

ChordBender

Manual for Advanced Topics

(using different tunings, different strings, *Chord Morphing*, checking setup, fine tuning the ChordBending, re-oiling the unvarnished wood fingerboard)

Whammy Cams (& Other Definitions of Terms Used Here)

The 6 bigger circular things in the Whammy.

Teeth

Each Whammy Cam has spiked “teeth” along at least 1 of its outside rims. These mesh with “spikes” in the bottom of the whammy’s carriage to keeping them in place so **Whammy Cams** need to be lifted off of these before they can rotate.

Alignment Marks (Marks)

There are 5 of them (1 @ notch) at the top of the carriage at each end of the row of Whammy Cams.

Cam Tool

The “hooked & looped” tool supplied in the guitar’s basic toolkit.

Using Different Tunings

Alignment Chart for Alternate Tunings

(Note: 2 *teeth* = 1 *Mark*)

Down 2 Frets 2 *Marks* farther from **Saddles**

Down 1 Fret 1 *Mark* farther from **Saddles**

Standard Middle Mark

Up 1 Fret 1 *Mark* closer to **Saddles**

Up 2 Frets 2 *Marks* closer to **Saddles**

Example (Open G Tuning):

Put the guitar on its back on a flat surface so the **Whammy Cams** will stay in place. Remove the **Whammy Cam** cover after removing its screw. Switch half-step stop **OFF**. In this tuning both Es and the A are tuned down 2 half steps. Therefore each of these strings needs to have its inked mark (visible from the side of the whammy with the word Patent”) rotated clockwise by 4 teeth or two *Marks*. **HOW**: depress the whammy’s arm and use the “hook” in the toolkit to lift the **Whammy Cam** and rotate it per the above (loosen string if it is too tight).

Note: inked marks on **Whammy Cams** might not have started aligned with the center **Mark** so move each **Whammy Cam** from where it was set at the factory.

Exception: if you change all the strings by a uniform number of half steps (3 for example) no adjustment is needed. The **pattern** has not been changed. We only need to reflect changes in the **pattern** of standard tuning (due to the Laws of Physics).

ChordMorphing

Example: near the end of Stairway to Heaven there is an A minor, G, F progression. You could style that up with a **ChordMorphing** from A minor (577555) to G (355433, not minor). You would do that by 1) setting the half-step stop to 2 half steps, 2) **releasing only half the pitch on the G string** per the following setup, & 3) playing 577555 for **both** the A minor and the G and using the whammy to **Morph** the chord.

Example 2 (major to minor): you could morph 577655 to 466444 (1 half step except the G string's 2) by doubling the pitch release on the G string.

Put the guitar on its back on a flat surface so the **Whammy Cams** will stay in place. Remove the screw holding the **Whammy Cam** cover on & remove the cover.

Note how the inked mark on the **Whammy Cam** is aligned versus its neighboring **Whammy Cam's** inked mark and **jot that down**.

You will be rotating the **Whammy Cam** by **9 Teeth (away from the saddles if halving) or 11 (toward the saddles if doubling)**. Example: if you want the special string to change by half as much as the others it will be rotated **9 Teeth** away from the saddles. You need to make an extra inked mark to help. We suggest using a toothpick to feel your way from the old inked mark to where you want to make the extra inked mark.

Fully depress the whammy, use the **Cam Tool** to lift the **Whammy Cam** enough so it can rotate as needed (loosen the string involved if it's too tight). Move the new inked mark to where the regular one was. Retighten the string. Make sure the Teflon sleeve is where it belongs.

See **Fine Tuning the ChordBending** if the **ChordMorphing** is off a bit.

Checking Setup

1st: Adjust Truss Rod (testing Fat E string)

- Capo @ 1st fret
- Press string down @ 17th fret (use somebody to help?)
- The distance from the Fat E string to the 6th fret should be about .004" (the thickness of 20 pound office paper if you do not have feeler gauges). Adjust truss rod using tool provided; use **Cam Tool** to lift the 2 strings out of the nut and away from the screws in the truss rod cover on headstock (where tuners are). Turn clockwise to reduce distance, counterclockwise otherwise. **Reinstall truss rod cover, 2 strings, & remove capo.**

2nd: Adjust Action (string height)

Set @ 17th fret = 1/16" to bottom of string, slightly more for Fat E (using "feeler" from step 4). If buzzing from the 10th fret & higher on each string raise the saddle. Use the thin L-shaped wrench provided in the toolkit to adjust the **both** screws on top of each **Saddle** to raise or lower it. Clockwise raises the string.

3rd: Set Intonation (12th fret should be exactly one octave above open string)

Do on lap in playing position using a tuner. Lock the Whammy Bar & turn your tuner on (assuming you have one—otherwise try to get the harmonic at the 12th fret to match the played tone). A) Tune the string **up** (from flat), B) play at the 12th fret, C) if the fretted note is **1/10** of a half step **flat** (relative to the open string) turn intonation screw (its head faces away from headstock) **counterclockwise 2.5 turns** and push on

the screw so the **Saddle** is fully advanced; use more or less depending on how much error was noted and go *clockwise* if the fretted note is *sharp*. Repeat B) & C) until satisfactory. Do / check each string.

4th: Set Pickup Height (they were set electronically at the factory) **(while pressing down strings at the highest fret)**

Fat E: 1/8" (except 3/32 @ bridge), Thin E: 3/32" (except 1/16 @ bridge). After setting once do it again since the 1st side has changed a bit after the 2nd has been adjusted. You can make "feelers" of the right size from 3 round toothpicks by wrapping tape around them until right.

Lubrication

Lubrication does not appear to be needed for several years. A small amount of the lightest synthetic oil you can find is recommended if you ever suspect that the bearings (one on each side of the whammy) need a lube. *ChordBenders hate grease*. Order the best oil from ChordBender.com (or get some sewing machine oil as John Cipollina recommended) & use only 2 to 4 drops per side; disassembly & direct application into each bearing is a good idea.

Fine Tuning the ChordBending

Put the guitar on its back on a flat surface so the **Whammy Cams** will stay in place. Connect your guitar to your tuner. Set the nylon **Half-step Stop Screw** (accessed below the "off" half-step stop) using a thin-bladed regular screwdriver so from when the whammy Bar is *locked* to when the whammy is fully used the **thin E** goes down exactly from E to D# or D (2 half steps). Put the half-step stop back in the "on" position. Do the other 5 strings one at a time. You will only need to remove the **Whammy Cam** cover if an adjustment is needed. A) Lock the Whammy Bar and tune the string, B) unlock the whammy and depress the whammy to its stop and note the results (the **Whammy Cam** is fine if the string is detuned by the expected 1 or 2 half steps and you can go on to the next string with Step A – otherwise note the amount the fretted note is flat or sharp and continue to C, C) put the half-step stop back in the "off" position & depress the whammy, lift the **Whammy Cam** using the **Cam Tool** and one of the circular holes in the side of the **Whammy Cam** (you can tune the string down to make this easier), D) rotate the **Whammy Cam's** inked mark *toward* the **Saddles** one "tooth" (2 if checking a bend of 1 half step) for each 1/10 the limited bent note was sharp (*away* if flat), and E) push the **Whammy Cam** down with your thumb or fingers & "squish" it around a bit so you are sure it is well "seated" onto its spikes Repeat A) through E) on this string until you are satisfied.

Re-oiling the Unvarnished Wood Fretboard

The fretboard (if unvarnished) should receive a thin coat of raw linseed oil when it looks dry. Do this when you replace strings by removing 3 strings on one side all at once and applying (and buffing off) the oil when those strings are off. Install the 3 new strings & then do the other 3 the same way.