

AMPLIFIER

Generally, an **amplifier** or simply **amp**, is a device for increasing the power of a signal.

In popular use, the term usually describes an electronic amplifier, in which the input "signal" is usually a voltage or a current. In audio applications, amplifiers drive the loudspeaker used in PA systems to make the human voice louder or play recorded music.



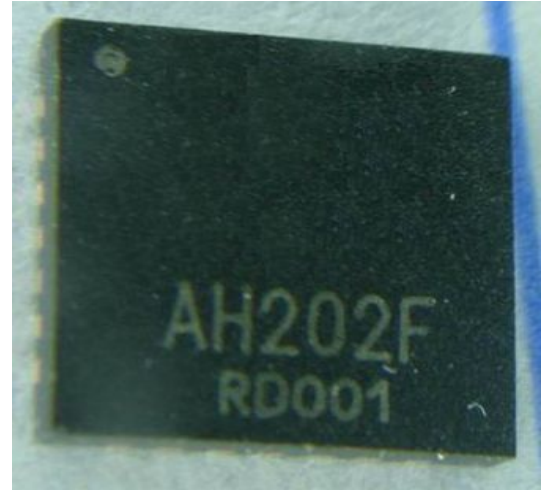
Gain

The gain of an amplifier is the ratio of output to input power or

Amplitude, and is usually measured in decibels.

(When measured in decibels it is logarithmically related to the power ratio: $G(\text{dB}) = 10 \log(P_{\text{out}} / P_{\text{in}})$).

RF amplifiers are often specified in terms of the maximum **power gain** obtainable, while the voltage gain of audio amplifiers and instrumentation amplifier will be more often specified (since the amplifier's input impedance will often be much higher than the source impedance, and the load impedance higher than the amplifier's output impedance).



Bandwidth

The bandwidth of an amplifier is the range of frequencies for which the amplifier gives "satisfactory performance". The definition of "satisfactory performance" may be different for different applications. However, a common and well-accepted metric is the half power points (i.e. frequency where the power goes down by half its peak value) on the output vs



Efficiency

Efficiency is a measure of how much of the power source is usefully applied to the amplifier's output.



Low-noise amplifier (LNA) is an electronic amplifier used to amplify very weak signals (for example, captured by an antenna). It is usually located very close to the detection device to reduce losses in the feed line. This active antenna arrangement is frequently used in microwave systems like GPS, because coaxial cable feed line is very lossy at microwave frequencies, e.g. a loss of 10% coming from few meters of cable would cause a 10% degradation of the signal- to-noise ratio (SNR).