



Capacitance:

What is it and how does it affect my tone?

by Resident "Gear Guru" Rob Cunningham

The capacitance of something is a measurement of its ability to store a charge. Did you ever drag your feet and then touch someone in order to shock them...capacitance in action!!

A capacitor is a device that has two conductors separated by an insulator. What does such a device have to do with a guitar player? If you play electric guitar, everything!!

Let's look at the construction of an instrument cable. A standard instrument cable in its most basic form is made up of a center conductor, some type of insulation, a shield (which is also used as a conductor) and the outer jacket. Hmm....a conductor, insulation and another conductor...Sound familiar?? Now that we realize that a guitar cable is basically a long capacitor, let's look at how your tone gets affected.

When you start playing your guitar, a small electrical current flows between the two conductors of the cable. As the frequency increases, so does the current. This is why high frequencies are affected more by cable capacitance than low frequencies.

Along with the source impedance, cable capacitance forms a low-pass filter between the instrument and amplifier, meaning it rolls-off or cuts high frequencies, much like your guitar's tone control. The higher the capacitance is of the cable, the more high-end roll-off you will experience.



Capacitance in instrument cables are measured in picofarads (pF) as a full farad is too large compared to typical requirements in electronic devices. The picofarad is sometimes comically called a "puff" as well. Let's say you have a cable that measure 45pF per foot and you use a 10ft cable to an effects pedal and then a 10 ft cable to your amplifier. Taking the pedal out of the equation you are looking at 900pF before your guitar signal hits your amplifier. Now lets take two cables that have a capacitance of only 33pF/ft. Using the same set-up you would have a total of 660pF before your guitar signal hits your Amplifier. See why it's important to use quality, low-capacitance cables?

Some manufacturers design cables with a sound in mind...say a "rock style" or "jazz style" cable. What they are doing is pre-equalizing the cable by the capacitance level to roll-off certain frequencies. While this may work for some players, the best cables should leave your signal untouched giving you the most control over your tone when it reaches your amp. Now when some people use a cable with low capacitance, they will say that the cable is very "bright" compared to their standard cable. That "brightness" is actually the high frequencies that their previous cable was rolling off or not effectively reproducing. You may also experience greater lows and added dynamics or "liveliness". The advantage of this is that you can now lower the treble controls on your amplifier, which in turn will cut down on the "hiss" that the amp produces. You are now getting a truer reproduction of your instrument into your amplifier.

Planet Waves cables are specifically designed and manufactured to have very low capacitance (among the lowest available), so that the output of your instrument remains intact and unchanged, giving you full tonal control over your sound.