

Demystifying the ALC and the Processor for Optimal HF Performance

Unlock the full potential of your HF transceiver by understanding and properly using the Automatic Level Control (ALC) and the Processor.

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These often overlooked functions can significantly improve the clarity and power of your signal on the air. Let's explore their purpose and how they work together.

The Purpose of the ALC:

Automatic Level Control is a crucial circuit designed to prevent overdriving the final amplifier stage of your transmitter. Overdriving leads to several undesirable effects, including:

- Splatter: The generation of unwanted signals on frequencies adjacent to yours, causing interference to other operators.
- Distortion: Degradation of the quality and intelligibility of your transmitted audio.
- Damage: Potential harm to the expensive transistors or tubes in the final amplifier.

How the ALC Works:

The ALC circuit monitors the output power of your transmitter. If the power exceeds a safe level, the ALC generates a negative voltage that feeds back to the earlier stages of the transmitter, reducing gain and thus the drive to the final amplifier. Think of it as an automatic volume limiter for your transmitted signal. The goal is for the ALC to be just barely active at voice peaks, indicated by a slight deflection on your radio's ALC meter.

The Role of the Processor:

The Processor, often an audio compression or voice processing circuit, aims to increase the average power of your transmitted voice signal. Human speech has a high peak-to-average power ratio, meaning the loud parts of your voice are much more intense than the softer parts. A processor compresses this dynamic range, making the softer parts louder relative to the peaks.



Proper Use of the Processor:

By increasing the average power, a properly adjusted processor can:

- Improve Intelligibility: Make your signal easier to understand, especially in noisy conditions or for distant stations.
- Increase Perceived Power: Give your signal a stronger presence at the receiving end.

However, over-processing is harmful. It can lead to:

- Increased Distortion: Making your voice sound unnatural and hard to understand.
- More Splatter: Widening your transmitted bandwidth and causing interference.

How the ALC and Processor Work Together:

The ALC and Processor are closely linked. When you enable the processor and it raises the average audio level, it also increases the peak levels driving the final amplifier. This is where the ALC comes into play. It detects these increased peaks and automatically reduces the drive to prevent overdriving.



The Key to Proper Adjustment:

The ideal setup involves using just the right amount of processing to achieve a noticeable improvement in your signal without overdriving the ALC. Here's a general guide:

Start with the processor off. Adjust your microphone gain so that the ALC meter barely flickers at the strongest voice peaks. Gradually turn on the processor. Increase the processing level while watching the ALC meter.

Try to achieve a slight increase in ALC activity at voice peaks compared to when the processor is off. If the ALC meter is constantly high, you are likely over-processing. Listen to your transmitted signal on a monitoring receiver or ask a trusted contact on the air for feedback on your audio quality.

By understanding and carefully adjusting your ALC and Processor, you can optimize your HF signal for maximum clarity and effectiveness, ensuring enjoyable and interference-free operation on the amateur bands.

Properly understanding and adjusting the ALC and Processor not only improves the quality of your transmission but also reflects a responsible commitment to the efficient and ethical use of the amateur radio spectrum. A clear, intelligible, and interference-free signal is the result of an operator who masters not only their equipment but also the art of HF communication.

