



Kappa Five

5 CHANNEL POWER AMPLIFIER

SERVICE MANUAL



Infinity Systems Incorporated
250 Crossways Park Dr.
Woodbury, New York 11797

Released 2009
Discontinued XXXX

Rev1 6/2010

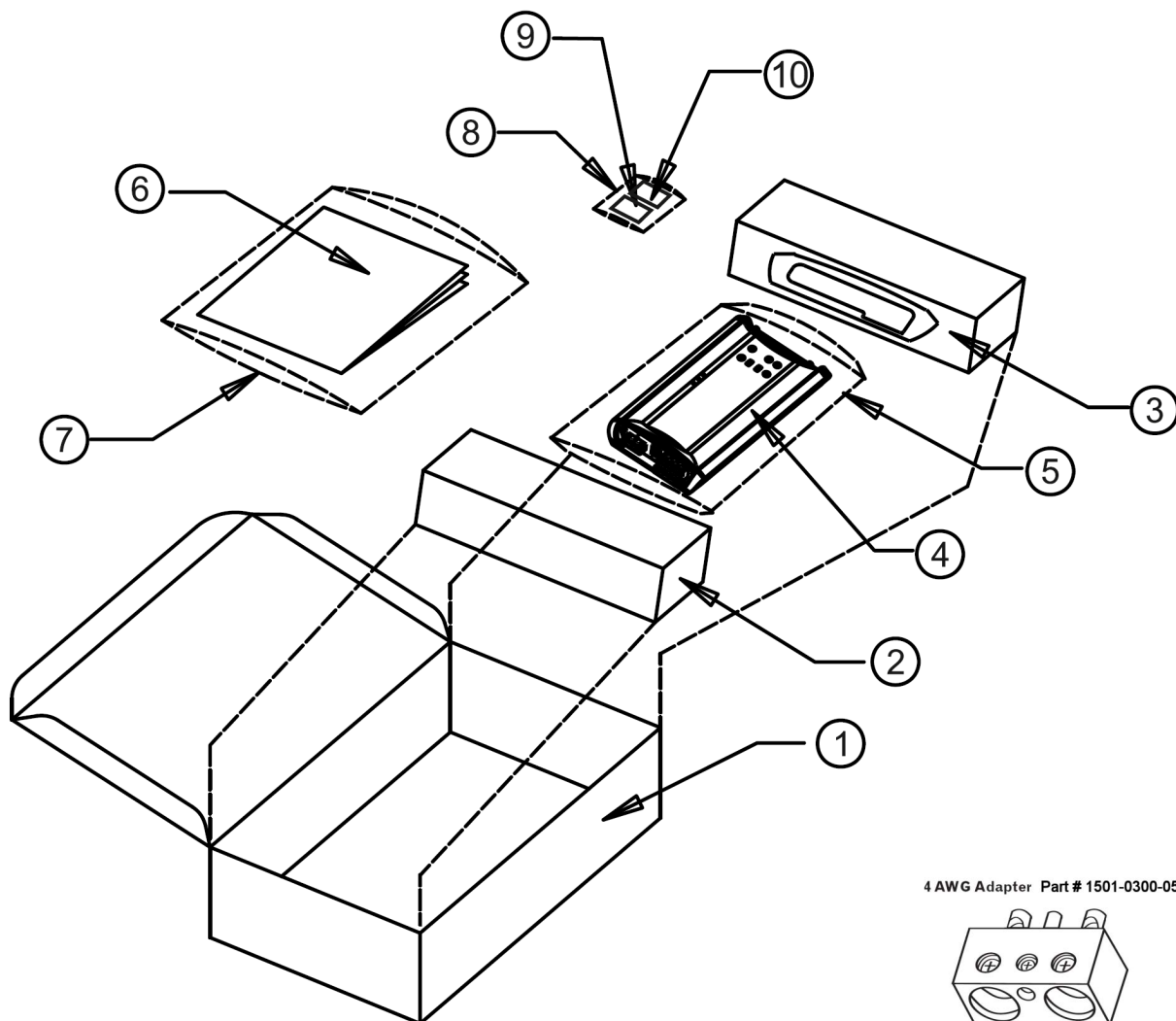
- CONTENTS -

SPECIFICATIONS	1
PACKAGING.....	2
CONTROL/INSTALLATION INSTRUCTIONS.....	3
CONTROL/INSTALLATION DRAWINGS.....	4
BASIC TROUBLESHOOTING.....	5
EXPLODED VIEW/PARTS LIST.....	6
DISASSEMBLY INSTRUCTIONS.....	7
AMPLIFIER BLOCK DIAGRAM.....	8
ELECTRICAL PARTS LIST	9
P.C.B. DRAWINGS.....	15
IC/TRANSISTOR PINOUTS.....	29
SCHEMATICS.....	37

Kappa Five Specifications

Output Power: (14.4V supply)	50W RMS x 4 channels @ 4 ohms $\leq 1\%$ THD + N & 200W RMS x 1 channel @ 4 ohms; $\leq 1\%$ THD + N 75W RMS x 4 channels @ 2 ohms; $\leq 1\%$ THD + N & 300W RMS x 1 channel @ 2 ohms; $\leq 1\%$ THD + N
Bridged (3 channel)	150W RMS x 2 & 200W RMS x 1 @ 4 ohms $\leq 1\%$ THD + N
Total Peak Power	1200W
Signal-to-noise ratio:	85dBA (reference 1W into 4 ohms) 100dBA (reference rated power into 4 ohms)
Frequency response:	10Hz – 75kHz & 20Hz – 320Hz (–3dB)
THD+N 1KHz LPF=22KHz	$\leq 0.05\%$ (rated power @ 4 ohms)
Output Regulation	0.03dB @ 4 ohms
Input Impedance	>20K ohms
Maximum input signal:	6.0V
Maximum sensitivity:	200mV
Bass Boost @ 50Hz	0-12dB
Channel Separation	≥ 50 dB
DC Offset	<30mV
Idle Current @ 4 ohms	2.0A
Max Current Draw	≤ 80 A
Remote Operating Voltages	ON 5V OFF 4V
Turn On Delay Time (sec)	2 - 3
Circuit Protection	Temperature (75C), Short circuit, over/under voltage
Operating voltage range	(8-16V)
Dimensions:	14 x 7 x 1.7" (360 x 179 x 44mm)
Fuses:	(2) x 40A

Infinity Systems continually strives to update and improve existing products, as well as create new ones. The specifications and details in this and related JBL publications are therefore subject to change without notice.



NO.	PART NO.	DESCRIPTION	QTY
1	CH4532371020	Outer Carton	1
2	BZL23094A112	Left Packing Foam	1
3	BZL23094A111	Right Packing Foam	1
4	KAPPA FIVE	Kappa Five Amplifier	1
5		Plastic Bag	1
6	Visit www.infinitysystems.com	Owner's Manual	1
7		Plastic Bag	1
8	Accessories see below		
9	LS1BA0402507	Screw	4
10	1601-403G-01	40A Fuse	2

Installation Warnings and Tips:

- Disconnect the negative (–) lead from your vehicle's battery.
- At the installation sites, locate and make a note of all fuel lines, hydraulic brake lines, vacuum lines and electrical wiring. Use extreme caution when cutting or drilling in and around these areas.
- Choose a safe mounting location away from moisture.
- Make sure there is sufficient air circulation at the mounting location for the amplifier to cool itself.
- Mount the amplifier, using the supplied hardware.

Specifications

- 50W RMS x 4 channels & 200W RMS x 1 channels @ 4 ohms <1% THD + N*
 - 75W RMS x 4 channels & 300W RMS x 1 channels @ 2 ohms <1% THD + N*
 - Total peak power: 1200W
 - Frequency response: 10 to 75kHz & 20 to 320Hz (–3dB)
 - Maximum input signal: 6V*
 - Maximum sensitivity: 200mV*
 - THD + N: 0.05%
 - Signal-to-noise ratio: 85dB (reference to 1 watt)
 - Signal-to-noise ratio: 100dB (reference to rated power)
- * CEA-2006A-compliant

1 Speaker Output Connectors

- Connect the speakers to these terminals, observing proper polarity. Gold screws indicate +, and silver screws indicate –.
- Five-channel operation: Connect the front left speaker to the Front L+ and L– terminals and the front right speaker to the Front R+ and R– terminals. Repeat for the rear speakers, using the Rear L+ and L– terminals, and the Rear R+ and R– terminals. Connect the subwoofer to the Sub+ and Sub– terminals.
- Four-channel operation: Connect the stereo speakers to the Front terminals, as above. The single speaker, into which the amplifier's rear channels will be bridged, must be connected to the Rear terminals marked "B." Connect the subwoofer to the Sub+ and Sub– terminals.
- Three-channel (bridged) operation: Connect one speaker to the Front terminals marked "B." Connect the other speaker to the Rear terminals marked "B." Connect the subwoofer to the Sub+ and Sub– terminals.
- Minimum speaker impedance for stereo operation is 2 ohms. Minimum speaker impedance for bridged operation is 4 ohms. Minimum subwoofer impedance is 2 ohms.

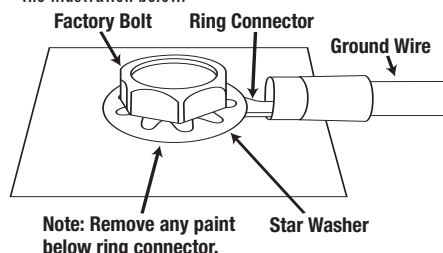
2 Fuses

- Replace only with the same type and rating.

3 Power Input Connectors

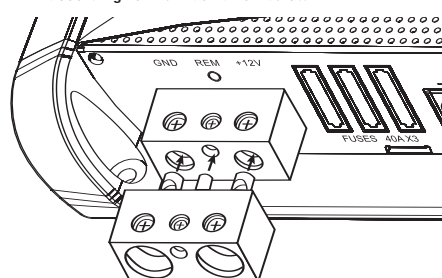
- +12V: Connect to the positive terminal of the vehicle's battery. 4 AWG wire is recommended. Install an appropriate fuse holder and fuse (80A minimum) within 18" of the battery. Make sure the wire is not damaged or pinched during installation. Install protective grommets when routing wires through the firewall or other sheet metal.

- GND: Connect to the vehicle's chassis. Refer to the illustration below.



3a 4 AWG Adapter

- For power wire longer than 4' (1.2m), 4 AWG wire is recommended. Use the adapter to make the connection according to the illustration below.



4 Protect LED

- Illuminated under any of the following fault conditions: battery over/under voltage, short circuit in speaker wires, amplifier is too hot, amplifier's output circuit has failed (DC voltage present in the amplifier's output).

5 Power On LEDs

- Illuminated when the amplifier is on.

6 Subwoofer Low-Pass Filter Frequency Control

- 12dB/Octave low-pass filter, variable from 32Hz to 320Hz.
- See 20 for the adjustment procedure.

7 Subwoofer Input-Level Control

- Used to match the SUB input of the amplifier to the output of the source unit.
- See 20 for the adjustment procedure.

8 Rear Input-Level Control

- Used to match the rear input level of the amplifier to the output level of the source unit.
- See 20 for the adjustment procedure.

9 Front Input-Level Control

- Used to match the input level of the amplifier to the output level of the source unit. See 20 for the adjustment procedure.

10 Front Crossover-Frequency Control

- 12dB/Octave crossover, variable from 32Hz to 320Hz.

11 Rear Crossover-Frequency Control

- 12dB/Octave crossover, variable from 32Hz to 320Hz. See 20 for the adjustment procedure.

12 DBQ: Variable Subsonic High-Pass Filter With Variable Boost (Q)

- For woofers in tuned (vented) enclosures, set the frequency control to a value 10Hz below the enclosure's resonance (tuned) frequency.
- For woofers in sealed boxes, set the frequency control to any value you prefer between 30Hz and 50Hz.
- Set the Boost control according to your preference, being careful not to apply enough boost to damage your woofer(s).

- A** Boost (Q) control provides up to 12dB of boost, slightly above the high-pass filter's frequency. See 12 for appropriate settings.

- B** High-Pass Filter Frequency control, variable between 10Hz and 80Hz. See 12 for appropriate settings.

13 Rear Crossover-Filter Selector

- LP: Select for subwoofer(s) or to provide a low-pass filter for separate mid-bass speakers. The subsonic filter will provide a high-pass filter for separate mid-bass speakers.
- FLAT: Select for full-range speakers when no subwoofer will be used in the system.
- HP: Select for midrange speakers or full-range speakers when a subwoofer is used in the system.

14 Front Crossover-Filter Selector

- LP: Select for subwoofer(s).
- FLAT: Select for full-range speakers when no subwoofer will be used in the system.
- HP: Select for midrange speakers or full-range speakers when a subwoofer is used in the system.

15 Input Selection Switch

- If you are using RCA-type inputs and the source unit has a subwoofer output, and you have connected it to the SUB input, set this switch to the EXT position. Otherwise, set it in the INT position.

16 Subwoofer Input Connector (RCA)

- Connect to subwoofer RCA-type outputs from the source unit or signal processor.

17 Rear Input Connectors (RCA)

- Connect to rear RCA outputs from the source unit, or signal processor.

18 Front Input Connectors (RCA)

- Connect to front RCA outputs from the source unit or signal processor.

19 Rear Input Signal Selection Switch

- If your source unit has only front RCA-type outputs and they are connected to the amplifier's Front input connectors, move this switch to the FRONT setting. If your source unit has 4 RCA-type outputs, leave it in the 4CH position.

20 Setting Gain (Input Level)

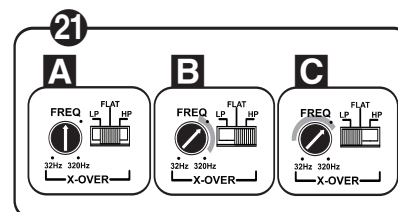
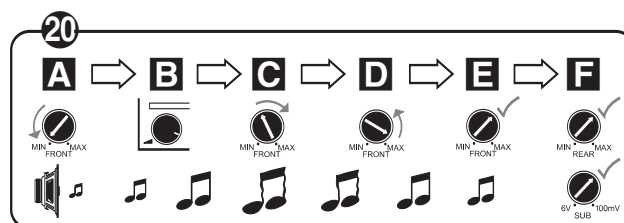
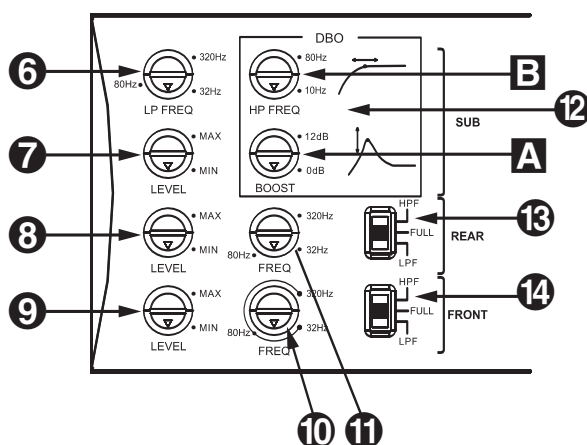
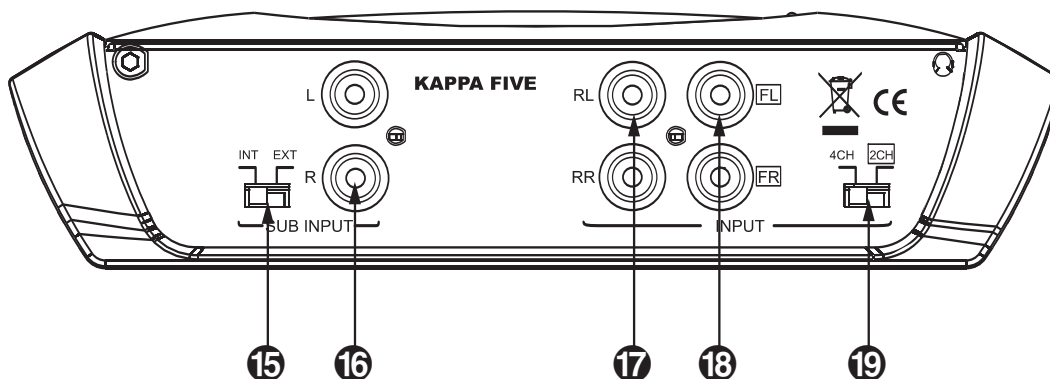
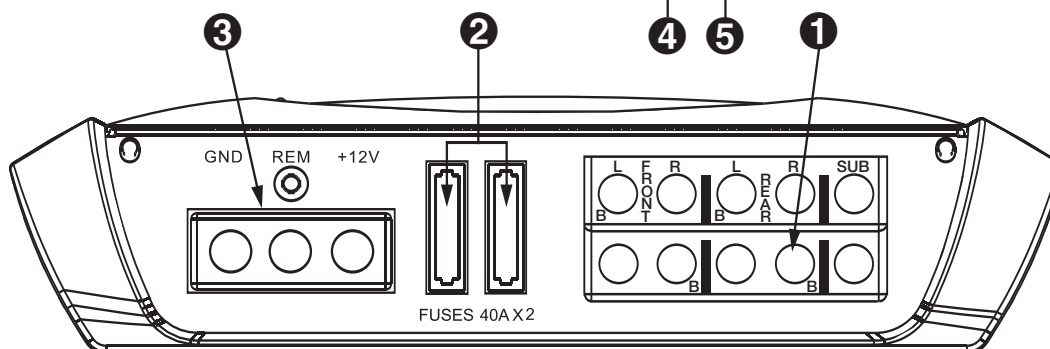
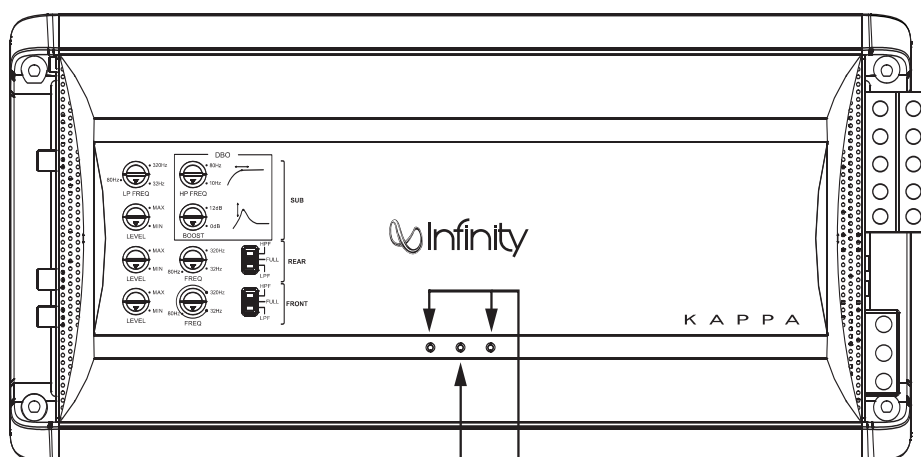
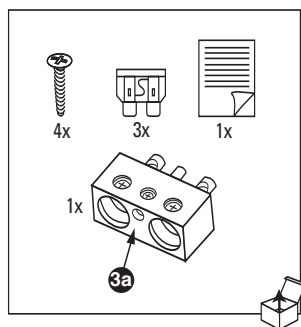
- A** Turn all Gain controls counterclockwise to 6V (minimum).
- B** With a dynamic music track playing, turn the head unit's volume control to the 3/4 position.
- C** Turn Front Gain control clockwise until the music is so loud that it no longer sounds clear (distortion is present in the output).
- D** Turn Front Gain control counterclockwise gradually, just until the music sounds clear, once again.
- E** Front Gain is now adjusted correctly.
- F** Adjust Rear- and Sub-Gain controls so that the level of the rear speakers is proportionate to the level of the front speakers, according to your preference.

21 Setting the Crossover

- A** Crossover setting for 5" or larger full-range speakers when no subwoofer is included in the system.
- B** Crossover setting for full-range speakers when a subwoofer is included in the system.
- C** Crossover setting for subwoofers.

Note: Acceptable frequency ranges indicated in gray.

This product is designed for mobile applications and is not intended for connection to the mains.
A valid serial number is required for warranty coverage.
Features, specifications and appearance are subject to change without notice.



Amplifier Troubleshooting Guide

1. Status LED on Amplifier not Lit - Head Unit (Source) Turned ON

Verify:

- A. Remote turn-on wire from source to amplifier has proper voltage
- B. Power (B+) connections at amplifier, terminal blocks, and battery are secure
- C. Ground (GND) connections at amplifier and vehicle chassis are secure
- D. Battery B+ fuse (if used) is OK
- E. Amplifier fuse is OK
- F. B+ at battery and B+ at amplifier has proper voltage

2. Status LED's Lit, No Output from Speakers in Normal Operating Condition

Verify:

- A. RCA cables from amplifier to source are securely connected
- B. Volume adjustment on amplifier is correctly adjusted
- C. Source is ON and playing

3. Engine Noise From Speaker(s)

Turn source OFF, Disconnect RCA cables at amplifier. If noise stops, check equipment & cables leading to amplifier.

Verify:

- A. RCA cables are of good quality with no breakage to internal shields
- B. RCA cables from source to amplifier are not run alongside any power cables

4. Amplifier Output Distorted Music

Verify:

- A. Source output music to amplifier is not distorted
- B. Source output sensitivity is correctly adjusted

5. Amplifier Shuts Down, Green LED's are Lit - Amplifier is in Thermal Protection Mode

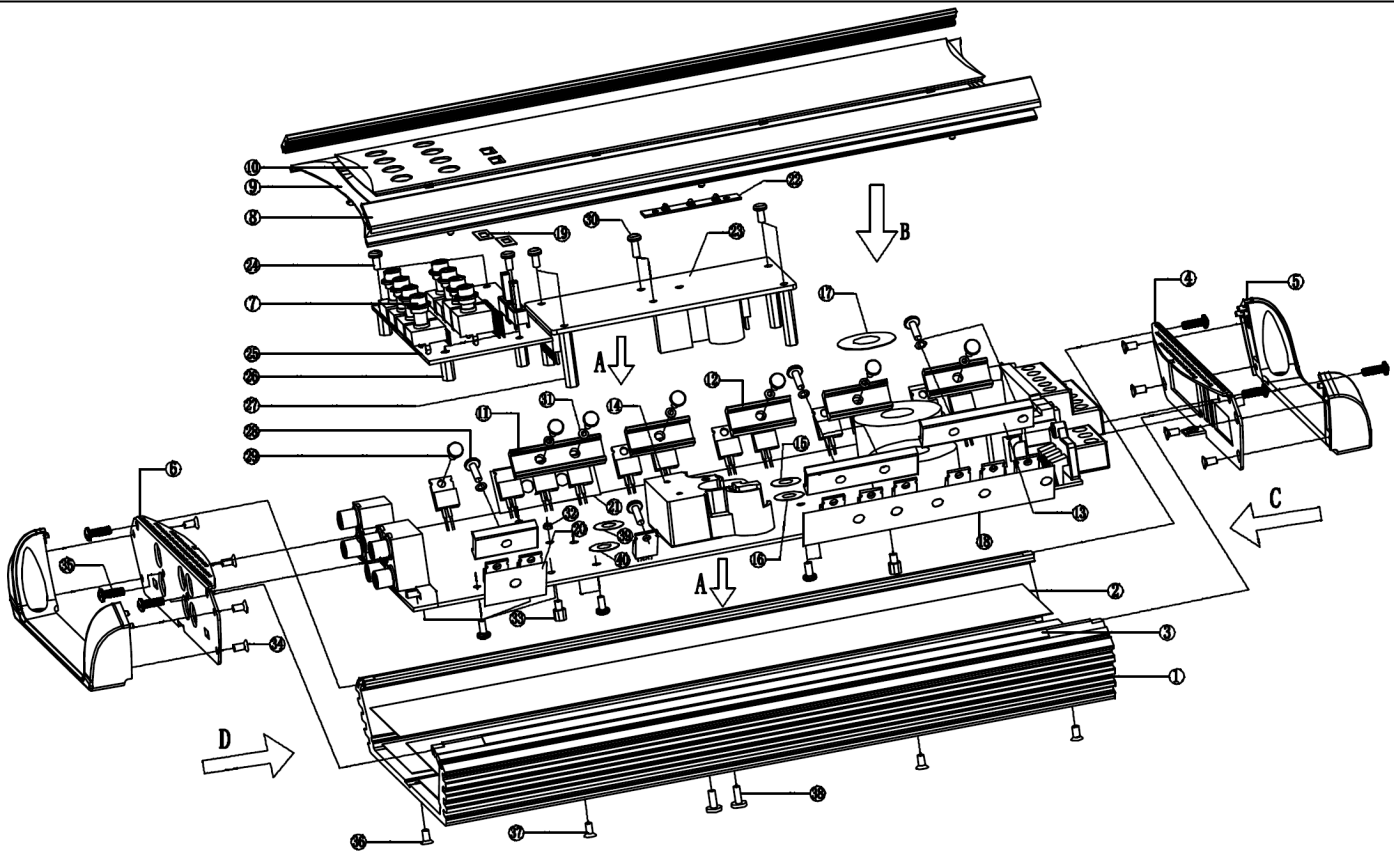
Verify:

- A. Amplifier is mounted with adequate air circulation around heatsinks or vents
- B. Amplifier is not mounted under carpet or sealed enclosure
- C. Speakers meet correct impedance for application (mono or stereo hookup)

6. Amplifier Does Not Turn ON, and Red LED is Lit Amplifier (and not Connected to a Shorted Speaker)

Verify:

- A. Speaker crossover (if used) is not defective



ITEM#	PART NUMBER	DESCRIPTION	QTY
1	SR-KAPP-0223	Main heat sink	1
2	JY431459A03X	Insulation	2
3	DQC270055080	Pad	2
4	HG-0039-0507	Rear panel	1
5	SG-0001-0133	Side Panel	2
6	MK-0146-0507	Front panel	1
7	XN-10503-001	Knob, Control	8
8	ZS-A00020133	Side Bar	2
9	SG-0012-0501	Top Plate	1
10	CP-A00020508	Cover, Top, Plastic	1
11	PL-A0060-000	Clamp, Transistor 43x13x5.6	2
12	PL-A0010-250	Clamp, Transistor 30x13x5.6	5
13	PL-A0002-250	Clamp, Transistor 53x13x5.6	1
14	SR-KAPP-0325	Heatsink, MOSFET	1
15	JY412000003X	Mat, Capacitor	3
16	JY417000003X	Mat, Capacitor	2
17	JY442A24A05X	Paper, Insulation	3
18	JY298A20A01X	Mica Insulation 98x20.9x0.1	1
19	FH-G00040500	Mat	2
20	JY233A20A01X	Mica Insulation 33x20.9x0.1	4
21	JY248A20A01X	Mica Insulation 48x32x0.1	1
22		LED PCB	1
23		Amplifier PCB	1
24	LS1AM0300601	Screw PM3*6	16
25		Preamp PCB	1
26	ZL-10030A-11	Stand off	4
27	ZL-10031A-11	Stand off	4
28	LS1JM0401401	Screw BM4*14	11
29	LS1JD0260501	Screw BT2.6*5	2
30	LS1AM0300801	Screw PM3*8	3
31	DQ5066040102	Spring Pad	11
32	LM-1030025-1	Heatsink Nut	2
33	ZL-10029A-11	Stand off	2
34	LS1FY0300501	Screw KM3*5	8
35	LS1JT0301001	Screw BT3*10	9
36	LS1FM0300501	Screw KM3*5	2
37	LS1FM0300601	Screw KM3*6	2
38	LS1BY0300801	Screw CM3*8	2
39	JY415000003X	Mat, Capacitor	1
40	JY421000003X	Mat, Capacitor	2

KAPPA FIVE DISASSEMBLY INSTRUCTIONS

NOTE keep track and separate any and all screws; they are dissimilar.

For examination:

- 1) Remove the two screws at opposite ends on the bottom of the heatsink.
- 2) Remove the end panel on the Input side only, four Phillips screws.
- 3) Slide both pieces of silver trim off the heatsink.
- 4) Remove the top cover; it will be attached with a cable so unplug the connector.

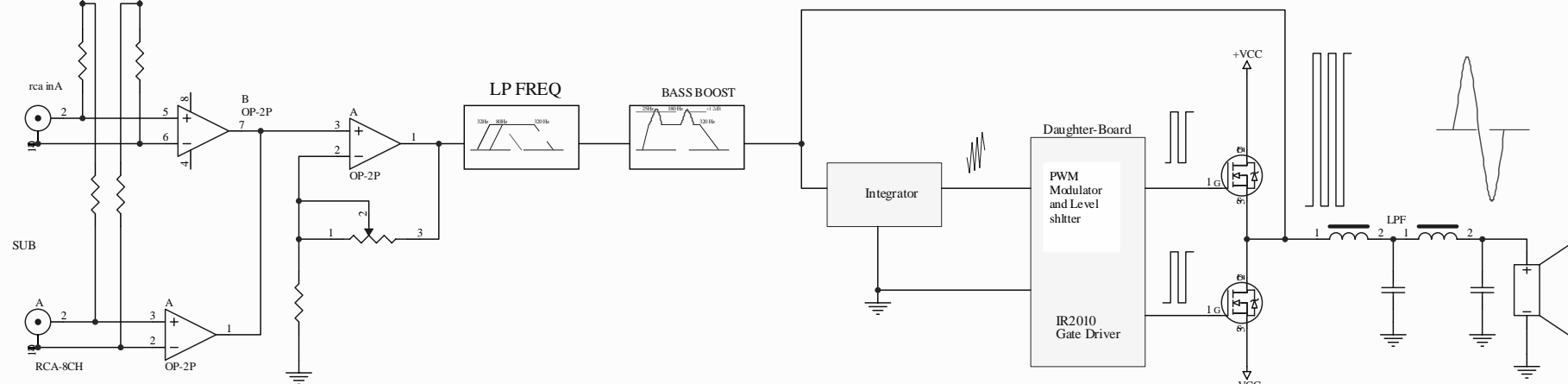
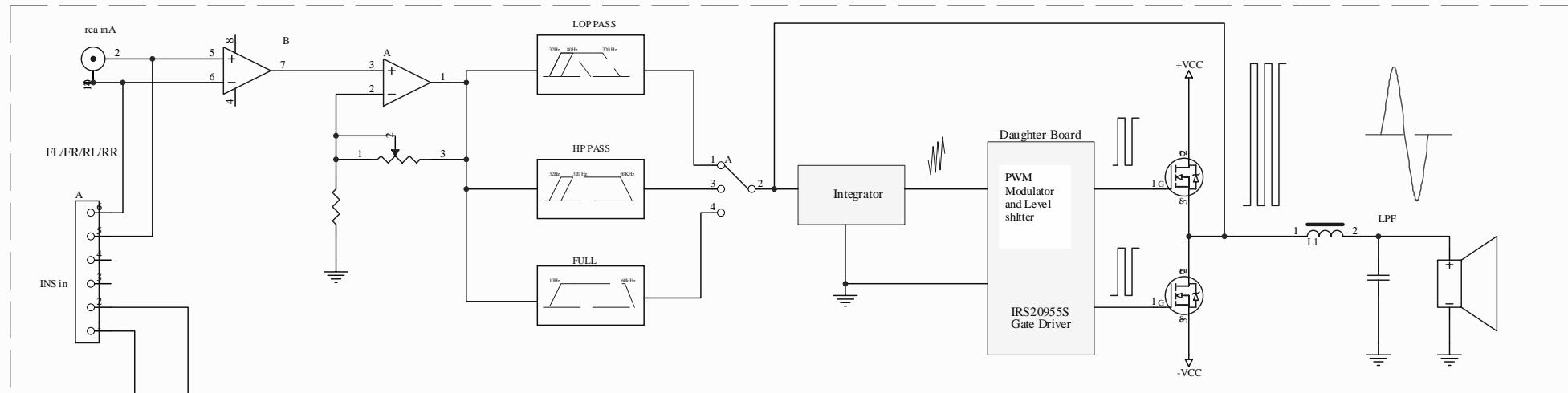
For most component repairs on the MAIN PCB, the entire PCB must be removed from the heatsink.

Note the 4 channel output MOSFETS (IRF6645) are an exception; skip to steps 1-5 below.

- 5) Remove the Output end panel, five Phillips screws.
- 6) Remove the terminal screws to the Power connections, and top row only of the speaker terminals.
- 7) Remove the remaining four Phillips screws on the bottom of the heatsink. There are two nuts which may spin on the machine screws; look at the top of the PCB.
- 8) Remove all Phillips screws holding the Aluminum transistor clamps on; remove the clamps. Two screws holding two additional TO-220 devices should be removed.
- 9) Remove the Amplifier PCB; six Philips screws. The PCB will then pull straight up and off the MAIN PCB.
- 10) Slide the complete PCB out of the heatsink channel.

Access to the (8) output MOSFETS Q3A, Q4A, Q5A, Q6A, Q2, Q8, Q13, Q14

- 1) Follow steps #1-4 above.
- 2) Remove the two centermost screws on the bottom of the heatsink.
- 3) Follow step #9 above to remove the Amplifier PCB
- 4) Remove the gray heatsink from the PCB by grasping and pulling it straight out – it is only held on by friction from the white heatsink compound.
- 5) The (8) output MOSFETS are underneath the rectangular insulator on the PCB.



-				DWG NO.
PARTNAME:				PARTNO:
方框图	SCALE:	UNIT: MM	DRAW BY: Huilian Li	DATA:
PRODUCT MODE:	SIZE: A2	APPROVED BY:		DATA:
Kappa Five	REV:			

KAPPA FIVE Electrical Parts List				
Part Number	Description		Qty	Reference Designator
Main PCB				
<i>Resistors</i>				
0702-0106-03	Resistor	10 1.5 10.5MM H16.5MM	1	R123P
0703-2000-01	Resistor	1/4W 0Ω ±1%	3	J23 J2 J18
0704-4220-02	Resistor	1W 22Ω ±5%	3	RR1 R180P R183P
07031185XK03	Resistor	1/8W 1.85K ±1%	1	R153PP
0704-64R7-02	Resistor	2W 4.7Ω ±5%	3	R125E R126 R153P
0704-6222-02	Resistor	2W 2.2K ±5%	2	R118E R119E
0706-A160-02	Resistor	10W 16Ω ±5% 23*13*13MM	1	R1A
0701-2000-02	Resistor	SMD 0Ω 1/8W ±5% 0805	9	R132A R132B R132C R132D L21 L22 L25 L26 L28
0701-2100-02	Resistor	SMD 10Ω 1/8W ±5% 0805	1	RR
0701-A220-02	Resistor	SMD 22Ω 1W ±5% 2512	7	RR2 RR3 RR4 R126P R126PB R110PB R110P
0701-2220-02	Resistor	SMD 22Ω 1/8W ±5% 0805	6	R130G R128E R129E R130E R129G R127E
0701-2101-02	Resistor	SMD 100Ω 1/8W ±5% 0805	8	R170P R171P R172P R173P R174P R175P R176P R177P
0701-2221-02	Resistor	SMD 220Ω 1/8W ±5% 0805	3	R121 R53 R158PP
0701-2102-02	Resistor	SMD 1KΩ 1/8W ±5% 0805	20	R115E R411 R111A RA105P RA104P R104P R105P R111C R111B R111D R126B R120 R104D R104A R113 R104B R213 R413 R104C R313
0701-2222-02	Resistor	SMD 2.2KΩ 1/8W ±5% 0805	4	R58 R116E R117E R121S
0701-2272-02	Resistor	SMD 2.7KΩ 1/8W ±5% 0805	3	R52 R111P R123S
0701-2332-02	Resistor	SMD 3.3KΩ 1/8W ±5% 0805	2	R7 R8
0701-2392-02	Resistor	SMD 3.9KΩ ±5% R0805	3	R218E R219E RA33
0701-2472-02	Resistor	SMD 4.7KΩ 1/8W ±5% 0805	1	R3
0701-2512-02	Resistor	SMD 5.1KΩ 1/8W ±5% 0805	1	R151G
0701-2562-02	Resistor	SMD 5.6KΩ 1/8W ±5% 0805	2	R507G R502G
0701-2682-02	Resistor	SMD 6.8KΩ 1/8W ±5% 0805	6	R105E R129A R129B R129C R129D R158P
0701-2103-02	Resistor	SMD 10KΩ 1/8W ±5% 0805	30	R705 R706 R707 R708 R52A R105A R105B R105C R105D R107A R107B R107C R107D R114 R123G R124F R125A R125B R125C R125D R126C R128G R131E R138E R158PA R187P R188P R311 R412 R501G
0701-2133-02	Resistor	SMD 1/8W 13KΩ ±5% 0805	1	R314
0701-2153-02	Resistor	SMD 15KΩ 1/8W ±5% 0805	5	R51 R158PD R161PA R508G RA279E
0701215K8002	Resistor	SMD 15.8K 1/8W ±1% 0805	1	R126D
0701-2203-04	Resistor	SMD 20KΩ 1/8W ±5% 0805	3	RA34 R312 R123F
0701-2223-02	Resistor	SMD 22KΩ 1/8W ±5% 0805	20	R108 R208 R308 R408 R701 R101 R103E R110B R114A R114B R114C R114D R127G R139E R201 R301 R315 R401 R501 R601
0701-2303-02	Resistor	SMD 30KΩ 1/8W ±5% 0805	2	R126A R126G
0701-2393-02	Resistor	SMD 39KΩ ±5% 0805	3	R507 R607 RA278
0701-2433-02	Resistor	SMD 43K 1/8W ±5% 0805	1	R137E
0701-2473-02	Resistor	SMD 47KΩ 1/8W ±5% 0805	35	R102 R103 R105 R106 R110A R110C R110D R133A R133C R134A R134C R202 R203 R205 R206 R302 R303 R305 R306 R402 R403 R405 R406 R502 R503 R505 R506 R509S R602 R603 R605 R606 R709S R809S R609S
0701-2563-02	Resistor	SMD 56KΩ 1/8W ±5% 0805	13	R109 R110 R209 R210 R309 R310 R409 R410 R160P R161P R162P R163P R164PP
0701-2623-02	Resistor	SMD 62KΩ 1/8W ±5% 0805	2	R205E R207E
0701-2823-04	Resistor	SMD 82KΩ 1/8W ±1% 0805	1	RA179E
0701-A472-02	Resistor	SMD 4.7KΩ 1W ±5% 2512	4	R4 R5 R6 R9
0701-2273-02	Resistor	SMD 27KΩ 1/8W ±5% 0805	3	R136E R702 R703
0701-A221-02	Resistor	SMD 220Ω 1W ±5% 2512	1	R132E
0701-A103-02	Resistor	SMD 10K 1W ±5% 2512	1	R149P
0701-2104-02	Resistor	SMD 100KΩ 1/8W ±5% 0805	10	R103A R103B R103C R103D R135E R135ES R510S R610S R710S R810S

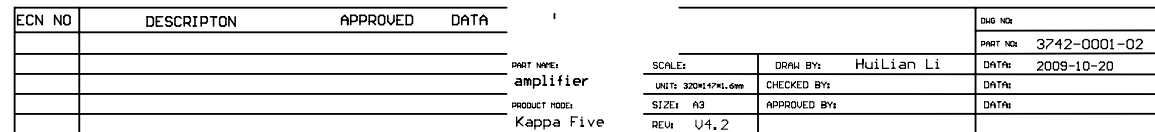
Part Number	Description		Qty	Reference Designator
Main PCB				
Capacitors				
06D341047400	Capacitor	104/100V ±5% 5MM	2	C125E C126E
06D374717400	Capacitor	470pF/100V ±5% 5.5mm	1	C122E
06D232227001	Capacitor	222/100 ±20% 5mm	2	C128L C33
06D231047000	Capacitor	0.1uF/100V ±20% 5MM	3	CC8 C128P C128W
06D322227200	Capacitor	222/100V ±5% 5MM	1	C117E
06D321027200	Capacitor	102/100V ±5% 5MM	2	C150P C152P
06D341037400	Capacitor	103/100V ±5% 5MM	4	CC2 CC44 CC5 CC3
06D1C104C700	Capacitor	104/250V ±10%, CBB, , 10MM,	1	C14
06D1C105G701	Capacitor	105/160V ±10%, CBB, 11.5*8.5*15.5MM,10.5MM,	2	C12 C115E
06D2C106G700	Capacitor	106/160V 20MM 105°C ±20%	2	C123E C124E
06D2C3357700	Capacitor	3.3UF/100V ±20% 105°C 20.5mm	1	C121E
06D3C1059700	Capacitor	105/63V ±5% 5MM MAX:10.5MM*10.5MM*6.0MM	4	C111P C113P C116E C119E
06D212256104	Capacitor	2.2uF/50V ±20% 4*7 105°C	3	C173P CC4 C143
06D212273100	Capacitor	220UF/16V ±20% 6.3*7	2	CA123P CA124P
06D212275101	Capacitor	220UF/35V ±20% 8*14 105°C 5mm	1	C142P
06D212274001	Capacitor	220UF/25V ±20% 8*16 105°C 5mm	6	C601 C501 C401 C201 C101 C301
06D151073100	Capacitor	100UF/16V ±10% 6*5 105°C	1	C142PD
06D211074111	Capacitor	100uF/25V ±20% 6.3*11 105°C 2.5MM	8	C112E C114E C153P C155P C157P CA153P CA248E CC11
06D211064000	Capacitor	10UF/25V ±20% 4*7 105°C 2.5MM	28	C107 C108 C207 C208 C307 C308 C407 C408 C702 C703 C503 C203 C202 C502 C403 C402 C303 C302 C102 C103 C602 C603 C106D C106C C106A C106B C127E C110
06D213366102	Capacitor	33UF/50V ±20% 5*11 105°C 5MM	1	C502G
06D214765167	Capacitor	47UF/35V ±20% 6.3*7 105°C 5MM	3	C154P C11 C9
06D213384013	Capacitor	3300UF/25V ±20% Φ13*28MM 105°C ≤28MM	3	C137P C139P C138P
06D214784016	Capacitor	4700UF/25V ±20% Φ16*28MM 105°C ≤28MM	1	C136P
06D213389025	Capacitor	3300UF/63V ±20% Φ25*28MM 105°C ≤28MM	2	C172P C171P
06D213385018	Capacitor	3300UF/35V ±20% Φ18*28MM 105°C ≤28MM	2	C163P C162P
06D203364000	Capacitor	33uF/25V 6.3*7 ±20% 105°C	2	C105E C109
06D214764102	Capacitor	47uF/25V ±20% 5*11 105°C 5MM	1	C142G
06S121017000	Capacitor	SMD 100PF/100V 0805 X7R ±10%	7	C001 C002 C003 C004 C005 C006 C309
06S321026000	Capacitor	SMD 1000pF/50V 0805 NPO ±5%	4	C105A C105B C105C C105D
06S121047001	Capacitor	SMD 104/100V ±10% X7R 0805 TDK	40	C1 C3 C5 C7 C8 C10 C18 C19 C20 C24 C25 C26 C27 C28 C29 C30 C120P C125P C129PB C130PB C131PB C132PB C140P C167G C167P C168G C169P C170P C509S C609S C709S C809S CA3 CA7 CA125P CA126P CA126PA C113E C104E C166PS
06S13104C001	Capacitor	SMD 104/250V ±10% X7R 1206 TDK	1	C127P
06S321006000	Capacitor	SMD 10pF/50V 0805 NPO ±5%	7	C704 C504 C604 C404 C304 C104 C204
06S123326000	Capacitor	SMD 332/50V ±10% X7R 0805	6	C104A C104B C104C C104D C104F C108P
06S122246002	Capacitor	SMD 224/50V ±10% X7R 0805 TDK	7	CC10 CC9 CC7 CC6 CC1 C105P CA8
06S124727000	Capacitor	SMD 472/100V 0805 X7R ±10%	6	C1A C3A C21 C22 C23 C34
06S124736000	Capacitor	SMD 0.047uF/50V 0805 X7R ±10%	2	C2A C4A
06S322206000	Capacitor	SMD 22pF/50V 0805 NPO ±5%	14	C506 C505 C605 C606 C406 C405 C306 C206 C106 C105 C205 C305 C116A C116C
06S132256000	Capacitor	SMD 2.2uF/50V 1206 X7R ±10%	3	C6A C501G C100
Semiconductors				
04ZL-5404-06	Diode	ASC SPA 1N5404 DO-201AD 3A 400V 52MM	1	D1
03P1-A940-02	Transistor	2SA940 PNP TO-220	1	Q202
03N1-2073-02	Transistor	2SC2073 NPN TO-220	1	Q201
03N1-P31C-02	Transistor	TIP31C TO-220 NPN	1	QA1
03T1-K117-01	FET	2SK117BL TO-92 N channel	5	Q107E Q100A Q100B Q100C Q100D
03N1-669A-07	Transistor	2SD669A NPN TO-126	1	QA109E
03T2-7805-01	Regulator	78L05 TO-92 5V/100MA	2	U107 U102E
0100-9L05-03	Regulator	79L05 TO-92 5V/100MA	2	U108 U103E
01NS-M317-04	Regulator	VREG ADJ 1.2-37V 1.5 AMP TO-220 LM317	1	U102P
03D1-38N2-02	Mos Fet	IRFB 38N20D TO-220	4	Q100E Q101E Q102E Q103E

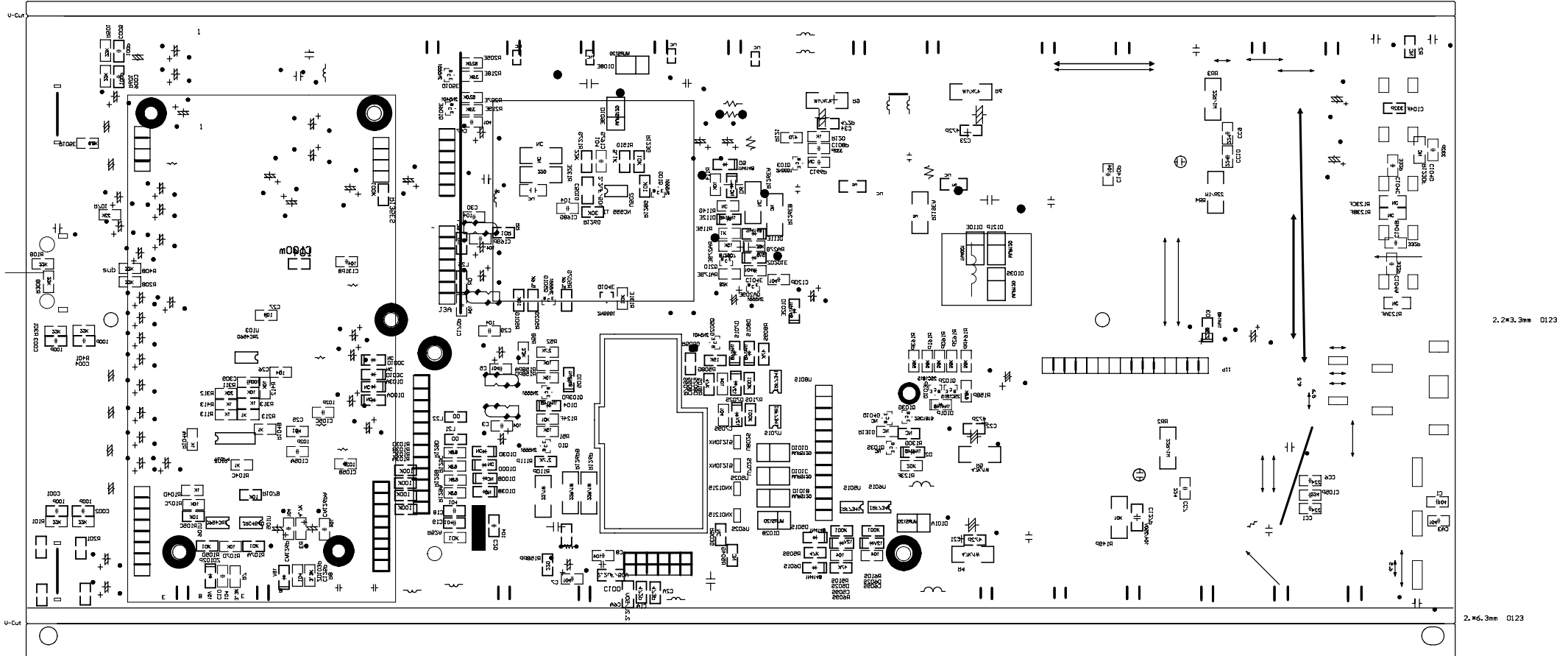
Part Number	Description		Qty	Reference Designator
Main PCB				
03T1-Z48V-02	Mos Fet	IRFZ 48V TO-220	8	Q113P Q114P Q116P Q117P Q118P Q119P Q120P Q115P
04WY-12BV101	Zener Diode	SMD 12V DO-213AA 0.5W	5	ZA102P D502S D602S D702S D802S
04WY-15BV111	Zener Diode	SMD 15V SOD-123 0.5W	3	ZD102P ZD103P ZDA1
04WY-56AV101	Zener Diode	SMD 5.6V DO-213AA 0.5W	1	ZD201E
04ZL-4007-02	Diode	SMD FM4007 DO-214AC	1	D110E
04PT-4148-11	Diode	SMD 1N4148 SOD-123	20	D2 D3 D5 D101E D102E D104 D104E D105 D101P D105E D106E D107E D111E D116P D501S D601S D701S D801S D112E D4
04ZL-2512-00	Diode	SMD MUR120 1A 2512	12	D101A D101B D101C D101D D102A D102B D102C D102D D108E D109E D103S D121P
03P1-5401-04	Transistor	SMD MMBT5401LT1 PNP SOT-23	3	Q106E Q502G Q102PA
03N1-5551-04	Transistor	SMD MMBT5551LT1 NPN SOT-23	10	Q104PD Q10 Q103 Q104E Q105E QA209E Q103PD Q123P Q501G Q10G
03N1-1815-04	Transistor	SMD 2SC1815 SOT-23 NPN	4	Q103S Q102P Q103G Q103P
03P1-2907-04	Transistor	SMD BT2907 SOT-23 PNP	1	Q210
01JR-4560-08	Dual Op-amp	SMD 4560 SOP-8 JRC	7	U103A U501 U201 U101 U103 U105 U106
01ST-L074-08	Quad Op-amp	SMD TL074 SOP-14	1	U102
03N1-XN15-03	Dual Transistor	SMD XNO1215 NPN SC-74J	4	U502S U602S U702S U802S
0100-NE55-08	Timer	SMD NE555 SOP-8	2	U1 U502
0100-IRF7-08	Mos Fet	SMD IRF7341 SOP-8	4	U501S U601S U701S U801S
2202-1602-05	Dual Diode	DIP UF1602CT AKA 16/200V TO-220	2	D117P D118P
2202-20RG-05	Dual Diode	DIP MUR1620RG KAK 16A/200V TO-220 ON SEMI	2	D119P D120P
Miscellaneous				
1001-2002-10	Inductor	DIP 20uH Φ 25*26MM T106-2	1	L101E
1001-4001-10	Inductor	DIP 40uH Φ 31*28MM T130-2 Φ 1.6	1	L100E
1004-0005-10	Inductor	W5 RH 3.5*8*0.8-2	8	L14 L15 L16 L17 L18 L19 L20 R1
1004-0004-10	Inductor	DIP 3.5MM/L=5MM 0 Ω 7.5MM	2	L24 L23
1501-0809-0A	pin holder	DIP 8P PITCH2.54MM	2	J2A J1A
1501-1209-08	pin holder	DIP 12P PITCH2.54MM	2	CON3A CON2A
1501-0409-04	pin holder	DIP 4P PITCH2.54MM	2	J3A J4A
1505-0609-01	pin holder	DIP 2*6P PITCH2.54MM*2.54MM	1	CON1A
1401-0008-00	Fuse Holder	DIP 2PIN BXS2-09	1	for F101P
1601-403G-01	Fuse	DIP 40A/32V UL Littelfuse	4	F101P
1380-0209-00	Temperature switch	DIP80°C \pm 5°C TO-220 2PCS	1	TH351
1500-1012-B1	Terminal	10P JSZ10-26A SPEAKER TERMINAL	1	J1
1501-0300-04	Terminal	DIP JS23A-25A 3PIN POWER TERMINAL	1	J102P
1332-0206-00	Switch	SK-22H07AG6 SW2P2T-SD INT/EXT 4CHAN/2CHAN	2	SW100E SW100R
24D1-0055191	Grounding cable	1015#18AWG L=55MM 4.2	3	EA1 EA2 EA3
1404-0020-04	QUAD RCA	AV4-8.4-38 QUAD JACK MAIN INPUTS	1	RCA1
3000-KAPP-02	Transformer	Φ 37 5.5:10.5(Φ 0.8*8P: Φ 0.8*4P)	1	T100P
3000-KAPP-03	Transformer	Φ 37 4.5:16.5:6(Φ 0.8*8P: Φ 0.8*4P: Φ 1.0*1P)	1	T101P
1001-4501-10	Inductor	Φ 0.9*4P K6A Φ 16*6 45UH	2	L108 L107
1001-3003-10	Inductor	Φ 0.8*3P K6A Φ 13*6 30UH	2	LL1 LL3
1001-3004-10	Inductor	Φ 0.65*4P K6A Φ 13*6 30UH	3	L106 L104 L105
2901-0000-00	Relay	12A/120VAC 12VDC 20.5*16.5*20.2MM	1	J1E
1001-1301-10	Inductor	Φ 28*12MM(Φ 1.0*6P)*2+1.0*1P K5A 13UH 7.5UH	1	L101
1501-0300-05	Terminal	3P JSZ3-83 180	1	
1404-0027-02	DUAL RCA	AV2-8.4-38 DUAL JACK SUB INPUTS	1	SUB
2102-0058-05	FFC	5Pin 2.0 UL1517 28AWG L=65MM	1	CON201A
1400-0011-08	RJ45	RJ45-10P8C 8PIN IMS INPUT	1	RJ45
Control/Preamp/PWM PCB				
Resistors				
0701-2000-02	Resistor	SMD 0 Ω 1/8W \pm 5% 0805	1	R201E
0701-34R7-04	Resistor	SMD 4.7 Ω 1/10W \pm 5% 1206	3	R43 R42 R21
0701-2100-02	Resistor	SMD 10 Ω 1/8W \pm 5% 0805	2	R23 R23A
0701-2101-02	Resistor	SMD 100 Ω 1/8W \pm 5% 0805	1	R39
0701-2221-02	Resistor	SMD 220 Ω 1/8W \pm 5% 0805	1	R112E

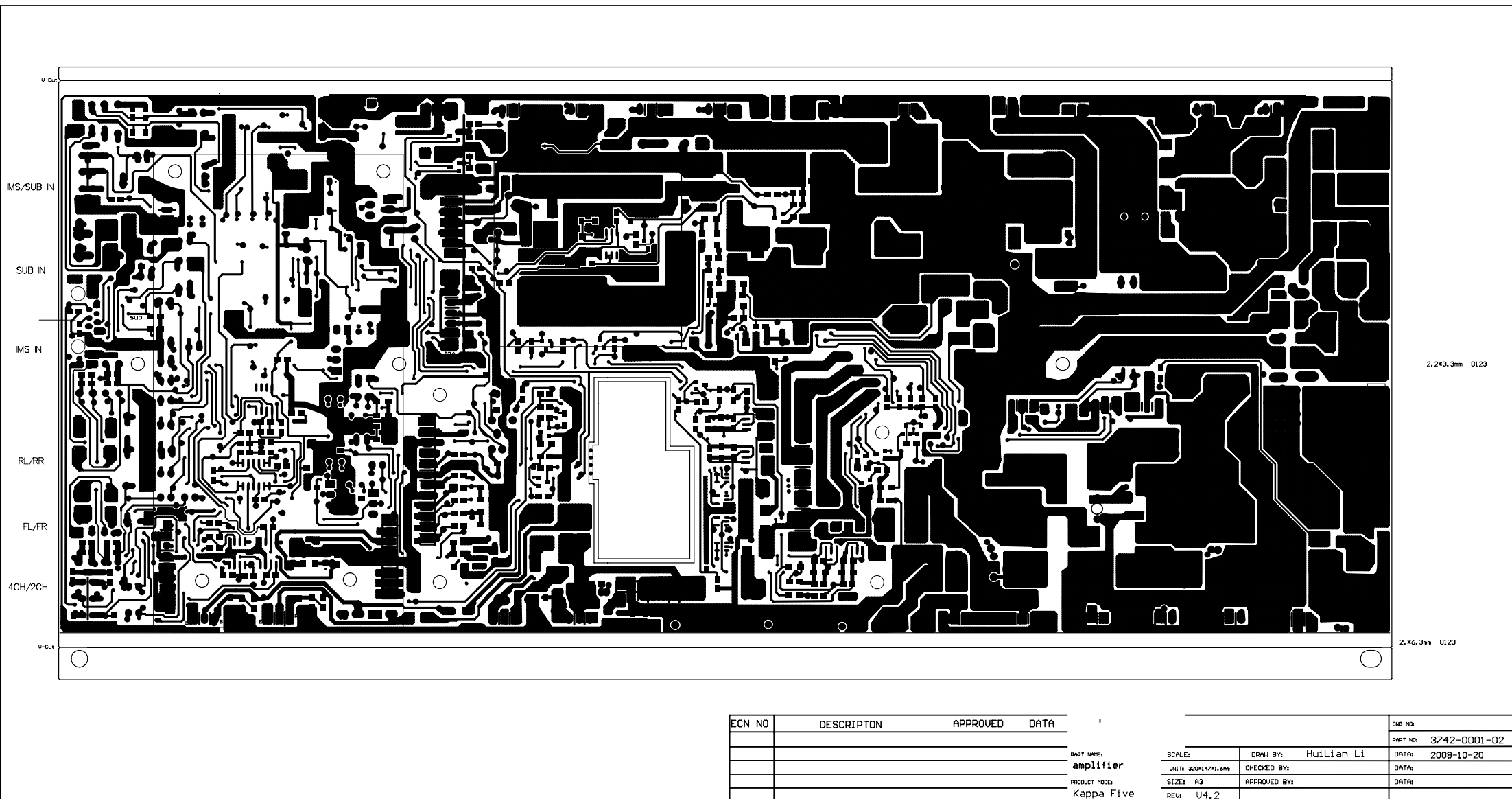
Part Number	Description		Qty	Reference Designator
Control/Preamp/PWM PCB				
0701-2331-02	Resistor	SMD 330Ω 1/8W ±5% 0805	3	R46 R206E R215E
0701-2681-02	Resistor	SMD 680Ω 1/8W ±5% 0805	7	R101E R101A R101B R101D R101C R32 R32A
0701-2182-02	Resistor	SMD 1.8KΩ 1/8W ±5% 0805	1	R114E
0701-2222-02	Resistor	SMD 2.2KΩ 1/8W ±5% 0805	2	R27 R28
0701-2472-03	Resistor	SMD 4.7KΩ 1/8W ±1% 0805	11	R108E R109E R22 R38 R60 R106A R106B R106C R106D R106E R204E
0701-2512-02	Resistor	SMD 5.1KΩ 1/8W ±5% 0805	1	R217E
0701-2752-02	Resistor	SMD 7.5KΩ 1/8W ±5% 0805	8	R108B R108C R108D R109B R108A R109A R109C R109D
0701-2822-02	Resistor	SMD 8.2KΩ 1/8W ±5% 0805	4	R105A R105B R105C R105D
07012909XK03	Resistor	SMD 9.09KΩ 1/8W 0805 ±1%	16	R100B R104B R103B R102B R104A R103A R102A R100A R104D R104C R103D R103C R102D R102C R100D R100C
0701-2103-03	Resistor	SMD 10K 1/8W ±1% 0805	5	R41 R115E R116E R202E R40
0701-2123-02	Resistor	SMD 12KΩ 1/8W ±5% 0805	1	R47
0701-2183-03	Resistor	SMD 18KΩ 1/8W ±1% 0805	1	R113E
0701-2273-03	Resistor	SMD 27KΩ 1/8W ±1% 0805	1	R210E
0701-2363-02	Resistor	SMD 36K 1/8W ±5% 0805	1	R103E
0701-2433-02	Resistor	SMD 43K 1/8W ±5% 0805	2	R211E R216E
0701-2473-02	Resistor	SMD 47KΩ 1/8W ±5% 0805	1	R205
0701-2105-02	Resistor	SMD 1MΩ 1/8W ±5% 0805	1	R220E
0701-2202-02	Resistor	SMD R0805 2KΩ 1/8W ±5%	4	R208E R209E R212E R214E
0701-1102-02	Resistor	SMD 1KΩ 1/10W ±5% 0603	2	R40L R41L
0701-1222-02	Resistor	SMD 2.2KΩ 1/10W ±5% 0603	1	R29
0701-1302-02	Resistor	SMD 3KΩ 1/10W ±5% 0603	1	R24L
0701-1442-03	Resistor	4.42KΩ 1/10W ±1% 0603 SMD	1	R35
0701-1562-02	Resistor	SMD 5.6KΩ 1/10W ±5% 0603	1	R26
0701-1103-02	Resistor	SMD 10KΩ 1/10W ±5% 0603	5	R33 R10 R23L R22L RR
0701-1153-02	Resistor	SMD 15KΩ 1/10W ±5% 0603	2	R19 R25
0701-1183-02	Resistor	SMD 18KΩ 1/10W ±5% 0603	1	R14
0701-1223-02	Resistor	SMD 22KΩ 1/10W ±5% 0603	1	R37
0701-1473-02	Resistor	SMD 47KΩ 1/10W ±5% 0603	1	R30
0701-1104-02	Resistor	SMD 100KΩ 1/10W ±5% 0603	6	R13 R36 R107A R107B R107C R107D
0701-1472-02	Resistor	SMD 4.7KΩ 1/10W ±5% 0603	1	R21L
0701-2102-02	Resistor	SMD 1KΩ 1/8W ±5% 0805	3	R100E R102E R203E
0701-2104-02	Resistor	SMD 100KΩ 1/8W ±5% 0805	1	R24
1204-2041-04	Variable Resistor	B200K/B2K L=20 R1=B200K/R2=B2K ±15% SUB HP FREQ	1	VR103E
1204-2031-33	Variable Resistor	B20K L=20 ±10% REAR, FRONT LEVEL	2	VR100C VR100A
1203-2031-17	Variable Resistor	B20K L=20 ±10% SUB LEVEL	1	VR102E
1203-5011-03	Variable Resistor	B500Ω L=20 ±10% BOOST	1	VR101E
1204-5031-37	Variable Resistor	C50K L=20 ±10% REAR, FRONT FREQ	2	VR101C VR101A
1204-5031-36	Variable Resistor	C50K L=20 ±10% LP FREQ	1	VR100E
Capacitors				
06D214763104	Capacitor	47uF/16V ±20% 4*7 105°C	1	C201E
06D321027200	Capacitor	102/100V ±5% 5MM	1	C26
06D341047400	Capacitor	104/100V ±5% 5MM	4	C105A C105B C105C C105D
06D344727400	Capacitor	472/100V ±5% 5MM	2	C36 C37
06D341847000	Capacitor	184/100V ±5% 5MM	1	C107E
06D942747400	Capacitor	274/100V ±2% 5MM	1	C109E
06D344737400	Capacitor	473/100V ±5% 5MM	4	C104A C104B C104C C104D
06D346837400	Capacitor	683/100V ±5% 5MM	1	C110E
06D348249400	Capacitor	824/63V ±5%	1	C108E
06D211064000	Capacitor	10UF/25V ±20% 4*7 105°C 2.5MM	8	C21 C22 C101A C101B C101C C101D C101E C205E
06D201066102	Capacitor	10UF/50V φ5*11MM ±20% 85°C 2.5MM	1	C210E
06D214764000	Capacitor	47UF/25V ±20% 5*8 105°C 2.5MM	4	C201A C201B C201C C201D
06S111046002	Capacitor	SMD 104/50V ±10% X7R 0603	7	C5 C12 C16 C17 C19 C21L C22L
06S252263055	Capacitor	SMD 22uF/16V 5*5.4 ±20% 105°C	1	C25
06S254764065	Capacitor	SMD 47uF/25V 6.3*5.4 ±20% 105°C	2	C23 C24
06S324706000	Capacitor	SMD 47PF/50V 0805 NPO ±5%	9	C102B C103B C102E C102A C103A C103D C103C C102D C102C

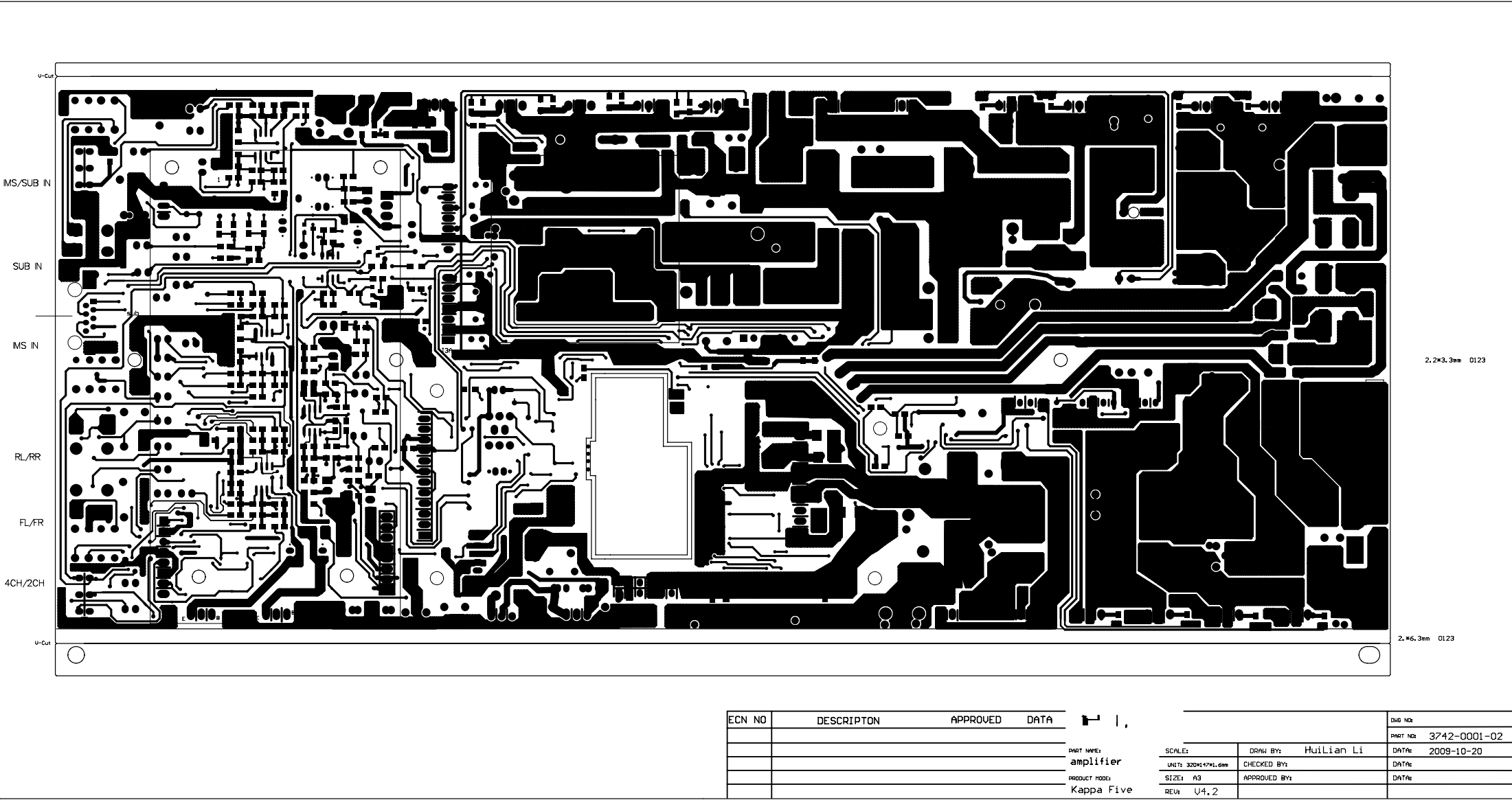
Part Number	Description		Qty	Reference Designator
Control/Preamp/PWM PCB				
06S121017000	Capacitor	SMD 100PF/100V 0805 X7R ±10%	6	C26L C52 C202A C202B C202C C202D
06S121047000	Capacitor	SMD 104/100V 0805 X7R ±10%	3	C20 C22S C43
06S138244001	Capacitor	SMD 824PF/25V ±10% X7R 1206 TDK	2	C20L C31
06S132256000	Capacitor	SMD 2.2uF/50V 1206 X7R ±10%	1	C44
06S134754000	Capacitor	SMD 4.7UF/25V X7R ±10% 1206	3	C32 C33 C34
06S131063000	Capacitor	SMD 10UF/16V ±10% X5R 1206	4	C49 C48 C6 C7
06S251074067	Capacitor	SMD 100uF/25V 6.3*7.7 ±20% 105°C	2	C30 C27
06S322206000	Capacitor	SMD 22pF/50V 0805 NPO ±5%	2	C202E C106E
06S254746045	Capacitor	SMD 0.47uF/50V 4*5.4 ±20% 105°C	1	C27L
Semiconductors				
03T1-F102-01	FET	MPF102 TO-92	1	Q201E
01ST-L074-08	Quad Op-amp	SMD TL074 SOP-14	3	U101A U101C U201E
04PT-4148-12	Diode	SMD RLS4148 LL-34	11	D6 D7 D201E D204E D205E D206E D1 D8 D11 D12 D13
04WY-52C5-11	Zener Diode	SMD 5V1 1/2W BZT52C5V1 SOD-123	1	Z1
04ZL-2512-00	Diode	SMD MUR120 1A 2512	1	D7L
04WY-39AV101	Zener Diode	SMD 3.9V DO-213AA 0.5W	1	ZD1
03P1-5401-04	Transistor	SMD MMBT5401LT1 PNP SOT-23	6	Q2 Q5 Q6 Q7 Q8 Q13
03N1-5551-04	Transistor	SMD MMBT5551LT1 NPN SOT-23	4	Q9 Q10 Q11 Q12
03P1-1015-04	Transistor	SMD 2SA1015 SOT-23 PNP	1	Q1
03N1-1815-04	Transistor	SMD 2SC1815 SOT-23 NPN	1	Q3
0100-74AH-00	Inverter	74AHC1G04 SOT-235	1	U3
0100-2010-00	IC	IR2010S SOL-16 High and Low Side Driver	1	U1E
01TC-WH04-00	Triple Inverter	TC7WH04F	1	U8
01TI-L494-09	PWM	SMD TL494C SO-16	1	U1
01JR-4560-08	Dual Op-amp	SMD 4560 SOP-8 JRC	7	U2 U100C U100D U100E U100A U100B U101E
Miscellaneous				
1501-0809-09	PIN	DIP 8P 180,6.0*2.54*3.0MM	2	J1B J2B
1501-0409-03	PIN	DIP 4P 180,6.0*2.54*3.0MM	2	J3B J4B
1333-0211-00	Switch	DIP SS-23D, 16*6.5*21 MM,7MM 2P3T HPF/FULL/LPF	2	SW100A SW100C
1501-0309-05	Bend Pin	DIP PITCH 2.54mm 3PIN 90	1	J2E
1501-0409-02	Bend Pin	DIP PITCH 2.54mm 4PIN 90	2	J2F J5B
1502-0709-01	PIN	DIP PITCH 2.54MM 1*7PIN 90	2	J3BA J3BB
24T1-125X089	Jumper	DIP Ø0.8*12.5MM	1	
Amplifier PCB				
Resistors				
0701-21R0-02	Resistor	SMD 1Ω 1/8W ±5% 0805	4	R52 R69 R31 R32
0701-2100-02	Resistor	SMD 10Ω 1/8W ±5% 0805	12	R16 R27A R28A R29A R30A R48 R49 R63 R67 R68 R15 R46
0701-2103-02	Resistor	SMD 10KΩ 1/8W ±5% 0805	9	R21 R22 R25 R60 R26 R36 R38 R41 R59
0701-3103-02	Resistor	SMD 10KΩ 1/4W ±5% 1206	4	R3 R4 R17 R57
0701-24R7-02	Resistor	SMD 4.7Ω 1/8W ±5% 0805	8	R118A R13 R14 R42 R62 R117A R117B R118B
0701-2471-02	Resistor	SMD 470Ω 1/8W ±5% 0805	4	R121B R121C R121D R121A
0701-2102-02	Resistor	SMD 1KΩ 1/8W ±5% 0805	9	R112A R112B R112C R112D R128A R128B R128C R128D RP1
0701-3102-02	Resistor	SMD 1KΩ 1/4W ±5% 1206	4	R113A R113B R113C R113D
0701-2202-02	Resistor	SMD R0805 2KΩ 1/8W ±5%	1	R33
0701-2222-02	Resistor	SMD 2.2KΩ 1/8W ±5% 0805	1	RA149P
0701-2272-02	Resistor	SMD 2.7KΩ 1/8W ±5% 0805	4	R7 R8 R34 R56
0701-2332-02	Resistor	SMD 3.3KΩ 1/8W ±5% 0805	4	R11 R12 R53 R70
0701-2822-02	Resistor	SMD 8.2KΩ 1/8W ±5% 0805	12	R1 R2 R5 R6 R9 R10 R18 R24 R23 R54 R55 R58
0701-2433-02	Resistor	SMD 43K 1/8W ±5% 0805	4	R40 R44 R45 R61
0701-2473-02	Resistor	SMD 47KΩ 1/8W ±5% 0805	8	R19 R20 R47 R64 R120A R120B R120C R120D
0701-2104-02	Resistor	SMD 100KΩ 1/8W ±5% 0805	3	R35 R37 R39
0701-2222-04	Resistor	SMD 2.2K 1/4W ±5% 1206	4	R123A R123B R123C R123D
0708-4100-02	Resistor	1W 10Ω ±5% 线绕	4	R122A R122B R122C R122D

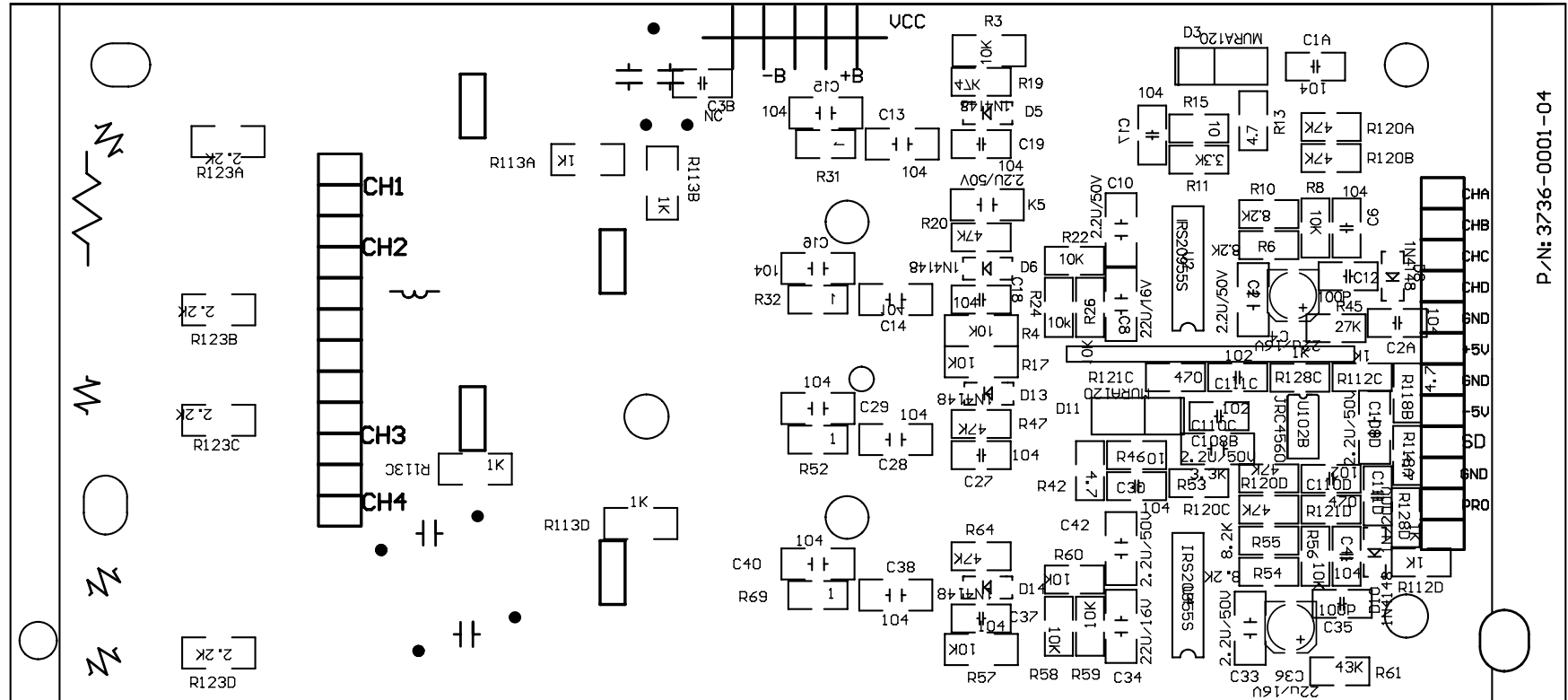
Part Number	Description		Qty	Reference Designator
Amplifier PCB				
Capacitors				
06S321026000	Capacitor	SMD 1000pF/50V 0805 NPO ±5%	8	C110A C110B C111A C111B C110C C110D C111C C111D
06S121047001	Capacitor	SMD 104/100V ±10% X7R 0805 TDK	16	C17 C18 C20 C27 C30 C37 C39 C6 C31 C41 C19 C1A C2A C3A C4A C5
06S13104C001	Capacitor	SMD 104/250V ±10% X7R 1206 TDK	8	C13 C14 C15 C16 C28 C29 C38 C40
06S121017000	Capacitor	SMD 100PF/100V 0805 X7R ±10%	4	C11 C25 C12 C35
06S432263000	Capacitor	SMD 22uF/16V 1206 Y5V +80%/-20%	4	C7 C8 C24 C34
06S132256000	Capacitor	SMD 2.2uF/50V 1206 X7R ±10%	13	K5 C1 C2 C9 C10 C22 C32 C33 C42 C108A C108B C108C C108D
06S251064045	Capacitor	SMD 10uF/25V 4*5.4 ±20% 105°C	4	C3 C4 C26 C36
06S124736000	Capacitor	SMD 0.047uF/50V 0805 X7R ±10%	2	C23 C21
06D344747000	Capacitor	474/100V ±5% 5MM	1	C1B
06D1C104C700	Capacitor	104/250V ±10%, CBB, Brown, 10MM	4	C114A C114B C114C C114D
06D1C105G701	Capacitor	105/160V ±10%, CBB, 11.5*8.5*15.5MM, 10.5MM, Brown	4	C113A C113B C113C C113D
06D33221L000	Capacitor	221P/500V ±5%	4	C100A C100B C100C C100D
Semiconductors				
03P1-5401-04	Transistor	SMD MMBT5401LT1 PNP SOT-23	1	Q1
03N1-5551-04	Transistor	SMD MMBT5551LT1 NPN SOT-23	1	Q7
04PT-4148-12	Diode	SMD RLS4148 LL-34	9	D2 D5 D6 D8 D9 D10 D13 D14 D1
04ZL-2512-00	Diode	SMD MUR120 1A 2512	4	D3 D4 D11 D12
03D1-6645-00	MOSFET	IRF6645	8	Q3A Q4A Q5A Q6A Q2 Q8 Q13 Q14
0100-2095-00	IC	IRS20955S Digital Audio Driver	4	U1 U3 U2 U4
01JR-4560-08	Dual Op-amp	SMD 4560 SOP-8 JRC	2	U102A U102B
Miscellaneous				
1001-1009-10	Inductor	10UH,φ15MM12MM :998AMF-101	4	L100A L100B L100C L100D
1004-0005-10	Inductor	W5 RH 3.5*8*0.8-2	1	L1
1501-1209-07	Pin	DIP 12P 180 6.0*14*4.0MM	2	CON2 CON4
1505-0209-00	Pin	DIP 2*6P 180,6.0*14*4.0MM	1	CON1
LED Board				
2009-0001-00	LED	SMD 3.2*2.4*2.4	2	LED1 LED3
200A-0001-00	LED	SMD 3.2*2.4*2.4	1	LED2
06S121046000	Capacitor	SMD 0.1uF/50V 0805 X7R ±10%	2	C1 C2
2102-0057-05	FCC	DIP 5Pin 2.0 UL1571 28AWG L=95MM 3MM	1	PR001

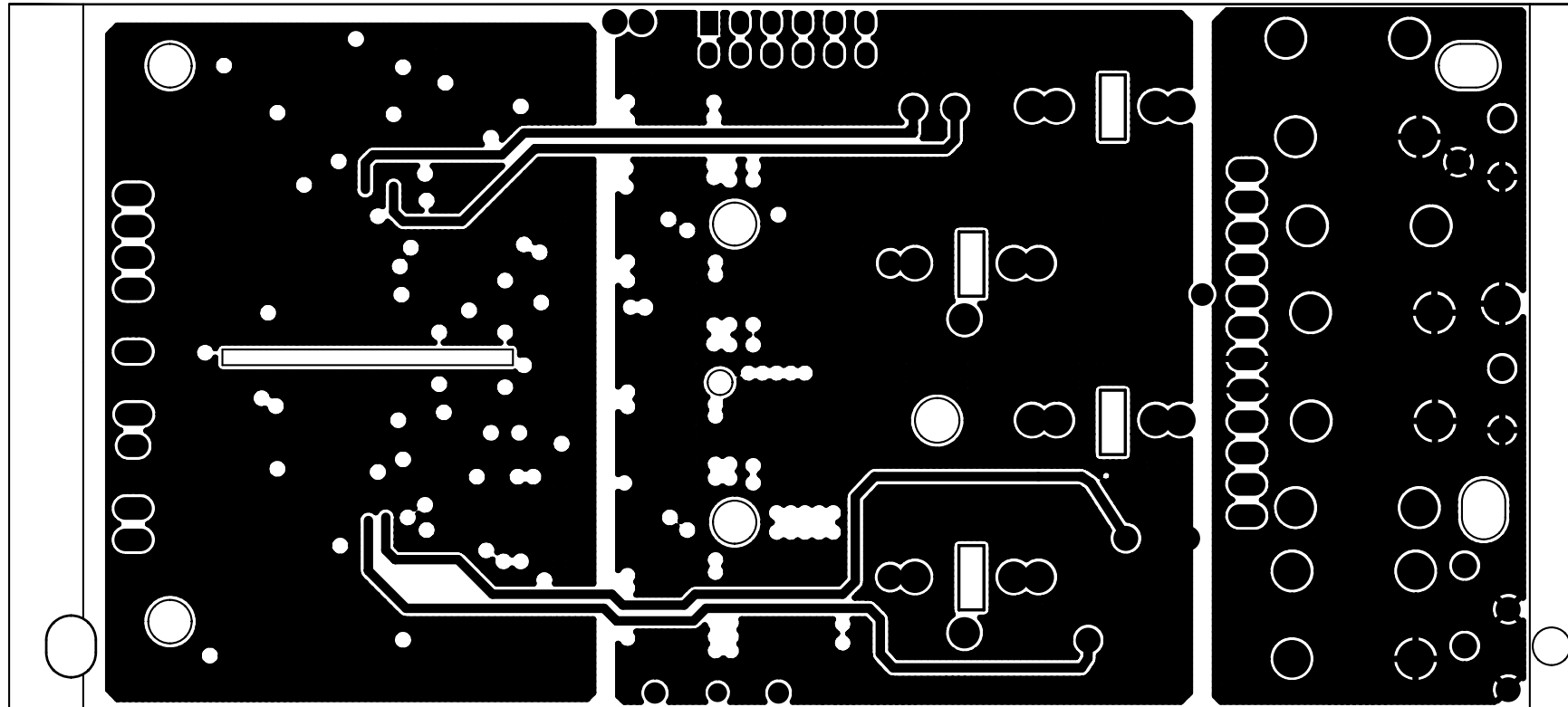












ECN NO	DESCRIPTION	APPROVED DATA

4ch Amplifier

PRODUCT MODE:

Kappa Five

UNIT: 117*57*2.0mm

SIZE: A4

REV: V3.6

DRAW BY: HuiLian Li

CHECKED BY:

APPROVED BY:

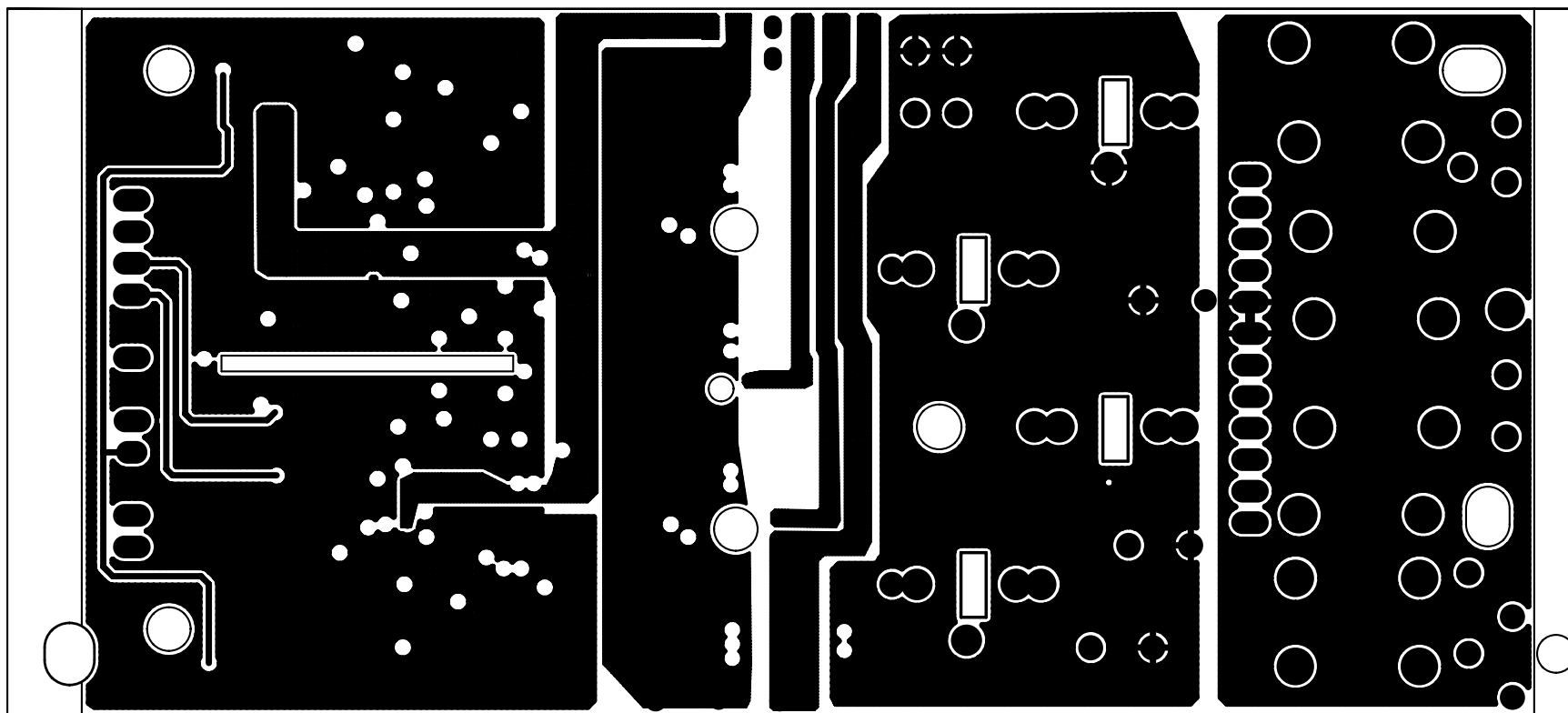
DWG NO:

PART NO: 3736-0001-04

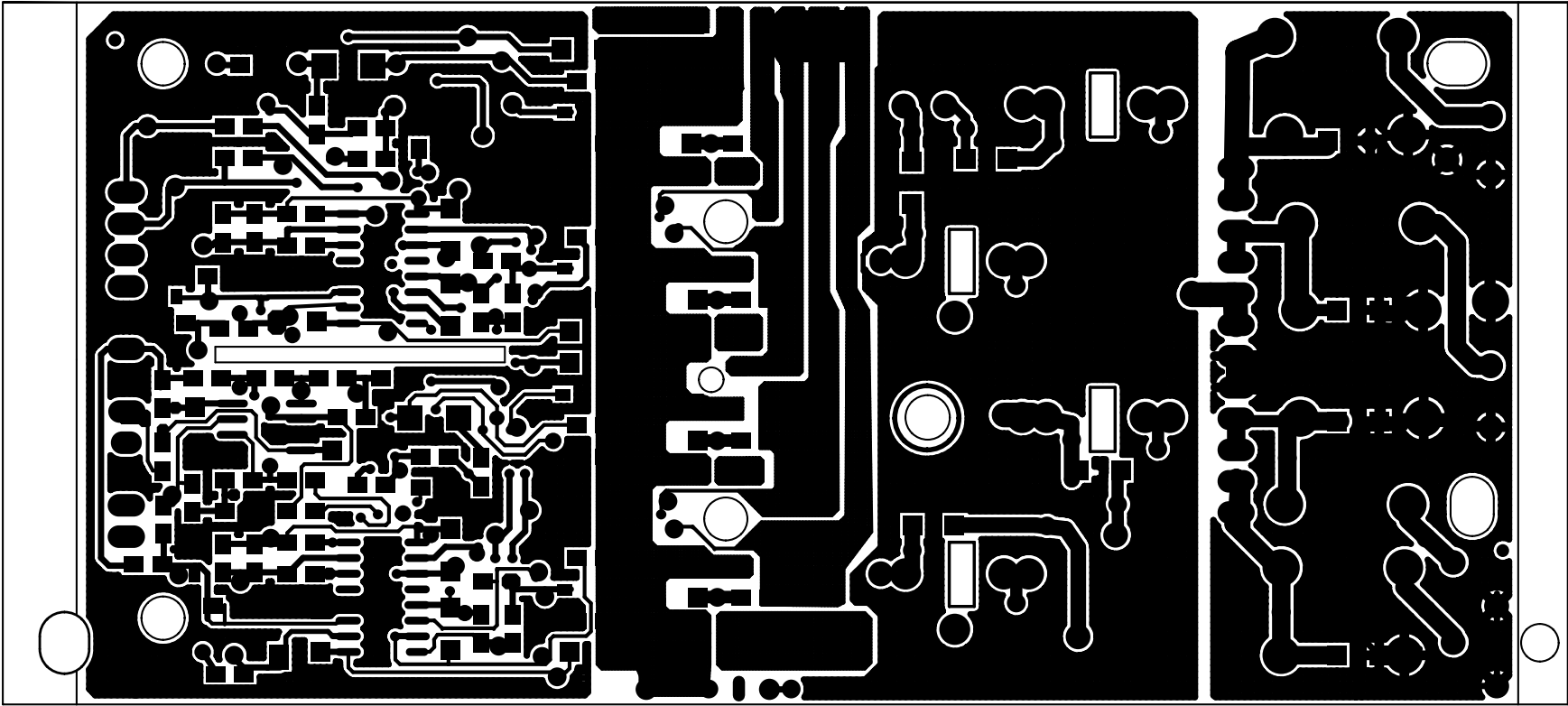
DATE: 2009-10-16

DATE:

DATE:

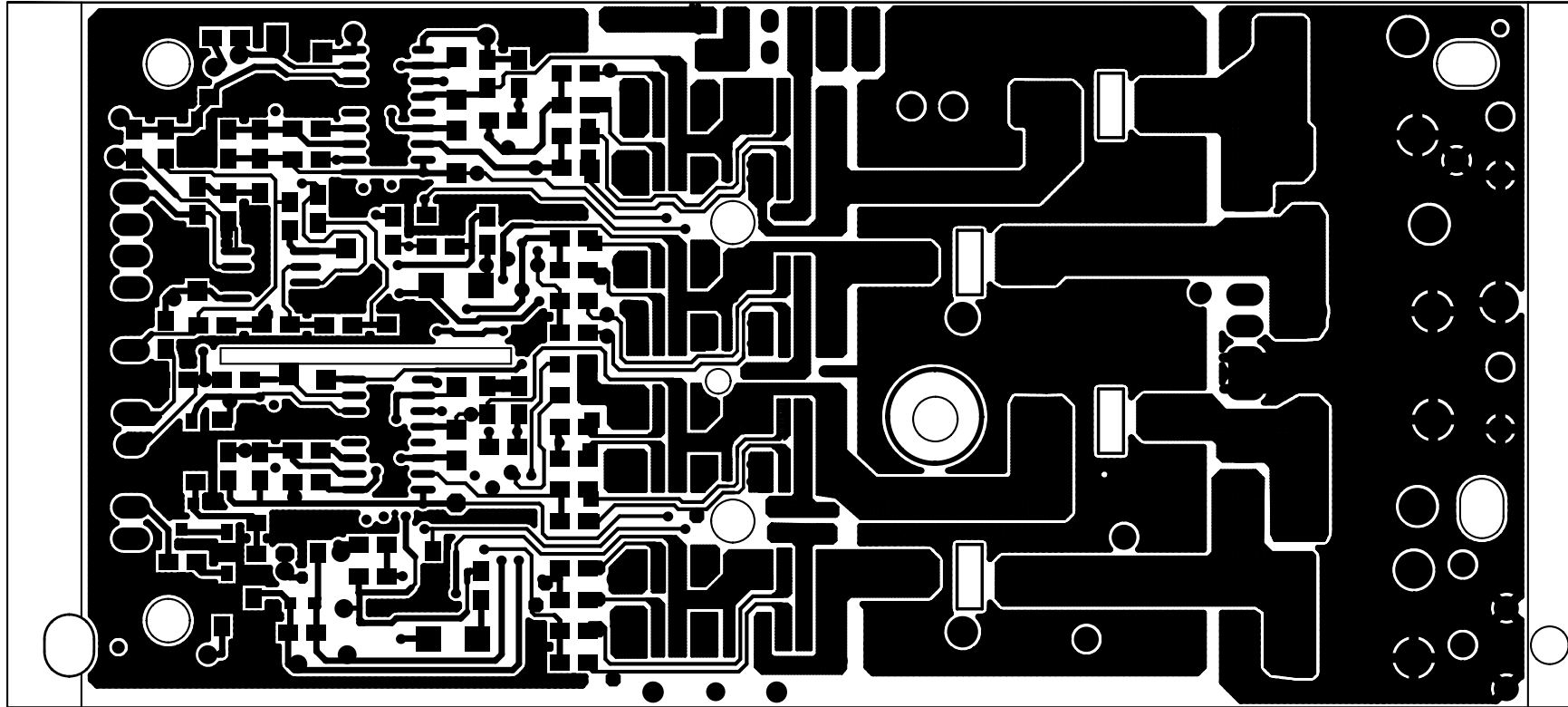


ECN NO	DESCRIPTION	APPROVED DATA	DWG NO:
			PART NO: 3736-0001-04
	PART NAME:	SCALE:	DRAW BY: HuiLian Li
	4ch Amplifier	UNIT: 117*57*2.0mm	CHECKED BY:
	PRODUCT CODE:	SIZE: A4	APPROVED BY:
	Kappa Five	REV: U3.6	DATA: 2009-10-16

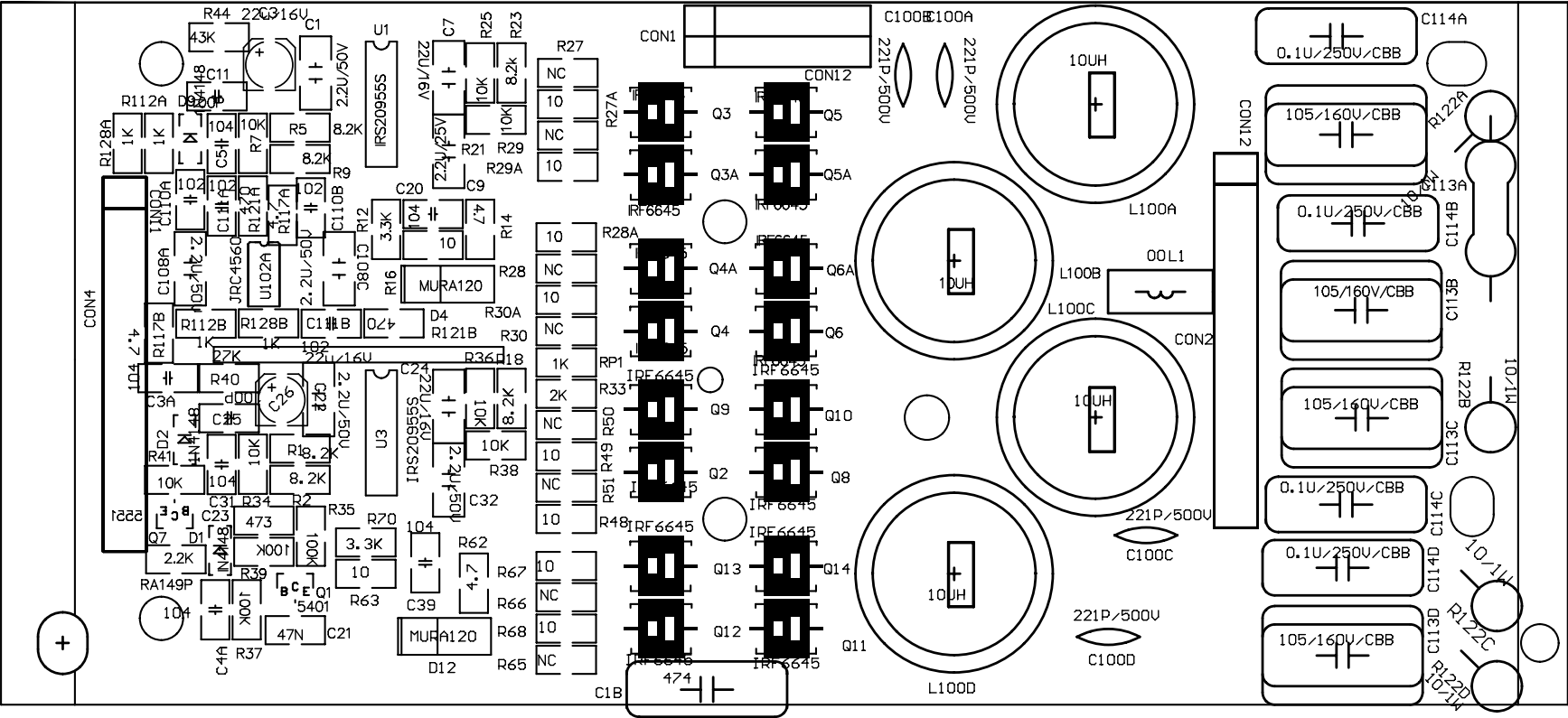


ECN NO	DESCRIPTION	APPROVED DATA	DWG NO:		
			PART NO: 3736-0001-04		
			DATE: 2009-10-16		
			DATE:		
			DATE:		
			DATE:		

PART NAME:	SCALE:	DRAW BY:	HuiLian Li
4ch Amplifier	UNIT: 117*57*2.0mm	CHECKED BY:	
PRODUCT MODE:	SIZE: A4	APPROVED BY:	
Kappa Five	REV: V3.6		

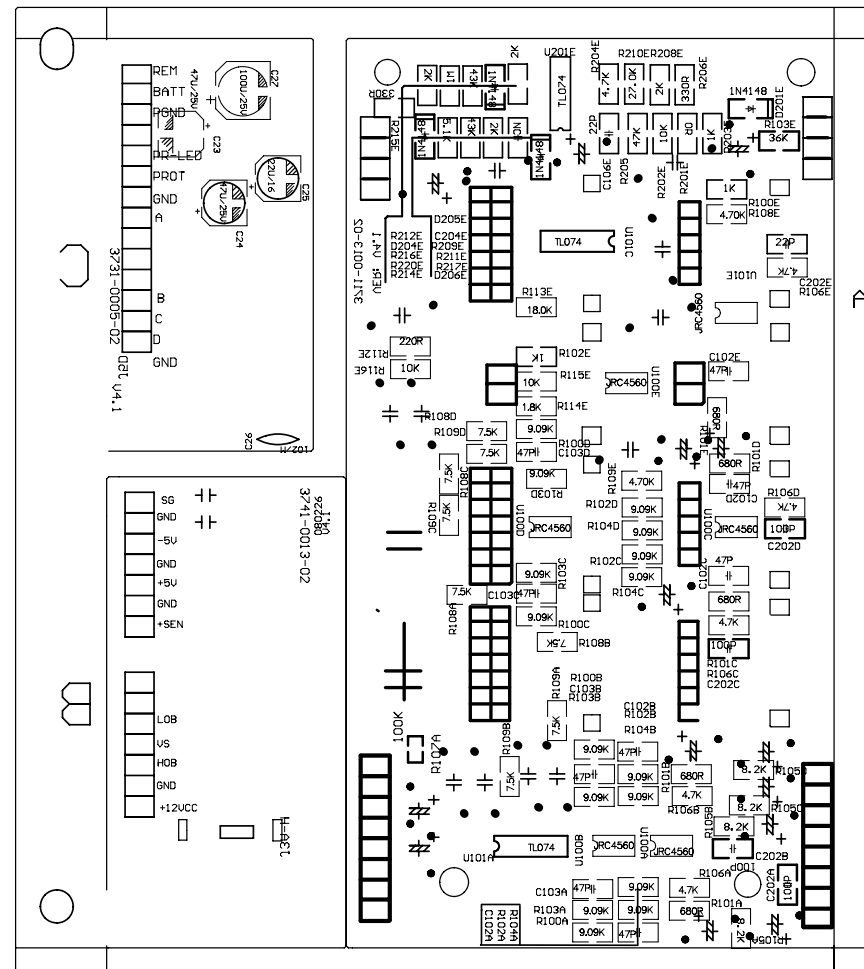


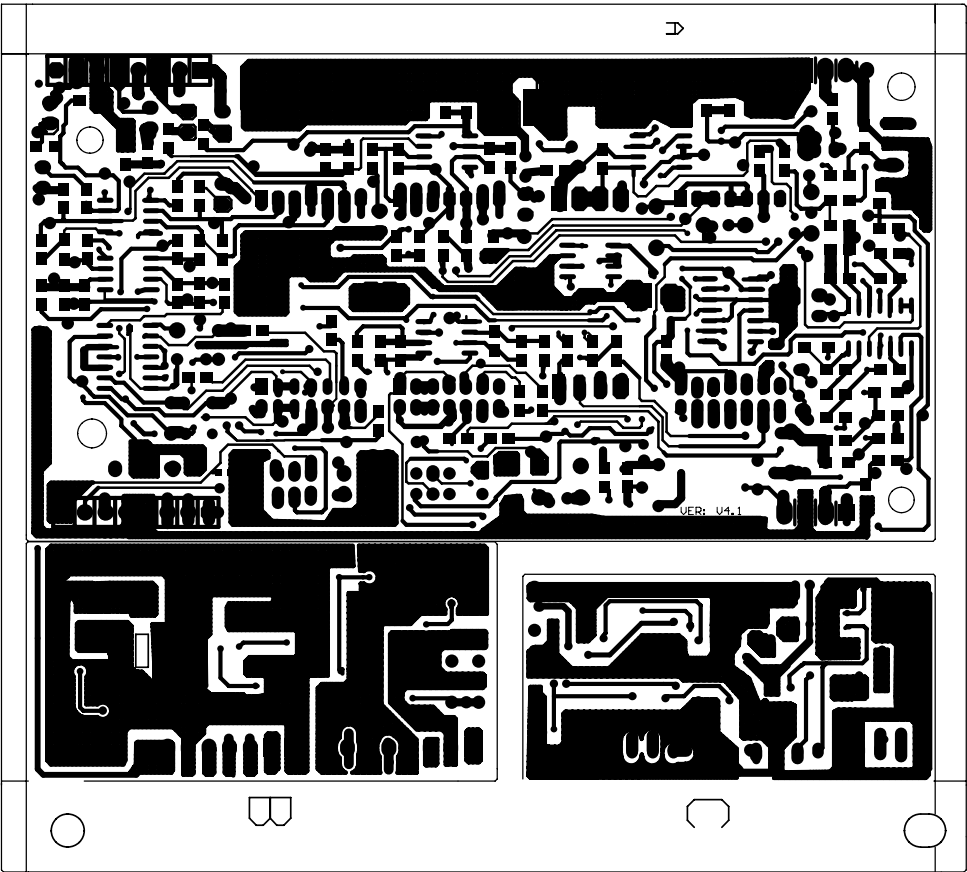
ECN NO	DESCRIPTION	APPROVED DATA	DWG NO:
			PART NO: 3736-0001-04
	PART NAME:	SCALE:	DRAW BY: HuiLian Li
	4ch Amplifier	UNIT: 117*57*2.0mm	CHECKED BY:
	PRODUCT MODE:	SIZE: A4	APPROVED BY:
	Kappa Five	REV: 03.6	DATA: 2009-10-16



ECN NO	DESCRIPTION	APPROVED DATA	DWG NO:		
			PART NO: 3736-0001-04		
			DATE: 2009-10-16		
			DATA:		
			DATA:		
			DATA:		

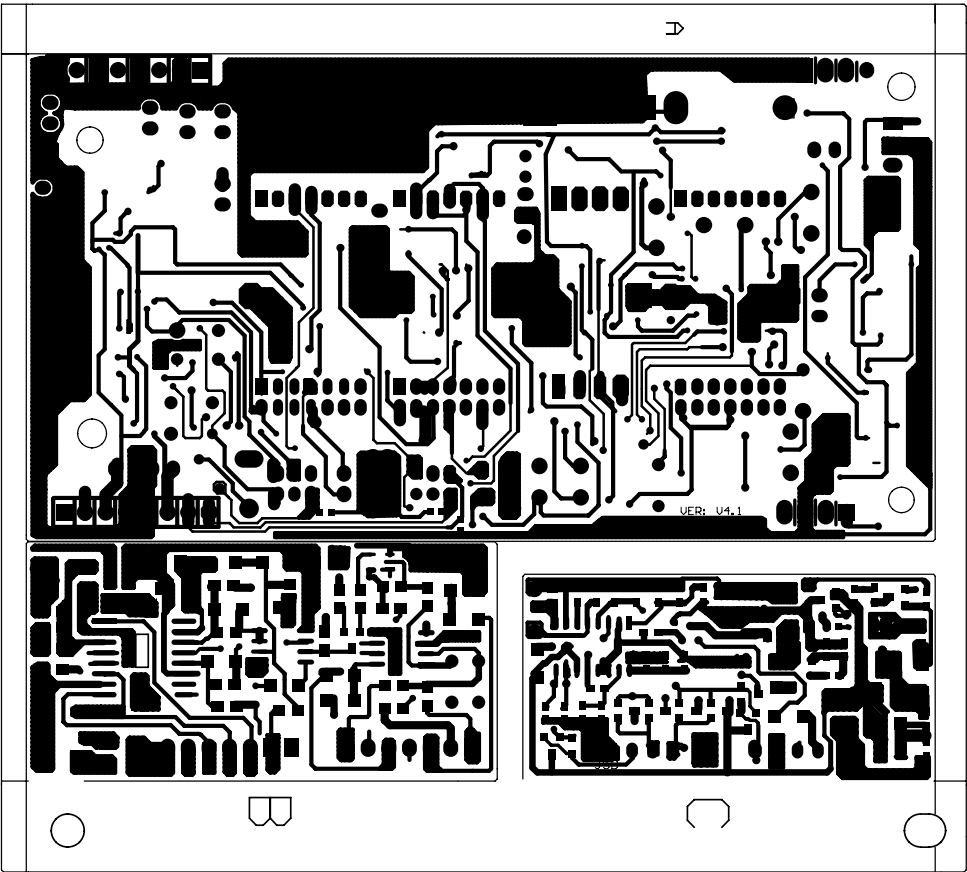
PART NAME:	SCALE:	DRAW BY:	HuiLian Li
4ch Amplifier	UNIT: 117*57*2.0mm	CHECKED BY:	
PRODUCT MODE:	SIZE: A4	APPROVED BY:	
Kappa Five	REV: V3.6		





ECN NO	DESCRIPTION	APPROVED	DATA	DWG NO:
				PART NO: 3741-0002-02
				DATE: 2009-09-09
				DATE:
				DATE:

PART NAME:	SCALE:	DRAW BY:	HuiLian Li
PRE	UNIT: 116*105*1.6mm	CHECKED BY:	
PRODUCT CODE:	SIZE: A4	APPROVED BY:	
Kappa Five	REV: U4.1		



ECN NO	DESCRIPTION	APPROVED	DATA	DATE	DWG NO:
					PART NO: 3741-0002-02
					DATE: 2009-09-09
					DATE:
					DATE:

PART NAME:
PRE

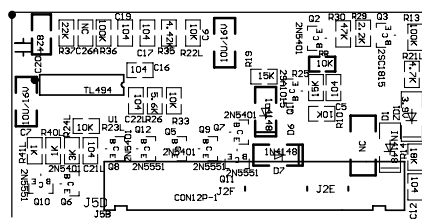
PRODUCT CODE:
Kappa Five

SCALE: DRAW BY: HuiLian Li

UNIT: 116*105*1.6mm CHECKED BY:

SIZE: A4 APPROVED BY:

REV: U4.1

28

International IR Rectifier

Data Sheet No. PD60303

IRS20955(S)PbF

PROTECTED DIGITAL AUDIO DRIVER

Features

- Floating PWM input enables easy half-bridge implementation
- Programmable bidirectional over-current protection with self-reset function
- Programmable preset deadtime for improved THD performances
- High noise immunity
- ± 100 V ratings deliver up to 500 W in output power
- 3.3 V/5 V logic compatible input
- Operates up to 800 kHz
- RoHS compliant

Product Summary

V_{OFFSET} (max)		± 100 V
Gate driver	I_{o+}	1.0 A
	I_{o-}	1.2 A
Selectable deadtime		15 ns, 25 ns, 35 ns, 45 ns
Propagation delay		90 ns
OC protection delay		500 ns (max)
Shutdown propagation delay		250 ns (max)

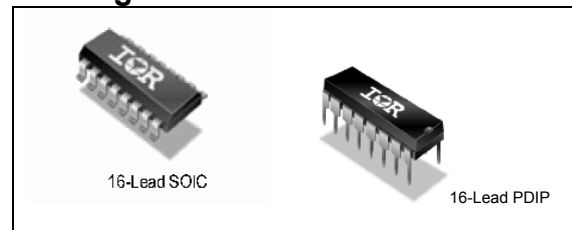
Description

The IRS20955 is a high voltage, high speed MOSFET driver with a floating PWM input designed for Class D audio amplifier applications.

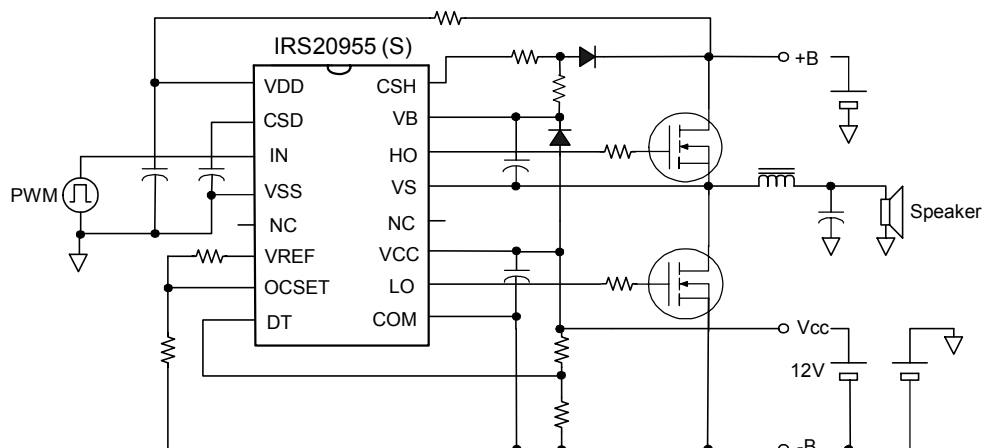
Bi-directional current sensing detects over-current conditions during positive and negative load currents without any external shunt resistors. A built-in protection control block provides a secure protection sequence against over-current conditions and a programmable reset timer.

The internal deadtime generation block enables accurate gate switching and optimum deadtime setting for better audio performance, such as lower THD and lower audio noise floor.

Package



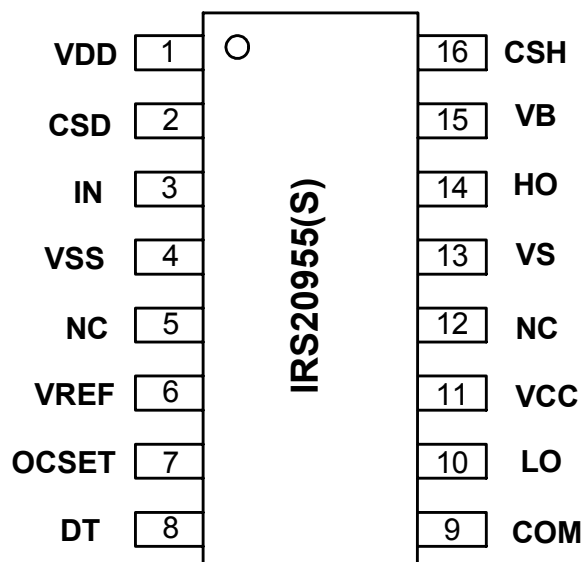
Typical Connection



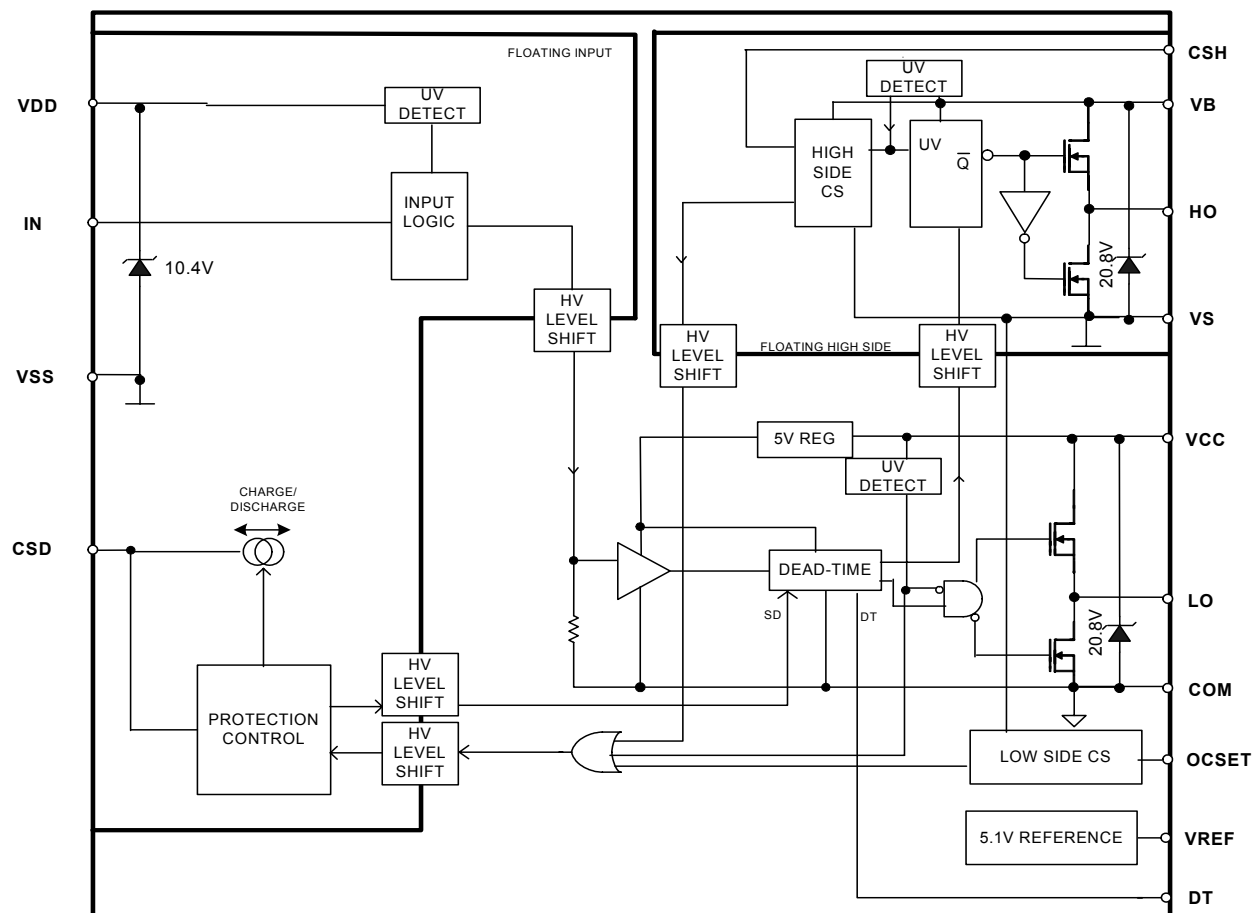
(Please refer to Lead Assignments for correct pin configuration. This diagram shows electrical connections only)

Lead Definitions

Pin #	Symbol	Description
1	VDD	Floating input positive supply
2	CSD	Shutdown timing capacitor, referenced to VSS
3	IN	PWM non-inverting input, in phase with HO
4	VSS	Floating input supply return
5	NC	
6	VREF	5 V reference output for setting OCSET
7	OCSET	Low-side over-current threshold setting, referenced to COM
8	DT	Input for programmable deadtime, referenced to COM
9	COM	Low-side supply return
10	LO	Low-side output
11	VCC	Low-side logic supply
12	NC	
13	VS	High-side floating supply return
14	HO	High-side output
15	VB	High-side floating supply
16	CSH	High-side over-current sensing input, referenced to VS

**IRS20955(S)****16-Lead SOIC (narrow body)****16-Lead PDIP**

Block Diagram



International IR Rectifier

Data Sheet No. PD60195-D

IR2010(S) & (PbF)

HIGH AND LOW SIDE DRIVER

Features

- Floating channel designed for bootstrap operation
Fully operational to 200V
Tolerant to negative transient voltage, dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout for both channels
- 3.3V logic compatible
Separate logic supply range from 3.3V to 20V
Logic and power ground $\pm 5V$ offset
- CMOS Schmitt-triggered inputs with pull-down
- Shut down input turns off both channels
- Matched propagation delay for both channels
- Outputs in phase with inputs
- Also available LEAD-FREE

Product Summary

V_{OFFSET}	200V max.
$I_{\text{O+/-}}$	3.0A / 3.0A typ.
V_{OUT}	10 - 20V
$t_{\text{on/off}}$	95 & 65 ns typ.
Delay Matching	15 ns max.

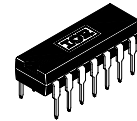
Applications

- Audio Class D amplifiers
- High power DC-DC SMPS converters
- Other high frequency applications

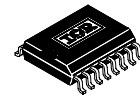
Description

The IR2010 is a high power, high voltage, high speed power MOSFET and IGBT drivers with independent high and low side referenced output channels, ideal for Audio Class D and DC-DC converter applications. Logic inputs are compatible with standard CMOS or LSTTL output, down to 3.0V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify use in high frequency applications. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 200 volts. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction.

Packages

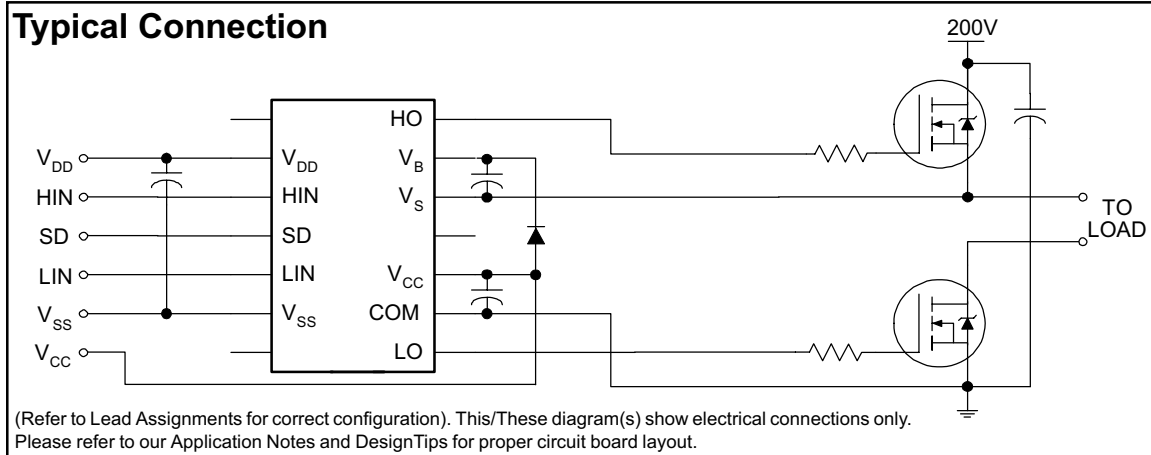


14-Lead PDIP



16-Lead SOIC

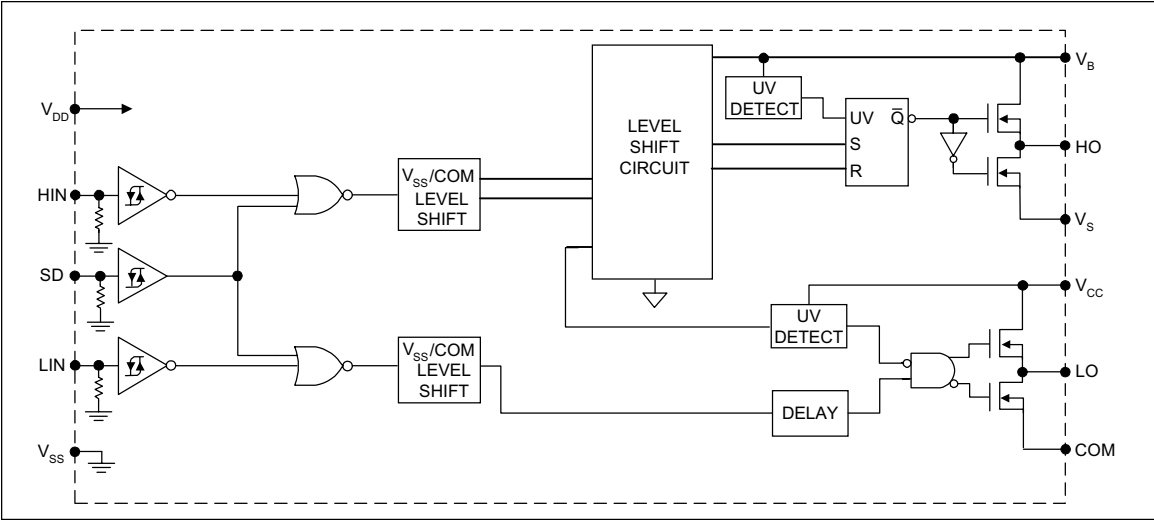
Typical Connection



IR2010(S) & (PbF)

International
IR Rectifier

Functional Block Diagram



Lead Definitions

Symbol	Description
VDD	Logic supply
HIN	Logic input for high side gate driver output (HO), in phase
SD	Logic input for shutdown
LIN	Logic input for low side gate driver output (LO), in phase
VSS	Logic ground
Vb	High side floating supply
HO	High side gate drive output
Vs	High side floating supply return
VCC	Low side supply
LO	Low side gate drive output
COM	Low side return

Lead Assignments

<p>14 Lead PDIP</p>	<p>16 Lead SOIC (Wide Body)</p>
IR2010	IR2010S
Part Number	

International IOR Rectifier

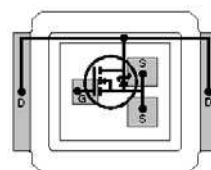
IRF6645

DirectFET™ Power MOSFET ②

Typical values (unless otherwise specified)

V_{DS}	V_{GS}	$R_{DS(on)}$
100V max	±20V max	28mΩ @ 10V
$Q_{g\ tot}$	Q_{gd}	$V_{gs(th)}$
14nC	4.8nC	4.0V

- RoHs Compliant Containing No Lead and Bromide ①
- Low Profile (<0.7 mm)
- Dual Sided Cooling Compatible ①
- Ultra Low Package Inductance
- Optimized for High Frequency Switching ①
- Ideal for High Performance Isolated Converter Primary Switch Socket
- Optimized for Synchronous Rectification
- Low Conduction Losses
- Compatible with existing Surface Mount Techniques ①



SJ



DirectFET™ ISOMETRIC

Applicable DirectFET Outline and Substrate Outline (see p.7,8 for details)①

SH	SJ	SP		MZ	MN					
----	----	----	--	----	----	--	--	--	--	--

Description

The IRF6645 combines the latest HEXFET® Power MOSFET Silicon technology with the advanced DirectFET™ packaging to achieve the lowest on-state resistance in a package that has the footprint of an Micro8 and only 0.7 mm profile. The DirectFET package is compatible with existing layout geometries used in power applications, PCB assembly equipment and vapor phase, infra-red or convection soldering techniques, when application note AN-1035 is followed regarding the manufacturing methods and processes. The DirectFET package allows dual sided cooling to maximize thermal transfer in power systems, improving previous best thermal resistance by 80%.

The IRF6645 is optimized for primary side bridge topologies in isolated DC-DC applications, for wide range universal input Telecom applications (36V - 75V), and for secondary side synchronous rectification in regulated DC-DC topologies. The reduced total losses in the device coupled with the high level of thermal performance enables high efficiency and low temperatures, which are key for system reliability improvements, and makes this device ideal for high performance isolated DC-DC converters.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	±20	
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ③	5.7	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ③	4.5	
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ④	25	
I_{DM}	Pulsed Drain Current ⑤	45	
E_{AS}	Single Pulse Avalanche Energy ⑥	29	mJ
I_{AR}	Avalanche Current ⑤	3.4	A

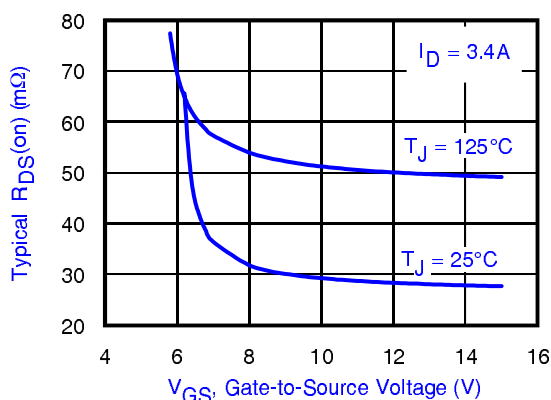


Fig 1. Typical On-Resistance vs. Gate Voltage

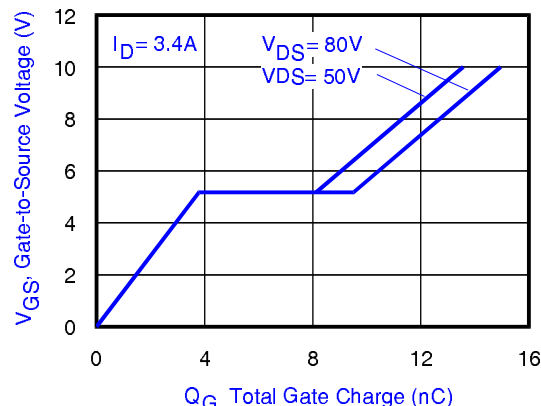


Fig 2. Typical Total Gate Charge vs. Gate-to-Source Voltage

Notes:

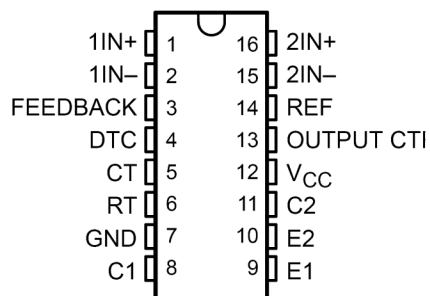
- ① Click on this section to link to the appropriate technical paper.
- ② Click on this section to link to the DirectFET Website.
- ③ Surface mounted on 1 in. square Cu board, steady state.

- ④ T_C measured with thermocouple mounted to top (Drain) of part.
- ⑤ Repetitive rating; pulse width limited by max. junction temperature.
- ⑥ Starting $T_J = 25^\circ\text{C}$, $L = 5.0\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 3.4\text{A}$.

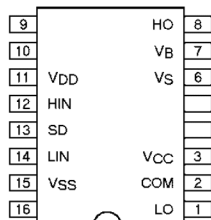
Semiconductor Pinouts

TL494 PWM

U1



IR2010S U1E



Dual Op-amp

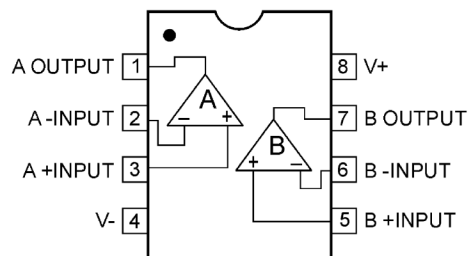
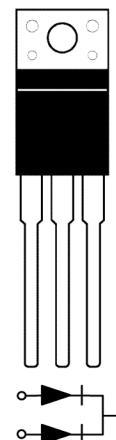
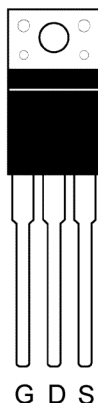
NJM4560

U101,103,105,106

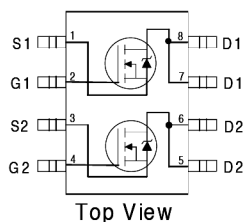
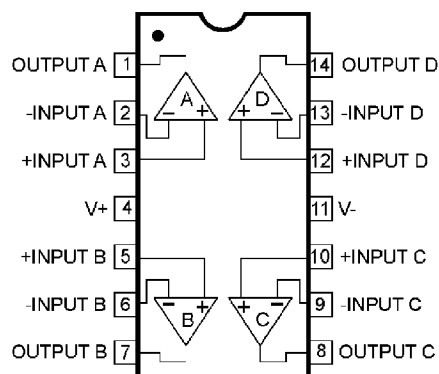
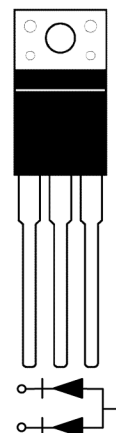
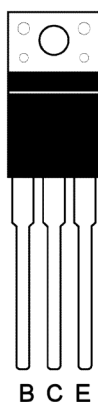
U103A, U201, U501

U100A-U100E, U2

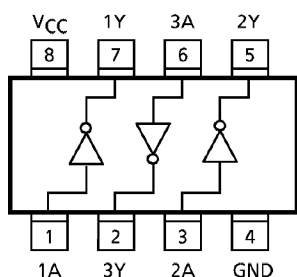
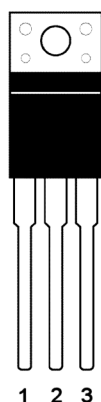
U102A, U102B

UF1620CT
Rectifier
D117P, D118PIRFB38N20D
Q100E-Q103E
IRFZ48V
Q113P-Q120P

IRF7341 U501S-U801S

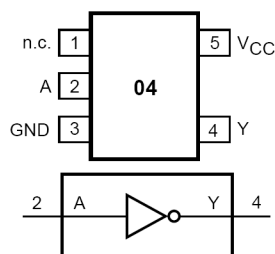
OPAMP, QUAD 14P DIL TL074
U102, U101A, U101C, U201EMUR1620CT
Rectifier
D119P, D120P2SA940P Q202
2SC2073 Q201
TIP31C QA1

TC7WH04F U8

LM317 ADJ REG
U102P

1. ADJ/GROUND
2. OUTPUT
3. INPUT

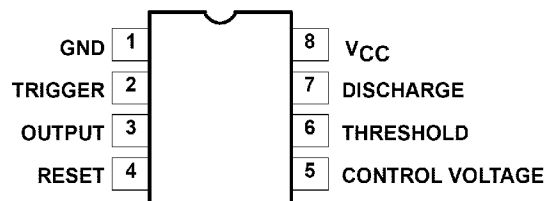
74AHC1G04 U3



TO-92 REGULATORS

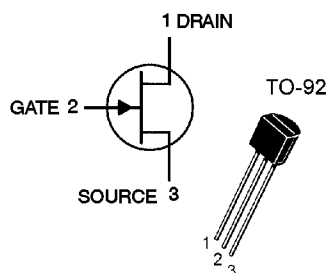
2SD669A
QA109E

LM555 U1 U502

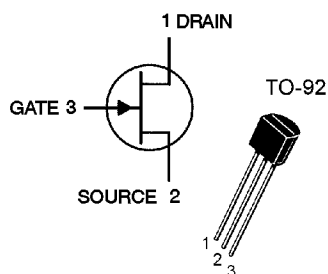
78L05
U107
U102E
1. INPUT
2. COMMON
3. OUTPUT79L05
U108
U103E
1. COMMON
2. INPUT
3. OUTPUT

Semiconductor Pinouts (CONT'D)

2SK117 FET
Q100A-Q100D, Q107E



MPF102 FET
Q201E



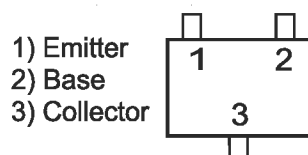
MMBT5401 SOT-23 Q106E, Q502G, Q102PA, Q2, Q5-Q8, Q13, Q1

MMBT5551 SOT-23 Q104PD, Q10, Q103, Q104E, 105E, QA209E,
Q103PD, Q123P, Q501G, Q10G, Q9-Q12, Q7

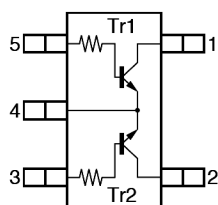
2SC1815 SOT-23 Q103S, Q102P, Q103G, Q103P, Q3

BT2907 SOT-23 Q210

2SA1015 SOT-23 Q1



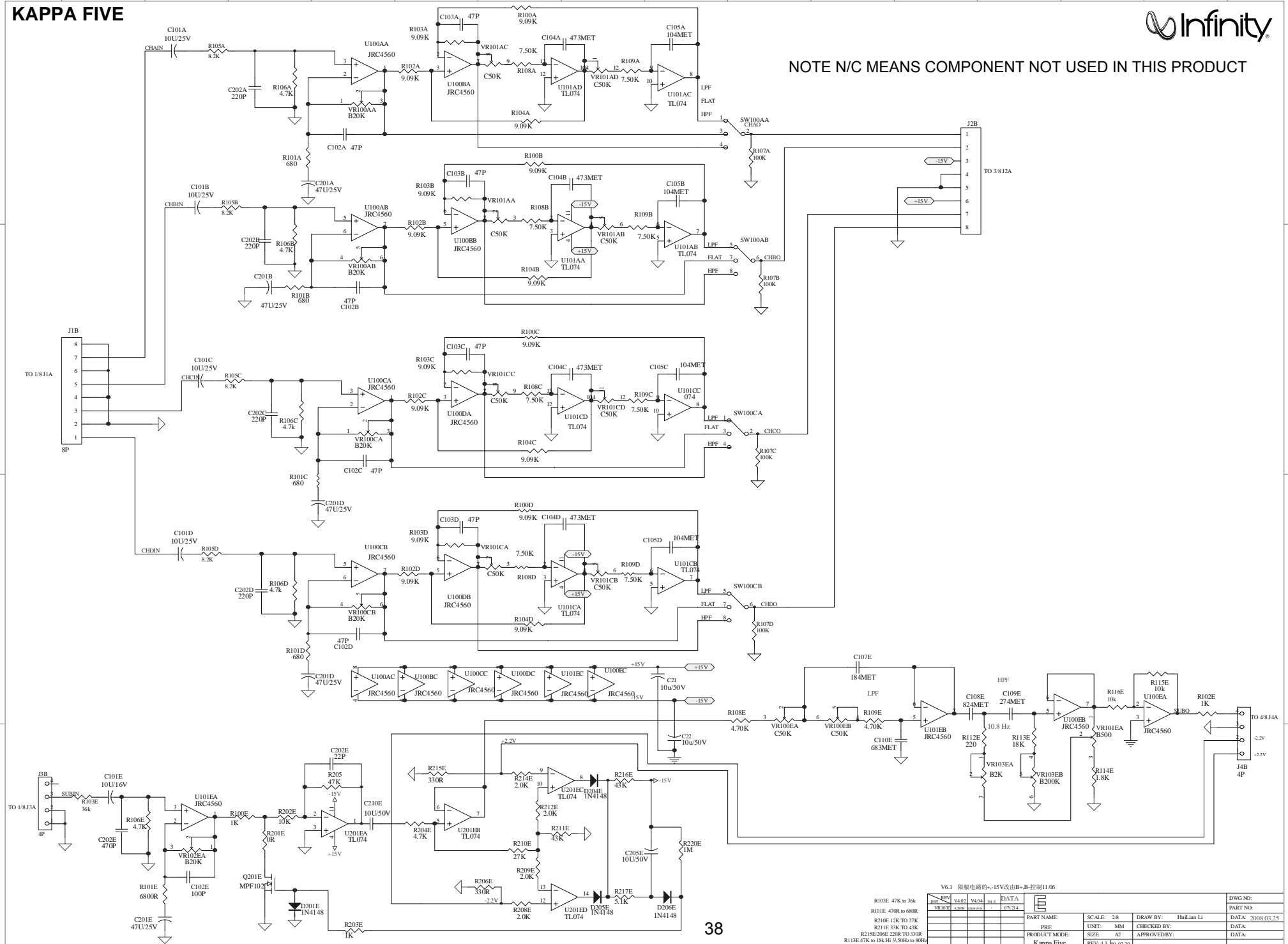
XN1215 Dual NPN Transistor
U502S, U602S, U702S, U802S





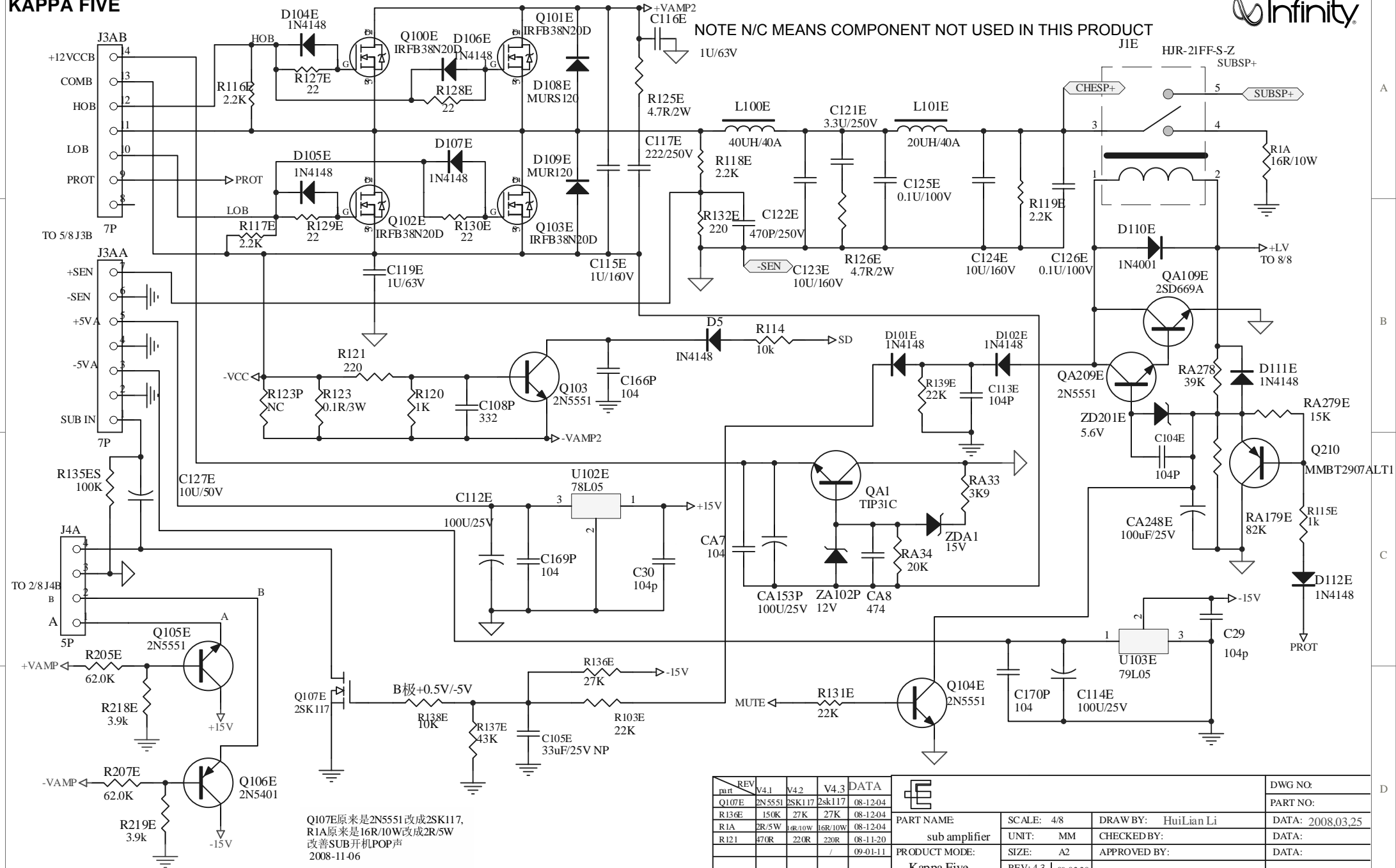
ECN NO	DESCRIPTION	APPROVED	DATA			DWG NO:
V4.03	增加BSP板及A板上的LED灯,增加板上的LED灯		071211			PART NO:
V4.03	/	0901-11	PART NAME:	SCALE: 1/8	DRAW BY: Huo Jian Li	DATA: 2008.03.25
			input	UNIT: MM	CHECKED BY:	DATA:
			PRODUCT MODE:	SIZE: A2	APPROVED BY:	DATA:
			Version:			

38






KAPPA FIVE



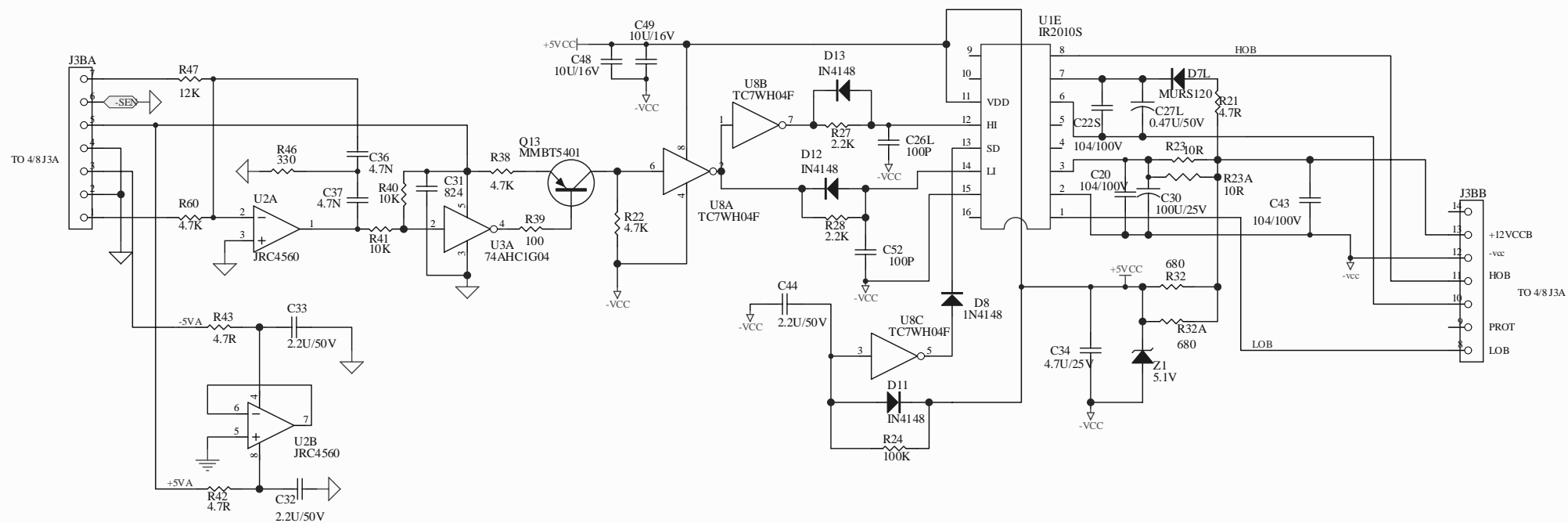
—用继电器的+12V做SUB的mute的方式,从而可以改善SUB开关机噪声。

REV									DWG NO:
part	V4.1	V4.2	V4.3	DATA					PART NO:
Q107E	2N5551	2SK117	2sk117	08-1204	PART NAME: sub amplifier	SCALE: 4/8	DRAW BY: HuiLian Li	DATA: 2008,03,25	
R136E	150K	27K	27K	08-1204		UNIT: MM	CHECKED BY:	DATA:	
R1A	2R/5W	16R10W	16R10W	08-1204		SIZE: A2	APPROVED BY:	DATA:	
R121	470R	220R	220R	08-1-20		REV: 4.3	09-02-20		
			/	09-01-11	PRODUCT MODE:				
					Kappa Five				

KAPPA FIVE



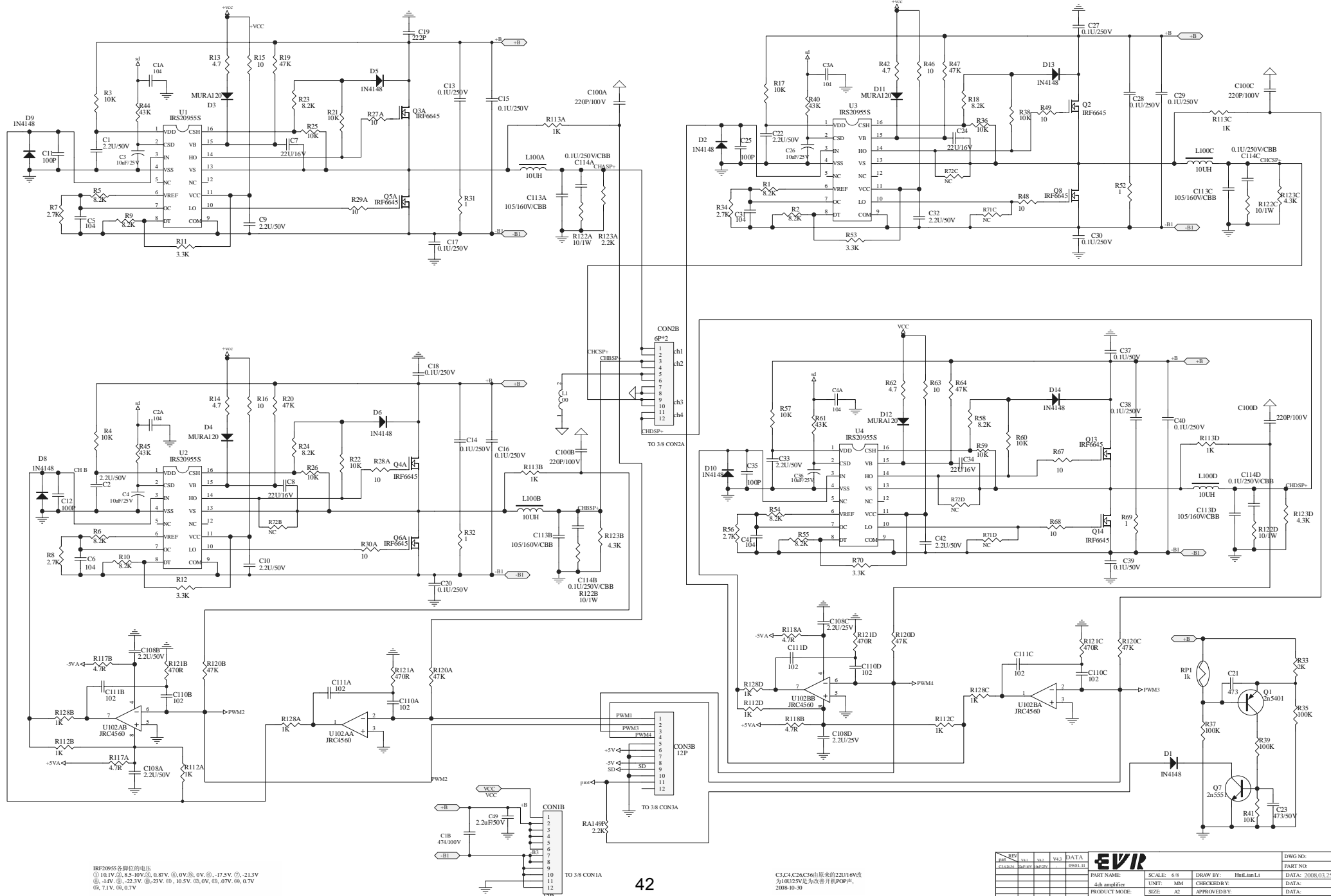
NOTE N/C MEANS COMPONENT NOT USED IN THIS PRODUCT



由LM833改用JRC4560改善直流输出

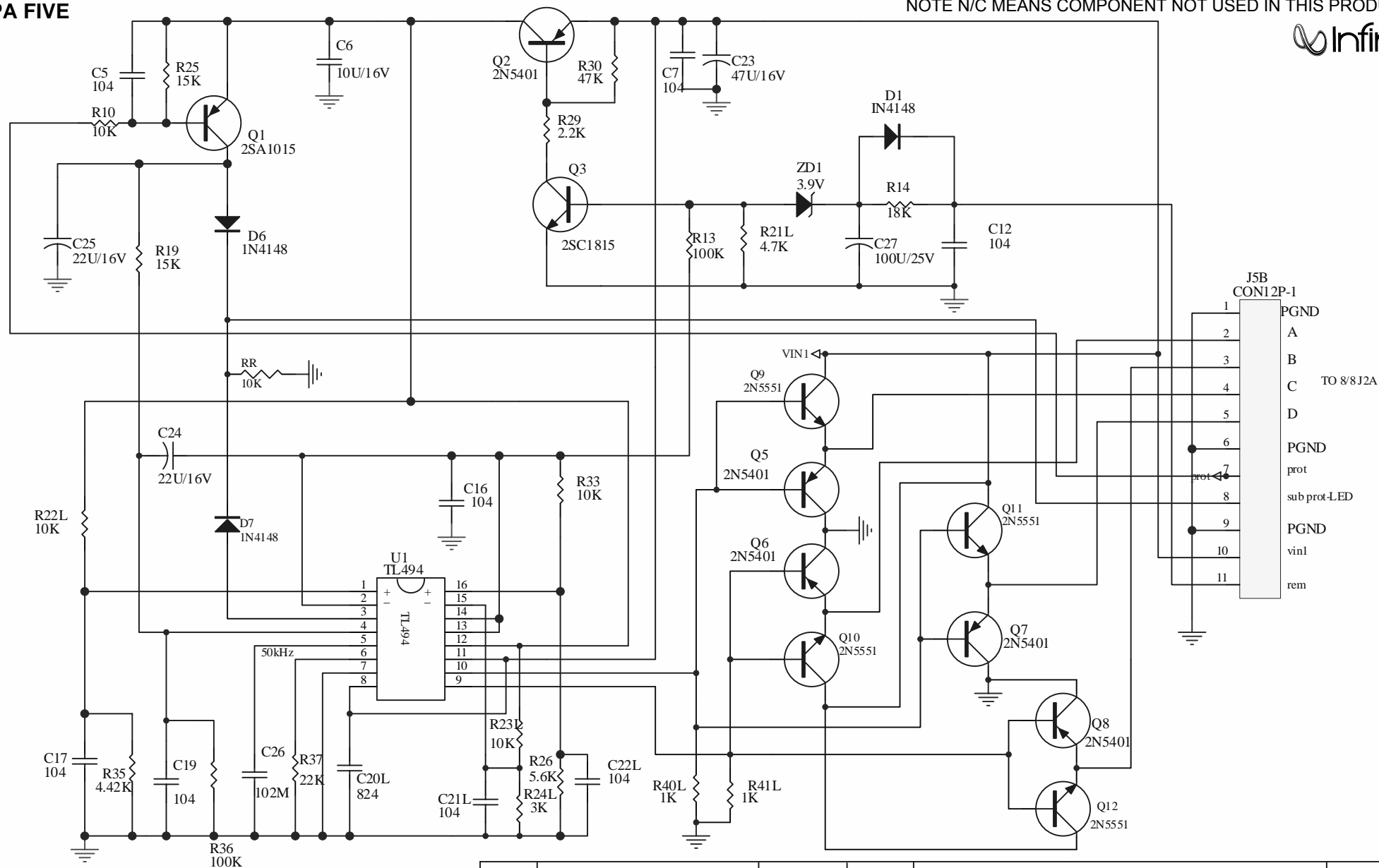
ECN NO	DESCRIPTION	APPROVED	DATA					DWG NO.
								PART NO.
				PARTNAME:	SCALE: 5/8	DRAW BY:	HuLian Li	DATA: 2008.03.25
				SUB ir2010	UNT: MM	CHECKED BY:		DATA:
				PRODUCT MODE:	SIZE: A2	APPROVED BY:		DATA:
				Kappa Five	REV: 4.3	09-02-20		

NOTE N/C MEANS COMPONENT NOT USED IN THIS PRODUCT



KAPPA FIVE

NOTE N/C MEANS COMPONENT NOT USED IN THIS PRODUCT

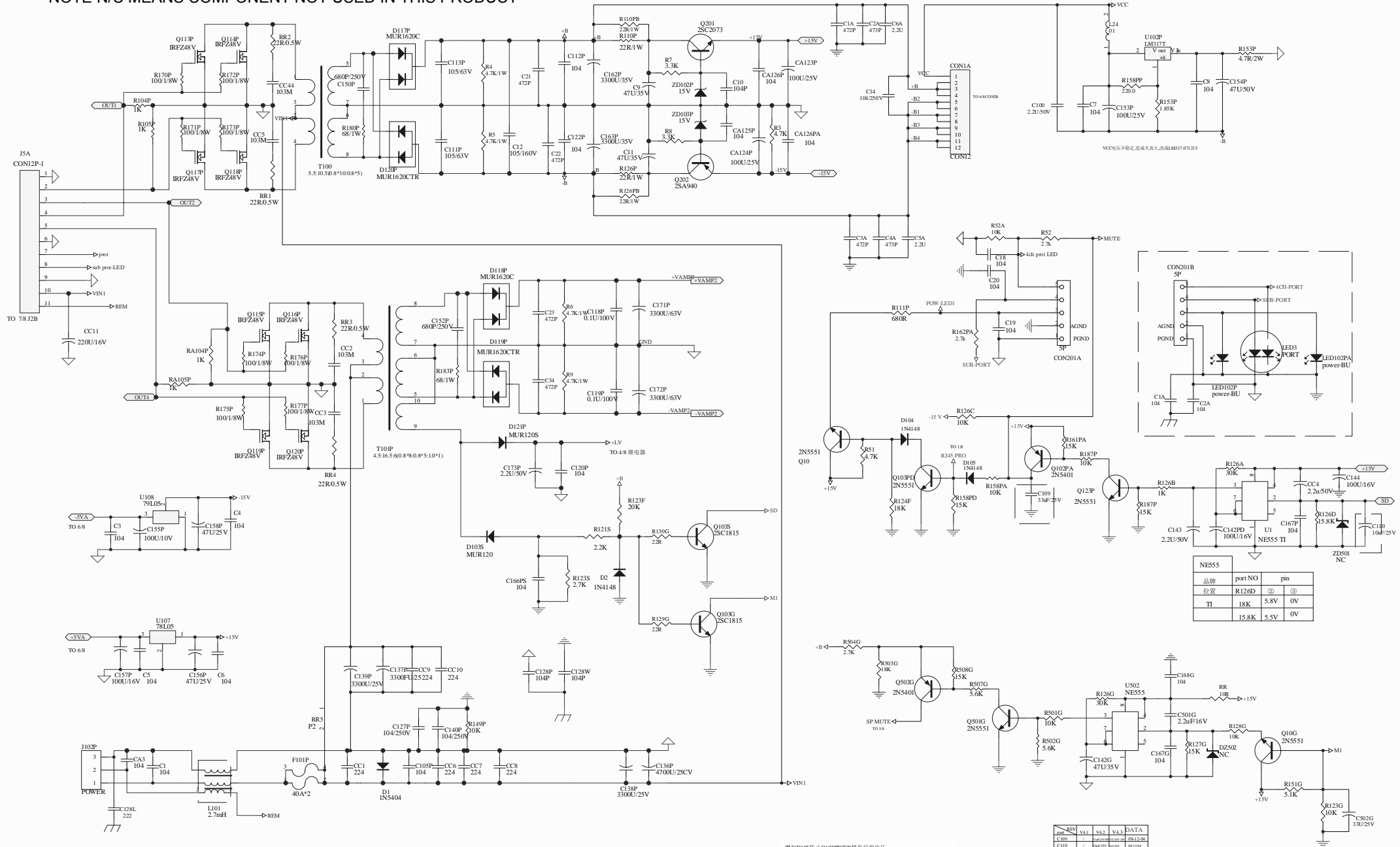


ECN NO	DESCRIPTION	APPROVED	DATA						DWG NO:
									PART NO:
				PART NAME:		SCALE: 7/8	DRAW BY: HuiLian Li		DATA: 2008.03.25
				power supply		UNIT: MM	CHECKED BY:		DATA:
				PRODUCT MODE:		SIZE: A2	APPROVED BY:		DATA:
				Kappa Five		REV: 4.3	09-02-20		

KAPPA FIVE



NOTE N/C MEANS COMPONENT NOT USED IN THIS PRODUCT



增加D105防止Q103PD的B极有反相电压。
增加C109,33uF/25V NP. C110,10uF/25V改善开机噪音08-10-27
R126D原来用18K网络名SD的电压是5.8V,改用15.8K网络名SD的电压是5.5V改善短路保护时间,2009-01-06
更改R51, R111P, R124P度(QQA)投屏亮度LED亮度不一致, 更改前
POW-LED1电压是2.6V,更改后是3.4V,2009-01-11

add d104 41 48

Q103PD, 2SC1815 5uMPS, A060(经过前中审)

REF	VAL	VAL2	VAL3	DATA
C109	33uF	25V	NP	0812-08
C110	10uF	25V	NP	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08
R126D	15.8K	15.8K	15.8K	0812-08

PART NAME:	SCALE: 8/8	DRAW BY: Huili.Liu	DWG NO:
power supply	UNIT: MM	CHECKED BY:	PART NO:
PRODUCT MODEL:	SIZE: A2	APPROVED BY:	DATA: 2008.03.25
Kappa Five	REV: 4.3	09.02.20	DATA: