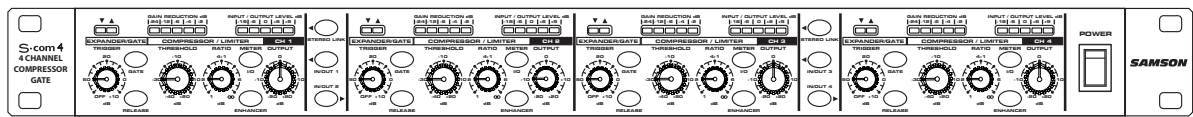
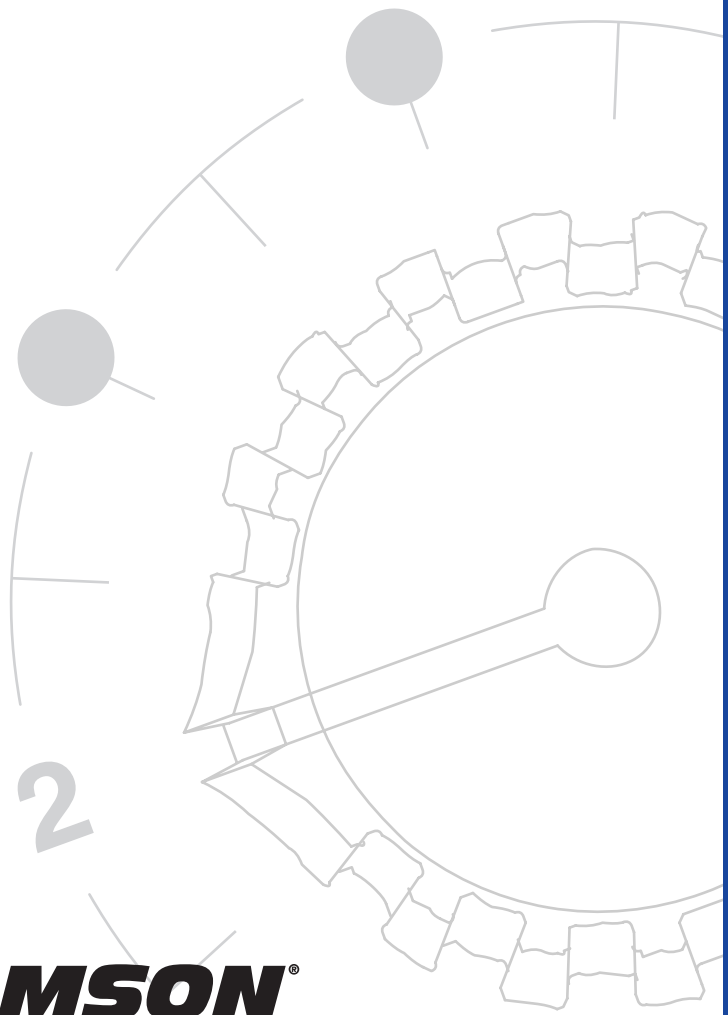


S.com 4



STEREO COMPRESSOR / LIMITER

Owners Manual



SAMSON®

Introduction

Thank you for purchasing the Samson S•com 4 dynamics processor. The Samson S•com 4 is a one-space, four channel dynamics processor optimized for recording, live sound reinforcement systems, DJ set-ups and commercial installations. The S•com 4 is a complete dynamics processing solution offering four channels of full function Compressor, Expander/Gate, and Enhancer. S•com 4's convenient meters provide instant status of important gain management settings.

In these pages, you'll find a detailed description of the features of the S•com 4 dynamics processor, as well a description of its front and rear panels, step-by-step instructions for its setup and use, and full specifications. You'll also find a warranty card enclosed—please don't forget to fill it out and mail it in so that you can receive online technical support and so we can send you updated information about these and other Samson products in the future.

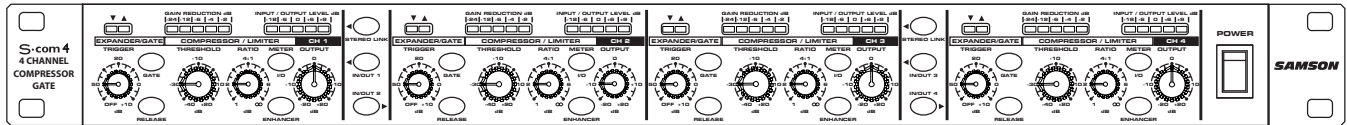
With proper care and adequate air circulation, your S•com 4 will operate trouble free for many years. We recommend you record your serial number in the space provided below for future reference.

Serial number: _____

Date of purchase: _____

Should your unit ever require servicing, a Return Authorization number (RA) must be obtained before shipping your unit to Samson. Without this number, the unit will not be accepted. Please call Samson at 1-800-3SAMSON (1-800-372-6766) for a Return Authorization number prior to shipping your unit. Please retain the original packing materials and if possible, return the unit in the original carton and packing materials.

S•com 4 Features

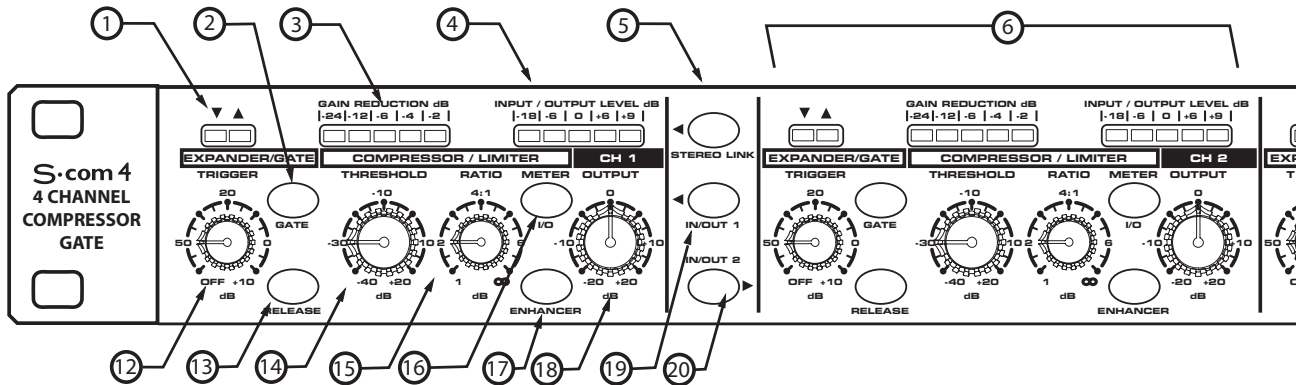


The Samson S com 4 dynamics processor utilizes the latest technology in gain management design. Here are some of its main features:

- Full featured, four channel dynamics processor including Compressor/Limiter and Expander/Gate on each channel.
- SKD (Smart Knee Detector) switches from soft to hard knee based on the level of input signal.
- AEG (Automatic Envelope Generator) feature constantly adjusts the Compressor's Attack and Release times based on input signal.
- 5 Segment LED Input/Output Meter, plus 5 Segment LED Gain Reduction Meter on each channel.
- Gate function can be switched from hard Off to light Downward Expander.
- Gate Open and Closed LED's.
- Expander/Gate with switchable Fast and Slow Release times.
- Stereo Link Switch for channels 1 & 2 and 3 & 4.
- Advanced circuit design, utilizing low noise operational amplifiers and high quality VCAs.
- Servo balanced inputs and outputs on XLR and 1/4" connectors.
- Switchable +4 and -10 operating levels.
- High quality 41 position detent pots and backlit switches.
- The stylish bead blasted electric blue anodized front-panel is as easy to read as it is to look at.
- Three-year extended warranty.

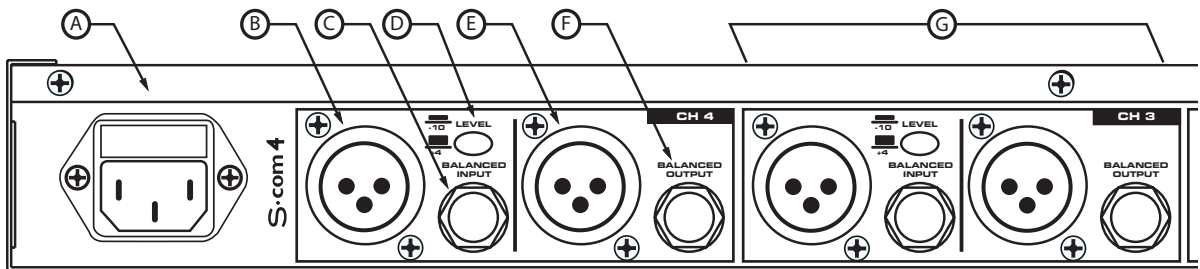
Controls and Functions

Front Panel Layout



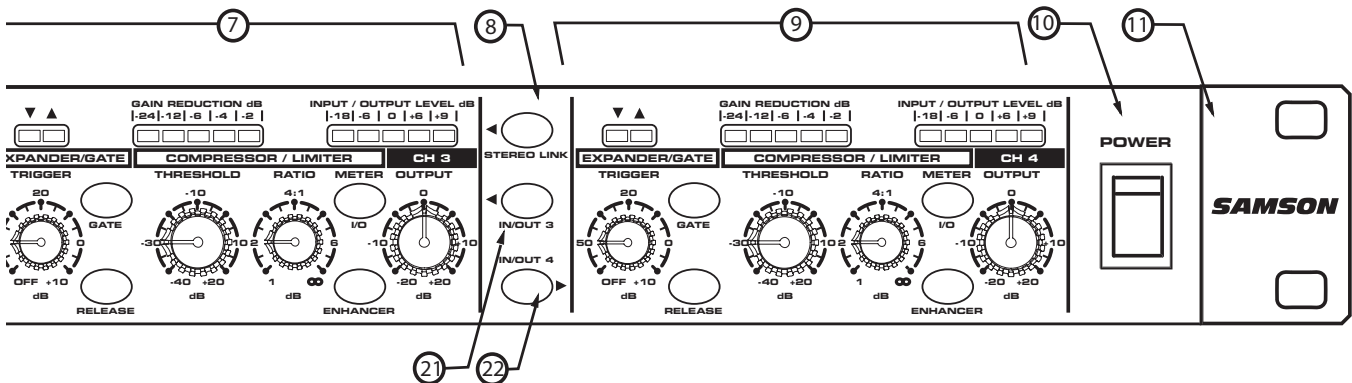
- ① **GATE OPEN & CLOSED LEDS** - Indicates when the gate is open and closed.
- ② **GATE SWITCH** - Selects either Gate or Expander mode.
- ③ **GAIN REDUCTION METER** - Displays the amount of Gain Reduction when Compressor circuit is activated.
- ④ **INPUT/OUTPUT METER** - Displays the Input or Output signal level based on the setting of the I/O meter switch.
- ⑤ **STEREO LINK SWITCH**- When engaged channel 2 functions are controlled by the settings on channel 1.
- ⑥ **CHANNEL 2 CONTROLS** - The same knob and switch complement as channel 1 .
- ⑦ **CHANNEL 3 CONTROLS** - The same knob and switch complement as channel 1.
- ⑧ **STEREO LINK SWITCH (3 & 4)**-When engaged, channel 4 functions are controlled by the settings on channel 3.
- ⑨ **CHANNEL 4 CONTROLS** - The same knob and switch complement as channel 1.
- ⑩ **MAINS POWER SWITCH** - When turned on, activates the S-com.
- ⑪ **RACK EARS** - Used for mounting into a 19inch standard rack.
- ⑫ **TRIGGER**- Controls the threshold level that the Expander/Gate becomes activated.
- ⑬ **RELEASE SWITCH** - Selects FAST or SLOW Release Time for EXPANDER/GATE.

Rear Panel Layout

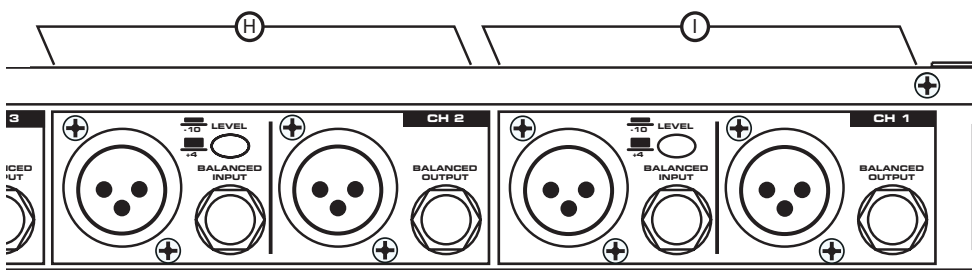


- Ⓐ **AC INLET** - IEC standard AC power cable connector with external fuse.
- Ⓑ **CHANNEL 4 XLR LINE INPUT** - XLR Balanced line input.
- Ⓒ **CHANNEL 4 1/4" TRS LINE INPUT** - 1/4" TRS Balanced line input.
- Ⓓ **OPERATING LEVEL SWITCH** - Switches the operating level from -10 to +4.

Controls and Functions



- 14 **THRESHOLD** - Used to set minimum signal level at which the Compressor circuit begins to function.
- 15 **RATIO** - Controls the amount Gain Reduction in proportion to the amount of signal over the selected threshold level.
- 16 **I/O METER SWITCH** - Selects either the input or output level to be displayed on the Input/Output meter.
- 17 **ENHANCE SWITCH**- Activates S-com 4's ERF (Enhanced Frequency Recovery) circuit restoring the high end loss resulting from extreme Gain Reduction.
- 18 **OUTPUT**- Controls the level of output signal.
- 19 **CHANNEL 1 IN/OUT** - Activates S-com 4 Channel 1.
- 20 **CHANNEL 2 IN/OUT** - Activates S-com 4 Channel 2.
- 21 **CHANNEL 1 IN/OUT** - Activates S-com 4 Channel 3.
- 22 **CHANNEL 2 IN/OUT** - Activates S-com 4 Channel 4.



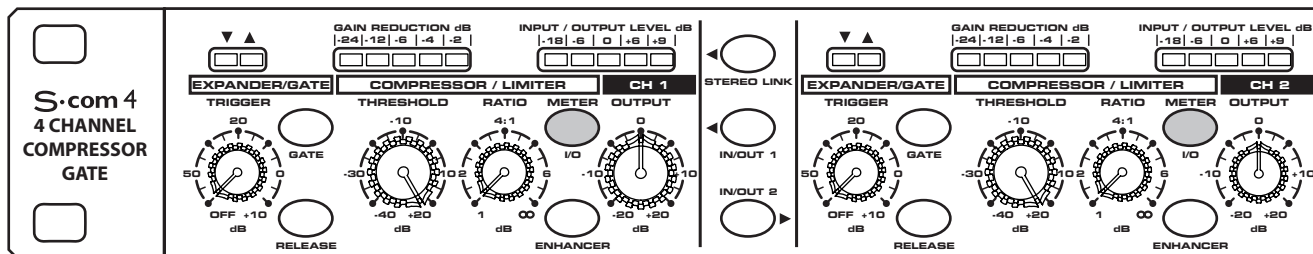
- E **CHANNEL 4 XLR LINE OUTPUT** - XLR Balanced line output.
- F **CHANNEL 4 1/4" TRS LINE OUTPUT** - 1/4" TRS Balanced line output.
- G **CHANNEL 3** - Same Inputs and Outputs as channel 4
- H **CHANNEL 2** - Same Inputs and Outputs as channel 4
- I **CHANNEL 1** - Same Inputs and Outputs as channel 4

Operating The S•com 4

Whether you are an experienced audio engineer, just starting out, or you just want to experiment, follow the steps below to get going. Further sections in this manual will cover basic dynamics and the associated parameters, system set-ups and applications for using dynamics processing in recording and live sound applications.

SETTING UP THE S•com 4

- Connect one set of inputs and outputs to the Channel 1 connectors on the rear panel.
- Set the controls to the following positions:



- EXPANDER/GATE TRIGGER – OFF
- GATE SWITCH – OUT
- FAST RELEASE – OUT
- COMPRESSOR THRESHOLD – +20dBu (fully clockwise)
- RATIO – 1:1
- ENHANCER - OUT
- METER SWITCH – IN
- OUTPUT LEVEL – 0 dBu
- STEREO LINK SWITCH – OUT
- CHANNEL 1 IN/OUT – OUT

In this configuration, the S•com 4 is simply passing audio at unity gain with no dynamics processing. It is a good idea to check your gain structure at this point. Use the Input/Output meter to match the level.

- Send a signal to the S•com 4's inputs and outputs.
- Press the METER switch to see that the input and output levels are matched.

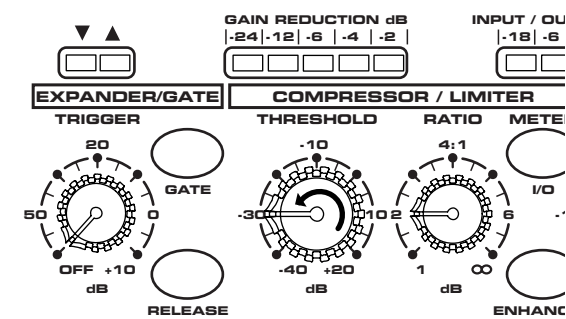
COMPRESSING A SIGNAL

S•com 4's Compressor section can be used for a variety of gain management tasks including printing signals to a multi-track recorder, as a mix-down effect, mastering, and for increasing the loudness of a live PA system. To begin compressing your signal, follow the steps below:

- Follow the section above, "SETTING UP THE S•com 4" for normalizing the controls.
- Press the In/Out switch (located between Channels 1 and 2) to the IN position.
- Adjust the Ratio to 2:1.

Operating The S•com 4

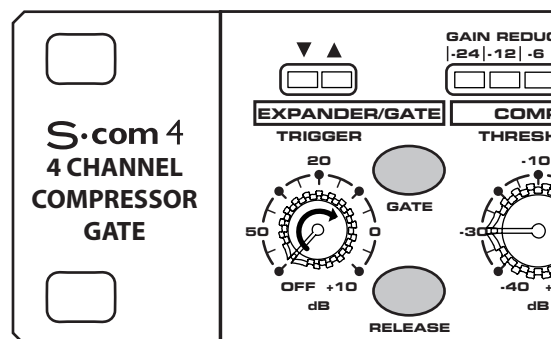
- Now gradually turn down the THRESHOLD level and listen for the compression. For a visual representation, the amount of compression is indicated on the GAIN REDUCTION meter.



GATING A SIGNAL

Unwanted noises, buzzes and hisses can be easily removed by using S•com 4's GATE. The idea is to have the Gate open only when your desired signal is playing and to mute off (Gate closed) the unwanted noise, buzz and hiss. To Gate your signal, do the following:

- Follow the section above, "SETTING UP THE S•com 4" for normalizing the controls.
- To engage the Gate, make sure that the EXPANDER/GATE switch is pressed in.
- Press the RELEASE switch to the IN position to select FAST release time.
- Now increase the TRIGGER level and listen as the signal begins to gate. For a visual representation of the gate opening and closing, look at the GATE OPEN/CLOSED LED's located above the EXPANDER/GATE TRIGGER control.



USING THE DOWNWARD EXPANDER

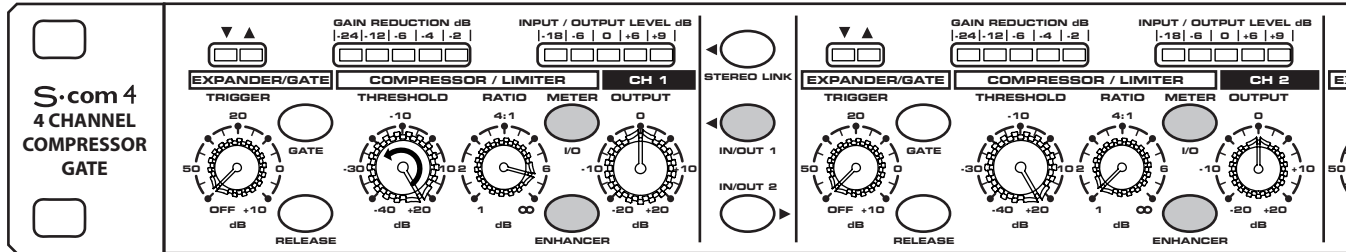
You can set the S•com 4's Gate section to work as a DOWNWARD EXPANDER to lower the volume of a signal. Try the simple steps below:

- Follow the section above, "SETTING UP THE S•com 4" for normalizing the controls.
- To engage the EXPANDER, make sure that the EXPANDER/GATE button is switched to the OUT position.
- Press the RELEASE switch out to select a SLOW RELEASE.
- Now increase the TRIGGER level and listen as the signal begins to get softer.

Operating The S•com 4

USING THE ENHANCER

The S•com 4's ENHANCER switch can be engaged to activate the EFR (Enhanced Frequency Recovery) circuit. By engaging the ENHANCER, the S•com 4 EFR restores the high frequency content that can be lost when high gain reduction is applied. The S•com 4 EFR achieves this by adding back the high-end of the original signal in an amount that is equal to the amount of gain reduction.



- Follow the section above, "SETTING UP THE S•com 4" for normalizing the controls and run a signal such as a CD through the S•com 4.
- Press the In/Out switch (located between Channels 1 and 2) to the IN position.
- Adjust the Ratio to 6 - 8:1.
- Switch on the ENHANCER and listen to how the high end is restored when the ENHANCER is on.

Dynamics Processing 101

To begin to understand dynamics processing, we must first understand what dynamics are. Dynamics, or the dynamic range of a signal or audio device, is the amount of level between the softest and loudest possible output. Dynamics processing is applied to a signal to manage the changes in level. Various types of processing units are available to control dynamics including Noise Gates, Expanders, Compressors, Limiters and De-Essers. All of these processes have a unique effect on a signal, but one common element they share is that in one way or another they control gain. Some dynamics processors control gain in a subtle way by slightly reducing how soft and loud a signal is, while others make drastic changes in gain like reducing the signal until it's off. Applications for dynamics processing can be categorized by two distinct groups; first, to treat a signal that has an unpredictable dynamic range and make it predictable, and second, to create a "sound" by squeezing out the dynamic range. Whether used for a live sound application, recording, mixing or mastering, dynamic processors like the S•com 4 are valuable tools for controlling gain. The following is a basic overview of dynamics processing and how it is used to improve the quality of recorded and live sound.

COMPRESSOR

A good compressor is one of the most useful tools in live sound and recording. Compressors are used to control the dynamic range of a signal, which offers a variety of benefits including leveling a signal that's being recorded, having an instrument sit in the mix, and increasing the loudness of a sound system to name a few. Drastic amounts of compression will also result in an effect that becomes more of a sound, than just controlling gain. To understand how a compressor works, it is necessary to become familiar with the basic parameters which include threshold, ratio, attack time, and release time.

Threshold

Threshold is the level that once the signal exceeds, gain reduction is applied. The normal range of adjustment for the threshold level is -40 to $+20$ dBu. If the threshold level is set above the highest level of the signal being sent to the compressors, the gain reduction is never triggered. Therefore, the compressor is virtually by-passed. If the threshold level is set very low so that any signal will trigger gain reduction, the compressor is working as an automatic leveler.

Ratio

The ratio control is used to set the proportion of gain reduction in relationship to the input signal. For example if the ratio is set to 2:1 and the signal crosses above the threshold level, an increase in level of 2 dB will produce a 1 dB increase in level at the output. A ratio setting of ∞ to 1 means that an infinite amount of input signal is needed to raise the output level by 1 dB. This means that the output level stays constant even when the input crosses over the threshold level.

Attack Time

Attack time is the amount of time that a compressor takes to effect the gain reduction after the signal rises above the threshold level. A well-designed compressor has adjustable attack times ranging from 100 μ s (microseconds) to 150 ms (milliseconds). A good compressor will sound smooth as it begins to control the gain regardless of the attack time.

Release Time

The release time is set to control how long the compressor takes to return the input signal back to its original level once the signal falls below the threshold level. The acceptable range for release time is from 500 μ s to 5 seconds. In normal use, faster release times are used for spoken word and longer release times are generally better for instrumental music.

Auto Attack and Release

Today, sophisticated compressors often incorporate a dynamic or Auto Attack and Release mode. The S•com 4's AEG (Auto Envelope Generator) automatically adjusts the attack and release times based on the dynamically changing input signal.

Dynamics Processing 101 - Continued

Soft-Knee / Hard-Knee

In order to prevent harsh, unnatural envelopes on compressed signals, sophisticated dynamics processors like the S•com 4 feature an SKD (Smart Knee Detector) or automatic knee circuit. The Smart Knee Detector automatically switches from Soft-Knee when the signal is less than 10 dB over Threshold, to Hard-Knee when the signal is 10db above Threshold. In Soft-Knee mode, there is a gradual effect on gain change, which begins as the signal approaches the Threshold level. In Hard-Knee mode, gain reduction is linear based on the Threshold and Ratio controls. Any signal that falls below the Threshold level will be unprocessed.

Noise Gates

Noise gates are used to remove unwanted noise and/or bleed from recorded tracks in the studio or from open microphones in live sound systems. Noise gates can also be used as a sound effect, most commonly to chop the end of a reverb let's say on a snare drum so that the entire snare sound ends just before the beat. The basic principle of a noise gate is to work as an automatic mute switch. Mute off (Gate Open) when the desired signal is present and mute on (Gate Closed) when the desired signal is not present. In order to get the gate to work predictably, it is necessary to set a threshold, or trigger level that will determine when the gate will open. If the signal is below the trigger the gate will remain closed. When the signal is above the trigger, the gate will trigger open allowing the desired signal to pass and be heard. Noise gates often have other adjustable controls like attack, hold, range and release. Many noise gates like the S•com 4 use sophisticated circuits to control some of these parameters automatically.

Downward Expander

The purpose of a well-designed Downward Expander is to increase the perceived dynamic range of a system. This is accomplished by decreasing the gain during the softer sections, thereby lowering the relative noise floor. When the signal level is below the desired trigger level, the expander lowers the overall gain by the selected amount.

Limiter

A Limiter is a specific form of a compressor configured to prevent peaks and for general overload protection. It is often characterized by a high ratio setting (10 or above), as well as a relatively high threshold level.

Stereo Link Mode

The S•com 4 can be configured from dual-mono operation to stereo by using the Stereo Link switch. In Stereo Link mode, Channel 2 functions are controlled by the settings of Channel 1 with the exception of IN/OUT, KEY and LIMITER. The same holds true for Channels 3 and 4.

Using the Expander/Gate to Remove Hiss and Noise

The S•com 4 is an extremely useful tool in reducing the level of unwanted noises. By using the Expander/Gate you can effectively fade the noise into the noise floor or abruptly turn the unwanted signal completely off.

Let's say you want to reduce the bleed or cross talk that occurs when different instruments are recorded in close proximity to each other. You have recorded an acoustic guitar simultaneously in the same room as with some other acoustic instruments. The problem is that you hear a lot of the other instruments playing when the acoustic guitar is silent. This can cause phasing and comb filtering problems due to microphone placement, so having the bleeding signal drop into the noise floor is desirable. To do this, set the S•com 4 to Expander mode with the Release switch to Slow and adjust the Trigger so that the acoustic guitar signal is well above the threshold level. When the signal from the acoustic guitar track falls below the threshold level, the signal subtly fades into the noise floor.

Now let's say you're attempting to remove the pick-up noise and hum from a guitar track that was recorded through a loud amplifier. The hum and noise is most noticeable in-between the rhythm of the performance, so you want to have the gate close during the silent parts and open during the musical passages. To do this, set the S•com 4 to Gate mode and adjust the Trigger level so that the gate is open just during the musical guitar parts, and so that the gate is closed during the silent passages so that the hum and noise is muted.

Gating Drums

Using noise gates on drums is particularly useful in recording and in live sound. When a drum kit is set up with individual microphones on each drum in a live PA system, there's potential for great sound. However, there are several gain management problems that can occur. Several microphones like the ones on the tom-toms, will only be used occasionally and until the time that the tom-tom is actually played, its microphone is merely picking up unwanted sound from other instruments on stage. This adds a lot of unwanted mush in the mix and also adds to feedback problems. Use the S•com 4 to gate the signal of the tom-tom by selecting Gate with the Expander/Gate switch. Now adjust the Trigger control so that the gate opens only when the tom-tom is played, and at the same time, so that the gate is closed even when the adjacent tom-tom is played. This same technique is useful on drums that have been recorded on individual tracks. By using the Gate to mute the bleed of the other drums, you can effectively reduce the comb filtering produced by phase cancellation due to microphone proximity.

Gating Longer Sounds

When using a noise-gate on sound with a longer decay like piano, it is usually necessary to use a longer release time. Run the piano signal through the S•com 4 and set the Expander/Gate Release switch to Slow. Adjust the Trigger level on sustained passages to get the best results. Be sure to listen for the natural decay of the instrument and allow the gate to remain open until just after end of the decay.

Applications

Leveling a Vocal Track

When recording a vocal track, the vocalist may change the distance between them and the microphone, or they may naturally have a lot of dynamic range in their performance. In either case, the sound engineer must decide how much compression should be used to balance the natural performance and printing a good level to tape or disk. Adjust the S•com 4's Ratio to 4:1. The S•com 4 uses the AEG (Auto Envelope Generator) for automatic attack and release. Now adjust the Threshold level so that the Gain Reduction meters show 6 to 10 dB of gain reduction. Adjust the Ratio control if necessary.

Leveling a Guitar or Bass

Guitar and especially bass guitar can have a lot of level change between strings and even frets on the fingerboard. Using compression when recording guitars and bass will even out these differences. Adjust the S•com 4's Ratio to 4:1. The S•com 4 uses the AEG (Auto Envelope Generator) for automatic attack and release. Now adjust the Threshold level so that the Gain Reduction meters show 10 to 12 dB of gain reduction. You'll notice that the each note is at the same loudness and the overall sustain is increased.

Compressing Drums

Adding compression on drums can make a boomy kick drum tighten up, almost as if you were tightening the head of the drum. Adjust the S•com 4's Ratio to 6:1. The S•com 4 uses the AEG (Auto Envelope Generator) for automatic attack and release. Set the Threshold so that the Gain Reduction meter reads 12 to 15 dB. Adjust the Ratio control if necessary. You can use the same basic set up on snare and toms as well.

Getting a Track to Sit in the Mix

By using a heavy amount of compression you can get the effect of the vocal suspending in the mix. While this may be a bit radical for some, the effect can be dramatic, especially if the vocal is mixed without any reverb or delay. Adjust the S•com 4's Ratio to 6:1. The S•com 4 uses the AEG (Auto Envelope Generator) for automatic attack and release. Now adjust the Threshold level to so that the Gain Reduction meters show 21 to 24 dB of gain reduction.

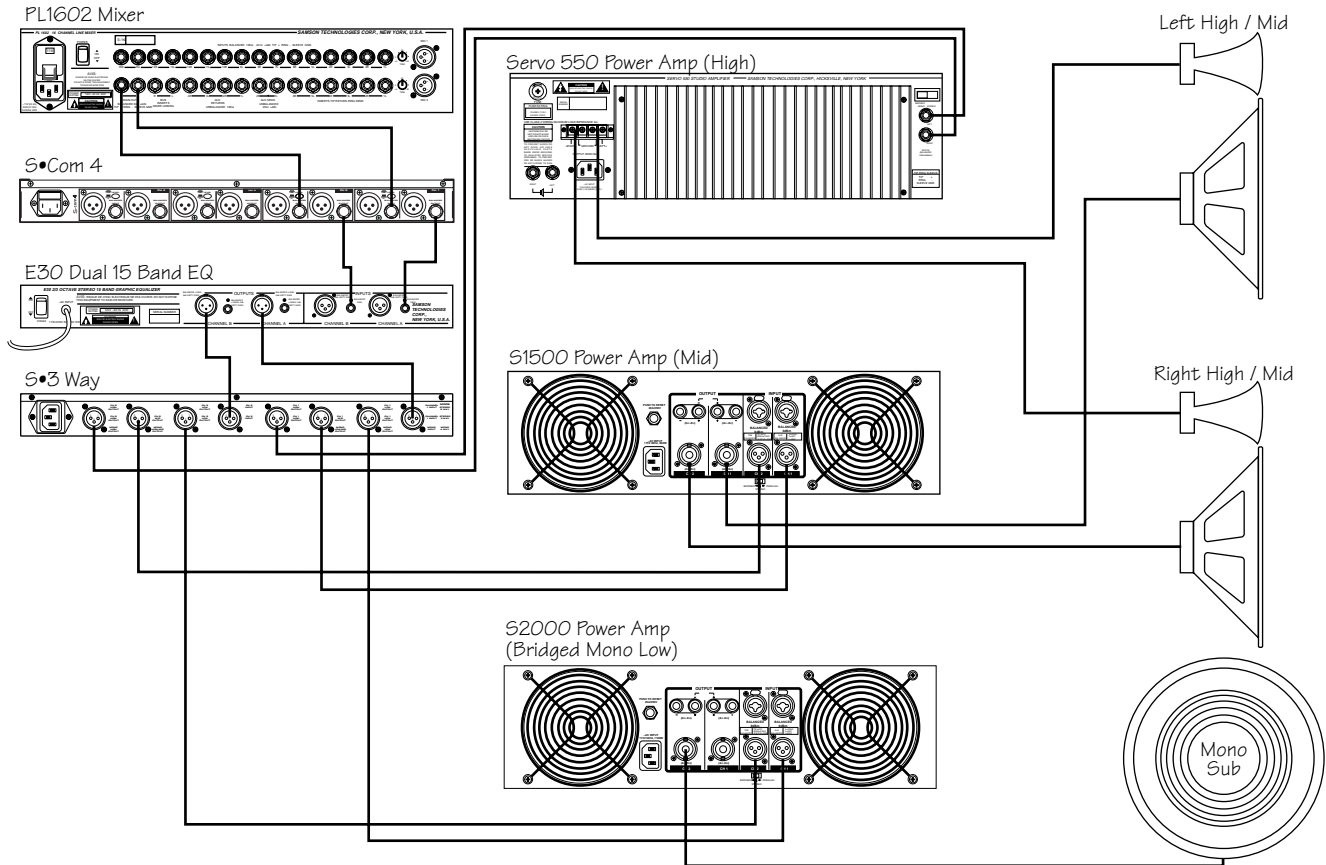
Speaker Protection

There are several ways to use a compressor to protect a speaker system and many considerations can be made including whether the speaker system is crossed over actively or passively.

If the speaker system is stereo using a passive crossover, then the line output of the mixer or equalizer is run directly into the S•com 4 inputs. The S•com 4 should be last in the chain before the power amps with its outputs feeding the inputs of the amp. Now set the S•com 4 to Stereo Link mode. Adjust the Threshold and Ratio so that the system's entire dynamic range is under control.

When using an active crossover, multiple compressors can be used to compress each section of the PA. For example, if the PA is using an active crossover to run a four-way mono system, the S•com 4 can be used for four band compression. By compressing each output of the crossover, you can maximize the output level while minimizing the gain to sensitive speakers like the mid-range. Run the low and low-mid frequencies into channel 1 and 2 of S•com 4 and the high-mid and high frequencies into channel 3 and 4 of the second S•com 4.

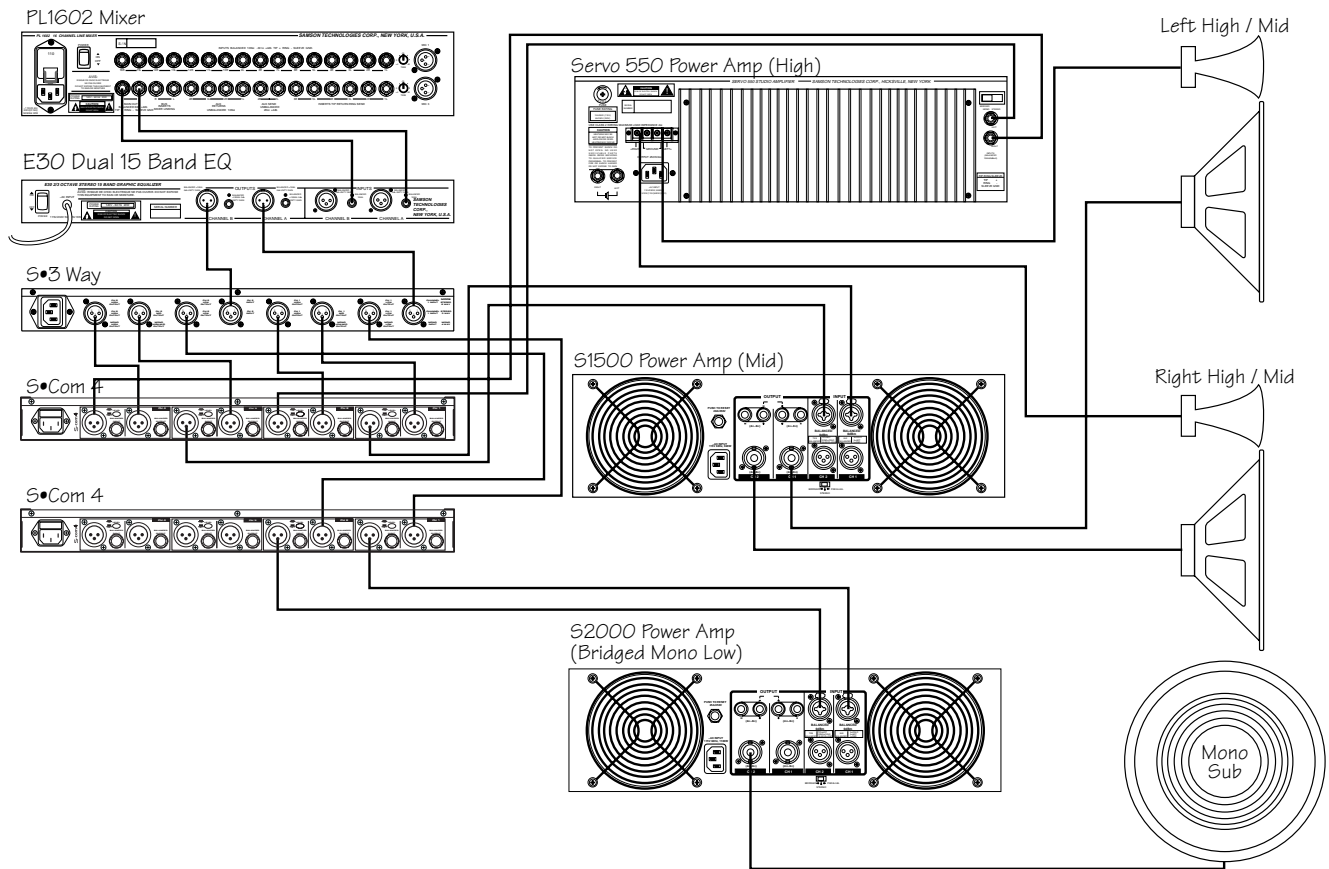
LIVE SOUND SYSTEM WITH STEREO COMPRESSION



In this example, the S•com 4 is inserted after the mixer and before the graphic equalizer, thereby compressing the full range signal from the mixer.

S•com 4 System Set-Ups

LIVE SOUND SYSTEM WITH MULTIBAND COMPRESSION



In this example, two S•com 4's are inserted after the mixer, equalizer and crossover, thereby providing individual compression on the low, mid and high frequencies.

S•com 4 Connections

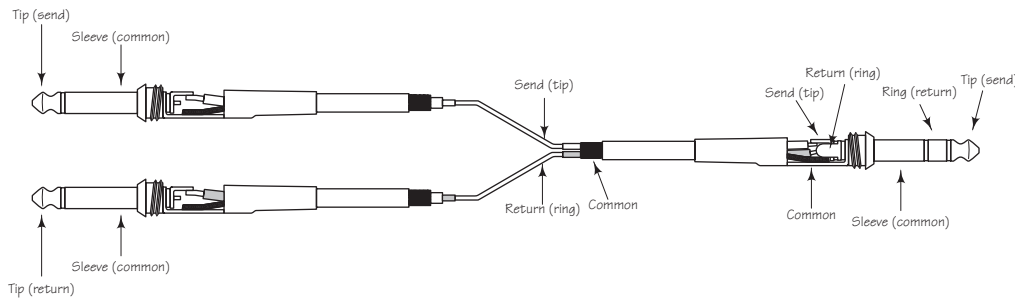
CONNECTING THE S•com 4

There are several ways to interface the S•com 4 to support a variety of applications. The S•com 4 features servo-balanced inputs and outputs, so connecting balanced and unbalanced signals is possible without any signal loss. The S•com 4 can be used on a single instrument by connecting to a mixer channel's insert points, or on an entire mix "in-line" between a mixer's outputs and a power amp or equalizer.

INSERT POINTS

Many mixers today provide channel and bus or group inserts. Insert points are input and output patch points that interrupt the channel or bus signal so that external processors can be connected. Channel insert points are ideal for connecting to when using the S•com 4 to process a single channel like a vocal, bass or guitar. Bus insert points are ideal for compressing groups of instruments like vocals, strings or drums. If you are connecting to a channel's insert points, you may have a single TRS jack for Send & Return. In this case, use an Insert "Y" Cable that configured like the one in the wiring diagram below.

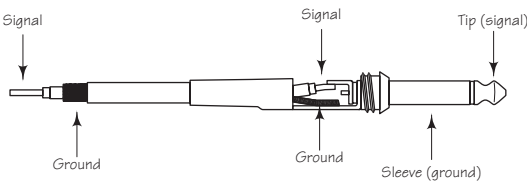
Insert Cable 1/4" male TRS connector to two male 1/4" in send and return configuration.



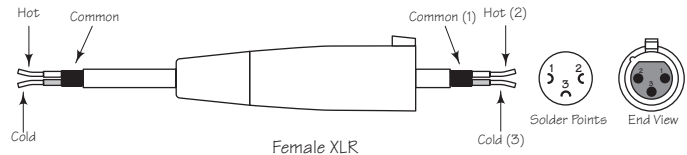
IN-LINE

In live sound operation the S•com 4 can be installed in-line between a mixer and equalizer or power amplifier. For these applications the S•com 4 provides both 1/4" TRS connectors and XLR connectors to easily interface with most any professional audio device. Follow the wiring examples below for your particular installation.

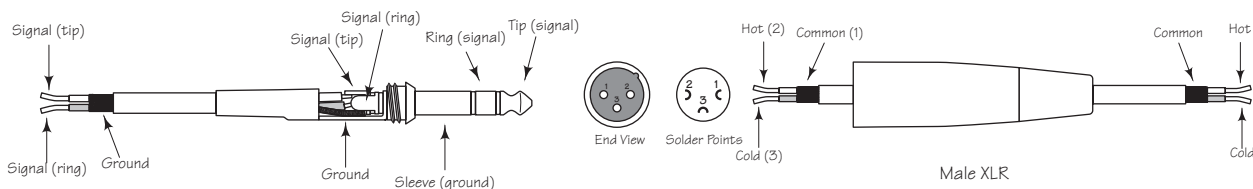
Unbalanced 1/4" Connector



XLR Balanced Wiring Guide



Balanced TRS 1/4" Connector



Specifications

System Specifications

Frequency Response	20Hz to 20kHz + - 0.5 dB
Dynamic range	95 dBu, un-weighted, 22 Hz to 22 kHz
THD	0.008 % typ. @ +4 dBu, 1 kHz
Crosstalk	90dB, 22 Hz to 22 kHz
Detector	RMS

Expander/Gate

Trigger range	variable (Off to +10 dB)
Attack	Auto, variable <1 ms per 50 dB
Release	Auto ,variable (Slow:100 ms / 1dB, Fast:100 ms/100 dB)

Compressor Section

Threshold	-40 dB to +20 dB
Ratio	variable (1:1 to 1:)
Auto Attack Time	variable (0.3 ms / 20 dB to 300 ms / 20 dB)
Auto Release Time	variable (0.05 to 5 Sec)
Output gain	variable (-20 to +20 dB)

Function Switches

Gate	Gate or Expander
Release	Fast/slow
Enhancer	In/Out
I/O Meter	Switches the Input/Output meter to read input or output level .
Stereo Link	Linking two channels for stereo operation. Channel 1 becomes master for Channel 2. Channel 3 becomes master for Channel 4.
Operating Level	Changes the internal reference level from-4 dBu to -10 dBV.

Meters & LED's

Gain Reduction	5 segment LED display: -24/-12/-6/-4/-2 dB
Input/Output level	5 segment LED display: -18/-6/0/+6/+9 dB
Auto Open/Closed	2 LED's under and over signal window
Function switch	LED indicator in each

Specifications

Audio Input

Connectors	XLR and 1/4" TRS jack
Impedance	20k Ohm balanced, 10k Ohm unbalanced
Nominal Operating Level	Selectable +4dBu/-10 dBV
Max. Input Level	+21 dBu, balanced and unbalanced
CMRR	Typ. 40dB, >55dB @ 1kHz

Audio Output

Connectors	XLR and 1/4" jack
Impedance	60 Ohms balanced, 30 Ohms unbalanced
Max. Output Level	+21 dBu, balanced and unbalanced

Power Supply

Mains Voltages/selectable	USA/Canada ~120 V AC, 60 Hz
	U.K./Australia ~240 V AC, 50 Hz
	Europe ~230 V AC, 50 Hz

Power Consumption

Power inlet	5 Watts Standard IEC receptacle/with fuse
-------------	--

Size

Dimensions	1 3/4" (44.5 mm)H x 19" (482.6 mm) x 7 3/4" (216 mm)
------------	--

Weight

Net Weight	5.25 lbs.(2.4 kg)
Shipping Weight	7.5 lbs.(3.4 kgs)