
# MODEL SC-50 PEAK LIMITER-COMPRESSOR

## OPERATING INSTRUCTIONS

manufacturer of professional audio equipment

## INTRODUCTION

The SC-50 is a peak limiter-compressor developed primarily for sound reinforcement and recording applications. Actually the design goal was a universal, peak-sensitive AGC device with audio performance comparable to that of a good console. It took over five years of research to realize this goal.

We have found that AGC (automatic gain control) devices such as the SC-50 are almost universally misunderstood. If you are not familiar with limiters, it would be a very good idea to read the instructions carefully before use and again after you have used the SC-50 for awhile.

## I. POWER

The SC-50 should be connected to a 3 wire grounded outlet supplying 120 Volts, 50-60 Hz. Power consumption is 5 watts.

## II. INPUT AND OUTPUT CONNECTIONS

The input, output, and stereo tie connections are $\frac{1}{4}$" phone jacks and mate with a standard phone plug such as a switchcraft 280. For rack mounted unbalanced audio systems, the common audio ground may be separated from the chassis by using stereo phone plugs for input, output, and stereo tie. The audio ground is wired to the ring of all connectors rather than the sleeve. In this manner, ground loops in the rack may be eliminated.

The input impedance of the SC-50 is 15k ohms. This imposes no load on usual low impedance sources. The output impedance is 50 ohms and full headroom is realized with any load greater than 600 ohms.

Musical instruments which do not have their own preamp will require a preamp such as an Ashly Audio SC-40 ahead of the SC-50.

To tie two limiters for stereo operation, simply place a patch cord between the stereo tie jacks of both limiters. If the ground isolation feature is being used, use a stereo patch cord.

## III. OPERATION

In general, the function of the SC-50 is to establish a maximum or ceiling level called the "threshold" for the loudest peaks in the program material. Program material below this ceiling passes through the SC-50 with no alteration. When the threshold is exceeded, gain is reduced, tending to contain program peaks at the ceiling level, accomplishing this by turning down the level rather than clipping all the peaks. Note that the SC-50 is strictly a level controlling device and does not affect frequency response.

III. OPERATION - continued

The threshold of the SC-50 detector is fixed at 0 dBV. With the input gain and output level at "0", the SC-50 has unity gain and a peak output of 0 dBV at the threshold. The effective threshold will be opposite to the amount of input GAIN. (+10 dB gain will cause the SC-50 to start limiting at -10 dBV) The OUTPUT LEVEL control is calibrated in dBV ouput level at the threshold.

The readout indicates the onset of limiting with the yellow "threshold" (T) indicator. The four red LED'S indicate the amount of GAIN REDUCTION in dB. If using two SC-50's in stereo, the readouts will still read independently each indicating half the total contribution to overall gain reduction. (i.e. one limiter indicating 10dB gain reduction produces only 5 dB actual reduction while both limiters indicating 10 dB gain reduction produce 10 dB actual reduction.) Gain reduction is always identical for both limiters, preserving stereo imaging.

The other three controls adjust gain reduction characteristics and have no effect when the SC-50 is not limiting. These controls are defined as follows:

RATIO - the increase in input level above the threshold to produce a 1 dB increase in output level. With a ratio of 5, 10 dB increase in input over the threshold would produce a 2 dB increase in output. With the ratio at ∞ (infinite) there would be virtually no increase in output level.

ATTACK - How fast the gain is reduced to normal when the input peak level is reduced. (seconds)

Note that the attack is always much faster than the release.

There are usually tradeoffs between the firmness of control and audible side effects. Larger ratios provide more rigid control of levels but restrict dynamics. Faster attack times effectively contain rapid transients but tend to introduce "rough edges" and harshness with large amounts of limiting. Faster release times increase loudness but make the limiting action itself more apparent through the constant, rapid changes in gain.

Special care was taken in the design of the SC-50 to make the three dynamic adjustments non-interacting. The combinations of control settings to accomodate differences in application will be infinite. The following suggestions for a few specific applications are intended as starting points only and certainly variations are possible.

## PREVENTION OF CLIPPING OR EXCESSIVE PEAK LEVEL

Apply a signal and adjust the input GAIN high enough to cause about 10 dB of limiting. Try a 1 ms. attack time, a .5 sec. release time, and a ratio of 10. Adjust the OUTPUT control to drive the subsequent equipment in the sustem to the maximum desired level. In the case of tape recorders this may be the 3% distortion point and in a sound system it may be the clip point. The SC-50 will tend to contain program material below this level. Then back off the input GAIN until only the loudest peaks cause the "threshold" indicator to illuminate. If the program material contains rapid transients, faster attack times may be necessary to control them while material without lots of overtones may require a slower attack to minimize the sound of the attack of the initial peaks.

## LOUDNESS ENHANCEMENT

Try a gentle compression ratio, say 3 with a 10 ms. attack time, .1 sec. release time and enough GAIN to cause about 6 dB of gain reduction.

## INSTRUMENT SUSTAIN

To use the SC-50 with a musical instrument, the instrument should feed an appropriate instrument preamp such as an Ashly Audio SC-40. The SC-50 is then inserted in the audio path between the preamp and power amp.

Try a RATIO of 5, attack time of 20 ms., and release time of .1 sec. Then adjust the input GAIN for the desired length of sustain.