

**Symetrix**



**SX208**  
**STEREO**  
**COMPRESSOR/LIMITER**  
User Manual

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## **Foreword**

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**Thank you for purchasing the Symetrix SX208. The following information in this manual may help you achieve optimum performance from your Stereo Compressor/Limiter.**

**Even if you are very experienced with signal processing equipment and techniques, we encourage you to read and make use of this manual.**

**Any comments on our products or this manual are more than welcome.**

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## 1. Introduction

### 1.1 Product Description

The Symetrix SX208 Stereo Compressor/Limiter is a precision dynamic range controller intended for use in professional audio applications.

Four front panel controls, and a precise 3 LED threshold indicator allow signal manipulation to solve problems found in both studio and live environments, while retaining ease of operation. Balanced or unbalanced signals may be applied to the 1/4" TRS input jacks. Outputs may be utilized as balanced or unbalanced signal connections.

The heart of the SX208 is built around an industry standard high performance VCA enabling a dynamic range in excess of 110dB with a typical distortion of less than .03%.

Paging systems, recording, broadcast and reinforcement sound systems are just a few of the areas where the Symetrix SX208 will offer flawless transparent operation handling a wide variety of gain reduction tasks.

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### 1.2 Dynamic Range

When dealing with audio signals, the term "dynamic range" describes actual level changes, or the range over which signals fluctuate. The dynamic range of the human voice, from a wisper to a shout is well over 100dB. So a microphone will convert the sound pressure of a voice going from a wisper to a shout into an electrical output signal with a dynamic range of well over 100dB.

For signals to stay below distortion and above noise, their actual dynamic range must be kept within the specified dynamic range of the circuits through which those signals flow. Unfortunately, the actual dynamic range of

real world signals often exceed the available dynamic range of even the best equipment.

The dynamic range of the best analog recorders is around 70dB; still not quite enough room for very wide dynamic range signals. In order to keep the signals going to the recorder well above its noise floor, and at the same time not exceed its limit before distortion occurs, signal processing is sometimes necessary to "squeeze" the signal into that signal-to-noise "window."

Often, in order to place high dynamic range signals into a circuit of normal dynamic range capability, a compressor or limiter is used to reduce signal dynamic range by setting an upper limit on the signal peaks.

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### 1.3 Threshold

The threshold is the level at which a dynamic range processor's activity begins. In operation, the dynamic range processor's sensing circuitry constantly "looks at" the incoming signal and compares it to a reference level, which is called the threshold point. Compressors and limiters respond when signals are above threshold. The threshold point of the SX208 is internally set at -10dB.

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### 1.4 Compression & Limiting

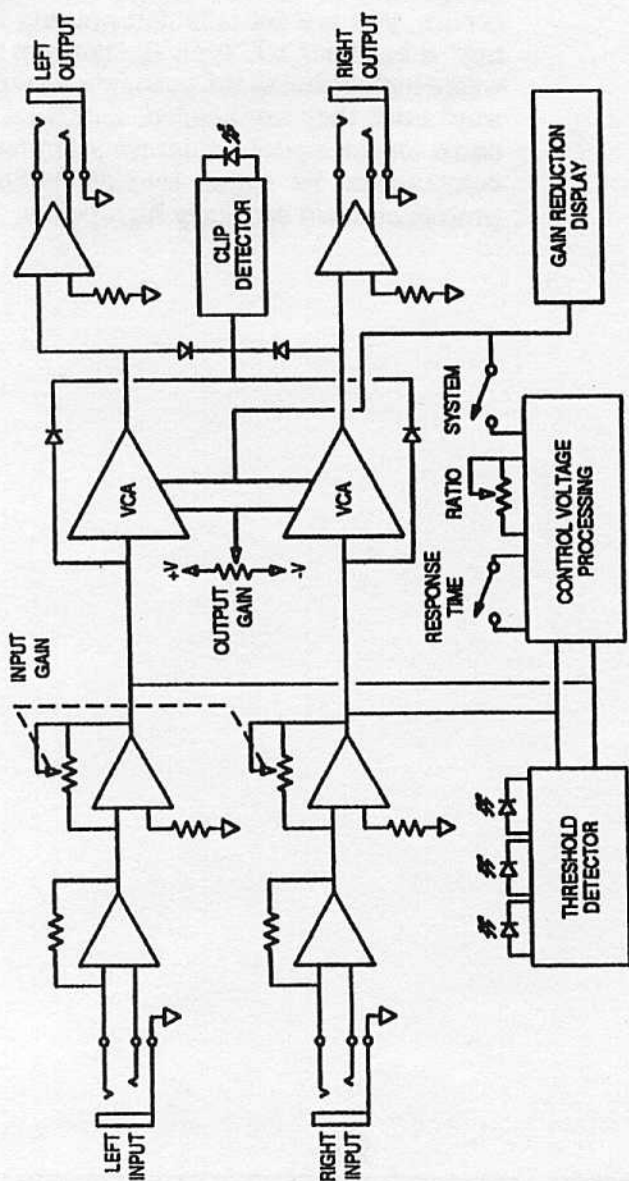
Compression and limiting are both derived from the same signal processing family of gain reduction. The heart of this process is based on amplifier circuitry in which the gain is dependent on the signal level passing through it. These amplifiers are known as VCA's (Voltage Controlled Amplifier). By changing the gain, based on signal conditions, the dynamic range of that signal can be automatically altered.

The amount of gain reduction is determined by the **RATIO** control. The ratio is the number of decibels of change in the input level, compared

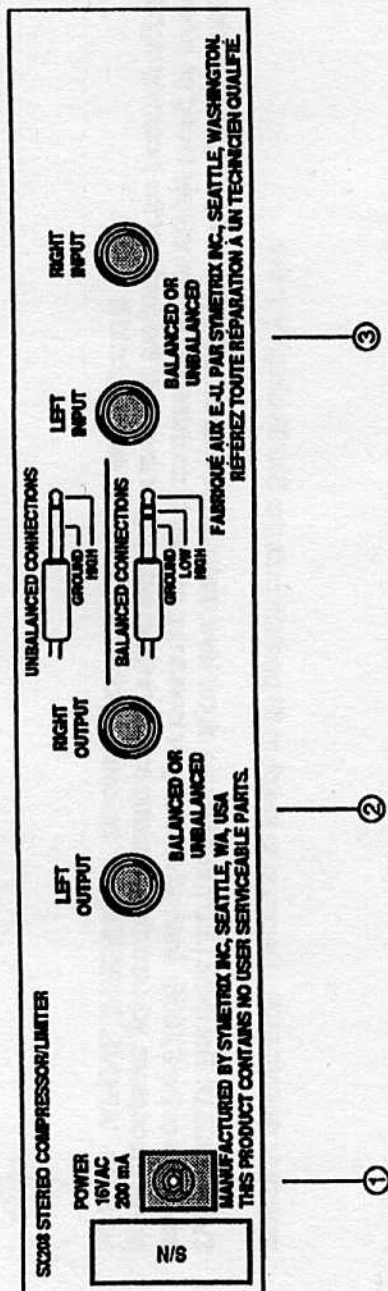
to the number of decibels of change in the output level. For example, if the input level to a compressor increases by 5dB and the change in output level is 1dB, then the compression ratio is 5:1. Low ratios provide a gentle averaging of levels. As the ratio is increased, the compressor becomes a limiter. When limiting occurs, you are actually determining a "ceiling," a hard cut off. Typically limiters are set with a higher threshold, so they "stay out of the way" until they are needed, and then clamp down on the signal. In simple summary, use compression for signal leveling, limiting for protection from seriously high peaks.

## 2. Connections, Controls and Switches

### 2.1 Block Diagram



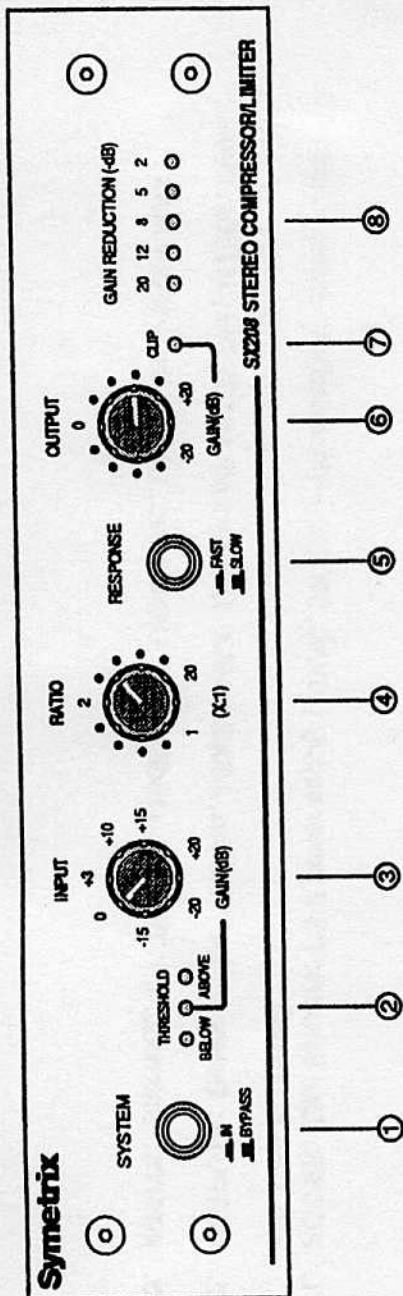
## 2.2 Rear Panel Connectors



- 1. POWER:** Use Symetrix' PS-2 power supply (16VAC, 500mA)— (Included with domestic units, UL and CSA Approved)
- 2. OUTPUTS:** Balanced: 1/4" TRS Jax, +20dBm MAX. Unbalanced: 1/4" TS Jax, +17dBm MAX.
- 3. INPUTS:** Balanced: 1/4" TRS Jax, +18dBv MAX. Unbalanced: 1/4" TS Jax, +18dBv MAX.



## 2.3 Front Panel Controls and Switches



1. **SYSTEM IN/BYPASS:** Depressing switch to IN position puts the SX208 circuitry in-line.
2. **THRESHOLD:** The three LED's indicate the signal level status as compared to the internally set gain reduction threshold of the SX208. Instead of raising or lowering a compression threshold as sometimes found on other signal processors, you are simply raising or lowering the input signal level until the peaks of the incoming signal fall in the "ABOVE THRESHOLD" indicator window. The internally set threshold is -10dB.

3. **INPUT:** The Input control lowers or raises the incoming signal level by 20dB. For example, a signal coming into the SX208 at -10dB will now have a -30dB to +10dB range.
4. **RATIO:** The Ratio control is variable from 1:1 to 20:1. As the control is rotated clockwise (higher ratios), the output signal increases less as the input signal increases.  
  
For gentle gain riding, the lower ratios are desirable. For overload protection, use high ratios (greater than 10:1).
5. **RESONSE:** SX208 response times (attack and release) are program controlled. The incoming signal itself determines how the unit will behave. The FAST/SLOW Response switch works in conjunction with the program controlled circuitry to adapt to various material types. Use **FAST** for percussive sounds, **SLOW** for smoother signals like vocals or speech.
6. **OUTPUT:** The Output control is used to make up overall gain lost by adding compression and to match the output of the SX208 to the next stage in the signal chain. Gain is variable from -20dB to +20dB.
7. **CLIP:** The LED Clip indicator warns you when the signal is overloading the input or the output stages of the SX208.
8. **GAIN REDUCTION:** The five LED indicator tells you the amount of gain reduction being applied to the incoming signal.

### 3. Troubleshooting

**No gain reduction** — [ Is the System switch depressed to "In" position?  
Is the Input gain control set too low for the present signal?

**Distortion or Clipping at Output** — Check signal at input. Is it too high or distorted? Check the setting of Both Output and Input gain controls (one at a time checking the Output control first). Turn each control counter clockwise until the "clip" LED turns off.

## 4. Service Information

### 4.1 Return Authorization

Symetrix will service any of its products, no matter when it was manufactured or what condition it's in. However, no goods will be accepted without a Return Authorization number.

**BEFORE SENDING ANYTHING TO SYMETRIX, CALL FOR AN R/A NUMBER. JUST ASK, WE'LL GLADLY GIVE YOU ONE! CALL (208) 282-2555 WEEKDAYS, 8 AM TO 4 PM PACIFIC TIME.**

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### 4.2 In-Warranty Repairs

To get your unit fixed:

1. Call for an R/A number.
2. Pack the unit in its original packaging materials
3. Put the R/A number on the **outside of the box.**
4. Ship it to Symetrix freight pre-paid.

Just do those four things, and repairs made in-warranty will cost you only the one-way freight fee. We'll pay the return freight.

However, if you send it to us in some kind of flimsy non-Symetrix packaging we'll have to charge you for proper shipping materials. We won't return the unit in anything but the original Symetrix packaging. And of course, if the problem turns out to be operator inflicted, you'll have to pay for parts, labor and regular UPS shipping charges. Charges will be C.O.D. (and we do mean CASH on delivery).

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### 4.3 Out-of- Warranty Repairs

We'll gladly service any Symetrix product, any time. If the warranty period is passed you'll be billed for all necessary parts, labor, packaging materials, as well as any applicable freight charges.

**Remember, you must call for an R/A number before you send the unit to Symetrix.**

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## 5. SX208 Specifications

<b>Input</b>	electronically balanced
Impedance	>10k
Max input level	+19dBV
CMRR	>40dB at 1kHz
<b>Output</b>	Electronically balanced
Impedance	300 $\Omega$ unbal. 600 $\Omega$ bal.
Max level into 600 $\Omega$ bal.	20dBm
Max level into 600 $\Omega$ unbal.	17dBm
<b>S/N Ratio</b>	-92dBV
<b>Dynamic Range</b>	110dB
<b>THD at 1k into 600<math>\Omega</math></b>	0.3% @ +4dBm
<b>Frequency Response</b>	20Hz—20kHz $\pm$ +0/-1dB
<b>Compressor/Limiter</b>	Soft-knee transition characteristic
Max. Attack	12dB/mS
Min. Attack	6dB/mS
Max. Release	10dB/mS
Min. Release	1dB/mS
Ratio	1:1—20:1
Max. Gain Reduction	40dB
<b>Controls</b>	System Bypass, Input Gain, Ratio, Respose Time, Output Gain
<b>Visual Indicators</b>	Threshold, Output Clip, Gain Reduction
<b>Connectors</b>	Inputs and Outputs: TRS 1/4" Phone Jax
<b>Physical</b>	
Size	Chassis: 1.5"H x 8.2"W x 6"D Front Panel: 8.5"W x 1.75"H
Shipping Weight	5lbs
<b>Power Requirements</b>	18VAC, 200ma (Symetrix PS-2 for 110VAC operation, PS-2EP for 220VAC operation)

## 6. Limited Warranty

The Symetrix SX208 is designed and manufactured for use in professional and studio audio systems. Symetrix, Inc., warrants that the SX208 manufactured by Symetrix, when properly installed, used and maintained in accordance with instructions contained in the manufacturer's operator's manual, will perform according to the specifications set forth in the operator's manual.

Symetrix expressly warrants that SX208 will be free from defects in material and workmanship for one (1) year. Symetrix' obligations under this warranty will be limited to repairing and replacing, at Symetrix' option, the part or parts of the SX208 which prove defective in material or workmanship within one (1) year from the date of purchase, provided that the Buyer gives Symetrix prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after a Return Authorization number (RA) has been obtained from Symetrix and Buyer will prepay all freight charges to return any products to the Symetrix factory. Symetrix reserves the right to inspect any products which may be the subject of any warranty claim before repair or replacement is carried out. Symetrix may, at its option, require proof of the original date of purchase (dated copy of original retail dealer's invoice). Final determination of warranty coverage lies solely with Symetrix. Products repaired under warranty will be returned freight prepaid via United Parcel Service by Symetrix, to any location within the Continental United States. Outside the Continental United States, products will be returned freight collect.

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The Symetrix SX208 is designed and manufactured for use in professional and studio audio systems and is not intended for other usage. With respect to products purchased by consumers for personal, family or household use, Symetrix **EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

This limited warranty, with all terms, conditions, limitations and disclaimers set forth herein, shall extend to the original purchaser and anyone who purchases the product within the specified warranty period.

Warranty Registration must be completed and mailed to Symetrix, Inc. within thirty (30) days of the date of purchase.

Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability or make any additional warranties or representation regarding this product performance on behalf of Symetrix.

This limited warranty gives the buyer certain rights. You may have additional rights provided by applicable law.

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## 7. PCB Layout

