

## S8400 Functional Description

The ISIS Group S8400 is a multifunction SMPTE 259M video and AES or analog audio core product designed specifically for ENG, SNG and Flyaways. The S8400 was developed to simplify the design of new DTV broadcast vehicles and provides the unique functionality of 6 individual routing, timing and distribution products in an easy-to-install, cost-effective and space-saving 2RU frame.

The S8400 modular approach to integration of routing, timing and distribution provides integrators the opportunity to reduce cabling complexity, power requirements and payload weight while increasing system flexibility and convenience.

Operational functionality is enhanced with the integration of a router control and an intercom station (if required) in one easy-to-use 2RU primary control panel.

### General

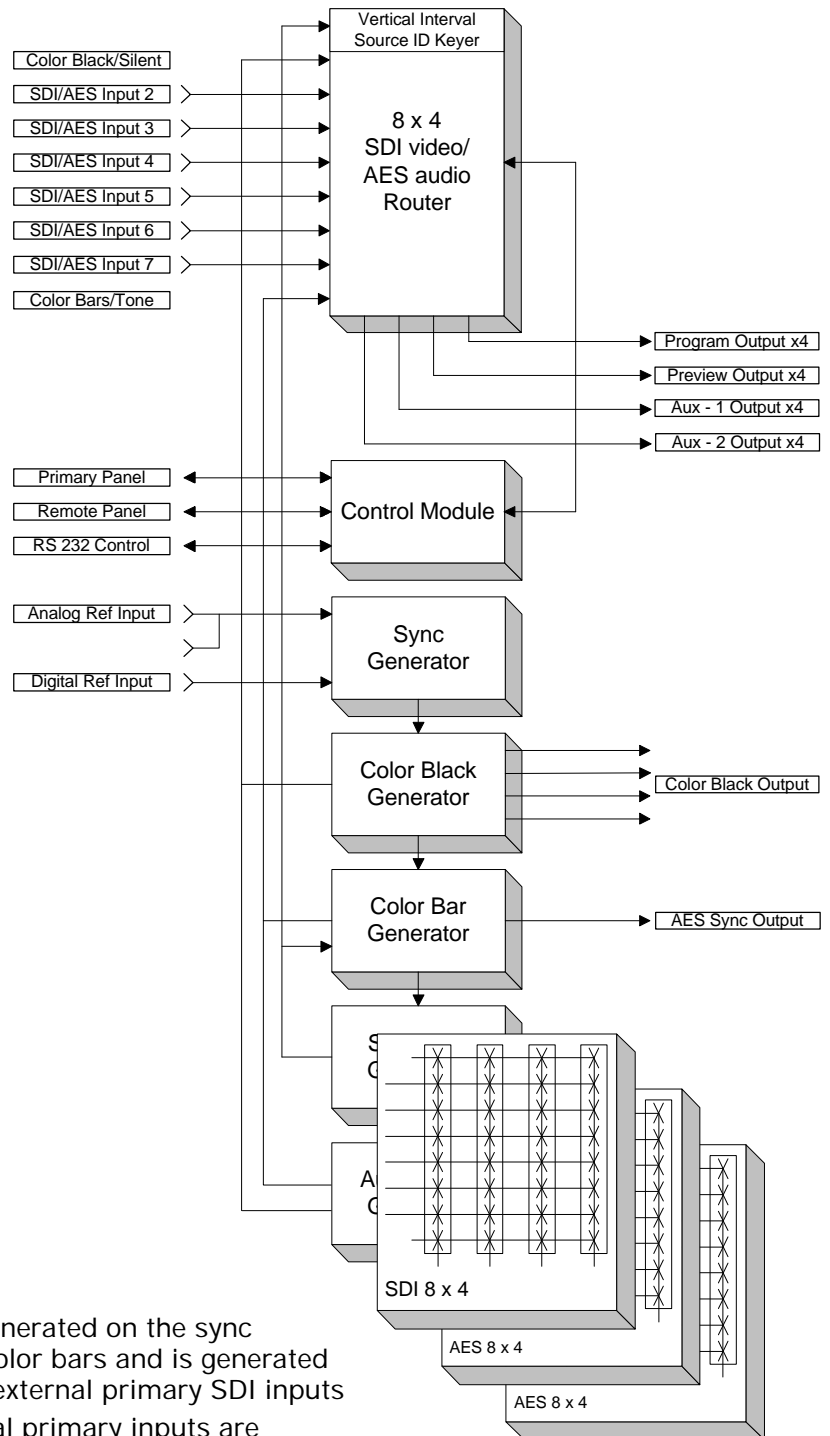
The 2RU modular frame integrates the functionality of an 8 x 4 SDI video and AES or analog audio router, NTSC/PAL sync generator, color black generator, color bar generator, AES audio tone generator, and source ID. Operator control is provided through the 2RU primary control panel which also includes an intercom station (if required). Options include remote aux bus control panel, SDI video D/A converter, AES audio D/A converter and SDI video DA. The system operates on +6.5 VDC and  $\pm 12$  VDC, directly from 90-250 VAC auto-ranging external power packs. The S8400 2RU modular frame houses 9 modules. The drawing above provides a functional block of the basic S8400 product configuration.

### Routing

#### SDI Video

The SDI video crosspoint module is a complete 8 x 4 video router, including crosspoints, input and output amplifiers and vertical interval source ID keyer.

Input 1 is hardwired SDI color black and is generated on the sync generator module. Input 8 is hardwired SDI color bars and is generated within the color bar module. Inputs 2 - 7 are external primary SDI inputs and are terminated in 75 $\Omega$ . The 6 SDI external primary inputs are



automatically cable equalized and reclocked to their incoming SMPTE 259M standard (143, 177, 270, or 360mb/s). Each video output bus provides 4 SDI video outputs.

Included within the PGM bus is a vertical interval source ID keyer. The source ID signal, which is generated within the source ID generator, is switch selectable as on or off, and has a maximum of 30 characters on 1 line. The line, located just above the active picture area, allows the source ID to be viewed on an underscanned monitor.

*AES Audio*

The AES audio crosspoint module is a complete 8 x 4 audio router, including crosspoints, and input and output amplifiers. The module provides routing of 2 AES channels (2 stereo pairs) with audio-follow-video as the default mode. Audio breakaway of the 2 AES channels is available. Input 1 is hardwired AES silent and is generated within the audio tone generator. Input 8 is hardwired AES tone and is generated within the audio tone generator. Inputs 2 - 7 are external primary AES inputs and are terminated in 110Ω. Each audio output bus provides 2 outputs for the individual AES channels 1 and 2. Input and output connectors are Weco (or equivalent) three-pin detachable compression-type.

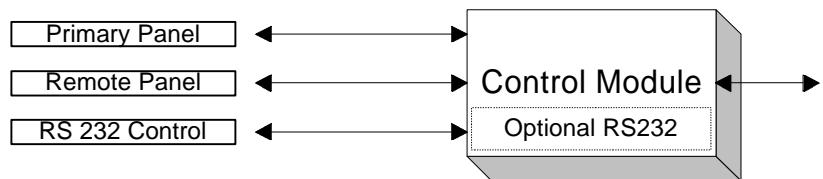
*Analog Audio*

The analog audio crosspoint module is a direct plug-in replacement for the AES audio module, and is a complete 8 x 4 audio router, including crosspoints, and input and output amplifiers. The module provides routing of two analog channels (1 stereo pair) with audio-follow-video as the default mode. Audio breakaway of the audio channels is available; however there is no separate switching of channel 1 and channel 2. Input 1 is hardwired silent. Input 8 is hardwired AES tone which is generated within the audio tone generator. On the crosspoint module the AES tone is decoded to analog and level corrected. Inputs 2 - 7 are external primary audio inputs and are high-impedance. Bus output impedance is <20 per leg. The program bus has two stereo outputs; each of the other busses has one pair. Input and output connectors are Weco (or equivalent) three-pin detachable compression-type.

**Control**

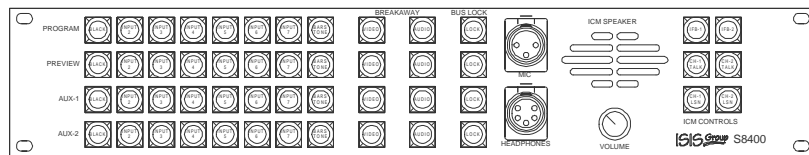
*Control Module*

The control module provides external communication interface between the primary control panel, remote aux bus control panel and the video and audio crosspoint modules.



*Primary Control Panel*

The primary control panel is a separate 2RU rack-mountable panel. The panel interfaces to the module frame via a 15 meter control cable. The panel operates on +6.5 VDC, which it receives from the system frame through the 15 conductor control cable.

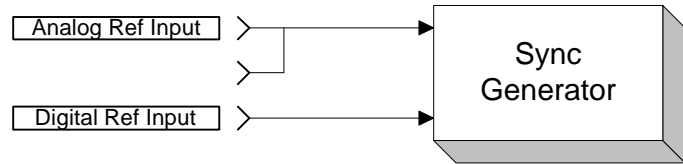


The panel integrates the functionality of an 8 input, 4 output bus router control panel with individual video or audio breakaway and bus lock as well as an intercom station (please see the primary control panel detail drawing at the end of this document). A separate version of the control panel is available without the intercom system. Each router bus has individual buttons for input selection 1 through 8, plus one for video breakaway and one for audio breakaway. Holding down 'video breakaway' and selecting a different video source causes only the video level to switch. Likewise, holding down 'audio breakaway' and selecting a different audio source causes only the audio level to switch. There is also a 'bus lock' function associated with each of the 4 buses to 'lock' or prevent crosspoint switching on that particular bus. When 'bus lock' is activated, an internal red light illuminates on that particular bus. Four 8-position dipswitches, one for each output bus, allow the panel to permanently 'lock' or prohibit a source from being selected on a specific bus. Program bus tally is provided through a 15-pin D connector.

**Timing**

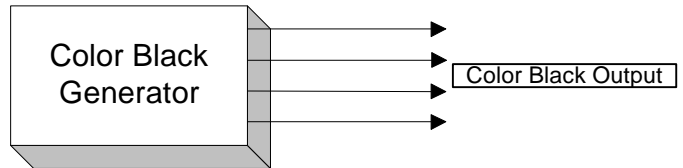
### Sync Generator

The NTSC/PAL sync generator provides internally wired reference for the router, color bar generator and color black generator. The standards compliant sync generator derives reference from the internal 27 MHz TCXO or from an external analog reference. The generator provides an adjustable timing range of  $\pm 4.7$  msec with reference to the external input. LEDs indicate the presence of the external genlock reference, and that the generator is, or is not, operating in genlock mode.



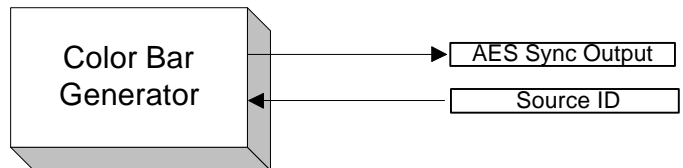
### Color Black Generator

The color black generator derives reference from the internal sync generator. The generator develops 6 color black signals. One SDI color black signal is internally wired to the #1 input of the SDI video router and another SDI color black signal is internally wired to the color bar generator reference input. Four analog video color black outputs are available through BNC connectors on the rear connector channel.



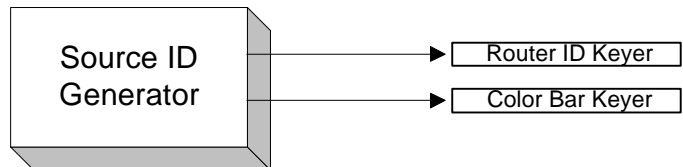
### Color Bar Generator

The color bar generator derives reference from the internal color black generator. The SMPTE 259M SDI color bar signal is jumper-selectable to either 75% or 100% full-field bars. The SDI color bar signal is internally wired to the #8 input of the router. Source ID is supplied to the color bar generator and is positioned in the active picture's center one-third and does not interfere with the I and Q bars. An AES sync output, which provides 48kHz reference to ancillary equipment, is available through a BNC connector on the rear connector channel.



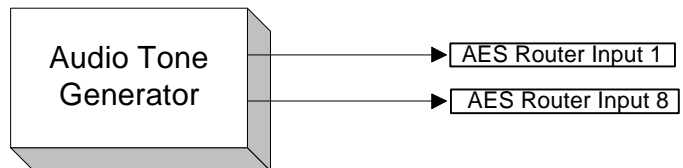
### Source ID Generator

The source ID generator develops a maximum of 30 changeable characters on three lines. The alpha-numeric character set is selected through the use of a scroll button and cursor switch. The source ID signal is available in two formats. The first, a vertical interval source ID signal, is internally wired to the SDI video router keyer. The signal is switch selectable on/off and is keyed above the active picture area and visible on an underscanned monitor. The second source ID signal is internally inserted in the color bar generator. One character of the source ID can be programmed to blink to indicate that the received picture is active and not a freeze frame.



### AES Tone Generator

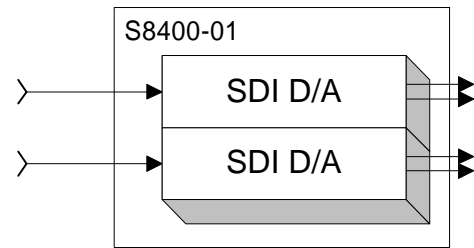
The AES tone generator develops reference tone and silence. AES silence is internally wired to the AES audio router input #1 left and right channels. AES tone is internally wired to the AES audio router input #8 left and right channels. The AES tone is jumper-selectable for either 440 Hz or 1 kHz at -20dBu. Channel ID is present within the audio tones. Every 30 seconds the left channel mutes, provides a single short tone, mutes again and then returns to constant tone. Similarly, the right channel mutes after 30 seconds of constant tone, provides two short tones, mutes again and then returns to constant tone. The left and right audio tones also click to provide an aural indication that the audio is active at the received destination and not freeze framed. The clicks are also in time with the visual blinking character to aid in establishing lip sync.



## Options

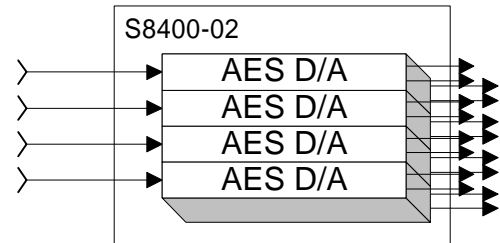
### SDI D/A Converter (Option S8400-01)

The -01 option provides two independent SDI-to-analog video converters on a single module for monitoring and/or delivery of NTSC/PAL video to analog destinations. Each SDI input provides two NTSC/PAL outputs. Two slots are provided in the S8400 modular frame in order that a maximum of two converter modules can be added to provide a total of four converters.



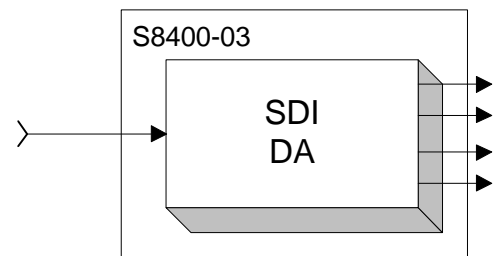
### AES D/A Converter (Option S8400-02)

The -02 option provides a single module with four independent AES-to-analog audio converters for monitoring and/or delivery of analog audio to analog destinations. Each AES input provides two stereo pairs of analog output. A maximum of one converter module can be added to the S8400 modular frame.



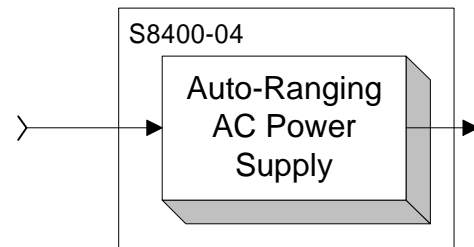
### SDI DA (Option S8400-03)

The -03 option provides a single SDI video distribution amplifier for monitoring and/or delivery of SDI video to SDI destinations. The input SDI is buffered to four outputs. A maximum of one DA module can be added to the S8400 modular frame.



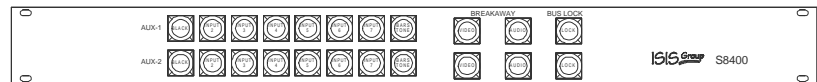
### Redundant AC Power Supply (Option S8400-04)

The -04 option provides a redundant auto-ranging 95-240VAC power supply. The supply is an external desk pack. The S8400-AC is configured with one AC power supply as standard. A maximum of one redundant AC power supply can be added to the S8400-AC modular frame.



### Remote Control Panel (Option S8400-05)

The remote control panel is a separate 1RU rack-mountable panel. The panel interfaces to the module frame via a



15 conductor control cable. The panel provides for parallel control of aux buses 1 and 2. Selection is provided for 8 inputs and 2 output buses with individual video or audio breakaway and bus lock. Each router bus has individual buttons for input selection 1 through 8, plus one for video breakaway and one for audio breakaway. Holding down 'video breakaway' and selecting a different video source causes only the video level to switch. Likewise, holding down 'audio breakaway' and selecting a different audio source causes only the audio level to switch. There is also a 'bus lock' function associated with each of the 2 buses to 'lock' or prevent crosspoint switching on that particular bus. When 'bus lock' is activated, an internal red light illuminates on that particular bus. Two 8-position dipswitches, one for each output bus, allow the panel to permanently 'lock' or prohibit a source from being selected on a specific bus.

## Intercom System

The S-8400-AC/1 and -AC/2 audio/video switchers are delivered with a two-channel intercom station, which is compatible with intercom systems from other vendors. Interfaces are built into the ISIS intercom package for RTS and Clearcom systems. The S-8400-AC/3 and -AC/4 are delivered without the intercom package installed.

The control panel of the S-8400 houses the intercom electronics, speaker, microphone, headset jacks, push-button switches, and volume controls. Other system interface connectors are accessible on the rear cover plate

and the package operates totally independent of the S-8400 main electronics thus providing total isolation of the two systems. The intercom system is powered by an independent desk pack power supply.

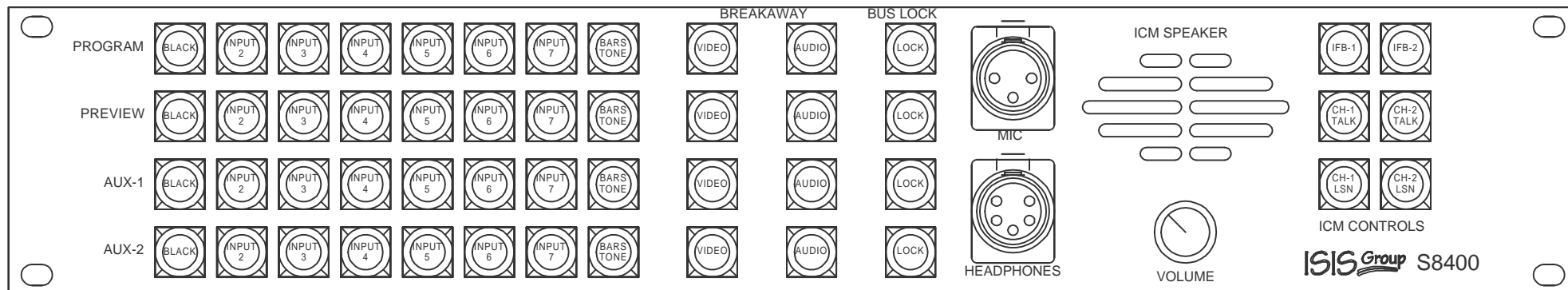
Located at the front panel are the controls with push button switches for a two-channel Talk and Listen system. The gooseneck microphone and/or two-channel headset with microphone plug into standard XLR type connectors. The microphone pre-amplifiers include a sophisticated AGC circuit, and provisions are made where a single muff headset is used and the intercom channels 1 and 2 are automatically mixed into the single muff.

The local loud speaker is driven by an internal 4W amplifier and can listen to either/or both of the intercom channels. When either of the TALK buttons is activated the speaker level automatically drops by about 15dB to alleviate the problem of feedback.

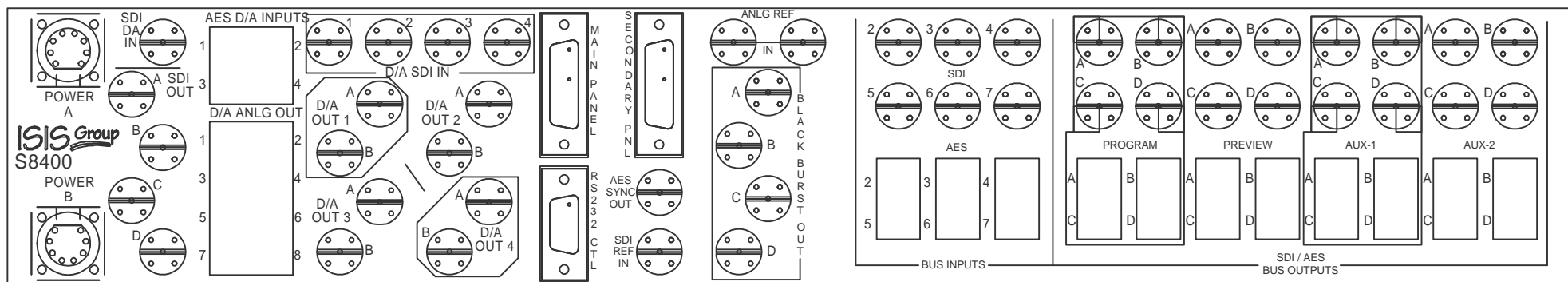
Combined with the S-8400 intercom is an interface to a Studio Technology two channel access station IFB system. Each IFB switch, when activated, sends the local intercom audio and a control signal to the external Studio Technology unit, which, in turn, inserts intercom audio into the Studio Technology program monitor channel. Connection to the Studio Technology access station is accomplished using a 9 pin 'D' connector.

The S-8400 intercom also responds to the 20KHz subliminal "Call" and the 24KHz RTS "MIC-KILL" signals. When the 20KHz signal is received the lamp in the corresponding LISTEN switch flashes at a rate of 2p/s. When the 24KHz "MIC-KILL" signal is detected the corresponding TALK switch is automatically turned off.

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Primary Control Panel



Frame Connector Channel