advanced media technologies®

MODEL

VSG-410

VIDEO (AND AUDIO) SIGNAL GENERATOR

HARRIS® assuredcommunications®

The VSG-410 High Definition Signal Generator is a half-rack width portable or stationary signal generator that is used both as a test signal generator and a master time generator. As a test signal generator, the VSG-410 can produce analog, digital, and audio test signals required in a broadcast facility.

As a master time generator, the VSG-410 inputs time information from various reference sources, including Global Positioning Systems (GPS) and Network Time Protocol (NTP) servers. It contains an internal timing engine that processes the incoming reference information, makes appropriate conversions to different time bases, and maintains a consistent time base, which is used to drive the outputs. The VSG-410 provides a Digital Audio Reference Signal (DARS) output, as well as a Vertical Interval Time Code (VITC) and Absolute Time Reference (ATR) support for black burst video outputs.

General navigation is performed via front panel controls, but can also be controlled remotely using Navigator software or NUCLEUS a user customizable remote control panel.

FEATURES

- Small in size and light in weight
- Powered by an external power supply
- HD, SD, and analog composite or tri-level sync test signal generation
- Composite video test signals
- Independent analog audio tone channels
- User loadable test signals
- Support for video/genlock input from NTSC, PAL-B, PAL-M, or Tri-Level Sync format sources
- Support for various time code formats and time code user bit formats, including SMPTE/EBU drop frame or non-drop time code formats
- V2A Video and Audio test signal output for lip sync measurement
- Detection of embedded information for video inputs
- Support for input Absolute Timing Reference (ATR) input features
- Support for Network Timing Protocol (NTP) via an Ethernet connection port
- Four independently configurable black burst video outputs
- Two SMPTE/EBU serial time code, 600 ohms, or Low-Z balanced time code outputs, each independently configurable for linear (LTC) drop frame or non-drop frame time code and Vertical Interval Time Code (VITC)
- Supports Digital Audio Reference Signal output (DARS)
- Configurable Daylight Savings Time and Leap Year

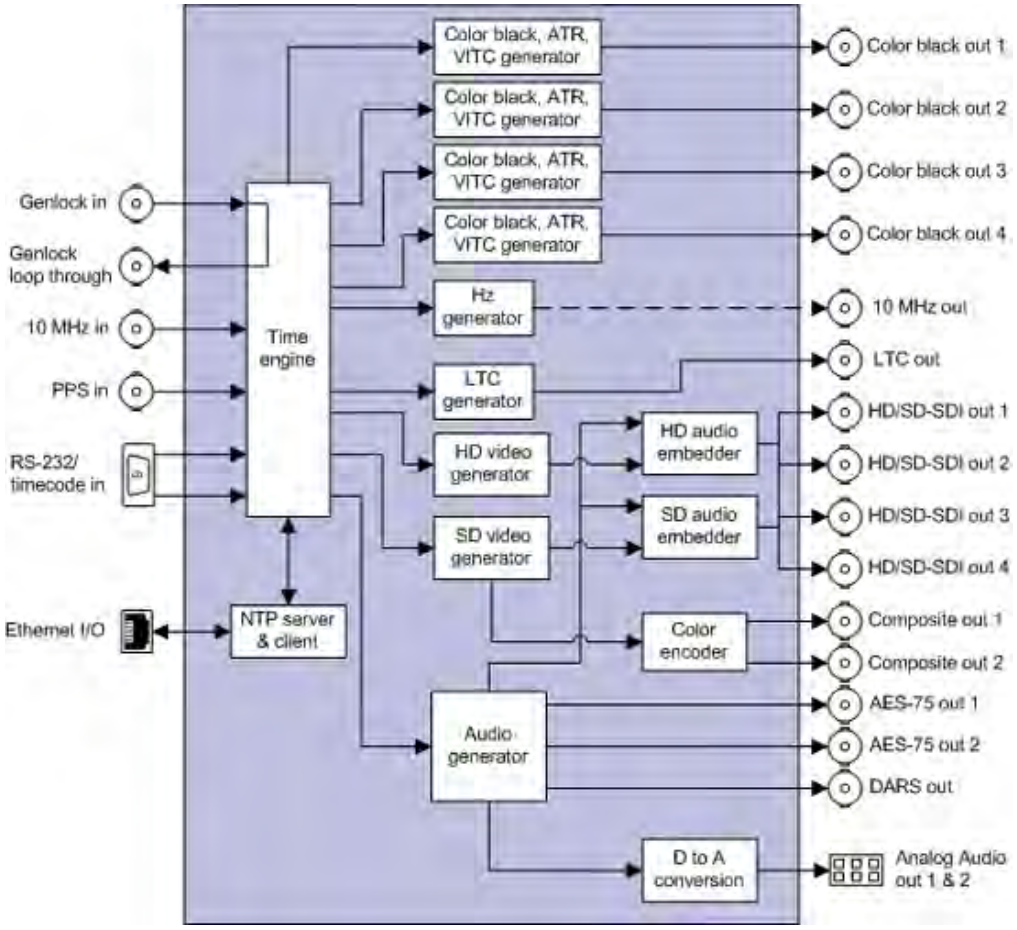
- User-definable scheduled call outs to time reference sources, such as GPS receivers
- AES and analog audio outputs
- LTC timecode input (600 ohms or High-Z termination)

Options include

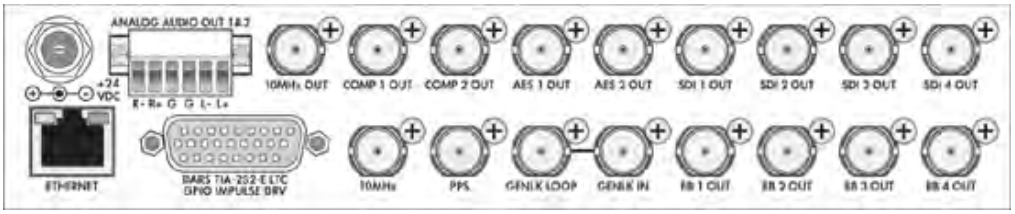
- Rack adapter and blank filler plate

IMAGES/DIAGRAMS

Block Diagram



Back Modules



SPECIFICATIONS

Specifications and designs are subject to change without notice.

Genlock Input (GENLOCK IN)

Electrical	Single-ended unbalanced
Mechanical	BNC connector
Termination	Loop through NTSC/PAL with VITC and ATR, or Tri-Level Sync (TLS) input
Level	1V p-p +6 dB/-6 dB TLS
Return Loss	>40 dB to 10 MHz
Lock Range	± 6 ppm (NTSC Fsc ± 21 Hz, PAL Fsc ± 26 Hz)

Video Output (Black Out)

Electrical	Single-ended unbalanced
Mechanical	BNC connector
Termination	75 ohms
Format	NTSC/PAL-B/PAL-M Black Burst with NTSC with VITC and ATR, or TLS output
Level (into 75 ohms)	1V p-p NTSC/PAL, 0.6V p-p TLS (SMPTE 274M)
Return Loss	40 dB to 10 MHz

10 MHz Input (10 MHz)

Termination	50 ohms
Mechanical	BNC connector
Level	2V p-p ± 3 dB

10/100Base-T Ethernet (Ethernet)

Mechanical RJ-45 Connector Network Interface	IEEE 802.3 (Ethernet) 10/100Base-T interface for NTP application

Supported GPS Devices

GPS-5300 (Trimble Acutime)	RS-232 (TAIP), PPS on PPS/TRIG
GPS-3901 (Trimble SVEE8)	RS-232 (TAIP), PPS on PPS/TRIG
GPS-3902 (Coleman CTI-SV8-TAIP)	RS-232 (TAIP), PPS on PPS/TRIG
GPS-3903 (Coleman CTISV12-TAIP)	RS-232 (TAIP), PPS on PPS/TRIG
GPS-1600 (Trimble Thunderbolt)	RS-232 (TSIP), PPS on BNC, 10M

NTP

Network Time Protocol based on ntp-4.1.1a distribution.

Time through Serial

Supported Modes	CSD and TCC
Baud Rate CSD	300 bps
Baud Rate TCC	300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, and 9600 bps
Time	Local CSD: date and time TCC: date, time, and frame (frame at 4800 bps and 9600 bps only)

Free-Run Mode on External Trigger

Setting Date and Time (Free-Run Mode) on External Trigger	With the trigger setup, the time and date entered are not set until the trigger input has a falling edge

SD/HD SDI Output Characteristics

Electrical	Single-ended unbalanced
Mechanical	BNC connector
Termination	75 ohms
HD/SD	HD and SD, user selectable
Level (into 75 ohms)	800 mV ± 10%
DC Offset	0 V ± 0.5 V
Return Loss	>15 db to 270 MHz SD, to 1.5 GHz HD

Composite Video Output

Electrical	Single-ended unbalanced
Mechanical	BNC connector
Termination	75 ohms
Format	NTSC/PAL-B with VITC and ATR, TLS 1080i60/1080i59.94 with VITC, TLS output (1080i50 / 1080sf24 / 1080sd23.98 / 1080p30 / 1080p29.97 / 1080p25 / 1080p24 / 1080p23.98 / 720p60 / 720p59.94 / 720p50)
Level (into 75 ohms)	1V p-p NTSC/PAL, 0.6V p-p TLS (SMPTE 274M, SMPTE 296M)
Return Loss	>40 db to 6 MHz, >30 db to 35 Mhz

Analog Audio Output

Frequency Response	± 0.1 dB (20 Hz – 20 kHz)

Linearity	± 1.0 dB to -100 dB
SNR	>100 dB (20 Hz – 20 kHz)
Full-Scale Level	+12 dBu to +28 dBu connector: RJ-11
Connector	Wiedmuller PCB 6-pin terminal block

AES Unbalanced

Sample Rate	48 kHz
Output Impedance	75 ohms
Output Connector	BNC
Output Return Loss	>30 db to 6 MHz
Output Signal Level	1 V p-p (75 ohms terminated)

10 MHz Output

Termination	50 ohms
Mechanical	BNC
Level	13 dBm into 50 ohms (± 2 dBm)

DARS EIA/TIA-232-E LTC GPIO

Mechanical	Male high density, DB-26, breakout module provides easy access to individual functions.
DARS Electrical	Single-ended, unbalanced
DARS Mechanical	Pin 1
Impulse Drive Mechanical	Pins 12 and 24
Impulse Drive Electrical	Single-ended unbalanced
Impulse Drive Format	12 V pulses (300m Sec)
EIA/TIA-232-E Electrical	EIA-232 DTE
EIA/TIA-232-E Mechanical	Pins 2-6, 8, 20, 22 per EIA-232
LTC Input (TCI) Electrical	Differential balanced
LTC Input (TCI) Mechanical	Pins 14 (LTC+), 15 (LTC-), 16 (GND)
LTC Input (TCI) Format	SMPTE/EBU LTC 24/25/30 drop/non-drop auto-sensing
LTC Input (TCI) Impedance	Hi-Z (>30k ohms) or 600 ohms, selectable with switches
LTC Input (TCI) Input Sensitivity	500 mV p-p
LTC Input (TCI) CM Range	±10V
LTC Input (TCI) CMRR	40 dB at 60 Hz
Output 1 and 2 (TC1, TC2) Electrical	Differential balanced
Output 1 and 2 (TC1, TC2) Mechanical (output	Pins 17 (LTC+), 18 (LTC-), and 19 (GND)

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Output 1 and 2 (TC1, TC2) Mechanical (output 2)	Pins 9 (LTC), 10 (LTC), and 11 (GND)
Output 1 and 2 (TC1, TC2) Format	SMPTE/EBU LTC 24/25/30 (frame per seconds) drop/non-drop support
Output 1 and 2 (TC1, TC2) Impedance	Low-Z (<25 ohms per side) or 600 ohms selectable with switches on break-out board
Output 1 and 2 (TC1, TC2) Level	3.9V p-p nominal into 1k ohms (Low-Z output)
Output 1 and 2 (TC1, TC2) Level	2.5V p-p nominal into 1k ohms (600 ohms output)
Output 1 and 2 (TC1, TC2) Transition Time	40µs ± 4µs measured at 10% and 90% amplitude
GPIO1 – Trigger Input Electrical	5V TTL-compatible HCT
GPIO1 – Trigger Input Mechanical	Pin 21
GPIO1 – Trigger Input Impedance	10k ohms
GPIO2 – Hz Output Electrical	5V TTL – compatible HCT
GPIO2 – Hz Output Mechanical	Pin 23
PPS Input Mechanical	BNC Connector
PPS Input Termination	50 ohms
PPS Input Level	TTL, Vih = 2.0V min, Vil = 0.8V max
PPS Input Edge Transition	20 ns max
PPS Input Return Loss	>45 dB to 20 MHz

Applicable Standards

Video and Audio Signal Quality Standards	SMPTE 170M-1994, ITU-R BT.470-6, ITU-R BT.470.6, SMPTE-276M, AES-3, AES-3id, AES-17 SMPTE-274M, SMPTE-12M, SMPTE-309M, SMPTE-276M, SMPTE-318B, AES-11, SMPTE-259, SMPTE-292

Power Requirements

Input Voltage Range	90 VAC – 264 VAC
Input Voltage Frequency	50 Hz to 60 Hz
Power Consumption (apparent power)	72W
Brownout Requirements	Must return to normal operation. A complete reset and boot up cycle is allowable.

Mechanical

Dimensions	Height: 1.75" (4.45 cm) Width: 8.00" (20.32 cm)

	Depth: 19.00” (48.26 cm)
	Weight: 7 lbs. (3.17 kg)
Environmental	
Operating Temperature	+0 to +50°C
Storage Temperature	-40 to +65°C
Humidity	90% maximum (non-condensing)
Standard Accessories	VSG-410 Installation and Operation Handbook (on CD-ROM) Navigator CD-ROM software Trial (inc. Co-Pilot) Icon Series Soft Tools CD-ROM (Logo Creator) Breakout board Power cord and power supply

ORDERING INFORMATION

VSG-410	1/2 Rack width video signal generator with genlock and HD/SD/Analog video and Embedded/AES/Analog audio outputs
VSG-410-RM	Optional rack mount for VSG-410