

## Engineering Note

### Details of the AGC, ALC and Max Gain Controls

Peninsula Engineering Solutions' RF repeaters include built in circuits to control the microwave amplifier's gain in normal operation and fading conditions.

A typical RTI repeater may have the following characteristics:

- Full Gain = 60dB
- AGC = 20dB range
- ALC set point = 0 to 14dB below Full Output Power Level
- Maximum Gain Limit or Gain Reduction = 0 to 20dB below Full Gain.
- P1dB = +28dBm

The charts below illustrate the region of gain control as the first flat section. The inset box in Figure 5 represents the normal operating region. The curve sections to the right of the box show the overload region ending at amplifier saturation. As the ALC set point and Gain Reduction are varied, one can observe that the gain control region shifts.

When setting up the repeater, it is important to note the operating conditions. The ALC set point can only be set when in the first flat section of the curve. Enough input RSL plus gain is needed to reach or exceed the ALC set point. Once in regulation, the ALC can be adjusted to hold the power at the set point.

Maximum Gain or Gain Reduction is used to limit the gain to somewhat less than Full Gain. This is helpful in case of closely spaced antennas with less than adequate isolation for full gain. Short hop repeater systems can benefit from this feature.

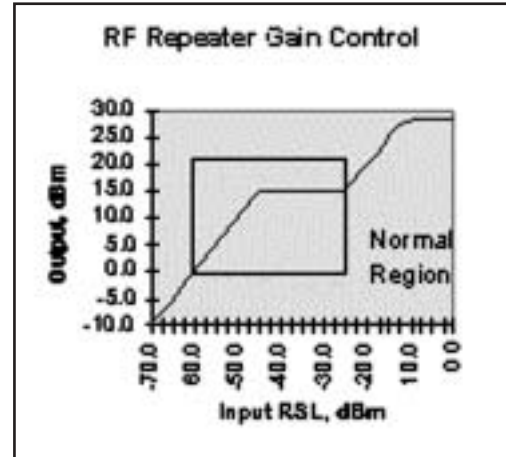


Figure 5 - ALC Set Point = +15dBm  
Gain Reduction = 0dB

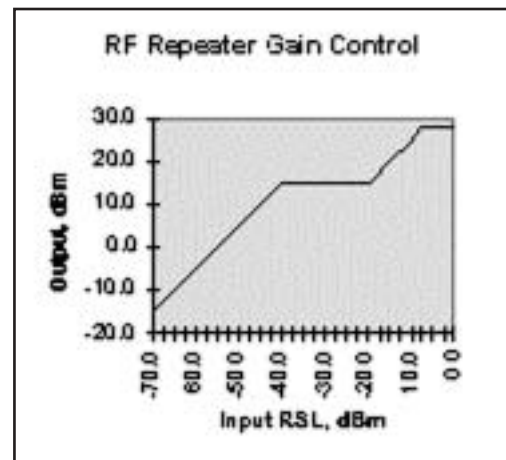


Figure 6 - ALC Set Point = +15dBm  
Gain Reduction = 5dB

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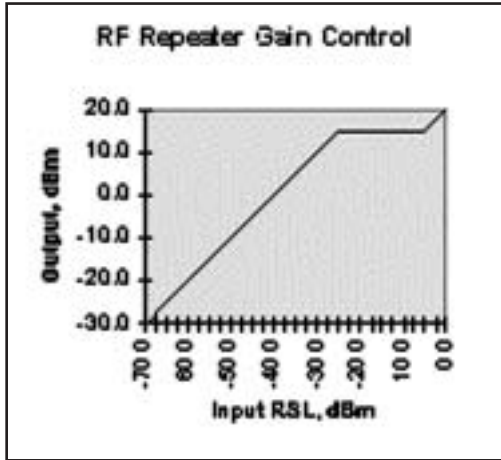


Figure 7 - ALC Set Point = +15dBm  
Gain Reduction = 20dB

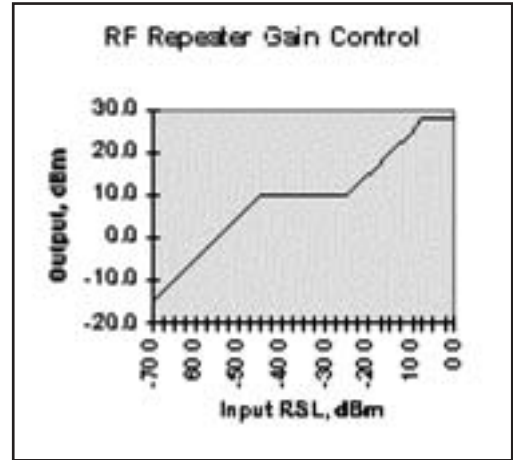


Figure 9 - ALC Set Point = +10dBm  
Gain Reduction = 5dB

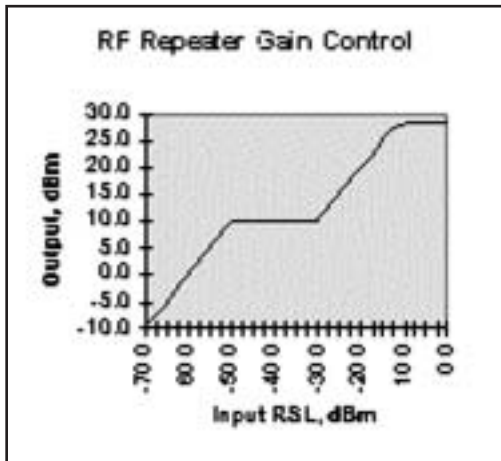


Figure 8 - ALC Set Point = +10dBm  
Gain Reduction = 0dB

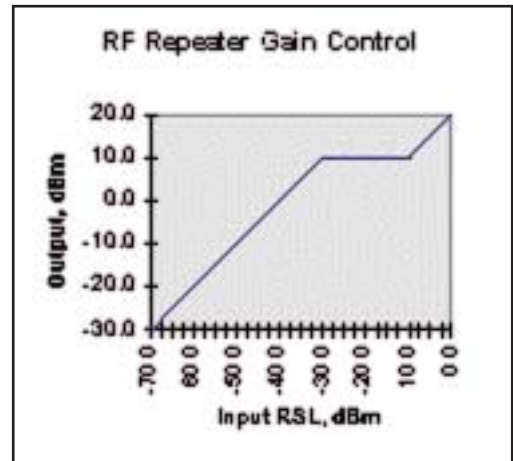


Figure 10 - ALC Set Point = +10dBm  
Gain Reduction = 20dB