Application Note AP31

Automatic Gain Controlled Amplifier
The Model 2173

Have you ever made a duplicate recording only to discover after midway into the recording the output signal was either too high or too low for the recorder to deal with appropriately? With too much amplitude the input of the recorder became saturated and caused a distorted recording. When the signal amplitude was too low the result was equally unacceptable. A good automatic gain controlled AGC amplifier in the circuit reduces these problems to manageable levels.

The Apogee Labs model 2173, shown in Figure 1, houses up to 14 dual channel AGC amplifiers (28 channels) of the type shown in Figure 2. Each IOC801 module contains two independent amplifier channels. The inputs and outputs for each channel are located at the rear of the chassis on isolated BNC connectors. Accessible at the chassis front panel, are the commonly used controls test-point connector for each channel on the modules.

Figure 1 Model 2173 Chassis

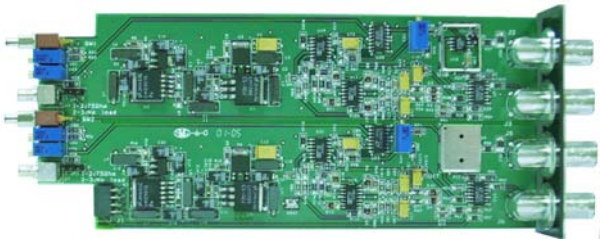
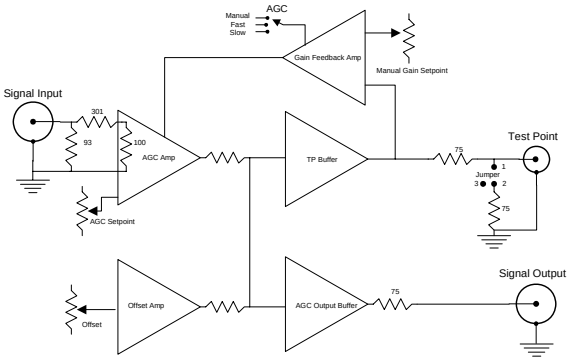


Figure 2 IOC801 AGC Amplifier

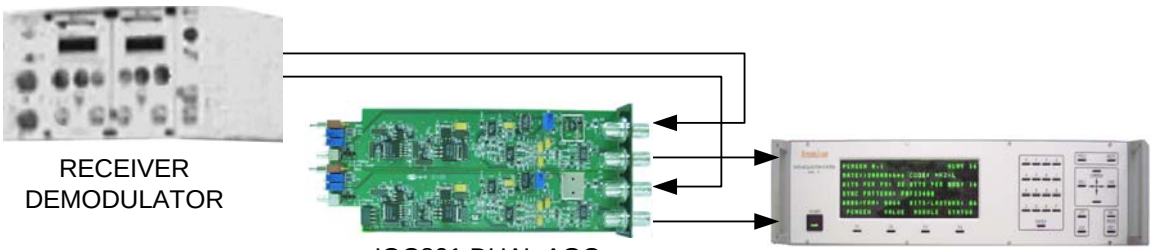
The user has front panel access to select the mode of operation, either manual or automatic gain control. When automatic gain control is selected, the user has the option of also selecting the attack rate of either 10 milli-seconds or 1 second. The gain limit is established by the set-point, which is adjusted at the factory to 2.83Vp-p. The DC offset is adjustable at the front panel within the range of ±4 Volts. The module may also be operated in manual mode. Manual mode requires the user to set the amplifier gain, which remains fixed. The gain range is between -16dB and +17dB.



Amplification fidelity is especially critical. The IOC801 is considered to be a high-fidelity wide-band amplifier given its frequency response of DC to 20 MHz. This pass-band is flat to within ±0.5dB over the entire range. The excellent distortion performance of this amplifier is highlighted by the fact that the signal to noise and distortion ratio is

better than 40dB over the entire pass-band. Furthermore, the channel-to-channel isolation is greater than 60dB at 20 MHz and greater than 80dB at 1 MHz.

A typical application for the model 2173 and the IOC801 module is illustrated below. A telemetry receiver, providing two demodulated outputs, is attached, through an IOC801, to a multi-channel PCM bit synchronizer. The IOC801 AGC amplifier automatically compensates for signal level variations that could contribute to the bit synchronizer producing errors. The IOC801 maintains an acceptable signal amplitude within the operating window of the input to the bit synchronizer.



When dealing with a large number of signals that need amplitude control, the model 2173 with its IOC801 modules is the ideal solution. An example of this is a large number of receivers used to simultaneously pass signals from related sources to a multi-track recorder.