LINEAR POWER™
FOR THE LOVE OF MUSIC

MODEL 2121©
STEREO BI-AMPLIFIER

OWNER'S MANUAL AND INSTALLATION GUIDE

INTRODUCTION

The **2121©** is basically the **2120©** in the newer lower profile, high heat dissipation, heat sink. This heat sink is more stylish and effective and is used on all of the new **Linear Power™** amplifiers using the Motorola **TO-3** transistors. The **2121** contains essentially four separate electronic components housed in a single chassis; a **120**-watt RMS mono amplifier to drive the **Bass Vent©** subwoofer, a **120**-watt RMS stereo amplifier, and two variable phase coherent electronic crossovers. Streamlined installation, systems versatility, modular expandability, and phase coherency are some of the key features that highlight the **Model 2121©.**

Like all **Linear Power™** amplifiers, the **2121©** incorporates the **Infinitely Variable Gain Adjustment** which allows the user to match the amplifier precisely to almost any deck on the market whether the output is pre-amp or speaker level. Follow the instructions in this book under OPERATION/ADJUSTMENT for adjustment of the gain control.

The **LINEAR POWER™ Model 2121© Bi-Amplifier** employs a sophisticated design combining reliability, high power, low distortion, and freedom from external noise. When properly installed, it will give long and faithful service. When combined with other high quality components, it will be the heart of a superb system.

WE STRONGLY RECOMMEND THAT THE INSTALLATION BE DONE BY A PROFESSIONAL AUTOSOUND INSTALLER.

TECHNICAL DESCRIPTION

POWER SUPPLY: Self oscillating for reliability and efficiency. The transformer is epoxy dipped for extreme vibration resistance.

OUTPUT STAGES: Transformer less, direct coupled and fully complimentary. Output transistors are high current and low distortion **TO-3 Devices** in the **2121, o**perating at a fraction of their limitations. Total power dissipation potential of the output transistors is over 500 watts.

PROTECTION: Our stable amplifier design is made virtually indestructible by two separate forms of protection. First is an all-new Thermal Protection Circuit, which is designed to prevent damage from high frequency oscillations or excessive ambient temperature. The second form of protection protects the amplifier from short circuits in the installation. Both circuits are automatically resetting.

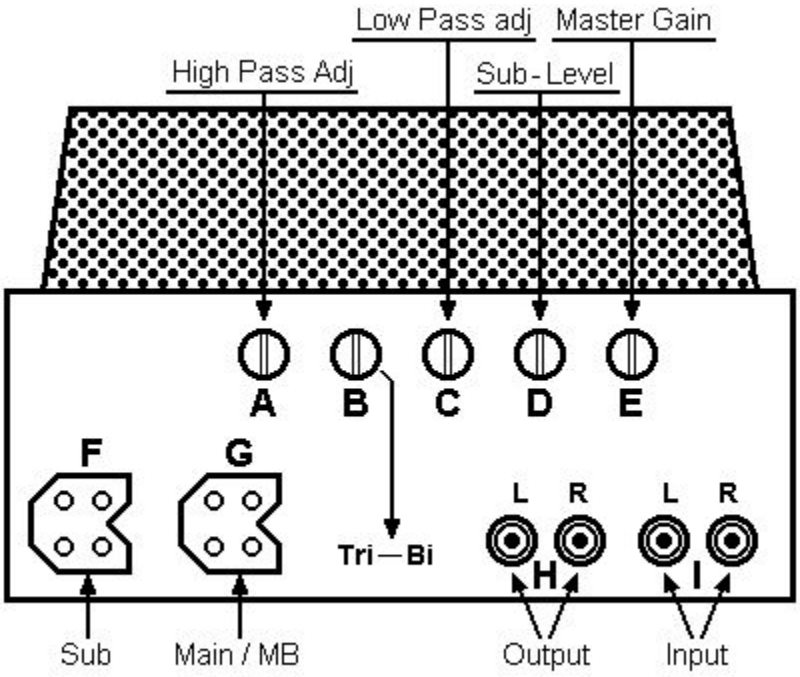
CONSTRUCTION FEATURES: The infinitely variable input sensitivity control permits optimal signal matching for lowest noise and lowest distortion with virtually any source. All components used are rated for at least 150% of their intended use, and are mounted on double-sided fiberglass epoxy circuit boards.

QUALITY CONTROL: In-house construction of critical components like transformers and chassis pieces, as well as total assembly, allows **LINEAR POWER™** to maintain uniform quality. 100% of the finished units are tested, then burned in for four hours, and tested again. Amplifiers, which pass these rigorous controls, have truly earned the **LINEAR POWER™** Logo.

INSTRUCTIONS

Read the following instructions through completely. If they appear too complicated we recommend you have an authorized **Linear Power™ D**ealer do the work. Refer to the diagram on the next page to assist you in following the wiring instructions associated with it.

FEATURE/DESCRIPTION



2120 control panel - feature / description

A. The High Pass Filter

This filter is screwdriver adjustable with a continuously variable range from 300Hz to 1.7Hz. In the fully counter-clockwise position, the stereo main amplifier is rolled off at 300Hz. This filter may only be activated when switch **"B"** is moved in the direction of the filter or **"TRI"** position. When this filter is operational the 120-watt stereo amp becomes essentially a band pass amplifier. A low level signal from phono plug set **"H"** provides output above the selected crossover point of the high pass filter so that a second amplifier may be added to complete the tri-amplified sound system.

B. The Operational Mode Activating Switch

The switch determines whether the **2121©** will operate as a bi-amplifier or a modular tri-amp. Move this switch with a small screwdriver in the direction of the filter you wish to activate. To the right, or "Bi" position, only the low pass filter (C) is functional. To the left, both filters become operational.

C. The Low Pass Filter

Screw driver adjustable with a continuously variable range between 45 to 200 Hz. Fully counter-clockwise is 45Hz. With the **2121©** operating in the bi-amp mode, low-level output is provided from plug set 'H' above the selected crossover point of the low pass filter to beyond 20KHz. This feature allows any smaller **Linear Power™** amplifier to power 'front fill' drivers in the automobile. With this

type of application, the 'font fill' amplifier and speakers see no low bass material. Cone distortion is drastically reduced, while efficiency is vastly increased.

D. Subwoofer Amplifier Gain
This control provides gain to the 120-watt mono subwoofer amplifier. Accentuation or attenuation of +-12dB is possible with this control. The purpose of this control is to adjust the output of the subwoofer system relative to the efficiency of the main speaker system.

E. Master Gain Control
This control is found on all **Linear Power™** amplifiers. The master-gain control matches the output of any deck to the input of the **2121©**. Fully counter-clockwise if minimum gain. Proper adjustment procedure is found under OPERATION/ADJUSTMENT.

F. 120 Watt Mono Subwoofer Output
To the **Bass Vent©** or any other dual speaker subwoofer system, Grey= right (+), Green= left (+), Black is ground. The mono output amplifier is **internally paralleled** to see a two-ohm load when **used with two, four-ohm drivers**. This is done for higher current capability, and superior woofer control. For single subwoofer use, connect both the green and gray wires to the speaker (+) and both black wires to speaker (-). The ideal configuration is two, 4-ohm woofers. When connected to a single four-ohm woofer full power will not be developed.

G.120 Watt Stereo Output
Grey = right (+), Green = left (+), Black = ground.

H. Low level Outputs
In bi-amp or tri-amp operation low level output (at unity gain) is always provided. In the bi-amp mode output from the selected subwoofer crossover point to beyond 20KHz is provided to the output plugs. In the tri-amp mode, output is provided above the selected crossover point of the high pass filter to beyond 20KHz.

I. Input Signal from Source Unit

MOUNTING

1. The amplifier will work best if it is kept as cool as possible. Mount in a position that allows air to flow freely through the black fins. Be sure there is ample space above the amplifier. The amplifier should not be mounted upside down. Avoid mounting the amplifier in the dash or on the firewall to avoid noises being radiated directly into the case.

2. Mount your amplifier in a position that allows ample room for gain adjustments, and the installation, removal, and attachment of all leads.

3. The case of your amplifier is designed to act as a noise shield. To maintain this protection, be sure the metal case of the amp does not touch the metal of the car. Do not remove or damage the rubber grommets, which provide electrical insulation and vibration isolation.

WIRING

1. **Fuse:** A fuse of the proper size must be installed in line with the main power in order to prevent possible damage to the vehicles wiring. It should be connected to the battery positive terminal or as close to the battery as possible. Use the fuse holder and fuse provided and replace only with the same size and type of fuse. Use **AGC 30**. **WARNING**: OVERFUSING WILL DAMAGE THE AMPLIFIER.

2. **Main Power:** The free end of the fuse holder wire should be connected to the large RED wire from the amplifier. IMPORTANT: Solder all connections!

3. **Main Ground:** Connect the large BLACK wire directly to the battery negative terminal.

4. **Remote Turn on:** The RED and WHITE wire is not a main power source for the amplifier, but acts as an electrical switch to turn the amplifier on and off. It should be connected to the power antenna lead from the radio. Where no power lead exists, a source of **+12 volts** connected through a toggle switch will do. DO NOT CONNECT DIRECTLY TO A SOURCE THAT WILL LEAVE THE AMPLIFIER PERMANENTLY ON, AS THIS WILL DRAIN THE BATTERY.

5. **Signal Input:** The RCA (Phono) Jack inputs will accommodate either high or low level signals, ranging from 180mV to 5 volts. For use with a high level source that is intended to drive speakers directly, attach the speaker leads to male RCA plugs and insert into the inputs. NOTE: The positive speaker lead should always connect to the center pin of the RCA plug.

6. **Speaker Outputs**
(a). The speaker fanout connector on the left, marked 'sub', is a 120-watt mono output.

Connect the GREY wire to the RIGHT speaker (+) terminal.
Connect the GREEN wire to the LEFT speaker (+) terminal.
Connect one of the BLACK wires to the RIGHT speaker (-) terminal.
Connect the other BLACK wire to the LEFT speaker (-) terminal.

(b). The speaker fanout connector on the right, marked 'main/mid-bass', is the stereo output.

Connect the GREY wire to the RIGHT speaker (+) terminal.
Connect the GREEN wire to the LEFT speaker (+) terminal.
Connect one of the BLACK wires to the RIGHT speaker (-) terminal.
Connect the other BLACK wire to the LEFT speaker (-) terminal.

OPERATION/ADJUSTMENT

DO NOT apply power to the system until the installation is complete, and the following steps 1 and 2 have been performed.

1. Be certain that all gain controls on each component have been turned down.

2. Set all crossovers a point well within the defined frequency parameters of the drivers. The speaker manufacturer will supply frequency response data with their driver.

3. Apply power to the system. The Amp(s) will turn on after a slight delay. To properly adjust the master-gain control of the **2120©** we suggest the following technique: Slowly turn the volume up on your source unit until you hear it just start to distort, and then back it down just below that point. That is a loud as you should ever play it for quality sound. Now, slowly increase the master gain on the 2120 until either the speakers distort from excess power, or, the amp distorts from input overload. At either point, slightly decrease the gain control on the amp and a perfect input/output match has been achieved. **After** the master gain has been properly adjusted, use the same procedure to adjust the sub-level control. Some source units with extremely low output levels will require a **LINEAR POWER™ PA2©** to boost the output to the necessary proper level.

NOTE: IT IS VERY IMPORTANT THAT THE GAIN CONTROL BE TURNED AS FAR DOWN AS POSSIBLE IN ORDER THAT UNWANTED ENGINE NOISE BE KEPT TO A MINIMUM.

SYSTEM FINE TUNING

Now that the gain controls have been properly set, the system is ready to be "fine tuned". Always tune a multi-amp/driver system from the bass up. In a bi-amp system, the subwoofer crossover should be varied until the smoothest low frequency response has been obtained. Tri-amping is a more sophisticated process of sound reproduction and hence requires more time to properly design and fine tune. Keep in mind that a poorly designed tri-amplified sound system may yield lower sound quality than a well executed bi-amped system.

NOISE NOTES

Unwanted noise is the worst single problem encountered in automotive amplifier installations. Several basics must be kept in mind when preventing noise problems.

1. Use shielded cables whenever a preamp level music source is used.
2. All connections must be tight and free from corrosion, paint, etc., and insulated.
3. Route all signal cables away from existing wiring in the vehicle.
4. If possible, avoid mounting the amplifier in the dash or on the firewall, as noise may be induced due to the proximity of noisy wiring and switches.

GENERAL TROUBLESHOOTING

NO SOUND

Check all connections. Check main power fuse. Check accessory fuse. With a trouble light or meter, be sure +12V is present at the amplifier on the large positive cable and on the small red/white turn-on wire. Check for a good ground connection. Check by substitution or other method for proper operation of music source.

BLOWS FUSES

Check all connections to be sure all power wires and speaker wires do not touch ground or each other. Re-check polarity of main power wires.

SHUTS OFF

As this amplifier is equipped with a thermal and a short circuit shut-down system, in the unlikely event of excessive temperatures due to high ambient temperature or improper speaker impedance, the amp will turn itself off. To avoid damage to the speakers, turn the volume to a minimum while waiting for the amp to turn itself back on.

SERVICE OR REPAIR

To obtain modification, service or repair, please contact our **ONLY Authorized LINEAR POWER™ Product Service Center**:

T.I.P.S. INC.
3455 Lanell lane, Pearl, MS 39208
(601) 932-8477
E-mail: ray@tipsinc.net

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SPECIFICATIONS

2121©

Main Amplifier:	60 Watts per channel minimum continuous average power into four ohms. Both channels driven from 300Hz to 20KHz with no more than 0.10% total harmonic distortion.
Subwoofer Amplifier:	120 watts minimum continuous average power output into two ohms, mono from 20Hz to 200Hz with no more than 0.10% total harmonic distortion.
Inter-modulation Distortion:	0.1%
Frequency Response:	-3dB from 12 to 150,000 Hertz
Signal to Noise Ratio:	95dB or greater (A-Weight)
Slew Rate:	16 volts per microsecond
Crossover Phase Shift:	+/- 2.8 degrees maximum
Current Draw:	1.2 amperes at idle. 24 amperes at maximum RMS test conditions.
Input Signal for Maximum Power:	0.2 volts at maximum gain setting. 5 volts at minimum gain setting.
Dynamic Headroom:	2dB
Damping Factor:	100 high freq./75 low freq.
Dimensions:	3”x9.5”x12”

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