

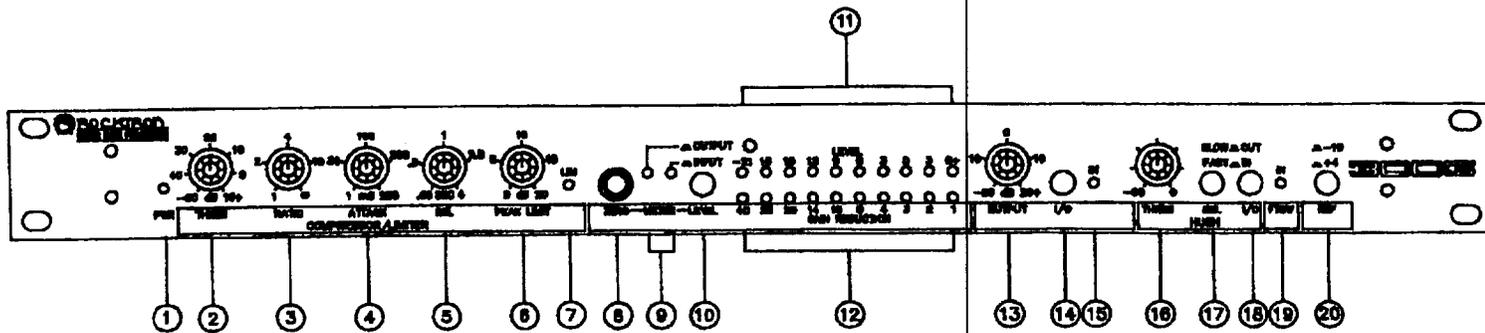
# MODEL 300G

COMPRESSOR/LIMITER/HUSH™

## INSTRUCTION MANUAL

May be covered by one or more of the following: U.S. Patents #4538297, 4647876, 4696044, 4745309, 4881047, 4893099.  
Other patents pending.  
Foreign patents pending.



**FRONT PANEL DESCRIPTION****COMPRESSOR/LIMITER CIRCUIT**

- (1) **POWER LED:**  
When lit, indicates the unit is powered and ready for operation.
- (2) **THRESHOLD CONTROL:**  
The Threshold control sets the input level above which compression begins. It is variable from -50dB to +10dB.
- (3) **RATIO CONTROL:**  
The Ratio control determines the degree of compression the signal will receive once it has exceeded the threshold. The ratio is the change in input level divided by the change in output level. This means, for example, at a 2:1 setting a 2dB increase in input level will result in only a 1dB increase in output level. This control is adjustable from 1:1 to infinity:1.
- (4) **ATTACK CONTROL:**  
The Attack control sets the speed at which the compressor engages upon the signal exceeding the threshold point. It is adjustable from 1mS to 250mS.
- (5) **RELEASE CONTROL:**  
This control sets the time that it takes for compression to cease after the signal drops below the threshold level. It is adjustable from .05 seconds to 4 seconds.
- (6) **PEAK LIMIT CONTROL:**  
With this control the user may set a level which will not be exceeded at the output, even when quick, high amplitude transients occur. It may be set from 0dB to 20dB.
- (7) **LIMIT INDICATOR LED:**  
This LED indicates the peak limit threshold has been exceeded and peak limiting is in effect.
- (8) **ZERO ADJUSTABLE CONTROL:**  
This is a trim control that gives the user the ability to adjust the zero point of the level meter between -15dBv and +10dBv to coincide with that of the equipment it is used with.
- (9) **METER SELECTION LEDs:**  
These LEDs indicate which level (input or output) the meter is displaying.

**(10) LEVEL METER SWITCH:**

This switch determines whether the level meter displays the input or output level.

**(11) LEVEL LED METER:**

This 10 segment meter will monitor either the input or output level, dependent upon whether the LEVEL switch is in or out.

**(12) GAIN REDUCTION METER:**

This 10 segment meter monitors the amount of gain reduction taking place.

**(13) OUTPUT CONTROL:**

This control adjusts the final output level of the compressor. It can be cut or boosted 20dB.

**(14) IN/OUT SWITCH:**

This switch determines whether or not the compressor circuit is in the signal path or bypassed.

**(15) COMPRESSOR IN LED:**

When lit, indicates compressor circuit is activated and in the signal path.

**HUSH II CIRCUIT**

**(16) HUSH THRESHOLD CONTROL:**

This control sets the point at which downward expansion takes place. It is adjustable over approximately a 60dB range.

**(17) RELEASE SWITCH:**

This allows the user to select a fast or slow release time in the expander section.

**(18) HUSH IN/OUT SWITCH:**

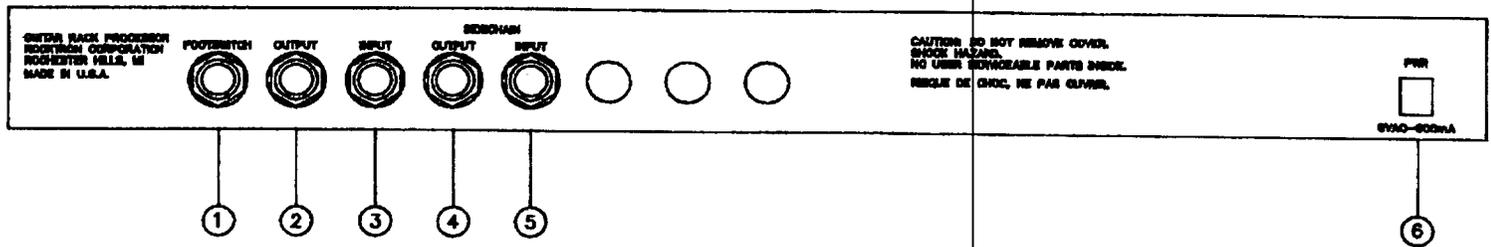
This switch determines whether the HUSH circuit is activated or bypassed. The function of this switch is defeated when using a footswitch connected to the rear panel.

**(19) HUSH IN LED:**

When lit, indicates HUSH circuit is activated and in the signal path.

**(20) REFERENCE SWITCH:**

Allows the user to select an input sensitivity of -10dB or +4dB. When using the 300G with professional studio equipment offering an output sensitivity of +4dB, selecting an input sensitivity of +4dB will achieve optimal performance from the unit. The -10dB setting is most commonly used when connecting an instrument (such as a guitar) directly into the input of the unit.



**(1) FOOTSWITCH JACK:**

This standard 1/4" mono jack accepts an optional single-function footswitch for bypassing the compressor and/or HUSH circuits, dependent upon the setting of the front panel switches. For example, if only the compressor is switched in on the front panel of the unit, only the compressor will be switched in or out via the footswitch.

**(2) OUTPUT JACK:**

This standard 1/4" mono jack provides the output from the unit.

**(3) INPUT JACK:**

This standard 1/4" mono jack provides the input to the unit.

**(4) 1/4" SIDECHAIN OUTPUT JACK:**

This standard mono jack provides an optional output to an outboard equalizer for de-essing or frequency dependant limiting/compression purposes.

**(5) 1/4" SIDECHAIN INPUT JACK:**

This standard mono jack provides an optional input from an outboard equalizer for de-essing or frequency dependent limiting/compression purposes.

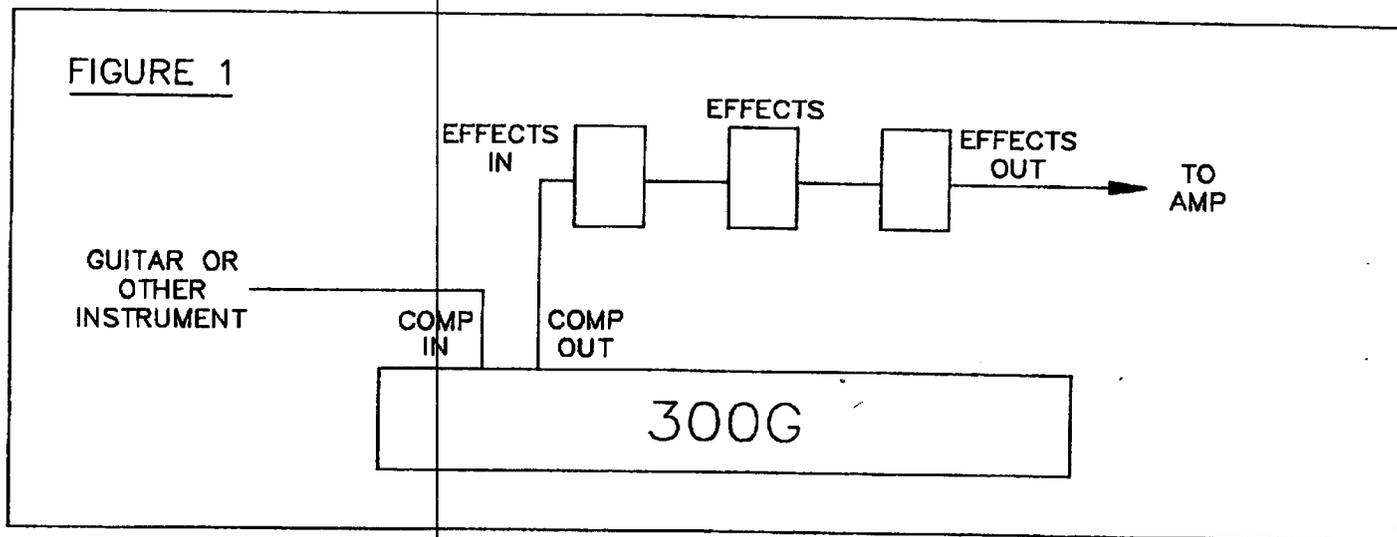
**(6) POWER JACK:**

This 2.5mm diameter pin jack accepts power from the 9VAC adaptor supplied with the unit.

## CONNECTIONS

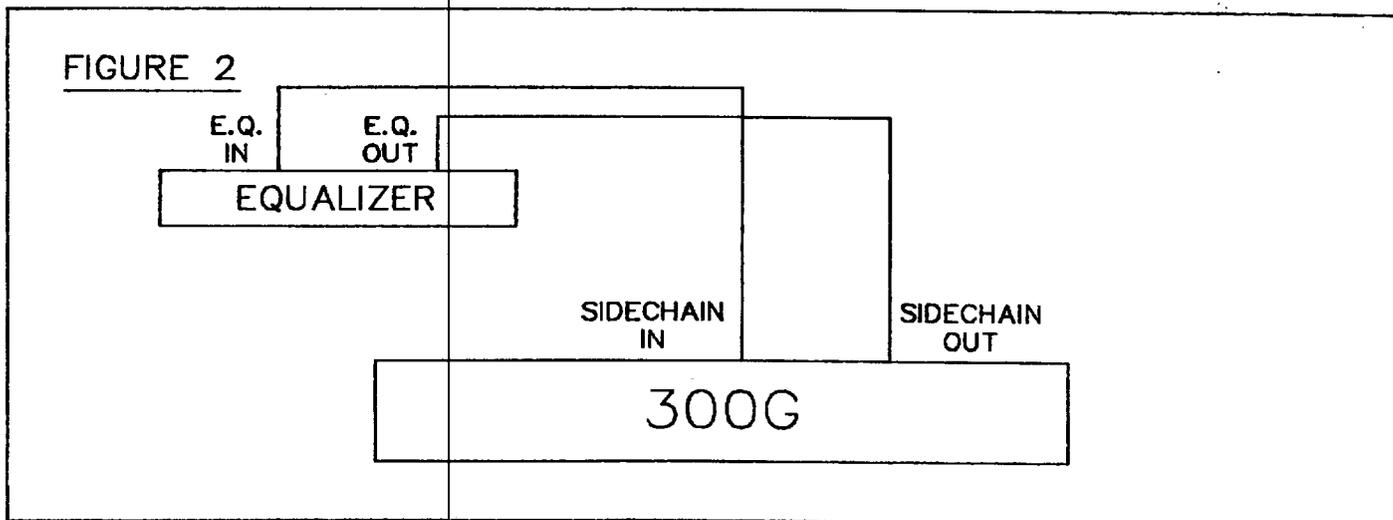
The 300G can be connected into your system different ways to achieve different functions.

One of the most common setups is to plug your instrument (guitar, keyboard, etc.) or mixer directly into the input of the 300G. From here, take the output and plug it into the rest of your effects. It is most common to run the compressor first in the chain of effects to achieve best results when compressing single instruments (see Figure 1).



There are still two jacks on the back panel of the 300G which have not been discussed. The sidechain IN and OUT. Let's look at them now.

The sidechain is useful for implementing an equalizer into the threshold circuit of the compressor for de-esser and other frequency dependent capabilities. Plug your equalizer out into the sidechain IN, and the equalizer in into the sidechain OUT (Figure 2). We will go into this procedure in greater detail in the next (Operations) section of this manual.



The basic purpose of a compressor is to give the user control over the dynamic range of any given signal. The 300G can be used for a variety of guitar effects from mild dynamic range reduction to a heavily compressed "squashed" sound. Compression also results in increased sustain of the guitar's signal.

With the Threshold control the user selects the input level at which compression begins. For example, if the threshold level is set at -20dB and the input signal is less than -20dB, no effect will take place. Yet, if the signal increases above -20dB, gain reduction will begin. The amount of gain reduction taking place may be monitored on the front panel meter.

The Ratio control allows the user to select the degree to which gain reduction will take place. Setting this control at a low level in conjunction with a low threshold setting will gently decrease the dynamic range of the guitar signal. Raising the Ratio control will cause an increase in gain reduction. This type of setup (with the Ratio at a moderate level) is generally used for leveling purposes. Leveling refers to maintaining a consistent output level when input levels vary. When set at excessively high levels, the 300G will begin to have the effect of sounding "squashed".

The Attack and Release controls allow for setting the speed at which compression will reach its maximum level upon exceeding the threshold level (Attack), and for setting the speed at which compression will cease completely upon falling below the threshold level (Release).

The Peak Limit control is generally used as a protection circuit against quick, high amplitude transient signals which can damage sound reinforcement systems. No signal will pass through the 300G's output at a higher level than that which the Peak Limit control is set. For example, if the Peak Limit was set at +10dB, no signal above +10dB will pass the unit's output at any time. The Limit LED will indicate when limiting is taking place.

The sidechain jacks on the rear panel are provided for use with a graphic or parametric equalizer. This feature makes the threshold of the unit frequency dependent, meaning that a given frequency may be boosted via the equalizer in the sidechain so as to cause compression of that frequency. This will level the output and subdue the level of an unwanted frequency.

\*\*\*\* It should be noted that the values shown on the front panel Threshold control reflect the unit in the +4 reference selection. When operating the unit in the -10 reference selection, these values change by -12dB (i.e. 0dB becomes -12dB, -50dB becomes -62dB, etc.). This is the result of a 12dB boost at the input and subsequent 12dB attenuation at the output, which improves the signal-to-noise of the unit by 12dB when operating in the -10 reference mode. This lower threshold range also offers substantially greater compression in this mode.

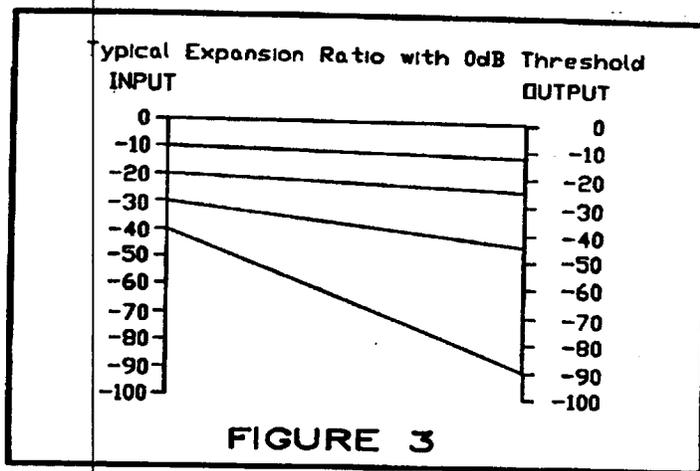
The HUSH II module is the single-ended noise reduction circuit in the 300G. Before exploring the controls, we need a basic understanding of how this module works.

The circuit is comprised of two parts; the expander and the dynamically controlled low pass filter.

The expander operates like an electronic volume control. The design utilizes a voltage controlled amplifier (VCA) circuit which can control the gain between the input and output from unity to 30, 40, or even 50dB of gain reduction. When the input signal is above the user pre-set threshold point the VCA circuit is at unity gain. This means the amplitude of the output signal will be equal to the input signal. As the input signal amplitude drops below the user pre-set threshold point, downward expansion begins. At this point the VCA operates like an electronic volume control and gradually begins to decrease the output signal level relative to the input signal. For example, if the input signal were to drop below the threshold point by 10dB, the output would drop approximately 12dB. As the input signal drops further below the threshold point, downward expansion increases exponentially. For example, if the input signal dropped 20dB below the threshold point, the output level would drop by approximately 30dB. A drop in the input level by 30dB

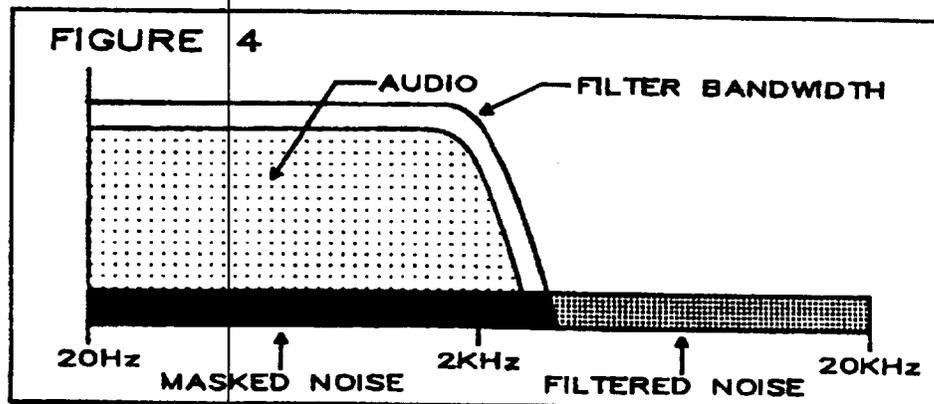
would cause the output to drop by approximately 60dB, i.e. 30dB of gain reduction. In the absence of any input signal, the expander circuit will reduce the gain so that the noise floor becomes inaudible (Figure 3).

The dynamically controlled low pass filter operates as follows. In the absence of any audio signal,



the dynamic filter will close down to the factory pre-set cut-off point of 800Hz. This means the filter is only allowing frequencies of 800Hz and below to pass through. If an input signal had a bandwidth from 20Hz to 1KHz the filter would open far enough to pass up to the 1KHz frequency and its harmonics, while reducing any noise present from approximately 2KHz to 20KHz. If a broad band signal, with frequency components up to 20KHz appears at the input, the dynamic filter would open to its full extreme allowing the bandwidth to open all the way to 40KHz. In simple terms, what this means is that if a signal is present at the input which is primarily bass components, the dynamic filter will reduce any mid or high band noise. However, if the input signal has high frequency components present, the dynamic filter will open to its full extreme to pass the signal and eliminate the possibility of loss of high end frequency response (see Figure 4).

These two processes of downward expansion and dynamic filtering work in unison to produce the



highly proficient HUSH noise reduction system.

Now that we have an understanding of the workings of the HUSH unit, let's check out the controls.

First, the threshold control. At full counter clockwise position the expander threshold is set at -60dB. As we turn the knob to the right we raise the level of threshold to as high as 0dB. At this same time we are also increasing the filter threshold from -60dB to -40dB.

Secondly, the release switch. In the OUT position we have selected the slow release time for the expander. This means that the rate at which downward expansion is released is at the factory set slow speed.

In the IN position the expander is now set for the faster release time.

Lastly, the I/O switch which simply puts the HUSH II circuit in or out of the signal path.

SPECIFICATIONS

<b>Input</b>	
Impedance	470K Ohms
Max. Input Level	+18dBu
Input Jack	1/4" Mono
Sidechain Input Jack	1/4" Mono
<b>Compression/Limiting</b>	
Threshold Variable	-50dB to +10db
Ratio Variable	1:1 to infinity:1
Attack Time Variable	1mS to 250mS
Release Time Variable	.05sec to 4sec
<b>Peak Limiter</b>	
Attack Time	10 microseconds
Release Time	10mS
Threshold Variable	0dBu to +20dBu
Frequency Response	+/-1dB, 20Hz to 20KHz
Distortion	.01% typ. @10dB compression
Output Gain Variable	-20dB to +20dB
Dynamic Range	Greater than 103dB A-Wtd (-10 Ref) Greater than 109dB A-Wtd (+4 Ref)
Noise Floor	Typ. -98dBu A-Wtd (-10 Ref) Typ. -91dBu A-Wtd (+4 Ref)
<b>Hush II</b>	
Effective Noise Reduction	Greater than 60dB
Meter Zero Set Variable	-15dBu to +10dBu
<b>Output</b>	
Impedance	Less than 150 Ohms
Max. Output Level	+18dBu (600 Ohms)
Output Jack	1/4" Mono
Sidechain Output Jack	1/4" Mono
Dimensions	19" x 1 3/4" x 6"
Power Requirements	9VAC/1500mA Adaptor
NOTE: 0dBu = 0.775V RMS	