



Summit Audio Inc.®

# Summit Audio Model 2BA-221 Microphone Preamp and Line Module

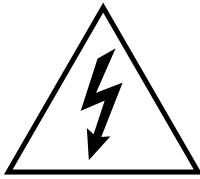


## Operation Manual

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# Introduction



**DANGER!**  
**HIGH VOLTAGE**

**IMPORTANT:** Check the bottom sticker to make sure the 2BA-221 is manufactured for the voltage used in your country. This is done at the factory **ONLY**.

Introducing the 2BA-221 continuously variable impedance microphone preamp from Summit Audio. Featuring microphone level, line level, and Hi-Z instrument inputs, the 2BA-221 utilizes separate and individually controlled solid state inputs to mix the microphone input with the Hi-Z or line input into the variable vacuum tube stage. Mix the signals through the 12AX7A/ECC83 vacuum tube output or output them separately through multiple solid state outputs. The 2BA-221 also features a stackable input design; multiple 2BA-221's can be linked together to form a modular mixing device with individual outs, inserts per channel, and a final vacuum tube gain stage. Its swept high pass filter, multiple simultaneous tube and solid state outputs, insert jack, and internal power supply makes the 2BA-221 a powerful tracking and mixing tool.

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## *Features*

- Variable microphone impedance
- High quality mic preamp with polarity, pad and level control
- Channel insert
- Highpass filter
- 1 balanced input, 1 mic input, 1 instrument input
- Balanced outputs
- Hand Crafted in the U.S.A.

Carefully unpack the 2BA-221 and its power cord. Save the carton and packing material for possible future use. Before powering up the unit, read this manual and observe the cautions for **HIGH VOLTAGE**.

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### *Important Warranty Information*

For your 3 year warranty, register your 2BA-221 on line today at **[www.summitaudio.com](http://www.summitaudio.com)**.

# Front Panel



## Hi Z Input (Solid State)

This input can be used to mix in a musical instrument or other high impedance signal.

## Line/Hi Z Input Gain Control

This control simultaneously adjusts the solid state gain of the front panel Hi-Z input and the rear panel line input. Use more of this control for a cleaner, less vacuum tube sound. Adjust this control along with the Tube Output gain to get the proper output level and to get the desired sound.

## Signal LEDs

- **Green** - -Signal is present at the input.
- **Amber** - Proper input signal level.
- **Red** - - -Signal is at the threshold of Clipping.

Set the input gain controls so that the red LED only lights occasionally. The green and amber LEDs should be on most of the time.

## Tube Output Gain Control

This control varies the tube output gain, including the XLR and balanced TRS outputs. Turn this dial up for more vacuum tube sound and to get more gain. Both the Line/Hi Z input and the Mic Preamp gain controls feed this control. For the most vacuum tube sound, turn this dial up to 2 or 3 o'clock and adjust the solid state input gain (Line/Hi Z or Mic) for the proper signal level. This control has no affect on the stacking output.

## Mic Preamp Gain Control

This control adjusts the gain of the solid state microphone input. Use more of this control for a cleaner, less vacuum tube sound. Adjust this control along with the Tube Output gain to get the proper output level and to get the desired sound.

## Mic Preamp Loading Control

This knob controls the loading or impedance for the microphone input. The input can be set from 100 ohms to 10K ohms. You can set this control to match the 2BA-221 to the impedance of your microphone or as a "tone" control. Try sweeping the impedance control to hear the different sounds available from a single microphone.

Check the manual for your microphone to find the output impedance or check the charts on page 18 which shows the output impedances for many commonly used microphones. The loading impedance should be about four times the microphones output impedance. Check the users manual of your microphone for more information.

If you are in doubt on how to set the Mic Loading control, set it fully clockwise to the 10K $\Omega$  position.

## Pad Switch

This switch engages or disengages a  $-20\text{dB}$  pad to set the input sensitivity of the microphone input. If enough gain is available with your microphone, use with the pad set to  $-20$  for quieter operation.

## Polarity Switch

This switch inverts the polarity of the microphone input in order to compensate for out of phase equipment or wiring.

## +48V Phantom Power Switch

This switch enables +48 volt phantom power to the microphone input. Phantom power is present whenever the blue LED is illuminated. Turn the unit off to bleed off the voltage.

**Warning:** Some microphones cannot tolerate phantom power and may be damaged. Check the microphone's specifications and requirements before using phantom power.

## Highpass Filter Frequency Control

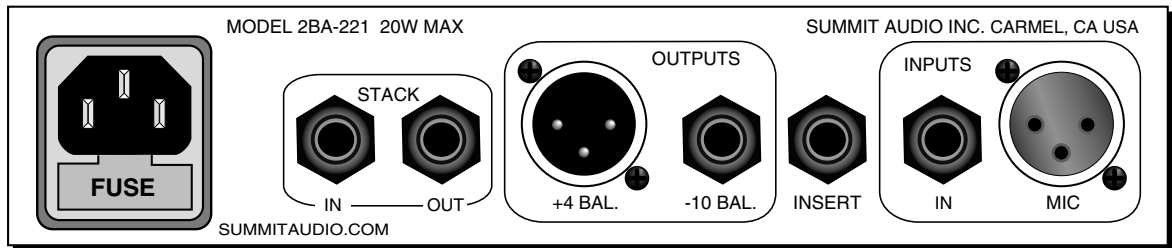
This control adjusts the frequency of the highpass filter from 20Hz to 200Hz. The highpass filter is used to remove low frequency rumble from the mic input.

### **Important - Please Read!**

The 2BA-221 contains a vacuum tube which generates heat.

Do not block the cooling holes on the top of the 2BA-221 and always allow adequate ventilation when mounting the unit in a rack enclosure.

# Rear Panel



## A.C. Receptacle

The 2BA-221 is factory wired for either 100, 115 or 230 Volts AC. Before connecting AC power make sure the 2BA-221 is wired for the voltage used in your country.

## +4 Balanced Output

This is a balanced, low impedance XLR output connection compatible with professional recording and audio equipment.

**Note:** You can use all inputs and outputs at the same time for versatility.

## 1/4" TRS Balanced Line Level Output

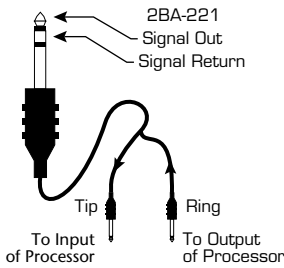
This is a -10dB, balanced 1/4" output designed to interface with your recording device, compressor or EQ.

## XLR Mic Level Input

This is a balanced low level input designed for microphones. The gain of this channel is adjusted using the front panel Mic Gain control and the -20 dB Pad switch.

## 1/4" Line Level Input

This is a 10K Ohm impedance, balanced line level input controlled by the front panel Line/Hi-Z Input Gain control.



**INSERT CABLE**

Signal is sent out on tip of plug and returned via ring of plug.

*When using the insert jack, a cable wired like the one shown above should be used.*

**Insert**

The insert jack allows you to insert a processing device, such as a compressor, after the highpass filter and before the vacuum tube stage. This jack can also be used as another input or output. Refer to the block diagram on page 14.

**Stacking Output**

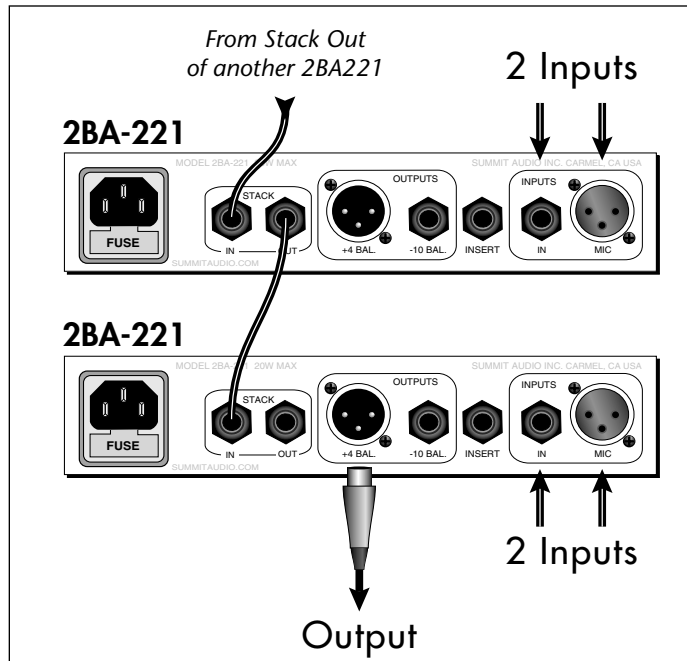
This is an unbalanced high level output taken just before the vacuum tube input and insert. Connect the Stacking Output to the Stacking Input of another 2BA-221 to add additional input channels. See the diagram below. This jack can also be used as an additional output (*phase inverted from input*).

**Stacking Input**

This is an unbalanced high level input which sums into the 2BA-221 just before the tube output stage and insert jack.

*The diagram at right shows one way to connect two 2BA-221 units to create a 4-input summing device.*

*The Hi-Z input on the front panel could be used instead of the rear panel line-in jack if desired.*





# Basic Operation

## Just Plug-in & Go

1. Plug your favorite microphone into the rear panel **Mic Input** jack, plug your instrument into the front panel **Hi-Z Input**, or your line level device such as a CD player into the rear panel **Line Input** jack.
2. Connect either the rear panel **XLR** or **1/4" Output** to the input of your mixer or recorder. *(Both outputs are balanced.)*
3. Adjust the **Mic** and **Line/Hi Z Level Gain** control so that the amber LED is lit most of the time and the red LED only lights occasionally.
4. Adjust the **Tube Output Level** for an optimal signal level.
5. Adjust the front panel **Mic Impedance** control to match your microphone. *If in doubt, set the control for 10K ohms.*
6. That's it!

**Important:** For proper operation of the 2BA-221 (or any vacuum tube device for that matter), allow the unit to warm up with power on for 15 minutes before use.

**Important:** Do not block the cooling holes and allow adequate ventilation.

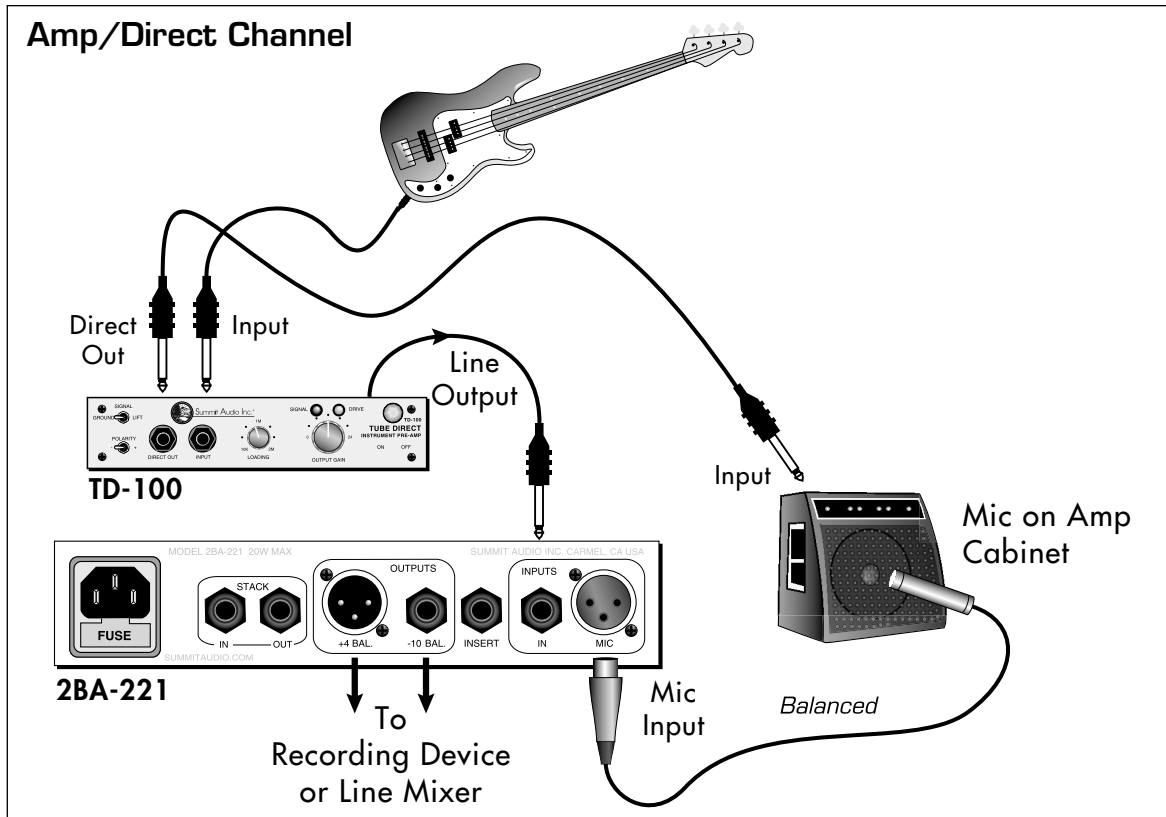
## Tips

- Use the Line/Hi Z gain control for solid state sound. Turn up the tube gain for more tube sound.
- Turn the tube output gain fully counter clockwise for full solid state output.
- Turn the solid state gain control fully counter-clockwise, then turn up the tube output to about 2 o' clock. Turn up the solid state gain control to overdrive the tube.
- If you want more distortion but the gain is too high for your recording device, try using the -10dB balanced output.

# Applications

## *Amp & Direct Sound*

The 2BA-221 in conjunction with the Summit TD-100 provides you with a direct box and a mic preamp. This setup allows you to mix the sound of your guitar or bass amp with the direct sound of your instrument and sounds fantastic in both live or recording situations.

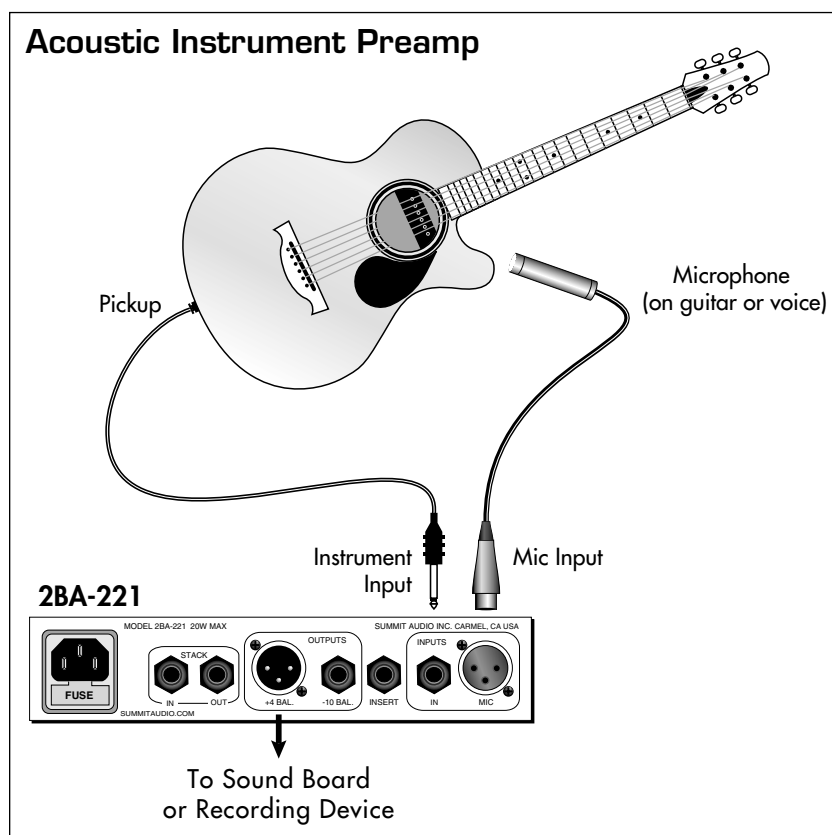


## Using the 2BA-221 as an Acoustic Instrument Preamp

Acoustic guitars and other instruments are often bi-amplified because of the superior sound reproduction obtained from using two transducers. The 2BA-221 is perfect for the job.

Connect the pickup output of your acoustic instrument to the High Z input and connect a high-quality microphone to the Mic input. Adjust the input gain controls for the best tonal balance between the microphone and pickup.

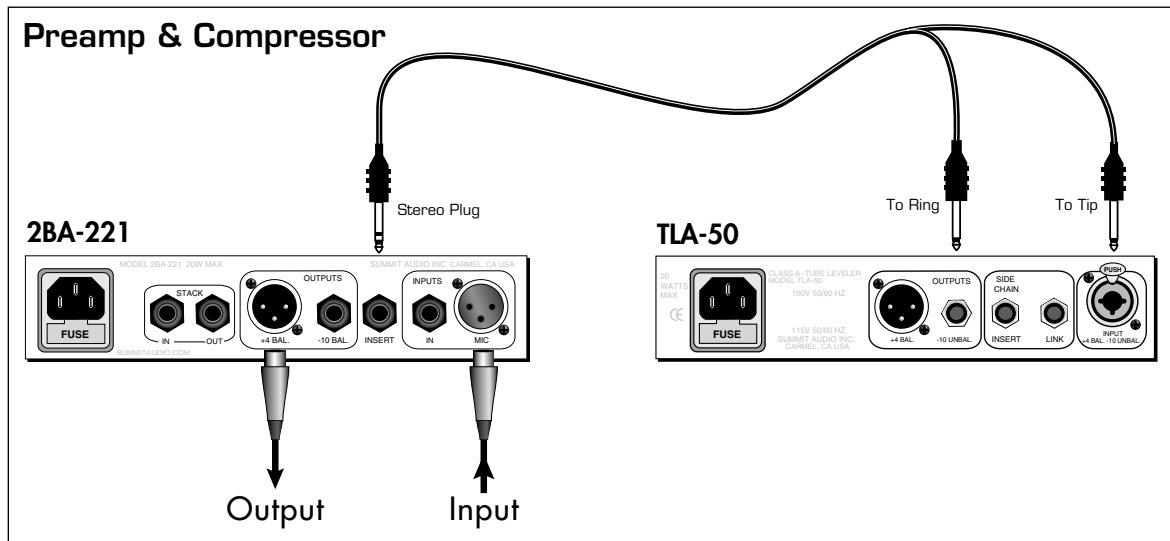
**Tip:** You could also use the microphone for vocals and the instrument input for the guitar using this same setup.



## Using the 2BA-221 with the Summit TLA-50 Leveling Amplifier

For a really sweet microphone channel, try using the Summit Audio 2BA-221 Mic and Line module in conjunction with the Summit TLA-50 Leveling Amplifier.

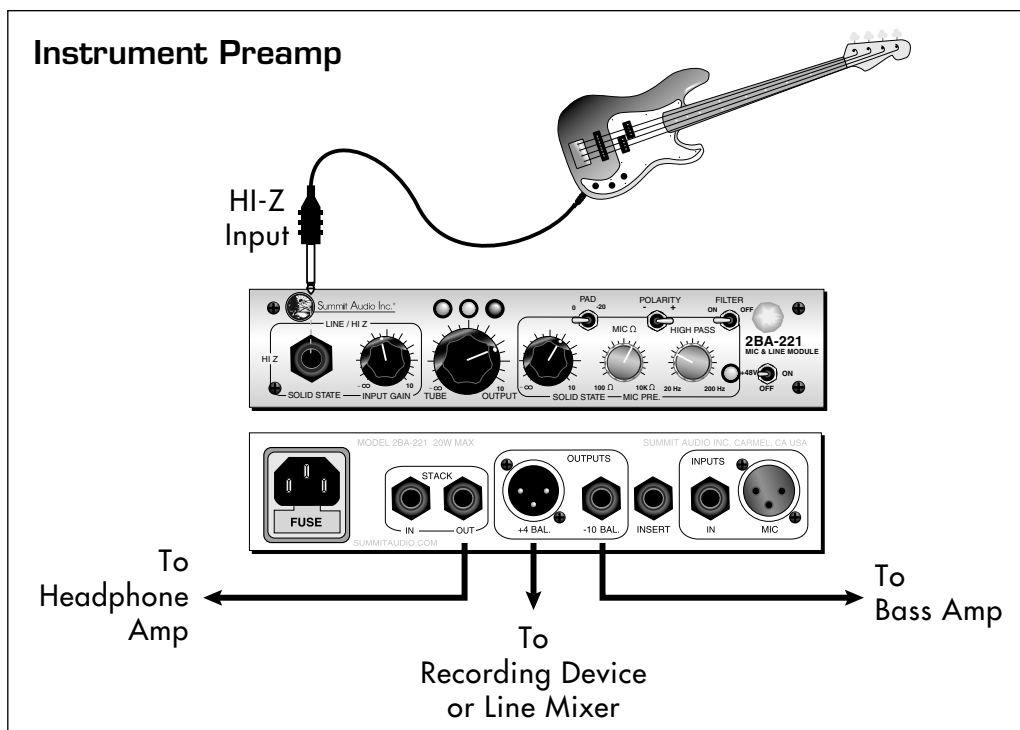
To make this connection, you'll need an insert cable with a stereo 1/4" phone plug such as the one described on page 8. Connect the two units with the insert cable as shown below. Adjust the input level on the 2BA-221 to get a proper signal level into the TLA-50. The tube output gain control on the 2BA-221 functions as a "gain makeup" control.



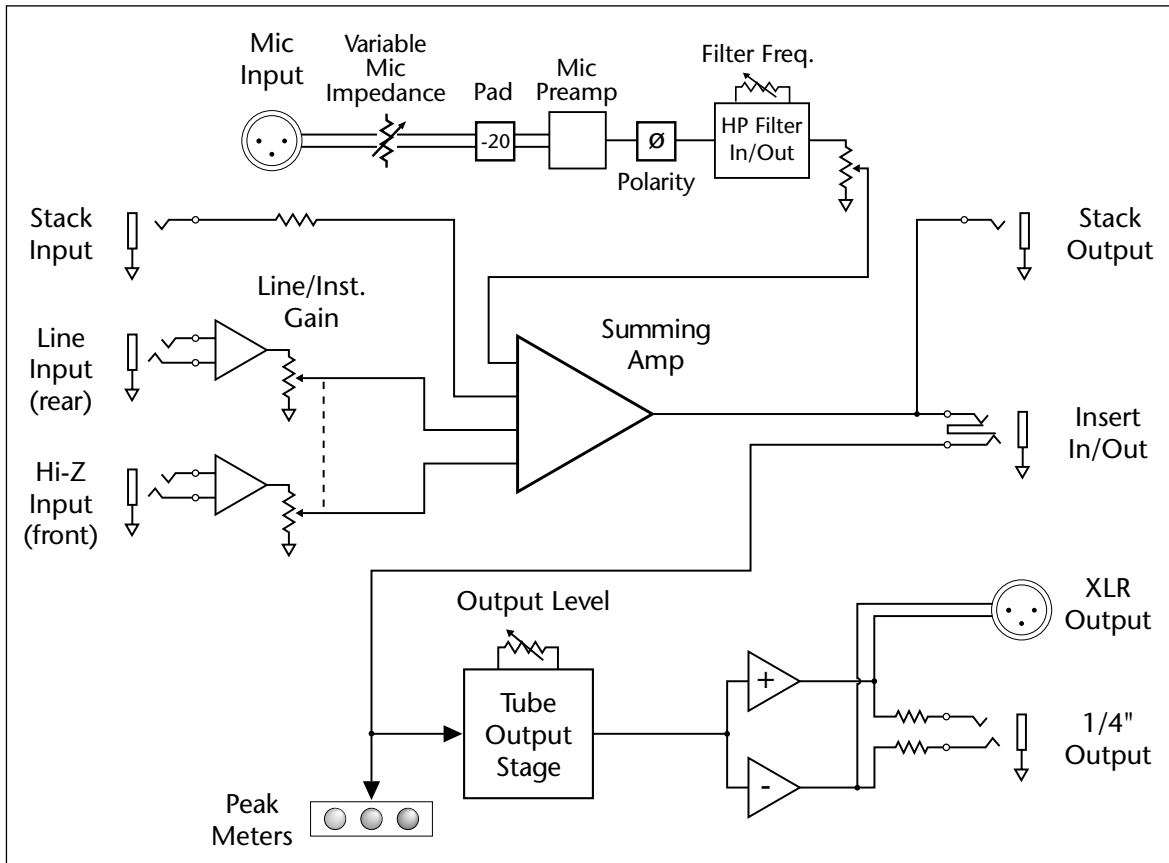
## Using the 2BA-221 as an Instrument Preamp

The 2BA-221 makes a great instrument preamp for guitars, basses, keyboards or whatever. In addition to the +4 Main Balanced Output, the Stacking Output and the -10 Main Output can be used to send the signal to the board, your amp or a headphone monitor amp.

Turn up the Tube Output control for more tube sound, use the Solid State input gain for a cleaner sound. To distort the 2BA-221, turn the Tube Output up to 2-3 o'clock and adjust the solid state Hi-Z input gain to get a good level. Adjust the solid state and tube output controls to get the desired amount of distortion. Use the -10dB balanced output if the XLR output has too much gain.



# Block Diagram



The Impedance control of the 2BA-221 sets the input impedance of the microphone input. The Pad reduces the input level by -20 dB. The microphone input is next amplified by the solid-state preamp before being summed together with the Hi-Z input, line level input and the stacking input. The polarity switch can invert the signal if desired.

The summing amplifier drives the Stack Output, which is designed to feed the Stack Input of another 2BA-221. This signal is also sent to the Insert jack output, which can be used to insert another device, such as a compressor before the tube stage.

The highpass filter has a variable cutoff frequency (20Hz -200Hz). This control is designed to remove low frequency rumble caused by stage vibration and other factors which may be picked up by the microphone.

The 2BA-221 features a vacuum tube amplifier driving an electronically balanced output stage. The balanced output drivers provide a low output impedance for driving cables and 600Ω loads. Both XLR and 1/4" outputs are provided.

# Electrical Connections

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## *Input*

### Balanced 3-pin XLR

Pin 1    Ground  
Pin 2    (+) Signal  
Pin 3    (-) Signal

### Balanced 1/4" jack

Sleeve - - Ground  
Tip - - - - (+) Signal  
Ring - - - - (-) Signal

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## *Output*

### Balanced 1/4" jack

Sleeve - - Ground  
Tip - - - - (+) Signal  
Ring - - - - (-) Signal

### Balanced 3-pin XLR

Pin 1 - - Ground  
Pin 2 - - (+) Signal  
Pin 3 - - (-) Signal



# Specifications

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## *Circuit Topology*

High-voltage Class A

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## *Power*

Internal AC Supply

20 watts

115 volts

50 or 60 Hz

Fuse size is .5 amp, slo-blo for 100/115 V

Fuse size is .25 amp, slo-blo at 230 V

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## *Dimensions*

**W:** 8.5", **H:** 1.75", **D:** 8.5"

*(Two units fit side by side on a standard one-space rack shelf.)*

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## *Weight*

7 pounds (3.15 kg)

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## *Audio Specs*

For current audio specifications please contact Summit Audio at [www.summitaudio.com](http://www.summitaudio.com).

# Microphone Impedance Chart

Loading Impedance should be approximately four times the microphone output impedance listed below. Check the users manual on the respective microphone for exact figures. Brands and model numbers listed below are all copyright of their respective owners. This list is for reference only.

## Microphone Impedance Chart

| Brand                 | Model      | Ω   | Brand          | Model   | Ω       | Brand          | Model       | Ω       |
|-----------------------|------------|-----|----------------|---------|---------|----------------|-------------|---------|
| <b>AKG</b>            | Solid Tube | 200 | Audio-Technica | AT3032  | 250     | Audio-Technica | PRO1        | 8K      |
| AKG                   | C1000      | 200 | Audio-Technica | AT3035  | 250     | Audio-Technica | PRO2        | 8K      |
| AKG                   | C5900      | 200 | Audio-Technica | AT4033  | 100     | Audio-Technica | PRO3        | 500     |
| AKG                   | C535       | 200 | Audio-Technica | AT4040  | 100     | Audio-Technica | PRO4        | 250     |
| AKG                   | C4500      | 200 | Audio-Technica | AT4041  | 100     | Audio-Technica | PRO5        | 250     |
| AKG                   | C2000      | 200 | Audio-Technica | AT4047  | 250     | Audio-Technica | PRO10HE     | 600     |
| AKG                   | C3000      | 200 | Audio-Technica | AT4050  | 100     | Audio-Technica | ATM27HE     | 200     |
| AKG                   | C4000      | 200 | Audio-Technica | AT4051  | 100     | Audio-Technica | ATM29HE     | 200     |
| AKG                   | 414ULS     | 180 | Audio-Technica | AT4060  | 200     | Audio-Technica | ATM31a      | 200-270 |
| AKG                   | 414TLII    | 180 | Audio-Technica | AE3300  | 150     | Audio-Technica | ATM33a      | 200-270 |
| AKG                   | D40        | 500 | Audio-Technica | AE4100  | 250     | Audio-Technica | ATM41a      | 250     |
| AKG                   | D50        | 500 | Audio-Technica | AE5400  | 150     | Audio-Technica | ATM61       | 600     |
| AKG                   | D60        | 500 | Audio-Technica | AE6100  | 250     | Audio-Technica | ATM63       | 600     |
| AKG                   | D660       | 500 | Audio-Technica | AT804   | 600     | Audio-Technica | ATM89       | 100     |
| AKG                   | D770       | 600 | Audio-Technica | AT813   | 200-270 | Audio-Technica | ATR10BL     | 500     |
| AKG                   | D880       | 600 | Audio-Technica | AT873   | 100     | <b>Audix</b>   | OM-2        | 250     |
| AKG                   | D3700      | 600 | Audio-Technica | ATM10a  | 200-270 | Audix          | VX-10       | 250     |
| AKG                   | D3800      | 600 | Audio-Technica | ATR10RD | 500     | Audix          | CD-11       | 600     |
| AKG                   | D112       | 210 | Audio-Technica | ATR20   | 500     | Audix          | CD-11H      | 50K     |
| AKG                   | D440       | 600 | Audio-Technica | ATR30   | 500     | Audix          | CD-21       | 250     |
| AKG                   | D550       | 600 | Audio-Technica | ATR50   | 500     | Audix          | F-50        | 250     |
| AKG                   | C418       | 200 | Audio-Technica | ES973   | 250     | Audix          | SCX1        | 600     |
| AKG                   | C419       | 200 | Audio-Technica | MB1000  | 500     | Audix          | SCX25       | 200     |
| AKG                   | C12        | 200 | Audio-Technica | MB1000  | 500     | <b>Blue</b>    | Dragonfly   | 50      |
| AKG                   | C426       | 200 | Audio-Technica | MB3000  | 250     | Blue           | Bottle      | 200     |
| <b>Audio-Technica</b> | AT3031     | 250 | Audio-Technica | MB4000  | 250     | Blue           | Baby Bottle | 50      |

## Microphone Impedance Chart

| Brand               | Model     | $\Omega$ | Brand             | Model      | $\Omega$ | Brand                 | Model    | $\Omega$ |
|---------------------|-----------|----------|-------------------|------------|----------|-----------------------|----------|----------|
| Blue                | Blueberry | 150      | N/DYM             | N/D767     | 300      | Evolution             | E609     | 350      |
| Blue                | Mouse     | 150      | N/DYM             | N/D468     | 150      | Evolution             | E825     | 350      |
| Blue                | Cactus    | 150      | N/DYM             | N/D478     | 300      | Evolution             | E835     | 350      |
| Blue                | Kiwi      | 50       | N/DYM             | N/D868     | 150      | Evolution             | E845     | 350      |
| <b>Beyerdynamic</b> | MC740     | 150      | RE                | RE27ND     | 150      | Evolution             | E855     | 350      |
| Beyerdynamic        | MC834     | 180      | RE                | RE510      | 150      | Evolution             | E865     | 200      |
| Beyerdynamic        | MCE90     | 190      | RE                | RE16       | 150      | <b>Shure</b>          | SM57     | 150      |
| Beyerdynamic        | MCE91     | 190      | RE                | RE20       | 150      | Shure                 | SM58     | 150      |
| Beyerdynamic        | MCE93     | 190      | RE                | RE200      | 200      | Shure                 | Beta 58A | 150      |
| Beyerdynamic        | MCE94     | 190      | RE                | RE1000     | 200      | Shure                 | KSM27    | 150      |
| Beyerdynamic        | Opus8 1   | 190      | <b>Neumann</b>    | M147       | 50       | Shure                 | KSM32    | 150      |
| <b>DPA</b>          | 4003      | 75       | Neumann           | M149       | 50       | Shure                 | KSM44    | 150      |
| DPA                 | 4004      | 75       | Neumann           | TLM103     | 50       | Shure Beta            | B52      | 150      |
| DPA                 | 4006      | 75       | Neumann           | U47        |          | Shure Beta            | B56      | 150      |
| DPA                 | 4007      | 75       | Neumann           | U87        | 200      | Shure Beta            | 57A      | 150      |
| DPA                 | 4011      | 220      | Neumann           | U89        | 150      | Shure Beta            | 58A      | 150      |
| DPA                 | 4012      | 75       | Neumann           | KMS105     | 20       | Shure Beta            | 87A      | 150      |
| DPA                 | 4015      | 220      | Neumann           | KM183      | 20       | <b>Stedman</b>        | C15      | 250      |
| DPA                 | 4016      | 220      | Neumann           | KM184      | 20       | Stedman               | N90      | 250      |
| DPA                 | 4041SP    | 200      | Neumann           | TLM170     | 20       | Stedman               | SC3      | 250      |
| <b>Earthworks</b>   | M30       | 600      | Neumann           | TLM193     | 20       | Stedman               | TR1      | 150      |
| Earthworks          | M550      | 600      | <b>Röde</b>       | NT1        | 40       | Stedman               | LD23     | 150      |
| Earthworks          | QTC1      | 600      | Röde              | NT1000     | 100      | Stedman               | LD50     | 150      |
| Earthworks          | SR68      | 600      | Röde              | NT2        | 40       | Stedman               | 1100B    | 150      |
| Earthworks          | SR69      | 600      | Röde              | NT3        | 200      | <b>Studio Project</b> | C3       | 200      |
| Earthworks          | SR77      | 600      | Röde              | NT4        | 200      | Studio Project        | T3       | 200      |
| Earthworks          | SR78      | 600      | Röde              | NTK        | 200      | Studio Project        | B1       | 200      |
| Earthworks          | SRO       | 600      | Röde              | Classic II | 200      | Studio Project        | B3       | 200      |
| Earthworks          | TC30K     | 600      | <b>Royer</b>      | R121       | 300      | Studio Project        | C1       | 200      |
| <b>Electrovoice</b> |           |          | Royer             | R122       | 300      | Studio Project        | TB1      | 250      |
| Cobalt              | Co4       | 600      | Royer             | SF12       | 300      |                       |          |          |
| Cobalt              | Co5       | 600      | Royer             | SF1        | 300      |                       |          |          |
| Cobalt              | Co7       | 600      | <b>Sennheiser</b> | MD421      | 200      |                       |          |          |
| Cobalt              | Co9       | 600      | Evolution         | E602       | 250      |                       |          |          |
| Cobalt              | Co11      | 250      | Evolution         | E602       | 350      |                       |          |          |
| N/DYM               | N/D167    | 600      | Evolution         | E604       | 250      |                       |          |          |
| N/DYM               | N/D267    | 300      | Evolution         | E608       | 350      |                       |          |          |



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Please register on-line today at [www.summitaudio.com](http://www.summitaudio.com).  
Thanks.

*2BA-221 Op Rev. A*