

THE VOLUME UNIT

MANY audio engineers do not understand the volume unit (vu), for it is a difficult unit to describe in words. Perhaps it would help to state what the vu is *not*.

The vu is *not* a unit of measurement for power or power level as are the watt and dBm. The vu is *not* a unit of measurement of loudness as is the phon. In fact, the vu has no relationship to any other unit of measurement encountered in electrical communications.

Nevertheless, it is one of the most useful tools of the audio engineer, as it is used in the stating of the level of complex, non-recurrent, and non-periodic waves (music and speech) of electricity.

The vu should not be used for steady-state waves, just as the dBm must not be used for complex material. The vu and the dBm are highly different units and must be treated so.

Volume in vu is numerically equal to the highest scale reading observed on a standard vu meter during a short period of time, added to the dB attenuation of the attenuator network that precedes the meter. Occasionally meter deflections of unusually high level may be ignored.

From the above strict definition, several things may be deduced. First, since the meter reading is constantly changing, the ballistic characteristics of the meter are of great importance. Second, the vu is far from being a precise unit of measurement because it depends on human interpretation of a constantly changing condition.

A "standard vu meter" has a reference point (marked "0") near the upper end of its scale. The ballistic characteristic must be such that if a sinusoidal voltage of such amplitude as to give reference deflection under steady-state conditions is suddenly applied, the meter pointer must reach 99% deflection in 0.3 second. The pointer must then overswing the reference point by at least 1.0% but not more than 1.5%. When the signal is removed, the pointer must fall with approximately the same characteristic that it had when it was rising.

Unless a meter has the above dynamic behavior, it cannot be used to determine volume in vu.

Many meter manufacturers mark common a.c. voltmeters in vu and then call them "vu" meters. The use of such instruments should be discouraged.

The attenuator preceding a vu meter is calibrated in dB and marked in vu. It must be designed specifically for use with the impedances stated by the meter manufacturer. All American firms are standardized on one set of impedances and parameters.

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