

AUDIO EQUIPMENT

Introduction

Panel potentiometers are used judiciously in all types of audio equipment. The potentiometers are used to control system functions such as frequency, tone, balance, sound and mix levels. Equipment such as audio mixing boards, instrument amplifiers, sound processing equipment and guitar effects pedals all use panel potentiometers as various adjustment controls.

Background

Panel potentiometers are simply variable resistors. This type of variable resistor is commonly constructed with phenolic, ceramic or hot molded plastic elements and a carbon or cermet resistive ink printed on the surface. A wiper rides across the element to create the variable resistive output. Wipers are commonly fabricated from stamped phosphor bronze, nickel-silver, or can even be fabricated from multiple formed wire strands (multi-finger wiper) welded to a tie bar. The wire tips are typically precious metal and are typically encountered in higher end potentiometers.

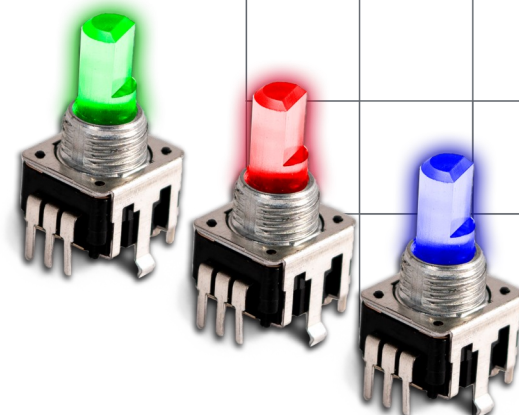
Panel potentiometers are used in two basic applications namely voltage divider and rheostat modes. Most commonly used a voltage divider, the potentiometer is powered between the outer terminals and the variable voltage is read through the center terminal. When the user turns the shaft, the voltage output changes directing the system to make a change to the frequency, volume, balance, or other function. In the rheostat mode, the actual resistance is used as the change in signal to drive the change in assigned function.

APPLICATIONS

Evolution of Audio Equipment

As sound and audio equipment continues to evolve, there is a trend for equipment to shrink in size. Concurrently, there is a trend to pack more controls into existing or smaller sized units. To address these trends, components of varying sizes are needed with the smaller sizes used to save printed circuit board space while maintaining performance and extending the individual control functionality.

Consumer grade audio mixers, better known as “prosumer” grade audio mixers, in compact sizes are now available for the avid musician who wants a home studio. Mixers use large quantities of various sized panel potentiometers to control frequency, tone, balance, effect send and attenuation. Each channel on a multichannel mixer requires a set of controls.



Evolution of Audio Equipment Continued

All associated signal processors that support the recording process also use a large quantity of various sized panel potentiometers for effect controls, wet/dry mix, input/output level controls and other functions.

Guitar effects “stomp boxes” are also booming in popularity. What were once large multifunction effects floor units have been pushed aside by guitarists who prefer individual effects units to customize their sound. Many of these effects use standard size panel potentiometers to control input level, output level, sound mix, and effect intensity. Mini-effects units have also exploded in popularity over the last two years. These units require smaller panel potentiometers to save space and provide the same functionality as their larger size counterparts. Also increasing in popularity are LED backlit control shafts that allow the guitarist to see control settings in dark club or concert settings.

Another trend over the last few years started with the introduction of “lunch box” guitar amplifiers. The reduction in size of the guitar amplifier requires smaller panel potentiometers that are used to control volume, brightness, attenuation, bass, treble and output level to the effects loop. “Lunch box” amplifiers continue to grow in popularity as they are light weight, portable, and carry the same power rating as their standard-sized and much heavier counterparts.



VR Series 09VR, 11VR, 12VR and 14VR Panel Potentiometers

CTS VR Series family of panel potentiometers offers a variety of sizes ranging from 9mm to 14mm packages. All models are available with and without bushing, horizontal and vertical mount styles, various standard resistance values and a variety of tapers. Rotational life ranges from 5,000 cycles to 30,000 cycles, and have a wide operating temperature range of -10°C to +70°C. Select models offering the dual output option have excellent tracking performance at $\pm 2\text{dB}$. Shaft length and trim options are available. In addition, Series 12VR offers backlit illuminated shafts for those applications requiring an illuminated shaft. LEDs are available in single, dual and three-color options in a variety of colors.



Custom configurations are also available on request. Contact an authorized CTS Sales Representative for additional details.

Contact us with any questions at <https://www.ctscorp.com/contact>.