

## **Echolab Sync-Generator**

Echolab Analog and Digital Video Sync-Generator  
Users Manual V1.3



## Echolab Sync-Generator

### Echolab Analog and Digital Video Sync-Generator Users Manual V1.2

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#### ***Important Contact Information***

##### **Main Office**

Echolab Inc.  
267 Boston Rd.  
Billerica, MA 01862 USA  
Phone: 978 715 1020  
Fax: 978 262 0179

Echolab main office hours: 8am - 5pm Eastern time, Monday through Friday  
USA regional and international sales manager hours: 8am - 5pm local time

**Support Hotline:** 978 715 1030 (24 hours, 7 days)

Main sales email: [sales@echolab.com](mailto:sales@echolab.com)

Main support email: [support@echolab.com](mailto:support@echolab.com)

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# Echolab Sync-Generator

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# 1. Introduction

## 1.1 Overview

The Echolab Sync-Generator will output both an analog and serial digital reference. The Sync-Generator may be operated in a stand-alone free-running mode or when given an analog input, an output that is locked to the input but with up to a two field delay. The output can be in blue or black, and in NTSC or PAL formats.

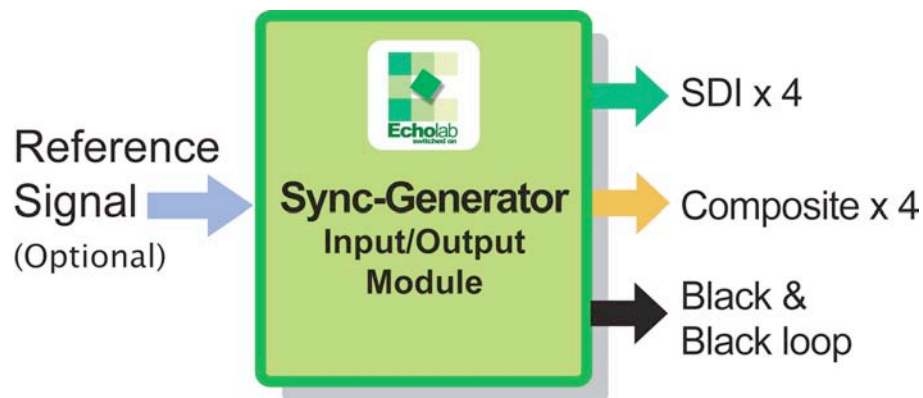


Diagram 1.1

The serial digital output has very low output jitter both when used with a stable analog reference and when used in free-run mode. The minimum delay between the input reference and output is only  $2\mu\text{s}$ .

The main features are as follows:

- Operates in free-run or synchronized modes
- Selectable black or blue output
- Up to four simultaneous Serial Digital and four Composite outputs
- Output timing up to two field's adjustment from analog reference input
- 50 ppm free running accuracy

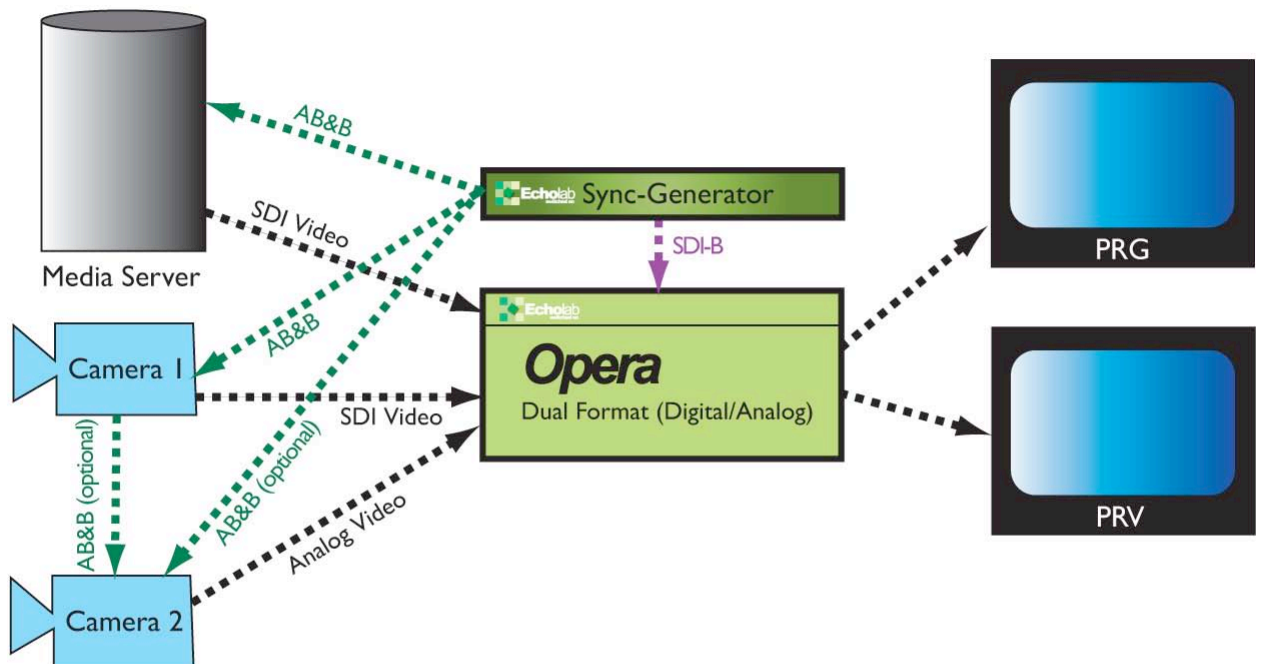
## 2. Common Sync-Generator Usage Scenarios

### 2.1 System Overview with Opera Switchers and Mixed Format Devices

The Sync-Generator is certified for use with all dual format Opera switchers. Using Sync-Generator as the master genlock signal for the video production system is the ideal way to ensure that all analog and digital devices have stable and synchronized genlock signals in analog black and burst or SDI black formats. In this configuration, the switcher and up to 3 devices can use the SDI black signal as a genlock signal and up to 4 devices can use the analog black and burst signal as their genlock signal. In this model, the system should be configured in the following manner.

Sync-Generator [Diagram 2.1](#)

General Usage for Opera



#### LEGEND

- ..... AB&B = Analog Black & Burst
- ..... SDI-B = SDI - Black

The Opera switcher internally converts the analog video signal to a digital video signal.

The Sync-Generator provides an analog and digital representation of the genlock signal that is in time with the video signal from the analog and digital devices.

In this configuration, no additional analog to digital conversion gear is required and the genlock, analog, and digital video signals are synchronized.

## 2.2 System Overview with Nova Switchers

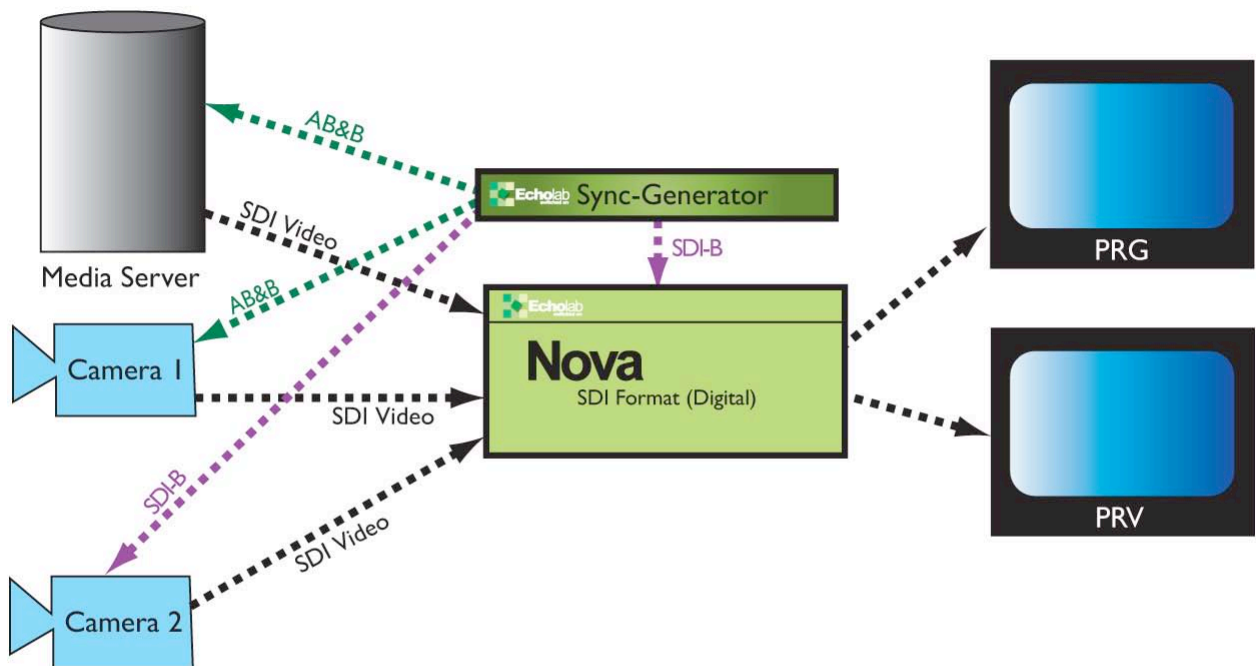
The Sync-Generator is also certified for use with Nova switchers in an all digital system. In this configuration, the switcher and up to 3 devices can use the SDI black signal and up to 4 devices can use the analog black and burst signal as their genlock source. All devices must have an SDI output signal without using external analog to digital conversion equipment. Using external conversion equipment will introduce a delay in the SDI signal, causing the SDI video to be out of time with respect to the system's genlock.

### System Overview with Digital Devices

In an all digital production system with a Nova switcher, the system should be configured in the following manner.

Sync-Generator [Diagram 2.2](#)

Nova - All SDI Sources



#### LEGEND

- ..... AB&B = Analog Black & Burst
- ..... SDI-B = SDI - Black

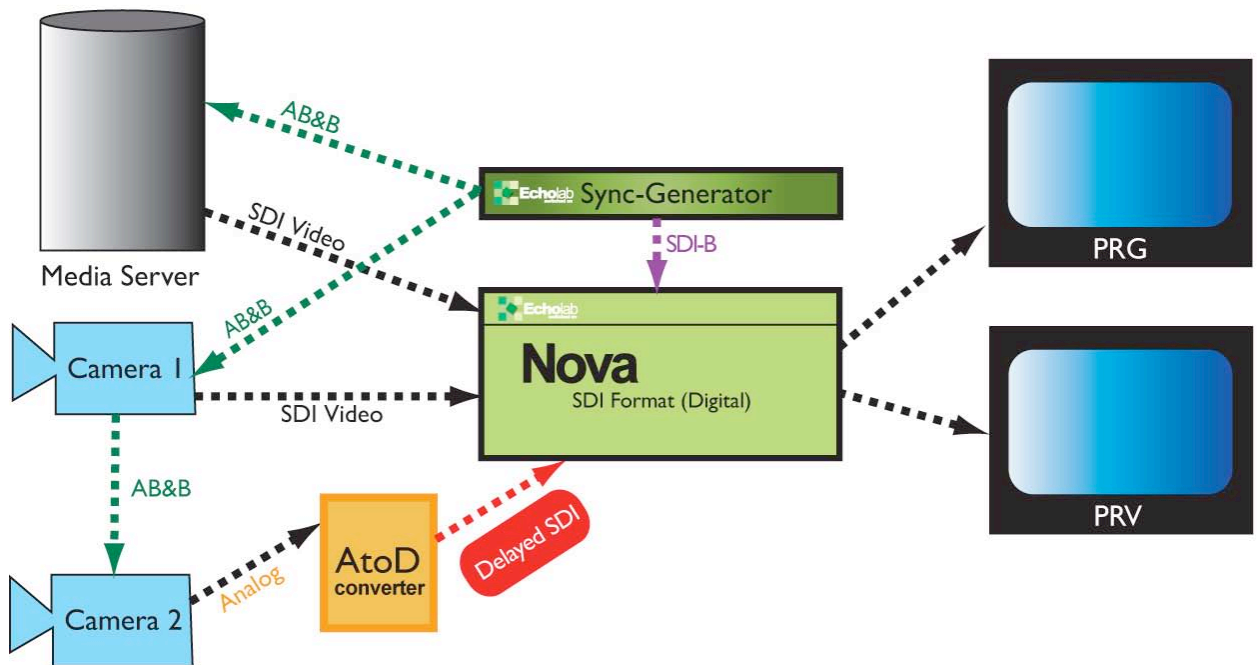
In this scenario all devices produce an SDI video signal and accept an analog or digital genlock signal.  
 There is no timing difference between the SDI video and the analog and digital representations of the genlock signal.



## System Overview with Analog and Digital Devices

To use the Sync-Generator with analog and digital devices presents a bit of a conversion delay problem. When the video signal from analog devices is converted to digital a delay is introduced, which causes the SDI black genlock signal to be out of time with respect to the converted SDI video signal from analog devices. This problem is described in the following diagram.

Sync-Generator **Diagram 2.3** Sync-Generator with Analog to Digital Conversion



### LEGEND

- ..... AB&B = Analog Black & Burst
- ..... SDI-B = SDI - Black

Analog to digital video conversion introduces a timing difference between digital video signal going into the Nova and the SDI - Black genlock signal.

**For this reason Sync-Generator is not supported with Nova Switchers and a mix of analog and digital devices!  
Contact your Echolab Sales Representative to discuss alternative solutions.**

## 3. Free Running and Synchronized Modes

### 3.1 Operation modes

The Echolab Sync-Generator has two modes of operation, free-run and synchronized . In synchronized mode the unit takes its timing from the analog external reference (studio signal) and will automatically lock its output to this. It is then possible to add a delay of between 0 and 2 fields in lines and pixels to the output reference with respect to the external reference.

In free-run mode the output reference is timed to an accurate on board clock generator. Switching between free running and synchronizer mode is automatic when the external reference is added or removed.



## 4. Hardware

### 4.1 Hardware installation

The Echolab Sync-Generator will fit into all standard rack frames.

- Model Number : **ADVSG-F** : w/ Fixed Frame (Desktop – with 1RU rack mount ears)
- Model Number : **ADVSG-E** : w/ Expandable Frame (1RU)

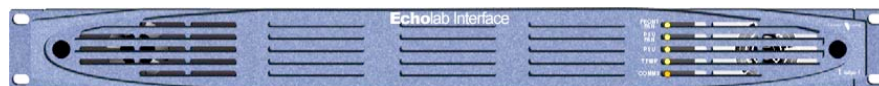


Diagram 4.1

- A hinged front panel allows easy access to removable fan assemblies, the power supply and installed modules.
- There is an easily accessible front fan fitted on a detachable plate in front of the PSU.
- There are three cooling modes normal, quiet and maximum. With normal cooling both fans run continuously, increasing in speed as the temperature inside the frame goes up. A frame temperature sensor mounted above the top central module position also controls fan speed.

### 4.2 Rear Modules and Signal Input/Output

There are two versions of Sync-Generator cards for use with Echolab fixed and expandable frames. To identify which version of the Echolab Sync-Generator you have, remove the Sync-Generator card from either the fixed or the expandable frame and note the label on the card. The cards are labeled either as "SyncGen" or "SyncGen 2".

#### For SyncGen Cards

The following diagram describes the input/output connections of the Echolab Sync-Generator.

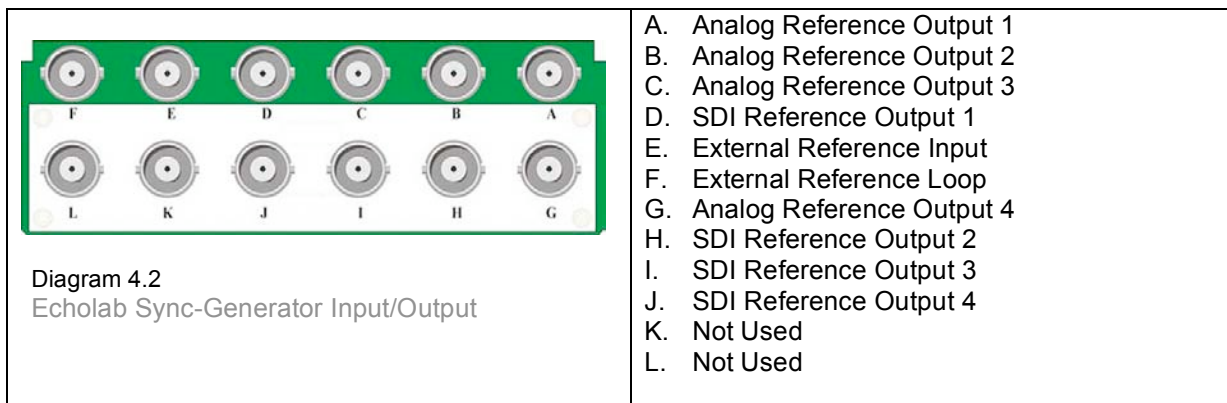
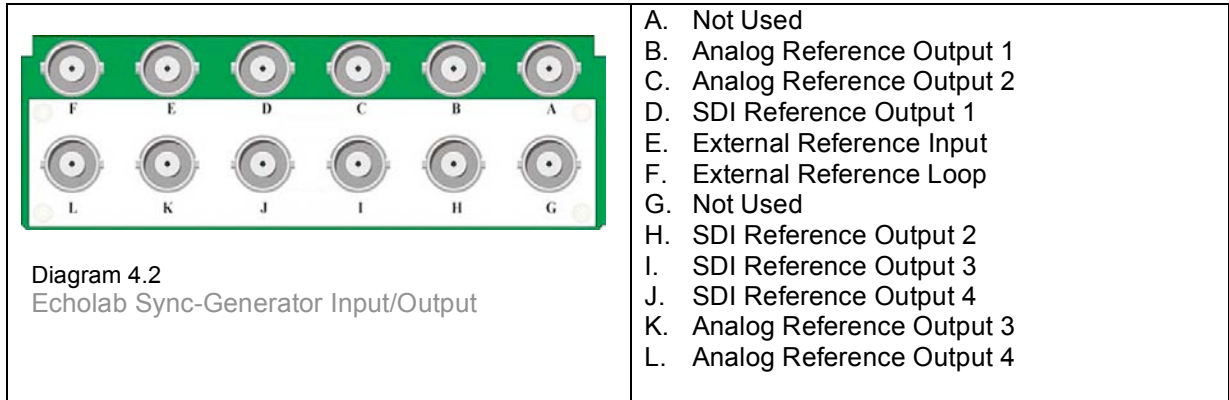


Diagram 4.2  
Echolab Sync-Generator Input/Output

## For SyncGen 2 Cards

The following diagram describes the input/output connections of the Echolab Sync-Generator.



## 5. Card Edge Operation

### 5.1 Card Edge

The hinged front panel of the Echolab frame reveals user controls of the card and LED status indicators.

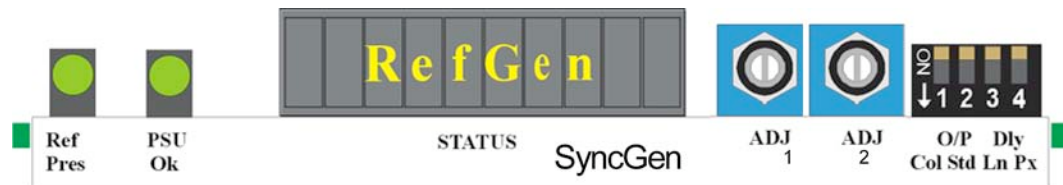


Diagram 5.1: The Sync-Generator front edge view

### 5.2 Card Edge Switch Settings

The 4-way piano switch allows the operating modes and status options to be selected.

DIP	Function	Up	Down
1	Output Color	No function	Adjust Black/Blue
2	Output Standard	No function	Adjust 625/525 lines
3	Delay in Lines	No function	Adjust 0-624 lines PAL. 0-524 lines NTSC
4	Delay in Pixels	No function	Adjust 0-1727 pixels PAL. 0-1715 pixels NTSC

Notes:

DIP2 has no selection when an external reference is present

DIP3 and DIP4 have no effect in free run mode

ADJ1 is not used

### 5.3 Card Edge Rotary Controls

Rotary controls can access menus and parameter values by clockwise or anti-clockwise rotation.

Control	Function
ADJUST	Used in conjunction with DIP1 to DIP4 switches. When the any single DIP switch is DOWN the ADJUST control when rotated will change the current selection or setting.

Notes:

ADJ1 is not used

## 5.4 Reading Card Edge LEDs

Card edge LEDs are used to display status and configuration information. Refer also to the trouble-shooting chapter for more help with solving problems and monitoring status information. The following table summarizes the card edge LED functions and colors:

Name	LED Color	Function When ON
SDI	Green	LED has no function (top left LED, if present)
REF	Green	External reference analog sync input present. (bottom left LED)
SHT	Yellow	LED has no function (top middle LED, if present)
FRO	Yellow	LED has no function (bottom middle LED, if present)
GRP	Red	LED has no function (top right LED, if present)
PSU	Green	Good power supply (PSU) rails. (bottom right LED)

## 5.5 Selecting the Reference Output Color

Set DIP1 to Down. This allows the selection of the reference output color. The choices are black (default) or blue field.

[OP = 'xxxxx']		Rotate ADJUST for reference output color
Option	Black	The analog output will be black and burst. The serial digital outputs will be digital black.
Option	Blue	The analog output will be blue field. The serial digital outputs will be digital blue.
Confirmation:		The new selection is active the moment it is displayed

Note:

This function will work in both free running mode and with an external reference present.

## 5.6 Selecting the Reference Output Standard

Set DIP2 to Down. This allows the selection of the reference output standard. The choices are 625-line PAL and 525-line NTSC.

[OP = 'xxxxx']		Rotate ADJUST for reference output standard
Option	625L	The reference outputs will be 625-line.
Option	525L	The reference outputs will be 525-line.
	no ctrl	An external reference is present.
Confirmation:		The new selection is active the moment it is displayed

Note:

This function will only work in free running mode i.e. no external reference present.

### 5.7 Setting the Course Video Delay (in lines)

Set DIP3 to Down. This sets the number of lines to delay the reference outputs with respect to the reference input.

[L Del 'nnn']		Rotate ADJUST control for course reference delay value
Option	'nnn'	Video delay in lines: where 'nnn' is 0~624 for 625 line systems, or 0~524 for 525 line systems
Confirmation:		The new value is active the moment it is displayed

Note:

This function will only work with an external reference present.

### 5.8 Setting the Course Video Delay (in pixels)

Set DIP4 to Down. This sets the number of pixels to delay the reference outputs with respect to the reference input.

[S Del 'nnnn']		Rotate ADJUST control for fine reference delay value
Option	'nnn'	Video delay in lines: where 'nnn' is 0~1727 for 625 line systems, or 0~1715 for 525 line systems
Confirmation:		The new value is active the moment it is displayed

Note:

This function will only work with an external reference present.

## 6. Trouble-shooting

### 6.1 Card Edge Monitoring

The card edge may be used to perform simple trouble-shooting. The card edge LEDs will indicate a fault in the on-board power supplies, missing external reference or a misplaced switch.

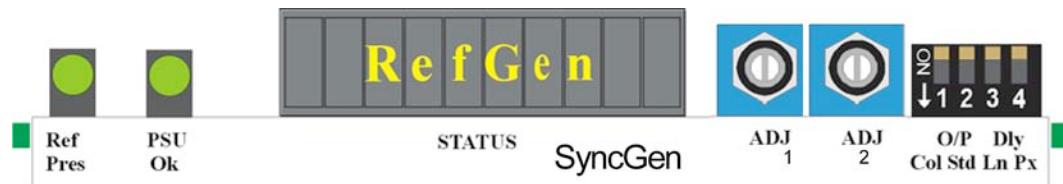


Diagram 6.1: The Sync-Generator front edge view

### 6.2 Basic Fault Finding Guide

**The Power LEDs are not illuminated**

Check that the frame power supply is functioning.

**There is no video output**

Check that all cable connections are intact.

**The video output exhibits jitter**

Check that the input signal stability is within normal limits and that the maximum cable length has not been exceeded.

**The card no longer responds to card edge or remote controller**

- Check that the card is seated correctly and that the Power OK LED is lit
- Check if the control panel can control another card in the same rack
- If necessary re-set the card by simply removing it from the rack while powered and re-inserting it after a few seconds. It is safe to re-insert the card while the rack is powered
- Check that the remote/local lever is correctly set for the mode of operation.

## 7. Specifications

### 7.1 System

Spec.	Description
<b>General</b>	
Dimensions	100mm x 266 mm module with DIN 41612 connector
Weight	225g
Power consumption	12 W
<b>Reference input</b>	
Video	Analog Black and Burst, mixed syncs or video Amplitude of syncs 100mV to 4VPCB link selects 75 $\Omega$ termination or high impedance with loop-through
<b>Outputs</b>	
SDI	Maximum of 4 reclocked SDI outputs to EBU Tech 3267-E and SMPTE-259M Will drive >200m Belden 8281 or equivalent
Composite	Maximum of 4 PAL/NTSC analog outputs
<b>Processing</b>	
Delay	Output reference delayed to external reference input from 2 $\mu$ s to 2 fields
<b>Control</b>	
Local/remote control panel	Multi-drop 19200 Baud, 8 bits, no parity – control from local frame active front panel / remote panel
SDI Jitter	397-434ps in both alignment and timing jitter when measured in free-run mode

### 7.2 Expandable Frame

Spec.	Description
<b>General</b>	
Dimensions	482mm wide (19 inches), 44.5mm high (1U), 425mm deep
Weight	3.5 kg
Power requirements	85 to 264 volts, 47 to 400Hz
<b>Operations</b>	
Conditions	0 to 40 degrees C non-condensing Ventilation front to sides, without air filters
<b>Power</b>	
Standard Supply	Single plug in power supply (75 Watt)
<b>Capacity</b>	
1 RU rack Mount	For up to 6 modules



Diagram 7.1

Note: Model Number: ADVSG-E Only



## 7.3 Desktop Fixed Frame

Spec.	Description
<b>General</b>	
Dimensions	223mm wide, 44.5mm high (1U), 365mm deep.
Weight	2.5 kg
Power requirements	20-36Vdc 30W max
<b>Operations</b>	
Conditions	0 to 40 degrees C non-condensing Ventilation front to sides, without air filters
<b>Power</b>	
Standard Supply	Single built in power supply
<b>Capacity</b>	
1 RU Desk Mount	For up to 2 modules
With rack mount ears	

Note: Model Number: ADVSG-F Only

## 7.4 Power Supply

Spec.	Description
<b>General</b>	
Mechanical	100mm x 290mm module with DIN mixed power connector. User indication at end of board to allow access from hinged front panel.
Weight	760g
Input	110-240V AC 50/60 Hz. Max power 100VA (excluding turn-on transient).
Outputs	+5.55V DC +/-4%, Maximum current 12A-6.6V DC +/-7%, Maximum current 1.2A
Conditions	0 to 40 degrees C non-condensing Ventilation front to sides, without air filters
<b>FEATURES</b>	
Front LED Indicators	Green +5V Output voltage present Green -5V Output voltage present Red Fail PSU temperature is too high (Possible Fan failure)

## 8. Warranty

### 8.1 Echolab Limited Warranty

#### ***Echolab Limited Warranty***

Echolab Inc. warrants that this product will be free from defects in materials and workmanship for a period of *3 year from the date of purchase*. If a product proves to be defective during this warranty period, Echolab Inc. will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify Echolab Inc. of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Echolab Inc. shall pay for the delivery of the replacement product to the Customer if the shipment is to a location within the country in which an Echolab Inc. service center is located. The Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to any other locations. Upon receipt of replacement product, the Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by Echolab, LLC, with shipping charges prepaid.

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