

## > What are **LINEARIZERS** and by whom are they purchased?

When information is sent by radio, the signal carrying the information must be increased in power to a level sufficient for successful transmission. The device that increases the signal level is an Amplifier. In many radio frequency (RF) and microwave communications systems, this level can be quite high. Consequently, the required high power amplifier (HPA) will be large and expensive. Satellite communications is an example of a service that often requires large HPAs.

In addition to requiring a high signal level, many communication systems also require that the signal be amplified with a minimum of distortion. Highly linear amplifiers are essential for the efficient transmission of information. Modern digital communications systems (cellular and personal radio) in particular need amplifiers with very high linearity. Most amplifiers are inherently non-linear.

Linearizer Technology, Inc (LTI) does not make amplifiers; it makes amplifiers better by reducing their distortion. LTI accomplishes this by producing modules that correct an amplifier's distortion. These modules are called Linearizers. They are placed in front of the amplifier. The function performed by the linearizer in relation to the amplifier is very similar to that of eyeglasses in relation to the eye. The eye distorts the image seen; the glasses pre-distort the image. When these two distortions are combined, the result is a clear image. For the nearsighted, the glasses must pre-distort the image one way. For the farsighted, the image must be pre-distorted in the opposite way. The lenses of the glasses must be shaped to match a particular sight problem. In the same way, the linearizers LTI produce must be tuned to cancel the distortion of a particular non-linear amplifier.

The matching of linearizers to amplifiers is much more complicated than the example of glasses. There are many more types of amplifiers than there are types of eyes. In addition, amplifiers operate at different frequencies and power levels, and are used for different applications. All these factors must be considered. The major cost in producing a linearizer is not the components used in its fabrication, but the labor and time spent in matching the linearizer to characteristics required to correct a given amplifier.

When properly adjusted, a linearizer can virtually eliminate HPA distortion. This often allows an HPA to more than quadruple in effective output power, and to increase by more than 50 percent in efficiency. Thus, the use of a linearizer can significantly reduce the cost of an HPA. Many systems would not be economically feasible without linearization.

Most of LTI's linearizers are supplied to manufacturers of HPAs. Linearizers are also supplied to an amplifier users – typically to satellite ground stations and teleports. These customers already have HPAs, but now need greater linearity. Knowledge of the characteristics of the amplifier to be linearized is important. This information is analogous to the data collected during an eye examination that is used to produce eyeglasses. Unlike eyeglasses, linearizers can be adjusted in the field to match a specific amplifier. This process is not complicated and typically requires only a few minutes. However, the linearizer must be designed for the particular amplifier class: Glasses designed for a nearsighted amplifier will not work properly with one that is farsighted.

The process of producing a linearizer can vary greatly in time depending on the amplifier's characteristics. Typical delivery time for our standard models is four to six weeks.