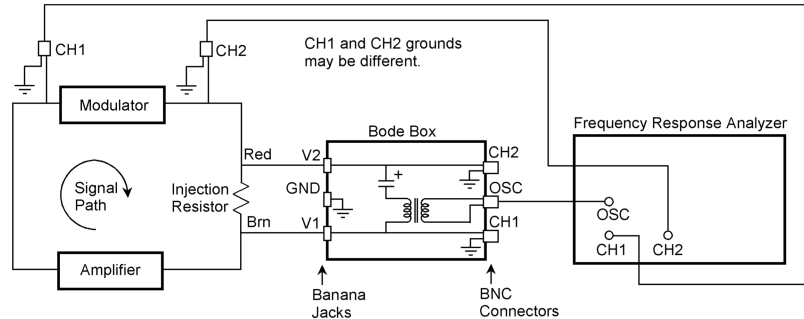


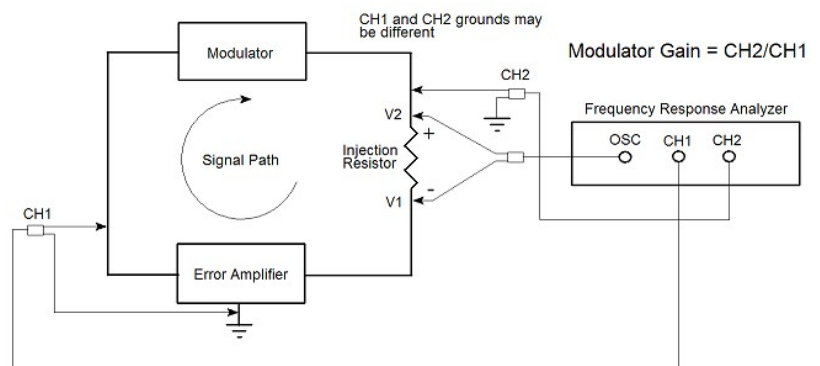
Measuring a Modulator Transfer Function – Closed Loop Method

The open loop method described in the previous section is the best method for going directly to the desired system performance without any trial-and-error. Quite often, however, the loop is already closed and the objective is to “fix” the loop rather than design it. In this case, the modulation signal is injected as an error voltage in series with the feedback loop exactly as it is when measuring loop gain (see section on measuring loop gain).

The principal difference between measuring the modulator and measuring the loop is that the simple connection where the injection signal is connected automatically to the FRA inputs through internal connections in the Bode Box injection transformer is not used. The Bode Box injection transformer is still needed to inject the signal to vary the operating point, unless the analyzer has a floating oscillator. Separate BNC-Minigrabber or scope probe connections are used to measure the modulator input and output voltage, just as in the open loop case.



The advantage of measuring the modulator transfer function while the system under test is operating closed loop is that the bias adjustment procedure described in the previous section is not needed. The disadvantage is that the signals are generally noisier and the accuracy is not as good, especially at high frequency.



Measurement with a Floating Oscillator and No Transformer

Servo Control Recommended

The Servo Control dynamically changes the AC Volts Out to keep an input channel at a fixed voltage while the analyzer takes data. The Servo Control compares the input voltage on the monitored channel to the AC Volts In and changes the AC Volts Out until they are equal. It changes the AC Volts Out by a maximum of AC Out Step Size. This feature is helpful in preventing the analyzer oscillator from overdriving the circuit past Max AC Volts Out during a sweep. The recommendation is to set Servo on the output channel (typically channel 2) at 20 mV to 30 mV and Max AC Volts Out to your circuit limits below the maximum output of 10 Vpk.