SG-192

DIGITAL STEREO GENERATOR

TECHNICAL MANUAL

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MANUAL

Wheatstone
AUDIO PROCESSING

September 2014

VORSIS ULTRA-HIGH RESOLUTION PROCESSING

Wheatstone Digital Stereo Generator Technical Manual

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Attention!

Federal Communications Commission (FCC) Compliance Notice:
Radio Frequency Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

> ⚠ **This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.**

This equipment must be installed and wired properly in order to assure compliance with FCC regulations.

Caution! *Any modifications not expressly approved in writing by Wheatstone could void the user's authority to operate this equipment.*

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The History of Wheatstone Audio Processors

Introduced in 2005, the Vorsis product line evolved from Wheatstone's return to its original roots in audio processing. Having designed and integrated analog and then, later, complex digital audio processing into our radio and television consoles and control surfaces, Wheatstone was perfectly poised to address the challenges of combining very high audio quality with competitive on air loudness.

Wheatstone audio processors are built to the same exacting standards as all Wheatstone products. Research and development, manufacturing, testing, and quality control for the line of audio processors are all accomplished within Wheatstone's large state-of-the-art facility located in New Bern, North Carolina. Keeping everything under one roof allows Wheatstone to have control over every facet of production and ensures that our costumers receive products of the highest possible quality *and* reliability. Staying true to "Made in the USA," Wheatstone does not utilize offshore manufacturing.

A dozen experts with deep experience in Digital Signal Processing, broadcast audio and other engineering disciplines comprise our design team. Led by audio processing expert and broadcast engineering veteran Jeff Keith, the team combines their talents to design and build audio processors that achieve the highest standards of on-air sound quality.

In its short history Wheatstone Processing has already invented many new *and* unique audio processing algorithms – algorithms that push audio processor performance to new and higher levels. Wheatstone was the first to develop an intelligent, "program density aware" AGC (2007 - Sweet Spot Technology, or SST). We were also the first to employ the science of human psychoacoustics in the design of a multiband limiter (2005, our acclaimed 31-band limiter). In addition, our well-regarded Bass Management systems solve the bass intermodulation problems that plague other brands of audio processors when pushed for competitive loudness.

Each Wheatstone Processing product comes with its own Windows® software-based intuitive Graphical User Interface for control of the processor. Carefully tuned factory presets ensure that our audio processors can be placed into use quickly and easily in any size market with a minimum of effort.

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General Information

Introduction

Welcome to the Wheatstone SG-192 Digital Stereo Generator. The SG-192 has been carefully designed to complement existing audio processing and help deliver a clean and easy to listen to sound on the dial along with very competitive loudness when that is the goal.

Remote control of the SG-192 is via a Windows-based Graphical User Interface (GUI) software and can be accomplished via 100BaseT wired Ethernet. Up to four simultaneous remote control sessions are possible. General Purpose Input/Output is provided on an RJ-45 to interface to station systems.

The SG-192 utilizes an internal base sampling rate of 192 kHz. Higher sample rates are used where it is beneficial to do so, such as within the SG-192 clipper. A 24-bit, 144dB internal dynamic range signal path allows audio to be processed with *extreme* precision. The front panel OLED screen permits convenient control of system and setup parameters.

Those wishing for remote or PC control over all parameters will appreciate our full-control GUI. This GUI is available free of charge and comes on a CD that accompanies this product or can be downloaded at http://wheatstone-processing.com.

Wheatstone products are designed and manufactured in our Corporate Headquarters in New Bern, North Carolina, USA. This large, state-of-the-art facility affords complete control over product quality during every step of the design and manufacturing process. In order to maintain the high product quality that Wheatstone has been known for, no offshore manufacturing is utilized.

The following pages will help you get the SG-192 up and running as quickly as possible without having to know a lot of techie stuff.

If during installation or setup you find that you need assistance or advice, please feel free to contact our technical support folks at (252) 638-7000 or email us at: **techsupport@wheatstone.com**.

SG-192 Feature Overview

The SG-192 Stereo Generator has been designed for conventional analog FM. It was made to complement existing audio processing and should not be used without audio processing preceding it.

Input audio can be analog or digital, with options on the digital input via WheatNet-IP or standard AES-3 connection. And input failover between the digital or analog inputs is available.

The processing section of the SG-192 includes an intelligent main limiter/clipper technology and composite processor taken from our flagship AirAura Digital Audio processor. This allows the SG-192 to be located at a remote site to supply stereo generation when there is a desire or need to locate the main audio processor at the studio.

The SG-192 can be directly fed to an exciter in a number of ways. Standard analog composite is available via the twin 50 Ohm BNC connectors on the rear of the unit. Conversely, the SG-192 can also feed an AES composite signal to compatible exciters via Wheatstone's baseband192 technology (MPX over AES). This feature makes the SG-192 the first stand-alone stereo generator to offer a full digital composite connection between stereo generator and exciter.

Because it has the highest sampling rate of any stereo generator on the market, the SG-192 can ingest SCA signals, convert them to digital and mix them in the digital domain. Previous stereo generators kept the SCA mixing in the analog domain where dirty and drifting trim pots can affect injection levels and modulation over time.

Syncing of multiple sites can be accomplished using the GPS lock capability on the SG-192. This allows for deployment of multiple SG-192's on Single Frequency Networks (SFN) where all of the transmitted signals will be treated as one signal by the receiver.

GPI (General Purpose Inputs) provide easy access to preset changes via external events such as contact closures and automation control.

Rack Mounting

The SG-192 is designed to fit into an industry standard 19" equipment rack, and requires one rack unit (1.75") of vertical space. The unit has a depth of 9" behind the rack rails (including chassis connectors), and its chassis has a width of 17-11/32". Space needed in front of rack rails is 3/4" and an additional five inches of space is required for wiring cables to pass through. If using only two rack screws <u>always</u> use the bottom two screws to prevent twisting of the front panel and other undue forces from harming the processor chassis.

The SG-192 may be mounted between other devices in the equipment rack; however, in accordance with good engineering practice it should not be mounted directly above devices that generate a significant amount of heat (such as power amplifiers or power supplies). If such a location is unavoidable, then it is advisable to utilize an extra 1RU blank rack panel between the SG-192 and devices immediately above and/or below it.

<u>WARNING!</u>

With very few exceptions, the SG-192 chassis DOES NOT need to be opened in the field.

Please be advised that the SG-192 contains <u>high voltage</u> power supply circuits operating at voltages well above AC line input.

These voltages are hazardous and potentially deadly if accidentally contacted.

Special tools, software, and fixtures are required for service. There are no user-serviceable parts inside.

The SG-192 unit must be returned to Wheatstone Corporation under a Return Authorization in the unlikely event that repair is necessary.

If you need to return the SG-192 to Wheatstone for repair, please contact our office at 252-638-7000 Monday – Friday 8:30am to 5:30pm ET or after hours at techsupport@wheatstone.com for a Return Authorization (RA) number.

SG-192 Installation Tips

Grounding

Establish a low impedance common ground in the facility and try to route all equipment grounds to that point. Use ground conductors with the largest possible surface area and keep ground leads as short as possible. The SG-192's ground reference is its chassis, which should be connected to the station ground. Such a connection is especially important when the SG-192 is operated in a high RF environment because it helps minimize differential voltages between the processor's chassis and other pieces of equipment such as the rack it is mounted within.

Surge Protection

Always place surge protection circuits as close as possible to the device being protected. AC power line surge protection should manage transients in a way that keeps instantaneous potential differences *between* the power line hot, neutral, AC grounding conductor, the station ground, and the processor chassis as low as possible. Likewise, measures should also be taken to keep the instantaneous potential difference between the audio cable shields and the processor chassis as low as possible (this applies to *all* audio equipment, not just the SG-192), particularly when the equipment is located within the electrically hostile environment of a station's transmitter facility.

UPS/Power Conditioning

Choose the best power conditioning/UPS units that your budget will allow, focusing on the most important features and options that you actually need. Some questions to ask while reviewing features are:

- How does the UPS behave when AC power is not exactly 60Hz, such as when the facility is on its backup generator?
- If the UPS has onboard surge protection, what kind of surge capability does it have and where are those surges directed to?
- Is the UPS equipped with remote monitoring capability?
- Does the UPS have onboard monitoring and alarms to signal problems such as low batteries?

Analog Audio Input Connections

Balanced audio *input* sources should be connected to the SG-192 using standard two-conductor shielded audio cable such as Belden 8451 or 9451.

2
3
1
SG-192
End of cable

Hot
Shield
Unbalanced equipment
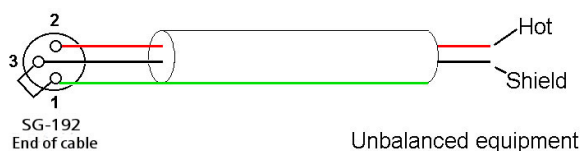
Unbalanced input audio connections should be made with shielded *two conductor* cable. At the unbalanced source's output connect the "+" output to SG-192's "Hi" input (XLR pin 2) and connect the shield wire to the SG-192's "Lo" input (XLR pin 3). If the cable's shield is used (recommended) connect it at the SG-192 end only (XLR pin 1) to prevent AC ground loops.
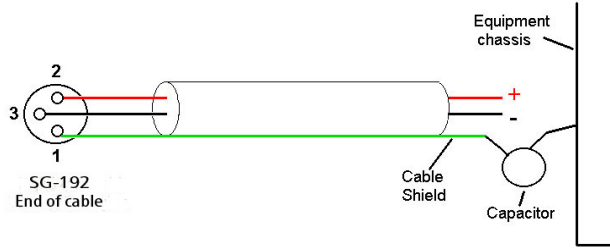
If RF interference is an issue, the far (floating and ungrounded) end of an audio cable shield can be experimentally bypassed to RF ground via a 0.01μF, 250V AC *rated* capacitor. Suitable capacitors are:

TDK	CS17-F2GA103MYGS
Murata	DE2F3KH103MA3B
Panasonic	ECK-ATS103MF
AVX	65N103MBLCP

Digital Audio/baseband192 Connections

For digital audio connections always use a good quality balanced digital audio cable (or twisted pair Category 5E/6 Network cable) having a characteristic impedance of 110 Ohms. This cable should be shielded where possible, and in the case of multi-pair cable, each pair should be individually shielded. Foil shielding is recommended for permanent installations, and a cable with foil shield plus an overall braid should be used in applications where frequent flexing of cables might occur.

Generic "audio" cable such as Belden 8451 and 9451 *may* sometimes be used for interconnecting AES3 digital audio devices *as long as the cable is short*. The actual cable length that will work satisfactorily is determined by *many* factors including the error correction and jitter tolerance of the AES3 receiver, the characteristics of the digital cable driver and the characteristics of the specific cable being used and its length. "Generic" analog audio cables usually have higher capacitance than digital cable and high capacitance cables can impair the ability of the AES3 receiver to recover the digital signal without errors. Increased jitter, dropouts, or no audio at all can be an indication of an improper cable type.

Where to Install the SG-192 (And What to Install in Front of It)

The best location to install the SG-192 is at the transmitter site. While it can be installed in front of a composite STL system, this negates the idea of locating your processing at the studio and doing the final peak control, composite processing and stereo generation at the transmitter for maximum loudness.

When placing a processor ahead of the SG-192 it is best to use the discreet left/right output (either analog or AES) and defeat pre-emphasis (set to FLAT). Unlike other stereo generators, pre-emphasis is very well managed in the SG-192.

If you have a processor where pre-emphasis cannot be defeated, turn off pre-emphasis in the SG-192 and let that processor manage pre-emphasis.

The SG-192 will NOT work well with standard compressor/limiters ahead of it. The signal fed to the SG-192 should be peak controlled for FM. Using a processor meant for streaming, HD or any type of studio compressor/limiter will not produce satisfying results.

The following is a list of processors that are suitable to place in front of the SG-192 and the pre-emphasis options. If the processor is a multi-mode processor or a dual mode processor, the FM output should ALWAYS be used. Refer to your processor's owners' manual for more details.

NOTE: For the pre-emphasis option to work, you need to make sure the CLIP + LP (low pass) Filter option is enabled. Pre-emphasis is not an option when CLIP + LP Filter isn't selected. This is needed for proper pre-emphasis management.

WHEATSTONE/VORSIS: AirAura, FM-531HD, SG-192, VP-8IP (FM mode only), AP-2000, FM-2000, VP-8 PLUS (FM mode only), VP-8 (FM mode only), FM-4, FM-10HD, FM-5, HD P3 (in broadcast mode) and AP3 (in broadcast mode). In all Wheatstone/Vorsis models, pre-emphasis should be set to flat in the processor and on in the SG-192.

ORBAN: In all Orban models, pre-emphasis should be off in the SG-192 and set to on the processor. IF you need to send processed audio over a lossy codec, the output of the Orban should be set to FLAT and pre-emphasis should be ON in the SG-192. If you are using an analog Orban processor, pre-emphasis should be done in the processor and the SG-192 should have pre-emphasis turned off.

NOTE: As stated above, the analog and AES outputs of an Orban audio processor should be set to "flat" if pre-emphasis is used in the SG-192, but keep in mind the actual audio itself is never truly "flat". By that we mean the audio is de-emphasized in the Orban to achieve a flat response as opposed to being delivered to the output with no pre-emphasis. Pre-emphasis cannot be truly defeated in the FM path of an Orban digital processor. Thus, if you use an Orban in front of a lossy codec/STL, the audio will be pre-emphasized and de-emphasized before the STL and then pre-emphasized again in the SG-192. The codec, plus the multiple stages of pre and de-emphasis will degrade your audio. This is exactly why a linear path that can accommodate the pre-emphasis curve without adding distortion is recommended.

CUTTING EDGE/OMNIA: In all Cutting Edge/Omnia models, pre-emphasis should be defeated in the processor and engaged in the SG-192. Unlike Orban, Cutting Edge/Omnia delivers a truly flat signal to its FM outputs if need be.

If you have a make/model not listed here, please feel free to contact Wheatstone support at 1-252-638-7000 or at techsupport@wheatstone.com for help adjusting your processor with our SG-192.

Orban is a registered trademark of Nabro Able LLC. Cutting Edge and Omnia are registered trademarks of TLS Corp.

AC Power Considerations

Please note that in order to enhance its long-term reliability, the SG-192 has no power switch because *all* power switches notoriously become intermittent over time without regular use.

The SG-192 accepts AC line input voltages between 90 and 260 VAC, 50 or 60Hz. Power consumption is under 100VA.

Although aggressive AC input filtering is utilized on the AC power input it is always advisable to use external surge protection and an uninterruptible power supply (UPS) wherever possible, especially where the AC power quality can be in question, such as at a remote transmitter site.

Power conditioning, surge suppression, and even power backup devices are wise investments when using sensitive modern electronic devices. The SG-192 is, after all, a highly specialized "computer."

The use of a UPS as recommended will protect the SG-192 from short duration power interruptions and glitches which might otherwise signal it to reboot. When the SG-192 reboots there will be a loss of audio for approximately 15 - 20 seconds.

Rear Panel Connections

The image below shows the rear panel of the SG-192 and the location of various connectors associated with an installation:

SG-192 Rear Panel Connections (left to right)

CONNECTOR	TYPE	FUNCTION & NOTES
1	XLR Female	Left Analog Input
2	XLR Female	Right Analog Input
3	BNC Female	SCA Input #1 (for reliable connection use 50 Ohm male connector)
4	BNC Female	SCA Input #2 (for reliable connection use 50 Ohm male connector)
5	BNC Female	GPS Sync
6	BNC Female	TX Output #1 (for reliable connection use 50 Ohm male connector)
7	BNC Female	TX Output #2 (for reliable connection use 50 Ohm male connector)
8	XLR Female	AES Audio Input
9	XLR Male	AES Audio Output (composite only... MPX over AES)
10	RJ-45	GPI Interface
11	RJ-45	Ethernet (Network) connection / WheatNet-IP audio connection
12	IEC	Mains connection (90-240~VAC / 50-60Hz)

Audio Inputs

The SG-192 accepts three types of audio input sources:

• Balanced analog line level left/right audio;

• Digital AES3-compliant left/right audio with sample rates between 32kHz and 96kHz;

• WheatNet-IP via 100BaseT Ethernet connection to a WheatNet-IP audio network.

Input audio can be applied to any or all inputs simultaneously with the caveat that the WheatNet-IP input and AES3 inputs share a *common* digital path into the internal processing.

Automatic audio failover from analog to digital or vice versa is supported. Automatic failover from AES3 or WheatNet-IP to analog is instantaneous and based on invalid or missing bits in the AES3 or WheatNet-IP stream, or after 30 seconds of "silence" (level below -42dBFS).

Automatic failover from analog to AES3 or WheatNet-IP is based on silence sense responding to audio on both channels being below -42dBFS for more than 30 seconds.

Failover capability is not available between the AES and WheatNet-IP inputs.

Analog In – XLR-F

Pin 1 XLR LT SH – LINE LT IN SH
Pin 2 XLR LT HI – LINE LT IN HI
Pin 3 XLR LT LO – LINE LT IN LO

Pin 1 XLR RT SH – LINE RT IN SH
Pin 2 XLR RT HI – LINE RT IN HI
Pin 3 XLR RT LO – LINE RT IN LO

AES In – XLR-F

Pin 1 XLR SH – AES IN SH
Pin 2 XLR HI – AES IN HI
Pin 3 XLR LO – AES IN LO

SCA In – BNC

Pin 1 BNC 1 HI – SCA 1 IN HI
Pin 2 BNC 1 SH – SCA 1 IN SH

Pin 1 BNC 2 HI – SCA 2 IN HI
Pin 2 BNC 2 SH – SCA 2 IN SH

GPS 10MHz Synchronization Input

The SG-192 is equipped with a 10MHz GPS synchronization (sync) input on its rear panel. The purpose of the sync input is to allow the synchronization of the 19kHz stereo pilot signal of one, or multiple SG-192's, to an extremely stable external reference.

The GPS input is often used in translator/repeater applications or within Single Frequency Networks (SFN's) to keep the stereo pilot frequencies of multiple stereo generators all at the same frequency and phase. Locking all of the stereo pilots to the same stable reference minimizes interference where the signals from multiple transmitters overlap.

The GPS input connector, a BNC, can accept virtually any 10MHz waveform as long as its amplitude is at least 0.5V P-P. Internal signal conditioning minimizes signal corruption from noise, hum and other interference and the input is over-voltage protected up to +/-15V.

GPS In – BNC

Pin 1 BNC 1 HI – GPS IN HI
Pin 2 BNC 1 SH – GPS IN SH

FM Audio Outputs

Output audio for the FM path is available in composite format ONLY as:

• AES3 digital composite (baseband192) connected to compatible transmitter*.

• Unbalanced composite stereo on two BNC female connectors.

AES / baseband192 Out – XLR-M

Pin 1 XLR SH – AES FM / BASEBAND192 OUT SH
Pin 2 XLR HI – AES FM / BASEBAND192 OUT HI
Pin 3 XLR LO – AES FM / BASEBAND192 OUT LO

TX Out – BNC

Pin 1 BNC 1 HI – TX 1 OUT HI
Pin 2 BNC 1 SH – TX 1 OUT SH

Pin 1 BNC 2 HI – TX 2 OUT HI
Pin 2 BNC 2 SH – TX 2 OUT SH

Headphone Monitoring

An overload protected stereo headphone amplifier drives the front panel ¼" stereo headphone output located on the left side of the SG-192's front panel. The audio source feeding the headphones is the currently selected input source.

Network Connection

The SG-192 can connect to a network or PC/laptop over Wired Ethernet via the 100Base-T Ethernet port on the rear panel. This port is completely independent and Auto-MDIX, allowing it to support straight-through and crossover cables in any combination. The wired Ethernet interface can support up to four simultaneous connections to remote GUIs.

For typical CAT5 cable pinouts see below. These connections are for communicating with the configuration computer via a network.

Ethernet – RJ-45

Pin 1 – TXD +
Pin 2 – TXD -
Pin 3 – RXD +
Pin 4 – N/C
Pin 5 – N/C
Pin 6 – RXD -
Pin 7 – N/C
Pin 8 – N/C

Typical Straight-Through Cable

	PIN			PIN	

White/Orange 1 ———————— TXD + ———————— 1 White/Orange

Orange 2 ———————— TXD - ———————— 2 Orange

RJ-45 Plug · White/Green 3 ———————— RXD + ———————— 3 White/Green · RJ-45 Plug

Blue 4 – – – – – – – N/C – – – – – – – 4 Blue

White/Blue 5 – – – – – – – N/C – – – – – – – 5 White/Blue

Green 6 ———————— RXD - ———————— 6 Green

White/Brown 7 – – – – – – – N/C – – – – – – – 7 White/Brown

Brown 8 – – – – – – – N/C – – – – – – – 8 Brown
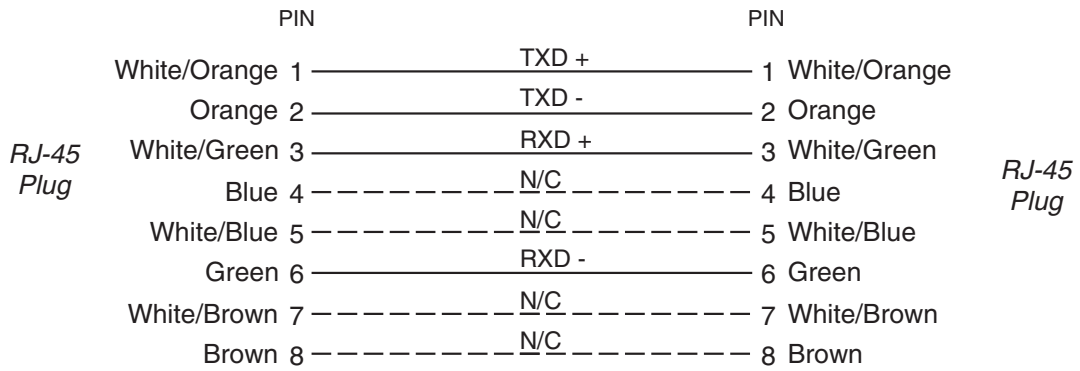
Typical Crossover Cable

White/Orange 1 — TXD + ——————— RXD + — 1 White/Green

Orange 2 — TXD - ——————— RXD - — 2 Green

RJ-45 Plug · White/Green 3 — RXD + ——————— TXD + — 3 White/Orange · RJ-45 Plug

Blue 4 — N/C – – – – – – – N/C — 4 Blue

White/Blue 5 — N/C – – – – – – – N/C — 5 White/Blue

Green 6 — RXD - ——————— TXD - — 6 Orange

White/Brown 7 — N/C – – – – – – – N/C — 7 White/Brown

Brown 8 — N/C – – – – – – – N/C — 8 Brown
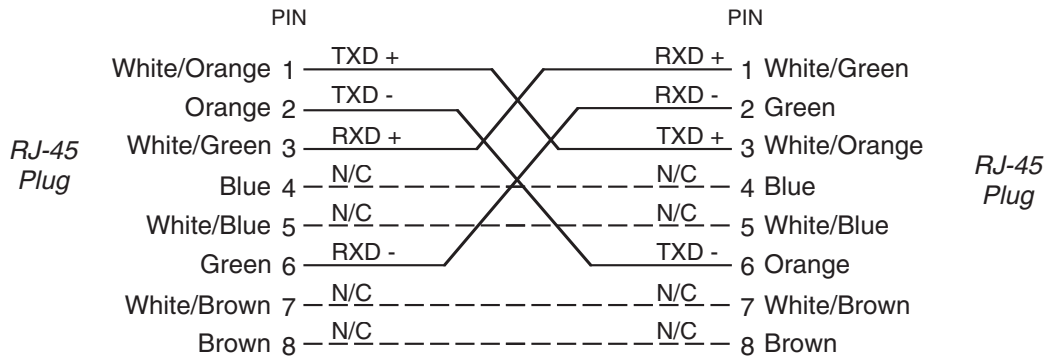
General Purpose Interface (GPIO)

The SG-192 is equipped with two General Purpose input (GPI) and output (GPO) ports on the rear RJ-45 connector. The General Purpose connections are optically-isolated from SG-192's internal circuitry to prevent external ground loops and to prevent dangerous voltages from being introduced into SG-192.

- GP Input #1 – Forces Analog Input regardless of currently selected input.
- GP Input #2 – Forces Digital Input regardless of currently selected input.
- GP Output #1 – Analog Input is selected.
- GP Output #2 – Digital Input is selected.

Each of the General Purpose inputs is current limited by 475 Ohm internal resistance. The LED device inside the opto-isolators is rated at a maximum forward current of 50mA and a normal operating current of 5mA.

Before connecting external circuitry to the General Interface inputs, first ascertain whether it will be necessary to utilize additional outboard series resistance in your application!

Use the following table to determine if an external resistance is required and if so, what value it should be. Note that a one-half watt resistor is sufficient. The resistance values in the table below have been calculated to result in approximately 5.0 milliamperes forward current through the opto-isolator's internal LED.

APPLIED VOLTAGE TO GPI	EXTERNAL RESISTANCE
3.3 Volts	None
5.0 Volts	330 Ohms
6.0 Volts	470 Ohms
7.5 Volts	820 Ohms
10.0 Volts	1.3 kOhms
12.0 Volts	1.8 kOhms
12.0 Volts	2.4 kOhms
24.0 Volts	3.9 kOhms
30.0 Volts	5.1 kOhms
48.0 Volts	9.1 kOhms

* For personal safety reasons a voltage in excess of 48VDC is NOT recommended to be applied to the General Purpose inputs.

The opto-isolators on the General Purpose outputs protect internal SG-192 circuitry from voltage up to 350 volts AC or DC. The <u>MAXIMUM</u> permissible load current is 100 milliamperes (0.10 Amperes).
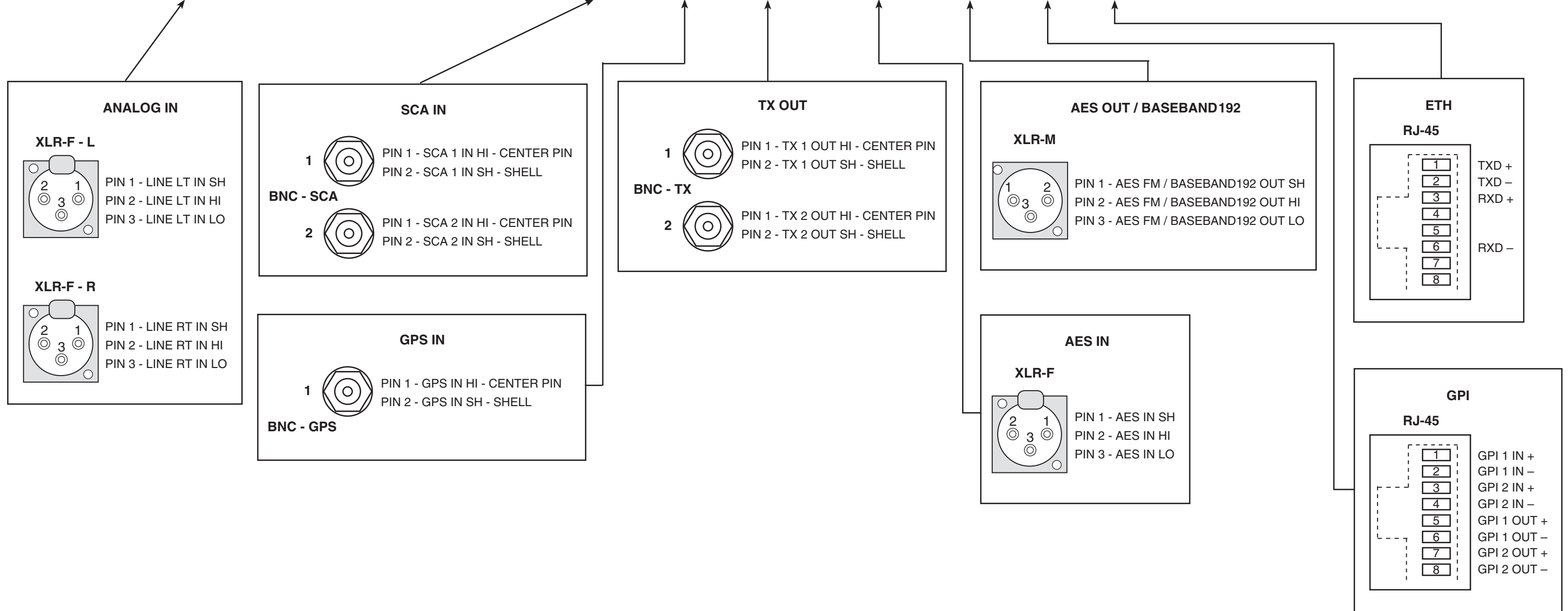
GPIO - RJ-45

The pin assignment for the rear panel RJ-45 GPI connector is as follows:

Pin 1 – GPI I IN +
Pin 2 – GPI 1 IN -
Pin 3 – GPI 2 IN +
Pin 4 – GPI 2 IN -
Pin 5 – GPI 1 OUT +
Pin 6 – GPI 1 OUT -
Pin 7 – GPI 2 OUT +
Pin 8 – GPI 2 OUT -

Special Notes About SG-192 Presets

Presets in the SG-192 function in a similar way to how presets behave on an audio processor. The sole purpose of Presets in the SG-192 is to allow the saving of various system-related operating configurations. SG-192 presets "remember" all control settings – even the input and output control calibrations – allowing any saved configuration to be instantly recalled from the front panel or via the software GUI.

Note also that the SG-192 saves all of its current settings several seconds after the last control change, so even if the current settings have not been formally saved as a "preset", the unit will still boot up to the same configuration after a power loss.

ANALOG IN

XLR-F - L

PIN 1 - LINE LT IN SH
PIN 2 - LINE LT IN HI
PIN 3 - LINE LT IN LO

XLR-F - R

PIN 1 - LINE RT IN SH
PIN 2 - LINE RT IN HI
PIN 3 - LINE RT IN LO

SCA IN

1   PIN 1 - SCA 1 IN HI - CENTER PIN
     PIN 2 - SCA 1 IN SH - SHELL

BNC - SCA

2   PIN 1 - SCA 2 IN HI - CENTER PIN
     PIN 2 - SCA 2 IN SH - SHELL

GPS IN

1   PIN 1 - GPS IN HI - CENTER PIN
     PIN 2 - GPS IN SH - SHELL

BNC - GPS

TX OUT

1   PIN 1 - TX 1 OUT HI - CENTER PIN
     PIN 2 - TX 1 OUT SH - SHELL

BNC - TX

2   PIN 1 - TX 2 OUT HI - CENTER PIN
     PIN 2 - TX 2 OUT SH - SHELL

AES OUT / BASEBAND192

XLR-M

PIN 1 - AES FM / BASEBAND192 OUT SH
PIN 2 - AES FM / BASEBAND192 OUT HI
PIN 3 - AES FM / BASEBAND192 OUT LO

AES IN

XLR-F

PIN 1 - AES IN SH
PIN 2 - AES IN HI
PIN 3 - AES IN LO

ETH

RJ-45

1	TXD +
2	TXD −
3	RXD +
4	
5	
6	RXD −
7	
8	

GPI

RJ-45

1	GPI 1 IN +
2	GPI 1 IN −
3	GPI 2 IN +
4	GPI 2 IN −
5	GPI 1 OUT +
6	GPI 1 OUT −
7	GPI 2 OUT +
8	GPI 2 OUT −

SG-192 Input/Output Connections

SG-192 Front Panel

Chapter Contents

SG-192 Front Panel


Meters and Status

Status LEDs

There are six status indicators on the SG-192 front panel designed to show the currently selected input source, whether the unit is in stereo or mono, and the states of the 15kHz low pass filter and BS.412 MPX power algorithms.

The Digital and Analog input status indicators show which audio input source is currently selected to be on air, noting that the *DIGITAL* indicator will be illuminated if either AES3 or WheatNet-IP sources are selected. Likewise, the *ANALOG* input indicator will be illuminated when that input has been selected. The input sources may be switched via the front panel, the software GUI, or via GPI logic.

The *STEREO* and *MONO* indicators directly reflect the operating mode of the stereo generator. They do not indicate the presence or absence of 19kHz stereo pilot, only the current 'mode' that the stereo generator is operating in.

The *15K LPF* indicator is on when the 15kHz low pass filter has been enabled from within the GUI software (the filter option is not available within the front panel menu tree). The 15kHz filter should be used whenever the externally connected processor is not equipped with its own. The 19kHz pilot and SCA protection filters are always in circuit and may not be disabled.

The *BS.412* indicator will be on whenever the BS.412 MPX power algorithm has been enabled. **NOTE:** this function is only used in certain countries in Europe. Enabling it in other locales where it is not legally required can cause up to a five dB loss of on-air loudness!
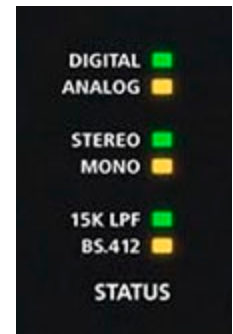
Input Level Meters

The input level meters have a scale showing the uppermost 42dB of the SG-192's internal, 24-bit, 144dB dynamic range. Levels which fall below the -42dB point on the input meter are also the assigned trip levels for automatic input failsafe when that feature is enabled (see page 3-6 for input auto failover).

Please take note that the levels shown on the Input/Output meters are calibrated in dBFS which stands for deciBels Full Scale. "0"dBFS is important because it is where there are no more

digital bits available to define the audio. Audio levels can never exceed 0dBFS and severe clipping distortion will result if the audio attempts to exceed it.

Please also note that the LED indicator for the -12dBFS level is yellow in order to warn the operator that there isn't much digital headroom left above that level. Therefore, normal input levels will usually fall between -24dBFS and -18dBFS with an occasional peak at -12dBFS. The input meters always show the audio input level from the currently selected input, analog or digital (AES3 or WheatNet-IP).

The Input Level Meters indicate the audio level being applied to input of the SG-192 and before the input gain control. These meters do not show audio levels post input gain control.

NOTE: The threshold of discrete L/R clipping is reached with peak input levels just reaching -12dBFS when the input *Digital Drive* or *Analog Drive* control is set to +12dB. Said another way, input drive control settings above +12dB will directly indicate the amount of L/R Clipper drive if the peak input levels are just reaching -12dBFS on the front panel or GUI meters.

Example: Assume a peak input level of -12dBFS maximum as shown on the front panel and the Input Drive control has been set to +15dB. This condition would result in an L/R Clipper drive of "+3dB".

Limiter Meters

The single limiter meter on the SG-192 front panel indicates the instantaneous depth of limiting being done by the MPX clipper.

Note also that the SG-192 was designed to be driven by a conventional FM processor with either discrete left/right of digital (AES3) outputs.

Output Meters

There are two sets of output meters, each with two bargraph columns. Like the input meters, the output meters show the upper 42dB of the SG-192's internal, 144dB dynamic range.

The baseband192 digital output is metered as the individual signals that make up the left and right inputs to the DSP-based stereo generator. Unlike the TX 1 and TX 2 meters (which show the raw stereo generator outputs), the BB192 meters indicate the levels which follow the BB192 digital output level control.

The TX OUT meters also have two columns, one for the TX 1 output and one for TX 2. These meters represent the audio levels as they exit the processing stages and therefore under normal operation will be seen peaking near the top of the meter column, and do not change if the actual output levels are adjusted.

OLED Display

On the front panel of the SG-192 is an OLED display that quickly and easily allows you to set up, configure and place the box on the air with a preset without having to set up the GUI interface. You can also make adjustments to the audio and set up user access to the front panel from this screen.

Adjustments are simple. The knob navigates up and down a menu when there is a list, or scrolls thru options in a submenu once one has been selected. Pushing the knob "takes" an option, while the "W" (WheatNet-IP) button backs out of a submenu to the main menu.
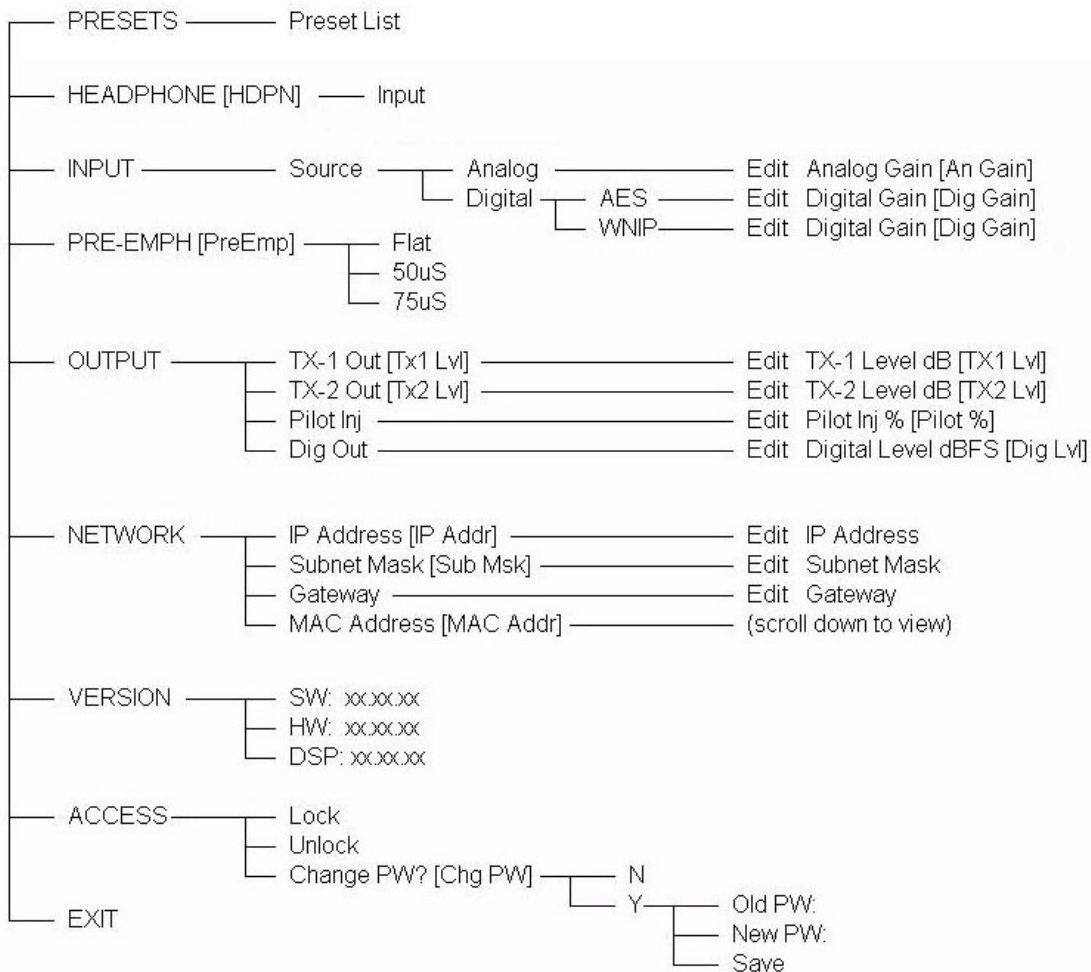
The main menu of the SG-192 shows all of the options available from the front panel. These options are:

- **Headphone** – Selects the headphone volume level.
- **Presets** – Selects a user or factory preset to place on the air.
- **Input** – Selects the input mode (Analog, Digital AES or Digital Wheat-Net-IP) and sets the gain structure for the analog and digital modes.
- **Pre-Emphasis** – Sets the pre-emphasis used, depending on your region and application. The options are FLAT, 50us and 75us.
- **Output** – Selects the output level of the composite and AES outputs as well as the pilot level and SCA injection levels.
- **Network** – Shows the current IP Address, Subnet and Gateway assigned to the SG-192. These settings can also be edited from this submenu.
- **Version** – Displays the current version of software running on the SG-192.
- **Access** – Allows you to set a password to lock out the front panel.
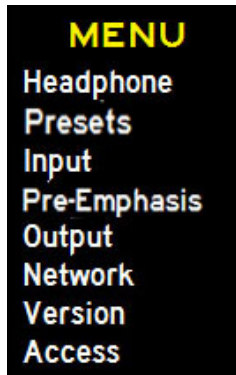
The front panel has a screen saver which activates after a few minutes of inactivity on the front panel controls.

See SG-192 Front Panel menu diagram at glance on the next page.

```
PRESETS ————— Preset List

HEADPHONE [HDPN] ——— Input

INPUT ————————— Source ——— Analog ————————— Edit  Analog Gain [An Gain]
                           Digital ——— AES ————— Edit  Digital Gain [Dig Gain]
                                        WNIP———— Edit  Digital Gain [Dig Gain]
PRE-EMPH [PreEmp] ——— Flat
                       50uS
                       75uS

OUTPUT ——————— TX-1 Out [Tx1 Lvl] ——————————— Edit  TX-1 Level dB [TX1 Lvl]
                TX-2 Out [Tx2 Lvl] ——————————— Edit  TX-2 Level dB [TX2 Lvl]
                Pilot Inj ——————————————————— Edit  Pilot Inj % [Pilot %]
                Dig Out ————————————————————— Edit  Digital Level dBFS [Dig Lvl]

NETWORK ——————— IP Address [IP Addr] ————————— Edit  IP Address
                Subnet Mask [Sub Msk] ————————— Edit  Subnet Mask
                Gateway ————————————————————— Edit  Gateway
                MAC Address [MAC Addr] ————————— (scroll down to view)

VERSION ——————— SW:  xx.xx.xx
                HW:  xx.xx.xx
                DSP: xx.xx.xx

ACCESS————————— Lock
                Unlock
                Change PW? [Chg PW] ——— N
                                         Y——— Old PW:
                                              New PW:
EXIT                                          Save
```

Headphone

The **Headphone** submenu gives you the option of adjusting the headphone volume.

To adjust the volume level, turn the knob to the second option and push the knob. You can then adjust the volume to a safe and comfortable level by turning the knob. Once complete, push the knob to exit the adjustment mode.

To return to the main menu, press the "W" *BACK* button.

Presets

The **Preset** submenu allows the user to pick any user presets that are saved on the hardware. To select a preset, turn the knob to highlight and then push the knob in to activate the preset.

To return to the main menu, press the "W" *BACK* button.

Management of presets on the hardware can be accomplished via the PC GUI program that communicates with the SG-192. You can add, delete and back up presets from the GUI. For more information about preset management with the GUI, please see page 3-16 of this manual.

MENU
Headphone
Presets
Input
Pre-Emphasis
Output
Network
Version
Access
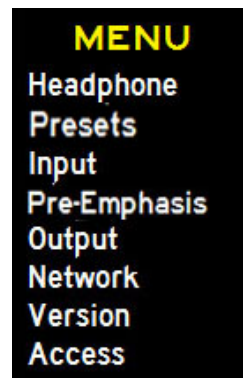
Input

The **Input** submenu allows you to change the input source to the stereo generator as well as adjust the input levels for each source independently.

Input Source

The first option is input source. To select the input source, highlight "input src" and push the knob in. Turn the knob to select the option you wish to place on air.

The options are:

- Digital AES ("Dig AES"). This is the audio that appears on the XLR AES3 input jack on the back of the stereo generator.

- WheatNet-IP ("Dig WIP"). This is the audio that is streamed to the stereo generator via the Ethernet jack. This option should only be selected if the SG-192 is part of a WheatNet-IP AoIP system and the stereo generator has been added to the system as a third-party device. For more information on how to set up the SG-192 for WheatNet-IP, please see Appendix B of this manual.

- Analog ("Analog"). This is the audio that appears on the balanced XLR analog L/R input jacks on the back of the SG-192.
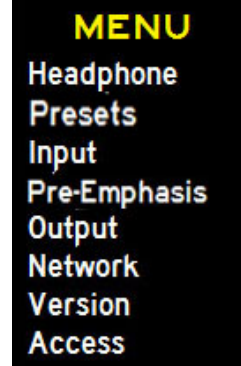
Once the source has been selected by pressing in the knob, the front panel will exit the source selection mode.

Input Drive Adjustment

The second option in the submenu are adjustments of the analog and digital input levels. Highlight the gain adjustment for the active input (which was selected above) by turning the knob and then pressing in the knob. While watching the input meters on the front panel, adjust the input level so that the audio just peaks at -12dBFS.

CAUTION! Because there is no processing between the input of the SG-192 and the safety clipper, this control basically acts as the clipper drive and must be carefully adjusted. You should turn the input control so the input audio indicates -12dBFS. to start. Then, once that is accomplished, you should check the CLIPPER DEPTH meter. If you see more than 2dB of clipping, you've gone too far. Back off the input slowly until there is no clipping depth shown.

Once the input gain has been adjusted, press the knob in to exit the adjustment option.

To calibrate the levels of non-active "backup audio source" inputs, you will need to activate the input as the main input to see its operating levels. A more comprehensive input adjustment menu is available in the PC based GUI software, which includes setting up main and backup audio sources.

To return to the main menu, press the "W" *BACK* button.

Pre-Emphasis

Pre-Emphasis has three options: Off, 50uS, and 75uS. The Off position is useful for testing and would not normally be used for broadcast. The 50uS or 75uS position should be selected to conform to your locale and regulatory requirements.

When a conventional FM processor is used ahead of the SG-192 and its output is pre-emphasized, then the SG-192's pre-emphasis option should be set to off.

When the processor ahead of the SG-192 utilizes pre-emphasis but its output is de-emphasized, pre-emphasis in the SG-192 should be turned on with the caveat that, due to the multiple uses of pre-emphasis and de-emphasis, previously well-controlled peak levels may be lost. Under these conditions additional clipping may occur (or be required) in the SG-192 in order to compensate.

Output

The **Output** submenu allows you to configure the composite and AES output levels and well as the pilot and SCA injection levels.

The adjustments in this submenu are:

- TX1 Level ("Tx1 Lvl") – Sets the level of the stereo generator's TX1 BNC output. If baseband192 is an selected as an option, the TX1 level control governs the baseband 192 output level (which appears on the AES XLR connector).

- TX2 Level ("Tx2 Lvl") – Sets the level of the stereo generator's TX2 BNC output. Use TX2 as a backup to TX1, or if you are using baseband192 and need a composite output independent of TX1 for your backup. Can also be used as a 19kHz reference (switchable in the PC GUI).

- Pilot Injection ("Pilot Inj") – The Pilot Injection control adjusts the level of the 19kHz stereo pilot and is adjustable from 0 (Off) to 20% of the main composite signal amplitude. Please refer to a properly calibrated modulation monitor to properly make this adjustment. Normal pilot injection is 9%.

- Digital Output Level ("Dig Lvl") – Adjusts the output of the baseband192 (MPX over AES) level. The SG-192 does not have an AES left/right output option.

- SCA1 Injection ("SCA1 Inj") – Inputs applied to the SCA connectors are high pass filtered to reduce hum and then low-pass filtered at 94kHz before being digitized at 192kHz. The SCA injection levels can be set to OFF, or to levels between -79.95dB and +10.0dB, in 0.05dB steps.

- SCA2 Injection ("SCA2 Inj") – Secondary SCA input that functions in the same manner as SCA1.
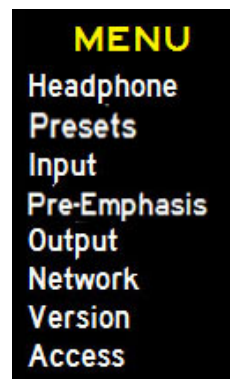
To change a settings, highlight the settings by turning the knob and the press the knob in. The value will now be highlighted. Turn the knob clockwise or counter clockwise to raise or lower the value. Push the knob in once you have reached the value to exit.

To return to the main menu, press the "W" *BACK* button.

Network

The **Network** submenu allows you to view and/or assign the IP Address, Subnet and Gateway to the SG-192 processor.

To view the SG-192 Network settings, from the main menu, turn the knob to highlight the Network option and press the knob in. You will see the IP Address, Subnet, Gateway and MAC Address displayed.

Changing The Network Settings

Once you are in the **Network** submenu, changing the settings is easy. Just turn the knob to highlight the address you want to change (IP Address, Subnet or Gateway… the MAC Address is not adjustable. It is a fixed address unique to the particular SG-192).

Once you have selected an address to edit, push in the knob and the first set of numbers in that field will flash. Turn the knob up or down to increase or decrease the numerical value. Once you have reached the desired value, push the knob in to move to the next field.

Once all of the fields are correct, dobby to the end of the address by pushing in the knob until you are back to the submenu edit address selection. You can now turn the knob to edit a different address.

Leading Zeroes

The SG-192 uses IPv4 addresses that are canonically represented in dot-decimal notation, which consists of four decimal numbers, each ranging from 0 to 255 and separated by dots. On the front panel and when assigning an IP address in the PC GUI, one and two number fields do not have "leading zeroes"… for example, an address of 192.168.1.192 should be entered as shown in the PC GUI when setting up the GUI to communicate with the SG-192 just as it is written in this example. The front panel does not allow the user to add "leading zeroes", but it can be accidently entered into the PC GUI. An incorrect way of entering the 192.168.1.192 address in the PC GUI would be 192.168.001.192. The correct way **IS** 192.168.1.192.

Default IP Address

The SG-192 Default network settings are:

IP ADDRESS: 192.168.1.192
SUBNET: 255.255.255.0
GATEWAY: 192.168.1.1

Version

There are no editable fields in this submenu, rather it is a reference to what version of firmware is running on your stereo generator. When contacting technical support for your SG-192, you may be asked to look at this screen to verify what version of SG-192 software is running on your unit. The key piece of information for users is the SOFTWARE version. This version must match the PC GUI version running on your computer for you to be able to properly adjust the SG-192 from your computer. For more information on checking the PC GUI version, see page 3-20 of this manual.
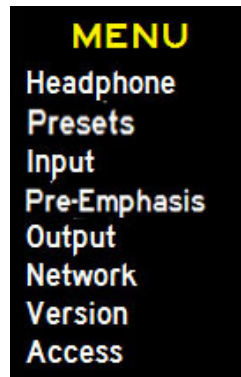
If the PC GUI and the version on the hardware are mismatched, you can contact Wheatstone Technical Support at +1-252-638-7000 Monday thru Friday (except major US holidays) from 8:30am to 5:30pm Eastern time. You can also email your SG-192 PC GUI and hardware versions to techsupport@wheatstone.com to obtain a copy of the PC GUI that matches the version running on your hardware.

Access

Access to the front panel of the SG-192 can be restricted with a password.

To set the front panel password:

- From the main menu, turn the knob to the **Access** option and push in the knob.
- Push the knob in again to Set Password ("Set PW")
- A dialogue will open with the cursor set on the first character. Turn the knob to assign a numerical character as the first of four numbers.
- When the character is set, push in the knob and the cursor will move to the next slot.
- Once the four digit password has been created, push and hold the knob to save the password.

When anyone attempts to access the processor front panel, they will be met with a prompt to enter a password. To enter a password, turn the knob to the first character, scroll the correct digit, and press the knob in. The cursor will move to the next character. Continue in this manner until the password has been entered, then press and hold the knob. A message will tell you if the password is correct or incorrect.

It is important that you REMEMBER your password. Only numerical characters can be used in password creation. If you lose your password, please contact Wheatstone Technical Support at +1-252-638-7000 Monday thru Friday (except major US holidays) from 8:30am to 5:30pm Eastern time.

SG-192 PC GUI

Chapter Contents

SG-192 PC GUI

The *SG-192 PC Graphical User Interface* (or GUI) is an advanced user interface. This GUI is designed to bring out all of the controls available to the user to adjust the sound of the stereo generator to fit the needs of the station and format.

This GUI expands on the basic adjustment controls that are found on the front panel of the SG-192.

The SG-192 GUI allows you to adjust the stereo generator and see, in real time, how it is reacting to the audio. All Wheatstone GUI's have been carefully designed so that no adjustment is more than two mouse clicks away.

The SG-192 GUI software may control an unlimited number of SG-192's via a standard Ethernet network. Utilizing TCP and UDP protocols, the GUI can be used to control these SG-192 devices from anywhere in the world as long as there is an Internet connection. This includes controlling it behind firewalls, NAT routers and VPN tunnels.

Getting Started

The SG-192 GUI is a Windows™ based program is designed to be intuitive and straightforward to use. The GUI installer is supplied on the product CD as an executable program. Though the GUI may be installed to any folder on the host computer, the default path is: *C:\Program Files\Wheatstone\SG-192*. After installation, the GUI can be started by clicking on the SG-192 item in the Windows Start menu.

Connecting With the GUI

The SG-192 and the PC running the SG-192 GUI program can be straightforwardly connected together over a standard Ethernet Local Area Network (LAN).

The SG-192 should be installed, powered-up, and verified to be operating normally. A CAT5 Ethernet cable connected to the rear panel's 100baseT LAN port should be connected to the Ethernet port on the host PC. The SG-192 is Auto-MDIX so either a straight-through or crossover cable may be used.

Configuring the GUI

Assuming a valid IP address has been assigned to the SG-192 and the GUI is now installed, start the program to bring the GUI on the screen. Next, on the bottom of the GUI locate the Remote Access Setup *Devices* button and click on it. This will open the *Edit Device* dialog which is used to tell the GUI what IP addresses and names the SG-192 may have.
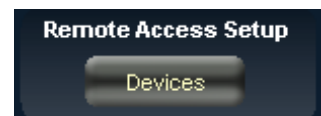
The *Name* field can be left blank or used to give the SG-192 a unique name in the "Device" display box at the top of the GUI – this is the device that the GUI is either currently connected to, or configured to connect to if it is not yet connected. In the *IP Address* field enter the "HARDWARE" address that was previously assigned to the SG-192 and then click *OK*.

Highlight the new SG-192 device in the *Devices* list and click on the *Select* button. Now you can place the GUI online by clicking on the button to the left of the "Status" message.

The indicator inside the button will be green when the SG-192 GUI is communicating with the SG-192. Once the GUI has been made aware of the SG-192's existence in this manner, it will always appear in the list of the SG-192 Devices and it will be instantly accessible from anywhere at any time.

When connected to the SG-192 the status bar will indicate *Online* and the "Device" text will show the name of the SG-192 that it is currently communicating with (in this example, the SG-192 has been named *WLNG_SG_2*). The status bar will also display the name of the preset that the SG-192 you're connected to is currently running.

When the "Current Preset" name is showing as green text it means that a factory or user preset is running and that no changes have been made to it. If the "Current Preset" name is showing in red text, it means that the preset has had some changes made to it or is a work in progress that has not yet been saved to the stereo generator.

Connecting Directly Without a LAN

You can also work without a LAN by connecting the SG-192 and the PC Ethernet ports together with a standard Ethernet cable – either a straight-through or crossover cable may be used. As mentioned previously the SG-192 has auto-sensing, Auto-MDIX Ethernet ports.

NOTE: The controlling PC and the SG-192's network settings must be configured to place them both on the same subnet!

The SG-192 and Internet Security Concerns

The SG-192 does not act as a "web device" or "web server," nor does it support open ports to the Internet. Therefore there is no worry that someone could "hack" into the SG-192 and use it as a pathway to the rest of the network to which it is connected.

About DHCP and the SG-192

The SG-192 does not utilize DHCP – Dynamic Host Configuration Protocol (or automatically assigned network addressing) – and needs to be assigned a "STATIC" network-unique IP address. Most DHCP servers assign addresses starting at the bottom of the group 192.168.0.xxx. Therefore choosing an address high in that group, say 192.168.0.200, as a static IP address will likely keep it out of the way of the busiest DHCP addressing.

However, it's always wise to check with your network administrator to determine what static IP addresses may be open and usable for the SG-192. Sometimes the local network warrants the "Subnet" and "Gateway" values to be vastly different, but our suggested starting values for the Subnet and for the Gateway usually suffice for all but the most complex situations.

The SG-192 Network Protocols and Ports Used

The SG-192 uses both TCP/IP and UDP protocols to communicate with the remote GUI. TCP/IP is used from the GUI to the SG-192 because its high reliability ensures that all control changes sent to the SG-192 will be received with 100% accuracy. The UDP protocol is used by SG-192 to send and update metering and other real time data back to the GUI. The TCP protocol uses port 55895. The UDP Protocol uses a port in the range between 60000 and 60010. It tries 60000 first and if it is busy it tries 60001 next. This process repeats if necessary until an idle UDP port is found. Note that SG-192 requires these ports to be open through any firewalls for successful connectivity.

For information on configuring the Network settings on the SG-192, please see page 2-8 of this manual.

Using the SG-192 GUI

The GUI may be positioned on the host computer's screen by left-clicking and holding the "Wheatstone" logo and dragging the GUI to the desired position. In normal "Windows" fashion, the GUI may be minimized on the desktop (taken off the screen) and/or closed by way of the familiar controls at the extreme top right.

Input Screen

The *Input* screen contains controls for the input source selection, automatic input failover, analog and digital input drive controls, input left/right gain balance, pre-emphasis, and clip and LP filter.

Input Source

The Input Sources can be selected as either Analog or Digital. There is one analog input source, the SG-192's balanced audio inputs on its rear panel. There are two types of Digital sources however, standard AES3 and WheatNet-IP.

☞ The currently selected input is shown by a yellow checkmark.

Automatic Input Failover

In the event the currently selected input source fails and the *Automatic Input Failover* check box is checked, an alternate source of audio which has been connected to the other audio input can automatically be put on the air.

☞ If the primary source was digital, the analog input will be selected immediately if there are invalid bits in the data stream or missing audio data. Also, the analog input will be selected after 30 seconds of a valid digital data stream having signal levels below -42dBFS.

☛ If the primary source was analog, then a silence sense timeout of 30 seconds must elapse before the unit switches to the digital input. The audio failure sense threshold is fixed at -42dBFS, and this combination with the 30 seconds timeout is suitable for virtually all program types.

NOTE: The input failover option can only switch between an analog input and a digital input. Failover from WheatNet-IP to AES/EBU (or vice versa) is not supported.

Clip + LP Filter

This option turns ON the main clipper and low pass function of the SG-192. This clipper is essentially a relative of the clipper in the Wheatstone AirAura audio processor and allows the user the ability to tailor precise peak control in the SG-192 as opposed to the processor the precedes it. If pre-emphasis is to be used in the SG-192, this function MUST be on to prevent gross distortion and overshoot. If pre-emphasis is deployed in the processor preceding the SG-192, this feature should be turned off.

Pre-Emphasis

Sets the pre-emphasis for FLAT, 50us or 75us. If pre-emphasis IS used, the Clip + LP Filter option needs to be selected.

Input Signal Presence

Below the *Pre-Emphasis* control are a pair of signal presence indicators. The Analog indicator is green if there is a signal present on both left and right channels and it is higher than -24dBu. The AES indicator turns green when there is a valid AES signal present at the digital input and it is above -42dBFS.

Analog Drive

The *Analog Drive* can be adjusted by clicking on the knob and dragging the mouse or touchpad to the right or left. It should be noted that there is NO PROCESSING between the input and the clipper, thus, the analog drive is essentially the main clipper drive when the analog input is selected.

Digital Drive

The *Digital Drive* can be adjusted by clicking on the knob and dragging the mouse or touchpad to the right or left. It should be noted that there is NO PROCESSING between the input and the clipper, thus, the digital drive is essentially the main clipper drive when the digital input is selected. The *Digital Drive* control affects both AES3 and WheatNet-IP.

Setting the Drive Levels

On most devices, the main gauge for setting an input level is usually the input metering. Because of the signal path of the SG-192, attention needs to be paid to the *Clip Depth* meter found on the left side of Input screen. This indicates how much clipping is taking place in the SG-192.

If the incoming audio is processed and peak controlled, the associated *Drive* control (analog or digital… depending on input source) should be set so that the first red segment of the clip depth meter is on. Any more drive has the potential
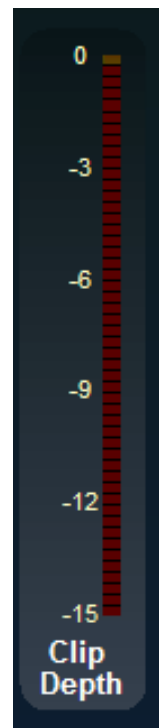
to cause clipping distortion as the already peak controlled (and clipped) audio will be clipped for a second time.

There are some cases where you may want the SG-192 to do more of the clipping work than the processor feeding it. This would be the case where the processor feeding it has an inferior clipper design. It will be up to the user to "balance" the clipping load between the processor and the SG-192. If you intend to let the SG-192 handle the bulk of clipping, the *Clip + LP Filter* option MUST be selected.

L/R Balance

Static level errors in Left/Right channel balance can be corrected by using the *L/R Balance* knob. The Left/Right balance control affects all input sources and can be adjusted over a +/- 12dB range. Usage of this control should be restricted to short term "band-aid" use only since Left/Right channel balance is best corrected upstream of SG-192 if it is out of balance.
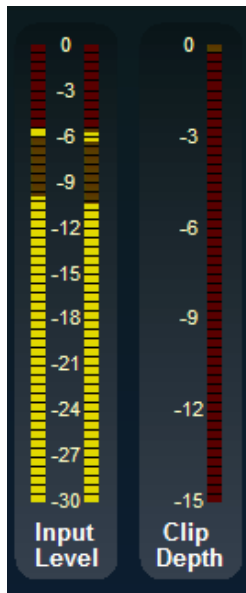
Headphone

Headphone Volume control adjusts the level on the front panel headphone jack.
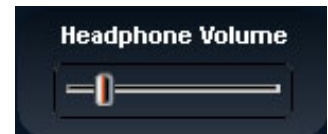
Metering

Input screen metering shows the incoming level, clip depth, the digital AES output and the TX1 and TX2 output levels.


The *Input Level* metering is determined by the OUTPUT level of the device feeding the SG-192. There is no way of lowering the input metering level on the SG-192, only a way of increasing or decreasing the clipper drive.

The *Clip Depth* meter shows the amount of clipping occurring in the SG-192 and should be used as a reference when setting up the analog or digital drive controls. For more information, see "Setting the Drive Levels" on the previous page.

The *Digital Out* meter shows the stereo (L/R) peak level before composite processing.

The *TX Out* meter displays the TX1 and TX2 output levels.
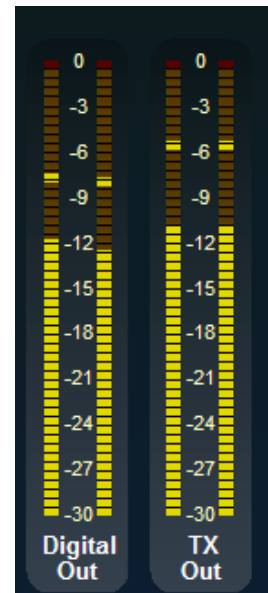
Stereo Generator Screen

The *Stereo Generator* screen (Encoder Tab) contains the controls required to configure the SG-192's internal DSP-based precision stereo generator and set the various output levels.

Composite Clipper Drive

A high ratio distortion managed clipper precisely controls peaks without generating high order distortion or high subcarrier noise levels.

ITU BS412 MPX Power Controller

The SG-192's *ITU BS412* MPX Power Controller can be set in 0.1dB increments from +6dB to -3dB. When the control is in any position it is measuring and making calculated corrections to MPX power. In order to engage the power controller, you must check the *Enable* box. At that point, immediate correction will be applied per the setting in *MPX PWR* window.
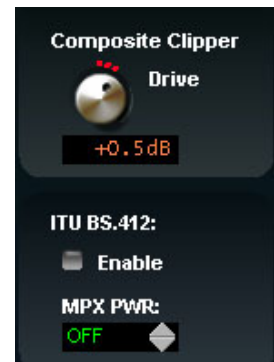
IMPORTANT!

*The ITU BS-412 MPX Power Controller's sole purpose is to reduce loudness and program density as required in certain European countries. **If you are not required to use the BS-412 Controller <u>do not</u> check the ITU BS412 Enable check box.** Turning on the BS412 MPX Power Limiter can result in a significant loss in loudness.*

As the controller measures and integrates the MPX energy over time the drive to the processing will be modified until the measured MPX power satisfies the reference level as set by the Stereo Generator menu's *ITU BS412* control. The control's "0dB" setting conforms to the current ITU-R BS.412-7 Multiplex Power standard.

Encoder Mode

The stereo encoder may be operated in *Stereo* or *Mono* simply by selecting the desired operating mode from drop-down list. In the Mono mode the stereo pilot and 38kHz subcarrier is completely turned off.

Subcarrier Inputs

Inputs applied to the SCA connectors are high pass filtered to reduce hum and then low- pass filtered at 94kHz before being digitized at 192kHz. The *SCA #1 Input* and *SCA #2 Input* controls set the SCA injection levels and can be set to OFF, or to levels between -80.0dB and +10.0dB and in 0.05dB steps.

Digital Output (baseband192)

The *Digital Output* control sets the baseband192 MPX over AES level when feeding a compatible exciter. This output appears on the XLR male connector on the rear of the SG-192.

Unlike traditional AES, baseband192 completes the final phase of the all-digital airchain that is clean AND highly competitive. Baseband192 allows you to use the composite clipper and stereo generator in the audio processor while the signal remains in the digital domain. Previously, if you wanted to interface your audio processor with your exciter using an AES signal, you needed to use the stereo generator in the exciter to complete the airchain. With the bandwidth available in Wheatstone audio processors and on the input of compatible exciters, it is now possible to interface a COMPOSITE signal over AES between the processor and the exciter. The stereo generator is now BACK in the audio processor, where it can work intelligently with the rest of the audio processing.

WARNING:

You should check with your exciter manufacturer to make sure your equipment has the capability to ingest the baseband192 AES over MPX standard before selecting this option. Interfacing the SG-192 to an non-compatible exciter with this option selected can cause unwanted results.
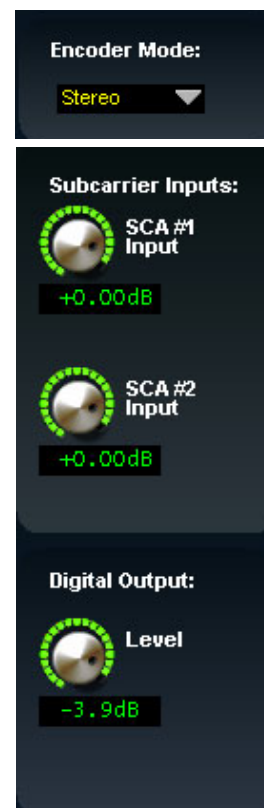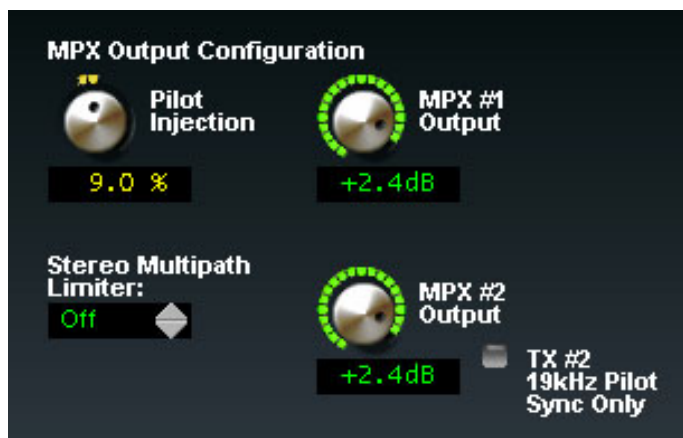
Pilot Injection

The *Pilot Injection* control adjusts the level of the 19kHz stereo pilot and is adjustable from 0 (Off) to 20% of the main composite signal amplitude in 0.1% steps.

Composite (MPX #1 and MPX #2) Outputs

The *MPX #1 Output* and *MPX #2 Output* level controls set the peak output amplitude of the TX 1 and TX 2 outputs on the rear panel BNC connectors respectively. These controls are used to set total modulation in the presence of audio and can be set to levels between -24dB and +6.00dB in 0.05dB steps. The control setting for approximately 3.5V P-P (1V RMS) into a 10kOhm load is +2.40dB.

If *TX #2 19kHz Pilot Sync Only* is checked, the TX 2 output becomes a 19kHz sine wave synchronizing source for RDS generators.

Stereo Multipath Limiter

The SG-192's Stereo Generator is equipped with a special algorithm called the Automatic Multipath Limiter. This algorithm operates in the sum/difference domain and automatically controls the amount of difference channel (L-R) amplitude as a function of the instantaneous sum channel (L+R) amplitude.

The purpose of this algorithm becomes clear when one realizes that a large amount of L-R is known to exacerbate FM multipath.

We said "exacerbate" because a high level of L-R does not *cause* multipath. Rather, the behavior of a stereo receiver as it blends between stereo and mono becomes much more *obvious* when there is a large amount of L-R in the decoded audio because of the acoustical summation of L+R and L-R energy in the listening environment. When the L-R signal "goes away" during a receiver blend the perceived audio level drops and the larger the amount of L-R present when such a blend occurs, the more noticeable the multipath "event" will be to the listener.

When stereo enhancement is utilized in the program chain (or in the audio processor) L-R energy is naturally increased – this is the purpose of stereo enhancement – to exaggerate the stereo image width by increasing the level of L-R. When taken to the extreme however the extra L-R energy can cause either unnatural sounding audio on some program material (the hole in the middle effect), odd behavior in many stereo receivers, or both.

Another issue is that in FM broadcasting, each dB of L-R increase results in a like decrease in level in the L+R sum channel and it is this signal that is responsible for mono loudness. This is important to keep in mind when a fair percentage of the listening audience might be listening on mono receivers!

In order to make stereo enhancement "play nice" with the majority of stereo receivers in real-world listening environments with all types of program material, it is preferable to have some sort of controlling mechanism in place to "manage" the amount of L-R energy present in the transmitted signal as a function of program material. This is precisely what the Automatic Multipath Limiter does.

There are eleven operational choices available under the *Stereo Multipath Limiter* control settings: 10% to 100% in 5% percent steps, and an Off setting. Off is the setting immediately above the setting for 100%.

When in the Off position the Stereo Multipath Limiter is completely out of the circuit. When the control is at the 100% position the L-R may be permitted to achieve 100% of the instantaneous L+R audio level. At lesser percentages the amount of L-R energy is constrained to that percentage of the L+R level at that instant.

A recommended setting for this control is 70%, which constrains the L-R to about 3dB below the L+R. With the Stereo Multipath Limiter at this setting it will almost never touch "normal" stereo program material – even when stereo enhancement is used. This is in contrast to a control in another audio processor that has static settings for Stereo, -3dB, -6dB, and Mono. In that product, setting the control to -3dB causes a *static* 3dB reduction in stereo separation on *all* program material regardless of whether it needs it or not. We believe our approach is better because it is intelligent. It does not decrease stereo separation on program material that does not need it.

System Screen

The *System* screen allows system-wide settings to be configured, such as how the GUI communicates with the hardware and security settings within the stereo generator.

Metering via TCP/IP

By default, the SG-192 utilizes the UDP protocol for transmitting metering data to the remote GUI (the TCP protocol with its guaranteed accurate packet delivery is always used for control).

In some situations UDP packets are blocked by Internet Service Providers, and when this occurs the GUI can successfully connect to the SG-192 but there is no visible metering data. Unless one can successfully convince the ISP to allow unsolicited UDP traffic on their network (doubtful) the solution is to utilize VPN Tunneling (which encapsulates all packets into TCP) or simply switch the SG-192 and its GUI to use the TCP protocol for metering. When the *Metering via TCP/IP* box is checked the TCP protocol is used for transmitting metering data instead of UDP.
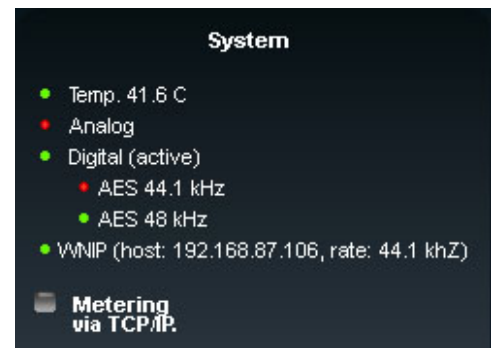
System Status

The system status shows you the current hardware temperature (in degrees Celsius), the active input (indicated by the "active" status), and WheatNet-IP info. The green dot next to the digital input indicates the presence of an AES signal, whether that input is active or not and shows the sample rate. The same applies to the analog input indicator. A green dot indicates that audio is present on the analog side. The WNIP indicator shows the host BLADE IP address and sample rate.

Security

Remote Login

When *Remote Login* is clicked, a password prompt box will open as shown on the left. There is no default password in the SG-192. If you are setting this up for the first time, you can skip the *Password* part and just enter the *New Password* and *Verify* the new password.

Other options in this menu include the ability for the PC to remember the password for the processor, to hide the password as you type it (with dots instead of the actual characters) and the ability to gang the password for both the processing and output options.

When access is restricted, only the *System* tab will be allowed to be viewed. If you try and access another tab, you will be prompted to input the proper password that covers the functions in that tab.
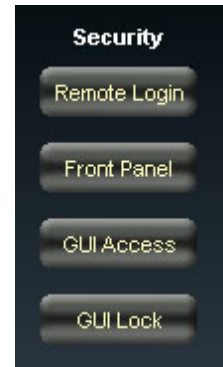
Front Panel

The SG-192 front panel can be passcode protected if desired to prevent unauthorized access. The desired passcode can be entered either through the front panel *Access* dialog (see Chapter 2, page 2-9) or via a remotely connected GUI. The passcode must be four characters long and use the digits 0 through 9, creating 10,000 possible passcode combinations.

The *System* screen of the software GUI is equipped with a button labeled *Front Panel*. Clicking on this button opens the dialog box shown, which offers three front panel security options:

Disable Front Panel – Clicking on this choice turns off the ability to do all local front panel navigation on the SG-192 hardware. When selected, this option prevents all front panel access leaving the only access via a remotely connected software GUI.

No Password Required – Clicking this option removes a front panel password if one is already assigned and also makes the front panel accessible without using any passcode.

Password: – Clicking this option prompts the user for a front panel passcode. If a passcode is entered and one has never been assigned before, that passcode becomes the front panel passcode and local access to front panel functions will require the use of this passcode.

If a passcode had already been assigned to the front panel, entering a passcode in this dialog will immediately change the front panel password to the one that was entered via this GUI dialog.

If the front panel has been locked and the passcode lost or forgotten, local front panel access can be regained by using the GUI to either assign a new and known passcode,

or remove an existing passcode by clicking the No Password Required option and then clicking *Ok*.

Note that the hardware may also be unlocked by other, much less convenient means. Please contact the factory for the procedure if it become necessary.

GUI Access

The system allows you to grant access at certain levels of permission in order to control the privileges of those accessing the various features of the SG-192. Privileges are granted by *Access Code*, not by user type. In fact, user types are created *through* the generation of access codes for those user types.

It is possible to separately lock the ability to change GUI screen pages and/or make changes. What is made inaccessible when the GUI is locked is configured by the various check boxes under the *GUI Access Code and Permissions* dialog box.
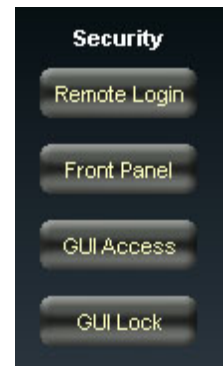
NOTE: If the GUI Access Code and Permissions dialog is configured without selecting any of the Locked User Access check boxes, then even though a password is set, nothing is "locked out".

GUI Lock

In the event that security has been enabled by configuring the *GUI Access Code & Permissions* Dialog (above), then selecting *GUI Lock* will immediately lock the GUI on the host PC, prohibiting access until it has been unlocked with the proper access code.

If the access code has been lost or forgotten you need to contact our technical support at (252) 638-7000 or email us at: techsupport@wheatstone.com.
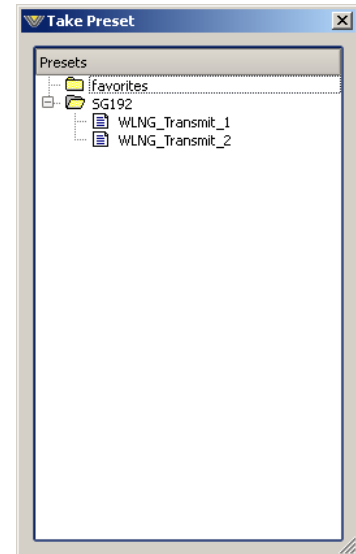
Preset Buttons
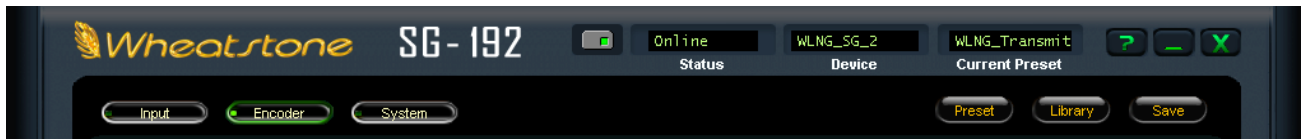
On the upper right area of the SG-192 GUI screen is row of buttons – *Preset*, *Library* and *Save*. We will explain each button in turn.

Preset

When the preset button is left-clicked, a dialog box appears showing the folders that contain presets. Double-clicking on a preset loads it into the SG-192 hardware. The box stays open until deliberately closed, allowing differing presets to be double-clicked upon readily in succession. This is a very direct means of comparing presets. It is important to remember to save the current settings as a preset before invoking others, or they will be lost. Note also that because all SG-192 configurations are unique to an individual installation, there are no "factory" presets in the SG-192 and all 80 preset storage slots on the hardware may be used to store customer configurations.
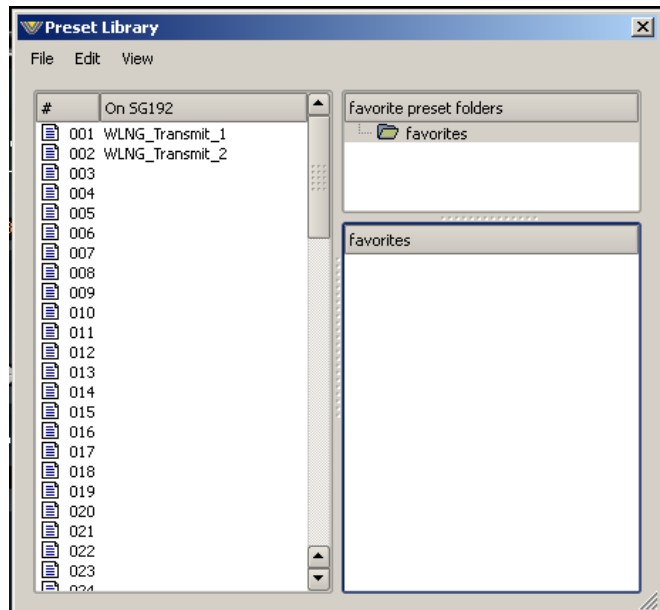
Library

When the *Library* button is pressed a window-style dialog box appears containing three panels. The large panel on the left shows the presets currently stored on the SG-192.

The upper right panel shows the preset folders on the PC hosting the GUI, and the lower panel shows the presets stored in the folder chosen in the above panel.

Normal windows-style drag-and-drop functions allow presets to be freely moved between the hardware and the PC and vice versa. Note that when preset are moved this way, it is copies of presets, not the presets themselves which are moved. The original preset always stays where it was stored last.
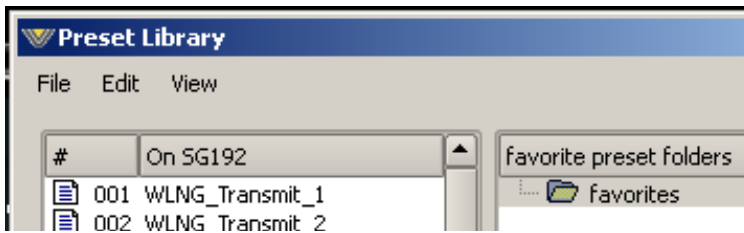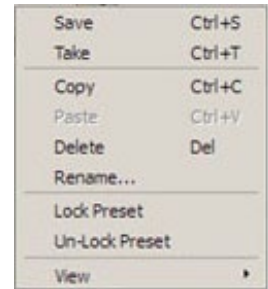
Locking Presets

Presets stored on the SG-192 may be locked by the user to prevent inadvertent overwriting, renaming, or deletion. This is accomplished by opening the *Preset Library* by clicking on the *Library* button in the GUI. Once the list of presets is open, the ones actually stored within the processor hardware itself will be visible in the left pane.

There are two ways to manage the lock status of user presets:

- The first method is by highlighting a preset (single left click) and then right clicking it to open a dialog box (shown on the right). Among the options are *Lock Preset* and *Unlock Preset*.

- The second method is by highlighting a preset as above, and then clicking the *Edit* option at the top of the *Preset Library* dialog box (shown below) to reveal the *Lock Preset/Unlock Preset* options. Note that these are user-level lock options and therefore cannot be used to override the lock status of a factory-locked preset!

Save	Ctrl+S
Take	Ctrl+T
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Rename...	
Lock Preset	
Un-Lock Preset	
View	▸

Preset Library

File　Edit　View

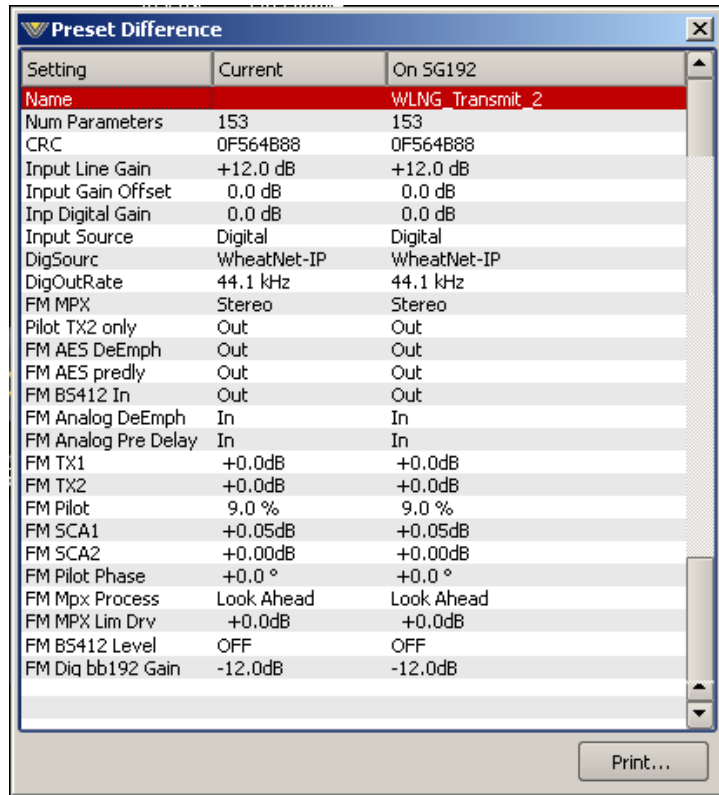| #	On SG192
📄 001	WLNG_Transmit_1
📄 002	WLNG_Transmit_2

favorite preset folders
　📁 favorites

How to View Preset Changes

It is possible to visually compare two different presets on the SG-192 with a special feature called Preset Difference.

When the *Library* tab is opened, highlight any preset you'd like to compare with the current preset running on the stereo generator. Then right click and select *View* and *Diff* from the sub-menu. You will see the window on the right open.

Any parameter that is listed with a RED background indicates a parameter that is different between the preset running on the hardware and the preset that has been highlighted. Parameters which are not highlighted have the same values between the two presets.

Preset Difference

Setting	Current	On SG192
Name		WLNG_Transmit_2
Num Parameters	153	153
CRC	0F564B88	0F564B88
Input Line Gain	+12.0 dB	+12.0 dB
Input Gain Offset	0.0 dB	0.0 dB
Inp Digital Gain	0.0 dB	0.0 dB
Input Source	Digital	Digital
DigSourc	WheatNet-IP	WheatNet-IP
DigOutRate	44.1 kHz	44.1 kHz
FM MPX	Stereo	Stereo
Pilot TX2 only	Out	Out
FM AES DeEmph	Out	Out
FM AES predly	Out	Out
FM BS412 In	Out	Out
FM Analog DeEmph	In	In
FM Analog Pre Delay	In	In
FM TX1	+0.0dB	+0.0dB
FM TX2	+0.0dB	+0.0dB
FM Pilot	9.0 %	9.0 %
FM SCA1	+0.05dB	+0.05dB
FM SCA2	+0.00dB	+0.00dB
FM Pilot Phase	+0.0 °	+0.0 °
FM Mpx Process	Look Ahead	Look Ahead
FM MPX Lim Drv	+0.0dB	+0.0dB
FM BS412 Level	OFF	OFF
FM Dig bb192 Gain	-12.0dB	-12.0dB

Print...

Save

Clicking on the *Save* button opens a dialog box (shown below), prompting the user for a name for the preset being

Save as Preset in SG192

Preset #: 3　　OK

Name: PSET 003　　Cancel

saved. The preset will be saved into the next available empty slot unless another empty slot is chosen by nudging the preset number (Preset #) up or down. Note that it is possible to save the present settings in over an existing and unlocked preset and doing so erases the previous preset's contents.

Title Bar
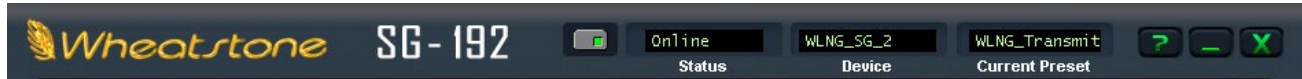
Along the top edge of the SG-192 GUI screen (in line with the *Wheatstone SG-192* product label to the left, and the Windows About, Minimize, and Exit icons to the right) are indicators and controls for the management of devices. The SG-192 GUI is capable of controlling multiple SG-192 units (*Devices*). Whether a connection is made (*Status*), and which device is presently under command are indicated.

Status

This indicator shows four different statuses:

Online – The GUI is in communication with an SG-192.

Offline – The GUI and SG-192 are disconnected.

Trying – The GUI is attempting to find the SG-192 on the LAN and connect to it.

*Pending* – The GUI has found the SG-192 and is trying to complete the connection.

An adjacent and illuminated button toggles between *Online* and *Offline*.

Device

The name of the SG-192 to which the GUI is connected (or with which it is attempting to connect) shows in the *Device* window in amber text.

Double-clicking on the name area brings up the *Devices* dialog box. A list of SG-192 devices that the GUI knows about is shown in the box. Highlighting the desired SG-192's name and hitting *Select* causes the GUI to attempt to connect to it if the *Online/Offline* button is green (Online).

In the event no SG-192 units are listed, or one is adding a further device, or one for the first time, *Add* brings up the *Edit Device* dialog box, which asks for the new prospect's name and IP address.
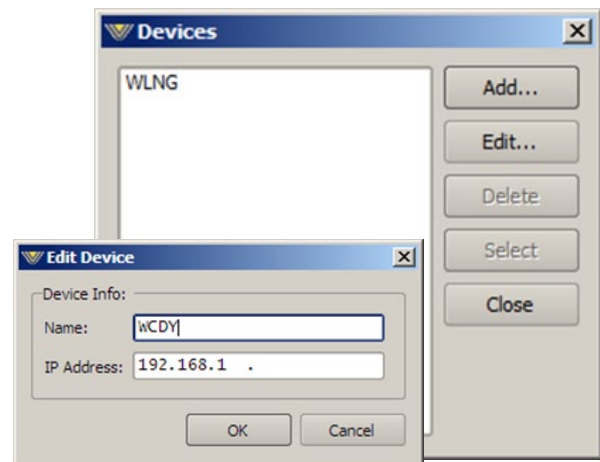
Current Preset

The *Current Preset* window shows the current preset that is active on the stereo generator.

When the preset name is displayed in GREEN text the currently running preset reflects exactly what has been last saved to that preset and that no changes have been made.

When the preset name is showing in RED text, the current preset has been

modified and is not saved on the SG-192 hardware. In order to return the preset name text to GREEN, the modified preset must be saved, or a new preset has to be retaken from the list of saved presets.

As covered earlier (page 3-17), it is possible to visually compare two different presets on the SG-192 with a special feature called Preset Difference.

Double-clicking on the name brings up a *Preset Difference* – parameter-by-parameter, setting-by-setting – comparison list between the current SG-192 settings and the recalled preset.

Any parameter that is listed with a RED background indicates a parameter that is different between the preset running on the hardware and the preset that has been highlighted. Parameters which are not highlighted have the same values between the two presets.

Accessing Menu Options

Right clicking anywhere on the SG-192 GUI screen will open a pop up menu tree with access to *File*, *Hardware* and *Presets*. These choices lead to sub-menus and dialog boxes that may also be accessed by clicking on other dedicated buttons on the SG-192 screens. As with many Windows programs, the GUI has multiple ways to access menu trees – go ahead and explore!
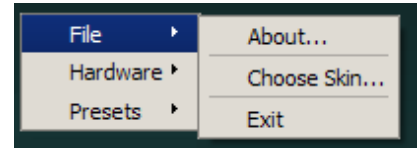
File Menu Items

The *File* menu tree may be accessed by right clicking anywhere on the SG-192 GUI screen.

About – Brings up the *About* box to indicate the GUI's software version. Note this is not where the firmware versions running on the hardware are polled. That is done under the *Hardware* option covered in a moment.

Choose Skin... – Brings up the *Choose Skin* dialog box. In some GUIs there are multiple skins available which allow the user to pick different color schemes and such. Not all GUIs have multiple skins but many do.

Exit – Closes down (exits!) the entire GUI (not just the dialog window).

Hardware Menu Items

The *Hardware* menu tree may be accessed by right clicking anywhere on the SG-192 GUI screen. Please note that most of the Hardware-related items require you to be connected (Online) to the SG-192 because that is where the data must come from. Sub menu choices include:

Devices... – Opens the *Devices* dialog box. Allows the creation, editing, selection, and deleting of Wheatstone processors connected to your system.

On-Line Mode... – Toggles between ONLINE and OFFLINE modes. This is the state the GUI will assume the next time it is started. This state is also remembered when the GUI is closed – if it was online to SG-192 at the time it will attempt to go back online the moment the GUI starts up next.

Login Password... – Opens the *Passwords* dialog box for editing login passwords.

Version... – Displays the current software and firmware versions running in the SG-192 hardware.

Update... – Opens the *Choose a file to download* dialog box. Only valid files of type *.rbn* are visible. See below.

Reboot... – Sends a remote command to restart the SG-192. **NOTE**: Rebooting will take you off the air for 20-30 seconds!
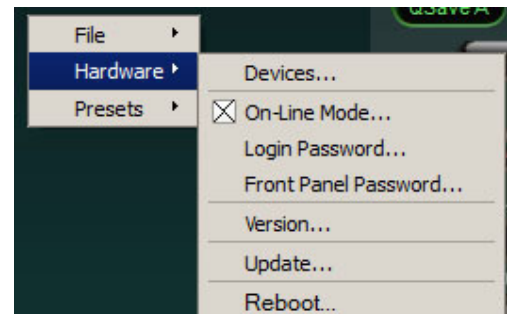
SG-192 Hardware Update

New or updated SG-192 software may be released at any time to implement new features, change specifications, or correct known bugs. The Hardware Update choice will open a separate dialog box which will prompt the user for the correct file type to be uploaded to the SG-192. Upon completion of the update you will be asked to restart the SG-192 (cycle its power).

The SG-192 is extremely easy to update when new firmware becomes available from Wheatstone. The update file is a ".RBN" which is packaged with a new GUI.

To update the SG-192, right click on any portion of the GUI screen to open pop up menu tree. Select the *Hardware* and then *Update…* option. The screen at right will appear.

Navigate to the location of the RBN file that was downloaded from the Wheatstone Processing website or if a new GUI version was just installed, the RBN that was unpacked during its installation. Verify that the version number is correct in that it matches the version number listed in the documentation about the firmware upgrade. If so, select the *Open* option in the *Choose a file to download* window. The prompt shown at right will appear with wording of the text varying according to versions to be uploaded.

Recheck that the versions match the documentation! Then click *Yes*.

Progress boxes will pop up as the download progress occurs:
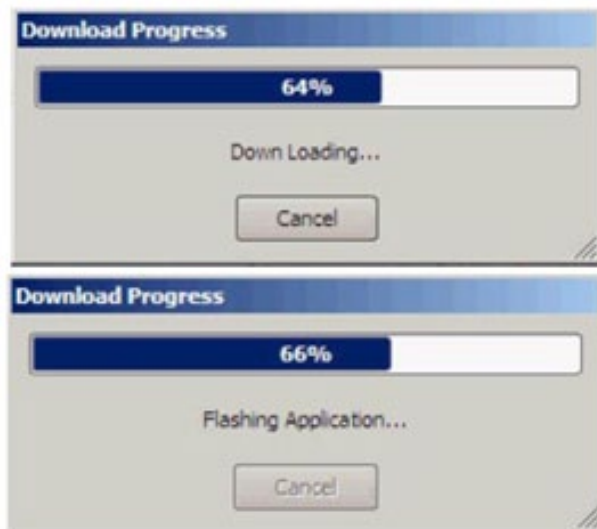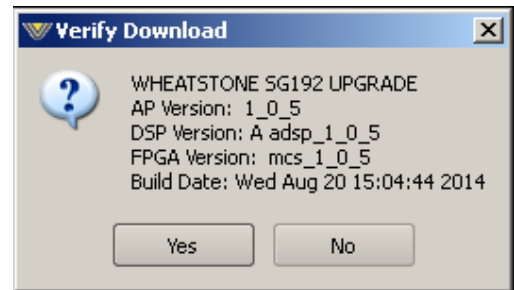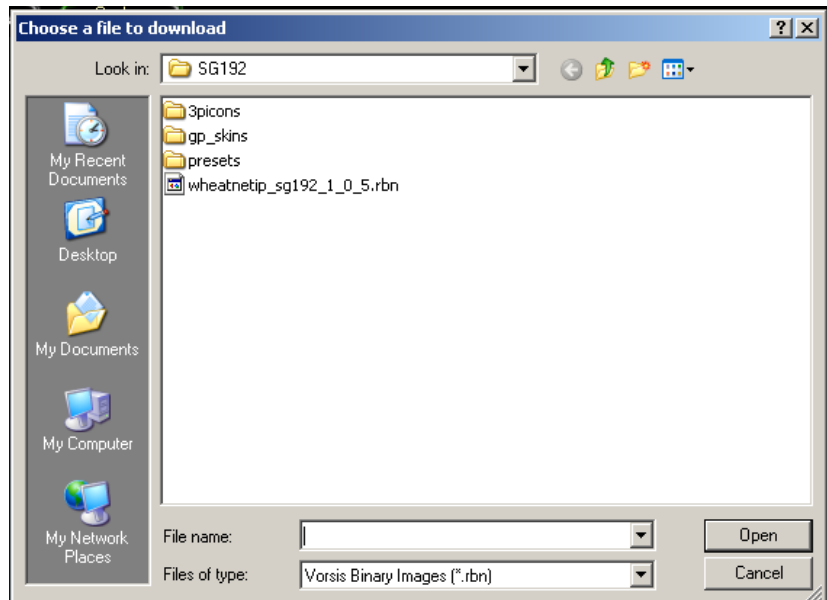
When the system has finished downloading, you will get a prompt to reboot the SG-192. This can be done by removing and restoring power or by sending the reboot command from the GUI.

After the SG-192 reboots the new RBN code will be running on the motherboard.
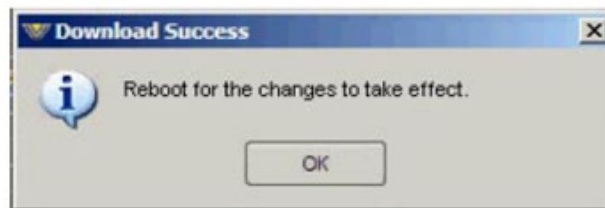
If you have any questions about an update, feel free to contact Wheatstone Technical Support at techsupport@wheatstone.com.
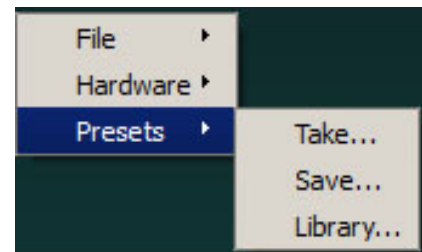
Presets Menu Items

The *Presets* menu tree may be accessed by right clicking anywhere on the SG-192 GUI screen.

Take... – Brings up the *Take Preset* dialog box.

Save – Brings up the *Save as Presets* dialog box.

Library... – Brings up the *Preset Library* dialog box.

These dialogs replicate those accessible using the so-labeled buttons on the GUI itself. The right click menu structure is simply another way to get there from here…

Appendices

Appendix A

Contents

General Specifications

Analog Line Input

Type:	Electronic Differential
Impedance:	> 10Kohm (bridging)
Optimum Source Impedance:	< 1Kohm
A/D Converter:	AKM5394. 192kHz, 24-bits

Digital Line Input

Data Standard:	AES/EBU (AES3)
Data Amplitude:	Per AES3-2003 assuming minimum allowable output signal amplitude of 2V and minimum allowable input signal amplitude of 200mV
AES Receiver:	CS8416, 192kHz, 24-bits
Type:	Wheatnet-IP
Data Type:	100 BASET Ethernet Network Compatible

Input Gain

Gain Range	Fixed

Input Failsafe

Type:	Automatic
Analog Fail Cause:	Audio level below -42dBFS (fixed)
Response Time:	30 seconds (fixed)
Digital Fail Cause 1:	Audio level below -42dBFS (fixed) (AES3 or WheatNet-IP selected)
Response Time:	30 seconds (fixed)
Digital Fail Cause 2:	Corrupted or invalid AES data (AES3 or WheatNet-IP selected)
Response Time:	Immediate (fixed)
Failsafe Direction:	Digital to Analog/Analog to Digital (no Digital to Digital)

Audio Level Balance

Type:	Common to both Analog and Digital inputs
Analog/Digital L/R Balance Range:	+/-12dB
Control Resolution:	0.5dB

Stereo Generator

Reference grade Stereo Generator with embedded Composite Clipper, SCA digitizer, and composite analog output or digital baseband192 output.

Composite Clipper Drive:	Oversampled Clipper
MPX Processing Drive Range:	+/-3dB
Stereo Multipath Limiter:	10% to 100% in 10% steps, plus Off
19kHz Stereo Pilot Injection:	0-20%, 0.1% steps
SCA 1 & 2 Input:	Analog, 10Kohm input impedance
Maximum SCA Input Level:	+24dBu
Gain Control Range:	-79.95dB to +10dB; OFF
Digital Output Trim Level:	-48dBfs to 0dBfs
Digital Output Options:	baseband192
TX 1 & 2 Output Standard Level:	3.5V P-P (1V RMS)
TX 1 & 2 Maximum Output Level:	8V P-P into 1kohm

System

Headroom Level:	>20dB*
Nominal Operating Level:	-20dBFS*
Recommended Operating Level:	-6dBFS (with peak controlled audio)
Total Harmonic Distortion:	<0.1%, 20Hz – 20 kHz*
Intermodulation Distortion:	<0.1% SMTPE*
Signal to Noise Ratio:	>80dB*
Signal Chain Internal Dynamic Range:	>144dB*
Stereo Separation:	>50dB
Crosstalk:	>50dB, 20Hz – 15kHz*
Power Requirements:	100-250 VAC (auto sensing) 50/60Hz, 100 VA Max.
Power Connector:	EMI suppressed IEC male
Operating Temperature:	0 to 50 degrees C (32 to 122 degrees F) Overtemp alarm reporting via GUI

* 75μS pre and de-emphasis

All specifications subject to improvement or change without notice.

General Purpose Interface (GPI)

The SG-192 is equipped with the ability to have General Purpose Input/Output closure via RJ-45 supplied on the rear of the unit. Refer to Chapter 1 page 1-13 for details.

Ethernet Interface

The SG-192's 100BaseT Ethernet port available on the rear of the unit for field use.

Software Remote Control

Supplied Windows® SG-192 GUI software affords control of all system and processing parameters via a via a 100BaseT Ethernet interface.

Appendix B

Contents

WheatNet-IP Configuration

Along with Digital AES3 and Analog inputs SG-192 is also equipped with WheatNet-IP (WNIP), the Audio Over Internet Protocol (AoIP) used in our Wheatstone BLADE and IP audio network control surface environment. WheatNet-IP permits SG-192's input audio and its output to be carried over the same standard CAT5 Ethernet cable as that used for remotely controlling SG-192.

This procedure assumes that your facility is equipped with at least one Wheatstone BLADE and the associated Navigator software. The BLADE used may even be the multiband, eight processor "Aura8ip" processing BLADE whose physical inputs and outputs (half analog, half digital) may even be used as a substitute for SG-192's physical I/O.

Open up WheatNet-IP Navigator to gain access to SG-192's WheatNet-IP-associated input and output signals.

Once the WheatNet-IP Navigator software is open and you are logged into the system we must create a new device for SG-192. Because SG-192 is not a "BLADE" it appears and operates as a "third party device" within the WheatNet-IP system. Our Sideboard, an outboard mixer/controller for use with any BLADE's pair of 8-channel utility mixers is one example of a third party device. Another example of a third party device is Tieline's Genie codec. These devices, while technically not BLADEs, can interact with any WheatNet-IP system and have signals routed to and from them. What they lack, however, is the built-in intelligence of an actual BLADE.

Adding SG-192 to The WheatNet-IP System

The first thing to do is click on Navigator's *System Third Party Devices* tab which will open a new window listing any third party devices currently present.
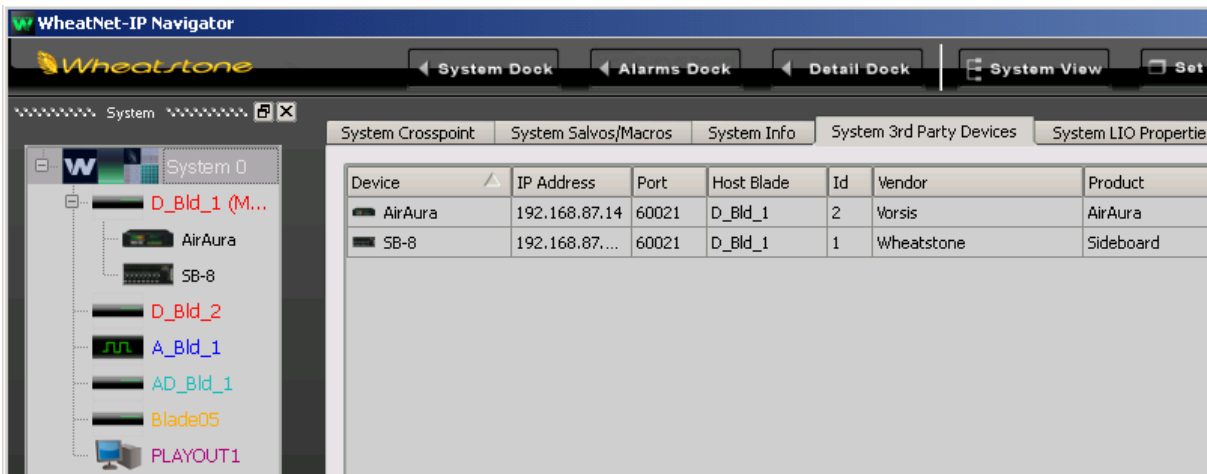
Clicking on the *Add* button opens a dialog where a new SG-192 may be added to the system. Here we will add the new SG-192's name, its hardware IP address, and tell the system what BLADE will be its host. At this time we do not have to modify the

TCP Port setting so we can leave it set to 60021. Once input to the dialog is finished, click on the *Ok* button and it will close.

Next we'll open the System Crosspoint window and see that our new SG-192's input and output signals are now present and available for routing.

Note that as shown in the example below we've used Navigator's signal name editing capability to assign SG-192's input and output signals the names we desire. Until changed the default names begin with "SG192" and will be "SG192 Input" and "SG192 Out". Of course these signals may be

manually crosspointed (and locked if desired!) to make connections, or it may be done through the many other methods available within the WheatNet-IP system for routing signals and changing the routes of both audio *and* logic signals.

More information on configuring and using WheatNet-IP Navigator and the other features and capabilities of the WheatNet-IP system may be found in the *WheatNet-IP Audio Over IP Network* manual.
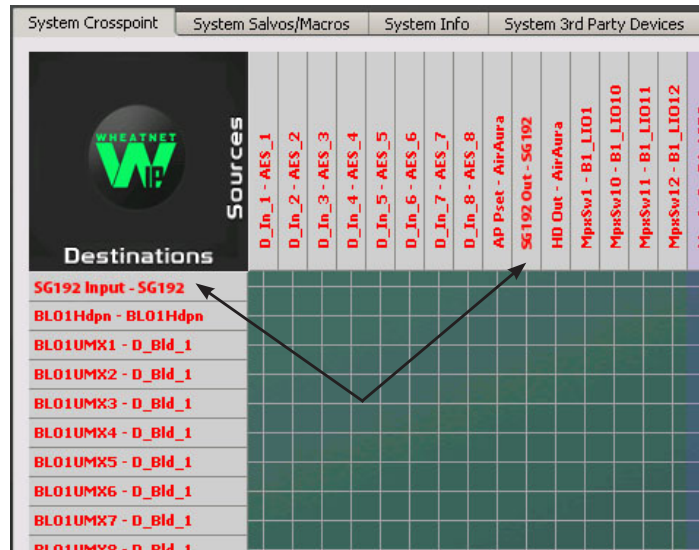
Assistance in configuring SG-192 for WheatNet-IP may be obtained by giving us a call at 252-638-7000 or by emailing techsupport@wheatstone.com.