

# Tektronix Video Signal Generators

## SPG600 and SPG300 Data Sheet



The Sync signal generator family SPG600 (full rack width) and SPG300 (half rack width).

### Features & Benefits

- Two models, SPG600 (full rack width) and SPG300 (half rack width), which provide all of the conventional video and audio signals that you need in one unit, Analog Black-burst/Test Signal, SD-SDI Black/Test Signal, AES/EBU Digital and Analog Audio Signal
- Stay GenLock™ – Unique, robust Genlock mode provides stable synchronization signals, for digital and traditional broadcast facilities
- All analog and SD-SDI signal output channels are configurable with selection of black-burst or test signal outputs
- SNMP and Web remote control makes it easy to integrate the units into any operational environment
- Choose between two form factors; Full rack width - SPG600, or Half rack width - SPG300
- Optional fine timing offset feature for analog video outputs – SPG600/SPG300 Option 01
- Up to 8 optional Analog Black-burst/Test Signal outputs with independent timing offset – SPG600 Option 02
- Up to 4 optional SD-SDI Black/Test Signal outputs with independent timing adjustment – SPG600 Option 03

### Applications

- Broadcast master sync generator
- Unique and robust Genlock – Stay GenLock™
- Genlock to house master sync

The SPG600 and SPG300 Sync Pulse Generators provide synchronization and test signals for both traditional analog and mixed digital and analog facilities, in both NTSC/525 and PAL/625 environments. These products are ideal as a stable master sync signal, which is critical in digital broadcast environments. When the SPG600/SPG300 is configured for Stay GenLock mode, a momentary loss of synchronization at the genlock reference input will not cause a disturbance in the unit's test signal and black outputs. When the genlock signal is reapplied the SPG system will gradually reacquire lock, causing little disruption in the outputs of the device, and will not cause any noticeable glitches in the outputs of the SPG. The Genlock source can be NTSC/PAL Black Burst, NTSC/PAL Sync, or CW. When using CW lock, the Genlock timing can be adjusted on all the NTSC or PAL color frames.

### Analog Black-burst/Test Signal Outputs

The SPG600 and SPG300 each provide four black-burst output channels which may be independently timed over the full NTSC or PAL color frame range. The black-burst output channels can be configured as a black-burst or a test signal output, providing outstanding flexibility to handle your production facility's needs. In analog-to-digital transition environments especially, the sync generator needs to provide a variety of sync outputs. The SPG600 and SPG300 are suitable for use as a master sync generator for small facilities or as a slave sync generator in larger environments. With Option 02 the SPG600 can provide four additional black-burst outputs, and with Option 01 the fine timing offset can be individually adjusted for each black-burst output in 0.1 ns increments, to support timing adjustments to analog systems.

The SPG600 and SPG300 also provide basic test signals for analog facilities. These test signal outputs can include ID text (up to 20 characters) or logo insertion. The ID text or logo may be positioned anywhere in the viewable area and, if desired, be made to blink.

### Serial Digital Video Outputs

The SPG600 and SPG300 provide two independently timed SD SDI black outputs with full frame range for 525/60 or 625/50. The SD SDI black output channel can be configured to provide SD SDI black or SD SDI test signals, similar to the analog black-burst outputs. With Option 03 the SPG600 offers two additional SD SDI black outputs.

The SPG600 and SPG300 also provide fundamental test signals for digital broadcast environments, which are selected individually from the analog test signals. As with the analog outputs, up to 20 characters of ID text or your logo can be inserted into the signal, positioned anywhere in the image, and, if desired, set to blink.

There are 16 channels of embedded audio which can be active in the SD SDI outputs. Audio Click (1 s, 2 s, 3 s, and 4 s) is available for easy channel identification.

### AES/EBU Digital Audio Outputs

The SPG600 provides four BNC connectors and two XLR connectors for AES/EBU Digital Audio. Frequency and level can be set on the eight AES/EBU unbalanced outputs, and each channel can have separate Audio Click channel identification. The two XLR balanced outputs can be set up to match the 1+2 and 3+4 BNC outputs. One-word clock output is available.

The SPG300 provides two XLR connectors for AES/EBU Digital Audio, and provides a one-word clock output.

### Analog Audio Outputs

The default setting for the two XLR outputs is AES/EBU digital audio. For analog audio applications, these two XLR outputs can be configured as two analog audio outputs. Frequency, level, and audio identification can be set on each channel.

### SNMP and Web Remote Control

The SPG600 and SPG300 both support SNMP, making it easy to integrate these generators into automated service and maintenance functions.

The Java applet based remote control makes it easy to remotely control these generators, and the remote monitoring software gives you a view of SPG300 or SPG600 operation at a distance. The SPG600 and SPG300 also provide traditional GPI features for reporting alarms and recalling presets.

## Characteristics

**Note:** Unless otherwise noted, specifications are common to both the SPG600 and SPG300.

### Genlock

#### Reference Input

Characteristic	Description
Input Connector	Two BNC connectors, loopthrough
Amplitude	Nominal $\pm 6$ dB. (Composite), 1 to 2.5 V <sub>pp</sub> (CW)
S/N Ratio	>40 dB
SCH Phase	Nominal $\pm 40^\circ$
Return Loss	>40 dB to 5 MHz
Performance	
Pull-in range	F <sub>sc</sub> $\pm 5$ ppm
Jitter	
Burst lock	<0.5°
Sync lock	<1 ns
Genlock Timing Offset	
Range	Full Color Frame
Resolution	<0.5° of NTSC/PAL subcarrier

#### Serial Digital Video Outputs

SDI Black Output 1/2. Add 3/4 with SPG600 Option 03.

Characteristic	Description
2 Channels	1 Black Generator and 1 Test Signal Generator Test signal can be distributed to both channels
SD SDI Test Signal Output	
525	100%, 75%, and SMPTE Color Bars, Linearity, Flat Field, Monitor, Multiburst, Pulse and Bar, Sweep, SDI, Timing, Other, Rec 801
625	100%, 75% Color Bars and 100%, 75% Color Bars over Red, Linearity, Flat Field, Monitor, Multiburst, Pulse and Bar, Sweep, SDI, Timing, Other, Rec 801
Standards	ITU-R BT 601, 656, EBU Tech 3267, SMPTE 125M, 244M, 259M, 272M, RP165, RP178
Format	525-270, 625-270 (270 Mb/s)
Output Connector	BNC
Output Impedance	75 $\Omega$
Output Amplitude	800 mV $\pm 10\%$
Rise and Fall Time	0.4 ns to 1.5 ns (20% to 80%)
Jitter	<0.2 UI
Timing Offset	Range: Full Color Frame Resolution: <1/27 MHz
Return Loss	>15 dB (5 MHz to 270 MHz)
ID Text	20 characters max Blinking Interval: Fast, Slow, or OFF
Logo	Grayscale, 4 level Blinking Interval: Fast, Slow, or OFF
Embedded Audio Signal	
Active channels	1 to 16 channels (4 groups)
Sample frequency	48 kHz
Digital coding	20 or 24 bits
Audio tone	
Frequency (Hz)	Inactive, Silence, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, 20000
Level	-60 to 0 dBFS, 1 dB steps
Click	1 s, 2 s, 3 s, 4 s, or OFF

#### AES/EBU Digital Audio Outputs

Characteristic	Description
Standards	ANSI S4.40 (AES3); SMPTE 276M (AES3 ID)
Number of Audio Channels	
SPG600	8 (1+2, 3+4, 5+6, 7+8) for BNC, 4 (1+2, 3+4) for XLR
SPG300	4 (1+2, 3+4) for XLR
Required Receiver Termination	75 $\Omega$ $\pm 10\%$ for BNC, 110 $\Omega$ $\pm 10\%$ for XLR
Output Connector	
SPG600	75 $\Omega$ BNC $\times$ 4 and XLR $\times$ 2*1
SPG300	XLR $\times$ 2*1
Audio Parameter	Frequency (Hz): Inactive, Silence, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, 20000
Level	-60 to 0 dBFS, 1 dB steps
Click	1 s, 2 s, 3 s, 4 s, or OFF
Quantized Resolution	20 or 24 bits
Amplitude	
Unbalanced (BNC)	1 V $\pm 0.1$ V
Balanced (XLR)	5 V $\pm 0.3$ V
Rise and Fall Time	30 ns to 44 ns (measured 10% to 90%) to BNC 5 ns to 30 ns (measured 10% to 90%) to XLR
Jitter	< $\pm 8$ ns
Timing Offset	
Range	160 ms
Resolution	1 $\mu$ s
Word Clock	
Output connector	BNC
Output level	CMOS compatible
Frequency	48 kHz

\*1 The 2 XLR outputs can be set to AES/EBU or analog audio.

#### Analog Video Outputs

Analog Video Output 1/2/3/4. Add 5/6/7/8 with SPG600 Option 02.

Characteristic	Description
4 Channels	3 Black Generators and 1 Test Signal Generator Test signal can be distributed to up to 4 channels
Test Signal	
NTSC and NTSC No Setup	SMPTE Color Bar, 75% Color Bar, Linearity, Flat Field, Monitor, Multiburst, Pulse and Bar, Sweep, Other
PAL	75% Color Bar, 100% Color Bar, 75% Color Bar over Red, 100% Color Bar over Red, Linearity, Flat Field, Monitor, Multiburst, Pulse and Bar, Sweep, Other
Format	NTSC, NTSC no setup and PAL
Output Connector	BNC
Output Impedance	75 $\Omega$
Return Loss	>30 dB to 5 MHz
Burst Amplitude Accuracy	$\pm 5\%$
Sync Amplitude Accuracy	$\pm 3\%$
Blanking Level	$\pm 50$ mV
SCH Phase Accuracy	$\pm 5^\circ$
Timing Offset	
Range	Full color frame
Resolution	<1/27 MHz (Clock). 0.1 ns (Option 01)
ID Text	20 characters max Blinking Interval: Fast, Slow, or OFF
Logo	Grayscale, 4 level Blinking Interval: Fast, Slow, or OFF

### Analog Audio Outputs

Characteristic	Description
Output Connector	XLR × 2*1
Output Impedance	12 Ω
Frequency (Hz)	Silence, 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, 20000
Audio Parameters	Level: -48 dBu to +12 dBu Resolution: 1 dB

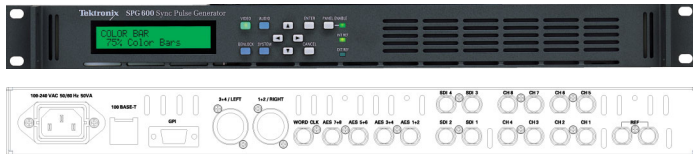
\*1 The 2 XLR outputs can be set to AES/EBU or analog audio.

### Communication

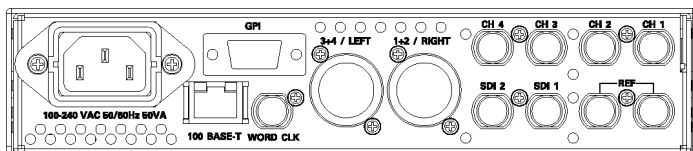
Characteristic	Description
GPI (General Purpose Interface)	Connector: D-sub, 9-pin
Outputs	
Pin 1	Error output
Pin 9	GND
Output level	<0.4V at 100 mA sink or maximum 4 Ω
Inputs	
Active low input	
Pin 3	Input 1
Pin 4	Input 2
Pin 5	Input 3
Pin 6	GND
Input level	TTL compatible (Low <0.4 V, High >1.4 V) Inputs are pulled up with 10 kΩ
Network Interface	10/100Base-T Ethernet

### Environmental

Characteristic	Description
Mains Ranges	90-250 V, 50/60 Hz
Power Consumption	
SPG600	<85 VA (35 W) at 110 or 240 V <sub>AC</sub>
SPG300	<65 VA (30 W) at 110 or 240 V <sub>AC</sub>
Temperature	
Operating	0 °C to 40 °C
Nonoperating	-20 °C to +60 °C



The Sync signal generator SPG600 (Full rack width) front and rear view.



The Sync signal generator SPG300 (Half rack width) front and rear view.

### Physical Characteristics

#### SPG600

Dimensions	mm	in.
Height	43.6	1.72
Width	482.5	19
Depth	557.5	21.9
Weight	kg	lb.
Net	5.0	11
Shipping	8.5	19

#### SPG300

Dimensions	mm	in.
Height	43.6	1.72
Width	206.2	8.1
Depth	435.7	17.2
Weight	kg	lb.
Net	2.5	5.5
Shipping	5.8	13

## Ordering Information

Model	Options	Description
<b>SPG600</b>		SD Sync Generator <b>Includes:</b> Quick Reference, Rackmount Kit, Rack Rail Type, CD-ROM, Reply Card, Packing List, Certificate
	Opt. 01	Fine timing adjustment
	Opt. 02	Adds 4-channel analog video outputs
	Opt. 03	Adds 2-channel SD-SDI video outputs
	Opt. 1R	Adds Rackmount Kit, Rack Rail Type
<b>SPG300</b>		SD Sync Generator <b>Includes:</b> Quick Reference, CD-ROM, Reply Card, Packing List, Certificate
	Opt. 01	Fine timing adjustment

### Power Plug Options

Option	Description
Opt. A0	North America power
Opt. A1	Universal EURO power
Opt. A2	United Kingdom power
Opt. A3	Australia power
Opt. A4	240 V, North America power
Opt. A5	Switzerland power
Opt. A6	Japan power
Opt. A10	China power
Opt. A99	No power cord or AC adapter

### Optional Accessories

Accessory	Description
User Manual	Order 071-1340-xx
Service Manual	Order 071-1342-xx

### Service

Option	Description
Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. D1	Calibration Data Report
Opt. D3	Calibration Data Report 3 Years (with Opt. C3)
Opt. D5	Calibration Data Report 5 Years (with Opt. C5)
Opt. R3	Repair Service 3 Years
Opt. R5	Repair Service 5 Years

### Recommended Accessories

Accessory	Description
TVGF11A	Single Rackmount
TVGF13	Dual Rackmount
TVF16	Zero-clearance Dual Rackmount Adapter

### Field Upgrade Kits

Field Upgrade Kit	Options	Description
<b>SPG6UP</b>		SPG600 Upgrade Kit Select at least one from the following options:
	Opt. 01	Upgrade for fine timing adjustment
	Opt. 02	Upgrade to add 4-channel analog video outputs
	Opt. 03	Upgrade to add 2-channel SD-SDI video outputs
	Opt. 1R	Upgrade to add Rackmount Kit / Rack Rail Type
	Opt. IF	Install SPG600 upgrades No calibration required
	Opt. IFC	Install SPG600 upgrades With calibration
<b>SPG3UP</b>		SPG300 Upgrade Kit Select at least one from the following options:
	Opt. 01	Upgrade for fine timing adjustment
	Opt. IF	Install SPG300 upgrades No calibration required
	Opt. IFC	Install SPG300 upgrades With calibration



Product(s) are manufactured in ISO registered facilities.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.





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