

w) wunder audio
Wunderbar



Operations Manual

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Introduction

The Fully Discrete Class-A Wunderbar will bring you years of the most enjoyable trouble free recording and mixing experiences. The blend of transformer sounds and bus flavors is infinite and it will be hard making anything not sound huge.

The Console utilizes the PEQ2 Channel Amplifier delivering from 12 to 60 channels. A "Fully Balanced Busing Scheme" is the heart of the Wunderbar, buffering the ground out of the equation. This results in significant increase in dynamic range while lowering noise substantially. There are transformer balanced direct outputs and inserts on all channels. The Stereo Bus champions The Wunderbahn and has three Stereo Amplifier choices: Wunder, 1272, and the 312.

The Wunderbar's circuitry is shielded by Mu-metal, Aluminum, steel and includes an external AC-DC power supply to reduce interference, to make it virtually immune to Wi-Fi, EMI and RFI interference. This is very import in todays cell phone environment.

The PEQ2 is a fully Class-A discrete 1970's-style mic-pre/ equalizer. The design employs proprietary, custom-designed mic, line, and output transformers. It can directly replace the 1073 module. The 18-way gold plated Amphenol connector will mate with vintage "80 Series" consoles or racks designed for a 1073 or equivalent.

The key to the sound of the Wunder Audio modules are the Western Electric 618-style transformers. The PEQ2 incorporates Upgraded "NICO" transformers (Nickle/Iron/Cobalt). This "Mu" metal was made in the USA at the same factory that supplied the Nickle/Iron/Cobalt cores that were use in the 1960's in our favorite vintage gear. Wunder went through the painstaking steps of having this metal re-made by the original factory and is the only recipient of this new batch of core metal. They are to the exact specifications as transformers that were custom made for the vintage console made for Led Zeppelin in 1971. These transformers are physically large and just fit in the 1073 style module housing!

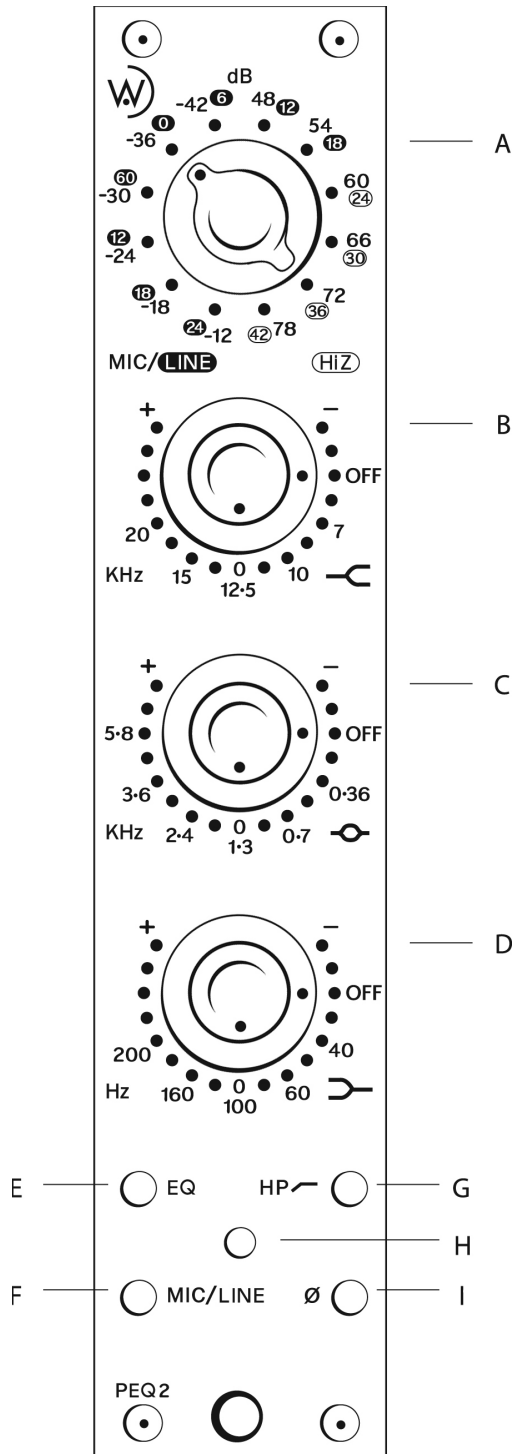
One of the most interesting features about the PEQ2, besides the magical mic-pre and EQ, is that you can record bass guitar and other instruments by plugging direct into the Line Input. When accessing the Line Input, you will get more low-end than any direct box/mic preamp combination. There is a very wide range of gain in the line input incorporating 60 dB of gain. The upper end of this gain stage from -24 to -42 dB is bracketed "HiZ" on the front panel which is suitable for tracking instruments. Here you will have monster bass sounds like no direct box can achieve.

The "HiZ" range on the line input can also be used as a second, totally different mic pre on the PEQ2 using a different transformer, thus a different sound. Try it. You can actually plug a microphone into the "LINE INPUT" the PEQ2.

Interestingly, the 66 dB of line input gain is double that of a 1073 and therefore has a huge amount of headroom. Thus when EQ-ing a source coming back into the PEQ2 from tape or hard disk to you will notice a fat, wide open sound with virtually no phase shift.

All the switches are custom made by Greyhill. The custom made potentiometers are Vishay audio-grade, made with conductive plastic for a long life (one million cycles). Large Sprague "Orange Drop" capacitors are used in the equalizer circuit. The Panasonic FC 105 μ C Electrolytic capacitors are used to insure reliable high temperature operation and long life. The hook-up wire is from the UK and is hand assembled to "Military Spec". A single circuit board offers a vast sonic improvement over 5 separate boards found in a 1073 eliminating the use of multiple edge-board connectors and redundant wiring. The enclosures are CAD designed to 1/1000" tolerance and are bright-nickel plated and have PEM nut hardware throughout for solid construction. Finally, the custom-designed anodized aluminum knob set on the PEQ2 gives the module character. The boost and cut knobs are solid brass with shiny nickel plating. The knob markers are embedded with white plastic dowels, so the white mark will never wear off.

PEQ2 Input Module

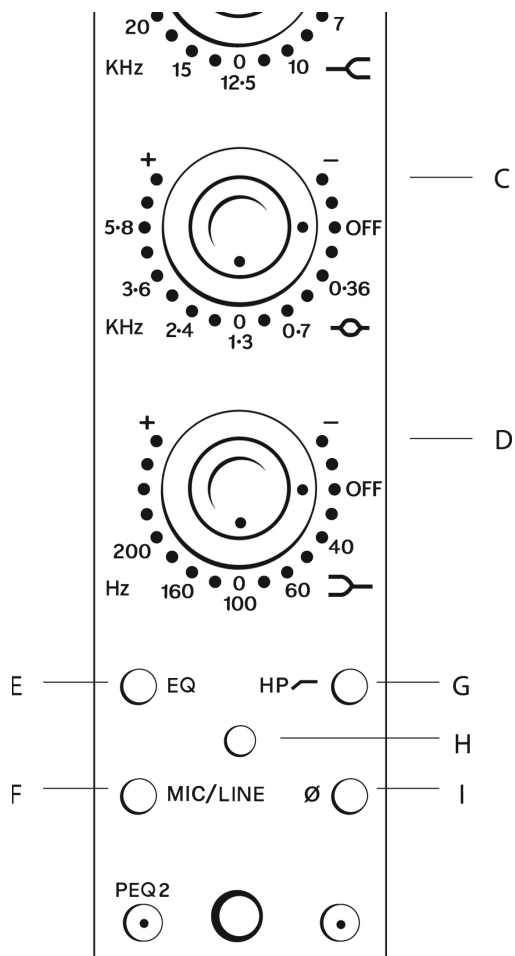


A Gain Switch- At the top of each channel PEQ2 module is a red winged knob which controls a 12-position switch. Each Position will show two values. The "Line" gain level is circled whereas the "Mic" gain level is not circled. Unity gain for the Line level is at "0".

HiZ range is the four most clockwise positions of the Line gain (-24 through -42) has higher input impedance ideally suited for "Direct In" instruments such as Bass or keyboards. These four line positions are can also be used as an alternate mic input using a different transformer.

B High Frequency control - The high frequency is adjusted using this dual concentric knob. The outer black knob determines the frequency at which boost or cut will occur. This knob also has an off position. The inner silver knob provides continuously variable BOOST or CUT from 0 to +/- 20 dB of the selected frequency. This knob should be set to the 6 o'clock position to achieve no boost or cut.

C Mid control - The Mid frequency is adjusted using this dual concentric knob. The outer black knob determines the frequency at which boost or cut will occur. This knob also has an off position. The inner silver knob provides continuously variable BOOST or CUT from 0 to +/- 20 dB of the selected frequency. This knob should be set to the 6 o'clock position to achieve no boost or cut.



D High Low control - The Low frequency is adjusted using this dual concentric knob. The outer black knob determines the frequency at which boost or cut will occur. This knob also has an off position. The inner silver knob provides continuously variable BOOST or CUT from 0 to +/- 20 dB of the selected frequency. This knob should be set to the 6 o'clock position to achieve no boost or cut.

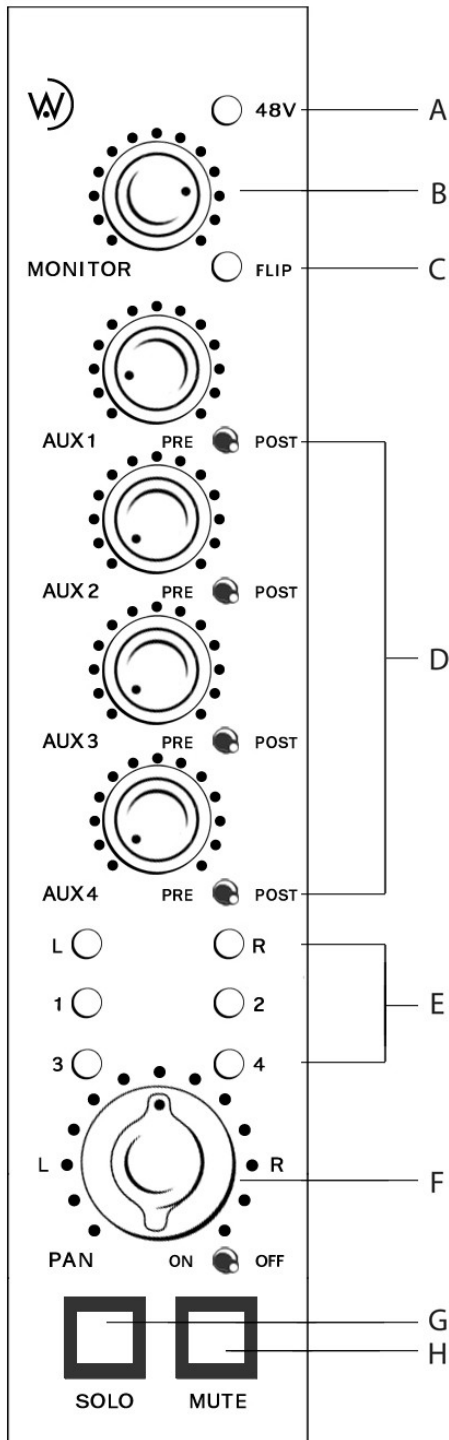
E EQ Switch - The Equalizer is activated by depressing this switch.

F Mic/Line Switch - This switch determines whether the unit is in Microphone Preamplifier or the Line Input mode.

G Discrete High Pass Filter - Corner Frequency is set at 90 HZ.

H Signal/Clip LED - This dual purpose LED will turn green when any signal is detected and red when signal approaches clipping.

I Phase Switch - The Output Polarity is Shifted 180 degrees by depressing this switch.



Routing Module

A 48 Volt/Phantom Power - on/off switch

B Trim (Direct Out) Knob - The second of two active gain stages. This is essentially a fade before the output amplifier in the PEQ2.

Although housed in the routing module, it is completely independent from the routing electronics. The VU meter displays the level of whatever is plugged into the input of the routing module.

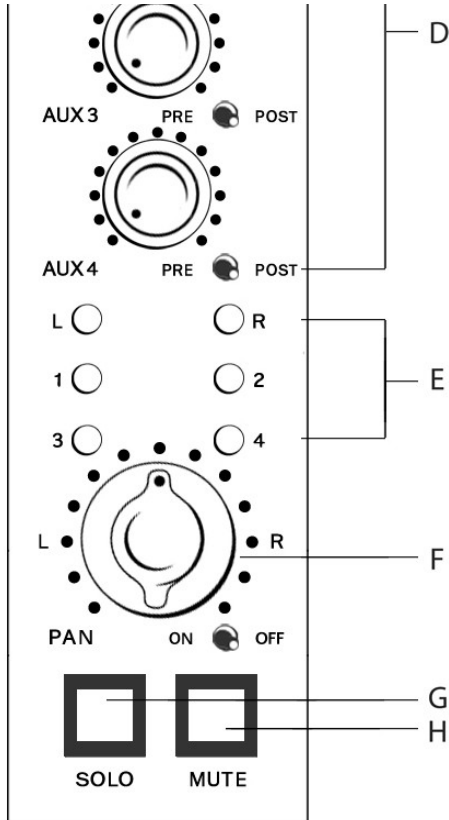
This knob is very unique to the Wunderbar. Unity Gain is just slightly before the 3 O'clock position. When making boost and cuts to the EQ this knob can be adjusted to achieve zero dB at the VU meter for unity gain. Not enough can be said about lowering this knob below unity gain and turning up the PEQ2 Line input knob during mix down to achieve a different more distorted color.

C Flip Switch - Swaps the trim knob and the P&G 100mm conductive plastic **channel fader**. *This allows the user to "ride" the trim via the channel fader during tracking if desired.*

D Auxiliary Sends 1-4 - Send signal from the I/O module (channel strip) to the corresponding aux master knob (rotary fader) in the **master section**.

Pre/Post switch determines whether the auxiliary signal is before or after the channel fader.

When sending signals to headphones, putting this switch in the pre-fade position will allow the headphone levels to be independent of the fader being used to monitor levels on the console. During a mix, setting this fader to post mode will conform its output to an effects device in proportion to the fade being used in the mix.



D E Bus Assign Switches -Assigns the channel output to the Wunderbar Left Right (L-R) bus, Neve 1-2 bus, and the API 3-4 bus.

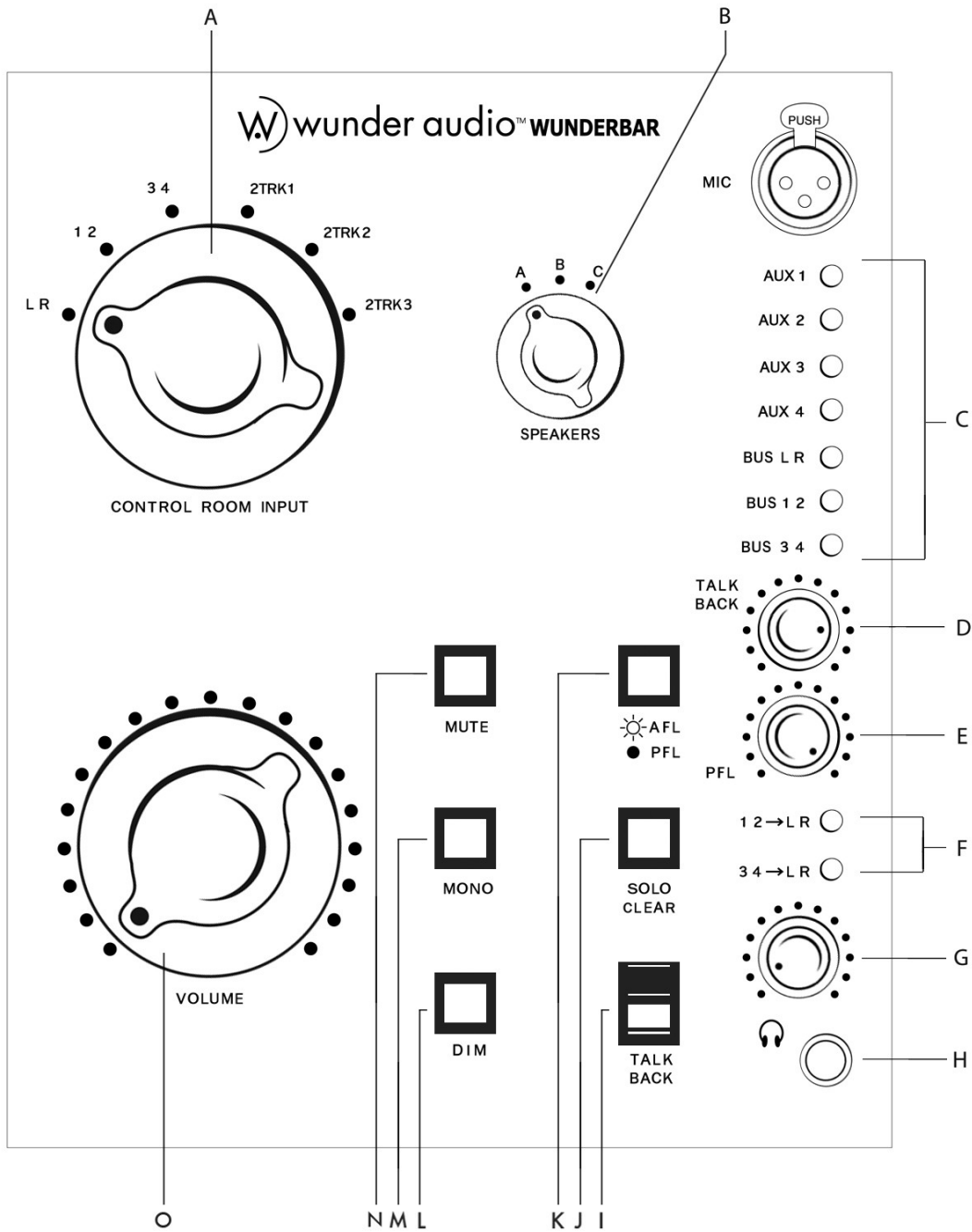
F The Pan Knob -Determines the proportion of signal sent to the left and right sides of the selected stereo buses. The pan law has a -3dB center attenuation to approximate constant power panning.

When the **Pan Defeat Switch** is engaged (**off**) the resistor that controls the pan is out of the circuit, the signal is centered straight up, or if assigned via the bus assign switches either left or right for a “hard pan.” It also doesn't have a -3dB center attenuation if you bus the signal to both left and right. With it **on**, the pan functions normally.

G Solo Switch -Mutes all channels not in solo, monitoring output is determined globally to be PFL or AFL via the PFL/AFL lighted switch in the master section. Listening in Pre-Fade Listen mode is a solo of the input to the routing module and is good for setting levels on the mic pre-amp. Listen in After Fade Listen mode to make level changes on the fader and adjustments on the eq.

H Mute Switch - Silences the output of the channel using an opto for completely silent switching.

Control Room Master Section



A ControlRoom Input Switch - Selects which input source the control room will monitor, the Wunder bus (L/R), the Neve bus (1 / 2), the API bus (3 / 4), or 1 of 3 two track sources. Example: A stereo mix routed from a pair of PT outputs or output from a two track tape machine.

B Control Room Speaker Selector - Selects between three possible pairs of monitor speakers.

C Talkback Microphone and Talkback Assign Switches – Assigns output from the talkback mic to Auxes 1-4 and/or the L/R, 1 / 2, 3 / 4 buses.

D Talkback Knob – Sets talkback volume (there is a built in optical limiter, so if it starts to sound too compressed, turn down the talkback.)

E PFL Level – Adjusts the output volume of the PFL signal. Unity gain for this knob is all the way clockwise.

F Wunderbahn Buttons – Folds the output of the 1 / 2 (Neve) and or 3 / 4 (API) buses into the L and R (Wunder) bus.

G Headphone Output and Volume – Takes the same signal as the control room has, but pre-mute and volume.

H Headphone Jack – Accepts standard 1/4" TRS headphone connectors .

I Talkback Switch – Set on a rocker switch, the forward position temporarily engages the talkback as long as the switch is pressed, the back position engages the talkback until the rocker is switched into the center off position.

J Solo Clear – Clears Solos globally and also flashes as a solo indicator.

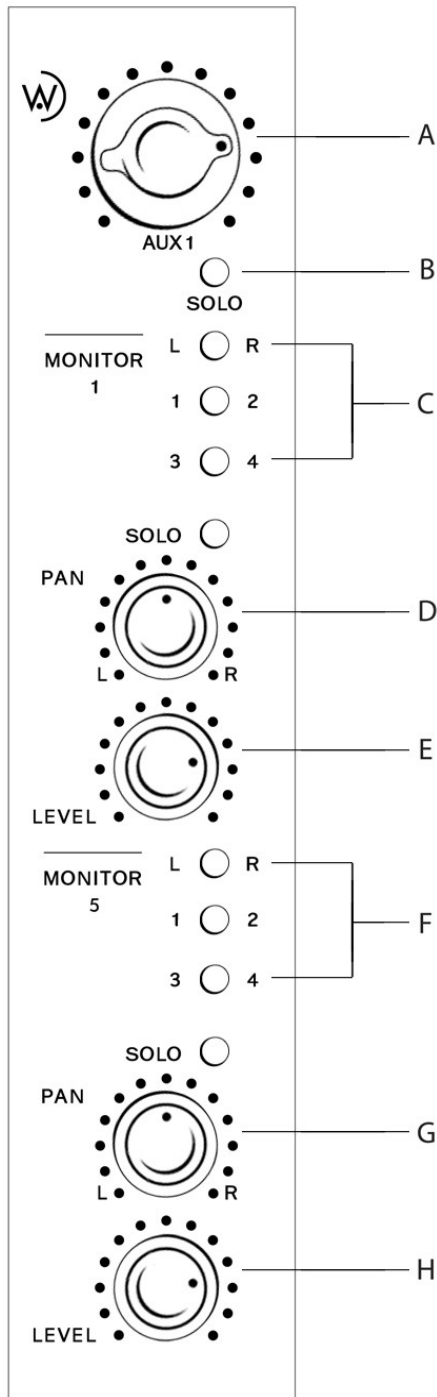
K AFL/PFL Switch – Selects between PFL (dark) and AFL (lite) for solo switches globally on the console. *When in PFL mode, the PFL knob controls the volume. In AFL the pans and fader positions are maintained, but it isn't a destructive solo, so if you solo an Aux, you will hear any other channels that are routed as well.*

L Dim Switch – Reduces output on the console by -20 dBs.

M Mono Switch – Sums the output of the left and right buses, handy for checking phase relations during mixing.

N Master Mute Switch – When engaged, silences all output from the console.

O Master Volume Knob – Controls all output from the console.



Aux Send and Return Master Section

A Auxiliary Send Masters 1-4 - There is a 10 dB gain “in-hand” split between the Aux Master and the Channel Aux Send controls. For gain staging reasons, you want to start with the Aux Masters at just less than 3 o'clock. This splits the gain +4dB master and +6dB in the routing modules.

B Master Aux Send Solo

C Aux Returns 1-4 to Bus Assign Buttons – Assigns the Aux Returns to the L / R bus, 1 / 2 bus, and/or the 3 / 4 bus.

D Aux Return Pans 1-4 – The proportion of aux return signal to L / R, 1 / 2, and/or 3 / 4 stereo buses. **Example:** May be used to bring effected signal back into the console from outboard devices.

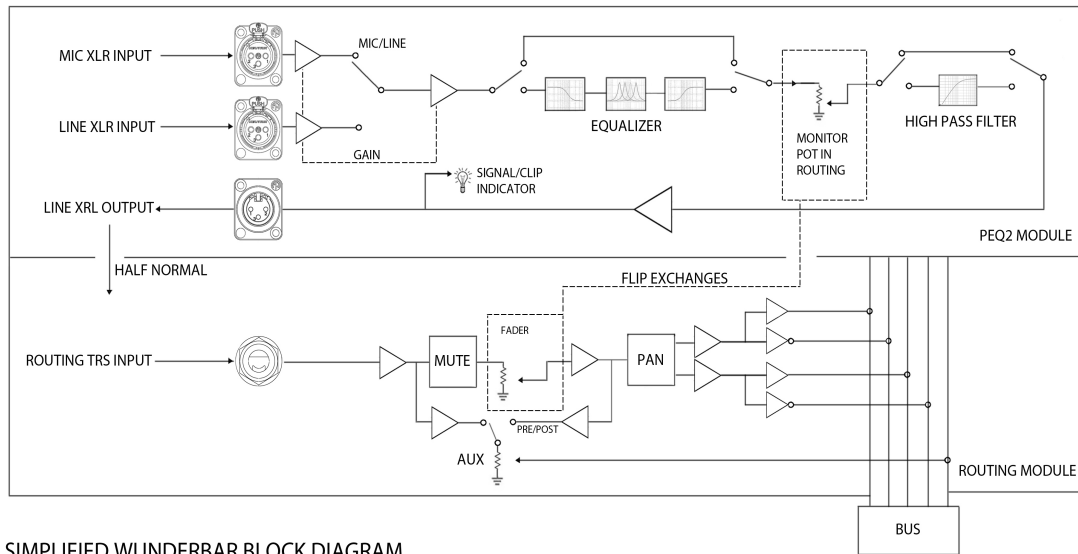
E Aux Return Levels 1-4 – Adjusts the amount of signal routed back into the stereo buses. **Example:** May be used to bring effected signal back into the console from outboard devices. *These inputs also have 10dB of gain above unity, just like the routing modules, but without transformer inputs.*

F Aux Returns 5-8 to Bus Assign Buttons – Assigns the Aux Returns to the L / R, the 1 / 2 bus, and/or the 3 / 4 bus.

G Aux Return Pans 5-8 – Assigns the proportion of aux return signal to L / R, 1 / 2, and/or 3 / 4 stereo buses. **Example:** May be used to bring effected signal back into the console from outboard devices.

H Aux Return Levels 5-8 – Adjusts the amount of signal routed back into the stereo buses. **Example:** May be used to bring effected signal back into the console from outboard devices. *These inputs also have 10 db of gain above unity, just like the routing modules, but without transformer inputs.*

Simplified Block Diagram



General Guidelines

The Wunderbar Console is completely modular, including the master section and rear i-o panels.

It is recommended that when removing the PEQ2 Modules, Routing modules, and all other sections the console should be powered down.

It is not necessary that you leave this console permanently switched on. If you decide to leave your equipment powered up or turn it off when not in use, the console should run problem free.

Tracking and Mixing Tips

The Wunderbar is an extremely easy console to use. When using the mic-pre, a good starting gain is 36 dB, right next to the Wunder Audio logo at the top of the PEQ2. The output trim, which is the top small red knob of the routing module and located below the PEQ2 on the console, should be between the 2 and 3 o'clock position.

Using the PFL (Pre-Fader Solo) button on the master section is a good way to check your level. As you sound check the instrument to be recorded, the small round LED at the bottom of the PEQ2 will light up yellow . This means that a signal is going through the PEQ2. This LED will turn RED as you approach 3 dB below clipping. Set the mic-pre level on the gain switch knob at the top of the PEQ2 until you reach clipping, then turn down one click so it will just light yellow. You can also use the large analog meter associated with the channel you are using to see your gain visually and make it so it just averages hitting zero. For a slightly different, more distorted sound you can drive the PEQ2 gain switch knob one click higher to get the LED to just light up red while turning down PEQ2 output trim on the routing module slightly.

When mixing, using the Line input on the PEQ2, a good starting gain is 0 dB right next to the Wunder Audio logo at the top of PEQ2, and the PEQ2 output trim, which is the top small red knob of the routing module below the PEQ2 on the console, should be between 2 and 3 o'clock position. Using the PFL (Pre fader Solo), button on the master section is a good way to check you level.

When mixing we suggest trying the **Wunderbahn** mode which adds the Neve 1 - 2 bus and the API 3 - 4 bus into the main Left Right (L -R) bus. To engage this mode, press the buttons labeled 1 2 → L R and 3 4 → L R. When these are engaged, the buttons light up blue. This will create a triple-tiered stereo bus, which is unique as there are three discrete classic flavors blended together. This can be infinitely adjusted using the six master faders. *It is suggest to always use the solo in PFL mode to set the level of each channel fader used in the mix down.*

Unpacking

When you receive your Wunderbar, it will be fully commissioned three times from our shop and ready to use. It normally takes roughly two hours to unpack, set it on the stand (see instruction below), plug in all the XLR connectors, and start recording and mixing!

To connect audio to the Wunderbar, we recommend you use only very high quality balanced cabling and connectors. The patch points on the back plane may be connected directly to other sources and destinations, however we recommend that you have a professional patch bay, to add convenience and avoid wear on the 5088's connection jacks.

Installing the Wunderbar Stand

Install the stand before you install the PEQ2 modules so the frame is lighter.

1) Place the desk on a carpet or blanket and tilt back the desk so the armrest faces upwards and the rear/back panel (just above the XLR' s) of the desk is on the floor *(never lift the desk by the armrest.)*

2) Install one of the two "Stand Feet" to the far left part of the bottom of the desk using 2 of the 4 inch bolts (included). When doing this, have someone hold all the weight of the end foot so there is no stress on the screw threads. Do not tighten all the way.

Place a small wood block in between the stand foot and the floor so the end foot does not hang all its weight on the two loose screws.

3) While leaving the left stand foot about 1/16" loose, as in the last step, place one of the 2" x 3" "Frame Struts" over the square stand foot guide. Examine the holes at either end of the frame strut and note that one hole is smaller and threaded, this hole

goes upwards so that it is against the bottom panel of the desk.

Attach the frame strut to the bottom on the desk with the long bolts. Do not tighten all the way.

4) Carefully thread the 3" bolt into the left end of the frame strut, through the stand foot guide and back into the treaded top on the frame strut.

5) Repeat step 3 & 4 with the 2nd frame strut.

6) Tighten all long bolts in the frame struts and left end foot.

7) Install the 2" x 3" bottom frame strut.

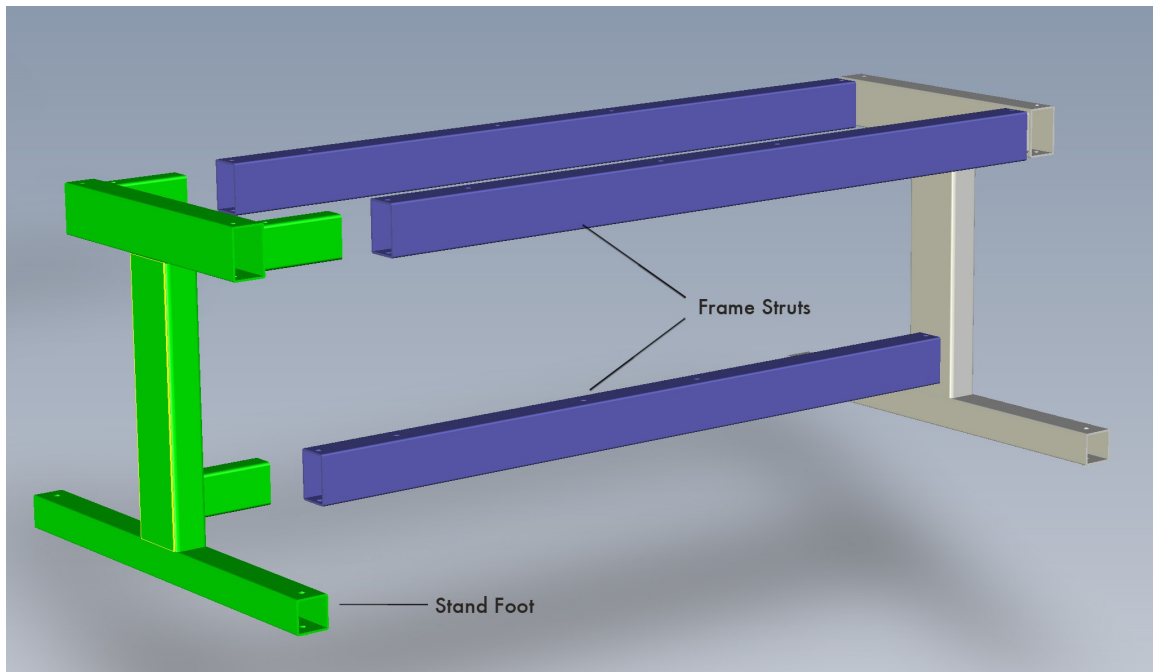
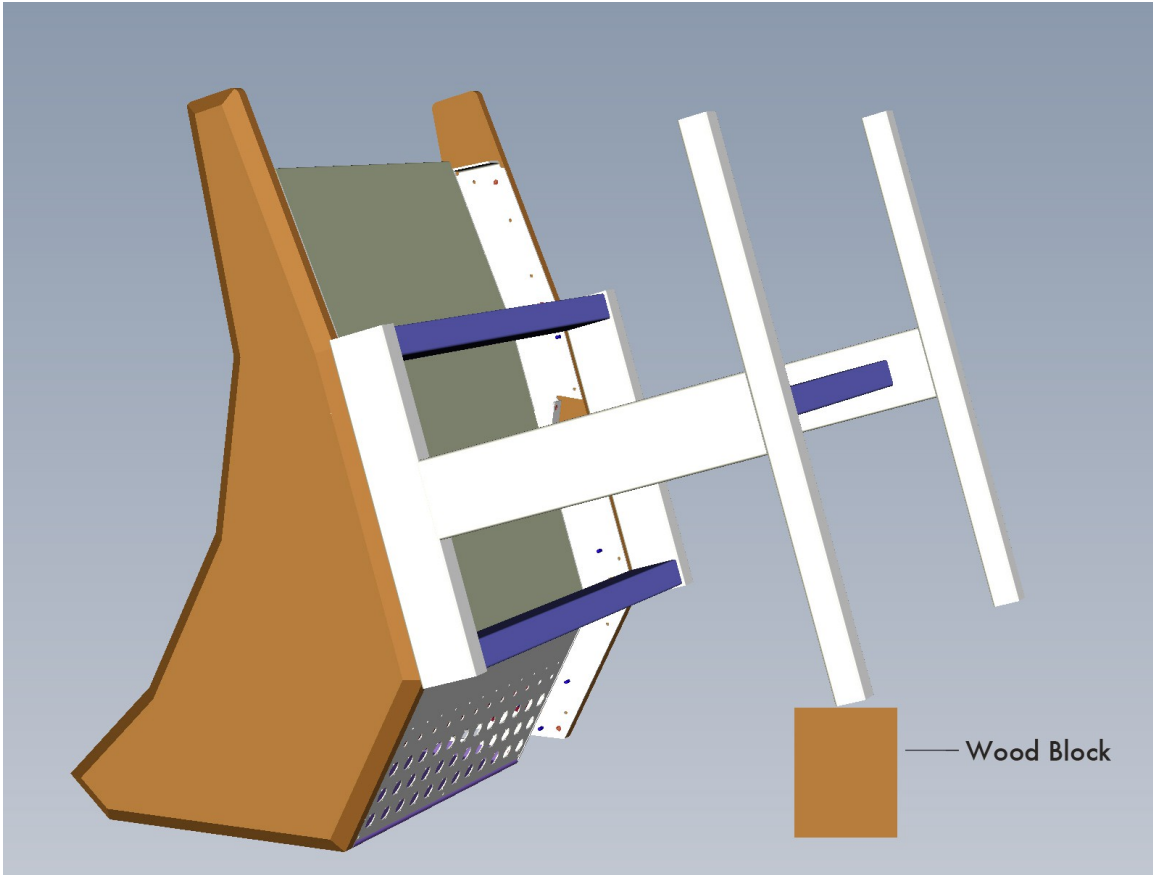
8) Install the right stand foot and tighten bolts.

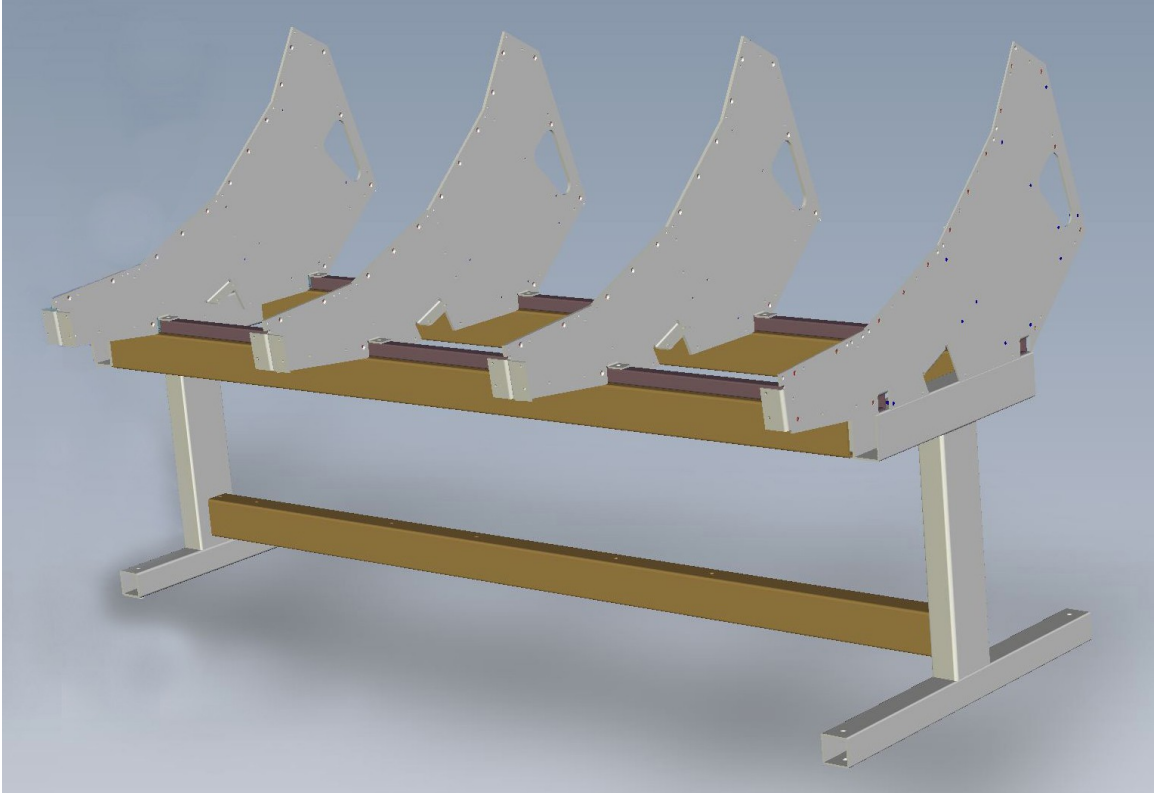
9) The desk is ready to tilt back upwards but before you do so, unscrew the rear adjustable foot on the bottom of each end foot so it is not subjected to the force of tilting up the desk.

10) After the desk is tilted up then use the wood blocks to raise the rear of the stand skids so that you can re-install the adjustable feet.

11) Adjust the leveling feet to the desk is level.

See illustrations below.





Dimensions

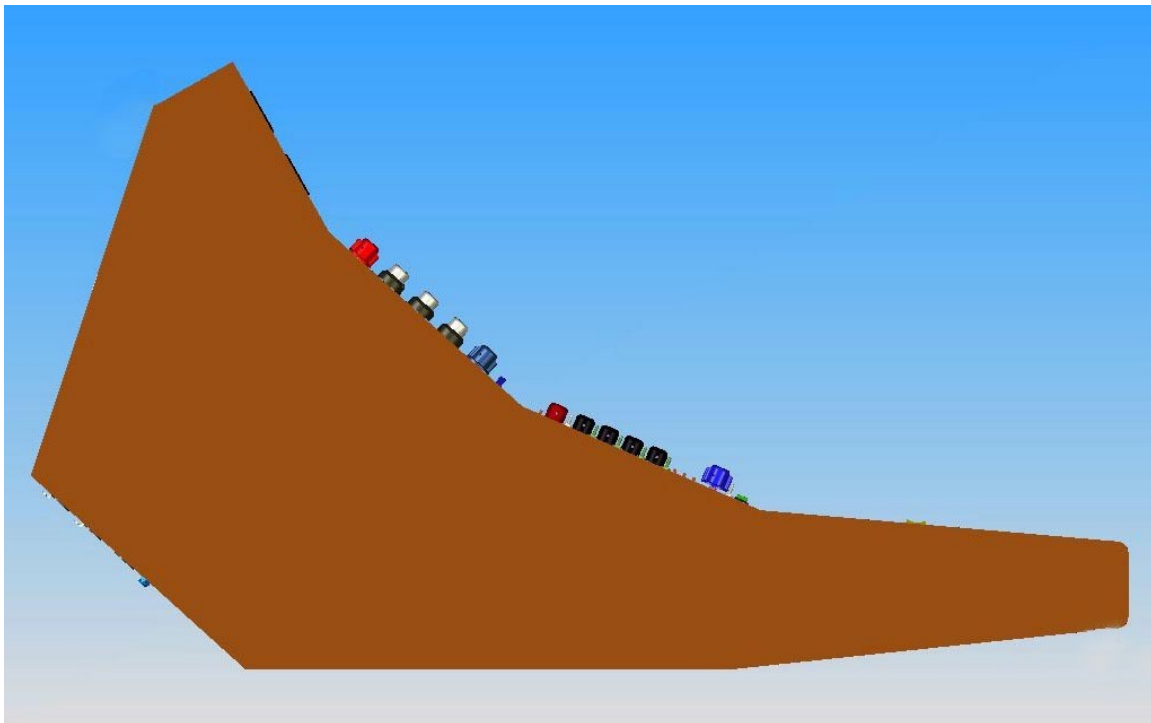
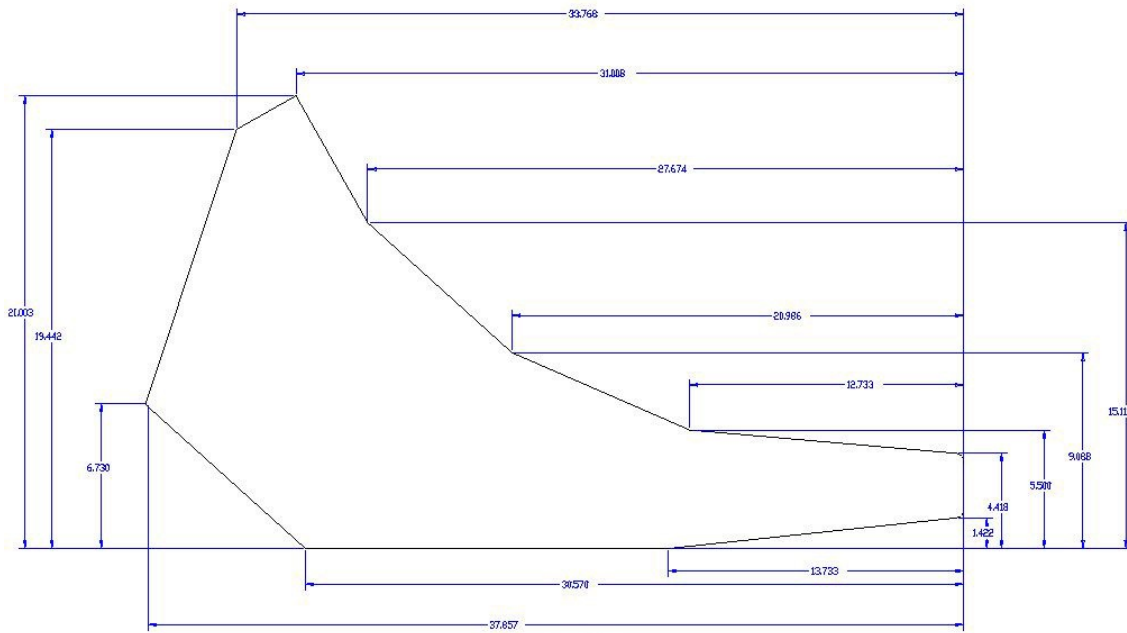
The 12-channels console is 32 1/4" wide.

For each extra bucket of 12 channels, Cinema display Section, or patch bay section add 21 7/8". **Example:** A 48-channel console with Cinema Display is 119 3/4" wide.

The Wunderbar Stand is 21 1/2" tall.

See below drawing for depth and height of all consoles.

Depth and Height of Console



Audio Connections:

To connect audio to the Wunderbar, we recommend you use only very high quality balanced cabling and connectors. The patch points on back plane may be connected directly to other sources and destinations, however *we recommend that you have a professional integrate the console with a patchbay to add convenience.*

Audio Connections per channel:

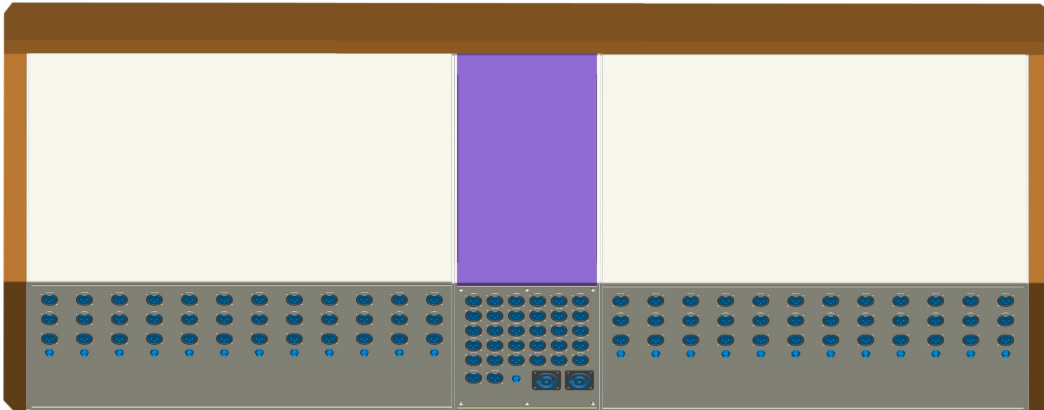
Mic Input XLR-F, Line Input XLR-F, Direct Output XLR-M, Routing Module Return TRS.

Master Section:

14 x XLR-in: Monitor 1-8, two track inputs 1-3

16 x XLR out: Stereo Bus L&R, 1&2, 3&4, Aux Out 1-4, Control Room Speakers A, B & C

Rear Panel



PEQ2 Module Connection

Your PEQ2 is provided with an Amphenol 18-way card edge connector on the rear of the module. This card edge connector is wired up identical to a vintage 1073 module.

The wiring scheme is detailed as follows:

power requirements: 24 volts DC at approximately 100 mA

Connections:

- A Microphone Input +
- B Microphone Input -
- C
- D
- E 0 volts Ground
- F Line Input +
- H Line input -
- J
- K external fader input
- L external fader output
- M
- N
- P
- R Line Output +
- S
- T Line Output -
- U 24 volts+
- V Chassis

Connecting the Power Supply

The Wunderbar Powerbar is a rack-mountable 4U (19" x 7" tall). The rack should have side-to-side airflow. The Powerbar is very quiet due, virtually silent, do to the military spec slow running fans.

The standard cable for the PSU is 25' and has a Speakon Connector at both ends. The cable distance can be custom ordered longer from Wunder Audio.

The heat generated by the Wunderbar power supply is radiated through ventilation holes in the case by convection as well as silent fans. These holes should not be covered or blocked or it may reduce component life and operating stability!



Cleaning Instructions

Simply use a mild dish soap and a slightly damp terry cloth, wrung out as much as possible. The complete console, solid hardwood enclosure, as well as the leather armrest can be cleaned in this fashion. All fader panels should be wiped in the direction of the metal grain.

Water and Moisture

As with any electrical equipment, Wunder Audio products should not be exposed to water or excess moisture. If any liquid enters the enclosure, it should be returned to your dealer for servicing.

Servicing

The user should not attempt to service this unit. Doing so can void the warranty. Please refer all servicing to Wunder Audio.

If you have a malfunctioning module that needs service, call 512-338-6777 or email Wunder Audio. Once we have verified the issue, arrange for an RMA and return shipping label.

To remove a PEQ2 module from your console, power down the Wunderbar, unscrew the thumbscrew at the bottom of the module, and carefully slide the module out by pulling on the top gain knob and thumbscrew.

Make sure the module is very safely packaged for the return shipping. Additional modules may be purchased to be used as spares in case one module needs to be serviced.

To remove the Master module, *please call for assistance first!*

Warranty

Wunder Audio warrants this product to be free from defects in materials and workmanship for a period of one (1) year from date of purchase, and agrees to remedy any defect identified within such one year period by, at our option, repairing, or replacing the product.

This warranty does not apply to any product which has been improperly installed, subjected to usage for which the product was not designed, misused or abused, damaged during shipping, or which has been altered or modified in any way. This warranty is extended to the original end-user purchaser only. A purchase receipt or other satisfactory proof of date of original purchase is required before any warranty service will be performed.

If you suspect a defect in your device, you must first email or call us at 512-338-6777. It is possible that a suspected defect could be due to a faulty cable or connector, improper setup, or some other factor not involving the unit itself.