



audison

- SERVICE MANUAL -

LR⁴⁰⁰ X1

Issued in November 2001

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UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A
Rk = 12 ohm	LRx1CD-S.0	Rev. A	Rev. B	Rev. A	Rev. A

PART 1

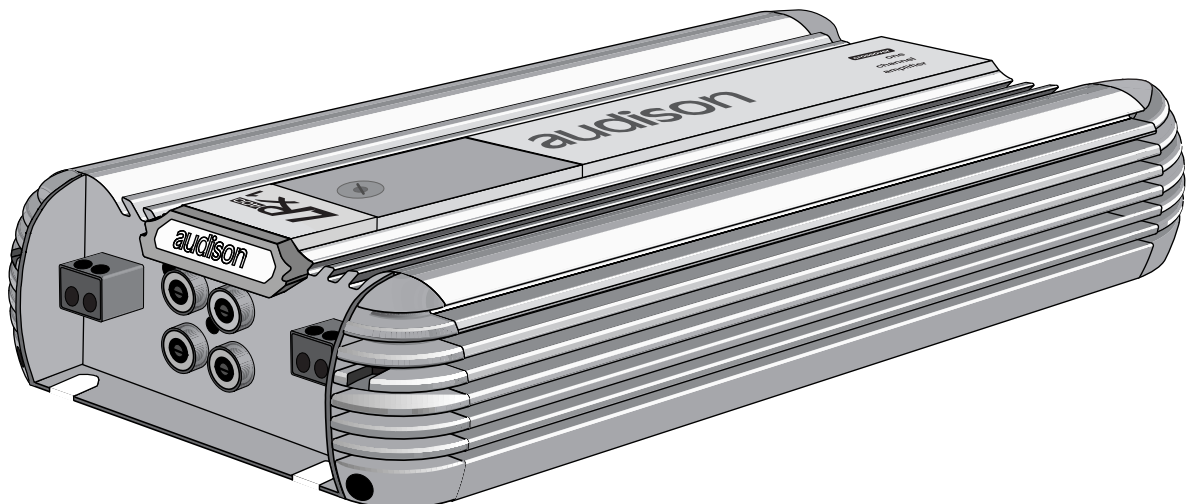
OWNER'S MANUAL

audison

OWNER'S MANUAL

CAR POWER AMPLIFIER

LR⁴⁰⁰_{X1}



INTRODUCTION

INTRODUCTION

Audison thanks you for preferring this product and compliments you on your choice since it was designed in order to insure outstanding musical and instrumental performances.

Before use instructions, please carefully read the safety norms you have to respect in order to avoid unpleasant inconveniences and to enjoy this product at best.

PRECAUTIONS

- Avoid to install the amplifier where temperature is below 0°C or above 55°C and in non ventilated places.
- The amplifier needs 12VDC power supply voltage with negative to ground. Be sure that your car electric system is compatible with the amplifier ordinary functioning.
- For safer driving, we recommend to adjust volume not to drown external traffic sounds.

WARNING!:

While installing the amplifier, make sure that the cable coming from the battery positive pole (+) doesn't touch the amplifier heat sink.

The heat sink is directly connected to the battery negative pole (-) through the screws which fix it to the vehicle chassis. Its contact with the positive pole cable would cause short circuit and, thus, possible fires and battery damages.

Please connect power supply cables to the amplifier terminal blocks (POWER + and -) before and to battery AFTER, to get maximum safety.

CAUTIONS

INPUTS: If the source output signal ground (PRE OUT) is not connected to the source chassis and the system sound is not powerful enough or is distorted, try to solve the problem by connecting the output signal cable braided shield (PRE OUT) to a point of the source chassis.

OUTPUTS: Don't connect -L and -R power outputs to each other or to ground (car chassis). In case you use an external crossover, make sure that channels grounds are not connected one to the other.

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DESCRIPTION

Audison LRx 1.400:

Mono car power amplifier characterised by excellent musical performances, small size and outstanding energy reserve.

Its PWM power supply stage is stabilised and oversized. Thanks to its great capacity to supply current and to the use of three 70A Mosfets pairs, this amplifier can easily drive even the hardest loads.

Input stage is provided with a special circuit (LNS) which permits the system disturbances rejection, reducing noise that is usually due to the vehicle electric parts (alternator, electronic injection, etc.), without altering musical signal quality.

Amplifier stage is made with six pairs of 18A MOSFETs and A Class bipolar driver. This allows LRx 1.400 to satisfy any power needs, supplying 350W with 4 Ohm load, 650W at 2 Ohms and 900W at 1 Ohm in continuous mode. Differently from what occurs with other amplifiers, LRx 1.400 is not blocked by protection systems immediately below these load values. Its exclusive "Overload Limiter" circuit allows it to go on working, limiting output power and pointing out how hard the applied load is by the "Limit" LED blinking.

Its big power reserve, its constant control at low frequencies and its exquisite timbre qualities make it an ideal amplifier to drive subwoofer and Full Range systems and to realise configurations designed to attain very high sound pressures (SPL).

LRx 1.400 has a bypass subsonic filter (24dB/Oct.) with adjustable frequency, pre-set at 20Hz. It also has two bypass Butterworth crossovers with independent frequencies. LO-PASS filter has 24dB/Oct. slope; it's possible to adjust its Q factor. HI-PASS filter has a 12dB/Oct. slope; it handles the high frequencies signal to send to the preamplified output (PRE OUT). There is a phase inverter ($0^\circ \div 180^\circ$) which is useful to recover the acoustic delay between subwoofer and front sections.

In case LRx amplifiers are used in extremely difficult conditions (very low loads) or in installations where space is too narrow and their heat sink cooling is not enough, they can be employed together with CLK2 cooling system (optional). It is a system made of two units to apply onto the amplifier sides; each of them is provided with an electronically controlled fan that allows the amplifier thermal stabilisation (see "CLK2 – LRx Cooling Kit").

Protection includes:

- **RGP** (Resettable Ground Protection) circuit; in case a short circuit occurs between loudspeakers outputs and car chassis, it detects a high current flow in the pre-input ground and acts by putting the amplifier in stand-by, protecting its circuitry;
- a device against short circuits and against DC in the outputs, to protect loudspeakers;
- a device that detects the amplifier temperature excessive increase and stops its functioning until optimal conditions occur again.

Once the causes which implied protection circuits intervention have been checked and solved, the amplifier is reset by switching it off and on again.

The amplifier is also provided with another general protection which is insured by an internal strip fuse, very easy to reach.

Optional:

The following devices are available upon request:

1 - Three kits for subwoofer volume remote control:

- VCR01 and VCRAK (analogue and specific for subwoofer);
- VCRDK (digital; it can be used for master volume control or for level control of any ways in a multichannel system).

2 - CLK2 cooling system.

IN-OUT PANEL

FUNCTIONS

1

SPEAKER A/B (LO-BYPASS)

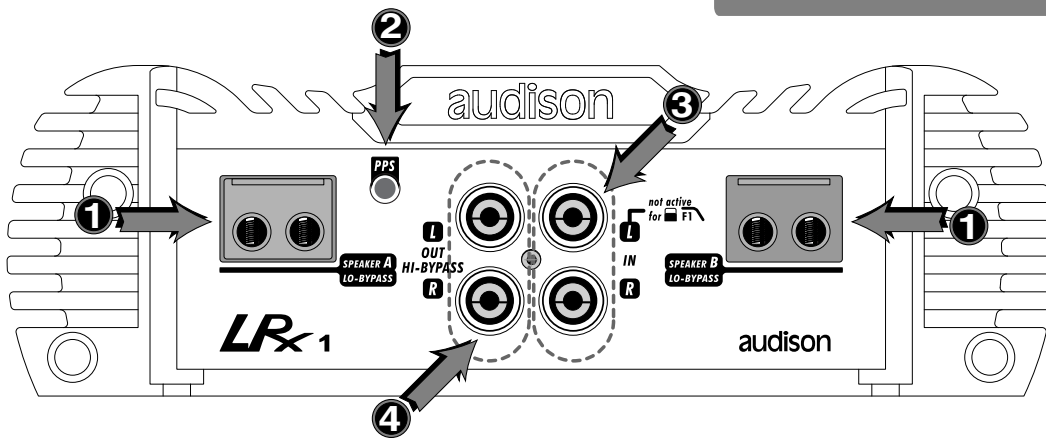
Amplifier power outputs. Signal is **MONO**. The two outputs are in parallel in order to allow the connection of one, two or more speakers. Connect the speakers cables to these outputs according to polarity. Terminal blocks accept cables up to 9 A.W.G. max (see "*audison cable* products for electric connections" as far as their size is concerned). We recommend the use of *audison cable* products.



2

PPS (Phantom Power Supply)

Power supply socket for *audison* external audio accessories.



3

IN

Amplifier left (**L**) and right (**R**) channels inputs. The preamplified outputs (PRE OUT) of a source (head unit, CD player, DAT, etc.) or of an external electronic crossover must be connected to them. If you bypass the LO-PASS filter (F1:), only the right channel (**R**) signal will be amplified; if you apply preamplified signals to inputs, you'll always have them on the corresponding outputs (**OUT**).

4

OUT/HI-BYPASS

Amplifier left (**L**) and right (**R**) channels preamplified outputs. Available signal is Hi-PASS or full range (see "Configurations table").

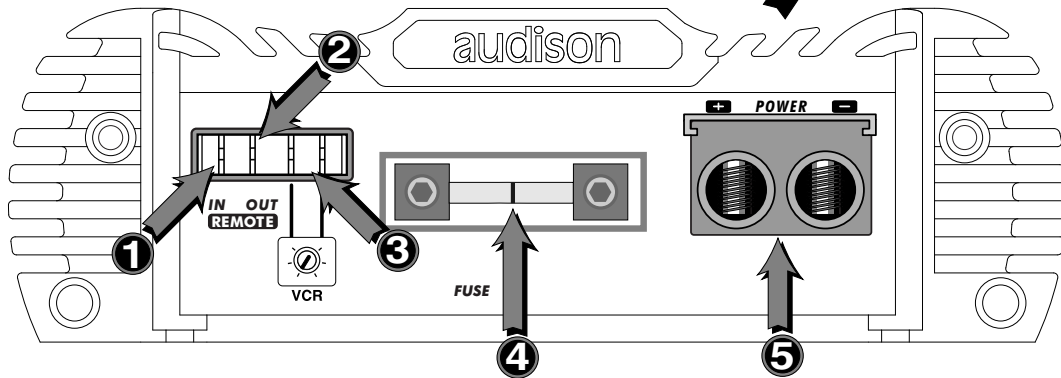
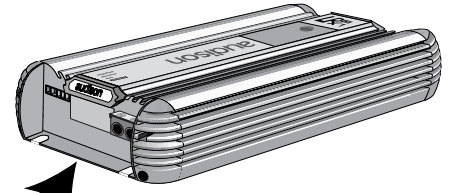
POWER SUPPLY PANEL

FUNCTIONS

1

REMOTE IN

Terminal to connect Remote cable, which comes from the source and which controls the amplifier switching on. Applied voltage must be between 7 and 15VDC.



2

REMOTE OUT

Terminal to repeat the switching on control (Remote IN) coming from the source. It is used to switch on another amplifier or device in the system simultaneously. Available voltage is the same as the one applied on Remote IN.

3

VCR (optional kit)

Terminals to connect VCR01/VCRA/VCRD adjuster included in VCR01K/VCRAK/VCRAK volume remote control kits.

4

FUSE (60A)

Strip fuse. It insures the amplifier general protection. In case the fuse breaks down, please replace it by respecting its original value.

CAUTION: If you want to protect the system even more, please put a strip fuse onto the cable which connects the battery positive pole to the amplifier POWER (+) terminal block (see "Electric connections").

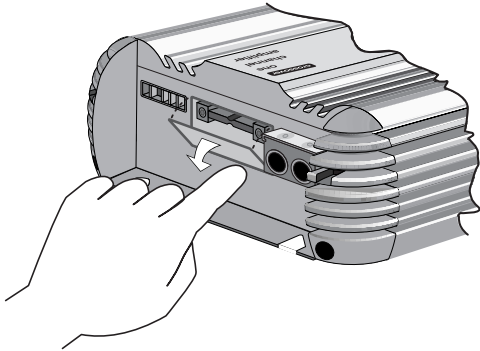
5

POWER

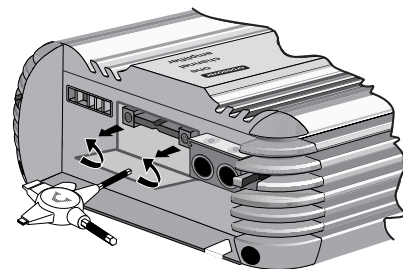
Terminal blocks for the amplifier power supply cable connection. Connect positive and negative poles according to indicated polarities. Holes have 8mm diameter and accept cables up to 3 A.W.G. max. In order to get the best current transfer, please use power supply cables with as big a section as possible. **audison cable** catalogue offers you a complete range of such products which can satisfy whatever demands; you can also find **Maincrimp** terminals in it. We strongly recommend their use because they contain the cable non protected end and allow the terminal block to fasten all its useful section.

POWER SUPPLY PANEL

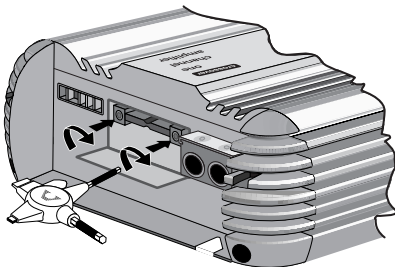
FUSE REPLACEMENT



1 - Open the transparent cover by pushing the two teeth in its lowest corners to the direction indicated by the arrows.

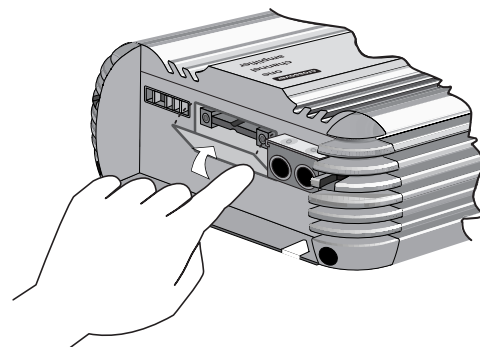


2 - Remove the screws which fasten the fuse to eliminate pieces of the broken one; prevent them from going into the device.



3 - Check the value of the new fuse to assemble, then fix it by gradually and alternately fastening the two screws. This will avoid voltage drops along the line and will make the device perfect functioning easier.

4 - Close the transparent cover.



CONTROLS PANEL

FUNCTIONS AND CONTROLS

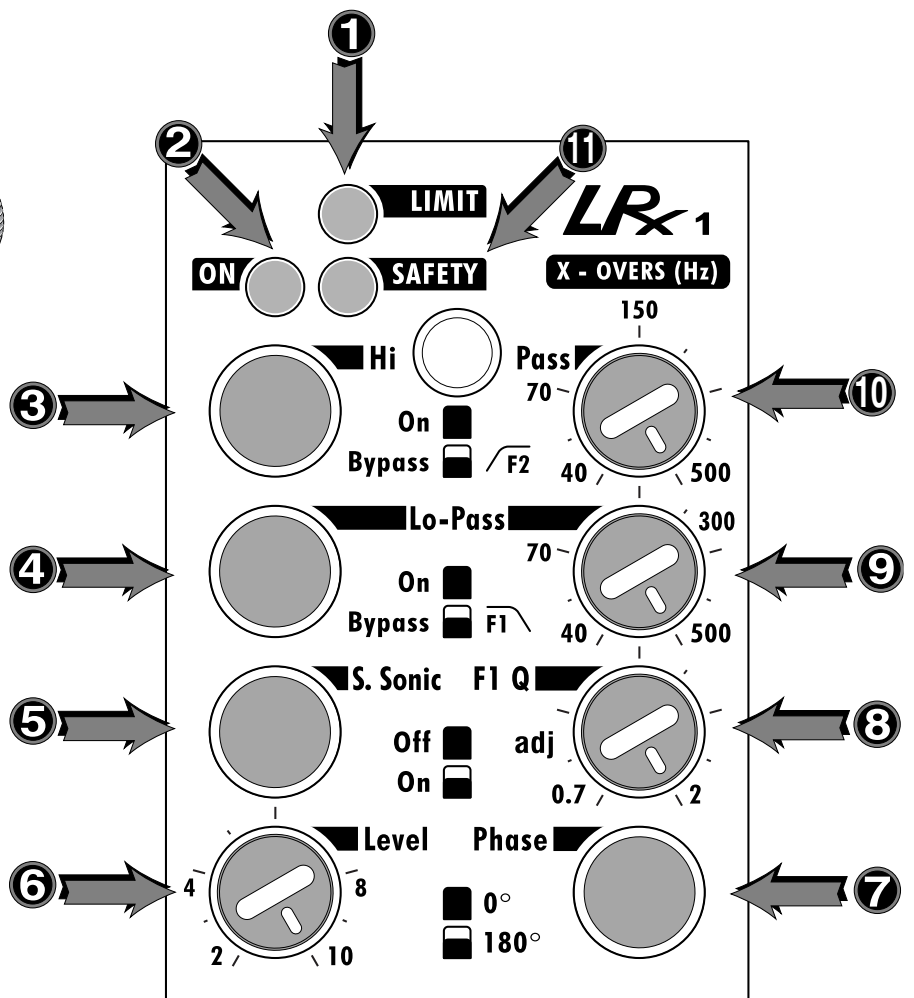
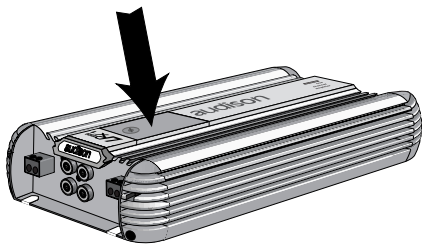
1

LIMIT (orange LED)

It indicates the Overload Limiter circuit is on.

Caution:

When this led is on (although sporadically), it means the applied load is a hard one. The activation of Overload Limiter circuit (output power limiter) will anyway allow the amplifier to function without distortions. In case Overload Limiter gets on too frequently (at every power peak), you will need to check if there are any failures or a too hard load (that's to say impedance is about 50% lower than the minimum recommended one). The amplifier can go on functioning in these conditions but power will inevitably decrease.



2

ON (green LED)

It indicates the amplifier is on.

3

HI-PASS

It permits to choose whether to send a full range signal (**BYPASS**) or a 12dB/Oct. HI-PASS signal for high frequencies (**ON**) to the preamplified output (**PRE OUT**).

CONTROLS PANEL

4

LO-PASS

It permits to choose whether to send a full range signal (**BYPASS**) or a 24dB/Oct. LO-PASS signal for low frequencies (**ON**) to the amplifier stage.

5

SUBSONIC

It permits to eliminate subsonic frequencies; these sounds cannot be heard by human ears but cause useless and damaging stress to amplifier and speakers. Subsonic filter can be bypassed (**BYPASS**) and it is pre-set at **20 Hz**. Its cut-off frequency can be adjusted between 16 and 32 Hz through 4 Hz steps; this occurs by replacing the special resistors located into a socket which can be reached through the setting panel in the amplifier bottom (see "Subsonic filter cut-off frequency modification").

6

LEVEL

It permits to adjust the amplifier input sensitivity and sets its output level.

7

PHASE (0°/180°)

It permits to invert the phase of the signal on the speakers output terminal blocks. It is especially useful to acoustically align subwoofer and front system.

8

F1 Q

It permits to adjust the LO-PASS filter Q, varying the filter gain at its cut-off frequency. It is useful to linearise the system response in the HI-PASS and LO-PASS crossover point.

9

F1

It permits to adjust LO-PASS filter cut-off frequency between 40 Hz and 500 Hz.

10

F2

It permits to adjust HI-PASS filter cut-off frequency between 40 Hz and 500 Hz.

11

SAFETY (red LED)

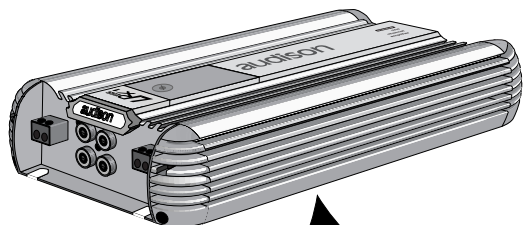
It indicates that the amplifier protection circuits are on. In order for the amplifier to work again, you need to switch the system off and then on after 10 seconds at least. We recommend to check all connections before switching the amplifier on again.

If LED stays on, please contact Audison authorised after sale centres.

SETTING PANEL

FUNCTIONS

It permits to reach the resistors to set subsonic filter cut-off frequency and to insert VCA modules for the subwoofer volume remote control.

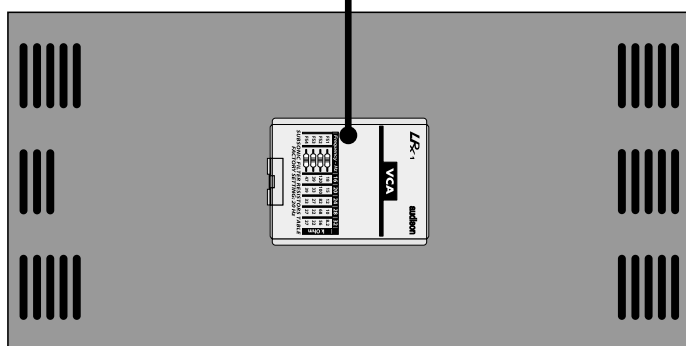


Setting panel

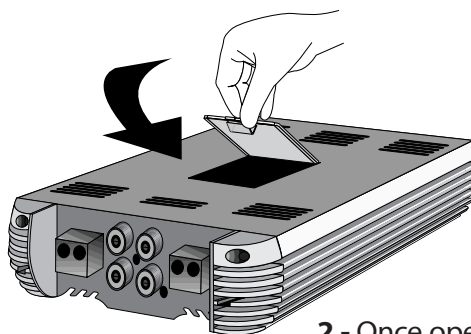
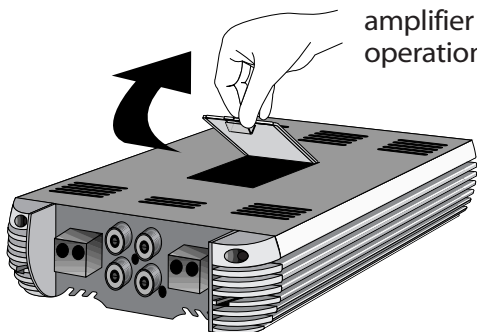
LR_{x1} VCA audison

Frequency - Hz	16	20	24	28	32	
FS1	18	15	12	10	8.2	kOhm
FS2	120	100	82	68	56	
FS3	39	33	27	22	22	
FS4	47	39	33	27	27	

SUBSONIC FILTER RESISTORS TABLE
FACTORY SETTING: 20 Hz



1 - Remove the setting panel in the amplifier bottom in order to carry out operations.



2 - Once operations have been carried out, please close the setting panel.

SETTING PANEL

SUBSONIC FILTER CUT-OFF FREQUENCY MODIFICATION

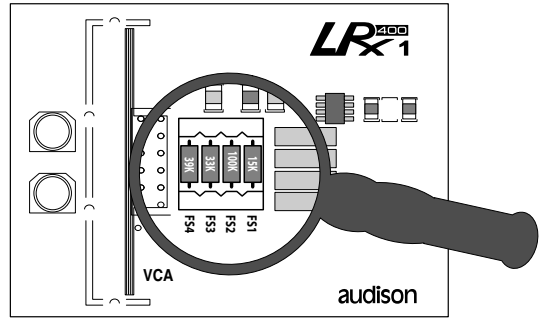
Subsonic filter is pre-adjusted at 20 Hz. In order to modify this value, please act according to what follows.

Procedure:

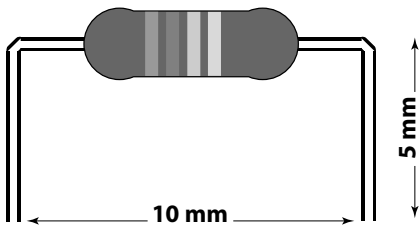


Frequency - Hz	16	20	24	28	32		
FS1		18	15	12	10	8.2	kOhm
FS2		120	100	82	68	56	
FS3		39	33	27	22	22	
FS4		47	39	33	27	27	

SUBSONIC FILTER RESISTORS TABLE
FACTORY SETTING: 20 Hz



Replace FS1, FS2, FS3, FS4 resistors according to the values in the setting panel table.



Remark: Cut the new resistors rheophores according to the size in the picture.

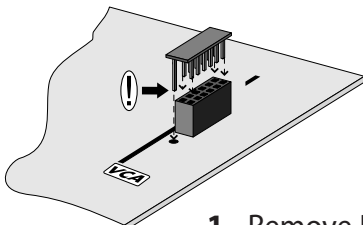
VCA-VCA1D MODULES INSERTION

LRx 1.400 can accept one of the three optional kits which allow the subwoofer volume remote control: VCR01K, VCRAK or VCRDK.

These kits have a specific module, VCA or VCA1D, to insert into the amplifier through the setting panel.

REMARK: please use VCRDK kit when the amplifier LO-PASS filter is off (F1:).

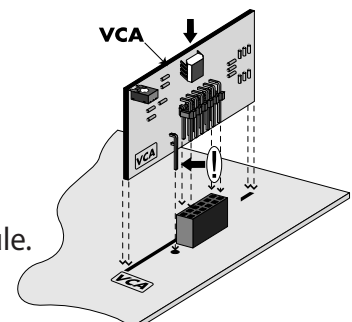
Installation:



1 - Remove BYP12 bridge.

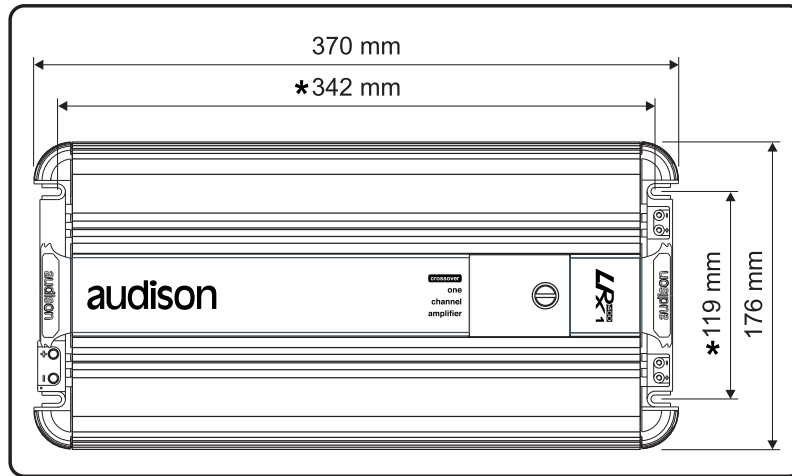
- Insertion key. It prevents the module from being inserted in the wrong way.

2 - Insert VCA/VCA1D module.



TECHNICAL FEATURES

SIZE FOR FIXING



* Drilling dimensions for fixing

LRx 1.400

<p>POWER SUPPLY Voltage: 11 ÷ 15 VDC Idling current:..... 1.9 A Idling current when off: 0.02 mA</p> <p>Consumption @ 13.8 VDC (Max Musical Power): - A config. (see Output Power):..... 20 A - B config. (see Output Power): 37.5 A - C config. (see Output Power): 55 A</p>	<p>Output power (RMS) @ 13.8 VDC; THD 1% - A config.: 350W x 1 (4 Ohm) - B config.: 650W x 1 (2 Ohm) - C config.: 900W x 1 (1 Ohm)</p>
<p>AMPLIFIER STAGE Distortion – THD (1kHz): 0.06 % Bandwidth (-3dB): 4 Hz ÷ 60 kHz S/N ratio(A weighed @ 1V):..... 105 dB Damping factor (1 kHz, 4 Ohms): 200 Input sensitivity: 0.2 ÷ 5 VRMS Input impedance:..... 15 kOhms</p> <p>Load impedance: - 1 Ch. mono:..... 4 - 2 - 1 Ohms</p>	<p>FILTERS/INPUTS Sub: Bypass/ 24dB/Oct. Lo-Pass (40 ÷ 500 Hz) Phase: 0° ÷ 180° Q control (LO-PASS): 0.7 ÷ 2 Subsonic: Bypass/ 24dB/Oct. Hi-Pass, 16÷32 Hz (pre-set at 20 Hz) Pre Out: . Bypass/ 12dB/Oct. Hi-Pass (40 ÷ 500 Hz) Inputs: IN L-R</p>
<p>Nominal output power (RMS) NP @ 12VDC; THD 0.3%: 300W x 1 (4 Ohms)</p>	<p>OTHER FUNCTIONS Remote IN: 7 ÷ 15 VDC – 1 mA Remote OUT: 12 VDC – 10 mA Auxiliary power supply (PPS): . ±12 VDC – 300 mA IN VCR (SUB volume) VCA/VCA1D attenuation:..... 100 dB Fuse:..... 60 A</p> <p>MAX SIZE (L x H x D): 176 x 56 x 370 mm</p> <p>WEIGHT: 3.6 kg</p>

ACCESSORIES

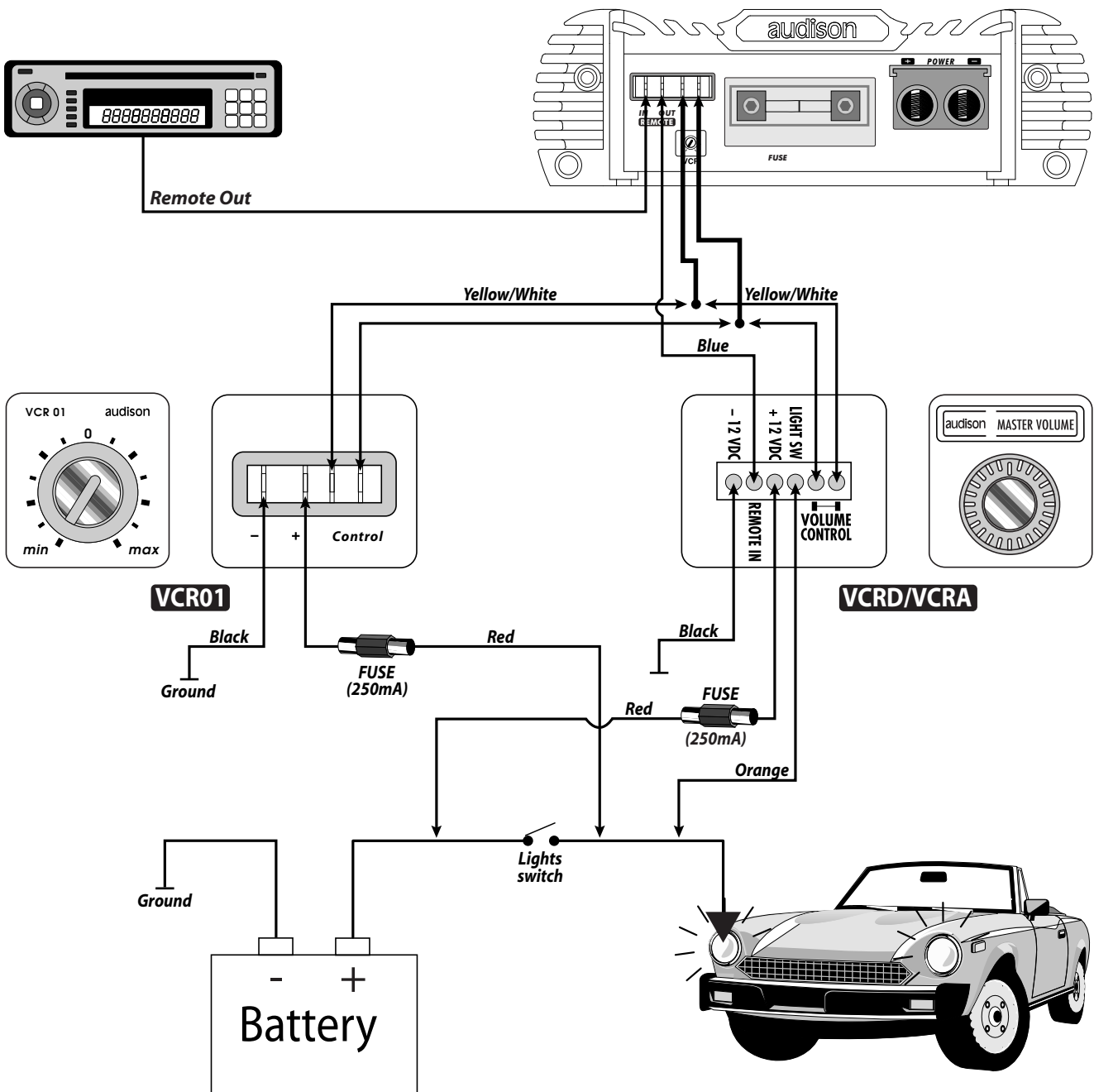
VCR01K, VCRAK and VCRDK

LRx 1.400 can accept one of the optional kits that allow the subwoofer volume remote control. VCR01K and VCRAK are analogue and special for sub; VCRDK is digital and can be used for master volume control or for level control of any ways in a multichannel system.

These kits are available as accessories and consist of three elements:

- 1) Volume adjuster (VCR01/VCRA/VCRD);
- 2) VCA/VCA1D module to put inside the amplifiers;
- 3) Wire to connect VCR01/VCRA/VCRD adjusters to the proper sockets in the amplifier rear panel and to the car lights switch, in order to light it up.

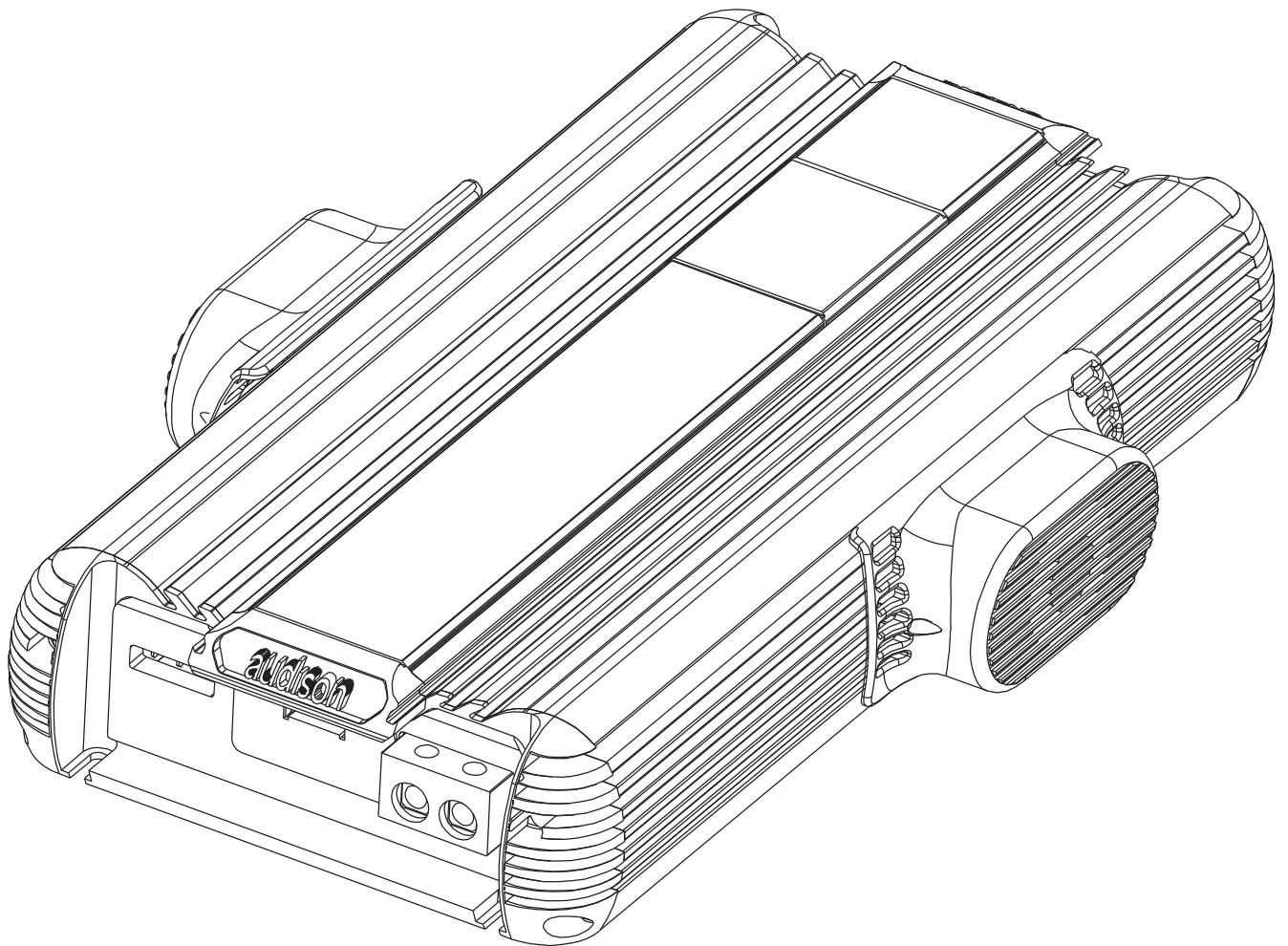
Install VCR01/VCRA/VCRD adjusters in a place you can easily and comfortably reach, according to the following connection diagram.



CLK2 - LRx Cooling Kit

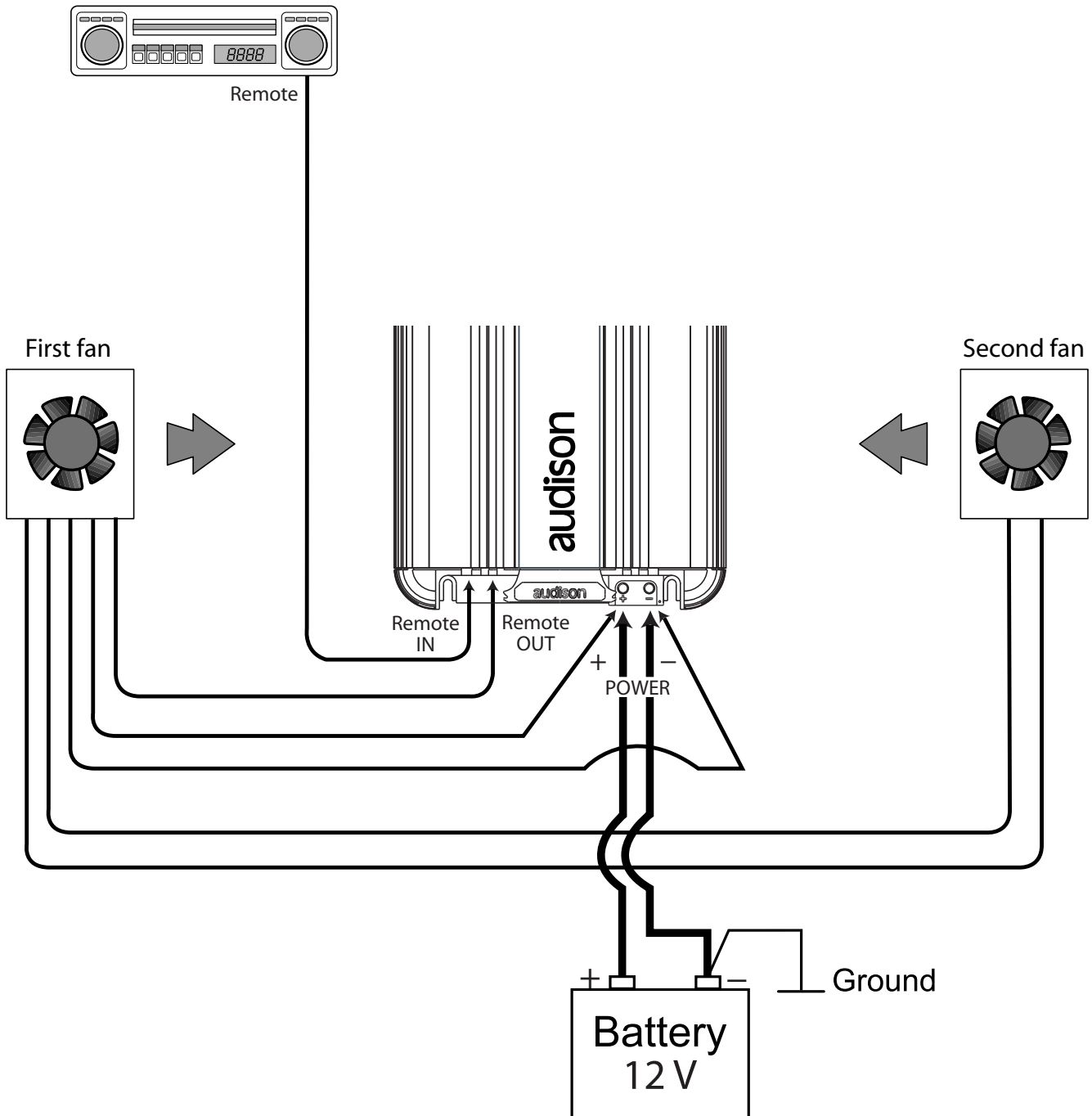
This cooling system is specially designed to provide LRx amplifiers with the right working temperature. **CLK2** should be used when LRx amplifiers work in extremely hard conditions (very low loads) or in installations where space is too narrow and heat sink cooling is not enough. It consists of two units to apply onto the amplifier sides; each of them is provided with an electronically controlled fan. Its intervention depends on a thermal sensor that starts the system as soon as LRx heat sink reaches 45°C. The same sensor is connected to a special circuit which controls the two fans speed progressive increase when temperature increases, too.

Air flux constant control allows the amplifier very good thermal stabilization and limits noise.



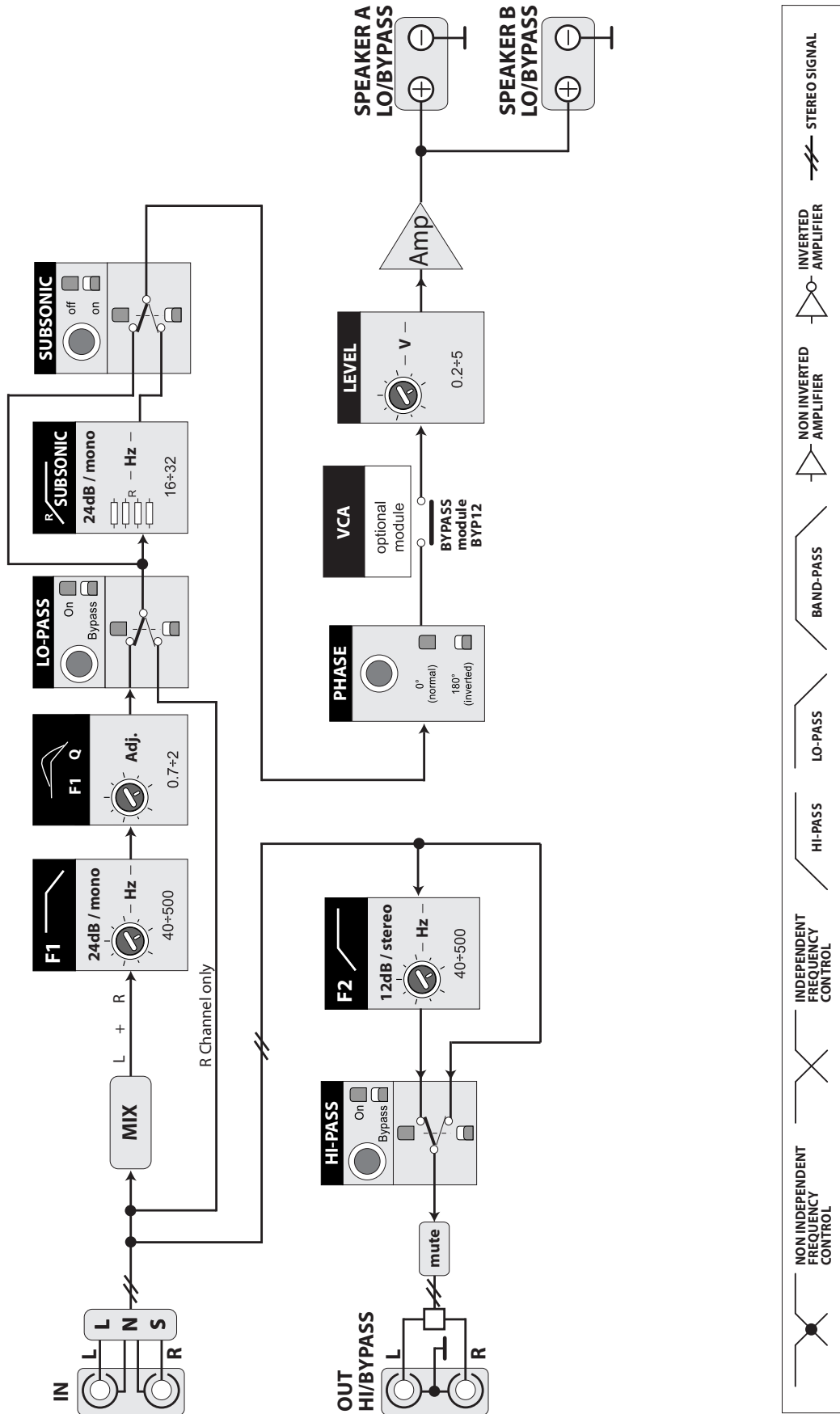
ACCESSORIES

Installation:



CONFIGURATIONS

BLOCK DIAGRAM



CONFIGURATIONS

CONFIGURATIONS TABLE

LRx 1.400 can be configured as follows:

Config. 1 = Speaker A/B (Full Range); Pre Out (Full Range)

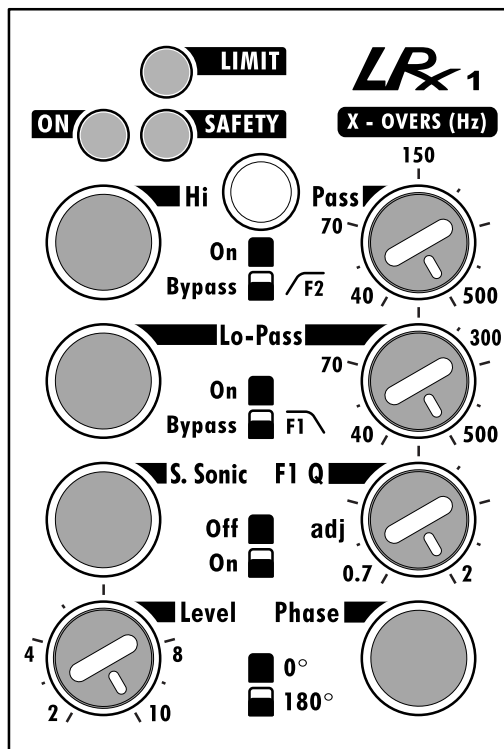
Config. 2 = Speaker A/B (Full Range); Pre Out (Hi 12 dB)

Config. 3 = Speaker A/B (Lo 24 dB); Pre Out (Full Range)

Config. 4 = Speaker A/B (Lo 24 dB); Pre Out (Hi 12 dB)

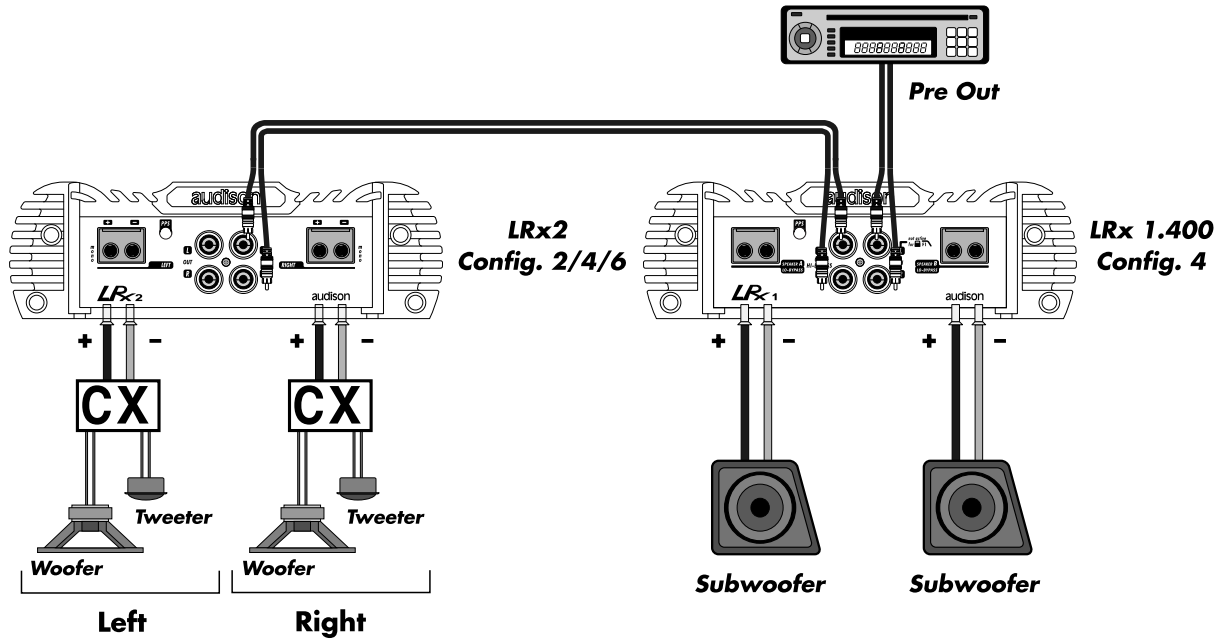
CONFIG.	SPEAKER A/B	PRE OUT	LO-PASS	HI-PASS
1			<input type="checkbox"/> BYPASS	<input type="checkbox"/> BYPASS
2			<input type="checkbox"/> BYPASS	<input checked="" type="checkbox"/> ON
3			<input checked="" type="checkbox"/> ON	<input type="checkbox"/> BYPASS
4			<input checked="" type="checkbox"/> ON	<input checked="" type="checkbox"/> ON

CONTROLS PANEL DIAGRAM

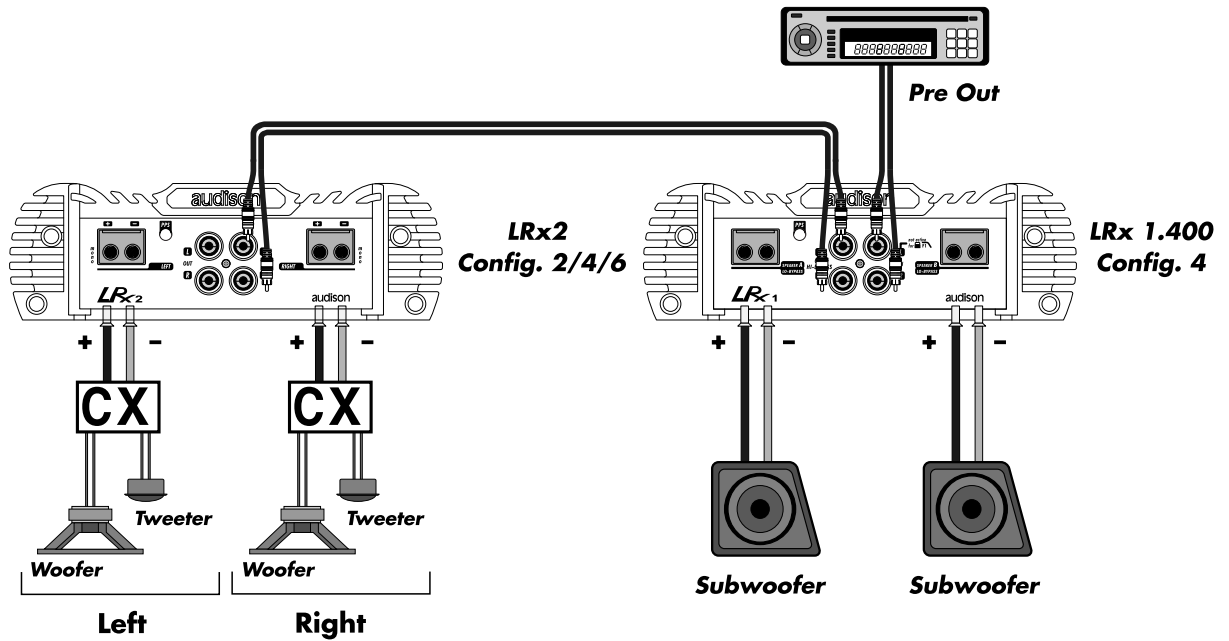


CONFIGURATION EXAMPLES

FRONT+SUBWOOFER

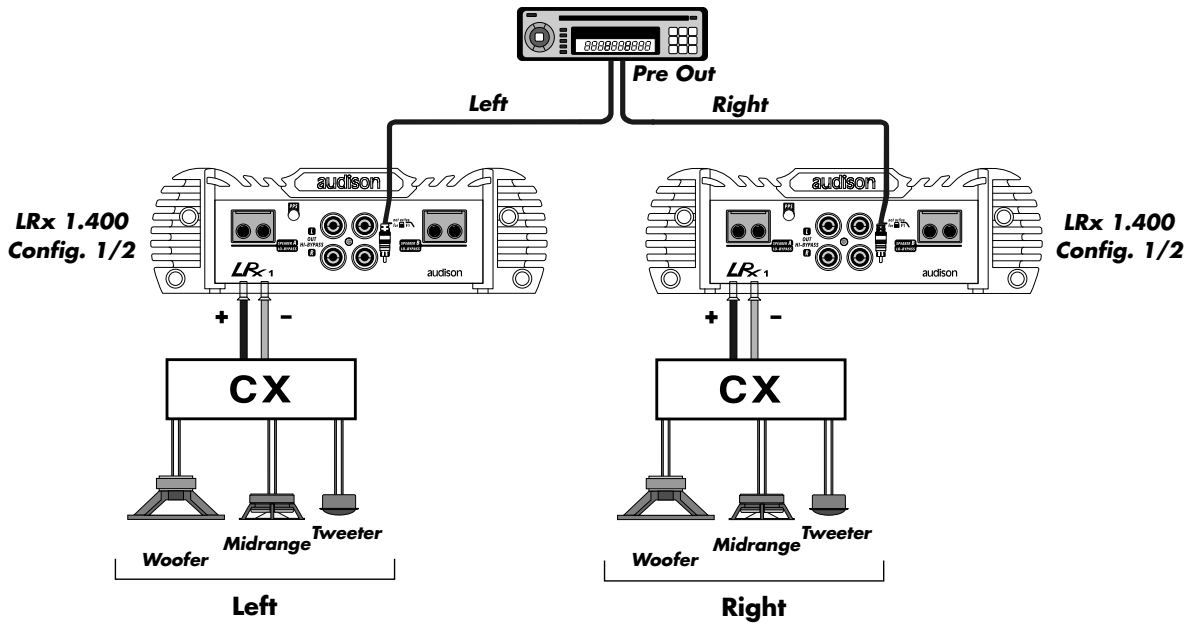


FRONT (DUAL MONO)+SUBWOOFER



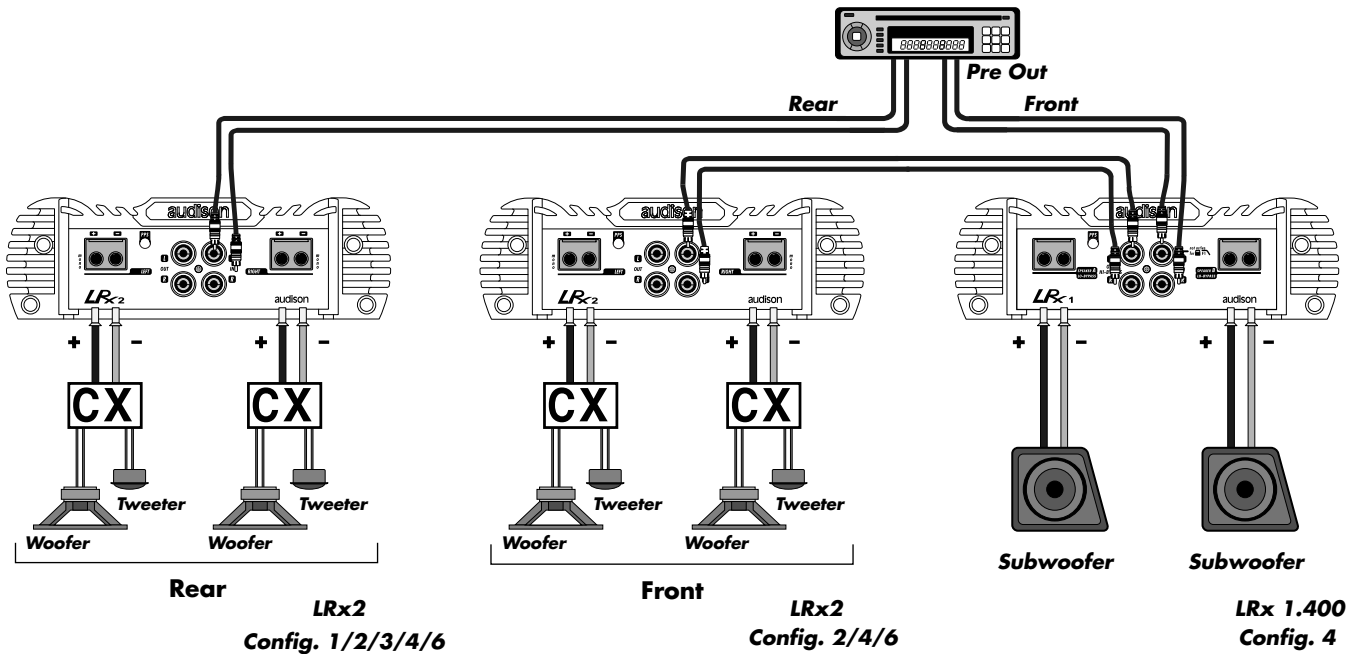
CONFIGURATION EXAMPLES

FRONT (DUAL MONO)



CX PASSIVE CROSSOVER

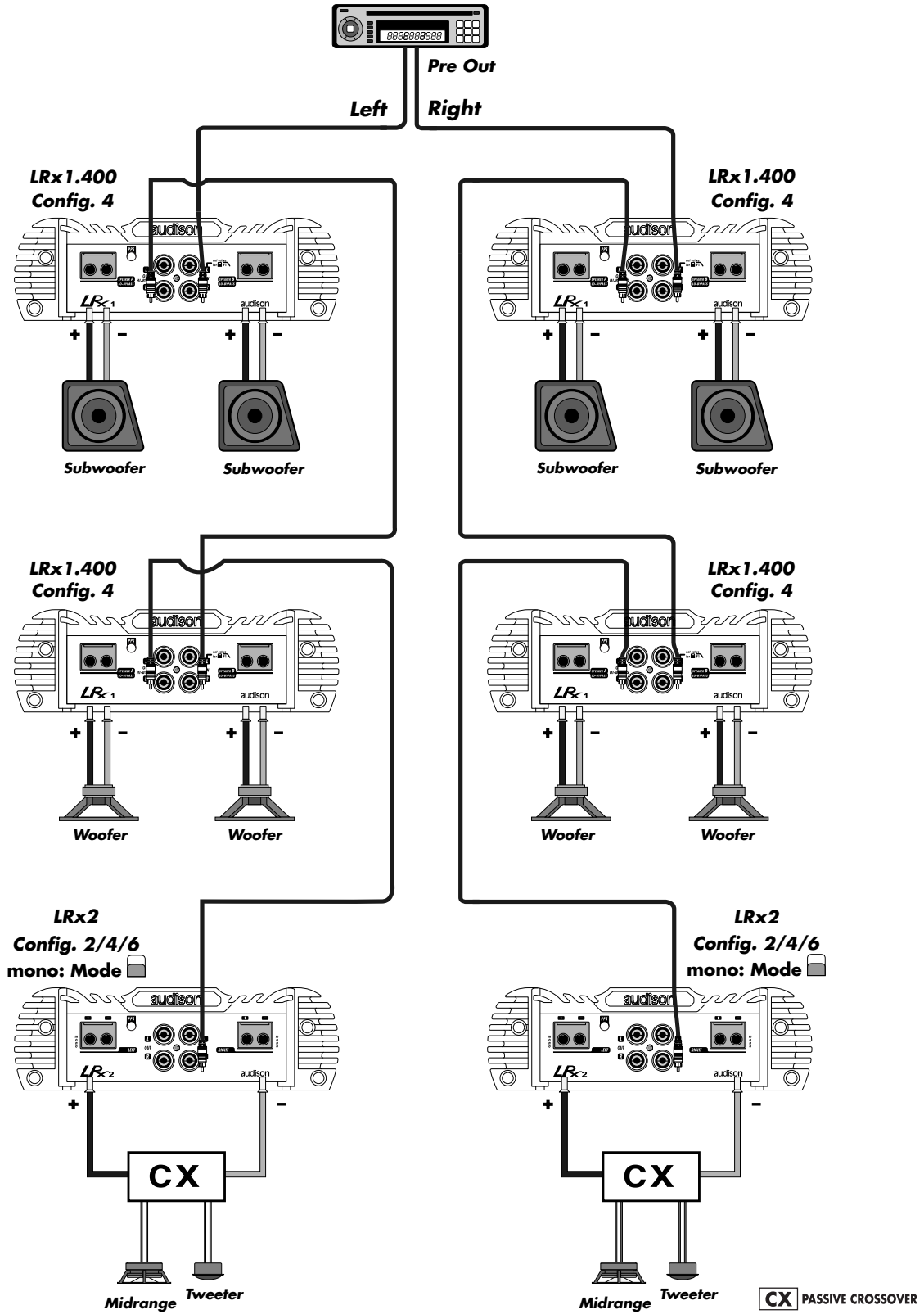
FRONT + REAR + SUBWOOFER



CX PASSIVE CROSSOVER

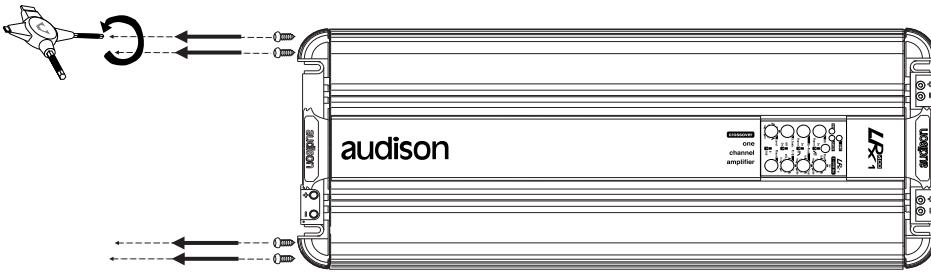
CONFIGURATION EXAMPLES

MULTICHANNEL



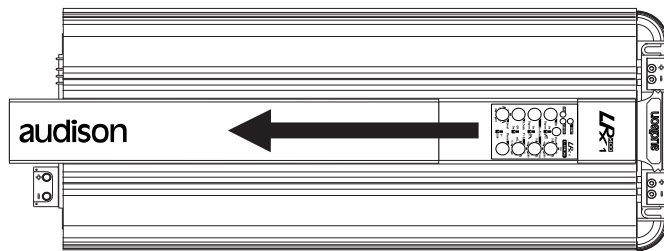
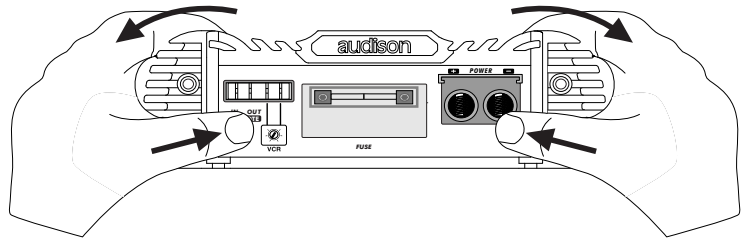
INSTALLATION

LOGO ROTATION



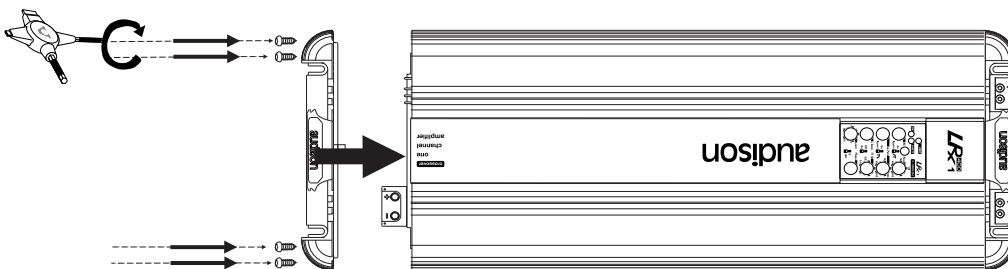
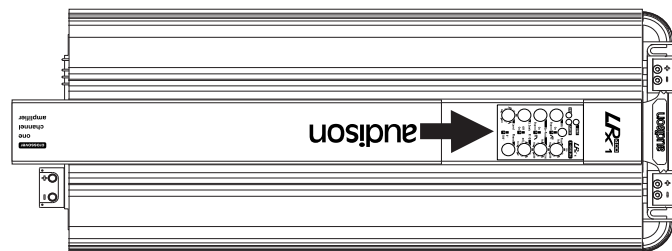
1 - Remove the transparent cover which protects controls and then the 4 screws which block the metal plate by using multispanner.

2 - Remove the plate without damaging the silkscreen printed panel which will have to stay on. We suggest that you seize both plate grips with your hands and pull them by blocking the silkscreen printed panel with your fingers against the amplifier chassis at the same time. This will permit to remove the plate from the panel without damages.



3 - Remove the strip with **audison** logo.

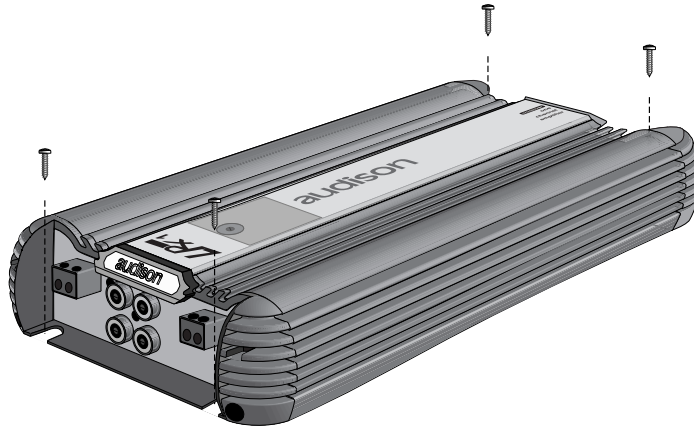
4 - Put the strip back again after turning it, so that **audison** logo is upside down.



5 - Mount the plate back by fixing it through the screws; then, re-assemble the transparent cover which protects controls.

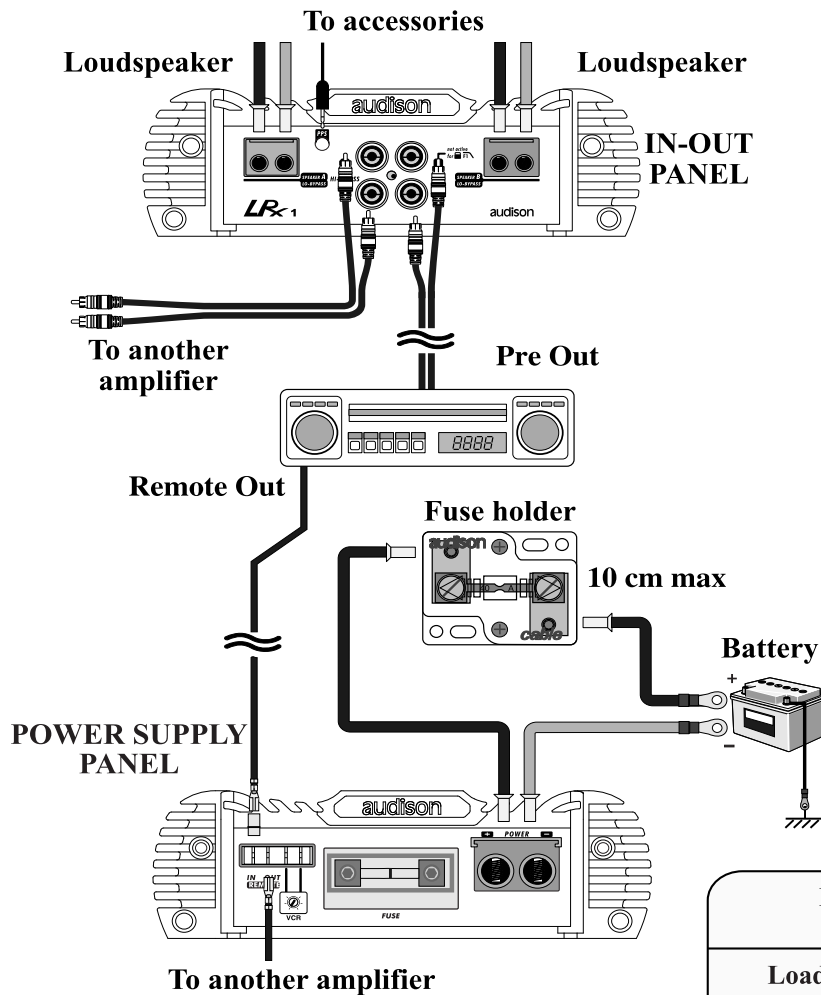
INSTALLATION

AMPLIFIER FIXING



Fix the amplifier through the self-tapping screws (4.2 x 16) given with it.

ELECTRIC CONNECTIONS



CAUTION!

For the system safer protection, we recommend the use of a strip fuse on the cable that connects the battery positive pole to the amplifier POWER (+) terminal block. This fuse has to be installed about 10 cm far from the battery; its value will have to be equal or slightly higher (+10% approx.) than consumption @13.8 VDC, according to the different configurations (see "Technical features").

It will have to be equal to the sum of the values of all fuses in case system consists of several amplifiers or in case amplifiers have several fuses.

LRx 1.400 FUSE: 60A

POWER SUPPLY CABLE SIZE Length: 4/5 m

Load	4 Ohms		1 Ohm	
	mm ²	A.W.G.	mm ²	A.W.G.
LRx 1.400	5.5	7	15.1	5

INSTALLATION

audison cable PRODUCTS FOR ELECTRIC CONNECTIONS

MAINCRIMP

audison cable

RING TERMINALS

RECOMMENDED POWER SUPPLY CABLES

Cable must be chosen according to its length and to the system total power.

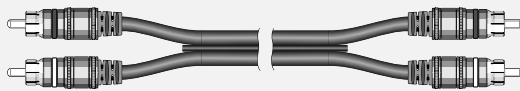
POWER SUPPLY TERMINAL BLOCKS		CABLES		BATTERY + AND GROUND	
1 Ohm					f mm (inch)
4/2 Ohms	MAINCRIMP 8	For 7 A.W.G.	POWERFLOW 7 (red and black)	PR 62.19 R&B	RB 6.45.1G f = 6 (.24) RB 8.45.1G f = 8 (.31)
1 Ohm	MAINCRIMP 8	For 5 A.W.G.	MAINPOWER 5 (red and black)	PR 80.24 R&B	RB 6.58.1G f = 6 (.24) RB 8.58.1G f = 8 (.34)

RECOMMENDED SPEAKERS CABLES

SPEAKERS TERMINAL BLOCKS	CABLE	
MAINCRIMP 14	093/20	2 x 14 A.W.G.
MAINCRIMP 14	092/20	2 x 12 A.W.G.

RECOMMENDED SIGNAL CABLES

BEST series PIN-RCA / PIN-RCA extensions are available in the following sizes



BS 50	cm 50 (19.68 inch)	BS 300	cm 300 (118.11 inch)
BS 100	cm 100 (39.37 inch)	BS 400	cm 400 (157.48 inch)
BS 150	cm 150 (59.05 inch)	BS 450	cm 450 (177.16 inch)
BS 200	cm 200 (78.74 inch)	BS 500	cm 500 (196.85 inch)
		BS 600	cm 600 (236.22 inch)

Audison measurement standards

*(Power measures taken according to **audison** standard, 1998 edition)*

- 12VDC and 13.8VDC;
- 1 kHz or crossover cut-off frequency;
- 0.3% THD @ nominal power; 1% THD @ continuous power;
- Tolerance: +10%; -5%;
- Continuous power given by RMS Voltage measured on resistive load;
- The nominal power of the amplifier is measured upon a battery voltage of 12 Volts with a 4 Ohm load and with all channels in function.

PRINTED IN ITALY - Code 10125750

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62018 Potenza Picena (MC) Italy

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PART 2

ELECTRONIC PART

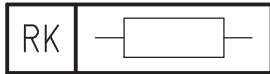
1. MAINBOARD IDENTIFICATION

There is a key resistor called “RK” on the amplifiers mainboard;
it allows you to identify which PCB it is and to find the proper electric diagrams and components layouts for it.

How to find the right diagrams to refer to

- 1) Find “RK” resistor on the mainboard and determine its value.
- 2) Please check the item “Rev/RK” in the cataloguing information table; then select the diagrams where “RK” value corresponds to the pre-determined one.

Example:



“Rk” resistor assembled onto mainboard, its value is 10 ohms.

Consult the diagrams where you can find 10 ohms value in item “Rev/Rk”.



Type:	MAINBOARD	Rev/Rk:	10ohms
Date:	29/mar/2001	Sheet:	

Caution

When “RK” resistor is not onto the PCB, you will find “-“ in the diagrams instead of its value.

2. MODULES IDENTIFICATION AND REPLACEMENT

Besides the module identification name, you can usually find a number (indicating version) and a letter (indicating revision) onto the PCB.

By decoding these two figures, you can handle the compatibility of the modules you have to replace and find the corresponding diagrams.

Example of how to decode the modules VERSION/REVISION.

LRx2CD-S.0A

LRx2CD-S = Module type

.0 = Version number

A = Revision letter

(If this letter is missing, it means the module is the first release).

VERSION NUMBER

A different number indicates a non compatible VERSION.

Please don't use modules with a different VERSION NUMBER for replacement, unless it is indicated.

Contact Audison for any necessary clarifications.

REVISION LETTER

A different letter indicates the module improved revision. Compatibility is not compromised. It is always suitable to replace a module with another one having the same letter or the successive one.

How to find the right diagrams to refer to

- 1) Find the version/revision identification figures on the module.
- 2) Please check the item “Rev/RK” in the cataloguing information table; then select the diagrams with corresponding version/revision figures.

Example:



Version/revision corresponding to “.0A”.

Consult the diagrams where you can find “.0A” in item “Rev/Rk”.



Type:	LRx2CD-S	Rev/Rk:	.0A
Date:	29/mar/2001	Sheet:	

PART 2: ELECTRONIC PART

Section B: Mainboard revisions

First version: Rk = /

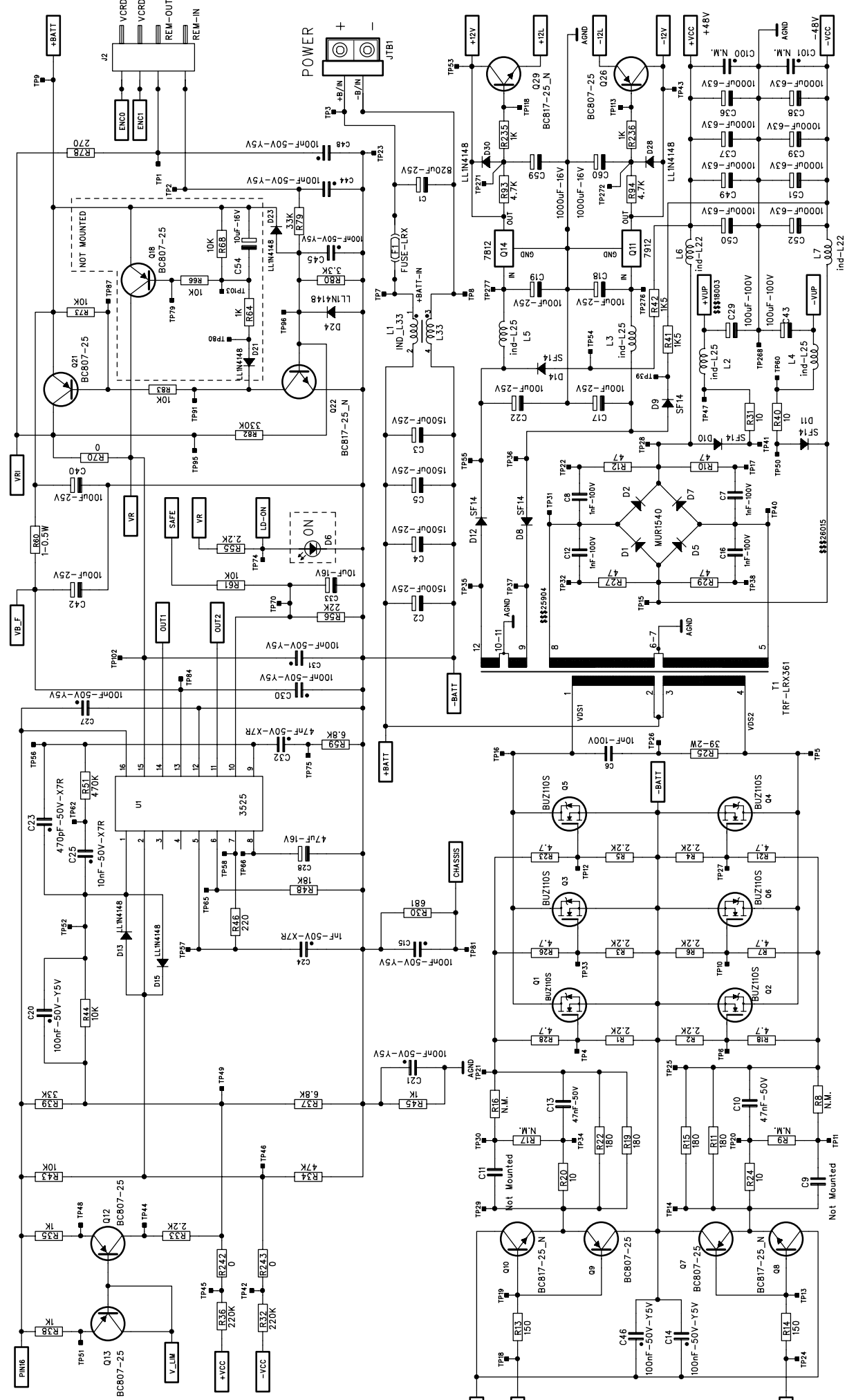
Electrical diagrams - **Rk = /** sheets from 1 to 6

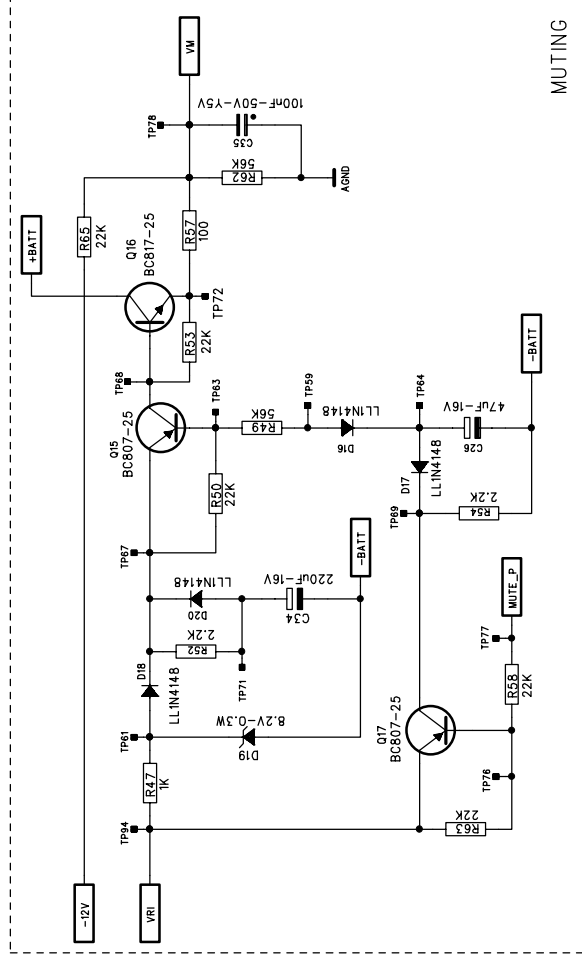
Components layout - **Rk = /** sheets from 1 to 1

PCB parts list - **Rk = /** sheets from 1 to 3

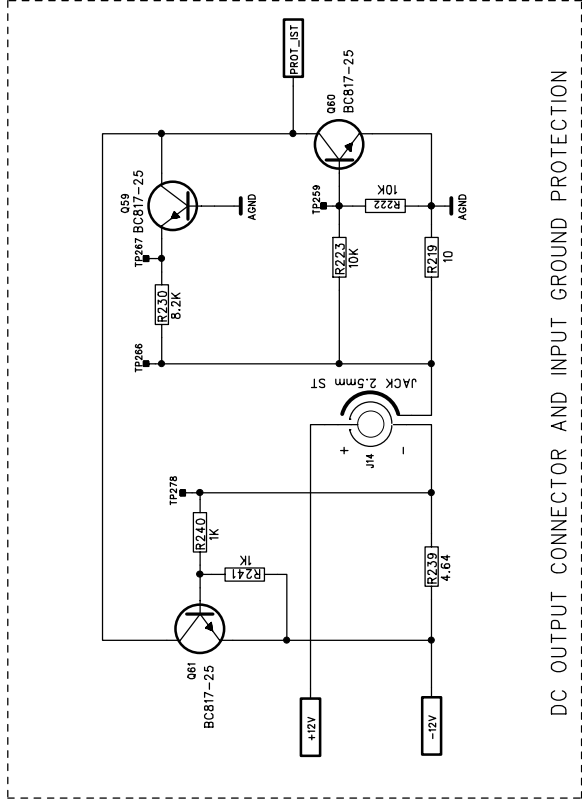
Table of the last upgrading revisions

UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A

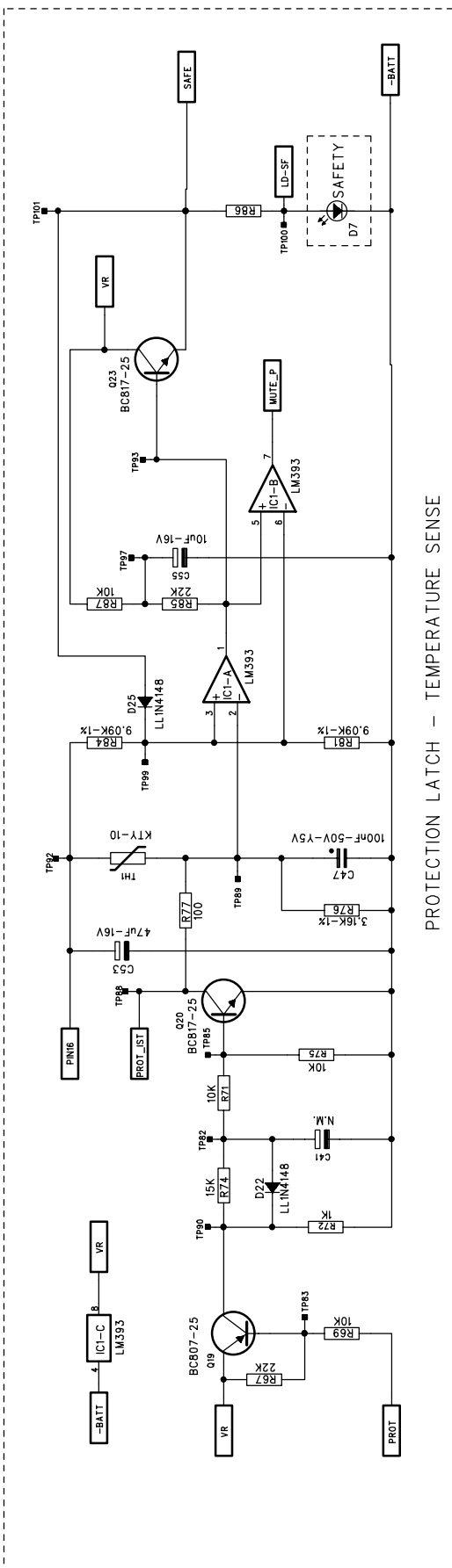




MUTING

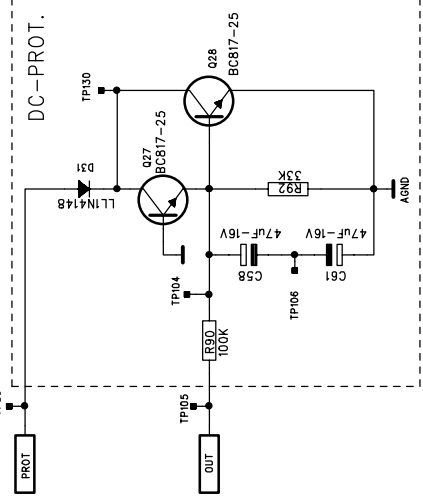
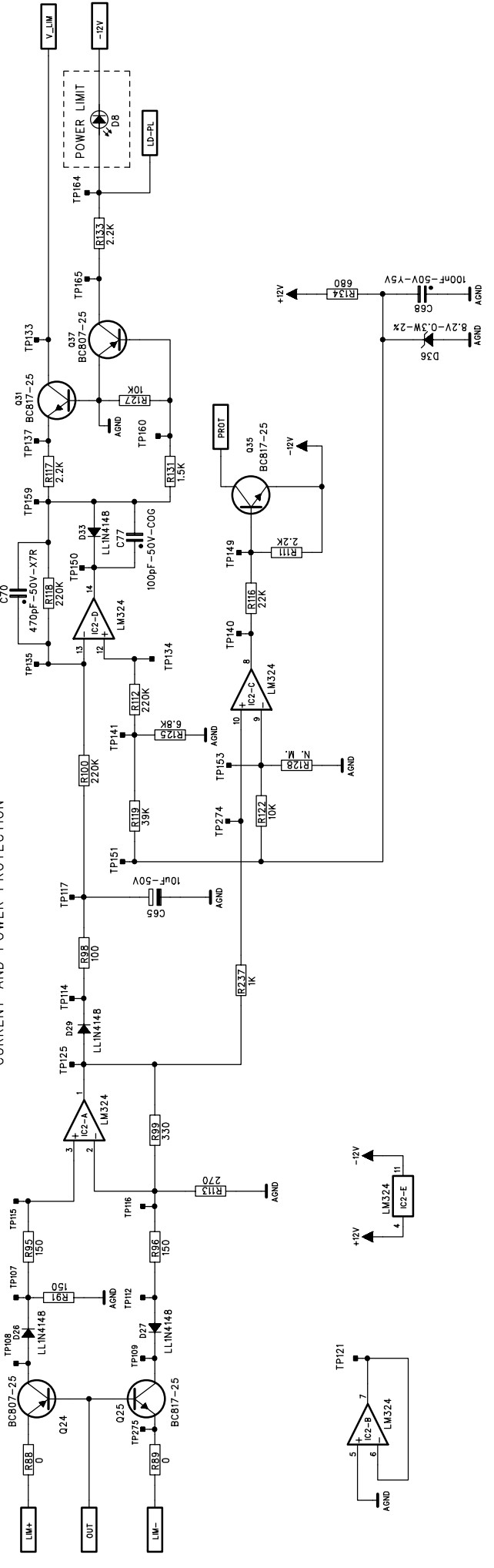


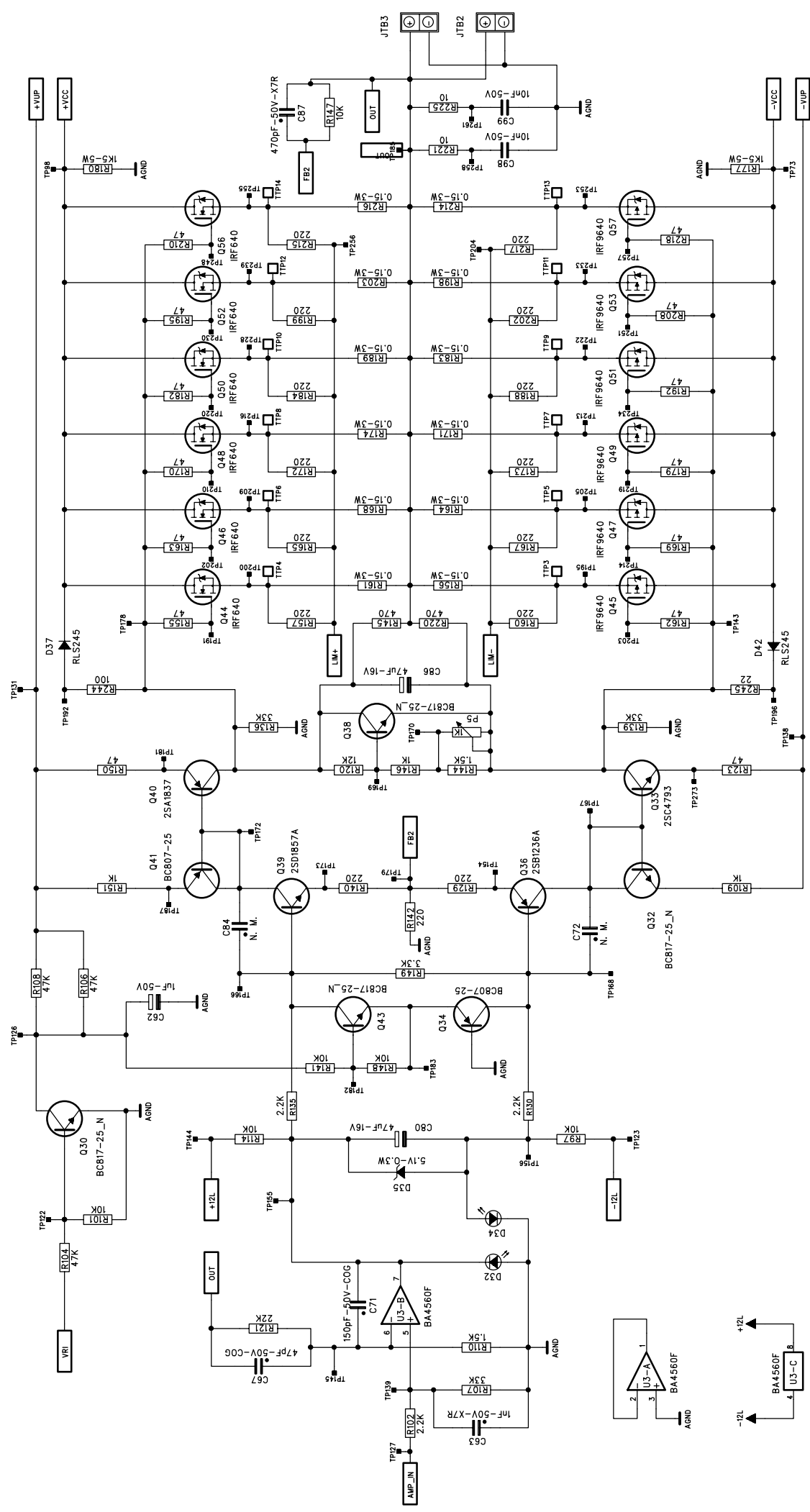
DC OUTPUT CONNECTOR AND INPUT GROUND PROTECTION



PROTECTION LATCH - TEMPERATURE SENSE

CURRENT AND POWER PROTECTION





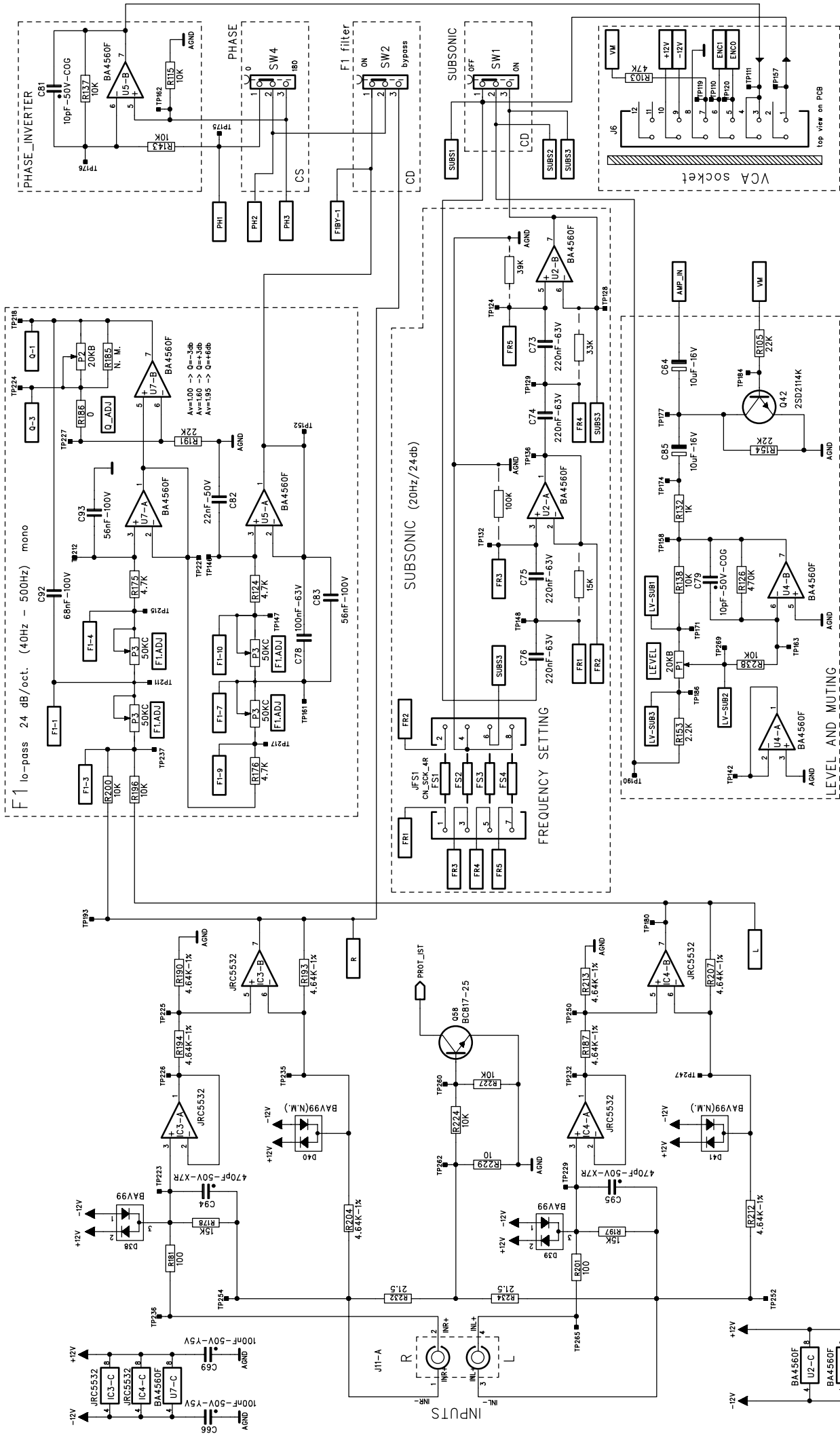
audison
TS: BAF004E

Sheet description:
POWER AMPLIFIER, DRIVER AND POWER FETs
ANTIBUMP

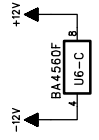
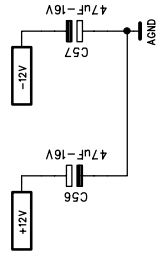
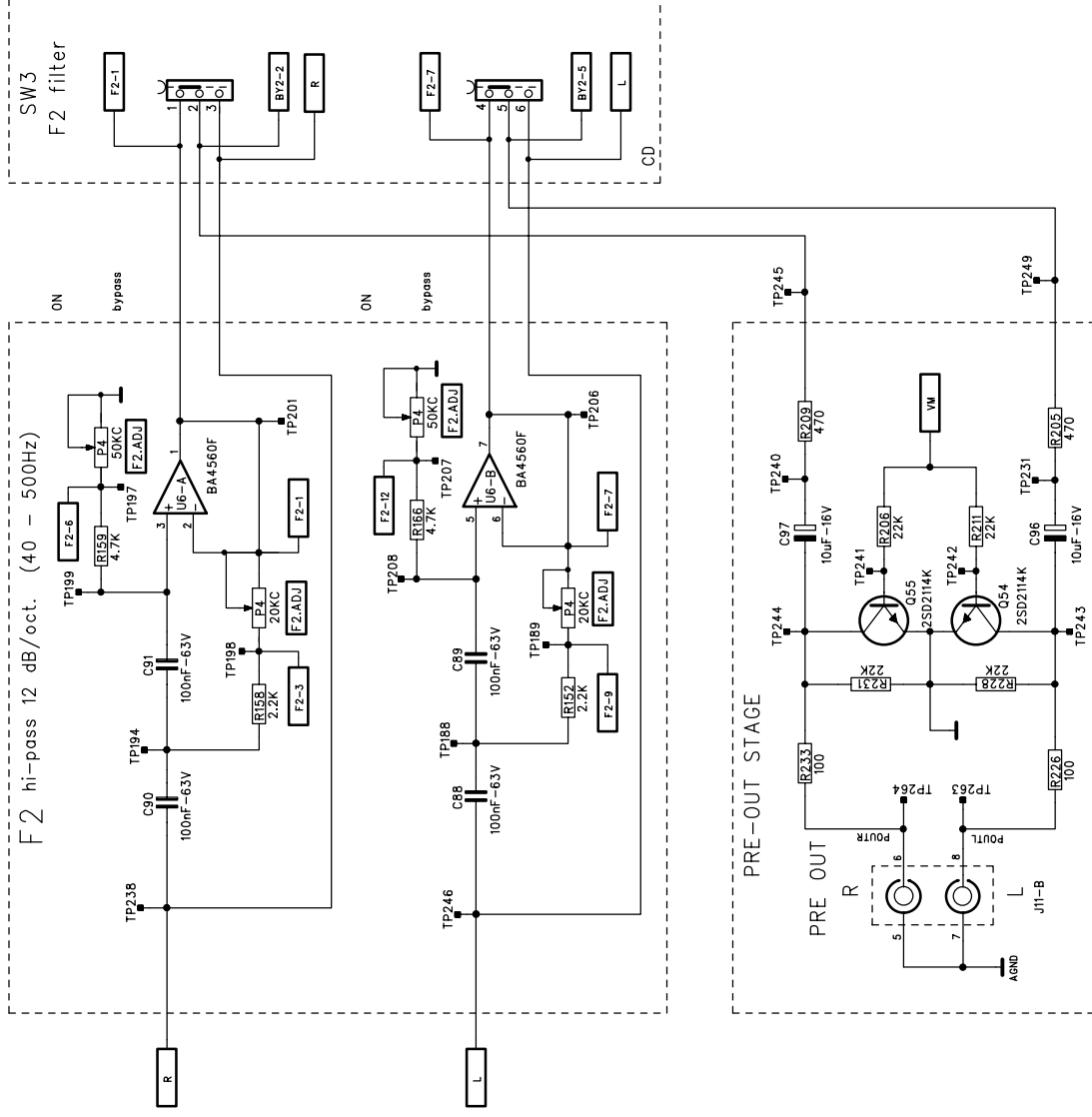
Product: LRx1.400
Type: MAINBOARD
PCB code: 16726000 D
Date: 16/Feb/2001
Sheet: 4 OF 6
Rev/RK: -

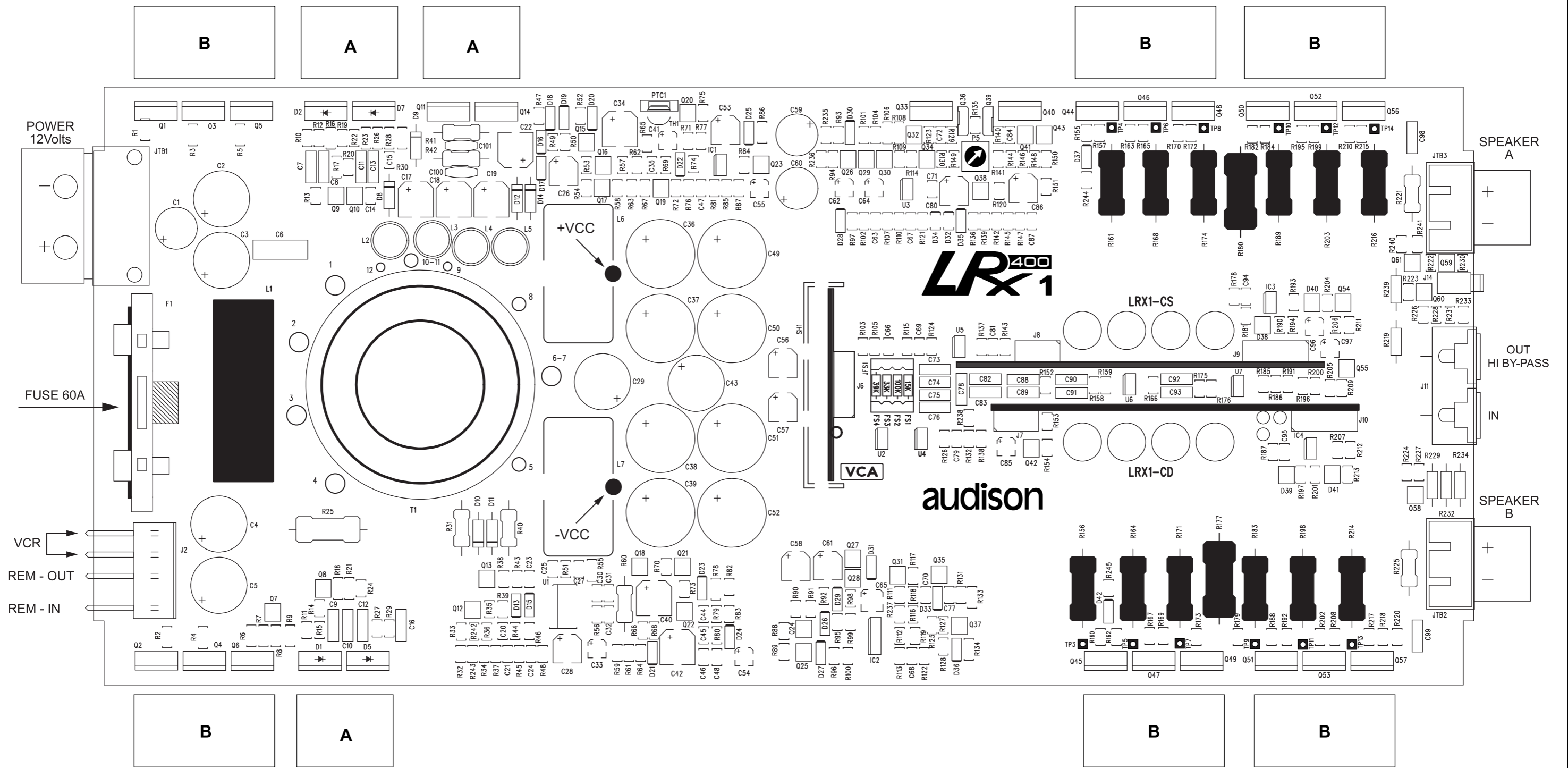
This drawing/specification is released on condition that is not copied, printed or given to thirds without previous written consent by elettromedia

elettromedia s.a.s.
S.S. Regina Km 6.250 - 62018 Potenza Picena (MC) - Italy tel. 0733/870870 r.a.
Fax 0733/870880 e-mail: com@audison.com



Product:	LRx1.400	Type:	MAINBOARD	Rev/RK:	—
Sheet description:	PRE INPUTS, F1 FILTER, SUBSONIC FILTER AND LEVEL			Date:	16/Feb/2001
TS: BAF004E	PCB code:	16726000 D	Sheet:	5 OF 6	





- P5: Trimmer for bias current adjustment.
- TP(4,6,8,10,12,14): Test points for positive channel bias current measure.
- TP(3,5,7,9,11,13): Test points for negative channel bias current measure.

LRx1- CS.0: Spare left control module.

LRx1- CD.0: Spare right control module.

A : Mica 2xTO220 24x18 mm

B : Mica 3xTO220 35x18 mm

NOTE: This document is valid for PCB without Rk (key resistor).

audison	Sheet description:	Product:	Type:	Rev/RK:
	COMPONENTS LAYOUT	LRx1.400	MAINBOARD	-
TS: BAC004E		PCB code:	Date:	Sheet:
		16726000 D	16/feb/2001	1 OF 1

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = /

REF. NO	PART NO	DESCRIPTION	Q.TY
INSULATORS			
For TOROIDAL CORE - L6 L7	S10027410	11x35 mm ADHESIVE MYLAR	2
For TRANSFORMER - T1	S10035000	Diam. 42 ADHESIVE MYLAR	1
Supp-PTC1	S14244000	METALLIC INSERT FOR KTY-10	1
CONNECTORS			
JTB1	S15213010	POWER SUPPLY TERMINAL BLOCK	1
JTB2 JTB3	S15213100	2 WAY SPEAKER TERMINAL BLOCK	2
J14	S15226120	JACK STEREO d.2,5mm	1
J11	S15230410	4 WAY RCA JACK	1
J7 J8	S15235030	4+4 WAY PIN SOCKET	2
J6 J9 J10	S15235040	6+6 WAY PIN SOCKET	3
JFS1 (2 with 4 ways)	S15235500	32 WAY PIN SOCKET	0,25
J2	S35241500	4 WAY FAST-ON TERMINAL	1
F1	S15289760	FUSE 60A	1
F1	S15770510	FUSE HOLDER	1
F1	S12112900	FUSE SCREW M5 WITH WASHER	2
MAGNETIC WIREWOUND			
L6 L7	S15721220	TOROIDAL CORE - L22	2
L2 L3 L4 L5	S15721250	INDUCTOR L25	4
L1	S15721330	"UR" CORE - L33	1
T1	S35754700	TOROIDAL TRANSFORMER - T354C	1
RESISTORS			
R239	S16000800	1/4W 1% 4,64 OHM (MRS25)	1
R219 R229	S16001200	1/4 W 1% 10 OHM	2
R232 R234	S16002500	1/4 W 1% 21,5 OHM	2
R30	S16011500	1/4 W 1% 681 OHM	1
15K - JFS1	S16124100	1/4W J N 15K OHM 5%	1
33K - JFS1	S16124500	1/4W J N 33K OHM 5%	1
39K - JFS1	S16124600	1/4W J N 39K OHM 5%	1
100K - JFS1	S16125100	1/4W J N 100K OHM 5%	1
R60	S16140100	1/2W 1 OHM 5%	1
R31 R40 R221 R225	S16141000	1/2 W J N 10 OHM	4
R41 R42	S16173260	MOX 1W 1,5K OHM 5%	2
R25	S16174810	MOX 2W 39 OHM 5%	1
R156 R161 R164 R168 R171	S16184980	WIRE - 3W 0.15 OHM 5%	12
R174 R183 R189 R198 R203			
R214 R216			
R177 R180	S16186380	MOX 5W 1,5K OHM 5%	2
R7 R18 R21 R23 R26 R28	S16331800	SMD 1/4W 1206 4,7 OHM 200V 5%	6
R78	S16333900	SMD 1/4W 1206 270 OHM 200V 5%	1
R134	S16334400	SMD 1/4W 1206 680 OHM 200V 5%	1
R1 R2 R3 R4 R5 R6 R55 R86	S16335000	SMD 1/4W 1206 2,2K OHM 200V 5%	9
R133			
R106 R108	S16336600	SMD 1/4W 1206 47K OHM 200V 5%	2
R70 R88 R89 R186 R242 R243	S16341000	SMD 1/10W 0805 0 OHM 100V 5%	6
R20 R24	S16342400	SMD 1/10W 0805 10 OHM 100V 5%	2
R245	S16342800	SMD 1/10W 0805 22 OHM 100V 5%	1
R10 R12 R27 R29 R123 R150	S16343200	SMD 1/10W 0805 47 OHM 100V 5%	18
R155 R162 R163 R169 R170			
R179 R182 R192 R195 R208			
R210 R218			
R57 R77 R98 R181 R201 R226	S16343600	SMD 1/10W 0805 100 OHM 100V 5%	8
R233 R244			
R13 R14 R91 R95 R96	S16343800	SMD 1/10W 0805 150 OHM 100V 5%	5
R11 R15 R19 R22	S16343900	SMD 1/10W 0805 180 OHM 100V 5%	4
R46 R129 R140 R142 R157 R160	S16344000	SMD 1/10W 0805 220 OHM 100V 5%	16
R165 R167 R172 R173 R184			
R188 R199 R202 R215 R217			
R113	S16344100	SMD 1/10W 0805 270 OHM 100V 5%	1
R99	S16344200	SMD 1/10W 0805 330 OHM 100V 5%	1
R145 R205 R209 R220	S16344400	SMD 1/10W 0805 470 OHM 100V 5%	4
R35 R38 R45 R47 R72 R109	S16344800	SMD 1/10W 0805 1K OHM 100V 5%	14
R132 R146 R151 R235 R236			
R237 R240 R241			
R110 R131 R144	S16345000	SMD 1/10W 0805 1,5K OHM 100V 5%	3
R33 R52 R54 R102 R111 R117	S16345200	SMD 1/10W 0805 2,2K OHM 100V 5%	11
R130 R135 R152 R153 R158			
R80 R149	S16345400	SMD 1/10W 0805 3,3K OHM 100V 5%	2

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = /

REF. NO	PART NO	DESCRIPTION	Q.TY
R93 R94 R124 R159 R166 R175 R176	S16345600	SMD 1/10W 0805 4,7K OHM 100V 5%	7
R37 R59 R125	S16345800	SMD 1/10W 0805 6,8K OHM 100V 5%	3
R230	S16345900	SMD 1/10W 0805 8,2K OHM 100V 5%	1
R43 R44 R61 R69 R71 R73 R75 R83 R87 R97 R101 R114 R115 R122 R127 R137 R138 R141 R143 R147 R148 R196 R200 R222 R223 R224 R227 R238 R120	S16346000	SMD 1/10W 0805 10K OHM 100V 5%	28
R74 R178 R197	S16346100	SMD 1/10W 0805 12K OHM 100V 5%	1
R48	S16346200	SMD 1/10W 0805 15K OHM 100V 5%	3
R50 R53 R56 R58 R63 R65 R67	S16346300	SMD 1/10W 0805 18K OHM 100V 5%	1
R85 R105 R116 R154 R191 R206 R211 R228 R231 R121	S16346400	SMD 1/10W 0805 22K OHM 100V 5%	16
R39 R79 R92 R107 R136 R139 R119	S16346500	SMD 1/10W 0805 27K OHM 100V 5%	1
R34 R103 R104	S16346600	SMD 1/10W 0805 33K OHM 100V 5%	6
R49 R62	S16346700	SMD 1/10W 0805 39K OHM 100V 5%	1
R90	S16346800	SMD 1/10W 0805 47K OHM 100V 5%	3
R32 R36 R100 R112 R118	S16346900	SMD 1/10W 0805 56K OHM 100V 5%	2
R82	S16347100	SMD 1/10W 0805 100K OHM 100V 5%	1
R51 R126	S16347500	SMD 1/10W 0805 220K OHM 100V 5%	5
R76	S16347700	SMD 1/10W 0805 330K OHM 100V 5%	1
R187 R190 R193 R194 R204	S16347900	SMD 1/10W 0805 470K OHM 100V 5%	2
R207 R212 R213	S16353738	SMD 1/10W 0805 3,16K OHM 100V 1%	1
R81 R84	S16353770	SMD 1/10W 0805 4,64K OHM 100V 1%	8
TRIMMERS P5	S16353826	SMD 1/10W 0805 9,09K OHM 100V1%	2
CAPACITORS C7 C8 C12 C16	S16360100	TRIMM. OR 1K 5x5 CARB	1
C98 C99	S16430200	POLYESTER 1nF 63Vdc/40Vac	4
C83 C93	S16431000	POLYESTER 10nF 63Vdc/40Vac	2
C92	S16431850	POLYESTER 56nF 63Vdc/40Vac	2
C78 C88 C89 C90 C91	S16431900	POLYESTER 68nF 63Vdc/40Vac	1
C73 C74 C75 C76	S16432000	POLYESTER 100nF 63Vdc/40Vac	5
C82	S16432280	POLYESTER 220nF 63Vdc/40Vac	4
C10 C13	S16441601	POLYESTER 22nF 50Vdc/30Vac	1
C6	S16442001	POLYESTER 47nF 50Vdc/30Vac	2
C26 C28 C53 C56 C57 C58 C61 C80 C86	S16451200	POLYPROPYLENE 100V 10nF	1
C34	S16520401	ELECTROLYTIC 47uF 16V	9
C59 C60	S16520600	ELECTROLYTIC 220uF 16V	1
C2 C3 C4 C5	S16521000	ELECTROLYTIC 1000uF 16V	2
C17 C18 C19 C22 C40 C42	S16530530	ELECTROLYTIC 105° 1500uF 25V	4
C1	S16530800	ELECTROLYTIC 100uF 25V	6
C29 C43	S16530980	ELECTROLYTIC 105° 820uF 25V	1
C62	S16531300	ELECTROLYTIC 100uF 100V	2
C33 C55 C64 C65 C85 C96 C97	S16540000	ELECTROLYTIC 1uF 50V	1
C36 C37 C38 C39 C49 C50 C51 C52	S16540501	ELECTROLYTIC 10uF 50V	7
C79 C81	S16560800	ELECTROLYTIC 1000uF 63V	8
C67	S16570024	CERAMIC COG 0805 10pF 50V 5%	2
C77	S16570040	CERAMIC COG 0805 47pF 50V 5%	1
C71	S16570048	CERAMIC COG 0805 100pF 50V 5%	1
C23 C70 C87 C94 C95	S16570052	CERAMIC COG 0805 150pF 50V 5%	1
C24 C63	S16570070	CERAMIC X7R 0805 470pF 50V10%	5
C25	S16570072	CERAMIC X7R 0805 1nF 50V10%	2
C32	S16570096	CERAMIC X7R 0805 10nF 50V10%	1
C14 C15 C20 C21 C27 C30 C31 C35 C44 C45 C46 C47 C48 C66 C68 C69	S16570112	CERAMIC X7R 0805 47nF 50V10%	1
TRANSISTORS Q36	S16570224	CERAMIC Y5V 0805 100nF 50V	16
Q39	S16601100	PNP 2SB1236A-Q	1
Q44 Q46 Q48 Q50 Q52 Q56	S16601120	NPN 2SD1857A-Q	1
Q45 Q47 Q49 Q51 Q53 Q57	S16605110	TO220 IRF640	6
	S16605210	TO220 IRF9640	6

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = /

REF. NO	PART NO	DESCRIPTION	Q.TY
Q1 Q2 Q3 Q4 Q5 Q6	S16606100	TO220 BUZ110S N CHANNEL MOSFET	6
Q33	S16614400	TO220 2SC4793-Y/2SD2400A	1
Q40	S16614500	TO220 2SA1837-Y/2SB1569A	1
Q7 Q9 Q12 Q13 Q15 Q17 Q19	S16615000	PNP SMD SOT23 BC807-25	13
Q21 Q24 Q26 Q34 Q37 Q41			
Q8 Q10 Q16 Q20 Q22 Q23 Q25	S16615200	NPN SMD SOT23 BC817-25	20
Q27 Q28 Q29 Q30 Q31 Q32 Q35			
Q38 Q43 Q58 Q59 Q60 Q61			
Q42 Q54 Q55	S16615300	NPN SMD SOT23 2SD2114K	3
DIODES			
D8 D9 D10 D11 D12 D14	S16621150	U-FAST 1A 200V SF14	6
D1 D2 D5 D7	S16631210	U-FAST TO220 15A 400V	4
D13 D15 D16 D17 D18 D20 D22	S16637000	SOD80 150mA 75V /4148	17
D23 D24 D25 D26 D27 D28 D29			
D30 D31 D33			
D37 D42	S16637020	SOD80 200mA 150V	2
D38 D39	S16637030	DOUBLE SMD SOT23 70V	2
D35	S16637945	ZENER SMD MMELF 5V1 5%0.5W	1
D19	S16637970	ZENER SMD MMELF 8V2 5%0.5W	1
D36	S16638610	ZENER SMD MMELF 8V2 2%0.5W	1
D32 D34	S16639000	LED SMD 0805 RED	2
ICS			
Q14	S16671210	TO220 7812 VOLTAGE REGULATOR	1
Q11	S16671310	TO220 7912 VOLTAGE REGULATOR	1
IC1	S16691000	SMD SO8 LM393 DUAL COMPARATOR	1
IC2	S16691100	SMD SO14 LM324 QUAD OP AMP	1
U1	S16691220	SMD SO16 2525 PWM DRIVER	1
U2 U3 U4 U5 U6 U7	S16691510	SMD SO8 BA4560F DUAL OP AMP	6
IC3 IC4	S16691560	SMD SO8 LM833 DUAL OP AMP	2
THERMISTORS			
TH1	S16832200	TEMPERATURE SENSOR KTY 10-5	1

PART 2: ELECTRONIC PART

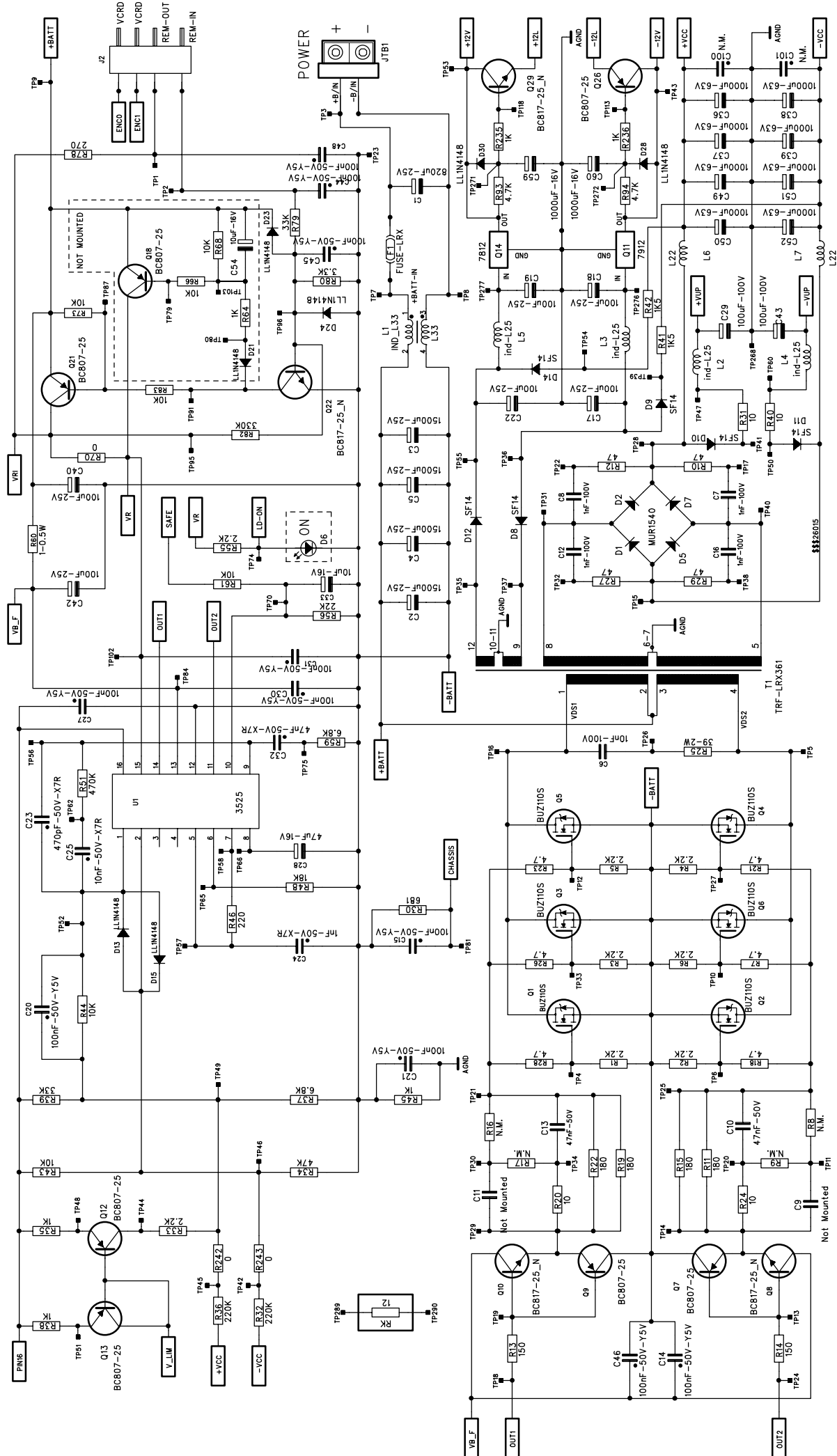
Section B: Mainboard revisions

Upgrading version: Rk = 12 ohms

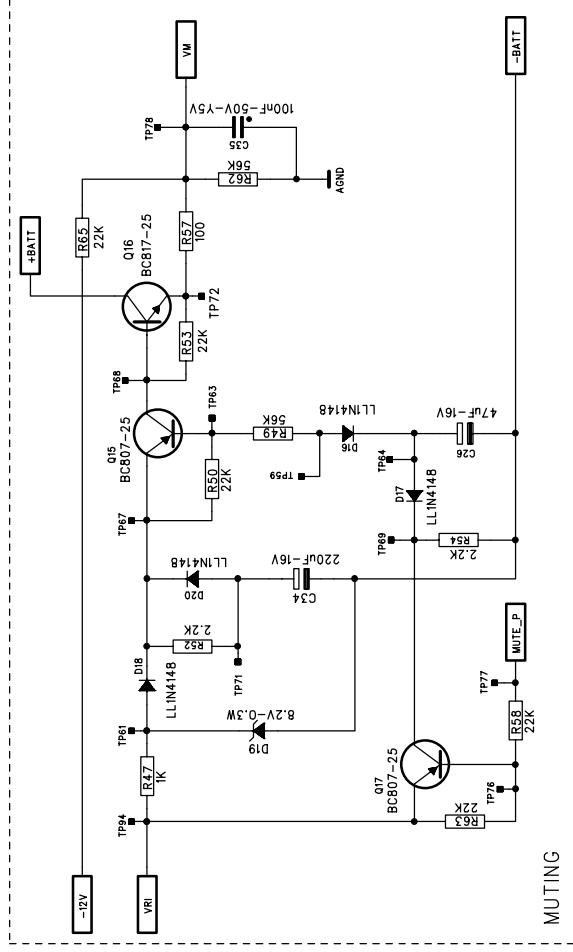
Electrical diagrams - Rk = 12 ohms	sheets from 1 to 6
Components layout - Rk = 12 ohms	sheets from 1 to 1
PCB parts list - Rk = 12 ohms	sheets from 1 to 3

Table of the last upgrading revisions

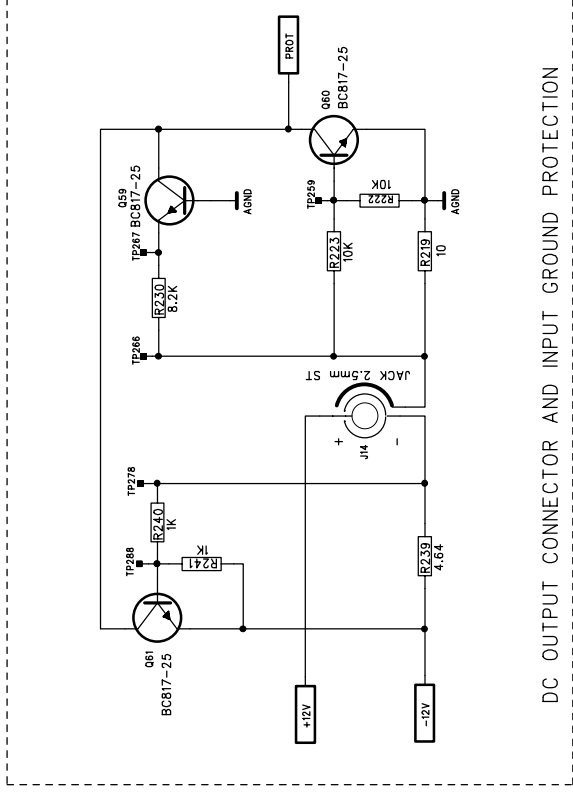
UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A
Rk = 12 ohms	LRx1CD-S.0	Rev. A	Rev. B	Rev. A	Rev. A



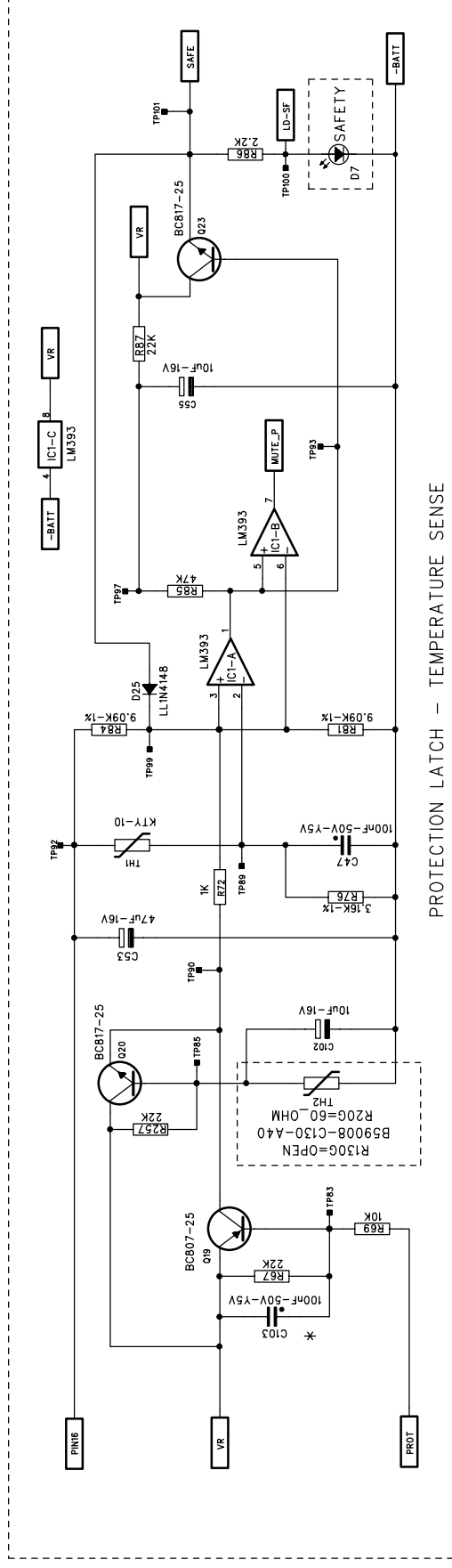
Sheet description:		Product:	Type:	Rev/RK:
audison		LRX1.400	MAINBOARD	112 ohms
TS: BAF004F		Switching Power Supply		Date: 05/06/2001
		PCB code:	16726000 E-F	Sheet: 1 of 6



MUTING



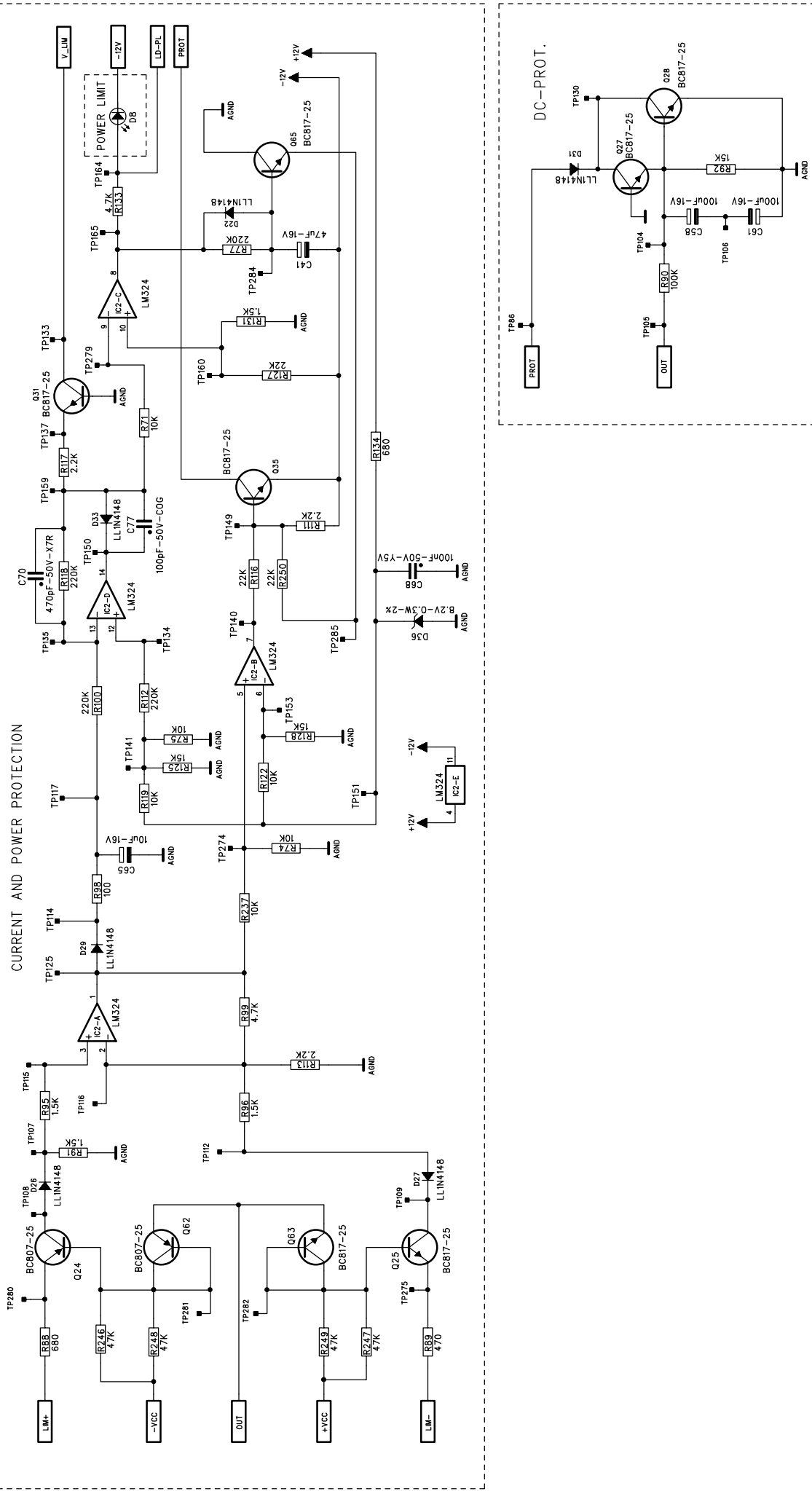
DC OUTPUT CONNECTOR AND INPUT GROUND PROTECTION

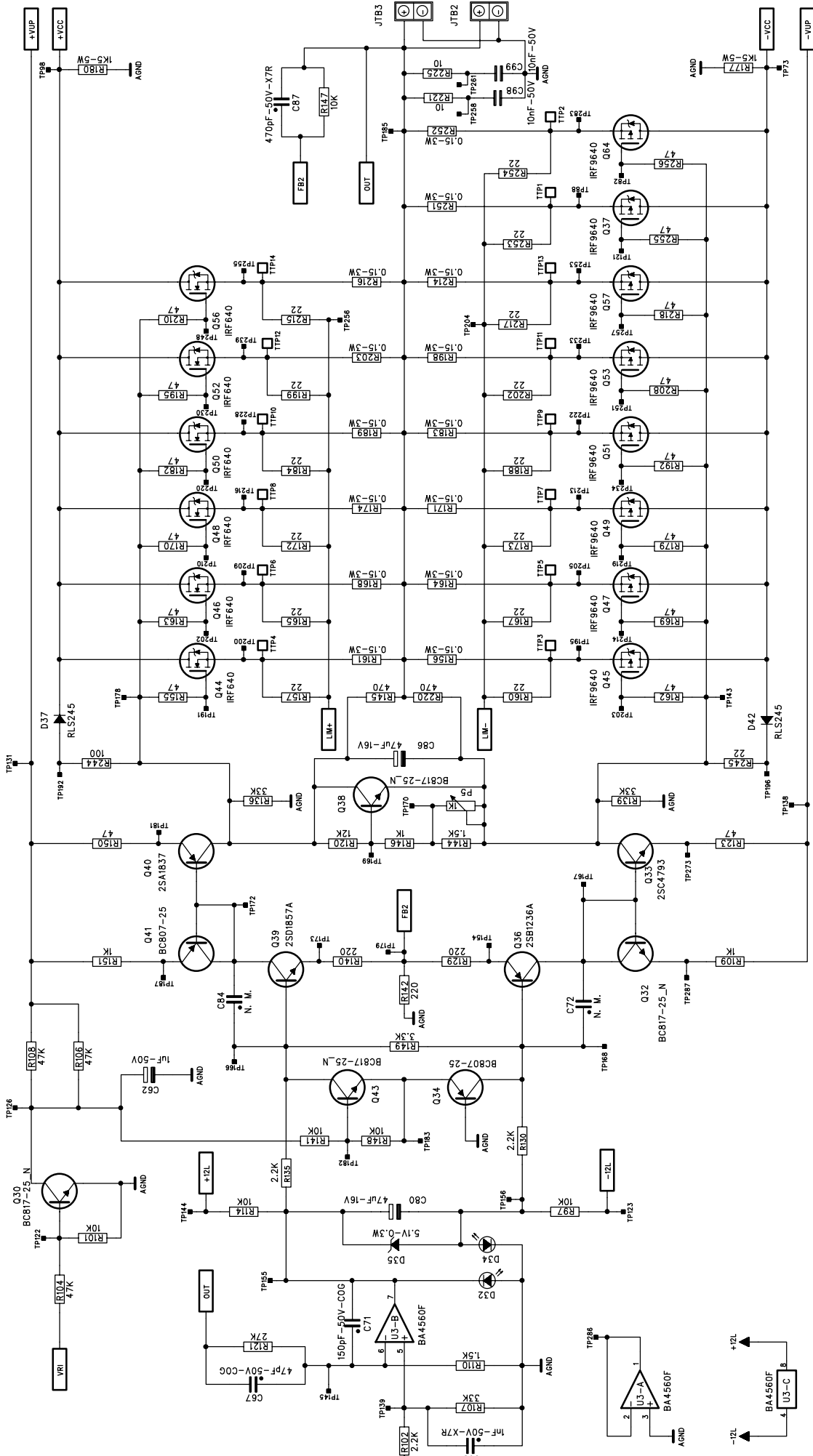


PROTECTION LATCH - TEMPERATURE SENSE

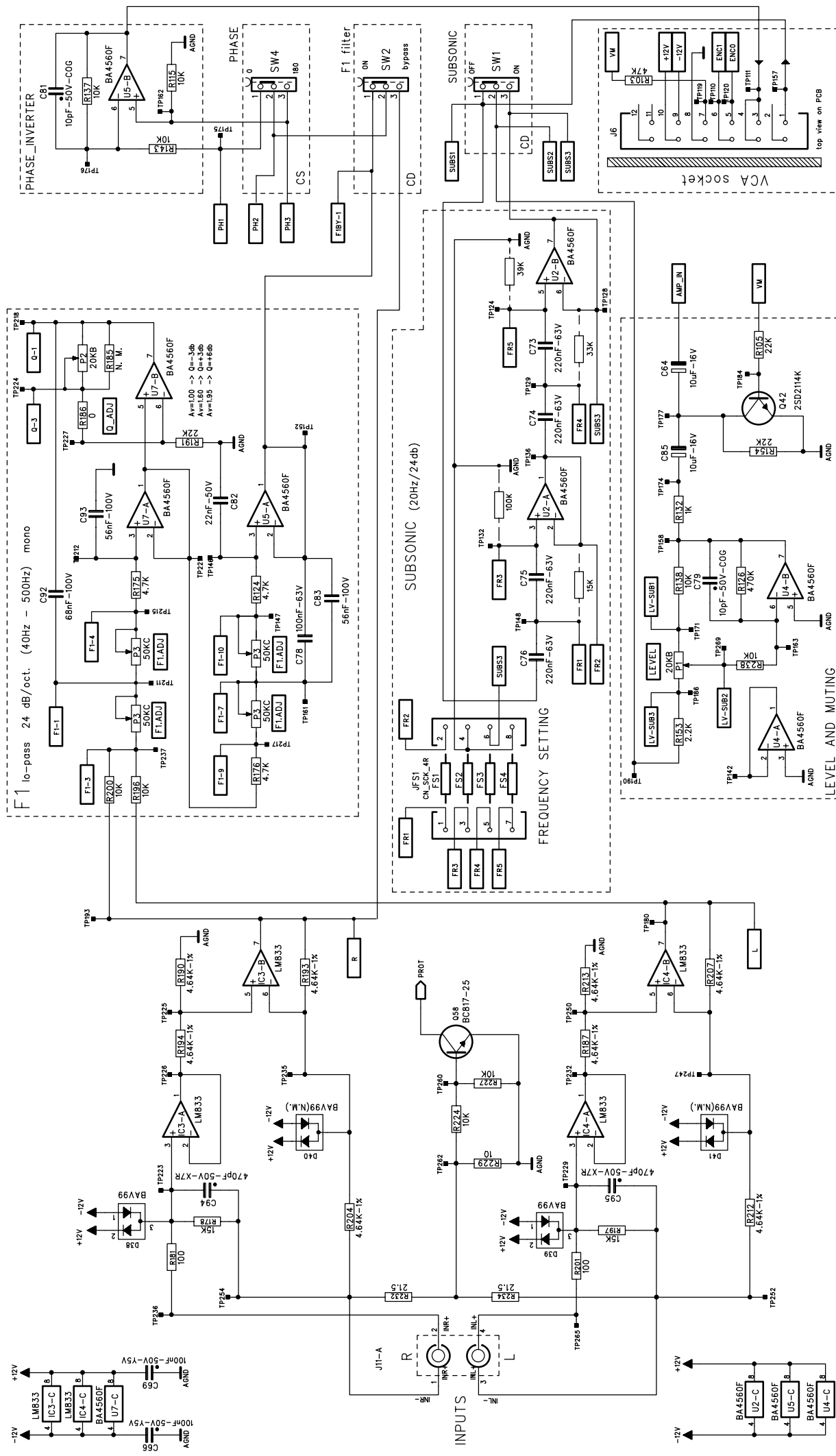
* In PCB rev. E it is soldered by hand (in parallel with R67)

<p>audison</p> <p>TS: BAF004F</p>		<p>Sheet description:</p> <p>AntiBump,Muting and Protections</p>		<p>Type:</p> <p>LRx1.400</p>	<p>Product:</p> <p>MAINBOARD</p>	<p>Rev/RK:</p> <p>12 ohms</p>
<p>TS: BAF004F</p>		<p>AntiBump,Muting and Protections</p>		<p>PCB code:</p> <p>16726000 E-F *</p>	<p>Date:</p> <p>05/06/2001</p>	<p>Sheet:</p> <p>2 of 6</p>





Sheet description:		Product:	Type:	Rev/RK:
POWER AMPLIFIER - DRIVER and POWER FETS - ANTIBUMP		LRx1.400	MAINBOARD	12 ohms
TS: BAF004F		PCB code:	Date:	Sheet:
		16726000 E-F	05/06/2001	4 of 6



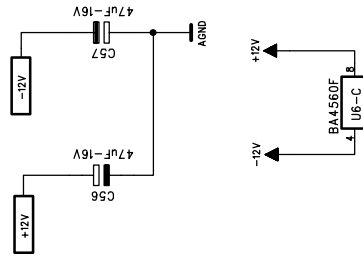
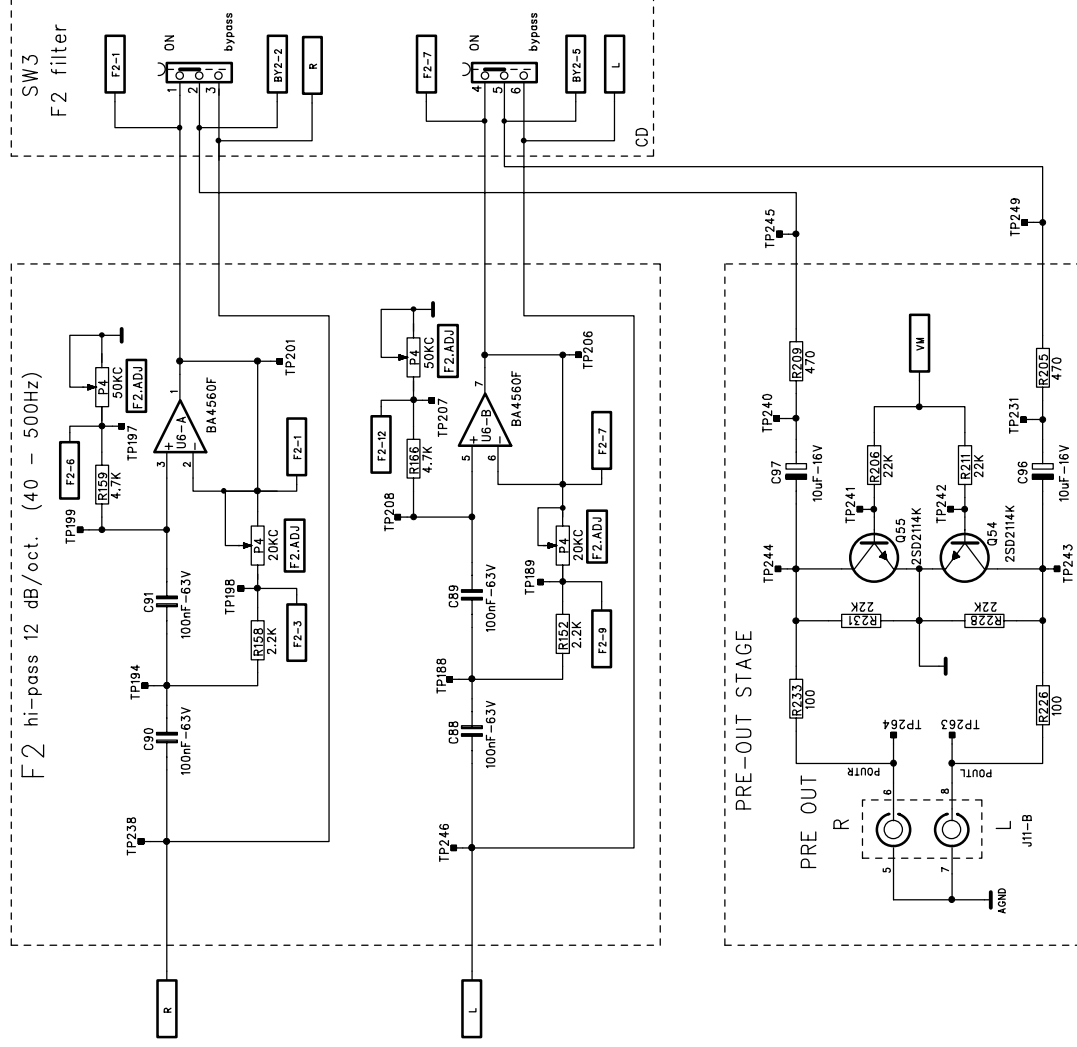
audison
TS: BAF004F

Sheet description:
PRE INPUTS, F1 filter, SUBSONIC filter & LEVEL

Product: LRx1.400
PCB code: 16726000 E-F

Type: MAINBOARD
Date: 05/06/2001

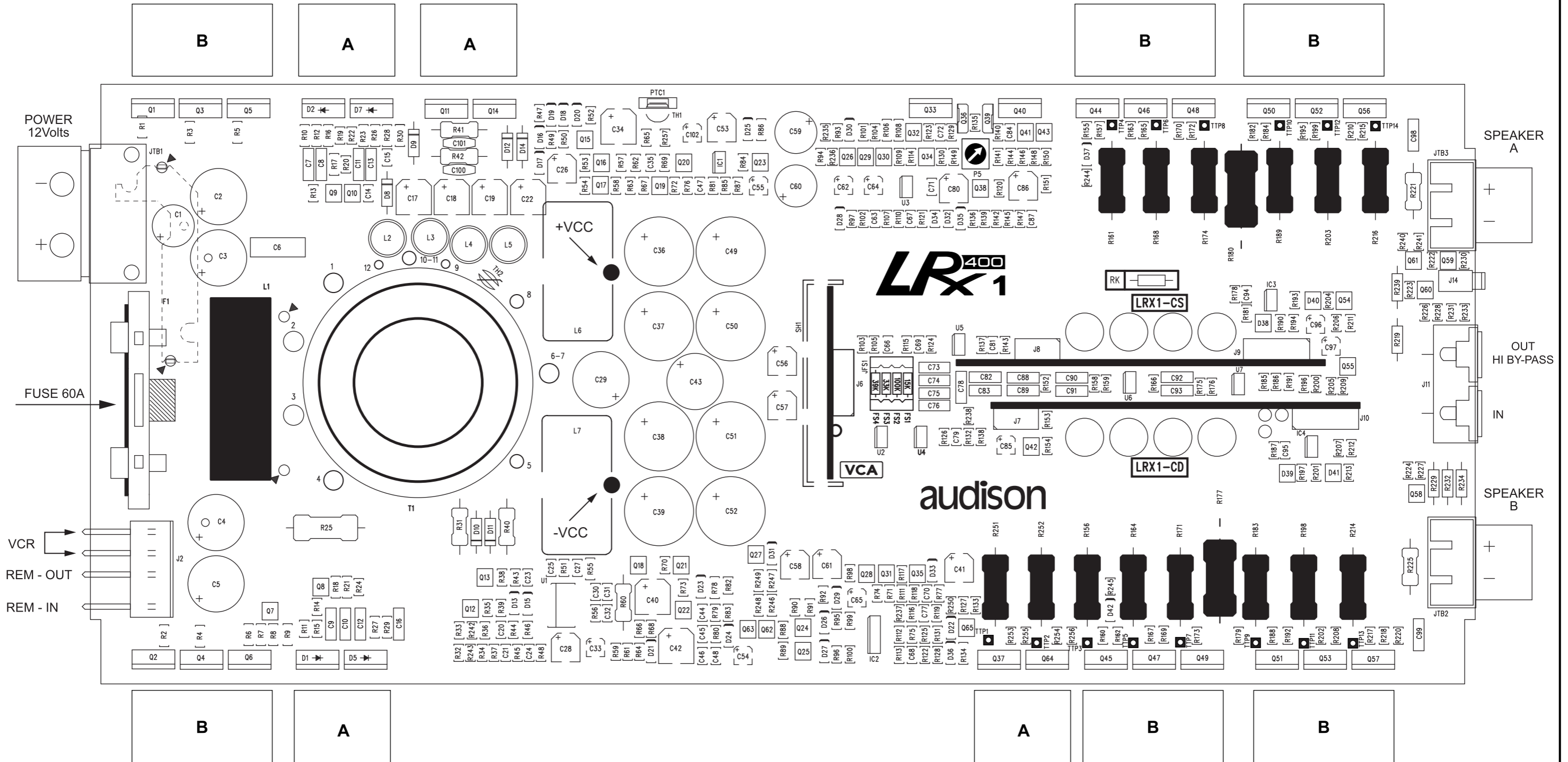
Rev/RK: 12 ohms
Sheet: 5 of 6



audison
TS: BAF004F

Sheet description:
F2 FILTER ON PRE OUT

Product: LRx1.400 Type: MAINBOARD Rev/RK: 12 ohms
PCB code: 16726000 E-F Date: 05/06/2001 Sheet: 6 of 6



⊗ P5: Trimmer for bias current adjustment.

■ TP(4,6,8,10,12,14): Test points for positive channel bias current measure.

■ TP(3,5,7,9,11,13): Test points for negative channel bias current measure.

LRx1- CS.0: Spare left control module.

LRx1- CD.0: Spare right control module.

A : Mica 2xTO220 24x18 mm

B : Mica 3xTO220 35x18 mm

audison

Sheet description:

COMPONENTS LAYOUT

TS: BAC004G

Product: LRx1.400

Type: MAINBOARD

Rev/RK: 12ohms

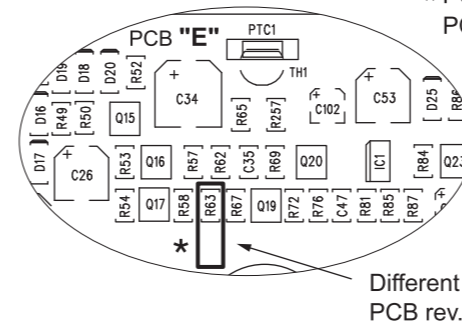
PCB code:

16726000 E

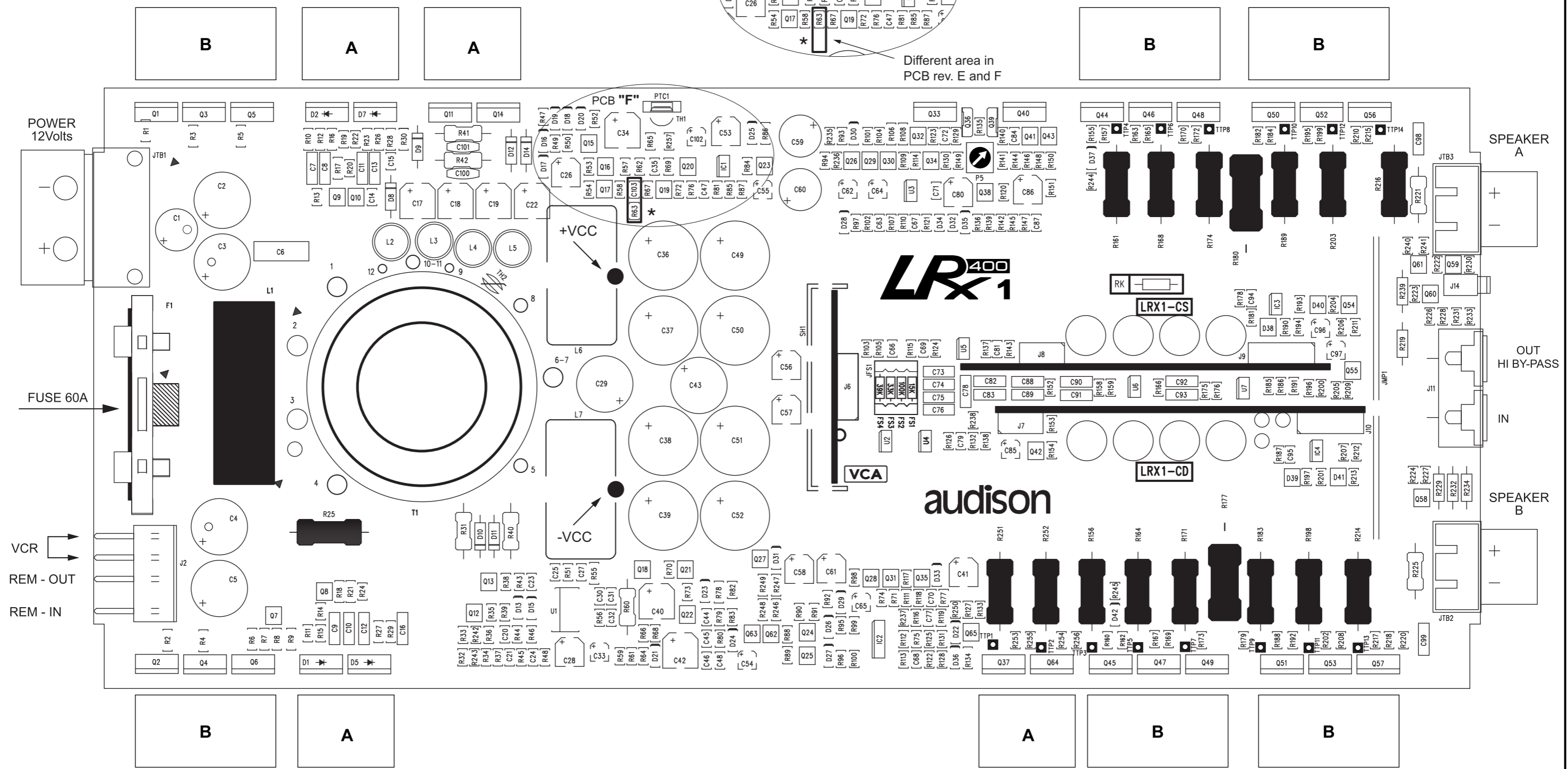
Date: 29/Mar/2001

Sheet: 1 OF 1

★ PCB rev. "F": C103
PCB rev. "E": Assembled in parallel with R63



Different area in
PCB rev. E and F



- P5: Trimmer for bias current adjustment.
 - TP(4,6,8,10,12,14): Test points for positive channel bias current measure.
 - TP(3,5,7,9,11,13): Test points for negative channel bias current measure.
- LRx1- CS.0: Spare left control module.
LRx1- CD.0: Spare right control module.

A : Mica 2xTO220 24x18 mm
B : Mica 3xTO220 35x18 mm

audison	Sheet description:	Product:	Type:	Rev/Rk:
	COMPNENTS LAYOUT	LRx1.400	MAINBOARD	12ohms
TS: BAC004H		PCB code:	Date:	Sheet:
		16726000 F	29/Mar/2001	1 OF 1

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = 12 ohms

REF. NO	PART NO	DESCRIPTION	Q.TY
INSULATORS			
FOR TOROIDAL CORE - L6 L7	S10027410	11x35 mm ADHESIVE MYLAR	2
FOR TRANSFORMER - T1	S10035000	Diam 42 mm ADHESIVE MYLAR	1
Supp-PTC	S14244000	METALLIC INSERT FOR KTY-10	1
CONNECTORS			
JTB1	S15213010	POWER SUPPLY TERMINAL BLOCK	1
JTB2 JTB3	S15213100	2 WAY SPEAKER TERMINAL BLOCK	2
J14	S15226120	JACK STEREO d2,5 mm	1
J11	S15230410	4 WAY RCA JACK	1
J7 J8	S15235030	4+4 WAY PIN SOCKET	2
J6 J9 J10	S15235040	6+6 WAY PIN SOCKET	3
JFS1 (2 with 4 ways)	S15235500	32 WAY PIN SOCKET	0,25
J2	S35241500	4 WAY FAST-ON TERMINAL	1
F1	S15289760	FUSE 60A	1
F1	S15270510	FUSE HOLDER	1
F1	S12112900	FUSE SCREW M5 WITH WASHER	2
MAGNETIC WIREWOUND			
L6 L7	S15721221	TOROIDAL CORE - L36A	2
L2 L3 L4 L5	S15721250	INDUCTOR L25	4
L1	S15721330	"UR" CORE - L33	1
T1	S35754700	TOROIDAL TRANSFORMER - T354E	1
RESISTORS			
R239	S16000800	1/4W 4,64 OHM 1%	1
R219 R229	S16001200	1/4 W 10 OHM 1%	2
R232 R234	S16002500	1/4 W 21,5 OHM 1%	2
R30	S16011500	1/4 W 681 OHM 1%	1
RK	S16120400	1/4W 12 OHM 5%	1
15K - JFS1	S16124100	1/4W 15 K OHM 5%	1
33K - JFS1	S16124500	1/4W 33 K OHM 5%	1
39K - JFS1	S16124600	1/4W 39 K OHM 5%	1
100K - JFS1	S16125100	1/4W 100 K OHM 5%	1
R60	S16140100	1/2W 1 OHM 5%	1
R31 R40 R221 R225	S16141000	1/2 W 10 OHM	4
R41 R42	S16173260	MOX 1W 1,5 K OHM 5%	2
R25	S16174810	MOX 2W 39 OHM 5%	1
R156 R161 R164 R168 R171 R174	S16184980	WIRE 3W 0,15 OHM 5%	14
R183 R189 R198 R203 R214 R216			
R251 R252			
R177 R180	S16186380	MOX 5W 1,5 K OHM 5%	2
R7 R18 R21 R23 R26 R28	S16331800	SMD 1/4W 1206 4,7 OHM 200V 5%	6
R10 R12 R27 R29	S16332900	SMD 1/4W 1206 47 OHM 200V 5%	4
R78	S16333900	SMD 1/4W 1206 270 OHM 200V 5%	1
R134	S16334400	SMD 1/4W 1206 680 OHM 200V 5%	1
R1 R2 R3 R4 R5 R6 R55 R86	S16335000	SMD 1/4W 1206 2,2 K OHM 200V 5%	8
R106 R108 R246 R247 R248 R249	S16336600	SMD 1/4W 1206 47 K OHM 200V 5%	6
R70 R186 R242 R243	S16341000	SMD 1/10W 0805 0 OHM 100V 5%	4
R20 R24	S16342400	SMD 1/10W 0805 10 OHM 100V 5%	2
R157 R160 R165 R167 R172 R173	S16342800	SMD 1/10W 0805 22 OHM 100V 5%	15
R184 R188 R199 R202 R215 R217			
R245 R253 R254			
R123 R150 R155 R162 R163 R169	S16343200	SMD 1/10W 0805 47 OHM 100V 5%	16
R170 R179 R182 R192 R195 R208			
R210 R218 R255 R256			
R57 R98 R181 R201 R226 R233	S16343600	SMD 1/10W 0805 100 OHM 100V 5%	7
R244			
R13 R14	S16343800	SMD 1/10W 0805 150 OHM 100V 5%	2
R11 R15 R19 R22	S16343900	SMD 1/10W 0805 180 OHM 100V 5%	4
R46 R129 R140 R142	S16344000	SMD 1/10W 0805 220 OHM 100V 5%	4
R89 R145 R205 R209 R220	S16344400	SMD 1/10W 0805 470 OHM 100V 5%	5
R88	S16344600	SMD 1/10W 0805 680 OHM 100V 5%	1
R35 R38 R45 R47 R72 R109 R132	S16344800	SMD 1/10W 0805 1 K OHM 100V 5%	13
R146 R151 R235 R236 R240 R241			
R91 R95 R96 R110 R131 R144	S16345000	SMD 1/10W 0805 1,5 K OHM 100V 5%	6
R33 R52 R54 R102 R111 R113	S16345200	SMD 1/10W 0805 2,2 K OHM 100V 5%	12
R117 R130 R135 R152 R153 R158			
R80 R149	S16345400	SMD 1/10W 0805 3,3 K OHM 100V 5%	2
R93 R94 R99 R124 R133 R159	S16345600	SMD 1/10W 0805 4,7 K OHM 100V 5%	9
R166 R175 R176			

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = 12 ohms

REF. NO	PART NO	DESCRIPTION	Q.TY
R37 R59	S16345800	SMD 1/10W 0805 6,8 K OHM 100V 5%	2
R230	S16345900	SMD 1/10W 0805 8,2 K OHM 100V 5%	1
R43 R44 R61 R69 R71 R73 R74	S16346000	SMD 1/10W 0805 10 K OHM 100V 5%	30
R75 R83 R92 R97 R101 R114			
R115 R119 R122 R137 R138 R141			
R143 R147 R148 R196 R200 R222			
R223 R224 R227 R237 R238			
R120	S16346100	SMD 1/10W 0805 12 K OHM 100V 5%	1
R125 R128 R178 R197	S16346200	SMD 1/10W 0805 15 K OHM 100V 5%	4
R48	S16346300	SMD 1/10W 0805 18 K OHM 100V 5%	1
R50 R53 R56 R58 R63 R65 R67	S16346400	SMD 1/10W 0805 22 K OHM 100V 5%	19
R87 R105 R116 R127 R154 R191			
R206 R211 R228 R231 R250 R257			
R121	S16346500	SMD 1/10W 0805 27 K OHM 100V 5%	1
R39 R79 R107 R136 R139	S16346600	SMD 1/10W 0805 33 K OHM 100V 5%	5
R34 R85 R103 R104	S16346800	SMD 1/10W 0805 47 K OHM 100V 5%	4
R49 R62	S16346900	SMD 1/10W 0805 56 K OHM 100V 5%	2
R90	S16347100	SMD 1/10W 0805 100 K OHM 100V 5%	1
R32 R36 R77 R100 R112 R118	S16347500	SMD 1/10W 0805 220 K OHM 100V 5%	6
R82	S16347700	SMD 1/10W 0805 330 K OHM 100V 5%	1
R51 R126	S16347900	SMD 1/10W 0805 470 K OHM 100V 5%	2
R76	S16353738	SMD 1/10W 0805 3,16 K OHM 100V 1%	1
R187 R190 R193 R194 R204 R207	S16353770	SMD 1/10W 0805 4,64 K OHM 100V 1%	8
R212 R213			
R81 R84	S16353826	SMD 1/10W 0805 9,09 K OHM 100V 1%	2
TRIMMERS			
P5	S16360100	CARBON 5x5 1 K OHM	1
CAPACITORS			
C7 C8 C12 C16	S16430200	POLYESTER 1nF 63Vdc/40Vac P5	4
C98 C99	S16431000	POLYESTER 10nF 63Vdc/40Vac P5	2
C83 C93	S16431850	POLYESTER 56nF 63Vdc/40Vac P5	2
C92	S16431900	POLYESTER 68nF 63Vdc/40Vac P5	1
C78 C88 C89 C90 C91	S16432000	POLYESTER 100nF 63Vdc/40Vac P5	5
C73 C74 C75 C76	S16432280	POLYESTER 220nF 63Vdc/40Vac P5	4
C82	S16441601	POLYESTER 22nF 50Vdc/30Vac P5N	1
C10 C13	S16442001	POLYESTER 47nF 50Vdc/30Vac P5N	2
C6	S16451200	POLYPROPYLENE 10nF 100V	1
C26 C28 C41 C53 C56 C57 C80	S16520401	ELECTROLYTIC 47uF 16V	8
C86			
C34	S16520600	ELECTROLYTIC 220uF 16V	1
C59 C60	S16521000	ELECTROLYTIC 1000uF 16V	2
C2 C3 C4 C5	S16530530	ELECTROLYTIC 105° 1500uF 25V	4
C17 C18 C19 C22 C40 C42 C58	S16530800	ELECTROLYTIC 100uF 25V	8
C61			
C1	S16530980	ELECTROLYTIC 105° 820uF 25V	1
C29 C43	S16531300	ELECTROLYTIC 100uF 100V	2
C62	S16540000	ELECTROLYTIC 1uF 50V	1
C33 C55 C64 C65 C85 C96 C97	S16540501	ELECTROLYTIC 10uF 50V	8
C102			
C36 C37 C38 C39 C49 C50 C51	S16560800	ELECTROLYTIC 1000uF 63V	8
C52			
C79 C81	S16570024	CERAMIC COG 0805 10pF 50V 5%	2
C67	S16570040	CERAMIC COG 0805 47pF 50V 5%	1
C77	S16570048	CERAMIC COG 0805 100pF 50V 5%	1
C71	S16570052	CERAMIC COG 0805 150pF 50V 5%	1
C23 C70 C87 C94 C95	S16570070	CERAMIC X7R 0805 470pF 50V10%	5
C24 C63	S16570072	CERAMIC X7R 0805 1nF 50V10%	2
C25	S16570096	CERAMIC X7R 0805 10nF 50V10%	1
C32	S16570112	CERAMIC X7R 0805 47nF 50V10%	1
C14 C15 C20 C21 C27 C30 C31	S16570224	CERAMIC Y5V 0805 100nF 50V	17
C35 C44 C45 C46 C47 C48 C66			
C68 C69 n1 soldered by hand in parallel with R67			
TRANSISTORS			
Q36	S16601100	PNP 2SB1236A-Q	1
Q39	S16601120	NPN 2SD1857A-Q	1
Q44 Q46 Q48 Q50 Q52 Q56	S16605110	TO220 IRF640	6
Q37 Q45 Q47 Q49 Q51 Q53 Q57	S16605210	TO220 IRF9640	8

LRx 1.400 MAINBOARD PARTS LIST

Revision Rk = 12 ohms

REF. NO	PART NO	DESCRIPTION	Q.TY
Q64			
Q1 Q2 Q3 Q4 Q5 Q6	S16606100	TO220 BUZ110 N CHANNEL MOSFET	6
Q33	S16614400	TO220 2C4793-Y/2SD2400A	1
Q40	S16614500	TO220 2A1837-Y/2SB1569A	1
Q7 Q9 Q12 Q13 Q15 Q17 Q19	S16615000	PNP SMD SOT23 BC807-25	13
Q21 Q24 Q26 Q34 Q41 Q62			
Q8 Q10 Q16 Q20 Q22 Q23 Q25	S16615200	NPN SMD SOT23 BC817-25	22
Q27 Q28 Q29 Q30 Q31 Q32 Q35			
Q38 Q43 Q58 Q59 Q60 Q61 Q63			
Q65			
Q42 Q54 Q55	S16615300	NPN SMD SOT23 2D2114K	3
DIODES			
D8 D9 D10 D11 D12 D14	S16621150	U-FAST 1A 200V F14	6
D1 D2 D5 D7	S16631210	UFAST TO220 15A 400V	4
D13 D15 D16 D17 D18 D20 D22	S16637000	SOD80 150mA 75V - LL4148	17
D23 D24 D25 D26 D27 D28 D29			
D30 D31 D33			
D37 D42	S16637020	SOD80 200mA 150V	2
D38 D39	S16637030	DOUBLE SMD SOT23 70V	2
D35	S16637945	ZENER MMELF 5V1 5% 0.5W	1
D19	S16637970	ZENER MMELF 8V2 5% 0.5W	1
D36	S16638610	ZENER MMELF 8V2 2% 0.5W	1
D32 D34	S16639000	LED SMD 0805 RED	2
ICS			
Q14	S16671210	TO220 7812 VOLTAGE REGULATOR	1
Q11	S16671310	TO220 7912 VOLTAGE REGULATOR	1
IC1	S16691000	SMD O8 LM393 DUAL COMPARATOR	1
IC2	S16691100	SMD O14 LM324 QUAD OP AMP	1
U1	S16691220	SMD SO16 2525 PWM DRIVER	1
U2 U3 U4 U5 U6 U7	S16691510	SMD SO8 BA4560F DUAL OP AMP	6
IC3 IC4	S16691560	SMD S08 LM833 DUAL OP AMP	2
THERMISTORS			
TH2	S16831100	PTC 30V 130°	1
TH1	S16832200	KTY 10-5	1

PART 2: ELECTRONIC PART

Section C: Controls revision

First version: Rev. = .0

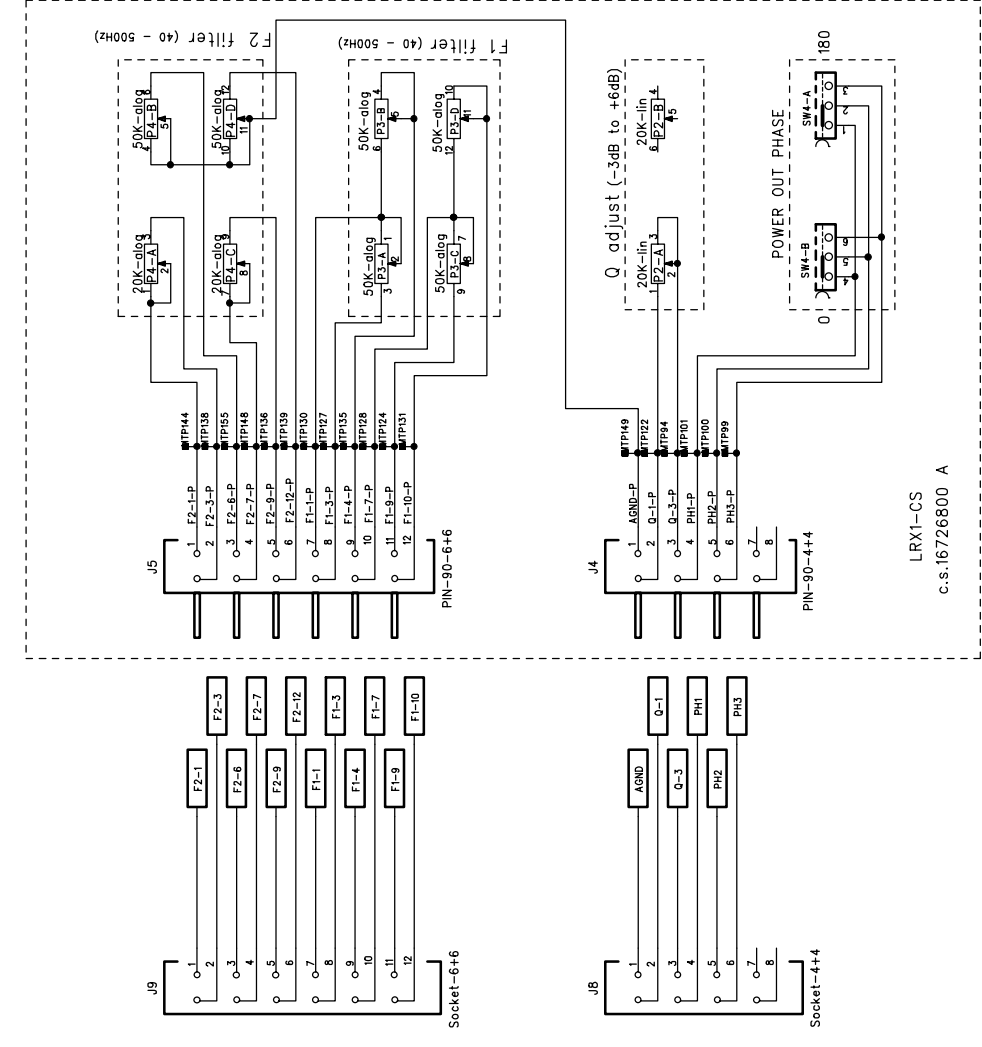
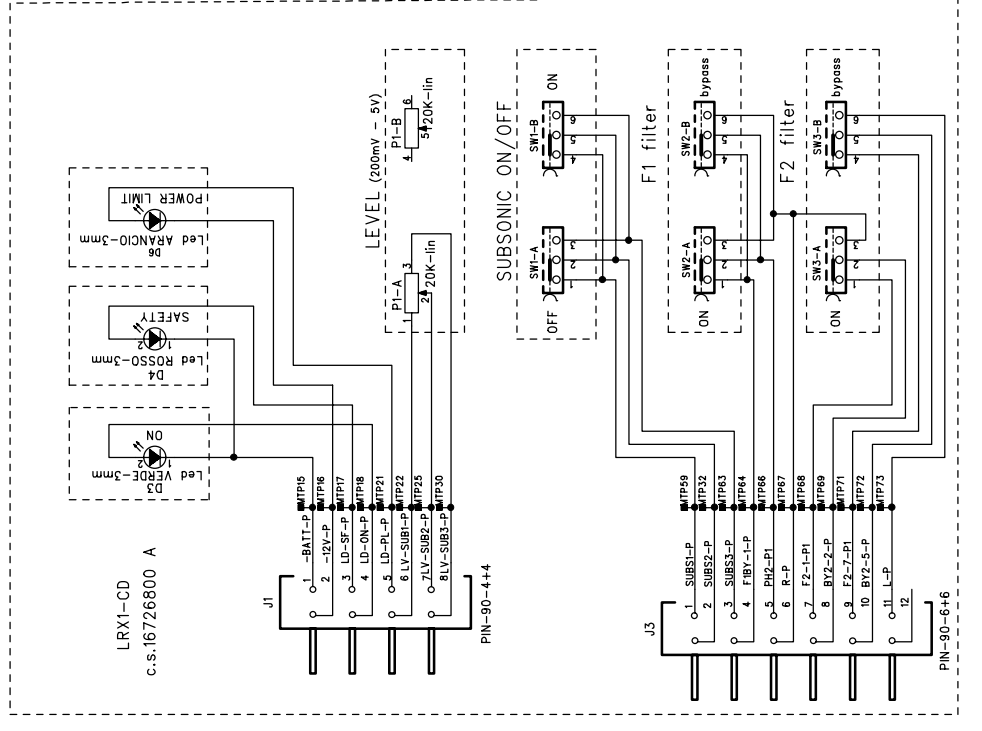
Electrical diagrams - **Rev. = .0** sheets from 1 to 1

Components layout - **Rev. = .0** sheets from 1 to 1

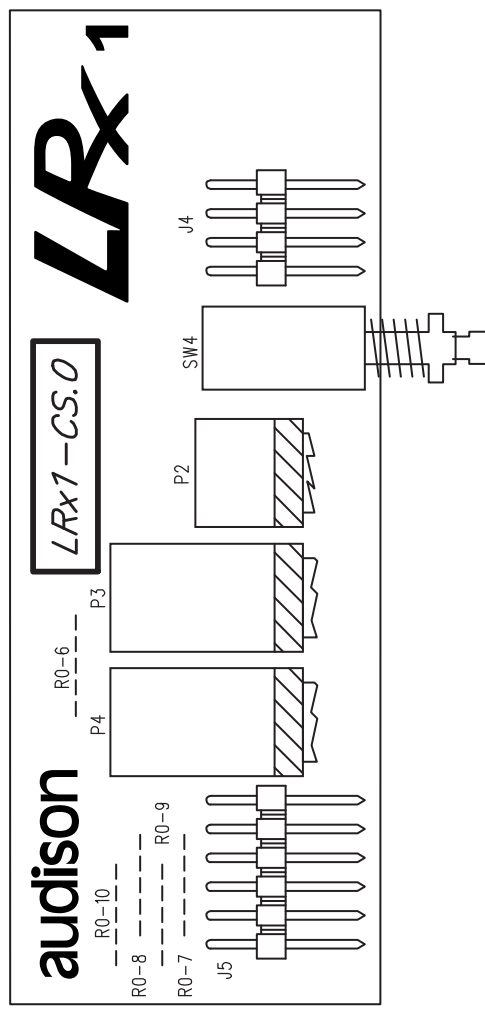
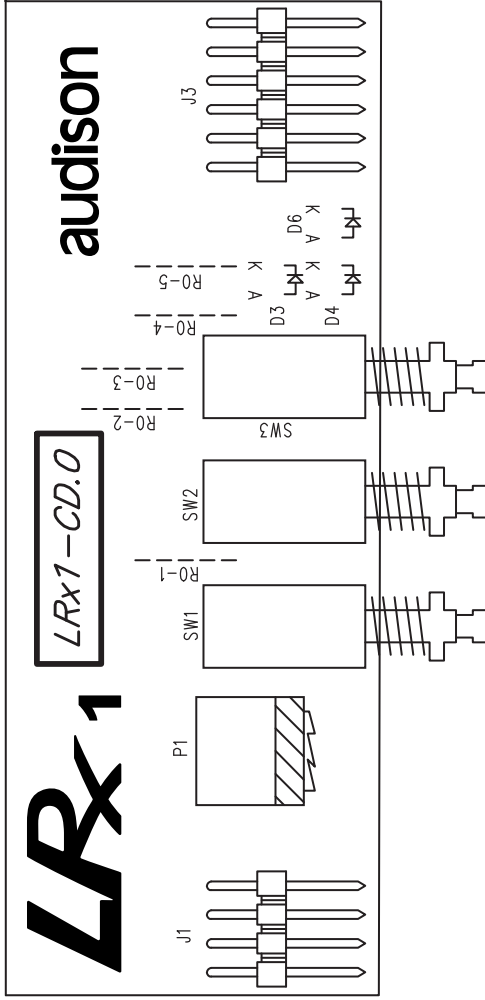
PCB parts list - **Rev. = .0** sheets from 1 to 1

Table of the last upgrading revisions

UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A



Sheet description:		Product:	Type:	Rev/RK:
MODULES CONTROLS (SWITCH + POTENTIOM.)		LRX1.400	LRX1CD-S	.0
TS: BAF009C		PCB code:	Date:	Sheet:
		16726800 A	16/Feb/2001	1 OF 1



audison

TS: BAC008C

Sheet description:

COMPONENTS LAYOUT

Product:

LRx1.400

Type:

LRx1CS-D.0

Rev/Rk:

.0

Date:

16/feb/2001

Sheet:

1 OF 1

LRx1CD-S.0 CONTROLS PARTS LIST

Revision Rev. = .0

REF. NO	PART NO	DESCRIPTION	Q.TY
CONNECTORS			
J1 J4	S15231430	4+4 WAY PIN STRIP	2
J3 J5	S15231440	6+6 WAY PIN STRIP	2
SWITCHES			
SW1 SW2 SW3 SW4	S15311000	PUSH -SWITCH 2W -2P	4
	S10020450	KNOB FOR SWITCH	4
RESISTORS			
R0-1 R0-2 R0-3 R0-4 R0-5 R0-6 R0-7 R0-8 R0-9 R0-10	S16130000	1/4W J N 0 OHM 5%	10
POTENTIOMETERS			
P1 P2	S16301100	POT 9mm B20Kx2 LIN (no knob)	2
P3	S16302100	POT 9mm C50Kx4 ALOG (no knob)	1
P4	S16302150	POT 9mm C20Kx2+50Kx2 ALOG (no knob)	1
	S10020470	KNOB FOR POTENTIOMETER	4
LEDS			
D4	S16635400	LED 3mm RED 1.7V 10mA	1
D3	S16635500	LED 3mm GREEN 1.9V 10mA	1
D6	S16635520	LED 3mm ORANGE 1.7V 10mA	1

PART 2: ELECTRONIC PART

Section D: LRx Series components pin-out rev. A

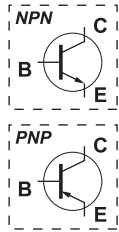
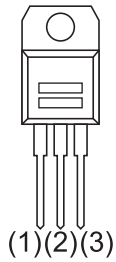
Leaded components

sheets from 1 to 3

SMT components

sheets from 4 to 6

Case TO220



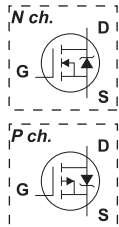
B: Base
C: Collector
E: Emitter

NPN bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio driver	2SC4793-Y 2SD2400A	C4793	B	C	E
	Darlington	BDW93C	BDW93	B	C	E

PNP bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio driver	2SA1837-Y 2SB1569A	A1837	B	C	E
	Darlington	BDW94C	BDW94	B	C	E



G: Gate
D: Drain
S: Source

N channel mosfet transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio power	IRF640	IRF640	G	D	S
	Audio power	IRF3710 IRFB59N10D	IRF3710 FB59N10D	G	D	S
	Switching power	BUZ110S SPP80N06S2-08	BUZ110S SPP80N06S2-08	G	D	S

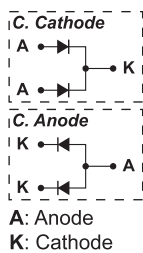
P channel mosfet transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio power	IRF9640	IRF9640	G	D	S

Voltage regulators

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Positive voltage reg.	MC7812C L7812C	MC7812C L7812CV	I	G	O
	Negative voltage reg.	MC7912C L7912C	MC7912C L7912CV	G	I	O

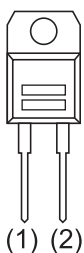
I : Input
G: Ground
O: Output



A: Anode
K: Cathode

Dual power diodes

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Ultra fast power rectifier (common Cathode)	MUR1620CT D10LC20U FFPF10U20DN	U1620 D10LC20U	A	K	A
	Ultra fast power rectifier (common Anode)	MUR1620CTR D10LC20UR FFPF10U20DP	U1620R D10LC20UR	K	A	K

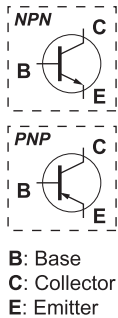
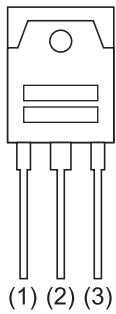


A: Anode
K: Cathode

Single power diodes

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	Ultra fast power rectifier	MUR820; RUR820; STPR820; BYV29	MUR820; RUR820; STPR820; BYV29	K	A
	Ultra fast power rectifier	MUR1520 RUR1520 STPR1520	MUR1520 RUR1520 STPR1520	K	A
	Ultra fast power rectifier	MUR1540 STPR1540	MUR1540 STPR1540	K	A

Case TO247



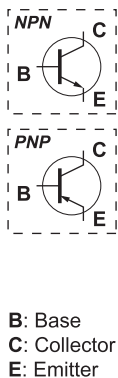
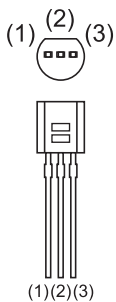
NPN bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio power	2SC4468	C4468	B	C	E

PNP bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio power	2SA1695	A1695	B	C	E

Case TO92



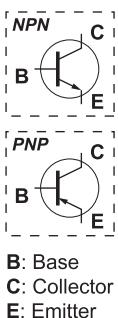
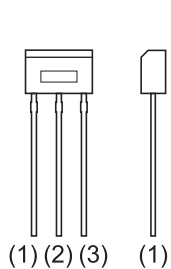
NPN bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio preamplifier	BC550C	BC550C	C	B	E
	Audio driver	BC639-16	BC639-16	E	C	B
	Darlington	MPSA14	MPSA14	E	B	C

PNP bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio driver	BC640-16	BC640-16	E	C	B

Case ATV



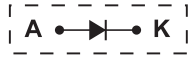
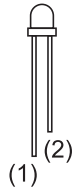
NPN bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio driver	2SD1857A-Q	D1857A	E	C	B

PNP bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Audio driver	2SB1236A-Y	B1236A	E	C	B

3mm cylinder type leds



A: Anode
K: Cathode

Leds

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	Red led	SLR-342VC3F GL3PR8	-	A	K
	Green led	SLR-342MC3F GLK3KG8	-	A	K
	Orange led	SLR-342DU3F L-934 ED	-	A	K

Case DO-41 / DO-204AL

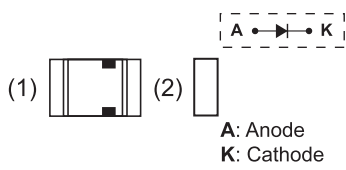


A: Anode
K: Cathode

Rectifier diodes

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	Ultra fast	UF4004	UF4004	A	K
	General purpose	1N4001	1N4001	A	K
	Super fast	SF14 ER102	SF14 ER102	A	K

Case 0805



Leds

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	Red	SML-210LT	-	A	K
	Green	SML-210MT	-	A	K

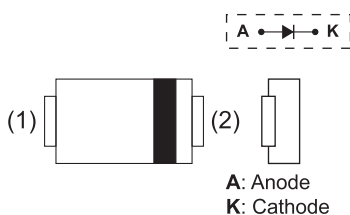
Case SOD-80 / MiniMELF



Diodes

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	General purpose 150mA 75V	LL4148	-	A	K
	General purpose 200mA 150V	BAV102 RLS245 FDLL 459/A	-	A	K
	Zener - 2V7 5%	BZV55C2V7 TZM5223B	-	A	K
	Zener - 3V3 5%	BZV55C3V3 CLL5226B ZMM5226B TZM5226B	-	A	K
	Zener - 5V1 5%	BZV55C5V1 CLL5231B ZMM5231B TZM5231B	-	A	K
	Zener - 8V2 5%	BZV55C8V2 CLL5237B ZMM5237B TZM5237B	-	A	K
	Zener - 12V 5%	BZV55C12 CLL5242B ZMM5242B TZM5242B	-	A	K
	Zener - 15V 5%	BZV55C15 CLL5245B ZMM5245B TZM5245B	-	A	K
	Zener - 8V2 2%	BZV55B8V2	-	A	K

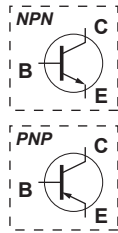
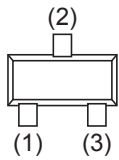
Case DO-214AC



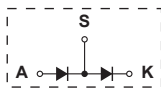
Diodes

Ref.	Type	Product name	Marking code	PIN OUT	
				(1)	(2)
	Rectifier - 1A 200V	S1G	GS	A	K
	Ultra fast rectifier 1A 200V	ES1D CMR1S-02 D1FL20U	ED CSF02 2U	A	K

Case SOT23



B: Base
C: Collector
E: Emitter



A: Anode
K: Cathode
S: Series

NPN bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Signal	BC817-25	6B	B	C	E
	Muting	2SD2114K	BBV	B	C	E
	Audio preamplifier	2SC3906K	TR	B	C	E

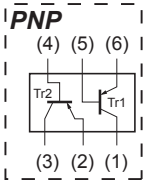
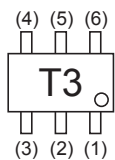
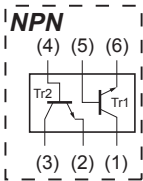
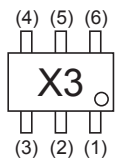
PNP bipolar transistor

Ref.	Type	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Signal	BC807-25	5B	B	C	E
	Audio preamplifier	2SA1514K-R	RR	B	C	E

Switching dual diodes

Ref.	Application	Product name	Marking code	PIN OUT		
				(1)	(2)	(3)
	Signal	BAV99	A7	A	S	K

Case SMT6



NPN bipolar dual transistor

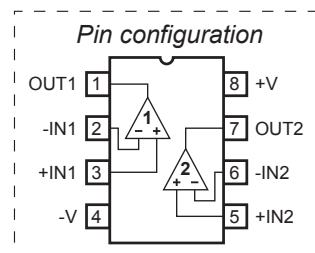
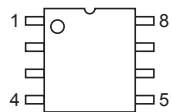
Ref.	Type	Product name	Marking code	PIN OUT
	Dual audio preamplifier	IMX3	X3	See DWG.

PNP bipolar dual transistor

Ref.	Type	Product name	Marking code	PIN OUT
	Dual audio preamplifier	IMT3A	T3	See DWG.

(1): Tr1 collector □ (2): Tr2 emitter □ (3): Tr2 collector □
(4): Tr2 base □ (5): Tr1 base □ (6): Tr1 emitter □

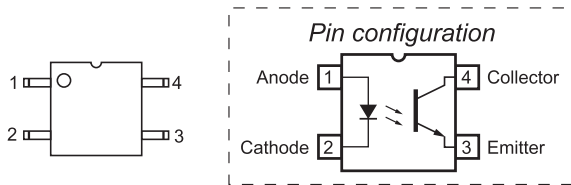
Case SO8



Linear ICS

Ref.	Type	Product name	Marking code
	Dual op amp	BA4560F	4560
	Dual op amp	LM833	LM833
	Dual op amp	TL072	TL072
	Dual op amp	NJM5532M BA15532F	5532 15532
	Dual comparator	LM393/A BA10393	393/A BA10393

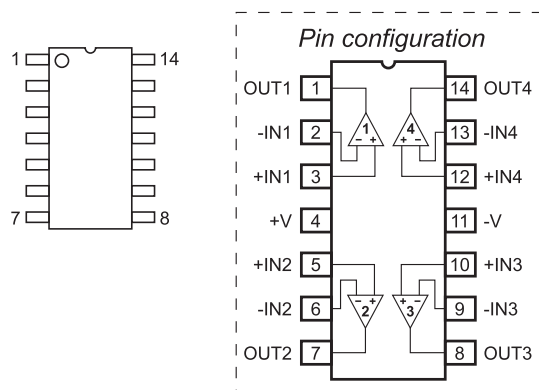
Case SO8 (4 pins)



Optocoupler components

Ref.	Type	Product name	Marking code
	Optocoupler	PS2701-1 PC357NT TLP181	PS2701-1 PC357NT P181

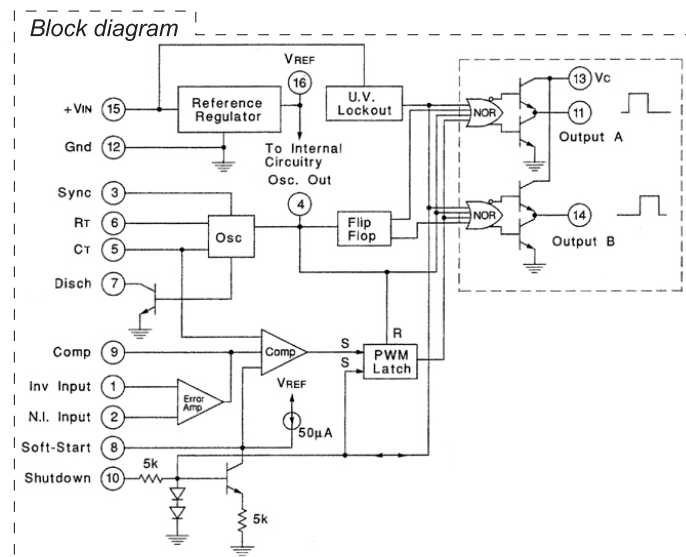
Case SO14



Linear ICS

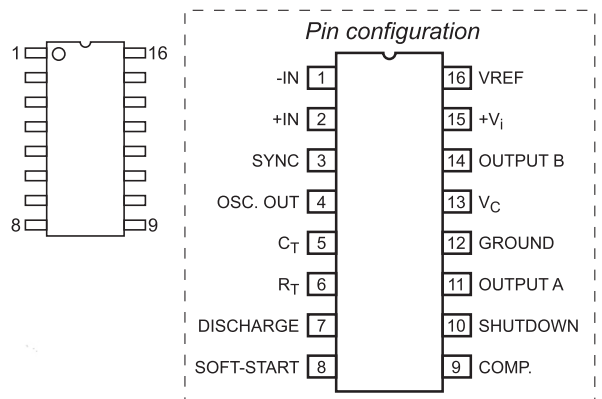
Ref.	Type	Product name	Marking code
	Quad op amps	LM324/A BA10324AF	324/A BA10324AF

Case SO16



Linear ICS

Ref.	Type	Product name	Marking code
	PWM driver	SG2525AP SG2525ADW	SG2525AP SG2525ADW



PART 3

MECHANICAL PART

PART 3: MECHANICAL PART

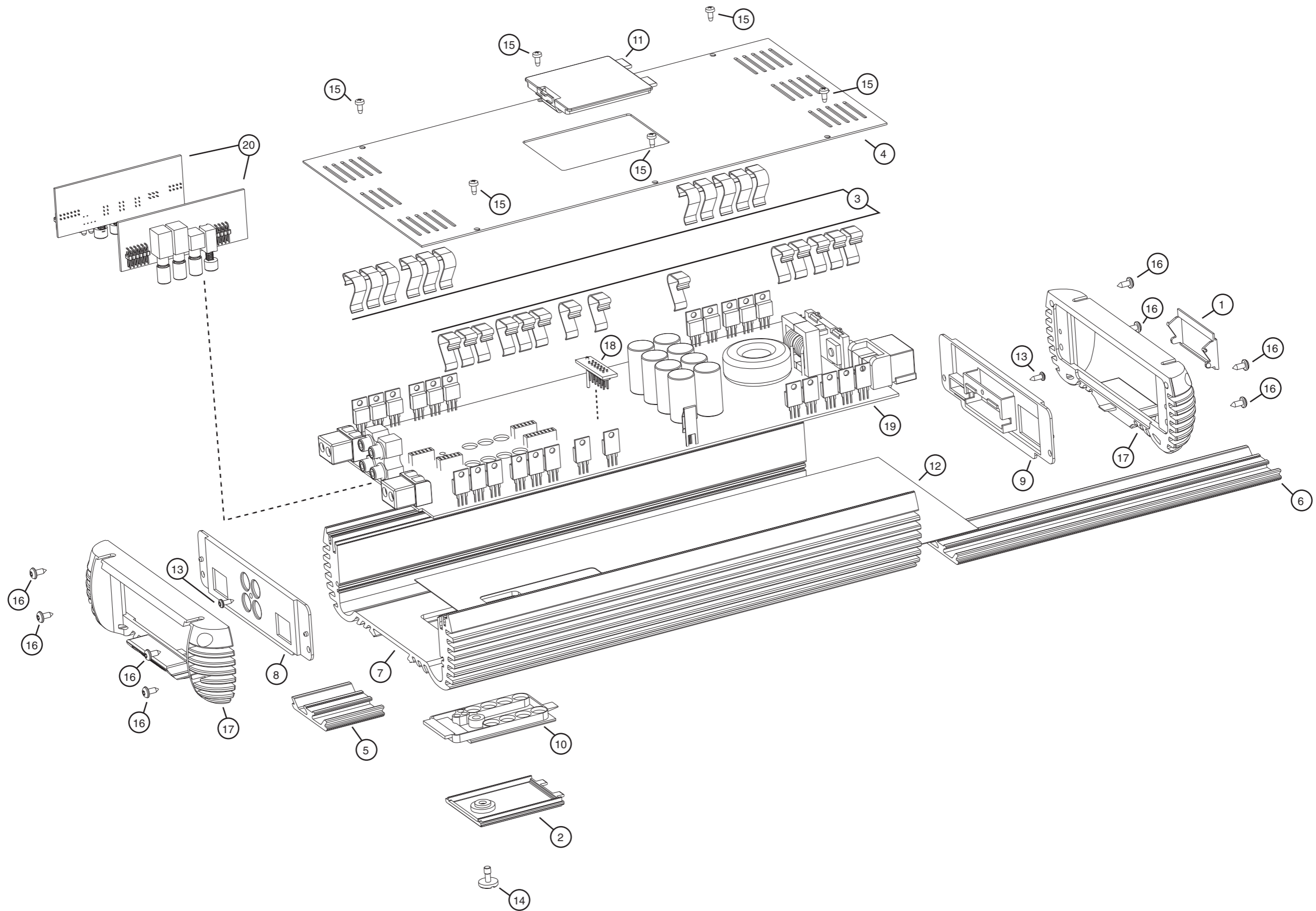
Section A: Exploded views and parts list rev. A

- | | |
|-----------------------------|--------------------|
| 1. Mechanical exploded view | sheets from 1 to 1 |
| 2. Package exploded view | sheets from 1 to 1 |
| 3. Amplifier parts list | sheets from 1 to 1 |

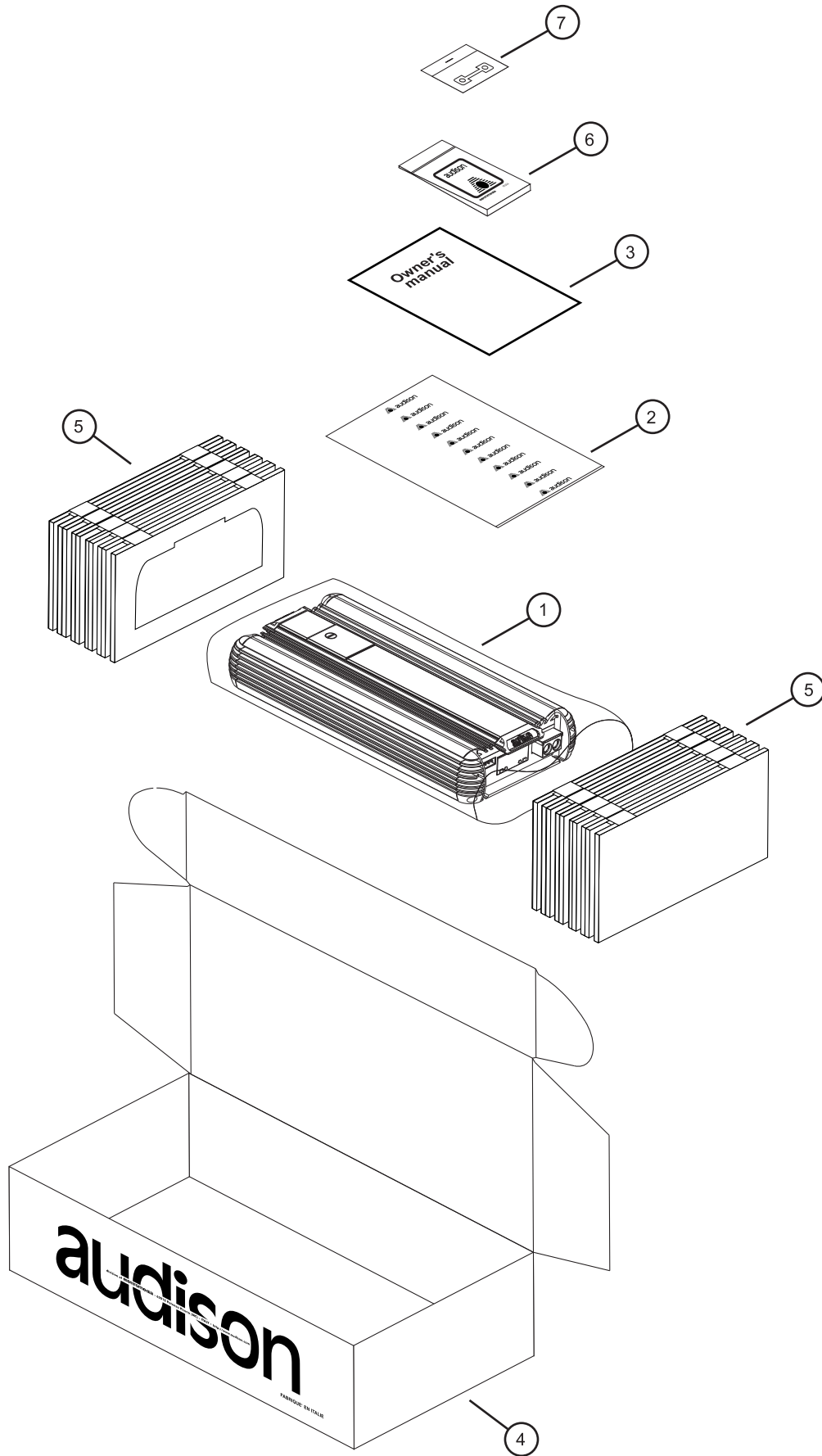
Table of the last upgrading revisions

UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A

LRx1.400 Mechanical exploded view Rev. A



PACKAGE EXPLODED VIEW Rev. A



LRx 1.400 ASSEMBLED AMPLIFIER PARTS LIST

Rev. A

REF NO	PART NO	DESCRIPTION	Q.TY	
	S10019200	MICA 2xTO220 24x18/.05-.08	3	See "part 2" components layout
	S10019300	MICA 3xTO220 35x18/.05-.08	6	See "part 2" components layout
	S07000410	THERMO CONDUCTIVE GREASE	1g	
1	S10024340	SPORTELLO TRASP. COPRIFUS. LRx	1	
2	S10024360	SPORT.TRASP.CONTROLLI LRx	1	
3	S12500520	MOLLA FISSAGGIO TO220 LRx	27	
4	S14403030	FONDO LRx1.400/LRx4.300 VER.	1	
5	S22658030	MODAN.ANT. VERN./SER. LRx1.400	1	
6	S22658060	MODAN.POS. VERN/SER. LRx1.400	1	
7	S23824030	DISSIP.SABB/VER.LRx1.4/2.5/4.3	1	
8	S30024010	MASCH.ANT.LRx1.400 VERN.+SER.	1	
9	S30024041	MASCH.POS.LRx1/4/5/6 VERN.+SER	1	
10	S30024200	PANNEL.CONTR.LRx1 8 FORI SER.	1	
11	S30024350	SPORT.TRASP.FONDO LRx1.400 SER	1	
12	S30244880	CARTA LAT.LRx1/2.5/4 mm323x135	1	
13	S32101210	VITE HILO 3x10 TBOTT. EI 2 CR	2	
14	S32111670	VITE CUSTOM MA 4x9.5 TP T CR P	1	
15	S32130800	VITE AF 2,9x7 TCg C ZN	6	
16	S32150230	VITE AF 3.5x13 TCB EI CR	8	
17	S33540010	TERMINALE PRESS. LRx VERN	2	

LRx 1.400 ASSEMBLED PCB

REF. NO	PART NO	DESCRIPTION	Q.TY
18	S36725920	BYPVCA C.S. ASS.	1
19	S46726000	MAINBOARD	1
20	S46726800	LRx1 CD-S	1

LRx 1.400 PACKAGE PARTS LIST

Rev. A

REF. NO	PART NO	DESCRIPTION	Q.TY
1	S10039800	SACCH. CARTENE AUD.STAMP.25x56	1
2	S10040400	SACCH. PER ACCES. LRx	1
3	S10125750	OWNER'S MANUAL	1
4	S11117010	LRx1.400 SCATOLA LITO	1
5	S11501510	LRx INTERNO IMBALLO "CUFFIA"	2
6	S35270710	KIT ACCESSORI LRx	1
7	S35270960	FUSE RICAMBIO	1

EXPENDABLE MATERIALS

REF. NO	PART NO	DESCRIPTION
GREASE	S07000410	50g THERMO CONDUCTIVE GREASE
ACST 1/10AG	S62400000	10m SOLDER
ACST1/250AG	S62400100	250g SOLDER

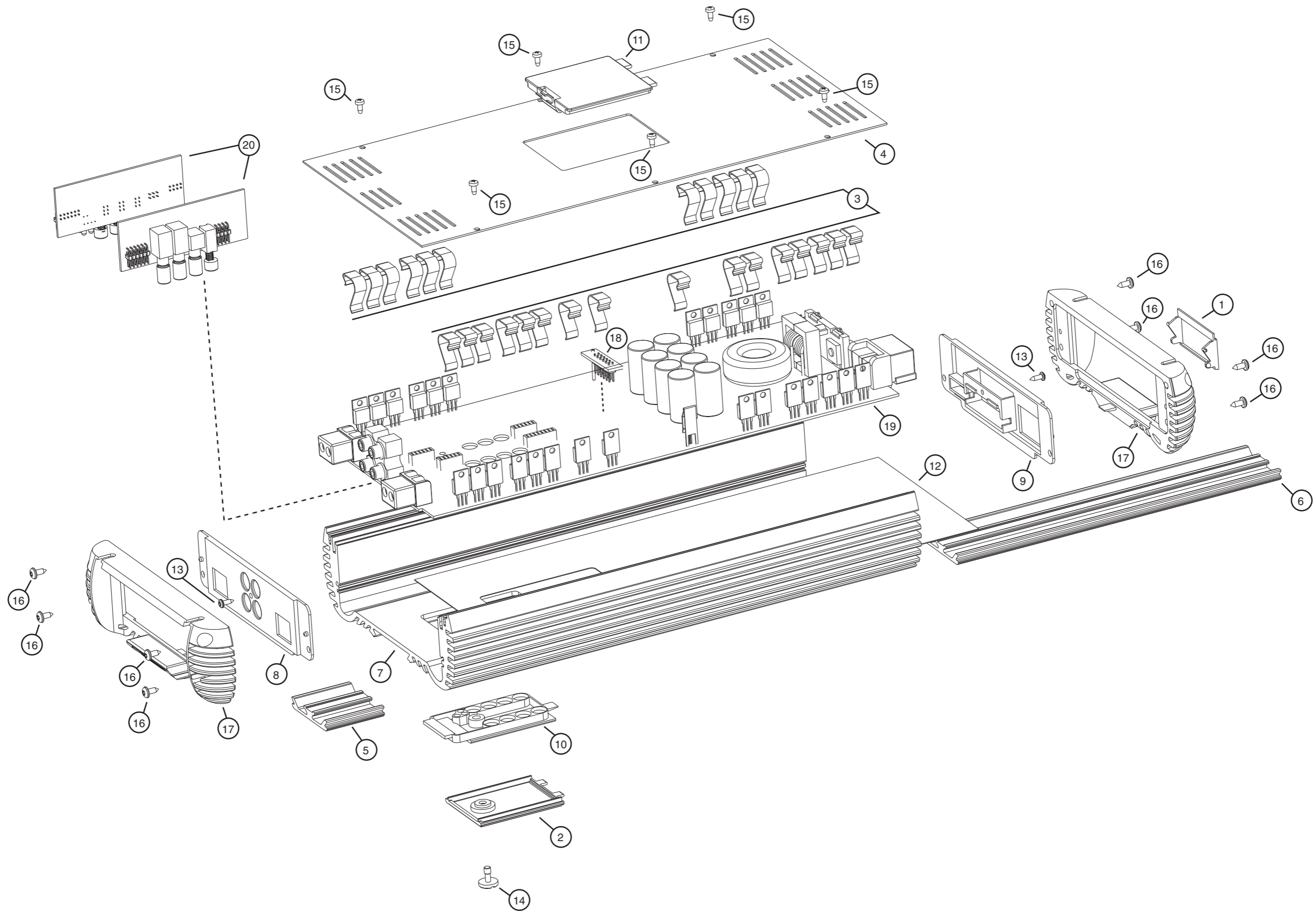
PART 3: MECHANICAL PART**Section A: Exploded views and parts list rev. B**

- | | |
|-----------------------------|--------------------|
| 1. Mechanical exploded view | sheets from 1 to 1 |
| 2. Package exploded view | sheets from 1 to 1 |
| 3. Amplifier parts list | sheets from 1 to 1 |

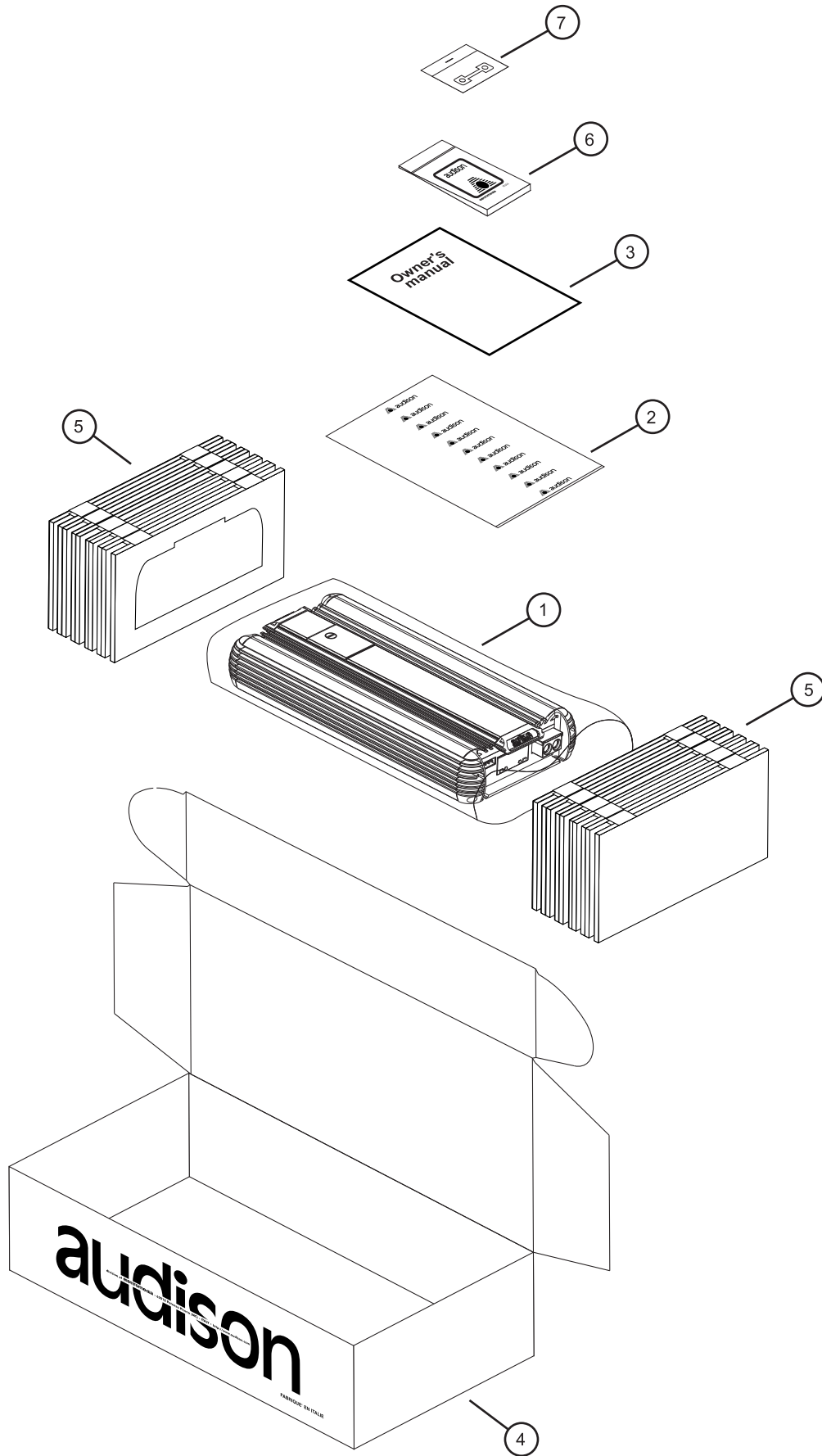
Table of last upgrading revisions

UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A
Rk = 12 ohms	LRx1CD-S.0	Rev. A	Rev. B	Rev. A	Rev. A

LRx1.400 Mechanical exploded view Rev. B



PACKAGE EXPLODED VIEW Rev. B



LRx 1.400 ASSEMBLED AMPLIFIER PARTS LIST

Rev. B

REF. NO	PART NO	DESCRIPTION	Q.TY
	S10019200	MICA 2xTO220 24x18/.05-.08	4 See "part 2" components layout
	S10019300	MICA 3xTO220 35x18/.05-.08	6 See "part 2" components layout
	S07000410	THERMO CONDUCTIVE GREASE	1g
1	S10024340	SPORTELLO TRASP. COPRIFUS. LRx	1
2	S10024360	SPORT.TRASP.CONTROLLI LRx	1
3	S12500520	MOLLA FISSAGGIO TO220 LRx	29
4	S14403030	FONDO LRx1.400/LRx4.300 VER.	1
5	S22658030	MODAN.ANT. VERN./SER. LRx1.400	1
6	S22658060	MODAN.POS. VERN/SER. LRx1.400	1
7	S23824030	DISSIP.SABB/VER.LRx1.4/2.5/4.3	1
8	S30024010	MASCH.ANT.LRx1.400 VERN.+SER.	1
9	S30024041	MASCH.POS.LRx1/4/5/6 VERN.+SER	1
10	S30024200	PANNEL.CONTR.LRx1 8 FORI SER.	1
11	S30024350	SPORT.TRASP.FONDO LRx1.400 SER	1
12	S30244880	CARTA LAT.LRx1/2.5/4 mm323x135	1
13	S32101210	VITE HILO 3x10 TBOTT. EI 2 CR	2
14	S32111670	VITE CUSTOM MA 4x9.5 TP T CR P	1
15	S32130800	VITE AF 2,9x7 TCg C ZN	6
16	S32150230	VITE AF 3.5x13 TCB EI CR	8
17	S33540010	TERMINALE PRESS. LRx VERN	2

LRx 1.400 ASSEMBLED PCB

REF. NO	PART NO	DESCRIPTION	Q.TY
18	S36725920	BYPVCA C.S. ASS.	1
19	S46726000	MAINBOARD	1
20	S46726800	LRx1 CD-S	1

LRx 1.400 PACKAGE PARTS LIST

Rev. B

REF. NO	PART NO	DESCRIPTION	Q.TY
1	S10039800	SACCH. CARTENE AUD.STAMP.25x56	1
2	S10040400	SACCH. PER ACCES. LRx	1
3	S10125750	OWNER'S MANUAL	1
4	S11117010	LRx1.400 SCATOLA LITO	1
5	S11501510	LRx INTERNO IMBALLO "CUFFIA"	2
6	S35270710	KIT ACCESSORI LRx	1
7	S35270960	FUSE RICAMBIO	1

EXPENDABLE MATERIALS

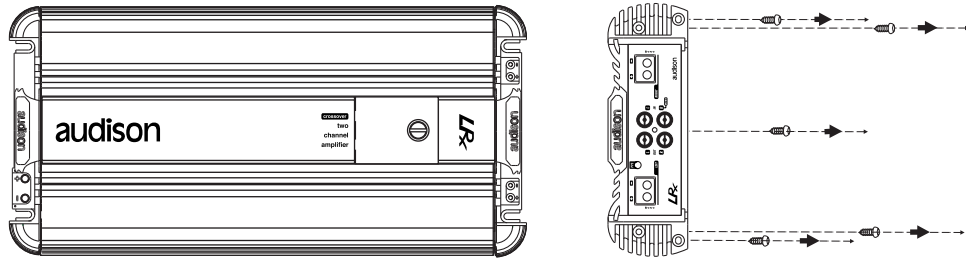
REF. NO	PART NO	DESCRIPTION
GREASE	S07000410	50g THERMO CONDUCTIVE GREASE
ACST 1/10AG	S62400000	10m SOLDER
ACST1/250AG	S62400100	250g SOLDER

PART 3: MECHANICAL PART

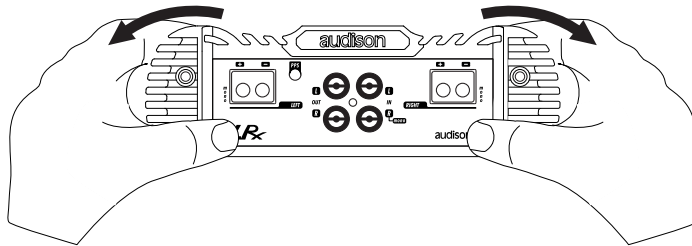
Section B: Amplifier opening instructions rev. A

- | | |
|-----------------------|--------------------|
| 1. Bottom disassembly | sheets from 1 to 2 |
| 2. PCB disassembly | sheets from 2 to 2 |

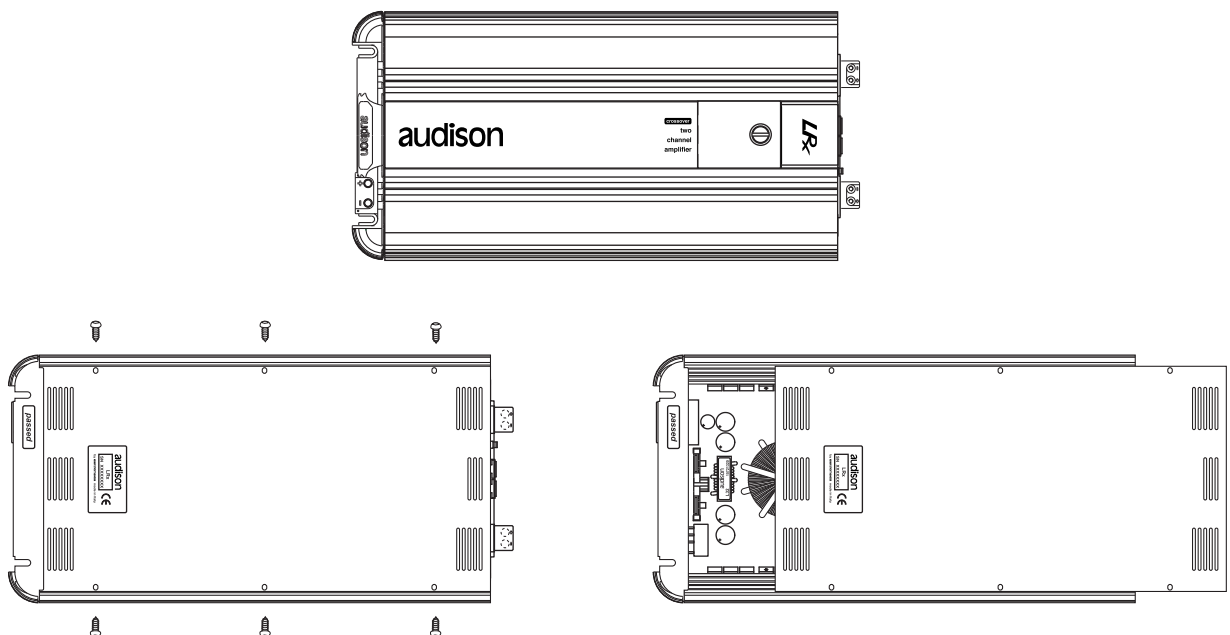
1. Remove the plastic front plate fixing screw (between RCA sockets); then, remove the 4 fixing screws of the die-cast plate as shown in the picture.



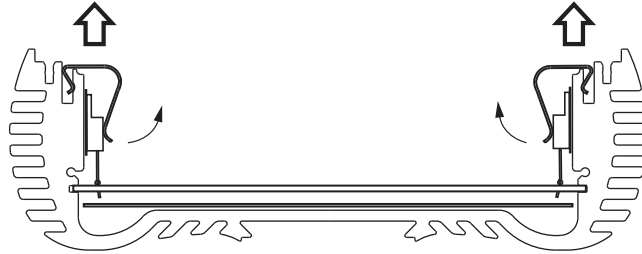
2. Remove the die-cast plate by seizing both grips with your hands and by pulling. This way you will remove the die-cast plate together with the plastic front plate, that will remain onto it.



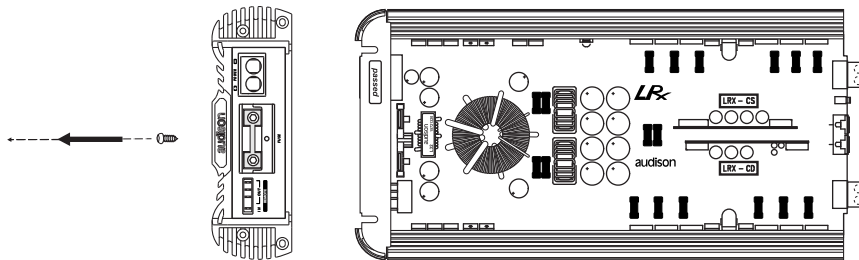
3. Remove the bottom fixing screws and then the bottom itself.



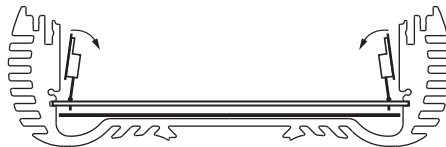
1. Remove all transistors fixing clips through pliers as shown in the picture.
IMPORTANT: Once you disassemble the clips, you cannot use them any longer; therefore, they must be replaced with new ones.



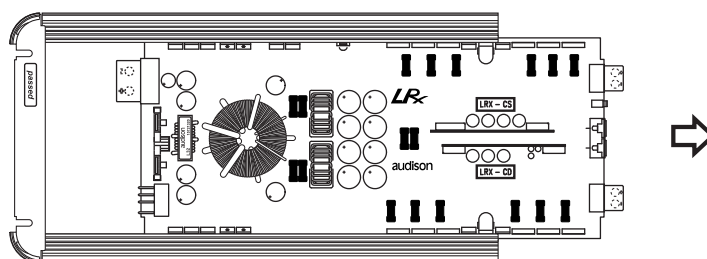
2. Remove the plastic front plate fixing screw (it is behind the fuse cover). This will allow you to extract the printed circuit board without removing the die-cast plate.
Remove right and left controls from the mainboard by pulling them upwards; mind not to bend the connectors pins.



3. In order to prevent transistors and other devices from touching the heat sink while extracting the printed circuit board, please bend them towards the amplifier interior.



4. Extract the board and salvage insulating micas.
CAUTION: Once you disassemble the micas, you have to remove grease residuals from them and apply new grease onto them for reassembling them. Use thermo conductive grease, code 07000410.



PART 4

FUNCTIONAL TEST

PART 4: FUNCTIONAL TEST rev. A

Table of the last upgrading revisions

UPGRADING REVISIONS					
PART 2 ELECTRONIC PART			PART 3 MECHANICAL PART		PART 4 FUNCTIONAL TEST
SECTION B: Mainboard	SECTION C: Controls	SECTION D: Comp. Pin-out	SECTION A: Exploded views and parts list	SECTION B: Opening instructions	FUNCTIONAL TEST
Rk = /	LRx1CD-S.0	Rev. A	Rev. A	Rev. A	Rev. A

LRx 1.400 Mono Amplifier

This test has to be carried out with the assembled PCB mounted into the heat sink.

INSTRUMENTS AND ACCESSORIES

- 12 VDC – 180 A power supply.....to be connected to power supply terminal block
- 20 MHz dual trace oscilloscope.....connected to load through probes attenuated x10
- 10 Hz – 50 KHz / 0 – 5 VRMS sinusoidal generator..... to L and R RCA inputs
- Digital multimeter
- 1 Kohm wire resistor

STARTING CONDITIONS:

 **F1, F2, LEVEL on MAX**  **Q on MINIMUM**  **All NON PRESSED**

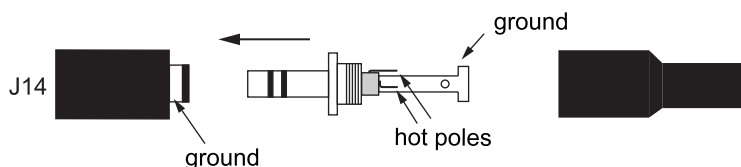
Set the idling current trimmer, **P7**, on **MIN** (counter clock wise)

NO LOAD – NO SIGNAL – NO REMOTE – NO POWER SUPPLY

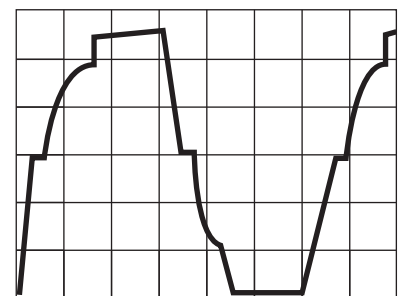
POWER SUPPLY CIRCUITS:

1. Measure resistance between –POWER and the ground of a RCA socket.....1 Kohm
2. Measure resistance between –POWER and PTC1 (*) metallic support (TH1).....(650 - 700) ohms
3. Measure resistance between the RCA ground of an input and the RCA ground of PRE output (*) (30 - 32) ohms
4. Measure resistance between the two grounds of the two **input** RCAs, L and R (*).....(41 - 43) ohms
5. **Connect power supply to POWER terminal block** (with current limit at 10 A).....**13.8Vcc**
6. Measure voltage between REMOTE OUT fast-on connector and – POWER0V
7. Measure voltage between –POWER and the ground of a RCA socket.....0V
8. Measure voltage between one VCR terminal and the ground of a RCA socket0V
9. Do the same with the other VCR terminal0V
10. **Apply REMOTE (13.8VDC voltage on REMOTE IN fast-on connector)**.....**Green LED is ON**
11. Measure voltage on J14 between the two hot poles and the ground (see pict. 1).....± (11.5 - 12.5) V
12. Measure **+VCC** and **-VCC** on **L6** and **L7** coils (see layout) with regards to –POWER± (52.5 - 54.5) V
13. Measure voltage on **pin 8** and **4** of **U3** (see pict. 3) with regards to -POWER± (9.8 - 11.8) V
14. Measure **VM** voltage on **Q42 BASE** (see pict. 3) with regards to –POWER- (8.0 - 8.5) V
15. Measure voltage between REMOTE OUT fast-on connector and –POWER(13.4 - 13.8) V
16. Measure voltage on **pin 2** of **IC1** with regards to –POWER (see pict. 3).....(3.1 - 3.3) V
17. Measure voltage on **pin 3** of **IC1** with regards to –POWER (see pict. 3).....(2.55 - 2.65) V
18. Measure voltage between –POWER and the ground of a RCA socket..... (0.25 - 0.35) V
19. Check the wave shape on the transformer **pin 1** (see layout and picture 2).....It must be stable
20. **Disconnect REMOTE – No power supply current limit**

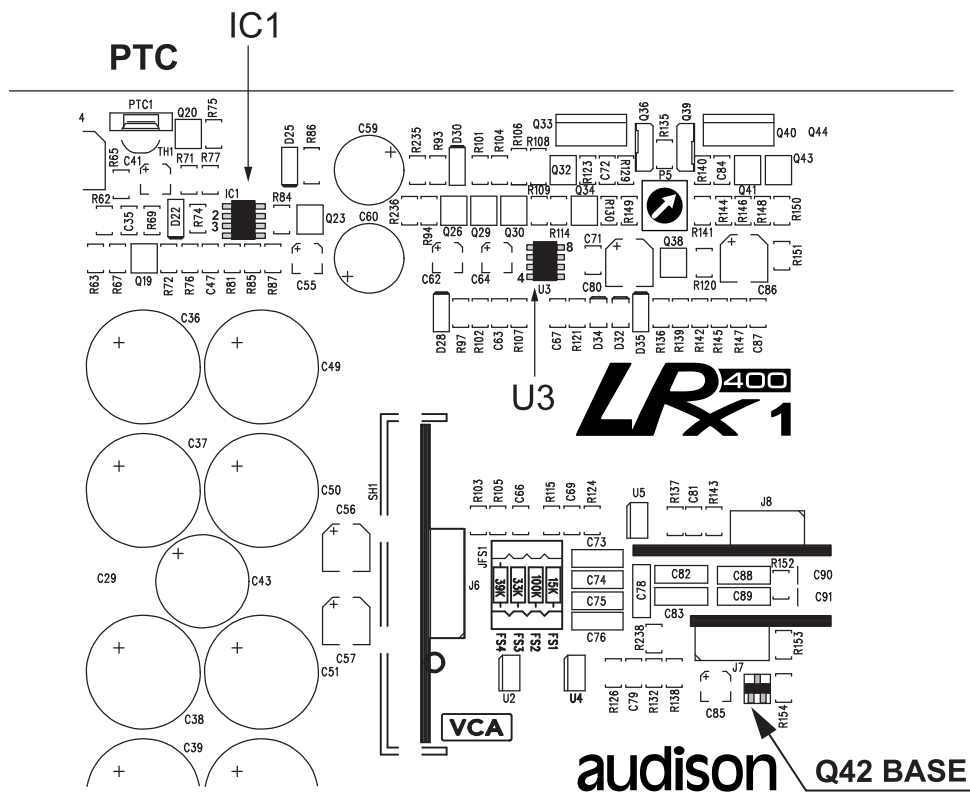
(*): See layout



Pict. 1: Insert a 2.5mm diameter jack plug into J14 connector and measure ± 12V voltage on the jack output.



Pict. 2: Wave shape on the transformer
TIME/DIV=5µS ; VOLT/DIV=5V



Pict. 3: Measurement of VM voltage on Q42 transistor and of voltages on IC1 and U3

MEASUREMENTS WITH LOAD AND SIGNAL ON POWER OUTPUTS:

STARTING CONDITIONS:

Connect a 4 ohm load to A or B power outputs

Connect oscilloscope to load.....**2V/div. (with probe x10)**

Connect sinusoidal generator to IN L-R.....**100Hz/zero signal**

IMPORTANT: The loads used on the outputs must have 100W min. power. You can use 10W resistors for loads lower than 1 ohm; mind the high heat that generates.

1. Apply REMOTE (13.8VDC on REMOTE IN)

2. Adjust the generator level in order to have outputs with clipping (see pict. 4)..Generator on (0.21 – 0.23) VRMS

3.  **LEVEL on MINIMUM**

4. Adjust the generator level in order to have outputs with clipping.....Generator on (4.8-5.4) VRMS

5. Disconnect remote.....Output on zero instantaneously

6. Apply remote.....Signal after about 5 seconds

7. Measure signal on power output.....(4.9 – 5.1) squ


8. Generator frequency at 10Hz

9. Adjust the generator level in order for the output to be with a lot of clipping (see pict. 7)...**It doesn't go on safe**

10. **Oscilloscope on 1V/div** – Adjust the generator level in order to have power outputs at **3 squ**

11. **Generator frequency at 500Hz**.....Outputs (2.0 – 2.5) squ

12. **Generator frequency at 50Hz** -  **F1 on MINIMUM**.....Outputs (2.0 – 2.5) squ

13.  **Q on MAXIMUM**.....Outputs (4.3-4.8) squ

14. Apply a single input at a time (then both).....Output halves

15.  **LO-PASS: PRESSED**.....Outputs (3.0-3.1) squ

16. **Generator frequency at 30KHz** (signal with crossover distortion, see pict. 5).....Outputs (3.0 – 3.1) squ

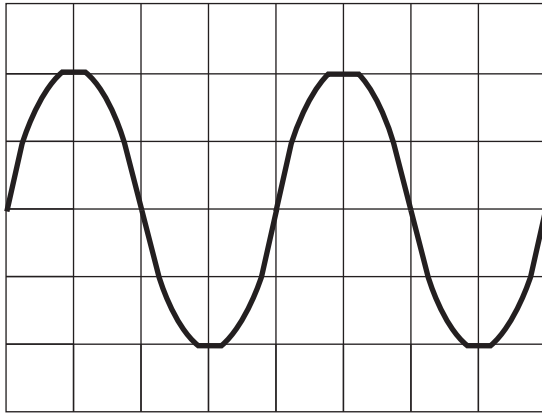
17.  **SUBSONIC: PRESSED - Generator frequency at 20Hz**.....Outputs (2.0 – 2.2) squ

18.  **PHASE: PRESSED**.....No variations

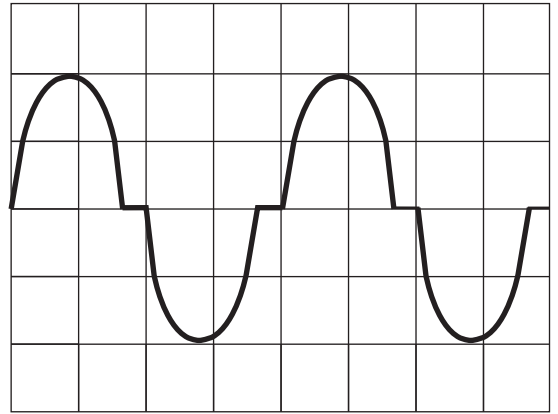
Measurements with VCA module

1. Remove VCA bypass, switch off the amplifier and insert one VCA module
2. Apply REMOTEOutputs (4.0-4.8) squ
3. Short-circuit the 2 pins of J2 connectors for VCR (see lay-out)..... Outputs on zero
4. Disconnect REMOTEOutputs on zero instantaneously
5. Insert VCA bypass

REMARK: squ = oscilloscope squares



Pict. 4: Output with clipping



Pict. 5: Signal with crossover distortion

MEASUREMENTS ON PRE OUTPUTS:

1. Remove bypass from VCA location
2. **Oscilloscope on PRE outputs: 2V/DIV – 5V RMS generator – 1000 Hz on IN R and L**
3. Check that the 2 PRE outputs have the same width (with no clipping and distortions)..... (6.8 – 7.1) squ
4. **Generator at 500 Hz**..... PRE outputs (4.8-5.0) squ
5. **Generator at 50 Hz – F2 on MINIMUM**.....PRE outputs (4.8-5.8) squ
6. **HI-PASS: PRESSED**.....PRE outputs (6.8-7.1) squ
7. Apply a single input signal at a time..... There is an output at a time
8. Disconnect REMOTE.....Outputs on zero instantaneously
9. Apply REMOTESignal after about 5 seconds
10. **Generator at zero signal – Insert bypass into VCA location – ALL NON PRESSED**

IMPORTANT: Please be always sure that L and R channels are the same

PROTECTION:

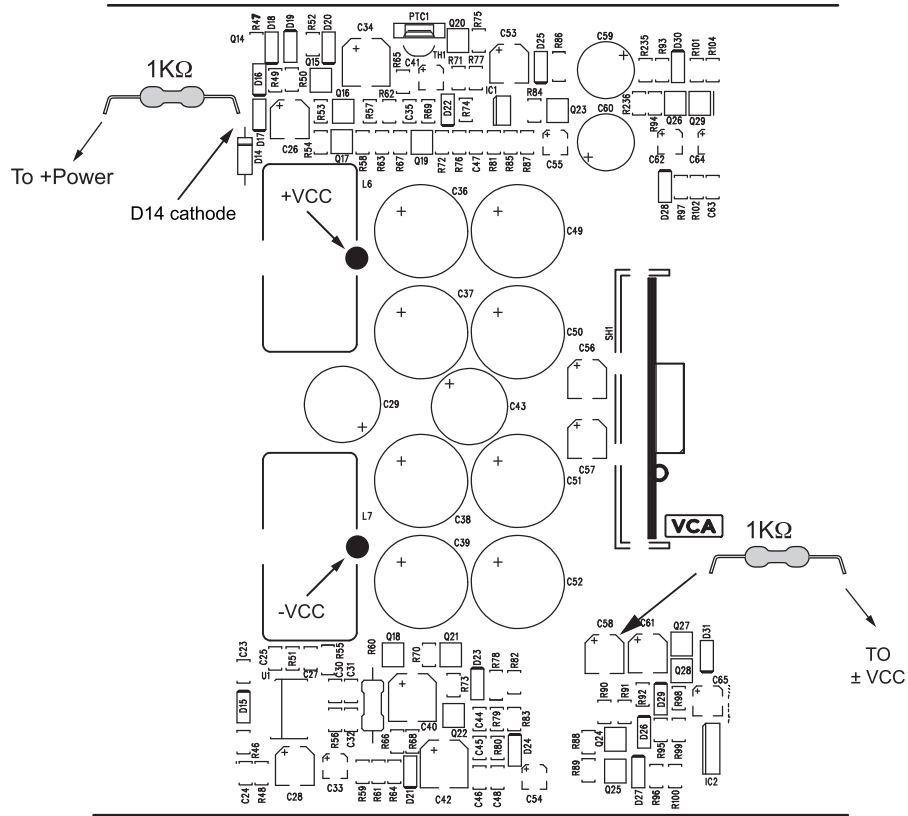
1. Measure output DC on the load with zero signal.....Lower than 50mV
2. Connect one 1K resistor between +VCC (on L6 coil)* and C58 positive (pict. 6).....**On safe** (red LED is on)
3. Connect one 1K resistor between -VCC (on L7 coil)* and C58 positive (pict. 6)..... **On safe** (red LED is on)
4. Connect one 1K resistor between +POWER and D14 cathode (pict. 6)..... **On safe** (red LED is on)
5. **Generator at 1KHz** – Adjust generator level in order to have outputs at about 2 squ
6. Generate a short circuit between one power output and L or R input RCAs ground.....**On safe** (red LED is on)
7. Generate a short circuit between one power output and J14 jack ground (see pict. 1)...**On safe** (red LED is on)
8. Adjust generator level in order for power output to be close to clipping (see pict. 8)
9. Connect a 1 ohm load to power output.....Output at (3.4–3.8) squ + **orange LED is on, PL*1**

Connect a 0.2 ohm load to power output (carry out measurements for **1 second max.**).....
**On safe** (red LED is on)

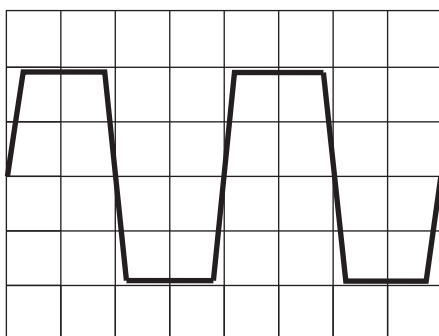
(*): See layout

(*¹): When you use 1 ohm load, the device goes in limiting; it means signal reaches clipping and its level decreases, both on positive and on negative part.

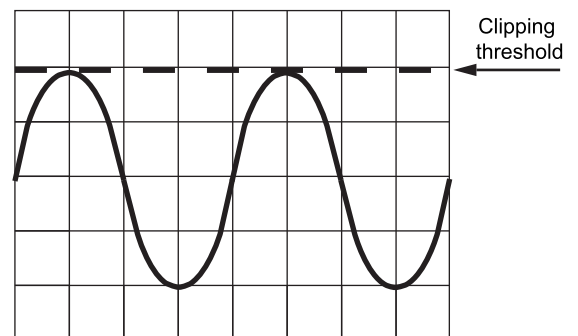
Remark: In order to reset protection, disconnect remote, wait for a few seconds, then apply remote again



Pict. 6: Protection test



Pict. 7: Output with a lot of clipping



Pict. 8: Output close to clipping

REMARK: The width of sinusoids in pict. 4-5-7-8 is not proportional to measurements.

BIAS CURRENT ADJUSTMENT:

In order to carry out this operation:

- 1) The amplifier temperature needs to be 30-40°C approx.
- 2) No load has to be applied on power outputs
- 3) No signal has to be in the input
- 4) Printed circuit board has to be assembled in the heat sink
- 5) Multimeter has to be set at 100-200 mV DC range
- 6) Idling current trimmers need to be all at MIN (anti clock wise)

Bias current value is obtained by measuring voltage between the **positive** terminal of one of the two outputs and “TP” test points indicated in the picture. Adjust **P5** by slowly turning it, in order for you to have a voltage **average value of 0.8-1 mV DC** on the test points.

