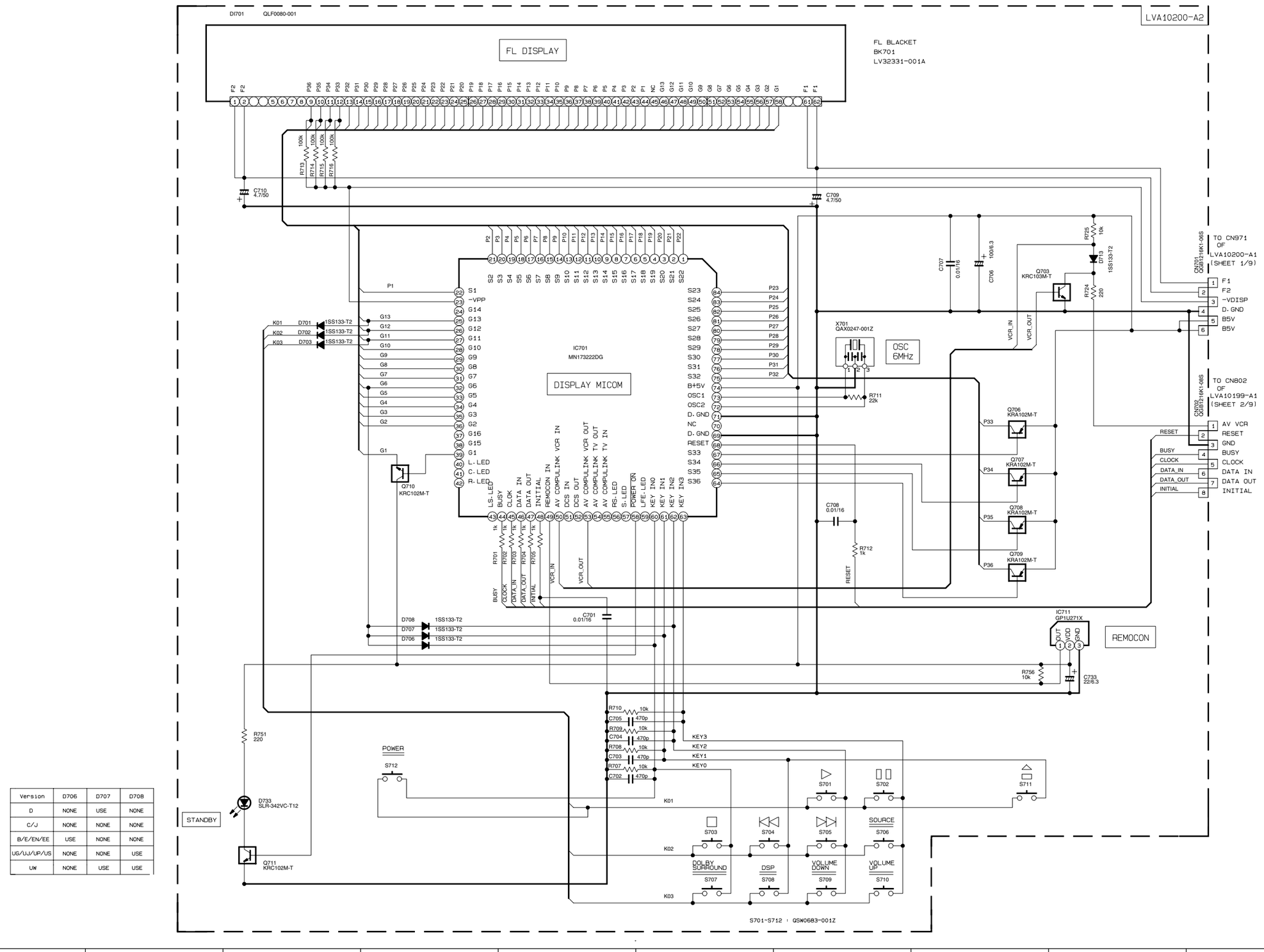
■DVD servo circuit 2/2



NOTES

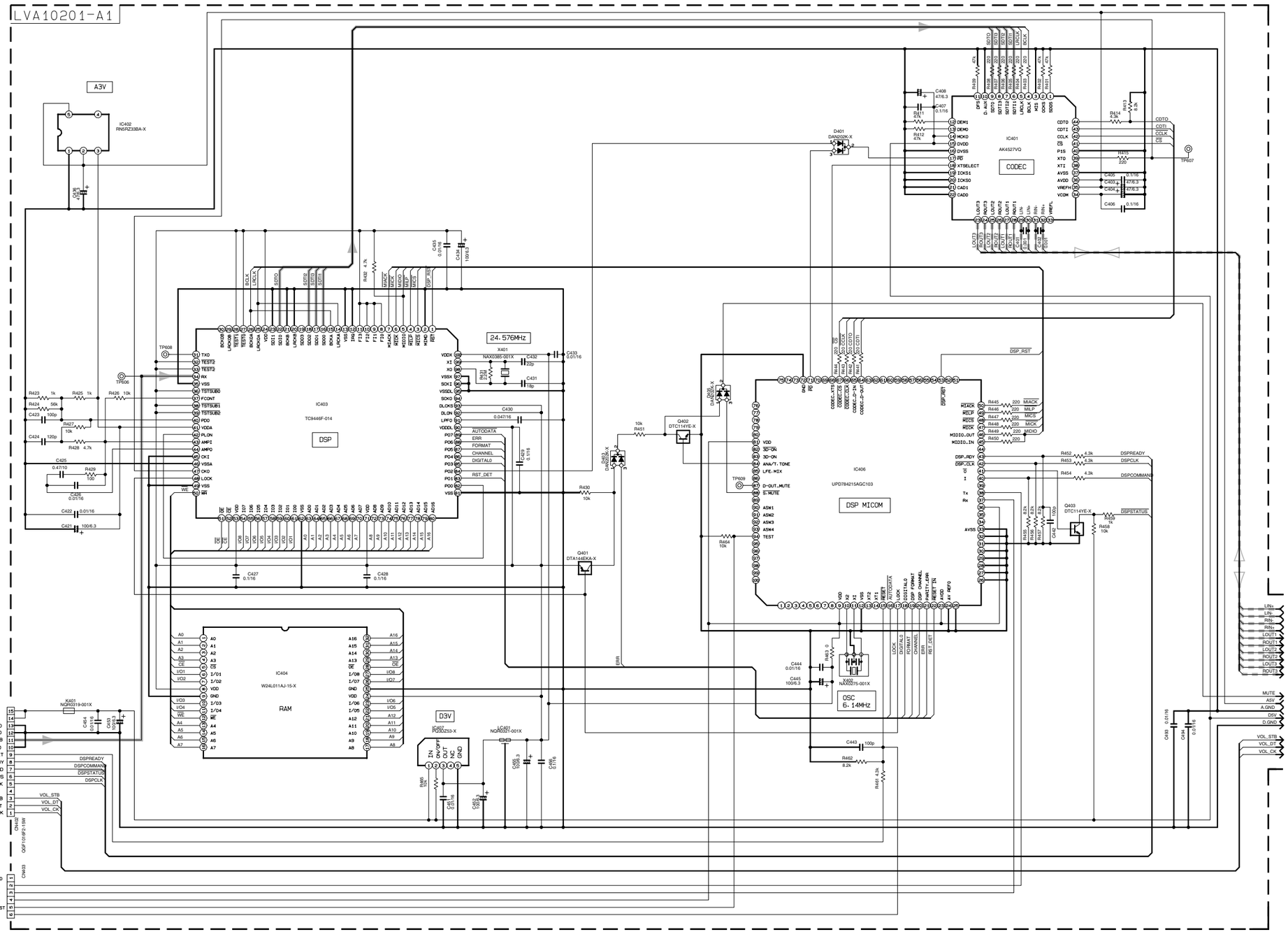
1. UNLESS OTHERWISE SPECIFIED.
   ALL RESISTORS ARE 1/16W ±5% METAL GLAZE RESISTOR.
   ALL CAPACITORS ARE 50V.25V CERAMIC CAPACITOR OR 50V MYLAR CAPACITOR.
   ALL RESISTANCE VALUES ARE IN Ω(Ω).
   ALL CAPACITANCE VALUES ARE IN μF(P=pF).
   ALL E.CAPACITORS ARE SHOWN IN THE FORM OF CAPACITANCE(μF)/RATED VOLTAGE (V).

■ FL circuit

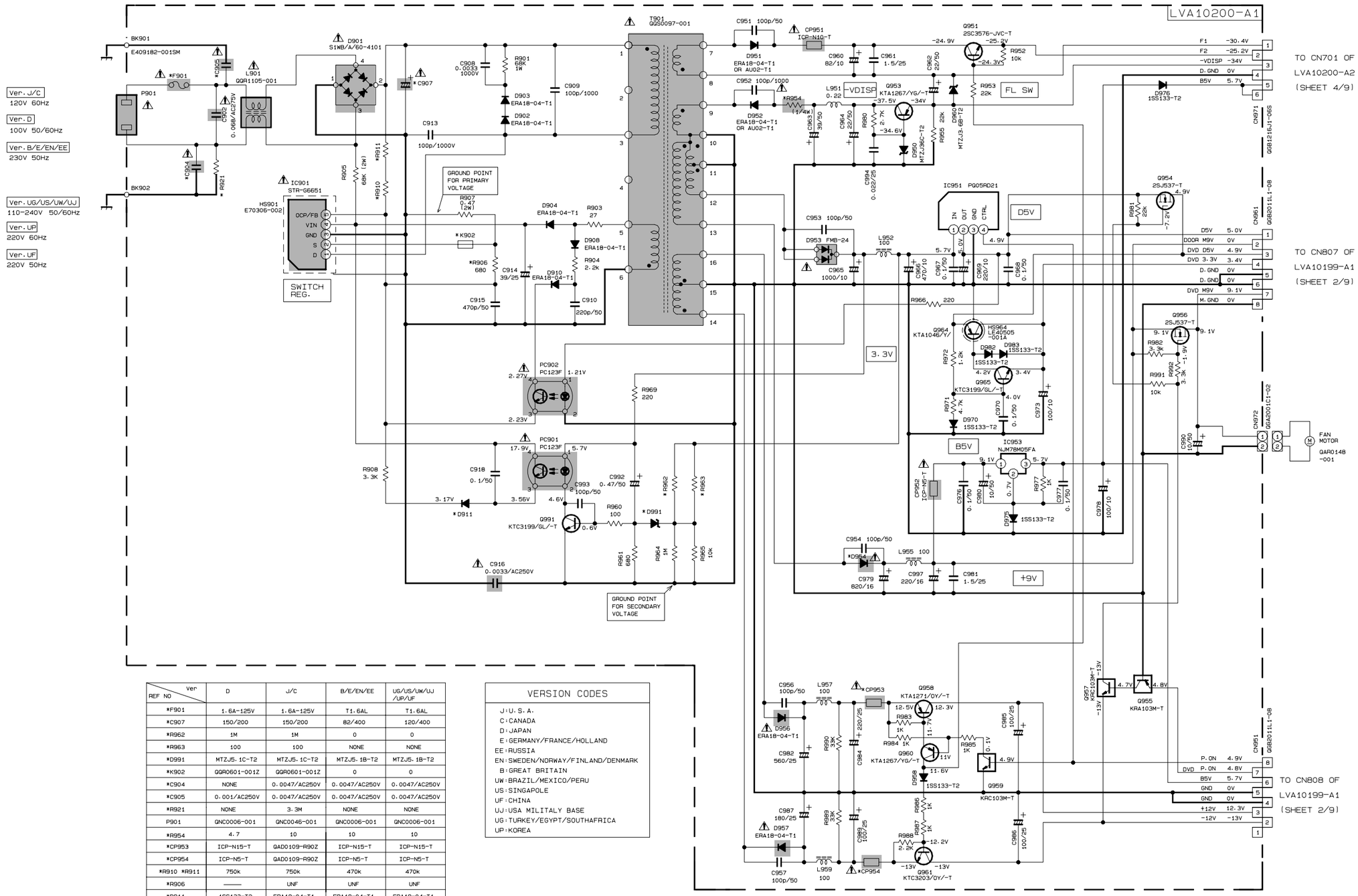


Version	D706	D707	D708
D	NONE	USE	NONE
C/J	NONE	NONE	NONE
B/E/EN/EE	USE	NONE	NONE
UG/UJ/UP/US	NONE	NONE	USE
UW	NONE	USE	USE

■ DSP circuit


LVA10201-A1
A3V
IC402
RN5RZ33BA-X
IC401
AK4527VQ
CODEC
IC403
TC9446F-014
DSP
IC404
W24L011AJ-15-X
RAM
IC406
UPD784215AGC103
DSP MICOM
24.576MHz
X401
NAX0385-001X
OSC
6.14MHz
X402
NAX0275-001X
D3V
IC407
R5521Z53-X
K401
NQR0319-001X
LC401
NQR0321-001X
CN403
OGF101BF3-15W
TP608
TP606
TP609
TP607
Q401
DTA144EKA-X
Q402
DTC114YE-X
Q403
DTC114YE-X
D401
DAN202K-X
D402
DAN202K-X
D403
DAN202K-X
TO CN804 OF LVA10199-A1 (SHEET 2/9)
TO SHEET 6/9
DSPRESET
DSPREADY
DSPCOMMAND
DSPSTATUS
DSPCLK
VOL_STB
VOL_DT
VOL_CK
DSP_RST
CODEC-MCLK
CODEC-BCLK
CODEC-SDTO
CODEC-LRCK
CODEC-SDTI
CODEC-P/S
CODEC-CAD0
CODEC-CAD1
CODEC-CCLK
CODEC-CDTI
CODEC-CDTO
CODEC-CSN
MIACK
MILP
MICB
MICK
MIDIO
MIDIO.OUT
MIDIO.IN
DSP_RDY
DSP_CLK
DSPREADY
DSPCLK
DSPCOMMAND
DSPSTATUS
ERR
LOCK
DIGITAL0
FORMAT
CHANNEL
RST_DET
AUTODATA
DSP FORMAT
DSP CHANNEL
DSP DATA
RESET TR
AVDD
AV REF0
LIN+
LIN-
RIN+
RIN-
LOUT1
ROUT1
LOUT2
ROUT2
LOUT3
ROUT3
MUTE
A5V
A.GND
D5V
D.GND
VOL_STB
VOL_DT
VOL_CK
Digital (audio) signal
Audio signal

■ Power supply circuit



Ver / REF NO	D	J/C	B/E/EN/EE	UG/US/UW/UJ /UP/UF
*F901	1.6A-125V	1.6A-125V	T1.6AL	T1.6AL
*C907	150/200	150/200	82/400	120/400
*R962	1M	1M	0	0
*R963	100	100	NONE	NONE
*D991	MTZJ5.1C-T2	MTZJ5.1C-T2	MTZJ5.1B-T2	MTZJ5.1B-T2
*K902	GQR0601-001Z	GQR0601-001Z	0	0
*C904	NONE	0.0047/AC250V	0.0047/AC250V	0.0047/AC250V
*C905	0.001/AC250V	0.0047/AC250V	0.0047/AC250V	0.0047/AC250V
*R921	NONE	3.3M	NONE	NONE
P901	GNC0006-001	GNC0046-001	GNC0006-001	GNC0006-001
*R954	4.7	10	10	10
*CP953	ICP-N15-T	GAD0109-R90Z	ICP-N15-T	ICP-N15-T
*CP954	ICP-N5-T	GAD0109-R90Z	ICP-N5-T	ICP-N5-T
*R910 *R911	750k	750k	470k	470k
*R906	———	UNF	UNF	UNF
*D911	1SS133-T2	ERA18-04-T1	ERA18-04-T1	ERA18-04-T1
*D954	ERA18-04-T1	ERA18-04-T1	EU2YX-LFH2K	EU2YX-LFH2K

VERSION CODES

J : U.S.A.
C : CANADA
D : JAPAN
E : GERMANY/FRANCE/HOLLAND
EE : RUSSIA
EN : SWEDEN/NORWAY/FINLAND/DENMARK
B : GREAT BRITAIN
UW : BRAZIL/MEXICO/PERU
US : SINGAPOLE
UF : CHINA
UJ : USA MILITALY BASE
UG : TURKEY/EGYPT/SOUTHAFRICA
UP : KOREA

⚠ Parts are safety assurance parts. When replacing those parts make sure to use the specified one.

■ Voltage value table

IC102

NO	DC(V)
1	0V
2	5.0V
3	0V
4	0V
5	0V

IC101

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	0V	17	1.7V	33	0V	49	2.2V
2	4.2V	18	1.7V	34	1.3V	50	2.2V
3	0V	19	1.7V	35	2.4V	51	2.2V
4	4.3V	20	1.7V	36	3.3V	52	2.2V
5	1.7V	21	1.7V	37	1.9V	53	2.2V
6	1.7V	22	1.7V	38	2.4V	54	2.2V
7	1.7V	23	0V	39	0V	55	4.8V
8	4.1V	24	1.7V	40	0V	56	2.2V
9	3.3V	25	3.3V	41	1.7V	57	2.2V
10	0V	26	0V	42	1.5V	58	2.2V
11	4.9V	27	2.1V	43	1.6V	59	2.2V
12	4.9V	28	4.8V	44	1.1V	60	2.2V
13	4.9V	29	4.8V	45	2.5V	61	0V
14	4.9V	30	2.1V	46	2.1V	62	2.2V
15	1.2V	31	2.1V	47	2.1V	63	2.2V
16	1.7V	32	2.0V	48	2.1V	64	1.6V

IC311

NO	DC(V)
1	5.0V
2	4.6V
3	0V
4	4.7V
5	5.0V

IC312

NO	DC(V)
1	5.0V
2	4.7V
3	0V
4	5.0V
5	5.0V

IC321

NO	DC(V)
1	5.0V
2	5.0V
3	5.0V
4	0V
5	0V
6	0V
7	5.0V
8	5.0V

IC322

NO	DC(V)
1	5.0V
2	5.0V
3	0V
4	0V
5	0V
6	5.0V
7	0V
8	5.0V
9	0V
10	0V
11	0V
12	5.0V
13	5.0V
14	5.0V

IC301

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	3.3V	37	0V	73	0.8V	109	2.5V
2	3.3V	38	0.3V	74	0.8V	110	0V
3	3.3V	39	0V	75	1.7V	111	1.7V
4	3.3V	40	4.1V	76	3.3V	112	1.1V
5	0V	41	4.3V	77	0V	113	1.1V
6	3.3V	42	4.2V	78	3.3V	114	1.1V
7	3.3V	43	1.6V	79	0V	115	1.1V
8	0V	44	2.6V	80	3.3V	116	3.3V
9	3.3V	45	3.3V	81	0V	117	3.3V
10	3.6V	46	3.6V	82	0V	118	3.3V
11	3.3V	47	3.7V	83	0V	119	0V
12	3.3V	48	3.8V	84	0V	120	0V
13	3.3V	49	3.7V	85	4.8V	121	0V
14	3.3V	50	3.8V	86	2.6V	122	0V
15	3.3V	51	1.0V	87	1.7V	123	0V
16	3.3V	52	1.0V	88	0V	124	3.3V
17	3.3V	53	3.6V	89	0V	125	2.6V
18	0V	54	3.8V	90	0V	126	1.3V
19	0V	55	1.0V	91	0V	127	0V
20	3.3V	56	0V	92	3.3V	128	1.4V
21	3.3V	57	0.7V	93	0V	129	1.1V
22	4.5V	58	4.9V	94	3.3V	130	3.3V
23	4.5V	59	4.9V	95	0V	131	1.6V
24	0V	60	4.4V	96	3.3V	132	3.3V
25	0.1V	61	3.3V	97	0V	133	0V
26	4.9V	62	1.2V	98	0V	134	0V
27	4.9V	63	2.4V	99	0V	135	3.3V
28	1.4V	64	0V	100	1.6V	136	1.3V
29	0V	65	0V	101	1.6V	137	0V
30	3.3V	66	2.6V	102	3.3V	138	3.3V
31	0V	67	0V	103	0V	139	1.3V
32	3.3V	68	1.0V	104	3.3V	140	1.0V
33	0V	69	2.1V	105	3.3V	141	1.1V
34	0V	70	1.0V	106	3.3V	142	0V
35	0V	71	0V	107	0V	143	3.3V
36	2.6V	72	2.3V	108	0V	144	3.3V

IC403

NO	DC(V)
1	4.9V
2	5.0V
3	0V
4	0V
5	0V
6	1.0V
7	0V
8	0V

IC402

NO	DC(V)	NO	DC(V)
1	4.9V	23	5V
2	0V	24	2.3V
3	0V	25	0V
4	3.5V	26	2.3V
5	1.7V	27	0V
6	2.1V	28	2.3V
7	1.8V	29	0V
8	2.7V	30	2.4V
9	1.9V	31	0V
10	2.1V	32	0V
11	0V	33	0V
12	4.6V	34	0V
13	0V	35	5V
14	4.2V	36	0V
15	1.1V	37	4V
16	0V	38	4.3V
17	1.5V	39	2.6V
18	0V	40	2V
19	0V	41	2.1V
20	0V	42	3.5V
21	0V	43	0V
22	0V	44	0V

IC201

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	1.7V	26	2.1V	76	1.7V	51	1.7V
2	1.7V	27	3.2V	77	1.1V	52	1.7V
3	1.7V	28	1.7V	78	1.1V	53	3.2V
4	3.2V	29	0V	79	1.1V	54	0V
5	1.7V	30	0V	80	1.1V	55	0V
6	1.7V	31	1.7V	81	0V	56	0V
7	0V	32	0V	82	3.3V	57	0V
8	1.6V	33	1.7V	83	3.3V	58	2.6V
9	1.6V	34	1.7V	84	4.8V	59	0V
10	1.5V	35	0.1V	85	4.9V	60	0V
11	1.5V	36	1.6V	86	4.9V	61	0V
12	1.7V	37	1.7V	87	3.3V	62	0V
13	1.5V	38	3.2V	88	4.9V	63	0V
14	3.2V	39	1.6V	89	4.9V	64	0V
15	1.7V	40	1.6V	90	0.5V	65	0V
16	2.7V	41	0V	91	1.7V	66	0V
17	0.2V	42	1.7V	92	2.5V	67	3.3V
18	2.2V	43	1.7V	93	3.3V	68	1.7V
19	1.5V	44	1.7V	94	0.7V	69	3.3V
20	0V	45	0V	95	0V	70	2.5V
21	1.6V	46	3.3V	96	2.6V	71	0V
22	1.6V	47	0V	97	1.8V	72	0V
23	1.5V	48	1.7V	98	1.6V	73	0V
24	1.7V	49	0V	99	1.6V	74	0V
25	1.5V	50	0.3V	100	1.7V	75	3.3V

IC202

NO	DC(V)
1	0V
2	3.3V
3	4.9V
4	0V
5	0V
6	4.9V
7	0V
8	4.9V

IC401

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	5.0V	26	2.7V	51	0.6V	76	5.0V
2	5.0V	27	1.8V	52	5.0V	77	5.0V
3	5.0V	28	2.1V	53	5.0V	78	3.1V
4	5.0V	29	1.7V	54	5.0V	79	0V
5	0V	30	3.5V	55	5.0V	80	5.0V
6	5.0V	31	3.5V	56	5.0V	81	5.0V
7	5.0V	32	2.1V	57	0V	82	4.9V
8	4.4V	33	2V	58	0V	83	5.0V
9	5.0V	34	5.0V	59	5.0V	84	5.0V
10	0V	35	2.6V	60	0V	85	0V
11	4.9V	36	4.3V	61	0V	86	0V
12	5.0V	37	4V	62	0V	87	0V
13	0V	38	0V	63	0V	88	5.0V
14	0V	39	5V	64	0V	89	5.0V
15	2.1V	40	0V	65	0V	90	5.0V
16	1.9V	41	0V	66	5.0V	91	5.0V
17	5.0V	42	0V	67	4.8V	92	0V
18	2.3V	43	0V	68	3.8V	93	1.1V
19	0V	44	0V	69	4.8V	94	1.5V
20	0V	45	0V	70	5.0V	95	0V
21	5.0V	46	0V	71	0V	96	0V
22	5.0V	47	0V	72	5.0V	97	2.3V
23	2.4V	48	5V	73	5.0V	98	2.3V
24	2.4V	49	0V	74	5.0V	99	2.3V
25	5.0V	50	5.0V	75	5.0V	100	2.4V

IC271

NO	DC(V)	NO	DC(V)
1	0V	22	1.37V
2	0V	23	1.37V
3	0V	24	0V
4	9V	25	5.0V
5	9V	26	5.0V
6	0V	27	1.37V
7	0V	28	1.37V
8	1.37V	29	0V
9	3.9V	30	1.41V
10	3.4V	31	2.37V
11	0V	32	2.56V
12	3.4V	33	0V
13	4.5V	34	2.39V
14	5.7V	35	2.56V
15	3V	36	1.34V
16	0V	37	1.37V
17	0V	38	4.93V
18	0V	39	9V
19	0V	40	1.37V
20	1.37V	41	3.2V
21	0V	42	3V

VOLTAGES ON SHEET 7/9

IC502

NO	DC(V)
1	3.1V
2	0V
3	1.6V
4	3.2V

IC554

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	1.3V	17	0.9V	33	0.9V	49	3.2V
2	0V	18	0V	34	1.3V	50	2.8V
3	5V	19	5V	35	2.1V	51	0V
4	1.27V	20	5V	36	1.3V	52	0V
5	0V	21	0V	37	0.6V	53	0V
6	5V	22	0.3V	38	0V	54	0V
7	2.1V	23	0V	39	1V	55	0V
8	0V	24	0V	40	1.4V	56	0V
9	5V	25	0V	41	1.2V	57	3.2V
10	0V	26	0V	42	1.6V	58	0V
11	2.8V	27	0V	43	1.2V	59	0V
12	2.8V	28	0V	44	1.2V	60	0V
13	5V	29	1.6V	45	1.2V	61	0V
14	2.7V	30	3.2V	46	1.2V	62	0V
15	0V	31	5V	47	0V	63	5.1V
16	0V	32	0V	48	0V	64	0V

IC501

NO	DC(V)	NO	DC(V)	NO	DC(V)	NO	DC(V)
1	3.1V	53	0.7V	105	0V	157	0.9V
2	1.7V	54	0.7V	106	0V	158	0.9V
3	0.7V	55	3.1V	107	3.1V	159	0V
4	2.0V	56	0.6V	108	0V	160	3.1V
5	3.1V	57	0V	109	0V	161	0V
6	1.6V	58	0.6V	110	0V	162	0V
7	0V	59	0.5V	111	0V	163	0V
8	0V	60	0.5V	112	0V	164	0V
9	2.4V	61	3.1V	113	3.1V	165	0V
10	2.9V	62	0.6V	114	0V	166	0V
11	2.6V	63	0V	115	0V	167	0V
12	2.5V	64	0.6V	116	0V	168	2.5V
13	5.0V	65	2.5V	117	2.5V	169	0.9V
14	0V	66	0.7V	118	0V	170	0V
15	5.0V	67	0V	119	0V	171	0V
16	3.1V	68	0.7V	120	0V	172	1.6V
17	3.1V	69	3.1V	121	0V	173	1.6V
18	3.1V	70	0.6V	122	0V	174	3.1V
19	0V	71	0V	123	3.1V	175	3.1V
20	3.1V	72	0.7V	124	0V	176	3.1V
21	3.1V	73	0.7V	125	0V	177	1.6V
22	3.1V	74	0.6V	126	0V	178	3.1V
23	3.1V	75	3.1V	127	0V	179	0V
24	3.1V	76	0.7V	128	0.8V	180	5.0V
25	3.1V	77	0V	129	3.1V	181	3.1V
26	3.1V	78	0.8V	130	3.1V	182	5.0V
27	3.1V	79	3.2V	131	3.1V	183	0V
28	3.1V	80	3.2V	132	3.1V	184	5.0V
29	0V	81	3.1V	133	3.1V	185	5.0V
30	3.1V	82	3.2V	134	3.1V	186	5.0V
31	0V	83	0V	135	3.1V	187	5.0V
32	0V	84	0V	136	0V	188	5.0V
33	0V	85	3.2V	137	3.1V	189	5.0V
34	0V	86	0V	138	3.1V	190	3.1V
35	3.1V	87	3.1V	139	3.1V	191	3.1V
36	3.1V	88	0V	140	0.8V	192	2.6V
37	0V	89	0V	141	3.1V	193	3.1V
38	0V	90	3.1V	142	0.9V	194	0V
39	0V	91	2.5V	143	0.9V	195	0V
40	2.5V	92	3.1V	144	2.5V	196	0V
41	3.1V	93	0V	145	0.9V	197	2.5V
42	0V	94	3.1V	146	0V	198	5.0V
43	3.1V	95	3.1V	147	3.1V	199	0V
44	0V	96	0V	148	0.9V	200	0V
45	3.1V	97	0V	149	3.1V	201	3.1V
46	3.1V	98	0V	150	0.9V	202	2.2V
47	0V	99	0V	151	0V	203	2.4V
48	3.1V	100	0V	152	0.9V	204	2.5V
49	0V	101	3.1V	153	3.1V	205	3.1V
50	3.1V	102	0V	154	0.9V	206	5.0V
51	0V	103	0V	155	0.9V	207	5.0V
52	3.1V	104	0V	156	3.1V	208	2.0V

IC505

NO	DC(V)	NO	DC(V)
1	3.2V	26	0V
2	0V	27	3.1V
3	0V	28	0V
4	0V	29	3.1V
5	0V	30	0V
6	0.3V	31	3.1V
7	3.2V	32	0V
8	0V	33	0V
9	0V	34	3.2V
10	0V	35	1.7V
11	0V	36	0V
12	0V	37	0V
13	3.2V	38	3.2V
14	0V	39	0V
15	3.1V	40	0V
16	3.1V	41	0V
17	3.1V	42	0V
18	2.3V	43	0V
19	0V	44	3.2V
20	0V	45	0V
21	0V	46	0V
22	3.1V	47	0V
23	3.1V	48	0V
24	0V	49	0V
25	3.2V	50	0V

IC504

NO	DC(V)	NO	DC(V)
1	3.2V	26	0V
2	0V	27	3.1V
3	0V	28	0V
4	0V	29	3.1V
5	0V	30	0V
6	0.3V	31	3.1V
7	3.2V	32	0V
8	0V	33	0V
9	0V	34	3.2V
10	0V	35	1.7V
11	0V	36	0V
12	0V	37	0V
13	3.2V	38	3.2V
14	0V	39	0V
15	3.1V	40	0V
16	3.1V	41	0V
17	3.1V	42	0V
18	2.3V	43	0V
19	0V	44	3.2V
20	0V	45	0V
21	0V	46	0V
22	3.1V	47	0V
23	3.1V	48	0V
24	0V	49	0V
25	3.2V	50	0V

IC503

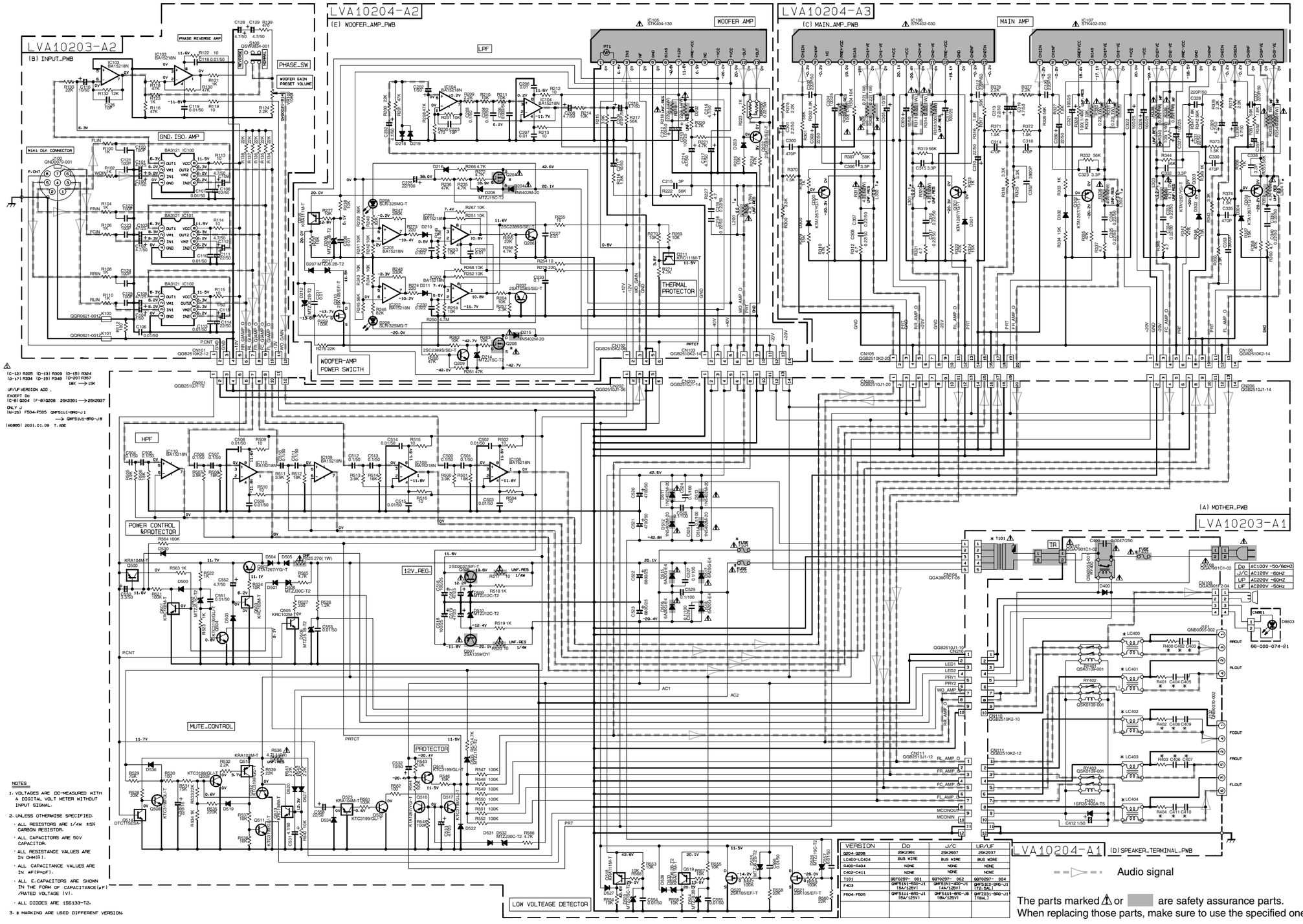
NO	DC(V)
1	0V
2	0V
3	3.2V
4	3.2V
5	1.6V
6	1.6V
7	0V
8	1.6V
9	1.6V
10	3.2V
11	3.2V
12	3.2V
13	0V
14	3.2V

VOLTAGES ON SHEET 8/9

NOTES

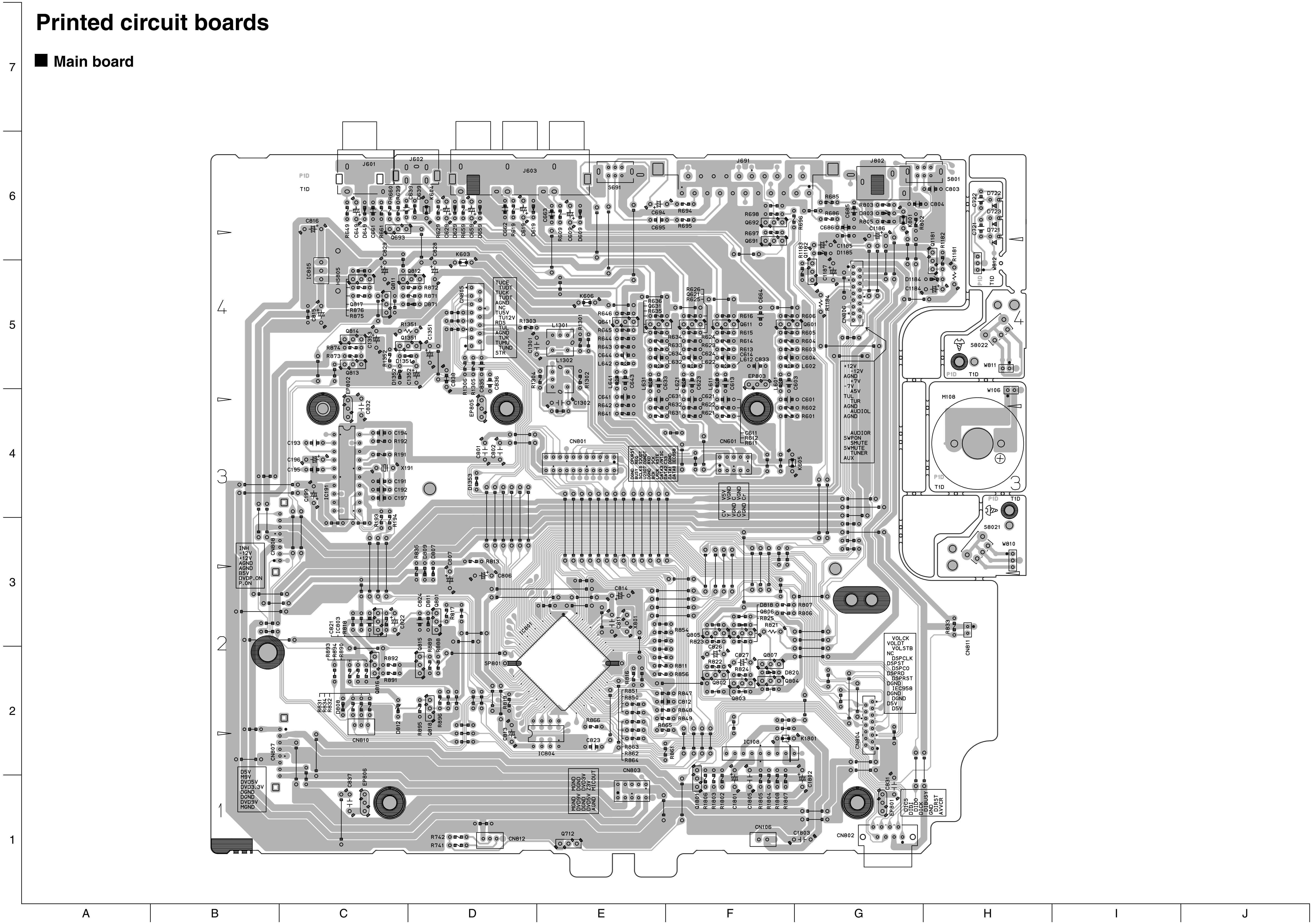
1. VOLTAGES ARE DC-MEASURED WITH A DIGITAL VOLT METER

■ Powered subwoofer circuit (SP-PWA9)

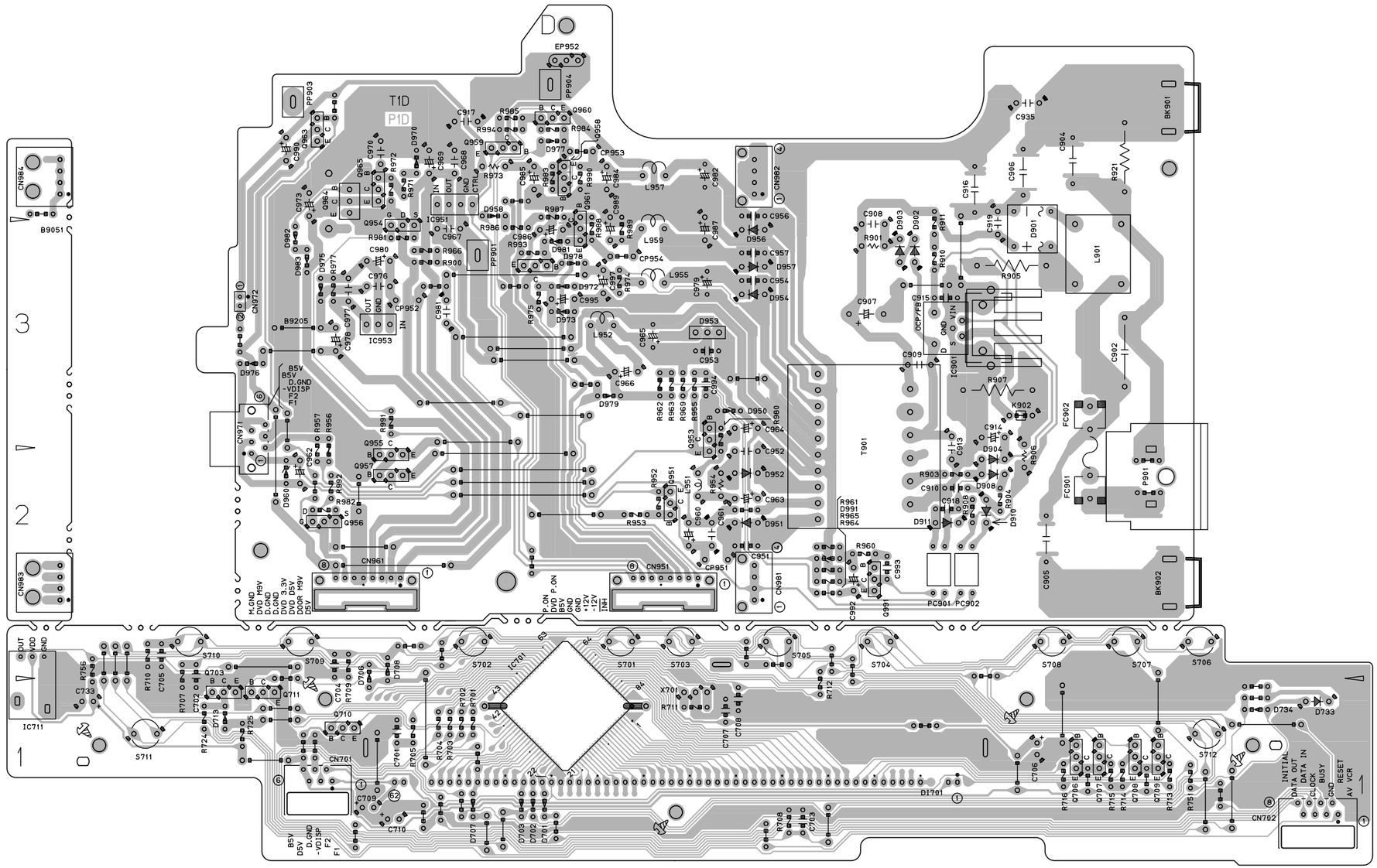


Printed circuit boards

■ Main board

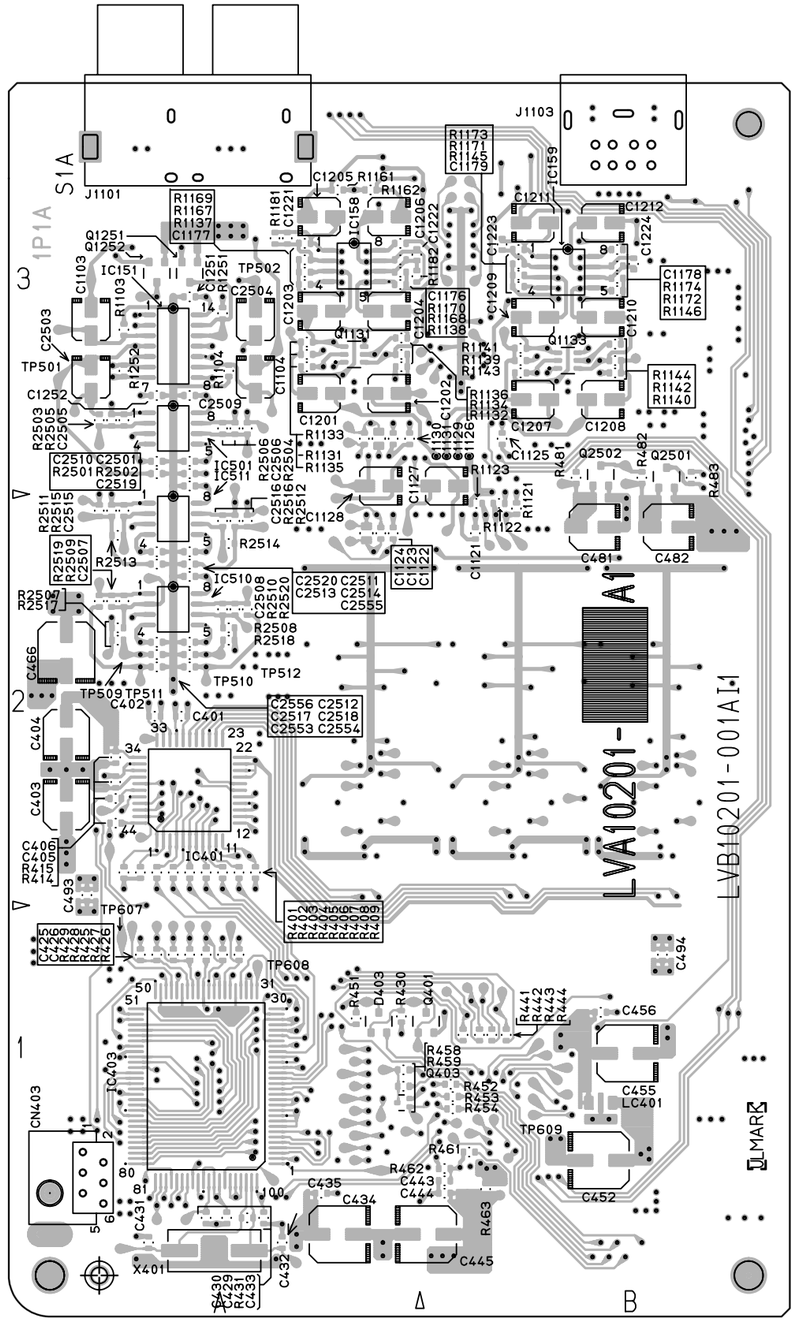


■ Power supply and front panel boards

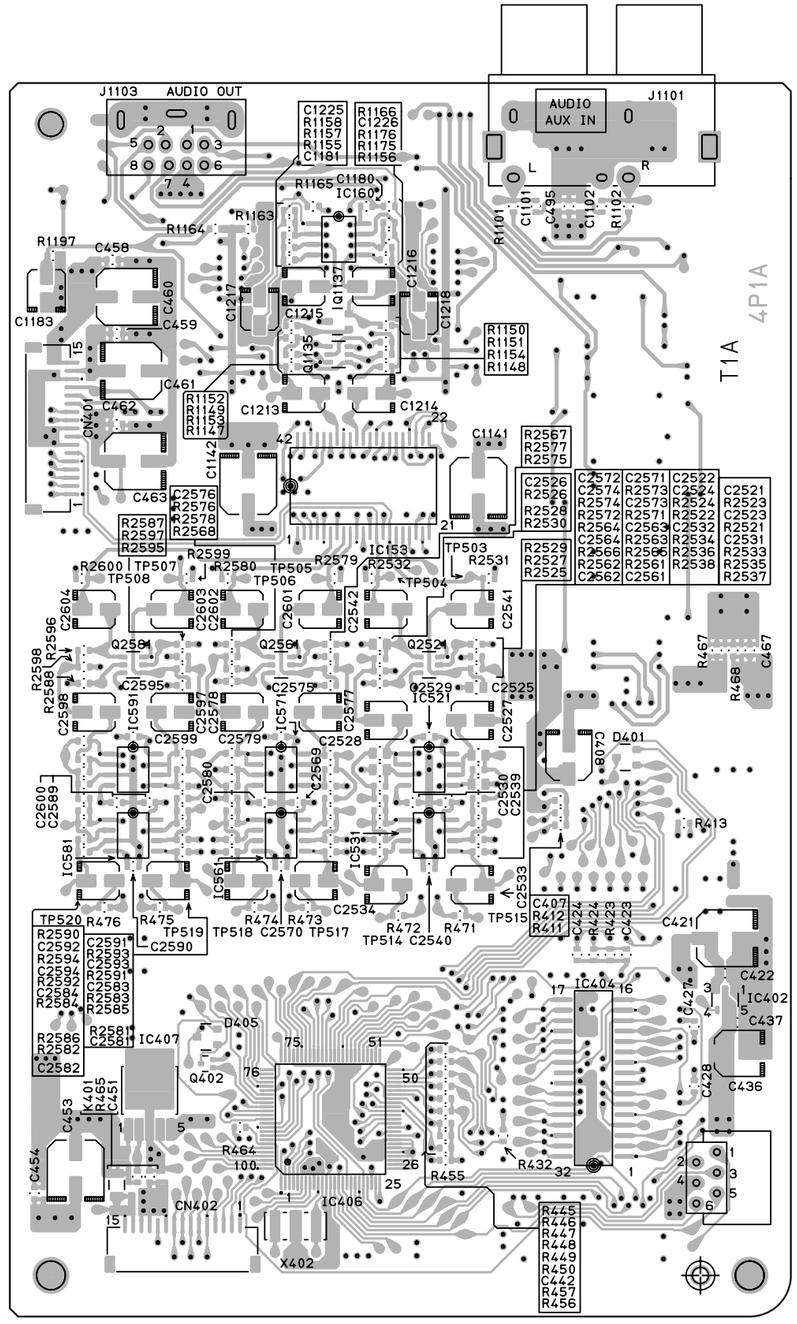


■ Audio input/output and DSP boards

(Surface view)

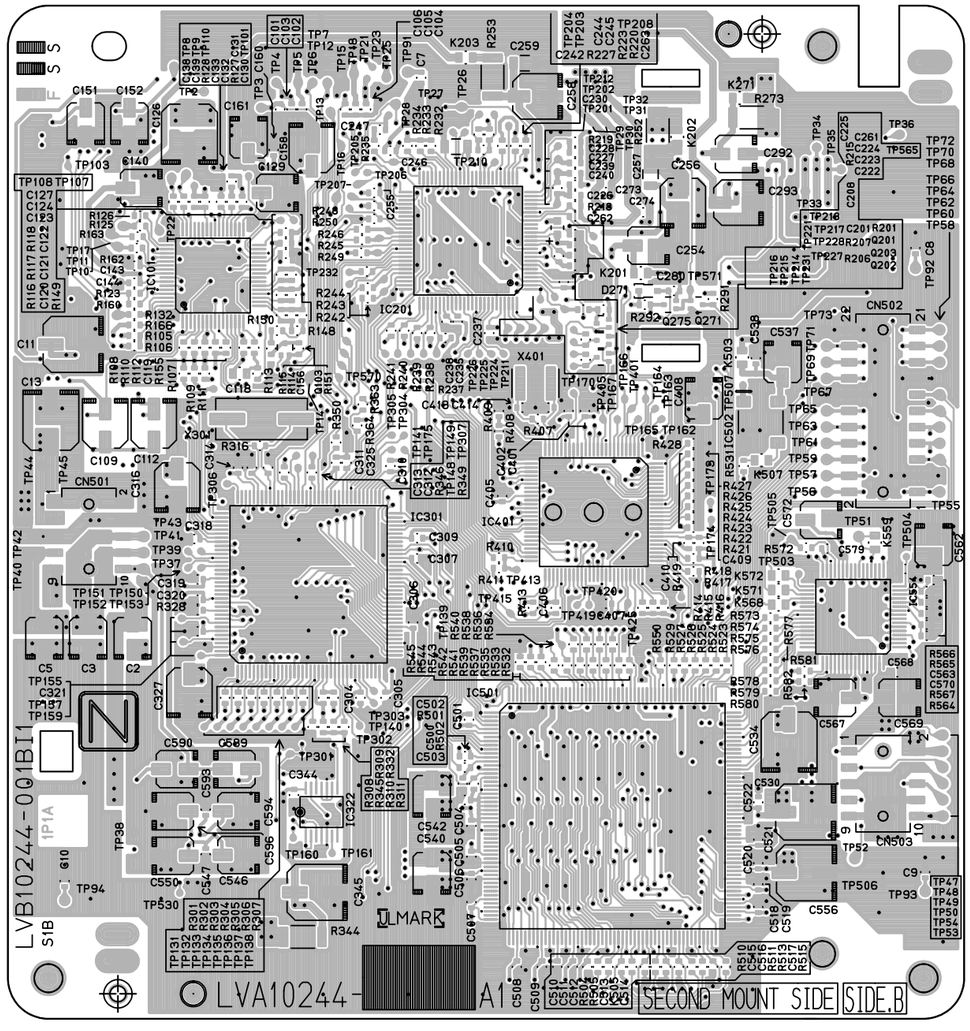


(Bottom view)

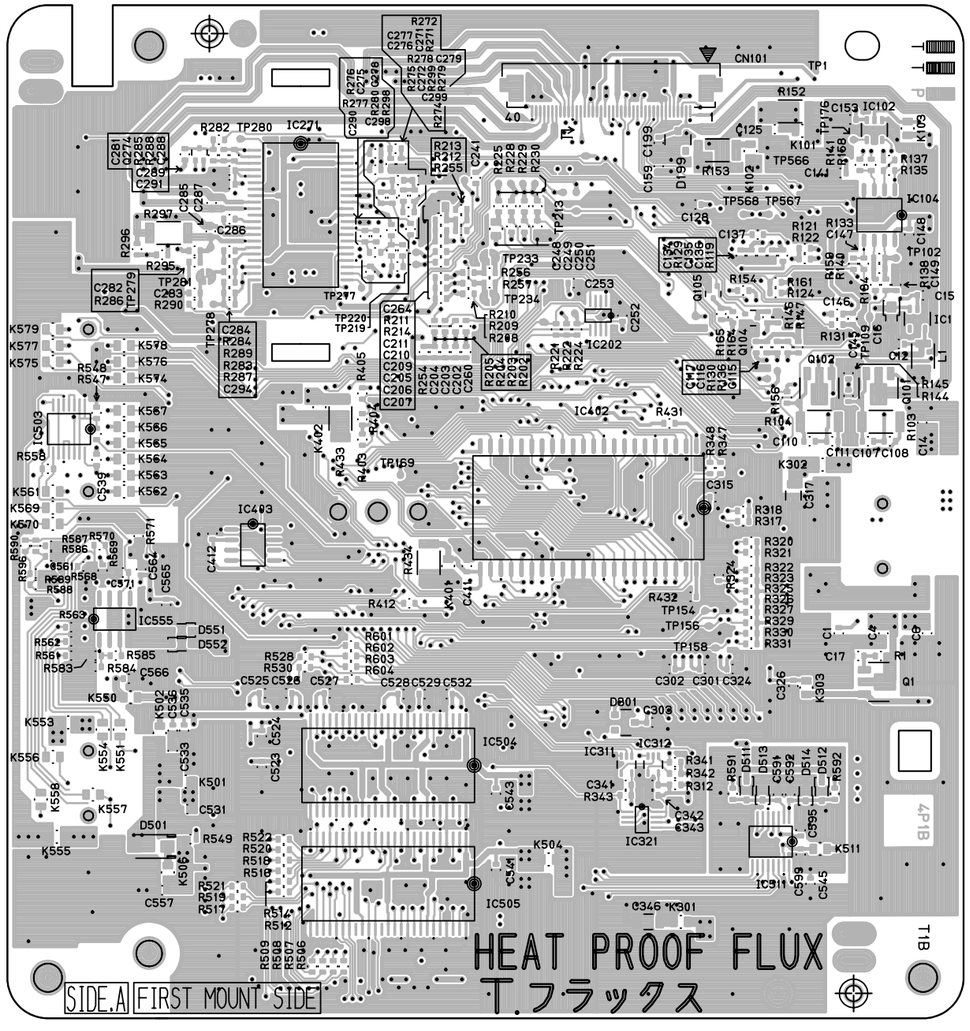


■ DVD servo board

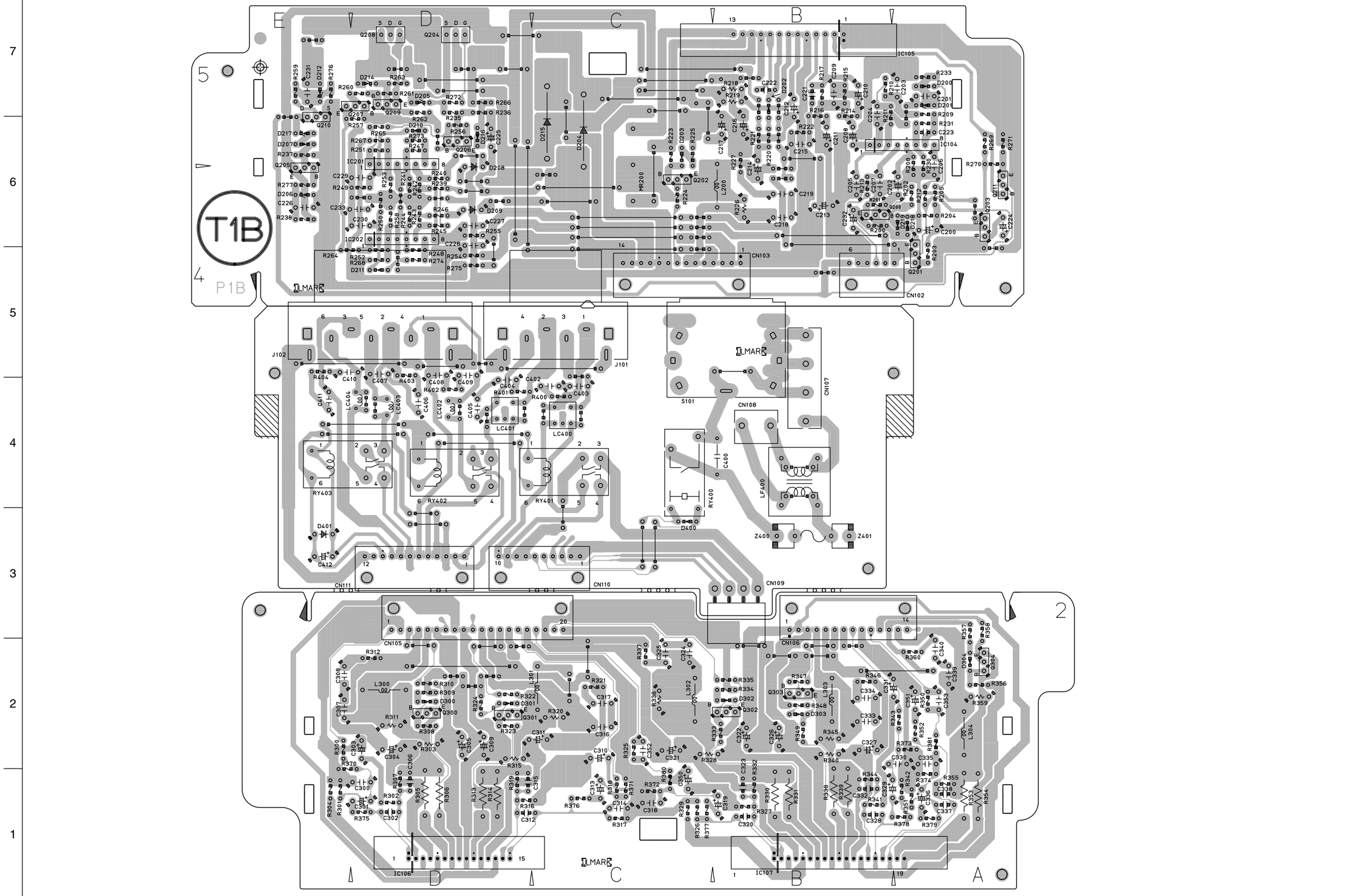
(Surface view)



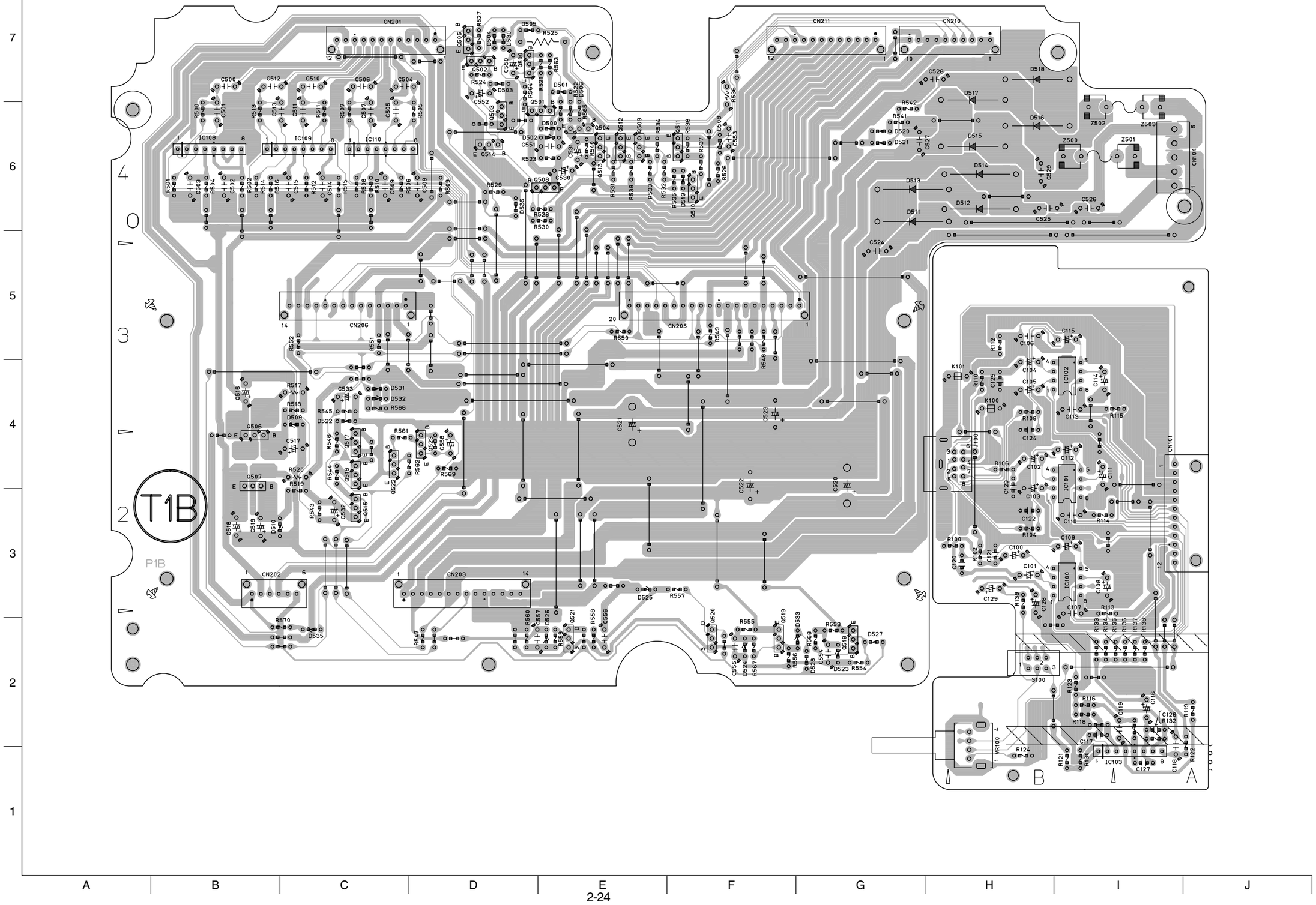
(Bottom view)



■ Powered subwoofer board (SP-PWA9) 1/2



■ Powered subwoofer board (SP-PWA9) 2/2



— MEMO —