Neo Owner's Manual

Congrats!

Thanks for choosing OzGuitarWorks Neo. We work hard at making this one of the best bass guitars you've ever played. When designing this instrument, every piece of hardware was examined as to its function and contribution to the whole. Not finding compelling string-locks, bridges, and tuners; we've designed our own. This manual gets you familiar with our ways of doing the classic and not-so-classic hardware. As this is a modular custom bass guitar, many options may or may not apply to yours.

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The Basics

Output Jacks

The **main output** is mono and at the **lower** end pin location as shown above. The upper output is shipped **not connected**. Various outputs can go various locations as **both** jacks can be stereo, and sources can be selected on an Ins/Outs connection board in the body. For creative hookups please see the Appendix m1.

Volume and Tone Controls

The stacked knobs have **volume** on top and **tone** on the bottom. Volume and tone pot resistances and wiring styles are set by selections in the pickup module's circuit board switches, personalizing the controls for the pickups installed.

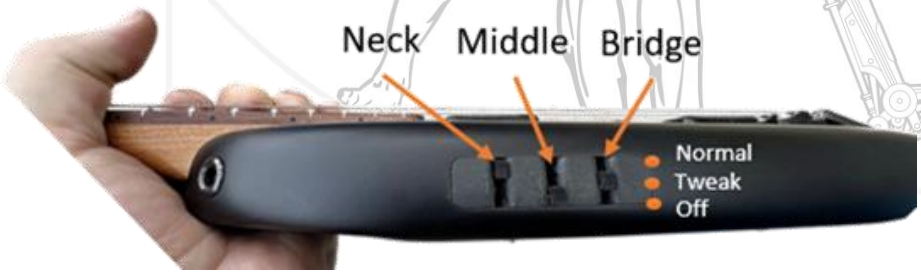
Tuning

Turn the string's tuner knob (located between the output jacks) clockwise to tighten the string raising the pitch. You'll note how easy it is to get that last cent out with the **63/1** ratio tuner, how little backlash, and how you don't have to approach the note from one direction (i.e., raising pitch). The KnobTool can be inserted into the Tuner-Knob for those wanting even less force and finer adjustment (see tool section). Clip-on electronic tuners work fine with our miniature headstock.

Pickup Switching

Three switches on the upper bout combine the pickup selections (in parallel as usual) to form the output. One switch controls each corresponding pickup, as shown below. Each switch has **3 positions** with **Off/Tweak/Normal**. Off means just what you'd think, no signal contribution by that pickup's switch. Yes, you can mix and match all positions for many choices, (**26 max!**), see Appendix-pm1 and 2.

Tweak is our term for **optional modes** for a particular pickup and module. For Single Coil pickups this includes HOOP, OOP, and coil tapping. Humbucker pickups tweak mode is single coil, with various methods of tuned coil shorting. Active pickups have their optional voices available… all defined on the pickup module. **As shipped** single coil pickups have HOOP mode selected, humbuckers have a 4.7k shorted single coil option and active pickups have single coil mode, as default tweaks.



Exception: When **less than three pickups** are on a module the **extra switch** is configured for more **global** tweaks, (woo-hoo!) So, when using your SSS module the middle switch is defined Off/Tweak/Normal as usual. Installing your HH two pickup module **the middle switch** is automatically **reconfigured** to **Off/Dark1/Dark2**; where Dark1 has a capacitor load on the mixed output and Dark 2 adds a resistive load.

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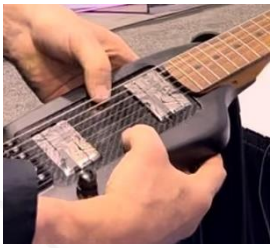
Pickup Module Removal/Install

Modules are typically removed for curiosity, swapping to another module-full of pickups you have, or to change the various switches (56!) on the module's passive circuit board. Four screws, on the back, secure the module transferring sound vibrations and keeping **pickups from falling out**. **Don't depend** on the module's **magnets** to hold the pickups in place during traveling, large bumps, or stage antics. It's not pretty when your guitar guts spill out.

For **removal** take the **four screws** out. Place both **thumbs** on either side of the pickguard. Press towards the back, with your **fingers** around the back **catching** the module as it suddenly becomes free of the magnets. Be careful as the modules aren't built for floor strikes. Remove in a straight shot. See video here.

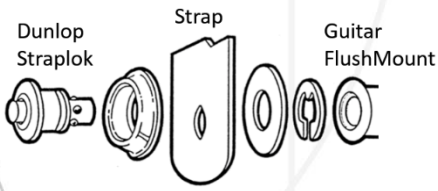
Installing: You will notice the module installs in only **one way** with the **circuit board** showing **on** the **bridge end**. Install the module in a straight shot with the bridge end making contact first (not required). Get your hands around to the thumbs on top position and make sure the module is seated, pickguard flush on top and wood flush in the back. You can **hot swap** (plugged in) with vol up; but better to turn down first.

Active Pickups Battery Notes

For those with active pickups (Fishman Fluence), whenever the lower jack has a connector plugged in it (as typical) the battery is on. So yes, you always need to unplug at the guitar when done. Standard active modules have a 9V battery accessed by removing the module then swinging the Velcro'd pickguard to the side. Opt. Fishman rechargeables are accessed from the back of their module, and don't require module removal.

Misc.

Strap Installation



Front

The front strap location was chosen for balance in both directions. The Dunlop Straplok **Flush-Mount** keeps things clean when no strap is used, so no button in the way. Hardware included. **Always check** if the pushbutton Straplock male is **full inserted**.

Rear

The **rear strap location** is on the back and top of the guitar. It's also a Dunlop Straplok. See rear pic. This location was chosen for very low neck-dive, comfort, and the best access from 1st fret to the last.

Guitar Cable

Note that a **90 deg jack** at the guitar end works better when laptop playing left leg classical. Also, note for all passive guitar's options, the longer and higher capacitance a cable is, the more it acts like a tone control, killing hi end. The **lower** endpin-jack is the **main** output, right or lefty flavors.

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Care and Grooming

Cleaning

Depending on your options, the **fretboard** wood is typically **raw** (unfinished, unvarnished) Indian Rosewood, Pao Farro, or Ebony. The **neck wood** is typically raw **roasted maple**. All need to be cleaned carefully with appropriate cleaner/polishers; like lemon oil, boiled linseed oil, or non-silicon wood furniture cleaner polishers, etc. Usually, a lint free cloth is used with the cleaner.

The **aluminum body** is typically **hard black** anodized then optionally painted. Use any very mild nonabrasive multisurface cleaners/polishers. On optional polished aluminum uncoated bodies, a slightly abrasive automotive wheel polish works wonders.

Strings

The tuners, saddles, nut, and string lock design leads to a **very low incidence of string breakage**. Your strings will lose tone **FAR** quicker than you'll ever break a string. Wiping down strings after every session helps, but **strings wear out**, as well as go "**off**" from embedded finger grime and corrosion. **Only standard strings** will **work** (single ball), double ball or bullets won't. Currently we recommend D'Addario's NYXL 45,60,80,105 from a sound/wear/intonation/stability/feel standpoint.

Sharing your environment

Unlike most headless guitars our headless **"headstock"** is just big enough to work with most any **wall mount** and floor stand that support using the headstock. The location of the output jacks is a convenient way to balance the guitar vertically next to you at your desk, with the neck leaning against something. But leaning guitars can take a tumble occasionally. Yes, you won't snap the "headstock" off, but you may put a dent where your fretting finger rubs. Of the many hanging style floor stands, we like the **Hercules**. Swiveling wall hangers work great.

Travel

Airlines seem to have zero issues with our softcase as a **carry on**. It's 35x9x3" loaded. Usually put it in the overhead after everone else is done. Other equiptment piled next to your guitar can push the strings against the stainless frets. Believe it or not our Jescar stainless frets will **scratch** with a constant grinding load. Same problem as guitars with zero frets. Use a paper towel or polishing cloth between your strings and frets while traveling. We don't recommend loosening strings for travel.

The **neck** can easily be **removed** for small packing needs. The tight fit of the neck's heel will loosen up over time, however, so we wouldn't recommend this for a daily activity. Note that the tapered fit means pulling the neck straight up away from the neck bolts, **NOT** towards the headstock.

Notes: Although the Neo is built like a tank, the vol/tone knobs stick out and can be hit, even thru the case.

Lube

Lubricate **tuner threads** occasionally with a teflon impregnated or graphite lubricant. A good time is during string changes with easily exposed threads to wipe clean and relube.

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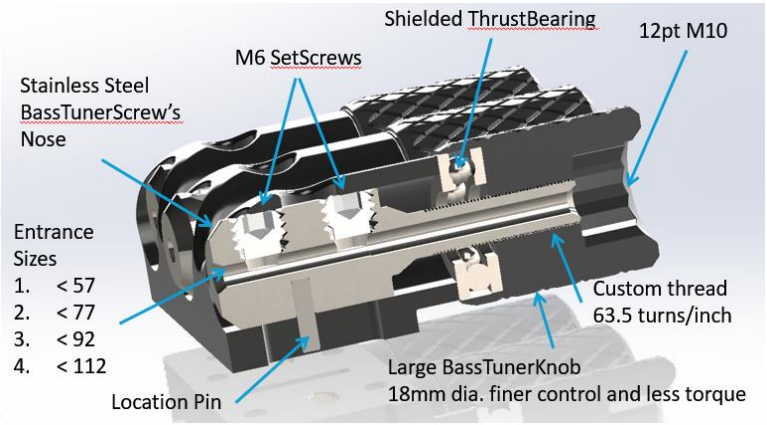
String replacement (obvious, but might save you some time)



- **Loosen** the **string** by the **TunerKnob** until **TunerNose** protrudes at the front of the tuner housing; once fully forward both M6 string lock set screws will line up for wrench access.
- Loosen both M6 set screws with the M3 wrench.
- Remove the ball end of the string from the **headstock anchoring post** and remove the old string.
- Put the new strings ball end on its anchor.
- Line up the new string slightly taught with the bridge and **cut it off** where the knob begins. On the largest string (typically the Low E) cut it off at the **dot** on the tuner housing. Be sure to use cutters that make a clean cut with no hanging wire, like **curved wire/cable cutters** or animal clippers.

- Insert the cut end thru the TunerScrew's entrance hole. While keeping the string slightly taught **tighten** down one of the set screws with the M3 wrench. Let go of the string and tighten the other one. Make certain both screws are below the housings surface. If unsure remove the string from the headpiece anchor and note that pulling the knob in and out can be done with no interference.
- **Tune** to pitch
    - If any **slippage** noticed during tuning to higher pitch (TunerKnob clockwise rotation but no pitch increase) means you **need to tighten** the string-lock set screw more.
    - Typically, it's best to always tune in one direction, tuning higher to get to your goal pitch; this seems unnecessary with our tuner.
    - New strings need a **breakin** (see tools), keep playing and retuning
    - Once strings are broken in, the tune **stability is impressive;** wood + aluminum body almost equals the string temp. expansion coefficient, roasted maple has lower humidity sensitivity, string fulcrums have low friction material, and 'unsung" string length is short.
- **Transportation tip**
    - If you need to be supper compact… the strings can be loosened with the tuner knobs then all four can be removed off their string anchors **leaving** the two **set screws** per string **alone**. Then the **neck is removed** with the M4 hex wrench and the strings are wrapped into a plastic bag and placed next to the bridge with the body. So, **neck and body** can be **stored separately**. This is not recommended as an everyday thing due to loosening the side neck clearances in the neck pocket.

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Adjustments

Important note!

Your purchase included a **detailed factory setup** and fretwork. This is our best compromise for intonation, fast play, low string/fret ring out on aggressive play, etc. Your settings were carefully done to take advantage of the 10-16" compound radius fretboard advantages and the stiff and accurate aluminum body. Please **don't change** the action height and adjust the truss rod until you are **sure** what you want.

Pickup Height Adjustment

Small screws on the back side of the guitar on the module, control the pickup height under the strings. Tightening pulls the pickup away from the strings increasing the clearance. Too close = loud/harsh and magnetic pull on strings hurting sustain. Too far away = muddy and low volume. Typically, tighter clearance on treble side than bass. This clearance is user's tastes and pickup installed, dependent.

Action Height Adjustment

The string height over the frets is called the action height. It's always measured as the distance from the underside of the string to the top of the fret. But which fret, and measuring conditions aren't standardized and need to be spelled out. Our measurements in your Factory Spec/Check sheet use an unfretted measurement for the 1st fret. Our 12th and 17th fret measurements are done with a capo on the first fret.

If needed, the action at the 1st fret is mainly controlled by the nut height. Careful nut work can raise (w/ shims) or lower thru filing. The nut is a Graphtec Black Tusq XL with impeded PTFE. The saddles are of the same material and can also be raised and lowered by filing or shimming. We believe the **sound benefits** of a solid connection of the **saddle directly to the body** override the convenience of adjustment.

Intonation Adjustment

Notes along a fretboard can be slightly off pitch by a variety of realities. Contact finger pressure on a fretted note, action height, where on the fretboard and it's curvature, and how much bend of what kind of string alloy and its core diameter. In general, thicker diameter string cores and shorter scale lengths need more compensation. Our comp is mainly done at the bridge. Typically, if the **fretted 12th is sharper than the 12th harmonic** then the **saddle** is moved **away** from the neck lengthening the scale for that string.

To **move a saddle**, first detune the string with the TunerKnob, enough to move the saddle easily. Loosen the fasteners with a **2mm** hex wrench. **Reposition the SaddleHolder** and retighten the fasteners. Retune and recheck as necessary. Note that a second set of holes in the body extend the range of intonation possible.

We don't just check intonation at the 12th, we check out **the whole fretboard**. Basses that need more help than just the bridge adjustments get a **compensated nut** as well, to help with entire fretboard compensation. This mainly happens with shorter scale lengths and heavier string cores. Typical users are encouraged to make changes at the bridge first, if required.

ProTip : If the intonation correction on an individual string seems way more than the typical staircase stagger pattern , try another string.

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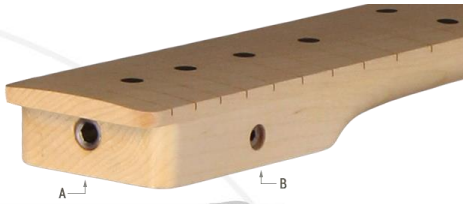
Truss Rod Adjustments (rarely needed, use a guitar tech if insecure)

- The neck's **double acting truss rod** counteracts wood and string forces to set a desired neck curvature (relief). The Neo4 will need rare and minimal truss adjustments due to the roasted maple and aluminum body construction. Your guitar's truss rod was adjusted carefully at the factory setup.
- Always loosen all strings **prior** to adjusting. Remeasure the neck after tuning to pitch. Repeat if necessary.
- If large adjustments are necessary, the neck will need to be removed for access to the course adjustment, A, shown and described below.



Making Truss Rod Adjustments

- Loosen all strings
- Remove pickup module
- Use a 7/32" hex wrench thru the access hole in the body to the **heel of the neck** and turn clockwise (maybe 30 degrees) to put in more backbend counter acting string forces (less relief). Use **counterclockwise** to loosen the truss rod and let the strings bend the neck further into a curve (**more relief**); thus increasing string clearance over most frets.

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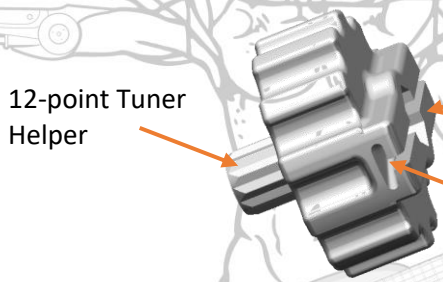
Tools and notes

- Neck
  - 4x **NeckBolts** to body use **4mm** hex wrench
    - Reduce string tension before neck removal/installation
    - Reassembling, load the neck's heel towards the bridge
    - During assembly alternate sides bringing torque up to a firm level. Note that over torquing bolts can crush neck heel wood and void warranty. The neck can get damaged before the screw or insert fails.
    - Frequent neck removal can lead to sloppier heel fit
  - **Truss rod** adjustment, **7/32"** hex wrench. ("A" in pic)
- Module
  - 4x ButtonHead Cap Screws, **1/8"** hex wrench. Torque, noting fastener depth into module. Just make good contact. Too much can fracture the spruce.
- Bridge Saddle
  - 8x ButtonHead Cap Screws, **2 mm** hex wrench. Torque < 3 inlbs

Knob Tool



- Knob Tool
  - With the 12pnt Tuner Helper (not Tuna) inserted into the knurled TunerKnobs, finger forces are lowered, and it gives extra sensitivity to dialing a tune. Handy when intonating or sensitive fingers.
  - Hex Tool Driver… Handy for holding hex bits during string changes and intonation. Not enough leverage for main truss and neck bolts. Could be power driven here for guitar-techs doing speed changes.
  - String Break-in.. Tool is applied to a string, twisted say clockwise 30degs, run up and back down the neck. Doesn't completely eliminate new string break-in, but it helps.

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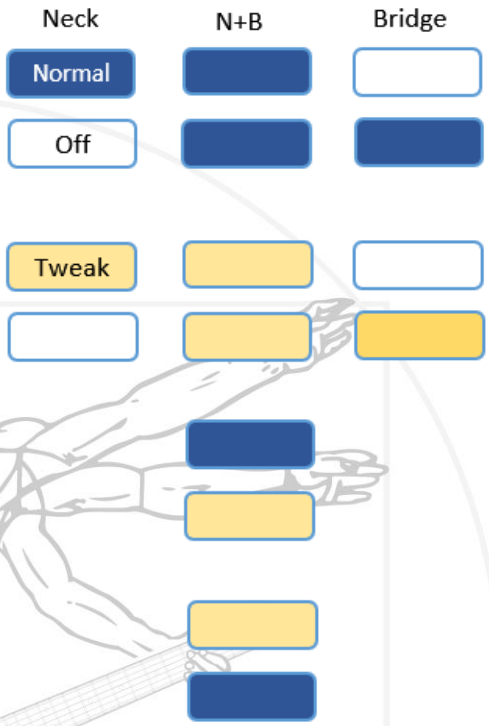
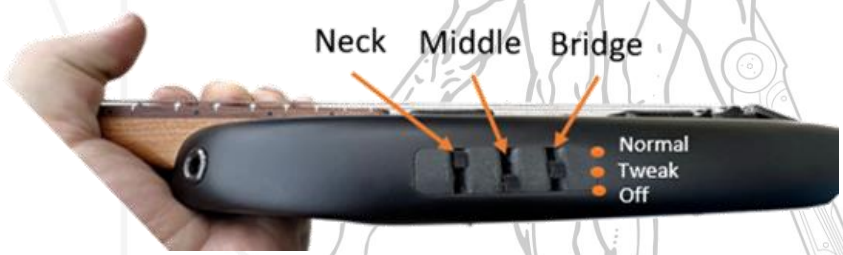
Appendix pm1: Neo Two Pickup Mixing Options

Notes:

- **Typical 2 pickup** guitar has **3 choices** (top row)
- Total passive choices **with Neo**
  - 2 choices per single pickup play -> 4x
  - 4 choices per pair of pickups ->4x
  - So, **8 choices total** pickup mixing shown; **not** using middle pickup switch for other flavors
- Viable for 2 Singles w/ taps, Humbuckers, Alumitones
- Tweaks that are phase dependent between pickups reduces choices from 8 -> **4** choices
- Including **middle switch Off**/**Dark**1/**Dark2** (not really pickup mixing) gives **24 choices** for passive
- Two **active** pickups with Single Coil mode for tweak position on Neck/Bridge and 3 “voices” with middle switch OFF/Voice2/OFF gives:
  - 3 choices per single pickup ->6
  - 7 choices per both pickups mixed -> 7
  - So, **13 total** mixing pickups and voices
  - When 4 voice are available, total -> 18





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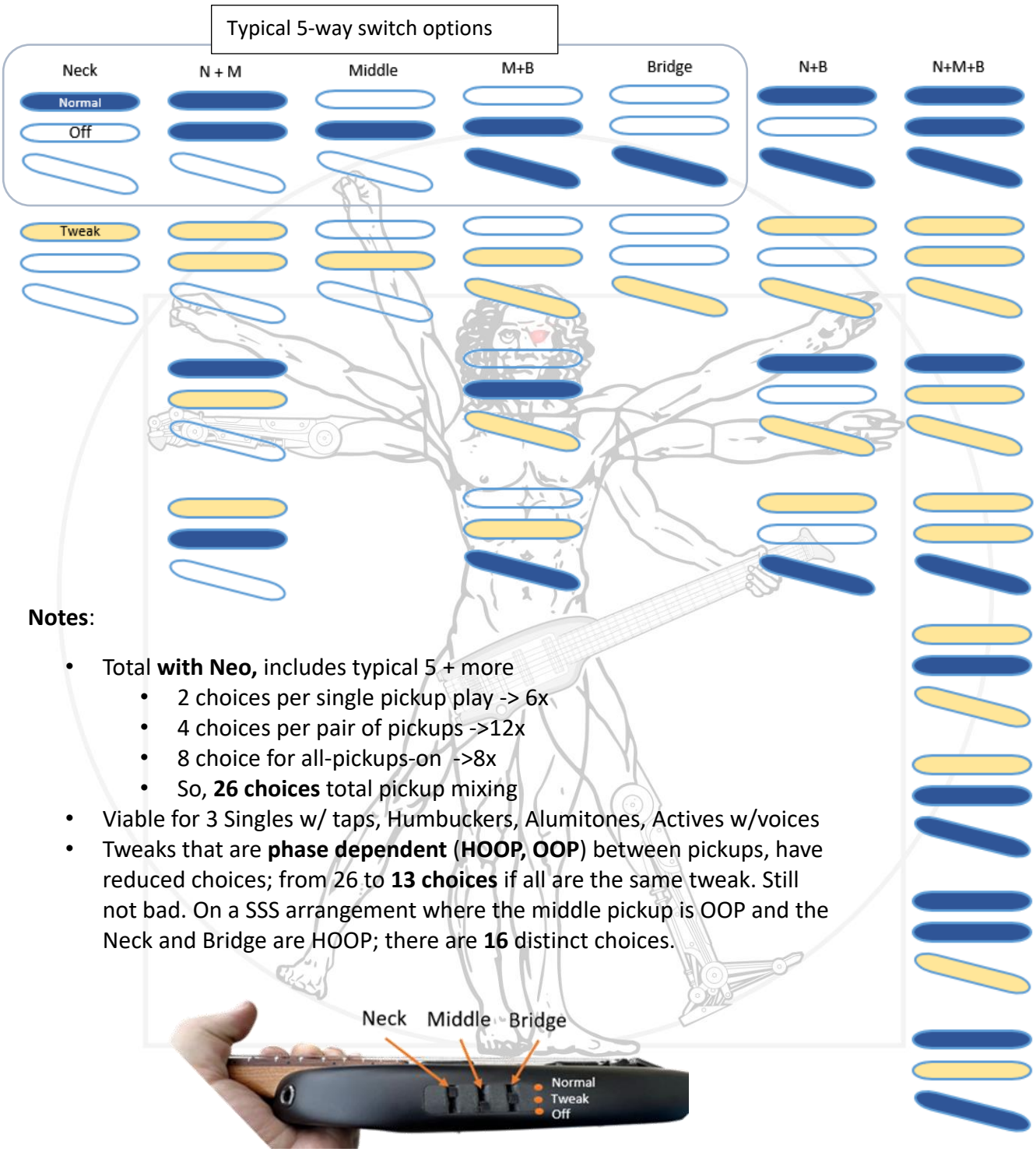
Appendix pm2: Neo Three Pickup Mixing Options



Notes:

- Total **with Neo,** includes typical 5 + more
  - 2 choices per single pickup play -> 6x
  - 4 choices per pair of pickups ->12x
  - 8 choice for all-pickups-on ->8x
  - So, **26 choices** total pickup mixing
- Viable for 3 Singles w/ taps, Humbuckers, Alumitones, Actives w/voices
- Tweaks that are **phase dependent** (**HOOP, OOP**) between pickups, have reduced choices; from 26 to **13 choices** if all are the same tweak. Still not bad. On a SSS arrangement where the middle pickup is OOP and the Neck and Bridge are HOOP; there are **16** distinct choices.

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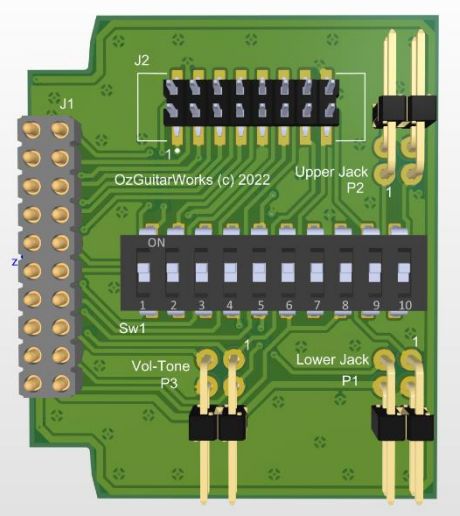
Appendix m1: MainBoard Options

Passive Main Board the “switchboard operator” directs inputs, outputs, and jack use, located under rear cover.

Switch S1	Function	Why	Norm mono J1	Norm Stereo J1	Quad, no Control Stereo J1 & J2 raw	Mono e mono J1 and J2
S1-1	NC->NCsw	Switch access	**on**	**on**	off	**on**
-2	BC->BCsw	Switch access	**on**	**on**	off	**on**
-3	NC->Tip1	MainOut Select	off	off	**on**	off
-4	Out->Tip1	MainOut Select	**on**	**on**	off	**on**
-5	NC2-> Ring1		off	off	**on**	off
-6	Opt-> Ring1		off	**on**	off	off
-7	BC-> Tip2		off	off	**on**	off
-8	Opt-> Tip2		off	off	off	**on**
-9	BC2-> Ring2		off	off	**on**	off
-10						



Lower End Pin

Tip1 -> NeckCoil (NC) or **Mixed Output**

Ring1-> NeckCoil2 (NC2) or Option (Opt) or Off

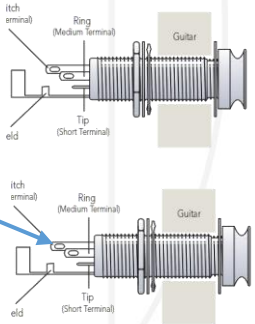
Upper End Pin

Tip2 -> BridgeCoil (BC) or **Opt** or Off

Ring2-> BC2 or Off

Option is connection on module board for piezos, octave producing synth pickups (e.g., “A Little Thunder”), etc.

Switchable gnd used on lower EndPin only, for cable detection for active pickup’s battery on/off



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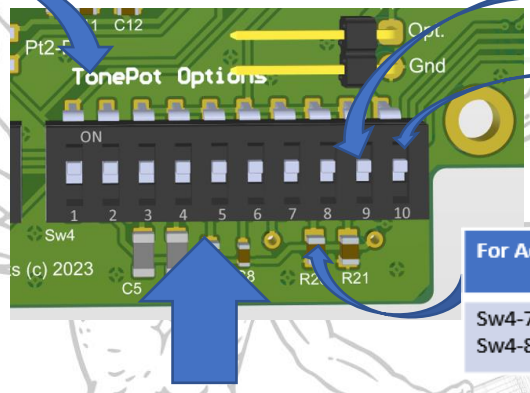
Appendix e1: Module Tone Pot Options

Tone Hookup	Source	Type
Sw4-1 = **on** Sw4-2 = off	Vol pot Input	**60's** style / modern Typical and our default
Sw4-1 = off Sw4-2 = **on**	Vol pot wiper Output	**50's** style Some vol/tone interaction
Sw4-1 = off Sw4-2 = off	No source	**No load,** Tone Pot **disconnected**



Tone Pot R	Res ohms
Sw4-9 = off	500k
Sw4-9 = **on**	250k

Active/Passive Pups	Mode
Sw4-10 = on Sw4-10 = off	Passive Pup Active Pups

For Active Pups	Res ohms	Caps
Sw4-7 = on Sw4-8 = on	25k	.22uf

Tone Cap Choice	Sw4-3	-4	-5	-6	Cap total pf	uF
1	0	0	0	0	0	
2	0	0	0	1	2700	0.003
3	0	0	1	0	5600	0.006
4	0	0	1	1	8300	0.008
5	0	1	0	0	12000	0.012
6	0	1	0	1	14700	0.015
7	0	1	1	0	17600	0.018
8	0	1	1	1	20300	0.020
9	**1**	**0**	**0**	**0**	**22000**	**0.022**
10	1	0	0	1	24700	0.025
11	1	0	1	0	27600	0.028
12	1	0	1	1	30300	0.030
13	1	1	0	0	34000	0.034
14	1	1	0	1	36700	0.037
15	1	1	1	0	39600	0.040
16	1	1	1	1	42300	0.042

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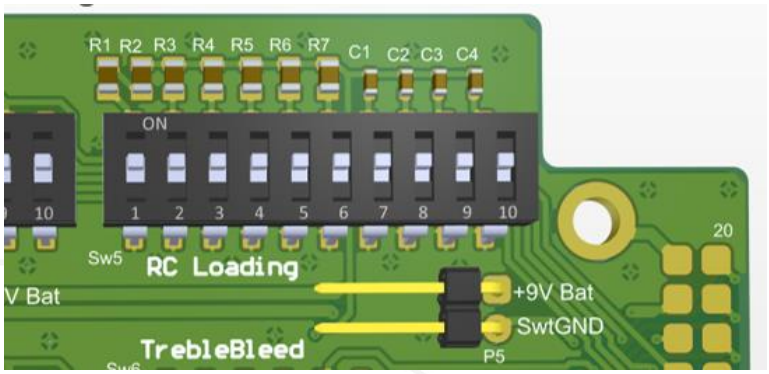
Appendix e2: Module RC Load Options



Rload		Sw 5					Rload
Opt.	S1	S2	S3	S4	S5	S6	kohms
1	0	0	0	0	0	0	500
2	1	0	0	0	0	0	458
3	0	1	0	0	0	0	422
4	1	1	0	0	0	0	391
5	0	0	1	0	0	0	353
6	1	0	1	0	0	0	331
7	0	1	1	0	0	0	312
8	1	1	1	0	0	0	295
9	0	0	0	1	0	0	274
10	1	0	0	1	0	0	260
11	0	1	0	1	0	0	248
12	1	1	0	1	0	0	237
13	0	0	1	1	0	0	223
14	1	0	1	1	0	0	214
15	0	1	1	1	0	0	206
16	1	1	1	1	0	0	198
17	0	0	0	0	1	0	188
18	1	0	0	0	1	0	181
19	0	1	0	0	1	0	175
20	1	1	0	0	1	0	170
21	0	0	1	0	1	0	162
22	1	0	1	0	1	0	157
23	0	1	1	0	1	0	153
24	1	1	1	0	1	0	149
25	0	0	0	1	1	0	143
26	1	0	0	1	1	0	139
27	0	1	0	1	1	0	136
28	1	1	0	1	1	0	133
29	0	0	1	1	1	0	128
30	1	0	1	1	1	0	125
31	0	1	1	1	1	0	122
32	1	1	1	1	1	0	119
33						1	25

Cload	Sw 5					35pf/ft
Opt.	S7	8	9	10	Ctot pF	Add ft
1	0	0	0	0	0	0
2	0	0	0	1	120	3
3	0	0	1	0	270	8
4	0	0	1	1	390	11
5	0	1	0	0	560	16
6	0	1	0	1	680	19
7	0	1	1	0	830	24
8	0	1	1	1	950	27
9	1	0	0	0	1200	34
10	1	0	0	1	1320	38
11	1	0	1	0	1470	42
12	1	0	1	1	1590	45
13	1	1	0	0	1760	50
14	1	1	0	1	1880	54
15	1	1	1	0	2030	58
16	1	1	1	1	2150	61

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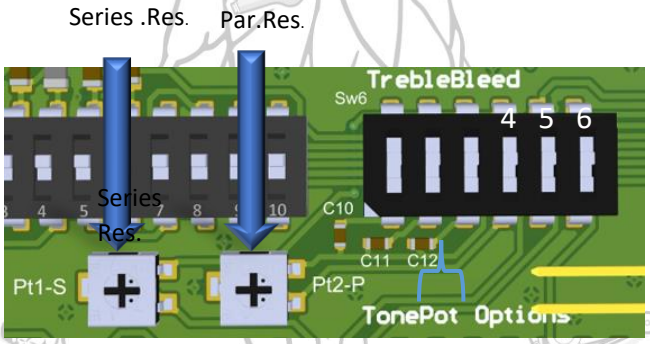
Appendix e3: Module Treble Bleed Options

Suggestion Source or setup	Mode	Series Res Pt1-S	Parallel Res ohms Pt2-P	Cap pf	Sw6-1 caps	-2 caps	-3 caps	Sw6-4 Functions…	-5 Functions ..	-6 Tbleed off/on
				0	off	off	off	off	off	off
G&L	C	0 adj		200	off	off	**on**	off	off	**on**
PRS	C	0 adj		180	off	off	**on**	off	off	**on**
Suhr	RC-P	0 auto	150k	680	off	**on**	**on**	**on**	**on**	**on**
Seymore Duncan	RC-P	0 auto	100k	2000	**on**	**on**	**on**	**on**	**on**	**on**
DiMarzio	RC-P	0 auto	300k	560	off	**on**	**on**	**on**	**on**	**on**
StewMac	RC-P	0 auto	150k	1000	**on**	off	off	**on**	**on**	**on**
TV Jones	RC-P	0 auto	150k	1000	**on**	off	off	**on**	**on**	**on**
Lace										**on**
MojoTone	RC-P	0 auto	220k	470	off	**on**	off	**on**	**on**	**on**
Kinman	RC-S	130k	0 auto	1200	**on**	off	**on**	off	off	**on**
Aki even	RC-SP-A	22k	150k	820	off	**on**	**on**	off	**on**	**on**
Aki less vol drop	RC-SP-A	100k	330k	470	off	**on**	off	off	**on**	**on**
Aki mild	RC-SP-A	100k	220k	470	off	**on**	off	off	**on**	**on**
Fender/Parish	RC-SP-P	20k	150k	1200	**on**	off	**on**	**on**	off	**on**

Sw6 caps	-1	-2	-3
0	off	off	off
180pf	off	off	**on**
470pf	off	**on**	off
650pf	off	**on**	**on**
1.0 nF	**on**	off	off
1.2 nF	**on**	off	**on**
1.5 nF	**on**	**on**	off
1.7 nF	**on**	**on**	**on**



Sw6 Tbleed Functions layout options	-4	-5	-6
Mode 0 No TrebBleed	off	off	off
Mode 1 Pt2-P || caps + Pt1-S *1	**on**	off	**on**
Mode 2 Pt2-P || (caps+Pt1-S) *2	off	**on**	**on**
Mode 3 Pt2-P || caps *3	**on**	**on**	**on**

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