IT CAN NEVER B2 LOUD®

Ref Four
"The Twelve Hundred"

USER MANUAL

#ITCANNEVERB2LOUD

INTRODUCTION

Since the beginning of this millennium, we have had a vision of pushing the envelope and not settling for less. This relentless pursuit of excellence has driven us to create groundbreaking products that not only meet but exceed expectations. Our commitment to innovation is reflected in every detail, from the initial concept to the final product. We believe that true differentiation comes from a deep understanding of our customers' needs and a dedication to solving their most pressing challenges. By staying ahead of the curve and continuously improving, we ensure that our products stand out in a crowded market, making a statement that resonates with both our customers and the industry.

REF FOUR V2

The Ref Four isn't just an amplifier—it's a labor of love, born from years of relentless dedication to achieving audio perfection. Every component, every circuit, every detail is meticulously crafted to bring music to life in a way that's rich, pure, and breathtakingly real.

To obtain the full potential of any amplifier & to minimize failure, it is adviced to upgrade your stock electrical system. Don't take any shortcuts, a better electrical equals enhanced performance and stability.

Stay updated on B2 audio, follow us on social media & visit our website.
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AT THE HEART OF B2 AUDIO LIES A RELENTLESS PURSUIT OF EXCELLENCE. WE BELIEVE IN DOING THINGS DIFFERENTLY AND PUSHING THE BOUNDARIES OF WHAT'S POSSIBLE. OUR TALENTED TEAM OF AUDIOPHILES AND INDUSTRY ENTHUSIASTS IS UNITED BY A PASSION FOR DESIGNING THE BEST POSSIBLE PRODUCTS—PRODUCTS THAT ARE MORE THAN JUST "GOOD ENOUGH." OUR UNWAVERING DEDICATION HAS ALLOWED US TO MAKE OUR MARK SINCE OUR FOUNDING IN 2008.

OUR JOURNEY HAS BEEN MARKED BY NUMEROUS MILESTONES AND ACCOLADES, REFLECTING OUR COMMITMENT TO PUSHING THE ENVELOPE AND SETTING NEW STANDARDS IN THE INDUSTRY. AS WE CONTINUE TO GROW AND EVOLVE, WE REMAIN DEDICATED TO OUR MISSION OF DELIVERING EXCEPTIONAL AUDIO PRODUCTS THAT INSPIRE AND DELIGHT.

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▪ DESIGN SPECIFICATIONS

MODEL:	REF FOUR
CIRCUIT CONFIGURATION:	CLASS A/B
FREQUENCY RESPONSE:	15 HZ-25 KHZ
SIGNAL TO NOISE RATIO:	>90 DB
INPUT SENSITIVITY:	6 V-0.3 V
CROSSOVER CIRCUIT:	24 DB/OCT
LOW PASS CROSSOVER:	40 HZ-400 HZ
HIGH PASS CROSSOVER:	40 HZ-4 KHZ
BASS EQ:	45 HZ / 0-12 DB
LEVEL CONTROL	
• WITH CLIP/VOLT/TEMP:	INCLUDED
POWER TERMINAL GAUGE:	0 GAUGE / 67 MM^2
FUSE RATING:	150 A
DIMENSIONS METRIC:	471 X 160 X 64 MM
IMPERIAL:	18.54" X 6.3" X 2.52"

CONTINIOUS OUTPUT POWER (RMS) @ 14.4V <1% THD

	4 OHM	2 OHM	4 OHM BRIDGE
REF FOUR	*4 X 200W**	*4 X 300W**	*2 X 1200W**

DESCRIPTIONS OF SPECIFICATIONS

* FULL OUTPUT POWER ACCORDING TO THE SPEC IS BASED ON A SUFFICIENT ELECTRICAL SUPPLY SYSTEM. IF YOUR SYSTEM IS INADEQUATE, THE EFFICIENCY OF THE AMPLIFIER DECREASES, HURTING THE PERFORMANCE!

OPERATION BELOW MINIMUM IMPEDANCE WILL STRESS THE AMPLIFIER & VOID THE WARRANTY. EXCESSIVE HEAT WILL OCCUR, CAUSING THE AMPLIFIER TO GO INTO THERMAL PROTECTION. THE CIRCUIT MAY SUSTAIN PERMANENT DAMAGE AND PROTECTION LIGHTS WON'T TURN OFF OR FLASH SEQUENTIALLY.
OPERATIONAL VOLTAGE IS FROM 9V TO 16V

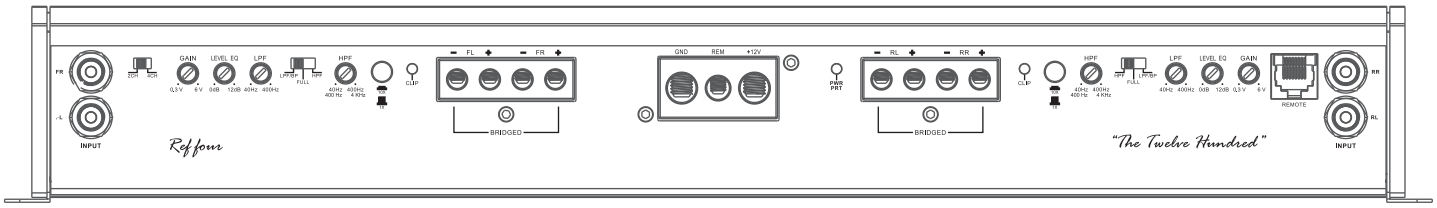
PROTECTION MAY ALSO BE CAUSED BY THE FOLLOWING
- INPUT VOLTAGE FROM HEADUNIT BEING TOO HIGH / LOW / POWER SUPPLY VOLTAGE TOO HIGH / LOW.
- SPEAKER OVERLOAD
- SHORT CIRCUIT

*FULL OUTPUT POWER ACCORDING TO THE SPEC IS BASED ON A SUFFICIENT ELECTRICAL SUPPLY SYSTEM. IF YOUR SYSTEM IS INADEQUATE, THE EFFICIENCY OF THE AMPLIFIER DECREASES, HURTING THE PERFORMANCE!

MININUM BATTERY REQUIREMENTS	AGM	LITHIUM 6C
REF FOUR	75 AH / 1000 CCA	20 AH

THE LIST ABOVE DESCRIBES THE ADDITIONAL DEDICATED BATTERY SUPPLY FOR THE AMPLIFIER. THE OEM BATTERY DOES NOT COUNT AS A PART OF IT.

PANEL LAYOUT



FRONT R/L RCA INPUT
RCA input for the 2 front channels. Ensure cables are inserted fully and are secured.

GAIN (6V~0.2V)
Adjusts signal input voltage from the input source to match the amplifiers input stage. 6V ~ 0.2V is the selected operational voltage. Voltages beyond may cause errors or damage the input section.

LPF (LOW PASS FILTER 40HZ~4KHZ, 24 DB/OCT)
Adjusts the cut off point for the low pass crossover, the LPF switch has to be in position. If the HPF is used at the same time, you can create a Band Pass Filter with the range of the setting used in LPF & HPF.

CLIP LED
Signal clip sensor for the Front L & R channels. Occasional flashing is acceptable, full lit LED is not.

REAR SECTION SPEAKER TERMINAL
8 gauge speaker output terminals for the rear left & right channels. To bridge the channels in 4 ohm, use the Negative terminal of the rear left and the positive of the rear right.

HPF (HIGH PASS FILTER 40HZ~4KHZ, 24 DB/OCT)
Adjusts the cut off point for the high pass crossover, the HPF switch has to be in position. The x10 multiplier will widen the crossover by that factor.

LEVEL EQ
Adjustable level eq set at 45 Hz, variable with 0 to 12 dB. Set your system properly, don't use it as an extra gain feature to raise the output.

REMOTE PORT
Connection of the Level Remote that displays voltage, clip sensor & temperature in both Fahrenheit and Celcius. The remote only affects the rear channels.

2CH / 4CH SWITCH
Signal routing to the entire 4 channels of the amplifier by using only 2 RCA inputs. In the 4CH position, 4 RCA inputs are needed to send signals to all channels.

LEVEL EQ
Adjustable level eq set at 45 Hz, variable with 0 to 12 dB. Set your system properly, don't use it as an extra gain feature to raise the output.

HPF (HIGH PASS FILTER 40HZ~4KHZ, 24 DB/OCT)
Adjusts the cut off point for the high pass crossover, the HPF switch has to be in position. The x10 multiplier will widen the crossover by that factor.

FRONT SECTION SPEAKER TERMINAL
8 gauge speaker output terminals for the Front left & right channels.
To bridge the channels in 4 ohm, use the Negative terminal of the front left and the positive of the front right.

POWER INPUT TERMINAL
0 gauge / 67 mm^2 ground and power terminal. The middle terminal is for the switched remote that signals the amplifier to turn on.

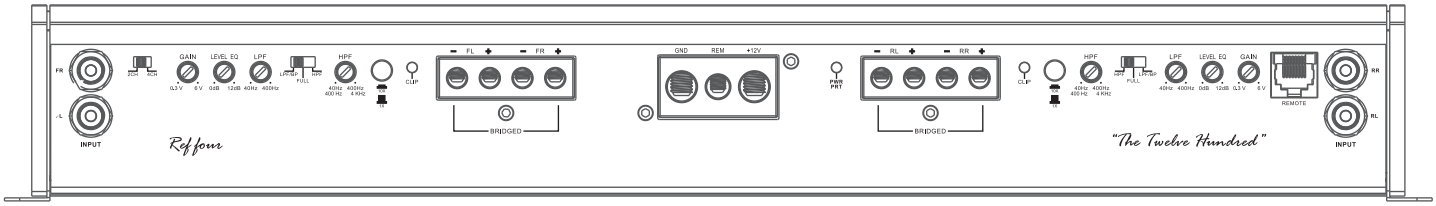
CLIP LED
Signal clip sensor for the Rear L & R channels.
Occasional flashing is acceptable, full lit LED is not.

LPF (LOW PASS FILTER 40HZ~4KHZ, 24 DB/OCT)
Adjusts the cut off point for the low pass crossover, the LPF switch has to be in position. If the HPF is used at the same time, you can create a Band Pass Filter with the range of the setting used in LPF & HPF.

GAIN (6V~0.2V)
Adjusts signal input voltage from the input source to match the amplifiers input stage. 6V ~ 0.2V is the selected operational voltage. Voltages beyond may cause damage to the input section.

REAR RCA INPUT
RCA input for the 2 rear channels. Ensure cables are fully inserted & secured.

PANEL LAYOUT



GROUND CONNECTION (GND)
Connect to the vehicle's chassis. Keep as short as possible. Less than 20" / 50 cm for the designated 0 AWG cable.

REM (12V SIGNAL / SWITCHED INPUT)
Run a remote turn on cable from the switched +12 V source. This may be a toggle switch, a relay, the source unit's remote ouput cable or power antenna trigger cable. Connect the remote turn on cable to the power terminal labeled as REM.

+12V (POWER CONNECTION)
Connects to the positive terminal of the power source
Use minimum 0 AWG to obtain specified performance.
Fuses shall be placed within 8" / 20 cm of the battery.

SPEAKER OUTPUT TERMINALS
Ensure the polarity of the cables is correct when connecting the loudspeakers. Use a mininum of 10 AWG cables for the subwoofer connection & a mininum of 14 AWG for the loudspeakers.

⚠ CAUTION

CONNECT THE +12V WIRE, KEEPING IN MIND THAT THIS WIRE MUST BE FUSED AT THE BATTERY AS WELL. ENSURE THE GROUND IS APPROPRIATE, THEN CONNECT IT TO THE AMPLIFIER. CONNECT THE SWITCHED REMOTE. REATTACH THE NEGATIVE WIRE (GROUND) TO THE BATTERY. OPERATION OVER 16 VOLTS WILL CAUSE THE AMPLIFIER TO GO INTO PROTECT MODE AND CAN VOID THE WARRANTY.

INSTALLATION

INSTALLATION CONSIDERATIONS

Installing an amplifier on your own can be a rewarding project, but it's important to approach it with caution and thorough preparation. Reading the owner's manual thoroughly will provide you with the necessary knowledge and precautions to take before beginning the installation process. If you find yourself uncertain at any point, seeking assistance from authorized distributors or dealers is a wise choice to ensure that your setup is correctly configured and your warranty remains valid. Remember, safety and proper functioning should always be your top priorities when handling electronic equipment.

PREPARATION

When installing an amplifier in a vehicle, it's crucial to disconnect the negative battery cable to prevent any electrical shorts or damage. Ensuring that the battery and alternator have secure and corrosion-free ground connections is vital for the system's performance. The amplifier should be mounted in a location that allows for proper cooling and is safe from excessive vibration; improper mounting can cause damage and hurt performance. Mounting the amplifier vertically helps dissipate heat through the heatsink fins effectively. It's also important to ensure the installation area is dry and well-ventilated. Careful routing of cables, especially the RCA cables, away from high-current wires minimizes interference and alternator whine. Keeping a good distance between RCA, power, and speaker cables can further reduce potential noise and safety hazards.

POWER CONNECTORS

12V (POWER CONNECTION)

Before mounting the amplifier, disconnect the negative (-) wire from the battery to prevent any accidental damage to the amplifier or the audio system. This amplifier is equipped with 0 AWG power and ground terminals. It is crucial that all terminals are used with the appropriate cable to ensure correct operation. Connect the power cables to the power terminal labeled as +12V.

The REF FOUR amplifiers are not equipped with fuses, so external fuses are required at both the battery and the amplifier. Connect one end of the fuse holder to the power cable and the other end of the fuse holder to the positive battery terminal within 8 inches (20 cm) of the same cable. The same should be done at the other end of the cable that connects to the amplifier. The fuses will protect the system and the vehicle against the possibility of a short circuit in the power cable. Make sure that the fuses and the fuse holder meet the system requirements.

GND (GROUND CONNECTION)

Locate a secure grounding connection as close as possible to the amplifier. Ensure the location is clean and provides a direct electrical connection to the chassis of the vehicle. Connect one end of a cable of equal size to the positive cable to the ground location. It is important that the ground cable is as short as possible, but no longer than 20 inches (50 cm) at maximum. Run one end of the cable to the grounding point and the other end to the mounting location. Connect the ground cable to the terminals labeled as GND.

REM (REMOTE CONNECTION)

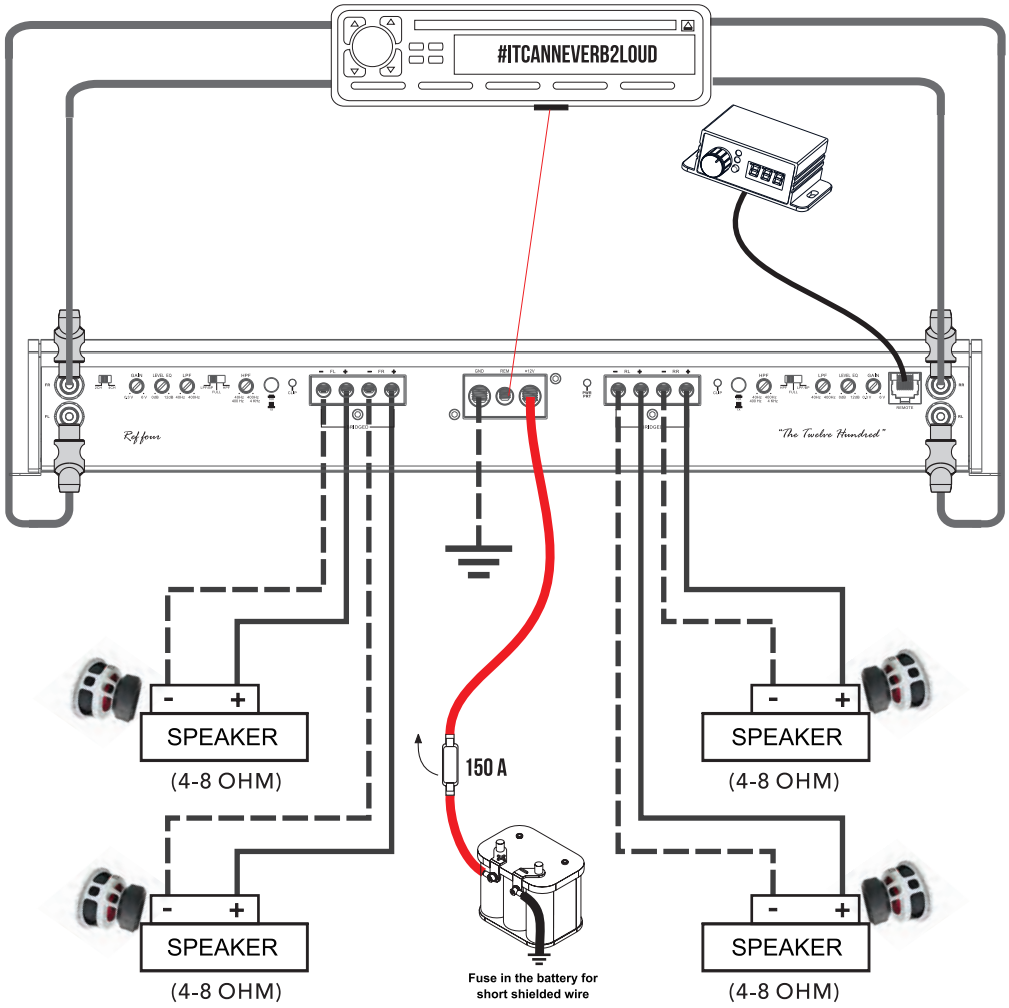
Run a remote turn-on cable from the switched +12V source. This may be a toggle switch, a relay, the source unit's remote output cable, or power antenna trigger cable. Connect the remote turn-on cable to the power terminal labeled as REM. The REM out terminal is mainly intended for connection of another amplifier run in a chain, but it can also be used for other units.

INPUT (RCA CABLE)

Run the RCA cables away from the high-current cables and speaker cables, and connect them to the amplifier. Use high-quality cables with a secure grounding point to avoid amplifier malfunction and/or alternator whine.

POWER & SPEAKER CONFIGURATION

4 CH STEREO



We recommend using a minimum of 10 AWG speaker cables to achieve the intended performance and efficiency. Run the speaker cables from your speakers to the amplifier's mounting location. Ensure these are run separately and away from high-current cables and, if possible, the RCA cables as well. In all cases where cables are penetrating the vehicle's chassis, use grommets to protect the cable.

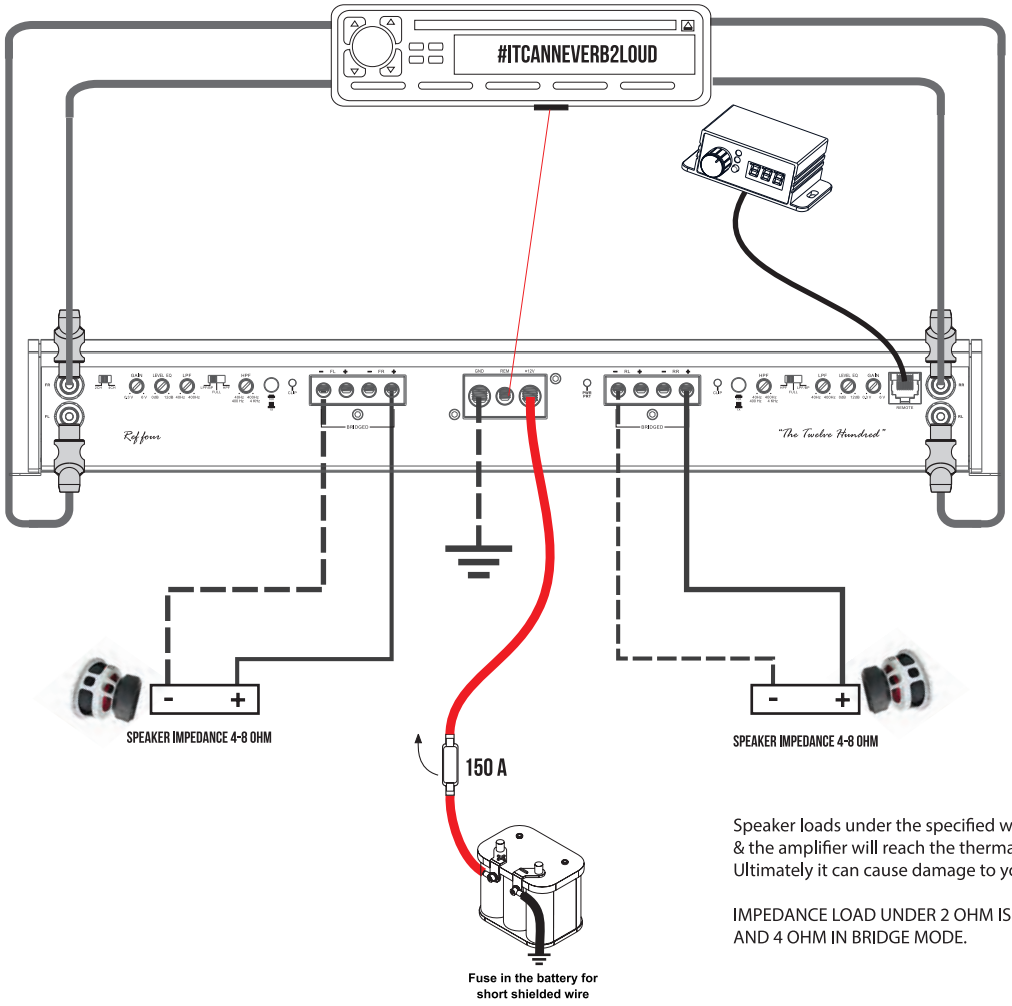
Connect the speaker wires according to the terminals on the speaker(s). Strip 3/8 inch (1 cm) of insulation from the end of each cable and twist the cable strands together tightly. Make sure there are no stray strands that could touch other cables or terminals, as this can cause a short circuit. Crimp spade plugs over the end of the cable or tin the ends with solder to provide a solid terminal.
Connect the cable ends to the amplifier as shown in the diagram.

⚠ CAUTION

CONNECT THE +12V WIRE, KEEPING IN MIND THAT THIS WIRE MUST BE FUSED AT THE BATTERY AS WELL. ENSURE THE GROUND IS APPROPRIATE, THEN CONNECT IT TO THE AMPLIFIER. CONNECT THE SWITCHED REMOTE. REATTACH THE NEGATIVE WIRE (GROUND) TO THE BATTERY. OPERATION OVER 16 VOLTS WILL CAUSE THE AMPLIFIER TO GO INTO PROTECT MODE AND CAN VOID THE WARRANTY.

POWER & SPEAKER CONFIGURATION

2 CH BRIDGE



Speaker loads under the specified will cause excessive heat
& the amplifier will reach the thermal shutdown at a faster rate.
Ultimately it can cause damage to your amplifier.

IMPEDANCE LOAD UNDER 2 OHM IS NOT WARRANTED IN STEREO MODE
AND 4 OHM IN BRIDGE MODE.

We recommend using a minimum of 10 AWG speaker cables to achieve the intended performance and efficiency. Run the speaker cables from your speakers to the amplifier's mounting location. Ensure these are run separately and away from high-current cables and, if possible, the RCA cables as well. In all cases where cables are penetrating the vehicle's chassis, use grommets to protect the cable.

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ACCU8

- **THE ACCURATE CROSSOVER SETTING**

Dealing with guesses and improper settings of your crossovers seems futile when you have invested both time and money into your audio system. If you use a DSP, you can set the crossovers at any specified frequency you see fit.
On the amplifier's crossover setting, you would have to rely on costlier tools or guesses. The ACCU8 feature eliminates this challenge. The potentiometers, except for the gain, have a 41-click ratio when turned. Each of these clicks corresponds to a specific frequency or level increase in dB. The chart below indicates these settings.

	REF FOUR			
STEP	LPF(HZ)	HPF 1*(HZ)	HPF 10*(HZ)	BOOST EQ(DB)
1	46,77	39,68	359,06	0,077
2	46,79	39,69	359,17	0,077
3	46,86	39,70	359,41	0,078
4	46,99	39,71	359,67	0,080
5	47,16	39,72	361,27	0,082
6	47,24	39,88	363,57	0,087
7	47,36	40,07	365,43	0,092
8	47,47	40,21	367,63	0,097
9	47,60	40,39	371,93	0,100
10	47,78	40,71	375,58	0,110
11	47,99	41,02	381,16	0,120
12	48,89	41,56	402,63	0,150
13	50,48	42,69	422,19	0,180
14	52,34	43,76	447,67	0,200
15	54,28	45,05	473,43	0,240
16	56,43	46,25	498,83	0,260
17	60,35	47,83	524,72	0,300
18	63,07	50,19	553,58	0,340
19	67,34	53,40	582,08	0,390
20	73,80	56,32	615,17	0,440
21	81,66	59,72	649,02	0,510
22	85,29	63,44	719,61	0,590
23	89,18	67,21	766,42	0,650
24	94,53	70,85	825,14	0,750
25	100,87	74,53	895,87	0,860
26	109,84	78,97	973,38	1,100
27	125,06	86,86	1.06K	1,380
28	141,95	97,85	1.20K	1,740
29	152,94	109,16	1.40K	2,240
30	173,74	122,79	1.63K	2,910
31	206,91	142,45	1.97K	3,850
32	244,54	177,10	2.51K	5,550
33	266,65	216,26	2.84K	7,020
34	285,41	244,99	3.04K	8,130
35	306,62	303,03	3.36K	9,370
36	334,42	322,72	3.65K	10,560
37	370,44	343,37	3.93K	11,730
38	398,56	361,58	4.23K	13,290
39	409,22	377,32	4.43K	14,940
40	412,29	379,64	4.46K	15,320
41	412,72	379,78	4.47K	15,330

TROUBLESHOOTING

The protection circuits of the amplifier prevent severe damage from faulty conditions and improper use.
The protection indicator will switch on due to a short circuit connection, high/low voltage or speaker overload, causing the amplifier to turn off. Before inspecting the problem, turn all levels down and all power off, then carefully check the installation for wiring mistakes, shorts, or faulty ground.

If the amplifier shuts down due to excessive heat, the protection indicator will light up; please allow time for the unit to cool off.
Before removing your amplifier, refer to the list below and follow the suggested procedures step by step.
If you are not at ease, contact an authorized installer who can assist you.

AMPLIFIER DOESN'T TURN ON

- Measure voltage on the +12V terminal.
- Ensure that the remote terminal has min. 13.8 V DC remote connection.
- Recheck the ground (GND) connection. Inspect the in-line fuses.
- Check the protection LED is not on.

PROTECTION LED IS LIT ONCE THE AMPLIFIER IS TURNED ON

- Check shorts on speaker wires & the connected load / impedance. Check power cables & GND.
- Disconnect the speaker cables and reset the amplifier.
- High / Low voltage, operation voltage is 9 V~16 V. Voltages below / beyond this will cause the amplifier to go into protect.

FUSE BLOWING

- Measure the speaker impedance & that it is in accordance with the configuration.
- Inspect the power cable for shorts along with vehicle chassis.

OVERHEATING

- Measure the speaker impedance & that it is in accordance with the configuration.
- Check speaker shorts.
- Ensure airflow around the amplifier is sufficient & that the amplifier is not installed in areas of excessive vibration & upside down!

AUDIO OUTPUT INSUFFICIENT - DISTORTED SOUND

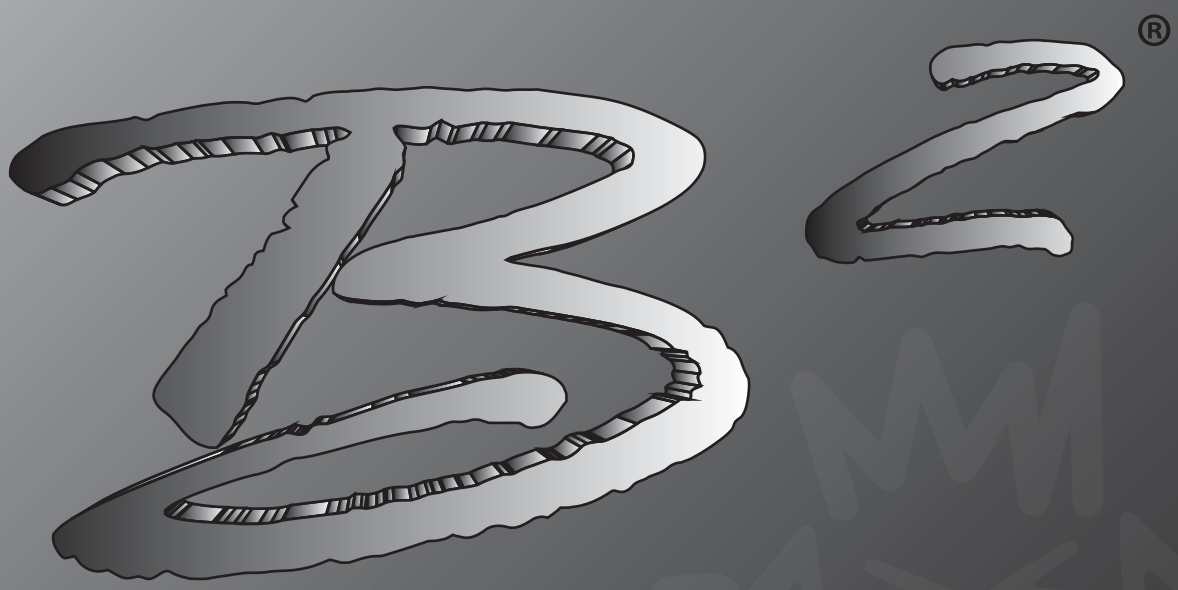
- Ensure that the gain settings on the amplifier is matched with the output level of the head unit.
- Adjust the head unit volume.
- Check speaker shorts.
- Adjust the crossover frequencies in accordance with the setup.
- If no output at all, check the RCA connections & the cable itself.

TURN ON THUMP

- Disconnect the signal input to the amplifier, then turn it on and off.
  a) If the noise is cancelled, then connect a delay turn on module on the REM wire running from the source unit to the amplifier.
  b) Use another 12V source for REM lead to the amplifier. If the noise is cancelled, use a relay to isolate the amplifier from the turn on thump.

HIGH HISS - ALTERNATOR WHINE

- Ensure that all signal transferring wires (RCA, speaker cables etc) are kept seperately / away from the power and the ground wires.
- Bypass all electrical components between the Head unit and the amplifier.
  Connect the Head unit directly to the amplifier's input. If the noise is eliminated, the unit bypassed is the one causing the noise.
- Remove the existing ground wires for all electrical components installed. Ensure that the point of ground is 100% metal which has been grinded free of rust, paint etc.
- Replace the ground cable from the OEM battery / alternator and ensure it is grounded accordingly.
- Test the battery and alternator load (can be carried out by a professional).
  Ensure that the vehichle's electrical system is in a good condition, this includes distributor, alternator, spark plugs / wires, voltage regulators etc.



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LIMITED WARRANTY INFORMATION

B2 audio offers a limited warranty under the following terms:
The product is to be free of defects in material & workmanship under normal use for a period of 1 year from the date of the original purchase, when installed by an authorized dealer. Items not installed by authorized dealers will be warrantied for 30 days from the original purchase. Original sales receips must be accompanied with all returns.The warranty applies to the original purchaser of the product & it being sold by authorized B2 audio dealers.

The warranty does **not** cover: 1. Damage caused by accident, abuse, misuse, improper operation, water / solvents & shipping.
2. Product modification, neglect, failure to follow installation instructions & misrepresentation by the seller.
3. Products used for competition purposes or are of such a charachter 4. Any product that has been opened.
5. Products that has had the serial number defaced, altered or removed.
6. The cost of shipping the product back for repair to an authorized repair centre & cost of return of non-defective items.