

## Gemini Pickups

Different by design


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### Multiple Sounds from Humbuckers

#### ACT

ACT stands for Asymmetric Coil Tap. A coil of wire can be tapped at any point, regardless of whether the coil is around one or two spools. A coil tap can be used for a hot connection or for an earth connection. Asymmetric coil taps are any coil taps that are not at the centre.

In a humbucker, we are all used to having 4 conductors, at the start and end of each spool. This is the easiest way to wire humbuckers but not necessarily the best. The two spools are normally then connected at the finishes or the starts of the two spools. The 4 conductor system allows the user to decide which and so change the phasing if required. It also provides the possibility to connect the two spools out of phase.



Most often the extra wires are used as simple coil taps, splitting off one of the coils. This tends to produce a thin, weak tone especially for vintage humbuckers. This should not be surprising, considering that a typical strat single coil has an impedance of around 6k ohms compared to a typical split vintage humbucker having an impedance of around 3.75k ohms.

In addition, a strat single coil pickup has a tall narrow winding and a strong narrow magnetic field. A humbucker has short fat windings and a weak wide magnetic field.

Gemini pickups do not provide any opportunity to connect the two spools out of phase as they are connected (in series) internally. The coil tap(s) provided are located within one or both of the spools.

This means that the "single coil" sounds and alternate humbucking sounds use parts of each spool. Consequently, all of the tones have some of the effects of combining two spools. In the main, these are increased harmonic richness, particularly in the mids and bass. The degree of this varies with the proportions of the two coils used.

Using all of one coil and 10% of the second coil produces a very different tone from using 55% of each coil. these differences allow the design of "single coil" sounds in a wide range from strat like tones to Hot P-90 tones.



Given the differences in design of the various types of single coil pickup, it should be no surprise that the bigger "single coil" tones

produced by ACT are much closer to their real single coil equivalents than the smaller ones.

The intention of ACT is not, however, to produce authentic copies of any other pickup's tone. The intention is to produce tones that guitarists can and do use.

I certainly have rarely used the split tones of humbuckers but I do use the tapped tones of my own pickups. I hope, and I believe that other guitarists will do the same.

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### Multimode

Multimode humbuckers are simply humbuckers that have more than two switchable tones. Some of these may be "single coil" tones, others may be alternate humbucker tones.

This is achieved by extending the idea of ACT to be used for both live and earth connections.

The basic idea is very simple. If I want a modern high output humbucker, I might build it with 7,000 turns per spool. If I wanted a vintage humbucker, I might use 5,000 turns per side.



If I build a humbucker with 7,000 turns per side and coil taps 2,000 turns from each side, I get both.

If I also have a coil tap slightly offset from the middle, I can use either the modern or the vintage start point and end at the offset, I can produce two different "single coil" tones.

If I use one full coil and one short coil, I get a different sound again. This is the contoured humbucker sound. It has less mids than the modern sound but more output than the vintage sound.

Any number of designs are possible. I settled on a limited set based on the availability of switching.

Switching between two sounds is easy to achieve. many guitars can already do this. For guitars that cannot, it is easy to fit combined potentiometer/coil tap switches.

Switching three sounds can be achieved with toggle switches. Some guitars already have toggle switches, they are, in any case relatively easy to add, and they are widely available and cheap.

Beyond three sounds, the only sensible solution is the addition of rotary switches. The commonest rotary switches are 6 way switches. Many of the 5 way switches sold are actually 6 way switches with an adjustable stop set to 5.

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